700 MHZ P25 PHASE II TRUNKED SIMULCAST SYSTEM IMPLEMENTATION

MOTOROLA

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Exhibit C-2

Exhibit C-3

PROFESSIONAL SERVICES AGREEMENT

Professional Services Agreement is included on the pages that follow.

PROFESSIONAL SERVICES AGREEMENT

Motorola Solutions, Inc. ("Motorola") and Cochise County, a political subdivision of the State of Arizona ("Customer") enter into this "Agreement," pursuant to which Customer will purchase and Motorola will sell the Services, 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 DEFINITIONS

Capitalized terms used in this Agreement have the following meanings:

1.1. "Administrative User Credentials" means an account that has total access over the operating system, files, end user accounts and passwords at either the System level or box level. Customer's personnel with access to the Administrative User Credentials may be referred to as the Administrative User.

1.2 "Beneficial Use" means when Customer first uses the System or a Subsystem for operational purposes (excluding training or testing).

1.3 "Confidential Information" means any information that is disclosed in written, graphic, verbal, or machine-recognizable form, and is marked, designated, 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.

1.4. "Contract Price" means the price for the Services and Deliverables, excluding any applicable sales or similar taxes, as set forth in Section 3.1.

1.5. "Deliverables" means all written information (such as reports, specifications, designs, plans, drawings, or other technical or business information) that Motorola prepares for Customer in the performance of the Services and is obligated to provide to Customer under this Agreement. The Deliverables, if any, are more fully described in the Statement of Work.

1.6. "Effective Date" means that date upon which the last party executes this Agreement.

1.7. "Equipment" means the equipment that is identified in Exhibit C-4.

1.8. "Force Majeure" which means an event, circumstance, or act that is beyond a party's reasonable control, such as 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, riots, or any other similar cause.

1.9. "Proprietary Rights" means the patents, patent applications, inventions, copyrights, trade secrets, trademarks, trade names, mask works, know-how, ideas and concepts, processes, methodologies, tools, techniques, and other intellectual property rights.

1.10. "Services" means those professional services to be provided by Motorola to Customer under this Agreement, the nature and scope of which are more fully described in the Statement of Work.

1.11. "Software" means the Motorola Software and Non-Motorola Software, in object code format that is furnished with the System or Equipment.

1.12. “Software License Agreement” means the software license agreement that will be assigned to Customer prior to Motorola commencing work on the Agreement.

1.13. “Statement of Work” means the statement of work attached hereto as Exhibit C-2 and incorporated herein by this reference. The Statement of Work describes the Services and Deliverables (if any) that Motorola will provide to Customer under this Agreement, and the other work-related responsibilities that the parties owe to each other. The Statement of Work may contain a performance schedule.

1.14 “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.

1.15 “System Acceptance” means the Acceptance Tests have been successfully completed.

1.16 “Warranty Period” means one year from the date of System Acceptance or Beneficial Use, whichever occurs first, unless as a result of delays caused by Customer, System Acceptance is delayed by more than one year after December 31, 2014, in which case the Warranty Period begins no later than December 31, 2015.

Section 2 SCOPE OF AGREEMENT; TERM

2.1 The purpose of this Agreement is to provide installation services and warranty protection for the Equipment and Software. Motorola and Customer will perform their respective responsibilities as described in this Agreement, including the Technical and Implementation Documents in Exhibit C. Motorola will provide to Customer the Services and Deliverables (if any). To enable Motorola to perform the Services, Customer will provide to Motorola reasonable access to relevant Customer information, personnel, systems, and office space when Motorola’s employees are working on Customer’s premises, and other general assistance. If the Statement of Work contains assumptions that affect the Services or Deliverables, Customer will verify that they are accurate and complete. Any information that Customer provides to Motorola concerning the Services or Deliverables will be accurate and complete in all material respects. Customer will make timely decisions and obtain any required management approvals that are reasonably necessary for Motorola to perform the Services and its other duties under this Agreement. Unless the Statement of Work states the contrary, Motorola may rely upon and is not required to evaluate, confirm, reject, modify, or provide advice concerning any assumptions and Customer-provided information, decisions and approvals described in this paragraph.

2.2 Motorola will assign qualified employees who have the requisite experience and competencies to perform the Services with reasonable skill and care. Motorola will provide and furnish all material, labor, supervision, tools, apparatus, equipment and incidental expenses for accomplishing the Services with the exception of those items mentioned in this Agreement to be provided by Customer.

2.3 If, as a result of the Services performed under this Agreement, Motorola recommends that Customer purchase products or other services, nothing in this Agreement precludes Motorola from offering or selling the recommended products or other services to Customer. If Customer is a governmental body or agency, it represents that this paragraph does not violate its procurement or other laws, regulations, or policies.

2.4 Customer may request changes to the Services. If Motorola agrees to a requested change, the change must be confirmed in writing and signed by authorized representatives of both parties. A reasonable price adjustment will be made if any change affects the time of performance or the cost to perform the Services. If Customer delays Motorola’s performance of the Services, modification of the performance schedule or an increase in the Contract Price may occur.

2.5 Unless terminated in accordance with other provisions of this Agreement, the term of this Agreement begins on the Effective Date and continues until completion of the Services.

Section 3 CONTRACT PRICE AND PAYMENT

3.1 The Contract Price in U.S. dollars is $1,194,151.00.

3.2 Any services performed by Motorola outside the scope of this Agreement at the direction of Customer will be considered to be additional Services which are subject to additional charges. Any agreement to perform additional Services will be reflected in a written and executed change order or amendment to this Agreement.

3.3 Motorola will submit invoices to Customer according to the Payment Schedule attached as Exhibit A. Except for a payment that is due on the Effective Date, Customer will make payments to Motorola within thirty (30) days after the receipt of each invoice. Customer will make payments when due 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 Customer's reference, the Federal Tax Identification Number for Motorola Solutions, Inc. is 36-1115800.

Section 4 TIME SCHEDULE; FORCE MAJEURE

4.1 All Services will be performed in accordance with the performance schedule included in the Statement of Work (Exhibit C-2).

4.2 Neither party will be liable for its non-performance or delayed performance if caused by a Force Majeure. Each party will notify the other in writing if it becomes aware of any Force Majeure that will significantly delay performance. The notifying party will give the notice promptly (but in no event later than fifteen (15) days) after it discovers the Force Majeure.

Section 5 CONFIDENTIAL INFORMATION AND PROPRIETARY RIGHTS

5.1. CONFIDENTIAL INFORMATION.

5.1.1. During the term of this Agreement, the parties may provide each other with Confidential Information. All Deliverables will be deemed to be Motorola's Confidential Information. 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 those 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 or pursuant to the license granted immediately below. The provisions of this paragraph are subject to and qualified by Arizona's Open Meetings and Public Records Laws, A.R.S. § 38-431 et. seq. and § 39-121 et. seq.

5.1.2. The disclosing party owns and retains all of its Proprietary Rights in and to its Confidential Information, except the disclosing party hereby grants to the receiving party the limited right and license, on a non-exclusive, irrevocable, and royalty-free basis, to use the Confidential Information for any lawful business purpose in the manner and to the extent permitted by this Agreement.

5.2. PRESERVATION OF PROPRIETARY RIGHTS.

Each party owns and retains all of its Proprietary Rights that exist on the Effective Date. Motorola owns and retains all Proprietary Rights that are developed, originated, or prepared in connection with providing the Deliverables or Services to Customer, and this Agreement does not grant to Customer any shared development rights. At Motorola's request and expense, Customer will execute all papers and provide reasonable assistance to Motorola to enable Motorola to establish the Proprietary Rights. Unless otherwise explicitly stated herein, this Agreement does not restrict a party concerning its own Proprietary Rights and is not a grant (either directly or by implication, estoppel, or otherwise) of a party's Proprietary Rights to the other party.

Section 6 WARRANTY

6.1 SYSTEM FUNCTIONALITY. Motorola represents that the System will perform in accordance with the specifications in all material respects. Upon System Acceptance, this System functionality representation is fulfilled.

6.2. 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.

6.3. MOTOROLA SOFTWARE WARRANTY. Unless otherwise stated in the Software License Agreement, during the Warranty Period, Motorola warrants the Motorola Software in accordance with the terms of the Software License Agreement and the provisions of this Section 6 that are applicable to the Motorola Software. TO THE EXTENT, IF ANY, THAT THERE IS A SEPARATE LICENSE AGREEMENT PACKAGED WITH, OR PROVIDED ELECTRONICALLY WITH, A PARTICULAR PRODUCT THAT BECOMES EFFECTIVE ON AN ACT OF ACCEPTANCE BY THE END USER, THEN THAT AGREEMENT SUPERCEDES THIS SOFTWARE LICENSE AGREEMENT AS TO THE END USER OF EACH SUCH PRODUCT.

6.4. EXCLUSIONS TO EQUIPMENT AND MOTOROLA SOFTWARE WARRANTIES. These warranties do not apply to: (i) defects or damage resulting from: use of the Equipment or Motorola 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, unless Customer ships the Equipment using the Motorola approved carrier, in which case Motorola will cover the freight costs (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.

6.5. 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 Motorola Software, replace it with the same or equivalent product, or refund the price of the defective Equipment or Motorola Software. That action will be the full extent of Motorola's liability for the warranty claim. Repaired or replaced product is warranted for one year from the date of repair or replacement. All replaced products or parts will become the property of Motorola.

6.6. ORIGINAL END USER IS COVERED. These express limited warranties are extended by Motorola to the original user of the System for commercial, industrial, or governmental use only, and are not assignable or transferable.

6.7. DISCLAIMER OF OTHER WARRANTIES. THESE WARRANTIES ARE THE COMPLETE WARRANTIES FOR THE EQUIPMENT AND MOTOROLA 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 7 LIMITATION OF LIABILITY

Except for personal injury or death, Motorola's total liability, whether for breach of contract, warranty, negligence, or otherwise, will be limited to the direct damages recoverable under law, but not to exceed the Contract Price. 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 OR THE PERFORMANCE OF THE SERVICES BY MOTOROLA. This limitation of liability provision survives the expiration or termination of this Agreement and applies notwithstanding any contrary provision.

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 as a whole will not postpone System Acceptance or Subsystem acceptance, but will be corrected according to a mutually agreed schedule.

8.3. BENEFICIAL USE. Customer acknowledges that 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.

SECTION 9 DEFAULT AND TERMINATION

9.1 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, 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. The defaulting party will begin implementing the cure plan immediately after receipt of notice by the other party that it approves the plan. If Customer

is the defaulting party, Motorola may stop work on the project until it approves the Customer's cure plan.

9.2. FAILURE TO CURE. If a defaulting party fails to cure the default as provided above in Section 9.1, unless otherwise agreed in writing, the non-defaulting party may terminate any unfulfilled portion of this Agreement. In the event of a 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 procures the Services through a third party, Customer may as its exclusive remedy recover from Motorola reasonable costs incurred to procure the Services (but not additional or out of scope services) less the unpaid portion of the Contract Price. Customer agrees to mitigate damages and provide Motorola with detailed invoices substantiating the charges.

Section 10 DISPUTES

10.1. SETTLEMENT PREFERRED. The parties will attempt to settle any dispute arising from this Agreement (except for a claim relating to intellectual property or breach of confidentiality) through consultation and a spirit of mutual cooperation. The dispute will be escalated to appropriate higher-level managers of the parties, if necessary. If cooperative efforts fail, the dispute will be mediated by a mediator chosen jointly by the parties within thirty (30) days after notice by one of the parties demanding non-binding mediation. The parties will not unreasonably withhold consent to the selection of a mediator, will share the cost of the mediation equally, may agree to postpone mediation until they have completed some specified but limited discovery about the dispute, and may replace mediation with some other form of non-binding alternative dispute resolution ("ADR").

10.2. LITIGATION. A party may submit to a court of competent jurisdiction any claim relating to intellectual property, breach of confidentiality, or any dispute that cannot be resolved between the parties through negotiation or mediation within two (2) months after the date of the initial demand for non-binding mediation. Each party consents to jurisdiction over it by that court. The use of ADR procedures will not be considered under the doctrine of laches, waiver, or estoppel to affect adversely the rights of either party. Either party may resort to the judicial proceedings described in this section before the expiration of the two-month ADR period if good faith efforts to resolve the dispute under these procedures have been unsuccessful; or interim relief from the court is necessary to prevent serious and irreparable injury to the party.

Section 11 GENERAL

11.1. 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 those taxes, it will send an invoice to Customer and Customer will pay to Motorola the amount of the taxes (including any interest and penalties) within twenty (20) days after the date of the invoice. Motorola will be solely responsible for reporting taxes on its income or net worth.

11.2. ASSIGNABILITY. Neither party may assign this Agreement without the prior written consent of the other party (which will not be unreasonably withheld or delayed), except that Motorola may assign this Agreement to any of its affiliates.

11.3. SUBCONTRACTING. Motorola may not subcontract any portion of the Services without the prior written consent of Customer, which will not be unreasonably withheld or delayed.

11.4 WAIVER. Failure or delay by either party to exercise a right or power 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.

11.5. SEVERABILITY. If a court of competent jurisdiction renders any part of this Agreement invalid or otherwise unenforceable, that part will be severed and the remainder of this Agreement will continue in full force and effect.

11.6. 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.

11.7. 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.

11.8. GOVERNING LAW. This Agreement and the rights and duties of the parties will be governed by and interpreted in accordance with the laws of the State of Arizona.

11.9. ENTIRE AGREEMENT. This Agreement, including Exhibits, constitutes the entire agreement of the parties regarding the subject matter of this Agreement and supersedes all previous agreements, proposals, and understandings, whether written or oral, relating to the subject matter. 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 amend or modify this Agreement.

11.10. NOTICES. Notices required under this Agreement to be given by one party to the other must be in writing and either delivered personally 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, UPS, or DHL), or by facsimile with correct answerback received, and will be effective upon receipt:

Motorola Soltuions, Inc.	Customer
Attn: _____	Attn: _____
_____	_____
_____	_____
fax: _____	fax: _____

11.11. 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. 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 or other matters.

11.12. 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.

11.13. SURVIVAL OF TERMS. The following provisions survives the expiration or termination of this Agreement for any reason: if any payment obligations exist, Section 3 (Contract Price and Payment); Section 5 (Confidential Information and Proprietary Rights); Section 7 (Limitation of

Liability); Section 9 (Default and Termination); Section 10 (Disputes); and all General provisions in Section 11.

11.14 ADMINISTRATOR LEVEL ACCOUNT ACCESS. Motorola will provide Customer with Administrative User Credentials. Customer agrees to only grant Administrative User Credentials to those personnel with the training or experience to correctly use the access. Customer is responsible for protecting Administrative User Credentials from disclosure and maintaining Credential validity by, among other things, updating passwords when required. Customer may be asked to provide valid Administrative User Credentials when in contact with Motorola System support. Customer understands that changes made as the Administrative User can significantly impact the performance of the System. Customer agrees that it will be solely responsible for any negative impact on the System or its users by any such changes. System issues occurring as a result of changes made by an Administrative User may impact Motorola's ability to perform its obligations under the Agreement or its Maintenance and Support Agreement. In such cases, a revision to the appropriate provisions of the Agreement, including the Statement of Work, may be necessary. To the extent Motorola provides assistance to correct any issues caused by or arising out of the use of or failure to maintain Administrative User Credentials, Motorola will be entitled to bill Customer and Customer will pay Motorola on a time and materials basis for resolving the issue.

Section 12 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 C will be resolved in the following order: Exhibit A, Exhibit C, and Exhibit B.

Exhibit A "Payment Schedule"

Exhibit B "System Acceptance Certificate"

Exhibit C "Technical and Implementation Documents"
- C-1 "System Description" dated November 13, 2014
- C-2 "Statement of Work" dated November 13, 2014
- C-3 "Acceptance Test Plan" or "ATP" dated November 13, 2014
- C-4 "Equipment List" dated November 13, 2014

In witness whereof, the parties hereto have executed this Agreement as of the Effective Date.

Cochise County	MOTOROLA SOLUTIONS, INC.
BY: _____	BY: _____
NAME: Pat Call	NAME: _____
TITLE: Chair, Board of Supervisors	TITLE: _____
DATE: _____	DATE: _____

Attest:

_____
Arlethe Rios, Clerk of the Board Date

Exhibit A

Payment Schedule

Pricing Summary

Description	Price
Sale Price	**$1,194,151**

Payment Terms

35% of the Contract Price upon Contract execution

50% of the Contract Price upon Completion of Installation

15% of the Contract Price upon Final Acceptance

Motorola reserves the right to invoice for installations on a site-by-site basis, when applicable.

Exhibit B

System Acceptance Certificate

Customer Name: _____

Project Name: _____

This System Acceptance Certificate memorializes the occurrence of System Acceptance. Motorola and Customer acknowledge that:

1. The Acceptance Tests set forth in the Acceptance Test Plan have been successfully completed.

2. The System is accepted.

Customer Representative:	Motorola Representative:
Signature: _____	Signature: _____
Print Name: _____	Print Name: _____
Title: _____	Title: _____
Date: _____	Date: _____

FINAL PROJECT ACCEPTANCE:

Motorola has provided and Customer has received all deliverables, and Motorola has performed all other work required for Final Project Acceptance.

Customer Representative:	Motorola Representative:
Signature: _____	Signature: _____
Print Name: _____	Print Name: _____
Title: _____	Title: _____
Date: _____	Date: _____

Exhibit C

Technical and Implementation Documents

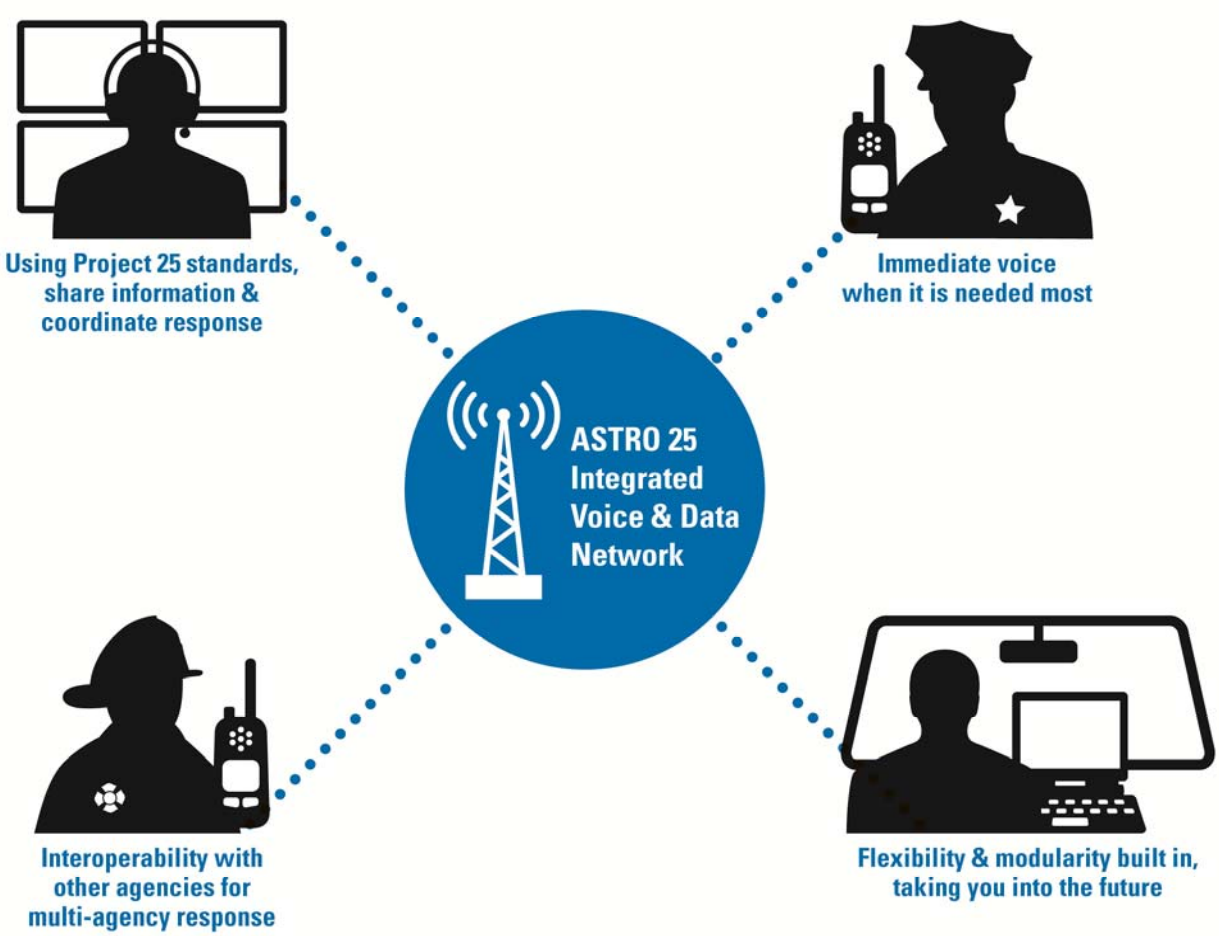
SYSTEM DESCRIPTION

C-1.1 OVERVIEW

ASTRO® 25 is the most widely used Project 25, Mission-Critical, Integrated Voice and Data (IV&D) communication network for public safety agencies. Installed worldwide, ASTRO 25 solutions meet and exceed IV&D requirements for day-to-day operations, as well as emergency response in the most demanding situations. ASTRO 25 is a wireless platform that combines uncompromising, real-world performance and the legendary reliability of Motorola Solutions, Inc. (Motorola).

From single-site to nationwide deployments, ASTRO 25 is a flexible, modular network with advanced call processing capabilities designed to meet the needs of public safety. ASTRO 25 can adapt to accommodate additional users, increased geographic coverage, enhanced data applications, and connectivity to other networks—all to ensure an efficient and cost-effective solution for decades to come.

ASTRO 25 is optimized for the rigorous demands of public safety, providing reliable communications. When an emergency involves multiple agencies, first responders can share voice and data communication among their teams. In addition, centralized command and control can deploy resources efficiently, maintain communication security, and track personnel effectively.



C-1.2 THE BENEFITS OF ASTRO 25 IP TECHNOLOGY

Motorola's proposed solution for Cochise County is our ASTRO 25 platform with IV&D, the foundation of the Mission-Critical portfolio. ASTRO offers a Project 25, standards-based Internet Protocol (IP) modular solution, providing your first responders with:

- ***Cost savings*** – ASTRO 25 reduces costs by integrating your voice and data needs into a single solution.
- ***Interoperability*** – ASTRO 25 is compliant with APCO Project 25 standards, offering seamless interoperability with other compliant systems and radios, putting the highest level of interoperability in the end-users' hands, without the need of gateways or console patches.
- ***Reliability*** – Pre-release software and upgrade testing, third-party hardware and software certification process, fault-tolerant architecture with multiple fallback modes, multiple levels of redundancy, and real-time network and security monitoring provide Mission-Critical reliability.
- ***Increased security*** – Information Assurance (IA) enhances

ASTRO 25
WHEN MISSION CRITICAL COMMUNICATIONS DEMAND PROJECT 25 INTEROPERABILITY & IP FLEXIBILITY

the confidentiality, integrity, and availability of the Radio Network Infrastructure (RNI). Multiple encryption algorithms keep end-to-end voice and data transmissions confidential.

- ***Enhanced productivity*** – Easy and intuitive interfaces to critical, real-time information is delivered to users when and where they need it.
- ***Flexibility*** – Scalable, flexible design allows ASTRO 25 to dynamically adapt to the operational demands of any size organization. The IP-based design supports a unique mix of voice, data, and geographical requirements, permitting easy system enhancements as the users' needs evolve.

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

C-1.3 ASTRO 25 IP SYSTEM FEATURES

An ASTRO 25 system is a feature-rich, modular platform that consists of a Core site, which may include ASTRO 25 RF sites and simulcast cells. This section discusses the various key features and equipment components that comprise the proposed system.

C-1.3.1 Master Site

The master site is the central point for all system traffic in each ASTRO 25 zone. Call processing and system management occur at the master site. The Voice and Data call processing for each zone is performed by the Zone Controller. The Zone Controller(s) maintain constant communication between the RF Sites, Simulcast Sites and Network Management (NM) sub-systems via the Network Transport Subsystem.

C-1.3.2 Network Management System

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

The NMS supports the following services:

- ***Network Monitoring*** – Applications are included for monitoring the status of the transport network and the individual infrastructure components; displaying status information; forwarding alert information; and performing diagnostic procedures.
- ***Configuration Management*** – Facilities are provided for entering and maintaining the operational parameters of the infrastructure components and user devices (i.e., the mobile and portable radios).
- ***Accounting Management*** – NMS supports the tracking of radio usage of the system by providing an optional interface to third-party accounting and/or billing applications.
- ***Performance Management*** – Standard and optional applications are available for monitoring, reporting, controlling, and optimizing the use of system resources.
- ***Security Management*** – NMS includes features for setting user privileges and controlling their access to view and/or modify information contained in the configuration databases.

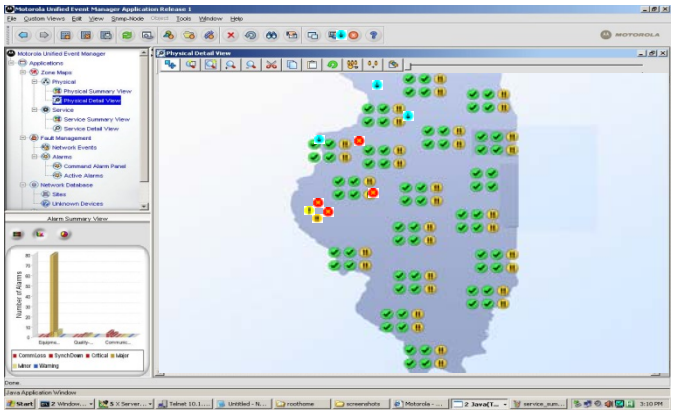
The Network Management subsystem will include the following servers at the zone and system levels of the ASTRO 25 system.

- ***NMS Zone-level Servers (one each per zone)*** – Air Traffic Router, Zone Database Server, Unified Event Manager (UEM), and Zone Statistics Server.
- ***NMS System-level Servers*** – User Configuration Server (UCS) and System Statistics Server.

C-1.3.2.1 Unified Event Manager

The Unified Event Manager (UEM) application allows system management personnel to manage LMR system devices from a single screen. Historical and real-time traffic screens give users access to radio events, radio status, and any device alarms. Other features include:

- Graphical views/maps.
- Active alarms and summary views.
- External notification flexibility.
- Remote site control.
- Fault reporting capabilities.
- Device inventory.
- External notification.
- Customized views.
- Role-based access.



Sample UEM Screen

The UEM provides a customized discovery process for optimization and deep discovery of subcomponents reported on by a device. The application also allows for automatic registration of the devices without pre-configuration. Interpreting and displaying events in an easy-to-understand and meaningful format—along with a topology of the network and devices tailored for the ASTRO 25 network—will ease navigation and present the network in a manner that is intuitive to a system operator.

Health of services is provided in addition to device-based alarms, including rules for determining the overall status of services in a separate service view (e.g., redundant controller is down – service is still up; we represent both views). Rules have been developed for calculating alarms based on interpreting incoming events. Security procedures are in place to roll SNMPv3 keys and maintain the ability to receive SNMP inform requests through the key role of an entire network. Device commands are presented in a manner specific to each device type. During discovery, a complete device inventory with specific rules to identify service and proxied components is accomplished for all individual devices. Table 1-1 outlines features and benefits of the UEM.

Table 1-1: Unified Event Manager (UEM) Features and Benefits

Feature	Benefit
Optimized Discovery Based on System Design	UEM supports subnet discovery of the IP addresses which are designated for radio system devices. This translates to an efficient device discovery process.
Discovery of Fault Managed Devices	Based on the device type the UEM has pre-determined rules for discovery of the custom entities supported on the device. Additional rules are used for event translation and alarm generation.
Fault Manager Registration	Procedures in place to register the manager's IP address as a trap/inform destination.
Centralized View of the Communications Network	System Managers can view the ASTRO 25 system status and quickly isolate problems to the board level.

Feature	Benefit
Intuitive Graphical User Interface (GUI)	System Managers are quickly notified of failures on the system and can diagnose device problems. Summary and Detail maps provide a graphical display of site status in their geographical location within the system.
Active Alarms View and Alarm Summary	Persistent single view of all failure conditions (“What’s Inoperable”) in the network and a quick reference summary of alarms by severity, allowing users to quickly pinpoint the highest priority failures.
Secure Device Access	SNMPv3 protocol with SHA and AES 128-bit encryption to prevent security breach attempts.
Role-Based Access Control	Assignment of user privileges for access to views and operational capabilities.
Email Notifications	User-specified event notifications are sent via secure email or forwarded to a portable mobile device, which allows System Managers to work away from the System Management Terminal but remain aware of system events.
Fault Reporting Capabilities	Event history data is auto-archived and exported for further analysis and reporting.
Remote Command Operation	Remote state change capability helps to service remote devices and avoid unnecessary trips to the sites for troubleshooting.
Network Inventory	Tabular view of the devices and their associated status.
Audit Trail and Job Status	Traceability and status for commands and actions executed.

The UEM is optimized to quickly discover the devices in our network—making installation and setup quick and error-free. The UEM has a built-in capability to identify the type of device it is discovering; it will activate the pre-determined rules for discovery of the devices, which results in faster event translation and alarm generation in the manager. Each device, via its various entities (i.e., fan, power supply, etc.), will quickly inform the manager what it needs to monitor. Procedures built into the UEM will configure the IP address in the device to give the correct path for sending its information during operation.

Quick and accurate interpretation of the system activity is crucial in effective management of the devices. The UEM translates the events into intuitive information, which will inform the user of either the severity of the failure or implication of the event.

UEM translates the events into active alarms, which make the user aware which events require immediate attention versus more minor events/alarms. The alarm view dynamically updates based on the condition of the reported device (i.e., the alarm will be cleared from the alarm view when a device sends a clear event to the UEM).

The Reliable Communication design in the UEM provides Supervision and Synchronization services:

- ***Supervision*** – Provides periodic SNMP Polling to ensure communication is established with each device on the network. The UEM generates communication failure alarms/events when communication between the agent and the manager fails.
- ***Synchronization*** – Used to ensure the accuracy of the state that the device is reporting. If the connection between the UEM and the device is lost, the device will queue up the missed fault

events and re-send when the connection is re-established. These Motorola-defined procedures were put in place to enhance the reliability of basic SNMPv3 trap messaging.
These procedures manage the re-synchronization of missed failures. The UEM utilizes SNMPv3 informs to enable the device to detect whether the connection has been interrupted.

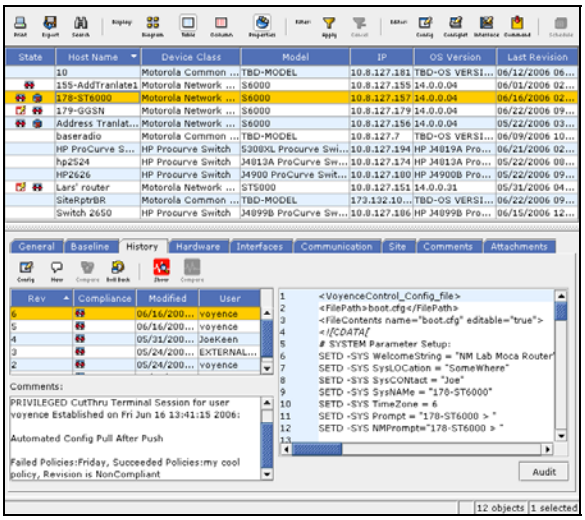
C-1.3.3 Configuration Management Applications

This section provides information about the applications that provide configuration management capability in ASTRO 25 systems. These devices are the Unified Network Configurator (UNC) and the Provisioning Manager (PM).

C-1.3.3.1 Unified Network Configurator

The Unified Network Configurator (UNC) is a network change and configuration management tool that enables users to efficiently manage the configurations of networks and devices in an ASTRO 25 system. The UNC is built on VoyenceControl, which is an automated compliance, change, and configuration management system. The UNC provides a single application for the configuration of all radio system and transport devices. Some of the key features that the UNC provides include:

- Efficient, role-based user setup.
- Auto discovery of devices/configurations, reducing configuration errors and initial configuration time by providing minimal data entry.



Sample UNC Screen

Historical configuration information is easily accessible, along with forensic information and the ability to roll back to previous versions. A valuable tool that the application provides is the ability to create a configuration and not implement it immediately. The UNC allows another user to approve and implement changes, which can help distribute those changes during off hours when system loading is minimal.

The UNC application allows system management personnel to see planned and current configurations simultaneously for quick comparison. This application offers easy editing screens and configuration “wizards” to reduce data entry.

Benefits of the UNC are outlined in Table 1-2.

Table 1-2: UNC Benefits

Feature	Benefit
Built-in Network Tool kit to enable features	Tools provide a methodical process to enable features in the system with minimal labor and chance of error. Examples of these are: turning on authentication on a set of protocols within the Gateways; locking Ethernet switch ports; setting delay; and jitter alarm thresholds.
Auto Discovery of Devices	Components are automatically discovered, and their configurations are added to the database without the need for any manual entry of data.

Feature	Benefit
Scheduled Distribution	Users can determine the time of day when they would like configurations to be sent to the devices, or delay the distribution of a configuration change until approved.
Distribution Monitoring	Allows users to view the status of configuration changes, such as whether the change is in progress, has successfully completed, or has failed.
Change Logging/Audit Trail	Maintains a log of various user interactions with the configuration system that can be used to help diagnose issues.
Configuration Versioning	Constantly tracks and logs versions that have changed and provides the ability to view or compare versions.
Management of Credentials	SSH and SNMP passwords can be managed. Automated mechanism allows seamless password and passphrase rolling, which can be performed automatically if desired.
Wizards for Common Operations	Radio system administrators can perform common operations using a simple web-based interface specifically developed for ASTRO 25 users. Provides an intuitive guide to assist in easy-to-follow setup procedures.
Rollback to Previous Version	Immediately reverts the device configuration to a previously created version.

C-1.3.4 Performance Management Applications

The Motorola performance suite enables a customer to monitor, manage, and report on system performance in near real-time. The applications empower system managers to proactively plan for expansion. The performance suite is composed of both Motorola and third-party solutions that are all certified, sold, and supported by Motorola. Each application has a unique set of features and benefits to facilitate efficient and effective system management. Together, these applications complete the big picture: how the system is performing, operating, and being used, by providing insight into the activity of each zone, site, subscriber, or talkgroup.

Motorola offers performance management as a standard feature of ASTRO 25 systems. Other standard features include ZoneWatch, Historical Reports, and Dynamic Reports. These features enable customers to manage their communications system business more efficiently. ZoneWatch displays real-time communications activity, while Dynamic and Historical reports collect traffic statistics over predetermined intervals for report generation. These applications are used to monitor, collect, log, and evaluate network performance and resource utilization; they collect statistics about radio resource usage for radio units, talkgroups, channels, sites, zones, and system-wide activity report generation. Dynamic and Historical Reports have archival and export features for saving reports for offline data analysis. Statistics are aggregated into detailed and summarized reports on both an individual zone and system-wide basis.

Historical and Dynamic reports were not included in this proposal. These features can be added at a future time.

Additionally, Motorola offers enhanced Performance Management features for ASTRO 25 systems, which are described below. Enhanced Performance Management features are available to provide further insight into system performance. Applications perform a variety of tasks, such as polling system resources, detailed reporting, long-term archiving and logging, and data stream collection.

Radio Control Manager

The Radio Control Manager (RCM) (Table 1-3) is used primarily by dispatchers to monitor and manage radio events, issue and monitor commands, and make informational queries of the system database. The RCM runs on a local PC client and, depending upon the configuration in the User Configuration Manager (UCM), can access multiple zones.

Table 1-3: Radio Control Manager Features and Benefits

Feature	Benefit
Radio Commands	- Regroup - Cancel Regroup - Selector Lock - Cancel Lock - Regroup and Lock - Cancel Regroup and Lock - Selective Inhibit - Cancel Inhibit - Storm Plan
Status Commands	- Radio check - Snapshot - Zone Status
Events	- Emergency Alarms - ChangeMe Requests - Status Events
Reports	The RCM Reports tool is used to create, view, print, schedule, and export standard reports from RCM. These reports use a common format so the data can be used in spreadsheets. The report information reflects the actual RCM server database information, except the Emergency Alarms. RCM Reports enables you to present and analyze data showing RCM activity on the system.

ZoneWatch

ZoneWatch is a performance management tool that has customizable displays and grids to monitor real-time communications activity in a single zone (Figure 1-1). The information displayed can help system managers become proactive in making better resource planning decisions, such as when additional channels need to be added.

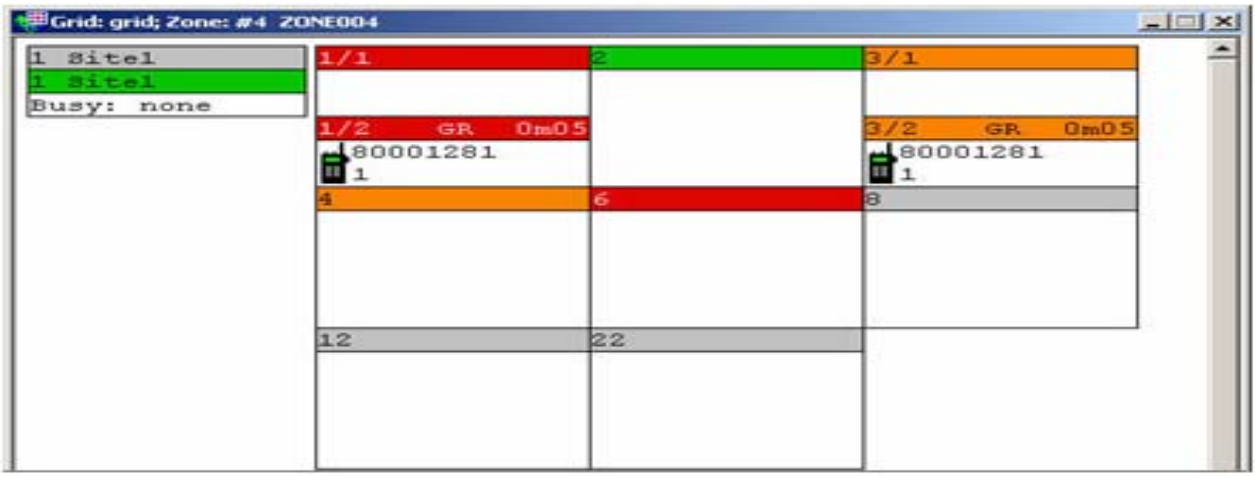


Figure 1-1: Sample ZoneWatch Screen

ZoneWatch also receives fault information relating to repeater sites, console sites, and the zone controller from the UEM. ZoneWatch is used to monitor call traffic and allows the system manager to organize displayed information using various criteria. Benefits of the ZoneWatch real-time display are provided in Table 1-4.

Table 1-4: ZoneWatch Features and Benefits

Real-Time Display	Single Site View, Channel View, and Multisite view display all important radio call information. This provides the manager with insight about radio call activity, channel usage activity, and busy activity, to more efficiently manage the radio system.

C-1.3.5 FDMA and TDMA Capability

It is important to note that Motorola's P25 TDMA operation compliments P25 FDMA operation on the ASTRO 25 platform; it does not replace it. The proposed system includes only TDMA operation on all voice channels at all trunked sites. Though not included in this proposal, the channels can be selectively ordered to operate as either TDMA-only or FDMA. Talkgroups configured in TDMA mode will operate on the TDMA-configured channels; likewise, talkgroups configured in FDMA mode will operate on the FDMA-configured channels. With TDMA operation enabled, voice calling capacity is increased over FDMA alone, without having to abandon FDMA operational stations and subscribers.

Motorola is committed to user-driven standards to support interoperability, and is providing Cochise County an ASTRO 25 system with Project 25 TDMA (P25 TDMA). The proposed ASTRO 25 system infrastructure and APX subscriber radios are capable of P25 TDMA operation. As an option to Cochise County, the system can also include software enhancements beyond Project 25-defined capability, specifically with the Dynamic Dual Mode feature. Dynamic Dual Mode greatly improves ease of use and system operation for systems with mixed P25 FDMA and P25 TDMA resources.

Dynamic Dual Mode was not included in this proposal.

The proposed solution is built upon the proven ASTRO 25 platform. With the addition of P25 TDMA operation, the ASTRO 25 system leverages 2:1 TDMA channel efficiency to double voice path capacity (Figure 1-2), as compared to a P25 FDMA channel (Figure 1-3).

This enhanced capacity improves the Grade of Service (GoS), leading to fewer busied calls and faster callbacks during busy situations, relative to a standard P25 FDMA system.

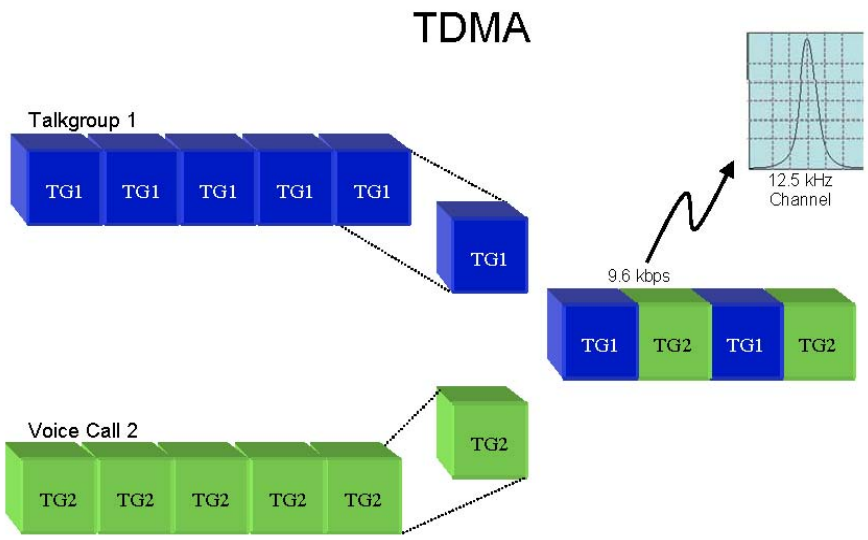


Figure 1-2: TDMA Operation divides a radio frequency into time slots and then allocates slots to calls.

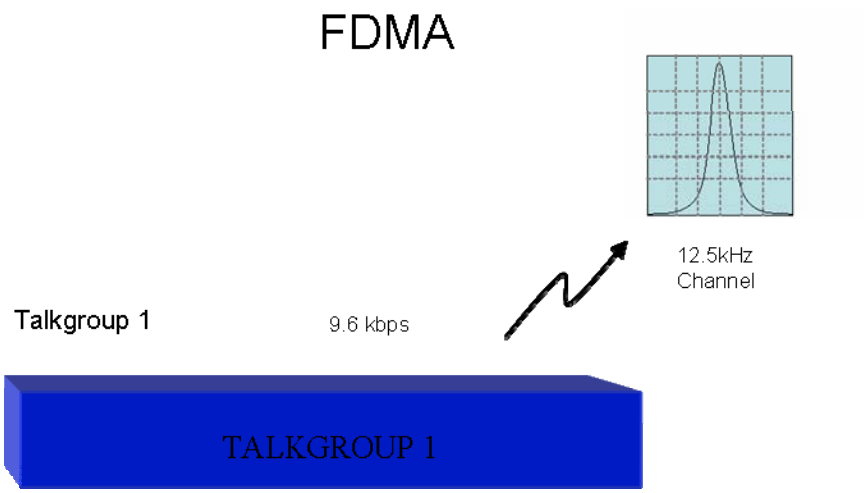


Figure 1-3: FDMA Operation divides spectrum into frequencies, which are then assigned to calls.

This improvement is due to the fact that TDMA provides double the talk path capacity in the same RF bandwidth allocation. Having this additional capacity improves GoS by reducing channel busies. Furthermore, callbacks are faster due to the greater availability of talk paths in the TDMA solution. If more voice path capacity is not required, the RF spectrum can be redeployed for packet data services at the same site, or be redeployed at another site that needs more voice path capacity. P25 TDMA also provides 6.25e (6.25 “equivalent”) operation for satisfying certain future FCC spectral efficiency requirements.

P25 TDMA provides the further advantage of increasing the potential voice path capacity of your system. An ASTRO 25 system utilizing P25 TDMA and implicitly defined channels (channels in 700 or 800 MHz bands) can provide up to 30 voice paths at a site.

This is an increase above the 27 voice path capacity of a P25 FDMA ASTRO 25 repeater site (non-simulcast) and the 29 voice path capacity of a P25 FDMA IP simulcast subsystem. With P25 TDMA, the ASTRO 25 system meets your needs for maximum system availability.

C-1.3.6 Network Transport Subsystem

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

Ethernet Switch

The Enterprise Ethernet Switch (LAN Switch) is used to aggregate all the Ethernet interfaces for all servers, clients, and gateways.

Cooperative WAN Routing

The Motorola Cooperative WAN Routing (CWR) solution allows core and exit routers to interface directly with RF sites, network management sites, console sites, and inter-zone links.

The CWR solution has the following advantages:

- Provides redundant router failover capabilities.
- Allows for easy configuration, testing, and maintenance.
- Minimizes downtime during upgrades.

The CWR consists of:

- Core Gateways— perform the routing control of audio and data in and out of the zone, while achieving the fast access levels required by real-time voice systems.
- Gateway Routers—used for devices that are multicasting beyond their local LAN, such as to IV&D and High Performance Data (HPD) packet data gateways.

Redundancy

To ensure system availability, the Transport Network provides:

- Redundant Ethernet switches.
- Redundant routers.

C-1.3.7 System Access Features

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

Busy Queuing/Call Back

This system has been designed to maximize availability to the end-user. In the unlikely event that all the channels are busy, a user depressing the Push-To-Talk (PTT) will be given a busy signal, and placed into a busy queue. When a channel becomes available, the system assigns the users to a channel via pre-assigned priority levels. Once a channel is assigned, the system notifies the user with

a call back tone. This feature makes it unnecessary for the radio operator to waste valuable time rekeying the radio in order to gain channel access.

Automatic Retry

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

Recent User Priority

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

Misdirected Radio Protection

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

Continuous Assignment Updating

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

Talk Prohibit Tones

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

User Talkgroup Features

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

Emergency Alarm/Call

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

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

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

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

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

Multiple Priority Levels

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

Multi-Group Call

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

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

Priority Monitor

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

Dispatch Console/Talkgroup Merge

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

C-1.3.8 Individual Call Features

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

Call Alert

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

In-Call User Alert

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

Radio Talkgroup Muting

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

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

Private Call

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

C-1.3.9 User Accessibility Features

Affiliation Display

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

- Sites.
- Talkgroups.
- Individual radios.

This allows a manager to understand the loading characteristics of their system in real-time. Graphing capabilities are also included. Figure 1-4 provides a selected site graph example.

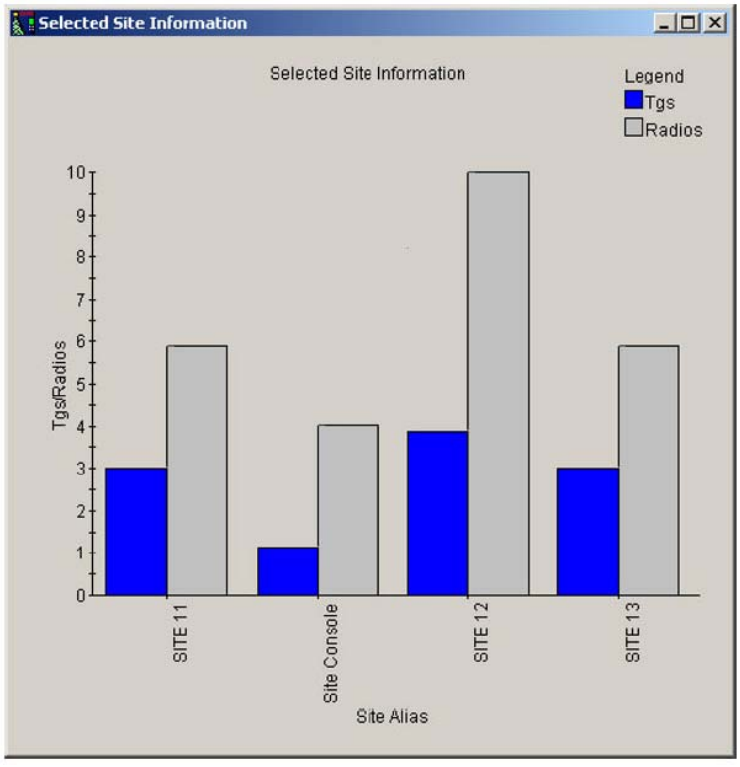


Figure 1-4: Selected Site Graph Example

C-1.4 ASTRO 25 SYSTEM FAILURE MODE ANALYSIS

Motorola's ASTRO 25 trunking networks have three modes of operation for increased reliability. The normal mode of operation is wide-area trunking. In the event of multiple component failures that lead to system disruption, the system is equipped to continue operation in two reduced feature operational modes: site trunking and failsoft.

The following pages include a detailed description of each of these operational modes, as well as a comprehensive analysis of the possible infrastructure failure scenarios and the system redundancy for mitigating each scenario.

Wide-Area Trunking

Wide-area trunking is the ASTRO 25 system's normal mode of operation. Wide-area trunking implies that the Fixed Network Equipment is operating properly. All simulcast cells and ASTRO 25 repeater sites are communicating with the Master Site. Subscriber units automatically roam between the various network RF cells. Talkgroup calls occur in the appropriate RF cells if users are distributed throughout multiple cells. Data applications are properly assigned channels for communication between the subscriber units and the host application.

Site Trunking

Site trunking is the first failover mode of operation. Site trunking impacts individual RF cells within a network. In multiple RF cell systems, one RF cell can be in site trunking, while the rest of the system remains in wide-area trunking. Site trunking implies that the simulcast prime site controller or the ASTRO 25 repeater site has lost connectivity with the Master Site.

Talkgroup calls initiated in the RF cell that is in site trunking will only be broadcast in that RF Cell. Dispatch consoles use control stations, or the operators use portable radios to communicate on a site trunking RF cell. Console priority is not available in site trunking. Data applications are not available on a site in site trunking and will have to be reinitiated once the system reverts to wide-area trunking.

Radios detect if a site is in wide-area trunking or site trunking. Radio models with a display will indicate to the user when the site is operating in site trunking. The radio alternately displays the selected talkgroup and "Site Trunking." Depending on how the system and user equipment are programmed, subscriber units will try to roam to an RF cell that is in wide-area trunking.

Failsoft by Talkgroup

Subsystem/site failsoft is the final fallback means of communication if a site no longer maintains wide-area or site trunking operation. Multiple failures have to occur for the system to enter failsoft. Failsoft impacts individual RF cells within a network. In multiple RF cell systems, one RF cell can be in failsoft, while the rest of the system remains in wide-area trunking. The subsystem goes into failsoft mode in any of these scenarios:

- The site controllers are not functioning properly.
- When all control channels are disabled or malfunctioned.
- When only one channel is enabled.

Failsoft operation provides communications in conventional mode via repeaters/base radios in order to maintain vital communications. In an IP multi-site simulcast subsystem, in subsystem-wide failsoft, received audio is routed to the comparator for voting and redistributed to all of the sites for simulcast transmission.

The subscriber's operation in failsoft mode is determined by the subscriber's programming. A subscriber can be programmed to behave in the following manner:

- ***Failsoft by control channel operation*** – The subscriber first scans for alternate control channels outside the multi-site subsystem, then scans the control channel frequencies for failsoft data.
- ***Failsoft by working group*** – The subscriber looks for failsoft data on a pre-programmed frequency after a scan for alternate control channels outside the multi-site subsystem is unsuccessful. If the subscriber cannot decode failsoft data on the pre-programmed frequency, the subscriber then scans the control channels in the simulcast subsystem for failsoft data.

Subscriber units in an RF cell that is in failsoft will try to roam to an RF cell that is in either wide-area trunking or site trunking. Dispatch consoles use control stations or the operators use portable radios to communicate on a site trunking RF cell. Console priority is not available in site trunking. Data applications are not available on a site in failsoft and will have to be reinitiated once the system reverts back to wide-area trunking.

Simulcast Local Failsoft

This feature addresses two simulcast subsystem failure scenarios, prime site to sub-site link failure and prime site failure:

- Upon loss of communication (11 seconds or more) with comparators due to a sub-site link failure, the GTR 8000 Base Radio, when programmed with local failsoft "on," will automatically enter in-cabinet repeat mode and continuously transmit failsoft signaling. Link failures of less than 11 seconds or more will not trigger a link failure condition.
- Provides continuity of operations within the coverage area of a simulcast sub-site, in case of loss of connectivity with Prime site, through local in-cabinet repeater mode operation. Prior to this feature, a prime site connectivity failure would cause the sub-site to be non-operational.
- This feature does not provide logic inputs to override and control this functionality, as was implemented on QUANTAR in SmartZone and SMARTNET systems. There is a change request in progress to enable this capability.
- TDMA-based systems will revert to FDMA conventional operation during local failsoft.

C-1.5 ASTRO 25 INFRASTRUCTURE

C-1.5.1 Master Site Components

A zone has a master site that contains the computing backbone for that zone. The master site contains all the components necessary for controlling calls within a zone and for communicating with other zones to manage InterZone calls in a multi-zone system. In addition, the master sites provide the hardware and software components that are used for Network Management and system configuration.

All the components that communicate over Ethernet are connected through a central switch called the master site Ethernet LAN switch. This switch provides two separate internal LANs which are integrated to provide redundant links for critical network traffic.

The zone controller is used to process system-wide commands and handle call processing and mobility management functions for the system. In systems with two zone controllers, there is a connection from each zone controller to the LAN switch and a direct connection between the two zone controllers. The LAN switch connection allows each zone controller to communicate with the gateway routers/Core Gateways.

C-1.5.1.1 Zone Controller

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

The Zone Controller builds upon the strength and experience of Motorola wide-area trunking systems to deliver multiple layers of reliability for business-critical, Mission-Critical and life-critical applications.

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

- **System Availability –** The Zone Controller allows software upgrades once loaded, providing enhanced system availability.
- **Intelligent Switchover –** The Redundant Configuration provides automatic switchover to the standby controller if a loss of wide-area communications is detected. Notification can be sent to the user if other components fail, allowing the user to manually switch to the standby controller if desired.
- **Cross Controller Compatibility –** Capable of running two different versions of software simultaneously, ensuring upgrades are fully functional with one controller before upgrading the second controller.
- **Redundant Configuration –** The Redundant Zone Controller is a computer platform with redundant processors that provide trunking call processing for ASTRO 25 wide-area radio communication systems. It is designed to detect failures by automatically switching operation to the standby controller, minimizing the interruption of call processing functionality.

C-1.5.2 ASTRO 25 RF Sites

ASTRO 25 RF sites provide communications for radio users both inside and outside the ASTRO 25 network. RF Sites may include ASTRO 25 repeater sites, simulcast cells, High Performance Data (HPD) RF sites, and ASTRO 25 conventional channel sites.

The RF Site types applicable to this system design are described briefly in this section.

C-1.5.2.1 Repeater Sites: ASTRO Site Repeater (ASR)

An ASTRO 25 Repeater Site consists of a single site with up to 28 channels and two site controllers (in a redundant configuration), which can be standalone or housed in a GTR 8000 Expandable Site Subsystem (ESS).

The GTR 8000 Expandable Site Subsystem in a repeater site is set up in a single trunked site, with one active control channel and a number of voice channels at the site. If packet data services are supported at the site, a number of voice channels can be configured with packet data channel capability. Voice traffic is routed from each of the base radios to the system for distribution to other sites and is repeated by the base radios to support other local subscribers. However, data traffic is routed to the GCP 8000 Site Controller. The site controller routes these packets upstream to the zone controller for further processing and routing.

The ASTRO 25 Repeater Site consists of the following components, described in the Component Descriptions section of this System Description.

- GTR 8000 Expandable Site Subsystem (ESS).
- GTR 8000 Repeater/Base Radio.
- GCP 8000 Site Controller.
- Radio Frequency Distribution System (RFDS).
- Sub-Site Ethernet Switch.
- GGM 8000 Site Gateway.

The following sites in this proposal will be of the ASR type:

- Mule Mountain.
- Texas Canyon.
- Jordan Farms.

C-1.5.2.2 Simulcast Sites

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

Trunked simulcast was developed by Motorola to meet the needs of users who were outgrowing their single-site radio systems. Simulcast offers the following advantages:

- ***Improved Coverage*** – One radio site may not provide the coverage necessary for the application in question. Simulcast expands the coverage area by expanding the number of radio sites without adding additional frequencies.
- ***Efficient Use of Frequencies*** – Adding sites typically requires more frequencies. In a simulcast system, the same frequencies are used at every site in the system. This makes very efficient use of the available spectrum.
- ***Simplified Radio Operations*** – Because the simulcast architecture operates like a single-site system, operations are simplified and radios are easy to use.

The ASTRO 25 simulcast infrastructure consists of a central simulcast prime site (a typical prime site is shown in the Figure 1-5) and up to 32 distributed simulcast remote sites, each with up to 30 channels (a typical remote site is shown in Figure 1-6). The prime site acts as a control and digitized audio center for the simulcast subsystem. Audio is routed to the prime site from each simulcast remote site. To ensure that the best audio from the simulcast receivers is processed, a voting comparator selects the best signal.

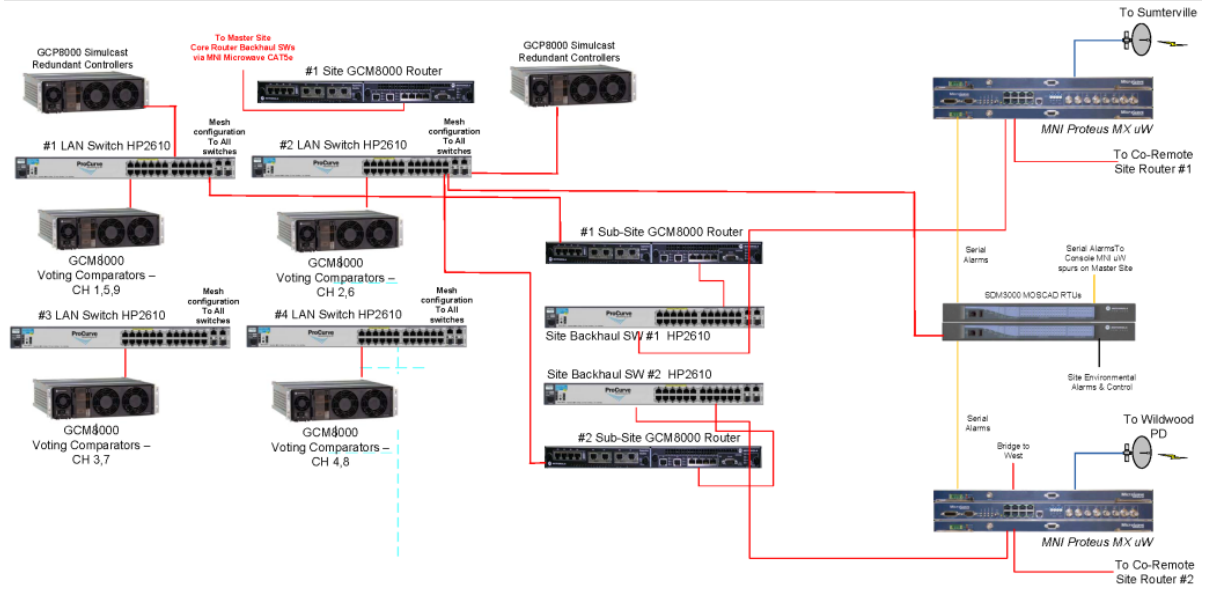


Figure 1-5: Basic Diagram of a Typical ASTRO 25 Simulcast Prime Site

The prime site contains the prime site simulcast controller, simulcast comparators, and networking equipment to interface to the remote simulcast sites. The simulcast RF transmitters and receivers are located at the simulcast remote sites. These sites simultaneously transmit identical information from each site to the radios. The receivers at these sites receive the audio from the user radios, and pass the audio back to the prime site for voting. Audio and site control comes from the prime and master sites. Equipment at a simulcast remote site includes a simulcast base radios, fault management equipment, and networking equipment to interface to the prime site.

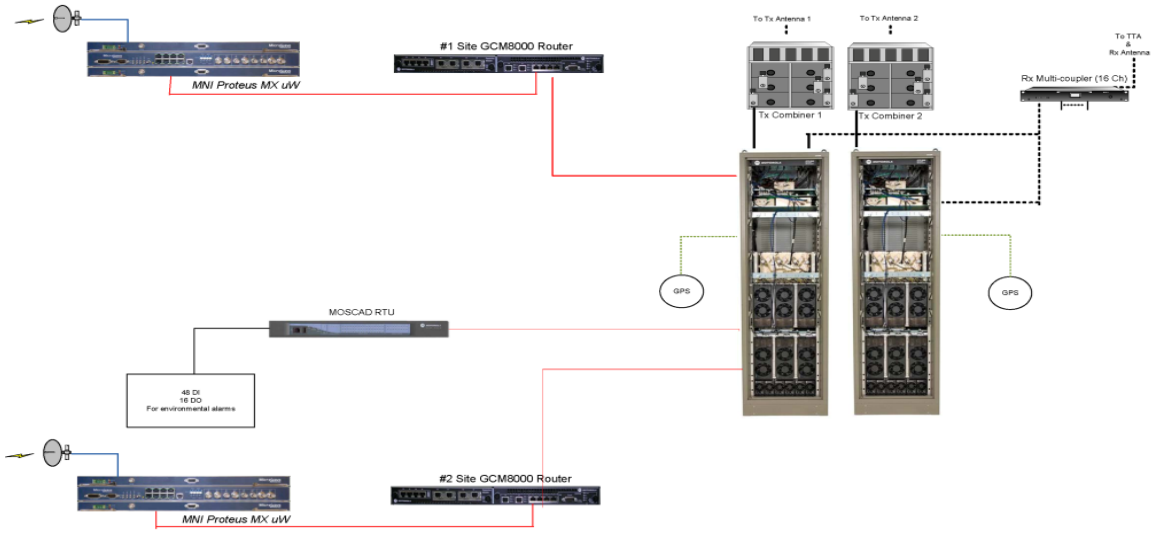


Figure 1-6: Basic Diagram of a Typical ASTRO 25 Simulcast Remote Site

Simulcast Prime Site

The ASTRO 25 Simulcast Prime Site consists of the following components, described in the Component Descriptions section of this System Description:

- GCP 8000 Site Controller.

- GCM 8000 Comparator.
- GGM 8000 Site Gateway.
- TRAK 9100 Simulcast Site Reference (the exiting VHF Trak will be expanded and reused where available).
- Sub-site Access Router.
- Prime Site Ethernet Switch.
- Sub-site Ethernet Switch.

Simulcast Remote Site

The ASTRO 25 Simulcast Remote Site consists of the following components, described in the Component Descriptions section of this System Description:

- GTR 8000 Expandable Site Subsystem (ESS).
- GTR 8000 Repeater/Base Radio.
- GGM 800 Site Gateway.
- TRAK 9100 Simulcast Site Reference (the exiting VHF Trak will be expanded and reused where available).
- Radio Frequency Distribution System (RFDS).
- Sub-Site Ethernet Switch.

The following sites in this proposal will be of the Simulcast Site type:

- Douglas.
- Sierra Vista.
- Elfrida.
- Black Knob.
- Bernardino.

C-1.5.2.3 ASTRO 25 Conventional Sites

ASTRO 25 systems are multifunctional communications systems which provide capabilities for trunked-only, trunked and conventional, and conventional-only operations. ASTRO 25 conventional systems with IP connectivity to dispatch and RF sites allow analog radio users and ASTRO 25 version 3.1 conventional customers to continue the migration path to IP connectivity.

Today’s conventional systems meet Federal mandates for narrowbanding, interoperability, and IP connectivity. They enable features such as text messaging and end-to-end encryption that help first responders do their jobs safely and effectively. To answer the needs of agencies that are ready to modernize their conventional radio systems, Motorola offers a selection of conventional solutions that are sized right, priced right and future ready. An easy upgrade path helps agencies move gradually from their current analog or Project 25 (P25) systems to a modern, conventional platform.

The adaptable ASTRO 25 platform gives customers complete control over their system’s future design strategy. Any of the following steps could be the starting point to modernize their conventional network. Customers can choose the focus that fits their current needs and resources:

- Expand the channel capacity of your current system by deploying GTR 8000 base stations.
- Upgrade dispatch center functionality with modern MCC 7500 IP-based consoles.
- Add data applications such as GPS location and/or text messaging to support increased productivity in the field.

The ASTRO 25 core provides a platform to manage the entire network. It supports users communicating across analog, mixed mode, and P25 digital RF channels. Motorola offers choices in core configurations scalable to fit agencies of all sizes. On an IP-based network, the central core server provides call management between conventional stations and console positions.

This is different from a circuit-based conventional system, in which a Central Electronics Bank switch performs these functions. New functionality, including fault management and security, also resides in the core.

The ASTRO 25 platform supports a wide range of channel types and coverage methodologies, giving customers maximum flexibility to integrate different types of equipment. Customers can select the channel and coverage types and price points to meet their needs.

Channel Types:

- Analog 4-wire.
- Mixed Mode – Analog / P25 Digital.
- P25 Digital V.24.
- P25 Digital over Ethernet.

Coverage Types:

- Repeater.
- Voting.
- Multicast.
- Simulcast.

Customers can centrally manage their network. An ASTRO 25 IP core provides a full-featured suite of system management applications to monitor, manage, and configure elements across your entire radio system. Centralized management helps you fine-tune network performance, minimize costly field visits, and keep the system running with minimal effort from your administrative staff. This has a big impact on your total cost of ownership, helping you get the best return on your investment.

System managers can:

- Generate performance reports to track the status of the system.
- Remotely download software updates vital to sustaining system integrity to system components.
- Configure infrastructure equipment from a central point.

Network security is a critical issue. Motorola offers Information Assurance (IA) services through the ASTRO 25 core to help customers centrally secure their network. With IA, customers can deploy a range of security capabilities, including:

- ASTRO 25 Core Security – Secure the heart of your ASTRO 25 conventional network with features such as central authentication event logging, backup recovery, and system hardening.
- Remote Site Security – Protect information as it travels across your network sites by implementing features such as: router encryption, port security, and access controls.
- Perimeter Security – Defend your network against outside attacks using: firewalls, Intrusion Detection Sensor, and Demilitarized zones.

ASTRO 25 complies with FISMA/NIST and DISA standards for Federal and military installations. Motorola can help you gain certification if these standards apply to your organization.

This proposed ASTRO 25 system provides the capability for console dispatchers to access conventional channels that are located in zones other than the zone in which the console is located. The conventional services and features that dispatchers and subscribers use to communicate with each other on conventional channels can operate across zone boundaries. This provides dispatchers in any zone of a multizone ASTRO 25 system the ability to affiliate to conventional channels in the same or any other zone and originate voice calls on those channels or monitor activity on them.

The Zone Controller (ZC) is used to assign and prioritize console conventional calls on channels served by the Conventional Channel Gateways (CCGWs) with MCC 7500 dispatch consoles affiliated to conventional channels. NM/Dispatch sites and distributed conventional subsystems also provide a Conventional Site Controller (CSC) for conventional call processing with CCGWs, with connectivity to the site or conventional subsystem when a link to a ZC is lost.

In this proposal, the existing MCC7500 consoles and 10 site VHF simulcast system will be upgraded and tied in to the new system. The existing K core will be decommissioned and reused as a CSUB (Conventional Subsystem) that will tie into the new M core.

C-1.5.3 ASTRO 25 Component Descriptions

Each site type in an ASTRO 25 system contains various components. Components included in this system design are described in this section.

GTR 8000 Expandable Site Subsystem

The GTR 8000 Expandable Site Subsystem (ESS) enclosure can contain reconfigured GTR 8000 base stations, site LAN switches, and GCP 8000 controllers, along with an optional Radio Frequency Distribution System (RFDS), depending on your configuration needs.

Voice traffic is routed from each of the site base stations to the system for distribution all sites associated with the call. Benefits of the ESS include:

- Integrated design provides a smaller footprint at the site.
- Front/top access design and minimized cabling reduces install and service labor.
- Increased power supply redundancy through common power bus.

GCP 8000 Site Controller

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

The GCP 8000 provides the following functions:

- Manages the channels to maximize throughput and channel availability.
- Administers registration and context activation requests.
- Monitors base stations and RF distribution equipment and interacts with the MOSCAD site device manager to facilitate centralized alarm and control monitoring.
- Provides redundant site control.
- Enables redundant site link routing for patch redundancy.

Additionally, the GCP 8000 provides the following functions at the simulcast site:

- Provides a time and frequency reference signal to the base stations, maximizing frequency stability and allowing for further site separation in a simulcast configuration.
- Provides IP simulcast capability, enabling true end-to-end IP connectivity in a simulcast configuration.

GCM 8000 Comparator

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

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

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 via 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 (RMC/LNA).

GPW 8000 Receiver

The GPW 8000 Receiver is a common-hardware product that provides receiver-voting support for ASTRO 25 Conventional system configurations. It consists of a transceiver module, fan module, and power supply. The transceiver is shipped with an option card that includes an internal frequency reference so that external frequency references do not need to be provided at the site. The receiver software, configuration, and network management, as well as inbound traffic handling, are performed through the transceiver module. On-board serial and Ethernet ports are located on this module for local servicing via CSS.

Radio Frequency Distribution System

The Radio Frequency Distribution System (RFDS) provides interconnect between the base radios and antennas, allowing for a completely contained and more compact installation footprint. For the transmitters, this can include isolators, combiners, TX filters, diplexers, and power monitors.

For the receivers, this can include duplexers, site preselectors, and multicouplers. Various RFDS options exist for each of the GTR 8000 Base Radio, GTR 8000 Site Subsystem, and GTR 8000 Expandable Site Subsystem.

RF Site Gateway

The Site Gateway provides an interface that handles all of the IP Network Management traffic between the Core Site and the RF Site. The Site Gateway provides the following:

- Media conversion – the gateway converts Ethernet to the selected transport medium.
- Traffic prioritization – the gateway applies a prioritization marking to the packets leaving the site.
- Fragmentation – the gateway fragments large IP packets per industry standards.

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 also access the system's Graphical User Interface (GUI).

TRAK 9100 Simulcast Site Reference

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

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

Sub-Site Access Routers

The sub-site access routers, located at the prime site, provide the IP network routing interfaces between the prime site and all of the sub-sites. In the single sub-site link configuration, two sub-site access routers are deployed in a cooperative WAN routing arrangement for T1/E1 subsystems. In the dual sub-site link configuration, two sub-site access routers each serve as the endpoint for one of the sub-site’s WAN links. The sub-site access routers support T1, FT1, E1, FE1 and Ethernet sub-site links.

Note that the total number of access routers utilized at a trunking IP multi-site subsystem depends on the number of sub-sites. IP multi-site subsystems with 15 or less sub-sites require two access routers. Subsystems with more than 15 sub-sites, however, require two access router pairs (i.e., four access routers) where each access router pair can support up to 16 sub-sites.

Prime Site Ethernet Switches

Two paired Ethernet switches form the prime site LAN in an IP multi-site subsystem. They are paired for redundancy so if one of them fails, half of the hosts (site controllers, comparators) on the LAN are still connected to a working Ethernet switch. In addition to these switches, a third Ethernet switch is required for IP multi-site subsystems equipped with more than 15 sub-sites. For this configuration, all four access routers will have their LAN 2 ports connected to the third Ethernet LAN switch (crossover Ethernet cable is no longer utilized).

It should be noted that although the third switch provides additional available ports, these ports should not be utilized for devices affecting critical services (e.g., comparators).

Customers may choose to improve resource availability further via the “Simulcast Prime Site High Availability” feature. This feature replaces the standard two LAN switch configuration (three switches for more than 15 sub-sites) at the simulcast prime site with four LAN switches set up in a mesh configuration. When the same site resources are spread across four LAN switches, the failure of a single switch will remove fewer resources hence improving the general availability of resources as well as improving the likelihood of preserving redundancy. Note, for subsystems with greater than 15 sub-sites, all four access routers will utilize the fourth switch for their LAN 2 connections.

In a single prime site link configuration, there is a single prime site router which is attached to one of the Ethernet switches. The entire subsystem is therefore, dependent on this Ethernet switch for its connection to the master site.

In a dual prime site link configuration, there are two prime site routers, each of which is attached to a different prime site LAN switch. This ensures that if either switch fails, there is still a path to a prime site router for connectivity to the master site.

Sub-Site Ethernet Switches – Non-Dual LAN Remote Sub-Site

There may be either one or two Ethernet switches at the sub-site to form the sub-site LAN. In a single sub-site link configuration, only one switch is used unless a second switch is needed to provide enough port capacity for all of the hosts at the sub-site. In a dual sub-site link configuration, two switches are used so that there is no single point of failure for the sub-site’s entire IP network.

MLC 8000 Analog Comparator

The MLC 8000 is a versatile, compact product platform that allows gradual migration of analog voting / simulcasts systems from circuit connectivity to IP networks. The MLC 8000 analog comparator is compatible with both the GTR 8000 and QUANTAR repeaters.

It provides analog voting, simulcast, multicast, mixed-mode multicast, and mixed-mode voting functionality, giving maximum design flexibility for voting up to 16 sub-sites.

There are two configurable analog voting modes:

- ***Vote & Hold*** – One audio resource is selected and maintained throughout the call.
- ***Continuous Voting*** – The MCL 8000 continues to sample all active audio resources for the best received audio signal.

MLC 8000 Sub-Site Link Converter

The MLC 8000 sub-site link converter can be used to provide IP backhaul for customers wishing to transition from circuit-based backhaul without replacing existing legacy station equipment. This device provides up to four v.24 interfaces connected to the legacy stations and an Ethernet connection that can be connected to Ethernet-based comparators like the GCM 8000. This sub-site link converter provides receiver status tone and base station Tone Remote Control (TRC) signaling on each of its four analog interfaces (non-simulcast voting configurations).

MLC 8000 Simulcast Base Radio Link Converter

Given the cost savings of IP technology compared to circuit leased lines, the MLC 8000 will exclusively support IP connectivity for analog simulcast systems. The MLC 8000's IP analog simulcast configuration greatly simplifies the audio distribution while continuing to provide the synchronization technology formerly provided by Motorola's circuit-based solution.

Note: The existing (recently purchased) VHF P25/analog 10- site simulcast system will be incorporated into the system proposed.

C-1.6 SITE CONNECTIVITY REQUIREMENTS

The proposed system requires a high performance, high reliability link transport for site-to-site communications. The transport system is one of the primary enabling technologies for wide area two-way communications. The performance and reliability of the transport system is vital to the overall performance of the Motorola Radio System.

Previously, radio systems relied on a dedicated site backhaul to guarantee voice performance. With the introduction of the Ethernet site link feature, a system is now able to use a shared network as the site backhaul. While this allows the Town of Darien more backhaul options, it also introduces the potential for performance issues. The reason is that packet-based networks, especially when shared, have inherent impairments such as jitter and packet loss that can directly affect radio systems behavior. Of special concern is voice performance due to its real-time nature.

There are three key parameters that describe the performance of an Ethernet backhaul network:

1. Latency (sometimes referred to as packet delay) – amount of time to deliver a packet through the link.
2. Jitter - variation in latency. Audio relies on a constant, steady, delivery of voice packets from the source to all the destinations.
3. Packet Loss - can result from exceeding jitter budgets or actual packet loss in the network.

Below are the minimum site link specifications for the proposed Motorola system between a remote repeater site and the prime site (also called sub site/prime site link) and Master to DSR site link. These are the requirements assuming that there are no other degradation factors besides our system. Motorola has assumed that Cochise County will be providing their own microwave IP layer 3 network. A mix of layer 2 and layer 3 links within the system is however not supported.

Table 1-5: Layer 2 IP Network Performance Requirements for a Single Prime Site to Subsite Links

ETH SPECIFICATIONS FOR ONE SUBSITE-PRIME-CORE-PRIME-SUBSITE SITE LINK	
Latency	< 40ms
Jitter	< 40ms
Packet Loss	< 0.01%
IP Version	IPv4
QoS Support	802.1p Priority using at least 2 QoS levels (4 recommended)
VLAN Tagging	Enabled, 802.1Q with VLAN ID (all sites must use the same VLAN ID)

No more than 10 ms differential delay between any two subsite/prime site links is required for continuous voting (optional for vote-and-hold operation).

The above specifications are applicable for each round trip path through any of source to destination links. Specifications may be updated at the time of the project implementation.

Table 1-6: Layer 2 IP Network Performance Requirements for a Single ASR to Destination Site Link

ETH SPECIFICATIONS FOR ONE ASR TO DESTINATION SITE LINK	
Latency	< 70ms
Jitter	< 20ms
Packet Loss	< 0.01%
IP Version	IPv4
QoS Support	802.1p Priority using at least 2 QoS levels (4 recommended)
VLAN Tagging	Enabled, 802.1Q with VLAN ID (all sites must use the same VLAN ID)

The above specifications are applicable for each round trip path through any of source to destination links. Specifications may be updated at the time of the project implementation.

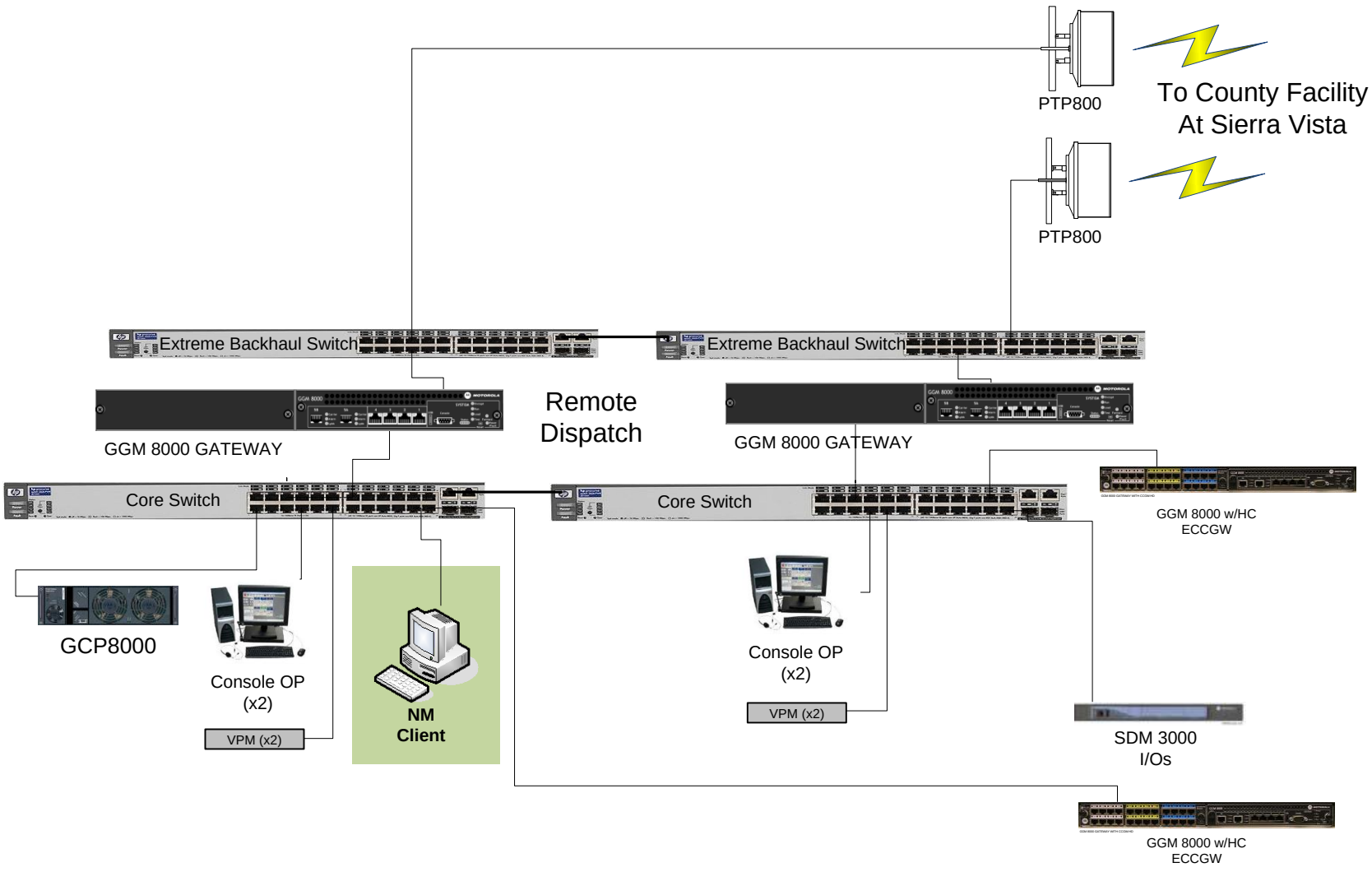
County provided microwave system that meets the site link bandwidth specifications in Table 1-7.

Table 1-7: Site Link Bandwidth Specifications

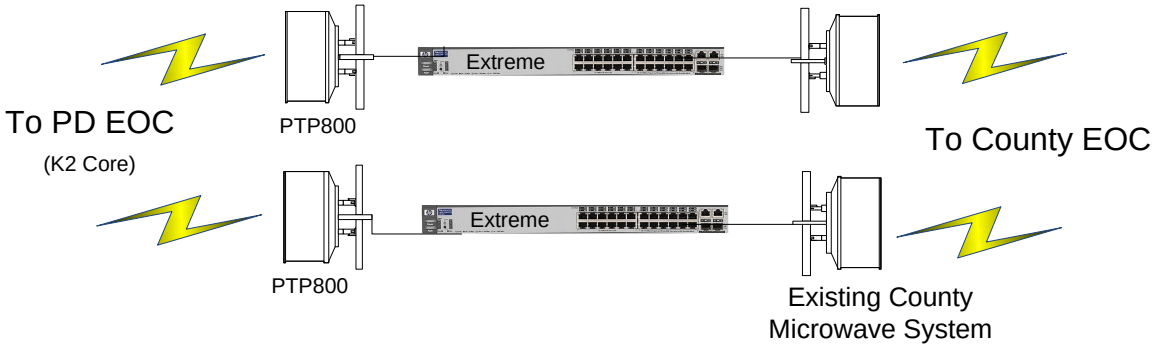
Site Link Specifications	
Sierra Vista PD EOC to Sierra Vista	1.5Mbps
Sierra Vista to Mule Mtn	3.5Mbps
Jordan Farms to Texas Canyon	2Mbps
Jordan Farms to Wilcox	2Mbps
Jordan Farms to Elfrida	2Mbps
Texas Canyon to Mule Mtn	4Mbps
Dos Cabezas to Elfrida	2Mbps
Wilcox to Elfrida	4Mbps
Elfrida to Mule Mtn	7Mbps
Sheriff's EOC to Black Knob	7Mbps
Black Knob to Mule Mtn	7.5Mbps
San Bernadino to Douglas	2Mbps
Douglas to Mule Mtn	4Mbps

C-1.7 SYSTEM DIAGRAM

Motorola has included system diagrams on the following pages.

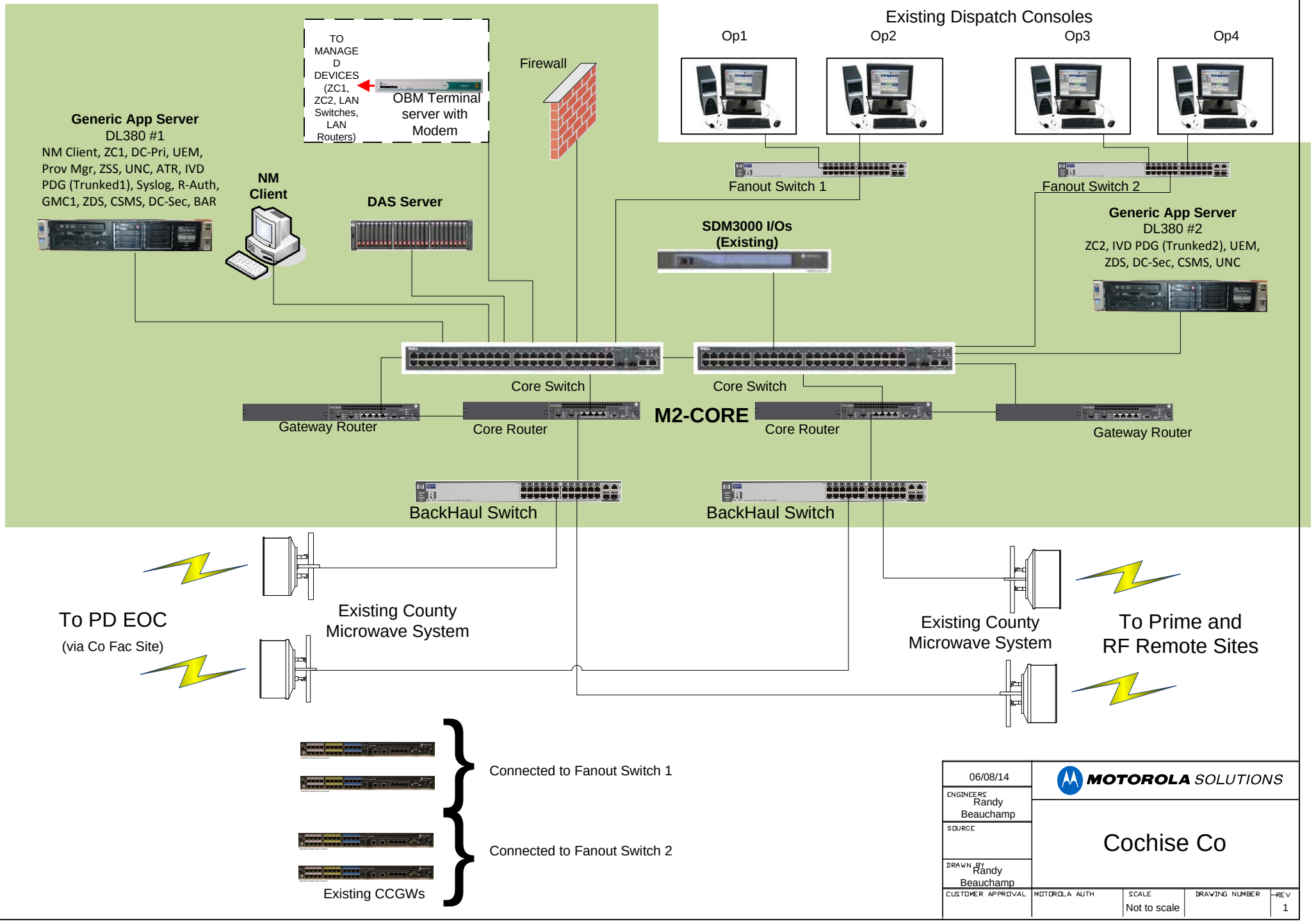


Sierra Vista PD EOC

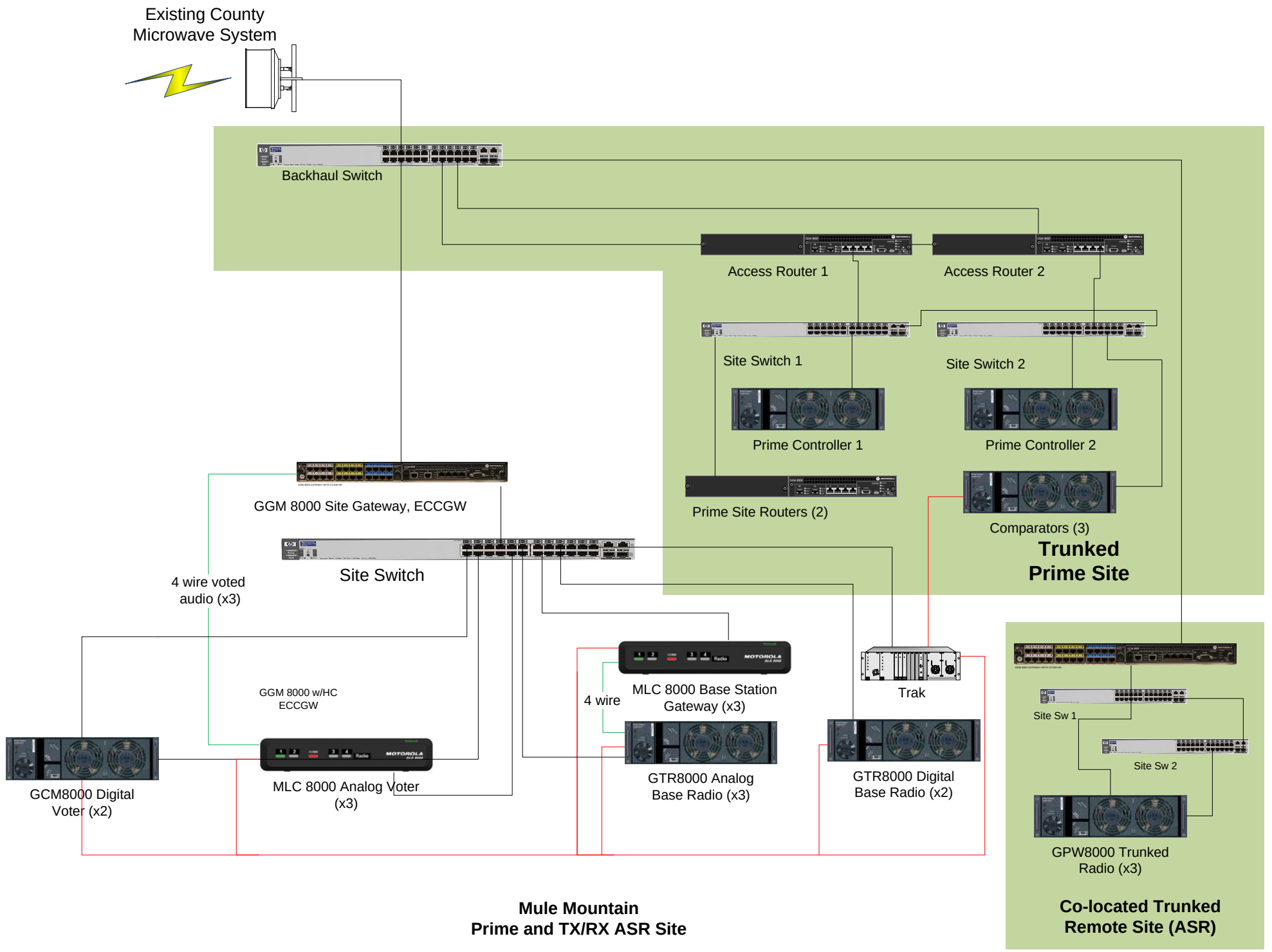


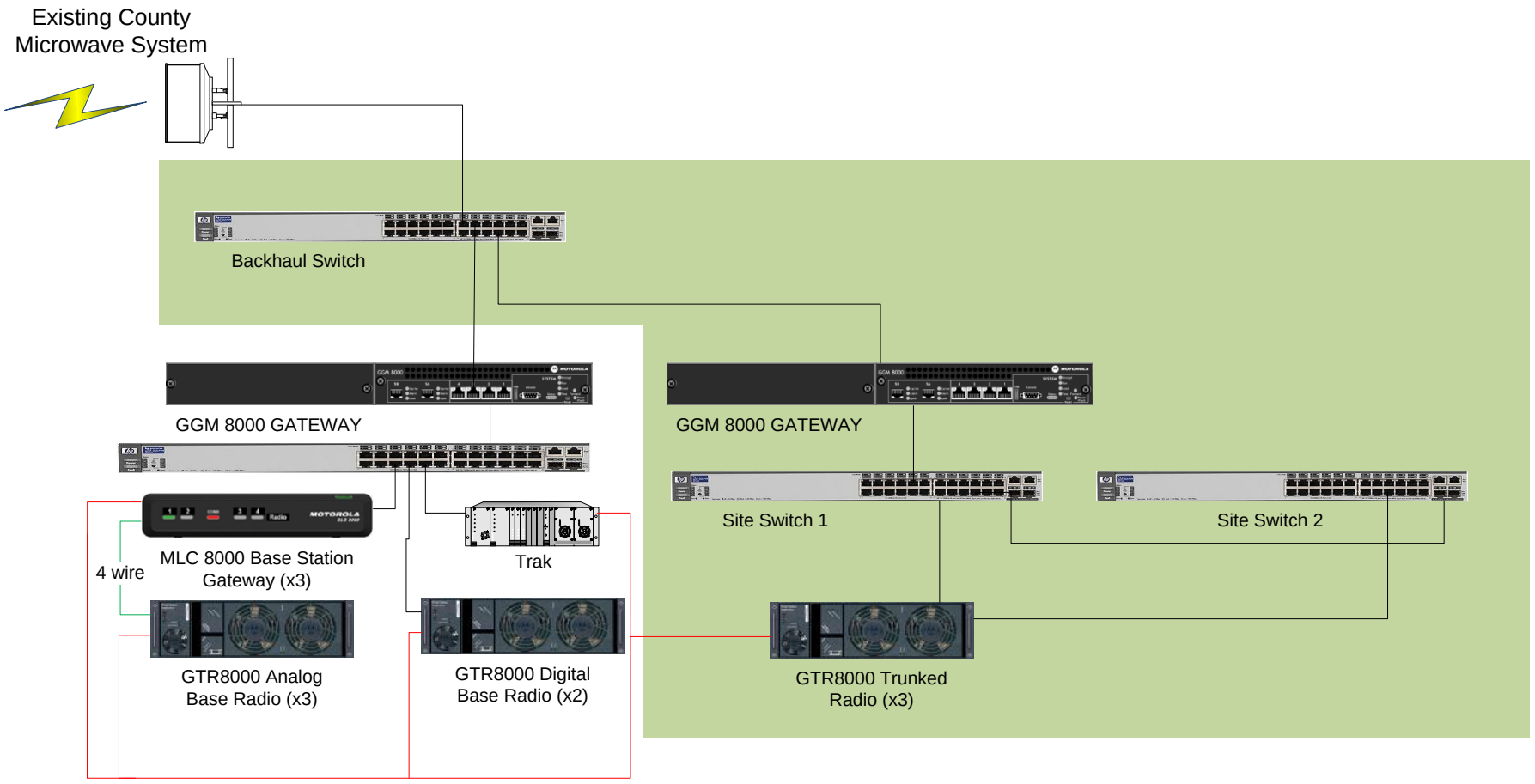
County Facility at
Sierra Vista
Pass-through Site

700 MHz ASTRO 25 M2 Core Trunked System
Master Site at the County EOC Site



06/08/14	MOTOROLA SOLUTIONS			
ENGINEERS Randy Beauchamp	Cochise Co			
SOURCE				
DRAWN BY Randy Beauchamp				
CUSTOMER APPROVAL	MOTOROLA AUTH	SCALE Not to scale	DRAWING NUMBER	REV 1

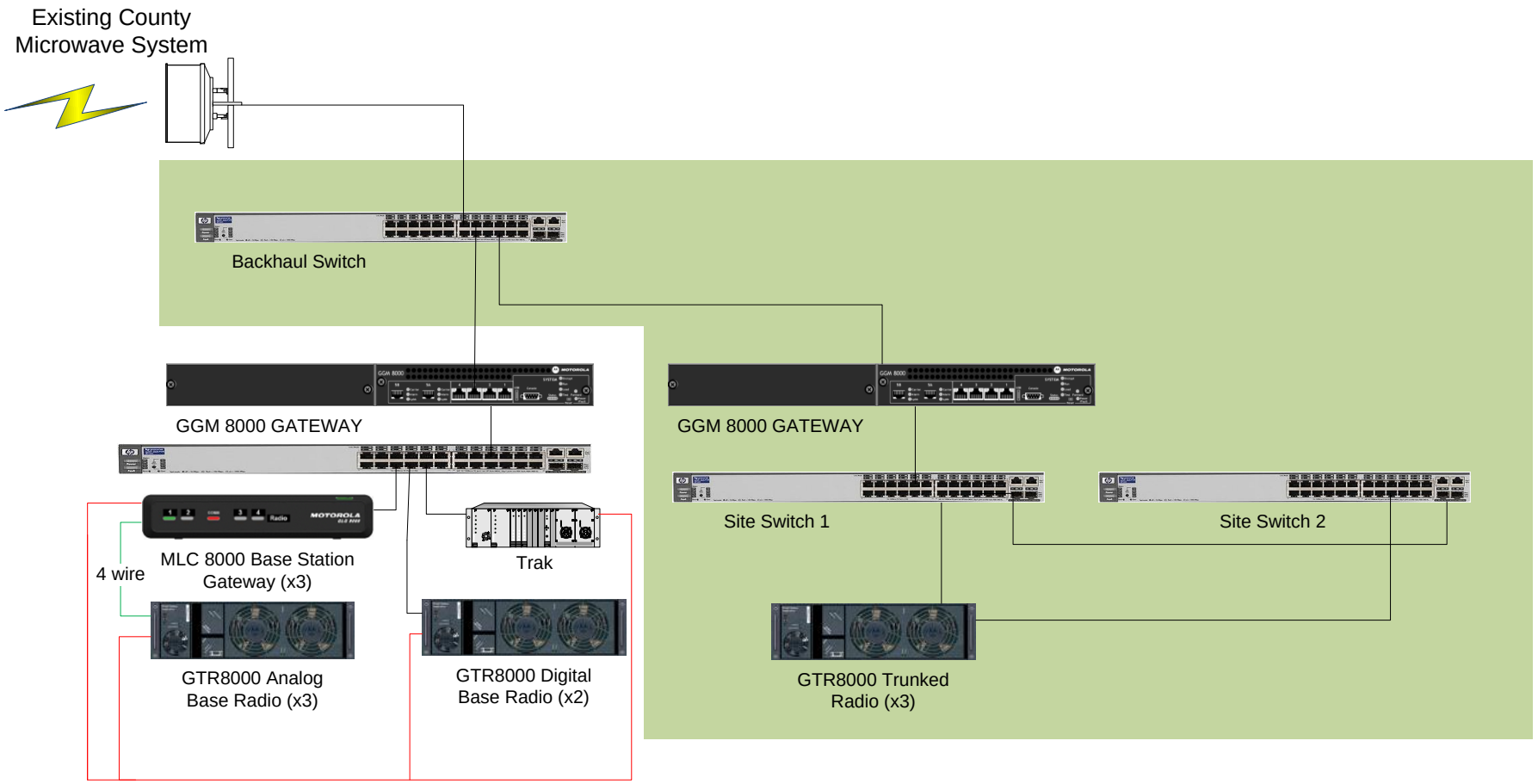

Existing County
Microwave System
Backhaul Switch
Access Router 1
Access Router 2
Site Switch 1
Site Switch 2
Prime Controller 1
Prime Controller 2
Prime Site Routers (2)
Comparators (3)
Trunked
Prime Site
GGM 8000 Site Gateway, ECCGW
Site Switch
4 wire voted
audio (x3)
GGM 8000 w/HC
ECCGW
4 wire
MLC 8000 Base Station
Gateway (x3)
Trak
GCM8000 Digital
Voter (x2)
MLC 8000 Analog Voter
(x3)
GTR8000 Analog
Base Radio (x3)
GTR8000 Digital
Base Radio (x2)
Site Sw 1
Site Sw 2
GPW8000 Trunked
Radio (x3)
Co-located Trunked
Remote Site (ASR)
Mule Mountain
Prime and TX/RX ASR Site



Simulcast TX/RX Sites

(1 of 5)

Sierra Vista
Black Knob
Bernadino
Douglas
Elfrida



Remote ASR TX/RX Sites

(1 of 2)

Texas Canyon

Jordan Farms

STATEMENT OF WORK

C-2.1 CIVIL WORK FOR COCHISE COUNTY-PROVIDED FACILITIES

Motorola Responsibilities:

No civil work has been included in this contract.

Customer Responsibilities:

- Secure site lease/ownership, zoning, permits, regulatory approvals, easements, power, and Telco connections.
- Provide clear and stable access to the sites for transporting electronics and other materials. Sufficient site access must be available for trucks to deliver materials under their own power and for personnel to move materials to the facility without assistance from special equipment.
- Design and construct facilities for housing communications equipment such as shelters, towers, generators, fuel tanks, fenced compounds, etc.
- Supply adequately sized electrical service, backup power (generator, batteries, etc.) including the installation of conduit, circuit breakers, outlets, etc., at each equipment location. Provide AC power (dedicated 20A, AC outlets - simplex with ground) for each major piece of equipment within 6 feet of the location of the Motorola-supplied equipment, including the associated electrical service and wiring (conduit, circuit breakers, etc.).
- Provide adequate HVAC, grounding, lighting, cable routing, and surge protection (also, among existing and Motorola-provided equipment) based upon Motorola's Standards and Guidelines for Communication Sites (R56). Ceiling (minimum 9 feet) and cable tray heights (minimum 8 feet) in the equipment rooms in order to accommodate 7-foot equipment racks.
- Provide floor space and desk space for the System equipment at customer -provided facilities. Each rack shall be provided a minimum of 24-inch x 24-inch footprint with 36-inch clearance in the front and back.
- Relocate existing equipment, if needed, to provide required space for the installation of Motorola-supplied equipment.
- Bring grounding system up to Motorola's R56 standards and supply a single point system ground, of 5 ohms or less, to be used on all FNE supplied under the Contract. Supply grounding tie point within 10 feet from the Motorola-supplied equipment.
- Provide all necessary wall or roof penetrations on existing buildings for antenna coax and microwave waveguide (if applicable) for main transmitter antennas, microwave radios, and control station Yagi antennas.
- Provide obstruction-free area for the cable run between the demarcation point and the communications equipment.
- Resolve any environmental issues including, but not limited to, asbestos, structural integrity (rooftop, water tank, tower, etc.) of the site, and any other building risks. (Resolve environmental or hazardous material issues).

- Arrange for space on the tower for installation of new antennas at the proposed heights.
- Perform structural analysis of existing tower and rooftops as required to confirm that the structure is capable of supporting proposed and future antenna loads.
- Supply all permits as contractually required.
- Supply interior building cable trays, raceways, conduits, and wire supports.
- Supply engineering and drafting as required for modifications to existing building drawings for site construction.
- Pay for usage costs of power and generator fueling, both during the construction and installation effort, and on an ongoing basis.
- Complete all Customer deliverables in accordance within the approved project schedule. If Customer (including its other contractors) delays the project schedule, it will make the promised payments according to the project schedule as if no delay occurred; and the parties will execute a change order to extend the project schedule and, if requested, compensate Motorola for all reasonable charges incurred because of the delay.

Completion Criteria:

All sites are ready for equipment installations in compliance with Motorola's R56 standards.

C-2.2 SYSTEM INSTALLATION

C-2.2.1 Install Fixed Network Equipment (Milestone)

Motorola Responsibilities:

- Install system equipment as specified by the Equipment List, System Description, and system drawings.

Interference:

- Motorola is not responsible for interference caused or received by the Motorola provided equipment except for interference that is directly caused by the Motorola-provided transmitter(s) to the Motorola-provided receiver(s).
- Should the customer's system experience interference, Motorola can be contracted to investigate the source and recommend solutions to mitigate the issue.
- Bond the supplied equipment to the site ground system in accordance with Motorola's R56 standards.
- Will interface with the following network connections:
- Will remove existing equipment.
- Will relocate existing equipment to a location designated by the customer .
- Will dispose of existing equipment.

Customer Responsibilities:

- Provide storage location for the Motorola equipment. Provide inventory of all Motorola equipment

- Provide access to the sites, as necessary.

Completion Criteria:

Fixed Network Equipment installation completed and ready for optimization.

C-2.2.2 Fixed Network Equipment Installation Complete

All fixed network equipment installed and accepted by customer .

C-2.2.3 Existing Console and VHF Simulcast Integration

Motorola Responsibilities:

- Perform programming of existing consoles as needed, based on the console templates designed during the fleet mapping process.
- The existing consoles and simulcast equipment will be upgraded to the same release as the new M2 core site equipment.
- Work with the customer to develop a mutually agreed cutover plan.

Customer Responsibilities:

Be present at the system cutover to ensure smooth cutover operation.

Completion Criteria:

Existing console and VHF Simulcast integration is complete.

Design Assumptions:

Motorola has made several system design assumptions in preparing this contract, which are noted below. Should any of these assumptions be incorrect, Motorola reserves the right to amend the contract which could result in a change in project scope, schedule, and/or cost. Motorola will need to verify all assumptions or seek alternate solutions in the case of invalid assumptions.

- This quote does not include considerations for any site specific installation requirements, including but not limited to:
  - HVAC.
  - Floor Loading.
  - Power sourcing/loading.
  - Breaker panel availability.
  - Surge suppression, beyond that provided by Motorola for new equipment.
- All power/HVAC will be provided by customer :
  - Equipment power is to be 120V AC.
  - The demarcation point will be the circuit distribution devices in the equipment racks.
  - Customer will provide NEC and R56 compliant TVSS power panel protection and grounding connection points for all rack-mounted equipment.

  - Customer will provide a connection to the building grounding system at each operator position.

- All existing sites or equipment locations will have sufficient space available for the system described. Customer will be responsible to secure the use of existing equipment racks and power/grounding systems for the proposed hardware from existing site owners
- Motorola is not providing any console workspace furniture or enclosures. Customer will be responsible for providing furniture and any custom equipment to accommodate the console operator terminal(s) and to suit individual dispatcher preferences.
- Any site/location or facility upgrades or modifications are the responsibility of customer.
- Approved local, State, or Federal permits as may be required for the installation and operation of the proposed equipment are the responsibility of customer .
- No provisions have been made to provide relay closure/detection for shared AUXI/O resources between the MCC 7500 and the existing consoles as none were identified during the design.
- No logging recorder solution integrated with the radio system network has been included. Customer -supplied analog logging recorder will be able to record audio via the resources connected to the CCGW only. Talkgroups along with signaling directly coming from the IP radio network will not be able to be accessed by the analog logging recorder.
- This design does not make any claims with regards to equivalent functionality between the existing console dispatch equipment/design and the MCC 7500 dispatch equipment.
- Motorola has not made any provisions in its design for connection of third-party systems to its dispatch hardware, this includes but is not limited to:
  - Computer Aided Dispatch (CAD).
  - Telephone Interconnect.
  - IP Logging recorder.
- Any required system interconnections not specifically outlined here will be provided by customer . These may include dedicated phone circuits, microwave links or other types of connectivity.
- No coverage guarantee is included in this contract.
- No box level or performance spec testing will be conducted.
- No logging recorder solution has been included.
- Motorola is not responsible for System performance deficiencies that are caused by ancillary equipment not furnished by Motorola as part of this System which is attached to or used in connection with the System or for reasons or parties beyond Motorola’s control, such as natural causes; the construction of a building that adversely affects the microwave path reliability or radio frequency (RF) coverage; the addition of frequencies at System sites that cause RF interference or intermodulation; or Customer changes to load usage or configuration outside the Specifications.

C-2.2.4 Existing VHF and Consoles Integration Complete

- Console installation completed and accepted by customer .

C-2.2.5 Control Station Installation

Motorola Responsibilities:

- Properly connectorize and ground the cabling, which will be run to the outdoor antenna location using the least obtrusive method.
- Protect the cabling by providing and installing a bulkhead lightning surge protector.
- Survey the exact mounting locations and develop control station installation plan.
- Perform the following tasks for the local control stations installations:
  - Install Equipment identified on equipment list.
  - Assist Customer to determine the locations of control stations and desk sets at each site.
  - Install RF local control stations identified in the equipment list.
  - Install line (not greater than 100 feet in length) and antenna system (connectors, coax grounding kit, antenna, and surge protection). Confirm line length is appropriate.
  - Connect to customer -supplied ground point.
- Program all control stations once, from the template (approved by customer prior to delivery.

Customer Responsibilities:

- Provide cable entry into the building through wall feed-through and seal with silicone, or provide an entry plate and boot.
- Provide ground point within 6 cable feet of the control station.
- Provide necessary space for installation of the local control station. (This also requires a flat surface for placement.)
- Supply, exterior or internal, vertical spaces for installation of the control station antenna with no more than a 100-foot cable run. Confirm length.
- Provide an elevated antenna mounting location.
- Supply a dedicated 115 VAC grounded electrical outlet rated at 15 A to power the control station and remote control device. Provide an outlet within 6 feet of the unit.
- Supply a ground point of 5 ohms or less located in the immediate vicinity (within 6 feet) of the finalized location of the antenna and control station.
- Provide antenna-mounting facilities at each of the RF control station points specified, while providing an adequate means of feed-line routing and support.

Completion Criteria:

Completion of all the control station installations, and approval by customer .

C-2.2.6 Control Station Complete

Control Station installation completed and accepted by customer .

C-2.2.7 System Installation Acceptance (Milestone)

All equipment installations are completed and accepted by customer.

C-2.3 SITES

ACCESS TO SITES. Customer will provide a designated project manager; all necessary 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

as reasonably requested by Motorola so that it may perform its duties in accordance with the Performance Schedule and Statement of Work. If the Statement of Work so indicates, Motorola may assist Customer in the local building permit process.

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 SOW is predicated upon normal soil conditions as defined by the version of E.I.A. standard RS-222 in effect on the date the Professional Services Agreement becomes effective..

SITE ISSUES. If a party determines that the sites identified are no longer available or desired, or if subsurface, structural, adverse environmental or latent conditions at any site differ from those indicated in the contract 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.

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, such as natural causes; the construction of a building that adversely affects the microwave path reliability or radio frequency (RF) coverage; the addition of frequencies at System sites that cause RF interference or intermodulation; or Customer changes to load usage or configuration outside the Specifications.

Customer will notify Motorola immediately if a date change for a scheduled training program is required. If Motorola incurs additional costs because Customer reschedules a training program less than thirty (30) days before its scheduled start date, Motorola may recover these additional costs.

C-2.4 SYSTEM OPTIMIZATION

C-2.4.1 Optimize System FNE

Motorola Responsibilities:

- Verify that all equipment is operating properly and that all electrical and signal levels are set accurately.
- Check forward and reflected power for all radio equipment, after connection to the antenna systems, to verify that power is within tolerances.
- Motorola and its subcontractors optimize each subsystem.
- Check audio and data levels to verify factory settings.
- Test features and functionality are in accordance with manufacturers' specifications and that they comply with the final configuration established during the CDR/system staging.
- Test and optimize the simulcast system.
- Install and integrate the RF sites with the system, then optimize and activate the core controller.

- Integrate the consoles and RF sites into the system to ensure proper operation.
- Set up the consoles on the new radio system to perform the dispatching operation.

Customer Responsibilities:

- Provide access/escort to the sites.
- Provide required radio ID and alias information to enable alias database setup for interface to console.
- Dispatchers to use the existing conventional system icons for dispatching until cutover.

Completion Criteria:

- System FNE optimization is complete.

C-2.4.2 Link Verification

Motorola Responsibilities:

- Perform test to verify site link performance, prior to the interconnection of the Motorola-supplied equipment to the link equipment.

Customer Responsibilities:

- Make available the required links which meet the Motorola-supplied specifications.

Completion Criteria:

- Link verification successfully completed.

C-2.4.3 Optimization Complete

System optimization is completed. Motorola and Customer agree that the equipment is ready for acceptance testing.

C-2.5 TRAINING

C-2.5.1 Perform Training

Motorola Responsibilities:

- Finalize Training Plan and schedules purchased as part of this project with Customer Project Manager.
- Conduct the training classes outlined in the Training Plan.

Customer Responsibilities:

- Attend training classes.
- Comply with the prerequisites in the Training Plan.

Completion Criteria:

All training classes completed.

C-2.5.2 Training Complete

All training classes completed.

C-2.6 AUDIT AND ACCEPTANCE TESTING

C-2.6.1 Perform R56 Installation Audit

Motorola Responsibilities:

- Perform R56 site-installation quality audits, verifying proper physical installation and operational configurations.
- Create site evaluation report to verify site meets or exceeds requirements, as defined in Motorola's Standards and Guidelines for Communication Sites (R56).

Customer Responsibilities:

- Provide access/escort to the sites.
- Witness tests. (optional)

Completion Criteria:

All R56 audits completed successfully.

C-2.7 CONDUCT FIELD ATP

Motorola Responsibilities:

- Conduct the Field ATP based upon functional testing documents approved during the Design Review phase.
- If any major task as contractually described fails, repeat that particular task after Motorola determines that corrective action has been taken.
- Document all issues that arise during the acceptance tests.
- Document the results of the acceptance tests and present to Customer for review.
- Resolve any minor task failures before Final System Acceptance.

Customer Responsibilities:

Witness the Field ATP.

Completion Criteria:

- Successful completion of the Field ATP.
- Customer approval of the Field ATP.

C-2.8 SUBSCRIBER PROGRAMMING

C-2.8.1 Customer Program and Distribute Portables

Motorola Responsibilities:

- Program test portables with each template version and activate them on the system.
- Once all templates and client software is tested and approved by customer, Motorola requests written approval of template acceptance.
- Program all the portables, as identified in the equipment list, based upon Customer approved programming templates, client software, and fleetmap. A “one-time only” programming is included in the project pricing.
- Deliver units to authorized Customer personnel and inventory upon receipt.
- Program 71 new APX7000 subscribers based on the agreed fleetmap design.

Customer Responsibilities:

- Approve final template(s) for portable programming.
- Upon receipt of portables, a customer -authorized signatory acknowledges receipt of all portables, accessories and proper operation of a sampling of portables.
- Distribute the portables to end users.

Completion Criteria:

All portables are successfully programmed and approved by customer .

C-2.8.2 Subscribers Complete

All Subscribers are programmed and/or distributed/installed successfully, and approved by customer .

C-2.9 FINALIZE

C-2.9.1 Cutover

Motorola Responsibilities:

- Motorola and Customer develop a mutually agreed upon cutover plan based upon discussions held during the CDR.
- During cutover, follow the written plan and implement the defined contingencies, as required.
- Conduct cutover meeting(s) to address both how to mitigate technical and communication problem impact to the users during cutover and during the general operation of the system.

Customer Responsibilities:

- Attend cutover meetings and approve the cutover plan.
- Notify the user group(s) affected by the cutover (date and time).
- Conduct a roll call of all users working during the cutover, in an organized and methodical manner.
- Ensure that all subscriber users are trained and the subscribers have been activated on the system.
- Provide Motorola with the subscriber information for input into the system database, for activation.

Completion Criteria:

Successful migration from the old system to the new system.

C-2.9.2 Resolve Punchlist

Motorola Responsibilities:

- Work with Customer to resolve punchlist items, documented during the Acceptance Testing phase, in order to meet all the criteria for final system acceptance.

Customer Responsibilities:

- Assist Motorola with resolution of identified punchlist items by providing support, such as access to the sites, equipment and system, and approval of the resolved punchlist item(s).

Completion Criteria:

All punchlist items resolved and approved by customer .

C-2.9.3 Transition to Service/Project Transition Certificate

Motorola Responsibilities:

- Review the items necessary for transitioning the project to warranty support and service.
- Provide a Customer Support Plan detailing the warranty and post-warranty support, if applicable, associated with the Contract equipment.
- Provide additional information regarding post-warranty support, included in the Warranty/Post-Warranty section of this document.

Customer Responsibilities:

- Participate in the Transition Service/Project Transition Certificate (PTC) process.

Completion Criteria:

All service information has been delivered and approved by customer .

C-2.9.4 Finalize Documentation

Motorola Responsibilities:

Provide the following documents:

- System-Level Diagram
- Rack Diagrams.
- ATP Test Checklists.
- Field Acceptance Test Plan Test Sheets and Results.

Customer Responsibilities:

Receive and approve all documentation provided by Motorola.

Completion Criteria:

All required documentation is provided and approved by customer .

C-2.9.5 Final Acceptance (Milestone)

- All deliverables completed, as contractually required.
- Final System Acceptance received from customer .

C-2.10 PROJECT ADMINISTRATION

C-2.10.1 Project Status Meetings

Motorola Responsibilities:

- Motorola Project Manager, or designee, will attend all project status meetings with Cochise County, as determined during the CDR.
- Record the meeting minutes and supply the report.
- The agenda will include the following:
  - Overall project status compared to the Project Schedule.
  - Product or service related issues that may affect the Project Schedule.
  - Status of the action items and the responsibilities associated with them, in accordance with the Project Schedule.
  - Any miscellaneous concerns of either Customer or Motorola.

Customer Responsibilities:

- Attend meetings.
- Respond to issues in a timely manner.

Completion Criteria:

Completion of the meetings and submission of meeting minutes.

C-2.10.2 Progress Milestone Submittal

Motorola Responsibilities:

- Submit progress (non-payment) milestone completion certificate/documentation.

Customer Responsibilities:

- Approve milestone, which will signify confirmation of completion of the work associated with the scheduled task.

Completion Criteria:

Customer approval of the Milestone Completion document(s).

C-2.10.3 Change Order Process

Either Party may request changes within the general scope of this Agreement. If a requested change causes an increase or decrease in the cost or time required to perform this Agreement, the Parties will agree to an equitable adjustment of the Contract Price, Performance Schedule, or both, and will reflect the adjustment in a change order. Neither Party is obligated to perform requested changes unless both Parties execute a written change order.

PRELIMINARY FIELD ACCEPTANCE TEST PLAN

Testing of the proposed equipment is included. This includes the following:

- Test features and functionality are in accordance with manufacturers' specifications.
- Verify the operational functionality and features of the individual subsystems and the system supplied by Motorola, as contracted.

A detailed Acceptance Test Plan will be developed upon purchase and will be reviewed during the Project Kickoff/Design Review meeting.

C-3.1 WIDE AREA TRUNKING - TDMA ONLY SITES

C-3.1.1 Auto Site Affiliation

1. DESCRIPTION

A Radio affiliation is a function that links a unique radio ID and unique talkgroup to a specific site. This information is stored in a affiliation table in the zone database.
Before resources are assigned, the affiliation table is accessed to know which sites need to be assigned to support the call. Only the sites that need to be assigned that have associated talkgroups will be assigned. If the site does not have that talkgroup affiliated to it will not be assigned. This allows for more calls to be processed with fewer resources.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 1
RADIO-3 - TALKGROUP 2
RADIO-3 - SITE - SITE 2
RADIO-4 - TALKGROUP 2
RADIO-4 - SITE - SITE 2
This test requires the ZoneWatch feature.

Note: There are system settings which could affect the assignment of resources, such as required site.

VERSION #1.030

2. TEST

Step 1. Turn RADIO-1 off and on.

Step 2. Verify via ZoneWatch that RADIO-1 sends in its affiliation.

Step 3. Initiate a call using RADIO-1 on TALKGROUP 1.

Step 4. Verify RADIO-2 can receive and respond to the call. Using ZoneWatch verify that no resources are assigned at SITE 2 as there are no subscribers affiliated to TALKGROUP 1 at SITE 2.

Step 5. Initiate a call on TALKGROUP 2 using RADIO-3.

Step 6. Verify that RADIO-4 can receive and respond to the call. Using ZoneWatch verify that no resources are assigned at SITE 1 as there are no subscribers affiliated to TALKGROUP 2 at SITE 1.

Pass____ Fail____

C-3.1.2 Talkgroup Call

1. DESCRIPTION

The Talkgroup is the primary level of organization for communications on a trunked radio system. Radios with Talkgroup call capability will be able to communicate with other members of the same Talkgroup. This provides the effect of a private channel down to the Talkgroup level.
This test will demonstrate that a Talkgroup transmission initiated by a radio user will only be heard by system users, which have, the same Talkgroup selected. As with other types of calls, Talkgroup calls can take place from anywhere in the system.

SETUP

RADIO-1 - SITE1 - TG1
RADIO-2 - SITE2 - TG1
RADIO-3 - SITE1 - TG2
RADIO-4 - SITE2 - TG2

VERSION #1.040

2. TEST

Step 1. Initiate a Wide Area Call with RADIO-1 in TG1.

Step 2. Observe that only RADIO-2 will be able to monitor and respond to the call.

Step 3. Initiate a Wide Area Call with RADIO-3 in TG2.

Step 4. Observe that only RADIO-4 will be able to monitor and respond the call.

Pass____ Fail____

C-3.1.3 Continuous Assignment Updating

1. DESCRIPTION

When a talkgroup is assigned a voice channel, the site controller continues to transmit the channel assignment on the control channel for the duration of the talkgroup call. Radios coming into use on the system are automatically sent to voice channels with conversations in progress involving their selected talkgroups.

SETUP

RADIO-1 - TG1
RADIO-2 - TG1
RADIO-3 - TG1

2. TEST

Step 1. Turn OFF RADIO-1.

Step 2. Initiate a Talkgroup Call using RADIO-2 and verify RADIO-3 hears the audio.

Step 3. While the Talkgroup Call is in progress, turn ON RADIO-1.

Step 4. Observe RADIO-1, which was just brought back into service, joins the Talkgroup Call already in progress.

Step 5. End the talkgroup call.

Step 6. Switch RADIO-1 to another talkgroup.

Step 7. Initiate a Talkgroup Call from RADIO-2 to RADIO-3.

Step 8. While the Talkgroup Call is in progress, set RADIO-1 back to TG1.

Step 9. Observe that RADIO-1 joins the Talkgroup Call already in progress.

VERSION #1.010

Pass____ Fail____

C-3.1.4 Recent User Priority (TDMA)

1. DESCRIPTION

A recent user of the channel has priority over other users of equal priority of being assigned a channel when a busy queue exists. The maximum number of consecutive times that a user may be elevated to recent user priority is two.

SETUP

RADIO-1 - TG1
RADIO-1 - SITE - SITE1
RADIO-2 - TG2
RADIO-2 - SITE - SITE1
RADIO-3 - TG3
RADIO-3 - SITE - SITE1
RADIO-5 - TG4
RADIO-5 - SITE - SITE1

VERSION #1.030

2. TEST

Step 1. Ensure that the priority level for all talkgroups is the same. Simulate a busy system by disabling all the physical channels at SITE1 with the exception of the control channel and one voice channel. Press the PTT of RADIO-5 and keep this call in progress for the duration of the test

Step 2. Press and hold the PTT switch of RADIO-1.

Step 3. Press and hold the PTT switch on RADIO-2 and then press and hold the PTT switch on RADIO-3. Verify that both radios receive a busy tone.

Step 4. Release the PTT switches on RADIO-2 and RADIO-3.

Step 5. Release the PTT switch on RADIO-1.

Step 6. As soon as RADIO-2 receives its callback tone, press and hold its PTT switch.

Step 7. Within 2 seconds of callback, re-key RADIO-1. Verify that RADIO-1 receives a busy tone. Release the PTT switch on RADIO-1.

Step 8. Release the PTT switch on RADIO-2. Verify that RADIO-1 receives a callback tone before RADIO-3.

Step 9. Repeat Steps 2-8 for RADIO-1 and RADIO-2. Verify that the priority of RADIO-1 is once more elevated in the busy queue.

Step 10. Repeat Steps 2-8 for RADIO-1 and RADIO-2 once more. Verify that in Step 9 that RADIO-3 receives the callback tone since RADIO-1 cannot be elevated in the busy queue more than two consecutive times. Release the PTT of RADIO-5.

Pass____ Fail____

C-3.1.5 Call Alert

1. DESCRIPTION

Call Alert is a tone page that allows a user to selectively alert another radio unit. The initiating radio will receive notification from the trunked system as to whether or not the page was received by the target radio. Units receiving a Call Alert will sound an alert tone. As with other types of calls, Call Alerts can take place from anywhere in the system.

SETUP

RADIO-1 - TG1
RADIO-2 - TG2
RADIO-3 - TG3

VERSION #1.010

2. TEST

Step 1. Using RADIO-1, press the page button.

Step 2. Enter the unit ID of RADIO-2 with the keypad, or scroll to the location where this ID is stored

Step 3. Press the PTT to initiate the call alert. Verify that the RADIO-1 user receives audible indication that the Call Alert was sent.

Step 4. Verify that RADIO-2 user receives an audible indication of an incoming Call Alert was sent but RADIO-3 does not.

Step 5. Verify RADIO-1 gets an audible indication that the Call Alert was successfully received at the target radio.

Step 6. Turn off RADIO-2. Send a Call Alert from RADIO-1 to RADIO-2.

Step 7. Verify that the RADIO-1 user receives audible indication that the Call Alert was sent.

Step 8. Verify RADIO-1 receives a "No Acknowledgement" indication that the Call Alert was not received at the target radio.

Pass____ Fail____

C-3.1.6 In Call User Alert (Enabled)

1. DESCRIPTION

In-Call User Alert enhances the Call Alert feature to allow Call Alerts to be received by radios that are currently involved in voice and data services. As part of this feature, the radio supports Talkgroup Muting where the radio user can mute all talkgroup voice received by the radio. The Console Dispatcher or another radio user can unmute the radio by sending the radio a Call Alert.

Note: Talkgroup Muting is a programmable option in the radio. There are also sub-options which will affect the time and operation of the Talkgroup muting.

SETUP

RADIO-1 - TG1
RADIO-2 - TG2
CONSOLE-1 - TG1
Verify that In-Call User Alert is enabled in the Unified Network Configurator Wizard.

VERSION #1.020

2. TEST

Step 1. Verify that RADIO-1 and RADIO-2 have Talkgroup Muting (VMUT) disabled in the radios.

Step 2. Enable Talkgroup Muting (VMUT) on RADIO-1.

Step 3. Verify that there is a visual indication on RADIO-1 that Talkgroup Muting is enabled.

Step 4. Initiate a talkgroup call on TG1 from CONSOLE-1.

Step 5. Verify that no audio is heard by RADIO-1 and that RADIO-1 displays the ID of CONSOLE-1.

Step 6. Send a Call Alert to RADIO-1 from RADIO-2. Verify that RADIO-1 receives a Call Alert and that RADIO-2 indicates success of Call Alert. Verify that CONSOLE-1 audio is now heard by RADIO-1

Step 7. End Console talkgroup call.

Step 8. Acknowledge Call Alert by hitting home key on RADIO-1.

Pass____ Fail____

C-3.1.7 In Call User Alert (Disabled)

1. DESCRIPTION

In-Call User Alert enhances the Call Alert feature to allow Call Alerts to be received by radios that are currently involved in voice and data services. As part of this feature, the radio supports Talkgroup Muting where the radio user can mute all talkgroup voice received by the radio. The Console Dispatcher or another radio user can unmute the radio by sending the radio a Call Alert.

Note: Talkgroup Muting is a programmable option in the radio. There are also sub-options which will affect the time and operation of the Talkgroup muting.

SETUP

RADIO-1 - TG1
RADIO-2 - TG2
CONSOLE-1 - TG1

VERSION #1.010

2. TEST

Step 1. Verify that In-Call User Alert is disabled. Verify that RADIO-1 and RADIO-2 have Talkgroup Muting (VMUT) disabled (Off) in the radios.

Step 2. Enable Talkgroup Muting (VMUT) (Turn on) on RADIO-1.

Step 3. Verify that there is a visual indication on RADIO-1 that Talkgroup Muting is enabled.

Step 4. Initiate a talkgroup call on TG1 from CONSOLE-1.

Step 5. Verify that no audio is heard by RADIO-1 and that RADIO-1 displays the ID of CONSOLE-1.

Step 6. Send a Call Alert to RADIO-1 from RADIO-2. Verify that RADIO-1 does not receive a Call Alert and that RADIO-2 indicates failure of Call Alert. End Console talkgroup call.

Step 7. Send a Call Alert to RADIO-1 from CONSOLE-1. Accept the Call Alert at RADIO-1 by pressing the Home key.

Step 8. Initiate a talkgroup call on TG1 from CONSOLE-1.

Step 9. Verify that audio is now heard by RADIO-1 and that RADIO-1 displays the ID of CONSOLE-1.

Step 10. End Console talkgroup call.

Pass____ Fail____

C-3.1.8 Emergency Alarm and Call with Top of Queue (TDMA)

1. DESCRIPTION

Users in life threatening situations can use the Emergency button on the radio to immediately send a signal to the dispatcher and be assigned the next available voice channel. An Emergency Call can be set to either Top of Queue or Ruthless Preemption operation. To accomplish this test, an Emergency Alarm and Call will be initiated from a subscriber which will be received by a subscriber affiliated at any site of any zone in the system.

NOTE: If the subscriber does not have the Display option, the Emergency ID will not be displayed.

NOTE: All radios and talkgroups should start with default priorities. Default is 10.

SETUP

RADIO-1 - TG1
RADIO-1 - SITE - SITE1
RADIO-2 - TG1
RADIO-2 - SITE - Any Site
RADIO-3 - TG2
RADIO-3 - SITE - SITE1
RADIO-4 - TG3
RADIO-4 - SITE - SITE1
RADIO-5 - TG4
RADIO-5 - SITE - Any Site

VERSION #1.020

2. TEST

Step 1. Verify the emergency type for TG1's template to be set up as Top of Queue.

Step 2. Simulate a busy system by disabling all channels at SITE1 with the exception of the control channel and one physical voice channel. Press the PTT on RADIO-5 and hold until the completion of the test.

Step 3. Press the PTT to initiate a call with RADIO-3 and hold the PTT switch until instructed to release.

Step 4. Key RADIO-4 and verify the radio receives a busy tone. Release the PTT switch on RADIO-4.

Step 5. Using RADIO-1, send an Emergency Call by depressing the emergency switch and then the PTT switch.

Step 6. Observe that RADIO-1 cannot transmit due to the voice channel being busy.

Step 7. Release the PTT switch on RADIO-3. Observe that RADIO-1 receives the call back before RADIO-4 and is able to proceed with the call.

Step 8. Observe that the display on RADIO-2 denotes an emergency and the unit ID or alias of RADIO-1.

Step 9. Dekey RADIO-1 and end the Emergency Call by holding down the Emergency button on RADIO-1 until an alert tone sounds. Verify RADIO-1 returns to normal operation.

Step 10. Verify RADIO-4 receives a callback. Release the PTT on RADIO-5. Return the system to normal operation.

Pass____ Fail____

C-3.1.9 Multigroup Call in Wait Mode

1. DESCRIPTION

This trunking feature allows an equipped radio user to transmit an announcement to several different talkgroups simultaneously. The multigroup (ATG) call can be flagged for Wait Mode in the Provisioning Manager (PM) database forcing all attached talkgroups to finish calls in progress before the trunked system will process the multigroup call. The system does not permit inactive, attached talkgroups to initiate Talkgroup Calls during the "wait" timeframe. As with other types of calls, multigroup calls can take place from anywhere in the system.

SETUP

RADIO-1 - TG1
RADIO-2 - TG2
RADIO-3 - RANDOM (Not part of MG)
RADIO-4 - ATG1

* TG1 and TG2 are members of ATG1.

* RANDOM is any talkgroup not a member of ATG1.

* Multigroups are set up through both the Provisioning Manager (PM) and the Subscriber Programming software.

VERSION #1.020

2. TEST

Step 1. Verify ATG1 is set for the Wait mode.

Step 2. Using RADIO-1, initiate a call on TG1.

Step 3. While RADIO-1 is keyed, attempt to initiate a multigroup call using RADIO-4 on ATG1. Verify RADIO-4 receives a busy tone because one of the talkgroups attached to ATG1 is involved in a Talkgroup Call.

Step 4. Key RADIO-2 and verify that a busy tone is received because the ATG1 call is in queue.

Step 5. Dekey RADIO-1 and verify RADIO-4 receives a callback.

Step 6. Key RADIO-4 and verify both RADIO-1 and RADIO-2 hear the multigroup call while RADIO-3 does not unmute.

Pass____ Fail____

C-3.1.10 Priority Monitor/Non-Priority Scan

1. DESCRIPTION

This test will demonstrate that a subscriber unit can scan a pre-programmed list to find any Priority and Non-priority Talkgroups with assigned voice channels at that site. To demonstrate this, a call will be initiated from a subscriber at a remote site on a talkgroup monitored by a subscriber at the same site as the scanning radio. The scanning radio will scan from its selected talkgroup to the active talkgroup.

Note: Subscribers must be capable of supporting the Talkgroup scan.

SETUP

RADIO-1 - TG1 (SCANNING)
RADIO-1 - SITE - SITE1
RADIO-2 - TG2
RADIO-2 - SITE - SITE1
RADIO-3 - TG3
RADIO-3 - SITE - SITE1
RADIO-4 - TG3
RADIO-4 - SITE - SITE2

* RADIO-1 needs to be set to a dial position configured to scan.

VERSION #1.010

2. TEST

Step 1. Verify that RADIO-1 is set to TG1 and in the scan mode of operation and programmed to scan TG1, TG2, and TG3.

Step 2. Initiate a Talkgroup Call with RADIO-4 and observe that RADIO-1 scans to the talkgroup and receives the call. Keep the call in progress until completion of the following step.

Step 3. Initiate a Talkgroup Call with RADIO-2 and observe that RADIO-1 does not receive the call since RADIO-1 is listening to TG3.

Pass____ Fail____

C-3.1.11 Priority Monitor/Priority Scan

1. DESCRIPTION

A subscriber unit can scan a pre-programmed list (in the radio) to find any Priority and Non-priority Talkgroups with assigned voice channels at that site. To demonstrate this, a call will be initiated from a portable at a remote site on a talkgroup monitored by a portable at the same site as the scanning radio. The scanning radio will scan from its selected talkgroup to the active talkgroup. The test will be repeated with an additional radio transmitting on the Priority Talkgroup while the scanning radio is scanning. This third radio will be on a remote site with a fourth radio on the Priority Talkgroup at the same site as the scanning radio.

SETUP

RADIO-1 - TG1 (SCANNING)
RADIO-1 - SITE - SITE1
RADIO-2 - TG1
RADIO-2 - SITE - SITE1
RADIO-3 - TG1
RADIO-3 - SITE - SITE2
RADIO-4 - TG2
RADIO-4 - SITE - SITE2
RADIO-5 - TG2
RADIO-5 - SITE - SITE1

VERSION #1.010

2. TEST

Step 1. Verify that RADIO-1 is set to TG1 and in the scan mode of operation and programmed to scan TG1 and TG2 with TG1 as its Priority Monitor Talkgroup.

Step 2. Verify Priority Monitor and the Valid Site setting is set to yes for SITE2.

Step 3. Initiate a Talkgroup Call with RADIO-4 to RADIO-5 and observe that RADIO-1 scans to the talkgroup and receives the call. Keep the call in progress until the completion of the following step.

Step 4. Initiate a Talkgroup Call with RADIO-3 and observe that RADIO-1 reverts to the TG1 and receives the call.

Pass____ Fail____

C-3.1.12 Site Access Control/"Both" Site Access Denial

1. DESCRIPTION

The system can be configured to limit radio or talkgroup access to selected valid sites. Control can be exercised to restrict radio users or talkgroups to certain sites, or to steer radio activity away from smaller sites in an effort to avoid busies. System flags establish which sites are valid for each individual radio user, talkgroup and multigroup. An overall Site Access Denial flag for the system governs how these radio and talkgroup settings affect the affiliation or rejection of radios to individual sites. Once a subscriber unit has been denied at a site, it will not attempt to access that site unless power is cycled or the user changes talkgroups. Four possible values for the Site Access Denial flag exist: Individual Only, Talkgroup Only, Either, or Both.
"Both" Site Access Denial indicates that a radio will not be allowed to affiliate to a site only if both the radio user and affiliated talkgroup do not have access to the site.

NOTE: Site Denial flags are not cleared from the subscriber until the power is cycled or the talkgroup is changed.

SETUP

RADIO-1 - TG1
RADIO-1 - SITE - SITE1
RADIO-2 - TG1
RADIO-2 - SITE - SITE2

VERSION #1.010

2. TEST

Step 1. Verify/Set the Site Access Denial Flag to Both.

Step 2. Cycle power to RADIO-1 and RADIO-2 to force them to affiliate, this will clear any site denials they may hold in memory.

Step 3. Initiate a TG1 call from RADIO-2. Verify that RADIO-2 is allowed to make the TG1 call.

Step 4. Set SITE2 to be a non-valid site for RADIO-2.

Step 5. Initiate a TG1 call from RADIO-2. Verify that RADIO-2 is allowed to make the TG1 call.

Step 6. Set SITE2 to be a non-valid site for TG1.

Step 7. Verify the updates complete.

Step 8. Initiate a TG1 call from RADIO-2. Verify that RADIO-2 receives a reject, and roams to a valid site. RADIO-2 is not allowed to make the TG1 call from SITE2 since TG1 nor RADIO-2 is valid at SITE2.

Step 9. Reset all Talkgroup and Radio User flags. Verify the updates complete.

Step 10. Recycle power to the radios to clear the affiliation flags.

Pass____ Fail____

C-3.1.13 Site Trunking Indication

1. DESCRIPTION

When a remote site loses its link or does not have a link to the Zone Controller, the affected site will enter "Site Trunking" mode of operation. Radios locked onto this site will be serviced locally within this site's coverage area.

NOTE: If the subscriber does not have the Display option, the "Site Trunking" indication will not be displayed.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 2
RADIO-2 - SITE - SITE 1
Lock the subscribers to SITE 1 if more than one site exists on the system.

VERSION #1.010

2. TEST

Step 1. Place SITE 1 into the Site Trunking mode.

Step 2. Verify that RADIO-1 and RADIO-2 are displaying the "Site Trunking" indication.

Step 3. Return the site to Wide Area Trunking unless the next test requires Site Trunking.

Pass____ Fail____

C-3.1.14 Talkgroup Call

1. DESCRIPTION

When a site goes into Site Trunking, radios with Talkgroup Call capability will be able to communicate with other members of the same talkgroup at that same site. Members of the same talkgroup at other sites will not be able to monitor those conversations.

SETUP

RADIO-1 - TG1
RADIO-1 - SITE - SITE1
RADIO-2 - TG1
RADIO-2 - SITE - SITE1
RADIO-3 - TG1
RADIO-3 - SITE - SITE2
RADIO-4 - TG1
RADIO-4 - SITE - SITE2

Note: All Radios should be "Site Locked"

VERSION #1.010

2. TEST

Step 1. Place SITE1 into the Site Trunking mode.

Step 2. Initiate a Talkgroup Call with RADIO-1 on TG1 at SITE1.

Step 3. Observe that only RADIO-2 will be able to monitor and respond to the call. Note that RADIO-3 and RADIO-4 are not able this monitor the call since the site is not in wide area operation.

Step 4. Initiate a Talkgroup Call with RADIO-3 on TG1 at SITE2.

Step 5. Observe that only RADIO-4 will be able to monitor and respond to the call.

Pass____ Fail____

C-3.1.15 Radio Check

1. DESCRIPTION

Radio Check is a Radio Control Manager (RCM) command used to verify that a radio is active in the trunking system. The Radio Check command causes the Zone Controller to poll for the radio requesting that the radio re-affiliate. When the radio re-affiliates, the RCM then has the knowledge that the radio is powered on and within system range. If the radio is involved in a conversation, whether group or interconnect, the RCM application displays a message to that effect.
The information displayed by the RCM in response to the Radio Check command is: current talkgroup affiliation, the multigroup that the talkgroup is attached to (assuming the talkgroup belongs to a multigroup), and the site where the radio is affiliated. If the radio does not respond to the Radio Check command, a message to that effect displays.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 2

VERSION #1.020

2. TEST

Step 1. Select the Command menu and then select the Radio Check item to open the Radio Check window.

Step 2. Enter the ID or alias of RADIO-2 into the entry box and click the Apply button.

Step 3. Observe the radio is polled and the current radio information is displayed on the RCM.

Step 4. Turn off RADIO-1.

Step 5. Enter the ID or alias of the RADIO-1 into the entry box and click the Apply button.

Step 6. Observe that the RCM displays "Radio Not Found."

Step 7. Depress and hold the PTT button of RADIO-2 until instructed to release.

Step 8. Enter the ID or alias of RADIO-2 into the entry box and click the Apply button. Observe that a busy for the radio is displayed on the RCM.

Step 9. Release the PTT button on RADIO-2.

Step 10. Observe the radio is polled and the current radio information is displayed on the RCM.

Pass____ Fail____

C-3.1.16 Radio Snapshot

1. DESCRIPTION

Snapshot is a Radio Control Manager (RCM) command used to retrieve information about an individual radio. Information provided by the RCM application in response to the Snapshot command includes: the serial number of the radio, current talkgroup/multigroup and site affiliations; the Regroup, Inhibit, and Selector Lock state of the radio. Snapshot information is taken from the system databases. The Snapshot command does not initiate any communication with the target radio.

SETUP

RADIO-1 - TG1
RADIO-1 - SITE - SITE1
RADIO-2 - TG1
RADIO-2 - SITE - SITE2
RADIO-3 - TG2
RADIO-3 - SITE - SITE3

* RADIO-1 and RADIO-3 must be programmed with Dynamic Regrouping capability.

*Make sure Radio Users are configured with a "Radio Primary Talkgroup Assignment" in the UCM.

VERSION #1.020

2. TEST

Step 1. Submit a Dynamic Regroup command for RADIO-1 and RADIO-3 to be regrouped to TG3.

Step 2. At the RCM, initiate the Snapshot command for RADIO-1.

Step 3. Verify that the RCM shows RADIO-1 affiliated to SITE1 and that its current Regroup state is "Regroup."

Step 4. At the RCM, revert the dynamic regrouping on RADIO-1 and RADIO-3.

Step 5. Initiate the Snapshot command for RADIO-1.

Step 6. Verify RADIO-1 shows an affiliation to SITE1 and that its current Regroup state is "Cancel Regroup."

Step 7. At the RCM, inhibit RADIO-2 and then initiate the Snapshot command for RADIO-2.

Step 8. Verify RADIO-2 shows an affiliation to SITE2 and that its current Inhibit state is "Selective Inhibit."

Step 9. At the RCM, revert RADIO-2 and then initiate the Snapshot command for RADIO-2.

Step 10. Verify RADIO-2 shows an affiliation to SITE2 and that its current Inhibit state is "Cancel Inhibit."

Pass____ Fail____

C-3.1.17 Radio Status

1. DESCRIPTION

This optional feature allows the Radio Control Manager (RCM) to view status information sent in by subscribers. Statuses are used to indicate the Radio operator's operational state (e.g. off duty). The information that will be displayed includes the radio alias, talkgroup alias, hour and minute time stamp, status number or message number, and the customer entered translation for the specific status. Status input is displayed in chronological order, independent of the type of status number.

SETUP

RADIO-1 - TG1
RADIO-1 - SITE - SITE1

* Configure RADIO-1 in the manager to use a particular status set.

* Configure the assigned status set (via the status set manager configuration objects) to include text translations for a few different statuses.

* The RCM user needs to be assigned the dispatch attachment group that matches the radio user's assigned dispatch attachment group.

VERSION #1.020

2. TEST

Step 1. Initiate a Status transmission from RADIO-1.

Step 2. Verify the RCM displays the proper Status text.

Pass____ Fail____

C-3.1.18 Selective Radio Inhibit

1. DESCRIPTION

The INHIBIT command issued by the Radio Control Manager (RCM) disables a radio, preventing it from transmitting or receiving any audio. All of the radio's functionality ceases while a radio is inhibited by the RCM. Once inhibited, the radio cannot be used to monitor voice channels or for any other radio user initiated activity. Note that an inhibited radio still monitors the control channel so that it can be re-enabled with the Cancel Inhibit command. Upon receiving the Cancel Inhibit command from the RCM, the radio returns to its normal operation.

SETUP

RADIO-1 - TG1
RADIO-1 - SITE - SITE1

VERSION #1.020

2. TEST

Step 1. From the Radio Control Manager select the Commands menu and then select the Radio Commands item in the menu to open the Command Window.

Step 2. Enter the IDs or aliases of RADIO-1.

Step 3. Select "Selective Inhibit" from the command pull down menu.

Step 4. Once all desired radio information is entered and appears in the command window click the submit button to initiate the command.

Step 5. Observe RADIO-1 is inhibited and appears to be dead.

Step 6. Observe that the Inhibit task appears in the Command Monitor window.

Step 7. Cancel the Inhibit by selecting the task in the Command Monitor window and clicking the Revert button to submit the task.

Step 8. Observe that the Cancel Inhibit task appears in the Command Monitor window and that RADIO-1 is returned to normal operation.

Pass____ Fail____

C-3.1.19 Emergency Alarm Display

1. DESCRIPTION

The emergency call information that is displayed on the Radio Control Manager (RCM) includes the radio alias of the radio that initiated the Emergency Alarm, the talkgroup that the radio was affiliated to at the time the alarm was sent, and the time the alarm was received.

SETUP

RADIO-1 - TG1
RADIO-1 - SITE - SITE1
RADIO-2 - TG1
RADIO-2 - SITE - SITE2

One RCM which has TG1 attached is required.

VERSION #1.020

2. TEST

Step 1. Open the Radio Control Manager (RCM) window(s) and verify that the Emergency Alarm window is visible. If it is not, go to the View menu and select it bringing it into the RCM viewable area.

Step 2. Initiate an Emergency Alarm from RADIO-1.

Step 3. Observe that the RCM receives the Emergency Alarm.

Step 4. Acknowledge the Emergency by selecting the Emergency in the window and clicking on the Respond button.

Step 5. Verify the window displays the radio alias, the talkgroup, and the time the alarm was received.

Step 6. Again, select the displayed Emergency and click the Delete button to clear the emergency.

Step 7. Reset the radio by holding the Emergency button until the radio clears.

Step 8. Repeat Steps 1-7 using RADIO-2.

Pass____ Fail____

C-3.1.20 Unified Event Manager - Views

1. DESCRIPTION

The Unified Event Manager (UEM) provides three different views. The purpose of this test is to demonstrate the views available from the UEM.

For A7.14: Custom views can be saved and retrieved by other NM Client users. This test demonstrates this capability, as well as demonstrating an improvement in display of Channel information.

SETUP

NMclient01 - UEM session up and running.

VERSION #1.050

2. TEST

Step 1. The first view is the Active Alarms. In the navigation pane expand Fault Management and select Network Events.

Step 2. Customize the Active Alarms display by selecting the View option from the menu bar, then select Search.

Step 3. 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.

Step 4. For each of the three searches a filtered alarm view is displayed that contains alarms for the appropriate device in the search.

Step 5. The second view is the Physical Summary view. In the navigation pane, expand Zone Maps and select Physical Summary. The Physical Summary View provides an aggregated alarm severity status of the devices located at all subnets in the Zone.

Step 6. The third view is the Service Summary. In the navigation pane, under Zone Maps select Service Summary. The Service Summary View provides a quick summary of the service status of sites in a Zone, including access to Channel status.

Step 7. In the main UEM window is an Alarm Summary View pane. In the Alarm Summary View, select the format for the desired view, pie, tabular or bar.

Step 8. Create a custom view. View the Active Alarms display to see result. Perform right click on the Network Events tree node in the navigation window and select export function. Select filter view, and provide a target location to save the custom view tree structure on NM Client.

Step 9. Log out of the UEM application, and log back in as a different user. Retrieve the custom view saved in step 8. View the Active Alarms display to see the same view.

Step 10. Navigate Network Database, select Repeater/Conventional Site and from Managed Resources menu, select Managed Resource Properties. Choose channel tab to display all channel status.

Pass____ Fail____

C-3.1.21 Console PC - Voice Processing Module Link Failure 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 Console PC to Voice Processing Module (VPM) link failure.

SETUP

RADIO-1 - TG1

CONSOLE-1 - TG1 (VPM Based console)

VERSION #1.020

2. TEST

Step 1. Initiate a call from RADIO-1 to CONSOLE-1 to verify communication.

Step 2. Remove the Ethernet cable from the VPM to the Console Site Ethernet Switch.

Step 3. Observe the UEM reports CommFailure alarms for the VPM.

Step 4. In addition, observe that CONSOLE-1 reports the link to the VPM as Down.

Step 5. Reconnect the VPM to the Console Site Ethernet Switch.

Step 6. Observe that UEM regains communication with the VPM and the Console PC to VPM link recovers.

Step 7. Initiate a call from RADIO-1 to CONSOLE-1 to verify communication.

Pass____ Fail____

C-3.1.22 Core Router Failure 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.

A Core Router/Gateway will be powered off to simulate a failure. The system health will be monitored on UEM.

SETUP

NMclient01 - UEM session up and running.

VERSION #1.040

2. TEST

Step 1. Verify that the Router/Gateway to be tested displays without failures (normal) on UEM. The core router is contained in the specific subnet that it is physically collocated with in the network.

Step 2. Power down the Router/Gateway.

Step 3. Observe that an alarm indicating a Router/Gateway failure appears on the UEM alarms view.

Step 4. Restore power to the Router/Gateway.

Step 5. Observe the changes to the alarm in UEM, indicating the Router/Gateway is enabling.

Step 6. Observe that alarm view updates in the UEM, indicating the Router/Gateway has recovered and is enabled.

Pass____ Fail____

C-3.1.23 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 - TG1
RADIO-1 - SITE - SITE1
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 SITE1 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____

C-3.1.24 Multiple Control Channels

1. DESCRIPTION

A maximum of four channels are eligible for assignment as control channel at each site. In the event that the assigned control channel fails at any remote site, the Zone Controller automatically selects one of the other control capable channels as the active control channel for that site. A Control Channel Preference Level can be used to rank the control capable channels where 1 is the highest ranking and 4 the lowest.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-2 - TALKGROUP 1
RADIO-3 - TALKGROUP 2
RADIO-4 - TALKGROUP 2

Note: All radios should be affiliated to the site under test.

VERSION #1.010

2. TEST

Step 1. Initiate a Talkgroup Call with RADIO-1 on TALKGROUP 1.

Step 2. Observe that only RADIO-2 will be able to monitor and respond to the call.

Step 3. Initiate a Talkgroup Call with RADIO-3 on TALKGROUP 2.

Step 4. Observe that only RADIO-4 will be able to monitor and respond to the call.

Step 5. Power off the control channel at the site under test.

Step 6. Observe that the control channel rotates to the next available channel capable of acting as a control channel.

Step 7. Initiate a Talkgroup Call with RADIO-1 on TALKGROUP 1.

Step 8. Observe that only RADIO-2 will be able to monitor and respond to the call.

Step 9. Initiate a Talkgroup Call with RADIO-3 on TALKGROUP 2.

Step 10. Observe that only RADIO-4 will be able to monitor and respond to the call. Power up the channel previously powered off to return the system to normal operation.

Pass____ Fail____

C-3.1.25 Redundant Zone Controller Switching – Manual Switchover

1. DESCRIPTION

In a non-Dynamic System Resilience (DSR) configuration the Zone Controller subsystem uses two Zone Controllers in a redundant configuration. The standby Zone Controller is made active either upon the loss of the active Zone Controller or upon a user command from the Unified Network Configurator. In a DSR configuration there are 4 Zone Controllers in a redundant configuration. Any one of the 4 could be active to keep the Zone Sites in Wide Area Trunking. If using DSR configuration the Unified Event Manager (UEM) will report the Zone Controller switchover in both UEMs.

SETUP

RADIO-1 - TG1
RADIO-1 - SITE - SITE1
RADIO-2 - TG1
RADIO-2 - SITE - SITE2
RADIO-3 - TG1
RADIO-3 - SITE - SITE3 (In another Zone if available, otherwise set to a random site in the same Zone.)

VERSION #1.010

2. TEST

Step 1. Verify the state of the current Zone Controllers is Active or Standby in the Unified Network Configurator (UNC). (There will be 2 Zone Controllers in single Zone or 4 in the case of DSR configured zones.)

Step 2. Using the Unified Network Configurator, switch the Standby Zone Controller to the Active state.

Step 3. Verify using UNC, UEM and ZoneWatch (if applicable) that the standby Zone Controller becomes active and brings all sites back wide. Wait for the Radios to settle out the site affiliations.

Step 4. Key RADIO-1 and verify that RADIO-2 and RADIO-3 hear the audio.

Step 5. End the call from RADIO-1.

Step 6. Verify that Zone Controller that was previously “Active” comes back up to an “Enabled” and “Standby” state.

Pass____ Fail____

C-3.1.26 ZoneWatch

1. DESCRIPTION

ZoneWatch is an administration tool for monitoring radio traffic on a system. A system manager can use ZoneWatch to analyze traffic patterns for load distribution and troubleshoot radio and site problems. ZoneWatch is used to view current radio traffic activity for the system. This activity is displayed in graphical format, color-coded for easy identification of the type of activity occurring on the system.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 2
RADIO-3 - TALKGROUP 1
RADIO-3 - SITE - SITE 3
RADIO-4 - TALKGROUP 1
RADIO-4 - SITE - SITE 4

VERSION #1.010

2. TEST

Step 1. Verify that ZoneWatch has been configured for the Grid and Multi Site Scroll windows to display system activity.

Step 2. From the PC Application Launcher, select a zone folder.

Step 3. From within that zone, select ZoneWatch.

Step 4. Select the appropriate profile to be able to view the channel usage on the system.

Step 5. Initiate several calls with the radios and observe that the appropriate channel usage information is displayed.

Pass____ Fail____

C-3.1.27 Affiliation Display

1. DESCRIPTION

Affiliation Display is a Private Radio Network Management (PRNM)application that monitors the mobility of radios for a particular zone. Mobility describes how radio users travel between different sites in a zone and how they communicate with other members of their assigned talkgroup or even with members outside of their talkgroup. A radio can be viewed in more than one zone. As a radio roams from one site to another or changes talkgroups, Affiliation Display updates and displays the affiliation and de-affiliation information for a monitored radio. This information can be useful for the troubleshooting and tracking of radios in the system and for monitoring the movement of traffic within a zone.
The Affiliation Display is divided into three sections: Site Viewer, Talkgroup Viewer, and Radio Viewer.
- The Site Viewer displays the number of talkgroups and number of radios affiliated to that site.
- The Talkgroup Viewer displays how many radios are affiliated to that talkgroup and the number of sites at which the talkgroup has radios affiliated.
- The Radio Viewer window displays affiliation information for a custom list of radios.

SETUP

RADIO-1 - TG1
RADIO-1 - SITE - SITE1
RADIO-2 - TG1
RADIO-2 - SITE - SITE1
RADIO-3 - TG2
RADIO-3 - SITE - SITE2
RADIO-4 - TG2
RADIO-4 - SITE - SITE2

VERSION #1.010

2. TEST

Step 1. Add RADIO-1,RADIO-2,RADIO-3, and RADIO-4 to the Affiliation Display.

Step 2. Verify that RADIO-1 and RADIO-2 show they are affiliated to SITE1 and TG1.

Step 3. Verify that RADIO-3 and RADIO-4 show they are affiliated to SITE2 and TG2.

Step 4. Change the talkgroup of RADIO-1 and RADIO-2 to TG2.

Step 5. Verify that RADIO-1 and RADIO-2's affiliated talkgroup changes to TG2 on the Affiliation Display.

Step 6. Change the site of RADIO-3 and RADIO-4 to SITE1.

Step 7. Verify that RADIO-3 and RADIO-4's affiliated site changes to SITE1 on the Affiliation Display.

Pass____ Fail____

C-3.1.28 Configuration Management - Access Permissions

1. DESCRIPTION

In ASTRO releases the Radio System Infrastructure management is done in the Unified Network Configurator (UNC) application. The Unified Network Configurator Wizard (UNCW) also helps to configure the system by having a User interface into the system configuration.
Configuration parameters such as Individual and Talkgroup Default Access Permission, and Site Access Denial Type can be manipulated from these applications.

SETUP

RADIO-1 - TG1
RADIO-1 - SITE - SITE1
RADIO-2 - TG1
RADIO-2 - SITE - SITE1

VERSION #1.030

2. TEST

Step 1. Delete the database record for RADIO-1 from the Provisioning Manager so that the system does not have any knowledge of RADIO-1. And distribute the configuration from the Provisioning Manager (i.e. invoke Distribute Configuration Changes operation).

Step 2. Verify the "Individual Default Access Permission" flag is set to "NO". If changes are made, approve the job in Voyence, then Publish Infrastructure Data from the Unified Network Configuration Wizard (UNCW).

Step 3. Initiate a call from RADIO-1 on TG1. Verify that the Radio System rejects the RADIO-1 call request because RADIO-1 has not been defined in the Radio User database.

Step 4. Change the Individual Default Access Permission flag to YES. After approving the job in Voyence, Publish Infrastructure Data from the UNCW.

Step 5. Initiate a call from RADIO-1. Verify that the system permits the RADIO-1 call request because the system grants radio access using default settings.

Step 6. From the Provisioning Manager, configure the RADIO-1 records that was automatically created as a result of the radio's PTT. And distribute the configuration from the Provisioning Manager (i.e. invoke Distribute Configuration Changes operation).

Step 7. Reset the "Individual Default Access Permission" flag to NO. After approving the job in Voyence, Publish Infrastructure Data from the UNCW.

Step 8. Initiate a call from RADIO-1. Verify that the Radio System permits the RADIO-1 call request because RADIO-1 is now a valid user.

Pass____ Fail____

C-3.1.29 Site Wide Area Trunking to Site Trunking State using the Unified Event Manager

1. DESCRIPTION

Through the Unified Event Manager (UEM), the system user can run diagnostics that change the "Trunking State" of a site. The effect of the diagnostic is displayed on the UEM.

SETUP

RADIO-1 - TG1
RADIO-1 - SITE - SITE1 (Site Locked)
RADIO-2 - TG1
RADIO-2 - SITE - SITE2

NMclient01 - UEM session up and running in the alarms view.

VERSION #1.020

2. TEST

Step 1. Initiate a Wide Area Call with RADIO-1 in TG1. Verify RADIO-2 will be able to monitor and respond to the call.

Step 2. Select SITE1 in the Network Database>Sites option in the tree view. Right click and select "Issue Command". Select "Site Trunking" and apply to put the site in Site Trunking mode.

Step 3. Observe that the UEM alarms view shows that the site is now in Site Trunking and is User Requested.

Step 4. Verify ZoneWatch (if applicable) no longer shows the SITE1 trunking activity. Also verify that RADIO-1 can no longer communicate with RADIO-2

Step 5. Place the site back into Wide Area Trunking using the "Issue command" feature from UEM. Verify that the site returns to Wide Area mode using the UEM.

Step 6. Verify communications between RADIO-1 and RADIO-2

Pass____ Fail____

C-3.1.30 Unified Event Manager - Diagnostics - ASTRO Repeater Site

1. DESCRIPTION

The purpose of this test is to demonstrate diagnostic commands can be sent to a Radio Frequency (RF) site and the proper status is reported at the Unified Event Manager (UEM).

All commands are initiated from the UEM.

Standalone and MultiSite configurations are tested.

SETUP

NMclient01 - UEM session up and running in the Network Database view.

VERSION #1.030

2. TEST

Step 1. From the UEM, right click on an ASTRO Repeater Site managed resource and select the Command option.

Step 2. The command window opens for the ASTRO repeater Site managed resource with the following commands available: Site Trunking, Site Off, Wide Trunking, and Site Failsoft.

Step 3. Select Site Trunking and click the Apply button.

Step 4. The command execution status is displayed in the command window. After the command is executed, the site enters site trunking mode. The event is displayed in the Network Events Browser. An alarm is displayed in the Alarms Browser.

Step 5. Select Site Off and click the Apply button.

Step 6. The command execution status is displayed in the command window. After the command is executed, the site enters site off mode. The event is displayed in the Network Events Browser. An alarm is displayed in the Alarms Browser.

Step 7. Select Wide Trunking and click the Apply button.

Step 8. The command execution status is displayed in the command window. After the command is executed, the site enters wide trunking mode. The event is displayed in the Network Events Browser.

Pass____ Fail____

C-3.1.31 Provisioning Manager – Export Data to .csv File

1. DESCRIPTION

The Provision Manager (PM) allows users to customize and filter the viewable date to show desired data. Through the Filter tile one can limit the viewed data to show specific items, like Radios 1 through 500. Through the Customize tile data can be added and data not desired can be hidden. Also within Customize is the ability to pull in columns from various other sources, like Profiles, Status sets, and more.
Once a Customized and Filtered view is created an Export of this data can generated. The output of this export is a .csv (Comma- Separated values) file. This file will be saved to the PC generating the export. This file can now be opened with many programs that can view and manipulate data in tables. Excel is one of these programs.
Export can be done on any PM data. This test case will focus on an IV&D radio.

SETUP

Enter some radios into the PM database: e.g.

RADIO-1,
RADIO-2,
RADIO-3,
Etc.

VERSION #1.050

2. TEST

Step 1. Start the PM application from the NM Client.

Step 2. Select <Subscriber> from the top menu.

Step 3. Select <IV&D radio> from the Navigation Tree from the left pane.

Step 4. Verify that radio list is correct.

Step 5. Select < Current View > under the <Export> from the Action lists on top of the pane.

Step 6. Select Folder and File Name to be saved as from the Pop Up File Menu using the drop box next to Save button and save the file.

Step 7. Open the saved file with any application that can view the file: e.g. open the file with Notepad, Wordpad, or use the “Type” command from a DOS window. It’s also possible to download the .csv file to a service laptop and view the file w/ Excel.

Step 8. Verify that the radios are listed as shown in the PM window.

Pass____ Fail____

C-3.2 SIGNOFF CERTIFICATE

By their signatures below, the following witnesses certify they have observed the system Acceptance Test Procedures.

Signatures

WITNESS: _____Date: _____

Please Print Name: _____ _____

Initials:

Please Print Title: _____

WITNESS: _____Date: _____

Please Print Name: _____ _____

Initials:

Please Print Title: _____

WITNESS: _____Date: _____

Please Print Name: _____ _____

Initials:

Please Print Title: _____

EXHIBIT C-4

EQUIPMENT LIST

C-4.1 MAIN OFFERING EQUIPMENT LIST

QTY	NOMENCLATURE	DESCRIPTION
Liftgate Delivery Required		
Master Site, County EOC Site		
1	SQM01SUM0226	MASTER SITE CONFIGURATION
1	CA02085AA	ADD: SYSTEM WITH REDUNDANCY
1	CA01472AA	ADD: WINDOWS SUPPLEMENTAL FULL CONFIG
8	CA01880AA	ADD: P25 TDMA TRUNKING OPERATION SITE LICENSE
16	CA01882AA	ADD: P25 TDMA TRUNKING SW ? BASE RADIO LICENSES (TRUNKING ONLY)
1	CA01877AA	ADD: P25 TDMA TRUNKING OPERATION ZONE LICENSE
2	CA01208AA	ENH: 500 RADIO USER LICENSES
20	CA02193AA	ADD: ANTI-MALWARE DEF UPDATE LIC
1	Z13AG	ENH: UNIFIED NETWORK CONFIGURATOR (UNC)
1	ZA00921AA	ENH: USER CONFIGURATION MANAGER (UCM)
1	CA01224AB	ENH: UNIFIED EVENT MANAGER (UEM)
1	D52AJ	ENH: ZONEWATCH
1	Z801AM	ENH: RADIO CONTROL MANAGER
2	CA02105AA	MCC7500/MCC7100 CONSOLE LIC
1	SQM01SUM0238	SRC7500 SWITCHING ROUTING CENTER (7.13 AND BEYOND)
1	CA02651AA	ADD: SRC 7500 FOR 7.13 / 7.14
1	CA02152AA	DUAL CORE LAN SWITCHES (HP3800-48 PORT)
1	CA01345AA	ADD: DUAL GATEWAY ROUTERS STANDARD
1	CA01350AA	ADD: QTY 1 PAIR CORE ROUTERS ETH
1	CA01360AA	ADD: CORE BACKHAUL SWITCHES
Fanout Switches		
2	CLN1856	2620-24 ETHERNET SWITCH
RSA		
1	TT2569	RSA AUTHENTICATION MANAGER 7.1 BASE ED. 25 USER LICENSES
1	TT05699	RSA ACE SERVER MAINTENANCE FOR 25 CLIENT ACCESS LICENSES
1	DVN4046B	MASTER SYSTEM KEY STARTER KIT
2 NM Clients, SVPD, County		
2	TT2565	NM Z420 HIGH TIER WIN7-IE9 64BIT
2	T8082	ASTRO CLIENT APPL SW UPGR 7.14
2	DS019BLK	TECH GLOBAL 19IN LCD NON-TOUCH, BLACK

QTY	NOMENCLATURE	DESCRIPTION
2	TT2565	NM Z420 HIGH TIER WIN7-IE9 64BIT
2	T8082	ASTRO CLIENT APPL SW UPGR 7.14
2	DS019BLK	TECH GLOBAL 19IN LCD NON-TOUCH, BLACK
2	T7885	MCAFEE WINDOWS AV CLIENT
1	TT2022	LX4000T 8 PORT TERMINAL SERVER, NO DIAL-UP MODEM INCLD.
8	T7448	WINDOWS SUPPLEMENTAL FULL CONFIG
1	DDN9590	SSG140 FIREWALL W/ 2 YEARS SUPPORT
1	DSTRAK88353M	GPS CLOCK, 10MHZ, RUBIDIUM, 48V INCL ANT AND 100' COAX W/DONGLE SNMPV3
1	DDN8325	17" LCD DRAWER W/ KEYBOARD & MOUSE, KVM 16 PORTS, CABLES
2	DS110110711	PDU, AC EDGE RACK MOUNT DISTRIBUTION PANEL, 120VAC 60A, 12-15A CIRCUIT
24	DS37502851	BREAKER KIT AIRPAX 15AMP SNAPAC, FOR AC EDGE QTY 1
6	DSTSJ100BT	SPD, RJ-48 8 PIN, 10/100 BASE T TSJ PROTECTS/PASSES ON ALL 8 PIN
2	DSTSJADP	RACK MOUNT GROUND BAR, 19 IN FOR TSJ AND WPH SERIES DATA SPDS
		Core Spares
1	DLN6864	FRU: DL380 G8p POWER SUPPLY
2	DLN6844	CPH 300 GB HARD DRIVE
2	DLN6866	DVD DRIVE
1	DLN6880	DAS - CHASSIS ONLY
5	DLN6878	DAS - 600 GB SAS HARD DRIVE
1	DLN6879	DAS - PROCESSOR MODULE
2	DLN6867	DAS POWER SUPPLY
4	CKN6952	SAS CABLE 1M
1	CLN1858	3800-48 ETHERNET SWITCH
1	CLN1837A	620 REDUNDANT/EXTERNAL POWER SUPPLY
1	DDN9590	SSG140 FIREWALL W/ 2 YEARS SUPPORT
1	SQM01SUM0205	GGM 8000 GATEWAY
1	CA01616AA	ADD: AC POWER
1	CA02086AA	ADD: HIGH DENSITY ENH CONV GATEWAY
		Prime Site, non HA
		RF Ch 1
1	T7321	GCM 8000 COMPARATOR
1	CA01183AA	ADD: GCM 8000 COMPARATOR
1	CA01185AA	ADD: IP BASED MULTISITE OPERATION
1	CA01901AA	ADD: P25 TDMA COMPARATOR SOFTWARE
1	X153AW	ADD: RACK MOUNT HARDWARE
		RF Ch 2
1	T7321	GCM 8000 COMPARATOR
1	CA01183AA	ADD: GCM 8000 COMPARATOR

QTY	NOMENCLATURE	DESCRIPTION
1	CA01185AA	ADD: IP BASED MULTISITE OPERATION
1	CA01901AA	ADD: P25 TDMA COMPARATOR SOFTWARE
1	X153AW	ADD: RACK MOUNT HARDWARE
		RF Ch 3
1	T7321	GCM 8000 COMPARATOR
1	CA01183AA	ADD: GCM 8000 COMPARATOR
1	CA01185AA	ADD: IP BASED MULTISITE OPERATION
1	CA01901AA	ADD: P25 TDMA COMPARATOR SOFTWARE
1	X153AW	ADD: RACK MOUNT HARDWARE
1	T7038	GCP 8000 SITE CONTROLLER
1	CA00303AA	ADD: QTY (1) SITE CONTROLLER
15	CA02214AA	ADD: SIMULCAST REMOTE SITE LICENSE VOICE ONLY
1	CA01194AA	ADD: IP BASED MULTISITE SITE CONTROLLER SOFTWARE
1	X153AW	ADD: RACK MOUNT HARDWARE
1	T7038	GCP 8000 SITE CONTROLLER
1	CA00303AA	ADD: QTY (1) SITE CONTROLLER
15	CA02214AA	ADD: SIMULCAST REMOTE SITE LICENSE VOICE ONLY
1	CA01194AA	ADD: IP BASED MULTISITE SITE CONTROLLER SOFTWARE
1	X153AW	ADD: RACK MOUNT HARDWARE
		Prime Site Routers to Master Site
2	SQM01SUM0205	GGM 8000 GATEWAY
2	CA01616AA	ADD: AC POWER
		Site Switches
2	CLN1856	2620-24 ETHERNET SWITCH
		Site Access Routers
2	SQM01SUM0205	GGM 8000 GATEWAY
2	CA01616AA	ADD: AC POWER
		Backhaul Switch
1	CLN1856	2620-24 ETHERNET SWITCH
1	THN1012	RACK 7' OPEN
6	DSTSJ100BT	SPD, RJ-48 8 PIN, 10/100 BASE T TSJ PROTECTS/PASSES ON ALL 8 PIN
2	DSTSJADP	RACK MOUNT GROUND BAR, 19 IN FOR TSJ AND WPH SERIES DATA SPDS
2	DSRS0615R	POWER STRIP, 6 REAR OUTLETS 19 IN, 15-AMP RACKMOUNT, LOCKING SWITCH
2	DSTRAK91061	FOUR PORT DDM
2	DSGXTR09001032	UPS, GXT3 RACKMT 1000VA/900W, 32 MIN RUNTIME
		Prime Spares
1	DSTRAK91061	FOUR PORT DDM
1	DLN6569	FRU: GCP 8000/GCM 8000

QTY	NOMENCLATURE	DESCRIPTION
1	DLN6781	FRU POWER SUPPLY
1	DLN6898	FRU: FAN MODULE

QTY	NOMENCLATURE	DESCRIPTION
		Remote Site 1, Douglas
2	DSRS0615R	POWER STRIP, 6 REAR OUTLETS 19 IN, 15-AMP RACKMOUNT, LOCKING SWITCH
2	DSTRAK91061	FOUR PORT DDM
1	DSGXTR4800N004HW	UPS, GXT3 RACKMNT 6KVA/4.8KW, 4 MN RUN
		Site Switches
3	CLN1856	2620-24 ETHERNET SWITCH
1	SQM01SUM7054	GTR 8000 EXPANDABLE SITE SUBSYSTEM
1	CA00855AA	ADD: 700/800 MHZ
1	X303AE	ADD: QTY (3) GTR 8000 BASE RADIOS
3	CA01193AA	ADD: IP BASED MULTISITE BASE RADIO SOFTWARE
1	CA00861AA	ADD: CABINET RMC W/ CAPABILITY OF 6 BRS
1	CA00879AA	ADD: PRIMARY 6 PORT CAVITY COMBINER
1	CA00882AA	ADD: 700 MHZ TX FILTER W/PMU
2	CA00884AA	ADD: QTY (1) XHUB
1	CA01402AA	ADD: 7.0 FT OPEN RACK
2	CA01842AA	ADD: P25 TDMA SOFTWARE
1	CA01706AA	ADD: ADD: GGM 8000 GATEWAY
1	DSTSJ100BT	SPD, RJ-48 8 PIN, 10/100 BASE T TSJ PROTECTS/PASSES ON ALL 8 PIN
1	DSTSJADP	RACK MOUNT GROUND BAR, 19 IN FOR TSJ AND WPH SERIES DATA SPDS
1	DS428D83I01T	TTA, MINI AUTO QUAD, 796-824 MHZ, SINGLE NETWORK, TOWER BOX
1	DS428D83I01C110	CONTROL MONITORING UNIT, 796-824 MHZ, 110 VAC
		TX Antenna
1	DQSE414SF3P4LDF	ENCLOSED 4 DIPOLE DIRECTIONAL, 8.0 DBD GAIN, LOW PIM, 746-869 MHZ
15	DSAT012J50	AT012J50, 1/2" TRANSMISSION LINE,50OHM,BLACK POLYETHYLENE JCKT PER FT
2	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
2	TDN9289	221213 CABLE WRAP WEATHERPROOFING
200	DSAT078J50	AT078J50, 7/8" TRANSMISSION LINE,50OHM,BLACK POLYETHYLENE JCKT PER FT
2	DSDFA07850	DFA07850, 7/16 DIN FEMALE FOR 7/8" CABLE
5	DSGKS78AC	GK-S78AC, STD GROUND KIT FOR 7/8" AIRCELL COAX
1	DSHG78	HG-78, LACE-UP HOISTING GRIP FOR 7/8" AIRCELL COAX
7	DSSSH78	SSH-78 7/8" SNAPSTAK HANGER 10PK
7	DSUA3	UA-3 UNIVERSAL ANGLE ADAPTOR KIT, KIT OF TEN
1	DSTSXDFMBF	RF SPD, 698-2700MHZ DC BLOCK HIGH POWER, DIN FEMALE/MALE BIDIRECTIONAL
1	DSGSAKITD	GROUND STRAP KIT - DIN

QTY	NOMENCLATURE	DESCRIPTION
25	DSAT012J50	AT012J50, 1/2" TRANSMISSION LINE,50OHM,BLACK POLYETHYLENE JCKT PER FT
2	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
10	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
1	TT05543AA	ADD: 7-16 DIN MALE PS FOR 1/2 IN LDF4-50A CABLE, ANT END
1	TT04967AA	ADD: CONNECTOR ATTACHMENT LDF4 ANTENNA END
1	TT05542AA	ADD: 7-16 DIN MALE PS FOR 1/2 IN LDF4-50A CABLE, STA END
1	TT04936AA	ADD: CONNECTOR ATTACHMENT FEE FOR LDF4 STATION END
1	DSAPM7487K2AC	ADVANCED POWER MONITOR, 740-870 MHZ, 90-246V AC (INC SINGLE COUPLER)
10	L1700	FSJ1-50A CABLE: 1/4" SUPERFLEX POLY JKT PER FOOT
2	DDN9769	F1PNM-HC 1/4" TYPE N MALE CONNECTOR FOR FSJ1-50A CABLE
10	L1700	FSJ1-50A CABLE: 1/4" SUPERFLEX POLY JKT PER FOOT
2	DDN9769	F1PNM-HC 1/4" TYPE N MALE CONNECTOR FOR FSJ1-50A CABLE
RX Antenna		
1	DSSC412HF2LDFE5749	COLLINEAR OMNI ANTENN, 11.5 DBD GAIN, HD, 746-869 MHZ, PIP RATED
15	DSAT012J50	AT012J50, 1/2" TRANSMISSION LINE,50OHM,BLACK POLYETHYLENE JCKT PER FT
1	DSNMA01250	NMA01250, N MALE FOR 1/2" CABLE
1	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
5	TDN9289	221213 CABLE WRAP WEATHERPROOFING
5	DSAT012J50	AT012J50, 1/2" TRANSMISSION LINE,50OHM,BLACK POLYETHYLENE JCKT PER FT
2	DSNMA01250	NMA01250, N MALE FOR 1/2" CABLE
200	DSAT078J50	AT078J50, 7/8" TRANSMISSION LINE,50OHM,BLACK POLYETHYLENE JCKT PER FT
2	DSNFA07850	NFA07850, N FEMALE FOR 7/8" CABLE
5	DSGKS78AC	GK-S78AC, STD GROUND KIT FOR 7/8" AIRCELL COAX
1	DSHG78	HG-78, LACE-UP HOISTING GRIP FOR 7/8" AIRCELL COAX
200	DSAT012J50	AT012J50, 1/2" TRANSMISSION LINE,50OHM,BLACK POLYETHYLENE JCKT PER FT
1	DSNMA01250	NMA01250, N MALE FOR 1/2" CABLE
1	DSNFA01250	NFA01250, N FEMALE FOR 1/2" CABLE
5	DSGKS12AC	GK-S12AC, STD GROUND KIT FOR 1/2" AIRCELL COAX
1	DSHG12	HG-12, LACE-UP HOISTING GRIP FOR 1/2" AIRCELL COAX
7	DSSSH12	SSH-12 1/2" SNAPSTAK HANGER 10PK
7	DSSSH78	SSH-78 7/8" SNAPSTAK HANGER 10PK
14	DSUA3	UA-3 UNIVERSAL ANGLE ADAPTOR KIT, KIT OF TEN
1	DS1090501WA	RF SPD, 700-1000MHZ BROADBAND 12 VDC PASS NM ANTENNA, NF EQUIPMENT
1	DS1090501WA	RF SPD, 700-1000MHZ BROADBAND 12 VDC PASS NM ANTENNA, NF EQUIPMENT
25	L1700	FSJ1-50A CABLE: 1/4" SUPERFLEX POLY JKT PER FOOT
2	DDN9769	F1PNM-HC 1/4" TYPE N MALE CONNECTOR FOR FSJ1-50A CABLE
25	L1702	FSJ4-50B CABLE: 1/2" SUPERFLEX POLY JKT PER FOOT
2	DDN9682	F4PNMV2-HC 1/2" TYPE N MALE PLATED CONNECTOR
		Remote Site 2, Sierra Vista

QTY	NOMENCLATURE	DESCRIPTION
2	DSRS0615R	POWER STRIP, 6 REAR OUTLETS 19 IN, 15-AMP RACKMOUNT, LOCKING SWITCH
2	DSTRAK91061	FOUR PORT DDM
1	DSGXTR4800N004HW	UPS, GXT3 RACKMNT 6KVA/4.8KW, 4 MN RUN
		1 Backhaul and 2 Site Switches
3	CLN1856	2620-24 ETHERNET SWITCH
1	SQM01SUM7054	GTR 8000 EXPANDABLE SITE SUBSYSTEM
1	CA00855AA	ADD: 700/800 MHZ
1	X303AE	ADD: QTY (3) GTR 8000 BASE RADIOS
3	CA01193AA	ADD: IP BASED MULTISITE BASE RADIO SOFTWARE
1	CA00861AA	ADD: CABINET RMC W/ CAPABILITY OF 6 BRS
1	CA00879AA	ADD: PRIMARY 6 PORT CAVITY COMBINER
1	CA00882AA	ADD: 700 MHZ TX FILTER W/PMU
2	CA00884AA	ADD: QTY (1) XHUB
1	CA01402AA	ADD: 7.0 FT OPEN RACK
2	CA01842AA	ADD: P25 TDMA SOFTWARE
1	CA01706AA	ADD: ADD: GGM 8000 GATEWAY
1	DSTSJ100BT	SPD, RJ-48 8 PIN, 10/100 BASE T TSJ PROTECTS/PASSES ON ALL 8 PIN
1	DSTSJADP	RACK MOUNT GROUND BAR, 19 IN FOR TSJ AND WPH SERIES DATA SPDS
1	DS428D83I01T	TTA, MINI AUTO QUAD, 796-824 MHZ, SINGLE NETWORK, TOWER BOX
1	DS428D83I01C110	CONTROL MONITORING UNIT, 796-824 MHZ, 110 VAC
		TX Antenna
1	DSSC479HF1LDFD4NU	COLLINEAR OMNI 9.5DBD LOW PIM NULL FILL HD 746-869MHZ 4 DEG DT
15	DSAT012J50	AT012J50, 1/2" TRANSMISSION LINE,50OHM,BLACK POLYETHYLENE JCKT PER FT
2	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
2	TDN9289	221213 CABLE WRAP WEATHERPROOFING
200	DSAT078J50	AT078J50, 7/8" TRANSMISSION LINE,50OHM,BLACK POLYETHYLENE JCKT PER FT
2	DSDFA07850	DFA07850, 7/16 DIN FEMALE FOR 7/8" CABLE
5	DSGKS78AC	GK-S78AC, STD GROUND KIT FOR 7/8" AIRCELL COAX
1	DSHG78	HG-78, LACE-UP HOISTING GRIP FOR 7/8" AIRCELL COAX
7	DSSSH78	SSH-78 7/8" SNAPSTAK HANGER 10PK
7	DSUA3	UA-3 UNIVERSAL ANGLE ADAPTOR KIT, KIT OF TEN
1	DSTSXDFMBF	RF SPD, 698-2700MHZ DC BLOCK HIGH POWER, DIN FEMALE/MALE BIDIRECTIONAL
1	DSGSAKITD	GROUND STRAP KIT - DIN
25	DSAT012J50	AT012J50, 1/2" TRANSMISSION LINE,50OHM,BLACK POLYETHYLENE JCKT PER FT
2	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
10	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
1	TT05543AA	ADD: 7-16 DIN MALE PS FOR 1/2 IN LDF4-50A CABLE, ANT END
1	TT04967AA	ADD: CONNECTOR ATTACHMENT LDF4 ANTENNA END
1	TT05542AA	ADD: 7-16 DIN MALE PS FOR 1/2 IN LDF4-50A CABLE, STA END

QTY	NOMENCLATURE	DESCRIPTION
1	TT04936AA	ADD: CONNECTOR ATTACHMENT FEE FOR LDF4 STATION END
1	DSAPM7487K2AC	ADVANCED POWER MONITOR, 740-870 MHZ, 90-246V AC (INC SINGLE COUPLER)
10	L1700	FSJ1-50A CABLE: 1/4" SUPERFLEX POLY JKT PER FOOT
2	DDN9769	F1PNM-HC 1/4" TYPE N MALE CONNECTOR FOR FSJ1-50A CABLE
10	L1700	FSJ1-50A CABLE: 1/4" SUPERFLEX POLY JKT PER FOOT
2	DDN9769	F1PNM-HC 1/4" TYPE N MALE CONNECTOR FOR FSJ1-50A CABLE
RX Antenna		
1	DSSC412HF2LDFE5749	COLLINEAR OMNI ANTENN, 11.5 DBD GAIN, HD, 746-869 MHZ, PIP RATED
15	DSAT012J50	AT012J50, 1/2" TRANSMISSION LINE,50OHM,BLACK POLYETHYLENE JCKT PER FT
1	DSNMA01250	NMA01250, N MALE FOR 1/2" CABLE
1	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
5	TDN9289	221213 CABLE WRAP WEATHERPROOFING
5	DSAT012J50	AT012J50, 1/2" TRANSMISSION LINE,50OHM,BLACK POLYETHYLENE JCKT PER FT
2	DSNMA01250	NMA01250, N MALE FOR 1/2" CABLE
200	DSAT078J50	AT078J50, 7/8" TRANSMISSION LINE,50OHM,BLACK POLYETHYLENE JCKT PER FT
2	DSNFA07850	NFA07850, N FEMALE FOR 7/8" CABLE
5	DSGKS78AC	GK-S78AC, STD GROUND KIT FOR 7/8" AIRCELL COAX
1	DSHG78	HG-78, LACE-UP HOISTING GRIP FOR 7/8" AIRCELL COAX
200	DSAT012J50	AT012J50, 1/2" TRANSMISSION LINE,50OHM,BLACK POLYETHYLENE JCKT PER FT
1	DSNMA01250	NMA01250, N MALE FOR 1/2" CABLE
1	DSNFA01250	NFA01250, N FEMALE FOR 1/2" CABLE
5	DSGKS12AC	GK-S12AC, STD GROUND KIT FOR 1/2" AIRCELL COAX
1	DSHG12	HG-12, LACE-UP HOISTING GRIP FOR 1/2" AIRCELL COAX
7	DSSSH12	SSH-12 1/2" SNAPSTAK HANGER 10PK
7	DSSSH78	SSH-78 7/8" SNAPSTAK HANGER 10PK
14	DSUA3	UA-3 UNIVERSAL ANGLE ADAPTOR KIT, KIT OF TEN
1	DS1090501WA	RF SPD, 700-1000MHZ BROADBAND 12 VDC PASS NM ANTENNA, NF EQUIPMENT
1	DS1090501WA	RF SPD, 700-1000MHZ BROADBAND 12 VDC PASS NM ANTENNA, NF EQUIPMENT
25	L1700	FSJ1-50A CABLE: 1/4" SUPERFLEX POLY JKT PER FOOT
2	DDN9769	F1PNM-HC 1/4" TYPE N MALE CONNECTOR FOR FSJ1-50A CABLE
25	L1702	FSJ4-50B CABLE: 1/2" SUPERFLEX POLY JKT PER FOOT
2	DDN9682	F4PNMV2-HC 1/2" TYPE N MALE PLATED CONNECTOR
Remote Site 3, Elfrida		
2	DSRS0615R	POWER STRIP, 6 REAR OUTLETS 19 IN, 15-AMP RACKMOUNT, LOCKING SWITCH
2	DSTRAK91061	FOUR PORT DDM
1	DSGXTR4800N004HW	UPS, GXT3 RACKMNT 6KVA/4.8KW, 4 MN RUN
1 Backhaul and 2 Site Switches		
3	CLN1856	2620-24 ETHERNET SWITCH
1	SQM01SUM7054	GTR 8000 EXPANDABLE SITE SUBSYSTEM

QTY	NOMENCLATURE	DESCRIPTION
1	CA00855AA	ADD: 700/800 MHZ
1	X303AE	ADD: QTY (3) GTR 8000 BASE RADIOS
3	CA01193AA	ADD: IP BASED MULTISITE BASE RADIO SOFTWARE
1	CA00861AA	ADD: CABINET RMC W/ CAPABILITY OF 6 BRS
1	CA00879AA	ADD: PRIMARY 6 PORT CAVITY COMBINER
1	CA00882AA	ADD: 700 MHZ TX FILTER W/PMU
2	CA00884AA	ADD: QTY (1) XHUB
1	CA01402AA	ADD: 7.0 FT OPEN RACK
2	CA01842AA	ADD: P25 TDMA SOFTWARE
1	CA01706AA	ADD: ADD: GGM 8000 GATEWAY
1	DSTSJ100BT	SPD, RJ-48 8 PIN, 10/100 BASE T TSJ PROTECTS/PASSES ON ALL 8 PIN
1	DSTSJADP	RACK MOUNT GROUND BAR, 19 IN FOR TSJ AND WPH SERIES DATA SPDS
1	DS428D83I01T	TTA, MINI AUTO QUAD, 796-824 MHZ, SINGLE NETWORK, TOWER BOX
1	DS428D83I01C110	CONTROL MONITORING UNIT, 796-824 MHZ, 110 VAC
		TX Antenna
1	DSSC479HF1LDFD4NU	COLLINEAR OMNI 9.5DBD LOW PIM NULL FILL HD 746-869MHZ 4 DEG DT
15	DSAT012J50	AT012J50, 1/2" TRANSMISSION LINE,50OHM,BLACK POLYETHYLENE JCKT PER FT
2	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
2	TDN9289	221213 CABLE WRAP WEATHERPROOFING
200	DSAT078J50	AT078J50, 7/8" TRANSMISSION LINE,50OHM,BLACK POLYETHYLENE JCKT PER FT
2	DSDFA07850	DFA07850, 7/16 DIN FEMALE FOR 7/8" CABLE
5	DSGKS78AC	GK-S78AC, STD GROUND KIT FOR 7/8" AIRCELL COAX
1	DSHG78	HG-78, LACE-UP HOISTING GRIP FOR 7/8" AIRCELL COAX
7	DSSSH78	SSH-78 7/8" SNAPSTAK HANGER 10PK
7	DSUA3	UA-3 UNIVERSAL ANGLE ADAPTOR KIT, KIT OF TEN
1	DSTSXDFMBF	RF SPD, 698-2700MHZ DC BLOCK HIGH POWER, DIN FEMALE/MALE BIDIRECTIONAL
1	DSGSAKITD	GROUND STRAP KIT - DIN
25	DSAT012J50	AT012J50, 1/2" TRANSMISSION LINE,50OHM,BLACK POLYETHYLENE JCKT PER FT
2	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
10	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
1	TT05543AA	ADD: 7-16 DIN MALE PS FOR 1/2 IN LDF4-50A CABLE, ANT END
1	TT04967AA	ADD: CONNECTOR ATTACHMENT LDF4 ANTENNA END
1	TT05542AA	ADD: 7-16 DIN MALE PS FOR 1/2 IN LDF4-50A CABLE, STA END
1	TT04936AA	ADD: CONNECTOR ATTACHMENT FEE FOR LDF4 STATION END
1	DSAPM7487K2AC	ADVANCED POWER MONITOR, 740-870 MHZ, 90-246V AC (INC SINGLE COUPLER)
10	L1700	FSJ1-50A CABLE: 1/4" SUPERFLEX POLY JKT PER FOOT
2	DDN9769	F1PNM-HC 1/4" TYPE N MALE CONNECTOR FOR FSJ1-50A CABLE
10	L1700	FSJ1-50A CABLE: 1/4" SUPERFLEX POLY JKT PER FOOT
2	DDN9769	F1PNM-HC 1/4" TYPE N MALE CONNECTOR FOR FSJ1-50A CABLE

QTY	NOMENCLATURE	DESCRIPTION
RX Antenna		
1	DSSC412HF2LDFE5749	COLLINEAR OMNI ANTENN, 11.5 DBD GAIN, HD, 746-869 MHZ, PIP RATED
15	DSAT012J50	AT012J50, 1/2" TRANSMISSION LINE,50OHM,BLACK POLYETHYLENE JCKT PER FT
1	DSNMA01250	NMA01250, N MALE FOR 1/2" CABLE
1	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
5	TDN9289	221213 CABLE WRAP WEATHERPROOFING
5	DSAT012J50	AT012J50, 1/2" TRANSMISSION LINE,50OHM,BLACK POLYETHYLENE JCKT PER FT
2	DSNMA01250	NMA01250, N MALE FOR 1/2" CABLE
200	DSAT078J50	AT078J50, 7/8" TRANSMISSION LINE,50OHM,BLACK POLYETHYLENE JCKT PER FT
2	DSNFA07850	NFA07850, N FEMALE FOR 7/8" CABLE
5	DSGKS78AC	GK-S78AC, STD GROUND KIT FOR 7/8" AIRCELL COAX
1	DSHG78	HG-78, LACE-UP HOISTING GRIP FOR 7/8" AIRCELL COAX
200	DSAT012J50	AT012J50, 1/2" TRANSMISSION LINE,50OHM,BLACK POLYETHYLENE JCKT PER FT
1	DSNMA01250	NMA01250, N MALE FOR 1/2" CABLE
1	DSNFA01250	NFA01250, N FEMALE FOR 1/2" CABLE
5	DSGKS12AC	GK-S12AC, STD GROUND KIT FOR 1/2" AIRCELL COAX
1	DSHG12	HG-12, LACE-UP HOISTING GRIP FOR 1/2" AIRCELL COAX
7	DSSSH12	SSH-12 1/2" SNAPSTAK HANGER 10PK
7	DSSSH78	SSH-78 7/8" SNAPSTAK HANGER 10PK
14	DSUA3	UA-3 UNIVERSAL ANGLE ADAPTOR KIT, KIT OF TEN
1	DS1090501WA	RF SPD, 700-1000MHZ BROADBAND 12 VDC PASS NM ANTENNA, NF EQUIPMENT
1	DS1090501WA	RF SPD, 700-1000MHZ BROADBAND 12 VDC PASS NM ANTENNA, NF EQUIPMENT
25	L1700	FSJ1-50A CABLE: 1/4" SUPERFLEX POLY JKT PER FOOT
2	DDN9769	F1PNM-HC 1/4" TYPE N MALE CONNECTOR FOR FSJ1-50A CABLE
25	L1702	FSJ4-50B CABLE: 1/2" SUPERFLEX POLY JKT PER FOOT
2	DDN9682	F4PNMV2-HC 1/2" TYPE N MALE PLATED CONNECTOR
Remote Site 4, Black Knob		
2	DSRS0615R	POWER STRIP, 6 REAR OUTLETS 19 IN, 15-AMP RACKMOUNT, LOCKING SWITCH
2	DSTRAK91061	FOUR PORT DDM
1	DSGXTR4800N004HW	UPS, GXT3 RACKMNT 6KVA/4.8KW, 4 MN RUN
1 Backhaul and 2 Site Switches		
3	CLN1856	2620-24 ETHERNET SWITCH
1	SQM01SUM7054	GTR 8000 EXPANDABLE SITE SUBSYSTEM
1	CA00855AA	ADD: 700/800 MHZ
1	X303AE	ADD: QTY (3) GTR 8000 BASE RADIOS
3	CA01193AA	ADD: IP BASED MULTISITE BASE RADIO SOFTWARE
1	CA00861AA	ADD: CABINET RMC W/ CAPABILITY OF 6 BRS
1	CA00879AA	ADD: PRIMARY 6 PORT CAVITY COMBINER
1	CA00882AA	ADD: 700 MHZ TX FILTER W/PMU

QTY	NOMENCLATURE	DESCRIPTION
2	CA00884AA	ADD: QTY (1) XHUB
1	CA01402AA	ADD: 7.0 FT OPEN RACK
2	CA01842AA	ADD: P25 TDMA SOFTWARE
1	CA01706AA	ADD: ADD: GGM 8000 GATEWAY
1	DSTSJ100BT	SPD, RJ-48 8 PIN, 10/100 BASE T TSJ PROTECTS/PASSES ON ALL 8 PIN
1	DSTSJADP	RACK MOUNT GROUND BAR, 19 IN FOR TSJ AND WPH SERIES DATA SPDS
1	DS428D83I01T	TTA, MINI AUTO QUAD, 796-824 MHZ, SINGLE NETWORK, TOWER BOX
1	DS428D83I01C110	CONTROL MONITORING UNIT, 796-824 MHZ, 110 VAC
		TX Antenna
1	DQSE414SF3P4LDF	ENCLOSED 4 DIPOLE DIRECTIONAL, 8.0 DBD GAIN, LOW PIM, 746-869 MHZ
15	DSAT012J50	AT012J50, 1/2" TRANSMISSION LINE,50OHM,BLACK POLYETHYLENE JCKT PER FT
2	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
2	TDN9289	221213 CABLE WRAP WEATHERPROOFING
200	DSAT078J50	AT078J50, 7/8" TRANSMISSION LINE,50OHM,BLACK POLYETHYLENE JCKT PER FT
2	DSDFA07850	DFA07850, 7/16 DIN FEMALE FOR 7/8" CABLE
5	DSGKS78AC	GK-S78AC, STD GROUND KIT FOR 7/8" AIRCELL COAX
1	DSHG78	HG-78, LACE-UP HOISTING GRIP FOR 7/8" AIRCELL COAX
7	DSSSH78	SSH-78 7/8" SNAPSTAK HANGER 10PK
7	DSUA3	UA-3 UNIVERSAL ANGLE ADAPTOR KIT, KIT OF TEN
1	DSTSXDFMBF	RF SPD, 698-2700MHZ DC BLOCK HIGH POWER, DIN FEMALE/MALE BIDIRECTIONAL
1	DSGSAKITD	GROUND STRAP KIT - DIN
25	DSAT012J50	AT012J50, 1/2" TRANSMISSION LINE,50OHM,BLACK POLYETHYLENE JCKT PER FT
2	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
10	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
1	TT05543AA	ADD: 7-16 DIN MALE PS FOR 1/2 IN LDF4-50A CABLE, ANT END
1	TT04967AA	ADD: CONNECTOR ATTACHMENT LDF4 ANTENNA END
1	TT05542AA	ADD: 7-16 DIN MALE PS FOR 1/2 IN LDF4-50A CABLE, STA END
1	TT04936AA	ADD: CONNECTOR ATTACHMENT FEE FOR LDF4 STATION END
1	DSAPM7487K2AC	ADVANCED POWER MONITOR, 740-870 MHZ, 90-246V AC (INC SINGLE COUPLER)
10	L1700	FSJ1-50A CABLE: 1/4" SUPERFLEX POLY JKT PER FOOT
2	DDN9769	F1PNM-HC 1/4" TYPE N MALE CONNECTOR FOR FSJ1-50A CABLE
10	L1700	FSJ1-50A CABLE: 1/4" SUPERFLEX POLY JKT PER FOOT
2	DDN9769	F1PNM-HC 1/4" TYPE N MALE CONNECTOR FOR FSJ1-50A CABLE
		RX Antenna
1	DSSC412HF2LDFE5749	COLLINEAR OMNI ANTENN, 11.5 DBD GAIN, HD, 746-869 MHZ, PIP RATED
15	DSAT012J50	AT012J50, 1/2" TRANSMISSION LINE,50OHM,BLACK POLYETHYLENE JCKT PER FT
1	DSNMA01250	NMA01250, N MALE FOR 1/2" CABLE
1	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
5	TDN9289	221213 CABLE WRAP WEATHERPROOFING

QTY	NOMENCLATURE	DESCRIPTION
5	DSAT012J50	AT012J50, 1/2" TRANSMISSION LINE,50OHM,BLACK POLYETHYLENE JCKT PER FT
2	DSNMA01250	NMA01250, N MALE FOR 1/2" CABLE
200	DSAT078J50	AT078J50, 7/8" TRANSMISSION LINE,50OHM,BLACK POLYETHYLENE JCKT PER FT
2	DSNFA07850	NFA07850, N FEMALE FOR 7/8" CABLE
5	DSGKS78AC	GK-S78AC, STD GROUND KIT FOR 7/8" AIRCELL COAX
1	DSHG78	HG-78, LACE-UP HOISTING GRIP FOR 7/8" AIRCELL COAX
200	DSAT012J50	AT012J50, 1/2" TRANSMISSION LINE,50OHM,BLACK POLYETHYLENE JCKT PER FT
1	DSNMA01250	NMA01250, N MALE FOR 1/2" CABLE
1	DSNFA01250	NFA01250, N FEMALE FOR 1/2" CABLE
5	DSGKS12AC	GK-S12AC, STD GROUND KIT FOR 1/2" AIRCELL COAX
1	DSHG12	HG-12, LACE-UP HOISTING GRIP FOR 1/2" AIRCELL COAX
7	DSSSH12	SSH-12 1/2" SNAPSTAK HANGER 10PK
7	DSSSH78	SSH-78 7/8" SNAPSTAK HANGER 10PK
14	DSUA3	UA-3 UNIVERSAL ANGLE ADAPTOR KIT, KIT OF TEN
1	DS1090501WA	RF SPD, 700-1000MHZ BROADBAND 12 VDC PASS NM ANTENNA, NF EQUIPMENT
1	DS1090501WA	RF SPD, 700-1000MHZ BROADBAND 12 VDC PASS NM ANTENNA, NF EQUIPMENT
25	L1700	FSJ1-50A CABLE: 1/4" SUPERFLEX POLY JKT PER FOOT
2	DDN9769	F1PNM-HC 1/4" TYPE N MALE CONNECTOR FOR FSJ1-50A CABLE
25	L1702	FSJ4-50B CABLE: 1/2" SUPERFLEX POLY JKT PER FOOT
2	DDN9682	F4PNMV2-HC 1/2" TYPE N MALE PLATED CONNECTOR
Remote Site 5, Bernardino		
2	DSRS0615R	POWER STRIP, 6 REAR OUTLETS 19 IN, 15-AMP RACKMOUNT, LOCKING SWITCH
2	DSTRAK91061	FOUR PORT DDM
1	DSGXTR4800N004HW	UPS, GXT3 RACKMNT 6KVA/4.8KW, 4 MN RUN
1 Backhaul and 2 Site Switches		
3	CLN1856	2620-24 ETHERNET SWITCH
1	SQM01SUM7054	GTR 8000 EXPANDABLE SITE SUBSYSTEM
1	CA00855AA	ADD: 700/800 MHZ
1	X303AE	ADD: QTY (3) GTR 8000 BASE RADIOS
3	CA01193AA	ADD: IP BASED MULTISITE BASE RADIO SOFTWARE
1	CA00861AA	ADD: CABINET RMC W/ CAPABILITY OF 6 BRS
1	CA00879AA	ADD: PRIMARY 6 PORT CAVITY COMBINER
1	CA00882AA	ADD: 700 MHZ TX FILTER W/PMU
2	CA00884AA	ADD: QTY (1) XHUB
1	CA01402AA	ADD: 7.0 FT OPEN RACK
2	CA01842AA	ADD: P25 TDMA SOFTWARE
1	CA01706AA	ADD: ADD: GGM 8000 GATEWAY
1	DSTSJ100BT	SPD, RJ-48 8 PIN, 10/100 BASE T TSJ PROTECTS/PASSES ON ALL 8 PIN
1	DSTSJADP	RACK MOUNT GROUND BAR, 19 IN FOR TSJ AND WPH SERIES DATA SPDS

QTY	NOMENCLATURE	DESCRIPTION
1	DS428D83I01T	TTA, MINI AUTO QUAD, 796-824 MHZ, SINGLE NETWORK, TOWER BOX
1	DS428D83I01C110	CONTROL MONITORING UNIT, 796-824 MHZ, 110 VAC
		TX Antenna
1	DSSC479HF1LDFE5749	COLLINEAR 9.5 DBD LOW PIM, HD, 746-869 PIP RATED
15	DSAT012J50	AT012J50, 1/2" TRANSMISSION LINE,50OHM,BLACK POLYETHYLENE JCKT PER FT
2	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
2	TDN9289	221213 CABLE WRAP WEATHERPROOFING
200	DSAT078J50	AT078J50, 7/8" TRANSMISSION LINE,50OHM,BLACK POLYETHYLENE JCKT PER FT
2	DSDFA07850	DFA07850, 7/16 DIN FEMALE FOR 7/8" CABLE
5	DSGKS78AC	GK-S78AC, STD GROUND KIT FOR 7/8" AIRCELL COAX
1	DSHG78	HG-78, LACE-UP HOISTING GRIP FOR 7/8" AIRCELL COAX
7	DSSSH78	SSH-78 7/8" SNAPSTAK HANGER 10PK
7	DSUA3	UA-3 UNIVERSAL ANGLE ADAPTOR KIT, KIT OF TEN
1	DSTSXDFMBF	RF SPD, 698-2700MHZ DC BLOCK HIGH POWER, DIN FEMALE/MALE BIDIRECTIONAL
1	DSGSAKITD	GROUND STRAP KIT - DIN
25	DSAT012J50	AT012J50, 1/2" TRANSMISSION LINE,50OHM,BLACK POLYETHYLENE JCKT PER FT
2	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
10	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
1	TT05543AA	ADD: 7-16 DIN MALE PS FOR 1/2 IN LDF4-50A CABLE, ANT END
1	TT04967AA	ADD: CONNECTOR ATTACHMENT LDF4 ANTENNA END
1	TT05542AA	ADD: 7-16 DIN MALE PS FOR 1/2 IN LDF4-50A CABLE, STA END
1	TT04936AA	ADD: CONNECTOR ATTACHMENT FEE FOR LDF4 STATION END
1	DSAPM7487K2AC	ADVANCED POWER MONITOR, 740-870 MHZ, 90-246V AC (INC SINGLE COUPLER)
10	L1700	FSJ1-50A CABLE: 1/4" SUPERFLEX POLY JKT PER FOOT
2	DDN9769	F1PNM-HC 1/4" TYPE N MALE CONNECTOR FOR FSJ1-50A CABLE
10	L1700	FSJ1-50A CABLE: 1/4" SUPERFLEX POLY JKT PER FOOT
2	DDN9769	F1PNM-HC 1/4" TYPE N MALE CONNECTOR FOR FSJ1-50A CABLE
		RX Antenna
1	DSSC412HF2LDFE5749	COLLINEAR OMNI ANTENN, 11.5 DBD GAIN, HD, 746-869 MHZ, PIP RATED
15	DSAT012J50	AT012J50, 1/2" TRANSMISSION LINE,50OHM,BLACK POLYETHYLENE JCKT PER FT
1	DSNMA01250	NMA01250, N MALE FOR 1/2" CABLE
1	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
5	TDN9289	221213 CABLE WRAP WEATHERPROOFING
5	DSAT012J50	AT012J50, 1/2" TRANSMISSION LINE,50OHM,BLACK POLYETHYLENE JCKT PER FT
2	DSNMA01250	NMA01250, N MALE FOR 1/2" CABLE
200	DSAT078J50	AT078J50, 7/8" TRANSMISSION LINE,50OHM,BLACK POLYETHYLENE JCKT PER FT
2	DSNFA07850	NFA07850, N FEMALE FOR 7/8" CABLE
5	DSGKS78AC	GK-S78AC, STD GROUND KIT FOR 7/8" AIRCELL COAX
1	DSHG78	HG-78, LACE-UP HOISTING GRIP FOR 7/8" AIRCELL COAX

QTY	NOMENCLATURE	DESCRIPTION
200	DSAT012J50	AT012J50, 1/2" TRANSMISSION LINE,50OHM,BLACK POLYETHYLENE JCKT PER FT
1	DSNMA01250	NMA01250, N MALE FOR 1/2" CABLE
1	DSNFA01250	NFA01250, N FEMALE FOR 1/2" CABLE
5	DSGKS12AC	GK-S12AC, STD GROUND KIT FOR 1/2" AIRCELL COAX
1	DSHG12	HG-12, LACE-UP HOISTING GRIP FOR 1/2" AIRCELL COAX
7	DSSSH12	SSH-12 1/2" SNAPSTAK HANGER 10PK
7	DSSSH78	SSH-78 7/8" SNAPSTAK HANGER 10PK
14	DSUA3	UA-3 UNIVERSAL ANGLE ADAPTOR KIT, KIT OF TEN
1	DS1090501WA	RF SPD, 700-1000MHZ BROADBAND 12 VDC PASS NM ANTENNA, NF EQUIPMENT
1	DS1090501WA	RF SPD, 700-1000MHZ BROADBAND 12 VDC PASS NM ANTENNA, NF EQUIPMENT
25	L1700	FSJ1-50A CABLE: 1/4" SUPERFLEX POLY JKT PER FOOT
2	DDN9769	F1PNM-HC 1/4" TYPE N MALE CONNECTOR FOR FSJ1-50A CABLE
25	L1702	FSJ4-50B CABLE: 1/2" SUPERFLEX POLY JKT PER FOOT
2	DDN9682	F4PNMV2-HC 1/2" TYPE N MALE PLATED CONNECTOR
Remote Site 6, Mule Mtn (co-located to Mule Mtn Prime Site)		
2	DSRS0615R	POWER STRIP, 6 REAR OUTLETS 19 IN, 15-AMP RACKMOUNT, LOCKING SWITCH
2	DSTRAK91061	FOUR PORT DDM
1	DSGXTR4800N004HW	UPS, GXT3 RACKMNT 6KVA/4.8KW, 4 MN RUN
2 Site Switches		
2	CLN1856	2620-24 ETHERNET SWITCH
1	SQM01SUM7054	GTR 8000 EXPANDABLE SITE SUBSYSTEM
1	CA00855AA	ADD: 700/800 MHZ
1	X303AE	ADD: QTY (3) GTR 8000 BASE RADIOS
3	X591AE	ENH: ASTRO 25 SITE REPEATER SW
1	CA00861AA	ADD: CABINET RMC W/ CAPABILITY OF 6 BRS
1	CA00879AA	ADD: PRIMARY 6 PORT CAVITY COMBINER
1	CA00882AA	ADD: 700 MHZ TX FILTER W/PMU
2	CA00884AA	ADD: QTY (1) XHUB
1	CA01402AA	ADD: 7.0 FT OPEN RACK
2	CA01842AA	ADD: P25 TDMA SOFTWARE
1	CA01706AA	ADD: ADD: GGM 8000 GATEWAY
1	DSTSJ100BT	SPD, RJ-48 8 PIN, 10/100 BASE T TSJ PROTECTS/PASSES ON ALL 8 PIN
1	DSTSJADP	RACK MOUNT GROUND BAR, 19 IN FOR TSJ AND WPH SERIES DATA SPDS
1	DS428D83I01T	TTA, MINI AUTO QUAD, 796-824 MHZ, SINGLE NETWORK, TOWER BOX
1	DS428D83I01C110	CONTROL MONITORING UNIT, 796-824 MHZ, 110 VAC
TX Antenna		
1	DSSC479HF1LDFD6NUP	COLLINEAR OMNI 9.5DBD LOW PIM NULL FILL PIP RATED, HD 746-869 6 DEG DT
15	DSAT012J50	AT012J50, 1/2" TRANSMISSION LINE,50OHM,BLACK POLYETHYLENE JCKT PER FT
2	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE

QTY	NOMENCLATURE	DESCRIPTION
2	TDN9289	221213 CABLE WRAP WEATHERPROOFING
200	DSAT078J50	AT078J50, 7/8" TRANSMISSION LINE,50OHM,BLACK POLYETHYLENE JCKT PER FT
2	DSDFA07850	DFA07850, 7/16 DIN FEMALE FOR 7/8" CABLE
5	DSGKS78AC	GK-S78AC, STD GROUND KIT FOR 7/8" AIRCELL COAX
1	DSHG78	HG-78, LACE-UP HOISTING GRIP FOR 7/8" AIRCELL COAX
7	DSSSH78	SSH-78 7/8" SNAPSTAK HANGER 10PK
7	DSUA3	UA-3 UNIVERSAL ANGLE ADAPTOR KIT, KIT OF TEN
1	DSTSXDFMBF	RF SPD, 698-2700MHZ DC BLOCK HIGH POWER, DIN FEMALE/MALE BIDIRECTIONAL
1	DSGSAKITD	GROUND STRAP KIT - DIN
25	DSAT012J50	AT012J50, 1/2" TRANSMISSION LINE,50OHM,BLACK POLYETHYLENE JCKT PER FT
2	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
10	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
1	TT05543AA	ADD: 7-16 DIN MALE PS FOR 1/2 IN LDF4-50A CABLE, ANT END
1	TT04967AA	ADD: CONNECTOR ATTACHMENT LDF4 ANTENNA END
1	TT05542AA	ADD: 7-16 DIN MALE PS FOR 1/2 IN LDF4-50A CABLE, STA END
1	TT04936AA	ADD: CONNECTOR ATTACHMENT FEE FOR LDF4 STATION END
1	DSAPM7487K2AC	ADVANCED POWER MONITOR, 740-870 MHZ, 90-246V AC (INC SINGLE COUPLER)
10	L1700	FSJ1-50A CABLE: 1/4" SUPERFLEX POLY JKT PER FOOT
2	DDN9769	F1PNM-HC 1/4" TYPE N MALE CONNECTOR FOR FSJ1-50A CABLE
10	L1700	FSJ1-50A CABLE: 1/4" SUPERFLEX POLY JKT PER FOOT
2	DDN9769	F1PNM-HC 1/4" TYPE N MALE CONNECTOR FOR FSJ1-50A CABLE
		RX Antenna
1	DSSC412HF2LDFE5749	COLLINEAR OMNI ANTENN, 11.5 DBD GAIN, HD, 746-869 MHZ, PIP RATED
15	DSAT012J50	AT012J50, 1/2" TRANSMISSION LINE,50OHM,BLACK POLYETHYLENE JCKT PER FT
1	DSNMA01250	NMA01250, N MALE FOR 1/2" CABLE
1	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
5	TDN9289	221213 CABLE WRAP WEATHERPROOFING
5	DSAT012J50	AT012J50, 1/2" TRANSMISSION LINE,50OHM,BLACK POLYETHYLENE JCKT PER FT
2	DSNMA01250	NMA01250, N MALE FOR 1/2" CABLE
200	DSAT078J50	AT078J50, 7/8" TRANSMISSION LINE,50OHM,BLACK POLYETHYLENE JCKT PER FT
2	DSNFA07850	NFA07850, N FEMALE FOR 7/8" CABLE
5	DSGKS78AC	GK-S78AC, STD GROUND KIT FOR 7/8" AIRCELL COAX
1	DSHG78	HG-78, LACE-UP HOISTING GRIP FOR 7/8" AIRCELL COAX
200	DSAT012J50	AT012J50, 1/2" TRANSMISSION LINE,50OHM,BLACK POLYETHYLENE JCKT PER FT
1	DSNMA01250	NMA01250, N MALE FOR 1/2" CABLE
1	DSNFA01250	NFA01250, N FEMALE FOR 1/2" CABLE
5	DSGKS12AC	GK-S12AC, STD GROUND KIT FOR 1/2" AIRCELL COAX
1	DSHG12	HG-12, LACE-UP HOISTING GRIP FOR 1/2" AIRCELL COAX
7	DSSSH12	SSH-12 1/2" SNAPSTAK HANGER 10PK

QTY	NOMENCLATURE	DESCRIPTION
7	DSSSH78	SSH-78 7/8" SNAPSTAK HANGER 10PK
14	DSUA3	UA-3 UNIVERSAL ANGLE ADAPTOR KIT, KIT OF TEN
1	DS1090501WA	RF SPD, 700-1000MHZ BROADBAND 12 VDC PASS NM ANTENNA, NF EQUIPMENT
1	DS1090501WA	RF SPD, 700-1000MHZ BROADBAND 12 VDC PASS NM ANTENNA, NF EQUIPMENT
25	L1700	FSJ1-50A CABLE: 1/4" SUPERFLEX POLY JKT PER FOOT
2	DDN9769	F1PNM-HC 1/4" TYPE N MALE CONNECTOR FOR FSJ1-50A CABLE
25	L1702	FSJ4-50B CABLE: 1/2" SUPERFLEX POLY JKT PER FOOT
2	DDN9682	F4PNMV2-HC 1/2" TYPE N MALE PLATED CONNECTOR
Remote Site 7, Texas Canyon		
2	DSRS0615R	POWER STRIP, 6 REAR OUTLETS 19 IN, 15-AMP RACKMOUNT, LOCKING SWITCH
2	DSTRAK91061	FOUR PORT DDM
1	DSGXTR4800N004HW	UPS, GXT3 RACKMNT 6KVA/4.8KW, 4 MN RUN
1 Backhaul and 2 Site Switches		
3	CLN1856	2620-24 ETHERNET SWITCH
1	SQM01SUM7054	GTR 8000 EXPANDABLE SITE SUBSYSTEM
1	CA00855AA	ADD: 700/800 MHZ
1	X303AE	ADD: QTY (3) GTR 8000 BASE RADIOS
3	X591AE	ENH: ASTRO 25 SITE REPEATER SW
1	CA00861AA	ADD: CABINET RMC W/ CAPABILITY OF 6 BRS
1	CA00879AA	ADD: PRIMARY 6 PORT CAVITY COMBINER
1	CA00882AA	ADD: 700 MHZ TX FILTER W/PMU
2	CA00884AA	ADD: QTY (1) XHUB
1	CA01402AA	ADD: 7.0 FT OPEN RACK
2	CA01842AA	ADD: P25 TDMA SOFTWARE
1	CA01706AA	ADD: ADD: GGM 8000 GATEWAY
1	DSTSJ100BT	SPD, RJ-48 8 PIN, 10/100 BASE T TSJ PROTECTS/PASSES ON ALL 8 PIN
1	DSTSJADP	RACK MOUNT GROUND BAR, 19 IN FOR TSJ AND WPH SERIES DATA SPDS
1	DS428D83I01T	TTA, MINI AUTO QUAD, 796-824 MHZ, SINGLE NETWORK, TOWER BOX
1	DS428D83I01C110	CONTROL MONITORING UNIT, 796-824 MHZ, 110 VAC
TX Antenna		
1	DSSC479HF1LDFE5749	COLLINEAR 9.5 DBD LOW PIM, HD, 746-869 PIP RATED
15	DSAT012J50	AT012J50, 1/2" TRANSMISSION LINE,50OHM,BLACK POLYETHYLENE JCKT PER FT
2	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
2	TDN9289	221213 CABLE WRAP WEATHERPROOFING
200	DSAT078J50	AT078J50, 7/8" TRANSMISSION LINE,50OHM,BLACK POLYETHYLENE JCKT PER FT
2	DSDFA07850	DFA07850, 7/16 DIN FEMALE FOR 7/8" CABLE
5	DSGKS78AC	GK-S78AC, STD GROUND KIT FOR 7/8" AIRCELL COAX
1	DSHG78	HG-78, LACE-UP HOISTING GRIP FOR 7/8" AIRCELL COAX
7	DSSSH78	SSH-78 7/8" SNAPSTAK HANGER 10PK

QTY	NOMENCLATURE	DESCRIPTION
7	DSUA3	UA-3 UNIVERSAL ANGLE ADAPTOR KIT, KIT OF TEN
1	DSTSXDFMBF	RF SPD, 698-2700MHZ DC BLOCK HIGH POWER, DIN FEMALE/MALE BIDIRECTIONAL
1	DSGSAKITD	GROUND STRAP KIT - DIN
25	DSAT012J50	AT012J50, 1/2" TRANSMISSION LINE,50OHM,BLACK POLYETHYLENE JCKT PER FT
2	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
10	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
1	TT05543AA	ADD: 7-16 DIN MALE PS FOR 1/2 IN LDF4-50A CABLE, ANT END
1	TT04967AA	ADD: CONNECTOR ATTACHMENT LDF4 ANTENNA END
1	TT05542AA	ADD: 7-16 DIN MALE PS FOR 1/2 IN LDF4-50A CABLE, STA END
1	TT04936AA	ADD: CONNECTOR ATTACHMENT FEE FOR LDF4 STATION END
1	DSAPM7487K2AC	ADVANCED POWER MONITOR, 740-870 MHZ, 90-246V AC (INC SINGLE COUPLER)
10	L1700	FSJ1-50A CABLE: 1/4" SUPERFLEX POLY JKT PER FOOT
2	DDN9769	F1PNM-HC 1/4" TYPE N MALE CONNECTOR FOR FSJ1-50A CABLE
10	L1700	FSJ1-50A CABLE: 1/4" SUPERFLEX POLY JKT PER FOOT
2	DDN9769	F1PNM-HC 1/4" TYPE N MALE CONNECTOR FOR FSJ1-50A CABLE
RX Antenna		
1	DSSC412HF2LDFE5749	COLLINEAR OMNI ANTENN, 11.5 DBD GAIN, HD, 746-869 MHZ, PIP RATED
15	DSAT012J50	AT012J50, 1/2" TRANSMISSION LINE,50OHM,BLACK POLYETHYLENE JCKT PER FT
1	DSNMA01250	NMA01250, N MALE FOR 1/2" CABLE
1	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
5	TDN9289	221213 CABLE WRAP WEATHERPROOFING
5	DSAT012J50	AT012J50, 1/2" TRANSMISSION LINE,50OHM,BLACK POLYETHYLENE JCKT PER FT
2	DSNMA01250	NMA01250, N MALE FOR 1/2" CABLE
200	DSAT078J50	AT078J50, 7/8" TRANSMISSION LINE,50OHM,BLACK POLYETHYLENE JCKT PER FT
2	DSNFA07850	NFA07850, N FEMALE FOR 7/8" CABLE
5	DSGKS78AC	GK-S78AC, STD GROUND KIT FOR 7/8" AIRCELL COAX
1	DSHG78	HG-78, LACE-UP HOISTING GRIP FOR 7/8" AIRCELL COAX
200	DSAT012J50	AT012J50, 1/2" TRANSMISSION LINE,50OHM,BLACK POLYETHYLENE JCKT PER FT
1	DSNMA01250	NMA01250, N MALE FOR 1/2" CABLE
1	DSNFA01250	NFA01250, N FEMALE FOR 1/2" CABLE
5	DSGKS12AC	GK-S12AC, STD GROUND KIT FOR 1/2" AIRCELL COAX
1	DSHG12	HG-12, LACE-UP HOISTING GRIP FOR 1/2" AIRCELL COAX
7	DSSSH12	SSH-12 1/2" SNAPSTAK HANGER 10PK
7	DSSSH78	SSH-78 7/8" SNAPSTAK HANGER 10PK
14	DSUA3	UA-3 UNIVERSAL ANGLE ADAPTOR KIT, KIT OF TEN
1	DS1090501WA	RF SPD, 700-1000MHZ BROADBAND 12 VDC PASS NM ANTENNA, NF EQUIPMENT
1	DS1090501WA	RF SPD, 700-1000MHZ BROADBAND 12 VDC PASS NM ANTENNA, NF EQUIPMENT
25	L1700	FSJ1-50A CABLE: 1/4" SUPERFLEX POLY JKT PER FOOT
2	DDN9769	F1PNM-HC 1/4" TYPE N MALE CONNECTOR FOR FSJ1-50A CABLE

QTY	NOMENCLATURE	DESCRIPTION
25	L1702	FSJ4-50B CABLE: 1/2" SUPERFLEX POLY JKT PER FOOT
2	DDN9682	F4PNMV2-HC 1/2" TYPE N MALE PLATED CONNECTOR
Remote Site 8, Jordan Farms		
2	DSRS0615R	POWER STRIP, 6 REAR OUTLETS 19 IN, 15-AMP RACKMOUNT, LOCKING SWITCH
2	DSTRAK91061	FOUR PORT DDM
1	DSGXTR4800N004HW	UPS, GXT3 RACKMNT 6KVA/4.8KW, 4 MN RUN

QTY	NOMENCLATURE	DESCRIPTION
1 Backhaul and 2 Site Switches		
3	CLN1856	2620-24 ETHERNET SWITCH
1	SQM01SUM7054	GTR 8000 EXPANDABLE SITE SUBSYSTEM
1	CA00855AA	ADD: 700/800 MHZ
1	X303AE	ADD: QTY (3) GTR 8000 BASE RADIOS
3	X591AE	ENH: ASTRO 25 SITE REPEATER SW
1	CA00861AA	ADD: CABINET RMC W/ CAPABILITY OF 6 BRS
1	CA00879AA	ADD: PRIMARY 6 PORT CAVITY COMBINER
1	CA00882AA	ADD: 700 MHZ TX FILTER W/PMU
2	CA00884AA	ADD: QTY (1) XHUB
1	CA01402AA	ADD: 7.0 FT OPEN RACK
2	CA01842AA	ADD: P25 TDMA SOFTWARE
1	CA01706AA	ADD: ADD: GGM 8000 GATEWAY
1	DSTSJ100BT	SPD, RJ-48 8 PIN, 10/100 BASE T TSJ PROTECTS/PASSES ON ALL 8 PIN
1	DSTSJADP	RACK MOUNT GROUND BAR, 19 IN FOR TSJ AND WPH SERIES DATA SPDS
1	DS428D83I01T	TTA, MINI AUTO QUAD, 796-824 MHZ, SINGLE NETWORK, TOWER BOX
1	DS428D83I01C110	CONTROL MONITORING UNIT, 796-824 MHZ, 110 VAC
TX Antenna		
1	DQSE414SF3P4LDF	ENCLOSED 4 DIPOLE DIRECTIONAL, 8.0 DBD GAIN, LOW PIM, 746-869 MHZ
15	DSAT012J50	AT012J50, 1/2" TRANSMISSION LINE,50OHM,BLACK POLYETHYLENE JCKT PER FT
2	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
2	TDN9289	221213 CABLE WRAP WEATHERPROOFING
200	DSAT078J50	AT078J50, 7/8" TRANSMISSION LINE,50OHM,BLACK POLYETHYLENE JCKT PER FT
2	DSDFA07850	DFA07850, 7/16 DIN FEMALE FOR 7/8" CABLE
5	DSGKS78AC	GK-S78AC, STD GROUND KIT FOR 7/8" AIRCELL COAX
1	DSHG78	HG-78, LACE-UP HOISTING GRIP FOR 7/8" AIRCELL COAX
7	DSSSH78	SSH-78 7/8" SNAPSTAK HANGER 10PK
7	DSUA3	UA-3 UNIVERSAL ANGLE ADAPTOR KIT, KIT OF TEN
1	DSTSXDFMBF	RF SPD, 698-2700MHZ DC BLOCK HIGH POWER, DIN FEMALE/MALE BIDIRECTIONAL

QTY	NOMENCLATURE	DESCRIPTION
1	DSGSAKITD	GROUND STRAP KIT - DIN
25	DSAT012J50	AT012J50, 1/2" TRANSMISSION LINE,50OHM,BLACK POLYETHYLENE JCKT PER FT
2	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
10	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
1	TT05543AA	ADD: 7-16 DIN MALE PS FOR 1/2 IN LDF4-50A CABLE, ANT END
1	TT04967AA	ADD: CONNECTOR ATTACHMENT LDF4 ANTENNA END
1	TT05542AA	ADD: 7-16 DIN MALE PS FOR 1/2 IN LDF4-50A CABLE, STA END
1	TT04936AA	ADD: CONNECTOR ATTACHMENT FEE FOR LDF4 STATION END
1	DSAPM7487K2AC	ADVANCED POWER MONITOR, 740-870 MHZ, 90-246V AC (INC SINGLE COUPLER)
10	L1700	FSJ1-50A CABLE: 1/4" SUPERFLEX POLY JKT PER FOOT
2	DDN9769	F1PNM-HC 1/4" TYPE N MALE CONNECTOR FOR FSJ1-50A CABLE
10	L1700	FSJ1-50A CABLE: 1/4" SUPERFLEX POLY JKT PER FOOT
2	DDN9769	F1PNM-HC 1/4" TYPE N MALE CONNECTOR FOR FSJ1-50A CABLE
		RX Antenna
1	DSSC412HF2LDFE5749	COLLINEAR OMNI ANTENN, 11.5 DBD GAIN, HD, 746-869 MHZ, PIP RATED
15	DSAT012J50	AT012J50, 1/2" TRANSMISSION LINE,50OHM,BLACK POLYETHYLENE JCKT PER FT
1	DSNMA01250	NMA01250, N MALE FOR 1/2" CABLE
1	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
5	TDN9289	221213 CABLE WRAP WEATHERPROOFING
5	DSAT012J50	AT012J50, 1/2" TRANSMISSION LINE,50OHM,BLACK POLYETHYLENE JCKT PER FT
2	DSNMA01250	NMA01250, N MALE FOR 1/2" CABLE
200	DSAT078J50	AT078J50, 7/8" TRANSMISSION LINE,50OHM,BLACK POLYETHYLENE JCKT PER FT
2	DSNFA07850	NFA07850, N FEMALE FOR 7/8" CABLE
5	DSGKS78AC	GK-S78AC, STD GROUND KIT FOR 7/8" AIRCELL COAX
1	DSHG78	HG-78, LACE-UP HOISTING GRIP FOR 7/8" AIRCELL COAX
200	DSAT012J50	AT012J50, 1/2" TRANSMISSION LINE,50OHM,BLACK POLYETHYLENE JCKT PER FT
1	DSNMA01250	NMA01250, N MALE FOR 1/2" CABLE
1	DSNFA01250	NFA01250, N FEMALE FOR 1/2" CABLE
5	DSGKS12AC	GK-S12AC, STD GROUND KIT FOR 1/2" AIRCELL COAX
1	DSHG12	HG-12, LACE-UP HOISTING GRIP FOR 1/2" AIRCELL COAX
7	DSSSH12	SSH-12 1/2" SNAPSTAK HANGER 10PK
7	DSSSH78	SSH-78 7/8" SNAPSTAK HANGER 10PK
14	DSUA3	UA-3 UNIVERSAL ANGLE ADAPTOR KIT, KIT OF TEN
1	DS1090501WA	RF SPD, 700-1000MHZ BROADBAND 12 VDC PASS NM ANTENNA, NF EQUIPMENT
1	DS1090501WA	RF SPD, 700-1000MHZ BROADBAND 12 VDC PASS NM ANTENNA, NF EQUIPMENT
25	L1700	FSJ1-50A CABLE: 1/4" SUPERFLEX POLY JKT PER FOOT
2	DDN9769	F1PNM-HC 1/4" TYPE N MALE CONNECTOR FOR FSJ1-50A CABLE
25	L1702	FSJ4-50B CABLE: 1/2" SUPERFLEX POLY JKT PER FOOT
2	DDN9682	F4PNMV2-HC 1/2" TYPE N MALE PLATED CONNECTOR

QTY	NOMENCLATURE	DESCRIPTION
Remote Spares		
1	DSTRAK91061	FOUR PORT DDM
1	DLN6885	FRU: XCVR 7/800 MHZ V2
1	DLN6895	FRU: PA 7/800 MHz
1	DLN6569	FRU: GCP 8000/GCM 8000
1	DLN6781	FRU POWER SUPPLY
1	DLN6898	FRU: FAN MODULE
Backup Consolettes		
8	L30TSS9PW1 N	APX7500 CONSOLETTE DUAL BAND MODEL
8	GA00244	ADD: 7/800MHZ PRIMARY BAND
8	GA00308	ADD: VHF MP SECONDARY BAND
8	GA00579	ADD: ENABLE DUAL BAND OPERATION
8	G806	ENH: ASTRO DIGITAL CAI OP APX
8	G51	ENH: SMARTZONE OPERATION APX
8	QA01749	SW KEY SUPPLEMENTAL DATA
8	G625	ADD: DES/DES-XL/DES-OFB ENCRYPTION
8	W382	ADD: CONTROL STATION DESK GCAI MIC
8	CA01598	ADD: AC LINE CORD US
8	L999	ADD: FULL FP W/05/KEYPAD/CLOCK/VU
8	GA00232	ENH: 3 YR SFS LITE
8	GA00580	ADD: TDMA OPERATION
8	G361	ADD: P25 TRUNKING SOFTWARE
8	G298	ADD: ENCRYPTION P25 & MDC OTAR
8	HKN6184C	CABLE CH, PROGRAMMING,USB
8	HKN6233	ASSEMBLY,ACCESSORY,APX CONSOLETTE RACK MOUNT TRAY HARDWARE KIT
2	DSCS15170405SN	STANDARD CONTROL STATION COMBINER, 150-174 MHZ 4 CH.
2	DS4383G01A08	CONTROL STATION COMBINER, STANDARD, 746-869 MHZ, 8 CHANNEL
DISPATCH CONSOLETTE ANTENNA SYSTEMS - SVPD		
1	DSCOL54160	OMNI, MEANDER COLLINEAR, 6.0 DBD, 150-160 MHZ, PIM RATED
120	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
1	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
1	DDN1091	L4TDF-PSA 7-16 DIN FEMALE PS FOR 1/2 IN CABLE
2	TDN9289	221213 CABLE WRAP WEATHERPROOFING
4	DSGKSUNV	GK-SUNV SMALL UNIVERSAL GROUNDING KIT
1	DSWSHG12PRL	WIRELESS SOLUTIONS PRE-LACED HOIST GRIP 1/2INCH
5	DSSSH12	SSH-12 1/2" SNAPSTAK HANGER 10PK
5	MDN6816	STD HANGERS FOR 1/2IN CABLE & EW180/EW220/EW-HANGER KIT STAINLESS-10PK
1	DSVHF50DMAPGR	RF SPD, 100-512MHZ, DC BLOCK HIGH POWER DIN MALE ANT, DIN FEMALE EQUIP
50	L1702	FSJ4-50B CABLE: 1/2" SUPERFLEX POLY JKT PER FOOT

QTY	NOMENCLATURE	DESCRIPTION
1	DSF4PDMV2C	F4PDMV2-C 1/2" 7-16 DIN MALE CONNECTOR
1	DDN9682	F4PNMV2-HC 1/2" TYPE N MALE PLATED CONNECTOR
10	L1700	FSJ1-50A CABLE: 1/4" SUPERFLEX POLY JKT PER FOOT
2	DDN9769	F1PNM-HC 1/4" TYPE N MALE CONNECTOR FOR FSJ1-50A CABLE
10	L1700	FSJ1-50A CABLE: 1/4" SUPERFLEX POLY JKT PER FOOT
2	DDN9769	F1PNM-HC 1/4" TYPE N MALE CONNECTOR FOR FSJ1-50A CABLE
1	TDN9576	MCPT-1412 1/4" OR 1/2" S FLEX PREP TOOL
1	DSUC1143	ANT CLAMPS, KIT OF 3 FOR 2.5 IN TO 4.5 IN OD FOR ANT LONGR THAN 15 FT
1	DSCOL54160	OMNI, MEANDER COLLINEAR, 6.0 DBD, 150-160 MHZ, PIM RATED
120	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
1	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
1	DDN1091	L4TDF-PSA 7-16 DIN FEMALE PS FOR 1/2 IN CABLE
2	TDN9289	221213 CABLE WRAP WEATHERPROOFING
4	DSGKSUNV	GK-SUNV SMALL UNIVERSAL GROUNDING KIT
1	DSWSHG12PRL	WIRELESS SOLUTIONS PRE-LACED HOIST GRIP 1/2INCH
5	DSSSH12	SSH-12 1/2" SNAPSTAK HANGER 10PK
5	MDN6816	STD HANGERS FOR 1/2IN CABLE & EW180/EW220/EW-HANGER KIT STAINLESS-10PK
1	DSVHF50DMAPGR	RF SPD, 100-512MHZ, DC BLOCK HIGH POWER DIN MALE ANT, DIN FEMALE EQUIP
50	L1702	FSJ4-50B CABLE: 1/2" SUPERFLEX POLY JKT PER FOOT
1	DSF4PDMV2C	F4PDMV2-C 1/2" 7-16 DIN MALE CONNECTOR
1	DDN9682	F4PNMV2-HC 1/2" TYPE N MALE PLATED CONNECTOR
10	L1700	FSJ1-50A CABLE: 1/4" SUPERFLEX POLY JKT PER FOOT
2	DDN9769	F1PNM-HC 1/4" TYPE N MALE CONNECTOR FOR FSJ1-50A CABLE
10	L1700	FSJ1-50A CABLE: 1/4" SUPERFLEX POLY JKT PER FOOT
2	DDN9769	F1PNM-HC 1/4" TYPE N MALE CONNECTOR FOR FSJ1-50A CABLE
1	TDN9576	MCPT-1412 1/4" OR 1/2" S FLEX PREP TOOL
1	DSUC1143	ANT CLAMPS, KIT OF 3 FOR 2.5 IN TO 4.5 IN OD FOR ANT LONGR THAN 15 FT
1	DSCOL54160	OMNI, MEANDER COLLINEAR, 6.0 DBD, 150-160 MHZ, PIM RATED
1	DSDB589A	746 806 ANT 9 DBD OMNI LOW PROFILE
120	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
1	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
1	DDN1091	L4TDF-PSA 7-16 DIN FEMALE PS FOR 1/2 IN CABLE
2	TDN9289	221213 CABLE WRAP WEATHERPROOFING
4	DSGKSUNV	GK-SUNV SMALL UNIVERSAL GROUNDING KIT
1	DSWSHG12PRL	WIRELESS SOLUTIONS PRE-LACED HOIST GRIP 1/2INCH
5	DSSSH12	SSH-12 1/2" SNAPSTAK HANGER 10PK
5	MDN6816	STD HANGERS FOR 1/2IN CABLE & EW180/EW220/EW-HANGER KIT STAINLESS-10PK
1	DSVHF50DMAPGR	RF SPD, 100-512MHZ, DC BLOCK HIGH POWER DIN MALE ANT, DIN FEMALE EQUIP
50	L1702	FSJ4-50B CABLE: 1/2" SUPERFLEX POLY JKT PER FOOT

QTY	NOMENCLATURE	DESCRIPTION
1	DSF4PDMV2C	F4PDMV2-C 1/2" 7-16 DIN MALE CONNECTOR
1	DDN9682	F4PNMV2-HC 1/2" TYPE N MALE PLATED CONNECTOR
10	L1700	FSJ1-50A CABLE: 1/4" SUPERFLEX POLY JKT PER FOOT
2	DDN9769	F1PNM-HC 1/4" TYPE N MALE CONNECTOR FOR FSJ1-50A CABLE
10	L1700	FSJ1-50A CABLE: 1/4" SUPERFLEX POLY JKT PER FOOT
2	DDN9769	F1PNM-HC 1/4" TYPE N MALE CONNECTOR FOR FSJ1-50A CABLE
1	TDN9576	MCPT-1412 1/4" OR 1/2" S FLEX PREP TOOL
1	DSUC1143	ANT CLAMPS, KIT OF 3 FOR 2.5 IN TO 4.5 IN OD FOR ANT LONGR THAN 15 FT
1	DSDB589A	746 806 ANT 9 DBD OMNI LOW PROFILE
120	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
1	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
1	DDN1091	L4TDF-PSA 7-16 DIN FEMALE PS FOR 1/2 IN CABLE
2	TDN9289	221213 CABLE WRAP WEATHERPROOFING
4	DSGKSUNV	GK-SUNV SMALL UNIVERSAL GROUNDING KIT
1	DSWSHG12PRL	WIRELESS SOLUTIONS PRE-LACED HOIST GRIP 1/2INCH
5	DSSSH12	SSH-12 1/2" SNAPSTAK HANGER 10PK
5	MDN6816	STD HANGERS FOR 1/2IN CABLE & EW180/EW220/EW-HANGER KIT STAINLESS-10PK
1	DSVHF50DMAPGR	RF SPD, 100-512MHZ, DC BLOCK HIGH POWER DIN MALE ANT, DIN FEMALE EQUIP
50	L1702	FSJ4-50B CABLE: 1/2" SUPERFLEX POLY JKT PER FOOT
1	DSF4PDMV2C	F4PDMV2-C 1/2" 7-16 DIN MALE CONNECTOR
1	DDN9682	F4PNMV2-HC 1/2" TYPE N MALE PLATED CONNECTOR
10	L1700	FSJ1-50A CABLE: 1/4" SUPERFLEX POLY JKT PER FOOT
2	DDN9769	F1PNM-HC 1/4" TYPE N MALE CONNECTOR FOR FSJ1-50A CABLE
10	L1700	FSJ1-50A CABLE: 1/4" SUPERFLEX POLY JKT PER FOOT
2	DDN9769	F1PNM-HC 1/4" TYPE N MALE CONNECTOR FOR FSJ1-50A CABLE
1	TDN9576	MCPT-1412 1/4" OR 1/2" S FLEX PREP TOOL
1	DSUC1143	ANT CLAMPS, KIT OF 3 FOR 2.5 IN TO 4.5 IN OD FOR ANT LONGR THAN 15 FT
		DISPATCH CONSOLETTE ANTENNA SYSTEMS - CCSO
1	DSCOL54160	OMNI, MEANDER COLLINEAR, 6.0 DBD, 150-160 MHZ, PIM RATED
120	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
1	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
1	DDN1091	L4TDF-PSA 7-16 DIN FEMALE PS FOR 1/2 IN CABLE
2	TDN9289	221213 CABLE WRAP WEATHERPROOFING
4	DSGKSUNV	GK-SUNV SMALL UNIVERSAL GROUNDING KIT
1	DSWSHG12PRL	WIRELESS SOLUTIONS PRE-LACED HOIST GRIP 1/2INCH
5	DSSSH12	SSH-12 1/2" SNAPSTAK HANGER 10PK
5	MDN6816	STD HANGERS FOR 1/2IN CABLE & EW180/EW220/EW-HANGER KIT STAINLESS-10PK
1	DSVHF50DMAPGR	RF SPD, 100-512MHZ, DC BLOCK HIGH POWER DIN MALE ANT, DIN FEMALE EQUIP
50	L1702	FSJ4-50B CABLE: 1/2" SUPERFLEX POLY JKT PER FOOT

QTY	NOMENCLATURE	DESCRIPTION
1	DSF4PDMV2C	F4PDMV2-C 1/2" 7-16 DIN MALE CONNECTOR
1	DDN9682	F4PNMV2-HC 1/2" TYPE N MALE PLATED CONNECTOR
10	L1700	FSJ1-50A CABLE: 1/4" SUPERFLEX POLY JKT PER FOOT
2	DDN9769	F1PNM-HC 1/4" TYPE N MALE CONNECTOR FOR FSJ1-50A CABLE
10	L1700	FSJ1-50A CABLE: 1/4" SUPERFLEX POLY JKT PER FOOT
2	DDN9769	F1PNM-HC 1/4" TYPE N MALE CONNECTOR FOR FSJ1-50A CABLE
1	TDN9576	MCPT-1412 1/4" OR 1/2" S FLEX PREP TOOL
1	DSUC1143	ANT CLAMPS, KIT OF 3 FOR 2.5 IN TO 4.5 IN OD FOR ANT LONGR THAN 15 FT
1	DSCOL54160	OMNI, MEANDER COLLINEAR, 6.0 DBD, 150-160 MHZ, PIM RATED
120	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
1	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
1	DDN1091	L4TDF-PSA 7-16 DIN FEMALE PS FOR 1/2 IN CABLE
2	TDN9289	221213 CABLE WRAP WEATHERPROOFING
4	DSGKSUNV	GK-SUNV SMALL UNIVERSAL GROUNDING KIT
1	DSWSHG12PRL	WIRELESS SOLUTIONS PRE-LACED HOIST GRIP 1/2INCH
5	DSSSH12	SSH-12 1/2" SNAPSTAK HANGER 10PK
5	MDN6816	STD HANGERS FOR 1/2IN CABLE & EW180/EW220/EW-HANGER KIT STAINLESS-10PK
1	DSVHF50DMAPGR	RF SPD, 100-512MHZ, DC BLOCK HIGH POWER DIN MALE ANT, DIN FEMALE EQUIP
50	L1702	FSJ4-50B CABLE: 1/2" SUPERFLEX POLY JKT PER FOOT
1	DSF4PDMV2C	F4PDMV2-C 1/2" 7-16 DIN MALE CONNECTOR
1	DDN9682	F4PNMV2-HC 1/2" TYPE N MALE PLATED CONNECTOR
10	L1700	FSJ1-50A CABLE: 1/4" SUPERFLEX POLY JKT PER FOOT
2	DDN9769	F1PNM-HC 1/4" TYPE N MALE CONNECTOR FOR FSJ1-50A CABLE
10	L1700	FSJ1-50A CABLE: 1/4" SUPERFLEX POLY JKT PER FOOT
2	DDN9769	F1PNM-HC 1/4" TYPE N MALE CONNECTOR FOR FSJ1-50A CABLE
1	TDN9576	MCPT-1412 1/4" OR 1/2" S FLEX PREP TOOL
1	DSUC1143	ANT CLAMPS, KIT OF 3 FOR 2.5 IN TO 4.5 IN OD FOR ANT LONGR THAN 15 FT
1	DSCOL54160	OMNI, MEANDER COLLINEAR, 6.0 DBD, 150-160 MHZ, PIM RATED
1	DSDB589A	746 806 ANT 9 DBD OMNI LOW PROFILE
120	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
1	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
1	DDN1091	L4TDF-PSA 7-16 DIN FEMALE PS FOR 1/2 IN CABLE
2	TDN9289	221213 CABLE WRAP WEATHERPROOFING
4	DSGKSUNV	GK-SUNV SMALL UNIVERSAL GROUNDING KIT
1	DSWSHG12PRL	WIRELESS SOLUTIONS PRE-LACED HOIST GRIP 1/2INCH
5	DSSSH12	SSH-12 1/2" SNAPSTAK HANGER 10PK
5	MDN6816	STD HANGERS FOR 1/2IN CABLE & EW180/EW220/EW-HANGER KIT STAINLESS-10PK
1	DSVHF50DMAPGR	RF SPD, 100-512MHZ, DC BLOCK HIGH POWER DIN MALE ANT, DIN FEMALE EQUIP
50	L1702	FSJ4-50B CABLE: 1/2" SUPERFLEX POLY JKT PER FOOT

QTY	NOMENCLATURE	DESCRIPTION
1	DSF4PDMV2C	F4PDMV2-C 1/2" 7-16 DIN MALE CONNECTOR
1	DDN9682	F4PNMV2-HC 1/2" TYPE N MALE PLATED CONNECTOR
10	L1700	FSJ1-50A CABLE: 1/4" SUPERFLEX POLY JKT PER FOOT
2	DDN9769	F1PNM-HC 1/4" TYPE N MALE CONNECTOR FOR FSJ1-50A CABLE
10	L1700	FSJ1-50A CABLE: 1/4" SUPERFLEX POLY JKT PER FOOT
2	DDN9769	F1PNM-HC 1/4" TYPE N MALE CONNECTOR FOR FSJ1-50A CABLE
1	TDN9576	MCPT-1412 1/4" OR 1/2" S FLEX PREP TOOL
1	DSUC1143	ANT CLAMPS, KIT OF 3 FOR 2.5 IN TO 4.5 IN OD FOR ANT LONGR THAN 15 FT
1	DSDB589A	746 806 ANT 9 DBD OMNI LOW PROFILE
120	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
1	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
1	DDN1091	L4TDF-PSA 7-16 DIN FEMALE PS FOR 1/2 IN CABLE
2	TDN9289	221213 CABLE WRAP WEATHERPROOFING
4	DSGKSUNV	GK-SUNV SMALL UNIVERSAL GROUNDING KIT
1	DSWSHG12PRL	WIRELESS SOLUTIONS PRE-LACED HOIST GRIP 1/2INCH
5	DSSSH12	SSH-12 1/2" SNAPSTAK HANGER 10PK
5	MDN6816	STD HANGERS FOR 1/2IN CABLE & EW180/EW220/EW-HANGER KIT STAINLESS-10PK
1	DSVHF50DMAPGR	RF SPD, 100-512MHZ, DC BLOCK HIGH POWER DIN MALE ANT, DIN FEMALE EQUIP
50	L1702	FSJ4-50B CABLE: 1/2" SUPERFLEX POLY JKT PER FOOT
1	DSF4PDMV2C	F4PDMV2-C 1/2" 7-16 DIN MALE CONNECTOR
1	DDN9682	F4PNMV2-HC 1/2" TYPE N MALE PLATED CONNECTOR
10	L1700	FSJ1-50A CABLE: 1/4" SUPERFLEX POLY JKT PER FOOT

QTY	NOMENCLATURE	DESCRIPTION
2	DDN9769	F1PNM-HC 1/4" TYPE N MALE CONNECTOR FOR FSJ1-50A CABLE
10	L1700	FSJ1-50A CABLE: 1/4" SUPERFLEX POLY JKT PER FOOT
2	DDN9769	F1PNM-HC 1/4" TYPE N MALE CONNECTOR FOR FSJ1-50A CABLE
1	TDN9576	MCPT-1412 1/4" OR 1/2" S FLEX PREP TOOL
1	DSUC1143	ANT CLAMPS, KIT OF 3 FOR 2.5 IN TO 4.5 IN OD FOR ANT LONGR THAN 15 FT
		Upgrade existing consoles
1	B1905	MCC 7500 ASTRO 25 SOFTWARE
8	CA00899AA	ADD: MCC 7500 DISPATCH CONSOLE SOFTWARE REFRESH LICENSE
8	BLN1311	MCC 7500 TRUNKING OPERATION FIELD-ADD LICENSE
		GCP Upgrade
1	T7140	G-SERIES SOFTWARE UPGRADE
2	CA01246AA	ADD: MCC 7500 CONV SITE UPGRADE
		Upgrade VHF Simulcast
		Analog and Digital Stations
1	T7140	G-SERIES SOFTWARE UPGRADE

QTY	NOMENCLATURE	DESCRIPTION
30	CA01995AA	ANALOG CONVENTIONAL GTR 8000 SOFTWARE UPGRADE
1	T7140	G-SERIES SOFTWARE UPGRADE
20	CA01615AA	ADD: ADD: ASTRO 25 CONVENTIONAL SW UPGRADE
MLC upgrades are free downloads from MOL		
		GCM Upgrade
1	T7140	G-SERIES SOFTWARE UPGRADE
2	CA01197AA	ADD: IP BASED MULTISITE OPERATION UPGRADE
		SDM Upgrade
1	T7955	SDM3000 ALL CONFIGURATION SOFTWARE AND FIRMWARE TO CURRENT VERSION
2	CA02411AA	ADD: AUX_I-O_SERVER FIRMWARE UPGRADE

QTY	NOMENCLATURE	DESCRIPTION
Replacement for existing Tait backup systems		
Mule Mountain		
1	T7039	GTR 8000 Base Radio
1	X530BG	ADD: VHF (136-174 MHZ)
1	CA01948AA	ADD: CONVENTIONAL SOFTWARE
1	CA01946AA	ADD: CONVENTIONAL MIXED MODE OPERATION
1	X153AW	ADD: RACK MOUNT HARDWARE
1	THN1012	RACK 7' OPEN
1	DSCOL54160	OMNI, MEANDER COLLINEAR, 6.0 DBD, 150-160 MHZ, PIM RATED
120	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
1	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
1	DDN1091	L4TDF-PSA 7-16 DIN FEMALE PS FOR 1/2 IN CABLE
2	TDN9289	221213 CABLE WRAP WEATHERPROOFING
4	DSGKSUNV	GK-SUNV SMALL UNIVERSAL GROUNDING KIT
1	DSWSHG12PRL	WIRELESS SOLUTIONS PRE-LACED HOIST GRIP 1/2INCH
5	DSSSH12	SSH-12 1/2" SNAPSTAK HANGER 10PK
5	MDN6816	STD HANGERS FOR 1/2IN CABLE & EW180/EW220/EW-HANGER KIT STAINLESS-10PK
1	DSVHF50DMAPGR	RF SPD, 100-512MHZ, DC BLOCK HIGH POWER DIN MALE ANT, DIN FEMALE EQUIP
50	L1702	FSJ4-50B CABLE: 1/2" SUPERFLEX POLY JKT PER FOOT
1	DSF4PDMV2C	F4PDMV2-C 1/2" 7-16 DIN MALE CONNECTOR
1	DDN9682	F4PNMV2-HC 1/2" TYPE N MALE PLATED CONNECTOR
10	L1700	FSJ1-50A CABLE: 1/4" SUPERFLEX POLY JKT PER FOOT
2	DDN9769	F1PNM-HC 1/4" TYPE N MALE CONNECTOR FOR FSJ1-50A CABLE
10	L1700	FSJ1-50A CABLE: 1/4" SUPERFLEX POLY JKT PER FOOT
2	DDN9769	F1PNM-HC 1/4" TYPE N MALE CONNECTOR FOR FSJ1-50A CABLE

1	TDN9576	MCPT-1412 1/4" OR 1/2" S FLEX PREP TOOL
1	DSUC1143	ANT CLAMPS, KIT OF 3 FOR 2.5 IN TO 4.5 IN OD FOR ANT LONGR THAN 15 FT
1	DS283706A	VN DUPLEXER 144-174 MHZ 1.0 MHZ MIN SEP
Dos Cabezas		
1	T7039	GTR 8000 Base Radio
1	X530BG	ADD: VHF (136-174 MHZ)
1	CA01948AA	ADD: CONVENTIONAL SOFTWARE
1	CA01946AA	ADD: CONVENTIONAL MIXED MODE OPERATION
1	X153AW	ADD: RACK MOUNT HARDWARE
1	THN1012	RACK 7' OPEN
1	DSCOL54160	OMNI, MEANDER COLLINEAR, 6.0 DBD, 150-160 MHZ, PIM RATED
120	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
1	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
1	DDN1091	L4TDF-PSA 7-16 DIN FEMALE PS FOR 1/2 IN CABLE
2	TDN9289	221213 CABLE WRAP WEATHERPROOFING
4	DSGKSUNV	GK-SUNV SMALL UNIVERSAL GROUNDING KIT
1	DSWSHG12PRL	WIRELESS SOLUTIONS PRE-LACED HOIST GRIP 1/2INCH
5	DSSSH12	SSH-12 1/2" SNAPSTAK HANGER 10PK
5	MDN6816	STD HANGERS FOR 1/2IN CABLE & EW180/EW220/EW-HANGER KIT STAINLESS-10PK
1	DSVHF50DMAPGR	RF SPD, 100-512MHZ, DC BLOCK HIGH POWER DIN MALE ANT, DIN FEMALE EQUIP
50	L1702	FSJ4-50B CABLE: 1/2" SUPERFLEX POLY JKT PER FOOT
1	DSF4PDMV2C	F4PDMV2-C 1/2" 7-16 DIN MALE CONNECTOR
1	DDN9682	F4PNMV2-HC 1/2" TYPE N MALE PLATED CONNECTOR
10	L1700	FSJ1-50A CABLE: 1/4" SUPERFLEX POLY JKT PER FOOT
2	DDN9769	F1PNM-HC 1/4" TYPE N MALE CONNECTOR FOR FSJ1-50A CABLE
10	L1700	FSJ1-50A CABLE: 1/4" SUPERFLEX POLY JKT PER FOOT
2	DDN9769	F1PNM-HC 1/4" TYPE N MALE CONNECTOR FOR FSJ1-50A CABLE
1	TDN9576	MCPT-1412 1/4" OR 1/2" S FLEX PREP TOOL
1	DSUC1143	ANT CLAMPS, KIT OF 3 FOR 2.5 IN TO 4.5 IN OD FOR ANT LONGR THAN 15 FT
1	DS283706A	VN DUPLEXER 144-174 MHZ 1.0 MHZ MIN SEP

QTY	NOMENCLATURE	DESCRIPTION
Texas Canyon		
1	T7039	GTR 8000 Base Radio
1	X530BG	ADD: VHF (136-174 MHZ)
1	CA01948AA	ADD: CONVENTIONAL SOFTWARE
1	CA01946AA	ADD: CONVENTIONAL MIXED MODE OPERATION
1	X153AW	ADD: RACK MOUNT HARDWARE

QTY	NOMENCLATURE	DESCRIPTION
1	THN1012	RACK 7' OPEN
1	DSCOL54160	OMNI, MEANDER COLLINEAR, 6.0 DBD, 150-160 MHZ, PIM RATED
120	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
1	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
1	DDN1091	L4TDF-PSA 7-16 DIN FEMALE PS FOR 1/2 IN CABLE
2	TDN9289	221213 CABLE WRAP WEATHERPROOFING
4	DSGKSUNV	GK-SUNV SMALL UNIVERSAL GROUNDING KIT
1	DSWSHG12PRL	WIRELESS SOLUTIONS PRE-LACED HOIST GRIP 1/2INCH
5	DSSSH12	SSH-12 1/2" SNAPSTAK HANGER 10PK
5	MDN6816	STD HANGERS FOR 1/2IN CABLE & EW180/EW220/EW-HANGER KIT STAINLESS-10PK
1	DSVHF50DMAPGR	RF SPD, 100-512MHZ, DC BLOCK HIGH POWER DIN MALE ANT, DIN FEMALE EQUIP
50	L1702	FSJ4-50B CABLE: 1/2" SUPERFLEX POLY JKT PER FOOT
1	DSF4PDMV2C	F4PDMV2-C 1/2" 7-16 DIN MALE CONNECTOR
1	DDN9682	F4PNMV2-HC 1/2" TYPE N MALE PLATED CONNECTOR
10	L1700	FSJ1-50A CABLE: 1/4" SUPERFLEX POLY JKT PER FOOT
2	DDN9769	F1PNM-HC 1/4" TYPE N MALE CONNECTOR FOR FSJ1-50A CABLE
10	L1700	FSJ1-50A CABLE: 1/4" SUPERFLEX POLY JKT PER FOOT
2	DDN9769	F1PNM-HC 1/4" TYPE N MALE CONNECTOR FOR FSJ1-50A CABLE
1	TDN9576	MCPT-1412 1/4" OR 1/2" S FLEX PREP TOOL
1	DSUC1143	ANT CLAMPS, KIT OF 3 FOR 2.5 IN TO 4.5 IN OD FOR ANT LONGR THAN 15 FT
1	DS283706A	VN DUPLEXER 144-174 MHZ 1.0 MHZ MIN SEP

QTY	NOMENCLATURE	DESCRIPTION
Red Mountain		
1	T7039	GTR 8000 Base Radio
1	X530BG	ADD: VHF (136-174 MHZ)
1	CA01948AA	ADD: CONVENTIONAL SOFTWARE
1	CA01946AA	ADD: CONVENTIONAL MIXED MODE OPERATION
1	X153AW	ADD: RACK MOUNT HARDWARE
1	THN1012	RACK 7' OPEN
1	DSCOL54160	OMNI, MEANDER COLLINEAR, 6.0 DBD, 150-160 MHZ, PIM RATED
120	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
1	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
1	DDN1091	L4TDF-PSA 7-16 DIN FEMALE PS FOR 1/2 IN CABLE
2	TDN9289	221213 CABLE WRAP WEATHERPROOFING
4	DSGKSUNV	GK-SUNV SMALL UNIVERSAL GROUNDING KIT
1	DSWSHG12PRL	WIRELESS SOLUTIONS PRE-LACED HOIST GRIP 1/2INCH

QTY	NOMENCLATURE	DESCRIPTION
5	DSSSH12	SSH-12 1/2" SNAPSTAK HANGER 10PK
5	MDN6816	STD HANGERS FOR 1/2IN CABLE & EW180/EW220/EW-HANGER KIT STAINLESS-10PK
1	DSVHF50DMAPGR	RF SPD, 100-512MHZ, DC BLOCK HIGH POWER DIN MALE ANT, DIN FEMALE EQUIP
50	L1702	FSJ4-50B CABLE: 1/2" SUPERFLEX POLY JKT PER FOOT
1	DSF4PDMV2C	F4PDMV2-C 1/2" 7-16 DIN MALE CONNECTOR
1	DDN9682	F4PNMV2-HC 1/2" TYPE N MALE PLATED CONNECTOR
10	L1700	FSJ1-50A CABLE: 1/4" SUPERFLEX POLY JKT PER FOOT
2	DDN9769	F1PNM-HC 1/4" TYPE N MALE CONNECTOR FOR FSJ1-50A CABLE
10	L1700	FSJ1-50A CABLE: 1/4" SUPERFLEX POLY JKT PER FOOT
2	DDN9769	F1PNM-HC 1/4" TYPE N MALE CONNECTOR FOR FSJ1-50A CABLE
1	TDN9576	MCPT-1412 1/4" OR 1/2" S FLEX PREP TOOL
1	DSUC1143	ANT CLAMPS, KIT OF 3 FOR 2.5 IN TO 4.5 IN OD FOR ANT LONGR THAN 15 FT
1	DS283706A	VN DUPLEXER 144-174 MHZ 1.0 MHZ MIN SEP

QTY	NOMENCLATURE	DESCRIPTION
		Hidalgo
1	T7039	GTR 8000 Base Radio
1	X530BG	ADD: VHF (136-174 MHZ)
1	CA01948AA	ADD: CONVENTIONAL SOFTWARE
1	CA01946AA	ADD: CONVENTIONAL MIXED MODE OPERATION
1	X153AW	ADD: RACK MOUNT HARDWARE
1	THN1012	RACK 7' OPEN
1	DSCOL54160	OMNI, MEANDER COLLINEAR, 6.0 DBD, 150-160 MHZ, PIM RATED
120	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
1	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
1	DDN1091	L4TDF-PSA 7-16 DIN FEMALE PS FOR 1/2 IN CABLE
2	TDN9289	221213 CABLE WRAP WEATHERPROOFING
4	DSGKSUNV	GK-SUNV SMALL UNIVERSAL GROUNDING KIT
1	DSWSHG12PRL	WIRELESS SOLUTIONS PRE-LACED HOIST GRIP 1/2INCH
5	DSSSH12	SSH-12 1/2" SNAPSTAK HANGER 10PK
5	MDN6816	STD HANGERS FOR 1/2IN CABLE & EW180/EW220/EW-HANGER KIT STAINLESS-10PK
1	DSVHF50DMAPGR	RF SPD, 100-512MHZ, DC BLOCK HIGH POWER DIN MALE ANT, DIN FEMALE EQUIP
50	L1702	FSJ4-50B CABLE: 1/2" SUPERFLEX POLY JKT PER FOOT
1	DSF4PDMV2C	F4PDMV2-C 1/2" 7-16 DIN MALE CONNECTOR
1	DDN9682	F4PNMV2-HC 1/2" TYPE N MALE PLATED CONNECTOR
10	L1700	FSJ1-50A CABLE: 1/4" SUPERFLEX POLY JKT PER FOOT
2	DDN9769	F1PNM-HC 1/4" TYPE N MALE CONNECTOR FOR FSJ1-50A CABLE

QTY	NOMENCLATURE	DESCRIPTION
10	L1700	FSJ1-50A CABLE: 1/4" SUPERFLEX POLY JKT PER FOOT
2	DDN9769	F1PNM-HC 1/4" TYPE N MALE CONNECTOR FOR FSJ1-50A CABLE
1	TDN9576	MCPT-1412 1/4" OR 1/2" S FLEX PREP TOOL
1	DSUC1143	ANT CLAMPS, KIT OF 3 FOR 2.5 IN TO 4.5 IN OD FOR ANT LONGR THAN 15 FT
1	DS283706A	VN DUPLEXER 144-174 MHZ 1.0 MHZ MIN SEP

C-4.2 SUBSCRIBERS

QTY	NOMENCLATURE	DESCRIPTION
50	H97TGD9PW1 N	APX7000 DIGITAL PORTABLE RADIO
50	QA00570	ADD: VHF PRIMARY BAND
50	QA00573	ADD: 7/800MHZ SECONDARY BAND
50	QA00577	ADD: LARGE COLOR DISPLAY AND FULL KEYPAD
50	QA00579	ADD: ENABLE DUAL BAND OPERATION
50	Q806	ADD: ASTRO DIGITAL CAI OPERATION
50	Q15	ENH: AES/DES,DES-XL,DES-OFB
50	Q498	ENH: ASTRO P25 OTAR W/ MULTIKEY
50	H38	ADD: SMARTZONE OPERATION
50	QA01749	SW KEY SUPPLEMENTAL DATA
50	Q361	ADD: P25 9600 BAUD TRUNKING
50	QA00580	ADD: TDMA OPERATION
50	Q387	ADD: MULTICAST VOTING SCAN
50	Q947	ADD: RADIO PACKET DATA
50	QA00782	ADD: ENABLE INTERNAL GPS OPERATION
50	QA00583	ADD: BLUETOOTH SOFTWARE
50	HA00025AB	ENH: SfS COMPREHENSIVE
21	H97TGD9PW1 N	APX7000 DIGITAL PORTABLE RADIO
21	QA00570	ADD: VHF PRIMARY BAND
21	QA00573	ADD: 7/800MHZ SECONDARY BAND
21	QA00577	ADD: LARGE COLOR DISPLAY AND FULL KEYPAD
21	QA00579	ADD: ENABLE DUAL BAND OPERATION
21	Q806	ADD: ASTRO DIGITAL CAI OPERATION
21	Q15	ENH: AES/DES,DES-XL,DES-OFB
21	Q498	ENH: ASTRO P25 OTAR W/ MULTIKEY
21	H38	ADD: SMARTZONE OPERATION
21	QA01749	SW KEY SUPPLEMENTAL DATA
21	Q361	ADD: P25 9600 BAUD TRUNKING

QTY	NOMENCLATURE	DESCRIPTION
21	QA00580	ADD: TDMA OPERATION
21	Q387	ADD: MULTICAST VOTING SCAN
21	Q947	ADD: RADIO PACKET DATA
21	QA00782	ADD: ENABLE INTERNAL GPS OPERATION
21	QA00583	ADD: BLUETOOTH SOFTWARE
21	HA00025AB	ENH: SfS COMPREHENSIVE
71	NNTN7080A	APX 7000 IMPRES SINGLE UNIT CHARGER US/NA/CA/LA
71	PMMN4060B	PSM IP55 WITH 3.5MM JACK RX 24IN
71	PMMN4061B	PSM IP55 WITH 3.5MM JACK RX 30IN
71	RLN4941A	RECEIVE ONLY EARPIECE W/TRANSLUCENT TUBE
71	PMAF4002	APX PSM 700/800MHZ ANTENNA
71	SVC03SVC0115	SUBSCRIBER PROGRAMMING