

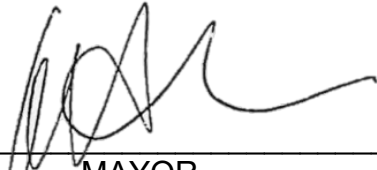
0150-12162-0000

T R A N S M I T T A L

TO The Council	DATE 08/29/2022	COUNCIL FILE NO. --
FROM The Mayor	COUNCIL DISTRICT All	

**Proposed Agreement between the Los Angeles Fire Department
and Motorola Solutions, Inc., to upgrade the Fire Department's voice radio system**

Approved and transmitted for your consideration.
See the City Administrative Officer report attached.



MAYOR
(Andre Herndon for)

MWS:LLE:04230012t

Report From
OFFICE OF THE CITY ADMINISTRATIVE OFFICER
Analysis of Proposed Contract
(\$25,000 or Greater and Longer than Three Months)

To: Mayor	Date: 08-18-22	C.D. No. --	CAO File No.: 0150-12162-0000
Contracting Department/Bureau: Fire Department		Contact: Lauren Nakasuji (213) 978-3427	
Reference: Board of Fire Commissioners report dated July 19, 2022; transmittal from the Mayor's Office received on July 20, 2022			
Purpose of Contract: To upgrade the Fire Department's voice radio system			
Type of Contract: (X) New contract () Amendment		Contract Term Dates: Three years from the date of execution plus five one-year extension options	
Contract/Amendment Amount: \$29,200,377.68 (\$17,953,555.68 plus up to \$11,246,822 for the extension options)			
Proposed amount \$ 29,200,377.68 + Prior award(s) \$ 0= Total \$ 29,200,377.68			
Source of funds: Municipal Improvement Corporation of Los Angeles (MICLA) financing and General Fund			
Name of Contractor: Motorola Solutions, Inc.			
Address: 500 W. Monroe Street, Chicago, IL 60661			
	Yes	No	N/A
1. Council has approved the purpose		X	
2. Appropriated funds are available	X		
3. Charter Section 1022 findings completed			X
4. Proposals have been requested			X
5. Risk Management review completed	X		
6. Standard Provisions for City Contracts included	X		
7. Workforce that resides in the City: 4%			
8. Business Inclusion Program			X
9. Equal Benefits & First Source Hiring Ordinances	X		
10. Contractor Responsibility Ordinance	X		
11. Disclosure Ordinances	X		
12. Bidder Certification CEC Form 50	X		
13. Prohibited Contributors (Bidders) CEC Form 55	X		
14. California Iran Contracting Act of 2010	X		

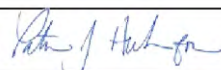
RECOMMENDATION

That the City Council authorize the Fire Chief, or designee, to execute an Agreement between the Los Angeles Fire Department and Motorola Solutions, Inc., for the upgrade of the Department's voice radio system, for a term of three years, with an amount not to exceed \$17,953,555.68, and the authority to execute up to five one-year extensions for a total amount not to exceed \$11,246,822, subject to available funding and the contractor's providing satisfactory services under the Agreement.

SUMMARY

The Los Angeles Fire Department (LAFD) requests authority to enter into an Agreement with Motorola Solutions, Inc. (Motorola), for a term of three years, plus up to five one-year extensions, to upgrade the voice radio system. The compensation for the Agreement will not exceed \$17,953,555.68 during the initial term, and will have a cumulative total of \$11,246,822 for the extensions, for a total amount of \$29,200,377.68.

Under the proposed Agreement, Motorola will provide hardware, software, and services to upgrade the existing voice radio system, including the upgrade and expansion of system infrastructure at the Fire Communications Center and LAFD remote sites, the upgrade of the radio platform to increase interoperability with the Los Angeles Police Department (LAPD) and other public safety agencies, and

Lindsey L. Estes LLE Analyst 0150-12162-0000	 City Administrative Officer
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provide for the replacement of the existing dispatch center consoles. The Department's voice radio system is vital to the LAFD's public safety operations, as it is used in response to a daily average of approximately 1,400 service calls received. The services provided under this Agreement will enable the Department to replace many of the system components that were installed over 30 years ago and are past their end of life and support dates.

The LAFD is therefore requesting to execute a sole source Agreement with Motorola for these services. Pursuant to Charter Section 371(e), competitive bidding is not required as the proposed services are professional, scientific, expert, or technical in nature. Motorola has the specialized ability to provide these services, as some of the existing equipment was originally provided by Motorola, which requires its proprietary expertise to maintain. In addition, as Motorola provides similar services to the LAPD voice radio system, this Agreement would allow for the seamless integration of interoperability and efficiency for both agency's systems maintenance and joint functionality.

On March 25, 2021, the Personnel Department reported that a Charter Section 1022 Determination for the proposed work was not required since the contractor requires the use of its own labor force to install, maintain, or service equipment or products in order to maintain specific warranties. A Notice of Intent to Contract was submitted to the Employee Relations Division on June 29, 2022.

In compliance with Los Angeles Administrative Code Section 10.5, Council approval is required because the term of the proposed contract exceeds three years. To the best of our knowledge, the contractor has complied with all standard provisions for City contracts, as well as City contracting requirements.

FISCAL IMPACT STATEMENT

Approval of the recommendation stated in this report will authorize the Los Angeles Fire Department (LAFD) to enter into an Agreement with Motorola Solutions, Inc. to upgrade the Department's voice radio system. Of the total project cost of approximately \$17.9 million, \$10.4 million in Municipal Improvement Corporation of Los Angeles (MICLA) funding has been previously approved for eligible capital costs. The remaining \$7.5 million required for completion of the project will be requested through the 2023-24 budget process. Funding from the General Fund may be required for any ineligible costs. Funding for the five one-year extensions for maintenance services (\$11.2 million total) will be requested by the LAFD in subsequent years. Approval of the Agreement extensions is subject to available funding.

FINANCIAL POLICIES STATEMENT

The action in this report is consistent with the City's Financial Policies in that the proposed services will be funded within budgeted funds.

DEBT IMPACT STATEMENT

The issuance of Municipal Improvement Corporation of Los Angeles (MICLA) debt is a General Fund obligation. The issuance of MICLA for the LAFD Voice Radio System Upgrade project would cause the City to borrow \$10,400,000 at an approximate 5.5 percent interest rate over 10 years. The total estimated debt service for this project is \$13,800,000, including interest of approximately \$3,400,000. During the life of the bonds, the estimated average annual debt service is \$1,380,000 over 10 years.

Actual interest rates may differ as rates are dependent on market conditions at the time of issuance. We cannot fully predict what interest rates will be in the future. In accordance with the City's Debt Management Policy, the City has an established debt ceiling to guide in evaluating the affordability for future debt. The debt ceiling for non-voted direct debt as a percentage of General Fund revenues is 6.0 percent. The 2022-23 Adopted Budget non voter-approved debt ratio is 2.97 percent. The issuance of debt for this project will not cause the City to exceed the six percent non voter-approved debt limit.

MWS:LLE:04230012

Attachment

LOS ANGELES FIRE COMMISSION

BOARD OF
FIRE COMMISSIONERS

JIMMIE WOODS-GRAY
PRESIDENT

JIMMY H. HARA, M.D.
VICE PRESIDENT

CORINNE TAPIA BABCOCK
DELIA IBARRA
REBECCA NINBURG

LETICIA GOMEZ
COMMISSION EXECUTIVE ASSISTANT II



ERIC GARCETTI
Mayor

SUE STENGEL
INDEPENDENT ASSESSOR

EXECUTIVE OFFICE
200 NORTH MAIN STREET, SUITE 1840
LOS ANGELES, CA 90012

(213) 978-3838 PHONE
(213) 978-3814 FAX

July 19, 2022

Honorable Eric Garcetti
Mayor, City of Los Angeles
Room 303, City Hall
Attn: Legislative Coordinator

[BFC 22-064] – AGREEMENT WITH MOTOROLA SOLUTIONS, INC. FOR THE VOICE
RADIO SYSTEM UPGRADE

At its meeting of July 19, 2022, the Board of Fire Commissioners approved the report and its recommendations. The report is hereby transmitted to the Mayor for consideration and approval.

Should you need additional information, please contact the Board of Fire Commissioners' office at 213-978-3838.

Sincerely,

Leticia Gomez
Commission Executive Assistant II

Attachment

cc: Fire Chief Kristin M. Crowley (via email)

LOS ANGELES FIRE DEPARTMENT



KRISTIN M. CROWLEY
FIRE CHIEF

APPROVED: 7/20/2022
BOARD OF FIRE COMMISSIONERS
BY: *[Signature]*
COMMISSION EXECUTIVE ASSISTANT

June 30, 2022

BOARD OF FIRE COMMISSIONERS
FILE NO. 22-064

TO: *[Signature]* Board of Fire Commissioners

FROM: *[Signature]* Kristin M. Crowley, Fire Chief

SUBJECT: AGREEMENT WITH MOTOROLA SOLUTIONS, INC. FOR THE VOICE
RADIO SYSTEM UPGRADE

FINAL ACTION:	☒ Approved	☐ Approved w/Corrections	☐ Withdrawn
	☐ Denied	☐ Received & Filed	☐ Other

SUMMARY

The Los Angeles City Fire Department (LAFD) requires a reliable, mission critical voice radio system to dispatch resources and support firefighter safety during calls for service. Many of the components of the existing 800 MHz analog conventional simulcast system were purchased over 30 years ago and are beyond their end of life and end of support dates. Over the last few years, there have been multiple documented failures resulting from the aging system components, including dispatch consoles, voter alignment issues, repeater antennas, etc. Due to the aging nature of the radio system, the LAFD will need to replace the system's components by contracting with Motorola Solutions, Inc. ("Motorola"). Motorola has provided the LAFD with high-performance equipment and quality customer service for many decades, and has a well-established understanding of the City's existing infrastructure and service needs. This proposed Agreement provides a combination of hardware, software and services, which include:

- Upgrading the system's aging voters and transceivers at the Fire Communications Center and at each of the nine (9) LAFD remote sites, as well as expanding the system to feature twenty (20) total channels across all nine (9) sites.
- Upgrading to Motorola's G-series radio platform. This platform features the same technology currently in use by the Los Angeles Police Department, which will increase interoperability options between the City's two public safety agencies, as well as neighboring agencies.
- Replacing existing dispatch consoles with one hundred (100) Command Central AXS Dispatch consoles for both the primary and backup dispatch centers.

This Agreement to upgrade the LAFD's voice radio system is critical for maintaining command and control of the Department's resources and firefighter safety. These improvements will also improve the City's and the LAFD's position for responding to future emergency and planned events, including the LA 2028 Summer Olympics.

The City has found that an Agreement for the voice radio system upgrade does not require a City Charter Section 1022 determination because Motorola requires the use of its staff to install, maintain or service equipment or other products in order to maintain warranties.

The proposed term for this Agreement is for three (3) years, commencing upon the date of execution by the City Clerk, and terminating three (3) years from that date, for an amount not to exceed \$17,953,555.68. Thereafter, the LAFD will have the option to purchase extended maintenance services, exercised in five (5) one-year increments, for a cumulative amount not to exceed \$11,246,822, contingent upon the availability of funds and the contractor having provided satisfactory services under the Agreement.

The attached Agreement has been reviewed and approved by the City Attorney as to legal form. Pursuant to Los Angeles City Charter Section 373, approval by the City Council is required.

RECOMMENDATIONS

That the Board:

1. Approve and authorize the Fire Chief to execute an Agreement with Motorola Solutions, Inc. to provide for hardware, software and professional installation services for the voice radio system upgrade for a three (3) year term, commencing upon the date of execution by the City Clerk, and terminating three (3) years from that date, and for an amount not to exceed \$17,953,555.68, with the authority for the Fire Chief to execute amendments to extend the term of the Agreement for up to five (5) additional years, exercisable in one-year increments, for a cumulative amount not to exceed \$11,246,822, contingent on the availability of funds and the contractor having provided satisfactory services in the Agreement and subject to review and approval by the City Attorney.
2. Transmit the Agreement to the Mayor for review and approval, in accordance with Executive Directive No. 3.

FISCAL IMPACT

There is no impact to the General Fund. Funding for this Agreement is available from the Municipal Improvement Corporation of Los Angeles (MICLA) Financing, consisting of \$6.4 million that was awarded to the Information Technology Agency and has been reauthorized to the LAFD, \$4 million that will be provided from the FY 2022-23 Approved Budget, and \$7.6 million that will be requested in the FY 2023-24 Budget, for a total of \$18,000,000. Subsequent contract extensions are contingent on the availability of funds.

Board Report prepared by Alfonso Ruiz, Battalion Chief, and Kanwarjit Bhopal, Sr. Management Analyst I, Information Technology Bureau, Fire Communications Dispatch Support Section.

Attachment

AGREEMENT NO. _____

AGREEMENT BETWEEN

THE CITY OF LOS ANGELES

AND

MOTOROLA SOLUTIONS, INC.

FOR

LAFD VOICE RADIO SYSTEM UPGRADE

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AGREEMENT NO. _____

AGREEMENT
BETWEEN THE CITY OF LOS ANGELES
AND
MOTOROLA SOLUTIONS, INC.

This Agreement (hereinafter referred to as “Agreement”) is made and entered into by and between the City of Los Angeles, a municipal corporation (hereinafter referred to as “City”), acting by and through the Los Angeles Fire Department (hereinafter referred to as “LAFD” or “the Department”), and Motorola Solutions, Incorporated, a Delaware Corporation (hereinafter referred to as “Contractor” or “Motorola”), with reference to the following:

RECITALS

WHEREAS, the day-to-day operations of the Los Angeles Fire Department and the safety of its members, relies on an integrated and complex system of telecommunications networks, mobile and handheld radios, computer hardware and software, collectively known as the Voice Radio System (VRS) or Land Mobile Radio System (LMRS), to provide mission-critical voice communications to and from field personnel; and

WHEREAS, the current LAFD VRS is more than 30 years old and has many hardware and software components that are no longer commercially supported or available to purchase making it difficult for the City’s Information Technology Agency (ITA) and the LAFD to properly and pro-actively maintain the system, increasing the potential frequency of system disruption and outages related to equipment failures of this mission-critical, frontline emergency communications system; and

WHEREAS, due to the high degree of risk, cost and complexity, upgrading the entire LAFD VRS system with a complete brand-new system, using different technology and frequencies would be operationally disruptive and fiscally imprudent; and

WHEREAS, ITA and the LAFD have determined that refreshing, updating, upgrading and replacing the aging components with the most current and fully supported equipment equivalents and focusing first on replacing those components that are most susceptible to failure, would be the most prudent and fiscally responsible path forward; and

WHEREAS, LAFD has conducted a cost analysis of available alternatives and determined that upgrading the existing system is the most cost-effective alternative to meet the LAFD’s needs; and

WHEREAS, ITA began work in July 2020 on several capital improvement projects needed to update the various physical sites located throughout the City that house the radio system in order to prepare them for this project and to make them ready for new LAFD VRS components; and

WHEREAS, the replacement of the current voice radio system components must be done in a manner that allows the new system components to co-exist and operate in parallel with the

current system components for a period of time without disruption to the day-to-day LAFD operations, and provide a modern, commercially supported platform that allows for the future expansion, interoperability with the Los Angeles Police Department and the LAFD area partners and for future innovation of the LAFD VRS over time; and

WHEREAS, the Contractor is a professional corporation with more than 90 years of experience designing, developing, delivering and supporting telecommunications systems for other major cities and municipalities located throughout the United States, including New York City, Houston, Boston, and Washington D.C.; and

WHEREAS, the Contractor has proposed a unique and proprietary solution that allows for the seamless upgrading of LAFD's existing VRS using commercial-off-the-shelf equipment that is fully supported by the Contractor and readily available for use, without degradation or loss of existing functionality and capabilities, and allows for the supply of an adequate cache of spare parts; and

WHEREAS, pursuant to Charter Section 371(e), competitive bidding is not required as the services contemplated involve the performance of professional, scientific, expert, or technical services, and the use of competitive bidding is otherwise undesirable, impractical, or impossible; and

WHEREAS, pursuant to Charter Section 372, obtaining competitive proposals is not reasonably practicable or compatible with the City's best interests; and

WHEREAS, the City and Contractor desire to enter into this Agreement for a three (3) year term not to exceed \$17,953,555.68, subject to the availability of funds.

WHEREAS, Contractor agrees that City may purchase, at City's sole discretion, five (5) years of additional maintenance support, exercisable in five (5) one-year increments and at a cumulative cost not to exceed \$11,246,822, subject to the limitations of this Agreement.

NOW, THEREFORE, the City and the Contractor agree as follows:

1.0 Section 1: General Information

1.1 Project Overview

The purpose of this project is to upgrade current aging LAFD voice radio system infrastructure components at each of nine (9) radio tower sites and various other locations throughout the City, including City Hall East and the Metro Fire Communications Center, with a modern, commercially available, and fully supported land mobile radio and dispatch console solution, without disruption of current operational service.

1.2 Parties to the Agreement

- A. City – The City of Los Angeles, a municipal corporation, having its principal office at 200 North Spring Street, Los Angeles, CA, 90012
- B. Contractor – Motorola Solutions, Inc., a Delaware State Corporation, having its principal office at 500 W. Monroe Street, Chicago, Illinois 60661.

1.3 Contractor's Representative

Contractor hereby appoints the following person to represent Contractor with respect to all matters pertaining to this Contract. Said representative shall be responsible for submitting all of the respective notices, reports, invoices, and other documents or information as required by this Contract.

Name: Joe Warner
Title: Senior Account Executive, City of Los Angeles
Address: 725 S. Figueroa St.
Suite 1855
Los Angeles CA 90012
Telephone: (312) 204-9300
E-Mail: joseph.warner@motorolasolutions.com

1.4 City's Representative

City hereby appoints the following person to represent the City with respect to all matters pertaining to this Contract. Said representative shall be responsible for submitting all of the respective notices, reports, and other documents or information as required by this Contract.

Name: Kristin M. Crowley
Title: Fire Chief
Address: 200 N. Main Street, Room 1800
Los Angeles, CA 90012
Telephone: (213) 978-3800
Email: lafdfirechief@lacity.org

With copies to:

Name: S. Jenny Park

Title: Fire Administrator
Address: 200 N. Main Street, Room 1630
Los Angeles, CA 90012
Telephone: (213) 978-3731
Email: s.jenny.park@lacity.org

And

Name: Emilio Rodriguez, Jr.
Title: Chief Management Analyst
Address: 200 N. Main Street, Room 1630
Los Angeles, CA 90012
Telephone: (213) 978-3478
Email: emilio.rodriguez@lacity.org

And

Name: Carr Oduro
Title: Senior Systems Analyst
Address: 200 N. Main Street, Room 1680
Los Angeles, CA 90012
Telephone: (213) 922-7761
Email: carr.oduro@lacity.org

1.5 Contractor's Project Manager

Contractor hereby appoints the following person to act as the Project Manager on behalf of the Contractor.

Name: Rebecca Burbink
Title: Sr. Project Manager
Address: 725 S. Figueroa St.
Suite 1855
Los Angeles CA 90012
Telephone: (619) 572-2133
E-Mail: rebecca.burbink@motorolasolutions.com

1.6 City's Project Manager

City hereby appoints the following person to act as the Project Manager on behalf of the City.

Name: Alfonso Ruiz
Title: Battalion Chief
Address: 500 E. Temple Street
Los Angeles, CA 90012
Telephone: (213) 910-7107
Email: al.ruiz@lacity.org

And

Name: Cristina Tolentino
Title: Information Systems Manager I
Address: 200 N. Main Street, Room 1400
Los Angeles CA 90012
Telephone: (213) 978-0863
E-Mail: cristina.tolentino@lacity.org

1.7 Notices, Demands and Communications

Formal notices, demands, and communication required hereunder by either party shall be made in writing and may be affected by personal delivery or by registered or certified mail, postage prepaid, return receipt requested and shall be deemed communicated as of the date of mailing. Formal notices, demands, and communications from the Contractor shall be given to the City's Representative with copies to the City's Project Manager.

If the name of the person designated to receive the notices, demands, or communications or the address of such person is changed, written notice shall be given, in accordance with this Section, within fifteen (15) working days of said change.

2.0 Section 2: Term of Agreement

2.1 Term

2.1.1 This Agreement is effective upon the date of attestation by the Los Angeles City Clerk (the "Effective Date").

2.1.2 Unless the Agreement is terminated earlier pursuant to Section 2.5 below, the term of the Agreement will commence on the Effective Date and will terminate three (3) years from that date.

2.1.3 Contractor shall provide to City one year of warranty services commencing upon the day following Final System Acceptance (as defined in Section 5 of **Appendix B, Scoping Statement of Work**). At City's option, City may purchase and Contractor agrees to provide, five years of maintenance support services at the pricing set forth in Section 9 of Appendix B, commencing immediately upon completion of the one year of warranty services. City's right to purchase maintenance support services may be exercised in five (5) one year options with any such purchase memorialized by amendment to this Agreement pursuant to Section 2.2, below.

2.1.4 Contractor shall provide City with at least two (2) years' prior written notice of the end of life or end of support of all hardware, software, firmware, or other System components.

2.2 Amendments

This Agreement may be extended for an additional five (5) years, exercised in five (5) one-year increments, utilizing the amendment process described in Section PSC-5

Amendment, of **Appendix A – Standard Provisions for City Contracts (Rev. 10/21)[v.4]**, attached hereto and incorporated by reference herein.

2.3 Ratification of Agreement

To the extent that the Contractor may have begun performance of the services before the date of execution at the City's request and due to the immediate needs of the LAFD, the City hereby ratifies and accepts those services performed in accordance with this Agreement and authorizes payment as provided by the terms of this Agreement. Notwithstanding this Section, the term of this Agreement will remain as stated above.

2.4 Suspension

At City's sole discretion, City may suspend any or all services provided under this Agreement by providing Contractor with written notice of suspension. Upon receipt of the notice of suspension, Contractor shall immediately cease the services suspended and shall not incur any additional obligations, costs or expenses to City until City gives written notice to recommence the services. In the event of a suspension under this provision, and provided that said suspension is not a result of Contractor's failure to perform, , the Parties will negotiate in good faith a change order which addresses any reasonable charges that may be incurred because of the delay specifically applicable to the work being performed during the applicable delivery milestone. Delay charges may include costs incurred by Contractor or its subcontractors for additional freight, warehousing and handling of equipment; extension of the warranties; travel; suspending and re-mobilizing the work; additional engineering, project management, and standby time calculated at then current rates; and preparing and implementing an alternative implementation plan.

2.5 Termination

This Agreement may be terminated in accordance PSC-9 of the Standard Provisions of City Contracts (Rev. 10/21)[v.4], which provision is incorporated herein as though fully set forth below, with the exception of Subsection PSC-9(B)(6), the language of which is instead replaced with the following:

In the event City terminates this Agreement as provided in this section due to Contractor's default or breach of this Agreement, City may procure, upon such terms and in the manner as City may deem appropriate, services substantially similar in scope and level of effort to those so terminated, and Contractor shall be liable to City for all of its reasonable costs and damages, including, but not limited to, any reasonable excess costs for such services.

3.0 Section 3: Scope of Work

3.1 Upgraded Voice Radio System

As further described in **Appendix B, Scoping Statement of Work**, Contractor shall provide City all the services and deliverables necessary to upgrade City's radio system infrastructure. Contractor shall provide an upgraded system (the "System") that: (i) meets or exceeds all of the

City's functional and technical requirements as described in **Appendix C, High-Level Specifications**; (ii) contains no less than the functionality currently available to City in City's radio system that exists as of the Effective Date, or exceeds or modifies that functionality in a form and manner agreed to by City and in this Agreement; and (iii) meets or exceeds all the requirements in **Appendix D, Contractor's Proposal**.

3.2 Software Licenses

As further articulated in this Agreement and as otherwise necessary to City's use of the System, Contractor shall provide City with certain end-user and administrative software. Contractor hereby grants City a nonexclusive, perpetual, irrevocable, worldwide, fully paid, royalty-free, license pursuant to **Appendix E, Contractor's Communications System Services Agreement and Software License Agreement** to use the deliverables for City's governmental purposes.

3.3 In Scope Services

The project scope includes the following services, described in detail in Appendix B, needed to upgrade the LAFD voice radio system infrastructure, including:

- Project Management
- System Design
- System Installation and Testing
- System Cut-Over
- System Training
- System Implementation
- System Warranty, Maintenance and Support
- As-Built System Documentation

3.4 Out of Scope Services

Unless mutually agreed to by both parties by way of an amendment to this Agreement, any services not specifically listed in this Agreement, are considered out of scope. The City shall not be responsible to pay Contractor for any out of scope work.

Contractor shall immediately notify the City in writing of any work that is requested to be performed that is outside of the original scope of work covered by this Agreement. If it is determined that the request is outside of the scope of work, Contractor shall not perform the requested work unless and until (i) the City's designated authority approves the request in writing and authorizes the use of any contingency funds for the work, and (ii) an amendment providing for an adjustment in Contractor's compensation, and the scope of work, is approved and executed by both parties.

4.0 Section 4: Compensation, Payment, Taxes, and Invoicing

4.1 Total Solution Cost.

Contractor shall provide the Voice Radio System solution (including one year of warranty support) as described in this Agreement, including **Appendix B, Scoping Statement of Work**, for a firm fixed price not to exceed \$17,953,555.68, in accordance with the pricing details and payment milestones articulated in Section 9 of **Appendix B**.

4.2 Optional Post-Warranty Maintenance Support Cost.

At City's discretion, Contractor shall provide maintenance support as described in **Appendix B, Scoping Statement of Work**, for five (5) years, exercisable at City's option in one or more year increments, following (i) Full System Acceptance by the City and (ii) one year of warranty support. Contractor shall provide this maintenance support at costs not to exceed the prices for the corresponding year of post warranty support articulated in Section 9 of **Appendix B**, and for a cumulative price not to exceed \$11,246,822 for five (5) years of maintenance support, provided City exercises its option to purchase maintenance support at or prior to Final System Acceptance.

4.3 Taxes

To the extent that any of the Services or Deliverables to be provided by Contractor hereunder are subject to any California sales and use taxes, City and Contractor acknowledge and agree that such taxes will be collected from the City. Contractor acknowledges and agrees to remit the same to the appropriate tax collection authorities in the manner set forth under applicable law.

Contractor shall be solely responsible for any uncollected and unremitted taxes due and owing to the appropriate tax collection authorities and shall indemnify the City for any losses in connection with any uncollected and unremitted taxes due. Contractor acknowledges and agrees that the total compensation amount set forth is inclusive of all taxes that City will be responsible to pay under this Agreement and that Contractor shall be responsible for paying for any costs beyond the total compensation, regardless of whether such additional costs are the result of new or uncalculated additional taxes.

4.4 Invoicing

The Contractor shall submit their invoices to:

Name: S. Jenny Park
Title: Fire Administrator
Address: 200 N. Main Street, Room 1630
Los Angeles, CA 90012
Telephone: (213) 978-3731
Email: s.jenny.park@lacity.org

With copies to:

Name: Emilio Rodriguez, Jr.
Title: Chief Management Analyst
Address: 200 N. Main Street, Room 1630
Los Angeles, CA 90012
Telephone: (213) 978-3478
Email: emilio.rodriguez@lacity.org

And

Name: Carr Oduro

Title: Senior Systems Analyst
Address: 200 N. Main Street, Room 1680
Los Angeles, CA 90012
Telephone: (213) 922-7761
Email: carr.oduro@lacity.org

The City will make payment to the Contractor for the services performed within 45 days of receipt and approval of the invoices by the City's Representative. The City will not unreasonably withhold approval of invoices. In the event an invoice is not approved, the City's Representative will immediately send a notice to the Contractor setting forth therein the reasons said invoice was not approved. Upon receipt of such notice, the Contractor may re-invoice the City for the accepted portion of the invoice or cure the defects identified in the City Representative's notice. The City will pay the revised invoice as soon as practical after its submission. If the City's Representative contests all or a portion of the invoice, the City's representative and the Contractor will use their best efforts to resolve the disputed portion or portions of the invoice.

The invoice must contain the following:

- a. Name and address of company or firm;
- b. Name and address of the contracting department;
- c. Date of the invoice and period covered;
- d. Reference to contract number;
- e. Description of the completed task and amount due for the task;
- f. Copy of the invoices and payments to third parties, if any;
- g. Payment terms, total due, and due date;
- h. Certification by a duly authorized officer of the Contractor;
- i. Discounts and terms (if applicable);
- j. Remittance address (if different from company address); and
- k. Percentage of maximum allowable compensation against which services have been billed to date, and percentage of maximum allowable compensation remaining.

All invoices shall be submitted on Contractor's letterhead, contain Contractor's official logo, if any, or contain other unique and identifying information such as name and address of Contractor. Evidence that tasks have been completed, in the form of a report (or progress report outlining work completed during the billing period), shall be attached to all invoices. Invoices shall be submitted within 30 days of performance of services. Invoices are considered complete when appropriate documentation or services provided are signed off as satisfactory by the Fire Chief or designee.

Invoices and supporting documentation shall be prepared at the sole expense and responsibility of Contractor. The Department will not compensate Contractor for any costs incurred for invoice preparation. The Department may request, in writing, changes to the content and format of the invoice and supporting documentation at any time. The Department reserves the right to request additional supporting documentation to

substantiate costs at any time.

Failure to adhere to these policies may result in nonpayment or non- approval of demands, pursuant to Charter 262(a), which requires the Controller to inspect the quality, quantity, and condition of services, labor, materials, supplies, or equipment received by any City office or department, and approve demands before they are drawn on the Treasury

5.0 Section 5: Representations and Warranties

5.1 In General.

The warranties in this section are nonexclusive and are cumulative of any other representations and warranties from Contractor in this Agreement, including but not limited to those warranties contained in the Appendices, or otherwise available to City under law.

5.2 Warranties of Function

5.2.1 Contractor represents and warrants that for one year following Final System Acceptance, the System will perform materially as described in the technical specifications set forth in the Appendices.

5.2.2 Contractor represents and warrants that, during the first year after Final System Acceptance, each component will perform materially according to its specification and documentation, as provided in Appendices.

5.2.3 Contractor represents and warrants that no component, when installed, will impair or degrade the Existing Radio System's performance, during the period from installation until Final System Acceptance.

5.2.4 The Contractor represents and warrants that any software products provided for the LAFD VRSSU shall be free from known defects or errors for the life of the Contract. The Contractor shall provide all necessary services to promptly correct any such defects at no cost to the City. This applies to the correction of "bugs," which may be found in the operating software. Software upgrades and enhancements, if requested by the City, may be negotiated with the Contractor at the time it is requested. The City reserves the right to deploy system-trained City technicians to perform emergency maintenance in coordination with the Contractor during the warranty period without voiding the terms of the warranty.

5.3 General Hardware Warranties

The Contractor shall warrant that all the equipment, work, and documentation supplied as part of this Agreement meet the following specification: Such work and equipment shall be free from defects in material and workmanship for a period of at least one (1) year from the date of Final System Acceptance. The Contractor shall provide all parts and labor needed during the warranty

period. All equipment supplied as part of this Agreement shall be new. Refurbished or remanufactured components will not be accepted.

5.4 Warranty of Originality

Contractor represents and warrants that the Work Product will be its own original work, without incorporation of software, text, images, or other assets created by third parties, except to the extent that City consents to such incorporation in writing.

5.4.1 Third-Party Software

Any third-party software provided by Contractor under this agreement will be subject to the terms and conditions of **Appendix E, Contractor's Communications System Services Agreement and Software License Agreement**.

5.5 Warranty of Authority

Contractor represents and warrants that it has the full right and authority to enter into, execute, and perform its obligations under this Agreement and that no pending or threatened claim or litigation known to it would have a material adverse impact on its ability to perform as required by this Agreement.

5.6 Deliverables

Contractor represents and warrants that any and all Deliverables shall at the time of delivery and acceptance conform to the applicable specifications; shall be free from any error, malfunction, or defect; shall be fit for the particular purpose for which the Deliverable is developed and of which City advises Contract; and if intended to serve as one or more components of an associated system, program, device, network or data, such Deliverable shall comply with the warranties and other requirements of this Agreement when integrated or used with the System

5.7 Pass through Warranties

Without limiting City's rights with respect to Contractor's warranties under this Agreement, if Contractor provides any Deliverables covered by a third-party manufacturer's warranty or indemnity, or both, Contractor shall: (i) provide City with a copy of each such warranty or indemnity; and (ii) if such warranty or indemnity does not by its terms pass through to the end-user, then to the extent permitted, Contractor shall assign to City or otherwise cause the manufacturer to grant to City all warranties and indemnities provided by such manufacturer.

5.8 Compliance with Law

Contractor represents and warrants that the services provide under this Agreement will comply with all applicable laws, including without limitation federal, state, and local.

5.9 Malicious Software

Contractor represents and warrants that the Software and any media used to distribute it contain no known viruses or other computer instructions or technological means intended to disrupt, damage, or interfere with the use of computers or related systems.

Contractor represents and warrants to City that all Software licensed hereunder does not contain any undisclosed disabling code (defined as computer code designed to interfere with the normal operation of the Software or Customer's hardware or software) other than that required for Contractor to provide updates and maintenance to City, or any program routine, device or other undisclosed feature, including but not limited to, a time bomb, virus, drop-dead device, malicious logic, worm, Trojan horse, or trap door which is designed to delete, disable, deactivate, interfere with or otherwise harm the software or Customer's hardware or software.

Contractor represents and warrants to City that: (a) Contractor has used its best efforts to scan for viruses within the Software, and (b) no known malicious System will be supplied under this Agreement.

5.10 System Security

Contractor represents and warrants that it will employ industry-standard or better protections to prevent unauthorized disclosure or exposure of sensitive or confidential information that City provides to the System.

5.11 The warranties set forth in this Section 5 do not apply to: (i) defects or damage resulting from: use of the equipment or software in other than its authorized manner; accident, liquids, neglect, or acts of God; testing, maintenance, disassembly, repair, installation, alteration, modification, or adjustment not provided or authorized in writing by Contractor; City's failure to comply with all applicable industry and OSHA standards; (ii) breakage of or damage to antennas unless caused directly by defects in material or workmanship; (iii) equipment that has had the serial number removed or made illegible; (iv) batteries (because they carry their own separate limited warranty) or consumables;; and (v) normal or customary wear and tear.

UNLESS OTHERWISE STATED IN AN APPLICABLE STATEMENT OF WORK, THESE WARRANTIES ARE THE COMPLETE WARRANTIES FOR THE EQUIPMENT AND CONTRACTOR SOFTWARE PROVIDED UNDER THIS AGREEMENT AND ARE GIVEN IN LIEU OF ALL OTHER WARRANTIES. CONTRACTOR DISCLAIMS ALL OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY, NON-INFRINGEMENT, AND FITNESS FOR A PARTICULAR PURPOSE.

6.0 Section 6: City Contracting Requirements

6.1 Standard Provisions

Contractor agrees to, and shall comply with, the Standard Provisions for City Contracts (Rev. 10/21)[v.4], attached hereto as **Appendix A**, and incorporated by reference as though fully set forth herein, with the exception of the following provisions, the subject matter of which are otherwise addressed in this Agreement: PSC-8, PSC-9(B)(6), PSC-12, PSC-13, PSC-18, PSC-19, PSC-20, PSC-21, PSC-22, PSC-24, PSC-39, and PSC-40.

6.2 Disclosure of Border Wall Contracting Ordinance

Contractor shall comply with Los Angeles Administrative Code (LAAC) Section 10.50 *et seq.*, "Disclosure of Border Wall Contracting Ordinance." City may terminate this

Agreement at any time if City determines that Contractor failed to fully and accurately complete the required affidavit and disclose all Border Wall Bids and Border Wall Contracts, as defined in LAAC Section 10.50.1.

6.3 Assignment and Delegation

Contractor may not, unless it has first obtained the written permission of City:

- A. Assign or otherwise alienate any of its rights under this Agreement, including the right to payment; or
- B. Delegate, subcontract, or otherwise transfer any of its duties under this Contract.
- C. Written permission of City for Contractor's assignment will not be unreasonably withheld.

6.4 Permits

Unless otherwise set forth in the applicable Statement of Work Contractor and its directors, officers, partners, agents, employees, and Subcontractors, shall obtain and maintain all licenses, permits, certifications and other documents necessary for Contractor's performance of this Contract. Contractor shall immediately notify City of any suspension, termination, lapses, non-renewals, or restrictions of licenses, permits, certificates, or other documents that relate to Contractor's performance of this Contract.

6.5 Indemnification

Except for the active negligence or willful misconduct of City, or any of its boards, officers, agents, employees, assigns and successors in interest, Contractor shall defend, indemnify and hold harmless City and any of its boards, officers, agents, employees, assigns, and successors in interest from and against all lawsuits and causes of action, claims, losses, demands and expenses, including, but not limited to, attorney's fees (both in house and outside counsel) and cost of litigation (including all actual litigation costs incurred by City, including but not limited to, costs of experts and consultants), damages or liability of any nature whatsoever, for death or injury to any person, including Contractor's employees and agents, or damage or destruction of any tangible property of either party hereto or of third parties, to the extent arising in any manner by reason of a negligent act, error, or omission by Contractor, Subcontractors, or their boards, officers, agents, employees, assigns, and successors in interest. The rights and remedies of City provided in this section shall not be exclusive and are in addition to any other rights and remedies provided by law or under this Contract. This provision will survive expiration or termination of this Contract.

6.6 Intellectual Property Indemnification

Contractor, at its own expense, shall defend, indemnify, and hold harmless the City, and any of its boards, officers, agents, employees, assigns, and successors in interest from and against all lawsuits and causes of action, claims, losses, demands and expenses, including, but not limited to, attorney's fees (both in house and outside counsel) and cost of litigation (including all actual litigation costs incurred by City, including but not limited to, costs of experts and consultants),

damages or liability of any nature arising out of the infringement, actual or alleged, direct or contributory, of any intellectual property rights, including, without limitation, any United States patent, copyright, trademark, right of publicity, and proprietary information (“Infringement Claim”): (1) on or in any design, medium, matter, article, process, method, application, equipment, device, instrumentation, software, hardware, or firmware used by Contractor, or its Subcontractors, in performing the work under this Contract (“Contractor Product”); or (2) as a result of City’s actual or intended use of any Work Product (as defined in PSC-21) furnished by Contractor, or its Subcontractors, under this Contract. The rights and remedies of City provided in this section shall not be exclusive and are in addition to any other rights and remedies provided by law or under this Contract. This provision will survive expiration or termination of this Contract.

If an Infringement Claim occurs, or in Contractor's opinion is likely to occur, Contractor may at its option and expense: (a) procure for City the right to continue using the Contractor Product; (b) replace or modify the Contractor Product so that it becomes non-infringing while providing functionally equivalent performance.

Contractor will have no duty to defend or indemnify for any Infringement Claim that is based upon: (a) the unintended combination of the Contractor Product with any software, apparatus or device not furnished by Contractor, but solely to the extent: (1) such combination causes the infringement and (2) the infringement claim results from such combination; (b) the unauthorized use of ancillary equipment or software not furnished by Contractor and that is attached to or used in connection with the Contractor Product, but solely to the extent: (1) such use causes the infringement and (2) the infringement claim results from such use; (c) Contractor Product designed or manufactured in accordance with City’s designs, specifications, guidelines or instructions, if the alleged infringement would not have occurred without such designs, specifications, guidelines or instructions; (d) an unauthorized modification of the Contractor Product by a party other than Contractor but solely to the extent: (1) such modification causes the infringement and (2) the infringement claim results from such modification; (e) use of the Contractor Product in a manner for which the Contractor Product was not designed or that is inconsistent with the terms of this Agreement, but solely to the extent (1) such use causes the infringement and (2) the infringement claim results from such use; or (f) the failure by City to install an enhancement release to the Contractor Software that is intended to correct the claimed infringement, but solely to the extent that: (1) Contractor has notified City in writing that use of the update would have avoided the claim, (2) the enhancement release correcting the infringement is provided to City free of charge, and (3) the enhancement does not result in a material diminution in the functionality of the Contractor Software or Contractor Product. .

This Section provides City’s sole and exclusive remedies and Contractor’s entire liability in the event of an Infringement Claim. City has no right to recover and Contractor has no obligation to provide any other or further remedies, whether under another provision of this Agreement or any other legal theory or principle, in connection with an Infringement Claim. In addition, the rights and remedies provided in this Section are subject to and limited by any liability limits set forth herein.

6.7 Limitation of Liability.

Except for personal injury or death, Contractor's total liability, whether for breach of contract, warranty, negligence, strict liability in tort, indemnification, or otherwise, will be limited to the direct damages recoverable under law, but not to exceed three times (3x) the price of the equipment, software, or implementation and other one-time services with respect to which losses or damages are claimed. With respect to all subscription or other ongoing services, Contractor's total liability will be limited to the direct damages recoverable under law, but not to exceed the price of eighteen (18) months of Services preceding the incident giving rise to the claim.

ALTHOUGH THE PARTIES ACKNOWLEDGE THE POSSIBILITY OF SUCH LOSSES OR DAMAGES, THEY AGREE THAT CONTRACTOR WILL NOT BE LIABLE FOR ANY COMMERCIAL LOSS, INCONVENIENCE, LOSS OF USE, LOSS TIME, DATA, GOODWILL, REVENUES, PROFITS OR SAVINGS; OR OTHER SPECIAL, INCIDENTAL, INDIRECT, OR CONSEQUENTIAL DAMAGES IN ANY WAY RELATED TO OR ARISING FROM THIS AGREEMENT, THE SALE OR USE OF THE EQUIPMENT OR SOFTWARE, OR THE PERFORMANCE OF SERVICES BY CONTRACTOR PURSUANT TO THIS AGREEMENT.

6.8 Ownership and License

All documentary deliverables and other materials that are promised deliverables under this Agreement and the applicable order shall become City property, title will transfer and risk of loss shall occur, upon the date of delivery and payment therefor (except for Software, if any, which is licensed), but no transfer of Contractor's or City's intellectual property rights will occur. As between the parties, City is the sole and exclusive owner of all data and information provided to Contractor by or on behalf of City pursuant to this Agreement and any and all updates or modifications thereto or derivatives thereof made by Contractor ("City Data"), and all intellectual property rights in the foregoing, whether or not provided to any other party under this Agreement. City Data is Confidential Information for the purposes of this Agreement.

Contractor shall not use City Data for any purpose other than that of rendering the services under this Agreement, nor sell, assign, lease, dispose of or otherwise exploit City Data. Contractor shall not possess or assert any lien or other right against, or to City Data. City may request an export of City Data stored within the systems or held by Contractor in any form or format at no charge to City.

Subject to the restrictions articulated elsewhere in this Agreement, City grants Contractor a non-transferable, non-exclusive, terminable at-will license, solely for the term of this Agreement, to use City Data solely for purposes of performing the services pursuant to this Agreement for City's benefit. This section is in lieu of PSC-21.

6.9 Data Protection

A. Contractor shall protect, using no less than the most secure means and technology that is commercially available and standard for public safety communications, City-provided data or consumer-provided data acquired in the course and scope of this Contract, including but not limited to customer lists and customer credit card or consumer data, (collectively, the "City

Data”). Contractor shall notify City in writing as soon as reasonably feasible, and in any event within forty-eight hours, of Contractor’s discovery of any unauthorized access of City Data (a “Data Breach”), or of any incident affecting, or potentially affecting City Data related to cyber security (a “Security Incident”), including, but not limited to, denial of service attack, and system outage, instability or degradation due to computer malware or virus. Contractor shall begin remediation immediately. Contractor shall provide daily updates, or more frequently if required by City, regarding findings and actions performed by Contractor until the Data Breach or Security Incident has been effectively resolved to City’s satisfaction. Contractor shall conduct an investigation of the Data Breach or Security Incident and shall share the report of the investigation with City. At City’s sole discretion, City and its authorized agents shall have the right to participate in the investigation. Contractor shall cooperate fully with City, its agents and law enforcement.

B. Except where the liability is primarily attributable to the City’s negligence, if City is subject to liability for any Data Breach or Security Incident, then Contractor shall fully indemnify and hold harmless City and defend against any resulting actions.

6.10 Best Terms

Contractor makes no representations or commitments concerning the pricing or discounts for the services to be provided hereunder, except as set forth in Section 4 above and **Appendix B** to this Agreement. Notwithstanding the preceding sentence, if City becomes aware of any of its orders under this Agreement that is substantially similar in time frame and nature to another service transaction with a different Motorola state or local governmental customer in the United States where that other customer received more favorable pricing, then City may notify Contractor of the other substantially similar transaction with more favorable pricing. Upon receipt of such notice, Contractor will investigate the matter, and thereafter the Parties will meet and confer to discuss the matter. Based upon that meet and confer process, if a differential in pricing does exist, Contractor will make an appropriate reduction in the pricing for City’s order in the form of a credit to be used against future purchases. In addition, Contractor may but is not obligated to provide additional or other discounts (e.g., large order) to City concerning any order.

6.11 Limitation of City’s Obligation to Make Payment to Contractor

Notwithstanding any other provision of this Contract, including any appendices or attachments incorporated therein, and in order for City to comply with its governing legal requirements, City shall have no obligation to make any payments to Contractor unless City shall have first made an appropriation of funds equal to or in excess of its obligation to make any payments as provided in this Contract. Contractor agrees that any services provided by Contractor, purchases made by Contractor or expenses incurred by Contractor in excess of the appropriation(s) shall be free and without charge to City and City shall have no obligation to pay for the services, purchases or expenses. Contractor shall have no obligation to provide any services, provide any equipment or incur any expenses in excess of the appropriated amount(s) until City appropriates additional funds for this Contract.

6.12 Compliance with Identity Theft Laws and Payment Card Data Security Standards

Contractor shall comply with all applicable identity theft laws including without limitation, laws related to: (1) payment devices; (2) credit and debit card fraud; and (3) the Fair and Accurate Credit Transactions Act (“FACTA”), including its requirement relating to the content of transaction receipts provided to Customers. Contractor also shall comply with all requirements related to maintaining compliance with Payment Card Industry Data Security Standards (“PCI DSS”). During the performance of any service to install, program or update payment devices equipped to conduct credit or debit card transactions, including PCI DSS services, Contractor shall verify proper truncation of receipts in compliance with FACTA.

7.0 Prevailing wage requirements

7.1 Prevailing Wage Requirements

7.1.1 Prevailing Wages must be paid on all City of Los Angeles public works projects when the work is for construction, alteration, demolition, installation, maintenance or repair when the work is done under Agreement and paid for in whole or in part out of public funds.

7.1.1.1 The Contractor and all subcontractors shall comply with all provisions of the California Labor Code relating to public works wages, and in specific, with Sections 1720-1861 of the Code requiring the Contractor to pay not less than the “General Prevailing Wage Rates” to all workers employed during the work. The prevailing wage rate is established by the State of California’s Department of Industrial Relations. Information regarding prevailing wage rates may be obtained from the Office of Policy, Research and Legislation, Prevailing Wage Unit, P.O. Box 420603, San Francisco, CA 94142, Telephone (415) 972-8628, Fax (415) 972-8640, or for a copy of the prevailing wage rates, contact the Office of Contract Compliance at (213) 847-2636.

7.1.1.2 Any contract awarded hereunder will require the Contractor and all subcontractors to comply with the provisions of the Labor Code of the State of California, relating to Public Works wages. These provisions require the Contractor to pay not less than the “General Prevailing Wage Rates” to all workers employed in the execution of the contract and to post a copy of the “General Prevailing Wage Rates” at the job-site, in a conspicuous place available to all employees and applicants for employment.

7.1.1.3 The Contractor and all subcontractors shall submit Certified Payroll Records to the Office of Contract Compliance on a weekly basis using the City’s On-Line Certified Payroll System (OCPS) throughout the project until completion of the project. In addition, the Contractor and all subcontractors shall employ apprentices in the ratio to journeymen as required by Section 1777.5 of the California Labor Code.

7.1.2 Pursuant to Section 1776 of the California Labor Code:

7.1.2.1 The Contractor must keep accurate payroll records, showing the name, address, social security number, work classification, straight time and overtime hours

worked each day and week, and the actual per diem wages paid to each worker or other employee employed by the Contractor.

7.1.2.2 All payroll records shall be available for inspection at all reasonable hours at the principal office of the Contractor upon request by the City.

7.1.3 Joint Labor Compliance Monitoring Program

The City has a Joint Labor Compliance Monitoring Program to assist in ensuring that the proper Prevailing Wage Rates are paid to all workers employed on the City's public works projects.

7.1.3.1 The Contractor and all subcontractors shall cooperate in allowing approved Compliance Group Representatives access to the project job site for the purpose of conducting worker interviews to insure compliance with the requirement to pay proper prevailing wages on City projects. This will be done in order to comply with the Board of Public Works' adoption of a Joint Labor Compliance Monitoring Program.

7.1.3.2 Each Compliance Group Representative must wear their City-issued Joint Labor Compliance Monitoring Program identification badge at all times while on the job site, and must restrict their actions to interviewing workers employed on the project. For a copy of the Joint Labor Compliance Monitoring Program board report, or for any questions, contact the Office of Contract Compliance at (213) 847-2675.

8.0 Miscellaneous

8.1 Non-Exclusive Agreement

City and Contractor understand and agree that this is a non-exclusive Agreement to provide services to the City and that the City reserves the right to enter into an agreement with other contractors to provide similar services during the term of this Agreement.

8.2 Not a Waiver

Contractor acknowledges and agrees that nothing contained in this Agreement is, represents, or is intended to be construed as a release, compromise, settlement, or waiver by City of any cause of action that City may have against Contractor. City reserves its rights in full, including, but not limited to, the right to bring any claim, cause of action, or request for reimbursement against Contractor in relation to this Agreement and other transactions between City and Contractor.

8.3 Audit Rights

In addition to those rights available to City pursuant to PSC-16, Retention of Records, Audit and Reports, Contractor shall provide City or City's duly authorized representatives access, for the purposes of audit and investigation, to any and all books, documents, papers, records,

deliverables, and software documentation pertaining to any past, current, or future (i) transactions between City and Contractor, (ii) work requested to be performed of Contractor, or (iii) demands for payment by Contractor. Contractor further agrees to maintain such records for a period of three (3) years after final payment under the Contract.

8.4 Payment Does Not Imply Acceptance of Work

The granting of any payment by City or the receipt thereof by Contractor, in no way lessens the liability of Contractor to replace unsatisfactory work, equipment, or materials although the unsatisfactory character of this work, equipment or materials may not have been apparent or detected at the time the payment was made. Materials, equipment, components, or workmanship that do not conform to the requirements of this Agreement may be rejected by City and upon rejection must be replaced by Contractor without delay.

8.5 Name Change

In the event that Contractor undergoes either an ownership change and the new Owner is able to comply with all Agreement terms and conditions, or a name change, the General Manager of the ITA may, at his discretion, execute an amendment to effect the assumption and/or change the Contractor name.

8.6 Subcontracting

8.6.1 Restriction on Disbursements to Subcontractors

If applicable, no money received pursuant to this Agreement by the Contractor shall be disbursed to any subcontractor except pursuant to a written agreement which incorporates the applicable provisions of this Agreement and unless the subcontractor is in compliance with City requirements with regard to accounting and fiscal matters, to the extent that they are applicable.

8.6.2 Records and Audits of Subcontracts

8.6.2.1 Records shall be maintained in accordance with requirements prescribed by the City with respect to all matters covered by any subcontract. Such records shall be retained within the Los Angeles Area for a period of five (5) years after receipt of final payment under this Agreement, unless authorization to remove them is granted in writing by the City.

8.6.2.2 Expenditures pertaining to subcontracts shall be supported by properly executed documents evidencing in detail the nature of the charges.

8.6.2.3 At such times and in such forms as the City may require, there shall be furnished to the City such statements, records, reports, data and information as the City may request pertaining to matters covered by any subcontract.

8.6.2.4 These records shall be made available to the City for copying, audit, and inspection at any time during normal business hours.

8.7 Contractor Performance Evaluation

At the end of this Contract, the City will conduct an evaluation of the Contractor's performance. The City may also conduct evaluations of the Contractor's performance during the term of the Contract. As required by Section 10.39.2 of the Los Angeles Administrative Code, evaluations will be based on a number of criteria, including the quality of the work product or service performed, the timeliness of performance, financial issues, and the expertise of personnel that the Contractor assigns to the Contract. A Contractor who receives a "Marginal" or "Unsatisfactory" rating will be provided with a copy of the final City Evaluation and allowed 14 calendar days to respond. The City will use the final City evaluation and any response from the Contractor to evaluate proposals and to conduct reference checks when awarding other personal services contracts.

8.8 Counterparts and Electronic Signatures

This Agreement may be executed in one or more counterparts, and by the parties in separate counterparts, each of which when executed shall be deemed to be an original but all of which taken together shall constitute one and the same agreement. The parties further agree that facsimile signatures or signatures scanned into .pdf (or signatures in another electronic format designated by City) and sent by e-mail shall be deemed original signatures.

8.9 Order of Precedence

This Agreement, and any appendices, attachments or documents incorporated herein by inclusion or by reference constitutes the complete and entire Agreement between the City and the Contractor. In the event of any inconsistency between the body of this Agreement and the Attachments, the order of precedence will be as follows:

- 1) This Agreement between the City and Motorola Solutions, Inc.
- 2) Appendix A – Standard Provisions for City Contracts (Rev. 10/21)[v.4]
- 3) Appendix B – Scoping Statement of Work
- 4) Appendix C – High-Level Specifications
- 5) Appendix D – Contractor Proposal, dated April 6, 2022, provided, however, that in the event of any inconsistency between Appendix D and Appendix B or Appendix C, the following Sections of Appendix D shall take precedence:
 - Section 2.7: 800MHz Analog VRS Radio System
 - Section 2.8: Preliminary Cutover Plan
 - Section 3: DC Power Upgrades & Tower Studies
 - Section 4.1: Dispatch Console Configuration for LAFD
 - Section 4.4: Deployment Options
 - Section 4.7: LAFD's Proposed Configuration
 - Section 5: Logging Recorder
 - Section 7: System Network Requirements
 - Section 9: Design Assumptions
 - Section 11: Statement of Work

- Section 13: Functional Acceptance Test Plan
 - Section 14: Coverage Acceptance Test Plan (CATP)
 - Section 17: ASTRO® 25 Services Statement of Work
- 6) Appendix E – Contractor’s Communications System Services Agreement and Software License Agreement.

8.10 Entire Agreement

This Agreement contains the full and complete Agreement between the parties. No verbal agreement or conversation with any officer or employee of either party shall affect or modify any of the terms and conditions of this Agreement. No-shrink-wrap, click-wrap, privacy policy, or other terms and conditions or agreements (“Additional Contractor Software Terms”) provided with any products, services, documentation, or software hereunder shall be binding on City, even if use of the foregoing requires an affirmative “acceptance” of those Additional Contractor Software Terms before access is permitted. All such Additional Contractor Software Terms shall be of no force or effect and shall be deemed rejected by City in their entirety.

[SIGNATURE PAGE FOLLOWS]

IN WITNESS THEREOF, the parties hereto have caused this instrument to be signed by their respective duly authorized officers:

THE CITY OF LOS ANGELES

MOTOROLA SOLUTIONS, INC.

By: _____

KRISTIN M. CROWLEY
Fire Chief
Los Angeles Fire Department

By: _____

Name: _____
Title: _____

Date: _____

Date: _____

By: _____

Name: _____
Title: _____

Date: _____

APPROVED AS TO FORM:
MICHAEL N. FEUER, City Attorney

ATTEST:
HOLLY L. WOLCOTT, City Clerk

By: _____

SAMUEL W. PETTY
Deputy City Attorney

By: _____

Deputy City Clerk

Date: _____

Date: _____

City Agreement Number: _____

APPENDIX A

STANDARD PROVISIONS FOR CITY CONTRACTS (Rev. 10/21)[v.4]

STANDARD PROVISIONS FOR CITY CONTRACTS

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STANDARD PROVISIONS FOR CITY CONTRACTS

PSC-1. Construction of Provisions and Titles Herein

All titles, subtitles, or headings in this Contract have been inserted for convenience, and shall not be deemed to affect the meaning or construction of any of the terms or provisions of this Contract. The language of this Contract shall be construed according to its fair meaning and not strictly for or against **CITY** or **CONTRACTOR**. The word "**CONTRACTOR**" includes the party or parties identified in this Contract. The singular shall include the plural and if there is more than one **CONTRACTOR**, unless expressly stated otherwise, their obligations and liabilities shall be joint and several. Use of the feminine, masculine, or neuter genders shall be deemed to include the genders not used.

PSC-2. Applicable Law, Interpretation and Enforcement

Each party's performance shall comply with all applicable laws of the United States of America, the State of California, and **CITY**, including but not limited to, laws regarding health and safety, labor and employment, wage and hours and licensing. This Contract shall be enforced and interpreted under the laws of the State of California without regard to conflict of law principles. **CONTRACTOR** shall comply with new, amended, or revised laws, regulations, or procedures that apply to the performance of this Contract with no additional compensation paid to **CONTRACTOR**.

In any action arising out of this Contract, **CONTRACTOR** consents to personal jurisdiction, and agrees to bring all such actions, exclusively in state or federal courts located in Los Angeles County, California.

If any part, term or provision of this Contract is held void, illegal, unenforceable, or in conflict with any federal, state or local law or regulation, the validity of the remaining parts, terms or provisions of this Contract shall not be affected.

PSC-3. Time of Effectiveness

Unless otherwise provided, this Contract shall take effect when all of the following events have occurred:

- A. This Contract has been signed on behalf of **CONTRACTOR** by the person or persons authorized to bind **CONTRACTOR**;
- B. This Contract has been approved by the City Council or by the board, officer or employee authorized to give such approval;
- C. The Office of the City Attorney has indicated in writing its approval of this Contract as to form; and
- D. This Contract has been signed on behalf of **CITY** by the person designated by the City Council, or by the board, officer or employee authorized to enter into this Contract.

PSC-4. Integrated Contract

This Contract sets forth all of the rights and duties of the parties with respect to the subject matter of this Contract, and replaces any and all previous Contracts or understandings, whether written or oral, relating thereto. This Contract may be amended only as provided for in the provisions of PSC-5 hereof.

PSC-5. Amendment

All amendments to this Contract shall be in writing and signed and approved pursuant to the provisions of PSC-3.

PSC-6. Excusable Delays

Neither party shall be liable for its delay or failure to perform any obligation under and in accordance with this Contract, if the delay or failure arises out of fires, floods, earthquakes, epidemics, quarantine restrictions, other natural occurrences, strikes, lockouts (other than a lockout by the party or any of the party's Subcontractors), freight embargoes, terrorist acts, insurrections or other civil disturbances, or other similar events to those described above, but in each case the delay or failure to perform must be beyond the control and without any fault or negligence of the party delayed or failing to perform (these events are referred to in this provision as "Force Majeure Events").

Notwithstanding the foregoing, a delay or failure to perform by a Subcontractor of **CONTRACTOR** shall not constitute a Force Majeure Event, unless the delay or failure arises out of causes beyond the control of both **CONTRACTOR** and Subcontractor, and without any fault or negligence of either of them. In such case, **CONTRACTOR** shall not be liable for the delay or failure to perform, unless the goods or services to be furnished by the Subcontractor were obtainable from other sources in sufficient time to permit **CONTRACTOR** to perform timely. As used in this Contract, the term "Subcontractor" means a subcontractor at any tier.

In the event **CONTRACTOR'S** delay or failure to perform arises out of a Force Majeure Event, **CONTRACTOR** agrees to use commercially reasonable best efforts to obtain the goods or services from other sources, and to otherwise mitigate the damages and reduce the delay caused by the Force Majeure Event.

PSC-7. Waiver

A waiver of a default of any part, term or provision of this Contract shall not be construed as a waiver of any succeeding default or as a waiver of the part, term or provision itself. A party's performance after the other party's default shall not be construed as a waiver of that default.

PSC-8. Suspension

At **CITY'S** sole discretion, **CITY** may suspend any or all services provided under this Contract by providing **CONTRACTOR** with written notice of suspension. Upon receipt of the notice of suspension, **CONTRACTOR** shall immediately cease the services suspended and shall not incur any additional obligations, costs or expenses to **CITY** until **CITY** gives written notice to recommence the services.

PSC-9. Termination

A. Termination for Convenience

CITY may terminate this Contract for **CITY'S** convenience at any time by providing **CONTRACTOR** thirty days written notice. Upon receipt of the notice of termination, **CONTRACTOR** shall immediately take action not to incur any additional obligations, costs or expenses, except as may be necessary to terminate its activities. **CITY** shall pay **CONTRACTOR** its reasonable and allowable costs through the effective date of termination and those reasonable and necessary costs incurred by **CONTRACTOR** to effect the termination. Thereafter, **CONTRACTOR** shall have no further claims against **CITY** under this Contract. All finished and unfinished documents and materials procured for or produced under this Contract, including all intellectual property rights **CITY** is entitled to, shall become **CITY** property upon the date of the termination. **CONTRACTOR** agrees to execute any documents necessary for **CITY** to perfect, memorialize, or record **CITY'S** ownership of rights provided herein.

B. Termination for Breach of Contract

1. Except as provided in PSC-6, if **CONTRACTOR** fails to perform any of the provisions of this Contract or so fails to make progress as to endanger timely performance of this Contract, **CITY** may give **CONTRACTOR** written notice of the default. **CITY'S** default notice will indicate whether the default may be cured and the time period to cure the default to the sole satisfaction of **CITY**. Additionally, **CITY'S** default notice may offer **CONTRACTOR** an opportunity to provide **CITY** with a plan to cure the default, which shall be submitted to **CITY** within the time period allowed by **CITY**. At **CITY'S** sole discretion, **CITY** may accept or reject **CONTRACTOR'S** plan. If the default cannot be cured or if **CONTRACTOR** fails to cure within the period allowed by **CITY**, then **CITY** may terminate this Contract due to **CONTRACTOR'S** breach of this Contract.
2. If the default under this Contract is due to **CONTRACTOR'S** failure to maintain the insurance required under this Contract, **CONTRACTOR** shall immediately: (1) suspend performance of any services under this Contract for which insurance was required; and (2) notify its employees and Subcontractors of the loss of insurance coverage and Contractor's obligation to suspend performance of

services. **CONTRACTOR** shall not recommence performance until **CONTRACTOR** is fully insured and in compliance with **CITY'S** requirements.

3. If a federal or state proceeding for relief of debtors is undertaken by or against **CONTRACTOR**, or if **CONTRACTOR** makes an assignment for the benefit of creditors, then **CITY** may immediately terminate this Contract.
4. If **CONTRACTOR** engages in any dishonest conduct related to the performance or administration of this Contract or violates **CITY'S** laws, regulations or policies relating to lobbying, then **CITY** may immediately terminate this Contract.
5. Acts of Moral Turpitude
 - a. **CONTRACTOR** shall immediately notify **CITY** if **CONTRACTOR** or any Key Person, as defined below, is charged with, indicted for, convicted of, pleads nolo contendere to, or forfeits bail or fails to appear in court for a hearing related to, any act which constitutes an offense involving moral turpitude under federal, state, or local laws ("Act of Moral Turpitude").
 - b. If **CONTRACTOR** or a Key Person is convicted of, pleads nolo contendere to, or forfeits bail or fails to appear in court for a hearing related to, an Act of Moral Turpitude, **CITY** may immediately terminate this Contract.
 - c. If **CONTRACTOR** or a Key Person is charged with or indicted for an Act of Moral Turpitude, **CITY** may terminate this Contract after providing **CONTRACTOR** an opportunity to present evidence of **CONTRACTOR'S** ability to perform under the terms of this Contract.
 - d. Acts of Moral Turpitude include, but are not limited to: violent felonies as defined by Penal Code Section 667.5, crimes involving weapons, crimes resulting in serious bodily injury or death, serious felonies as defined by Penal Code Section 1192.7, and those crimes referenced in the Penal Code and articulated in California Public Resources Code Section 5164(a)(2); in addition to and including acts of murder, rape, sexual assault, robbery, kidnapping, human trafficking, pimping, voluntary manslaughter, aggravated assault, assault on a peace officer, mayhem, fraud, domestic abuse, elderly abuse, and child abuse, regardless of whether such acts are punishable by felony or misdemeanor conviction.

- e. For the purposes of this provision, a Key Person is a principal, officer, or employee assigned to this Contract, or owner (directly or indirectly, through one or more intermediaries) of ten percent or more of the voting power or equity interests of **CONTRACTOR**.
- 6. In the event **CITY** terminates this Contract as provided in this section, **CITY** may procure, upon such terms and in the manner as **CITY** may deem appropriate, services similar in scope and level of effort to those so terminated, and **CONTRACTOR** shall be liable to **CITY** for all of its costs and damages, including, but not limited to, any excess costs for such services.
- 7. If, after notice of termination of this Contract under the provisions of this section, it is determined for any reason that **CONTRACTOR** was not in default under the provisions of this section, or that the default was excusable under the terms of this Contract, the rights and obligations of the parties shall be the same as if the notice of termination had been issued pursuant to PSC-9(A) Termination for Convenience.
- 8. The rights and remedies of **CITY** provided in this section shall not be exclusive and are in addition to any other rights and remedies provided by law or under this Contract.
- C. In the event that this Contract is terminated, **CONTRACTOR** shall immediately notify all employees and Subcontractors, and shall notify in writing all other parties contracted with under the terms of this Contract within five working days of the termination.

PSC-10. Independent Contractor

CONTRACTOR is an independent contractor and not an agent or employee of **CITY**. **CONTRACTOR** shall not represent or otherwise hold out itself or any of its directors, officers, partners, employees, or agents to be an agent or employee of **CITY**.

PSC-11. Contractor's Personnel

Unless otherwise approved by **CITY**, **CONTRACTOR** shall use its own employees to perform the services described in this Contract. **CITY** has the right to review and approve any personnel who are assigned to work under this Contract. **CONTRACTOR** shall remove personnel from performing work under this Contract if requested to do so by **CITY**.

CONTRACTOR shall not use Subcontractors to assist in performance of this Contract without the prior written approval of **CITY**. If **CITY** permits the use of Subcontractors, **CONTRACTOR** shall remain responsible for performing all aspects of this Contract and paying all Subcontractors. **CITY** has the right to approve **CONTRACTOR'S** Subcontractors, and **CITY** reserves the right to request replacement of any

Subcontractor. **CITY** does not have any obligation to pay **CONTRACTOR'S** Subcontractors, and nothing herein creates any privity of contract between **CITY** and any Subcontractor.

PSC-12. Assignment and Delegation

CONTRACTOR may not, unless it has first obtained the written permission of **CITY**:

- A. Assign or otherwise alienate any of its rights under this Contract, including the right to payment; or
- B. Delegate, subcontract, or otherwise transfer any of its duties under this Contract.

PSC-13. Permits

CONTRACTOR and its directors, officers, partners, agents, employees, and Subcontractors, shall obtain and maintain all licenses, permits, certifications and other documents necessary for **CONTRACTOR'S** performance of this Contract. **CONTRACTOR** shall immediately notify **CITY** of any suspension, termination, lapses, non-renewals, or restrictions of licenses, permits, certificates, or other documents that relate to **CONTRACTOR'S** performance of this Contract.

PSC-14. Claims for Labor and Materials

CONTRACTOR shall promptly pay when due all amounts owed for labor and materials furnished in the performance of this Contract so as to prevent any lien or other claim under any provision of law from arising against any **CITY** property (including reports, documents, and other tangible or intangible matter produced by **CONTRACTOR** hereunder), and shall pay all amounts due under the Unemployment Insurance Act or any other applicable law with respect to labor used to perform under this Contract.

PSC-15. Current Los Angeles City Business Tax Registration Certificate Required

For the duration of this Contract, **CONTRACTOR** shall maintain valid Business Tax Registration Certificate(s) as required by **CITY'S** Business Tax Ordinance, Section 21.00 *et seq.* of the Los Angeles Municipal Code ("LAMC"), and shall not allow the Certificate to lapse or be revoked or suspended.

PSC-16. Retention of Records, Audit and Reports

CONTRACTOR shall maintain all records, including records of financial transactions, pertaining to the performance of this Contract, in their original form or as otherwise approved by **CITY**. These records shall be retained for a period of no less than three years from the later of the following: (1) final payment made by **CITY**, (2) the expiration of this Contract or (3) termination of this Contract. The records will be subject to examination and audit by authorized **CITY** personnel or **CITY'S** representatives at any time. **CONTRACTOR** shall provide any reports requested by **CITY** regarding

performance of this Contract. Any subcontract entered into by **CONTRACTOR** for work to be performed under this Contract must include an identical provision.

In lieu of retaining the records for the term as prescribed in this provision, **CONTRACTOR** may, upon **CITY'S** written approval, submit the required information to **CITY** in an electronic format, e.g. USB flash drive, at the expiration or termination of this Contract.

PSC-17. Bonds

All bonds required by **CITY** shall be filed with the Office of the City Administrative Officer, Risk Management for its review and acceptance in accordance with Los Angeles Administrative Code ("LAAC") Sections 11.47 *et seq.*, as amended from time to time.

PSC-18. Indemnification

Except for the active negligence or willful misconduct of **CITY**, or any of its boards, officers, agents, employees, assigns and successors in interest, **CONTRACTOR** shall defend, indemnify and hold harmless **CITY** and any of its boards, officers, agents, employees, assigns, and successors in interest from and against all lawsuits and causes of action, claims, losses, demands and expenses, including, but not limited to, attorney's fees (both in house and outside counsel) and cost of litigation (including all actual litigation costs incurred by **CITY**, including but not limited to, costs of experts and consultants), damages or liability of any nature whatsoever, for death or injury to any person, including **CONTRACTOR'S** employees and agents, or damage or destruction of any property of either party hereto or of third parties, arising in any manner by reason of an act, error, or omission by **CONTRACTOR**, Subcontractors, or their boards, officers, agents, employees, assigns, and successors in interest. The rights and remedies of **CITY** provided in this section shall not be exclusive and are in addition to any other rights and remedies provided by law or under this Contract. This provision will survive expiration or termination of this Contract.

PSC-19. Intellectual Property Indemnification

CONTRACTOR, at its own expense, shall defend, indemnify, and hold harmless the **CITY**, and any of its boards, officers, agents, employees, assigns, and successors in interest from and against all lawsuits and causes of action, claims, losses, demands and expenses, including, but not limited to, attorney's fees (both in house and outside counsel) and cost of litigation (including all actual litigation costs incurred by **CITY**, including but not limited to, costs of experts and consultants), damages or liability of any nature arising out of the infringement, actual or alleged, direct or contributory, of any intellectual property rights, including, without limitation, patent, copyright, trademark, trade secret, right of publicity, and proprietary information: (1) on or in any design, medium, matter, article, process, method, application, equipment, device, instrumentation, software, hardware, or firmware used by **CONTRACTOR**, or its Subcontractors, in performing the work under this Contract; or (2) as a result of **CITY'S** actual or intended use of any Work Product (as defined in PSC-21) furnished by **CONTRACTOR**, or its Subcontractors, under this Contract. The rights and remedies of **CITY** provided in this section shall not be exclusive

and are in addition to any other rights and remedies provided by law or under this Contract. This provision will survive expiration or termination of this Contract.

PSC-20. Intellectual Property Warranty

CONTRACTOR represents and warrants that its performance of all obligations under this Contract does not infringe in any way, directly or contributorily, upon any third party's intellectual property rights, including, without limitation, patent, copyright, trademark, trade secret, right of publicity and proprietary information.

PSC-21. Ownership and License

Unless otherwise provided for herein, all finished and unfinished works, tangible or not, created under this Contract including, without limitation, documents, materials, data, reports, manuals, specifications, artwork, drawings, sketches, blueprints, studies, memoranda, computation sheets, computer programs and databases, schematics, photographs, video and audiovisual recordings, sound recordings, marks, logos, graphic designs, notes, websites, domain names, inventions, processes, formulas, matters and combinations thereof, and all forms of intellectual property originated and prepared by **CONTRACTOR** or its Subcontractors under this Contract (each a "Work Product"; collectively "Work Products") shall be and remain the exclusive property of **CITY** for its use in any manner **CITY** deems appropriate. **CONTRACTOR** hereby assigns to **CITY** all goodwill, copyright, trademark, patent, trade secret and all other intellectual property rights worldwide in any Work Products originated and prepared under this Contract. **CONTRACTOR** further agrees to execute any documents necessary for **CITY** to perfect, memorialize, or record **CITY'S** ownership of rights provided herein.

CONTRACTOR agrees that a monetary remedy for breach of this Contract may be inadequate, impracticable, or difficult to prove and that a breach may cause **CITY** irreparable harm. **CITY** may therefore enforce this requirement by seeking injunctive relief and specific performance, without any necessity of showing actual damage or irreparable harm. Seeking injunctive relief or specific performance does not preclude **CITY** from seeking or obtaining any other relief to which **CITY** may be entitled.

For all Work Products delivered to **CITY** that are not originated or prepared by **CONTRACTOR** or its Subcontractors under this Contract, **CONTRACTOR** shall secure a grant, at no cost to **CITY**, for a non-exclusive perpetual license to use such Work Products for any **CITY** purposes.

CONTRACTOR shall not provide or disclose any Work Product to any third party without prior written consent of **CITY**.

Any subcontract entered into by **CONTRACTOR** relating to this Contract shall include this provision to contractually bind its Subcontractors performing work under this Contract such that **CITY'S** ownership and license rights of all Work Products are preserved and protected as intended herein.

PSC-22. Data Protection

- A. **CONTRACTOR** shall protect, using the most secure means and technology that is commercially available, **CITY**-provided data or consumer-provided data acquired in the course and scope of this Contract, including but not limited to customer lists and customer credit card or consumer data, (collectively, the “City Data”). **CONTRACTOR** shall notify **CITY** in writing as soon as reasonably feasible, and in any event within twenty-four hours, of **CONTRACTOR’S** discovery or reasonable belief of any unauthorized access of City Data (a “Data Breach”), or of any incident affecting, or potentially affecting City Data related to cyber security (a “Security Incident”), including, but not limited to, denial of service attack, and system outage, instability or degradation due to computer malware or virus. **CONTRACTOR** shall begin remediation immediately. **CONTRACTOR** shall provide daily updates, or more frequently if required by **CITY**, regarding findings and actions performed by **CONTRACTOR** until the Data Breach or Security Incident has been effectively resolved to **CITY’S** satisfaction. **CONTRACTOR** shall conduct an investigation of the Data Breach or Security Incident and shall share the report of the investigation with **CITY**. At **CITY’S** sole discretion, **CITY** and its authorized agents shall have the right to lead or participate in the investigation. **CONTRACTOR** shall cooperate fully with **CITY**, its agents and law enforcement.
- B. If **CITY** is subject to liability for any Data Breach or Security Incident, then **CONTRACTOR** shall fully indemnify and hold harmless **CITY** and defend against any resulting actions.

PSC-23. Insurance

During the term of this Contract and without limiting **CONTRACTOR’S** obligation to indemnify, hold harmless and defend **CITY**, **CONTRACTOR** shall provide and maintain at its own expense a program of insurance having the coverages and limits not less than the required amounts and types as determined by the Office of the City Administrative Officer of Los Angeles, Risk Management (template Form General 146 in Exhibit 1 hereto). The insurance must: (1) conform to **CITY’S** requirements; (2) comply with the Insurance Contractual Requirements (Form General 133 in Exhibit 1 hereto); and (3) otherwise be in a form acceptable to the Office of the City Administrative Officer, Risk Management. **CONTRACTOR** shall comply with all Insurance Contractual Requirements shown on Exhibit 1 hereto. Exhibit 1 is hereby incorporated by reference and made a part of this Contract.

PSC-24. Best Terms

Throughout the term of this Contract, **CONTRACTOR**, shall offer **CITY** the best terms, prices, and discounts that are offered to any of **CONTRACTOR’S** customers for similar goods and services provided under this Contract.

PSC-25. Warranty and Responsibility of Contractor

CONTRACTOR warrants that the work performed hereunder shall be completed in a manner consistent with professional standards practiced among those firms within **CONTRACTOR'S** profession, doing the same or similar work under the same or similar circumstances.

PSC-26. Mandatory Provisions Pertaining to Non-Discrimination in Employment

Unless otherwise exempt, this Contract is subject to the applicable non-discrimination, equal benefits, equal employment practices, and affirmative action program provisions in LAAC Section 10.8 et seq., as amended from time to time.

- A. **CONTRACTOR** shall comply with the applicable non-discrimination and affirmative action provisions of the laws of the United States of America, the State of California, and **CITY**. In performing this Contract, **CONTRACTOR** shall not discriminate in any of its hiring or employment practices against any employee or applicant for employment because of such person's race, color, religion, national origin, ancestry, sex, sexual orientation, gender, gender identity, age, disability, domestic partner status, marital status or medical condition.
- B. The requirements of Section 10.8.2.1 of the LAAC, the Equal Benefits Ordinance, and the provisions of Section 10.8.2.1(f) are incorporated and made a part of this Contract by reference.
- C. The provisions of Section 10.8.3 of the LAAC are incorporated and made a part of this Contract by reference and will be known as the "Equal Employment Practices" provisions of this Contract.
- D. The provisions of Section 10.8.4 of the LAAC are incorporated and made a part of this Contract by reference and will be known as the "Affirmative Action Program" provisions of this Contract.

Any subcontract entered into by **CONTRACTOR** for work to be performed under this Contract must include an identical provision.

PSC-27. Child Support Assignment Orders

CONTRACTOR shall comply with the Child Support Assignment Orders Ordinance, Section 10.10 of the LAAC, as amended from time to time. Pursuant to Section 10.10(b) of the LAAC, **CONTRACTOR** shall fully comply with all applicable State and Federal employment reporting requirements. Failure of **CONTRACTOR** to comply with all applicable reporting requirements or to implement lawfully served Wage and Earnings Assignment or Notices of Assignment, or the failure of any principal owner(s) of **CONTRACTOR** to comply with any Wage and Earnings Assignment or Notices of Assignment applicable to them personally, shall constitute a default by the **CONTRACTOR** under this Contract. Failure of **CONTRACTOR** or principal owner to cure

the default within 90 days of the notice of default will subject this Contract to termination for breach. Any subcontract entered into by **CONTRACTOR** for work to be performed under this Contract must include an identical provision.

PSC-28. Living Wage Ordinance

CONTRACTOR shall comply with the Living Wage Ordinance, LAAC Section 10.37 *et seq.*, as amended from time to time. **CONTRACTOR** further agrees that it shall comply with federal law proscribing retaliation for union organizing. Any subcontract entered into by **CONTRACTOR** for work to be performed under this Contract must include an identical provision.

PSC-29. Service Contractor Worker Retention Ordinance

CONTRACTOR shall comply with the Service Contractor Worker Retention Ordinance, LAAC Section 10.36 *et seq.*, as amended from time to time. Any subcontract entered into by **CONTRACTOR** for work to be performed under this Contract must include an identical provision.

PSC-30. Access and Accommodations

CONTRACTOR represents and certifies that:

- A. **CONTRACTOR** shall comply with the Americans with Disabilities Act, as amended, 42 U.S.C. Section 12101 *et seq.*, the Rehabilitation Act of 1973, as amended, 29 U.S.C. Section 701 *et seq.*, the Fair Housing Act, and its implementing regulations and any subsequent amendments, and California Government Code Section 11135;
- B. **CONTRACTOR** shall not discriminate on the basis of disability or on the basis of a person's relationship to, or association with, a person who has a disability;
- C. **CONTRACTOR** shall provide reasonable accommodation upon request to ensure equal access to **CITY**-funded programs, services and activities;
- D. Construction will be performed in accordance with the Uniform Federal Accessibility Standards (UFAS), 24 C.F.R. Part 40; and
- E. The buildings and facilities used to provide services under this Contract are in compliance with the federal and state standards for accessibility as set forth in the 2010 ADA Standards, California Title 24, Chapter 11, or other applicable federal and state law.

CONTRACTOR understands that **CITY** is relying upon these certifications and representations as a condition to funding this Contract. Any subcontract entered into by **CONTRACTOR** for work to be performed under this Contract must include an identical provision.

PSC-31. Contractor Responsibility Ordinance

CONTRACTOR shall comply with the Contractor Responsibility Ordinance, LAAC Section 10.40 *et seq.*, as amended from time to time.

PSC-32. Business Inclusion Program

Unless otherwise exempted prior to bid submission, **CONTRACTOR** shall comply with all aspects of the Business Inclusion Program as described in the Request for Proposal/Qualification process, throughout the duration of this Contract. **CONTRACTOR** shall utilize the Business Assistance Virtual Network ("BAVN") at <https://www.labavn.org/>, to perform and document outreach to Minority, Women, and Other Business Enterprises. **CONTRACTOR** shall perform subcontractor outreach activities through BAVN. **CONTRACTOR** shall not change any of its designated Subcontractors or pledged specific items of work to be performed by these Subcontractors, nor shall **CONTRACTOR** reduce their level of effort, without prior written approval of **CITY**.

PSC-33. Slavery Disclosure Ordinance

CONTRACTOR shall comply with the Slavery Disclosure Ordinance, LAAC Section 10.41 *et seq.*, as amended from time to time. Any subcontract entered into by **CONTRACTOR** for work to be performed under this Contract must include an identical provision.

PSC-34. First Source Hiring Ordinance

CONTRACTOR shall comply with the First Source Hiring Ordinance, LAAC Section 10.44 *et seq.*, as amended from time to time. Any subcontract entered into by **CONTRACTOR** for work to be performed under this Contract must include an identical provision.

PSC-35. Local Business Preference Ordinance

CONTRACTOR shall comply with the Local Business Preference Ordinance, LAAC Section 10.47 *et seq.*, as amended from time to time. Any subcontract entered into by **CONTRACTOR** for work to be performed under this Contract must include an identical provision.

PSC-36. Iran Contracting Act

In accordance with California Public Contract Code Sections 2200-2208, all contractors entering into, or renewing contracts with **CITY** for goods and services estimated at \$1,000,000 or more are required to complete, sign, and submit the "Iran Contracting Act of 2010 Compliance Affidavit."

PSC-37. Restrictions on Campaign Contributions and Fundraising in City Elections

Unless otherwise exempt, if this Contract is valued at \$100,000 or more and requires approval by an elected **CITY** office, **CONTRACTOR**, **CONTRACTOR'S** principals, and **CONTRACTOR'S** Subcontractors expected to receive at least \$100,000 for performance under the Contract, and the principals of those Subcontractors (the "Restricted Persons")

shall comply with Charter Section 470(c)(12) and LAMC Section 49.7.35. Failure to comply entitles **CITY** to terminate this Contract and to pursue all available legal remedies. Charter Section 470(c)(12) and LAMC Section 49.7.35 limit the ability of the Restricted Persons to make campaign contributions to and engage in fundraising for certain elected **CITY** officials or candidates for elected **CITY** office for twelve months after this Contract is signed. Additionally, a **CONTRACTOR** subject to Charter Section 470(c)(12) is required to comply with disclosure requirements by submitting a completed and signed Ethics Commission Form 55 and to amend the information in that form as specified by law. Any **CONTRACTOR** subject to Charter Section 470(c)(12) shall include the following notice in any contract with any Subcontractor expected to receive at least \$100,000 for performance under this Contract:

“Notice Regarding Restrictions on Campaign Contributions and Fundraising in City Elections

You are a subcontractor on City of Los Angeles Contract # _____. Pursuant to the City of Los Angeles Charter Section 470(c)(12) and related ordinances, you and your principals are prohibited from making campaign contributions to and fundraising for certain elected City of Los Angeles (“**CITY**”) officials and candidates for elected **CITY** office for twelve months after the **CITY** contract is signed. You are required to provide the names and contact information of your principals to the **CONTRACTOR** and to amend that information within ten business days if it changes during the twelve month time period. Failure to comply may result in termination of this Contract and any other available legal remedies. Information about the restrictions may be found online at ethics.lacity.org or by calling the Los Angeles City Ethics Commission at (213) 978-1960.”

PSC-38. Contractors’ Use of Criminal History for Consideration of Employment Applications

CONTRACTOR shall comply with the City Contractors’ Use of Criminal History for Consideration of Employment Applications Ordinance, LAAC Section 10.48 *et seq.*, as amended from time to time. Any subcontract entered into by **CONTRACTOR** for work to be performed under this Contract must include an identical provision.

PSC-39. Limitation of City’s Obligation to Make Payment to Contractor

Notwithstanding any other provision of this Contract, including any exhibits or attachments incorporated therein, and in order for **CITY** to comply with its governing legal requirements, **CITY** shall have no obligation to make any payments to **CONTRACTOR** unless **CITY** shall have first made an appropriation of funds equal to or in excess of its obligation to make any payments as provided in this Contract. **CONTRACTOR** agrees that any services provided by **CONTRACTOR**, purchases made by **CONTRACTOR** or expenses incurred by **CONTRACTOR** in excess of the appropriation(s) shall be free and without charge to **CITY** and **CITY** shall have no obligation to pay for the services, purchases or expenses. **CONTRACTOR** shall have no obligation to provide any services,

provide any equipment or incur any expenses in excess of the appropriated amount(s) until **CITY** appropriates additional funds for this Contract.

PSC-40. Compliance with Identity Theft Laws and Payment Card Data Security Standards

CONTRACTOR shall comply with all identity theft laws including without limitation, laws related to: (1) payment devices; (2) credit and debit card fraud; and (3) the Fair and Accurate Credit Transactions Act ("FACTA"), including its requirement relating to the content of transaction receipts provided to Customers. **CONTRACTOR** also shall comply with all requirements related to maintaining compliance with Payment Card Industry Data Security Standards ("PCI DSS"). During the performance of any service to install, program or update payment devices equipped to conduct credit or debit card transactions, including PCI DSS services, **CONTRACTOR** shall verify proper truncation of receipts in compliance with FACTA.

PSC-41. Compliance with California Public Resources Code Section 5164

California Public Resources Code Section 5164 prohibits a public agency from hiring a person for employment or as a volunteer to perform services at any park, playground, or community center used for recreational purposes in a position that has supervisory or disciplinary authority over any minor, if the person has been convicted of certain crimes as referenced in the Penal Code, and articulated in California Public Resources Code Section 5164(a)(2).

If applicable, **CONTRACTOR** shall comply with California Public Resources Code Section 5164, and shall additionally adhere to all rules and regulations that have been adopted or that may be adopted by **CITY**. **CONTRACTOR** is required to have all employees, volunteers and Subcontractors (including all employees and volunteers of any Subcontractor) of **CONTRACTOR** working on premises to pass a fingerprint and background check through the California Department of Justice at **CONTRACTOR'S** sole expense, indicating that such individuals have never been convicted of certain crimes as referenced in the Penal Code and articulated in California Public Resources Code Section 5164(a)(2), if the individual will have supervisory or disciplinary authority over any minor.

PSC-42. Possessory Interests Tax

Rights granted to **CONTRACTOR** by **CITY** may create a possessory interest. **CONTRACTOR** agrees that any possessory interest created may be subject to California Revenue and Taxation Code Section 107.6 and a property tax may be levied on that possessory interest. If applicable, **CONTRACTOR** shall pay the property tax. **CONTRACTOR** acknowledges that the notice required under California Revenue and Taxation Code Section 107.6 has been provided.

PSC-43. Confidentiality

All documents, information and materials provided to **CONTRACTOR** by **CITY** or developed by **CONTRACTOR** pursuant to this Contract (collectively “Confidential Information”) are confidential. **CONTRACTOR** shall not provide or disclose any Confidential Information or their contents or any information therein, either orally or in writing, to any person or entity, except as authorized by **CITY** or as required by law. **CONTRACTOR** shall immediately notify **CITY** of any attempt by a third party to obtain access to any Confidential Information. This provision will survive expiration or termination of this Contract.

PSC-44. COVID-19

Employees of Contractor and/or persons working on its behalf, including, but not limited to, subcontractors (collectively, “Contractor Personnel”), while performing services under this Agreement and prior to interacting in person with City employees, contractors, volunteers, or members of the public (collectively, “In-Person Services”) must be fully vaccinated against the novel coronavirus 2019 (“COVID-19”). “Fully vaccinated” means that 14 or more days have passed since Contractor Personnel have received the final dose of a two-dose COVID-19 vaccine series (Moderna or Pfizer-BioNTech) or a single dose of a one-dose COVID-19 vaccine (Johnson & Johnson/Janssen) and all booster doses recommended by the Centers for Disease Control and Prevention. Prior to assigning Contractor Personnel to perform In-Person Services, Contractor shall obtain proof that such Contractor Personnel have been fully vaccinated. Contractor shall retain such proof for the document retention period set forth in this Agreement. Contractor shall grant medical or religious exemptions (“Exemptions”) to Contractor Personnel as required by law. If Contractor wishes to assign Contractor Personnel with Exemptions to perform In-Person Services, Contractor shall require such Contractor Personnel to undergo weekly COVID-19 testing, with the full cost of testing to be borne by Contractor. If Contractor Personnel test positive, they shall not be assigned to perform In-Person Services or, to the extent they have already been performing In-Person Services, shall be immediately removed from those assignments. Furthermore, Contractor shall immediately notify City if Contractor Personnel performing In-Person Services (1) have tested positive for or have been diagnosed with COVID-19, (2) have been informed by a medical professional that they are likely to have COVID-19, or (3) meet the criteria for isolation under applicable government orders.

EXHIBIT 1

INSURANCE CONTRACTUAL REQUIREMENTS

CONTACT For additional information about compliance with City Insurance and Bond requirements, contact the Office of the City Administrative Officer, Risk Management at (213) 978-RISK (7475) or go online at www.lacity.org/cao/risk. The City approved Bond Assistance Program is available for those contractors who are unable to obtain the City-required performance bonds. A City approved insurance program may be available as a low cost alternative for contractors who are unable to obtain City-required insurance.

CONTRACTUAL REQUIREMENTS

CONTRACTOR AGREES THAT:

1. Additional Insured/Loss Payee. The CITY must be included as an Additional Insured in applicable liability policies to cover the CITY'S liability arising out of the acts or omissions of the named insured. The CITY is to be named as an Additional Named Insured and a Loss Payee As Its Interests May Appear in property insurance in which the CITY has an interest, e.g., as a lien holder.

2. Notice of Cancellation. All required insurance will be maintained in full force for the duration of its business with the CITY. By ordinance, all required insurance must provide at least thirty (30) days' prior written notice (ten (10) days for non-payment of premium) directly to the CITY if your insurance company elects to cancel or materially reduce coverage or limits prior to the policy expiration date, for any reason except impairment of an aggregate limit due to prior claims.

3. Primary Coverage. CONTRACTOR will provide coverage that is primary with respect to any insurance or self-insurance of the CITY. The CITY'S program shall be excess of this insurance and non-contributing.

4. Modification of Coverage. The CITY reserves the right at any time during the term of this Contract to change the amounts and types of insurance required hereunder by giving CONTRACTOR ninety (90) days' advance written notice of such change. If such change should result in substantial additional cost to CONTRACTOR, the CITY agrees to negotiate additional compensation proportional to the increased benefit to the CITY.

5. Failure to Procure Insurance. All required insurance must be submitted and approved by the Office of the City Administrative Officer, Risk Management prior to the inception of any operations by CONTRACTOR.

CONTRACTOR'S failure to procure or maintain required insurance or a self-insurance program during the entire term of this Contract shall constitute a material breach of this Contract under which the CITY may immediately suspend or terminate this Contract or, at its discretion, procure or renew such insurance to protect the CITY'S interests and pay any and all premiums in connection therewith and recover all monies so paid from CONTRACTOR.

6. Workers' Compensation. By signing this Contract, CONTRACTOR hereby certifies that it is aware of the provisions of Section 3700 *et seq.*, of the California Labor Code which require every employer to be insured against liability for Workers' Compensation or to undertake

self-insurance in accordance with the provisions of that Code, and that it will comply with such provisions at all time during the performance of the work pursuant to this Contract.

7. California Licensee. All insurance must be provided by an insurer admitted to do business in California or written through a California-licensed surplus lines broker or through an insurer otherwise acceptable to the CITY. Non-admitted coverage must contain a **Service of Suit** clause in which the underwriters agree to submit as necessary to the jurisdiction of a California court in the event of a coverage dispute. Service of process for this purpose must be allowed upon an agent in California designated by the insurer or upon the California Insurance Commissioner.

8. Aggregate Limits/Impairment. If any of the required insurance coverages contain annual aggregate limits, CONTRACTOR must give the CITY written notice of any pending claim or lawsuit which will materially diminish the aggregate within thirty (30) days of knowledge of same. You must take appropriate steps to restore the impaired aggregates or provide replacement insurance protection within thirty (30) days of knowledge of same. The CITY has the option to specify the minimum acceptable aggregate limit for each line of coverage required. No substantial reductions in scope of coverage which may affect the CITY'S protection are allowed without the CITY'S prior written consent.

9. Commencement of Work. For purposes of insurance coverage only, this Contract will be deemed to have been executed immediately upon any party hereto taking any steps that can be considered to be in furtherance of or towards performance of this Contract. The requirements in this Section supersede all other sections and provisions of this Contract, including, but not limited to, PSC-3, to the extent that any other section or provision conflicts with or impairs the provisions of this Section.

Required Insurance and Minimum Limits

Name: Motorola Solutions, Inc.Date: 09/30/2021Agreement/Reference: LAFD Voice Radio System Upgrade

Evidence of coverages checked below, with the specified minimum limits, must be submitted and approved prior to occupancy/start of operations. Amounts shown are Combined Single Limits ("CSLs"). For Automobile Liability, split limits may be substituted for a CSL if the total per occurrence equals or exceeds the CSL amount.

Limits

☒ **Workers' Compensation - Workers' Compensation (WC) and Employer's Liability (EL)**

 WC Statutory
 EL \$1,000,000
☐ Waiver of Subrogation in favor of City
☐ Longshore & Harbor Workers
☐ Jones Act

☒ **General Liability**
\$1,000,000☒ Products/Completed Operations☐ Sexual Misconduct☐ Fire Legal Liability☐

☒ **Automobile Liability** (for any and all vehicles used for this contract, other than commuting to/from work)
\$1,000,000

☒ **Professional Liability** (Errors and Omissions)
\$1,000,000Discovery Period 12 Months After Completion of Work or Date of Termination

☐ **Property Insurance** (to cover replacement cost of building - as determined by insurance company)
☐ All Risk Coverage☐ Flood☐ Earthquake☐ Boiler and Machinery☐ Builder's Risk☐

☐ **Pollution Liability**
☐

☐ **Surety Bonds - Performance and Payment (Labor and Materials) Bonds**

100% of the contract price

☐ **Crime Insurance**

Other:

APPENDIX B

SCOPING STATEMENT OF WORK

LAFD Voice Radio System Upgrade

Appendix B – Scoping Statement of Work

Section 1. GENERAL

1.1. Project Objectives

The objective of this project is to replace the LAFD Voice Radio System infrastructure and consoles with a new, fully integrated, and easy-to-use system that can support the Department's full range of operational needs.

1.2. In Scope Services

The Contractor shall perform all required services in order to provide the hardware and software necessary to meet the requirements described in this Appendix B Statement of Work and Appendix C Operational Requirements.

The project scope includes the following systems:

- Voice Radio System Infrastructure including, but not limited to, radio site equipment such as voters, repeaters and antennas;
- Voice Radio System Dispatch consoles at both the LAFD primary dispatch center, Metro Fire Communications (MFC) and the LAFD back-up dispatch center, Operations Command Division (OCD), including the short- and long-term logging recorders.

The project scope also includes, but is not limited to, the following professional services, described in the sections below:

- Project Management
- System Design and Configuration
- System Installation and Testing
- System Training
- System Implementation and Cutover Support
- System Warranty, Maintenance, and Support

1.3. Project Management

The Contractor shall provide a dedicated project manager who will act as the Contractor's single point of contact for all communications related to the day-to-day delivery of services. The Contractor's project manager will be available to work on site as needed for key project tasks and meetings.

The Contractor shall establish and follow a project management process that includes all necessary tools, methods and documents required to manage a project of this size, scope and duration. At a minimum, the Contractor shall provide the City:

- An initial project plan within 30 days of the project start that describes the major project tasks, durations, milestones and dependencies, similar to the sample provided in Section 12 “Implementation Schedule” of Contractor’s Proposal;
- A detailed project plan within 30 days of the final system design document that describes the specific project tasks, durations, milestones and dependencies;
- A monthly project status report that provides information about: the current state of the project; tasks accomplished since the last reporting period; tasks planned for the next reporting period; project risks and mitigations; and any items that require attention or escalation by the City.

The City shall provide a dedicated project manager who will act as the City’s single point of contact for all communications related to the day-to-day delivery of services.

1.4. Project Reporting and Escalation

The Contractor will provide the City with regular reports of project status including schedule, scope, and project risks no less than once per month and more frequently as needed. The Contractor shall escalate any issues or concerns that are not being resolved and may impact the success of the project, including the schedule, cost, or risk of completion in writing to the City’s project manager or other executive representative as appropriate.

1.5. Work Hours

The Contractor shall perform project work during normal business hours, which are Monday through Friday from 0700 – 1500. From time to time, due to operational necessity or other considerations, the Contractor may be required to perform work after-hours if performing the work during normal business hours would negatively impact the operation of the department or City. Any after-hours work shall be agreed to in advance by both the Contractor and the City.

1.6. Compliance, Construction Licensing, and Permitting

All new installations shall comply with applicable local, state, and federal laws including, but not limited to, Motorola R56, Cal OSHA, NEC, NFPA, City of LA Building Codes and Regulations, FCC, FAA, and UL. The City shall be responsible for identifying, obtaining, and managing all necessary licenses and permits. Rectification of Site issue preventing compliance with any of the applicable Standards or Regulations will be the responsibility of the City. Contractor shall provide relevant system design information and documents to assist the city in obtaining any necessary licenses and permits.

1.7. Site Access

City shall provide Contractor with access to any required sites where City equipment is located, which will include, but may not be limited to, both City-owned and leased property. City shall ensure that sufficient space is available at the site for Contractor personnel and vehicles. Some site access may be limited due to seasonal road deterioration and may require additional time and/or

coordination between City, Contractor and the site agent (if City is not the site agent). Access to 100 Wilshire will have to be coordinated with building owner/management.

The Contractor shall not perform work at any City managed facility or on City equipment unless accompanied by a City employee or designee, unless prior approval has been provided by the City to the Contractor for unaccompanied access. Project delays beyond 30 days due to site access issues will result in a Change Order.

Contractor shall abide by the requirements of the physical access security plan devised by City and any supplemental physical access security requirements promulgated by the Los Angeles Police Department, as applicable.

Section 2. SYSTEM DESIGN

2.1. System Requirements

Contractor shall provide a System that (i) contains no less than the functionality described in the post-contract detailed design documents; (ii) meets or exceeds all of the requirements as described in Appendix C, High-Level Specifications; and (iii) meets or exceeds all the requirements articulated in Appendix D, Contractor's Proposal.

2.2. System Design

Contractor shall begin drafting a Detailed System Design Document for the System after Contract Execution, and such Detailed System Design Document must be materially consistent with the requirements of the Agreement, including this Appendix B Statement of Work, Appendix C High-Level Specifications, and Appendix D Contractor's Proposal.

The Contractor shall provide the City with a Detailed System Design Document that, at a minimum, contains the following:

- Detailed description of overall operational objectives and requirements
- Identification of major operational discrepancies between Appendix B / Appendix C and the post-contract detailed design plan.
- Detailed equipment layout plans and system design drawings for each site
- Detailed list of parts and materials
- Detailed list of spares provided by Contractor to the City
- High Level list of operating system versions and major hardware elements.
- Detailed system configuration specifications
- Detailed description of system security and protection against viruses and malware
- Detailed description of system high-availability and fail-over design
- Detailed description of Vendor provided API connections.
- Detailed specifications for backhaul performance and demarcations for each site
- Detailed specifications for network access and demarcations for each site
- Detailed heat and power load requirements for each site
- Detailed results of tower load study
- Detailed RF Distribution System parameters.

- Detailed intermodulation studies for frequencies provided in design
- Detailed description of interconnection of LAFD System with LAPD Voice Radio Switching System
- Preliminary system installation, test, and cutover plans
- Detailed single-channel proof of performance installation and testing plan
- Provide informational only 12.5KHz coverage maps

Prior to any equipment delivery or installation, the City must provide the Contractor with written acceptance of the Detailed System Design Document pursuant to Section 2.3, below.

2.3. Detailed System Design Document Acceptance

The preliminary system design will be based upon the functional design descriptions detailed in Appendix C (*High Level Specifications*) and Appendix D (*Contractor's Proposal*). Documentation submitted shall be in sufficient detail to allow City engineers to determine the feasibility and reliability of the complete system design. The Detailed System Design Document shall include block and schematic diagrams and detailed drawings that illustrate cabling, wiring, rack layouts and elevations, equipment lists, and plans necessary for system installation and testing. The Detailed System Design Document shall be based on the approved preliminary system design detailed in Appendix D and the requirements listed in Section 2.2 above, and submitted to the City for approval prior to the commencement of any further work. The City will review and provide a written notice of approval or disapproval of the Detailed System Design Document within 30 days of receipt.

Section 3. Site Preparation and Development

The City shall provide adequate space, tower loading, or other civil requirements as defined in the Motorola-provided specifications and requirements documents. The Contractor will be responsible for developing an installation plan that minimizes impact on the existing sites. This may include, removing and replacing existing infrastructure, such as antennas, with new infrastructure that are of the same or lesser weight, stress, and power consumption, where possible.

The City shall resolve any agreed upon environmental or hazardous material issues at each site including, but not limited to any asbestos, structural integrity, or other building issues, prior to Contractor starting work at that site.

3.1. Interconnections, Networking, and Backhaul

The Contractor shall provide the City with detailed specifications for all required interconnections, networking, and backhaul. The City will provide the Contractor with access to all required interconnections, network, and backhaul infrastructure as identified in the Detailed System Design Document. This includes, but is not be limited to, Ethernet network connectivity at all voter, remote, and dispatch site locations.

The System will use existing City-provided microwave network and Cisco MPLS routers in conjunction with Contractor-provided IP-network/MPLS configuration to be implemented as backhaul to and between each of the sites, as well as dispatch centers.

Contractor shall provide all equipment, cabling, and materials needed to connect the system to the City's demarcation point.

Section 4. SYSTEM INSTALLATION

4.1. System Staging

Initial system configuration and staging will take place at Contractor's facilities. Contractor shall assemble, stage, and configure all equipment as it will be installed at each site, including, but not limited to, racking, cable runs, connections, labeling, software installation and configuration, and document the system inventory, including detailed list of equipment items and serial numbers.

Contractor shall provide travel and accommodations for up to twelve (12) City employees and/or representatives to travel to Contractor facility to witness the performance of the Factory Functional Acceptance tests.

Contractor shall perform continuous (24 hours per day) system "burn-in" during staging to isolate and capture any defects.

4.2. System Shipping and Warehousing

The Contractor shall pack and ship all equipment to a local delivery point that is maintained by the Contractor for receipt, inventory, and storage of equipment prior to the delivery to any specific site for installation. Contractor shall use this local warehouse as a central distribution location for all remote site installations. Contractor will store the equipment, as necessary, prior to installation for the duration identified in the Project Schedule. Equipment will not be delivered directly to a specific site for storage until it is ready for installation. The City and Contractor will jointly receive and perform a detailed inventory of all equipment delivered to the Contractor's receiving facility.

4.3. Site Readiness

The City shall ensure that each site is ready for equipment prior to the Contractor starting installation, unless otherwise mutually agreed to by both the City and the Contractor. In accordance with the agreed upon project schedule, City shall provide the Contractor with notice when the site is ready for installation work to begin. Contractor shall not be obligated to begin performing work on any site until 15 days, or unless mutually agreed upon, following City having provided notice to Contractor that the site is ready.

4.4. Tower Load Study

For each of the nine (9) radio tower sites, the Contractor shall perform a tower loading study, according to mutually agreed criteria, at the radio tower site to ensure that no loading issues exist

with the replacement of the existing equipment with the new equipment. Contractor shall perform the tower loading study for a particular site prior to the installation of any equipment at that site.

4.5. Intermodulation Study

Prior to the start of equipment installation at each of the nine (9) radio tower sites, Contractor shall perform an intermodulation (IM) study to find the effects of other radio interference resulting from all other frequencies in use at each site. The City will provide the Vendor with a list of frequencies present at each site location. The purpose of the analysis is to determine the baseline radio frequency (RF) environment at each site to minimize or eliminate intermodulation issues.

The intermodulation study shall analyze intermodulation interference, transmitter noise interference, and receiver desensitization. Contractor shall submit a report on the results of the intermodulation study that will serve as a guide for channel assignments, transmitter combining, and site selection. The report shall specify potential sources of interference and the preventive measures that will be taken to address any identified interference problems. Contractor will assist the City to identify interference or desensitization issues, but because the Contractor must use specified Frequencies, resolution of interference or desensitization issues is the responsibility of the City.

4.6. System Installation

Contractor shall perform all required installation and configuration of Contractor provided equipment as specified in the Detailed System Design. This includes, but is not limited to, all required installation at each of the various locations, such as radio sites and dispatch centers.

4.7. Phased Implementation

Contractor shall perform a phased implementation that minimizes operational disruption and/or downtime and allows for the continuous operation of the current LAFD voice radio system while the new system is being installed.

Contractor shall first install and configure one (1) channel at each of the nine (9) sites as a “proof of performance” for a minimum of thirty (30) days in operation prior to the installation and operation of the remaining channels.

Contractor shall first install and configure all dispatch consoles located at the Operations Control Division (OCD) back-up dispatch center located at City Hall East P4 as a “proof of performance” for a minimum of thirty (30) days in operation prior to the installation and operation of the remaining consoles at Metro Fire Communications (MFC) dispatch center.

Contractor shall ensure that during the phased implementation there is no interruption or other disruption to the audio recording of the existing telephone or radio systems as the new system is being installed.

The City must accept the “proof-of-performance” test before proceeding with the rest of the installation.

4.8. Implementation Schedule

Contractor shall provide the City with a detailed implementation plan and schedule that, at a minimum, describes the specific order of required tasks, timeline, and dependencies of all planned installations. System implementation and cutover shall not start until the City has approved the Contractor’s system implementation plan.

4.9. Channel Cutover

Contractor shall provide the City with a detailed cutover plan that identifies how and when each channel will be cutover from the old to the new system and identify any potential operational impacts. Contractor shall delineate a cutover plan that provides a seamless transition from the old to the new system. The channel cutover plan shall also identify how each channel will be tested and/or verified at cutover prior to moving on to the next channel. The contractor will design the cut-over plan to feature minimal operational impact.

Current system capabilities that must be supported during cutover include, but are not limited to:

- VHF/UHF radio system
- 800 MHz analog simulcast radio system
- Current 800 MHz Mutual Aid Repeater System
- Current LAFD Air to Ground Channel and VHF Mutual Aid radio system
- Conventional FM two-way radio base and or repeater stations
- Current Voice Radio System
- Variety of networking technologies and topologies.

The Voice Radio Switch at CHE P4 OCD will be replaced, tested, and accepted before the Voice Radio Switch is replaced at MFC.

4.10. Current Version

Contractor shall ensure that all hardware, software, and firmware is operating at the most current and fully supported version at the time of staging system acceptance testing.

4.11. Rack Elevation Drawings

Contractor shall provide illustrations of any equipment to be mounted in racks in rack elevation drawings with equipment model and serial numbers clearly labeled for each piece of equipment.

Updated, as-built drawings will be included as part of the system documentation described in Section 7.

4.12. Equipment Removal

Contractor shall transport all removed equipment to a location designated by the City that is within the City limits. Removed equipment is limited to old DC system, voters, transmitters, receivers, antennas, line, dispatch consoles, and other related legacy radio systems and related equipment and materials.

Section 5. SYSTEM OPTIMIZATION AND TESTING

5.1. System Test Plan

The Contractor shall perform all tests necessary to demonstrate that the VRSU system fully and completely meets all specified requirements, as detailed in Appendix C. The Contractor shall provide all necessary personnel, labor, materials, documentation, and test equipment to perform all acceptance tests. City personnel and/or their representative will attend and monitor Factory Staging and Field Acceptance Tests. Contractor shall pay for Factory Staging, Testing, and Field Acceptance, and accommodate a total of twelve (12) City personnel: six (6) City personnel for Voice Radio Switch and six (6) for Voice Radio System.

The test plan and procedures shall be designed to ensure that the equipment and software meet system reliability, maintainability, maximum system capacity, maximum system load, alarms, and diagnostics requirements. Tests shall also include redundancy of the systems for automatic switchover from primary to backup. This also includes system, subsystem specification, verifications, signal level adjustments and optimization.

Formal sign-off and acceptance by the City is required at each stage of testing.

Prior to the start of system testing, Contractor shall provide the City with a comprehensive overall System Test Plan. The System Test Plan shall describe, in detail, each of the various system tests that will be performed during the project.

At a minimum, each System Test Plan must include: the test objectives; how the test will be performed; who will be performing the test; the observable pass/fail criteria; and who will be observing/signing off on the test.

Contractor shall provide a detailed test plan for each of the major project milestones, including, but not limited to the following:

- **Factory Acceptance Test Plan (FATP):** Contractor shall design a plan to stage and test the system equipment at the factory prior to shipment, as witnessed by City staff. Contractor shall perform factory functional acceptance tests of system features, conduct site and system level testing, and perform system burn-in 24 hours a day during staging to isolate and capture any defects.
- **Proof of Performance Test Plan (PoPTP):** Contractor shall design a plan for an initial test of the system that shall serve as a “proof of performance.” Contractor shall install the consoles at OCD and one channel at each of the nine (9) remote sites to test the system

functions and operations as a Proof of Performance (PoP) before implementing the rest of the system. PoP testing shall be performed against the requirements in Appendix C and the agreed-upon design in Appendix D. City personnel must be present at the testing and give final approval before the Contractor proceeds with the rest of the system installation.

- **Coverage Acceptance Test Plan (CATP):** Contractor shall devise a plan to test the radio coverage in accordance with TIA TSB-88 standards within the Service Area of the City of Los Angeles. The Service Area shall be broken into 1-mile-x-1-mile grids, and all grids shall be tested. Upon finalization of RF Distribution System Design in the Project Design Review process a formal CATP with Service Area Coverage guarantees will be generated.
- **Field Acceptance Test Plan (ATP):**
 - **IP Acceptance Test Plan:** As part of the IP test plan, the Contractor shall test the efficacy of the IP system, including MPLS.
 - **Voter Acceptance Test Plan:** Contractor shall devise a plan to test that voters choose the best signal from a portable or mobile radio for the dispatcher's received audio and for retransmission to other mobiles and portables.
 - **Dispatch Console Acceptance Test Plan:** Contractor shall perform all tests necessary to demonstrate that the dispatch console fully and completely meets all features and functions as described in the approved Detailed System Design Document.
 - **Logging Recorder Acceptance Test Plan:** Contractor shall provide a logging recorder test plan for both the Long-Term and Short-Term Recorders that meets the requirements as described in the Detailed System Design Document, including but not limited to the features, system redundancy, and integration with Master Time Base, 9-1-1, Phone, DCN, and Radio communication systems. Audio and video recording of Telemedicine should also be included in the test plan.

5.2. 30-Day Reliability/Operational Tests

Contractor shall perform a 30-Day Operational Test to ensure that all hardware and software defects have been corrected prior to entering final system acceptance. The fully integrated operation of the system shall be demonstrated during this test. The test shall be designed to demonstrate the reliability, long-term stability, and maintainability of the system.

Any major failure, equipment down-time, or performance degradation that requires adjustment or modification of the system during the 30-day test period shall require that the test be terminated, corrective action taken, and the entire 30-day test re-initiated.

5.3. Re-testing

Acceptance tests that fail to meet the acceptance criteria may be re-scheduled and re-initiated at a mutually agreed schedule. Additional acceptance tests required to demonstrate compliance may be initiated only upon express written permission from the City.

5.4. Final System Acceptance

Contractor shall demonstrate to the City's satisfaction that the equipment complies with the features and functionality agreed upon in the final post-contract detailed design documentation. Final system acceptance requires, but is not limited to, the following:

- Completion of all system component, hardware, and software delivery, installation, training, testing, integration, phase-over, as-built documentation, and contract deliverables.
- Written certification by Contractor of compliance with the performance requirements.
- Successful completion of a 30-day operational test. Critical and Major failures, as defined in Appendix D, Section 13 "Functional Acceptance Test Plan" will result in repeating the 30-day test.
- Correction of all punch-list items found during the acceptance test plans and 30-day operational test.
- City sign-off on the above.

5.5. Integration Testing

Contractor to provide API Tech Support to integrate and test with the following: Radio System, Voter/Comparator, ACD, Fire Station Alerting System (FSAS-DCN), CAD system, Master Time Base (MTB), SONET system, Logging Recorders, and other systems.

Contractor shall provide the necessary technical support to ensure that their equipment/subsystem provides the performance, functions, and interfaces to other equipment necessary to meet this prime objective.

Section 6. TRAINING

6.1. Technical Training

Contractor shall provide the City with all required technical training and documentation, including a video recording of the training, necessary for the City to effectively operate the system and fulfill the City's support and maintenance responsibilities. Contractor shall provide the City with a detailed Training Plan that includes, but is not limited to:

- A list and description of all required Technical training courses and prerequisites;
- A training schedule, including the order, number, and duration of courses;
- A description of training logistics, including required space and equipment needed.

The Contractor shall provide all required in-person technical training at City facilities for up to twelve (12) City technicians and engineers.

City technicians will receive "on-the-job" training during the first year of warranty.

6.2. End User Training

The Contractor shall provide the City with all required operational, “end-user” training and documentation, including a video recording of the training, necessary for the City to effectively operate the system. The Contractor shall provide the City with a detailed Training Plan that includes, but may not be limited to:

- List and description of all required Operational training courses and prerequisites;
- Training schedule, including the order, number and duration of courses
- Training logistics, including required space, and equipment needed

The Contractor shall provide all required in-person operational training in a ‘train-the-trainer’ format for up to fifteen (15) City end-user trainers and engineers.

The City will be responsible for completing the remaining end-user training after the Contractor has provided end-user training and prior to system go-live.

Section 7. DOCUMENTATION

7.1. Documentation

Contractor shall provide all necessary as-built Documentation prior to Final System Acceptance. Documentation includes, but is not limited to, Contractor’s training course materials, system specifications, hardware requirements, technical service manuals, software configuration files, cutover documentation, site block diagrams, site floor plans, site equipment rack configurations, antenna network drawings for RF sites, ATP test checklists, functional Acceptance Test Plan test sheets and results, equipment inventory list, console programming template, maintenance manuals and all other user instructions regarding the capabilities, operation, installation, and use of the System, including all online help files and other user instructions. Any modification to the Documentation will not reflect an overall material decrease in the functionality or performance of the System from that existing on the date of Final System Acceptance.

The Contractor shall provide all documentation, firmware, software in a digital media format in the case it is required for system recovery.

Section 8. SYSTEM WARRANTY, MAINTENANCE, AND SUPPORT

8.1. System Warranty and Extended Maintenance and Support

The Contractor shall provide one (1) year of standard warranty and, at City’s option, five (5) years of extended maintenance and support to ensure the continuous operation of the System according to City’s requirements. The Contractor’s warranty and maintenance service must cover both ongoing planned preventative maintenance and support as well as rapid response to any unforeseen issues in order to minimize downtime and disruption of service. The warranty period will begin upon Final System Acceptance, and will continue for one year. Immediately upon completion of the warranty period, the maintenance and support period will begin. The Contractor shall provide

sample Warranty and Maintenance SOW's as part of Appendix D, Contractor Proposal. Warranty and Maintenance SOW's will be finalized during the post-contract design period.

8.2. Centralized Service Delivery

The Contractor shall provide the City with a single point-of-contact for all support issues, including any communications between the City, third-party subcontractors and manufacturers, and the Contractor.

The Contractor shall provide the City with a method of documenting and tracking the status of all support requests and will provide the City with accurate and timely reports of all service performance including the nature, impact, duration and disposition. The Contractor shall provide the City with a means of escalating service requests as needed.

The Contractor shall answer critical "Priority 1" service calls, as defined in Appendix D, Section 16 "ASTRO® 25 Services Statement of Work", in no more than 30 minutes and non-critical calls within one hour, 24 hours per day, seven (7) days per week and provide a means of escalation when the City determines an issue is not being resolved or addressed in a timely or satisfactory manner.

8.3. Field Service Delivery

The Contractor shall provide on-site repair 24 hours per day, seven (7) days per week. The Contractor shall use only authorized, trained and qualified local field service delivery personnel responsible for complete end-to-end support, which includes but may not be limited to, diagnosis, repair, replacement and preventive maintenance.

The Contractor shall maintain a sufficient supply of available spare parts on-hand and field service personnel staffing levels to minimize service disruption and/or degradation to no more than four (4) hours. At a minimum, the Contractor shall maintain spares at agreed upon locations numbering 10% of the total for each critical part (as per the City's Project Manager), no less than one (1), for each critical system part.

The Contractor shall supply a comprehensive list of spares and its subsystems. All spare parts shall be properly packed and protected, marked, tagged as appropriate, and accompanied by documentation. All spares shall be up-to-date with the hardware, software, and firmware during the maintenance periods of the entire system.

8.4. Preventive Maintenance

Preventative Maintenance shall be provided on an 8x5 schedule. Once the first year of warranty expires, the City shall perform pro-active, preventive maintenance on a regular schedule of all systems including hardware, firmware, software, and all site equipment/devices, as recommended by the Contractor.

8.5. Network Hardware Repair

The Contractor shall manage all logistics of equipment repair (including providing Return Material Authorization (RMA) and the return of repaired equipment), repair or replace equipment, and coordinate the repair of third-party solution components. Contractor shall exchange any malfunctioning components and equipment with advanced replacement units and ensure that all critical system components are available locally.

8.6. Maintain Current Versions

The Contractor shall ensure that all installed Hardware, Software, and Firmware is supported by the Contractor and either repairable, or replaceable in the event of a failure.

Section 9. PRICING

9.1. System Price

The Contractor shall provide the Voice Radio System solution for a firm fixed price of \$17,953,555.68, which pricing has been calculated as follows:

Component	Price
Voter & Transmitter Equipment:	\$9,066,153.30
Dispatch Console Equipment	\$8,416,705.64
Contract Equipment Discount	\$(2,248,277.63)
Implementation Services	\$5,931,671.19
System Sub-Total	\$21,166,252.50
Volume Purchase Discount	\$(1,750,503.20)
June 30th 2022 PO Discount	\$(1,531,690.30)
Quantar Trade-In Discount	\$(1,377,788.55)
System Total	\$16,506,270.45
Estimated Taxes (9.5% on Equipment)	\$1,447,285.22
System Total + Tax	\$17,953,555.68

9.2. Payment Schedule

Payments will be made according the Payment Milestone Schedule, in this Section 9.2.

Payment Milestone	% of System Total	Invoice Amount (Excl. Tax)	Milestone
1	5%	\$825,313.52	Contract execution or issuance of a Purchase Order
2	8%	\$1,320,501.64	Design Review Acceptance
3	10%	\$1,650,627.05	Shipment of equipment to City
4	15%	\$2,475,940.57	Installation of First Channel
5	16%	\$2,641,003.27	Installation of Dispatch Console & Logging Recorder Sub-System
6	15%	\$2,475,940.57	Completion of Coverage Testing
7	16%	\$2,641,003.27	Installation of remaining Channels
8	15%	\$2,475,940.57	Final System Acceptance

9.3. Optional Extended Maintenance Pricing

Should City, at City's sole discretion, elect to purchase extended maintenance from Contractor, City's payments to Contractor shall occur in accordance with the following schedule and at the following prices. For each year that City elects to obtain maintenance services from Contractor, Contractor shall provide the extended maintenance services contemplated by this Agreement, for a price not to exceed the corresponding price articulated below.

Year	Price
Year 1	Warranty (no cost)
Year 2	\$2,159,302
Year 3	\$2,203,005
Year 4	\$2,248,019
Year 5	\$2,294,364
Year 6	\$2,342,132

APPENDIX C

HIGH-LEVEL SPECIFICATIONS

LAFD Voice Radio System Upgrade

Appendix C – High-Level Specifications

Section 1. General

1.1. Objective

The objective of this project is to update the LAFD's aging radio system with modern, fully supported hardware and software while maintaining capabilities and performance in accordance with the Project specifications and design documentation.

1.2. System Uptime

The Contractor shall ensure that the components included in this project operate 99.99% of the time, measured twenty-four (24) hours per day, seven (7) days per week, 365 days per year. The Contractor shall ensure that the system is not susceptible to systemwide outage and/or degraded performance, greater than a single channel or single dispatch console, due to the failure of a single component or subsystem.

Section 2. Analog Voice Radio System Infrastructure Upgrade

2.1. General

The Contractor shall upgrade the current LAFD 800MHz analog voice radio system infrastructure at each of the nine (9) radio tower sites and at City Hall East, and Metro Fire Communications sites with a new, modern, and fully supported 800MHz voice radio system with Internet Protocol (IP) infrastructure without degradation of system coverage or performance.

TABLE 1 – LAFD RADIO TRANSMITTER SITES

Number	Site Name	Site Address
1	100 Wilshire	100 Wilshire Blvd, Santa Monica, 90401
2	Baldwin Hills	4201 S La Brea Ave., Los Angeles, 90008
3	Beverly Glenn	14240 Mulholland Dr., Beverly Hills, 90077
4	Los Angeles City Hall	200 N. Spring St., Los Angeles, 90012
5	KSKQ Radio	4600 Carter Dr., Los Angeles, 90032
6	Mount Washington	721 Lark Court, Los Angeles, 90065
7	Oat Mountain	Oat Mountainway, Porter Ranch, 91326
8	San Pedro Hill	3960 Crest Rd, Rancho Palos Verdes, 90275
9	Verdugo Peak	Verdugo Mountainway, Glendale, 91214

2.2. Conventional two-way radio base and repeater stations

The Contractor shall support conventional FM two-way radio base and/or repeater stations.

2.3. Channel Capacity

The Contractor shall install and configure twenty (20) non-trunked 800 MHz radio channels in a simulcast repeated voice at each of the nine (9) RF remote site locations.

2.4. Conventional Comparators and Voters

The Contractor shall replace existing eighteen (18) voter/comparators with twenty (20) voter/comparators and existing 180 remote site transmitters with new equipment to receive audio from multiple sites and identify and combine the highest quality audio for transmission.

The Contractor shall install the new voter/comparators at Metro Fire Communications (MFC) and remove the existing voter/comparators from Operations Control Dispatch (OCD).

2.5. Radio Frequency Distribution Subsystems

The Contractor shall replace all radio frequency (RF) distribution subsystems at each of the nine (9) sites including, but not limited to, any required 800MHz combiners, couplers, transmission lines, lightning arrestors, tower-top amplifiers, and antennas.

2.6. GPS Frequency and Time Reference

The Contractor shall provide GPS-based frequency and time reference at all repeater sites and circuit-based or IP-based voting subsystems.

2.7. Serviceability

The Contractor shall provide configurable and upgradeable software and convertible hardware to ensure maximum hardware lifespan.

The Contractor shall provide “software-only” installation of upgrades, patching, and new releases.

The Contractor shall provide front access for hot-swappable components.

2.8. Power Backup

The Contractor shall provide AC/DC-48V power supply at each site with integrated battery revert and charging to limit dependency on site UPS in the event of a power failure.

The Contractor shall provide DC systems for 8-hour, off-power runtime, and 12-hour recharge at each site.

2.9. Voice Quality

The Contractor shall meet or exceed the LAFD’s standards for audio quality.

2.10. Coverage

The Contractor shall provide proposed 12.5kHz coverage maps for comparison of current system coverage, the baseline, with new (proposed) system coverage, the required coverage of the new system, for comparison at time of design, prior to system installation.

The Contractor shall provide full-size coverage maps for both 25kHz and informational-only 12.5kHz in PDF format and on Size-E plot during the post-contract-award design review. All the properties of antenna height and detail specs needed will be submitted to City as part of delivery packages at the same time.

The Contractor shall complete a DAQ-3.0 baseline coverage test of the existing radio system and design the new system to meet or exceed the composite coverage of the

existing system.

2.11. Emergency Trigger

The Contractor shall provide Emergency Trigger function of the radios for the operation of the dispatchers and radio users in the field.

The Contractor shall display the field unit ID at the dispatch terminal, console, or both, and activate an audible alert when a field unit activates the emergency function of the radio unit.

2.12. Inbound (Uplink) Operation

The Contractor shall design the system so that when the portable or mobile radio is keyed up, the signal is received by one or more repeater receivers on that channel.

The Contractor shall design tower-top receiver preamplifiers at all repeater sites to provide balanced uplink/downlink system gains to eliminate the need for additional voting receiver sites.

The Contractor shall design the audio from each repeater receiver (Unit ID and voice) to be sent via the City's digital microwave system to the simulcast central equipment.

2.13. Outbound (Downlink) Operation

The Contractor shall design console transmit and push-to-talk (PTT) audio to meet LAFD's operational and functional requirements defined in this Appendix. Prioritize the console operator over inbound radio traffic on the channel. All voice radio channels shall be capable of operating in analog simplex mode from the console.

2.14. Automatic Telephone Interconnect Operation

The Contractor shall provide a radio telephone interconnect phone patch on each of the 20 channels in the simulcast radio system to give access to telephone lines via the radio system. These lines can be shared by another extension or can be dedicated to the radio telephone interconnect.

2.15. Station ID Announcer

The Contractor shall provide automatic station ID announcer units for station identification on the twenty (20) LAFD radio channels. The station call sign shall be transmitted by Morse Code or other means at intervals as required by the Federal Communications Commission (FCC). Any transmission from the operator consoles shall override the announcer.

2.16. Redundancy

The Contractor shall design all critical components with redundancy in order to provide high system availability.

2.17. Equipment and Hardware Requirements

The Contractor shall provide critical components with hot standbys that will automatically come online in the event of a failure in the primary unit and design the system to revert to primary once issues are resolved.

The Contractor shall provide equipment that will function in all remote RF sites, OCD, and MFC under extreme operating conditions.

2.18. Software Requirements

The Contractor shall ensure that all hardware is capable of accepting the latest software at the time of staging acceptance.

The Contractor shall use software that allows encryption algorithms to be added or upgraded in existing secure-capable sites.

The Contractor shall provide a list of all software installed in all systems equipment, a brief description of their function(s), and the latest configuration file (soft copy) for the radio system that will be used in the event of any failures.

Section 3. Dispatch Console System

3.1. General

The Contractor shall replace seventy-two (72) voice radio dispatch consoles located at Metro Fire Communications Center (MFC) and twenty-eight (28) located at the LAFD back-up center, Operations Command Center (OCD), located on P4 at City Hall East and associated equipment that supports the consoles.

3.2. Integrated Dispatch Environment

The Contractor shall provide an integrated dispatch environment for LAFD user operators, functioning together with Fire Station Alerting System-Dispatch Communications Network (FSAS-DCN), LAFD Computer Aided Dispatch (CAD) system, Logging Recorders, Master Time Base (MTB), and Transmission System, which support the activities of the LAFD 9-1-1 dispatch operation.

While the City and its various vendors are responsible for writing and testing 3rd party interfaces, the Contractor must provide API access, documentation, and at least 40 hours

of API technical support. Additional API technical support should be optionally priced.

3.3. Redundancy

The Contractor shall provide redundancy for both Primary Dispatch Center at MFC and Backup Dispatch Center at CHE P4 OCD.

3.4. Future Enhancements/Scalability

The Contractor shall provide a system design that facilitates future enhancements and scalability that support LAFD's operational growth and reduce response time to 9-1-1 calls.

3.5. Voice Radio System Interoperability

The Contractor shall provide full system integration and control of the LAFD voice radio system while also providing seamless interface and interoperability with the LAPD 700/800 MHz radio systems and the LA City Simulcast Trunked Radio System (STRS).

3.6. Functional Requirements

3.6.1. Radio Operator Positions

The Contractor shall provide the ability to use the current/existing dispatch console furniture without modification.

The Contractor shall provide the number of radio operator dispatch positions required at the MFC as enumerated in Table 2 – Primary Dispatch Center at MFC: Operator Positions and their Locations, and those required at the CHE P4 OCD, as described in Table 3 – Back up Dispatch Center at CHE P4 OCD: Operator Positions and their Locations.

Table 2 – Primary Dispatch Center at MFC: Operator Positions and their Locations		
OPERATOR LOCATION	POSITIONS	AMOUNT
Dispatch, Room #220	1-37, 60, 61	39
Training, Room #222	39-51	13
Captain Desk, Room #225	52 Radio and Phone, 53 Phone only (PC provided by	2

	Contractor)	
PSO, Room #259	Radio only	1
Battalion Chief, Room #244	58 Radio only	1
Sit-Stat Re-Stat, Room #258	62 and 63 Radio and Phone	2
Battalion Chief, Room #245	57 Radio only	1
Asst. Chief, Room #249		1
Chiefs Office, Room #250	65 Radio only	1
OCD B.C. Office	38	1
FCCS CAD Dev Room, Room #241	CAD only (PC provided by Contractor)	3
Tech Control, Room #214	Maintenance	1
Equipment Room #215	Maintenance	1
AV Equipment Room #221	9-1-1 only (PC provided by Contractor)	1
AT&T Room	9-1-1 only (PC provided by Contractor)	2
Captain Room #225	CAD only (PC provided by Contractor)	1
Captain Room #227	Radio only	1
	Total Positions	72

Table 3 – Back up Dispatch Center at CHE P4 OCD: Operator Positions and their Locations

OPERATOR LOCATION	POSITIONS	AMOUNT
Dispatch Room	1-23	23
Public Safety Officer (PSO)	Radio only	1
Battalion Chief		1
Captain's Office		1
Captain's Office		1
Tech Control Maintenance		1
	Total	28

3.6.2. Radio Channel and Trunked Talk-Group Capacity

The Contractor shall size the console system and related equipment to provide a minimum of 84 conventional radio channels. These include:

- 20 Primary Voice Channels
- 18 Mt. Lukens Voice Backup Channels
- Los Angeles City Simulcast Trunked Radio System (STRS) P25
- 700 MHz Nationwide Interoperable Channels
- Non-Federal 800 MHz National Mutual Aid (8CALL90, 8TAC91), Los Angeles County Fire Tactical, and other miscellaneous (VHF/UHF) channels

The Contractor shall size the console system and related equipment to provide a support trunked radio systems integration / interoperability for a minimum of 120 simultaneous P25 Talk Paths (60 talkpaths for main and 60 talkpaths for backup) to allow LAFD to communicate with LAPD, Interagency Communications Interoperability System (ICIS), and Los Angeles Regional Interoperability Communications Systems (LARICS).

The list of frequencies of all LAFD Radio channels will be provided by the City during the preliminary design phase of the project.

3.6.3. Operator Position Equipment

3.6.3.1. *Dispatchers, Call Takers, and Training Operator Positions*

The Contractor shall provide all dispatcher, call taker, and radio operator

training positions to be identical.

The contractor shall equip each position with:

- All required computer hardware (e.g. CPU, keyboard, monitor, mouse)
- Audio Processing Unit
- Two (2) headset jacks
- Four (4) desktop speakers
- Physical button/footswitch for Shunt activation.
- One footswitch with Tx and Mute
- One counter-top keypad with Push-To-Talk (PTT), Mute, Alert tone Transmit, select audio shunt
- Interface to long-term logging recorder
- Interface to instant recall recorder (IRR)
- Public address system interface capability
- Two headsets for each radio operator position
- Monitor and control for Mt. Lukens 18-channel backup base stations
- Gooseneck microphone, at selected positions.

3.6.3.2. *Supervisors and Battalion Chief Positions*

The Contractor shall equip supervisor and BC positions and training room with the same radio operator position equipment, as detailed in Section 3.8.3.1, Dispatchers, Call Takers, and Training Operator Positions, with the following exception: supervisor positions will use a handset instead of a headset.

3.6.3.3. *Other Specified Radio Operator Positions*

The Contractor shall equip radio operator positions in Public Service Office, Sit-Stat, Re-Stat, and DOC with equipment identical to that as described in Section 3.8.3.2, Supervisors and Battalion Chief Positions in the OCD.

3.6.3.4. *Other Offices*

The Contractor shall equip radio operator positions in other offices with the same radio operator position equipment, as detailed in Section 3.8.3.1, Dispatchers, Call Takers, and Training Operator Positions, with the following exception: counter-top pad with PTT, Mute, Alert Tone, and Shunt is required.

3.6.3.5. *Technician Positions Mobile for Maintenance*

The Contractor shall equip technician positions with same equipment as that detailed in Section 3.8.3.1, Dispatchers, Call Takers, and Training Operator Positions, with the following exceptions: installed on a suitable high quality cart to make it easy for system maintenance and parking placement for monitoring

during normal operation.

3.6.3.6. *Tech Control Monitoring Position*

The Contractor shall equip Tech Control monitoring position with the full capability of any dispatch position, as detailed in Section 3.8.3.1, Dispatchers, Call Takers, and Training Operator Positions.

3.6.3.7. *Headset Jacks and Headsets*

The Contractor shall provide the ability to use a single headset for Telephone, Radio, and DCN communication between the dispatcher console and all required peripheral systems including the Fire Station Alerting system. (See Table 4 – LAFD Headset Requirement Matrix.). Through Contractor provided API's the City will manage routing, dialing, and connection of the telephone and DCN audio.

The Contractor shall provide dispatch operator position to support up to three headset jacks: two headset jacks for Radio (Radio, DCN, and Telephony) and one for telephony only as a backup. The telephony-only jack and headset will be provided by Telco. Radio System shall arbitrate between DCN and radio.

The Contractor shall design the minimum audio level to be adjustable, and the characteristics of received audio should not be changed.

The Contractor shall ensure that each jack shall accept a non-polarized switchboard-type double-prong plug.

The Contractor shall mount the radio headset jacks underneath the console writing surface (one on each side), in a low-profile position to ensure safe user operation. The headset jack must allow users to use a headset that minimizes the effect of ambient noise on console Voice Radio Switch, thus improving the quality of audio being transmitted from the dispatch center, and allowing the dispatch console users to hear received audio more clearly.

The Contractor shall ensure that when a headset is plugged into a headset jack, the selected receive-audio is typically removed from the speaker(s) and routed to the headset earpiece. When both radio headsets are connected to a dispatch console, the same audio appears in the earpieces of both of them.

Table 4 – LAFD HEADSET REQUIREMENTS

TELEPHONY - Telephony has highest priority								
Item #	Type Of Arbitration	Telephony Audio On Headset	Radio Tx On Headset	Radio Rx On Headset	No A/V On Headset	DCN Audio On Headset	Audio Routed To Speakers (Auto/Manual)	Remarks
1	Telephony followed by DCN SCENARIO : Calltaker (CT) Logged on to ACD (Automatic Call Distributor) Queue and in the Ready state	Yes	N/A	N/A	N/A	Muted/ Blocked at Headset	N/A	1. Telephony has priority 2. If Calltaker is in the <u>ACD Ready state</u>, ACD call will always be delivered to the headset. 3. If Calltaker is on an ACD 9-1-1 call, they will be trained to complete the ACD 9-1-1 Call and go Not ready prior to picking up a DCN call. 3.. Calltaker must always be in the Not Ready state prior to picking up a Dispatch Communications Network (DCN) call. This will be re-enforced during training
2	Telephony followed by DCN SCENARIO : Calltaker Logged on to ACD Queue and in the NOT Ready state	YES	N/A	N/A	N/A	Muted/ Blocked at headset	N/A	1. Telephony has priority. 2. If Calltaker is on a Dialed Number (DN) call. telephony audio is delivered to the headset. 3. If Calltaker is on a DN call, they will be trained to complete the DN Call and or place the call on hold prior to picking up a DCN call. This will be re-enforced during training

3	Telephony followed by DCN SCENARIO : Dispatcher Logged on to Radio (not logged onto ACD)	YES	N/A	N/A	N/A	Muted/ Blocked at headset	N/A	1. Telephony has priority. 2. If Dispatcher is on a DN call telephony is delivered to the headset. 3. If Calltaker is on a DN call, they will be trained to complete the DN Call and or place the call on hold prior to picking up a DCN call. This will be re-enforced during training
4	Telephony followed by Radio Tx (Transmit) SCENARIO : <i>Dispatcher logged on to Radio</i>	Yes	No	N/A	N/A	N/A	N/A	1. If Dispatcher is on a DN call, telephony is delivered to the headset. 2. When Dispatcher keys the MIC button while on a DN call, the DN caller will not hear the Dispatchers Radio Tx audio.
5	Telephony followed by Radio Rx (Receive) SCENARIO : Dispatcher logged on to Radio (not logged onto ACD)	Yes	No	N/A	N/A	N/A	Yes	Automatic (Shunt) Audio Mode 1. If Dispatcher is on a Telephony/DN call, telephony audio is delivered to the headset. 2. If Radio Rx audio is received while on a DN call, the Radio Rx audio is shunted to the radio speakers
6	Telephony followed by Radio Rx SCENARIO : Dispatcher logged on to Radio (not logged onto ACD)	Yes	No	Yes	N/A	N/A	No	Manual (Headset) Audio Mode 1. If Dispatcher is on a DN call, telephony is delivered to the headset. 2. If Radio Rx audio is received while on a DN call, the Radio Rx audio is delivered to the headset. (Both Telephony and Radio are present on the headset)

DCN (Dispatch Communications Network) - Telephony has highest priority								
Item #	Type of Arbitration	Telephony Audio on Headset	Radio Tx on Headset	Radio Rx on Headset	No A / V on Headset	DCN Audio on Headset	Audio Routed to Speakers (Auto/Manual)	Remarks
1	DCN followed by Telephony SCENARIO : Dispatcher logged on to Radio (not logged onto ACD)	Yes	No	No	N/A	Muted/ Blocked at headset	N/A	1. If DCN is selected when there is no telephone audio present, DCN audio will be delivered to the headset. 2. It will be mandatory that only one audio source (DN/DCN) be selected at any one time. This will be re-enforced during training 3. If a DN needs to be selected while on a DCN call, Calltaker/Dispatcher is required to either clear or disconnect the DCN caller. Otherwise Telephone has priority and DCN must be muted or blocked at the headset.
2	DCN followed by Radio Rx SCENARIO : Dispatcher logged on to Radio (not logged onto ACD)	No	No		N/A	Yes	Yes	Automatic (Shunt) Audio Mode: 1. If Dispatcher is on a DCN call, DCN audio will be delivered to the headset. 2. If Radio Rx is presented while on a DCN call, Radio Rx is shunted to the radio speakers
2	DCN followed by Radio Rx SCENARIO : Dispatcher logged on to Radio (not logged onto ACD)	No	No	Yes	N/A	Yes		Manual (Headset) Audio Mode: 1. If Dispatcher is on a DCN call, DCN audio will be delivered to the headset. 2. If Radio Rx is presented while on a DCN call, Radio Rx will also be delivered to

								the headset (Both DCN and Radio are present on the headset)
3	DCN followed by Radio Tx SCENARIO : Dispatcher logged on to Radio (not logged onto ACD)	No	Yes	No	N/A	Yes	N/A	Auto & Manual Mode 1. If Dispatcher is on a DCN call, DCN audio will be delivered to the headset 2. If Dispatcher keys the MIC to transmit radio while on a DCN call, the DCN caller will hear the Radio Tx audio
Radio								
Item #	Type of Arbitration	Telephony Audio on Headset	Radio Tx on Headset	Radio Rx on Headset	No A/V on Headset	DCN Audio on Headset	Audio Routed to Speakers (Auto/Manual)	Remarks
1	Radio Tx followed by telephony DN SCENARIO : Dispatcher logged on to Radio (not logged onto ACD)	Yes	No	No	N/A	Yes	No	Automatic Mode; 1. When a Dispatcher keys the MIC button while on a DN call, the DN caller will not hear the Dispatchers Radio Tx audio.
3	Radio Rx followed by Telephony Dispatcher logged on to Radio (not logged onto ACD)	Yes	No	No	N/A	No	Yes	Automatic (Shunt) Audio Mode 1 . If a telephone/DN button is selected while receiving Radio Rx audio, the telephone/DN audio is delivered to the headset and the Radio RX is shunted to the radio speakers.
3	Radio Rx followed by Telephony Dispatcher logged on to Radio (not logged onto ACD)	Yes	No	Yes	N/A	No	No	Manual (Headset) Audio Mode 1. If Dispatcher is on a radio call, radio Rx audio is delivered to the headset. 2. If a telephone/DN button is selected while receiving Radio Rx audio on the

								headset, the telephone/DN audio is delivered to the headset (Both Telephony and Radio are present on the headset)
3	Radio Rx followed by DCN Dispatcher logged on to Radio (not logged onto ACD)	No	No	No	N/A	Yes	Yes	Automatic (Shunt) Audio Mode: 1. If Dispatcher is on a DCN call, DCN audio will be delivered to the headset. 2. If Radio Rx is presented while on a DCN call, Radio Rx is shunted to the radio speakers
3	Radio Rx followed by DCN Dispatcher logged on to Radio (not logged onto ACD)	No	No	Yes	N/A	Yes	No	Manual (Headset) Audio Mode: 1. If Dispatcher is on a DCN call, DCN audio will be delivered to the headset. 2. If Radio Rx is presented while on a DCN call, Radio RX will also be delivered to the headset. (Both DCN and Radio are present on the headset)
NOTE: 1. Headset Interface Unit (HIU) will arbitrate Radio, DCN (Dispatch Communications Network), and Telephone audio 2. Telephony has highest priority when logged onto ACD (Automatic Call Distribution) 3 Use of DCN requires Calltaker position to be in the ACD NOT READY state and or DN (Dialed Number button on telephone set) 4. Dispatcher cannot be logged in as a Calltaker 5. Calltaker cannot be logged in as a Dispatcher. (Wingman has speaker capability only) 6. Audio Visual (AV) audio will not connect to the HIU.								

3.6.3.8. **Headset Interface**

The Contractor shall design the headset interface to allow dispatchers to plug a headset directly into the console instead of having to switch between various communications systems. The interface shall automatically coordinate and prioritize communications over telephone, radio, and the DCN, and allow the user some freedom to override automatic prioritization.

LAFD and ITA have developed operational requirements for the headset interfaces. These headset interfaces are designed to operate within the matrix parameters. HIUs will arbitrate Radio, DCN and Telephone audio (please refer

to Table 4 – LAFD Headset Requirements Matrix).

The hardware specific design of the HIU shall be completed during detail design of the LAFD Voice Radio Switch.

3.6.3.9. ***Personal Computer (PC)***

The Contractor shall provide a dedicated CPU for each radio operator position that runs on the latest Operating System approved by the City and any City-required virus and/or malware protection software.

Due to space limitations in the training and test environments, the Radio and CAD software will cohabitate on the same physical CAD PC.

3.6.3.10. ***Monitor, Keyboard, and Mouse***

The Contractor shall provide a monitor, mouse, and keyboard for each position.

The Contractor shall use a City-provided KVM to allow sharing one monitor, keyboard, and mouse with multiple CPUs where needed.

3.6.3.11. ***Speaker Requirements***

The Contractor shall provide the Voice Radio Switch with four (4) speakers, through which audio is presented to a dispatch console.

The Contractor shall route audio associated with different sources to different speakers at the operating position.

The Contractor shall allow a dispatch console user to choose which speakers are to be used for a given resource. The Select Audio can be fixed to a specific, pre-defined speaker. Monitor audio can be routed to any of the monitor speakers.

3.6.3.12. ***Unselect Speaker***

The Contractor shall dedicate a single speaker as the "Unselect" speaker. When a resource is not selected, its audio shall be sent to a speaker dedicated as the unselect audio destination for that resource.

3.6.3.13. ***Select Speaker***

The Contractor shall dedicate a single speaker as the "Select" audio destination for all resources selected by that console operator. Whichever radio resource is currently selected will have its audio presented in that speaker.

3.6.3.14. *Monitor Speaker*

The Contractor shall provide two (2) monitoring speakers for other audio not needed to be on the operator headset.

3.6.3.15. *Footswitch*

The Contractor shall provide a heavy-duty, non-skid pedal footswitch at each console operator position. The foot switch shall provide Mute, and PTT functions. Shunt operation from a footswitch is desired but detailed operation can be determined during the Detailed Design process.

3.6.3.16. *Commercially Available Accessories*

The Contractor shall provide the ability to use commercially available accessories, including but not limited to, a USB microphone, USB headset, USB footswitch, power supply, and speakers.

3.6.3.17. *Auxiliary Input/Output Hardware*

The Contractor shall support auxiliary input/output hardware that is independent of the dispatch positions in a system that can be accessible to multiple dispatch positions.

Allow auxiliary inputs and outputs to control external devices via relay closures and sense the state of external devices via input buffers from dispatch operator positions.

3.6.4. *Additional Icons*

The Contractor shall provide additional voice resource icons and the necessary connections to integrate with other systems as required for LAFD operations.

3.7. *Operational Requirements*

This section provides the minimum operating requirements of the LAFD radio dispatch console system.

3.7.1. *General Operator Features*

The Contractor shall provide all console positions the ability to access any active Tx/Rx channel at the console for transmit and receive operations.

The Contractor shall provide all console positions the ability to transmit and receive on one or more Tx/Rx channels, up to the maximum number of active channels at

the console.

The Contractor shall allow each console to transmit on any channel, on a first-come, first-served basis. Lock out all other consoles from transmitting on that channel until the first transmission is completed (PTT is released).

The Contractor shall allow all console positions to access one or more Rx-only channels, up to the maximum number of monitor channels at the console, for monitor-only operation.

The Contractor shall allow all console positions to load predefined screen configurations without being taken off-line or losing communications on selected channel(s) while loading a new screen configuration.

The Contractor shall allow for the radio operator position not being used and a resource is being added to a configuration, a console may be taken offline for a maximum of 30 seconds while the new resource is added.

The Contractor shall design the system so that dispatchers can perform tasks quickly and with no interruption.

The Contractor shall ensure that configuration files can be loaded with minimal or no disruption.

The Contractor shall allow any console position to select and display a Tx/Rx channel(s), multiple channels, or a pre-selected group(s) of channels with a single control, up to the maximum number of active channels at the console.

The Contractor shall provide all console operator positions the capability to select the 20 LAFD Primary Radio channels or 18 Mt. Lukens Backup Radio channels to meet their operational requirements.

The Contractor shall ensure that the user can execute any primary control function with no more than a single operation or keystroke on preselected channels, e.g. multiple channel or group transmit selection.

The Contractor shall equip all console positions with a predefined control layout. Capability to assign channels for all consoles shall be identical.

The Contractor shall allow the status of all selected channels to be visible to the operator at all times either by displaying the channel module onscreen or representation in the STAT list. Minimum status display is: Channel Select, Transmit Active, Call, and Busy. Display all channel and console status indications on a computer monitor.

The Contractor shall allow the operator to control consoles through an input device, such as a standard keyboard, 3-button mouse with scrolling feature, or touchscreen.

The Contractor shall activate an audible tone and cause an error message or indication to be displayed when there is an error in a system entry by a console operator such as PTT failure, PTT override, etc.

The Contractor shall transmit and receive audio at one position that is available and heard at parallel positions that have the same channel selected.

The Contractor shall automatic 9-1-1 telephone assignments shall not be allowed unless a headset has been plugged into a headset jack-box and user ACD login has occurred.

The Contractor shall ensure consoles are capable of transmitting a distinctive alert tone for emergency traffic as required by NFPA 1561.

The Contractor shall allow all consoles to transmit three (3) pre programmed alert tones over the air as long as an Alert tone-switch is depressed. An alert tone may be transmitted over any selected or combination of selected channels. Programming of the three alert keys may be from any tone in the following list:

- 1004 Hz Continuous tone
- 600 Hz Continuous tone
- 1004 Hz Beeps at a 2 Hz Rate
- 600 Hz beeps at a 2 Hz Rate
- 900/1500 Hz High or low at a 2 Hz Cycle rate
- 1200 Hz Continuous tone.
- 1004 Hz 3 beep tones only

The Contractor shall ensure consoles are intuitive for trained dispatchers to operate with guides located within the dispatch application itself

The Contractor shall provide each console position with a shunt/auto-off feature controlled by an application program installed in the position's computer.

3.7.2. System Control Capability

3.7.2.1. Console Status Display

At a minimum, provide the following system functions and visual status indications at all console positions. Other methods of status may be offered.

3.7.2.2. ***Receive Functions***

- Channel select (Channel to be monitored)
- Audio Call (Received audio on line)
- Channel Busy (Other console transmitting on Channel)

3.7.2.3. ***Transmit Functions***

- Channel Select (Tx/Rx channel)
- Simulcast Select (Pre-programmed channels)
- Channel Busy (Other position transmitting)
- Transmit (Position can transmit)
- Repeat Enable/Disabled (Channel repeat disabled/enabled)
- Priority Tx

3.7.2.4. ***Graphical User Interface (GUI)***

Employ a GUI for displaying information to and accepting commands from console operators.

3.7.2.5. ***Resource Assignment***

Provide a resource assignment feature with the ability to monitor and control the following radio resources:

- Analog Conventional Channels
- Broadcast call/All call
- Trunked Talk-group call
- Trunked individual calls

Allow all console operator positions to select the radio channels dynamically for single-channel, multi-channel, or group-select operation with easy access to set up changes.

Provide visual indication of audio activity on a radio resource that allows user to see at a glance what the status of a resource is at any moment.

3.7.2.6. ***General Transmit***

Provide a general transmit feature to initiate a voice transmission on the selected resources with the footswitch, the counter top keypad push button, or GUI.

3.7.2.7. ***Instant Priority Transmit***

Provide instant or high-priority transmit to allow quick transmission on a specific channel regardless of its select or in-use state resources with the footswitch, the counter top keypad push button, or GUI.

3.7.2.8. ***Supervisory Functions***

Provide the supervisory consoles the capability of Primary/Secondary Supervisor Hierarchy feature to allow supervisory personnel to priority-override the transmit function of other operators or users regardless of their current state. Other details of the administrative function will be defined in the Detailed Design Document.

3.7.2.9. ***Priority Levels***

Provide Transmit Priority hierarchy level capability for different types of transmission on the same dispatch console or between dispatch consoles. This allows a higher priority transmission to take over resources from a lower priority transmission.

The following priority levels, from highest to lowest are:

- Primary supervisor and Battalion Chief console instant transmit
- Secondary supervisor console instant transmit
- Dispatcher console instant transmit
- General transmit on any type of console
- Auxiliary Inputs and Outputs (AUX I/O)

3.7.2.10. ***Single Select***

Design the Single-Select feature that allows only one radio resource to be selected at a time, and to route audio on the resource to the selected speaker. When a resource is single-selected, the previously selected resource becomes deselected. This audio shall be easily recognized from the other audio sources at the dispatch console.

Provide user controls so that the user can define their own audio reception profile by selecting a single audio source, whether conventional or talk group, to be heard on a selected speaker or headset (Single Select).

3.7.2.11. ***Multi-Select***

Provide a Multi-Select feature to identify and select multiple resources simultaneously. A dispatch console is required to support multiple Multi-Select

groups, each of which supports multiple, potentially overlapping resources. Multi-selecting a group of resources shall route the inbound audio on the multiple resources to the select speaker. Only one Multi-Select group shall be active at a time.

Provide user controls so that the user can define groups of radio resources that can all be heard on a selected speaker or headset.

3.7.2.12. *Channel Select*

Provide a Channel Select feature that selects the active transmit/receive frequency of a conventional base station via in-band signaling (Dual Tone Multi-Frequency (DTMF) or function tones).

3.7.2.13. *Volume Control*

Provide audio controls including volume and mute. Compartmentalize them so that audio quality can be maintained and interference, acoustic feedback, and interruptions are minimized. Provide activation capability of Automatic Gain Control (AGC) for transmit and receive audio at the console.

3.7.2.14. *Individual Resource Volume Control*

Provide an Individual Resource Volume Control feature to adjust the level at which each resource is received at a speaker's input. When a resource is selected, its volume shall be at a full volume. However, the level to the operator headset shall not be at a level damaging to the listener.

3.7.2.15. *Mute*

Provide a Mute feature that mutes traffic on any channel.

3.7.2.16. *All Mute*

Provide an All Mute feature that mutes all audio on resources that are not currently selected. It shall deactivate automatically after a certain amount of time elapses, typically 30 seconds.

3.7.2.17. *Cross Mute*

Provide a Cross Mute feature that prevents acoustic feedback when dispatch consoles are physically located near each other.

3.7.2.18. **Patch**

Provide the ability to patch communication between trunked and/or conventional radios that are normally unable to communicate with each other due to different features, programming, or even different frequency bands.

Provide the ability to transmit all audio on one resource to all other resources in the patch group and ensure that patches are automatically reestablished, if interrupted, to minimize disruption.

Provide the ability to predefine and automatically reinitiate patches each time a dispatch position is restarted.

3.7.2.19. **Selective Intercom Call**

Provide a Selective Intercom Call feature that allows dispatch console operators to speak privately with each other through the dispatch intercom system.

3.7.2.20. **All Call Intercom**

Provide a Group Intercom Call feature that allows a dispatch console user to have one-way voice communication with all other operator positions through their dispatch consoles.

3.7.2.21. **Private Line Select**

Provide a Private Line Select capability that selects the Private Line code for a Mutual Aid conventional resource. Selecting a Private Line on a conventional resource shall cause the dispatch console to transmit/receive audio only to the subgroups of radios using the selected Private Line code.

3.7.2.22. **Wildcards**

Provide a Wildcards feature that activates miscellaneous functions that a conventional base station can perform (e.g. to turn a relay on/off at the base station connected to external equipment).

3.7.2.23. **Multi-Frequency Conventional Base Stations**

Provide the dispatch console with the capability to access and control base stations.

Design the console to select and broadcast on any number of frequencies.

3.7.2.24. *Display Radio Unit ID*

Immediately display an indication of an emergency activation showing the unit ID associated with an inbound radio call. When an alias is used for the unit ID, display the alias instead of the unit ID.

3.7.2.25. *Console Unit ID (P25 Feature)*

Display an identifier unique to the console being used when the console user transmits on a radio channel and when the user initiates an individual call to another console.

3.7.2.26. *Emergency Alarm*

Alert console users of a critical situation needing immediate attention with an emergency alarm.

Provide immediate prioritization and resolution of emergency communications by use of both visual and audible indications.

Provide the ability to bypass the standard console interface to enable specific controls for responding to an emergency call, initiating an emergency call, and ending an emergency call.

3.7.2.27. *Signaling Protocol*

Design the system to be compatible with LAFD mobile and portable radios' signaling protocol (currently, MDC-1200) to display both radio ID and alias identifications for incoming radio messages.

Provide signaling protocol on the twenty (20) Fire channels and the eighteen (18) Mt. Lukens Backup channels.

Equip the Voice Radio Switch with a redundant decoder and comparators for emergency trigger channel.

Provide decoders capable of decoding up to 9,999 different IDs and alias identities. The hardware numbers and alias names of the radio units transmitting on each of the twenty (20) LAFD Primary channels and eighteen (18) Mt. Lukens backup TAC channels shall be displayable on all consoles.

Provide a backup to primary decoder to ensure that no Emergency Triggers or alarms are missed or unacknowledged.

Annunciate an alarm at the Supervisor and Maintenance Position if both

decoders fail to decode the Emergency Trigger Signal.

3.7.2.28. *Mute Emergency Trigger Display*

Display an Emergency Trigger Signal at all consoles for each radio.

Make both hardware and alias ID from at least the last ten (10) transmissions available for simultaneous display.

Display a pop-up channel module for the Emergency Trigger channel at all positions programmed for a pop-up option. An Emergency Trigger shall cause the module to sound an audible alarm at all positions programmed for the audible alert option.

Allow audio alarms at all console positions to be cleared by any console operator, whereas allow visual alarms to be cleared by supervisors only. Allow the silencing of the audible alarm and the reset of each of the ID displays.

3.7.2.29. *DTMF Encoder*

Allow all console operator positions to generate Dual Tone Multiple Frequency (DTMF) signals to control radio transmissions.

3.7.2.30. *Secure Capability in the Dispatch Console*

Allow conventional channels and P25 channels to be encrypted on all transmit/receive voice transmissions.

3.7.2.31. *Visual Alert (Clear Audio Alert)*

Provide visual indications when any call is in the clear mode for P25 and conventional channels using the encryption system.

Alert the dispatch console user that a call is unencrypted.

3.7.2.32. *Aliasing*

Allow aliases to be used in the configuration, operation, and management of the voice radio system in both conventional and trunk mode. An alias is an alpha-numeric text that is associated with some element of a console subsystem (e.g., a user, a conventional radio channel, or a talk group).

Perform updates of the Radio Alias IDs by the LAFD CAD system automatically via the Application Programmer Interface (API). The City is responsible for developing the API integration. The Vendor shall provide API technical support

to the City.

Provide a means to edit the Radio Alias Database. Updating from the Voice Radio System to the Voice Radio Switch shall be transparent and shall not experience delay as this is a critical part of the operations.

3.7.2.33. *Log-In and Log-Out*

Require user account name and password information to be entered before the console can be used.

Require positive information to allow log-out (but not password).

Allow an administrative user to create accounts for the different users of the system and to assign different capabilities and access rights to them.

3.7.3. Mobile Console

Allow the ability to have direct radio console access for command post type incidents offsite in order to be able to access remote mobile radio setup from Dispatch Centers.

3.7.4. Radio Communications through Mobile Phone

Support at least 40 WAVE or more users, with access to at least 20 voice talk paths that would be tied to the new consoles.

3.8. Interface Requirements

3.8.1. Customizable User Interface

Ability to customize graphical user interface by agency and/or user preference to show details of status on a per-channel basis.

3.8.2. Long-Term Logging Recorder Interface

Interface to a fully redundant external Long-Term Logging Recorder.

Allow the audio that appears on the LAFD Voice Radio Switch output to be configurable.

The Voice Radio Switch logging interface is also required to present Trunked voice radio traffic, talk group, Caller ID, and Radio hardware ID.

3.8.3. Short-Term Recorder Interface (Instant Recall Recorder)

Include Instant Recall Recorder capability as part of the dispatch operator positions.

Provide the radio audio interface to the IRR via an analog 2-wire interface.

3.8.4. LAN Interfaces

Provide a LAN interface to communicate with positions for the purpose of configuration data downloads/uploads. A failure of the LAN interface shall not interrupt voice dispatch operations; therefore, provide a redundant LAN interface for this application.

3.8.5. CAD Interface

Provide an ATIA data stream that allows for the near real-time exchange between the LAFD CAD and the Voice Radio System of supported information, such as radio alias maintenance and push-to-talk ID's.

Include the capability of using a CAD interface for other applications in the future that shall, at minimum, allow the CAD to receive Unit numeric ID, Unit Alias, PTT status (normal or emergency), radio channel addresses, PTT Start-time, and PTT End-time.

3.8.6. External Time Interface

Use the existing Master Time Base (MTB) for dispatch console synchronization.

Accept a signal by utilizing an RS232 serial interface, Netclock Format protocol, or Ethernet network interface.

Conform to the NENA Master Time Source Standard for Public Safety agencies.

3.8.7. Channel Interface

Define all analog and digital channel interfaces with the assistance of ITA. Channel interfacing for existing analog channels may be two- or four-wire, tone or E&M keying, 600-ohm balanced audio.

3.8.8. DCN Interface Requirements

Interface to both legacy Redcom and the new Redcom HDX Gateway IP system, along with the associated user interface software.

3.8.9. 9-1-1 Telephony Interface

Interface with the Telephony Junction Box (by Telco) for standard radio interface. Provide off-hook indication to the Contractor Dispatch Console system.

3.8.10. ACD Not Ready Interface

Interface with the 9-1-1 Telephone System to provide the “ACD Not Ready” function.

3.8.11. Phone Switch Interface

Interface with City-provided phone switch with Session Initiation Protocol (SIP).

3.8.12. Audio Level and Quality at Headset Interface

Receive audio level shall not exceed more than 3 dB at the headset interface for any variation of input signal. Audio level and quality will be presented to the City for testing and acceptance.

3.9. Monitoring and System Management

3.9.1. Hardware Fault Manager

Monitor, diagnose, and report the status of all hardware elements in the system, including the dispatch operator positions, and major common equipment assemblies that support the Voice Radio Switch elements.

3.9.2. System Monitoring and Diagnostics

Monitor and log the status of all software processes running on the various hardware elements in the system. Report status changes to the Voice Radio Switch fault manager.

Changes in the status of software processes on a device shall be recorded internally, manually printed, and be used for troubleshooting problems. Loss of one or more audio cards shall cause an automatic switch to standby units, and error messages and alarms shall be generated.

Distribute diagnostic routines among various microprocessors and other independent and redundant subsystems, so that they shall not depend on one central diagnostic circuit. Diagnostic messages shall be easy to understand.

Fault messages or detection notices requiring translation shall not be acceptable. Fault detection shall automatically institute routines to minimize outages.

Include an entire suite of fault management and monitoring software. The Contractor's suite combined with their NMS reporting software shall meet or exceed the requirements of maintenance personnel.

Provide all documentation, firmware, and software in a digital media format in case it is required for system recovery.

3.9.3. Links Integrity Monitoring

Monitor all internal links used in the Voice Radio Switch system, not including City provided Aviat / Cisco equipment, in the same manner as the network elements. Any failure in these links needs to be reported to the System Manager. Error and failure messages shall be collected and processed on detection so that automatic switchover to redundant equipment shall occur without affecting system operation.

3.9.4. Self-Healing Actions

Automatically take action to remedy failures detected by fault management routines. If a fault is detected, the system control software shall generate an automatic switchover to the standby system.

3.9.5. Configuration Management

Design the Voice Radio Switch to be configured by an application residing on the System Manager.

Allow user to use the configuration application to define what hardware is present at each element and the capabilities of each element.

Distribute changed information through the system manager to all the Voice Radio Switch sub-system elements that require it.

Install Monitoring and System Management at MFC and CHE P4 Tech Control Area.

3.9.6. Statistics Management

Provide channel utilization information for use by the operation management. This data shall be stored on the Technician position/Tech Control console. The report data shall be accessible in a universal data format to be used by other systems to generate reports and also available for printing in the form of statistics to benefit management operations.

At a minimum, provide the following statistics as part of the Statistics and Management package:

- Total uplink transmissions per channel
- Total downlink transmissions per channel
- Total elapsed time of uplink transmissions per channel
- Total elapsed time of downlink transmissions per channel
- Total Emergency Trigger Alarm activation

Elapsed time measurements shall be accurate to a tenth of a second.

3.10. **Error Logging**

Record all system messages on the System Manager PC in a mutually agreed database. A query of the database and custom report may be made at any time using a licensed copy of application software supplied by Contractor. An error message shall contain all details required to correct the error. The error messages shall be easy to understand.

3.11. **Interoperability and Trunking Capabilities**

Provide the capability to interface with a P25 Trunked RF System.

Be compatible and interoperable with the following trunking systems:

- LAPD Motorola P25 System
- City STRS Harris P25 System

3.12. **Reliability**

Design system in such a way that no single component has the ability to disrupt service to more than a single position or a single radio channel.

Design system infrastructure, including dispatch console systems, such that a single point failure will not disrupt day-to-day or emergency operations in any way. T

Design critical components with redundancy in order to provide high system availability.

Design the system so that there is no single point of failure.

3.13. **Maintainability**

Allow for maintenance with no disruption of ongoing dispatch operations.

All cards utilized in the equipment card cages shall allow for removal or insertion (hot swappable) while the system is powered up and operational without interruption to operation of the system.

Route all audio and IP signals through jack fields and patch panels for ease of maintenance and testing.

When IP technology is used, provide gateway, routers, LAN switches, etc. with failover to a redundant unit in the event the primary should fail.

Provide visual and audible alarms on the console to alert the user of system problems. Allow the console to provide alarm outputs to external devices.

3.14. **AC Power**

Provide detailed information regarding electrical loads at each location and the type of power required.

3.15. **HVAC Requirements**

Provide detailed information regarding heat loads, ventilation, and air conditioning requirements imposed by Contractor-furnished equipment.

3.16. **Grounding**

All essential communications equipment shall be bonded to the single-point facility ground system in accordance with R56 Standards. The Contractor shall test the grounding system for compliance and identify issues requiring correction to the City.

Components shall support two separate ground systems: Electrical supply ground, used for compliance to electrical codes and user safety, and equipment ground, used to distribute a common grounding reference among all communication systems.

Utilize the Equipment Grounding Backbone System at MFC that is already present in the equipment room and under raised floor in the LAFD dispatch center and training areas.

Electrically bond and ground all equipment, including cabinets, metal conduit, equipment racks, cable trays, battery racks, shelves, and surge suppression on all Radio Tie Lines, directly to the ground bus.

Survey the grounding system at both MFC and CHE P4 and provide a report.

3.17. **Hardware Requirements**

All system components must be new. Discontinued products or refurbished or remanufactured components will not be accepted.

Back up critical components with hot standby components that will automatically come online in the event of a failure in the primary unit.

The remote site equipment shall be designed to function under extreme operating temperature ranging between -22 to 140F.

All applicable equipment supplied for Voice Radio Switch by Contractor shall be UL-listed or approved by the City Electrical Laboratory.

Warrant all equipment to perform according to the manufacturer's published specifications.

3.18. Equipment Certifications

All hardware elements shall be certified to meet the requirements for UL and FCC part 15 Class A for EMC Emissions & Immunity Standard.

3.19. Software Requirements

Provide Dispatch Console Software Licenses for each software program. The software used on the dispatch console shall allow encryption algorithms to be added or upgraded in existing secure-capable dispatch consoles for security of messages.

Provide a list of Operating System Level software installed on all network components and the latest configuration file (soft copy) for the Dispatch Console that will be used in the event of any failures.

3.20. Test Equipment and Spare Parts

Provide all test equipment and tools necessary for City Technicians to monitor, test, and maintain the system.

All spare parts shall be brand new with no manufacturer-discontinued items. No refurbished items shall be provided.

Replace discontinued items with manufacturer-recommended replacement parts that are fully compatible to the delivered equipment.

3.21. Equipment Inventory

Provide personnel to receive and inventory the equipment, including spare parts, test equipment and tools, move it to a mutually agreed designated location if required/necessary, and inspect it for damage. Replace all equipment that has been damaged at no additional cost to the City.

3.22. Mutual Aid System

Integrate with seven (7) 800 MHz Harris Master III repeaters, Mutual Aid (MA) frequencies at Verdugo, and San Pedro Hills sites that are interconnected on the IMC Harris switch at CHE-19th floor.

Allow access to MA channels from the dispatch consoles or from the Harris C3 Maestro dispatch console located at MFC. A list of MA Channels that shall be connected to the Dispatch system will be provided at the time of design.

Design dispatch system to be capable of integrating more MA channels in the future.

Section 4. Recording and Logging System

4.1. General

Replace the existing enterprise logging and recording system with a new system that can provide full functional parity with the current recording system.

4.2. Long-Term Recorder

Record the conventional voice radio traffic, channel number and Radio Hardware ID, Dispatch Communications Network (DCN), telephony, intercom, and all other audio on the Long-Term Recorder.

All recordings should be retrievable via metadata, including, but not limited to, user information, incident number, time stamp, and Automatic Number Identification (ANI)/Automatic Location Identification (ALI).

Record audio and video for telemedicine calls.

Integrate recorder with the Master Time Base for accurate time logging.

4.3. Short-Term Recorder (Instant Recall Recorder)

Provide Instant Recall Recorder functionality using the 9-1-1 telephone system. Provide the ability to instantly recall audio, video, and associated data such as PTT ID, resource name, time, etc. of any audio source heard through the console for a minimum of four hours.

Allow each Radio Dispatch position to play back audio and video from at least four different sources (e.g., radio, DCN, telemedicine, and telephone). This includes conventional and trunked radio communications.

4.4. Audio and Video Recording

Provide a single enterprise recording system that records all audio and video from both MFC and OCD.

Provide the ability to record a minimum of 120 simultaneous conversations from all available sources.

Provide the ability to record metadata associated with each recording, such as, but not limited to, identification, user, date and time information.

Provide the ability to save and share recordings in standard audio and video formats, such as .mpeg, .wav, and .mp4.

4.5. Redundancy and High-Availability

Provide system redundancy and high-availability to ensure continuous recording in the event of equipment or component failure.

4.6. Long-Term Recording Retention Period

Provide the ability to store all recordings online for a minimum of ten (10) years in a fully searchable and retrievable format without requiring use of special retrieval from archive.

Provide the ability to store all recordings offline indefinitely beyond ten (10) years in a fully searchable and retrievable format that may require the use of an archive system.

4.7. Recording Playback

Provide the ability for authorized users to search and playback recordings from any network-connected workstation without the use or installation of specialized software.

Provide playback capability for the archived recordings even after upgrading or replacing the logging recorder in the future.

4.8. Screen Recording

Provide the ability to record and synchronize the playback of the user's onscreen activity from the dispatch console (e.g. CAD, radio console).

4.9. Quality Improvement

Provide a replacement system for the current dispatch quality improvement system that allows for the monitoring, auditing, and rating of dispatcher performance.

APPENDIX D

CONTRACTOR PROPOSAL (APRIL 6, 2022)

Motorola Solutions, Inc.
725 S. Figueroa St., Suite 1855
Los Angeles, CA 90017
USA

April 6, 2022

Alfonso Ruiz | Battalion Chief
Fire Communications Dispatch Support Section
Los Angeles Fire Department
500 E. Temple St., Los Angeles CA 90012

Subject: LAFD Voice Radio System Upgrade

Dear Chief Ruiz:

Motorola Solutions, Inc. ("Motorola") is pleased to present Los Angeles Fire Department (LAFD) the following proposal for upgrade of your current Analog/Conventional 800 MHz Radio System.

As a longtime partner of the City of Los Angeles Fire Department, Motorola Solutions understands the LAFD's need to maintain a reliable mission critical voice radio system. Many of the components of the existing 800MHz analog conventional simulcast system are passed their end of life and end of support dates.

Our solution provides a combination of hardware, software and services which includes the following:

- Upgrading the aging voters and transceivers at the prime site and each of the nine remote sites as well as expand the System to feature twenty (20) total channels across the nine (9) sites.
- Upgrade to Motorola's G-Series radio platform. The G-Series radio platform features the same technology currently in use by the Los Angeles Police Department.
- One hundred (100) CommandCentral AXS Dispatch consoles to replace your existing consoles and further grow interoperability between LAFD and LAPD.

This proposal is subject to the terms and conditions contained herein and the Agreement between the City of Los Angeles and Motorola Solutions, Inc., for LAFD Voice Radio System Upgrade ("Contract") as further described in this document and shall remain valid through June 30, 2022. LAFD may accept this proposal by issuing a purchase order incorporating the Contract and this proposal. Motorola Solutions would be pleased to address any concerns LAFD may have. Any questions can be directed to your Motorola Account Executive, Joseph Warner at 312-204-9300.

We thank you for the opportunity to furnish the Los Angeles Fire Department with "best in class" solutions and we hope to strengthen our relationship by implementing this project. Our goal is to provide you with the best products and services available in the communications industry.

Sincerely,
Motorola Solutions, Inc.



Neil Thomas
Vice President, West Region



MOTOROLA SOLUTIONS

LOS ANGELES FIRE DEPARTMENT

VOICE RADIO SYSTEM UPGRADE

APPENDIX D - CONTRACTOR PROPOSAL

APRIL 6, 2022



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SECTION 1

EXECUTIVE SUMMARY

As a longtime partner of the City of Los Angeles Fire Department, Motorola Solutions understands the Departments need to maintain a reliable mission critical voice radio system. Many of the components of the existing 800MHz analog conventional simulcast system are passed their end of life and end of support dates. Based upon the LAFD commissioned Radio Infrastructure Assessment conducted by Gartner, Motorola is providing this proposal to allow LAFD and the City's Information Technology Agency to upgrade the end-of-support simulcast system equipment.

LAFD's existing simulcast system consists of 18 channels across nine (9) transmitter site locations. Six (6) of those sites contain all 18 channels while the remaining three (3) sites contain 14 channels. Due to the aging nature of the Radio System, the primary objective of this proposal is to replace the aging voters and transceivers at the prime site and each of the nine remote sites. The secondary objective of this proposal is to expand the System to feature twenty (20) channels at all nine sites. If a site does not have enough utility power capacity to handle expansion from its existing channel count the expansion transmitters will be installed but not cabled for power. The channels will be available for activation once adequate power is available. Based upon Gartner's report to LAFD, modifications to the backup system has not been included in this proposal.

Motorola has included our G-Series radio platform in this offering. The G-Series radio platform included features the same technology currently in use by the Los Angeles Police Department. This common ASTRO® platform, along with ISSI, inherently increases interoperability options between the two city agencies. To further the interoperability between LAFD and LAPD Motorola has included optional pricing to upgrade LAFD's dispatch consoles to the CommandCentral AXS IP based dispatch console. The AXS Dispatch Console functions on the same underlying Radio System Platform console currently in use by LAPD. Operating on the similar platform would allow LAPD and LAFD to dispatch from any LAPD or LAFD dispatch facility. This would provide unparalleled reliability and redundancy in the event of a dispatch center failure our mutual aid incident.

The following sections of this proposal are intended to provide a detailed description of the efforts and costs associated with the simulcast system upgrade. Motorola has designed the upgrade to ensure that the net power, tower, and shelter loading does not increase at any of the LAFD sites. Motorola looks forward to working with LAFD and ITA to refine this proposal and implement the voter upgrade.



SECTION 2

ASTRO25® VRS RADIO SYSTEM

2.1 ASTRO 25 INFRASTRUCTURE

Motorola Solutions, Inc. (Motorola Solutions) proposes our ASTRO® 25 platform to provide secure and reliable communications for the Los Angeles Fire Department. ASTRO 25 offers a future-ready, wireless platform that combines a uncompromising, real-world performance and reliability.

ASTRO 25 offers LAFD a Project 25(P25), standards-based Internet Protocol (IP) solution with a flexible, modular network. ASTRO 25 can expand to accommodate additional radio users, increased geographic coverage, enhanced data applications, and connectivity to other networks, ensuring that LAFD will have efficient and cost-effective communications for decades to come.

ASTRO 25 also provides advanced call processing capabilities designed to meet the needs of public safety. On an ASTRO 25 network, first responders can share voice and data communications between members of the same team, across an agency, or among different agencies. In addition, the network's centralized command and control capabilities will enable LAFD to deploy resources, track personnel, and maintain communication security more efficiently and effectively.



2.2 PROPOSED SYSTEM ARCHITECTURE

The proposed ASTRO 25 solution will provide an adaptable and affordable platform for mission critical wireless communications throughout LAFD's geographic area. The proposed system consists of a primary zone core that comprises the master site and Radio Frequency (RF) sites referred to as the "system" throughout this proposal.

The proposed solution consists of the following sites:

- One fully redundant master site.
- Simulcast prime site.
- Nine 20-channel simulcast remote sites.

The "master site"—where core equipment is located—provides a central point of control for the operation of the radio communication system. From the master site, LAFD's system administrators will have access to the hardware and software components that control call processing, network management, and system

configuration. Common Server Architecture (CSA) reduces physical space and individual component requirements at the master site by using Virtual Management Servers (VMSs) to host server applications in a Virtual Machine (VM) environment.

The proposed Simulcast Sites provide simultaneous broadcast of the same voice or message from multiple transmitters on the same frequency. Simulcast sites provide consistent communications throughout large geographical areas, such as a large city, metropolitan area, county, or country. The architecture of a simulcast cell includes a simulcast prime site, which controls the cell and communicates with the system's master site, and one or more simulcast remote sites, which provide simulcast coverage to users.

2.3 SYSTEM CONFIGURATION MANAGEMENT

The ASTRO 25 system will provide LAFD's system administrators with a centralized approach to configuring the proposed system.

With the Unified Network Configurator (UNC), LAFD's system administrators will be able to configure networks and devices in the ASTRO 25 system through easy editing screens and configuration "wizards." Role-based radio user setup, auto discovery of devices/configurations, and minimized data entry reduces configuration errors and initial configuration time. Personnel can quickly access historical configuration and forensic information, and quickly roll back to previous configuration versions, if necessary.

The UNC can direct comparison between the current system configuration with any planned changes, simultaneously displaying the configurations and enabling the scheduling of any changes for distribution during off hours, minimizing the impact of system changes on communications. The UNC is highly secure, supporting SSH and SNMP passwords and providing an automated mechanism to seamlessly roll passwords and passphrases.

The Provisioning Manager (PM) enables LAFD's system administrators to provision the infrastructure and devices in the ASTRO 25 radio system through a GUI. The PM offers a well-rounded set of features:

- **Streamlined Web-Based Graphic User Interface** – Requires fewer keystrokes to manage critical information. Provides a central point for the configuration of operational parameters for mobile and portable radios, dispatch operator positions, and system administrators.
- **Batch Creation of Radios** – Minimizes data entry and reuses configuration information through "Multi-Instance Creation."
- **External Provisioning Manager Interface** – Provides an interface that partners with an identified third-party vendor (Genesis, MCM, Premier One, NGI) to provide an integrated solution for critical customer applications on the system, such as, Asset Management, Billing, and Fleet Mapping applications.
- **Radio and Radio User fields Combined into One Window** – Provides efficient management of user radio provisioning by eliminating the need to enter device information multiple times.
- **Import/Export Capabilities** – Offer a convenient mechanism to export and import data from external applications using .csv protocol.

With the PM's integrated database, system administrators are required to enter data only once, improving accuracy, saving time, and maintaining data integrity.

2.4 SYSTEM PERFORMANCE MANAGEMENT

The ASTRO 25 performance suite will enable LAFD's system administrators to monitor, manage, and report on system performance in near real-time, as well as proactively plan for expansion. The performance suite comprises both Motorola Solutions and third-party management applications that are



certified, integrated, and supported by Motorola Solutions. Together, these applications provide a complete picture of how the system is operating.

The Computer Aided Dispatch Interface (CADI) provides an Application Programming Interface (API) that enables the connection of the ASTRO 25 radio system with third-party CAD applications. Through CADI LAFD will be able to work with third-party vendors to create software that specifically meets LAFD's CAD needs on Motorola Solutions ASTRO 25 radio systems. The API gives the CADI client application direct access to the commands and events used by LAFD's system and its network management applications. Motorola has included 40 hours of API technical support. Additional support can be purchased if needed.

2.5 SYSTEM FAULT MANAGEMENT

System performance depends on the proper functioning of the system's software and components. The proposed system includes the following features to facilitate the detection, isolation, and resolution of events that are reported by system components.

The Unified Event Manager (UEM) provides critical fault management, including processing and presentation of events that are sent by managed devices. Historical and real-time traffic screens will give LAFD's system administrators access to radio events, radio status, and any device alarms.

The UEM supports the following main functions:

- **Device discovery** – The UEM is optimized to quickly discover the managed devices in the system.
- **Fault management** – Fault management in the UEM includes processing and presentation of events sent by a managed device.
- **Supervision** – The UEM periodically checks its ability to communicate with the devices it manages.
- **Synchronization** – The UEM performs synchronization automatically, by validating the health of a device with the information stored in the fault management database.
- **North Bound Interface** – The included NBI allows UEM to send SNMP alarms "North" to a 3rd party fault management system. While Motorola has included the interface it is a City responsibility to manage integration to a 3rd party, such as WhatsUp.

The UEM will provide secure communications with LAFD's managed devices. If a loss of communication with a managed device occurs, that failure will be reported to the UEM, which will alert administrators according to the severity of the event. The UEM's alarm view dynamically updates based on the condition of the reported device (that is, the alarm will be cleared from the alarm view when a device sends a clear event to the UEM).

The UEM is the system's main fault manager, aggregating all system health information and managing the status of non-Motorola Solutions equipment through SDM3000 Remote Terminal Units (RTUs). Devices from other manufacturers managed by the UEM include power and security equipment, microwave radios, and environmental alarms for doors, and control tower lights.

UEM Enhanced Navigation enables advanced navigation and data visualization capabilities in the UEM client. The user can navigate through zone and system health information using a drill-down navigation concept, traversing through additional views and visualizing data related to infrastructure health. The enhanced navigation enables the following features:

- System Map.
- Site View.
- Network Element View.
- Visualization of RTU Digital Input/Digital Output/Analog Input information.



- Advanced drill-down navigation.

The UEM Simple Network Management Protocol (SNMP) Element Management Toolkit enables third-party vendors to define SNMP messages between their devices and the UEM, allowing system administrators to monitor faults on critical third-party devices directly from the UEM.

UEM Email Alarm Notifications will allow LAFD's system administrators to configure e-mail notifications for events and alarms in the Unified Event Manager (UEM) application. Alarm notifications can also be forwarded to a mobile device such as a cell phone or personal digital assistant (PDA).

North Bound Interface (NBI) describes an interface offered by many Network Management System (NMS) products, such as Unified Event Manager (UEM), which allows for NMS features, functions, and data to be accessible for Operations Support System (OSS) and Manager of Managers (MoM). NBI uses SNMPv3 and the User-Based Security Model (USM) to provide secure communication between the UEM and NMS. NBI offers the following services:

- **NBI Event Forwarding** – The events reported on the UEM are sent to registered NMS products using SNMPv3 traps.
- **NBI Notification Persistence** – The UEM stores the last 300 forwarded events to enable the NMS to quickly retrieve any events it may have missed.
- **NBI Event Synchronization** – The UEM provides the means for the NMS to query and obtain a set of events from the UEM datastore. This feature is typically used to obtain events missed due to lost traps or when connectivity between the UEM and NMS is lost temporarily.
- **Getting QuickSync events** – The UEM provides the means for the NMS to query and obtain a set of events from the UEM datastore. This feature is typically used when the missed trap is within the most recent 300 traps captured in the NMS.
- **NBI Alarm Synchronization** – The UEM provides the means for the NMS to query and obtain a set of alarms from the UEM datastore. This feature is typically used to re-synchronize fault information on the NMS after an extended outage.

2.6 CORE SYSTEM COMPONENTS

An ASTRO 25 radio system is comprised of a master site and one or more radio frequency sites. This section provides descriptions of the components at each location.

2.6.1 Master Site Core Components

The equipment at an ASTRO 25 master site provides an adaptable and affordable platform for mission critical wireless communications in a scalable and virtualized configuration. The master site equipment comprises the system's core components, including a common server architecture (running the applications that provide command and control for the system) and LAN switches (routing information to and from the master site to the radio frequency sites that provide system coverage). The master site will be located at MFC.

2.6.1.1 Common Server Architecture

A master site's Common Server Architecture (CSA) deploys server applications with the Linux/Windows operating systems on a HP DL380 Virtual Management Server (VMS) host. The VMS hosts the following server applications through VMware in a Virtual Machine (VM) environment:

- **Air Traffic Router (ATR)** – Captures data exhibited by Affiliation Display, Dynamic Reports, Historical Reports, Radio Control Manager (RCM) Reports, and for systems with the Inter-RF System



Gateway (ISGW) employing the ISSI 8000/CSSI 8000 feature. The ATR also captures foreign talkgroup and foreign Subscriber Unit Identifier information for ZoneWatch to display.

- **Backup and Recovery (BAR) Server** – Backs up and restores critical data.
- **Core Security Management Server (CSMS)** – Provides antivirus service and multi-factor authentication.
- **User Configuration Server (UCS)** – Stores information about user radios, talkgroups, critical sites, and security information.
- **Zone Database Server (ZDS)** – Exports infrastructure and subscriber information it receives from the User Configuration Server (UCS) to consoles and site gateways (conventional channel interface).
- **Zone Statistics Server (ZSS)** – Provides database storage of statistics and back-end processes required for zone-level functions.
- **Zone Controller (ZC)** – Provides centralized control for call processing and mobility management functions.
- **License Manager** – Stores and manages software licenses.
- **Unified Event Manager (UEM)** – Provides fault management.
- **Unified Network Configurator (UNC)** – Provides controlled and validated configuration management of system devices.
- **Authentication Center (AuC) Server** – Provides key management function in the system and stores authentication keys.
- **Centralized Event Logging Server (Syslog) Server** – Captures Operating System (OS) events generated by most devices in the Radio Network.
- **Unified Network Configurator (UNC) Device Server (UNCDS)** – Enables the UNC to manage up to 15,000 devices.
- **System Statistics Server (SSS)** – Stores and provides statistical data for the system.
- **vCenter Appliance** – Manages all fault tolerant Packet Data Gateways (PDGs) and ATRs.
- **Network Management (NM) Client** – Provides a virtual workstation for system administrators and technicians to use for various system-related tasks.
- **Intersystem Gateway (ISGW)** – Supports an ISSI interface and a CSSI interface for interconnectivity with P25 compatible systems and consoles.

2.6.1.2 Firewall

A firewall provides network boundary enforcement and attack detection features. The firewall restricts traffic to known sources, destinations, and protocols, based on the hosts and services that are specified in the firewall configuration. All undefined traffic is discarded.

2.6.1.3 LAN Switches

The master site includes one or more LAN switches. The LAN switches aggregate all the Ethernet interfaces for all servers, clients, and routers at the core.

The proposed system for LAFD will include redundant LAN switches for added system resilience.

2.7 800MHZ ANALOG VRS RADIO SYSTEM

Motorola Solutions has included upgrading LAFD's existing 18 voter / comparators with the GRV 8000 Analog Simulcast Comparator. This proposal includes upgrading the existing 150 remote site transmitters with the GTR 8000 Base Radio (Transmitter). In addition to the 150 transmitter upgrades an additional 12 transmitters have been included to complete the build out of all 18 simulcast channels at each of the 9 transmitter site locations.



Motorola has included 18 additional transmitters to add two (2) new channels to the LAFD simulcast radio system. Frequency licensing and coordination is not included in the proposal and is the responsibility of LAFD and/or ITA.

To ensure that each component of the system is properly configured, and supported Motorola has included replacement of the RF distribution sub-systems at each of the transmitter site locations. This includes the 800MHz combiners, transmission line, and antennas at each of the 9 sites.

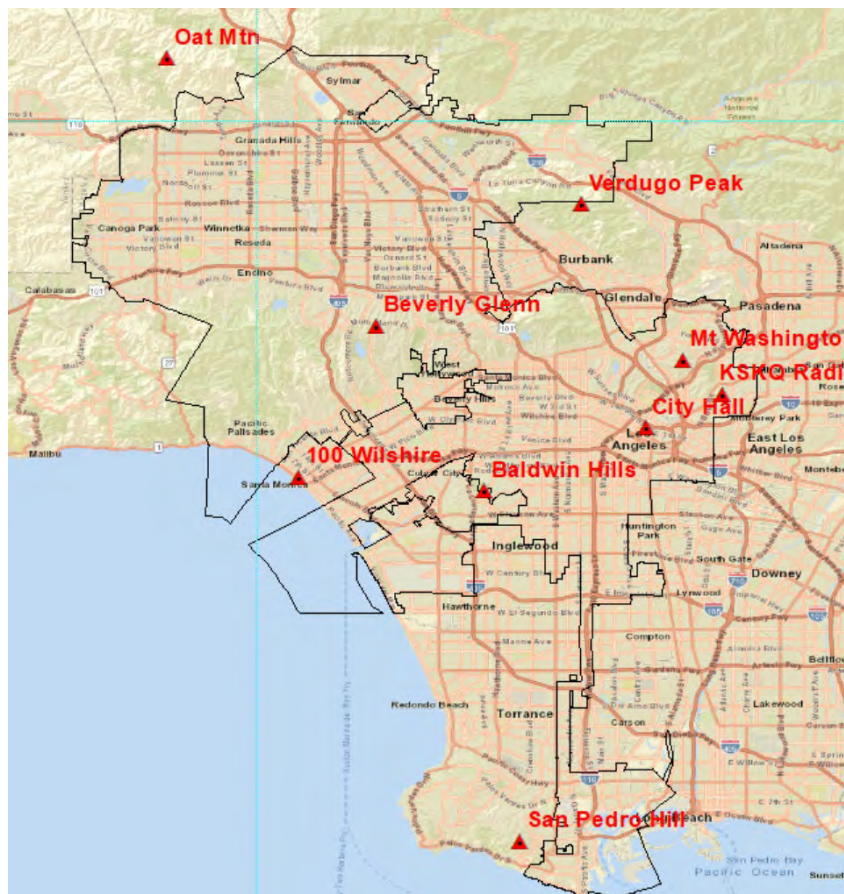


Figure 2-1: LAFD Transmitter Site Locations

2.7.1 Radio Frequency Site Component Descriptions

An ASTRO 25 Radio Frequency (RF) site supports a wide variety of configurations to meet critical communications requirements for present and future communication needs. Depending on the RF site configuration, each RF site has several different components. The following components are included in the RF sites provided as part of our solution for LAFD.

2.7.1.1 GTR 8000 Site Repeater/Base Radio

The GTR 8000 base radio consists of a transceiver module, power amplifier module, fan module, and power supply. The transceiver module includes the functionality for the exciter, receiver, and station control. The base radio software, configuration, and network management, as well as inbound/outbound traffic handling, are performed through this transceiver module. On-board serial and Ethernet ports are located on this module for local servicing through Configuration/Service Software (CSS). The power

amplifier module amplifies the low-level modulated RF signal from the transceiver module and delivers the amplified signal on the path to the transmit antenna. The power supply module supports the transceiver and power amplifier modules and can also provide auxiliary power to a connected site controller or receive multicoupler/low noise amplifier



Figure 2-2: G-Series Chassis—A single chassis and six basic modules create the entire G-series platform, resulting in reduced spare parts inventory.

2.7.1.2 GRV 8000 Conventional Comparator

The GRV 8000 Comparator is used in Project 25 (P25) conventional or P25 trunking voting and simulcast network topologies to increase the talk-in coverage of a radio in the field.

The comparator works by picking up the audio from multiple sites and performing a frame-by-frame analysis to identify and combine the highest quality audio package for transmission.

The GRV 8000 supports analog conventional and P25 digital conventional systems.

Features:

- Software configurable, upgradable, and convertible hardware ensures long hardware lifespan
- Software-only installations can enable new features
- Remote system software upgrades and patching includes system release migration and security updates
- Easy to service - only front access is required and modules are hot-swap capable
- Two comparator modules per chassis means comparators are smaller than ever
- Daisy-chainable power supplies among comparator chassis ensures seamless operation
- AC/DC -48V power supplies with integrated battery revert and charging enables elimination of UPS installations in many site designs
- Chassis is 3 RU
- Size: 5.25" x 19" x 18"



Figure 2-3: GRV 8000 Conventional Comparator

2.7.1.2.1 GRV 8000 / GTR 8000 interconnect Diagram

The diagram below depicts the high-level operation of the GRV 8000 Comparator with the GTR 8000 Base Radios. Include in the graphic is a depiction of the optional Analog Sidetalk feature.

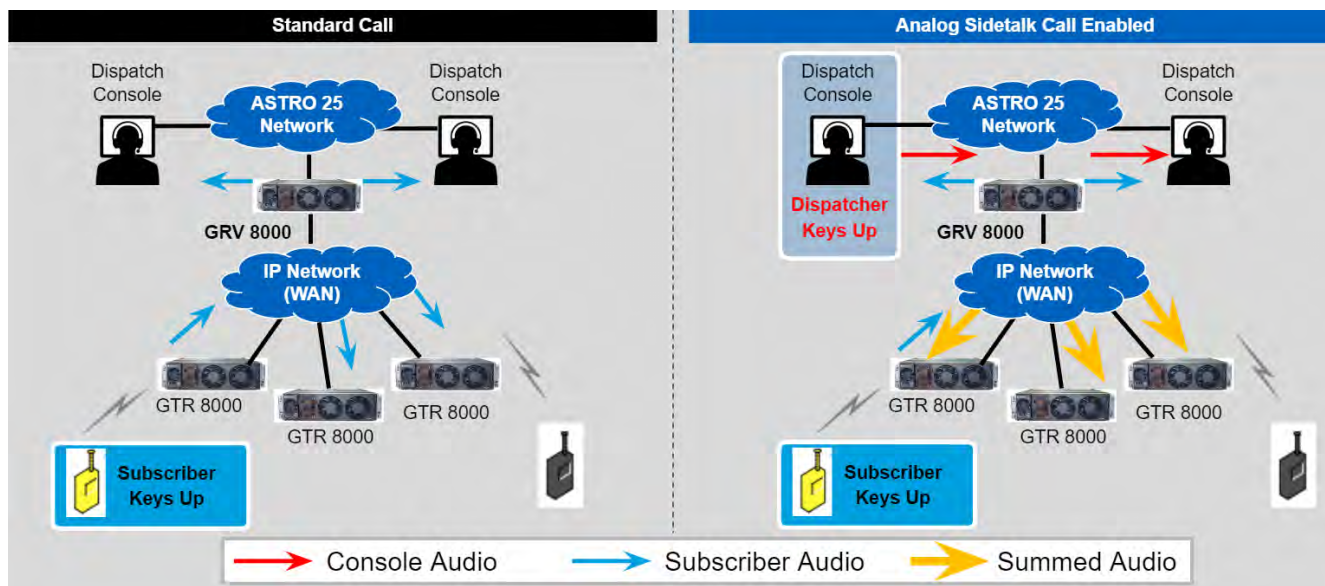


Figure 2-4: GRV/GTR Audio Process w. Analog Sidetalk

2.7.1.3 TRAK 8835 Site Reference

The TRAK 8835 Site Reference is a GPS-based frequency and time reference. The TRAK 8835 Site Reference device is certified only for use at an ASTRO 25 repeater site and circuit-based or IP-based analog-only voting subsystems.



Figure 2-5: TRAK 8835 Site GPS Reference

2.7.1.4 Site LAN Switch

The site LAN switch provides a LAN interface for site equipment and a LAN port for the site gateway. Through the switch, the service technicians gain access to service the site, and access to the system's Graphical User Interface (GUI).



Figure 2-6: Aruba 2930F LAN Switch

2.7.1.5 Site Router/Firewall

Motorola Solutions includes two site Router/Firewalls at each remote site for redundancy and enhanced security. The SRX345 features customizations designed to optimize the performance of Mission Critical radio traffic.



Figure 2-7: Juniper SRX345

2.7.1.6 RFDS (Combiner & Antenna) Replacement

Each of the nine (9) RF sites includes a one-for-one replacement of the existing combiner, transmit antenna, receive antenna, RF transmission line, and TTA. The equipment cannot co-exist on the towers and will require a detailed cut-over plan that will be finalized during the contract design review stage.

Table 2-1: Site Antenna Parameters

Site Name	Transmit Antenna	Receive Antenna
100 Wilshire	DS7C08PPYU-D_840_0_REV3	DS7C09P36U-D_816_0_Rev2
Baldwin Hills	DS7C08PPYU2D_815_2	DS7C09P36U-D_816_0_Rev2
Beverly Glenn	CC807-08 @806 V1.0	DS7C09P36U-D_816_0_Rev2
KSKQ Radio	DS7C08PPYU-D_840_0_REV3	DS7C09P36U-D_816_0_Rev2
Los Angeles City Hall	DS7C06P36T-D_BOTTOM_Rev2	DS7C06P36T-D_TOP_Rev2
Mount Washington	DS7C08PPYU-D_840_0_REV3	DS7C09P36U-D_816_0_Rev2
Oat Mountain	DS7C08PPYU-D_840_0_REV3	DS7C09P36U-D_816_0_Rev2
San Pedro Hill	DS7C08PPYU4D_815_4	DS7C09P36U-D_816_0_Rev2
Verdugo Peak	DS7C09P36U-D_816_0_Rev2	DS7C09P36U-D_816_0_Rev2

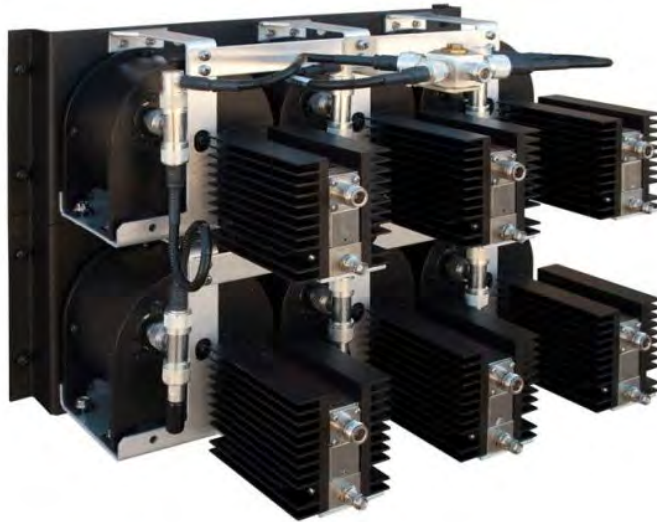


Figure 2-8: Custom dbSpectra Combiner



Figure 2-9: Omni-Directional 7/800MHz Antenna



Figure 2-10: Slim Panel Directional Antenna



Figure 2-11: RFI Tower-Top Amplifier

2.7.1.7 Site Loading (Power, Space, & Weight)

At all existing transmitter sites, assuming no changes to the transmit power or currently licenses ERP's, the new equipment will not consume more utility power, require more tower space, or require more shelter space than the old equipment being removed. In situations where the proposed solution would increase the overall load, in any category, Motorola will down-scope the design to fit the existing loading profile. For example, the DC systems are designed for the requested 8-hour run-time with 12-hour recharge. However, if the DC system being replaced does not currently meet those specifications and there is not enough capacity for expansion, the new DC system at that specific location will be reconfigured to match the old

system one-for-one. Despite the addition of channels are many of the sites, due to the improved efficiency of the GTR radios, and optimization of the RF Distribution System, the overall utility draw is not anticipated to increase. All of this assumes, except for the new channels, that the new transmitters will be configured to the same operating levels of the existing transmitters.

Civil improvements at the transmitter sites are not included. If site issues exist today, they will not be remediated in this project. The net result of this project will not cause any net-new Civil issues, specifically, utility power requirements, tower loading, shelter loading, and rack space. This is only applicable to the nine (9) existing transmitter sites. As requested by the City, Motorola has included tower Mapping and Loading studies for each tower location with the exception of 100 Wilshire and City Hall.

2.8 PRELIMINARY CUTOVER PLAN

Motorola realizes the transition from LAFD's existing system to an upgraded system is not to be taken lightly. We recognize the importance of a well thought out transition plan and therefore, we dedicate considerable planning and resources to make the transition as smooth and graceful as possible, considering operation, technical and logistical considerations.

This section represents a preliminary plan to outline the steps required in the cut-over process from the existing system to the new system. A detailed plan will be created during the detailed design review (DDR) phase, utilizing the precise site and equipment detail available at that time, and working with LAFD to identify times and dates for specific steps to minimize any potential downtime or other impacts to operations. Note that by the DDR, the two new system frequencies will have been identified and acquired.

Motorola has included a preliminary install and transition plan based on the following phases:

- RF Infrastructure Cut-Over
 - Phase 1 – Sites Preparation / Baseline Coverage Verification
 - Phase 2 – Antenna/RFDS System & DC Power Replacement
 - Phase 3 – Antenna/RFDS Coverage Verification
 - Phase 4 – Pilot Channel Removal / Install
 - Phase 5 – Guaranteed Coverage Test
 - Phase 6 – Remaining Channels Removal / Install
- Dispatch Console Cut-Over
 - Phase 1 – OCD Dispatch Center Installation
 - Phase 2 – MFC Dispatch Center Installation

This plan will allow LAFD and its users to fully understand what will occur and when events will occur during the transition. The cutover plan will be reviewed and updated again after Design Review and prior to cutover to ensure it meets the needs of the LAFD and the City.

2.8.1 RF Infrastructure Cut-Over

2.8.1.1 Phase 1 – Sites Preparation / Baseline Coverage Verification

Motorola has included a baseline coverage verification of the existing system today. Before any RF site work is completed Motorola will conduct a subjective audio test on the existing system and present LAFD with the results. This test will be limited to paved roads within the boundaries of the City of Los Angeles. More details of this Baseline Test are available in the Statement of Work section.



2.8.1.2 Phase 2 – Antenna/RFDS System & DC Power Replacement

After completion of the baseline coverage verification Motorola will replace the existing DC system, RFDS, and antennas at the nine remote sites. The existing transmitters and voters will continue to operate on the new DC, RFDS, and Antenna system. This step will take sites offline as the DC system and antennas are replaced. Motorola will work with LAFD and the City to limit the impact to operations.

2.8.1.3 Phase 3 – Antenna/RFDS Coverage Verification

After installation and optimization of the new Antennas and RFDS, Motorola will conduct another Baseline Coverage Verification. This test will be limited to paved roads within the boundaries of the City of Los Angeles. More details of this Baseline Test are available in the Statement of Work section.

2.8.1.4 Phase 4 – Pilot Channel Removal / Install

Upon completion of the second Coverage Verification Motorola and its Subcontractors will install the Motorola Routing equipment and configure the existing Cisco MPLS routers in preparation for the new IP Based Voters and Transmitters. Upon completion, one existing RF channel will be taken offline, equipment removed, and replaced with the new G-Series based Voter and Transmitter equipment. This channel will be out of service until the completion of the Guaranteed Coverage Test.

2.8.1.5 Phase 5 – Guaranteed Coverage Test

Once the pilot channel is installed and optimized Motorola will conduct the official, guaranteed, coverage test against the as-built coverage map, grid file, and final CATP.

2.8.1.6 Phase 6 – Remaining Channels Removal / Install

Once the CATP is complete and coverage is verified Motorola will start removing and replacing the remaining RF channels in a multi-mobilization approach.

- 1st Mobilization: New Channels 19 & 20, and Existing Channels 2 & 3
- 2nd Mobilization: Existing Channels 4,5, & 6
- 3rd Mobilization: Existing Channels 7, 8, 9, & 10
- 4th Mobilization: Existing Channels 11, 12, 13, & 14
- 5th Mobilization: Existing Channels 15, 16, 17, & 18

During each mobilization the respective channels will be brought offline during the removal, installation, and cut-over period.

2.8.2 Dispatch Console Cut-Over

2.8.2.1 Phase 0 – Existing MFC Consoles

As the radio system is progressively cut-over Motorola will provide an Analog audio port to allow the new Voter/Transmitter system audio to be present on the existing MFC consoles prior to AXS cut-over. The demarcation for this port will be in the same rack as the current analog-to-IP equipment located at City Hall East. Motorola will need the support of LAFD/ITA with configuration changes on the existing consoles.



2.8.2.2 Phase 1 – OCD Dispatch Center Installation

Motorola Solutions will use the OCD dispatch center as the pilot for the AXS Dispatch Console Platform. Motorola will bring the entire OCD dispatch center offline and install all consoles and dispatch center components. Upon completion and acceptance of the Field Acceptance Test Motorola will begin transitioning the MFC dispatch center.

2.8.2.3 Phase 2 – MFC Dispatch Center Installation

At the MFC dispatch center Motorola will first remove and install new consoles at the non-critical dispatch positions located throughout the building. After installation and testing of the non-critical positions the main dispatch floor transition will begin. The dispatch floor will be broken into three segments and cut-over will occur in succession at these segments.

2.9 TECHNICAL TRAINING

Motorola has included a training bankf in this project for up to 12 technicians for each sub-system (RF Infrastructure, AXS Consoles, and Verint Logging) and 20 AXS Dispatch Users. Dispatch training is based upon a “train-the-trainer” model. Below are links to the currently available courses as well as a pricing schedule.

2022 Training Catalog:

<https://learning.motorolasolutions.com/node/27012/download>

2022 Training Pricing Schedule:

<https://learning.motorolasolutions.com/node/34620/download>



SECTION 3

DC POWER UPGRADES & TOWER STUDIES

3.1 DC POWER SUB-SYSTEM REPLACEMENTS

Motorola is providing new 48VDC power systems for all LAFD Prime and Remote RF sites (1 prime, 9 remote). Each new site will be equipped with the ELTEK Flatpack2 -48V power systems. Each remote site will feature eight (8) 48V, 3000W Flatpack2 inverters contained in a single, redundant, chassis. Each site will include two 48VDC to 120VAC power inverters. This will allow an AC only equipment to benefit from the DC power sub-system.

3.1.1 Remote Site DC Power Components

Each site will contain the following high-level equipment

- One (1) ELTEK Flatpack2 Rectifier Shelf
- Eight (8) 3000W, 48V Flatpack2 Rectifiers
- Two (2) 48VDC to 120VAC Power Inverters
- One (1) Seismic Battery Rack
- One (1) 48V 1200AH Battery Set 3W x 8H
- One (1) DC System Power Panel

3.1.2 Prime Site DC Power Components

Each site will contain the following high-level equipment

- One (1) ELTEK Flatpack2 Rectifier Shelf
- Three (4) 3000W, 48V Flatpack2 Rectifiers
- Two (2) 48VDC to 120VAC Power Inverters
- One (1) Seismic Battery Rack
- Two (2) Battery Sets 48V/170AH 12V170FS
- One (1) DC System Power Panel

3.1.3 Major Components

3.1.3.1 Flatpack2 Rectifier

The Flatpack2 HE family is available in a variety of voltages and power ratings, all with superior efficiency up to 96.5%. With more than 4 billion in-field operating hours and a proven cumulative field MTBF of more than 1.9 million hours, Flatpack 2 HE is the only HE (High Efficiency) rectifier with a proven track record. The line of systems available for the ENERGY STAR® qualified Flatpack2 HE 48V



rectifiers spans from 8kW 2U racks with complete distribution to multi-cabinet systems in multi MW installations.



Figure 3-1: Flatpack2 Rectifier

3.1.3.2 Trilogy with SmartpakS

At only 16 to 19 deep, the Trilogy system is designed for use in rack spaces and cabinets. Both 19 and 23 rack widths are available. Powered by Flatpack2 HE rectifier modules, typical efficiency exceeds 95% at 48VDC output. Flatpack2 DC/DC converters can also be added within the same system footprint.

The distribution sections features unique circuit breaker holders that facilitate at-will assignment in the field to one of two output buses. Bulk cable connections are available in the rear of the distribution. All cabling is vertical, further reducing horizontal space demands.



Figure 3-2: Smartpack2 Rectifier Chassis

3.1.3.3 EnerSys Battery Set

EnerSys PowerSafe 12V125F range of valve regulated lead acid batteries have been designed specifically for use in applications which demand the highest levels of security and reliability. They have a long service life and an excellent high rate of performance.

PowerSafe V batteries deliver superior performance while occupying less space than conventional standby power batteries. The use of V-0 rated, flame retardant, ABS plastic for the thick wall containers and covers offers high mechanical strength with excellent safety features. Oxygen evolved at the positive plates diffuses through microporous separators to the negative plates and, by a series of chemical reactions within the cell, recombines to form water. Each cell incorporates its own safety valve that allows the controlled release of gas when pressure builds up within the cell.

EnerSys PowerSafe 12V125F Specifications

- 6 Cell, 12V
- 125Ah
- 22.1L x 4.1W x 12.4H



Figure 3-3: EnerSys PowerSage Batteries

3.1.4 Breaker Requirements

Below is a listing of suggested breaker sizes and counts to support the proposed DC system designed to support all twenty (20) channels at each of the nine (9) sites and prime site. The proposed DC system will replace the existing DC system and the two will not need to co-exist. In the event the recommended amount of breaker space and utility power is not available at a site then the DC system, for that site, will be downsized to match the existing footprint. If the downsizing is significant enough to prevent the expansion channels from operating then the expansion channels will be disabled until adequate power can be provided.

3.1.4.1 Prime Site Locations

Option A	Option B
Two (2) – 120V, 15A Circuits	Two (2) – 120V, 15A Circuits
Four (4) – 240V (or 208V), 30A Circuits	Two (2) – 240V (or 208V), 50A Circuits

3.1.4.2 Remote Site Locations

Option A	Option B
Two (2) – 120V, 15A Circuits	Two (2) – 120V, 15A Circuits
Eight (8) – 240V (or 208V), 30A Circuits	Four (4) – 240V (or 208V), 50A Circuits

3.1.5 Power Failure

Motorola's has provided a design to ensure the voter system is as fault tolerant as possible. Each transmitter will feature an independent DC breaker. In the event of a breaker is tripped the impact will be limited to only that single transmitter (channel) at that particular site.

3.2 TOWER LOADING STUDIES

This project is intended to replace tower equipment on a one-for-one basis, with no point of old and new equipment co-existence on the tower. However, to validate this assumption, tower loading studies have been included for each of the remote transmitter sites, excluding 100 Wilshire and LA City Hall. Rectifying any discovered issues are not included in this proposal and are the responsibility of LAFD and/or ITA.



SECTION 4

COMMANDCENTRAL AXS DISPATCH CONSOLES

Motorola has included our CommandCentral AXS Dispatch Console in this proposal to provide LAFD with the confidence of state-of-the-art secure communications, seamless IP-based connectivity, flexible system architecture with scalable components, and centralized console management.

Motorola Solutions designs its console to help reduce the total cost of owning an IP-based, feature-rich dispatch system without compromising quality and reliability. The console provides LAFD with sophisticated network management and easy migration to future capabilities.

4.1 DISPATCH CONSOLE CONFIGURATION FOR LAFD

The proposed console will interface with the City of LA's ASTRO® 25 system via an ISSI connection. This will allow LAPD and LAFD to operate completely independent systems while simultaneously maximizing interoperability options. Allowing dispatchers to transmit, receive, patch, etc. on both the LAFD and LAPD channels.

The proposed solution offers LAFD seventy-two (72) dispatch console positions at MFC and twenty-eight (28) at OCD.

4.2 AXS DISPATCH OVERVIEW

Motorola Solutions' CommandCentral AXS Dispatch Console reduces the barriers between systems in LAFD's dispatch center, allowing access to all the mission-critical tools and applications dispatchers need in the moments that matter. CommandCentral AXS integrates the capabilities of other dispatch center technologies into a single, streamlined view. This makes operation more efficient in emergency situations. Resources are accessible with an intuitive, highly configurable browser-based GUI. Dispatchers will have an expansive feature set, a mission-critical IP network for transporting information and calls throughout the system, and robust integration capabilities with other dispatch center technologies.





Figure 4-1: One Screen, All the Resources Users Need

CommandCentral AXS improves the efficiency and operation of dispatchers in the following ways:

- **Next Generation Dispatch Experience**—Responds to touch, type, or click, giving dispatchers the flexibility to interact and stay connected to teams in the way that best suits them. Extensive customization options, flexible deployment configurations, and simple scalability means agencies only pay for what is needed now, with the room to adapt and grow as needs change over time.
- **Seamless Multi-system Access**—Supports future advancements and integrations with additional systems now and in the future. Dispatchers will be able to seamlessly communicate and connect across ASTRO 25 and other P25 trunking systems.
- **Pain-Free Enhancements**—Simplifies keeping up-to-date with new features, fixes, and security updates via Internet download (with valid subscription). Based on permissions from system administrators, users may trigger the download themselves without disrupting console operation. This flexible approach to updates reflects the software focus of CommandCentral AXS, and allows the update process to work around differing schedules.
- **Purpose-built Dispatch Console Accessories**—Enhances the dispatch experience with accessories, such as gooseneck microphone, speakers, headset jack, and footswitch, designed and tested for industry-leading performance and reliability.

This solution also reduces operating costs and provides a smaller physical footprint in the command center without compromising on features or reliability. This combination of seamless communications, modern architecture, and advanced integration capabilities enables the CommandCentral AXS solution to scale and evolve as needs change over time.

4.3 NEXT GENERATION DISPATCH EXPERIENCE

CommandCentral AXS features a highly customizable graphical user interface (GUI) that provides quick, single-view access to important information and functionalities from different applications and systems. The browser-based GUI's versatile option panels and scalable resources allow users to organize and customize their dispatch experience and make engagement more familiar and intuitive from shift to shift. Option panels can be relocated, exposed, or hidden as needed, giving dispatchers more control of what information they see and how they interact with those resources. CommandCentral AXS also offers multiple options for routing audio to speakers and controlling volume levels.



Mapping Panel UI Snapshot

CommandCentral AXS features flexible window positioning and assist panel capabilities for quick and efficient access to services such as:

- **Activity Log** —Provides an efficient point of reference for all incoming calls into a dispatch position, showing dispatchers detailed, searchable call information (radio resource name and call time) to enable faster and more informed response.
- **Paging** —Allows users to send customizable pages on radio resources. This flexible paging feature is integrated with CommandCentral AXS for both conventional and trunked radio resources, while an external paging encoder port on the CommandCentral Hub enables third-party paging encoders to send pages on the selected radio resources. The use of .wav paging audio files allows any type of tone page to be sent by CommandCentral AXS as well as alerting warbles or even recorded messages.
- **Patch Capabilities** —Enables dispatchers to set up a communication path between two or more resources that are normally unable to communicate with each other, such as trunked resources, conventional resources, and console telephony resources.
- **Alert Tones** —Allows dispatchers to send one of fifteen user-configurable alert tones on selected radio resources. Fifteen default .wav files are provided with the dispatch position software, but any combination of these default files may be replaced with customized .wav files to meet specific needs.
- **Channel Marker** —Enables dispatchers to send a periodically repeating piece of audio on radio resources, based on a customizable .wav file to meet the specific needs.

Flexible deployment options enable the GUI to be displayed on one or more dispatch position monitors or monitors used for other command center applications, allowing side-by-side or embedded views to better fit different dispatch workflows. This also gives users immediate access to necessary dispatch console features wherever they need. These integrations are designed to evolve and meet future needs as workflows change.

4.4 DEPLOYMENT OPTIONS

CommandCentral AXS offers flexible deployment options by providing P25 compliant features and integrations with trunking, conventional, MDC 1200 conventional, and analog conventional systems. The following table addresses which features and functionalities are available across the various platforms.

Table 4-1: CommandCentral AXS Features Per Platform

P25 Trunking	P25 Conventional	MDC 1200	Analog Conventional
• PTT Calls • Talk Group Calls • Individual, Announcement, Agency Group Calls • Secure Calls • Radio Unit ID and Alias • Emergency Call and Alarm • Call Alert • Repeat On/Off • Tactical/Normal • Radio Status Display • Remote Unit Monitor	• PTT Calls • Voice Selective Calls • Secure Calls • Radio Unit ID and Alias • Emergency Call and Alarm • Call Alert • Repeat On/Off • Frequency Select • PL Select • Mute Second Receiver • Wild Card • Radio Status Request, Display • Radio Message Display • Radio Enable/Disable • Radio Check • Remote Unit Monitor	• PTT Calls • Voice Selective Calls • Secure Calls • Radio Unit ID and Alias • Emergency Call and Alarm • Call Alert • Repeat On/Off • Frequency Select • PL Select • Mute Second Receiver • Wild Card • Radio Status Request, Display • Radio Message Display • Radio Enable/Disable • Radio Check • Remote Unit Monitor	• PTT Calls • Repeat On/Off • Frequency Select • PL Select • Mute Second Receiver • Wildcard

4.5 SIMPLIFIED UPDATES

CommandCentral AXS gives LAFD personnel greater control of the software update process. Based on policies set by the system administrator, dispatchers and/or system managers can decide when updates will best fit in their workflow to minimize interruptions and ensure software is up-to-date when it is needed most. Users can access these update deployments through the Cloud Software Hub.

With Internet connectivity, users can perform the following actions:

- Download the latest CommandCentral AXS software release into the cluster via the Cloud Software Hub.
- Manage software entitlement licenses via the Motorola Licensing website.
- Access product documentation through via the Motorola Learning Solutions website.

4.6 RELIABILITY/AVAILABILITY

The CommandCentral AXS solution delivers high availability and minimized user downtime in the event of failures. The AXS console continuously monitors software processes and hardware elements and in the event of failure will rapidly restart failed software processes or launch replacement services on the remaining healthy hardware elements. More information on AXS reliability is located in the Cluster section below.

4.7 LAFD'S PROPOSED CONFIGURATION

4.7.1 Number of Dispatch Position Clients and Locations

The CommandCentral AXS dispatch position client consists of the CommandCentral Hub running on a Linux Operating System, while the GUI is displayed on the Chromium web browser. The proposed solution provides LAFD with the following dispatch position clients at the indicated locations:

Table 4-2: MFC Console Positions

Location Name	Quantity
Dispatch, Room #220	39
Training, Room #222	13
Captain Desk, Room #225	2
PSO, Room #259	1
Battalion Chief, Room #244	1
Sit-Stat Re-Stat, Room #258	2
Battalion Chief, Room #245	1
Asst. Chief, Room #249	1
Chiefs Office, Room #250	1
OCD B.C. Office	1
FCCS CAD Dev Room, Room #241	3
Tech Control, Room #214	1
Equipment Room #215	1
AV Equipment Room #221	1
AT&T Room	2

Location Name	Quantity
Captain Room #225	1
Captain Room #227	1
Total Quantity	72

Table 4-3: OCD Console Positions

Location Name	Quantity
Dispatch Room	23
Public Safety Officer (PSO)	1
Battalion Chief	1
Captain's Office	1
Captain's Office	1
Tech Control Maintenance	1
Total Quantity	28

4.7.2 Dispatch Position Client Hardware

The CommandCentral AXS dispatch console solution can be enhanced through dispatch peripherals, such as speakers, microphone, headset jack, and footswitch. These peripherals are designed for 24/7 usage without degradation in performance or reliability.

The CommandCentral AXS dispatch position features the following hardware elements:

- One (1) CommandCentral Hub
- One (1) Touchscreen Monitor
- Four (4) Speakers
- Two (2) Microphones
- Two (2) Headset jack box(s)
- One (1) Footswitch

4.7.3 CommandCentral AXS Cluster Specifications

The CommandCentral AXS servers are split into groups of three or more called clusters, and a single cluster supports the dispatch position clients at each location. All call processing, audio processing, and console software for the dispatch position clients is handled in this cluster. The cluster distributes the dispatch position client connections across the servers to provide load balancing and resiliency, while anti-malware protects the cluster against cybersecurity threats.

A configuration service for the console-specific aspects of an AXS console (such as number of speakers per dispatch client or user roles) is provided in the cluster. Configuration of radio system parameters is done in the radio system's configuration manager and is automatically downloaded into the cluster.

Each server contains six Ethernet ports, two USB ports, and a VGA port. A rack-mounted KVM (keyboard, video, mouse) switch with built-in display, keyboard, and touchpad is also available for use when installing and servicing servers.



- Server Management and Orchestration Software – Industry standard applications are used to manage the server cluster and provide high levels of availability and reliability for the processes therein.

The following cluster configuration is included at the two dispatch locations.

Table 4-4: AXS Server Cluster Configuration

	MFC	OCD
Primary Cluster Server Qty.	7	5
Redundant Cluster Server Qty.	7	5

4.7.4 Subscription Agreement

A subscription service is included as part of CommandCentral AXS to enhance dispatch capabilities over time. LAFD will be able to access CommandCentral AXS application software releases (typically released monthly) to enable new features and defect fixes. Some of the new features may require additional licensing.

The subscription also includes access to security patches (typically released monthly, but can be released more often if necessary). These patches cover all the console system software, including the operating system software, server management and orchestration software, web browser software, console application software, and other supporting software. Remote technical support is available via the System Support Center. The SSC will assist in troubleshooting and resolving any issues that may arise.



SECTION 5

LOGGING RECORDER

Motorola Solutions has partnered with Verint Systems to provide the Los Angeles Fire Department with a customized Radio and Telephony Recording solution. The following sections describe the proposed solution.

5.1 VERINT SOLUTION OVERVIEW

The Requirements of this new system have been set forth are to provide a new logging recorder that will record all audio at MFC 500 East Temple and with a Primary recorder and redundant recorder at the City Hall East OCD with the following requirements per recorder:

500 East Temple (MFC)

- Verint Primary Recorder (MFC)
 - 72 Position Select Radio Recording
 - 72 Position Phone Recording, contact closure recording.
 - 120 Talk Groups – VIA AIS Interface
 - 20 TAC Channels (Vox Analog)
 - 20 STR Channels (Vox Analog)
 - 20 Mutual Aid Channels (Vox Analog)
 - 47 E911 CAMA Trunks (Analog)
 - 3 Crash Phone (Analog)
 - 15 Nortel IP Phones
- Redundant Recorder with Expansion Chassis
 - 72 Position Select Radio Recording
 - 72 Position Phone Recording, contact closure recording.
 - 20 TAC Channels (Vox Analog)
 - 20 STR Channels (Vox Analog)
 - 20 Mutual Aid Channels (Vox Analog)
 - 47 E911 CAMA Trunks (Analog)
 - 3 Crash Phone (Analog)
 - 15 Nortel IP Phones
- Quality Management
 - 120 Named Users
 - 6 Evaluators
 - Online Training for 6 Evaluators
- CAD Integration
 - Integrate CAD Data with E911 Telephone Calls, Custom Integration to pull CAD Fields

City Hall East (OCD)

- Verint Primary Recorder (OCD)
 - 28 Position Select Radio Recording
 - 28 Position Phone Recording, contact closure recording.
 - 120 Talk Groups – VIA AIS Interface
 - 20 TAC Channels (Vox Analog)
 - 20 STR Channels (Vox Analog)



- 20 Mutual Aid Channels (Vox Analog)
- 47 E911 CAMA Trunks (Analog)
- 3 Crash Phone (Analog)
- 15 Nortel IP Phones
- Verint Secondary Recorder (OCD)
 - 28 Position Select Radio Recording
 - 28 Position Phone Recording, contact closure recording.
 - 20 TAC Channels (Vox Analog)
 - 20 STR Channels (Vox Analog)
 - 20 Mutual Aid Channels (Vox Analog)
 - 47 E911 CAMA Trunks (Analog)
 - 3 Crash Phone (Analog)
 - 15 Nortel IP Phones

The Verint Solution Design is based upon the LAFD Logging Recorder Requirements Matrix dated August 7th 2021 and has been included in the Section 19 “LAFD Logging Recorder Requirements Matrix” of this proposal.

5.2 VERINT RECORDING SOLUTION DESIGN

5.2.1 Telephone & Radio Recording

To meet these requirements set forth by LA Fire, Motorola and Verint Systems is proposing a Public Safety Recording Solution based upon the Verint Recorder v15.2.

To accomplish the recording requirements for the LA Fire Communication Center, Verint will deploy Primary recorder and a Redundant recorder at MFC and Primary and Redundant Recorder the OCD location. Each Server and Recorder server will capture the following communications:



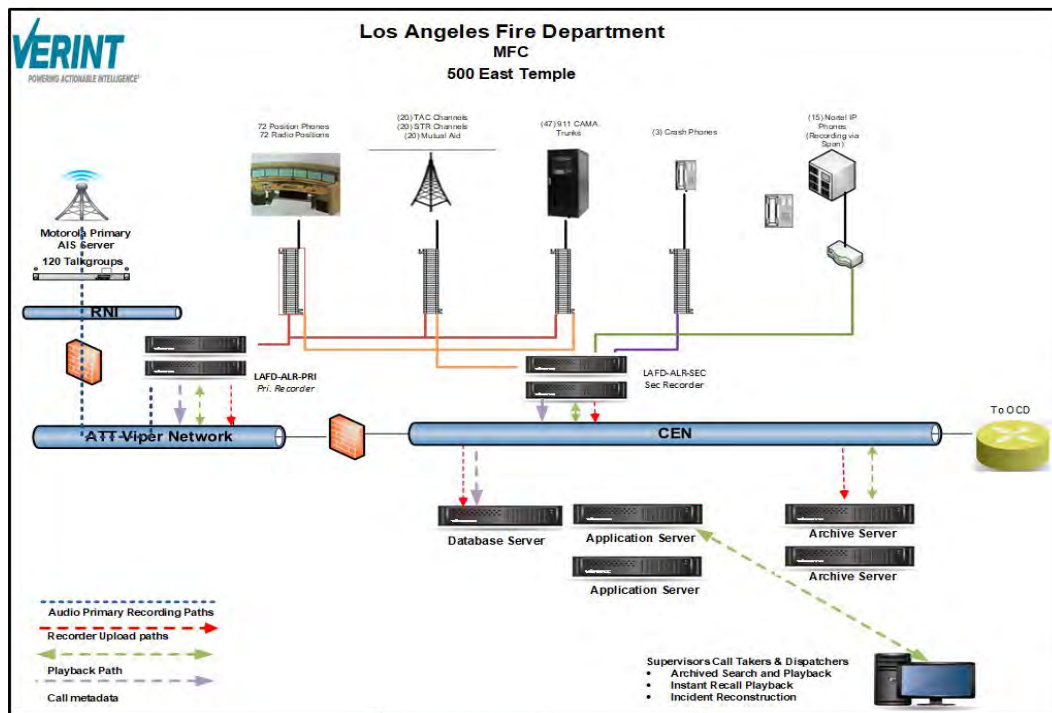


Figure 5-1: MFC Location

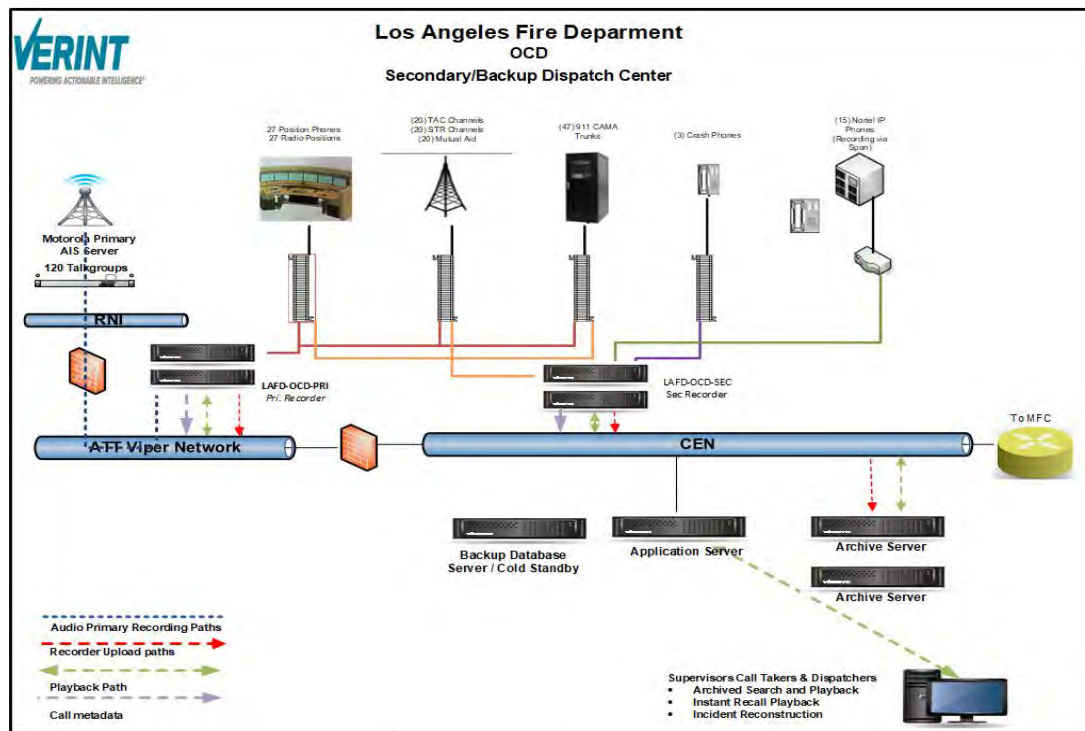


Figure 5-2: OCD Location

5.2.1.1 MFC Location

- Data Base Server
 - Verint Database services for MFC will be the Primary DataBase, the Secondary DataBase will reside at OCD
- Application Servers (2)
 - Servers that will distribute the users access for playback and application access.
- Primary Recording Server
 - 389 channels Radio & Telephony inputs
 - Provide 3.8TB of local Storage
- Redundant Recording Server
 - 389 channels Radio & Telephony inputs
 - Provide 3.8TB of local Storage
- Archive Servers
 - Provide 3.8TB of Archive Storage

5.2.1.2 OCD Location

- Data Base Server
 - The Secondary DataBase will reside at OCD, the Primary will be at MFC Location
- Application Server (1)
 - Servers that will distribute the users access for playback and application access.
- Primary Recording Server –
 - 299 channels Radio & Telephony inputs
 - Provide 3.8TB of local Storage
- Redundant Recording Server –
 - 299 channels Radio & Telephony inputs
 - Provide 3.8TB of local Storage
- Archive Servers –
 - Provide 3.8TB of Archive Storage

5.2.1.3 Customer Services to Extract CAD Data

The Verint API will be used to extract 21 fields form the LA Fire CAD system and insert this data into the Verint system to be used to query calla based on this data. All data required must be available through Verint API / Interface. Motorola/Verint will not provide any calculations or calculated fields

Below are the fields that we have discussed that would need to be captured:

1. INCIDENT_NBR	YYYYMMDDxxxx (Example: 201401010011)
2. INITIAL_911_TIME	timestamp
3. CREATION_TIME	timestamp
4. WRS_TIME	timestamp
5. EMS_DETAIL_DESC	TDS determinant descriptor
6. CALL_TAKER_ID	123456
7. DISPATCHER_ID	123456
8. STREET_ADDRESS	Example: 10123 N SHARP AV X W PIERCE ST SFV
9. FIRST_IN_DISTRICT	7 (example Fire Station 07)
10. CALLER_PHONE_NBR	213-256-8666
11. CALL_TYPE	Landline, PBS, cellphone
12. 911-CR	Elapsed time (Calculated by application)
13. CR-WRS	Elapsed time (Calculated by application)

14. 911-WRS	Elapsed time (Calculated by application)
15. 911-CREATION TIME * (TDS)	Elapsed Time (calculated by application)
16. CALL_TAKER_CONSOLE	C19
17. DISPATCHER_CONSOLE	C21
18. INCIDENT_TYPE	TDS code, example SS01
19. [TDS_CASE] CREATION_TIME *	TDS software invoked (* LAFD TDS_CASE table)
20. [TDS_CASE] COMPLAINT_TIME*	TDS software complaint card selected (* LAFD
21. [TDS_CASE] CPR_START_TIME *	TDS software emergency instructions activated

The Verint Recording Servers also include the capability to capture and tag E911 ANI/ALI information to the call database record. This will enable operations center staff to perform search and retrieval using ANI & ALI information.

Important Note: We will need to verify the Make/Model of the ANI/ALI controller and the availability of a useable ANI/ALI “CADSPILL” or Post Call CDR or Enhanced CDR. Testing may be required to verify usability of the data source.

Currently not part of the project scope: When LAFD goes to the Motorola P25 IP the recording will need to be converted to capture IP traffic from the Motorola AIS. To provide for the most robust recording solution for P25 Radio Recording, each “Primary” Recording server at the Public Safety Building Center as well as City Hall East (OCD), are also equipped to record the P25 Radio System. This Recording Server is designed to record all xxx Talk Groups from the Archive Information Server (AIS). In addition to recording the Audio from the P25 radio System, the Verint Recorder is to capture Radio metadata with each recorded transmission. This metadata is provided by the Motorola Archive Information Server and includes such info as Radio ID, Radio Alias, Talk group ID and Talk Group Alias. This will enable users to search and retrieve recorded radio communications based upon Talk group and/or Radio information.

5.2.1.4 Search and Playback

The Search and Retrieval of Recorded Communications is to be done using Verint’s Web Based Application designed for Public Safety Users known as “Insight Center”. Verint’s Insight Center application provides a powerful, browser-based, set of tools for search and replay the recordings stored on your Verint Recording servers. Directly accessed from your desktop PC, with an easy-to-use browser interface, you can easily search for recordings by Recorded Channel, Date, Time, Duration, User Reference Tags, and other captured metadata from both the P25 ASTRO Radio system and the E-911 Switch. Playback audio is delivered via the local area network to the speakers of the client PC. Insight Center is certified to work with a Chrome Browser.

The Verint Installation Team will work with your defined Verint System Administrator to assign each individual agency use a Unique User Name and Password. Each user account will have certain permissions associated with it in order to play recordings back. Depending upon how a user account permissions have been configured, a user may be permitted to playback all recordings or may be restricted to only playing recordings from a limited subset of telephone extensions or Radio Talk Groups. If Playback permissions are limited, then the replay application will only show recordings for the Telephone Audio Channels or Radio Talk Groups to which have been assigned.

5.2.1.5 Call Storage

Verint’s Recording Solutions are designed to fulfill the widest range of recording requirements while being one of the most efficient, easy-to-use and reliable solutions available. Verint’s open architecture provides maximum storage flexibility, with dedicated internal RAID 5 Storage or call recordings, automatic call archiving to customer designed archive locations with native support for Network-Attached Storage (NAS), or SAN storage, RDX drive, using Verint’s robust Archive Campaigns.

Each Recording Server is equipped with multiple hard drive arrays, one of which is specifically designed for storage, providing 3.8 TB of local storage.

5.3 VERINT SYSTEMS TECHNICAL OVERVIEW

The Verint v15.2 Recording Solution is able record voice communications in your operations center, whether they be in VoIP, TDM, or mixed telephony environments. Please keep in mind that as your center's technologies evolve and change, Verint has a solution for you. If anything is planned in your center during the next 2 years which is not included in this Solution Design, or has not be discussed with your Verint Representatives, please bring this to our attention as quickly as possible so that we may account for changing technologies within this design, or with future system updates.

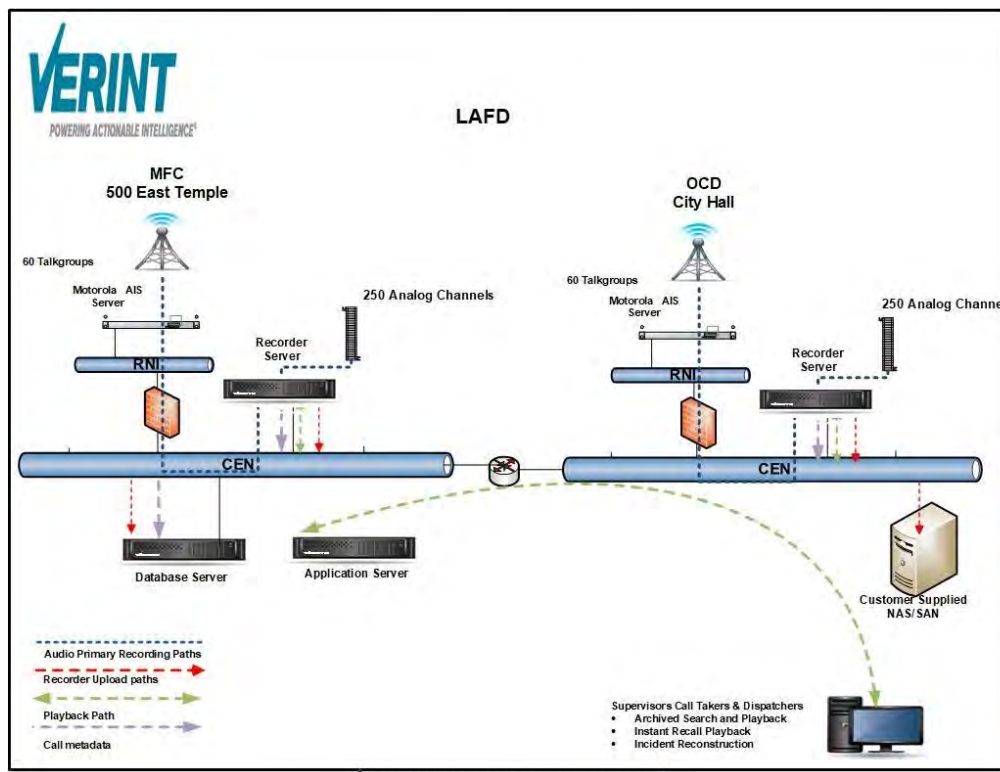


Figure 5-3: Verint System Diagram

5.3.1 Verint Recording – A Logical Architecture Overview

The system's logical architecture is based on three logical deployment zones:

- **Data Center** – Serves as a centralized, single point of access where application data and content metadata is accessed, managed and maintained
- **Recorder Site(s)** – Provides recording (content acquisition), content storage and integration with the customer environment
- **Desktop** – Provides the agent or supervisor's working environment

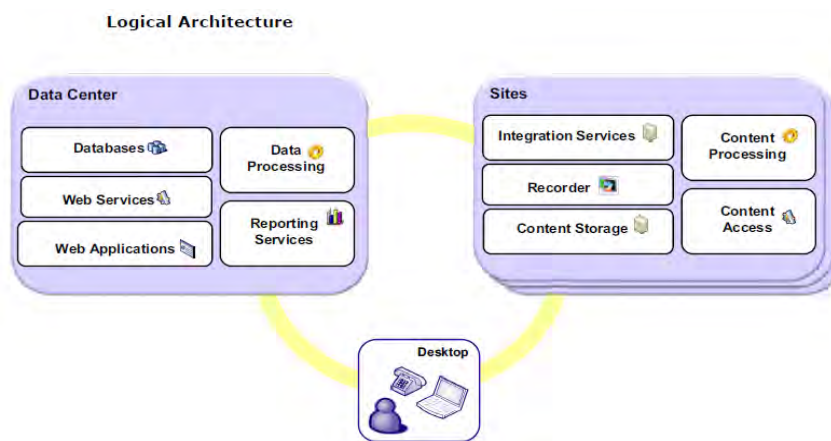


Figure 5-4: Verint Architecture

Every system deployment includes one Data Center, and one or more Recording Sites and Client Replay Desktops (depending on system size and scaling issues).

Dividing the system's functions into logical zones supports flexibility for different system scaling levels, streamlines the flow of data, enables easier and more efficient upgrade paths, and provides system security.

Maintaining the data in one single location (Data Center Zone) both protects sensitive system data and provides centralized access to data by authorized users. The Site zone can be configured in multiple instances with multiple servers, providing system flexibility and scalability.

Main system data is sent from the Site zone to the Data Center zone. The Site zone sends recorded content and other stored data to the Data Center zone. The Data Center zone provides a centralized, single location where this data can be accessed by users to view and modify. In turn, the Data Center zone sends user information and system configuration information to the Site zone, where it is then integrated into the customer's environment.

The software in the Data Center and Site zones can be upgraded separately, which enables easier upgrade processes. For example, the customer can upgrade the Data Center zone for new applications or new features, without the need to invest in upgrading the entire enterprise.

5.3.2 Data Center

The Data Center provides a single, central point of access for application and content metadata. Every system deployment includes one Data Center zone. Users access the Data Center to view and modify system stored and real-time data. Users who do not have access to the Data Center zone cannot log in to an application or access any of the data.

The Data Center hosts one or more database servers, depending on the size of the system deployment. Data Center zone databases contain the following information:

- System Management Data: Includes IT-oriented information on licenses, configuration, and data sources.
- Application Management Data: Includes business-oriented information on:
 - User management: Includes users, hierarchy, roles, and user preferences
 - Application management: Includes forms, flags, reports, and custom data

- **Application Data:** Includes raw recorded call information, evaluations, scorecard source measures, DPA data, Speech content, and excludes audio and screen records.
- **Operational Data:** Includes archived segment data indicating which segments are archived, including the information required to restore and play back a segment. Operational data is generated by the system and maintained in the database, and helps the system manage acquired structured and unstructured data.

5.3.3 Recorder Site Functions

The primary functions of the Recorder are to record, archive, and replay voice & screen recordings, Recorder features include:

- Full-time and selective, rules-driven recording
- Close integration with CTI data sources such as Motorola's AIS and E9-1-1 ANI/ALI
- Archiving support
- High-availability (Recording acquisition redundancy)
- Web-based administration & configuration

The recording solution consists of a set of logical servers that can be deployed on a single machine or on multiple machines in a large enterprise environment. These servers can also be deployed in the form of clusters in order to scale with the size of the customer's systems.

The Recorder supports both TDM and IP recording, including trunk-side recording (TDM) or gateway recording (IP), and station-side recording (TDM) or extension-side recording (IP) recording. You can configure each of these types of recording by using the Enterprise Manager to set up extension groups or pools (called member groups), each with a data source that defines where the recorded call is coming from, and then setting the recording mode.

5.3.4 Call Data and CTI Tagging

Call data captured by the Recorder includes associated and non-associated call data. Associated call data represents parameters of the call such as the start time, stop time and call length. In addition to the call data values, other data fields can be appended that contain any relevant data that is associated with the call. This data can be from switch CTI ports, and can be information such as an agent extension. Associated call data includes the following, which are logged with every call recorded:

- Start Date and Time
- End Date and Time
- Call length
- Dialed Digits (outbound)
- CLI Digits
- DNIS
- Call ID (unique to the call and Recorder)
- Call direction

Non-associated call data allows the Integration Service to place records into the database when they cannot be directly associated with a voice call (either because the call has finished or the inum of the call is unknown). At this point, a join is performed between some common element within the associated data, such as a unique ID from the CTI system, to allow this non-associated data to be added to the call details.

For Advanced Radio Recording environments with available Call Data for call tagging the following call data is typical to be tagged with each radio transmission recording:



- Radio ID & Radio Alias
- Talk Group Id & Talk Group Alias

Once you determine which fields you need to use in your system, you can add them as custom attributes, then map these custom attributes to an adapter. You can then use these attributes for tagging and to build recording rules, where the attributes become criteria upon which the decision to record or not is based.

5.3.5 Recorder Redundancy & High Availability

Recording provides high availability via redundancy of the Recorders, Integration Service, or both.

5.3.5.1 Recorder Redundancy

There are three types of Recorder Redundancy:

- N+N, in which all calls (or the desired redundant calls) are recorded by pairs of Recorders.

Important Note: N+N is the redundancy as designed for LAFD.

- N-Dedicated M-Shared, in which calls are recorded by a primary N Recorder, with a backup M Recorder available to take over should N experience any errors.
- N+M All Shared, in which all calls are load-balanced across a pool of Recorders.

5.3.5.2 High Availability Recorder Cluster

The diagram below illustrates a fully fault-tolerant Recorder cluster (N+M All Shared) containing redundant devices (the load balancing device, Link Protector, voice switch and Recorder). In this configuration, the failure of any single component will not result in the loss of recording. The cluster in this example has a recording capacity of 1000 channels (5 Recorders x 200 channels). Each Recorder has a capacity of 650 Channels so the spare capacity per recorder is 450 Channels, meaning that the system is tolerant of up to two (2) recorder failures at any moment in time.

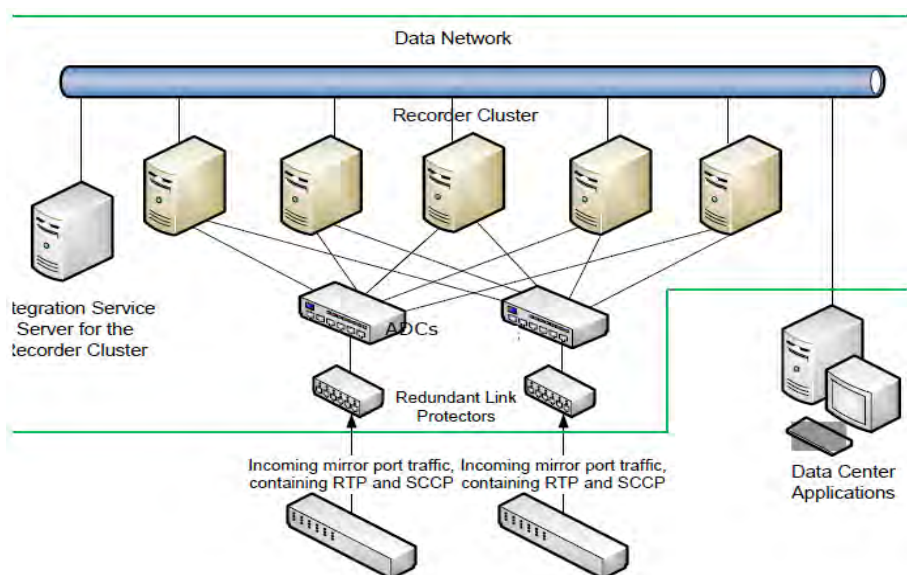


Figure 5-5: High Availability Design

The cluster is designed to be fault tolerant of key elements being offline for periods of time, and includes the following components:

- **Data Center Zone application components:** The servers for these components have no effect on the ability of the system to record. If the database is unavailable, the Recorders queue up the recorded calls. Once the database comes back online, the Recorders will upload the calls.
- **Archive:** This component is designed to run behind real-time archiving of the calls. The system would only be detrimentally affected if it was offline for a sustained period, such that when it came back online, calls to be archived were no longer on the Recorders. The hard disks on the recorders should be sized such that they can be tolerant of the Archive system running behind.
- **Cluster Integration Service:** In this configuration, the Integration Service is utilized for CTI Integrations and tagging. If the Integration Service server fails, then this tagging will be lost. If an extension must be recorded even during an Integration Service failure, it should not be configured in this mode.
- **IP Recorder Nodes:** As described above, the configuration in the diagram contains five recorders, but is specified as providing 4000 channels of concurrent recording, as the fifth recorder represents the spare capacity required for redundancy.
- **ADC or Load Balancing Device:** If either load balancer fails, the other passive device will be presented with the links via the Link Protectors. A network port failure would result in that individual link being activated to the redundant the load balancer.
- **Link Protectors:** If the Link Protector fails, then the network connection will be maintained to the primary the load balancing device via the protector's fail-through capability. The system is likely not to be fault tolerant of a Link Protector and load balancer failure at the same time.

5.3.6 Desktop (Search & Replay) Sites

The Desktop is the main component in the customer's environment that hosts software and certified third-party software. Depending on the package, the Desktop optionally contains the following types of clients required by agents to work with system servers:

- **Insight Center Web Agent:** Provides Multi-Channel, Multi-media Search, Replay and Incident Management for users. (Primary User Application for Recorded Call Replay)

Important Note: Insight Center has been designed to work in the customer's computer environment. In the rare case that conflicts exist between other applications, a stand-alone play back station provided by the customer may be required.

- **Integration Services Agent:** Retrieves and acquires agent information, and extend contact metadata with data available only on the agent desktop.
- **Content Access Client:** Provides Playback Control (Interactions and Analytics)
- **Thick Client Applications:** Includes Form Designer (Interactions and Analytics)

5.3.7 Archive Storage Topologies

After a recorder has completed recording a contact, it stores it on its local disk. The recorder's call storage drive, no matter how large, has some limit to its capacity. Therefore, at some point, the older contacts need to be moved to long-term storage.

"Archive" refers to the infrastructure dedicated to preserving call information in long-term storage (usually for one year and longer, depending on customer requirements). The archive service transfers recorded content from recorders to specific storage media for preservation.

The following are the two different archive topologies that can be configured:

- Local Archive Topology: Recorders push contacts directly from their local call buffer to the target media.
- Central Archive Topology: Central archive server is configured to pull contact data from Recorders and write this data to the target media.

Each type of archive (local or central) can be deployed in different configurations. To determine which type of archive should be used depends on the topology best suited for a customer's specific requirements.

Verint supports most industry standard Network Storage Strategies and devices. Examples supported, but not limited to are: RDX drive, NAS, SAN, EMC Centera, Public Cloud Services and Private Cloud.

5.3.8 Web Applications

All users log on to the system through Web applications. A single point of authentication—Single Sign-On (SSO)—provides application access in the system, as defined by user privileges. Web applications run application pages with system management and application management data. It is mainly structured information. Unstructured information is accessed directly from the Site zone in which it was recorded or archived.

The application cluster consists of one or more application servers, depending on the deployment size. In large deployments with more than one server, the application servers are deployed behind a Network Load Balancer (NLB) and each server exposes the same set of applications and services. All application servers run the same version of software and have an identical configuration. Users access the system from the URL of the NLB. The NLB routes the user to one of the application servers.

5.3.9 Insight Center: Search, Replay and Incident Management

Insight Center provides a powerful, browser-based, set of tools to search for and play the recordings stored on your Verint enterprise recording system from your desktop PC. With an easy-to-use browser interface, you can easily search for recordings by channel, agent, date and time, or any available metadata associated with the recording.

Insight Center allows you to playback multiple sequenced and/or simultaneous recordings, regardless of which channel they were recorded on. This allows you to reconstruct an incident by listening to a series of recordings in their entirety, even if the recordings overlap. Selected recordings can then be saved to an incident folder for ease of incident management. To assist you when creating a transcript of the recordings, you can configure Insight Center to provide a spoken time and date stamp at the beginning and end of the selected sequence of recordings. Insight Center plays the selected recordings in chronological order.

Verint's Recording solutions provide for full-time recording, selective recording, recording on demand, and dial-in recording across digital and analog telephones, trunked and conventional Land Mobile Radio systems, telephone lines and trunks, IP phones, short message service (SMS), and PC screens. It can record screens while minimizing network usage and storage requirements and can capture screen changes, including mouse movements and keystrokes, without disrupting call handlers.

Insight Center is designed to address the replay and incident management of these multi-media Interactions along with Multi-Channel mixing capabilities to allow effective Incident Reconstruction in the emergence of NG9-1-1 Technology, including replay capabilities for: Audio, Video, PC Screen Capture, Still Photos and Text messaging.



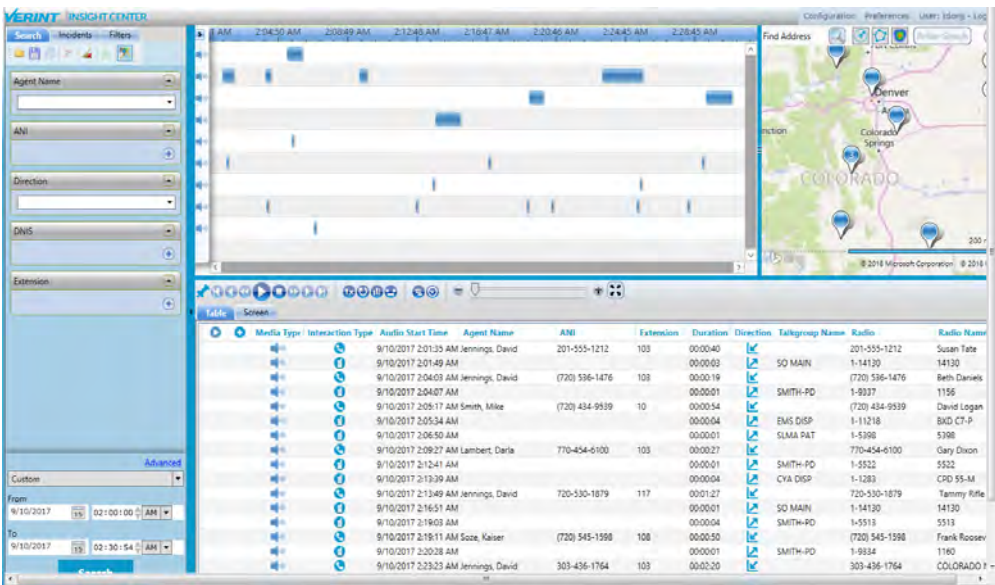


Figure 5-6: Insight Center User Interface

SECTION 6

SYSTEM NETWORK REQUIREMENTS

6.1 LINK REQUIREMENTS

- Layer 3, MPLS Ethernet Backhaul
 - 3 Layers of QoS is highly suggested
- IPKeys services are included for Cisco Router configuration
- One port, per router, per site will be required
- Motorola's design assumes 99.999% uptime reliability of the Microwave and MPLS backhaul.

6.1.1 Bandwidth, Latency, & Jitter Requirements

Link Name	Min. Bandwidth	Max. Latency	Max. Jitter
Prime Site (MFC) to Each RF Site	2,200 Kbps	20ms	20ms
OCD Dispatch to Core (MFC)	10,617 Kbps	20ms	10ms
MFC to OCD (Logging)	20 Mbps	20ms	10ms

If multiple sites connect through the same link the bandwidth aggregate needs to be considered. For example, if a remote site and the OCD dispatch center use the same connection to MFC the available bandwidth will need to be 12,817 kbps (10,617 kbps + 2,200 kbps).

6.1.2 Cisco MPLS Configuration

Motorola, through our subcontractor IPKeys, has included configuration of the existing Cisco MPLS routers in use on the Microwave network. This work includes initial configuration only and does not include any hardware modifications or upgrades.



6.2 POWER & HVAC LOADING SPECIFICATIONS



MFC Master Site

120 VAC POWER REQUIREMENTS

Equipment	Qty	Voltage (VAC)	Current per Unit (A)	Total Current (A)	Duty Cycle (%)	Total Current (A) @ Duty Cycle	Power per Unit (W)	Total Power (W)	Total Power (W) @ Duty Cycle	BTU/hr per Unit	Total BTU/hr	Rack#	Circuit#	Breaker Size
Core VMS 01 Power Supply #1	1	120	6.7	6.7	100%	6.7	800	800	800	2,730	2,730	1	Circuit #1	20A
Core VMS 02 Power Supply #2	1	120	6.7	6.7	100%	6.7	800	800	800	2,730	2,730	1		
CEN VMS 01 Power Supply #1	1	120	6.7	6.7	100%	6.7	800	800	800	2,730	2,730	1	Circuit #2	20A
ISGM VMS 01 Power Supply #2	1	120	6.7	6.7	100%	6.7	800	800	800	2,730	2,730	1		
Core LAN Switch 01	1	120	0.9	0.9	100%	0.9	108	108	108	369	369	1	Circuit #3	20A
Core Edge Router 01	1	120	2.5	2.5	100%	2.5	300	300	300	1,024	1,024	1		
Core Backhaul Switch 01	1	120	0.9	0.9	100%	0.9	108	108	108	369	369	1		
CEN Firewall	1	120	2.5	2.5	100%	2.5	300	300	300	1,024	1,024	1		
CEN LAN Switch	1	120	0.9	0.9	100%	0.9	108	108	108	369	369	1		
Terminal Server	1	120	2.5	2.5	100%	2.5	300	300	300	1,024	1,024	1	Circuit #4	20A
Core VMS 01 Power Supply #2	1	120	6.7	6.7	100%	6.7	800	800	800	2,730	2,730	1		
Core VMS 02 Power Supply #1	1	120	6.7	6.7	100%	6.7	800	800	800	2,730	2,730	1	Circuit #5	20A
CEN VMS 01 Power Supply #2	1	120	6.7	6.7	100%	6.7	800	800	800	2,730	2,730	1		
ISGM VMS 01 Power Supply #1	1	120	6.7	6.7	100%	6.7	800	800	800	2,730	2,730	1	Circuit #6	20A
Core LAN Switch 02	1	120	0.9	0.9	100%	0.9	108	108	108	369	369	1		
Core Edge Router 02	1	120	2.5	2.5	100%	2.5	300	300	300	1,024	1,024	1		
Core Backhaul Switch 02	1	120	0.9	0.9	100%	0.9	108	108	108	369	369	1		
Border Router	1	120	2.5	2.5	100%	2.5	300	300	300	1,024	1,024	1		
ISSI Firewall	1	120	2.5	2.5	100%	2.5	300	300	300	1,024	1,024	1		
Network Management Client	1	120	3.3	3.3	100%	3.3	400	400	400	1,365	1,365	1		
Total 120 VAC Power Requirements				76.2		76.2		9,140	9,140		31,187			

MFC Simulcast Prime Site

120 VAC POWER REQUIREMENTS

Equipment	Qty	Voltage (VAC)	Current per Unit (A)	Total Current (A)	Duty Cycle (%)	Total Current (A) @ Duty Cycle	Power per Unit (W)	Total Power (W)	Total Power (W) @ Duty Cycle	BTU/hr per Unit	Total BTU/hr	Rack#	Circuit#	Breaker Size
Prime LAN Switch No.1	1	120	0.8	0.8	100%	0.8	100	100	100	341	341	1	Circuit #1	15A
Prime LAN Switch No.2	1	120	0.8	0.8	100%	0.8	100	100	100	341	341	1	Circuit #2	15A
Access Switch No.1	1	120	0.8	0.8	100%	0.8	100	100	100	341	341	1	Circuit #1	15A
Access Switch No.2	1	120	0.8	0.8	100%	0.8	100	100	100	341	341	1	Circuit #2	15A
				3.3		3.3		400	400		1365			
Total 120 VAC Power Requirements				3.3		3.3		400	400		1365			

-48 VDC POWER REQUIREMENTS

Equipment	Qty	Voltage (VDC)	Current per Unit (A)	Total Current (A)	Duty Cycle (%)	Total Current (A) @ Duty Cycle	Power per Unit (W)	Total Power (W)	Total Power (W) @ Duty Cycle	BTU/hr per Unit	Total BTU/hr	Rack #	DC Brkr #	Breaker Size
Site Controller (DC, 2 modules/chassis)	2	48	1.3	2.5	100%	2.5	60	120	120	205	409	1	DC Breaker 1	5A
Comparators Ch. 1 & 2	1	48	1.7	1.7	100%	1.7	80	80	80	273	273	1	DC Breaker 2	5A
Comparators Ch. 3 & 4	1	48	1.7	1.7	100%	1.7	80	80	80	273	273	1	DC Breaker 3	5A
Comparators Ch. 5 & 6	1	48	1.7	1.7	100%	1.7	80	80	80	273	273	1	DC Breaker 4	5A
Comparators Ch.7 & 8	1	48	1.7	1.7	100%	1.7	80	80	80	273	273	1	DC Breaker 5	5A
Comparators Ch. 9 & 10	1	48	1.7	1.7	100%	1.7	80	80	80	273	273	1	DC Breaker 6	5A
Comparators Ch. 11 & 12	1	48	1.7	1.7	100%	1.7	80	80	80	273	273	1	DC Breaker 7	5A
Comparators Ch. 13 & 14	1	48	1.7	1.7	100%	1.7	80	80	80	273	273	1	DC Breaker 8	5A
Comparators Ch. 15 & 16	1	48	1.7	1.7	100%	1.7	80	80	80	273	273	1	DC Breaker 9	5A
Comparators Ch. 17 & 18	1	48	1.7	1.7	100%	1.7	80	80	80	273	273	1	DC Breaker 10	5A
Comparators Ch. 19 & 20	1	48	1.7	1.7	100%	1.7	80	80	80	273	273	1	DC Breaker 11	5A
TRAK Modular Frequency Clock - PS1	1	48	3.1	3.1	100%	3.1	150	150	150	512	512	1	DC Breaker 12	5A
TRAK Modular Frequency Clock - PS2	1	48	3.1	3.1	100%	3.1	150	150	150	512	512	1	DC Breaker 13	5A
Access Router No.1	1	48	1.00	1.0	100%	1.0	48	48	48	164	164	1	DC Breaker 14	5A
Access Router No.2	1	48	1.00	1.0	100%	1.0	48	48	48	164	164	1	DC Breaker 15	5A
Sub-Site Router No.1	1	48	1.00	1.0	100%	1.0	48	48	48	164	164	1	DC Breaker 16	5A
Sub-Site Router No.2	1	48	1.00	1.0	100%	1.0	48	48	48	164	164	1	DC Breaker 17	5A
				29.4		29.4		1,412	1,412		4,818			
Total -48 VDC Power Requirements				29.4		29.4		1,412	1,412		4,818			

800MHz Remote TX/RX Site

-48 VDC POWER REQUIREMENTS

Equipment	Qty	Voltage (VDC)	Current per Unit (A)	Total Current (A)	Duty Cycle (%)	Total Current (A) @ Duty Cycle	Power per Unit (W)	Total Power (W)	Total Power (W) @ Duty Cycle	BTU/hr per Unit	Total BTU/hr	Rack #	DC Brkr #	Breaker Size
GTR 8000 Base Radio Subsystem 800MHz Channel 1	1	48	9.0	9.0	100%	9.0	430	430	430	1,467	1,467	1	DC Brkr #1	25A
GTR 8000 Base Radio Subsystem 800MHz Channel 2	1	48	9.0	9.0	100%	9.0	430	430	430	1,467	1,467	1	DC Brkr #2	25A
GTR 8000 Base Radio Subsystem 800MHz Channel 3	1	48	9.0	9.0	100%	9.0	430	430	430	1,467	1,467	1	DC Brkr #3	25A
GTR 8000 Base Radio Subsystem 800MHz Channel 4	1	48	9.0	9.0	100%	9.0	430	430	430	1,467	1,467	1	DC Brkr #4	25A
GTR 8000 Base Radio Subsystem 800MHz Channel 5	1	48	9.0	9.0	100%	9.0	430	430	430	1,467	1,467	1	DC Brkr #5	25A
GTR 8000 Base Radio Subsystem 800MHz Channel 6	1	48	9.0	9.0	100%	9.0	430	430	430	1,467	1,467	1	DC Brkr #6	25A
GTR 8000 Base Radio Subsystem 800MHz Channel 7	1	48	9.0	9.0	100%	9.0	430	430	430	1,467	1,467	1	DC Brkr #7	25A
GTR 8000 Base Radio Subsystem 800MHz Channel 8	1	48	9.0	9.0	100%	9.0	430	430	430	1,467	1,467	1	DC Brkr #8	25A
GTR 8000 Base Radio Subsystem 800MHz Channel 9	1	48	9.0	9.0	100%	9.0	430	430	430	1,467	1,467	1	DC Brkr #9	25A
GTR 8000 Base Radio Subsystem 800MHz Channel 10	1	48	9.0	9.0	100%	9.0	430	430	430	1,467	1,467	1	DC Brkr #10	25A
TRAK Modular Frequency Clock - PS1	1	48	3.1	3.1	100%	3.1	150	150	150	512	512	1	DC Brkr #11	5A
TRAK Modular Frequency Clock - PS2	1	48	3.1	3.1	100%	3.1	150	150	150	512	512	1	DC Brkr #12	5A
Site Router 01	1	48	1.7	1.7	100%	1.7	80	80	80	273	273	1	DC Brkr #13	5A
CCGW #3	1	48	1.7	1.7	100%	1.7	80	80	80	273	273	1	DC Brkr #14	5A
CCGW #4	1	48	1.7	1.7	100%	1.7	80	80	80	273	273	1	DC Brkr #15	5A
120VAC Power Converter (LAN Switch #1)	1	48	6.3	6.3	100%	6.3	300	300	300	1,024	1,024	1	DC Brkr #16	10A
GTR 8000 Base Radio Subsystem 800MHz Channel 11	1	48	9.0	9.0	100%	9.0	430	430	430	1,467	1,467	2	DC Brkr #17	25A
GTR 8000 Base Radio Subsystem 800MHz Channel 12	1	48	9.0	9.0	100%	9.0	430	430	430	1,467	1,467	2	DC Brkr #18	25A
GTR 8000 Base Radio Subsystem 800MHz Channel 13	1	48	9.0	9.0	100%	9.0	430	430	430	1,467	1,467	2	DC Brkr #19	25A
GTR 8000 Base Radio Subsystem 800MHz Channel 14	1	48	9.0	9.0	100%	9.0	430	430	430	1,467	1,467	2	DC Brkr #20	25A
GTR 8000 Base Radio Subsystem 800MHz Channel 15	1	48	9.0	9.0	100%	9.0	430	430	430	1,467	1,467	2	DC Brkr #21	25A
GTR 8000 Base Radio Subsystem 800MHz Channel 16	1	48	9.0	9.0	100%	9.0	430	430	430	1,467	1,467	2	DC Brkr #22	25A
GTR 8000 Base Radio Subsystem 800MHz Channel 17	1	48	9.0	9.0	100%	9.0	430	430	430	1,467	1,467	2	DC Brkr #23	25A
GTR 8000 Base Radio Subsystem 800MHz Channel 18	1	48	9.0	9.0	100%	9.0	430	430	430	1,467	1,467	2	DC Brkr #24	25A
GTR 8000 Base Radio Subsystem 800MHz Channel 19	1	48	9.0	9.0	100%	9.0	430	430	430	1,467	1,467	2	DC Brkr #25	25A
GTR 8000 Base Radio Subsystem 800MHz Channel 20	1	48	9.0	9.0	100%	9.0	430	430	430	1,467	1,467	2	DC Brkr #26	25A
CCGW #3	1	48	1.7	1.7	100%	1.7	80	80	80	273	273	2	DC Brkr #27	5A
CCGW #4	1	48	1.7	1.7	100%	1.7	80	80	80	273	273	2	DC Brkr #28	5A
Site Router 02	1	48	1.7	1.7	100%	1.7	80	80	80	273	273	2	DC Brkr #29	5A
120VAC Power Converter (LAN Switch #2)	1	48	6.3	6.3	100%	6.3	300	300	300	1,024	1,024	2	DC Brkr #30	10A
Total -48 VDC Power Requirements				207.9		207.9		9,980	9,980		34,053			

MFC Dispatch Site

120 VAC POWER REQUIREMENTS

Equipment	Qty	Voltage (VAC)	Current per Unit (A)	Total Current (A)	Duty Cycle (%)	Total Current (A) @ Duty Cycle	Power per Unit (W)	Total Power (W)	Total Power (W) @ Duty Cycle	BTU/hr per Unit	Total BTU/hr	Rack#	Circuit#	Breaker Size
Site Gateway 01	1	120	0.5	0.5	100%	0.5	60	60	60	205	205	1	Circuit #1	20A
LAN Switch 01	1	120	0.8	0.8	100%	0.8	100	100	100	341	341	1		
Proxy Server 01	1	120	5.0	5.0	100%	5.0	600	600	600	2,047	2,047	1		
Conventional Channel Gateway (CCGW) 1-2	2	120	0.5	1.0	100%	1.0	60	120	120	205	409	1		
Conventional Site Controller	1	120	2.9	2.9	100%	2.9	350	350	350	1,194	1,194	1		
Site Gateway 02	1	120	0.5	0.5	100%	0.5	60	60	60	205	205	1	Circuit #2	20A
LAN Switch 02	1	120	0.8	0.8	100%	0.8	100	100	100	341	341	1		
Proxy Server 02	1	120	5.0	5.0	100%	5.0	600	600	600	2,047	2,047	1		
Conventional Channel Gateway (CCGW) 3-4	2	120	0.5	1.0	100%	1.0	60	120	120	205	409	1		
Proxy Firewall	1	120	2.0	2.0	100%	2.0	240	240	240	819	819	1		
Verint Server #1	1	120	10.0	10.0	100%	10.0	1200	1,200	1,200	4,095	4,095	2	Circuit #3	15A
Verint Server #2	1	120	10.0	10.0	100%	10.0	1200	1,200	1,200	4,095	4,095	2	Circuit #4	15A
Verint Server #3	1	120	10.0	10.0	100%	10.0	1200	1,200	1,200	4,095	4,095	2	Circuit #5	15A
Verint Server #4	1	120	10.0	10.0	100%	10.0	1200	1,200	1,200	4,095	4,095	2	Circuit #6	15A
ASX Dispatch Position	72	120	5.0	360.0	100%	360.0	600	43,200	43,200	2,047	147,405	N/A	N/A	N/A
ASX Dispatch Audio Interface	72	120	0.4	30.0	100%	30.0	50	3,600	3,600	171	12,284	N/A	N/A	N/A
ASX Dispatch Monitor	72	120	0.3	19.8	100%	19.8	33	2,376	2,376	113	8,107	N/A	N/A	N/A
Total 120 VAC Power Requirements				469.4		469.4		56,326	56,326		192,192			

OCD Dispatch Site

120 VAC POWER REQUIREMENTS

Equipment	Qty	Voltage (VAC)	Current per Unit (A)	Total Current (A)	Duty Cycle (%)	Total Current (A) @ Duty Cycle	Power per Unit (W)	Total Power (W)	Total Power (W) @ Duty Cycle	BTU/hr per Unit	Total BTU/hr	Rack#	Circuit#	Breaker Size
Site Gateway 01	1	120	0.5	0.5	100%	0.5	60	60	60	205	205	1	Circuit #1	20A
LAN Switch 01	1	120	0.8	0.8	100%	0.8	100	100	100	341	341	1		
Proxy Server 01	1	120	5.0	5.0	100%	5.0	600	600	600	2,047	2,047	1		
Conventional Channel Gateway (CCGW) 1-2	2	120	0.5	1.0	100%	1.0	60	120	120	205	409	1		
Conventional Site Controller	1	120	2.9	2.9	100%	2.9	350	350	350	1,194	1,194	1		
Site Gateway 02	1	120	0.5	0.5	100%	0.5	60	60	60	205	205	1	Circuit #2	20A
LAN Switch 02	1	120	0.8	0.8	100%	0.8	100	100	100	341	341	1		
Proxy Server 02	1	120	5.0	5.0	100%	5.0	600	600	600	2,047	2,047	1		
Conventional Channel Gateway (CCGW) 3-4	2	120	0.5	1.0	100%	1.0	60	120	120	205	409	1		
Proxy Firewall	1	120	2.0	2.0	100%	2.0	240	240	240	819	819	1		
Verint Server #1	1	120	10.0	10.0	100%	10.0	1200	1,200	1,200	4,095	4,095	2	Circuit #3	15A
Verint Server #2	1	120	10.0	10.0	100%	10.0	1200	1,200	1,200	4,095	4,095	2	Circuit #4	15A
Verint Server #3	1	120	10.0	10.0	100%	10.0	1200	1,200	1,200	4,095	4,095	2	Circuit #5	15A
Verint Server #4	1	120	10.0	10.0	100%	10.0	1200	1,200	1,200	4,095	4,095	2	Circuit #6	15A
ASX Dispatch Position	28	120	5.0	140.0	100%	140.0	600	16,800	16,800	2,047	57,324	N/A	N/A	N/A
ASX Dispatch Audio Interface	28	120	0.4	11.7	100%	11.7	50	1,400	1,400	171	4,777	N/A	N/A	N/A
ASX Dispatch Monitor	28	120	0.3	7.7	100%	7.7	33	924	924	113	3,153	N/A	N/A	N/A
Total 120 VAC Power Requirements				219.0		219.0		26,274	26,274		89,651			

6.3 RACKFACE DIAGRAMS



Transmit / Receive Site

RU

800MHz Rack	800Mhz Rack	RF Rack	DC Power Rack
			DC Breakers
Rack RMC	Rack RMC	Site RMC	DC Breakers
		Junction Panel	DC Breakers
TRAK 9100 GPS Clock		Junction Panel Open Space	
		RX Tray	
		Site-LNA	
CCGW #1	CCGW #3	TX Filter #1	
CCGW #2	CCGW #4	TX Filter #2	
LAN Switch #1	LAN Switch #2		
Site Router #1	Site Router #2		
GTR #1	GTR #11		
		800MHz Combiner #1	
GTR #2	GTR #12		
GTR #3	GTR #13	800MHz Combiner #2	
GTR #4	GTR #14		
GTR #%	GTR #15	800MHz Combiner #3	
GTR #6	GTR #16	800MHz Combiner #4	
GTR #7	GTR #17		
GTR #8	GTR #18		
GTR #9	GTR #19		
GTR #10	GTR #20		

Prime Site Location

Prime Site Rack		DC Power Rack
RU		
48	TRAK 9100 GPS Clock	DC Breakers
47		
46		DC Breakers
45		
44		DC Breakers
43	Site Router #1	
42	Site Router #2	DC Breakers
41	LAN Switch #1	
40	LAN Switch #2	
39	Sub-Site Router #1	
38	Sub-Site Router #2	DC Rectifiers
37	Backhaul Switch #1	
36	Backhaul Switch #2	
35	CCGW #1	
34	CCGW #2	
33	CCGW #3	
32	CCGW #4	
31		
30	GRV #19 & #20	
29		
28		
27	GRV #17 & #18	
26		
25		
24	GRV #15 & #16	
23		
22		
21	GRV #13 & #14	
20		
19		
18	GRV #11 & #12	
17		
16		
15	GRV #9 & #10	
14		
13		
12	GRV #7 & #8	
11		
10		
9	GRV #5 & #6	
8		
7		
6	GRV #3 & #4	
5		
4		
3	GRV #1 & #2	
2		
1		

Dispatch Location

RU		Dispatch	Logging Recorder
48		AC Breakers	AC Breakers
47			
46			
45			
44			
43			
42			
41		Site Router #1	Logging Recorder LAN Switch
40		Site Router #2	
39		LAN Switch #1	NICE Logging Recorder
38		LAN Switch #2	
37		Firewall #1	
36			
35		Aux I/O	NICE NRX Logging Recorder
34			
33		CCGW #1	
32		CCGW #2	
31		CCGW #3	NICE Storage Center
30			
29		MCC7500 Proxy Server	
28			
27			KVM
26			
25			
24			
23			
22			
21			
20			
19			
18			
17			
16			
15			NICE Replay Station
14			
13			
12			
11			
10			MCC7500 AIS VPM
9			MCC7500 AIS
8			
7			
6			
5			
4			
3		GCP 8000 Site Controller	
2			
1			

SECTION 7

COVERAGE MAPS

The sub-sections below contain the coverage prediction maps for the proposed solution.

7.1 GUARANTEED MAP

7.1.1 Portable – 25kHz Inbound



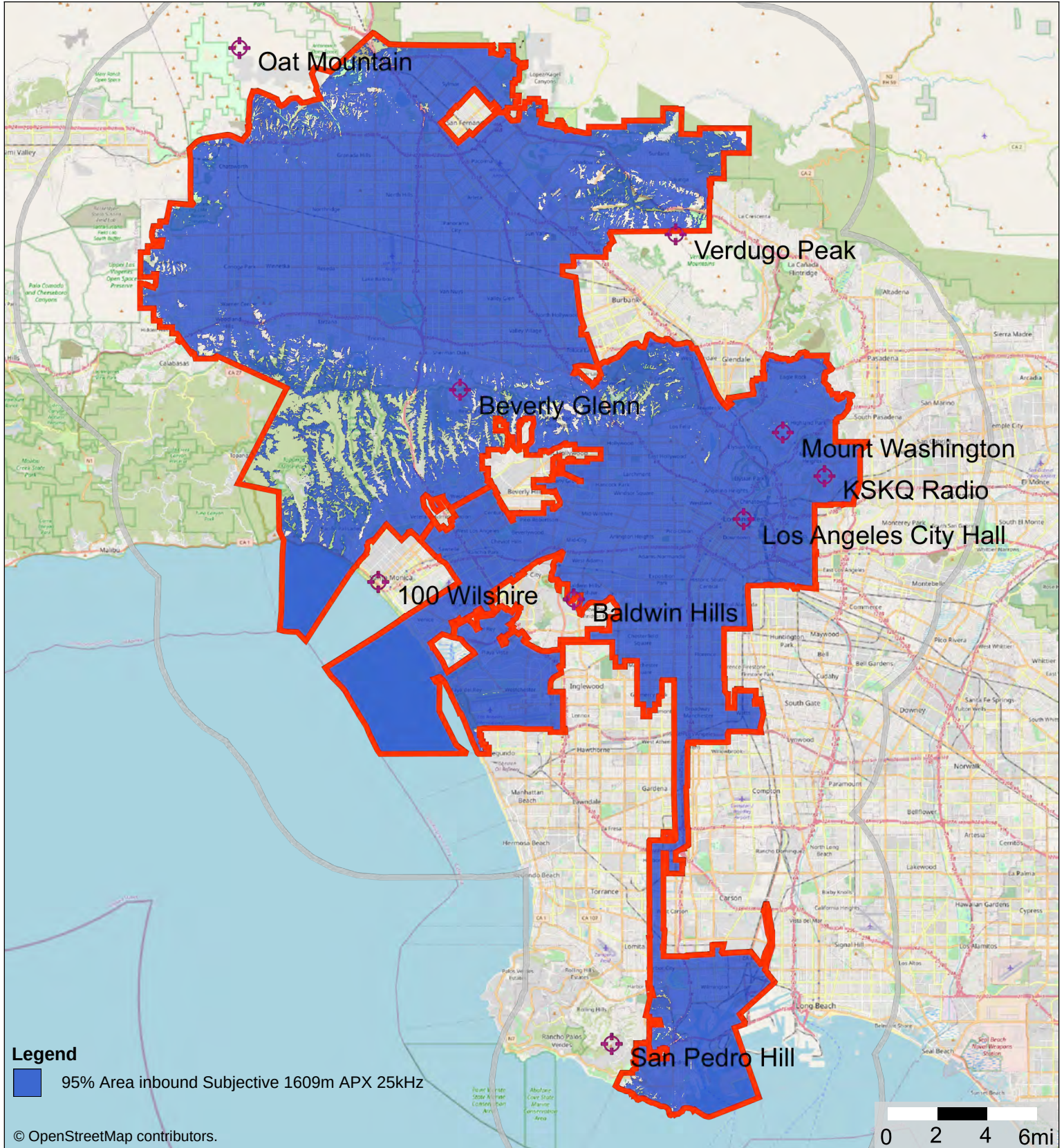


Los Angeles Fire Department - 800MHz Analog VRS

This map is subject to change based upon as-built configuration.

MOTOROLA
SOLUTIONS

DAQ3.0 - 25kHz APX Portable Inbound



Printed: 7/29/2021
System version: 2.8.7

3W APX8000HXE w. XE Antenna
Belt Clip w. XE RSM
Portable on Street

Solution: CA_LAFD
Project: 2021 LAFD Analog
Design: Design 12 Alex_CATP_IB_Subj
fh786

This map is intended solely for the equipment configuration stated above.
Coverage can vary significantly if different configurations are used.

7.2 INFORMATIONAL PURPOSES ONLY MAPS

7.2.1 Portable – 25kHz Outbound





Los Angeles Fire Department - 800MHz Analog VRS

This map is not guaranteed and is subject to change based upon as-built configuration.

MOTOROLA
SOLUTIONS

Information Only: 25kHz APX Portable Outbound



Printed: 7/29/2021
System version: 2.8.7

3W APX8000HXE w. XE Antenna
Belt Clip w. XE RSM
Portable on Street

Solution: CA_LAFD
Project: 2021 LAFD Analog
Design: Design 16
fhf786

This map is intended solely for the equipment configuration stated above.
Coverage can vary significantly if different configurations are used.

7.2.2 Mobile – 25kHz Inbound



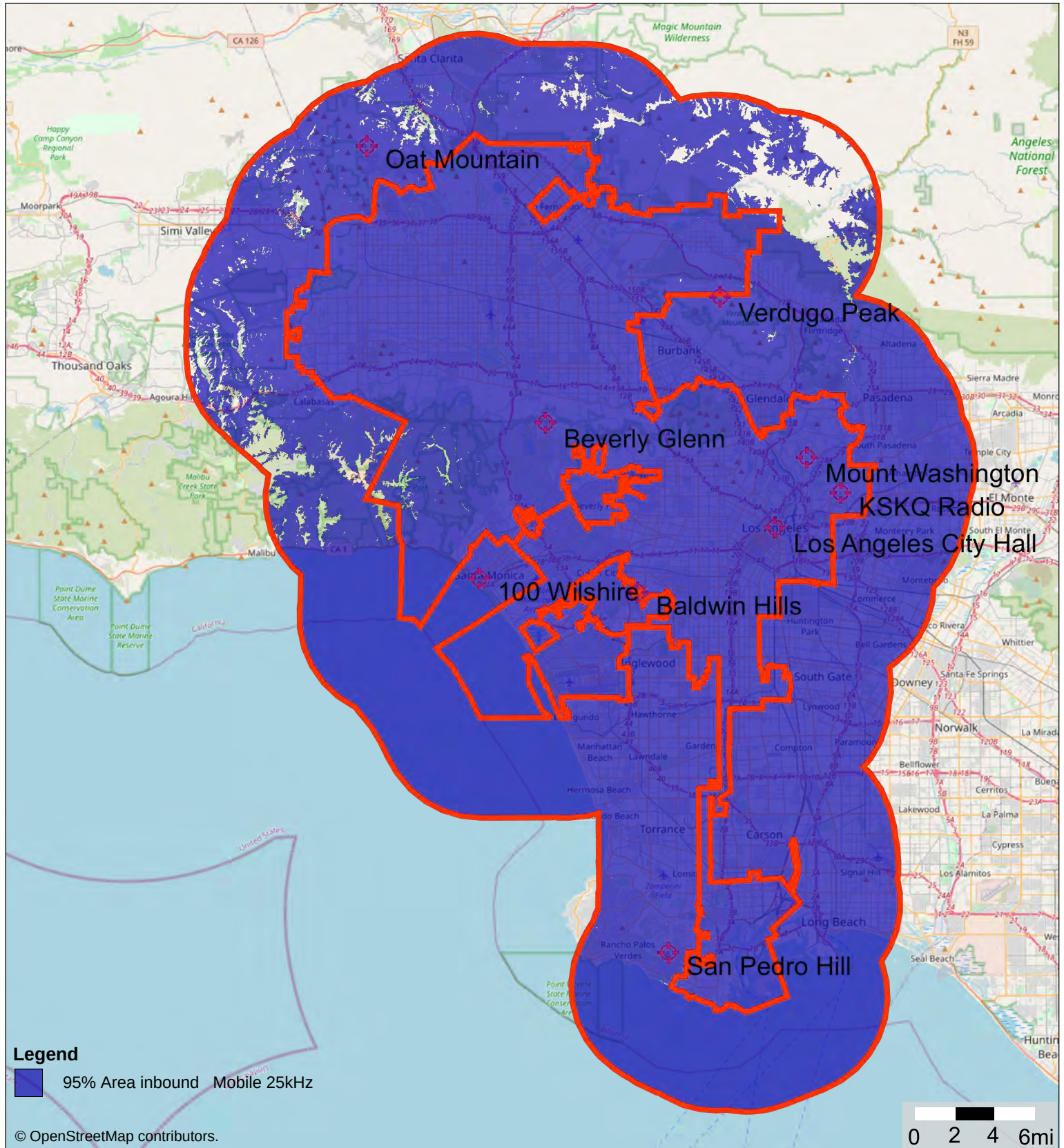


Los Angeles Fire Department - 800MHz Analog VRS

This map is not guaranteed and is subject to change based upon as-built configuration.

MOTOROLA
SOLUTIONS

Information Only: 25kHz APX Mobile Inbound



Printed: 7/29/2021
System version: 2.8.7

35W APX 8500 Mobile
All-Band Roof Mount

Solution: CA_LAFD
Project: 2021 LAFD Analog
Design: Design 16
fhf786

This map is intended solely for the equipment configuration stated above.
Coverage can vary significantly if different configurations are used.

7.2.3 Mobile – 25kHz Outbound



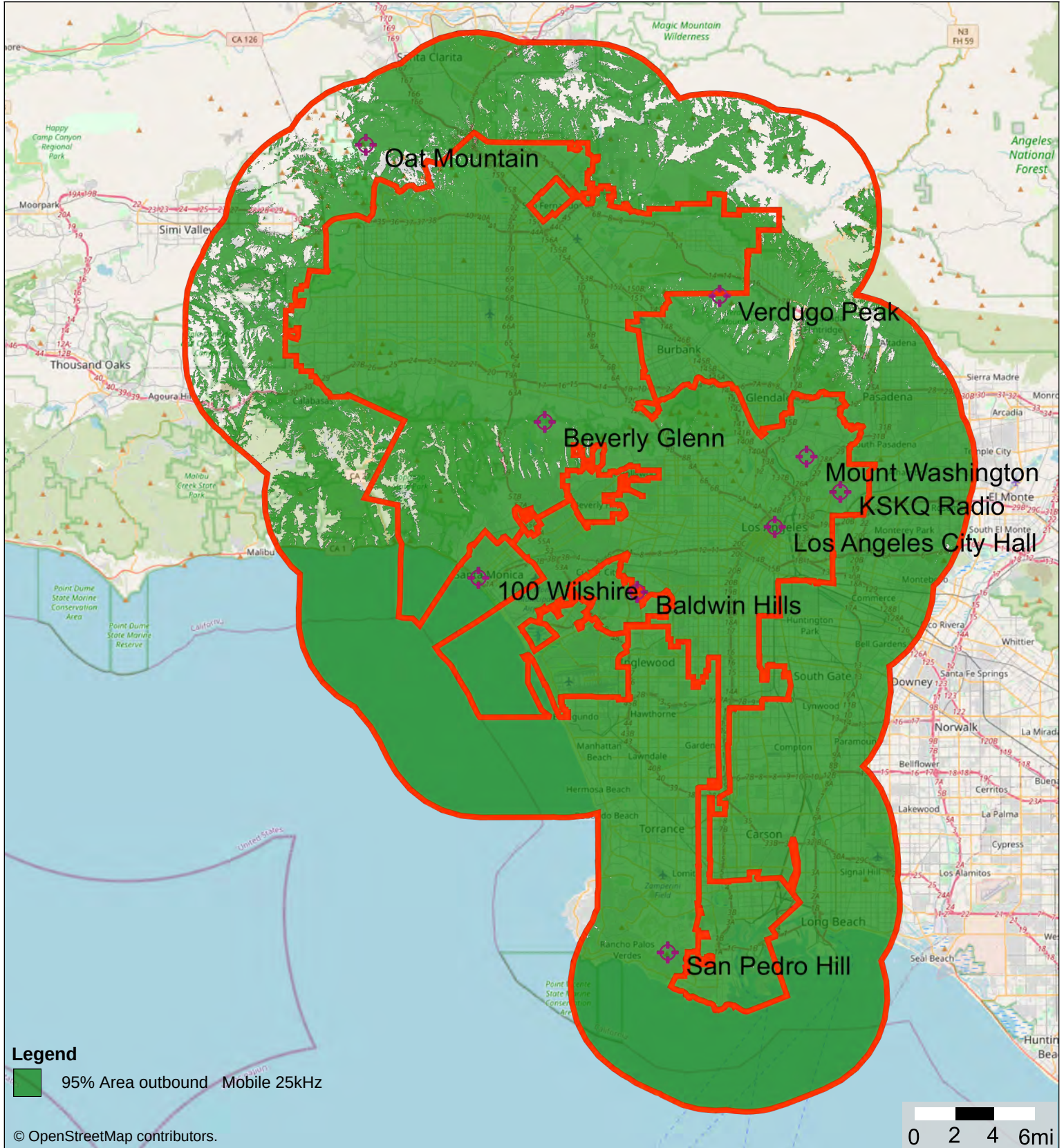


Los Angeles Fire Department - 800MHz Analog VRS

This map is not guaranteed and is subject to change based upon as-built configuration.

MOTOROLA
SOLUTIONS

Information Only: 25kHz APX Mobile Outbound



Printed: 7/29/2021
System version: 2.8.7

35W APX 8500 Mobile
All-Band Roof Mount

Solution: CA_LAFD
Project: 2021 LAFD Analog
Design: Design 16
fhf786

This map is intended solely for the equipment configuration stated above.
Coverage can vary significantly if different configurations are used.

7.2.4 Portable – 12.5kHz Inbound



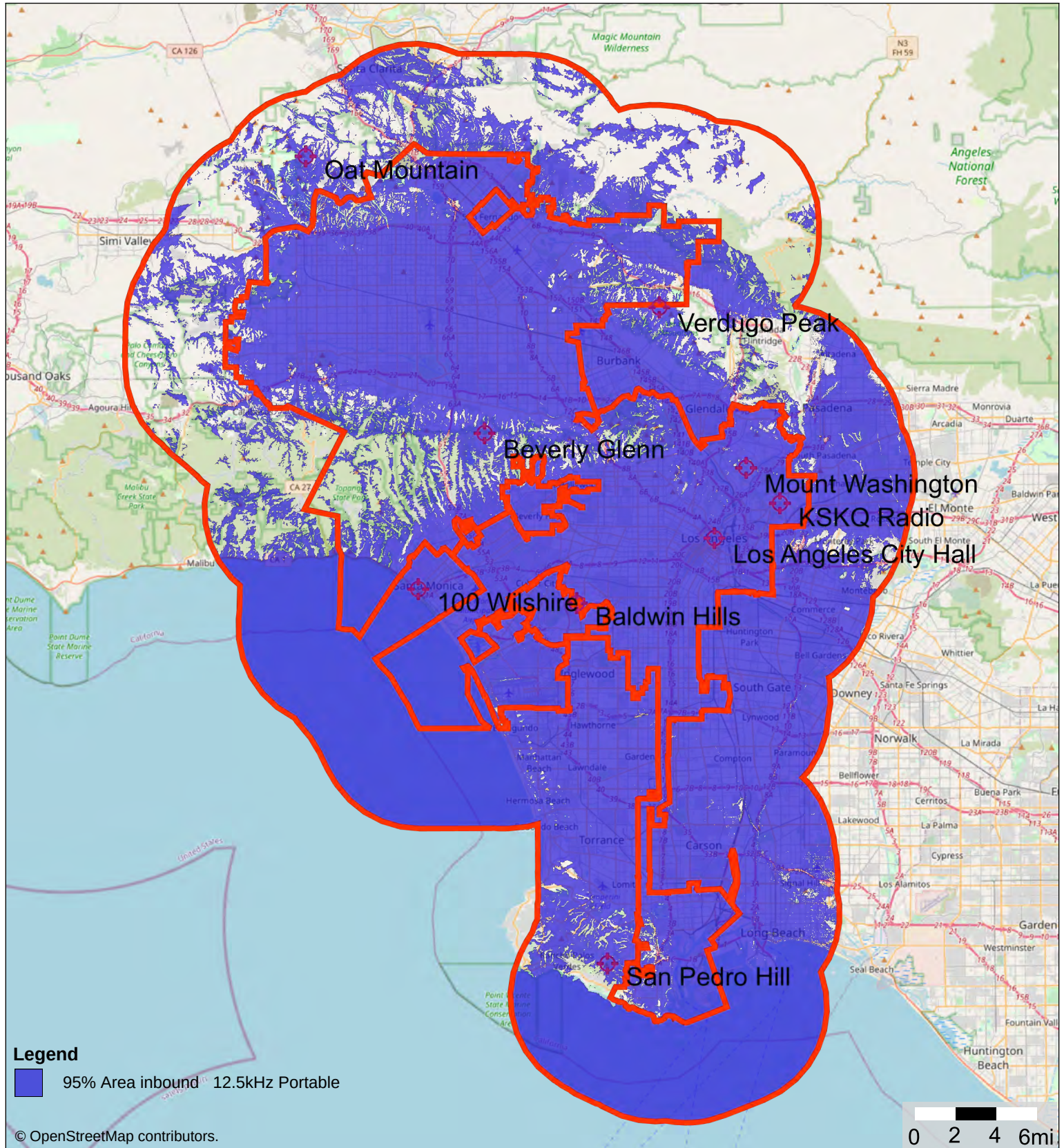


Los Angeles Fire Department - 800MHz Analog VRS

This map is subject to change based upon as-built configuration.

MOTOROLA
SOLUTIONS

Information Only: 12.5kHz APX Portable Inbound



Printed: 7/29/2021
System version: 2.8.7

3W APX8000HXE w. XE Antenna
Belt Clip w. XE RSM
Portable on Street

Solution: CA_LAFD
Project: 2021 LAFD Analog
Design: Design 14 12.5KHz
fh786

This map is intended solely for the equipment configuration stated above.
Coverage can vary significantly if different configurations are used.

7.2.5 Portable – 12.5kHz Outbound



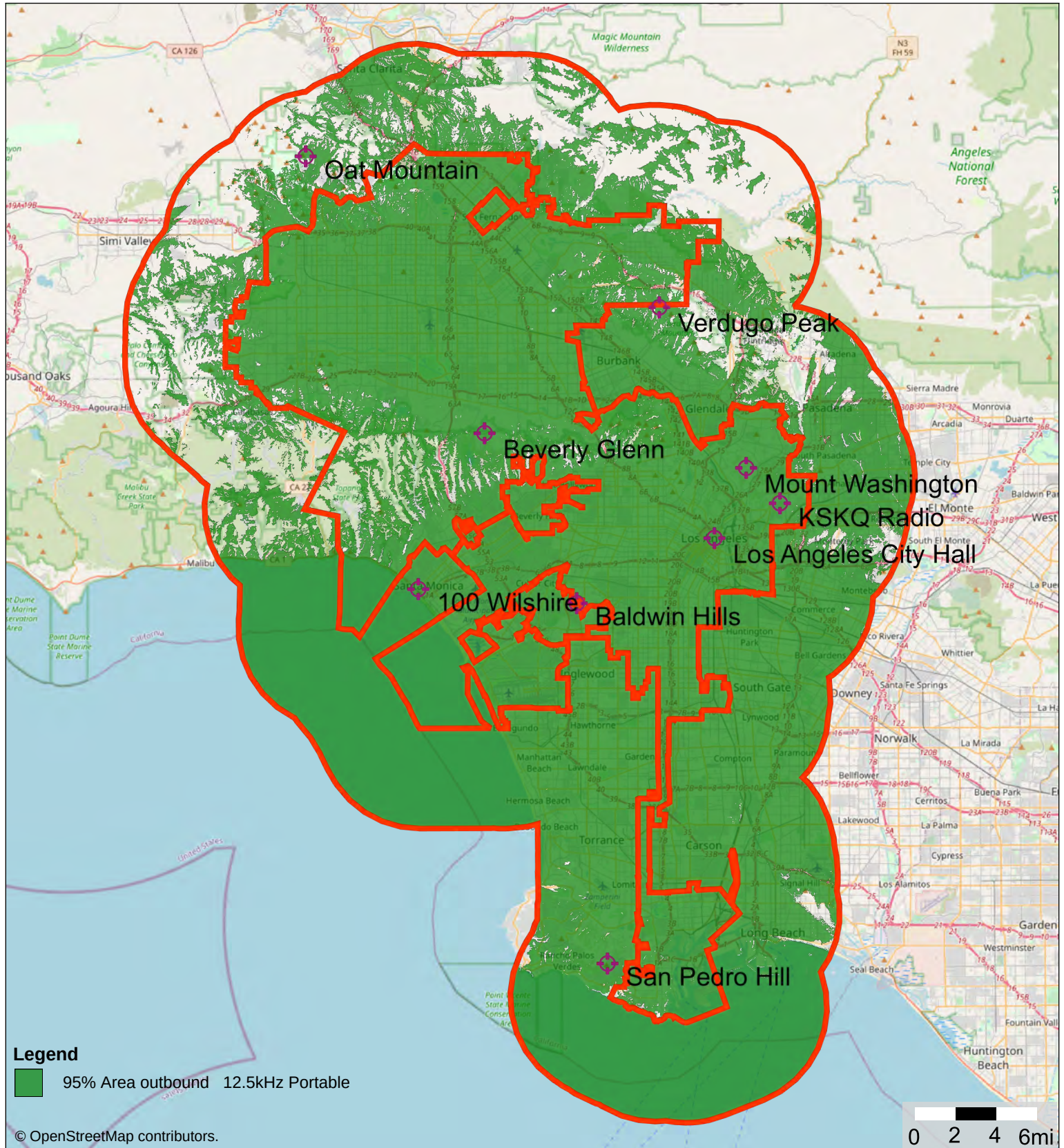


Los Angeles Fire Department - 800MHz Analog VRS

This map is subject to change based upon as-built configuration.

MOTOROLA
SOLUTIONS

Information Only: 12.5kHz APX Portable Outbound



Printed: 7/29/2021
System version: 2.8.7

3W APX8000HXE w. XE Antenna
Belt Clip w. XE RSM
Portable on Street

Solution: CA_LAFD
Project: 2021 LAFD Analog
Design: Design 14 12.5KHz
fh786

This map is intended solely for the equipment configuration stated above.
Coverage can vary significantly if different configurations are used.

7.2.6 Mobile – 12.5kHz Inbound



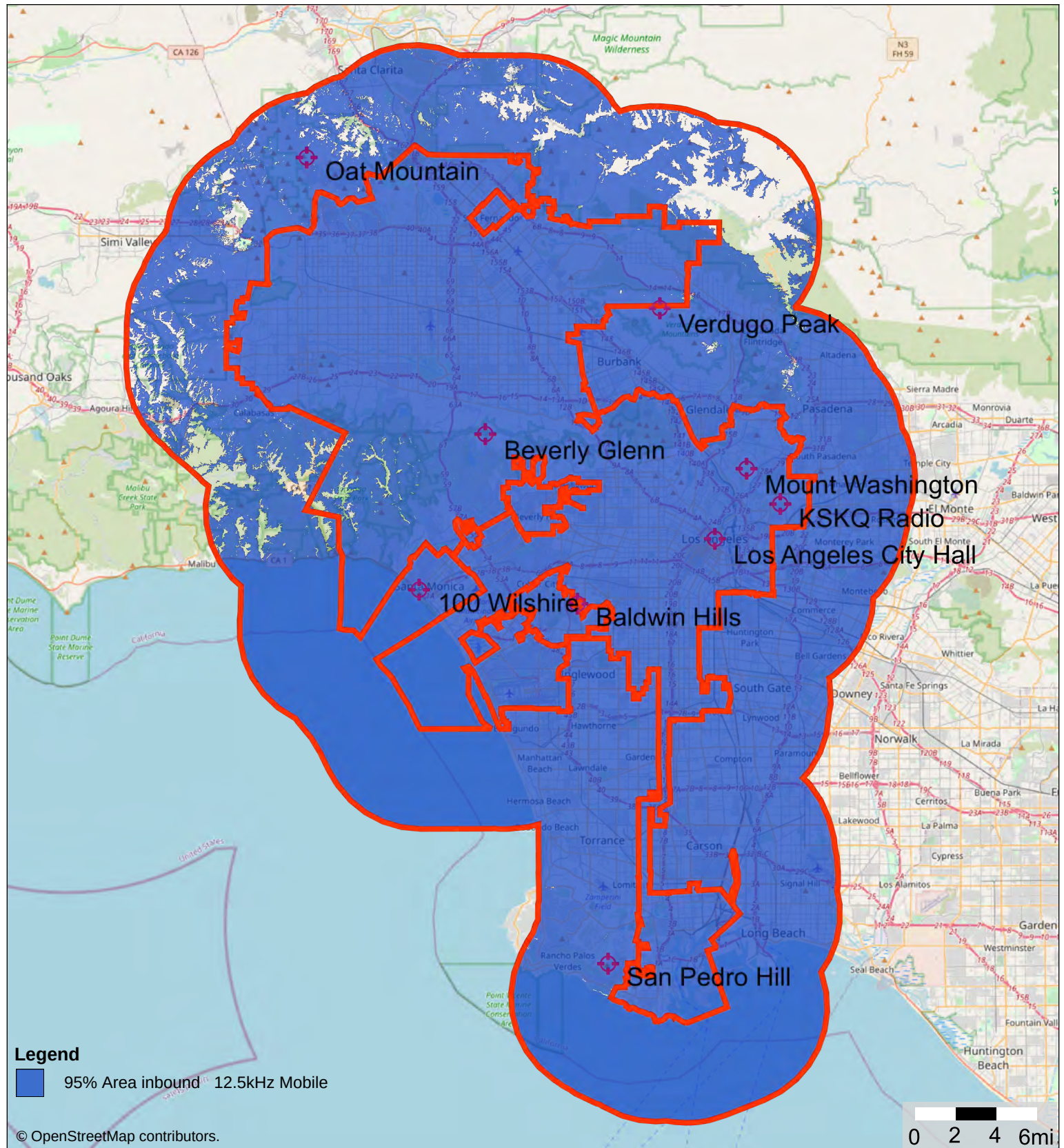


Los Angeles Fire Department - 800MHz Analog VRS

This map is subject to change based upon as-built configuration.

MOTOROLA
SOLUTIONS

Information Only: 12.5kHz APX Mobile Inbound



Printed: 7/29/2021
System version: 2.8.7

35W APX 8500 Mobile
All-Band Roof Mount

Solution: CA_LAFD
Project: 2021 LAFD Analog
Design: Design 14 12.5kHz
fh786

This map is intended solely for the equipment configuration stated above.
Coverage can vary significantly if different configurations are used.

7.2.7 Mobile – 12.5kHz Outbound



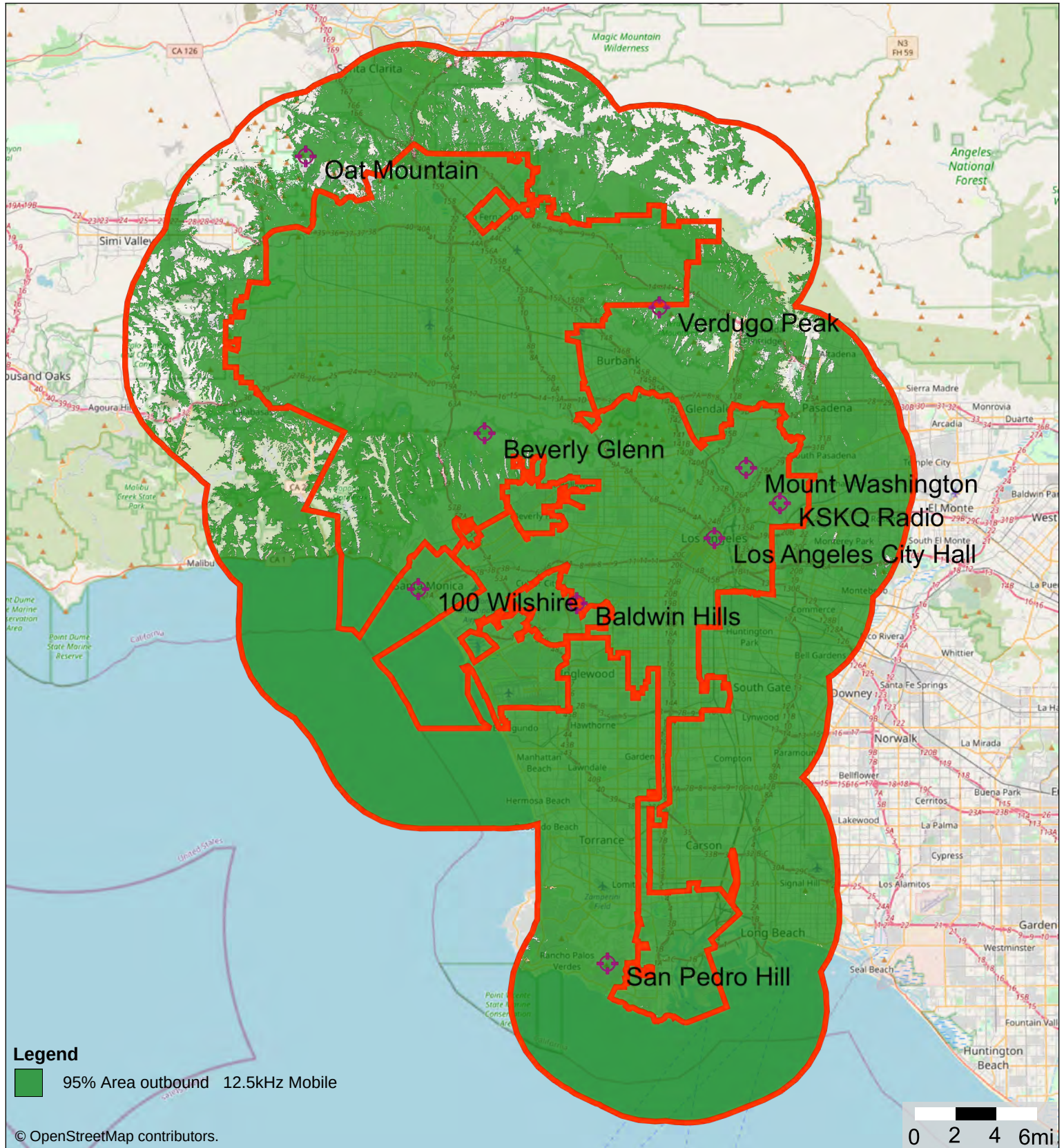


Los Angeles Fire Department - 800MHz Analog VRS

This map is subject to change based upon as-built configuration.

MOTOROLA
SOLUTIONS

Information Only: 12.5kHz APX Mobile Outbound



Printed: 7/29/2021
System version: 2.8.7

35W APX 8500 Mobile
All-Band Roof Mount

Solution: CA_LAFD
Project: 2021 LAFD Analog
Design: Design 14 12.5kHz
fh786

This map is intended solely for the equipment configuration stated above.
Coverage can vary significantly if different configurations are used.

7.3 BASELINE COVERAGE TEST(S) GRID MAP – INBOUND PORTABLE ON STREET – 25HKZ



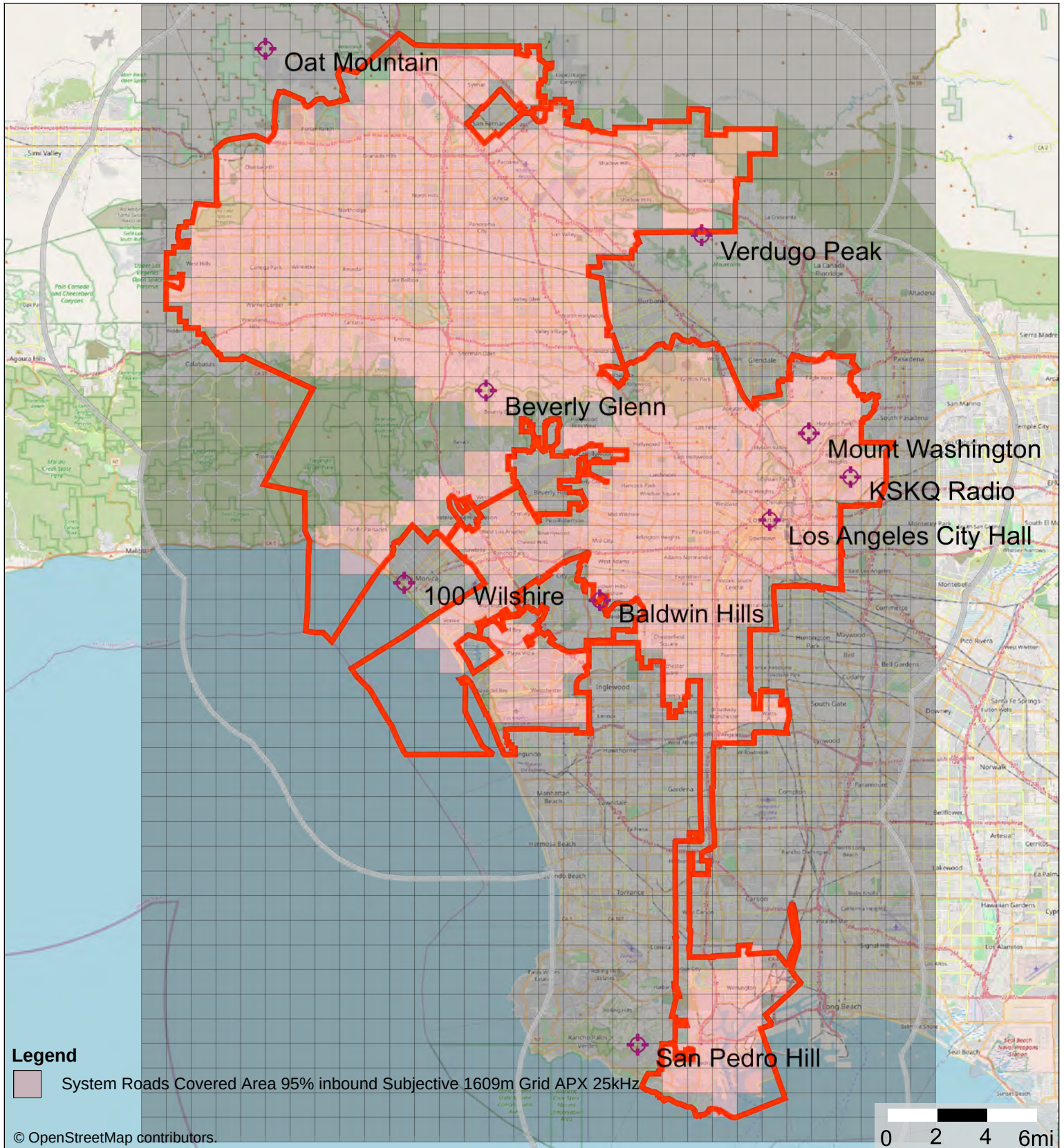


MOTOROLA
SOLUTIONS

Los Angeles Fire Department - 800MHz Analog VRS

This map is subject to change based upon as-built configuration.

CATP Grid Map - On-Roads
DAQ3.0 - 25kHz APX Portable Inbound



Printed: 7/29/2021
System version: 2.8.7

3W APX800HXE w. XE Antenna
Belt Clip w. XE RSM
Portable on Street

Solution: CA_LAFD
Project: 2021 LAFD Analog
Design: Design 12 Alex_CATP_IB_Subj
fhd786

This map is intended solely for the equipment configuration stated above.
Coverage can vary significantly if different configurations are used.

7.4 GUARANTEED CATP GRID MAP – INBOUND PORTABLE ON STREET – 25HKZ



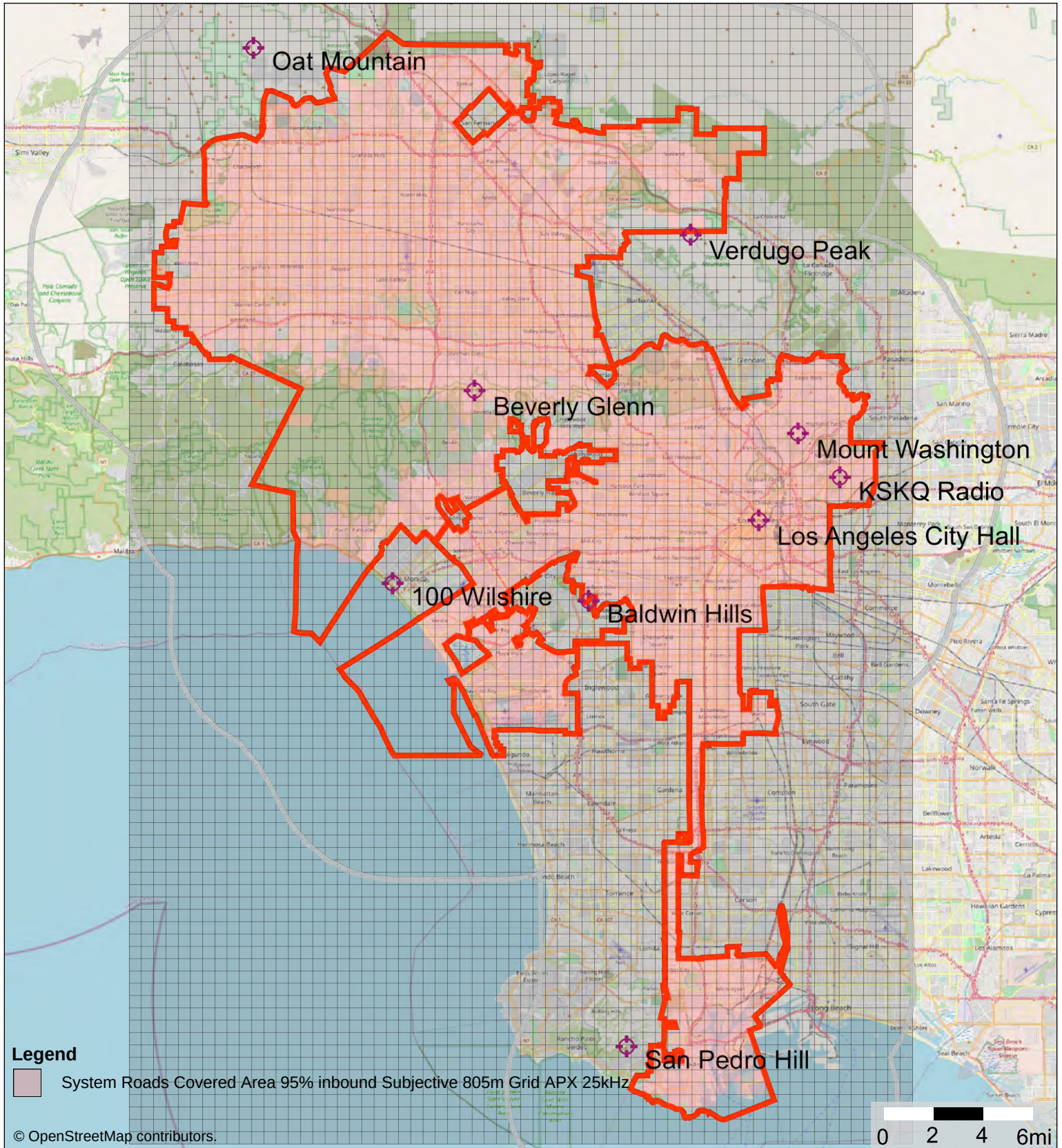


MOTOROLA
SOLUTIONS

Los Angeles Fire Department - 800MHz Analog VRS

This map is subject to change based upon as-built configuration.

CATP Grid Map - On-Roads
DAQ3.0 - 25kHz APX Portable Inbound



Printed: 9/02/2021
System version: 2.8.8

3W APX800HXE w. XE Antenna
Belt Clip w. XE RSM
Portable on Street

Solution: CA_LAFD
Project: 2021 LAFD Analog
Design: Design 18 CATP_IB_Sub_5mi
fh786

This map is intended solely for the equipment configuration stated above.
Coverage can vary significantly if different configurations are used.

SECTION 8

DESIGN ASSUMPTIONS

This City Contract's with Motorola and this Proposal is based on a firm-fixed price, not time and materials. To manage risk both for Motorola and for LAFD / the City Motorola has made the following assumptions.

- Existing sites and/or other equipment locations will have adequate space available for the system as described.
 - Motorola's proposal is based on the assumption that existing equipment will be replaced with new equipment that is of the same size or smaller and, unless otherwise described in the proposal, will be placed in the current existing equipment locations. Motorola is assuming that existing equipment that will be replaced will be removed and will not remain at the location and therefore no additional space will be required.
- Existing sites and/or other equipment locations will have adequate electrical power and site grounding suitable to support the requirements of the system as described.
 - Motorola's proposal is based on the assumption that each site is adequately powered to support the existing system and that power and grounding is sufficient for the new system. As described in the proposal, if a site has enough power and grounding capacity to include all 20 channels (18 current, plus 2 new), then this will be done at the time of installation. If the site does not have sufficient power for the expanded capacity at this time, then only the existing, currently supported channels will be installed, but the system will be ready for the new channels, when the power and grounding are sufficient to support them.
- Existing towers will have adequate space and size to support the antenna network requirements of the system as described.
 - Motorola's proposal is based on the assumption that existing tower space and loading capacity will support the new system, as described, since the proposed antennas that will replace existing antennas are of the same or lesser weight than the existing antennas and that the existing antennas will be removed by Motorola as part of the installation of the new antennas.
- Tower stress analysis or upgrades are not required.
 - Motorola will conduct Tower Loading Studies to verify, but this proposal is based upon the assumption that current tower space and loading is sufficient to support the proposed new antennas as they will replace existing antenna and be of the same or less weight as the antenna being replaced.
- Additional site and/or location upgrades or modifications are not in-scope.
 - Motorola's proposal is based on the assumption that all sites are adequately built to accommodate the existing radio system and that the new system, as proposed, will not require additional space, power or environmental improvements, beyond those that are specifically included in the proposal. Additional site improvements that may be required, even for the current radio system, are not in scope and are the City's responsibility.
- Approved FCC licensing will be provided by the City.
 - The City, as the licensee, is responsible for all FCC license filings. Motorola will provide information (e.g. contour maps, antenna patterns) as needed to support FCC license filings.
- Local, State and/or Federal permits will be provided by the City.

- As may be required for the installation and operation of the proposed equipment, Motorola assumes the City will file for and provide any required permits.
- All required interconnections and backhaul infrastructure will be provided by the City.
 - Motorola assumes that the City will provide Motorola with adequate network access as described in the proposal to each of the included sites using existing network infrastructure, such as interconnections and backhaul. Any additions and or changes that may be required to the existing interconnections and backhaul infrastructure will be the responsibility of the City.
 - Motorola will configure the Cisco MPLS routers on the Microwave network to accommodate the proposed system.
- Motorola will provide a single delivery point for receipt, inventory and storage of equipment prior to delivery to the sites. Warehousing has been included for a time period up to two years from delivery.
 - Motorola assumes that all equipment will first be delivered to a single warehouse where all equipment will be delivered for receipt, inventory and storage and used as a central distribution site for remote site installations.
- Ethernet network connectivity is available at all voter, remote and dispatch site locations.
 - Motorola assumes that Ethernet network access will be available at each site/location in accordance with the Backhaul Requirements section of this Proposal.
- All work to be performed during normal business hours.
 - Motorola assumes that all work will be performed during normal business hours, Monday – Friday between 0700 – 1500.



SECTION 9

EQUIPMENT LISTS

9.1 VRS CORE EQUIPMENT LIST

Qty.	Nomenclature	Description
1	SQM01SUM0323	ASTRO MASTER SITE
1	CA03515AC	ADD: NEW PRIMARY ZONE CORE
1	CA03512AB	ADD: REDUNDANCY
1	CA03508AA	ADD: CABINET
22	UA00156AA	ADD: CONSOLE LICENSES (QTY
1	CA03721AA	ADD: SLC8000 TS 16 PORT EXPANSION M
2	UA00136AA	ADD: UNIFIED NETWORK CONFIGURATOR (
2	UA00147AA	ADD: PROVISIONING MANAGER
10	CA01316AA	ADD: UNC ADDTL DEVICE LIC (QTY 10)
1	CA01416AH	ADD: SYS STATISTICS SVR AND HISTORI
1	UA00135AA	ADD: PROVISIONING MANAGER INTERFACE
2	UA00146AA	ADD: UNIFIED EVENT MANAGER (UEM)
1	UA00142AA	ADD: CADI SOFTWARE OPTION
1	UA00138AA	ADD: FLEXIBLE ATIA
1	UA00225AA	ADD: UEM ENHANCED NAVIGATION
1	UA00227AA	ADD: UEM SNMP ELEMENT MANAGEMENT TO
1	UA00139AA	ADD: NORTHBOUND INTERFACE
2	ZA00104AA	ENH: TECHNICAL ASSISTANCE, FORTY HR
50	T8742	MCAFFEE FOR WINDOWS CLIENT, A2019.2
1	DLN6455	CONFIGURATION/SERVICE SOFTWARE
1	DVN4046B	MASTER SYSTEM KEY STARTER KIT
1	T7776	ISSI 8000 / CSSI 8000 UPGRAGE Softw
1	UA00005AA	ADD: ISSI Automatic Roaming License
2	CVN6565	SPARE CABINET ASTRO 7.9 & BEYOND
1	CLN1868	2930F 24-PORT SWITCH
1	DSTRAK88353M	GPS CLOCK, 10MHZ, RUBIDIUM, 48V INC



Qty.	Nomenclature	Description
1	DSTRAKP001134	AC POWER SUPPLY FOR 8835 GPS CLOCK
1	TT3903A	Z2 G5 MINI WORKSTATION NON RETURNAB
1	DSTG191B	TECH GLOBAL EVOLUTION SERIES 19INCH
1	DLN6692	PRINTER HP LASERJET 110V
2	T8126	FORTINET FIREWALL APPLIANCE
1	CLN1868	2930F 24-PORT SWITCH
1	SQM01SUM0206	ENHANCED TELEPHONE INTERCONNECT
6	CA01778AA	ADD: CAPACITY FOR 3 CALL LINES
1	DSQ24FR000000139550	MOTO BASE DL160 (RADIO ONLY)
1	TT3316	THREE LINE NON JITC COMPLIANT ADD-O
6	TT05501AA	LICENSING, ADDITIONAL 3 SIM. LINES,
2	TT3318	NEC AUDIO CODES M800 DIGITAL TELEPH
1	CVN7288	NON-JITC CONFIGURATION ANALOG/DIGIT
1	CVN6565	SPARE CABINET ASTRO 7.9 & BEYOND
1	DLN8006	FRU: DL380 G10 POWER SUPPLY
1	DLN8007	FRU: DL380 G10 FAN
1	DLN6942	1.2 TB HARD DRIVE
1	DLN6971	FRU: HPE 9.5MM SATA DVD-RW OPTICAL
1	DLN7018	DL 380 G9 ETHERNET CARD
1	DLN8013	FRU: DAS 4525 CHASSIS ONLY
1	DLN8014	FRU: DAS 4525 POWER SUPPLY
1	DLN8016	FRU: DAS 4125 JBOD MODULE
1	DLN8015	FRU: DAS 4525 CONTROLLER MODUL
1	DLN8017	FRU: 600GB HARD DRIVE, DAS 452
1	CKN6975	CABLE, DATA,CABLE, MINI-SAS HD TO M
1	T8492	SITE ROUTER & FIREWALL- AC
1	CA03445AA	ADD: MISSION CRITICAL HARDENING
1	CA03448AA	ADD: STATEFUL FIREWALL
1	CLN1868	2930F 24-PORT SWITCH



9.2 PRIME SITE EQUIPMENT LIST

Qty.	Nomenclature	Description
2	T8547	SITE ROUTER & FIREWALL- DC
2	CA03445AA	ADD: MISSION CRITICAL HARDENING
2	CA03448AA	ADD: STATEFUL FIREWALL
2	CLN1868	2930F 24-PORT SWITCH
1	T7038	GCP 8000 SITE CONTROLLER
2	CA01136AA	MCC 7500 CONVEN SITE OPER
1	CA03678AA	ADD: ASTRO SYSTEM RELEASE 2021.1
2	CA01194AA	ADD: IP BASED MULTISITE SITE CONTRO
1	CA01953AA	ADD: POWER EFFICIENCY PACKAGE
1	CA03111AA	ADD: CEC COMPLIANCE
1	CA01400AA	ADD: POWER CABLE, DC
2	CA01953AA	ADD: POWER EFFICIENCY PACKAGE
2	CA01953AA	ADD: POWER EFFICIENCY PACKAGE
2	CA01953AA	ADD: POWER EFFICIENCY PACKAGE
2	CA01953AA	ADD: POWER EFFICIENCY PACKAGE
2	CA01953AA	ADD: POWER EFFICIENCY PACKAGE
1	T8341	GRV 8000 COMPARATOR
2	CA03084AA	ADD: COMPARATOR
2	CA01949AC	ADD: ANALOG CONV ONLY SW
2	CA01952AC	ADD: ANALOG CONV SIMULCAST SW
2	CA02310AA	ADD: R&TTE CERTIFICATION
2	CA03111AA	ADD: CEC COMPLIANCE
1	CA01400AA	ADD: POWER CABLE, DC
1	T8341	GRV 8000 COMPARATOR
2	CA03084AA	ADD: COMPARATOR
2	CA01949AC	ADD: ANALOG CONV ONLY SW
2	CA01952AC	ADD: ANALOG CONV SIMULCAST SW
2	CA02310AA	ADD: R&TTE CERTIFICATION
2	CA03111AA	ADD: CEC COMPLIANCE

Qty.	Nomenclature	Description
1	CA01400AA	ADD: POWER CABLE, DC
2	CA03086AA	ADD: ANALOG SIDETALK-MDC MUTING
1	T8341	GRV 8000 COMPARATOR
2	CA03084AA	ADD: COMPARATOR
2	CA01949AC	ADD: ANALOG CONV ONLY SW
2	CA01952AC	ADD: ANALOG CONV SIMULCAST SW
2	CA02310AA	ADD: R&TTE CERTIFICATION
2	CA03111AA	ADD: CEC COMPLIANCE
1	CA01400AA	ADD: POWER CABLE, DC
2	CA03086AA	ADD: ANALOG SIDETALK-MDC MUTING
1	T8341	GRV 8000 COMPARATOR
2	CA03084AA	ADD: COMPARATOR
2	CA01949AC	ADD: ANALOG CONV ONLY SW
2	CA01952AC	ADD: ANALOG CONV SIMULCAST SW
2	CA02310AA	ADD: R&TTE CERTIFICATION
2	CA03111AA	ADD: CEC COMPLIANCE
1	CA01400AA	ADD: POWER CABLE, DC
2	CA03086AA	ADD: ANALOG SIDETALK-MDC MUTING
1	T8341	GRV 8000 COMPARATOR
2	CA03084AA	ADD: COMPARATOR
2	CA01949AC	ADD: ANALOG CONV ONLY SW
2	CA01952AC	ADD: ANALOG CONV SIMULCAST SW
2	CA02310AA	ADD: R&TTE CERTIFICATION
2	CA03111AA	ADD: CEC COMPLIANCE
1	CA01400AA	ADD: POWER CABLE, DC
2	CA03086AA	ADD: ANALOG SIDETALK-MDC MUTING
1	F4543	SITE MANAGER BASIC
1	VA00874	ADD: AUX I-O SERV FW CURR ASTRO REL
1	VA00905	ADD:24/48 VDC PS TO SM
3	V592	AAD TERM BLCK & CONN WI



Qty.	Nomenclature	Description
2	T8547	SITE ROUTER & FIREWALL- DC
2	CA03445AA	ADD: MISSION CRITICAL HARDENING
2	CA03448AA	ADD: STATEFUL FIREWALL
2	CLN1868	2930F 24-PORT SWITCH
1	T7038	GCP 8000 SITE CONTROLLER
2	CA01136AA	MCC 7500 CONVEN SITE OPER
1	CA03678AA	ADD: ASTRO SYSTEM RELEASE 2021.1
2	CA01194AA	ADD: IP BASED MULTISITE SITE CONTRO
1	CA01953AA	ADD: POWER EFFICIENCY PACKAGE
1	CA03111AA	ADD: CEC COMPLIANCE
1	CA01400AA	ADD: POWER CABLE, DC
2	CA01953AA	ADD: POWER EFFICIENCY PACKAGE
2	CA01953AA	ADD: POWER EFFICIENCY PACKAGE
2	CA01953AA	ADD: POWER EFFICIENCY PACKAGE
2	CA01953AA	ADD: POWER EFFICIENCY PACKAGE
2	CA01953AA	ADD: POWER EFFICIENCY PACKAGE
1	T8341	GRV 8000 COMPARATOR
2	CA03084AA	ADD: COMPARATOR
2	CA01949AC	ADD: ANALOG CONV ONLY SW
2	CA01952AC	ADD: ANALOG CONV SIMULCAST SW
2	CA02310AA	ADD: R&TTE CERTIFICATION
2	CA03111AA	ADD: CEC COMPLIANCE
1	CA01400AA	ADD: POWER CABLE, DC
2	CA03086AA	ADD: ANALOG SIDETALK-MDC MUTING
1	T8341	GRV 8000 COMPARATOR
2	CA03084AA	ADD: COMPARATOR
2	CA01949AC	ADD: ANALOG CONV ONLY SW
2	CA01952AC	ADD: ANALOG CONV SIMULCAST SW
2	CA02310AA	ADD: R&TTE CERTIFICATION
2	CA03111AA	ADD: CEC COMPLIANCE



Qty.	Nomenclature	Description
1	CA01400AA	ADD: POWER CABLE, DC
2	CA03086AA	ADD: ANALOG SIDETALK-MDC MUTING
1	T8341	GRV 8000 COMPARATOR
2	CA03084AA	ADD: COMPARATOR
2	CA01949AC	ADD: ANALOG CONV ONLY SW
2	CA01952AC	ADD: ANALOG CONV SIMULCAST SW
2	CA02310AA	ADD: R&TTE CERTIFICATION
2	CA03111AA	ADD: CEC COMPLIANCE
1	CA01400AA	ADD: POWER CABLE, DC
2	CA03086AA	ADD: ANALOG SIDETALK-MDC MUTING
1	T8341	GRV 8000 COMPARATOR
2	CA03084AA	ADD: COMPARATOR
2	CA01949AC	ADD: ANALOG CONV ONLY SW
2	CA01952AC	ADD: ANALOG CONV SIMULCAST SW
2	CA02310AA	ADD: R&TTE CERTIFICATION
2	CA03111AA	ADD: CEC COMPLIANCE
1	CA01400AA	ADD: POWER CABLE, DC
2	CA03086AA	ADD: ANALOG SIDETALK-MDC MUTING
1	T8341	GRV 8000 COMPARATOR
2	CA03084AA	ADD: COMPARATOR
2	CA01949AC	ADD: ANALOG CONV ONLY SW
2	CA01952AC	ADD: ANALOG CONV SIMULCAST SW
2	CA02310AA	ADD: R&TTE CERTIFICATION
2	CA03111AA	ADD: CEC COMPLIANCE
1	CA01400AA	ADD: POWER CABLE, DC
2	CA03086AA	ADD: ANALOG SIDETALK-MDC MUTING
1	DSTRAK91008EDC	PRIME/MASTER SITE REDUNDANT MODULAR
4	DSTRAK91061	FOUR PORT DDM
2	DSTRAK93007DC	DISTRIBUTION SHELF FOR 9100 DC
50	DSFSJ150ACABLE	CABLE: 1/4IN SUPERFLEX POLY JKT PER

Qty.	Nomenclature	Description
4	DSF1TNMHC	TYPE N MALE FOR 1/4 IN FSJ1-50A CAB
1	T8492	SITE ROUTER & FIREWALL- AC
1	CA03445AA	ADD: MISSION CRITICAL HARDENING
1	CA03448AA	ADD: STATEFUL FIREWALL
1	CLN1868	2930F 24-PORT SWITCH
1	T8492	SITE ROUTER & FIREWALL- AC
1	CA03445AA	ADD: MISSION CRITICAL HARDENING
1	CA03448AA	ADD: STATEFUL FIREWALL
1	CLN1868	2930F 24-PORT SWITCH

9.3 REMOTE SITE EQUIPMENT LIST (X9)

Qty.	Nomenclature	Description
1	T8547	SITE ROUTER & FIREWALL- DC
1	CA03445AA	ADD: MISSION CRITICAL HARDENING
1	CA03448AA	ADD: STATEFUL FIREWALL
1	T8547	SITE ROUTER & FIREWALL- DC
1	CA03445AA	ADD: MISSION CRITICAL HARDENING
1	CA03448AA	ADD: STATEFUL FIREWALL
2	CLN1868	2930F 24-PORT SWITCH
1	T7039	GTR 8000 Base Radio
1	CA00855AA	ADD: 700/800 MHZ
1	CA01949AA	ADD: ANALOG ONLY CONV SW
1	CA01952AA	ADD: ANALOG CONVENTIONAL SIMULCAST
1	CA02310AA	ADD: R&TTE CERTIFICATION
1	CA03111AA	ADD: CEC COMPLIANCE
1	X153AW	ADD: RACK MOUNT HARDWARE
1	T7039	GTR 8000 Base Radio
1	CA00855AA	ADD: 700/800 MHZ
1	CA01949AA	ADD: ANALOG ONLY CONV SW
1	CA01952AA	ADD: ANALOG CONVENTIONAL SIMULCAST

Qty.	Nomenclature	Description
1	CA02310AA	ADD: R&TTE CERTIFICATION
1	CA03111AA	ADD: CEC COMPLIANCE
1	X153AW	ADD: RACK MOUNT HARDWARE
1	T7039	GTR 8000 Base Radio
1	CA00855AA	ADD: 700/800 MHZ
1	CA01949AA	ADD: ANALOG ONLY CONV SW
1	CA01952AA	ADD: ANALOG CONVENTIONAL SIMULCAST
1	CA02310AA	ADD: R&TTE CERTIFICATION
1	CA03111AA	ADD: CEC COMPLIANCE
1	X153AW	ADD: RACK MOUNT HARDWARE
1	T7039	GTR 8000 Base Radio
1	CA00855AA	ADD: 700/800 MHZ
1	CA01949AA	ADD: ANALOG ONLY CONV SW
1	CA01952AA	ADD: ANALOG CONVENTIONAL SIMULCAST
1	CA02310AA	ADD: R&TTE CERTIFICATION
1	CA03111AA	ADD: CEC COMPLIANCE
1	X153AW	ADD: RACK MOUNT HARDWARE
1	T7039	GTR 8000 Base Radio
1	CA00855AA	ADD: 700/800 MHZ
1	CA01949AA	ADD: ANALOG ONLY CONV SW
1	CA01952AA	ADD: ANALOG CONVENTIONAL SIMULCAST
1	CA02310AA	ADD: R&TTE CERTIFICATION
1	CA03111AA	ADD: CEC COMPLIANCE
1	X153AW	ADD: RACK MOUNT HARDWARE
1	T7039	GTR 8000 Base Radio
1	CA00855AA	ADD: 700/800 MHZ
1	CA01949AA	ADD: ANALOG ONLY CONV SW
1	CA01952AA	ADD: ANALOG CONVENTIONAL SIMULCAST
1	CA02310AA	ADD: R&TTE CERTIFICATION
1	CA03111AA	ADD: CEC COMPLIANCE



Qty.	Nomenclature	Description
1	X153AW	ADD: RACK MOUNT HARDWARE
1	T7039	GTR 8000 Base Radio
1	CA00855AA	ADD: 700/800 MHZ
1	CA01949AA	ADD: ANALOG ONLY CONV SW
1	CA01952AA	ADD: ANALOG CONVENTIONAL SIMULCAST
1	CA02310AA	ADD: R&TTE CERTIFICATION
1	CA03111AA	ADD: CEC COMPLIANCE
1	X153AW	ADD: RACK MOUNT HARDWARE
1	T7039	GTR 8000 Base Radio
1	CA00855AA	ADD: 700/800 MHZ
1	CA01949AA	ADD: ANALOG ONLY CONV SW
1	CA01952AA	ADD: ANALOG CONVENTIONAL SIMULCAST
1	CA02310AA	ADD: R&TTE CERTIFICATION
1	CA03111AA	ADD: CEC COMPLIANCE
1	X153AW	ADD: RACK MOUNT HARDWARE
1	T7039	GTR 8000 Base Radio
1	CA00855AA	ADD: 700/800 MHZ
1	CA01949AA	ADD: ANALOG ONLY CONV SW
1	CA01952AA	ADD: ANALOG CONVENTIONAL SIMULCAST
1	CA02310AA	ADD: R&TTE CERTIFICATION
1	CA03111AA	ADD: CEC COMPLIANCE
1	X153AW	ADD: RACK MOUNT HARDWARE
1	T7039	GTR 8000 Base Radio
1	CA00855AA	ADD: 700/800 MHZ
1	CA01949AA	ADD: ANALOG ONLY CONV SW
1	CA01952AA	ADD: ANALOG CONVENTIONAL SIMULCAST
1	CA02310AA	ADD: R&TTE CERTIFICATION
1	CA03111AA	ADD: CEC COMPLIANCE
1	X153AW	ADD: RACK MOUNT HARDWARE
1	DSTRAK88353M	GPS CLOCK, 10MHZ, RUBIDIUM, 48V INC



Qty.	Nomenclature	Description
1	F4543	SITE MANAGER BASIC
1	VA00874	ADD: AUX I-O SERV FW CURR ASTRO REL
1	VA00905	ADD:24/48 VDC PS TO SM
3	V592	AAD TERM BLCK & CONN WI
2	TRN7343	SEVEN AND A HALF FOOT RACK
1	T8547	SITE ROUTER & FIREWALL- DC
1	CA03445AA	ADD: MISSION CRITICAL HARDENING
1	CA03448AA	ADD: STATEFUL FIREWALL
1	T8547	SITE ROUTER & FIREWALL- DC
1	CA03445AA	ADD: MISSION CRITICAL HARDENING
1	CA03448AA	ADD: STATEFUL FIREWALL
2	CLN1868	2930F 24-PORT SWITCH
1	T7039	GTR 8000 Base Radio
1	CA00855AA	ADD: 700/800 MHZ
1	CA01949AA	ADD: ANALOG ONLY CONV SW
1	CA01952AA	ADD: ANALOG CONVENTIONAL SIMULCAST
1	CA02310AA	ADD: R&TTE CERTIFICATION
1	CA03111AA	ADD: CEC COMPLIANCE
1	X153AW	ADD: RACK MOUNT HARDWARE
1	T7039	GTR 8000 Base Radio
1	CA00855AA	ADD: 700/800 MHZ
1	CA01949AA	ADD: ANALOG ONLY CONV SW
1	CA01952AA	ADD: ANALOG CONVENTIONAL SIMULCAST
1	CA02310AA	ADD: R&TTE CERTIFICATION
1	CA03111AA	ADD: CEC COMPLIANCE
1	X153AW	ADD: RACK MOUNT HARDWARE
1	T7039	GTR 8000 Base Radio
1	CA00855AA	ADD: 700/800 MHZ
1	CA01949AA	ADD: ANALOG ONLY CONV SW
1	CA01952AA	ADD: ANALOG CONVENTIONAL SIMULCAST

Qty.	Nomenclature	Description
1	CA02310AA	ADD: R&TTE CERTIFICATION
1	CA03111AA	ADD: CEC COMPLIANCE
1	X153AW	ADD: RACK MOUNT HARDWARE
1	T7039	GTR 8000 Base Radio
1	CA00855AA	ADD: 700/800 MHZ
1	CA01949AA	ADD: ANALOG ONLY CONV SW
1	CA01952AA	ADD: ANALOG CONVENTIONAL SIMULCAST
1	CA02310AA	ADD: R&TTE CERTIFICATION
1	CA03111AA	ADD: CEC COMPLIANCE
1	X153AW	ADD: RACK MOUNT HARDWARE
1	T7039	GTR 8000 Base Radio
1	CA00855AA	ADD: 700/800 MHZ
1	CA01949AA	ADD: ANALOG ONLY CONV SW
1	CA01952AA	ADD: ANALOG CONVENTIONAL SIMULCAST
1	CA02310AA	ADD: R&TTE CERTIFICATION
1	CA03111AA	ADD: CEC COMPLIANCE
1	X153AW	ADD: RACK MOUNT HARDWARE
1	T7039	GTR 8000 Base Radio
1	CA00855AA	ADD: 700/800 MHZ
1	CA01949AA	ADD: ANALOG ONLY CONV SW
1	CA01952AA	ADD: ANALOG CONVENTIONAL SIMULCAST
1	CA02310AA	ADD: R&TTE CERTIFICATION
1	CA03111AA	ADD: CEC COMPLIANCE
1	X153AW	ADD: RACK MOUNT HARDWARE
1	T7039	GTR 8000 Base Radio
1	CA00855AA	ADD: 700/800 MHZ
1	CA01949AA	ADD: ANALOG ONLY CONV SW
1	CA01952AA	ADD: ANALOG CONVENTIONAL SIMULCAST
1	CA02310AA	ADD: R&TTE CERTIFICATION
1	CA03111AA	ADD: CEC COMPLIANCE



Qty.	Nomenclature	Description
1	X153AW	ADD: RACK MOUNT HARDWARE
1	T7039	GTR 8000 Base Radio
1	CA00855AA	ADD: 700/800 MHZ
1	CA01949AA	ADD: ANALOG ONLY CONV SW
1	CA01952AA	ADD: ANALOG CONVENTIONAL SIMULCAST
1	CA02310AA	ADD: R&TTE CERTIFICATION
1	CA03111AA	ADD: CEC COMPLIANCE
1	X153AW	ADD: RACK MOUNT HARDWARE
1	T7039	GTR 8000 Base Radio
1	CA00855AA	ADD: 700/800 MHZ
1	CA01949AA	ADD: ANALOG ONLY CONV SW
1	CA01952AA	ADD: ANALOG CONVENTIONAL SIMULCAST
1	CA02310AA	ADD: R&TTE CERTIFICATION
1	CA03111AA	ADD: CEC COMPLIANCE
1	X153AW	ADD: RACK MOUNT HARDWARE
1	T7039	GTR 8000 Base Radio
1	CA00855AA	ADD: 700/800 MHZ
1	CA01949AA	ADD: ANALOG ONLY CONV SW
1	CA01952AA	ADD: ANALOG CONVENTIONAL SIMULCAST
1	CA02310AA	ADD: R&TTE CERTIFICATION
1	CA03111AA	ADD: CEC COMPLIANCE
1	X153AW	ADD: RACK MOUNT HARDWARE
1	DSTRK88353M	GPS CLOCK, 10MHZ, RUBIDIUM, 48V INC
2	TRN7343	SEVEN AND A HALF FOOT RACK
1	CLN1868	2930F 24-PORT SWITCH
1	T8492	SITE ROUTER & FIREWALL- AC
1	CA03445AA	ADD: MISSION CRITICAL HARDENING
1	CA03448AA	ADD: STATEFUL FIREWALL
1	DLN6455	CONFIGURATION/SERVICE SOFTWARE
15	DSLDF450ACABLE	CABLE: 1/2IN LDF HELIAX POLY JKT PE



Qty.	Nomenclature	Description
2	DSL4TDMPSA	7-16 DIN MALE POSITIVE STOP FOR 1/2
2	DS221213	WEATHERPROOFING KIT
150	DSAVA550	AVA5-50, COAXIAL CABLE, CORRUGATED
2	DSA5DFD	D-CLASS 7-16 DIN FEMALE FOR AVA5-50
4	DSSG7812B2U	SG78-12B2U SUREGROUND GROUNDING KIT
1	DSL5SGRIP	L5SGRIP 7/8" SUPPORT HOIST GRIP
5	DS42396A2	STANDARD HANGER KIT FOR 1 5/8 CABLE
1	DSTSXD FMBF	RF SPD, 698-2700MHZ DC BLOCK HIGH P
1	DSGSAKITD	GROUND STRAP KIT – DIN
25	DSLDF450ACABLE	CABLE: 1/2IN LDF HELIAX POLY JKT PE
1	DSL4TNMPSA	TYPE N MALE POSITIVE STOP FOR 1/2 I
1	DSL4TDMPSA	7-16 DIN MALE POSITIVE STOP FOR 1/2
15	DSLDF450ACABLE	CABLE: 1/2IN LDF HELIAX POLY JKT PE
2	DSL4TDMPSA	7-16 DIN MALE POSITIVE STOP FOR 1/2
2	DS221213	WEATHERPROOFING KIT
150	DSAVA550	AVA5-50, COAXIAL CABLE, CORRUGATED
2	DSA5DFD	D-CLASS 7-16 DIN FEMALE FOR AVA5-50
4	DSSG7812B2U	SG78-12B2U SUREGROUND GROUNDING KIT
1	DSL5SGRIP	L5SGRIP 7/8" SUPPORT HOIST GRIP
5	DS42396A2	STANDARD HANGER KIT FOR 1 5/8 CABLE
1	DSTSXD FMBF	RF SPD, 698-2700MHZ DC BLOCK HIGH P
1	DSGSAKITD	GROUND STRAP KIT – DIN
25	DSLDF450ACABLE	CABLE: 1/2IN LDF HELIAX POLY JKT PE
1	DSL4TNMPSA	TYPE N MALE POSITIVE STOP FOR 1/2 I
1	DSL4TDMPSA	7-16 DIN MALE POSITIVE STOP FOR 1/2
15	DSLDF450ACABLE	CABLE: 1/2IN LDF HELIAX POLY JKT PE
1	DSL4TNMPSA	TYPE N MALE POSITIVE STOP FOR 1/2 I
1	DSL4TDMPSA	7-16 DIN MALE POSITIVE STOP FOR 1/2
5	DS221213	WEATHERPROOFING KIT
5	DSLDF450ACABLE	CABLE: 1/2IN LDF HELIAX POLY JKT PE

Qty.	Nomenclature	Description
2	DSL4TNMPSA	TYPE N MALE POSITIVE STOP FOR 1/2 I
150	DSAVA550	AVA5-50, COAXIAL CABLE, CORRUGATED
2	DSA5NFS	N FEMALE FOR AVA5-50 CABLE
4	DSSG7812B2U	SG78-12B2U SUREGROUND GROUNDING KIT
1	DSL5SGRIP	L5SGRIP 7/8" SUPPORT HOIST GRIP
150	DSLDF450ACABLE	CABLE: 1/2IN LDF HELIAX POLY JKT PE
1	DSL4TNMPSA	TYPE N MALE POSITIVE STOP FOR 1/2 I
1	DSL4TNFPSA	TYPE N FEMALE POSITIVE STOP FOR 1/2
4	DSSG1212B2U	SG12-12B2U, SUREGROUND 1/2", 48"
1	DSL4SGRIP	L4SGRIP SUPPORT HOIST GRIP 1/2" LDF
5	DS43211A	BUTTERFLY HANGER FOR 1/2 IN OR 3/8
5	DS42396A2	STANDARD HANGER KIT FOR 1 5/8 CABLE
1	DS1090501WA	RF SPD, 700-1000MHZ BROADBAND 15 VD
1	DS1090501WA	RF SPD, 700-1000MHZ BROADBAND 15 VD
25	DSFSJ150ACABLE	CABLE: 1/4IN SUPERFLEX POLY JKT PER
2	DSF1TNMHC	TYPE N MALE FOR 1/4 IN FSJ1-50A CAB
25	DSFSJ450BCABLE	FSJ4-50B 1/2" 50 OHM
2	DSF4PNMV2HC	TYPE N MALE FOR 1/2 IN FSJ4-50B CAB

9.4 REMOTE SITE RFDS & ANTENNA LIST

Qty.	Nomenclature	Description
2	DSDSCC8510D	10 CHANNEL CERAMIC CAVITY COMBINER
2	DSMWF8AMD	800MHZ HI PWR TX MILLED FILTER 851-
1	A07SYSSS16AM	794-824MHZ 16CH,7/800MHZTTA SYS,AC,
1	DSDS7C06P36TD	764-869MHZ, 5.9DB GAIN TRIPLE LOW P
2	DSDSCC8510D	10 CHANNEL CERAMIC CAVITY COMBINER
2	DSMWF8AMD	800MHZ HI PWR TX MILLED FILTER 851-
1	A07SYSSS16AM	794-824MHZ 16CH,7/800MHZTTA SYS,AC,
2	DSDS7C08PPYUD	764-869 MHZ 8 DB GAIN 4' PANEL LOW-
1	DSDS7C09P36UD	DS7C09P36U-D, 764-869MHZ SINGLE 9DB

Qty.	Nomenclature	Description
2	DSDSCC8510D	10 CHANNEL CERAMIC CAVITY COMBINER
2	DSMWF8AMD	800MHZ HI PWR TX MILLED FILTER 851-
1	A07SYSSS16AM	794-824MHZ 16CH,7/800MHZTTA SYS,AC,
2	DSDS7C08PPYU2D	764-869 MHZ 8 DB GAIN 4' PANEL LOW-
1	DSDS7C09P36UD	DS7C09P36U-D, 764-869MHZ SINGLE 9DB
2	DSDSCC8510D	10 CHANNEL CERAMIC CAVITY COMBINER
2	DSMWF8AMD	800MHZ HI PWR TX MILLED FILTER 851-
1	A07SYSSS16AM	794-824MHZ 16CH,7/800MHZTTA SYS,AC,
2	DSCC80708	OMNI, CORPORATE COLLINEAR, 8 DBD, 7
1	DSDS7C09P36UD	DS7C09P36U-D, 764-869MHZ SINGLE 9DB
2	DSDSCC8510D	10 CHANNEL CERAMIC CAVITY COMBINER
2	DSMWF8AMD	800MHZ HI PWR TX MILLED FILTER 851-
1	A07SYSSS16AM	794-824MHZ 16CH,7/800MHZTTA SYS,AC,
2	DSDS7C08PPYUD	764-869 MHZ 8 DB GAIN 4' PANEL LOW-
1	DSDS7C09P36UD	DS7C09P36U-D, 764-869MHZ SINGLE 9DB
2	DSDSCC8510D	10 CHANNEL CERAMIC CAVITY COMBINER
2	DSMWF8AMD	800MHZ HI PWR TX MILLED FILTER 851-
1	A07SYSSS16AM	794-824MHZ 16CH,7/800MHZTTA SYS,AC,
2	DSDS7C08PPYUD	764-869 MHZ 8 DB GAIN 4' PANEL LOW-
1	DSDS7C09P36UD	DS7C09P36U-D, 764-869MHZ SINGLE 9DB
2	DSDSCC8510D	10 CHANNEL CERAMIC CAVITY COMBINER
2	DSMWF8AMD	800MHZ HI PWR TX MILLED FILTER 851-
1	A07SYSSS16AM	794-824MHZ 16CH,7/800MHZTTA SYS,AC,
2	DSDS7C08PPYUD	764-869 MHZ 8 DB GAIN 4' PANEL LOW-
1	DSDS7C09P36UD	DS7C09P36U-D, 764-869MHZ SINGLE 9DB
2	DSDSCC8510D	10 CHANNEL CERAMIC CAVITY COMBINER
2	DSMWF8AMD	800MHZ HI PWR TX MILLED FILTER 851-
1	A07SYSSS16AM	794-824MHZ 16CH,7/800MHZTTA SYS,AC,
2	DSDS7C08PPYUD	764-869 MHZ 8 DB GAIN 4' PANEL LOW-
1	DSDS7C09P36UD	DS7C09P36U-D, 764-869MHZ SINGLE 9DB
2	DSDSCC8510D	10 CHANNEL CERAMIC CAVITY COMBINER
2	DSMWF8AMD	800MHZ HI PWR TX MILLED FILTER 851-
1	A07SYSSS16AM	794-824MHZ 16CH,7/800MHZTTA SYS,AC,
2	DSDS7C08PPYU4D	764-869 MHZ 8 DB GAIN 4' PANEL LOW-
1	DSDS7C09P36UD	DS7C09P36U-D, 764-869MHZ SINGLE 9DB

Qty.	Nomenclature	Description
2	DSDSCC8510D	10 CHANNEL CERAMIC CAVITY COMBINER
2	DSMWF8AMD	800MHZ HI PWR TX MILLED FILTER 851-
1	A07SYSSS16AM	794-824MHZ 16CH,7/800MHZTTA SYS,AC,
2	DSDS7C09P36UD	DS7C09P36U-D, 764-869MHZ SINGLE 9DB
1	DSDS7C09P36UD	DS7C09P36U-D, 764-869MHZ SINGLE 9DB

9.5 PRIME & REMOTE SITE DC POWER

Qty.	Nomenclature	Description
1	DST2S20844.00006	TRILOGY POWER SYSTEM WITH SMARTPACK
3	DS241119.105	FLATPACK2 HE RECTIFIER 3000W 48V,
5	DS331E23640800	BLIND PANEL FP2 HE BLACK G1
1	DSCBB080E	80A BATTERY BREAKER
1	DSCET3KVA.00000	MEDIA INVERTER 2I
2	DS275843	INVERTER, 1.5KVA, 120VAC, 48VDC INV
2	DS305467	BATTERY, 48V/170AH 12V170FS
1	DST2S20844.00004	TRILOGY POWER SYSTEM WITH SMARTPACK
8	DS241119.105	TRILOGY POWER SYSTEM WITH SMARTPACK
1	DS331E23640800	BLIND PANEL FP2 HE BLACK G1
1	DSCBB080E	80A BATTERY BREAKER
1	DSCET3KVA.00000	MEDIA INVERTER 2I
2	DS275843	INVERTER, 1.5KVA, 120VAC, 48VDC INV
1	DS505317	48V 1200AH BATTERY SET #DDMP100-25
1	DST2S20844.00004	TRILOGY POWER SYSTEM WITH SMARTPACK
8	DS241119.105	TRILOGY POWER SYSTEM WITH SMARTPACK
1	DS331E23640800	BLIND PANEL FP2 HE BLACK G1
1	DSCBB080E	80A BATTERY BREAKER
1	DSCET3KVA.00000	MEDIA INVERTER 2I
2	DS275843	INVERTER, 1.5KVA, 120VAC, 48VDC INV
1	DS505317	48V 1200AH BATTERY SET #DDMP100-25
1	DST2S20844.00004	TRILOGY POWER SYSTEM WITH SMARTPACK

Qty.	Nomenclature	Description
8	DS241119.105	TRILOGY POWER SYSTEM WITH SMARTPACK
1	DS331E23640800	BLIND PANEL FP2 HE BLACK G1
1	DSCBB080E	80A BATTERY BREAKER
1	DSCET3KVA.00000	MEDIA INVERTER 2I
2	DS275843	INVERTER, 1.5KVA, 120VAC, 48VDC INV
1	DS505317	48V 1200AH BATTERY SET #DDMP100-25
1	DST2S20844.00004	TRILOGY POWER SYSTEM WITH SMARTPACK
8	DS241119.105	TRILOGY POWER SYSTEM WITH SMARTPACK
1	DS331E23640800	BLIND PANEL FP2 HE BLACK G1
1	DSCBB080E	80A BATTERY BREAKER
1	DSCET3KVA.00000	MEDIA INVERTER 2I
2	DS275843	INVERTER, 1.5KVA, 120VAC, 48VDC INV
1	DS505317	48V 1200AH BATTERY SET #DDMP100-25
1	DST2S20844.00004	TRILOGY POWER SYSTEM WITH SMARTPACK
8	DS241119.105	TRILOGY POWER SYSTEM WITH SMARTPACK
1	DS331E23640800	BLIND PANEL FP2 HE BLACK G1
1	DSCBB080E	80A BATTERY BREAKER
1	DSCET3KVA.00000	MEDIA INVERTER 2I
2	DS275843	INVERTER, 1.5KVA, 120VAC, 48VDC INV
1	DS505317	48V 1200AH BATTERY SET #DDMP100-25
1	DST2S20844.00004	TRILOGY POWER SYSTEM WITH SMARTPACK
8	DS241119.105	TRILOGY POWER SYSTEM WITH SMARTPACK
1	DS331E23640800	BLIND PANEL FP2 HE BLACK G1
1	DSCBB080E	80A BATTERY BREAKER
1	DSCET3KVA.00000	MEDIA INVERTER 2I
2	DS275843	INVERTER, 1.5KVA, 120VAC, 48VDC INV
1	DS505317	48V 1200AH BATTERY SET #DDMP100-25
1	DST2S20844.00004	TRILOGY POWER SYSTEM WITH SMARTPACK
8	DS241119.105	TRILOGY POWER SYSTEM WITH SMARTPACK
1	DS331E23640800	BLIND PANEL FP2 HE BLACK G1

Qty.	Nomenclature	Description
1	DSCBB080E	80A BATTERY BREAKER
1	DSCET3KVA.00000	MEDIA INVERTER 2I
2	DS275843	INVERTER, 1.5KVA, 120VAC, 48VDC INV
1	DS505317	48V 1200AH BATTERY SET #DDMP100-25
1	DST2S20844.00004	TRILOGY POWER SYSTEM WITH SMARTPACK
8	DS241119.105	TRILOGY POWER SYSTEM WITH SMARTPACK
1	DS331E23640800	BLIND PANEL FP2 HE BLACK G1
1	DSCBB080E	80A BATTERY BREAKER
1	DSCET3KVA.00000	MEDIA INVERTER 2I
2	DS275843	INVERTER, 1.5KVA, 120VAC, 48VDC INV
1	DS505317	48V 1200AH BATTERY SET #DDMP100-25
1	DST2S20844.00004	TRILOGY POWER SYSTEM WITH SMARTPACK
8	DS241119.105	TRILOGY POWER SYSTEM WITH SMARTPACK
1	DS331E23640800	BLIND PANEL FP2 HE BLACK G1
1	DSCBB080E	80A BATTERY BREAKER
1	DSCET3KVA.00000	MEDIA INVERTER 2I
2	DS275843	INVERTER, 1.5KVA, 120VAC, 48VDC INV
1	DS505317	48V 1200AH BATTERY SET #DDMP100-25

9.6 COMMANDCENTRAL AXS DISPATCH EQUIPMENT LIST (MFC)

Qty.	Nomenclature	Description
7	TT3992A	COMPUTER, DL20 G10
1	DSB07000819	8-PORT CONSOLE CAT5 KVM SWITCH 1U R
7	DSB078101USB1	USB SINGLE SRVR INTERFACE UNIT VIRT
1	HKVN4728	LICENSE,AXS ASTRO 25 SYSTEM WI
1	HKVN4828	LICENSE, AXS CLUSTER TEMPORARY STAG
7	TT3992A	COMPUTER, DL20 G10
1	DSB07000819	8-PORT CONSOLE CAT5 KVM SWITCH 1U R
7	DSB078101USB1	USB SINGLE SRVR INTERFACE UNIT VIRT

Qty.	Nomenclature	Description
72	HKVN4729	AXS DISPATCH CLIENT LICENSE
72	HKVN4730	LICENSE,AXS TRUNKING SERVICES
72	HKVN4731	LICENSE,AXS ADVANCED CONVENTION
72	HKVN4733	LICENSE,AXS CHANNEL BASED IRR
72	HKVN4734	LICENSE,AXS MULTIPLE GUI WINDOWS
72	HKVN4737	LICENSE,AXS STANDARD LEVEL RADIO
72	HKVN4736	LICENSE,AXS AMBE+2 VOCODER ROY
72	HKVN4732	LICENSE,AXS SECURE VOICE SERVICES
72	B1956	COMMANDCENTRAL HUB, W/CLIENT PC
72	CA03553AA	ADD: AC LINE CORD, NORTH AMERICA
72	CA03547AA	ADD: BRACKET, MOUNTING 2RU
72	CA03572AA	ADD: CABLE RETENTION BRACKET
72	L3225A	CERTIFIED KEYBOARD FOR RSD SERVERS
72	L3226A	CERTIFIED OPTICAL WHEEL MOUSE FOR R
72	B1951	MICROPHONE, DESKTOP, USB
72	CA03412AA	ADD: USB CABLE, TYPE C TO TYPE C, 4
144	B1913	MCC SERIES HEADSET JACK
72	DSTWIN6328A	PROVIDES ONE DUAL PEDAL FOOTSWITCH
144	RLN6098	HDST MODULE BASE W/PTT, 15 FT CBL
144	RMN5150A	OVER-THE-HEAD, MONAURAL, NOISE-CANC
1	3082933N08	GR500 AC POWER CORD
1	FKN8696	CABLE – MCD 5000 DESKSET TO LOGGER
1	BKN2002	FRU: POWER CABLE, 24VDC
1	BLN1325	FRU: MOUNTING BRACKET KIT
1	BHN1024	FRU: COVER, FRONT
1	BHN6114	FRU: BRACKET, CABLE RETENTION
1	BPN1030	FRU, POWER SUPPLY WITH DC CORD
1	BLN1277	HEADSET JACK CIRCUIT BOARD FRU
1	3071113H01	CABLE ASSY, 16 PIN CONNECTOR
1	3071114H01	CABLE ASSY, EXTENDER

Qty.	Nomenclature	Description
2	SQM01SUM0292	CRYPTR
2	CA02066AA	AC Line Cord, North America
2	CA02954AA	ADD: SECURE OPERATION
2	CA03441AA	ADD:MCC7500E CRYPTR AES256
2	T8490	MCC7500 CRYPTR SOFTWARE CD UPGRADE
2	T8126	FORTINET FIREWALL APPLIANCE
1	T7038	GCP 8000 SITE CONTROLLER
1	CA03678AA	ADD: ASTRO SYSTEM RELEASE 2021.1
2	CA00303AA	ADD: QTY (1) SITE CONTROLLER
1	CA01136AA	MCC 7500 CONVEN SITE OPER
1	X153AW	ADD: RACK MOUNT HARDWARE
1	TRN7343	SEVEN AND A HALF FOOT RACK
2	DS1101990	SPD, SHIELDED RJ-45 JACK, SINGLE LI
2	DSTSJADP	RACK MOUNT GROUND BAR, 19 IN FOR TS
1	T8492	SITE ROUTER & FIREWALL- AC
1	CA03445AA	ADD: MISSION CRITICAL HARDENING
1	CA03448AA	ADD: STATEFUL FIREWALL
1	T8492	SITE ROUTER & FIREWALL- AC
1	CA03445AA	ADD: MISSION CRITICAL HARDENING
1	CA03448AA	ADD: STATEFUL FIREWALL
1	F4544	SITE MANAGER ADVANCED
1	VA00872	ADD: SDM ASTRO RTU FW CURR ASTRO RE
1	V266	ADD: 90VAC TO 260VAC PS TO SM
3	V592	AAD TERM BLCK & CONN WI
8	CLN1868	2930F 24-PORT SWITCH

9.7 COMMANDCENTRAL AXS DISPATCH EQUIPMENT LIST (OCD)

Qty.	Nomenclature	Description
5	TT3992A	COMPUTER, DL20 G10

Qty.	Nomenclature	Description
1	DSB07000819	8-PORT CONSOLE CAT5 KVM SWITCH 1U R
5	DSB078101USB1	USB SINGLE SRVR INTERFACE UNIT VIRT
1	HKVN4728	LICENSE,AXS ASTRO 25 SYSTEM WI
1	HKVN4828	LICENSE, AXS CLUSTER TEMPORARY STAG
5	TT3992A	COMPUTER, DL20 G10
1	DSB07000819	8-PORT CONSOLE CAT5 KVM SWITCH 1U R
5	DSB078101USB1	USB SINGLE SRVR INTERFACE UNIT VIRT
28	HKVN4729	AXS DISPATCH CLIENT LICENSE
28	HKVN4730	LICENSE,AXS TRUNKING SERVICES
28	HKVN4731	LICENSE,AXS ADVANCED CONVENTION
28	HKVN4733	LICENSE,AXS CHANNEL BASED IRR
28	HKVN4734	LICENSE,AXS MULTIPLE GUI WINDOWS
28	HKVN4737	LICENSE,AXS STANDARD LEVEL RADIO
28	HKVN4736	LICENSE,AXS AMBE+2 VOCODER ROY
28	HKVN4732	LICENSE,AXS SECURE VOICE SERVICES
28	B1956	COMMANDCENTRAL HUB, W/CLIENT PC
28	CA03553AA	ADD: AC LINE CORD, NORTH AMERICA
28	CA03547AA	ADD: BRACKET, MOUNTING 2RU
28	CA03572AA	ADD: CABLE RETENTION BRACKET
28	L3225A	CERTIFIED KEYBOARD FOR RSD SERVERS
28	L3226A	CERTIFIED OPTICAL WHEEL MOUSE FOR R
28	B1951	MICROPHONE, DESKTOP, USB
28	CA03412AA	ADD: USB CABLE, TYPE C TO TYPE C, 4
56	B1913	MCC SERIES HEADSET JACK
28	DSTWIN6328A	PROVIDES ONE DUAL PEDAL FOOTSWITCH
56	RLN6098	HDST MODULE BASE W/PTT, 15 FT CBL
56	RMN5150A	OVER-THE-HEAD, MONAURAL, NOISE-CANC
1	3082933N08	GR500 AC POWER CORD
1	FKN8696	CABLE – MCD 5000 DESKSET TO LOGGER
1	BKN2002	FRU: POWER CABLE, 24VDC



Qty.	Nomenclature	Description
1	BLN1325	FRU: MOUNTING BRACKET KIT
1	BHN1024	FRU: COVER, FRONT
1	BHN6114	FRU: BRACKET, CABLE RETENTION
1	BPN1030	FRU, POWER SUPPLY WITH DC CORD
1	BLN1277	HEADSET JACK CIRCUIT BOARD FRU
1	3071113H01	CABLE ASSY, 16 PIN CONNECTOR
1	3071114H01	CABLE ASSY, EXTENDER
2	SQM01SUM0292	CRYPTR
2	CA02066AA	AC Line Cord, North America
2	CA02954AA	ADD: SECURE OPERATION
2	CA03441AA	ADD:MCC7500E CRYPTR AES256
2	T8490	MCC7500 CRYPTR SOFTWARE CD UPGRADE
1	SQM01SUM0299	EDGE CONTROLLER SERVER
1	CA03120AA	ADD: EDGE CONTROLLER BASE SOFTWARE
1	CA03082AA	ADD: LXN OPEN RACK INSTALL KIT
1	SQM01SUM0205	GGM 8000 GATEWAY
1	CA01616AA	ADD: AC POWER
2	CLN1868	2930F 24-PORT SWITCH
2	T8126	FORTINET FIREWALL APPLIANCE
2	T8639	JUNIPER FIREWALL APPLIANCE
1	T7038	GCP 8000 SITE CONTROLLER
1	CA03678AA	ADD: ASTRO SYSTEM RELEASE 2021.1
2	CA00303AA	ADD: QTY (1) SITE CONTROLLER
1	CA01136AA	MCC 7500 CONVEN SITE OPER
1	X153AW	ADD: RACK MOUNT HARDWARE
1	TRN7343	SEVEN AND A HALF FOOT RACK
2	DS1101990	SPD, SHIELDED RJ-45 JACK, SINGLE LI
2	DSTSJADP	RACK MOUNT GROUND BAR, 19 IN FOR TS
1	T8492	SITE ROUTER & FIREWALL- AC
1	CA03445AA	ADD: MISSION CRITICAL HARDENING

Qty.	Nomenclature	Description
1	CA03448AA	ADD: STATEFUL FIREWALL
1	T8492	SITE ROUTER & FIREWALL- AC
1	CA03445AA	ADD: MISSION CRITICAL HARDENING
1	CA03448AA	ADD: STATEFUL FIREWALL
4	CLN1868	2930F 24-PORT SWITCH
1	FKN8696	CABLE – MCD 5000 DESKSET TO LOGGER
1	BLN1325	FRU: MOUNTING BRACKET KIT
1	BHN1024	FRU: COVER, FRONT
1	BHN6114	FRU: BRACKET, CABLE RETENTION
1	BLN1277	HEADSET JACK CIRCUIT BOARD FRU
1	3071113H01	CABLE ASSY, 16 PIN CONNECTOR
1	3071114H01	CABLE ASSY, EXTENDER
1	T8492	SITE ROUTER & FIREWALL- AC
1	CA03445AA	ADD: MISSION CRITICAL HARDENING
1	CA03448AA	ADD: STATEFUL FIREWALL
1	CLN1868	2930F 24-PORT SWITCH

9.8 LOGGING RECORDER SUB-SYSTEM

Qty.	Nomenclature	Description
1	SQM01SUM0205	GGM 8000 GATEWAY
1	CA01619AA	ADD: DC POWER
1	CLN1868	2930F 24-PORT SWITCH
1	B1948	MCC 7500E DISPATCH POSITION LICENSE
2	UA00653AA	ADD: BASIC CONSOLE OPERATION
2	UA00654AA	ADD: ASTRO 25 TRUNKING OPERATION
2	UA00655AA	ADD: ADVANCED CONVENTIONAL OPERATIO
2	UA00659AA	ADD: ADP/AES/DES-OFB ENCRYPTION
2	UA00658AA	ADD: SECURE OPERATION
2	UA00652AA	ADD: 160 RADIO RESOURCES LICENSE
2	UA00661AA	ADD: ENHANCED IRR

Qty.	Nomenclature	Description
1	B1949	MCC 7500E SOFTWARE DVD
2	DSTG191B	TECH GLOBAL EVOLUTION SERIES 19INCH
2	TT3903A	Z2 G5 MINI WORKSTATION NON RETURNAB
4	DDN2825	USB HEADSET BASE WITH PTT
2	DDN1574	USB HUB 7 PORT
2	T8742	MCAFFEE FOR WINDOWS CLIENT, A2019.2
1	T8806A	WINDOWS SUPP TRANS CONFIG, A2020.1/
1	T8639	JUNIPER FIREWALL APPLIANCE
1	CLN1868	2930F 24-PORT SWITCH
1	T8492	SITE ROUTER & FIREWALL- AC
1	CA03445AA	ADD: MISSION CRITICAL HARDENING
1	CA03448AA	ADD: STATEFUL FIREWALL
2	B1905	MCC 7500 ASTRO 25 SOFTWARE
2	B1933	MOTOROLA VOICE PROCESSOR MODULE
2	CA00288AB	ADD: MCC 7500 ARCHIVING INTERFACE S
2	CA00147AF	ADD: MCC 7500 SECURE OPERATION
2	CA00182AB	ADD: AES ALGORITHM
2	CA00140AA	ADD: AC LINE CORD, NORTH AMERICAN
2	T8742	MCAFFEE FOR WINDOWS CLIENT, A2019.2
6	SQM01SUM0205	GGM 8000 GATEWAY
6	CA01619AA	ADD: DC POWER
6	CA02086AA	ADD: HIGH DENSITY ENH CONV GATEWAY
1	B1948	MCC 7500E DISPATCH POSITION LICENSE
2	UA00653AA	ADD: BASIC CONSOLE OPERATION
2	UA00654AA	ADD: ASTRO 25 TRUNKING OPERATION
2	UA00655AA	ADD: ADVANCED CONVENTIONAL OPERATIO
2	UA00659AA	ADD: ADP/AES/DES-OFB ENCRYPTION
2	UA00658AA	ADD: SECURE OPERATION
2	UA00652AA	ADD: 160 RADIO RESOURCES LICENSE
2	UA00661AA	ADD: ENHANCED IRR



Qty.	Nomenclature	Description
1	B1949	MCC 7500E SOFTWARE DVD
2	DSTG191B	TECH GLOBAL EVOLUTION SERIES 19INCH
2	TT3903A	Z2 G5 MINI WORKSTATION NON RETURNAB
4	DDN2825	USB HEADSET BASE WITH PTT
2	DDN1574	USB HUB 7 PORT
2	T8742	MCAFFEE FOR WINDOWS CLIENT, A2019.2
1	T8806A	WINDOWS SUPP TRANS CONFIG, A2020.1/
1	T8639	JUNIPER FIREWALL APPLIANCE
1	CLN1868	2930F 24-PORT SWITCH
1	T8492	SITE ROUTER & FIREWALL- AC
1	CA03445AA	ADD: MISSION CRITICAL HARDENING
1	CA03448AA	ADD: STATEFUL FIREWALL
2	B1905	MCC 7500 ASTRO 25 SOFTWARE
2	B1933	MOTOROLA VOICE PROCESSOR MODULE
2	CA00288AB	ADD: MCC 7500 ARCHIVING INTERFACE S
2	CA00147AF	ADD: MCC 7500 SECURE OPERATION
2	CA00182AB	ADD: AES ALGORITHM
2	CA00140AA	ADD: AC LINE CORD, NORTH AMERICAN
2	T8742	MCAFFEE FOR WINDOWS CLIENT, A2019.2
6	SQM01SUM0205	GGM 8000 GATEWAY
6	CA01619AA	ADD: DC POWER
6	CA02086AA	ADD: HIGH DENSITY ENH CONV GATEWAY
2	89-270-0097	7000 platform Recorder Server (SVR7KH1-REC)
1	89-270-0102	7000 platform Database Server (SVR7KH1-DB)
2	89-270-0103	7000 platform Application Server (SVR7KH1-APP)
2	89-270-0118	Add on Media Storage 3x1.9TB SSD SATA 6 Gb/s, 2.5-inch, (RAID5, SSD-SD3R5)
1	89-270-0054	2 Post Rack Rail kit for 6000/7000 Series Servers
1	89-270-0108	Spare Parts Kit for 7000 Series H1/H2 platforms (Without Drive)
1	89-270-0067	San Disk - 960GB SSD SATA 6 Gb/s, 2.5-inch



Qty.	Nomenclature	Description
1	89-270-0109	Spare Part for 1.9TB SSD SATA 6 Gb/s, 2.5-inch
269	93-630-0003	Verint Public Safety Call Recording(Channel based)
120	93-630-0001	Verint Public Safety Recording Named Radio Talkgroup
1	93-630-0028	Motorola Radio P25 Interface Enabler
1	89-270-0097	7000 platform Recorder Server (SVR7KH1-REC)
1	89-270-0120	Add on Dual Port Intel I350-AE2 GbE I/O Module (Dual Port Mezzanine card)
1	89-270-0118	Add on Media Storage 3x1.9TB SSD SATA 6 Gb/s, 2.5-inch, (RAID5, SSD-SD3R5)
2	89-270-0054	2 Post Rack Rail kit for 6000/7000 Series Servers
3	89-270-0090	Add on USB contact closure to 32 Optically Isolated Inputs Digital Interface Adapter
1	89-270-0039	Add on 13 Slot PCI Expansion Chassis for 6000 - 7000 Series Platform
12	89-270-0020	Add on AudioCodes LD Card 24 analog Port (PCI)
269	93-630-0007	Verint Public Safety N+N Voice Recording Redundancy (Channel-based)
1	89-270-0097	7000 platform Recorder Server (SVR7KH1-REC)
1	89-270-0120	Add on Dual Port Intel I350-AE2 GbE I/O Module (Dual Port Mezzanine card)
1	89-270-0118	Add on Media Storage 3x1.9TB SSD SATA 6 Gb/s, 2.5-inch, (RAID5, SSD-SD3R5)
2	89-270-0054	2 Post Rack Rail kit for 6000/7000 Series Servers
2	89-270-0090	Add on USB contact closure to 32 Optically Isolated Inputs Digital Interface Adapter
1	89-270-0039	Add on 13 Slot PCI Expansion Chassis for 6000 - 7000 Series Platform
10	89-270-0020	Add on AudioCodes LD Card 24 analog Port (PCI)
1	93-630-0024	Verint Public Safety Recording Integration - Production
1136	93-630-0008	Verint Public Safety Data Center Redundancy (Channel-based)
2	89-270-0097	7000 platform Recorder Server (SVR7KH1-REC)
1	89-270-0102	7000 platform Database Server (SVR7KH1-DB)
1	89-270-0103	7000 platform Application Server (SVR7KH1-APP)

Qty.	Nomenclature	Description
2	89-270-0118	Add on Media Storage 3x1.9TB SSD SATA 6 Gb/s, 2.5-inch, (RAID5, SSD-SD3R5)
4	89-270-0054	2 Post Rack Rail kit for 6000/7000 Series Servers
179	93-630-0003	Verint Public Safety Call Recording(Channel based)
120	93-630-0001	Verint Public Safety Recording Named Radio Talkgroup
1	93-630-0028	Motorola Radio P25 Interface Enabler
1	89-270-0097	7000 platform Recorder Server (SVR7KH1-REC)
1	89-270-0120	Add on Dual Port Intel I350-AE2 GbE I/O Module (Dual Port Mezzanine card)
1	89-270-0118	Add on Media Storage 3x1.9TB SSD SATA 6 Gb/s, 2.5-inch, (RAID5, SSD-SD3R5)
2	89-270-0054	2 Post Rack Rail kit for 6000/7000 Series Servers
1	89-270-0090	Add on USB contact closure to 32 Optically Isolated Inputs Digital Interface Adapter
1	89-270-0039	Add on 13 Slot PCI Expansion Chassis for 6000 - 7000 Series Platform
7	89-270-0020	Add on AudioCodes LD Card 24 analog Port (PCI)
179	93-630-0007	Verint Public Safety N+N Voice Recording Redundancy (Channel-based)
1	89-270-0097	7000 platform Recorder Server (SVR7KH1-REC)
1	89-270-0120	Add on Dual Port Intel I350-AE2 GbE I/O Module (Dual Port Mezzanine card)
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2	89-270-0090	Add on USB contact closure to 32 Optically Isolated Inputs Digital Interface Adapter
1	89-270-0039	Add on 13 Slot PCI Expansion Chassis for 6000 - 7000 Series Platform
7	89-270-0020	Add on AudioCodes LD Card 24 analog Port (PCI)
126	93-630-0005	Verint Public Safety Quality Management
99	93-630-0037	Verint Public Safety Offline Screen Interaction Recording



SECTION 10

STATEMENT OF WORK

10.1 STATEMENT OF WORK

Motorola Solutions will install and configure the proposed equipment. The following table describes the tasks involved with installation and configuration.

Tasks	Motorola Solutions	Customer
PROJECT INITIATION		
Contract Finalization and Team Creation		
Execute contract and distribute contract documents.	X	X
Assign a Project Manager as a single point of contact.	X	X
Assign resources.	X	X
Schedule project kickoff meeting.	X	X
Deliverable: Signed contract, defined project team, and scheduled project kickoff meeting.		
Project Administration		
Ensure that project team members attend all meetings relevant to their role on the project.	X	X
Set up the project in the Motorola Solutions information system.	X	
Record and distribute project status meeting minutes.	X	
Maintain responsibility for third-party services contracted by Motorola Solutions.	X	
Complete assigned project tasks according to the project schedule.	X	X
Submit project milestone completion documents.	X	
Upon completion of tasks, approve project milestone completion documents.		X
Conduct all project work Monday thru Friday, 7:30 a.m. to 5:00 p.m.).	X	
Deliverable: Completed and approved project milestones throughout the project.		
Project Kickoff		
Introduce team, review roles, and decision authority.	X	X
Present project scope and objectives.	X	
Review SOW responsibilities and project schedule.	X	X
Schedule Design Review.	X	X

Tasks	Motorola Solutions	Customer
Deliverable: Completed project kickoff and scheduled Design Review.		
Design Review		
Review the Customer's operational requirements.	X	X
Present the system design and operational requirements for the solution.	X	
Present installation plan.	X	
Present preliminary cutover plan and methods to document final cutover process.	X	
Present configuration and details of sites required by system design.	X	
Validate that sites can accommodate proposed equipment.		X
Provide approvals required to add equipment to proposed existing sites.		X
Review safety, security, and site access procedures.	X	
Finalize site acquisition and development plan.	X	
Present equipment layout plans and system design drawings.	X	
Provide backhaul performance specifications and demarcation points.	X	
Provide heat load and power requirements for new equipment.	X	
Provide information on existing system interfaces.		X
Provide frequency and radio information for each site.		X
Assume liability and responsibility for proving all information necessary for complete installation.		X
Assume responsibility for issues outside of Motorola Solutions' control.		X
Assist the City with completing required frequency coordination forms.	X	
Complete the required forms required for frequency coordination and licensing.		X
Ensure that frequency availability and licensing meet project requirements, and pay licensing and frequency coordination fees.		X
Review and update design documents, including System Description, Statement of Work, Project Schedule, and Acceptance Test Plan, based on Design Review agreements.	X	
Provide minimum acceptable performance specifications for customer provided hardware, software, LAN, WAN and internet connectivity.	X	
Conduct paper only intermodulation studies for the frequencies included in this design.	X	
Conduct Tower Loading Studies for all RF sites (not including City Hall East or 100 Wilshire)	X	
Rectify issues identified in the Tower Loading Study report.		X
Provide frequency and RFDS characteristics of any frequencies, other than the ones included in this project, to be included in the intermodulation study.		X



Tasks	Motorola Solutions	Customer
Provide exclusive use of a existing channel for baseline coverage study.		X
Conduct the first baseline coverage study in accordance with the Baseline Coverage Test Grid-Map included in this proposal. Modifications of the design at the direction of the City based on these results may result in a change order.	X	
Provide a comparison of predicted new system coverage against the baseline coverage study.	X	
Execute Change Order in accordance with all material changes to the Contract resulting from the Design Review.	X	
Deliverable: Finalized design documentation based upon “frozen” design, along with any relevant Change Order documentation.		
SITE PREPARATION AND DEVELOPMENT		
Site Access		
Provide site owners/managers with written notice to provide entry to sites identified in the project design documentation.		X
Maintain access roads in order to provide clear and stable entry to sites for heavy-duty construction vehicles, cement trucks and cranes. Ensure that sufficient space is available at the site for these vehicles to maneuver under their own power, without assistance from other equipment.		X
Obtain site licensing and permitting, including site lease/ownership, zoning, permits, regulatory approvals, easements, power, and telco connections.		X
Provide escorts for all site visits within 48 hours of notification.		X
Deliverable: Access, permitting, and licensing necessary to install system equipment at each site.		
Site Planning		
Provide necessary buildings, equipment shelters, and towers for installation of system equipment.		X
Provide the R56 requirements for space, power, grounding, HVAC, and connectivity requirements at each site.	X	
Ensure that proposed design does not require additional utility power above the existing system.	X	
Provide adequate electrical power in proper phase and voltage at sites.		X
Provide as-built structural and foundation drawings of the structures and site locations, along with geotechnical reports, in order to facilitate a structural analysis.		X
Perform structural analysis of tower structures to confirm that they are capable of supporting proposed and future antenna loads. Excluding 100 Wilshire & City Hall	X	
Confirm that there is adequate utility service to support the new equipment and ancillary equipment.	X	
Modify towers or other structures, or relocate sites in the system, to ensure that they are capable of supporting proposed and future antenna loads.		X
Conduct site walks to collect pertinent information (e.g. location of telco, power, structures, etc.)	X	X
Ensure that each site meets the R56 standards for space, grounding, power, HVAC, and connectivity requirements.		X
Conduct one three-point ground resistance test of each site.	X	

Tasks	Motorola Solutions	Customer
Prepare and submit Electromagnetic Energy (EME) plans for the site (as licensee) to demonstrate compliance with FCC RF Exposure Guidelines.		X
Pay for application fees, taxes, and recurring payments for lease/ownership of property.		X
Ensure that required rack space is available for installation of the new equipment.		X
Deliverable: Information and permitting requirements completed at each site.		
General Facility Improvements		
Provide adequate HVAC, grounding, lighting, cable routing, and surge protection based upon Motorola Solutions' Standards and Guidelines for Communication Sites (R56)		X
Ensure the resolution of environmental and hazardous material issues at each site including, but not limited to, asbestos, structural integrity (tower, rooftop, water tank, etc.), and other building risks.		X
Validate that electrical service will accommodate installation of system equipment, including isolation transformers, circuit breakers, surge protectors, and cabling.	X	
Provide obstruction-free area for the cable run between the demarcation point and system equipment.		X
Provide structure penetrations (wall or roof) for transmission equipment (e.g. antennas, microwave radios, etc.).		X
Supply interior building cable trays, raceways, conduits, and wire supports.		X
Pay for usage costs of power and generator fueling, both during the construction and installation effort, and on an ongoing basis.		X
Provide one-time mobilization of Installation crews.	X	
Install new DC Rectifiers and batteries at each prime and remote site. The DC system is only designed to support the newly provided equipment.	X	
Modify the DC design to ensure it does not consume more space than the old system.	X	
Transport removed site equipment to a location designated by Customer and within Customer's jurisdiction. Removed equipment is limited to old DC system, voters, transmitters, receivers, antennas, and line that are being replaced.	X	
Deliverable: Sites meet physical requirements for equipment installation.		
SYSTEM INSTALLATION		
Equipment Order and Manufacturing		
Create equipment order and reconcile to contract.	X	
Manufacture Motorola Solutions-provided equipment necessary for system based on equipment order.	X	
Procure non-Motorola Solutions equipment necessary for the system.	X	
Deliverable: Equipment procured and ready for shipment.		
System Staging		
Ship all RF equipment needed for staging to Motorola Solutions' Customer Center for Solutions Integration (CCSi).	X	

Tasks	Motorola Solutions	Customer
Provide information on existing system interfaces, room layouts, or other information necessary for the assembly to meet field conditions.		X
Set up and rack the solution equipment on a site-by-site basis, as it will be configured in the field at each of the sites.	X	
Cut and label the cables with to/from information to specify interconnection for field installation and future servicing needs.	X	
Complete the cabling/connecting of the subsystems to each other ("connectorization" of the subsystems).	X	
Assemble required subsystems to assure system functionality.	X	
Power up, load application parameters, program, and test all staged equipment.	X	
Confirm system configuration and software compatibility with the existing system.	X	
Inventory the equipment with serial numbers and installation references.	X	
Review and approve proposed Factory Acceptance Test Plan.		X
For up to 12 people, Pay for travel, lodging, meals, and all incidental expenses for Customer personnel and representatives to witness the Factory Acceptance Testing.	X	
For any additional attendees above 12, Pay for travel, lodging, meals, and all incidental expenses for Customer personnel and representatives to witness the Factory Acceptance Testing.		X
Perform factory functional acceptance tests of system features	X	
Conduct site and system level testing.	X	
Perform system burn-in 24 hours a day during staging to isolate and capture any defects.	X	
Deliverable: System staged and ready for shipment.		
Equipment Shipment and Storage		
Provide secure location for solution equipment.	X	X
Pack and ship solution equipment to the identified, or site locations.	X	
Receive solution equipment.	X	
Inventory solution equipment.	X	
Deliverable: Solution equipment received and ready for installation		
General Installation		
Generate a mutually agreed upon site installation schedule. With the understanding that LAFD operational situations will require, within reason, flexibility.	X	X
Deliver solution equipment to installation location.	X	
Coordinate receipt of and inventory solution equipment with designated contact.	X	
Install all proposed fixed equipment as outlined in the System Description based upon the agreed-upon floor plans, connecting audio, control, and radio transmission cables to connect equipment to the power panels or	X	



Tasks	Motorola Solutions	Customer
receptacles, and audio/control line connection points. Installation performed in accordance with R56 standards and state/local codes.		
Provide system interconnections that are not specifically outlined in the system design, including dedicated phone circuits, microwave links, or other types of connectivity.		X
Install and terminate all network cables between site routers and network demarcation points, including microwave, leased lines, and Ethernet.	X	
Ensure that Type 1 and Type 2 AC suppression is installed to protect installed equipment.		X
Connect installed equipment to the provided ground system.	X	
Label equipment, racks, and cables.	X	
Perform preliminary audit of installed equipment to ensure compliance with requirements and R56 standards.	X	
Note any required changes to the installation for inclusion in the “as-built” system documentation.	X	
Deliverable: Equipment installed.		
Antenna and Transmission Line Installation		
Install antennas, including supplying and installing new side arm mounts	X	
Install towertop amplifiers (as required in final design).	X	
Install transmission lines required for system.	X	
Provide structure penetrations for transmission equipment (e.g. antennas & microwave line.).		X
Perform sweep tests on transmission lines.	X	
Provide and install attachment hardware for supporting transmission lines on antenna support structure.	X	
Provide ground buss bar at the bottom of each antenna support structure. This will be identified at Design Review Site Walks.		X
Deliverable: Antenna and Transmission Line installed.		
ASTRO 25 Core and Remote Site Installation and Configuration		
Install fixed equipment contained in the equipment list and system description.	X	
Provide backhaul connectivity and associated equipment for all sites to meet latency, jitter and capacity requirements.		X
Configure ASTRO system to support the new RF sites.	X	
Verify site link performance, prior to the interconnection of the solution equipment to the link equipment.	X	
Integrate the RF sites into the system to ensure proper operation.	X	
Deliverable: ASTRO 25 core and remote site equipment installation completed.		
Console Installation and Configuration		
Identify ethernet connection to console and provide a demarcation point located within 25 feet of the console interface for MFC Consoles.		X



Tasks	Motorola Solutions	Customer
Identify ethernet connection to console and provide a demarcation point located within 300 feet of the console interface for OCD Consoles.	X	
Connect console to ethernet demarcation points.	X	
Install PC workstation w/ keyboard and mouse, and monitor.	X	
Provide analog audio source for existing Mt. Lukens Backup channels at either MFC or City Hall East.		X
Develop templates for console programming.	X	
Perform console programming and configuration.	X	
Deliverable: Console equipment installation completed.		
Logging Equipment Installation and Configuration		
Supply logging equipment.	X	
Install and configure logging equipment according to design featured in the Verint Logging Recorder Section.	X	
Provide interfaces to logging equipment.		X
Deliverable: Logging equipment installation completed.		
SYSTEM OPTIMIZATION AND TESTING		
R56 Site Audit		
Perform R56 site-installation quality-audits, verifying proper physical installation and operational configurations.	X	
Create site evaluation report to verify site meets or exceeds requirements, as defined in Motorola Solutions' R56 Standards and Guidelines for Communication Sites.	X	
Deliverable: R56 Standards and Guidelines for Communication Sites audits completed successfully.		
Solution Optimization		
Verify that all equipment is operating properly and that all electrical and signal levels are set accurately.	X	
Verify that all audio and data levels are at factory settings.	X	
Verify communication interfaces between devices for proper operation.	X	
Ensure that functionality meets manufacturers' specifications and complies with the final configuration established during design review or system staging.	X	
Deliverable: Completion of System Optimization.		
Functional & Coverage Acceptance Testing		
Verify the operational functionality and features of the solution supplied by Motorola Solutions, as contracted.	X	
Witness the functional testing.		X
Document all issues that arise during the acceptance tests.	X	



Tasks	Motorola Solutions	Customer
If any major task for the system as contractually described fails during the Customer acceptance testing or beneficial use, repeat that particular task after Motorola Solutions determines that corrective action has been taken.	X	
Resolve any minor task failures before Final System Acceptance.	X	
Document the results of the acceptance tests and present for review.	X	
Conduct the Coverage Acceptance Test Plan in accordance with the final design.	X	
Compile and present the Coverage Test Results	X	
Review and approve final acceptance test results.		X
Deliverable: Completion of functional testing and approval by Customer.		
PROJECT TRANSITION		
Training		
Finalize schedule for training coursework.	X	
Provide training facility.		X
Ensure that the training participants fulfill course prerequisites.		X
Conduct the training classes outlined in the Training Plan.	X	
Attend proposed training classes.		X
Deliverable: Training coursework completed.		
Cutover		
Finalize Cutover Plan.	X	X
Conduct cutover meeting with relevant personnel to address both how to mitigate technical and communication problem impacts to the users during cutover and during the general operation of the system.	X	
Notify the personnel affected by the cutover of the date and time planned for cutover.		X
Provide ongoing communication with users regarding the project and schedule.	X	X
Resolve punchlist items, documented during the Acceptance Testing phase, in order to meet all the criteria for final system acceptance.	X	
Assist Motorola Solutions with resolution of identified punchlist items by providing support, such as access to the sites, equipment and system, and approval of the resolved punchlist items.		X
Deliverable: Migration to new system completed, and punchlist items resolved.		
Transition to Warranty		
Review the items necessary for transitioning the project to warranty support and service.	X	
Motorola Solutions to provide services during year 1 warranty which align with the proposed services.	X	



Tasks	Motorola Solutions	Customer
Provide a Customer Support Plan detailing the warranty support associated with the contract equipment.	X	
Participate in the Transition Service/Project Transition Certificate (PTC) process.		X
Deliverable: Service information delivered and approved by Customer		
Finalize Documentation and System Acceptance		
Provide manufacturer's installation material, part list and other related material to Customer upon project completion.	X	
Provide an electronic as-built system manual on CD or other Customer preferred electronic media. The documentation will include the following: ▪ Site Block Diagrams ▪ RF Interconnect Diagrams ▪ Cable Tray Layouts ▪ Power Interconnect Diagrams ▪ Site Floor Plans. ▪ Site Equipment Rack Configurations. ▪ Antenna Network Drawings for RF Sites (where applicable). ▪ ATP Test Checklists. ▪ Functional Acceptance Test Plan Test Sheets and Results. ▪ Equipment Inventory List. ▪ Console Programming Template (where applicable). ▪ Maintenance Manuals (where applicable). ▪ Technical Service Manuals (where applicable). Drawings will be delivered in Adobe PDF format.	X	
Receive and approve documentation.		X
Execute Final Project Acceptance.	X	X
Deliverable: All required documents are provided and approved. Final Project Acceptance.		



SECTION 11

IMPLEMENTATION SCHEDULE

11.1 PROJECT SCHEDULE

The proposed project schedule is a working document and will be finalized during the contract design review period.



ID		Task Mode	Task Name	Duration	Start	Finish	Predecessors	1st Half, 2022					2nd Half, 2022					1st Half, 2023					2nd Half, 2023					1st Half, 2024					2nd Half, 2024					1st Half, 2025				
								F	M	A	M	J	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	A	S	O	N	D
1			LAFD - Voter, Transmitter, & Console Refresh	806 days	Tue 3/1/22	Tue 4/1/25																																				
2			Project Initiation	118 days	Tue 3/1/22	Thu 8/11/22																																				
3			Contract	6 days	Tue 3/1/22	Tue 3/8/22																																				
4			Contract Award	1 day	Tue 3/1/22	Tue 3/1/22																																				
5			Contract Administration	5 days	Wed 3/2/22	Tue 3/8/22	4																																			
6			Contract Design Review	60 days	Wed 3/9/22	Tue 5/31/22	3																																			
7			RF Infrastructure Design Review	60 days	Wed 3/9/22	Tue 5/31/22																																				
8			Dispatch Center Design Review	60 days	Wed 3/9/22	Tue 5/31/22																																				
9			Design Approval	0 days	Tue 5/31/22	Tue 5/31/22	7,8																																			
10			Initial Coverage Verification	20 days	Wed 6/1/22	Tue 6/28/22	6																																			
11			Conduct Coverage Baseline	20 days	Wed 6/1/22	Tue 6/28/22																																				
12			Tower Loading Studies	52 days	Wed 6/1/22	Thu 8/11/22	6																																			
13			Baldwin Hills	5 days	Wed 6/1/22	Tue 6/7/22																																				
14			Beverly Glenn	5 days	Wed 6/8/22	Tue 6/14/22	13																																			
15			KSKQ Radio	5 days	Wed 6/15/22	Tue 6/21/22	14																																			
16			Mount Washington	5 days	Wed 6/22/22	Tue 6/28/22	15																																			
17			Oat Mountain	2 days	Wed 6/29/22	Thu 6/30/22	16																																			
18			San Pedro Hill	5 days	Fri 7/1/22	Thu 7/7/22	17																																			
19			Verdugo Peak	5 days	Fri 7/8/22	Thu 7/14/22	18																																			
20			Generate Loading Report	20 days	Fri 7/15/22	Thu 8/11/22	19																																			
21			City to Rectify Identified Issues (Duration TBD)	0 days	Thu 8/11/22	Thu 8/11/22	20																																			
22			Ordering, Installation, & Testing	430 days	Wed 6/1/22	Tue 1/23/24	6																																			
23			Infrastructure Order Processing	15 days	Wed 6/1/22	Tue 6/21/22																																				
24			Process Equipment List	10 days	Wed 6/1/22	Tue 6/14/22																																				
25			Order Bridged	5 days	Wed 6/15/22	Tue 6/21/22	24																																			
26			Infrastructure Manufacturing & Staging	160 days	Wed 6/22/22	Tue 1/31/23	23																																			
27			Manufacture Motorola FNE	60 days	Wed 6/22/22	Tue 9/13/22																																				
28			Manufacture Non-Motorola Equipment	90 days	Wed 6/22/22	Tue 10/25/22																																				
29			Develop CCSi Configurations	20 days	Wed 6/22/22	Tue 7/19/22	23																																			
30			Ship FNE to CCSi	15 days	Wed 10/26/22	Tue 11/15/22	28,29																																			
31			Stage FNE Equipment	30 days	Wed 11/16/22	Tue 12/27/22	30																																			
32			CCSi Factory Acceptance Test Plan (FATP)	10 days	Wed 12/28/22	Tue 1/10/23	31																																			
33			Ship FNE Equipment to Field	10 days	Wed 1/11/23	Tue 1/24/23	32																																			
34			Receive & Inventory Equipment	5 days	Wed 1/25/23	Tue 1/31/23	33																																			
35			P25 Radio Site Installation	255 days	Wed 2/1/23	Tue 1/23/24	26,6,12																																			
36			Master Site Installation	30 days	Wed 2/1/23	Tue 3/14/23																																				
37			Deliver & Bolt Racks	15 days	Wed 2/1/23	Tue 2/21/23																																				
38			Cable Equipment	15 days	Wed 2/22/23	Tue 3/14/23	37																																			

Project: LAFD - Voter & Transm

Date: Tue 1/25/22

Task

Split

Milestone

Summary

Project Summary

Inactive Task

Inactive Milestone

Inactive Summary

Manual Task

Duration-only

Manual Summary Rollup

Manual Summary

Start-only

Finish-only

External Tasks

External Milestone

Deadline

Progress

Manual Progress

Page 1

ID		Task Mode	Task Name	Duration	Start	Finish	Predecessors	f 1, 2022					Half 2, 2022					Half 1, 2023					Half 2, 2023					Half 1, 2024					Half 2, 2024					Half 1, 2025																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
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39			RF Sites Installation (Antenna & DC)	60 days	Wed 2/1/23	Tue 4/25/23	26																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	

ID		Task Mode	Task Name	Duration	Start	Finish	Predecessors	f 1, 2022					Half 2, 2022					Half 1, 2023					Half 2, 2023					Half 1, 2024					Half 2, 2024					Half 1, 2025																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
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77			Deliver & Bolt Racks	4 days	Tue 4/18/23	Fri 4/21/23																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			</

ID		Task Mode	Task Name	Duration	Start	Finish	Predecessors	f 1, 2022	Half 2, 2022	Half 1, 2023	Half 2, 2023	Half 1, 2024	Half 2, 2024	Half 1, 2025
								F M A M J	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 A S O N D	J F M A M
115			Prime Site	2 days	Tue 8/1/23	Wed 8/2/23	111							
116			Site Link Verification	1 day	Tue 8/1/23	Tue 8/1/23								
117			Site Optimization	1 day	Wed 8/2/23	Wed 8/2/23	116							
118			100 Wilshire	2 days	Thu 8/3/23	Fri 8/4/23	115							
119			Site Link Verification	1 day	Thu 8/3/23	Thu 8/3/23								
120			Site Optimization	1 day	Fri 8/4/23	Fri 8/4/23	119							
121			Baldwin Hills	2 days	Mon 8/7/23	Tue 8/8/23	118							
122			Site Link Verification	1 day	Mon 8/7/23	Mon 8/7/23								
123			Site Optimization	1 day	Tue 8/8/23	Tue 8/8/23	122							
124			Beverly Glenn	2 days	Wed 8/9/23	Thu 8/10/23	121							
125			Site Link Verification	1 day	Wed 8/9/23	Wed 8/9/23								
126			Site Optimization	1 day	Thu 8/10/23	Thu 8/10/23	125							
127			Los Angeles City Hall	2 days	Fri 8/11/23	Mon 8/14/23	124							
128			Site Link Verification	1 day	Fri 8/11/23	Fri 8/11/23								
129			Site Optimization	1 day	Mon 8/14/23	Mon 8/14/23	128							
130			KSKQ Radio	2 days	Tue 8/15/23	Wed 8/16/23	127							
131			Site Link Verification	1 day	Tue 8/15/23	Tue 8/15/23								
132			Site Optimization	1 day	Wed 8/16/23	Wed 8/16/23	131							
133			Mount Washington	2 days	Thu 8/17/23	Fri 8/18/23	130							
134			Site Link Verification	1 day	Thu 8/17/23	Thu 8/17/23								
135			Site Optimization	1 day	Fri 8/18/23	Fri 8/18/23	134							
136			Oat Mountain	2 days	Mon 8/21/23	Tue 8/22/23	133							
137			Site Link Verification	1 day	Mon 8/21/23	Mon 8/21/23								
138			Site Optimization	1 day	Tue 8/22/23	Tue 8/22/23	137							
139			San Pedro Hill	2 days	Wed 8/23/23	Thu 8/24/23	136							
140			Site Link Verification	1 day	Wed 8/23/23	Wed 8/23/23								
141			Site Optimization	1 day	Thu 8/24/23	Thu 8/24/23	140							
142			Verdugo Peak	2 days	Fri 8/25/23	Mon 8/28/23	139							
143			Site Link Verification	1 day	Fri 8/25/23	Fri 8/25/23								
144			Site Optimization	1 day	Mon 8/28/23	Mon 8/28/23	143							
145			Guaranteed CATP Test	40 days	Wed 7/26/23	Tue 9/19/23	82							
146			Conduct Guaranteed Coverage Test	40 days	Wed 7/26/23	Tue 9/19/23								
147			Cutover Pilot Channel	0 days	Tue 9/19/23	Tue 9/19/23	146							
148			Training	30 days	Wed 7/26/23	Tue 9/5/23	6,82							
149			ASTRO25 Radio System Training	30 days	Wed 7/26/23	Tue 9/5/23								
150			P25 Infrastructure Training	20 days	Wed 7/26/23	Tue 8/22/23								
151			Train-The-Trainer Console Training	30 days	Wed 7/26/23	Tue 9/5/23	212							
152			Train-The-Trainer Verint Training	30 days	Wed 7/26/23	Tue 9/5/23	212							

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Date: Tue 1/25/22

Task

Split

Milestone

Summary

Project Summary

Inactive Task

Inactive Milestone

Inactive Summary

Manual Task

Duration-only

Manual Summary Rollup

Manual Summary

Start-only

Finish-only

External Tasks

External Milestone

Deadline

Progress

Manual Progress

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ID		Task Mode	Task Name	Duration	Start	Finish	Predecessors	f 1, 2022					Half 2, 2022					Half 1, 2023					Half 2, 2023					Half 1, 2024					Half 2, 2024					Half 1, 2025													
								F	M	A	M	J	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	A	S	O	N	D	J	F	M	A	M				
153			RF Sites Installation (Second Mobilization)	45 days	Wed 9/20/23	Tue 11/21/23	145																																												
154			100 Wilshire	5 days	Wed 9/20/23	Tue 9/26/23																																													
155			Deliver & Rack Equipment	4 days	Wed 9/20/23	Mon 9/25/23																																													
156			Cable Equipment	1 day	Tue 9/26/23	Tue 9/26/23	155																																												
157			Baldwin Hills	5 days	Wed 9/27/23	Tue 10/3/23	154																																												
158			Deliver & Rack Equipment	4 days	Wed 9/27/23	Mon 10/2/23																																													
159			Cable Equipment	1 day	Tue 10/3/23	Tue 10/3/23	158																																												
160			Beverly Glenn	5 days	Wed 10/4/23	Tue 10/10/23	157																																												
161			Deliver & Rack Equipment	4 days	Wed 10/4/23	Mon 10/9/23																																													
162			Cable Equipment	1 day	Tue 10/10/23	Tue 10/10/23	161																																												
163			Los Angeles City Hall	5 days	Wed 10/11/23	Tue 10/17/23	160																																												
164			Deliver & Rack Equipment	4 days	Wed 10/11/23	Mon 10/16/23																																													
165			Cable Equipment	1 day	Tue 10/17/23	Tue 10/17/23	164																																												
166			KSKQ Radio	5 days	Wed 10/18/23	Tue 10/24/23	163																																												
167			Deliver & Rack Equipment	4 days	Wed 10/18/23	Mon 10/23/23																																													
168			Cable Equipment	1 day	Tue 10/24/23	Tue 10/24/23	167																																												
169			Mount Washington	5 days	Wed 10/25/23	Tue 10/31/23	166																																												
170			Deliver & Rack Equipment	4 days	Wed 10/25/23	Mon 10/30/23																																													
171			Cable Equipment	1 day	Tue 10/31/23	Tue 10/31/23	170																																												
172			Oat Mountain	5 days	Wed 11/1/23	Tue 11/7/23	169																																												
173			Deliver & Rack Equipment	4 days	Wed 11/1/23	Mon 11/6/23																																													
174			Cable Equipment	1 day	Tue 11/7/23	Tue 11/7/23	173																																												
175			San Pedro Hill	5 days	Wed 11/8/23	Tue 11/14/23	172																																												
176			Deliver & Rack Equipment	4 days	Wed 11/8/23	Mon 11/13/23																																													
177			Cable Equipment	1 day	Tue 11/14/23	Tue 11/14/23	176																																												
178			Verdugo Peak	5 days	Wed 11/15/23	Tue 11/21/23	175																																												
179			Deliver & Rack Equipment	4 days	Wed 11/15/23	Mon 11/20/23																																													
180			Cable Equipment	1 day	Tue 11/21/23	Tue 11/21/23	179																																												
181			Cutover 10 Channels	0 days	Tue 11/21/23	Tue 11/21/23	178																																												
182																																																			

ID		Task Mode	Task Name	Duration	Start	Finish	Predecessors	f 1, 2022												Half 2, 2022					Half 1, 2023					Half 2, 2023					Half 1, 2024					Half 2, 2024					Half 1, 2025				
								F	M	A	M	J	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	A	S	O	N	D	J	F	M	A	M		
191			Cable Equipment	1 day	Tue 12/12/23	Tue 12/12/23	190																																										
192			Los Angeles City Hall	5 days	Wed 12/13/23	Tue 12/19/23	189																																										
193			Deliver & Rack Equipment	4 days	Wed 12/13/23	Mon 12/18/23																																											
194			Cable Equipment	1 day	Tue 12/19/23	Tue 12/19/23	193																																										
195			KSKQ Radio	5 days	Wed 12/20/23	Tue 12/26/23	192																																										
196			Deliver & Rack Equipment	4 days	Wed 12/20/23	Mon 12/25/23																																											
197			Cable Equipment	1 day	Tue 12/26/23	Tue 12/26/23	196																																										
198			Mount Washington	5 days	Wed 12/27/23	Tue 1/2/24	195																																										
199			Deliver & Rack Equipment	4 days	Wed 12/27/23	Mon 1/1/24																																											
200			Cable Equipment	1 day	Tue 1/2/24	Tue 1/2/24	199																																										
201			Oat Mountain	5 days	Wed 1/3/24	Tue 1/9/24	198																																										
202			Deliver & Rack Equipment	4 days	Wed 1/3/24	Mon 1/8/24																																											
203			Cable Equipment	1 day	Tue 1/9/24	Tue 1/9/24	202																																										
204			San Pedro Hill	5 days	Wed 1/10/24	Tue 1/16/24	201																																										
205			Deliver & Rack Equipment	4 days	Wed 1/10/24	Mon 1/15/24																																											
206			Cable Equipment	1 day	Tue 1/16/24	Tue 1/16/24	205																																										
207			Verdugo Peak	5 days	Wed 1/17/24	Tue 1/23/24	204																																										
208			Deliver & Rack Equipment	4 days	Wed 1/17/24	Mon 1/22/24																																											
209			Cable Equipment	1 day	Tue 1/23/24	Tue 1/23/24	208																																										
210			Cutover 9 Channels	0 days	Tue 1/23/24	Tue 1/23/24	207																																										
211			Dispatch Center Installation	128 days	Wed 2/1/23	Fri 7/28/23	26																																										
212			OCD Dispatch Center	64 days	Wed 2/1/23	Mon 5/1/23	26																																										
213			Test Site Connectivity	2 days	Wed 2/1/23	Thu 2/2/23																																											
214			Equipment Room Rack Install	2 days	Fri 2/3/23	Mon 2/6/23	213																																										
215			Dispatch Consol Install	30 days	Tue 2/7/23	Mon 3/20/23	214																																										
216			AXS Console Proof Of Concept Testing	30 days	Tue 3/21/23	Mon 5/1/23	215																																										
217			MFC Dispatch Center	34 days	Tue 6/13/23	Fri 7/28/23	26,212FS+30 days																																										
218			Test Site Connectivity	2 days	Tue 6/13/23	Wed 6/14/23																																											
219			Equipment Room Rack Install	2 days	Thu 6/15/23	Fri 6/16/23	218																																										
220			Dispatch Consol Install	30 days	Mon 6/19/23	Fri 7/28/23	219																																										
221			Site Installation Audit	50 days	Tue 8/29/23	Mon 11/6/23	114																																										
222			RF Sites & Sub-Systems	30 days	Tue 8/29/23	Mon 10/9/23																																											

ID		Task Mode	Task Name	Duration	Start	Finish	Predecessors	f 1, 2022					Half 2, 2022					Half 1, 2023					Half 2, 2023					Half 1, 2024					Half 2, 2024					Half 1, 2025										
								F	M	A	M	J	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	A	S	O	N	D	J	F	M	A	M	
229			Cutover Dispatch	10 days	Wed 2/21/24	Tue 3/5/24	225																																									
230			Site Equipment Removal	20 days	Wed 3/6/24	Tue 4/2/24	228																																									
231			Dispatch Centers	8 days	Wed 3/6/24	Fri 3/15/24																																										
232			OCD Dispatch	3 days	Wed 3/6/24	Fri 3/8/24																																										
233			MFC Dispatch	5 days	Mon 3/11/24	Fri 3/15/24	232																																									
234			RF Remote Sites	20 days	Wed 3/6/24	Tue 4/2/24																																										
235			Prime Site	2 days	Wed 3/6/24	Thu 3/7/24																																										
236			100 Wilshire	2 days	Fri 3/8/24	Mon 3/11/24	235																																									
237			Baldwin Hills	2 days	Tue 3/12/24	Wed 3/13/24	236																																									
238			Beverly Glenn	2 days	Thu 3/14/24	Fri 3/15/24	237																																									
239			Los Angeles City Hall	2 days	Mon 3/18/24	Tue 3/19/24	238																																									
240			KSKQ Radio	2 days	Wed 3/20/24	Thu 3/21/24	239																																									
241			Mount Washington	2 days	Fri 3/22/24	Mon 3/25/24	240																																									
242			Oat Mountain	2 days	Tue 3/26/24	Wed 3/27/24	241																																									
243			San Pedro Hill	2 days	Thu 3/28/24	Fri 3/29/24	242																																									
244			Verdugo Peak	2 days	Mon 4/1/24	Tue 4/2/24	243																																									
245			Project Finalization	20 days	Wed 3/6/24	Tue 4/2/24	228																																									
246			Final Documentation	20 days	Wed 3/6/24	Tue 4/2/24																																										
247			Puchlist Resolution	20 days	Wed 3/6/24	Tue 4/2/24																																										
248			Service Transition	0 days	Tue 4/2/24	Tue 4/2/24	230,247																																									
249			Final System Acceptance	0 days	Tue 4/2/24	Tue 4/2/24	230,247																																									
250			LAFD Voter Replacement Warranty Period	260 days	Wed 4/3/24	Tue 4/1/25	249																																									
251			Warranty Period	260 days	Wed 4/3/24	Tue 4/1/25																																										

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Task

Split

Milestone

Summary

Project Summary

Inactive Task

Inactive Milestone

Inactive Summary

Manual Task

Duration-only

Manual Summary Rollup

Manual Summary

Start-only

Finish-only

External Tasks

External Milestone

Deadline

Progress

Manual Progress

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SECTION 12

FUNCTIONAL ACCEPTANCE TEST PLAN

Los Angeles Fire Department - VRS Upgrade

800MHz Conventional Analog System

Pre-Design Review Draft

www.motorolasolutions.com/services/government



12.1 ANALOG CONVENTIONAL TESTS

12.1.1 Active Conventional Call During Transition to, and in Site Conventional Mode

1. DESCRIPTION

The Conventional Site Controller is an optional device that is installed at a console site. The CSC provides fallback capability for the console site and conventional channels colocated with this site when the link between a console site and the zone controller is lost. Such way of operating is called Site Conventional mode.

This test will demonstrate that the active conventional calls are transferred to the Conventional Site Controller (CSC) during Wide area to site conventional transition.

SETUP

RADIO-1 - CONVENTIONAL CHANNEL 1
RADIO-1 - SITE - CONVSITE 1

CONSOLE-1 - CONVENTIONAL CHANNEL 1
CONSOLE-1 - SITE - CONSITE 1
CONSOLE-2 - CONVENTIONAL CHANNEL 1
CONSOLE-2 - SITE - CONSITE 1

CSC - SITE CONVSITE 1

CCGW-1 - CONVENTIONAL CHANNEL 1
CCGW-1 - SITE - CONVSITE 1

Note: Configure the method to detect inbound radio transmission to VOX

VERSION #1.040

2. TEST

- Step 1. Initiate a call with RADIO-1 on CONVENTIONAL CHANNEL 1. Continue to transmit this call until the completion of the test.
- Step 2. Verify that CONSOLE-1 and CONSOLE-2 hear RADIO-1 audio.
- Step 3. Put CONVSITE 1 into site conventional mode by disconnecting the site link.
- Step 4. CONVSITE 1 transitions to site conventional mode. For a short period of time CONSOLE-1 and CONSOLE-2 stop hearing RADIO-1 audio. Verify that CONSOLE-1 and CONSOLE-2 join the call again and continue to hear audio from RADIO-1.
- Step 5. End the CONVENTIONAL CHANNEL 1 call on RADIO-1.
- Step 6. Verify from CONSOLE-1 or CONSOLE-2 that site conventional mode is active.
- Step 7. Initiate a call on CONVENTIONAL CHANNEL 1 from CONSOLE-1.
- Step 8. Verify that RADIO-1, RADIO-2 and CONSOLE-2 hear audio from CONSOLE-1 on CONVENTIONAL CHANNEL 1.
- Step 9. De-key CONSOLE-1 and key-up CONSOLE-2 on CONVENTIONAL CHANNEL 1. Verify that RADIO-1, RADIO-2 and CONSOLE-1 hear audio from CONSOLE-2 on CONVENTIONAL CHANNEL 1.
- Step 10. Return the system to normal operation by connecting the site link..

Pass_____ Fail_____



Analog Conventional Tests

12.1.2 Active Call During Transition to Wide Area Conventional Mode

1. DESCRIPTION

The Conventional Site Controller (CSC) is an optional device that is installed at a console site. The CSC provides fallback capability for the console site and conventional channels colocated with this site when the link between a console site and the zone controller is lost. Such way of operating is called Site Conventional mode.

This test demonstrates the ability for an active site conventional call to transition to wide conventional with minimal interruption. The active call will be interrupted for a short period.

Note: Configure the method to detect inbound radio transmission to VOX.

SETUP

RADIO-1 - CONVENTIONAL CHANNEL 1
RADIO-1 - SITE - CONVSITE-1

CONSOLE-1 - CONVENTIONAL CHANNEL 1
CONSOLE-1 - SITE - CONVSITE-1

CONSOLE-2 - CONVENTIONAL CHANNEL 1
CONSOLE-2 - SITE - CONSITE-1
CSC - SITE - CONVSITE-1

CCGW-1 - CONVENTIONAL CHANNEL 1
CCGW-1 - SITE - CONVSITE-1

VERSION #1.020

2. TEST

- Step 1. Disconnect the CONSITE 1 link and verify that CONSOLE-1 provides an indication that the CONVSITE-1 has entered into site conventional mode.
- Step 2. Initiate a conventional call on CONVENTIONAL CHANNEL 1 with RADIO-1.
- Step 3. Verify that CONSOLE-1 hears RADIO-1. Continue to transmit the call through the duration of the test.
- Step 4. Put CONVSITE 1 into wide area conventional mode by connecting the CONSITE 1 link.
- Step 5. Verify that the RADIO-1 call continues with a brief interruption while the CONVSITE 1 transitions into wide area conventional mode. (Note: CONSOLE-1 will briefly stop hearing RADIO-1, but then the call will resume once back into wide area conventional mode).
- Step 6. Verify that CONSOLE-1 continues to hear RADIO-1 after transitioning to wide area conventional mode.
- Step 7. End the CONVENTIONAL CHANNEL 1 call.

Pass____ Fail____



Analog Conventional Tests

12.1.3 Main / Alt Change Request

1. DESCRIPTION

The Main/Alternate feature provides a back-up station interface for a conventional channel. The console provides a single channel control window for the Main/Alternate channel pair. It also provides an interface indicating which interface is currently active (Main/Alternate), and allows the user to request that the active interface be changed to the other interface. The system will automatically switch to the inactive interface if the active interface fails (and the inactive has not failed). The channels comprising the Main/Alternate pair may be located at the same or different RF sites, but must be members of the same zone. The Main/Alternate conventional channel interfaces may be located on the same or on different CCGWs.

This test will demonstrate that the Main/ Alt change can be requested by Dispatch Console.

SETUP

SITE-1 - ZONE 1

CCGW-1 - CONVENTIONAL CHANNEL 1

CCGW-1 - CONVSITE 1

CCGW-2 - CONVSITE 1

CCGW-2 - CONVENTIONAL CHANNEL 2

MAIN - CONVENTIONAL CHANNEL 1

ALTERNATE - CONVENTIONAL CHANNEL 2

CONSOLE-1 - CONVENTIONAL CHANNEL 1 -
CONVSITE 1

VERSION #1.010

2. TEST

- Step 1. Verify that CONSOLE-1 shows the channel available with status of Main active
- Step 2. Send Main / Alt switch from CONSOLE-1.
- Step 3. Verify that the CONSOLE-1 shows the channel available with status of Alt active
- Step 4. Verify the Main / Alt switch from ZoneWatch and ATIA logs
- Step 5. Send Main / Alt switch from CONSOLE-1 (to set the Main active)

Pass_____ Fail_____



12.2 CONVENTIONAL TESTS

12.2.1 Conventional Comparator Force Vote Using Customer Service Software (CSS)

1. DESCRIPTION

The user has the ability to send a "Force Vote" command to a Conventional Comparator. Force voting allows the user to customize or test the audio paths of the system.

SETUP

RADIO-1 – CONVENTIONAL CHANNEL 1
RADIO-2 - CONVENTIONAL CHANNEL 1

VERSION #1.000

2. TEST

- Step 1. Using a client with CSS, enable the "Force Vote" command on one site and verify the "Force Vote" on CSS is active.
- Step 2. Initiate a call on CONVENTIONAL CHANNEL 1 using RADIO-1 and verify the audio is received from the force-voted site on RADIO-2.
- Step 3. In CSS, disable the "Force Vote" command on the site and verify the "Force Vote" on the CSS is deactivated.
- Step 4. Repeat steps 1-3 on all sites.

Pass_____ Fail_____



12.3 FAULT MANAGEMENT

12.3.1 Unified Event Manager - Base Views

1. DESCRIPTION

The Unified Event Manager (UEM) in its base configuration provides a number of views. The purpose of this test is to demonstrate the key views available from the UEM.

The Physical Summary and Detail View (Physical Map) and Service Summary and Detail View (Service Map) in previous releases are deprecated and are replaced by the Zone Map. Custom views can be saved and retrieved by other NM Client users.

SETUP

NMclient01 - UEM session up and running.

VERSION #1.010

2. TEST

- Step 1. Alarms View: In the navigation pane expand Fault Management and select Alarms. The view displays active alarms for managed resources, displaying impacted managed resources and specific objects on the managed resource along with selected alarm properties.
- Step 2. Alarm View Search: Customize the Active Alarms display by selecting the View option from the menu bar, then select Search. Perform a Managed Resource search for channels, site controllers and routers by entering "Contains" and ch, sc, and z00 respectively in the search fields to perform the three separate searches. For each of the three searches a filtered alarm view is displayed that contains alarms for the appropriate device in the search.
- Step 3. Network Events View: In the navigation pane expand Fault Management and select Network Events. The view displays recent events reported for managed resources, displaying impacted managed resources and specific object on the managed resource along with selected event properties. Alarming events are base for creating alarm objects.
- Step 4. Physical Summary View: In the navigation pane expand Zone Views and Physical, then select Physical Summary View. The Physical Summary View provides an aggregated alarm severity status of the devices located at all subnets in the Zone.
- Step 5. Service Summary View: In the navigation pane expand Zone Views and Service, then select Service Summary View. The Service Summary View provides a quick summary of the service status of sites in a Zone, including access to Channel status.
- Step 6. Zone Map: In the navigation pane, expand Zone Views and select Zone Map. The Zone Map view provides an aggregated alarm severity status of the devices located at discovered sites in the Zone.



- Step 7. Network Database: In the navigation pane select Network Database. The Network Database displays a list of all discovered Managed Resources and Sites. The display includes properties of each resource as well as overall severity of all objects and/or sub resources

Pass____ Fail____



Fault Management

12.3.2 Station Power Amp Failure Reports to the Unified Event Manager (UEM)

1. DESCRIPTION

This test will demonstrate 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 - CHANNEL 1
RADIO-1 - SITE - SITE 1
RADIO-2 - CHANNEL 2
RADIO-2 - SITE - SITE 1
NMclient01 - UEM session up and running.

* All Radios should be "Site Locked"

VERSION #1.020

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 the changes to the alarm on the UEM, indicating the module is restored to service.

Pass____ Fail____



Fault Management

12.3.3 Conventional Site Controller Fan Alarm reports to Unified Event Manager

1. DESCRIPTION

The Conventional Site Controller (CSC) is an optional device that is installed at a console site. The CSC provides fallback capability for the console site and conventional channels collocated with this site when the link between a console site and the zone controller is lost.

The Unified Event Manager (UEM) is the fault management application that is used to monitor the status of devices on the network. The Conventional Site Controller is monitored by the UEM in order to give the Network Manager a view to the status of the device. This test will demonstrate the Conventional Site Controller's ability to generate a fan fault message and to display it at the Unified Event Manager (UEM).

SETUP

CSC-1 - SITE - CONSITE 1

VERSION #1.030

2. TEST

- Step 1. Remove the fan assembly from the front of the selected test Conventional Site Controller.
- Step 2. From a Network Management client, verify that a "Major" alarm is displayed at the Unified Event Manager (UEM) indicating that the fan has failed.
- Step 3. Replace the fan assembly on the front of the selected test Conventional Site Controller.
- Step 4. From a Network Management client, verify that the "Major" alarm clears at the UEM.

Pass_____ Fail_____



Fault Management

12.3.4 Site Path Failure (Ethernet) Reports to the Unified Event Manager

1. DESCRIPTION

This test will demonstrate 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/transport failure by removing a customer selected site data link and monitoring the alerts.

Note: If using a Simulcast site, this test refers to the Prime Site links. While failures would be seen at the subsite level if a Subsite link were failed, the site would not drop into Site Trunking.

SETUP

RADIO-1 - CHANNEL 1
RADIO-1 - SITE - SITE 1
NMclient01 - UEM session up and running.

* RADIO-1 should be "Site Locked"

VERSION #1.030

2. TEST

- Step 1. Remove the Ethernet cable(s) to the SITE 1 router(s) (If Simulcast, this refers to the Prime Site router(s)) at the site where RADIO-1 is affiliated. Be certain to remove the Ethernet 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 Ethernet 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/events that appear in the UEM, indicating the site is in recovery and after a period of time has recovered.

Pass____ Fail____



12.4 FAULT MANAGEMENT - JUNIPER

12.4.1 Ethernet Site Link Round Trip Delay Fault Reports to the Unified Event Manager - Juniper

1. DESCRIPTION

When the average round trip IPTD(delay) statistic exceeds the IPTD Fault Threshold for an Ethernet Site/Interzone Link, an event is sent to the Unified Event Manager (UEM).

NOTE: This test is only valid if it is executed on a real Ethernet Site/Interzone Link that has 10ms or more of round trip delay. 10ms is the minimum configurable value.

SETUP

No prior setup is necessary.

Note: This test will not be practical to run in staging because the link delays would not exceed the threshold in most cases even at the minimum settings. This test, if used, should be reserved for execution in the field under real conditions.

VERSION #1.010

2. TEST

- Step 1. On both routers at each end of the Ethernet Site/Interzone Link (ie Core & Site Router for a site link), configure the IPTD(delay) threshold for the minimum value of 10ms. (Follow step 2 procedure)
- Step 2. In the UNC, right-click on each router and select SetTWAMP Round Trip Delay Threshold and Enable Trap from the Saved Commands. After selecting the Saved Commands option, navigate using the Up button and double clicking on folders within the folder list to get to: LibraryManager>System > Motorola > Juniper router>TWAMP. This folder contains additional folders specific for the link type so choose the proper one.
- Step 3. After the end of next full measurement interval (approximately 30 minutes) check for the event reporting. In UEM, select Fault Management > Events.
- Step 4. Verify Unified Event Manager displays an event for the configured routers indicating that the IPTD Fault Threshold has been exceeded, including the IPTD(delay) value.
- Step 5. Using the procedure in Step #1, set the trap threshold to the appropriate value for the Ethernet Site/Interzone link. This value is determined during system planning and provisioning of the customer backhaul network. The default value is 40ms.

Pass_____ Fail_____



12.5 PUBLIC SAFETY LTE TO ASTRO SYSTEM

12.5.1 ASTRO to Public Safety LTE (PS-LTE) Group Calls

1. DESCRIPTION

This test verifies that an ASTRO to PS-LTE PTT call is successful when there are no previously active sessions.

SETUP

RADIO-1 - CHANNEL 1
RADIO-2 - CHANNEL 1
PS-LTE HANDSET-1 - CHANNEL 1
PS-LTE HANDSET-2 - CHANNEL 1

Idle system – no recent calls made.

VERSION #1.020

2. TEST

- Step 1. Initiate a group call from RADIO-1 and transmit audio.
- Step 2. Verify that PS-LTE HANDSET-1 and PS-LTE HANDSET-2 receive the RADIO-1 call.
- Step 3. Dekey RADIO-1. Initiate a group call from RADIO-2 within 5 seconds.
- Step 4. Verify that PS-LTE HANDSET-1 and PS-LTE HANDSET-2 receive the RADIO-2 call.

Pass____ Fail____



Public Safety LTE to ASTRO System

12.5.2 Public Safety LTE (PS-LTE) PTT Gateway forwards Emergency Calls

1. DESCRIPTION

This test will demonstrate that an PS-LTE PTT gateway forwards ASTRO emergency calls.

SETUP

RADIO-1 - CHANNEL 1
RADIO-2 - CHANNEL 1
CONSOLE-1 – CHANNEL 1
PS-LTE HANDSET-2 - CHANNEL 1
PS-LTE HANDSET-2 - CHANNEL 1

Idle system – no recent calls made.

VERSION #1.040

2. TEST

- Step 1. Put RADIO-1 into Emergency mode, then key RADIO-1 to initiate an Emergency call.
- Step 2. Verify that RADIO-2 and CONSOLE-1 hear RADIO-1's Emergency call, and that PS-LTE HANDSET-1 and PS-LTE HANDSET-2 hear the call as non-Emergency audio.
- Step 3. Dekey RADIO-1. Acknowledge and knockdown the Emergency on CONSOLE-1 and end the Emergency on RADIO-1. Setup an Emergency call on CONSOLE-1.
- Step 4. Verify that RADIO-1 and RADIO-2 hear CONSOLE-1's Emergency call, and that PS-LTE HANDSET-1 and PS-LTE HANDSET-2 hear the call as non-Emergency audio.

Pass_____ Fail_____



12.6 DISPATCH CONSOLE CONVENTIONAL RESOURCES

12.6.1 Conventional Subscriber Alias

1. DESCRIPTION

The purpose of this section is to verify that the alias for a radio can be added using the Provisioning Manager.

SETUP

RADIO-1 - CONVENTIONAL CHANNEL 1

CONSOLE-1 - CONVENTIONAL CHANNEL 1

Provisioning Manager – no alias for RADIO-1

VERSION #1.010

2. TEST

- Step 1. Initiate a voice call from RADIO-1 to CONSOLE-1 on CONVENTIONAL CHANNEL 1
- Step 2. Verify the radio's ID is displayed at CONSOLE-1
- Step 3. From the Provisioning Manager, change RADIO-1's alias to "Robert" and download the configuration, then restart the Console application.
- Step 4. When the Console is operational, verify communications between CONSOLE-1 and RADIO-1 on CONVENTIONAL CHANNEL 1.
- Step 5. Initiate a voice call from RADIO-1 to CONSOLE-1 on CONVENTIONAL CHANNEL 1.
- Step 6. Verify the RADIO-1 alias "Robert" is displayed at the CONSOLE-1 operator position.

Pass____ Fail____



Dispatch Console Conventional Resources

12.6.2 Console Priority

1. DESCRIPTION

Console Operator Positions have ultimate control of transmitted audio on an assigned resource. The Console Position has the capability to take control of an assigned voice channel for a channel/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 - CONVENTIONAL CHANNEL 1
RADIO-2 - CONVENTIONAL CHANNEL 1

CONSOLE-1 - CONVENTIONAL CHANNEL 1

VERSION #1.040

2. TEST

- Step 1. Initiate a call from RADIO-1 on CONVENTIONAL CHANNEL 1. Keep this call in progress until the test has completed.
- Step 2. Observe that RADIO-2 receives the call.
- Step 3. While the call is in progress, key up CONSOLE-1 on CONVENTIONAL CHANNEL 1.
- Step 4. Observe that RADIO-2 is now receiving audio from CONSOLE-1 on CONVENTIONAL CHANNEL 1
- Step 5. De-key CONSOLE-1.
- Step 6. Verify RADIO-2 now receives RADIO-1 audio.
- Step 7. End the CONVENTIONAL CHANNEL 1 call from RADIO-1.

Pass____ Fail____



Dispatch Console Conventional Resources

12.6.3 Alert Tones - Conventional Channel

1. DESCRIPTION

Pre-defined alert tones can be transmitted on the selected Radio Resource to subscribers which can alert members of a channel / talkgroup to a particular event or signify to radio users special instructions are to follow. The Console has the ability to send an Alert-Tone signal on selected conventional or talkgroup resources.

SETUP

RADIO-1 - CONVENTIONAL CHANNEL 1
RADIO-2 - CONVENTIONAL CHANNEL 1
CONSOLE-1 - CONVENTIONAL CHANNEL 1

VERSION #1.030

2. TEST

- Step 1. Select CONVENTIONAL CHANNEL 1 on CONSOLE-1.
- Step 2. Select Alert Tone 1 and depress the Alert Tone button.
- 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____



Dispatch Console Conventional Resources

12.6.4 Patch Operation - Conventional

1. DESCRIPTION

The Patch feature allows more than one Radio Resource to be grouped simultaneously. This can be used for temporarily merging two or more channels/frequencies together to act as one larger group. Telephones and radio resources can be patched together. In a patch group, the members can receive messages from the console and they can transmit to all other members of the patch group.

SETUP

RADIO-1 - CONVENTIONAL CHANNEL 1
RADIO-2 - CONVENTIONAL CHANNEL 2
CONSOLE-1 - CONVENTIONAL CHANNEL 1 and
CONVENTIONAL CHANNEL 2

VERSION #1.020

2. TEST

- Step 1. Select the tab for patch 1, 2 or 3. Verify that the patch edit button and patch transmit button appear.
- Step 2. Select the "Patch Edit" icon. The selected patch will turn blue.
- Step 3. Select the CONVENTIONAL CHANNEL 1 and CONVENTIONAL CHANNEL 2 Radio Resource by moving the cursor over the Radio Resources' names and selecting them.
- Step 4. Verify that the selected Radio Resources display a "Patch Edit" icon.
- Step 5. Press and hold the "Patch Transmit" icon to initiate the patch transmission.
- Step 6. Verify that the RADIO-1 and RADIO-2 monitor the console outbound audio.
- Step 7. Verify that RADIO-1 can communicate with RADIO-2 even though they are on separate channels.
- Step 8. To knock down the patch, select the Radio Resources by moving the mouse cursor over the resource window and clicking over the patch icon. Repeat this process until all the resources have been removed from the Patch window.
- Step 9. Select the Patch Edit icon and idle the current patch.

Pass____ Fail____



Dispatch Console Conventional Resources

12.6.5 Activity Log - Conventional

1. DESCRIPTION

The Console activity log will show all traffic for the resource assigned to that console to include the time, radio alias, Channel, PTT ID and Emergency Call.

The dispatcher has the capability of selecting a logged call within in the "Activity Log Window" for instant transmit on the corresponding logged resource.

This activity log can be logged to a text file for archival purposes.

Note: The log file in the ops will only be seen if you first check Log Activity in Elite Admin application then in folder options uncheck hide hidden system files.

SETUP

RADIO-1 – CONVENTIONAL CHANNEL 1
RADIO-2 – CONVENTIONAL CHANNEL 2
RADIO-3 – CONVENTIONAL CHANNEL 3
RADIO-4 – CONVENTIONAL CHANNEL 4

CONSOLE-1 – CONVENTIONAL CHANNEL 1,
CONVENTIONAL CHANNEL 2, CONVENTIONAL
CHANNEL 3, CONVENTIONAL CHANNEL 4

VERSION #1.060

2. TEST

- Step 1. On CONSOLE-1 select the "Show Activity Log" button on the tool bar to open the Activity Log Window.
- Step 2. Initiate calls on RADIO-1, RADIO-2, RADIO-3 and RADIO-4 to log call information and verify calls are displayed in the activity log window.
- Step 3. Select a logged call in the Activity Log Window and verify that the Channel Control Window (CCW) at the top of the Activity log window changes to the corresponding resource. Verify the dispatcher is capable of responding via the instant transmit button.
- Step 4. Open the text file created by the Activity Log and verify call traffic has been archived to the document file.

Pass_____ Fail_____



Dispatch Console Conventional Resources

12.6.6 Conventional Comparator Force Vote

1. DESCRIPTION

The console user has the ability to send a "Force Vote" command to a Conventional Comparator. Force voting allows the user to customize the audio of the system.

SETUP

RADIO-1 – CONVENTIONAL CHANNEL 1

CONSOLE-1 - CONVENTIONAL CHANNEL 1
CONSOLE-1 - Configured with Voting Display and Control

VERSION #1.040

2. TEST

- Step 1. On CONSOLE-1, enable the "Force Vote" command on one site and verify the "Force Vote" on CONSOLE-1 is active.
- Step 2. Initiate a call on CONVENTIONAL CHANNEL 1 using RADIO-1 and verify the audio is received from the force-voted site.
- Step 3. From CONSOLE-1, disable the "Force Vote" command on the site and verify the "Force Vote" on the console is deactivated.

Pass____ Fail____



Dispatch Console Conventional Resources

12.6.7 Multi-Select Operation

1. DESCRIPTION

Multi-Select (Msel) allows the console operator to group a number of channels/talkgroups together such that when the general transmit bar is depressed, all of the multi-selected channels/talkgroups will transmit at the same time with the same information. Multi-Select is one way communication call. If a radio user responds to a Multi-Select call the talkgroup the user is affiliated to will be the only one to hear the call. There is no super-group formed, so radio communication is still at the single channel level. Multi-Select is utilized to send an APB to several channels/talkgroups. A Multi-Select has a limit of twenty (20) trunking/conventional resources

SETUP

RADIO-1 - CONVENTIONAL CHANNEL 1
RADIO-2 - CONVENTIONAL CHANNEL 2

CONSOLE-1 - CONVENTIONAL CHANNEL 1,
CONVENTIONAL CHANNEL 2

VERSION #1.030

2. TEST

- Step 1. From CONSOLE-1, create an Msel group with CONVENTIONAL CHANNEL 1 and CONVENTIONAL CHANNEL 2.
- Step 2. Transmit on the Msel using the Msel instant transmit button.
- Step 3. Verify that RADIO-1 and RADIO-2 hear the call.
- Step 4. Initiate a call with RADIO-1.
- Step 5. Verify the call is heard on CONSOLE-1 but not on RADIO-2.
- Step 6. Initiate a call with RADIO-2.
- Step 7. Verify the call is heard on CONSOLE-1 but not on RADIO-1.
- Step 8. On CONSOLE-1 dissolve the Msel.

Pass____ Fail____



Dispatch Console Conventional Resources

12.6.8 Main / Alt - Conventional

1. DESCRIPTION

This test will demonstrate that a console can create Main/Alt channel pairs and that the channels can be swapped and the call processing behavior will be according to the defined operation of Main/Alt for Digital Conventional, Analog Conventional, Mixed Mode and MDC 1200 channels.

SETUP

RADIO-1 - CONVENTIONAL CHANNEL 1
RADIO-2 - CONVENTIONAL CHANNEL 2

CONVENTIONAL CHANNEL 1 - MAIN-ACTIVE
CONVENTIONAL CHANNEL 2 - ALTERNATE-INACTIVE

CONSOLE-1 - CONVENTIONAL CHANNEL 1
CONSOLE-1 - CONVENTIONAL CHANNEL 2

VERSION #1.020

2. TEST

- Step 1. Key-up CONSOLE-1 on CONVENTIONAL CHANNEL 1
- Step 2. Verify that RADIO-1 hears CONSOLE-1 on CONVENTIONAL CHANNEL 1.
- Step 3. Fail the MAIN_ACTIVE Channel (CONVENTIONAL CHANNEL 1) and verify that the Alt channel (CONVENTIONAL CHANNEL 2) is available for selection by the console. Key-up CONSOLE-1 on CONVENTIONAL CHANNEL 2 and verify that RADIO-2 on the Alt channel is able to hear the console audio transmission.

Pass_____ Fail_____



Dispatch Console Conventional Resources

12.6.9 Alert Tone Transmission - Latched - Conventional

1. DESCRIPTION

This test demonstrates the latched transmission of alert tones. Latched transmissions can be initiated with a single alert tone button push.

SETUP

RADIO-1 – CHANNEL 1

CONSOLE-1 – CHANNEL 1

VERSION #1.010

2. TEST

- Step 1. Configure CONSOLE-1 for latched alert tone transmission.
- Step 2. Select an alert tone for latched transmission via single button push.
- Step 3. Observe the alert tone continues to be heard on RADIO-1 when the alert tone button is no longer being pushed
- Step 4. During the latched transmission of an alert tone, select the alert tone button again.
- Step 5. Observe the alert tone transmission stops after the alert tone button is released.
- Step 6. Select an alert tone for latched transmission via single button push.
- Step 7. Observe the alert tone continues to be heard on RADIO-1 to completion of the alert tone wave file.

Pass____ Fail____



SECTION 13

COVERAGE ACCEPTANCE TEST PLAN (CATP)

13.1 OVERVIEW

This Coverage Acceptance Test Plan (CATP) is designed to verify that the voice radio system implemented by Motorola Solutions for the Los Angeles Fire Department meets or exceeds the required reliability as shown on Motorola Solutions' maps. The CATP defines the coverage testing method and procedure, the coverage acceptance criterion, the test documentation, and the responsibilities of both Motorola Solutions and the Los Angeles Fire Department.

Coverage Acceptance Testing is based upon a coverage prediction that accurately represents the implemented infrastructure and parameters that are consistent with the contract agreements. To characterize system performance accurately, the actual user equipment radio series deployed for the Los Angeles Fire Department will be used to conduct the coverage test.

Subsequent sections define the coverage acceptance test configuration(s) and test criteria.

13.2 CATP DEFINITIONS

Several definitions are needed to accurately describe the coverage acceptance test method and criteria. Where cited, these terms or methods are defined in TIA TSB-88.1-E¹ or TSB-88.3-E².

13.2.1 Defined Test Area

The defined test area is the geographical area in which communications will be provided that meet or exceed the specified Channel Performance Criterion (CPC) at the specified reliability for the specified equipment configuration(s). The defined test area(s) are listed in Table 14-1. Coverage Acceptance Test Summary, along with names of the corresponding Motorola Solutions map(s) which show the defined test areas. Please see the Coverage Maps Section of this Proposal for the Guaranteed Coverage Map.

¹ *Wireless Communications Systems --- Performance in Noise- and Interference-Limited Situations --- Part 1: Recommended Methods for Technology Independent Performance Modeling* Technical Service Bulletin TSB-88.1-E, Telecommunications Industry Association (TIA), Arlington VA, 2018.

² *Wireless Communications Systems --- Performance in Noise- and Interference-Limited Situations --- Part 3: Recommended Methods for Technology Independent Performance Verification*, Technical Service Bulletin TSB-88.3-E, Telecommunications Industry Association (TIA), Arlington VA, 2018.



For some defined test areas (identified in Table 14-2. Coverage Acceptance Test Summary), the coverage reliability commitment is only on-roads. The roads included in the on-road commitment are defined by the US Census Bureau TIGER streets that are paved roads, accessible by 2-wheel drive vehicles.

For coverage testing, each defined test area will be divided into a grid pattern by Motorola Solutions to produce at least the number of uniformly sized test locations (or tiles) required by the Estimate of Proportions formula. [TSB-88.3-E, §5.2.1, equation 2] The minimum number of test tiles required varies, from a hundred to many thousands, depending on the size of the defined test area, desired confidence in results, type of coverage test, and the predicted versus required reliability.

13.2.2 Channel Performance Criterion (CPC)

The CPC is the specified minimum design performance level in a faded channel. [TSB-88.1-E, §5.2] For this system, the CPC is the Delivered Audio Quality (DAQ) as stated in Table 14-2. Coverage Acceptance Test Summary. The DAQ definitions are provided in Table 14-1. [TSB-88.1-E, §5.4.2, Table 3].

Table 14-1: DAQ 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.
4.5	Speech easily understood. Infrequent noise/distortion.
5	Speech easily understood.

The CPC pass/fail criterion is the faded performance threshold, plus any adjustments for antenna performance, external noise, and in-building or in-vehicle losses. [TSB-88.1-E, §5.4.2, Figure 6] The faded performance threshold for the specified CPC is determined using the receiver's static reference sensitivity adjusted by the projected CPC parameters for the applicable Modulation Type and DAQ as listed in the current version of TSB-88.1, Annex A, Table A-1. For coverage testing of digital voice radio systems, the faded performance threshold is the applicable Bit Error Rate (BER) from the projected CPC parameters.

13.2.3 Reliability

The Covered Area reliability is the percentage of locations within the defined test area that are predicted to meet or exceed the specified CPC. The Motorola Solutions map(s) indicate the Covered Area(s) within which this system is predicted to provide at least the reliability of meeting or exceeding the CPC as stated in Table 14-2 Coverage Acceptance Test Summary.

For the defined test area(s) guaranteed for Covered Area reliability, only the painted covered area on Motorola Solutions' maps will be tested for coverage acceptance. No acceptance testing will be performed in locations predicted on Motorola Solutions' maps to be below the required Covered Area reliability.

After all accessible tiles in the defined test area have been tested, the Covered Area reliability will be determined by dividing the number of tiles tested that meet or exceed the CPC pass/fail criterion by the total number of tiles tested. [TSB-88.3-E, §5.1, equation 1]

13.2.4 Direction(s) of Test

The direction(s) of test in Table 14-2 Coverage Acceptance Test Summary defines the direction(s) which will be tested for coverage acceptance. Inbound (also called reverse link, uplink, or talk-in) is the path from the mobile or portable radios inward to the fixed equipment.

13.2.5 Equipment Configurations

This section defines the equipment configurations and infrastructure design parameters upon which the coverage guarantee and the coverage acceptance test are based. The equipment configurations are defined in Table 14-2 Coverage Acceptance Test Summary, and include user equipment, outdoor/in-building definition, defined test area, number of test tiles, reliability, CPC, CPC pass/fail, and direction(s) of test. The infrastructure design parameters are defined in Table 14-3 Infrastructure Design Parameters, and include site names, site locations, and antenna system parameters. If the implemented system equipment configuration and/or infrastructure design parameters vary from these configurations and/or parameters, a revised coverage map will be used to define the test configuration and potential areas from which test tiles will be included in the revised coverage acceptance test.

Coverage testing will be conducted with equipment installed per the configurations in Table 14-2 Coverage Acceptance Test Summary. The mobile mounted antennas must be in unobstructed locations that are not adjacent to other large objects or metallic items which would distort the antenna patterns.



Table 14-2: Los Angeles Fire Department Coverage Acceptance Test Summary

User Equipment	Outdoor / In-Building	Defined Test Area & Map Name	Number of Test Tiles	Reliability	CPC	CPC Pass/Fail	Direction(s) of Test
APX Portable with XE All-Band Antenna with the RSM. Radio at on belt-clip at hip level from transmit and receive.	Outdoor	CATP On-Roads Grid Map in this Proposal	1603 (0.5 mile tiles)	95%	DAQ-3.0	Subjective DAQ	Inbound Only



Table 14-3: Los Angeles Fire Department Infrastructure Design Parameters

Site Name	Latitude	Longitude	Transmit Antenna System				Receive Antenna System				
			Height	Azimuth	Antenna Model	ERP (watts)	Height	Azimuth	Antenna Model	External Noise assumed (relative to KToB)	EFS (dBm)
Simulcast/Voting Subsystem											
100 Wilshire	34° 1' 0.6" N	118° 30' 0.84" W	390 ft	45°	[dbSpectra Inc.DS7C08PP YU-D_840_0_RE V3_CCDT]	125 watts	390 ft	45°	[dbSpectra Inc.DS7C09P36U-D_816_0_Rev2_CCDT]	N/A	-117.21 dBm
Baldwin Hills	34° 0' 24.07" N	118° 21' 44.43" W	100 ft	0°	[dbSpectra Inc.DS7C08PP YU2D_815_2_CCDT]	116.1 watts	150 ft	0°	[dbSpectra Inc.DS7C09P36U-D_816_0_Rev2_CCDT]	N/A	-117.21 dBm
Beverly Glenn	34° 7' 44.94" N	118° 26' 33.27" W	50 ft	300°	[RF Industries Pty LtdCC807-08 @806 V1.0_CCDT]	131.2 watts	80 ft	0°	[dbSpectra Inc.DS7C09P36U-D_816_0_Rev2_CCDT]	N/A	-117.2 dBm
KSKQ Radio	34° 4' 43.29" N	118° 11' 8.12" W	30 ft	300°	[dbSpectra Inc.DS7C08PP YU-D_840_0_RE V3_CCDT]	137.7 watts	40 ft	0°	[dbSpectra Inc.DS7C09P36U-D_816_0_Rev2_CCDT]	N/A	-117.21 dBm
Los Angeles City Hall	34° 3' 12.99" N	118° 14' 33.25" W	433 ft	0°	[dbSpectra Inc.DS7C06P3 6T-D_BOTTOM_Rev2_CCDT]	78.9 watts	445 ft	0°	[dbSpectra Inc.DS7C06P36T-D_TOP_Rev2_CCDT]	N/A	-113.81 dBm
Mount Washington	34° 6' 15.04" N	118° 12' 53.92" W	40 ft	280°	[dbSpectra Inc.DS7C08PP YU-D_840_0_RE V3_CCDT]	135.2 watts	65 ft	0°	[dbSpectra Inc.DS7C09P36U-D_816_0_Rev2_CCDT]	N/A	-117.21 dBm
Oat Mountain	34° 19' 41.99" N	118° 35' 53.26" W	60 ft	120°	[dbSpectra Inc.DS7C08PP YU-	127.9 watts	165 ft	0°	[dbSpectra Inc.DS7C09P36U-	N/A	-117.21 dBm



Site Name	Latitude	Longitude	Transmit Antenna System				Receive Antenna System				
			Height	Azimuth	Antenna Model	ERP (watts)	Height	Azimuth	Antenna Model	External Noise assumed (relative to KToB)	EFS (dBm)
					D_840_0_RE V3_CCDT]				D_816_0_Rev2_CCDT]		
San Pedro Hill	33° 44' 47.03" N	118° 20' 8.27" W	30 ft	300°	[dbSpectra Inc.DS7C08PP YU4D_815_4 _CCDT]	137.7 watts	50 ft	0°	[dbSpectra Inc.DS7C09P36U-D_816_0_Rev2_CCDT]	N/A	-117.21 dBm
Verdugo Peak	34° 13' 11.29" N	118° 17' 25.93" W	50 ft	0°	[dbSpectra Inc.DS7C09P36U-D_816_0_Rev 2_CCDT]	157.8 watts	75 ft	0°	[dbSpectra Inc.DS7C09P36U-D_816_0_Rev2_CCDT]	N/A	-117.21 dBm



13.2.6 Outdoor Only Coverage

Motorola Solutions' portable coverage prediction is for outdoor locations only. Portable coverage inside buildings and vehicles is not a design requirement of this system and is, therefore, not guaranteed.

13.2.7 CPC Pass/Fail Criteria for a Test Tile

For each equipment configuration, the CPC pass/fail criteria for a test tile is stated in Table 14-2 Coverage Acceptance Test Summary each equipment configurations[s] will have only one CPC pass or fail criterion for a test tile.

Coverage for the portable outdoor equipment configurations will be verified for acceptance by attenuation of the test radio for DAQ tests. The attenuation will be the difference between the test radio's antenna system and the additional loss used in Motorola Solutions' coverage prediction to account for portable antenna performance. The attenuator values will be provided during design review and reflected in Table 14-4.

This provides a method of verifying that the radio system provides the required DAQ for the specified CPC for each of the defined equipment configurations.

The methodology to determine the attenuator value is demonstrated in TSB-88.1-E §5.4.2, Figure 6. The attenuator value includes the proper values for the equipment configuration requirement plus adjustments for the test equipment setup. Should the test equipment setup losses (e.g. cable length) vary, an adjustment to the attenuator value may be required to represent the required equipment configuration accurately.

Table 14-4: Attenuator Values to Evaluate Each Equipment Configuration

User Equipment Configuration and Outdoor / In-Building	Attenuator Value
Portable Outdoors	TBD – Pending Final Design Review.

13.2.8 Required Number of Test Tiles in the Defined Test Area

The method used to test coverage is a statistical sampling of the defined test area to verify that the 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 defined test 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 defined test area. There is one test sample per test tile, where a sample consists of multiple sub-samples.

Coverage acceptance testing will be performed in the defined test area as indicated on Motorola Solutions-provided maps. To verify that the reliability requirement is met, the defined test area indicated on Motorola Solutions' maps will be divided into uniformly sized test tiles, with at least the number of test tiles indicated in Table 14-2 Coverage Acceptance Test Summary. The number of test tiles indicated in Table 14-2 Coverage Acceptance Test Summary is at least the minimum required by the Estimate of Proportions formula as stated in section 1.2.1 (Defined Test Area) of this document.

Per TSB-88.3-E, the stated minimum outdoor tile size is 100 by 100 wavelengths; however, the minimum *practical* test tile size is typically about 400 by 400 meters (about 0.25 by 0.25 miles). The minimum practical tile 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 test tiles. A related

consideration is the time, resources, and cost involved in testing very large numbers of very small tiles. For a given defined test area, all test tiles must be of equal size. The maximum test tile size is 2 by 2 km (1.24 by 1.24 miles) [TSB-88.3-E, §5.5.1]. In some wide-area systems, this constraint on maximum tile size may dictate a greater number of test tiles than the minimum number required by the Estimate of Proportions formula.

No acceptance testing will be performed in locations outside the defined test area as indicated on the Motorola Solutions-provided maps. Motorola Solutions and the Los Angeles Fire Department may agree to perform “information only” tests in locations outside the defined test area; however, these “information only” test results will not be used for coverage acceptance. Any “information only” test locations must be defined before starting the test. If the added locations require significant additional time and resources to test, a change order will be required and Motorola Solutions may charge the Los Angeles Fire Department on a time-and-materials basis.

13.2.9 Accessibility to Test Tiles

Prior to testing, Motorola Solutions and the Los Angeles Fire Department will plan the route for the test vehicle(s) through the defined test area, to ensure that at least the minimum required number of tiles is tested. While planning the route (if possible) or during the test, Motorola Solutions and the Los Angeles Fire Department will identify any test tiles that are inaccessible for the coverage test (due to lack of roads, restricted land, etc.). Inaccessible tiles will be eliminated from the acceptance test calculation. [TSB-88.3-E, §5.5.4]

If elimination of inaccessible test tiles results in less than a statistically significant number of test tiles or substantially alters the defined test area, Motorola Solutions reserves the right to adjust the committed reliability based on the reduced number of accessible test tiles within the altered test area and the Estimate of Proportions formula. [TSB-88.3-E, §5.2.1, equation 2]

13.2.10 Random Selection of a Test Location in Each Tile

This CATP provides an objective method of randomly selecting and tracking test locations using Motorola Solutions’ VoyagerSM coverage testing tool. The method has direct correlation with Motorola Solutions’ coverage prediction methodology.

Using Voyager, the actual test location within each test tile will be randomly selected by the test vehicle crossing into the tile at an arbitrary point, with an arbitrary speed and direction. If the selected test location is in a shielded area such as a tunnel or underground parking garage, the data from that test location must be eliminated and a replacement test location must be used.

13.2.11 CPC Measurements in Each Tile

In each test tile, a voice test exchange will be initiated using predetermined text typical of a common voice exchange between the fixed location and the location. The person conducting the test at the portable will be moving at a typical speed for the surrounding conditions.

13.3 RESPONSIBILITIES AND PREPARATION

This section identifies the responsibilities of the Los Angeles Fire Department and Motorola Solutions regarding requirements for equipment, personnel, and time during the coverage test.

The Los Angeles Fire Department will provide the following for the duration of the coverage test:

- At least two test vehicle(s) and will provide the driver(s).
- Exclusive use of the test channels required by Motorola Solutions during the test.
- One team each with three or more representatives designated by the Los Angeles Fire Department per team to evaluate and record the pass/fail result of each subjective audio transmission. The required quantity of test participants shall be available a minimum of eight hours a day.
- Facility with one console for the fixed end subjective audio test.
- Provide 4 user radios for the test.

Motorola Solutions will provide the following for the duration of the coverage test:

- Two team(s) each with two members, to navigate and to operate Voyager, operate the portable radio, and to evaluate and record the pass/fail result of each subjective audio transmission.
- One Motorola Solutions representatives to operate the fixed equipment, and to evaluate and record the pass/fail result of each subjective audio transmission.
- At least one Motorola Solutions Voyager coverage testing tool.

Before starting the test, the Los Angeles Fire Department and Motorola Solutions will agree upon the time frame for Motorola Solutions' submission of a report containing the coverage test results.

13.4 CATP PROCEDURES

A coverage acceptance test will be performed using Motorola Solutions' Voyager tool to randomly select test locations.

Voyager consists of the following:

- A Global Positioning System (GPS) receiver, which will provide the computer with the location and speed of the test vehicle.
- A laptop computer with Voyager software and a mapping database, which includes highways and local streets.

The procedure for the subjective DAQ coverage test outdoors will be as follows:

- A subjective listening test will be performed for coverage acceptance testing, to verify talk-in DAQ performance of the system.
- A fixed dispatch location will be established.
- Prior to testing, Los Angeles Fire Department and Motorola Solutions will agree upon a procedure to allow each audio transmission to be evaluated for approximately five seconds.
- The test participants will be divided into teams, each consisting of personnel from both the Los Angeles Fire Department and Motorola Solutions. Each team will have members that operate a portable radio in the field, and members that are stationed at the fixed dispatch location.
- As the field test team(s) drive through the coverage area, test locations within each test tile will be selected randomly by Voyager's GPS location indication. Voyager will be used to log the talk-in and talk-out pass/fail result as well as any pertinent notes for the location.
- At each test tile location team members stationed at the dispatch location will evaluate talk-in audio quality of transmissions from the test radio(s) in that tile. Each team member will maintain a test log to record date, time, and subjective pass/fail evaluation for each test tile location. Subjective pass/fail evaluation will be based on the DAQ descriptions in Table 14-1. The determination of whether each test tile passes or fails the required DAQ value will be the majority vote of all team members' pass/fail subjective evaluations for that tile. An odd number of team members is required to avoid ties for the pass/fail majority vote.



13.5 CATP DOCUMENTATION AND COVERAGE ACCEPTANCE

During the coverage acceptance test, Voyager generates computer files that include the raw test data. A copy of this data will be provided to the Los Angeles Fire Department at the conclusion of the coverage test. Motorola Solutions will process this data to produce a map detailing the coverage test results, and to determine whether the coverage test was passed for each user equipment configuration.

The coverage acceptance criterion for a user equipment configuration will be that the voice radio system implemented by Motorola Solutions for the Los Angeles Fire Department meets or exceeds the reliability stated in Table 14-2 Coverage Acceptance Test Summary for that user equipment configuration. The system coverage acceptance criterion will be the successful passing of each of the user equipment configurations defined in Table 14-2 Coverage Acceptance Test Summary.

Motorola Solutions reserves the right to review any test tiles that fail. If a coverage test, or a portion thereof, is suspected by Motorola Solutions to have failed due to external interference, those tiles suspected of being affected by an interferer may be re-tested. If the test tiles re-tested are confirmed to have failed due to interference or external noise, those test tiles will be excluded from all acceptance calculations and Motorola Solutions will work with the Los Angeles Fire Department to identify potential solutions to the interference issues.

Motorola Solutions will conduct this Coverage Acceptance Test only once. If any portion of the test is determined to be affected by proven equipment malfunctions or failures, Motorola Solutions will repeat the portion of the test affected by the equipment malfunction or failure. The Los Angeles Fire Department will have the option to accept the coverage at any time prior to completion of the coverage test or documentation process.

Motorola Solutions will submit to the Los Angeles Fire Department a report detailing the coverage test results. This report will include a document, which is to be signed by both the Los Angeles Fire Department and Motorola Solutions, 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.



SECTION 14

WARRANTY & EXTENDED MAINTENANCE

14.1 OVERVIEW

Motorola Solutions is proposing our Advanced Plus Services for ASTRO® 25 infrastructure, a comprehensive program to sustain the long-term performance of LAFD's network. Advanced Plus Services consists of the following elements:

- Network Event Monitoring.
- Remote Technical Support.
- Network Hardware Repair.
- On-site Infrastructure Response.
- Annual Preventive Maintenance.
- Network Updates.
- Security Monitoring.

Together, these elements will help to avoid operational disruptions and maintain the value of LAFD's communications investment.

14.2 ADVANCED PLUS SERVICES ELEMENT DESCRIPTIONS

The following sections describe the elements proposed for LAFD's ASTRO 25 infrastructure.

14.2.1 Network Event Monitoring

Motorola Solutions will continuously monitor LAFD's ASTRO 25 network to detect potential issues or communications outages, maximizing network uptime. Motorola Solutions assesses each alert with advanced event detection and correlation algorithms to determine how to respond. Potential responses include remote restoration or dispatching a local field technician to resolve the incident on-site.

14.2.2 Remote Technical Support

Motorola Solutions' Centralized Managed Support Operations (CMSO) will provide Remote Technical Support for infrastructure issues that require specific technical expertise. Experienced technical support specialists will be available to consult with LAFD to help diagnose, troubleshoot, and resolve infrastructure issues. Service Desk maintenance procedures and incident resolution techniques are based on ISO 9001 and TL 9000 standards.



14.2.3 Network Hardware Repair

To restore LAFD's ASTRO 25 network components if they malfunction, Motorola Solutions will repair Motorola Solutions-provided infrastructure equipment. This includes select third-party infrastructure equipment supplied by Motorola Solutions. Motorola Solutions will ship and return repaired equipment, and will coordinate the repair of third-party solution components.

14.2.4 On-site Infrastructure Response

Motorola Solutions will provide repair service from trained and qualified technicians. Once dispatched, technicians will travel to LAFD's ASTRO 25 network location to diagnose issues and restore functionality. These technicians will run diagnostics on hardware to identify defective components, and repair or replace them as appropriate. Infrastructure Response times are based on a given issue's impact on overall system function.

Travel times and service levels are governed by local geography. Motorola Solutions will provide additional information in the Statement of Work for ASTRO 25 Advanced Plus Services and in the Customer Support Plan agreed between LAFD and Motorola Solutions.

14.2.5 Annual Preventive Maintenance

Motorola Solutions will annually test and service network components. Qualified field technicians will perform routine hands-on examination and diagnostics of network equipment to keep them operating according to original manufacturer specifications.

14.2.6 Network Updates

The Network Updates service provides public safety radio system release updates on a consistent, budgeted plan. These updates maintain reliable network operations and cybersecurity protection. In addition, Network Updates keeps LAFD's ASTRO 25 network compatible with expansion elements, as well as new products or features. With Network Updates, LAFD's network will remain on a release that qualifies for support services.

Motorola Solutions will deliver updates based on a predefined cadence of upgrade windows, with up to one update in each window. The Network Updates service includes the following:

- **Software Release Updates** - Motorola Solutions-certified software that improves network functions over previous releases. This also includes commercial operating system and application software updates.
- **Hardware Update** – When needed to support a software release update, Motorola Solutions provides new hardware. New hardware will both support the new software update, as well as maintain existing functions and features.
- **Professional Implementation Services** – Motorola Solutions will plan and implement updates at LAFD's site. This includes factory integration, testing, and supply chain management for new software and hardware.

With these services, LAFD will have access to the technology, support, and planning expertise needed for an effective upgrade.



14.2.7 Security Monitoring

Increased network activity, reduced performance, and loss in functionality may be symptoms of malicious software intrusion. Motorola Solutions will continuously monitor LAFD's ASTRO 25 network for attempts to compromise the network. Security Monitoring tools will collect automatic alerts from network firewalls, intrusion detection systems (IDS), Syslog, and anti-malware systems. Motorola Solutions security personnel will evaluate if that alert indicates there is an active cybersecurity threat. If personnel find a potential threat, Motorola Solutions will alert LAFD.

14.3 MOTOROLA SOLUTIONS SERVICE DELIVERY ECOSYSTEM

Advanced Plus Services are delivered through a tailored combination of field service personnel, centralized teams, product repair depots, and MyView Portal. These service resources will collaborate to swiftly analyze network issues, accurately diagnose root causes, and efficiently resolve issues to return the network to normal operation.

Motorola Solutions services will be delivered by staff experienced in servicing mission-critical networks. Motorola Solutions uses the Information Technology Infrastructure Library (ITIL) framework to define service tasks based on industry-recognized best practices. As staff perform tasks, service incident information will be available to LAFD's administrators and personnel through MyView Portal.

Service activities and Motorola Solutions' service team are described in more detail below.

14.3.1 Centralized Managed Support Operations

The cornerstone of Motorola Solutions' support process is the Centralized Managed Support Operations (CMSO) organization. This TL 9000/ISO 9001-certified organization is staffed 24x7x365 by experienced service desk specialists, security analysts, and operations managers. The CMSO houses critical central functions, including the Service Desk.

The CMSO Service Desk will serve as a single point of contact for services. It processes service requests, service incidents, change requests, and dispatching. The Service Desk communicates necessary information to stakeholders, bridging communications among LAFD, Motorola Solutions, and third-party subcontractors.

Service Desk teams record, track, and update incidents through the Motorola Solutions Customer Relationship Management (CRM) system. They document and respond to inquiries, requests, concerns, and service tickets. When an incident is initiated, the CMSO will engage with teams to resolve that incident. The CMSO will escalate to new teams when needed. Depending on the incident, the CMSO will coordinate incident resolution with local field service and authorized repair depots.

14.3.2 Field Service

Motorola Solutions authorized and qualified field service technicians will perform the On-site Infrastructure Response service, repair malfunctioning hardware in the field, and conduct preventive maintenance tasks. These technicians will coordinate with the Service Desk, technical support teams, and product engineering as needed to resolve incidents.



14.3.3 Repair Depot

The Motorola Solutions Repair Depot will provide LAFD with a central repair location. This will eliminate the need to send network equipment to multiple vendor locations for repair. Motorola Solutions tracks products sent to the Depot via a case management system throughout the repair process. This system will enable LAFD's representatives to check repair status, from inbound shipment to return.

14.3.4 Customer Support Manager

A Motorola Solutions Customer Support Manager (CSM) will be LAFD's key point of contact for the definition and administration of services. The CSM will work with LAFD to define service delivery details to address LAFD's specific priorities.

14.3.5 MyView Portal

To provide LAFD with quick access to service details, Motorola Solutions will provide our MyView Portal online network information tool. MyView Portal provides our customers with real-time critical network and services information through an easy-to-use graphical interface.



Figure 15-1: MyView Portal offers real-time, role-based access to critical network and services information.

With MyView Portal, LAFD's administrators will be able to monitor system health and maintenance updates. Capabilities include:

- Viewing network and support compliance.
- Viewing incident reports.
- Updating and creating incidents.
- Checking system update status.
- Receiving pro-active notifications regarding updates.

Available 24x7x365 from any web-enabled device, the information provided by MyView will be based on your needs and user access permissions, ensuring that the information displayed is secure and pertinent to your operations.

SECTION 15

PRICING SUMMARY

15.1 PRICING ASSUMPTIONS

Pricing Validity for this Proposal is based on the following assumptions.

- Contract Execution or Purchase Order Issuance by June 30th 2022
- Acceptance of equipment shipment in accordance with the Project Schedule
- Trade-In of the Quantar Base Radios and Spectra TAC Voters.

15.2 VRS SYSTEM PURCHASE

Component	Price
Voter & Transmitter Equipment:	\$9,066,153.30
Dispatch Console Equipment:	\$8,416,705.64
Contract Equipment Discount:	\$(2,248,277.63)
Implementation Services:	\$5,931,671.19
System Sub-Total:	\$21,166,252.50
Volume Purchase Discount:	\$(1,750,503.20)
June 30 th 2022 PO Discount:	\$(1,531,690.30)
Quantar Trade-In Discount:	\$(1,377,788.55)
System Total:	\$16,506,270.45
Estimated Taxes (9.5% on Equipment):	\$1,447,285.22
System Total + Tax:	\$17,953,555.68

15.3 EXTENDED MAINTENANCE OPTION

Year	Price
Year 1	Warranty
Year 2	\$2,159,302
Year 3	\$2,203,005
Year 4	\$2,248,019
Year 5	\$2,294,364
Year 6	\$2,342,132

Note: They first year warranty covers all items included in this proposal. The extended maintenance years only covers Motorola Internet Protocol based core radio equipment (transmitters, combiners, consoles, etc.) and the Verint Logging Subsystem and excludes any non-IP or other 3rd party sub-systems provided in this proposal (antennas, transmission line, API interfaces, etc.).

15.4 PAYMENT SCHEDULE & PRICING TERMS

Except for a payment that is due on the Effective Date, Customer will make payments to Motorola within thirty (30) 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.

1. 5% of the System Total due upon contract execution or issuance of a Purchase Order.
2. 8% of the System Total Implementation Design Review Acceptance.
3. 10% of the System Total due upon shipment of equipment to Customer.
4. 15% of the System Total due upon installation of First Channel.
5. 16% of the System Total due upon installation of Dispatch Console & Logging Recorder Sub-System.
6. 15% of the System Total due upon completion of Coverage Testing
7. 16% of the System Total due upon installation of remaining Channels.
8. 15% of the System Total due upon Final Acceptance.

Overdue invoices will bear simple interest at the rate of ten percent (10%) per annum, unless such rate exceeds the maximum allowed by law, in which case it will be reduced to the maximum allowable rate. Motorola reserves the right to make partial shipments of equipment and to request payment upon shipment of such equipment. In addition, Motorola reserves the right to invoice for installations or civil work completed on a site-by-site basis, when applicable.

Payment Milestone	Invoice Amount (Excl. Tax)	Est. Invoice Date
1	\$825,313.52	3/2022
2	\$1,320,501.64	6/2022
3	\$1,650,627.05	1/2023
4	\$2,475,940.57	7/2023

Payment Milestone	Invoice Amount (Excl. Tax)	Est. Invoice Date
5	\$2,641,003.27	7/2023
6	\$2,475,940.57	9/2023
7	\$2,641,003.27	1/2024
8	\$2,475,940.57	4/2024



SECTION 16

ASTRO® 25 SERVICES STATEMENT OF WORK

Motorola has included the following Lifecycle Services Statement of work as a guideline to the City on the level of Post-Warranty services included in this offering. A final Services Statement of Work will be executed post-installation and prior to the start of the Optional Extended Warranty Period if Purchased by the City.

16.1 OVERVIEW

Motorola Solutions' ASTRO® 25 Advanced Plus Services ("Advanced Plus Services") provide an integrated and comprehensive sustainment program for fixed end network infrastructure equipment located at the network core, RF sites, and dispatch sites. Advanced Plus Services do not include maintenance for mobile devices, portable devices, or network backhaul equipment.

Advanced Plus Services consist of the following elements:

- Network Event Monitoring.
- Remote Technical Support.
- Network Hardware Repair.
- Remote Security Update Service.
- On-site Infrastructure Response.
- Annual Preventive Maintenance.
- Network Updates.

Each of these elements is summarized below and expanded upon in Section 17.4. In the event of a conflict between the descriptions below and an individual subsection of Section 17.4, the individual subsection prevails.

This Statement of Work ("SOW"), including all of its subsections and attachments is an integral part of the applicable agreement ("Agreement") between Motorola Solutions, Inc. ("Motorola Solutions") and the customer ("Customer").

In order to receive the services as defined within this SOW, the Customer is required to keep the system within a standard support period as described in Motorola Solutions' [Software Support Policy \("SwSP"\)](#).

Network Event Monitoring

Real-time, continuous ASTRO 25 radio communications network monitoring and event management. Using sophisticated tools for remote monitoring and event characterization, Motorola Solutions will assess events, determine the appropriate response, and initiate that response. Possible responses include remotely addressing the issue, escalation to product technical support groups, and dispatch of designated field technical resources.



Remote Technical Support

Motorola Solutions will provide telephone consultation with specialists skilled at diagnosing and swiftly resolving infrastructure operational technical issues that require a high level of ASTRO 25 network experience and troubleshooting capabilities.

Network Hardware Repair

Motorola Solutions will repair Motorola Solutions-manufactured infrastructure equipment and select third-party manufactured infrastructure equipment supplied by Motorola Solutions. Motorola Solutions coordinates the equipment repair logistics process.

Remote Security Update Service

Motorola Solutions will pre-test third-party security updates to verify they are compatible with the ASTRO 25 network, and remotely push the updates to the Customer's network.

On-site Infrastructure Response

When needed to resolve equipment malfunctions, Motorola Solutions will dispatch qualified local technicians to the Customer's location to diagnose and restore the communications network. Technicians will perform diagnostics on impacted hardware and replace defective components. The service technician's response time will be based on pre-defined incident priority levels.

Annual Preventive Maintenance

Qualified field service technicians will perform regularly scheduled operational testing and alignment of infrastructure and network components to verify those components comply with the original manufacturer's specifications.

Network Updates

Periodically updates the Customer's ASTRO 25 system release software, and includes hardware and implementation services necessary to complete the update. With this service, the Customer's system is kept current so that it is prepared to support the latest capabilities.

16.2 MOTOROLA SOLUTIONS SERVICE DELIVERY ECOSYSTEM

Advanced Plus Services are delivered through a tailored combination of local field service personnel, centralized teams equipped with a sophisticated service delivery platform, product repair depots, and MyView Portal. These service entities will collaborate to swiftly analyze issues, accurately diagnose root causes, and promptly resolve issues to restore the Customer's network to normal operations.

16.2.1 Centralized Managed Support Operations

The cornerstone of Motorola Solutions' support process is the Centralized Managed Support Operations ("CMSO") organization, which includes the Service Desk and technical support teams. The CMSO is staffed 24x7x365 by experienced personnel, including service desk specialists, security analysts, and operations managers.

The Service Desk provides a single point of contact for all service related items, including communications between the Customer, Motorola Solutions, and third-party subcontractors. The Service Desk processes service requests, service incidents, change requests, and dispatching, and communicates with stakeholders in accordance with pre-defined response times.



All incoming transactions through the Service Desk are recorded, tracked, and updated through the Motorola Solutions Customer Relationship Management (“CRM”) system. The Service Desk also documents Customer inquiries, requests, concerns, and related tickets.

The CMSO coordinates with the field service organization that will serve the Customer locally.

16.2.2 Field Service

Motorola Solutions authorized and qualified field service technicians perform on-site infrastructure response, field repair, and preventive maintenance tasks. These technicians are integrated with the Service Desk and with technical support teams and product engineering as required to resolve repair and maintenance requests.

16.2.3 Customer Support Manager

A Motorola Solutions Customer Support Manager (“CSM”) will be the Customer’s key point of contact for defining and administering services. The CSM’s initial responsibility is to create the Customer Support Plan (“CSP”) in collaboration with the Customer.

The CSP functions as an operating document that personalizes the services described in this document. The CSP contains Customer-specific information, such as site names, site access directions, key contact persons, incident handling instructions, and escalation paths for special issues. The CSP also defines the division of responsibilities between the Customer and Motorola Solutions so response protocols are pre-defined and well understood when the need arises.

The CSP governs how the services will be performed and will be automatically integrated into this Statement of Work by this reference. The CSM and Customer will review and amend the CSP on a mutually agreed cadence so the CSP remains current and effective in governing the Advanced Plus Services.

16.2.4 Repair Depot

The Motorola Solutions Repair Depot provides the Customer with a central repair location, eliminating the need to send network equipment to multiple vendor locations for repair. All products sent to the Depot are tracked throughout the repair process, from inbound shipment to return, through a case management system that enables Customer representatives to see repair status.

16.2.5 MyView Portal

Supplementing the CSM and the Service Desk as the Customer points of contact, MyView Portal is a web-based platform that provides network maintenance and operations information. The portal is accessed from a desktop, laptop, tablet, or smartphone web browser. The information available includes:

- Network Event Monitoring: Manage incidents and view self-service reports. Observe incident details by incident priority level, and track the progress of issue resolution.
- Remote Technical Support: Manage incidents and view self-service reports. Observe incident details by incident priority level, and track the progress of issue resolution.
- Network Hardware Repair: Track return material authorizations (“RMA”) shipped to Motorola Solutions’ repair depot and eliminate the need to call for status updates. In certain countries, customers will also have the ability to create new RMA requests online.
- Remote Security Update Service: View patch history and status of recently completed security updates.



- On-site Infrastructure Response: Manage incidents and view self-service reports. Observe incident details by incident priority level, and track the progress of issue resolution.
- Annual Preventive Maintenance: View incident status and details of each annual change request for preventive maintenance, including completed checklist information for the incident.
- Network Updates: View system status overview and software update information.
- Orders and Contract Information: View available information regarding orders, service contracts, and service coverage details.

The data presented in MyView Portal is provided to support the services described in the following sections, which define the terms of any service delivery commitments associated with this data.

16.3 CONNECTIVITY SPECIFICATIONS

The Advanced Plus Services package requires available internet connectivity provided by the Customer. A minimum connection of 2 Mbps is necessary to enable remote monitoring and update services.

16.4 ADVANCED PLUS SERVICES DETAILED DESCRIPTION

Due to the interdependence between deliverables within the detailed sections, any changes to or any cancellation of any individual section may require a scope review and price revision.

16.4.1 Network Event Monitoring

Network Event Monitoring provides continuous real-time fault monitoring for radio communications networks. Motorola Solutions uses a defined set of tools to remotely monitor the Customer's ASTRO 25 radio network and characterize network events. When an actionable event takes place, it becomes an incident. Centralized Managed Support Operations ("CMSO") technologists acknowledge and assess these incidents, and initiate a defined response.

16.4.1.1 Description of Service

With Network Event Monitoring, Motorola Solutions uses a Managed Services Suite of Tools ("MSST") to detect events 24/7 as they occur, analyze them, and escalate them to the Network Operation Center ("NOC"). Incidents will be generated automatically based on the criteria shown in Table 17-1.

Table 17-1: Alarm Threshold Rule Options for all Event Types

Standard Threshold	Optional Threshold
An incident will be triggered if an event fulfills one of the two following criteria: ▪ Event occurs 5 times in 30 minutes. ▪ Event causes 10 minutes of continuous downtime for a monitored component.	An incident will be triggered if an event fulfills one of the two following criteria: ▪ Event occurs 7 times in 30 minutes. ▪ Event causes 15 minutes of continuous downtime for a monitored component.

The CMSO NOC agent assigns a priority level to an incident, then initiates a response in accordance with the Customer Handling Procedure ("CHP"). Depending on the incident, Motorola Solutions' response may include continued monitoring for further incident development, remote remediation by technical support, dispatching a field service technician, or other actions Motorola Solutions determines necessary.



To prevent duplicate incidents from being generated by the same root cause, Motorola Solutions employs an auto triage process that groups related incidents. The auto triage process therefore automatically assigns grouped incidents to a field service technician, enabling the resolution of these incidents together if the root alarm has been addressed.

Motorola Solutions uses a set of standard templates to record key information on service process, defined actions, and points of contact for the Customer's service. In the event of an incident, Motorola Solutions and the Customer can reference these templates. When information is updated, it will be organized in four categories:

- Open: – Motorola Solutions' points of contact for dispatch permissions, entitlement information, and knowledge management.
- Vendor – Escalation and contact information.
- Resolution – Incident closure information.
- Site Arrival – Site arrival and exit process information.

The Customer will be able to access information on Network Event Monitoring activities via MyView Portal, including incident management reports. Any specific remediation and action notes from Motorola Solutions' CMSO or field service technicians will be available for the Customer to review as well.

Service Configuration Portal-Lite ("SCP-Lite"), which can be accessed through MyView Portal, provides a read only view of the Customer's current service configuration, including site parameters, notification preferences, and dispatch information. If the Customer or Motorola Solutions make changes to the network, the updated information will be incorporated into SCP-Lite allowing the Customer a view of the ASTRO 25 radio network's state.

16.4.1.2 Scope

Network Event Monitoring is available 24 hours a day, 7 days a week. Incidents generated by the monitoring service will be handled in accordance with Section 17.5: Priority Level Definitions and Response Times.

Network Event Monitoring is a globally provided service unless limited by data export control or other applicable local and regional regulations. Timeframes are based on the Customer's local time zone.

16.4.1.3 Inclusions

Network Event Monitoring is available for the devices listed in Section 17.4.1.9: Monitored Elements.

16.4.1.4 Motorola Solutions Responsibilities

- Provide a dedicated network connection necessary for monitoring the Customer's communication network. Section 17.4.1.7: Connectivity Matrix describes available connectivity options.
- If determined necessary by Motorola Solutions, provide Motorola Solutions-owned equipment at the Customer's premises for monitoring network elements. The type of equipment and location of deployment is listed in Section 17.4.1.8: Motorola Solutions Owned and Supplied Equipment.
- Verify connectivity and event monitoring prior to system acceptance or start date.
- Monitor system continuously during hours designated in the Customer Support Plan ("CSP"), and in accordance with Section 17.5: Priority Level Definitions and Response Times.
- Remotely access the Customer's system to perform remote diagnosis as permitted by the Customer pursuant to Section 17.4.1.6: Customer Responsibilities.
- Create an incident, as necessary. Gather information to perform the following:
 - Characterize the issue.



- Determine a plan of action.
- Assign and track the incident to resolution.
- Provide the Customer with a link to access system configuration info, site info, system notifications, and system notes.
- Cooperate with the Customer to coordinate the transition of monitoring responsibilities between Motorola Solutions and the Customer as specified in Section 17.4.1.6: Customer Responsibilities.
- If the Customer's technician designated in the CSP is Mobile OSS (“MOSS”) enabled, the incident will be Automatically Dispatched to MOSS. Otherwise, the incident will be sent to the CMSO Service Desk.
- Maintain communication as needed with the Customer in the field until incident resolution.
- Provide available information on incident resolution to the Customer.

16.4.1.5 Limitations and Exclusions

- The following activities are outside the scope of the Network Monitoring service:
 - Motorola Solutions will not monitor any elements outside of the Customer’s ASTRO 25 network, or monitor infrastructure provided by a third party, excluding Verint Logging, unless specifically stated. Monitored elements must be within the ASTRO 25 radio network and capable of sending alerts to the Unified Event Manager (“UEM”).
 - Additional support charges above contracted service agreement fees may apply if Motorola Solutions determines that system faults were caused by the Customer making changes to critical system parameters without written agreement from Motorola Solutions.
 - Monitoring of network transport, such as WAN ports (Cisco Routers), unless provided by supplemental service outside this standard scope.

16.4.1.6 Customer Responsibilities

- Allow Motorola Solutions continuous remote access to enable the monitoring service.
- Provide continuous utility service to any Motorola Solutions equipment installed or used at the Customer’s premises to support delivery of the service. The Customer agrees to take reasonable due care to secure the Motorola Solutions equipment from theft or damage while on the Customer’s premises.
- Prior to maintenance start date, provide Motorola Solutions with pre-defined information necessary to complete a Customer Support Plan (CSP), including:
 - Incident notification preferences and procedure.
 - Repair verification preference and procedure.
- Submit timely changes in any information supplied to Motorola Solutions and included in the CSP to the Customer Support Manager (“CSM”).
- Notify the CMSO if the Customer performs any activity that impacts the operation of the system or Motorola’s ability to monitor the system.
- Send system configuration change requests to Motorola Solutions’ CSM.
- Allow Motorola Solutions’ field service technician, if designated in the CSP, access to equipment, including any connectivity or monitoring equipment, if remote service is not possible.
- Allow Motorola Solutions’ field service technician, if designated in the CSP, access to remove Motorola Solutions-owned monitoring equipment upon cancellation of service.
- Provide Motorola Solutions with all Customer-managed passwords required to access the Customer’s system upon request, when opening a request for service support, or when needed to enable response to a technical issue.
- Pay additional support charges above the contracted service agreements that may apply if it is determined that system faults were caused by the Customer making changes to critical system parameters without written agreement from Motorola Solutions.



- In the event that Motorola Solutions agrees in writing to provide supplemental monitoring for third-party elements provided by the Customer, the Customer agrees to obtain third party consents or licenses required to enable Motorola Solutions to provide the monitoring service.
- Cooperate with Motorola Solutions and perform reasonable or necessary acts to enable Motorola Solutions to provide these services.
- Contact Motorola Solutions to coordinate transition of monitoring when the responsibility for monitoring needs to be transferred to or from Motorola Solutions, as specified in pre-defined information provided in the Customer's CSP. An example of a transfer scenario is transferring monitoring from Motorola Solutions for network monitoring after normal business hours.
 - Upon contact, the Customer must provide Motorola Solutions with customer name, site ID, status on any open incidents, priority level of any open incidents, brief descriptions of any ongoing incident, and action plan for resolving those incidents.
- Acknowledge that incidents will be handled in accordance with Section 17.5: Priority Level Definitions and Response Times.

16.4.1.7 Connectivity Matrix

Request connectivity eight weeks in advance of service start date.

Table 17-2: Available Connectivity

System Type	Available Connectivity	Set up and Maintenance
ASTRO® 25	Internet VPN	Motorola Solutions
ASTRO® 25	Ethernet	Motorola Solutions

16.4.1.8 Motorola Solutions Owned and Supplied Equipment

This table identifies equipment that Motorola Solutions will supply to support the network monitoring service for the duration of the service.

Table 17-3: Motorola Solutions Owned and Supplied Equipment

Equipment Type	Location Installed
Firewall/Router	Master Site
Service Delivery Management Server	Master Site for each Zone

16.4.1.9 Monitored Elements

This table identifies the elements that can be monitored by the service. The specific quantities of each element to be monitored on the Customer's system will be inventoried in the CSP.

Table 17-4: Monitored Elements

Monitored Elements		
Active Directory	Enrichment Testing	Probe
Agent	Environmental	QUANTAR
AIS	ESX	Radio Interface
AMB	Exit Router	RDM
Application Server	Firewall	RFDS
APX Cloud Application	GAS Server	RGU

Monitored Elements		
ATR	Gateway	RNG
AUC	Gateway Router	Router
Backup Server	Gateway Unit	RTU
Base Radio	GIS Server	SCOM Server
Call Processor	HSS	Short Data Router
CAM	Infrastructure (CHI CAM)	Site
Camera	Install Server	Statistical Server
CBSD	LAN Switch	Storage Networking
CCGW	Licensing Service	Switch
CEB	Link	Telephony
Channel	Load Balancer	TENSR
Client Station	Logging Recorder	Terminal Server
CommandCentral AXS dispatch console	Logging Replay Station	Time Keeper
Controller	MGE	Training App
Conventional	Microwave	Training Database
Core	MME	TRAK
Core Router	MOSCAD Server	Trap Forwarder
Data Processing	Network Address	UCS
Database Server	Network Device	UEM
Data Warehouse Server	NTP	Virtual Machine
Device Configuration Server	OP	VMS
DIU	OSP	VPM
DNS	Packet Data Gateway	WSGU
Domain Controller	Physical Host Environmental	ZDS
DSC 8000 Site Controller	Physical Host Power and Network	Zone Controller
eNodeB	Power Distribution Unit	



16.4.2 Remote Technical Support

Motorola Solutions' Remote Technical Support service provides telephone consultation for technical issues that require a high level of ASTRO 25 network knowledge and troubleshooting capabilities. Remote Technical Support is delivered through the Motorola Solutions Centralized Managed Support Operations ("CMSO") organization by a staff of technical support specialists skilled in diagnosis and swift resolution of infrastructure performance and operational issues.

Motorola Solutions applies leading industry standards in recording, monitoring, escalating, and reporting for technical support calls from its contracted customers to provide the support needed to maintain mission-critical systems.

16.4.2.1 Description of Service

The CMSO organization's primary goal is Customer Issue Resolution ("CIR"), providing incident restoration and service request fulfillment for Motorola Solutions' currently supported infrastructure. This team of highly skilled, knowledgeable, and experienced specialists is an integral part of the support and technical issue resolution process. The CMSO supports the Customer remotely using a variety of tools, including fault diagnostics tools, simulation networks, and fault database search engines.

Calls requiring incidents or service requests will be logged in Motorola Solutions' Customer Relationship Management ("CRM") system, and Motorola Solutions will track the progress of each incident from initial capture to resolution. This helps ensure that technical issues are prioritized, updated, tracked, and escalated as necessary, until resolution. Motorola Solutions will advise and inform Customer of incident resolution progress and tasks that require further investigation and assistance from the Customer's technical resources.

The CMSO Operations Center classifies and responds to each technical support request in accordance with Section 17.5: Priority Level Definitions and Response Times.

This service requires the Customer to provide a suitably trained technical resource that delivers maintenance and support to the Customer's system, and who is familiar with the operation of that system. Motorola Solutions provides technical consultants to support the local resource in the timely closure of infrastructure, performance, and operational issues.

16.4.2.2 Scope

The CMSO Service Desk is available via telephone 24 hours per day, 7 days per week, and 365 days per year to receive and log requests for technical support. Remote Technical Support service is provided in accordance with Section 17.5: Priority Level Definitions and Response Times.

16.4.2.3 Inclusions

Remote Technical Support service will be delivered for Motorola Solutions-provided infrastructure, including integrated third-party products.

16.4.2.4 Motorola Solutions Responsibilities

- Maintain availability of the Motorola Solutions CMSO Service Desk via telephone (800-MSI-HELP) 24 hours per day, 7 days per week, and 365 days per year to receive, log, and classify Customer requests for support.
- Respond to incidents and technical service requests in accordance with Section 17.5: Priority Level Definitions and Response Times.



- Provide caller a plan of action outlining additional requirements, activities, or information required to achieve restoral/fulfillment.
- Maintain communication with the Customer in the field as needed until resolution of the incident.
- Coordinate technical resolutions with agreed upon third-party vendors.
- Escalate support issues to additional Motorola Solutions technical resources, as applicable.
- Determine, in its sole discretion, when an incident requires more than the Remote Technical Support services described in this SOW and notify the Customer of an alternative course of action.

16.4.2.5 Limitations and Exclusions

The following activities are outside the scope of the Remote Technical Support service:

- Customer training.
- Remote Technical Support for network transport equipment or third-party products not sold by Motorola Solutions.
- Any maintenance and/or remediation required as a result of a virus or unwanted cyber intrusion.

16.4.2.6 Customer Responsibilities

- Prior to contract start date, provide Motorola Solutions with pre-defined information necessary to complete Customer Support Plan (“CSP”).
- Submit timely changes in any information supplied in the CSP to the Customer Support Manager (“CSM”).
- Contact the CMSO Service Desk to engage the Remote Technical Support service when needed, providing the necessary information for proper entitlement services. This information includes, but is not limited to, the name of contact, name of Customer, system ID number, site(s) in question, and a brief description of the problem that contains pertinent information for initial issue classification.
- Maintain suitably trained technical resources familiar with the operation of the Customer’s system to provide field maintenance and technical maintenance services for the system.
- Supply suitably skilled and trained on-site presence as necessary.
- Validate issue resolution in a timely manner prior to close of the incident.
- Acknowledge that incidents will be addressed in accordance with Section 17.5: Priority Level Definitions and Response Times.
- Cooperate with Motorola Solutions, and perform all acts that are reasonable or necessary to enable Motorola Solutions to provide Remote Technical Support.
- In the event that Motorola Solutions agrees in writing to provide supplemental Remote Technical Support to third-party elements provided by the Customer, the Customer agrees to obtain all third-party consents or licenses required to enable Motorola Solutions to provide the service.



16.4.3 Network Hardware Repair

Motorola Solutions will provide hardware repair for Motorola Solutions and select third-party infrastructure equipment supplied by Motorola Solutions. A Motorola Solutions authorized repair depot manages and performs the repair of Motorola Solutions supplied equipment, and coordinates equipment repair logistics.

16.4.3.1 Description of Service

Infrastructure components are repaired at Motorola Solutions-authorized Infrastructure Depot Operations (“IDO”). At Motorola Solutions’ discretion, select third-party infrastructure may be sent to the original equipment manufacturer or third-party vendor for repair.

Network Hardware Repair is also known as Infrastructure Repair.

16.4.3.2 Scope

Repair authorizations are obtained by contacting the Centralized Managed Support Operations (“CMSO”) organization Service Desk, which is available 24 hours a day, 7 days a week. Repair authorizations can also be obtained by contacting the Customer Support Manager (“CSM”).

16.4.3.3 Inclusions

This service is available on Motorola Solutions-provided infrastructure components, including integrated third-party products. Motorola Solutions will make a commercially reasonable effort to repair Motorola Solutions manufactured infrastructure products after product cancellation. The post-cancellation support period of the product will be noted in the product’s end-of-life (“EOL”) notification.

16.4.3.4 Motorola Solutions Responsibilities

- Provide the Customer access to the CMSO Service Desk, operational 24 hours a day and 7 days per week, to request repair service.
- Provide repair return authorization numbers when requested by the Customer.
- Properly package and ship the malfunctioning component. Motorola is responsible for properly packaging the malfunctioning infrastructure component to ensure it is not damaged in-transit and arrives in repairable condition.
- Receive malfunctioning infrastructure components from the field and document its arrival, repair, and return.
- Maintain versions and configurations for software, applications, and firmware to be installed on repaired equipment.
- Provide proper software and firmware information to reprogram equipment after repair, unless current software has caused this malfunction.
- Conduct the following services for Motorola Solutions infrastructure:
 - Perform an operational check on infrastructure components to determine the nature of the problem.
 - Replace malfunctioning components.
 - Verify that Motorola Solutions infrastructure components are returned to applicable Motorola Solutions factory specifications.
 - Perform a box unit test on serviced infrastructure components.
 - Perform a system test on select infrastructure components.
- Conduct the following services for select third-party infrastructure:



- When applicable, perform pre-diagnostic and repair services to confirm infrastructure component malfunctions and prevent sending infrastructure components with No Trouble Found (“NTF”) to third-party vendor for repair.
- When applicable, ship malfunctioning infrastructure components to the original equipment manufacturer or third-party vendor for repair service.
- Track infrastructure components sent to the original equipment manufacturer or third-party vendor for service.
- When applicable, perform a post-test after repair by original equipment manufacturer or third-party vendor to confirm malfunctioning infrastructure components have been repaired and function properly in a Motorola Solutions system configuration.
- Reprogram repaired infrastructure components to original operating parameters based on software and firmware provided by the Customer, as required in Section 17.4.3.6. If the Customer’s software version and configuration are not provided, shipping will be delayed. If the repair depot determines that infrastructure components are malfunctioning due to a software defect, the repair depot reserves the right to reload these components with a different but equivalent software version.
- Properly package repaired infrastructure components.
- Ship repaired infrastructure components to Customer-specified address during normal operating hours of Monday through Friday from 7:00 a.m. to 7:00 p.m. Central Standard Time (“CST”), excluding holidays. Infrastructure component will be sent using two-day air shipping unless the Customer requests otherwise. Motorola Solutions will pay for shipping unless the Customer requests shipments outside of the above mentioned standard business hours or carrier programs, such as next flight out (“NFO”). In such cases, the Customer will be responsible for paying shipping and handling charges.

16.4.3.5 Limitations and Exclusions

Motorola Solutions may return infrastructure equipment that is no longer supported by Motorola Solutions, the original equipment manufacturer, or a third-party vendor without repairing or replacing it. The following items are excluded from this service:

- All Motorola Solutions infrastructure components over the post-cancellation support period.
- All third-party infrastructure components over the post-cancellation support period.
- All broadband infrastructure components over the post-cancellation support period.
- Physically damaged infrastructure components.
- Third-party equipment not shipped by Motorola Solutions.
- Consumable items including, but not limited to, batteries, connectors, cables, toner or ink cartridges, tower lighting, laptop computers, monitors, keyboards, and mouse.
- RF infrastructure and backhaul components, including but not limited to, antennas, transmission lines, antenna dehydrators, microwave, line boosters, amplifiers (such as tower top amplifiers and bi-directional amplifiers), logging recorders, data talker wireless transmitters, short haul modems, combiners, multicouplers, duplexers, shelters, shelter HVAC, generators, UPS’s, and test equipment.
- Racks, furniture, and cabinets.
- Non-standard configurations, customer-modified infrastructure, and certain third party infrastructure.
- Firmware or software upgrades.

16.4.3.6 Customer Responsibilities

- Contact or instruct servicer to contact the Motorola Solutions CMSO organization, and request a return authorization number prior to shipping malfunctioning infrastructure components.
- Provide model description, model number, serial number, type of system, software and firmware version, symptom of problem, and address of site location for spare infrastructure components.



- Indicate if Motorola Solutions or third-party infrastructure components being sent in for service were subjected to physical damage or lightning damage.
- Follow Motorola Solutions instructions regarding including or removing firmware and software applications on infrastructure components being sent in for service.
- In the event that the Customer requires repair of equipment that is not contracted under this service at the time of request, the Customer acknowledges that charges may apply to cover shipping, labor, and parts. Motorola Solutions and the Customer will collaborate to agree on payment vehicle that most efficiently facilitates the work, commensurate with the level of urgency that is needed to complete the repair.
- Cooperate with Motorola Solutions and perform reasonable or necessary acts to enable Motorola Solutions to provide hardware repair services to the Customer.



16.4.3.7 Repair Process

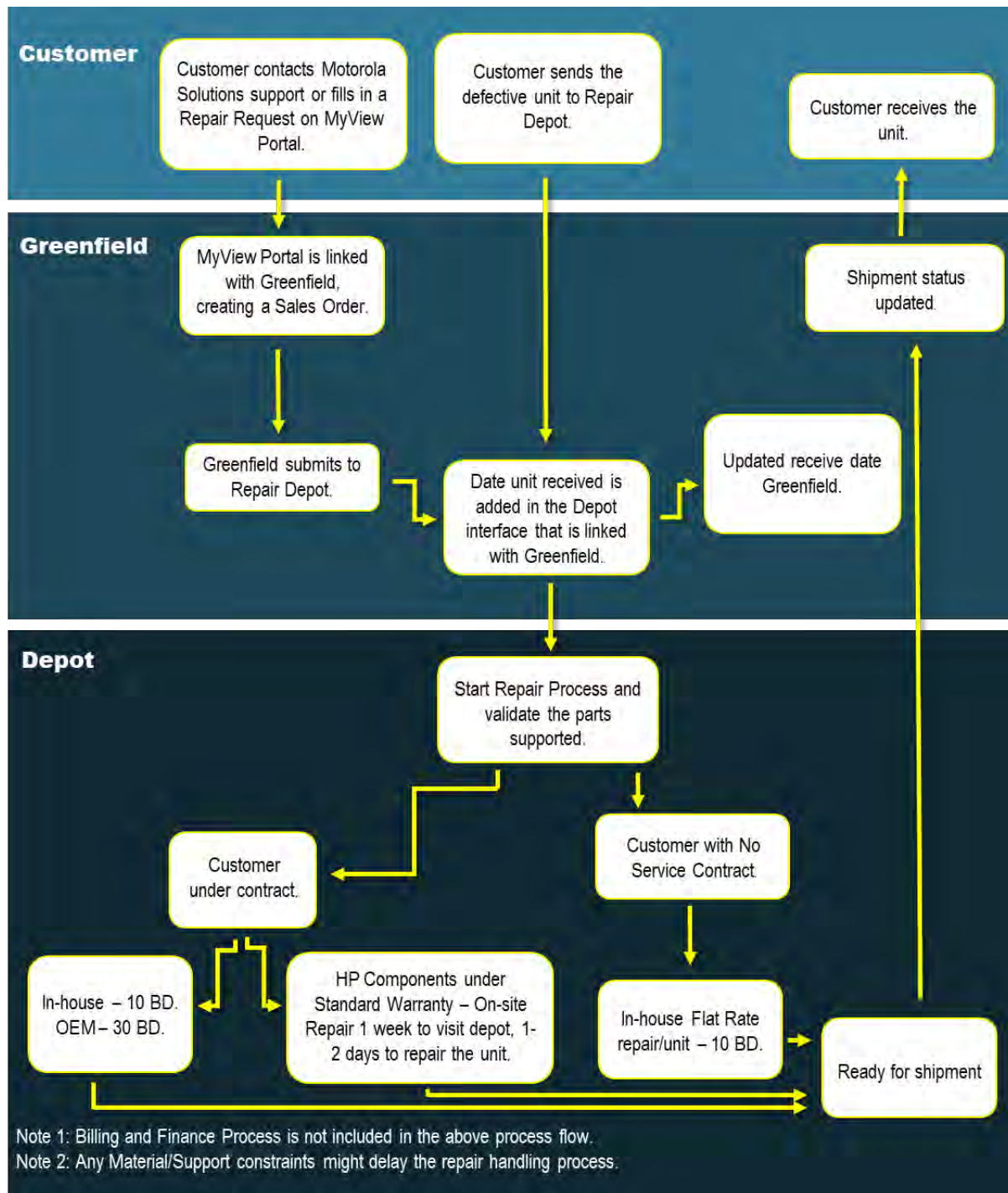


Figure 17-1: Repair Decision Process

16.4.4 Remote Security Update Service

Motorola Solutions' ASTRO 25 Remote Security Update Service ("RSUS") provides pretested security updates, minimizing cyber risk and software conflicts. These security updates contain operating system security patches and antivirus definitions that have been validated for compatibility with ASTRO 25 systems. Motorola Solutions will remotely deliver tested security updates to the Customer using a network connection. Reboot responsibility is determined by which options are included as part of this service.

The ASTRO 25 Security Update Service ("SUS") and Network Event Monitoring service are prerequisites for RSUS. These prerequisites are included as part of this service package.

16.4.4.1 Description of Service

Motorola Solutions remotely installs pretested security updates on the Customer's network. Motorola Solutions tests security updates for compatibility with ASTRO 25 in a dedicated information assurance lab.

Motorola Solutions will install compatible ASTRO 25 security updates using a remote connection. After installing tested security updates remotely, Motorola Solutions provides the Customer with a report outlining the updates made to the Customer's system. This report will inform the Customer of security update network transfers and installation.

16.4.4.1.1 Remote Update Requirements

A reliable connection from Motorola Solutions to the Customer's network is required to enable remote security update installation. Motorola Solutions' Network Event Monitoring service includes the required hardware and maintenance, and is a prerequisite to RSUS. Customer systems with slow and/or unreliable remote site links may impact the speed of RSUS updating and our ability to deliver the service.

In some instances, Motorola Technical Notices ("MTN") must be applied to enable Motorola Solutions to remotely deploy the latest security updates. MTN installation is not part of RSUS. In the event Motorola Solutions cannot deploy security updates unless one or more MTNs are installed, Motorola Solutions will communicate this to the Customer. The Customer and their Customer Support Manager ("CSM") will determine how to apply necessary MTNs. Once necessary MTNs are applied to the Customer's system, Motorola Solutions will continue to remotely deploy security updates.

Connections to other networks, herein referred to as Customer Enterprise Network ("CEN"), are delineated by firewalls. All security updates deployed by RSUS are specific to the equipment included in the ASTRO 25 radio network.

16.4.4.1.2 Reboot Support

Motorola Solutions will provide technician support to reboot impacted Microsoft Windows servers and workstations after operating system security patches have been installed.

16.4.4.2 Scope

RSUS includes pretested security updates for the software listed in Table 17-5. This table also describes the release cadence for security updates.

Table 17-5: Update Cadence

Software	Update Release Cadence
Antivirus Definition Files	Weekly



Software	Update Release Cadence
Microsoft Windows	Monthly
Microsoft Windows SQL Server	Quarterly
Microsoft Windows third party (Adobe Reader)	Monthly
Red Hat Linux (RHEL)	Quarterly
VMWare ESXi Hypervisor	Quarterly
PostgreSQL (From ASTRO 25 7.14 and newer major releases)	Quarterly
McAfee Patch(es)	Quarterly
Dot Hill DAS Firmware	Quarterly
HP SPP Firmware	Quarterly
QNAP Firmware	Quarterly

Motorola Solutions installs security updates during normal business hours. Normal business hours are defined as 8 a.m. to 5 p.m. Central Standard Time on Monday through Friday, excluding Public Holidays. The Customer may submit a formal request that Motorola Solutions personnel work outside of these hours. The Customer may need to pay additional costs for work to be completed outside of normal business hours.

Motorola Solutions will provide an Impact Timeline (“ITL”) to show installation tasks scheduled during normal business hours, including preparation work and the transfer of security updates to local storage or memory. Server and workstation reboots or zone controller rollover will be initiated at the times shared in the ITL.

Intrusive security updates require Customer coordination. Intrusive security updates may require hardware reboots and zone controller rolling (switching from one zone controller to the other) to fully implement. Systems with redundant zone controllers (L2, M2, M3) have low downtime (minutes) as the zone controllers are rolled, but systems with single zone controllers (L1, M1) will be down for longer periods. While rolling the zone controllers, the system will operate in “Site trunking” mode. The Customer will need to be aware of these operational impacts, and coordinate events with users.

16.4.4.3 Inclusions

Supported ASTRO 25 core types and security update delivery methods are included in Table 17-6. This table indicates if Motorola Solutions will provide any RSUS optional services to the Customer. RSUS supports the current Motorola Solutions ASTRO 25 system release and aligns with the established [Software Support Policy \(SwSP\)](#).

Motorola Solutions reserves the right to determine which releases are supported as business conditions dictate. Additional charges may apply in the event of supporting older releases. Contact Motorola Solutions’ assigned Customer Support Manager (“CSM”) for the latest supported releases.

Table 17-6: SUS Packages

Service	ASTRO 25 Core Type	Included
Remote Security Update Service	L Core M Core Simplified Core	X

Responsibilities for rebooting applicable hardware are detailed in Section 17.4.4.7: Reboot Responsibilities.

16.4.4.4 Motorola Solutions Responsibilities

- Remotely deploy updates listed in Section 17.4.4.2: Scope on the Customer's system. Updates will be installed on the cadence described in that section.
 - As outlined in Section 17.4.4.2: Scope, coordinate and communicate with the Customer when installing updates that will require server reboots, workstation reboots, or both.
 - Install non-intrusive updates, like antivirus definitions, as released without coordination.
- In the event no security updates are released by the OEMs during the usual time period, Motorola Solutions will send a notice that no new security updates were deployed.

16.4.4.5 Limitations and Exclusions

- Systems with customer implemented configurations that have not been certified by Motorola Solutions' Systems Integration and Test ("SIT") team are specifically excluded from this service, unless otherwise agreed in writing by Motorola Solutions.
- Interim or unplanned releases outside the supported release cadence.
- This service does not include releases for Motorola Solutions products that are not ASTRO 25 L, M, and Simplified Core radio network infrastructure equipment.
- Shared network infrastructure firmware, such as transport and firewall firmware, are not included in these services.

16.4.4.6 Customer Responsibilities

- This service requires connectivity from Motorola Solutions' CMSO to the Customer's ASTRO 25 system. Procure Motorola Solutions' Network Event Monitoring service, and maintain it for the duration of RSUS contract.
- Refrain from making uncertified changes to the ASTRO 25 system. Consult with Motorola Solutions before making changes to the ASTRO 25 system.
- Be aware of the operational impacts of RSUS update installation, and coordinate the update process with users.
- Coordinate any maintenance or other updates that are not part of RSUS with Motorola Solutions to minimize downtime and redundant efforts.

16.4.4.7 Reboot Responsibilities

Microsoft Windows servers and workstations often need to be rebooted before security updates take full effect and mitigate vulnerabilities. Reboot responsibilities are determined by the specific RSUS package being purchased. Table 17-7 contains the breakdown of responsibilities. Section 17.4.4.3: Inclusions indicates which services are included.



Table 17-7: Reboot Responsibilities Matrix

Remote SUS Package	Motorola Solutions Responsibilities	Customer Responsibilities
Remote Security Update Service	Provide a report to the Customer's main contact listing the servers or workstations which must be rebooted to ensure installed security updates become effective.	- When a security update requires a reboot, reboot servers and workstations after security updates are installed. - When remote deployment is in progress, it may be necessary for multiple reboots to be coordinated with Motorola Solutions.
Remote Security Update Service with Reboot Support	When a security update requires a reboot, dispatch a technician to reboot servers and workstations after security updates are installed.	

16.4.4.8 Disclaimer

This service tests OEM security updates. Delivering security updates for specific software depends on OEM support for that software. If an OEM removes support (end-of-life) from deployed software, Motorola Solutions will work with the OEM to reduce the impact, but may remove support for the affected software from this service without notice if no support from the OEM is available.

OEMs determine security update schedules, supportability, or release availability without consultation from Motorola Solutions. Motorola Solutions will obtain and test security updates when they are made available, and incorporate those security updates into the next appropriate release.

Motorola Solutions disclaims any warranty with respect to pretested database security updates, hypervisor patches, operating system software patches, intrusion detection sensor signature files, or other third-party files, express or implied. Further, Motorola Solutions disclaims any warranty concerning non-Motorola Solutions software, except for the Verint Logging Recorder, and does not guarantee Customers' systems will be error-free or immune to security breaches as a result of these services.



16.4.5 On-site Infrastructure Response

Motorola Solutions' On-site Infrastructure Response service provides incident management and escalation for on-site technical service requests. The service is delivered by Motorola Solutions' Centralized Managed Support Operations ("CMSO") organization in cooperation with a local service provider.

On-site Infrastructure Response may also be referred to as On-site Support.

16.4.5.1 Description of Service

The Motorola Solutions CMSO Service Desk will receive the Customer's request for on-site service.

The CMSO Dispatch Operations team is responsible for opening incidents, dispatching on-site resources, monitoring issue resolution, and escalating as needed to ensure strict compliance to committed response times.

The dispatched field service technician will travel to the Customer's location to restore the system in accordance with Section 17.5: Priority Level Definitions and Response Times.

Motorola Solutions will manage incidents as described in this SOW. The CMSO Service Desk will maintain contact with the field service technician until incident closure.

16.4.5.2 Scope

On-site Infrastructure Response is available 24 hours a day, 7 days a week in accordance with Section 17.5: Priority Level Definitions and Response Times. Customer's Response Time Classification is designated in the Customer Support Plan.

16.4.5.3 Inclusions

On-site Infrastructure Response is provided for Motorola Solutions-provided infrastructure (Core, Prime, Transmitters/Receivers, Switches, Routers, Consoles, Verint Logging sub-systems, etc.).

16.4.5.4 Motorola Solutions Responsibilities

- Receive service requests.
- Create an incident when service requests are received. Gather information to characterize the issue, determine a plan of action, and assign and track the incident to resolution.
- Dispatch a field service technician, as required by Motorola Solutions' standard procedures, and provide necessary incident information.
- Provide the required personnel access to relevant Customer information, as needed.
- Motorola Solutions field service technician will perform the following on-site:
 - Run diagnostics on the infrastructure component.
 - Replace defective infrastructure component, as supplied by the Customer.
 - Provide materials, tools, documentation, physical planning manuals, diagnostic and test equipment, and any other material required to perform the maintenance service.
 - If a third-party vendor is needed to restore the system, the vendor can be accompanied onto the Customer's premises.
 - If required by the Customer's repair verification in the Customer Support Plan ("CSP"), verify with the Customer that restoration is complete or system is functional. If verification by the Customer cannot be completed within 20 minutes of restoration, the incident will be closed and the field service technician will be released.



- Escalate the incident to the appropriate party upon expiration of a response time.
- Close the incident upon receiving notification from the Customer or Motorola Solutions field service technician, indicating the incident is resolved.
- Notify the Customer of incident status, as defined in the CSP and Service Configuration Portal (“SCP”):
 - Open and closed.
 - Open, assigned to the Motorola Solutions field service technician, arrival of the field service technician on-site, delayed, or closed.
- Provide incident activity reports to the Customer, if requested.

16.4.5.5 Customer Responsibilities

- Contact Motorola Solutions, as necessary, to request service.
- Prior to start date, provide Motorola Solutions with the following pre-defined Customer information and preferences necessary to complete CSP:
 - Incident notification preferences and procedure.
 - Repair verification preference and procedure.
 - Database and escalation procedure forms.
- Submit timely changes in any information supplied in the CSP to the Customer Support Manager (“CSM”).
- Provide the following information when initiating a service request:
 - Assigned system ID number.
 - Problem description and site location.
 - Other pertinent information requested by Motorola Solutions to open an incident.
- Provide field service technician with access to equipment.
- Supply infrastructure spare or FRU, as applicable, in order for Motorola Solutions to restore the system.
- Maintain and store software needed to restore the system in an easily accessible location.
- Maintain and store proper system backups in an easily accessible location.
- If required by repair verification preference provided by the Customer, verify with the CMSO Service Desk and dispatch that restoration is complete or system is functional.
- Cooperate with Motorola Solutions and perform reasonable or necessary acts to enable Motorola Solutions to provide these services.
- In the event that Motorola Solutions agrees in writing to provide supplemental On-site Infrastructure Response to Customer-provided third-party elements, the Customer agrees to obtain and provide applicable third-party consents or licenses to enable Motorola Solutions to provide the service.



16.4.6 Annual Preventive Maintenance

Motorola Solutions personnel will perform a series of maintenance tasks to keep network equipment functioning correctly.

16.4.6.1 Description of Service

Annual Preventative Maintenance provides annual operational tests on the Customer's infrastructure equipment to monitor its conformance to specifications.

16.4.6.2 Scope

Annual Preventive Maintenance will be performed during standard business hours, unless otherwise agreed to in writing. After the service starts, if the system or Customer requirements dictate that the service must occur outside of standard business hours, an additional quotation will be provided. The Customer is responsible for any charges associated with unusual access requirements or expenses.

16.4.6.3 Inclusions

Annual Preventive Maintenance service will be delivered for Motorola Solutions-provided infrastructure, including integrated third-party products (Verint Logging), per the level of service marked in Table 17-8.

Table 17-8: Preventive Maintenance Level

Service Level	Included
Level 1 Preventive Maintenance	X

16.4.6.4 Motorola Solutions Responsibilities

- Notify the Customer of any planned system downtime needed to perform this service.
- Maintain communication with the Customer as needed until completion of the Annual Preventive Maintenance.
- Determine, in its sole discretion, when an incident requires more than the Annual Preventive Maintenance services described in this SOW, and notify the Customer of an alternative course of action.
- Provide the Customer with a report in MyView Portal, or as otherwise agreed in the Customer Support Plan ("CSP"), comparing system performance with expected parameters, along with any recommended actions. Time allotment for report completion is to be mutually agreed.
- Provide trained and qualified personnel with proper security clearance required to complete Annual Preventive Maintenance services.
- Field service technician will perform the following on-site:
 - Perform the tasks defined in Section 17.4.6.7: Preventive Maintenance Tasks.
 - Perform the procedures defined in Section 17.4.6.8: Site Performance Evaluation Procedures for each site type on the system.
 - Provide diagnostic and test equipment necessary to perform the Preventive Maintenance service.
 - As applicable, use the Method of Procedure ("MOP") defined for each task.

16.4.6.5 Limitations and Exclusions

The following activities are outside the scope of the Annual Preventive Maintenance service.



- Preventive maintenance for third-party equipment not sold by Motorola Solutions as part of the original system.
- Network transport link performance verification.
- Verification or assessment of Information Assurance.
- Any maintenance and/or remediation required as a result of a virus or unwanted cyber intrusion.
- Tower climbs, tower mapping analysis, or tower structure analysis.

16.4.6.6 Customer Responsibilities

- Provide preferred schedule for Annual Preventative Maintenance to Motorola Solutions.
- Authorize and acknowledge any scheduled system downtime.
- Maintain periodic backup of databases, software applications, and firmware.
- Establish and maintain a suitable environment (heat, light, and power) for the equipment location as described in equipment specifications, and provide Motorola Solutions full, free, and safe access to the equipment so that Motorola Solutions may provide services. All sites shall be accessible by standard service vehicles.
- Submit timely changes in any information supplied in the CSP to the Customer Support Manager (“CSM”).
- Provide site escorts, if required, in a timely manner.
- Provide Motorola Solutions with requirements necessary for access to secure facilities.
- In the event that Motorola Solutions agrees in writing to provide supplemental Annual Preventive Maintenance to third-party elements provided by Customer, the Customer agrees to obtain any third-party consents or licenses required to enable Motorola Solutions field service technician to access the sites to provide the service.

16.4.6.7 Preventive Maintenance Tasks

The Preventive Maintenance service includes the tasks listed in this section. Tasks will be performed based on the level of service noted in Section 17.4.6.3: Inclusions.

MASTER SITE CHECKLIST – LEVEL 1	
Servers	
Equipment Alarms	Check LED and/or other status indicators for fault conditions.
Capture Diagnostics	Perform recommended diagnostic tests based on server type. Capture available diagnostic logs.
Network Management (“NM”) Client Applications	Review Unified Event Manager (“UEM”) events and verify backhaul links are reported as operational. Review event log for persistent types. Verify all NM client applications are operating correctly.
Verify System software physical media	Perform audit of software media on site. Verify that versions, KC numbers, and types match what is deployed to Customer server.
Complete Backup	Verify backups have been completed or scheduled, and that data has been stored in accordance with the Customer’s backup plan. Check that adequate storage space is available for backups.
Network Time Protocol (“NTP”)	Verify operation and syncing all devices.
Data Collection Devices (“DCD”) check (if present)	Verify data collection.

MASTER SITE CHECKLIST – LEVEL 1	
Anti-Virus	Verify anti-virus is enabled and that definition files on core security management server were updated within two weeks of current date.
Routers	
Equipment Alarms	Check LED and/or other status indicators for fault conditions.
Capture Diagnostics	Perform recommended diagnostic tests based on router type. Capture available diagnostic logs.
Verify Redundant Routers	Test redundancy in cooperative WAN routers. Carry out core router switchover in coordination with Customer.
Switches	
Equipment Alarms	Check LED and/or other status indicators for fault conditions.
Capture Diagnostics	Perform recommended diagnostic tests based on switch type. Capture available diagnostic logs.
Verify Redundant Switches	Test redundancy in backhaul switches. Carry out core router switchover in coordination with Customer.
Domain Controllers (non-Common Server Architecture)	
Equipment Alarms	Check LED and/or other status indicators for fault conditions.
Capture Diagnostics	Perform recommended diagnostic tests based on server type. Capture available diagnostic logs.
Verify System software physical media	Perform audit of software media on site. Verify that versions, KC numbers, and types match what is deployed to Customer server.
Firewalls	
Equipment Alarms	Check LED and/or other status indicators for fault conditions.
Capture Diagnostics	Perform recommended diagnostic tests based on server type. Capture available diagnostic logs.
Logging Equipment	
Equipment Alarms	Check LED and/or other status indicators for fault conditions.
Capture Diagnostics	Perform recommended diagnostic tests based on server type. Capture available diagnostic logs.
Server CPU Health	Check memory, HDD, CPU, and disk space utilization.

PRIME SITE CHECKLIST – LEVEL 1	
Software	
Verify System software physical media	Perform audit of software media on site. Verify that versions, KC numbers, and types match what is deployed to Customer server.
Switches	
Equipment Alarms	Check LED and/or other status indicators for fault conditions.
Capture Diagnostics	Perform recommended diagnostic tests based on switch type. Capture available diagnostic logs.
Clean Fans and Equipment	Use antistatic vacuum to clean cooling pathways.



PRIME SITE CHECKLIST – LEVEL 1	
Routers	
Equipment Alarms	Check LED and/or other status indicators for fault conditions.
Capture Diagnostics	Perform recommended diagnostic tests based on router type. Capture available diagnostic logs.
Clean Fans and Equipment	Use antistatic vacuum to clean cooling pathways.
Miscellaneous Equipment	
Equipment Alarms	Check LED and/or other status indicators for fault conditions.
Capture Diagnostics	Perform recommended diagnostic tests based on server type. Capture available diagnostic logs.
Site Frequency Standard Check (Timing Reference Unit)	Check LEDs for proper operation.
Site Controllers	
Capture Diagnostics	Perform recommended diagnostic tests based on server type. Capture available diagnostic logs.
Equipment Alarms	Check LED and/or other status indicators for fault conditions.
Clean Fans and Equipment	Use antistatic vacuum to clean cooling pathways.
Site Controller Redundancy (Trunking)	Roll site controllers with no dropped audio.
Comparators	
Equipment Alarms	Verify no warning/alarm indicators.
Capture Diagnostics	Perform recommended diagnostic tests based on server type. Capture available diagnostic logs.
Clean Fans and Equipment	Use antistatic vacuum to clean cooling pathways.

DISPATCH SITE CHECKLIST – LEVEL 1	
General	
Inspect all Cables	Inspect all cables and connections to external interfaces are secure.
Mouse and Keyboard	Verify operation of mouse and keyboard.
Configuration File	Verify each operator position has access to required configuration files.
Console Operator Position Time	Verify console operator position time is consistent across all operator positions.
Screensaver	Verify screensaver set as Customer prefers.
Screen Performance	Verify screen operational and is not suffering from dead pixels or image burn-in that prevent user operation.
Touchscreen	Verify touchscreen operation, if present.
Cabling/Lights/Fans	Visual inspection of all equipment cabling, lights, and fans



DISPATCH SITE CHECKLIST – LEVEL 1	
Filters/Fans/Dust	Clean all equipment filters and fans and remove dust.
Monitor and Hard Drive	Confirm monitor and hard drive do not "sleep".
DVD/CD	Verify and clean DVD or CD drive.
Time Synchronization	Verify console time is synchronized with NTP server
Anti-Virus	Verify anti-virus is enabled and that definition files have been updated within two weeks of current date.
Headset Unplugged Testing	
Speakers	Test all speakers for audio quality, volume, static, drop-outs, and excess hiss when turned up.
Channel Audio in Speaker	Verify selected channel audio in select speaker only.
Footswitch Pedals	Verify both footswitch pedals operational.
Radio On-Air Light	Verify radio on-air light comes on with TX (if applicable).
Headset Plugged In Testing	
Radio TX and RX	Verify radio TX/RX from both headset jacks. Verify levels OK. Check volume controls for noise, static, or drop-outs.
Speaker Mute	Verify speaker mutes when muted.
Telephone Operation	Verify telephone operational through both headset jacks. Check volume controls for noise, static, or drop-outs.
Audio Switches	Verify audio switches to speaker when phone off-hook if interfaced to phones.
Radio Takeover in Headset	Verify radio-takeover in headset mic when phone is off-hook, with mic switching to radio and muting phone during push-to-talk.
Other Tests	
Phone Status Light	Verify phone status light comes on when phone is off-hook (if applicable).
Desk Microphone Operation	Confirm desk mic operation (if applicable).
Radio Instant Recall Recorder ("IRR") Operation	Verify radio IRR operational on Motorola Solutions dispatch (if applicable).
Telephone IRR Operation	Verify telephone IRR operational on Motorola Solutions dispatch, if on radio computer.
Recording	Verify operator position being recorded on long term logging recorder, if included in service agreement
Computer Performance Testing	
Computer Reboot	Reboot operator position computer.
Computer Operational	Confirm client computer is fully operational (if applicable).
Audio Testing	
Conventional Resources	Confirm all conventional resources are functional, with adequate audio levels and quality.
Secure Mode	Confirm any secure talkgroups are operational in secure mode.



DISPATCH SITE CHECKLIST – LEVEL 1	
Trunked Resources	Confirm all trunked resources on screen are functioning by placing a call in both directions, at the Customer's discretion, and at a single operator position
Backup Resources	Confirm backup resources are operational.
Logging Equipment Tests	
Recording - AIS Test	Verify audio logging of trunked calls.
Recording	With Customer assistance, test operator position logging on recorder.
System Alarms	Review alarm system on all logging equipment for errors.
Capture Diagnostics	Perform recommended diagnostic tests based on equipment, and capture available diagnostic logs.
Verify System software Physical media	Perform audit of software media on site. Verify that versions, KC numbers, and types match what is deployed to Customer server.
Playback Station (Motorola Solutions Provided)	
Capture Diagnostics	Perform recommended diagnostic tests based on equipment, and capture available diagnostic logs.
Recall Audio	Verify that radio and telephone audio can be recalled.

RF SITE CHECKLIST – LEVEL 1	
RF PM Checklist	
Equipment Alarms	Verify no warning or alarm indicators.
Clean Fans and Equipment	Use an antistatic vacuum to clean cooling pathways.
Site Frequency Standard Check	Check LEDs for proper operation.
Basic Voice Call Check	Voice test each voice path, radio to radio.
Trunking Control Channel Redundancy	Roll control channel, test, and roll back.
Trunking Site Controller Redundancy, ASTRO 25 Site Repeater only	Roll site controllers with no dropped audio.
PM Optimization Workbook (See Section 17.4.6.8 Site Performance Evaluation Procedures for GTR tests)	Complete Base Station Evaluation tests - Frequency Error, Modulation Fidelity, Forward at Set Power, Reverse at Set Power, and Gen Level Desense no TX. Update station logs.



16.4.6.8 Site Performance Evaluation Procedures

The Preventive Maintenance service includes the site performance evaluation procedures listed in this section.

ASTRO 25 GTR SITE PERFORMANCE
Antennas
Transmit Antenna Data
Receive Antenna System Data
Tower Top Amplifier Data
FDMA Mode
Base Radio Transmitter Tests
Base Radio Receiver Tests
Base Radio Transmit RFDS Tests
Receive RFDS Tests with TTA (if applicable)
Receive RFDS Tests without TTA (if applicable)



16.4.7 Network Updates

16.4.7.1 Description of Service

The ASTRO 25 Network Updates service periodically provides updates to system software, with associated implementation services and hardware changes, to keep the overall ASTRO 25 system in a supportable state for maintenance, repair, overall network health, and security.

16.4.7.2 Scope

As system releases become available, Motorola Solutions agrees to provide the Customer with the software updates and implementation services necessary to maintain the ASTRO 25 system. If needed to perform the software updates, Motorola Solutions will provide updated and/or replacement hardware for covered components. System release updates, when executed, will provide an equivalent level of functionality as that originally purchased and deployed by the Customer. At Motorola Solutions' option, new system releases may introduce new features or enhancements that Motorola Solutions may offer for purchase. These new features, available separately for purchase, are not part of the Network Update service.

As system releases become available, Motorola Solutions agrees to provide the Customer with the software, hardware, and implementation services required to execute up to one system infrastructure upgrade in each eligible update window over the term of this agreement. The term of the Network Updates service is listed in Table 17-9.

Table 17-9: Network Updates Term

Duration:	TBD (Based Upon Final Contract)
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To be eligible for recurring ASTRO 25 Network Updates, the ASTRO 25 system must be in the Standard Support Period as defined in Motorola Solutions' [Software Support Policy \("SwSP"\)](#).

The methodology for executing each Network Update is described in Section 17.4.7.4: Update Planning and Preparation through Section 17.4.7.7: Update Completion.

ASTRO 25 Network Updates pricing is based on the system configuration outlined in Section 17.4.7.10: System Pricing Configuration. This configuration is to be reviewed annually from the contract effective date. Any change in system configuration may require an ASTRO 25 Network Updates price adjustment.

The price quoted for Network Updates requires the Customer to choose a certified system update path from the system release update chart referenced in Section **Error! Reference source not found.: Error! Reference source not found.** Should the Customer elect an update path other than one listed in Section **Error! Reference source not found.: Error! Reference source not found.**, the Customer agrees that additional fees may be incurred to complete the implementation of the system update. In this case, Motorola Solutions agrees to provide a price quotation for any additional materials and services necessary.

16.4.7.3 Inclusions

ASTRO 25 Network Updates entitles the Customer to eligible past software versions for the purpose of downgrading product software to a compatible release version. Past versions from within the Standard Support Period will be available.

ASTRO 25 Network Updates makes available the subscriber radio software releases that are shipping from the factory during the Network Updates coverage period.



The Network Updates service covers ASTRO 25 certified software releases for the following products:

- Servers.
- Workstations.
- Firewalls.
- Routers.
- LAN switches.
- MCC 7500 Dispatch Consoles.
- AXS Dispatch Consoles
- GTR 8000 Base Stations.
- GCP 8000 Site Controllers.
- GRV 8000 Comparators.
- Motorola Solutions logging interface equipment.
- PBX switches for telephone interconnect.
- Verint IP logging solutions

The following hardware components, if originally provided by Motorola Solutions, are eligible for full product replacement when necessary to support the system release update:

- Firewalls.
- Servers.
- Workstations.
- CommandCentral AXS Hub.
- Routers.
- LAN switches.
- PBX switches for telephone interconnect.

The following hardware components, if originally provided by Motorola Solutions, are eligible for board-level replacement when necessary to support the system release update. A “board-level replacement” is defined as any Field Replaceable Unit (“FRU”) for the products listed below:

- GTR 8000 Base Stations.
- GCP 8000 Site Controllers.
- GRV 8000 Comparators.
- MCC 7500 Dispatch Console Voice Processing Module.

The ASTRO 25 Network Updates does not cover all products. Refer to Section 17.4.7.8: Limitations and Exclusions for exclusions and limitations.

The ASTRO 25 Network Updates applies only to system release updates within the ASTRO 25 7.x platform.

16.4.7.4 Update Planning and Preparation

All items listed in this section are to be completed at least 6 months prior to a scheduled update.

16.4.7.4.1 Motorola Solutions Responsibilities

- Obtain and review infrastructure system audit data as needed.
- If applicable, identify additional system hardware needed to implement a system release, and determine if the Customer has added hardware that is not covered under this agreement.
- Identify the equipment requirements and the installation plan.



- Advise the Customer of probable impact to system users during the actual field update implementation.
- If applicable, advise the Customer on the network connection specifications necessary to perform the system update.
- Assign program management support required to perform the certified system update. Prepare an overall project schedule identifying key tasks and personnel resource required from Motorola Solutions and Customer for each task and phase of the update. Conduct a review of this schedule and obtain mutual agreement of same.
- Assign installation and engineering labor required to perform the certified system update.
- Deliver release impact and change management training to the primary zone core owners, outlining the changes to their system as a result of the update path elected. This training needs to be completed at least 12 weeks prior to the scheduled update. This training will not be provided separately for user agencies who reside on a zone core owned by another entity. Unless specifically stated in this document, Motorola Solutions will provide this training only once per system.

16.4.7.4.2 Customer Responsibilities

- Contact Motorola Solutions to schedule and engage the appropriate Motorola Solutions resources for a system release update and provide necessary information requested by Motorola Solutions to execute the update. Review update schedule and reach mutual agreement of same.
- If applicable, provide network connectivity at the zone core site(s) for Motorola Solutions to use to download and pre-position the software that is to be installed at the zone core site(s) and pushed to remote sites from there. Motorola Solutions will provide the network connection specifications, as listed in Section 17.4.7.4.1: Motorola Solutions Responsibilities. Network connectivity must be provided at least 12 weeks prior to the scheduled update. In the event access to a network connection is unavailable, the Customer may be billed additional costs to execute the system release update.
- Assist in site walks of the system during the system audit when necessary.
- Provide a list of any FRUs and/or spare hardware to be included in the system release update when applicable. Upon reasonable request by Motorola Solutions, Customer will provide a complete serial and model number list of the equipment. The inventory count of Customer FRUs and/or spare hardware to be included as of the start of the Network Updates service is included in Section 17.4.7.10: System Pricing Configuration.
- Acknowledge that new and optional system release features or system expansions, and their required implementation labor, are not within the scope of the Network Updates service. The Customer may purchase these under a separate agreement.
- Participate in release impact training at least 12 weeks prior to the scheduled update. This applies only to primary zone core owners. It is the zone core owner's responsibility to contact and include any user agencies that need to be trained, or to act as a training agency for those users not included.

16.4.7.5 System Readiness Checkpoint

All items listed in this section must be completed at least 30 days prior to a scheduled update.

16.4.7.5.1 Motorola Solutions Responsibilities

- Perform appropriate system backups.
- Work with the Customer to validate that all system maintenance is current.
- Work with the Customer to validate that all available security patches and antivirus updates have been updated on the Customer's system.



16.4.7.5.2 Customer Responsibilities

- Validate that system maintenance is current.
- Validate that all available security patches and antivirus updates to the Customer's system have been completed.

16.4.7.6 System Update

16.4.7.6.1 Motorola Solutions Responsibilities

- Perform system infrastructure update for the system elements outlined in this Statement of Work ("SOW").

16.4.7.6.2 Customer Responsibilities

- Inform system users of software update plans and scheduled system downtime.
- Cooperate with Motorola Solutions and perform all acts that are reasonable or necessary to enable Motorola Solutions to provide software update services.

16.4.7.7 Update Completion

16.4.7.7.1 Motorola Solutions Responsibilities

- Validate all certified system update deliverables are complete as contractually required.

16.4.7.7.2 Customer Responsibilities

- Cooperate with Motorola Solutions in efforts to complete any post update punch list items as needed.

16.4.7.8 Limitations and Exclusions

The Customer and Motorola Solutions agree that systems that have non-standard configurations that have not been certified by Motorola Solutions Systems Integration Testing are specifically excluded from the ASTRO 25 Network Updates service unless otherwise agreed in writing by Motorola Solutions and included in this SOW.

Customer acknowledges that if the system has independently implemented Special Product Feature not certified by Motorola, that it may be overwritten by the software update. Restoration of that feature is not included in the coverage of this SOW.

The parties acknowledge and agree that the ASTRO 25 Network Updates does not cover the following products:

- E911 systems.
- Motorola Solutions Public Sector Applications Software ("PSA").
- Custom software, Computer-aided Dispatch ("CAD"), Records Management Software.
- Data radio devices.
- Mobile computing devices such as laptops.
- Non-Motorola Solutions two-way radio subscriber products.
- Genesis products.
- Point-to-point products, such as MPLS equipment, microwave terminals, and associated multiplex equipment.



ASTRO 25 Network Updates does not cover any hardware or software supplied to the Customer when purchased directly from a third party, unless specifically included in this SOW.

ASTRO 25 Network Updates service does not include repair or replacement of hardware or software that is due to defects that are not corrected by the system release, nor does it include repair or replacement of hardware defects resulting from any nonstandard, improper use or conditions; or from unauthorized installation of software; or excessive wear and tear; or accidental damage, power surges, neglect, acts of God or other force majeure events.

Updates for equipment add-ons or expansions during the term of this ASTRO 25 Network Updates service are not included in the coverage of this SOW unless otherwise agreed to in writing by Motorola Solutions.

Items that are consumed in the normal operation of the hardware are excluded, such as accessories. The Network Updates service excludes repair or maintenance of any transmission line, antenna, microwave equipment, tower or tower lighting, duplexer, combiner, or multicoupler. Motorola Solutions has no obligations for any transmission medium, such as telephone lines, computer networks, the internet or worldwide web, or for hardware malfunction caused by the transmission medium.

Any updates to hardware versions and/or replacement hardware required to support new features or those not specifically required to maintain existing functionality are not included. Platform migrations are the replacement of a product with the next generation of that product. Unless otherwise stated, platform migrations are not included.

New subscriber radio options and features not previously purchased by the Customer are excluded from ASTRO 25 Network Updates coverage. Additionally, subscriber software installation and reprogramming are excluded from the ASTRO 25 Network Updates coverage.

Any implementation services that are not directly required to support the certified system update are not included. Unless otherwise stated, implementation services necessary to provide system expansions, platform migrations, and/or new features or functionality that are implemented concurrently with the certified system update are not included.

16.4.7.9 Special Provisions

Any Motorola Solutions software, including any system releases, is licensed to Customer solely in accordance with the applicable Motorola Solutions Software License Agreement. Any non-Motorola Solutions Software is licensed to Customer in accordance with the standard license, terms, and restrictions of the copyright owner unless the copyright owner has granted to Motorola Solutions the right to sublicense the Non-Motorola Solutions Software pursuant to the Software License Agreement, in which case it applies and the copyright owner will have all of Licensor's rights and protections under the Software License Agreement. Motorola Solutions makes no representations or warranties of any kind regarding non-Motorola Solutions Software. Non-Motorola Solutions Software may include Open Source Software.

ASTRO 25 Network Updates coverage and the parties' responsibilities described in this SOW will automatically terminate if Motorola Solutions no longer supports the ASTRO 25 7.x software version in the Customer's system or discontinues the ASTRO 25 Network Updates program. In either case, Motorola Solutions will refund to Customer any prepaid fees for ASTRO 25 Network Updates services applicable to the terminated period.

If the Customer cancels a scheduled update within less than 12 weeks of the scheduled on site date, Motorola Solutions reserves the right to charge the Customer a cancellation fee equivalent to the cost of the pre-planning efforts completed by the Motorola Solutions Upgrade Operations Team.



The Network Updates annualized price is based on the fulfillment of the system release update in each eligible update window. If the Customer terminates, except if Motorola Solutions is the defaulting party, the Customer will be required to pay for the balance of payments owed in that eligible update window if a system release update has been taken prior to the point of termination.

16.4.7.10 System Pricing Configuration

This configuration is to be reviewed annually from the contract effective date. Any change in system configuration may require an ASTRO 25 Network Updates price adjustment.

Table 17-10: System Configuration

System Configuration	
Master Site Configuration	
# of Master Sites	1
System Level Features	
ISSI 8000 / CSSI 8000 - Total # of Servers (2 if redundant and/or DSR)	1
Network Management Clients	2
Telephone Interconnect	1
Security Configuration	
Firewalls	4
RF Site Configuration	
Simulcast Prime Sites (including co-located/redundant)	1
RF Sites (includes Simulcast sub-sites, ASR sites, HPD sites)	9
GTR 8000 Base Stations	180
Dispatch Site Configuration	
# of Dispatch Sites	2
AXS Dispatch Consoles	100
AIS (Logging) Dispatch Consoles	4
Third Party Elements	
Verint Logging recorders (IP, Telephony, or Analog)	2



16.5 PRIORITY LEVEL DEFINITIONS AND RESPONSE TIMES

Table 17-11 describes the criteria Motorola Solutions uses to prioritize incidents and service requests, and lists the response times for those priority levels.

Table 17-11: Priority Level Definitions and Response Times

Incident Priority	Incident Definition	Initial Response Time	On-site Response Time
Critical P1	Core: Core server or core link failure. No redundant server or link available. Sites/Subsites: Primary site down. Two RF sites or more than 10% of RF sites down, whichever is greater. Consoles: More than 40% of a site's console positions down. Conventional Channels: Conventional Channel Gateways (CCGW) down without redundant gateways available. Security Features: Security is non-functional or degraded. Alarm Events: Door, motion, intrusion, power failure, or environmental alarms triggered.	Response provided 24/7 until service restoration. Technical resource will acknowledge incident and respond within 30 minutes of CMSO logging incident.	Response provided 24/7 until service restoration. Field service technician arrival on-site within 4 hours of receiving dispatch notification.
High P2	Core: Core server or link failures. Redundant server or link available. Consoles: Between 20% and 40% of a site's console positions down. Sites/Subsites: One RF site or up to 10% of RF sites down, whichever is greater. Conventional Channels: Up to 50% of CCGWs down. Redundant gateways available. Network Elements: Site router, site switch, or GPS server down. No redundant networking element available.	Response provided 24/7 until service restoration. Technical resource will acknowledge incident and respond within 1 hour of CMSO logging incident.	Response provided 24/7 until service restoration. Field service technician arrival on-site within 4 hours of receiving dispatch notification.
Medium P3	Consoles: Up to 20% of a site's console positions down. Conventional Channels: Single channel down. Redundant gateway available. Network Elements: Site router/switch or GPS server down. Redundant networking element available.	Response provided during normal business hours until service restoration. Technical resource will acknowledge incident and respond within 4 hours of CMSO logging incident.	Response provided during normal business hours until service restoration. Field service technician arrival on-site within 8 hours of receiving dispatch notification.
Low P4	Service Requests: Minor events and warnings in the system. Preventative and planned maintenance activities (scheduled work).	Response provided during normal business hours. Motorola Solutions will acknowledge and respond within 1 Business Day.	Not applicable.



SECTION 17

TERMS & CONDITIONS

17.1 TERMS & CONDITIONS

This proposal is subject to the terms and conditions of the Agreement between the City of Los Angeles and Motorola Solutions, Inc., for the LAFD Voice Radio System Upgrade. Any subscription services provided herein will be subject to Motorola's subscription services agreement, a copy of which will be provided upon request.



SECTION 18

LAFD LOGGING RECORDER REQUIREMENTS MATRIX



LAFD Logging Recorder Requirements - 8/7/2020

Primary Recorder

Recorder	Channel	Name	Description	Type	Location	Comments
Primary	1	TEL POS 01	Telephone Position 01	Telephone	MFC	
Primary	2	TEL POS 02	Telephone Position 02	Telephone	MFC	
Primary	3	TEL POS 03	Telephone Position 03	Telephone	MFC	
Primary	4	TEL POS 04	Telephone Position 04	Telephone	MFC	
Primary	5	TEL POS 05	Telephone Position 05	Telephone	MFC	
Primary	6	TEL POS 06	Telephone Position 06	Telephone	MFC	
Primary	7	TEL POS 07	Telephone Position 07	Telephone	MFC	
Primary	8	TEL POS 08	Telephone Position 08	Telephone	MFC	
Primary	9	TEL POS 09	Telephone Position 09	Telephone	MFC	
Primary	10	TEL POS 10	Telephone Position 10	Telephone	MFC	
Primary	11	TEL POS 11	Telephone Position 11	Telephone	MFC	
Primary	12	TEL POS 12	Telephone Position 12	Telephone	MFC	
Primary	13	TEL POS 13	Telephone Position 13	Telephone	MFC	
Primary	14	TEL POS 14	Telephone Position 14	Telephone	MFC	
Primary	15	TEL POS 15	Telephone Position 15	Telephone	MFC	
Primary	16	TEL POS 16	Telephone Position 16	Telephone	MFC	
Primary	17	TEL POS 17	Telephone Position 17	Telephone	MFC	
Primary	18	TEL POS 18	Telephone Position 18	Telephone	MFC	
Primary	19	TEL POS 19	Telephone Position 19	Telephone	MFC	
Primary	20	TEL POS 20	Telephone Position 20	Telephone	MFC	
Primary	21	TEL POS 21	Telephone Position 21	Telephone	MFC	
Primary	22	TEL POS 22	Telephone Position 22	Telephone	MFC	
Primary	23	TEL POS 23	Telephone Position 23	Telephone	MFC	
Primary	24	TEL POS 24	Telephone Position 24	Telephone	MFC	
Primary	25	TEL POS 25	Telephone Position 25	Telephone	MFC	
Primary	26	TEL POS 26	Telephone Position 26	Telephone	MFC	
Primary	27	TEL POS 27	Telephone Position 27	Telephone	MFC	
Primary	28	TEL POS 28	Telephone Position 28	Telephone	MFC	
Primary	29	TEL POS 29	Telephone Position 29	Telephone	MFC	
Primary	30	TEL POS 30	Telephone Position 30	Telephone	MFC	
Primary	31	TEL POS 31	Telephone Position 31	Telephone	MFC	
Primary	32	TEL POS 32	Telephone Position 32	Telephone	MFC	
Primary	33	TEL POS 33 FLR CAPT	Telephone Position 33	Telephone	MFC	
Primary	34	TEL POS 34 FLR CAPT	Telephone Position 34	Telephone	MFC	
Primary	35	TEL POS 35 FLR CAPT	Telephone Position 35	Telephone	MFC	
Primary	36	TEL POS 36 FLR CAPT	Telephone Position 36	Telephone	MFC	
Primary	37	TEL POS 37 FLR CAPT	Telephone Position 37	Telephone	MFC	
Primary	38	TEL POS 38 BAT Chief	Telephone Position 38	Telephone	MFC	
Primary	39	TEL TRAINING POS 39	Telephone Position 39	Telephone	MFC	
Primary	40	TEL TRAINING POS 40	Telephone Position 40	Telephone	MFC	
Primary	41	TEL TRAINING POS 41	Telephone Position 41	Telephone	MFC	

Primary	42	TEL TRAINING POS 42	Telephone Position 42	Telephone	MFC	
Primary	43	TEL TRAINING POS 43	Telephone Position 43	Telephone	MFC	
Primary	44	TEL TRAINING POS 44	Telephone Position 44	Telephone	MFC	
Primary	45	TEL TRAINING POS 45	Telephone Position 45	Telephone	MFC	
Primary	46	TEL TRAINING POS 46	Telephone Position 46	Telephone	MFC	
Primary	47	TEL TRAINING POS 47	Telephone Position 47	Telephone	MFC	
Primary	48	TEL TRAINING POS 48	Telephone Position 48	Telephone	MFC	
Primary	49	TEL TRAINING POS 49	Telephone Position 49	Telephone	MFC	
Primary	50	TEL TRAINING POS 50	Telephone Position 50	Telephone	MFC	
Primary	51	TEL TRAINING POS 51	Telephone Position 51	Telephone	MFC	
Primary	52	TAC 01	Tactical Channel 01	Radio	MFC	
Primary	53	TAC 02	Tactical Channel 02	Radio	MFC	
Primary	54	TAC 03	Tactical Channel 03	Radio	MFC	
Primary	55	TAC 04	Tactical Channel 04	Radio	MFC	
Primary	56	TAC 05	Tactical Channel 05	Radio	MFC	
Primary	57	TAC 06	Tactical Channel 06	Radio	MFC	
Primary	58	TAC 07	Tactical Channel 07	Radio	MFC	
Primary	59	TAC 08	Tactical Channel 08	Radio	MFC	
Primary	60	TAC 09	Tactical Channel 09	Radio	MFC	
Primary	61	TAC 10	Tactical Channel 10	Radio	MFC	
Primary	62	TAC 11	Tactical Channel 11	Radio	MFC	
Primary	63	TAC 12	Tactical Channel 12	Radio	MFC	
Primary	64	TAC 13	Tactical Channel 13	Radio	MFC	
Primary	65	TAC 14	Tactical Channel 14	Radio	MFC	
Primary	66	TAC 15	Tactical Channel 15	Radio	MFC	
Primary	67	TAC 16	Tactical Channel 16	Radio	MFC	
Primary	68	TAC 17	Tactical Channel 17	Radio	MFC	
Primary	69	TAC 18	Tactical Channel 18	Radio	MFC	
Primary	70	STR 01	Side Tone Receiver 01	Side Tone Receiver	MFC	
Primary	71	STR 02	Side Tone Receiver 02	Side Tone Receiver	MFC	
Primary	72	STR 03	Side Tone Receiver 03	Side Tone Receiver	MFC	
Primary	73	STR 04	Side Tone Receiver 04	Side Tone Receiver	MFC	
Primary	74	STR 05	Side Tone Receiver 05	Side Tone Receiver	MFC	
Primary	75	STR 06	Side Tone Receiver 06	Side Tone Receiver	MFC	
Primary	76	STR 07	Side Tone Receiver 07	Side Tone Receiver	MFC	
Primary	77	STR 08	Side Tone Receiver 08	Side Tone Receiver	MFC	
Primary	78	STR 09	Side Tone Receiver 09	Side Tone Receiver	MFC	
Primary	79	STR 10	Side Tone Receiver 10	Side Tone Receiver	MFC	
Primary	80	STR 11	Side Tone Receiver 11	Side Tone Receiver	MFC	
Primary	81	STR 12	Side Tone Receiver 12	Side Tone Receiver	MFC	
Primary	82	STR 13	Side Tone Receiver 13	Side Tone Receiver	MFC	
Primary	83	STR 14	Side Tone Receiver 14	Side Tone Receiver	MFC	
Primary	84	STR 15	Side Tone Receiver 15	Side Tone Receiver	MFC	
Primary	85	STR 16	Side Tone Receiver 16	Side Tone Receiver	MFC	
Primary	86	STR 17	Side Tone Receiver 17	Side Tone Receiver	MFC	
Primary	87	STR 18	Side Tone Receiver 18	Side Tone Receiver	MFC	
Primary	88	RADIO POS 01	Radio Position 01	Radio	MFC	

Primary	89	RADIO POS 02	Radio Position 02	Radio	MFC	
Primary	90	RADIO POS 03	Radio Position 03	Radio	MFC	
Primary	91	RADIO POS 04	Radio Position 04	Radio	MFC	
Primary	92	RADIO POS 05	Radio Position 05	Radio	MFC	
Primary	93	RADIO POS 06	Radio Position 06	Radio	MFC	
Primary	94	RADIO POS 07	Radio Position 07	Radio	MFC	
Primary	95	RADIO POS 08	Radio Position 08	Radio	MFC	
Primary	96	RADIO POS 09	Radio Position 09	Radio	MFC	
Primary	97	RADIO POS 10	Radio Position 10	Radio	MFC	
Primary	98	RADIO POS 11	Radio Position 11	Radio	MFC	
Primary	99	RADIO POS 12	Radio Position 12	Radio	MFC	
Primary	100	RADIO POS 13	Radio Position 13	Radio	MFC	
Primary	101	RADIO POS 14	Radio Position 14	Radio	MFC	
Primary	102	RADIO POS 15	Radio Position 15	Radio	MFC	
Primary	103	RADIO POS 16	Radio Position 16	Radio	MFC	
Primary	104	RADIO POS 17	Radio Position 17	Radio	MFC	
Primary	105	RADIO POS 18	Radio Position 18	Radio	MFC	
Primary	106	RADIO POS 19	Radio Position 19	Radio	MFC	
Primary	107	RADIO POS 20	Radio Position 20	Radio	MFC	
Primary	108	RADIO POS 21	Radio Position 21	Radio	MFC	
Primary	109	RADIO POS 22	Radio Position 22	Radio	MFC	
Primary	110	RADIO POS 23	Radio Position 23	Radio	MFC	
Primary	111	RADIO POS 24	Radio Position 24	Radio	MFC	
Primary	112	RADIO POS 25	Radio Position 25	Radio	MFC	
Primary	113	RADIO POS 26	Radio Position 26	Radio	MFC	
Primary	114	RADIO POS 27	Radio Position 27	Radio	MFC	
Primary	115	RADIO POS 28	Radio Position 28	Radio	MFC	
Primary	116	RADIO POS 29	Radio Position 29	Radio	MFC	
Primary	117	RADIO POS 30	Radio Position 30	Radio	MFC	
Primary	118	RADIO POS 31	Radio Position 31	Radio	MFC	
Primary	119	RADIO POS 32	Radio Position 32	Radio	MFC	
Primary	120	RADIO POS 33	Radio Position 33	Radio	MFC	
Primary	121	RADIO POS 34	Radio Position 34	Radio	MFC	
Primary	122	RADIO POS 35	Radio Position 35	Radio	MFC	
Primary	123	RADIO POS 36	Radio Position 36	Radio	MFC	
Primary	124	RADIO POS 37	Radio Position 37	Radio	MFC	
Primary	125	RADIO POS 38	Radio Position 38	Radio	MFC	
Primary	126	RADIO TRAIN POS 39	Radio Training Position 39	Radio	MFC	
Primary	127	RADIO TRAIN POS 40	Radio Training Position 40	Radio	MFC	
Primary	128	RADIO TRAIN POS 41	Radio Training Position 41	Radio	MFC	
Primary	129	RADIO TRAIN POS 42	Radio Training Position 42	Radio	MFC	
Primary	130	RADIO TRAIN POS 43	Radio Training Position 43	Radio	MFC	
Primary	131	RADIO TRAIN POS 44	Radio Training Position 44	Radio	MFC	
Primary	132	RADIO TRAIN POS 45	Radio Training Position 45	Radio	MFC	
Primary	133	RADIO TRAIN POS 46	Radio Training Position 46	Radio	MFC	
Primary	134	RADIO TRAIN POS 47	Radio Training Position 47	Radio	MFC	
Primary	135	RADIO TRAIN POS 48	Radio Training Position 48	Radio	MFC	

Primary	136	RADIO TRAIN POS 49	Radio Training Position 49	Radio	MFC	
Primary	137	RADIO TRAIN POS 50	Radio Training Position 50	Radio	MFC	
Primary	138	RADIO TRAIN POS 51	Radio Training Position 51	Radio	MFC	
Primary	139	RADIO POS 52	Radio Position 52	Radio	MFC	
Primary	140	RADIO POS 60	Radio Position 60	Radio	MFC	
Primary	141	RADIO POS 61	Radio Position 61	Radio	MFC	
Primary	142	MA-LACOTAC1	Mutual Aid - LA Co FD TAC 1	Radio	MFC	
Primary	143	MA-LACOTAC2	Mutual Aid - LA Co FD TAC 2	Radio	MFC	
Primary	144	MA-LACOTAC3	Mutual Aid - LA Co FD TAC 3	Radio	MFC	
Primary	145	Channel 145	for verification		MFC	
Primary	146	Channel 146	for verification		MFC	
Primary	147	Channel 147	for verification		MFC	
Primary	148	Channel 148	for verification		MFC	
Primary	149	MA-CLEMARS	Mutual Aid - Clemars	Radio	MFC	
Primary	150	MA-ICALL	Mutual Aid - ICALL	Radio	MFC	
Primary	151	MA-ITAC1	Mutual Aid - ITAC 1	Radio	MFC	
Primary	152	MA-ITAC2	Mutual Aid - ITAC2	Radio	MFC	
Primary	153	MA-ITAC3	Mutual Aid - ITAC3	Radio	MFC	
Primary	154	MA-ITAC4	Mutual Aid - ITAC4	Radio	MFC	
Primary	155	MA-FIREMARS	Mutual Aid - FIREMARS	Radio	MFC	
Primary	156	MA-AIRCRAFT	Mutual Aid - AIRCRAFT	Radio	MFC	
Primary	157	MA-ST-WHITE LEE	Mutual Aid - White Lee	Radio	MFC	
Primary	158	MA-ST-WHITE OAT	Mutual Aid - Vfire 21 Oat Mt	Radio	MFC	
Primary	159	DVS 01	Digitized Voice Service 01	Digitized Voice Services	MFC	
Primary	160	DVS 02	Digitized Voice Service 02	Digitized Voice Services	MFC	
Primary	161	DVS 03	Digitized Voice Service 03	Digitized Voice Services	MFC	
Primary	162	DVS 04	Digitized Voice Service 04	Digitized Voice Services	MFC	
Primary	163	DVS 05	Digitized Voice Service 05	Digitized Voice Services	MFC	
Primary	164	DVS 06	Digitized Voice Service 06	Digitized Voice Services	MFC	
Primary	165	DVS 07	Digitized Voice Service 07	Digitized Voice Services	MFC	
Primary	166	DVS 08	Digitized Voice Service 08	Digitized Voice Services	MFC	
Primary	167	DVS 09	Digitized Voice Service 09	Digitized Voice Services	MFC	
Primary	168	DVS 10	Digitized Voice Service 10	Digitized Voice Services	MFC	
Primary	169	DVS 11	Digitized Voice Service 11	Digitized Voice Services	MFC	
Primary	170	DVS 12	Digitized Voice Service 12	Digitized Voice Services	MFC	
Primary	171	DVS 13	Digitized Voice Service 13	Digitized Voice Services	MFC	
Primary	172	DVS 14	Digitized Voice Service 14	Digitized Voice Services	MFC	
Primary	173	DVS 15	Digitized Voice Service 15	Digitized Voice Services	MFC	
Primary	174	DVS 16	Digitized Voice Service 16	Digitized Voice Services	MFC	
Primary	175	DVS 17	Digitized Voice Service 17	Digitized Voice Services	MFC	
Primary	176	DVS 18	Digitized Voice Service 18	Digitized Voice Services	MFC	
Primary	177	DVS 19	Digitized Voice Service 19	Digitized Voice Services	MFC	
Primary	178	DVS 20	Digitized Voice Service 20	Digitized Voice Services	MFC	
Primary	179	DVS 21	Digitized Voice Service 21	Digitized Voice Services	MFC	
Primary	180	DVS 22	Digitized Voice Service 22	Digitized Voice Services	MFC	
Primary	181	DVS 23	Digitized Voice Service 23	Digitized Voice Services	MFC	
Primary	182	DVS 24	Digitized Voice Service 24	Digitized Voice Services	MFC	

Primary	183	DVS 25	Digitized Voice Service 25	Digitized Voice Services	MFC	
Primary	184	DVS 26	Digitized Voice Service 26	Digitized Voice Services	MFC	
Primary	185	DVS 27	Digitized Voice Service 27	Digitized Voice Services	MFC	
Primary	186	DVS 28	Digitized Voice Service 28	Digitized Voice Services	MFC	
Primary	187	DVS 29	Digitized Voice Service 29	Digitized Voice Services	MFC	
Primary	188	DVS 30	Digitized Voice Service 30	Digitized Voice Services	MFC	
Primary	189	DVS 31	Digitized Voice Service 31	Digitized Voice Services	MFC	
Primary	190	DVS 32	Digitized Voice Service 32	Digitized Voice Services	MFC	
Primary	191	9-1-1-HLWD-01 (001)	Hollywood Trunk 01	Telephone Trunk	MFC	
Primary	192	9-1-1-HLWD-13 (002)	Hollywood Trunk 13	Telephone Trunk	MFC	
Primary	193	9-1-1-HLWD-05 (003)	Hollywood Trunk 05	Telephone Trunk	MFC	
Primary	194	9-1-1-HLWD-17 (004)	Hollywood Trunk 17	Telephone Trunk	MFC	
Primary	195	9-1-1-HLWD-09 (005)	Hollywood Trunk 09	Telephone Trunk	MFC	
Primary	196	9-1-1-HLWD-21 (006)	Hollywood Trunk 21	Telephone Trunk	MFC	
Primary	197	9-1-1-HLWD-25 (007)	Hollywood Trunk 25	Telephone Trunk	MFC	
Primary	198	9-1-1-HLWD-37 (008)	Hollywood Trunk 37	Telephone Trunk	MFC	
Primary	199	9-1-1-HLWD-29 (009)	Hollywood Trunk 29	Telephone Trunk	MFC	
Primary	200	9-1-1-HLWD-41 (010)	Hollywood Trunk 41	Telephone Trunk	MFC	
Primary	201	9-1-1-HLWD-33 (011)	Hollywood Trunk 33	Telephone Trunk	MFC	
Primary	202	9-1-1-HLWD-45 (012)	Hollywood Trunk 45	Telephone Trunk	MFC	
Primary	203	9-1-1-SHOK-02 (001)	Sherman Oaks Trunk 02	Telephone Trunk	MFC	
Primary	204	9-1-1-SHOK-14 (002)	Sherman Oaks Trunk 14	Telephone Trunk	MFC	
Primary	205	9-1-1-SHOK-06 (003)	Sherman Oaks Trunk 06	Telephone Trunk	MFC	
Primary	206	9-1-1-SHOK-18 (004)	Sherman Oaks Trunk 18	Telephone Trunk	MFC	
Primary	207	9-1-1-SHOK-10 (005)	Sherman Oaks Trunk 10	Telephone Trunk	MFC	
Primary	208	9-1-1-SHOK-22 (006)	Sherman Oaks Trunk 22	Telephone Trunk	MFC	
Primary	209	9-1-1-SHOK-26 (007)	Sherman Oaks Trunk 26	Telephone Trunk	MFC	
Primary	210	9-1-1-SHOK-38 (008)	Sherman Oaks Trunk 38	Telephone Trunk	MFC	
Primary	211	9-1-1-SHOK-30 (009)	Sherman Oaks Trunk 30	Telephone Trunk	MFC	
Primary	212	9-1-1-SHOK-42 (010)	Sherman Oaks Trunk 42	Telephone Trunk	MFC	
Primary	213	9-1-1-SHOK-34 (011)	Sherman Oaks Trunk 34	Telephone Trunk	MFC	
Primary	214	9-1-1-SNGB-46 (001)	San Gabriel Trunk 46	Telephone Trunk	MFC	
Primary	215	9-1-1-SNGB-03 (002)	San Gabriel Trunk 03	Telephone Trunk	MFC	
Primary	216	9-1-1-SNGB-15 (003)	San Gabriel Trunk 15	Telephone Trunk	MFC	
Primary	217	9-1-1-SNGB-07 (004)	San Gabriel Trunk 07	Telephone Trunk	MFC	
Primary	218	9-1-1-SNGB-19 (005)	San Gabriel Trunk 19	Telephone Trunk	MFC	
Primary	219	9-1-1-SNGB-11 (006)	San Gabriel Trunk 11	Telephone Trunk	MFC	
Primary	220	9-1-1-SPLD-23 (001)	San Pedro Trunk 23	Telephone Trunk	MFC	
Primary	221	9-1-1-SPLD-27 (002)	San Pedro Trunk 27	Telephone Trunk	MFC	
Primary	222	9-1-1-SPLD-39 (003)	San Pedro Trunk 39	Telephone Trunk	MFC	
Primary	223	9-1-1-SPLD-31 (004)	San Pedro Trunk 31	Telephone Trunk	MFC	
Primary	224	9-1-1-SPLD-43 (005)	San Pedro Trunk 43	Telephone Trunk	MFC	
Primary	225	9-1-1-SPLD-35 (006)	San Pedro Trunk 35	Telephone Trunk	MFC	
Primary	226	9-1-1-WLA-47 (001)	West LA Trunk 47	Telephone Trunk	MFC	
Primary	227	9-1-1-WLA-04 (002)	West LA Trunk 04	Telephone Trunk	MFC	
Primary	228	9-1-1-WLA-16 (003)	West LA Trunk 16	Telephone Trunk	MFC	
Primary	229	9-1-1-WLA-08 (004)	West LA Trunk 08	Telephone Trunk	MFC	

Primary	230	9-1-1-WLA-20 (005)	West LA Trunk 20	Telephone Trunk	MFC	
Primary	231	9-1-1-WLA-12 (006)	West LA Trunk 12	Telephone Trunk	MFC	
Primary	232	9-1-1-WLA-24 (007)	West LA Trunk 24	Telephone Trunk	MFC	
Primary	233	9-1-1-WLA-28 (008)	West LA Trunk 28	Telephone Trunk	MFC	
Primary	234	9-1-1-LBCH-40 (001)	Long Beach Trunk 40	Telephone Trunk	MFC	
Primary	235	9-1-1-LBCH-32 (002)	Long Beach Trunk 32	Telephone Trunk	MFC	
Primary	236	9-1-1-LBCH-44 (003)	Long Beach Trunk 44	Telephone Trunk	MFC	
Primary	237	9-1-1-LBCH-36 (004)	Long Beach Trunk 36	Telephone Trunk	MFC	
Primary	238	911 TEST LINE	Telephone Test Line	Telephone Test Line	MFC	
Primary	239	Channel 239	for verification		MFC	
Primary	240	Channel 240	for verification		MFC	

Secondary Recorder (Backup)

Recorder	Channel	Name	Description	Type	Location	Comments
Secondary	1	TEL POS 01	Telephone Position 01	Telephone	MFC	
Secondary	2	TEL POS 02	Telephone Position 02	Telephone	MFC	
Secondary	3	TEL POS 03	Telephone Position 03	Telephone	MFC	
Secondary	4	TEL POS 04	Telephone Position 04	Telephone	MFC	
Secondary	5	TEL POS 05	Telephone Position 05	Telephone	MFC	
Secondary	6	TEL POS 06	Telephone Position 06	Telephone	MFC	
Secondary	7	TEL POS 07	Telephone Position 07	Telephone	MFC	
Secondary	8	TEL POS 08	Telephone Position 08	Telephone	MFC	
Secondary	9	TEL POS 09	Telephone Position 09	Telephone	MFC	
Secondary	10	TEL POS 10	Telephone Position 10	Telephone	MFC	
Secondary	11	TEL POS 11	Telephone Position 11	Telephone	MFC	
Secondary	12	TEL POS 12	Telephone Position 12	Telephone	MFC	
Secondary	13	TEL POS 13	Telephone Position 13	Telephone	MFC	
Secondary	14	TEL POS 14	Telephone Position 14	Telephone	MFC	
Secondary	15	TEL POS 15	Telephone Position 15	Telephone	MFC	
Secondary	16	TEL POS 16	Telephone Position 16	Telephone	MFC	
Secondary	17	TEL POS 17	Telephone Position 17	Telephone	MFC	
Secondary	18	TEL POS 18	Telephone Position 18	Telephone	MFC	
Secondary	19	TEL POS 19	Telephone Position 19	Telephone	MFC	
Secondary	20	TEL POS 20	Telephone Position 20	Telephone	MFC	
Secondary	21	TEL POS 21	Telephone Position 21	Telephone	MFC	
Secondary	22	TEL POS 22	Telephone Position 22	Telephone	MFC	
Secondary	23	TEL POS 23	Telephone Position 23	Telephone	MFC	
Secondary	24	TEL POS 24	Telephone Position 24	Telephone	MFC	
Secondary	25	TEL POS 25	Telephone Position 25	Telephone	MFC	
Secondary	26	TEL POS 26	Telephone Position 26	Telephone	MFC	
Secondary	27	TEL POS 27	Telephone Position 27	Telephone	MFC	
Secondary	28	TEL POS 28	Telephone Position 28	Telephone	MFC	
Secondary	29	TEL POS 29	Telephone Position 29	Telephone	MFC	
Secondary	30	TEL POS 30	Telephone Position 30	Telephone	MFC	
Secondary	31	TEL POS 31	Telephone Position 31	Telephone	MFC	
Secondary	32	TEL POS 32	Telephone Position 32	Telephone	MFC	

Secondary	33	TEL POS 33 FLR CAPT	Telephone Position 33	Telephone	MFC	
Secondary	34	TEL POS 34 FLR CAPT	Telephone Position 34	Telephone	MFC	
Secondary	35	TEL POS 35 FLR CAPT	Telephone Position 35	Telephone	MFC	
Secondary	36	TEL POS 36 FLR CAPT	Telephone Position 36	Telephone	MFC	
Secondary	37	TEL POS 37 FLR CAPT	Telephone Position 37	Telephone	MFC	
Secondary	38	TEL POS 38 BAT Chief	Telephone Position 38	Telephone	MFC	
Secondary	39	TEL TRAINING POS 39	Telephone Position 39	Telephone	MFC	
Secondary	40	TEL TRAINING POS 40	Telephone Position 40	Telephone	MFC	
Secondary	41	TEL TRAINING POS 41	Telephone Position 41	Telephone	MFC	
Secondary	42	TEL TRAINING POS 42	Telephone Position 42	Telephone	MFC	
Secondary	43	TEL TRAINING POS 43	Telephone Position 43	Telephone	MFC	
Secondary	44	TEL TRAINING POS 44	Telephone Position 44	Telephone	MFC	
Secondary	45	TEL TRAINING POS 45	Telephone Position 45	Telephone	MFC	
Secondary	46	TEL TRAINING POS 46	Telephone Position 46	Telephone	MFC	
Secondary	47	TEL TRAINING POS 47	Telephone Position 47	Telephone	MFC	
Secondary	48	TEL TRAINING POS 48	Telephone Position 48	Telephone	MFC	
Secondary	49	TEL TRAINING POS 49	Telephone Position 49	Telephone	MFC	
Secondary	50	TEL TRAINING POS 50	Telephone Position 50	Telephone	MFC	
Secondary	51	TEL TRAINING POS 51	Telephone Position 51	Telephone	MFC	
Secondary	52	TAC 01	Tactical Channel 01	Radio	MFC	
Secondary	53	TAC 02	Tactical Channel 02	Radio	MFC	
Secondary	54	TAC 03	Tactical Channel 03	Radio	MFC	
Secondary	55	TAC 04	Tactical Channel 04	Radio	MFC	
Secondary	56	TAC 05	Tactical Channel 05	Radio	MFC	
Secondary	57	TAC 06	Tactical Channel 06	Radio	MFC	
Secondary	58	TAC 07	Tactical Channel 07	Radio	MFC	
Secondary	59	TAC 08	Tactical Channel 08	Radio	MFC	
Secondary	60	TAC 09	Tactical Channel 09	Radio	MFC	
Secondary	61	TAC 10	Tactical Channel 10	Radio	MFC	
Secondary	62	TAC 11	Tactical Channel 11	Radio	MFC	
Secondary	63	TAC 12	Tactical Channel 12	Radio	MFC	
Secondary	64	TAC 13	Tactical Channel 13	Radio	MFC	
Secondary	65	TAC 14	Tactical Channel 14	Radio	MFC	
Secondary	66	TAC 15	Tactical Channel 15	Radio	MFC	
Secondary	67	TAC 16	Tactical Channel 16	Radio	MFC	
Secondary	68	TAC 17	Tactical Channel 17	Radio	MFC	
Secondary	69	TAC 18	Tactical Channel 18	Radio	MFC	
Secondary	70	STR 01	Side Tone Receiver 01	Side Tone Receiver	MFC	
Secondary	71	STR 02	Side Tone Receiver 02	Side Tone Receiver	MFC	
Secondary	72	STR 03	Side Tone Receiver 03	Side Tone Receiver	MFC	
Secondary	73	STR 04	Side Tone Receiver 04	Side Tone Receiver	MFC	
Secondary	74	STR 05	Side Tone Receiver 05	Side Tone Receiver	MFC	
Secondary	75	STR 06	Side Tone Receiver 06	Side Tone Receiver	MFC	
Secondary	76	STR 07	Side Tone Receiver 07	Side Tone Receiver	MFC	
Secondary	77	STR 08	Side Tone Receiver 08	Side Tone Receiver	MFC	
Secondary	78	STR 09	Side Tone Receiver 09	Side Tone Receiver	MFC	
Secondary	79	STR 10	Side Tone Receiver 10	Side Tone Receiver	MFC	

Secondary	80	STR 11	Side Tone Receiver 11	Side Tone Receiver	MFC	
Secondary	81	STR 12	Side Tone Receiver 12	Side Tone Receiver	MFC	
Secondary	82	STR 13	Side Tone Receiver 13	Side Tone Receiver	MFC	
Secondary	83	STR 14	Side Tone Receiver 14	Side Tone Receiver	MFC	
Secondary	84	STR 15	Side Tone Receiver 15	Side Tone Receiver	MFC	
Secondary	85	STR 16	Side Tone Receiver 16	Side Tone Receiver	MFC	
Secondary	86	STR 17	Side Tone Receiver 17	Side Tone Receiver	MFC	
Secondary	87	STR 18	Side Tone Receiver 18	Side Tone Receiver	MFC	
Secondary	88	RADIO POS 01	Radio Position 01	Radio	MFC	
Secondary	89	RADIO POS 02	Radio Position 02	Radio	MFC	
Secondary	90	RADIO POS 03	Radio Position 03	Radio	MFC	
Secondary	91	RADIO POS 04	Radio Position 04	Radio	MFC	
Secondary	92	RADIO POS 05	Radio Position 05	Radio	MFC	
Secondary	93	RADIO POS 06	Radio Position 06	Radio	MFC	
Secondary	94	RADIO POS 07	Radio Position 07	Radio	MFC	
Secondary	95	RADIO POS 08	Radio Position 08	Radio	MFC	
Secondary	96	RADIO POS 09	Radio Position 09	Radio	MFC	
Secondary	97	RADIO POS 10	Radio Position 10	Radio	MFC	
Secondary	98	RADIO POS 11	Radio Position 11	Radio	MFC	
Secondary	99	RADIO POS 12	Radio Position 12	Radio	MFC	
Secondary	100	RADIO POS 13	Radio Position 13	Radio	MFC	
Secondary	101	RADIO POS 14	Radio Position 14	Radio	MFC	
Secondary	102	RADIO POS 15	Radio Position 15	Radio	MFC	
Secondary	103	RADIO POS 16	Radio Position 16	Radio	MFC	
Secondary	104	RADIO POS 17	Radio Position 17	Radio	MFC	
Secondary	105	RADIO POS 18	Radio Position 18	Radio	MFC	
Secondary	106	RADIO POS 19	Radio Position 19	Radio	MFC	
Secondary	107	RADIO POS 20	Radio Position 20	Radio	MFC	
Secondary	108	RADIO POS 21	Radio Position 21	Radio	MFC	
Secondary	109	RADIO POS 22	Radio Position 22	Radio	MFC	
Secondary	110	RADIO POS 23	Radio Position 23	Radio	MFC	
Secondary	111	RADIO POS 24	Radio Position 24	Radio	MFC	
Secondary	112	RADIO POS 25	Radio Position 25	Radio	MFC	
Secondary	113	RADIO POS 26	Radio Position 26	Radio	MFC	
Secondary	114	RADIO POS 27	Radio Position 27	Radio	MFC	
Secondary	115	RADIO POS 28	Radio Position 28	Radio	MFC	
Secondary	116	RADIO POS 29	Radio Position 29	Radio	MFC	
Secondary	117	RADIO POS 30	Radio Position 30	Radio	MFC	
Secondary	118	RADIO POS 31	Radio Position 31	Radio	MFC	
Secondary	119	RADIO POS 32	Radio Position 32	Radio	MFC	
Secondary	120	RADIO POS 33	Radio Position 33	Radio	MFC	
Secondary	121	RADIO POS 34	Radio Position 34	Radio	MFC	
Secondary	122	RADIO POS 35	Radio Position 35	Radio	MFC	
Secondary	123	RADIO POS 36	Radio Position 36	Radio	MFC	
Secondary	124	RADIO POS 37	Radio Position 37	Radio	MFC	
Secondary	125	RADIO POS 38	Radio Position 38	Radio	MFC	
Secondary	126	RADIO TRAIN POS 39	Radio Training Position 39	Radio	MFC	

Secondary	127	RADIO TRAIN POS 40	Radio Training Position 40	Radio	MFC	
Secondary	128	RADIO TRAIN POS 41	Radio Training Position 41	Radio	MFC	
Secondary	129	RADIO TRAIN POS 42	Radio Training Position 42	Radio	MFC	
Secondary	130	RADIO TRAIN POS 43	Radio Training Position 43	Radio	MFC	
Secondary	131	RADIO TRAIN POS 44	Radio Training Position 44	Radio	MFC	
Secondary	132	RADIO TRAIN POS 45	Radio Training Position 45	Radio	MFC	
Secondary	133	RADIO TRAIN POS 46	Radio Training Position 46	Radio	MFC	
Secondary	134	RADIO TRAIN POS 47	Radio Training Position 47	Radio	MFC	
Secondary	135	RADIO TRAIN POS 48	Radio Training Position 48	Radio	MFC	
Secondary	136	RADIO TRAIN POS 49	Radio Training Position 49	Radio	MFC	
Secondary	137	RADIO TRAIN POS 50	Radio Training Position 50	Radio	MFC	
Secondary	138	RADIO TRAIN POS 51	Radio Training Position 51	Radio	MFC	
Secondary	139	RADIO POS 52	Radio Position 52	Radio	MFC	
Secondary	140	RADIO POS 60	Radio Position 60	Radio	MFC	
Secondary	141	RADIO POS 61	Radio Position 61	Radio	MFC	
Secondary	142	MA-LACOTAC1	Mutual Aid - LA Co FD TAC 1	Radio	MFC	
Secondary	143	MA-LACOTAC2	Mutual Aid - LA Co FD TAC 2	Radio	MFC	
Secondary	144	MA-LACOTAC3	Mutual Aid - LA Co FD TAC 3	Radio	MFC	
Secondary	145	Channel 145	for verification		MFC	
Secondary	146	Channel 146	for verification		MFC	
Secondary	147	Channel 147	for verification		MFC	
Secondary	148	Channel 148	for verification		MFC	
Secondary	149	MA-CLEMARS	Mutual Aid - Clemars	Radio	MFC	
Secondary	150	MA-ICALL	Mutual Aid - ICALL	Radio	MFC	
Secondary	151	MA-ITAC1	Mutual Aid - ITAC 1	Radio	MFC	
Secondary	152	MA-ITAC2	Mutual Aid - ITAC2	Radio	MFC	
Secondary	153	MA-ITAC3	Mutual Aid - ITAC3	Radio	MFC	
Secondary	154	MA-ITAC4	Mutual Aid - ITAC4	Radio	MFC	
Secondary	155	MA-FIREMARS	Mutual Aid - FIREMARS	Radio	MFC	
Secondary	156	MA-AIRCRAFT	Mutual Aid - AIRCRAFT	Radio	MFC	
Secondary	157	MA-ST-WHITE LEE	Mutual Aid - White Lee	Radio	MFC	
Secondary	158	MA-ST-WHITE OAT	Mutual Aid - Vfire 21 Oat Mt	Radio	MFC	
Secondary	159	DVS 01	Digitized Voice Service 01	Digitized Voice Services	MFC	
Secondary	160	DVS 02	Digitized Voice Service 02	Digitized Voice Services	MFC	
Secondary	161	DVS 03	Digitized Voice Service 03	Digitized Voice Services	MFC	
Secondary	162	DVS 04	Digitized Voice Service 04	Digitized Voice Services	MFC	
Secondary	163	DVS 05	Digitized Voice Service 05	Digitized Voice Services	MFC	
Secondary	164	DVS 06	Digitized Voice Service 06	Digitized Voice Services	MFC	
Secondary	165	DVS 07	Digitized Voice Service 07	Digitized Voice Services	MFC	
Secondary	166	DVS 08	Digitized Voice Service 08	Digitized Voice Services	MFC	
Secondary	167	DVS 09	Digitized Voice Service 09	Digitized Voice Services	MFC	
Secondary	168	DVS 10	Digitized Voice Service 10	Digitized Voice Services	MFC	
Secondary	169	DVS 11	Digitized Voice Service 11	Digitized Voice Services	MFC	
Secondary	170	DVS 12	Digitized Voice Service 12	Digitized Voice Services	MFC	
Secondary	171	DVS 13	Digitized Voice Service 13	Digitized Voice Services	MFC	
Secondary	172	DVS 14	Digitized Voice Service 14	Digitized Voice Services	MFC	
Secondary	173	DVS 15	Digitized Voice Service 15	Digitized Voice Services	MFC	

Secondary	174	DVS 16	Digitized Voice Service 16	Digitized Voice Services	MFC	
Secondary	175	DVS 17	Digitized Voice Service 17	Digitized Voice Services	MFC	
Secondary	176	DVS 18	Digitized Voice Service 18	Digitized Voice Services	MFC	
Secondary	177	DVS 19	Digitized Voice Service 19	Digitized Voice Services	MFC	
Secondary	178	DVS 20	Digitized Voice Service 20	Digitized Voice Services	MFC	
Secondary	179	DVS 21	Digitized Voice Service 21	Digitized Voice Services	MFC	
Secondary	180	DVS 22	Digitized Voice Service 22	Digitized Voice Services	MFC	
Secondary	181	DVS 23	Digitized Voice Service 23	Digitized Voice Services	MFC	
Secondary	182	DVS 24	Digitized Voice Service 24	Digitized Voice Services	MFC	
Secondary	183	DVS 25	Digitized Voice Service 25	Digitized Voice Services	MFC	
Secondary	184	DVS 26	Digitized Voice Service 26	Digitized Voice Services	MFC	
Secondary	185	DVS 27	Digitized Voice Service 27	Digitized Voice Services	MFC	
Secondary	186	DVS 28	Digitized Voice Service 28	Digitized Voice Services	MFC	
Secondary	187	DVS 29	Digitized Voice Service 29	Digitized Voice Services	MFC	
Secondary	188	DVS 30	Digitized Voice Service 30	Digitized Voice Services	MFC	
Secondary	189	DVS 31	Digitized Voice Service 31	Digitized Voice Services	MFC	
Secondary	190	DVS 32	Digitized Voice Service 32	Digitized Voice Services	MFC	
Secondary	191	9-1-1-HLWD-01 (001)	Hollywood Trunk 01	Telephone Trunk	MFC	
Secondary	192	9-1-1-HLWD-13 (002)	Hollywood Trunk 13	Telephone Trunk	MFC	
Secondary	193	9-1-1-HLWD-05 (003)	Hollywood Trunk 05	Telephone Trunk	MFC	
Secondary	194	9-1-1-HLWD-17 (004)	Hollywood Trunk 17	Telephone Trunk	MFC	
Secondary	195	9-1-1-HLWD-09 (005)	Hollywood Trunk 09	Telephone Trunk	MFC	
Secondary	196	9-1-1-HLWD-21 (006)	Hollywood Trunk 21	Telephone Trunk	MFC	
Secondary	197	9-1-1-HLWD-25 (007)	Hollywood Trunk 25	Telephone Trunk	MFC	
Secondary	198	9-1-1-HLWD-37 (008)	Hollywood Trunk 37	Telephone Trunk	MFC	
Secondary	199	9-1-1-HLWD-29 (009)	Hollywood Trunk 29	Telephone Trunk	MFC	
Secondary	200	9-1-1-HLWD-41 (010)	Hollywood Trunk 41	Telephone Trunk	MFC	
Secondary	201	9-1-1-HLWD-33 (011)	Hollywood Trunk 33	Telephone Trunk	MFC	
Secondary	202	9-1-1-HLWD-45 (012)	Hollywood Trunk 45	Telephone Trunk	MFC	
Secondary	203	9-1-1-SHOK-02 (001)	Sherman Oaks Trunk 02	Telephone Trunk	MFC	
Secondary	204	9-1-1-SHOK-14 (002)	Sherman Oaks Trunk 14	Telephone Trunk	MFC	
Secondary	205	9-1-1-SHOK-06 (003)	Sherman Oaks Trunk 06	Telephone Trunk	MFC	
Secondary	206	9-1-1-SHOK-18 (004)	Sherman Oaks Trunk 18	Telephone Trunk	MFC	
Secondary	207	9-1-1-SHOK-10 (005)	Sherman Oaks Trunk 10	Telephone Trunk	MFC	
Secondary	208	9-1-1-SHOK-22 (006)	Sherman Oaks Trunk 22	Telephone Trunk	MFC	
Secondary	209	9-1-1-SHOK-26 (007)	Sherman Oaks Trunk 26	Telephone Trunk	MFC	
Secondary	210	9-1-1-SHOK-38 (008)	Sherman Oaks Trunk 38	Telephone Trunk	MFC	
Secondary	211	9-1-1-SHOK-30 (009)	Sherman Oaks Trunk 30	Telephone Trunk	MFC	
Secondary	212	9-1-1-SHOK-42 (010)	Sherman Oaks Trunk 42	Telephone Trunk	MFC	
Secondary	213	9-1-1-SHOK-34 (011)	Sherman Oaks Trunk 34	Telephone Trunk	MFC	
Secondary	214	9-1-1-SNGB-46 (001)	San Gabriel Trunk 46	Telephone Trunk	MFC	
Secondary	215	9-1-1-SNGB-03 (002)	San Gabriel Trunk 03	Telephone Trunk	MFC	
Secondary	216	9-1-1-SNGB-15 (003)	San Gabriel Trunk 15	Telephone Trunk	MFC	
Secondary	217	9-1-1-SNGB-07 (004)	San Gabriel Trunk 07	Telephone Trunk	MFC	
Secondary	218	9-1-1-SNGB-19 (005)	San Gabriel Trunk 19	Telephone Trunk	MFC	
Secondary	219	9-1-1-SNGB-11 (006)	San Gabriel Trunk 11	Telephone Trunk	MFC	
Secondary	220	9-1-1-SPLD-23 (001)	San Pedro Trunk 23	Telephone Trunk	MFC	

Secondary	221	9-1-1-SPLD-27 (002)	San Pedro Trunk 27	Telephone Trunk	MFC	
Secondary	222	9-1-1-SPLD-39 (003)	San Pedro Trunk 39	Telephone Trunk	MFC	
Secondary	223	9-1-1-SPLD-31 (004)	San Pedro Trunk 31	Telephone Trunk	MFC	
Secondary	224	9-1-1-SPLD-43 (005)	San Pedro Trunk 43	Telephone Trunk	MFC	
Secondary	225	9-1-1-SPLD-35 (006)	San Pedro Trunk 35	Telephone Trunk	MFC	
Secondary	226	9-1-1-WLA-47 (001)	West LA Trunk 47	Telephone Trunk	MFC	
Secondary	227	9-1-1-WLA-04 (002)	West LA Trunk 04	Telephone Trunk	MFC	
Secondary	228	9-1-1-WLA-16 (003)	West LA Trunk 16	Telephone Trunk	MFC	
Secondary	229	9-1-1-WLA-08 (004)	West LA Trunk 08	Telephone Trunk	MFC	
Secondary	230	9-1-1-WLA-20 (005)	West LA Trunk 20	Telephone Trunk	MFC	
Secondary	231	9-1-1-WLA-12 (006)	West LA Trunk 12	Telephone Trunk	MFC	
Secondary	232	9-1-1-WLA-24 (007)	West LA Trunk 24	Telephone Trunk	MFC	
Secondary	233	9-1-1-WLA-28 (008)	West LA Trunk 28	Telephone Trunk	MFC	
Secondary	234	9-1-1-LBCH-40 (001)	Long Beach Trunk 40	Telephone Trunk	MFC	
Secondary	235	9-1-1-LBCH-32 (002)	Long Beach Trunk 32	Telephone Trunk	MFC	
Secondary	236	9-1-1-LBCH-44 (003)	Long Beach Trunk 44	Telephone Trunk	MFC	
Secondary	237	9-1-1-LBCH-36 (004)	Long Beach Trunk 36	Telephone Trunk	MFC	
Secondary	238	911 TEST LINE	Telephone Test Line	Telephone Test Line	MFC	
Secondary	239	Channel 239	for verification		MFC	
Secondary	240	Channel 240	for verification		MFC	

Admin Recorder Checklist

Recorder	Channel	Name	Description	Type	Location	Comments
LAFD-ADM	1	Adm Admin Fir Cap Pos 33	Admin - Fir Capt Position 33	Admin Telephone		
LAFD-ADM	2	Adm Admin Fir Cap Pos 34	Admin - Fir Capt Position 34	Admin Telephone		
LAFD-ADM	3	Adm Admin Fir Cap Pos 35	Admin - Fir Capt Position 35	Admin Telephone		
LAFD-ADM	4	Adm Admin Fir Cap Pos 36	Admin - Fir Capt Position 36	Admin Telephone		
LAFD-ADM	5	Adm Admin Fir Cap Pos 37	Admin - Fir Capt Position 37	Admin Telephone		
LAFD-ADM	6	Adm Admin Fir BC Pos 60	Admin - Fir Capt Position 60	Admin Telephone		
LAFD-ADM	7	Adm Admin Fir BC Pos 61	Admin - Fir Capt Position 61	Admin Telephone		
LAFD-ADM	8	Adm LAX BLUE	Admin - LAX BLUE	Admin Telephone		
LAFD-ADM	9	Adm LAX RED	Admin - LAX RED	Admin Telephone		
LAFD-ADM	10	Adm VAN NUYS	Admin - VAN NUYS	Admin Telephone		

Note: Need to verify existing logging recorder.

Playback Client Requirement

PC Name	Location at MFC	Description	Type	Location	Comments
MFC2UA1050QSV	Room 220/P-34			MFC	
MFC2UA1050QSV7	Room 220/P-35			MFC	
MFC2UA1050QTD	Battalion Commander/Room 227			MFC	
MFC2UA1050QSL	CAD Training/Room 222/P-39			MFC	
QIS4DRBJQ1	QI/Room 235/John Flores			MFC	
QISMXL4130RFL	QI/Room 235			MFC	
QISMXL4130QHF	QI/Room 235			MFC	

QISMXL4130RFB	QI/Room 235			MFC	
QISMXL4130RFM	QI/Room 235			MFC	
QISMXL4130QG4	QI/Room 235			MFC	
QISMXL4130QGB	Room 236/Conference Room			MFC	
QISMXL4130QHB	Room 236/Conference Room			MFC	
MFC2UA1050QTK	Room 220/P-1			MFC	
MFC2UA1050QT8	Room 220/P-2			MFC	
MFC2UA1050QS0	Room 220/P-3			MFC	
MFC2UA1050QRX	Room 220/P-4			MFC	
MFC2UA1050QTQ	Room 220/P-5			MFC	
MFC2UA1050QTN	Room 220/P-6			MFC	
MFC2UA1050QSB	Room 220/P-7			MFC	
MFC2UA1050QTC	Room 220/P-8			MFC	
MFC2UA1050QSH	Room 220/P-9			MFC	
MFC2UA1050QTY	Room 220/P-10			MFC	
MFC2UA1050QTT	Room 220/P-11			MFC	
MFC2UA1050QT5	Room 220/P-12			MFC	
MFC2UA1050QSQ	Room 220/P-13			MFC	
MFC2UA1050QSD	Room 220/P-14			MFC	
MFC2UA1050QS8	Room 220/P-15			MFC	
MFC2UA1050QT1	Room 220/P-16			MFC	
MFC2UA1050QSC	Room 220/P-17			MFC	
MFC2UA1050QSS	Room 220/P-18			MFC	
MFC2UA1050QTZ	Room 220/P-19			MFC	
MFC2UA1050QSW	Room 220/P-20			MFC	
MFC2UA1050QSJ	Room 220/P-21			MFC	
MFC2UA1050QSK	Room 220/P-22			MFC	
MFC2UA1050QSY	Room 220/P-23			MFC	
MFC2UA1050QTJ	Room 220/P-24			MFC	
MFC2UA1050QTP	Room 220/P-25			MFC	
MFC2UA1050QS2	Room 220/P-26			MFC	
MFC2UA1050QTR	Room 220/P-27			MFC	
MFC2UA1050QSP	Room 220/P-28			MFC	
MFC2UA1050QRY	Room 220/P-29			MFC	
MFC2UA1050QTV	Room 220/P-30			MFC	
MFC2UA1050QTG	Room 220/P-31			MFC	
MFC2UA1050QS9	Room 220/P-32			MFC	
MFC2UA1050QTH	Room 220/P-33			MFC	
MFC2UA1050QTL	Room 220/P-36			MFC	
MFC2UA1050QT9	Room 220/P-37			MFC	
MFC2UA1050QT7	Battalion Commander/Room 227			MFC	
MFC2UA1050QTS	CAD Training/Room 222/P-40			MFC	
MFC2UA1050QSR	CAD Training/Room 222/P-41			MFC	
MFC2UA1050QRZ	CAD Training/Room 222/P-42			MFC	
MFC2UA1050QTM	CAD Training/Room 222/P-43			MFC	
MFC2UA1050QSG	CAD Training/Room 222/P-44			MFC	
MFC2UA1050QSN	CAD Training/Room 222/P-45			MFC	

MFC2UA1050QSF	CAD Training/Room 222/P-46			MFC	
MFC2UA1050QV2	CAD Training/Room 222/P-47			MFC	
MFC2UA1050QSX	CAD Training/Room 222/P-48			MFC	
MFC2UA1050QS4	CAD Training/Room 222/P-49			MFC	
MFC2UA1050QTW	CAD Training/Room 222/P-50			MFC	
MFC2UA1050QTX	CAD Training/Room 222/P-51			MFC	
MFC2UA1050QV1	Tim Wuerfel/Dispatch Section Commander/Room 244			MFC	
MFC2UA1050QST	DOC Commander/Room 250			MFC	
MFC2UA1050QT2	Platoon Commander's Office/Room 225 and 226			MFC	
MFC2UA1050QT3	Captains Office/Room 225/ P-52			MFC	
MFC2UA2340FWY	Captains Office/Room 225/Cubicle			MFC	
MFC2UA1050QS6	Captains Office/Room 225			MFC	
MFC2UA2340FX0	Storage/Room 206			MFC	
MFC2UA1050QT4	Room 220/P-60			MFC	
MFC2UA1050QS1	Room 220/P-61			MFC	
MFC2UA1050QT0	Natalie/Communications Division Office/Room 246			MFC	
MFC2UA1050QS3	PSO/Room 259			MFC	
MFC2UA1050QTB	PSO/Room 259			MFC	
MFC2UA1220G3G	DIV Commander/Room 249/Chief Ottman			MFC	
MFC2UA1220G3H	Terry/Communications Division Office/Room 246			MFC	
MFC2UA1050QSM	Sam S./Room 235			MFC	
MFC2UA1220G3L	Leslie/Room 235			MFC	
MFC2UA1050QS5	Mohammad/Room 235			MFC	
MFC2UA2340FWT	Gamboa/Communications Division Office/Room 246			MFC	
MFC2UA2340FWZ	Ch. Tomlinson/Room 246			MFC	
MFC2UA2340FWW	Digital Records Office/Room 229			MFC	
QIS4DRCJQ1	QI/Room 235/Linda Hughes			MFC	
New Requirement	Tech Control Area - MFC			MFC	
New Requirement	Tech Control Area - OCD			CHE P4 OCD	
New Requirement	Battalion Commander			CHE P4 OCD	
New Requirement	Captain Office 1			CHE P4 OCD	
New Requirement	Captain Office 2			CHE P4 OCD	
New Requirement	City Hall East Rm#1255 - ITA Engineering			CHE Rm1255	
New Requirement	City Hall East Rm#1255 - ITA Engineering			CHE Rm1255	
New Requirement	City Hall East Rm#1255 - ITA Engineering			CHE Rm1255	
New Requirement	City Hall East Rm#1255 - ITA Engineering			CHE Rm1255	
New Requirement	Fire Stations Playback Station			All 106 Fire Stations	

Note: We need the following information:

SECTION 19

PRODUCT SPECIFICATION SHEETS





ASTRO[®] 25 G-SERIES SITE EQUIPMENT

DATASHEET | ASTRO 25 G-SERIES SITE EQUIPMENT



MOTOROLA SOLUTIONS



COMMON PLATFORM

The ASTRO® 25 portfolio of RF stations, receivers, site controllers and comparators make up the building blocks for Project 25 (P25) two-way radio communication systems from Motorola Solutions. ASTRO 25 site equipment is built with flexibility, resilience and service in mind.



FLEXIBLE DESIGN. SOFTWARE-CONFIGURABLE.

Because it is defined and configured through software, the common platform has the flexibility to support different modes of operations based on individual site requirements. Simple software downloads provide cyber security patches, new features and technology migrations to carry your needs into the future.



ALWAYS AVAILABLE. RESILIENT TO DISRUPTION.

Built to last, ASTRO 25 sites continue to provide wide-area communication regardless of the conditions. From technology that delivers superior coverage to site designs with no single point of failure (resulting in no more than 1 channel removed from service), ASTRO 25 sites provide best-in-class performance.



SERVICE MADE EASY.

ASTRO 25 sites are built to ease service and maintenance with front access modules, cable connections and LED indicators. Hot-swap modules ensure channels are back on the air with minimal downtime. Remote software upgrades with rolling activation makes it easy to stay up to date with minimal disruption.

TOPOLOGIES

Whether analog, digital, conventional or trunked, ASTRO 25 sites support various modes of operation and can be software-configured based on need.

TRUNKING

ASTRO 25 sites support P25 FDMA and TDMA trunking operations ranging from single site to large regional systems. The sites support seamless interoperability with the ability to dynamically switch between FDMA and TDMA without any user intervention or awareness.

CONVENTIONAL

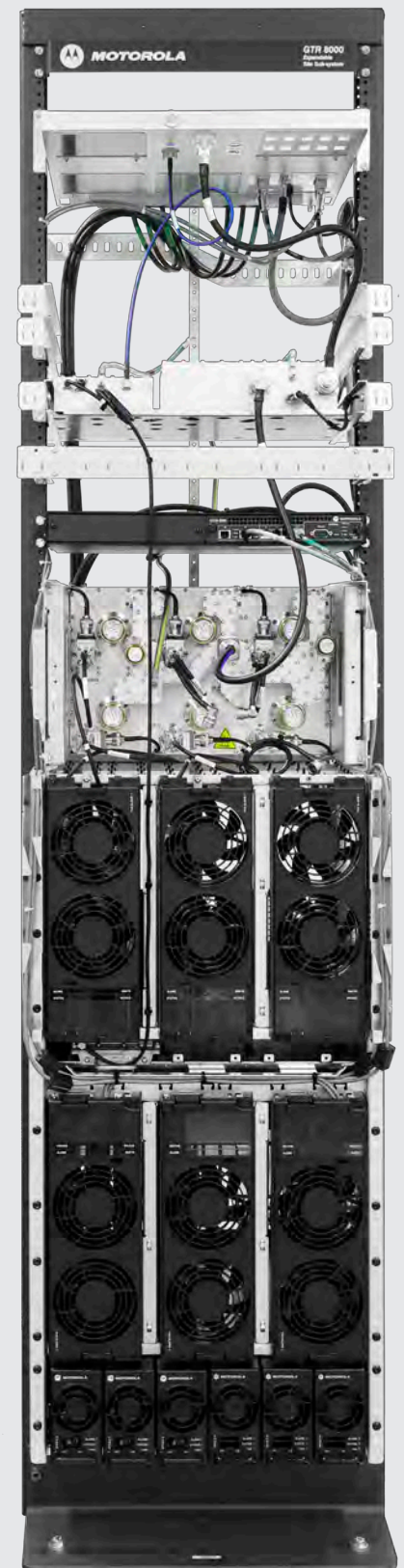
The equipment can be configured to support analog conventional or P25 digital conventional operation. Mixed mode operation supports fleets of both radio types to allow a gradual migration from analog to digital. The ASTRO 25 site components can be used separately for a single conventional repeater or together for a large statewide or country-wide conventional system.

SIMULCAST

When configured for simulcast operation, additional timing and voting equipment allow adjacent sites to utilize the same frequencies with minimal audio degradation. ASTRO 25 sites support both conventional and trunking simulcast systems. Linear Simulcast Modulation (LSM) enables greater spacing without sacrificing coverage or capacity, resulting in fewer sites to build and maintain.

DATA

ASTRO 25 trunking and conventional systems can be enabled with P25 Integrated Data to support basic user data needs. Base station channels can dynamically switch from voice to data based on the call type. ASTRO 25 Enhanced Data optimizes the data channel for applications with a high amount of short inbound data messages like location, telemetry and biometrics, and can improve data efficiency by 12X over standard P25 data.





GTR 8000 BASE RADIO (T7039A)

From conventional to trunking, single repeater to multisite, FDMA to TDMA, and available in multiple frequency bands, the GTR 8000 offers design flexibility and investment protection in a high performance package.

GENERAL SPECIFICATIONS					
		700/800 MHz	UHF Range 1 UHF Range 2	VHF	High Power 800 MHz
Size (HxWxD)		5.25 x 19 x 18 in (133 x 483 x 457 mm)			
Weight		46 lb (21 kg)	46 lb (21 kg)	46 lb (21 kg)	48 lb (22 kg)
Temperature Range		-22 to 140 °F (-30 to 60 °C)			
Power Requirements		AC: 90-264 VAC, 47-63 Hz			
		DC: 43.2-60 VDC			
Power Consumption	Efficiency Package	C4FM, FM: 405 W LSM, H-DQPSK: 425 W	C4FM, FM: 410 W LSM, H-DQPSK: 445 W	C4FM, FM: 405 W LSM, H-DQPSK: 315 W	C4FM, FM: 700 W
	Standard	C4FM, FM: 430 W LSM, H-DQPSK: 470 W	C4FM, FM: 435 W LSM, H-DQPSK: 455 W	C4FM, FM: 435 W LSM, H-DQPSK: 345 W	C4FM, FM: 725 W
Antenna Connectors TX		N female			
Antenna Connectors RX	Standard	BNC female			
	Optional Preselector	N female			
Channel Spacing		12.5/25 kHz	12.5/25 kHz	12.5/15/25/30 kHz	12.5/25 kHz
Modulation	TX	C4FM, LSM, H-DQPSK, FM	C4FM, LSM, H-DQPSK, FM	C4FM, LSM, H-DQPSK, FM	FM, C4FM
	RX	C4FM, H-CPM, FM			
Frequency Stability		100 ppb/2 yr or External Reference			

TRANSMITTER				
	700/800 MHz	UHF Range 1 UHF Range 2	VHF	High Power 800 MHz
Frequency Range	764-776, 851-870 MHz	380-435, 435-524 MHz	136-174 MHz	851-870 MHz
Power Output	2-100 W	C4FM, FM: 2-110 W H-DQPSK, LSM: 2-100 W	C4FM, FM: 2-100 W H-DQPSK, LSM: 2-60 W	High Power: 15-150 W Low Power: 2-30 W
Electronic Bandwidth	Full Bandwidth			
Modulation Fidelity	5%			
Intermodulation Attenuation	80 dB	65 dB	55 dB	55 dB
Spurious and Harmonic Emissions Attenuation	90 dB			
Analog FM Hum and Noise	12.5 kHz channel	45 dB		
	25 kHz channel	50 dB		
Analog Audio Distortion	<2% at 1000 Hz	<2% at 1000 Hz (Typical: 1%)	<2% at 1000 Hz (Typical: 1%)	<2% at 1000 Hz
Emissions Designators	8K70D1E, 8K70D1D, 8K70D1W, 8K10F1E, 8K10F1D, 8K10F1W, 10K0F1E, 10K0F1D, 10K0F1W, 9K80D7E, 9K80D7D, 9K80D7W, 17K7D7D, 16K0F1D, 16K0F3E, 11K0F3E, 14K0F1D, 14K0F3E, 21K7D7E, 21K7D7D, 21K7D7W	8K70D1E, 8K70D1D, 8K70D1W, 8K10F1E, 8K10F1D, 8K10F1W, 9K80D7E, 9K80D7D, 9K80D7W, 10K0F1D, 11K0F3E, 16K0F1D, 16K0F3E	8K70D1E, 8K70D1D, 8K70D1W, 8K10F1E, 8K10F1D, 8K10F1W, 9K80D7E, 9K80D7D, 9K80D7W, 10K0F1D, 11K0F3E, 16K0F1D, 16K0F3E	High Power: 8K10F1E, 8K10F1D, 8K10F1W, 16K0F1D, 16K0F3E, 11K0F3E, 14K0F1D, 14K0F3 Low Power: 8K10F1D, 8K10F1E, 8K10F7W, 8K70D1W, 8K70D7W, 9K80D7W, 10K0F1D, 11K0F3E, 16K0F3E, 16K0F1D

RECEIVER					
		700/800 MHz	UHF Range 1 UHF Range 2	VHF	High Power 800 MHz
Frequency Range		792-825 MHz	380-435, 435-524 MHz	136-174 MHz	806-825 MHz
Analog Sensitivity (12 dB SINAD)	12.5 kHz channel	-118 dBm	-118 dBm	-119 dBm	-118 dBm
	25 kHz channel	-117 dBm	-117 dBm	-118 dBm	-117 dBm
Digital Sensitivity (5% BER)	C4FM	-118 dBm	-118 dBm	-119 dBm	-118 dBm
	H-CPM	-116 dBm	-116 dBm	-117 dBm	-116 dBm
Intermodulation Rejection		85 dB			
Digital Adjacent Channel Rejection		60 dB			
Analog Adj Channel Rejection (EIA603)	12.5 kHz channel	75 dB			
Analog Adj Channel Rejection (TIA603D)	12.5 kHz channel	50 or 60 dB (adjustable)			
	25 kHz channel	80 dB			
Spurious and Image Response Rejection	Standard	85 dB	85 dB	90 dB	85 dB
	With optional preselector	100 dB	100 dB	95 dB	100 dB
Analog Audio Response		+1, -3 dB from 6 dB per octave de-emphasis; 300-3000 Hz referenced to 1000 Hz at line output			
Analog Audio Distortion		3% or 5% (adjustable)			
Analog FM Hum and Noise	12.5 kHz channel	45 dB			
	25 kHz channel	50 dB			
Intermediate Frequency	First	73.35 MHz	73.35 MHz	44.85 MHz	73.35 MHz
	Second	2.16 MHz			

GTR 8000 EXPANDABLE SITE SUBSYSTEM (SQM01SUM7054A)

The single rack design of the GTR 8000 Expandable Site Subsystem (ESS) houses up to 6 channels with RF distribution and power systems. Factory-configured and tuned to your specific system, it makes installation quick and easy. Connect multiple ESS racks to achieve maximum site capacity.

GENERAL SPECIFICATIONS						
		700/800 MHz	UHF Range 1 UHF Range 2	VHF	High Power 800 MHz	900 MHz
Number of Channels		1 to 6	1 to 6	1 to 6	2 to 6	1 to 6
Height with 7.5 ft Rack		90.4 in (2300 mm)				
Footprint (W x D) with 7.5 ft Rack		20.5 x 23.5 in (520 x 600 mm)				
Weight with 7.5 ft Rack		520 lb (235 kg)	UHF R1: 475 lb (215 kg) UHF R2: 565 lb (260 kg)	475 lb (215 kg)	538 lb (246 kg)	575 lb (260 kg)
Temperature Range		-22 to 140 °F (-30 to 60 °C)				
Power Requirements		AC: 90-264 VAC, 47-63 Hz, DC: 43.2-60 VDC				
Power Consumption	C4FM,FM	2900 W	2500 W	2650 W	4580 W	3700 W
	LSM, H-DQPSK	3100 W	2700 W	2200 W	N/A	4100 W
	C4FM,FM (Efficiency Package)	2755 W	2325 W	2500 W	4310 W	3700 W
	LSM, H-DQPSK (Efficiency Package)	2900 W	2500 W	2100 W	N/A	4100 W
Antenna Connectors	TX	7/16 or N Female	7/16 Female	N Female	N Female	7/16 Female
	RX	N Female	N Female	BNC Female	N Female	N female
Channel Spacing		12.5/25 kHz	12.5/25 kHz	12.5/15/ 25/30 kHz	12.5/25 kHz	12.5 kHz
Transmit Combiner Spacing		100 or 150 kHz	150 kHz (450 - 512 MHz) N/A (380-450, 512-524 MHz)	N/A	N/A	12.5 kHz (Hybrid) 150 kHz (Cavity)
Modulation	TX	C4FM, LSM, H-DQPSK, FM	C4FM, LSM, H-DQPSK, FM	C4FM, LSM, H-DQPSK, FM	FM, C4FM	C4FM, LSM, H-DQPSK
	RX	C4FM, H-CPM, FM	C4FM, H-CPM, FM	C4FM, H-CPM, FM	C4FM, H-CPM, FM	C4FM, H-CPM
Frequency Stability		Repeater Site: 100 ppb/2 yr				
		Simulcast (Multisite): GPS synchronized				



TRANSMITTER (CABINET OUTPUT)						
	700/800 MHz	UHF Range 1 UHF Range 2	VHF	High Power 800 MHz	900 MHz	
Frequency Range	764-776, 851-870 MHz	380-435, 435-524 MHz	136-174 MHz	851-870 MHz	935-941 MHz	
Power Output	1-40 W	C4FM, FM: 2-110 W (380-450, 512-524 MHz) LSM, H-DQPSK: 2-100 W (380-450, 512-524 MHz) C4FM, FM: 1-33 W (450-512 MHz) LSM, H-DQPSK: 1-30 W (450-512 MHz)	C4FM, FM: 2-100 W LSM, H-DQPSK: 2-60 W	13-134 W	2-way Hybrid: 1-37 W 3-way Hybrid: 1-22 W 4-way Hybrid: 1-17 W 5-way Hybrid: 1-12 W 6-way Hybrid: 1-10 W	
Modulation Fidelity	5%					
Intermodulation Attenuation	80 dB	80 dB (450-512 MHz), 65 dB (380-450, 512-524 MHz)	55 dB	55 dB	80 dB	
Spurious / Harmonic Emissions Attenuation	90 dB					
Analog FM Hum / Noise	12.5 kHz channel	45 dB	45 dB	45 dB	TBA	N/A
	25 kHz channel	50 dB	50 dB	50 dB	TBA	N/A
Analog Audio Distortion	<2% at 1000 Hz, 1% typ for UHF and VHF bands					
Emissions Designators	8K70D1E, 8K70D1D, 8K70D1W, 8K10F1E, 8K10F1D, 8K10F1W, 10K0F1E, 10K0F1D, 10K0F1W, 9K80D7E, 9K80D7D, 9K80D7W, 17K7D7D, 16K0F1D, 16K0F3E, 11K0F3E, 14K0F1D, 14K0F3E, 21K7D7E, 21K7D7D, 21K7D7W	8K70D1E, 8K70D1D, 8K70D1W, 8K10F1E, 8K10F1D, 8K10F1W, 9K80D7E, 9K80D7D, 9K80D7W, 10K0F1D, 11K0F3E, 16K0F1D, 16K0F3E	8K70D1E, 8K70D1D, 8K70D1W, 8K10F1E, 8K10F1D, 8K10F1W, 9K80D7E, 9K80D7D, 9K80D7W, 10K0F1D, 11K0F3E, 16K0F1D, 16K0F3E	8K10F1E, 8K10F1D, 8K10F1W, 10K0F1E, 10K0F1D, 10K0F1W, 16K0F1D, 16K0F3E, 11K0F3E, 14K0F1D, 14K0F3E	8K70D1E, 8K70D1D 8K70D1W, 8K10F1E 8K10F1D, 8K10F1W 9K80D7E, 9K80D7D 9K80D7W, 10K0F1D 11K0F3E, 16K0F1D 16K0F3E	

Does not include Transmitter RF Distribution System for VHF, UHF 380-450, 512-524 MHz and High Power 800 MHz.

RF DISTRIBUTION SYSTEM (TX)			
	700/800 MHz Cavity	900 MHz Hybrid	UHF Cavity
Frequency Range	764-776 MHz 851-870 MHz	935-941 MHz	450-512 MHz
Insertion Loss (150 kHz spacing)	3.1 dB typ	2-way loss: 4.4 dB typ 3-way loss: 6.3 dB typ 4-way loss: 7.6 dB typ 5-way loss: 8.8 dB typ 6-way loss: 9.7 dB typ	4.5 dB typ
Tx-Tx Isolation (150 kHz spacing)	32 dB	20 dB	32 dB

RF DISTRIBUTION SYSTEM (RX)			
		700/800/900 MHz	UHF
Frequency Range		792-825 MHz or 896-902 MHz	450-512 MHz
Noise Figure	Typ / Limit	3.8 / 5 dB	4.6 / 5.5 dB
Gain	Typ / Limit	13 / -16 to 24 dB adjustable	10 / -16 to 24 dB adjustable
3rd Order Output Intercept (Typ)		21 dBm	19 dBm
Amplifier Intercept		35 dBm	40 dBm
Preselector Bandwidth		792-825 MHz or 896-902 MHz	2 or 3.5 MHz
RF Input Connector Type		N (Female)	N (Female)
RF Output Connector Type		BNC (Female)	BNC (Female)

RECEIVER (TOP OF CABINET)

		700/800 MHz	UHF Range 1 UHF Range 2	VHF	High Power 800 MHz	900 MHz
Frequency Range		792-825 MHz	380-435, 435-524 MHz	136-174 MHz	806-825 MHz	896-902 MHz
Analog Sensitivity (12 dB SINAD)	12.5 kHz channel	-123 dBm	-117 dBm (380-450, 512-524 MHz) -121.5 dBm (450-512 MHz)	-118 dBm (12.5/15 kHz)	-123 dBm	N/A
	25 kHz channel	-122 dBm	-116 dBm (380-450, 512-524 MHz) -120.5 dBm (450-512 MHz)	-117 dBm (25/30 kHz)	-122 dBm	N/A
Digital Sensitivity (5% BER)	C4FM	-123 dBm	-117 dBm (380-450, 512-524 MHz) -121.5 dBm (450-512 MHz)	-118 dBm	-123 dBm	-123 dBm
	H-CPM	-121 dBm	-115 dBm (380-450, 512-524 MHz) -119.5 dBm (450-512 MHz)	-116 dBm	N/A	-118.5 dBm
Intermodulation Rejection		80 dB				
Digital Adjacent Channel Rejection		60 dB				
Analog Adjacent Channel Rejection (EIA603)	12.5 kHz channel	75 dB	75 dB	75 dB	75 dB	N/A
Analog Adjacent Channel Rejection (TIA603D)	12.5 kHz channel	50 or 60 dB (adjustable)	50 or 60 dB (adjustable)	50 or 60 dB (adjustable)	50 or 60 dB (adjustable)	N/A
	25 kHz channel	80 dB	80 dB	80 dB	80 dB	N/A
Spurious and Image Response Rejection		100 dB	85 dB (380-435 MHz)	90 dB	100 dB	100 dB
			100 dB (450-512 MHz)			
Analog Audio Response		+1, -3 dB from 6 dB per octave de-emphasis; 300-3000 Hz referenced to 1000 Hz at line output				N/A
Analog Audio Distortion		3% or 5% (adjustable)	3% or 5% (adjustable)	3% or 5% (adjustable)	3% or 5% (adjustable)	N/A
Analog FM Hum / Noise	12.5 kHz channel	45 dB	45 dB	45 dB	45 dB	N/A
	25 kHz channel	50 dB	50 dB	50 dB	50 dB	N/A
Intermediate Frequency	First	73.35 MHz	73.35 MHz	44.85 MHz	73.35 MHz	73.35 MHz
	Second	2.16 MHz				

GCM 8000 COMPARATOR (T7321A)

GENERAL SPECIFICATIONS	
TRUNKING SYSTEMS	
Channel Capacity	1 or 2
Size (HxWxD)	5.25 x 19 x 18 in (133 x 483 x 457 mm)
Weight	40 lb (18 kg)
Temperature Range	-22 to 140°F (-30 to 60°C)
Rack Option	19 in standard rack mountable
Time Stability	External Reference
Power Requirements	AC: 90-264 VAC 47-63Hz DC: 43.2-60 VDC
Power Consumption	AC: 1 module 130 W AC: 2 modules 160 W DC: 1 module 60 W DC: 2 modules 80 W

GRV 8000 COMPARATOR (T8341A)

GENERAL SPECIFICATIONS	
CONVENTIONAL SYSTEMS	
Channel Capacity	1 or 2
Size (HxWxD)	5.25 x 19 x 18 in (133 x 483 x 457 mm)
Weight	36 lb (16 kg)
Temperature Range	-22 to 140°F (-30 to 60°C)
Rack Option	19 in standard rack mountable
Time Stability	External Reference
Power Requirements	AC: 90-264 VAC 47-63Hz DC: 43.2-60 VDC
Power Consumption	AC: 1 module 80 W AC: 2 modules 105 W DC: 1 module 50 W DC: 2 modules 75 W

GPW 8000 RECEIVER (T7540A)

GENERAL SPECIFICATIONS					
		700/800 MHz	UHF Range 1	VHF	900 MHz
Frequency Range		792-825 MHz	380-435, 435-524 MHz	136-174 MHz	896-902 MHz
Size (HxWxD)		5.25 x 19 x 18 in (133 x 483 x 457 mm)			
Weight		36 lb (16 kg)			
Temperature Range		-22 to 140°F (-30 to 60°C)			
Power Requirements		AC: 90-264 VAC 47-63Hz			
		DC: 43.2-60 VDC			
Power Consumption (1 Module / 2 Modules)	AC - Power Efficiency Package	40 / 65 W			
	DC - Power Efficiency Package	30 / 50 W			
	AC	80 / 105 W			
	DC	50 / 75 W			
Antenna Connectors	Standard	BNC Female			
	With Optional Preselector	N Female			
Modulation		C4FM, FM			
Frequency Stability		Conventional: 100 ppb/2 yr			
Analog Sensitivity (12 dB SINAD)	12.5 kHz channel	-118 dBm	-118 dBm	-119 dBm (12.5/15 kHz)	N/A
	25 kHz channel	-117 dBm	-117 dBm	-118 dBm (25/30 kHz)	N/A
Digital Sensitivity (5% BER)	C4FM	-118 dBm	-118 dBm	-119 dBm	-118 dBm
	H-CPM	-116 dBm	-116 dBm	-117 dBm	-116 dBm
Intermodulation Rejection		85 dB	85 dB	85 dB	N/A
Digital Adjacent Channel Rejection		60 dB	60 dB	60 dB	N/A
Analog Adjacent Channel Rejection (EIA603)	12.5 / 25 kHz channel	75 dB	75 dB	75 dB	TBA
Analog Adjacent Channel Rejection (TIA603D)	12.5 kHz channel	50 or 60 dB (adjustable)	50 or 60 dB (adjustable)	50 or 60 dB (adjustable)	TBA
	25 kHz channel	80 dB	80 dB	80 dB	TBA
Spurious and Image Response Rejection	Standard	85 dB	85 dB	90 dB	90 dB
	With Optional Preselector	100 dB	100 dB	95 dB	N/A
Analog Audio Response		+1, -3 dB from 6 dB per octave de-emphasis; 300-3000 Hz referenced to 1000 Hz at line output			
Analog Audio Distortion		3% or 5% (adjustable)			
Analog FM Hum and Noise	12.5 kHz channel	45 dB			
	25 kHz channel	50 dB			
Intermediate Frequency	First	73.35 MHz	73.35 MHz	44.85 MHz	73.35 MHz
	Second	2.16 MHz			

GCP 8000 SITE CONTROLLER (T7038A)

GENERAL SPECIFICATIONS			
Channel Capacity	Repeater Site: 28	Rack Option	19 in standard rack mountable
	Simulcast (Multicast): 30	Frequency Stability	Simulcast (Multisite): External
Size (HxWxD)	5.25 x 19 x 18 in (133 x 483 x 457 mm)	Power Requirements	AC: 90-264 V, 47-63 Hz or DC: 43.2-60 V
Weight	40 lb (18 kg)	Power Consumption	AC: 130 W, DC: 60 W
Temperature Range	-22 to 140 °F (-30 to 60 °C)		



G-SERIES COMPACT SITE

Protected from the elements, the G-Series Compact Site is a complete ASTRO 25 site that can house up to three GTR 8000 Base Radios in an outdoor, environmentally controlled cabinet. It is ideal for Project 25 (P25) deployments where building enclosures are not cost effective or not feasible due to difficult terrain.

Frequency Band	700 MHz, 800 MHz
Size (HxWxD)	51.2 x 27.2 x 36.5 in (1300 x 690 x 925 mm): Pole Mount 59.5 x 27.2 x 36.5 in (1510 x 690 x 925 mm): Pad Mount 55.3 x 27.2 x 36.5 in (1405 x 690 x 925 mm): Wall Mount
Weight	230 lb (104 kg) empty, 460 lb (209 kg) fully loaded
Temperature Range (External to Cabinet)	-22 to 122 °F (-30 to 50 °C)
Mounting Options	Pole, Pad, or Wall Mountable



SERVICES

Choose the right level of services you need to achieve mission-critical performance for your ASTRO 25 system. The more you engage Motorola Solutions, the more you transfer the risk to us and achieve peace of mind in maximizing your uptime.



ESSENTIAL

Technical support when and where you need it, so you can maintain and restore your system.



ADVANCED

Rely on us to monitor and update your network, providing improved network response and continuity.



PREMIER

Transfer day-to-day accountability to us to operate and optimize all or part of your system to maximize performance and reduce risk.



FCC TYPE ACCEPTANCE			
Frequency Range	Type	Power Output	Type Acceptance Number
136-174 MHz	Transmitter	2-100 W	ABZ89FC3790B, ABZ89FC3799B
136-174 MHz	Receiver	N/A	ABZ89FR3791B
406-435 MHz	Transmitter	2-110 W	ABZ89FC4821B
406-435 MHz	Receiver	N/A	ABZ89FR4822B
435-512 MHz	Transmitter	2-110 W	ABZ89FC4819B
435-512 MHz	Receiver	N/A	ABZ89FR4820B
764-776 MHz	Transmitter	2-100 W	ABZ89FC5812B
851-870 MHz	Transmitter	2-100 W	ABZ89FC5810B
792-825 MHz	Receiver	N/A	ABZ89FR5811B
935-941 MHz	Transmitter	2-120 W	ABZ89FC5823B
896-902 MHz	Receiver	N/A	ABZ89FR5824B
851-870 MHz	Transmitter	15-150 W	ABZ89FC5825B

EU REGULATORY COMPLIANCE

CE mark is available on the GTR 8000 Base Radio (T7039A) and GPW 8000 Receiver (T7540A) in the following frequency ranges: UHF 380-525 MHz and VHF 136-174 MHz.

NOTES

- All specifications shown are typical unless otherwise noted.
- All specifications are subject to change without notice.

For more information, please visit us on the web at: www.motorolasolutions.com/ASTRO



Motorola Solutions, Inc. 500 West Monroe Street, Chicago, IL 60661 U.S.A. motorolasolutions.com

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COMMANDCENTRAL AXS CONSOLE

CONSOLE FOR THE MODERN DISPATCHER

As a dispatcher, when every second counts, it's your job to provide crucial intelligence to personnel and to keep people safe. Yet in today's world you have more information, resources, and tools competing for your attention than ever. Precious time is lost if you have to switch between multiple applications across multiple screens to collect and process data from disparate sources. That's why we created the CommandCentral AXS Console. Based on extensive observation of the way dispatchers work, it has been thoughtfully designed to help you confidently and efficiently manage any situation that comes your way.

You can rest assured that the investment you're making will return value over the entire life of your system. CommandCentral AXS is designed from the ground up to be a completely extensible platform. It is designed to support future simultaneous integration with multiple types of radio systems, as well as other applications commonly found in dispatch centers. Plus, monthly software releases continuously add new functionality, improve performance, and provide the necessary security updates, making CommandCentral AXS even more future ready.

With a resource-centric design and the flexibility to interact by touch, type or click, you can stay connected to your team in the way that suits you best. Configure and deploy CommandCentral AXS based on your needs -- not ours -- and know it can grow with your organization for years to come. Whether you're supporting a small agency or an entire state, you can count on the mission-critical reliability that has made Motorola Solutions the most trusted name in dispatch communications for over 80 years.



CommandCentral Hub

FEATURES



NEXT GENERATION DISPATCH EXPERIENCE
Works The Way You Do



CROSS PLATFORM INTEGRATION CAPABILITY
Retain Your Focus



SEAMLESS MULTI-SYSTEM ACCESS
One Platform, Now and Into The Future



PAIN FREE ENHANCEMENTS
Updates without the Hassle



MISSION-CRITICAL DISPATCHING
Industry Leading Innovation and Reliability

PROACTIVE AND REGULAR SOFTWARE UPDATES

To ensure the highest levels of functionality and security, plus technical support when needed, we recommend our CommandCentral AXS subscription agreement. The first year subscription is mandatory with the purchase of the dispatch client. In order to receive software updates the subscription must be active.



RADIO RESOURCE FEATURES

Types of Resources	ASTRO 25 Trunking Talk Group Resource
	ASTRO 25 Trunking Announcement Group Resource
	ASTRO 25 Trunking Individual Resource
	ASTRO 25 Trunking System Wide Resource
	Simple Analog Conventional Resource
	MDC1200 Analog Conventional Resource
	ASTRO 25 Conventional Resource

Type of Calls	ASTRO 25 Trunking Talk Group Call
	ASTRO 25 Trunking Announcement Group Call
	ASTRO 25 Trunking Emergency Call
	ASTRO 25 Trunking Individual Call
	ASTRO 25 Trunking System Wide Call
	Conventional PTT Call
	Conventional ASTRO 25 Emergency Call
	Conventional MDC 1200 Emergency Call
	Conventional ASTRO 25 Voice Selective Call
	Conventional MDC 1200 Voice Selective Call

Resource Controls	Individual Resource Volume Control
	Repeat Control (trunking and conventional)
	Transmit Mode Control (Coded / Clear) (trunking and conventional)
	System Access Priority Select (Normal / Tactical) (trunking)
	Frequency Selection Control (conventional)
	PL Selection Control (conventional)
	Wildcard I and II Control (conventional)
	Mute Receiver 2 Control (conventional)
	Emergency Alarm (conventional)
	Radio Status (trunking and conventional)
	Radio Message (conventional)
	Radio Enable / Disable (conventional)
	Radio Check (conventional)
	Remote Monitor (trunking and conventional)

AUXILIARY INPUTS AND OUTPUTS

Public Aux I/Os	Public Momentary Relay
	Public Latching Relay
	Public Interlocked Latching Relay
	Public Momentary Input
	Public Latching Input

Private Aux I/Os	Private Relay for Dispatch Console PTT
	Private Relay for Received Emergency
	Private Relay for Received Call on Selected Channel
	Private Relay Closure when Global Aux I/O goes Active (for external Sonalert)

SECURE VOICE SERVICES

Algorithms	AES, DES-OFB and ADP Algorithms
Dispatcher User Controls	Secure Mode Selection (coded / clear)
	Panic Key Zeroizing
	Key Select (conventional)
	Multikey (conventional)
	Momentary Key Override (conventional)
	Keyset / Indexset Selection
Dispatcher User Indications	Receive Cross-Mode Indication
	Multi-Select Cross-Mode Alert
	Patch Cross-Mode Alert
	Key Fail Indication
	Clear Audio Alert
	Key Display (conventional)
Key Management	Key Management via Key Variable Loader
	Key Management via Over The Ethernet Keying (OTEK)

SUPPORTED BROWSERS

Supported Browsers	Most Current Version of Chromium or Chrome
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GENERAL CONSOLE FUNCTIONALITY

Console Functionality	General Transmit
	Instant Transmit
	APB Transmit
	Monitor (disable CTCSS)
	Single Select
	Multi-Select (up to 16 groups per dispatch position)
	On-Screen Speaker Volume Controls
	All Mute
	Acoustic Cross Mute
	Patch (up to 16 groups per dispatch position)
	Display Radio PTT ID with Alias
	Emergency Alarm
	Call Alert
	Time Display
	VU Meter
	Activity Log
	Channel Based Instant Recall Recorder
	Integrated Paging Encoder
	Customizable Channel Marker
	Alert Tones (up to 15 per dispatch position, all customizable)
	Group Text Messaging (trunking)

COMMANDCENTRAL HUB	
Dimensions (H x W x D)	Without cable strain relief bracket: 3.5 x 17.0 x 7.2 inches 88 x 431.5 x 183 mm With cable strain relief bracket: 3.5 x 17.0 x 10.4 inches 88 x 431.5 x 263 mm
Weight	3 lbs 1.4 kg
Power Consumption	170 W typical 260 W maximum
Thermal Output	580 BTU/hr typical 887 BTU/hr maximum
Operating Voltages/ Frequencies	85 - 264 VAC 47 - 63 Hz
Operating Environment	32 - 104 °F at 90% RH maximum non-condensing 0 - 40 °C at 90% RH maximum non-condensing
Storage Environment	-4 - 140 °F at 90% RH maximum non-condensing -20 - 60 °C at 90% RH maximum non-condensing
Certifications	Safety UL/CSA 60950 EN60950-1 2001 EMC Emissions & Immunity FCC part 15 Class A ICES-003 EN55022 1998 + A1: 2001 + A2:2003 (CISPR-22 Class A) EN55024 + A1:2001 + A2:2003 EN61000-3-2 2000 EN61000-3-3 1995 + A1:2001 Energy Efficiency (CommandCentral Hub Power Supply only) Energy Efficiency Level VI

COMMANDCENTRAL AXS ACCESSORIES	
Devices	CommandCentral Hub
	Up to 10 Speakers
	Up to 2 Headset Jacks
	1 Desk Microphone
	1 Footswitch
	1 External Paging Encoder Port
	1 Telephone / Headset Port
	3 Local Logging Ports

COMMANDCENTRAL AXS CLUSTER	
Servers per Cluster	3
Memory (per server)	64 GB Error Code Correcting (ECC)
Dimensions (H x W x D) (per server)	1.70 x 17.11 x 15.05 inches 43.2 x 434.6 x 382.2 mm
Weight (per server)	17.4 lb 7.9 kg
Power Consumption (per server)	40 Watts (idle) 220 Watts (maximum)
Thermal Output (per server)	137 BTU/hr (idle) 751 BTU/hr (maximum)
Operating Environment	50 to 95 °F / 10 to 35 °C at sea level with an altitude derating of 1.0°C per every 305 m (1.8°F per every 1000 ft) above sea level to a maximum of 3050 m (10,000 ft) 8 to 90% RH at 82°F (28°C) maximum wet bulb temperature, non-condensing
Storage Environment	-22 to 140 °F / -30 to 60 °C 5 to 95% RH at 101.7°F (38.7°C) maximum wet bulb temperature, non-condensing

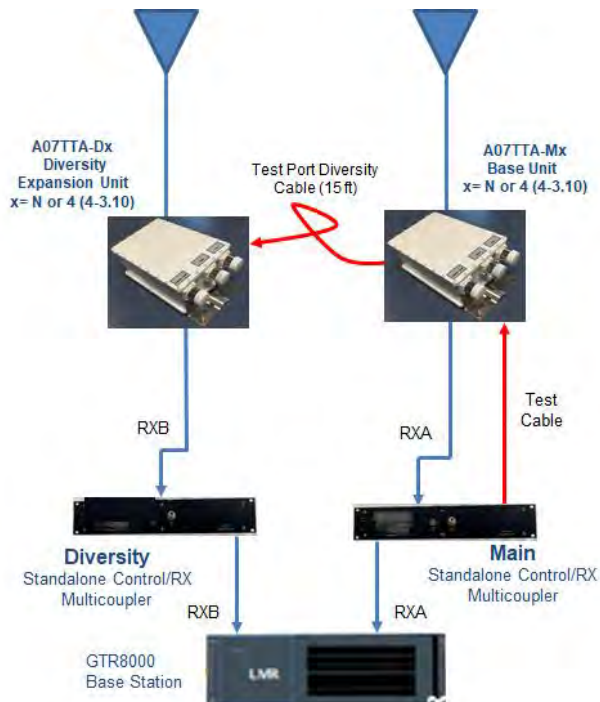
For more information or to learn more please visit
www.motorolasolutions.com/commandcentralaxs



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ESS (Expandable Site Subsystem) /SA (Stand Alone) Tower Top Amplifier System (700/800 MHz)

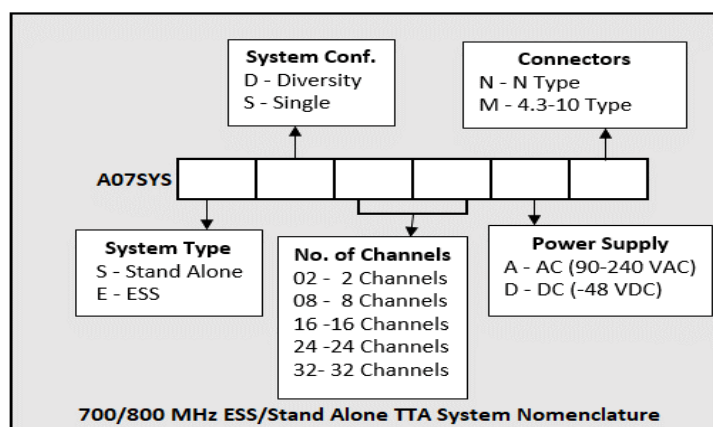


System Features and Benefits

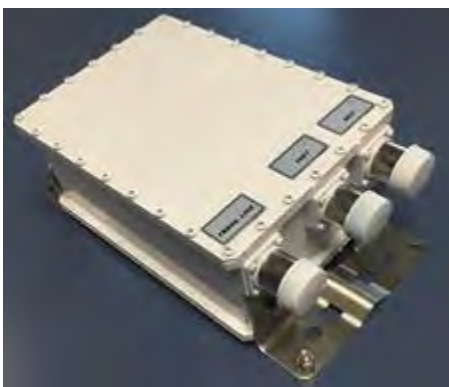
- ❖ Full Redundant Amplifiers in each TTA and Control/RX Multicoupler unit.
- ❖ System Low Noise Figure Performance of 2.5 dB or less.
- ❖ Models available for diversity or non-diversity deployment.
- ❖ Single Branch systems can be easily upgraded to diversity operation in the field.
- ❖ Test port for accurate receiver sensitivity with ability to switch between the antenna and a load.
- ❖ RX Antenna Test – Allows return loss testing of Receive Antenna for site baseline measurements.
- ❖ Monitors site spectrum for high levels carriers and provides SNMP or dry contact alarms if levels exceed -35 dBm (Stand Alone) or -40 dBm (ESS).
- ❖ Auto RX Gain Setup in user interface.

System Specifications	
Parameter	Specification
Frequency Band(s)	700 / 800 MHz
System Gain	SA: 23 dB, adjustable to 10 dB or less ESS: 18 dB adjustable to 3 dB.
System Noise Figure	≤ 2.5 dB
System Passband	794 - 824 MHz (30 MHz)
System Gain Flatness	≤ 1.5 dB
Adjustable Attenuation Range	0 dB to 15 dB
Adjustable Attenuation Step Size	0.25 dB
Optional Redundant Power Supply	Yes External 1RU tray is required for Non-diversity applications.
Test Port	Yes
Internal TTA Preselector	Yes
System TX Band Rejection	≥ 110 dB
Internal Termination Test Mode	Yes
RX Antenna Test Mode	Yes
Bypass (Failure) Mode	Yes
Bypass Mode System Loss	-26 dB (Stand alone)
Internal Storage of Test Data	Yes Electronic Data for CU, TTA data entered manually
Auto Rx Overall Gain	Yes
High-Level Carrier Monitor	Yes

Ordering Information (System Level)



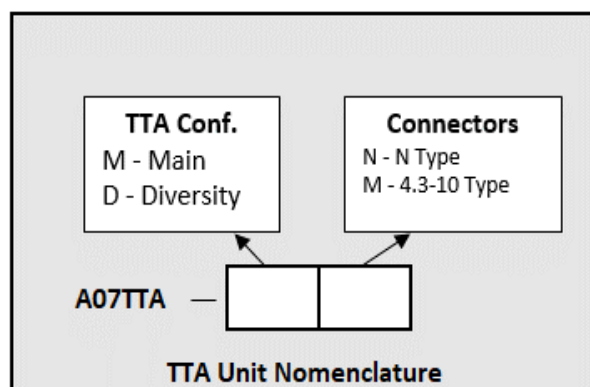
ESS (Expandable Site Subsystem) /SA (Stand Alone) Tower Top Amplifier System (700/800 MHz)



TTA Features and Benefits

- ❖ Dual redundant quadrature-coupled LNA's
- ❖ Low Noise Figure Performance of 2.0 dB or less.
- ❖ Test port standard for accurate receiver sensitivity testing.
- ❖ Automatic Switching between Amp A & B.
- ❖ Automatic or Manual Amp Bypass during alarm event or loss of power.
- ❖ Compact weatherproof housing
- ❖ Lightning protection on all ports.
- ❖ Use with A07CU RX Multicoupler series.

Ordering Information



TTA (Top Unit Only) Specifications	
Type of Amplifier	Quadrature -Coupled
Amplifier Redundancy	2 independent quadrature-coupled LNA's
Amplifier Switching	Automatic upon failure detection
Type of Amplifier/Test Mode Switching	Relay
Amplifier Input 3rd Order Intercept Point	> +13 dBm
Return Loss on all RF Ports	> 14 dB
Power Requirements	Power derived from Main RX and Test port RF cables , 18-24 VDC for main and 6 VDC for Test Port
Operating Temp. Range (full Specs)	-30° C to + 60° C
Operating Temp. Range (degraded Specs)	+60° C to + 70° C Gain degrades by 1 dB
Lightning Protection	20kA IEC 61000-4-5 8/20 uS multiple strikes. 3 kA 10/350 uS slow pulse waveform
Grounding Studs	(2) ¼" -20 studs for 2-hole lugs with ¾" center to center spacing
Test Port Coupling (Test input to Antenna input)	30 dB ± 2 dB (low directivity)
Test Port Coupling Flatness	≤ 0.5 dB
Test Port Balance	± 0.25 dB (dual branch only)
Branch to Branch Isolation	≥ 50 dB (dual branch only)
Internal Termination Accuracy	< ±5% or 32 dB RL (VSWR 1.05)
Connector Type (all Ports)	N or 4.3-10 female
Connector Spacing (X and Y planes)	1.9" center to center minimum
Enclosure	NEMA 3X minimum
Size (H x W x D)	13.0" x 6.5" x 4.4" including mounting brackets.
Weight Maximum	9.5 lbs. (Single) / 19 lbs. (dual branch)
TTA Unit Test Record	Yes, Factory entered in CU if ordered as system plus hard copy.

ESS (Expandable Site Subsystem) /SA (Stand Alone) Tower Top Amplifier System (700/800 MHz)

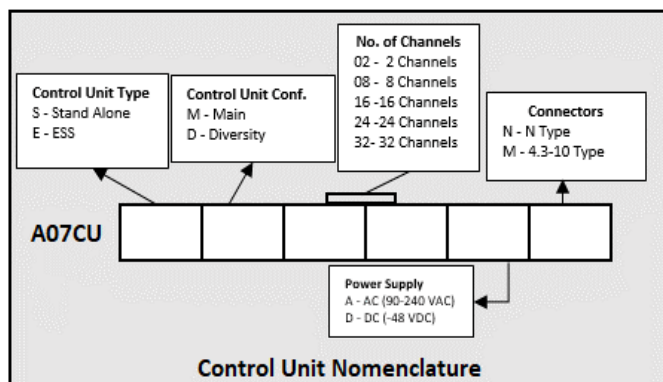


Main Unit Shown

Features and Benefits (Control Unit)

- ❖ 8 – 32 Channels in a 2 RU chassis (expandable in 8 channel increments)
- ❖ Large front panel display for local monitoring and configuration.
- ❖ Includes a secondary filter for additional isolation at the 700 & 800 MHz Transmitter Bands.
- ❖ Post filter ports to connect an external filter for additional selectivity.
- ❖ Test Port for accurate receiver testing.
- ❖ Antenna Test Port for antenna return loss testing
- ❖ Pre attenuator (0 – 15 in 0.25 dB steps)
- ❖ Self-terminating splitter outputs
- ❖ IP Interface
 - o Web Interface for remote monitoring and configuration
 - o TLS IP security layer
 - o SNMP V2c & V3

Ordering Information



Control and Control & Distribution Units	
Type of Amplifier	Quadrature-Coupled
Amplifier Redundancy	Yes
Amplifier Output 3rd Order Intercept Point	≥ 45 dB
RF Port Return Loss	≥ 14 dB
Adjustable Attenuator Type	Electronic, 0 -15 dB, 0.25 dB steps
TTA Connectors Type (rear-facing)	N-Female or 4.3-10 (See ordering information)
Number of RX Output ports	8 - 32 on C&D ESS CU has two RF outputs
RX Output Connectors Type (rear-facing)	BNC-Female
Rx to Rx Port Isolation	≥ 20 dB
External Filter Ports	Yes
External Filter Port Connector Type	N-Female
Test Port Input Connector Type (front-facing)	Test Port: BNC-Female. Antenna Test: N-female
Grounding Studs	(2) ¼" -20 for 2 hole lugs
Status Indicators	LED plus LCD Display
Alarm Contacts	Form-C Contacts
Ethernet Port	Provided for SNMP, configuration, control and monitoring.
Power Requirements	90-240 VAC 50/60 Hz OR -48 VDC
Operating Temperature Range (full Specs)	0°C to + 50°C
Enclosure	Standard EIA 19" Rack Mount
Size Maximum (H x W x D)	3.5"(2 RU) x 19" x 11"
Control Unit Test Record	Yes , entered electronically and hard copy provided with shipment.

ESS (Expandable Site Subsystem) /SA (Stand Alone) Tower Top Amplifier System (700/800 MHz)

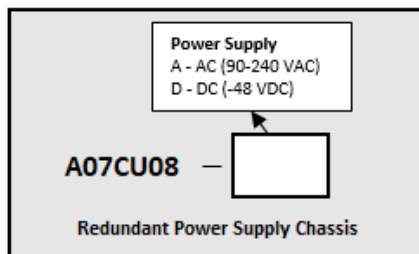
Nomenclature Charts

ESS/Stand Alone TTA System Nomenclature Chart					
System Conf.	AC Supply; N Connector	AC Supply; 4.3-10 DIN Connector	DC Supply; N Connector	DC Supply; 4.3-10 DIN Connector	Channels
<i>Stand Alone System</i>					
<i>Diversity</i>	A07SYSSD08AN	A07SYSSD08AM	A07SYSSD08DN	A07SYSSD08DM	08
	A07SYSSD16AN	A07SYSSD16AM	A07SYSSD16DN	A07SYSSD16DM	16
	A07SYSSD24AN	A07SYSSD24AM	A07SYSSD24DN	A07SYSSD24DM	24
	A07SYSSD32AN	A07SYSSD32AM	A07SYSSD32DN	A07SYSSD32DM	32
<i>Single</i>	A07SYSSS08AN	A07SYSSS08AM	A07SYSSS08DN	A07SYSSS08DM	08
	A07SYSSS16AN	A07SYSSS16AM	A07SYSSS16DN	A07SYSSS16DM	16
	A07SYSSS24AN	A07SYSSS24AM	A07SYSSS24DN	A07SYSSS24DM	24
	A07SYSSS32AN	A07SYSSS32AM	A07SYSSS32DN	A07SYSSS32DM	32
<i>ESS System</i>					
<i>Diversity</i>	A07SYSED02AN	A07SYSED02AM	A07SYSED02DN	A07SYSED02DM	02
<i>Single</i>	A07SYSES02AN	A07SYSES02AM	A07SYSES02DN	A07SYSES02DM	02

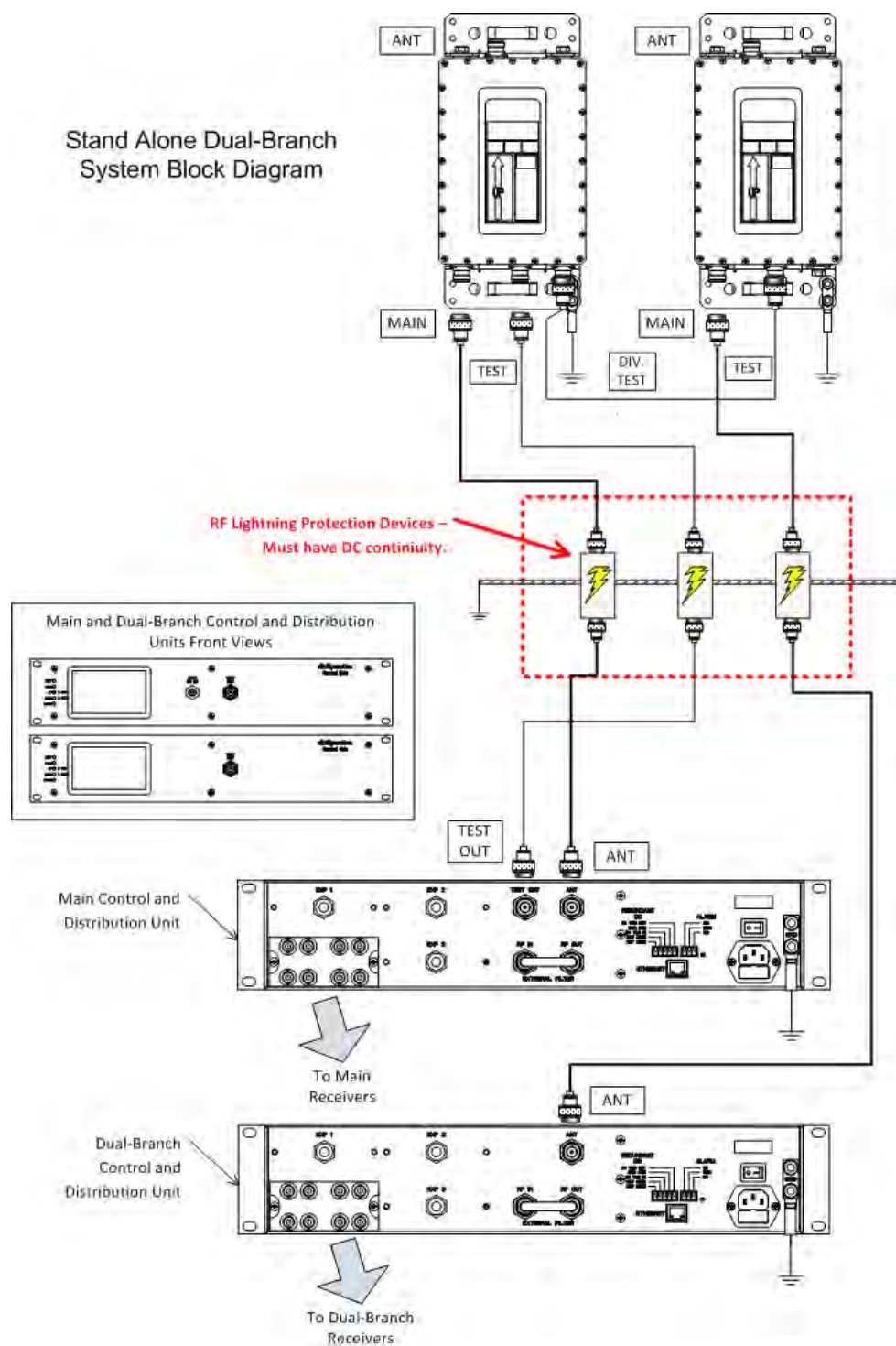
Nomenclature Chart for TTA (Top Unit) Combination (For Stand Alone and ESS options)		
<i>Diversity</i>	<i>Single</i>	Connectors
A07TTA-MN, A07TTA-DN	A07TTA-MN	N Conn.
A07TTA-MM, A07TTA-DM	A07TTA-MM	4.3-10 DIN Conn.

Nomenclature Chart for Control Unit (Bottom Unit) Combination				
<i>Diversity</i>	<i>Single</i>	<i>Channels</i>	<i>Supply</i>	<i>Connector Options</i>
<i>Stand Alone Options</i>				
A07CUSM08AN , A07CUSD08AN	A07CUSM08AN	08	AC	N-Type
A07CUSM16AN , A07CUSD16AN	A07CUSM16AN	16	AC	N-Type
A07CUSM24AN , A07CUSD24AN	A07CUSM24AN	24	AC	N-Type
A07CUSM32AN , A07CUSD32AN	A07CUSM32AN	32	AC	N-Type
A07CUSM08DN , A07CUSD08DN	A07CUSM08DN	08	DC	N-Type
A07CUSM16DN , A07CUSD16DN	A07CUSM16DN	16	DC	N-Type
A07CUSM24DN , A07CUSD24DN	A07CUSM24DN	24	DC	N-Type
A07CUSM32DN , A07CUSD32DN	A07CUSM32DN	32	DC	N-Type
A07CUSM08AM , A07CUSD08AM	A07CUSM08AM	08	AC	4.3-10 Type
A07CUSM16AM , A07CUSD16AM	A07CUSM16AM	16	AC	4.3-10 Type
A07CUSM24AM , A07CUSD24AM	A07CUSM24AM	24	AC	4.3-10 Type
A07CUSM32AM , A07CUSD32AM	A07CUSM32AM	32	AC	4.3-10 Type
A07CUSM08DM , A07CUSD08DM	A07CUSM08DM	08	DC	4.3-10 Type
A07CUSM16DM , A07CUSD16DM	A07CUSM16DM	16	DC	4.3-10 Type
A07CUSM24DM , A07CUSD24DM	A07CUSM24DM	24	DC	4.3-10 Type
A07CUSM32DM , A07CUSD32DM	A07CUSM32DM	32	DC	4.3-10 Type
<i>ESS Options</i>				
A07CUEM02AN , A07CUED02AN	A07CUEM02AN	02	AC	N-Type
A07CUEM02DN , A07CUED02DN	A07CUEM02DN	02	DC	N-Type
A07CUEM02AM , A07CUED02AM	A07CUEM02AM	02	AC	4.3-10 Type
A07CUEM02DM , A07CUED02DM	A07CUEM02DM	02	DC	4.3-10 Type

Expansion Kit (Redundant Power Supply Chassis)



ESS (Expandable Site Subsystem) /SA (Stand Alone) Tower Top Amplifier System (700/800 MHz)



MWF7AM-D, MWF8AM-D, and MWF9AM-D

High-Power Transmit Window Filter (700, 800, 900 MHz)

Single Band Transmit Window Filters



Rear View with 7/16 DIN Female connectors shown

Features and Benefits

- ❖ Single Band transmit window filter systems enhance isolation of transmit carrier and transmit sideband noise from system receivers – great for sites with horizontally separated antennas.
- ❖ *Isolation at Receiver Frequencies* quoted in table should be added to isolation provided by transmit combiner.
- ❖ 500-Watt continuous duty power rating will handle peak voltage for Peak Instantaneous Power (PIP) from ten P25 Phase 2 trunk channels, each 50 W at filter input.
- ❖ Milled aluminum construction provides outstanding selectivity characteristics in a rugged and compact package – only 2 RU and 11.0" depth.

Ordering Information

Model	Band	Passband
MWF7AM-D	700 MHz	14 MHz
MWF8AM-D	800 MHz	18 MHz
MWF9AM-D	900 MHz	6 MHz

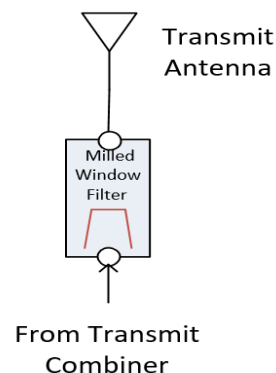
High Power Transmit Window Filter

Filter must be factory tuned; Provide frequency information at time of order. Rear brackets for 4-post mounting provided; for 2-post mounting order P/N MWF2PKIT.

Specifications

Electrical Specifications	
Maximum RF Power	500W Continuous
Peak Instantaneous Power	19,000W
Frequency Range 700 MHz model: 800 MHz model: 900 MHz model:	762-776 MHz 851-869 MHz 935-941 MHz
Bandwidth 700 MHz model: 800 MHz model: 900 MHz model:	14 MHz 18 MHz 6 MHz
Isolation at Receive Frequencies 700 MHz model: 800 MHz model: 900 MHz model	>45 dB >45 dB >60 dB
Insertion Loss 700 MHz model: 800 MHz model: 900 MHz model:	<0.3 dB <0.3 dB <0.5 dB
Return Loss all Ports	>19 dB
Mechanical Specifications	
Construction/Finish	Milled AL casting /Clear Chem Film/Panel Blk Powder coat
Connectors	7/16" DIN Female
Mounting	EIA 19-inch rack
Temperature Range	-30° C to +60° C
Dimensions and Weight	
Width	19.0 in.
Height	3.5 in. (2RU)
Depth	11.0 in.
Weight / Shipping Weight	17 lb. / 25 lb.

Typical Application



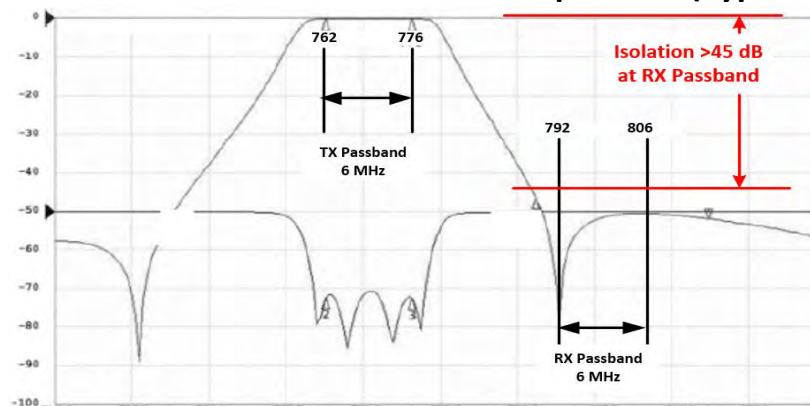
MWF7AM-D, MWF8AM-D, and MWF9AM-D

High-Power Transmit Window Filter (700, 800, 900 MHz)

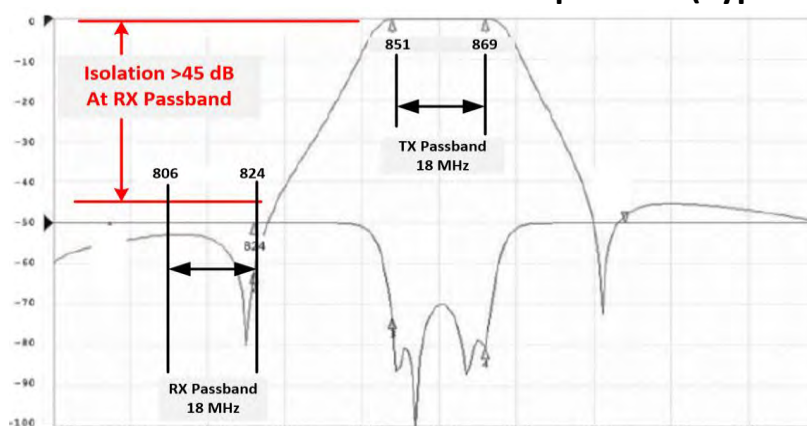
Single Band Transmit Window Filters

Filter Characteristics

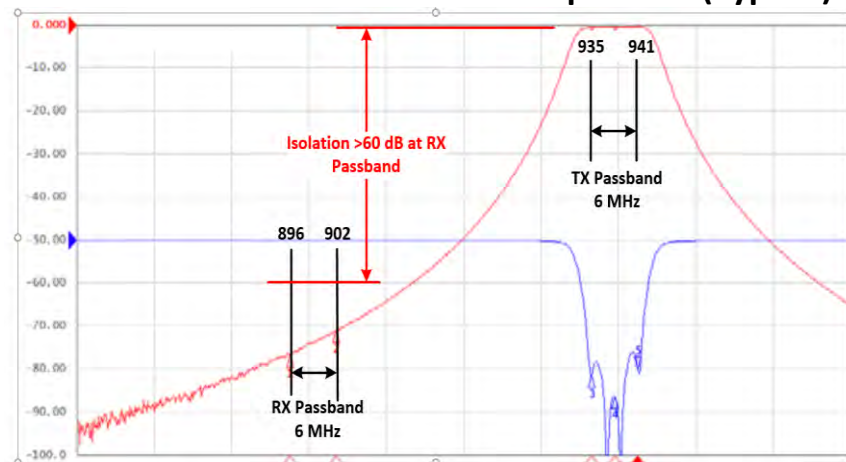
MWF7AM Isolation at Receive Frequencies (Typical)



MWF8AM Isolation at Receive Frequencies (Typical)



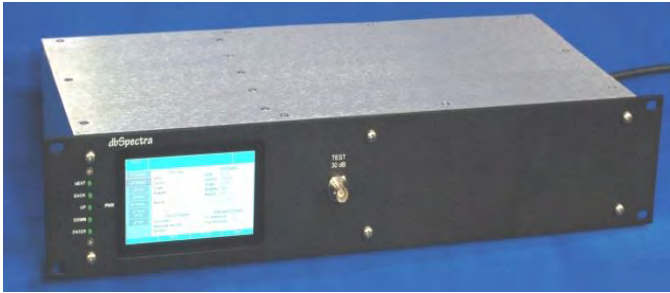
MWF9AM Isolation at Receive Frequencies (Typical)



DSX7PDU (700/800 MHz)

SMART Receiver Multicoupler/Power Distribution Unit 8-32 channels

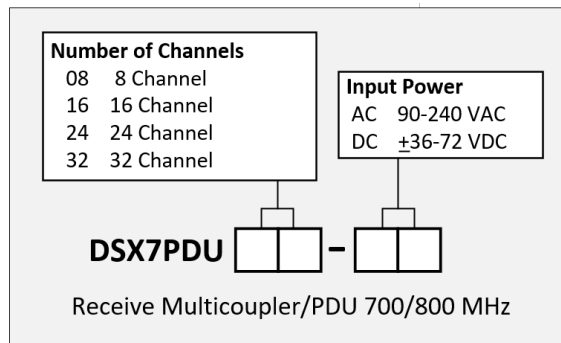
Use with DS7TM-Series Tower Top Amplifier ordered separately



Features and Benefits

- ❖ 8-to-32 Channels in a 2 RU chassis (field expandable in 8 channel increments).
- ❖ Internal window filter provides 60 dB of extra system isolation at TX band; the multicoupler/PDU and DS7TM-series TTA can provide >120 dB of TX/RX isolation at 700/800 MHz bands, easing need for antenna separation.
- ❖ Includes provision for connection of external post-filter for additional selectivity if needed.
- ❖ TTA Test Port connection at Multicoupler/PDU facilitates accurate receiver sensitivity testing.
- ❖ Self-terminating splitter outputs. No loads necessary.
- ❖ Built-in IP network Interface for remote monitoring and configuration; includes TLS Security Layer, SNMP V2c/V3 alarm traps for alarm management.

Ordering Information



*8-Channel Expansion Kits DSX7PDUEXP8 available for field installation

Specifications

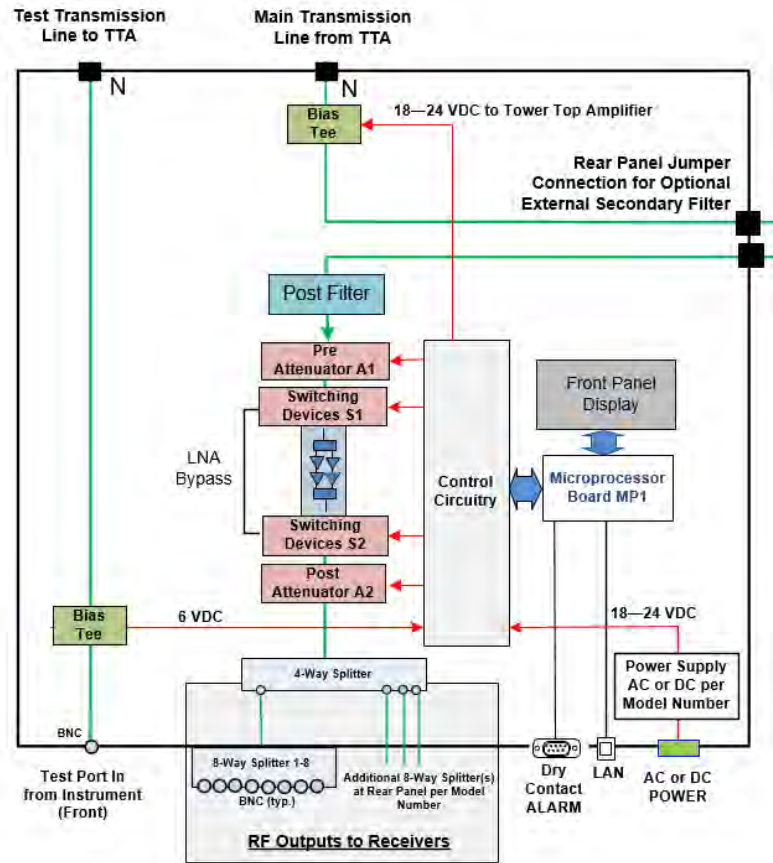
Electrical Specifications	
Frequency Range	799-824 MHz
Number of Channels	8-32 Channels *
Gain	Splitter Outputs: 5.5 dB Minimum Expansion Ports: 20 dB Minimum (0 dB pre & post attenuator settings)
Noise Figure	6.8 dB Maximum (0 dB pre & post attenuator settings, NF includes Post filter loss)
Input/Output Return Loss	14 dB
Input IP3	+15 dBm
Low Noise Amplifier	Quadrature Coupled
Test Port Instrument Connection	Front Panel BNC
Post-LNA Filter Connections	Available on Rear Panel
Pre & Post -LNA Adjustable Attenuators	Electronic , 0 – 15 dB, 0.5 dB steps
RX – RX Port Isolation	>20 dB
Power Input	90-240 VAC or -48 VDC (36-72 VDC isolated) models available
Output DC Voltages to TTA	Transmission Line Port: 18/24 VDC Test Port: 6 VDC
User Interface	Web Browser or Front panel Touchscreen display
IP Interface	IPV4 ,TLS Security Layer, SNMP Alarms V2C/V3
Mechanical Specifications	
RF Connectors	✓ RF Input: N Female ✓ RF Outputs: BNC Female (rear) ✓ Test Port --Instrument: BNC Female (front) ✓ Test Port Out to TTA: N Female (rear) ✓ RF External Filter Ports: N female (rear)
IP Interface Connector	RJ45
Dry Contact Alarm Connector	Block Type
Mounting	19" x 3.5" 2 RU Panel, depth 11.5" including connectors
Grounding Provision	¼-inch stud at rear
Temperature Range (no degradation)	0°C to +50° C
Weight / Shipping Weight	8 lbs. / 12 lbs.

DSX7PDU (700/800 MHz)

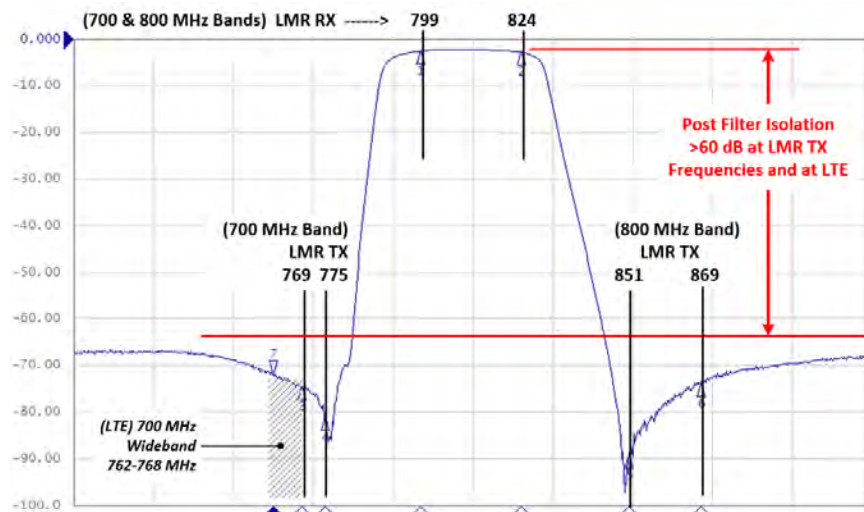
SMART Receiver Multicoupler/Power Distribution Unit 8-32 channels

Use with DS7TM-Series Tower Top Amplifier ordered separately

Block Diagram



Post Filter Characteristics



The original HE rectifier

Since setting the new standard for rectifier efficiency, the Flatpack2 HE family is now available in a variety of voltages and power ratings, all with superior efficiency up to 96.5%.

With more than 4 billion in-field operating hours and a proven cumulative field MTBF of more than 1,9 million hours, Flatpack 2 HE is the only HE (High Efficiency) rectifier with a proven track record.

The line of systems available for the ENERGY STAR® qualified Flatpack2 HE 48V rectifiers spans from 8kW 2U racks with complete distribution to multi-cabinet systems in multi MW installations.



Flatpack2 48V HE Rectifiers

2000W & 3000W

Doc 24111x.105.DS3 – v4

APPLICATIONS

TELECOM – MOBILE / WIRELESS

- RADIO BASE STATIONS/ CELL SITES
- LTE / 4G / WIMAX
- MOBILE SWITCHING CENTER (MSC)
- MICROWAVE
- BROADBAND

TELECOM – FIXED

- CENTRAL OFFICE
- TELEPHONY SERVERS / SWITCHES
- FIBER OPTICS
- MICROWAVE
- CABLE
- BROADBAND
- BROADCAST
- DATACENTERS

POWER UTILITIES

- SCADA



Flatpack2 Hybrid Power core



Flatpack2 Power core in T3 Outdoor cabinet

KEY FEATURES

- PROVEN RELIABILITY
- HIGH EFFICIENCY (HE)
- POWER DENSE, UP TO 33 W/INCH³
- WIDE TEMPERATURE RANGE
- APPLICATION FLEXIBILITY 2KW→
- GLOBAL COMPLIANCE (CE, UL)
- PATENTED HE TECHNOLOGY



108kW System

Flatpack2 48V HE Rectifiers

Doc 24111x.105.DS3 – v4



Model	48V / 2000W HE	48V / 3000W HE
Part number	241115.105	241119.105
INPUT DATA		
Voltage (nominal)	185 - 275 V _{AC} / 185 - 275 V _{DC}	176 - 277 V _{AC}
Voltage (range)	85 - 300 V _{AC} / 85 - 275 V _{DC}	85 - 305 V _{AC}
Frequency	45 - 66 Hz, 15-18.5 Hz ¹⁾ / 0 Hz	45 - 66 Hz
Current (maximum) @ nominal input, full load	11.6 A _{RMS}	19.2 A _{RMS}
Protection	Fuse in both lines Varistor for transient protection Disconnect above 300 V _{AC/DC}	Fuse in both lines Varistor for transient protection Disconnect above 305 V _{AC}
OUTPUT DATA		
Voltage (default)	53.5 V _{DC}	
Voltage (adjustable range)	43.5 - 57.6 V _{DC}	
Power (maximum)	2000 W	3000 W
Power @ 85 V _{AC}	850 W	1380 W
Current (maximum) @ nominal input, full load	41.7 A	62.5 A
Ripple, 30MHz bandwidth	< 100 mV _{pp}	< 150 mV _{pp}
Psophometric noise	< 2 mV _{RMS}	< 2 mV _{RMS}
Static Voltage regulation	±0.5% for 10 - 100% load	
Dynamic Voltage regulation	±5.0% for 10-90% or 90-10% load variation, regulation time < 50ms	
Protection	Fuse, Short circuit proof, High temperature protection, Hot plug-in inrush current limiting	
OTHER SPECIFICATIONS		
Efficiency @ nominal input	96 %	
Isolation	3.0 kV _{AC} - input to output, 1.5 kV _{AC} - input to earth, 500 V _{DC} - output to earth	
Alarms: Red LED 'on'	Low mains shutdown, High and low temperature shutdown, Rectifier Failure, Overvoltage shutdown on output, Fan failure, Low voltage alarm, CAN bus failure	
Warnings: Yellow LED 'on'	Rectifier in power derate mode, Remote battery current limit activated, Input voltage out of range, flashing at overvoltage	
Normal (module running): Green LED 'on'		
Acoustic noise, full load @ T _{ambient} = 25°C full load @ T _{ambient} = 40°C	< 20 dBA < 56 dBA	< 40 dBA < 58 dBA
MTBF (Telcordia SR-332 Issue I method III (a))	>350 000 (@ T _{ambient} : 25 °C)	>300 000 (@ T _{ambient} : 25 °C)
Operating temperature	-40 to +75°C (-40 to +167°F), humidity 5 - 95% RH non-condensing	
Temperature de-rating above 45°C (110°F)	2000W to 1200W @ 75°C (167°F)	3000W to 2100W @ 75°C (167°F)
Storage temperature	-40 to +85°C (-40 to +185°F), humidity 0 - 99% RH non-condensing	
Dimensions[WxHxD] / Weight	109 x 41.5 x 327mm (4.25 x 1.69 x 13") / 1.95 kg (4.3 lbs)	
DESIGN STANDARDS		
Electrical safety	EN 60950-1:2006+A11:2009+A1:2010+A12:2011+A2:2013, UL 60950-1:2014, CSA C22.2 No.60950-1-07:2014	
EMC	EN 61000-6-1:2007, -6-2:2005, -6-3:2007 + A1:2011, -6-4:2007 + A1:2011, EN 61000-3-2 ETSI EN 300 386 V.2.1.1, Telcordia NEBS GR1089 CORE	
Marine	DNVGL-CG-0339 ²⁾	-
Environment	ETSI EN 300 019: 2-1 (Class 1.2) & 2-2 (Class 2.3) 2011/65/EU (RoHS) & 2012/19/EU (WEEE) Normal operating conditions as per IEC 62040-5-3:2016 clause 4.2. Other operating conditions as per IEC 62040-5-3:2016 clause 4.3, must be advised	

1) power de-rating, maximum 1000W @ 230Vac 16 2/3 Hz

2) only valid for part number 241115.105M

1) power de-rating, maximum 1000W @ 230Vac 16 2/3 Hz
2) only valid for part number 241115.105M

Specifications are subject to change without notice.

APPENDIX E

CONTRACTOR'S COMMUNICATIONS SYSTEMS SERVICES AGREEMENT AND SOFTWARE LICENSE AGREEMENT

Communications System Agreement

Motorola Solutions, Inc. ("Motorola") and City of Los Angeles Fire Department ("Customer") enter into this "Agreement," pursuant to which Customer will purchase and Motorola will sell the System, as described below. Motorola and Customer may be referred to individually as a "Party" and collectively as the "Parties." For good and valuable consideration, the Parties agree as follows:

Section 1 EXHIBITS

The exhibits listed below are incorporated into and made a part of this Agreement. In interpreting this Agreement and resolving any ambiguities, the main body of this Agreement takes precedence over the exhibits and any inconsistency between Exhibits A through D will be resolved in their listed order.

Exhibit A	Motorola "Software License Agreement"
Exhibit B	"Payment Schedule"
Exhibit C	Motorola Proposal dated _____, 201_, including the "Technical and Implementation Documents" such as (if applicable)
C-1	"System Description"
C-2	"Equipment List"
C-3	"Statement of Work"
C-4	"Acceptance Test Plan" or "ATP"
C-5	"Performance Schedule"
Exhibit D	"Service Terms and Conditions" (for maintenance and support services, if applicable)

Section 2 DEFINITIONS

Capitalized terms used in this Agreement have the following meanings:

- 2.1. "Acceptance Tests" means those tests described in the Acceptance Test Plan.
- 2.2. "Beneficial Use" means when Customer first uses the System or a Subsystem for operational purposes (excluding training or testing).
- 2.3. "Confidential Information" means any information that is disclosed in written, graphic, verbal, or machine-recognizable form, and is marked or identified at the time of disclosure as being confidential or its equivalent; or if the information is in verbal form, it is identified as confidential at the time of disclosure and is confirmed in writing within thirty (30) days of the disclosure. Confidential Information does not include any information that: is or becomes publicly known through no wrongful act of the receiving Party; is already known to the receiving Party without restriction when it is disclosed; is or becomes, rightfully and without breach of this Agreement, in the receiving Party's possession without any obligation restricting disclosure; is independently developed by the receiving Party without breach of this Agreement; or is explicitly approved for release by written authorization of the disclosing Party.
- 2.4. "Contract Price" means the price for the System, excluding applicable sales or similar taxes and freight charges.
- 2.5. "Effective Date" means that date upon which the last Party executes this Agreement.
- 2.6. "Equipment" means the equipment that Customer purchases from Motorola under this Agreement.
- 2.7. "Force Majeure" means an event, circumstance, or act of a third party that is beyond a Party's reasonable control (e.g., an act of God, an act of the public enemy, an act of a government entity, strikes or other labor disturbances, hurricanes, earthquakes, fires, floods, epidemics, embargoes, war, and riots).
- 2.8. "Infringement Claim" means a third party claim alleging that the Equipment manufactured by Motorola or the Motorola Software directly infringes a United States patent or copyright.

- 2.9. "Motorola Software" means Software that Motorola or its affiliated company owns.
- 2.10. "Non-Motorola Software" means Software that another party owns.
- 2.11. "Open Source Software" means software with either freely obtainable source code, license for modification, or permission for free distribution.
- 2.12. "Proprietary Rights" means the patents, patent applications, inventions, copyrights, trade secrets, trademarks, trade names, mask works, know-how, and other intellectual property rights in and to the Equipment and Software, including those created or produced by Motorola under this Agreement and any corrections, bug fixes, enhancements, updates or modifications to or derivative works from the Software whether made by Motorola or another party.
- 2.13. "Software" means the Motorola Software and Non-Motorola Software, in object code format that is furnished with the System or Equipment.
- 2.14. "Specifications" means the functionality and performance requirements that are described in the Technical and Implementation Documents.
- 2.15. "Subsystem" means a major part of the System that performs specific functions or operations. Subsystems are described in the Technical and Implementation Documents.
- 2.16. "System" means the Equipment, Software, and incidental hardware and materials that are combined together into an integrated system; the System is described in the Technical and Implementation Documents.
- 2.17. "System Acceptance" means the Acceptance Tests have been successfully completed.
- 2.18. "Warranty Period" means one (1) year from the date of System Acceptance or Beneficial Use, whichever occurs first. For non-system purchase and sale transactions (such as the purchase and sale of products only or products plus incidental services), the "Warranty Period" means one (1) year from the date of shipment.

Section 3 SCOPE OF AGREEMENT AND TERM

- 3.1. SCOPE OF WORK. Motorola will provide, install and test the System, and perform its other contractual responsibilities, all in accordance with this Agreement. Customer will perform its contractual responsibilities in accordance with this Agreement.
- 3.2. CHANGE ORDERS. Either Party may request changes within the general scope of this Agreement. Neither Party is obligated to perform requested changes unless both Parties execute a written change order.
- 3.3. TERM. Unless terminated in accordance with other provisions of this Agreement or extended by mutual agreement of the Parties, the term of this Agreement begins on the Effective Date and continues until the date of expiration of (i) the Warranty Period or (ii) the rights under Section 3.4 below, whichever occurs last.
- 3.4. ADDITIONAL EQUIPMENT OR SOFTWARE. For three (3) years after the Effective Date, Customer may order additional Equipment or Software if it is then available and related services. Each order must refer to this Agreement and must specify the pricing and delivery terms. Notwithstanding any additional or contrary terms in the order, the applicable provisions of this Agreement (except for pricing, delivery, passage of title and risk of loss to Equipment, warranty commencement, and payment terms) will govern the purchase and sale of the additional Equipment or Software. Title and risk of loss to additional Equipment will pass at shipment, and payment is due within thirty (30) days after the invoice date. Motorola will send Customer an invoice as the additional Equipment is shipped or Software is licensed.

Alternatively, Customer may register with and place orders through Motorola Online ("MOL"), and this Agreement will be the "Underlying Agreement" for those MOL transactions rather than the MOL On-Line Terms and Conditions of Sale. MOL information may be found at <https://businessonline.motorola.com> and the MOL telephone number is (800) 814-0601.

3.5. **MAINTENANCE SERVICE.** During the Warranty Period, in addition to warranty services, Motorola will provide maintenance services for the Equipment and support for the Motorola Software. Those services and support are included in the Contract Price. If Customer wishes to purchase additional maintenance and support services for the Equipment either during the Warranty Period or after the Warranty Period, the description of and pricing for the services will be set forth in a separate document. If Customer wishes to purchase extended support for the Motorola Software after the Warranty Period, it may do so by ordering software maintenance or upgrade services. Unless otherwise agreed by the Parties in writing, the terms and conditions applicable to the maintenance, support or software services will be Motorola's standard Service Terms and Conditions, together with the appropriate statements of work.

3.6. **MOTOROLA SOFTWARE.** Any Motorola Software, including subsequent releases, is licensed to Customer solely in accordance with the Software License Agreement. Customer hereby accepts and agrees to abide by all of the terms and restrictions of the Software License Agreement.

3.7. **NON-MOTOROLA SOFTWARE.** Any Non-Motorola Software is licensed to Customer in accordance with the standard license, terms, and restrictions of the copyright owner on the Effective Date unless the copyright owner has granted to Motorola the right to sublicense the Non-Motorola Software pursuant to the Software License Agreement, in which case it applies and the copyright owner will have all of Licensor's rights and protections under the Software License Agreement. Non-Motorola Software may include Open Source Software. All Open Source Software is licensed to Customer in accordance with, and Customer agrees to abide by, the provisions of the standard license of the copyright owner and not the Software License Agreement.

3.8. **SUBSTITUTIONS.** At no additional cost to Customer, Motorola may substitute any Equipment, Software, or services to be provided by Motorola, if the substitute meets or exceeds the Specifications and is of equivalent or better quality to the Customer. Any substitution will be reflected in a change order.

Section 4 PERFORMANCE SCHEDULE

The Parties will perform their respective responsibilities in accordance with the Performance Schedule. By executing this Agreement, Customer authorizes Motorola to proceed with contract performance.

Section 5 CONTRACT PRICE, PAYMENT AND INVOICING

5.1. **CONTRACT PRICE.** The Contract Price in U.S. dollars is \$_____. Motorola has priced the services, Software, and Equipment as an integrated system, and a reduction in product quantities or services may affect the overall Contract Price, including any discounts.

5.2. **INVOICING AND PAYMENT.** Motorola will submit invoices to Customer according to the Payment Schedule. Customer will make payments to Motorola within thirty (30) days after the date of each invoice in the form of a wire transfer, check, or cashier's check from a U.S. financial institution. Overdue invoices will bear simple interest at the maximum allowable rate. For reference, the Federal Tax Identification Number for Motorola Solutions, Inc. is 36-1115800.

5.3. **FREIGHT, TITLE, AND RISK OF LOSS.** Motorola will pre-pay and add all freight charges to the invoices. Title to the Equipment will pass to Customer upon shipment. Title to Software will not pass to Customer at any time. Risk of loss will pass to Customer upon delivery of the Equipment to the Customer. Motorola will pack and ship all Equipment in accordance with good commercial practices.

5.4. INVOICING AND SHIPPING ADDRESSES. Invoices will be sent to the Customer at the following address: _____

The address which is the ultimate destination where the Equipment will be delivered to Customer is: _____

The Equipment will be shipped to the Customer at the following address (insert if this information is known): _____

Customer may change this information by giving written notice to Motorola.

Section 6 SITES AND SITE CONDITIONS

6.1. ACCESS TO SITES. Customer will provide a designated project manager; all necessary land use, construction and building permits, zoning variances, licenses, and any other approvals that are necessary to develop or use the sites and mounting locations; and access to the work sites or vehicles identified in the Technical and Implementation Documents as reasonably requested by Motorola so that it may perform its duties in accordance with the Performance Schedule and Statement of Work. Motorola may assist Customer in the local building permit process.

6.2. SITE CONDITIONS. Customer will ensure that all work sites it provides will be safe, secure, and in compliance with all applicable industry and OSHA standards. To the extent applicable and unless the Statement of Work states to the contrary, Customer will ensure that these work sites have adequate: physical space; air conditioning and other environmental conditions; adequate and appropriate electrical power outlets, distribution, equipment and connections; and adequate telephone or other communication lines (including modem access and adequate interfacing networking capabilities), all for the installation, use and maintenance of the System. Before installing the Equipment or Software at a work site, Motorola may inspect the work site and advise Customer of any apparent deficiencies or non-conformities with the requirements of this Section. This Agreement is predicated upon normal soil conditions as defined by the version of E.I.A. standard RS-222 in effect on the Effective Date.

6.3. SITE ISSUES. If a Party determines that the sites identified in the Technical and Implementation Documents are no longer available or desired, or if subsurface, structural, adverse environmental or latent conditions at any site differ from those indicated in the Technical and Implementation Documents, the Parties will promptly investigate the conditions and will select replacement sites or adjust the installation plans and Specifications as necessary. If change in sites or adjustment to the installation plans and Specifications causes a change in the cost or time to perform, the Parties will equitably amend the Contract Price, Performance Schedule, or both, by a change order.

Section 7 [RESERVED]

Section 8 SYSTEM ACCEPTANCE

8.1. COMMENCEMENT OF ACCEPTANCE TESTING. Motorola will provide to Customer at least ten (10) days notice before the Acceptance Tests commence. System testing will occur only in accordance with the Acceptance Test Plan.

8.2. SYSTEM ACCEPTANCE. System Acceptance will occur upon successful completion of the Acceptance Tests. Upon System Acceptance, the Parties will memorialize this event by promptly executing a System Acceptance Certificate. If the Acceptance Test Plan includes separate tests for individual Subsystems or phases of the System, acceptance of the individual Subsystem or phase will occur upon the successful completion of the Acceptance Tests for the Subsystem or phase, and the Parties will promptly execute an acceptance certificate for the Subsystem or phase. If Customer believes the System has failed the completed Acceptance Tests, Customer will provide to Motorola a written notice

that includes the specific details of the failure. If Customer does not provide to Motorola a failure notice within thirty (30) days after completion of the Acceptance Tests, System Acceptance will be deemed to have occurred as of the completion of the Acceptance Tests. Minor omissions or variances in the System that do not materially impair the operation of the System will not postpone System Acceptance or Subsystem acceptance, but will be corrected according to a mutually agreed punch list schedule.

8.3. BENEFICIAL USE. Motorola's ability to perform its implementation and testing responsibilities may be impeded if Customer begins using the System before System Acceptance. Therefore, Customer will not commence Beneficial Use before System Acceptance without Motorola's prior written authorization, which will not be unreasonably withheld. Motorola is not responsible for System performance deficiencies that occur during unauthorized Beneficial Use. Upon commencement of Beneficial Use, Customer assumes responsibility for the use and operation of the System.

8.4 FINAL PROJECT ACCEPTANCE. Final Project Acceptance will occur after System Acceptance when all deliverables and other work have been completed. When Final Project Acceptance occurs, the Parties will promptly memorialize this final event by means of a Final Project Acceptance Certificate.

Section 9 REPRESENTATIONS AND WARRANTIES

9.1. SYSTEM FUNCTIONALITY. Motorola represents that the System will perform in accordance with the Specifications in all material respects. Upon System Acceptance or Beneficial Use, whichever occurs first, this System functionality representation is fulfilled. Motorola is not responsible for System performance deficiencies that are caused by ancillary equipment not furnished by Motorola which is attached to or used in connection with the System or for reasons or parties beyond Motorola's control.

9.2. EQUIPMENT WARRANTY. During the Warranty Period, Motorola warrants that the Equipment under normal use and service will be free from material defects in materials and workmanship. If System Acceptance is delayed beyond six (6) months after shipment of the Equipment by events or causes within Customer's control, this warranty expires eighteen (18) months after the shipment of the Equipment.

9.3. SOFTWARE WARRANTY. Unless otherwise stated in the Software License Agreement, during the Warranty Period, Motorola warrants the Software in accordance with the terms of the Software License Agreement and the provisions of this Section 9 that are applicable to the Software. If System Acceptance is delayed beyond six (6) months after shipment of the Software by events or causes within Customer's control, this warranty expires eighteen (18) months after the shipment of the Software.

9.4. EXCLUSIONS TO EQUIPMENT AND MOTOROLA SOFTWARE WARRANTIES. These warranties do not apply to: (i) defects or damage resulting from: use of the Equipment or Software in other than its normal, customary, and authorized manner; accident, liquids, neglect, or acts of God; testing, maintenance, disassembly, repair, installation, alteration, modification, or adjustment not provided or authorized in writing by Motorola; Customer's failure to comply with all applicable industry and OSHA standards; (ii) breakage of or damage to antennas unless caused directly by defects in material or workmanship; (iii) Equipment that has had the serial number removed or made illegible; (iv) batteries (because they carry their own separate limited warranty) or consumables; (v) freight costs to ship Equipment to the repair depot; (vi) scratches or other cosmetic damage to Equipment surfaces that does not affect the operation of the Equipment; and (vii) normal or customary wear and tear.

9.5. WARRANTY CLAIMS. To assert a warranty claim, Customer must notify Motorola in writing of the claim before the expiration of the Warranty Period. Upon receipt of this notice, Motorola will investigate the warranty claim. If this investigation confirms a valid warranty claim, Motorola will (at its option and at no additional charge to Customer) repair the defective Equipment or Software, replace it with the same or equivalent product, or refund the price of the defective Equipment or Software. That action will be the full extent of Motorola's liability for the warranty claim. Repaired or replaced product is warranted for the balance of the original applicable warranty period. All replaced products or parts will become the property of Motorola.

9.6. ORIGINAL END USER IS COVERED. These express limited warranties are extended by Motorola to the original user purchasing the System for commercial, industrial, or governmental use only, and are not assignable or transferable.

9.7. DISCLAIMER OF OTHER WARRANTIES. THESE WARRANTIES ARE THE COMPLETE WARRANTIES FOR THE EQUIPMENT AND SOFTWARE PROVIDED UNDER THIS AGREEMENT AND ARE GIVEN IN LIEU OF ALL OTHER WARRANTIES. MOTOROLA DISCLAIMS ALL OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

Section 10 DELAYS

10.1. FORCE MAJEURE. Neither Party will be liable for its non-performance or delayed performance if caused by a Force Majeure. A Party that becomes aware of a Force Majeure that will significantly delay performance will notify the other Party promptly after it discovers the Force Majeure. If a Force Majeure occurs, the Parties will execute a change order to extend the Performance Schedule for a time period that is reasonable under the circumstances.

10.2. PERFORMANCE SCHEDULE DELAYS CAUSED BY CUSTOMER. If Customer (including its other contractors) delays the Performance Schedule, the Parties will execute a change order to extend the Performance Schedule and, if requested, compensate Motorola for all reasonable charges incurred because of the delay. Delay charges may include costs incurred by Motorola or its subcontractors for additional freight, warehousing and handling of Equipment; extension of the warranties; travel; suspending and re-mobilizing the work; additional engineering, project management, and standby time calculated at then current rates; and preparing and implementing an alternative implementation plan.

Section 11 DISPUTES

The Parties will use the following procedure to address any dispute arising under this Agreement (a "Dispute").

11.1. GOVERNING LAW. This Agreement will be governed by and construed in accordance with the laws of the State in which the System is installed.

11.2. NEGOTIATION. Either Party may initiate the Dispute resolution procedures by sending a notice of Dispute ("Notice of Dispute"). The Parties will attempt to resolve the Dispute promptly through good faith negotiations, including timely escalation of the Dispute to executives who have authority to settle the Dispute and who are at a higher level of management than the persons with direct responsibility for the matter and direct communication between the executives. If the Dispute has not been resolved within ten (10) days from the Notice of Dispute, the Parties will proceed to mediation.

11.3. MEDIATION. The Parties will choose an independent mediator within thirty (30) days of a notice to mediate from either Party ("Notice of Mediation"). A Party may not unreasonably withhold consent to the mediator selection. If the Parties are unable to agree upon a mediator, either Party may request that American Arbitration Association nominate a mediator. Each Party will bear its own costs of mediation, but the Parties will share the cost of the mediator equally. Each Party will participate in the mediation in good faith and will be represented at the mediation by an executive with authority to settle the Dispute.

11.4. LITIGATION, VENUE AND JURISDICTION. If a Dispute remains unresolved for sixty (60) days after the Notice of Mediation, either Party may submit the Dispute to a court of competent jurisdiction in the state in which the System is installed. Each Party agrees to submit to the exclusive jurisdiction of the courts in such state over any claim or matter arising under or in connection with this Agreement.

11.5. CONFIDENTIALITY. All communications pursuant to subsections 11.2 and 11.3 will be treated as compromise and settlement negotiations for purposes of applicable rules of evidence and any additional confidentiality protections provided by applicable law. The use of these Dispute resolution

procedures will not be construed under the doctrines of laches, waiver or estoppel to affect adversely the rights of either Party.

Section 12 DEFAULT AND TERMINATION

12.1 **DEFAULT BY A PARTY.** If either Party fails to perform a material obligation under this Agreement, the other Party may consider the non-performing Party to be in default (unless a Force Majeure causes the failure) and may assert a default claim by giving the non-performing Party a written and detailed notice of default. Except for a default by Customer for failing to pay any amount when due under this Agreement which must be cured immediately, the defaulting Party will have thirty (30) days after receipt of the notice of default to either cure the default or, if the default is not curable within thirty (30) days, provide a written cure plan that is reasonably acceptable to the other Party. The defaulting Party will begin implementing the cure plan immediately after receipt of notice by the other Party that it approves the plan.

12.2. **FAILURE TO CURE.** If a defaulting Party fails to cure the default as provided above in Section 12.1, unless otherwise agreed in writing, the non-defaulting Party may terminate any unfulfilled portion of this Agreement. In the event of termination for default, the defaulting Party will promptly return to the non-defaulting Party any of its Confidential Information. If Customer is the non-defaulting Party, terminates this Agreement as permitted by this Section, and completes the System through a third party, Customer may as its exclusive remedy recover from Motorola reasonable costs incurred to complete the System to a capability not exceeding that specified in this Agreement less the unpaid portion of the Contract Price. Customer will mitigate damages and provide Motorola with detailed invoices substantiating the charges.

Section 13 INDEMNIFICATION

13.1. **GENERAL INDEMNITY BY MOTOROLA.** Motorola will indemnify and hold Customer harmless from any and all liability, expense, judgment, suit, cause of action, or demand for personal injury, death, or direct damage to tangible property which may accrue against Customer to the extent it is caused by the negligence of Motorola, its subcontractors, or their employees or agents, while performing their duties under this Agreement, if Customer gives Motorola prompt, written notice of any the claim or suit. Customer will cooperate with Motorola in its defense or settlement of the claim or suit. This section sets forth the full extent of Motorola's general indemnification of Customer from liabilities that are in any way related to Motorola's performance under this Agreement.

13.2. **GENERAL INDEMNITY BY CUSTOMER.** [Intentionally Omitted.]

13.3. **PATENT AND COPYRIGHT INFRINGEMENT.**

13.3.1. Motorola will defend at its expense any suit brought by a third-party claim against Customer to the extent it is based on an Infringement Claim. Motorola's duties to defend and indemnify are conditioned upon: Customer promptly notifying Motorola in writing of the Infringement Claim; Motorola having sole control of the defense of the suit and all negotiations for its settlement or compromise; and Customer providing to Motorola cooperation and, if requested by Motorola, reasonable assistance in the defense of the Infringement Claim. In addition to Motorola's obligation to defend, and subject to the same conditions, Motorola will pay all damages finally awarded against Customer by a court of competent jurisdiction for an Infringement Claim or agreed to, in writing, by Motorola in settlement of an Infringement Claim.

13.3.2. If an Infringement Claim occurs, or in Motorola's opinion is likely to occur, Motorola may at its option and expense: (a) procure for Customer the right to continue using the allegedly infringing product; (b) replace or modify the product so that it becomes non-infringing while providing functionally equivalent performance; or (c) accept the return of the product and grant Customer a credit for the product, less a reasonable charge for depreciation. The depreciation amount will be calculated based upon generally accepted accounting standards.

13.3.3. Motorola will have no duty to defend or indemnify for any Infringement Claim that is based upon: (a) the combination of the product with any software, apparatus or device not furnished by Motorola; (b)

the use of ancillary equipment or software not furnished by Motorola and that is attached to or used in connection with the product; (c) the product is designed or manufactured in accordance with Customer's designs, specifications, guidelines or instructions, if the alleged infringement would not have occurred without such designs, specifications, guidelines or instructions; (d) a modification of the product by a party other than Motorola; (e) use of the product in a manner for which it was not designed or that is inconsistent with the terms of this Agreement; or (f) the failure by Customer to install an enhancement release to the Software that is intended to correct the claimed infringement. In no event will Motorola's liability resulting from its indemnity obligation to Customer extend in any way to royalties payable on a per use basis or the Customer's revenues, or any royalty basis other than a reasonable royalty based upon revenue derived by Motorola from Customer from sales or license of the infringing product.

13.3.4. This Section 13 provides Customer's sole and exclusive remedies and Motorola's entire liability in the event of an Infringement Claim. Customer has no right to recover and Motorola has no obligation to provide any other or further remedies, whether under another provision of this Agreement or any other legal theory or principle, in connection with an Infringement Claim.

Section 14 LIMITATION OF LIABILITY

Except for personal injury or death, Motorola's total liability, regardless of the cause of action or theory of liability, will be limited to the direct damages recoverable under law, but not to exceed the price of the Equipment, Software, or services with respect to which losses or damages are claimed. ALTHOUGH THE PARTIES ACKNOWLEDGE THE POSSIBILITY OF SUCH LOSSES OR DAMAGES, THEY AGREE THAT MOTOROLA WILL NOT BE LIABLE FOR ANY COMMERCIAL LOSS; INCONVENIENCE; LOSS OF USE, TIME, DATA, GOOD WILL, REVENUES, PROFITS OR SAVINGS; OR OTHER SPECIAL, INCIDENTAL, INDIRECT, OR CONSEQUENTIAL DAMAGES IN ANY WAY RELATED TO OR ARISING FROM THIS AGREEMENT, THE SALE OR USE OF THE EQUIPMENT OR SOFTWARE, OR THE PERFORMANCE OF SERVICES BY MOTOROLA PURSUANT TO THIS AGREEMENT. This limitation of liability provision survives the expiration or termination of the Agreement and applies notwithstanding any contrary provision.

Section 15 CONFIDENTIALITY AND PROPRIETARY RIGHTS

15.1. CONFIDENTIAL INFORMATION. During the term of this Agreement, the Parties may provide each other with Confidential Information. Subject to the requirements of any applicable public records law, each Party will: maintain the confidentiality of the other Party's Confidential Information and not disclose it to any third party, except as authorized by the disclosing Party in writing or as required by a court of competent jurisdiction; restrict disclosure of the Confidential Information to its employees who have a "need to know" and not copy or reproduce the Confidential Information; take necessary and appropriate precautions to guard the confidentiality of the Confidential Information, including informing its employees who handle the Confidential Information that it is confidential and is not to be disclosed to others, but these precautions will be at least the same degree of care that the receiving Party applies to its own confidential information and will not be less than reasonable care; and use the Confidential Information only in furtherance of the performance of this Agreement. Confidential Information is and will at all times remain the property of the disclosing Party, and no grant of any proprietary rights in the Confidential Information is given or intended, including any express or implied license, other than the limited right of the recipient to use the Confidential Information in the manner and to the extent permitted by this Agreement.

15.2. PRESERVATION OF MOTOROLA'S PROPRIETARY RIGHTS. Motorola, the third party manufacturer of any Equipment, and the copyright owner of any Non-Motorola Software own and retain all of their respective Proprietary Rights in the Equipment and Software, and nothing in this Agreement is intended to restrict their Proprietary Rights. All intellectual property developed, originated, or prepared by Motorola in connection with providing to Customer the Equipment, Software, or related services remain vested exclusively in Motorola, and this Agreement does not grant to Customer any shared development rights of intellectual property. Except as explicitly provided in the Software License Agreement, Motorola does not grant to Customer, either directly or by implication, estoppel, or otherwise, any right, title or interest in Motorola's Proprietary Rights. Customer will not modify, disassemble, peel components,

decompile, otherwise reverse engineer or attempt to reverse engineer, derive source code or create derivative works from, adapt, translate, merge with other software, reproduce, distribute, sublicense, sell or export the Software, or permit or encourage any third party to do so. The preceding sentence does not apply to Open Source Software which is governed by the standard license of the copyright owner.

Section 16 GENERAL

16.1. **TAXES.** The Contract Price does not include any excise, sales, lease, use, property, or other taxes, assessments or duties, all of which will be paid by Customer except as exempt by law. If Motorola is required to pay any of these taxes, Motorola will send an invoice to Customer and Customer will pay to Motorola the amount of the taxes (including any interest and penalties) within thirty (30) days after the invoice date. Customer will be solely responsible for reporting the Equipment for personal property tax purposes, and Motorola will be solely responsible for reporting taxes on its income or net worth.

16.2. **ASSIGNABILITY AND SUBCONTRACTING.** Except as provided herein, neither Party may assign this Agreement or any of its rights or obligations hereunder without the prior written consent of the other Party, which consent will not be unreasonably withheld. Any attempted assignment, delegation, or transfer without the necessary consent will be void. Notwithstanding the foregoing, Motorola may assign without the prior consent of Customer this Agreement to any of its affiliates or as part of a major corporate reorganization or restructuring, or its right to receive payment. Motorola may subcontract any of the work, but subcontracting will not relieve Motorola of its duties under this Agreement.

16.3. **WAIVER.** Failure or delay by either Party to exercise a right or power under this Agreement will not be a waiver of the right or power. For a waiver of a right or power to be effective, it must be in a writing signed by the waiving Party. An effective waiver of a right or power will not be construed as either a future or continuing waiver of that same right or power, or the waiver of any other right or power.

16.4. **SEVERABILITY.** If a court having jurisdiction finds any part of this Agreement to be invalid or unenforceable, that part will be severed and the remainder will continue in full force and effect.

16.5. **INDEPENDENT CONTRACTORS.** Each Party will perform its duties under this Agreement as an independent contractor. The Parties and their personnel will not be considered to be employees or agents of the other Party. Nothing in this Agreement will be interpreted as granting either Party the right or authority to make commitments of any kind for the other. This Agreement will not constitute, create, or be interpreted as a joint venture, partnership or formal business organization of any kind.

16.6. **HEADINGS AND SECTION REFERENCES.** The section headings in this Agreement are inserted only for convenience and are not to be construed as part of this Agreement or as a limitation of the scope of the particular section to which the heading refers. This Agreement will be fairly interpreted in accordance with its terms and conditions and not for or against either Party.

16.7. **ENTIRE AGREEMENT.** This Agreement, including all Exhibits, constitutes the entire agreement of the Parties regarding the subject matter of the Agreement and supersedes all previous agreements, proposals, and understandings, whether written or oral, relating to this subject matter. This Agreement may be executed in multiple counterparts, each of which shall be an original and all of which shall constitute one and the same instrument. A facsimile copy or computer image of a signature shall be treated as and shall have the same effect as an original signature. In addition, a true and correct facsimile copy or computer image of this Agreement shall be treated as and shall have the same effect as an original signed copy of this document. This Agreement may be amended or modified only by a written instrument signed by authorized representatives of both Parties. The preprinted terms and conditions found on any Customer purchase order, acknowledgment or other form will not be considered an amendment or modification of this Agreement, even if a representative of each Party signs that document.

16.8. **NOTICES.** Notices required under this Agreement to be given by one Party to the other must be in writing and either personally delivered or sent to the address shown below by certified mail, return

receipt requested and postage prepaid (or by a recognized courier service, such as Federal Express or UPS), or by facsimile with correct answerback received, and will be effective upon receipt:

Motorola Solutions, Inc.

Attn: _____

Customer

Attn: _____

16.9. COMPLIANCE WITH APPLICABLE LAWS. Each Party will comply with all applicable federal, state, and local laws, regulations and rules concerning the performance of this Agreement or use of the System. Customer will obtain and comply with all Federal Communications Commission ("FCC") licenses and authorizations required for the installation, operation and use of the System before the scheduled installation of the Equipment. Although Motorola might assist Customer in the preparation of its FCC license applications, neither Motorola nor any of its employees is an agent or representative of Customer in FCC matters.

16.10. AUTHORITY TO EXECUTE AGREEMENT. Each Party represents that it has obtained all necessary approvals, consents and authorizations to enter into this Agreement and to perform its duties under this Agreement; the person executing this Agreement on its behalf has the authority to do so; upon execution and delivery of this Agreement by the Parties, it is a valid and binding contract, enforceable in accordance with its terms; and the execution, delivery, and performance of this Agreement does not violate any bylaw, charter, regulation, law or any other governing authority of the Party.

16.11. SURVIVAL OF TERMS. The following provisions will survive the expiration or termination of this Agreement for any reason: Section 3.6 (Motorola Software); Section 3.7 (Non-Motorola Software); if any payment obligations exist, Sections 5.1 and 5.2 (Contract Price and Invoicing and Payment); Subsection 9.7 (Disclaimer of Implied Warranties); Section 11 (Disputes); Section 14 (Limitation of Liability); and Section 15 (Confidentiality and Proprietary Rights); and all of the General provisions in Section 16.

The Parties hereby enter into this Agreement as of the Effective Date.

Motorola Solutions, Inc.

Customer

By: _____

Name: _____

Title: _____

Date: _____

By: _____

Name: _____

Title: _____

Date: _____

Exhibit A

SOFTWARE LICENSE AGREEMENT

This Exhibit A Software License Agreement ("Agreement") is between Motorola Solutions, Inc., ("Motorola"), and _____ ("Licensee").

For good and valuable consideration, the parties agree as follows:

Section 1 DEFINITIONS

1.1 "Designated Products" means products provided by Motorola to Licensee with which or for which the Software and Documentation is licensed for use.

1.2 "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).

1.3 "Open Source Software" means software with either freely obtainable source code, license for modification, or permission for free distribution.

1.4 "Open Source Software License" means the terms or conditions under which the Open Source Software is licensed.

1.5 "Primary Agreement" means the agreement to which this exhibit is attached.

1.6 "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 compromised, manipulated or stolen or the system damaged.

1.7 "Software" (i) means proprietary software in object code format, and adaptations, translations, de-compilations, disassemblies, emulations, or derivative works of such software; (ii) means any modifications, enhancements, new versions and new releases of the software provided by Motorola; and (iii) may contain one or more items of software owned by a third party supplier. The term "Software" does not include any third party software provided under separate license or third party software not licensable under the terms of this Agreement.

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 the terms and conditions of the license Motorola is providing to Licensee, and Licensee's use of the Software and Documentation.

Section 3 GRANT OF LICENSE

3.1. Subject to the provisions of this Agreement and the payment of applicable license fees, Motorola grants to Licensee a personal, limited, non-transferable (except as permitted in Section 7) and non-exclusive license under Motorola's copyrights and Confidential Information (as defined in the Primary Agreement) embodied in the Software to use the Software, in object code form, and the Documentation solely in connection with Licensee's use of the Designated Products. This Agreement does not grant any rights to source code.

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.

Section 4 LIMITATIONS ON USE

4.1. Licensee may use the Software only for Licensee's internal business purposes and only in accordance with the Documentation. 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 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 one copy of Software to be used solely for archival, back-up, or disaster recovery purposes; *provided* that Licensee may not operate that 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 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 one other device. Licensee may temporarily transfer Software installed on a Designated Product to another device if the Designated Product is inoperable or malfunctioning, if Licensee provides written notice to Motorola of the temporary transfer and identifies the device on which the Software is transferred. Temporary transfer of the Software to another device must be discontinued when the original Designated Product is returned to operation and the Software must be removed from the other device. Licensee must provide prompt written notice to Motorola at the time temporary transfer is discontinued.

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. For any Software that is licensed on the basis of the number of users, 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, Documentation or related services, 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. Unless the Warranty Period is otherwise stated in the Primary Agreement, the Software warranty will be for a period of ninety (90) days from shipment. If Licensee is not in breach of any of its obligations under this Agreement, Motorola warrants that the unmodified Software, when used properly and in accordance with the Documentation and this Agreement, will be free from a reproducible defect that eliminates the functionality or successful operation of a feature critical to the primary functionality or successful operation of the Software. Whether a defect occurs will be determined by Motorola solely with reference to the Documentation. Motorola does not warrant that Licensee's use of the Software or the Designated Products will be uninterrupted, error-free, completely free of Security Vulnerabilities, or that the Software or the Designated Products will meet Licensee's particular requirements. Motorola makes no representations or warranties with respect to any third party software included in the Software.

6.2 Motorola's sole obligation to Licensee and Licensee's exclusive remedy under this warranty is to use reasonable efforts to remedy any material Software defect covered by this warranty. These efforts will involve either replacing the media or attempting to correct significant, demonstrable program or documentation errors or Security Vulnerabilities. If Motorola cannot correct the defect within a reasonable time, then at Motorola's option, Motorola will replace the defective Software with functionally-equivalent Software, license to Licensee substitute Software which will accomplish the same objective, or terminate the license and refund the Licensee's paid license fee.

6.3. Warranty claims are described in the Primary Agreement.

6.4. 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 of condition, title, non-infringement, merchantability, or fitness for a particular purpose or use by Licensee, whether arising by law, by reason of custom or usage of trade, or by course of dealing. In addition, Motorola disclaims any warranty to any person other than Licensee 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. If the Designated Products are Motorola's radio products and Licensee transfers ownership of the Motorola radio products to a third party, Licensee may assign its right to use the Software (other than RSS and Motorola's FLASHport® software) which is embedded in or furnished for use with the radio products and the related Documentation; *provided* that Licensee transfers all copies of the 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 for the life of the Designated Products with which or for which the Software and Documentation have been provided by Motorola, unless Licensee breaches this Agreement, in which case this Agreement and Licensee's right to use the Software and Documentation may be terminated immediately upon notice by Motorola.

8.2 Within thirty (30) days after termination of this Agreement, Licensee must certify in writing to Motorola that all copies of the Software have been removed or deleted from the Designated Products and that all copies of the Software and Documentation have been returned to Motorola or destroyed by Licensee and are no longer in use by Licensee.

8.3 Licensee acknowledges that Motorola made a considerable investment of resources in the development, marketing, and distribution of the Software and Documentation and that Licensee's breach of this Agreement will result in irreparable harm to Motorola for which monetary damages would be inadequate. If Licensee breaches this Agreement, Motorola may terminate this Agreement and be entitled to all available remedies at law or in equity (including immediate injunctive relief and repossession of all non-embedded Software and associated Documentation unless Licensee is a Federal agency of the United States Government).

Section 9 UNITED STATES GOVERNMENT LICENSING PROVISIONS

This Section applies 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 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

The Limitation of Liability provision is described in the Primary Agreement.

Section 12 NOTICES

Notices are described in 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 LAWS. 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 AND SUBCONTRACTING. Motorola may assign its rights or subcontract its obligations under this Agreement, or encumber or sell its rights in any Software, without prior notice to or consent of Licensee.

13.4. GOVERNING LAW. This Agreement is governed by the laws of the United States to the extent that they apply and otherwise by the internal substantive laws of the State to which the Software is shipped if Licensee is a sovereign government entity, or the internal substantive laws of the State of Illinois if Licensee is not a sovereign government entity. The terms of the U.N. Convention on Contracts for the International Sale of Goods do not apply. In the event that the Uniform Computer Information Transaction Act, any version of this Act, or a substantially similar law (collectively "UCITA") becomes applicable to a party's performance under this Agreement, UCITA does not govern any aspect of this Agreement or any license granted under this Agreement, or any of the parties' rights or obligations under this Agreement. The governing law will be that in effect prior to the applicability of UCITA.

13.5. THIRD PARTY BENEFICIARIES. This Agreement is entered into solely for the benefit of Motorola and Licensee. No third party has the right to make any claim or assert any right under this Agreement, and no third party is deemed a beneficiary of this Agreement. Notwithstanding the foregoing, any licensor or supplier of third party software included in the Software will be a direct and intended third party beneficiary of this 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, the parties agree that this Exhibit prevails, but only with respect to the specific subject matter of this Exhibit.

13.8 SECURITY. Motorola uses reasonable means in the design and writing of its own Software and the acquisition of third party Software to limit Security Vulnerabilities. While no software can be guaranteed to be free from Security Vulnerabilities, if a Security Vulnerability is discovered, Motorola will take the steps set forth in Section 6 of this Agreement.