EXHIBIT A
FORM OF AGREEMENT

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City of Philadelphia
800 MHz Radio System Upgrade
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August 31, 2007

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Amendment Agreement

This Amendment Agreement No. 3 ("Amendment Agreement" or "Amendment" or "Amendment No. 3") to Contract No. 99-0844 (the "Agreement" or the "1999 Agreement") between the City of Philadelphia ("City") and Motorola, Inc., a Delaware corporation ("Motorola" or "Contractor"), is entered into this _____day of _____ and is effective as of _____. 2009 (the "Effective Date").

BACKGROUND

      A.   The City and Contractor entered into a certain Contract, Contract No. 99-0844, dated June 30, 1999, which includes all exhibits, attachments, and executed Change Orders thereto (collectively, the "Base Contract" or "Contract").

      B.   The City entered into the Base Contract by and through its Procurement Department ("Procurement").

      C.   Under the Contract, Contractor agreed to furnish all Equipment, personnel and labor, Software, Documentation, Services and Deliverables required to install and fully implement a 800 MHz trunked radio communications system, as defined in the Contract and set forth in detail therein.

      D.   The City and Contractor have agreed to amend certain terms and conditions of the Base Contract to provide for upgrade of the City's circuit-based ASTRO 800 MHz trunked municipal radio system to Motorola's ASTRO 25 Internet Protocol-based 800 MHz trunked municipal radio system, as set forth herein.

IN CONSIDERATION of the mutual obligations set forth herein, and each intending to be legally bound hereby, the City and Motorola covenant and agree, as of the Effective Date, that the 1999 Agreement is hereby amended as set forth in Sections 1-13 below. With the exception of the amendments set forth in Sections 1-13, and subject to councilmanic appropriation of funds, the terms and conditions of the 1999 Agreement shall be and remain in full force and effect and shall apply to the Upgrade Project. References to "Article 1," "Article 2," etc. and to "Section 1", "Section 2" etc. are references to the correspondingly numbered articles and sections of the 1999 Agreement.

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1. Definitions. Article 1 Section 1.1 ("Definitions") of the 1999 Agreement is amended to provide that the following terms shall have the following definitions when used in this Amendment Agreement and solely as applied to the Upgrade Project. Capitalized terms not otherwise defined in this Amendment Agreement shall have the meanings set forth in the 1999 Agreement.

       1.1   Amendment Agreement or Amendment or Amendment No. 3 – shall mean Sections 1-13 hereof, together with all Appendices, exhibits, and attachments hereto, all of which are incorporated by reference in this Amendment.

       1.2   Coverage Requirements - shall mean the radio coverage requirements as set forth in Section 4.1 (*Coverage*) of Appendix A ("ASTRO 25 Upgrade Proposal as Revised")

       1.3   Cutover Plan – shall mean the Upgrade/Cutover Upgrade Implementation Plan (UIP) / Implementation Time Line (ILT) developed during the Detailed Design Review phase of the Upgrade Project, which is discussed in Section 5 of Appendix A to this Amendment No. 3.

       1.4   Deliverables **-** shall mean the deliverables for each Phase of the Project as outlined in Section 3 of Appendix A, ("ASTRO 25 Upgrade Proposal as Revised"), and in the Project Schedule set forth in Section 3.7.4 of Appendix A ("ASTRO 25 Upgrade Proposal as Revised").

       1.5   Documentation - shall mean the documentation itemized in Section 3.17 of Appendix A ("ASTRO 25 Upgrade Proposal as Revised").

       1.6   Equipment **-** shall mean the equipment required for the successful implementation of the Upgrade System, including Fixed Network Equipment and Subscriber Equipment, test and support equipment, and all other equipment as set forth in Section 9 of Appendix A ("ASTRO 25 Upgrade Proposal as Revised").

       1.7   Final Acceptance – shall mean the point in time at which Motorola completes all Work identified in the Punchlist created by the City and Motorola, and the City accepts such Work and provides written notice to Motorola of the Final Acceptance of the Upgrade Project.

       1.8   Fixed Network Equipment (FNE) **-** shall mean the equipment designated as such in Section 9 of Appendix A ("ASTRO 25 Upgrade Proposal as Revised").

       1.9   Final Implementation Schedule (FIS) – shall mean the refinement of the Preliminary Project Schedule (Appendix G to this Amendment No. 3) for the Upgrade

Project, which is to be prepared during the Detailed Design Review phase of the Upgrade Project and is to be agreed upon by Motorola and the City.

1.10 Functional Requirements – shall mean Functional Requirements as provided in Appendix A to this Amendment and Exhibit A, Section 1.0 ("System Description"), relating to Functional Requirements.

1.11 1999 System – shall mean the circuit-based ASTRO 800 MHz radio communications system provided by Motorola to the City pursuant to the 1999 Agreement.

1.12 Notice Date – shall mean the date of execution of this Amendment No. 3.

1.13 Operational Communications Functionality – shall mean conformance with Performance Standards as defined in Section 1.1 of the 1999 Agreement, which consists of the standards and requirements set forth in the following Exhibits to the 1999 Agreement: Exhibit A, Section 5.2R1, (*Coverage*); Exhibit C, (*System Acceptance Test Plan*); Exhibits I (*800 MHz Voice Quality Definition*) and J, (*800 MHz Voice Quality Definition – Audio Sample*); and Exhibit K (*System Throughput Performance Standard*).

1.14 Performance Standards – shall mean, collectively, the standards and requirements set forth in the following Appendices to this Amendment: Appendix A, Section 4.1, (*Coverage*); Appendix A, Section 4.10, (*Functional Acceptance Test Plan*); and Appendix I (*System Controller Performance Testing Results*), and the following Exhibits to the 1999 Agreement Exhibit I (*800 MHz Voice Quality Definition*), Exhibit J (*800 MHz Voice Quality Definition – Audio Sample*) and Exhibit K (*System Throughput Performance Standard*).

1.15 Project or Upgrade Project **-** shall mean and include the furnishing of all Equipment, personnel and labor, Software, Documentation, Services and Deliverables and complete performance by the Contractor required to install and fully implement the upgrade of the City's circuit-based ASTRO 800 MHz trunked municipal radio system to Motorola's ASTRO 25 Internet Protocol-based 800 MHz trunked municipal radio system in accordance with the terms of this Amendment.

1.16 Project Milestone - shall mean each milestone as set forth in the following Appendices to this Amendment No. 3: Milestone Payment Schedule (Appendix F), Preliminary Project Schedule (Appendix G), and/or the Final Implementation Schedule.

1.17 Preliminary Project Schedule - The schedule for the work provided initially by the Contractor and included in this Amendment as Appendix G.

1.18   Punchlist – shall mean a list of minor product or system deficiencies of the Upgrade Project identified by the City with the assistance of Motorola and to be corrected by Motorola prior to Final Acceptance, which Punchlist may be supplemented up to 30 calendar days after the System Acceptance. Following are examples of possible Punchlist items:

- Subscriber problems (hardware and/or software/programming), up to 5% of the spares or less than 10 spare units.
- Errors with the manuals/documentation
- Deficiencies in workmanship, which does not effect the normal operation of the system, such as clean-up work at the sites, dents/scratches on equipment, etc.
- As built drawing not available
- Grounding issues.
- Requested Subscriber equipment still not delivered

1.19   Software means, collectively, the computer software programs, including but not limited to object code but not including source code, furnished to the City for the 800 MHz Upgrade Project pursuant to Amendment No. 3**,** including (i) proprietary software in object code format, and all Motorola provided or authorized adaptations, translations, de-compilations, disassemblies, emulations, or derivative works of such software; (ii) any modifications, enhancements, new versions and new releases of the software provided by Motorola; (iii) computer software programs owned by a third party supplier which Motorola has the right to license to the City; (iv) Third Party Software that is furnished by Motorola but licensed by the publisher of the software; and (v)software programs that are embedded or pre-loaded in products furnished by Motorola pursuant to Amendment No. 3; and (vi) Motorola Directly Licensed Third Party Software.

1.20   Statement of Work - shall mean Section 3 of the Appendix A ("ASTRO 25 Upgrade Proposal as Revised") submitted to City by Motorola June 13, 2008, as revised through negotiation, and except with the deletion of Appendix A thereto ("Communications System Agreement"), attached hereto.

1.21   Subscriber Radios or Subscribers – shall mean mobile radios, portable radios, Control Stations, and the accessories required for their operation and intended use.

1.22   System or Upgrade System **-** shall mean, collectively, the City's 800 MHz radio communications system, upgraded to the Motorola ASTRO 25 Internet Protocol-based 800 MHz trunked municipal radio system required under this Amendment, and the work comprising such upgrade of the System, including all Equipment, Software, Services and Deliverables required therefor.

1.23   System Acceptance -shall mean the point in time at which the Upgrade Project satisfies all the material requirements set forth in Section 7.2 of this Agreement and the City issues its written notice to Contractor of System Acceptance of the Upgrade Project, with the caveat that the parties agree that Motorola shall complete any specified Punchlist requirements identified by the City.

1.24   System Staging - as defined and described in Appendix A, Section 3.9.4 (*Factory Testing*) and Section 3.14 (*Acceptance Testing*).

1.25   Work - the construction, labor, materials, Equipment, Software and contractual requirements for the Upgrade Project as indicated in this Amendment No. 3 and its related documents and exhibits.

2. Term. Article 2 ("Term of Agreement") of the 1999 Agreement is amended to change the expiration date to the later of: (i) four years from Amendment execution; or (ii) Contractor's completion of all of its obligations as set forth in the Agreement (including, without limitation, completion and delivery of the System, successful completion of all Acceptance Tests, the City's System Acceptance and Final Acceptance of the Project as provided in Article 7 (*Acceptance*), the completion of all warranty and maintenance obligations, and the expiration of all warranty periods and all periods of maintenance provided in Exhibit A to the 1999 Agreement and any amendment of the Contract to provide for additional periods of maintenance); unless sooner terminated by the City or Contractor pursuant to the terms of the Agreement. In accordance with the Philadelphia Home Rule Charter, Section 8-200(3), the City reserves the right to terminate this Agreement at the option of the City at any time after the expiration of four years from the Effective Date of this Amendment No. 3 without liability to Motorola for damages or loss of profits which would have been realized had the Agreement not been terminated.

3. Scope of Work.

3.1   Article 3 ("Scope of Work") of the 1999 Agreement is amended to add the following new Sections 3.1(g), (h) and (i):

(g) All Equipment, personnel and labor, Software, Documentation, Services, and Deliverables required to install and fully implement the Upgrade Project, as set forth in Appendix A and Appendix B to Amendment No. 3 to this Agreement; provided, however, that Contractor shall furnish, in accordance with the terms and conditions of this Agreement, at no cost to the City additional to the costs set forth in Article 4, any Equipment, labor, Software, Documentation, Services, and Deliverables additional to or different from those set forth in Appendix A and

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Appendix B to Amendment No. 3 that may be required in order to cause the Upgrade Project to conform to the Performance Standards (including, without limitation, Coverage Requirements) and Functional Requirements provided in the foregoing Appendices and in the 1999 Agreement and the Exhibits thereto.

(h) Motorola shall maintain all Operational Communications Functionality of the City's current 800 MHz Radio System, as it exists at the Effective Date of this Amendment, through the City's Conditional Acceptance {Article 7}of Project Milestone #19 (Transition SmartZone 3.0 to SmartX and New ASTRO25 Mastersite (3600 A & B Simulcast System – Embassy / Elite console system) as set forth in the Project Schedule attached as Appendix G to Amendment No. 3. After Conditional Acceptance of Project Milestone #19 Motorola shall maintain all such Operational Communication Functionality on the Upgrade System through Final Acceptance and thereafter. Provided, however, that during the Cutover only, communications shall be maintained as provided in accordance with the Cutover Plan developed during the Detailed Design Review and accepted by the City in writing.

(i) Software for the Upgrade System furnished pursuant to Amendment No. 3 shall be subject to the terms and conditions of Appendix D, *Software License Agreement*, to Amendment No. 3. If any Software furnished by Motorola for the Upgrade Project require a license directly between the City and the Software owner, Motorola shall furnish each applicable license for the Upgrade Project as described in Appendix K to the City at the commencement of the Detailed Design Review for its review and written approval or rejection (such approval not to be unreasonably withheld) which shall be not later than sixty (60) days after delivery of the licenses, and it shall be a condition of start of manufacturing that the City shall have received and so approved all such licenses. Motorola to provide any additional such licenses that are identified during the Detailed Design Review by the completion of the Detailed Design Review. Any such rejection shall if necessary result in mutually agreed to extension of the Project Schedule.

3.2   Article 3 is amended to add the following subsections at the end of Section 3.4 ("Detailed Design"), which subsections shall apply to the Upgrade Project:

<u>Upgrade Detailed Design Document</u>. The Upgrade Project shall be designed and installed in accordance with Appendix A. Not later than the delivery date for the Detailed Design Project Milestone(s) as set forth in the Preliminary Project Schedule (Appendix G), Contractor shall deliver the Detailed Design Document to the City for its review, comment and approval. The Detailed Design Document shall conform to Appendix A, and shall fully detail and specify the Upgrade Project, including, without limitation, the following: complete technical specifications for the Upgrade Project, including, without limitation, performance

specifications, propagation studies, and coverage maps; floor plans, equipment layouts, equipment drawings, equipment termination drawings, cable layout drawings, electrical power and confirmation of the existing HVAC capacity as sufficient for the Upgrade Project, for each individual site or facility furnished by the City. All such plans, drawings and information will be provided to a level of detail sufficient for delivery to a construction contractor as a work package or bid specification. Provided that the City and Motorola agree the Detailed Design Review Document is satisfactory to both, the City shall within fifteen (15) calendar days of receipt notify Contractor in writing of its comments and any changes in the Detailed Design Document that the City may require. Contractor shall revise the Detailed Design Document to incorporate such comments and changes; provided, however, that if Contractor contends that the City's comments and changes are not within the scope of Appendix A, then Contractor shall notify the City in writing, not less than 10 calendar days following receipt of the City's notice of comments and changes, describing in reasonable detail the comments and changes that it believes are outside the scope of Appendix A and the reasons for its contention. The City shall determine whether it requires such comments and changes notwithstanding Contractor's notice. Any such changes and comments that constitute a change in scope of the work will be subject to Article 8 *(Changes).* Contractor's failure to timely provide the written notice required under this Section 3.4 shall constitute waiver of Contractor's right to a change in compensation or time of performance on account of changes to the Detailed Design Document required by the City except by written Change Order signed by both Motorola and the City. City's failure to timely provide the written comments on the Detailed Design Document required under this Section 3.4 shall constitute waiver of City's right to change the Detailed Design Document except by written Change Order signed by both Motorola and the City.

In no event shall any change to the Detailed Design Document made at the City's request, or the City's approval of the Detailed Design Document or Conditional Acceptance of the Project Milestone that includes the Detailed Design Document, in any way limit, alter, or excuse Contractor's obligation to design and install the Upgrade Project in accordance with Appendix A, and the Performance Standards, as they may be modified, if they are modified, by written Change Order executed by both Contractor and the City.

In no event shall Contractor perform any work on the Project except the work comprising the Project Milestone(s) for the Detailed Design Document, nor shall the City have any payment or other obligation with respect to work not included in such Project Milestones, unless and until the City has approved the Detailed Design Document in writing; except as agreed otherwise by the City in writing.

3.3   Upgrade Options. The following Section 3.6 (a) is added to Section 3.6 of the 1999 Agreement:

(a) The City shall have the right, in its sole discretion, to purchase the options set forth in Appendix A under the "Options" tab for the prices set forth at pages 28 and 29 of Appendix B under the heading "Optional Offerings".

4. Price and Payment.

4.1   Article 4 ("Price and Payment") of the 1999 Agreement is amended to add the following section at the end of Section 4.1 ("Project Price") (references to "Project Price" in provisions of the 1999 Agreement are deemed to refer to the "Upgrade Project Price," as defined below, to the extent they remain in effect under this Amendment and apply to the Upgrade Project):

Contractor's total compensation for all Equipment, personnel and labor, Software, Documentation, Services, and Deliverables required to install and fully implement the Upgrade Project in accordance with Amendment No. 3 to the Agreement (the "Upgrade Project Price") shall be the Upgrade Project Price set forth in Appendix B to Amendment No. 3, *Supplemental Schedule of Project Costs* under the heading "Total Equipment and Services with Discounts" on page 27, which amount is equal to $34,492,433.00. Such amount shall be due and payable in accordance with the Milestone Payment Schedule set forth in Appendix F to Amendment No. 3; provided, however, that no Milestone Payment shall become due or payable - unless and until all work comprising the Project Milestone (including, without limitation, delivery and installation of all Equipment, Software, and Deliverables which may be required for the Project Milestone) has been completed and Conditionally Accepted by the City, in writing, in accordance with Article *7 (Acceptance),* or, in the case of the final Milestone Payment, unless and until the City has Finally Accepted the Upgrade Project as a whole, in writing, in accordance with Article 7 (*Acceptance*). The Upgrade Project Price shall be based on and shall reflect the line item costs set forth in the *Supplemental Schedule of Project Costs* (Appendix B to Amendment No. 3). Contractor shall furnish, at no cost to the City additional to that set forth in this Article 4, any Equipment, personnel and labor, Software, Documentation, Services, and Deliverables additional to or different from those set forth in Appendix A to Amendment No. 3 and elsewhere in this Agreement that may be required in order to cause the Upgrade Project to conform to the Performance Standards (including, without limitation, Coverage Requirements) and Functional Requirements provided in Appendix A to Amendment No. 3 and Exhibit A, Section 1.0 (*System Description*), relating to Functional Requirements, and with respect to Performance Standards, Exhibit A, Section 5.2R1 (*Coverage*), Exhibit C (*System Acceptance Test Plan*), Exhibits I (*800 MHz Voice Quality Definition*),

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Exhibit J (*800 MHz Voice Quality Definition – Audio Sample*), and Exhibit K (*System Throughput Performance Standard*).

4.2   Article 4 ("Price and Payment") is amended to add the following at the end of Section 4.2 ("Prices for Options"):

Prices for Options for the Upgrade Project (as set forth in Appendix A to Amendment No. 3, under the "Options" tab in Section 2) shall be as set forth in Appendix B to Amendment No. 3, *Supplemental Schedule of Project Costs*. Notwithstanding anything to the contrary that may be stated in Appendix A, it is understood that the Acceptance Test Plan for any such Option will be created at the time the City exercises such option and shall be subject to City written approval.

4.3   Article 4 ("Price and Payment") is amended to add the following at the end of Section 4.3 ("Prices for Maintenance and Support"):

Contractor's annual price for maintenance services for the Fixed Network Equipment and the mobile radios for the Upgrade Project, following expiration of the warranty period through the tenth year after the Effective Date of Amendment No. 3 to the Agreement, shall be in accord with the maintenance contract pricing set forth below:

Maintenance contract pricing assumes the initial two years are needed for implementation and the third year is the Warranty Period for the Fixed Network Equipment. Year Four pricing is calculated by reference to the usual Total Maintenance Services Sale Price of $2,342,882.77, from which is deducted $407,132.60 to account for portable radios not covered by the proposed maintenance contracts
(3010 portables x $135.26 = $407,132.60), with a remainder of $1,935,750.17.   Annual Escalation is 5% for Maintenance Cost for FNE + mobiles.

Maintenance Cost for FNE + mobiles:
Year 4 $ 1,935,750.17
Year 5 $ 2,032,537.68
Year 6 $ 2,134,164.57
Year 7 $ 2,240,872.79
Year 8 $ 2,352,916.43
Year 9 $ 2,470,562.26
Year 10 $ 2,594,090.37

If the City chooses to enter into a maintenance contract with Motorola at a price set forth above in this Section 4.3, for any period following the expiration of the Warranty Period through the tenth year after the Effective Date, Motorola will provide the following services to the City pursuant to such maintenance contract:

- Dispatch Service, Network and Security Monitoring Services with Pre-Tested Anti-Virus Subscription, Technical Support
- Radio Repair Services including Depot Repair and Preventive Maintenance for 744 Mobile Units
- Wireless Pickup and Delivery
- Infrastructure Repair with Advanced Replacement Service
- Premier OnSite Infrastructure Response Service with Dedicated Technicians
- Consolette Repair Services
- Local Admin System Management Service
- Database Management
- Template Conversions
- Template Management
- Tower Maintenance

Additional Maintenance Services available for the portable radio is $135.26 per unit per year to include radio repair service including depot repair and preventive maintenance.

4.4   Article 4 is amended to add the following at the end of Section 4.12 ("Long-Term Pricing; Application of Project Price Discounts"):

Contractor shall guarantee Equipment pricing for the ten-year period beginning on the execution date of Amendment No. 3 to this Agreement, as follows:

(a)   For the period commencing on the date of this Agreement and ending on the One Hundred and Eightieth (180th) calendar day following the date of execution of Amendment No. 3 to this Agreement, the City shall have the right to purchase additional Fixed Network Equipment at the stated percentage discount list in the itemized equipment list provided in the Pricing Section of Appendix A ("ASTRO 25 Upgrade Proposal as Revised")

(b)   For the five (5) year period beginning on the date of execution of Amendment No. 3 to this Agreement (the "Initial Pricing Period") Contractor shall extend the long term Subscriber pricing currently in effect between the City of Philadelphia and Motorola. The negotiated discounts for Subscriber units are listed in the table below.

Product	Discount
Mobile Radios	
ASTRO Digital XTL5000 Family Mobiles	22%
ASTRO Digital XTL2500 Family Mobiles	15%
ASTRO Digital XTL1500 Family Mobiles	15%
Portable Radios	
ASTRO Digital XTS5000 Family Portables	22%
ASTRO Digital XTS2500 Family Portables	15%
ASTRO Digital XTS1500 Family Portables	15%
For XTL5000 Mobile Radios and XTS5000 Portable Radios, Motorola will extend an additional discount of:	
3% For volumes of 100-499 units on a single purchase order	
6% For volumes of 500+ units on a single purchase order	

(c)   Direct FNE product replacements for cancelled Motorola manufactured equipment (Subscribers and FNE), shall be offered at the stated discount listed in the Pricing Schedule of Exhibit A.   This pricing provision is applicable during a ten (10) year period beginning on the date of execution of Amendment No. 3 to this Agreement.

(d)   Motorola FNE products that are not currently available (new technology), when introduced, will be offered at a 15% discount off the applicable Motorola list price at the time of purchase. This pricing is available for the ten (10) year period following the date of execution of Amendment No. 3 to this Agreement.

4.5   Article 4 is amended to add the following at the end of Section 4.14 ("Contractor's Guarantee of Parts Availability"):

Motorola represents and warrants that replacement parts for all Equipment furnished for the Upgrade Project under this Agreement shall be available until December 31, 2018. Motorola reserves the right to supply either assemblies or piece parts during the above described time frame. The City will have the option

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to purchase the Upgrade Assistance Program – UAP during the life of the System, on the condition that the City has obtained and installed the then-current release of the system software (and required hardware). Software shall be governed by the terms set forth in the Software License Agreement attached hereto as Appendix D.

5. Project Schedule; Liquidated Damages for Delay.

5.1   Project Schedule. Article 5 is amended to add the following Section 5.1(a) at the end of Section 5.1 of the 1999 Agreement:

(a) Subject to the occurrence of a "Force Majeur Event" (as defined in Section 5.5 of the 1999 Agreement) or the other provisions of this Agreement, Contractor shall commence performance of the Upgrade Project within 10 days following execution of Amendment No. 3 by the City. Subject to the occurrence of a "Force Majeur Event" (as defined in Section 5.5 of the 1999 Agreement) or delays caused by the City, and subject to the other provisions of this Agreement, Contractor represents and warrants that it will complete each Project Milestone on or before the due date provided in the Final Implementation Schedule, as from time to time revised with the City's written approval. The Final Implementation Schedule shall conform to the Preliminary Schedule attached as Appendix G, except as agreed otherwise by both parties. Contractor shall create and maintain a Critical Path Method ("CPM") schedule for the Upgrade Project that identifies and schedules each task and activity required for the Upgrade Project as well as each Project Milestone, using a CPM methodology, with Microsoft Project or Workbench software that is approved in writing by the City (which written approval must be issued by the City prior to Contractor's commencement of performance). The CPM schedule shall be consistent with the Final Implementation Schedule, and shall be updated at least once in every thirty (30) calendar days (or more frequently, if requested by the City in writing). A copy of each updated CPM schedule shall be delivered to the City's Project Manager immediately upon creation by Contractor. No change in the Final Implementation Schedule that results in a change in a Liquidated Damages Milestone may be made except by Change Order executed by both the City and Contractor.

5.2   Article 5 Section 5.3   ("Liquidated Damages for Delay") is amended to add the following subsection at the end of Section 5.3, which subsection shall apply to the Upgrade Project:

Contractor acknowledges and agrees that the City will incur costs and damages for each day that Contractor fails to complete any of the following Project Milestones by the dates of Acceptance provided for them in the Preliminary

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Project Schedule, or if later, a Final Implementation Schedule agreed upon by the City and Motorola**:** (a) successful completion of Factory System Acceptance Testing (Preliminary Project Schedule, Line 10, "Staging"), (b) successful completion of first 30-day Reliability Test (Preliminary Project Schedule, Line 17), (c) successful performance of Functional Acceptance Test Plan and Coverage Acceptance Test Plan (Preliminary Project Schedule, Line 22), (d) the Final Acceptance date of twenty-one (21) months following execution of Amendment No. 3, or such different date for System Acceptance that may be agreed by the City and Contractor as set forth in the Final Implementation Schedule (the "System Acceptance Date"). If Contractor fails to complete Project Milestone (b) by the completion date provided for it in the Project Schedule, then the City may, in its sole discretion, assess liquidated damages in the amount of Six Thousand Five Hundred Dollars ($6,500) per day for every calendar day after such completion date that the Project Milestone is not completed. If Contractor fails to complete Project Milestones (a) or (c) by the completion dates provided for them in the Project Schedule, then the City may, in its sole discretion, assess liquidated damages in the amount of Three Thousand Dollars ($3,000) per day for every calendar day after such completion date that the Project Milestone is not completed. If Contractor fails to complete System Acceptance by the System Acceptance Date, then the City may, in its sole discretion, assess liquidated damages in the amount of Six Thousand Five Hundred Dollars ($6,500) per day for every calendar day after the System Acceptance Date that System Acceptance is not achieved; provided that, in no event shall Contractor be liable for liquidated damages for any day of delay that is caused solely by the City or a Force Majeur Event. The total amount of such liquidated damages assessed pursuant to this Amendment shall not exceed five percent (5%) of the Upgrade Project Price.

5.3   Section 5.4 ("Contractor's Remedy for Delay*;* Submission of Claims") is amended by substituting the following rates in the table for Motorola's direct labor daily rates, such rates to apply to the Upgrade Project and this Amendment:

Motorola Direct Labor Daily Rate	2009 - 2013 rates	2014 – 2018 rates
Project Manager/Supervisor	$1,591	$1850
Project Engineer	$1,545	$1805
System Technologist	$1,600	$1860
Application Specialist	$1,591	$1850

6. Project Management.

6.1   Section 6.1 ("Project Managers") is amended to add the following:

Contractor's initial Project Manager for the Upgrade Project shall be Selina Lam. The City's initial Project Manager for the Upgrade Project shall be Frank Punzo.

7. Acceptance

7.1   Section 7.1 ("Conditional Acceptance") is amended to delete subsection 7.1(a) in its entirety and to replace it with the following new subsection 7.1(a):

> Contractor shall notify the City in writing when Contractor contends that all Work comprising a Project Milestone as set forth in Appendix F to Amendment No. 3 ("Milestone Payment Schedule") is completed and ready for Conditional Acceptance by the City. Within thirty (30) days following receipt of Contractor's written notice, the City shall issue its written statement of Conditional Acceptance of the corresponding Project Milestone, or its written notice that the Work comprising the corresponding Project Milestone is not Conditionally Accepted. Conditional Acceptance will not be unreasonably withheld provided that all Work comprising the Project Milestone is completed and conforms to the Warranty Standards, as defined in Article 9 (*Warranty*), and successfully completes all applicable Conditional Acceptance Tests (as defined in Article 7 (*Acceptance*), in accordance with the Conditional Acceptance Test Plan(s) (as set forth in Article 7).

7.2   Section 7.2 ("Final Acceptance") is amended to add the following subsection at the end of Section 7.2:

> **System Acceptance and Final Acceptance of the Upgrade Project.** Contractor shall notify the City in writing when Contractor contends that all Work required per the Final Implementation Schedule for the Upgrade Project is completed and that the Upgrade System and all other components of the Upgrade Project have been installed and optimized in accordance with Amendment No. 3, including, without limitation, the Warranty Standards, and the Work is ready for System Acceptance Test(s). Following receipt of such notice, the City shall establish a schedule for commencing and conducting the System Acceptance Test(s), the commencement date of which shall be not more than ten (10) business days following the date on which the City receives Contractor's notice except as may be agreed otherwise by the parties in writing. The Upgrade Project shall not be considered to have achieved System Acceptance unless and until all of the following conditions are satisfied:
>
> (a)   The Upgrade System and all other components of the Upgrade Project function together as an integrated whole in accordance with the Warranty Standards;
>
> (b)   The Upgrade System and, as applicable, all other components of the Upgrade Project successfully complete the System Acceptance Test(s) in

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accordance with the System Acceptance Test Plan(s), as approved by the City; and

(c)   The Upgrade System shall have successfully completed all Reliability Periods.

If the City determines that these conditions have been met, the City will provide written notification to Motorola of System Acceptance. Motorola and the City will identify additional Punchlist requirements, which is Work that must be completed by Motorola to complete the Upgrade Project, and to attain the final Payment Milestone, but which do not prevent the attainment of System Acceptance. Following completion of Motorola of all Work listed on the Punchlist, and its acceptance by the City, the City will provide Motorola written notification of Final Acceptance in accordance with Article 7 and will make the final payment.

7.3   Article 7 is amended to add the following at the end of Section 7.3 ("Acceptance Test(s); Test Plan(s)"):

The Services and Deliverables comprising each Project Milestone in the Milestone Payment Schedule in Appendix F to the Amendment Agreement shall be subject to conditional acceptance testing as approved and accepted by the City, if any (the "Conditional Acceptance Tests"), and the Services and Deliverables as an integrated system shall be subject to final acceptance testing as approved and accepted by the City (the "System Acceptance Tests"). No Conditional or System Acceptance Test or other test of the Services and Deliverables shall commence unless and until Contractor has delivered and the City has accepted and approved, in writing, Contractor's written plan or plans setting forth, for the Conditional Acceptance Test(s) and the System Acceptance Test(s), a test method and criteria and standards of performance that must be satisfied for the test to be successful (collectively, the "Test Plan(s)"). The Test Plan(s) shall include, without limitation, test methods and criteria and standards of performance identified in Appendix A, Section 4 (Acceptance Test Plan) for all Project Milestones, shall include all elements and otherwise conform to the general test requirements set forth in Appendix A; and shall fully test the System for conformance to the Performance Standards (excluding the *System Throughput Performance Standard* set forth in Exhibit K, but including, without limitation, Coverage Requirements) and other Warranty Standards. The Test Plan(s) shall be Deliverables under the Agreement.

7.4   Article 7 is amended to add the following at the end of Section 7.4 ("Reliability Period"):

It shall be a condition of the Conditional Acceptance of the Upgrade Project that the completed and fully integrated System function in conformance with the Warranty Standards and without failure or interruption for the Reliability Periods provided in Appendix A as set forth therein. The City may not use the system until Motorola confirms the System availability for reliability testing. However, in the event of a catastrophic failure of the old system (which shall be defined as the failure of one of the two prime controller sites which can not be repaired in a reasonable period of time), then the City and Motorola will jointly review the current status of the new system to determine whether use of the new system is the preferable course of action. If the City and Motorola can not agree then the City has the right to use the new system upon written notice to Motorola at which time warranty period will commence. In the event the System suffers failure or interruption prior to the expiration of a Reliability Period, Contractor shall remedy such failure and the defects that caused such interruption, and a new reliability period (the "Following Reliability Period") shall begin on the day that Contractor notifies the City that the remedy has been completed. In the event the System does not successfully complete the Following Reliability Period, the City may, at its sole discretion, terminate the Agreement for default and exercise any one or more of the remedies provided to the City in Article 13 (Termination).

8. Warranty.

Section 9.1 ("Warranty; Warranty Standards") is amended to add the following terms and conditions at the end of Section 9.1, such terms and conditions to apply to the Upgrade Project:

Subject to the other provisions of this Article 9, Contractor warrants that for a period of twelve (12) months following the City's System Acceptance of Project in accordance with Article 7 (the "Project Warranty Period"), all Equipment, Documentation, Services, and Deliverables furnished for the Upgrade Project, whether by itself or by its Subcontractors and suppliers, shall be free from defects and errors in material, design, workmanship, and execution, and shall function together as an integrated system in conformance with items (1)-(5) following (collectively the "Warranty Standards"): (1) the descriptions of functionality and performance, and all standards of performance, compliance with FCC National Public Safety Plan Region 28 and FCC requirements, compliance with other codes and standards, and Radio Coverage that are set forth below in this Article 9, in the Statement of Work (Appendix A), in the Performance Standards; and the Functional Requirements set forth at Appendix A, Section 2.1 and elsewhere in this Agreement; (2) the Documentation; (3) the manufacturer's (including, without limitation, Contractor's, where applicable) most current published specifications for all Equipment and Deliverables; (4) all design documents prepared by Contractor under the Contract, including, without limitation, the

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Detailed Design, as approved and accepted by the City; and (5) all acceptance criteria, including without limitation, test criteria and standards of performance specified in Article 7 (Acceptance); and/or in the Statement of Work (Appendix A, Section 3), including, without limitation, any such criteria or standards of performance set forth in the "Test Performance Plan(s)" as defined in Article 7 (*Acceptance*) and which also shall include, without limitation, test methods and criteria and standards of performance as identified in Appendix A, Section 4 (System Acceptance Test Plan) that are accepted and approved by the City in writing, including, without limitation, modifications accepted and approved by the City during Design Review; provided, however, that the Warranty shall apply to Subscriber Equipment for the following periods: Portable radios – three (3) years commencing on the date on which the radios are delivered to the City ("Portable Radio Warranty Period"); mobile radios – three (3) years commencing on the date on which the radio is installed ("Mobile Radio Warranty Period"). If the last day of the Project Warranty Period or the Portable or Mobile Radio Warranty Periods, falls on a Saturday, Sunday, national holiday, state holiday, or City holiday, such Warranty Period(s) shall be deemed to be extended until midnight of the next business day. With respect to any conflict or variance relating to warranty terms between the provisions of Sections 1-13 of Amendment No. 3 and the 1999 Agreement on the one hand, and the provisions of Section 8 ("Warranty and Maintenance") of Appendix A to Amendment No. 3 on the other, the provisions of Sections 1-13 of Amendment No. 3 and the 1999 Agreement shall govern; in the event of conflict or variance related to warranty terms between Amendment No. 3 (other than Section 8 of Appendix A) and the 1999 Agreement, Amendment No. 3 shall govern.

9. Independent Contractor; Indemnification.

9.1   Article 10 is amended to add the following new subsection 10.2(c) to the end of Section 10.2:

(c) <u>Limitation of Liability for Upgrade Project.</u> In no event shall either the Contractor or the City be liable to the other for consequential or incidental damages arising from the performance of the Upgrade Project or Amendment No. 3. The liability of Contractor and the City to each other for direct damages relating to claims arising under Amendment No. 3 or in relation to the Upgrade Project shall not exceed, in aggregate dollar amount, the total amount of (a) the Upgrade Project Price, plus (b) the total of the price(s) for each Change Order executed by the City and Contractor with respect to the Upgrade Project, plus (c) the price of each amendment to the 1999 Agreement executed by both parties subsequent to this Amendment, plus (d) the price of each Purchase Order issued by the City with respect to the Upgrade Project (unless reflected in (a), (b), (c) or (e)), plus (e) the price of each Option (including but not limited to the options set

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forth in Appendix B) that is purchased by the City from Contractor. Provided, however, that nothing contained in this Section 10.2(c) shall limit, alter, or apply to Contractor's liability under Section 10.2(a) with respect to losses, costs, claims, suits, actions, damages, liability and/or expenses relating to loss of life, bodily injury, personal injury, or property damage to Contractor's obligation to indemnify and defend the City from claims of infringement of patent rights or copyright as set forth in Section 10.3; or to the City's liability with respect to losses, costs, claims, suits, actions, damages, liability and/or expenses relating to loss of life, bodily injury, or personal injury, or claims of infringement of patent rights or copyright set forth in Section 10.3(d) (provided, that nothing herein shall waive or amend any defense or immunity which the City, its officers, agents or employees may have under the Pennsylvania Political Subdivision Tort Claims Act, 42 Pa.C.S.A. §8541 et. seq.).

9.2   Article 10 is amended to add the following subsection 10.3(d) to the end of Section 10.3, which subsection shall apply solely to the Upgrade Project and the Upgrade System:

10.3(d) Patent, Copyright And Other Proprietary Rights Indemnity – Upgrade Project.

(1) Contractor warrants that all Equipment, Software (with the exception of the Third Party Software programs identified in Appendix D, *Software License Agreement*, which shall be subject to the terms and conditions of the publisher's license), Documentation, and Deliverables furnished for the Upgrade Project under this Amendment No. 3 (collectively referred to in this Section 10.3 as the "Indemnified Work"), do not and will not infringe upon or violate any United States patent or copyright, of any third party. In the event of any claim, suit or action by any third party against the City alleging that the Indemnified Work infringes any United States patent or copyright, the City shall promptly notify Contractor in writing and Contractor shall defend such claim, suit or action at Contractor's expense, to the extent it is based on such claim of infringement, and Contractor shall indemnify the City against any loss, cost, damage, expense or liability arising out of such claim, suit or action (including, without limitation, damages and costs resulting from loss of use, replacement costs, litigation costs and reasonable counsel fees) whether or not such claim, suit or action is successful.

(2) For the Upgrade Project performed under this Amendment No. 3, Contractor will have no duty to defend or indemnify for any such infringement claim to the extent infringement is finally determined by a court of competent jurisdiction to be the result of (1) the City's modification of the Indemnified Work or its use of the Indemnified Work in a manner not intended by the parties or

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contemplated by this Agreement; (2) the City's failure to use corrections or enhancements to Software that are furnished by Contractor at no cost to the City additional to that set forth in Article 4 *(Price and Payment)* and that do not materially alter the functionality of the Software as it exists at the time the Software was furnished under the Agreement; or (3) the act or omission of the third party supplier of a software product used in combination with Contractor's Software but not furnished by Contractor under this Agreement; or (4) use of the Product in a manner for which the Product was not intended or that is inconsistent with the terms of Amendment No. 3. Prior to such final determination, however, Contractor shall remain fully responsible, at its expense, for the defense and indemnification of any infringement claim in accordance with this Section 10.3; provided, that to the extent the claimed infringement is finally determined to be the result of one or more of (1)-(4) preceding, the City will reimburse Contractor for its reasonable expenses (including reasonable litigation costs and attorneys fees) incurred in such defense.

(3) The indemnification requirements set forth in this Section 10.3(d) apply only to the specific subject matter hereof. With respect to any and all other losses, costs (including, but not limited to, litigation and settlement costs and reasonable counsel fees), claims, suits, actions, damages, liability and expenses, the requirements set forth in Section 10.2, as amended, shall apply.

10.   Termination; Suspension of the Work.

10.1   Article 13 is amended to add the following new subsections 13.2(g) and (h) to the end of Section 13.2 ("Termination for Default"), to state additional events of default:

(g)   Contractor's failure to materially comply with any provision, term or condition of Amendment No. 3 to this Agreement.

(h)   Contractor's failure to materially comply with any provision, term or condition of the Economic Opportunity Plan, Appendix C to Amendment No. 3 to this Agreement.

11.   Insurance; Performance and Payment Bonds.

11.1   Article 14 ("Insurance; Performance and Payment Bonds") is amended in Section 14.1 ("Insurance") in the first paragraph, to restate the second to last sentence: "The City of Philadelphia, its officers, employees and agents shall be named as additional insureds on the General Liability Insurance policy and Umbrella Liability Insurance policies".

11.2   Article 14 ("Insurance; Performance and Payment Bonds") is amended to add the following subsection at the end of Section 14.2. ("Performance and Labor and Materialman's Bonds").

Performance and Labor and Materialman's Bonds for the Upgrade Project. Prior to commencing work on the Upgrade Project, and within the time period specified by the City's Procurement Department, Contractor shall furnish a properly executed performance bond and labor and materialmans bond, as prepared by the City on the City's form, each in an amount equal to the Upgrade Project Price, and having as surety thereon such surety company or companies as are approved by and acceptable to the City, (which approval will not be unreasonably withheld provided that the financial capacity of the surety is sufficient to ensure payment of the obligation). The City reserves the right to require Contractor to increase the amounts of such bonds to equal the total amount of the Limitation of Liability for the Upgrade Project as provided in Section 10.2(c) of the 1999 Agreement as amended, in the event the amount of Contractor's compensation for the Upgrade Project increases, because of Change Orders, options, or otherwise, subsequent to execution of the Agreement, and the parties agree that if the total amount of Contractor's compensation for the Upgrade Project decreases, then the amounts of such bonds may be reduced correspondingly. Contractor agrees to pay promptly any required performance bond fee within the time period specified by the City.

12.   Economic Opportunity.

The following provisions, applicable to the Upgrade Project and this Amendment, are added to Article 16 ("Executive Order 1-93").

(a)   Executive Order 02-05 and 14-08. In accordance with Executive Order 02-05, the City established an antidiscrimination policy that relates to the solicitation and inclusion of Minority Business Enterprises ("MBE"), Woman Business Enterprises ("WBE"), and Disabled Business Enterprises ("DSBE") (collectively, "M/W/DSBE") in City contracts. The purpose of Executive Order 02-05 is to ensure that all businesses desiring to do business with the City have an equal opportunity to compete by creating access to the City's procurement process and meaningfully increasing opportunities for the participation by M/W/DSBEs in City contracts at all tiers of contracting, as prime contractors, subcontractors and joint venture partners. ("Antidiscrimination Policy"). Executive Order 14-08 transfers administration of the Antidiscrimination Policy from the Minority Business Enterprise Council ("MBEC") and to the Office of Economic Opportunity ("OEO").

(b)   Chapter 17-1600 of The Philadelphia Code. In support of the City's Antidiscrimination Policy, Chapter 17-1600 of The Philadelphia Code requires the creation and implementation of "Economic Opportunity Plan(s)" for certain classes of

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contracts and covered projects as defined in Section 17-1601. The Economic Opportunity Plan ("EOP") memorializes the Contractor's best and good faith efforts to provide meaningful and representative opportunities for M/W/DSBEs in the Contract and identifies Contractor's outreach and hiring activities for employing an appropriately diverse workforce in connection with the Contract**.**

(1)   In furtherance of the foregoing, Contractor agrees to the following:

a)   Contractor represents that it has entered into legally binding agreement(s) with M/W/DSBEs as participants under this Amendment Agreement for the services and in the dollar amount(s) and percentage(s) as specified in Appendix C ("Economic Opportunity Plan") to this Amendment Agreement.

b)   Contractor shall secure the prior written approval of OEO before making any changes or modifications to any Amendment Agreement commitments made by Contractor herein, including, without limitation, substitutions for its MBEs, WBEs and/or DSBEs, changes or reductions in the services provided by its M/W/DSBE Subcontractors, or changes or reductions in the dollar and/or percentage amounts of commitments with its M/W/DSBE Subcontractors.

c)   Unless otherwise specified in a legally binding agreement as described in (2) (a) above, Contractor shall, within five (5) business days after receipt of a payment from the City for work performed under the Amendment Agreement, deliver to its M/W/DSBE Subcontractors the proportionate share of such payment for services performed by its M/W/DSBE Subcontractors. In connection with payment of its M/W/DSBE Subcontractors, Contractor agrees to fully comply with the City's payment reporting process which may include the use of electronic payment verification systems.

d)   Contractor shall, in the event of an increase in units of work and/or compensation under the Amendment Agreement, increase its commitments with its M/W/DSBE Subcontractors proportionately. The OEO may from time to time request documentation from Contractor evidencing compliance with this provision.

e)   Contractor shall submit, within the time frames prescribed by the City, any and all documentation the City may request, including, but not limited to, copies of Subcontract(s) with M/W/DSBEs, participation summary reports, M/W/DSBE Subcontractor invoices, telephone logs and correspondence with M/W/DSBE Subcontractors, cancelled checks and certification of payments. Contractor shall maintain all documentation related to this Section for a period of five (5) years from the date of Contractor's receipt of final payment under the Amendment Agreement.

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f) Contractor agrees that the City may, in its sole discretion, conduct periodic reviews to monitor Contractor's compliance with the terms of the EOP.

g) Contractor agrees that in the event the City determines that Contractor has failed to comply with the terms of the EOP attached as Appendix C to Amendment No. 3, the City may, in addition to any other rights and remedies it may have under the 1999 Agreement and Amendment No. 3, exercise one or more of the following remedies which shall be deemed cumulative and concurrent:

1) Debar Contractor from proposing on and/or participating in any future contracts for a maximum period of three (3) years.

2) Recover as liquidated damages, one percent (1%) of the total dollar amount of the Amendment Agreement, which amount shall include any increase by way of further amendments to the Base Contract for the Upgrade Project, for each one percent (1%) (or fraction thereof) of the shortfall in commitment(s) to Contractor's M/W/DSBE Subcontractors.

h) No privity of contract exists between the City and any M/W/DSBE Subcontractor identified herein and the City does not intend to give or confer upon any such M/W/DSBE Subcontractor(s) any legal rights or remedies in connection with the subcontracted services pursuant to the EOP or by reason of this Amendment Agreement except such rights or remedies that the M/W/DSBE Subcontractor may seek as a private cause of action under any legally binding contract to which it may be a party. The remedies enumerated above are for the sole benefit of the City and City's failure to enforce any provision or the City's indulgence of any non-compliance with any provision hereunder, shall not operate as a waiver of any of the City's rights in connection with this Amendment Agreement nor shall it give rise to actions by any third parties including identified M/W/DSBE Subcontractors.

(2) It is understood that false certification or representation made in connection with Executive Order 02-05 may be subject to prosecution under Title 18 Pa. C.S. Sections 4107.2 and 4904.

(c) Motorola's Economic Opportunity Plan ("EOP"), Appendix C to Amendment No. 3, is incorporated in and made a part of Amendment No. 3. Motorola shall comply with all provisions of the EOP. Non-compliance of Motorola with any material provision, term or condition of the EOP shall be an Event of Default pursuant to Section 13.2 of the 1999 Agreement, and the City may, in the event of such default, terminate the Agreement pursuant to Section 13.2, or, in its sole discretion, exercise one

or more of the contract remedies as provided in Sections 13.3 and 13.4 of the 1999 Agreement.

13.   Miscellaneous Provisions.

13.1   Section 17.1 ("Contract Documents; Order of Precedence") is amended to add the following at the end of current Section 17.1:

13.2   For the purposes of Amendment No. 3, Contract Documents shall include Amendment No. 3, Sections 1-13, together with all Appendices, attachments, and exhibits thereto; and the Order of Precedence of the Contract Documents shall consist of the following: (a) Amendment No. 3 (which includes Sections 1-13 and the Appendices A through K thereto), (b) the Agreement dated June 30, 1999 between the City and Motorola, and Exhibits A-N to the 1999 Agreement. With respect to the Upgrade Project and Amendment No. 3, in the event of conflict or variance between Amendment No. 3 and any other Contract Document, Amendment No. 3 shall govern, and in the event of conflict or variance between Sections 1-13 of Amendment No. 3 and any Appendix to Amendment No. 3, Sections 1-13 shall govern. With respect to the 1999 System only**,** in the event of conflict or variance between the 1999 Agreement and any other Contract Document, the 1999 Agreement shall govern. The Contract Documents shall not include the City's RFP pursuant to which the 1999 Agreement was awarded, Contractor's proposal for the 1999 System, or Contractor's proposal for the Upgrade System.

13.3   Section 17.16 ("Notices") is amended to add the following, which shall apply to Amendment No. 3 and the Upgrade Project: Any notice required or permitted to be given under the Amendment Agreement shall be given in writing and shall be personally delivered by hand with receipt obtained, by a national overnight express carrier (such as Federal Express), by facsimile (with copy by registered or certified United States mail) or by registered or certified United States mail, return receipt requested, addressed as follows (provided, that the individuals and addresses specified below may be changed from time to time by the written agreement of both parties):

IF TO CITY:

Attn: Frank Punzo, Deputy Commissioner
City of Philadelphia Department of Public Property
City Hall, Room 732
Philadelphia, PA 19107

With copies to:

Procurement Commissioner
City of Philadelphia
Municipal Services Building, Room 120
15th Street and JFK Boulevard
Philadelphia, PA 19102

and

City of Philadelphia
City Solicitor
1515 Arch Street, 17th Floor
Philadelphia, PA 19102

IF TO CONTRACTOR:

Attn.: Selina Lam, Project Manager
Motorola, Inc.
101 Tournament Drive
Horsham, PA 19044

With copy to:

Motorola Law Dept.
5 Paragon Drive, Suite 200
Montvale, NJ 07645

13.4   Applicable Laws. Article 17 is amended to add the following new Section 17.29:

17.29. Applicable Laws.   Contractor shall comply with all Applicable Laws as set forth in Appendix J to Amendment No. 3, and provides the representations and warranties stated in Section 1.8 of Appendix J.

IN WITNESS WHEREOF, the parties hereto, intending to be legally bound, have executed this Amendment as of the day first written above.

MOTOROLA, INC.

CORPORATE SEAL: By:_____
                                             Patty Holtschneider
                                             MSSI Vice President

_____
Assistant Secretary

_____
Typed or Printed Name and Title

APPROVED AS TO FORM: **ACCEPTED AND EXECUTED:**

_____   _____
Deputy City Solicitor   Procurement Commissioner
                                          City of Philadelphia

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APPENDICES

Appendix A – ASTRO 25 Upgrade Proposal submitted to City by Motorola June 13, 2008, as revised through negotiation, and except with the deletion of Appendix A thereto ("Communications System Agreement").
Appendix B – Supplemental Schedule of Project Costs
Appendix C – Economic Opportunity Plan
Appendix D – Software License Agreement
Appendix E – [Reserved]
Appendix F – Milestone Payment Schedule
Appendix G – Preliminary Project Schedule
Appendix H – [Reserved]
Appendix I – System Controller Performance Testing Results
Appendix J – Applicable Laws
Appendix K – Open Source Software and Third Party Software (to be finalized during Detailed Design Review)

Notice of Trade Secrets
and Confidential Proprietary Information

Pursuant to the Commonwealth of Pennsylvania's Right-to-Know Act, as codified at 65 P.S. §§67.101-3104 ("Act"), this written statement serves as notice under 65 P.S. 707(b) that the following records, attached as Appendices to Amendment No. 3 to Contract No. 99-0844 between the City of Philadelphia ("City") and Motorola, Inc. and provided by Motorola to the City, contain trade secrets or confidential proprietary information or both (as those terms are defined in the Act):

Appendix A – ASTRO 25 Upgrade Proposal
Appendix B – Supplemental Schedule of Itemized Costs
Appendix D – Software License Agreement
Appendix F – Milestone Payment Schedule
Appendix K – Open Source Software and Third Party Software

In the event that the City receives a request for one or more of the records identified above, Motorola understands that the City will provide Motorola with notification of the request and an opportunity to provide input on the release of the record(s) as provided in the Act.

MOTOROLA, INC.

By:_____
　　　Patty Holtschneider

Title: MSSI Vice President

Date:

MOTOROLA
intelligence everywhere

August 31, 2007

Mr. Frank Punzo, Deputy Commissioner
Department of Public Works
City of Philadelphia
City Hall, Room 732
Philadelphia, PA 19102

Subject: 800MHz Radio System Upgrade

Dear Mr. Punzo,

Motorola, Inc. is pleased to provide the attached proposal for the City of Philadelphia 800 MHz Radio System Upgrade. Motorola has included all the necessary hardware, software and services to upgrade the City's existing ASTRO communication network to an ASTRO 7.X IP based network.

The proposed upgrade will extend the system's lifecycle while utilizing the majority of the City's existing assets. The upgraded network will provide a platform for future expansion as the City's communication needs change.

In the development of this proposal Motorola has identified areas where we can team with City certified MBE's. As in the past we are please to be able to include M&M Solutions as a key partner in our communications solution for the City.

Motorola appreciates the opportunity continue our collaborative relationship with City of Philadelphia. Should there be any questions please contact Joe Papania, at 609-221-8995, Tony Salonga, at 717-471-0477, or Jim Ahrens at 410-544-1961.

Sincerely,

Patty Holtschneider
MSSI Vice President
Government Project Team
North America Government & Commercial Markets Division

Section 1. Executive Summary

Motorola takes great pride in having been a partner with the City of Philadelphia over the last decade, supplying and supporting mission critical emergency communications for all City Public Safety and Public Service departments. Through this partnership, we have been able to better understand the critical needs of the City, and your vision of the future. The 800 MHz radio communications network represents a major technology investment for the City. Motorola has completed a review of the City's current system, and is very pleased to present this firm proposal for a system upgrade. This upgrade will preserve a major portion of the City's past investments and provide the City the requested obsolescence protection. Our proposed solution will upgrade the City's circuit-based network to our open-standards, IP based ASTRO 25 IP network with a roadmap to the future. Our solution also incorporates the use of City certified MBEs and WBEs wherever possible

1.1 Technology Platform for the Future

Motorola's solution provides a cost-effective migration to a scalable ASTRO 25 IP based technology platform for City users. This new technology platform includes:

♦ Scalable IP network design that facilitates future expansion for new users and technologies, as the City's communications requirements grow

♦ Current network lifecycle extended by at least 8-10 years

♦ Reuse of the majority of the City's existing 800Mhz radio system network equipment

♦ Existing mobile and portable radios will be upgraded to operate on the new ASTRO 25 IP platform

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City of Philadelphia
ASTRO 25 Upgrade
Executive Summary
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- APCO Project 25 compliant system supports subscribers from any APCO 25 compliant vendor
- Improved network security
- Continued outstanding voice coverage using linear simulcast technology

1.1.1 Combination of IP and APCO Project 25 Standards-Based Technology

The proposed system architecture will provide an optimized Internet Protocol (IP) network that supports Mission Critical operations. Unlike vendors who specialize in the commercial marketplace, where immediate access to the network is not essential, Motorola has leveraged our 65 years of experience and expertise to design and implement Mission Critical IP networks that truly meet the needs of the public safety community. The ASTRO 25 network uses many of the same protocols and components found in commercial and corporate data networks, reducing your overall network costs by eliminating the need for customized circuit based equipment.

Our ASTRO 25 infrastructure incorporates many commercial off-the-shelf (COTS) components found in corporate and industrial data networks. However, our Mission Critical IP design uses equipment with faster call setup times than commercial IP networks. We utilize enhanced routers and switches to improve audio quality during peak traffic loads, and customized the design to route around component failures in seconds. Our proposed upgrade uses redundant equipment to prevent a single point of failure from reducing overall system performance, and ensures the network will meet the stringent demands of Fire, Police, Municipal, and Airport communications. The result is the best combination of COTS and enhanced COTS equipment, giving the City of Philadelphia the benefits of IP architecture without compromising the reliable performance required by public safety users.

1.2 Mission Critical Reliability and Capacity

The term "Mission Critical" is used to describe a network created to operate flawlessly and reliably every time. Motorola's network is designed to meet the reliability, capacity, and control requirements of the City's Public Safety and Public Service users.

1.2.1 Mission Critical Reliability

1.2.1.1 Reliability

Designed for Mission Critical applications, with multiple levels of fault-tolerance, redundancy, and back-up power

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1.2.1.2   Capacity

Capability to accommodate a multitude of public safety users during emergencies with orderly and prioritized system access

1.3   Control

Motorola's ASTRO 25 Network will provide the City an audit trail of who is communicating, when they communicate, and whom they communicate with.

Our proposed network upgrade is designed to meet the reliability, capacity, and control needs of the City's users. The proposed City of Philadelphia system upgrade is designed with a combination of fault tolerance and redundancy. Our Mission Critical IP network has built-in robustness with no single point of failure. By employing distributed architecture, local failures will not propagate throughout the network. The system will be monitored 24 hours a day, 7 days a week to ensure that the network will always be available.

The ASTRO 25 network has the capacity to operate reliably during both routine and emergency situations. A major advantage of our simulcast design is that all channels in each cell are available to all users at all times. Since no one knows where the next emergency will occur, a full complement of channels throughout the City assures that your public safety users will have adequate resources. A simulcast configuration ensures that your system will operate dependably during peak access times. The ASTRO 25 network will allow the City to manage and monitor whom they are communicating with, and when they communicate. This level of control will allow the City to designate priority access to first responders, to ensure that your Mission Critical communications will get through no matter how many users access the network.

1.4   Comprehensive System Support

We have proposed a comprehensive total support plan that can be tailored by the City. Our Systems Support Center (SSC) in Schaumburg, Illinois provides 24 hours per day, 7 days per week system support. Our expert technicians at the SSC remotely monitor the health of systems throughout the world. If a problem should arise with the City of Philadelphia network, the SSC will promptly diagnose and correct it quickly. In many cases, we have remotely diagnosed system issues before users even knew there was a problem.

Motorola's experienced project team is ready today to implement and maintain the upgraded system for the City of Philadelphia. Service to the City will continue to be provided by our local field service and installation team, which includes Motorola employees and qualified technicians from Wireless Electronics, that have been trained by Motorola in maintaining trunking and microwave systems for public safety

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users. Together this team will also provide on-site first echelon support for mobile and portable radios. Our Radio Support Center will provide depot repair services. Additionally a comprehensive training plan coordinates dispatcher, maintainer, and end-user training within the proposed system implementation schedule. Motorola has also included refresher training for mobile and portable operation, as we recognize this to be an extremely important component to the success of the radio system.

1.5 Flexible Financing Options

A flexible, tax exempt municipal lease/purchase plan is available to the City of Philadelphia through Motorola Credit Corporation. This plan enables the City to receive low interest rates resulting from tax benefits received by Motorola. The tax exempt municipal lease/purchase plan also offers the City the following:

♦ 100% transaction financing
♦ Even, graduated, or deferred payment streams
♦ Up to 20 year terms
♦ Fixed or floating rate structure
♦ Flexible payment structure

1.6 Summary

Our solution provides the City of Philadelphia:

♦ A Technology Platform for the Future
  ♦ IP-based network with new capabilities and compliance with APCO Project 25
  ♦ Upgraded IP based transmitters
  ♦ Upgraded network that will be controlled by existing dispatch consoles
  ♦ Upgraded mobile and portable radios
♦ Mission Critical Reliability and Capacity
  ♦ Redundancy and fault-tolerant design for critical network reliability
  ♦ Capacity for prioritized and orderly access during emergencies
  ♦ Control to designate priority access for first responders
♦ Cost-Effective Standards Based Technology
  ♦ APCO Project 25 digital standards
  ♦ Standards-based IP network design for scalability and lower total cost of ownership
  ♦ Mission Critical network enhancements

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June 13, 2008

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- Flexible Interoperability
  - Common platform for all City public safety users
  - Distributed IP architecture for increased reliability and lower costs
- Comprehensive System Support
  - Experienced support network in place today in the City of Philadelphia
  - 24 x 7 system monitoring with rapid response times
  - Detailed training plans coordinated with implementation schedule
- Motorola Credit Corporation
  - 100% transaction financing
  - Municipal Lease-Purchase Plan with aggressive rates
  - Flexible terms and payment structures

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Section 2.   System Description

Motorola is proposing an upgrade as a cost effective approach to migrate from the City of Philadelphia's existing Smart Zone 3.0Z system to Motorola's premier ASTRO 25 platform. The City of Philadelphia's new ASTRO 25 system will utilize the existing radio sites, simulcast channel configuration and subscribers that are currently in use by the SmartZone 3.0Z 800 MHz system.

> MOTOA4™ provides you with technology that is Second Nature and enables continuous interoperable communications that are vital to your first responders to save lives, assess threats, enforce laws, and serve the public. Our standards-based technology ensures improved coverage, maximizes reliability through system capacity, and increases interoperability with neighboring agencies, while providing you a cost-effective and predictable migration to future technology.

2.1   Technology that's second nature: The MOTOA4 Portfolio ™

Our MOTOA4 portfolio represents a full evolution of advanced public safety communications from analog voice to digital technologies based on Project 25 standards to broadband networking solutions and mobile data devices optimized for a wide range of Mission Critical environments.

MOTOA4 solutions are built around a fundamental need for technology that is 'second nature', enabling responders to focus on the mission and not the technology. Motorola's extensive portfolio includes wireless networks, advanced devices and advanced applications, allowing agency personnel to receive better information so they can make better decisions for better outcomes.

MOTOA4 enables public safety agencies to confidently take the next step in mission critical communications beyond the basics to the most reliable and innovative wireless solutions. It is based on providing seamless connectivity, real-time information in the hands of users. MOTOA4 stands for the 4 advanced evolutions of mission critical Advanced Voice, Advanced Integrated Voice and Data, Advanced Wide Area Data to Advanced Broadband Data. It incorporates networks, applications, devices and services, providing:

♦ *Seamless Connectivity* - Ultra-reliable mission critical communications – across networks, applications and devices. Anywhere. Anytime.

♦ *Real-Time Information* - Mobile intelligence and instant awareness when you need it most. Suite of advanced applications that deliver actionable, accurate, real-time information to the field.

♦ *In the Hands of Users* - Rugged. Dependable. Easy-to-use devices. So you can focus on the mission – each time, every time.

2.2 ASTRO 25 IP

Motorola's proposed solution for the City of Philadelphia is our ASTRO 25 platform with Integrated Voice and Data, the foundation of the MOTOA4 Mission Critical Portfolio. This platform offers a Project 25 standards-based Internet Protocol (IP) modular solution, providing your first responders with:

♦ *Cost savings* – reduces costs by integrating your voice and data needs into a single solution.

ASTRO 25

When Mission Critical Communications Demand Project 25 Interoperability and IP Flexibility

- *Interoperability*– Compliant with APCO Project 25 standards, offering seamless interoperability with other compliant systems and radios, putting the highest level of interoperability in the end users' hands, without the need of gateways or console patches.
- *Reliability* – Pre-release software and upgrade testing, 3rd party hardware and software certification process, fault tolerant architecture with multiple fall back modes, multiple levels of redundancy, and real-time network and security monitoring provide Mission Critical reliability.
- *Increased security* – Information Assurance (IA) enhances the confidentiality, integrity, and availability of the Radio Network Infrastructure (RNI). Multiple encryption algorithms keep end-to-end voice and data transmissions confidential.
- *Enhanced productivity* – Easy and intuitive interfaces to critical real-time information is delivered to the user when and where they need it.
- *Flexibility* – Scaleable, flexible design allows ASTRO 25 to dynamically adapt to the operational demands of any size organization - the IP-based design supports a unique mix of voice, data, and geographical requirements, permitting easy system enhancements as the users' needs evolve.

A description of the features, benefits, system architecture, and hardware components are provided in this system description.

2.2.1 Proposed Solution

Our ASTRO 25 IP solution provides scalability, flexible system architecture, unparalleled network management, and easy migration to future capabilities, offering the City of Philadelphia a world class mission critical Motorola ASTRO 25 communication system.

The system includes the following:

- Migrate both of the City's existing 10 site simulcast subsystems (System A – 15 Channels, and System B 20 channels) to ASTRO25 and integrate them into the new ASTRO25 Master site. At the direction of the City, Motorola is designing the new system around using the new GTR8000 series base stations with IP-Simulcast transport. The migration and reuse of the existing Quantar base stations and associated existing circuit based TeNSr transport network is now being presented as an option.

- Citywide dispatch network – Migrate the existing dispatch network over to the new ASTRO25 Master site. This will allow the City reuse of the existing CENTRACOM Gold Elite operator positions.

♦ Digital radios – The City of Philadelphia's existing subscriber base of mobile and portables will be upgraded to support the ASTRO25 network. Re-use of existing Mobile and Portable radios to the greatest extent possible will allow the City to leverage their initial investment.

The proposed City of Philadelphia ASTRO25 System will utilize the radio sites that are currently in use by the two separate 800MHz simulcast sub-cells. The existing sites locations being re-used on the ASTRO system are as follows:

♦ City Hall Room 626m – Master Site
♦ City Hall 10th Floor – Prime Site for System A w/ Co-located A&B system Remote Sites
♦ 320 Domino Lane – Prime Site for System B w/ Co-located A&B Remote Sites
♦ Engine 9 – Remote RF Site
♦ Ford & Belmont – Remote RF Site
♦ Victory Garden – Remote RF Site
♦ 31st & Grays Ferry – Remote RF Site
♦ Streets & Highways Department - Remote RF Site
♦ Police Academy – RF Remote Site
♦ Bustleton & Hoffnagle – RF Remote Site
♦ South Hampton – RF Remote Site

Motorola has taken great care to propose an offering that will provide a cost-effective way for the City of Philadelphia to upgrade to Motorola's newest ASTRO 25 platform. This upgrade will meet the City of Philadelphia's needs today and in the future.

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♦ City Hall Room 626m – Master Site
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♦ Ford & Belmont – Remote RF Site
♦ Victory Garden – Remote RF Site
♦ 31st & Grays Ferry – Remote RF Site
♦ Streets & Highways Department - Remote RF Site
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Motorola has taken great care to propose an offering that will provide a cost-effective way for the City of Philadelphia to upgrade to Motorola's newest ASTRO 25 platform. This upgrade will meet the City of Philadelphia's needs today and in the future.

Figure 2-1: Network Site Connectivity

2.2.2   System Features

ASTRO 25 is a feature-rich, modular platform that has been configured to maximize the utility of the system to your unique needs. The following sections provide discussion of the key ASTRO 25 IP System Features to include:

♦ System Access Features
♦ User Talkgroup Features
♦ Individual Call Features
♦ Integrated Voice and Data
♦ Encryption Capabilities
♦ Network Management Features
♦ Information Assurance
♦ Network Monitoring
♦ User Accessibility Features
♦ Simulcast Operation
♦ Reports

2.2.2.1   System Access Features

To ensure system access, simplify radio operation, and limit operator involvement, the ASTRO 25 platform has many access features, as described below.

Busy Queuing/Call Back

This system has been designed to maximize availability to the end user. In the unlikely event that all the channels are busy, a user depressing their Push-To-Talk (PTT) will be given a busy signal, and placed into a busy queue. When a channel becomes available, the system assigns the users to a channel via pre-assigned priority levels. Once a channel is assigned, the system notifies the user with a call back tone. This feature makes it unnecessary for the radio operator to waste valuable time rekeying their radio in an effort to gain channel access.

Automatic Retry

If a channel request is not received at the Zone Controller, the individual radio unit continues sending channel requests until the Controller acknowledges the request, or until a total of 16 automatic retries occur. This feature eliminates the need for the operator to continually key and de-key their radio, or to keep their radio keyed in an effort to gain system access.

Recent User Priority

To ensure uninterrupted communications, a recent radio user priority provides those users who have been recently assigned a voice channel priority over the other system users. Recent user priority ensures that a talkgroup engaged in a conversation receives priority system access for up to 10 seconds between transmissions.

Misdirected Radio Protection

To ensure that a radio from one talkgroup cannot accidentally be assigned to a voice channel being used by a different talkgroup, the system utilizes embedded signaling. If a unit from a different talkgroup is accidentally assigned the same channel, the radio will recognize that it has been assigned incorrectly, and will automatically revert to the control channel.

Continuous Assignment Updating

Once a talkgroup is assigned a voice channel, the control channel continues to transmit the channel assignment for as long as that talkgroup is using the channel. This ensures that a radio just coming into service will be sent to the appropriate voice channel to join the rest of its talkgroup.

Talk Prohibit Tones

In the event that a user attempts to perform an unauthorized function as defined by system permissions, a talk prohibit tone is given.

2.2.2.2 User Talkgroup Features

To enhance user functionality, the ASTRO 25 platform has many talkgroup features, as described below. These features are configurable by the System Administrator

Emergency Alarm/Call

Emergency alarm/call provides users the capability to inform dispatch personnel of a life-threatening situation. By pressing the radio's emergency alarm button, an audible and visible alarm and the user's ID are sent to the dispatcher, and optionally all talkgroup members.

In emergencies, the dispatch center is notified immediately, regardless of whether the system is busy. If one or more voice channels are available, one of those channels will be assigned immediately to the emergency call when the user presses the PTT switch. The duration of the emergency call can be defined by the system administrator.

In the event that the system is busy, two alternatives are provided for handling emergency traffic:

♦ *Top of the Queue*—when an emergency is initiated and no channel is available, the emergency user is put at the top of the busy queue. As soon as the first user on any channel de-keys, the emergency caller is assigned that channel. The major advantage to this approach is that there is no contention for the channel.

♦ *Ruthless Preemption*—when an emergency is initiated and no channel is available, the Zone Controller selects the channel assigned to the lowest priority user and assigns it to the emergency caller – a feature unique to Motorola trunking systems.

Multiple Priority Levels

The system provides 10 priority levels, allowing administrators to segment their users according to their communications needs. Priority 1 is always reserved for emergencies. Priorities 2 through 10 can be assigned by the System Manager on a per radio or talkgroup basis. These priorities are only applicable when the system is busy.

Multi-Group Call

Multi-group call is used to make a simultaneous call to multiple talkgroups, and allow all units to be configured for talk back capability. The System Manager can program this call to operate in one of two ways:

♦ The requesting user waits for all requested talkgroups to finish all calls in progress.

♦ The requested call immediately interrupts other conversations in progress without waiting for active users to de-key. Radio users who are transmitting on a voice channel will not hear the call until they de-key.

Dispatch Console/Talkgroup Merge

Talkgroup merge is a dispatch function that allows multiple talkgroups to operate together on one voice channel, improving channel efficiency. This is a standard feature of Motorola wireline consoles.

Non-Priority Scan

Non-priority scan allows the radio user to scan between multiple systems, talkgroups, or conventional channels.

Priority Monitor

Priority monitor allows the radio user to scan talkgroups in their system, and mark up to two talkgroups in their scan list as Priority. A non-priority conversation will be interrupted by Priority 1 or Priority 2 talkgroup activity.

2.2.2.3 Individual Call Features

To further enhance user functionality, the ASTRO 25 platform has individual call features in addition to user talkgroup features, as described below. These features are configurable by the system administrator.

Call Alert

Call Alert allows a dispatcher or radio user to selectively page an individual's radio. Call Alert signaling is conducted over the control channel and does not affect voice channel capacity. The Call Alert produces an audible and visual alert on the receiving radio. Indicators on the initiating radio acknowledge delivery of the Call Alert. If the receiving unit has a display, it will show and store the sending unit's ID.

In-Call User Alert

In-Call User Alert is a feature that builds upon Call Alert. When In-Call User Alert is enabled on the system, radios will be able to receive Call Alerts even when involved in voice and data services.

Radio Talkgroup Muting

Radio Talkgroup Muting is a feature that utilizes the Call Alert feature. Radio Talkgroup Muting allows the radio user to mute all voice traffic for the currently selected talkgroup.

The radio can be automatically un-muted by the console dispatcher or another radio user by sending the muted radio a Call Alert. With In-Call User Alert enabled, the Call Alert will reach the muted radio when it is on the voice channel or a data channel, as well as if it is idle on the control channel.

Private Call

Private Call allows a radio user or console dispatcher to selectively call and carry on a private conversation with another individual radio, as long as that unit is not already engaged in another Private Call. The calling unit will receive an acknowledgment of a successful Private Call. If the receiving radio has a display, it will show the calling party's unit ID.

2.2.2.4   Integrated Voice and Data (IV&D)

The Project 25 compliant IV&D operation allows data traffic to seamlessly utilize your ASTRO25 stations, improving in-field efficiency. Voice is prioritized, allowing mission critical traffic to always take precedence over data transmissions. The IV&D service creates a data transport layer *capable of supporting* both industry standard IP and customer-developed applications such as:

♦ Text Messaging
♦ GPS Location
♦ Over the Air Programming (POP25)
♦ Over the Air Rekeying (OTAR)
♦ NCIC Queries

Users can achieve a number of important benefits, including:

♦ Conservation of valuable airtime
♦ Increased communications accuracy
♦ Allows users in field to perform textual look up queries without dispatch
♦ Better return on investment – same assets for multiple functions
♦ Utilizes common radio units for both voice and IV&D data applications

This proposal includes a Packet Data Gateway (PDG), General Gateway Service Node (GGSN) Router which allows the system to support IV&D operations. Motorola's proposal also includes one (1) Customer Network Interface (CNI) consisting of a Firewall Appliance, Peripheral Router, Boarder Router and DMZ Ethernet Switch. The CNI provides the interface at a network level between the Mobile Data Network and the customer's enterprise network. It also isolates, for network security purposes, the customer's network from the mission critical Radio Network Interface. Please note that some mobile applications may require the use of separate, dedicated CNIs; Motorola's ASTRO25 IP Radio System can support multiple CNI's.

Over-the-Air Programming

Motorola's over-the-air programming feature is called Programming Over P25 (POP25). POP25 allows a radio to be remotely configured from your network by sending a sequence of commands over-the-air via the IV&D transport layer. POP25 enables the reconfiguration of a radio's code-plug via the Motorola Customer Programming Software (CPS) without having to be physically connected to the radio.

POP25 allows end users and radio users to stay in the field during the reconfiguration process, thus saving valuable time and resources.

Other substantial benefits include:

♦ No loss of communications while reprogramming occurs

♦ Programming resumes automatically after interruption

♦ Quicker network optimization

♦ Eliminates time spent tracking assets for reprogramming

Motorola's proposal includes a separate option for adding the necessary server and software (Presence Notifier) to the Fixed Network Equipment to allow POP25 functionality on the ASTRO25 IP Radio Network. The option also includes details on the per subscriber radio pricing to include POP25 functionality on XTS/XTL5000, 2500 or 1500 radios. Please note that XTS3000 portable radios or ASTRO Spectra Mobiles cannot support POP25 functionality.

Text Messaging Service

Similar to text messaging on a cell phone, the Text Messaging Service provides a convenient means of communication between all network users. A user can send a text message of up to 200 characters to another radio or dispatcher. Dispatchers and radio users may be a part of a named text messaging group, allowing point-multipoint service. Text Messaging Service makes use of the IV&D transport layer, and provides a store and forward function, ensuring message delivery. At the direction of the City, Text Messaging Service is not being proposed at this time.

2.2.2.5 Encryption Capabilities

When it's absolutely critical that communications not be monitored by unauthorized parties, radio systems can be configured with encryption. Encryption assures that only authorized units in the system can listen to transmissions being made. Encrypted calls are protected end-to-end throughout the network.

Project 25 Encryption Algorithms

ASTRO systems can be equipped with current Project 25 algorithms, and fully compliant with all Federal Information Processing Standards (FIPS). Please note that Motorola's proposal includes the continued use of DES-OFB encryption.

Over-the-Air Rekeying

Over-The-Air Rekeying (OTAR) provides all the features of multikey (multiple keys) and enables you to distribute encryption keys over the air without physically touching the radio. OTAR is designed to work on the IV&D transport layer.

Encryption is configured by distributing unique keys to designated user(s). OTAR eliminates the burden of manually rekeying your radios on a regular basis. It enables key distribution and key management to be conducted securely over-the-air.

Key Management Facility (KMF)

The Key Management Facility (KMF), a centralized key manager, is the essential key management controller for Motorola's Project 25 Over the Air Rekeying (OTAR) feature. Utilizing the KMF, information can easily be created, inventoried, archived, and distributed to end-users. Combining centralized key management with our standards-based OTAR capability enables effective planning, implementation, and execution of robust security procedures.

Motorola's proposal includes a separate option for adding the necessary KMF server, one KMF client and associated software to the Fixed Network Equipment to allow OTAR functionality on the ASTRO25 IP Radio Network. The option also includes details on the per subscriber radio pricing to include OTAR functionality on XTS/XTL5000 radios. Please note that XTS3000 portable radios and ASTRO Spectra Mobiles cannot support OTAR functionality.

2.2.2.6   Included Network Management Features

The following Network Management Features have been included in this proposal; please see System Design Details Section for details on numbers of concurrent licenses where applicable.

Flexible Air Traffic Information Access (ATIA)

The Flexible ATIA interface feature provides an access point for air traffic call information. Customers can generate detailed billing reports or management reports with third-party products or services.

Security Partitioning

This feature allows the creation of security groups in order to limit access to selected database records. It allows system administrators to control access to network management data by department, geography, or individual user.

Basic Radio Control Manager

The Radio Control Manager (RCM) application provides the ability to generate radio commands and to display radio events. Users also have the capability to generate RCM reports. Some features of the RCM are:

♦ **Dynamic Regrouping** - Allows a dispatcher or system manager to dynamically program an affiliated radio user to a particular talkgroup. The radio will generate an audible noise indicating to the user that the radio has been regrouped.

♦ **Storm Plans** – Provide the system with an automated, predefined procedure for special or emergency situations.

♦ **Selective Radio Inhibit** – Denies system access to lost or stolen Motorola radios. When a radio is reported missing, a network management terminal operator can send a Selective Radio Inhibit command to the system controller, rendering the radio unit inoperable. Once found, the radio can be reactivated and restored to normal operations over the air.

Figure 2-2: Sample Radio Control Manager Screen

ZoneWatch

Our customers say ZoneWatch is the single most important application for real-time monitoring of their network.

ZoneWatch provides customizable displays and graphs to monitor real-time communications activity and network health. It is a set of diagnostic tools allowing individuals to make more efficient system management decisions. An administrator defined display of information can be created down to individual unit or talkgroup activity.

♦ At a glance, provides a real-time snapshot of the system

♦ Color coded display allows for quick network status indications

♦ Enables faster identification and resolution of potential issues

Figure 2-3: ZoneWatch Control Display Example

Channel Partitioning

The Channel Partitioning feature provides agencies or departments, with exclusive use of specific RF channels. The use of this feature allows the segregation of one set of users from another to ensure dedicated resources for a specific group.

Affiliation Display

The Affiliation Display provides a dynamic view of the sites to which all operating units are currently affiliated, making it easy to track and troubleshoot radios in the system. Provides a dynamic view of

♦ Sites

♦ Talkgroups

♦ Individual Radios

This allows a manager to understand the loading characteristics of their system in real-time. Graphing capabilities are also included. Figure 2-4 provides a selected site graph example.

Figure 2-4: Selected Site Graph Example

Computer-Aided Dispatch Interface

Computer-Aided Dispatch Interface (CADI) provides access to radio traffic information and some control functions. This capability provides a method for a customer provided Computer-Aided Dispatch (CAD) host to interface to the network via the CNI.

Alphanumeric Paging

Alphanumeric Paging forwards user configurable system alarms through a customer selected paging service, providing real-time alerts to designated personnel.

2.2.2.7   Information Assurance (IA)

ASTRO 25's Information Assurance services are organized in a multi-level hierarchy, as shown in Figure 2-5. To build a well-protected system, it is necessary to implement all the services in one layer before proceeding to the next. The extent to which a customer needs to implement IA services is determined by that customer's operational needs. Motorola's proposal includes the first three layers of the IA pyramid shown below ("Part of Every System", "Perimeter Protection", & "Master Site Protection". Motorola will be pleased to work with the City to determine if additional IA layers are needed.

IA

Remote Site Protection
Zone Core Protection
Router Encryption

Remote Site Protection (Configuration)
MAC Port Lockdown / 802.1x Authentication
Secure NM – SNMPv3 Authentication and Encryption
SSH

Master Site Protection
Centralized Logging *and* Centralized Authentication
Install/Backup Service

Perimeter Protection
AntiVirus, Dial-in Authentication/Access,
Network Interface Barrier (CEN/RNI Firewall and IDS)

Part of Every System
Router ACLs
Transparent Full Element Hardening for Windows Devices - Orderable
Full Element Hardening for Solaris and Linux Devices - Inherent

Figure 2-5: Information Assurance Hierarchy

The three key benefits of Information Assurance are:

♦ *Confidentiality* - Protecting the system's working voice and data traffic from unauthorized monitoring. Shielding information from being read, copied or monitored by anyone who has not been explicitly authorized access by the owner of the information.

♦ *Integrity* - Protecting the system's network from unauthorized access. Securing information (including programs) from being deleted or altered in any way without the permission of the owner of that information. This includes log files, backup tapes, documentation, etc.

♦ *Availability* - Providing high network uptime through routine maintenance, secure service access, and remote storage of critical system operating information. Protecting services so they are not degraded or made unavailable without authorization.

2.2.2.8   Network Monitoring

The ASTRO 25 platform's suite of network monitoring applications continuously monitors the health and status of all network devices and applications, providing network managers instant visibility to status changes throughout the network. The applications include:

♦ *Hardware Element Monitoring* – The radio system monitors and reports the status of all the hardware elements in the network.

♦ *Software Process Monitoring* – The system monitors and reports the status of all the critical software processes running on the various hardware elements. If a change in a software process is detected, self-healing actions may be initiated to correct the process. Refer to the Self-Healing Actions feature for more information.

♦ *Network Link Integrity Monitoring* – Any changes in the network links are reported to the radio system's fault manager.

♦ *SNMP Trap Forwarding* – The system supports the reporting of status to the radio system's network manager via the SNMP protocol.

♦ *Self-Healing Actions* – The system automatically takes actions to remedy errors detected by its fault management routines to ensure continuation of critical communications.

2.2.2.9   User Accessibility Features

Enhanced Intermodulation (IM) Reduction

Motorola has developed an enhanced IM reduction feature (configurable feature in CPS) that helps to improve our radios performance in the presence of strong near-channel transmissions. Please consult with your Motorola system's engineer and Systems Technologist prior to implementing this feature.

Noise Reduction Software

Our unique Noise Reduction Software (NRS) feature provides improvements in audio quality by minimizing background noise, and maximizing audio quality in high noise environments.

Adaptive Power Control

Adaptive Power Control (configurable feature in CPS) optimizes the transmit power on the portable radio to extend battery life and minimize interference. Please consult with your Motorola system's engineer and Systems Technologist prior to implementing this feature.

Radio Generalized Gain Control

People talk at different levels depending on their personal usage characteristics or environmental situations. Generalized Gain Control (GGC) is used to reduce audio level variations.

Adjacent Control Channel Outbound Signaling Packet

In an ASTRO 25 Trunking system, Motorola radio units maintain a list of the adjacent sites. Each RF site (ASTRO Repeater Site and Simulcast Subsystem) in wide area trunking mode transmits a series of Outbound Signaling Packets (OSPs) containing the following:

♦ The zone/site identification.

♦ The active control channel of adjacent sites.

♦ The alternate control channels at the current site.

♦ The channel resource capabilities.

When a Motorola radio is registered with a site, the adjacent site list is updated with the information obtained from the Adjacent OSPs on the Control Channel (CC) and Link Controls (LCs) on assigned channels from that site.

After being registered on a site, and during a period of inactivity on the control channel, the radio will periodically scan the internal list of potential control channels at adjacent sites. The radio performs this control channel scan to determine the current signal strength of the control channel at the adjacent sites. Depending on the strength of the new signal, the radio may either attempt to register on the new site, or it may simply remember the new site signal strength and remain on the original site to which it is registered. By repeating this process a number of times, the internal list of potential control channels will be updated with relative signal strength measurements.

Automatic Site Registration

Site Registration is the automatic registration process that takes place when a radio roams from one site to another, which is transparent for the user.

On power up, or selection of a new system, the radio must do a Full Registration. Once completed, a procedure is used by the Motorola radio to inform the Fixed Network Equipment (FNE) of its current location upon roaming to a new site. The system tracks the location of each radio user making site switching more efficient and reducing system traffic overhead.

Radio Deregistration

Deregistration of a radio unit occurs in two forms:

♦ Radio activated

♦ Timeout activated

Radio activated deregistration is a radio function that sends in a deregistration signal to the system when turning off power or going to another trunking system or conventional personality.

Timeout activated deregistration occurs when no activity has been seen from a radio for a pre-selected time. When the timeout occurs, the radio is deregistered. Radios are polled after timeout occurs. If the radio responds to the polling, the timer is restarted. The timeout period is programmable by talkgroup, allowing the Zone Controller to conserve channels for future calls.

Dynamic Network Access Code (DNAC)

The dynamic network access code is used to reduce co-channel and co-site interference. The radio decodes the Network Access Code (NAC) associated with the control channel at a site and uses it for both transmit and receive on the ASTRO 25 voice channel at that particular site. NAC serves as the ASTRO 25 equivalent of connect tone. Each site can have one of the 16 unique NACs allowed within the system. Interference protection is provided from nearby systems as well as between sites in the customer system.

Preferred Site

Preferred Site Operation allows a radio to use an additional site ranking criteria to select an alternative, pre-programmed preferred site in trunking mode. Signal quality measured by the radio is used to determine what the radio should do in preferred site operation. The combination of the signal quality reading and the preferred site status results in the "site ranking" for that site. Preferred status allows a system administrator to better manage the capacity and traffic of their system, increasing availability of system resources to users in the field.

There are four variations of preferred site status:

- ♦ *Always preferred* – In all modes, the radio unit remains affiliated, always using this site if it has an acceptable signal quality.
- ♦ *Preferred* – In wide area trunking, the radio unit uses this site if it has an acceptable signal quality rating.
- ♦ *No preference site* - The radio unit uses the site with the best signal. This is the default setting for radios.
- ♦ *Least preferred* - The radio unit only uses this site when no other sites with an acceptable signal quality are available for use.

Given Philadelphia's unique system configuration of two completely overlapping simulcast sites and potentially two underground stand alone repeater sites, Motorola strongly recommends the City's radio templates and personalities are re-optimized for improved site selection.

Site Trunking Indication

Radios detect if a site is in wide area trunking or site trunking. Radio models with a display will indicate to the user when the site is operating in site trunking. The radio alternately displays the selected talkgroup and "Site Trunking."

User Initiated Site Search

This Motorola radio feature allows the user to manually search for the site with the next best signal quality. Please consult with your Motorola system's engineer and Systems Technologist prior to implementing this feature.

Site Lock/Unlock

This Motorola radio feature allows the radio to lock onto a specific site and not roam among wide-area talkgroup sites. Please consult with your Motorola system's engineer and Systems Technologist prior to implementing this feature.

Failsoft by Talkgroup

Subsystem/Site Failsoft is a fall back means of communication if a site no longer maintains wide area or subsystem trunking operations. Failsoft operation provides communications via repeaters/base radios in order to maintain vital communications. Each talkgroup is associated to a given frequency, the radio checks the frequency associated with its current talkgroup first. It also allows some balancing of radios across the various channels at a site and provides some basic group partitioning. Alternately, the control channels are the default Failsoft channel for each subsystem/site.

2.2.2.10   Simulcast Operation

A simulcast land mobile radio system provides continuous coverage over a large geographic region using a single set of frequencies. Simulcast solutions extend a system's RF coverage, especially in areas where available frequencies are limited, and in areas where physical barriers (e.g. mountains and buildings) can cause reduced signal coverage.

Originally, trunked simulcast was developed by Motorola to meet the needs of users who were outgrowing their single-site radio systems. Today, the City of Philadelphia enjoys the following simulcast benefits:

♦   **Improved Coverage –** One radio site may not provide the coverage necessary for the application in question. Simulcast expands the coverage area by expanding the number of radio sites without adding additional frequencies.

♦   **Efficient Use of Frequencies** — Adding sites typically requires more frequencies. In a simulcast system, the same frequencies are used at every site in the system. This makes very efficient use of the available spectrum.

♦   **Simplified Radio Operations** —Because the simulcast architecture operates like a single-site system, operations are simplified and radios are easy to use.

Motorola's approach to solving audio quality problems was to develop highly specialized simulcast equipment to eliminate the simulcast distortion problems inherent in off-the-shelf equipment. Motorola's latest ASTRO 25 digital simulcast system as proposed for the City of Philadelphia uses the newest simulcast technology. This newest ASTRO 25 digital simulcast technology still uses proven GPS based time launch to insure that all sites transmit in synchronization, and eliminates the need for remote site (ReSC) call processing equipment. This technology also uses a new Linear simulcast RF repeater station with a Linear Power Amplifier (PA). The use of a Linear transmitter allows up to twice the signal delay spread tolerance of non-linear simulcast in narrowband 12.5 kHz channels. This means that audio quality is enhanced in the site 'overlap' areas. Users hear clearer, cleaner messages, which correlate to better system acceptance.

Motorola's Project 25 solution is designed to provide consistent reliable coverage throughout the designated coverage area. Our **_proven_** simulcast technology will allow the City of Philadelphia to take true advantage of the key element in simulcast design—**_overlapping coverage._** Motorola simulcast systems encourage the use of overlapping coverage by assuring the simultaneous reception of signals from multiple transmitter sites and the incorporation of enhanced composite signal receiver voting for the inbound signals. The capability to realize the significant benefits of composite outbound and inbound signals can only be achieved utilizing simulcast technology designed to standards that far exceed the systems offered by any other manufacturer.

The simulcast subsystems proposed for the voice system are based on IP technology. The IP technology has been extended for the Project 25 platform to include a cost effective IP Simulcast offering that eliminates the need for circuit switched channel banks for trunking system operation.

2.2.2.11 IP Simulcast Subsystem Architecture

An IP simulcast subsystem has the capacity for a prime site and up to 15 simulcast remote sites. A simulcast remote site will be co-located at each prime site. The simulcast cell also can handle a maximum of 30 channels/talk paths.

An IP simulcast subsystem supports a 100Base-T LAN. The simulcast prime site communicates with the simulcast remote sites over an IP network. A prime site acts as a control point for the digital audio of the simulcast subsystem. Each comparator at a prime site collects the data for a single channel from all of the simulcast remote sites. It then selects the best received packets from all of its inputs and routes a single data stream to the multicast group. The voted audio from the comparator is sent as IP packets that are routed to all of the required sites. The Prime Site contains redundant prime site simulcast controllers, comparators, and networking equipment interface with the master site and remote simulcast sites.

The simulcast RF transmitters and receivers are located at the simulcast remote sites. These sites simultaneously transmit identical information from each site to the subscribers. The receivers at these sites receive the audio from the user radios, and pass the audio back to the prime site for audio voting. Equipment at a simulcast prime site in Motorola's proposal includes a GCP 8000 simulcast site controller, GCM 8000 comparators, and networking equipment. Simulcast remote sites contain GTR 8000 simulcast base radios, and networking equipment to interface with the prime site.

2.2.2.12   Reports

ASTRO 25 provides users with numerous reports including:

♦   Zone and System Historical Reports

♦   Dynamic reports

♦   Custom reports

♦   Affiliation User Reports

♦   Radio Control Manager Reports

These reports provide historical and real-time traffic data to aid in system optimization, allow system managers to view real time call activity to be proactive in making resource planning decisions, and monitor system usage by identifying the sites that are used the most and determining where radio users are located throughout the system.

Historical Reports

ASTRO 25 allows users to manually or automatically generate historical performance reports through the use of standard templates contained.

The Historical Reports application generates reports of statistical data that is gathered at specific, predefined time intervals. Users can then create reports from this data to monitor and analyze information about zones, sites, channels, talkgroups, and users. This data is displayed using predefined report templates and parameters.

Figure 2-6 shows an example of a Historic Report.

Preview

Site11
Site12

Site Summary

Created:	7/6/2005	10:10:07AM
Time range:	7/5/2005 10:09:41AM	7/6/2005 10:15:41AM
Interval Length:	15 Minutes	

Site Alias: Site11   Site ID: 11

Time	Total Active Calls	Duration	Total Busy Calls	Duration	Total Push To Talks	Average Voice Call Duration	Data Channel Duration	Dynamic Freq. Blocked Dur.	Percent Usage	Percent Complete
7/5/2005 3:15:00PM	0	0:00:00	0	0:00:00	0	0:00:00	0:00:00	0:00:00	33	100
7/5/2005 3:30:00PM	0	0:00:00	0	0:00:00	0	0:00:00	0:00:00	0:00:00	33	100
7/5/2005 3:45:00PM	0	0:00:00	0	0:00:00	0	0:00:00	0:00:00	0:00:00	33	100
7/5/2005 4:00:00PM	2	0:00:13	0	0:00:00	5	0:00:07	0:00:00	0:00:00	25	100
7/5/2005 4:15:00PM	0	0:00:00	0	0:00:00	0	0:00:00	0:00:00	0:00:00	33	100
7/5/2005 4:30:00PM	0	0:00:00	0	0:00:00	0	0:00:00	0:00:00	0:00:00	18	100
7/5/2005 4:45:00PM	0	0:00:00	0	0:00:00	0	0:00:00	0:00:00	0:00:00	33	100
7/5/2005 5:00:00PM	0	0:00:00	0	0:00:00	0	0:00:00	0:00:00	0:00:00	33	100
7/5/2005 5:15:00PM	0	0:00:00	0	0:00:00	0	0:00:00	0:00:00	0:00:00	33	100
7/5/2005 5:30:00PM	0	0:00:00	0	0:00:00	0	0:00:00	0:00:00	0:00:00	33	100
7/5/2005 5:45:00PM	0	0:00:00	0	0:00:00	0	0:00:00	0:00:00	0:00:00	33	100
7/5/2005 6:00:00PM	0	0:00:00	0	0:00:00	0	0:00:00	0:00:00	0:00:00	33	100
7/5/2005 6:15:00PM	0	0:00:00	0	0:00:00	0	0:00:00	0:00:00	0:00:00	33	100

Figure 2-6: Historical Reports Example

Dynamic Reports User Licenses:

ASTRO 25 allows users to generate near real-time graphical reports showing system utilization for talk group, private, and interconnect calls.

Dynamic Reports provides several predefined report templates that can be used to display statistics for a zone, site, or a console site (but not for a system) in near real time. Some of these include:

♦ **Templates for Zone-Level Reports** – Dynamic Reports allows you to create and run reports to capture statistics across a zone. For example, the Zone Call Activity report provides statistics for determining the levels of different call activities within the zone, such as call rejects or call terminations.

♦ **Templates for Site-Level Reports** – Dynamic Reports allows you to create and run reports to capture statistics across a site. For example, the Site Busy Count report provides statistics for determining the number of busies caused by lack of resources at this site or the number of busy calls originating at this site.

♦ **Templates for Console Site-Level Reports** – Dynamic Reports allows you to create and run reports to capture statistics across a console site. For example, the Console Site Link Bandwidth Usage report provides the percentage of bandwidth to a console site consumed by trunking calls in the time interval.

An example of a Dynamic Report for Zone Call Activity is shown in Figure 2-7.

Figure 2-7: Example of Dynamic Report: Zone Call Activity

Custom Reports

Custom Reports lets you create or modify reports to meet your specific needs using the statistical data elements supported by the Performance Reports application. This can be applied for either Historical or Dynamic Reports. The Custom Report is created using the Crystal Reports® application and is an optional feature of the ASTRO 25 platform.

Affiliation User Reports

Affiliation User Reports allows a user to observe selected real time affiliations in the zone for sites, talkgroups, or individual radio users. Also provides graphing capabilities.

Radio Control Manager Reports

Radio Control Manager (RCM) Reports will allow you to create and view standard reports from the following categories:

♦ *Emergency Alarms Reports* - Provides a historical listing of all Emergency Alarms received by the RCM in a selected period of time. The report can display all Emergency Alarms in the active or historical events queues. These reports include:

- Emergency Alarms by Radio Report
- Emergency Alarms by Talkgroup Report
- Emergency Alarms in the Deleted State Report
- Emergency Alarms in the Responded State Report

♦ *Current Login Sessions Reports* - Provides information about the RCM users currently logged into the system.

♦ *Radio Command Reports* - Shows the commands that have been sent to radio users, such as Regroup, Inhibit, and Selector Lock. These reports include:

- Radio Commands by Command Report
- Radio Commands by User Report
- Radio Commands by Radio Report

2.2.3   System Upgrades and Expansion Capabilities

Motorola systems are designed with expandability and future migration in mind. ASTRO 25 is an IP Standards Based scalable platform. This fact, in conjunction with our experience in designing and implementing solutions to specifically address your needs, makes us uniquely suited to solve your current communications needs as well as providing a foundation for your future growth.

2.3   Failure Mode Analysis and Reliability

One of the most important attributes of the proposed system is how it performs during various failure conditions. ASTRO 25 is designed with multiple levels of redundancy and the ability to provide continued communications should failures occur. A large communications system can be a lifeline to your users. There is no tolerance for system failure. The ASTRO 25 system can withstand multiple failures and still provide full-featured trunked communications.

To ensure that the City of Philadelphia's ASTRO 25 IP Radio System functions even in the event of multiple component failures, Motorola employs three proven design techniques:

1.   Redundancy
2.   Fault Tolerance
3.   Fault Distribution

> By incorporating these design techniques within every subsystem, Motorola provides for a graceful degradation of system performance even in the event of major failures.

Redundancy is defined as two independent components with one in an active mode and one in a hot standby mode. If a component fails, the redundant component immediately comes on line such that system operation is unaffected. A typical master site is equipped with two Motorola Zone Controllers in a redundant configuration such that if the first Zone Controller fails, the second Zone Controller assumes system-wide control. Similarly, the Prime Sites contain two Prime Site Controllers each in a redundant configuration such that if the first Prime Site Controller fails, the second Prime Site Controller assumes simulcast control.

Fault tolerance incorporates redundant subcomponents within a main component. If a subcomponent fails, the redundant subcomponent comes on line immediately and the main component remains in operation. An example of fault tolerance can be found in Motorola's Zone Controller. If a power supply fails, a redundant power supply with that Zone Controller will back-up the component.

F**ault distribution** is a design approach where multiple components are incorporated such that a failure of any one component does not disable the system but rather reduces the available resources. For example, multiple Ethernet switches will be distributed among the City's base stations at the simulcast remote sites. Therefore, in the event of the failure of one of the switches, only the base stations associated with that particular switch will be impacted.

In the event of multiple system failures, Motorola also designs into the system two reduced feature operational modes: site trunking and failsoft. Site trunking is full

featured, wide-area simulcast operation with the exception of dispatch consoles. Failsoft is conventional wide-area operation.

In both of these reduced feature modes, the most important capability of any system, reliable coverage, is fully maintained.

The following pages contain a comprehensive analysis of the possible infrastructure failure scenarios and the system redundancy for mitigating that particular scenario.

Table 2-1 is a summary of the main components of the ASTRO 25 System and their reliability design.

Table 2-1: System Redundancy and Reliability

Fixed Network Equipment Description	Redundancy/Distribution Description
Master Site (City Hall Rm626m)	
MZC 5000 Zone Controller	Redundant Zone Controllers
Enterprise Ethernet Switch	Redundant Master Site Ethernet Switches
Core Router	Redundant Core Routers
Network Management Servers	Provide management function only. Therefore, these are not redundant as a failure of a server will not fail the radio system.
Prime Sites (City Hall 10th Floor and Domino Lane)	
Prime Controllers	Redundant Prime Controllers
Prime Site Router	Redundant Prime Site Routers back to master site
Prime Site Ethernet Switches	Two Prime Site Ethernet Switches with channels distributed (odds & evens) to each of these switches.
Simulcast Remote Sites	
Site Router	Redundant Site Routers (Please Note: Requires dual T1 links per system, per site. Redundant Site Routers Not included as part of this proposal at City's direction)
Site Ethernet Switch	Redundant Site Ethernet Switches
Channels	Multiple potential control channels (i.e. four redundant control channels per simulcast system)
GPS Frequency Standard	Fault Tolerant Atomic Clock backs up GPS 1PPS; Redundant Atomic Modules
Gold Elite Dispatch Console Sites	
Console Unit	Failure of single console only effects that console
Embassy Network Console Router	Provide management function only. Therefore, these are not redundant as a failure of a server will not fail the radio system.
Embassy Network Console Switches	Provide management function only. Therefore, these are not redundant as a failure of a server will not fail the radio system.

The following pages contain a comprehensive analysis of the possible infrastructure failure scenarios and the system redundancy for mitigating that particular scenario. system reliability equates to system availability.

2.3.1   Master Site

2.3.1.1   Main ASTRO 25 MZC5000 Zone Controller

Figure 2-8: Failure of Zone Controller A at the Primary Master Site

Main ASTRO 25 MZC5000 Zone Controller

Scenario: **Failure of Zone Controller A at the Primary Master Site.**

Result: Motorola has provided redundant MZC5000 Zone Controllers at the Master Site. Failure of the active Zone Controller at the Master site will result in automatic switchover to the redundant Zone Controller. During the transition between the Primary and Backup Zone Controllers the simulcast cells and ASTRO 25 Repeater Sites will be in Site Trunking. During the transition the dispatch operators will revert to operating on Control Stations. In a matter of seconds following the switch to the Backup Zone Controller, the sites will return to Wide Area operation.

The Zone Controllers have redundant power supplies as a standard feature, which will help keep the controllers operational in case of a failure of that component. The redundant controller is regularly updated with all pieces of critical information so that if it needs to become the active controller, the current system configuration and operational characteristics are maintained.

Protection: Redundant Zone Controllers at the Master site and spare boards for the Zone Controllers.

Detection: Alarm on Manager Terminal

2.3.1.2 Main & Redundant ASTRO 25 MZC5000 Zone Controllers

Figure 2-9: Failure Scenario Diagram – Failure of Zone Controller A and B at the Master Site

Main & Redundant ASTRO 25 MZC5000 Zone Controllers

Scenario: **Failure of Zone Controller A and B at the Master Site.**

Result: In the unlikely event that both the active and redundant Zone Controllers fail, the simulcast cells and the ASTRO 25 Trunked Repeater sites will go into Site Trunking. All active calls will be lost. The dispatch operators will revert to operating on Control Stations.

Protection: Spare boards for MCZ5000 Zone Controller

Detection: Alarm on Manager Terminal

2.3.2 Master Site Enterprise Switch

Figure 2-10: Failure Scenario Diagram – Failure of a Master Site Enterprise Switch

Master Site Enterprise Switch

Scenario: **Failure of a Master Site Enterprise Switch at the Master Site.**

Result: Motorola's ASTRO 25 system employs redundant Master Site Ethernet Switches at both the Primary and Backup Master Sites. Failure of one Ethernet Switch on the active Master site will result in automatic switchover to the redundant switch. The entire system remains in the simulcast wide area trunking mode. The failure is transparent to all system users.

Protection: Redundant Master Site Ethernet Switches.
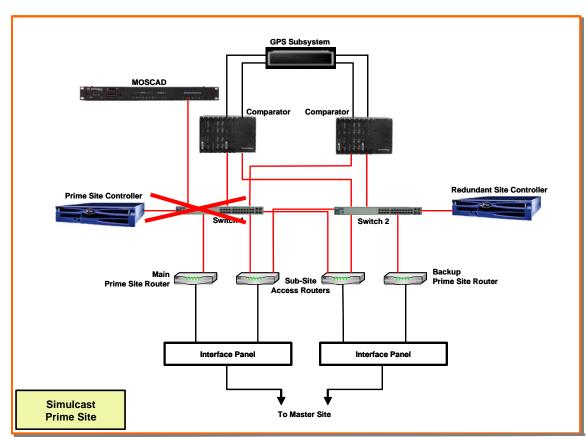
Detection: Alarm on Manager Terminal

2.3.2.1 Both Master Site Enterprise Switches

Figure 2-11: Failure Scenario Diagram: Failure of both Master Site Enterprise Switches

Both Master Site Enterprise Switches

Scenario: **Failure of both Master Site Enterprise Switches at the Master Site.**

Result: In the unlikely event that both Enterprise Switches fail, the simulcast cells and the ASTRO 25 Trunked Repeater sites will go into Site Trunking. All active calls will be lost. The dispatch operators will revert to operating on Control Stations.

Protection: Spare Enterprise Switch.

Detection: Alarm on Manager Terminal

2.3.2.2   Master Site Core Router

Figure 2-12: Failure Scenario Diagram – Failure of a Master Site Core Router

Master Site Core Router

Scenario: **Failure of a Master Site Core Router at the Master Site.**

Result: The Core Routers are configured so that site links to Simulcast Cells or to ASTRO25 Stand-alone Repeater Sites are distributed across multiple Core Routers. Failure of one Core Router at the active Master site will result in automatic switchover to the redundant Core Router. The entire system remains in Wide Area operation. The failure is transparent to all system users.

Protection: Redundant Core Router, Spare Core Router, Redundant site links (to Simulcast Prime Sites or ASTRO25 Stand-alone Repeater Sites).

Detection: Alarm on Manager Terminal

2.3.2.3 Master Site Core Routers

Figure 2-13: Failure Scenario Diagram – Failure of Both the Main and Redundant Core Routers

Master Site Core Routers

Scenario: **Failure of all the main and redundant Core Routers at the Master Site.**

Result: In the unlikely event that all Core Routers fail, the simulcast cells and the ASTRO 25 Trunked Repeater sites will go into Site Trunking. All active calls will be lost. The dispatch operators will revert to operating on Control Stations.

Protection: Spare Core Router.

Detection: Alarm on Manager Terminal

2.3.2.4 Network Management Servers

Figure 2-14: Failure Scenario Diagram – Failure of the Network Management Servers

Network Management Servers

Scenario: **Failure of the Network Management Servers at the Primary or Redundant Master Site.**

Result: There are several Network Management servers on the ASTRO 25 Network LAN. The failure of any specific server on the LAN at the Master site will result in loss of the management function associated with the specific server, while the entire system will remain in the wide area trunking mode. The failure is transparent to all radio and dispatch console users. The failure will affect the Network Management system user.

Protection: Multiple servers running separate applications. Spare components for server computers.

Detection: Alarm on Manager Terminal

2.3.2.5   Simulcast Prime Site Controller

Figure 2-15: Failure of the Simulcast Prime Controller

Scenario: **Failure of the Simulcast Prime Site Controller at a Simulcast Prime Site.**

Result: Motorola has provided redundant Simulcast Prime Controllers (GCP 8000) at the Prime sites. Failure of the active controller will result in automatic switchover to the redundant controller. The entire system remains in the simulcast wide area trunking mode. The failure is transparent to all voice system users. Dispatch console operation remains unaffected.

Protection: Redundant Prime Simulcast Controllers, spare controller modules.

Detection: Alarm on Manager Terminal

2.3.2.6 Main and Redundant Simulcast Prime Site Controllers

Figure 2-16: Failure Scenario Diagram – Failure of the Simulcast Prime and Redundant Controllers

Scenario: **Failure of the Simulcast Prime and Redundant Site Controllers at a Simulcast Prime Site.**

Result: In the unlikely event that both the Main Prime Simulcast Controller and the Redundant Prime Simulcast Controller fail at any of the Simulcast Prime sites, the Simulcast cell will revert to Simulcast Failsoft, where all transmitters' sites operate in the conventional simulcast mode. Coverage for the simulcast cell will not be degraded. Dispatchers will be able to communicate to the simulcast cell via control stations or portable radios. The unaffected simulcast cells will remain in wide area operation but will not be able to communicate to the field units in conventional simulcast mode, unless a dispatcher can patch the conventional and trunked resources together. Additionally, depending on how the subscriber radios are programmed, the subscriber radios will attempt to roam to a cell or site in wide-area trunking mode.

Protection: Spare controllers, backup consolettes, and subscriber programming.

Detection: Alarm on Manager Terminal

2.3.2.7 Simulcast Prime Site Router

Figure 2-17: Failure Scenario Diagram: Failure of a Simulcast Prime Site Router

Scenario: **Failure of a Simulcast Prime Site Router at a Simulcast Prime Site.**

Result: Motorola's ASTRO 25 system employs redundant Prime Site Routers. Failure of one Site Router at any of the Simulcast Prime sites will result in automatic switchover to the redundant router. The entire system remains in the wide area trunking mode. The failure is transparent to all system users.

Protection: Redundant Simulcast Prime Site Router.

Detection: Alarm on Manager Terminal

2.3.2.8 Main and Redundant Simulcast Prime Site Routers

Figure 2-18: Failure Scenario Diagram: Failure of a Prime Site and Redundant Site Router

Scenario: **Failure of a Simulcast Prime Site Router and Redundant Site Router at a Simulcast Prime Site.**

Result: In the unlikely event that both the Primary and Redundant Site Routers fail at any of the Simulcast Prime sites, the simulcast cell will revert to simulcast site trunking. The dispatchers for that cell will need to revert to the fallback control stations to communicate with the users within that cell. The simulcast cell will continue to operate until the wide area connection is restored. Users that have roamed to another simulcast cell or stand alone repeater site will not be able to communicate with users within the failed cell, unless the dispatcher can patch together the wide area and site trunked simulcast cells.

Protection: Spare Site Routers, backup control stations at dispatch locations.

Detection: Alarm on Manager Terminal

2.3.2.9   Simulcast Prime Site Ethernet Switch

Figure 2-19: Failure Scenario Diagram – Failure of a Simulcast Prime Site Ethernet Switch

Scenario: **Failure of a Simulcast Prime Site Ethernet Switch at a Simulcast Prime Site.**

Result: Motorola's ASTRO 25 system employs redundant Simulcast Prime Site Ethernet Switches. Failure of one Ethernet Switch at any of the Simulcast Prime sites will result in a loss of the channels connected to the failed switch. The entire system remains in Wide Area. Dispatch console operation remains unaffected.

Protection: Redundant Simulcast Prime Ethernet Switches, spare Simulcast Prime Ethernet Switch

Detection: Alarm on Manager Terminal

2.3.2.10　Simulcast Remote Site Router

Figure 2-20: Failure Scenario Diagram – Failure of a Simulcast Remote Site Router

Scenario:　**Failure of a Simulcast Remote Site Router**

Result:　The system is capable of employing redundant remote site routers. Failure of one Site Router at a remote site will result in automatic switchover to the redundant router. The entire system remains in the simulcast trunking mode.

The failure is transparent to all system users.

Protection:　Standby Simulcast Remote Site router.

Please Note: Redundant Simulcast Remote Site routers requires dual T1 links per system, per site. Redundant Site Routers Not included as part of this proposal at City's direction

Detection:　Alarm on Manager Terminal

2.3.2.11   Primary and Redundant Simulcast Remote Site Router Diagram

Figure 2-21: Failure Scenario Diagram – Failure of a Primary and Redundant Simulcast Remote Site Router

Scenario: **Failure of a Simulcast Primary and Redundant Simulcast Remote Site Routers**

Result: In the unlikely event that both the Primary and Redundant Simulcast Remote Site Routers fail, the failed remote site will be removed from the simulcast cell, and the remaining simulcast remote sites within that cell will remain unaffected. The coverage from that site will no longer be available, possibly reducing the coverage footprint. Network Management alarms and software download capability will be lost for this remote site. All other remote simulcast sites within the cell will have Network Management Alarming capability.

Protection: Spare Remote Site Router. Simulcast coverage design overlap.

Please Note: Redundant Simulcast Remote Site routers requires dual T1 links per system, per site. Redundant Site Routers Not included as part of this proposal at City's direction

Detection: Alarm on Manager Terminal

2.3.2.12 Simulcast Remote Site Primary Ethernet Switch

Figure 2-22: Failure Scenario Diagram – Primary Simulcast Remote Site Ethernet Switch

Scenario: **Failure of the Primary Simulcast Remote Site Ethernet Switch.**

Result: Failure of the Primary Simulcast Remote Site Ethernet Switch will result in a loss of the channels connected to the failed switch. The entire system remains in the simulcast trunking mode. The failure is transparent to all system users.

Protection: Redundant Simulcast Remote Site Ethernet Switch

Detection: Alarm on Manager Terminal

2.3.2.13   T1 Site Link

Scenario: **Failure of a T1 Site Link.**

Result: The failure of a T1 Site Link path between any sites without redundant
path protection will result in loss of Wide Area Communications for those
sites. Dispatch console operation remains unaffected to those sites still
connected by a properly functioning T1 site links. If sufficient T1 links are
lost to the Embassy/Elite based dispatch centers, then the dispatchers
working on consoles connected to the effected CEBs will revert to control
station operation. If the T1 link to a MCC7500 deployed for Prisons or
Police training is lost the dispatchers must revert to subscriber radios for
wireless access to the system.

Protection: Redundant T1 links proposed between master site and simulcast prime
sites. However please note that redundant site routers and therefore T1 site
links at simulcast sub-sites, the underground sites and at the Prison/Police
MCC7500 console sites have not been proposed at City's direction.
Existing CEBs at Embassy/Elite dispatch centers will continue to support
resources distributed over multiple T1 circuits using X-Bus configuration.

Detection: Alarm on Manager Terminal.

2.3.2.14 Single Simulcast Channel (Base Station or Comparator)

Figure 2-23: Failure Scenario Diagram – Failure of a single Simulcast channel.

Scenario: **Failure of a single Simulcast channel.**

Result: In a trunking system, multiple channels inherently provide redundancy. The failure of one channel (Comparator or Base Station) will be transparent to all system users. The failure of a repeater or a comparator will result in the ASTRO 25 Zone Controller removing the channel from the system, resulting in some reduced channel capacity. Any calls in progress on the failing channel will be lost, and on the next push-to-talk, radio traffic will be restored. All other channels in the simulcast cell remain unaffected. The entire system remains in the simulcast trunking mode. Dispatch console operation remains unaffected.

Protection: Multiple channels, multiple potential control channels, spare modules.

Detection: Alarm on Manager Terminal

2.3.2.15   Single Simulcast Control Channel

Figure 2-24: Failure Scenario Diagram – Failure of a single control channel.

Scenario: **Failure of a single control channel.**

Result: Motorola trunking systems provide up to four possible control channels in a Simulcast cell or ASTRO 25 Repeater site. If the currently active control channel fails, another channel automatically takes over and the control channel as the failed channel is automatically taken out of service. All other channels within the simulcast cell remain unaffected. The simulcast cell remains in the wide-area trunking mode. The failure is transparent to all system users. Dispatch console operation remains unaffected.

Protection: Multiple potential control channels

Detection: Alarm on Manager Terminal

2.3.2.16   MCC 7500 Dispatcher Operator Position

Figure 2-25: Failure Scenario Diagram – Failure of a Single Dispatch Operator Position

Scenario: **Failure of a single dispatch operator position.**

Result: The failure of a dispatch operator position would result in that particular dispatcher moving to another operator position or reverting to a fallback control station or portable radio. All other dispatch terminals operate normally and remain unaffected. The entire system remains in the simulcast trunking mode.

Protection: Fallback control stations, multiple independent dispatch positions.

Detection: Console user detection, console diagnostics.

2.3.2.17 MCC 7500 Dispatch Center Ethernet Switch

Figure 2-26: Failure Scenario Diagram – Failure of a Dispatch Center Ethernet Switch

Scenario: **Failure of a Dispatch Center Ethernet Switch.**

Result: The ASTRO 25 network was designed with dual Ethernet switches that connect the operator positions to the network. Any operator positions connected to the failed switch will be taken out of service.

Protection: Dual redundant switches. Spare switches. Please note that the optional console positions proposed for Prison have only a single position at each location thus negating the need for redundant switches.

Detection: Console user detection, console diagnostics.

2.3.2.18   GPS / Rubidium Site Frequency Control Standard

Figure 2-27: Failure Scenario Diagram: Failure of GPS Frequency Standard

Scenario: **Failure of GPS Frequency Standard.**

Result: The GPS device is implemented with redundant power supplies, GPS receiver modules, and redundant antennas.

If the GPS receiver should fail the Rubidium Frequency Standard will automatically take over the 1 pps signal to the base radios. The simulcast system's performance and audio quality will be the same as before the failure. All radio users will be unaware that a failure has occurred. The Rubidium Frequency Standard has redundant Rubidium modules. Failure of the primary module would result in the automatic activation of the standby module. Simulcast audio should be completely unaffected for several days. Gradual degradation of audio quality in overlap areas may be seen after days of no GPS synchronization.

The failure is transparent to all system users until the base radio frequency drifts out of Motorola specification. Dispatch console operation remains unaffected.

Protection: Atomic Clock backs up GPS 1 pps; Redundant Atomic Modules

Detection: Alarm on Manager Terminal

2.3.2.19   Failure Indications at Supervisory Console

The radio system's fault manager monitors and reports the status of all the hardware elements in the radio and console subsystems. Each supervisory console at the dispatch center is provided with a fault management terminal. This allows the entire radio and console network to be fault managed from the same point at which the rest of the radio system is fault managed. The specific hardware elements which are monitored are the dispatch consoles, the archiving interface servers (as applicable) and any networking equipment which support the console elements. Each of these hardware elements monitors critical internal hardware sub-elements and reports their status. This allows a failure within a hardware element to be detected and displayed on the fault management terminal.

2.4   RF System Components

An ASTRO 25 system consists of a Master Site, ASTRO 25 Repeater Site(s), and ASTRO 25 Simulcast Cell(s). This section discusses the various components that make up the proposed system.

2.4.1   Master Site Components

The Master Site is the central point for all system traffic in each ASTRO 25 zone. Call processing and system management occur at the Master Site. The Master Site equipment is described briefly in the following sections.

2.4.1.1   Zone Controller

The Zone Controller is a redundant processor that provides trunking call processing for ASTRO 25 system operation. The Zone Controller forms the heart of a wide area radio system by providing the central processor for the zone with the necessary hardware and software capabilities to provide call processing and mobility management.

The Zone Controller builds upon the strength and experience of Motorola Wide Area Trunking Systems to deliver multiple layers of reliability for business critical, mission critical and life critical applications.

Reliability through Redundancy

The Zone Controller is supplied in a redundant controller configuration, and provides the following:

♦ *System Availability* – The Zone Controller allows software upgrades once loaded, providing enhanced system availability.

♦ *Intelligent Switchover* – The Redundant Configuration provides automatic switchover to the standby controller if a loss of wide area communications is detected. Notification can be sent to the user if other components fail, allowing the user to manually switch to the standby controller if desired.

♦ *Cross Controller Compatibility* – Capable of running two different versions of software simultaneously, ensuring that upgrades are fully functional with one controller before upgrading the second controller.

♦ *Redundant Configuration* – The Redundant Zone Controller is a computer platform with redundant-processors that provide trunking call processing for ASTRO 25 wide area radio communication systems. The Redundant Zone Controller is designed to detect failures by automatically switching operation to the standby controller, minimizing interruption of call processing functionality.

2.4.1.2   Network Management Servers

The Network Management System (NMS) can be viewed as a set of software applications or tools used to manage the ASTRO 25 wide area trunked radio system and its constituent components.

The NMS supports the following services:

♦ *Network Monitoring* – Applications are included for monitoring the status of the transport network and the individual infrastructure components; displaying status information; forwarding alert information; and performing diagnostic procedures.

♦ *Configuration Management* – Facilities are provided for entering and maintaining the operational parameters of the infrastructure components and user devices (i.e., the mobile and portable radios).

♦ *Accounting Management*– NMS supports the tracking of radio usage of the system by providing an optional interface to third-party accounting and/or billing applications.

♦ *Performance Management* – Standard and optional applications are available for monitoring, reporting, controlling, and optimizing the use of system resources.

♦ *Security Management* – NMS includes features for setting user privileges and controlling their access to view and/or modify information contained in the configuration databases.

The NMS subsystem is comprised of the following servers at the zone and system levels of the ASTRO 25 system.

♦ NMS Zone-level Servers (one each per zone): Air Traffic Router, Zone Database Server, FullVision INM Server, Unified Event Manager, and Zone Statistics Server.

♦ System-level Servers (one each per system): User Configuration Server (UCS), and System Statistics Server (SSS).

Air Traffic Router (ATR)

The ATR hosts a variety of real-time, data processing applications to support user and system applications. The ATR server receives air traffic information from the Zone Controller, creates Air Traffic Information Access (ATIA) packets, and sends them to the customer server which is located on the customer network. This includes processing real-time call transactions, sourcing Air Traffic Information Access (ATIA) data stream to third-party applications, logging all ATIA data to disk, routing Radio Control Manager command and status packets to/from the Zone Controller, and routing call logging packets from the Zone Controller to the Statistics servers.

Zone Database Server (ZDS)

The ZDS handles a variety of tasks; including hosting the zone configuration database, administering applications licenses, authenticating network manager users accessing the system, and performing back-end support for user applications.

The Zone Database Server (ZDS) performs the following database server functions:

♦ Maintains the infrastructure (zone configuration) database for the zone

♦ Exports the infrastructure information from its database to the Zone Controller where it is stored as the local infrastructure database

♦ Maintains a replica of the current UCS database and home zone map

♦ Exports the radio information it receives from the UCS to the Zone Controller

The ZDS also performs all network management and fault management polling of system devices to support the network management clients. The fault management information that the ZDS collects is passed on to the FullVision® Integrated Network Management (INM) server.

The ZDS handles a variety of administrative tasks, including the following:

- Administering the standard and optional applications licenses
- Authenticating network manager users accessing the system
- Performing back-end support services for user applications
- Handling telephone interconnect record processing

FullVision® Integrated Network Management (INM) Server

The FullVision® Integrated Network Management (INM) server provides fault management for the system. It hosts the FullVision INM and FullVision Web applications, along with a Router Manager application and optional MOSCAD™ application for monitoring alarms of third-party devices.

FullVision INM allows access to status, alarm messages, and other fault management information obtained from the ZDS and other IP-managed devices via a network management client workstation. The FullVision INM application provides a centralized view of system operational status by displaying intuitive, graphical representations (subsystem topology maps) of the system. FullVision INM also maintains a data warehouse, storing event history for report generation.

FullVision® INM scans system-level and zone-level configuration information to monitor the health of system and zone-level objects such as servers, Zone Controllers, and sites. There is one FullVision INM server per zone. In a multiple zone system, one of the FullVision INM servers is equipped with the ability to collect and present information from all zones.

Zone Statistics Server (ZSS) and System Statistics Server (SSS)

The statistics servers are the data repositories for data statistics necessary to drive Historical Reports. Statistics such as the number of calls, push-to-talks, and busies are accumulated over preset time intervals.

User Configuration Server (UCS)

The UCS provides database storage and back-end processes required for most system-wide functions. The UCS makes it possible for management personnel to configure home zone maps, users, radios, talkgroups, critical sites, Adjacent Control Channels (ACC), security information at a system-level, and other system-level parameters. Group and Unit ID home zone assignments are also made at the UCS level. This information is configured using the User Configuration Manager (UCM) application and is saved in the UCS database.

Unified Event Manager (UEM)

The UEM provides a central location for managing all radio, transport, and environmental devices on the system. The application automatically discovers devices on the network to determine their real-time status. Color-coded symbols displayed on a topography map provide a geographical and hierarchical representation of the entire network. The UEM allows each user to filter out and customize the pertinent information important to their roles and responsibilities.

Features and benefits of the UEM are outlined in Table2-2.

Table 2-2: Benefits of the UEM

Feature	Benefit
Centralized View of Entire Communications Network	Network Managers can view the entire ASTRO 25 system status and quickly isolate problems to the board level.
Intuitive Graphical User Interface (GUI)	Network Managers can be quickly notified of failures on the system and diagnose device problems, utilizing a display and an intuitive GUI.
Auto Discovery of Devices	Components are automatically discovered and map views are created to show the overall health of the network.
Active Alarms View and Alarm Summary	Persistent single view all failure conditions in the network and a quick reference summary of alarms by severity allows users to quickly pinpoint the highest priority failures
Secure Device Access	SNMPv3 protocol with Triple DES and AES 256 bit encryption to prevent security breach attempts
Northbound Interface	Real time event stream using a standard industry protocol that can be used to forward events to a higher level management application for added flexibility.
Email Notifications	User specified event notifications sent via email – which could also be forwarded to a portable mobile device – allows System Managers to simultaneously address other tasks
Network Monitoring Capabilities	Archive and export event history data for analysis
Remote Command Operation	Remote state change capability helps to avoid unnecessary sites trips

The Unified Event Manager (UEM) gives the Network Manager virtually instantaneous notification of any system deficiency or element failure.

UEM Event Browser

Figure 2-28: UEM Event Browser Sample Screen

The UEM event browser (Figure 2-28) provides a way to look at all the events (or a filtered subset of events) that are received by UEM. By default, when viewing an event, the event browser displays Severity, Date/Time, Managed Resource, Entity, and Message. Additional display properties are available.

UEM Alarm Browser

The UEM alarm browser (Figure 2-29) allows the user to view all alarms, or a filtered subset of alarms. By default, when viewing an alarm, the alarm browser displays Severity, Date/Time, Managed Resource, Entity, Message, and Owner/Assignee information. Additional display properties are available. UEM supports exporting events and alarms for future analysis.

Figure 2-29: UEM Alarm Browser Sample Screen

2.4.1.3   Network Management Terminals

The NMS Windows-based client/server architecture distributes most of the user application processing to the client PC workstations. The following applications run on or may be accessed from the Network Management terminal:

- System Profile
- User Configuration Manager
- Software Download

- Historical Reports (System-level)
- Zone Profile
- Zone Configuration Manager
- ZoneWatch
- Affiliation Display
- Air Traffic Information Access (ATIA) Log Viewer
- Dynamic Reports
- Historical Reports (Zone-level)
- Fault Manager using FullVision Integrated Network Manager (INM)
- FullVision Administration
- FullVision Web Browser
- Radio Control Manager (RCM)
- Radio Control Manager Reports

2.4.1.4   Packet Data Gateway

The Packet Data Gateway (PDG) is a modular platform designed to link the wireline IP Data Network to Motorola's ASTRO 25 Trunked radio frequency (RF) network.

The PDG software platform manages IP message traffic to and from the wireless network supporting wide area roaming. With wide area roaming, data radios can roam seamlessly throughout the coverage area of the ASTRO 25 Trunked System without the need to select a different channel or have any specific knowledge of the RF network.

The PDG supports SNMP-based network management by providing detailed statistics and alarm information to monitor system activity and performance. These statistics and alarms allow you to monitor system operation and loading to support audit, diagnostic, and optimization activities using SNMP-based standard. The information can be viewed directly via the PDG local console or through the Network Management System.

2.4.1.5   Motorola GPRS (General Packet Radio Service) Gateway Service Node (GGSN) Router

The Motorola GGSN router provides for the internetworking between the Customer's Network and the ASTRO 25 data system allowing for independent management of IP addresses across networks.

The Motorola GGSN router handles the IP routing services in support of End-to-End IP data messaging. These services include Static and Dynamic IP addressing, IP fragmentation and ICMP error reporting messaging for diagnostics and troubleshooting.

2.4.1.6   Motorola Gold Elite Gateway

The Motorola Gold Elite Gateway (MGEG) is an interface that allows existing CENTRACOM Elite dispatch systems to communicate over and control a packet-based ASTRO 25 trunked radio system. The MGEG allows for support of the CENTRACOM Gold Series architecture (Ambassador Electronics Bank (AEB), Central Electronics Bank (CEB), and Elite operator positions) within the ASTRO 25 system.

As part of an ASTRO 25 system, the MGEG allows console dispatch operators to participate in secure encrypted communications if the encryption option is purchased for the system and radios. The audio between the MGEG and the radio is encrypted; however, the audio between the MGEG and the console is not encrypted. The Motorola Gold Elite Gateway (MGEG) Crypto Card provides the encryption and decryption functions to the MGEG to allow secure dispatch communications.

2.4.1.7   Ambassador Electronics Bank (AEB)

The AEB provides an interface for audio and call control to the wide-area trunking system. The AEB allows multiple CEBs to interface into the ASTRO 25 system, allowing for expanded dispatch capabilities. The AEB allows any dispatch operator to access any assigned channel within the entire console subsystem.

2.4.1.8   Network Transport Subsystem

The ASTRO 25 release transport core is engineered to meet the performance requirements of a real time system transporting voice, call control, network management, and ancillary network services. The Transport Network is a closed network. Only Motorola supplied equipment, applications and services can be used on the network.

Enterprise Ethernet Switch

The Enterprise Ethernet Switch (LAN Switch) is used to aggregate all the Ethernet interfaces for all servers, clients, and routers. To ensure system availability, redundant LAN switches are provided in the ASTRO 25 system.

Cooperative WAN Routing

The Motorola Cooperative WAN Routing (CWR) solution allows core and exit routers at the Master site to interface directly with stand-alone RF sites, simulcast prime sites, network management sites, console sites, and interzone links

The CWR solution has the following advantages:

♦ Provides redundant router failover capabilities

♦ Allows for easy configuration, testing, and maintenance

♦ Minimizes downtime during upgrades

There are three different types of routers in the CWR:

♦ *Core Routers* - The Core Routers perform the routing control of audio and data in and out of the zone, while achieving the fast access levels required by real-time voice systems. To increase availability, two Core Routers are used.

♦ *Gateway Routers* - Gateway Routers are used for devices that are multicasting beyond their local LAN, such as to Integrated Voice and Data (IV&D) and High Performance Data (HPD) packet data gateways.

♦ *Exit Routers* - Exit Routers are routers that handle Inter-Zone links. To increase availability, redundant Exit Routers are used.

Zone Core Synchronization

The Zone Core is synchronized by the Network Time Protocol server at the Master site. The clock source for both types of synchronization is a Stratum 1 source, which is derived from the Global Positioning Satellite (GPS) system. The device used includes redundant GPS receivers and antennas, redundant DC power supplies, and a back-up oscillator. Additionally, a back-up oscillator is employed in the unlikely event of lost GPS signal.

2.4.1.9   Information Assurance Elements

Keeping any network secure from unauthorized intrusions is critical. Keeping your Public Safety communications network secure is even more important.

Motorola takes ASTRO 25 network security very seriously. The integration of Information Assurance (IA) is another step towards the continuing enhancement of making sure that these mission critical networks remain operational so that the users can do their jobs better and more efficiently.

The next several paragraphs explain some of the processes, hardware and software that can be implemented with an ASTRO 25 system. We will work closely with your security team to make sure that this system experiences minimal disruption due to outside sources.

ASTRO 25's Information Assurance features, including our network security services, are organized in a hierarchy illustrated in Figure 2-30. Each feature builds upon the previous level. The Information Assurance program is scaleable to meet each customer's security requirements. Motorola's proposal includes the first three layers of the IA pyramid shown below ("Part of Every System", "Perimeter Protection", & "Master Site Protection". Motorola will be pleased to work with the City to determine if additional IA layers are needed.

Figure 2-30: Information Assurance

Below are listed several of the key services that are provided in our Information Assurance package.

Full Element Hardening

"Hardening" a system (or a system component) makes the operating system resistant to intrusion or attack. Motorola provides comprehensive hardening on key components throughout the system.

Router ACL (Access Control List)

Router ACLs ensure that only required ports and protocols can pass through the routers, providing an additional layer of protection against unauthorized or malicious traffic.

SSH (Secure Shell)

SSH encrypts the content carried by IP-based network protocols, preventing unauthorized access to information.

Antivirus Service

The Antivirus (AV) Service detects, quarantines, and repairs viruses before they can infect a network. Anti-Virus definitions require regular updates to ensure that the network is continuously protected. All antivirus programs are tested on a similar system prior to implementation to verify that these will not interfere with the networks functionality.

"Dial-In" System Service Interface

This System Service Interface utilizes RSA two factor authentication to allow remote system access by authorized individuals, allowing them to perform maintenance tasks and monitor system health.

Hardened Passwords

Hardened passwords follow generally accepted strong password guidelines. Implementation of hardened passwords are limited to those protecting default or software service accounts. Passwords protecting user accounts, and that are user accessible, are not included in this feature.

Zone Core Protection

The Zone Core Protection feature protects the System Core site from unauthorized access by providing a combination of Firewalls and Intrusion Detection.

Firewall

The firewall controls the traffic allowed to pass between networks to mitigate any risk to the operational integrity of the ASTRO 25 Radio Network Infrastructure System, and is recommended when the system will be connected to external networks.

Intrusion Detection

The ASTRO 25 system's core or master radio system site is monitored by the Intrusion Detection Sensor (IDS), which analyzes traffic crossing the interface between the radio system master/core site and an external network to detect attempts to compromise the confidentiality, integrity, or availability of a systems resource.

Intrusion Detection and Firewalls complement one another; IDS detects and notifies/logs intrusion events while Firewalls block unauthorized traffic.

Centralized Backup Service (Part of Install/Backup Service)

In conjunction with Element Provisioning, the Centralized Backup Service provides a means to quickly recover a failed or compromised network element. This service provides a repository where volatile data generated and used by the system (configuration files, log data, etc.) is stored. The information stored by the backup service is used to recover system elements to a known state in the event of a failure.

Element Provisioning Service (Part of Install/Backup Service)

The Element Provisioning Service provides a repository for all non-volatile data necessary to provision system elements including operating system, patches, and application software. This repository provides all components necessary to upgrade, restore or replace system elements.

Centralized Event Logging (System Core and Remote Sites)

Centralized Event Logging provides a location to which significant events are forwarded for analysis and storage in the network. This feature provides accountability data and audit records that are an industry recognized element of good system security practices.

Centralized Authentication Service

Centralized Authentication provides the system with a central server which manages user accounts and implements password policies for the ASTRO 25 system from a single interface. This is intended to prevent unauthorized users from accessing the network.

Port Security (MAC Port Lockdown)

The Port Security feature prevents use of any port by any unauthorized device. Port security is the implementation of MAC Port Lockdown for all layer 2 devices in the radio network.

Secure Network Management SNMPv3

SNMPv3 is the part of current network management protocol standard suite. It provides enhanced security provisions such as:

♦ Authentication - validating the source of the message
♦ Encryption - protecting the contents of a packet to prevent its contents from being read by an unauthorized source

Router Encryption (not proposed at this time)

Router Encryption equips a system's Core, Exit, and Site routers with encryption modules and provides cryptographic protection for all traffic sent over all site and zone links.

Service Access Architecture (Secure Service Access)

This feature extends the boundary protection provided by the firewall and IDS to the core site to protect the site from potential malicious traffic. It permits a permanent connection between a radio system's core and a geographically separate location for remote system monitoring or maintenance. The feature also reconfigures the "Dial-in" Service Interface to operate through the firewall and IDS.

Network Interface Barrier

The Network Interface Barrier (NIB) is an optional set of hardware and software components providing boundary enforcement and attack detection features to provide enhanced network security protection. Deploying NIBs at each connection point between radio system resources and external networks provides an important and necessary level of security in a mission critical network.

Each Network Interface Barrier is composed of two pieces of equipment: a network interface barrier firewall and an Intrusion Detection Sensor.

♦ The firewall ensures that only legitimate traffic is allowed to traverse between authorized points in external networks and the radio system.
♦ The Intrusion Detection Sensor monitors allowed connections and traffic in order to detect anomalies and potential attacks; works with the firewall to block in-progress attacks.

Motorola's proposal includes one NIB as part of the Customer Network Interface (CNI).

2.4.1.10 Alarm and Control Equipment (MOSCAD)

The Motorola Supervisory Control and Data Acquisition (MOSCAD) Graphic Master Central (GMC) coupled with the MOSCAD Remote terminal Unit (RTU) creates a fault management subsystem that ports non-SNMP alarms, such as environmental alarms, over to the SNMP alarming system (FullVision/UEM). MOSCAD also provides control capabilities through dry-contact relays, and limited programming capabilities to non-IP-based site equipment such as channel banks (as applicable), microwave equipment (as applicable), TRAK GPS receivers, and legacy base stations.

Detailed graphics and display logs allow more information to be displayed on devices monitored by the MOSCAD RTU. Geographic displays and "front panel" views of remote site equipment permit enhanced recognition of component problems and simplifies customer operator training. Custom graphics allow easy navigation from high-level geographical system view down to individual site details.

All events, alarms and control actions are time stamped, stored in the appropriate files and can be printed for hard copy record keeping. History files allow for retrieval of information at all times.

Motorola's proposal includes replacing the existing alarm and control system with a new, SDM based MOSCAD Network Fault Management System for ASTRO25. The new MOSCAD will be configured to provide the same quantity of DI alarm inputs as with the existing SMARTZONE 3.0z system and to monitor the existing TRAK9100 GPS units and existing TeNSr channel banks to the extent they are maintained in the final system configuration. Please note that as the City of Philadelphia's new ASTRO 25 integrated MOSCAD system will use high-speed IP based networking, dial-up modem based fall back reporting of alarms from remote sites will no longer be supported.

During discussions prior to this submittal, it was inquired if the new MOSCAD system needs to duplicate the existing MOSCAD system's TRAK GPS Monitoring & Module Switching functionality. This existing functionality was an SP (Special) feature developed specifically for Philadelphia's SMARTZONE 3.0z system, to address an extremely unique event which occurred on a single TRAK8900 series GPS unit during burn-in testing of the original system. To Motorola's knowledge, after almost eight years of monitoring, the unique event for which this feature was implemented has never reoccurred. It is also worth noting, the TRAK8900 series units were replaced at both existing Prime sites by the TRAK9100 series several years ago. ASTRO25 IP Radio systems utilize the TRAK9100 series GPS. Motorola's proposal does not include the referenced SP Functionality in the upgraded MOSCAD system.

2.4.2   RF Site Components

2.4.2.1   GCP 8000 Site Controller

The GCP 8000 Site Controller (GCP 8000) is the control interface between the transmitter/receiver subsystem and the Zone Controller. The GCP 8000 Site Controller comprises redundant site controller modules; one site controller module acts as the active module, and the second module as standby. The redundancy helps minimizes the possibility of a single point of failure at the site.

The GCP 8000 provides the following functions:

♦ Manages the channels to maximize throughput and channel availability

♦ Administers registration and context activation requests

♦ Monitors base stations and interacts with the MOSCAD site device manager to facilitate centralized alarm and control monitoring

♦ Provides redundant site control

♦ Enables redundant site link routing for master to prime site path redundancy.

♦ Enables upgradeability to Dynamic System Resiliency (DSR) at the site (when also using GCM comparators and GTR base stations).

♦ Enables site with upgradeability to TDMA (when also using GCM comparators and GTR base stations)

♦ Enables site with upgradeability to Dynamic Dual Mode (DDM) allowing the site to adapt for use with both FDMA and TDMA subscribers (when also using GCM comparators and GTR base stations).

Additionally, the GCP 8000 provides IP simulcast capability, enabling true end-to-end IP connectivity in a simulcast configuration.

2.4.2.2   GCM 8000 Comparator

The GCM 8000 Comparator ensures the broadcast of the best possible voice signal by combining the best parts of a single signal that has been received by multiple sites in a Multisite (simulcast) system.

The comparator features a state-of-the-art digital voting methodology: Frame Diversity Reception. The comparator selects the data frame or signals with the lowest BER and forwards it. By using the best pieces of each input signal, the result is the best possible composite signal.

2.4.2.3 GTR 8000 Station

The GTR 8000 base radio is Motorola's Next Generation platform, in which Motorola has incorporated benefits such as:

♦ Software-definable station allows for flexibility in implementation for multi-site configuration, simulcast configuration, or HPD configuration.

♦ A common hardware platform requires fewer Field Replaceable Units (FRU)

♦ Innovative design allows for upgrades within systems via hardware and/or software to avoid total infrastructure replacement

♦ Enables upgradeability to Dynamic System Resiliency (DSR) at the site.

♦ Enables site with upgradeability to TDMA

♦ Enables site with upgradeability to Dynamic Dual Mode (DDM) allowing the site to adapt for use with both FDMA and TDMA subscribers.

The GTR 8000 is available in several different configurations:

♦ GTR 8000 Base Radio (shown in **Error! Reference source not found.**) as proposed to City of Philadelphia to allow for a 1:1 physical replacement of existing Quantar stations.

♦ GTR 8000 Site Subsystem (available only in HPD systems)

♦ GTR 8000 Expandable Site Subsystem (available only in Site Repeater and HPD)

Figure 2-31: GTR 8000 Base Radio

2.4.2.4 Remote Site Router

The Site Router provides an interface that handles all of the IP Network Management traffic between the Master Site and the Remote Site. The Site Router provides the following:

♦ Media conversion – the router converts Ethernet to the selected transport medium.

♦ Traffic prioritization – the router applies a prioritization marking to the packets leaving the site.

♦ Fragmentation – the router fragments large IP packets per industry standards.

2.4.2.5   Site LAN Switch

The site LAN Switch provides a LAN interface for site equipment and a LAN port for the site router. Through the switch, the service technicians gain access to service the site, and also access the system's Graphical User Interface.

2.4.2.6   Frequency Reference

The TRAK 9100 Simulcast Site Reference is a GPS-based frequency and time reference. The TRAK frequency reference provides the simulcast system 1 PPS (Pulse per Second), 5 MPPS, and 1 PPS + 5 MPPS composite signals. These signals are used to synchronize the transmission of a simulcast system to improve overall performance and coverage.

This unit provides a high level redundancy including redundant GPS receivers, backup rubidium standard, and redundant power supplies.

2.4.3   System Design Details

2.4.3.1   Frequency Plan

The City of Philadelphia's existing SmartZone 3.0z system is currently operating on thirty-five (35) licensed 821 MHz Public Safety NPSPAC channels, administered by the Region 28 NPSPAC committee. The ASTRO25 IP Radio System has been designed to operate on these same frequencies again in 12.5 kHz bandwidth channels allowing for reuse of existing antennas, lines, channel combining and receive multi-coupling devices at the remote sites. Changes to these frequencies may necessitate changes to these devices; those changes would be handled via the change order process. Also, Motorola is not responsible for mitigating or correcting any existing interference on any of these channels.

2.4.3.2   ASTRO 25 Master Site

The proposed ASTRO25 IP Radio System Upgrade includes the Master site. The Master site acts as the control hub for the two simulcast cells the optional underground ASTRO25 Stand-alone sites and dispatch sites (to include the upgraded Embassy/Elite Console system and any future MCC7500 based console sites.)

The Master Site will continue to be located at 626M City Hall and proposed to have the following equipment:

♦ Qty(2) MZC5000 Zone Controllers
♦ Qty(1) Network Management Server

- ♦ Qty(1) Air Traffic Router
- ♦ Qty(1) Zone Database Server
- ♦ Qty(1) Full Vision Server
- ♦ Qty(1) Zone Statistics Server
- ♦ Qty(1) User Configuration Server with following system licenses:
  - CA01209AB   ASTRO25 IV&D SITES
    - Licenses provided to support up to twenty-four (24) sites. Please note all sites (simulcast or standalone) count toward total quantity
  - CA01225AB   MCC7500 DISPATCH OPERATORS
    - Licenses for up to twenty (20) MCC7500 operator positions to support Prisons, Police Training and System Manager's position. These licenses are in blocks of five (5) Operator Positions.
  - CA01208AA   RADIO USERS
    - Licenses for up to ten thousand (10,000) radios
  - D999AL   SECURITY PARTITIONING
    - Allows the creation of security groups in order to limit access to selected database records.
  - CA00966AA   FLEXIBLE AIR TRAFFIC INFORMATION ACCESS
    - Allows an external computer to access non-buffered air traffic information.
    - Includes Qty(1) ZA00103AA providing up to 10 hours of Motorola phone assistance to those developing 3rd party interfaces to the ATIA.
  - D980AM   CADI SOFTWARE OPTION
    - Provides access to radio traffic information and some control functions for a customer provided 3rd party CAD server. The radio traffic information includes PTTs, Emergency IDs received, and Status Messages received. The control functions available include: Dynamic Regrouping, Individual Selective Radio Inhibit and Radio-to-Radio or Console-to-Radio Call Alert.
    - Includes Qty(1) ZA00104AA providing up to 40 hours of Motorola phone assistance to those developing 3rd party interfaces to the CADI.
  - CA00965AA   CHANNEL PARTITIONING
    - Allows the system manager to configure the system such that agencies, or a subset of agencies, have exclusive use of specific RF channels. This is a zone level option and may be ordered for all or any zone.

- Z07AA ALPHANUMERIC PAGING
  - Forwards system alarms in the FullVision application through a customer selected paging service. The paging feature requires a dedicated paging modem and an alphanumeric paging service that provides a modem bank to accept computer-generated paging requests. This feature has been specifically tested with SKYTEL paging service and RAM-PAGE paging service.
- Qty(8) Network Management Terminals each with a 21inch non-touch, black LCD monitor and capable of using the following system network management applications. Quantity of NM Terminals assumes one terminal each at Rm626m, SMO, Municipal dispatch, FAB, PHQ, PIA and at two other T.B.D. locations using City provided T1 interconnect. Quantities of licenses shown below are for "concurrent licenses":
  - Qty(6) CA01224AB UNIFIED EVENT MANAGER (UEM)
    - Network Fault Management tool. This option also includes the FullVision Integrated Network Management application.
  - Qty(7) Z13AG UNIFIED NETWORK CONFIGURATOR (UNC)
    - Provides the capability for a user to enter configuration information for all infrastructure and transport objects.
  - Qty(8) Z802AF USER CONFIGURATION MANAGER (UCM)
    - Provides the capability for a user to enter configuration information for all radio users, console users and some security.
  - Qty(8) DA00148AG ZONE HISTORICAL REPORTS
    - Provides the capability for users to manually or automatically generate historical performance reports through the use of standard templates.
  - Qty(5) ZA00149AD DYNAMIC REPORTS
    - Provides the capability for users to generate near real-time graphical reports showing the total system utilization for talkgroup, private, and interconnect calls.
  - Qty(8) Z801AM RADIO CONTROL MANAGER
    - This option also includes Dynamic Regrouping and Status capability.
  - Qty(5) D52AJ ZONEWATCH
    - Provides a graphical display of channel activity for an entire zone by channel.
  - Qty(5) ZA00151AG AFFILIATION USER REPORTS
    - Allows a user to observe selected real time affiliations in the zone for sites, talk groups, or individual radio users. Also provides graphing capabilities.

- Qty(4) Zone Domain Controllers
- Network Security Equipment consisting of:
  - Qty(1) Core Security Management Server
  - Qty(1) Firewall
  - Qty(1) Intrusion Detection Server
- Qty(1) TRAK9100 GPS Network Time Protocol Server
  - Provide NTS to all servers and dispatch consoles. Eliminates need for WWVB BIMs.
- Qty(1) ASTRO Network Switching Center with Dual Site Link Capability
  - Contains redundant Enterprise LAN switches, core and gateway routers
- MOSCAD SDM3000 Alarm And Control Equipment
  - Qty(1) Graphic Master Central Servers
    - To be installed in SMO
  - Qty(1) Graphic Work Stations
    - To be installed in Municipal Dispatch
  - Qty(1) SDM3000 RTU with 48 digital inputs, 16 digital outputs and 8 analog inputs
- Qty(1) Network Transport Performance Server with INFOVISTA
- Qty(1) 48 Port Out of Band Terminal Server with Qty(1) dial-up modem
- Qty(1) IV&D Packet Data Gateway
- Qty(1) GPRS Gateway Server Node (GGSN)
- Qty(2) Motorola Gold Elite Gateways (MGEG)
- ASTRO25 Upgrades for existing AEB
- ASTRO25 Upgrades for existing Muni CEB

2.4.3.3 ASTRO Prime Site w/ Co-located Remote Site

Each of the ASTRO25 IP Radio System's two simulcast cells contains one site which acts as the cell's "Prime Site" for control of simulcast launch timing, receive voting and interface back to the master site. Each of the simulcast prime sites are also co-located with an RF site and are proposed to have the following equipment:

Simulcast System "A" Prime Site w/ co-located remote located on 10th Floor City Hall

- Qty(2) Prime Site – Master Site Link Routers
- Qty(2) Prime Site Ethernet switches
- Qty (2) GCP 8000 Simulcast Controllers
- Qty (15) GCM8000 Comparators
  - Deployed two (2) comparators per G-Series BR Style chassis enclosure
- Qty(1) IP Simulcast Remote Site Access Switching Center
- Qty(1) SDM3000 MOSCAD NFM with 48 digital inputs, 16 digital outputs and 8 analog inputs
- Reuse of the Existing TRAK9100 GPS
- Qty(1) Co-located Remote Site – Prime Site Link Router
- Qty(2) Co-located Remote Site Ethernet switches
- Qty (15) GTR8000BR IP Simulcast stations
- Reuse the existing TX Combining Network
- Reuse the existing RX Multi-coupling Network
- Reuse the existing RX Tower Top Amplifier
- Reuse of existing Antennas & Transmission line networks
  - Basic testing of the existing antenna/line networks at the site will be performed to verify proper performance. If a performance problem is suspected more detailed testing will be performed. Necessary replacement of any part of the existing antenna/lines network will be handled via the change order process.
- Qty (1) Genesis "GenWatch3 for 9600" terminal with two P25 Over-the-Air system inputs via EFJRS53SL Radios. Proposed with the following options:
  - Qty (1) GW3-H-CORE   This is the collection of minimum required modules for Control Channel based GenWatch3. This can be operated as a Stand Alone GW3 or GW3 Host. This includes: RIMII Input or P25 Input from EFJRS53SL, LaunchPad, Security Manager, License Connection Manager, SysLog, Alias Manager.

- Qty (1) GW3-RIMII   Additional RIMII Control Channel Input Module or P25 from EFJRS53SL connections **First one is included in the CORE selection above (all located on GW3 'server' machine, one for each System ID) ** GW3-H-CORE can support up to 5 RIMII inputs at one time.

- Qty (1) GW3-Grp   Displays talkgroup dispatch call activity, one TG per sizable and colorable window. Maximum of 2048 TGs. Very GUI interface that displays Talkgroup based dispatch call activity, most recent activity for any open Talkgroup window, Emergency display, short term logging and alerts. Optionally, a setting can be changed to turn this window into simple basic Talkgroup based PTT activity window that can be resized. Each pane can be also sized and colored and all fonts can be changed.

- Qty (1) GW3-SysSum   Summary Grid of all system activity. Summaries can be created every 1min,5min,15min,60min, 3hr,6hr,12hr,24hr. Also includes quick graphing of that information.

- Qty (1) GW3-AFF   Displays Affiliations and Deaffiliations. Search for and display current affiliation of a single ID is included.

- Qty(1) GW3-ARCHiver   Archives control channel data to SQL database. Storage length is limited to 9GB (apx 1 year for a single site) when database is co-located on the HOST PC. With Genesis engineering assistance, it can be moved to another machine where the DB limit is raised to 25Gb (apx. 3 years for a single site). Only one GW3-ARCHIVE is needed per location.

- Qty(1) GW3-SQL-WGP This is Microsoft for Workgroups with 5 CAL. This MUST be used if the Archiver is purchased.

- Qty(1) GW3-CoreRpt   Full Suite of core excel based reports relevant to industry requirements. Includes a graphical report launching interface that shows an icon of the report to be run

- Qty(1) GW3-CHAN   Graphically displays channel status for each channel on the system. Includes window showing all diagnostics and busies. Also includes a window that shows global system settings reported by the Control Channel and system rejects.

- Qty(1) GW3-GSP-SWII   Specialized GenSPOut output to emulate the SWII 'printer' output to a COM port. GSP will also send the specialized output to a TCP/IP connection.

- Qty(1) GW3-DISCRPT   This is a specialized report to aid in Rebanding or auditing radio programming. This will uniquely search the database and report on all radios, all Talkgroups each radio has used, all services each radio has used and much more. Excellent audit tool. *Requires all required core modules plus Archiver.

- Qty(1) GW3-GOSRPT   This is a highly specialized and informative report. There are two versions that come in this report group. One will automatically select your Busy Hour from a range of dates and then calculate Site Utilization, show busies, Channel Usage, Erlangs and much more.

- Qty(1) GW3-CloneWatch   Dynamically find and show radios suspected of being cloned.

- Qty(1) GW3-TRIG   Monitors an array of Control Channel activity and alerts the desktop when selected events happen. * GW3-Archiver is required.

- Qty(1) GW3-EA   USB hardware box that closes up to 8 relays based on GW3-Trigger events. Use this to turn on alarms, lights, etc. *All Core Required modules are required plus Trigger

- Qty(1) GW3-HW-CPU1   Intel™ Pentium® Dual Core Processor or better, apx. 3.00GHz, Windows® XP Professional, 128MB PCIe x16 NVIDIA Quadro NVS 285, Dual Monitor VGA Capable, 4GB, SDRAM Memory, CD/DVD-RW, 160GB SATA, 10K RPM Hard Drive, 2 Native COM Ports, 16 Port RocketPort Card (gives up to 16 COM ports for SMT, RF-modems, etc.) 17 inch (or better) Flat Panel, Sound plus basic speakers, Keyboard, Mouse, Modem, MS Office Basic, PC Anywhere, NAV (not activated) MS SQL for Workgroups

- Qty(2) EFJ-53SL-BUN   EFJ RS53SL Radio (700-800MHz) Includes: interfaces and connectors from radio to PC; Power Supply; Firmware for 3600 and P25 systems.

- Qty(1) GW3-INST   On Site in Philadelphia one person, install, , 3 days work

- Qty (1) GW3-TRAIN   One person for 2 days at customer location. 5-10 students.

Simulcast System "B" Prime Site w/ co-located remote site located at Domino Lane

- Qty (2) Prime Site – Master Site Link Routers
- Qty (2) Prime Site Ethernet switches
- Qty (2) GCP 8000 Simulcast Controllers
- Qty (20) GCM8000 Comparators
  - Deployed two (2) comparators per G-Series BR Style chassis enclosure
- Qty(1) IP Simulcast Remote Site Access Switching Center
- Qty(1) SDM3000 MOSCAD NFM with 48 digital inputs, 16 digital outputs and 8 analog inputs
- Reuse of the Existing TRAK9100 GPS
- Qty(1) Co-located Remote Site – Prime Site Link Router
- Qty(2) Co-located Remote Site Ethernet switches
- Qty (15) GTR8000BR IP Simulcast stations
- Reuse of the Existing five (5) NPSPAC Mutual Aid Channels
  - Assumes City maintains existing TeNSr channel bank connectivity back to BIM cards in Municipal CEB
- Reuse the existing TX Combining Network
- Reuse the existing RX Multi-coupling Network
- Reuse the existing RX Tower Top Amplifier
- Reuse of existing Antennas & Transmission line networks
  - Basic testing of the existing antenna/line networks at the site will be performed to verify proper performance. If a performance problem is suspected more detailed testing will be performed. Necessary replacement of any part of the existing antenna/lines network will be handled via the change order process.

2.4.3.4   A & B System Simulcast Remote RF Sites

Each Remote RF Site (South Hampton, Police Academy, S.W.W.W.T.P, Eng. #9, 31st & Grays Ferry, Streets & Highway Dept, Ford & Belmont, and Bustleton & Hoffnagle are proposed to have the following equipment:

- ♦ Qty(1) A-System Remote Site – Prime Site Link Router
- ♦ Qty(2) A System Remote Site Ethernet switches
- ♦ Qty (15) A-System GTR8000BR IP Simulcast stations
- ♦ Qty(1) B-System Remote Site – Prime Site Link Router
- ♦ Qty(2) B System Remote Site Ethernet switches
- ♦ Qty (20) B-System GTR8000BR IP Simulcast stations
- ♦ Qty (1) SDM3000 MOSCAD NFM with 48 digital inputs, 16 digital outputs and 8 analog inputs
- ♦ Reuse of the Existing TRAK9100 GPS
- ♦ Reuse the existing TX Combining Network
- ♦ Reuse the existing RX Multi-coupling Network
- ♦ Reuse the existing RX Tower Top Amplifier
- ♦ Reuse of existing Antennas & Transmission line networks

    - • Basic testing of the existing antenna/line networks at the site will be performed to verify proper performance. If a performance problem is suspected more detailed testing will be performed. Necessary replacement of any part of the existing antenna/lines network will be handled via the change order process.

2.4.4 Embassy/Elite Console Network Dispatch Sites

The existing dispatch console centers, (Municipal, Fire, Philadelphia International Airport & Police Headquarters) are proposed to have the following equipment:

Municipal Dispatch Center

♦ Reuse existing Qty (4) Centracom Gold Elite Operator Position Equipment/PCs

- Upgrade Elite software to ASTRO25 versions

♦ Reuse existing Qty(2) Console Electronics Banks (CEB)

- Upgrade existing cards to ASTRO25 firmware

♦ Reuse of the existing Logging Recorder via LOMI/LORI

- City assumed responsible to provide upgrade of existing NICE Detrunked Logging recorder to support ASTRO25 Flexible ATIA stream.

♦ Reuse of the existing RACAL Instant recall recorders (1/op)

♦ Decommissioning of the existing WWVB Time Sync BIM

- City must maintain use of existing Spectra COM NetClock for legal time reference if existing RACAL Logging recorder is maintained.

♦ Qty (1) Network Manager Terminal PC (Supervisor) with 21 inch non-touch Black LCD monitor

♦ Qty (1) 21" MOSCAD GWS Terminal (Supervisor) with 21 inch non-touch Black LCD monitor

♦ Qty (4) XTL5000 Consolettes for back-up

- reuse existing Yagi Antennas and transmission lines already under maintenance agreement
- Qty (4) MC3000 desktop controllers

♦ Qty(1) Embassy/Elite LAN Router

♦ Qty(2) Embassy/Elite LAN Switch

♦ Reuse of existing CenterCore Dispatch Operator Furniture

Fire Dispatch Center (FAB)

♦ Reuse existing Qty (5) CENTRACOM Gold Elite Touchscreen Operator Position Equipment/PCs

- Upgrade Elite software to ASTRO25 versions

♦ Reuse existing Qty(3) Console Electronics Bank (CEB)

- 4Upgrade existing cards to ASTRO25 firmware

- Reuse of the existing Logging Recorder via LOMI/LORI
  - City assumed responsible to provide upgrade of existing NICE Detrunked Logging recorder to support ASTRO25 Flexible ATIA stream.
- Replace existing instant recalls with Qty(5) Gold Elite Software-based Dual Instant recall Recorder

> The Dual Instant Recall Recorder (IRR) software allows users to record two channels of audio radio and/or telephone conversations digitally on the Elite operator PC (the software can also be configured to operate as a single channel IRR). Recording files are stored on the PC's hard drive. The Instant Recall Recorder keeps a database of all recordings, which allows for convenient "point and click" search and playback of any recordings. IRR functions are controlled through a Graphical User Interface (GUI) icon. In addition, the Instant Retrieval Recorder has numerous special features; such as the ability to attach text documents to recordings, a security system, multiple playback (which allows the user to playback more than one recording at the same time), and real time audio monitor (which allows the user to listen to the last ten minutes of a recording in progress without being required to stop recording to be able to listen). The Instant Retrieval window allows the user to immediately access the recordings. The Instant Retrieval window initially opens on the newest recordings, but allows access to any recordings on the system. The recording can also be saved to the .WAV file that the user specifies. This is useful if the user wants to save a specific recording to a CD or hard disk.

- Decommissioning of the existing WWVB Time Sync BIM
  - City must maintain use of existing Spectra COM NetClock for legal time reference for any other devices requiring it.
- Qty (1) Network Manager Terminal PC (Supervisor) with 21 inch non-touch Black LCD monitor
- Qty (1) SDM3000 MOSCAD NFM with 48 digital inputs, 16 digital outputs and 8 analog inputs
- Qty (5) XTL5000 Consolettes for back-up
  - reuse existing Yagi Antennas and transmission lines already under maintenance agreement
  - Qty (5) MC3000 desktop controllers
- Qty(1) Embassy/Elite LAN Router
- Qty(2) Embassy/Elite LAN Switch
- Reuse the existing CenterCore Dispatch Operator Furniture

EOC Dispatch, Basement FAB

- Reuse existing Qty (1) CENTRACOM Gold Elite Touchscreen Operator Position Equipment/PC
  - Upgrade Elite software to ASTRO25 versions
- Interfaces to existing Fire Console Electronics Bank (CEB)
- Qty (19) XTL5000 Consolettes for back-up
  - reuse existing Yagi Antennas and transmission lines already under maintenance agreement
  - Qty (19) MC3000 desktop controllers

Philadelphia International Airport Dispatch Center

- Reuse existing Qty (5) Centracom Gold Elite Operator Position Equipment/PCs
  - Upgrade Elite software to ASTRO25 versions
- Reuse existing Qty(2) Console Electronics Banks (CEB)
  - Upgrade existing cards to ASTRO25 firmware
- Reuse of the existing Logging Recorder via LOMI/LORI
  - City assumed responsible to provide upgrade of existing NICE Detrunked Logging recorder to support ASTRO25 Flexible ATIA stream.
- Reuse of the existing RACAL Instant recall recorders (1/op)
- Decommissioning of the existing WWVB Time Sync BIM
  - City must maintain use of existing Spectra COM NetClock for legal time reference if existing RACAL Logging recorder is maintained.
- Qty (1) Network Manager Terminal PC (Supervisor) with 21 inch non-touch Black LCD monitor
- Qty (1) 21" MOSCAD GWS Terminal (Supervisor) with 21 inch non-touch Black LCD monitor
- Qty (7) XTL5000 Consolettes for back-up
  - reuse existing Yagi Antennas and transmission lines already under maintenance agreement
  - Qty (8) MC3000 desktop controllers
- Qty(1) Embassy/Elite LAN Router
- Qty(2) Embassy/Elite LAN Switch
- Reuse of existing CenterCore Dispatch Operator Furniture

Philadelphia Police HQ Dispatch Center

♦ Reuse existing Qty (32) Centracom Gold Elite Operator Position Equipment/PCs

- Upgrade Elite software to ASTRO25 versions

♦ Reuse existing Qty(10) Console Electronics Banks (CEB)

- Upgrade existing cards to ASTRO25 firmware

♦ Reuse of the existing Logging Recorder via LOMI/LORI

- City assumed responsible to provide upgrade of existing NICE Detrunked Logging recorder to support ASTRO25 Flexible ATIA stream.

♦ Reuse of the existing Instant recall recorders

♦ Decommissioning of the existing WWVB Time Sync BIM

- City must maintain use of existing Spectra COM NetClock for legal time reference if existing RACAL Logging recorder is maintained.

♦ Qty (1) Network Manager Terminal PC (Supervisor) with 21 inch non-touch Black LCD monitor

♦ Qty (1) 21" MOSCAD GWS Terminal (Supervisor) with 21 inch non-touch Black LCD monitor

♦ Qty (15) XTL5000 Consolettes for back-up

- reuse existing Yagi Antennas and transmission lines already under maintenance agreement

- Reuse Qty (15) Comtegra desktop controllers and "Centurion" Console

♦ Qty(1) Embassy/Elite LAN Router

♦ Qty(2) Embassy/Elite LAN Switch

♦ Reuse of existing Dispatch Operator Furniture

2.4.5   System Connectivity Requirements

ASTRO 25 Digital systems and the other related subsystems such as consoles require high performance, high reliability link transport systems for site-to-site communications. The transport system is one of the primary enabling technologies for wide area two-way communications. The performance and reliability of the transport system is key to the overall performance of an ASTRO 25 system.

Motorola's ASTRO 25 network utilizes packet switched IP links to pass voice, data, control and management information between sites. Interface to the packet transport links is done via industry standard routers and packet switching equipment. Motorola's proposed design and equipment includes these items.

This proposal assumes the City is providing all necessary links via leased T1 circuits. However, almost any mix of digital transport technologies such as microwave, leased T-1's, or fiber can support the proposed ASTRO 25 network as long as these transport links meet the minimum Motorola specifications for Bit Error Rate (BER), timing delays and capacity. Failure to meet these specifications 100% of the time will severely and negatively impact system performance. Based on past performance issues, Motorola strongly recommends the City consider implementing a dedicated site interconnect network such as point to point microwave.

There are many issues to be considered when the transport system is designed for an ASTRO 25 system. In order to ensure that all factors are considered, and that the link transport system meets certain minimum requirements, Motorola has established a team of experts to assist customers such as the City of Philadelphia. This group, called the Network Design Service Team (NDST), is a group of subject matter experts that can review transport system designs and make recommendations. Motorola will be pleased to work with the City's personnel to answer any further questions related link transport requirements.

Motorola T-1 Specifications for Simulcast Prime to Remote Site Links

The specifications below are the minimum requirements for a Simulcast Prime to remote Site T-1 link.

Line Coding	B8ZS
Framing Format	ESF
Signaling	Clear Channel
Availability Expectation	99.999%
Compression	None
Clocking	Stratum 2 or better
Dry or Wet Line	Dry (i.e. no -48V present)
Bit Error Rate	1×10^{-6}
Maximum Delay	5 ms one way

Motorola T-1 Specifications for Simulcast Prime to Zone Master, and ASTRO Site Repeater Remote to Zone Master and Remote Dispatch Locations

The specifications below are the minimum requirements for a Simulcast Prime to Master, and ASTRO Site Repeater Remote to Master.

Line Coding	B8ZS
Framing Format	ESF
Signaling	Clear Channel
Availability Expectation	99.999%
Compression	None
Clocking	Stratum 2 or better
Dry or Wet Line	Dry (i.e. no -48V present)
Bit Error Rate	1×10^{-6}
Maximum Delay	5 ms one way

2.4.5.1 Inter-site Link Configurations

Each RF site in the ASTRO 25 network requires a digital transport connection back to its Prime or Master Site. For planning purposes, we recommend assuming all links be full T-1 (1.544 Mbps) bandwidth apportionment. In addition, any simulcast Prime Sites will also require a T-1 equivalent bandwidth links to the Master Site. In order to minimize impact to the existing radio system during cutover and migration Motorola recommends at a minimum the City implement new T1 circuits as per the table shown on the next page. Circuits shown in blue shading are existing CityNet circuits which could be reused with Motorola performance specification adherence commitments

2.4.6 Subscriber Upgrades

The City of Philadelphia's existing system utilizes XTS 3000 portables and ASTRO SPECTRA Consolettes and Mobiles. Upgrading these subscribers to the latest ASTRO digital technology will require software flash upgrades and in some cases board changes to allow for 9600 baud capability supported in latest ASTRO platform. Motorola will work closely with the City of Philadelphia during the transition from the SmartZone 3.0Z system to the new ASTRO25 system to ensure a smooth upgrade of these units. When the XTS 3000s and ASTRO SPECTRA are upgraded to support the ASTRO 25 9600 baud capability the XTS 3000 will not be capable of supporting advanced features of the ASTRO 25 platform. These features include OTAR, OTAP/POP25 and text messaging. The XTS 3000s will continue to provide the same basic subscriber functionality as exists today with the SMARTZONE 3.0z system and they will operate on both the old and new systems during cutover. The chart below indicates the features lost upgrading the XTS3000s to ASTRO 25 Digital Trunking.

What You Gain	What You Lose
	Type IIi Trunking
	Surveillance Mode
	Call Alert (Dig Conv)
	Radio Check (Dig Conv)
	Remote Monitor (Dig Conv & Type II Trunking)
	Selective Call (Dig Conv)
	Status/Message (Dig Conv)
ASTRO 25 Digital Trunking	Telephone Interconnect (Dig Conv)
	DTMF (Analog Conv)
	MDC Features
	AMSS (Type II Trunking)
	Dispatch Interrupt
	Busy Override
	System Wide Call
	Voice On Control
	Dual Mode Scan (Analog/Digital 3600 cc)

Note : Dig Conv – Digital Conventional

The City of Philadelphia may or may not utilize these features, but this is a full disclosure of what features are lost when upgrading the XTS3000s to ASTRO 25 Digital Trunking.

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2.5 Project Schedule

City of Philadelphia
Channelization Plan
ASTRO25 IP Radio System T1's

▢ : YELLOW denotes hardwired Ckt(s) not in Verizon Scope
▢ : LIGHT BLUE denotes exisiting Verizon Ckts reusable with performance specification commitments
● : Single DOT denotes Ckt(s) within same room

USE	T1 #	Channel Bank	City Hall, Sys Mgr Office	Master - City Hall, PentOils	Intelligrepeater - SysC City Hall, Subway Rm.	Prime A City Hall	Remote - City Hall	Prime B 320 Domino Ln	Remote - 320 Domino Ln	Southampton	Eng. 9	Ford and Belmont	Victory Gardens	31st & Greys Ferry	Streets & Hway Dept	Police Academy	Bustleton	PHQ	FA&EOC	R.L	City Hall Gen Tank Rm	Comments
ASTRO25 T1 Lines																						
AEB Link 1 to MGEG 1	1			●																		Local in same room
AEB Link 2 to MGEG 1	2			●																		Local in same room
AEB Link 1 to MGEG 2	3			●																		Local in same room
AEB Link 2 to MGEG 2	4			●																		Local in same room
System A Prime Router #1 to Masterside SRC	5			●——————●																		Local between 7th & 10th flrs IP Voice/Data and Network Mgt Transport
System A Prime Router #2 to Masterside SRC	6			●——————●																		Local between 7th & 10th flrs IP Voice/Data and Network Mgt Transport
System B Prime Router #1 to Masterside SRC	8			●				●														IP Voice/Data and Network Mgt Transport
System B Prime Router #2 to Masterside SRC	9			●				●														IP Voice/Data and Network Mgt Transport
System C Underground Site 1 to Masterside SRC	10			●——●																		OPTIONAL (Local T1 between 826in & SEPTA Rm 1)
System D Underground Site 2 to Masterside SRC	11			●——●																		OPTIONAL (Local T1 826in & SEPTA Rm 2)
System A Prime Access Router to co-located Site Router	NA					●——————●																Local on 10th Flr IP Simulcast and network mgt transport
System A Prime Access Router to Site Router	12					●			●													IP Simulcast and network mgt transport
System A Prime Access Router to Site Router	13					●				●												IP Simulcast and network mgt transport
System A Prime Access Router to Site Router	14					●					●											IP Simulcast and network mgt transport
System A Prime Access Router to Site Router	15					●						●										IP Simulcast and network mgt transport
System A Prime Access Router to Site Router	16					●							●									IP Simulcast and network mgt transport
System A Prime Access Router to Site Router	17					●								●								IP Simulcast and network mgt transport
System A Prime Access Router to Site Router	18					●									●							IP Simulcast and network mgt transport
System A Prime Access Router to Site Router	19					●										●						IP Simulcast and network mgt transport
System A Prime Access Router to Site Router	20					●											●					IP Simulcast and network mgt transport
System B Prime Access Router to co-located Site Router	N/A							●——————●														Local Domino Ln. IP Simulcast and network mgt transport
System B Prime Access Router to Site Router	21						●——●															IP Simulcast and network mgt transport
System B Prime Access Router to Site Router	22							●		●												IP Simulcast and network mgt transport
System B Prime Access Router to Site Router	23							●			●											IP Simulcast and network mgt transport
System B Prime Access Router to Site Router	24							●				●										IP Simulcast and network mgt transport
System B Prime Access Router to Site Router	25							●					●									IP Simulcast and network mgt transport
System B Prime Access Router to Site Router	26							●						●								IP Simulcast and network mgt transport
System B Prime Access Router to Site Router	27							●							●							IP Simulcast and network mgt transport
System B Prime Access Router to Site Router	28							●								●						IP Simulcast and network mgt transport
System B Prime Access Router to Site Router	29							●									●					IP Simulcast and network mgt transport
Muni CEB 1 AIM 1	30, 31			●																		Local in same room
Muni CEB 1 AIM 2	32, 33			●																		Local in same room
Muni CEB 2 AIM 1	34, 35			●																		Local in same room
Muni CEB 2 AIM 2	36, 37			●																		Local in same room
FAB CEB 1 AIM 1	38, 39			●——————————————●															●			Phase 1
FAB CEB 1 AIM 2	40, 41			●——————————————●															●			Phase 1
FAB CEB 2 AIM 1	42, 43			●——————————————●															●			Phase 1
FAB CEB 2 AIM 2	44, 45			●——————————————●															●			Phase 1
FAB CEB 3 AIM 1	46, 47			●——————————————●															●			Phase 1

Project Schedule (continued)

Red denotes changes since last Rev.

City of Philadelphia
Channelization Plan
ASTRO25 IP Radio System TT's

: YELLOW denotes hardwired Ckt(s) not in Verizon Scope
: LIGHT BLUE denotes exisitng Verizon Ckts reusable with performance specification commitments
● : Single DOT denotes Ckt(s) within same room

USE	TT #	Channel Banks	City Hall Sys Mgr Office	Master - City Hall Rm02m	Intg Regenator - Sys C City Hall Subway Rm.	Prime A City Hall	Remote - City Hall	Prime B 329 Domino Ln	Remote - 329 Domino Ln	Southampton	Eng 9	Ford and Belmont	Victory Gardens	31st & Grays Ferry	Streets & Hiway Dept	Police Academy	Bustleton	PHQ	PA&EOC	RHL	City Hall Gen Tank Rm	Comments
FAB: Gold Elite Lan Extension to ADM/CDM Server	50			●															●			Phase 1
FAB: SZ Sys Mgmt Terminal	51			●															●			Phase 1
PHQ CEB 1 AIM 1	52, 53			●														●				Phase 2
PHQ CEB 1 AIM 2	54, 55			●														●				Phase 2
PHQ CEB 2 AIM 1	56, 57			●														●				Phase 2
PHQ CEB 2 AIM 2	58, 59			●														●				Phase 2
PHQ CEB 3 AIM 1	60, 61			●														●				Phase 2
PHQ CEB 3 AIM 2	62, 63			●														●				Phase 2
PHQ CEB 4 AIM 1	64, 65			●														●				Phase 2
PHQ CEB 4 AIM 2	66, 67			●														●				Phase 2
PHQ CEB 5 AIM 1	68, 69			●														●				Phase 2
PHQ CEB 5 AIM 2	70, 71			●														●				Phase 2
PHQ CEB 6 AIM 1	72, 73			●														●				Phase 2
PHQ CEB 6 AIM 2	74, 75			●														●				Phase 2
PHQ CEB 7 AIM 1	76, 77			●														●				Phase 2
PHQ CEB 7 AIM 2	78, 79			●														●				Phase 2
PHQ CEB 8 AIM 1	80, 81			●														●				Phase 2
PHQ CEB 8 AIM 2	82, 83			●														●				Phase 2
PHQ CEB 9 AIM 1	84, 85			●														●				Phase 2
PHQ CEB 9 AIM 2	86, 87			●														●				Phase 2
PHQ CEB 10 AIM 1	88, 89			●														●				Phase 2
PHQ CEB 10 AIM 2	90, 91			●														●				Phase 2
PHQ: Gold Elite Lan Extension to ADM/CDM Server	92			●														●				Phase 2
PHQ: SZ Sys Mgmt Terminal	93			●														●				Phase 2
PIA CEB 1 AIM 1	94, 95			●																●		Phase 1
PIA CEB 1 AIM 2	96, 97			●																●		Phase 1
PIA CEB 2 AIM 1	98, 99			●																●		Phase 1
PIA CEB 2 AIM 2	100, 101			●																●		Phase 1
PIA: Gold Elite Lan Extension to ADM/CDM Server	102			●																●		Phase 1
PIA: Sys Mgmt Terminal	103			●																●		Phase 1

Section 3.   Statement of Work

3.1   General Information

This Statement of Work (SOW) defines the principal activities and responsibilities of all parties for the implementation of the Project 25 800 MHz Project 25 Radio Communications System upgrade for the City of Philadelphia (City). Notwithstanding anything to the contrary in this Section 3 or elsewhere in Amendment No. 3 or Appendices thereto, Motorola shall perform all tasks and activities and provide all Equipment, Documentation, and Software required to deliver the Project Upgrade in accordance with Performance Standards (including, without limitation, Coverage Requirements) and Functional Requirements. The System Description, Section 2 of Appendix A, sets forth the Equipment to be implemented for the Project Upgrade.

Deviations from and changes to this SOW are subject to mutual agreement between Motorola and the City and shall require a Change Order pursuant to Article 8 *Changes*, of the 1999 Contract.

In the event any provision of this SOW conflicts with or varies from Amendment No. 3 or the 1999 Agreement, as amended, Amendment No. 3 and the 1999 Agreement, as amended, shall govern.

3.2   Statement of Work Overview

The following major subsystems are included as components of the Project Statement of Work:

- Project 25 SmartZone Master Site System
- RF Site P25 New GTR8000 Base Radios
- Console Dispatch System Upgrades
- Subscriber P25 Upgrades
- New P25 Subscribers

Capitalized terms not otherwise defined in this SOW shall have the meanings provided in the body of Amendment No. 3, and if not there provided, shall have the meanings provided in the 1999 Agreement.

> **Note:** Unless otherwise indicated from the context in which it is used, the word "system" or "System" will be used herein to refer to the compilation of the foregoing subsystems, together with all interfaces and ancillary systems that are required for the Upgrade Project to conform to Amendment No. 3 and the 1999 Agreement, as amended.

3.3   System Implementation Overview

Motorola shall provide systems integration and implementation services and all other services required to deploy a fully functional communications system in accordance with Amendment No. 3, Appendices thereto, and the 1999 Agreement, as amended. Motorola's experience as a Systems Integrator, deploying large and complex communication and software systems, will provide a smooth system implementation and cutover to the new communications system. This SOW specifically addresses the implementation of the City's Project 25 upgrade.

Motorola's local Systems Integration teams are highly skilled at deploying systems of the size and complexity of this communications system.

Motorola provides a phased approach to implementation, with the following phases:

- Project Initiation and Kick Off
- Design Review
- Site Audits and Civil Review
- Order Processing, Manufacturing & Factory Testing
- Installation and Upgrades
- Systems Integration & Optimization
- Acceptance Testing
- Training

♦ Cutover

♦ Project Finalization

♦ Warranty Support

Motorola has provided a preliminary design as a part of this proposal, which serves as a baseline for the Design Review. The Design Review encompasses the design finalization of the major subsystems, including but not limited to, finalization of the site space and power requirements, Acceptance Test Plans, and Cutover plan. Motorola will work closely with the City to develop a detailed cutover plan to transition to the new communications system, such plan to be approved by the City in writing prior to installation of the System. At the end of the Design Review phase, detailed Design Documents will be provided to the City.

While the Design Review progresses, Motorola will work in parallel to perform site audits, identifying any site issues associated with the implementation of the new system. Motorola will perform upgrades to electrical systems to ensure adequate power to the new and old equipment during the transition to Project 25 operations.

Factory staging of the radio infrastructure at Motorola's Customer Center for Solutions Integration (CCSi) in Schaumburg, Illinois follows equipment manufacturing. Factory staging provides for initial assembly and testing of all Motorola manufactured radio system components. The P25 upgrade is composed of both new and existing equipment. The new components allow the Project 25 Master Site to be staged and tested with equipment from trunked RF sites. This allows the system to be configured as closely as possible to its final configuration during factory staging. Factory staging will allow testing of the functional capabilities of the communications system. This process will allow the City to witness factory testing in a controlled environment, as well as provide a smooth and easy field installation. Except as agreed otherwise by the City in writing, Motorola shall not proceed with System implementation beyond factory staging unless or until the City has accepted and approved, in writing, the configuration of the System implemented in factory staging and all factory test results.

Motorola's local implementation team will install and optimize the communications system at the City sites as staged at CCSi. Motorola's implementation includes the integration of all proposed subsystems to provide an end-to-end solution. To close the loop between proposed functionality with the deployed system, Motorola will execute Acceptance Testing according to an Acceptance Test Plan (ATP) approved by the City in writing as set forth in Section 3.7.6.

Following Functional Acceptance Testing, Motorola and the City will begin the cutover to the new system. Motorola will provide just-in-time training, scheduled in

coordination with the City and the cutover schedule, to ensure a smooth transition to the communications system.

Motorola shall maintain all Operational Communications Functionality of the City's current 800 MHz Radio System, as it exists at the Effective Date of this Amendment, through the City's Conditional Acceptance of Project Milestone #19 (Transition SmartZone 3.0 to SmartX and New ASTRO25 Mastersite (3600 A & B Simulcast System – Embassy / Elite console system) as set forth in the Project Schedule attached as Appendix G to Amendment No. 3. After Conditional Acceptance of Project Milestone #19 Motorola shall maintain all such Operational Communication Functionality on the Upgrade System through Final Acceptance and thereafter. Provided, however, that during the Cutover only, communications shall be maintained as provided in accordance with the Cutover Plan developed during the Detailed Design Review and accepted by the City in writing.

The final steps to full system implementation are delivery of system documentation, Punchlist resolution, and Final Acceptance. The project team and the post-acceptance service team will work with the City during this phase, to ensure a smooth transition to post acceptance support period.

3.4   Detailed Description of Work

The work required by this SOW is divided up into the following tasks: Title, Objective, Task Description, Motorola and the City Responsibilities and Completion Criteria, including project Deliverable(s). Notwithstanding the inclusion of Completion Criteria in this SOW, the Milestones identified in Appendix F (Milestone Payment Schedule) are subject to Article 7 (*Acceptance*), as amended. The scheduled dates of tasks are depicted in the Project Schedule.

3.5   General Project Responsibilities

The following general project responsibilities, not defined by specific tasks, include:

3.5.1   Motorola Responsibilities

Motorola will designate a Project Manager who will direct Motorola's efforts and serve as the primary point of contact for the City. The Motorola Project Manager will have significant authority to make certain decisions relative to the project, on behalf of Motorola, and will have direct access to Motorola's executive management for

resolving problems beyond the Project Manager's immediate authority. The responsibilities of the Motorola Project Manager include:

♦ Participate with the City in progress review meetings at least once a month and submit monthly status reports that identify the activities of the previous review period, as well as activities planned for the upcoming review period, including an updated Project Schedule. Maintain project communications with the City Project Manager. If requested by the City, Motorola shall conduct such progress review meetings and submit such status reports more frequently, up to once each week.

♦ Maintain project communications with the City Project Manager, and project team members. Motorola will provide a record of correspondence as part of the progress reports provided prior to each progress meeting.

♦ Maintain a documentation schedule that identifies and shows the status of documents to be transmitted for review during the next two reporting periods.

♦ Participate in weekly or monthly conference calls or face-to-face meetings and issue a mutually agreed upon agenda for each call or meeting.

♦ Manage the efforts of Motorola staff and coordinate Motorola activities with the City project team members.

♦ Measure, evaluate and report the progress against the Project Schedule.

♦ Resolve deviations from the Project Schedule.

♦ Monitoring and management of risks via Risk Management Plan.

♦ Monitor the project to ensure that support resources are available as scheduled and as identified in the contract.

♦ Assume accountability for all Motorola contractor and subcontractor supplied tasks within the Project Schedule.

♦ Coordinate and oversee the installation of all licensed Motorola application software.

♦ Review and administer change control procedures through the City Project Manager, commonly referenced as a "Project Change Request" (PCR), issued by the Motorola Project Manager.

♦ Provide timely responses to issues related to project progress raised by the City Project Manager.

♦ Work with the City Project Manager in designing and approving the format of an action item log to be used in conjunction with the Project Schedule. The purpose of the log is to identify outstanding issues, provide continual status updates on specific tasks and to identify responsibilities of the parties.

♦ Prepare and submit a monthly status report that identifies the activities and milestones completed in the previous month and activities planned for the current month and the next month, including progress and payment milestones, and an updated Project Schedule.

3.5.2 City Responsibilities

The City will designate a Project Manager who will direct the City efforts and serve as the primary point of contact for the City. The City Project Manager will have significant authority to make certain decisions relative to the project, on behalf of the City, and will have direct access to the City executive management for resolving problems beyond the Project Manager's immediate authority. The responsibilities of the City Project Manager include:

♦ Maintain project communications with Motorola's Project Manager.

♦ Identify the efforts required of the City staff to meet the City task requirements and milestones in the Statement of Work and Project Schedule.

♦ Review the preliminary Project Schedule with Motorola's Project Manager and assist Motorola in developing a detailed Project Schedule defining the detailed tasks and a schedule of Motorola and the City responsibilities.

♦ Measure and evaluate progress against the Project Schedule.

♦ Monitor the project to ensure that support resources are available as scheduled.

♦ Participate in weekly or monthly conference calls or meetings.

♦ Participate in Progress Reviews every month.

♦ Provide timely responses to issues related to project progress raised by Motorola's Project Manager.

♦ Liaison and coordinate with other Local, State, and Federal agencies, other governmental agencies and the City vendors, contractors and common carriers where it is reasonably necessary for the City to perform such liaison and coordination activities.

♦ Review and administer change control procedures, hardware and software certification (i.e. Acceptance as provided in the 1999 Agreement, as amended), and all related project tasks in a timely manner.

♦ Approve payments in a timely manner, as provided in Amendment No. 3 and the 1999 Agreement, as amended, and subject to delivery and acceptance of project deliverables in accordance with Amendment No. 3 and the 1999 Agreement, as amended.

♦ Ensure that all appropriate City personnel attend and actively participate in Progress Reviews, conference calls, and other project meetings.

♦ Assign one or more personnel, as reasonably determined by the City, who will work with Motorola staff as needed for the duration of the project, including at least one system administrator.

♦ Ensure acceptable Standard Change Request and Approval Letter(s) are approved by authorized signature(s) in accordance with Amendment No. 3 and the 1999 Agreement, as amended.

♦ Work with Motorola personnel in designing and approving the format of an action item log to be used in conjunction with the project schedule. The purpose of the log is to identify outstanding issues, provide continual status updates on specific tasks and to identify responsibilities of the parties.

♦ Provide building access to Motorola personnel to all facilities where the system is to be installed during the project, subject to City security regulations and hours of access. Temporary identification cards should be issued to Motorola personnel if required for access to the City facilities. Access must be available after business hours where necessary to perform the work or meet the project schedule.

♦ Provide any required parking permits to Motorola personnel for restricted access entry and/or parking where the Department of Public Property has the authority to issue the permits.

♦ Provide the appropriate fire inspection and building inspection certificates.

♦ Provide adequate space, electrical, HVAC, communications lines and environmental conditions for the Equipment to be installed by Motorola.

♦ Provide sites that meet Motorola's R56 Site Standards.

♦ Provide all travel accommodations for visits to Factory Testing.

♦ Provided that the City and Motorola agree the Detailed Design Review documentation is satisfactory to both, review and approve or revise delivered design documents within fifteen calendar days of submission.

3.6 Contract Initiation - Kickoff Meeting and Initiation Activities

The project will be initiated with a Project Kickoff meeting including key the City and Motorola project participants. The objectives of the Kickoff meeting include:

♦ Introduce and exchange contact information of all project participants.

♦ Review roles of key participants and project review procedures.

♦ Establish a clear chain of communication and authority.

♦ Review overall project scope and objectives.

♦ Review resource and scheduling requirements.

♦ Review preliminary project schedule with the City.

During the Project Initiation phase, Motorola will review and work with the City to finalize the following project processes and procedures and shall deliver the following documents for City review by the times specified in Appendix G Preliminary Project Schedule for the Detailed Project Schedule, and for the other documents, by the times specified in the Detailed Project Schedule:

♦ Detailed Project Schedule

♦ Risk Management Plan

♦ Change Control Plan

♦ Issues Document and Action Item Log

Motorola shall revise the foregoing documents as reasonably required by the City. Motorola shall not proceed with the Work unless or until the City has approved these documents in writing or agreed otherwise in writing.

3.6.1 Responsibility Matrix

Task	Responsibility	Deliverable
Initiate the City's Project 25 upgrade project with a Kick Off Meeting.	Motorola and the City	Documented project personnel names, responsibilities, contacts, and project review procedures
Begin creating Risk Management Plan	Motorola	Initial Risk Management Plan
Define format of the Issues and Action Item Log.	Motorola	Initial Issues and Action Item Log
Review change control procedures with the City Project Manager.	Motorola	Initial Change Control Plan
Work with Motorola personnel in finalizing and approving the Change Control Plan.	City	Initial Change Control Plan as approved by City
Provide current system documentation.	Motorola and the City	Existing System Documentation

Completion Criteria

This task is considered complete when the Project Kickoff Session has been held with Motorola and the City representatives in attendance and project scope, schedules, procedures, roles and responsibilities are documented and agreed upon within ten (10) calendar days of the Project Kickoff Meeting.

3.7   Design Review

The City and Motorola will review the Motorola's Project 25 upgrade design through analysis of the system functionality, interface requirements, and end-user requirements, all of which shall be subject to the City's written approval. Motorola will present all design documents to the City for its review. Design Review tasks and responsibilities are described in greater detail in the following sections of this SOW. Draft and Final versions of documents will be provided to the City for review and approval or rejection that will finalize the design review process, with the exception of ATPs, the development of which is governed by Section 3.7.6. Absent the City's written agreement otherwise, the Work shall not proceed unless or until the City approves the design and Motorola's documentation of the design (design documents) in writing. Motorola and the City deliverables and responsibilities are defined in the Responsibility Matrix below.

3.7.1 Responsibility Matrix

Task	Responsibility	Deliverable
Site surveys will be conducted at each site where new or upgraded equipment will be installed.	Motorola and the City	Site Surveys
A cutover plan will be developed. The City will provide existing system and user information, such as shift information and specific vehicle information which must be taken in to account to develop a Cutover plan	Motorola and the City	Cutover Plan
Motorola and the City will finalize the project implementation schedule.	Motorola and the City	Project Schedule
The System Acceptance Test Plan will be reviewed.	Motorola	Acceptance Test Plan
Motorola will deliver a Design Document that reflects changes in design and scope, as well as definition of details determined during the Design Review. Motorola will update the equipment list as necessary to accommodate the specifics of the Design Review. Motorola will update the System Description to reflect changes in the system design. Motorola will update the system drawings and documentation to reflect changes in the system design. Motorola will update the SOW to reflect changes in the implementation scope. Motorola and the City will finalize the implementation schedule. Motorola will submit a final Design Document to the City through the change order process. This document will be baselined by the System Description, SOW, Project Schedule, and other documentation provided prior to contract approval.	Motorola	Equipment List System Description System Drawings Statement of Work Project Schedule Change Orders (as necessary)

Task	Responsibility	Deliverable
The City will review the work performed by Motorola (i.e. the Motorola deliverables identified above) and provided all deliverables conform to Amendment No. 3 and the 1999 Agreement, as amended, will issue its written notice of acceptance or rejection as set forth in Section 3.4 of the 1999 Agreement, as amended by Section 3.2 of Amendment No. 3, with the exception of ATPs, the development of which is governed by Section 3.7.6.	City	Approval/Rejection Statement

3.7.2 Site Survey/Preparation

Site inspections will be conducted during this phase of the project. All equipment locations will be audited for site ready purposes and Motorola will prepare a Site Audit Report for each location. Where Motorola is providing civil work, Motorola will implement facilities that meet the site readiness / R56 requirements. Site surveys are executed as an integral part of installation preparation. This section addresses the facilities where the City is responsible for site readiness. Such City responsibility is subject to the City's written approval of the applicable Site Audit Report, which approval shall not be unreasonably withheld.

Responsibility Matrix

Task	Responsibility	Deliverable
Site Access: Subject to City security regulations and hours of operation, the City will assure reasonable site access to inspect equipment installation sites, finalize equipment locations and determine if any course of action is necessary to handle installation constraints. The City will provide existing site and system drawings as available.	City	Reasonable Site Access And Existing System Documentation
Site Readiness Audits: Motorola will perform a R56 site audit to verify site readiness. Motorola will prepare a report that includes recommendations detailing site preparation required to provide a suitable environment for installation of the equipment. This report will become part of the final system documentation.	Motorola	Site Audit Reports

Task	Responsibility	Deliverable
Electrical Upgrades: Motorola will upgrade the existing electrical systems at each site to support the additional equipment operating in parallel with the existing equipment during the cutover period.	Motorola	Electrical Upgrades
Floor Loading Motorola will perform a structural analysis on the from in Room 626M to verify that the slab is sufficient to support the weight of the new equipment during cutover. Motorola assumes that the floor can support the load.	Motorola	Structural Analysis
Subject to Section 3.3 of the 1999 Agreement as amended, the City will prepare all sites for the equipment implementation, based on the recommendations in the Site Walk Reports as approved and agreed to by the City in writing, unless preparation is provided by Motorola as part of this Appendix A.	City	The City Sites Meeting Site Readiness Conditions
As set forth in Section 3.5 of the 1999 Agreement as amended and with the cooperation of Motorola and subject to the Philadelphia Code and applicable regulations, the City will apply for the necessary FCC license and zoning requirements	City	Approved FCC Licenses and Zoning permissions
As set forth in Section 3.5 of the 1999 Agreement as amended, obtain all licenses, permits, and approvals required by any federal, state of local government body (other than zoning or FCC approval) for the performance of the work required for the project.	Motorola	All licenses, permits, and approvals

Completion Criteria

This phase is considered complete when all necessary site improvements have been implemented by the City and verified as complete.

3.7.3   Develop Cutover Plan

The implementation of the Project 25 upgrade will require a detailed cutover plan, which plan will be subject to the City's review and written approval, for a smooth transition of the existing system components into an integrated network with the new Project 25 equipment.

Responsibility Matrix

Task	Responsibility	Deliverable

Task	Responsibility	Deliverable
The City of will provide existing system and user information, such as specific vehicle information which must be taken in to account to develop a detailed cutover plan	City	Existing System and User Information
The Project 25 upgrade cutover plan will be developed. It will take in to account the need to minimize the impact to users migrating to the Project 25 upgrade system.	Motorola	Cutover Plan

Completion Criteria

This task is considered complete upon the City's written approval of the Project 25 upgrade cutover plan.

3.7.4   Finalize Project Schedule

The objective of this task is to finalize the preliminary Project Schedule contained in the initial contract based upon the requirements identified and the associated project objectives, plans, schedules, approvals, priorities and inter-dependencies among tasks. The Project Schedule will be finalized through the change order process and mutually agreed upon between the parties. The resulting document defines the specific project tasks to be completed and documents the final Project Schedule for each subsystem to be implemented.

Responsibility Matrix

Task	Responsibility	Deliverable
Review with the City personnel the identified implementation tasks, priorities, inter-dependencies and other requirements needed to establish the final Project Schedule	Motorola	Project Schedule Review
Analyze with Motorola project personnel the identified requirements and make such implementation decisions as are reasonably required to finalize the Project Schedule	City	Project Schedule Review
Prepare the final Project Schedule document and deliver it to the City. Review the Project Schedule with the City personnel and make changes and/or corrections that are mutually agreed upon through the change order process	Motorola	Project Schedule Finalization
Review the final Project Schedule and identify in writing any specific deficiencies.	City	Project Schedule Approval/Rejection
Maintain the Project Schedule as provided in Section 5.1 of the 1999 Agreement as amended.	Motorola	Update Project Schedule

Completion Criteria

This task is considered complete upon mutual written agreement of the parties to implement in accordance with the final project schedule. This final Project Schedule will become the governing Project Schedule incorporated into the contract, but is subject to change upon mutual written agreement of the parties.

3.7.5   Finalize Hardware and Fixed Equipment Design Requirements

Motorola will present design materials and the design approach of the Fixed Equipment during the Design Review. Motorola and the City deliverables and responsibilities are defined in the Responsibility Matrix below.

Responsibility Matrix

Task	Responsibility	Deliverable
Motorola and the City will review the coverage.	Motorola and the City	Agreement of coverage ATP

Task	Responsibility	Deliverable
Site Acquisition Floor space and Tower space have to be secured for the equipment sites.	City	Lease or agreements to use the site and tower. Identification of floor space available and tower space available for the City equipment
As set forth in Section 3.5 of the 1999 Agreement as amended and with the cooperation of Motorola and subject to the Philadelphia Code and applicable regulations, the City will apply for all necessary zoning permits and/or zoning variances.	City	Zoning Permits or Zoning Variances
As set forth in Section 3.5 of the 1999 Agreement as amended, obtain all licenses, permits, and approvals required by any federal, state of local government body (other than zoning or FCC approval) to install antennas for equipment sites if required.	Motorola	Permits and guidelines/limitations to install antennas and supporting equipment

3.7.6   Acceptance Test Procedures

Motorola will review the Acceptance Test Procedures (ATP) with the City to provide an understanding of procedures used for testing the functionality and performance of the system. The ATP shall be subject to the City's written acceptance and approval in accordance with Section 7.3 Acceptance Test(s); Test Plan(s) in Amendment 3 and in the 1999 Agreement, as amended. The ATP, as accepted and approved by the City in writing, establishes a framework for the City system acceptance; acceptance shall be governed by Article 7 of the 1999 Agreement, as amended by Section [7] of Amendment No. 3.

Subject to this Section 3.7.6, the ATPs will be finalized for the City's Project 25 upgrade project as a part of the design review process. The ATPs, as approved and accepted by the City in writing, shall include the mutually agreed to acceptance criteria to ensure the equipment operates in accordance with the specifications identified in the contract. Motorola to submit the final ATP document for each test plan to include Fixed Network Equipment Installation Acceptance, Subscriber Equipment Installation/Programming Acceptance, Functional Acceptance Tests (Factory Staging and Field), Coverage Acceptance Tests, and four 30-Day Reliability Tests, in each case sixty days before testing is scheduled to begin. The City will provide its written notice of approval or rejection no less than thirty days before each of these test periods begin.

Responsibility Matrix

Task	Responsibility	Deliverable
Work with the City in finalizing the ATPs. Review the overall approach to testing including hardware and software. The review will be based on the Acceptance Test Plan included with this proposal.	Motorola	Review ATPs and Methodology
Work with Motorola in finalizing the ATPs, using the ATPs submitted with this proposal as a baseline. Provide related information requested by Motorola to assist Motorola in completing the ATP. Review the baseline ATP document and identify in writing any specific deficiencies.	City	Review ATPs, provide written information and feedback
Submit a final ATP document to the City for approval.	Motorola	Final ATPs
Review and approve the final ATP on a test by test basis.	City	Approval of Final ATPs

Completion Criteria:

This task is considered complete upon the City's written acceptance and approval of the ATP.

3.8 Order Processing

3.8.1 Description

Motorola will place factory orders for the system hardware that is being purchased for the communications system. Motorola will place orders for required third-party equipment and execute major subcontracts.

Responsibility Matrix

Task	Responsibility	Deliverable
Factory orders placed for all Motorola manufactured equipment	Motorola	Orders for Motorola manufactured equipment
Order placed for all third-party equipment	Motorola	Third-Party Equipment Orders
Motorola will execute major subcontracts	Motorola	Subcontracts in place

Completion Criteria

This phase is considered complete when all equipment orders have been placed.

3.9 Manufacturing and Factory Testing

3.9.1 Description

During this phase of the project, all equipment for the City's Project 25 upgrade is manufactured, the system is Factory Staged, and shipped.

Completion Criteria

This phase is considered complete when Manufacturing and Development, Template Development, and Factory Staging are complete and approved by the City in writing.

3.9.2   Manufacturing

Description

The Manufacturing activities commence after order processing.

Responsibility Matrix

Task	Responsibility	Deliverable
Manufacture equipment and track third-party equipment orders.	Motorola	Communications System Hardware

3.9.3   Template Development

Description

Equipment programming and configurations are defined during the activity of Template Development. Equipment programming and configurations will be determined as defined in the responsibility matrix below.

The City and Motorola will review the City's Project 25 upgrade operational requirements and the impact of those requirements to various equipment configurations.

Responsibility Matrix

Task	Responsibility	Deliverable
Motorola will provide technical information to the City to aid in determining equipment configurations and programming requirements.	Motorola	Standard Configuration and Programming Documentation
The City will finalize the equipment configurations requirements.	City	Configuration Requirements
Motorola will develop templates for the following dispatch system components: ASTRO® 25 Master Site Equipment CENTRACOM Gold Elite System and the subscribers	Motorola	Voice Dispatch Templates

Task	Responsibility	Deliverable
Motorola will develop templates for the mobile and portable equipment. Motorola will: Upgrade 800 existing templates prior to the Astro 25 upgrade Downgrade the upgraded 800 existing City of Philadelphia templates after the Astro 25 upgrade. Not own any of the existing or upgraded templates.	Motorola	Subscriber Programming Templates
Motorola will provide and review templates and configuration detail as defined by the City requirements, for the City approval.	Motorola	Template and Configuration Documentation
The City will review the template development work performed by Motorola and provided the work conforms with City requirements and Amendment No. 3, issue its written acceptance or rejection of the work, as well as: --The City will have 800 templates ready to upgrade prior to the ASTRO 25 upgrade. --Motorola and the City agree; (i) that any templates over 800 will be billed at a rate of $150.00 to upgrade and $150.00 to downgrade (as per Contract 07194 800 MHz Radio System Maintenance Services between the City and Motorola, entered into October 1, 2006 ("Maintenance Agreement") after the ASTRO 25 upgrade; and (ii) that Public Property will approve any and all changes to the existing 800 templates provided they meet City requirements. --The City will retain ownership of all 800 templates prior to, during and after the ASTRO 25 upgrades.	City	Written Programming Template and Configuration Approval/Rejection Statement

Completion Criteria

This task is considered complete when the City has reviewed and approved in writing the template and configuration documents and work described above.

3.9.4 Factory Testing

Description

The radio system manufacturing is followed by staging the radio infrastructure at CCSi. Staging includes assembly and testing of all major radio system components. The system will be configured as it will in the field for this Factory Testing, which will exercise the functional capabilities of the communications system. This process will allow the City personnel to witness factory testing in a controlled environment, as well as providing for a smooth and easy installation in the field. Motorola will perform end-to-end system testing, from subscriber units to the dispatch console.

Responsibility Matrix

Task	Responsibility	Deliverable
Functional Performance Testing: Motorola will perform a Functional Performance Test in order to verify the functionality of the communications system. The Functional Performance Test will include the following: Physical inspection; Thorough exercise of the hardware and software; Testing of the voice communications features, to the extent possible with the City purchased equipment; Verification of device and system recovery from failures	Motorola	Functional Performance Tests
The City will issue its written notice of acceptance, in accordance with Article [7], *Acceptance*, of the 1999 Agreement, as amended by Section __ of Amendment No. 3, upon, but only upon, the successful completion of all Factory Acceptance Tests and the Testing Period. Absent the City's written agreement otherwise, Motorola shall not proceed with installation of the System on site unless or until the City issues such written notice of acceptance for Factory Tests.	City	Written Acceptance of Factory Acceptance Test

Completion Criteria

This task is considered complete when the City signs a certificate of acceptance of the Factory Acceptance Test.

3.10 Site Preparation

Motorola will begin work at the existing sites only after mutual agreement by the City and Motorola that the site is deemed ready. At a minimum, site ready requires a site to have adequate room in an existing building or shelter to accommodate the equipment to be installed, and electrical service and internal distribution in place. In addition, network testing must have been satisfactorily completed.

Sites are required to meet or exceed the requirements as defined in the Motorola document "Fixed Network Equipment Installations" ("R56 Standard V2005"). Detailed site ready audits will be performed by Motorola after contract execution. Motorola will provide a detailed site report identifying any site deficiencies. All site upgrades not identified in this document specifically as a Motorola deliverable are the responsibility of the City.

The City may, in its sole discretion, elect to contract with Motorola to perform necessary site upgrades, perform the upgrades itself, or utilize the services of a third party subcontractor. Site requirements must be met before Motorola will begin installation of system equipment.

The following is a list of some, but not all, of the specific site ready requirements for this project. Motorola shall present all site ready requirements not identified below to the City at least sixty (60) days prior to the date on which the City's site preparation work is scheduled to begin under the Project Schedule. The City shall not be obligated to make any site conform to any such additional Motorola site ready requirements unless it has approved the requirements in writing.

3.10.1 Single Point Grounding

Requirement - The single point ground system is comprised of both internal and external components, which are bonded together, along with all other grounds at the site, to form the overall site grounding system.

Internal - The City shall provide a single point ground system to be used on all fixed equipment supplied under this contract. The ground system must include an internal master ground point, and sub-system ground points when applicable, located within (3) feet of the Motorola supplied equipment.

__External__ - The City shall provide an external grounding electrode system that is designed and installed in accordance to the document "Standards and Guidelines for Communications Sites - R56. The grounding electrode system shall have a design goal of 5 ohms or less and shall be met whenever possible and/or practical. The grounding electrode system shall include an interconnection to all other grounding electrode systems and utility grounds at the site.

3.10.2 Transient Voltage Surge Suppression

__Requirement__ - Transient voltage surge suppression for telephone circuits, AC power, radio frequency (RF) cabling, and all other applicable external connections and utilities are required to meet or exceed the Motorola document "Standards and Guidelines for Communications Sites - R56".

3.10.3 Electrical

__Requirement__ – Sites must have electrical service and electrical wiring that meets all applicable city, county, state, and National Electrical Codes (NEC) requirements.

3.10.4 Equipment Space

__Requirement__ – Sites must have sufficient floor and desk space for the Motorola supplied equipment as identified in an equipment installation location document submitted by Motorola and approved (in writing) by the City.

3.10.5 Environmental Conditions

Requirement – Sites must have adequate environmental controls to meet the heating, ventilation, cooling, and humidity requirements for all equipment that will be installed at the site; provided, the City shall not be obligated to make any site conform to any such environmental controls or requirements unless Motorola has submitted them to the City and the City has approved them in writing.. The sites must be free of hazardous materials such as fuels, asbestos, etc. Contact Motorola to obtain specific equipment specifications required for building environmental control sizing and design.

3.10.6 Site Access

Requirement – The City shall provide reasonable site access for scheduled site walks, installation, optimization, system troubleshooting and completion of ATP, subject to City security regulations and operating hours. The City shall exercise commercially reasonable efforts to provide site access including transportation to sites that are not accessible by regular four-wheel drive vehicles. The City shall be responsible for coordinating and scheduling with the Motorola Project Manager access to sites not directly controlled by the City.

3.11 Installation of Fixed Network Equipment (FNE)

3.11.1 Description

Installation of the Fixed Network Equipment (FNE) consists of the radio communications infrastructure and computer equipment at the dispatch and control centers. All installations are assumed to be performed during standard business hours, Monday through Friday 8:00 AM – 5:00 PM; such assumption is reflected in the Project Schedule.

3.11.2 Responsibility Matrix

Task	Responsibility	Deliverable
Site Ready: The City will prepare the site for equipment installations, resolving (subject to the terms of Sections	City	Sites Meeting City Approved Site Preparation Requirements for

Task	Responsibility	Deliverable
3.7.2, *Site Survey/Preparation* and 3.10, *Site Preparation*) any site deficiencies identified in the Site Audit Reports as approved by the City. Sites will be ready according to the project schedule for equipment installation.		Installation
General Installation Responsibilities Motorola will install the new system equipment that is provided in the equipment list. Motorola will ground and bond the site equipment to the ground system, in accordance with the R56 site installation standards. Motorola will remove and dispose of any debris that is a result of the project activities from the site. Motorola will create "As Built" documentation of the prime site installation for inclusion in the final project documentation	Motorola	New Equipment Installations per Motorola's Site Quality Standards
Master Site Installation: Motorola will temporarily locate the existing SmartZone 3.0 Master Site equipment in a location to allow the Project 25 Master Site equipment to be installed in its ultimate location. Motorola will install SmartX, for the duration of the cutover. After which time, it will be removed and shipped back to Motorola. Motorola may re-cable the existing Master Site equipment as necessary to accommodate the new location. Motorola will install the new Master Site in its final location Following cutover, Motorola will remove the SmartZone 3.0 Master site and place it in a City designated location.	Motorola	Radio System Installation Audit
Prime Sites Motorola will install new Prime Site controllers and comparators at each Prime Site. As required, Motorola will relocate the existing equipment to provide space for the new equipment Motorola will install the new Prime Site equipment in its ultimate location. Motorola may re-cable the existing		

Task	Responsibility	Deliverable
Prime Site equipment as necessary to accommodate the new location. Motorola will install the new Prime Site equipment in its final location Following cutover, Motorola will remove the SmartZone 3.0 prime site and place it in a City designated location.		
RF Sites: Motorola will install new GTR8000 Base Radios for Project 25 operation and install new controllers and routers at each RF site. Motorola will test the existing antenna systems to verify that they are operating correctly Motorola has provided optional pricing to install replacement antenna systems, should it be required.	Motorola	Radio System Installation Audit
Motorola will upgrade the following existing equipment for Project 25 operation Central Electronics Banks Console Operator Positions	Motorola	Upgrade of existing console system equipment
Motorola will remove the existing equipment being removed from service, as defined during the design review and place in the City designated location.	Motorola	Decommissioned Equipment removals
Motorola and the City will conduct FNE inspection audit.	Motorola and the City	Inspection Audit Report
The City will sign installation acceptance certificates after inspection and check out of FNE on a site-by-site, system-by-system basis. Upon successful installation of the FNE, the City will issue its notice of Conditional Acceptance on a site-by-site, system-by-system basis as provided in Article 7 of the 1999 Agreement, as amended.	City	Notices of Conditional Acceptance on a site-by-site, system-by-system basis

3.11.3 Completion Criteria

This task is considered complete when the City reviews FNE installations with Motorola and issues its notice of Conditional Acceptance as provided in Article 7. The installation of each FNE subsystem must be completed for this phase of the project to be considered complete.

3.12   Subscriber Equipment Upgrade

3.12.1 Description

Motorola will provide Project 25 software and hardware upgrades to existing portable and mobile radios (Subscriber Equipment), as well as new subscribers per the equipment list, during this phase of the project.

The installation Subscriber Equipment in City-designated vehicles will be accomplished in phases, agency by agency, and as determined by the cutover plan described in Section 3.7.3, *Develop Cutover Plan*, and elsewhere in this SOW. Installation in City vehicles will occur in accordance with the cutover plan in a manner that will minimize impact to the City's operations.

An installation crew of adequate size to complete up to ten vehicle installations per day will be on-site; up to three locations will be used for vehicle installations. The City will provide locations for the vehicle installations. All vehicle installations will occur during normal business hours, Monday – Friday, from 8:00 AM to 5:00 PM. The City will designate a person as point of contact (POC) for each department with vehicle installations. The POC will ensure that the vehicles and portable radios are delivered for the upgrade as agreed upon in the cutover plan.

New vehicle equipment will be installed and the installation will receive a post-inspection to verify the quality of the installation. This acceptance procedure will be run by the installer and witnessed by Motorola and the City. Upon successful completion of the acceptance test, the vehicle will return to service, considered conditionally accepted.

Task	Responsibility	Deliverable
Ten vehicles per day available for pre-installation inspections and equipment installations.	City	Vehicles Available
Installation of new vehicle equipment – equipment for up to 10 vehicles per day to be installed.	Motorola	Installed Mobile Radios
Installation inspections and witness of execution of vehicle ATPs; acceptance or rejection of installations in accordance with applicable ATPs	City	Vehicle Acceptance/ Rejection per ATPs

Task	Responsibility	Deliverable
Motorola: o Will program up to 9,400 City of Philadelphia subscriber radios before ASTRO 25 upgrade. o Will downgrade the upgraded City of Philadelphia subscribers after the ASTRO 25 upgrade. o Agrees to have six two-man teams in place for a four-week period before ASTRO 25 upgrade and six two-man teams in place for a four-week period after the ASTRO 25 upgrade. o Agrees that programming of radios not made available to Motorola for programming during each four-week period will be billed on a per radio basis of $75.00 each to the City (as per the Maintenance Agreement).	Motorola	Subscribers programmed
City of Philadelphia: o Will have up to 9,400 subscribers available to program in a four-week period before the ASTRO 25 upgrade and available to program in a four-week period after the ASTRO 25 upgrade, and work with Motorola with the six two-man teams. o Agrees that programming of radios not made available to Motorola for programming during each four-week period will be billed on a per radio basis of $75.00 each to the City of Philadelphia (as per the Maintenance Agreement). o Agrees that Public Property will be scheduling and contacting all departments to coordinate any and all pickups with Motorola personnel. o Agrees that any and all radios will have proper documentation prior to each re-program including: Alias ID, City ID number, serial number, Template in radio and the End user department. o Agrees that for any radios that do not have basic information, it will be the responsibility of the City to get that information prior to programming. o Will approve all subscriber radios after each re-program in a timely manner, according to the mutually agreed upon project schedule. o Will retain ownership of all subscriber radios prior to, during and after ASTRO 25 upgrades.	City	Identified tasks for programming subscriber radios

3.12.2 Completion Criteria

This task is considered complete when the City has reviewed all vehicle installations with Motorola and has approved all installations by signing the installation check

sheets. The installation and upgrade of subscriber equipment must be completed and accepted by the City in writing for this phase of the project to be considered complete.

3.13 Systems Integration and Optimization

3.13.1 Description

During this phase of the project, Motorola will configure, optimize, and program all system equipment. Motorola will integrate all of the Motorola provided subsystems identified in Section 2 (System Description) of this Appendix A, as well as integrate City provided T1 Network, site equipment, 911 recording system, and communications consoles and other City provided systems and equipment that are necessary for the operation of the ASTRO 25 Network.   Motorola technologist(s) will be onsite throughout this phase and will prepare the System for acceptance testing.

Motorola technologist(s) will maintain a punch list of items that require resolution. The City will be responsible for directing the activities of non-Motorola subcontractors and supporting City agencies. The City is also responsible to coordinate all on-site integration activities that are the City's responsibility under this SOW, including assistance to Motorola for system testing requiring participation from City contractors other than Motorola.

Motorola and the City will each ensure that their respective subcontractors and contractors perform in accordance with the Project Schedule.

Task	Responsibility	Deliverable
Provide and install all communication lines and equipment that are not Motorola provided deliverables, as identified in the Detailed Design Review. Provide liaison with agencies and vendors that must support System implementation. Ensure that the necessary technical support is made available for installation and testing requiring third party vendors and interfaces with City systems other than the System	City	City Provided Equipment and Interfaces with City systems as Required for Integration
Install, integrate and test the hardware, software and interfaces as specified in the contract.	Motorola	Installation and Integration of Equipment
Maintain a punch list of items that need resolution. Manage the resolution of punch list items.	Motorola	Punch list Resolution

3.13.2 Completion Criteria

This task is considered complete when the system is ready for acceptance testing.

3.14 Acceptance Testing

3.14.1 Description

Motorola proposes a multi-level acceptance testing procedure. This process provides multiple checkpoints for the City to oversee the overall progress that is being made as the communications system implementation progresses. The Acceptance Test Plan is composed of Equipment Installation Acceptance, Functional Acceptance Tests

(Factory Staging and Field), Coverage Acceptance Tests, and a total of 120-Day Reliability Test which is composed of four 30-Day Reliability Tests. Not withstanding anything to the contrary contained in this Appendix A, all testing described herein is subject to Article 7 of the 1999 Agreement as amended by Section 7 of Amendment No. 3.

3.14.2 Equipment Installation Acceptance

Description

Equipment installations will be inspected to ensure adherence to quality standards as set forth in _R56. Equipment installation acceptance will occur on a site-by-site, system-by-system basis.

Responsibility Matrix

Task	Responsibility	Deliverable
Control Site Installation Inspection	Motorola	Installation Inspection Audit Report
Fixed Equipment Subsystem Installation Inspections	Motorola	Installation Inspection Audit Report
Subscribers	Motorola	Programming Audit Report
Dispatch Site Installation Inspections	Motorola	Installation Inspection Audit Report
Issue written notice of approval or rejection of Installation Inspection Audit Reports and Programming Audit Reports on a site-by-site, system-by-system basis	City	Written Notice of Approval or Rejection of Installation Inspection Audit Reports and Programming Audit Reports on a site-by-site, system-by-system basis

Completion Criteria

This task is considered complete when the City has issued its written notice of approval or rejection of Installation Inspection Audit Reports and Programming Audit Reports on a site-by-site, system-by-system basis.

3.14.3 Functional Tests

Description

System Functional Acceptance Tests will be performed when the system optimization is complete. A complete list of Functional Acceptance Tests is included as an appendix to the functional system description.

If deficiencies are found during the testing, both the deficiencies and resolutions to the deficiencies shall be documented and agreed upon. Motorola is responsible for the

resolution of the documented deficiencies using a punch list as a controlling document for resolution planning.

Any system testing that the City wants performed that is not specified in the ATP section of this proposal must be reviewed by Motorola for feasibility and acceptability. Any additional tests will represent a change in the project's scope.

Upon completion of the acceptance testing, the City will acknowledge system acceptance by signing the System Acceptance document per the terms of the contract.

Responsibility Matrix

Task	Responsibility	Deliverable
Motorola will perform System Functional Acceptance Tests for the communications system. During each test, test results will be recorded for review and approval of the test.	Motorola	Execution of Functional Acceptance Testing
Upon successful completion of each Acceptance test on a site-by-site and system-by-system level, the City and Motorola will sign acceptance certificates documenting acceptance.	City	Written Approval or Rejection of Functional Acceptance Testing

3.14.4 Coverage Acceptance Tests

Description

Coverage Acceptance Tests will be performed when the RF site and control equipment installations and optimization are complete. A detailed Coverage Acceptance Test Plan (CATP) is included in this proposal and defines the scope of the CATP, subject to revision as set forth in Section 3.7.6.

Responsibility Matrix

Task	Responsibility	Deliverable
Motorola will perform Coverage Acceptance Tests for the City's Project 25 upgrade. During each test, test results will be recorded for review and approval of the test.	Motorola	Execution of Coverage Acceptance Tests
Upon successful completion of the coverage acceptance test, the City will issue a notice of Conditional	City	Written Approval of Successful Coverage Acceptance Testing

Task	Responsibility	Deliverable
Acceptance as set forth in Article 7 of the 1999 Agreement, as amended.		

Completion Criteria

This task is considered complete when the City has issued a notice of Conditional Acceptance as set forth in Article 7 of the 1999 Agreement, as amended.

3.14.5 Reliability Test

Description

Four 30 day Reliability Tests will be conducted as set forth in Section 4.9 System Reliability Test.

Responsibility Matrix

Task	Responsibility	Deliverable
Motorola will conduct the first 30 day Reliability Test of the core IP network components of the ASTRO 25 Upgrade Project as set forth in the Final Implementation Schedule.	Motorola	Test Result Report
Upon successful completion of the first 30 day Reliability Test, the City will issue a notice of Conditional Acceptance as set forth in Article 7 of the 1999 Agreement, as amended.	City	Notice of Conditional Acceptance
Motorola will conduct the second 30 day Reliability Test following cutover of the existing 3600 Simulcast Systems A & B to the new ASTRO 25 Master Site via SmartX as set forth in the Final Implementation Schedule.	Motorola	Test Result Report
Upon successful completion of the second 30 day reliability test, the City will issue a notice of Conditional Acceptance as set forth in Article 7 of the 1999 Agreement, as amended.	City	Notice of Conditional Acceptance
Motorola will conduct the third 30 day Reliability Test after migration, during which time the system will be used for its intended purpose as set forth in the Final Implementation Schedule.	Motorola	Test Result Report
Upon successful completion of the third 30 day reliability test, the City will issue a notice of Conditional Acceptance as set forth in Article 7 of the 1999 Agreement, as amended.	City	Notice of Conditional Acceptance
Motorola will conduct the fourth 30	Motorola	Test Result Report

Task	Responsibility	Deliverable
day Reliability Test during which time the system will be used for its intended purpose as set forth in the Final Implementation Schedule.		
Upon successful completion of the fourth 30 day reliability test, the City will issue a notice of System Acceptance as set forth in Article 7 of the 1999 Agreement, as amended.	City	Notice of System Acceptance

Completion Criteria

This task is considered complete when the City has issued its written notice of System Acceptance.

3.15 Training

The purpose of the Training Program is to provide the City with a set of training sessions that will ensure the successful integration of the system into daily fleet operations. Upon completion of the training program, the City personnel will be able to operate and manage the system, enabling the City to provide a smoother and more efficient operation of the system.

Motorola will conduct their standard training courses, according to the Training Plan, to thoroughly train the City personnel on the use of the systems and the City technical personnel on the operation and support of the system.

3.15.1 Responsibility Matrix

Task	Responsibility	Deliverable
Motorola will schedule the training classes defined in the training plan with the City personnel and the training provider.	Motorola	Scheduled Training Classes
The City will provide the facility for all scheduled training classes.	City	Training Facility
The City will provide access to the system equipment required for training, as defined in the Training Plan.	City	Equipment for Training
Upon approval of Field Performance Tests, Motorola will provide training to designated personnel in accordance with the Training Plan.	Motorola	Deliver Training

3.15.2 Completion Criteria

This task is considered complete when the training has been delivered as described in the Training Plan.

3.16 Cutover to New System Operations

3.16.1 Description

Following the successful completion of the Functional Acceptance Tests, Motorola will begin cutover of the remainder of the users to the new communications system. This phase will follow the approved cutover plan. In developing the cutover plan,

Motorola will develop a transition to the new system that minimizes the operational impact to the City.

3.16.2 Responsibility Matrix

Task	Responsibility	Deliverable
Motorola will review the communications system acceptance status, cutover plan, and schedule system cutover with the City.	Motorola	Completed Cutover Checklist
The City will confirm the cutover plan and cutover planning for execution of the system cutove r by issuing a written notice of acceptance or rejection of the Completed Cutover Checklist.	City	Written Notice of Acceptance or Rejection of CutoverChecklist
Motorola and the City will execute the cutover plan.	Motorola and the City	Cutover to New System Operations
Where an existing system is being taken out of service, Motorola will reconfigure new equipment as necessary to delete access to the old equipment.	Motorola	Post Cutover Reconfiguration
Motorola will remove equipment being taken out of service.	Motorola	Equipment Removal

3.16.3 Completion Criteria

This task is considered complete when users are fully cutover to operation on the new system.

3.17   System Documentation

Motorola will provide documentation of the system configurations, physical installation, and system testing. Documentation is created and updated during the project. Electronic versions of custom documentation will be provided by Motorola both in a viewable format and in the documents standard format.

3.17.1 Design Documentation

Motorola will create or update the following standard documents during the design phase:

- ♦ Documentation Index
- ♦ System description
- ♦ Deliverables list
- ♦ Site Planning and Preparation Manuals
- ♦ Block and level diagrams for system and sites
- ♦ Floor plans
- ♦ Radio Communication System Technical Data
- ♦ Coverage maps
  - • Individual site maps
  - • System composite coverage maps
- ♦ System Administrator Documentation
- ♦ Installation and Cutover Plan
- ♦ Acceptance test procedures
- ♦ Programming parameters
- ♦ Drawings

3.17.2 Factory Staging Documentation

Motorola will create or update the following documents of system staging:

- ♦ Programming templates
- ♦ Interconnection drawings
- ♦ Interconnection charts
- ♦ Manufacturer's standard operator manuals
- ♦ Re-assembly instructions
- ♦ Interconnection cable description and inventory
- ♦ Printout of equipment parameters
- ♦ Inventory with serial numbers and installation reference
- ♦ Software/firmware version numbers
- ♦ Manufacturer's standard technical manuals

3.17.3 System Manual - "As-Built" Documentation

Motorola will supply "as-built" documentation for the system. The documentation will consist of:

- ♦ Standard Equipment Manuals
- ♦ System drawings:
- ♦ Fixed Equipment Documentation
- ♦ Plan and elevation views of the equipment installation at the radio site
  - • Equipment inter-cabling diagrams for each site
- ♦ Demarcation wiring lists
- ♦ Programming and level setting data sheets
- ♦ Equipment by site
  - • Key access procedures
  - • Site inventory lists
  - • Remote sign-on procedures and passwords
  - • Software versions and equipment wiring by equipment site
- ♦ Radio Licenses
- ♦ Field ATP test sheets and results
- ♦ R56 site audit
- ♦ Maintenance Records
- ♦ Warranty information
- ♦ Service Provider

3.17.4 Equipment Manuals

Motorola will provide equipment manuals covering both standard and optional features. The content of these manuals is standardized and may not be specific to the City, however, manuals will be supplied for all equipment provided for the Upgrade Project. Motorola will provide ten sets of the manuals/documentation, in both hard and soft copies.

3.17.5 Asset Management

Motorola will enter asset information about the system and subscriber equipment into the City's asset management database. Information such as serial number, software version, etc will be collected.

3.18 Project Finalization

3.18.1 Description

The finalization phase of the project consists of ensuring that all criteria for Final Project Completion have been met.

3.18.2 Responsibility Matrix

Task	Responsibility	Deliverable
Motorola will resolve punch list items documented at System Acceptance	Motorola	Approved Punch list Resolution
Motorola will ensure that the criteria defined to transition the project to the Motorola Service Organization has been completed, including the development of a Customer Support Plan with the City.	Motorola	Service Transition Certificate and Customer Support Plan
All documents listed in System Manual – "As Built" Documentation Section will be submitted, as they become ready.	Motorola	System Manual – "As Built" Documents
Final approvals of all System Manual – "As Built" Documents	City	Written Approval Statement(s)
The City will issue a notice of Final Acceptance as provided in Article 7 of the 1999 Agreement, as amended.	City	Signed Final Acceptance Documents

3.18.3 Completion Criteria

This task is considered complete when the City has issued a notice of Final Acceptance as provided in Article 7 of the 1999 Agreement, as amended.

3.19 System Performance

System Performance is composed of many elements, including system coverage, system traffic, and equipment performance. Motorola will be responsible for the performance of all equipment as provided by Motorola under this contract. The City will assume responsibility for the performance of all other equipment necessary for completion of this project not provided by Motorola. Motorola's responsibilities for this project are further defined in the Project Schedule and in the Work Breakdown Structure (depicted in the Responsibility Matrices in this Statement of Work).

3.19.1 Equipment Performance

The project implementation requires the integration of existing City equipment with Motorola provided equipment under this contract.

Motorola Provided Equipment

Motorola is responsible for the performance of all Motorola provided equipment either under this Amendment or the existing Maintenance Contract. This hardware must operate functionally as described in the System Description, when operating within environmental specifications and in an RF environment that complies with the Motorola R56 specification as such specification is reasonably agreed to by the City during the Detailed Design Review. When the hardware environment is outside of electromechanical and environmental specifications, performance is no longer guaranteed.

City Provided Equipment

The City is responsible for the performance of all existing and the City provided hardware that will be interfaced with or integrated into the various subsystem implementations for this project.

Section 4.   Acceptance Test Plan

4.1   Coverage Acceptance Test Plan (CATP)

Motorola is proposing to the City of Philadelphia an upgrade of the existing SMARTZONE 3.0z voice radio system to Motorola's newest digital communications system platform, ASTRO 25. Motorola understands that the City of Philadelphia requires the upgraded system to maintain, at a minimum, the contractual coverage performance of the existing SMARTZONE 3.0z radio system.

This Coverage Acceptance Test Plan (CATP) is designed to verify the upgraded ASTRO 25 IP Radio System meets or exceeds the originally contracted portable and mobile coverage reliability within the City of Philadelphia's service areas (the city boundaries) and outside the City's boundaries to a distance of three (3) miles (mobile coverage only). The CATP defines the coverage testing methods and procedures, the coverage acceptance criteria, the test documentation, and the responsibilities of both Motorola and the City of Philadelphia.

4.1.1   Development of CATP

In general the Coverage Acceptance Test Plan was developed for Motorola customers as a thorough and systematic coverage testing procedure with defined methodologies and procedures. This CATP is closely based on the contractual CATP used to test the original ASTRO-CAI voice radio system.   The simulated in-building tests will be performed with portable radios configured with attenuators to simulate the three contractual categories of building attenuation, 30 dB, 20 dB and 12 dB. These portable radios will be outfitted with magnetic mount antennas affixed to the rooftop of the City vehicle used during the tests. It is therefore agreed that a simulated in-building CATP will effectively verify the performance of the coverage provided by

the ASTRO 25 Digital voice radio system. The City will require testing in residential buildings within the City. The scope and price of which will be refined during the Detailed Design Review.

4.1.2   CATP Detailed Description

A detailed description of the CATP consists of the following elements:

♦ Definitions

♦ Methods

♦ Responsibilities and Preparation

♦ Procedures

♦ Documentation and Acceptance

4.1.2.1   CATP Definitions

Several definitions are needed to accurately describe the coverage test method. Where cited, these terms or methods are defined in the Telecommunications Industry Association (TIA) Technical Service Bulletin TSB-88 Version B, titled "Wireless Communications Systems, Performance in Noise- and Interference-Limited Situations, Recommended Methods for Technology-Independent Modeling, Simulation, and Verification

Coverage Area

The coverage area is the geographical region where communications will be provided, which meets or exceeds the specified Channel Performance Criterion at the specified reliability for the specified equipment configuration(s). Typically radio systems are designed to maximize the coverage area within the customer's service area (users' operational area, jurisdictional boundaries, etc.) The predicted coverage area for each equipment configuration for the ASTRO25 IP Radio System is as indicated on Motorola's coverage map(s) supplied with the original ASTRO-CAI voice radio system contract/Technical Committee Summary Document.

Channel Performance Criterion (CPC)

The CPC is the specified minimum design performance level for delivered audio quality in a faded channel (Refer to table below). For this system, the CPC is defined by the worst-case audio ("DAQ-3, 3mph") as presented on the benchmark Compact-Disc included as part of the contract.

To aid each test team in evaluating the delivered audio quality, Motorola will also provide copies of an analog audio tape containing numerous voice samples recorded from the applicable track on the contract benchmark Compact-Disc that meet the

definition of minimum designed delivered audio quality for the system. The Compact-Disc will be used prior to test start as part of the Test Readiness Meeting and the audio tapes will be available for use by each test team throughout the test period.

Table 4-1: Delivered Audio Quality Definitions

DAQ	Subjective Performance Description
1	Unusable, speech present but unreadable.
2	Understandable with considerable effort. Frequent repetition due to noise/distortion.
3	Speech understandable with slight effort. Occasional repetition required due to noise/distortion.
3.4	Speech understandable with repetition only rarely required. Some Noise/Distortion.
4	Speech easily understood. Occasional noise/distortion.
5	Speech easily understood.

Reliability

The reliability is the percent of locations within the applicable coverage area(s) which meet or exceed the specified minimum CPC. Motorola's coverage map(s) indicate the area within which this system is predicted to provide at least 95% (90% where applicable) reliability of meeting or exceeding the minimum CPC.

4.2 Equipment configurations

These are the types and configurations of radio network and field unit equipment upon which coverage acceptance testing is based. The CATP applicable Motorola coverage map(s) provided for this system indicate the coverage area for the following equipment configurations and are considered to be representative of the worst-case configuration:

♦ Simulcast coverage and Receiver voting coverage to/from 3 watt ASTRO-CAI (12.5KHz) portables inside buildings; the building loss definitions were provided in **Section 3.1.5** of the original ASTRO-CAI radio system contract/Technical Committee Summary Document. The portable with 1/2 wave flex whip antenna will be located at the user's belt level using a swivel case arrangement for both transmit and receive through the use of a Remote Speaker/Microphone (RSM). The RSM is attached to the user's clothing at shoulder level.

4.3 In-Building Coverage

Motorola's coverage maps for portable in-building equipment configurations are predictions of coverage inside buildings with up to 30dB loss in the downtown city area and inside buildings with up to 20dB loss elsewhere within the boundary of the City of Philadelphia. Coverage maps have also been provided which indicate portable coverage inside building with up to 12dB loss and "on-street".

The downtown 30dB building loss area is defined as the area bounded by Spring Garden Street in the North, South Street in the South, and the Delaware River in the East and the Schuylkill River in the West. The in-building coverage predictions are based on the maximum building losses specified by The City of Philadelphia in the RFP for buildings located within the boundaries of the City of Philadelphia.

Since building loss varies significantly depending on the construction of buildings, Motorola's coverage maps do not predict coverage within any specific building nor do they reflect 95% coverage of the areas within a building. Rather, the applicable shaded areas on the Motorola supplied coverage map(s) indicate the geographic areas where there exists sufficient fade margin to withstand an additional 30dB/20dB/12dB of building loss and still maintain the minimum CPC at the required reliability level (95%).

The in-building coverage maps apply only to the above-ground portions of buildings. The coverage maps do not apply to in-building locations which are shielded from radio penetration, such as elevators, stairwells, basements below ground levels, tunnels, bank vaults, jails, x-ray rooms, nuclear facilities, and other similar locations or locations shielded by metal walls and/or with heavy construction and/or with no windows or doors.

If coverage is required in specific buildings, then Motorola must be notified and field surveys may be required to measure the penetration loss of those specific buildings. The results of these surveys must be used to generate the in-building coverage maps. Providing coverage in specific buildings may require additional equipment in the proposal, or a change order to the contract to supply such items as additional radio sites, radiating cable, or bi-directional amplifiers in specific buildings. This additional equipment, if needed, is considered to be the responsibility of the City of Philadelphia.

4.4 CATP Methods

The method used to test coverage is statistical sampling of the predicted coverage area to verify the minimum CPC is met or exceeded at the required reliability for each of the defined equipment configurations. It is impossible to verify every point within a coverage area, because there are infinite points; therefore, coverage reliability will be verified by sampling a statistically significant number of randomly selected locations, quasi-uniformly distributed throughout the predicted coverage area.

Determine the Required Number of Test Grids in the Coverage Area

The predicted coverage service area(s) shown on Motorola's coverage map(s) system will be divided into evenly sized square grids. A minimum of 1600 test grids will be utilized within the City's borders for in-building or simulated in-building tests to include the Philadelphia International Airport. A total of 4000 grids are utilized for mobile testing which encompasses the areas within the City limits and 3 miles beyond the City's borders. Both of these of grid totals exceed the City of Philadelphia's original RFP requirement for a minimum of 500 test points throughout the City.

Constraints on Test Grid Sizes

The minimum above ground test grid size is 100 by 100 wavelengths; however, the minimum practical grid size is typically about 400 by 400 meters (about 0.25 by 0.25 miles). The minimum practical grid size for any system is determined by the distance traveled at the speed of the test vehicle while sampling, GPS error margin, and availability of road access within very small grids. A related consideration is the time, resources, and cost involved in testing very large numbers of very small grids. The maximum test grid size is 2 by 2 km (1.25 by 1.25 miles). In some wide-area systems, this constraint on maximum grid size may dictate a greater number of test grids than the minimum number required by the Estimate of Proportions formula. The grid size to be tested in the above ground areas by this CATP is based on an 18 arc-second tile projection and each are approximately 0.26 mi. X 0.35 mi. (W x H).

Accessibility to Test Grids

Prior to testing (if possible) or during the test, Motorola and the City of Philadelphia will determine if any grids are not accessible for the coverage test (due to lack of roads, restricted land, etc.) Inaccessible grids will be removed from the test and the total number of potential test grids as well as the total number of "*passed*" grids required for coverage acceptance shall be reduced accordingly.

Coverage Failure Due to Interference

If the coverage test or a portion thereof, is suspected to have failed due to external interference, those grids suspected of being affected by an interferer may be re-tested. Motorola may conduct necessary testing to support an inference that the grid(s) failed due to external interference; testing for the presence of interference shall be in accordance with TSB88 Section 7.9 which includes both a signal measurement (RSSI) and Bit Error Rate (BER) test. If this testing demonstrates external interference in excess of the allowable external interference as set forth in 47 CFR 90.672, the City may, in its sole discretion: a) permit Motorola to exclude those grids from the coverage acceptance calculations; or b) attempt, for a period of up to 15 days to correct the interference. If the City attempts to correct the interference, and if this attempt extends the CATP testing, then Motorola will get a day for day extension to the Final Implementation Schedule (Appendix H). Following the City's efforts, if any, to correct the interference, the City and Motorola will retest the site with the Digital Vehicle Repeater System (DVRS) deployed. If the re-tested grid fails due to external interference, Motorola may exclude those grids from the coverage acceptance calculations. Motorola will document the total grids passed without interference, total grids passed after remediation of interference, total grids passed after deployment of DVRS, total grids failed due to unremediated interference, and total grids failed due to lack of coverage.

Motorola is not responsible for external interference. The implementation of any possible solution would be the subject of a project change order.

Randomly Select a Test Location Within Each Grid (Portable Testing)

The geographic location of the center of the test grid will be determined using GPS. The building to be tested within the grid shall be randomly selected by the test team and shall be as close to the center of the grid under test as possible without going outside of the City of Philadelphia boundary. The actual test location(s) within the selected building of each test grid will be randomly selected by the test team, with a goal of having uniformly distributed test points within the building. As instructed by the City of Philadelphia, in-building tests for residential areas shall be performed by simulating the in-building test using attenuators.

Perform Measurements in Each Grid

In each test grid, the test team(s) will listen to a number of audio transmissions, and each team will record a subjective pass/fail evaluation of the Delivered Audio Quality (DAQ) for these transmissions based on the minimum CPC requirement. The test teams will also note test as an actual in-building or a simulated in-building test.

Determine if Each Grid Pass or Fail the CPC Requirement

Subjective pass/fail evaluation of the audio transmissions will be based on the team consensus of the test transmissions versus the contract benchmark example CD/tape used during the test team calibration process.

Determine the Coverage Area Reliability for Acceptance

Above Ground In-building Testing

Motorola is proposing to perform a series of portable in-building tests at various levels of maximum building penetration loss (20/30dB, 12dB & 0dB). Assuming no adjustments for inaccessible grids, the sum total of all grids passed will equal at least 1520 which is 95% of the 1600 potential test grids.

First, the 20/30dB building test will be performed as de-tailed in this document. If necessary, tested grids failing the 20/30 dB building test will be re-tested in the same fashion but using a maximum building loss criteria of 12dB. Finally, if required, grids failing the 12dB building test will be re-tested for portable on-street coverage.

If during the 20/30dB building test, a given test grid does not contain a testable building, a portable simulated in-building test shall be performed and shall count toward the 20/30dB building test total.

Motorola will guaranty that a minimum of 1444 grids will pass the 20/30dB test and that no more than 20 grids will be required to pass on-street testing due to failure of both the 20/30 dB and 12 dB in-building tests.

Mobile In-Street Testing for Above Ground Voice System

After all accessible grids in the coverage area have been tested, the coverage area reliability (%) will be determined by dividing the number of grids which pass by the total number of valid grids tested as follows:

♦ 95% of the grids within the City shown on the coverage maps as having the required reliability (95%) or greater shall pass.
♦ 90% of the grids from the city borders out to 3 miles, shown on the coverage maps as having the required reliability (90%) or greater shall pass.

If a grid passed the portable in-building test, it is considered to have passed the mobile test. If a grid failed the portable in-building and/or portable on-street tests, Motorola reserves the right to perform a mobile test for verification of mobile coverage within the grid.

IRS rounding rules will be considered to be in effect (i.e. 94.5% = 95%).

4.5   Responsibilities and Preparation

This information will help set the expectations of the City of Philadelphia and Motorola regarding requirements for equipment, personnel, and time during the coverage test.

Dependent upon the total number of test teams to be utilized, the City of Philadelphia will provide the following for the duration of the coverage test:

♦ Four (4) Portable radio(s) per test team with applicable features and accessories configured for operation on the system as detailed in the *Equipment Configuration* section of this document.
♦ Access to and use of three (3) existing Elite Console dispatch positions for while the CATP test is conducted.

- Access to and use of ASTRO25 network management suite of applications to monitor system performance.

- The tests will be recorded on the logging recorder at City Hall supplied with original implementation and a copy of the recording kept with CATP test results report. It is understood that the audio recording of the outbound transmissions does not accurately reflect audio quality heard at the portable or mobile radio.

- Test vehicle(s). For the above ground voice CATP this vehicle should be clearly marked as an official City vehicle. It is the City's intent to use marked Police Department vehicles. To accommodate the simulated in-vehicle testing, the marked City vehicles must have unobstructed rooftops. i.e., no light bars or roof racks.

- At least one City of Philadelphia representative, to drive each test vehicle and/or to be the customer representative(s) for the test team(s). The City of Philadelphia representative is responsible for getting permission and access to locations tested as actual in-building tests.

- Additional personnel for the test team(s), both at the control point(s) and in the field

Dependent upon the total number of test teams to be utilized, Motorola will provide the following for the duration of the coverage test:

- At least one Motorola representative, to navigate and to operate GPS mapping/navigation software to the extent which it is required.

- At least one laptop computer equipped with GPS mapping/navigating software

- Additional personnel as required for the test team(s), both at the control point(s) and in the field

- Programming of test radios and Elite Dispatch Talkgroup(s) for testing.

- Verify the city provided test radios are within specification prior to testing.

- Provide and setup of attenuators, magnetic mount antennas and all required cables and connectors to achieve simulated in-building attenuation for the three categories of building densities detailed in the original CATP document.

- Test log forms

Motorola will conduct this test only once. If any portion of the test is determined to be unreliable because of proven equipment malfunctions or failures, Motorola will repeat the portion of the test affected by the equipment malfunction or failure. The City of Philadelphia will have the option to accept the coverage at any time prior to completion of the coverage test.

Before starting the test, the City of Philadelphia and Motorola will agree upon the time frame for Motorola's submission of a report containing the coverage test results. However, this time frame shall be no sooner than 10 working days after the completion of the primary CATP and/or secondary testing that may be required.

4.6   CATP Procedures

4.6.1   Subjective DAQ Test

A subjective listening test will be performed for coverage acceptance testing of grids to verify talk-out and talk-in Delivered Audio Quality (DAQ) performance of the system.

♦ To perform a statistically valid subjective DAQ test, a large group of people is required to ensure high confidence in the results. However, obtaining a large group of people for a subjective listening test is usually impractical; therefore, several (3 to 6) people per team must be used for the test. Since a group this small can not provide statistically significant results, it is very important that the personnel participating in the subjective test be familiar with the sound of radio conversations. Before subjectively testing digital voice systems (ASTRO, SECURENET, etc.), all personnel who will evaluate audio quality must be "calibrated" by listening to a example of audio representative of the minimum CPC (DAQ) level expected from the type of system being tested.

♦ The test participants will be divided into teams, each consisting of personnel from both the City of Philadelphia and Motorola. Each team will have members that operate a portable unit in the field, and members that are stationed at the control point location.

4.6.2   Portable In-building Testing for the ASTRO 25 Digital System

♦ As the field test team(s) drive through the coverage area, the test grid locations will be located by the GPS feature of Voyager however the test locations within each grid will be selected randomly by test team personnel as closely as possible to the geographic center of the grid under test. Voyager is the new tool replacing the old FACTWare tool.

♦ Within each grid location, the test team will randomly select one building location, which will serve as the test location for the grid under test. The team will enter and, as a team, gather five (5) test samples on the first floor of the selected building. Each of the 5 test samples shall be in a different location on the first floor of the building.

- The test radios will be portable radios worn at hip level for both transmit and receive through the use of a remote speaker microphone worn at shoulder level. Multiple radios will be used within a given test team for listening to talk-out tests from dispatch. This is to ensure a close user proximity to the Remote Speaker Microphone can be achieved. For simulated in-building tests, the test radio will be portable radios with in-line attenuators using vehicle mounted rooftop mag-mount antenna.

- One radio for each location test samples will be used for talk-in transmissions; however a different radio can be utilized for test samples at each in-building location.

- Within the selected building, the field test team will listen to a talk-out audio transmission within each of the five (5) test sample locations, and will record their pass/fail result based on their subjective evaluation of the DAQ for the test sample.

- Both talk-out and talk-in tests will be performed with the portable test radio in motion and with the user utilizing favorable radio antenna/body etiquette. The user wearing the test radio and their field-testing partner will slowly walk around the general test sample area during the duration of the transmission. The test team shall remain together within the selected test sample area.

- Team members stationed at the control point will evaluate talk-in audio quality of transmissions from the test field unit in that grid. The exchange used for the voice quality check will be similar to the following:

    - (*Field Team*) - "Team # to Dispatcher, location # Testing 1-2-3-4-5, how do you copy?" The fixed team representatives will record the test point number and the pass/fail rating. (This is a talk-back transmission.)

    - (*Fixed End Team*) - "Dispatcher to Team # your transmission was received and rated pass/fail. Location #, Testing 1-2-3-4-5, how do you copy?" The field team will record the test point number and the pass/fail rating. (This is a talk-out transmission.)

    - (*Field Team*) - "Team # to Dispatcher your transmission was received and rated as pass/fail."

- One team member in both the fixed and field teams will maintain a test log to record date, time, and pass/fail evaluation for each test sample within the given grid and then ultimately for each test grid overall. The overall pass/fail evaluation of the grid under test will be based on at least 4 out of the 5 test locations being rated as "*passed*" by the team consensus of the test sample transmissions versus the benchmark example CD/tape used during the test team calibration process.

- If the members at each end of the test (Field Team and Fixed End Team), respectively, cannot reach a pass/fail consensus for a given test sample location under test, the Field Test Team will move to another test sample location within

the same building. The above test will be conducted again. If this second test results in a consensus opinion of equal or better audio quality than the benchmark example comparison CD/tape then this result shall be recorded, and the test sample location / test grid shall be rated as *"passed."*

- ♦ If less than 4 of the test locations taken on the first floor are rated as *"pass"* Motorola reserves the right to perform more extensive subjective voice testing of the selected building. Tests will be performed as described in the above paragraphs. Tests will be performed in a minimum of 10 evenly distributed locations on each above ground floor of the building. This will apply up to a maximum of 100 points per building. For buildings in excess of 10 floors, the 100 test locations will be chosen such that the test locations are evenly distributed throughout all above ground floors of the building. If 95% of the test locations within the building are rated *"pass"* the building and overall grid location under test will be considered *"passed"*.

- ♦ For test sample location(s) within a building, which fail the subjective DAQ coverage test, Motorola reserves the right to test the loss of the failed building locations. The failed building locations will be measured to insure that the building loss to each of those points is not greater than the loss used in Motorola's applicable coverage prediction or CATP. Those points with a penetration loss in excess of 12/20/30 dB will be excluded from the pass/fail scoring for the building and the reliability re-computed. If a majority of the initially tested locations within a building are determined to have a loss greater than was used in the prediction or applicable CATP (12/20/30dB), the building will be declared invalid for coverage acceptance testing. In this case an alternate building will be selected within the center of the test grid as a substitute and the test will be conducted again in accordance with the above paragraphs. If the second building is also declared invalid due to excessive building loss, then the entire grid will be excluded from the coverage acceptance test calculations. Building loss measurements will be performed only after primary testing in all valid test grids throughout the City have been completed and only in the presence of City representatives; should unavailability of City personnel extend CATP testing then Motorola will be granted a day for day extension of the Final Implementation Schedule Appendix H.

- ♦ In the event that excessive background acoustical noise in the field and/or fixed test locations disrupts or renders the reception/transmission of any test message impossible, the test team will repeat the test message once the noise subsides to a level where the test can proceed.

- ♦ The overall test grid pass/fail evaluations will be used to determine the overall coverage area reliability.

4.7 CATP Documentation and Coverage Acceptance

During subjective Delivered Audio Quality testing, a test log will be kept by each test team, mobile and at the control point. The pass/fail evaluations for each test grid will be recorded on the test logs. A copy of the test logs will be provided to the City of Philadelphia at the conclusion of the coverage test. Motorola will evaluate the subjective test logs to determine whether the coverage test was passed for the equipment configuration under test.

Motorola will submit to the City of Philadelphia a report detailing the coverage test results. This report will include a form, which is to be signed by both the City of Philadelphia and Motorola, indicating the test was performed in accordance with this CATP and the results of the test indicate the acceptance or non-acceptance of the coverage portion of the system. The City of Philadelphia will have the option to accept the coverage at any time prior to completion of the coverage test or documentation process.

4.8 Summary

The Coverage Acceptance Test Plan quantifies the coverage area, defines the coverage requirements, explains how the coverage area will be tested, and ensures that all parties understand their responsibilities. It allows the user the peace of mind that the new system will meet or exceed the coverage requirements.

4.9 System Reliability Test

4.9.1 Purpose

The purpose of the Reliability Test Plan (RTP) is to verify that the ASTRO25 IP Radio System performs as described in the detailed system design documents.

Successful completion of the Reliability Test shall be based upon each tested subsystem meeting the acceptable level of System Availability of 99.995% ("Four nines and a five") as agreed to by the Technical Committee. This level of System Availability equates to approximately 2 minutes and 10 seconds of system unavailability over each 30 day test segment.

System Availability shall be defined by the following equation:

System Availability = 100 x (1 - UNAVAILABLE Time / Total Time)

Where "UNAVAILABLE Time" is the total time in which the system is UNAVAILABLE as defined by this document. A failure which causes the system to

be UNAVAILABLE shall be considered a MAJOR failure. A failure which does not affect subsystem availability shall be considered a MINOR failure.

"Total Time" shall be equal to the total number of days the test is performed. Motorola proposes the Total Time to be thirty (30) calendar days after installation of new ASTRO25 Mastersite (to include SmartX servers) and core IP networking equipment at sites, thirty (30) calendar days after transition to SmartX operation , and thirty (30) days for each system reliability test conducted post FATP, CATP and user migration. This allows for a portion of the test to be performed with system loading.

The City of Philadelphia system has been designed with suitable redundancy in critical subsystems and an adequate number of channels that will ensure continued availability even though certain equipment may fail. A failure of a primary critical component that results in the use of a redundant critical component is a major failure notwithstanding Levels 5 and 6 set forth in Section 4.9.4; System components that constitute critical components will be identified during Detailed Design Review but include Zone Controllers, Prime Site Controllers, Motorola Gold Elite Gateway, Core Routers and/or Trak Units. Failures within critical components that are protected by fault tolerance are considered minor and shall not affect system availability if the overall critical component remains capable of performing its primary function or mission. With the exception of the fourth 30 day reliability period, failure of redundant components shall not be considered major failures During the fourth 30 day reliability period, failure of any component shall constitute a major failure, except for failure of minor components identified during Detailed Design Review and approved by the City. Minor failures will be noted and corrected but not counted against system availability.. The loss of a simulcast sub-site, or reduction in system performance level during system transition due to a site interconnect link failure shall be considered minor. Please reference the "Classification of System Availability/ Unavailability" section for more details regarding system/subsystem availability.

4.9.2 Conditions

In order to proceed with the Reliability Test, the following conditions must be satisfied:

1. Installation/Upgrade and optimization of the ASTRO25 IP Radio System, related subsystems (Dispatch, Alarm and Fault Mgt.) must be successfully completed.
2. All functional tests must be successfully completed.
3. Motorola has approved the system for the City of Philadelphia's use.
4. The System Reliability ATP has been submitted to the City and approved in writing as set forth in Section 3.7.6.

Preventive maintenance and all other infrastructure related installation must be completed or put on hold until after the test period. Motorola shall submit a letter to The City of Philadelphia signifying that the system is ready for test.

4.9.3 Procedure

The reliability test will be performed for a total period of one-hundred twenty (120) days, comprised of four thirty (30) continuous day segments. During each thirty (30)-day reliability test, all equipment/subsystem(s) installed prior to the commencement of the reliability segment will be subject to the reliability test. Please note that the first 30 day reliability test of the core IP network components of the ASTRO25 upgrade will be consistent with the Final Implementation Schedule (Appendix H). The second 30 day period will occur after the cutover of the existing 3600 simulcast systems A & B to the new ASTRO25 mastersite via SmartX, consistent with the Final Implementation Schedule (Appendix H). The third and fourth 30 day reliability periods will occur after FATP, CATP and cutover/migration of users to the new 9600 ASTRO25 simulcast systems. The third 30 day reliability periods will use backup/redundant major components as defined in the Detailed Design Review. The fourth 30 day reliability period will use the prime critical components to the extent possible with all failures considered MAJOR with the exception of the agreed upon list of minor components defined at the Detailed Design Review.

After the each segment, the test will be paused to allow for appropriate and orderly transition to the next project segment and/or test period.

During the third and fourth 30 day reliability periods the City of Philadelphia shall utilize the radio system for its intended purpose, and shall test all operational modes and equipment configurations to ensure that all features operate properly, and that all system anomalies have been identified. Representatives from each of the following entities will be involved as required:

♦ City of Philadelphia
♦ RCC
♦ Motorola
♦ CityNet

For purposes of the first and second reliability periods, the entire system shall be divided into three distinct subsystems. These are:

♦ ASTRO25 IP Radio Subsystem, including:
- 9600 Simulcast Subsystems A and B
- ASTRO25 Mastersite
- SmartX servers

- ♦ Radio Dispatch Console Subsystem including:
  - Police
  - Fire/EOC
  - Municipal
  - Philadelphia International Airport
- ♦ Fault Monitoring Subsystems including:
  - ♦ Unified Event Manager
  - ♦ FullVision
  - ♦ MOSCAD

Each subsystem must be designated "Passed" before the overall system reliability test can be considered "Passed." The following table illustrates a "Passed" reliability test:

Subsystem	Availability	Result
ASTRO Radio	99.995 %	Passed
Dispatch Console	99.995 %	Passed
Fault Monitoring	99.995 %	Passed

A MAJOR failure of any subsystem during the first or second reliability period will result in a suspension of the thirty-day reliability test period for that subsystem alone until corrective actions have been successfully completed. During this suspension period, the other subsystem reliability tests will continue. If the accumulated time consumed for corrective action exceeds the acceptable limit of system unavailability (2 minutes and 10 seconds), the 30 day reliability test period for that subsystem will start over. If the accumulated time consumed for corrective action is less than the acceptable limit of system availability, the 30 day reliability test will commence from the point of failure.

Motorola reserves the right to continue the 30 day reliability period without stoppage for any subsystem incurring a MINOR failure. However, if the test is stopped due to a MINOR failure, the subsystem's test will be restarted from the point of failure.

The failure of one subsystem test during the first or second 30 day reliability test will not require that the entire reliability test be started over from the beginning. During the third and fourth 30 day reliability test a MAJOR failure to either the AstroRadio subsystem or Dispatch Console subsystem will require that the entire 30 day reliability test be repeated. During the fourth 30 day reliability period, failure of any component shall constitute a major failure, except for failure of minor components identified during Detailed Design Review and approved by the City.

Upon successful completion of the System Reliability Test, the City of Philadelphia will provide Motorola with System Acceptance.

4.9.4 Classification of Subsystem Availability/Unavailability

Failures effecting availability within each of the four distinct subsystems are defined below. Failures not effecting subsystem availability (MINOR Failures) will be noted and corrected but not counted against overall subsystem availability. Classifications of availability have been modified to reflect severity levels contained on page 3 of the Network Monitoring, OnSite Infrastructure Response and Dispatch Service document being part of Motorola's Service Agreement S00001007383.

ASTRO25 IP Radio System

SYSTEM OPERATIONAL LEVEL DESCRIPTIONS		
Level	Operational Mode	Notes
Six	Wide-Area	Normal mode - System fully operational
Five	Site Trunking	Zone Controller link not caused by T1 link failure at Master Site lost
Four	Site Trunking	Zone Controller link caused by T1 link failure at Master Site lost
Three	Wide Area Failsoft	Non-trunked Wide-area Comparator In-Cabinet-Repeat (Simulcast)
Two	Stand-alone Failsoft	Standalone ICR Non-Trunked/Non-Simulcast (Not available for ASTRO25 simulcast systems)
One	Talk-Around	Direct unit to unit communications only
Zero	Inoperative	System totally nonfunctional

The subsystem shall be considered AVAILABLE when operating in level FIVE and above Note that the above ground voice subsystem actually consists of two independent simulcast subsystems (A and B). This provides a higher level of availability in that if one subsystem becomes unavailable, suitably programmed subscribers can migrate onto the other subsystem. Please note that for optimum system performance Motorola highly recommends subscriber templates be re-optimized as part of the ASTRO25 upgrade. This re-optimization should include at a minimum system specific talkgroups by personality.

The subsystem shall be considered UNAVAILABLE during the occurrence of anyone of the following events:

♦ Operation below Level 5 for subsystems A or B;

♦ 3 or more of the same sites having both simulcast subsystems (A and B) off the air;

♦ Greater than 4 channel failures system-wide;

♦ During fourth reliability period, any site or channel off the air.

Radio Dispatch Console Subsystem

The Radio Dispatch Console Subsystem shall be considered AVAILABLE except during the occurrence of any one of the following events:

♦ Loss of 2 or more operator positions at Muni; loss of 2 or more operator positions at Fire; loss of 2 or more operator positions at the Airport; or loss of 4 or more at Police Dispatch center;

♦ Total loss of a dispatch position due to failure of both the CRT Op AND applicable Control Station unit;

♦ Total loss of AEB;

♦ Total Zone Controller failure;

♦ Total loss of both MGEG units except during the fourth reliability period, during which loss of either MGEG unit shall constitute unavailability.

Failures caused solely by operator position hardware shall not constitute system unavailability. Overall system availability shall not be affected by a failure of the Radio-Dispatch Console Subsystem as long as control station access to subscribers is possible.

Fault Monitoring Subsystem

The Fault Monitoring Subsystem shall be considered AVAILABLE except during the occurrence of any one of the following events:

♦ Loss of servers associated with FullVision and/or UEM;

♦ Loss of MOSCAD GMC and GWS terminals, or all SmartZone Management Network User Terminals;

♦ This will be tested separately for the third and fourth reliability period.

4.9.5 Failure Reporting

All subsystem failures will be reported. MAJOR and MINOR FAILURES will be recorded in a log detailing failure. Information provided will include the amount of time that the subsystem or component operated in a failed condition, as well as corrective measures taken to resolve the failure. Supporting reports will be provided from the UEM, FullVision and MOSCAD, as applicable.

Subsystem non-availability start time shall begin either upon notification of the authorized Motorola representative by the City of the actual failure condition or when Motorola becomes aware or when recorded by the monitoring system.

Non-availability end time shall be marked when system availability is restored. The authorized Motorola representative will take all reasonable steps to notify the authorized City representative that the failure condition has been corrected.

Time taken by the City in an attempt to diagnose or correct the condition will not be counted towards system or subsystem non-availability. Further system or subsystem complications caused by the City's attempts to correct the failure condition shall not be counted against system non-availability.

Within 48 hours after the restoration of any failure condition, Motorola and the involved subcontractors will meet with the City to explain the failure, corrective actions, and steps taken to prevent similar failures in the future.

A Failures Mode and Errors Analysis (FMEA) will be generated each week. This report will track all MAJOR and MINOR FAILURES, as well as the corrective action that was taken to resolve the issue.

4.9.6 Exclusions

Failures caused wholly, or in part, by the following conditions shall not adversely impact system/subsystem acceptance associated with the Reliability Test:

- ♦ Acts of God, such as lightning, flood, fire, or earthquake;
- ♦ Willful abuse or damage caused by any person or group of persons (excluding Motorola);
- ♦ T1 site interconnect failures that result in loss of service or unusable service. Unusable service is service which do not meet Motorola's T1 specifications;
- ♦ Work stoppage or strike for any reason;
- ♦ Loss of adequate AC power for a period longer than provided for by battery or UPS backup power;
- ♦ Lack of performance of any City of Philadelphia supplied equipment or subsystems;
- ♦ Disruptions caused by normal generator test cycling on power systems provided by the City of Philadelphia.

4.9.7   Final Report

Failures detected during the Reliability Test will be reported to the City of Philadelphia. These written reports will include, as a minimum:

♦   Model and Serial Number of the equipment affected (Asset number if applicable)

♦   Original Complaint

♦   Revised Complaint and/or Trouble Found, i.e. Description of Failure

♦   Repairs Made and Parts Used

♦   Technician Name or Control Number

♦   Any recommended improvements to the system/subsystem

A final written report shall be submitted to the City of Philadelphia within thirty (30) days after the successful completion of the Reliability Test. All items on the City's Punch-list, plus all failures uncovered during this test, will be prioritized, and an Action Plan will be generated which addresses each failure.

4.9.8   Preliminary Punchlist

During the Reliability Test period it is anticipated that minor, non-availability affecting problems may be identified. The following table will be completed during the test period to define those mutually agreed to problems requiring future resolution. This preliminary punchlist of items must be corrected within a mutually agreed upon time frame.

#	Punch List Item	Target Completion Date	Actual Completion Date	Comments
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
N				

4.10   Sample Functional Acceptance Test Plan

This Sample Functional Acceptance Test Plan (ATP) has been developed to demonstrate the functional operation of the ASTRO 25 IP Radio System Upgrade.

The final ATP procedures may differ from the detailed procedures outlined in this document. As long as the intent of the test is verified, the test will be considered a pass. The final ATP document will be mutually agreed upon prior to testing. Motorola to submit the final ATP document sixty days before testing begins. The City will provide its written notice of approval or rejection no less than thirty days before testing begins.

It is understood that the City requests the following demonstrations/verifications above and beyond the "standard" tests contained herein. Where applicable the standard tests have been modified accordingly:

a. **Hot Mic**- verify proper activation over multiple attempts
b. **Multiselect**- verify maximum users allowed to "tailgate" an active MSEL
c. **Announcement Group Call**- verify users are not allowed to "tailgate" on an active AG call.
d. **30 Day GCP "Throttling" monitor test** – monitor GCP controller "throttling" events for a 30 day period during normal operations. NOTE: this test to be done as part of 30d reliability
e. **Functional Digital Vehicular Repeater (DVRs) test for the mobile, portable and the fixed DVRs during the Coverage Acceptance Test**. The testing methodology will be developed during the Acceptance Test Plan development.

4.10.1 Test Methodology

Both the City of Philadelphia and Motorola will complete each test according to an ATP script with various pass/fail checkpoints and signoff after the tests are completed.

4.10.2 Post ATP Requirements

Upon completion of the fixed network ATP, a punch list of issues and timelines will be developed, if necessary.

4.10.3 Wide Area SmartZone Trunking Features

Talkgroup Call

1. DESCRIPTION

The Talkgroup is the primary level of organization for communications on a trunked radio system. Radios with Talkgroup Call capability will be able to communicate with other members of the same Talkgroup. This provides the effect of a private channel down to the Talkgroup level. This test will demonstrate that a Talkgroup transmission initiated by a radio user will only be heard by system users who have the same Talkgroup selected. As with other types of calls, Talkgroup Calls can take place from anywhere in the system.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 2
RADIO-3 - TALKGROUP 2
RADIO-3 - SITE - SITE 1
RADIO-4 - TALKGROUP 2
RADIO-4 - SITE - SITE 2

VERSION #1.02
SPS #7.5

2. TEST

Step 1. Initiate a wide area call with RADIO-1 in TALKGROUP 1.

Step 2. Observe that only RADIO-2 will be able to monitor and respond to the call.

Step 3. Initiate a wide area call with RADIO-3 in TALKGROUP 2.

Step 4. Observe that only RADIO-4 will be able to monitor and respond to the call.

Pass____ Fail____

Wide Area SmartZone Trunking Features

Secure Operation

1. DESCRIPTION

Digital encryption is used to scramble a transmission so only properly equipped radios can monitor the conversation. A "Key" is used to encrypt the transmit audio. Only radios with the same "Key" can decrypt the audio and listen to it.

SETUP

RADIO-1 - TALKGROUP 1 (Secure TX Mode)
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1 (Secure TX Mode)
RADIO-2 - SITE - SITE 1
RADIO-3 - TALKGROUP 1 (Secure TX Mode & No Key)
RADIO-3 - SITE - SITE 1
RADIO-4 - TALKGROUP 1 (Clear TX Mode)
RADIO-4 - SITE - SITE 1

Verify the identical secure mode is programmed into RADIO-1, RADIO-2, RADIO-4 and that RADIO-3 has no secure code loaded or has a unique secure code from the other testing radios.

VERSION #1.02
SPS #7.5

2. TEST

Step 1. Initiate a secure wide area call with RADIO-1 on TALKGROUP 1. Keep this call in progress until instructed to end the call.

Step 2. Observe that RADIO-2 will be able to monitor and respond to the call once the call from RADIO-1 has ended.

Step 3. Observe that RADIO-3 does not receive the call.

Step 4. Observe that RADIO-4 will also receive the call even with the secure switch set to the non-secure mode of operation.

Step 5. End the call from RADIO-1.

Step 6. For radios equipped with dual algorithm encryption modules, select a talkgroup using the second algorithm and repeat Steps 1-5.

Pass_____ Fail_____

Wide Area SmartZone Trunking Features

Multigroup Call in Wait Mode

1. DESCRIPTION

This trunking feature allows an equipped radio user to transmit an announcement to several different talkgroups simultaneously. The multigroup (ATG) call can be flagged for Wait Mode in the User Configuration Manager (UCM) database forcing all attached talkgroups to finish calls in progress before the trunked system will process the multigroup call. The system does not permit inactive, attached talkgroups to initiate Talkgroup Calls during the "wait" timeframe. As with other types of calls, multigroup calls can take place from anywhere in the system.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 2
RADIO-2 - SITE - SITE 1
RADIO-3 - RANDOM (Not part of MG)
RADIO-3 - SITE - SITE 2
RADIO-4 - ATG 1
RADIO-4 - SITE - SITE 2

* TALKGROUP 1, TALKGROUP 2 are members of ATG 1.

* RANDOM is any talkgroup not a member of ATG 1.

* Multigroups are set up through both the UCM and the Subscriber Programming software.

VERSION #1.02
SPS #7.5

2. TEST

Step 1. Verify ATG 1 is set for the Wait mode in the UCM database.

Step 2. Using RADIO-1, initiate a call on TALKGROUP 1.

Step 3. While RADIO-1 is keyed, attempt to initiate a multigroup call using RADIO-4 on ATG 1. Verify RADIO-4 receives a busy tone because one of the talkgroups attached to ATG 1 is involved in a Talkgroup Call.

Step 4. Dekey RADIO-1 and verify RADIO-4 receives a callback.

Step 5. Key RADIO-4 and verify both RADIO-1 and RADIO-2 hear the multigroup call while RADIO-3 does not unmute.

Pass_____ Fail_____

Wide Area SmartZone Trunking Features

Multigroup Call in Interrupt Mode

1. DESCRIPTION

This trunking feature allows an equipped radio user to transmit an announcement to several different talkgroups simultaneously. The multigroup (MG) call can be flagged for Interrupt Mode in the User Configuration Manager (UCM) database, this means that the trunked system does not wait for attached talkgroups to finish calls in progress. Upon dekeying, the interrupted radios will join the multigroup call in progress. As with other types of calls, multigroup calls can take place from anywhere in the system.

NOTE: A receiver interference failure may appear if RADIO-1 is not immediately dekeyed. This test is not recommended for singe site systems as RF contention will occur.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 2
RADIO-2 - SITE - SITE 1
RADIO-3 - RANDOM (Not part of MG)
RADIO-3 - SITE - SITE 2
RADIO-4 - ATG 1
RADIO-4 - SITE - SITE 2

* TALKGROUP 1, TALKGROUP 2 are members of ATG 1.

* RANDOM is any talkgroup not a member of ATG 1.

* Multigroups are set up through both the UCM and the Subscriber Programming software.

VERSION #1.02
SPS #7.5

2. TEST

Step 1. Verify ATG 1 is set for the Interrupt mode in the UCM database.

Step 2. Using RADIO-1, initiate a call on TALKGROUP 1.

Step 3. While RADIO-1 is keyed, initiate a multigroup call using RADIO-4 on ATG 1. Verify RADIO-2 receives the call but RADIO-3 does not unmute.

Step 4. Dekey RADIO-1 and verify RADIO-1 unmutes and joins the multigroup call in progress.

Customer Requested Modification:

Step 5   *Attempt to create a "tailgating" condition where a subscriber causes a continuation of the the initial console MG call. Verify that system will not allow this condition.*

Pass_____ Fail_____

Wide Area SmartZone Trunking Features

Private Call

1. DESCRIPTION

Private Call is a selective calling feature that allows a dispatcher or radio user to carry on one-to-one conversation that is only heard by the 2 parties involved. Subscriber units receiving a private call will sound an alert tone. As with other types of calls, Private Calls can take place from anywhere in the system.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 2
RADIO-3 - TALKGROUP 1
RADIO-3 - SITE - SITE 3

VERSION #1.02
SPS #7.5

2. TEST

Step 1. Using RADIO-1, press the Private Call (Call) button.

Step 2. Enter the unit ID of RADIO-2 with the keypad, or scroll to the location where this ID is stored.

Step 3. Press the PTT to initiate the Private Call (Call).

Step 4. Verify that RADIO-2 hears tones and the display indicates that a Private Call (Call) has been received, but RADIO-3 receives no indications.

Step 5. Answer the call at RADIO-2 by pressing the Private Call (Call) button. If RADIO-2 has a display, verify it shows the ID number or alias of RADIO-1.

Step 6. Press the PTT switch on RADIO-2 and respond to the Private Call (Call). Note that if you do not press the Private Call (Call) button before pressing PTT, your audio will be heard by all members of the talkgroup, and not by the radio initiating the Private Call (Call).

Step 7. Verify that RADIO-2 can communicate with RADIO-1.

Step 8. Verify that RADIO-3 does not monitor the Private Call (Call).

Step 9. End the Private Call (Call) and return to normal talkgroup operation.

Pass____ Fail____

Wide Area SmartZone Trunking Features

Call Alert

1. DESCRIPTION

Call Alert is a tone page that allows a user to selectively alert another radio unit. The initiating radio will receive notification from the trunked system as to whether or not the page was received by the target radio. Units receiving a Call Alert will sound an alert tone. As with other types of calls, Call Alerts can take place from anywhere in the system.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 2
RADIO-2 - SITE - SITE 2
RADIO-3 - TALKGROUP 3
RADIO-3 - SITE - SITE 3

VERSION #1.02
SPS #7.5

2. TEST

Step 1. Using RADIO-1, press the page button.

Step 2. Enter the unit ID of RADIO-2 with the keypad, or scroll to the location where this ID is stored

Step 3. Press the PTT to initiate the call alert (Page). Verify that the RADIO-1 user receives audible indication that the Call Alert (Page) was sent.

Step 4. Verify that RADIO-2 user receives an audible indication of an incoming Call Alert (Page) was sent but RADIO-3 does not.

Step 5. Verify RADIO-1 gets an audible indication that the Call Alert (Page) was successfully received at the target radio.

Step 6. Turn off RADIO-2. Send a Call Alert (Page) from RADIO-1 to RADIO-2.

Step 7. Verify that the RADIO-1 user receives audible indication that the Call Alert (Page) was sent.

Step 8. Verify RADIO-1 receives a "No Acknowledgement" indication that the Call Alert (Page) was not successfully received at the target radio.

Pass____ Fail____

Wide Area SmartZone Trunking Features

In Call User Alert (In-Call User Alert disabled)

1. DESCRIPTION

In-Call User Alert enhances the Call Alert feature to allow Call Alerts to be received by radios that are currently involved in voice and data services. As part of this feature, the radio supports Talkgroup Muting where the radio user can mute all talkgroup voice received by the radio. The Console Dispatcher or another radio user can unmute the radio by sending the radio a Call Alert.

Note: Talkgroup Muting is a programmable option in the radio. There are also sub-options which will affect the time and operation of the Talkgroup muting.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 2
RADIO-2 - SITE - SITE 2
CONSOLE-1 - TALKGROUP 1

VERSION #1.05
SPS #7.5

2. TEST

Step 1.   In the Unified Network Configurator (UNC), verify that In-Call User Alert is disabled. Verify that RADIO-1 and RADIO-2 have Talkgroup Muting (VMUT) disabled (Off) in the radios.

Step 2.   Enable Talkgroup Muting (VMUT) (Turn on) on RADIO-1.

Step 3.   Verify that there is a visual indication on RADIO-1 that Talkgroup Muting is enabled.

Step 4.   Initiate a talkgroup call on TALKGROUP 1 from CONSOLE-1.

Step 5.   Verify that no audio is heard by RADIO-1 and that RADIO-1 displays the ID of CONSOLE-1.

Step 6.   Send a Call Alert to RADIO-1 from Radio 2. Verify that Radio-1 does not receive a Call Alert and that Radio-2 indicates failure of Call Alert. End Console talkgroup call.

Step 7.   Send a Call Alert to RADIO-1 from CONSOLE-1. Accept the Call Alert at RADIO-1 by pressing the Home key.

Step 8.   Initiate a talkgroup call on TALKGROUP 1 from CONSOLE-1.

Step 9.   Verify that audio is now heard by RADIO-1 and that RADIO-1 displays the ID of CONSOLE-1.

Step 10. End Console talkgroup call.

Pass____ Fail____

Wide Area SmartZone Trunking Features

In Call User Alert (In-Call User Alert Enabled)

1. DESCRIPTION

In-Call User Alert enhances the Call Alert feature to allow Call Alerts to be received by radios that are currently involved in voice and data services. As part of this feature, the radio supports Talkgroup Muting where the radio user can mute all talkgroup voice received by the radio. The Console Dispatcher or another radio user can unmute the radio by sending the radio a Call Alert.

Note: Talkgroup Muting is a programmable option in the radio. There are also sub-options which will affect the time and operation of the Talkgroup muting.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 2
RADIO-2 - SITE - SITE 2
CONSOLE-1 - TALKGROUP 1

VERSION #1.06
SPS #7.5

2. TEST

Step 1. In the Unified Network Configurator (UNC), verify that In-Call User Alert is enabled. Verify that RADIO-1 and RADIO-2 have Talkgroup Muting (VMUT) disabled in the radios.

Step 2. Enable Talkgroup Muting (VMUT) on RADIO-1.

Step 3. Verify that there is a visual indication on RADIO-1 that Talkgroup Muting is enabled.

Step 4. Initiate a talkgroup call on TALKGROUP 1 from CONSOLE-1.

Step 5. Verify that no audio is heard by RADIO-1 and that RADIO-1 displays the ID of CONSOLE-1.

Step 6. Send a Call Alert to RADIO-1 from Radio 2. Verify that Radio-1 receives a Call Alert and that Radio-2 indicates success of Call Alert. Verify that CONSOLE-1 audio is now heard by RADIO-1

Step 7. End Console talkgroup call.

Step 8. Acknowledge Call Alert by hitting home key on RADIO-1.

Pass_____ Fail_____

Wide Area SmartZone Trunking Features

Emergency Alarm and Call with Top of Queue

1. DESCRIPTION

Users in life threatening situations can use the Emergency button on the radio to immediately send a signal to the dispatcher and be assigned the next available voice channel. An Emergency Call can be set to either Top of Queue or Ruthless Preemption operation. To accomplish this test, an Emergency Alarm and Call will be initiated from a portable which will be received by a portable affiliated at any site of any zone in the system.

NOTE : If the subscriber does not have the PTT Display option, the Emergency ID will not be displayed.

NOTE: All radios and talkgroups should start with default priorities. Default is 10.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 2
RADIO-3 - TALKGROUP 2
RADIO-3 - SITE - SITE 1
RADIO-4 - TALKGROUP 3
RADIO-4 - SITE - SITE 1

VERSION #1.03
SPS #7.5

2. TEST

Step 1. The emergency type for TALKGROUP 1's template must be set up through the User Configuration Manager (UCM) as Top of Queue.

Step 2. Simulate a busy system by disabling all channels at SITE 1 with the exception of the control channel and one voice channel.

Step 3. Press the PTT to initiate a call with RADIO-3 and hold the PTT switch until instructed to release.

Step 4. Key RADIO-4 and verify the radio receives a busy tone. Release the PTT switch on RADIO-4.

Step 5. Using RADIO-1 send an Emergency Call by depressing the emergency switch and then the PTT switch.

Step 6. Observe that RADIO-1 cannot transmit due to the voice channel being busy.

Step 7. Release the PTT switch on RADIO-3.

Step 8. Observe that RADIO-1 receives the call back before RADIO-4 and is able to proceed with the call.

Step 9. **For radios with displays only** Observe that the display on RADIO-2 denotes an emergency and the unit ID of RADIO-1.

Step 10. Dekey RADIO-1 and end the Emergency Call by holding down the Emergency button on RADIO-1 until an alert tone sounds. Verify RADIO-1 returns to normal operation and that RADIO-4 receives a callback.

Pass____ Fail____

Wide Area SmartZone Trunking Features

Emergency Alarm and Call with Ruthless Preemption

1. DESCRIPTION

Users in life threatening situations can use the Emergency button on the radio to immediately send a signal to the dispatcher and be assigned the next available voice channel. An Emergency Call can be set to either Top of Queue or Ruthless Preemption operation. To accomplish this test, an Emergency Alarm and Call will be initiated from a portable which will be received by a portable affiliated at any site of any zone in the system.

NOTE : If the subscriber does not have the PTT Display option, the Emergency ID will not be displayed. This test is not recommended for singe site systems as RF contention will occur.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 2
RADIO-3 - TALKGROUP 2
RADIO-3 - SITE - SITE 1
RADIO-4 - TALKGROUP 2
RADIO-4 - SITE - SITE 2

**VERSION #1.03
SPS #7.5**

2. TEST

Step 1. The emergency type for TALKGROUP 1's template must be set up through the User Configuration Manager (UCM) as Ruthless Preemption.

Step 2. Simulate a busy system by disabling all channels at SITE 1 with the exception of the control channel and one voice channel.

Step 3. Press the PTT to initiate a call with RADIO-4 and hold the PTT switch until instructed to release. Verify RADIO-3 receives the call.

Step 4. Key RADIO-1 and verify the radio receives a busy tone. Release the PTT switch on RADIO-1.

Step 5. Using RADIO-1 send an Emergency Call by depressing the emergency switch and then the PTT switch.

Step 6. Observe that RADIO-1 is granted the channel immediately and the Talkgroup Call is dropped for RADIO-3. An Emergency Alarm is displayed at a console position monitoring TALKGROUP 1. Dekey RADIO-4.

Step 7. Key RADIO-3 and verify the radio receives a busy tone. Release the PTT switch on RADIO-3.

Step 8. End the Emergency Call by holding down the Emergency button on RADIO-1 until an alert tone sounds. Verify RADIO-1 returns to normal operation and that RADIO-3 receives a callback after the emergency hang time expires.

Step 9. Return the emergency type for TALKGROUP 1's template back to Top of Queue.

Pass____ Fail____

Wide Area SmartZone Trunking Features

Emergency Alarm and Call with Talkgroup Revert

1. DESCRIPTION

Users in life threatening situations can use the Emergency button on the radio to immediately send a signal to the dispatcher and be assigned the next available voice channel. An Emergency Call can be set to either Top of Queue or Ruthless Preemption operation. This test verifies the Emergency ID will appear on the display of the subscribers. To accomplish this test, an Emergency Alarm and Call will be initiated from a portable which will be received by a portable affiliated at any site of any zone in the system.

A portable has the ability to revert to a specific talkgroup when an emergency is initiated. This is useful when the users have a designated talkgroup for handling emergencies.

The revert talkgroup must be set in the portable via software.

NOTE : If the subscriber does not have the PTT Display option, the Emergency ID will not be displayed.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 2
RADIO-3 - EMERGENCY TG
RADIO-3 - SITE - SITE 3 (SITE 2 if only 2 Sites)

* EMERGENCY TG is the talkgroup programmed for emergency reverts.

VERSION #1.03
SPS #7.5

2. TEST

Step 1.   Make a Talkgroup Call from RADIO-1 and verify only RADIO-2 can hear the audio.

Step 2.   Dekey RADIO-1.

Step 3.   Using RADIO-1 send an Emergency Call by depressing the emergency switch and then the PTT switch.

Step 4.   **For radios with displays only** Observe the display on RADIO-3 denotes an emergency and the unit ID of the unit sending the emergency and that RADIO-3 can hear RADIO-1's audio.

Step 5.   In addition observe that RADIO-2 can not hear RADIO-1's audio.

Step 6.   Release the PTT switch on RADIO-1 and cancel the emergency.

Pass____ Fail____

Wide Area SmartZone Trunking Features

Emergency Alarm and Call with Hot Mic

1. DESCRIPTION

Users in life threatening situations can use the Emergency button on the radio to immediately send a signal to the dispatcher and be assigned the next available voice channel. An Emergency Call can be set to either Top of Queue or Ruthless Preemption operation. This test verifies the Emergency ID will appear on the display of the subscribers. To accomplish this, an Emergency Alarm and Call will be initiated from a portable which will be received by a portable affiliated at any site of any zone in the system.

If the Hot Mic option is chosen, the subscriber will send an emergency and after a voice channel is assigned, the subscriber will automatically transmit for a programmable period of time.

Emergency Alarm with Voice to Follow (Hot Mic) is an option in the portable and must be enabled via software.

This test case works for all portable radios. For mobile radios, specific mobile microphone models are required.

NOTE : If the subscriber does not have the PTT Display option, the Emergency ID will not be displayed.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 2
RADIO-3 - TALKGROUP 1
RADIO-3 - SITE - SITE 3

Make sure that Emergency Alarm w/ Voice Following has been enabled in the subscriber.

VERSION #1.02

SPS #7.5

2. TEST

Step 1. Using RADIO-1 send an Emergency Alarm by depressing the emergency switch.

Step 2. **For radios with displays only** Observe the display on RADIO-2 and RADIO-3 denotes an emergency and the unit ID of RADIO-1.

Step 3. Observe that RADIO-2 and RADIO-3 can hear any audio from RADIO-1 even though RADIO-1 does not have its PTT switch depressed.

Step 4. Observe that RADIO-1 PTT times out and the radio dekeys.

Step 5. Cancel the emergency.

Customer Requested Modification

Step 6   Repeat Steps 1 through 5 for a series of 10 full test cycles and verify proper Hot Mic functionality for each cycle.

Pass_____ Fail_____

Wide Area SmartZone Trunking Features

Busy Queuing and Callback with Ten Talkgroup Priority Levels

1. DESCRIPTION

If no voice channel resources are available, radios requesting channels for new conversations are placed in a queue. Users of the same priority will move through the queue in a FIFO (first in, first out) sequence; however, users of higher priority will be inserted ahead of lower priority users in queue.

When a voice channel becomes available, the radio at the top of the busy queue gets a channel assignment and generates a callback tone. The callback tone alerts the user that a channel assignment was made and transmitting is now possible on the selected talkgroup.

Note that an Emergency Call has the highest priority at level 1. The highest assignable priority is 2 and 10 is the lowest.

NOTE: All radios and talkgroups should start with default priorities. Default is 10.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 2
RADIO-2 - SITE - SITE 1
RADIO-3 - TALKGROUP 3
RADIO-3 - SITE - SITE 1
RADIO-4 - TALKGROUP 2
RADIO-4 - SITE - SITE 2

VERSION #1.02
SPS #7.5

2. TEST

Step 1. Simulate a busy system by disabling all channels at SITE 1 with the exception of the control channel and one voice channel.

Step 2. The priority level for TALKGROUP 2's template must be set up through the User Configuration Manager (UCM) as 9.

Step 3. Initiate a Talkgroup Call with RADIO-1. Keep this call in progress until instructed to end the call.

Step 4. Key RADIO-3 and observe that the radio receives a busy.

Step 5. Key RADIO-2 and observe that the radio receives a busy.

Step 6. End the Talkgroup Call established in Step 3.

Step 7. Observe RADIO-2 receives the first callback and can now make a call to RADIO-4 upon receipt of the callback indication.

Step 8. End the call between RADIO-2 and RADIO-4.

Step 9. Observe RADIO-3 now receives a callback and can make a call upon receipt of the callback indication.

Pass_____ Fail_____

Wide Area SmartZone Trunking Features

Continuous Assignment Updating

1. DESCRIPTION

When a talkgroup is assigned a voice channel, the site controller continues to transmit the channel assignment on the control channel for the duration of the talkgroup call. Radios coming into use on the system are automatically sent to voice channels with conversations in progress involving their selected talkgroups.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 2

VERSION #1.02
SPS #7.5

2. TEST

Step 1.   Turn OFF RADIO-1.

Step 2.   Initiate a Talkgroup Call using RADIO-2 on the talkgroup.

Step 3.   While the Talkgroup Call is in progress, turn ON RADIO-1.

Step 4.   Observe that the radio, which was just brought back into service, joins the Talkgroup Call already in progress.

Step 5.   Switch RADIO-1 to another talkgroup.

Step 6.   Initiate a Talkgroup Call using RADIO-2 on the original talkgroup.

Step 7.   While the Talkgroup Call is in progress, set RADIO-1 back to the original talkgroup.

Step 8.   Observe that RADIO-1 joins the Talkgroup Call already in progress.

Pass____ Fail____

Wide Area SmartZone Trunking Features

Site Access Control/"Individual Only" Site Access Denial

1. DESCRIPTION

The User Configuration Manager (UCM) can be used to limit radio or talkgroup access to selected valid sites. Control can be exercised to restrict radio users or talkgroups to certain sites, or to steer radio activity away from smaller sites in an effort to avoid busies. UCM flags establish which sites are valid for each individual radio user, talkgroup and multigroup. An overall Site Access Denial flag for the system governs how these radio and talkgroup settings affect the affiliation or rejection of radios to individual sites. Once a subscriber unit has been denied at a site it will not attempt to access that site unless power is cycled or the user changes talkgroups. Four possible values for the Site Access Denial flag exist: Individual Only, Talkgroup Only, Either, or Both.

"Individual Only" Site Access Denial dictates that a radio will not be allowed to affiliate to a particular site if the radio user does not have access to that site. If the Site Access Denial flag is set to "Individual Only", the talkgroup record for valid sites is not used in the determination of actual site affiliation permissions.

NOTE: Site Denial flags are not cleared from the subscriber until the power is cycled or the talkgroup is changed.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 2

VERSION #1.02
SPS #7.5

2. TEST

Step 1. Set the Site Access Denial Flag to Individual Only via the UCM.

Step 2. Cycle power to RADIO-1 and RADIO-2 to force them to affiliate, this will clear any site denials they may hold in memory.

Step 3. Initiate a Private Call from RADIO-2 to RADIO-1. Verify that the Private Call occurs since RADIO-2 is valid at SITE 2. End the Private Call.

Step 4. Set SITE 2 to be a non-valid site for RADIO-2 through the UCM.

Step 5. Initiate a Private Call from RADIO-2 to RADIO-1. Verify that RADIO-2 receives a reject, and roams to a valid site. RADIO-2 is not allowed to make the Private Call from SITE 2 since it is no longer valid at SITE 2.

Pass_____ Fail_____

Wide Area SmartZone Trunking Features

Site Access Control/"Talkgroup Only" Site Access Denial

1. DESCRIPTION

The User Configuration Manager (UCM) can be used to limit radio or talkgroup access to selected valid sites. Control can be exercised to restrict radio users or talkgroups to certain sites, or to steer radio activity away from smaller sites in an effort to avoid busies. UCM flags establish which sites are valid for each individual radio user, talkgroup and multigroup. An overall Site Access Denial flag for the system governs how these radio and talkgroup settings affect the affiliation or rejection of radios to individual sites. Four possible values for the Site Access Denial flag exist: Individual Only, Talkgroup Only, Either, or Both.

"Talkgroup (TG) Only" Site Access Denial dictates that a radio will not be allowed to affiliate to a particular site if its affiliated talkgroup does not have access to that site. In this case, the individual radio user setting for valid sites is not used in the determination of actual site affiliation permissions.

NOTE: Site Denial flags are not cleared from the subscriber until the power is cycled or the talkgroup is changed.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 1

VERSION #1.02
SPS #7.5

2. TEST

Step 1.   Set the Site Access Denial Flag to Talkgroup Only via the User Configuration Manager (UCM).

Step 2.   Set SITE 2 to be a valid site for RADIO-2 through the UCM. Set SITE 2 to be a non-valid site for TALKGROUP 1 through the UCM.

Step 3.   Force RADIO-2 to scan to SITE 2. Verify that RADIO-2 cannot affiliate to SITE 2 since TALKGROUP 1 is a non-valid talkgroup for SITE 2.

Step 4.   Set SITE 2 to be a valid site for TALKGROUP 1 through the UCM. Set SITE 2 to be a non-valid site for RADIO-2 through the UCM.

Step 5.   Force RADIO-2 to scan to SITE 2. Verify that RADIO-2 is now allowed to affiliate to SITE 2 since the talkgroup record determines site access.

Step 6.   Initiate a call from RADIO-2. Verify that RADIO-2 is allowed to make the call from SITE 2 since TALKGROUP 1 is valid at SITE 2.

Pass_____ Fail_____

Wide Area SmartZone Trunking Features

Site Access Control/"Either" Site Access Denial

1. DESCRIPTION

The User Configuration Manager (UCM) can be used to limit radio or talkgroup access to selected valid sites. Control can be exercised to restrict radio users or talkgroups to certain sites, or to steer radio activity away from smaller sites in an effort to avoid busies. UCM flags establish which sites are valid for each individual radio user, talkgroup and multigroup. An overall Site Access Denial flag for the system governs how these radio and talkgroup settings affect the affiliation or rejection of radios to individual sites. Once a subscriber unit has been denied at a site, it will not attempt to access that site unless power is cycled or the user changes talkgroups. Four possible values for the Site Access Denial flag exist: Individual Only, Talkgroup Only, Either, or Both.

"Either" Site Access Denial indicates that a radio will not be allowed to affiliate to a site if either the radio user or affiliated talkgroup does not have access to that site.

NOTE: Site Denial flags are not cleared from the subscriber until the power is cycled or the talkgroup is changed.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 2
RADIO-3 - TALKGROUP 2
RADIO-3 - SITE - SITE 2

VERSION #1.02
SPS #7.5

2. TEST

Step 1. Set the Site Access Denial Flag to Either via the UCM.

Step 2. Cycle power to the radios to force them to affiliate, this will clear any site denials they may hold in memory.

Step 3. Initiate a TALKGROUP 1 call from RADIO-2. Verify that RADIO-2 is allowed to make the TALKGROUP 1 call.

Step 4. Set SITE 2 to be a non-valid site for RADIO-2 through the UCM.

Step 5. Initiate a TALKGROUP 1 call from RADIO-2. Verify that RADIO-2 receives a reject, and roams to a valid site. RADIO-2 is not allowed to make the TALKGROUP 1 call from SITE 2 since RADIO-2 is no longer valid at SITE 2.

Step 6. Switch RADIO-1 to TALKGROUP 2.

Step 7. Initiate a TALKGROUP 2 call from RADIO-3. Verify that RADIO-3 is allowed to make the TALKGROUP 2 call.

Step 8. Set SITE 2 to be a non-valid site for TALKGROUP 2.

Step 9. Initiate a TALKGROUP 2 call from RADIO-3. Verify that RADIO-3 receives a reject, and roams to a valid site. RADIO-3 is not allowed to make the TALKGROUP 2 call from SITE 2 since TALKGROUP 2 is no longer valid at SITE 2.

Pass_____ Fail_____

City of Philadelphia
ASTRO 25 Upgrade
Acceptance Test Plan
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Wide Area SmartZone Trunking Features

Site Access Control/"Both" Site Access Denial

1. DESCRIPTION

The User Configuration Manager (UCM) can be used to limit radio or talkgroup access to selected valid sites. Control can be exercised to restrict radio users or talkgroups to certain sites, or to steer radio activity away from smaller sites in an effort to avoid busies. UCM flags establish which sites are valid for each individual radio user, talkgroup and multigroup. An overall Site Access Denial flag for the system governs how these radio and talkgroup settings affect the affiliation or rejection of radios to individual sites. Once a subscriber unit has been denied at a site, it will not attempt to access that site unless power is cycled or the user changes talkgroups. Four possible values for the Site Access Denial flag exist: Individual Only, Talkgroup Only, Either, or Both.

"Both" Site Access Denial indicates that a radio will not be allowed to affiliate to a site only if both the radio user and affiliated talkgroup do not have access to the site.

NOTE: Site Denial flags are not cleared from the subscriber until the power is cycled or the talkgroup is changed.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 2

VERSION #1.02
SPS #7.5

2. TEST

Step 1. Set the Site Access Denial Flag to Both via the UCM.

Step 2. Cycle power to RADIO-1 and RADIO-2 to force them to affiliate, this will clear any site denials they may hold in memory.

Step 3. Initiate a TALKGROUP 1 call from RADIO-2. Verify that RADIO-2 is allowed to make the TALKGROUP 1 call.

Step 4. Set SITE 2 to be a non-valid site for RADIO-2 through the UCM. Set SITE 2 to be a non-valid site for TALKGROUP 1 through the UCM.

Step 5. Initiate a TALKGROUP 1 call from RADIO-2. Verify that RADIO-2 receives a reject, and roams to a valid site. RADIO-2 is not allowed to make the TALKGROUP 1 call from SITE 2 since TALKGROUP 1 nor RADIO-2 is no longer valid at SITE 2.

Step 6. Reset all Talkgroup and Radio User flags in the UCM.

Pass____ Fail____

Wide Area SmartZone Trunking Features

All Start Talkgroups

1. DESCRIPTION

Talkgroups can be set up as either All Start or Fast Start.

"AllStart" is the default Talkgroup Call setup approach that requires that all sites with affiliated talkgroup members and other required resources be available before the call begins. Otherwise, the system returns a busy response to the subscriber who initiated the Talkgroup Call. Once the required resources become available, the call is granted.

NOTE: This feature only works on a multi-site system.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 2
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 1
RADIO-3 - TALKGROUP 2
RADIO-3 - SITE - SITE 1

VERSION #1.02
SPS #7.5

2. TEST

Step 1.   Verify TALKGROUP 1's template is setup as an All Start Talkgroup in the User Configuration Manager (UCM).

Step 2.   Simulate a busy system by disabling all channels at SITE 1 with the exception of the control channel and one voice channel.

Step 3.   Key RADIO-3 and busy out the only voice channel available at SITE 1 where RADIO-2 and RADIO-3 are affiliated..

Step 4.   Initiate a Talkgroup Call from RADIO-1 and observe a busy indication is received due to no available voice channel at SITE 1 where RADIO-2 is affiliated.

Step 5.   Dekey RADIO-3. Verify that the call from RADIO-1 is now granted and RADIO-2 can hear the audio.

Pass_____ Fail_____

Wide Area SmartZone Trunking Features

Fast Start Talkgroup without Critical Site

1. DESCRIPTION

Talkgroups can be set up as either All Start or Fast Start.

"FastStart" is the Talkgroup Call setup approach that allows a group call setup whether or not all affiliated Talkgroup members are available. This "Automatic Busy Override by Talkgroup" call setup method still requires the participation of all affiliated consoles, LOMIs (i.e. logging recorders) and critical sites before the call can begin. As channels at the affiliated talkgroup members' sites become available, they are added to the call in progress.

NOTE: This feature only works on a multi-site system.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 2
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 1
RADIO-3 - TALKGROUP 2
RADIO-3 - SITE - SITE 1

VERSION #1.02
SPS #7.5

2. TEST

Step 1.   Verify that TALKGROUP 1's template is set up as Fast Start through the User Configuration Manager (UCM) with no critical sites specified.

Step 2.   Simulate a busy system by disabling all channels at SITE 1 with the exception of the control channel and one voice channel.

Step 3.   Key RADIO-3 and busy out the only voice channel available at SITE 1.

Step 4.   Initiate a Talkgroup Call from RADIO-1 and observe the call is granted even with no voice channel available at SITE 2 for RADIO-2.

Step 5.   Dekey RADIO-3. Verify that RADIO-2 can now hear RADIO-1.

Pass____ Fail____

Wide Area SmartZone Trunking Features

Fast Start Talkgroup with Critical Site

1. DESCRIPTION

Talkgroups can be set up as either All Start or Fast Start.

"FastStart" is the Talkgroup Call setup approach that allows a group call setup whether or not all affiliated Talkgroup members are available. This "Automatic Busy Override by Talkgroup" call setup method still requires the participation of all affiliated consoles, LOMIs (i.e. logging recorders) and critical sites before the call can begin. As channels at the affiliated talkgroup members' sites become available, they are added to the call in progress.

NOTE: This feature only works on a multi-site system.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 2
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 1
RADIO-3 - TALKGROUP 2
RADIO-3 - SITE - SITE 1

VERSION #1.02
SPS #7.5

2. TEST

Step 1. Verify that TALKGROUP 1's template is set up as Fast Start through the User Configuration Manager (UCM) and specify SITE 1 as a Critical Site.

Step 2. Simulate a busy system by disabling all channels at SITE 1 with the exception of the control channel and one voice channel.

Step 3. Key RADIO-3 and busy out the only voice channel available at SITE 1.

Step 4. Initiate a Talkgroup Call from RADIO-1 and observe the call is busied as no voice channel is available at SITE 1 for RADIO-2.

Step 5. Dekey RADIO-3. Verify that the call from RADIO-1 is now granted and RADIO-2 can hear the audio.

Pass____ Fail____

Wide Area SmartZone Trunking Features

Recent User Priority

1. DESCRIPTION

This test verifies that a recent user of the channel has priority over other users of equal priority of being assigned a channel when a busy queue exists. The maximum number of consecutive times that a user may be elevated to recent user priority is two.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 2
RADIO-2 - SITE - SITE 1
RADIO-3 - TALKGROUP 3
RADIO-3 - SITE - SITE 1

VERSION #1.02
SPS #7.5

2. TEST

Step 1. Ensure that the priority level for all talkgroups is the same. Simulate a busy system by disabling all channels at SITE 1 with the exception of the control channel and one voice channel.

Step 2. De-press and hold the PTT switch of RADIO-1.

Step 3. De-press and hold the PTT switch on RADIO-2 and then depress and hold the PTT switch on RADIO-3. Verify that both radios receive a busy tone.

Step 4. Release the PTT switches on RADIO-2 and RADIO-3.

Step 5. Release the PTT switch on RADIO-1.

Step 6. As soon as RADIO-2 receives its callback tone, depress and hold its PTT switch.

Step 7. Within 2 seconds of callback, re-key RADIO-1. Verify that RADIO-1 receives a busy tone. Release the PTT switch on RADIO-1.

Step 8. Release the PTT switch on RADIO-2. Verify that RADIO-1 receives a callback tone before RADIO-3.

Step 9. Repeat Steps 2-8. Verify that the priority of RADIO-1 is once more elevated in the busy queue.

Step 10. Repeat Steps 2-8 once more. Verify that in Step 9 that RADIO-3 receives the callback tone since RADIO-1 cannot be elevated in the busy queue more than two consecutive times.

Pass_____ Fail_____

Wide Area SmartZone Trunking Features

Audio Interrupt/Interrupt Never Mode

1. DESCRIPTION

A radio PTT request may be received for a group already active and currently being sourced by another radio unit. The talkgroup can be flagged in the User Configuration Manager (UCM) to either allow or disallow the new PTT. If allowed, the latest PTT request will be granted and become the source of the call. If both Radios are at the same site, RF contention may prevent either call from working.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 2
RADIO-3 - TALKGROUP 1
RADIO-3 - SITE - SITE 3 (SITE 2 if only 2 Sites)

VERSION #1.02
SPS #7.5

2. TEST

Step 1. Set up TALKGROUP 1's template to be Audio Interrupt Never through the UCM.

Step 2. Using RADIO-1, initiate a call on TALKGROUP 1.

Step 3. Verify both RADIO-2 and RADIO-3 monitor the audio.

Step 4. Using RADIO-3, initiate a call on TALKGROUP 1.

Step 5. Verify that RADIO-3 receives a reject and that RADIO-2 continues to listen to RADIO-1.

Step 6. Dekey both Radios.

Pass____ Fail____

Wide Area SmartZone Trunking Features

Audio Interrupt/Interrupt Always Mode

1. DESCRIPTION

A radio PTT request may be received for a group already active and currently being sourced by another radio unit. The talkgroup can be flagged in the User Configuration Manager (UCM) to either allow or disallow the new PTT. If allowed, the latest PTT request will be granted and become the source of the call. If both Radios are at the same site, RF contention may prevent either call from working.

Note: This test is not recommended for singe site systems as RF contention will occur.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 2
RADIO-3 - TALKGROUP 1
RADIO-3 - SITE - SITE 3 (SITE 2 if only 2 Sites)

VERSION #1.02
SPS #7.5

2. TEST

Step 1.   Set up TALKGROUP 1's template to be Audio Interrupt Always through the UCM.

Step 2.   Using RADIO-1, initiate a call on TALKGROUP 1.

Step 3.   Verify both RADIO-2 and 3 monitor the audio.

Step 4.   Using RADIO-3, initiate a call on TALKGROUP 1.

Step 5.   Verify that RADIO-2 now listens to RADIO-3.

Step 6.   Dekey both Radios.

Pass____ Fail____

Wide Area SmartZone Trunking Features

Sub-band Restricted Operation

1. DESCRIPTION

This feature will allow radios limited to one sub-band to operate at sites set up with resources to handle both sub-band and full band range radios.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 2
RADIO-2 - SITE - SITE 1
RADIO-3 - TALKGROUP 1
RADIO-3 - SITE - SITE 2
RADIO-4 - TALKGROUP 2
RADIO-4 - SITE - SITE 2

* SITE 1 and SITE 2 should support sub-band channels.

VERSION #1.02
SPS #7.5

2. TEST

Step 1. Verify that TALKGROUP 1 is set up in the User Configuration Manager (UCM) to be a sub-band restricted talkgroup.

Step 2. Verify TALKGROUP 2 is set up in the UCM to be a non-sub-band restricted talkgroup.

Step 3. Using RADIO-1, initiate a call on TALKGROUP 1.

Step 4. Verify that a sub-band restricted channel is granted at both sites and that only RADIO-3 is able to monitor and respond to the call.

Step 5. Dekey RADIO-1.

Step 6. Using RADIO-2, initiate a call on TALKGROUP 2.

Step 7. Verify that a non-sub-band restricted channel is granted at both sites and that only RADIO-4 is able to monitor and respond to the call.

Pass____ Fail____

Wide Area SmartZone Trunking Features

Channel Partitioning Operation

1. DESCRIPTION

This feature provides exclusive use of designated RF channels for high priority groups. This test will demonstrate that the calls belonging to the high priority group is steered to the RF channels that are designated.

Create a User Group (UG2) via the User Configuration Manager. Assign the UG2 User Group to the talkgroup TG5 profile. In the Zone Configuration Manager, add UG2 to the RF Channel RF5 at RF Site 1 to be tested. This will ensure that UG2 will have exclusive use of the Channel (RF5).

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TG5
RADIO-2 - SITE - SITE 1

VERSION #1.02
SPS #7.5

2. TEST

Step 1.   While channels on the RF site 1 are idle, initiate a talkgroup call on TG5 from RADIO-2 on SITE 1

Step 2.   Verify that RADIO-2 is assigned RF5.

Step 3.   Release the PTT and wait for the talkgroup call to end.

Step 4.   Initiate a talkgroup call from RADIO-1 on TALKGROUP 1 at SITE 1.

Step 5.   Observe that the talkgroup call from RADIO-1 is not assigned RF5.

Pass____ Fail____

Wide Area SmartZone Trunking Features

Priority Monitor/Non-Priority Scan

1. DESCRIPTION

This test verifies that a subscriber unit can scan a pre-programmed list (in the radio) to find any Priority and Non-priority Talkgroups with assigned voice channels at that site. To accomplish this, a call will be initiated from a portable at a remote site on a talkgroup monitored by a portable at the same site as the scanning radio. The scanning radio will scan from its selected talkgroup to the active talkgroup. The test will be repeated with an additional radio transmitting on the Priority Talkgroup while the scanning radio is scanning. This third radio will be on a remote site with a fourth radio on the Priority Talkgroup at the same site as the scanning radio.

SETUP

RADIO-1 - TALKGROUP 1 (SCANNING)
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 2
RADIO-2 - SITE - SITE 1
RADIO-3 - TALKGROUP 3
RADIO-3 - SITE - SITE 1
RADIO-4 - TALKGROUP 3
RADIO-4 - SITE - SITE 2

* RADIO-1 needs to be set to a dial position configured to scan.

VERSION #1.02
SPS #7.5

2. TEST

Step 1.   Verify that RADIO-1 is set to TALKGROUP 1 and in the scan mode of operation and programmed to scan all TALKGROUP 1, TALKGROUP 2, and TALKGROUP 3.

Step 2.   Initiate a Talkgroup Call with RADIO-4 and observe that RADIO-1 scans to the talkgroup and receives the call. Keep the call in progress until completion of the following step.

Step 3.   Initiate a Talkgroup Call with RADIO-2 and observe that RADIO-1 does not receive the call since RADIO-1 is listening to TALKGROUP 3.

Pass____ Fail____

Wide Area SmartZone Trunking Features

Priority Monitor/Priority Scan

1. DESCRIPTION

This test verifies that a subscriber unit can scan a pre-programmed list (in the radio) to find any Priority and Non-priority Talkgroups with assigned voice channels at that site. To accomplish this, a call will be initiated from a portable at a remote site on a talkgroup monitored by a portable at the same site as the scanning radio. The scanning radio will scan from its selected talkgroup to the active talkgroup. The test will be repeated with an additional radio transmitting on the Priority Talkgroup while the scanning radio is scanning. This third radio will be on a remote site with a fourth radio on the Priority Talkgroup at the same site as the scanning radio.

SETUP

RADIO-1 - TALKGROUP 1 (SCANNING)
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 1
RADIO-3 - TALKGROUP 1
RADIO-3 - SITE - SITE 2
RADIO-4 - TALKGROUP 2
RADIO-4 - SITE - SITE 2
RADIO-5 - TALKGROUP 2
RADIO-5 - SITE - SITE 1

* RADIO-1 needs to be set to a dial position configured to scan.

VERSION #1.02
SPS #7.5

2. TEST

Step 1. Verify that RADIO-1 is set to TALKGROUP 1 and in the scan mode of operation and programmed to scan TALKGROUP 1 and TALKGROUP 2 with TALKGROUP 1 as its Priority Monitor Talkgroup.

Step 2. Verify that in the User Configuration Manager (UCM) under Talkgroup Configuration, Priority Monitor and the Valid Site setting is set to yes for SITE 2.

Step 3. Initiate a Talkgroup Call with RADIO-4 and observe that RADIO-1 scans to the talkgroup and receives the call. Keep the call in progress until the completion of the following step.

Step 4. Initiate a Talkgroup Call with RADIO-3 and observe that RADIO-1 reverts to the TALKGROUP 1 and receives the call.

Pass_____ Fail_____

Wide Area SmartZone Trunking Features

Receive Only Radio

1. DESCRIPTION

This test verifies that a subscriber can be set up for receive operation only.

Setting a portable for "dispatch enabled" equal to false in the Radio User Capabilities record allows the radio to receive, but not initiate group calls.

Setting a portable for "Voice enabled" equal to false in the Radio User profile allows the user to receive dispatch calls, but not originate or receive Unit-to-Unit or call alerts.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 2

VERSION #1.02
SPS #7.5

2. TEST

Step 1.   Set RADIO-1's template for "dispatch enabled" equal to false in the Radio User Capabilities Profile. This allows the radio to receive, but not initiate group calls.

Step 2.   Set RADIO-1 for "Voice enabled" equal to false in the Radio User profile. This allows the user to receive dispatch calls, but not originate or receive Unit-to-Unit or call alerts.

Step 3.   Verify that the Site Access denial flag is set to either "Both" or "TG Only".

Step 4.   Make a call from any Console in the system with the Talkgroup. Verify both Radios can hear the audio.

Step 5.   Make a call from RADIO-2 and verify that both RADIO-1 and the Console hear the call.

Step 6.   Verify that RADIO-1 is not granted a channel when it is keyed up.

Step 7.   Verify that the Console can not make a Private Call to RADIO-1 but can Private Call RADIO-2.

Step 8.   Verify that RADIO-2 cannot make a Private Call to RADIO-1 but can Private Call the Console.

Pass____ Fail____

4.10.4 Site Trunking Features

Site Trunking Talkgroup Call

1. DESCRIPTION

When a Site goes into Site Trunking, radios with Talkgroup Call capability will be able to communicate with other members of the same talkgroup at that same site. Members of the same talkgroup at other sites will not be able to monitor those conversations.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 1
RADIO-3 - TALKGROUP 1
RADIO-3 - SITE - SITE 2
RADIO-4 - TALKGROUP 1
RADIO-4 - SITE - SITE 2

* All Radios should be "Site Locked"

VERSION #1.03
SPS #7.5

2. TEST

Step 1. Place SITE 1 into the Site Trunking mode via the Unified Event Manager (UEM).

Step 2. Initiate a Talkgroup Call with RADIO-1 on TALKGROUP 1 at SITE 1.

Step 3. Observe that only RADIO-2 will be able to monitor and respond to the call. Note that RADIO-3 and RADIO-4 are not able this monitor the call since the site is not in wide area operation.

Step 4. Initiate a Talkgroup Call with RADIO-3 on TALKGROUP 1 at SITE 2.

Step 5. Observe that only RADIO-4 will be able to monitor and respond to the call.

Pass_____ Fail_____

Site Trunking Features

Site Trunking Private Call

1. DESCRIPTION

Private Calls is a selective calling feature that allows a dispatcher or radio user to carry on one-to-one conversation that is only heard by the 2 parties involved. When a site is in Site Trunking, Radios at the site will only be able to Private Call other radios at the same site.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 1
RADIO-3 - TALKGROUP 1
RADIO-3 - SITE - SITE 1

* All Radios should be "Site Locked"

VERSION #1.03
SPS #7.5

2. TEST

Step 1.   Place SITE 1 into the Site Trunking mode via the Unified Event Manager (UEM).

Step 2.   Using RADIO-1, press the Private Call button.

Step 3.   Enter the Unit ID of RADIO-2 with the keypad, or scroll to the location where this ID is stored.

Step 4.   Press the PTT to initiate the call.

Step 5.   Verify that at RADIO-2 only tones are heard and the display indicates that a call has been received.

Step 6.   Answer the call at RADIO-2 by pressing the Private Call button. Verify its display shows the ID number of the calling unit.

Step 7.   Press the PTT switch on RADIO-2 and respond to the call. Note that if you do not press the Private Call button before pressing PTT, your audio will be heard by all members of the talkgroup, and not by the radio initiating the Private Call.

Step 8.   Verify only RADIO-1 hears the audio from RADIO-2.

Step 9.   End the Private Call and return to normal talkgroup operation.

Pass____ Fail____

Site Trunking Features

Site Trunking Call Alert

1. DESCRIPTION

Call Alert is a tone page that allows a user to selectively alert another radio unit. When a site is in Site Trunking, Radios at the site will only be able to Call Alert other radios at the same site. The initiating radio will receive notification from the trunked system as to whether or not the page was received by the target radio.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 2
RADIO-2 - SITE - SITE 1

* All Radios should be "Site Locked"

VERSION #1.03
SPS #7.5

2. TEST

Step 1. Place SITE 1 into the Site Trunking mode via the Unified Event Manager (UEM).

Step 2. Using RADIO-1, press the page button.

Step 3. Enter the Unit ID of RADIO-2 with the keypad, or scroll to the location where this ID is stored.

Step 4. Press the PTT to initiate the Call Alert.

Step 5. Verify that RADIO-2 received the Call Alert.

Step 6. Exit the Call Alert mode and return to normal talkgroup mode.

Pass____ Fail____

Site Trunking Features

Site Trunking Busy Queuing and Callback

1. DESCRIPTION

If no voice channel resources are available, radios requesting channels for new conversations are placed in a queue. Users of the same priority will move through the queue in a FIFO (first in, first out) sequence; however, users of higher priority will be inserted ahead of lower priority users in the queue.

When a voice channel becomes available, the radio at the top of the busy queue gets a channel assignment and generates a callback tone. The callback alerts the user that a channel assignment was made and transmitting is now possible on the selected talkgroup.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 2
RADIO-2 - SITE - SITE 1
RADIO-3 - TALKGROUP 3
RADIO-3 - SITE - SITE 1
RADIO-4 - TALKGROUP 1
RADIO-4 - SITE - SITE 1

* All Radios should be "Site Locked"

VERSION #1.03
SPS #7.5

2. TEST

Step 1. Place SITE 1 into the Site Trunking mode via the Unified Event Manager (UEM).

Step 2. Simulate a busy system by disabling all channels at SITE 1 with the exception of the control channel and one voice channel.

Step 3. Initiate a Talkgroup Call with RADIO-1 and observe that it is received by RADIO-4. Keep this call in progress until instructed to end the call.

Step 4. Key RADIO-2 and observe that the radio receives a busy.

Step 5. Key RADIO-3 and observe that the radio receives a busy.

Step 6. End the Talkgroup Call established in Step 3.

Step 7. Observe that RADIO-2 receives a callback prior to RADIO-3 receiving a callback.

Step 8. Return all channels for the site to service.

Pass____ Fail____

Site Trunking Features

Site Trunking Emergency Call and Alarm

1. DESCRIPTION

This test verifies that Emergency Alarms and Calls can be initiated by subscribers when the registered site is in Site Trunking. With all portables registered on the Site Trunking site from the previous test, a portable will initiate an Emergency Alarm by pressing the Emergency button. By pressing the PTT, an Emergency Call will be issued and the ID of the initiator will be displayed with an Emergency indication by the other subscribers on the same talkgroup. Note that for site trunking, Emergency Call operation is always Top of Queue.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 1
RADIO-3 - TALKGROUP 2
RADIO-3 - SITE - SITE 1
RADIO-4 - TALKGROUP 3
RADIO-4 - SITE - SITE 1

* All Radios should be "Site Locked"

VERSION #1.03
SPS #7.5

2. TEST

Step 1.   Place SITE 1 into the Site Trunking mode via the Unified Event Manager (UEM).

Step 2.   Simulate a busy system by disabling all channels at SITE 1 with the exception of the control channel and one voice channel.

Step 3.   Press the PTT on RADIO-3 and hold the PTT switch until instructed to release.

Step 4.   Key RADIO-4 and observe that the radio receives a busy.

Step 5.   Using RADIO-1, initiate an emergency alarm followed by an emergency call.

Step 6.   Observe that RADIO-1 cannot transmit due to the voice channel being busy.

Step 7.   Release the PTT switch on RADIO-3.

Step 8.   Observe that RADIO-1 can now proceed with the call and RADIO-2 receives the call. Also observe that the display on RADIO-2 denotes an emergency and the ID of the unit sending the emergency.

Step 9.   End the emergency call and verify that RADIO-4 gets a callback.

Step 10. Restore all channels to service.

Pass____ Fail____

Site Trunking Features

Site Trunking Continuous Assignment Updating

1. DESCRIPTION

When a talkgroup is assigned a voice channel, the site controller continues to transmit the channel assignment on the control channel for the duration of the Talkgroup Call. Radios coming into use on the system are automatically sent to voice channels with conversations in progress involving their selected talkgroups. This is demonstrated for a site in Site Trunking.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 1
RADIO-3 - TALKGROUP 1
RADIO-3 - SITE - SITE 1

* All Radios should be "Site Locked"

VERSION #1.03
SPS #7.5

2. TEST

Step 1. Place SITE 1 into the Site Trunking mode via the Unified Event Manager (UEM).

Step 2. Turn OFF RADIO-1.

Step 3. Initiate a Talkgroup Call using RADIO-2.

Step 4. While the Talkgroup Call is in progress, turn on RADIO-1.

Step 5. Observe that RADIO-1, which was just brought back into service, joins the Talkgroup Call already in progress.

Step 6. Release the PTT of RADIO-2.

Step 7. Switch RADIO-1 to TALKGROUP 2.

Step 8. Initiate a Talkgroup Call using RADIO-2.

Step 9. While the Talkgroup Call is in progress, turn RADIO-1 back to TALKGROUP 1.

Step 10. Observe that RADIO-1, which was just set back to TALKGROUP 1, joins the Talkgroup Call already in progress.

Pass_____ Fail_____

Site Trunking Features

Site Trunking Indication

1. DESCRIPTION

When a remote site loses its link or does not have a link to the Zone Controller, the affected site will enter "Site Trunking" mode of operation. Radios locked onto this site will be serviced locally within this site's coverage area.

SETUP

Lock the subscribers to the site to be tested if more than one site exists on the system.

VERSION #1.03
SPS #7.5

2. TEST

Step 1. Place the site in Site Trunking through the Unified Event Manager (UEM).

Step 2. Verify that the subscriber radios are displaying the "Site Trunking" indication.

Pass____ Fail____

Site Trunking Features

Site Trunking Wide Area Recovery

1. DESCRIPTION

A site in Site Trunking will transition to Wide Area Trunking when all failures have been cleared and when the Unified Event Manager (UEM) has set the sites status to Wide Area.

All subscribers should transition from Site Trunking to Wide Area Trunking and continue to process calls.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 1

Site needs to be placed in Site Trunking via the UEM
* All Radios should be "Site Locked"

VERSION #1.03
SPS #7.5

2. TEST

Step 1.   From the UEM set the status of SITE 1 to Wide Area and clear any system errors that may have placed SITE 1 into Site Trunking.

Step 2.   Verify that the status of SITE 1 in ZoneWatch and UEM reflect that SITE 1 has transitioned into Wide Area Trunking.

Step 3.   Verify that RADIO-1 and RADIO-2 no longer display Site Trunking.

Step 4.   Verify communications between RADIO-1 and RADIO-2.

Step 5.   Verify that ZoneWatch can now monitor the status of SITE 1.

Pass____ Fail____

Site Trunking Features

Site Trunking Roaming to Wide Area Sites

1. DESCRIPTION

Radios at a site that goes into Site Trunking will
attempt to roam to a site in Wide Area Trunking so it
is not stranded at a site with limited system resources
available. The parameter adjusted in the test is the
Failure Random Holdoff Time setting. This timer is
used by the subscribers to set a random timer, which
delays subscribers from flooding an adjacent site with
registration requests.

NOTE: This feature only works on a multi-site
system.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 1

*Start up a ZoneWatch session for the site the radios
are affiliated in.

*All sites should be in Wide Area at the start of this
test.

*All radios should NOT be "Site Locked"

*The radios should have alternate site control channel
frequencies setup in the portable's control channel
list.

*The portables should not be configured for "Always
Preferred" for this site which would prevent the
radios from roaming under site trunking conditions.

VERSION #1.01
SPS #7.5

2. TEST

Step 1. Set the Failure Random Holdoff Time
(FRHOT) setting for SITE 1 in the Zone
Configuration Manager to 1 minute.

Step 2. Initiate a Talkgroup Call between RADIO-1
and RADIO-2.

Step 3. Note the site that the radios are affiliated to
on the ZoneWatch screen.

Step 4. Place the site the radios are affiliated to into
Site Trunking.

Step 5. After 1 minute, initiate a Talkgroup Call
between RADIO-1 and RADIO-2.

Step 6. Observe that Radios 1 and 2 have roamed to
a wide area site on the Zone Watch screen.

Step 7. Reset the FRHOT setting of SITE 1 back to
the customer's default.

Step 8. Return SITE 1 back to Wide Area.

Pass____ Fail____

4.10.5 Elite Console Features

Talkgroup Selection and Call

1. DESCRIPTION

The Talkgroup Call is the primary level of organization for communications on a trunked radio system. Dispatchers with Talkgroup Call capability will be able to communicate with other members of the same talkgroup. This provides the effect of an assigned channel down to the talkgroup level. When a Talkgroup Call is initiated from a subscriber unit, the call is indicated on each dispatch operator position that has a channel control resource associated with the unit's channel/talkgroup.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 2
RADIO-2 - SITE - SITE 1
RADIO-3 - TALKGROUP 1
RADIO-3 - SITE - SITE 2
RADIO-4 - TALKGROUP 2
RADIO-4 - SITE - SITE 2

VERSION #1.02
SPS #7.5

2. TEST

Step 1.   Initiate a wide area call from any operator position on TALKGROUP 1.

Step 2.   Observe that RADIO-1 and RADIO-3 will be able to monitor the call. Dekey the console and have either radio respond to the call.

Step 3.   Observe that all Consoles with TALKGROUP 1 can monitor both sides of the conversation.

Step 4.   Initiate a wide area call from any operator position on TALKGROUP 2.

Step 5.   Observe that RADIO-2 and RADIO-4 will be able to monitor the call. Dekey the console and have either radio respond to the call.

Step 6.   Observe that all Consoles with TALKGROUP 2 can monitor both sides of the conversation.

Pass____ Fail____

Elite Console Features

Console ASTRO Secure Talkgroup Call

1. DESCRIPTION

Digital encryption is used to scramble a transmission so only properly equipped radios can monitor the conversation. A "Key" is used to encrypt the transmit audio. Only radios and Consoles/MGEGs with the same "Key" can decrypt the audio and listen to it. The talkgroup to Common Key Reference (CKR) binding is kept in the MGEG and configured in the User Configuration Manager (UCM). The bindings are propagated to the MGEGs, which enable the Console to participate in encrypted calls. The "Key" that corresponds to the CKRs must be loaded into all MGEG Crypto Cards in the Zone.

SETUP

Four radios, each capable of performing ASTRO secure calls on secure console Talkgroups, are required to perform this test (RADIO-1, RADIO-2, RADIO-3 and RADIO-4). This test requires RADIO-1 and RADIO-2 to be affiliated at one site and RADIO-3 and RADIO-4 to be affiliated at another site. Set all RADIO-1 and RADIO-3 to monitor TALKGROUP 1, and RADIO-2 and RADIO-4 to monitor TALKGROUP 2.

The MGEG needs to be equipped with Crypto Cards and radios with Crypto Modules in order to participate in secure calls. TALKGROUP 1 needs to be bound to CKR1, and Talkgroup B needs to be bound to CKR2 in both the UCM and in the Radio programming. RADIO-1, RADIO-2, RADIO-3 should be loaded with the "keys" that correspond to CKR1 and CKR2. RADIO-4 should only have the "key" that corresponds to CKR1. All Radios should be set to transmit in the secure mode.

VERSION #1.02
SPS #7.5

2. TEST

Step 1. Initiate a wide area coded call from an operator position on TALKGROUP 1.

Step 2. Verify that RADIO-1 and RADIO-3 can monitor and respond to the secure call.

Step 3. Initiate a wide area coded call from an operator position on TALKGROUP 1.

Step 4. Verify that RADIO-2 can monitor and respond to the secure call. Note that RADIO-4 cannot monitor the call because it does not have the "Key" that corresponds to CKR2.

Step 5. Change RADIO-2 and RADIO-4 to TALKGROUP 1.

Step 6. Initiate a wide area coded call from an operator position on TALKGROUP 1.

Step 7. Verify that RADIO-1, RADIO-2, RADIO-3 and RADIO-4 can monitor and respond to the secure call because they all have the "Key" that corresponds to CKR1.

Step 8. If the radios equipped with dual algorithm encryption modules, select talkgroups using the second algorithm and repeat steps 1-6.

Pass____ Fail____

Elite Console Features

Multigroup Call

1. DESCRIPTION

This trunking feature allows an equipped console operator position to transmit an announcement to several different talkgroups simultaneously. As with Talkgroup Calls, multigroup calls operate across sites as well as within the same site.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 2
RADIO-2 - SITE - SITE 2
RADIO-3 - TALKGROUP 3
RADIO-3 - SITE - SITE 3 (SITE 1 if only 2 Sites)
RADIO-4 - RANDOM
RADIO-4 - SITE - SITE 4 (SITE 2 if only 2 Sites)

* TALKGROUP 1, TALKGROUP 2, & TALKGROUP 3 are members of ATG 1.

* RANDOM is any talkgroup not a member of ATG 1.

* Multigroups are set up through both the UCM and the Subscriber Programming software.

VERSION #1.02
SPS #7.5

2. TEST

Step 1. Select the ATG 1 resource, which corresponds to TALKGROUP 1, TALKGROUP 2, and TALKGROUP 3.

Step 2. Initiate the Multigroup Call from the operator position.

Step 3. Observe that RADIO-1, RADIO-2 and RADIO-3 receive the Multigroup Call.

Step 4. Verify that RADIO-4 does not receive the Multigroup Call because it is not a member of ATG 1.

Step 5. Answer the Multigroup Call using RADIO-1 and observe the consoles receives the response.

Step 6. Verify that if the call is answered within the repeater hang time, the console will receive the call on the ATG 1 resource tile, otherwise the console will receive the call on the TALKGROUP 1 tile.

Step 7. Verify that if the call is answered within the repeater hang time, RADIO-2 and RADIO-3 will monitor that call.

Pass____ Fail____

Elite Console Features

Talkgroup Patch

1. DESCRIPTION

Talkgroup Patch allows a dispatcher to merge several talkgroups together on one voice channel to participate in a single conversation. This can be used for situations involving two or more channels or talkgroups that need to communicate with each other.

Using the Patch feature, the console operator can talk and listen to all of the selected talkgroups grouped; in addition, the members of the individual talkgroups can also talk or listen to members of other talkgroups. Patched talkgroups can communicate with the console dispatcher and other members of different talkgroups because of the "supergroup" nature of the Patch feature.

NOTE : If "secure" and "clear" resources are patched together, one repeater for each mode may be assigned per site.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 2
RADIO-2 - SITE - SITE 1
RADIO-3 - TALKGROUP 1
RADIO-3 - SITE - SITE 2
RADIO-4 - TALKGROUP 2
RADIO-4 - SITE - SITE 2

* All 4 Radios must have the same home zone.

VERSION #1.02
SPS #7.5

2. TEST

Step 1. Select an operator position for testing which contains TALKGROUP 1 and TALKGROUP 2.

Step 2. At the desired operator position select one of the Patch tabs in the Patch/Multi-Select window.

Step 3. Click the button on the patch that allows an operator to setup and edit a patch (note patch window turns blue).

Step 4. Add TALKGROUP 1 and TALKGROUP 2 to the patch by selecting each resource tile.

Step 5. Once the talkgroups are added, click the patch setup button again to complete the patch setup.

Step 6. Initiate several Talkgroup Calls between radios.

Step 7. Observe that all radios are able to communicate with one another. Also via Zone Watch observe that only one station is assigned at each of the two sites.

Step 8. Initiate a call from the operator position using the Patch Transmit and observe that all radios are able to receive the call and only one station is assigned at each of the two sites.

Step 9. Remove TALKGROUP 1 and TALKGROUP 2 from the patch.

Pass____ Fail____

Elite Console Features

Secure Talkgroup Patch

1. DESCRIPTION

This test validates the ability of the console/radio to transmit and to receive secure calls on Patch and patch secure audio from one resource to another.

SETUP

Four radios are required to perform this test (Radios 1, 2, 3, 4). This test requires Radios 1 and 2 to be affiliated onto the same site to Talkgroup A and Radio 3 and 4 affiliated to Talkgroup B. Consoles C1 is patching Console with Talkgroup A and B in the same patch.
R1 is a clear only radio. The TGA and TGB are non-regroupable and transmit mode set to secure.

VERSION #1.02
SPS #7.5

2. TEST

Step 1.   While the system is in wide area operation, verify that all radios are affiliated and selected to a talkgroup as described above.

Step 2.   Select an operator position for testing that contains Talkgroup A and B.

Step 3.   At the desired operator position, select one of the Patch tabs in the Patch/Multi- Select window.

Step 4.   Click the button on the patch that allows an operator to setup and edit a patch (note patch window turns blue).

Step 5.   Add all the talkgroups to the patch that were selected on the radios above in the setup procedure by selecting each resource tile.

Step 6.   Once all talkgroups are added, click the patch setup button again to complete the patch setup.

Step 7.   Initiate a talkgroup call on Talkgroup A from R2 in a secure transmit mode.

Step 8.   Observe that all radios are able to hear R2 except R1 as it is a clear only radio.

Pass____ Fail____

Elite Console Features

Multi-Select/APB

1. DESCRIPTION

A Multi-Select (MSEL) allows a dispatcher to merge several talkgroups together on one voice channel to participate in a single conversation. This can be used for announcements to two or more channels or talkgroups for general broadcast purposes.

Using the Multi-Select feature, the console operator can talk and listen to all of the selected talkgroups grouped; however, the members of the individual talkgroups cannot talk or listen to members of other talkgroups. Multi-selected talkgroups still only communicate with the console dispatcher and other members in the same talkgroup. A predefined multi-select configuration can be saved by the console operator as an All Points Bulletin (APB) for quick broadcast-type transmissions by the dispatcher.

NOTE : If "secure" and "clear" resources are multi-selected, one repeater for each mode may be assigned per site.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 2
RADIO-2 - SITE - SITE 2
RADIO-3 - TALKGROUP 3
RADIO-3 - SITE - SITE 3
RADIO-4 - TALKGROUP 4
RADIO-4 - SITE - SITE 4

VERSION #1.02
SPS #7.5

2. TEST

Step 1.   Select an operator position for testing which contains TALKGROUP 1, TALKGROUP 2, TALKGROUP 3 and TALKGROUP 4.

Step 2.   At the desired operator position select one of the Multi-Select tabs in the Patch/Multi-Select window.

Step 3.   Click the button on the Multi-Select that allows an operator to setup and edit a multiselect (note: MSEL window turns green).

Step 4.   Add TALKGROUP 1, TALKGROUP 2, TALKGROUP 3 and TALKGROUP 4 to the Multi-Select by selecting each resource tile.

Step 5.   Once the talkgroups are added click the Multi-Select Setup button again to complete the Multi-Select setup.

Step 6.   Initiate a call from the operator position using the APB Transmit and observe that all radios are able to receive the call. Also via Zone Watch verify that only one RF resource is assigned at any site where multiple radios are affiliated.

Step 7.   Remove all talkgroups from the Multi-Select.

Customer Requested Modification:

Step 8   If possible, create a "tailgating" condition where an inbound caller on one of the TGs involved in the MSEL gets repeated on the MSEL.

Step 9   Attempt to create a second "tailgated" call immediately after release of the first "tailgating" call. Verify that system will either not allow any "tailgating" of a MSEL or that a maximum of one (1) "tailgate" call can occur.

Pass_____ Fail_____

Elite Console Features

Console Initiated Private Call

1. DESCRIPTION

Private Conversation is a selective calling feature which allows a dispatcher or radio user to carry on one-to-one conversation that is heard only by the two parties involved. Subscriber units receiving a private call will sound an alert tone. As with other call types, Private Calls operate across sites as well as within the same site.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1

VERSION #1.02
SPS #7.5

2. TEST

Step 1. Select an operator position for testing.

Step 2. Select the "PRIVATE-CALL" tile.

Step 3. Click the button on the tile that provides the Private Call function.

Step 4. Select the unit to be Private Called, in this case RADIO-1.

Step 5. Click the Send button.

Step 6. Answer the Private Call with RADIO-1 and respond to the console.

Step 7. After completing the Private Call, return to the normal talkgroup mode.

Pass_____ Fail_____

Elite Console Features

Console Initiates/Receives Secure Private Call

1. DESCRIPTION

Private Conversation is a selective calling feature that allows a dispatcher or radio user to carry on one-to-one conversation that is heard only by the two parties involved. The test validates the ability to initiate/receive secure private calls by the Console/Radio.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
CONSOLE-1 (w/Private Call)

VERSION #1.02
SPS #7.5

2. TEST

Step 1.   Select the "PRIVATE-CALL" tile and set to the secure mode at C1.

Step 2.   Click the button on the tile that provides the Private Call function.

Step 3.   Select the numeric keypad and using the displayed keypad enter the unit ID for R1.

Step 4.   Click the Send button.

Step 5.   Answer the Private Call with the radio as done during the trunking test and respond to the console.

Step 6.   Verify that audio can be heard on both ends.

Step 7.   After completing the Private Call, return to the normal talkgroup mode.

Step 8.   PTT radio R1 to initiate Private Calling (PC) ring sequence to console C1 in secure transmit mode. Answer PC ring on C1 and establish audio conversation between R1 and C1.

Step 9.   Verify that audio can be heard on both ends.

Step 10. Exit PC on radio R1 and C1.

Pass____ Fail____

Elite Console Features

Emergency Alarm And Call Display

1. DESCRIPTION

Users in life threatening situations can use the emergency button on the radio to send an audible alarm and a visual alarm signal to a console operator in order to request immediate system access to a voice channel for an emergency call.

An emergency alarm begins after the radio user presses the radio's emergency button. Pressing the emergency button places the radio in "emergency mode". To begin an emergency call, the radio user must press the radio's PTT button while in "emergency mode." The assigned voice channel will be dedicated to the emergency caller's talkgroup for an extended period of time, equal to the Message Hang Time plus the Emergency Hang Time. As with other call types, emergency calls can operate across sites as well as within the same site.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1

VERSION #1.02
SPS #7.5

2. TEST

Step 1.   Select an operator position in the zone where RADIO-1 is affiliated for the test.

Step 2.   Initiate an Emergency Alarm from RADIO-1.

Step 3.   Observe the Emergency from RADIO-1 is received at the operator position on TALKGROUP 1. Note that if RADIO-1 is programmed for Emergency Revert, the Emergency will be received on the designated revert talkgroup.

Step 4.   Acknowledge the Emergency at the operator position.

Step 5.   Key RADIO-1 to initiate an Emergency call to the operator position and reply to the radio from the operator position. Observe that the call takes place.

Step 6.   Clear the Emergency from the console on TALKGROUP 1.

Step 7.   Reset RADIO-1 by holding the Emergency button on the radio.

Pass____ Fail____

Elite Console Features

PTT Unit ID/Alias Display

1. DESCRIPTION

Console operator positions contain various resources such as talkgroup, multigroup and Private Call which enable the operator to communicate with the subscriber units. If activity occurs on one of these operator position resources, the unit ID or associated alias of the initiating radio appears at the console resource. Default operation for the system is to display unit IDs at the console operator resource, but pre-defined aliases can be substituted for each unit ID.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 2

Make sure that RADIO-2 does not have an alias in the Console's Alias Database Manager (ADM), delete if necessary. Make sure to give enough time for the alias change to propagate to the console position.

VERSION #1.02
SPS #7.5

2. TEST

Step 1.   Select TALKGROUP 1 on any operator position with that Talkgroup.

Step 2.   Initiate a call from RADIO-2 and observe that the unit ID is seen at both consoles in the list in the resource window as well as in the Activity Log window.

Step 3.   Initiate a call from RADIO-1 and observe that the alias of RADIO-1 is seen at both consoles in the list in the resource window as well as in the Activity Log window.

Step 4.   Update the ADM by downloading the aliases from the UCM. Verify that RADIO-2 now has an entry in the ADM. Make sure to give enough time for the alias change to propagate to the console position.

Step 5.   Initiate a call from RADIO-2 and observe that now the alias of RADIO-2 is seen at both consoles in the list in the resource window as well as in the Activity Log window.

Pass_____ Fail_____

Elite Console Features

Console Initiated Tactical/Normal Priority

1. DESCRIPTION

The Tactical/Normal Priority feature is initiated at the console operator position and provides the dispatcher with the ability to change the priority for a particular talkgroup. When selected, a higher priority level (level 2) is assigned to the talkgroup. This overrides the priority level set in the UCM.

NOTE: All radios and talkgroups should start with default priorities. Default is 10.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 2
RADIO-2 - SITE - SITE 1
RADIO-3 - TALKGROUP 3
RADIO-3 - SITE - SITE 1
RADIO-4 - TALKGROUP 3
RADIO-4 - SITE - SITE 2

* The priority level for the talkgroups selected should be the same.

VERSION #1.02
SPS #7.5

2. TEST

Step 1.   Simulate a busy system by disabling all channels at SITE 1 with the exception of the control channel and one voice channel.

Step 2.   Enable Tactical Priority for TALKGROUP 3 from any console position with this option.

Step 3.   Initiate a Talkgroup Call with RADIO-1. Keep this call in progress until instructed to end the call.

Step 4.   Key RADIO-2 and observe that the radio receives a busy.

Step 5.   Key RADIO-3 and observe that the radio receives a busy.

Step 6.   End the Talkgroup Call established in Step 3.

Step 7.   Verify RADIO-3 receives the first callback and can communicate with RADIO-4. Note that if TALKGROUP 3 was not set to Tactical, RADIO-2 would receive the first callback.

Step 8.   End the call between RADIO-3 and RADIO-4.

Step 9.   Verify that RADIO-2 receives a call back.

Step 10. Disable Tactical Priority for TALKGROUP 3.

Pass_____ Fail_____

Elite Console Features

Alert Tones

1. DESCRIPTION

To send alert tones from a console operator position, the dispatcher must depress one of three alert switches which sends an alert tone over a selected channel/talkgroup resource. Three distinct alert tones can be transmitted which might alert members of a talkgroup to a particular event or signify to radio users that special instructions are to follow. The three alert tones available at the console operator position are: Alert 1 - Constant 1 kHz Tone, Alert 2 - Two Alternating Tones and Alert 3 - Chopped 1 kHz Tone.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 2

VERSION #1.02
SPS #7.5

2. TEST

Step 1.   Select TALKGROUP 1 on any console position.

Step 2.   Select Alert Tone 1 and depress the Alert Tone button for 5 seconds.

Step 3.   Verify that RADIO-1 and RADIO-2 hear Alert Tone 1.

Step 4.   Repeat Steps 2-3 for Alert Tone 2 and 3.

Pass____ Fail____

Elite Console Features

Call Alert Page

1. DESCRIPTION

Call Alert Page allows a dispatcher to selectively alert another radio unit. The initiating radio will receive notification as to whether or not the call alert was received. Units receiving a Call Alert will sound an alert tone and show a visual alert indication. The display will also show the individual ID of the initiating radio unit. After receiving the Call Alert, the radio can respond with either a Private Call or normal talkgroup call.

This feature is fully supported on all display portables and mobiles.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1

VERSION #1.02
SPS #7.5

2. TEST

Step 1.   Select the call alert button in the "Private Call" resource window.

Step 2.   Enter the ID of RADIO-1.

Step 3.   Send the call alert to RADIO-1 by depressing the send button.

Step 4.   Verify that RADIO-1 receives the alert and that the ID of the console is shown.

Step 5.   Turn off RADIO-1.

Step 6.   Send the call alert to RADIO-1 again.

Step 7.   Verify that after trying to page RADIO-1, the console does display "Can not send call alert - target not found" in the summary list.

Pass____ Fail____

Elite Console Features

Radio Status (Purchased Option)

1. DESCRIPTION

This optional feature allows the Console to display status information sent in by subscribers. Statuses are used to indicate the Radio operator's operational state (e.g. off duty).

The information that will be displayed includes the radio alias, hour and minute time stamp, event state and the customer entered translation for the specific status. Event sorting and filtering for the window can be configured in the Elite Administration application.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1

* Configure the radio user in the Manager to use a particular status set.

* Configure Status through the Manager to also be routed to the console.

VERSION #1.02
SPS #7.5

2. TEST

Step 1. Initiate a Status transmission from RADIO-1.

Step 2. Verify that RADIO-1 receives an audible indication that the status has been received at the Master Site.

Step 3. Verify the Console displays the proper Status text and the operator is audibly alerted to the status (configurable).

Step 4. Verify that the Console can respond back to the radio directly by selecting the status and transmitting from the Resource Preview Tile.

Pass____ Fail____

Elite Console Features

Console Initiated Emergency

1. DESCRIPTION

Emergency Call can be initiated by the console. If the console initiates an emergency call on a Talkgroup, a channel is assigned to that Talkgroup indefinitely. The console initiated emergency call is ended when the call is knocked down, the channel fails, or the last affiliated member in the talkgroup de-affiliates. Any dispatcher may knock down an emergency call, regardless of who initiated it. All the radios in the Talkgroup receive the emergency call.

NOTE : If the subscriber does not have the PTT Display option, the Emergency ID will not be displayed.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 1

* Two console are required for this test.

* The consoles must have TALKGROUP 1.

VERSION #1.02
SPS #7.5

2. TEST

Step 1.   Click the "Emergency" button on the resource window for TALKGROUP 1 on Console 1 to display the Emergency QuickList and then click on the "Setup" button to initiate a console emergency.

Step 2.   Verify that an emergency indication is shown on Console 2 and on RADIO-1 and RADIO-2 (if they have displays).

Step 3.   Transmit on TALKGROUP 1 from Console 1. Determine which repeaters are keyed at SITE 1.

Step 4.   Verify that the individual ID of the TALKGROUP 1 resource on Console 1 is shown on Console 2 and on both Radios (if they have displays) and all hear Console 1's transmit audio.

Step 5.   Stop transmitting on TALKGROUP 1 from Console 1.

Step 6.   Wait a minute and then keyup on RADIO-1.

Step 7.   Verify both consoles and RADIO-2 hear the audio. Verify the same repeaters as determined in step 3 are keyed.

Step 8.   Dekey RADIO-1.

Step 9.   Click the "Emergency" button on the resource window for TALKGROUP 1 on Console 2 to display the Emergency QuickList and then click on the "Knockdown" button.

Step 10. Verify the emergency is knocked down and the repeaters previously keyed are no longer assigned.

Pass____ Fail____

Elite Console Features

Console Initiated Secure Emergency

1. DESCRIPTION

Emergency Call can be initiated by the console. If the console initiates an emergency call on a Talkgroup, a channel is assigned to that Talkgroup indefinitely. The console initiated emergency call is ended when the call is knocked down, the channel fails, or the last affiliated member in the Talkgroup de-affiliates. Any dispatcher may knock down an emergency call, regardless of who initiated it. All the radios in the Talkgroup receive the emergency call.

SETUP

Two radios and 2 consoles are required to perform this test (Radios 1 and 2 and console 1 and 2). The Radios can be affiliated to any site in the system. Set the Radios to Talkgroup A (Secure mode). Both consoles must have Talkgroup A.

VERSION #1.02
SPS #7.5

2. TEST

Step 1. Click the "Emergency" button on the resource window for Talkgroup A on Console 1 to display the Emergency QuickList and then click on the "Setup" button to initiate a console emergency.

Step 2. Verify that an emergency indication is shown on the Console 2 and on both Radios (if they have displays).

Step 3. Transmit on Talkgroup A from Console 1. Determine which repeaters are keyed at the sites where Radios 1 and 2 are affiliated.

Step 4. Verify that the individual ID of the Talkgroup A resource on Console 1 is shown on Console 2 and on both Radios (if they have displays) and all hear Console 1's transmit audio.

Step 5. Stop transmitting on Talkgroup A from Console 1.

Step 6. Wait a minute and then keyup on Radio 1.

Step 7. Verify both consoles and Radio 2 hear the audio.

Step 8. Verify the same repeaters as determined in step 3 are keyed,Unkey Radio 1.

Step 9. Click the "Emergency" button on the resource window for Talkgroup A on Console 2 to display the Emergency QuickList and then click on the "Knockdown" button.

Step 10. Verify the emergency is knocked down and the repeaters previously keyed are no longer assigned.

Pass____ Fail____

Elite Console Features

Console Repeat Disable (Optional)

1. DESCRIPTION

This test verifies that any console operator position with a Repeat Disable control can enable and disable the repeat path for a particular talkgroup. This will be accomplished by changing the Repeat Disable status at various console operator positions scattered throughout the system and showing the effects on a radio call.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 2
RADIO-3 - TALKGROUP 1
RADIO-3 - SITE - SITE 1

* Several operator positions with a Repeat Disable control for the selected talkgroup are required.

* For multizone systems, the operator positions should be located in different zones.

VERSION #1.02
SPS #7.5

2. TEST

Step 1.   Initiate a wide area call with RADIO-1. Keep this call in progress until instructed to end the call.

Step 2.   Verify that the RADIO-1 audio is heard at the other radios and all operator positions with TALKGROUP 1.

Step 3.   Select the Repeat Disable icon for that talkgroup on any operator position.

Step 4.   Verify that RADIO-1 audio is still heard at the operator positions but not at any radio.

Step 5.   Select the Repeat Enable icon for that talkgroup on any operator position.

Step 6.   Verify that RADIO-1 audio is heard at the operator positions and at all radios.

Step 7.   Dekey RADIO-1.

Pass____ Fail____

Elite Console Features

Outbound Telephone Interconnect and Patch

1. DESCRIPTION

The dispatch console has the capabilities of initiating communication to landline telephone resources. The console can also patch together a telephone communication to a radio resource.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1

VERSION #1.02
SPS #7.5

2. TEST

Step 1. Select the Telephone Resource Window. Verify that the Resource Window is highlighted in blue, the On/Off Hook icon displays Off Hook. Verify the dial tone is heard.

Step 2. Choose the keypad icon and enter a local phone number, verify that operator hears a ringing, close the keypad icon

Step 3. When the landline answers, verify communication between landline user and operator

Step 4. Patch the TALKGROUP 1 Resource to the Telephone Resource.

Step 5. Transmit on the RADIO-1, verify communication with landline user.

Step 6. Verify that Console Operator receives transmission. Console operator presses patch transmit, verify communication with RADIO-1 and landline user.

Step 7. Dissolve the patch.

Pass____ Fail____

Elite Console Features

Inbound Telephone Interconnect and Patch

1. DESCRIPTION

The dispatch console has the capabilities of answering communication from landline telephone resources. The console can also patch together a telephone communication to a radio resource.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1

VERSION #1.02
SPS #7.5

2. TEST

Step 1. From a landline, dial the number connected to the SPI in the CEB.

Step 2. Verify that Console 1 displays an incoming call indication.

Step 3. Answer the incoming call and verify communication between landline user and operator.

Step 4. Patch the TALKGROUP 1 Resource to the Telephone Resource.

Step 5. Transmit on RADIO-1, verify communication with landline user. Also verify that Console Operator receives transmission. Console Operator presses patch transmit, verify communication with RADIO-1 and landline user.

Step 6. Dissolve the patch.

Pass____ Fail____

Elite Console Features

Console Priority

1. DESCRIPTION

Console Operator Positions have ultimate control of transmitted audio on an assigned voice channel resource. The Console Position has the capability to take control of an assigned voice channel for a talkgroup call so that the operator's audio overrides any subscriber audio. Console priority is a feature that enables dispatchers to gain immediate access to an assigned voice channel so that a central point of audio control exists.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 1

VERSION #1.02
SPS #7.5

2. TEST

Step 1. Initiate a Talkgroup call from RADIO-1 on TALKGROUP 1.

Step 2. Observe that RADIO-2 receives the call.

Step 3. While the call is in progress, key up any operator position at the console on TALKGROUP 1.

Step 4. Observe that RADIO-2 is now receiving audio from the operator position.

Step 5. De-key the Operator Position.

Step 6. Verify RADIO-2 now receives RADIO-1 audio.

Pass____ Fail____

Elite Console Features

Supervisory Control

1. DESCRIPTION

The Console Operators may override subscriber audio being transmitted on the system. The Console Supervisor position may override all other console positions.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1

VERSION #1.02
SPS #7.5

2. TEST

Step 1.   Set up two dispatch positions on the same talkgroup; one must be the Supervisor position.

Step 2.   Transmit from the non-Supervisor position.

Step 3.   Verify that RADIO-1 receives the non-Supervisor audio.

Step 4.   While continuing to transmit at the non-supervisory position, transmit on the same channel at the Supervisor's position using the Instant Transmit Key.

Step 5.   Verify that RADIO-1 receives the supervisor audio and that the supervisor audio is heard at non-supervisor position.

Pass_____ Fail_____

Elite Console Features

Conventional Radio Resource (BIM Only)

1. DESCRIPTION

A conventional station can be integrated into a
trunking system by placing a conventional resource
on the Elite consoles. This allows the user to patch
the conventional station with the desired talkgroups.

SETUP

Connect a transmission test set to the CEB interface
panel port that corresponds to a conventional BIM in
the CEB.
Each RJ45 receptacle on the CEB interface panel,
pins 1 and 2 are for CEB RX audio, and pins 4 and 5
are for CEB TX audio.

VERSION #1.02
SPS #7.5

2. TEST

Step 1. Choose a conventional Radio Resource at
the console.

Step 2. Connect a transmission test set to the output
of the Base Interface Module corresponding
to the selected Radio Resource.

Step 3. Key up the console Radio Resource and
verify Transmit audio for the conventional
resource.

Step 4. Inject a test tone into the input of the Radio
Resource selected.

Step 5. Verify the Radio Resource receives the tone
in the select speaker.

Step 6. Repeat Steps 1-5 for one conventional BIM
in each CEB.

Pass_____ Fail_____

Elite Console Features

Alarm Input / Outputs (16 Aux I/O)

1. DESCRIPTION

The alarm inputs of the 16 Aux I/O can be connected to almost any device that requires or can detect a relay closure. These signals can be simulated and monitored with simple test equipment such as a multimeter.

SETUP

Connect a multi-meter capable of monitoring closures to the proper pins of the punch block cabled to the Aux I/O.
Using the Elite Console Database Manager (CDM) and the Elite Admin software, add the aux I/O buttons to the Elite dispatch screen for at least one momentary input and one momentary output.

Aux I/O pinout:

Aux I/O 1 - pins 26,1
Aux I/O 2 - pins 27,2
Aux I/O 3 - pins 28,3
Aux I/O 4 - pins 29,4

VERSION #1.02
SPS #7.5

2. TEST

Step 1.   Using a shorting wire, simulate a relay closure on an input via the punch block for the I/O's to be tested.

Step 2.   Verify that the Operator position momentary input displays the icon designated for an ON_STATE.

Step 3.   Remove the shorting wire and verify that the Operator position displays the icon designated for an OFF_STATE.

Step 4.   Connect the Multimeter to the pins to monitor a relay output.

Step 5.   Verify that the meter reads an open circuit.

Step 6.   Depress the momentary input button on the console to initiate a relay closure.

Step 7.   Verify that the multimeter displays a closed circuit.

Pass_____ Fail_____

Elite Console Features

Logging Recorder

1. DESCRIPTION

The Logging Record Interface (LORI) and Logging
Recorder/Operator Interface Module (LOMI) in the
Central Electronics Bank (CEB) provide an audio
source to an external Logging Recorder used to
record console dispatch audio. The LOMI card
detrunks the talkgroup audio and sources the
talkgroup audio to the AEI/LORI boards which
connect to the actual Logging Recorder.

LORI pinouts:

Output Pair #1 - pins 26,1
Output Pair #2 - pins 28,3
Output Pair #3 - pins 30,5
Output Pair #4 - pins 32,7
Output Pair #5 - pins 36,11
Output Pair #6 - pins 38,13
Output Pair #7 - pins 40,15
Output Pair #8 - pins 42,17

SETUP

Use the Console Dispatch Manager (CDM) software
to configure a LOMI to detrunk TALKGROUP 1 and
TALKGROUP 2 in order to test the audio availability
at the LORI card. Connect the LORI card that
contains the logging tracks for TALKGROUP 1 and
TALKGROUP 2 to a punchblock.

VERSION #1.02
SPS #7.5

2. TEST

Step 1.   Identify the pins on the designated LORI
punchblock that provide the demarcation
for the detrunked logging tracks for
TALKGROUP 1 and TALKGROUP 2.

Step 2.   Connect a transmission test set to monitor
the audio across the punchblock
demarcation.

Step 3.   Initiate a Talkgroup Call from the console
position.

Step 4.   Monitor audio traffic between the radio user
and the console dispatcher on the test set.

Step 5.   Initiate a Talkgroup Call from RADIO-1 on
TALKGROUP 1.

Step 6.   Monitor audio traffic between RADIO-1 and
the console dispatcher on the test set.

Step 7.   Repeat Steps 2-6 for TALKGROUP 2.

Pass_____ Fail_____

Elite Console Features

Intercom Operation (Console to Console)

1. DESCRIPTION

The intercom function allows console operators to communicate with other console operator positions without using a radio resource.

SETUP

* Two consoles are required

VERSION #1.02
SPS #7.5

2. TEST

Step 1.   At the console press the "INTERCOM CALL" icon.

Step 2.   Choose the console to be called and press the SEND button.

Step 3.   Answer the call at the destination console by pressing the "INTERCOM CALL" icon and selecting ANSWER.

Step 4.   Verify communications between the two consoles. The answering console will have a hot microphone, and the sending console must press the lightning bolt in the Intercom Window to transmit.

Step 5.   End the intercom call by pressing the HANGUP icon on either console.

Pass_____ Fail_____

Elite Console Features

Console Enable / Disable

1. DESCRIPTION

In an Elite Operator configuration, the Supervisory console position may disable the non-supervisory positions. This will disable all transmit capability from the disabled console.

SETUP

* Two consoles are required

VERSION #1.02
SPS #7.5

2. TEST

Step 1. Verify that Console 1 is set up as a Supervisor.

Step 2. Transmit from the Console 2 (non-supervisory) and verify communication with RADIO-1.

Step 3. Select the "Enable/Disable Op Position" button from the tool bar on the Supervisory console.

Step 4. Disable Console 2.

Step 5. Verify that the non-supervisory position is completely disabled from making a call.

Step 6. Select the "Enable/Disable Op Position" button from the tool bar on the Supervisory console.

Step 7. Enable Console 2.

Step 8. Verify that the non-supervisory position is completely enabled.

Pass____ Fail____

Elite Console Features

Acoustic Crossmute

1. DESCRIPTION

Acoustic crossmuting means that selected operator positions will not hear outbound transmissions from operator positions they are cross-muted with.

This feature is used when operator positions are located in the same room.

The Acoustic Crossmute is configured in the system's Console Database Manager.

SETUP

* Two adjacent console positions monitoring the same talkgroup.

* Portable monitoring talkgroup

VERSION #1.02
SPS #7.5

2. TEST

Step 1.   Without an Acoustic Crossmute configured, and the select speakers of each operator position turned to maximum volume, transmit on Console 1.

Step 2.   Confirm feedback is heard on the operator positions and the portable hears feedback on the talkgroup.

Step 3.   With an Acoustic Crossmute configured, and the select speakers of each operator position turned to maximum volume, transmit on Console 1.

Step 4.   Verify no feedback is heard at either operator position and that the portable doesn't hear feedback on the talkgroup.

Pass____ Fail____

Elite Console Features

Console Operator Secure / Clear Mode
Mismatch Indication

1. DESCRIPTION

This test validates the ability of the console to show a
visual indication of a Secure and Clear mode
mismatch during following conditions:
Talkgroup on the Console is in secure transmit mode
but receiving clear audio.
Talkgroup on the Console is in clear transmit mode
but receiving secure audio.

Note that the secure talkgroup and private call tests
would show the alert in a case where the mode
mismatch is encountered.

SETUP

This test requires one Zone, one Trunking site (Site
1), one Console site (Site 2), one console (C1) and
one radio Radio1. C1 is affiliated with Talk Group
TG_A with transmit mode set to secure. Radio1 is
affiliated to TG_A with transmit mode set to secure.

VERSION #1.02
SPS #7.5

2. TEST

Step 1. PTT radio Radio1.

Step 2. Verify that C1 is able to receive audio from
R1.

Step 3. Place radio Radio1 in clear transmit mode.

Step 4. PTT radio Radio1.

Step 5. Verify that C1 is able to receive audio from
Radio1, also displays secure mode mismatch
indication.

Step 6. Place radio Radio1 in secure transmit mode
and place Console C1 in clear transmit
mode.

Step 7. PTT radio Radio1

Step 8. Verify that C1 is able to receive audio from
Radio1, also displays secure mode mismatch
indication.

Pass____ Fail____

4.10.6 System Management Tests

Unified Event Manager/Ambassador Link Failure

1. DESCRIPTION

This test verifies that the Unified Event Manager (UEM) is able to capture information about various failures at the system and zone level.

This test simulates a failure by removing one of the links between the Ambassador and MGEG (Motorola Gold Elite Gateway). The alerts will be monitored at the UEM.

*The MCC7500 Console Sub-system does not use AEB, but if the Telephone Interconnect functionality is present then AEB is required regardless of the Console type.

SETUP

No setup is required for this test.

VERSION #1.04
SPS #7.5

2. TEST

Step 1. Remove one of the E1 connections from the MGEG line card.

Step 2. Observe the appropriate alert indicating an Audio Switch link failure appears on the Unified Event Manager (UEM).

Step 3. Replace the link removed in Step 1.

Step 4. Observe that the alarm clears for the link.

Pass____ Fail____

System Management Tests

Unified Event Manager/InterZone Control Path Failure

1. DESCRIPTION

This test verifies that the Unified Event Manager (UEM) event browser is able to capture information about various failures at the system and zone level.

This test simulates a failure by removing one of the InterZone links. The alerts will be monitored on the UEM.

NOTE: This feature only works on a multi-zone system.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 1
RADIO-3 - TALKGROUP 1
RADIO-3 - SITE - SITE in Zone 2

VERSION #1.04
SPS #7.5

2. TEST

Step 1.   Initiate a call with RADIO-1.

Step 2.   Observe that the call is received by both RADIO-2 and RADIO-3.

Step 3.   Disconnect one of the InterZone cables from the CWR panel.

Step 4.   Observe that an alarm is received indicating a link failure.

Step 5.   Initiate a call with RADIO-1.

Step 6.   Observe that the call is received by RADIO-2 and RADIO-3 verifying the system remains in interzone trunking since the interzone control paths are redundant.

Step 7.   Connect the cable unplugged in the previous step.

Step 8.   Observe that the alarm clears in the UEM for the InterZone link.

Pass____ Fail____

System Management Tests

ZoneWatch

1. DESCRIPTION

ZoneWatch is an administration tool for monitoring radio traffic on a system. A system manager can use ZoneWatch to analyze traffic patterns for load distribution and troubleshoot radio and site problems. ZoneWatch is used to view current radio traffic activity for the system. This activity is displayed in graphical format, color-coded for easy identification of the type of activity occurring on the system.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 2
RADIO-3 - TALKGROUP 1
RADIO-3 - SITE - SITE 3
RADIO-4 - TALKGROUP 1
RADIO-4 - SITE - SITE 4

VERSION #1.03
SPS #7.5

2. TEST

Step 1. Set up the Zone Watch Window Definitions and Watch Profile though the Zone Configuration Manager to allow Multi-Site Scroll and Grid Display.

Step 2. From the PC Application Launcher, select a zone folder.

Step 3. From within that zone, select ZoneWatch.

Step 4. Select the profile created in the Setup procedure.

Step 5. Initiate several calls with the radios and observe that the appropriate channel usage information is displayed.

Pass_____ Fail_____

System Management Tests

> **Configuration Management - Subscriber Capabilities**

1. DESCRIPTION

The User Configuration Manager (UCM) controls the parameters for all radio users and dispatchers on the system. Within the Subscriber section, the Radio User Configuration Window enables the network manager to tailor SmartZone subscribers' capabilities. Multigroup, Secure, Call Alert, Private Call, and Telephone Interconnect are some of the features that can be enabled or disabled. The features that could be unique to the particular user are configured directly in the Radio User Configuration Window. The features that could be configured the same for a group of users are placed into records called profiles. The network manager references the profile which contains the desired setup for these features from the Radio User Configuration Window.

Note - A profile must already exist to be referenced through the Radio Configuration Window but can be modified later if needed.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 2

* Flag both radios to be capable of Call Alert, Private Call, and Dispatch Calls.

* Set the "User Enabled" flag to YES for both RADIO-1 and RADIO-2.

VERSION #1.02
SPS #7.5

2. TEST

Step 1. Initiate a Call Alert (PAGE) from RADIO-1 to RADIO-2. Verify that RADIO-2 receives the Call Alert (PAGE).

Step 2. Change the Call Alert Enabled flag to NO for RADIO-1 via the UCM.

Step 3. Initiate a Call Alert (PAGE) from RADIO-2 to RADIO-1. Verify that RADIO-2 receives a reject when attempting to Call Alert (PAGE) RADIO-1.

Step 4. Change the Call Alert Enabled flag back to YES for RADIO-1 via the UCM.

Step 5. Initiate a Call Alert (PAGE) from RADIO-2 to RADIO-1. Verify that RADIO-1 now receives the Call Alert (PAGE).

Step 6. Initiate a Private Call (CALL) from RADIO-1 to RADIO-2. Verify that RADIO-2 receives the Private Call (CALL).

Step 7. Change the Private Call Enabled flag to NO for RADIO-1 via the UCM.

Step 8. Initiate a Private Call (CALL) from RADIO-2 to RADIO-1. Verify that RADIO-2 receives a reject when attempting to Private Call (CALL) RADIO-1.

Step 9. Change the Private Call Enabled flag back to YES for RADIO-1 via the UCM.

Step 10. Initiate a Private Call (CALL) from RADIO-2 to RADIO-1. Verify that RADIO-1 now receives the Private Call (CALL).

Pass_____ Fail_____

System Management Tests

Configuration Management - Talkgroup
Capabilities

1. DESCRIPTION

The User Configuration Manager (UCM) controls the
parameters for all radio users and dispatchers on the
system.

Within the Subscriber section, the Talkgroup
Configuration Window enables the network manager
to tailor SmartZone Talkgroup Capabilities.
Emergency, Secure and Priority Monitor are some of
the features that can be enabled or disabled. The
features that could be unique to the particular user are
configured directly in the Talkgroup Configuration
Window. The features that could be configured the
same for a group of users are placed into records
called profiles. The network manager references the
profile which contains the desired setup for these
features from the Talkgroup Configuration Window.

NOTE: A profile must already exist to be referenced
through the Talkgroup Configuration Window but
can be modified later if needed.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 2

* Set the "Talkgroup Enabled" flag to YES for
TALKGROUP 1 in the UCM.

VERSION #1.02
SPS #7.5

2. TEST

Step 1.   Initiate a call from RADIO-1 on
TALKGROUP 1. Verify that RADIO-2
hears the RADIO-1 audio.

Step 2.   Change the Talkgroup Enabled flag to NO
for TALKGROUP 1 via the UCM.

Step 3.   Initiate a call from RADIO-1 or RADIO-2
on TALKGROUP 1. Verify that neither
radio can initiate a call because of the
change in status of the Group Enabled Flag
of TALKGROUP 1.

Step 4.   Initiate an Emergency call from RADIO-1.
Verify that both the console (if present) and
RADIO-2 can hear the transmission.

Step 5.   Dekey RADIO-1.

Step 6.   Change the Talkgroup Enabled flag back to
YES for TALKGROUP 1 via the UCM.

Step 7.   Initiate a call from RADIO-1 on
TALKGROUP 1. Verify that both the
console (if present) and RADIO-2 hear
RADIO-1.

Pass_____ Fail_____

System Management Tests

Configuration Management - Console Talkgroup

1. DESCRIPTION

The User Configuration Manager (UCM) controls the parameters for all radio users and dispatchers on the system. Within the Subscriber section, the Console Talkgroup Capability profile enables the network manager to tailor a Console's Talkgroup capabilities.

SETUP

Console User1 is logged on, is affiliated to TALKGROUP 1, and has the "Emergency Acknowledge" set to YES in the Console Talkgroup Capability Profile for TALKGROUP 1.

VERSION #1.04
SPS #7.5

2. TEST

Step 1. Initiate an Emergency on TALKGROUP 1. Verify that Console User1 is able to "Ack" the Emergency.

Step 2. Change the "End Emergency" flag to NO in the console talkgroup capability profile for TALKGROUP 1.

Step 3. Verify that an indication is provided via the console's Elite GUI status bar indicating to the dispatcher that new configuration information is available.

Step 4. Verify that after the database update indication is received, the Console User1 is not able to "Ack" an Emergency.

Pass____ Fail____

System Management Tests

Configuration Management - Access
Permissions

1. DESCRIPTION

The Radio System Infrastructure Configuration
Management section of the Zone Configuration
Manager (ZCM) application sets the parameters for
each of the system devices in the SmartZone system.

Configuration parameters such as Individual and
Talkgroup Default Access Permission, and Site
Access Denial Type can be manipulated from the
Zone Configuration Window.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 1

VERSION #1.02
SPS #7.5

2. TEST

Step 1. Delete the database record for RADIO-1 in
both the Radio and Radio User
Configuration Windows so that the
SmartZone system does not have any
knowledge of RADIO-1.

Step 2. Set the "Individual Default Access
Permission" flag to NO in the Zone
Configuration Window.

Step 3. Initiate a call from RADIO-1 on
TALKGROUP 1. Verify that the SmartZone
system rejects the RADIO-1 call request
because RADIO-1 has not been defined in
the SmartZone Radio User database.

Step 4. Change the Individual Default Access
Permission flag to YES via the SmartZone
Manager.

Step 5. Initiate a call from RADIO-1. Verify that the
SmartZone system permits the RADIO-1
call request because the system grants radio
access using default settings.

Step 6. Configure the RADIO-1 records that were
automatically created in the Radio and
Radio User Configuration Windows as a
result of the radio's PTT.

Step 7. Reset the "Individual Default Access
Permission" flag to NO in the Zone
Configuration Window.

Step 8. Initiate a call from RADIO-1. Verify that the
SmartZone system permits the RADIO-1
call request because the RADIO-1 is now a
valid user.

Pass_____ Fail_____

System Management Tests

Configuration Management - General Timeout Parameters

1. DESCRIPTION

The Radio System Infrastructure Configuration Management section of the Zone Configuration Manager (ZCM) application sets the parameters for each of the system devices in the SmartZone system.

Within the Radio System Infrastructure section, the Zone Configuration Window enables the network manager to tailor the general timeout and call parameters for each zone in the SmartZone system.

Configuration parameters such as Individual/Talkgroup Default Access Permission, and Site Access Denial Type can be manipulated from the Zone Configuration Window. System and call timeout parameters such as Carrier, Message Trunk, Fade, Dispatch Call, and Emergency Call can also be manipulated from the Zone Configuration Window.

*Note: After 1 minute the system will start to Transmission Trunk, so the call could possibly last longer than 1 minute.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 1

VERSION #1.04
SPS #7.5

2. TEST

Step 1. Initiate a TALKGROUP 1 call from RADIO-1. Verify that the SmartZone system permits the RADIO-1 call request.

Step 2. In the UCM, in the System object, configure the "Maximum Private Call Duration" to 1 minute and apply.

Step 3. Initiate a Private Call from RADIO-1 to RADIO-2. Keep the Private Call active until the system disconnects the channel assigned for the Private Call.

Step 4. Verify that after one minute elapses, the system disconnects the Private Call because the maximum call duration has been exceeded*.

Step 5. Reset the Private Call Maximum Call Duration setting to be 10 minutes (default).

Pass____ Fail____

System Management Tests

Affiliation Display

1. DESCRIPTION

Affiliation Display is a Private Radio Network Management (PRNM) Suite application that monitors the mobility of radios for a particular zone. Mobility describes how radio users travel between different sites in a zone and how they communicate with other members of their assigned talkgroup or even with members outside of their talkgroup. You can view a radio in more than one zone.

As a radio roams from one site to another or changes talkgroups, Affiliation Display updates and displays the affiliation and de-affiliation information for a monitored radio. This information can be useful for the troubleshooting and tracking of radios in the system and for monitoring the movement of traffic within a zone.

The Affiliation Display is divided into three sections: Site Viewer, Talkgroup Viewer, and Radio Viewer.

- The Site Viewer displays the number of talkgroups and number of radios affiliated to that site.
- The Talkgroup Viewer displays how many radios are affiliated to that talkgroup and the number of sites at which the talkgroup has radios affiliated.
- The Radio Viewer window displays affiliation information for a custom list of radios.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 1
RADIO-3 - TALKGROUP 2
RADIO-3 - SITE - SITE 2
RADIO-4 - TALKGROUP 2
RADIO-4 - SITE - SITE 2

VERSION #1.02
SPS #7.5

2. TEST

Step 1. Add RADIO-1,RADIO-2,RADIO-3, and RADIO-4 to the Affiliation Display.

Step 2. Verify that RADIO-1 and RADIO-2 show they are affiliated to SITE 1 and TALKGROUP 1.

Step 3. Verify that RADIO-3 and RADIO-4 show they are affiliated to SITE 2 and TALKGROUP 2.

Step 4. Change the talkgroup of RADIO-1 and RADIO-2 to TALKGROUP 2.

Step 5. Verify that RADIO-1 and RADIO-2's affiliated talkgroup changes to TALKGROUP 2 on the Affiliation Display.

Step 6. Change the site of RADIO-3 and RADIO-4 to SITE 1.

Step 7. Verify that RADIO-3 and RADIO-4's affiliated site changes to SITE 1 on the Affiliation Display.

Pass____ Fail____

System Management Tests

InfoVista

1. DESCRIPTION

InfoVista is a network performance management tool that provides individual and group reports, including CPU utilization, data memory utilization, buffer memory utilization, interface errors and discards, port bandwidth utilization, port errors and discards. Each report type has four templates to provide daily, weekly, monthly, and yearly reports. The InfoVista client application is used to access the server software. It provides an online connection to the server to perform administrative tasks, such as starting and stopping existing reports, adding an instance, or creating new reports. InfoVista reports can be used for proactive network performance management, troubleshooting, and network capacity planning.

SETUP

InfoVista must be properly configured to display reports. No radios are required for this test.

VERSION #1.02
SPS #7.5

2. TEST

Step 1. Double-click on the IVReports Icon on the desktop and login using the proper username and password.

Step 2. Choose the Reports tab.

Step 3. From the treeview in the left pane, select Report Folders, Systems, and then Site Routers.

Step 4. In the right pane, double-click on the Site Routers (MNR Group Top 10 Performance - Daily) report.

Step 5. Verify a graphical report is displayed that includes: CPU Utilization, Data Memory Utilization, Buffer Memory Utilization, Interface Errors and Interface Discards.

Step 6. Use the Time Reference Slider to change the reporting day.

Step 7. Repeat steps 4-6 to generate a weekly, monthly and yearly report Site Router (MNR Group Top 10 Performance)

Step 8. Generate a daily, weekly, monthly and yearly report for Site Switches (HP LAN Switch Group Top 10 Port Performance). Verify that a graphical report is displayed that includes: Port Bandwidth Utilization, Port Errors and Port Discards.

Step 9. Generate daily, weekly, monthly and yearly reports for the Core Routers and Exit Routers.

Pass____ Fail____

System Management Tests

Zone Controller Database Backup

1. DESCRIPTION

This is a feature that allows the infrastructure database to be stored onto a CD for backup. The database can be backed up or restored without affecting system operation.

SETUP

No setup required.

VERSION #1.04
SPS #7.5

2. TEST

Step 1.   Login onto the Zone Controller admin menu via the NM Client.

Step 2.   Select "Backup Database" from the menu.

Step 3.   Read the prompts and enter the required information to backup database onto a CD.

Step 4.   Verify the successful completion of the database backup from the menu.

Pass____ Fail____

System Management Tests

UNC Device Management - Site Parameter

1. DESCRIPTION

The Unified Network Configurator (UNC) allows users to perform various functions to managed devices on the system. This test will cover the modification of a parameter at a site.

For this test, the Site Alias parameter will be modified on all radio system devices at the site.

SETUP

If the UNC is not open, double-click the UNC shortcut (UNC) on the desktop, and a Voyence Control client session will launch. When prompted, use the Login dialog box to login to the UNC using the appropriate username and password.
If the UNC Wizard is not open, double-click the UNC Wizard (UNCW) shortcut on the desktop, and a UNC Wizard client session will launch. When prompted, use the Login dialog box to login to the UNC Wizard using the appropriate username and password.

VERSION #1.04
SPS #7.5

2. TEST

Step 1. Using the UNC Wizard , select an RF site to update.

Step 2. Change the Site Alias parameter to a new value and click the Submit button.

Step 3. From the tools menu of the UNC client session, open the Schedule Manager. Configuration remedy jobs are immediately added to the Schedule Manager with a status of Pending for all affected target devices.

Step 4. Highlight the pending Remedy jobs and approve them in the Schedule Manager. The remedy jobs are approved and indicate a status of running in the Schedule Manager.

Step 5. Refresh the Schedule Manager view until the jobs are completed.

Step 6. Once the jobs are performed successfully, perform a pull on all site devices

Step 7. View the current configuration information for the devices at the site, and verify that the Site Alias has been updated in the devices current configuration

Step 8. Return the site alias to the correct value.

Pass____ Fail____

System Management Tests

UNC Device Management - Channel Parameter

1. DESCRIPTION

The Unified Network Configurator (UNC) allows users to perform various functions on the system. This test will cover the modification of a parameter on a device.

For this test, the control channel capability for a channel will be modified.

It is important to note that this change will impact the control channel capability for the site only when it is operating in Site Trunking. In order to modify the operation for Wide Area, the change will need to be made in the Zone Configuration Manager (ZCM). It is recommended that the change be made in both the User Configuration Manager (UCM)/ZCM and UNC for live systems.

SETUP

If the UNC is not open, double-click the UNC shortcut (UNC) on the desktop, and a Voyence Control client session will launch. When prompted, use the Login dialog box to login to the UNC using the appropriate username and password.

If the UNC Wizard is not open, double-click the UNC Wizard (UNCW) shortcut on the desktop, and a UNC Wizard client session will launch. When prompted, use the Login dialog box to login to the UNC Wizard using the appropriate username and password.

VERSION #1.05
SPS #7.5

2. TEST

Step 1. Using the UNC Wizard , select a channel from a Repeater Site to update.

Step 2. From the wizard, change the Home / Control Channel Capable parameter for the channel, and submit the change.

Step 3. Start a UNC client session and open the Schedule Manager. Configuration remedy jobs are immediately added to the Schedule Manager with a status of Pending for all affected target devices.

Step 4. Highlight the pending jobs related to this update, and approve the remedy jobs in the Schedule Manager. The remedy jobs are approved and indicate a status of running in the Schedule Manager. Refresh the Schedule Manager view until the jobs are completed.

Step 5. Once the jobs are performed successfully, perform a pull for the current configuration information from the channel.

Step 6. View the configuration data for the device and verify that the Home / Control Channel Capability has been updated in the devices current configuration.

Step 7. Change the Home / Control Channel Capability parameter for the channel back to the initial value.

Pass____ Fail____

System Management Tests

UNC Device Compliance Testing

1. DESCRIPTION

The Unified Network Configurator (UNC) allows users to perform various functions on managed devices on the system. The purpose of this test is to validate system parameter compliance testing by the UNC.

The UNC has the capability to detect errors in configuration data before the change is sent to device(s), immediately after a change has been sent to a device, or on a configuration poll.

For this test, the error in the configuration data will be detected before the change is sent to the device. The configuration error can be detected by performing an audit check in either the channel configuration screen, or through the approval process. This test covers detecting the configuration error from the channel configuration screen.

SETUP

If the UNC is not open, double-click the UNC shortcut (UNC) on the desktop, and a Voyence Control client session will launch. When prompted, use the Login dialog box to login to the UNC using the appropriate username and password.

If the UNC Wizard is not open, double-click the UNC Wizard (UNCW) shortcut on the desktop, and a UNC Wizard client session will launch. When prompted, use the Login dialog box to login to the UNC Wizard using the appropriate username and password.

VERSION #1.04
SPS #7.5

2. TEST

Step 1. From the Voyence Control Network View, select a Site Controller to modify.

Step 2. Change the SITE ID for the Site Controller to a different value.

Step 3. Perform an audit on the configuration change by selecting the audit button. When the audit dialogue box opens, select Site Controller and select Audit. When the Select Item dialogue box for the system opens, select the correct Zone in which the Site Controller to be audited resides. When the Select Item dialogue box for the Zone opens, select the correct Site in which the Site Controller to be audited resides. When the Select Item dialogue box for the Site opens, select the Site Controller that was modified, and select the item.

Step 4. Verify that the Audit Results indicate the device is non compliant.

Step 5. Select the item in the non compliant window and select Preview. A remedy is displayed indicating which parameters need to be changed for the device to be compliant.

Step 6. Return the device to compliance by scheduling the remedy task. Select Schedule, when the Schedule Push Job dialogue box give the job a name and select Approve and Submit.

Step 7. In the Schedule Manager, press the refresh button to verify that the job is running, and to obtain the current status. The job is done when the status indicates complete.

Step 8. In the Network View, open the Site Controller that was previously modified and verify that the Site ID is set to the correct value.

Step 9. In the Network View tab double click the Site Controller that was previously modified. In the configuration window select Audit. Follow the dialogue boxes (as in step 3) to perform the audit and verify the device is compliant.

Pass____ Fail____

System Management Tests

UNC Device Compliance Testing (2)

1. DESCRIPTION

The Unified Network Configurator (UNC) allows users to perform various functions on managed devices on the system. The purpose of this test is to validate system parameter compliance testing by the UNC.

The UNC has the capability to detect errors in configuration data before the change is sent to device(s), immediately after a change has been sent to a device, or on a configuration poll.

For this test, the error in the configuration data will be detected by the UNC after a change has been sent to a device.

SETUP

If the UNC is not currently open, double-click the UNC shortcut (UNC) on the desktop, and a Voyence Control client session will launch. When prompted, use the Login dialog box to login to the UNC using the appropriate username and password.

If the UNC Wizard is not currently open, double-click the UNC Wizard (UNCW) shortcut on the desktop, and a UNC Wizard client session will launch. When prompted, use the Login dialog box to login to the UNC Wizard using the appropriate username and password.

VERSION #1.03
SPS #7.5

2. TEST

Step 1.   From the Voyence Control Network View, select a Channel that is currently Control Channel Capable to update.

Step 2.   Double click the channel to open the Configuration window. Edit the configuration to change "Dynamic Frequency Blocking Capability = Disable" to "Dynamic Frequency Blocking Capability = Enable".

Step 3.   Select the Schedule button, and in the Schedule Dialogue Box select schedule. When the Schedule Job Dialogue box opens, give the job a name and select Approve and Submit.

Step 4.   From the Schedule Manager, verify that the configuration change job is listed with a status of Running. Press the refresh button to verify that the job is running, and to obtain the current status. The job is done when the status indicates complete.

Step 5.   Once the job is successfully completed, the UNC will automatically pull and validate the configuration data from the device that was modified. The UNC will detect the error, and indicate the device is non compliant. In the Network View, press the refresh button until the state icon for the channel indicates that the device is not compliant.

Step 6.   The UNC will generate a remedy that indicates which parameter(s) need to be changed for the device to be compliant.

Step 7.   Approve the remedy from the Schedule Manager to return the channel to compliance.

Pass_____ Fail_____

System Management Tests

UEM Fault Management/Station Power Amp Failure

1. DESCRIPTION

This test verifies that the Unified Event Manager (UEM) alarms view is able to capture information about various failures at the system and zone level.

A station will be keyed while the output is unloaded to simulate a power amp failure. The failures will be monitored on the UEM.

Note: For safety, either power down the station or TX Inhibit it before disconnecting or re-connecting the dummy load to prevent accidental keying of the station.

Note: This test should be done on a site with more than 2 channels. Failsoft will occur if the test is done on a 2 channel site.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 2
RADIO-2 - SITE - SITE 1
NMclient01 - UEM session up and running.

* All Radios should be "Site Locked"

VERSION #1.06
SPS #7.5

2. TEST

Step 1. Verify that the power amp of the station to be tested has no active alarms against it.

Step 2. Disconnect the dummy load/antenna from the station.

Step 3. Make several talkgroup calls using Radio-1 until the test station has been keyed.

Step 4. Observe that an alarm indicating a Power Amp failure appears on the UEM alarms view.

Step 5. Reconnect the dummy load/antenna disconnected in Step 3.

Step 6. In approximately 5 minutes, observe that changes to the alarm on the UEM, indicating the module is restored to service.

Pass_____ Fail_____

System Management Tests

UEM Fault Management/Site Path Failure

1. DESCRIPTION

This test verifies that the Unified Event Manager (UEM) alarms view is able to capture information about various failures at the system and zone level.

This test simulates a microwave failure by removing a customer selected site data link and monitoring the alerts.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
NMclient01 - UEM session up and running.

* RADIO-1 should be "Site Locked"

VERSION #1.08
SPS #7.5

2. TEST

Step 1.   Remove the T1 cable(s) to the site router(s) at the site where Radio 1 is affiliated. Be certain to remove the T1 cable from both routers if redundant site links are being utilized.

Step 2.   Observe the UEM reports CommFailure alarms for the devices at the affected site.

Step 3.   In addition, observe that the site is now in the Site Trunking mode.

Step 4.   Reconnect the T1 cable(s) disconnected in Step 1.

Step 5.   Observe the site returns to the Wide Area Trunking mode.

Step 6.   Observe the topology and alarms that appear on the UEM.

Pass____ Fail____

System Management Tests

UEM Fault Management/Site Trunking

1. DESCRIPTION

Through the Unified Event Manager (UEM), the system user can run diagnostics that change the "Trunking State" of a site. The effect of the diagnostic is displayed on the UEM.

SETUP

NMclient01 - UEM session up and running in the alarms view.

VERSION #1.08
SPS #7.5

2. TEST

Step 1. Disable the site instance from the UEM by selecting a site in the Network Devices tab. Right click and select SNMP Node then Issue Command. Put the site in Site Trunking.

Step 2. Observe that the UEM alarms view shows that the site is now in Site Trunking and is User Requested.

Step 3. Place the site back into Wide Area Trunking using the "Issue command" feature from UEM.

Step 4. Observe updates to the UEM alarms view.

Step 5. Close the open windows.

Pass____ Fail____

System Management Tests

UEM Fault Management/Core Router Failure

1. DESCRIPTION

This test verifies that the Unified Event Manager (UEM) alarms view is able to capture information about various failures at the system and zone level.

A Core Router will be turned off to simulate a failure. The system health will be monitored on UEM.

SETUP

NMclient01 - UEM session up and running.

VERSION #1.04
SPS #7.5

2. TEST

Step 1. Verify that the Core Router to be tested shows up without failures (normal) on UEM. The core router is contained in the specific subnet that it is physically located in the network.

Step 2. Power down the Core Router.

Step 3. Observe that an alarm indicating a Core Router failure appears on the UEM alarms view.

Step 4. Restore power to the Core Router.

Step 5. Observe that the changes to the alarm in UEM, indicating the Core Router is Enabling.

Step 6. Observe that alarm view updates in the UEM, indicating the Core Router is Enabled.

Pass____ Fail____

System Management Tests

UEM - Diagnostics - RF Site

1. DESCRIPTION

The purpose of this test is to confirm diagnostic commands are sent to an RF site and the proper status is reported at the Unified Event Manager (UEM).

All commands are initiated from the UEM.

Standalone and MultiSite configurations are tested.

SETUP

NMclient01 - UEM session up and running in the Network Database view.

VERSION #1.07
SPS #7.5

2. TEST

Step 1.   From the UEM, right click on an ASTRO Repeater Site managed resource and select the Command option.

Step 2.   The command window opens for the ASTRO repeater Site managed resource with the following commands available: Site Trunking, Site Off, Wide Trunking, and Site Failsoft.

Step 3.   Select Site Trunking and click the Apply button.

Step 4.   The command execution status is displayed in the command window. After the command is executed, the site enters site trunking mode. The event is displayed in the Network Events Browser. An alarm is displayed in the Alarms Browser.

Step 5.   Select Site Off and click the Apply button.

Step 6.   The command execution status is displayed in the command window. After the command is executed, the site enters site off mode. The event is displayed in the Network Events Browser. An alarm is displayed in the Alarms Browser.

Step 7.   Select Wide Trunking and click the Apply button.

Step 8.   The command execution status is displayed in the command window. After the command is executed, the site enters wide trunking mode. The event is displayed in the Network Events Browser.

Step 9.   For a MultiSite Site, repeat step 1 except right click on a MultiSite Site managed resource.

Step 10. Repeat steps 2-8. Verify the same results occur.

Pass____ Fail____

System Management Tests

UEM - Views

1. DESCRIPTION

The Unified Event Manager (UEM) provides three
different views. The purpose of this test is to validate
the views available from the UEM.

SETUP

NMclient01 - UEM session up and running.

VERSION #1.07
SPS #7.5

2. TEST

Step 1.   The first view is the Active Alarms. In the
navigation pane expand Fault Management
and select Alarms.

Step 2.   Customize the Active Alarms display by
selecting the Edit option from the menu bar,
then select Search.

Step 3.   Perform a Managed Resource search for
channels, site controllers and routers by
entering "Starts with" and ch, sc, and z00
respectively in the search fields to perform
the three separate searches.

Step 4.   For each of the three searches a filtered
alarm view is displayed that contains alarms
for the appropriate device in the search.

Step 5.   The second view is the Physical Summary
view. In the navigation pane, expand Zone
Maps and select Physical Summary. The
Physical Summary View provides an
aggregated alarm severity status of the
devices located at all subnets in the Zone.

Step 6.   The third view is the Service Summary. In
the navigation pane, under Zone Maps select
Service Summary. The Service Summary
View provides a site alarm severity status of
the devices located at all sites including the
Master Site.

Step 7.   In the main UEM window is an Alarm
Summary View pane. In the Alarm
Summary View, select the format for the
desired view, pie, tabular or bar.

Pass_____ Fail_____

System Management Tests

UEM - Manual Synchronization - IVD Site
Controller

1. DESCRIPTION

The purpose of this test is to manually synchronize
state with agents within the system using the Unified
Event Manager (UEM).

Manual synchronization provides a fallback to obtain
object status after a network interruption.

SETUP

NMclient01 - UEM session up and running.

VERSION #1.1
SPS #7.5

2. TEST

Step 1.   On a UEM client session, click on the
           Network Database node tree in the
           navigation window.

Step 2.   Right click on an IVD Site Controller, select
           SNMP-Node, and then select Synchronize.

Step 3.   The Synchronization Job Status window
           appears with the Job Status ID.

Step 4.   Click on the View Job Status button.

Step 5.   The Job Status View window opens
           providing the Job ID, Status, Owner, Type,
           Target, Submit Time, End Time, and
           Additional Information for all the jobs.

Step 6.   Locate the Synchronization job initiated in
           step 2 and click on the job. Verify the
           Synchronization job is listed with a status of
           Success.

Step 7.   Click on the View Log button. A summary
           of the Synchronization job details is
           provided in the job log.

Step 8.   Locate the IVD Site Controller in the
           Network Database View. The correct
           Severity property of the device is displayed.

           Pass____ Fail____

System Management Tests

UEM - Manual Synchronization - Core
Router

1. DESCRIPTION

The purpose of this test is to manually synchronize
state with agents within the system using the Unified
Event Manager (UEM).

Manual synchronization provides a fallback to obtain
object status after a network interruption.

SETUP

NMclient01 - UEM session up and running.

VERSION #1.09
SPS #7.5

2. TEST

Step 1.   On a UEM client session, click on the
Network Database node tree in the
navigation window.

Step 2.   Right click on a Core Router, select SNMP-
Node, and then select Synchronize.

Step 3.   The Synchronization Job Status window
appears with the Job Status ID.

Step 4.   Click on the View Job Status button.

Step 5.   The Job Status View window opens
providing the Job ID, Status, Owner, Type,
Target, Submit Time, End Time, and
Additional Info for all the jobs.

Step 6.   Locate the Synchronization job initiated in
step 2 and click on the job.
Verify the Synchronization job is listed with a status
of Success.

Step 7.   Click on the View Log button.
A summary of the Synchronization job details is
provided in the job log.

Step 8.   Locate the Core Router in the Network
Database View. The correct Severity
property of the device is displayed.

Pass____ Fail____

System Management Tests

UEM - UEM User actions are logged

1. DESCRIPTION

This test validates that Unified Event Manager (UEM) user actions are logged by the system.

SETUP

NMclient 01 - UEM client session active.

VERSION #1.05
SPS #7.5

2. TEST

Step 1.   On a UEM client session, select Tools from the menu bar and then System Administration. The Administration Menu window opens up.

Step 2.   In the System Administration window, click on Audit Trails.

Step 3.   Verify the Authentication Audit Log is displayed. The following information is displayed for each entry: User Name, Operation, Audit Time, Severity, Category, and Audited Object. User actions recorded include: Login, Logout, Discovery, Synchronization,
Device Deletion, Diagnostics, Telnet, and Manage/Unmanage. (Note: If the Authentication Audit Log has been cleared there will only be the event to clear the log.)

Pass_____ Fail_____

4.10.7 Radio Control Manager (RCM) Features

Emergency Alarm Display

1. DESCRIPTION

The emergency call information that is displayed on the SmartZone RCM includes the radio alias of the radio that initiated the Emergency Alarm, the talkgroup that the radio was affiliated to at the time the alarm was sent, and the time the alarm was received.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 2

One RCM is required which has TALKGROUP 1 attached to it.

VERSION #1.02
SPS #7.5

2. TEST

Step 1.   Open the Radio Control Manager (RCM) windows and verify that the Emergency Alarm window is visible. If it is not, go the View menu and select it bringing it into the RCM viewable area.

Step 2.   Initiate an Emergency Alarm from RADIO-1.

Step 3.   Observe that the RCM receives the Emergency Alarm.

Step 4.   Acknowledge the Emergency by selecting the Emergency in the window and clicking on the Respond button.

Step 5.   Verify the window displays the radio alias, the talkgroup, and the time the alarm was received.

Step 6.   Again, select the displayed Emergency and click the Delete button to clear the emergency.

Step 7.   Reset the radio by holding the Emergency button until the radio clears.

Step 8.   Repeat Steps 1-7 using RADIO-2.

Pass____ Fail____

Radio Control Manager (RCM) Features

Dynamic Regrouping

1. DESCRIPTION

Dynamic Regrouping allows the RCM to assign individual radios operating in different talkgroups to a temporary talkgroup via the Regroup command. Network managers or supervisors can override individual radio talkgroup selections by steering regrouped subscribers to a new talkgroup containing users which need to communicate on a temporary basis. After receiving a Regroup command, a radio will ignore the current setting of the talkgroup selector and move to the target talkgroup specified in the Regroup command. Unless the supervisor issues a LOCK command, the radio user can deselect the target talkgroup by selecting another talkgroup using the radio selector. A unique location on the radio selector is reserved for the target talkgroup following a Regroup command.

Dynamic Regrouping assignments can be initiated rapidly, but not instantaneously. Regrouping is best suited for planned activities or occasional changes from normal routines. It is not intended for immediate responses such as high speed chases or for a rapid deployment on a per incident basis.

Regrouped radios receiving a second Regroup command will move to the new target talkgroup specified in the second command. When a regrouped radio receives a Regroup command, all information pertaining to the previous Regroup command is lost. A Cancel Regroup command or a Revert returns an individual radio to its normal operation.

Note - RCM user must be attached to primary and target talkgroup.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 2
RADIO-3 - TALKGROUP 2
RADIO-3 - SITE - SITE 3
RADIO-4 - TALKGROUP 2
RADIO-4 - SITE - SITE 4

VERSION #1.02
SPS #7.5

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2. TEST

Step 1.   With the RCM open from the Commands menu item select the Radio Commands item to open the command window. Choose Regroup.

Step 2.   Enter TALKGROUP 3 in the target field.

Step 3.   Enter the IDs or aliases of RADIO-1, RADIO-2, RADIO-3 and RADIO-4.

Step 4.   Once all desired radio information is entered and appears in the command window click the Regroup button to initiate the command.

Step 5.   Observe all radios are regrouped and are able to communicate on TALKGROUP 3.

Step 6.   Switch the Subscriber to the Dynamic Regroup channel to acknowledge the group request.

Step 7.   Observe that the radios are able to select different talkgroups and are not locked onto the regrouped mode. Note- The Talkgroup selector knob has to be set to the dynamic regroup position before switching to any other talkgroup.

Step 8.   Observe that the Regroup task appears in the Command Monitor window.

Step 9.   Issue a Selector Lock command all four radios and verify their selectors have been locked.

Step 10. Revert both commands and verify the radios have returned to normal operation.

Pass____ Fail____

Radio Control Manager (RCM) Features

Storm Plans

1. DESCRIPTION

Storm Plans represent any number of preprogrammed Dynamic Regrouping combinations constructed in advance to anticipate a unique need, such as a disaster, or to make a needed adjustment for an infrequent yet repeated event, like a parade or election. When implemented, a Storm Plan will automatically assign individual radios operating in different talkgroups to a temporary talkgroup, containing the radios specified by the stored Dynamic Regrouping command. Storm Plans are deactivated by selecting the revert option in the Command window.

Note - Radios are not required to be locked to a specific site for this test.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 2
RADIO-3 - TALKGROUP 2
RADIO-3 - SITE - SITE 3
RADIO-4 - TALKGROUP 2
RADIO-4 - SITE - SITE 4

Create a storm plan in the UCM that regroups RADIO-1 and RADIO-2 to TALKGROUP 2.

VERSION #1.02
SPS #7.5

2. TEST

Step 1.   With the RCM open from the Commands menu item select the Storm Plan item to open the Storm Plan Window.

Step 2.   Select the Storm Plan.

Step 3.   Click on OK or Apply to invoke the Storm Plan.

Step 4.   Observe that the Storm Plan appears in the Command Monitor window.

Step 5.   Observe RADIO-1 and RADIO-2 are regrouped.

Step 6.   Initiate a call from RADIO-1.

Step 7.   Observe that RADIO-2. RADIO-3 and RADIO-4 are able to communicate with one another.

Step 8.   Un-regroup the radios by selecting the task in the Command Monitor window and clicking on the Revert button to submit the task.

Step 9.   Observe that the regrouping of the radios is now dissolved.

Pass_____ Fail_____

Radio Control Manager (RCM) Features

Selective Radio Inhibit

1. DESCRIPTION

The INHIBIT command issued by the RCM disables a radio, preventing it from transmitting or receiving any audio. All of the radio's functionality ceases while a radio is inhibited by the SmartZone RCM. Once inhibited, the radio cannot be used to monitor voice channels or for any other radio user initiated activity. Note that an inhibited radio still monitors the control channel so that it can be re-enabled with the Cancel Inhibit command. Upon receiving the Cancel Inhibit command from the SZ RCM, the radio returns to its normal operation.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1

VERSION #1.02
SPS #7.5

2. TEST

Step 1. Select the Commands menu and then select the Radio Commands item in the menu to open the Command Window. Choose Selective Inhibit.

Step 2. Enter the IDs or alias of RADIO-1.

Step 3. Once all desired radio information is entered and appears in the command window click the Submit button to initiate the command.

Step 4. Observe RADIO-1 is inhibited and appears to be dead.

Step 5. Observe that the Inhibit task appears in the Command Monitor window.

Step 6. Cancel the Inhibit by selecting the task in the Command Monitor window and clicking the Revert button to submit the task.

Step 7. Observe that the Cancel Inhibit task appears in the Command Monitor window and that RADIO-1 is returned to normal operation.

Pass_____ Fail_____

Radio Control Manager (RCM) Features

Radio Check

1. DESCRIPTION

Radio Check is a RCM command used to verify that a radio is active in the trunking system. The Radio Check command causes the Zone Controller to poll for the radio requesting that the radio re-affiliate. When the radio re-affiliates, the RCM then has the knowledge that the radio is powered on and within system range. If the radio is involved in a conversation, whether group or interconnect, the RCM application displays a message to that effect.

The information displayed by the RCM in response to the Radio Check command is: current talkgroup affiliation, the multigroup that the talkgroup is attached to (assuming the talkgroup belongs to a multigroup), and the site where the radio is affiliated. If the radio does not respond to the Radio Check command, a message to that effect displays.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 2

VERSION #1.02
SPS #7.5

2. TEST

Step 1.   Select the Command menu and then select the Radio Check item to open the Radio Check window.

Step 2.   Enter the IDs or aliases of RADIO-2 into the entry box and click the Apply button.

Step 3.   Observe the radio is polled and the current radio information is displayed on the RCM.

Step 4.   Turn off RADIO-1.

Step 5.   Enter the ID or alias of the RADIO-1 into the entry box and click the Apply button.

Step 6.   Observe that the RCM displays "Radio Not Found."

Step 7.   Depress and hold the PTT button of RADIO-2 until instructed to release.

Step 8.   Enter the ID or alias of RADIO-2 into the entry box and click the Apply button. Observe that a busy for the radio is displayed on the RCM.

Step 9.   Release the PTT button on RADIO-2.

Step 10. Observe the radio is polled and the current radio information is displayed on the RCM.

Pass____ Fail____

Radio Control Manager (RCM) Features

Radio Snapshot

1. DESCRIPTION

Snapshot is a RCM command used to retrieve information about an individual radio. Information provided by the RCM application in response to the Snapshot command includes: the serial number of the radio, current talkgroup/multigroup and site affiliations; the Regroup, Inhibit, and Selector Lock state of the radio. Snapshot information is taken from the system databases. The Snapshot command does not initiate any communication with the target radio.

Note - Radios are not required to be locked to a specific site for this test.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 2
RADIO-3 - TALKGROUP 2
RADIO-3 - SITE - SITE 3

* RADIO-1 and RADIO-3 must be programmed with Dynamic Regrouping capability.

*Make sure Radio Users are configured with a "Radio Primary Talkgroup Assignment" in the UCM.

VERSION #1.03
SPS #7.5

2. TEST

Step 1. Submit a Dynamic Regroup command for RADIO-1 and RADIO-3 to be regrouped to TALKGROUP 3.

Step 2. At the RCM, initiate the Snapshot command for RADIO-1.

Step 3. Verify that the RCM shows RADIO-1 affiliated to SITE 1 and that its current Regroup state is "Regroup."

Step 4. At the RCM, revert the dynamic regrouping on RADIO-1 and RADIO-3.

Step 5. Initiate the Snapshot command for RADIO-1.

Step 6. Verify RADIO-1 shows an affiliation to SITE 1 and that its current Regroup state is "Cancel Regroup."

Step 7. At the RCM, inhibit RADIO-2 and then initiate the Snapshot command for RADIO-2.

Step 8. Verify RADIO-2 shows an affiliation to SITE 2 and that its current Inhibit state is "Selective Inhibit."

Step 9. At the RCM, revert RADIO-2 and then initiate the Snapshot command for RADIO-2.

Step 10. Verify RADIO-2 shows an affiliation to SITE 2 and that its current Inhibit state is "Cancel Inhibit."

Pass____ Fail____

Radio Control Manager (RCM) Features

Radio Status

1. DESCRIPTION

This optional feature allows the Radio Console
Manager to view status information sent in by
subscribers. Statuses are used to indicate the Radio
operator's operational state (e.g. off duty). The
information that will be displayed includes the radio
alias, talkgroup alias, hour and minute time stamp,
status number or message number, and the customer
entered translation for the specific status. Status input
is displayed in chronological order, independent of
the type of status number.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1

* Configure RADIO-1 in the manager to use a
particular status set.

* Configure the assigned status set (via the status set
manager configuration objects) to include text
translations for a few different statuses.

* The RCM user needs to be assigned the dispatch
attachment group that matches the radio user's
assigned dispatch attachment group.

VERSION #1.02
SPS #7.5

2. TEST

Step 1.   Initiate a Status transmission from RADIO-
1.

Step 2.   Verify the RCM displays the proper Status
text.

Pass____ Fail____

4.10.8 Report Generation Tests

User Configuration Subsystem (UCM) Reports

1. DESCRIPTION

The User Configuration Manager report window allows the user to generate data summaries to view information from the database in a Web browser or to export the information as a file. The User Configuration Manager report window shows the users all of the fields that can be included in the report. By selecting which fields are wanted in the report and entering selection criteria for each field, the user can restrict the data that is retrieved.

SETUP

No prior setup is required for this test.

VERSION #1.02
SPS #7.5

2. TEST

Step 1.   From the PC Application Launcher, select User Configuration Manager.

Step 2.   Click on the appropriate folder to list its contents if it is not already open.

Step 3.   Select the object for which a report is to be generated.

Step 4.   Under the toolbar FILE pull down menu, select Reports.

Step 5.   Observe a window opens allowing a user to create a report.

Step 6.   Enter all sorting data for the report and click Generate Report.

Step 7.   Observe a window appears showing the requested report.

Step 8.   Close the report window.

Step 9.   Reports available to an operator under the UCM User Configuration Reports section are arranged in three categories: Subscribers, Security and System Configuration. Run the following reports : Under Subscribers folder, select Radio User; Under Security, select User; Under System Configuration , select System.

Pass_____ Fail_____

Report Generation Tests

Historical Reports

1. DESCRIPTION

Performance reports can be created automatically for dynamic statistical information about the air traffic activity on the system. These reports provide assistance with system management, resource planning, usage allocation, and monitoring. All reports are preformatted and summarize air traffic activity for a configured time span.

SETUP

No prior setup is required for this test.

VERSION #1.02
SPS #7.5

2. TEST

Step 1.   From the PC Application Launcher, select a zone.

Step 2.   From that zone's menu, choose Zone Historical Reports.

Step 3.   From the Historical Reports Player window that opens, select a report.

Step 4.   Using the left mouse button, click on the view button.

Step 5.   Observe a window opens allowing a user enter report parameters.

Step 6.   Enter all desired data for the report and Generate Report.

Step 7.   Observe a window appears showing the requested report.

Step 8.   Close the report window.

Step 9.   Run the following reports during testing: Talkgroup at Zone Summary; User at Zone Summary; Site Summary.

Pass____ Fail____

Report Generation Tests

Zone Configuration Manager Reports: Infrastructure

1. DESCRIPTION

The Zone Configuration Manager report window allows the user to generate data summaries to view information from the database in a Web browser or to export the information as a file. The Zone Configuration Manager report window shows the users all of the fields that can be included in the report. By selecting which fields are wanted in the report and entering selection criteria for each field, the user can restrict the data that is retrieved.

Note: It is important to note that the configuration data for Site Controllers, Base Stations, and transport devices are contained in the Unified Network Configurator (UNC). The configuration data for the devices managed in the UNC must be taken into account to obtain a complete view of the configuration data for devices in the system.

SETUP

No prior setup is required for this test.

VERSION #1.04
SPS #7.5

2. TEST

Step 1.   From the PC Application Launcher, select a zone.

Step 2.   From that zone's menu, select Zone Configuration Manager.

Step 3.   Navigate through the folders on the left side to the object for which a report is to be generated.

Step 4.   Under the toolbar FILE pull down menu, select Reports.

Step 5.   Observe a window opens allowing a user to create a report.

Step 6.   Enter sorting data for the report and click Generate Report.

Step 7.   Observe a window appears showing the requested report.

Step 8.   Close the report window.

Step 9.   Run the following reports during testing: MGEG Application; Zone Controller; Core RP (Rendezvous Point) Router.

Pass____ Fail____

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Report Generation Tests

UNC Reports - Device Configuration

1. DESCRIPTION

The Unified Network Configurator (UNC) reports allow the user to generate data summaries to view information from the UNC database. Once the report is run, the results can be viewed, printed, and exported. This test will run a report that provides the configuration data for a specific device.

SETUP

If the UNC is not open, double-click the UNC shortcut (UNC) on the desktop, and a VoyenceControl client session will launch. When prompted, use the Login dialog box to login to the UNC using the appropriate username and password.

Note: The output format for the report will default to PDF. If a PDF viewer is not loaded on the workstation, a different output format for the report will need to be selected.

VERSION #1.04
SPS #7.5

2. TEST

Step 1. From the UNC launch page menu bar select the Tools menu and choose Report Manager

Step 2. From the Report Manager screen, select the "DeviceReport - ASTRO 25 Radio Network" report and click Edit.

Step 3. When the Edit Existing Report Criteria window opens, the report name, description and the desired output format of the report can be modified. Once this is done click Next.

Step 4. Navigate through the Available Resources until the desired device is located, select the device and add it to the Selected Resources list. Remove the ASTRO 25 Radio Network from the Selected Resources list and click Next.

Step 5. For the Next two screens, select the information to be included in the report and click Next.

Step 6. Once the report has been successfully created select the Run Now option and click OK. Click Yes to continue.

Step 7. View the generated report

Pass____ Fail____

Report Generation Tests

UNC Reports - Device Change Report

1. DESCRIPTION

The UNC reports allow the user to generate data summaries to view information from the UNC database. Once the report is run, the results can be viewed, printed, and exported. This test will run a report that provides a list of changes that have been made to an RF site.

SETUP

If the UNC is not open, double-click the UNC shortcut (UNC) on the desktop, and a Voyence Control client session will launch. When prompted, use the Login dialog box to login to the UNC using the appropriate username and password.

Note: The output format for the report will default to PDF. If a PDF viewer is not loaded on the workstation, a different output format for the report will need to be selected.

VERSION #1.03
SPS #7.5

2. TEST

Step 1. From the UNC launch page menu bar select the Tools menu and choose Report Manager.

Step 2. From the Report Manager screen, select New to generate a new report. When the Choose Your Report Type window opens, select Device Change and click OK.

Step 3. When the Create New Report Criteria window opens, the report name, description and the desired output format of the report can be modified. Once this is done, click Next.

Step 4. Navigate through the Available Resources until the desired device is located. For this test select an RF site. When the site is located, select the Site object and add it to the Selected Resources list and click Next.

Step 5. Use the Output view Options to select the Data Range Criteria for the report. Once this is complete, click Next. When the screen has updated select the desired Data Type and Device Change Criteria for the report and click Next.

Step 6. Select the information to be included in the report and click Next. Once the report has been successfully created select the Run Now option and click OK. Select Yes to continue.

Step 7. The report is generated showing configuration changes for devices at the RF site. The results appear in a new window.

Pass_____ Fail_____

4.10.9 System Reliability Features

> **AEB to CEB Redundant Link Failure (CentraCom Gold Elite Only)**

1. DESCRIPTION

Communication between the AEB (Ambassador Electronics Bank) and each CEB (Central Electronics Bank) can take place over dedicated redundant links. The two links between the AEB and a CEB operate in a hot/standby mode. The system will continue uninterrupted if the main link fails.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 1

* Select a CEB with redundant links to the AEB.

* The CEB must have at least one console operator position capable of monitoring the selected TALKGROUP 1.

* The CEB must have at least one console operator position capable of monitoring TALKGROUP 1.

VERSION #1.02
SPS #7.5

2. TEST

Step 1.   Initiate a Talkgroup Call with RADIO-1 on TALKGROUP 1.

Step 2.   Observe that RADIO-2 and the selected console are able to monitor and respond to the call.

Step 3.   Remove the RJ45 AIMI (Ambassador Interface- Mux Interface) link connection between the AEB and the CEB.

Step 4.   Initiate a Talkgroup Call with RADIO-1 on TALKGROUP 1.

Step 5.   Observe that RADIO-2 and the selected console are able to monitor and respond to the call.

Step 6.   Replace the link connection previously removed in Step 3.

Step 7.   Repeat the above steps for the other AEB to CEB redundant link.

Pass_____ Fail_____

System Reliability Features

AEB to Zone Controller Redundant Link
Failure (CentraCom Gold Elite Only)

1. DESCRIPTION

This test verifies that the two communication paths
between the Zone Controller and audio switch are hot
standby and the system will continue uninterrupted if
the main path fails. To accomplish this, each ZAMBI
(Zone Ambassador) link in the AEB Ambassador
Electronics Bank) will be disconnected individually
while verifying that the system remains operational.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 1
RADIO-3 - TALKGROUP 2
RADIO-3 - SITE - SITE 2
RADIO-4 - TALKGROUP 2
RADIO-4 - SITE - SITE 3

VERSION #1.02
SPS #7.5

2. TEST

Step 1. Initiate a Talkgroup Call with RADIO-1 on
TALKGROUP 1.

Step 2. Observe that only RADIO-2 and the console
will be able to monitor and respond to the
call.

Step 3. Initiate a Talkgroup Call with RADIO-3 on
TALKGROUP 2.

Step 4. Observe that only RADIO-4 and the console
will be able to monitor and respond to the
call.

Step 5. Remove one of the active ZAMBI cards
from the AEB, this will simulate a Zone
Controller to AEB Link failure.

Step 6. Initiate a Talkgroup Call with RADIO-1 on
TALKGROUP 1.

Step 7. Observe that only RADIO-2 and the console
will again be able to monitor and respond to
the call.

Step 8. Initiate a Talkgroup Call with RADIO-3 in
TALKGROUP 2.

Step 9. Observe that only RADIO-4 and the console
will again be able to monitor and respond to
the call.

Step 10. Replace the ZAMBI card removed
previously in Step 5. Repeat the above steps
for the other Zone Controller to AEB link.

Pass_____ Fail_____

System Reliability Features

Simulcast Essential Subsite Operation

1. DESCRIPTION

This test verifies the essential site operation within a simulcast system. An essential simulcast remote site is one that must have at least one control channel and one traffic channel for the simulcast subsystem to remain trunking mode. If all control channels or all traffic channels have experienced faults at an essential simulcast remote site, then the entire simulcast subsystem is put into failsoft mode to ensure communication can continue in the area covered by the essential simulcast remote site. When all of the wide area failsoft channels at an essential simulcast remote site have experienced faults, the essential simulcast remote site is malfunctioned.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - (SIMULCAST SITE)
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - (SIMULCAST SITE)
RADIO-3 - TALKGROUP 1
RADIO-3 - SITE - SITE 1

* At least one of the remote simulcast sites must be designated an essential site (availability number is set to 100%) and one must be designated a non-essential site.
* CSS (Configuration Service Software) must be running on a laptop computer (provided by CCSI) and plugged into the Simulcast Site Controller.

* This test assumes that the availability number for the non-essential site is set to the default of 50%.

VERSION #1.02
SPS #7.5

2. TEST

Step 1. Using CSS read the Site Controller and bring up the Site Controller Status Panel service screen.

Step 2. Power down one of the control channel capable stations at the non-essential site and note that the CSS shows the channel is disabled at all the other sites.

Step 3. Repeat Step 1 for each of the other control channel capable stations or until 50% or more of the stations have been malfunctioned.

Step 4. Verify that the CSS shows that the disabled channels have been enabled at all other sites in the simulcast subsystem and that RADIO-1 can communicate with RADIO-3.

Step 5. Re-power all of the control channel capable stations at the non-essential site.

Step 6. Power down all of the control channel capable stations at the essential site.

Step 7. Verify that the simulcast subsystem is now in the failsoft mode.

Step 8. Re-power all of the control channel capable stations at the essential site and verify the simulcast subsystem is back in wide-area trunking.

Pass____ Fail____

System Reliability Features

Multiple Control Channels

1. DESCRIPTION

A maximum of four channels are eligible for assignment as control channel in each site. In the event that the assigned control channel fails at any remote site, the Zone Controller automatically selects one of the other control capable channels as the active control channel for that site. A Control Channel Preference Level can be used to rank the control capable channels where 1 is the highest ranking and 4 is the lowest.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 2
RADIO-3 - TALKGROUP 2
RADIO-3 - SITE - SITE 1
RADIO-4 - TALKGROUP 2
RADIO-4 - SITE - SITE 2

VERSION #1.03
SPS #7.5

2. TEST

Step 1.   Initiate a Talkgroup Call with RADIO-1 on TALKGROUP 1.

Step 2.   Observe that only RADIO-2 will be able to monitor and respond to the call.

Step 3.   Initiate a Talkgroup Call with RADIO-3 on TALKGROUP 2.

Step 4.   Observe that only RADIO-4 will be able to monitor and respond to the call.

Step 5.   Disable the current control channel at SITE 1.

Step 6.   Observe that the control channel rotates to the next available channel capable of acting as a control channel.

Step 7.   Initiate a Talkgroup Call with RADIO-1 on TALKGROUP 1.

Step 8.   Observe that only RADIO-2 will be able to monitor and respond to the call.

Step 9.   Initiate a Talkgroup Call with RADIO-3 on TALKGROUP 2.

Step 10. Observe that only RADIO-4 will be able to monitor and respond to the call. Enable the channel previously disabled in Step 5.

Pass____ Fail____

System Reliability Features

Site Failsoft

1. DESCRIPTION

Failure of all control channels, failure of all voice channels, or failure of the site controller will cause a site (RF Subsystem) to enter failsoft operation. Subscribers can be programmed to operate in failsoft by talkgroup; to search its list of control channel frequencies in failsoft; or to disable failsoft altogether. When a site enters failsoft, a radio programmed for failsoft by talkgroup will first look for a specific failsoft channel dictated by the selected talkgroup. Since many systems have different frequencies across sites, if the radio is unable to find the talkgroup's failsoft channel the radio will instead operate in the control channel search failsoft mode. A radio programmed or needing to search control channels for failsoft frequencies will lock onto the first control channel in its control channel list.

Note that radios should not be site locked when in failsoft mode as the radio will not check the full list of 64 control channels programmed into the radio's code plug. All radios should be programmed to have the same sequence of control channel frequencies.

*Note: The subscribers MUST be SmartZone capable.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 1
RADIO-3 - TALKGROUP 2
RADIO-3 - SITE - SITE 1
RADIO-4 - TALKGROUP 2
RADIO-4 - SITE - SITE 1

* Program the Radios for failsoft operation by talkgroup. TALKGROUP 1 should use a different channel for failsoft than TALKGROUP 2 and neither should be a control channel.

* Turn off all subsystems except the subsystem under test.

VERSION #1.05
SPS #7.5

2. TEST

Step 1.   Using the Unified Event Manager (UEM), place the subsystem into failsoft mode.

Step 2.   Verify that the Radios emits a failsoft tone approximately once every ten seconds.

Step 3.   Initiate a Talkgroup Call from RADIO-1 while in failsoft mode.

Step 4.   Verify that only RADIO-2 can hear RADIO-1.

Step 5.   Dekey RADIO-1 and power down the failsoft channel associated with TALKGROUP 1.

Step 6.   Key RADIO-1 and verify RADIO-2 can still monitor the call but the other radios cannot. *

Step 7.   Dekey RADIO-1 and initiate a Talkgroup Call from RADIO-3.

Step 8.   Verify that only RADIO-4 can hear RADIO-3.*

Pass____ Fail____

System Reliability Features

Base Station Identification

1. DESCRIPTION

This test verifies that the repeaters programmed for BSI operation at every site broadcasts the FCC Base Station Identification (BSI) every 30 minutes. To accomplish this, a service monitor will be set up to monitor the BSI channel of a random site and note that the Morse Code is heard.

SETUP

A service monitor will be required to perform this test.

VERSION #1.02
SPS #7.5

2. TEST

Step 1. Choose one site to test for Base Station Identification.

Step 2. Setup the service monitor to receive the frequency of the BSI channel for the particular site.

Step 3. Monitor the service monitor until the system ID is broadcast.

Pass_____ Fail_____

System Reliability Features

Redundant Zone Controller Switching/User Initiated Switchover

1. DESCRIPTION

The Zone Controller subsystem uses two Zone Controllers in a redundant configuration. The backup Zone Controller is made active either upon the loss of the active ZC or upon a user-initiated command from the Zone Configuration Manager.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 2
RADIO-3 - TALKGROUP 1
RADIO-3 - SITE - Site in Another Zone

VERSION #1.02
SPS #7.5

2. TEST

Step 1. Verify in the Zone Configuration Manager (ZCM) that the switchover mode is user-initiated.

Step 2. Verify in the ZCM under Zone object that the Standby Zone Controller is in "Synchronization Complete" state prior to switching.

Step 3. Switch the Zone Controllers from the ZCM.

Step 4. Verify that the backup Zone Controller becomes active and brings all sites back wide. Wait for the Radios to settle out the site affiliations.

Step 5. Key RADIO-1 and verify that RADIO-2 and RADIO-3 hear the audio.

Step 6. End the call from RADIO-1.

Pass_____ Fail_____

System Reliability Features

Redundant Zone Controller Switching/Automatic Switchover

1. DESCRIPTION

The Zone Controller subsystem uses two Zone Controllers in a redundant configuration. The backup Zone Controller is made active either upon the loss of the active ZC or upon a user-initiated command from the Zone Configuration Manager.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 2
RADIO-3 - TALKGROUP 1
RADIO-3 - SITE - Site in Another Zone

VERSION #1.02
SPS #7.5

2. TEST

Step 1. Set the switchover mode to automatic through the ZCM.

Step 2. Verify in the ZCM that the idle Zone Controller is in "Standby" state prior to switching.

Step 3. Disable the active Zone Controller via the ZCM diagnostic.

Step 4. Verify that the backup Zone Controller becomes active and brings all sites back wide. Wait for the Radios to settle out the site affiliations.

Step 5. Key RADIO-1 and verifying that RADIO-2 and RADIO-3 hear the audio.

Step 6. End the call from RADIO-1.

Step 7. Enable the Zone Controller disabled in step 3.

Pass_____ Fail_____

System Reliability Features

Redundant Site Link Failure

1. DESCRIPTION

Communication between the Master Site and the Remote Site can take place over dedicated redundant links. The two links between the Master Site and the Remote Site operate in a hot/standby mode. The system will switch to the backup link if the main LAN or WAN link fails.

Note that the Primary Site Router, if functional, will always be the active router. The Secondary Site Router will only take over when the Primary Site Router is malfunctioning.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 1

* SITE 1 should have redundant links to the Master Site.

VERSION #1.02
SPS #7.5

2. TEST

Step 1. Initiate a Talkgroup Call with RADIO-1 on TALKGROUP 1.

Step 2. Observe that RADIO-2 is able to monitor and respond to the call.

Step 3. Remove the WAN link from the active router at the Remote Site.

Step 4. Initiate a Talkgroup Call with RADIO-1 on TALKGROUP 1.

Step 5. Observe that RADIO-2 is able to monitor and respond to the call.

Step 6. Replace the WAN link connection that was removed in Step 3.

Pass____ Fail____

System Reliability Features

> **Redundant MGEG* (CENTRACOM Gold Elite only)**

1. DESCRIPTION

The Motorola Gold Elite Gateway (MGEG) is an interface device that allows an existing circuit-switched CENTRACOM Elite™ system to communicate over an IP or packet-based system. The MGEG provides two additional services:

- Encryption/decryption capability to and from the console operator position or client.
- Audio connectivity and encryption/decryption capability for telephone interconnect in ASTRO 25 systems that include the telephone interconnect option.

The system utilizes two MGEGs to process audio to the console. Each MGEG has a line card with four E1 connections to the AEB. The system distributes calls between the two MGEGs and their E1 resources. If a failure occurs in the MGEG or in any of the links, the system will continue to process calls on the remaining available MGEG resources.

*The MCC7500 Console Sub-system does not use MGEG, but if the Telephone Interconnect functionality is present then MGEG is required regardless of the Console type and test will be applicable.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 1

This test also requires a console position capable of communicating on TALKGROUP 1. The ZoneWatch Raw display must be available to monitor the MGEG link being utilized for each call.

VERSION #1.02
SPS #7.5

2. TEST

Step 1. Process several calls between the console, RADIO-1 and RADIO-2 on TALKGROUP 1.

Step 2. Using the ZoneWatch Raw display, monitor the MGEG and Tline ID being used for each new call. Note that these calls are distributed between the active MGEGs links.

Step 3. Remove the LAN connection to MGEG 1. This failure will cause MGEG 1 to stop processing calls.

Step 4. Verify communications between the console, RADIO-1 and RADIO-2.

Step 5. Using the ZoneWatch Raw display, monitor the MGEG and Tline ID being used for each new call. Verify that calls are now exclusively being handled by MGEG 2 and that there is no disruption of inbound or outbound console audio.

Step 6. Replace the LAN connection removed in Step 3.

Step 7. Using the ZoneWatch Raw display, verify that after the MGEG becomes operational, it is again included in the distribution of calls.

Pass____ Fail____

System Reliability Features

Station Failure

1. DESCRIPTION

When a base station repeater at one site fails due to hardware problems, the pending call is lost and the trunking controllers removes the channel from service system wide. This failure can be created by powering down one base station repeater.

SETUP

No set up required.

VERSION #1.02
SPS #7.5

2. TEST

Step 1. Power down a voice repeater for any voice channel at one remote site.

Step 2. Press PTT on a radio several times to step through all available voice channels.

Step 3. Verify that the disabled channel is not used.

Pass_____ Fail_____

System Reliability Features

> Redundant Site Controller Switching/User Initiated Switchover

1. DESCRIPTION

The Simulcast subsystem uses two Site Controllers in a redundant configuration. The backup Site Controller is made active either upon the loss of the active Site Controller or upon a user-initiated command from the Configuration Service Software.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 1

VERSION #1.02
SPS #7.5

2. TEST

Step 1.   Using CSS, connect to the ACTIVE site controller, and read the configuration data.

Step 2.   Select the "Status Panel Screen" from the Service Pull-Down Menu.

Step 3.   Initiate a Talkgroup Call with RADIO-1 and observe that it is received by RADIO-2. Keep this call in progress until instructed to end the call.

Step 4.   Disable the ACTIVE site controller by placing it into the "USER DISABLED" state. This will force the INACTIVE site controller to become ACTIVE and take over control of the system.

Step 5.   Notice that the call set-up in Step 3 is unaffected by the site controller switchover.

Step 6.   End the call started in Step 3, and initiate a new call with RADIO-2.

Step 7.   Notice that the call is granted, and that RADIO-1 receives the new transmission.

Pass_____ Fail_____

System Reliability Features

Receiver Interference Shutdown

1. DESCRIPTION

Receiver interference occurs when a repeater receives an unauthorized signal. In order to prevent a disruption of communications, the affected channel will be disabled and removed from the system's pool of available channel resources when the undesired carrier is detected for longer than the time-out period. Once the interfering carrier disappears, the channel is returned to service within approximately 5 minutes. The channel is then enabled.

Note: The default Carrier Malfunction Timeout is 50 seconds. If the default value is to be modified, the change will need to be made in the Unified Network Configurator (UNC) for the channel(s) to be modified.

SETUP

Service Monitor to transmit a signal at the receive frequency of a chosen channel.

VERSION #1.07
SPS #7.5

2. TEST

Step 1. Using a service monitor, transmit a 1 kHz tone at the receive frequency of any repeater.

Step 2. Continue to transmit the 1 kHz tone until the controller removes the channel from service.

Step 3. Verify the channel is removed from the selection/assignment process.

Step 4. From the Unified Event Manager (UEM), verify channel malfunction due to interfering carrier is indicated

Step 5. Remove the interfering signal. Verify the Channel is returned to service within five minutes and that UEM indicates that the channel is now enabled.

Pass____ Fail____

System Reliability Features

Transmitter Power Failure Shutdown

1. DESCRIPTION

The repeaters can detect a loss or decrease in transmitter output power of all trunked repeaters connected to it. Each trunked repeater contains an internal wattmeter element. Once the forward power has decreased past the threshold set, the repeater instructs the Zone Controller to take the channel out of service. If reflected power increases past the threshold set, the repeater will also instruct the Zone Controller to take the channel out of service.

Note: This test should be done on a site with more than 2 channels. Failsoft will occur if the test is done on a 2 channel site.

UEM - Unified Event Manager

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1

VERSION #1.06
SPS #7.5

2. TEST

Step 1. Disconnect the transmit antenna connection to a trunked repeater. (This will cause a high VSWR condition)

Step 2. Key RADIO-1 so that the selected channel is assigned, and verify that the channel disables. Verify that this alarm is reported at the UEM.

Step 3. Restore the transmit antenna connection to the trunked repeater.

Step 4. Verify that the channel is put back into service by the UEM within five minutes.

Pass____ Fail____

4.10.10   Agency Partitioning Tests

Channel Partitioning Operation

1. DESCRIPTION

This feature provides exclusive use of designated RF
channels for high priority groups. This test will
demonstrate that the calls belonging to the high
priority group is steered to the RF channels that are
designated.

Create a User Group (UG2) via the User
Configuration Manager. Assign the UG2 User Group
to the talkgroup TG5 profile. In the Zone
Configuration Manager, add UG2 to the RF Channel
RF5 at RF Site 1 to be tested. This will ensure that
UG2 will have exclusive use of the Channel (RF5).

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TG5
RADIO-2 - SITE - SITE 1

VERSION #1.02
SPS #7.5

2. TEST

Step 1.   While channels on the RF site 1 are idle,
initiate a talkgroup call on TG5 from
RADIO-2 on SITE 1

Step 2.   Verify that RADIO-2 is assigned RF5.

Step 3.   Release the PTT and wait for the talkgroup
call to end.

Step 4.   Initiate a talkgroup call from RADIO-1 on
TALKGROUP 1 at SITE 1.

Step 5.   Observe that the talkgroup call from
RADIO-1 is not assigned RF5.

Pass____ Fail____

Agency Partitioning Tests

Console Monitoring Permission Granted Channels

1. DESCRIPTION

This is to demonstrate that the Consoles cannot monitor channels they have not been granted permission via security groups.

Agency Partitioning is implemented through Security Groups. The dispatchers can only retrieve resource info for their respective agencies.

Note: Once a Security Group is created in the User Configuration Manager (UCM) it cannot be deleted.

SETUP

RADIO-1 TALKGROUP 1
RADIO-2 TALKGROUP 1
C1 TALKGROUP 1
C2 TALKGROUP 2
TG_A is assigned to security group SG_A and console users CU1 and CU2 are assigned to SG_A. The users CU1 and CU2 are logged into C1 and C2 respectively.
Note: The user will need to quit the UCM application when a new Security Group is created or after users are assigned to a new Security Group.

VERSION #1.02
SPS #7.5

2. TEST

Step 1. Initiate a Talkgroup Call from console C1.

Step 2. Verify that RADIO-1, RADIO-2 and C2 can hear the audio.

Step 3. Remove the security group SG_A from user CU1 via the User Configuration Manager (UCM)

Step 4. log off user CU1 and then log CU1 user back into console

Step 5. Verify that C1 does not have TALKGROUP 1 on the screen

Step 6. Initiate a Talkgroup Call from console C2

Step 7. Verify that no audio is received at console C1.

Pass____ Fail____

Agency Partitioning Tests

AIS Logs only Permission Granted Channels

1. DESCRIPTION

This test will demonstrate the Archiving Interface Server (AIS) can be used to log trunking talkgroup call audio/events on a given Talkgroup for multiple agencies authorized to use TalkGroup channels. Each logging sub-system placed on the radio system infrastructure is granted access to some subset of the resources in the radio system. This is done in the radio system's network manager by specifying the rights of the login account used by the AIS. This restricts the logging recorders in one agency from recording information that pertains to another agency's traffic

Note 1: The logging recorder that can be used with AIS is required to execute this test.

Note 2: Make sure to quit the UCM application when new security groups are created also after the users are assigned to new security groups.

SETUP

The AIS is at MCC7500 Console site affiliated to TALKGROUP 1.
RADIO-1 TALKGROUP 1
RADIO-2 TALKGROUP 1
C1 TALKGROUP 1
C2 TALKGROUP 2
TG_A is assigned to security group SG_A and console users CU1 and CU2 are assigned to SG_A. The users CU1 and CU2 are logged into C1 and C2 respectively. And CU1 has right of login account in AIS, CU2 does not have right of login account in AIS.

VERSION #1.02
SPS #7.5

2. TEST

Step 1. Initiate a TalkGroup Call from console C1.

Step 2. Verify that RADIO-1, RADIO-2, C2 and AIS can hear the audio.

Step 3. Verify that CU1 can log the TALKGROUP 1 audio / events via logging recorder.

Step 4. Verify that CU2 can not log TALKGROUP 1 audio / events via logging recorder.

Step 5. Remove the right of login account of CU1 in AIS via UCM.

Step 6. Verify that CU1 can no longer log TALKGROUP 1 audio / events via logging recorder

Pass_____ Fail_____

Agency Partitioning Tests

Recorder Replays only Permission Granted Channels

1. DESCRIPTION

This test will demonstrate the playback station can be used to replay trunking talkgroup call audio/events on a given Talkgroup for multiple agencies authorized to use TalkGroup channels.
Replay stations require the user to log in with an account name and password. These account names and passwords are different than and separate from any account names and passwords created on the radio system's network management sub-system. The replay user accounts can be configured with access rights to the radio resources being recorded by the recorders. This allows the various agencies to control which replay users can access which recordings

Note: The playback equipment that can be used with AIS is required to execute this test.

SETUP

The NICE play back station connected to AIS via the site LAN switch. AIS with prerecorded audio / events in TALKGROUP 1and TALKGROUP 2 is required.

VERSION #1.02
SPS #7.5

2. TEST

Step 1. Configure playback station with user account (UA) to access TALKGROUP 1 and TALKGROUP 2 recordings.

Step 2. Verify that TALKGROUP 1 and TALKGROUP 2 recorded audio / events can be replayed by logging in with UA

Step 3. Change playback station user account UA to remove access to TALKGROUP 1

Step 4. Verify that user with account UA can no longer replay the recorded audio / events in TALKGROUP 1

Step 5. Verify that UA account user can still access the recorded audio / events in TALKGROUP 2

Pass____ Fail____

4.10.11 Integrated Voice and Data (IV & D)

<div style="border: 1px solid black; padding: 4px;">Context Activation</div>

1. DESCRIPTION

Context Activation covers the process a Radio uses to register for packet data service on the trunked system. For this test, the Radio is configured to initiate a context request with the system upon establishment of the PPP link with the mobile computer (NAT Enabled).
Note: The following test requires the user to be on a non-OTAR, but data capable mode in the radio

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1

Note: RADIO-1 must be a XTS 5000. and must have data capabilities enabled in the network manager. SITE 1 must be operating in wide area trunking, capable of supporting data service.

VERSION #1.02
SPS #7.5

2. TEST

Step 1. Verify that the "PPP Link Establishment icon" and the "Packet Data IP icon" RADIO-1 are not displayed. This indicates that RADIO-1 is not currently context activated with the system.

Step 2. Verify that the DLM icon on the PC connected to RADIO-1 is red in the System Status area of the Taskbar (Windows System Tray). This indicates that a PPP link between the PC and the Radio is not present.

Step 3. Connect the PC to the Radio via the interface cable.

Step 4. Initiate a Context Activation Request from the Radio by attempting to send a data message. Note: the data application must use the PPP link assigned to the data service network connection from the PC.

Step 5. Verify that the context request for the Radio is successful.

Step 6. Verify that the "PPP Link Establishment icon" and the "Packet Data IP icon" are visible on the Radio display. This indicates that the Radio is context activated with the system.

Step 7. Verify that the DLM icon on the PC is displayed in the System Status area of the Taskbar. This indicates that a PPP link between the PC and the Radio is present.

Pass_____ Fail_____

Integrated Voice and Data (IV & D)

Context Reject - Radio Not Enabled for Data Service

1. DESCRIPTION

If a Radio is not enabled for data service in the SmartZone Manager, a Context Activation request from that Radio will be rejected. This test will demonstrate that a Radio that is not enabled for data service will not be allowed to register with the data system.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1

Note: SITE 1 must be operating in wide area trunking, capable of supporting data service.

VERSION #1.02
SPS #7.5

2. TEST

Step 1.   Open the Radio User record for the radio that will be used for this test. Verify that the radio record indicates that it is not enabled for data service.

Step 2.   Verify that the "PPP Link Establishment icon" and the "Packet Data IP icon" on the Radio are not displayed. This indicates that the RADIO is not currently context activated with the system.

Step 3.   Verify that the DLM Icon on the PC is red on the System Status area of the Taskbar. This indicates that a PPP link between the PC and the Radio is not present.

Step 4.   Initiate a Context Activation Request from the Radio by starting the PPP link assigned to the data service network connection from the PC.

Step 5.   Verify that the context request for the Radio is unsuccessful.

Step 6.   Verify that the "PPP Link Establishment icon" is visible and the "Packet Data IP icon" is not visible on the Radio display.

Step 7.   Verify that the DLM Icon on the PC is yellow in the System Status area of the Taskbar.

Pass____ Fail____

Integrated Voice and Data (IV & D)

Context Deactivation - Initiated from the Network Manager

1. DESCRIPTION

Context deactivation covers the process used to cancel a currently active context. Context deactivation can be initiated either at the Radio or at the network manager. For this test, the context will be deactivated from the Network Manager. Once context deactivated, the Radio will be unable to use the packet data service. This test will be performed from a fixed location.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1

Note: RADIO-1 must be affiliated to the system and be context activated. SITE 1 must be operating in wide area trunking, capable of supporting data service.

VERSION #1.02
SPS #7.5

2. TEST

Step 1. Verify that the "PPP Link Establishment icon" and the "Packet Data IP icon" on the Radio are visible. This indicates that the RADIO is currently context activated with the system.

Step 2. Verify that the DLM icon on the PC is displayed in the System Status area of the Taskbar. This indicates that a PPP link between the PC and the Radio is present.

Step 3. From the Network Manager, open the Radio User record for the Radio that will be used for this test and change the "Data Enabled" parameter for the Radio to "No".

Step 4. Verify that the Radio is context deactivated.

Step 5. Verify that the "PPP Link Establishment icon" is visible and the "Packet Data IP icon"   on the Radio display is turned off.

Step 6. Verify that the DLM Icon on the PC is now yellow in the System Status area of the Taskbar.

Pass____ Fail____

Integrated Voice and Data (IV & D)

Inbound Data Transfer - Project 25 Data

1. DESCRIPTION

This test will demonstrate the transfer of a short message from the mobile user terminal to a host computer on the CEN. For the purposes of this test, a short message is defined as between 50 to 200 bytes.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
Host computer - Connected

Note: RADIO-1 must be affiliated to the system and have a data terminal connected. SITE 1 must be operating in wide area trunking, capable of supporting data service. For this test, RADIO-1 will be context activated for data service.

VERSION #1.02
SPS #7.5

2. TEST

Step 1.   From a data terminal attached to RADIO-1, generate an inbound message to a Host computer on the network, using the ping command from the MS-DOS prompt:
ping -w 4000 <destination IP address>

Step 2.   Verify that the data terminal attached to RADIO-1 receives a response from the Host computer.

Pass____ Fail____

Integrated Voice and Data (IV & D)

Outbound Confirmed Data Transfer

1. DESCRIPTION

This test will demonstrate the transfer of a short message from the host computer on the CEN to a mobile user terminal.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
Host computer - Connected
Note: RADIO-1 must be affiliated to the system and have a data terminal connected. SITE 1 must be operating in wide area trunking, capable of supporting data service. For this test, RADIO-1 will be context activated for data service. This test will be performed from a fixed location.

VERSION #1.02
SPS #7.5

2. TEST

Step 1.   From a Host computer on the Customer Enterprise Network (CEN), generate an outbound message to a data terminal attached to RADIO-1, using the ping command from the MS-DOS prompt: ping -w 4000 <destination IP address>

Step 2.   Verify that the Host computer receives a response from the data terminal attached to RADIO-1.

Pass____ Fail____

Integrated Voice and Data (IV & D)

Over the Air Programming (PoP25)

1. DESCRIPTION

The feature Programming Over P25 (POP25) allows a user to configure a radio remotely from the enterprise network by sending a sequence of commands over-the-air via the ASTRO 25® IV&D system. It is expected that the POP25 will significantly reduce the operational costs of IV&D radios by configuring personalities, talkgroups, channels, sites, etc in a radio without physically touching the radio.
This test will demonstrate the ability to perform a subscriber update using CPS over the air.

NOTE: There are subscriber programming options that will affect the test. The subscriber can be programmed to Approve the update, implement the update on next power cycle or disregard the update.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 1

PC loaded with Customer Programming Software (CPS) and the System Key Dongle. The PC must be connected to the ASTRO 25® network via the CEN. RADIO-1 must be data capable and context activated for data service.

VERSION #1.05
SPS #7.5

2. TEST

Step 1. Locate IP address for Radio-1

Step 2. From the CPS computer on the Customer Enterprise Network (CEN), connect to RADIO-1 over the network and read the subscriber.

Step 3. Make a change to the archived program file and write to RADIO-1.

Step 4. Once the new archive is received at RADIO-1 the radio user will have to approve the new configuration.

Step 5. Once the new configuration has been received and the load is complete, verify the configuration change has been implemented.

Step 6. On the CPS PC return the archive feature to the original state.

Step 7. Begin a talkgroup call by keying RADIO-2. Verify RADIO-1 hears the audio.

Step 8. While the call is in progress send the program update to RADIO-1. Verify that the radio continues to hear the audio. Dekey and key RADIO-2 several times with various pauses to interrupt the data transfer to RADIO-1.

Step 9. Dekey RADIO-2 and verify the data transfer completes. Once the programming update has completed accept the configuration change on RADIO-1.

Step 10. Verify RADIO-1 configuration has returned to its original state.

Pass____ Fail____

4.10.12 MOSCAD Fault Management System

Screen Navigation

1. DESCRIPTION

MOSCAD alarming tests shall be conducted from the
MOSCAD server and clients if applicable. The
alarms demonstrated are to be made on the actual
equipment or punch block interface, with an
exception made for cases where it is not practical to
create an actual alarm. The following will provide a
brief introduction and description of the main display
screens encountered when navigating the MOSCAD
GUI (Graphic User Interface).

VERSION #1.03
SPS #7.5

2. TEST

Step 1. Login and Password Screen -
This is the first screen displayed after a system startup. It
allows a user with the proper login and password
to access the MOSCAD alarm system. Login to
MOSCAD using the appropriate user name and
password.

Step 2. System Overview Screen -
The "System Overview" screen contains site
names adjacent to color status pushpins. Details
of a particular site can be viewed by selecting the
site name pushpin of interest. Depending on
alarm status, the color bullet will flash
accordingly.

Step 3. Alarm Summary Screen -
Proceed to the "Alarm Summary" screen from
the "System Overview" screen. The "Alarm
Summary" screen provides a text display of all
alarms currently in the system. On this screen,
you can choose between alarm summary and
alarm history by selecting the "Alarm Summary /
Alarm History" button. Also, the display can be
filtered to show alarms based on site name or
acknowledgement status.

Step 4. Comm Screen -
From the "Alarm Summary" screen access the
"Site Comm" screen. The "Site Comm" screen
displays a combined communication status for
each site. To view all the SDM3000s within a
site, select the icon next to the site comm.
Should the communications path between the IP
Gateway and any SDM3000 in the system be
interrupted, it will be indicated by an alarm
present on this screen.

Step 5. Device Monitoring
From the "System Overview" screen, navigate to
each site monitored by MOSCAD in the system.
Once a particular site pushpin has been selected,
a site overview screen will appear that indicates
the types and quantities of devices monitored by
MOSCAD at that site.
                    Pass____ Fail____

MOSCAD Fault Management System

InTouch Alarm Processing - Acknowledged Alarm

1. DESCRIPTION

This segment of the test verifies that the bi-state site alarms are processed and communicated to the MOSCAD Server. The alarms can originate from a device with "hard wired" physical dry contact interfacing or from a device connected to the MOSCAD SDM3000 by means of an RS232 or Ethernet protocol interface.

This test will also show the equal display and acknowledging capabilities of both MOSCAD Server and Client(s).

VERSION #1.02
SPS #7.5

2. TEST

Step 1. Create an alarm condition by simulating an alarm on a device in the system or shorting/opening a status input to any MOSCAD status input module in the system. Navigate to the lowest level screen that depicts the highest degree of alarm detail.

Step 2. Verify that the colored status bullet for the associated alarm on the server is blinking red and for RS232 interfaces, that the "state" text is red and is displayed for the correct alarm point and site.

Step 3. If speakers are present, verify that an audible indication is heard at the server.

Step 4. Verify that the alarm displays in red text on the pop-up Alarm Summary window.

Step 5. Click with the mouse on the "acknowledge" button. Verify that the audible indication is silenced.

Step 6. Verify that the text on the alarm summary window of the server changes from red (unacknowledged alarm) to black (acknowledged alarm).

Step 7. Verify that the colored status bullet for the associated alarm on the server remains red but stops blinking.

Step 8. Return the alarm point to the normal condition. Verify that the colored status bullet for the associated alarm returns to green.

Step 9. Verify that the text is removed from the alarm summary window.

Step 10. These steps should be performed once again to verify the functionality of the MOSCAD client(s).

Pass____ Fail____

MOSCAD Fault Management System

| InTouch Alarm Processing - |
| Unacknowledged Alarm |

1. DESCRIPTION

This segment of the test verifies that the bi-state site alarms are processed and communicated to the MOSCAD Server. The alarms can originate from a device with "hard wired" physical dry contact interfacing or from a device connected to the MOSCAD SDM3000 by means of an RS232 or Ethernet protocol interface.

This test will also show the equal display and acknowledging capabilities of both MOSCAD Server and Client(s).

VERSION #1.02
SPS #7.5

2. TEST

Step 1. Create an alarm condition by simulating an alarm on a device in the system or shorting/opening a status input to any MOSCAD status input module in the system. Navigate to the lowest level screen that depicts the highest degree of alarm detail.

Step 2. Verify that the colored status bullet for the associated alarm on the server is blinking red and for RS232 interfaces, that the "state" text is red and is displayed for the correct alarm point and site.

Step 3. If speakers are present, verify that an audible indication is heard at the Server.

Step 4. Without acknowledging the alarm, return the alarm point to its normal condition.

Step 5. Verify the text on the alarm summary window of the server has changed from red to blue indicating the alarm that has returned to normal but remains unacknowledged.

Step 6. Verify that the associated alarm bullet is blinking green and yellow, indicating an unacknowledged alarm that has returned to normal. An audible alert will persist until the alarm is acknowledged.

Step 7. These steps should be performed once again to verify the functionality of the MOSCAD client(s).

Pass_____ Fail_____

MOSCAD Fault Management System

Physical Inputs/Outputs - Digital Inputs

1. DESCRIPTION

The purpose of this section is to verify that the physical inputs and outputs that interface to the MOSCAD I/O module(s) are properly processed by the MOSCAD system. All alarms demonstrated are to be made on the punch block. Proper processing can be verified by observing I/O module LED indications for DI's.

DI - Digital Inputs
UEM - Unified Event Manager

SETUP

NMclient01 - UEM session up and running.

VERSION #1.05
SPS #7.5

2. TEST

Step 1.   Select a site at to perform the test.

Step 2.   Short/Open the input point and verify that an alarm indication is received at the InTouch Server and/or client(s).

Step 3.   Verify the active alarm is displayed in the UEM. (Make sure the show all button has been selected.)

Step 4.   Return the input to its normal condition. Verify that the alarm indication changes in the UEM active alarms view.

Pass_____ Fail_____

MOSCAD Fault Management System

Physical Inputs/Outputs - Digital Outputs

1. DESCRIPTION

The purpose of this section is to verify that the physical inputs and outputs that interface to the MOSCAD I/O modules are properly processed by the MOSCAD system. Proper processing can be verified in two ways. First, a witness can observe the I/O module LED indications for DO's by changes on the SDM3000 panel. Second, a witness can observe the DO back indication on the InTouch "Digital Output" screen.

Note that digital outputs cannot be initiated from the FullVision Client.

Digital Outputs

VERSION #1.02
SPS #7.5

2. TEST

Step 1. Select a site to perform the test.

Step 2. Trigger a latched state of the output point by selecting the "On" button from the appropriate site's digital output screen, confirming that the screen indication changes from "Off" to "On" for that point.

Step 3. Verify a change of state by observing the LED on the MOSCAD DO module and by observing the control back indication on the InTouch client or server.

Step 4. Return the output to its "Off" condition. Verify that the "On" indication on the InTouch server returns to "Off" in addition to confirming a change of state of the MOSCAD LED.

Pass____ Fail____

MOSCAD Fault Management System

Physical Inputs/Outputs - Analog Inputs

1. DESCRIPTION

The purpose of this section is to verify that the physical inputs and outputs that interface to the MOSCAD I/O modules are properly processed by the MOSCAD system. Analog inputs can be tested by comparing GUI needle deflection on-screen (full scale, half scale, 2/3 scale, etc)

Analog values can only been seen on the MOSCAD alarm server and clients.

Analog Inputs

VERSION #1.02
SPS #7.5

2. TEST

Step 1.   Choose the site to perform the test.

Step 2.   At the MOSCAD server or client, select the Analog Input icon from the testing site overview screen.

Step 3.   Using a MOSCAD test board, manipulate the analog input voltage by moving the potentiometer to ¼, ½, or ¾ of the full range.

Step 4.   Verify that the needle deflection of the MOSCAD alarm manager matches, with reasonable accuracy, to that of the potentiometer.

Pass____ Fail____

MOSCAD Fault Management System

TRAK GPS - Communication Status Fault

1. DESCRIPTION

The MOSCAD system connects to a TRAK 9100 GPS Standard via the RS-232 port 9 pin D connector. This interface requires a dedicated MOSCAD SDM3000 RS-232 port. The MOSCAD will periodically solicit the TRAK for its status and response messages are sent back to the MOSCAD SDM3000. New alarm messages, with respect to the last received status held in the SDM3000, are then converted to native MOSCAD data format for transmission to the MOSCAD alarm Server. Alarm messages are also sent as SNMP traps from the SDM3000's IP Interface to the FullVision Server.

VERSION #1.02
SPS #7.5

2. TEST

Step 1.   Choose the site to perform the test.

Step 2.   Verify there are no current alarms for the chosen TRAK GPS on the InTouch and FullVision Alarm Managers.

Step 3.   Disconnect the RJ45 communication cable (which ultimately connects to the TRAK 9100 RS232 port) from the rear of the GPS..

Step 4.   Verify that the TRAK 9100 communication alarm is received at the MOSCAD server and FullVision alarm managers.

Step 5.   Acknowledge the alarm on either the MOSCAD server or client.

Step 6.   Reconnect the communication cable to the TRAK 9100 GPS..

Step 7.   Verify that the GPS communication status returns to normal on the alarm managers.

Pass_____ Fail_____

MOSCAD Fault Management System

TeNSr Channel Bank - Configuration

1. DESCRIPTION

The MOSCAD system will connect to each TeNSr channel bank's terminal port. This specifically is the RJ45 "TERM" port found on the back of the channel bank on the INF (Interface) module. This interface takes place through a MOSCAD MUX port (port 1, 2, 3 or 4). This connection, made using the TeNSr term port, is used solely for the VT-100 configuration interface. This connection is manually initiated and used for configuration. This interface should not be confused with the channel bank's alarm port.

2. TEST

Step 1.   At the server, open the terminal application (VT100 mode) by selecting the configure button on the TeNSr display screen.

Step 2.   A HyperTerminal display will show the channel bank that corresponds to the current site and margin tab.

Step 3.   Verify connection by validating channel bank name.

Step 4.   Close the HyperTerminal display.

Pass____ Fail____

VERSION #1.02
SPS #7.5

MOSCAD Fault Management System

RSBR(Repeater Site Base Radio) / MSBR(Multisite Base Radio) Diagnostics - Reset Station

1. DESCRIPTION

The MOSCAD system will connect to each repeater site base radio (RSBR) or a multisite base radio (MSBR) using the site's Ethernet switch(es). The MOSCAD will receive SNMP traps from the base radio (BR) as well as solicit the BR for status. The MOSCAD will continuously poll for any alarm messages present in the BR. New alarm messages, with respect to the last received status held in the SDM3000, are then converted to native MOSCAD data format for transmission to the MOSCAD alarm Server.

VERSION #1.02
SPS #7.5

2. TEST

Step 1.   Choose the channel and site to perform test.

Step 2.   Verify that there are no current alarms for the chosen base radio on MOSCAD server and client(s).

Step 3.   Select "Station Reset".

Step 4.   Verify that the station is reset by observing the LED's on the face of the respective base radio.

Pass____ Fail____

MOSCAD Fault Management System

RSBR(Repeater Site Base Radio) / MSBR(Multisite Base Radio) GTR8000 Diagnostics-Ext. Ref. Status

1. DESCRIPTION

The MOSCAD system will connect to each repeater site base radio (RSBR) or a multisite base radio (MSBR) using the site's Ethernet switch(es). The MOSCAD will receive SNMP traps from the base radio (BR) as well as solicit the BR for status. The MOSCAD will continuously poll for any alarm messages present in the BR. New alarm messages, with respect to the last received status held in the SDM3000, are then converted to native MOSCAD data format for transmission to the MOSCAD alarm Server.
Note - this test only applies for Base Radios that use an external frequency reference

VERSION #1.1
SPS #7.5

2. TEST

Step 1. Choose the channel and site to perform test.

Step 2. Verify that there are no current alarms for the chosen GTR8000 on the MOSCAD Server.

Step 3. Disconnect the external standard frequency reference cable found in the rear of the chosen station.

Step 4. Verify that the alarm is received at the MOSCAD server and clients.

Step 5. Acknowledge the alarm on MOSCAD server or clients.

Step 6. Reconnect the cable at the station.

Step 7. Verify that the station returns to normal.

Pass____ Fail____

MOSCAD Fault Management System

GCP Site Controller - Simulcast Site Failsoft

1. DESCRIPTION

The MOSCAD system will interface to the GCP Site Controller via the network hub or switch. Select alarm messages are then converted to native MOSCAD data format for transmission to the MOSCAD alarm Server.

VERSION #1.02
SPS #7.5

2. TEST

Step 1. Choose the site to perform test.

Step 2. Verify that there are no current alarms for the chosen GCP Site Controller on the MOSCAD server and client(s).

Step 3. From the Zone Configuration Manager, select the Simulcast site to be tested, right click the site and select Diagnostics, set the Site to "Site Failsoft"

Step 4. Verify that a site failsoft alarm is received at the MOSCAD server and clients.

Step 5. Acknowledge the alarm on either the MOSCAD server or client.

Step 6. Return the site from failsoft.

Step 7. Verify that the site controller returns to normal.

Pass_____ Fail_____

MOSCAD Fault Management System

Report Generator

1. DESCRIPTION

The Report Generator is used as a stand-alone or a networked application to log and report alarms that are generated within the Wonderware Intouch database. Alarms and Acknowledgements can be logged and stored according to the time, site, or equipment at which the alarm originated, and the detailed summary of filtered events can then be forwarded to a printer. Report Generator is capable of Auto Archiving on a monthly basis or at every 150,000 events, whichever occurs first, and it includes utilities to both compact and repair the alarm database.

VERSION #1.02
SPS #7.5

2. TEST

Step 1. Minimize the Wonderware Intouch software and select the Report Generator icon from the Windows NT desktop.

Step 2. Select the "Show Report" button shown in the application.

Step 3. Verify that the present date is displayed as well as any past alarms for which the Report Generator id configured.

Step 4. Crate several alarm conditions (typically 2 or 3) by simulating alarms on devices in the system or by shorting/opening a status input to any MOSCAD status input module in the system.

Step 5. Verify that the alarms are displayed on the Wonderware Intouch alarm summary screen.

Step 6. Verify that the alarms are displayed on the Report Generator alarm history report.

Pass____ Fail____

MOSCAD Fault Management System

UEM MOSCAD Management

1. DESCRIPTION

MOSCAD SDM3000s report alarms to the Unified
Event Manager (UEM) via SNMP traps. The purpose
of this test is to verify that all MOSCAD site objects
are being managed effectively from UEM.

SETUP

NMClient01 - UEM client session running

VERSION #1.04
SPS #7.5

2. TEST

Step 1.   Navigate through the UEM application to
view a site with the MOSCAD SDM3000.

Step 2.   Verify all MOSCAD devices for the specific
site have been discovered and indicative of
any failures that they have in the active
alarms view.

Pass____ Fail____

MOSCAD Fault Management System

TRAK GPS - GPS Fault

1. DESCRIPTION

The MOSCAD system connects to a TRAK 9100 GPS Standard via the RS-232 port 9 pin D connector. This interface requires a dedicated MOSCAD RS-232 port. The MOSCAD will periodically solicit the TRAK for its status and response messages are sent back to the MOSCAD SDM3000. New alarm messages, with respect to the last received status held in the SDM3000, are then converted to native MOSCAD data format for transmission to the MOSCAD Server. Alarm messages are also sent as SNMP traps from the SDM3000's IP Interface to the Unified Event Manager (UEM) application.

SETUP

NMclient01 - UEM session up and running.

VERSION #1.04
SPS #7.5

2. TEST

Step 1. Choose the site to perform the test.

Step 2. Verify there are no current alarms for the chosen TRAK GPS on the MOSCAD server and UEM active alarms view.

Step 3. Disconnect the antenna cable from the TRAK GPS.

Step 4. Verify that the alarm is received at the MOSCAD server and/or client.

Step 5. Acknowledge the alarm on either the MOSCAD server or client.

Step 6. Reconnect the antenna cable to the TRAK GPS standard.

Step 7. Verify that the TRAK GPS status returns to normal.

Pass____ Fail____

MOSCAD Fault Management System

TeNSr Channel Bank - T1 No Signal (NOS)

1. DESCRIPTION

The MOSCAD system will connect to each TeNSr channel bank's computer port 9 pin D connector. This port is found in the rear of the channel bank on the INF (Interface) module. TeNSr monitoring requires a dedicated MOSCAD SDM3000 RS-232 port. The MOSCAD receives alarms from the channel bank but cannot solicit status from the channel bank. New alarm messages, with respect to the last received status held in the SDM3000, are then converted to native MOSCAD data format for transmission to the MOSCAD alarm Server. Alarm messages are also sent as SNMP traps from the SDM3000's IP Interface to the Unified Event Manager (UEM) application. The channel bank can have up to 28 modular circuits monitored, though in most cases it will be a subset of this maximum.

SETUP

NMclient01 - UEM session up and running.

VERSION #1.04
SPS #7.5

2. TEST

Step 1.   Choose the site to perform test.

Step 2.   Verify that there are no current alarms for the chosen channel bank on the MOSCAD and UEM active alarms view.

Step 3.   Disconnect the T1 Link.

Step 4.   Verify that the alarm is received on the MOSCAD and changes are seen on the UEM active alarms view.

Step 5.   Acknowledge the alarm on either the MOSCAD server or client.

Step 6.   Reconnect the T1 Link.

Step 7.   Verify that the TeNSr status returns to normal.

Pass____ Fail____

MOSCAD Fault Management System

TeNSr Channel Bank - Power Supply Fail

1. DESCRIPTION

The MOSCAD system will connect to each TeNSr channel bank's computer port 9 pin D connector. This port is found in the rear of the channel bank on the INF (Interface) module. TeNSr monitoring requires a dedicated MOSCAD SDM3000 RS-232 port. The MOSCAD receives alarms from the channel bank but cannot solicit status from the channel bank. New alarm messages, with respect to the last received status held in the SDM3000, are then converted to native MOSCAD data format for transmission to the MOSCAD alarm Server. Alarm messages are also sent as SNMP traps from the SDM3000's IP Interface to the Unified Event Manager (UEM) application. The channel bank can have up to 28 modular circuits monitored, though in most cases it will be a subset of this maximum

Note that this test requires the channel bank to be configured with dual power supplies. This test may not be run on a single power supply channel bank.

SETUP

NMclient01 - UEM session up and running.

VERSION #1.04
SPS #7.5

2. TEST

Step 1. Choose the TeNSr channel bank with dual power supplies to perform test.

Step 2. Verify that there are no current alarms for the chosen channel bank on the MOSCAD and UEM active alarms view.

Step 3. Remove one of the power supplies and verify it is no longer powered.

Step 4. Verify that the alarm is received on the MOSCAD and alarms are also received in the active alarms view of UEM.

Step 5. Acknowledge the alarm on either the MOSCAD server or the MOSCAD client.

Step 6. Reinsert the power supply.

Step 7. Verify that the TeNSr status returns to normal.

Pass_____ Fail_____

MOSCAD Fault Management System

TeNSr Channel Bank - User Card Alarm (OOS)

1. DESCRIPTION

The MOSCAD system will connect to each TeNSr channel bank's computer port 9 pin D connector. This port is found in the rear of the channel bank on the INF (Interface) module. TeNSr monitoring requires a dedicated MOSCAD SDM3000 RS-232 port. The MOSCAD receives alarms from the channel bank but cannot solicit status from the channel bank. New alarm messages, with respect to the last received status held in the SDM3000, are then converted to native MOSCAD data format for transmission to the MOSCAD alarm Server. Alarm messages are also sent as SNMP traps from the SDM3000's IP Interface to the Unified Event Manager (UEM) application. The channel bank can have up to 28 modular circuits monitored, though in most cases it will be a subset of this maximum.

SETUP

NMclient01 - UEM session up and running.

VERSION #1.04
SPS #7.5

2. TEST

Step 1. Choose the site to perform test.

Step 2. Verify that there are no current alarms for the chosen channel bank on the MOSCAD and UEM active alarms view.

Step 3. Pull a user card other than the INTF card from the rear of the TeNSr.

Step 4. Verify that the alarm is received on the MOSCAD and alarms are also received in the active alarms view of the UEM.

Step 5. Acknowledge the alarm on either the MOSCAD server or client.

Step 6. Reinsert the card.

Step 7. Verify that the TeNSr status returns to normal.

Pass____ Fail____

MOSCAD Fault Management System

TRAK GPS - Power Supply Fault

1. DESCRIPTION

The MOSCAD system connects to a TRAK 9100 GPS Standard via the RS-232 port 9 pin D connector. This interface requires a dedicated MOSCAD SDM3000 RS-232 port. The MOSCAD will periodically solicit the TRAK for its status and response messages are sent back to the MOSCAD SDM3000. New alarm messages, with respect to the last received status held in the SDM3000, are then converted to native MOSCAD data format for transmission to the MOSCAD alarm Server. Alarm messages are also sent as SNMP traps from the SDM3000's IP Interface to the Unified Event Manager (UEM) application.

SETUP

NMclient01 - UEM session up and running.

VERSION #1.04
SPS #7.5

2. TEST

Step 1. Choose the site to perform the test.

Step 2. Verify there are no current alarms for the chosen TRAK GPS on the InTouch and UEM active alarms view.

Step 3. Disconnect one of the power supply cables from the rear of the TRAK GPS

Step 4. Verify that the alarm is received on the alarm managers.

Step 5. Acknowledge the alarm on the MOSCAD server or client.

Step 6. Reconnect the power supply cable to the rear of the TRAK GPS.

Step 7. Verify that the TRAK GPS power status returns to normal.

Pass____ Fail____

4.11   Signoff Certificate

By their signatures below, the following witnesses certify they have observed the In-Field System Acceptance Test Procedures.

Signatures

WITNESS: _____Date: _____

Please Print Name: _____

_____

Initials

WITNESS: _____Date: _____

Please Print Name: _____

_____

Initials

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Section 5.   Cutover Plan

5.1   General

Within the telecommunications industry, cutover is a logical, well-documented process designed to activate new communications systems while minimizing disruption to user groups. Motorola's cutover strategy as it relates to implementing the system will vary from project to project based on numerous factors including type of system being installed or upgraded. A cutover plan will require a closely coordinated planning effort incorporating inputs of City of Philadelphia staff, and all affected City of Philadelphia user groups.

The Motorola team has extensive experience planning for and implementing transitions from existing to new public safety communications systems. The most critical requirement in any communication system cutover plan is the ability to maintain integrity throughout the cutover process, thus minimizing interruption to service during the transition period. The steps taken prior to system cutover will facilitate the actual cutover period.

Motorola understands that a portion of the existing system in service supporting the various City of Philadelphia user groups need to remain operational during the cutover period. The final cutover details will be developed jointly between Motorola and the City of Philadelphia, to ensure that an effective and efficient transition occurs from the old radio system to the new system. The cutover plan will also detail how communications will occur for each department during the transition process. A cutover plan timetable listing the chronological orders and time frames will also be developed.

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The intent of this document is to address the cutover for the major system elements that construct the overall system design. This preliminary document addresses the new ASTRO 25 IP Radio System, assumes new GTR8000BR stations using IP Simulcast, the use of SmartX technology and subscriber, and consoles upgrades.

5.2 ASTRO 25 System Upgrade

Prior to on-site implementation of the new ASTRO 25 system infrastructure, Motorola will stage the new site equipment at our Customer Center for System Integration (CCSI) factory floor. The primary function of CCSI staging is to assemble all new equipment in racks according to the actual site layouts, software loads, and internal system verification testing prior to field shipment for an ease of implementation and installation.

Motorola will stage the following system components:

- ♦ Master Site Infrastructure
- ♦ Network Management Equipment
- ♦ Motorola Gold Elite Gateways
- ♦ SmartX Servers
- ♦ Prime Site Infrastructures
- ♦ IP Simulcast Network Equipment
- ♦ GTR8000BR IP Simulcast Base Stations

5.3 SmartX versus Console Patching

The SmartX capability provides an advanced network interconnectivity solution based on the ASTRO 25 IP core network. The existing 3600 SmartZone 3.0 simulcast cells shall be tied directly into the ASTRO 25 IP core network through the deployment of 3600 site IP gateways located at the zone master site. Additionally, the Gold Elite console subsystem will be upgraded and connected into the ASTRO 25 network via a Motorola Gold Elite (IP) Gateway (MGEG).

After these upgrades are complete, the ASTRO 25 IP Radio System Master Site equipment performs the call processing and network management functions for the combined 3600/9600 system. Thus, the overall network is simplified by eliminating the SmartZone 3.0 Master Site Zone Controllers and Network Management hardware and software.

From an operational perspective, the City of Philadelphia users will not notice any difference in the operation or coverage of their radios or performance of their Gold

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Elite dispatch consoles. All operational aspects of the system remain unchanged, removing any need for additional user or dispatcher training.

The diagram below, Figure 5-1, shows the System-A and System-B simulcast cells linked to the ASTRO 25 Master Site via the SmartX converter. The SmartX converters will be located at the Master Site providing emulation between 3600 SmartZone and 9600 ASTRO25 based site control protocols. The diagram shows that system during the cutover period, where there is a partial build out of the Project 25 RF cells, with some of the channels still operating with the 3600 control channel.

Figure 5-1: System A and System B Simulcast Cells

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MIGRATION USING SMARTX	MIGRATION WITHOUT THE USE OF SMARTX
Install new Project 25 Master Site and keep 3600 RF sites and 3600 radios operational during migration Decommission SmartZone 3.0 Master Site Migrate dispatch to P25 Master Site by installing the MGEG Migrate users by user groups	Install new Project 25 Master Site Migration driven by dispatch, migrate CEB by CEB Migrate users associated with dispatchers Migrate appropriate number of channels to P25 to support users Patch together talkgroups between the 3600 and 9600 baud system Upgrade mobiles and portables together with dispatchers and RF channels
Existing 3600 users can be supported during migration period and gradually transitioned to P25	Existing 3600 users will be supported during migration via the use of dual system and patching
Single Network Management Subsystem	Dual Network Management Subsystems
– Centralized management for 3600 and 9600 radios / sites	– Dual management for 3600 and 9600 radios / sites
– Advanced ASTRO 25 network management applications	– Advanced ASTRO 25 network management only for the Departments migrated to P25
One System / One Master Site to Manage & Service	Two Systems Two Master Sites to Manage & Service *during the migration*
– Single ASTRO 25 Master Site requires less space, maintenance	– Two Master Sites require more space & maintenance for duration of the complete cutover
New ASTRO 25 features, in parallel with existing 3600 operation during cutover:	New ASTRO 25 features available only for users on P25 system, in parallel with existing 3600 operation during cutover, ONLY for the Departments cutover: Operability among 3600 radios, 9600 radios and dispatch consoles, will be accomplished via patching
Maintain System Features throughout the cutover:	Maintain System Features only for the Departments cutover:
– Talkgroup / Announcement Group Calls	– Talkgroup / Announcement Group Calls
Integrated call management w/A25 Zone Controller – not a "patch", throughout the cutover period	Call management with P25 Zone Controller using "patch", during the cutover, among Departments not cutover
– Emergency Call, Emergency Alarm	– No Emergency Call, Emergency Alarm signaling across the 3600/9600 systems - Emergency Call, Emergency Alarm to for each system to dispatchers on that system
– PTT-ID to Dispatchers and equipped Radio Users	– No PTT-ID to Dispatchers and equipped Radio Users across the 3600/9600 systems
– Private Call II Enhanced	– No Private Call II Enhanced across the 3600/9600 systems
– Call Alert	– No Call Alert across the 3600/9600 systems
– AllStart / FastStart Talkgroup Call Set-up	– No AllStart / FastStart Talkgroup Call Set-up across the 3600/9600 systems
– Busy Callback	No Busy Callback across the 3600/9600 systems In the event of a busy on one side of the system, the busy tone will be pushed out as a talkgroup call on the other system
– Console Trunked Talkgroup Patch	– Console Trunked Talkgroup Patch
– Multi-Select	– Multi-Select
– Console Priority	– Console Priority

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MIGRATION USING SMARTX	MIGRATION WITHOUT THE USE OF SMARTX
– Alert Tones	– No Alert Tones across the 3600/9600 systems
– Dynamic Regrouping	– No Dynamic Regrouping across the 3600/9600 systems
Graceful migration from circuit-switched to packet switched P25 network	Migration must be well planned and managed for the duration of the cutover
– Common Fleetmap	– Common Fleetmap
– Common Network Management	– Separate Network Management
Continue use of analog infrastructure in one integrated network	Dual use infrastructure in place for the duration of the cutover
Consoles talk on both systems	Consoles talk on single system wireline and to the other via control stations

5.3.1 3600 Baud Throttling: Migration Using SmartX versus Console Patching

In certain system loading conditions, the City of Philadelphia currently experiences simulcast prime controller "throttling" due to the capacity constraints of the 3600 baud control channel on the existing SmartZone 3.0 system. This issue causes busies on the SmartZone3.0 system. Regardless of the migration, SmartX or via Console Patching, the 3600 baud SmartZone system's performance will continue to be determined by the loading and traffic. A cutover goal should be to minimize the number of user groups that are split between the two systems. SmartX will significantly enhance the ability to cut over users by user group or by multiple user groups. This is possible because with SmartX, the cutover does not need to be driven on a CEB by CEB basis.

With either approach, when talkgroups have users on both systems, traffic will appear on both systems. With either approach, if the 3600 baud legacy control channel's capacity is exceeded, system controller "throttling" may still occur.

5.4 Subscriber Upgrade

Prior to the system upgrade, Motorola will make an effort to upgrade all existing XTS 5000, XTS 3000 and XTS 2500 Portables and ASTRO Spectra Mobiles. Motorola would like to set up different depot locations and times as agreed upon by Motorola and the City of Philadelphia to make it logistically easy for all users to bring in radios to be upgraded with the latest hardware and software. This upgrade will allow the subscribers the necessary hardware and software to support the ASTRO 25 system platform and the existing SMARTZONE 3.0z system platform. Having both systems programmed into the radio will allow the user to operate on the existing system and when their department is ready for cutover to the new system it can be as easy as switching to a new location within their radio. Depending upon the number of

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Talkgroups (fleet structure) programmed in the radio, Motorola will program those same talkgroups in a different position in the radio. Outline below are the steps for the subscriber cutover:

1. The City of Philadelphia will decide on a department to transition first to the new ASTRO 25 infrastructure. Motorola recommends that the City of Philadelphia consider a department that is the least risky (i.e. Public Works) than your public safety departments. In fact Motorola recommends that those departments be migrated to the new system last.

2. The City of Philadelphia subscriber user will bring in their radio at the appropriate time and location.

3. The radio will be upgraded with the appropriate hardware, software and tested.

4. Once the department transition to the new system is complete, Motorola will begin the XTS3000 and ASTRO SPECTRA software and hardware upgrade.

5. Motorola will perform the above steps 1-3 for Simulcast System A until all stations have been moved to the new ASTRO 25 system.

6. Motorola will perform the above steps 1-3 for Simulcast System B until all station have been moved to the new ASTRO 25 system.

7. ALL subscribers must be made available for programming within a four-week window. Otherwise, a different (higher) pricing model will need to be applied.

Should this not be the optimal approach for transitioning the users over to the new system, Motorola would explore other approaches during the Contract Design Review (CDR).

5.5   Conceptual Cutover Plan

The following conceptual cutover plan was originally agreed to at the May 22, 2008 Radio System Technical Committee meeting. It is presented here in its original form for clarity. Please note that the plan is not necessarily shown in complete chronological order. Motorola will be pleased to work with the City during the Detailed Design Phase of the project to develop final and fully detailed Upgrade/Cutover Upgrade Implementation Plan (UIP) / Implementation Time Line (ITL)

♦ Install new T1 circuits
- Master to Primes
- Primes to Remotes
♦ Install ASTRO25 Master Site at City Hall RM626m
- Install SmartX servers (not yet connected to SZ3.0)

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- Upgrade Embassy network to ASTRO25 compatible code (while still connected to SZ3.0)
  - AEB cards
  - CEB cards
  - Elite Ops
    - new PCs recommended for given project implementation timeframe
    - new PCs not included in this proposal at the direction of the City
- Conduct first 30 day Reliability Test
- Install ASTRO25 IP Network Equipment at Primes & Remotes
  - A&B Site Routers (connected to new T1s)
  - A&B Site Switches
  - Prime Simulcast Controllers
  - Prime Site Comparators
- Transition sz3.0 to SmartX & New ASTRO25 Mastersite
  - 3600 A&B Simulcast Systems
  - Embassy / Elite console system
- Perform 2nd 30 day Reliability Test?
- Start upgrading fleet to 9600 code at this point but still using SZ3.0?
  - Perhaps a rotational group of radios is better?
- Decommission 6 Channels from SZ3.0 System   (3 from Sys A, 3 from Sys B)
  - Provides 1 CC & 2 VC per system
    - Should NOT be an active CC on 3.0 system
  - Re-commission on ASTRO25 system for ATP purposes
    - Upgrade these 6 stations at all sites
      - QTAR upgrades or GTR replaces
    - perform FATP & CATP
- Proceed to Sys-A User migrations
- Begin Migration of System-A Users
  - Determine traffic load for 1st user group to migrate
  - Decommission appropriate number of traffic channels from existing 3.0
  - Re-commission same channels on ASTRO25 system
    - Upgrade these stations at all sites
      - QTAR upgrades or GTR replaces
  - Basic testing to ensure channels ready to take traffic

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- Migrate chosen user group over to new system
- Repeat process until all Sys-A channels & users are migrated
♦ Migration of System-B Users using same process
♦ Complete 3rd & 4th 30 day Reliability Tests
♦ Retouch fleet to remove any migration templates as necessary

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Section 6.   Training Plan

6.1   Overview

Motorola's Learning Services organization dedicates itself exclusively to offering the most comprehensive training available for Motorola's advanced equipment to fully realize the equipment's potential. From sophisticated training needs analysis to ongoing training throughout the lifecycle of your product or system, we can help ensure that your investment in training today is an investment for your future.

Our training methodology includes knowledgeable instructors, well-designed courseware, lab activities, and system hardware and software that closely parallel your operating environment and that is integrated with proper system documentation. This methodology is based upon several key criteria:

♦ Course design is driven by an analysis of learner needs and focuses on how-to rather than theory.

♦ Learning objectives are based upon what learners need to accomplish on the job and focus on specific applications.

♦ Hands-on lab opportunities using customer-specific job aids are incorporated into training to maximize the transfer of skills to the job and the retention/reuse of information.

Motorola offers both train-the-trainer and end-user training, and the training plan we have designed for the City of Philadelphia utilizes both methodologies. As an example, every police officer or other individual who will utilize a portable or mobile radio will be trained at the Police Academy or other designated location. This will involve approximately 7,000 individuals, and is a prime example of Motorola's dedication to getting the proper training delivered to everyone that needs to be trained. In conjunction with or in addition to instructor-led training, we can provide

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self-study/e-learning programs in which students follow a computer-based training module on CD-ROM or other media.

Motorola utilizes the Interactive End User Tool Kit (iEUTK) to supplement instructor led for field end user training. The IEUTK is a revolutionary knowledge transfer tool designed to accelerate learning. It provides an excellent graphic, audio and visual learning experience. City personnel will learn to operate mobiles, portables, or console positions faster and with increased retention over paper based alternatives. WLS trainers use the iEUTK to tailor operator training materials to match unique button and feature programming. Each iEUTK is user friendly and menu driven. This allows City trainers to update training materials on an as-needed basis to depict new features, functionality, Standard Operating Guidelines and post on intranet sites for review by City personnel. The iEUTK could also be utilized if the City moves forward with the plans for the "Channel 1" cable TV initiative.

6.1.1   Courses Proposed

In the process of assessing your training needs, Motorola has identified the following course(s) that are necessary to achieve your training goals. Course description files for your review or printing are in section 6.1.2.

System Management						
Course	**Target Audience**	**No. of Sessions**	**Duration (days)**	**Location**	**Date**	**No. of Attendees**
ASTRO 25 7.x System Networking (Instructor Led)	System Managers and IT Technicians	1	5	Philadelphia, PA	Post Installation	12
Course Synopsis: This course provides the technician with the necessary networking information required for understanding the Network Transport subsystem components installed in an ASTRO 25 Release 6.x/7.x communications system. The course includes familiarization with basic networking concepts and the networking components deployed throughout the system. See page 6-10 for course description.						
ASTRO 25 7.x System Overview Part 1 of 3 (Per Request Instructor Led)	System Managers and Technicians	1	1	Philadelphia, PA	Prior to Part 2	12
Course Synopsis: The ASTRO 25 Integrated Voice and Data System Overview course is intended to provide an overview of the ASTRO 25 System in order to familiarize the various audiences with the overall system capabilities, components, features, and benefits. See page 6-12 for course description.						

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System Management						
ASTRO 25 7.x Introduction to System Management Applications Part 2 of 3 (Per Request Instructor Led)	System Managers and Technicians	1	2	Philadelphia, PA	Prior to Part 3	12
Course Synopsis: This course provides an introduction to the Motorola Radio System Management Applications. This course is a Prerequisite to Radio System Management. See page 6-14 for course description.						
ASTRO 25 7.x Radio System Management Part 3 of 3 (Instructor-led)	System Managers	1	5	Philadelphia, PA	Prior to Managing	12
Course Synopsis: This workshop covers management functions for an ASTRO 25 Integrated Voice and Data (IV&D) System. Learning activities in this document-based training course focus on how to use the different ASTRO 25 IV&D System Management applications. Participants will be provided with an opportunity to discuss how to structure their organization and personnel for optimal ASTRO 25 IV&D system use. See page 6-16 for course description.						
ASTRO 25 Secure Communications (OTAR) Workshop (Instructor Led)	System Managers and All Technicians	1	5	Philadelphia, PA	Post Installation	6
Course Synopsis: This workshop describes planning, installation, configuration, operations, and troubleshooting of Secure Communications within the ASTRO 25 Integrated Voice and Data (IV&D) System. See page 6-18 for course description.						
ASTRO 25 Mutual Aid (Self-Paced Online)	System Managers and Technicians	N/A	4 hours	Online Philadelphia, PA	Post Installation	12
Course Synopsis: This workshop describes the functionality of – and the hardware and software associated with – using Mutual Aid in the ASTRO 25 Integrated Voice & Data (IV&D) System. See page 6-20 for course description.						
MOSCAD Operator	System Managers and Operators	1	1 (6 to 8 hours)	Philadelphia, PA	Post Installation	6

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System Management
Course Synopsis: This course provides System Designers, Technicians and System Managers focused skill and development and the practical experience to operate and navigate the Graphic Master Computer (GMC) used in MOSCAD systems. This class will be provided using the customers installed system and fully functional GMC computer(s). An operator manual is provided and will be supplied to each participant. See page 6-22 for course description.

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Technician Training						
Course	**Target Audience**	**No. of Sessions**	**Duration (days)**	**Location**	**Date**	**No. of Attendees**
CPS Radio Programming (Per Request Instructor Led)	Radio Programmers / System Managers	1	1	Philadelphia, PA	Prior to Program-ming	6
Course Synopsis: This course may be modified and tailored to the customer's features. It will introduce the student to CPS installation, assembling hardware, CPS menu structure, Software configuration, and normal features used in Analog Conventional and Trunked systems. Tutorials will guide the student through the CPS menus and screens. Adequate time will be available for hands-on practice using a variety of scenarios. It will also demonstrate how to create templates used to program subscribers in a system. See page 6-24 for course description.						
MOSCAD Maintenance (Instructor Led)	Technical System Managers	1	3	Philadelphia, PA	Prior to Cutover	6
Course Synopsis: MOSCAD systems are used to monitor and control Motorola and third party products. The end goal is to alert and identify problems before they happen or as soon as they happen. There are multiple hardware and software pieces that makeup the MOSCAD sub-system solution. The training will include on site visits to a prime site and a local RF site if location permits. This will allow the students to observe operation and testing of their own system. Note – There will be no downloads of programs during this time, no disruption of the customer system will occur. See page 6-26 for course description.						
Optional MOSCAD Programming (Maintenance is a Prerequisite) (Instructor Led)	Technicians	1	2	Philadelphia, PA	Prior to Cutover	6

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Technician Training
Course Synopsis:
This course is designed to teach the ability to edit Environmental Digital inputs using Site Builder, use of IMASB for creating tags in Graphic Master Central (GMC), editing Environmental Digital Outputs and Analog Inputs in .CSV files, adding and deleting devices to sites (Quantar, TeNSr, CEBs, etc.), creating new sites in Site Builder and implementing in GMC database and obtain the necessary skills for creating Custom Map Displays in GMC. See page 6-29 for course description.

It is recommended that the students bring their laptop computers for all System Manager and Technician classes.

For ASTRO 25 IV&D classes, one set of hard copy manuals will be provided for the class. Students will receive their manuals in CD-ROM format. Students will also receive hard copy participant guides.

To order self-study CD ROM based materials visit us online at http://www.motorola-wls.com/Dynamic/region.asp

CENTRACOM Console End User Training						
Course	Target Audience	No. of Sessions	Duration (days)	Location	Date	No. of Attendees
CENTRACOM Gold Elite Console ADMIN, Alias Database Manager (ADM) and Operator 4 training consoles (2x1 Ratio)	Police Dispatchers	25 (4-hour sessions)	13	Philadelphia, PA	Prior to Cutover	200 (8 per session)
CENTRACOM Gold Elite Console ADMIN, Alias Database Manager (ADM) and Operator Train-the-Trainers 5 training consoles (2x1 Ratio)	Fire Dispatch Trainers	2 (8-hour sessions)	2	Philadelphia, PA	Prior to Cutover	20 (10 per session)

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CENTRACOM Console End User Training						
CENTRACOM Gold Elite Console ADMIN, Alias Database Manager (ADM) and Operator Train-the-Trainers 5 training consoles (2x1 Ratio)	EOC Dispatch Trainers	1 (8-hour session)	1	Philadelphia, PA	Prior to Cutover	10 (10 per session)
CENTRACOM Gold Elite Console ADMIN, Alias Database Manager (ADM) and Operator Train-the-Trainers 5 training consoles (2x1 Ratio)	Other Dispatch Trainers	1 (8-hour session)	1	Philadelphia, PA	Prior to Cutover	10 (10 per session)

Course Synopsis:
This course will provide Dispatch Supervisors with an introduction to the special operation of the supervisory console. In addition, the operation of the Alias Database Manager (ADM) Applications Program will be discussed and demonstrated with facilitation and hands-on activities. It will also include the Operator training listed below. See pages 6-30 and 6-32 for course descriptions.

Course Synopsis:
This course provides Dispatch Console Operators with an introduction to the dispatch console, its basic operation and to the tailored job aids available for assistance in operation. The learning experience is a mix of video, instructor led facilitation and hands – on activities to help console operators perform common tasks associated with their console's operation. Practical exercises will be used to reinforce the skills needed to train Operators across the State. Students will also receive training on proper use and customization of the iEUTK (Interactive End User Toolkit). See page 6-33 for course description.

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MCC7500 Console End User Training						
Course	**Target Audience**	**No. of Sessions**	**Duration (days)**	**Location**	**Date**	**No. of Attendees**
MCC7500 Console Supervisors and Operator (Instructor-led) 4 training consoles (2x1 Ratio)	Prison Dispatchers	7 (4-hour sessions)	4	Philadelphia, PA	Prior to Cutover	50 (8 per session)
Course Synopsis: This course provides participants with the knowledge and skills to manage and utilize the MCC 7500 console administrator functions. Through facilitation and hands-on activities, the participant learns how to customize the console screens. This session also includes the Operator course below. See page 6-36 for course description.						
Course Synopsis: This course provides participants with an introduction to the dispatch console, its basic operation and tailored job aids which will be available for assistance in operation. Through facilitation and hands-on activities, the user learns how to perform common tasks associated with the console operation. See page 6-37 for course description.						

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Mobile and Portable Training						
Course	**Target Audience**	**No. of Sessions**	**Duration (days)**	**Location**	**Date**	**No. of Attendees**
ASTRO 25 Mobile and Portable Operator Training End Users (2 Trainers for 30 days each to cover 2 shifts)	Police Users	480 (2-hour sessions)	60	Philadelphia, PA	Prior to Cutover	7,000 (15 per session)
ASTRO 25 Mobile and Portable Operator Training End Users	Prison Users	50 (2-hour sessions)	13	Philadelphia, PA	Prior to Cutover	700 (15 per session)
ASTRO 25 Mobile and Portable Operator Training Train-the-Trainers	Fire Trainers	3 (1-day sessions)	3	Philadelphia, PA	Prior to Cutover	30 (10 per session)

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Mobile and Portable Training						
ASTRO 25 Mobile and Portable Operator Training Train-the-Trainers	Other Trainers	3 (1 day sessions)	3	Philadelphia, PA	Prior to Cut-over	30 (10 per session)
Course Description: These courses are designed to teach the customer how to operate the ASTRO 25 radios with the features programmed. In addition, the customer will be taught how to use Motorola Interactive End User Toolkits (iEUTK) to customize their end user training presentations for individual agencies. Segmentation between user groups (i.e. Police, Fire/EMS, Public Service) is encouraged to help focus instruction on the specific operational issues of the individual user group. (Note: Similar course descriptions will be used for additional models.) See pages 6-37, 6-39, and 6-40 for course descriptions.						

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Refresher Training						
Course	Target Audience	No. of Sessions	Duration (days)	Location	Date	No. of Attendees
Refresher ASTRO 25 Mobile and Portable Operator Training Train-the-Trainers	Radio Trainers	1 (1-day session)	1	Philadelphia, PA	Prior to Cutover	10 (10 per session)

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6.1.1.1　iEUTK

The Interactive End User Tool Kit (iEUTK) is a revolutionary knowledge transfer tool designed to accelerate learning. Using the iEUTK allows trainers to customize operator training to match unique button, feature programming, and displays provided in the system. Each iEUTK is user friendly and menu driven. The home page in every iEUTK provides excellent navigation to the multiple areas of interest for the specific communication device. Operators select "Getting Started" to view a highly informative video overview that helps build solid foundational knowledge and quickly brings users up to speed on the operational theory of their specific device. The tailored materials are developed on-site using tool kits that allow users to modify training materials when radio or console features change. Personnel are taught how to maneuver through and tailor the iEUTK screens. The tailored selections are saved to an electronic file that the Motorola training team sends to the printer to develop the training materials. The trainers use the iEUTK to generate their instructor guides, incorporating standard operating procedures, notes, and reminders. This dynamic tool allows the customer to generate training materials on an as-needed basis depicting current features and functionality.

Figure 6-1: We use our iEUTK to produce PowerPoint™ presentations so that students can have self-paced training on any PC with Microsoft Office™.

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6.1.2   Course Descriptions

6.1.2.1   ASTRO 25 Release 6.x/7.x System Networking

Course Length

4.5 Days Resident

4.5 Days Field (requires access to customer 6.x/7.x system)

Target Audience

Technical system managers, technicians, engineers

Course Description

This course provides the technician with the necessary networking information required for understanding the Network Transport subsystem components installed in an ASTRO 25 Release 6.x/7.x communications system. The course includes familiarization with basic networking concepts and the networking components deployed throughout the system.

Required Pre-Work

♦   None

Recommended Prerequisites

♦   None

Course Objectives

Upon Completion, the Participant will be able to:

♦   Understand basic networking concepts
♦   Describe the various Transport network subsystem components
♦   Define the LAN topologies for each system
♦   Define the WAN topologies for each system
♦   Identify the expanse of Network Management across each system
♦   Explain SNMP deployment throughout the systems
♦   Discuss HP Switch, and Motorola Series Router configurations
♦   Describe backup procedures for the HP Switch, Motorola Series Routers, and the Nortel Passport Switch in the ASTRO 25 system
♦   Perform Backups and Restoration of HP Switches and Motorola Routers

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Course Outline

1. Review Basic Networking Concepts
   a. Terminology and Acronyms
   b. LANS and WANS
   c. Protocols
2. ASTRO 25 Network Transport Subsystem
   a. Call Processing
      i. Block diagram description of how a call travels through the system
      ii. Identification and isolation of the network components
   b. Network Components
      i. HP Switches—description and location in the network
      ii. Nortel Passport—description and location in the network
      iii. Motorola Series Routers—description and location in the network
         Command Line Interface Configuration
         Menu-Driven Configuration
         Web-Based Configuration
      iv. Network Management Console—location and application identification
      v. Router manage -- location and application identification
   c. Network Concepts
      i. Identify the LAN portion(s) of the network
      ii. Identify the LAN Protocol and trace where it's present in the network
      iii. Identify the WAN portion(s) of the network
      iv. Identify the WAN Protocols and trace where they're present in the network
      v. Identify the expanse of the Network Management Console
      vi. Explain SNMP deployment throughout this network
   d. Hands-On Practice
      i. Back up and Restore HP Switch Configurations
      ii. Back up and Restore Motorola Series Router Configurations

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6.1.2.2 ASTRO 25 Integrated Voice and Data System Releases 6/7/7.0 - System Overview

Duration

12 hours

Target Audience

System Managers, Technical System Managers, System Technicians, and other Application Users

Course Description

The ASTRO 25 Integrated Voice and Data System Overview course is intended to provide an overview of the ASTRO 25 System in order to familiarize the various audiences with the overall system capabilities, components, features, and benefits.

Prerequisites

Completion of the following courses or equivalent experience:

♦ ACT100 – Bridging the Knowledge Gap

♦ NST762 – Networking Essentials in Communication Equipment

♦ NWT003 – Advanced Networking in Motorola Communications Equipment

Course Objectives

After completing this course, the student will be able to do the following:

♦ Explain the purpose of the ASTRO 25 IV&D System.

♦ List and describe the ASTRO 25 system features and capabilities.

♦ Describe the ASTRO 25 system subsystems and their respective functions.

♦ List the system and software tools.

♦ Identify ASTRO 25 system compatible end-user devices.

Benefits to You

♦ Provides base knowledge about the ASTRO 25 Integrated Voice and Data System that is necessary to continue with the specific System Management and Technician required courses.

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Course Outline

1. Multiple Zone Trunking Systems
   a. Definitions
   b. Site Statuses
   c. Information Types
   d. A25 Repeater Site
   e. GTR8000 Site
   f. Simulcast Site
   g. Master Site
2. Voice Processing
   a. Turning on the radio
   b. Making a call
   c. Information paths
3. Data Processing
   a. 9600 BPS
   b. High Performance Data
4. Mobility Management
   a. Affiliation Registration Details
   b. Roaming
   c. Out of Range
   d. Scan in Multiple Zone Trunking Systems
5. Servers and Databases
   a. Servers
   b. Databases
   c. Backups

Next Steps

System Managers:

♦ ASTRO Integrated Voice and Data System Release 6.7/7.0 - Introduction to System Manager Applications (ACS651-V)

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Technicians – One of the following:

♦ ASTRO 25 Integrated Voice and Data System Release 6.7 - Master Site Workshop (ACS653)

♦ ASTRO 25 Integrated Voice and Data System Release 7.0 – Master Site Workshop (ACS673)

♦ ASTRO 25 Integrated Voice and Data System- Release 6.7/7.0 - Digital Simulcast Workshop (ACS654)

♦ ASTRO 25 Integrated Voice and Data System Release 6.7/7.0 - ASTRO 25 Repeater Site Workshop (ACS655)

6.1.2.3 ASTRO 25 Integrated Voice and Data System Release 6.7/7.0 - Introduction to Radio System Management Applications

Duration

(5) 2-hour Sessions

Target Audience

System Managers, Technical System Managers, System Technicians, and other Application Users

Course Description

This course provides an introduction to the Motorola Radio System Management Applications.

Prerequisites

Completion of the following courses or equivalent experience:
♦ ACT100 – Bridging the Knowledge Gap
♦ NST762 – Networking Essentials in Communication Equipment
♦ NWT003 – Advanced Networking in Motorola Communications Equipment

Completion of ACS650-E: ASTRO Integrated Voice and Data System Overview and passing score on post-test.

Benefits to You

♦ Ability to see and ask questions about the common operations allowed by the radio network management applications.

♦ Acquire base knowledge of the overall system management functions, their purposes, and an introduction to basic navigation and use of the applications.

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Course Objectives

After completing this course, the student will be familiar with the following ASTRO 25 IV&D system management applications:

♦ User Configuration Manager (UCM)

♦ Zone Watch

♦ ATIA Log Viewer

♦ Affiliation Display

♦ Radio Control Manager (RCM)

♦ Historical Reports

♦ Dynamic Reports

♦ RCM Reports

♦ System Profile

♦ Zone Profile

♦ Zone Configuration Manager (ZCM)

♦ Customer Service Software (CSS)

♦ Router Manager

Course Outline

1. Introduction
2. User Configuration Manager (UCM)
3. Zone Watch – Default Profile
4. ATIA Log Viewer
5. Affiliation Display
6. RCM Basics
7. Reports
8. System Profile
9. Zone Profile
10. Zone Configuration Manager
11. Customer Service Software (CSS)
12. Introduction to Router Manager
13. Introduction to FullVision

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Next Steps

♦ ASTRO 25 Integrated Voice and Data System Release 6.7 - Radio System Management Workshop Course - No. ACS652

OR

♦ ASTRO 25 Integrated Voice and Data System Release 7.0 - Radio System Management Workshop Course - No. ACS672

6.1.2.4 ASTRO 25 Integrated Voice and Data System Release 7.0 - Radio System Management Workshop

Duration

5 days

Target Audience

System Managers, Technical System Managers, System Technicians, and other Application Users

Course Description

This workshop covers management functions for an ASTRO 25 Integrated Voice and Data (IV&D) System. Learning activities in this document-based training course focus on how to use the different ASTRO 25 IV&D System Management applications. Participants will be provided with an opportunity to discuss how to structure their organization and personnel for optimal ASTRO 25 IV&D system use.

Prerequisites

Completion of the following courses or equivalent experience:

♦ ACT100 – Bridging the Knowledge Gap
♦ NST762 – Networking Essentials in Communication Equipment
♦ NWT003 – Advanced Networking in Motorola Communications Equipment

Completion of ACS650-E: ASTRO Integrated Voice and Data System Overview and passing score on post-test.

Completion of ACS651-V: ASTRO Integrated Voice and Data System Introduction to System Manager Applications.

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Course Objectives

♦ List the network management tools applicable at each phase of the system life cycle.

♦ Identify the advantages and disadvantages of options available for the configuration of system infrastructure and user parameters.

♦ Use the report and real-time data to monitor performance and make adjustments necessary to maintain acceptable system performance levels.

♦ Describe the relationship between radio programming, console administration and system management, and the impact of this relationship on system planning.

Benefits to You

♦ Provides the knowledge necessary to self manage and control the resources of your ASTRO IV&D System.

♦ Maintain optimal system efficiency by utilizing and interpreting the PRNM application suite.

♦ Plan all aspects of your system's capacity, usage, maintenance, security, and implementation.

Course Outline

1. Planning
   a. Factors that Impact Communications System Planning
   b. Fleetmapping
2. Configuration
   a. Configuration Process and Tools
   b. User Configuration Manager (UCM)
   c. Zone Configuration Manager (ZCM)
   d. Configuration Service Software (CSS)
3. Opeation and Optimization
   a. Live Monitoring of the System
   b. Report Generation
   c. License Sharing
   d. Performance Management

Next Steps

None required. Student may register for any of the optional courses in the ASTRO 7.0 curriculum.

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6.1.2.5 ASTRO 25 Integrated Voice and Data System Release 6.8/7.1 Secure Communications Workshop

Duration

5 days

Target Audience

System Managers, Technical System Managers, System Technicians, and other Application Users

Course Description

This workshop describes planning, installation, configuration, operations, and troubleshooting of Secure Communications within the ASTRO 25 Integrated Voice and Data (IV&D) System.

Prerequisites

Completion of the following courses or equivalent experience:

♦ ACT100 – Bridging the Knowledge Gap

♦ NST762 – Networking Essentials in Communication Equipment

Completion of ACS71200-E: ASTRO Integrated Voice and Data System Overview, and a passing score on the post-test

Course Objectives

♦ Describe the implementation of Secure Communications in the ASTRO 25 IV&D system.

♦ List the purpose and function of the encryption keys.

♦ Describe how supported calls are transmitted in a secure mode.

♦ List the security precautions that must be considered for all Secure Communications devices.

♦ Describe the role of the Key Management Facility (KMF) Client.

♦ Describe the use of management windows in configuring the KMF.

♦ Describe how to perform administration procedures within the KMF submenus.

♦ Describe the role of the Key Variable Loader (KVL).

♦ Discuss the different diagnostic and troubleshooting tools and how to use them.

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Benefits to You

♦ Be able to implement secure communications in an ASTRO 25 IV&D system.

♦ Increase efficiency by using the different diagnostic and troubleshooting tools.

Course Outline

1. System Overview
   a. Secure Communications Concepts
   b. Secure Equipment
   c. Secure Communications on a Trunked System
   d. Secure Communications on a Conventional System
2. Planning and Organizing
   a. Communication Patterns
   b. Initial Configuration Management
3. Installation
   a. Installing the KMF Hardware and Software
   b. Installing the MGEG Components for a Trunked System
   c. Installing the Components for a Conventional System
4. Configuration
   a. Configuring a Trunked System
   b. Configuring a Conventional System
   c. Configuring the Key Management Facility (KMF)
   d. Configuring the Radio
   e. Configuring the Console
   f. Configuring the Key Variable Loader (KVL)
5. Over the Air Rekeying (OTAR)
   a. Managing Currency
   b. OTAR Commands
6. Administering and Monitoring
   a. Security Management
   b. Overview of Performance Management Tools
   c. Performance Management for Trunked Systems
   d. Performance Management for Conventional Systems
   e. Administering the KMF Server

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7. Fault Management and Troubleshooting
    a. Fault Management
    b. Diagnostic and Troubleshooting Tools
    c. Troubleshooting the KMF Server
    d. Troubleshooting the KMF Client
    e. Troubleshooting the KMF Database
    f. Troubleshooting Radio Unit Problems
8. MCC 7500
    a. Secure Voice with the MCC 7500 Console
    b. Secure Card Overview
    c. Installation of the Secure Card at the MCC 7500 Console and MCC 7500 AIS
    d. Configuration of the Secure Card at the MCC 7500 Console and MCC7500 AIS
    e. Operations on a Secure MCC 7500 Console and MCC 7500 AIS
    f. Troubleshooting a Secure MCC 7500 Console and MCC 7500 AIS

Next Steps

None required. Student may register for any of the optional courses in the ASTRO 6.8/7.1 curriculum.

6.1.2.6 ASTRO 25 Integrated Voice and Data System Release 6.8/7.1 Mutual Aid

Duration

4 Hours

Target Audience

System Technicians, System Managers

Course Description

This workshop describes the functionality of – and the hardware and software associated with – using Mutual Aid in the ASTRO 25 Integrated Voice & Data (IV&D) System.

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Prerequisites

Completion of the following courses or equivalent experience:

- ♦ ACT100 – Bridging the Knowledge Gap
- ♦ NST762 – Networking Essentials in Communication Equipment
- ♦ NWT003 – Advanced Networking in Motorola Communications Equipment

Completion of ACS71200-E: ASTRO Integrated Voice and Data System Overview and passing score on post-test.

Course Objectives

- ♦ Describe the Mutual Aid feature.
- ♦ Describe the configurations available for mutual aid in an ASTRO 25 IV&D system.
- ♦ List and describe the components for use with Digital Mutual Aid and Analog Mutual Aid in the ASTRO 25 IV&D system.
- ♦ Configure Digital Mutual Aid and Analog Mutual Aid in the ASTRO 25 IV&D system.
- ♦ Maintain and troubleshoot Digital Mutual Aid and Analog Mutual Aid in the ASTRO 25 IV&D system.

Benefits to You

- ♦ Helps implement Mutual Aid in ASTRO 25 IV&D System.
- ♦ Increase efficiencies in troubleshooting problems with Mutual Aid.

Course Outline

1. Mutual Aid Overview
   a. General definition
   b. Digital mutual aid
   c. Analog mutual aid
2. Digital Mutual Aid
   a. Description
   b. Components
   c. Configuration
   d. Maintenance and Troubleshooting

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3. Analog Mutual Aid
   a. Description
   b. Components
   c. Configuration
   d. Maintenance and Troubleshooting

Next Steps

None required. Student may register for any of the optional courses in the ASTRO 6.8/7.1 curriculum.

6.1.2.7 MOSCAD Operator Training

Target Audience

System Operators and Managers

Course Length

If standalone, up to 8 hours

If maintenance training was offered first, up to 4 hours

Course Description

This course provides System Designers, Technicians and System Managers focused skill and development and the practical experience to operate and navigate the GMC (Graphic Master Computer) used in MOSCAD systems. This class will be provided using the customers installed system and fully functional GMC computer(s). An operator manual is provided and will be supplied to each participant.

Note: Course given as customer specific will cover options pertinent to customer equipment.

Recommended Prerequisites

♦ A basic understanding of Windows 2000 and XP desktop navigation.

Course Objectives

♦ Develop the knowledge and experience needed to operate and navigate the GMC used in MOSCAD systems.

♦ Obtain the necessary skills to access and understand the information in order to diagnose system problems.

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Course Outline

1. System Overview
2. Introduction to the MOSCAD System
3. MOSCAD Hardware
4. System Functionality
5. Getting Started
   a. Log In / Log Off
   b. First Display
   c. System Title Window
   d. Help Windows
6. System Security
7. System Operations
   a. Screen Navigation
   b. Maps
8. Alarm Processing
   a. Alarm States
   b. Unacknowledged
   c. Acknowledged
   d. Return to normal
9. Site Interrogation
   a. Manual Interrogation
   b. Auto Interrogation
10. Alarm History
    a. Alarm Summary
    b. Alarm History
    c. Alarm History File Archiving
11. Report Printer Operation (optional)
12. Report Generator (Optional)
    a. Site Specific Reporting
    b. Equipment Specifying
    c. Alarm Status Reporting
    d. Displaying, Printing, and Exporting

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6.1.2.8 Radio Programming and Template Building

Target Audience

System Managers and Technicians.

Course Length

3 Days

Course Description

This course provides communications management personnel and technicians with the knowledge and tools needed to program the radio units in the most efficient way depending on the system, features and options they require. The parameters and exercises shown in the class apply to a wide number of portable and mobile radios, including XTS3000, MTS2000, MCS2000, the SPECTRA family and the Professional Series.

Recommended Prerequisites

Knowledge of the basic features and options of two-way radios, and the basic concepts of trunking.

Course Objectives

♦ Program the basic parameters of any radio using the Customer Programming Software (CPS)

♦ Program the specific parameters of any radio related with the system where the user is going to work: conventional, single-site trunking, Simulcast, AMSS or SmartZone

♦ Demonstrate knowledge of the options and features that can be programmed in a radio

♦ Create templates for the programming of subscribers in a system

Course Outline

1. Introduction/Course Outline
   a. Personal Introduction
   b. Course Objectives
   c. Review Student Guide
   d. Attendance

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2. Set up and Data Transfer
   a. Read/Write/Open/Save the codeplug of a radio
   b. User Settings
3. Conventional Personalities
   a. Repeater/Talkaround
   b. Coded squelch (PL, DPL)
   c. Unmute conditions
   d. Monitor types
   e. Time out timer
   f. Smart PTT
   g. Signaling
4. Conventional Scan Lists
   a. Scan
   b. Scanning features
   c. Priority levels
   d. Breaking the circle
5. Trunking Systems
   a. Basic parameters of a Trunking System
      i. System ID
      ii. Individual ID
      iii. Control channels
      iv. Connect Tone
      v. Status/Messages
   b. More parameters
      i. Affiliation type
      ii. Coverage type
   c. Channel assignment type
      i. Domestic
      ii. International
   d. Splinter channels
6. Trunking Personalities
   a. Types of calls
   b. What is a trunking personality?
   c. Parameters of a trunking personality

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  d. The programming of the radio vs. the management of the system

  e. Scan lists for trunking personalities

  f. Emergency Data configuration

  g. Failsoft parameters

  h. Types of trunking

  i. The logic of the programming in a trunking system

7. Special system environments

  a. VHF/UHF Trunking systems

  b. SmartZone systems

8. CPS Features

9. Radio Wide Options

  a. Indications and Tones

  b. Buttons, switches and menu

  c. Display options

10. Programming Practice

6.1.2.9 MOSCAD NFM Maintenance Training

Target Audience

Motorola STs, Motorola Service Center and End-User Maintenance Personnel

Course Length

3 days

Course Description

This course provides System Designers, Technicians and System Managers general knowledge, troubleshooting, programming, and development skills of MOSCAD (Network Fault Management) systems.

Required Pre-work

♦ None Required

Recommended Prerequisites

♦ A basic understanding of Windows 2000 and XP desktop navigation.

♦ Laptop Computer with XP Professional Operating System (recommended)

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Course Objectives:

♦ General knowledge of NFM system software and their use in programming and troubleshooting NFM hardware.

♦ Ability to edit Environmental Digital inputs using Site Builder and SDM Builder

♦ Use of MASB for creating tags in Graphic Master Central (GMC)

♦ Editing Environmental Digital Outputs and Analog Inputs in .CSV files

♦ Adding and deleting devices to sites (QUANTARS, TeNSr, CEBs, etc.)

♦ Creating new sites in Site Builder and implementing in GMC database

♦ Obtain the necessary skills for creating Custom Map Displays in GMC

♦ Benefits To You:

♦ Perform first echelon troubleshooting of Motorola Network Fault Management (NFM) System

♦ Knowledge of System Software Components and their use in NFM systems

♦ Ability to use the tools necessary for programming Graphic Master Central (GMC) custom map screen and environmental I/Os

♦ Program the addition of a new site or adding/deleting equipment being monitored from an existing site

Course Overview:

♦ NFM System Overview

♦ MOSCAD NFM System Hardware Overview

♦ SDM3000 System Hardware Overview

♦ Third Party Hardware and Software

♦ Motorola Software

♦ Making Changes to Environmental I/Os

♦ Create Custom Maps

♦ Add/Delete Devices from Sites

♦ Creating New Sites in Site Builder

♦ Using MASB for importing Site Builder and SDM Builder Data to GMC

♦ Backing up Project Files

Note: This course is geared towards the NFM-XC and SDM3000 based RTUs.

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Course Outline

1. NFM System Overview
   a. Serial Infrastructure
   b. Ethernet and Serial/Ethernet Hybrid Infrastructure
   c. Ethernet Radio Infrastructure
   d. Serial Infrastructure with Moscad Classic EP/RTUs
2. MOSCAD System Hardware Overview
   a. NFM RTUs
   b. NFM XC (Enhanced Communication) RTUs
   c. 'Classic' MOSCAD RTU
   d. IP Interface
   e. RS232 MUX
   f. R-MUX
3. Third Party Hardware
   a. GMC NFM Server
   b. GWS NFM Client
   c. Terminal Server (Router)
4. Motorola Software
   a. Toolbox
   b. Toolbox IP Option
   c. IP Toolbox
   d. IMASB/MASB
   e. Fault Management Site Builder
   f. Report Generator
5. Third Party Software
   a. Intouch
   b. Intouch Motorola MDLC Gateway Driver
   c. Win-911
   d. SCADA Alarm

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6.1.2.10 MOSCAD Network Fault Management Programming and Configuration Training

Target Audience

Motorola STs, Motorola Service Center, and End-User Maintenance Personnel

Course Length

2 days

Course Description

This course provides System Designers, Technicians and System Managers general programming and development skills of MOSCAD (Network Fault Management) systems. This class will be provided using Instructor Provided NFM-XC. A Training manual is provided and will be supplied to each participant.

Recommended Prerequisites

♦ MOSCAD NFM Maintenance Training (3-day Course)

♦ Laptop Computer with XP Professional Operating System (recommended)

Course Objectives

♦ Ability to edit Environmental Digital inputs using Site Builder.

♦ Use of IMASB for creating tags in Graphic Master Central (GMC).

♦ Editing Environmental Digital Outputs and Analog Inputs in .CSV files.

♦ Adding and deleting devices to sites (QUANTARS, TeNSr, CEBs, etc.)

♦ Creating new sites in Site Builder and implementing in GMC database.

♦ Obtain the necessary skills for creating Custom Map Displays in GMC.

Course Outline

1. Introduction to Site Builder
2. Making changes to Environmental I/Os
   a. Digital Inputs
   b. Digital Outputs
   c. Analog Inputs
3. Creating Custom Maps in CMC computer
4. Adding and Deleting Devices from Sites (QUANTAR, GPS, CEBS etc.)
5. Creating new sites in Site Builder project

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6. Introduction to IMASB
7. Using IMASB for Intouch GMC tag development.
8. Introduction to GMC Intouch Window Maker Program
9. Creating graphics In Intouch Windowmaker Program
10. Creating Custom Map Displays in GMC
11. Backing up Project Files
    a. Site Builder
    b. MOSCAD Programming Toolbox
    c. Intouch

6.1.2.11 CENTRACOM Gold Elite Admin End User Training

Target Audience

System Administrators and System Managers

Course Description

The Elite ADMIN End User Training provides participants with the knowledge and skills to manage and utilize the Elite Admin application. Through facilitation and hands on activities the participant learns how to customize the console screens

Required Pre-work

♦ None

Recommended Prerequisites

♦ Basic Understanding of the Elite console's operational characteristics

Course Objectives

♦ Understand the relationship of CDM/ADM Databases to the ADMIN program
♦ Understand the menu items and tool bar icons
♦ Edit folders, multiselect/patch groups, auxiliary input output groups, windows and toolbars
♦ Add/delete folders

Course Outline

1. Discuss relationship of CDM/ADM Database to ADMIN
2. Starting the ADMIN

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3. Creating a new configuration

4. Discuss ADMIN screen and menu items at top of screen

5. Editing resources

    a. Viewing a resource

    b. Setting up resource headers

    c. Setting up features and modifying icons

    d. Setting up audio features

6. Editing Folders

    a. Selecting folders

    b. Adding resources to folders

7. Edit Multiselect/patch initial setup

8. Editing auxio groups

    a. Creating group

    b. Modifying a group

9. Editing auxio floating windows

    a. Establishing a floating window

    b. Adding a group to a floating window

10. Editing tool base

    a. Setting up 1 or 2 tool bars

    b. Assigning tool to toolbars

    c. Enable/disable clock display

    d. Editing preferences

    e. Setting up activity log

    f. Building customer alias list

    g. Building custom speed dial phone list

    h. Editing dispatcher menu items

    i. Building custom page list

11. Adding folders

12. Deleting folders

    a. Customizing folders

    b. Naming folders

    c. Naming Multiselect/patches

    d. Reordering folders

13. Changing folder tab widths

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6.1.2.12 Alias Database Manager (ADM) Applications Program

Target Audience

Dispatch console supervisors or System Administrators.

Course Description

This course will provide an introduction to the special operation of the supervisory console. In addition, the operation of the Alias Database Manager (ADM) Applications Program will be discussed and demonstrated with facilitation and hands-on activities.

Required Pre-Work

None

Recommended Prerequisites

None

Course Objectives

The participant will be able understand and perform the functions required in the operation of the ADM program.

Computer Requirements

The ADM software application loaded on training consoles to facilitate hands-on activities

Course Outline

1. Overview
2. Scenario
3. Specifications and Prerequisites
4. Starting the ADM
5. Menu items, Tool Bar Icons, Systems Selection
6. Creating and Alias Book
7. Creating Alias Entries
    a. Selecting the Alias length
    b. Discussing and Demonstrating Adding a Unit
    c. Discussing and Demonstrating Adding Individual Pages (Elite)***
    d. Discussing and Demonstrating Adding Page Groups (Elite)***

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e. Discussing and Demonstrating Adding Dialing (Elite)***

f. Discussing and Demonstrating Adding Messages***

g. Discussing and Demonstrating Adding PCII and PCIIe Aliases***

h. Modifying Individual Page Membership (Elite)***

i. Discussing and Demonstrating Adding Status***

j. Deleting an Alias

k. Finding an Alias

8. Sorting the Alias Entry List

9. Printing the Alias Entry List

10. Importing and Exporting as Alias Book

11. Backing up the ADM

12. Restoring the ADM

13. Exiting the ADM

***Items May Not Apply To All Customers

6.1.2.13 CENTRACOM Gold Elite Console Training

Target Audience

Dispatch console operators, supervisors and support personnel

Course Description

This course provides Dispatch Console Operators with an introduction to the dispatch console, its basic operation and to the tailored job aids available for assistance in operation. The learning experience is a mix of video, instructor led facilitation and hands – on activities to help console operators perform common tasks associated with their console's operation.

Required Pre-work

♦ None

Recommended Prerequisites

♦ None

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Course Objectives

♦ Perform basic operational tasks of the dispatch console

♦ Utilize the provided job aids to perform specific tasks associated with the console

♦ Understand a high level view of the system configuration

♦ High-level overview of the customer system configuration

♦ General console operation

♦ Proper operating procedures for specific customer features

Course Outline

1. Basics

   a. Explain component parts of Console

   b. CPU

   c. Interface with volume controls

      i. Mic (condenser and boom)/Headset jack

      ii. Main volume control

      iii. Radio to phone control

      iv. Telephone to radio control

   d. Mouse

      i. Choose/APB

      ii. General transmit

      iii. Instant transmit

   e. Monitor

      i. Radio Work Area (RWA)

      ii. Summary Area

      iii. Status Box

         Mode State Line

         General Status Line

         Link State Line

         Error Line

         Clock Line

      iv. Menu Key Line

   f. Colors of Text and Icons on screen

      i. Green Background—the talkgroup is selected

      ii. Red (flashing) Background—an emergency call is in progress

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iii. Red Letters—incoming call

　　　　iv. Dark Blue Background—patch indication

　　　　v. Black letters—audio is muted

　　　　vi. White letters—audio is not muted

　　　　vii. Red Letters—incoming call

　　　　viii.　　　　Gold Letters—channel busy

　　　　ix. Blue Letters—channel patch is busy

　　　　x. Yellow Letters—private call received

　　　　xi. Gray Color—not available at this time

　　g. Border colors

　　　　i. Selectable except Red, reserved for emergency

2. Features

　　a. Multiselect

　　　　i. APB

　　　　ii. Instant transmit

　　b. Patch

　　　　i. Active

　　　　ii. Idle

　　　　iii. Empty

　　c. Paging

　　　　i. Manual

　　　　ii. Alphabetic

　　　　iii. Numeric

　　d. Signal

　　　　i. P/C

　　　　ii. Call alert

　　e. Display

　　　　i. Leave Windows

　　　　ii. Move windows

　　　　iii. Show Hide

　　f. Special

　　　　i. Intercom

　　　　ii. Supervisor

　　　　iii. Diagnostic

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iv. Public Address

        v. Emergency Setup

        vi. Emergency reset

        vii. All mute

        viii.   Channel Marker (for conventional Mode only)

    g. Monitor

    h. Help

6.1.2.14 MCC7500 Dispatch Console Administrator Training

Duration

4 hours

Target Audience

Dispatch Supervisors, System Administrators

Course Description

This course provides participants with the knowledge and skills to manage and utilize
the MCC 7500 console administrator functions. Through facilitation and hands-on
activities, the participant learns how to customize the console screens.

Recommended Prerequisites

♦ None

Key Topics

♦ Introduction

♦ Configurations

♦ Folders and Resource Setup

♦ Customizing Folders

♦ Auto Starting the MCC 7500 Dispatch Console

♦ Editing Preferences

♦ Configuring the Toolbar

♦ Setting Up Aux IOs

♦ Resource Groups

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6.1.2.15   MCC7500 Dispatch Console Operator Training

Duration

4 hours

Target Audience

Dispatch Console Operators, Supervisors, System Administrators, and Support Personnel

Course Description

This course provides participants with an introduction to the dispatch console, its basic operation and tailored job aids which will be available for assistance in operation. Through facilitation and hands-on activities, the user learns how to perform common tasks associated with the console operation.

Recommended Prerequisites

♦   None

Key Topics

1. Overview
2. Communicating with Radios
3. Advanced Signaling Features
4. Resource Groups
5. Working with Configurations
6. Working with Aux IOs
7. Troubleshooting

6.1.2.16   XTS5000 Portable End User

Target Audience

Portable radio users, supervisors and support personnel.

Course Description

This course provides portable radio users with an introduction to their radio, its basic operation and tailored job aids available for assistance in operation. The learning experience is a mix of video, facilitation and hands-on activities to help users perform common tasks associated with their radio operation.

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Required Pre-Work

♦ None

Recommended Prerequisites

♦ None

Course Objectives

♦ High-level overview of the customer system configuration

♦ General portable radio operation

♦ Proper operating procedures for specific customer features

♦ Perform basic operational tasks of the portable radio

♦ Utilize the provided job aids to perform specific tasks associated with the portable radio

♦ Understand high-level view of the system configuration

Course Outline

1. Basics
   a. Volume/on–off
   b. Zone up and down keys
   c. Home key
   d. Display with all its icons
   e. Push to talk or PTT found on the microphone
   f. Hub, hang up box
2. Features
   a. Mute tone of keypad
   b. Changing Talkgroups
   c. Changing zones or personalities
   d. Differences of Talkgroups call and Private call
      i. Call list program
   e. Phone Interconnect
      i. Phone list program
   f. Scan
      i. Scan program

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g. Direct

h. Display light

i. Failsoft definition

6.1.2.17   XTL5000 Mobile Radio Train-the-Trainer

Target Audience

Mobile radio users, supervisors and support personnel

Course Description

This course provides mobile radio users with an introduction to their radio, its basic operation and tailored job aids available for assistance in operation. The learning experience is a mix of video, facilitation and hands-on activities to help users perform common tasks associated with their radio operation.

Required Pre-Work

♦ None

Recommended Prerequisites

♦ None

Course Objectives

♦ High-level overview of the customer system configuration

♦ General mobile radio operation

♦ Proper operating procedures for specific customer features

♦ Perform basic operational tasks of the mobile radio

♦ Utilize the provided job aids to perform specific tasks associated with the mobile radio

♦ Understand high-level view of the system configuration

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Course Outline

1. Basics
   a. Volume/on-off
   b. Zone up and down keys
   c. Home key
   d. Display with all its icons
   e. Push to talk or PTT found on the microphone
   f. Hub, hang up box
2. Features
   a. Mute tone of keypad
   b. Changing Talkgroups
   c. Changing zones or personalities
   d. Differences of Talkgroups call and Private call
      i. Call list program
   e. Phone Interconnect
      i. Phone list program
   f. Scan
      i. Scan program
   g. Direct
   h. Display light
   i. Failsoft definition

6.1.2.18   Train-the-Trainer – iEUTK Product/Presentation

Duration

1 Day

Target Audience

This one-day course is geared for customers who have an experienced dedicated training staff in their organization. This course concentrates on specific product features and how it relates to the training process.

Course Description

This one-day course provides the customer's identified training personnel with the knowledge and practice applying training techniques that will enable them to successfully train their students. Trainers will use video, facilitation and hands-on

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activities to facilitate learning events supported by tailored or customized training materials and job aides. They will become proficient in discussing common tasks associated with the operation of the customer's radios as identified by the Customer's Training Needs Analysis (CTNA).

Note: This course is presented as customer specific and will cover pertinent to customer equipment.

Prerequisites

♦ Previous training experience and radio system knowledge is a must.

Course Objectives

The participant will be able to employ the toolkit resource needed to facilitate learning events supported by the Interactive Toolkit.

Train-the-Trainer sessions for radio user/operations will typically consist of a training event following the basic outline:

1. Discuss high-level overview of the customer's system configuration.
2. Present a Trunking Overview is applicable.
3. Cover the Instructor Guide provided for group and product being covered.
4. Present Interactive End User Toolkit (iEUTK) training philosophy/methodology.
5. Review Interactive End User Toolkit (iEUTK) controls.
6. Demonstrate techniques for training using the Interactive End User Toolkit (iEUTK) materials.
7. Discuss the difference between ASTRO and Analog audio quality if applicable to the customer's system.
8. Discuss proper radio techniques.
9. Conduct practice sessions with trainers. (depends on size and protocol of audience.)

Note: The Toolkit can refer to the Interactive Toolkit or configurations supplied by the customer.

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Section 7.   Implementation Schedule

Following is the Implementation Schedule

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ID	Task Name
	Q3 ... **Q4** ... **Q1** ... **Q2** ... **Q3** ... **Q4** ... **Q1** ... **Q2** ... **Q3**
	J A S O N D J F M A M J J A S O N D J F M A M J J
1	**CITY OF PHILADELPHIA ASTRO 25 SYSTEM UPGRADE PRELIMINARY PROJECT SCHEDULE**
2	*Contract execution*
3	Contract Administration/Project Kick-off Process
4	Contract Design Review (CDR)
5	Site Surveys
6	Site Preparation
7	Order Processing
8	Fleetmapping/Template Development
9	Manufacturing
10	Staging
11	**Installation/Optimization/Cutover**
12	*City installs new T1 circuits (Master to Primes and Primes to Remotes)*
13	Complete Link Testing
14	Install/Optimize ASTRO25 Master Site at City Hall RM626m (Install SmartX servers - not yet connected to SZ3.0)
15	Upgrade Embassy network to ASTRO25 compatible code (while still connected to SZ3.0) (AEB cards, CEB cards and Elite Ops)
16	Program all subscribers
17	Conduct first 30-day Reliability Test
18	Install/Optimize ASTRO25 IP Network Equipment at Primes & Remotes (A&B Site Routers (connected to new T1s) - A&B Site Switches - Prime Simulcast Controllers - Prime Site
19	Transition sz3.0 to SmartX & New ASTRO25 Mastersite (3600 A&B Simulcast Systems - Embassy / Elite console system)
20	Perform 2nd 30-day Reliability Test
21	Start upgrading fleet to 9600 code at this point but still using SZ3.0 (Decommission 6 Channels from SZ3.0 System - 3 from Sys A, 3 from Sys B), Re-commission on ASTRO25 system for ATP
22	Perform FATP & CATP
23	Complete System-A User migrations
24	*Beneficial Use/Conditional Acceptance System-A*
25	Complete migration of System-B Users
26	*System Conditional Acceptance/Beneficial Use*
27	Complete 3rd & 4th 30 day Reliability Tests
28	*Installation/Optimization/Cutover Complete*
29	Training
30	Final Reprogramming of all subscribers
31	Project Finalization
32	*Final System Acceptance*

Milestones: 9/30 (ID 2), 6/30 (ID 32)

Legend:
Red Text: Critical Path/Tasks
Blue Text: Milestone

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ID	Task Name	Duration	Start	Finish
1	CITY OF PHILADELPHIA ASTRO 25 SYSTEM UPGRADE PRELIMINARY PROJECT SCHEDULE	457 days	3/26/09	12/24/10
2	*Contract execution*	*0 days*	*3/26/09*	*3/26/09*
3	*Payment Schedule: 10% upon Contract Execution (Effective Date)*	*0 days*	*3/26/09*	*3/26/09*
4	Contract Administration/Project Kick-off Process	15 days	4/2/09	4/22/09
5	Contract Design Review (CDR)	45 days	4/23/09	6/24/09
6	*Payment Schedule: 5% upon completion and City's written approval of Detailed Design Review*	*0 days*	*6/24/09*	*6/24/09*
7	Site Surveys	25 days	4/9/09	5/13/09
8	Site Preparation	150 days	5/14/09	12/9/09
9	Order Processing	20 days	6/25/09	7/22/09
10	Fleetmapping/Template Development	100 days	7/23/09	12/9/09
11	Manufacturing	45 days	7/23/09	9/23/09
12	Staging	60 days	9/24/09	12/16/09
13	*Payment Schedule: 25% upon Shipment of FNE equipment from CCSi*	*0 days*	*12/16/09*	*12/16/09*
14	Installation/Optimization/Cutover	249 days	11/19/09	11/2/10
15	*City installs new T1 circuits (Master to Primes and Primes to Remotes)*	*0 days*	*11/19/09*	*11/19/09*
16	Complete Link Testing	20 days	11/19/09	12/16/09
17	Install/Optimize ASTRO25 Master Site at City Hall RM626m (Install SmartX servers - not yet connected to SZ3.0)	15 days	12/17/09	1/6/10
18	Upgrade Embassy network to ASTRO25 compatible code (while still connected to SZ3.0) (AEB cards, CEB cards and Elite Ops)	10 days	1/7/10	1/20/10
19	Program all subscribers *	20 days	12/10/09	1/6/10
20	Conduct first 30-day Reliability Test	23 days	1/21/10	2/22/10
21	Install/Optimize ASTRO25 IP Network Equipment at Primes & Remotes (A&B Site Routers (connected to new T1s) - A&B Site Switches - Prime Simulcast Controllers - Prime Site Comparators)	20 days	2/23/10	3/22/10
22	Transition sz3.0 to SmartX & New ASTRO25 Mastersite (3600 A&B Simulcast Systems - Embassy / Elite console system)	10 days	3/23/10	4/5/10
23	Perform 2nd 30-day Reliability Test	22 days	4/6/10	5/5/10
24	*Payment Schedule: 10% upon completion and City's Conditional Acceptance; of 2nd Reliability Test*	*0 days*	*5/5/10*	*5/5/10*
25	Start upgrading fleet to 9600 code at this point but still using SZ3.0 (Decommission 6 Channels from SZ3.0 System - 3 from Sys A, 3 from Sys B), Re-commission on ASTRO25 system for ATP purposes, Upgrade these 6 stations at all sites	15 days	5/6/10	5/26/10
26	*Payment Schedule: 10% upon Installation and the City's Conditional Acceptance of FNE equipment on a site by site, system by system basis*	*0 days*	*5/26/10*	*5/26/10*
27	Perform FATP & CATP	60 days	5/27/10	8/18/10
28	*Payment Schedule: 15% upon completion and City's Conditional Acceptance of Coverage Acceptance Test in accordance with Coverage Acceptance Test*	*0 days*	*8/18/10*	*8/18/10*
29	Complete System-A User migrations	5 days	8/19/10	8/25/10
30	*Conditional Acceptance System-A*	*0 days*	*8/18/10*	*8/18/10*
31	Complete migration of System-B Users	5 days	8/26/10	9/1/10
32	*Conditional Acceptance System-B*	*0 days*	*9/1/10*	*9/1/10*
33	Complete 3rd & 4th 30 day Reliability Tests	44 days	9/2/10	11/2/10
34	*Conditional Acceptance-Installation/Optimization/Cutover Complete*	*0 days*	*11/2/10*	*11/2/10*

Legend:
Red Text: Critical Path/Tasks
Blue Text: Milestone

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ID	Task Name	Duration	Start	Finish	Q1 J F M	Q2 A M J	Q3 J A S	Q4 O N D	Q1 J F M	Q2 A M J	Q3 J A S	Q4 O N D	Q J
35	Training	80 days	2/4/10	5/26/10									
36	Final Reprogramming of all subscribers	20 days	11/3/10	11/30/10									
37	System Acceptance - Warranty Commences	0 days	11/30/10	11/30/10									
38	Payment Schedule: 20% upon System Acceptance	0 days	11/30/10	11/30/10									
39	Project Finalization	18 days	12/1/10	12/24/10									
40	Final Acceptance	0 days	12/24/10	12/24/10								12/24	
41	Payment Schedule: 5% upon Final Acceptance	0 days	12/24/10	12/24/10									
42	* Subscriber Equipment will be invoiced 100% upon delivery and inventory	0 days	1/6/10	1/6/10									

Legend:
Red Text: Critical Path/Tasks
Blue Text: Milestone

Task		Summary		Rolled Up Progress		Group By SummTask	
Critical Task		Rolled Up Task		Split		Critical Task	
Progress		Rolled Up Critical Task		External Tasks			
Milestone	◆	Rolled Up Milestone	◇	Project Summary			

Section 8. Warranty and Maintenance

8.1   Overview

Motorola is the world leader in mission critical system support. By remotely monitoring and managing critical customer information, we can identify potential problems and typically resolve them before they cause critical outages. This means maximum uptime for the City of Philadelphia's communications system.

For nearly 60 years, Motorola has been building a unique service team, national in scope, but local in its ability to respond to our customers' needs through a nationwide network of independently owned and authorized Motorola Service Stations (MSS). There are presently over 900 service centers strategically located throughout the continental U.S. Specifically for the City of Philadelphia there will continue to be a dedicated Motorola technical team having maximum system uptime goals. The City of Philadelphia can be assured that your communications system will be there for your public safety responders when it is needed most.

This type of service structure is unrivaled within the electronic communications industry today and has been instrumental in implementing Motorola's cutting-edge technologies and supporting our extensive customer base.

Motorola will provide a one-year warranty on the upgraded equipment as part of this proposal. Through ongoing service agreements, Motorola will continue providing full maintenance services for the City's communications system throughout the post-warranty period.

The following services will be provided during the Warranty period and will continue if the City elects the same coverage during the Maintenance periods.

8.2   Warranty and Maintenance Program

Motorola has the most comprehensive warranty and maintenance program in the Land Mobile Industry with a wealth of experience and expertise in maintaining network radio systems.

Motorola will provide the City with the following services during the warranty period:

♦ One-year Parts and Labor warranty

♦ Remote Network and Security Monitoring Service

♦ Pre-Tested Software Subscription (PTSS)

♦ Dispatch Service

♦ Technical Support

♦ Continued support from your current System Manager

♦ Infrastructure Board Repair with Advance Replacement

♦ Network Preventative Maintenance

♦ Subscriber Radio Repair

♦ Optional Software Subscription Agreement (SSA)

♦ Optional System Audit

♦ Optional Software Upgrade Design

♦ Optional Infrastructure Software Installation

8.3   Warranty and Maintenance Services Detail

One-Year Parts and Labor Warranty

Motorola warrants that the equipment under normal use and service will be free from defects in both materials and workmanship for a period of one year from beneficial use or system acceptance, which ever occurs first.

Remote Network Monitoring Service

Motorola will remotely monitor all sites in the City's system from Schaumburg, Illinois at the Motorola System Support Center (SSC). Today, Motorola monitors over 600 customer networks at the SSC. Here, highly trained technologists electronically observe network performance and stability continuously 24 hours a day, 7 days a week. With all network variations either expected or unexpected, Motorola's technologist take appropriate action to maximize network uptime and overall preparedness. ***There are times when Motorola may intervene remotely and correct the problem before users know it exists.***

When the SSC detects an event, trained technologists acknowledge the event, run remote diagnostic routines, and initiate an appropriate response. Appropriate responses may include, but are not limited to, continued monitoring of the event for further development, attempts to restore the system remotely, or opening a "case" (an electronic service request) for dispatch of a local service technician.

The SSC maintains regular contact with the on-site technician until the system is restored and the case is closed. Through extensive case management, the SSC continuously tracks and manages case activity from open to close through an automated case tracking process. This case management allows Motorola to ensure timely resolution and provides a mechanism for performance and activity reports.

Network Security Services

Motorola provides a suite of network security products and services in order to fulfill customer needs to prevent, detect, and respond to security incidents. These include Pre-Tested Anti-Virus Subscription, and 24 x 7 Security Management Services such as Anti-Virus Management, and Network Barrier Management.

Security Management Services
• Planning & Integration
• Anti-virus pre-test
• 24x7 Security Management
• Emergency Response

Remote Technician

Service Interface Barrier
• Authenticate service users

Customer Networks

Radio Network

Internet

Network Interface Barrier:
• Enforce Boundary
• Detect Attacks

Network Anti-Virus:
• Protect "Windows" nodes

Anti-Virus

Security Manager

Security Manager:
• Enable Central Security Management

Figure 8-1: Radio Network Security Services

Network Security Monitoring

The goal of network security monitoring is to maintain the integrity, availability, and accessibility of the City's communication network.

The combination of Network Monitoring and Security Monitoring provides the best protection for meeting that goal. The combined service provides all of the essential elements for rapid detection of security events, timely responses, and quick recovery. In the event of a security incident that threatens the radio network, the Network Operations Center (NOC) and Security Operations Center (SOC) teams working together can quickly identify the security issue, engage the world's security community if need be, work to contain the threat, and quickly begin remediation. Our NOC and SOC are collocated, having visibility to the same case data and access to each other's escalation tiers with the ability to instantly share information to quickly identify and resolve issues.

Additionally, Motorola's NOC and SOC teams have visibility to hundreds of systems worldwide as well as part of the world's security community. The combination gives a view greater than the sum of the individual views. The combined network and security monitoring service leverages that combined view and brings radio network

expertise and security expertise to bear. This tight coupling of NOC and SOC capabilities and expertise ensures rapid event detection and incident response.

Motorola's Network Security Monitoring Service provides security assurance by proactively managing the security elements present on the system to mitigate risk from viruses, worms, or attacks whether deliberate or inadvertent. This may include periodically deploying the latest release of pre-tested anti-virus definitions to the anti-virus management server and/or updating the intrusion detection sensor signature files on the network barrier. Motorola will also modify intrusion sensor settings and update firewall settings as determined by Motorola.

Motorola's ASTRO Network Security Monitoring is more than just ordinary Security Monitoring. While other security vendors can monitor firewalls and intrusion detection sensors, Motorola's ASTRO Network Security Monitoring goes further. Mission Critical systems need to be protected with a mission critical mentality and Motorola's service does that. We pre-test and certify security updates for anti-virus definitions and intrusion detection signature files before pushing them onto your system. We pretest and certify operating system patches so you can be assured that they are safe for deploying them on your network. We also monitor your system's Core Security Management Server, which logs systems events and your authentication application to give us a more complete view into your system. No other security vendor can do that.

Specifically, Network Security Monitoring Service provides:

♦ 24 x 7 x 365 real-time monitoring of security elements
♦ Data collection, event analysis, and incident response
♦ Pre-testing, certification, and deployment of anti-virus definitions and intrusion detection sensor signatures
♦ Routine and urgent updates/notifications
♦ Reporting

Pre-Tested Software Subscription (PTSS)

With PTSS service, Motorola pretests the updated commercial anti-virus definitions for the Microsoft Windows®-based boxes on a system. This service will also include pre-testing operating system software patches and signature files on the intrusion detection sensors. Motorola will receive and test anti-virus definitions for the Microsoft Windows boxes, intrusion detection sensor signatures, and operating system patches from commercial suppliers selected by Motorola.

PTSS includes:

♦ Pre-tested weekly updates, or within 24 hours on urgent updates. Motorola tests, addresses issues, and releases updates weekly; within 24 hours if urgent

- Motorola IT expertise, radio expertise, security expertise.
- Multi-million dollar test facility for pre-testing.
- Heads-up, head start. Motorola receives updates from vendors in advance, before they are released to general public.
- Weekly notifications of security updates or within 24 hours if urgent.
- Motorola manages license renewal of customer subscription with Symantec/ISS. Prevents license lapse from preventing an update.
- Support for current release of system software and two releases back.

Dispatch Service

Motorola's SSC Call Center Operations (CCO) is the central point of contact for all service issues. When an issue is detected locally, a phone call to this operation's toll-free phone number initiates a case and begins the service response process to the appropriate degree required. The CCO's function is to manage all calls so that the request case will be tracked and monitored from beginning to end and ensure the appropriate action is taken to resolve the issue in a timely manner.

With detailed accounts of thousands of customer systems at our fingertips, Customer Support Representatives are trained to understand the situation and determine the next steps to be taken. The team tracks the status of the case and ensures that all personnel involved have access to customer's information. Motorola uses stringent inbound-call management and case-management standards recognized as industry best in class.

Technical Support

In addition to the system being continuously monitored remotely, Technical Support is available by telephone 24 hours a day, 7 days a week for service issues detected locally in the field. Our Technical Support Staff provides telephone support for technical issues requiring a high level of communications network expertise and troubleshooting. The Technical Support Center is staffed with highly trained technologist specializing in the diagnosis and resolution of network performance issues. Each technologist has been trained to analyze, isolate, and work virtually any scenario to a swift resolution.

The Technical Support technologist may remotely access the system to more clearly define a problem and determine the area of failure in order to decide on the most suitable action plan. If the problem is beyond the scope of the SSC's support staff, they will contact key personnel who are involved with the design, development, and manufacture of the system components for resolution.

Response Times

In the event of major system equipment failure:

♦ Motorola will respond by phone within one (1) hour hours (24 hours a day, 7 days a week) after notification and will be on-site within 1.5 hours Monday – Friday 8:00 AM – 4:30 PM and on-site within 2 hours all other times.

In the event of minor system equipment failure:

♦ Motorola will respond and be on-site within four (4) hours (during standard business hours) after notification.

For non-emergency issues, Motorola will respond within 24 hours.

Please refer to the following tables for details regarding response times.

Table 8-1: Response Time

Severity Level	Regular Response Time
Severity 1	Within 1 hour by phone for Technical Support 24 hours a day, 7 days a week from receipt of Notification. On-site within 1.5 hours Monday – Friday 8:00 AM – 4:30 PM and within 2 hours all other times. Support is continuous (24x7) until resolved.
Severity 2	Within 4 hours from receipt of Notification - Standard Business Day
Severity 3	Within 24 hours from receipt of Notification - Standard Business Day

Table 8-2: Severity Definitions

Severity Level	Problem Types
Severity 1	Response is provided continuously Major System failure 33% of System down 33% of Site channels down Site Environment alarms (smoke, access, temperature, AC power. This level is meant to represent a major issue that results in an unusable system, sub-system, Product, or critical features from the Customer's perspective. No Work-around or immediate solution is available.
Severity 2	Response during Standard Business Day Significant System Impairment not to exceed 33% of system down System problems presently being monitored This level is meant to represent a moderate issue that limits a Customer's normal use of the system, sub-system, product, or major non-critical features from a Customer's perspective
Severity 3	Response during Standard Business Day Intermittent system issues Information questions (General End User Help Desk) Upgrades/preventative maintenance This level is meant to represent a minor issue that does not preclude use of the system, sub-system, product, or critical features from a Customer's perspective. It may also represent a cosmetic issue, including documentation errors, general usage questions, recommendations for product enhancements or modifications, and scheduled events such as preventative maintenance or product/system upgrades.

Infrastructure Board Repair

In the event a malfunctioning board/unit is discovered at the site location, the local technician will contact the SSC's Call Center to request a return authorization (RA) number. They will remove the malfunctioning board/unit and ship it to the SSC for repair.

Upon receipt of malfunctioning equipment, the SSC will fully system test and repair malfunctioning Motorola manufactured boards/units down to the component level utilizing automated test equipment. A system test is performed to ensure that all software and hardware is set to current customer configuration. If Motorola does not manufacture the unit, it may be returned to the Original Equipment Manufacturer (OEM) for repair.

Once the equipment is received from the SSC, the local servicing technician will either re-install the equipment or return it to the City's spare inventory.

Network Preventative Maintenance

Preventive Maintenance of the Network is an important part of any maintenance program as it detects potential problems before they develop. This reduces the possibility of system failures, while helping to prolong the life of and maximizing the performance of the City's communications system. Because experience dictates that these objectives require a regular regimen, our local technician visits are scheduled and managed through the SSC's Call Center, on an automatic pre-determined schedule. Reviews include pro-active checks on equipment based on a customized checklist for your equipment.

Subscriber Radio Repair

End users may utilize our local Motorola MSS network for first echelon repair service to subscriber equipment during the warranty period. Motorola's Radio Repair Depot will provide component level repair of all Motorola manufactured portable and mobile radio communications equipment at a central Motorola facility in the event of more serious repair requirements.

The repair center tests and repairs malfunctioning radios down to the component level utilizing state-of-the-art test equipment. Upon completion of the repair, the Motorola repair facility will return ship the radio for reinstallation by the local technician.

Continued Support from your Assigned System Manager

The heart of Motorola's support program for the City is the System Management team designed to provide management and operational activities necessary to ensure performance, availability, and utilization of system resources.

Your local Motorola System Manager will be the single point of contact in the field, responsible for coordinating system maintenance efforts and ensuring optimal performance and utilization of the City's communications system equipment and software.

The System Manager will work closely with the City to customize the deliverables from the team, examples of which are:

♦ Provide reports of the system performance, use, operational and maintenance activities.

♦ Standard reports include device availability and system performance, repair activity, response and restoration cycle time and open/closed cases for tracking issue resolution.

♦ Identify system capacities pertaining to the system.

♦ Identify other technologies that may be implemented in the system and their benefits.

- Analyze the data on a monthly basis, and provide recommendations for improvement.
- Perform annual Technology Refresh reviews with the City and determine any modifications necessary to the existing scope of services provided.
- Track Motorola service suppliers.

Optional Software Subscription Agreement (SSA)

The SSA provides notification of periodic Motorola Software System Releases and Core Releases for use with upgrade-capable Motorola equipment covered under the contract. Motorola will provide bulletins to the City announcing System Releases and Core Releases. Software releases announced in the bulletins are available upon request.

Optional System Audit

A System Audit provides the technical resources to gather system configuration information. Depending on the specific requirements for the audit, information such as software versions, hardware versions, model and serial numbers, equipment distribution and system layout/architecture is gathered and retained by Motorola. Motorola will provide a copy of the audit data to the City.

Optional Software Upgrade Design

Software Upgrade Design includes design services for System Releases. Motorola will review system audit data along with an equipment list to ensure there will be no software incompatibilities between equipment that is not being upgraded versus equipment that is being upgraded with a System Release. Motorola will identify additional equipment and engineering that is required as a result of the upgrade and will recommend a plan for installation.

Optional Infrastructure Software Installation

Infrastructure Software Installation provides the technical resources to install and activate one (1) software System Release per year. These resources generally include the expertise of our System Technologists (ST) who are also accompanied by the local technicians supporting the system.

8.4 Post Warranty Maintenance Period

During the post warranty period, Motorola can continue to provide full maintenance services for the City's radio network as provided during the warranty period.

Section 9.   Equipment List

9.1   Master Site Equipment

System	Site	Sys Seg	Line #	Qty	Model #	Description
626mAnnex	MASTER	DACS	1-63	1	DSACDXMOTO004	16 PORT DS1 DIGITAL X-CONN SWITCH 1
626mAnnex	MASTER	TENSR	1-65	1	DSPREM891830	UNIVERSAL ENCLOSURE TENSR 800
626mAnnex	MASTER	TENSR	1-66	2	DSPREM8901	AC POWER SUPPLY 110/220VAC
626mAnnex	MASTER	TENSR	1-67	2	DSPREM880160	CPU 8 T1 E1 CROSS CONNT
626mAnnex	MASTER	TENSR	1-68	1	DSPREM892060	8T1 E1 IF CARD 32K WITH MODEM
626mAnnex	MASTER	TENSR	1-69	1	DSPREM801065	DUAL T1 E1 WAN CARD
626mAnnex	MASTER	TENSR	1-70	1	DSPREM801460	DUAL T1E1 WAN W/ RELAYS 1:N REDUNDA
626mAnnex	MASTER	TENSR	1-71	4	DSPREM81230	CSU PLUG IN MODULE
626mAnnex	MASTER	TENSR	1-72	1	DSPREM811960	8 PORT 4W E M TO EXT RANGE CRD
626mAnnex	MASTER	NM_NETWORK	1-19	3	ST2500	S2500 MULTIPROTOCOL WAN ROUTER
626mAnnex	MASTER	NM_NETWORK	1-20	3	ST2512	S2500 ROUTER T1/E1 DAUGHTER BOARD
626mAnnex	MASTER	NM_NETWORK	1-22	1	ST2500	S2500 MULTIPROTOCOL WAN ROUTER
626mAnnex	MASTER	NM_NETWORK	1-23	1	ST2512	S2500 ROUTER T1/E1 DAUGHTER BOARD
626mAnnex	MASTER	CNI	1-50	1	ST6000	S6000 MNR MULTI-PROTOCOL ROUTER
626mAnnex	MASTER	CNI	1-51	1	ST6000	S6000 MNR MULTI-PROTOCOL ROUTER
626mAnnex	MASTER	SRC	1-62	1	ST6200	ASTRO SWITCHING-ROUTING CENTER

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System	Site	Sys Seg	Line #	Qty	Model #	Description
626mAnnex	MASTER	SRC	1-62a	1	CA01053AA	ADD: DUAL SITE LINK CAPABILITY
626mAnnex	MASTER	AEB	1-64a	1	K762BD	EHN: EXTENDED WARRANTY, 2 CARD CAGE
626mAnnex	MASTER	KVLPLUS	1-88	2	T6717	KVL 3000 PLUS HARDWARE
626mAnnex	MASTER	KVLPLUS	1-88a	2	U239AC	ADD: ASTRO 25 MODE
626mAnnex	MASTER	KVLPLUS	1-88b	2	X795AH	ADD: ASN MODE
626mAnnex	MASTER	KVLPLUS	1-88c	2	X423AE	ADD: DES/DES-XL/DES-OFB ENCRYPTION
626mAnnex	MASTER	KVLPLUS	1-88d	2	CA00182AA	ADD: AES ENCRYPTION SOFTWARE
626mAnnex	MASTER	KVLPLUS	1-88e	2	C543	ADD: CABLE FOR RNC, DIU, MGEG
626mAnnex	MASTER	KVLPLUS	1-88f	2	C724	CABLE, KEYLOAD
626mAnnex	MASTER	KVLPLUS	1-88g	2	C954	ADD: CABLE FOR SPECTRA/SPECTRO
626mAnnex	MASTER	KVLPLUS	1-92	2	6881132E29	KVL3000 PLUS USER GUIDE
626mAnnex	MASTER	GPS	1-58	1	DSTRAK91008	PRIME/MASTER SITE CONFIG AC POWER
626mAnnex	MASTER	GPS	1-59	2	DSTRAK91111	FOUR PORT T1 FRAMED AND CLOCK TELEC
626mAnnex	MASTER	GPS	1-60	300	L1700	1/4" SUPERFLEX POLY JKT PER FOOT
626mAnnex	MASTER	GPS	1-61	4	TDN9714	1/4" CONN N MALE S FLEX PLTD
626mAnnex	MASTER	MGEG	1-79	1	DS11487719	CPU SHELF WITH SG KEYBOARD 19 INCH
626mAnnex	MASTER	RACK	1-80	3	DS46053701	6 FT UNIVERSAL RACK BLACK 19 IN WI
626mAnnex	MASTER	RACK	1-81	3	DS46053701	6 FT UNIVERSAL RACK BLACK 19 IN WI
626mAnnex	MASTER	RACK	1-82	3	DS46053701	6 FT UNIVERSAL RACK BLACK 19 IN WI
626mAnnex	MASTER	RACK	1-83	2	DSCAB003150	43U X 600W X 800D UNIVERSAL EURORAC
626mAnnex	MASTER	SURGE	1-84	9	DSOP820B	POWER DIST. UNIT SURGE PROTECT
626mAnnex	MASTER	SURGE	1-85	9	DS1101378	RACK MOUNTING PLATE ADAPTER , DSOP8
626mAnnex	MASTER	SURGE	1-86	3	DSMPS32T1	32 T1 PROTECTOR
626mAnnex	MASTER	KVM	1-87	3	DDN8325	17" LCD DRAWER W/ KEYBOARD & MOUSE,
626mAnnex	MASTER	NM_CLIENT	1-10	1	DLN6545	HP CP3505N COLOR LASER PRINTER 110V
626mAnnex	MASTER	AEB	1-64	1	B1842BB	CENTRACOM GOLD AMBASSADOR ELECTRONI
626mAnnex	MASTER	AEB	1-64b	1	X758AA	ADD: SPARES, AMBASSADOR ELECTRONICS
626mAnnex	MASTER	AEB	1-64c	2	K994AJ	ADD: MODULE, AMBASSADOR
626mAnnex	MASTER	AEB	1-64d	1	X762AB	ADD: INTERFACE, ZONE CONTROLLER (TW
626mAnnex	MASTER	AEB	1-64e	1	CA00126AA	ADD: SOFTWARE LICENSE, ASTRO 25 TRU

System	Site	Sys Seg	Line #	Qty	Model #	Description
626mAnnex	MASTER	MGEG	1-73	2	B1896	MGEG WITH CPU, 120 CLEAR CALL CAPAB
626mAnnex	MASTER	MGEG	1-73a	2	CA00169AA	ADD: ASTRO 25 IMBE CAPABILITY
626mAnnex	MASTER	MGEG	1-73b	2	CA00147AC	ADD: SECURE CAPABILITY & SECURE SOF
626mAnnex	MASTER	MGEG	1-73c	2	CA00143AC	ADD: DES-OFB ALGORITHM
626mAnnex	MASTER	MGEG	1-73d	2	CA00145AC	ADD: DVI-XL ALGORITHM
626mAnnex	MASTER	MGEG	1-73e	2	CA00182AB	ADD: AES ALGORITHM
626mAnnex	MASTER	MGEG	1-73f	2	CA00245AA	ADD: ADP ALGORITHM
626mAnnex	MASTER	KVLPLUS	1-89	2	NTN7395BR	1200MAH HICAP BATT
626mAnnex	MASTER	KVLPLUS	1-91	2	HKN6182	KEYLOADING CABLE ADAPTER (GCAI)
626mAnnex	MASTER	NMS/ZC	1-2	1	DS301100111G	USB TO DB 9 PIN SERIAL ADAPTOR
626mAnnex	MASTER	NMS/ZC	1-3	1	L3174	3810 PLUS MODEM S/A V.34 PROTOCOL
626mAnnex	MASTER	NMS/ZC	1-4	1	DSZ1Z1118560	RM001 W/SPECIAL FACEPLATE W/1 CUTOU
626mAnnex	MASTER	NTMS_DC	1-5	4	L3539	CERTIFIED DOMAIN CONTROLLER / NTMS
626mAnnex	MASTER	NTMS	1-6	1	T7121C	DCD/NTMS/DC CONFIGURATION SW FOR A6
626mAnnex	MASTER	NMS/ZC	1-7	1	L3225A	CERTIFIED KEYBOARD FOR RSD SERVERS
626mAnnex	MASTER	NMS/ZC	1-8	1	L3226A	CERTIFIED OPTICAL WHEEL MOUSE FOR R
626mAnnex	MASTER	NMS/ZC	1-9	1	DS213BLK	21.3" MVA 4:3 LCD, BLACK, NON-TOUCH
626mAnnex	MASTER	NM_CLIENT	1-11	3	DDN9162	CERTIFIED 6.9 /7.0 ASTRO PRIVATE NE
626mAnnex	MASTER	NM_CLIENT	1-12	3	DDN8673	CRYSTAL REPORTS 11.0
626mAnnex	MASTER	NM_CLIENT	1-14	2	DS213BLK	21.3" MVA 4:3 LCD, BLACK, NON-TOUCH
626mAnnex	MASTER	NM_CLIENT	1-15	3	DDN9162	CERTIFIED 6.9 /7.0 ASTRO PRIVATE NE
626mAnnex	MASTER	NM_CLIENT	1-16	3	DDN8673	CRYSTAL REPORTS 11.0
626mAnnex	MASTER	NM_CLIENT	1-18	3	DS213BLK	21.3" MVA 4:3 LCD, BLACK, NON-TOUCH
626mAnnex	MASTER	NM_NETWORK	1-21	3	DSJ4900B	HP PROCURVE SWITCH 2626B
626mAnnex	MASTER	OBM_SERVER	1-24	1	TT1491	LX TERMINAL SERVER 48 PORTS WITH MO
626mAnnex	MASTER	OBM_SERVER	1-25	1	L3174	3810 PLUS MODEM S/A V.34 PROTOCOL
626mAnnex	MASTER	OBM_SERVER	1-26	1	DSZ1Z1118567	RM001 WITH SPECIAL FACEPLATE WITH 2
626mAnnex	MASTER	CSMS	1-27	1	DDN9182	CERTIFIED CORE SECURITY MANAGEMENT
626mAnnex	MASTER	CSMS	1-28	1	T7401	CSMS SUPPLEMENTARY DISK A7.1.1
626mAnnex	MASTER	ANTI_VIRUS	1-29	15	DDN9454	SYMANTEC ANTI VIRUS 10.1.5 CORP ED

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System	Site	Sys Seg	Line #	Qty	Model #	Description
626mAnnex	MASTER	AUTHEN	1-30	1	TT1969	RSA AUTH. MGMT V. 6.1 WITH 25 CLIEN
626mAnnex	MASTER	AUTHEN	1-30a	1	TT04523AA	ADD: RSA ACE SERVER MAINTENANCE FOR
626mAnnex	MASTER	AUTHEN	1-31	5	DDN8653	RSA 5 YEAR HARD TOKEN
626mAnnex	MASTER	CSMS	1-32	1	DS213BLK	21.3" MVA 4:3 LCD, BLACK, NON-TOUCH
626mAnnex	MASTER	IBS CNI_SV	1-33	1	DSWQ4798653	VIRTUAL SERVER HARDWARE AND LINUX M
626mAnnex	MASTER	IBS	1-34	1	DSWQ4800408	VMWARE INFRA STR LIC & GOLD SUPPORT
626mAnnex	MASTER	IBS	1-35	1	DS1161857	WINDOWS SERVER STD 2003 R2A WITH 5
626mAnnex	MASTER	IBS	1-36	3	DS1818265	RED HAT ENT LINUX ES BASIC LICENSE
626mAnnex	MASTER	IBS	1-37	1	DDN9178	SNAP SERVER 110 500 GB
626mAnnex	MASTER	NM Site IB	1-38	3	L3504	CERTIFIED SYSLOG SERVER
626mAnnex	MASTER	NM Site IB	1-39	3	T7402	IBS SUPPLEMENTARY DISK
626mAnnex	MASTER	NM Site IB	1-40	3	DDN9178	SNAP SERVER 110 500 GB
626mAnnex	MASTER	CNI	1-41	1	TT1931	SSG520 FIREWALL W/ 2 YEARS SUPPORT
626mAnnex	MASTER	CNI	1-42	1	TT1949	NETSCREEN-SECURITY MGR W/ 10 DEVICE
626mAnnex	MASTER	CNI	1-43	1	T7399	FMS SUPPLEMENTARY DISK A7.1.1
626mAnnex	MASTER	CNI	1-44	1	L3510	PROVENTIA G SERIES COMPLETE SYSTEM
626mAnnex	MASTER	CNI	1-45	1	T7328	IDS SUPPLEMENTARY CD
626mAnnex	MASTER	CNI	1-46	1	DSJ4900B	HP PROCURVE SWITCH 2626B
626mAnnex	MASTER	DCD	1-47	1	DDN9184	CERTIFIED DCD SERVER FOR 6.9/7.2
626mAnnex	MASTER	DCD	1-48	1	T7121C	DCD/NTMS/DC CONFIGURATION SW FOR A6
626mAnnex	MASTER	DCD	1-49	1	L3536	DCD CONSOLE V 4.0 W/2 YEARS MNT
626mAnnex	MASTER	MGEG	1-74	1	L3225A	CERTIFIED KEYBOARD FOR RSD SERVERS
626mAnnex	MASTER	MGEG	1-75	1	L3226A	CERTIFIED OPTICAL WHEEL MOUSE FOR R
626mAnnex	MASTER	MGEG	1-76	1	DS213BLK	21.3" MVA 4:3 LCD, BLACK, NON-TOUCH
626mAnnex	MASTER	MGEG	1-77	1	DSF1DZ104T	4 PORT BELKIN KVM SWITCH SE SERIES
626mAnnex	MASTER	MGEG	1-78	2	DSF3X110506	PS/2 KVM 6FT ALL IN ONE CABLE SET
626mAnnex	MASTER	NMS/ZC	1-1n	1	ZA00103AA	ENH: TECHNICAL ASSISTANCE, TEN HOUR
626mAnnex	MASTER	KVLPLUS	1-90	2	HKTN4004B	VISAR / KVL CHGR KIT 110V
626mAnnex	MASTER	NMS/ZC	1-1	1	SQM01SUM0184	MASTER SITE CONFIGURATION
626mAnnex	MASTER	NMS/ZC	1-1a	1	QA01205AA	ENH: ASTRO 25 IV&D
626mAnnex	MASTER	NMS/ZC	1-1b	22	CA01209AB	ENH: ASTRO 25 IV&D SITE

System	Site	Sys Seg	Line #	Qty	Model #	Description
626mAnnex	MASTER	NMS/ZC	1-1c	20	CA01208AA	ENH: 500 RADIO USER LICENSES
626mAnnex	MASTER	NMS/ZC	1-1d	1	CA01257AA	ENH: ZONE CONTROLLER/NETWORK MANAGE
626mAnnex	MASTER	NMS/ZC	1-1e	1	CA01235AA	ENH: USER CONFIGURATION SERVER (UCS
626mAnnex	MASTER	NMS/ZC	1-1f	5	CA01224AB	ENH: UNIFIED EVENT MANAGER (UEM)
626mAnnex	MASTER	NMS/ZC	1-1g	5	Z13AG	ENH: UNIFIED NETWORK CONFIGURATOR (
626mAnnex	MASTER	NMS/ZC	1-1h	5	Z802AF	ENH: USER CONFIGURATION MANAGER (UC
626mAnnex	MASTER	NMS/ZC	1-1j	1	D999AL	ENH: SECURITY PARTITIONING
626mAnnex	MASTER	NMS/ZC	1-1l	1	D41AF	ENH: DYNAMIC SHARED SERVICES
626mAnnex	MASTER	NMS/ZC	1-1m	1	CA00966AA	ENH: FLEXIBLE AIR TRAFFIC INFORMATI
626mAnnex	MASTER	NMS/ZC	1-1o	1	CA00965AA	ENH: CHANNEL PARTITIONING
626mAnnex	MASTER	NMS/ZC	1-1p	5	DA00148AG	ENH: ZONE HISTORICAL REPORTS
626mAnnex	MASTER	NMS/ZC	1-1r	5	Z801AM	ENH: RADIO CONTROL MANAGER
626mAnnex	MASTER	NMS/ZC	1-1s	5	D52AJ	ENH: ZONEWATCH
626mAnnex	MASTER	NMS/ZC	1-1t	5	ZA00151AG	ENH: AFFILIATION USER REPORTS
626mAnnex	MASTER	NMS/ZC	1-1u	1	Z07AA	ENH: ALPHANUMERIC PAGING
626mAnnex	MASTER	NMS/ZC	1-1v	1	CA01237AA	ENH: NORTHBOUND INTERFACE
626mAnnex	MASTER	NMS/ZC	1-1w	1	ZA00272AA	ENH: SNMP TRAP FORWARDING
626mAnnex	MASTER	NMS/ZC	1-1x	1	ZA00149AD	ENH: DYNAMIC REPORTS
626mAnnex	MASTER	NM_CLIENT	1-13	3	T7420	ASTRO 7.4 CLIENT APPLICATION SOFTWA
626mAnnex	MASTER	NM_CLIENT	1-17	3	T7420	ASTRO 7.4 CLIENT APPLICATION SOFTWA

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9.2 Fixed Equipment Upgrade

System	Site	Sys Seg	Line #	Qty	Model No.	Description
RM626M	MUNI	ELITEUPGRD	1-448	1	ST2500	S2500 MULTIPROTOCOL WAN ROUTER
RM626M	MUNI	ELITEUPGRD	1-449	1	ST2510	S2500 10 BASE-T DAUGTHER BOARD
PAB	POLICE	ELITEUPGRD	1-451	1	ST2500	S2500 MULTIPROTOCOL WAN ROUTER
PAB	POLICE	ELITEUPGRD	1-452	1	ST2510	S2500 10 BASE-T DAUGTHER BOARD
FAB	FIRE	ELITEUPGRD	1-454	1	ST2500	S2500 MULTIPROTOCOL WAN ROUTER
FAB	FIRE	ELITEUPGRD	1-455	1	ST2510	S2500 10 BASE-T DAUGTHER BOARD
PIA	AIRPORT	ELITEUPGRD	1-457	1	ST2500	S2500 MULTIPROTOCOL WAN ROUTER
PIA	AIRPORT	ELITEUPGRD	1-458	1	ST2510	S2500 10 BASE-T DAUGTHER BOARD
RM626M	MASTER	SURGE	1-137	2	DSMPS32T1	32 T1 PROTECTOR
10thFLOOR	PRIME	SURGE	1-138	2	DSMPS32T1	32 T1 PROTECTOR
DOMINO	PRIME	SURGE	1-139	2	DSMPS32T1	32 T1 PROTECTOR
FORD&BLMNT	A&B-RMT	SURGE	1-140	1	DSPBM6607	PUNCH DOWN FOR M66 BLOCK. PAIR PROT
31st&GRAYS	A&B-RMT	SURGE	1-141	1	DSPBM6607	PUNCH DOWN FOR M66 BLOCK. PAIR PROT
VICTRYGNDS	A&B-RMT	SURGE	1-142	1	DSPBM6607	PUNCH DOWN FOR M66 BLOCK. PAIR PROT
SOUTHMPTN	A&B-RMT	SURGE	1-143	1	DSPBM6607	PUNCH DOWN FOR M66 BLOCK. PAIR PROT
ENGINE9	A&B-RMT	SURGE	1-144	1	DSPBM6607	PUNCH DOWN FOR M66 BLOCK. PAIR PROT
POLACAD	A&B-RMT	SURGE	1-145	1	DSPBM6607	PUNCH DOWN FOR M66 BLOCK. PAIR PROT
BSLTN&HOFF	A&B-RMT	SURGE	1-146	1	DSPBM6607	PUNCH DOWN FOR M66 BLOCK. PAIR PROT
STRTS&HYWY	A&B-RMT	SURGE	1-147	1	DSPBM6607	PUNCH DOWN FOR M66 BLOCK. PAIR PROT
RM626M	MASTER	CPS	1-464	5	RKN4106	CABLE- PROGRAMMING, RS232
RM626M	MASTER	CPS	1-465	5	RKN4105	CABLE- PROGRAMMING USB
RM626M	MASTER	QTARUPGRD	1-445	1	RVN5002	RSS QUANTAR QUANTRO RECEIVER
RM626M	MASTER	CPS	1-462	5	RVN4186AA	CPS R10.00.00 ASTRO 25 PORT/MOBILE
10thFLOOR	A&B-RMT	QTARUPGRD	1-435	1	SQM01SUM0130	SOFTWARE & HARDWARE UPGRADE KIT
10thFLOOR	A&B-RMT	QTARUPGRD	1-435a	36	CA00134AA	ENH: 6809 TRUNKED UPGRADE
10thFLOOR	A&B-RMT	QTARUPGRD	1-435b	36	CA00137AA	ENH: PRE 5.0 TO P25 UPGRADE
10thFLOOR	A&B-RMT	QTARUPGRD	1-435c	36	CA00025AE	ADD: 6.X MULTI SITE UPGRADE
10thFLOOR	A&B-RMT	QTARUPGRD	1-435d	36	CA00255AA	ADD: EPIC IV CONTROL BOARD

10thFLOOR	A&B-RMT	QTARUPGRD	1-435e	36	CA00257AA	ADD: EXCITER EPROM UPGRADE
10thFLOOR	A&B-RMT	QTARUPGRD	1-435f	36	X793	ENH: EPIC BOARD ALREADY IN USE
DOMINO	A&B-RMT	QTARUPGRD	1-436	1	SQM01SUM0130	SOFTWARE & HARDWARE UPGRADE KIT
DOMINO	A&B-RMT	QTARUPGRD	1-436a	37	CA00134AA	ENH: 6809 TRUNKED UPGRADE
DOMINO	A&B-RMT	QTARUPGRD	1-436b	37	CA00137AA	ENH: PRE 5.0 TO P25 UPGRADE
DOMINO	A&B-RMT	QTARUPGRD	1-436c	37	CA00025AE	ADD: 6.X MULTI SITE UPGRADE
DOMINO	A&B-RMT	QTARUPGRD	1-436d	37	CA00255AA	ADD: EPIC IV CONTROL BOARD
DOMINO	A&B-RMT	QTARUPGRD	1-436e	37	CA00257AA	ADD: EXCITER EPROM UPGRADE
DOMINO	A&B-RMT	QTARUPGRD	1-436f	37	X793	ENH: EPIC BOARD ALREADY IN USE
SOUTHMPTN	A&B-RMT	QTARUPGRD	1-437	1	SQM01SUM0130	SOFTWARE & HARDWARE UPGRADE KIT
SOUTHMPTN	A&B-RMT	QTARUPGRD	1-437a	37	CA00134AA	ENH: 6809 TRUNKED UPGRADE
SOUTHMPTN	A&B-RMT	QTARUPGRD	1-437b	37	CA00137AA	ENH: PRE 5.0 TO P25 UPGRADE
SOUTHMPTN	A&B-RMT	QTARUPGRD	1-437c	37	CA00025AE	ADD: 6.X MULTI SITE UPGRADE
SOUTHMPTN	A&B-RMT	QTARUPGRD	1-437d	37	CA00255AA	ADD: EPIC IV CONTROL BOARD
SOUTHMPTN	A&B-RMT	QTARUPGRD	1-437e	37	CA00257AA	ADD: EXCITER EPROM UPGRADE
SOUTHMPTN	A&B-RMT	QTARUPGRD	1-437f	37	X793	ENH: EPIC BOARD ALREADY IN USE
ENGINE9	A&B-RMT	QTARUPGRD	1-438	1	SQM01SUM0130	SOFTWARE & HARDWARE UPGRADE KIT
ENGINE9	A&B-RMT	QTARUPGRD	1-438a	36	CA00134AA	ENH: 6809 TRUNKED UPGRADE
ENGINE9	A&B-RMT	QTARUPGRD	1-438b	36	CA00137AA	ENH: PRE 5.0 TO P25 UPGRADE
ENGINE9	A&B-RMT	QTARUPGRD	1-438c	36	CA00025AE	ADD: 6.X MULTI SITE UPGRADE
ENGINE9	A&B-RMT	QTARUPGRD	1-438d	36	CA00255AA	ADD: EPIC IV CONTROL BOARD
ENGINE9	A&B-RMT	QTARUPGRD	1-438e	36	CA00257AA	ADD: EXCITER EPROM UPGRADE
ENGINE9	A&B-RMT	QTARUPGRD	1-438f	36	X793	ENH: EPIC BOARD ALREADY IN USE
FORD&BLMNT	A&B-RMT	QTARUPGRD	1-439	1	SQM01SUM0130	SOFTWARE & HARDWARE UPGRADE KIT
FORD&BLMNT	A&B-RMT	QTARUPGRD	1-439a	36	CA00134AA	ENH: 6809 TRUNKED UPGRADE
FORD&BLMNT	A&B-RMT	QTARUPGRD	1-439b	36	CA00137AA	ENH: PRE 5.0 TO P25 UPGRADE
FORD&BLMNT	A&B-RMT	QTARUPGRD	1-439c	36	CA00025AE	ADD: 6.X MULTI SITE UPGRADE
FORD&BLMNT	A&B-RMT	QTARUPGRD	1-439d	36	CA00255AA	ADD: EPIC IV CONTROL BOARD

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FORD&BLMNT	A&B-RMT	QTARUPGRD	1-439e	36	CA00257AA	ADD: EXCITER EPROM UPGRADE
FORD&BLMNT	A&B-RMT	QTARUPGRD	1-439f	36	X793	ENH: EPIC BOARD ALREADY IN USE
VICTRYGNDS	A&B-RMT	QTARUPGRD	1-440	1	SQM01SUM0130	SOFTWARE & HARDWARE UPGRADE KIT
VICTRYGNDS	A&B-RMT	QTARUPGRD	1-440a	36	CA00134AA	ENH: 6809 TRUNKED UPGRADE
VICTRYGNDS	A&B-RMT	QTARUPGRD	1-440b	36	CA00137AA	ENH: PRE 5.0 TO P25 UPGRADE
VICTRYGNDS	A&B-RMT	QTARUPGRD	1-440c	36	CA00025AE	ADD: 6.X MULTI SITE UPGRADE
VICTRYGNDS	A&B-RMT	QTARUPGRD	1-440d	36	CA00255AA	ADD: EPIC IV CONTROL BOARD
VICTRYGNDS	A&B-RMT	QTARUPGRD	1-440e	36	CA00257AA	ADD: EXCITER EPROM UPGRADE
VICTRYGNDS	A&B-RMT	QTARUPGRD	1-440f	36	X793	ENH: EPIC BOARD ALREADY IN USE
31st&GRAYS	A&B-RMT	QTARUPGRD	1-441	1	SQM01SUM0130	SOFTWARE & HARDWARE UPGRADE KIT
31st&GRAYS	A&B-RMT	QTARUPGRD	1-441a	36	CA00134AA	ENH: 6809 TRUNKED UPGRADE
31st&GRAYS	A&B-RMT	QTARUPGRD	1-441b	36	CA00137AA	ENH: PRE 5.0 TO P25 UPGRADE
31st&GRAYS	A&B-RMT	QTARUPGRD	1-441c	36	CA00025AE	ADD: 6.X MULTI SITE UPGRADE
31st&GRAYS	A&B-RMT	QTARUPGRD	1-441d	36	CA00255AA	ADD: EPIC IV CONTROL BOARD
31st&GRAYS	A&B-RMT	QTARUPGRD	1-441e	36	CA00257AA	ADD: EXCITER EPROM UPGRADE
31st&GRAYS	A&B-RMT	QTARUPGRD	1-441f	36	X793	ENH: EPIC BOARD ALREADY IN USE
SOUTHMPTN	A&B-RMT	QTARUPGRD	1-442	1	SQM01SUM0130	SOFTWARE & HARDWARE UPGRADE KIT
SOUTHMPTN	A&B-RMT	QTARUPGRD	1-442a	36	CA00134AA	ENH: 6809 TRUNKED UPGRADE
SOUTHMPTN	A&B-RMT	QTARUPGRD	1-442b	36	CA00137AA	ENH: PRE 5.0 TO P25 UPGRADE
SOUTHMPTN	A&B-RMT	QTARUPGRD	1-442c	36	CA00025AE	ADD: 6.X MULTI SITE UPGRADE
SOUTHMPTN	A&B-RMT	QTARUPGRD	1-442d	36	CA00255AA	ADD: EPIC IV CONTROL BOARD
SOUTHMPTN	A&B-RMT	QTARUPGRD	1-442e	36	CA00257AA	ADD: EXCITER EPROM UPGRADE
SOUTHMPTN	A&B-RMT	QTARUPGRD	1-442f	36	X793	ENH: EPIC BOARD ALREADY IN USE
POLACAD	A&B-RMT	QTARUPGRD	1-443	1	SQM01SUM0130	SOFTWARE & HARDWARE UPGRADE KIT
POLACAD	A&B-RMT	QTARUPGRD	1-443a	36	CA00134AA	ENH: 6809 TRUNKED UPGRADE
POLACAD	A&B-RMT	QTARUPGRD	1-443b	36	CA00137AA	ENH: PRE 5.0 TO P25 UPGRADE
POLACAD	A&B-RMT	QTARUPGRD	1-443c	36	CA00025AE	ADD: 6.X MULTI SITE UPGRADE
POLACAD	A&B-RMT	QTARUPGRD	1-443d	36	CA00255AA	ADD: EPIC IV CONTROL BOARD

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POLACAD	A&B-RMT	QTARUPGRD	1-443e	36	CA00257AA	ADD: EXCITER EPROM UPGRADE
POLACAD	A&B-RMT	QTARUPGRD	1-443f	36	X793	ENH: EPIC BOARD ALREADY IN USE
BSLTN&HOFF	A&B-RMT	QTARUPGRD	1-444	1	SQM01SUM0130	SOFTWARE & HARDWARE UPGRADE KIT
BSLTN&HOFF	A&B-RMT	QTARUPGRD	1-444a	36	CA00134AA	ENH: 6809 TRUNKED UPGRADE
BSLTN&HOFF	A&B-RMT	QTARUPGRD	1-444b	36	CA00137AA	ENH: PRE 5.0 TO P25 UPGRADE
BSLTN&HOFF	A&B-RMT	QTARUPGRD	1-444c	36	CA00025AE	ADD: 6.X MULTI SITE UPGRADE
BSLTN&HOFF	A&B-RMT	QTARUPGRD	1-444d	36	CA00255AA	ADD: EPIC IV CONTROL BOARD
BSLTN&HOFF	A&B-RMT	QTARUPGRD	1-444e	36	CA00257AA	ADD: EXCITER EPROM UPGRADE
BSLTN&HOFF	A&B-RMT	QTARUPGRD	1-444f	36	X793	ENH: EPIC BOARD ALREADY IN USE
RM626M	MASTER	PAK	1-461	1	CVN6143	PROGAMMING ACCESS KEY (PAK) 3.5" ME
RM626M	MUNI	ELITEUPGRD	1-450	2	DSJ4900B	HP PROCURVE SWITCH 2626B
PAB	POLICE	ELITEUPGRD	1-453	4	DSJ4900B	HP PROCURVE SWITCH 2626B
FAB	FIRE	ELITEUPGRD	1-456	2	DSJ4900B	HP PROCURVE SWITCH 2626B
PIA	AIRPORT	ELITEUPGRD	1-459	2	DSJ4900B	HP PROCURVE SWITCH 2626B
RM626M	MASTER	CPS	1-463	5	HKN6155	PROGRAMMING/FLASH CABLE, ASTRO SPEC
RM626M	MASTER	QTARUPGRD	1-446	1	DLN6455	CONFIGURATION/SERVICE SOFTWARE
RM626M	MASTER	ELITEUPGRD	1-460	1	B1879	CENTRACOM GOLD SOFTWARE REFRESH PAC
RM626M	MASTER	ELITEUPGRD	1-460a	73	X69	ADD: SOFTWARE REFRESH, COIM OR LOMI
RM626M	MASTER	ELITEUPGRD	1-460b	53	X03	ADD: SOFTWARE REFRESH, ELITE/ADMI0D
RM626M	MASTER	ELITEUPGRD	1-460c	65	X49	ADD: SOFTWARE REFRESH, BIM
RM626M	MASTER	ELITEUPGRD	1-460d	42	X80	ADD: SOFTWARE REFRESH, AMBASSADOR
RM626M	MASTER	ELITEUPGRD	1-460e	87	X60	ADD: SOFTWARE REFRESH, SPI
RM626M	MASTER	ELITEUPGRD	1-460f	3	X77	ADD: SOFTWARE REFRESH, 16 I/O OR CO
RM626M	MASTER	ELITEUPGRD	1-460g	34	X79	ADD: SOFTWARE REFRESH, AIMI
10thFLOOR	PRIME	PRMCTRL	1-1	2	T7038	GCP 8000 SITE CONTROLLER
10thFLOOR	PRIME	PRMCTRL	1-1a	2	X153AW	ADD: RACK MOUNT HARDWARE
10thFLOOR	PRIME	PRMCTRL	1-1b	2	CA00303AB	ADD: QTY (1) SITE CONTROLLER
10thFLOOR	PRIME	PRMCTRL	1-1c	2	CA00025AG	ADD: CIRCUIT BASED MULTISITE SITE C
DOMINO	PRIME	PRMCTRL	1-21	2	T7038	GCP 8000 SITE CONTROLLER

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DOMINO	PRIME	PRMCTRL	1-21a	2	X153AW	ADD: RACK MOUNT HARDWARE
DOMINO	PRIME	PRMCTRL	1-21b	2	CA00303AB	ADD: QTY (1) SITE CONTROLLER
DOMINO	PRIME	PRMCTRL	1-21c	2	CA00025AG	ADD: CIRCUIT BASED MULTISITE SITE C
10thFLOOR	A&B-RMT	HSU	1-51	2	DSPREM821260	2 PORT V 35 HSU CARD WITH DB25F
10thFLOOR	A&B-RMT	HSU	1-52	4	DSPREM1203F	CABLE 5FT DB25M TO V.35F STRAIGHT
DOMINO	A&B-RMT	HSU	1-60	2	DSPREM821260	2 PORT V 35 HSU CARD WITH DB25F
DOMINO	A&B-RMT	HSU	1-61	4	DSPREM1203F	CABLE 5FT DB25M TO V.35F STRAIGHT
FORD&BLMNT	A&B-RMT	HSU	1-69	1	DSPREM821260	2 PORT V 35 HSU CARD WITH DB25F
FORD&BLMNT	A&B-RMT	HSU	1-70	2	DSPREM1203F	CABLE 5FT DB25M TO V.35F STRAIGHT
31st&GRAYS	A&B-RMT	HSU	1-78	1	DSPREM821260	2 PORT V 35 HSU CARD WITH DB25F
31st&GRAYS	A&B-RMT	HSU	1-79	2	DSPREM1203F	CABLE 5FT DB25M TO V.35F STRAIGHT
VICTRYGNDS	A&B-RMT	HSU	1-87	1	DSPREM821260	2 PORT V 35 HSU CARD WITH DB25F
VICTRYGNDS	A&B-RMT	HSU	1-88	2	DSPREM1203F	CABLE 5FT DB25M TO V.35F STRAIGHT
SOUTHMPTN	A&B-RMT	HSU	1-96	1	DSPREM821260	2 PORT V 35 HSU CARD WITH DB25F
SOUTHMPTN	A&B-RMT	HSU	1-97	2	DSPREM1203F	CABLE 5FT DB25M TO V.35F STRAIGHT
ENGINE9	A&B-RMT	HSU	1-107	1	DSPREM821260	2 PORT V 35 HSU CARD WITH DB25F
ENGINE9	A&B-RMT	HSU	1-108	2	DSPREM1203F	CABLE 5FT DB25M TO V.35F STRAIGHT
POLACAD	A&B-RMT	HSU	1-116	1	DSPREM821260	2 PORT V 35 HSU CARD WITH DB25F
POLACAD	A&B-RMT	HSU	1-117	2	DSPREM1203F	CABLE 5FT DB25M TO V.35F STRAIGHT
BSLTN&HOFF	A&B-RMT	HSU	1-125	1	DSPREM821260	2 PORT V 35 HSU CARD WITH DB25F
BSLTN&HOFF	A&B-RMT	HSU	1-126	2	DSPREM1203F	CABLE 5FT DB25M TO V.35F STRAIGHT
STRTS&HYWY	A&B-RMT	HSU	1-134	1	DSPREM821260	2 PORT V 35 HSU CARD WITH DB25F
STRTS&HYWY	A&B-RMT	HSU	1-135	2	DSPREM1203F	CABLE 5FT DB25M TO V.35F STRAIGHT
10thFLOOR	PRIME	PRMRTR	1-17	2	ST6000	S6000 MNR MULTI-PROTOCOL ROUTER
10thFLOOR	PRIME	PRMRTR	1-18	2	ST6010	S6000 4-PORT ULTRAWAN MODULE
DOMINO	PRIME	PRMRTR	1-42	2	ST6000	S6000 MNR MULTI-PROTOCOL ROUTER
DOMINO	PRIME	PRMRTR	1-43	2	ST6010	S6000 4-PORT ULTRAWAN MODULE
10thFLOOR	A-RMT	PRMRTR	1-45	2	ST6000	S6000 MNR MULTI-PROTOCOL ROUTER

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10thFLOOR	A-RMT	PRMRTR	1-46	2	ST6010	S6000 4-PORT ULTRAWAN MODULE
10thFLOOR	B-RMT	SITERTR	1-48	1	ST2500	S2500 MULTIPROTOCOL WAN ROUTER
10thFLOOR	B-RMT	SITERTR	1-49	1	ST2511	S2500 FLEXWAN DAUGHTER BOARD
DOMINO	A-RMT	SITERTR	1-54	1	ST2500	S2500 MULTIPROTOCOL WAN ROUTER
DOMINO	A-RMT	SITERTR	1-55	1	ST2511	S2500 FLEXWAN DAUGHTER BOARD
DOMINO	B-RMT	PRMRTR	1-57	2	ST6000	S6000 MNR MULTI-PROTOCOL ROUTER
DOMINO	B-RMT	PRMRTR	1-58	2	ST6010	S6000 4-PORT ULTRAWAN MODULE
FORD&BLMNT	A-RMT	SITERTR	1-63	1	ST2500	S2500 MULTIPROTOCOL WAN ROUTER
FORD&BLMNT	A-RMT	SITERTR	1-64	1	ST2511	S2500 FLEXWAN DAUGHTER BOARD
FORD&BLMNT	B-RMT	SITERTR	1-66	1	ST2500	S2500 MULTIPROTOCOL WAN ROUTER
FORD&BLMNT	B-RMT	SITERTR	1-67	1	ST2511	S2500 FLEXWAN DAUGHTER BOARD
31st&GRAYS	A-RMT	SITERTR	1-72	1	ST2500	S2500 MULTIPROTOCOL WAN ROUTER
31st&GRAYS	A-RMT	SITERTR	1-73	1	ST2511	S2500 FLEXWAN DAUGHTER BOARD
31st&GRAYS	B-RMT	SITERTR	1-75	1	ST2500	S2500 MULTIPROTOCOL WAN ROUTER
31st&GRAYS	B-RMT	SITERTR	1-76	1	ST2511	S2500 FLEXWAN DAUGHTER BOARD
VICTRYGNDS	A-RMT	SITERTR	1-81	1	ST2500	S2500 MULTIPROTOCOL WAN ROUTER
VICTRYGNDS	A-RMT	SITERTR	1-82	1	ST2511	S2500 FLEXWAN DAUGHTER BOARD
VICTRYGNDS	B-RMT	SITERTR	1-84	1	ST2500	S2500 MULTIPROTOCOL WAN ROUTER
VICTRYGNDS	B-RMT	SITERTR	1-85	1	ST2511	S2500 FLEXWAN DAUGHTER BOARD
SOUTHMPTN	A-RMT	SITERTR	1-90	1	ST2500	S2500 MULTIPROTOCOL WAN ROUTER
SOUTHMPTN	A-RMT	SITERTR	1-91	1	ST2511	S2500 FLEXWAN DAUGHTER BOARD
SOUTHMPTN	B-RMT	SITERTR	1-93	1	ST2500	S2500 MULTIPROTOCOL WAN ROUTER
SOUTHMPTN	B-RMT	SITERTR	1-94	1	ST2511	S2500 FLEXWAN DAUGHTER BOARD
ENGINE9	A-RMT	SITERTR	1-101	1	ST2500	S2500 MULTIPROTOCOL WAN ROUTER
ENGINE9	A-RMT	SITERTR	1-102	1	ST2511	S2500 FLEXWAN DAUGHTER BOARD
ENGINE9	B-RMT	SITERTR	1-104	1	ST2500	S2500 MULTIPROTOCOL WAN ROUTER
ENGINE9	B-RMT	SITERTR	1-105	1	ST2511	S2500 FLEXWAN DAUGHTER BOARD
POLACAD	A-RMT	SITERTR	1-110	1	ST2500	S2500 MULTIPROTOCOL WAN ROUTER

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POLACAD	A-RMT	SITERTR	1-111	1	ST2511	S2500 FLEXWAN DAUGHTER BOARD
POLACAD	B-RMT	SITERTR	1-113	1	ST2500	S2500 MULTIPROTOCOL WAN ROUTER
POLACAD	B-RMT	SITERTR	1-114	1	ST2511	S2500 FLEXWAN DAUGHTER BOARD
BSLTN&HOFF	A-RMT	SITERTR	1-119	1	ST2500	S2500 MULTIPROTOCOL WAN ROUTER
BSLTN&HOFF	A-RMT	SITERTR	1-120	1	ST2511	S2500 FLEXWAN DAUGHTER BOARD
BSLTN&HOFF	A&B-RMT	SITERTR	1-122	1	ST2500	S2500 MULTIPROTOCOL WAN ROUTER
BSLTN&HOFF	A&B-RMT	SITERTR	1-123	1	ST2511	S2500 FLEXWAN DAUGHTER BOARD
STRTS&HYWY	A-RMT	SITERTR	1-128	1	ST2500	S2500 MULTIPROTOCOL WAN ROUTER
STRTS&HYWY	A-RMT	SITERTR	1-129	1	ST2511	S2500 FLEXWAN DAUGHTER BOARD
STRTS&HYWY	B-RMT	SITERTR	1-131	1	ST2500	S2500 MULTIPROTOCOL WAN ROUTER
STRTS&HYWY	B-RMT	SITERTR	1-132	1	ST2511	S2500 FLEXWAN DAUGHTER BOARD
10thFLOOR	PRIME	RACK	1-20	6	DS46053701	6 FT UNIVERSAL RACK BLACK 19 IN WI
10thFLOOR	A&B-RMT	RACK	1-53	1	DS46053701	6 FT UNIVERSAL RACK BLACK 19 IN WI
DOMINO	A&B-RMT	RACK	1-62	1	DS46053701	6 FT UNIVERSAL RACK BLACK 19 IN WI
FORD&BLMNT	A&B-RMT	RACK	1-71	1	DS46053701	6 FT UNIVERSAL RACK BLACK 19 IN WI
31st&GRAYS	A&B-RMT	RACK	1-80	1	DS46053701	6 FT UNIVERSAL RACK BLACK 19 IN WI
VICTRYGNDS	A&B-RMT	RACK	1-89	1	DS46053701	6 FT UNIVERSAL RACK BLACK 19 IN WI
SOUTHMPTN	A&B-RMT	RACK	1-100	1	DS46053701	6 FT UNIVERSAL RACK BLACK 19 IN WI
ENGINE9	A&B-RMT	RACK	1-109	1	DS46053701	6 FT UNIVERSAL RACK BLACK 19 IN WI
POLACAD	A&B-RMT	RACK	1-118	1	DS46053701	6 FT UNIVERSAL RACK BLACK 19 IN WI
BSLTN&HOFF	A&B-RMT	RACK	1-127	1	DS46053701	6 FT UNIVERSAL RACK BLACK 19 IN WI
STRTS&HYWY	A&B-RMT	RACK	1-136	1	DS46053701	6 FT UNIVERSAL RACK BLACK 19 IN WI
RM626M	MASTER	MAINTOP	1-468	1	DS40108719	DOUBLE SIDED 19 INCH RACK
RM626M	MASTER	MAINTOP	1-469	1	DS12193101	KEYBOARD
RM626M	MASTER	MAINTOP	1-470	1	DSJNSB59619B	19 SHELF. B-LINE SAME AS 40622 NEW
RM626M	MASTER	MAINTOP	1-447	1	B1822B	CENTRACOM GOLD ELITE INTERFACE ELEC
RM626M	MASTER	MAINTOP	1-447a	1	K572AF	ADD: FOOTSWITCH
RM626M	MASTER	MAINTOP	1-447b	1	K704AA	ADD: HEADSET JACK, #2 W/6 FOOT CABL
RM626M	MASTER	MAINTOP	1-447c	1	K570	ADD: HEADSET JACK, W/5 FOOT CABLE (

RM626M	MASTER	MAINTOP	1-447d	1	K703	ADD: MICROPHONE, GOOSENECK, 9 INCH
10thFLOOR	PRIME	ATAC9600	1-2	1	T6507	ASTRO-TAC 9600 COMPARATOR
10thFLOOR	PRIME	ATAC9600	1-2a	1	CA00091AA	ENH: ASTRO 25 SIMULCAST TRUNKING OP
10thFLOOR	PRIME	ATAC9600	1-2b	1	X230AJ	ADD: 16 I/O PORTS
10thFLOOR	PRIME	ATAC9600	1-2c	1	X153	ADD: HARDWARE, RACKMOUNT
10thFLOOR	PRIME	ATAC9600	1-3	1	T6507	ASTRO-TAC 9600 COMPARATOR
10thFLOOR	PRIME	ATAC9600	1-3a	1	CA00091AA	ENH: ASTRO 25 SIMULCAST TRUNKING OP
10thFLOOR	PRIME	ATAC9600	1-3b	1	X230AJ	ADD: 16 I/O PORTS
10thFLOOR	PRIME	ATAC9600	1-3c	1	X153	ADD: HARDWARE, RACKMOUNT
10thFLOOR	PRIME	ATAC9600	1-4	1	T6507	ASTRO-TAC 9600 COMPARATOR
10thFLOOR	PRIME	ATAC9600	1-4a	1	CA00091AA	ENH: ASTRO 25 SIMULCAST TRUNKING OP
10thFLOOR	PRIME	ATAC9600	1-4b	1	X230AJ	ADD: 16 I/O PORTS
10thFLOOR	PRIME	ATAC9600	1-4c	1	X153	ADD: HARDWARE, RACKMOUNT
10thFLOOR	PRIME	ATAC9600	1-5	1	T6507	ASTRO-TAC 9600 COMPARATOR
10thFLOOR	PRIME	ATAC9600	1-5a	1	CA00091AA	ENH: ASTRO 25 SIMULCAST TRUNKING OP
10thFLOOR	PRIME	ATAC9600	1-5b	1	X230AJ	ADD: 16 I/O PORTS
10thFLOOR	PRIME	ATAC9600	1-5c	1	X153	ADD: HARDWARE, RACKMOUNT
10thFLOOR	PRIME	ATAC9600	1-6	1	T6507	ASTRO-TAC 9600 COMPARATOR
10thFLOOR	PRIME	ATAC9600	1-6a	1	CA00091AA	ENH: ASTRO 25 SIMULCAST TRUNKING OP
10thFLOOR	PRIME	ATAC9600	1-6b	1	X230AJ	ADD: 16 I/O PORTS
10thFLOOR	PRIME	ATAC9600	1-6c	1	X153	ADD: HARDWARE, RACKMOUNT
10thFLOOR	PRIME	ATAC9600	1-7	1	T6507	ASTRO-TAC 9600 COMPARATOR
10thFLOOR	PRIME	ATAC9600	1-7a	1	CA00091AA	ENH: ASTRO 25 SIMULCAST TRUNKING OP
10thFLOOR	PRIME	ATAC9600	1-7b	1	X230AJ	ADD: 16 I/O PORTS
10thFLOOR	PRIME	ATAC9600	1-7c	1	X153	ADD: HARDWARE, RACKMOUNT
10thFLOOR	PRIME	ATAC9600	1-8	1	T6507	ASTRO-TAC 9600 COMPARATOR
10thFLOOR	PRIME	ATAC9600	1-8a	1	CA00091AA	ENH: ASTRO 25 SIMULCAST TRUNKING OP
10thFLOOR	PRIME	ATAC9600	1-8b	1	X230AJ	ADD: 16 I/O PORTS
10thFLOOR	PRIME	ATAC9600	1-8c	1	X153	ADD: HARDWARE, RACKMOUNT
10thFLOOR	PRIME	ATAC9600	1-9	1	T6507	ASTRO-TAC 9600 COMPARATOR
10thFLOOR	PRIME	ATAC9600	1-9a	1	CA00091AA	ENH: ASTRO 25 SIMULCAST TRUNKING OP
10thFLOOR	PRIME	ATAC9600	1-9b	1	X230AJ	ADD: 16 I/O PORTS

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10thFLOOR	PRIME	ATAC9600	1-9c	1	X153	ADD: HARDWARE, RACKMOUNT
10thFLOOR	PRIME	ATAC9600	1-10	1	T6507	ASTRO-TAC 9600 COMPARATOR
10thFLOOR	PRIME	ATAC9600	1-10a	1	CA00091AA	ENH: ASTRO 25 SIMULCAST TRUNKING OP
10thFLOOR	PRIME	ATAC9600	1-10b	1	X230AJ	ADD: 16 I/O PORTS
10thFLOOR	PRIME	ATAC9600	1-10c	1	X153	ADD: HARDWARE, RACKMOUNT
10thFLOOR	PRIME	ATAC9600	1-11	1	T6507	ASTRO-TAC 9600 COMPARATOR
10thFLOOR	PRIME	ATAC9600	1-11a	1	CA00091AA	ENH: ASTRO 25 SIMULCAST TRUNKING OP
10thFLOOR	PRIME	ATAC9600	1-11b	1	X230AJ	ADD: 16 I/O PORTS
10thFLOOR	PRIME	ATAC9600	1-11c	1	X153	ADD: HARDWARE, RACKMOUNT
10thFLOOR	PRIME	ATAC9600	1-12	1	T6507	ASTRO-TAC 9600 COMPARATOR
10thFLOOR	PRIME	ATAC9600	1-12a	1	CA00091AA	ENH: ASTRO 25 SIMULCAST TRUNKING OP
10thFLOOR	PRIME	ATAC9600	1-12b	1	X230AJ	ADD: 16 I/O PORTS
10thFLOOR	PRIME	ATAC9600	1-12c	1	X153	ADD: HARDWARE, RACKMOUNT
10thFLOOR	PRIME	ATAC9600	1-13	1	T6507	ASTRO-TAC 9600 COMPARATOR
10thFLOOR	PRIME	ATAC9600	1-13a	1	CA00091AA	ENH: ASTRO 25 SIMULCAST TRUNKING OP
10thFLOOR	PRIME	ATAC9600	1-13b	1	X230AJ	ADD: 16 I/O PORTS
10thFLOOR	PRIME	ATAC9600	1-13c	1	X153	ADD: HARDWARE, RACKMOUNT
10thFLOOR	PRIME	ATAC9600	1-14	1	T6507	ASTRO-TAC 9600 COMPARATOR
10thFLOOR	PRIME	ATAC9600	1-14a	1	CA00091AA	ENH: ASTRO 25 SIMULCAST TRUNKING OP
10thFLOOR	PRIME	ATAC9600	1-14b	1	X230AJ	ADD: 16 I/O PORTS
10thFLOOR	PRIME	ATAC9600	1-14c	1	X153	ADD: HARDWARE, RACKMOUNT
10thFLOOR	PRIME	ATAC9600	1-15	1	T6507	ASTRO-TAC 9600 COMPARATOR
10thFLOOR	PRIME	ATAC9600	1-15a	1	CA00091AA	ENH: ASTRO 25 SIMULCAST TRUNKING OP
10thFLOOR	PRIME	ATAC9600	1-15b	1	X230AJ	ADD: 16 I/O PORTS
10thFLOOR	PRIME	ATAC9600	1-15c	1	X153	ADD: HARDWARE, RACKMOUNT
10thFLOOR	PRIME	ATAC9600	1-16	1	T6507	ASTRO-TAC 9600 COMPARATOR
10thFLOOR	PRIME	ATAC9600	1-16a	1	CA00091AA	ENH: ASTRO 25 SIMULCAST TRUNKING OP
10thFLOOR	PRIME	ATAC9600	1-16b	1	X230AJ	ADD: 16 I/O PORTS
10thFLOOR	PRIME	ATAC9600	1-16c	1	X153	ADD: HARDWARE, RACKMOUNT
DOMINO	PRIME	ATAC9600	1-22	1	T6507	ASTRO-TAC 9600 COMPARATOR
DOMINO	PRIME	ATAC9600	1-22a	1	CA00091AA	ENH: ASTRO 25 SIMULCAST TRUNKING OP
DOMINO	PRIME	ATAC9600	1-22b	1	X230AJ	ADD: 16 I/O PORTS

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DOMINO	PRIME	ATAC9600	1-22c	1	X153	ADD: HARDWARE, RACKMOUNT
DOMINO	PRIME	ATAC9600	1-23	1	T6507	ASTRO-TAC 9600 COMPARATOR
DOMINO	PRIME	ATAC9600	1-23a	1	CA00091AA	ENH: ASTRO 25 SIMULCAST TRUNKING OP
DOMINO	PRIME	ATAC9600	1-23b	1	X230AJ	ADD: 16 I/O PORTS
DOMINO	PRIME	ATAC9600	1-23c	1	X153	ADD: HARDWARE, RACKMOUNT
DOMINO	PRIME	ATAC9600	1-24	1	T6507	ASTRO-TAC 9600 COMPARATOR
DOMINO	PRIME	ATAC9600	1-24a	1	CA00091AA	ENH: ASTRO 25 SIMULCAST TRUNKING OP
DOMINO	PRIME	ATAC9600	1-24b	1	X230AJ	ADD: 16 I/O PORTS
DOMINO	PRIME	ATAC9600	1-24c	1	X153	ADD: HARDWARE, RACKMOUNT
DOMINO	PRIME	ATAC9600	1-25	1	T6507	ASTRO-TAC 9600 COMPARATOR
DOMINO	PRIME	ATAC9600	1-25a	1	CA00091AA	ENH: ASTRO 25 SIMULCAST TRUNKING OP
DOMINO	PRIME	ATAC9600	1-25b	1	X230AJ	ADD: 16 I/O PORTS
DOMINO	PRIME	ATAC9600	1-25c	1	X153	ADD: HARDWARE, RACKMOUNT
DOMINO	PRIME	ATAC9600	1-26	1	T6507	ASTRO-TAC 9600 COMPARATOR
DOMINO	PRIME	ATAC9600	1-26a	1	CA00091AA	ENH: ASTRO 25 SIMULCAST TRUNKING OP
DOMINO	PRIME	ATAC9600	1-26b	1	X230AJ	ADD: 16 I/O PORTS
DOMINO	PRIME	ATAC9600	1-26c	1	X153	ADD: HARDWARE, RACKMOUNT
DOMINO	PRIME	ATAC9600	1-27	1	T6507	ASTRO-TAC 9600 COMPARATOR
DOMINO	PRIME	ATAC9600	1-27a	1	CA00091AA	ENH: ASTRO 25 SIMULCAST TRUNKING OP
DOMINO	PRIME	ATAC9600	1-27b	1	X230AJ	ADD: 16 I/O PORTS
DOMINO	PRIME	ATAC9600	1-27c	1	X153	ADD: HARDWARE, RACKMOUNT
DOMINO	PRIME	ATAC9600	1-28	1	T6507	ASTRO-TAC 9600 COMPARATOR
DOMINO	PRIME	ATAC9600	1-28a	1	CA00091AA	ENH: ASTRO 25 SIMULCAST TRUNKING OP
DOMINO	PRIME	ATAC9600	1-28b	1	X230AJ	ADD: 16 I/O PORTS
DOMINO	PRIME	ATAC9600	1-28c	1	X153	ADD: HARDWARE, RACKMOUNT
DOMINO	PRIME	ATAC9600	1-29	1	T6507	ASTRO-TAC 9600 COMPARATOR
DOMINO	PRIME	ATAC9600	1-29a	1	CA00091AA	ENH: ASTRO 25 SIMULCAST TRUNKING OP
DOMINO	PRIME	ATAC9600	1-29b	1	X230AJ	ADD: 16 I/O PORTS
DOMINO	PRIME	ATAC9600	1-29c	1	X153	ADD: HARDWARE, RACKMOUNT
DOMINO	PRIME	ATAC9600	1-30	1	T6507	ASTRO-TAC 9600 COMPARATOR
DOMINO	PRIME	ATAC9600	1-30a	1	CA00091AA	ENH: ASTRO 25 SIMULCAST TRUNKING OP
DOMINO	PRIME	ATAC9600	1-30b	1	X230AJ	ADD: 16 I/O PORTS

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DOMINO	PRIME	ATAC9600	1-30c	1	X153	ADD: HARDWARE, RACKMOUNT
DOMINO	PRIME	ATAC9600	1-31	1	T6507	ASTRO-TAC 9600 COMPARATOR
DOMINO	PRIME	ATAC9600	1-31a	1	CA00091AA	ENH: ASTRO 25 SIMULCAST TRUNKING OP
DOMINO	PRIME	ATAC9600	1-31b	1	X230AJ	ADD: 16 I/O PORTS
DOMINO	PRIME	ATAC9600	1-31c	1	X153	ADD: HARDWARE, RACKMOUNT
DOMINO	PRIME	ATAC9600	1-32	1	T6507	ASTRO-TAC 9600 COMPARATOR
DOMINO	PRIME	ATAC9600	1-32a	1	CA00091AA	ENH: ASTRO 25 SIMULCAST TRUNKING OP
DOMINO	PRIME	ATAC9600	1-32b	1	X230AJ	ADD: 16 I/O PORTS
DOMINO	PRIME	ATAC9600	1-32c	1	X153	ADD: HARDWARE, RACKMOUNT
DOMINO	PRIME	ATAC9600	1-33	1	T6507	ASTRO-TAC 9600 COMPARATOR
DOMINO	PRIME	ATAC9600	1-33a	1	CA00091AA	ENH: ASTRO 25 SIMULCAST TRUNKING OP
DOMINO	PRIME	ATAC9600	1-33b	1	X230AJ	ADD: 16 I/O PORTS
DOMINO	PRIME	ATAC9600	1-33c	1	X153	ADD: HARDWARE, RACKMOUNT
DOMINO	PRIME	ATAC9600	1-34	1	T6507	ASTRO-TAC 9600 COMPARATOR
DOMINO	PRIME	ATAC9600	1-34a	1	CA00091AA	ENH: ASTRO 25 SIMULCAST TRUNKING OP
DOMINO	PRIME	ATAC9600	1-34b	1	X230AJ	ADD: 16 I/O PORTS
DOMINO	PRIME	ATAC9600	1-34c	1	X153	ADD: HARDWARE, RACKMOUNT
DOMINO	PRIME	ATAC9600	1-35	1	T6507	ASTRO-TAC 9600 COMPARATOR
DOMINO	PRIME	ATAC9600	1-35a	1	CA00091AA	ENH: ASTRO 25 SIMULCAST TRUNKING OP
DOMINO	PRIME	ATAC9600	1-35b	1	X230AJ	ADD: 16 I/O PORTS
DOMINO	PRIME	ATAC9600	1-35c	1	X153	ADD: HARDWARE, RACKMOUNT
DOMINO	PRIME	ATAC9600	1-36	1	T6507	ASTRO-TAC 9600 COMPARATOR
DOMINO	PRIME	ATAC9600	1-36a	1	CA00091AA	ENH: ASTRO 25 SIMULCAST TRUNKING OP
DOMINO	PRIME	ATAC9600	1-36b	1	X230AJ	ADD: 16 I/O PORTS
DOMINO	PRIME	ATAC9600	1-36c	1	X153	ADD: HARDWARE, RACKMOUNT
DOMINO	PRIME	ATAC9600	1-37	1	T6507	ASTRO-TAC 9600 COMPARATOR
DOMINO	PRIME	ATAC9600	1-37a	1	CA00091AA	ENH: ASTRO 25 SIMULCAST TRUNKING OP
DOMINO	PRIME	ATAC9600	1-37b	1	X230AJ	ADD: 16 I/O PORTS
DOMINO	PRIME	ATAC9600	1-37c	1	X153	ADD: HARDWARE, RACKMOUNT
DOMINO	PRIME	ATAC9600	1-38	1	T6507	ASTRO-TAC 9600 COMPARATOR
DOMINO	PRIME	ATAC9600	1-38a	1	CA00091AA	ENH: ASTRO 25 SIMULCAST TRUNKING OP
DOMINO	PRIME	ATAC9600	1-38b	1	X230AJ	ADD: 16 I/O PORTS

DOMINO	PRIME	ATAC9600	1-38c	1	X153	ADD: HARDWARE, RACKMOUNT
DOMINO	PRIME	ATAC9600	1-39	1	T6507	ASTRO-TAC 9600 COMPARATOR
DOMINO	PRIME	ATAC9600	1-39a	1	CA00091AA	ENH: ASTRO 25 SIMULCAST TRUNKING OP
DOMINO	PRIME	ATAC9600	1-39b	1	X230AJ	ADD: 16 I/O PORTS
DOMINO	PRIME	ATAC9600	1-39c	1	X153	ADD: HARDWARE, RACKMOUNT
DOMINO	PRIME	ATAC9600	1-40	1	T6507	ASTRO-TAC 9600 COMPARATOR
DOMINO	PRIME	ATAC9600	1-40a	1	CA00091AA	ENH: ASTRO 25 SIMULCAST TRUNKING OP
DOMINO	PRIME	ATAC9600	1-40b	1	X230AJ	ADD: 16 I/O PORTS
DOMINO	PRIME	ATAC9600	1-40c	1	X153	ADD: HARDWARE, RACKMOUNT
DOMINO	PRIME	ATAC9600	1-41	1	T6507	ASTRO-TAC 9600 COMPARATOR
DOMINO	PRIME	ATAC9600	1-41a	1	CA00091AA	ENH: ASTRO 25 SIMULCAST TRUNKING OP
DOMINO	PRIME	ATAC9600	1-41b	1	X230AJ	ADD: 16 I/O PORTS
DOMINO	PRIME	ATAC9600	1-41c	1	X153	ADD: HARDWARE, RACKMOUNT
10thFLOOR	PRIME	PRMSWCH	1-19	2	DSJ4900B	HP PROCURVE SWITCH 2626B
DOMINO	PRIME	PRMSWCH	1-44	2	DSJ4900B	HP PROCURVE SWITCH 2626B
10thFLOOR	A-RMT	SITESWCH	1-47	2	DSJ4900B	HP PROCURVE SWITCH 2626B
10thFLOOR	B-RMT	SITESWCH	1-50	2	DSJ4900B	HP PROCURVE SWITCH 2626B
DOMINO	A-RMT	SITESWCH	1-56	2	DSJ4900B	HP PROCURVE SWITCH 2626B
DOMINO	B-RMT	SITESWCH	1-59	2	DSJ4900B	HP PROCURVE SWITCH 2626B
FORD&BLMNT	A-RMT	SITESWCH	1-65	2	DSJ4900B	HP PROCURVE SWITCH 2626B
FORD&BLMNT	B-RMT	SITESWCH	1-68	2	DSJ4900B	HP PROCURVE SWITCH 2626B
31st&GRAYS	A-RMT	SITESWCH	1-74	2	DSJ4900B	HP PROCURVE SWITCH 2626B
31st&GRAYS	B-RMT	SITESWCH	1-77	2	DSJ4900B	HP PROCURVE SWITCH 2626B
VICTRYGNDS	A-RMT	SITESWCH	1-83	2	DSJ4900B	HP PROCURVE SWITCH 2626B
VICTRYGNDS	B-RMT	SITESWCH	1-86	2	DSJ4900B	HP PROCURVE SWITCH 2626B
SOUTHMPTN	A-RMT	SITESWCH	1-92	2	DSJ4900B	HP PROCURVE SWITCH 2626B
SOUTHMPTN	B-RMT	SITESWCH	1-95	2	DSJ4900B	HP PROCURVE SWITCH 2626B
ENGINE9	A-RMT	SITESWCH	1-103	2	DSJ4900B	HP PROCURVE SWITCH 2626B
ENGINE9	B-RMT	SITESWCH	1-106	2	DSJ4900B	HP PROCURVE SWITCH 2626B

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POLACAD	A-RMT	SITESWCH	1-112	2	DSJ4900B	HP PROCURVE SWITCH 2626B
POLACAD	B-RMT	SITESWCH	1-115	2	DSJ4900B	HP PROCURVE SWITCH 2626B
BSLTN&HOFF	A-RMT	SITESWCH	1-121	2	DSJ4900B	HP PROCURVE SWITCH 2626B
BSLTN&HOFF	A&B-RMT	SITESWCH	1-124	2	DSJ4900B	HP PROCURVE SWITCH 2626B
STRTS&HYWY	A-RMT	SITESWCH	1-130	2	DSJ4900B	HP PROCURVE SWITCH 2626B
STRTS&HYWY	B-RMT	SITESWCH	1-133	2	DSJ4900B	HP PROCURVE SWITCH 2626B
RM626M	MASTER	MAINTOP	1-466	1	L3531	CERTIFIED GOLD ELITE WORKSTATION
RM626M	MASTER	MAINTOP	1-467	1	DS019BLK	19" LCD, BLACK, NO-TOUCH

9.3   MOSCAD Equipment

System	Site	Sys Seg	Line #	Qty	Model No.	Description
RM714	MOSCAD	MOSCADGMC	1-1	1	DDN9172	HP MOSCAD SERVER WITH WINDOWS 2003
RM714	MOSCAD	MOSCADGMC	1-4	1	T5807	INTOUCH DEVELOPMENT 60K V8.0 TAG
RM714	MOSCAD	MOSCADGMC	1-6	1	DDN9047	HYPERACCESS FOR WINDOWS 95/98/2000/
RM714	MOSCAD	MOSCADGMC	1-7	1	DDN9048	SERIAL/ IP 1 PORT SEAT LICENSE
RM714	MOSCAD	MSCPGNG	1-8	1	T6772	SCADALARM PAGING WITH MODEM V5.0
RM714	MOSCAD	MOSCADGMC	1-11	1	DDN9172	HP MOSCAD SERVER WITH WINDOWS 2003
RM714	MOSCAD	MOSCADGMC	1-14	1	T5807	INTOUCH DEVELOPMENT 60K V8.0 TAG
RM714	MOSCAD	MOSCADGMC	1-16	1	DDN9047	HYPERACCESS FOR WINDOWS 95/98/2000/
RM714	MOSCAD	MOSCADGMC	1-17	1	DDN9048	SERIAL/ IP 1 PORT SEAT LICENSE
RM714	MOSCAD	MOSCAD	1-18	2	T6772	SCADALARM PAGING WITH MODEM V5.0
RM714	MOSCAD	MOSCADGWS	1-21	1	DDN9158	CERTIFIED MOSCAD WORKSTATION WITH X
RM714	MOSCAD	MOSCADGWS	1-23	1	T5739	INTOUCH RUNTIME W/O I/O V8.0 SW
RM714	MOSCAD	MOSCADGWS	1-24	1	DDN9047	HYPERACCESS FOR WINDOWS 95/98/2000/
RM714	MOSCAD	MOSCADGWS	1-25	1	DDN9048	SERIAL/ IP 1 PORT SEAT LICENSE
RMTS&MSTR	MOSCAD	DIALMODEMS	1-87	13	DSJNSB59619B	19 SHELF. B-LINE SAME AS 40622 NEW
RM714	MOSCAD	MSCPGNG	1-9	1	F4300	IP GATEWAY LESS RADIO
RM714	MOSCAD	MSCPGNG	1-9a	1	V345	ADD: ASYNC RS232 VIA PORT 3
RM714	MOSCAD	MSCPGNG	1-9b	1	V051	ALT: IP GATEWAY RACKMOUNT
RM714	MOSCAD	MOSCAD	1-19	2	F4300	IP GATEWAY LESS RADIO
RM714	MOSCAD	MOSCAD	1-19a	2	V345	ADD: ASYNC RS232 VIA PORT 3
RM714	MOSCAD	MOSCAD	1-19b	2	V051	ALT: IP GATEWAY RACKMOUNT
RMTS&MSTR	MOSCAD	DIALMODEMS	1-88	13	FLN6458	CABLE, MODEM 3M W/ADAPTER
RM714	MOSCAD	MOSCADGMC	1-5	1	F4537	SDM3000 BUILDER V1.30.31 FOR A6.9/7
RM714	MOSCAD	GMCLICS	1-10	1	F4538	MOSCAD GMC/GWS, SERVICE PACK 1

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RM714	MOSCAD	MOSCADGMC	1-15	1	F4537	SDM3000 BUILDER V1.30.31 FOR A6.9/7
RM714	MOSCAD	GMCLICS	1-20	1	F4538	MOSCAD GMC/GWS, SERVICE PACK 1
RM714	MOSCAD	GMCLICS	1-20a	17	V809	SW,S/W LIC. FOR MOSCAD I/O
MASTER	MOSCAD	RTULICS	1-28	1	F2463	REMOTE TERMINAL UNIT DEVICE INTERFA
MASTER	MOSCAD	RTULICS	1-28a	3	V833	ADD:RTU SFWR LICENSE FOR PREMISYS A
MASTER	MOSCAD	RTULICS	1-28b	3	V834	ADD:RTU SFWR LICENSE FOR PREMISYS C
MASTER	MOSCAD	RTULICS	1-28c	2	V837	ADD:RTU SFWR LICENSE FOR DIU ALARMS
MASTER	MOSCAD	RTULICS	1-28d	1	V838	ADD:RTU SFWR LICENSE FOR EFRATOM GP
MASTER	MOSCAD	RTULICS	1-28e	2	V839	ADD:RTU SFWR LICENSE FOR MOSCAD I/O
31st&GRAYS	MOSCAD	RTULICS	1-34	1	F2463	REMOTE TERMINAL UNIT DEVICE INTERFA
31st&GRAYS	MOSCAD	RTULICS	1-34a	45	V844	ADD:RTU SFWR LICENSE FOR ASTRO 25 8
31st&GRAYS	MOSCAD	RTULICS	1-34b	45	V845	ADD: RTU SOFTWARE LICENSE FOR INTEL
31st&GRAYS	MOSCAD	RTULICS	1-34c	1	V833	ADD:RTU SFWR LICENSE FOR PREMISYS A
31st&GRAYS	MOSCAD	RTULICS	1-34d	1	V834	ADD:RTU SFWR LICENSE FOR PREMISYS C
31st&GRAYS	MOSCAD	RTULICS	1-34e	1	V838	ADD:RTU SFWR LICENSE FOR EFRATOM GP
31st&GRAYS	MOSCAD	RTULICS	1-34f	1	V839	ADD:RTU SFWR LICENSE FOR MOSCAD I/O
BSLTN&HOFF	MOSCAD	RTULICS	1-39	1	F2463	REMOTE TERMINAL UNIT DEVICE INTERFA
BSLTN&HOFF	MOSCAD	RTULICS	1-39a	45	V844	ADD:RTU SFWR LICENSE FOR ASTRO 25 8
BSLTN&HOFF	MOSCAD	RTULICS	1-39b	45	V845	ADD: RTU SOFTWARE LICENSE FOR INTEL
BSLTN&HOFF	MOSCAD	RTULICS	1-39c	1	V833	ADD:RTU SFWR LICENSE FOR PREMISYS A
BSLTN&HOFF	MOSCAD	RTULICS	1-39d	1	V834	ADD:RTU SFWR LICENSE FOR PREMISYS C

BSLTN&HOFF	MOSCAD	RTULICS	1-39e	1	V838	ADD:RTU SFWR LICENSE FOR EFRATOM GP
BSLTN&HOFF	MOSCAD	RTULICS	1-39f	1	V839	ADD:RTU SFWR LICENSE FOR MOSCAD I/O
ENGINE9	MOSCAD	RTULICS	1-44	1	F2463	REMOTE TERMINAL UNIT DEVICE INTERFA
ENGINE9	MOSCAD	RTULICS	1-44a	45	V844	ADD:RTU SFWR LICENSE FOR ASTRO 25 8
ENGINE9	MOSCAD	RTULICS	1-44b	45	V845	ADD: RTU SOFTWARE LICENSE FOR INTEL
ENGINE9	MOSCAD	RTULICS	1-44c	1	V833	ADD:RTU SFWR LICENSE FOR PREMISYS A
ENGINE9	MOSCAD	RTULICS	1-44d	1	V834	ADD:RTU SFWR LICENSE FOR PREMISYS C
ENGINE9	MOSCAD	RTULICS	1-44e	1	V838	ADD:RTU SFWR LICENSE FOR EFRATOM GP
ENGINE9	MOSCAD	RTULICS	1-44f	1	V839	ADD:RTU SFWR LICENSE FOR MOSCAD I/O
FORD&BLMNT	MOSCAD	RTULICS	1-49	1	F2463	REMOTE TERMINAL UNIT DEVICE INTERFA
FORD&BLMNT	MOSCAD	RTULICS	1-49a	45	V844	ADD:RTU SFWR LICENSE FOR ASTRO 25 8
FORD&BLMNT	MOSCAD	RTULICS	1-49b	45	V845	ADD: RTU SOFTWARE LICENSE FOR INTEL
FORD&BLMNT	MOSCAD	RTULICS	1-49c	1	V833	ADD:RTU SFWR LICENSE FOR PREMISYS A
FORD&BLMNT	MOSCAD	RTULICS	1-49d	1	V834	ADD:RTU SFWR LICENSE FOR PREMISYS C
FORD&BLMNT	MOSCAD	RTULICS	1-49e	1	V838	ADD:RTU SFWR LICENSE FOR EFRATOM GP
FORD&BLMNT	MOSCAD	RTULICS	1-49f	1	V839	ADD:RTU SFWR LICENSE FOR MOSCAD I/O
POLACAD	MOSCAD	RTULICS	1-54	1	F2463	REMOTE TERMINAL UNIT DEVICE INTERFA
POLACAD	MOSCAD	RTULICS	1-54a	45	V844	ADD:RTU SFWR LICENSE FOR ASTRO 25 8
POLACAD	MOSCAD	RTULICS	1-54b	45	V845	ADD: RTU SOFTWARE LICENSE FOR INTEL
POLACAD	MOSCAD	RTULICS	1-54c	1	V833	ADD:RTU SFWR LICENSE FOR PREMISYS A
POLACAD	MOSCAD	RTULICS	1-54d	1	V834	ADD:RTU SFWR LICENSE FOR PREMISYS C

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POLACAD	MOSCAD	RTULICS	1-54e	1	V838	ADD:RTU SFWR LICENSE FOR EFRATOM GP
POLACAD	MOSCAD	RTULICS	1-54f	1	V839	ADD:RTU SFWR LICENSE FOR MOSCAD I/O
SOUTHMPTN	MOSCAD	RTULICS	1-59	1	F2463	REMOTE TERMINAL UNIT DEVICE INTERFA
SOUTHMPTN	MOSCAD	RTULICS	1-59a	45	V844	ADD:RTU SFWR LICENSE FOR ASTRO 25 8
SOUTHMPTN	MOSCAD	RTULICS	1-59b	45	V845	ADD: RTU SOFTWARE LICENSE FOR INTEL
SOUTHMPTN	MOSCAD	RTULICS	1-59c	1	V833	ADD:RTU SFWR LICENSE FOR PREMISYS A
SOUTHMPTN	MOSCAD	RTULICS	1-59d	1	V834	ADD:RTU SFWR LICENSE FOR PREMISYS C
SOUTHMPTN	MOSCAD	RTULICS	1-59e	1	V838	ADD:RTU SFWR LICENSE FOR EFRATOM GP
SOUTHMPTN	MOSCAD	RTULICS	1-59f	1	V839	ADD:RTU SFWR LICENSE FOR MOSCAD I/O
STRTS&HYWY	MOSCAD	RTULICS	1-64	1	F2463	REMOTE TERMINAL UNIT DEVICE INTERFA
STRTS&HYWY	MOSCAD	RTULICS	1-64a	45	V844	ADD:RTU SFWR LICENSE FOR ASTRO 25 8
STRTS&HYWY	MOSCAD	RTULICS	1-64b	45	V845	ADD: RTU SOFTWARE LICENSE FOR INTEL
STRTS&HYWY	MOSCAD	RTULICS	1-64c	1	V833	ADD:RTU SFWR LICENSE FOR PREMISYS A
STRTS&HYWY	MOSCAD	RTULICS	1-64d	1	V834	ADD:RTU SFWR LICENSE FOR PREMISYS C
STRTS&HYWY	MOSCAD	RTULICS	1-64e	1	V838	ADD:RTU SFWR LICENSE FOR EFRATOM GP
STRTS&HYWY	MOSCAD	RTULICS	1-64f	1	V839	ADD:RTU SFWR LICENSE FOR MOSCAD I/O
VICTRYGNDS	MOSCAD	RTULICS	1-68	1	F2463	REMOTE TERMINAL UNIT DEVICE INTERFA
VICTRYGNDS	MOSCAD	RTULICS	1-68a	45	V844	ADD:RTU SFWR LICENSE FOR ASTRO 25 8
VICTRYGNDS	MOSCAD	RTULICS	1-68b	45	V845	ADD: RTU SOFTWARE LICENSE FOR INTEL
VICTRYGNDS	MOSCAD	RTULICS	1-68c	1	V833	ADD:RTU SFWR LICENSE FOR PREMISYS A
VICTRYGNDS	MOSCAD	RTULICS	1-68d	1	V834	ADD:RTU SFWR LICENSE FOR PREMISYS C

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VICTRYGNDS	MOSCAD	RTULICS	1-68e	1	V838	ADD:RTU SFWR LICENSE FOR EFRATOM GP
VICTRYGNDS	MOSCAD	RTULICS	1-68f	1	V839	ADD:RTU SFWR LICENSE FOR MOSCAD I/O
Domino	MOSCAD	RTULICS	1-73	1	F2463	REMOTE TERMINAL UNIT DEVICE INTERFA
Domino	MOSCAD	RTULICS	1-73a	5	V832	ADD:RTU SFWR LICENSE FOR QUANTAR AL
Domino	MOSCAD	RTULICS	1-73b	5	V831	ADD: RTU SOFTWARE LICENSE FOR QUANT
Domino	MOSCAD	RTULICS	1-73c	45	V844	ADD:RTU SFWR LICENSE FOR ASTRO 25 8
Domino	MOSCAD	RTULICS	1-73d	45	V845	ADD: RTU SOFTWARE LICENSE FOR INTEL
Domino	MOSCAD	RTULICS	1-73e	7	V833	ADD:RTU SFWR LICENSE FOR PREMISYS A
Domino	MOSCAD	RTULICS	1-73f	7	V834	ADD:RTU SFWR LICENSE FOR PREMISYS C
Domino	MOSCAD	RTULICS	1-73g	27	V846	ADD:RTU SFWR LICENSE FOR ASTROTAC 9
Domino	MOSCAD	RTULICS	1-73h	1	V838	ADD:RTU SFWR LICENSE FOR EFRATOM GP
Domino	MOSCAD	RTULICS	1-73i	1	V839	ADD:RTU SFWR LICENSE FOR MOSCAD I/O
10thFlr	MOSCAD	RTULICS	1-77	1	F2463	REMOTE TERMINAL UNIT DEVICE INTERFA
10thFlr	MOSCAD	RTULICS	1-77a	45	V844	ADD:RTU SFWR LICENSE FOR ASTRO 25 8
10thFlr	MOSCAD	RTULICS	1-77b	45	V845	ADD: RTU SOFTWARE LICENSE FOR INTEL
10thFlr	MOSCAD	RTULICS	1-77c	6	V833	ADD:RTU SFWR LICENSE FOR PREMISYS A
10thFlr	MOSCAD	RTULICS	1-77d	6	V834	ADD:RTU SFWR LICENSE FOR PREMISYS C
10thFlr	MOSCAD	RTULICS	1-77e	22	V846	ADD:RTU SFWR LICENSE FOR ASTROTAC 9
10thFlr	MOSCAD	RTULICS	1-77f	1	V838	ADD:RTU SFWR LICENSE FOR EFRATOM GP
10thFlr	MOSCAD	RTULICS	1-77g	1	V839	ADD:RTU SFWR LICENSE FOR MOSCAD I/O
PAB	MOSCAD	RTULICS	1-80	1	F2463	REMOTE TERMINAL UNIT DEVICE INTERFA

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PAB	MOSCAD	RTULICS	1-80a	11	V837	ADD:RTU SFWR LICENSE FOR DIU ALARMS
PAB	MOSCAD	RTULICS	1-80b	1	V839	ADD:RTU SFWR LICENSE FOR MOSCAD I/O
FAB	MOSCAD	RTULICS	1-82	1	F2463	REMOTE TERMINAL UNIT DEVICE INTERFA
FAB	MOSCAD	RTULICS	1-82a	3	V837	ADD:RTU SFWR LICENSE FOR DIU ALARMS
FAB	MOSCAD	RTULICS	1-82b	1	V839	ADD:RTU SFWR LICENSE FOR MOSCAD I/O
PIA	MOSCAD	RTULICS	1-83	1	F2463	REMOTE TERMINAL UNIT DEVICE INTERFA
PIA	MOSCAD	RTULICS	1-83a	2	V837	ADD:RTU SFWR LICENSE FOR DIU ALARMS
PIA	MOSCAD	RTULICS	1-83b	1	V839	ADD:RTU SFWR LICENSE FOR MOSCAD I/O
MASTER	MOSCAD	MOSCADRTU	1-26	2	F4544	SITE MANAGER ADVANCED
MASTER	MOSCAD	MOSCADRTU	1-26a	2	V266	ADD: 90VAC TO 260VAC PS TO SM
MASTER	MOSCAD	MOSCADRTU	1-26b	2	V803	ADD: SDM3000 ASTRO F/W FOR A6.7/7.0
MASTER	MOSCAD	MOSCADRTU	1-26c	6	V592	AAD TERM BLCK & CONN WI
MASTER	MOSCAD	MOSCADRTU	1-27	1	F4568	R-MUX 1004
MASTER	MOSCAD	MOSCADRTU	1-29	8	F4543	SITE MANAGER BASIC
MASTER	MOSCAD	MOSCADRTU	1-29a	8	V266	ADD: 90VAC TO 260VAC PS TO SM
MASTER	MOSCAD	MOSCADRTU	1-29b	8	V803	ADD: SDM3000 ASTRO F/W FOR A6.7/7.0
31st&GRAYS	MOSCAD	MOSCADRTU	1-30	1	F4544	SITE MANAGER ADVANCED
31st&GRAYS	MOSCAD	MOSCADRTU	1-30a	1	V260	ADD: 48 VDC PS TO SM
31st&GRAYS	MOSCAD	MOSCADRTU	1-30b	1	V803	ADD: SDM3000 ASTRO F/W FOR A6.7/7.0
31st&GRAYS	MOSCAD	MOSCADRTU	1-30c	3	V592	AAD TERM BLCK & CONN WI
31st&GRAYS	MOSCAD	MOSCADRTU	1-31	1	F4547	SM IO EXPANSION BASIC
31st&GRAYS	MOSCAD	MOSCADRTU	1-31a	1	V260	ADD: 48 VDC PS TO SM
31st&GRAYS	MOSCAD	MOSCADRTU	1-31b	3	V592	AAD TERM BLCK & CONN WI
31st&GRAYS	MOSCAD	MOSCADRTU	1-32	1	F4548	SM IO EXPANSION ADVANCED
31st&GRAYS	MOSCAD	MOSCADRTU	1-32b	1	V260	ADD: 48 VDC PS TO SM
31st&GRAYS	MOSCAD	MOSCADRTU	1-33	1	F4568	R-MUX 1004

BSLTN&HOFF	MOSCAD	MOSCADRTU	1-35	1	F4544	SITE MANAGER ADVANCED
BSLTN&HOFF	MOSCAD	MOSCADRTU	1-35a	1	V260	ADD: 48 VDC PS TO SM
BSLTN&HOFF	MOSCAD	MOSCADRTU	1-35b	1	V803	ADD: SDM3000 ASTRO F/W FOR A6.7/7.0
BSLTN&HOFF	MOSCAD	MOSCADRTU	1-35c	3	V592	AAD TERM BLCK & CONN WI
BSLTN&HOFF	MOSCAD	MOSCADRTU	1-36	1	F4548	SM IO EXPANSION ADVANCED
BSLTN&HOFF	MOSCAD	MOSCADRTU	1-36a	1	V260	ADD: 48 VDC PS TO SM
BSLTN&HOFF	MOSCAD	MOSCADRTU	1-37	1	F4547	SM IO EXPANSION BASIC
BSLTN&HOFF	MOSCAD	MOSCADRTU	1-37a	1	V260	ADD: 48 VDC PS TO SM
BSLTN&HOFF	MOSCAD	MOSCADRTU	1-37b	3	V592	AAD TERM BLCK & CONN WI
BSLTN&HOFF	MOSCAD	MOSCADRTU	1-38	1	F4568	R-MUX 1004
ENGINE9	MOSCAD	MOSCADRTU	1-40	1	F4544	SITE MANAGER ADVANCED
ENGINE9	MOSCAD	MOSCADRTU	1-40a	1	V260	ADD: 48 VDC PS TO SM
ENGINE9	MOSCAD	MOSCADRTU	1-40b	1	V803	ADD: SDM3000 ASTRO F/W FOR A6.7/7.0
ENGINE9	MOSCAD	MOSCADRTU	1-40c	3	V592	AAD TERM BLCK & CONN WI
ENGINE9	MOSCAD	MOSCADRTU	1-41	1	F4547	SM IO EXPANSION BASIC
ENGINE9	MOSCAD	MOSCADRTU	1-41a	1	V260	ADD: 48 VDC PS TO SM
ENGINE9	MOSCAD	MOSCADRTU	1-41b	3	V592	AAD TERM BLCK & CONN WI
ENGINE9	MOSCAD	MOSCADRTU	1-42	1	F4568	R-MUX 1004
ENGINE9	MOSCAD	MOSCADRTU	1-43	1	F4548	SM IO EXPANSION ADVANCED
ENGINE9	MOSCAD	MOSCADRTU	1-43a	1	V260	ADD: 48 VDC PS TO SM
FORD&BLMNT	MOSCAD	MOSCADRTU	1-45	1	F4544	SITE MANAGER ADVANCED
FORD&BLMNT	MOSCAD	MOSCADRTU	1-45a	1	V260	ADD: 48 VDC PS TO SM
FORD&BLMNT	MOSCAD	MOSCADRTU	1-45b	1	V803	ADD: SDM3000 ASTRO F/W FOR A6.7/7.0
FORD&BLMNT	MOSCAD	MOSCADRTU	1-45c	3	V592	AAD TERM BLCK & CONN WI
FORD&BLMNT	MOSCAD	MOSCADRTU	1-46	1	F4547	SM IO EXPANSION BASIC
FORD&BLMNT	MOSCAD	MOSCADRTU	1-46a	1	V260	ADD: 48 VDC PS TO SM
FORD&BLMNT	MOSCAD	MOSCADRTU	1-46b	3	V592	AAD TERM BLCK & CONN WI
FORD&BLMNT	MOSCAD	MOSCADRTU	1-47	1	F4548	SM IO EXPANSION ADVANCED
FORD&BLMNT	MOSCAD	MOSCADRTU	1-47a	1	V260	ADD: 48 VDC PS TO SM

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FORD&BLMNT	MOSCAD	MOSCADRTU	1-48	1	F4568	R-MUX 1004
POLACAD	MOSCAD	MOSCADRTU	1-50	1	F4544	SITE MANAGER ADVANCED
POLACAD	MOSCAD	MOSCADRTU	1-50a	1	V260	ADD: 48 VDC PS TO SM
POLACAD	MOSCAD	MOSCADRTU	1-50b	1	V803	ADD: SDM3000 ASTRO F/W FOR A6.7/7.0
POLACAD	MOSCAD	MOSCADRTU	1-50c	3	V592	AAD TERM BLCK & CONN WI
POLACAD	MOSCAD	MOSCADRTU	1-51	1	F4548	SM IO EXPANSION ADVANCED
POLACAD	MOSCAD	MOSCADRTU	1-51a	1	V260	ADD: 48 VDC PS TO SM
POLACAD	MOSCAD	MOSCADRTU	1-52	1	F4547	SM IO EXPANSION BASIC
POLACAD	MOSCAD	MOSCADRTU	1-52a	1	V260	ADD: 48 VDC PS TO SM
POLACAD	MOSCAD	MOSCADRTU	1-52b	3	V592	AAD TERM BLCK & CONN WI
POLACAD	MOSCAD	MOSCADRTU	1-53	1	F4568	R-MUX 1004
SOUTHMPTN	MOSCAD	MOSCADRTU	1-55	1	F4548	SM IO EXPANSION ADVANCED
SOUTHMPTN	MOSCAD	MOSCADRTU	1-55a	1	V260	ADD: 48 VDC PS TO SM
SOUTHMPTN	MOSCAD	MOSCADRTU	1-56	1	F4544	SITE MANAGER ADVANCED
SOUTHMPTN	MOSCAD	MOSCADRTU	1-56a	1	V260	ADD: 48 VDC PS TO SM
SOUTHMPTN	MOSCAD	MOSCADRTU	1-56b	1	V803	ADD: SDM3000 ASTRO F/W FOR A6.7/7.0
SOUTHMPTN	MOSCAD	MOSCADRTU	1-56c	3	V592	AAD TERM BLCK & CONN WI
SOUTHMPTN	MOSCAD	MOSCADRTU	1-57	1	F4547	SM IO EXPANSION BASIC
SOUTHMPTN	MOSCAD	MOSCADRTU	1-57a	1	V260	ADD: 48 VDC PS TO SM
SOUTHMPTN	MOSCAD	MOSCADRTU	1-57b	3	V592	AAD TERM BLCK & CONN WI
SOUTHMPTN	MOSCAD	MOSCADRTU	1-58	1	F4568	R-MUX 1004
STRTS&HYWY	MOSCAD	MOSCADRTU	1-60	1	F4544	SITE MANAGER ADVANCED
STRTS&HYWY	MOSCAD	MOSCADRTU	1-60a	1	V260	ADD: 48 VDC PS TO SM
STRTS&HYWY	MOSCAD	MOSCADRTU	1-60b	1	V803	ADD: SDM3000 ASTRO F/W FOR A6.7/7.0
STRTS&HYWY	MOSCAD	MOSCADRTU	1-60c	3	V592	AAD TERM BLCK & CONN WI
STRTS&HYWY	MOSCAD	MOSCADRTU	1-61	1	F4547	SM IO EXPANSION BASIC
STRTS&HYWY	MOSCAD	MOSCADRTU	1-61a	1	V260	ADD: 48 VDC PS TO SM
STRTS&HYWY	MOSCAD	MOSCADRTU	1-61b	3	V592	AAD TERM BLCK & CONN WI
STRTS&HYWY	MOSCAD	MOSCADRTU	1-62	1	F4568	R-MUX 1004

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STRTS&HYWY	MOSCAD	MOSCADRTU	1-63	1	F4548	SM IO EXPANSION ADVANCED
STRTS&HYWY	MOSCAD	MOSCADRTU	1-63a	1	V260	ADD: 48 VDC PS TO SM
VICTRYGNDS	MOSCAD	MOSCADRTU	1-65	1	F4544	SITE MANAGER ADVANCED
VICTRYGNDS	MOSCAD	MOSCADRTU	1-65a	1	V260	ADD: 48 VDC PS TO SM
VICTRYGNDS	MOSCAD	MOSCADRTU	1-65b	1	V803	ADD: SDM3000 ASTRO F/W FOR A6.7/7.0
VICTRYGNDS	MOSCAD	MOSCADRTU	1-65c	3	V592	AAD TERM BLCK & CONN WI
VICTRYGNDS	MOSCAD	MOSCADRTU	1-66	1	F4547	SM IO EXPANSION BASIC
VICTRYGNDS	MOSCAD	MOSCADRTU	1-66a	1	V260	ADD: 48 VDC PS TO SM
VICTRYGNDS	MOSCAD	MOSCADRTU	1-66b	3	V592	AAD TERM BLCK & CONN WI
VICTRYGNDS	MOSCAD	MOSCADRTU	1-67	1	F4568	R-MUX 1004
VICTRYGNDS	MOSCAD	MOSCADRTU	1-69	1	F4548	SM IO EXPANSION ADVANCED
VICTRYGNDS	MOSCAD	MOSCADRTU	1-69a	1	V260	ADD: 48 VDC PS TO SM
Domino	MOSCAD	MOSCADRTU	1-70	1	F4544	SITE MANAGER ADVANCED
Domino	MOSCAD	MOSCADRTU	1-70a	1	V260	ADD: 48 VDC PS TO SM
Domino	MOSCAD	MOSCADRTU	1-70b	1	V803	ADD: SDM3000 ASTRO F/W FOR A6.7/7.0
Domino	MOSCAD	MOSCADRTU	1-70c	3	V592	AAD TERM BLCK & CONN WI
Domino	MOSCAD	MOSCADRTU	1-71	1	F4547	SM IO EXPANSION BASIC
Domino	MOSCAD	MOSCADRTU	1-71a	1	V260	ADD: 48 VDC PS TO SM
Domino	MOSCAD	MOSCADRTU	1-71b	3	V592	AAD TERM BLCK & CONN WI
Domino	MOSCAD	MOSCADRTU	1-72	1	F4568	R-MUX 1004
Domino	MOSCAD	MOSCADRTU	1-72a	2	V582	ADD : 4OUT TO R-MUX
Domino	MOSCAD	MOSCADRTU	1-72b	1	V527	ADD : IP INTERFACE TO R-MUX
10thFlr	MOSCAD	MOSCADRTU	1-74	1	F4544	SITE MANAGER ADVANCED
10thFlr	MOSCAD	MOSCADRTU	1-74a	1	V260	ADD: 48 VDC PS TO SM
10thFlr	MOSCAD	MOSCADRTU	1-74b	1	V803	ADD: SDM3000 ASTRO F/W FOR A6.7/7.0
10thFlr	MOSCAD	MOSCADRTU	1-74c	3	V592	AAD TERM BLCK & CONN WI
10thFlr	MOSCAD	MOSCADRTU	1-75	1	F4547	SM IO EXPANSION BASIC
10thFlr	MOSCAD	MOSCADRTU	1-75a	1	V260	ADD: 48 VDC PS TO SM
10thFlr	MOSCAD	MOSCADRTU	1-75b	3	V592	AAD TERM BLCK & CONN WI
10thFlr	MOSCAD	MOSCADRTU	1-76	1	F4568	R-MUX 1004

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PAB	MOSCAD	MOSCADRTU	1-78	1	F4544	SITE MANAGER ADVANCED
PAB	MOSCAD	MOSCADRTU	1-78a	1	V266	ADD: 90VAC TO 260VAC PS TO SM
PAB	MOSCAD	MOSCADRTU	1-78b	1	V803	ADD: SDM3000 ASTRO F/W FOR A6.7/7.0
PAB	MOSCAD	MOSCADRTU	1-78c	3	V592	AAD TERM BLCK & CONN WI
PAB	MOSCAD	MOSCADRTU	1-79	3	F4543	SITE MANAGER BASIC
PAB	MOSCAD	MOSCADRTU	1-79a	3	V266	ADD: 90VAC TO 260VAC PS TO SM
PAB	MOSCAD	MOSCADRTU	1-79b	3	V803	ADD: SDM3000 ASTRO F/W FOR A6.7/7.0
PAB	MOSCAD	MOSCADRTU	1-79c	9	V592	AAD TERM BLCK & CONN WI
FAB	MOSCAD	MOSCADRTU	1-81	1	F4544	SITE MANAGER ADVANCED
FAB	MOSCAD	MOSCADRTU	1-81a	1	V266	ADD: 90VAC TO 260VAC PS TO SM
FAB	MOSCAD	MOSCADRTU	1-81b	1	V803	ADD: SDM3000 ASTRO F/W FOR A6.7/7.0
FAB	MOSCAD	MOSCADRTU	1-81c	3	V592	AAD TERM BLCK & CONN WI
PIA	MOSCAD	MOSCADRTU	1-84	1	F4544	SITE MANAGER ADVANCED
PIA	MOSCAD	MOSCADRTU	1-84a	1	V266	ADD: 90VAC TO 260VAC PS TO SM
PIA	MOSCAD	MOSCADRTU	1-84b	1	V803	ADD: SDM3000 ASTRO F/W FOR A6.7/7.0
PIA	MOSCAD	MOSCADRTU	1-84c	3	V592	AAD TERM BLCK & CONN WI
10thFlr	MOSCAD	MOSCADRTU	1-85	1	F4548	SM IO EXPANSION ADVANCED
10thFlr	MOSCAD	MOSCADRTU	1-85a	1	V260	ADD: 48 VDC PS TO SM
RM714	MOSCAD	MOSCADGMC	1-2	1	DS019BLK	19" LCD, BLACK, NO-TOUCH
RM714	MOSCAD	MOSCADGMC	1-3	1	DDN9043	MICROSOFT SELECT SQL SERVER 2000 LI
RM714	MOSCAD	MOSCADGMC	1-12	1	DS019BLK	19" LCD, BLACK, NO-TOUCH
RM714	MOSCAD	MOSCADGMC	1-13	1	DDN9043	MICROSOFT SELECT SQL SERVER 2000 LI
RM714	MOSCAD	MOSCADGWS	1-22	1	DS019BLK	19" LCD, BLACK, NO-TOUCH
RMTS&MSTR	MOSCAD	DIALMODEMS	1-86	13	CDN1542	US ROBOTICS 56K V.90 EXT 14K FAX

9.4 Spare Equipment

System	Site	SysSeg	Line No.	Qty	Model No.	Description
--	MASTER	SPARES	1-1	1	DLN6569	FRU: GCP 8000/GCM 8000
--	MASTER	SPARES	1-12	1	DLN1338A	FAN MODULE
--	MASTER	SPARES	1-13	1	DSPREM8901	AC POWER SUPPLY 110/220VAC
--	MASTER	SPARES	1-14	1	DSPREM892060	8T1 E1 IF CARD 32K WITH MODEM
--	MASTER	SPARES	1-15	1	DSPREM880160	CPU 8 T1 E1 CROSS CONNT
--	MASTER	SPARES	1-16	1	DSPREM880460	CPU 2T1 E1 RCON BUS-CONNECT
--	MASTER	SPARES	1-17	1	DSPREM801460	DUAL T1E1 WAN W/ RELAYS 1:N REDUNDA
--	MASTER	SPARES	1-18	2	DSPREM81230	CSU PLUG IN MODULE
--	MASTER	SPARES	1-19	1	DSPREM811960	8 PORT 4W E M TO EXT RANGE CRD
--	MASTER	SPARES	1-23	1	ST2500	S2500 MULTIPROTOCOL WAN ROUTER
--	MASTER	SPARES	1-25	1	ST2512	S2500 ROUTER T1/E1 DAUGHTER BOARD
--	MASTER	SPARES	1-29	1	ST6000	S6000 MNR MULTI-PROTOCOL ROUTER
--	MASTER	SPARES	1-30	1	ST6010	S6000 4-PORT ULTRAWAN MODULE
--	MASTER	SPARES	1-32	1	CLN8356	SRC SPARE KIT
--	MASTER	SPARES	1-20	1	DSTRAK91008DC	PRIME/MASTER SITE CONFIG DC POWER
--	MASTER	SPARES	1-21	1	DSTRAK91111	FOUR PORT T1 FRAMED AND CLOCK TELEC
--	MASTER	SPARES	1-7	1	DLN1333	HARD DISK 146GB
--	MASTER	SPARES	1-8	1	DLN1334	DVD-RW DRIVE
--	MASTER	SPARES	1-9	1	DLN1335	POWER SUPPLY
--	MASTER	SPARES	1-10	1	DLN1336	SUN NETRA 240
--	MASTER	SPARES	1-11	1	DLN1337	EXTERNAL TAPE DRIVE (NM ONLY)
--	MASTER	SPARES	1-48	1	DDN9349	FRU 6020 AC DISTRIBUTION PANEL
--	MASTER	SPARES	1-49	1	DDN9350	FRU 6020 ALARM PANEL
--	MASTER	SPARES	1-50	1	DDN9351	FRU 6020 UNIVERSAL BRIDGE BOARD
--	MASTER	SPARES	1-51	1	DDN9352	FRU 80GB 3.5IN EIDE DRIVE
--	MASTER	SPARES	1-52	1	DDN9353	FRU: 6020 DVD CD-ROM KIT
--	MASTER	SPARES	1-53	1	DDN9357	FRU - 6020 BLANK PANEL (FOR OPEN CH
--	MASTER	SPARES	1-41	1	BLN1273	VC/SC TRANSITION CARD FRU (POST A6.
--	MASTER	SPARES	1-33	1	RLN5340	I/O CABLE KIT, 0113990B04
--	MASTER	SPARES	1-34	1	RLN5342	DRIIVE RAILS, 0113990B06

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City of Philadelphia
ASTRO 25 Upgrade
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System	Site	SysSeg	Line No.	Qty	Model No.	Description
--	MASTER	SPARES	1-35	1	RLN5343A	AC POWER SUPPLY, 0113990B07
--	MASTER	SPARES	1-36	1	RLN5344	DUAL IDE CABLW, 0113990B08
--	MASTER	SPARES	1-37	1	RLN5345	FILLER PANEL, 0113990B09
--	MASTER	SPARES	1-38	1	RLN5346	256MB SDRAM MEMORY (IDIMM) 011
--	MASTER	SPARES	1-39	1	RLN5347	3.5" 1.44 MB FLOPPY CHASS MTD 01139
--	MASTER	SPARES	1-40	1	RLN5354	TRANSITION MODULE
--	MASTER	SPARES	1-22	1	F4544	SITE MANAGER ADVANCED
--	MASTER	SPARES	1-22a	1	VA00150	SDM3000 ASTRO F/W FOR A6.10/7.4
--	MASTER	SPARES	1-22b	1	V260	ADD: 48 VDC PS TO SM
--	MASTER	SPARES	1-24	1	F4568	R-MUX 1004
--	MASTER	SPARES	1-24a	1	V534	ADD: SITE NOT WIDE DRIVER
--	MASTER	SPARES	1-26	1	F4543	SITE MANAGER BASIC
--	MASTER	SPARES	1-26a	1	V260	ADD: 48 VDC PS TO SM
--	MASTER	SPARES	1-26b	1	VA00150	SDM3000 ASTRO F/W FOR A6.10/7.4
--	MASTER	SPARES	1-42	1	DDN9175	EIDE DVD-ROM DRIVE W/SCSI ADAPTER
--	MASTER	SPARES	1-43	1	DDN9176	EIDE TO SCSI ADAPTER
--	MASTER	SPARES	1-44	1	DDN9344	FRU AC POWER SUPPLY SLED WITH FAN
--	MASTER	SPARES	1-45	1	DDN9345	FRU FAN SLED WITHOUT POWER SUPPLY
--	MASTER	SPARES	1-46	1	DDN9346	FRU 6020 DUAL IDE CABLE R/W
--	MASTER	SPARES	1-47	1	DDN9348	FRU 6020 EIDE DEVICE REMOVABLE CARR
--	MASTER	SPARES	1-2	1	CCN1009	FRU CNTRL BD ASTRO-TAC 9600 W/10BT
--	MASTER	SPARES	1-3	1	CLN1163	FRU V 24 WITH RJ48
--	MASTER	SPARES	1-4	1	CLN1488	FRU 265 WATT AC POWER SUPPLY
--	MASTER	SPARES	1-5	1	DLN6463	FRU WIRELINE COMPARATOR FC
--	MASTER	SPARES	1-6	1	TLN3328	5V EXPANSION POWER SUPPLY
--	MASTER	SPARES	1-27	1	TT1491	LX TERMINAL SERVER 48 PORTS WITH MO
--	MASTER	SPARES	1-28	1	DSJ4900B	HP PROCURVE SWITCH 2626B
--	MASTER	SPARES	1-31	1	L3415	ENTERPRISE LAN SWITCH

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9.5   Test Equipment

SYSTEM	SITE	SYS SEG	LINE #	QTY	MODEL #	DESCRIPTION
MASTER	TEST	TESTEQ	1-14	1	0180305F46	400-1000MHZ, 5W ELEMENT
MASTER	TEST	TESTEQ	1-8	1	T1013A	RF LOAD RES
MASTER	TEST	TESTEQ	1-1	1	R1770	ATS2 AUDIO TEST SET
MASTER	TEST	TESTEQ	1-2	1	R1542	EARTH GROUND RESISTANCE TESTER
MASTER	TEST	TESTEQ	1-3	1	R1415	PC CABLE AND WIRING TESTER
MASTER	TEST	TESTEQ	1-4	1	R1414	PHONE LINE CONTINUITY TESTER
MASTER	TEST	TESTEQ	1-7	1	R1418	ANTENNA TESTER 80MHZ TO 520MHZ
MASTER	TEST	TESTEQ	1-9	1	R1612	100MHZ, 4 CHANNEL OSCOPE, AGIL
MASTER	TEST	TESTEQ	1-10	1	R1718	N2610A-903 HANDHELD NETWORK ANALYZE
MASTER	TEST	TESTEQ	1-12	1	0180305F49	400-1000MHZ, 50W ELEMENT
MASTER	TEST	TESTEQ	1-13	1	0180305F47	400-1000MHZ, 10W ELEMENT
MASTER	TEST	TESTEQ	1-15	1	R1441	DIGITAL/ANALOG WATTMETER/N(F)
MASTER	TEST	TESTEQ	1-16	1	RLN5119	POWER SENSOR, 10MHZ - 18GHZ, 2
MASTER	TEST	TESTEQ	1-17	1	R1510	SINGLE CHANNEL POWER METER
MASTER	TEST	TESTEQ	1-18	1	R1732	E4407B 9KHZ-26.5 GHZ SPECTRUM ANALY
MASTER	TEST	TESTEQ	1-32	1	RLN4604B	FLUKE ES-LAN ETHERSCOPE LAN ANALYZE
MASTER	TEST	TESTEQ	1-11	1	0180305F50	400-1000MHZ, 100W ELEMENT
MASTER	TEST	TESTEQ	1-19	1	R1775	2975 P25 RADIO TEST SET
MASTER	TEST	TESTEQ	1-20	1	R1776	AEROFLEX OPT#3 FOR 2975
MASTER	TEST	TESTEQ	1-21	1	R1777	P25 TRUNKING 800MHZ OPT#4 2975
MASTER	TEST	TESTEQ	1-22	1	R1778	CC LOGGER-OPT#6 2975
MASTER	TEST	TESTEQ	1-23	1	R1780	AUTOTEST 1-OPT#9 -2975
MASTER	TEST	TESTEQ	1-24	1	R1781	AES-OPT#10-2975
MASTER	TEST	TESTEQ	1-25	1	R1782	P25 PHASE2 & LSM-OPT#11-2975
MASTER	TEST	TESTEQ	1-26	1	R1783	KVL KEYLOAD OPT#12-2975
MASTER	TEST	TESTEQ	1-27	1	R1784	LSM ADV/P25-2 ADV-OPT#13- 2975
MASTER	TEST	TESTEQ	1-28	1	R1785	P25 TRUNKING VHF/UHF/700MHZ
MASTER	TEST	TESTEQ	1-29	1	R1786	AUDIO ANALYZER OPT#15 2975
MASTER	TEST	TESTEQ	1-30	1	R1788	RX BER OPT#17-2975
MASTER	TEST	TESTEQ	1-31	1	R2032	2975OPT20-KVL ASN MODE
MASTER	TEST	TESTEQ	1-33	1	R1787	ANLOG SIMULCAST ALIGN OPT#16-2975
MASTER	TEST	TESTEQ	1-34	1	R1792	2975 OPERATION MANUAL - CD - ROM
MASTER	TEST	TESTEQ	1-35	1	R1793	MICROPHONE/AUDIO ADAPTER
MASTER	TEST	TESTEQ	1-36	1	R1795	CASE, SOFT PADDED CARRYING
MASTER	TEST	TESTEQ	1-37	1	R1796	KIT, 10/20 DB PADS, TNC
MASTER	TEST	TESTEQ	1-38	1	R1797	SCOPE PROBE KIT
MASTER	TEST	TESTEQ	1-39	1	R1798	UHF ANTENNA (STANDARD)

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SYSTEM	SITE	SYS SEG	LINE #	QTY	MODEL #	DESCRIPTION
MASTER	TEST	TESTEQ	1-40	1	R1799	FRONT/REAR COVER
MASTER	TEST	TESTEQ	1-41	1	R1801	RF CABLE
MASTER	TEST	TESTEQ	1-42	1	R1802	TNC TO BNC ADAPTER
MASTER	TEST	TESTEQ	1-43	1	R1803	ACCESSORY POUCH
MASTER	TEST	TESTEQ	1-44	1	R1804	DC TO AC CONVERTOR
MASTER	TEST	TESTEQ	1-45	1	R1808	CALIBRATION CERTIFICATE
MASTER	TEST	TESTEQ	1-5	1	8183069X01	TESTER TELCO CABLE 8 POS
MASTER	TEST	TESTEQ	1-6	1	REX4430	PC ETHERNET SERVICE KIT

9.6   Subscriber Upgrades

SYSTEM	SITE	SYS SEG	LINE #	QTY	MODEL #	DESCRIPTION
Subscriber	XTS3000	Upgrade	1-1	1	T5781	DIGITAL SMARTZONE XTS3000 UPGRADE
Subscriber	XTS3000	Upgrade	1-1a	5200	Q173AH	ADD: ENHANCED SMARTZONE OMNILINK OP
Subscriber	XTS3000	Upgrade	1-1b	5200	Q361AE	ENH: ASTRO PROJ 25 TRK XTS3000
Mobile	ALL	W9/W5/CONSL	1-1	854	M20XXSP001	MOBILE UPGRADE KIT
Mobile	CNTRL	JBOX	1-9	78	L3208	DIGITAL JUNCTION BOX - MCS2000 & AS
Mobile	CNTRL	JBOX	1-9a	78	ZA00225AA	ADD: CABLE, JUNCTION BOX, ASTRO CON
Mobile	CNTRL	MC3000	1-10	78	L3223	MC3000 DIGITAL DESKSET

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Options Pricing

10 Channel Expansion

Equipment	$ 2,898,322.00
Services	$ 1,059,245.00
Total Equipment and Services	**$ 3,957,245.00**

Note: Equipment is priced per the City of Philadelphia and Motorola contract.

5 Channel Expansion

Equipment	$ 1,665,822.00
Services	$ 989,245.00
Total Equipment and Services	**$ 2,655,067.00**

Note: Equipment is priced per the City of Philadelphia and Motorola contract.

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City of Philadelphia
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Addition of 11th Simulcast Site

Equipment	$ 1,734,141.00
Services	$ 1,878,156.00
Total Equipment and Services	**$ 3,612,297.00**

Note: Equipment is priced per the City of Philadelphia and Motorola contract. Motorola has made assumptions for the transmitter site supporting structures. Once the City specifies a specific location and approved tower height Motorola will requite option

Prisons and Training Consoles

Equipment	$ 788,471.00
Services	$ 321,956.00
Total Equipment and Services	**$1,110,427.00**

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Note: Equipment is priced per the City of Philadelphia and Motorola Contract.

Replace GTR Station with Quantar Upgrade

Equipment and Services	**$-5,666,135.00**

Note: Equipment is priced per the City of Philadelphia and Motorola Contract.

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Option 1. System Description/Technical Overview 10 Channel Expansion

1.1 Project Scope

Motorola is proposing a 10 channel system expansion. These 10 channels will utilize the Philadelphia School District frequencies. Motorola is proposing the use of the GTR 8000BR, the newest technology in station design. This option assumes Motorola's new GTR stations will operate in IP Simulcast mode to be consistent with the new baseline system configuration of GTR8000BR stations and IP Simulcast.

This document is intended to provide a general overview of the 10 Channel Expansion System for the City of Philadelphia. Included is the City of Philadelphia project overview, system architecture and design details.

1.2 Project Overview

This system expansion will add 5 channels to System A and 5 channels System B. System A will have a total of 20 channels and System B a total of 25 channels. The new 10 channels will utilize the GTR 8000s. The existing multi-coupler has sufficient port capability to handle the additional channels, thus no expansion or additional equipment is required. The existing combining system will be utilized along with expansion of the existing 5 channel combiner to support the addition of the channels. Motorola has determined the existing Power and HVAC at the shelter is sufficient for the addition of this equipment. Intermodulation studies were performed to ensure the 10 PSD channels in question will properly integrate into the existing antenna systems with the City currently licensed 800MHz channels (pre-rebanding).

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City of Philadelphia
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System Description / Technical Overview
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Option 1-1

Motorola has taken great care to propose an offering that will provide a cost-effective way for the City of Philadelphia to expand the proposed ASTRO 25 system by 10 channels.

1.3 System Architecture

1.3.1 ASTRO 25 Simulcast Prime Site Overview

1.3.1.1 Prime Site

The 10 channel expansion will have impact to the prime sites for both systems. System A prime site and System B prime site will each receive an additional Ethernet Switch, GCM8000 Comparators and expansion of the existing TRAK9100 Global Positioning System (GPS) time and frequency reference in order to keep the network in sync.

1.3.1.2 GCM8000 Comparators

Motorola will provide the 10 new GCM8000 comparators to support the 10 channel expansion. Five (5) comparators will be placed at System A prime site and five (5) comparators at System B prime site. The GCM8000 Comparator is the only comparator that supports IP Simulcast capabilities. Please see Section 02 of the proposal for more details on the GCM8000 comparator.

1.3.1.3 Prime Site Ethernet LAN Switches

The Ethernet LAN switches provided under the Baseline ASTRO25 system upgrade will be expanded by one switch to support the addition of the 10 comparators to support the 10 additional channels.

1.3.1.4 TRAK 9100 Time and Frequency Standard

To synchronize the transmissions of all RF sites in the radio system, a precision timing device is used to control simulcast operations. The Prime Site will reuse the existing TRAK9100 GPS-based Time and Frequency Standard that provides a frequency/timing device for synchronized simulcast transmissions. Motorola will expand the existing TRAK9100 unit to support the additional 10 comparators required for the channel expansion.

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Option 1-2

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1.4 Simulcast Remote-Site Overview

Motorola is proposing to add ten (10) GTR 8000BR base stations to each Simulcast RF Site to the upgraded ASTRO 25 system. Thus, there will be a total of twenty (20) simulcast channels for system A and twenty-five (25) for System B.

1.4.1 Ethernet LAN Switches

The Ethernet LAN switches provided under the Baseline ASTRO25 system upgrade will be expanded by one switch each for System A and System B to support the 10 channel expansion.

1.4.2 ASTRO 25 GTR8000 Base Radio

Motorola is proposing to the City of Philadelphia the use of the ASTRO 25 GTR8000BR base radio in IP Simulcast mode for the 10-channel expansion. Motorola will provide one (1) additional 7-foot tall rack and Motorola requires a rack space at each site assumed to be off the end of the row's cable tray. Please see Section 02 of the proposal for more details on the GTR8000BR.

1.4.2.1 TRAK 9100 Time and Frequency Standard

Motorola will expand the existing TRAK 9100 by adding the appropriate distribution cards to support the 10 channel expansion.

1.5 System Design Details

The City of Philadelphia 10 channel expansion will add five (5) channels to System A and five (5) channels to System B. No new antennas and transmission line will be required because Motorola will utilize/expand existing combiner designed during the 5 channel upgrade in 2005.

The Philadelphia School District channels assumed to be used for this expansion are as follows:

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Option 1-3

Philadelphia, PA 10 Ch. Expansion Frequencies		
CH#	Base Tx	Base Rx
1	855.7875	810.7875
2	856.8375	811.8375
3	857.9125	812.9125
4	858.8125	813.8125
5	858.8375	813.8375
6	859.8125	814.8125
7	859.8375	814.8375
8	860.8125	815.8125
9	860.8375	815.8375
10	860.9125	815.9125

Any changes to the above frequency list will invalidate the proposed combining scheme and may require additional equipment such as, but not limited to additional combiners, filters, antennas and/or transmission lines. Motorola is also not responsible for any existing interference on these frequencies.

1.5.1 System Components

The City of Philadelphia 10 channel expansion is proposed to have the following equipment.

1.5.1.1 10 Channel Expansion

1. Prime Site w/ Co-located Remote Site (Domino & City Hall 10th Floor)

♦ Qty (5) GTR8000 Base radios for System A

♦ Qty (5) GTR8000 Base radios for System B

♦ Qty (5) GCM8000 Comparators for System A

♦ Qty (5) GCM8000 Comparators for System B

♦ Qty (1) Additional Prime Ethernet Switch for System A

♦ Qty (1) Additional Prime Ethernet Switch for System B

♦ Qty (1) Additional co-located Site Ethernet Switch for System A

♦ Qty (1) Additional co-located Site Ethernet Switch for System B

♦ Reuse existing co-located Site Router at System A

♦ Reuse existing co-located Site Router at System B

♦ Reuse and expand existing TRAK9100 GPS

♦ Reuse and expand existing Combining

♦ Reuse existing Antennas and Transmission Line Network

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Option 1-4

2. Each Remote RF Site (South Hampton, Police Academy, S.W.W.W.T.P, Eng. #9, 31st & Grays Ferry, Streets & Highway Dept, Ford & Belmont, and Bustleton & Hofnagle):

♦ Qty (5) GTR8000 Base radios for System A

♦ Qty (5) GTR8000 Base radios for System B

♦ Qty (1) Additional co-located Ethernet Switch for System A

♦ Qty (1) Additional co-located Ethernet Switch for System B

♦ Reuse existing co-located Site Router at System A

♦ Reuse existing co-located Site Router at System B

♦ Reuse and expand existing TRAK9100 GPS

♦ Reuse and expand existing Combining

♦ Reuse existing Antennas and Transmission Line Network

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Option 1-5

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Option 1-6

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Option 1b.   Statement of Work
10 Channel Expansion

1b.1   General Information

This Statement of Work (SOW) defines the principal activities and responsibilities of all parties for the implementation of additional channels described in this proposal to expand the City of Philadelphia Project 25 system. The System Description provides information on the equipment implemented under this scope. A System Description is included in this proposal.

1b.2   Statement of Work Overview

The following major subsystems are included as components of the Project Statement of Work:

1b.2.1 Option 1: 10 Channel Expansion

Add 10 channels to each of the ten (10) RF sites

1b.3   System Implementation Overview

Motorola's proposal to the City of Philadelphia provides systems integration and implementation services to deploy a fully functional communications system. Motorola's experience as a Systems Integrator, deploying large and complex communication and software systems, will provide a smooth system implementation and cutover to the new communications system. This SOW specifically addresses the implementation of the expansion option to add 10 channels to the City's 800 MHz Project 25 network.

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Option 1 – Statement of Work
June 13, 2008

Option 1b.- 1

Motorola's local Systems Integration teams are highly skilled at deploying systems of the size and complexity of this communications system.

Motorola provides a phased approach to implementation, with the following phases:

♦ Project Initiation and Kick Off
♦ Design Review
♦ Civil Review and Civil Work
♦ Order Processing, Manufacturing & Factory Testing
♦ Installation and Upgrades
♦ Systems Integration & Optimization
♦ Acceptance Testing
♦ Training
♦ Cutover
♦ Project Finalization
♦ Warranty Support

Motorola has provided a preliminary design as a part of this proposal, which serves as a baseline for the Design Review. The Design Review encompasses the design finalization, such as finalization of the equipment locations and frequency compatibility verification. Motorola will work closely with the City of Philadelphia to develop a cutover plan gracefully add the new channels to the system. At the end of the Design Review phase, detailed Design Documents will be provided to the City of Philadelphia.

While the Design Review progresses, Motorola will work in parallel to perform site audits, identifying any site issues associated with the implementation of the new system.

Equipment manufacturing is followed by factory staging of the radio infrastructure at Motorola's Customer Center for Solutions Integration (CCSi) in Schaumburg, Illinois. Factory staging provides for initial assembly and testing of all Motorola manufactured radio system components. Factory staging will allow testing of the functional capabilities of the communications system. This process will allow the City of Philadelphia to witness factory testing in a controlled environment, as well as provide a smooth and easy field installation.

Motorola's local implementation team will install and optimize the communications system at the City of Philadelphia sites as staged at CCSi. Motorola's implementation includes the integration of all proposed subsystems to provide an end-to-end solution. To close the loop between proposed functionality with the deployed system, Motorola will execute Acceptance Testing according to an Acceptance Test Plan (ATP). The ATP includes Functional Performance Tests.

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Option 1b.- 2

The final steps to full system implementation are delivery of system documentation, punch list resolution, and final acceptance. The project team and the post-acceptance service team will work with City of Philadelphia during this phase, to ensure a smooth transition to the post acceptance support period.

1b.4 Project Scope

The project scope is outlined below, with the major project elements described. The total project implementation is based on three major phases. Each phase will have the elements described below, unless indicated.

1b.5 Contract Initiation - Kickoff Meeting and Initiation Activities

The project will be initiated with a Project Kickoff meeting including key City of Philadelphia and Motorola project participants. The objectives of the Kickoff meeting include:

♦ Introduce and exchange contact information of all project participants.

♦ Review roles of key participants and project review procedures.

♦ Establish a clear chain of communication and authority.

♦ Review overall project scope and objectives.

♦ Review resource and scheduling requirements.

♦ Review preliminary project schedule with the City of Philadelphia.

During the Project Initiation phase, Motorola will review and work with the City of Philadelphia to finalize the following project processes and procedures:

♦ Detailed Project Schedule

♦ Risk Management Plan

♦ Change Control Plan

♦ Issues Document and Action Item Log

1b.6 Design Review

The City of Philadelphia and Motorola will review the channel expansion design through analysis of the sites and frequencies, as mutually agreed between Motorola and City of Philadelphia. During this portion of the project, the Project Plan will be developed.

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Option 1b.- 3

Design Review deliverables include:

- Final Equipment locations
- Intermodulation and combiner compatibility analysis
- Cutover Plan
- Final Implementation Schedule

1b.7 Civil Review

The required sites for channel expansion will be reviewed for site readiness prior to equipment implementation. The City is responsible for providing sites that are suitable for the implementation of the system.

1b.8 Staging

The City's equipment will be staged at Motorola's staging facility in Schaumburg, IL. City of Philadelphia representatives will have the option to witness the testing and demonstration of their system. Because the system is composed existing equipment and new equipment, the staging effort will include the stagable subsystems. Full system testing will occur when the new and upgraded equipment are integrated in the field during Field Acceptance Testing.

1b.9 Installation and Optimization

The installation and optimization of the equipment will prepare the system for acceptance testing and cutover. This includes the installation and programming Fixed Network Equipment (FNE).

1b.10 Acceptance Testing

The acceptance testing for the City will be executed in accordance with the baseline ATP executed under the current contract with the City of Philadelphia.

1b.11 Training

No training is included in this phase of the project.

1b.12 Cutover

The cutover will be executed in accordance with a mutually agreed upon cutover plan that will minimize the impact to the users of the City of Philadelphia system.

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Option 1b.- 4

1b.13 System Acceptance

System acceptance will be governed by the successful execution of the ATPs, as well as delivery of deliverables such as the training, documentation, and resolution of any punch list items.

1b.14 Responsibility

1b.14.1 Customer Responsibility

It will be the City's responsibility to provide:

- Site links
- Frequencies
- Generators
- Shelters
- Towers
- UPS equipment
- Type I & Type II surge suppression
- Tower and shelter space
- Electrical
- Sufficient HVAC
- Environmental and grounding facilities

The City will be responsible to verify the existing backup power systems are sufficient to support the new equipment additions to existing facilities. All frequency licensing will remain the responsibility of the City of Philadelphia.

1b.14.2 Assumptions

Motorola has made the following assumptions in development of this budgetary quotation:

- All sites will meet Motorola's R56 2005 Standards for Communications sites. If the City does not have a copy of the "R56 v.2005 Standards & Guidelines for Communications site", one will be provided by Motorola
  - Sufficient space exists at the radio locations
  - Adequate power is available to support the new equipment
  - Grounding meets Motorola's R56 installation standards

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Option 1b.- 5

- ◆ New frequencies can be implemented using existing combiners and antennas
- ◆ Existing towers can support the loading required for the system (if new antennas are required
- ◆ Existing generators have adequate capacity to support the equipment
- ◆ The City will provide the necessary 800 MHz frequency pairs and FCC licenses
- ◆ System backhaul will be provided by the City of Philadelphia that meets Motorola's link specifications.
- ◆ No spares are included
- ◆ No subscriber services or template creation are included in this project
- ◆ The City is responsible for all licenses, permits, etc required for the implementation of this system
- ◆ No civil work or site upgrades are included in Motorola's quotation
- ◆ Coverage verification is included in this quotation, not a full Coverage Acceptance Test Plan

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Option 1b.- 6

Option 1c.   Equipment List
10 Channel Expansion

Qty	Model Number	Item Description	Sys Seg
100	T7039	GTR 8000 BASE RADIO	GTR8000
100	CA00855AA	ADD: 700/800 MHZ MID POWER	GTR8000
100	CA00025AF	ADD: CIRCUIT BASED MULTISITE BASE R	GTR8000
100	CA00883AA	ADD: 800 MHZ TX FILTER W/PMU	GTR8000
100	CA00952AA	ADD: QUANTAR RETROFIT HARDWARE	GTR8000
100	X153AW	ADD: RACK MOUNT HARDWARE	GTR8000
100	X265AH	ADD: NARROW PRESELECTOR, 800 MHZ	GTR8000

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Option 1c.-1

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Option 1c.-2

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Option 1c. Equipment List
5 Channel Expansion

Qty	Model Number	Item Description	Sys Seg
50	T7039	GTR 8000 BASE RADIO	GTR8000
50	CA00855AA	ADD: 700/800 MHZ MID POWER	GTR8000
50	CA00025AF	ADD: CIRCUIT BASED MULTISITE BASE R	GTR8000
50	CA00883AA	ADD: 800 MHZ TX FILTER W/PMU	GTR8000
50	CA00952AA	ADD: QUANTAR RETROFIT HARDWARE	GTR8000
50	X153AW	ADD: RACK MOUNT HARDWARE	GTR8000
50	X265AH	ADD: NARROW PRESELECTOR, 800 MHZ	GTR8000

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Option 1c.-2

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Option 1d. Acceptance Test Plan 10 Channel Expansion

1d.1 Coverage Acceptance Test Plan (CATP)

Motorola is proposing to the City of Philadelphia a 10 Channel Expansion. The 10 Channel Expansion will provide five (5) channels to System A and five (5) channels to System B. System A will be expanded to a total of 20 channels and System B will be expanded to a total of 25 channels. This expansion will reuse the existing antenna, transmission line and combining network, thus coverage should not be impacted by the addition of these channels to the system. Motorola does understand if the City of Philadelphia feels it is necessary to complete a CATP, Motorola would perform a similar CATP test as identified in Section 4 of the Baseline system offering documented in the ASTRO 25 Upgrade Proposal however instead of testing a full coverage grid set, a statistically relevant subset (>800) of randomly selected grids would be tested. This would be in line with the testing performed for the previous Five Channel Expansion Project.

1d.2 10 Channel Expansion Acceptance Test Plan

1d.2.1 General

This Acceptance Test Plan (ATP) shall specify the demonstration procedures to ensure Motorola's compliance with the applicable RF remote site field performance specifications set forth under the contract. The failure of one test will not necessarily require that the entire ATP be run again. In the event of a test failure, Motorola will determine the cause of the failure, make the required corrections, and that particular test will be run again.

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Option 1d.-1

Representatives of the City will attend the testing that takes place at the remote sites. Acceptance by the City of Philadelphia will be achieved with one signature per individual demonstration. In the event of non-acceptance of items associated with a particular

demonstration, those items of non-acceptance will be noted on a "punch list" and will be corrected before final acceptance for the phase. After all deficiencies noted on the "punch list" are corrected, a representative of the City of Philadelphia and Motorola will acknowledge all items are completed with appropriate signatures.

1d.2.2 Description

This procedure lists the tests that are required to verify the specifications of the GTR trunked Stations and associated RF ancillary equipment. Each test has been performed on each station at all sites during equipment optimization. The test data has been recorded in the site log (site data). Each of the following tests require that all site log records be verified by comparing testing measurements with the data contained in the Site Log for each station. Test results are to be recorded on 821 MHz Base Station TX/RX Power and Level Test Checklists. A test checklist is to be completed for each station at each site. Initial either (Pass) or an exception (Fail w/Exception code). Tests have been grouped into categories, thereby minimizing the number of cable and configuration changes required during testing. Although a test may be written to repeat for all remaining stations at the site, it shall be the Motorola technician's discretion to determine if all applicable tests or subsets thereof should be completed for a given station before moving to the next station.

1d.2.3 Required Test Equipment

The following list of test equipment is required to perform the 821 MHz Field Specification Test.

♦ Motorola R2975 Series Service Monitor (or approved equal) ASTRO CAI and P25 equipped.

♦ Transmission Impairment Measurement Set

♦ Min. two In-Line bi-directional wattmeter (Bird Model 43 or approved equal)

♦ 50 ohm RF power termination load (50ohm dummy load)

♦ IBM PC (or 100% compatible computer) with GTR Communications Service Software (CSS)

All test equipment used for 821 MHz specification testing will have been calibrated within the last year. The calibration of the test equipment will be verified by the presence of a calibration sticker or a calibration certificate for all equipment used in testing.

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Option 1d.-2

1d.2.4 Setup

Performing these tests requires that the stations be taken out of service. Follow the CSS service procedure for station access disable/enable. Test equipment setup procedures to be perform by qualified personnel.

In addition, it is required that all power and level measurements for the site have been conducted prior to testing the site and all measurements are recorded on the log at the site. This site log will be located on site for reference during testing.

1.2.4.1   821 MHz Trunked Base Station/NPSPAC Base Station Testing

The purpose of this testing is to verify the equipment and setup specifications for the new trunked base stations located at the new RF site.

Test 1.   Measure and Verify Station Transmitter Output Power at the Combining System Input Port.

Step 1.   Using CSS or NMS, take the station under test Out Of Service by disabling it.

Step 2.   Using a RG142 test cable (or other cable of known loss), or directly if possible, connect an in-line wattmeter between the transmitter combiner input port and the ½" Superflex coaxial cable that is connected to said port for the transmitter under test.

Step 3.   Using CSS, key the station locally.

Step 4.   Read transmitter power level on the in-line wattmeter.

Step 5.   Verify that the power level displayed on the wattmeter is within tolerance of the projected value listed on the test checklist for the station under test.

Step 6.   Repeat step 3 to de-key the station under test.

Step 7.   Record testing results and/or initial PASS/FAIL in the corresponding field(s) of the base station testing checklist.

> **Note:**   Repeat steps 1 through 7 for all stations at the site. Test will be performed with station at rated power output necessary to comply with site licensed ERP based on measured combiner system and projected antenna system gains.

Test 2.   Measure and Verify Station Transmit RF Frequency.

Step 1.   Connect the service monitor to the respective transmit combiner test port for the station under test.

Step 2.   Using CSS, key the station locally.

Step 3.   Read the station transmit frequency on the service monitor display.

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Option 1d.-3

Step 4.   Verify that the frequency displayed on the service monitor is within tolerance of the station transmit frequency as depicted on the label located on the front of the station.

Step 5.   Repeat step 2 to de-key the station under test.

Step 6.   Record testing results and/or initial PASS/FAIL in the corresponding field(s) of the base station testing checklist.

> **Note:**   Repeat steps 1 through 6 for all remaining stations at the site.

Test 3.   Transmitter Deviation Measure and Verify V.52 Test Pattern Deviation

Step 1.   With the connection of the service monitor still configured as per Test 2, set up the service monitor to display modulation.

Step 2.   Select the V.52 test pattern via the RSS/CSS program.

Step 3.   Key the station under test generating the V.52 test pattern as modulation via the appropriate function key in the RSS/CSS program.

Step 4.   Read the transmitter deviation for the station on the service monitor

Step 5.   Verify that the deviation level is within tolerance of the specification as listed on the test checklist for the station under test (2.83KHz, ±0.57).

Step 6.   De-key the station under test via the appropriate function key in the RSS/CSS program.

Step 7.   Record testing results and/or initial PASS/FAIL in the corresponding field(s) of the base station testing checklist.

> **Note:**   Repeat steps 1 through 7 for all remaining trunked stations at the site.

Test 4.   Measure and Verify Station Transmitter Reflected Power at the Transmitter Output RF Port.

Step 1.   Using the RG142 test cable (or other cable of known loss), connect an in-line wattmeter between the transmitter RF output port of the station and the ½" superflex coaxial cable that is connected to the transmitter output port of the station.

Step 2.   Using CSS key the station locally.

Step 3.   Read reflected power.

Step 5.   Repeat step 2 to de-key the station under test.

Step 6.   Record results and/or initial in the corresponding field(s) of the base station testing checklist.

Step 7.   Reconnect coaxial cable to the station.

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Option 1d.-4

> **Note:** Repeat steps 1 through 7 for all stations at the site. Test will be performed with station at rated power output necessary to comply with site licensed ERP based on measured combiner system and projected antenna system gains.

Test 5. Receiver Sensitivity Test Measured at the Multicoupler RF Output
Port Receiver Sensitivity Test

Step 1. Disconnect the superflex cable for the selected station receiver from the Multicoupler RF output port.

Step 2. Connect the superflex cable to the service monitor.

Step 3. Set up the service monitor to generate an on frequency signal at the selected receivers' frequency at a level of 0.3 uvolts.

Step 4. Set up the service monitor to modulate the carrier with a V.52 test pattern at a level of +/- 2.83KHz of deviation.

Step 5. Using the RSS/CSS program note the value at which the BER stabilizes as the station captures the V.52 pattern. The BER value should be no more than 5%.

Step 6. Record testing results and/or initial PASS/FAIL in the corresponding field(s) of the base station testing checklist.

Step 7. Reconnect superflex cable to the receiver multicoupler RF output port.

> **Note:** Repeat steps 1 through 7 for all remaining trunked stations at the site.

1.2.4.2 Combiner Output Power Testing and Combining System Loss Verification

The purpose of this test is to measure the combining system forward and reflected output power for all stations interfaced to the combining systems at the site and to verify the combining system loss. This test is to be conducted only after all individual station testing has been completed at the site.

Test 1. Measure and Verify Station Transmitter Forward and Reflected Power at the Output Port of the Associated Transmitter Combining System.

Step 1. Performing this test requires that all stations be taken out of service via CSS.

Step 2. Using the RG142 test cable (or other cable of known loss); connect an in-line wattmeter to the associated combining system output (hybrid antenna port) and the 50-ohm RF termination load (dummy load).

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Option 1d.-5

Step 3.   Via CSS, locally key each station sequentially that is connected to the combining system.

Step 4.   Read the forward and reflected power at the output of the combining system for each station.

Step 5.   Verify the forward and reflected power levels against what is recorded in the Site Log for the selected base station.

Step 6.   Record testing results and/or initial PASS/FAIL in the corresponding field(s) of the base station testing checklist.

Step 7.   Once all stations for the combining system have been tested remove the wattmeter/dummy load and reconnect the ½" combiner output jumper cable.

Step 8.   Verify combiner loss.

Combiner Loss = [LOG(Combiner Input in Watts) X 10] – [LOG(combiner Output in Watts) X 10]

Note: Repeat steps 2 through 7 for all combining systems located at the site.

1.2.4.3   Existing TTA/Multicoupler System

The Existing TTA/Multicoupler System will not be individually tested as part of the ATP. Instead, each Site will be tested by injecting a signal through the TTA test port on three (3) frequencies (High/Mid/Low). The results will be compared to the most recent PM base line test documents. The intent is to show no change in performance of the existing TTA/Multicoupler after adding the 10 new channels to existing multicoupler ports. The 50ohm loads will be removed and replaced with the 10 new channels at each RF site.

1.2.4.4   PUNCHLIST PROCEDURE AND FORM

The Punchlist will a record of all items that did not meet the terms and conditions of this contract and requires corrective action or resolution. All Punchlist items will be addressed until each item has been resolved. An item gets recorded as a Punchlist item when the City of Philadelphia decides a test has failed.

Resolution of Punchlist items shall be addressed by priority as indicated in the Exception Procedure Code. The Punchlist will contain:

1.   A specific acceptance test reference.

2.   The person or persons witnessing the failure.

3.   The date.

4.   The equipment, feature or facility involved, if applicable.

5.   A description of the exception or failure.

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Option 1d.-6

6. The Exception Procedure Code that categorizes the City's exception for proper priority of the efforts to resolve the item.

7. A resolution/action plan with target completion date.

8. Two (2) signature blocks for the Motorola and City representative/s. One for recording the exception item and a second for approving that the item was resolved and tested.

9. A completion date.

10. Resolution comments.

Exception Procedures Codes (EPC's) are:

1. AI - Accept as Is, Exception item minor and does not require any corrective action.

2. CS - Correction to Specifications or procedures, Not an exception item, but recorded for future reference. Delineate corrections to specification or ATP procedure on the Punchlist.

3. CI - Critical Item, Exception item which requires correction prior to any system transition/cut-over. When an item is considered critical, one of the following Exception Codes are also required (CA, or CR).

4. CA - Corrective Action required as part of Contract. Exception item that falls within Motorola's Contract commitment.

5. CR - Change Request with or without additional cost. Exception item beyond Motorola's Contract commitment. In this case, the City may find a problem at a site where the work responsibility is beyond Motorola's Contract work commitment. If corrected, the correction may be at the City's costs.

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Option 1d.-7

1d.3   City Hall 10th Flr

821 MHz Base Station Tx/Rx Power and Level Check List

Site Name	City Hall	Site Licensed E.R.P		Date	

Motorola System Technologist: **CUST. Technician:**

1d.3.1 821 MHz Trunked Base Station

Test #1: Measure and Verify Station Transmitter Output Power at the input to the Combining System.

♦ Measured value should be 100 Watts (full station rated value) or T.B.D. Watts (as required for site licensed ERP.) ±5%.

Channel	Frequency	Measured Forward Power	PASS	FAIL
A16				
A17				
A18				
A19				
A20				

Channel	Frequency	Measured Forward Power	PASS	FAIL
B21				
B22				
B23				
B24				
B25				

Test #2: Measure and Verify Station Transmit RF Frequency.

♦ Measured value should = Transmit frequency ±87Hz

Channel	Frequency	Measured Frequency Error	PASS	FAIL
A16				
A17				
A18				
A19				
A20				

Channel	Frequency	Measured Frequency Error	PASS	FAIL
B21				
B22				
B23				
B24				
B25				

Test #3: Transmitter Deviation

- ♦ Measure and Verify V.52 Test Pattern Deviation (ASTRO Trunked Stations Only)
- ♦ (2.83KHz ±0.56 KHz)
- ♦ Measure and Verify Transmit Deviation Test (NPSPAC Stations Only)
- ♦ (2.4 KHz ±0.24 KHz)

Channel	Frequency	Measured Deviation	PASS	FAIL
A16				
A17				
A18				
A19				
A20				

Channel	Frequency	Measured Deviation	PASS	FAIL
B21				
B22				
B23				
B24				
B25				

Test #4: Measure and Verify Station Transmitter Reflected Power at the Transmitter Output RF Port.

- ♦ 4 watts, ± 5%

Channel	Frequency	Measured Reflected Power	PASS	FAIL
A16				
A17				
A18				
A19				
A20				

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Option 1d.-9

Channel	Frequency	Measured Reflected Power	PASS	FAIL
B21				
B22				
B23				
B24				
B25				

Test #5: Receiver Sensitivity Test Measured at the Station Receiver Input RF Port

♦ Receiver Sensitivity Test (ASTRO Trunked Stations Only) V.52 BER is 5% or less @ 0.3μV

Channel	Frequency	Measured Sensitivity	PASS	FAIL
A16				
A17				
A18				
A19				
A20				

Channel	Frequency	Measured Sensitivity	PASS	FAIL
B21				
B22				
B23				
B24				
B25				

1d.3.2 Combiner Output Power Testing and Combiner Loss Verification

Test #1: Measure Station Transmitter Forward and Reflected Power at the Output Port of the Associated Transmitter Combining System and Verify Combining System Loss

♦ Measure Input Power at input to combining system & Output Power at output of combining system (Hybrid antenna port) using an in-line wattmeter with combiner output terminated into dummy load.

♦ Insertion loss should not exceed 8.1dB (329 Domino, City Hall & Southampton) or 6.8dB (other sites) ±1dB.

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Option 1d.-10

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Channel	Frequency	Measured Input Power	Measured Fwd. Output Power	Measured Reflected Output Power	Calculated Combiner Loss	PASS	FAIL
A16							
A17							
A18							
A19							
A20							

Channel	Frequency	Measured Input Power	Measured Fwd. Output Power	Measured Reflected Output Power	Calculated Combiner Loss	PASS	FAIL
B21							
B22							
B23							
B24							
B25							

1d.3.3 Existing TTA/Multicoupler System

Verify PM base line test document for TTA/Multicoupler level setting for the High/Median/Low frequencies being used.

Frequency	PM Base line test level	Site ATP Base line test level
B15 – 821.1000 MHz		
A9 – 822.5875 MHz		
A1 – 823.8375 MHz		

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Option 1d.-11

1d.3.4 Punchlist Form

Test Description: _____

Test Number: _____

Noted By: _____

Date: _____

Exception Code and/or Comment

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┌─────────────────────────────────────┐
│                                     │
│                                     │
│                                     │
└─────────────────────────────────────┘
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Resolution/Action Plan

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┌─────────────────────────────────────┐
│                                     │
│                                     │
│                                     │
└─────────────────────────────────────┘
```

Philadelphia Representative _____

Motorola Representative _____

Retest Completion Date _____

Philadelphia Representative _____

Motorola Representative _____

Resolution Comments

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┌─────────────────────────────────────┐
│                                     │
│                                     │
│                                     │
└─────────────────────────────────────┘
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Option 1d.-12

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1d.4   Southampton

821 MHz Base Station TX/Rx Power and Level Check List

Site Name	Southampton	Site Licensed E.R.P.		Date	

Motorola System Technologist: **CUST. Technician:**

1d.4.1 821 MHz Trunked Base Station

Test #1: Measure and Verify Station Transmitter Output Power at the input to the Combining System.

- ♦ Measured value should be 100 Watts (full station rated value) or T.B.D. Watts (as required for site licensed ERP.) ±5%.

Channel	Frequency	Measured Forward Power	PASS	FAIL
A16				
A17				
A18				
A19				
A20				

Channel	Frequency	Measured Forward Power	PASS	FAIL
B21				
B22				
B23				
B24				
B25				

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Option 1d.-13

Test #2: Measure and Verify Station Transmit RF Frequency.

♦ Measured value should = Transmit frequency ±87Hz

Channel	Frequency	Measured Forward Power	PASS	FAIL
A16				
A17				
A18				
A19				
A20				

Channel	Frequency	Measured Forward Power	PASS	FAIL
B21				
B22				
B23				
B24				
B25				

Test #3: Transmitter Deviation

♦ Measure and Verify V.52 Test Pattern Deviation (ASTRO Trunked Stations Only) (2.83KHz ±0.56 KHz)

♦ Measure and Verify Transmit Deviation Test (NPSPAC Stations Only) (2.4 KHz ±0.24 KHz)

Channel	Frequency	Measured Forward Power	PASS	FAIL
A16				
A17				
A18				
A19				
A20				

Channel	Frequency	Measured Forward Power	PASS	FAIL
B21				
B22				
B23				
B24				
B25				

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Option 1d.-14

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Test #4: Measure and Verify Station Transmitter Reflected Power at the Transmitter Output RF Port.

♦ 4 watts, ± 5%

Channel	Frequency	Measured Forward Power	PASS	FAIL
A16				
A17				
A18				
A19				
A20				

Channel	Frequency	Measured Forward Power	PASS	FAIL
B21				
B22				
B23				
B24				
B25				

Test #5: Receiver Sensitivity Test Measured at the Station Receiver Input RF Port

♦ Receiver Sensitivity Test (ASTRO Trunked Stations Only) V.52 BER is 5% or less @ 0.3μV

Channel	Frequency	Measured Forward Power	PASS	FAIL
A16				
A17				
A18				
A19				
A20				

Channel	Frequency	Measured Forward Power	PASS	FAIL
B21				
B22				
B23				
B24				
B25				

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Option 1d.-15

1d.4.2 Combiner Output Power Testing and Combiner Loss Verification

Test #1: Measure Station Transmitter Forward and Reflected Power at the Output Port of the Associated Transmitter Combining System and Verify Combining System Loss

♦ Measure Input Power at input to combining system & Output Power at output of combining system (Hybrid antenna port) using an in-line wattmeter with combiner output terminated into dummy load.

Insertion loss should not exceed 8.1dB (329 Domino, City Hall & Southampton) or 6.8dB (other sites) ±1dB.

Channel	Frequency	Measured Forward Power	PASS	FAIL
A16				
A17				
A18				
A19				
A20				

Channel	Frequency	Measured Forward Power	PASS	FAIL
B21				
B22				
B23				
B24				
B25				

1d.4.3 Existing TTA/Multicoupler System

Verify PM base line test document for TTA/Multicoupler level setting for the High/Median/Low frequencies being used.

Frequency	PM Base line test level	Site ATP Base line test level
B15 – 821.1000 MHz		
A9 – 822.5875 MHz		
A1 – 823.8375 MHz		

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Option 1d.-16

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1d.4.4 Punchlist Form

Test Description: _____

Test Number: _____

Noted By: _____

Date: _____

Exception Code and/or
Comment

Resolution/Action Plan

Philadelphia Representative _____

Motorola Representative _____

Retest Completion Date _____

Philadelphia Representative _____

Motorola Representative _____

Resolution Comments

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Option 1d.-17

1d.5   Domino Lane

821 MHz Base Station TX/Rx Power and Level Check List

Site Name:	Domino Lane	Site Licensed E.R.P.:		Date:	

Motorola System Technologist: **CUST. Technician:**

1d.5.1 821 MHz Trunked Base Station

Test #1: Measure and Verify Station Transmitter Output Power at the input to the Combining System.

- ♦ Measured value should be 100 Watts (full station rated value) or T.B.D. Watts (as required for site licensed ERP.) ±5%.

Channel	Frequency	Measured Forward Power	PASS	FAIL
A16				
A17				
A18				
A19				
A20				

Channel	Frequency	Measured Forward Power	PASS	FAIL
B21				
B22				
B23				
B24				
B25				

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Option 1d.-18

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Test #2: Measure and Verify Station Transmit RF Frequency.

♦ *Measured value should = Transmit frequency ±87Hz*

Channel	Frequency	Measured Forward Power	PASS	FAIL
A16				
A17				
A18				
A19				
A20				

Channel	Frequency	Measured Forward Power	PASS	FAIL
B21				
B22				
B23				
B24				
B25				

Test #3: Transmitter Deviation

- Measure and Verify V.52 Test Pattern Deviation (ASTRO Trunked Stations Only)
  (2.83KHz ±0.56 KHz)
- Measure and Verify Transmit Deviation Test (NPSPAC Stations Only)
  (2.4 KHz ±0.24 KHz)

Channel	Frequency	Measured Forward Power	PASS	FAIL
A16				
A17				
A18				
A19				
A20				

Channel	Frequency	Measured Forward Power	PASS	FAIL
B21				
B22				
B23				
B24				
B25				

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June 13, 2008

Option 1d.-19

Test #4: Measure and Verify Station Transmitter Reflected Power at the Transmitter Output RF Port.

♦ 4 watts, ± 5%

Channel	Frequency	Measured Forward Power	PASS	FAIL
A16				
A17				
A18				
A19				
A20				

Channel	Frequency	Measured Forward Power	PASS	FAIL
B21				
B22				
B23				
B24				
B25				

Test #5: Receiver Sensitivity Test Measured at the Station Receiver Input RF Port

♦ Receiver Sensitivity Test (ASTRO Trunked Stations Only) V.52 BER is 5% or less @ 0.3μV

Channel	Frequency	Measured Forward Power	PASS	FAIL
A16				
A17				
A18				
A19				
A20				

Channel	Frequency	Measured Forward Power	PASS	FAIL
B21				
B22				
B23				
B24				
B25				

City of Philadelphia
ASTRO 25 Upgrade
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June 13, 2008

Option 1d.-20

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1d.5.2 Combiner Output Power Testing and Combiner Loss Verification

Test #1: Measure Station Transmitter Forward and Reflected Power at the Output Port of the Associated Transmitter Combining System and Verify Combining System Loss

♦ Measure Input Power at input to combining system & Output Power at output of combining system (Hybrid antenna port) using an in-line wattmeter with combiner output terminated into dummy load.

Insertion loss should not exceed 8.1dB (329 Domino, City Hall & Southampton) or 6.8dB (other sites) ±1dB.

Channel	Frequency	Measured Forward Power	PASS	FAIL
A16				
A17				
A18				
A19				
A20				

Channel	Frequency	Measured Forward Power	PASS	FAIL
B21				
B22				
B23				
B24				
B25				

1d.5.3 Existing TTA/Multicoupler System

Verify PM base line test document for TTA/Multicoupler level setting for the High/Median/Low frequencies being used.

Frequency	PM Base line test level	Site ATP Base line test level
B15 – 821.1000 MHz		
A9 – 822.5875 MHz		
A1 – 823.8375 MHz		

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City of Philadelphia
ASTRO 25 Upgrade
Option 1 - Acceptance Test Plan
June 13, 2008

Option 1d.-21

1.5.3.1   Punchlist Form

Test Description: _____

Test Number: _____

Noted By: _____

Date: _____

Exception Code and/or Comment

Resolution/Action Plan

Philadelphia Representative _____

Motorola Representative _____

Retest Completion Date _____

Philadelphia Representative _____

Motorola Representative

_____

Resolution Comments

City of Philadelphia
ASTRO 25 Upgrade
Option 1 - Acceptance Test Plan
June 13, 2008

Option 1d.-22

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subject to the restrictions on the title page

1d.6 Victory Garden

821 MHz Base Station TX/Rx Power and Level Check List

Site Name	Victory Garden	Site Licensed E.R.P.		Date	

Motorola System Technologist   **CUST. Technician**

1d.6.1 821 MHz Trunked Base Station

Test #1: Measure and Verify Station Transmitter Output Power at the input to the Combining System.

♦ Measured value should be 100 Watts (full station rated value) or T.B.D. Watts (as required for site licensed ERP.) ±5%.

Channel	Frequency	Measured Forward Power	PASS	FAIL
A16				
A17				
A18				
A19				
A20				

Channel	Frequency	Measured Forward Power	PASS	FAIL
B21				
B22				
B23				
B24				
B25				

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City of Philadelphia
ASTRO 25 Upgrade
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June 13, 2008

Option 1d.-23

Test #2: Measure and Verify Station Transmit RF Frequency.

Measured value should = Transmit frequency ±87Hz

Channel	Frequency	Measured Forward Power	PASS	FAIL
A16				
A17				
A18				
A19				
A20				

Channel	Frequency	Measured Forward Power	PASS	FAIL
B21				
B22				
B23				
B24				
B25				

Test #3: Transmitter Deviation

- ♦ Measure and Verify V.52 Test Pattern Deviation (ASTRO Trunked Stations Only)

  (2.83KHz ±0.56 KHz)

- ♦ Measure and Verify Transmit Deviation Test (NPSPAC Stations Only)

  (2.4 KHz ±0.24 KHz)

Channel	Frequency	Measured Forward Power	PASS	FAIL
A16				
A17				
A18				
A19				
A20				

Channel	Frequency	Measured Forward Power	PASS	FAIL
B21				
B22				
B23				
B24				
B25				

City of Philadelphia
ASTRO 25 Upgrade
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June 13, 2008

Option 1d.-24

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subject to the restrictions on the title page

Test #4: Measure and Verify Station Transmitter Reflected Power at the Transmitter Output RF Port.

- ♦ 4 watts, ± 5%

Channel	Frequency	Measured Forward Power	PASS	FAIL
A16				
A17				
A18				
A19				
A20				

Channel	Frequency	Measured Forward Power	PASS	FAIL
B21				
B22				
B23				
B24				
B25				

Test #5: Receiver Sensitivity Test Measured at the Station Receiver Input RF Port

- ♦ Receiver Sensitivity Test (ASTRO Trunked Stations Only) V.52 BER is 5% or less @ 0.3μV

Channel	Frequency	Measured Forward Power	PASS	FAIL
A16				
A17				
A18				
A19				
A20				

Channel	Frequency	Measured Forward Power	PASS	FAIL
B21				
B22				
B23				
B24				
B25				

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City of Philadelphia
ASTRO 25 Upgrade
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June 13, 2008

Option 1d.-25

1d.6.2 Combiner Output Power Testing and Combiner Loss Verification

Test #1: Measure Station Transmitter Forward and Reflected Power at the Output Port of the Associated Transmitter Combining System and Verify Combining System Loss

- ♦ Measure Input Power at input to combining system & Output Power at output of combining system (Hybrid antenna port) using an in-line wattmeter with combiner output terminated into dummy load.

- ♦ Insertion loss should not exceed 8.1dB (329 Domino, City Hall & Southampton) or 6.8dB (other sites) ±1dB.

Channel	Frequency	Measured Forward Power	PASS	FAIL
A16				
A17				
A18				
A19				
A20				

Channel	Frequency	Measured Forward Power	PASS	FAIL
B21				
B22				
B23				
B24				
B25				

1d.6.3 Existing TTA/Multicoupler System

Verify PM base line test document for TTA/Multicoupler level setting for the High/Median/Low frequencies being used.

Frequency	PM Base line test level	Site ATP Base line test level
B15 – 821.1000 MHz		
A9 – 822.5875 MHz		
A1 – 823.8375 MHz		

1.6.3.1   Punchlist Form

Test Description: _____

Test Number: _____

Noted By: _____

Date: _____

Exception Code and/or Comment

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[                                    ]
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Resolution/Action Plan

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Philadelphia Representative _____

Motorola Representative _____

Retest Completion Date _____

Philadelphia Representative _____

Motorola Representative

_____

Resolution Comments

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City of Philadelphia
ASTRO 25 Upgrade
Option 1 - Acceptance Test Plan
June 13, 2008

Option 1d.-27

1d.7   Streets & Highway

821 MHz Base Station TX/Rx Power and Level Check List

Site Name	Streets & Highway	Site Licensed E.R.P.		Date	

Motorola System Technologist: **CUST. Technician:**

1d.7.1 821 MHz Trunked Base Station

Test #1: Measure and Verify Station Transmitter Output Power at the input to the Combining System.

- ♦ Measured value should be 100 Watts (full station rated value) or T.B.D. Watts (as required for site licensed ERP.) ±5%.

Channel	Frequency	Measured Forward Power	PASS	FAIL
A16				
A17				
A18				
A19				
A20				

Channel	Frequency	Measured Forward Power	PASS	FAIL
B21				
B22				
B23				
B24				
B25				

City of Philadelphia
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Option 1d.-28

Test #2: Measure and Verify Station Transmit RF Frequency.

Measured value should = Transmit frequency ±87Hz

Channel	Frequency	Measured Forward Power	PASS	FAIL
A16				
A17				
A18				
A19				
A20				

Channel	Frequency	Measured Forward Power	PASS	FAIL
B21				
B22				
B23				
B24				
B25				

Test #3: Transmitter Deviation

♦ Measure and Verify V.52 Test Pattern Deviation (ASTRO Trunked Stations Only)

(2.83KHz ±0.56 KHz)

♦ Measure and Verify Transmit Deviation Test (NPSPAC Stations Only)

(2.4 KHz ±0.24 KHz)

Channel	Frequency	Measured Forward Power	PASS	FAIL
A16				
A17				
A18				
A19				
A20				

Channel	Frequency	Measured Forward Power	PASS	FAIL
B21				
B22				
B23				
B24				
B25				

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City of Philadelphia
ASTRO 25 Upgrade
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June 13, 2008

Option 1d.-29

Test #4: Measure and Verify Station Transmitter Reflected Power at the Transmitter Output RF Port.

- ♦ 4 watts, ± 5%

Channel	Frequency	Measured Forward Power	PASS	FAIL
A16				
A17				
A18				
A19				
A20				

Channel	Frequency	Measured Forward Power	PASS	FAIL
B21				
B22				
B23				
B24				
B25				

Test #5: Receiver Sensitivity Test Measured at the Station Receiver Input RF Port

- ♦ Receiver Sensitivity Test (ASTRO Trunked Stations Only) V.52 BER is 5% or less @ 0.3μV

Channel	Frequency	Measured Forward Power	PASS	FAIL
A16				
A17				
A18				
A19				
A20				

Channel	Frequency	Measured Forward Power	PASS	FAIL
B21				
B22				
B23				
B24				
B25				

City of Philadelphia
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June 13, 2008

Option 1d.-30

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1d.7.2 Combiner Output Power Testing and Combiner Loss Verification

Test #1: Measure Station Transmitter Forward and Reflected Power at the Output Port of the Associated Transmitter Combining System and Verify Combining System Loss

♦ Measure Input Power at input to combining system & Output Power at output of combining system (Hybrid antenna port) using an in-line wattmeter with combiner output terminated into dummy load.

Insertion loss should not exceed 8.1dB (329 Domino, City Hall & Southampton) or 6.8dB (other sites) ±1dB.

Channel	Frequency	Measured Forward Power	PASS	FAIL
A16				
A17				
A18				
A19				
A20				

Channel	Frequency	Measured Forward Power	PASS	FAIL
B21				
B22				
B23				
B24				
B25				

1d.7.3 Existing TTA/Multicoupler System

Verify PM base line test document for TTA/Multicoupler level setting for the High/Median/Low frequencies being used.

Frequency	PM Base line test level	Site ATP Base line test level
B15 – 821.1000 MHz		
A9 – 822.5875 MHz		
A1 – 823.8375 MHz		

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City of Philadelphia
ASTRO 25 Upgrade
Option 1 - Acceptance Test Plan
June 13, 2008

Option 1d.-31

1.7.3.1   Punchlist Form

Test Description: _____

Test Number: _____

Noted By: _____

Date: _____

Exception Code and/or
Comment

Resolution/Action Plan

Philadelphia Representative _____

Motorola Representative _____

Retest Completion Date _____

Philadelphia Representative _____

Motorola Representative

_____

Resolution Comments

City of Philadelphia
ASTRO 25 Upgrade
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Option 1d.-32

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1d.8   Bustleton & Hoffnagle

821 MHz Base Station TX/Rx Power and Level Check List

Site Name:	BUSTLETON & HOFFNAGLE	Site Licensed E.R.P.:		Date:	

Motorola System Technologist: **CUST. Technician:**

1d.8.1 821 MHz Trunked Base Station

Test #1:   Measure and Verify Station Transmitter Output Power at the input to the Combining System.

♦   Measured value should be 100 Watts (full station rated value) or T.B.D. Watts (as required for site licensed ERP.) ±5%.

Channel	Frequency	Measured Forward Power	PASS	FAIL
A16				
A17				
A18				
A19				
A20				

Channel	Frequency	Measured Forward Power	PASS	FAIL
B21				
B22				
B23				
B24				
B25				

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City of Philadelphia
ASTRO 25 Upgrade
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Option 1d.-33

Test #2: Measure and Verify Station Transmit RF Frequency.

Measured value should = Transmit frequency ±87Hz

Channel	Frequency	Measured Forward Power	PASS	FAIL
A16				
A17				
A18				
A19				
A20				

Channel	Frequency	Measured Forward Power	PASS	FAIL
B21				
B22				
B23				
B24				
B25				

Test #3: Transmitter Deviation

- ◆ Measure and Verify V.52 Test Pattern Deviation (ASTRO Trunked Stations Only)

  (2.83KHz ±0.56 KHz)

- ◆ Measure and Verify Transmit Deviation Test (NPSPAC Stations Only)

  (2.4 KHz ±0.24 KHz)

Channel	Frequency	Measured Forward Power	PASS	FAIL
A16				
A17				
A18				
A19				
A20				

Channel	Frequency	Measured Forward Power	PASS	FAIL
B21				
B22				
B23				
B24				
B25				

City of Philadelphia
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Option 1d.-34

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Test #4: Measure and Verify Station Transmitter Reflected Power at the Transmitter Output RF Port.

♦ 4 watts, ± 5%

Channel	Frequency	Measured Forward Power	PASS	FAIL
A16				
A17				
A18				
A19				
A20				

Channel	Frequency	Measured Forward Power	PASS	FAIL
B21				
B22				
B23				
B24				
B25				

Test #5: Receiver Sensitivity Test Measured at the Station Receiver Input RF Port

♦ Receiver Sensitivity Test (ASTRO Trunked Stations Only) V.52 BER is 5% or less @ 0.3µV

Channel	Frequency	Measured Forward Power	PASS	FAIL
A16				
A17				
A18				
A19				
A20				

Channel	Frequency	Measured Forward Power	PASS	FAIL
B21				
B22				
B23				
B24				
B25				

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City of Philadelphia
ASTRO 25 Upgrade
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June 13, 2008

Option 1d.-35

1d.8.2 Combiner Output Power Testing and Combiner Loss Verification

Test #1: Measure Station Transmitter Forward and Reflected Power at the Output Port of the Associated Transmitter Combining System and Verify Combining System Loss

♦ Measure Input Power at input to combining system & Output Power at output of combining system (Hybrid antenna port) using an in-line wattmeter with combiner output terminated into dummy load.

Insertion loss should not exceed 8.1dB (329 Domino, City Hall & Southampton) or 6.8dB (other sites) ±1dB.

Channel	Frequency	Measured Forward Power	PASS	FAIL
A16				
A17				
A18				
A19				
A20				

Channel	Frequency	Measured Forward Power	PASS	FAIL
B21				
B22				
B23				
B24				
B25				

1d.8.3 Existing TTA/Multicoupler System

Verify PM base line test document for TTA/Multicoupler level setting for the High/Median/Low frequencies being used.

Frequency	PM Base line test level	Site ATP Base line test level
B15 – 821.1000 MHz		
A9 – 822.5875 MHz		
A1 – 823.8375 MHz		

City of Philadelphia
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June 13, 2008

Option 1d.-36

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1d.8.4 Punchlist Form

Test Description: _____

Test Number: _____

Noted By: _____

Date: _____

Exception Code and/or Comment
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Resolution/Action Plan
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Philadelphia Representative _____

Motorola Representative _____

Retest Completion Date _____

Philadelphia Representative _____

Motorola Representative

_____

Resolution Comments
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City of Philadelphia
ASTRO 25 Upgrade
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June 13, 2008

Option 1d.-37

1d.9   Police Academy

821 MHz Base Station TX/Rx Power and Level Check List

Site Name:	Police Academy	Site Licensed E.R.P.:		Date:	

Motorola System Technologist: **CUST. Technician:**

1d.9.1 821 MHz Trunked Base Station

Test #1: Measure and Verify Station Transmitter Output Power at the input to the Combining System.

♦ Measured value should be 100 Watts (full station rated value) or T.B.D. Watts (as required for site licensed ERP.) ±5%.

Channel	Frequency	Measured Forward Power	PASS	FAIL
A16				
A17				
A18				
A19				
A20				

Channel	Frequency	Measured Forward Power	PASS	FAIL
B21				
B22				
B23				
B24				
B25				

City of Philadelphia
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Option 1d.-38

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Test #2: Measure and Verify Station Transmit RF Frequency.

Measured value should = Transmit frequency ±87Hz

Channel	Frequency	Measured Forward Power	PASS	FAIL
A16				
A17				
A18				
A19				
A20				

Channel	Frequency	Measured Forward Power	PASS	FAIL
B21				
B22				
B23				
B24				
B25				

Test #3: Transmitter Deviation

♦ Measure and Verify V.52 Test Pattern Deviation (ASTRO Trunked Stations Only)

(2.83KHz ±0.56 KHz)

♦ Measure and Verify Transmit Deviation Test (NPSPAC Stations Only)

(2.4 KHz ±0.24 KHz)

Channel	Frequency	Measured Forward Power	PASS	FAIL
A16				
A17				
A18				
A19				
A20				

Channel	Frequency	Measured Forward Power	PASS	FAIL
B21				
B22				
B23				
B24				
B25				

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City of Philadelphia
ASTRO 25 Upgrade
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Option 1d.-39

Test #4: Measure and Verify Station Transmitter Reflected Power at the Transmitter Output RF Port.

♦ 4 watts, ± 5%

Channel	Frequency	Measured Forward Power	PASS	FAIL
A16				
A17				
A18				
A19				
A20				

Channel	Frequency	Measured Forward Power	PASS	FAIL
B21				
B22				
B23				
B24				
B25				

Test #5: Receiver Sensitivity Test Measured at the Station Receiver Input RF Port

♦ Receiver Sensitivity Test (ASTRO Trunked Stations Only) V.52 BER is 5% or less @ 0.3μV

Channel	Frequency	Measured Forward Power	PASS	FAIL
A16				
A17				
A18				
A19				
A20				

Channel	Frequency	Measured Forward Power	PASS	FAIL
B21				
B22				
B23				
B24				
B25				

City of Philadelphia
ASTRO 25 Upgrade
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June 13, 2008

Option 1d.-40

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1d.9.2 Combiner Output Power Testing and Combiner Loss Verification

Test #1: Measure Station Transmitter Forward and Reflected Power at the Output Port of the Associated Transmitter Combining System and Verify Combining System Loss

♦ Measure Input Power at input to combining system & Output Power at output of combining system (Hybrid antenna port) using an in-line wattmeter with combiner output terminated into dummy load.

Insertion loss should not exceed 8.1dB (329 Domino, City Hall & Southampton) or 6.8dB (other sites) ±1dB.

Channel	Frequency	Measured Forward Power	PASS	FAIL
A16				
A17				
A18				
A19				
A20				

Channel	Frequency	Measured Forward Power	PASS	FAIL
B21				
B22				
B23				
B24				
B25				

1d.9.3 Existing TTA/Multicoupler System

Verify PM base line test document for TTA/Multicoupler level setting for the High/Median/Low frequencies being used.

Frequency	PM Base line test level	Site ATP Base line test level
B15 – 821.1000 MHz		
A9 – 822.5875 MHz		
A1 – 823.8375 MHz		

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City of Philadelphia
ASTRO 25 Upgrade
Option 1 - Acceptance Test Plan
June 13, 2008

Option 1d.-41

1d.9.4 Punchlist Form

Test Description: _____

Test Number: _____

Noted By: _____

Date: _____

Exception Code and/or Comment
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Philadelphia Representative _____

Motorola Representative _____

Retest Completion Date _____

Philadelphia Representative _____

Motorola Representative

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Resolution Comments
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City of Philadelphia
ASTRO 25 Upgrade
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Option 1d.-42

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1d.10 Engine 9

821 MHz Base Station TX/Rx Power and Level Check List

Site Name	Engine 9	Site Licensed E.R.P.		Date	

Motorola System Technologist: **CUST. Technician:**

1d.10.1 821 MHz Trunked Base Station

Test #1: Measure and Verify Station Transmitter Output Power at the input to the Combining System.

♦ Measured value should be 100 Watts (full station rated value) or T.B.D. Watts (as required for site licensed ERP.) ±5%.

Channel	Frequency	Measured Forward Power	PASS	FAIL
A16				
A17				
A18				
A19				
A20				

Channel	Frequency	Measured Forward Power	PASS	FAIL
B21				
B22				
B23				
B24				
B25				

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City of Philadelphia
ASTRO 25 Upgrade
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June 13, 2008

Option 1d.-43

Test #2: Measure and Verify Station Transmit RF Frequency.

Measured value should = Transmit frequency ±87Hz

Channel	Frequency	Measured Forward Power	PASS	FAIL
A16				
A17				
A18				
A19				
A20				

Channel	Frequency	Measured Forward Power	PASS	FAIL
B21				
B22				
B23				
B24				
B25				

Test #3: Transmitter Deviation

♦ Measure and Verify V.52 Test Pattern Deviation (ASTRO Trunked Stations Only)

(2.83KHz ±0.56 KHz)

♦ Measure and Verify Transmit Deviation Test (NPSPAC Stations Only)

(2.4 KHz ±0.24 KHz)

Channel	Frequency	Measured Forward Power	PASS	FAIL
A16				
A17				
A18				
A19				
A20				

Channel	Frequency	Measured Forward Power	PASS	FAIL
B21				
B22				
B23				
B24				
B25				

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Option 1d.-44

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Test #4: Measure and Verify Station Transmitter Reflected Power at the Transmitter Output RF Port.

♦ 4 watts, ± 5%

Channel	Frequency	Measured Forward Power	PASS	FAIL
A16				
A17				
A18				
A19				
A20				

Channel	Frequency	Measured Forward Power	PASS	FAIL
B21				
B22				
B23				
B24				
B25				

Test #5: Receiver Sensitivity Test Measured at the Station Receiver Input RF Port

♦ Receiver Sensitivity Test (ASTRO Trunked Stations Only) V.52 BER is 5% or less @ 0.3μV

Channel	Frequency	Measured Forward Power	PASS	FAIL
A16				
A17				
A18				
A19				
A20				

Channel	Frequency	Measured Forward Power	PASS	FAIL
B21				
B22				
B23				
B24				
B25				

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City of Philadelphia
ASTRO 25 Upgrade
Option 1 - Acceptance Test Plan
June 13, 2008

Option 1d.-45

1d.10.2   Combiner Output Power Testing and Combiner Loss Verification

Test #1: Measure Station Transmitter Forward and Reflected Power at the Output Port of the Associated Transmitter Combining System and Verify Combining System Loss

♦   Measure Input Power at input to combining system & Output Power at output of combining system (Hybrid antenna port) using an in-line wattmeter with combiner output terminated into dummy load.

Insertion loss should not exceed 8.1dB (329 Domino, City Hall & Southampton) or 6.8dB (other sites) ±1dB.

Channel	Frequency	Measured Forward Power	PASS	FAIL
A16				
A17				
A18				
A19				
A20				

Channel	Frequency	Measured Forward Power	PASS	FAIL
B21				
B22				
B23				
B24				
B25				

1d.10.3   Existing TTA/Multicoupler System

Verify PM base line test document for TTA/Multicoupler level setting for the High/Median/Low frequencies being used.

Frequency	PM Base line test level	Site ATP Base line test level
B15 – 821.1000 MHz		
A9 – 822.5875 MHz		
A1 – 823.8375 MHz		

City of Philadelphia
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June 13, 2008

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Option 1d.-46

1d.10.4   Punchlist Form

Test Description: _____

Test Number: _____

Noted By: _____

Date: _____

Exception Code and/or Comment

[blank box]

Resolution/Action Plan

[blank box]

Philadelphia Representative _____

Motorola Representative _____

Retest Completion Date _____

Philadelphia Representative _____

Motorola Representative _____

Resolution Comments

[blank box]

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June 13, 2008

Option 1d.-47

1d.11 Ford & Belmont

821 MHz Base Station TX/Rx Power and Level Check List

Site Name:	Ford & Belmont	Site Licensed E.R.P.:		Date:	

Motorola System Technologist: **CUST. Technician:**

1d.11.1   821 MHz Trunked Base Station

Test #1: Measure and Verify Station Transmitter Output Power at the input to the Combining System.

♦ Measured value should be 100 Watts (full station rated value) or T.B.D. Watts (as required for site licensed ERP.) ±5%.

Channel	Frequency	Measured Forward Power	PASS	FAIL
A16				
A17				
A18				
A19				
A20				

Channel	Frequency	Measured Forward Power	PASS	FAIL
B21				
B22				
B23				
B24				
B25				

Test #2: Measure and Verify Station Transmit RF Frequency.

Measured value should = Transmit frequency ±87Hz

Channel	Frequency	Measured Forward Power	PASS	FAIL
A16				
A17				
A18				

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Option 1d.-48

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Channel	Frequency	Measured Forward Power	PASS	FAIL
A19				
A20				

Channel	Frequency	Measured Forward Power	PASS	FAIL
B21				
B22				
B23				
B24				
B25				

Test #3: Transmitter Deviation

- ♦ Measure and Verify V.52 Test Pattern Deviation (ASTRO Trunked Stations Only)

  (2.83KHz ±0.56 KHz)

- ♦ Measure and Verify Transmit Deviation Test (NPSPAC Stations Only)

  (2.4 KHz ±0.24 KHz)

Channel	Frequency	Measured Forward Power	PASS	FAIL
A16				
A17				
A18				
A19				
A20				

Channel	Frequency	Measured Forward Power	PASS	FAIL
B21				
B22				
B23				
B24				
B25				

Test #4: Measure and Verify Station Transmitter Reflected Power at the Transmitter Output RF Port.

- ♦ 4 watts, ± 5%

Channel	Frequency	Measured Forward Power	PASS	FAIL
A16				
A17				

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June 13, 2008

Option 1d.-49

Channel	Frequency	Measured Forward Power	PASS	FAIL
A18				
A19				
A20				

Channel	Frequency	Measured Forward Power	PASS	FAIL
B21				
B22				
B23				
B24				
B25				

Test #5: Receiver Sensitivity Test Measured at the Station Receiver Input RF Port

- ♦ Receiver Sensitivity Test (ASTRO Trunked Stations Only) V.52 BER is 5% or less @ 0.3μV

Channel	Frequency	Measured Forward Power	PASS	FAIL
A16				
A17				
A18				
A19				
A20				

Channel	Frequency	Measured Forward Power	PASS	FAIL
B21				
B22				
B23				
B24				
B25				

1d.11.2   Combiner Output Power Testing and Combiner Loss Verification

Test #1: Measure Station Transmitter Forward and Reflected Power at the Output Port of the Associated Transmitter Combining System and Verify Combining System Loss

- ♦ Measure Input Power at input to combining system & Output Power at output of combining system (Hybrid antenna port) using an in-line wattmeter with combiner output terminated into dummy load.

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Insertion loss should not exceed 8.1dB (329 Domino, City Hall & Southampton) or 6.8dB (other sites) ±1dB.

Channel	Frequency	Measured Forward Power	PASS	FAIL
A16				
A17				
A18				
A19				
A20				

Channel	Frequency	Measured Forward Power	PASS	FAIL
B21				
B22				
B23				
B24				
B25				

1d.11.3   Existing TTA/Multicoupler System

Verify PM base line test document for TTA/Multicoupler level setting for the High/Median/Low frequencies being used.

Channel	Frequency	Measured Forward Power	PASS	FAIL
A16				
A17				
A18				
A19				
A20				

Channel	Frequency	Measured Forward Power	PASS	FAIL
B21				
B22				
B23				
B24				
B25				

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Option 1d.-51

1d.11.4   Punchlist Form

Test Description: _____

Test Number: _____

Noted By: _____

Date: _____

Exception Code and/or Comment

Resolution/Action Plan

Philadelphia Representative _____

Motorola Representative _____

Retest Completion Date _____

Philadelphia Representative _____

Motorola Representative _____

Resolution Comments

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Option 1d.-52

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1d.12 31st & Graysferry

821 MHz Base Station TX/Rx Power and Level Check List

Site Name	31st & Graysferry	Site Licensed E.R.P.		Date	

Motorola System Technologist: **CUST. Technician:**

1d.12.1   821 MHz Trunked Base Station

Test #1: Measure and Verify Station Transmitter Output Power at the input to the Combining System.

♦ Measured value should be 100 Watts (full station rated value) or T.B.D. Watts (as required for site licensed ERP.) ±5%.

Channel	Frequency	Measured Forward Power	PASS	FAIL
A16				
A17				
A18				
A19				
A20				

Channel	Frequency	Measured Forward Power	PASS	FAIL
B21				
B22				
B23				
B24				
B25				

Test #2: Measure and Verify Station Transmit RF Frequency.

Measured value should = Transmit frequency ±87Hz

Channel	Frequency	Measured Forward Power	PASS	FAIL
A16				
A17				

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Option 1d.-53

Channel	Frequency	Measured Forward Power	PASS	FAIL
A18				
A19				
A20				

Channel	Frequency	Measured Forward Power	PASS	FAIL
B21				
B22				
B23				
B24				
B25				

Test #3: Transmitter Deviation

♦ Measure and Verify V.52 Test Pattern Deviation (ASTRO Trunked Stations Only)

(2.83KHz ±0.56 KHz)

♦ Measure and Verify Transmit Deviation Test (NPSPAC Stations Only)

(2.4 KHz ±0.24 KHz)

Channel	Frequency	Measured Forward Power	PASS	FAIL
A16				
A17				
A18				
A19				
A20				

Channel	Frequency	Measured Forward Power	PASS	FAIL
B21				
B22				
B23				
B24				
B25				

Test #4: Measure and Verify Station Transmitter Reflected Power at the Transmitter Output RF Port.

♦ 4 watts, ± 5%

Channel	Frequency	Measured Forward Power	PASS	FAIL
A16				
A17				
A18				
A19				
A20				

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Channel	Frequency	Measured Forward Power	PASS	FAIL
B21				
B22				
B23				
B24				
B25				

Test #5: Receiver Sensitivity Test Measured at the Station Receiver Input RF Port

♦ Receiver Sensitivity Test (ASTRO Trunked Stations Only) V.52 BER is 5% or less @ 0.3μV

Channel	Frequency	Measured Forward Power	PASS	FAIL
A16				
A17				
A18				
A19				
A20				

Channel	Frequency	Measured Forward Power	PASS	FAIL
B21				
B22				
B23				
B24				
B25				

1d.12.2 Combiner Output Power Testing and Combiner Loss Verification

Test #1: Measure Station Transmitter Forward and Reflected Power at the Output Port of the Associated Transmitter Combining System and Verify Combining System Loss

♦ Measure Input Power at input to combining system & Output Power at output of combining system (Hybrid antenna port) using an in-line wattmeter with combiner output terminated into dummy load.

Insertion loss should not exceed 8.1dB (329 Domino, City Hall & Southampton) or 6.8dB (other sites) ±1dB.

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Option 1d.-55

Channel	Frequency	Measured Forward Power	PASS	FAIL
A16				
A17				
A18				
A19				
A20				

Channel	Frequency	Measured Forward Power	PASS	FAIL
B21				
B22				
B23				
B24				
B25				

1d.12.3   Existing TTA/Multicoupler System

Verify PM base line test document for TTA/Multicoupler level setting for the High/Median/Low frequencies being used.

Frequency	PM Base line test level	Site ATP Base line test level
B15 – 821.1000 MHz		
A9 – 822.5875 MHz		
A1 – 823.8375 MHz		

1d.12.4   Punchlist Form

Test Description: _____

Test Number: _____

Noted By: _____

Date: _____

Exception Code and/or
Comment

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Resolution/Action Plan

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└─────────────────────────────────────┘
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Philadelphia
Representative _____

Motorola Representative _____

_____

Retest Completion Date _____

Philadelphia
Representative _____

Motorola Representative

_____

Resolution Comments

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┌─────────────────────────────────────┐
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Option 1d.-57

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Option 1 - Acceptance Test Plan
June 13, 2008

Option 1d.-58

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Option 2a. System Description/Technical Overview Addition of 11th Site

2a.1 Project Scope

Motorola has always designed systems with expandability and future migration in mind. In the past, it has been difficult to upgrade a system without replacing major components. The easy migration and expandability is one of the benefits of the new ASTRO 25 IP Radio System technology. This innovative capability allows for incremental upgrades within systems via hardware and/or software to avoid total infrastructure replacement. The flexibility that the ASTRO 25 system offers allows the City to grow the system as needed.

Motorola understands the need for the City of Philadelphia to improve certain area(s) of coverage within the City's limits; thus; Motorola is proposing an 11th Simulcast Site add-on to the new ASTRO 25 system. This new site will utilize Motorola's new GTR station utilizing IP Simulcast mode to be consistent with new baseline system configuration of GTR8000BR stations and IP Simulcast.

This document is intended to provide a general overview of the 11th Simulcast Site add-on System for the City of Philadelphia. Included is the City of Philadelphia project overview, system architecture and design details.

2a.2 Project Overview

This proposal would add an 11th site to the proposed ASTRO 25 IP Radio System. The proposed site add-on is predicated that the 11th site will be a newly developed or "Green" site. Please see Option Section 2c SOW for full details on site development of the proposed 11th Site.

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City of Philadelphia
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Option 2 – System Description/Technical Overview
June 13, 2008

Option 2a.-1

The 11[th] site will contain RF equipment for both A and B simulcast systems. At the City's direction, a single T1 will be required for each of the remote RF sites for connectivity back to their associated simulcast prime site. Please see Section 2 of the proposal for additional details on site link performance specifications.

2a.3 System Architecture

This section is intended to detail the proposed equipment to support adding an 11[th] site to ASTRO25 IP Radio System. For specific details about the equipment discussed herein please see Section 2 of the proposal. This option assumes that the 10 Channel Expansion Option has also been exercised.

2a.3.1 ASTRO 25 Simulcast Prime Site Design

No significant impact to either of the Simulcast Prime Sites is proposed. The ASTRO25 IP Radio System utilizing IP Simulcast technology will already be capable of accepting connectivity for up to fifteen (15) simulcast remote sites via its integrated Site Access Switching Center. System licensing to support this 11[th] site is already included in the Baseline proposal.

2a.3.2 Simulcast Remote-Site Design

The 11th simulcast RF site is intended to improve coverage in the Morris Arboretum area for the City of Philadelphia. The simulcast RF sites operate under the direction and control of the Master/Prime Site. The 11[th] simulcast RF site add-on fixed network equipment will be virtually identical to the equipment used in the new ASTRO 25 IP Radio simulcast system with the exception of the possible use of customized antenna networks to optimize coverage performance once a location for said site is established.

2a.3.2.1 Remote Site Router

Motorola will supply two remote site routers at the new RF Simulcast site. At the direction of the City, one router will support the WAN interface to and from System A prime site and the remaining router will support the WAN interface to and from System B prime site. Please see Section 2 of the proposal for details on site interconnectivity requires and performance specifications.

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Option 2a.-2

2a.3.3 Ethernet LAN Switches

Motorola will supply six (6) Ethernet LAN switches. Three (3) LAN switches will support System A 20 channels and three (3) LAN switches to support System B 25 channels.

2a.3.4 ASTRO 25 GTR8000 Base Radio

Motorola is proposing to the City of Philadelphia the use of the ASTRO 25 GTR8000BR base radio in IP Simulcast mode for the 11[th] site add-on system. The site will have a total of forty-five (45) GTR 8000s to support the channel capacity for both Systems assuming the 10 Channel Expansion Option is also exercised.

2a.3.5 TRAK 9100 Time and Frequency Standard

The simulcast RF site will have a GPS-based time and frequency standard to provide the critical frequency/timing data needed to allow synchronization of simulcast transmissions. This unit will match the existing TRAK9100 units at the other RF Sites with support for up to forty-five (45) base stations.

2a.3.6 Antenna System

The antenna system consists of a Tower Top Amplifier (TTA), transmit antenna, receive antenna, antenna line kit, combiner and receiver multi-coupler. Motorola is proposing hybrid combiners in the same configuration as the other existing RF Sites to support the forty-five (45) 800 MHz frequencies. Motorola will make every attempt to acquire the same combiners and TTA as is deployed in the existing system however Motorola cannot guaranty said equipment will be available. If that is the case, Motorola will provide similar equipment matching as closely as possible the existing TTA performance specifications.

2a.3.7 MOSCAD RTU

Motorola will provide a new MOSCAD SDM3000 based RTU at the new simulcast RF site. Similar monitoring provided at the other 10 RF sites will be provided for the new 11[th] site.

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Option 2a.-3

2a.4 System Design Details

2a.4.1 11th Site Add-on

- ♦ Qty(1) A-System Remote Site – Prime Site Link Router
- ♦ Qty(3) A System Remote Site Ethernet switches
- ♦ Qty (20) A-System GTR8000BR IP Simulcast stations
- ♦ Qty(1) B-System Remote Site – Prime Site Link Router
- ♦ Qty(3) B System Remote Site Ethernet switches
- ♦ Qty (25) B-System GTR8000BR IP Simulcast stations
- ♦ Qty (1) SDM3000 MOSCAD NFM with 48 digital inputs, 16 digital outputs and 8 analog inputs
- ♦ Qty (1) TRAK9100 GPS
- ♦ Qty (1) Transmit Antenna, Transmission Line & Combining Network Includes:
  - • Qty(2) TX Antennas
  - • Qty(4) 10 Ch. Combiners configured in pairs via hybrids (configured for 10 Ch. Expansion option)
  - • Qty(2) 5 Ch. Combiners configured in a pair via hybrid (FCE combiner configured for 10 Ch. Expansion option)
  - • Qty(3) Bird ACM Power Monitoring (1 per combiner)
- ♦ Qty (1) Receive Antenna, Transmission Line & Multi-coupling TTA Network

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Option 2a.-4

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Option 2b. Statement of Work
Addition of 11th Site

2b.1 General Information

This Statement of Work (SOW) defines the principal activities and responsibilities of all parties for the implementation of option to add an 11th site described in this proposal to expand the City of Philadelphia Project 25 system. The System Description provides information on the equipment implemented under this scope. A System Description is included in this proposal.

2b.2 Statement of Work Overview

The following major subsystems are included as components of the Project Statement of Work:

2b.2.1 Option 2: 11th Site Expansion

Add an 11th site to the City's Project 25 System

2b.3 System Implementation Overview

Motorola's proposal to the City of Philadelphia provides systems integration and implementation services to deploy a fully functional communications system. Motorola's experience as a Systems Integrator, deploying large and complex communication and software systems, will provide a smooth system implementation

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Option 2b.-1

and cutover to the new communications system. This SOW specifically addresses the implementation of the expansion option to add an 11th site for both the A and B simulcast cells to the City's 800 MHz Project 25 network.

Motorola's local Systems Integration teams are highly skilled at deploying systems of the size and complexity of this communications system.

Motorola provides a phased approach to implementation, with the following phases:

- Project Initiation and Kick Off
- Design Review
- Civil Review and Civil Work
- Order Processing, Manufacturing & Factory Testing
- Installation and Upgrades
- Systems Integration & Optimization
- Acceptance Testing
- Training
- Cutover
- Project Finalization
- Warranty Support

Motorola has provided a preliminary design as a part of this proposal, which serves as a baseline for the Design Review. The Design Review encompasses the design finalization, such as finalization of the site location and the coverage design. Motorola will work closely with the City of Philadelphia to develop a cutover plan gracefully add the new site to the system. At the end of the Design Review phase, detailed Design Documents will be provided to the City of Philadelphia.

While the Design Review progresses, Motorola will work in parallel to perform site development. Assumptions regarding the site development are included in this SOW, since a location for the 11th site has not been identified.

Equipment manufacturing is followed by factory staging of the radio infrastructure at Motorola's Customer Center for Solutions Integration (CCSi) in Schaumburg, Illinois. Factory staging provides for initial assembly and testing of all Motorola manufactured radio system components. Factory staging will allow testing of the functional capabilities of the communications system. This process will allow the City of Philadelphia to witness factory testing in a controlled environment, as well as provide a smooth and easy field installation.

Motorola's local implementation team will install and optimize the communications system at the City of Philadelphia sites as staged at CCSi. Motorola's implementation includes the integration of all proposed subsystems to provide an end-to-end solution.

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Option 2b.-2

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To close the loop between proposed functionality with the deployed system, Motorola will execute Acceptance Testing according to an Acceptance Test Plan (ATP). The ATP includes Functional Performance Tests, Coverage Acceptance Testing, and a 90-Day Reliability Test.

The final steps to full system implementation are delivery of system documentation, punchlist resolution, and final acceptance. The project team and the post-acceptance service team will work with City of Philadelphia during this phase, to ensure a smooth transition to the post acceptance support period.

2b.4   Project Scope

The project scope is outlined below, with the major project elements described. The total project implementation is based on three major phases. Each phase will have the elements described below, unless indicated.

2b.5   Contract Initiation - Kickoff Meeting and Initiation Activities

The project will be initiated with a Project Kickoff meeting including key City of Philadelphia and Motorola project participants. The objectives of the Kickoff meeting include:

♦ Introduce and exchange contact information of all project participants.

♦ Review roles of key participants and project review procedures.

♦ Establish a clear chain of communication and authority.

♦ Review overall project scope and objectives.

♦ Review resource and scheduling requirements.

♦ Review preliminary project schedule with the City of Philadelphia.

During the Project Initiation phase, Motorola will review and work with the City of Philadelphia to finalize the following project processes and procedures:

♦ Detailed Project Schedule

♦ Risk Management Plan

♦ Change Control Plan

♦ Issues Document and Action Item Log

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Option 2b.-3

2b.6   Design Review

The City of Philadelphia and Motorola will review the channel expansion design through analysis of the sites and frequencies, as mutually agreed between Motorola and City of Philadelphia. During this portion of the project, the Project Plan will be developed.

Design Review deliverables include:

♦   Finalize Coverage Design
♦   Finalize Acceptance Test Plans
♦   Cutover Plan
♦   Final Implementation Schedule

2b.7   Civil Review

During this phase of the project, a final location will be identified to develop a radio site to house the equipment for the 11th site. Motorola assumes the use of a prefab 12'x 24' building equipped with the appropriate environmental support for the new site. The building includes an indoor generator in a separate generator room. In addition Motorola assumes that a 100' self supporting tower will be constructed to support the equipment for the 11th site. Motorola will provide engineering drawings during the design phase of the site construction. Motorola will prepare permits as required for construction. Motorola assumes that road access is available, no road development or improvements are included in this proposal. Motorola will connect utilities to the equipment shelter, assuming utilities are within 50' of the shelter.

2b.8   Staging

The City's equipment will be staged at Motorola's staging facility in Schaumburg, IL. City of Philadelphia representatives will have the option to witness the testing and demonstration of their system. Because the system is composed existing equipment and new equipment, the staging effort will include the stageable subsystems. Full system testing will occur when the new and upgraded equipment are integrated in the field during Field Acceptance Testing.

2b.9   Installation and Optimization

The installation and optimization of the equipment will prepare the system for acceptance testing and cutover. This includes the installation and programming Fixed Network Equipment (FNE).

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Option 2b.-4

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2b.10 Acceptance Testing

Acceptance testing will be conducted in accordance with the final ATPs defined during the Design Review. Motorola's proposal includes Functional Acceptance Testing, a full Coverage Acceptance Test, as the addition of the 11[th] site may impact the coverage of existing sites, and a 90-Day Reliability Test, which consists of three (3) contiguous 30-Day Reliability Tests.

2b.11 Training

No training is included in this phase of the project.

2b.12 Cutover

The cutover will be executed in accordance with a mutually agreed upon cutover plan that will minimize the impact to the users of the City of Philadelphia system.

2b.13 System Acceptance

System acceptance will be governed by the successful execution of the ATPs, as well as delivery of deliverables such as the training, documentation, and resolution of any punchlist items.

2b.14 Responsibility

2b.14.1 Customer Responsibility

It will be the City's responsibility to provide:

- ♦ Site links
- ♦ Frequencies
- ♦ Generators
- ♦ Shelters
- ♦ Towers
- ♦ UPS equipment
- ♦ Type I & Type II surge suppression
- ♦ Tower and shelter space

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Option 2b.-5

- Electrical
- Sufficient HVAC
- Environmental and grounding facilities

The City will be responsible to verify the existing backup power systems are sufficient to support the new equipment additions to existing facilities. All frequency licensing will remain the responsibility of the City of Philadelphia.

2b.14.2 Assumptions

Motorola has made the following assumptions in development of this budgetary quotation:

- All sites will meet Motorola's R56 2005 Standards for Communications sites. If the City does not have a copy of the "R56 v.2005 Standards & Guidelines for Communications site", one will be provided by Motorola
  - Sufficient space exists at the radio locations
  - Adequate power is available to support the new equipment
  - Grounding meets Motorola's R56 installation standards
  - New frequencies can be implemented using existing combiners and antennas
  - Existing towers can support the loading required for the system (if new antennas are required
  - Existing generators have adequate capacity to support the equipment
- The City will provide the necessary 800 MHz frequency pairs and FCC licenses
- System backhaul will be provided by the City of Philadelphia that meets Motorola's link specifications.
- No spares are included
- No subscriber services or template creation are included in this project
- The City is responsible for all licenses, permits, etc required for the implementation of this system
- No civil work or site upgrades are included in Motorola's quotation
- Coverage verification is included in this quotation, not a full Coverage Acceptance Test Plan

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Option 2b.-6

Option 2c.   Equipment List
Addition of 11th Site

Qty	Model Number	Item Description	System	Sys Seg
2	T7054	GTR 8000 EXPANDABLE SITE SUB-SYSTEM	UNDRGNDUPG	GTR8000
2	CA00855AA	ADD: 700/800 MHZ MID POWER	UNDRGNDUPG	GTR8000
2	X306AC	ADD: QTY (6) GTR 8000 BASE RADIOS	UNDRGNDUPG	GTR8000
12	X591AE	ENH: ASTRO 25 SITE REPEATER SW	UNDRGNDUPG	GTR8000
1	CA00877AA	ADD: CABINET RMC FOR EXPANSION RACK	UNDRGNDUPG	GTR8000
1	CA00883AA	ADD: 800 MHZ TX FILTER W/PMU	UNDRGNDUPG	GTR8000
2	CA00303AA	ADD: QTY (1) SITE CONTROLLER	UNDRGNDUPG	GTR8000
2	X591AF	ENH: ASTRO 25 SITE REPEATER SITE CO	UNDRGNDUPG	GTR8000
2	CA00884AA	ADD: QTY (1) XHUB	UNDRGNDUPG	GTR8000
2	X882AH	ADD: 7.5 FT OPEN RACK, 48RU	UNDRGNDUPG	GTR8000
1	DLN6566	FRU: GTR 8000 TRANSCEIVER 700/800 M	UNDRGNDUPG	SPARES
1	DLN6567	FRU: GTR 8000 PA 700/800 MHZ	UNDRGNDUPG	SPARES
1	DLN6634	FRU: 700/800 MHZ SITE LNA	UNDRGNDUPG	SPARES
1	DLN1306	FRU: 700/800 MHZ CABINET LNA	UNDRGNDUPG	SPARES
1	DLN6569	FRU: GCP 8000/GCM 8000	UNDRGNDUPG	SPARES
1	DLN6568	FRU: GTR 8000/GCP 8000 POWER SUPPLY	UNDRGNDUPG	SPARES
1	DLN6636	FRU: GTR 8000 EXPANSION HUB	UNDRGNDUPG	SPARES
2	T7054	GTR 8000 EXPANDABLE SITE SUB-SYSTEM	UNDRGNDUPG	GTR8000
2	CA00855AA	ADD: 700/800 MHZ MID POWER	UNDRGNDUPG	GTR8000
2	X306AC	ADD: QTY (6) GTR 8000 BASE RADIOS	UNDRGNDUPG	GTR8000
12	X591AE	ENH: ASTRO 25 SITE REPEATER SW	UNDRGNDUPG	GTR8000
1	CA00877AA	ADD: CABINET RMC FOR EXPANSION RACK	UNDRGNDUPG	GTR8000
1	CA00883AA	ADD: 800 MHZ TX FILTER W/PMU	UNDRGNDUPG	GTR8000
2	CA00303AA	ADD: QTY (1) SITE CONTROLLER	UNDRGNDUPG	GTR8000
2	X591AF	ENH: ASTRO 25 SITE REPEATER SITE CO	UNDRGNDUPG	GTR8000

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Qty	Model Number	Item Description	System	Sys Seg
2	CA00884AA	ADD: QTY (1) XHUB	UNDRGNDUPG	GTR8000
2	X882AH	ADD: 7.5 FT OPEN RACK, 48RU	UNDRGNDUPG	GTR8000
1	DLN6566	FRU: GTR 8000 TRANSCEIVER 700/800 M	UNDRGNDUPG	SPARES
1	DLN6567	FRU: GTR 8000 PA 700/800 MHZ	UNDRGNDUPG	SPARES
1	DLN6634	FRU: 700/800 MHZ SITE LNA	UNDRGNDUPG	SPARES
1	DLN1306	FRU: 700/800 MHZ CABINET LNA	UNDRGNDUPG	SPARES
1	DLN6569	FRU: GCP 8000/GCM 8000	UNDRGNDUPG	SPARES
1	DLN6568	FRU: GTR 8000/GCP 8000 POWER SUPPLY	UNDRGNDUPG	SPARES
1	DLN6636	FRU: GTR 8000 EXPANSION HUB	UNDRGNDUPG	SPARES
1	ST2500	S2500 MULTIPROTOCOL WAN ROUTER	UNDRGNDUPG	NETWORK
1	ST2512	S2500 ROUTER T1/E1 DAUGHTER BOARD	UNDRGNDUPG	NETWORK
1	ST2500	S2500 MULTIPROTOCOL WAN ROUTER	UNDRGNDUPG	SPARES
1	ST2512	S2500 ROUTER T1/E1 DAUGHTER BOARD	UNDRGNDUPG	SPARES
1	ST2500	S2500 MULTIPROTOCOL WAN ROUTER	UNDRGNDUPG	NETWORK
1	ST2512	S2500 ROUTER T1/E1 DAUGHTER BOARD	UNDRGNDUPG	NETWORK
1	ST2500	S2500 MULTIPROTOCOL WAN ROUTER	UNDRGNDUPG	SPARES
1	ST2512	S2500 ROUTER T1/E1 DAUGHTER BOARD	UNDRGNDUPG	SPARES
3	DSOP820B	POWER DIST. UNIT SURGE PROTECT	UNDRGNDUPG	SURGE
3	DS1101378	RACK MOUNTING PLATE ADAPTER , DSOP8	UNDRGNDUPG	SURGE
1	DSTSJ48CLT	8 WIRE MOD PROT. , RJ-45 (4 WIRE P	UNDRGNDUPG	SURGE
1	DSTSJADP	HORIZONTAL RACK BUS BAR FOR TSJ AND	UNDRGNDUPG	SURGE
3	DSOP820B	POWER DIST. UNIT SURGE PROTECT	UNDRGNDUPG	SURGE
3	DS1101378	RACK MOUNTING PLATE ADAPTER , DSOP8	UNDRGNDUPG	SURGE
1	DSTSJ48CLT	8 WIRE MOD PROT. , RJ-45 (4 WIRE P	UNDRGNDUPG	SURGE
1	DSTSJADP	HORIZONTAL RACK BUS BAR FOR TSJ AND	UNDRGNDUPG	SURGE
1	F2463	REMOTE TERMINAL UNIT DEVICE INTERFA	UNDRGNDUPG	RTULicence
12	V844	ADD:RTU SFWR LICENSE FOR ASTRO 25 8	UNDRGNDUPG	RTULicence
12	V845	ADD: RTU SOFTWARE LICENSE FOR INTEL	UNDRGNDUPG	RTULicence
1	V833	ADD:RTU SFWR LICENSE FOR PREMISYS A	UNDRGNDUPG	RTULicence
1	V834	ADD:RTU SFWR LICENSE FOR PREMISYS C	UNDRGNDUPG	RTULicence
2	V846	ADD:RTU SFWR LICENSE FOR ASTROTAC 9	UNDRGNDUPG	RTULicence
1	V839	ADD:RTU SFWR LICENSE FOR MOSCAD I/O	UNDRGNDUPG	RTULicence
1	F2463	REMOTE TERMINAL UNIT DEVICE INTERFA	UNDRGNDUPG	RTULicence
12	V844	ADD:RTU SFWR LICENSE FOR ASTRO 25 8	UNDRGNDUPG	RTULicence
12	V845	ADD: RTU SOFTWARE LICENSE FOR INTEL	UNDRGNDUPG	RTULicence
1	V833	ADD:RTU SFWR LICENSE FOR PREMISYS A	UNDRGNDUPG	RTULicence
1	V834	ADD:RTU SFWR LICENSE FOR PREMISYS C	UNDRGNDUPG	RTULicence
2	V846	ADD:RTU SFWR LICENSE FOR ASTROTAC 9	UNDRGNDUPG	RTULicence
1	V839	ADD:RTU SFWR LICENSE FOR MOSCAD I/O	UNDRGNDUPG	RTULicence
1	F4544	SITE MANAGER ADVANCED	UNDRGNDUPG	MOSCADRTU
1	V260	ADD: 48 VDC PS TO SM	UNDRGNDUPG	MOSCADRTU
1	V803	ADD: SDM3000 ASTRO F/W FOR A6.7/7.0	UNDRGNDUPG	MOSCADRTU
3	V592	AAD TERM BLCK & CONN WI	UNDRGNDUPG	MOSCADRTU
1	F4568	R-MUX 1004	UNDRGNDUPG	MOSCADRTU

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Qty	Model Number	Item Description	System	Sys Seg
1	F4544	SITE MANAGER ADVANCED	UNDRGNDUPG	MOSCADRTU
1	V260	ADD: 48 VDC PS TO SM	UNDRGNDUPG	MOSCADRTU
1	V803	ADD: SDM3000 ASTRO F/W FOR A6.7/7.0	UNDRGNDUPG	MOSCADRTU
3	V592	AAD TERM BLCK & CONN WI	UNDRGNDUPG	MOSCADRTU
1	F4568	R-MUX 1004	UNDRGNDUPG	MOSCADRTU
1	TRN7343	SEVEN AND A HALF FOOT RACK	UNDRGNDUPG	RACK
1	TRN7343	SEVEN AND A HALF FOOT RACK	UNDRGNDUPG	RACK

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Option 2c.-3

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Option 2c.-4

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Option 2d.   Acceptance Test Plan Addition of 11th Site

2d.1   Coverage Acceptance Test Plan (CATP)

Motorola is proposing to the City of Philadelphia an 11th Site Add-on as an option to improve certain area(s) of coverage within the City's limits. The 11th site will support System A and System B, thus providing to both systems an 11th site. Motorola will perform a similar CATP test identified in Section 4 of the Baseline system offering documented in the ASTRO 25 IP Radio Upgrade Proposal. Final coverage maps and IM studies (as applicable) for the 11th site will be provided to the City of Philadelphia within a mutually agreed upon time frame after receiving appropriate site information from the City. Until Motorola is able to provide appropriate coverage maps there can be no guaranty of coverage for the 11th Site or for the rest of the system with respect to the new 11th Site.

2d.2   11th Site Addition Option Acceptance Test Plan

2d.2.1 General

This Acceptance Test Plan (ATP) shall specify the demonstration procedures to ensure Motorola's compliance with the applicable RF remote site field performance specifications set forth under the contract. The failure of one test will not necessarily require that the entire ATP be run again. In the event of a test failure, Motorola will determine the cause of the failure, make the required corrections, and that particular test will be run again.

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Option 2d.-1

Representatives of the City will attend the testing that takes place at the remote sites. Acceptance by the City of Philadelphia will be achieved with one signature per individual demonstration. In the event of non-acceptance of items associated with a particular demonstration, those items of non-acceptance will be noted on a "punch list" and will be corrected before final acceptance for the phase. After all deficiencies noted on the "punch list" are corrected, a representative of the City of Philadelphia and Motorola will acknowledge all items are completed with appropriate signatures.

2d.2.2 Description

This procedure lists the tests that are required to verify the specifications of the GTR trunked Stations and associated RF ancillary equipment. Each test has been performed on each station at all sites during equipment optimization. The test data has been recorded in the site log (site data). Each of the following tests require that all site log records be verified by comparing testing measurements with the data contained in the Site Log for each station. Test results are to be recorded on 821 MHz Base Station TX/RX Power and Level Test Checklists. A test checklist is to be completed for each station at each site. Initial either (Pass) or an exception (Fail w/Exception code). Tests have been grouped into categories, thereby minimizing the number of cable and configuration changes required during testing. Although a test may be written to repeat for all remaining stations at the site, it shall be the Motorola technician's discretion to determine if all applicable tests or subsets thereof should be completed for a given station before moving to the next station.

2d.2.3 Required Test Equipment

The following list of test equipment is required to perform the 821 MHz Field Specification Test.

♦ Motorola R2975 Series Service Monitor (or approved equal) ASTRO CAI and P25 equipped.

♦ Transmission Impairment Measurement Set

♦ Min. two In-Line bi-directional wattmeter (Bird Model 43 or approved equal)

♦ 50 ohm RF power termination load (50ohm dummy load)

♦ IBM PC (or 100% compatible computer) with GTR Communications Service Software (CSS)

All test equipment used for 821 MHz specification testing will have been calibrated within the last year. The calibration of the test equipment will be verified by the presence of a calibration sticker or a calibration certificate for all equipment used in testing.

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2d.2.4 Setup

Performing these tests requires that the stations be taken out of service. Follow the CSS service procedure for station access disable/enable. Test equipment setup procedures to be perform by qualified personnel.

In addition, it is required that all power and level measurements for the site have been conducted prior to testing the site and all measurements are recorded on the log at the site. This site log will be located on site for reference during testing.

2d.2.4.1 821 MHz Trunked Base Station/NPSPAC Base Station Testing

The purpose of this testing is to verify the equipment and setup specifications for the new trunked base stations located at the new RF site.

Test 1.   **Measure and Verify Station Transmitter Output Power at the Combining System Input Port.**

Step 1.   Using CSS or NMS, take the station under test Out Of Service by disabling it.

Step 2.   Using a RG142 test cable (or other cable of known loss), or directly if possible, connect an in-line wattmeter between the transmitter combiner input port and the ½" Superflex coaxial cable that is connected to said port for the transmitter under test.

Step 3.   Using CSS, key the station locally.

Step 4.   Read transmitter power level on the in-line wattmeter.

Step 5.   Verify that the power level displayed on the wattmeter is within tolerance of the projected value listed on the test checklist for the station under test.

Step 6.   Repeat step 3 to de-key the station under test.

Step 7.   Record testing results and/or initial PASS/FAIL in the corresponding field(s) of the base station testing checklist.

> **Note:**   Repeat steps 1 through 7 for all stations at the site. Test will be performed with station at rated power output necessary to comply with site licensed ERP based on measured combiner system and projected antenna system gains.

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Test 2.   Measure and Verify Station Transmit RF Frequency.

Step 1.   Connect the service monitor to the respective transmit combiner test port for the station under test.

Step 2.   Using CSS, key the station locally.

Step 3.   Read the station transmit frequency on the service monitor display.

Step 4.   Verify that the frequency displayed on the service monitor is within tolerance of the station transmit frequency as depicted on the label located on the front of the station.

Step 5.   Repeat step 2 to de-key the station under test.

Step 6.   Record testing results and/or initial PASS/FAIL in the corresponding field(s) of the base station testing checklist.

Note: Repeat steps 1 through 6 for all remaining stations at the site.

Test 3.   Transmitter Deviation Measure and Verify V.52 Test Pattern Deviation.

Step 1.   With the connection of the service monitor still configured as per Test 2, set up the service monitor to display modulation.

Step 2.   Select the V.52 test pattern via the RSS/CSS program.

Step 3.   Key the station under test generating the V.52 test pattern as modulation via the appropriate function key in the RSS/CSS program.

Step 4.   Read the transmitter deviation for the station on the service monitor

Step 5.   Verify that the deviation level is within tolerance of the specification as listed on the test checklist for the station under test (2.83 KHz, ±0.57).

Step 6.   De-key the station under test via the appropriate function key in the RSS/CSS program.

Step 7. Record testing results and/or initial PASS/FAIL in the corresponding field(s) of the base station testing checklist.

Note: Repeat steps 1 through 7 for all remaining trunked stations at the site.

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Test 4. Measure and Verify Station Transmitter Reflected Power at the Transmitter Output RF Port.

Step 1. Using the RG142 test cable (or other cable of known loss), connect an in-line wattmeter between the transmitter RF output port of the station and the ½" superflex coaxial cable that is connected to the transmitter output port of the station.

Step 2. Using CSS key the station locally.

Step 3. Read reflected power.

Step 5. Repeat step 2 to de-key the station under test.

Step 6. Record results and/or initial in the corresponding field(s) of the base station testing checklist.

Step 7. Reconnect coaxial cable to the station.

Note: Repeat steps 1 through 7 for all stations at the site. Test will be performed with station at rated power output necessary to comply with site licensed ERP based on measured combiner system and projected antenna system gains.

Test 5. Receiver Sensitivity Test Measured at the Multicoupler RF Output Port.

Step 1. Disconnect the superflex cable for the selected station receiver from the Multicoupler RF output port.

Step 2. Connect the superflex cable to the service monitor.

Step 3. Set up the service monitor to generate an on frequency signal at the selected receivers' frequency at a level of 0.3 uvolts.

Step 4. Set up the service monitor to modulate the carrier with a V.52 test pattern at a level of +/- 2.83 KHz of deviation.

Step 5. Using the RSS/CSS program note the value at which the BER stabilizes as the station captures the V.52 pattern. The BER value should be no more than 5%.

Step 6. Record testing results and/or initial PASS/FAIL in the corresponding field(s) of the base station testing checklist.

Step 7. Reconnect superflex cable to the receiver multicoupler RF output port.

Note: Repeat steps 1 through 7 for all remaining trunked stations at the site.

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Option 2d.-5

2d.2.4.2 Combiner Output Power Testing and Combining System Loss Verification

The purpose of this test is to measure the combining system forward and reflected output power for all stations interfaced to the combining systems at the site and to verify the combining system loss. This test is to be conducted only after all individual station testing has been completed at the site.

Test 1. Measure and Verify Station Transmitter Forward and Reflected Power at the Output Port of the Associated Transmitter Combining System.

Step 1.   Performing this test requires that all stations be taken out of service via CSS.

Step 2.   Using the RG142 test cable (or other cable of known loss), connect an in-line wattmeter to the associated combining system output (hybrid antenna port) and the 50-ohm RF termination load (dummy load).

Step 3.   Via CSS, locally key each station sequentially that is connected to the combining system.

Step 4.   Read the forward and reflected power at the output of the combining system for each station.

Step 5.   Verify the forward and reflected power levels against what is recorded in the Site Log for the selected base station.

Step 6.   Record testing results and/or initial PASS/FAIL in the corresponding field(s) of the base station testing checklist.

Step 7.   Once all stations for the combining system have been tested remove the wattmeter/dummy load and reconnect the ½" combiner output jumper cable.

Step 8.   Verify combiner loss.
Combiner Loss = [LOG (Combiner Input in Watts) X 10] – [LOG (combiner Output in Watts) X 10]

Note: Repeat steps 2 through 7 for all combining systems located at the site.

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2d.2.4.3 TTA/Multicoupler System Testing

The purpose of this test is to verify the receive sensitivity of each base station at the site through the TTA/multicoupler system for both the primary and secondary tower top amplifiers. This test is to be conducted only after all individual station testing has been completed at the site.

Test 1. Receiver Sensitivity Measured at the Receiver TTA Test Port Input.

TTA/Multicoupler System Receiver Sensitivity Test
(ASTRO Trunked Stations Only)

Step 1.   Using the TTA Test/Control Panel, disconnect antenna from the TTA antenna input port which terminates the input into a 50 ohm load internal to the TTA.

Step 2.   Using an RG142 test cable (or other cable of known loss), connect the service monitor to the TTA Test Input Port on the TTA Test/Control Panel.

Step 3.   Set up the service monitor to generate an on frequency signal at the selected receivers' frequency at a level of 0.25 μ-volts after line losses to the TTA and the –30dB RF Test Port Tap within the TTA are taken into account.

Step 4.   Set up the service monitor to modulate the carrier with a V.52 test pattern at ±2.83 KHz deviation.

Step 5.   Using the RSS program, note the value at which the BER stabilizes as the station captures the V.52 pattern. The BER value should be no more than 5%.

Step 6.   Record testing results and/or initial PASS/FAIL in the corresponding field(s) of the base station testing checklist.

Step 7.   Repeat steps 1 through 6 for all remaining trunked stations at the site.

Step 8.   If available, from the TTA Control Panel institute a switch from the Primary tower top amplifier to the Secondary tower top amplifier and repeat Steps 1 through 7.

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TTA/Multicoupler System Receiver Sensitivity Test
(NPSPAC Stations Only)

Step 1.   Using the TTA Test/Control Panel, disconnect antenna from the TTA antenna input port, which terminates the input into a 50-ohm load internal to the TTA.

Step 2.   Using an RG142 test cable (or other cable of known loss), connect the service monitor to the TTA Test Input Port on the TTA Test/Control Panel.

Step 3.   Set up the service monitor to generate an on frequency signal at the selected receivers' frequency.

Step 4.   Set up the service monitor to modulate the carrier with a 1000 Hz tone at a level of $\pm$ 2.4 KHz of deviation (60% deviation).

Step 5.   Adjust the signal level of the service monitor until the 12 dB SINAD level of the receiver is reached.

Step 6.   Read and verify that the Service Monitor signal level is equal to or less than 0.25µV after taking into account line losses to the TTA and the –30dB RF Test Port Tap in the TTA. Verify result is recorded in the site log.

Step 7.   Record testing results and/or initial PASS/FAIL in the corresponding field(s) of the base station testing checklist.

Step 8.   Repeat steps 1 through 7 for each of the NPSPAC stations at the site as applicable.

Step 9.   If available, from the TTA Control Panel institute a switch from the Primary tower top amplifier to the Secondary tower top amplifier and repeat Steps 1 through 8.

Step 10.   Reconnect antenna to the TTA antenna input port using the TTA Test/Control Panel.

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TTA/Multicoupler System Gain Calculation (As Applicable)

Step 1.   Verify the loss of the in-line attenuator (where applicable) placed before the multicoupler against what is recorded in the site log.

Step 2.   Verify the readings of both the DC Voltmeter and DC Ammeter on the front panel of the TTA panel against the levels recorded in the site log for proper operation for the given installation.

Step 3.   Subtract the TTA/Multicoupler System receiver sensitivity levels (in dBm, normalized to output of the –30dB RF Test Port Tap in the TTA) from the sensitivity readings taken directly from the station receive port. Verify result against what is recorded in the site log.

Step 4.   Repeat for results obtained when using Secondary TTA

Note:	Repeat Steps 2 - 4 for the Highest, Mid-range and Lowest Frequencies of the stations on the TTA/multicoupler.

2d.2.4.4   Bird ACM Integrated Alarm Monitor

The purpose of this test is to verify the calibration and setup of the Bird ACM at the output of the combining system (connected to Hybrid Antenna Port). This test is to be conducted only after all individual station testing has been completed at the site.

The Bird ACM product installed on the combining system output port requires calibration. All sensors will be calibrated during site optimization prior to specification testing. The tolerance of the Bird wattmeter is 7 % while the tolerance of the sensors is 10 %. Therefore, a tolerance of +/- 10 % for the Decibel handheld wattmeter test will be used.

The measurement criteria for this test will be as follows. The value depicted on the Bird ACM wattmeter will be referenced against the combiner output measurement to be within 10 % of the combiner output value.

Test 1.   Measure Station Transmitter Forward and Reflected Power at the Output Port of the Associated Transmitter Combining System. (For Information Only)

Step 1. Performing this test requires that the stations be taken out of service via CSS.

Step 2. Connect a wattmeter in-line with the Bird ACM sensor connected to the hybrid antenna output port for the combining system under test.

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Step 3. Using CSS, locally key each station connected to the combining system individually.

Step 4. Measure forward and reflected power on both the Bird ACM Sensor and the in-line wattmeter. Record/Verify test results in the corresponding field(s) of the base station test checklist (See Note)

Notes: Repeat the above procedures for all combining systems located at the site.

To ensure a sufficient measurable power level for the sensor, remove site antenna line when measuring reflected power.

2d.2.4.5 Functional Testing Of Fault Tolerant GPS/Rb Frequency-Time Standard

In this "hot-standby" configured unit, in addition to the primary GPS/Rb frequency and timing standard, there is a secondary GPS/XO standard. If the primary (A-side) GPS unit fails, operation continues on the Rb standard. Should the Rb standard fail the unit automaticly switches to the hot-standby (B-side) GPS unit. If this secondary GPS were to fail, the system would continue to operate by freewheeling on the secondary (B-side) Crystal Oscillator (XO) frequency standard.

Test 1. Primary and Secondary GPS/Rb Operation

Step 1. Using CSS, determine that the simulcast Quantar base stations are operating with timing and frequency reference signals from the GPS/Rb unit.

Step 2. Disable the Primary GPS unit and verify the system continues to operate on the Rubidimum standard..

Step 4. Disable the Rubidium standard and verify the system automatically switches to the Secondary GPS unit.

Step 5. Disable the Secondary GPS unit and verify the system continues operating on the Secondary Crystal Oscilator standard

Step 6. Return all disabled modules to normal operation and re-establish Primary (A-side) GPS/Rb operation from the front panel of the TRAK9100 unit.

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2d.2.5 MOSCAD Physical Digital Input Verification

The purpose of this section is to verify that the DI module properly processes the physical inputs that interface to the MOSCAD Digital Input (DI) modules. Status inputs are tested from the punchblock termination interface as shown on the MOSCAD Punchblock Diagrams in the respective site design drawing package. The status can be simulated by shorting/opening the input to the MOSCAD ground reference or by creating the actual condition with the actual device being monitored. The verification is made by observing the response at the front panel of the respective DI module.

2d.2.6 Transmission Line Time Domain Reflectometry (TDR) Review

Description

All RF sites containing 821 MHz RF equipment will have all antenna transmission lines TDR tested and a printout of the results of each line will be provided to the City of Philadelphia. The printouts will be reviewed and analyzed as part of the 821 MHz Specification Testing procedures. Following this review the antenna systems for the site will be marked as a pass or fail. If a TDR test of antenna transmission line is in question it will become a punch list item to be corrected and re-tested.

The 821 MHz antenna transmission line TDR data will be collected, copied and provided to the City of Philadelphia prior to the beginning of specification testing in the field. This will allow a review and signoff of the 821 MHz antenna systems prior to conducting any and all measurement testing in the field.

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2d.2.7 821 MHz Antenna Transmission Line TDR Checklist

SITE #	# of Antenna Lines	PASS	FAIL	COMMENTS
NEW 11th SITE	4			Includes TTA ½" RF test line.

Note: This is a sample form depicting form and format. A specific sheet by site will be database generated for recording TDR review results and comments.

2d.2.7.1 Punchlist Procedure and Form

The Punchlist will a record of all items that did not meet the terms and conditions of this contract and requires corrective action or resolution. All Punchlist items will be addressed until each item has been resolved. An item gets recorded as a Punchlist item when the City of Philadelphia decides a test has failed.

Resolution of Punchlist items shall be addressed by priority as indicated in the Exception Procedure Code. The Punchlist will contain:

1. A specific acceptance test reference.
2. The person or persons witnessing the failure.
3. The date.
4. The equipment, feature or facility involved, if applicable.
5. A description of the exception or failure.
6. The Exception Procedure Code that categorizes the City's exception for proper priority of the efforts to resolve the item.
7. A resolution/action plan with target completion date.
8. Two (2) signature blocks for the Motorola and City representative/s. One for recording the exception item and a second for approving that the item was resolved and tested.
9. A completion date.
10. Resolution comments.

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Exception Procedures Codes (EPC's) are:

1. AI - Accept as Is, Exception item minor and does not require any corrective action.
2. CS - Correction to Specifications or procedures, not an exception item, but recorded for future reference. Delineate corrections to specification or ATP procedure on the Punchlist.
3. CI - Critical Item, Exception item which requires correction prior to any system transition/cut-over. When an item is considered critical, one of the following Exception Codes are also required (CA, or CR).
4. CA - Corrective Action required as part of Contract. Exception item that falls within Motorola's Contract commitment.
5. CR - Change Request with or without additional cost. Exception item beyond Motorola's Contract commitment. In this case, the City may find a problem at a site where the work responsibility is beyond Motorola's Contract work commitment. If corrected, the correction may be at the City's costs.

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Option 2d.-13

2d.2.7.2   Punchlist Form

Test Description: _____

Test Number: _____

Noted By: _____

Date: _____

Exception Code and/or
Comment

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┌─────────────────────────────────────────┐
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Resolution/Action Plan

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Philadelphia Representative _____

Motorola Representative _____

Retest Completion Date _____

Philadelphia Representative _____

Motorola Representative _____

Resolution Comments

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┌─────────────────────────────────────────┐
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Option 2d.-14

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2d.2.8 821 MHz Base Station Tx/Rx Power and Level Check List

Site Name	NEW 11TH SITE	Site Licensed E.R.P.		Date	

Motorola System Technologist   **CUST. Technician**

2d.2.9 821 MHz Trunked Base Station/NPSPAC Base Station Testing

Test #1: Measure and Verify Station Transmitter Output Power at the input to the Combining System.

♦ Measured value should be 100 Watts (full station rated value) or T.B.D. Watts (as required for site licensed ERP.) ±5%.

Channel	Frequency	Measured Forward Power	PASS	FAIL
A1				
A2				
A3				
A4				
A5				
A6				
A7				
A8				
A9				
A10				
A11				
A12				
A13				
A14				
A15				
A16				
A17				
A18				
A19				
A20				
B1				
B2				
B3				
B4				
B5				
B6				
B7				
B8				
B9				
B10				
B11				
B12				
B13				
B14				
B15				

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Channel	Frequency	Measured Forward Power	PASS	FAIL
B16				
B17				
B18				
B19				
B20				
B21				
B22				
B23				
B24				
B25				

Test #2: Measure and Verify Station Transmit RF Frequency.

♦ Measured value should = Transmit frequency ±87Hz

Channel	Frequency	Measured Frequency Error	PASS	FAIL
A1				
A2				
A3				
A4				
A5				
A6				
A7				
A8				
A9				
A10				
A11				
A12				
A13				
A14				
A15				
A16				
A17				
A18				
A19				
A20				
B1				
B2				
B3				
B4				
B5				
B6				
B7				
B8				
B9				
B10				
B11				
B12				
B13				
B14				
B15				
B16				
B17				
B18				
B19				
B20				
B21				
B22				
B23				
B24				
B25				

Test #3: Transmitter Deviation

♦ Measure and Verify V.52 Test Pattern Deviation (ASTRO Trunked Stations Only) (2.83KHz ±0.56 KHz)

♦ Measure and Verify Transmit Deviation Test (NPSPAC Stations Only) (2.4 KHz ±0.24 KHz)

Channel	Frequency	Measured Deviation	PASS	FAIL
A1				
A2				
A3				
A4				
A5				
A6				
A7				
A8				
A9				
A10				
A11				
A12				
A13				
A14				
A15				
A16				
A17				
A18				
A19				
A20				
B1				
B2				
B3				
B4				
B5				
B6				
B7				
B8				
B9				
B10				
B11				
B12				
B13				
B14				
B15				
B16				
B17				
B18				
B19				
B20				
B21				
B22				
B23				
B24				
B25				

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Option 2d.-17

Test #4: Measure and Verify Station Transmitter Reflected Power at the Transmitter Output RF Port.

♦ 4 watts, ± 5%

Channel	Frequency	Measured Reflected Power	PASS	FAIL
A1				
A2				
A3				
A4				
A5				
A6				
A7				
A8				
A9				
A10				
A11				
A12				
A13				
A14				
A15				
A16				
A17				
A18				
A19				
A20				
B1				
B2				
B3				
B4				
B5				
B6				
B7				
B8				
B9				
B10				
B11				
B12				
B13				
B14				
B15				
B16				
B17				
B18				
B19				
B20				
B21				
B22				
B23				
B24				
B25				

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Option 2d.-18

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Test #5: Receiver Sensitivity Test Measured at the Station Receiver Input RF Port

♦ Receiver Sensitivity Test (ASTRO Trunked Stations Only)
V.52 BER is 5% or less @ 0.3μV

♦ Receiver Sensitivity Test (NPSPAC Stations Only)
0.30μV or less for 12 dB SINAD

Channel	Frequency	Measured Sensitivity	PASS	FAIL
A1				
A2				
A3				
A4				
A5				
A6				
A7				
A8				
A9				
A10				
A11				
A12				
A13				
A14				
A15				
A16				
A17				
A18				
A19				
A20				
B1				
B2				
B3				
B4				
B5				
B6				
B7				
B8				
B9				
B10				
B11				
B12				
B13				
B14				
B15				
B16				
B17				
B18				
B19				
B20				
B21				
B22				
B23				
B24				
B25				

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Option 2d.-19

2d.2.10   Combiner Output Power Testing and Combiner Loss Verification

Test #1:   Measure Station Transmitter Forward and Reflected Power at the Output Port of the Associated Transmitter Combining System and Verify Combining System Loss

♦ Measure Input Power at input to combining system & Output Power at output of combining system (Hybrid antenna port) using an in-line wattmeter with combiner output terminated into dummy load.

♦ Insertion loss should not exceed 8.1dB (329 Domino, City Hall & Southampton) or 6.8dB (other sites) ±1dB.

Channel	Frequency	Measured Input Power	Measured Fwd. Output Power	Measured Reflected Output Power	Calculated Combiner Loss	PASS	FAIL
A1							
A2							
A3							
A4							
A5							
A6							
A7							
A8							
A9							
A10							
A11							
A12							
A13							
A14							
A15							
A16							
A17							
A18							
A19							
A20							
B1							
B2							
B3							
B4							
B5							
B6							
B7							
B8							
B9							
B10							
B11							
B12							
B13							
B14							
B15							
B16							
B17							

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Channel	Frequency	Measured Input Power	Measured Fwd. Output Power	Measured Reflected Output Power	Calculated Combiner Loss	PASS	FAIL
B18							
B19							
B20							
B21							
B22							
B23							
B24							
B25							

2d.2.11 TTA/Multicoupler System Sensitivity Testing

Test #1: Receiver Sensitivity Test Measured at the TTA/ Multicoupler System Input (TTA antenna port terminated in 50 ohm load)

♦ TTA/Multicoupler System Receiver Sensitivity Test (Trunked Stations Only)
V.52 BER is 5% or less @ 0.25µV

♦ TTA/Multicoupler System Receiver Sensitivity Test (NPSPAC Stations Only)
0.25µV or less for 12 dB SINAD

Channel	Frequency	Measured Sensitivity Primary TTA AMP	Measured Sensitivity Secondary TTA AMP	PASS	FAIL
A1					
A2					
A3					
A4					
A5					
A6					
A7					
A8					
A9					
A10					
A11					
A12					
A13					
A14					
A15					
A16					
A17					
A18					
A19					
A20					
B1					
B2					
B3					
B4					
B5					
B6					
B7					
B8					
B9					
B10					

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Channel	Frequency	Measured Sensitivity Primary TTA AMP	Measured Sensitivity Secondary TTA AMP	PASS	FAIL
B11					
B12					
B13					
B14					
B15					
B16					
B17					
B18					
B19					
B20					
B21					
B22					
B23					
B24					
B25					

TTA/Multicoupler System Gain Calculation

♦ All Multicoupler Ports Terminated (Receiver or 50 ohm Load)

♦ (Gain should be 1 to 1 (0dB) or better)

FYI:

In-line attenuator loss is: dB

Voltmeter Reading is   Volts (Primary Amp)   Volts (Secondary Amp)

Ammeter Reading is: mA (Primary Amp)   mA (Secondary Amp)

	Primary TTA Calculated Result	Secondary TTA Calculated Result	PASS	FAIL
Measure Multicoupler Lowest Frequency Range Gain/Loss			FYI	FYI
Measure Multicoupler Mid-Frequency Range Gain/Loss			FYI	FYI
Measure Multicoupler Highest Frequency Range Gain/Loss			FYI	FYI

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Option 2d.-22

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2d.2.12   Decibel Integrated Alarm Monitor DB8802B-1000

Test #1: Measure Station Transmitter Forward and Reflected Power at the Output Port of the Associated Transmitter Combining System and verify calibration of DB8802B-1000 power sensor.

♦ Readings should be ±10% of readings taken with Bird in-line wattmeter.

Channel	Frequency	Measured Forward Power Bird / Sensor	Measured Reflected Power Bird / Sensor	PASS	FAIL
A1					
A2					
A3					
A4					
A5					
A6					
A7					
A8					
A9					
A10					
A11					
A12					
A13					
A14					
A15					
A16					
A17					
A18					
A19					
A20					
B1					
B2					
B3					
B4					
B5					
B6					
B7					
B8					
B9					
B10					
B11					
B12					
B13					
B14					
B15					
B16					
B17					
B18					
B19					
B20					
B21					
B22					
B23					
B24					
B25					

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Option 2d.-23

2d.2.13 Functional Testing Of Fault Tolerant Gps/Rb Frequency-Time Standard

	PASS	FAIL
All Quantars Receiving 5MHz & 1pps signals		
All DSM-II Cards receiving 1pps signals		
All ASTRO-TAC3000 Comparators receiving 1pps signals		
Proper GPS/Rb. Primary and backup operation		

2d.2.14 Verification of MOSCAD Digital Inputs

INPUT	PB POSITION	PASS	FAIL
SWR ALARM #1	PB1-PR15		
SWR ALARM #2	PB1-PR16		
TTA ALARM #1	PB1-PR17		
TTA ALARM #2	PB1-PR18		
TTA ALARM #3	PB1-PR19		
TTA ALARM #4	PB1-PR20		
48VDC TVSS SUMMARY ALARM	PB2-PR1		
HVAC DDC VENT FAN FAILURE	PB2-PR2		
HVAC DDC VENT INTAKE DAMPER FAILURE	PB2-PR3		
HVAC DDC UNIT COMMON FAILURE	PB2-PR4		
HVAC DDC EQ. RM. HIGH TEMP	PB2-PR5		
HVAC DDC EQ. RM. LOW TEMP	PB2-PR6		
HVAC DDC EQ. RM. HIGH HUMIDITY	PB2-PR7		
RECTIFIER SUMMARY ALARM URGENT/NON-URGENT	PB2-PR8		
RECTIFIER ACTIVE (LOW-FLOAT)	PB2-PR9		
48VDC INVERTER ALARM	PB2-PR10		
ATS IN EMERGENCY POSITION	PB2-PR11		
ATS NORMAL VOLTAGE SOURCE PRESENT	PB2-PR12		
TOWER LIGHTING CONTROLER 1 & 2 SUMMARY ALARMS	PB2-PR13		
GENERATOR FAILURE	PB3-PR1		
GENERATOR COMMON ALARM	PB3-PR2		
GENERATOR LOW FUEL/GAS PRESSURE	PB3-PR3		
BATTER CHARGER FAULT/LOW VOLTAGE	PB3-PR4		
GENERATOR RUNNING	PB3-PR5		
DOOR ALARM	PB3-PR6		
TYPE 2 TVSS ALARM	PB3-PR7		
TYPE 1 TVSS ALARM	PB3-PR8		
FIRE ALARM PANEL TROUBLE	PB3-PR9		
FIRE ALARM PANEL ALARM	PB3-PR10		

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Option 2d.-24

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2d.2.15   821 MHz Antenna Transmission Line TDR Checklist

LINE	PASS	FAIL	COMMENTS
Main TX #1			
Main TX #2			
Main RX			
½ In. TTA Test			

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Option 2d.-25

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Option 2d.-26

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Option 3a. System Description / Technical Overview MCC 7500

3a.1 Project Scope

Motorola is proposing the addition of eleven (11) MCC 7500 dispatch operator positions for the City of Philadelphia Prison System. These eleven (11) operator positions will each be installed in a separate location within the prison system. Motorola is also proposing four (4) MCC 7500 dispatch operator positions for Police Training Facility. These four (4) operator positions will be installed at the 990 Spring Garden Street Training Facility. The MCC 7500 is Motorola's newest technology in dispatch solutions.

This document is intended to provide a general overview of the eleven (11) dispatch operator positions for the City of Philadelphia Prison System and the four (4) dispatch operator positions for Police Training Facility training. Included is the project overview, system architecture and design details.

3a.2 Project Overview

This option will add eleven (11) MCC 7500 dispatch operator positions for the City of Philadelphia Prison System. Each location will have an MCC 7500 operator position which will be mounted on existing furniture. A site router and Ethernet switch will be rack-mounted in an equipment room within 200 feet from the operator position. Each position will be tied into the City's ASTRO25 system via City-supplied T1s from the Master Site (Room 626m City Hall) to each location. Please refer to Section 02 of this proposal for T1 performance specifications.

This option will also add four (4) MCC 7500 dispatch operator positions for the Police Training Facility, mounted on existing furniture at the 990 Spring Garden Street Training Facility. A site router and Ethernet switch will be rack-mounted in an

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Option 3a.-1

equipment room within 200 feet from the operator positions. The dispatch site will be tied into the City's ASTRO25 7.6 system via City-supplied T1 from the Master Site (Room 626m City Hall) to the Training Facility. Please refer to Section 02 of this proposal for T1 performance specifications.

3a.3   System Architecture

The MCC 7500 is Motorola's Mission Critical IP console. The MCC 7500 system uses packet-based IP architecture to deliver ease of operation, expandability, flexibility, and supportability.

The MCC 7500 console features an easy to use Graphical User Interface (GUI). It operates under the Microsoft Windows XP platform and follows the same standards as other Windows-based programs. The screen layout is simple and uses valuable space efficiently. Key information and critical functions are clearly identified with easy to understand icons. Dispatchers can quickly recognize these icons instead of reading text, maximizing their productivity.

Many tasks can be completed more quickly and easier than ever before with the MCC 7500 consoles.

- Dispatchers can rapidly see information about who is calling, the time of call, and the call type.
- The critical tools dispatchers require to communicate with field personnel are at their fingertips. Channels or talkgroups are displayed in on-screen "folders" for prioritization.
- Flashing red indicators easily identify incoming emergencies.
- Trunked callers can also be identified by real names versus numerical IDs if the City of Philadelphia prefers.

3a.4   System Design Details

Most of the features of our previous console systems have been carried forward to the Motorola MCC 7500 product. In addition to these legacy features, the Motorola MCC 7500, Figure 3-1, product provides new features. Some these new features include:

- Seamless integration with ASTRO 25 trunking systems:
  - Supports the IP protocols of the trunking system's transport network; no circuit-switched network to packet-switched network conversion equipment is necessary.

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Option 3a.-2

- Encryption and decryption can be performed within the dispatch console, which allows true end-to-end encryption in the radio system. This proposal includes DES-OFB encryption capabilities in each MCC7500 operator position.

- Participation in the radio system's agency partitioning functionality.

- Configuration of the console subsystem via the radio system's centralized configuration subsystem (Network Manager) so the City Radio System Manager has a single point for configuring the radio system. The configuration subsystem may be accessed from multiple remote locations so users can still have convenient access while enjoying the benefits of centralized configuration.

- Management of the console subsystem via the radio system's centralized network management subsystem so the City has a single point for managing faults, accounting, performance, and security of the radio system. The network management subsystem may be accessed from multiple remote locations so the City can still have convenient access while enjoying the benefits of centralized management.

♦ Centralized and/or distributed logging of conventional and trunked radio audio, associated radio call information, and certain radio system events when used with the MCC7500 IP Logger (not included in this proposal)

♦ Higher capacities in numerous areas (64,000 talkgroups, thousands of logging "tracks").

Figure 3-1: Typical layout of the MCC 7500 console in a dispatch center along with two other public safety terminals.

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Option 3a.-3

3a.4.1 MCC 7500 System Components

Motorola MCC 7500 console equipment connects directly to the trunking system's IP transport network. It uses IP packet protocols for passing call control data and call audio through the system.

3a.4.1.1   Proposed Equipment Description

The MCC 7500 dispatch console is based on a Motorola-certified, commercially available personal computer customized with Motorola-provided hardware and software. The proposed Motorola hardware includes the following equipment at each of the operator positions:

♦ One (1) Motorola-certified personal computer, including keyboard, mouse, and 19-inch LCD touch screen monitor
♦ One (1) Voice Card installed inside the computer
♦ One (1) Secure Card installed inside the computer
♦ One (1) General Purpose Input/Output Module (GPIOM)
♦ Two (2) desktop speakers
♦ Two (2) headset jacks
♦ Two (2) Headsets with Headset Base and PTT Switch
♦ One (1) desktop microphone
♦ One (1) dual pedal footswitch
♦ One (1) software based dual Instant Recall Recorder

The hardware elements that comprise the dispatch console are described in the following paragraphs.

General Purpose Input/Output Module (GPIOM)

The GPIOM connects to the Voice Card and performs the digital-to-analog and analog-to-digital conversions for all analog audio flowing into or out of the dispatch console. It is designed so it can be mounted in furniture, placed on top of a writing surface, or mounted in an EIA 19-inch rack. It is also capable of supporting monitors weighing up to 80 pounds (36 kg). It provides the connections for the following items:

♦ Speakers
♦ Headset Jacks
♦ Microphone
♦ Footswitch

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- ♦ Local Logging Recorder *(not included)*
- ♦ 911 Telephone Headset *(not included)*
- ♦ Instant Recall Recorder for Radio

The connections for the above items use RJ45 connectors except for the headset jack connectors, which are DB15. The audio inputs and outputs are 600 Ohms, balanced and transformer coupled, except for the microphone, which is 2000 Ohms, balanced, and does not use a transformer. The headset jack connectors accept or provide audio levels appropriate for the devices being connected.

The Voice Card in the operator PC provides the vocoding and audio processing services for the dispatch console. It is capable of supporting IMBE (for ASTRO 25) vocoder algorithms as well as supporting audio level adjustments, summing and filtering. It is also capable of supporting multiple simultaneous streams of audio.

The Secure Card in the operator PC provides the encryption and decryption services for the dispatch console. It is capable of supporting multiple simultaneous encryption/decryption sessions using up to four encryption algorithms and multiple secure keys.

If no Secure Card is present, the LAN connection for the dispatch console is provided by the Voice Card. If a Secure Card is present, then the LAN connection is provided by the Secure Card to ensure the proper separation of coded and clear audio.

Figure 3-1 shows the hardware architecture of the Motorola MCC 7500 dispatch console. The paragraphs that follow provide additional detail on the hardware components of the MCC 7500 dispatch console positions.

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Option 3a.-5

Figure 3-2: Motorola MCC 7500 Dispatch Console Hardware Architecture

Personal Computer (PC)

The dispatch console uses a customized Motorola certified personal computer running the Microsoft Windows operating system and containing a Motorola-designed Voice Card and a Motorola-designed Secure Card. The PCs used in ASTRO 25 systems have a mini tower form factor.

The PCs are processed through Motorola factories so that the application software, Voice Cards, and Secure Cards can be installed and tested to ensure they are operating properly.

Desk Microphone

The dispatch console is capable of supporting a single desk microphone. The desk microphone contains a microphone cartridge on a flexible shaft and two buttons in its base. One button controls the General Transmit feature and the other controls the Monitor feature.

The desk microphone may be permanently fastened down or it may be left loose so the dispatch console user can pick it up during use. The 18-inch long flexible shaft allows the base to be placed behind a keyboard or writing area and still be able to position the microphone cartridge within a few inches of the speaker's mouth.

If a desk microphone is connected to a dispatch console while no headsets are connected, the desk microphone is active whenever any transmit function is active.

If a desk microphone is connected to a dispatch console while one or two headsets are connected, then the desk microphone is only active during a transmit function if its transmit button is pressed. This prevents the desk microphone from picking up unwanted background sound while the dispatch console user is using a headset to transmit.

Figure 3-3: The MCC 7500 is Motorola's latest IP based console.

Headset Jack

A dispatch console is capable of supporting up to two headset jacks. A headset jack allows a dispatch console user to use a headset while operating the dispatch console. The headset jack supports headsets which use either PJ7 (6-wire) or PJ327 (4-wire) long frame connectors (6-wire headsets have a PTT button while 4-wire headsets do not have a PTT button).

The headset jack contains two volume controls; one for adjusting the level of received radio audio and one for adjusting the level of received telephone audio. A small dimple is molded into the headset jack housing near the telephone volume control so the dispatch console user can tell them apart without having to look at them.

Desktop Speaker

A dispatch console is capable of supporting multiple speakers through which audio is presented to a dispatch console user. Each speaker on a dispatch console contains unique audio; that is, an audio source cannot appear in multiple speakers at a single dispatch console.

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Option 3a.-7

The speaker is a self-contained unit that may be placed on a desktop, mounted in a rack/furniture, mounted on a wall, or mounted on a computer monitor. It contains an amplifier that provides a maximum of 2 Watts of power output. Input Power for the speaker is obtained from the GPIOM via it's interconnect cable. A mounting bracket is included with the speaker.

Footswitch

The dispatch console is capable of supporting a single footswitch. The footswitch can contain either one or two pedals.

Telephone/Headset Port

The Telephone/Headset Port allows an external telephone set to be connected to the dispatch console. The dispatch console's headset can then be used to communicate on both the radio system and the telephone set. The port provides the following inputs and outputs:

♦ A balanced 600 Ohm analog audio output containing the headset's microphone audio

♦ A balanced 600 Ohm analog audio input for the external telephone's received audio

♦ An input buffer for the Off Hook signal from the external telephone

♦ An input buffer for an Auxiliary Jack Sense signal from the external telephone

When the dispatch console senses a dry closure on the Off Hook input buffer, it removes the selected radio audio from the headset earpiece and puts it back in the appropriate speaker(s). It then routes any audio appearing at the Telephone/Headset Port's audio input to the headset earpiece. It also routes headset microphone audio to the Telephone/Headset Port's audio output. This allows the dispatch console user to communicate hands-free on the telephone set.

When the dispatch console senses a dry closure on the Auxiliary Jack Sense input buffer, it ignores any closures on the Off Hook input buffer. This causes the headset to work with the radio system instead of the external telephone system. This allows the dispatch console headset to be used for radio operations when another person is staffing the telephone set.

If the dispatch console user transmits on any radio resources while the Off Hook signal is active, the headset microphone is re-routed to the radio system for the duration of the transmission. When the transmission is ended, the headset microphone is routed back to the Telephone Headset Port's audio output. The headset earpiece audio routing is not changed during the transmission, so the dispatch console user can still hear the telephone's received audio.

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Option 3a.-8

The Telephone/Headset Port allows a dispatch console user to use a single headset to communicate on both the radio system and a telephone system (e.g., a 911 system).

Instant Recall Recorder Port (for Radio)

The Instant Recall Recorder Port (for Radio) allows an instant recall recorder to be connected to a dispatch console. The port provides an RJ45 connector with a balanced, 600 Ohm analog audio output containing the receive radio audio on the selected channels. Transmit audio of any type (from either this dispatch console or a parallel dispatch console) as well as tones generated by the dispatch console (emergency tones, callback tones, busy tones) are not included in the audio output.

If transmit audio is desired for the instant recall recorder, the Long Term Logging Port may be used instead of the Instant Recall Recorder Port. Both outputs have the same electrical characteristics; only the content of the audio is different. No playback speaker input or recording control line output are provided on the port.

Dispatch console generated tones (e.g., emergency alarm tones, trunking busy tones, error tones, etc.) are not included in the audio appearing at the analog audio output. This is done so that they do not interfere with the dispatch console user's ability to understand the voice audio that was recorded.

Short-term, console-specific audio recording is a mechanism used to record a portion of the inbound audio present on a specific dispatch console and make it readily available to the dispatch console user. This recorded audio is retained by the recording system for a short period (typically about 60 minutes) and is easily played back by the dispatch console user. This allows the dispatch console user to replay received audio, which the user may have missed.

Long Term Logging Port

The Long Term Logging Port allows an external logging recorder (customer provided) to be connected to a dispatch console. The port provides an RJ45 connector with a 600 Ohm balanced analog output. The audio that appears on this output is configurable, but is typically the audio that was transmitted and/or received at that dispatch console.

The configuration of audio to be presented at this port is tied to the physical dispatch console, so that no matter what user is logged into the console, the same type of audio is logged. This configuration is done as part of configuring the dispatch console at the radio system's network manager. The long term logging port can be configured to log any combination of these audio sources:

♦ Audio received from the currently selected radio resources (note that the level of this audio is not affected by either the individual volume setting of the radio resource or the master volume control on the speaker or headset jack)

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Option 3a.-9

- Microphone audio being transmitted to the currently selected radio resources by this dispatch console user

- Microphone audio being transmitted to unselected radio resources by this dispatch console user

- Any tones generated by the dispatch console that appear in its speakers (trunking tones, emergency tones, etc.)

- Tones generated by an external paging encoder

Please note that this output may be used with an instant recall recorder as well as a long term logging recorder.

Long term, console-specific audio recording is a mechanism used to record a portion of the inbound and outbound audio present on a specific dispatch console. This is historically done by providing a logging port at the dispatch console, and wiring that port to a track of an audio recording device. The recordings are then archived for long-term storage, and provide a historical record of the radio communications made at a given dispatch console.

3a.4.1.1.1 Network Connectivity

All IP devices within the console site connect to the same network segment, which, in turn, connects to the main P25 network. Figure 3-4 is a simplified diagram of the general network structure employed:

Figure 3-4: Simplified Diagram of the General Network Structure

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Option 3a.-10

3a.4.1.1.2 Backup

City-provided portable subscriber radios will be used for backup to the MCC 7500 console system at the City of Philadelphia Prison System locations. These radios will serve as emergency backup for each of the console positions.

For training purposes, four (4) high-tier mobile subscribers, XTL5000 Consolettes are included for use as backup control stations at the 990 Spring Garden Street Training Facility, to mimic the setup at the Police Administration Building (PAB) Dispatch site. Each of the four XTL Consolettes shall be connected in to the MCC7500 console system via a Conventional Channel Gateway (CCGW) thus allowing each Consolette to appear as a resource tile in the Elite Dispatch GUI on the MCC7500. These stations will allow dispatchers to continue communications should the main console positions become inoperative. Each station and its power supply can be integrated into the furniture of its respective dispatch position. One (1), eight (8)-port control station combiner is used to connect the control stations into two (2), roof-mounted antennas. Each control station connects to the combiner network through a run of up to two-hundred (200) feet of 1/4-inch super flex transmission line. Backup stations are included to provide an alternate half-duplex wireless path to the radio network. Each station includes AC surge and coaxial lightning suppression.

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Option 3a.-11

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Option 3a.-12

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Option 3b. Statement of Work
Prisons and Training Consoles

3b.1 General Information

This Statement of Work (SOW) defines the principal activities and responsibilities of all parties for the implementation of option to install eleven (11) consoles to the prisons and provide four (4) consoles for the training purpose, described in this proposal as part of the City of Philadelphia Project 25 system proposal. The System Description provides information on the equipment implemented under this scope. A System Description is included in this proposal.

3b.2 Statement of Work Overview

The following major subsystems are included as components of the Project Statement of Work:

3b.2.1 Option 3: Prisons and Training Consoles

♦ Provide and install eleven (11) MCC 7500 dispatch operator positions

♦ Provide four (4) MCC 7500 dispatch operator positions for Police Training Facility

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Option 3b.-1

3b.3 System Implementation Overview

Motorola's proposal to the City of Philadelphia provides systems integration and implementation services to deploy fully functional consoles. Motorola's experience as a Systems Integrator, deploying large and complex communication and software systems, will provide a smooth system implementation and cutover to the new communications system. This SOW specifically addresses the implementation of the Prisons and Training Consoles.

Motorola's local Systems Integration teams are highly skilled at deploying systems of the size and complexity of this communications system.

Motorola provides a phased approach to implementation, with the following phases:

- Project Initiation and Kick Off
- Design Review
- Order Processing, Manufacturing & Factory Testing
- Installation
- Systems Integration & Optimization
- Acceptance Testing
- Training
- Cutover
- Project Finalization
- Warranty Support

Motorola has provided a preliminary design as a part of this proposal, which serves as a baseline for the Design Review. The Design Review encompasses the design finalization, such as finalization of the site location and the coverage design. Motorola will work closely with the City of Philadelphia to develop a cutover plan gracefully add the new site to the system. At the end of the Design Review phase, detailed Design Documents will be provided to the City of Philadelphia.

Equipment manufacturing is followed by factory staging of the radio infrastructure at Motorola's Customer Center for Solutions Integration (CCSi) in Schaumburg, Illinois. Once the City decides to purchase this option as part of the base proposal, factory staging will provide for initial assembly and testing of all Motorola manufactured radio system components. Factory staging will allow testing of the functional capabilities of the communications system. This process will allow the City of Philadelphia to witness factory testing in a controlled environment, as well as provide a smooth and easy field installation.

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Option 3b.-2

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Motorola's local implementation team will install the consoles. Motorola will then execute Acceptance Testing according to an Acceptance Test Plan (ATP).

The final steps to full system implementation are delivery of system documentation, punchlist resolution, and final acceptance. The project team and the post-acceptance service team will work with City of Philadelphia during this phase, to ensure a smooth transition to the post acceptance support period.

3b.4 Project Scope

Motorola is proposing the addition of eleven (11) MCC 7500 dispatch operator positions for the City of Philadelphia Prison System. These eleven (11) operator positions will each be installed in a separate location within the prison system. Motorola is also proposing four (4) MCC 7500 dispatch operator positions for Police Training Facility. These four (4) operator positions will be installed at the 990 Spring Garden Street Training Facility. The MCC 7500 is Motorola's newest technology in dispatch solutions.

3b.5 Contract Initiation - Kickoff Meeting and Initiation Activities

The project will be initiated with a Project Kickoff meeting including key City of Philadelphia and Motorola project participants. The objectives of the Kickoff meeting include:

♦ Introduce and exchange contact information of all project participants.
♦ Review roles of key participants and project review procedures.
♦ Establish a clear chain of communication and authority.
♦ Review overall project scope and objectives.
♦ Review resource and scheduling requirements.
♦ Review preliminary project schedule with the City of Philadelphia.

During the Project Initiation phase, Motorola will review and work with the City of Philadelphia to finalize the following project processes and procedures:

♦ Site Access Procedures
♦ Site Installation Requirements
♦ Detailed Project Schedule
♦ Risk Management Plan
♦ Change Control Plan
♦ Issues Document and Action Item Log

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Option 3b.-3

3b.6 Design Review

The City of Philadelphia and Motorola will review the channel expansion design through analysis of the sites and frequencies, as mutually agreed between Motorola and City of Philadelphia. During this portion of the project, the Project Plan will be developed.

Design Review deliverables include:

♦ Finalize Console Design
♦ Finalize Acceptance Test Plans
♦ Cutover Plan
♦ Final Implementation Schedule

3b.7 Site Requirements Review

During this phase of the project, the final location of the consoles will be determined. It is not within the scope of this contract to provide, assemble, and/or repair any existing console furniture. The installation of the console equipment will commence upon notification from the City that any required furniture is ready for use. The City shall assign one (1) representative to work with Motorola on the console installation issues. This representative shall have full authority to accept any and all equipment layouts and installations. Any changes made once the City has agreed to an installation layout shall result in a change order for services to Motorola. All furniture (if metal) shall be common-bonded.

All electrical distribution points shall be installed and provided for by the City. The electrical connection points and network connection points must be within 3 feet of the final console equipment being powered. Any and all surge, UPS, generator backup systems must be connected to this AC power connection point for all console positions, and are the responsibility of the City.

Console furniture ventilation must be provided for by the City. Furniture cavities must have proper air flow as to prevent superheating of hardware components. Any equipment cavity reaching an excess of 80 degrees F, shall be grounds to cancel all manufacturer warranty claims.

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Option 3b.-4

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3b.8 Staging

As part of the base system, the console equipment will be staged at Motorola's staging facility in Schaumburg, IL. City of Philadelphia representatives will have the option to witness the testing and demonstration of their system. Because the system is composed existing equipment and new equipment, the staging effort will include the stageable subsystems. Full system testing will occur when the new and upgraded equipment are integrated in the field during Field Acceptance Testing.

3b.9 Installation and Optimization

The installation and optimization of the equipment will prepare the system for acceptance testing and cutover. This includes the installation and programming.

3b.10 Acceptance Testing

Acceptance testing will be conducted in accordance with the final ATPs defined during the Design Review. Motorola's proposal includes Functional Acceptance Testing.

3b.11 Training

The required training is included in the base proposal of the project.

3b.12 Cutover

The cutover will be executed in accordance with a mutually agreed upon cutover plan that will minimize the impact to the users of the City of Philadelphia system.

3b.13 System Acceptance

System acceptance will be governed by the successful execution of the ATPs, as well as delivery of deliverables such as documentation, and resolution of any punchlist items.

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Option 3b.-5

3b.14 Responsibility

3b.14.1 Customer Responsibility

It will be the City's responsibility to provide:

♦ Access to the sites on a timely basis

♦ The necessary escorts for the installations or site visits

♦ Site links within 3 feet of the console equipment

♦ AC Power within 3 feet of the console equipment

♦ Any required Generators

♦ The required space

♦ Any required console furniture

♦ UPS equipment

♦ Type I & Type II surge suppression

♦ Sufficient HVAC

♦ Environmental and grounding facilities

The City will be responsible to verify the existing backup power systems are sufficient to support the new equipment additions to existing facilities.

3b.14.2 Assumptions

Motorola has made the following assumptions in development of this budgetary quotation:

♦ One-time installation is included in this proposal.

♦ All sites will meet Motorola's R56 2005 Standards for Communications sites.

   • Sufficient space exists at the equipment locations

   • Adequate power is available to support the new equipment

   • Grounding meets Motorola's R56 installation standards

   • Existing generators have adequate capacity to support the equipment

♦ System backhaul will be provided by the City of Philadelphia that meets Motorola's link specifications.

♦ No spares are included

♦ The City is responsible for all licenses, permits, etc required for the implementation of this system

♦ No civil work or site upgrades are included in Motorola's quotation

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Option 3b.-6

Option 3c.   Acceptance Test Plan

3c.1   Sample Functional Acceptance Test Plan

This Sample Acceptance Test Plan (ATP) has been developed to demonstrate the functional operation of the MCC7500 Console positions for Prisons and Police Training proposed as an option to the ASTRO 25 IP Radio System Upgrade.

The final ATP procedures may differ from the detailed procedures outlined in this document. As long as the intent of the test is verified, the test will be considered a pass. The final ATP document will be mutually agreed upon prior to testing.

3c.1.1 Test Methodology

Both the City of Philadelphia and Motorola will complete each test according to an ATP script with various pass/fail checkpoints and signoff after the tests are completed.

3c.1.2 Post ATP Requirements

Upon completion of the fixed network ATP, a punch list of issues and timelines will be developed, if necessary.

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Option 3c.-1

3c.1.2.1   MCC 7500 Features

Talkgroup Selection and Call

1. DESCRIPTION

The Talkgroup Call is the primary level of organization for communications on a trunked radio system. Dispatchers with Talkgroup Call capability will be able to communicate with other members of the same talkgroup. This provides the effect of an assigned channel down to the talkgroup level. When a Talkgroup Call is initiated from a subscriber unit, the call is indicated on each dispatch operator position that has a channel control resource associated with the unit's channel/talkgroup.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 2
RADIO-2 - SITE - SITE 1
RADIO-3 - TALKGROUP 1
RADIO-3 - SITE - SITE 2
RADIO-4 - TALKGROUP 2
RADIO-4 - SITE - SITE 2
C1 - TALKGROUP 1
C2 - TALKGROUP 2

VERSION #1.02
SPS #7.5

2. TEST

Step 1.   Initiate a wide area call from any operator position on TALKGROUP 1.

Step 2.   Observe that RADIO-1 and RADIO-3 will be able to monitor the call. De-key the console and have either radio respond to the call.

Step 3.   Observe that all Consoles with TALKGROUP 1 can monitor both sides of the conversation.

Step 4.   Initiate a wide area call from any operator position on TALKGROUP 2.

Step 5.   Observe that RADIO-2 and RADIO-4 will be able to monitor the call. De-key the console and have either radio respond to the call.

Step 6.   Observe that all Consoles with TALKGROUP 2 can monitor both sides of the conversation.

Pass____ Fail____

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Option 3c.-2

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MCC 7500 Features

Gold Elite/MCC 7500 Interoperability - Talkgroup Selection and Call

1. DESCRIPTION

The talkgroup call is the primary level of organization for communications on a trunked radio system. Dispatchers with talkgroup call capability will be able to communicate with other members of the same talkgroup. This provides the effect of an assigned channel down to the talkgroup level. When a talkgroup call is initiated from a subscriber unit, the call is indicated on each dispatch operator position that has a channel control resource associated with the unit's channel/talkgroup.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 2
RADIO-2 - SITE - SITE 1
RADIO-3 - TALKGROUP 1
RADIO-3 - SITE - SITE 2
RADIO-4 - TALKGROUP 2
RADIO-4 - SITE - SITE 2

VERSION #1.02
SPS #7.5

2. TEST

Step 1. Initiate a wide area call from any Gold Elite operator position on TALKGROUP 1.

Step 2. Observe that RADIO-1 and RADIO-3 will be able to monitor the call.

Step 3. Observe that any MCC 7500 Console on TALKGROUP 1 is able to monitor the call.

Step 4. De-key the Gold Elite console and have either radio respond to the call.

Step 5. Observe that all Consoles (both Gold Elite and MCC 7500) with TALKGROUP 1 can monitor both sides of the conversation.

Step 6. Initiate a wide area call from any MCC 7500 operator position on TALKGROUP 2.

Step 7. Observe that RADIO-2 and RADIO-4 and any Gold Elite Console monitoring TALKGROUP 2 will be able to monitor the call.

Step 8. De-key the MCC 7500 console and have either radio respond to the call.

Step 9. Observe that all Consoles (both Gold Elite and MCC 7500) with TALKGROUP 2 can monitor both sides of the conversation.

Pass____ Fail____

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Option 3c.-3

MCC 7500 Features

Secure Talkgroup Selection and Call

1. DESCRIPTION

The talkgroup call is the primary level of organization for communications on a trunked radio system. Dispatchers with talkgroup call capability will be able to communicate with other members of the same talkgroup. This provides the effect of an assigned channel down to the talkgroup level. When a talkgroup call is initiated from a subscriber unit, the call is indicated on each dispatch operator position that has a channel control resource associated with the unit's channel/talkgroup.

Note: Radios used in this test must be secure capable.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 2
RADIO-2 - SITE - SITE 1
RADIO-3 - TALKGROUP 1
RADIO-3 - SITE - SITE 2
RADIO-4 - TALKGROUP 2
RADIO-4 - SITE - SITE 2
TALKGROUP 1 uses "CKR1" and TALKGROUP 2 uses "CKR2". All radios are set for secure transmit. All Consoles (MCC 7500 and Gold Elite) are configured with TALKGROUP 1 and TALKGROUP 2 with CKR1 and CKR2 assigned, respectively. Encryption Keys for "CKR1" and "CKR2" are properly loaded in all Radios and Consoles.

VERSION #1.02
SPS #7.5

2. TEST

Step 1.   Initiate a secure wide area call from any Gold Elite operator position on TALKGROUP 1.

Step 2.   Observe that RADIO-1 and RADIO-3 will be able to monitor the secure call. Also observe that any MCC 7500 Console on TALKGROUP 1 is able to monitor the secure call.

Step 3.   Dekey the Gold Elite console and have either radio respond in secure to the call.

Step 4.   Observe that all Consoles (both Gold Elite and MCC 7500) with TALKGROUP 1 can monitor both sides of the conversation.

Step 5.   Dekey the radio.

Step 6.   Initiate a secure wide area call from any MCC 7500 operator position on TALKGROUP 2.

Step 7.   Observe that RADIO-2 and RADIO-4 will be able to monitor the secure call. Also observe that any Gold Elite Console on TALKGROUP 2 is able to monitor the secure call.

Step 8.   Dekey the MCC 7500 console and have either radio respond in secure to the call.

Step 9.   Observe that all Consoles (both Gold Elite and MCC 7500) with TALKGROUP 2 can monitor both sides of the conversation.

Step 10. Dekey the radio.

Pass____ Fail____

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Option 3c.-3-4

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MCC 7500 Features

Console Operator Secure/Clear Mode Mismatch Indication

1. DESCRIPTION

This test validates the ability of the console to show a visual indication of a Secure and Clear mode mismatch during the following conditions:
1. Talkgroup on the Console is in secure transmit mode but receiving clear audio.
2. Talkgroup on the Console is in clear transmit mode but receiving secure audio.

SETUP

RADIO-1 TALKGROUP 1 (Secure TX mode)
RADIO-1 - SITE - SITE 1
Console 1 - C1
C1 TALKGROUP 1 (Secure TX mode)

VERSION #1.02
SPS #7.5

2. TEST

Step 1. Initiate a Secure Talkgroup call on RADIO-1 by hitting the PTT.

Step 2. Verify that C1 is able to receive audio from RADIO-1.

Step 3. Place RADIO-1 in clear TX mode.

Step 4. Initiate a Talkgroup call on RADIO-1 by hitting the PTT.

Step 5. Verify that C1 is able to receive audio from RADIO-1 and displays a secure mode mismatch indication.

Step 6. Place RADIO-1 in secure transmit mode and place C1 in clear transmit mode.

Step 7. Initiate a Secure Talkgroup call on RADIO-1 by hitting the PTT.

Step 8. Verify that C1 is able to receive audio from RADIO-1 and displays a secure mode mismatch indication.

Pass_____ Fail_____

MCC 7500 Features

Multigroup Call

1. DESCRIPTION

This trunking feature allows an equipped console operator position to transmit an announcement to several different talkgroups simultaneously. As with Talkgroup Calls, multigroup calls operate across sites as well as within the same site.

* Multigroups are set up through both the UCM and the Subscriber Programming software.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 2
RADIO-2 - SITE - SITE 2
RADIO-3 - TALKGROUP 3
RADIO-3 - SITE - SITE 3 (SITE 1 if only 2 Sites)
RADIO-4 - RANDOM
RADIO-4 - SITE - SITE 4 (SITE 2 if only 2 Sites)

* TALKGROUP 1, TALKGROUP 2, & TALKGROUP 3 are members of ATG 1.

* RANDOM is any talkgroup not a member of ATG 1.

VERSION #1.02
SPS #7.5

2. TEST

Step 1. Select the ATG 1 resource, which corresponds to TALKGROUP 1, TALKGROUP 2, and TALKGROUP 3.

Step 2. Initiate the Multigroup Call from the operator position.

Step 3. Observe that RADIO-1, RADIO-2 and RADIO-3 receive the Multigroup Call.

Step 4. Verify that RADIO-4 does not receive the Multigroup Call because it is not a member of ATG 1.

Step 5. Answer the Multigroup Call using RADIO-1 and observe the console(s) receive the response.

Step 6. Verify that if the call is answered within the repeater hang time, the console will receive the call on the ATG 1 resource tile, otherwise the console will receive the call on the TALKGROUP 1 tile.

Step 7. Verify that if the call is answered within the repeater hang time, RADIO-2 and RADIO-3 will monitor that call.

Pass____ Fail____

MCC 7500 Features

Talkgroup Patch

1. DESCRIPTION

Talkgroup Patch allows a dispatcher to merge several talkgroups together on one voice channel to participate in a single conversation. This can be used for operations involving two or more talkgroups/users that need to communicate with each other.

Using the Patch feature, the console operator can talk and listen to all of the selected talkgroups grouped; in addition, the members of the individual talkgroups can also talk or listen to members of other talkgroups. Patched talkgroups can communicate with the console dispatcher and other members of different talkgroups because of the "supergroup" nature of the Patch feature.

NOTE : If "secure" and "clear" resources are patched together, one repeater for each mode may be assigned per site.

If the system has mixed consoles an "echo" effect may be heard. Refer to MCC7500 documentation manual number 6881014Y70-A page 7-2 for more information.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 2
RADIO-2 - SITE - SITE 1
RADIO-3 - TALKGROUP 1
RADIO-3 - SITE - SITE 2
RADIO-4 - TALKGROUP 2
RADIO-4 - SITE - SITE 2

VERSION #1.02
SPS #7.5

2. TEST

Step 1. Select an operator position for testing which contains TALKGROUP 1 and TALKGROUP 2.

Step 2. At the desired operator position select one of the Patch tabs in the Patch/Multi-Select window.

Step 3. Click the button on the patch that allows an operator to setup and edit a patch (note patch window turns blue).

Step 4. Add TALKGROUP 1 and TALKGROUP 2 to the patch by selecting each resource tile.

Step 5. Once the talkgroups are added, click the patch setup button again to complete the patch setup.

Step 6. Initiate several Talkgroup Calls between radios.

Step 7. Observe that all radios are able to communicate with one another. Also via ZoneWatch (if available) observe that only one station is assigned at each of the two sites.

Step 8. Initiate a call from the operator position using the Patch Transmit and observe that all radios are able to receive the call and only one station is assigned at each of the two sites.

Step 9. Remove TALKGROUP 1 and TALKGROUP 2 from the patch.

Pass____ Fail____

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Option 3c.-3-7

MCC 7500 Features

Multi-Select/APB

1. DESCRIPTION

A Multi-Select (MSEL) allows a dispatcher to merge several talkgroups together on one voice channel to participate in a single conversation. This can be used for announcements to two or more channels or talkgroups for general broadcast purposes.

Using the Multi-Select feature, the console operator can talk and listen to all of the selected talkgroups grouped; however, the members of the individual talkgroups cannot talk or listen to members of other talkgroups. Multi-selected talkgroups still only communicate with the console dispatcher and other members in the same talkgroup. A predefined multi-select configuration can be saved by the console operator as an All Points Bulletin (APB) for quick broadcast-type transmissions by the dispatcher.

NOTE : If "secure" and "clear" resources are multi-selected, one repeater for each mode may be assigned per site.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 2
RADIO-2 - SITE - SITE 2
RADIO-3 - TALKGROUP 3
RADIO-3 - SITE - SITE 3
RADIO-4 - TALKGROUP 4
RADIO-4 - SITE - SITE 4

VERSION #1.02
SPS #7.5

2. TEST

Step 1. Select an operator position for testing which contains TALKGROUP 1, TALKGROUP 2, TALKGROUP 3 and TALKGROUP 4.

Step 2. At the desired operator position select one of the Multi-Select tabs in the Patch/Multi-Select window.

Step 3. Click the button on the Multi-Select that allows an operator to setup and edit a multiselect (note: MSEL window turns green).

Step 4. Add TALKGROUP 1, TALKGROUP 2, TALKGROUP 3 and TALKGROUP 4 to the Multi-Select by selecting each resource tile.

Step 5. Once the talkgroups are added click the Multi-Select Setup button again to complete the Multi-Select setup.

Step 6. Initiate a call from the operator position using the APB Transmit and observe that all radios are able to receive the call. Also via ZoneWatch (if available) verify that only one RF resource is assigned at any site where multiple radios are affiliated.

Step 7. Remove all talkgroups from the Multi-Select.

Pass____ Fail____

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Option 3c.-3-8

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MCC 7500 Features

Console Initiated Private Call

1. DESCRIPTION

Private Conversation is a selective calling feature which allows a dispatcher or radio user to carry on one-to-one conversation that is heard only by the two parties involved. Subscriber units receiving a private call will sound an alert tone. As with other call types, Private Calls operate across sites as well as within the same site.

Note: Private calls between the MCC 7500 and Gold Elite consoles are NOT supported.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1

VERSION #1.02
SPS #7.5

2. TEST

Step 1.   Select an operator position for testing.

Step 2.   Select the "PRIVATE-CALL" tile.

Step 3.   Click the button on the tile that provides the Private Call function.

Step 4.   Select the unit to be Private Called, in this case RADIO-1. (or select the numeric keypad and enter the Unit ID to be Private Called.)

Step 5.   Click the Send button.

Step 6.   Answer the Private Call with RADIO-1 and respond to the console.

Step 7.   After completing the Private Call, return to the normal talkgroup mode.

Pass_____ Fail_____

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Option 3c.-3-9

MCC 7500 Features

MCC 7500 Console Initiated Private Call to
a MCC 7500 Console

1. DESCRIPTION

Private Conversation is a selective calling feature that
allows a dispatcher or radio user to carry on one-to-
one conversation that is heard only by the two parties
involved. Subscriber units receiving a private call
will sound an alert tone. As with other call types,
Private Calls operate across sites as well as within the
same site. MCC 7500 Console can use the feature to
communicate with another MCC 7500 Console in the
same or another Console Site.
Private call between the two Consoles is supported
for MCC 7500 Consoles only.

SETUP

This test requires two MCC 7500 Consoles (C1 and
C2) located at the same or different sites. A U2U
resource must be assigned to each Console.

VERSION #1.02
SPS #7.5

2. TEST

Step 1.   Select the "PRIVATE-CALL" tile at C1.

Step 2.   Click the button on the tile that provides the
          Private Call function.

Step 3.   Select the numeric keypad.

Step 4.   Using the displayed keypad enter the unit ID
          to be Private Called (C2).

Step 5.   Click the Send button.

Step 6.   At C2, answer the Private Call from the
          Console C1 and verify the C2 is able to hear
          the C1 audio. Also verify that the C1 can
          hear the C2 audio.

Step 7.   After completing the Private Call, return to
          the normal talkgroup mode.

Pass____ Fail____

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Option 3c.-3-10

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MCC 7500 Features

Console Initiates / Receives Secure Private Call

1. DESCRIPTION

Private Conversation is a selective calling feature that allows a dispatcher or radio user to carry on one-to-one conversation that is heard only by the two parties involved. The test validates the ability to initiate/receive secure private calls by the Console/Radio.

SETUP

RADIO-1 TALKGROUP 1
RADIO-1 - SITE - SITE 1
Console 1 - C1

VERSION #1.02
SPS #7.5

2. TEST

Step 1. Select the "PRIVATE-CALL" tile and set to the secure mode at C1.

Step 2. Click on the button that provides the "Private Call" function.

Step 3. Select the numeric keypad.

Step 4. Using the displayed keypad enter the ID for RADIO-1.

Step 5. Click the Send button.

Step 6. Answer the Private Call with RADIO-1 and respond to the Console.

Step 7. Verify the audio can be heard on both ends. After completing the Private Call, return to the normal talkgroup mode.

Step 8. Using RADIO-1, press the Private Call button, Enter the unit ID of C1 with the keypad, or scroll to the location where this ID is stored.

Step 9. Press the PTT to initiate the call. Verify that audio can be heard on both RADIO-1 and C1.

Step 10. After completing the Private Call, return to the normal talkgroup mode.

Pass____ Fail____

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Option 3c.-3-11

MCC 7500 Features

Call Alert Page

1. DESCRIPTION

Call Alert Page allows a dispatcher to selectively alert another radio unit. The initiating radio will receive notification as to whether or not the call alert was received. Units receiving a Call Alert will sound an alert tone and show a visual alert indication. The display will also show the individual ID of the initiating radio unit. After receiving the Call Alert, the radio can respond with either a Private Call or normal talkgroup call.

This feature is fully supported on all display portables and mobiles.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1

VERSION #1.02
SPS #7.5

2. TEST

Step 1.   Select the call alert button in the "Private Call" resource window.

Step 2.   Enter the ID of RADIO-1.

Step 3.   Send the call alert to RADIO-1 by depressing the send button.

Step 4.   Verify that RADIO-1 receives the alert and that the ID of the console is shown.

Step 5.   Turn off RADIO-1.

Step 6.   Send the call alert to RADIO-1 again.

Step 7.   Verify that after trying to page RADIO-1, the console does display "Can not send call alert - target not found" in the summary list.

Pass____ Fail____

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Option 3c.-3-12

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MCC 7500 Features

Gold Elite Console Initiated Emergency (Knocked down by MCC 7500 Console)

1. DESCRIPTION

Emergency Call can be initiated by the console. If the console initiates an emergency call on a Talkgroup, a channel is assigned to that Talkgroup indefinitely. The console initiated emergency call is ended when the call is knocked down, the channel fails, or the last affiliated member in the Talkgroup de-affiliates. Any dispatcher may knock down an emergency call, regardless of who initiated it. All the radios in the Talkgroup receive the emergency call.

SETUP

Two radios and 2 consoles are required to perform this test (RADIO-1 and RADIO-2 and Gold Elite Console 1 and MCC7500 Console 2). The Radios can be affiliated to any site in the system. Set the Radios to TALKGROUP 1. Both consoles must have TALKGROUP 1.

VERSION #1.02
SPS #7.5

2. TEST

Step 1. Click the "Emergency" button on the resource window for TALKGROUP 1 on Gold Elite Console 1 to display the Emergency QuickList and then click on the "Setup" button to initiate a console emergency.

Step 2. Verify that an emergency indication is shown on the MCC 7500 Console 2, on RADIO-1 AND RADIO-2 (if the radios have displays).

Step 3. Transmit on TALKGROUP 1 from Gold Elite Console 1. Determine which repeaters are keyed at the sites where Radios 1 and 2 are affiliated.

Step 4. Verify that the individual ID of the TALKGROUP 1 resource on Gold Elite Console 1 is shown on MCC 7500 Console 2, on RADIO-1 AND RADIO-2 (if the radios have displays) and all hear Gold Elite Console 1's transmit audio.

Step 5. Stop transmitting on TALKGROUP 1 from Gold Elite Console 1.

Step 6. Wait a minute and then keyup on RADIO-1.

Step 7. Verify both consoles and RADIO-2 hear the audio.

Step 8. Verify the same repeaters as determined in step 3 are keyed. De-key RADIO-1.

Step 9. Click the "Emergency" button on the resource window for TALKGROUP 1 on MCC 7500 Console 2 to display the Emergency QuickList and then click on the "Knockdown" button.

Step 10. Verify the emergency is knocked down and the repeaters previously keyed are no longer assigned.

Pass_____ Fail_____

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Option 3c.-3-13

MCC 7500 Features

MCC 7500 Console Initiated Emergency (Knocked down by the Gold Elite Console)

1. DESCRIPTION

Emergency Call can be initiated by the console. If the console initiates an emergency call on a Talkgroup, a channel is assigned to that Talkgroup indefinitely. The console initiated emergency call is ended when the call is knocked down, the channel fails, or the last affiliated member in the Talkgroup de-affiliates. Any dispatcher may knock down an emergency call, regardless of who initiated it. All the radios in the Talkgroup receive the emergency call.

SETUP

Two radios and 2 consoles are required to perform this test (RADIO-1 and RADIO-2 and MCC 7500 Console 1 and Gold Elite Console 2). The Radios can be affiliated to any site in the system. Set the Radios to TALKGROUP 1. Both consoles must have TALKGROUP 1.

VERSION #1.02
SPS #7.5

2. TEST

Step 1. Click the "Emergency" button on the resource window for TALKGROUP 1 on MCC 7500 Console 1 to display the Emergency QuickList and then click on the "Setup" button to initiate a console emergency.

Step 2. Verify that an emergency indication is shown on the Gold Elite Console 2, on RADIO-1 and on RADIO-2 (if the radios have displays).

Step 3. Transmit on TALKGROUP 1 from MCC 7500 Console 1. Determine which repeaters are keyed at the sites where RADIO-1 and RADIO-2 are affiliated.

Step 4. Verify that the individual ID of the TALKGROUP 1 resource on MCC 7500 Console 1 is shown on Gold Elite Console 2, on RADIO-1 and RADIO-2 (if the radios have displays) and all hear MCC 7500 Console 1's transmit audio.

Step 5. Stop transmitting on TALKGROUP 1 from MCC 7500 Console 1.

Step 6. Wait a minute and then keyup on RADIO-1.

Step 7. Verify both consoles and RADIO-2 hear the audio.

Step 8. Verify the same repeaters as determined in step 3 are keyed. De-key RADIO-1.

Step 9. Click the "Emergency" button on the resource window for TG 1 on Gold Elite Console 2 to display the Emergency QuickList and then click on the "Knockdown" button.

Step 10. Verify the emergency is knocked down and the repeaters previously keyed are no longer assigned.

Pass____ Fail____

MCC 7500 Features

Emergency Alarm (Ack'd by Gold Elite Console) and Call Display Description

1. DESCRIPTION

Users in life threatening situations can use the emergency button on the radio to send an audible alarm and a visual alarm signal to a console operator in order to request immediate system access to a voice channel for an emergency call.
An emergency alarm begins after the radio user presses the radio's emergency button. Pressing the emergency button places the radio in "emergency mode". To begin an emergency call, the radio user must press the radio's PTT button while in "emergency mode." The assigned voice channel will be dedicated to the emergency caller's talkgroup for an extended period of time, equal to the Message Hang Time plus the Emergency Hang Time. As with other call types, emergency calls can operate across sites as well as within the same site.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1

VERSION #1.02
SPS #7.5

2. TEST

Step 1. Select a Gold Elite operator position in the zone where RADIO-1 is affiliated for the test.

Step 2. Initiate an Emergency Alarm from RADIO-1.

Step 3. Observe the Emergency from RADIO-1 is received at the Gold Elite operator position for TALKGROUP 1.

Step 4. Acknowledge the Emergency at the Gold Elite operator position. Verify that an MCC 7500 operator position affiliated to TALKGROUP 1 receives notification that the call has been acknowledged.

Step 5. Key RADIO-1 to initiate an Emergency call to the Gold Elite operator position and reply to the radio from the operator position. Observe that the call takes place.

Step 6. Clear the Emergency from the Gold Elite console on TALKGROUP 1.

Step 7. Reset RADIO-1 by holding the Emergency button on the radio.

Pass_____ Fail_____

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Option 3c.-3-15

MCC 7500 Features

Emergency Alarm (Ack'd by MCC 7500 Console) and Call Display Description

1. DESCRIPTION

Users in life threatening situations can use the emergency button on the radio to send an audible alarm and a visual alarm signal to a console operator in order to request immediate system access to a voice channel for an emergency call.
An emergency alarm begins after the radio user presses the radio's emergency button. Pressing the emergency button places the radio in "emergency mode". To begin an emergency call, the radio user must press the radio's PTT button while in "emergency mode." The assigned voice channel will be dedicated to the emergency caller's talkgroup for an extended period of time, equal to the Message Hang Time plus the Emergency Hang Time. As with other call types, emergency calls can operate across sites as well as within the same site.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1

VERSION #1.02
SPS #7.5

2. TEST

Step 1.   Select an MCC 7500 operator position in the zone where RADIO-1 is affiliated for the test.

Step 2.   Initiate an Emergency Alarm from RADIO-1.

Step 3.   Observe the Emergency from RADIO-1 is received at the MCC 7500 operator position for TALKGROUP 1.

Step 4.   Acknowledge the Emergency at the MCC 7500 operator position. Verify that a Gold Elite operator position affiliated to TALKGROUP 1 receives notification that the call has been acknowledged.

Step 5.   Key RADIO-1 to initiate an Emergency call to the MCC 7500 operator position and reply to the radio from the operator position. Observe that the call takes place.

Step 6.   Clear the Emergency from the MCC 7500 console on TALKGROUP 1.

Step 7.   Reset RADIO-1 by holding the Emergency button on the radio.

Pass____ Fail____

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Option 3c.-3-16

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MCC 7500 Features

MCC 7500 Console Initiated Private Call to a Gold Elite Console (Not supported)

1. DESCRIPTION

Private Conversation is a selective calling feature that allows a dispatcher or radio user to carry on one-to-one conversation that is heard only by the two parties involved. Subscriber units receiving a private call will sound an alert tone. As with other call types, Private Calls operate across sites as well as within the same site. MCC 7500 Console can use the feature to communicate with another MCC 7500 Console in the same or another Console Site.

Note: Private calls between the MCC 7500 and Gold Elite consoles are NOT supported.

SETUP

This test requires both an MCC 7500 and Gold Elite Console. A U2U resource must be assigned to each Console.

VERSION #1.02
SPS #7.5

2. TEST

Step 1. Select the "PRIVATE-CALL" tile at the MCC 7500 console.

Step 2. Click the button on the tile that provides the Private Call function.

Step 3. Select the numeric keypad.

Step 4. Using the displayed keypad enter the unit ID of the target Gold Elite console.

Step 5. Click the Send button.

Step 6. Verify that the Private Call is rejected at the MCC 7500 console.

Step 7. Repeat Steps 1-6 with the Gold Elite console as the initiator and the MCC 7500 console as the destination/target.

Pass____ Fail____

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Option 3c.-3-17

MCC 7500 Features

> MCC 7500 Console Repeat Disable / Gold Elite Console Repeater Disable

1. DESCRIPTION

This test verifies that any console operator position (in a system with mixed console types) with a Repeat Disable control can enable and disable the repeat path for a particular talkgroup. This will be accomplished by changing the Repeat Disable status at the console operator positions for each type, scattered throughout the system and showing the effects on a radio call.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - ZONE 1 - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - ZONE 2 - SITE 2
RADIO-3 - TALKGROUP 1
RADIO-3 - SITE - ZONE 1 - SITE 1
Several operator positions of each type (ie. Gold Elite and MCC 7500) with a Repeat Disable control for the selected talkgroup are required. For multizone systems, the operator positions should be located in different zones.

VERSION #1.02
SPS #7.5

2. TEST

Step 1.   Initiate a wide area call with RADIO-1. Continue the call through the rest of the steps.

Step 2.   Verify that the RADIO-1 audio is heard at the other radios and all operator positions with that resource.

Step 3.   Select the Repeat Disable icon for that talkgroup on any MCC 7500 operator position.

Step 4.   Verify that RADIO-1 audio is still heard at all of the affiliated operator positions but not at any radio.

Step 5.   Select the Repeat Enable icon for that talkgroup on any Gold Elite operator position.

Step 6.   Verify that RADIO-1 audio is heard at all the affliated operator positions and radios.

Pass____ Fail____

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Option 3c.-3-18

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MCC 7500 Features

Console Priority

1. DESCRIPTION

Console Operator Positions have ultimate control of
transmitted audio on an assigned voice channel
resource. The Console Position has the capability to
take control of an assigned voice channel for a
talkgroup call so that the operator's audio overrides
any subscriber audio. Console priority is a feature
that enables dispatchers to gain immediate access to
an assigned voice channel so that a central point of
audio control exists.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 1

VERSION #1.02
SPS #7.5

2. TEST

Step 1. Initiate a Talkgroup call from RADIO-1 on
TALKGROUP 1.

Step 2. Observe that RADIO-2 receives the call.

Step 3. While the call is in progress, key up any
operator position at the console on
TALKGROUP 1.

Step 4. Observe that RADIO-2 is now receiving
audio from the operator position.

Step 5. De-key the Operator Position.

Step 6. Verify RADIO-2 now receives RADIO-1
audio.

Pass_____ Fail_____

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Option 3c.-3-19

MCC 7500 Features

Console Tactical/Normal Priority

1. DESCRIPTION

The Tactical/Normal Priority feature is initiated at the console operator position and provides the dispatcher with the ability to change the priority for a particular talkgroup. When selected, a higher priority level (level 2) is assigned to the talkgroup. This overrides the priority level set in the UCM.

Note: Tactical Priority is initiated by MCC 7500 and Normal Priority is done by Gold Elite.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 2
RADIO-2 - SITE - SITE 1
RADIO-3 - TALKGROUP 3
RADIO-3 - SITE - SITE 1
RADIO-4 - TALKGROUP 1
RADIO-4 - SITE - SITE 2
RADIO-5 - TALKGROUP 2
RADIO-5 - SITE - SITE 2
RADIO-6 - TALKGROUP 3
RADIO-6 - SITE - SITE 2
The priority level for the talkgroups selected should be the same. The busy condition can be created by disabling all channels except the control channel and one voice channel at the site to which Radios 1, 2 and 3 are affiliated.
Both types of consoles (i.e. Gold Elite and MCC 7500) are required to verify this feature across console types.

VERSION #1.02
SPS #7.5

2. TEST

Step 1.   Initiate a Talkgroup Call with RADIO-1 and observe that it is received by RADIO-4. Keep this call in progress until instructed to end the call.

Step 2.   Key RADIO-2 and observe that the radio receives a busy. Key RADIO-3 and observe that the radio receives a busy.

Step 3.   End the talkgroup call established in step 1.

Step 4.   Verify RADIO-2 receives the first callback and make a call to RADIO-5 upon receipt of the callback indication.

Step 5.   End the call between RADIO-2 and RADIO-5. Verify that RADIO-3 receives a call back.

Step 6.   Enable Tactical Priority for TALKGROUP 3 from any MCC 7500 console position with this option. Initiate a Talkgroup Call with RADIO-1 and observe that it is received by RADIO-4. Keep this call in progress until instructed to end the call.

Step 7.   Key RADIO-2 and observe that the radio receives a busy then key RADIO-3 and observe that the radio receives a busy.

Step 8.   End the Talkgroup Call established by RADIO-1. Verify RADIO-3 now receives the first callback and make a call to RADIO-6 upon receipt of the callback indication.

Step 9.   End the call between RADIO-3 and RADIO-6. Verify that RADIO-2 receives a call back.

Step 10. Disable Tactical Priority for TALKGROUP 3 from any Gold Elite console position and repeat Steps 1-5.

Pass____ Fail____

MCC 7500 Features

> **PTT Unit ID / Alias Display for MCC 7500 and Gold Elite Consoles**

1. DESCRIPTION

All aliases sent by the Zone Controller to the Dispatch Console will be in Unicode format. The information will be carried in the new ATIA format and all alias will be 16 character UTF-8 unicode format. Only MCC 7500 will be able to display the aliases as assigned. The Gold Elite Console will not be able to display the aliases that contain more than 14 characters.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 2
Mixed consoles (MCC 7500 - C1 and Gold Elite - C2)
Assign a 14 character alias to RADIO-1 and a 16 character alias to RADIO-2.

VERSION #1.02
SPS #7.5

2. TEST

Step 1. Select TALKGROUP 1 on any operator position with that Talkgroup.

Step 2. Initiate a call from RADIO-2 and observe that the alias is seen at both consoles in the list in the resource window as well as in the Activity Log window.

Step 3. Verify that the alias for RADIO-2 is displayed correctly on MCC 7500 Console

Step 4. Verify that the alias for RADIO-2 is not displayed correctly on Gold Elite Console.

Step 5. Initiate a call from RADIO-1 and observe that the alias of RADIO-1 is seen at both consoles in the list in the resource window as well as in the Activity Log window.

Step 6. Verify that the alias for RADIO-1 is displayed correctly on both the consoles.

Step 7. Update UCM with a new RADIO-2 alias that contains the maximum 14 characters. Make sure to give enough time for the alias change to propagate to the Zone Controller.

Step 8. Initiate a call from RADIO-2 and observe that the new alias of RADIO-2 is seen at both consoles in the list in the resource window as well as in the Activity Log window

Step 9. Verify that the alias for RADIO-2 is displayed correctly on both the consoles.

Pass____ Fail____

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Option 3c.-3-21

MCC 7500 Features

Link Failure between MCC 7500 site and
Zone Controller

1. DESCRIPTION

This test verifies that the two communication paths
between the MCC 7500 Console Site and Zone
Controller are redundant and the system will continue
uninterrupted if the main path fails. To accomplish
one of the two NIC connections is removed at the
ZC.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 1
RADIO-3 - TALKGROUP 2
RADIO-3 - SITE - SITE 1
RADIO-4 - TALKGROUP 2
RADIO-4 - SITE - SITE 2
TALKGROUP 1 AND TALKGROUP 2 require
Console resources.
Consoles C1 and C2 at the MCC 7500 Console site
are affiliated to the TALKGROUP 1 and
TALKGROUP 2 talkgroups.

VERSION #1.02
SPS #7.5

2. TEST

Step 1.   Initiate a Talkgroup Call with RADIO-1 in
          TALKGROUP 1.

Step 2.   Observe that only RADIO-2 and the
          consoles C1 and C2 are able to monitor and
          respond to the call

Step 3.   Initiate a Talkgroup call with RADIO-3 in
          TALKGROUP 2.

Step 4.   Observe that only RADIO-4 and the
          consoles C1 and C2 are able to monitor and
          respond to the call.

Step 5.   Remove the ENET cable to Link 1 from the
          NIC on the ZC, this will simulate a Zone
          Controller to Console Site Link failure.

Step 6.   Observe that the calls on TALKGROUP 1
          and TALKGROUP 2 continue.

Step 7.   Repeat steps 1-6 for the other Zone
          Controller.

Step 8.   Connect the ENET cables to normalize the
          system.

Pass____ Fail____

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Option 3c.-3-22

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MCC 7500 Features

Console ASTRO Secure Talkgroup Call
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1. DESCRIPTION

Digital encryption is used so only properly equipped radios can monitor the conversation. A "Key" is used to encrypt the transmit audio. Only radios and Consoles/MGEGs with the same "Key" can decrypt the audio and listen to it. The talkgroup to Common Key Reference (CKR) binding is kept in the MGEG and configured in the User Configuration Manager (UCM). The bindings are propagated to the MGEGs, which enable the Console to participate in encrypted calls. The "Key" that corresponds to the CKRs must be loaded into all MGEG Crypto Cards in the Zone.

Note: The MGEG/Console(s) need to be equipped with Crypto Cards and the radios with Crypto Modules in order to participate in secure calls.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 2
RADIO-2 - SITE - SITE 1
RADIO-3 - TALKGROUP 1
RADIO-3 - SITE - SITE 2
RADIO-4 - TALKGROUP 2
RADIO-4 - SITE - SITE 2
C1 - TALKGROUP 1
C2 - TALKGROUP 2
TG 1 uses "CKR1" and TG 2 uses "CKR2".
MGEGs/C1, C2, RADIO-1, RADIO-2 and RADIO-3 should be loaded with the "Keys" that correspond to CKR1 and CKR2. RADIO-4 should only have the "Key" that corresponds to CKR1. All radios should be set for the secure mode.

VERSION #1.02
SPS #7.5

2. TEST

Step 1. Initiate a wide area coded call from C1 on TALKGROUP 1.

Step 2. Verify RADIO-1 and RADIO-3 can monitor and respond to the secure call.

Step 3. Initiate a wide area coded call from C2 on TALKGROUP 2.

Step 4. Verify that RADIO-2 can monitor and respond to the secure call. Note that RADIO-4 cannot monitor the call because it does not have the "Key" that corresponds to CKR2.

Step 5. Change RADIO-2 and RADIO-4 to TALKGROUP 1.

Step 6. Initiate a wide area coded call from C1 on TALKGROUP 1.

Step 7. Verify that RADIO-1, RADIO-2, RADIO-3 and RADIO-4 can monitor and respond to the secure call because they all have the "Key" that corresponds to CKR1. If the radios are equipped with dual algorithm encryption modules, select talkgroups using the second algorithm and repeat steps 1-6.

Pass_____ Fail_____

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Option 3c.-3-23

MCC 7500 Features

> ### Console ASTRO Secure Talkgroup Call (MCC 7500 only)

1. DESCRIPTION

Digital encryption is used so only properly equipped radios can monitor the conversation. A "Key" is used to encrypt the transmit audio. Only radios and Consoles with the same "Key" can decrypt the audio and listen to it. Unlike CENTRACOM Gold Elite Console, the MGEG functionality resides within the MCC 7500 Console via KVL.

Note: The MCC 7500 Console(s) need to be equipped with Crypto Cards and the radios with Crypto Modules in order to participate in secure calls.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 2
RADIO-2 - SITE - SITE 1
RADIO-3 - TALKGROUP 1
RADIO-3 - SITE - SITE 2
RADIO-4 - TALKGROUP 2
RADIO-4 - SITE - SITE 2
C1 - TALKGROUP 1
C2 - TALKGROUP 2
TALKGROUP 1 needs to be bound to "CKR1" and TALKGROUP 2 needs to be bound to "CKR2" in both the UCM and the radio programming. C1, C2, RADIO-1, RADIO-2 and RADIO-3 should be loaded with the "Keys" that correspond to CKR1 and CKR2. RADIO-4 should only have the "Key" that corresponds to CKR1. All radios should be set for the secure mode.

VERSION #1.02
SPS #7.5

2. TEST

Step 1.   Initiate a wide area coded call from C1 on TALKGROUP 1.

Step 2.   Verify RADIO-1 and RADIO-3 can monitor and respond to the secure call.

Step 3.   Initiate a wide area coded call from C2 on TALKGROUP 2.

Step 4.   Verify that RADIO-2 can monitor and respond to the secure call. Note that RADIO-4 cannot monitor the call because it does not have the "Key" that corresponds to CKR2.

Step 5.   Change RADIO-2 and RADIO-4 to TALKGROUP 1.

Step 6.   Initiate a wide area coded call from C1 on TALKGROUP 1.

Step 7.   Verify that RADIO-1, RADIO-2, RADIO-3 and RADIO-4 can monitor and respond to the secure call because they all have the "Key" that corresponds to CKR1. If the radios are equipped with dual algorithm encryption modules, select talkgroups using the second algorithm and repeat steps 1-6.

Pass_____ Fail_____

City of Philadelphia
ASTRO 25 Upgrade
Option 3 – Acceptance Test Plan

Option 3c.-3-24

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MCC 7500 Features

Secure Talkgroup Patch

1. DESCRIPTION

This test validates the ability of the console/radio to transmit and to receive secure calls on Patch and patch secure audio from one resource to another.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 1
RADIO-3 - TALKGROUP 2
RADIO-3 - SITE - SITE 2
RADIO-4 - TALKGROUP 2
RADIO-4 - SITE - SITE 2
Console C1 is patching Console with TALKGROUP 1 and TALKGROUP 2 in the same patch.
RADIO-1 is a clear only radio. The TALKGROUP 1 and TALKGROUP 2 are non-regroupable and transmit mode set to secure.

VERSION #1.02
SPS #7.5

2. TEST

Step 1.   Select an operator position for testing that contains TALKGROUP 1 and TALKGROUP 2.

Step 2.   At the desired operator position, select one of the Patch tabs in the Patch/Multi- Select window.

Step 3.   Click the button on the patch that allows an operator to setup and edit a patch (note patch window turns blue).

Step 4.   Add all the talkgroups to the patch that were selected on the radios in the setup procedure by selecting each resource tile.

Step 5.   Once all talkgroups are added, click the patch setup button again to complete the patch setup.

Step 6.   Initiate a talkgroup call on TALKGROUP 1 from RADIO-2 in a secure transmit mode.

Step 7.   Observe that all radios are able to hear RADIO-2 except RADIO-1 as it is a clear only radio.

Pass____ Fail____

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Option 3c.-3-25

MCC 7500 Features

> **Tone Generation Trunking Resource (MCC 7500 Consoles)**

1. DESCRIPTION

This test will demonstrate that the dispatch console is able to transmit Alt-Tone on a trunking resource during the tone generation period.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1

SITE-1 - ZONE 1

CONSOLE-1 -TALKGROUP 1
CONSOLE-1 - SITE - CSITE 1

VERSION #1.03
SPS #7.5

2. TEST

Step 1.   Send an Alert tone from CONSOLE-1

Step 2.   Verify that RADIO-1 hears Alert tone from CONSOLE-1

Step 3.   Key up general transmit by using Console-1's mike or foot switch

Step 4.   Verify that RADIO-1 hears audio from CONSOLE-1 during the Alert Tone Talk Extend period.

Pass____ Fail____

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Option 3c.-3-26

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MCC 7500 Features

Tone Generation Trunking Resource in Secure Mode (MCC 7500 Consoles)

1. DESCRIPTION

This test will demonstrate that the dispatch console (which is in secure mode) is able to transmit Alt-Tone on a trunking resource during the tone generation period.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
TG-1 - Crypto Key - CKR1

SITE-1 - ZONE 1

CONSOLE-1 -TALKGROUP 1
CONSOLE-1 - SITE - CSITE 1

VERSION #1.03
SPS #7.5

2. TEST

Step 1.   Send an Alert tone from CONSOLE-1

Step 2.   Verify that RADIO-1 hears Alert tone from CONSOLE-1

Step 3.   Key up general transmit by using CONSOLE-1's mike or foot switch

Step 4.   Verify that RADIO-1 hears audio from CONSOLE-1 during the Alert Tone Talk Extend period..

Pass_____ Fail_____

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Option 3c.-3-27

MCC 7500 Features

Sending Alert Tone to Patch Member (MCC 7500 Consoles)

1. DESCRIPTION

This test will demonstrate that the console will send Alert-Tone to all the members in a patch.

SETUP

SITE-1 - ZONE 1

CONSOLE-1-TG-1
CONSOLE-1-TG-2
CONSOLE-1 - SITE - CSITE-1

PATCH-1-TG-1-TG-2

RADIO-1-TG-1
RADIO-1- SITE- SITE-1

RADIO-2-TG-2
RADIO-2 -SITE- SITE-1

VERSION #1.03
SPS #7.5

2. TEST

Step 1.   Send a Alert-Tone to PATCH-1

Step 2.   Verify that RADIO-1 and RADIO-2 hear the Alert-Tone

Pass_____ Fail_____

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Option 3c.-3-28

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MCC 7500 Features

> **Sending Alert Tone Console Selected Resource (MCC 7500 Consoles)**

1. DESCRIPTION

This test demonstrates the MCC 7500 Console ability to send an Alert-Tone signal on selected resources.

SETUP

RADIO-1- CH1
RADIO-1- SITE- SITE-1

CCGW-1 - CH1
CCGW-1 - SITE - CONVSITE 1

CONSOLE-1 - CH1
CONSOLE-2 - CH1
CONSOLE-1- SITE - CSITE 1

VERSION #1.03
SPS #7.5

2. TEST

Step 1.   Send Alert-Tone on CH1 from CONSOLE-1

Step 2.   Verify that CONSOLE-1 displays transmit indication.

Step 3.   Verify that CONSOLE-2 and RADIO-1 hear Alert-Tone from CONSOLE-1.

Pass____ Fail____

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Option 3c.-3-29

MCC 7500 Features

> Channel Marker - Trunked Channels (MCC 7500 Consoles Only)

1. DESCRIPTION

A Channel Marker is a distinct, short duration, audible tone over radio and Console speakers. The tone is initiated and cancelled by a console operator.

The tone can be initiated only for the talkgroups or analog conventional channels. On initiation, it is generated periodically when there is no voice activity.

The tone can be used for various purposes. The primary purpose of the tone is to inform radio users that the conventional channel or the trunked talkgroup is currently involved in a high priority situation and they should stay off it unless they are involved in the high priority situation. The tone also informs the users that a console operator is actively monitoring the talkgroup.

Note that the Channel Marker tone will only start when there is no voice activity for the selected Talkgroup/Analog conventional channel.

The channel Marker tone is sent in a current transmission mode of the Console user.

SETUP

RADIO-1 TALKGROUP 1
RADIO-2 TALKGROUP 1

CONSOLE-1 - TALKGROUP 1
CONSOLE-2 - TALKGROUP 1

Note: Verify that TG-A has Channel Marker capability

VERSION #1.02
SPS #7.5

2. TEST

Step 1. Verify communications between the Consoles and the Radios on TALKGROUP 1

Step 2.   Initiate a Channel Marker tone on TALKGROUP 1 from Console 1.

Step 3. Verify that RADIO-1 and RADIO-2 can monitor the Channel Marker tone at TALKGROUP 1 preset period.

Step 4. Verify that CONSOLE-1 and CONSOLE-2 can also monitor the Channel Marker tone at TALKGROUP 1 preset period.

Step 5.   Initiate a call from RADIO-1 and continue to key longer than the preset Channel Marker tone period for TALKGROUP 1

Step 6. Verify that while RADIO-1 is keyed, the Channel Marker tone is suppressed.

Step 7. Verify that after RADIO-1 de-keys, the periodic Channel Marker tone continues to be transmitted on TALKGROUP 1

Step 8. Cancel the Channel Marker on TALKGROUP 1 from CONSOLE-1.

Step 9. Verify the Channel Marker is no longer monitored on TALKGROUP 1

Pass____ Fail____

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Option 3c.-3-30

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3c.2   Signoff Certificate

By their signatures below, the following witnesses certify they have observed the In-Field System Acceptance Test Procedures.

Signatures

WITNESS: _____Date: _____

Please Print Name: _____   _____

Initials

WITNESS: _____Date: _____

Please Print Name: _____   _____

Initials

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Option 3c.-3-31

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Option 3c.-3-32

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Motorola Software Subscription Option

Motorola Life Cycle Model

The Motorola Life Cycle model was introduced in 1999 to balance system operator wants and needs with the issues facing Motorola as a manufacturer and integrator. System operators want to know when products and services will be available. They also need to forecast expenses for budgeting reasons. Internally, Motorola has to invest in development and support. Motorola uses lifecycle to guide commitments to system operators for maintenance and other business obligations. The model was first presented to the Motorola Trunked User Group (MTUG) in 1999 and shortly thereafter to the Motorola Utility Trunked Users Alliance (MUTUAL). Since that time it has gained wide acceptance with both system operators and with internal planning groups as an effective short- and long-range planning guide. The primary tool for life cycle planning is the life cycle roadmap (Roadmap). The Roadmap consists of a series of "tiers", which denote the guidelines for shipments, expansion, and support for a system platform. The chart below shows a typical life cycle roadmap:

Life Cycle Tier Structure

The life cycle roadmap is intended to be a guideline based on current knowledge. As such, certain future events can alter the roadmap, including supply issues, standards/spectrum mandates, etc. In the event that changes are necessary, they will be communicated to system operators via the various user groups, as well as through the Motorola distribution teams.

Project 25 IP-Based Systems

Life cycle planning has become more important as Motorola and our customers move into the IP world with the ASTRO 25 system platform. The ASTRO 25 system architecture includes industry-standard IP third party products within the core network. There is also a much larger proportion of third-party supplied content throughout the entire system. These products are predominantly used in the IT industry, and as such their life spans are much shorter that our traditional network boxes. Most suppliers of these products ship and support their current products, plus one or two prior versions only. Past that point, they will not ship an "obsolete" product, nor will they provide technical support until the customer has upgraded to a supported version.

Motorola works with our suppliers to incorporate their new versions into our system certification process, thus ensuring compatibility of new third-party software with Motorola software. This often enables Motorola to ship versions of third-party software that are no longer available from the manufacturer. In some cases our shipment period is twice as long as the manufacturer's, thus reducing the amount of "churn" by half. Despite our efforts, however, we cannot offer the level of support necessary to guarantee operation of a third-party product once that product's manufacturer has stopped supporting it. It is essential, therefore, that the end-user system be upgraded regularly to ensure optimal support in the event of a technical problem. Motorola recommends system upgrades approximately once per year to keep current with third-party products.

Motorola's Software Release Strategy

The third party software certification is part of a broader effort to periodically release new system-level software for our customers. For the ASTRO 25 platform, this process results in approximately semi-annual or annual releases. This schedule normally continues through the end of the software development period for a system platform (end of Tier 50 as shown in the above chart) and is often noted as the "Z" Release. These releases include new optional features, performance improvements and operational updates available for a given system platform. So in addition to the benefit of supportability, upgrading yearly provides the latest baseline performance improvements and optional new features to optimize the functionality and efficiency of your system. As two-way communications technology has evolved, the functionality of the systems has become increasingly driven by software.

Effectively we have gone from 10,000 lines of code to well over 100 million lines of code over the past two decades. More than any previous system, the functionality of our ASTRO 25 systems is primarily in the software. This is why it is critically important to keep the system current to obtain the highest benefit.

Motorola System Expansion Strategy

Motorola can not guarantee compatibility between system release because suppliers products changes. The only exception to this is that adjoining releases are compatible to

minimize disruption during system upgrades. In other words in a system being upgraded from release 7.1 to 7.2, the sites can be upgraded individually to the new release without risk of incompatibility. Of course this is a simplified example and any system upgrade should be carefully planned with Motorola's Upgrade Operations and Systems Integration teams. If the system is not periodically upgraded, then the system functionality is subject to no new features, no operational updates, limited technical support and the overall equipment lifecycle is shortened.

Motorola System Roadmap

Optional features, such as Integrated Voice & Data, High Performance Data, OTAR, MCC75000, Dynamic Dual Mode (FDMA/TDMA) are all available at specific points on the system roadmap. In order to take advantage of these features, it is necessary to stay current on the roadmap through periodic system upgrades to obtain such features. SSA facilitates upgrades of your system to take advantage of new features and functionality as they become available.

Network Security

With the introduction of IP-based networks and integrated voice & data, the security of the network becomes a critical consideration for system operators. Motorola offers protections in the system architecture, as well as various services to protect against virus infection and unauthorized network intrusion. Due to the extremely volatile nature of the security industry, Motorola is able to offer these services on the current-shipping system release. Network Security is included in the existing (and quoted) System maintenance Agreement between Motorola and the City of Philadelphia.

System Platform Migration Considerations

If migration to a new system platform is desired in the future, there will be specific certified migration paths from the current platform to the new platform. In all likelihood the migration path(s) will require customers to be on the final software release or one of the later releases of the existing platform in order to migrate to the new platform. A customer on a prior platform would have to upgrade their existing system to a later release (both hardware & software), then migrate to the new release. This would mean incurring the same costs as if he had kept current, but without receiving the benefits of doing so.

Software Subscription Agreement

Developments in telecommunications, notably the Internet Protocol, the adoption of the Project 25 Standard (P25), and the evolution to digital and packet-switched technology have led to changes in the industry. While these developments have allowed Motorola to provide amazing capabilities never before available to our system operators, they have

also changed the environment in which manufacturers, suppliers, system operators, and integrators operate.

Motorola is constantly working to extend the life of numerous components and third-party products through negotiations, re-certification, redesign, and last-time buys. Despite these efforts, we are constrained by ever-shortening life cycles -- fueled by third party manufacturers' desire to release the latest and greatest products -- and other global supply issues such as outsourcing.

Motorola offers a **Software Subscription Agreement** (SSA) to complement the life cycle of our customers' systems during the post-warranty phase. The Software Subscription Agreement (SSA) is an innovative product which adds a level of service beyond that normally provided by traditional software warranty. The SSA is the most cost-effective way for a customer to extend their Motorola system lifespan and protect their initial investment. SSA customers are entitled to receive new releases of system software applicable to their system on a periodic basis. This structured approach ensures reliability and compatibility for all system components due to Motorola's rigorous testing and certification processes. These releases contain performance improvements and operational updates for current generation Motorola systems software, as well as and the ability to enable new Optional Feature purchases.

SSA is intended to safeguard the entire communications system. At the highest level, it covers all Motorola copyrighted software in the system including: subscribers, consoles, controllers, etc. It also includes any third party software which Motorola Radio systems Division certifies with a system release. Because software releases are tested system-wide and have interdependencies, it is not meant to be scalable, i.e., breaking out stations only. This is to ensure that all system components are compatible with each other per the system-wide testing of the software.

SSA entitles the customer to receive unlimited software release updates issued by Motorola for a fixed period of time. The minimum term for SSA is 1 year, multi-year agreements are recommended for optimal benefit.

The SSA includes:

- The right to obtain latest software releases, which may include:
    - Access to New Features (Purchased Features)
    - Performance Improvements
    - Operational Updates
- Motorola Upgrade Design and Support
    Motorola Upgrade Operations (UO) In –House Labor:
        UO Audit Review
        UO Design Engineering
        UO Pre-Configuration
        UO Implementation Engineering Telephone Support
        UO Dedicated Project Manager
- Upgrade Software and Firmware used to deliver the software upgrades
- System Release Certified 3rd Party Supplier upgrade software and licensing.
- Upgrades or Downgrades for equipment add-ons during SSA term
- SSA Bulletin:
    - Latest System Release (SR) details
    - Important Life Cycle messages

The SSA does NOT include:

- Plant E9-1-1 software
- Motorola Integrated Solutions Division (ISD) Software
    - Custom Software: CAD etc…
    - Subscriber/Laptop 3rd party software
- Extra-cost options (e.g. Trunked OTAR)
    - Discount available on SW options
- Additional Hardware required for the upgrade
- Field Services:
    - Engineering
    - Systems Integration Program Management
    - Installation

All Motorola-provided software (see exceptions above) in the system is covered, including subscribers and infrastructure. These two tables show a sample of what products are covered under SSA:

ASTRO 25 Products (Sample)

Motorola Products	Site Router	AEB
Zone Controller	RF Stations	MGEG
Network Management	Console MCC7500	CEB
Site Controller	Console CENTRACOM	

Zone Level Servers (4)	DCD Server	CCGW Routers
System Level Servers (2)	LAN Switch	Border Routers
	WAN Switch	HPD
Network Transport Servers (2)	Exit Routers	IV&D
	Core Routers	OTAR
Network Security Server	Gateway Routers	KMF
Terminal Server	PN Routers	Telephone Intercon
AD Server	Firewall	

ASTRO 25 3rd Party –Supplier Software (Sample)

AdventNet	Internet Explorer	Site Protector - IDS Mgt.
AdventNet Agent Proxy	InTouch	SmartStart CD
AdventNet API	Java RPC	Solaris
Crystal Reports	Java Runtime	SUN LDAP
Checkpoint	Environment	Symantec Anti Virus
Exceed	Linux	Symantec PC Anywhere
HP Openview	Macrovision/Globetrotter	Voyence
Hummingbird Exceed	Microsoft SQL Server	Windows Server
HyperACCESS	Netra 240 Server	Windows Vista
Terminal	NetScreen Firewall	Windows XP Professional
InfoVista	Security	Windows XP Re-Connect
Installshield	ODBC Interbase	XML Parser
Multiplatform	RadioIP Middleware	
Interbase DBS	RSA/ACE Serial/IP	
Interclient	RSA/ACE Com Port	

SSA also allows you to plan and budget your software upgrade expenses annually, to avoid unwanted surprises in the event of an unplanned upgrade.

ASTRO® 25 Upgrade Assistance Plan

Motorola offers an **Upgrade Assistance Plan** (UAP) to complement the life cycle of our ASTRO® 25 IP trunking customers' systems during the post-warranty phase. The UAP includes all of Motorola's Software Subscription Agreement (SSA) benefits plus the labor and hardware required for a system release upgrade. Customers that take advantage of the UAP program are more likely to stay current on the life cycle roadmap and receive support for a fixed annual fee. This reduces unexpected costs which can drive emergency funding request and system disruption.

Motorola recommends that Customers maintain continuity of their ASTRO 25 Trunking Systems by keeping their system at the current system release by either a box system upgrade or Software Subscription Agreement (SSA) service or UAP service. UAP services starts with the system and equipment certified at the current system release. UAP entitles customer to receive one system release update per year issued by Motorola during the term and customer selected. The minimum term for UAP is 3 years.

The UAP consists of the following items for the Voice, Data, MOSCAD, and System Release certified 3rd party supplier software. In addition, Software upgrade kits for Subscribers are also included (Subscriber labor is additional).

One Motorola Software and Hardware Upgrade with Installation
- The right to obtain latest software releases, which may include:
  - Access to New Features (Purchased Features)
  - Performance Improvements
  - Operational Updates
- Motorola Upgrade Design and Support
  - Motorola Upgrade Operations (UO):
    - UO Audit Review
    - UO Design Engineering
    - UO Pre-Configuration
    - UO Implementation Engineering Telephone Support
    - UO Dedicated Project Manager
    - UO On-Site Implementation Engineering
- Upgrade Software and Firmware used to deliver the software upgrades
- Pre-Tested Security Updates (Optional)
- System Release Certified 3rd Party Supplier upgrade software and licensing.
- Equipment Refresh (Certified Mandatory Motorola Roadmap Equipment)
- Field System Engineering
- End-to-end Program Management
- System Optimization / Acceptance Testing
- Software only for Upgrades or Downgrades for equipment add-ons during UAP term
- SSA Bulletin:
  - Latest System Release (SR) details
  - Important Life Cycle messages

The UAP does NOT include:
- Plant E9-1-1 software
- Motorola Integrated Solutions Division (ISD) Software
  - Custom Software: CAD etc...
  - Subscriber/Laptop 3rd Party Software
- Extra-cost options (e.g. Trunked OTAR)
  - Discount available on SW options

The UAP offers the following benefits for customers:
- Covers all customer upgrade costs in one plan
- Enables firm budgeting for upgrades for multiple years
- Reduces risk of higher costs during implementation
- Reduce surprise expenses & emergency funding requests
- Enjoy benefits of Life Cycle Roadmap for fixed annual fee
- Lower total cost v. traditional upgrade project approach

All Motorola-provided software (see exceptions above) in the system is covered, including subscribers and infrastructure. These two tables show a sample of what products are covered under UAP:

ASTRO 25 Products (Sample)

Motorola Products	Zone Level Servers (4)	Gateway Routers
Zone Controller	System Level Servers (2)	PN Routers
Network Management	Network Transport Servers (2)	Firewall
Site Controller	Network Security Server	CCGW Routers
Site Router	Terminal Server	Border Routers
RF Stations	AD Server	HPD
Console MCC7500	DCD Server	IV&D
Console CENTRACOM	LAN Switch	OTAR
AEB	WAN Switch	KMF
MGEG	Exit Routers	Telephone Interconn.
CEB	Core Routers	

ASTRO 25 3[rd] Party –Supplier Software (Sample)

AdventNet	InTouch	Site Protector - IDS
AdventNet Agent Proxy	Java RPC	Mgt.
AdventNet API	Java Runtime	SmartStart CD
Crystal Reports	Environment	Solaris
Checkpoint	Linux	SUN LDAP
Exceed	Macrovision	Symantec Anti Virus
HP Openview	Globetrotter	Symantec PC
Hummingbird Exceed	Microsoft SQL Server	Anywhere
HyperACCESS	Netra 240 Server	Voyence
Terminal	NetScreen Firewall	Windows Server
InfoVista	Security	Windows Vista
Installshield	ODBC Interbase	Windows XP
Multiplatform	RadioIP Middleware	Professional
Interbase DBS	RSA/ACE	Windows XP Re-Con
Interclient	Serial/IP RSA/ACE	XML Parser
Internet Explorer	Com Port	

UAP allows you to plan and budget your system upgrade expenses annually, to avoid unwanted surprises in the event of an unplanned upgrade.

Summary

Changes in IP industry have drastically re-shaped the telecommunications industry. These changes impact how systems are designed, manufactured, supplied and maintained today. Motorola developed the life cycle model as a means for managing these challenges as they began to emerge in the late 1990's. With the more recent advances in technology and resulting structural and market impacts, the life cycle model has become an essential tool for customers and Motorola to plan and manage systems. Due to shortening life cycles and standardization of IP-based networks, it has become essential to refresh two-way communications systems periodically to obtain new features, expand, obtain technical support, protect against security threats, and plan for future technology migrations. Today's systems are software driven, and can be kept current primarily through software "flash" upgrades (some hardware replacement may be necessary). Motorola offers the Software Subscription Agreement, Upgrade Assistance Plan and other related services to enable periodic upgrades at a discounted rate. Motorola has a team of professionals dedicated to ensuring successful planning and execution of a system upgrade. Together with Motorola's field teams, Upgrade Operations carefully reviews, designs, and implements all elements of an upgrade. By using our trained experts, we can ensure the best possible results are attained. Motorola recommends upgrading trunking systems once per year on average to attain maximum performance and return on investment.

SSA / UAP Optional Pricing

Upgrade Assistance Plan (UAP) quote is for a term of 3 continuous years or more and includes is a Software Subscription Agreement (SSA). Software Subscription Agreement (SSA) is an all inclusive offering that includes Motorola upgrade software, 3rd Party Applications, 3rd party Licenses, Upgrade Operations In-House Services and upgrade software for subscribers. The UAP includes the SSA plus provides any mandatory hardware required by the System Release (SR) as well as the field labor to install the SR. This is to ensure all SR components are compatible following our in house system interdependency testing prior to any implementation. This ASTRO 25 SSA quote extends to the last full year term ending following the Z Release date for a system configuration listed below in blue.

Philadelphia System Configuration:

ASTRO 25; 1 Zone, 2 RF Sites, 22 Simulcast Sites, 2 SmartX Site Converters, 372 Stations, 50 MCC7500 Console Ops, 1 NICE Logger interface, 0 Logger Clients, 8 NM Clients and 8500 Subscribers
ZONE FEATURES: Omnilink, IV&D, OTAR, CSMS, CNI, IA Master, InfoVista
MOSCAD: 2 Server, 16 RTU and 2 Client
No TDMA, No DSR, No HPD, No Telephone, No IA Remote

SSA Optional Quote: (would be added back into existing maintenance Agreement)

SSA System: $699,300 per year fee until end of 2014
    Coverage Subsystems:
    1-System/Features/Sites/Subscribers T7024C = $606,300
    2-MOSCAD DLN6503C = $43,000
    3-Console T5803C = $50,000

UAP Optional Quote: (includes SSA)

UAP System: $2,987,060 for a 3 year continuous term
UAP System: $995,687 per year continues following the term contract until end of 2014.

Benefits of Motorola UAP:
UAP was developed in 2004 to supply a SSA that includes mandatory roadmap hardware and Service Implementation with the option for Pre-Tested Subscription Software (PTSS) for one upgrade per year. UAP price is not to have its products/services broken apart. The UAP biggest advantage is one price at a fixed price allowing customers to maintain consistence budgeting for multiple years. A Motorola UAP provides the additional benefit of 20% discount for new Optional Features. UAP does not include subscriber programming/management as this is often a customer elective. Subscribers do not always need to be upgraded during a full system upgrade.

Appendix B – Supplemental Schedule of Project Costs

Master Site Equipment

Qty	Nomenclature	Description	Total Discounted Price
1	SQM01SUM0188	MASTER SITE CONFIGURATION 7.5	
1	QA01205AA	ENH: ASTRO 25 IV&D AND VOICE	
24	CA01209AB	ENH: ASTRO 25 IV&D SITE	
4	CA01225AB	ENH: MCC 7500 CONSOLE LICENSES (QTY	
20	CA01208AA	ENH: 500 RADIO USER LICENSES	
1	CA01257AB	ADD: ZONE CONTROLLER AND NETWORK MA	
1	CA01235AB	ADD: USER CONFIGURATION SERVER (UCS	
6	CA01224AB	ENH: UNIFIED EVENT MANAGER (UEM)	
7	Z13AG	ENH: UNIFIED NETWORK CONFIGURATOR (	
8	Z802AF	ENH: USER CONFIGURATION MANAGER (UC	
1	D999AL	ENH: SECURITY PARTITIONING	
1	CA00965AA	ENH: CHANNEL PARTITIONING	
1	CA00966AA	ENH: FLEXIBLE AIR TRAFFIC INFORMATI	
1	ZA00103AA	ENH: TECHNICAL ASSISTANCE, TEN HOUR	
1	D980AM	ENH: CADI SOFTWARE OPTION	
1	ZA00104AA	ENH: TECHNICAL ASSISTANCE, FORTY HR	
5	D52AJ	ENH: ZONEWATCH	
8	DA00148AG	ENH: ZONE HISTORICAL REPORTS	
5	ZA00149AD	ENH: DYNAMIC REPORTS	
8	Z801AM	ENH: RADIO CONTROL MANAGER	
5	ZA00151AG	ENH: AFFILIATION USER REPORTS	
1	CA01237AA	ENH: NORTHBOUND INTERFACE	
1	ZA00272AA	SNMP TRAP FORWARDING	
1	CA01238AA	ENH: EMAIL ALARM NOTIFICATIONS	
28	CA01613AA	ADD: UNC ADDITIONAL DEVICE LIC (10)	
1	DS301100111G	USB TO DB 9 PIN SERIAL ADAPTOR	
1	L3174	3810 PLUS MODEM S/A V.34 PROTOCOL	
1	DSZ1Z1118560	RM001 W/SPECIAL FACEPLATE W/1 CUTOU	
4	TT2024	AUTHENTICATION SERVER	
5	T7400	DOMAIN CONTROLLER SOFTWARE	
1	DDN9185	CERTIFIED INFO VISTA SERVER (MCTE)	
1	DDN8369	INFO VISTA SOFTWARE V2.3 SERVICE P	
1	T6679K	INFOVISTA NETWORK PERFORMANCE SOFTW	
1	L3225A	CERTIFIED KEYBOARD FOR RSD SERVERS	
1	L3226A	CERTIFIED OPTICAL WHEEL MOUSE FOR R	
1	DS213BLK	21.3" MVA 4:3 LCD, BLACK, NON-TOUCH	
1	DLN6545	HP CP3505N COLOR LASER PRINTER 110V	
3	DDN9555	CERTIFIED NETWORK MANAGEMENT ASTRO	
3	DDN8673	CRYSTAL REPORTS 11.0	
3	T7453	ASTRO 7.5 CLIENT APPLICATION SOFTWA	
3	DS213BLK	21.3" MVA 4:3 LCD, BLACK, NON-TOUCH	

5	DDN9555	CERTIFIED NETWORK MANAGEMENT ASTRO
5	DDN8673	CRYSTAL REPORTS 11.0
5	T7453	ASTRO 7.5 CLIENT APPLICATION SOFTWA
5	DS213BLK	21.3" MVA 4:3 LCD, BLACK, NON-TOUCH
2	ST2500	S2500 MULTIPROTOCOL WAN ROUTER
2	ST2512	S2500 ROUTER T1/E1 DAUGHTER BOARD
2	DSJ4900B	HP PROCURVE SWITCH 2626B
1	ST2500	S2500 MULTIPROTOCOL WAN ROUTER
1	ST2512	S2500 ROUTER T1/E1 DAUGHTER BOARD
1	TT2022	LX4000T 8 PORT TERMINAL SERVER
4	L3174	3810 PLUS MODEM S/A V.34 PROTOCOL
2	DSZ1Z1118567	RM001 WITH SPECIAL FACEPLATE WITH 2
1	TT2021	LX4000T 48 PORT TERM SVR W/ MODEM
1	L3174	3810 PLUS MODEM S/A V.34 PROTOCOL
1	DSZ1Z1118567	RM001 WITH SPECIAL FACEPLATE WITH 2
1	DDN9182	CERTIFIED CORE SECURITY MANAGEMENT
1	T7401	CSMS SUPPLEMENTARY DISK A7.1.1
19	DDN9454	SYMANTEC ANTI VIRUS 10.1.5 CORP ED
1	TT1969	RSA AUTH. MGMT V. 6.1 WITH 25 CLIEN
1	TT04523AA	ADD: RSA ACE SERVER MAINTENANCE FOR
5	DDN8653	RSA 5 YEAR HARD TOKEN
1	DS213BLK	21.3" MVA 4:3 LCD, BLACK, NON-TOUCH
19	T7448	WINDOWS SUPPLEMENTAL FULL CONFIG
1	DSWQ4798653	VIRTUAL SERVER HARDWARE AND LINUX M
1	DSWQ4800408	VMWARE INFRA STR LIC & GOLD SUPPORT
1	DS1932136	WINDOWS SVR ENT 2003 R2A W/ 25 CALS
3	DSRHEL4UP5	RED HAT ENT LINUX ES BASIC LICENSE
1	DDN9178	SNAP SERVER 110 500 GB
1	T7402	IBS SUPPLEMENTARY DISK
1	TT1931	SSG520 FIREWALL W/ 2 YEARS SUPPORT
1	L3540	CERTIFIED FIREWALL MANAGEMENT SERVE
1	TT1933	NETSCREEN-SECURITY MGR W/25 DEVICE
1	T7399	FMS SUPPLEMENTARY DISK
1	DSJ4900B	HP PROCURVE SWITCH 2626B
1	T7227	CENTRALIZED LOGGING SUPP CD
1	T7400	DOMAIN CONTROLLER SOFTWARE
1	DSOPAVNTPK	VINTELA AUTHENTICATION SERVICES LIC
1	T7362	VINTELA AUTHENTICATION SERVICES SW
1	TT2024	AUTHENTICATION SERVER
1	L3504	CERTIFIED SYSLOG SERVER
1	ST6000	S6000 MNR MULTI-PROTOCOL ROUTER
1	ST6000	S6000 MNR MULTI-PROTOCOL ROUTER
1	ST6010	S6000 4-PORT ULTRAWAN MODULE
1	TT1967	PACKET DATA GATEWAY-- 6020 NON REDU
1	ZA00248AA	ADD: CABLE POWER UNITED STATES AND
1	T6808	PACKET DATA GATEWAY SOFTWARE FOR AS
1	Z234AA	ADD: ASTRO 25 TRUNKING SYSTEM SUPPO

Appendix B

1	ZA00691AA	ADD: IVD SOFTWARE TRANSIT 25 SOFTWA
1	DDN6368	CABLE 25FT DB9M DB25M
1	DDN6370	CABLE 25FT DB9F RJ45M
1	ST6000	S6000 MNR MULTI-PROTOCOL ROUTER
1	ST6500	MNR GGSN SOFTWARE
1	DSTRAK91008	PRIME/MASTER SITE CONFIG AC POWER
2	DSTRAK91111	FOUR PORT T1 FRAMED AND CLOCK TELEC
300	L1700	1/4" SUPERFLEX POLY JKT PER FOOT
4	TDN9714	1/4" CONN N MALE S FLEX PLTD
1	ST6200	ASTRO SWITCHING-ROUTING CENTER
1	CA01053AA	ADD: DUAL SITE LINK CAPABILITY
2	DSACDXMOTO004	16 PORT DS1 DIGITAL X-CONN SWITCH 1
2	T6717	KVL 3000 PLUS HARDWARE
2	X795AH	ADD: ASN MODE
2	U239AC	ADD: ASTRO 25 MODE
2	X423AE	ADD: DES/DES-XL/DES-OFB ENCRYPTION
2	C793BL	ADD: DVI-XL ENCRYPTION SOFTWARE
2	CA00182AA	ADD: AES ENCRYPTION SOFTWARE
2	CA00243AA	ADD: ADP ENCRYPTION SOFTWARE
2	C724	CABLE, KEYLOAD
2	C954	ADD: CABLE FOR SPECTRA/SPECTRO
2	C543	ADD: CABLE FOR RNC, DIU, MGEG
2	6.88E+35	KVL3000 PLUS USER GUIDE
2	HKTN4004B	VISAR / KVL CHGR KIT 110V
1	B1842BC	CENTRACOM GOLD AMBASSADOR ELECTRONI
1	K762BE	EHN: EXTENDED WARRANTY, 3 CARD CAGE
1	X758AA	ADD: SPARES, AMBASSADOR ELECTRONICS
6	K994AJ	ADD: MODULE, AMBASSADOR
1	X762AB	ADD: INTERFACE, ZONE CONTROLLER (TW
1	CA00126AA	ADD: SOFTWARE LICENSE, ASTRO 25 TRU
1	DSPREM891830	UNIVERSAL ENCLOSURE TENSR 800
2	DSPREM8901	AC POWER SUPPLY 110/220VAC
2	DSPREM880160	CPU 8 T1 E1 CROSS CONNT
1	DSPREM892060	8T1 E1 IF CARD 32K WITH MODEM
3	DSPREM801065	DUAL T1 E1 WAN CARD
1	DSPREM801460	DUAL T1E1 WAN W/ RELAYS 1:N REDUNDA
8	DSPREM81230	CSU PLUG IN MODULE
1	DSPREM822061	10 PORT RS232C SRU
1	DSPREM811960	8 PORT 4W E M TO EXT RANGE CRD
2	B1896	MGEG WITH CPU, 120 CLEAR CALL CAPAB
2	CA00169AA	ADD: ASTRO 25 IMBE CAPABILITY
2	CA00147AC	ADD: SECURE CAPABILITY & SECURE SOF
2	CA00143AC	ADD: DES-OFB ALGORITHM
2	CA00145AC	ADD: DVI-XL ALGORITHM
2	CA00182AB	ADD: AES ALGORITHM
2	CA00245AA	ADD: ADP ALGORITHM
1	L3225A	CERTIFIED KEYBOARD FOR RSD SERVERS

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1	L3226A	CERTIFIED OPTICAL WHEEL MOUSE FOR R
1	DS213BLK	21.3" MVA 4:3 LCD, BLACK, NON-TOUCH
3	DDN8325	17" LCD DRAWER W/ KEYBOARD & MOUSE,
2	DSF3X110506	PS/2 KVM 6FT ALL IN ONE CABLE SET
1	DS11487719	CPU SHELF WITH SG KEYBOARD 19 INCH
3	DS46053701	6 FT UNIVERSAL RACK BLACK 19 IN WI
3	DS46053701	6 FT UNIVERSAL RACK BLACK 19 IN WI
3	DS46053701	6 FT UNIVERSAL RACK BLACK 19 IN WI
3	DSCAB003150	43U X 600W X 800D UNIVERSAL EURORAC
18	DSOP820B	POWER DIST. UNIT SURGE PROTECT
18	DS1101378	RACK MOUNTING PLATE ADAPTER , DSOP8
3	DSMPS32T1	32 T1 PROTECTOR
5	RKN4106	CABLE- PROGRAMMING, RS232
5	RKN4105	CABLE- PROGRAMMING USB
5	RVN4186AD	CPS R12.00.00 ASTRO 25 PORT/MOBILE
5	HKN6155	PROGRAMMING/FLASH CABLE, ASTRO SPEC

Total Master Site Equipment $ 2,739,495.45

Fixed Network Equipment

Qty	Nomenclature	Description
1	CVN6143	PROGAMMING ACCESS KEY (PAK) 3.5" ME
5	DLN6455L	CONFIGURATION/SERVICE SOFTWARE 7.4
1	T7038	GCP 8000 SITE CONTROLLER
1	X153AW	ADD: RACK MOUNT HARDWARE
1	CA00303AB	ADD: QTY (1) SITE CONTROLLER
1	CA01194AA	ADD: IP BASED MULTISITE SITE CONTRO
1	T7038	GCP 8000 SITE CONTROLLER
1	X153AW	ADD: RACK MOUNT HARDWARE
1	CA00303AB	ADD: QTY (1) SITE CONTROLLER
1	CA01194AA	ADD: IP BASED MULTISITE SITE CONTRO
2	ST6000	S6000 MNR MULTI-PROTOCOL ROUTER
2	ST6010	S6000 4-PORT ULTRAWAN MODULE
1	ST6201	SRC 24 PORT T1/E1 EXPANSION
2	ST6000	S6000 MNR MULTI-PROTOCOL ROUTER
2	ST6010	S6000 4-PORT ULTRAWAN MODULE
2	ST6000	S6000 MNR MULTI-PROTOCOL ROUTER
2	ST6010	S6000 4-PORT ULTRAWAN MODULE
1	ST2500	S2500 MULTIPROTOCOL WAN ROUTER
1	ST2512	S2500 ROUTER T1/E1 DAUGHTER BOARD
1	ST2500	S2500 MULTIPROTOCOL WAN ROUTER
1	ST2512	S2500 ROUTER T1/E1 DAUGHTER BOARD
2	ST6000	S6000 MNR MULTI-PROTOCOL ROUTER
2	ST6010	S6000 4-PORT ULTRAWAN MODULE
1	ST6201	SRC 24 PORT T1/E1 EXPANSION

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1	ST2500	S2500 MULTIPROTOCOL WAN ROUTER
1	ST2512	S2500 ROUTER T1/E1 DAUGHTER BOARD
1	ST2500	S2500 MULTIPROTOCOL WAN ROUTER
1	ST2512	S2500 ROUTER T1/E1 DAUGHTER BOARD
1	ST2500	S2500 MULTIPROTOCOL WAN ROUTER
1	ST2512	S2500 ROUTER T1/E1 DAUGHTER BOARD
1	ST2500	S2500 MULTIPROTOCOL WAN ROUTER
1	ST2512	S2500 ROUTER T1/E1 DAUGHTER BOARD
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1	ST2512	S2500 ROUTER T1/E1 DAUGHTER BOARD
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1	ST2512	S2500 ROUTER T1/E1 DAUGHTER BOARD
1	ST2500	S2500 MULTIPROTOCOL WAN ROUTER
1	ST2512	S2500 ROUTER T1/E1 DAUGHTER BOARD
1	ST2500	S2500 MULTIPROTOCOL WAN ROUTER
1	ST2512	S2500 ROUTER T1/E1 DAUGHTER BOARD
1	ST2500	S2500 MULTIPROTOCOL WAN ROUTER
1	ST2512	S2500 ROUTER T1/E1 DAUGHTER BOARD
1	ST2500	S2500 MULTIPROTOCOL WAN ROUTER
1	ST2512	S2500 ROUTER T1/E1 DAUGHTER BOARD
1	ST2500	S2500 MULTIPROTOCOL WAN ROUTER
1	ST2512	S2500 ROUTER T1/E1 DAUGHTER BOARD
1	ST2500	S2500 MULTIPROTOCOL WAN ROUTER
1	ST2512	S2500 ROUTER T1/E1 DAUGHTER BOARD
1	ST2500	S2500 MULTIPROTOCOL WAN ROUTER
1	ST2512	S2500 ROUTER T1/E1 DAUGHTER BOARD
1	ST2500	S2500 MULTIPROTOCOL WAN ROUTER
1	ST2512	S2500 ROUTER T1/E1 DAUGHTER BOARD
1	ST2500	S2500 MULTIPROTOCOL WAN ROUTER
1	ST2512	S2500 ROUTER T1/E1 DAUGHTER BOARD
6	DS46053701	6 FT UNIVERSAL RACK BLACK 19 IN WI
1	DS46053701	6 FT UNIVERSAL RACK BLACK 19 IN WI
1	DS46053701	6 FT UNIVERSAL RACK BLACK 19 IN WI
1	DS46053701	6 FT UNIVERSAL RACK BLACK 19 IN WI
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1	DS46053701	6 FT UNIVERSAL RACK BLACK 19 IN WI
1	DS46053701	6 FT UNIVERSAL RACK BLACK 19 IN WI
1	T7321	GCM 8000 COMPARATOR
2	CA01183AA	ADD: GCM 8000 COMPARATOR
2	CA01185AA	ADD: IP BASED MULTISITE OPERATION
1	X153AW	ADD: RACK MOUNT HARDWARE

1	T7321	GCM 8000 COMPARATOR
2	CA01183AA	ADD: GCM 8000 COMPARATOR
2	CA01185AA	ADD: IP BASED MULTISITE OPERATION
1	X153AW	ADD: RACK MOUNT HARDWARE
1	T7321	GCM 8000 COMPARATOR
2	CA01183AA	ADD: GCM 8000 COMPARATOR
2	CA01185AA	ADD: IP BASED MULTISITE OPERATION
1	X153AW	ADD: RACK MOUNT HARDWARE
1	T7321	GCM 8000 COMPARATOR
2	CA01183AA	ADD: GCM 8000 COMPARATOR
2	CA01185AA	ADD: IP BASED MULTISITE OPERATION
1	X153AW	ADD: RACK MOUNT HARDWARE
1	T7321	GCM 8000 COMPARATOR
2	CA01183AA	ADD: GCM 8000 COMPARATOR
2	CA01185AA	ADD: IP BASED MULTISITE OPERATION
1	X153AW	ADD: RACK MOUNT HARDWARE
1	T7321	GCM 8000 COMPARATOR
2	CA01183AA	ADD: GCM 8000 COMPARATOR
2	CA01185AA	ADD: IP BASED MULTISITE OPERATION
1	X153AW	ADD: RACK MOUNT HARDWARE
1	T7321	GCM 8000 COMPARATOR
2	CA01183AA	ADD: GCM 8000 COMPARATOR
2	CA01185AA	ADD: IP BASED MULTISITE OPERATION
1	X153AW	ADD: RACK MOUNT HARDWARE
1	T7321	GCM 8000 COMPARATOR
1	CA01183AA	ADD: GCM 8000 COMPARATOR
1	CA01185AA	ADD: IP BASED MULTISITE OPERATION
1	X153AW	ADD: RACK MOUNT HARDWARE
1	T7321	GCM 8000 COMPARATOR
2	CA01183AA	ADD: GCM 8000 COMPARATOR
2	CA01185AA	ADD: IP BASED MULTISITE OPERATION
1	X153AW	ADD: RACK MOUNT HARDWARE
1	T7321	GCM 8000 COMPARATOR
2	CA01183AA	ADD: GCM 8000 COMPARATOR
2	CA01185AA	ADD: IP BASED MULTISITE OPERATION
1	X153AW	ADD: RACK MOUNT HARDWARE
1	T7321	GCM 8000 COMPARATOR
2	CA01183AA	ADD: GCM 8000 COMPARATOR
2	CA01185AA	ADD: IP BASED MULTISITE OPERATION
1	X153AW	ADD: RACK MOUNT HARDWARE
1	T7321	GCM 8000 COMPARATOR
2	CA01183AA	ADD: GCM 8000 COMPARATOR
2	CA01185AA	ADD: IP BASED MULTISITE OPERATION
1	X153AW	ADD: RACK MOUNT HARDWARE
1	T7321	GCM 8000 COMPARATOR
2	CA01183AA	ADD: GCM 8000 COMPARATOR
2	CA01185AA	ADD: IP BASED MULTISITE OPERATION

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1	X153AW	ADD: RACK MOUNT HARDWARE
1	T7321	GCM 8000 COMPARATOR
2	CA01183AA	ADD: GCM 8000 COMPARATOR
2	CA01185AA	ADD: IP BASED MULTISITE OPERATION
1	X153AW	ADD: RACK MOUNT HARDWARE
1	T7321	GCM 8000 COMPARATOR
2	CA01183AA	ADD: GCM 8000 COMPARATOR
2	CA01185AA	ADD: IP BASED MULTISITE OPERATION
1	X153AW	ADD: RACK MOUNT HARDWARE
1	T7321	GCM 8000 COMPARATOR
2	CA01183AA	ADD: GCM 8000 COMPARATOR
2	CA01185AA	ADD: IP BASED MULTISITE OPERATION
1	X153AW	ADD: RACK MOUNT HARDWARE
1	T7321	GCM 8000 COMPARATOR
2	CA01183AA	ADD: GCM 8000 COMPARATOR
2	CA01185AA	ADD: IP BASED MULTISITE OPERATION
1	X153AW	ADD: RACK MOUNT HARDWARE
1	T7321	GCM 8000 COMPARATOR
2	CA01183AA	ADD: GCM 8000 COMPARATOR
2	CA01185AA	ADD: IP BASED MULTISITE OPERATION
1	X153AW	ADD: RACK MOUNT HARDWARE
2	DSJ4900B	HP PROCURVE SWITCH 2626B
2	DSJ4900B	HP PROCURVE SWITCH 2626B
2	DSJ4900B	HP PROCURVE SWITCH 2626B
2	DSJ4900B	HP PROCURVE SWITCH 2626B
2	DSJ4900B	HP PROCURVE SWITCH 2626B
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2	DSJ4900B	HP PROCURVE SWITCH 2626B
2	DSJ4900B	HP PROCURVE SWITCH 2626B
2	DSJ4900B	HP PROCURVE SWITCH 2626B
2	DSJ4900B	HP PROCURVE SWITCH 2626B
2	DSJ4900B	HP PROCURVE SWITCH 2626B
1	T7038	GCP 8000 SITE CONTROLLER
1	X153AW	ADD: RACK MOUNT HARDWARE
1	CA00303AB	ADD: QTY (1) SITE CONTROLLER
1	CA01194AA	ADD: IP BASED MULTISITE SITE CONTRO

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   1    T7038              GCP 8000 SITE CONTROLLER
   1    X153AW             ADD:  RACK MOUNT HARDWARE
   1    CA00303AB          ADD: QTY (1) SITE CONTROLLER
   1    CA01194AA          ADD: IP BASED MULTISITE SITE CONTRO
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Total Fixed Network Equipment $ 1,121,258.75

GTR8000

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Qty   Nomenclature       Description
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  36   T7039              GTR 8000 BASE RADIO
  36   CA00855AA          ADD: 700/800 MHZ MID POWER
  36   CA01193AA          ADD: IP BASED MULTISITE BASE RADIO
  36   X153AW             ADD:  RACK MOUNT HARDWARE
  37   T7039              GTR 8000 BASE RADIO
  37   CA00855AA          ADD: 700/800 MHZ MID POWER
  37   CA01193AA          ADD: IP BASED MULTISITE BASE RADIO
  37   X153AW             ADD:  RACK MOUNT HARDWARE
  37   T7039              GTR 8000 BASE RADIO
  37   CA00855AA          ADD: 700/800 MHZ MID POWER
  37   CA01193AA          ADD: IP BASED MULTISITE BASE RADIO
  37   X153AW             ADD:  RACK MOUNT HARDWARE
  36   T7039              GTR 8000 BASE RADIO
  36   CA00855AA          ADD: 700/800 MHZ MID POWER
  36   CA01193AA          ADD: IP BASED MULTISITE BASE RADIO
  36   X153AW             ADD:  RACK MOUNT HARDWARE
  36   T7039              GTR 8000 BASE RADIO
  36   CA00855AA          ADD: 700/800 MHZ MID POWER
  36   CA01193AA          ADD: IP BASED MULTISITE BASE RADIO
  36   X153AW             ADD:  RACK MOUNT HARDWARE
  36   T7039              GTR 8000 BASE RADIO
  36   CA00855AA          ADD: 700/800 MHZ MID POWER
  36   CA01193AA          ADD: IP BASED MULTISITE BASE RADIO
  36   X153AW             ADD:  RACK MOUNT HARDWARE
  36   T7039              GTR 8000 BASE RADIO
  36   CA00855AA          ADD: 700/800 MHZ MID POWER
  36   CA01193AA          ADD: IP BASED MULTISITE BASE RADIO
  36   X153AW             ADD:  RACK MOUNT HARDWARE
  36   T7039              GTR 8000 BASE RADIO
  36   CA00855AA          ADD: 700/800 MHZ MID POWER
  36   CA01193AA          ADD: IP BASED MULTISITE BASE RADIO
  36   X153AW             ADD:  RACK MOUNT HARDWARE
  36   T7039              GTR 8000 BASE RADIO
  36   CA00855AA          ADD: 700/800 MHZ MID POWER
  36   CA01193AA          ADD: IP BASED MULTISITE BASE RADIO
  36   X153AW             ADD:  RACK MOUNT HARDWARE
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36	T7039	GTR 8000 BASE RADIO
36	CA00855AA	ADD: 700/800 MHZ MID POWER
36	CA01193AA	ADD: IP BASED MULTISITE BASE RADIO
36	X153AW	ADD: RACK MOUNT HARDWARE

Total GTR8000 $ 8,923,300.00

MOSCAD

Qty	Nomenclature	Description
1	DDN9172	HP MOSCAD SERVER WITH WINDOWS 2003
1	TT1959	INTOUCH DEVELOPMENT 60K TAG V9.5 S
1	DDN9047	HYPERACCESS FOR WINDOWS 95/98/2000/
1	DDN9048	SERIAL/ IP 1 PORT SEAT LICENSE
1	TT1964	SCADALARM PAGING WITH MODEM V6.0
1	DDN9172	HP MOSCAD SERVER WITH WINDOWS 2003
1	TT1959	INTOUCH DEVELOPMENT 60K TAG V9.5 S
1	DDN9047	HYPERACCESS FOR WINDOWS 95/98/2000/
1	DDN9048	SERIAL/ IP 1 PORT SEAT LICENSE
2	TT1964	SCADALARM PAGING WITH MODEM V6.0
1	DDN9158	CERTIFIED MOSCAD WORKSTATION WITH X
1	TT2033	INTOUCH RUNTIME W/O I/O V10.0 SW
1	DDN9047	HYPERACCESS FOR WINDOWS 95/98/2000/
1	DDN9048	SERIAL/ IP 1 PORT SEAT LICENSE
13	DSJNSB59619B	19 SHELF. B-LINE SAME AS 40622 NEW
1	F4300	IP GATEWAY LESS RADIO
1	V345	ADD: ASYNC RS232 VIA PORT 3
1	V051	ALT: IP GATEWAY RACKMOUNT
2	F4300	IP GATEWAY LESS RADIO
2	V345	ADD: ASYNC RS232 VIA PORT 3
2	V051	ALT: IP GATEWAY RACKMOUNT
13	FLN6458	CABLE, MODEM 3M W/ADAPTER
1	F4537	SDM3000 BUILDER V1.30.31 FOR A6.9/7
1	F4538	MOSCAD GMC/GWS, SERVICE PACK 1
1	F4537	SDM3000 BUILDER V1.30.31 FOR A6.9/7
1	F4538	MOSCAD GMC/GWS, SERVICE PACK 1
17	V809	SW,S/W LIC. FOR MOSCAD I/O
1	F2463	REMOTE TERMINAL UNIT DEVICE INTERFA
3	V833	ADD:RTU SFWR LICENSE FOR PREMISYS A
3	V834	ADD:RTU SFWR LICENSE FOR PREMISYS C
2	V837	ADD:RTU SFWR LICENSE FOR DIU ALARMS
1	V838	ADD:RTU SFWR LICENSE FOR EFRATOM GP
2	V839	ADD:RTU SFWR LICENSE FOR MOSCAD I/O
1	F2463	REMOTE TERMINAL UNIT DEVICE INTERFA
45	V844	ADD:RTU SFWR LICENSE FOR ASTRO 25 8
45	V845	ADD: RTU SOFTWARE LICENSE FOR INTEL

1	V833	ADD:RTU SFWR LICENSE FOR PREMISYS A
1	V834	ADD:RTU SFWR LICENSE FOR PREMISYS C
1	V838	ADD:RTU SFWR LICENSE FOR EFRATOM GP
1	V839	ADD:RTU SFWR LICENSE FOR MOSCAD I/O
1	F2463	REMOTE TERMINAL UNIT DEVICE INTERFA
45	V844	ADD:RTU SFWR LICENSE FOR ASTRO 25 8
45	V845	ADD: RTU SOFTWARE LICENSE FOR INTEL
1	V833	ADD:RTU SFWR LICENSE FOR PREMISYS A
1	V834	ADD:RTU SFWR LICENSE FOR PREMISYS C
1	V838	ADD:RTU SFWR LICENSE FOR EFRATOM GP
1	V839	ADD:RTU SFWR LICENSE FOR MOSCAD I/O
1	F2463	REMOTE TERMINAL UNIT DEVICE INTERFA
45	V844	ADD:RTU SFWR LICENSE FOR ASTRO 25 8
45	V845	ADD: RTU SOFTWARE LICENSE FOR INTEL
1	V833	ADD:RTU SFWR LICENSE FOR PREMISYS A
1	V834	ADD:RTU SFWR LICENSE FOR PREMISYS C
1	V838	ADD:RTU SFWR LICENSE FOR EFRATOM GP
1	V839	ADD:RTU SFWR LICENSE FOR MOSCAD I/O
1	F2463	REMOTE TERMINAL UNIT DEVICE INTERFA
45	V844	ADD:RTU SFWR LICENSE FOR ASTRO 25 8
45	V845	ADD: RTU SOFTWARE LICENSE FOR INTEL
1	V833	ADD:RTU SFWR LICENSE FOR PREMISYS A
1	V834	ADD:RTU SFWR LICENSE FOR PREMISYS C
1	V838	ADD:RTU SFWR LICENSE FOR EFRATOM GP
1	V839	ADD:RTU SFWR LICENSE FOR MOSCAD I/O
1	F2463	REMOTE TERMINAL UNIT DEVICE INTERFA
45	V844	ADD:RTU SFWR LICENSE FOR ASTRO 25 8
45	V845	ADD: RTU SOFTWARE LICENSE FOR INTEL
1	V833	ADD:RTU SFWR LICENSE FOR PREMISYS A
1	V834	ADD:RTU SFWR LICENSE FOR PREMISYS C
1	V838	ADD:RTU SFWR LICENSE FOR EFRATOM GP
1	V839	ADD:RTU SFWR LICENSE FOR MOSCAD I/O
1	F2463	REMOTE TERMINAL UNIT DEVICE INTERFA
45	V844	ADD:RTU SFWR LICENSE FOR ASTRO 25 8
45	V845	ADD: RTU SOFTWARE LICENSE FOR INTEL
1	V833	ADD:RTU SFWR LICENSE FOR PREMISYS A
1	V834	ADD:RTU SFWR LICENSE FOR PREMISYS C
1	V838	ADD:RTU SFWR LICENSE FOR EFRATOM GP
1	V839	ADD:RTU SFWR LICENSE FOR MOSCAD I/O
1	F2463	REMOTE TERMINAL UNIT DEVICE INTERFA

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45	V844	ADD:RTU SFWR LICENSE FOR ASTRO 25 8
45	V845	ADD: RTU SOFTWARE LICENSE FOR INTEL
1	V833	ADD:RTU SFWR LICENSE FOR PREMISYS A
1	V834	ADD:RTU SFWR LICENSE FOR PREMISYS C
1	V838	ADD:RTU SFWR LICENSE FOR EFRATOM GP
1	V839	ADD:RTU SFWR LICENSE FOR MOSCAD I/O
1	F2463	REMOTE TERMINAL UNIT DEVICE INTERFA
5	V832	ADD:RTU SFWR LICENSE FOR QUANTAR AL
5	V831	ADD: RTU SOFTWARE LICENSE FOR QUANT
45	V844	ADD:RTU SFWR LICENSE FOR ASTRO 25 8
45	V845	ADD: RTU SOFTWARE LICENSE FOR INTEL
7	V833	ADD:RTU SFWR LICENSE FOR PREMISYS A
7	V834	ADD:RTU SFWR LICENSE FOR PREMISYS C
27	V846	ADD:RTU SFWR LICENSE FOR ASTROTAC 9
1	V838	ADD:RTU SFWR LICENSE FOR EFRATOM GP
1	V839	ADD:RTU SFWR LICENSE FOR MOSCAD I/O
1	F2463	REMOTE TERMINAL UNIT DEVICE INTERFA
45	V844	ADD:RTU SFWR LICENSE FOR ASTRO 25 8
45	V845	ADD: RTU SOFTWARE LICENSE FOR INTEL
6	V833	ADD:RTU SFWR LICENSE FOR PREMISYS A
6	V834	ADD:RTU SFWR LICENSE FOR PREMISYS C
22	V846	ADD:RTU SFWR LICENSE FOR ASTROTAC 9
1	V838	ADD:RTU SFWR LICENSE FOR EFRATOM GP
1	V839	ADD:RTU SFWR LICENSE FOR MOSCAD I/O
1	F2463	REMOTE TERMINAL UNIT DEVICE INTERFA
11	V837	ADD:RTU SFWR LICENSE FOR DIU ALARMS
1	V839	ADD:RTU SFWR LICENSE FOR MOSCAD I/O
1	F2463	REMOTE TERMINAL UNIT DEVICE INTERFA
3	V837	ADD:RTU SFWR LICENSE FOR DIU ALARMS
1	V839	ADD:RTU SFWR LICENSE FOR MOSCAD I/O
1	F2463	REMOTE TERMINAL UNIT DEVICE INTERFA
2	V837	ADD:RTU SFWR LICENSE FOR DIU ALARMS
1	V839	ADD:RTU SFWR LICENSE FOR MOSCAD I/O
2	F4544	SITE MANAGER ADVANCED
2	V266	ADD: 90VAC TO 260VAC PS TO SM
2	V803	ADD: SDM3000 ASTRO F/W FOR A6.7/7.0
6	V592	AAD TERM BLCK & CONN WI
1	F4568	R-MUX 1004
8	F4543	SITE MANAGER BASIC
8	V266	ADD: 90VAC TO 260VAC PS TO SM
8	V803	ADD: SDM3000 ASTRO F/W FOR A6.7/7.0
1	F4544	SITE MANAGER ADVANCED
1	V260	ADD: 48 VDC PS TO SM
1	V803	ADD: SDM3000 ASTRO F/W FOR A6.7/7.0
3	V592	AAD TERM BLCK & CONN WI
1	F4547	SM IO EXPANSION BASIC
1	V260	ADD: 48 VDC PS TO SM

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3	V592	AAD TERM BLCK & CONN WI
1	F4548	SM IO EXPANSION ADVANCED
1	V260	ADD: 48 VDC PS TO SM
1	F4568	R-MUX 1004
1	F4544	SITE MANAGER ADVANCED
1	V260	ADD: 48 VDC PS TO SM
1	V803	ADD: SDM3000 ASTRO F/W FOR A6.7/7.0
3	V592	AAD TERM BLCK & CONN WI
1	F4548	SM IO EXPANSION ADVANCED
1	V260	ADD: 48 VDC PS TO SM
1	F4547	SM IO EXPANSION BASIC
1	V260	ADD: 48 VDC PS TO SM
3	V592	AAD TERM BLCK & CONN WI
1	F4568	R-MUX 1004
1	F4544	SITE MANAGER ADVANCED
1	V260	ADD: 48 VDC PS TO SM
1	V803	ADD: SDM3000 ASTRO F/W FOR A6.7/7.0
3	V592	AAD TERM BLCK & CONN WI
1	F4547	SM IO EXPANSION BASIC
1	V260	ADD: 48 VDC PS TO SM
3	V592	AAD TERM BLCK & CONN WI
1	F4568	R-MUX 1004
1	F4548	SM IO EXPANSION ADVANCED
1	V260	ADD: 48 VDC PS TO SM
1	F4544	SITE MANAGER ADVANCED
1	V260	ADD: 48 VDC PS TO SM
1	V803	ADD: SDM3000 ASTRO F/W FOR A6.7/7.0
3	V592	AAD TERM BLCK & CONN WI
1	F4547	SM IO EXPANSION BASIC
1	V260	ADD: 48 VDC PS TO SM
3	V592	AAD TERM BLCK & CONN WI
1	F4548	SM IO EXPANSION ADVANCED
1	V260	ADD: 48 VDC PS TO SM
1	F4568	R-MUX 1004
1	F4544	SITE MANAGER ADVANCED
1	V260	ADD: 48 VDC PS TO SM
1	V803	ADD: SDM3000 ASTRO F/W FOR A6.7/7.0
3	V592	AAD TERM BLCK & CONN WI
1	F4548	SM IO EXPANSION ADVANCED
1	V260	ADD: 48 VDC PS TO SM
1	F4547	SM IO EXPANSION BASIC
1	V260	ADD: 48 VDC PS TO SM
3	V592	AAD TERM BLCK & CONN WI
1	F4568	R-MUX 1004
1	F4548	SM IO EXPANSION ADVANCED
1	V260	ADD: 48 VDC PS TO SM
1	F4544	SITE MANAGER ADVANCED

1	V260	ADD: 48 VDC PS TO SM
1	V803	ADD: SDM3000 ASTRO F/W FOR A6.7/7.0
3	V592	AAD TERM BLCK & CONN WI
1	F4547	SM IO EXPANSION BASIC
1	V260	ADD: 48 VDC PS TO SM
3	V592	AAD TERM BLCK & CONN WI
1	F4568	R-MUX 1004
1	F4544	SITE MANAGER ADVANCED
1	V260	ADD: 48 VDC PS TO SM
1	V803	ADD: SDM3000 ASTRO F/W FOR A6.7/7.0
3	V592	AAD TERM BLCK & CONN WI
1	F4547	SM IO EXPANSION BASIC
1	V260	ADD: 48 VDC PS TO SM
3	V592	AAD TERM BLCK & CONN WI
1	F4568	R-MUX 1004
1	F4548	SM IO EXPANSION ADVANCED
1	V260	ADD: 48 VDC PS TO SM
1	F4544	SITE MANAGER ADVANCED
1	V260	ADD: 48 VDC PS TO SM
1	V803	ADD: SDM3000 ASTRO F/W FOR A6.7/7.0
3	V592	AAD TERM BLCK & CONN WI
1	F4547	SM IO EXPANSION BASIC
1	V260	ADD: 48 VDC PS TO SM
3	V592	AAD TERM BLCK & CONN WI
1	F4568	R-MUX 1004
1	F4548	SM IO EXPANSION ADVANCED
1	V260	ADD: 48 VDC PS TO SM
1	F4544	SITE MANAGER ADVANCED
1	V260	ADD: 48 VDC PS TO SM
1	V803	ADD: SDM3000 ASTRO F/W FOR A6.7/7.0
3	V592	AAD TERM BLCK & CONN WI
1	F4547	SM IO EXPANSION BASIC
1	V260	ADD: 48 VDC PS TO SM
3	V592	AAD TERM BLCK & CONN WI
1	F4568	R-MUX 1004
2	V582	ADD : 4OUT TO R-MUX
1	V527	ADD : IP INTERFACE TO R-MUX
1	F4544	SITE MANAGER ADVANCED
1	V260	ADD: 48 VDC PS TO SM
1	V803	ADD: SDM3000 ASTRO F/W FOR A6.7/7.0
3	V592	AAD TERM BLCK & CONN WI
1	F4547	SM IO EXPANSION BASIC
1	V260	ADD: 48 VDC PS TO SM
3	V592	AAD TERM BLCK & CONN WI
1	F4568	R-MUX 1004
1	F4544	SITE MANAGER ADVANCED
1	V266	ADD: 90VAC TO 260VAC PS TO SM

1	V803	ADD: SDM3000 ASTRO F/W FOR A6.7/7.0
3	V592	AAD TERM BLCK & CONN WI
3	F4543	SITE MANAGER BASIC
3	V266	ADD: 90VAC TO 260VAC PS TO SM
3	V803	ADD: SDM3000 ASTRO F/W FOR A6.7/7.0
9	V592	AAD TERM BLCK & CONN WI
1	F4544	SITE MANAGER ADVANCED
1	V266	ADD: 90VAC TO 260VAC PS TO SM
1	V803	ADD: SDM3000 ASTRO F/W FOR A6.7/7.0
3	V592	AAD TERM BLCK & CONN WI
1	F4544	SITE MANAGER ADVANCED
1	V266	ADD: 90VAC TO 260VAC PS TO SM
1	V803	ADD: SDM3000 ASTRO F/W FOR A6.7/7.0
3	V592	AAD TERM BLCK & CONN WI
1	F4548	SM IO EXPANSION ADVANCED
1	V260	ADD: 48 VDC PS TO SM
1	DS019BLK	19" LCD, BLACK, NON-TOUCH
1	DS22804023	SQL SVR STANDARD EDTN 2005 X64 32 B
1	DS019BLK	19" LCD, BLACK, NON-TOUCH
1	DS22804023	SQL SVR STANDARD EDTN 2005 X64 32 B
1	DS019BLK	19" LCD, BLACK, NON-TOUCH
13	CDN1542	US ROBOTICS 56K V.90 EXT 14K FAX

Total MOSCAD $ 354,249.55

Elite Upgrade

Qty	Nomenclature	Description
1	ST2500	S2500 MULTIPROTOCOL WAN ROUTER
1	ST2512	S2500 ROUTER T1/E1 DAUGHTER BOARD
1	ST2500	S2500 MULTIPROTOCOL WAN ROUTER
1	ST2512	S2500 ROUTER T1/E1 DAUGHTER BOARD
1	ST2500	S2500 MULTIPROTOCOL WAN ROUTER
1	ST2512	S2500 ROUTER T1/E1 DAUGHTER BOARD
1	ST2500	S2500 MULTIPROTOCOL WAN ROUTER
1	ST2512	S2500 ROUTER T1/E1 DAUGHTER BOARD
2	DSJ4900B	HP PROCURVE SWITCH 2626B
4	DSJ4900B	HP PROCURVE SWITCH 2626B
2	DSJ4900B	HP PROCURVE SWITCH 2626B
2	DSJ4900B	HP PROCURVE SWITCH 2626B
1	B1879	CENTRACOM GOLD SOFTWARE REFRESH PAC
73	X69	ADD: SOFTWARE REFRESH, COIM OR LOMI
53	X03	ADD: SOFTWARE REFRESH, ELITE/ADMI0D
65	X49	ADD: SOFTWARE REFRESH, BIM
42	X80	ADD: SOFTWARE REFRESH, AMBASSADOR
87	X60	ADD: SOFTWARE REFRESH, SPI

3	X77	ADD: SOFTWARE REFRESH, 16 I/O OR CO
34	X79	ADD: SOFTWARE REFRESH, AIMI
1	DS40108719	DOUBLE SIDED 19 INCH RACK
1	DS12193101	KEYBOARD
1	DSJNSB59619B	19 SHELF. B-LINE SAME AS 40622 NEW
1	B1822B	CENTRACOM GOLD ELITE INTERFACE ELEC
1	K572AF	ADD: FOOTSWITCH
1	K704AA	ADD: HEADSET JACK, #2 W/6 FOOT CABL
1	K570	ADD: HEADSET JACK, W/5 FOOT CABLE (
1	K703	ADD: MICROPHONE, GOOSENECK, 9 INCH
1	TT2066	CERTIFIED GOLD ELITE WORKSTATION XP
1	ZA00268AA	ADD: DUAL IRR CARD & PC SPKER
1	TT04038AA	ADD: TWO SOUND CARDS FOR DUAL IRR C
1	DS213BLK	21.3" MVA 4:3 LCD, BLACK, NON-TOUCH
1	DSJ4900B	HP PROCURVE SWITCH 2626B
1	B1905	MCC 7500 ASTRO 25 SOFTWARE
1	B1908	MCC7500 ASTRO25 SECURE DISPATCH CON
1	CA00287AA	ADD: MCC 7500 DISPATCH CONSOLE SOFT
1	CA00897AA	ADD: MCC 7500 ASTRO 25 OPERATION
1	CA00182AB	ADD: AES ALGORITHM
1	CA00140AA	ADD: AC LINE CORD, NORTH AMERICAN
1	DS213BLK	21.3" MVA 4:3 LCD, BLACK, NON-TOUCH
1	L3225A	CERTIFIED KEYBOARD FOR RSD SERVERS
1	L3226A	CERTIFIED OPTICAL WHEEL MOUSE FOR R
1	B1911	MCC 7500 GENERAL PURPOSE I/O MODULE
1	CA00140AA	ADD: AC LINE CORD, NORTH AMERICAN
2	B1912	MCC SERIES DESKTOP SPEAKER
1	B1914	MCC SERIES DESKTOP GOOSENECK MICROP
2	B1913	MCC SERIES HEADSET JACK
1	RLN6098	HDST MODULE BASE W/PTT, 15' CBL
1	RMN5077A	SUPRAPLUS SINGLE MUFF HEADSET
2	DSVPR3MCC	PROTECTION MODULE FOR MCC 5500/5700
1	DSTWIN6328A	PROVIDES ONE DUAL PEDAL FOOTSWITCH
1	DDN9454	SYMANTEC ANTI VIRUS 10.1.5 CORP ED
1	DDN9332	SOFTWARE BASED DUAL IRR USB HASP WI
1	DDN6493	SOUND CARD AUDIGY SE
1	CDN6673	SET OF LABTEC SPIN 95
1	B1811BB	CENTRACOM GOLD CENTRAL ELECTRONICS
1	K995BC	ALT: MODULES, AMBASSADOR INTERFACE
1	X643AA	ENH: AEB-CEB LINK TYPE, CO-LOCATED
6	DDN9331	SOFTWARE IRR SOUND CARD & PC SPEAKERS USB HASP

Total Elite Upgrade $ 511,177.25

Spares

Qty	Nomenclature	Description
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1	DLN1333	HARD DISK 146GB
1	DLN1334	DVD-RW DRIVE
1	DLN1335	POWER SUPPLY
1	DLN1336	SUN NETRA 240
1	DLN1337	EXTERNAL TAPE DRIVE (NM ONLY)
1	DLN1338A	FAN MODULE
2	ST2500	S2500 MULTIPROTOCOL WAN ROUTER
2	ST2512	S2500 ROUTER T1/E1 DAUGHTER BOARD
2	ST2516	S2500 ENCRYPTION MODULE
1	TT2021	LX4000T 48 PORT TERM SVR W/ MODEM
4	DSJ4900B	HP PROCURVE SWITCH 2626B
1	CLN8356	SRC SPARE KIT
1	DDN9175	EIDE DVD-ROM DRIVE W/SCSI ADAPTER
1	DDN9176	EIDE TO SCSI ADAPTER
1	DDN9344	FRU AC POWER SUPPLY SLED WITH FAN
1	DDN9345	FRU FAN SLED WITHOUT POWER SUPPLY
1	DDN9346	FRU DUAL IDE CABLE R/W
1	DDN9348	FRU EIDE DEVICE REMOVABLE CARRIER
1	DDN9349	FRU AC DISTRIBUTION PANEL
1	DDN9350	FRU ALARM PANEL
1	DDN9351	FRU UNIVERSAL BRIDGE BOARD
1	DDN9352	FRU 80GB 3.5IN EIDE DRIVE
1	DDN9353	FRU: 6020 DVD CD-ROM KIT
1	DDN9357	FRU - 6020 BLANK PANEL (FOR OPEN CH
1	T6698	MZC 3000 FRU'S, DELUXE ASTRO25
1	TT2022	LX4000T 8 PORT TERMINAL SERVER
1	L3174	3810 PLUS MODEM S/A V.34 PROTOCOL
1	ST6000	S6000 MNR MULTI-PROTOCOL ROUTER
1	ST6010	S6000 4-PORT ULTRAWAN MODULE
1	ST6016	S6000 ENCRYPTION MODULE
1	DLN6569	FRU: GCP 8000/GCM 8000
1	DLN6568	FRU: GTR 8000/GCP 8000 POWER SUPPLY
1	DLN6566	FRU: GTR 8000 TRANSCEIVER 700/800 M
1	DLN6567	FRU: GTR 8000 PA 700/800 MHZ
1	DSOP820B	POWER DIST. UNIT SURGE PROTECT
1	DSISDC50LNZ30M/	DC INJECTOR 30V M CONN ANTENNA POR
2	F4544	SITE MANAGER ADVANCED
2	V260	ADD: 48 VDC PS TO SM
2	V803	ADD: SDM3000 ASTRO F/W FOR A6.7/7.0
1	V260	ADD: 48 VDC PS TO SM
1	V803	ADD: SDM3000 ASTRO F/W FOR A6.7/7.0
1	F4568	R-MUX 1004
1	CDN1542	US ROBOTICS 56K V.90 EXT 14K FAX
1	DDN8493	CERTIFIED MCC7500 FRU XP
1	BLN1263	FRU VOICE CARD
1	B1924	PCI SECURE CARD FRU, MCC7500 CONSOL
1	CA00182AB	ADD: AES ALGORITHM

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1	CA00182AB	ADD: AES ALGORITHM
1	B1911	MCC 7500 GENERAL PURPOSE I/O MODULE
1	CA00140AA	ADD: AC LINE CORD, NORTH AMERICAN
1	B1912	MCC SERIES DESKTOP SPEAKER
1	B1914	MCC SERIES DESKTOP GOOSENECK MICROP
1	B1913	MCC SERIES HEADSET JACK
1	DSTWIN6328A	PROVIDES ONE DUAL PEDAL FOOTSWITCH
1	CDN6281AR	HDST MODULE BASE W/PTT SWITCH
1	CDN6293	ENCORE MONAURAL NOISE CANCELLING
1	DS213BLK	21.3" MVA 4:3 LCD, BLACK, NON-TOUCH
1	L3225A	CERTIFIED KEYBOARD FOR RSD SERVERS
1	L3226A	CERTIFIED OPTICAL WHEEL MOUSE FOR R
1	ST2513	S2500 ANALOG CONV TO IP IF KIT
1	T7321	GCM 8000 COMPARATOR
2	CA01183AA	ADD: GCM 8000 COMPARATOR
2	CA01185AA	ADD: IP BASED MULTISITE OPERATION
1	X153AW	ADD: RACK MOUNT HARDWARE
2	DSTRAK91211	DC INPUT POWER SUPPLY MODULE
1	DSTRAK91049	FAULT SENSE UNIT WITH NTS/NTP
1	DSTRAK91013	GPS REF WITH RUB OSC
1	DSTRAK91061	FOUR PORT DDM
1	DSTRAK91111	FOUR PORT T1 FRAMED AND CLOCK TELEC
1	DSTRAK91008	PRIME/MASTER SITE CONFIG AC POWER

Total Spares $ 244,871.80

Test Equipment

Qty	Nomenclature	Description
1	R1770	ATS2 AUDIO TEST SET
1	R1542	EARTH GROUND RESISTANCE TESTER
1	R1415	PC CABLE AND WIRING TESTER
1	R1414	PHONE LINE CONTINUITY TESTER
1	8183069X01	TESTER TELCO CABLE 8 POS
1	REX4430	PC ETHERNET SERVICE KIT
1	RRDN6671A	BIRD AT-500 ANTENNA TESTER 2-520MHZ
1	T1013A	RF LOAD RES
1	R1612B	DSO6014A 100MHZ - 4 CH OSCOPE
1	R1718	N2610A-903 HANDHELD NETWORK ANALYZE
1	0180305F50	400-1000MHZ, 100W ELEMENT
1	0180305F49	400-1000MHZ, 50W ELEMENT
1	0180305F47	400-1000MHZ, 10W ELEMENT
1	0180305F46	400-1000MHZ, 5W ELEMENT
1	R1441	DIGITAL/ANALOG WATTMETER/N(F)
1	R1510	SINGLE CHANNEL POWER METER
1	R1732	E4407B 9KHZ-26.5 GHZ SPECTRUM ANALY

1	R1775	2975 P25 RADIO TEST SET
1	R1776	AEROFLEX OPT#3 FOR 2975
1	R1777	P25 TRUNKING 800MHZ OPT#4 2975
1	R1778	CC LOGGER-OPT#6 2975
1	R1780	AUTOTEST 1-OPT#9 -2975
1	R1781	AES-OPT#10-2975
1	R2117A	2975-OPT29 CQPSK GEN/REC ANALYSIS
1	R1783	KVL KEYLOAD OPT#12-2975
1	R1785	P25 TRUNKING VHF/UHF/700MHZ
1	R1786	AUDIO ANALYZER OPT#15 2975
1	R1788	RX BER OPT#17-2975
1	R2032	2975OPT20-KVL ASN MODE
1	RLN4604B	FLUKE ES-LAN ETHERSCOPE LAN ANALYZE
1	R1787	ANLOG SIMULCAST ALIGN OPT#16-2975
1	R1792	2975 OPERATION MANUAL - CD -ROM
1	R1793	MICROPHONE/AUDIO ADAPTER
1	R1795	CASE, SOFT PADDED CARRYING
1	R1796	KIT, 10/20 DB PADS, TNC
1	R1797	SCOPE PROBE KIT
1	R1798	UHF ANTENNA (STANDARD)
1	R1799	FRONT/REAR COVER
1	R1801	RF CABLE
1	R1802	TNC TO BNC ADAPTER
1	R1803	ACCESSORY POUCH
1	R1804	DC TO AC CONVERTOR
1	R1808	CALIBRATION CERTIFICATE

Total Test Equipment $ 130,716.26

KMF Equipment

Qty	Nomenclature	Description
1	T5935C	KMF EXTENSIONS (INTEGRATED)
1	Z376AF	ADD: KMF SERVER SOFTWARE
1	Z187AD	ADD: KMF CLIENT SOFTWARE
1	CA00930AA	ENH: KMF SERVER TRUNKED AND CONVENT
1	SQM01SUM0134	KEY MANAGEMENT FACILITY ENCRYPTION
1	CA00143AA	ADD: DES OFB ENCRYPTION KIT
1	CA00147AB	ADD: BASIC SOFTWARE OPTION
1	DDN9556	CERTIFIED KMF WORKSTATION
1	DDN9177	CERTIFIED KMF 6.9/7.2 SERVER
2	DDN9454	SYMANTEC ANTI VIRUS 10.1.5 CORP ED
2	L3479	SYMANTEC PC ANYWHERE 11.5.1 (LICENS
2	DS213BLK	21.3" MVA 4:3 LCD, BLACK, NON-TOUCH

Total KMF Equipment $ 214,734.30

Appendix B

POP25

Qty	Nomenclature	Description
1	T7290	ASTRO PRESENCE NOTIFIER APPLICATION
1	DDN9336	PRESENCE NOTIFER APPLICATION SERVER
2	DDN9454	SYMANTEC ANTI VIRUS 10.1.5 CORP ED
2	L3479	SYMANTEC PC ANYWHERE 11.5.1 (LICENS
1	DS213BLK	21.3" MVA 4:3 LCD, BLACK, NON-TOUCH
1	TT2066	CERTIFIED GOLD ELITE WORKSTATION XP
1	DVN4046	MASTER SYSTEM KEY PACKAGE FOR THE A
5	DVN4181	USB ADAPTER FOR ADVANCE SYSTEM KEY
1	RVN4186AC	CPS R11.00.00 ASTRO 25 PORT/MOBILE

Total POP25   **$ 17,875.25**

Spectra Upgrades

Qty	Nomenclature	Description
854	M20XXSP001	Mobile Upgrade Kit

Total Spectra Upgrades   **$ 2,230,648.00**

XTS3000 Upgrades

Qty	Nomenclature	Description
1	T5781	DIGITAL SMARTZONE XTS3000 UPGRADE
100	Q173AH	ADD: ENHANCED SMARTZONE OMNILINK OP
100	Q361AE	ENH: ASTRO PROJ 25 TRK XTS3000
1	T5781	DIGITAL SMARTZONE XTS3000 UPGRADE
100	Q173AH	ADD: ENHANCED SMARTZONE OMNILINK OP
100	Q361AE	ENH: ASTRO PROJ 25 TRK XTS3000
1	T5781	DIGITAL SMARTZONE XTS3000 UPGRADE
100	Q173AH	ADD: ENHANCED SMARTZONE OMNILINK OP
100	Q361AE	ENH: ASTRO PROJ 25 TRK XTS3000
1	T5781	DIGITAL SMARTZONE XTS3000 UPGRADE
100	Q173AH	ADD: ENHANCED SMARTZONE OMNILINK OP
100	Q361AE	ENH: ASTRO PROJ 25 TRK XTS3000
1	T5781	DIGITAL SMARTZONE XTS3000 UPGRADE
100	Q173AH	ADD: ENHANCED SMARTZONE OMNILINK OP
100	Q361AE	ENH: ASTRO PROJ 25 TRK XTS3000
1	T5781	DIGITAL SMARTZONE XTS3000 UPGRADE
100	Q173AH	ADD: ENHANCED SMARTZONE OMNILINK OP

100	Q361AE	ENH: ASTRO PROJ 25 TRK XTS3000
1	T5781	DIGITAL SMARTZONE XTS3000 UPGRADE
100	Q173AH	ADD: ENHANCED SMARTZONE OMNILINK OP
100	Q361AE	ENH: ASTRO PROJ 25 TRK XTS3000
1	T5781	DIGITAL SMARTZONE XTS3000 UPGRADE
100	Q173AH	ADD: ENHANCED SMARTZONE OMNILINK OP
100	Q361AE	ENH: ASTRO PROJ 25 TRK XTS3000
1	T5781	DIGITAL SMARTZONE XTS3000 UPGRADE
100	Q173AH	ADD: ENHANCED SMARTZONE OMNILINK OP
100	Q361AE	ENH: ASTRO PROJ 25 TRK XTS3000
1	T5781	DIGITAL SMARTZONE XTS3000 UPGRADE
100	Q173AH	ADD: ENHANCED SMARTZONE OMNILINK OP
100	Q361AE	ENH: ASTRO PROJ 25 TRK XTS3000
1	T5781	DIGITAL SMARTZONE XTS3000 UPGRADE
100	Q173AH	ADD: ENHANCED SMARTZONE OMNILINK OP
100	Q361AE	ENH: ASTRO PROJ 25 TRK XTS3000
1	T5781	DIGITAL SMARTZONE XTS3000 UPGRADE
100	Q173AH	ADD: ENHANCED SMARTZONE OMNILINK OP
100	Q361AE	ENH: ASTRO PROJ 25 TRK XTS3000
1	T5781	DIGITAL SMARTZONE XTS3000 UPGRADE
100	Q173AH	ADD: ENHANCED SMARTZONE OMNILINK OP
100	Q361AE	ENH: ASTRO PROJ 25 TRK XTS3000
1	T5781	DIGITAL SMARTZONE XTS3000 UPGRADE
100	Q173AH	ADD: ENHANCED SMARTZONE OMNILINK OP
100	Q361AE	ENH: ASTRO PROJ 25 TRK XTS3000
1	T5781	DIGITAL SMARTZONE XTS3000 UPGRADE
100	Q173AH	ADD: ENHANCED SMARTZONE OMNILINK OP
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Appendix B

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Appendix B

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1	T5781	DIGITAL SMARTZONE XTS3000 UPGRADE
100	Q173AH	ADD: ENHANCED SMARTZONE OMNILINK OP
100	Q361AE	ENH: ASTRO PROJ 25 TRK XTS3000

Total XTS3000 Upgrades $ 2,600,000.00

XTL5000 Upgrades

Qty	Nomenclature	Description		
1	T7000	DIGITAL SMARTZONE		
10	G361	ENH: ASTRO PROJECT 25 TRUNKING SOFT		

Total XTL5000 Upgrades $ **3,000.00**

XTS2500 Upgrades

Qty	Nomenclature	Description		
1	T6811	DIGITAL AND ANALOG LIMITED 3600 BAU		
100	Q574AC	ENH: TRUNKING 9600 BAUD FLASHPORT		
100	Q883AC	ENH: 3600/9600 INTEROPERITABILITY F		

Total XTS2500 Upgrades $ **80,000.00**

XTS5000 Upgrades

Qty	Nomenclature	Description		
1	T6751	DIGITAL SMARTZONE		
555	Q361AM	ENH: PROJECT 25 9600 BAUD TRUNKING		

Total XTS5000 Upgrades $ **141,525.00**

XTS5000

Qty	Nomenclature	Description
615	H18UCF9PW6 N	PORTABLE XTS5000 MODEL II 3X2 KEYPA
615	Q806	ADD: SOFTWARE ASTRO DIGITAL CAI OPE
615	H38	ADD: SMARTZONE SYSTEM SOFTWARE
615	Q361	ENH: PROJECT 25 9600 BAUD TRUNKING
615	G996	ENH: OVER THE AIR PROVISIONING
615	H14	ENH: ENHANCED PTT ID DISPLAY
615	Q947	ENH: RS232, IV&D PACKET INTERFACE
615	Q159	ADD: XTS5000 UCM HARDWARE ENCRYPTIO
615	Q498	ENH: MDC & ASTRO P25 OTAR W/ MULTIK
615	Q625	ADD: DES, DES-XL, DES-OFB ENCRYPTIO
615	Q696	ALT: ANTENNA 1/2 WAVE 7" WHIP 700/8
615	H499	ALT: SUBMERSIBLE - 6 FT. 2 HOURS (R
615	Q393RUGD	ALT: BATTERY IMPRES NIMH FM RUGGED
615	H64	ALT: HOUSING YELLOW
615	Q58AK	3 YR ENCRYPTED REPAIR SERVICE ADVAN
615	H88	ADD: USER GUIDE MANUAL CD
615	H415	ADD: BULK PACKAGING

615	RMN5038	REMOTE SPEAKER MICROPHONE WITH EMER
615	NNTN4115	LEATHER CASE W/HIGH ACTIVITY 3.0" S
545	H18UCF9PW6 N	PORTABLE XTS5000 MODEL II 3X2 KEYPA
545	Q806	ADD: SOFTWARE ASTRO DIGITAL CAI OPE
545	H38	ADD: SMARTZONE SYSTEM SOFTWARE
545	Q361	ENH: PROJECT 25 9600 BAUD TRUNKING
545	G996	ENH: OVER THE AIR PROVISIONING
545	H14	ENH: ENHANCED PTT ID DISPLAY
545	Q947	ENH: RS232, IV&D PACKET INTERFACE
545	Q696	ALT: ANTENNA 1/2 WAVE 7" WHIP 700/8
545	Q43	ALT: BATTERY NIMH ULTRA HIGH CAPACI
545	H886AQ	3 YR REPAIR SERVICE ADVANTAGE
545	H88	ADD: USER GUIDE MANUAL CD
545	H415	ADD: BULK PACKAGING
545	RMN5038	REMOTE SPEAKER MICROPHONE WITH EMER
545	NNTN4115	LEATHER CASE W/HIGH ACTIVITY 3.0" S
70	H18UCF9PW6 N	PORTABLE XTS5000 MODEL II 3X2 KEYPA
70	Q806	ADD: SOFTWARE ASTRO DIGITAL CAI OPE
70	H38	ADD: SMARTZONE SYSTEM SOFTWARE
70	Q361	ENH: PROJECT 25 9600 BAUD TRUNKING
70	G996	ENH: OVER THE AIR PROVISIONING
70	H14	ENH: ENHANCED PTT ID DISPLAY
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70	Q159	ADD: XTS5000 UCM HARDWARE ENCRYPTIO
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70	Q58AK	3 YR ENCRYPTED REPAIR SERVICE ADVAN
70	H88	ADD: USER GUIDE MANUAL CD
70	H415	ADD: BULK PACKAGING
70	RMN5038	REMOTE SPEAKER MICROPHONE WITH EMER
70	NNTN4115	LEATHER CASE W/HIGH ACTIVITY 3.0" S

Total XTS5000 $ 5,549,453.60
Total Equipment $ 24,862,305.21

Design Review	$	228,375
Staging	$	709,496
Site Improvements	$	1,054,301
Installation & Optimization & Cutover	$	3,901,474
Acceptance Testing	$	346,550
Training	$	378,618
General: Project Management, project administration, engineering, documentation	$	1,520,417

Total Services   **$ 8,139,231**

Total Equipment And Services   **33,001,536.13**

XTS Trade In   **$ (1,000,000.00)**

System Discount   **$ (2,013,093.00)**

Total Equipment And Services with Discounts   **$ 29,988,443.13**

Revisions after June 13, 2008:

Remove Speaker Mics and Cases from 1230 Portables $ **(188,190.00)**

Additional Equipment (DVRS) $ **818,361.00**

     40 mobile, 5 fixed, 5 transportable

Qty	Model	Description
FIXED		
5	TT1301	800 MHZ DVR FIXED MOUNT IN BAND APPLICATION B
5	TT05130AA	FIXED MOUNT OUTDOOR ENCLOSURE UPGRADE
5	DDN9028	DVR TO XTL5000 CONTROL CABLE 3 FT TO 25 FT (NEED TO SPECIFY)
1	DDN9024	DVR PROGRAMMING SOFTWARE
1	DDN9009	DVR PROGRAMMING KIT
5	M21URM9PW1 N	XTL 2500 764-870MHZ, 10-35W
5	G806	ENH: SOFTWARE ASTRO DIGITAL CAI
5	G51	ENH: SOFTWARE SMARTZONE/SINGLETONE
5	G361	ENH: ASTRO PROJECT 25 TRUNKING SOFTWARE
5	G442	ADD: XTL2500 CONTROL HEAD
5	G444	ADD: CONTROL HEAD SOFTWARE
5	G67	ADD: THUMB SCREW REMOTE MOUNT W/KEYLOCK
3	DDN9022	USERS MANUAL FOR XTL5000 INTERFACED DVR
TRANSPORTABLE		
5	TT1265	800 MHZ DVR TRANSPORTABLE IN-BAND APPLICATION B
10	DDN9016	800 MHZ UNITY GAIN ANTENNA FOR TRANSPORTABLE DVR
10	M21URM9PW1 N	XTL 2500 764-870MHZ, 10-35W
10	G806	ENH: SOFTWARE ASTRO DIGITAL CAI
10	G51	ENH: SOFTWARE SMARTZONE/SINGLETONE
10	G361	ENH: ASTRO PROJECT 25 TRUNKING SOFTWARE
10	G442	ADD: XTL2500 CONTROL HEAD
10	G444	ADD: CONTROL HEAD SOFTWARE
10	G67	ADD: THUMB SCREW REMOTE MOUNT W/KEYLOCK
SIDE BY SIDE (MOBILE)		
40	TT1256	800 MHZ DVR SIDE-BY-SIDE IN-BAND APPLICATION B
40	HAF4016	ANTENNA (762-870 MHZ) 1/4 WAVE
40	M21URM9PW1 N	XTL 2500 764-870MHZ, 10-35W
40	G806	ENH: SOFTWARE ASTRO DIGITAL CAI
40	G51	ENH: SOFTWARE SMARTZONE/SINGLETONE
40	G361	ENH: ASTRO PROJECT 25 TRUNKING SOFTWARE
40	G442	ADD: XTL2500 CONTROL HEAD
40	G444	ADD: CONTROL HEAD SOFTWARE
40	G67	ADD: THUMB SCREW REMOTE MOUNT W/KEYLOCK

Mobile DVRS Installation $ 54,000.00

Credit for DVRS units and Installation $ (872,361.00)

Additional Equipment (Portable radios) $ 5,731,680.00
    15000 XTS5000 Portable radios

Qty	Model	Description
1500	H18UCF9PW6 N	PORTABLE XTS5000 MODEL II 3X2 KEYPA
1500	Q806	ADD: SOFTWARE ASTRO DIGITAL CAI OPE
1500	H38	ADD: SMARTZONE SYSTEM SOFTWARE
1500	Q361	ENH: PROJECT 25 9600 BAUD TRUNKING
1500	G996	ENH: OVER THE AIR PROVISIONING
1500	H14	ENH: ENHANCED PTT ID DISPLAY
1500	Q947	ENH: RS232, IV&D PACKET INTERFACE
1500	Q696	ALT: ANTENNA 1/2 WAVE 7" WHIP 700/8
1500	Q43	ALT: BATTERY NIMH ULTRA HIGH CAPACI
1500	H886AQ	3 YR REPAIR SERVICE ADVANTAGE
1500	H88	ADD: USER GUIDE MANUAL CD
1500	H415	ADD: BULK PACKAGING
0	RMN5038	REMOTE SPEAKER MICROPHONE WITH EMER
0	NNTN4115	LEATHER CASE W/HIGH ACTIVITY 3.0" S

Smartzone Trade-in credit for 1500 Portables $ (450,000.00)

Remove Speaker Mics and Cases from 1500 Portables $ (229,500.00)

Additional Trade-in credit for (4) controllers $ (60,000.00)

Additional System Discount $ (300,000.13)

Total Equipment And Services with Discounts $ 34,492,433.00

Optional Offerings as detailed in June 13, 2008 Proposal:

10 Channel Expansion	**$ 3,957,245.00**
5 Channel Expansion	**$ 2,655,067.00**
Addition of 11th Simulcast Site	**$ 3,612,297.00**
Prison and Training Consoles	**$ 1,110,427.00**

Maintenance Pricing for Years 2 - 10, after 1 year Warranty

(assuming 2 year implementation, final Acceptance 12/2010 and 1 year warranty)

<mark>**Year 2 (first year after warranty) Services Included**</mark>

Dispatch Service, Network and Security Monitoring Services with Pre-Tested Anti-Virus Subscription, Technical Support
Radio Repair Services including Depot Repair and PM for 744 Mobile Units
Wireless Pickup and Delivery
Infrastructure Repair W/ Adv Repl Service
Premier OnSite Infrastructure Response Service with Dedicated Technicians
Consolette Repair Services
Local Admin System Management Service
Database Management
Template Conversions
Template Management
Tower Maintenance
Total Services for:

Calendar				
2012	Year 2 **	$1,935,750.17	FNE + mobiles *	*no portable radios included in annual pricing -
	Annual Escalation is 5%			annual cost of maintenance for each portable
2013	Year 3	$2,032,537.68	FNE + mobiles *	radio added to Maintenance Agreement is $ 135.26
2014	Year 4	$2,134,164.57	FNE + mobiles *	
2015	Year 5	$2,240,872.79	FNE + mobiles *	** Year 2 of Maintenance is Year 4 of Amendment period
2016	Year 6	$2,352,916.43	FNE + mobiles *	
2017	Year 7	$2,470,562.26	FNE + mobiles *	
2018	Year 8	$2,594,090.37	FNE + mobiles *	
2019	Year 9	$2,723,794.89	FNE + mobiles *	
2020	Year 10	$2,859,984.63	FNE + mobiles *	

Upgrade Assistance Plan Quote: (includes Software Subscription Agreement) as described in Appendix E

UAP System: $2,987,060 for a 3 year continuous term
UAP System: $995,687 per year continues following the term contract until end of 2014.
Stand-alone SSA System (without UAP) : $699,300 per year fee until end of 2014

Appendix B

ECONOMIC OPPORTUNITY PLAN
City of Philadelphia – Motorola, Inc.
ASTRO 25 Upgrade

I. Purpose

      A. Executive Orders 02-05 and 14-08 establish policies relating to antidiscrimination in contracts with the City of Philadelphia (the "City") for the purpose of providing equal opportunity in contracting and employment and assuring that City funds and resources are not used directly or indirectly, to promote, reinforce or perpetuate discriminatory practices. In furtherance of these policies, Chapter 17-1600 of The Philadelphia Code requires the development and implementation of "Economic Opportunity Plan(s)" for contracts that are subject to approval by City Council. Economic Opportunity Plans are intended to memorialize the applicable contracting party's commitment to make "best and good faith efforts" to provide meaningful subcontracting opportunities for businesses owned by minority persons, women and disabled persons ("M/W/DSBEs") and provide for an appropriately diverse workforce.

Motorola, Inc. ("Motorola") is a manufacturer of wireless RF communications equipment systems and a service provider, which has provided and currently maintains the City of Philadelphia's 800 MHz Public Safety Radio Network. Motorola has proposed an upgrade to the current network which will bring the current infrastructure to an Internet Protocal based platform (ASTRO 25) and will provide the City of Philadelphia, its Public Safety personnel, all radio using agencies and Citizens with the latest platform to increase network capacity, and position the network for new and future communications technologies (the "Project"). The implementation period of the Upgrade is preliminarily set for 21 months.

Motorola and the City desire to promote and increase economic opportunities for local residents and businesses, which may be derived from Motorola's continued provision and maintenance of the Public Safety Radio Network and services thereof. In furtherance of Motorola's and the City's shared goals with respect to such economic opportunities as they relate to the 800 MHz Public Safety Radio Network ASTRO25 Upgrade, Motorola hereby submits this Economic Opportunity Plan (the "Plan") effective as of the date Amendment No. 3 to Contract No. 99-0844 ("Agreement") is executed by both parties pursuant to which Motorola commits to exercise "best and good faith efforts" (as hereinafter defined) throughout the term of this Plan, to provide meaningful contracting opportunities for M/W/DSBEs and employment opportunities for minority persons and women during the implementation phase of the upgrade. Motorola agrees to

include in all subcontracts let by Motorola in connection with the Project, an enforceable requirement that each subcontractor abide by the provisions of the Plan.

The Term of this Plan, and all of the commitments and obligations set forth herein, shall expire on the date of Final System Acceptance of the ASTRO 25 Upgrade project.

      B. For the purposes of this Plan, MBE, WBE and DSBE (collectively, "M/W/DSBEs") shall refer to businesses so certified by the City's Office of Economic Opportunity ("OEO").

      C. For purposes of this Plan, the term "best and good faith efforts," means those efforts, the scope, intensity and appropriateness of which are designed and performed to achieve meaningful business opportunities for M/W/DSBEs and employment opportunities for minority persons and females including Philadelphia residents. The sufficiency of Motorola's best and good faith efforts shall be in the sole determination of the City. As an example of best and good faith efforts, Motorola will undertake the following activities:

- Motorola solicits, through all reasonable and available means, the interest and participation of M/W/DSBEs which have the capability to perform related and specific work of the ASTRO 25 Upgrade project. Such efforts include the use of the City's Office of Economic Opportunity ("OEO") Directory.

- Motorola provide interested MBEs, WBEs and DSBEs with adequate information about the plans, specifications, and requirements of the contract in a timely manner to assist them in responding to a solicitation.

- Motorola establishes a single point of contact within Motorola for communication with the City and M/W/DSBEs regarding the implementation of this Plan.

- Motorola negotiates in good faith with interested M/W/DSBEs by using good business judgment which includes consideration of price and capabilities as well as the objectives of the Plan.

II. Statement of Diversity Practices, Policies and Past Achievements

A. Motorola Supplier Diversity Program

The Motorola Supplier Diversity Department is a centralized organization that supports all of Motorola's business units and strives to match the diversity of our supply base to our customers and consumers and effectively support diversity community outreach programs.

The charter of Motorola's Supplier Diversity Department is to take initiatives to build strength in socially and economically disadvantaged business sectors as these sectors grow to become critical elements of global corporate citizenship. Motorola recognizes that inclusion of diversity suppliers in our supply chain broadens our access to innovation and creativity to help us win in the marketplace. Diversity ensures that we have the broadest representation of diversity of ideas, perspectives and talent in our supply chain. Diversity businesses have supplied Motorola with a variety of products and services such as cables, accessories, packaging, logistics, travel and engineering.

Motorola is committed to the identification, development and utilization of small, minority, woman, and other business enterprises that meet Motorola's objectives for quality products and services in support of achieving our key initiatives, providing a competitive advantage, and ensuring compliance with contractual requirements.

Through outreach efforts to diversity organizations, such as the National Minority Development Council and the Women's Business Enterprise National Council, the Supplier Diversity Department provides a communication link to Motorola opportunities. Motorola's outreach is also global: in 2005, Motorola participated in a trade mission to create business relationships between U.S. minority businesses and South African Black Economic Enterprises.

In 2008, Motorola spent 9.3% of eligible US spend with diversity businesses. Motorola includes only certified diversity suppliers in this measurement. Motorola accepts third-party certifications from national and regional organizations as well as city and state municipalities, including, but not limited to the City of Philadelphia, Minority Supplier Development Council of PA-NJ-DE, NMSDC and WBENC.

Motorola's Supplier Diversity Department supports customer initiatives by tracking and reporting Motorola's participation with diversity suppliers. Through its proprietary "Tier 2 Reporting," Motorola requires its prime suppliers to report their diversity supplier spend for work done on behalf of Motorola. Motorola is committed to the following:

- As a prime contractor, Motorola is committed to achieving the goals of the Federal Government Small Business Subcontracting Program.
- Motorola supports its customers who share their commitment to diversity participation by achieving their customers' contractually required targets.
- Motorola has internal goals with management accountability to achieve a target percentage of diversity supplier procurement.

The Motorola Supplier Diversity Department is responsible for developing, leading and providing assistance for activities related to the identification and utilization of diversity suppliers, disseminating information on available business opportunities, and ensuring that such businesses are provided an equal opportunity to bid on goods or services purchased or contracted.

Motorola has centralized its supplier diversity program in order to maximize and leverage use of diversity suppliers within its supply chain. The organization reports to the Chief Procurement Office in the Motorola Integrated Supply Chain.

In addition to leadership positions in national and regional supplier diversity organizations, Motorola participates in outreach events. Motorola financially sponsors and/or has a presence at many supplier outreach events including, but not limited to:

- National Minority Supplier Development Council Conference and Business Opportunity Fair (NMSDC)
- Telecommunications Industry Group (TIG) Supplier Diversity Summit (Note: TIG is an NMSDC Industry Group.)
- Women's Business Enterprise National Council Trade Fair (WBENC).
- Chicago Minority Business Development Council Business Opportunity Trade Fair (CMBDC)
- Women's Business Development Center Buyers Mart (WBDC)

MOTOROLA SUPPLIER DIVERSITY POLICY

It is the policy of the Motorola to purchase goods and services necessary for the effective operation of our business from minority, woman, and other business enterprises to the fullest extent possible consistent with the merits of the suppliers' offerings. Motorola puts forth its best efforts to source and utilize qualified minority, woman, and other business enterprises for subcontracting opportunities.

The program requires all individuals making purchasing and/or sub-contracting decisions and the Supplier Diversity Department to make every effort to achieve the objectives of the program. The focus is to develop mutually beneficial long-term relationships with our customers and suppliers.

Appendix C

Motorola is committed to the identification, development and utilization of minority, women, service disabled, veteran, and other diversity business enterprises that meet Motorola's objectives for quality products and services in support of achieving our key initiatives, providing a competitive advantage, and ensuring compliance with contractual requirements.

The program requires all individuals making purchasing/sub-contracting decisions and the Supplier Diversity Department to make every effort to achieve the objectives of the program. The focus is to develop mutually beneficial long-term relationships with our suppliers.

The Supplier Diversity Department identifies specific business needs and, using a variety of tools, sources minority, woman, and other business enterprises that have the potential to meet the identified needs. Motorola is currently seeking to identify more businesses that can contribute goods necessary in the manufacturing process as well as provide related services. Motorola is also identifying potential businesses to provide more services related to the day-to day operation of its business.

Motorola's Supplier Diversity Program Director is Nannette Kelley. She can be reached at (480) 208-9377 and Nannette.Kelley@motorola.com. Reporting to Kelley is Jeffrey Espiritu, Supplier Diversity Manager. He can be reached on (847) 632 – 5371 and j.espiritu@motorola.com. In addition to supporting Motorola's national efforts for supplier diversity participation, Mr. Espiritu supports Motorola's city and state project teams. For this project, he supports Motorola's City of Philadelphia Project Team.

B.   City of Philadelphia

Project-specific diversity spend information for the City of Philadelphia is not available as it has been ten years since the last project. However, diversity spend with minority and woman owned businesses located in Philadelphia for the period 2007-2008 was $23 Million. Philadelphia suppliers represented in this dollar amount are:

- Urban Harvest Partnership LLC (MBE), Systems Integration Services
- SHI International (MBE), Software - Business
- RA Consulting Services (MBE), Professional Services

C. Management and Employee Demographics

Motorola is an Equal Employment Opportunity Employer and has filed federal Form EEO1, attached hereto, which presents a breakout of Motorola's employees by race, gender and ethnicity. Motorola has established diversity

councils within its company which help integrate inclusion into its marketing, community involvement, recruitment and employee development initiatives. Led by senior executives and open to any Motorola employee, the councils sponsor inclusion events, collaborate with external inclusion organizations, raise awareness and mentor employees.

III. Economic Opportunities

A. M/W/DSBE Participation

1.   Participation Ranges and Documentation Requirements

As a benchmark for Motorola's expression of its best and good faith efforts to provide meaningful and representative opportunities for M/W/DSBEs on this Project, the following participation ranges have been developed by the OEO. These participation ranges represent, in the absence of discrimination in the solicitation and selection of M/W/DSBEs, the percentage of MBE, WBE and DSBE participation that is reasonably attainable on this Project through the exercise of Motorola's best and good faith efforts. These ranges are based upon an analysis of factors such as the size and scope of the Project, the availability of subcontracted portions and the availability of MBEs, WBEs and DSBEs to perform various elements of the Project:

ASTRO 25 UPGRADE	MBE	WBE	DSBE
ELECTRICAL SUPPLY & INSTALL	15% - 20%	5% - 10%	Encouraged
PROJECT MANAGEMENT	10 % - 20%		Encouraged
ANCILLARY SERVICES	15% - 20%	5% -10%	Encouraged

a. Documentation of Best and Good Faith Efforts

Prior to execution of the Agreement, Motorola shall complete and submit to the OEO, the *Documentation of Best and Good Faith Efforts Form-Part A* ("BGFE Form"), attached hereto and made a part hereof, which identifies its solicitations and commitments with M/W/DSBEs, and details its exercise of best and good faith efforts to include M/W/DSBEs in the Project. The submission of the BGFE Form is a material element in the contract.

(i)   The BGFE Form must include the company name, address, contact person, telephone number, facsimile number and OEO certification number of each M/W/DSBE firm solicited for participation on this Project (regardless of the response by the firm), a detailed description of the services or the supply effort solicited/quoted and the dollar amount and percentage of contract commitments made to M/W/DSBE firms.   Avoid using one-word

descriptions of the services or supply effort and submit copies of the supporting quotation(s) or letter(s) of intent. If no commitments were made, or if quotes were not received from solicited M/W/DSBE firms, provide an explanation. Only firms that are certified by the OEO at the time of execution of the contract will receive credit as a best and good faith effort. A list of currently certified firms is maintained by the OEO and is available online at www.phila.gov/mbec/directory or in printed format at the OEO offices, located in the Municipal Services Building, 1401 JFK Blvd. Suite 330, Philadelphia, PA. 19102-1666.

(ii)   M/W/DSBEs identified on the BGFE Form constitutes a representation by Motorola, that the M/W/DSBE is capable of completing the subcontract with its own workforce, and that Motorola has made a legally binding commitment with the firm for the work or supply effort described and the dollar/percentage amount(s) set forth on the BGFE Form. Motorola is required to maintain the M/W/DSBE percentage commitments throughout the term of the contract which shall apply to the total amount of the contract and any additional increases. In the event Motorola's contract is increased by change order and/or modification, or amendment, it shall be the responsibility of Motorola to apply its best and good faith efforts to the amended amount in order to maintain any participation ranges committed to on the total dollar amount of the contract at the time of contract completion.

(iii)   Only subcontracts where the M/W/DSBE performs a commercially acceptable function will receive credit as best and good faith efforts ("CAF"). An M/W/DSBE is considered to perform a CAF when it engages in meaningful work or supply effort that provides for a distinct element of the subcontract (as required by the work to be performed in accordance with contract scope of work/specifications), where the distinct element is worthy of the dollar amount of the subcontract and where the M/W/DSBE carries out its responsibilities by actually performing, managing and supervising the work involved. The City may evaluate the amount of work subcontracted, industry practices and any other relevant factors in determining whether the M/W/DSBE is performing a CAF and in determining the amount of credit received towards the participation ranges. For example, using an M/W/DSBE non-stocking supplier (i.e., a firm that does not manufacture or warehouse the materials or equipment of the general character described by the scope of work and required under the contract) to furnish equipment or materials will only receive credit towards the participation ranges for the fees or commissions charged, not the entire value of the equipment or materials furnished.

(iv) In calculating the percentage of M/W/DSBE participation, the standard mathematical rules shall be applied in rounding off numbers. In the event of inconsistency between the dollar and percentage amounts listed on the BGFE Form, the percentage will govern.

(v) Upon execution of the Agreement, the letters of intent, quotations and any other accompanying documents regarding solicitation and commitments with MBEs, WBEs and DSBEs, including the BGFE Form, become part of the contract. M/W/DSBE percentage commitments are to be maintained throughout the term of the contract and shall apply to the total contract value (including approved change orders and amendments). Any change in commitment, including but not limited to substitutions for the listed firms, changes or reductions in the work and/or listed dollar/percentage amounts, must be pre-approved in writing by OEO. Throughout the term of the contract, Motorola is required to continue its best and good faith efforts.

2.   Participation Commitment

Motorola agrees to use best and good faith efforts to meet the commitment set forth below over the Term of this Plan (the "M/W/DSBE Participation Commitment"). The M/W/DSBE Participation Commitment is $1,391,000 as further described below:

Services portion[1] of ASTRO 25 Upgrade Project Contract:

Design Review [Motorola Project Management (PM), and Engineering]	$228,375.00
System Staging [Motorola, Schaumburg, IL]	$709,496.00
Site Improvements [A portion of these tasks will be subcontracted to Spectrum Electric, WBE]	$1,054,301.00
Installation, Optimization & Cutover [Motorola: Service Center, System Technologist, PM and Engineering]	$3,901,474.00
Acceptance Testing [A portion of these tasks will be subcontracted to PALURA, MBE and Spectrum Electric, WBE]	$346,550.00
Training [Motorola is in the process of certifying PALURA, MBE to perform End User Training]	$378,618.00
General: PM, Project Administration, Engineering, Documentation [A portion of these tasks will be subcontracted to PALURA, MBE and Spectrum Electric, WBE]	$1,520,417.00
Total Services	$8,139,231.00

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[1] The dollar amount represented in the "Services portion" is exclusive of Motorola's supply of communications equipment valued at $21,147,022; the communications equipment is manufactured and distributed exclusively by Motorola for the Project.

Motorola Services[2]	$6,484,930.00
Total dollars available for outside subcontracting:	$1,654,301.00
M/W/DSBE Service Participation Commitment	**$1,391,000.00**

Equipment Sourcing Commitment

Sun Servers Provided by ITD (WBE)	$154,000.00
Urban Harvest Partnership (MBE #7048018CC) provided equipment and services	$5,052,180.00
M/W/DSBE Equipment Sourcing Commitment	**$5,206,180.00**

OEO Participation Commitment	**$6,597,180.00**

(Equipment sourcing plus Services) equals 19.13% of the contract value of $ 34,492,433.00

    a. Service Provider Requirements/Qualifications

In order to ensure a successful system implementation and to guarantee compliance with Motorola's system warranty requirements, certain tasks and functions of the proposed upgrade must be performed by Motorola employees, such as a Project Manager, System Engineer and System Technologist. These personnel must have the necessary training, skills, experience and access to Motorola proprietary tools and information. Critical system tasks, such as Design Review, System Staging, System Installation/Optimization and Technical Training, can only be performed by Motorola personnel. Highlighted below are further descriptions of the tasks associated with the listed service responsibilities:

    (i) Design Review (Motorola PM and Engineering):
This item is for Motorola Systems Engineering and Motorola Project Management, along with the City and/or it's designees, to jointly review the technical design of the Astro 25 system upgrade. Since this phase is highly technical in nature, and speaks directly to the equipment and services that Motorola is responsible for, the participation is limited to Motorola.

    (ii) System Staging (Motorola):
This item is for the fixed network infrastructure network (FNE) to be completely staged at Motorola's Customer Center for Solutions Integration (CCSI), located at Motorola's campus in Schaumburg, IL.   The tasks associated with these items are performed by Motorola System Technologists, Motorola Project Management, and Motorola Systems

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[2] The dollars represented in "Motorola Services" include amounts for certain services provided exclusively by Motorola to ensure Warranty and Project Test Plan and are not available to outside contracting.

Engineering. The FNE will be temporarily installed at CCSI, will be completely functional, and will be available for live demonstration to the City and/or it's designees. Full functionality testing will be verified and approved by the City and/or it's designees before the system is shipped to it's final destination for installation. Since this phase is highly technical in nature, and speaks directly to the equipment and services that Motorola is responsible for, the participation is limited to Motorola.

(iii) Site Improvements (Subcontractors):
Portions of tasks associated with Site Improvements are available for inclusion in Motorola's Plan and will be subcontracted to M/W/DSBEs.

(iv) Installation, Optimization & Cutover (Motorola: Service Center, System Technologist, PM and Engineering):
These items are comprised of the installation, optimization, and cutover of the Astro 25 system upgrade. The tasks associated with these items are performed by Motorola's Authorized Service Center, Motorola System Technologists, Motorola Project Management, and Motorola Systems Engineering. These items require Motorola-certified technicians and speak directly to the equipment and services that Motorola is responsible for, therefore the provision of these services are exclusive to Motorola.

(v) Acceptance Testing (Motorola PM and Engineering):
These items are comprised of the system acceptance testing for the Astro 25 system upgrade, and are performed by Motorola Systems Engineering and Motorola Project Management. The Acceptance Testing is conducted jointly with Motorola and the City and/or its designees, but portions of tasks associated with Acceptance testing are available for inclusion in Motorola's Plan and will be subcontracted to M/W/DSBEs.

(vi) Training (Motorola Worldwide Learning Services):
This item is for complete end user and administrative training for the equipment and services associated with the Astro 25 system upgrade. These tasks are performed by Motorola worldwide Training Services (WLS). The curriculum and training materials are completely developed and deployed by WLS. Training must be furnished by Motorola and/or Motorola certified trainers. End User Training is available for inclusion in Motorola's Plan and will be subcontracted to Motorola-certified M/W/DSBEs.

(vii) General: Project Management, project administration, engineering, documentation. These items consist of general project management tasks, general project administration tasks, general engineering tasks, and system documentation. Portions of tasks associated with Project Management are available for inclusion in Motorola's Plan and will be subcontracted to M/W/DSBEs.

b. M/W/DSBE Subcontractor's Responsibilities[3]

PALURA Systems [MBE]:
- Project Management Services: Provide project manager(s), with the necessary skills, to directly support the Motorola Lead Project Manger, in all aspects of the project implementation. Motorola may also utilize them for pre-site inspections. This will ensure on-time, seamless and high-quality system implementation/installation.

- End-User Training: Provide subscriber training for all the end-users, such Police, and Fire personnel. PALURA is committed to hiring the most qualified/skilled person(s) for this task, and Motorola is committed to providing the necessary training and certification for PALURA's trainer(s).

- Warehousing/Storage Facility: Potentially provide some additional (above and beyond what the Motorola Service Center will provide) warehousing space, and inventory services, for storing the equipment shipped to the City, during the installation of the various segments of the system.

- Coverage Acceptance Testing (CATP): Provide technical staff in support of the CATP.
- PALURA Systems will utilize local expertise and staff, with knowledge of Philadelphia standards and best practices, to handle any spikes in project workload and to ensure project deadlines are met.

Spectrum Electric, Inc. [WBE]:
- Electrical Upgrades: Upgrade the existing electrical systems at each site to support the additional equipment operating in parallel with the existing equipment during the cutover period.
- Coverage Acceptance Testing (CATP): Provide technical staff in support of the CATP.
- Fixed Network Equipment (FNE) Installation: Provide support to the Motorola Authorized Service Center for the physical installation and removal of the FNE.

Urban Harvest Partnership, LLC [MBE]:
- Providing radio equipment and services; such as inventory management, tracking and services related to trade-in.

ITD [WBE]:
- Providing Sun server equipment for ASTRO 25 infrastructure

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[3] Based upon preliminary scope and letter(s) of intent, the anticipated dollar value of PALURA Systems' contract is $845,000. and $546,000 for Spectrum Electric, Inc.

B.   Employment

1. Employment Benchmarks and Outreach

Motorola agrees to exhaust its best and good faith efforts to employ minority persons, women and Philadelphia residents in the Project workforce. As evidence of its Best and Good Faith Efforts, Motorola shall maintain a current list of minority and female recruitment sources and provide written notification to these recruitment sources when Motorola has employment opportunities available in connection with the Project. Motorola agrees to work with the Philadelphia Workforce Development Corporation and similar programs to identify candidates for employment with its local suppliers. For this project, Motorola is obligated to exhaust its Best and Good Faith Efforts to employ or cause its subcontractors to employ:

Minority Workers – **30%** of all hours worked by all workers on the Project
Female Workers – **8%** of all hours worked by all workers on the Project

After the execution of the Agreement, it is anticipated that Motorola's subcontractors will hire additional people to fulfill the contracted scopes of work assigned to them during the implementation phase of the ASTRO 25 Upgrade.

PALURA Systems plans to hire 2-3 personnel for the project management and training related tasks, as well as utilize existing Philadelphia-based employees from their Center City office.

Spectrum Electric plans to hire 2-3 additional personnel to work specifically on the electrical upgrade related tasks.

Henkels & McCoy also plans to hire 2-3 personnel for electrical design and CAD support.

In anticipation of the execution of the Agreement, Motorola has staffed the necessary resources for the implementation of the system upgrade as well as its ongoing maintenance.

2. Training

Motorola intends to provide training and educational opportunities for various aspects of the work to be performed by the subcontractor organizations under this Plan. Motorola shall use its best and good faith efforts to provide such training and educational opportunities to City certified and subcontracted minorities, women, handicapped and veterans on a non-discriminatory basis.

IV. Evaluation of Responsiveness and Responsibility

A. Evaluation and Determination

1. The City, acting through its OEO, will evaluate the responsiveness of Motorola's Plan. OEO reserves the right to request further documentation and/or clarifying information at any time prior to execution of the contract which may result in Motorola's amendment to its BGFE Form.

2. Best and good faith efforts will be evaluated on the basis of the BGFE Form and any other information requested from Motorola by the City.

V. Compliance and Monitoring of Best and Good Faith Efforts

A. Recordkeeping and Quarterly Reports.

1. Motorola agrees to cooperate with OEO in its compliance monitoring efforts, and to submit, within the time limits prescribed by OEO, all documentation which may be requested by OEO relative to the awarded contract, including the items described below. The Director of OEO, or the appropriate designee thereof, shall be Motorola's primary point of contact for the purposes of collecting or providing information or carrying out any of the activities under this Plan. The primary contact for
Motorola for purposes of this Plan shall be the Project Manager assigned for the ASTRO 25 Upgrade Project period. Motorola agrees to provide as required and maintain the following contract documentation for a period of three (3) years following acceptance of final payment under the contract:

- Copies of signed contracts and purchase orders with M/W/DSBE subcontractors;

- Evidence of payments (cancelled checks, invoices, etc.) to subcontractors and suppliers to verify participation;

- Telephone logs and correspondence relating to M/W/DSBE commitments.

2. Within twenty (20) days of the close of each calendar quarter during the Term of this Plan, Motorola shall provide the Director of OEO (or the appropriate designee thereof) with a written report setting forth, in reasonable detail, Motorola's exercise of "best and good faith efforts" as defined in Section I. C hereof, and Motorola's satisfaction of the Participation Commitment as described in Section II. A. and B. hereof (the "Quarterly Report"). Such Quarterly Report shall include the following information:

- the name of each M/W/DSBE providing services to Motorola / City of Philadelphia;

- a description of the services provided by each M/W/DSBE;

- the amount of the contract or procurement with each M/W/DSBE;

- the amount actually paid by Motorola to each M/W/DSBE for the applicable portion of the calendar year and to date from the commencement of this EOP.

3. OEO reserves the right to request further documentation and/or further clarifying information from Motorola at any time during the term of this Plan in order to confirm Motorola's compliance with the terms hereof. Motorola agrees that it will cooperate in good faith with any such request from OEO.

4. Notwithstanding anything to the contrary set forth herein, Motorola shall not be required to disclose information or materials that it reasonably deems (and so designates in writing) to be proprietary or confidential in nature; provided, however, that Motorola shall not designate information or materials as proprietary or confidential for the purpose of evading compliance or disclosure of noncompliance with Motorola's obligations under this Plan.

B.   Oversight Committee

1. For this project, the City, in its sole discretion, will establish a Project Oversight Committee consisting of representatives from Motorola and the City including the City's Project Manager, OEO, and any other appropriate representatives ("Committee"). The Committee will meet to provide advice for the purpose of facilitating compliance with the Plan.

2. The City will convene meetings of the Project Oversight Committee no more than two (2) times per year and only after commencement of the Project.

C.   Prompt Payment of M/W/DSBEs

1. Motorola shall within five (5) business days after receipt of a payment from the City for work performed under the contract, deliver to its M/W/DSBE subcontractors their proportionate share of such payment for work performed.

VI.   Remedies and Penalties for Non-Compliance

A. Motorola agrees that its compliance with the requirements of the Plan is material to the contract. Any failure to materially comply with these requirements may constitute an Event of Default under the Agreement. It is further agreed and understood that in the event the

Appendix C

City determines that Motorola has failed to comply with the Plan requirements the City may, in addition to any other rights and remedies the City may have under the contract, or any bond filed in connection therewith or at law or in equity, exercise one or more of the remedies discussed below, as deemed applicable, which shall be deemed cumulative and concurrent:

a. Withhold payment(s) or any part thereof until corrective action is taken.

b. Suspend the Motorola from bidding on and/or participating in any future City contracts for a period of up to three (3) years.

c. Recover as liquidated damages, one percent of the total dollar amount of the contract for each one percent (or fraction thereof) of the commitment shortfall. (<u>NOTE</u>: The "total dollar amount of the contract" shall include approved change orders, and amendments.)

The remedies enumerated above are for the sole benefit of the City and City's failure to enforce any provision or the City's indulgence of any non-compliance with any provision hereunder, shall not operate as a waiver of any of the City's rights under the contract nor shall it give rise to actions by any third parties including identified M/W/DSBE subcontractors. No privity of contract exists between the City and the M/W/DSBE subcontractor(s) identified in this Plan or related documents (e.g., BFGE Form). The City does not intend to give or confer upon any such M/W/DSBE subcontractor(s) any legal rights or remedies in connection with subcontracted services under any law or Executive Order or by any reason of any contract related to this Plan except such rights or remedies that the M/W/DSBE subcontractor may seek as a private cause of action under any legally binding contract to which it may be a party.

DOCUMENTATION OF BEST AND GOOD FAITH EFFORTS FORM

Minority (MBE), Women (WBE), and Disabled (DSBE) Business Enterprises[1]		**DEPARTMENT OF COMMERCE** **OFFICE OF ECONOMIC OPPORTUNITY (OEO)**
PROJECT TITLE - *ASTRO 25 Upgrade Proposal*	*NAME OF PARTICIPANT* *Motorola, Inc.*	
June 13, 2008		

List below ALL MBE/WBE/DSBEs that were solicited regardless of whether a commitment resulted therefrom. - Photocopy this form as necessary.			

[x] MBE [ ] WBE [ ] DSBE	**Please Specify Work to be Performed and/or Type of Supply Effort**	**Date Solicited-**			**Commitment Made**	
Company Name Palura Systems, LLC		**By Phone** X	**By Mail**	**By Advertisement**	**YES** [X]	**NO**
Address 645 N. 15th Street Philadelphia, PA 19130	Project Management Documentation Preparation Storage and Asset Coordination Training				*(If Yes, give date and Proceed to Part C)*	*(If No Commitment Proceed to Part B And then Part C)*
Contact Person Patrick Thompson		**Quote Received**			**Amount Committed To**	
Telephone Number 800-704-3350 **Fax #**	Quality Control Quality Assurance	**YES[2]** X		**NO**	**Dollar Amount** $845,000.00	
[x] Subcontractor [ ] Supplier						
OEO CERTIFICATION # 7904113EC					**Percent of Total Proposal** 51% of available services	
[ ] MBE [x] WBE [ ] DSBE	**Please Specify Work to be Performed and/or Type of Supply Effort**	**Date Solicited**			**Commitment Made**	
Company Name Spectrum Electric, Inc.		**By Phone** X	**By Mail**	**By Advertisement**	**YES** [X]	**NO** [ ]
Address 274 Roxborough Ave. Philadelphia, PA 19128	Electrical upgrades to be performed at radio communications sites to support additional equipment operating in parralel with existing equipment during cut-over period.				*(If Yes, give date and Proceed to Part C)*	*(If No Commitment Proceed to Part B And then Part C)*
Contact Person Mary Trodden		**Quote Received**			**Amount Committed To**	
Telephone Number 215-482-8316 **Fax #**	Assistance in Coverage Testing. Supply of electrical wiring, panels, racks and misc. parts for installation.	**YES[2]** X		**NO**	**Dollar Amount** $546,000.00	
[x] Subcontractor [ ] Supplier						
OEO CERTIFICATION # 4703040GC					**Percent of Total Proposal** 33% of available services	
[ ] MBE [ ] WBE [ ] DSBE	**Please Specify Work to be Performed and/or Type of Supply Effort**	**Date Solicited**			**Commitment Made**	
Company Name		**By Phone**	**By Mail**	**By Advertisement**	**YES** [ ]	**NO** [ ]
Address					*(If Yes, give date and Proceed to Part C)*	*(If No Commitment Proceed to Part B And then Part C)*
Contact Person		**Quote Received**			**Amount Committed To**	
Telephone Number **Fax #**		**YES[2]**		**NO**	**Dollar Amount** $	
[ ] Subcontractor [ ] Supplier						
OEO CERTIFICATION #					**Percent of Total Proposal** %	
[ ] MBE [ ] WBE [ ] DSBE	**Please Specify Work to be Performed and/or Type of Supply Effort**	**Date Solicited**			**Commitment Made**	
Company Name		**By Phone**	**By Mail**	**By Advertisement**	**YES** [ ]	**NO** [ ]
Address					*(If Yes, give date and Proceed to Part C)*	*(If No Commitment Proceed to Part B And then Part C)*
Contact Person		**Quote Received**			**Amount Committed To**	
Telephone Number **Fax #**		**YES[2]**		**NO**	**Dollar Amount** $	
[ ] Subcontractor [ ] Supplier						
OEO CERTIFICATION #					**Percent of Total Proposal** %	

[1] MBE/WBE/DSBEs Listed above must be certified by the OEO by the time of contract execution.

[2] Participant should attach quotation with this form, but the City reserves the right to request this information which shall be submitted by bidder within 48 hours of the City's reques

co= 0033743

u= 0033743

EQUAL EMPLOYMENT OPPORTUNITY

2008 EMPLOYER INFORMATION REPORT

CONSOLIDATED REPORT - TYPE 2

SECTION B – COMPANY IDENTIFICATION

1. MOTOROLA INC
1303 EAST ALGONQUIN RD
SCHAUMBURG, IL 60196

2.a. MOTOROLA INC
1303 EAST ALGONQUIN RD
SCHAUMBURG, IL 60196

c. Y

SECTION C – TEST FOR FILING REQUIREMENT

1-Y 2-Y 3-Y DUNS NO.:001325463

SECTION E – ESTABLISHMENT INFORMATION

NAICS:

SECTION D – EMPLOYMENT DATA

JOB CATEGORIES	HISPANIC OR LATINO		NOT-HISPANIC OR LATINO												OVERALL TOTALS
			* * * * * * * * * * * * MALE * * * * * * * * * * * *						* * * * * * * * * * * FEMALE * * * * * * * * * *						
	MALE	FEMALE	WHITE	BLACK OR AFRICAN AMERICAN	NATIVE HAWAIIAN OR PACIFIC ISLANDER	ASIAN	AMERICAN INDIAN OR ALASKAN NATIVE	TWO OR MORE RACES	WHITE	BLACK OR AFRICAN AMERICAN	NATIVE HAWAIIAN OR PACIFIC ISLANDER	ASIAN	AMERICAN INDIAN OR ALASKAN NATIVE	TWO OR MORE RACES	
EXECUTIVE/SR OFFICIALS & MGRS	1	0	6	0	0	0	0	0	1	0	0	0	0	0	8
FIRST/MID OFFICIALS & MGRS	284	74	3696	123	3	556	12	3	879	58	0	163	4	0	5855
PROFESSIONALS	598	217	6486	347	12	3166	24	15	1578	151	6	1194	7	4	13805
TECHNICIANS	166	27	1297	154	1	164	7	3	163	33	0	39	3	0	2057
SALES WORKERS	44	4	824	19	1	29	6	0	124	7	0	5	2	0	1065
ADMINISTRATIVE SUPPORT	75	158	281	44	0	41	1	2	1033	138	0	96	2	3	1874
CRAFT WORKERS	7	0	34	1	0	2	0	0	1	0	0	0	0	0	45
OPERATIVES	19	29	19	11	0	21	0	0	27	16	0	17	0	0	159
LABORERS & HELPERS	63	33	19	5	0	3	0	1	20	4	0	2	1	0	151
SERVICE WORKERS	1	0	0	1	0	0	0	0	0	0	0	0	0	0	2
TOTAL	1258	542	12662	705	17	3982	50	24	3826	407	6	1516	19	7	25021
PREVIOUS REPORT TOTAL	1405	604	14181	805	8	4537	60	3	4202	474	1	1662	21	0	27963

SECTION F – REMARKS

DATES OF PAYROLL PERIOD: 07/31/2008 THRU 07/31/2008

CERTIFICATION

CERTIFYING OFFICIAL: JEANETTE KILO- SMITH TITLE: DIRECTOR HUMAN RESOURCE COMPLIANCE
EEO-1 REPORT CONTACT PERSON: JEANETTE KILO- SMITH TITLE: AVP HUMAN RESOURCES
EMAIL: JEANETTE.KILO-SMITH@MOTOROLA.COM TELEPHONE NO: 8476326059

Diversity and Equal Employment Opportunity

Statement of Policy
Motorola is committed to developing a diverse workforce with equal opportunities for all employees and applicants for employment. No person is to be discriminated against in employment or hiring decisions because of race, color, age, religion, sex, national origin, sexual orientation, gender identity or expression, genetic information, disability, status as a disabled veteran or veteran of the Vietnam era, or any other legally protected characteristic or activity (i.e., opposition to prohibited discrimination, participation in the statutory complaint process, or reporting of suspected unlawful or unethical conduct, including suspected fraud or securities law violations).

Scope
All Motorola employees based at locations within the United States.

Application
This policy applies to all terms, conditions and privileges of employment and/or retention including, but not limited to, recruiting, hiring, training, placement, employee development, performance evaluation, promotion, demotion, transfer, compensation, benefits, layoff and recall, social and recreational programs, employee facilities, discipline, termination and retirement.

Reasonable Accommodations

Motorola will make reasonable accommodations wherever necessary for all employees or applicants with disabilities (as defined by applicable law), provided the individual is otherwise qualified to safely perform the duties and assignments connected with the job and provided such accommodations do not impose undue hardship on Motorola. If an employee or applicant has a disability that requires an accommodation in order to apply for employment, perform his or her job, or otherwise enjoy the benefits and privileges of employment, he or she should consult with a representative of Leadership & Talent Supply, Human Resources or Occupational Health Resources.

Communication

Federal and state government nondiscrimination posters, as well as this policy, are displayed prominently in conspicuous locations in all facilities.

Notices, advertisements, forms, job descriptions and other specifications relating to employment shall not indicate any preference, limitation or discrimination based on race, color, age, religion, sex, national origin, sexual orientation, gender identity or expression, genetic information, disability, status as a disabled veteran or veteran of the Vietnam era, or any other legally protected characteristic or activity. All employment advertisements placed by Motorola or its contract recruiters include the phrase: "EEO/AA Employer."

Reporting a Complaint

Any employee, applicant for employment or employee of a contractor assigned to work at Motorola who believes the words or actions of a supervisor, another employee or a non-employee with whom he or she interacts as part of his or her job duties, constitute discrimination should report the situation as soon as possible. Such report or complaint should be made to the employee's supervisor, department management, Human Resources representative, the local Human Resources Compliance representative, or a representative of the Law Department.

Investigation of a Complaint

Complaints of discrimination are to be managed and investigated by Human Resources, the local Human Resources Compliance representative, or the Law Department promptly and in as confidential a manner as possible under the circumstances. A timely resolution of each complaint will be reached and communicated to the parties involved. Where applicable, Motorola will institute immediate and appropriate corrective action designed to stop the improper conduct and correct its effects.

Protection Against Retaliation

Motorola will not in any way retaliate against an individual who makes a good faith claim or report of discrimination or provides information related to such claim or report, nor will Motorola permit any manager, officer, employee or contractor to do so. Retaliation is a serious violation of this policy and should be reported immediately.

Sanctions
Any employee who is found to have violated this policy will be subject to appropriate disciplinary action up to and including termination of employment pursuant to Motorola's Progressive Discipline Policy. Motorola may end the assignment of an employee of a contractor assigned to work at Motorola who is found to have violated this policy.

Responsibilities
Management - Each manager and supervisor has the responsibility for ensuring all employees or employees of contractors within his or her area of supervision are aware of this policy, and for ensuring any personnel decisions made in his or her department is in accordance with this policy. If a manager becomes aware of any conduct, which he or she construes as a violation of this policy, he or she shall take prompt action to eliminate such behavior and immediately report such behavior to Human Resources, the local Human Resources Compliance representative or the Law Department. If a manager receives a complaint of discrimination, the manager should immediately inform either Human Resources, the local Human Resources Compliance representative or a representative of the Law Department.

Employees/Applicants - As set forth above, any employee, applicant for employment or employee of a contractor working at Motorola who believes that the words or actions of a supervisor, another employee or a non-employee constitute discrimination is encouraged to report the situation as soon as possible to the employee's supervisor, department management, Human Resources representative, the local Human Resources Compliance representative or a representative of the Law Department. Employees are also expected to cooperate and provide truthful and accurate information in any investigation conducted pursuant to this policy.

Human Resources - The Human Resources Department, along with the Law Department, is responsible for enforcing this policy and thoroughly investigating all reports and complaints of discrimination.

Human Resources Compliance Solutions - The Human Resources Compliance Solutions function is responsible for ensuring that all required postings are in place and current.

Law Department - The Law Department is responsible for supporting the Human Resources Department in enforcing this policy and in its investigation of all reports of discrimination. The Law Department may, in select cases, conduct the investigation of a report or complaint of discrimination under this policy.

Cross Reference

- Code of Business Conduct
- Open Door Process
- Progressive Discipline
- Safe and Respectful Workplace
- Motorola's Information Protection Policy IP-01 (iProtect)

Version Date: 08/01/2008
Original Effective Date: 01/01/2002

This policy does not constitute an employment contract or implied promise of any kind. The terms of this policy may be modified or eliminated by the Company at any time with or without notice. For more detailed information, see Notice to Employees Regarding Motorola's U.S. Human Resource Policies.

Appendix D

SOFTWARE LICENSE AGREEMENT

This Software License Agreement ("Agreement" or "License") is between Motorola, Inc., ("Motorola"), and the City of Philadelphia ("Licensee").

For good and valuable consideration, the parties agree as follows:

Section 1   DEFINITIONS

1.1   Capitalized terms not otherwise defined in this Section 1 or elsewhere in this License shall have the meanings provided for them in the Primary Agreement or, if not there defined, in the 1999 Agreement.

1.2   "Designated Product(s)" means product(s) provided by Motorola to Licensee with which or for which the Software is licensed for use.

1.3   "Documentation" means product and software documentation that specifies technical and performance features and capabilities, and the user, operation and training manuals for the Software (including all physical or electronic media upon which such information is provided).

1.4   "Final Acceptance" means the point in time upon which the 800 MHz Upgrade Project satisfies all the requirements set forth in Section 7 of the Primary Agreement for Final Acceptance and the City issues its written notice to Contractor that the Project is Finally Accepted.

1.5   "Motorola Directly Licensed Third Party Software" means Software owned by a third party supplier and licensed subject to the terms of this Software License Agreement.

1.6   "Motorola Software" means Software that Motorola or its affiliate company owns.

1.7   "Open Source Software" means software with either freely obtainable source code, license for modification, or permission for free distribution.

1.8   "Open Source Software License" means the terms or conditions under which the Open Source Software is licensed.

1.9   "Primary Agreement" means Contract No. 99-0844 between the City of Philadelphia ("City") and Motorola, Inc. as amended by Amendments No. 1 and No. 2, and by Amendment No. 3, providing for the Upgrade Project to which this Software License Agreement is attached as Exhibit D.

1.10   "Security Vulnerability" means a flaw or weakness in system security procedures, design, implementation, or internal controls that could be exercised (accidentally triggered or intentionally exploited) and result in a security breach such that data is or reasonably could be compromised, manipulated or stolen or the Software or System is or reasonably could be damaged.

1.11   "Software" means, collectively, the computer software programs, including but not limited to object code but not including source code, furnished to the City for the 800 MHz Upgrade Project pursuant to Amendment No. 3, including: (i) proprietary software in object code format, and all Motorola provided or authorized adaptations, translations, de-compilations, disassemblies, emulations, or derivative works of such software; (ii) any modifications, enhancements, new versions and new releases of the software provided by Motorola; (iii) computer software programs owned by a third party supplier which Motorola has the right to license to the City; (iv) Third Party Software that is furnished by Motorola but licensed by the publisher of the software to furnish; and (v) software programs that are embedded or pre-loaded in products furnished by Motorola pursuant to Amendment No. 3; and (vi) Motorola Directly Licensed Third Party Software.

1.12   "System" or "Upgrade System" means shall mean the 800 MHz radio communications system upgrade required under Amendment No. 3, including all Equipment, Software, and Deliverables required therefor.

1.13   System Acceptance" means the point in time at which the Upgrade Project satisfies all the material requirements set forth in Section 7.2 of this Agreement and the City issues its written notice to Contractor of System Acceptance of the Upgrade Project, subject to the requirement that Motorola shall complete any specified "punch list" requirements identified by the City.

1.14   "Third Party Software" means software programs or software code owned by parties other than Motorola and incorporated in Motorola Software or products and that Motorola is licensed to furnish to the City.

1.15   "Warranty Standards" means, collectively: (i) the descriptions of functionality and performance, and all standards of performance, compliance with FCC National Public Safety Plan Region 28 and other applicable FCC requirements, compliance with other codes and standards, and Radio Coverage that are set forth in Article 9 of the Primary Agreement, in the Statement of Work (Appendix A), and in the Performance Standards; and the Functional Requirements (set forth at Appendix A, Section 2.1) and elsewhere in the Primary Agreement; (ii) the Documentation; (iii) the manufacturer's (including, without limitation, Contractor's, where applicable) most current published specifications for Equipment, and Deliverables; (iv) all design documents prepared by Contractor under the Contract, including, without limitation, the Detailed Design, as approved and accepted by the City; and (v) all acceptance criteria, including without limitation, test criteria and standards of performance specified in Article 7 (Acceptance); and/or in the Statement of Work (Appendix A, Section 3), including, without limitation, any such criteria or standards of performance set forth in the "Test Performance Plan(s)" as defined in Article 7 (Acceptance) and which also shall include, without limitation, test methods and criteria and standards of performance as identified in Appendix A, Section 4 (System Acceptance Test Plan) that are accepted and approved by the City in writing, including, without limitation, modifications accepted and approved by the City during Detailed Design Review.

Section 2   SCOPE

Motorola and Licensee enter into this Agreement in connection with Motorola's delivery of certain proprietary Software, or products containing embedded or pre-loaded proprietary Software, or both. This Agreement contains terms and conditions of the license Motorola is providing to Licensee for

Motorola Software and Motorola Directly Licensed 3rd Party Software that is furnished by Motorola pursuant to the Primary Agreement, and of Licensee's use of the Software and the associated Documentation delivered by Motorola under the Primary Agreement. Such Software or products may incorporate Third Party Software.

Certain Third Party Software will be furnished subject to the publishers' standard license terms, and the terms of this Motorola Software License shall not apply to such Third Party Software. Such standard third party license terms shall be subject to City review and approval as provided in Section 3.3 of Amendment No. 3. Motorola shall provide a list of such Third Party Software and the publisher's license terms as provided in Section 3.3 of Amendment No. 3..

Section 3   GRANT OF LICENSE

3.1.   Motorola hereby grants to Licensee a personal, non-exclusive, perpetual (subject to Motorola's termination rights as set forth in Article 8), royalty-free license to use the Motorola Software and Motorola Directly Licensed Third Party Software, in object code form, and the Documentation solely in connection with Licensee's use of the Designated Products as well as third party equipment approved by Motorola or APCO Project 25 certified; provided, that for purposes of this grant of license, Designated Products are understood to include all Equipment and products furnished by Motorola for the Upgrade System. This Agreement does not grant any rights to source code. Motorola represents and warrants (a) that Motorola is the owner of the Motorola Software; and (b) that Motorola has sufficient license and/or other rights to provide all of the Software furnished pursuant to Amendment No. 3, as well as full authority, power, and right, (i) to grant to Licensee all rights granted under this License with respect to such Software and (ii) to furnish all such Software to the City for its use as part of the Upgrade System;

Provided, however, as follows: (a) In the case of Software (if any) furnished under Amendment No. 3 that can be furnished only pursuant to a license directly between the City and the manufacturer of the Software, such license shall be subject to City review and approval, and provided the City approves the license, shall govern the City's right to use the Software. Motorola represents and warrants (i) that it has the right to furnish such Software for use in the Upgrade System, and (ii) that all such Software will be licensed to the City under terms that do not impair or interfere with the City's use of the Upgrade System in accordance with Amendment No. 3 and/or for the Upgrade System's intended purpose; (b) In the case of software (if any) furnished under Amendment No. 3 that is not licenseable to the City, Motorola represents and warrants that it has the right to furnish the software to the City for use in the Upgrade System and that the City's use rights shall not impair or interfere with its use of the Upgrade System in accordance with Amendment No. 3 and/or for the Upgrade System's intended purpose.

3.2.   If the Software licensed under this Agreement contains or is derived from Open Source Software, the terms and conditions governing the use of such Open Source Software are in the Open Source Software Licenses of the copyright owner and not this Agreement. If there is a conflict between the terms and conditions of this Agreement and the terms and conditions of the Open Source Software Licenses governing Licensee's use of the Open Source Software, the terms and conditions of the license grant of the applicable Open Source Software Licenses will take precedence over the license grants in this Agreement. The Third Party Software programs identified as open source software in Appendix K_to Amendment No. 3 are Open Source Software

that Motorola intends to use in connection with the Upgrade Project, which list will be updated following the Detailed Design Review according to the terms of Section 3.3 of Amendment No. 3. Such license terms and conditions, together with Section 2 of this License, will govern any licenses the City may be required to enter into with the publisher of the publisher of the software.

If requested by Licensee, Motorola will use commercially reasonable efforts to provide Licensee a copy of the Open Source Software source code, without charge, if it is publicly available.

Section 4   LIMITATIONS ON USE

4.1.   Licensee may use the Software only for Licensee's internal business purposes. Any other use of the Software is strictly prohibited. Without limiting the general nature of these restrictions, Licensee will not make the Software available for use by third parties on a "time sharing," "application service provider," or "service bureau" basis or for any other similar commercial rental or sharing arrangement.

4.2.   Licensee will not, and will not intentionally or negligently allow or enable any third party to: (i) reverse engineer, disassemble, peel components, decompile, reprogram or otherwise reduce the Software or any portion to a human perceptible form or otherwise attempt to recreate the source code; (ii) modify, adapt, create derivative works of, or merge the Software; (iii) copy, reproduce, distribute, lend, or lease the Software or Documentation to any third party, grant any sublicense or other rights in the Software or Documentation to any third party, or take any action that would cause the Software or Documentation to be placed in the public domain; (iv) remove, or in any way alter or obscure, any copyright notice or other notice of Motorola's proprietary rights; (v) provide, copy, transmit, disclose, divulge or make the Software or Documentation available to, or permit the use of the Software by any third party or on any machine except as expressly authorized by this Agreement; or (vi) use, or permit the use of, the Software in a manner that would result in the production of a copy of the Software solely by activating a machine containing the Software. Licensee may make copies of Motorola Software and Motorola Directly Licensed Third Party Software as necessary for archival, back-up, or disaster recovery purposes; and may make such copies of other Software subject to the terms of any software license between the third party and the City; *provided* that Licensee may not operate any copy of the Software at the same time as the original Software is being operated. Licensee may make as many copies of the Documentation as it may reasonably require for the internal use of the Software.

4.3.   Unless otherwise authorized by Motorola in writing, Licensee will not, and will not intentionally or negligently enable or allow any third party to: (i) install a licensed copy of the Software on more than one unit of a Designated Product; or (ii) copy onto or transfer Software installed in one unit of a Designated Product onto another other deviceprovided, however, that Licensee may temporarily transfer Motorola Software or Motorola Directly Licensed Third Party Software installed on a Designated Product to another device if the Designated Product is inoperable or malfunctioning.

4.4.   When using Motorola's Radio Service Software ("RSS"), Licensee must purchase a separate license for each location at which Licensee uses RSS. Licensee's use of RSS at a licensed location does not entitle Licensee to use or access RSS remotely. Licensee may make one copy of RSS for each licensed location. Licensee shall provide Motorola with a list of all locations at which Licensee uses or intends to use RSS upon Motorola's request.

4.5. Licensee will maintain, during the term of this Agreement and for a period of two years thereafter, accurate records relating to this license grant to verify compliance with this Agreement. Motorola or an independent third party ("Auditor") may inspect Licensee's premises, books and records, upon reasonable prior notice to Licensee, during Licensee's normal business hours and subject to Licensee's facility and security regulations. Motorola is responsible for the payment of all expenses and costs of the Auditor. Any information obtained by Motorola and the Auditor will be kept in strict confidence by Motorola and the Auditor and used solely for the purpose of verifying Licensee's compliance with the terms of this Agreement.

Section 5   OWNERSHIP AND TITLE

Motorola, its licensors, and its suppliers retain all of their proprietary rights in any form in and to the Software and Documentation, including, but not limited to, all rights in patents, patent applications, inventions, copyrights, trademarks, trade secrets, trade names, and other proprietary rights in or relating to the Software and Documentation (including any corrections, bug fixes, enhancements, updates, modifications, adaptations, translations, de-compilations, disassemblies, emulations to or derivative works from the Software or Documentation, whether made by Motorola or another party, or any improvements that result from Motorola's processes or, provision of information services). No rights are granted to Licensee under this Agreement by implication, estoppel or otherwise, except for those rights which are expressly granted to Licensee in this Agreement. All intellectual property developed, originated, or prepared by Motorola in connection with providing the Software, Designated Products, or Documentation, remains vested exclusively in Motorola, and Licensee will not have any shared development or other intellectual property rights.

Section 6   LIMITED WARRANTY; DISCLAIMER OF WARRANTY

6.1. For a period of one year commencing upon System Acceptance (the "Software Warranty Period"), Motorola warrants that the Documentation and unmodified Software (unless modification has been performed by or authorized by Motorola), when used for its intended purpose and in accordance with this Agreement , will comply with the Warranty Standards and be free from reproducible defects that eliminate or degrade the functionality or successful operation of the Software or the System.

Motorola does not warrant that Licensee's use of the Software (including, without limitation, Software embedded in Designated Products) will be completely uninterrupted or completely error-free or completely free of Security Vulnerabilities; provided, however, that nothing contained in the foregoing clause of this sentence shall limit or alter Motorola's foregoing warranty that the Software and the System will comply with the Warranty Standards and be free from reproducible defects that eliminate or degrade the functionality or successful operation of the Software or that eliminate the functionality of a feature critical to the primary functionality of the System.

6.2. Motorola shall correct, at no cost to the City, noncompliance with the Warranty Standards and reproducible defects that eliminate or degrade the functionality or successful operation of the Software or the System, or that eliminate the functionality of a feature critical to the primary functionality of the System, such correction to be in accordance with the terms and conditions of

Contract No. 07194, *800 MHz Radio System Maintenance Services*, between the City and Motorola, effective October 1, 2006 ("Maintenance Contract"), including, without limitation, the notification and escalation process provided in Section A 3.1.4 of Appendix A thereto, and the following options: Motorola, at its option, may (i) repair any defective Motorola Software, or (ii) replace it with the same or equivalent Motorola Software, provided the City notifies Motorola of the noncompliance or defect as set forth in the Maintenance Agreement.

6.3.   The express warranties set forth in this Section 6 are in lieu of, and Motorola disclaims, any and all other warranties (express or implied, oral or written) with respect to the Software or Documentation, including, without limitation, any and all implied warranties merchantability or fitness for a particular purpose; provided, however, that neither such disclaimer nor anything else contained in this sentence or elsewhere in this Section 6 shall limit, alter, apply to, or excuse Motorola from performing, any indemnification, warranty, or other obligations provided elsewhere in the Agreement or in Exhibit E to the Agreement. In addition, Motorola disclaims any warranty to any person other than Licensee, its employees, agents, and subcontractors with respect to the Software or Documentation.

Section 7   TRANSFERS

Licensee will not transfer the Software or Documentation to any third party without Motorola's prior written consent. Motorola's consent may be withheld at its discretion and may be conditioned upon transferee paying all applicable license fees and agreeing to be bound by this Agreement; provided, however, as follows: if Licensee transfers ownership of Motorola radio products to a third party, Licensee may assign its right to use the Motorola Software or Motorola Directly Licensed Third Party Software (other than RSS and Motorola's FLASHport® software) which is embedded in or furnished for use with the radio products, together with related Documentation; *provided* that Licensee transfers all copies of the Motorola Software or Motorola Directly Licensed Third Party Software and Documentation to the transferee, and Licensee and the transferee sign a transfer form to be provided by Motorola upon request, obligating the transferee to be bound by this Agreement.

Section 8   TERM AND TERMINATION

8.1.   Licensee's right to use the Software and Documentation will begin when the Primary Agreement is signed by both parties and will continue as long as any Designated Product with or for with the Software and Documentation have been provided by Motorola is in use by any City user or any third party transferee, in perpetuity, unless terminated as follows: If Licensee materially breaches this License, Motorola shall so notify Licensee in writing. Licensee shall have thirty (30) days from receipt of that notice to correct the breach and if the breach is not cured within that time period, Motorola may terminate this License. Upon termination, Motorola will be entitled to immediate injunctive relief without proving damages. If Motorola materially breaches this License, Licensee shall so notify Motorola in writing. Motorola shall have sixty (60) days from receipt of that notice to correct the breach; provided, that if the breach is a severity 1, 2, or 3 issue as provided in the Maintenance Contract, Motorola will resolve the severity 1, 2, or 3 issue as provided in Section A 3.1.3 of Appendix A ("Detailed Project Requirements") of the Maintenance Contract. If the breach is not cured within that time period, Licensee shall have the right to exercise all rights

and remedies available to it at law, in equity, and pursuant to Amendment No. 3 and the 1999 Agreement, all of which rights and remedies are expressly reserved. Motorola and Licensee further agree that in the event of such uncured breach, Licensee shall be entitled to immediate injunctive relief without proving damages, such injunctive relief being to compel Motorola to use its best efforts to correct severity 1 or 2 defects, as described in Section A 3.1.3 of Appendix A of the Maintenance Contract, within the time periods provided in that Section.

8.2.   Within sixty (60) days after termination of this Agreement, Licensee shall, if requested by Motorola in writing, certify in writing to Motorola that all copies of the Motorola Software or Motorola Directly Licensed Third Party Software and Documentation have been returned to Motorola or destroyed by Licensee and are no longer in use by Licensee.

Section 9   UNITED STATES GOVERNMENT LICENSING PROVISIONS

This Section applies only if Licensee is the United States Government or a United States Government agency. Licensee's use, duplication or disclosure of the Software and Documentation under Motorola's copyrights or trade secret rights is subject to the restrictions set forth in subparagraphs (c)(1) and (2) of the Commercial Computer Software-Restricted Rights clause at FAR 52.227-19 (JUNE 1987), if applicable, unless they are being provided to the Department of Defense. If the Software and Documentation are being provided to the Department of Defense, Licensee's use, duplication, or disclosure of the Software and Documentation is subject to the restricted rights set forth in subparagraph (c)(1)(ii) of the Rights in Technical Data and Computer Software clause at DFARS 252.227-7013 (OCT 1988), if applicable. The Software and Documentation may or may not include a Restricted Rights notice, or other notice referring to this Agreement. The provisions of this Agreement will continue to apply, but only to the extent that they are consistent with the rights provided to the Licensee under the provisions of the FAR or DFARS mentioned above, as applicable to the particular procuring agency and procurement transaction.

Section 10   CONFIDENTIALITY

Licensee acknowledges that the Motorola Software or Motorola Directly Licensed Third Party Software and Documentation contain Motorola's valuable proprietary and Confidential Information and are Motorola's trade secrets, and that the provisions in the Primary Agreement concerning Confidential Information apply.

Section 11   LIMITATION OF LIABILITY

This License shall be governed by Section 10.2(c) of the Primary Agreement, *Limitation of Liability for Upgrade Project*, added by Section 9.1 of Amendment No. 3.

Section 12   NOTICES

Notices required or permitted under this License shall be governed by Section 13.3 of Amendment No. 3, amending Section 17.16 of the Primary Agreement.

Section 13   GENERAL

13.1.   COPYRIGHT NOTICES. The existence of a copyright notice on the Software will not be construed as an admission or presumption of publication of the Software or public disclosure of any trade secrets associated with the Software.

13.2.   COMPLIANCE WITH EXPORT LAWS AND REGULATIONS. Licensee acknowledges that the Software is subject to the laws and regulations of the United States and Licensee will comply with all applicable laws and regulations, including export laws and regulations of the United States. Licensee will not, without the prior authorization of Motorola and the appropriate governmental authority of the United States, in any form export or re-export, sell or resell, ship or reship, or divert, through direct or indirect means, any item or technical data or direct or indirect products sold or otherwise furnished to any person within any territory for which the United States Government or any of its agencies at the time of the action, requires an export license or other governmental approval. Violation of this provision is a material breach of this Agreement.

13.3.   ASSIGNMENTS. Assignments of rights under this License are governed by Section 17.15, *Assignment*, of the Primary Agreement.

13.4.   GOVERNING LAW. This License is governed by Section 17.17, *Governing Law*, of the Primary Agreement.

13.5.   THIRD PARTY BENEFICIARIES. This License is governed by Section 17.23, *Third Party Beneficiaries*, of the Primary Agreement.

13.6.   SURVIVAL. Sections 4, 5, 6.3, 7, 8, 9, 10, 11 and 13 survive the termination of this Agreement.

13.7.   ORDER OF PRECEDENCE. In the event of inconsistencies between this Exhibit and the Primary Agreement or other Exhibits to the Primary Agreement, the parties agree that this Exhibit prevailswith respect to the specific subject matter of this Exhibit but only with respect to such specific subject matter.

13.8   SECURITY. Motorola's Information Assurance Policy addresses the issue of security. Motorola shall use reasonable, industry standard means in the design and writing of Motorola Software, and in the acquisition of third party Software, to prevent Security Vulnerabilities. If a Security Vulnerability is discovered in any Software or Designated Product at any time during the term of this License, Motorola will correct the vulnerability in accordance with Section 6.2 of this Agreement provided the Upgrade System is under Warranty or the City has purchased maintenance and support services for the System from Motorola. If a Security Vulnerability is discovered by Motorola, Motorola will in addition notify the City in writing immediately upon the discovery.

Appendix F

Milestone Payment Schedule

Customer will make payments to Motorola within thirty (30) to forty-five (45) days after the date of each invoice. Customer will make payments when due in the form of a check, cashier's check, or wire transfer drawn on a U.S. financial institution and in accordance with the following milestones.

Subscriber Equipment Payments   **$9,413,443.60**

Subscriber Equipment will be invoiced 100% upon delivery and inventory ($9,413,443.60)

Fixed Network Equipment Payments

1.	10% upon Contract Execution (Effective Date)	$2,507,898.94
2.	5% upon completion and City's written approval of Detailed Design Review	$1,253,949.47
3.	25% upon Delivery and Inventory of FNE equipment from CCSI	$6,269,747.35
4.	10% upon Installation and the City's Conditional Acceptance of FNE equipment on a site by site, system by system basis (20 payments at $125,394.95)	$2,507,898.94
5.	15% upon completion and City's Conditional Acceptance of Coverage Acceptance Test in accordance with Coverage Acceptance Test Plan	$3,761,848.41
6.	10% upon completion and City's Conditional Acceptance; of 2nd Reliability Test	$2,507,898.94
7.	20% upon System Acceptance	$5,015,797.88
8.	5% upon Final Acceptance	$1,253,949.47
Total Fixed Network Equipment Payments		**$25,078,989.40**

Motorola reserves the right to make partial shipments of equipment and to request payment upon shipment of such equipment.

ID	Task Name	Duration	Start	Finish
1	CITY OF PHILADELPHIA ASTRO 25 SYSTEM UPGRADE PRELIMINARY PROJECT SCHEDULE	457 days	3/26/09	12/24/10
2	*Contract execution*	*0 days*	*3/26/09*	*3/26/09*
3	*Payment Schedule: 10% upon Contract Execution (Effective Date)*	*0 days*	*3/26/09*	*3/26/09*
4	Contract Administration/Project Kick-off Process	15 days	4/2/09	4/22/09
5	Contract Design Review (CDR)	45 days	4/23/09	6/24/09
6	*Payment Schedule: 5% upon completion and City's written approval of Detailed Design Review*	*0 days*	*6/24/09*	*6/24/09*
7	Site Surveys	25 days	4/9/09	5/13/09
8	Site Preparation	150 days	5/14/09	12/9/09
9	Order Processing	20 days	6/25/09	7/22/09
10	Fleetmapping/Template Development	100 days	7/23/09	12/9/09
11	Manufacturing	45 days	7/23/09	9/23/09
12	Staging	60 days	9/24/09	12/16/09
13	*Payment Schedule: 25% upon Shipment of FNE equipment from CCSi*	*0 days*	*12/16/09*	*12/16/09*
14	Installation/Optimization/Cutover	249 days	11/19/09	11/2/10
15	*City installs new T1 circuits (Master to Primes and Primes to Remotes)*	*0 days*	*11/19/09*	*11/19/09*
16	Complete Link Testing	20 days	11/19/09	12/16/09
17	Install/Optimize ASTRO25 Master Site at City Hall RM626m (Install SmartX servers - not yet connected to SZ3.0)	15 days	12/17/09	1/6/10
18	Upgrade Embassy network to ASTRO25 compatible code (while still connected to SZ3.0) (AEB cards, CEB cards and Elite Ops)	10 days	1/7/10	1/20/10
19	Program all subscribers *	20 days	12/10/09	1/6/10
20	Conduct first 30-day Reliability Test	23 days	1/21/10	2/22/10
21	Install/Optimize ASTRO25 IP Network Equipment at Primes & Remotes (A&B Site Routers (connected to new T1s) - A&B Site Switches - Prime Simulcast Controllers - Prime Site Comparators)	20 days	2/23/10	3/22/10
22	Transition sz3.0 to SmartX & New ASTRO25 Mastersite (3600 A&B Simulcast Systems - Embassy / Elite console system)	10 days	3/23/10	4/5/10
23	Perform 2nd 30-day Reliability Test	22 days	4/6/10	5/5/10
24	*Payment Schedule: 10% upon completion and City's Conditional Acceptance; of 2nd Reliability Test*	*0 days*	*5/5/10*	*5/5/10*
25	Start upgrading fleet to 9600 code at this point but still using SZ3.0 (Decommission 6 Channels from SZ3.0 System - 3 from Sys A, 3 from Sys B), Re-commission on ASTRO25 system for ATP purposes, Upgrade these 6 stations at all sites	15 days	5/6/10	5/26/10
26	*Payment Schedule: 10% upon Installation and the City's Conditional Acceptance of FNE equipment on a site by site, system by system basis*	*0 days*	*5/26/10*	*5/26/10*
27	Perform FATP & CATP	60 days	5/27/10	8/18/10
28	*Payment Schedule: 15% upon completion and City's Conditional Acceptance of Coverage Acceptance Test in accordance with Coverage Acceptance Test*	*0 days*	*8/18/10*	*8/18/10*
29	Complete System-A User migrations	5 days	8/19/10	8/25/10
30	*Conditional Acceptance System-A*	*0 days*	*8/18/10*	*8/18/10*
31	Complete migration of System-B Users	5 days	8/26/10	9/1/10
32	*Conditional Acceptance System-B*	*0 days*	*9/1/10*	*9/1/10*
33	Complete 3rd & 4th 30 day Reliability Tests	44 days	9/2/10	11/2/10
34	*Conditional Acceptance-Installation/Optimization/Cutover Complete*	*0 days*	*11/2/10*	*11/2/10*

Legend:
Red Text: Critical Path/Tasks
Blue Text: Milestone

March 11, 2009
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ID	Task Name	Duration	Start	Finish	Q1 J F M	Q2 A M J	Q3 J A S	Q4 O N D	Q1 J F M	Q2 A M J	Q3 J A S	Q4 O N D	Q J
35	Training	80 days	2/4/10	5/26/10									
36	Final Reprogramming of all subscribers	20 days	11/3/10	11/30/10									
37	System Acceptance - Warranty Commences	0 days	11/30/10	11/30/10									
38	Payment Schedule: 20% upon System Acceptance	0 days	11/30/10	11/30/10									
39	Project Finalization	18 days	12/1/10	12/24/10									
40	Final Acceptance	0 days	12/24/10	12/24/10									12/24
41	Payment Schedule: 5% upon Final Acceptance	0 days	12/24/10	12/24/10									
42	* Subscriber Equipment will be invoiced 100% upon delivery and inventory	0 days	1/6/10	1/6/10									

Task	Summary	Rolled Up Progress	Group By SummTask
Critical Task	Rolled Up Task	Split	Critical Task
Progress	Rolled Up Critical Task	External Tasks	
Milestone	Rolled Up Milestone	Project Summary	

Appendix I

During the first quarter of 2008 Motorola defined a series of tests to measure the performance of an ASTRO 25 network under the loading levels that the City of Philadelphia experienced in October of 2007. This call profile included the following traffic:

- Calls
- Affiliations/Deaffiliations
- MSEL's
- Rejects

This testing was completed on equipment that simulated what will be installed during the City of Philadelphia's ASTRO 25 network upgrade, including GCP8000 Prime Site Simulcast Controllers. The test also used GTR8000 base stations and IP transport.

The testing completed is valid due to the fact that in a Motorola ASTRO 25 network, the call control and mobility messaging is the same regardless if it is in an IP simulcast configuration or a circuit simulcast configuration utilizing Quantars or GTR 8000 base stations. While the call traffic on a P25 system is not identical to the traffic on Philadelphia's current system, we believe that the testing that was done approximates the same type of load on the new system.

During the testing, the ASTRO25 network performed with no revert to the redundant or back up controller. Upon completion of tests with the initial profile, additional tests were conducted where we increased the system load to approximately 25% above what the City had previously experienced. During these additional test scenarios the system did not revert to back up mode.

Subsequently, Motorola tested to determine at what load level the new system would revert to backup. We were able to increase the traffic load to 70% above the city's October 31, 2007 load profile and were not able to cause the system to revert to backup. At this point we had exhausted our test tool's ability to generate additional load.

We were able to determine that at 30% above the load profile, traffic load on the control channel resulted in some call setup delays beyond the APCO25 specification. We were able to determine this was a result of the overall data speed requirements of the APCO25 control channel specifications and not an equipment limitation.

Motorola consistently runs Systems Integration Testing (SIT)* on the Philadelphia configuration of: ASTRO-TAC9600 Comparators, GCP8000 Prime Site Simulcast Controllers and Quantars to assure the compatibility and quality on this configuration with every ASTRO 25 release.

Based on the testing outlined above Motorola is confident in the test methodology and guarantees that this equipment provides a valid and effective test configuration to prove enhanced system loading performance for the City of Philadelphia's configuration and traffic model with an upgraded ASTRO 25 network.

*Motorola's Systems Integration Testing (SIT) process represents a significant product development step that enables a successful volume deployment of commercial systems. SIT testing ensures each system configuration meets specific performance and quality requirements. As new system configurations become available, SIT incorporates test scenarios, or scripts, that include performance testing of legacy configurations as well.

APPENDIX J

APPLICABLE LAWS

     The provisions of this Appendix J are not intended to limit the applicability of the other provisions of this Contract, including, without limitation, Provider's agreement to comply with all Applicable Law. Applicable Law shall include, without limitation, the following:

    1.1 **Non-Discrimination; Fair Practices.** This Contract is entered into under the terms of the Philadelphia Home Rule Charter, as it may be amended from time to time, and in performing this Contract, Provider shall not discriminate or permit discrimination against any individual because of race, color, religion or national origin. In addition, Provider shall, in performing this Contract, comply with the provisions of the Fair Practices Ordinance of The Philadelphia Code (Section 9-1100) and the Mayor's Executive Order No. 04-86, as each may be amended from time to time and which, as applicable, prohibit, among other things, discrimination against individuals in employment, housing, and/or services in places of public accommodation because of race, color, sex, sexual orientation, gender identity, religion, national origin, ancestry, age, handicap (including, but not limited to, Human Immunodeficiency Virus infection), marital status, presence of children or source of income. In the event of any breach of this Section 1.1 (Non-Discrimination; Fair Practices), the City may, in addition to any other rights or remedies available under this Contract, at law or in equity, suspend or terminate this Contract forthwith.

    1.2 **The Philadelphia Code, Chapter 17-400.**

     (a) In accordance with Chapter 17-400 of The Philadelphia Code, as it may be amended from time to time, Provider agrees that its payment or reimbursement of membership fees or other expenses associated with participation by its employees in an exclusionary private organization, insofar as such participation confers an employment advantage or constitutes or results in discrimination with regard to hiring, tenure of employment, promotions, terms, privileges or conditions of employment on the basis of race, color, sex, sexual orientation, religion, national origin or ancestry, constitutes, without limiting the applicability of Section 13.2 of the 1999 Agreement, as amended, and Section 13.3 of the 1999 Agreement, as amended, a substantial breach of this Contract entitling the City to all rights and remedies provided in this Contract or otherwise available at law or in equity.

     (b) Provider agrees to cooperate with the Commission on Human Relations of the City in any manner which the Commission deems reasonable and necessary for the Commission to carry out its responsibilities under Chapter 17-400 of The Philadelphia Code. Provider's failure to so cooperate shall constitute, without limiting the applicability of Section 13.2 of the 1999 Agreement, as amended, and Section 13.3 of the 1999 Agreement, as amended, a substantial breach of this Contract entitling the City to all rights and remedies provided in this Contract or otherwise available at law or in equity.

    1.3 **[Intentionally Deleted]**

    1.4 **Northern Ireland.**

     (a) In accordance with Section 17-104 of The Philadelphia Code, Provider by execution of this Contract certifies and represents that (1) Provider (including any parent company, subsidiary, exclusive distributor or company affiliated with Provider) does not have, and will not have at any time during the Term of this Contract (including any extensions of the Term), any investments, licenses, franchises, management agreements or operations in Northern Ireland and (2) no product to be provided to the City under this Contract will originate in Northern Ireland, unless Provider has implemented the fair employment principles embodied in the MacBride Principles.

     (b) In the performance of this Contract, Provider agrees that it will not use any suppliers, Subcontractors or subconsultants at any tier (1) who have (or whose parent, subsidiary, exclusive distributor or company affiliate have) any investments, licenses, franchises, management agreements or operations in Northern Ireland or (2) who will provide products originating in Northern Ireland unless said supplier, subconsultant or Subcontractor has implemented the fair employment principles embodied in the MacBride Principles.

(c)   Provider agrees to cooperate with the City's Director of Finance in any manner which the said Director deems reasonable and necessary to carry out the Director's responsibilities under Section 17-104 of The Philadelphia Code. Provider expressly understands and agrees that any false certification or representation in connection with this Section 1.4 (Northern Ireland) and any failure to comply with the provisions of this Section 1.4 (Northern Ireland) shall constitute a substantial breach of this Contract entitling the City to all rights and remedies provided in this Contract or otherwise available at law (including, but not limited to, Section 17-104 of The Philadelphia Code) or in equity. In addition, Provider understands that false certification or representation is subject to prosecution under 18 Pa. C.S. Section 4904.

(d)   Paragraphs (a) and (b) of this Section 1.4 do not apply if Provider has secured a waiver from the Director of Finance.

1.5   **Business, Corporate and Slavery Era Insurance Disclosure.**

(a)   In accordance with Section 17-104 of The Philadelphia Code, Provider, after execution of this Agreement, will complete an affidavit certifying and representing that Provider (including any parent company, subsidiary, exclusive distributor or company affiliated with Provider) has searched any and all records of Provider or any predecessor company regarding records of investments or profits from slavery or slaveholder insurance policies during the slavery era. The names of any slaves or slaveholders described in those records must be disclosed in the affidavit. This paragraph does not apply if Provider has secured a waiver from the Director of Finance.

(b)   Provider expressly understands and agrees that any false certification or representation in connection with this Section 1.5 and/or any failure to comply with the provisions of this Section shall constitute a substantial breach of this Agreement entitling the City to all rights and remedies provided in this Agreement or otherwise available in law (including, but not limited to, Section 17-104 of The Philadelphia Code) or equity and the contract will be deemed voidable. In addition, it is understood that false certification or representation is subject to prosecution under 18 Pa. C.S.A. Section 4904.

1.6   **Limited English Proficiency.** Provider understands and agrees that no individual who is limited in his or her English language proficiency shall be denied access to Services provided under this Contract on the basis of that limitation. As a condition of accepting and executing this Contract, Provider shall comply with all provisions of Title VI of the Civil Rights Act of 1964, the President of the United States of America Executive Order No. 12250, the Mayor of the City of Philadelphia Executive Order No. 04-01, "Access to Federally Funded City Programs and Activities for Individuals with Limited English Proficiency" dated September 29, 2001, and all regulations promulgated thereunder, as the Act and regulations may be amended from time to time, which are applicable (a) to Provider, (b) to the benefits, services, activities and programs provided in connection with this Contract, (c) to the City, or the Commonwealth of Pennsylvania, and (d) to the benefits, services, activities and programs of the City or of the Commonwealth, and if any funds under this Contract are provided by the federal government, which are applicable to the federal government and its benefits, services, activities and programs. Without limiting the applicability of the preceding sentence, Provider shall comply with 45 C.F.R. 80 et. seq. and all other regulations promulgated under Title VI of the Civil Rights Act of 1964, as they may be amended from time to time, which are applicable to the benefits, services, programs and activities provided by the City through contracts with outside contractors.

1.7   **Philadelphia 21st Century Minimum Wage Standard.**

(a)   If Provider is subject to Philadelphia Code Chapter 17-1300, as specified therein, Provider shall comply with the minimum benefits and compensation standards by providing its employees with an hourly wage, excluding benefits, at least one hundred fifty percent (150%) of the federal or state minimum wage, whichever is higher, as more fully set forth at Philadelphia Code Chapter 17-1300. Provider shall promptly provide to the City all documents and information verifying its compliance with the requirements of Section 17-1300. Furthermore, Provider shall notify each affected employee what wages are required to be paid.

(b)   The Office of Labor Standards, as defined by Section 17-1302, may grant a partial or total waiver of Chapter 17-1300 based on specific stipulated reasons elaborated in Section 17-1304 of the Philadelphia Code. City remedies for noncompliance of this section are set forth in Article XII herein. As it relates to minimum benefits, Chapter 17-1300 is effective July 1, 2009.

1.8   **Provider's Representations and Covenants.** Provider makes, and will continue to update as needed throughout the term of this Contract, the following representations, warranties and covenants; the City has relied on such representations as a material consideration for the execution and delivery by the City of this Amendment No. 3:

(a) Contributions.

(1)   In accordance with Section 17-1402 of The Philadelphia Code, Provider represents that contribution(s) will not be made during the term of the Contract by Provider or any party from which a contribution can be attributed to Provider, that would render Provider ineligible to apply for or enter into a Non-Competitively Bid Contract or to receive Financial Assistance under the provisions of Philadelphia Code Sections 17-1404(1) and 17-1405 and, further, that disclosures required by Subsection 17-1402(1)(b) made as part of its application to receive a Non-Competitively Bid Contract or Financial Assistance contain no material misstatements or omissions.

(2)   Provider will not use any Subcontractor(s) that is ineligible to enter into a Non-Competitively Bid Contract with the City. To that end, Provider will enter into a written Subcontract with each Subcontractor, requiring said Subcontractor to represent that contributions will not be made that would render the Subcontractor ineligible to enter into a Subcontract pursuant to Chapter 17-1400 of The Philadelphia Code. It shall not be a violation of this Subsection 1.8(a)(2) if Provider fails to comply herewith because the Provider was unable to obtain such information from the Subcontractor, provided that the Provider demonstrates that it used reasonable efforts to attempt to obtain such information, including, at a minimum:

a)   Entering into a written agreement with the Subcontractor for such Subcontractor's services before Provider filed its application for the Contract;

b)   Including in such Subcontract a provision requiring Subcontractor to provide the Provider in a timely manner with all information required to be disclosed under the provisions of Code Chapter 17-1400 and providing that the Subcontract will be terminated by the Provider if Subcontractor fails to provide all required information on a timely basis and that no further payments, including payments owed for services performed prior to the date of termination, will be made to Subcontractor, by or on behalf of the Provider, as of the date of such termination;

c)   Communicating regularly with the Subcontractor concerning the Subcontractor's obligations to provide timely information to permit the Provider to comply with all provisions of Code Chapter 17-1400; and,

d)   Invoking the termination provisions of the Subcontract in a timely and full manner.

The same terms and conditions of this Subsection 1.8(a)(2) shall apply to excuse the obligations of Provider and Consultant under Subsection 1.8(a)(4) below, with appropriate adjustments to the identity of the parties.

(3)   In addition to remedies set forth in the Contract, breach of any of these representations shall constitute an event of default and render the Contract voidable at the City's option, and shall make Provider liable for liquidated damages to the City in the amount of ten percent (10%) of the maximum payments to Provider allowed under Amendment No. 3, regardless whether actually paid**.**

(4)   Subject to Subsection 17-1402(2)(b) (Failure to Disclose Consultant's Contributions) of The Philadelphia Code, Provider shall, during the term of the Contract and for one (1) year thereafter, disclose any contribution of money or in-kind assistance Provider or any Consultant has made during such time period to a candidate for nomination or election to any public office in the Commonwealth of Pennsylvania or to an individual who holds such office, or to any political committee

or state party in the Commonwealth of Pennsylvania, or to any group, committee or association organized in support of any such candidate, office holder, political committee or state party, and the date and amount of such contribution. Such disclosure shall be made on a form provided by the Department awarding the Contract, and the form shall be signed and filed with such Department within five (5) business days of the contribution. The Department receiving the disclosure form shall forward copies to the President and Chief Clerk of Council, and to the Mayor, Finance Director, Procurement Department, and the Department of Records. The attribution rules of Philadelphia Code Section 17-1405 shall apply to determine what contributions must be disclosed under this provision as contributions of Provider or of a Consultant.

   (5)   Provider shall, during the Term of the Contract and for one year thereafter, disclose the name and title of each City officer or employee who, during such time period, asked Provider, any officer, director or management employee of Provider, or any Person representing Provider, to give money, services, or any other thing of value (other than a Contribution as defined in Section 17-1401) to any Person, and any payment of money, provision of services, or any other thing of value (other than a Contribution as defined in Section 17-1401) given to any Person in response to any such request. Provider shall also disclose the date of any such request, the amount requested, and the date and amount of any payment made in response to such request. Such disclosure shall be made on a form provided by the Department awarding the contract, and the form shall be signed and filed with the Department within five (5) business days after a request was made or a payment in response to a request was made, as the case may be. The Department receiving the disclosure form will forward copies to the President and Chief Clerk of Council, and to the Mayor, Finance Director, Procurement Department, and the Department of Records.

   (6)   In accordance with Subsection 17-1402 (1)(e)(iv) of The Philadelphia Code, Provider shall, during the term of the Contract, disclose the name and title of each City officer or employee who directly or indirectly advised Provider, any officer, director or management employee of Provider, or any Person representing Provider that a particular Person could be used by Provider to satisfy any goals established in the Contract for the participation of minority, women, disabled or disadvantaged business enterprises. Provider shall also disclose the date the advice was provided, and the name of such particular Person. Such disclosure shall be made on a form provided by the Department awarding the contract, and the form shall be signed and filed with the Department within five (5) business days after Provider was so advised. The Department receiving the disclosure form will forward copies to the President and Chief Clerk of Council, and to the Mayor, Finance Director, Procurement Department, and the Department of Records.

   (7)   <u>Survival</u>**.** The above representations, warranties and covenants shall continue throughout the Term of this Contract and shall survive for one (1) year thereafter; provided, however, that if Provider is a recipient of Financial Assistance, Provider shall be subject to such representations, warranties and covenants for a period of five (5) years after receiving such assistance. In the event said representations, warranties and covenants are, or become, untrue or inaccurate, Provider shall promptly give notice thereof to the City, specifying the manner in which said representation, warranty or covenant is untrue or inaccurate.

   (8)   Pursuant to Section 17-1406(6) of The Philadelphia Code, the requirements of this subsection 1.8(a) do not apply to Provider if Provider is a governmental agency or not-for-profit corporation established by the City.

  (b)   **Executive Order 02-04: Gifts.** Pursuant to Executive Order 02-04, no official or employee in the Executive and Administrative Branch of the City shall solicit or accept, directly or indirectly, anything of value, including any gift, gratuity, favor, entertainment or loan from any of the following sources:

   (1)   A person seeking to obtain business from, or who has financial relations with the City;

(2)   A person whose operations or activities are regulated or inspected by any City agency;

(3)   A person engaged, either as principal or attorney, in proceedings before any City agency or in court proceedings in which the City is an adverse party;

(4)   A person seeking legislative or administrative action by the City; or

(5)   A person whose interests may be substantially affected by the performance or nonperformance of the official's or employee's official duties.

Provider understands and agrees that if it offers anything of value to a City official or employee under circumstances where the receipt of such item would violate the provisions of Executive Order 02-04, Provider shall be subject to sanctions with respect to future City contracts. Such sanctions may range from disqualification from participation in a particular contract to debarment, depending on the nature of the violation as more fully set forth in Executive Order 02-04. The terms and duration of such sanctions shall be pursuant to such rules as the Procurement Commissioner, with respect to contracts subject to competitive bidding, or the Director of Finance, with respect to all other contracts, shall develop.

(c)   **Notice of Change.** If there is a material change in the foregoing representations made by Provider for itself or on behalf of any of its Subcontractors, or a circumstance occurs adversely affecting Provider's business integrity, Provider shall promptly notify Responsible Official of such changed circumstances.

Open Source Software

Case ID	Product System	Product	Product Release	Component type	Package	Package WebSite	Version	OSS License Category
Consoles / Control Centers								
	ASTRO25	MCC 7500	A7.7	class library	ACE/TAO	http://www.cs.wustl.edu/~schmidt/ACE.html	5.4.1	ACE/TAO Open Source License
	ASTRO25	MCC 7500	A7.7	SNMP Framework	Net-SNMP	http://www.net-snmp.org/	5.3.0.1	BSD Type
	ASTRO25	MCC 7500	A7.7	Secure Communications and Cryptography	OpenSSL	http://www.openssl.org/	0.9.8d	BSD Type
	ASTRO25	MGEG	A7.7	class library	ACE/TAO	http://www.cs.wustl.edu/~schmidt/ACE.html	5.4.1	ACE/TAO Open Source License
	ASTRO25	MGEG	A7.7	SNMP Framework	Net-SNMP	http://www.net-snmp.org/	5.3.0.1	BSD Type
	ASTRO25	MGEG	A7.7	Secure Communications and Cryptography	OpenSSL	http://www.openssl.org/	0.9.8d	BSD Type
	ASTRO25	VPM	A7.7	Adaptive Computing Framework	ACE	http://www.cs.wustl.edu/~schmidt/ACE.html	5.1.4	ACE/TAO License
	ASTRO25	VPM	A7.7	Compression	BZIP2	http://www.bzip.org	1.0.3	BSD Type
	ASTRO25	VPM	A7.7	SNMP Framework	NET-SNMP	http://www.net-snmp.org	5.3.0.1	BSD Type
	ASTRO25	VPM	A7.7	Abstraction Headers/Includes	OpenBSD OS Includes	http://www.openbsd.org	4	BSD Type
	ASTRO25	VPM	A7.7	Secure Communications / Encryption	OpenSSL	http://www.openssl.org	0.9.7c	BSD Type
3600 Gateway Products								
	ASTRO25	SmartX 3600 Gateway	A7.7	Adaptive Computing Framework	ACE	http://www.cs.wustl.edu/~schmidt/ACE.html	5.1.4	ACE/TAO License
	ASTRO25	SmartX 3600 Gateway	A7.7	Compression	BZIP2	http://www.bzip.org	1.0.3	BSD Type
	ASTRO25	SmartX 3600 Gateway	A7.7	SNMP Framework	NET-SNMP	http://www.net-snmp.org	5.3.0.1	BSD Type
	ASTRO25	SmartX 3600 Gateway	A7.7	Abstraction Headers/Includes	OpenBSD OS Includes	http://www.openbsd.org	4	BSD Type
	ASTRO25	SmartX 3600 Gateway	A7.7	Secure Communications / Encryption	OpenSSL	http://www.openssl.org	0.9.7c	BSD Type
Astro RF Site Products								
	ASTRO25	GCM8000 Comparator(s)	A7.7	Adaptive Computing Framework	ACE	http://www.cs.wustl.edu/~schmidt/ACE.html	5.1.4	ACE/TAO License
	ASTRO25	GCP8000 Site Controller(s)	A7.7	Adaptive Computing Framework	ACE	http://www.cs.wustl.edu/~schmidt/ACE.html	5.1.4	ACE/TAO License
	ASTRO25	GTR8000 Station(s)	A7.7	Adaptive Computing Framework	ACE	http://www.cs.wustl.edu/~schmidt/ACE.html	5.1.4	ACE/TAO License
	ASTRO25	GCM8000 Comparator(s)	A7.7	Compression	BZIP2	http://www.bzip.org	1.0.3	BSD Type
	ASTRO25	GCP8000 Site Controller(s)	A7.7	Compression	BZIP2	http://www.bzip.org	1.0.3	BSD Type
	ASTRO25	GTR8000 Station(s)	A7.7	Compression	BZIP2	http://www.bzip.org	1.0.3	BSD Type
	ASTRO25	GCM8000 Comparator(s)	A7.7	SNMP Framework	NET-SNMP	http://www.net-snmp.org	5.3.0.1	BSD Type

	ASTRO25	GCP8000 Site Controller(s)	A7.7	SNMP Framework	NET-SNMP	http://www.net-snmp.org	5.3.0.1	BSD Type
	ASTRO25	GTR8000 Station(s)	A7.7	SNMP Framework	NET-SNMP	http://www.net-snmp.org	5.3.0.1	BSD Type
	ASTRO25	GCM8000 Comparator(s)	A7.7	Abstraction Headers/Includes	OpenBSD OS Includes	http://www.openbsd.org	4	BSD Type
	ASTRO25	GCP8000 Site Controller(s)	A7.7	Abstraction Headers/Includes	OpenBSD OS Includes	http://www.openbsd.org	4	BSD Type
	ASTRO25	GTR8000 Station(s)	A7.7	Abstraction Headers/Includes	OpenBSD OS Includes	http://www.openbsd.org	4	BSD Type
	ASTRO25	GCM8000 Comparator(s)	A7.7	Secure Communications / Encryption	OpenSSL	http://www.openssl.org	0.9.7c	BSD Type
	ASTRO25	GCP8000 Site Controller(s)	A7.7	Secure Communications / Encryption	OpenSSL	http://www.openssl.org	0.9.7c	BSD Type
	ASTRO25	GTR8000 Station(s)	A7.7	Secure Communications / Encryption	OpenSSL	http://www.openssl.org	0.9.7c	BSD Type
	ASTRO25	CSS	A7.7	Secure Communications	JSch	http://www.jcraft.com/jsch	0.1.33	BSD Type
	ASTRO25	CSS	A7.7	Java Environment	Java JRE/JDK	http://www.sun.com	1.6.0_12	Sun Binary and Supplemental Licenses
	ASTRO25	CSS	A7.7	Java Serial Communications	RXTX	http://users.frii.com/jarvi/rxtx/index.html	2.1-7r2	RXTX License v 2.1 (LGPL v 2.1 + Linking Over Controlled Interface)
	ASTRO25	CSS	A7.7	Java Logging	log4j	http://logging.apache.org/log4j	1.2.14	Apache 2.0
	ASTRO25	CSS	A7.7	Install Framework	NSIS (Nullsoft Scriptable Install System)	http://nsis.sourceforge.net	2.34	NSIS License (zlib/libpng License + CPL 1.0 + BSD Type)
Router Products								
	ASTRO25	Sxxxx Routers	A7.7	Secure Communications / Encryption	OpenSSL	www.openssl.org	0.9.8b	BSD Type
	ASTRO25	Sxxxx Routers	A7.7	Secure Communications / Encryption	OpenSSH	www.openssh.org	4.3	BSD Type
	ASTRO25	Sxxxx Routers	A7.7	SNMP Framework	Net-snmp	www.net-snmp.org	5.3.0.1	BSD Type
	ASTRO25	Sxxxx Routers	A7.7	OS Portability Headers	OpenBSD	www.openbsd.org	4	BSD Type
	ASTRO25	Sxxxx Routers	A7.7	OSS	CRC		N/A	Public Domain
	ASTRO25	Sxxxx Routers	A7.7	OSS	ctime		N/A	BSD Type
	ASTRO25	Sxxxx Routers	A7.7	OSS	elf		N/A	BSD Type
	ASTRO25	Sxxxx Routers	A7.7	OSS	gzip algorithms		N/A	Public Domain
	ASTRO25	Sxxxx Routers	A7.7	OSS	l2tpd		N/A	BSD Type
	ASTRO25	Sxxxx Routers	A7.7	OSS	md5		N/A	BSD Type
	ASTRO25	Sxxxx Routers	A7.7	OSS	pqh	University of California	N/A	BSD Type
	ASTRO25	Sxxxx Routers	A7.7	OSS	random		N/A	BSD Type + Public Domain
	ASTRO25	Sxxxx Routers	A7.7	OSS	regexp	University of Toronto	1.3	BSD Type
	ASTRO25	Sxxxx Routers	A7.7	OSS	rsvp	USC Information Sciences Institute	N/A	BSD Type
	ASTRO25	Sxxxx Routers	A7.7	OSS	snprintf		N/A	BSD Type
	ASTRO25	Sxxxx Routers	A7.7	OSS	superfasthash	http://www.azillionmonkeys.com/qed/weblicense.html	N/A	Public Domain
	ASTRO25	Sxxxx Routers	A7.7	OSS	qsort		N/A	BSD Type
	ASTRO25	Sxxxx Routers	A7.7	OSS	ldap	University of Michigan	3.3	BSD Type
	ASTRO25	Sxxxx Routers	A7.7	OSS	getopt		N/A	Public Domain
Packet Data Gateways								

	ASTRO25	IV&D / HPD PDG	A7.7	Perl Utility Module	TermReadKey	http://www.cpan.org	2.3	GPLv2
	ASTRO25	IV&D / HPD PDG	A7.7	Perl Utility Module	IO-Prompt	http://www.cpan.org	0.99.4	GPLv2
	ASTRO25	IV&D / HPD PDG	A7.7	Perl Utility Module	Want	http://www.cpan.org	0.15	GPLv2
	ASTRO25	IV&D / HPD PDG	A7.7	Perl Utility Module	version	http://www.cpan.org	0.73	GPLv2
	ASTRO25	IV&D / HPD PDG	A7.7	CGI Framework	CGIC	http://www.boutell.com/cgic	1	BSD Type + Commercial
	ASTRO25	IV&D / HPD PDG	A7.7	OS Configuration	LIBIFCONFIG	http://www.pobox.com/~tgbf/	0.1	LGPLv2
	ASTRO25	IV&D / HPD PDG	A7.7	Abstraction Headers/Includes	OpenBSD OS Includes	http://www.openbsd.org	4	BSD Type
	ASTRO25	IV&D / HPD PDG	A7.7	SNMP Framework	NET-SNMP	http://www.net-snmp.org	5.3.0.1	BSD Type
	ASTRO25	IV&D / HPD PDG	A7.7	Linux OS	Red Hat Enterprise Linux	www.redhat.com	4.x	Commercial License to the Customer with OSS content
	ASTRO25	IV&D / HPD PDG	A7.7	Auditing/Logging	logrotate	www.redhat.com	3.7.1	GPLv2
	ASTRO25	IV&D / HPD PDG	A7.7	Auditing/Logging	syslog-ng	http://www.balabit.com/downloads/syslog-ng/1.6/src/.	1.6.8-3	GPLv2
	ASTRO25	IV&D / HPD PDG	A7.7	Auditing/Logging	libol	http://www.balabit.com/downloads/syslog-ng/1.6/src/.	0.3.16-2	GPLv2
	ASTRO26	IV&D / HPD PDG	A7.7	Framework	Lynx Browser	http://lynx.isc.org	2.8.5	GPLv2
	ASTRO25	IV&D / HPD PDG	A7.7	Security - Host Integrity Checker / IDS	samhain	http://www.la-samhna.de	2.4.2	GPLv2
	ASTRO25	IV&D / HPD PDG	A7.7	Security - Networking	tcpwrappers	ftp://ftp.porcupine.org/pub/security index.html	7.6	BSD Type
	ASTRO25	IV&D / HPD PDG	A7.7	Security - Network Communication	openSSH	http://www.openssh.com	4.7p1	BSD Type
	ASTRO25	IV&D / HPD PDG	A7.7	Security - Crypto	openSSL	http://www.openssl.org	0.9.8g	BSD Type
Common Platforms and IP Services								
	ASTRO25	InfoVista	A7.7	compression utility	Gzip	http://www.gzip.org/	1.2.4	GPLv2
	ASTRO25	Windows Bar Clients	A7.7	Linux-like environment for Windows	cygwin	http://www.cygwin.com/	1.5.25-7	GPLv2
	ASTRO25	InfoVista	A7.7	Snmp package	Net-Snmpd	http://www.net-snmp.org/	5.2.0	BSD Type
	ASTRO25	Windows Supplimental CD	A7.7	PDF Reader	Adobe Acrobat Reader	http://www.adobe.com/products/reader/	9	Adobe Distribution License
	ASTRO25	Windows Supplimental CD	A7.7	Java Runtime Env	JRE	http://java.com/en/download/manual.jsp	v6	Sun Binary and Supplemental Licenses
	ASTRO25	Windows Supplimental CD	A7.7	Development framework	.NET 2.0	http://www.microsoft.com/NET/	2	Microsoft License (must be applied to a Legal License Holder of Windows)
	ASTRO25	Quest Putty	A7.7	A Free Telnet/SSH Client	Putty	http://www.chiark.greenend.org.uk/~sgtatham/putty/	0.59	PuTTY License
	ASTRO25	Windows Logging Clients	A7.7	Executable for Logging	snare	http://www.intersectalliance.com/projects/SnareWindows/	2.6.6	GPLv2
	ASTRO25	Linux Boxes	A7.7	Operating System	Red Hat Linux	http://www.redhat.com	4 update 6	Commercial License to the Customer with OSS content

	ASTRO25	Motorola Linux Kickstart	A7.7	Linux Loader	anaconda	http://www.redhat.com	10.1.1.63-4	GPLv2
	ASTRO25	Motorola Linux Kickstart	A7.7	Linux Screen Logout utility	doinkd	http://sourceforge.net/projects/idled/	0.01-2	GPLv2
	ASTRO25	Motorola Linux Kickstart	A7.7	Linux OS Hardening Utility	Bastille	http://bastille-linux.sourceforge.net/	3.0.9-1.0	GPLv2
	ASTRO25	Motorola Linux Kickstart	A7.7	Linux file integrity monitoring daemon	samhain	http://www.la-samhna.de/beltane/	2.4.2-1	GPLv2
	ASTRO25	Motorola Linux Kickstart	A7.7	Linux Logging Utility	syslog-ng	http://www.balabit.com/network-security/syslog-ng/	1.6.8-3	GPLv2
	ASTRO25	Motorola Linux Kickstart	A7.7	is a library written by the author of syslog-ng	libol	www.balabit.com/downloads/	0.316-2	GPLv2
	ASTRO25	Firewall Manager Server	A7.7	Juniper Netscreen Firewall Manager	Postgres	http://www.juniper.net/us/en/solutions/enterprise/branch/?gclid=CKiQzY2wipkCFSEgDQodgHI	8.1.7-3.el4	BSD Type (contained in Juniper Commercial
KMF Client & Server								
TBD - Link to ASE Justification	ASTRO25	KMF	A7.7	runtime environment	Java Development Kit	http://www.java.com	1.6.0_01	Sun Binary and Supplemental Licenses
TBD - Link to ASE Justification	ASTRO25	KMF	A7.7	application server	jboss	http://www.jboss.org/	4.0.5.GA	LGPLv2.1
TBD - Link to ASE Justification	ASTRO25	KMF	A7.7	reporting engine	JasperReports	http://jasperforge.org/	1.3.1	LGPLv2.1
TBD - Link to ASE Justification	ASTRO25	KMF	A7.7	graphics	Macromedia Flash Player	http://www.adobe.com/	8	Adobe Distribution License
TBD - Link to ASE Justification	ASTRO25	KMF	A7.7	server service	Java Service Wrapper	http://wrapper.tanukisoftware.org	3.2.0	BSD Type License
Common Solaris Platform (GAS) / Trunking Controllers								
	ASTRO25	Zone Controller	A7.7	Protocol Stack	CMU SNMP	http://net-snmp.sourceforge.net		BSD Type
	ASTRO25	Zone Controller	A7.7	Scripting language	Tcl/Tk	http://www.tcl.tk	7.4	TCL/TK License
	ASTRO25	Generic Applicatoin Server	A7.7	Software Library	ncurses	http://www.sunfreeware.com/	5.6	MIT Type License
	ASTRO25	Generic Applicatoin Server	A7.7	Software Library	popt	http://www.sunfreeware.com/	1.7	MIT Type License
	ASTRO25	Generic Applicatoin Server	A7.7	Software Library	sudo	http://www.sunfreeware.com/	1.6.9p13	http://www.sudo.ws/sudo/license.html
	ASTRO25	Generic Applicatoin Server	A7.7	Software Library	rsync	http://www.sunfreeware.com/	2.6.9	GPLv2
	ASTRO25	Generic Applicatoin Server	A7.7	Software Library	libintl	http://www.sunfreeware.com/	3.4.0	LGPLv2
	ASTRO25	Generic Applicatoin Server	A7.7	Software Library	libiconv	http://www.sunfreeware.com/	1.11	LGPLv2
	ASTRO25	Generic Applicatoin Server	A7.7	Software Library	libgcc	http://www.sunfreeware.com/	3.4.6	GPLv2 with Exception Terms for Linking
	ASTRO25	Generic Applicatoin Server	A7.7	Software Library	libdwarf	http://reality.sgiweb.org/davea/dwarf.html	20081013	LGPLv2
	ASTRO25	Generic Applicatoin Server	A7.7	Programming Languuage	perl - built into Solaris 10 distribution	http://www.perl.org/	5.8.4	Artistic License
	ASTRO25	Generic Applicatoin Server	A7.7	Software Library	perl add on modules - included in Solaris 10 distribution	http://cpan.org		Artistic License

	ASTRO25	Generic Applicatoin Server	A7.7	Protocol Stack	NET-SNMP		5.3.0.1	BSD Type
	ASTRO25	Generic Applicatoin Server	A7.7	Communication Framework	ACE	http://www.cs.wustl.edu/~schmidt/	5.6.1	ACE/TAO License
	ASTRO25	Generic Applicatoin Server	A7.7	Communication Framework	TAO	http://www.cs.wustl.edu/~schmidt/	1.6.1	ACE/TAO License
	ASTRO25	Generic Applicatoin Server	A7.7	Compression	gzip - included in Solaris 10 distribution	http://www.gzip.org/	1.3.5	GPLv2
	ASTRO25	DTI1000	A7.7	Runtime Environment	Java Runtime Environment	http://java.sun.com/	1.6.0 Update 7	Sun Binary and Supplemental Licenses
	ASTRO25	Generic Applicatoin Server	A7.7	Protocol Stack	OpenSSL - comes with Solaris 10	http://www.sun.com		BSD Type
	ASTRO26	Generic Applicatoin Server	A7.7	Runtime Environment - Comes with Solaris 10	Java Runtime Environment - Comes with Solaris 10	http://java.sun.com/	1.5.0_17	Sun Binary and Supplemental Licenses
	ASTRO27	Generic Applicatoin Server	A7.7	Scripting language	Tcl/Tk 8.3 - Comes with Solaris 10 SUNWTk	http://www.tcl.tk	11.10.0	TCL/TK License
Network Management Servers / Clients								
	GNMO	NM Client	A7.7	runtime environment	Java Runtime Environment	http://www.java.com	1.6.0_03	Sun Binary and Supplemental Licenses
	GNMO	NM Client	A7.7	ACE/TAO – framework	ACE/TAO	http://www.cs.wustl.edu/~schmidt/ACE-sitemap.html	ACE 5.6.1, TAO 1.6	ACE/TOA License (MIT/BSD Type)
	GNMO	NM Client	A7.7	Logging utility	Log4j	http://logging.apache.org/log4j/docs/index.html	1.2.14	Apache 2.0
	GNMO	NM Client (SWDL Mgr)	A7.7	Java FTP Client	jFTP		2.0b1	MIT Type
	GNMO	NM Client	A7.7	SSH, Telnet and Rlogin client	PuTTy	http://www.chiark.greenend.org.uk/~sgtatham/putty/	Quest-PuTTY-0.60_q1.129	BSD/MIT Type
	GNMO	NM Client	A7.7	parse file in directories	jLEX	http://www.cs.princeton.edu/~appel/modern/java/JLex/	1.2	BSD/MIT Type
	GNMO	NM Client	A7.7	parse file in directories	jCup	http://www.cs.princeton.edu/~appel/modern/java/CUP/	10j	BSD/MIT Type
	GNMO	NM Client	A7.7	jTreetableGUI	SUN jTreetableGUI package		1	BSD Type
	GNMO	NM Client	A7.7	command line utility	MD5 Command Line Message Digest Utility	http://www.fourmilab.ch/	2.2	Public Domain
	GNMO	NM Client	A7.7	Java implementation of SSH2	Jsch	http://www.jcraft.com/jsch	0.1.40	BSD type
	GNMO	PNM Server	A7.7	SNMP support	SNMP++	http://www.agentpp.com/	3.2.10	BSD/MIT Type
	GNMO	PNM Server	A7.7	integrated development environment	Apache Tomcat	http://tomcat.apache.org/	6.0.13	Apache 2.0
	GNMO	PNM Server	A7.7	XML and XSLT	Xalan-Java	http://xml.apache.org/xalan-j/	2.7.0	Apache 2.0
	GNMO	PNM Server	A7.7	JAVA library	xerces	http://xerces.apache.org/xerces-j/	2.7.1	Apache 1.1
	GNMO	PNM Server	A7.7	Protocol Stack	CMU SNMP	http://net-snmp.sourceforge.net	1990	BSD Type
	GNMO	PNM Server	A7.7	Protocol Stack	ASNMP		2.1	BSD/MIT Type
	GNMO	PNM Server	A7.7	OS utilities	less	http://www.mvista.com/	358-mvl3.0.0.1	BSD Type
	GNMO	PNM Server	A7.7	OS utilities	Top	http://www.groupsys.com/top	3.5beta12	BSD Type
	GNMO	PNM Server	A7.7	Voyence component	JacORB freeware	http://www.jacorb.org	1.3	LGPLv2
	GNMO	PNM Server	A7.7	Programming language	tcl	http://www.tcl.tk/software/tcltk/8.4.html	8.3	Tcl/tk

	GNMO	PNM Server	A7.7	runtime environment	JAVATM 2 RUNTIME ENVIRONMENT	http://java.sun.com/j2se/1.4.2/download.html, http://java.sun.com/java se/downloads/index_jdk5.jsp	1.5.0_16 1.5.0_13	SUN J2RE
	GNMO	PNM Server	A7.7	Programming language	perl	http://www.perl.org/	5.8.4 5.8.8	Artistic
	GNMO	PNM Server	A7.7	OS utilities	sudo	http://www.sudo.ws/	1.6.6	UCB
	GNMO / STM	Air Traffic Router	A7.7	OS utilities	sudo	http://www.sudo.ws/	1.6.6	UCB
	GNMO	PNM Server	A7.7	Compression	GZIP	http://www.gzip.org/	1.3.3	GPLv2
	GNMO	PNM Server	A7.7	SNMP Library	Scotty		2.1.10	BSD/MIT Type
	GNMO	PNM Server	A7.7	ACE – framework	ACE/TAO	http://www.cs.wustl.edu/~schmidt/ACE-sitemap.html	ACE 5.6.1, TAO 1.6.1	ACE/TOA License (MIT/BSD Type)
	GNMO	PNM Server	A7.7	ZIP compression and archivation library	Zip, UnZip	http://www.info-zip.org/	Zip 2.32, UnZip 5.52	BSD Type
	GNMO / STM	Air Traffic Router	A7.7	Language Interpreter	TCL	http://tcl.sourceforge.net/	8.3	TCL/TK License
	GNMO / STM	Air Traffic Router	A7.7	library	ICU	http://icu-project.org/	1.2	BSD Type
	GNMO / STM	Air Traffic Router	A7.7	DSSA and ATR Agents are java application.	Java Runtime Environment	http://java.sun.com/	1.5.0_16	Sun Binary and Supplemental Licenses
	GNMO / STM	Air Traffic Router	A7.7	Object Oriented programming toolkit for using SNMP	ASNMP	http://snmp.adventnet.com/	5.4	BSD Type
	GNMO	PNM Server	A7.7	library	NET-SNMP(Motorola Common Agent)	http://snmp.adventnet.com/	5.3.0.1 (modified by Motorola)	BSD Type
	GNMO / STM	Air Traffic Router	A7.7	library	NET-SNMP(Motorola Common Agent)	http://snmp.adventnet.com/	5.3.0.1 (modified by Motorola)	BSD Type
	GNMO / STM	Air Traffic Router	A7.7	library	Xerces-C	http://xerces.apache.org/xerces-c/	2.7.0	Apache 2.0
	GNMO	PNM Server	A7.7	library	Open SSL	http://www.openssl.org/	0.9.8d	BSD Type
	GNMO / STM	Air Traffic Router	A7.7	library	Open SSL	http://www.openssl.org/	0.9.8d	BSD Type
	GNMO	PNM Server	A7.7	ACE – framework	ACE/TAO	http://www.cs.wustl.edu/~schmidt/ACE-sitemap.html	ACE 5.6.1, TAO 1.6.1	ACE/TOA License (MIT/BSD Type)
	GNMO / STM	Air Traffic Router	A7.7	Scripting language	Perl	http://www.perl.org/	5.8.4	Artistic License
	GNMO / STM	GNMO Servers	A7.7	Implementation of the SSL and TLS protocols	Open SSL	http://www.openssl.org/	0.9.7d	BSD Type
	GNMO	PNM Server	A7.7	http server	Apache HTTP Server	http://www.apache.org/	2.0.59 2.0.63	Apache 2.0
MOSCAD								
	Fixed Data – NFM and FSA	Graphical Master Computer, Graphical Workstation, Alerting Master Computer, Alerting LAN Computer	A7.7	OS utilities	setacl	http://setacl.sourceforge.net/	2.0.2.0	GPLv2

	Fixed Data – NFM and FSA	SDM3000 Remote Terminal Unit (RTU), Basic and Advanced models; SDM3000 Network Translator (SNT); and the SDM3000 Builder GUI configuration tool (running on Microsoft® Windows platform).	A7.7	Timezone database	Olson TZ database	http://www.twinsun.com/tz/tz-link.htm	2008h - code 2008i - data	Public Domain
	Fixed Data – NFM and FSA	SDM3000 Remote Terminal Unit (RTU), Basic and Advanced models, SDM3000 Network Translator (SNT)	A7.7	XML free/open source library	Arabica	http://www.jezuk.co.uk/arabica	2004-february	BSD style
	Fixed Data – NFM and FSA	SDM3000 Builder GUI	A7.7	IP Address GUI control	Ariad IP Address Control	http://www.freevbcode.com/ShowCode.Asp?ID=368	1.2.0.19	Freeware
	Fixed Data – NFM and FSA	SDM3000 Builder GUI	A7.7	Balloon GUI control	Balloon.Net	http://www.codeproject.com/cs/miscctrl/balloonnet.asp	1.0.1885.37343	CPOL 1.02
	Fixed Data – NFM and FSA	SDM3000 Builder GUI	A7.7	TFTP server	tftpd32	http://tftpd32.jounin.net/	2.84	Freeware
	Fixed Data – NFM and FSA	SDM3000 Remote Terminal Unit (RTU)	A7.7	OS utilities	BusyBox	http://www.busybox.net/	1.4.2	GPLv2
	Fixed Data – NFM and FSA	SDM3000 Remote Terminal Unit (RTU)	A7.7	web server CGI	CGICC	http://www.gnu.org/software/cgicc/	3.2.2	GPLv2
	Fixed Data – NFM and FSA	SDM3000 Remote Terminal Unit (RTU)	A7.7	Security library	cracklib	http://sourceforge.net/projects/cracklib	2.8.9	GPLv2
	Fixed Data – NFM and FSA	SDM3000 Remote Terminal Unit (RTU)	A7.7	DHCP Daemon	DHCPD	http://www.isc.org/index.pl?/sw/dhcp /	3.0.5	?
	Fixed Data – NFM and FSA	SDM3000 Remote Terminal Unit (RTU)	A7.7	Process control daemon	doinkd	http://linux.softpedia.com/get/System/Monitoring/doinkd-12649.shtml	0.01	GPLv2
	Fixed Data – NFM and FSA	SDM3000 Remote Terminal Unit (RTU)	A7.7	XML free/open source library	Expat	http://expat.sourceforge.net/	1.95.7	MIT
	Fixed Data – NFM and FSA	SDM3000 Remote Terminal Unit (RTU)	A7.7	web server	HTTPD	http://httpd.apache.org /	2.2.10	Apache2.2
	Fixed Data – NFM and FSA	SDM3000 Remote Terminal Unit (RTU)	A7.7	Network library	libpcap	http://www.tcpdump.org /	0.9.5	BSD style
	Fixed Data – NFM and FSA	SDM3000 Remote Terminal Unit (RTU)	A7.7	library providing ping support	libping	http://directory.fsf.org/project/libping/	1.15	GPLv2
	Fixed Data – NFM and FSA	SDM3000 Remote Terminal Unit (RTU)	A7.7	module for Apache httpd	mod_evasive	http://www.zdziarski.com/projects/mod_evasive/	1.10.1	GPLv2
	Fixed Data – NFM and FSA	SDM3000 Remote Terminal Unit (RTU)	A7.7	module for Apache httpd	modsecurity	http://www.modsecurity.org/	1.9.4	GPLv2

Fixed Data – NFM and FSA	SDM3000 Remote Terminal Unit (RTU)	A7.7	Operating System Kernel	Linux Pro Kernel	http://www.mvista.com/	3	GPLv2
Fixed Data – NFM and FSA	SDM3000 Remote Terminal Unit (RTU)	A7.7	Compression library	bzip2-dev	http://www.mvista.com/	1.0.2-mvl3.0.0.3	BSD style
Fixed Data – NFM and FSA	SDM3000 Remote Terminal Unit (RTU)	A7.7	OS utilities	cron	http://www.mvista.com/	3.0p11-mvl3.0.0.4	GPLv2
Fixed Data – NFM and FSA	SDM3000 Remote Terminal Unit (RTU)	A7.7	OS utilities	diff	http://www.mvista.com/	2.7-mvl3.0.0.3	GPLv2
Fixed Data – NFM and FSA	SDM3000 Remote Terminal Unit (RTU)	A7.7	OS utilities	e2fsprogs	http://www.mvista.com/	1.22-mvl3.0.0.2	GPL v2 w/ exception
Fixed Data – NFM and FSA	SDM3000 Remote Terminal Unit (RTU)	A7.7	OS utilities	fileutils	http://www.mvista.com/	4.1-mvl3.0.0.2	GPLv2
Fixed Data – NFM and FSA	SDM3000 Remote Terminal Unit (RTU)	A7.7	OS utilities	findutils	http://www.mvista.com/	4.1.7-mvl3.0.0.2	GPLv2
Fixed Data – NFM and FSA	SDM3000 Remote Terminal Unit (RTU)	A7.7	OS utilities	glibc	http://www.mvista.com/	2.2.5-mvl3.0.0.15.5	GPLv2
Fixed Data – NFM and FSA	SDM3000 Remote Terminal Unit (RTU)	A7.7	OS utilities	hardhatutils	http://www.mvista.com/	1.14-mvl3.0.0.10	GPLv2
Fixed Data – NFM and FSA	SDM3000 Remote Terminal Unit (RTU)	A7.7	OS utilities	hostname	http://www.mvista.com/	2.09-mvl3.0.0.1	GPLv2
Fixed Data – NFM and FSA	SDM3000 Remote Terminal Unit (RTU)	A7.7	OS utilities	iputils-ping	http://www.mvista.com/	20020124-mvl3.0.0.1	Multiple Publicly Available Software Licenses
Fixed Data – NFM and FSA	SDM3000 Remote Terminal Unit (RTU)	A7.7	OS utilities	less	http://www.mvista.com/	358-mvl3.0.0.1	BSD style
Fixed Data – NFM and FSA	SDM3000 Remote Terminal Unit (RTU)	A7.7	Common library	libdb3	http://www.mvista.com/	3.2.9-mvl3.0.0.7	Multiple Publicly Available Software Licenses
Fixed Data – NFM and FSA	SDM3000 Remote Terminal Unit (RTU)	A7.7	Common library	libgcc1	http://www.mvista.com/	3.2.1-mvl3.0.0.5.8	GPLv2
Fixed Data – NFM and FSA	SDM3000 Remote Terminal Unit (RTU)	A7.7	Common library	libgdbm-dev	http://www.mvista.com/	1.7.3-mvl3.0.0.1	GPLv2
Fixed Data – NFM and FSA	SDM3000 Remote Terminal Unit (RTU)	A7.7	Common library	libncurses	http://www.mvista.com/	5.2-mvl3.0.0.5	Multiple Publicly Available Software Licenses
Fixed Data – NFM and FSA	SDM3000 Remote Terminal Unit (RTU)	A7.7	Common library	libstdc++5-dev	http://www.mvista.com/	3.2.1-mvl3.0.0.5.8	GPLv2
Fixed Data – NFM and FSA	SDM3000 Remote Terminal Unit (RTU)	A7.7	Common library	libwrap	http://www.mvista.com/	7.6-mvl3.0.0.4	BSD style
Fixed Data – NFM and FSA	SDM3000 Remote Terminal Unit (RTU)	A7.7	OS utilities	nano	http://www.mvista.com/	1.0.3-mvl3.0.0.1	GPLv2

	Fixed Data – NFM and FSA	SDM3000 Remote Terminal Unit (RTU)	A7.7	Network utiltities	netkit-telnet-client; netkit-telnet-server	http://www.mvista.com/	0.17-mvl3.0.0.7; 0.17-mvl3.0.0.7	BSD style
	Fixed Data – NFM and FSA	SDM3000 Remote Terminal Unit (RTU)	A7.7	Network utiltities	net-tools	http://www.mvista.com/	1.60-mvl3.0.0.2	GPLv2
	Fixed Data – NFM and FSA	SDM3000 Remote Terminal Unit (RTU)	A7.7	Network utiltities	ntp	http://www.mvista.com/	4.0.99g-mvl3.0.0.3	BSD style
	Fixed Data – NFM and FSA	SDM3000 Remote Terminal Unit (RTU)	A7.7	OS utilities	portmap	http://www.mvista.com/	5beta-mvl3.0.0.2	BSD style + Sun
	Fixed Data – NFM and FSA	SDM3000 Remote Terminal Unit (RTU)	A7.7	OS utilities	procps	http://www.mvista.com/	2.0.7-mvl3.0.0.3	GPLv2
	Fixed Data – NFM and FSA	SDM3000 Remote Terminal Unit (RTU)	A7.7	OS utilities	readline	http://www.mvista.com/	4.1-mvl3.0.0.2	GPLv2
	Fixed Data – NFM and FSA	SDM3000 Remote Terminal Unit (RTU)	A7.7	OS utilities	rpm; rpm-build; rpm-dev	http://www.mvista.com/	4.0-mvl3.0.0.8; 4.0-mvl3.0.0.8; 4.0-mvl3.0.0.8	GPLv2
	Fixed Data – NFM and FSA	SDM3000 Remote Terminal Unit (RTU)	A7.7	OS utilities	shadow	http://www.mvista.com/	20000902-mvl3.0.0.3	BSD style
	Fixed Data – NFM and FSA	SDM3000 Remote Terminal Unit (RTU)	A7.7	OS utilities	shellutils	http://www.mvista.com/	2.0.11-mvl3.0.0.3	GPLv2
	Fixed Data – NFM and FSA	SDM3000 Remote Terminal Unit (RTU)	A7.7	OS utilities	stat	http://www.mvista.com/	2.5-mvl3.0.0.2	GPLv2
	Fixed Data – NFM and FSA	SDM3000 Remote Terminal Unit (RTU)	A7.7	OS utilities	sysklogd	http://www.mvista.com/	1.3.31-mvl3.0.0.3	GPLv2
	Fixed Data – NFM and FSA	SDM3000 Remote Terminal Unit (RTU)	A7.7	OS utilities	sysvinit	http://www.mvista.com/		GPLv2
	Fixed Data – NFM and FSA	SDM3000 Remote Terminal Unit (RTU)	A7.7	Network utiltities	tcpd	http://www.mvista.com/	7.6-mvl3.0.0.4	BSD style
	Fixed Data – NFM and FSA	SDM3000 Remote Terminal Unit (RTU)	A7.7	Network utiltities	tftp-hpa	http://www.mvista.com/	0.31-mvl3.0.0.1	BSD style
	Fixed Data – NFM and FSA	SDM3000 Remote Terminal Unit (RTU)	A7.7	Network utiltities	traceroute	http://www.mvista.com/	1.4a12-mvl3.0.0.3	BSD style
	Fixed Data – NFM and FSA	SDM3000 Remote Terminal Unit (RTU)	A7.7	OS utilities	util-linux	http://www.mvista.com/	2.11h-mvl3.0.0.4	Dual: UCB BSD or LGPL v2
	Fixed Data – NFM and FSA	SDM3000 Remote Terminal Unit (RTU)	A7.7	Encryption / Network utiltities/libraries	openssh	http://www.openssh.com/	5.1p1	BSD style
	Fixed Data – NFM and FSA	SDM3000 Remote Terminal Unit (RTU)	A7.7	Encryption / Network utiltities/libraries	openssl	http://www.openssl.org/	0.9.8i	Dual BSD or GPLv2
	Fixed Data – NFM and FSA	SDM3000 Remote Terminal Unit (RTU)	A7.7	Security library	pam	http://www.kernel.org/pub/linux/libs/pam/	0.99.6.3	BSD, GPL
	Fixed Data – NFM and FSA	SDM3000 Remote Terminal Unit (RTU)	A7.7	Library	PStreams	http://pstreams.sourceforge.net/	0.5.2	LGPLv2

	Fixed Data – NFM and FSA	SDM3000 Remote Terminal Unit (RTU)	A7.7	OS utilities	sudo	http://www.sudo.ws/	1.6.9p12	ISC/BSD Type
	Fixed Data – NFM and FSA	SDM3000 Remote Terminal Unit (RTU)	A7.7	Network utiltities	tcpdump	http://www.tcpdump.org/	3.9.5	BSD Type
	Fixed Data – NFM and FSA	SDM3000 Remote Terminal Unit (RTU)	A7.7	Boot Loader	U-Boot	http://www.denx.de/wiki/Uboot	1.1.1	GPLv2
	Fixed Data – NFM and FSA	SDM3000 Remote Terminal Unit (RTU)	A7.7	OS utilities	util-linux	http://www.kernel.org/pub/linux/utils/util-linux/	2.12r	BSD
	Fixed Data – NFM and FSA	SDM3000 Remote Terminal Unit (RTU)	A7.7	FTP Deamon	wu-ftpd	http://www.wu-ftpd.org /	2.6.2	BSD
	Fixed Data – NFM and FSA	SDM3000 Remote Terminal Unit (RTU)	A7.7	Network Deamon	xinetd	http://www.xinetd.org /	2.3.14	MIT/BSD Type
	Fixed Data – NFM and FSA	SDM3000 Remote Terminal Unit (RTU)	A7.7	compression library	zlib	http://www.zlib.net/	1.2.3	BSD/MIT

Third Party Software

Manufacturer	7.7 Version
Adobe	Version 9
Infovista	07.00.02
Infovista	3.2SP1
Infovista	Win2003R2, SP2
Juniper Networks	NSM2007.1r1
Microsoft	R06.00.01
Microsoft	Windows 2003 SP2
Quest Software (Formerly known as Sitraka/http://www.sitraka.com/jclass/licensing.shtml)	3.3.2
Red Hat	Linux V4 Update 6
Red Hat	Linux V4 Update 6
Red Hat	Linux V4 Update 6
RSA	6.1
RSA	Version N/A
RSA	6.1
RSA	6.1
RSA	6.1
RSA	6.1
Symantec	10.2.1 Vista, 10.1.7 XP&2003
Symantec	10.2.1 Vista, 10.1.7 XP&2003
Symantec	10.2.1 Vista, 10.1.7 XP&2003
WindRiver	Not in A7.7
WindRiver	Not in A7.7
WindRiver	Not in A7.7
WindRiver	Not in A7.7
AdventNet	6.0.1
Enea OSE Systems	6.x Family
Enea OSE Systems	6.x Family
Enea OSE Systems	6.x Family
Enea OSE Systems	6.x Family
Enea OSE Systems	4.6.1
Enea OSE Systems	4.6.1
Enea OSE Systems	4.6.1
Enea OSE Systems	4.6.1
Enea OSE Systems	4.6.1
WindRiver	2.5.4
WindRiver	3.0

Accelerated Technologies INC [of Mentor Graphics]	Version N/A
Brooktrout	7.6
Digital Voice Systems Incorporated [DVSI]	1.4.0
Digital Voice Systems Incorporated [DVSI]	Version N/A
Identify Software INC	6.5
Macrovision [formerly Installshield]	8.0
Macrovision [formerly Installshield]	12.0
Microsoft	Regular Version 6.0 .Net Version 7.1.3088
Symantec	9.0
WindRiver	4.3F
WindRiver	3.1.3
WindRiver	2.5
AdventNet	v4.0.4
Digital Voice Systems Incorporated [DVSI]	AMBE+2 FEC decoder (Version 1.4.0)
Digital Voice Systems Incorporated [DVSI]	Dual Rate AMBE+2 vocoder (Version 1.5.0)
AdventNet	Proposal: AdventNet SNMP API 4 (Release 4.0.0)
Borland	9.0.0.206
Borland	2009
DataDirect Technologies	5.1.0.44
Microsoft	7.0.6001.18000
Microsoft	Not in A7.7
Microsoft	Not in A7.7
Motorola Embedded Communication Computer Group (ECCG) (Microsoft OS)	Business (32-bit x86)
Motorola Embedded Communication Computer Group (ECCG) (Microsoft OS)	SP1
Seagate Crystal	11.5
AdventNet	AdventNet SNMP API 4 (Release 4.0.4)
AdventNet	AdventNet WebNMS 4.7 Professional SP-3_30
Borland	IB 2009
Macrovision (Fmr. Globetrotter)	9.2
Motorola Embedded Communication Computer Group (ECCG) (Sun O/S)	Solaris 10 update 5
MySql AB	5.0.67
Quest Software (Formerly known as Sitraka/http://www.sitraka.com/jclass/licensing.shtml)	3.1.2.11
Sun MicroSystems	1.2
Sun MicroSystems	6.3
Voyence	4.0
Oracle	(PDG ONLY) R3.3.11
Juniper Networks	ScreenOS 5.4r10
Hifn Intelligent Secure Networking	3.4
Macrovision [formerly Installshield]	4.5
Signals & Software Ltd	G728/C5400/SRC
Adobe	v9.0.0
Crystal Reports	2008
FarPoint	3.5
FarPoint	v3.0
Hewlett Packard (HP)	ML110 G5
Hewlett Packard (HP)	ML110 G5
Hewlett Packard (HP)	xw4600
Hewlett Packard (HP)	xw4600

Hewlett Packard (HP)	xw4600
Hewlett Packard (HP)	xw4600
Hilgraeve	8.4
Macrovision [formerly Installshield]	2008 + hotfixes
McObject	2.2
Microsoft	2.0
Microsoft	1.1 + SP1
Microsoft	6.0 [6.0.88.4]
Microsoft	3.0 [3.0.8449.0]
Microsoft	3.60 [1.1]
Microsoft	Win 2000, NT, XP, 2003
Microsoft	2.7, 2.8
Microsoft	6.0 [6.0.8665.0]
Microsoft	6.0 [6.0.8797.0]
Microsoft	6.0 [6.0.84.18]
Microsoft	[4.71.1460.1]
Microsoft	2.7 (English) [1.1.0.0]
Microsoft	6.0 [6.0.88.42]
Microsoft	5.0 [5.1.81.4]
Microsoft	6.0 [6.0.81.69]
Microsoft	6.0 [6.0.88.4]
Microsoft	6.0 [6.0.81.69]
Microsoft	6.0 [6.0.84.18]
Microsoft	4.0 (English) [1.0.0.0]
Microsoft	[2.40.4275.1]
Microsoft	2.0 [6.0.88.4]
Microsoft	6.0 [6.0.88.42]
Microsoft	(6.0) [6.0.88.12]
Microsoft	MS SQL server 2005 Standard Edition with Service Pack 2
Microsoft	5.2.3790.0
Symantec	10.2.1 (10.1.5)
Symantec	10.2.1 (10.1.5)
Symantec	Not in A7.7
Tactical Software	4.8.5
WeOnlyDo.Com	2.2.6.74
WeOnlyDo.Com	2.0.9
WindRiver	5.5.1
Wonderware	7.1.1.1
Wonderware	10.0 with hotfixes
Wonderware	10.0 with hotfixes
Wonderware	7.5.1.3
Wonderware	7.5.0.7
Wonderware	6.0 with SP2
Acresso (Macrovision)	Not included in A7.7
Avaya (Fmrly: Alliance Systems)	MIL_TOOLKITS _D01.00.50
Back Base	Not included in A7.7
Red Hat	RHEL ES Version 4 Update 6
SleepyCat	R3.3.11
AdventNet	V5.0
Data Light	4.02.292
WindRiver	2.5.4
WindRiver	3.0
WindRiver	1.53
WindRiver	4.0.0
WindRiver	3.5.1
WindRiver	4.05
AdventNet	V5.0
Data Light	4.02.292
WindRiver	2.5.4
WindRiver	3.0
WindRiver	1.53
WindRiver	4.0.0
WindRiver	3.5.1
WindRiver	4.05
AdventNet	6.0.1
Enea OSE Systems	4.6.1
Enea OSE Systems	4.6.1
Enea OSE Systems	4.6.1
Enea OSE Systems	4.6.1
Enea OSE Systems	4.6.1
WindRiver	2.5.4
WindRiver	6.x Family

WindRiver	6.x Family
WindRiver	6.x Family
WindRiver	6.x Family
WindRiver	3.0
Express Logic, Inc.	Not in A7.7
WindRiver	Not in A7.7
WindRiver	Not in A7.7
WindRiver	Not in A7.7
WindRiver	Not in A7.7
WindRiver	Not in A7.7
WindRiver	Not in A7.7
WindRiver	Not in A7.7
Acresso Software	5.03
AdventNet	4
Hewlett Packard (HP)	7.5.1
Hewlett Packard (HP)	7.5.1
Microsoft	Windows Server 2003 Standard Edition Service Pack 2
Microsoft	Windows Vista Business Service Pack 1
ORACLE	10.1.0.2 10.1.0.5
Sun MicroSystems	1.6.0_01
Motorola Embedded Communication Computer Group (ECCG) (w/ WindRiver O/S)	2.5
AdventNet	5.1, 6.0.1
Enea OSE Systems	4.6.1
Enea OSE Systems	4.6.1
Enea OSE Systems	4.6.1
Enea OSE Systems	4.6.1
Enea OSE Systems	4.6.1
WindRiver	2.5.4
WindRiver	6.x Family
WindRiver	6.x Family
WindRiver	6.x Family
WindRiver	6.x Family
WindRiver	3.0
AdventNet	5.1, 6.0.1
Enea OSE Systems	4.6.1
Enea OSE Systems	4.6.1
Enea OSE Systems	4.6.1
Enea OSE Systems	4.6.1
Enea OSE Systems	4.6.1.
WindRiver	2.5.4
WindRiver	6.x Family
WindRiver	6.x Family
WindRiver	6.x Family
WindRiver	6.x Family
WindRiver	3.0
AdventNet	5.1, 6.0.1
Enea OSE Systems	4.6.1
Enea OSE Systems	4.6.1
Enea OSE Systems	4.6.1
Enea OSE Systems	4.6.1
Enea OSE Systems	4.6.1
WindRiver	2.5.4
WindRiver	6.x Family
WindRiver	6.x Family
WindRiver	6.x Family
WindRiver	6.x Family
WindRiver	3.0
AdventNet	5.1, 6.0.1
Enea OSE Systems	4.6.1
Enea OSE Systems	4.6.1
Enea OSE Systems	4.6.1
Enea OSE Systems	4.6.1
Enea OSE Systems	4.6.1
WindRiver	2.5.4
WindRiver	6.x Family
WindRiver	6.x Family
WindRiver	6.x Family
WindRiver	6.x Family
WindRiver	3.0
AdventNet	V5.0
Data Light	4.02.292
WindRiver	2.5.4
WindRiver	3.0
WindRiver	1.53

WindRiver	4.0.0
WindRiver	3.5.1
WindRiver	4.05
Crystal	11.0 release 2 with Service Pack 3
Distinct	5.0
AdventNet	3.2, 4.2
AdventNet	3.2, 4.2
Borland	IB 2009
Macrovision (Fmr. Globetrotter)	Not in A7.7
Motorola Embedded Communication Computer Group (ECCG) (SUN O/S)	10 update 5
Quest Software (Formerly known as Sitraka/http://www.sitraka.com/jclass/licensing.shtml)	3.1.2.11
Sun MicroSystems	1.2
Sun MicroSystems	To be produced post release
Avaya	TT1145a + TT1425a (T1) or TT1426a (E1)
Envox	v 6.1
Intel	TT1356a (T1) TT1357a (E1)
Symantec	NA
AdventNet	NA
Oracle USA Inc.	NA
Quest Software (Formerly known as Sitraka/http://www.sitraka.com/jclass/licensing.shtml)	3.3.2.118
Sun MicroSystems	1.6.8
Sun MicroSystems	1.5.0_16
Sun MicroSystems	
Sun MicroSystems	Not produced yet
Sun MicroSystems	4.22.33
Sun MicroSystems	4.22.33
Sun MicroSystems	4.2.33
Sun MicroSystems	Solaris 10u5
Sun MicroSystems	7.1.6
AdventNet	6.0.1
Digital Voice Systems Incorporated [DVSI]	1.5.0
Enea OSE Systems	5.3
Express Logic, Inc.	Version?
Freescale	5.3
Motorola MD	3.3
WindRiver	2.5.4
WindRiver	6.x Family
WindRiver	6.x Family
WindRiver	6.x Family
WindRiver	6.x Family
WindRiver	3.0

EXHIBIT B
FORM OF LEASE AGREEMENT

FORM OF EQUIPMENT LEASE-PURCHASE AGREEMENT

Lease Number: _____

LESSEE: **LESSOR:**

CITY OF PHILADELPHIA   _____

This Equipment Lease-Purchase Agreement (the "Agreement") sets forth the terms and conditions pursuant to which Lessee may lease from Lessor the Equipment set forth on Schedule A hereto (the "Equipment") in connection with   the purchase and installation of certain equipment and related software to upgrade the City's 800 MHz trunked radio communications system to an ASTRO 25 Internet Protocol-based radio system pursuant to Amendment No. 3 to Contract No. 99-0844 between Motorola, Inc. (hereinafter, Vendor) and the City of Philadelphia (hereinafter, Lessee or City) executed by Vendor and Lessee contemporaneously with this Agreement, as described in Schedule A attached hereto, and with Lease payments as set forth on Lease Payment Schedule B attached hereto. In this Agreement the term "Contract" refers to Contract No. 99-0844 as amended by Amendments No. 1-3.

      1. CREATION OF ACQUISITION ESCROW FUND; TERM.   This Agreement will become effective upon the date of execution hereof by Lessor and Lessee (the "Commencement Date"). On the Commencement Date, Lessor shall pay $31,000,000 to the Escrow Agent, who shall act in accordance with an escrow agreement in substantially the form attached hereto as Schedule D (the "Escrow Agreement") and who shall deposit such sum into an account (the "Equipment Acquisition Fund") to purchase the Equipment listed in Schedule A as provided for in the Escrow Agreement. The moneys in the Equipment Acquisition Fund and any investments held as part of such Equipment Acquisition Fund shall be held in trust and, except as otherwise provided in this Agreement or the Escrow Agreement, shall be applied by the Escrow Agent solely in accordance with the Milestone Payment Schedule as set forth in the Contract at Appendix F and Milestones identified in Payment Request and Acceptance Certificates from Lessee in the form provided by Exhibit A to the Escrow Agreement. The term of this Agreement will commence on the Commencement Date and unless (i) terminated according to terms hereof or (ii) Lessee exercises the purchase option provided in Section 18, this Agreement will continue for four years after the Commencement Date (the "Lease Term") or until terminated in accordance with the terms hereof.

      2. LEASE PAYMENTS.   Lessee agrees to pay to Lessor, or an Assignee as may be approved pursuant to Section 15 of this Agreement, the Lease Payments (herein so called), including the interest portion, in the amounts specified in Lease Payment Schedule B. The Lease Payments will be payable without notice or demand at the office of the Lessor (or such other place as Lessor or its assignee may from time to time designate in writing), and will commence on the first Lease Payment Date and thereafter on each of the Lease Payment Dates set forth in Lease Payment Schedule B. Except as specifically provided in Section 5 hereof, the Lease Payments will be absolute and unconditional in all events and will not be subject to any set-off, defense, counterclaim, or recoupment for any reason whatsoever. Lessee reasonably believes that funds will be made available sufficient to make all Lease Payments when due during the Lease Term and hereby covenants that it will do all things lawfully within its power to obtain, maintain and properly request and pursue funds from which the Lease Payments may be made, including making provisions for such payments in each budget submitted for the purpose of obtaining funding, using its bona fide best efforts to have such portion of the budget approved, and exhausting all available administrative reviews and appeals in the event such portion of the budget is not approved. It is Lessee's intent to make Lease Payments for the full Lease Term if funds are legally available therefor and in that regard Lessee represents that the Equipment will be used for one or more authorized governmental or proprietary functions essential to its proper, efficient and economic operation.

      3. DELIVERY AND ACCEPTANCE.   Vendor will cause the Equipment to be delivered to Lessee at the location specified in the Contract ("Equipment Location"). Lessee will accept the Equipment according to the acceptance criteria provided in the Contract. Lessee will evidence such acceptance of the Equipment by executing and delivering to Lessor a Delivery and Acceptance Certificate in substantially the form attached hereto as Schedule C.

      4. DISCLAIMER OF WARRANTIES; LIMITATION OF LIABILITY.   Lessee acknowledges that the Equipment leased pursuant to this Agreement is being manufactured and installed by Vendor pursuant to the Contract. LESSEE FURTHER ACKNOWLEDGES THAT LESSOR MAKES NO EXPRESS OR IMPLIED WARRANTIES OF ANY NATURE OR KIND WHATSOEVER, AND AS BETWEEN LESSEE AND THE LESSOR (BUT NOT AS BETWEEN THE LESSEE AND MOTOROLA, INC.), THE PROPERTY SHALL BE ACCEPTED BY

LESSEE "AS IS" AND "WITH ALL FAULTS". LESSEE AGREES TO SETTLE ALL CLAIMS DIRECTLY WITH VENDOR AND WILL NOT ASSERT OR SEEK TO ENFORCE ANY SUCH CLAIMS AGAINST THE LESSOR. LESSOR SHALL NOT BE LIABLE FOR ANY DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES OF ANY CHARACTER AS A RESULT OF THE LESSEE'S PURCHASE OF THE EQUIPMENT FROM VENDOR, INCLUDING WITHOUT LIMITATION, LOSS OF PROFITS, PROPERTY DAMAGE OR LOST PRODUCTION WHETHER SUFFERED BY LESSEE OR ANY THIRD PARTY. Lessee covenants and agrees not to assert against the Lessor any claims or defenses by way of abatement, setoff, counterclaim, recoupment or the like which Lessee may have against Vendor. Lessor is not responsible for, and shall not be liable to Lessee for damages relating to loss of value of the Equipment for any cause or situation (including, without limitation, governmental actions or regulations or actions of other third parties). PROVIDED, HOWEVER, AS FOLLOWS: NOTHING CONTAINED IN THIS SECTION 4 SHALL PRECLUDE THE LESSEE FROM ENFORCING AS TO VENDOR ANY AND ALL OBLIGATIONS, WARRANTIES RIGHTS AND REMEDIES THAT MAY BE AVAILABLE TO THE LESSEE UNDER THE CONTRACT, ALL OF WHICH ARE EXPRESSLY RESERVED.

5. NON-APPROPRIATION OF FUNDS. Notwithstanding anything contained in this Agreement to the contrary, Lessee is obligated only to pay such Lease Payments from funds budgeted and appropriated for that purpose during Lessee's then current fiscal period, and shall be subject to Lessee's annual appropriations of funds for the Equipment procured under this Agreement by Lessee's governing body. Lessee's obligation to make Lease Payments shall not constitute a pledge of Lessee's full faith and credit within the meaning of any constitutional debt limitation. If sufficient funds have not been appropriated by Lessee to support continuation of this Agreement during any subsequent fiscal period, this Agreement shall terminate absolutely and without any further obligation on Lessee's part whatsoever. Lessee shall give Lessor notice of such termination at least 60 days prior to the end of the then current fiscal period. In the event the funds appropriated by Lessee's governing body or funds otherwise available by any means whatsoever in any fiscal period of Lessee for Lease Payments are insufficient therefor, this Agreement shall terminate on the last day of the fiscal period for which appropriations were received without penalty or expense to Lessee of any kind whatsoever, except as to the portions of Lease Payments for which funds shall have been appropriated and budgeted or are otherwise available. In the event of such termination, Lessee agrees to peaceably surrender possession of the Equipment to Lessor or its Assignee on the date of such termination. Lessor will have all legal and equitable rights and remedies to take possession of the Equipment. Notwithstanding the foregoing, Lessee agrees, to the extent not prohibited by law, that it will not cancel this Agreement under the provisions of this Section if any funds are appropriated to it, or by it, for the acquisition, retention or operation of the Equipment.

6. LESSEE'S REPRESENTATIONS AND WARRANTIES Lessee represents, warrants and covenants on the date hereof that: (a) Lessee is a state or a duly constituted political subdivision or agency of the state where the Equipment is to be located; (b) the execution, delivery and performance by the Lessee of this Agreement has been duly authorized by all necessary action on the part of the Lessee; (c) this Agreement constitutes a legal, valid and binding obligation of the Lessee enforceable in accordance with its terms; (d) Lessee will comply with the information reporting requirements of Section 149(e) of the Internal Revenue Code of 1986, as it may be amended from time to time (the "Code"), and such compliance shall include but not be limited to the execution of information statements requested by Lessor; (e) Except as otherwise permitted by Section 15, the Lessee will be the only entity to possess, use and operate the Equipment during the Lease Term; (f) Lessee will do or cause to be done all things necessary to preserve and keep the Agreement in full force and effect, (g) Lessee has complied with all applicable local, state and federal laws including without limitation laws regarding open meetings and public bidding, and by due notification presented this Agreement for approval and adoption as a valid obligation on its part, and (h) Lessee has sufficient appropriations or other funds available to pay all amounts due under this Agreement for the current fiscal period.

7. TAX AND ARBITRAGE REPRESENTATIONS. Lessee further represents on the date hereof as follows: (a) the estimated total costs of the Equipment listed in Lease Payment Schedule B will not be less than the total principal portion of the Lease Payments set forth in this Agreement; (b) no proceeds of this Agreement will be used to reimburse Lessee for expenditures made more than 60 days prior to the Commencement Date thereof or, if earlier, more than 60 days prior to any official action taken to evidence an intent to finance; (c) with regard to this Agreement, Lessee has not created or established, and does not expect to create or establish, any sinking fund or similar fund (i) that is reasonably expected to be used to pay the Lease Payments, or (ii) that may be used solely to prevent a default in the payment of the Lease Payments; (d) the Equipment listed in this Agreement has not been and is not expected to be sold or otherwise disposed of by Lessee, either in whole or in part, prior to the last maturity of Lease Payments thereunder; (e) the interest portion of the Lease Payments shall be excludable from Lessor's gross income pursuant to Section 103 of the Code; (f) Lessee will not do or cause to be done any act which will cause, or by omission of any act allow, this Agreement to be an arbitrage bond within the meaning of

Section 148(a) of the Code; (g) Lessee will not do or cause to be done any act which will cause, or by omission of any act allow, this Agreement to be a private activity bond within the meaning of Section 141(a) of the Code; (h) Lessee will not do or cause to be done any act which will cause, or by omission of any act allow, the interest portion of the Lease Payments under this Agreement to be or become includible in Lessor's gross income for Federal income taxation purposes under the Code, (i) the Equipment listed in this Agreement has been ordered or is expected to be ordered within six (6) months of the Commencement Date of this Agreement, and Lessee reasonably anticipates that at least Eighty-Five Percent (85%) of all amounts deposited in escrow to pay for the Equipment, together with interest earnings, will be expended on costs of the Equipment and the financing within three (3) years of the Commencement Date of this Agreement, unless the City has not yet at that time issued its Final Acceptance of such Equipment pursuant to the terms of the Contract, and (j) the Escrow Agreement shall contain a provision restricting the interest earned on unexpended funds held by the escrow agent to a rate that shall cause the yield earned on such unexpended funds not to exceed the yield earned by Lessor pursuant to the terms of this Agreement.

Lessee acknowledges that any breach by Lessee of the covenants contained in Section 6 or this Section 7 of this Agreement may cause the interest component of Lease Payments to become includible in gross income of the owner or owners thereof for federal income tax purposes. In such event, notwithstanding anything to the contrary contained in Section 12 of this Agreement, Lessee agrees to pay promptly after any such determination of taxability and on each Lease Payment date thereafter to Lessor an additional amount determined by Lessor to compensate such owner or owners for the loss of such excludability (including, without limitation, compensation relating to interest expense, penalties or additions to tax), which determination shall be conclusive (absent manifest error). Notwithstanding anything herein to the contrary, any additional amount payable by Lessee pursuant to this Section 7 shall be payable solely from legally available funds.

8. TITLE TO EQUIPMENT; SECURITY INTEREST. It is Lessor's and Lessee's intention that this Agreement not constitute a "true" lease for federal income tax purposes and, therefore, it is Lessor's and Lessee's intention that Lessee be considered the owner of the Equipment for federal income tax purposes. Upon delivery of the Equipment to Lessee under this Agreement, title to the Equipment will vest in Lessee, subject to the rights of Lessee under this Agreement; provided, however, that (a) in the event of non-appropriation by Lessee pursuant to Section 5 hereof; (b) upon the occurrence of an Event of Default (as hereinafter defined), and as long as such Event of Default is continuing; or (c) in the event that the purchase option provided in Section 18 has not been exercised prior to the Expiration Date, title will immediately vest in Lessor or its Assignee. To the extent that no Event of Default has occurred and is continuing, or no event which with notice or lapse of time, or both, could become an Event of Default then exists, when all Lease Payments set forth in Schedule B have been paid, along with any applicable late charges or taxes, Lessor will transfer any and all of its right, title and interest in the Equipment to Lessee. In order to secure all of its obligations hereunder, Lessee hereby (w) grants to Lessor a first priority security interest in any and all right, title and interest of Lessee in the Equipment and in all additions, attachments, accessions, and substitutions thereto, and on any proceeds therefrom; (x) moneys and investments held from time to time in any escrow, acquisition or similar fund, including proceeds therefrom, established under any escrow agreement entered into by the Lessee and Lessor with respect to this Agreement (y) agrees that this Agreement may be filed as a financing statement evidencing such security interest; and (z) agrees to execute and deliver all financing statements, certificates of title and other instruments reasonably requested by Lessor or its Assignee to evidence such security interest.

9. USE; REPAIRS. Lessee will use the Equipment in a careful manner for the use contemplated by the manufacturer of the Equipment and shall comply with all laws, ordinances, insurance policies and regulations relating thereto, and will pay all costs, claims, damages, fees and charges arising out of the possession, use or maintenance of the Equipment. Lessee, at its expense will keep the Equipment in good repair and furnish all parts, mechanisms and devices required therefor. Lessee may satisfy this obligation by entering into a maintenance agreement or agreements with Vendor.

10. ALTERATIONS. Lessee will not make any alterations, additions or improvements to the Equipment without Lessor's prior written consent unless such alterations, additions or improvements may be readily removed without damage to the Equipment.

11. LOCATION; INSPECTION. The Equipment will not be removed from, the Equipment Location without Lessor's prior written consent which will not be unreasonably withheld; provided that any items of Equipment that are intended by design to be a mobile piece of technology or are installed in motor vehicles may be moved within the continental U.S. without consent, but the permanence base will remain the Equipment Location. Lessor will be entitled to enter upon the Equipment Location or elsewhere during reasonable business hours to inspect the Equipment or observe its use and operation.

12. LIENS AND TAXES.   Lessee shall keep the Equipment free and clear of all levies, liens and encumbrances except those created under this Agreement. Lessee shall pay, when due, all charges and taxes (local, state and federal) which may now or hereafter be imposed upon the ownership, leasing, rental, sale, purchase, possession or use of the Equipment, excluding however, all taxes on or measured by Lessor's income. If Lessee fails to pay said charges and taxes when due, Lessor shall have the right, but shall not be obligated, to pay said charges and taxes. If Lessor pays any charges or taxes, Lessee shall reimburse Lessor therefor within ten days of written demand as an addition to the Lease Payments.

13. RISK OF LOSS: DAMAGE; DESTRUCTION.   Upon delivery of equipment to Lessee, Lessee assumes all risk of loss or damage to the Equipment in accordance with the Contract; provided, however, that no such loss of or damage to the Equipment, nor defects therein, nor unfitness or obsolescence thereof, shall relieve Lessee of the obligation to make Lease Payments or to perform any other obligation under this Agreement. In the event of damage to any item of Equipment under this Agreement, Lessee will immediately place the same in good repair with the proceeds of any insurance recovery applied to the cost of such repair. If Lessor determines that any item of Equipment is lost, stolen, destroyed or damaged beyond repair, Lessee at the option of Lessor will either (a) replace the same with like equipment in good repair; or (b) on the next Lease Payment date, pay Lessor the sum of (i) all amounts then owed by Lessee to Lessor under this Agreement, including the Lease Payment due on such date; and (ii) an amount equal to all remaining Lease Payments to be paid during the Lease Term.

In the event that Lessee is obligated to make such payment with respect to less than all of the Equipment, Lessor will provide Lessee with the pro rata amount of the Lease Payment and the Balance Payment (as set forth in Schedule B) to be made by Lessee with respect to that portion of the Equipment which has suffered such loss or damage.

14. INSURANCE.   The City of Philadelphia is self insured against claims to persons or property, subject to the immunities, rights and defenses available to the City of Philadelphia in accordance with the provisions of the Pennsylvania Political Subdivision Tort Claims Act, 42 Pa. C.S.A. § 8541, et seq., as amended.

Lessor acknowledges that the Lessee has been permitted to self-insure, and Lessee will furnish Lessor with a letter or certificate to such effect. In the event of any loss, damage, injury or accident involving the Equipment, Lessee will promptly provide Lessor with written notice thereof and make available to Lessor all information and documentation relating thereto.

15. ASSIGNMENT.   Without Lessor's prior written consent, Lessee will not (a) assign, transfer, pledge, hypothecate, grant any security interest in or otherwise dispose of this Agreement, the Equipment or any interest in such Equipment or; (b)sublet or lend the Equipment or permit it to be used by anyone other than (i) the Lessee or any of its instrumentalities or agencies or authorities or their employees or (ii) any state or other local governmental unit, or instrumentality or agency or authority thereof or their employees (not including, however, the United States or an agency or instrumentality thereof). Conditioned upon prior written consent of Lessee, Lessor may assign its rights, title and interest in and to this Agreement, the Equipment and any documents executed with respect thereto, and/or grant or assign a security interest therein, in whole or in part, to another entity (an "Assignee"). Any subsequent assignment by any Assignee is also subject to the City's consent. Such consent to assignment shall not be unreasonably withheld by Lessee. Any such Assignees shall have all of the rights of Lessor under this Agreement. Subject to the foregoing, this Agreement inures to the benefit of and is binding upon the heirs, executors, administrators, successors and assigns of the parties hereto.

No assignment or reassignment of any Lessor's right, title or interest in this Agreement or the Equipment shall be effective unless and until Lessee shall have received a notice of assignment, disclosing the name and address of each such assignee; provided, however, that if such assignment is made to a bank or trust company as paying or escrow agent for holders of certificates of participation in the Agreement, it shall thereafter be sufficient that a copy of the agency agreement shall have been deposited with Lessee until Lessee shall have been advised that such agency agreement is no longer in effect. During each Lease Term, Lessee shall keep a complete and accurate record of all such assignments in form necessary to comply with Section 149(a) of the Code, and the regulations, proposed or existing, from time to time promulgated thereunder. No further action will be required by Lessor or by Lessee to evidence the assignment, but Lessee will acknowledge such assignments in writing if so requested.

After notice of such assignment, Lessee shall name the Assignee as additional insured and loss payee in any insurance policies obtained or in force. Any Assignee of Lessor may reassign this Agreement and its interest in

the Equipment and the Lease Payments to any other person who, thereupon, shall be deemed to be Lessor's Assignee hereunder.

16. EVENT OF DEFAULT. As used herein, the term "Event of Default" means the occurrence of any one or more of the following events: (a) except in the event of non-appropriation of funds as set forth in Section 5 of this Agreement, Lessee fails to make any Lease Payment (or any other payment) as it becomes due in accordance with the terms of this Agreement, and any such failure continues for forty-five (45) days after the due date thereof and, following notice by Lessor to Lessee, such failure is not cured within thirty (30) days of the due date; (b) Lessee fails to perform or observe any other covenant, condition, or agreement to be performed or observed by it hereunder or under this Agreement, and such failure is not cured within sixty (60) days after written notice thereof by Lessor; (c) the discovery by Lessor that any statement, representation, or warranty made by Lessee in this Agreement is false, misleading or erroneous in any material respect, and following notice by Lessor to Lessee such failure is not cured within sixty (60) days; (d) proceedings under any bankruptcy, insolvency, reorganization or similar legislation shall be instituted against or by Lessee, or a receiver or similar officer shall be appointed for Lessee or any of its property, and such proceedings or appointments shall not be vacated, or fully stayed, within sixty (60) days after the institution or occurrence thereof; or (e) an attachment, levy or execution is threatened or levied upon or against the Equipment, and following notice by Lessor to Lessee such failure is not cured within sixty (60) days.

17. REMEDIES. Upon the occurrence of an Event of Default, and as long as such Event of Default is continuing, Lessor may, at its option, exercise any one or more of the following remedies: (a) by written notice to Lessee, declare all amounts then due under this Agreement, and all remaining Lease Payments due during the fiscal period in effect when the default occurs to be immediately due and payable, whereupon the same shall become immediately due and payable; (b) by written notice to Lessee, request Lessee to (and Lessee agrees that it will), at Lessee's expense, promptly return the Equipment to Lessor in the manner set forth in Section 5 hereof, or Lessor, at its option, may enter upon the premises where the Equipment is located and take immediate possession of and remove the same; (c) sell or lease the Equipment or sublease it for the account of Lessee, holding Lessee liable for all Lease Payments and other amounts due prior to the effective date of such selling, leasing or subleasing and for the difference between the purchase price, rental and other amounts paid by the purchaser, lessee or sublessee pursuant to such sale, lease or sublease and the amounts payable by Lessee thereunder; and (d) exercise any other right, remedy or privilege which may be available to it under applicable laws of the Commonwealth of Pennsylvania or any other applicable law or proceed by appropriate court action to enforce the terms of this Agreement or to recover damages for the breach of this Agreement or to rescind this Agreement as to any or all of the Equipment. In addition, Lessee will remain liable for all covenants and indemnities under this Agreement, and for all legal fees and other costs and expenses, including court costs, incurred by Lessor with respect to the enforcement of any of the remedies listed above or any other remedy available to Lessor.

18. PURCHASE OPTION. Upon thirty (30) days prior written notice from Lessee to Lessor, and provided that no Event of Default has occurred and is continuing, or no event which with notice or lapse of time, or both, could become an Event of Default then exists, Lessee will have the right to purchase the Equipment on the Lease Payment dates set forth in Schedule B by paying to Lessor the Lease Payment then due together with the Balance Payment amount set forth opposite such date. Upon satisfaction by Lessee of such purchase conditions, Lessor will transfer any and all of its right, title and interest in the Equipment to Lessee "AS IS", WITHOUT WARRANTY, express or implied, (subject to Section 4 of this Agreement and except for the warranties as specified in the warranty section of the Contract No. 99-0844, as amended, between Motorola, Inc. and the City of Philadelphia), and such Equipment shall be free and clear of any liens created by Lessor.

19. NOTICES. All notices to be given under this Agreement shall be made in writing and mailed by certified mail, return receipt requested, to the other party at its address set forth herein or at such address as the party may provide in writing from time to time. Any such notice shall be deemed to have been received five days subsequent to such mailing.

20. SECTION HEADINGS. All section headings contained herein are for the convenience of reference only and are not intended to define or limit the scope of any provision of this Agreement.

21. GOVERNING LAW. This Agreement shall be construed in accordance with, and governed by the laws of, the state of the Commonwealth of Pennsylvania.

22. DELIVERY OF RELATED DOCUMENTS. Lessee will execute or provide, as requested by Lessor, such other documents and information as are reasonably necessary with respect to the transaction contemplated by this Agreement including but not limited to a Tax Compliance Agreement and Non-arbitrage Certificate.

23. ENTIRE AGREEMENT; WAIVER. This Agreement, together with the Delivery and Acceptance Certificate, each schedule and exhibit attached hereto, and other documents or instruments executed by Lessee and Lessor in connection herewith, are incorporated herein by reference and made a part hereof. This Agreement constitutes the entire agreement between the parties with respect to the lease of the Equipment described in Schedule A, and shall not be modified, amended, altered, or changed except with the written consent of Lessee and Lessor. Any provision of the Agreement found to be prohibited by law shall be ineffective to the extent of such prohibition without invalidating the remainder of the Agreement .

The waiver by Lessor of any breach by Lessee of any term, covenant or condition of this Agreement shall not operate as a waiver of any subsequent breach hereof.

24. EXECUTION IN COUNTERPARTS. This Agreement may be executed in several counterparts, each of which shall be deemed an original and all of which shall constitute but one and the same instrument; provided, however, that only one counterpart of this Agreement shall constitute the original for this Agreement for purposes of the sale or transfer of this Agreement as chattel paper.

IN WITNESS WHEREOF, the parties have executed this Agreement as of the _____ day of _____, 20_____.

LESSEE: **LESSOR:**

CITY OF PHILADELPHIA   _____

By:_____   By:_____

Title:_____   Title:_____

OPINION OF COUNSEL

With respect to that certain Equipment Lease-Purchase Agreement dated _____ by and between _____ and the Lessee, I am of the opinion that: (i) the Lessee is, within the meaning of Section 103 of the Internal Revenue Code of 1986, a state or a fully constituted political subdivision or agency of the State of the Equipment Location described in Schedule A hereto; (ii) the execution, delivery and performance by the Lessee of the Agreement have been duly authorized by all necessary action on the part of the Lessee, (iii) the Agreement constitutes a legal, valid and binding obligation of the Lessee enforceable in accordance with its terms; and (iv) Lessee has sufficient monies available to make all payments required to be paid under the Agreement during the current fiscal period of the Agreement, and such monies have been properly budgeted and appropriated for this purpose in accordance with State law.

_____

Attorney for **CITY OF PHILADELPHIA**

SCHEDULE A
EQUIPMENT LEASE-PURCHASE AGREEMENT

Schedule A _____
Lease Number:

This Lease dated as of _____ is being executed by _____ ("Lessor") and **CITY OF PHILADELPHIA** (Lessee"), as a supplement to, and is hereby attached to and made a part of that certain Equipment Lease-Purchase Agreement Number _____ dated as of _____ ("Agreement"), between Lessor and Lessee.

Lessor hereby leases to Lessee under and pursuant to the Agreement, and Lessee hereby accepts and leases from Lessor under and pursuant to the Agreement, subject to and upon the terms and conditions set forth in the Agreement and upon the terms set forth below, the sum of Thirty One Million ($31,000,000) (the "Lease Amount') which the Lessee will use for the purchase, design, installation and testing of certain equipment and related software to upgrade the City's 800 MHz trunked radio communications system to an ASTRO 25 Internet Protocol-based radio system pursuant to Amendment No. 3 to Contract No. 99-0844 between Motorola, Inc. and the City of Philadelphia (the "Contract")

QUANTITY	DESCRIPTION (Manufacturer, Model, and Serial Nos.)
	Refer to attached Equipment List.
Equipment Location:	

Initial Term: 48 Months   **Commencement Date:**   xx/xx/200x
                                      First Payment Due Date: xx/xx/200x

X Annual Payments of $_____ as outlined in the attached Schedule B, plus Sales/Use Tax of $0.00, payable on the Lease Payment Dates set forth in Schedule B.

EXECUTED as of the date first herein set forth.

LESSEE: LESSOR:

City of Philadelphia   _____

By: _____   By:_____

Title: _____   Title:_____

2524312.01.02
2163855

SCHEDULE B
LEASE PAYMENT SCHEDULE

Compound Period: Annual
Nominal Annual Rate: _____
Effective Annual Rate: _____

Event Date	Start Date	Amount	Number	Period	End
Lease	_/_/2009	$31,000,000.00	1		
Payment	_/_/2010	_____	4	Annual	
	_/_/2013				

Payment #	Due Date	Payment Amount	Interest	Principal	Balance
1	_/_/2010	_____	_____	_____	_____
2	_/_/2011	_____	_____	_____	_____
3	_/_/2012	_____	_____	_____	_____
4	_/_/2013	_____	_____	_____	$0.00
Grand Totals		_____	_____	$31,000,000.00	

INITIAL INSURANCE REQUIREMENT: $_____

Except as specifically provided in Section 5 of the Agreement hereof, Lessee agrees to pay to Lessor or its assignee the Lease Payments, including the interest portion, in the amounts and dates specified in the above payment schedule.

LESSEE: LESSOR:

CITY OF PHILADELPHIA   _____

By: _____   By:
       _____

Title: _____   Title:
        _____

Date: _____   Date:
       _____

CERTIFICATE OF INCUMBENCY

I, _____ do hereby certify that I am the duly elected or
     (Signature of Secretary/Clerk)

appointed and acting Secretary or Clerk of the **CITY OF PHILADELPHIA ,** an entity duly organized and

existing under the laws of the **State of Pennsylvania** that I have custody of the records of such entity,

and that, as of the date hereof, the individuals named below are the duly elected or appointed officers of

such entity holding offices set forth opposite of their respective names. I further certify that (i) the

signatures set opposite their respective names and titles are their true and authentic signatures and (ii)

such officers have the authority on behalf of such entity to enter into that certain Equipment Lease

Purchase Agreement number _____ dated _____, and Lease Schedule A number _____

dated _____, between **CITY OF PHILADELPHIA** and _____.

Name	**Title**	**Signature**
_____	_____	_____

(Individual who signed Lease documents should be listed here and sign where applicable)

IN WITNESS WHEREOF, I have executed this certificate and affixed the seal of **CITY OF
PHILADELPHIA** , hereto this _____ day of _____, 200_.

By: _____
     (Signature of Secretary/Clerk)

SEAL

[Statement of Self-Insurance by City of Philadelphia is to be provided.]

Lessee:

CITY OF PHILADELPHIA

By: _____

Its: _____

Date: _____

SCHEDULE C

EQUIPMENT LEASE PURCHASE AGREEMENT DELIVERY AND ACCEPTANCE CERTIFICATE

The undersigned Lessee hereby acknowledges receipt of the Equipment described below and Lessee confirms that with respect to the category of Acceptance designated below, Lessee has accepted the Equipment described below after completion of the applicable Acceptance Test(s) as described in the Contract in Appendix A, Sections 3 and 4. Categories of Acceptance include, but are not limited to, Equipment Installation Acceptance, Functional Acceptance, Coverage Acceptance, Conditional Acceptance at completion of First, Second, and Third Reliability Periods, System Acceptance at completion of Fourth Reliability Period, and Final Acceptance.

Equipment Lease Purchase Agreement Date: _____

Equipment Lease Purchase Agreement No.: _____

EQUIPMENT INFORMATION

QUANTITY	MODEL NUMBER	EQUIPMENT DESCRIPTION	CATEGORY OF ACCEPTANCE
		[Refer to the Equipment referenced in Schedule A See Schedule A for a detailed Equipment List.]	

LESSEE:

CITY OF PHILADELPHIA

By: _____

Date: _____

LESSEE RESOLUTION [Replace with City Council Ordinance Approving Lease]

Form **8038-G**
(Rev. November 2000)

Department of the Treasury
Internal Revenue Service

Information Return for Tax-Exempt Governmental Obligations

▶ **Under Internal Revenue Code Section 149 (e)**
▶ **See separate instructions**

Caution: Use Form 8038-GC if the issue price is under $100,000

OMB No. 1545-0720

Part I	**Reporting Authority**	If **Amended Return**, Check here ▶ ☐

1 Issuer's name

CITY OF PHILADELPHIA

2 Issuer's employer Identification

3 Number and street (or P. O. box if mail is not delivered to Street address)	Room/suite	**4** Report number
		3 -

5 City, town, or post office, state, and ZIP code	**6** Date of Issue
	1/1/04

7 Name of issue	**8** CUSIP number
Equipment Lease-Purchase Agreement #12345	N/A

9 Name and title of officer or legal representative whom the IRS may call for more information

10 Telephone number of officer or legal representative

Part II	**Type of Issue (check applicable box(es) and enter the issue price)** See Instructions and attach schedule

11	☐	Education	**11**
12	☐	Health and hospital	**12**
13	☐	Transportation	**13**
14	☒	Public safety	**14**
15	☐	Environment (including sewage bonds)	**15**
16	☐	Housing	**16**
17	☐	Utilities	**17**
18	☐	Other. Describe (see instructions) ▶	**18**

19 If obligations are TANs or RANs, check box ▶ ☐   If obligations are BANs, check box ▶ ☐

20 If obligations are in the form of a Lease or installment sale, check box ▶ ☒

Part III	**Description of Obligations** (Complete for the entire issue for which this form is being filed)

	(a) Final Maturity date	(b) Issue Price	(c) Stated redemption price at maturity	(d) Weighted average maturity	(e) Yield
21	1/1/2014	19,307,118.50	N/A	10 years	4.34%

Part IV	**Uses of Proceeds of Bonds Issue (including underwriters' discount)**	**N/A**

22	Proceeds used for accrued interest	**22**	0.00
23	Issue Price of entire issue (Enter amount from line 21, column (b))	**23**	
24	Proceeds used for bond issuance costs (including underwriters' discount)	**24** 0.00	
25	Proceeds used for credit enhancement	**25** 0.00	
26	Proceeds allocated to reasonably require reserve or replacement fund	**26** 0.00	
27	Proceeds used to currently refund prior issues	**27** 0.00	
28	Proceeds used to advance refund prior issues	**28** 0.00	
29	Total (add lines 24 through 28)	**29**	0.00
30	Nonrefunding proceeds of the issue (subtract line 29 from line 23 and enter amount here)	**30**	

Part V	**Description of Refunded Bonds (Complete this part only for refunding bonds.)**	**N/A**

31	Enter the remaining weighted average maturity of the bonds to be currently refunded	▶	years
32	Enter the remaining weighted average maturity of the bonds to be advanced refunded	▶	years
33	Enter the last date on which the refunded bonds will be called	▶	
34	Enter the dates(s) the refunded bonds were issued ▶		

Part VI	**Miscellaneous**	**N/A**

35	Enter the amount of the state volume cap allocated to the issue under section 141 (b)(5)	**35**
36a	Enter the amount of gross proceeds invested or to be invested in a guaranteed investment contract (see instructions)	**36a**
b	Enter the final maturity date of the guaranteed investment contract ▶	
37	Pooled financings: **a** Proceeds of this issue that are to be used to make loans to other governmental units	**37a**
b	If this issue is a loan made from the proceeds of another tax-exempt issue, check box ▶ ☐ and enter the name of the issuer _____ and the date of the issue ▶	

38 If the issuer has designated the issue under section 265 (b)(3)(B)(i)(III) (smaller issuer exception), check box . . . . ▶ ☐

39 If the issuer has elected to pay a penalty in lieu of arbitrage rebate, check box . . . . ▶ ☐

40 If the issuer has identified a hedge, check box . . . . ▶ ☐

Please Sign Here	Under penalties of perjury, I declare that I have examined this return and accompanying schedules and statements, and to the best of my knowledge and belief, they are true, correct and complete.

▶ _____   ▶ _____
Signature of Issuer's authorized representative   Date   Type or print name and title

For Paperwork Reduction Act Notice, see page 2 of the Instructions.   Cat. No. 63773S   Form 8038-G (Rev. 11-2000)

Instructions for 8038-G:

On 8038-G forms, the below described lines need to be filled out by the Lessee:

1. **Line No. 2:**   Fill in the Lessee's EIN number. (An issuer that does not have an EIN should apply for one on Form SS-4, Application for Employer Identification Number. This form may be obtained from most IRS and Social Security Administration offices. File Form SS-4 according to the instructions on that form. If the EIN has not been received by the date of filing the 8038-G, write "Applied for" in the space for the EIN).

2. **Line No. 4:**   After the preprinted 3, enter two self-designated numbers. Number reports consecutively during any calendar year (e.g., 334, 335, etc.).

3. **Line No. 9:**   State the name and the title for the legal representative the IRS may call for more information. The legal representative is the person who will be contacted if there are any questions with respect to the IRS form 8038-G and the transaction reported. Typically this person is employed by the issuer and is the same person who signs the IRS Form 8038-G.

4. **Line No. 10**:   State the telephone number of the person listed in line 9.

SCHEDULE D
FORM OF ESCROW AGREEMENT

EXHIBIT C
FORM OF ESCROW AGREEMENT

FORM OF ESCROW AGREEMENT

This Escrow Agreement, dated as of _____   __, 2009 by and among _____, a _____ corporation (*"Lessor"*), the City of Philadelphia (*"Lessee"*), and _____   __, a national banking association with a corporate trust office in _____, __, as Escrow Agent (the *"Escrow Agent"*):

In consideration of the mutual covenants and agreements herein set forth, the parties hereto do hereby covenant and agree as follows:

1.   This Escrow Agreement is simultaneously executed with the Equipment Lease-Purchase Agreement dated _____ __, 2009, between Lessor and Lessee (*"Lease"*) and is hereby made a part of the Lease.

2.   Except as otherwise defined herein, all terms defined in the Lease shall have the same meaning for the purposes of this Escrow Agreement as in the Lease.

3.   Lessor, Lessee and the Escrow Agent agree that the Escrow Agent will act as sole Escrow Agent under the Lease and this Escrow Agreement, in accordance with the terms and conditions set forth in this Escrow Agreement. The Escrow Agent shall not be deemed to be a party to the Lease and this Escrow Agreement shall be deemed to constitute the entire agreement among Lessor, Lessee, and the Escrow Agent.

4.   There is hereby established in the custody of the Escrow Agent a special trust fund designated Equipment Acquisition Fund (the "*Acquisition Fund*") to be held and administered by the Escrow Agent in trust for the benefit of Lessor and Lessee in accordance with the Escrow Agreement. Lessor, Lessee and the Escrow Agent intend that the Acquisition Fund constitute an escrow account in which Lessor has a security interest , and such security interest is hereby granted by Lessee to secure payment of all sums due to Lessor under the Lease. For such purpose, the Escrow Agent hereby agrees to act as agent for Lessor in connection with the perfection of such security interest and agrees to note, or cause to be noted, on all books and records relating to the Acquisition Fund, the Lessor's interest therein.

5.   (a) Lessor shall deposit $_____ in the Acquisition Fund. Moneys held by the Escrow Agent hereunder shall be invested and reinvested by the Escrow Agent upon order of a representative of Lessee in Qualified Investments (as hereinafter defined) maturing or subject to redemption at the option of the holder thereof prior to the date on which it is expected that such funds will be needed, provided however, that no such Qualified Investment shall earn a yield higher than the yield earned by Lessor pursuant to the Lease. Such investments shall be held by the Escrow Agent in the Acquisition Fund.

(b)   The parties recognize and agree that the Escrow Agent will not provide supervision, recommendations or advice relative to either the investment of the Acquisition Fund or the purchase, sale, retention or other disposition of any Qualified Investment. Lessee warrants that

the investments directed to be purchased by the Escrow Agent pursuant to this paragraph 5 are Qualified Investments as defined in paragraph 6 of this Escrow Agreement.

(c)   Any loss or expense incurred from an investment will be borne by the Acquisition Fund. If the Escrow Agent does not receive directions to invest the monies held in the Acquisition Fund, its only obligation with respect to the Acquisition Fund shall be to hold it or deposit uninvested without liability for interest or other compensation to either party.

(d)   The Escrow Agent is hereby authorized to execute purchases and sales of Qualified Investments through the facilities of its own trading or capital markets operations. The Escrow Agent shall send statements to each of the parties on or before the 15th day of each month reflecting activity, including but not limited to earnings, losses and expenses, for the Escrow Account for the preceding month.

6.   (a) *"Qualified Investments"* shall be defined for purposes of this Escrow Agreement as follows, but only to the extent the same are at the time legal for investment of the funds being invested:

(i)   Obligations of States which are rated AA or better by Standard & Poors Corporation or Aa or better by Moody's Investors Services, Inc.;

(ii)   Obligations issued by the United States government;

(iii)   Obligations fully insured or guaranteed by the United States government or a United States government agency;

(iv)   Federal Farm Credit System;

(v)   Federal Home Loan Bank System;

(vi)   Federal Intermediate Credit Bank;

(vii)   Prime banker's acceptances;

(viii)   The local government investment pool established by O.C.G.A. section 36-83-8;

(ix)   Fully collateralized repurchase agreements provided Lessee has on file a signed Master Repurchase Agreement, approved by the City Attorney of Lessee, which details eligible collateral, collateralization ratios, standards for collateral custody and control, collateral valuation, and conditions for agreement termination and provided the repurchase agreement:

(a)   has a defined termination date;

(b)   is secured by obligations in accordance with Section 11.0 herein;

(c)   requires the securities being purchased by Lessee to be assigned to Lessee, held in Lessee's name, and deposited at the time the investment is made with Lessee or with a third party selected and approved by Lessee; and

(d)   is placed through a primary government securities dealer, as defined by the Federal Reserve, or a financial institution doing business in this state, and which is rated no less than A or its equivalent by two nationally recognized rating services;

(x)   Obligations of other political subdivisions of the state of Pennsylvania, which are rated AA or better by Standard & Poors Corporation or Aa or better by Moody's Investors Services, Inc;

Lessee will restrict investments in eligible obligations described in this section to discount notes and callable or non-callable fixed-rate securities with a fixed principal repayment amount.

(b)   Any investment earnings and income on the Acquisition Fund shall become part of the Acquisition Fund, and shall be disbursed in accordance with Section 7 of this Escrow Agreement.

7.   Moneys in the Acquisition Fund, including investment earnings, shall be used to pay for the cost of the acquisition of the Equipment and Services and interest payments on the Lease. Payment shall be made from the Acquisition Fund for the cost of acquisition of part or all Equipment and Services, in accordance with the Contract and the Milestone Payment Schedule as set forth in the Contract at Appendix F, and upon presentation to the Escrow Agent of one or more properly executed Payment Request and Acceptance Certificates, a form of which is attached hereto as *Exhibit A*, identifying the Milestone and executed by Lessee, together with an invoice for the cost of the acquisition of the Equipment and Services for which payment is requested and a written approval by Lessor of the Vendor to be paid. The Escrow Agent shall not have any right, title or interest in any funds remaining in the Acquisition Fund after the Escrow Agent has made payment for all Equipment and Services which have been made pursuant to a Payment Request and Acceptance Certificates, and Lessor agrees that any funds remaining in the Acquisition Fund thereafter shall be applied to the next consecutive lease payment(s) due from Lessee, and if no such lease payments or other costs are due from Lessee pursuant to the Lease, shall pay any funds remaining in the Acquisition Fund to the Lessee.

8.   *Concerning the Escrow Agent.* Notwithstanding any provision contained herein to the contrary, the Escrow Agent, including its officers, directors, employees and agents, shall:

(a)   not be liable for any action taken or omitted under this Escrow Agreement so long as it shall have acted in good faith and without fraud, malice or negligence; and shall have no responsibility beyond the exercise of ordinary care to inquire into or determine the genuineness, authenticity, or sufficiency of any securities, checks, or other documents or instruments submitted to it in connection with its duties hereunder;

(b)   upon the exercise of ordinary care, be entitled to deem the signatories of any documents or instruments submitted to it hereunder as being those purported to be authorized to sign such documents or instruments on behalf of the parties hereto, and, absent any obvious indication of forgery or fraud, shall be entitled to rely upon the genuineness of the signatures of such signatories without inquiry and without requiring substantiating evidence of any kind; and have no liability for acting upon any written and/or facsimile and/or e-mail instructions presented by Lessee or Lessor in connection with the Escrow Agreement which the Escrow Agent in good faith, and exercising ordinary care, believes to be genuine.

(c)   be entitled to refrain from taking any action contemplated by this Escrow Agreement in the event that it becomes aware of any disagreement between the parties hereto pertaining to disbursements from the Acquisition Fund, execution of an Acceptance Certificate or satisfaction of a Payment Request;

(d)   have no responsibility or liability for any diminution in value of any assets held hereunder which may result from any investments or reinvestment made in accordance with any investment or reinvestment instruction from Lessee's representative;

(e)   be entitled to compensation for its services hereunder as per *Exhibit B*, which is attached hereto and made a part hereof, and for reimbursement of its out-of-pocket expenses including, but not by way of limitation, the fees and costs of attorneys or agents which it may find necessary to engage in performance of its duties hereunder, all to be paid by Lessee;

(f)   to the extent authorized by Pennsylvania law (including, but not limited to the provisions of the Pennsylvania Political Subdivision Tort Claims Act, 42 Pa. C.S.A. § 8541, et seq., as amended) and subject to applicable Pennsylvania constitutional limitations, be indemnified and saved harmless by Lessee hereto from all losses, costs, and expenses, including attorney fees which may be incurred by the Escrow Agent as a result of its acceptance of the Acquisition Fund or arising from the performance of its duties hereunder, unless the Escrow Agent shall have acted in bad faith, failed to have exercised ordinary care or to have been negligent, and such indemnification shall survive its resignation or removal, or the termination of this Escrow Agreement until extinguished by any applicable statute of limitations;

(g)   in the event any dispute shall arise between the parties with respect to the disposition or disbursement of any of the assets held hereunder, be permitted to interplead all of the assets held hereunder into a court of competent jurisdiction, and thereafter be fully relieved from any and all liability or obligation with respect to such interpleaded assets, unless the basis for the dispute is related to the Escrow Agent's failure to perform according to the terms of this Escrow Agreement. The parties further agree to pursue any redress or recourse in connection with such a dispute not related to the Escrow Agent's failure to perform according to the terms of this Escrow Agreement, without making the Escrow Agent a party to same;

(h)   only have those duties as are specifically provided herein, which shall be deemed purely ministerial in nature, and shall under no circumstance be deemed a fiduciary for any of the parties to this Escrow Agreement. Except for definitions, terms and conditions of other agreements which are referenced in this Escrow Agreement, the Escrow Agent shall neither be

responsible for, nor chargeable with, knowledge of the terms and conditions of any other agreement, instrument, or document between the other parties hereto, in connection herewith. This Escrow Agreement and all attachments and exhibits to this Escrow Agreement, sets forth all matters pertinent to the escrow contemplated hereunder, and no additional obligations of the Escrow Agent shall be inferred from the terms of this Escrow Agreement or any other Agreement. IN NO EVENT SHALL THE ESCROW AGENT BE LIABLE, INDIRECTLY, FOR ANY (i) DAMAGES OR EXPENSES ARISING OUT OF THE SERVICES PROVIDED HEREUNDER, OTHER THAN DAMAGES WHICH RESULT FROM THE ESCROW AGENT'S FAILURE TO ACT ON INVESTMENT DIRECTION FROM LESSEE'S REPRESENTATIVE IN ACCORDANCE WITH THE REASONABLE COMMERCIAL STANDARDS OF THE BANKING BUSINESS, OR (ii) CONSEQUENTIAL DAMAGES;

(i) have the right, but not the obligation, to consult with nationally-recognized counsel of its choice and shall not be liable for action taken or omitted to be taken by the Escrow Agent either in accordance with the advice of such counsel;

(j) have the right to perform any of its duties hereunder through agents, attorneys, custodians or nominees; and

(k) not be required by any provision of this Escrow Agreement to expend or risk its own funds in the performance of its duties if it shall have reasonable grounds for believing that repayment of such funds is not reasonably assured to it.

Any banking association or corporation into which the Escrow Agent (or substantially all of its corporate trust business) may be merged, converted or with which the Escrow Agent may be consolidated, or any corporation resulting from any merger, conversion or consolidation to which the Escrow Agent shall be a party, succeed to all the Escrow Agent's rights, obligations and immunities hereunder without the execution or filing of any paper or any further act on the part of any of the parties hereto, except as to notice to Lessee and Lessor of the succession.

9. *Tax Matters.*

(a) *Tax Allocation and Reporting.* The parties agree that, for tax reporting purposes, all interest or other income from investment of the Acquisition Fund shall, as of the end of each calendar year and to the extent required by the Internal Revenue Service be reported as having been earned by Lessee, whether or not income was disbursed during a particular year.

(b) *Certification of Tax Identification Number.* At the time funds are initially deposited into the Acquisition Fund, the parties shall provide the Escrow Agent with certified tax identification numbers by furnishing appropriate W-9 or W-8 and such other forms and documents that the Escrow Agent may request. The parties understand that if such tax reporting documentation is not provided and certified to the Escrow Agent, the Escrow Agent may be required by the Internal Revenue Code of 1986, as amended, and the Regulations promulgated thereunder, to withhold a portion of any interest or other income earned on the investment of monies or other property held by the Escrow Agent pursuant to this Escrow Agreement.

(c)   The Escrow Agent agrees to keep and retain the records referred to in §§4.3, 4.4(c) and 7.6 of the Tax Agreement until three (3) years after the Loan is paid in full.

10.   The Acquisition Fund shall terminate upon the occurrence of the earlier of (a) the presentation of a proper Payment Request and Acceptance Certificate with the portion thereof designated "Final Acceptance Certificate" properly executed by Lessee, or (b) the presentation of written notification by the Lessor, or if the Lessor shall have assigned its interest under the Agreement, then the assignees or subassignees of all of Lessor's interest under the Lease or an Agent on their behalf, that an Event of Default has occurred or that Lessee has terminated the Lease pursuant to Sections 5 or 17 of the Lease. Upon termination as described in clause (a) of this paragraph, any amount remaining in the Acquisition Fund shall be used to pay the next scheduled Lease Payment or Lease Payments when due until exhausted. Upon termination as described in clause (b) of this paragraph, any amount remaining in the Acquisition Fund shall immediately be paid to Lessor or, pro rata, to any assignees or subassignees of Lessor.

11.   The Escrow Agent may at any time resign by giving at least ninety (90) days written notice to Lessee and Lessor, but such resignation shall not take effect until the appointment of a successor Escrow Agent. The substitution of another bank or trust company to act as Escrow Agent under this Escrow Agreement may occur by written agreement of Lessor and Lessee. In addition, the Escrow Agent may be removed at any time, with or without cause, by an instrument in writing executed by the Lessor and Lessee. In the event of any resignation or removal of the Escrow Agent, a successor Escrow Agent shall be appointed by an instrument in writing executed by Lessor and Lessee. Such successor Escrow Agent shall indicate its acceptance of such appointment by an instrument in writing delivered to Lessor, Lessee, and the predecessor Escrow Agent. Thereupon such successor Escrow Agent shall, without any further act or deed, be fully vested with all the trust, powers, rights, duties and obligations of the Escrow Agent under this Escrow Agreement, and the predecessor Escrow Agent shall deliver all moneys and securities held by it under this Escrow Agreement to such successor Escrow Agent.

12.   The Escrow Agent incurs no liability to make any disbursements pursuant to the Escrow Agreement except from funds held or received in the Acquisition Fund. The Escrow Agent makes no representations or warranties as to the title to any Equipment or as to the performance of any obligations of Lessor or Lessee.

13.   *Notices*. Any notice, consent or request to be given in connection with any of the terms or provisions of this Escrow Agreement shall be in writing and be given in person, by facsimile transmission or courier delivery service or by mail, and shall become effective (a) on delivery if given in person, (b) on the date of delivery if sent by facsimile with receipt confirmed by telephone or by courier delivery service, or (c) four business days after being deposited in the mails, with proper postage prepaid for first-class registered or certified mail.

Notices shall be addressed as follows:

if to *Lessor*:

_____
_____
_____

_____

if to *Lessee:*   _____
                                   City of Philadelphia
                                   _____
                                   Philadelphia, Pennsylvania
                                   Attention: _____

With a copy to: _____
                                   Department of _____
                                   City of Philadelphia
                                   _____
                                   _____
                                   Philadelphia, Pennsylvania
                                   Attention: _____

if to the *Escrow Agent:*

                                   _____
                                   _____
                                   _____
                                   _____

14. In the event any provision of this Escrow Agreement shall be held invalid or unenforceable by any court of competent jurisdiction, such holding shall not invalidate or render unenforceable any other provision hereof.

15. This Escrow Agreement may not be amended except by a written instrument executed by Lessor, Lessee and the Escrow Agent.

16. *Governing Law, Counterparts.* This Agreement shall be construed in accordance with the laws of the State of Pennsylvania. It may be executed in several counterparts, each one of which shall constitute an original and all collectively shall constitute but one instrument.

The remainder of this page is intentionally left blank and is followed by a signature page.

IN WITNESS WHEREOF, Lessor, Lessee and the Escrow Agent have caused this Escrow Agreement to be executed by their duly authorized representatives.

_____. (Lessor)   CITY OF PHILADELPHIA (Lessee)

_____   _____

_____   _____
Title

ATTEST   ATTEST

                                                 _____

                                                 _____

_____   By: _____
Corporate Secretary   _____

Affix Corporate Seal Here

                                                 Approved as to Form:
 _____, Escrow Agent   this ___ day of _____, 2009

_____   _____
_____   City Attorney
Title
                                                 By:_____
                                                      Divisional Deputy City Solicitor

ATTEST:

_____
Corporate Secretary

Affix Corporate Seal Here

ESCROW AGREEMENT
PAYMENT REQUEST AND ACCEPTANCE CERTIFICATE

To:

_____
_____
_____
_____

and

_____
_____
_____
_____

RE: Equipment Lease-Purchase Agreement _____ dated _____ __, 2009

The Escrow Agent is hereby requested to pay from the Acquisition Fund to the person or corporation designated below as Payee, the sum set forth below in payment of a portion or all of the cost of the acquisition of the equipment, software and/or services described in Schedule A to the Equipment Lease-Purchase Agreement. The amount shown below is due and payable under the invoice of the Payee attached hereto with respect to the cost of the acquisition of the equipment, software and/or services and has not formed the basis of any prior request for payment. The Milestone described below is set forth in the Milestone Payment Schedule of Appendix F of the "Contract", as defined in the Lease, and such Milestone has been completed.

Milestone Achieved:_____

Payee: Motorola, Inc.

Payee's Federal ID Number:_____

Lessee hereby certifies and represents to and agrees with Lessor as follows:

(1)   The equipment, software and/or services required for the completion of the Milestone described above have been delivered, installed and accepted as of the date hereof.

(2)   Lessee has conducted such inspection and/or testing of said equipment, software and/or services as it deems necessary and appropriate to determine that such Milestone has been completed and hereby acknowledges that with respect to such

Milestone, and the applicable category of Acceptance which it signifies, Lessee accepts said equipment, software and/or services.

(3)   Through its self-insurance program, Lessee is currently maintaining the coverage described in Section 14 of the Agreement.

(4)   No event or condition that constitutes, or with notice or lapse of time or both would constitute, an Event of Default (as such term is defined in the Agreement) exists at the date hereof.

Dated: _____   CITY OF PHILADELPHIA
                                         LESSEE

                                         By _____
                                            Title: _____

Approved:

_____
LESSOR

By_____
Title:_____

ESCROW AGREEMENT
FINAL ACCEPTANCE CERTIFICATE

_____

FINAL ACCEPTANCE CERTIFICATE
_____

(THIS CERTIFICATE IS TO BE EXECUTED ONLY WHEN ALL EQUIPMENT HAS BEEN ACCEPTED IN ACCORDANCE WITH THE "CONTRACT", AS DEFINED IN THE LEASE)

The undersigned hereby certifies that the equipment described above, together with the equipment described in and accepted by Payment Request and Acceptance Certificates previously filed by Lessee with the Lessor pursuant to the Lease, constitutes all of the Equipment and Services subject to the Lease.

Dated:_____

LESSEE (CITY OF PHILADELPHIA)

By_____
Title:_____

<center>**EXHIBIT B**</center>

<center>**ESCROW AGREEMENT**</center>
<center>**(ESCROW AGENT FEE SCHEDULE)**</center>

The Escrow Agent shall be entitled to fees for its ordinary services as follows:

> **$25.00 per trade, plus an annual fee of $1,000.00 due upon receipt of the Final Acceptance Certificate signed by Lessor/Lessee. These fees are payable by Lessee and may be paid from interest earnings.**

<center>**CUSTOMER NOTICE REQUIRED BY THE USA PATRIOT ACT**</center>

To help the US government fight the funding of terrorism and money laundering activities, US Federal law requires all financial institutions to obtain, verify, and record information that identifies each person (whether an individual or organization) for which a relationship is established.

What this means to you: When you establish a relationship with _____[Escrow Agent], we will ask you to provide certain information (and documents) that will help us to identify you. We will ask for your organization's name, physical address, tax identification or other government registration number and other information that will help us to identify you. We may also ask for a Certificate of Incorporation or similar document or other pertinent identifying documentation for your type of organization.

EXHIBIT D
DISCLOSURES

Non-Competitively Bid Contract Disclosure Report

Vendor Name: **Motorola Communications & Electronics** Address: 13108 Collections Center Drive Chicago, IL 60693 Gen Phone No: 717-471-0477	Contact Name: Joseph Papania Title: Phone No: 856-589-4674 Ext: Fax No: 856-589-4683

Opportunity Number: 990844-03	**Submission Date: 04/22/2009 10:41 AM**

Contributions of money or in-kind assistance made during the two years prior to the application deadline for this contract opportunity

Contributor Name	Relationship to Applicant	Recipient Name	Contribution Date	Contribution Amount
MOTPAC	Applicant	Nutter for Mayor	10/25/2007	$5,000.00

Consultant(s) used in the year prior to the application deadline for this contract opportunity

Name	Address / Phone Number	Amount
Franklin Square Group	The Phoenix 1600 Arch Street, Suite 203 Philadelphia PA 19103 267-322-7200	$70,000

Consultant Name	Contributor Name	Relationship	Recipient Name	Date	Amount
Franklin Square Group	David Dunphy	Partner	Committee to elect John Sabatina, Jr	02/07/2008	$100.00
	David Dunphy	Partner	Committee to elect John Sabatina, Jr	10/22/2008	$150.00
	David Dunphy	Partner	Friends of Farnese	10/10/2008	$500.00
	David Dunphy	Partner	Friends of Jack Kelly	11/19/2008	$250.00
	David Dunphy	Partner	Friends of Marian Tasco	02/19/2008	$250.00
	David Dunphy	Partner	Friends of Tony Payton, Jr.	12/20/2007	$500.00
	David Dunphy	Partner	Friends of Tony Payton, Jr.	02/29/2008	$500.00
	David Dunphy	Partner	Green for Philadelphia	05/10/2007	$250.00
	Lauren Freda	Family Member	Friends of Mike Gerber	09/15/2008	$500.00
	Scott Freda	Partner	Friends of Marian Tasco	02/19/2009	$250.00
	Scott Freda	Partner	Friends of Mike Gerber	12/31/2007	$2,500.00
	Scott Freda	Partner	Nutter for Mayor	06/01/2008	$500.00

Non-Competitively Bid Contract Disclosure Report

Vendor Name: **Motorola Communications & Electronics** Address: 13108 Collections Center Drive Chicago, IL 60693 Gen Phone No: 717-471-0477	Contact Name: Joseph Papania Title: Phone No: 856-589-4674 Ext: Fax No: 856-589-4683
Opportunity Number: 990844-03	**Submission Date: 04/22/2009 10:41 AM**

Subcontractor(s) planned on using if awarded this contract

Name	Address / Phone Number	Amount / Percent
Palura Systems, LLC	645 N. 15th Street Philadelphia PA 19130 800-704-3350	$845,000
Spectrum Electric, Inc.	274 Roxborough Avenue Philadelphia PA 19128 215-482-8316	$546,000
Wireless Communications and Electronics	2905 Southampton Road Philadelphia PA 19154	$750,000
Henkels & McCoy, Inc.	985 Jolly Road Blue Bell PA 19422	$250,000

City employee(s) or officer(s) who asked the Applicant, any officer, director or management employee of the Applicant, or any person representing the Applicant to give money, services, or any other thing of value (other than contributions) during the two years prior to the application deadline for this contract opportunity

√   Applicant has responded that NO City employee or officer asked the Applicant, any officer, director or management employee of the Applicant, or any person representing the Applicant to give money, services, or any other thing of value (other than contributions) during the two years prior to the application deadline for this contract opportunity.

City employee(s) or officer(s) who gave the Applicant, any officer, director or management employee of the Applicant, or any person representing the Applicant advice that a particular individual or business could be used by the Applicant to satisfy any goals established in the contract for the participation of minority, women, disabled or disadvantaged business enterprises during the two years prior to the application deadline for this contract opportunity

√   Applicant has responded NO City employee or officer gave the Applicant, any officer, director or management employee of the Applicant, or any person representing the Applicant advice that a particular individual or business could be used by the Applicant to satisfy any goals established in the contract for the participation of minority, women, disabled or disadvantaged business enterprises during the two years prior to the application deadline for this contract opportunity.