

MOTOROLA SOLUTIONS COMMUNICATIONS SYSTEM AND SERVICES AGREEMENT

Communications System and Services Agreement

Motorola Solutions, Inc. (“Motorola”) and the County of Humboldt (“Customer”) enter into this “Agreement,” pursuant to which Customer will purchase and Motorola will sell the System and 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 ATTACHMENTS

1.1. EXHIBITS. The Exhibits listed below are exhibits related to the System sale and implementation. These Exhibits are incorporated into and made a part of this Agreement.

Exhibit A – “Motorola Software License Agreement”

Exhibit B – “Pricing and Payment”

Exhibit C – “Technical and Implementation Documents”

Exhibit C-1 – “System Description” dated December 5, 2018

Exhibit C-2 – “Pricing Summary & Equipment List” dated December 5, 2018

Exhibit C-3 – “Implementation Statement of Work” dated December 5, 2018

Exhibit C-4 – “Acceptance Test Plan” or “ATP” dated December 5, 2018

Exhibit C-5 – “Performance Schedule” dated December 5, 2018

Exhibit D – “System Acceptance Certificate”

1.2. ADDENDUM (ADDENDA). Customer may elect to purchase professional or subscription services in addition to the System and related services. Any such services will be governed by the terms in the main body of the Agreement and an applicable Addendum containing terms specific to such service. Such Addendums will be labeled with the name of the service being purchased.

1.3 ORDER OF PRECEDENCE. In interpreting this Agreement and resolving any ambiguities: 1) the main body of this Agreement takes precedence over the exhibits (unless otherwise specified in an exhibit), and any inconsistency between Exhibits A through E will be resolved in their listed order, and 2) The applicable service Addendum will take precedence over the main body of the Agreement and the Exhibits.

Section 2 DEFINITIONS

Capitalized terms used in this Agreement have the following meanings:

“**Acceptance Tests**” means those tests described in the Acceptance Test Plan.

“**Addendum (Addenda)**” is the title of the document(s) containing a specific set of terms and conditions applicable to a particular service or other offering beyond the Communication System and System implementation services. The terms in the Addendum are applicable only to the specific service or offering described therein.

“**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.

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

“Confidential Information” means all information consistent with the fulfillment of this Agreement that is (i) disclosed under this Agreement in oral, written, graphic, machine recognizable, and/or sample form, being clearly designated, labeled or marked as confidential or its equivalent or (ii) obtained by examination, testing or analysis of any hardware, software or any component part thereof provided by discloser to recipient. Confidential Information that is disclosed orally must be identified as confidential at the time of disclosure and confirmed by the discloser by submitting a written document to the recipient within thirty (30) days after such disclosure. The written document must contain a summary of the Confidential Information disclosed with enough specificity for identification purpose and must be labeled or marked as confidential or its equivalent.

“Contract Price” means the price for the System and implementation Services, excluding applicable sales or similar taxes and freight charges. Further, unless otherwise stated in Exhibit B, “Payment” or the pricing pages of the proposal, recurring fees for maintenance, SUA, or subscription services are not included in the Contract Price.

“Deliverables” means all written information (such as reports, specifications, designs, plans, drawings, analytics, Solution Data, 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.

“Derivative Proprietary Materials” means derivatives of the Proprietary Materials that Motorola may from time to time, including during the course of providing the Services, develop and/or use and/or to which Motorola provides Customer access.

“Effective Date” means that date upon which the last Party executes this Agreement.

“Equipment” means the hardware components of the Solution that Customer purchases from Motorola under this Agreement. Equipment that is part of the System is described in the Equipment List.

“Feedback” means comments or information, in oral or written form, given to Motorola by Customer in connection with or relating to Equipment or Services, during the term of this Agreement.

“Force Majeure” 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, other labor disturbances, supplier performance, hurricanes, earthquakes, fires, floods, epidemics, embargoes, war, riots, or any other similar cause.

“Motorola Software” means software that Motorola or its affiliated companies owns.

“Non-Motorola Software” means software that a party other than Motorola or its affiliated companies owns.

“Open Source Software” (also called “freeware” or “shareware”) means software with either freely obtainable source code, license for modification, or permission for free distribution.

“Proprietary Materials” means certain software tools and/or other technical materials, including, but not limited to, data, modules, components, designs, utilities, subsets, objects, program listings, models, methodologies, programs, systems, analysis frameworks, leading practices and specifications which Motorola has developed prior to, or independently from, the provision of the Services and/or which Motorola licenses from third parties.

“Proprietary Rights” means the patents, patent applications, inventions, copyrights, trade secrets, trademarks, trade names, mask works, know-how, and other intellectual property rights in and to the Equipment and Software, including those created or produced by Motorola under this Agreement and any corrections, bug fixes, enhancements, updates or modifications to or derivative works from the Software whether made by Motorola or another party.

“Services” means system implementation, maintenance, support, subscription, or other professional services provided under this Agreement, which may be further described in the applicable Addendum and/or SOW.



“Software” (i) means proprietary software in object code format, and adaptations, translations, de-compilations, disassemblies, emulations, or derivative works of such software; (ii) means any modifications, enhancements, new versions and new releases of the software provided by Motorola; and (iii) may contain one (1) or more items of software owned by a third party supplier. The term "Software" does not include any third party software provided under separate license or third party software not licensable under the terms of this Agreement.

“Software Support Policy” (“SwSP”) means the policy set forth at <http://www.motorolasolutions.com/softwarepolicy> describing the specific technical support that will be provided to Customers under the Warranty Period and during any paid maintenance support period for Motorola Software. This policy may be modified from time to time at Motorola’s discretion.

“Solution” means the combination of the System(s) and Services provided by Motorola under this Agreement.

“Solution Data” means Customer data that is transformed, altered, processed, aggregated, correlated or operated on by Motorola, its vendors or other data sources and data that has been manipulated or retrieved using Motorola know-how to produce value-added content to data consumers, including customers or citizens which is made available to Customer with the Solution and Services.

“Specifications” means the functionality and performance requirements that are described in the Technical and Implementation Documents.

“SUA” means Motorola’s Software Upgrade Agreement program.

“Subsystem” means a major part of the System that performs specific functions or operations. Subsystems are described in the Technical and Implementation Documents.

“System” means the Equipment, including incidental hardware and materials, Software, and design, installation and implementation services that are combined together into an integrated system; the System(s) is (are) described in the Technical and Implementation Documents.

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

“System Data” means data created by, in connection with or in relation to Equipment or the performance of Services under this Agreement.

“Warranty Period” for System Hardware, Software, or services related to system implementation means one (1) year from the date of System Acceptance or Beneficial Use, whichever occurs first. Unless otherwise stated in the applicable Addendum, Warranty Period for other Services means ninety (90) days from performance of the Service.

Section 3 SCOPE OF AGREEMENT AND TERM

3.1. **SCOPE OF WORK.** Motorola will provide, install and test the System(s), and perform its other contractual responsibilities to provide the Solution, all in accordance with this Agreement. Customer will perform its contractual responsibilities in accordance with this Agreement.

3.2. **CHANGE ORDERS.** Either Party may request changes within the general scope of this Agreement. 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 or applicable subscription fees, Performance Schedule, or both, and will reflect the adjustment in a change order or Addendum. Neither Party is obligated to perform requested changes unless both Parties execute a written change order.

3.3. **TERM.** Unless terminated in accordance with other provisions of this Agreement or extended by mutual agreement of the Parties, the term of this Agreement begins on the Effective Date and continues until the date of Final Project Acceptance or expiration of the Warranty Period, or completion of the Services, whichever occurs last. The term and the effective date of recurring Services will be set forth in the applicable Addendum.

3.4. **ADDITIONAL EQUIPMENT OR SOFTWARE.** For three (3) years after the expiration date of the Agreement, Customer may order additional Equipment or Software, if it is then available. Each purchase order must refer to this Agreement, the expiration date of the Agreement, and must specify the pricing and delivery terms. The Parties agree that, notwithstanding expiration of the Agreement, the applicable provisions of this Agreement (except for pricing, delivery, passage of title and risk of loss to Equipment, warranty commencement, and payment terms) will govern the purchase and sale of the additional Equipment or Software. Additional or contrary terms in the purchase order will be inapplicable, unless signed by both Parties. Title and risk of loss to additional Equipment will pass at shipment, warranty will commence upon delivery, and payment is due within thirty (30) days after the invoice date. Motorola will send Customer an invoice as the additional Equipment is shipped or Software is licensed. Alternatively, Customer may register with and place orders through Motorola Online (“MOL”), and this Agreement will be the “Underlying Agreement” for those MOL transactions rather than the MOL On-Line Terms and Conditions of Sale. MOL registration and other information may be found at <https://businessonline.motorolasolutions.com> and the MOL telephone number is (800) 814-0601.

3.5. **Motorola SOFTWARE.** Any Motorola Software, including subsequent releases, is licensed to Customer solely in accordance with the Motorola Software License Agreement in Exhibit A (“Software License Agreement”). Customer hereby accepts and agrees to abide by all of the terms and restrictions of the Software License Agreement.

3.6. **NON-Motorola SOFTWARE.** Any Non-Motorola Software is licensed to Customer in accordance with the standard license, terms, and restrictions of the copyright owner on the Effective Date unless the copyright owner has granted to Motorola the right to sublicense the Non-Motorola Software pursuant to the Software License Agreement, in which case it applies and the copyright owner will have all of Licensor’s rights and protections under the Software License Agreement. Motorola makes no representations or warranties of any kind regarding Non-Motorola Software. Non-Motorola Software may include Open Source Software.

3.7. **SUBSTITUTIONS.** At no additional cost to Customer, Motorola may substitute any Equipment, Software, or services to be provided by Motorola, if the substitute meets or exceeds the Specifications and is of equivalent or better quality to the Customer. Any substitution will be reflected in a change order.

3.8. **OPTIONAL EQUIPMENT OR SOFTWARE.** This paragraph applies only if a “Priced Options” exhibit is shown in Section 1, or if the Parties amend this Agreement to add a Priced Options exhibit. During the term of the option as stated in the Priced Options exhibit (or if no term is stated, then for one (1) year after the Effective Date), Customer has the right and option to purchase the equipment, software, and related services that are described in the Priced Options exhibit. Customer may exercise this option by giving written notice to Seller which must designate what equipment, software, and related services Customer is selecting (including quantities, if applicable). To the extent they apply, the terms and conditions of this Agreement will govern the transaction; however, the Parties acknowledge that certain provisions must be agreed upon, and they agree to negotiate those in good faith promptly after Customer delivers the option exercise notice. Examples of provisions that may need to be negotiated are: specific lists of deliverables, statements of work, acceptance test plans, delivery and implementation schedules, payment terms, maintenance and support provisions, additions to or modifications of the Software License Agreement, hosting terms, and modifications to the acceptance and warranty provisions.

Section 4 SERVICES

4.1. If Customer desires and Motorola agrees to continue Services beyond the Term, Customer’s issuance and Motorola’s acceptance of a purchase order for Services will serve as an automatic extension of the Agreement for purposes of the continuing Services. Only the terms and conditions applicable to the performance of Services will apply to the extended Agreement.

4.2. During the Warranty Period, in addition to warranty services, Motorola will provide maintenance Services for the Equipment and support for the Motorola Software pursuant to the applicable maintenance and support Statements of Work. Support for the Motorola Software will be in accordance with Motorola’s established Software Support Policy. Copies of the SwSP can be found at <http://www.motorolasolutions.com/softwarepolicy> and will be sent by mail, email or fax to Customer upon written request. Maintenance Services and support during the Warranty Period are included in the Contract Price. Unless already included in the Contract Price, if Customer wishes to purchase 1) additional maintenance or software support services during the Warranty Period; or 2) continue or expand maintenance, software support, installation, and/or SUA services after the Warranty Period, Motorola will provide the description of and pricing for such services in a separate proposal document. Unless otherwise agreed by the Parties in writing, the terms and conditions in this Agreement applicable



to maintenance, support, installation, and/or SUA Services, will be included in the Maintenance and Support Addendum, SUA Addendum, the applicable Statements of Work, and the proposal, (if applicable). These collective terms will govern the provision of such Services.

To obtain any such additional Services, Customer will issue a purchase order referring to this Agreement and the separate proposal document. Omission of reference to this Agreement in Customer's purchase order will not affect the applicability of this Agreement. Motorola's proposal may include a cover page entitled "Service Agreement" or "Installation Agreement," as applicable, and other attachments. These cover pages and other attachments are incorporated into this Agreement by this reference

4.3. **PROFESSIONAL AND SUBSCRIPTION SERVICES.** If Customer purchases professional or subscription Services as part of the Solution, additional or different terms specific to such Service will be included in the applicable Addendum and will apply to those Services. Customer may purchase additional professional or subscription services by issuing a purchase order referencing this Agreement and Motorola's proposal for such additional services.

4.4. Any information in the form of specifications, drawings, reprints, technical information or otherwise furnished to Customer in providing Services under this Agreement or data viewed, accessed, will remain Motorola's property, will be deemed proprietary, Confidential Information. This Confidential Information will be promptly returned at Motorola's request.

4.5. **TOOLS.** All tools, equipment, dies, gauges, models, drawings or other materials paid for or furnished by Motorola for the purpose of providing Services under this Agreement will be and remain the sole property of Motorola. Customer will safeguard all such property while it is in Customer's custody or control, be liable for any loss or damage to this property, and return it to Motorola upon request. This property will be held by Customer for Motorola's use without charge and may be removed from Customer's premises by Motorola at any time without restriction. Upon termination of the contract for any reason, Customer shall return to Motorola all equipment delivered to Customer.

4.6. **COVENANT NOT TO EMPLOY.** During the term of this Agreement and continuing for a period of two (2) years thereafter, Customer will not hire, engage on contract, solicit the employment of, or recommend employment to any third party of any employee of Motorola or its subcontractors without the prior written authorization of Motorola. This provision applies only to those employees of Motorola or its subcontractors who are responsible for rendering Services under this Agreement. If this provision is found to be overly broad under applicable law, it will be modified as necessary to conform to applicable law.

4.7. **CUSTOMER OBLIGATIONS.** If the applicable Statement of Work or Addendum 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.

4.8. **ASSUMPTIONS.** If any assumptions or conditions contained in this Agreement, applicable Addenda or Statements of Work prove to be incorrect or if Customer's obligations are not performed, Motorola's ability to perform under this Agreement may be impacted and changes to the Contract Price, subscription fees, project schedule, Deliverables, or other changes may be necessary.

4.9. **PROPRIETARY MATERIALS.** Customer acknowledges that Motorola may use and/or provide Customer with access to Proprietary Materials and Derivative Proprietary Materials. The Proprietary Materials and the Derivative Proprietary Materials are the sole and exclusive property of Motorola and Motorola retains all right, title and interest in and to the Proprietary Materials and Derivative Proprietary Materials.

4.10. **ADDITIONAL SERVICES.** 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, Addendum or amendment to this Agreement.

4.11. **MONITORING.** Motorola agrees that Customer has the right to monitor all activities related to this Agreement, including, without limitation, the right to review and monitor Motorola's records, programs and procedures, at any time, in order to ensure compliance with the terms and conditions of this Agreement. Motorola will cooperate with a corrective action plan, if deficiencies in Motorola's records, programs or procedures are identified by Customer. However, Customer is not responsible, and will not be held accountable, for overseeing or evaluating the adequacy of Motorola's performance hereunder.

Section 5 PERFORMANCE SCHEDULE

The Parties will perform their respective responsibilities in accordance with the Performance Schedule. By executing this Agreement, Customer authorizes Motorola to proceed with contract performance.

Section 6 CONTRACT PRICE, PAYMENT AND INVOICING

6.1. Customer affirms that a purchase order or notice to proceed is not required for contract performance or for subsequent years of service, if any, and that sufficient funds have been appropriated in accordance with applicable law. The Customer will pay all invoices as received from Motorola and any changes in scope will be subject to the change order process as described in this Agreement. At the time of execution of this Agreement, the Customer will provide all necessary reference information to include on invoices for payment in accordance with this Agreement.

6.2. **CONTRACT PRICE.** The Contract Price for this Agreement is Five Million Six Hundred Fifty Thousand U.S. Dollars (\$5,650,000.00). If applicable, a pricing summary is included with the Payment schedule. Motorola has priced the Services, Software, and Equipment as an integrated System. A change in Software or Equipment quantities, or Services, may affect the overall Contract Price, including discounts if applicable. Fees for professional, SUA, and/or subscription services which are not included in the Contract Price may be listed and invoiced according to the pricing pages of the proposal, Exhibit B, or the applicable Addendum. For Customer's reference, the Federal Tax Identification Number for Motorola Solutions, Inc. is 36-1115800.

6.3. **TAXES.** The Contract Price does not include any excise, sales, lease, use, property, or other taxes, assessments or duties, all of which will be paid by Customer except as exempt by law. If Motorola is required to pay any of these taxes, Motorola will send an invoice to Customer and Customer will pay to Motorola the amount of the taxes (including any interest and penalties) within thirty (30) days after the date of the invoice. Customer will be solely responsible for reporting the Equipment for personal property tax purposes, and Motorola will be solely responsible for reporting taxes on its income or net worth.

6.4. **FREIGHT, TITLE, AND RISK OF LOSS.** Motorola will pre-pay and add all freight charges to the invoices. Title and risk of loss to the Equipment will pass to Customer upon shipment. Title to Software will not pass to Customer at any time. Motorola will pack and ship all Equipment in accordance with good commercial practices.

6.5. **MAXIMUM AMOUNT PAYABLE.** The maximum amount payable by Customer for the System and implementation Services provided, and costs and expenses incurred, including, without limitation, any and all applicable taxes, freight charges and travel expenses, pursuant to the terms and conditions of this Agreement is Five Million Eight Hundred Twenty-Three Thousand Forty-Three U.S. Dollars (\$5,823,043.00). Motorola agrees to perform all services required by this Agreement for an amount not to exceed such maximum amount payable. However, if local, state or federal funding or allowance rates are reduced or eliminated, Customer may, by a mutually agreed upon amendment, revise the Scope of Services and reduce the maximum amount payable hereunder, or terminate this Agreement as provided herein.

6.6. **INVOICING AND PAYMENT.** Motorola will submit invoices to Customer according to the Payment Schedule in Exhibit B. Except for a payment that is due on the Effective Date, Customer will make payments to Motorola within thirty (30) days after the date of each invoice. Customer will make payments when due in the form of a wire transfer, check, or cashier's check from a U.S. financial institution. Overdue invoices will bear simple interest at the maximum allowable rate. For reference, the Federal Tax Identification Number for Motorola is 36-1115800.



6.7 INVOICING AND SHIPPING ADDRESSES.

6.7.1. Invoices will be sent to the Customer at the following address:

Customer: Humboldt County Administrative Office – Information Technology Division
Attention: Jim Storm, Information Technology Director
839 Fourth Street
Eureka, California 95501
Phone: (707) 268-3674
Email: jstorm@co.humboldt.ca.us

6.7.2. The address which is the ultimate destination where the Equipment will be delivered to Customer is:

Customer: Humboldt County Administrative Office – Information Technology Division
Attention: Jim Storm, Information Technology Director
839 Fourth Street
Eureka, California 95501
Phone: (707) 268-3674
Email: jstorm@co.humboldt.ca.us

6.7.3. The Equipment will be shipped to the Customer at the following address (insert if this information is known):

Customer: Humboldt County Administrative Office – Information Technology Division
Attention: Jim Storm, Information Technology Director
839 Fourth Street
Eureka, California 95501
Phone: (707) 268-3674
Email: jstorm@co.humboldt.ca.us

Customer may change this information by giving written notice to Motorola.

Section 7 SITES AND SITE CONDITIONS

7.1. ACCESS TO SITES. In addition to its responsibilities described elsewhere in this Agreement, 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 worksites or vehicles identified in the Technical and Implementation Documents as reasonably requested by Motorola so that it may perform its duties in accordance with the Performance Schedule and Statement of Work. If the Statement of Work so indicates, Motorola may assist Customer in the local building permit process.

7.2. SITE CONDITIONS. Customer will ensure that all work sites it provides will be safe, secure, and in compliance with all applicable industry and OSHA standards. To the extent applicable and unless the Statement of Work states to the contrary, Customer will ensure that these work sites have adequate: physical space; air conditioning and other environmental conditions; adequate and appropriate electrical power outlets, distribution, equipment and connections; and adequate telephone or other communication lines (including modem access and adequate interfacing networking capabilities), all for the installation, use and maintenance of the System. Before installing the Equipment or Software at a work site, Motorola may inspect the work site and advise Customer of any apparent deficiencies or non-conformities with the requirements of this Section. This Agreement is predicated upon normal soil conditions as defined by the version of E.I.A. standard RS-222 in effect on the Effective Date.

7.3. SITE ISSUES. If a Party determines that the sites identified in the Technical and Implementation Documents are no longer available or desired, or if subsurface, structural, adverse environmental or latent conditions at any site differ from those indicated in the Technical and Implementation Documents, the Parties will promptly investigate the conditions and will select replacement sites or adjust the installation plans and specifications as necessary. If change in sites or adjustment to the installation plans and specifications causes a change in the cost or time to perform, the Parties will equitably amend the Contract Price, Performance Schedule, or both, by a change order.

Section 8 TRAINING

Any training to be provided by Motorola to Customer will be described in the applicable Statement of Work. 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.

Section 9 SYSTEM ACCEPTANCE

9.1. 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.

9.2. 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.

9.3. 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.

9.4. FINAL PROJECT ACCEPTANCE. Final Project Acceptance will occur after System Acceptance when all deliverables and other work have been completed. When Final Project Acceptance occurs, the Parties will promptly memorialize this final event by so indicating on the System Acceptance Certificate (Exhibit D).

Section 10 REPRESENTATIONS AND WARRANTIES

10.1. SYSTEM FUNCTIONALITY. Motorola represents that the System will perform in accordance with the Specifications in all material respects. Upon System Acceptance or Beneficial Use, whichever occurs first, this System functionality representation is fulfilled. Motorola is not responsible for System performance deficiencies that are caused by ancillary equipment not furnished by Motorola which is attached to or used in connection with the System or for reasons or parties beyond Motorola's control, 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.

10.2. EQUIPMENT WARRANTY. During the Warranty Period, Motorola warrants that the Equipment under normal use and service will be free from material defects in materials and workmanship. If System Acceptance is delayed beyond six (6) months after shipment of the Equipment by events or causes beyond Motorola's control, this warranty expires eighteen (18) months after the shipment of the Equipment.

10.3. SOFTWARE WARRANTY. Except as described in the SwSP and unless otherwise stated in the Software License Agreement, during the Warranty Period, Motorola warrants the Software in accordance with the warranty terms set forth in the Software License Agreement and the provisions of this Section that are applicable to the Software. If System Acceptance is delayed beyond six (6) months after shipment of the Motorola Software by events or causes beyond Motorola's control, this warranty expires eighteen (18) months after the shipment of the Motorola Software. **Nothing in this Warranty**



provision is intended to conflict or modify the Software Support Policy. In the event of an ambiguity or conflict between the Software Warranty and Software Support Policy, the Software Support Policy governs.

10.4. **EXCLUSIONS TO EQUIPMENT AND SOFTWARE WARRANTIES.** These warranties do not apply to: (i) defects or damage resulting from: use of the Equipment or Software in other than its normal, customary, and authorized manner; accident, liquids, neglect, or acts of God; testing, maintenance, disassembly, repair, installation, alteration, modification, or adjustment not provided or authorized in writing by Motorola; Customer's failure to comply with all applicable industry and OSHA standards; (ii) breakage of or damage to antennas unless caused directly by defects in material or workmanship; (iii) Equipment that has had the serial number removed or made illegible; (iv) batteries (because they carry their own separate limited warranty) or consumables; (v) freight costs to ship Equipment to the repair depot; (vi) scratches or other cosmetic damage to Equipment surfaces that does not affect the operation of the Equipment; and (vii) normal or customary wear and tear.

10.5. **SERVICE WARRANTY.** During the Warranty Period, Motorola warrants that the Services will be provided in a good and workmanlike manner and will conform in all material respects to the applicable Statement of Work. Services will be free of defects in materials and workmanship for a period of ninety (90) days from the date the performance of the Services are completed. Customer acknowledges that the Deliverables may contain recommendations, suggestions or advice from Motorola to Customer (collectively, "recommendations"). Motorola makes no warranties concerning those recommendations, and Customer alone accepts responsibility for choosing whether and how to implement the recommendations and the results to be realized from implementing them.

10.6. **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 Equipment or Software 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. These actions will be the full extent of Motorola's liability for the warranty claim. In the event of a valid Services warranty claim, Customer's sole remedy is to require Motorola to re-perform the non-conforming Service or to refund, on a pro-rata basis, the fees paid for the non-conforming Service. Repaired or replaced product is warranted for the balance of the original applicable warranty period. All replaced products or parts will become the property of Motorola.

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

10.8. **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, NON-INFRINGEMENT, AND FITNESS FOR A PARTICULAR PURPOSE.**

Section 11 DELAYS

11.1. **FORCE MAJEURE.** Neither Party will be liable for its non-performance or delayed performance if caused by a Force Majeure. A Party that becomes aware of a Force Majeure that will significantly delay performance will notify the other Party promptly (but in no event later than fifteen days) after it discovers the Force Majeure. If a Force Majeure occurs, the Parties will execute a change order to extend the Performance Schedule or applicable Addenda for a time period that is reasonable under the circumstances.

11.2. **PERFORMANCE SCHEDULE DELAYS CAUSED BY CUSTOMER.** If Customer (including its other contractors) delays the Performance Schedule, it will make the promised payments according to the Payment schedule as if no delay occurred; and the Parties will execute a change order to extend the Performance Schedule. If Customer delays the Performance Schedule by more than ninety (90) days, Motorola may suspend its performance of the Agreement or alternatively negotiate a mutually agreeable change order signed by both Motorola and Customer to compensate Motorola for the reasonable and actual damages caused by the delay. If Motorola suspends the Agreement as allowed above, upon the

request of Customer, Motorola will remobilize the project and be entitled to its actual and reasonable charges incurred to demobilize and re-mobilize the project not to exceed Ten Thousand U.S. Dollars (\$10,000.00).

Section 12 DISPUTES

The Parties will use the following procedure to address any dispute arising under this Agreement (a “Dispute”).

12.1. **GOVERNING LAW.** This Agreement will be governed by and construed in accordance with the laws of the State of California.

12.2. **NEGOTIATION.** Either Party may initiate the Dispute resolution procedures by sending a notice of Dispute (“Notice of Dispute”). The Parties will attempt to resolve the Dispute promptly through good faith negotiations including 1) timely escalation of the Dispute to executives who have authority to settle the Dispute and who are at a higher level of management than the persons with direct responsibility for the matter and 2) direct communication between the executives. If the Dispute has not been resolved within ten (10) days from the Notice of Dispute, the Parties will proceed to mediation.

12.3. **MEDIATION.** The Parties will choose an independent mediator within thirty (30) days of a notice to mediate from either Party (“Notice of Mediation”). Neither Party may unreasonably withhold consent to the selection of a mediator. If the Parties are unable to agree upon a mediator, either Party may request that American Arbitration Association nominate a mediator. Each Party will bear its own costs of mediation, but the Parties will share the cost of the mediator equally. Each Party will participate in the mediation in good faith and will be represented at the mediation by a business executive with authority to settle the Dispute.

12.4. **LITIGATION, VENUE and JURISDICTION.** If a Dispute remains unresolved for sixty (60) days after receipt of the Notice of Mediation, either Party may then submit the Dispute to a court of competent jurisdiction. Each Party irrevocably agrees to submit to the exclusive jurisdiction of the courts in the State of California over any claim or matter arising under or in connection with this Agreement. Any and all Disputes shall be litigated in the State of California and venue shall lie in the County of Humboldt unless transferred pursuant to California Code of Civil Procedure Sections 394 or 395.

12.5. **CONFIDENTIALITY.** All communications pursuant to subsections 12.2 and 12.3 will be treated as compromise and settlement negotiations for purposes of applicable rules of evidence and any additional confidentiality protections provided by applicable law. The use of these Dispute resolution procedures will not be construed under the doctrines of laches, waiver or estoppel to affect adversely the rights of either Party.

Section 13 DEFAULT AND TERMINATION

13.1. **DEFAULT BY A PARTY.** If either Party fails to perform a material obligation under this Agreement, the other Party may consider the non-performing Party to be in default (unless a Force Majeure causes the failure) and may assert a default claim by giving the non-performing Party a written and detailed notice of default. Except for a default by Customer for failing to pay any amount when due under this Agreement which must be cured immediately, the defaulting Party will have thirty (30) days after receipt of the notice of default to either cure the default or, if the default is not curable within thirty (30) days, provide a written cure plan. 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.

13.2. **FAILURE TO CURE.** If a defaulting Party fails to cure the default as provided above in Section 13.1, unless otherwise agreed in writing, the non-defaulting Party may terminate any unfulfilled portion of this Agreement. In the event of termination for default, the defaulting Party will promptly return to the non-defaulting Party any of its Confidential Information. If Customer is the non-defaulting Party, terminates this Agreement as permitted by this Section, and completes the System through a third party, Customer may as its exclusive remedy recover from Motorola reasonable costs incurred to complete the System to a capability not exceeding that specified in this Agreement less the unpaid portion of the Contract Price. Customer will mitigate damages and provide Motorola with detailed invoices substantiating the charges.

13.3. **WITHOUT CAUSE.** Customer may terminate this Agreement without cause upon thirty (30) days advance written notice. Such notice shall state the effective date of the termination.



13.4. **INSUFFICIENT FUNDING.** Customer's obligations under this Agreement are contingent upon the availability of local, state and/or federal funds. In the event such funding is reduced or eliminated, Customer shall, at its sole discretion, determine whether this Agreement shall be terminated. Customer shall provide Motorola seven (7) days advance written notice of its intent to terminate this Agreement due to insufficient funding.

13.5. **COMPENSATION UPON TERMINATION.** In the event Customer elects to terminate this Agreement for any reason other than default, Customer shall pay Motorola for the conforming Equipment and/or Software delivered and all services performed pursuant to the terms and conditions of this Agreement through and including the effective date of such termination.

Section 14 INDEMNIFICATION AND INSURANCE

14.1. GENERAL INDEMNIFICATION OBLIGATIONS.

14.1.1. **GENERAL INDEMNITY BY MOTOROLA.** Motorola will indemnify and hold Customer harmless from any and all liability, expense, judgment, suit, cause of action, or demand for personal injury, death, or direct damage to tangible property which may accrue against Customer to the extent it is caused by the negligence of Motorola, its subcontractors, or their employees or agents, while performing their duties under this Agreement, if Customer gives Motorola prompt, written notice of any claim or suit. Customer will cooperate with Motorola in its defense or settlement of the claim or suit. This Section sets forth the full extent of Motorola's general indemnification of Customer from liabilities that are in any way related to Motorola's performance under this Agreement.

14.1.2. **GENERAL INDEMNITY BY CUSTOMER.** Customer will indemnify and hold Motorola harmless from any and all liability, expense, judgment, suit, cause of action, or demand for personal injury, death, or direct damage to tangible property which may accrue against Motorola to the extent it is caused by the negligence of Customer, its other contractors, or their employees or agents, while performing their duties under this Agreement, if Motorola gives Customer prompt, written notice of any the claim or suit. Motorola will cooperate with Customer in its defense or settlement of the claim or suit. This Section sets forth the full extent of Customer's general indemnification of Motorola from liabilities that are in any way related to Customer's performance under this Agreement.

14.2. PATENT AND COPYRIGHT INFRINGEMENT.

14.2.1. Motorola will defend at its expense any suit brought against Customer to the extent it is based on a third-party claim alleging that the Equipment manufactured by Motorola or the Motorola Software ("Motorola Product") directly infringes a United States patent or copyright ("Infringement Claim"). Motorola's duties to defend and indemnify are conditioned upon: Customer promptly notifying Motorola in writing of the Infringement Claim; Motorola having sole control of the defense of the suit and all negotiations for its settlement or compromise; and Customer providing to Motorola cooperation and, if requested by Motorola, reasonable assistance in the defense of the Infringement Claim. In addition to Motorola's obligation to defend, and subject to the same conditions, Motorola will pay all damages finally awarded against Customer by a court of competent jurisdiction for an Infringement Claim or agreed to, in writing, by Motorola in settlement of an Infringement Claim.

14.2.2 If an Infringement Claim occurs, or in Motorola's opinion is likely to occur, Motorola may at its option and expense: (a) procure for Customer the right to continue using the Motorola Product; (b) replace or modify the Motorola Product so that it becomes non-infringing while providing functionally equivalent performance; or (c) accept the return of the Motorola Product and grant Customer a credit for the Motorola Product, less a reasonable charge for depreciation. The depreciation amount will be calculated based upon generally accepted accounting standards.

14.2.3 Motorola will have no duty to defend or indemnify for any Infringement Claim that is based upon: (a) the combination of the Motorola Product with any software, apparatus or device not furnished by Motorola; (b) the use of ancillary equipment or software not furnished by Motorola and that is attached to or used in connection with the Motorola Product; (c) Motorola Product designed or manufactured in accordance with Customer's designs, specifications, guidelines or instructions, if the alleged infringement would not have occurred without such designs, specifications, guidelines or instructions; (d) a modification of the Motorola Product by a party other than Motorola; (e) use of the Motorola Product in a manner for which the Motorola Product was not designed or that is inconsistent with the terms of this Agreement; or (f) the failure by Customer to install an enhancement release to the Motorola Software that is intended to correct the claimed

infringement. In no event will Motorola's liability resulting from its indemnity obligation to Customer extend in any way to royalties payable on a per use basis or the Customer's revenues, or any royalty basis other than a reasonable royalty based upon revenue derived by Motorola from Customer from sales or license of the infringing Motorola Product.

14.2.4. This Section 14 provides Customer's sole and exclusive remedies and Motorola's entire liability in the event of an Infringement Claim. Customer has no right to recover and Motorola has no obligation to provide any other or further remedies, whether under another provision of this Agreement or any other legal theory or principle, in connection with an Infringement Claim. In addition, the rights and remedies provided in this Section 14 are subject to and limited by the restrictions set forth in Section 15.

14.3 INSURANCE REQUIREMENTS.

14.3.1. GENERAL INSURANCE REQUIREMENTS. Without limiting Motorola's indemnification obligations provided for herein, Motorola shall, and similarly shall require that all subcontractors hereunder, take out and maintain, throughout the entire period of this Agreement, and any extended term thereof, the following policies of insurance, placed with insurers authorized to do business in the State of California with a current A.M. Bests rating of no less than A: VII or its equivalent against personal injury, death and property damage which may arise from, or in connection with, the activities of Motorola and its agents, officers, directors, employees, licensees, invitees, assignees or subcontractors:

14.3.1.1. Comprehensive or Commercial General Liability Insurance at least as broad as Insurance Services Office Commercial General Liability Coverage (occurrence form CG 0001), in an amount of Two Million Dollars (\$2,000,000.00) per occurrence for any one (1) incident, including, but not limited to, personal injury, death and property damage. If a general aggregate limit is used, such limit shall apply separately hereto or shall be twice the required occurrence limit.

14.3.1.2. Automobile/Motor Liability Insurance with a limit of liability of One Million Dollars (\$1,000,000.00) combined single limit coverage. Such insurance shall include coverage of all owned, hired and non-owned vehicles. Said coverage shall be at least as broad as Insurance Service Offices Form Code 1 (any auto).

14.3.1.3. Workers' Compensation Insurance, as required by the Labor Code of the State of California, with statutory limits, and Employers Liability Insurance with a limit of One Million Dollars (\$1,000,000.00) per accident for bodily injury or disease. Said policy shall contain, or be endorsed to contain, a waiver of subrogation against Customer and its agents, officers, officials, employees and volunteers.

14.3.1.4. Professional Liability Insurance – Error and Omission Coverage including coverage in an amount of Two Million Dollars (\$2,000,000.00) for each claim (Four Million Dollars (\$4,000,000.00) general aggregate). Said insurance shall be maintained for the statutory period during which Motorola may be exposed to liability. Motorola shall require that such coverage be incorporated into its professional services agreements with any other entities.

14.3.2. SPECIAL INSURANCE REQUIREMENTS. Said policies shall, unless otherwise specified herein, be endorsed with the following provisions:

14.3.2.1. The Comprehensive or Commercial General Liability Policy shall provide that Customer, and its agents, officers, officials, employees and volunteers, are covered as additional insured for liability arising out of the operations performed by, or on behalf of, Motorola. The coverage shall contain no special limitations on the scope of protection afforded to Customer or its agents, officers, officials, employees and volunteers. Said policy shall also contain a provision stating that such coverage: (a) includes contractual liability; (b) does not contain exclusions as to property damage caused by explosion or collapse of structures or underground damage, commonly referred to as "XCU Hazards;" (c) is the primary insurance with regard to Customer; (d) does not contain a pro-rata, excess only and/or escape clause; and (e) contains a cross liability, severability of interest or separation of insureds clause.

14.3.2.2. The above-referenced policies shall not be canceled, non-renewed or materially reduced in coverage without thirty (30) days prior written notice being provided to Customer in accordance with the notice provisions set forth herein. It is further understood that Motorola shall not terminate such coverage until Customer receives adequate proof that equal or better insurance has been secured.



14.3.2.3. The inclusion of more than one (1) insured shall not operate to impair the rights of one (1) insured against another insured, and the coverage afforded shall apply as though separate policies had been issued to each insured, but the inclusion of more than one (1) insured shall not operate to increase the limits of the insurer's liability.

14.3.2.4. For claims related to this Agreement, Motorola's insurance is the primary coverage to Customer.

14.3.2.5. Any failure to comply with the provisions of this Agreement shall not affect coverage provided to Customer or its agents, officers, officials, employees and volunteers.

14.3.2.6. Motorola shall furnish Customer with certificates and blanket endorsements effecting the required coverage prior to execution of this Agreement. The endorsements shall be on industry standard forms. Any deductible shall be responsibility of Motorola.

14.3.2.7. Customer is to be notified immediately if twenty-five percent (25%) or more of any required insurance aggregate limit is encumbered, and Motorola shall be required to purchase additional coverage to meet the above-referenced aggregate limits.

14.3.3. **INSURANCE NOTICES.** Any and all insurance notices required to be given pursuant to the terms of this Agreement shall be sent to the addresses set forth below in accordance with the notice provisions described herein.

Customer: County of Humboldt
Attention: Risk Management
825 Fifth Street, Room 131
Eureka, California 95501
Phone: (707) 268-3669

Motorola: Motorola Solutions, Inc.
Attention: Global Insurance
500 W. Monroe Street, Suite 4400
Chicago, Illinois 60661
Phone: (847) 576-5000

14.3.4. **EFFECT OF INSURANCE.** Acceptance of the insurance required by this Agreement shall not relieve either Party from the indemnification obligations set forth in this Section 14. The Indemnification obligations set forth in this Section 14 shall apply to all claims for damages related to either Party's performance hereunder regardless of whether any insurance is applicable or not. The insurance policy limits set forth herein shall not act as a limitation upon the amount of indemnification or defense to be provided by either Party hereunder.

Section 15 LIMITATION OF LIABILITY

Except for personal injury or death, Motorola's total liability, whether for breach of contract, warranty, negligence, strict liability in tort, indemnification, or otherwise, will be limited to the direct damages recoverable under law, but not to exceed the price of the Equipment, Software, or implementation and other one (1) time Services with respect to which losses or damages are claimed. With respect to all subscription or other ongoing Services and unless as otherwise provided under the applicable Addenda, Motorola's total liability will be limited to the direct damages recoverable under law, but not to exceed the price of twelve (12) months of Services preceding the incident giving rise to the claim. **ALTHOUGH THE PARTIES ACKNOWLEDGE THE POSSIBILITY OF SUCH LOSSES OR DAMAGES, THEY AGREE THAT MOTOROLA WILL NOT BE LIABLE FOR ANY COMMERCIAL LOSS, INCONVENIENCE, LOSS OF USE, LOSS TIME, DATA, GOODWILL, REVENUES, PROFITS OR SAVINGS; OR OTHER SPECIAL, INCIDENTAL, INDIRECT, OR CONSEQUENTIAL DAMAGES IN ANY WAY RELATED TO OR ARISING FROM THIS AGREEMENT, THE SALE OR USE OF THE EQUIPMENT OR SOFTWARE, OR THE PERFORMANCE OF SERVICES BY MOTOROLA PURSUANT TO THIS AGREEMENT.** This limitation of liability provision survives the expiration or termination of the Agreement and applies notwithstanding any contrary provision. No action for contract breach or otherwise relating to the transactions contemplated by this Agreement may be brought more than one (1) year after the accrual of the cause of action, except for money due upon an open account.

Section 16 CONFIDENTIALITY AND PROPRIETARY RIGHTS

16.1. CONFIDENTIAL INFORMATION.

16.1.1. Each Party is a disclosing Party (“Discloser”) and a receiving Party (“Recipient”) under this Agreement. During the term of this Agreement and for a period of three (3) years from the expiration or termination of this Agreement, Recipient will (i) not disclose Confidential Information to any third party; (ii) restrict disclosure of Confidential Information to only those employees (including, but not limited to, employees of any wholly owned subsidiary, a parent company, any other wholly owned subsidiaries of the same parent company), agents or consultants who must be directly involved with the Confidential Information for the purpose and who are bound by confidentiality terms substantially similar to those in this Agreement; (iii) not copy, reproduce, reverse engineer, de-compile or disassemble any Confidential Information; (iv) use the same degree of care as for its own information of like importance, but at least use reasonable care, in safeguarding against disclosure of Confidential Information; (v) promptly notify Discloser upon discovery of any unauthorized use or disclosure of the Confidential Information and take reasonable steps to regain possession of the Confidential Information and prevent further unauthorized actions or other breach of this Agreement; and (vi) only use the Confidential Information as needed to fulfill this Agreement.

16.1.2. Recipient is not obligated to maintain as confidential, Confidential Information that Recipient can demonstrate by documentation (i) is now available or becomes available to the public without breach of this Agreement; (ii) is explicitly approved for release by written authorization of Discloser; (iii) is lawfully obtained from a third party or parties without a duty of confidentiality; (iv) is known to the Recipient prior to such disclosure; (v) is independently developed by Recipient without the use of any of Discloser’s Confidential Information or any breach of this Agreement; or (vi) Customer receives a California Public Records Act request for documents and after providing Motorola reasonable time, Motorola does not obtain an injunction prohibiting the release of the documents.

16.1.3. All Confidential Information remains the property of the Discloser and will not be copied or reproduced without the express written permission of the Discloser, except for copies that are absolutely necessary in order to fulfill this Agreement. Within ten (10) days of receipt of Discloser’s written request, Recipient will return all Confidential Information to Discloser along with all copies and portions thereof, or certify in writing that all such Confidential Information has been destroyed. However, Recipient may retain one (1) archival copy of the Confidential Information that it may use only in case of a dispute concerning this Agreement. No license, express or implied, in the Confidential Information is granted other than to use the Confidential Information in the manner and to the extent authorized by this Agreement. The Discloser warrants that it is authorized to disclose any Confidential Information it discloses pursuant to this Agreement.

16.2. **PRESERVATION OF MOTOROLA’S PROPRIETARY RIGHTS.** Motorola, the third party manufacturer of any Equipment, and the copyright owner of any Non-Motorola Software own and retain all of their respective Proprietary Rights in the Equipment and Software, and nothing in this Agreement is intended to restrict their Proprietary Rights. All intellectual property developed, originated, or prepared by Motorola in connection with providing to Customer the Equipment, Software, or related services remain vested exclusively in Motorola, and this Agreement does not grant to Customer any shared development rights of intellectual property. Except as explicitly provided in the Software License Agreement, Motorola does not grant to Customer, either directly or by implication, estoppel, or otherwise, any right, title or interest in Motorola’s Proprietary Rights. Customer will not modify, disassemble, peel components, decompile, otherwise reverse engineer or attempt to reverse engineer, derive source code or create derivative works from, adapt, translate, merge with other software, reproduce, distribute, sublicense, sell or export the Software, or permit or encourage any third party to do so. The preceding sentence does not apply to Open Source Software which is governed by the standard license of the copyright owner.

16.3 **VOLUNTARY DISCLOSURE.** Except as required to fulfill its obligations under this Agreement, Motorola will have no obligation to provide Customer with access to its Confidential Information and/or proprietary information. Under no circumstances will Motorola be required to provide any data related to cost and pricing unless such information is contained in a required contract document.

16.4 DATA AND FEEDBACK.

16.4.1 To the extent permitted by law, Customer owns all right, title and interest in System Data created solely by it or its agents (hereafter, “Customer Data”), and grants to Motorola the right to use, host, cache, store, reproduce, copy, modify, combine, analyze, create derivatives from, communicate, transmit, publish, display, and distribute such Customer Data.



16.4.2 Motorola owns all right, title and interest in data resulting from System Data that is or has been transformed, altered, processed, aggregated, correlated or operated on (hereafter, "Derivative Data").

16.4.3 Any Feedback given by Customer is and will be entirely voluntary and, even if designated as confidential, will not create any confidentiality obligation for Motorola. Motorola will be free to use, reproduce, license or otherwise distribute and exploit the Feedback without any obligation to Customer. Customer acknowledges that Motorola's receipt of the Feedback does not imply or create recognition by Motorola of either the novelty or originality of any idea. The Parties further agree that all fixes, modifications and improvements made to Motorola products or services conceived of or made by Motorola that are based, either in whole or in part, on the Feedback are the exclusive property of Motorola and all right, title and interest in and to such fixes, modifications or improvements to the Motorola product or service will vest solely in Motorola.

Section 17 GENERAL

17.1. RECORD RETENTION AND INSPECTION.

17.1.1. Each Party agrees to timely prepare accurate and complete financial and performance records, documents and other evidence relating to its performance hereunder, and to maintain and preserve said records for a period of three (3) years after the expiration of this Agreement, except that if any litigation, claim, negotiation, audit or other action is pending, the records shall be retained until completion and resolution of all issues arising therefrom. Such records shall be original entry books with a general ledger itemizing all debits and credits for the services provided pursuant to the terms and conditions of this Agreement.

17.1.2. Each Party agrees to make all pertinent records, documents, conditions and activities related to its performance hereunder available during normal business hours to inspection, audit and reproduction by the other Party and any other duly authorized local, state and/or federal agencies in accordance with any and all applicable local, state and federal laws, regulations, policies, procedures and standards, including, without limitation, California Government Code Section 8546.7, for a period of three (3) years after the expiration or termination of this Agreement. Each Party further agrees to allow interviews of any of its employees who might reasonably have information related to such records by the other Party and any other duly authorized local, state and/or federal agencies. All examinations and audits conducted hereunder shall be strictly confined to those matters connected with the performance of this Agreement, including, without limitation, the costs of administering this Agreement.

17.1.3. In the event of an audit exception or exceptions related to either Party's performance hereunder, the Party responsible for not meeting the requirements set forth herein shall be responsible for the deficiency and for the cost of the audit.

17.2. NON-DISCRIMINATION COMPLIANCE.

17.2.1. In connection with the execution of this Agreement, neither Party shall unlawfully discriminate in the provision of professional services or against any employee or applicant for employment because of: race; religion or religious creed; color; age, over forty (40) years of age; sex, including, without limitation, gender identity and expression, pregnancy, childbirth and related medical conditions; sexual orientation, including, without limitation, heterosexuality, homosexuality and bisexuality; national origin; ancestry; marital status; medical condition, including, without limitation, cancer and genetic characteristics; mental or physical disability, including, without limitation, HIV status and AIDS; political affiliation; military service; denial of family care leave; or any other classifications protected by local, state or federal laws or regulations. Nothing herein shall be construed to require the employment of unqualified persons.

17.2.2. Each Party further assures that it will abide by the applicable provisions of: Title VI and Title VII of the Civil Rights Act of 1964; Section 504 of the Rehabilitation Act of 1973; the Age Discrimination Act of 1975; the Food Stamp Act of 1977; Title II of the Americans with Disabilities Act of 1990; the California Fair Employment and Housing Act; California Civil Code Sections 51, et seq.; California Government Code Sections 4450, et seq.; California Welfare and Institutions Code Section 10000; Division 21 of the California Department of Social Services Manual of Policies and Procedures; United States Executive Order 11246, as amended and supplemented by United States Executive Order 11375 and 41 C.F.R. Part 60; and any other applicable local, state and/or federal laws and regulations, all as may be amended from time to time. The applicable regulations of the California Fair Employment and Housing Commission implementing California Government Code Section



12990, set forth in Sections 8101, et seq. of Title 2 of the California Code of Regulations are incorporated into this Agreement by reference and made a part hereof as if set forth in full.

17.3. DRUG-FREE WORKPLACE CERTIFICATION.

17.3.1 By executing this Agreement, each Party certifies that it will provide a drug-free workplace in accordance with the requirements of the Drug-Free Workplace Act of 1990 (California Government Code Sections 8350, et seq.) by doing all of the following:

17.3.1.1. Publish, as required by California Government Code Section 8355(a)(1), a Drug-Free Policy Statement which notifies employees that the unlawful manufacture, distribution, dispensation, possession or use of a controlled substance is prohibited, and specifies the actions to be taken against employees for violations.

17.3.1.2. Establish, as required by California Government Code Section 8355(a)(2), a Drug-Free Awareness Program which informs employees about the following: (i) the dangers of drug abuse in the workplace; (ii) the Party's policy of maintaining a drug-free workplace; (iii) any available counseling, rehabilitation and employee assistance programs; and (iv) the penalties that may be imposed upon employees for drug abuse violations.

17.3.1.3. Ensure, as required by California Government Code Section 8355(a)(3), that every employee responsible for performing the Parties' obligations under this Agreement will receive, and agree to abide the terms of, the applicable Drug-Free Policy Statement as a condition of employment.

17.4. NUCLEAR FREE HUMBOLDT COUNTY ORDINANCE COMPLIANCE. By executing this Agreement, each Party certifies that it is not a Nuclear Weapons Contractor, in that it is not knowingly or intentionally engaged in the research, development, production or testing of nuclear warheads, nuclear weapons systems or nuclear weapons components, as defined by the Nuclear Free Humboldt County Ordinance. Each Party agrees to notify the other Party immediately if it becomes a Nuclear Weapons Contractor as defined above. Either Party may immediately terminate this Agreement if it determines that the foregoing certification is false or if the other Party subsequently becomes a Nuclear Weapons Contractor.

17.5. REPORTS. Each Party agrees to provide the other Party with any and all reports that may be required by local, state and/or federal agencies for compliance with this Agreement. Reports shall be submitted no later than fifteen (15) days after the end of each calendar quarter using the format required by the State of California as appropriate.

17.6. ASSIGNABILITY AND SUBCONTRACTING. Except as provided herein, neither Party may assign this Agreement or any of its rights or obligations hereunder without the prior written consent of the other Party, which consent will not be unreasonably withheld. Any attempted assignment, delegation, or transfer without the necessary consent will be void. Notwithstanding the foregoing, Motorola may assign this Agreement to any of its affiliates or its right to receive payment without the prior consent of Customer. In addition, in the event Motorola separates one (1) or more of its businesses (each a "Separated Business"), whether by way of a sale, establishment of a joint venture, spin-off or otherwise (each a "Separation Event"), Motorola may, without the prior written consent of the other Party and at no additional cost to Motorola, assign this Agreement such that it will continue to benefit the Separated Business and its affiliates (and Motorola and its affiliates, to the extent applicable) following the Separation Event. Motorola may subcontract any of the work, but subcontracting will not relieve Motorola of its duties under this Agreement. Motorola shall remain legally responsible for the performance of all terms and conditions of this Agreement, including work performed by third parties under subcontracts, whether approved by Customer or not.

17.7. AGREEMENT SHALL BIND SUCCESSORS. All provisions of this Agreement shall be fully binding upon, and inure to the benefit of, the parties and to each of their heirs, executors, administrators, successors and permitted assigns.

17.8. WAIVER. Failure or delay by either Party to exercise a right or power under this Agreement will not be a waiver of the right or power. For a waiver of a right or power to be effective, it must be in a writing signed by the waiving Party. An effective waiver of a right or power will not be construed as either a future or continuing waiver of that same right or power, or the waiver of any other right or power. In no event shall any payment by Customer constitute a waiver of any breach of this Agreement which may then exist on the part of Motorola. Nor shall such payment impair or prejudice any remedy available to Customer with respect to any breach or default. Customer shall have the right to demand repayment of, and



Motorola shall promptly refund, any funds disbursed to Motorola which Customer determines were not expended in accordance with the terms of this Agreement.

17.9. NON-LIABILITY OF OFFICIALS AND EMPLOYEES. No official or employee of either Party shall be personally liable for any default or liability under this Agreement.

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

17.11. 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. Each Party shall be solely responsible for the acts or omissions of its agents, officers, employees, assignees and subcontractors.

17.12. 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.

17.13. NOTICES. Notices required under this Agreement to be given by one (1) Party to the other must be in writing and either personally delivered or sent to the addresses set forth below by certified mail, return receipt requested and postage prepaid or by a recognized courier service, such as Federal Express, UPS, or DHL, and will be effective upon receipt.

Customer: Humboldt County Administrative Office – Information Technology Division
Attention: Jim Storm, Information Technology Director
839 Fourth Street
Eureka, California 95501

AND

Humboldt County Sheriff's Office
Attention: William Honsal, Sheriff
826 Fourth Street
Eureka, California 95501

Motorola: Motorola Solutions, Inc.
Attention: Law Department
10680 Trenea Street, STE 200
San Diego, California 92131

17.14. COMPLIANCE WITH APPLICABLE LAWS AND LICENSURE REQUIREMENTS. Each Party will comply with all applicable local, state and federal laws, regulations, policies, procedures, rules and licensure and certification requirements concerning the performance of this Agreement or use of the System. Customer will obtain and comply with all Federal Communications Commission ("FCC") licenses and authorizations required for the installation, operation and use of the System before the scheduled installation of the Equipment. Although Motorola might assist Customer in the preparation of its FCC license applications, neither Motorola nor any of its employees is an agent or representative of Customer in FCC or other matters.

17.15. PROVISIONS REQUIRED BY LAW. This Agreement is subject to any additional local, state and federal restrictions, limitations or conditions that may affect the provisions, terms or funding of this Agreement. This Agreement shall be read and enforced as though all legally required provisions are included herein, and if for any reason any such provision is not included, or is not correctly stated, the Parties agree to amend the pertinent section to make such insertion or correction.

17.16. **REFERENCE TO LAWS AND RULES.** In the event any law, regulation or standard referred to herein is amended during the term of this Agreement, the Parties agree to comply with the amended provision as of the effective date thereof. Motorola will be entitled to seek a change order to the extent Motorola provides documentary evidence that any change in local, state or federal constitutions, laws, rules, codes, orders and regulations, including applicable licensure and certification requirements, increases the cost to perform this Agreement.

17.17. **ADVERTISING AND MEDIA RELEASE.** All informational material related to this Agreement shall receive approval from the other Party prior to being used as advertising or released to the media, including, but not limited to, television, radio, newspapers and internet. Each Party shall inform the other Party of all requests for interviews by the media related to this Agreement before such interviews take place; and each Party shall be entitled to have a representative present at such interviews.

17.18. **ATTORNEYS' FEES.** If either Party shall commence any legal action or proceeding, including an action for declaratory relief, against the other Party by reason of the alleged failure of the other Party to perform or keep any provision of this Agreement to be performed or kept, the Prevailing Party in said action or proceeding shall be entitled to recover court costs and reasonable attorneys' fees, including the reasonable value of services rendered by the Humboldt County Counsel's Office, to be fixed by the court, and such recovery shall include court costs and attorneys' fees on appeal, if applicable. As used herein, "Prevailing Party" means the Party who dismisses an action or proceeding in exchange for payment of substantially all sums allegedly due, performance of provisions allegedly breached, or other considerations substantially equal to the relief sought by said Party, as well as the Party in whose favor final judgment is rendered.

17.19. **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.

17.20. **ADMINISTRATOR LEVEL ACCOUNT ACCESS.** If applicable to the type of System purchased by Customer, Motorola will provide Customer with Administrative User Credentials. Customer agrees to only grant access to the Administrative User Credentials to those personnel with the training and experience to correctly use them. 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 personnel. 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 using the Administrative User Credentials may impact Motorola's ability to perform Services or other obligations under the 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.

17.21. **SURVIVAL OF TERMS.** The following provisions shall survive the expiration or termination of this Agreement for any reason: Section 3.5 (Motorola Software); Section 3.6 (Non-Motorola Software); if any payment obligations exist, Sections 6.2 and 6.3 (Contract Price and Invoicing and Payment); Subsection 10.8 (Disclaimer of Implied Warranties); Section 12 (Disputes); Section 15 (Limitation of Liability); and Section 16 (Confidentiality and Proprietary Rights); and all of the General provisions in Section 17.

17.22. **ENTIRE AGREEMENT.** This Agreement, including all Exhibits, constitutes the entire agreement of the Parties regarding the subject matter of the Agreement and supersedes all previous agreements, proposals, and understandings, whether written or oral, relating to this subject matter. This Agreement may be executed in multiple counterparts, and shall have the same legal force and effect as if the Parties had executed it as a single document. The Parties may sign in writing, or by electronic signature, including by email. An electronic signature, or a facsimile copy or computer image, such as a PDF or tiff image, of a signature, shall be treated as and shall have the same effect as an original signature. In addition, an electronic signature, a true and correct facsimile copy or computer image of this Agreement shall be treated as and shall have the same effect as an original signed copy of this document. This Agreement may be amended or modified only by a written instrument signed by authorized representatives of both Parties. The preprinted terms and conditions found on any Customer



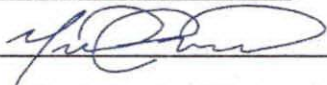
purchase or purchase order, acknowledgment or other form will not be considered an amendment or modification of this Agreement, even if a representative of each Party signs that document.

IN WITNESS WHEREOF, The Parties have entered into this Agreement as of the Effective Date.

TWO SIGNATURES ARE REQUIRED FOR CORPORATIONS:

- (1) CHAIRPERSON OF THE BOARD, PRESIDENT OR VICE PRESIDENT; AND
- (2) SECRETARY, CHIEF FINANCIAL OFFICER OR TREASURER.

MOTOROLA SOLUTIONS, INC.:

By: 

Date: December 10, 2018

Name: Micah Applewhite

Title: MSSSI Vice President


By: 

Date: 12-10-2018

Name: David Little


Title: Asst Secretary

COUNTY OF HUMBOLDT:

By: 
Ryan Sundberg
Chair, Humboldt County Board of Supervisors

Date: 12-18-18

INSURANCE AND INDEMNIFICATION REQUIREMENTS APPROVED:

By: 
Risk Manager

Date: 12/12/18

LIST OF EXHIBITS:

- Exhibit A – Motorola Software License Agreement
- Exhibit B – Pricing and Payment
- Exhibit C – Technical and Implementation Documents
 - Exhibit C-1 – System Description dated December 5, 2018
 - Exhibit C-2 – Pricing Summary & Equipment List dated December 5, 2018
 - Exhibit C-3 – Implementation Statement of Work dated December 5, 2018
 - Exhibit C-4 – Acceptance Test Plan dated December 5, 2018
 - Exhibit C-5 – Performance Schedule dated December 5, 2018
- Exhibit D – System Acceptance Certificate

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EXHIBIT A MOTOROLA SOFTWARE LICENSE AGREEMENT

This Exhibit A Motorola Software License Agreement ("Agreement") is between Motorola Solutions, Inc. ("Motorola") and the County of Humboldt ("Licensee"). Motorola and Licensee 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

- 1.1 "Designated Products" means products provided by Motorola to Licensee with which or for which the Software and Documentation is licensed for use.
- 1.2 "Documentation" means product and software documentation that specifies technical and performance features and capabilities, and the user, operation and training manuals for the Software (including all physical or electronic media upon which such information is provided).
- 1.3 "Open Source Software" means software with either freely obtainable source code, license for modification, or permission for free distribution.
- 1.4 "Open Source Software License" means the terms or conditions under which the Open Source Software is licensed.
- 1.5 "Primary Agreement" means the agreement to which this exhibit is attached.
- 1.6 "Security Vulnerability" means a flaw or weakness in system security procedures, design, implementation, or internal controls that could be exercised (accidentally triggered or intentionally exploited) and result in a security breach such that data is compromised, manipulated or stolen or the system damaged.
- 1.7 "Software" (i) means proprietary software in object code format, and adaptations, translations, de-compilations, disassemblies, emulations, or derivative works of such software; (ii) means any modifications, enhancements, new versions and new releases of the software provided by Motorola; and (iii) may contain one (1) or more items of software owned by a third party supplier. The term "Software" does not include any third party software provided under separate license or third party software not licensable under the terms of this Agreement.

Section 2 SCOPE

Motorola and Licensee enter into this Agreement in connection with Motorola's delivery of certain proprietary software or products containing embedded or pre-loaded proprietary software, or both. This Agreement contains the terms and conditions of the license Motorola is providing to Licensee, and Licensee's use of the proprietary software and affiliated documentation.

Section 3 GRANT OF LICENSE

- 3.1. Subject to the provisions of this Agreement and the payment of applicable license fees, Motorola grants to Licensee a personal, limited, non-transferable (except as permitted in Section 7) and non-exclusive license under Motorola's copyrights and Confidential Information (as defined in the Primary Agreement) embodied in the Software to use the Software, in object code form, and the Documentation solely in connection with Licensee's use of the Designated Products. This Agreement does not grant any rights to source code.
- 3.2. If the Software licensed under this Agreement contains or is derived from Open Source Software, the terms and conditions governing the use of such Open Source Software are in the Open Source Software Licenses of the copyright owner and not this Agreement. If there is a conflict between the terms and conditions of this Agreement and the terms and conditions of the Open Source Software Licenses governing Licensee's use of the Open Source Software, the terms and conditions of the license grant of the applicable Open Source Software Licenses will take precedence over the license grants in this Agreement. If requested by Licensee, Motorola will use commercially reasonable efforts to: (i) determine whether any



Open Source Software is provided under this Agreement; and (ii) identify the Open Source Software (or specify where that license may be found).

3.4 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 SUPERSEDES THE SOFTWARE LICENSE AGREEMENT AS TO THE END USER OF EACH SUCH PRODUCT.

Section 4 LIMITATIONS ON USE

4.1. Licensee may use the Software only for Licensee's internal business purposes and only in accordance with the Documentation. Any other use of the Software is strictly prohibited. Without limiting the general nature of these restrictions, Licensee will not make the Software available for use by third parties on a "time sharing," "application service provider," or "service bureau" basis or for any other similar commercial rental or sharing arrangement.

4.2. Licensee will not, and will not allow or enable any third party to: (i) reverse engineer, disassemble, peel components, decompile, reprogram or otherwise reduce the Software or any portion to a human perceptible form or otherwise attempt to recreate the source code; (ii) modify, adapt, create derivative works of, or merge the Software; (iii) copy, reproduce, distribute, lend, or lease the Software or Documentation to any third party, grant any sublicense or other rights in the Software or Documentation to any third party, or take any action that would cause the Software or Documentation to be placed in the public domain; (iv) remove, or in any way alter or obscure, any copyright notice or other notice of Motorola's proprietary rights; (v) provide, copy, transmit, disclose, divulge or make the Software or Documentation available to, or permit the use of the Software by any third party or on any machine except as expressly authorized by this Agreement; or (vi) use, or permit the use of, the Software in a manner that would result in the production of a copy of the Software solely by activating a machine containing the Software. Licensee may make one (1) copy of Software to be used solely for archival, back-up, or disaster recovery purposes; *provided* that Licensee may not operate that copy of the Software at the same time as the original Software is being operated. Licensee may make as many copies of the Documentation as it may reasonably require for the internal use of the Software.

4.3. Unless otherwise authorized by Motorola in writing, Licensee will not, and will not enable or allow any third party to: (i) install a licensed copy of the Software on more than one (1) unit of a Designated Product; or (ii) copy onto or transfer Software installed in one (1) unit of a Designated Product onto one (1) other device. Licensee may temporarily transfer Software installed on a Designated Product to another device if the Designated Product is inoperable or malfunctioning, if Licensee provides written notice to Motorola of the temporary transfer and identifies the device on which the Software is transferred. Temporary transfer of the Software to another device must be discontinued when the original Designated Product is returned to operation and the Software must be removed from the other device. Licensee must provide prompt written notice to Motorola at the time temporary transfer is discontinued.

4.4 Licensee will maintain, during the term of this Agreement and for a period of three (3) years thereafter, accurate records relating to this license grant to verify compliance with this Agreement. Motorola or an independent third party ("Auditor") may inspect Licensee's premises, books and records, upon reasonable prior notice to Licensee, during Licensee's normal business hours and subject to Licensee's facility and security regulations. Motorola is responsible for the payment of all expenses and costs of the Auditor. Any information obtained by Motorola and the Auditor will be kept in strict confidence by Motorola and the Auditor and used solely for the purpose of verifying Licensee's compliance with the terms of this Agreement. Each Party hereby acknowledges that the provisions set forth in Section 17.1 of the Primary Agreement concerning record retention and inspection apply to this Agreement.

Section 5 OWNERSHIP AND TITLE

Motorola, its licensors, and its suppliers retain all of their proprietary rights in any form in and to the Software and Documentation, including, but not limited to, all rights in patents, patent applications, inventions, copyrights, trademarks, trade secrets, trade names, and other proprietary rights in or relating to the Software and Documentation (including any corrections, bug fixes, enhancements, updates, modifications, adaptations, translations, de-compilations, disassemblies, emulations to or derivative works from the Software or Documentation, whether made by Motorola or another party, or any improvements that result from Motorola's processes or, provision of information services). No rights are granted to Licensee under this Agreement by implication, estoppel or otherwise, except for those rights which are expressly granted to Licensee



in this Agreement. All intellectual property developed, originated, or prepared by Motorola in connection with providing the Software, Designated Products, Documentation or related services, remains vested exclusively in Motorola, and Licensee will not have any shared development or other intellectual property rights.

Section 6 LIMITED WARRANTY; DISCLAIMER OF WARRANTY

6.1. Unless otherwise stated in the Primary Agreement, the commencement date and the term of the Software warranty will be a period of ninety (90) days from Motorola's shipment of the Software (the "Warranty Period"). If Licensee is not in breach of any of its obligations under this Agreement, Motorola warrants that the unmodified Software, when used properly and in accordance with the Documentation and this Agreement, will be free from a reproducible defect that eliminates the functionality or successful operation of a feature critical to the primary functionality or successful operation of the Software. Whether a defect occurs will be determined by Motorola solely with reference to the Documentation. Motorola does not warrant that Licensee's use of the Software or the Designated Products will be uninterrupted, error-free, completely free of Security Vulnerabilities, or that the Software or the Designated Products will meet Licensee's particular requirements. Motorola makes no representations or warranties with respect to any third party software included in the Software. Notwithstanding, any warranty provided by a copyright owner in its standard license terms will flow through to Licensee for third party software provided by Motorola.

6.2 Motorola's sole obligation to Licensee and Licensee's exclusive remedy under this warranty is to use reasonable efforts to remedy any material Software defect covered by this warranty. These efforts will involve either replacing the media or attempting to correct significant, demonstrable program or documentation errors or Security Vulnerabilities. If Motorola cannot correct the defect within a reasonable time, then at Motorola's option, Motorola will replace the defective Software with functionally-equivalent Software, license to Licensee substitute Software which will accomplish the same objective, or terminate the license and refund the Licensee's paid license fee.

6.3. Warranty claims are described in the Primary Agreement.

6.4. The express warranties set forth in this Section 6 are in lieu of, and Motorola disclaims, any and all other warranties (express or implied, oral or written) with respect to the Software or Documentation, including, without limitation, any and all implied warranties of condition, title, non-infringement, merchantability, or fitness for a particular purpose or use by Licensee (whether or not Motorola knows, has reason to know, has been advised, or is otherwise aware of any such purpose or use), whether arising by law, by reason of custom or usage of trade, or by course of dealing. In addition, Motorola disclaims any warranty to any person other than Licensee with respect to the Software or Documentation.

Section 7 TRANSFERS

Licensee will not transfer the Software or Documentation to any third party without Motorola's prior written consent. Motorola's consent may be withheld at its discretion and may be conditioned upon transferee paying all applicable license fees and agreeing to be bound by this Agreement. If the Designated Products are Motorola's radio products and Licensee transfers ownership of the Motorola radio products to a third party, Licensee may assign its right to use the Software (other than CPS and Motorola's FLASHport® software) which is embedded in or furnished for use with the radio products and the related Documentation; *provided* that Licensee transfers all copies of the Software and Documentation to the transferee, and Licensee and the transferee sign a transfer form to be provided by Motorola upon request, obligating the transferee to be bound by this Agreement.

Section 8 TERM AND TERMINATION

8.1 Licensee's right to use the Software and Documentation will begin when the Primary Agreement is signed by both Parties and will continue for the life of the Designated Products with which or for which the Software and Documentation have been provided by Motorola, unless Licensee breaches this Agreement, in which case this Agreement and Licensee's right to use the Software and Documentation may be terminated immediately upon notice by Motorola.

8.2 Within thirty (30) days after termination of this Agreement, Licensee must certify in writing to Motorola that all copies of the Software have been removed or deleted from the Designated Products and that all copies of the Software and Documentation have been returned to Motorola or destroyed by Licensee and are no longer in use by Licensee.

8.3 Licensee acknowledges that Motorola made a considerable investment of resources in the development, marketing, and distribution of the Software and Documentation and that Licensee's breach of this Agreement will result in irreparable harm to Motorola for which monetary damages would be inadequate. If Licensee breaches this Agreement, Motorola may terminate this Agreement and be entitled to all available remedies at law or in equity (including immediate injunctive relief and repossession of all non-embedded Software and associated Documentation unless Licensee is a Federal agency of the United States Government).

Section 9 Commercial Computer Software

9.1 *This Section 9 only applies to U.S. Government end users.* The Software, Documentation and updates are commercial items as that term is defined at 48 C.F.R. Part 2.101, consisting of "commercial computer software" and "computer software documentation" as such terms are defined in 48 C.F.R. Part 252.227-7014(a)(1) and 48 C.F.R. Part 252.227-7014(a)(5), and used in 48 C.F.R. Part 12.212 and 48 C.F.R. Part 227.7202, as applicable. Consistent with 48 C.F.R. Part 12.212, 48 C.F.R. Part 252.227-7015, 48 C.F.R. Part 227.7202-1 through 227.7202-4, 48 C.F.R. Part 52.227-19, and other relevant sections of the Code of Federal Regulations, as applicable, the Software, Documentation and Updates are distributed and licensed to U.S. Government end users: (i) only as commercial items, and (ii) with only those rights as are granted to all other end users pursuant to the terms and conditions contained herein.

9.2 If Licensee is licensing Software for end use by the United States Government or a United States Government agency, Licensee may transfer such Software license, but only if: (i) Licensee transfers all copies of such Software and Documentation to such United States Government entity or interim transferee, and (ii) Licensee has first obtained from the transferee (if applicable) and ultimate end user an enforceable end user license agreement containing restrictions substantially identical to those contained in this Agreement. Except as stated in the foregoing, Licensee and any transferee(s) authorized by this subsection 9.2 may not otherwise use or transfer or make available any Motorola software to any third party nor permit any party to do so.

Section 10 CONFIDENTIALITY

Licensee acknowledges that the Software and Documentation contain Motorola's valuable proprietary and Confidential Information and are Motorola's trade secrets, and that the provisions in the Primary Agreement concerning Confidential Information apply.

Section 11 LIMITATION OF LIABILITY

The Limitation of Liability provisions applicable to this Agreement are described in the Primary Agreement.

Section 12 NOTICES

The notice requirements applicable to this Agreement are described in the Primary Agreement.

Section 13 NON-DISCRIMINATION COMPLIANCE

The non-discrimination requirements applicable to this Agreement are described in the Primary Agreement.

Section 14 INDEMNIFICATION AND INSURANCE

The indemnification and insurance requirements applicable to this Agreement are described in the Primary Agreement.

Section 15 GENERAL

15.1. **COPYRIGHT NOTICES.** The existence of a copyright notice on the Software will not be construed as an admission or presumption of publication of the Software or public disclosure of any trade secrets associated with the Software.

15.2. **COMPLIANCE WITH LAWS.** Each Party acknowledges that the Software is subject to the laws and regulations of the United States and each Party will comply with all applicable laws and regulations, including export laws and regulations of the United States. Licensee will not, without the prior authorization of Motorola and the appropriate governmental authority of the United States, in any form export or re-export, sell or resell, ship or reship, or divert, through direct or



indirect means, any item or technical data or direct or indirect products sold or otherwise furnished to any person within any territory for which the United States Government or any of its agencies at the time of the action, requires an export license or other governmental approval. Violation of this provision is a material breach of this Agreement.

15.3. **ASSIGNMENTS AND SUBCONTRACTING.** Motorola may assign its rights or subcontract its obligations under this Agreement, or encumber or sell its rights in any Software, without prior notice to or consent of Licensee. Motorola shall remain legally responsible for the performance of all terms and conditions of this Agreement, including performance by third parties under subcontracts, whether approved by Licensee or not.

15.4. **GOVERNING LAW.** This Agreement is governed by the laws of the United States to the extent that they apply and otherwise by the internal substantive laws of the State of California. The terms of the U.N. Convention on Contracts for the International Sale of Goods do not apply. In the event that the Uniform Computer Information Transaction Act, any version of this Act, or a substantially similar law (collectively "UCITA") becomes applicable to a Party's performance under this Agreement, UCITA does not govern any aspect of this Agreement or any license granted under this Agreement, or any of the Parties' rights or obligations under this Agreement. The governing law will be that in effect prior to the applicability of UCITA.

15.5. **THIRD PARTY BENEFICIARIES.** This Agreement is entered into solely for the benefit of Motorola and Licensee. No third party has the right to make any claim or assert any right under this Agreement, and no third party is deemed a beneficiary of this Agreement. Notwithstanding the foregoing, any licensor or supplier of third party software included in the Software will be a direct and intended third party beneficiary of this Agreement.

15.6. **SURVIVAL.** Sections 4, 5, 6.4, 7, 8, 9, 10, 11, 14 and 15 shall survive the expiration or termination of this Agreement.

15.7. **APPLICABILITY OF PRIMARY AGREEMENT AND ORDER OF PRECEDENCE.** This Exhibit is intended to supplement the terms and conditions contained in the Primary Agreement and the definitions, terms and conditions set forth herein have been incorporated into the Primary Agreement by reference and shall be binding upon the Parties as though fully set forth therein. Notwithstanding anything to the contrary, any and all applicable definitions, terms and conditions set forth in the Primary Agreement shall apply to this Exhibit. In the event of inconsistencies between this Exhibit and the Primary Agreement, the Parties agree that this Exhibit prevails, only with respect to the specific subject matter of this Exhibit, and not the Primary Agreement or any other exhibit as it applies to any other subject matter.

15.8 **SECURITY.** Motorola uses reasonable means in the design and writing of its own Software and the acquisition of third party Software to limit Security Vulnerabilities. While no software can be guaranteed to be free from Security Vulnerabilities, if a Security Vulnerability is discovered, Motorola will take the steps set forth in Section 6 of this Agreement.



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EXHIBIT B PRICING AND PAYMENT

Except for a payment that is due on the Effective Date, Customer will make payments to Motorola within thirty (30) days after the date of each invoice. Customer will make payments when due in the form of a check, cashier's check, or wire transfer drawn on a U.S. financial institution.

Below is the pricing without taxes. An incentive of One Hundred Thirty-Five Thousand Five Hundred Twenty-Five U.S. Dollars (\$135,525.00) is based upon payment of the first milestone prior to December 31, 2018.

Humboldt County Radio Project	
Fixed Network Equipment	\$3,593,631
DC Power Equipment	\$153,289
Microwave Network Equipment	\$870,984
User Radio Equipment	
Sheriff's Office	\$723,960
District Attorney's Office, Public Works Supervisors, Probation	\$362,763
User Radio Accessories	\$58,818
User Radio Labor	\$181,281
Spectrum Fingerprinting Labor	\$117,647
MCC 7500 Dispatch Console Equipment	\$124,060
Site Development Labor	\$435,756
Frequency Coordination Labor	\$17,647
VHF Combining Equipment	\$67,090
Site Monitoring Equipment	\$38,618
Sugarpine – Site Equipment	\$175,123
Sugarpine Solar Equipment	\$15,824
Discounted Total Before Incentives	\$6,936,489
System Incentive	(\$650,964)
Contract Execution by December 21, 2018	(\$500,000)
Incentive to Pay First Milestone before December 31, 2018	(\$135,525)
Total with Incentives	\$5,650,000

The incentives only apply at time of contract execution, and are based on the equipment and system configuration as proposed. For purchases after contract execution and prior to system acceptance, the pricing is based on Houston-Galveston Area Council (H-GAC) discount off list price with an additional 5% incentive applied to the H-GAC discounted price. H-GAC discount pricing can be found at <http://www.hgacbuy.org>.

The contract price after incentives for calculation of taxes is below. Taxes are estimated. Should the required taxes be different, it will be handled through a change order.

Equipment	\$2,035,793.00
Labor	\$3,614,207.00
Total	\$5,650,000.00
Estimated Taxes on Equipment (8.5%)	\$173,042.41
Contract Total (taxes estimated)	\$5,823,042.41



Payment Schedule

Payment for the System purchase will be in accordance with the following milestones.

Milestone	Percent	Amount	Anticipated Schedule
Contract Execution*	25%	\$1,455,760.60	Payment received by December 31, 2018
Shipment of equipment from Staging	45%	\$2,620,369.08	August 28, 2019
Installation of equipment	10%	\$582,304.24	August 28, 2019 – March 17, 2020
Final Acceptance.	20%	\$1,164,608.48	August 12, 2020
Total	100%	\$5,823,042.41	

*With the exception of the first payment, the schedule may vary based on final implementation schedule agreed upon during Design Review.

Motorola shall have the option to make partial shipments of equipment and will request payment upon shipment of such equipment, when applicable. In addition, Motorola shall invoice for installations completed on a site-by-site basis or when professional services are completed, when applicable. The value of the equipment shipped/services performed will be determined by the value shipped/services performed as a percentage of the total milestone value.

Unless otherwise specified, contract discounts are based upon all items proposed and overall system package.

For invoicing purposes only, discounts will be applied proportionately to the FNE and Subscriber equipment values to total contract price. Overdue invoices will bear simple interest at the maximum allowable rate by state law.



EXHIBIT C
Technical and Implementation Documents

Exhibit C – Technical and Implementation Documents includes these documents on the following pages:

- Exhibit C-1 – System Description dated December 5, 2018
- Exhibit C-2 – Pricing Summary & Equipment List dated December 5, 2018
- Exhibit C-3 – Implementation Statement of Work dated December 5, 2018
- Exhibit C-4 – Acceptance Test Plan dated December 5, 2018
- Exhibit C-5 – Performance Schedule dated December 5, 2018



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COUNTY OF HUMBOLDT, CALIFORNIA

EXHIBIT C-1 SYSTEM DESCRIPTION

HUMBOLDT COUNTY RADIO SYSTEM REPLACEMENT PROJECT

DECEMBER 5, 2018

RFP#18-100-COMM



The design, technical, pricing, and other information ("Information") furnished with this submission is proprietary and/or trade secret information of Motorola Solutions, Inc. ("Motorola Solutions") and is submitted with the restriction that it is to be used for evaluation purposes only. To the fullest extent allowed by applicable law, the Information is not to be disclosed publicly or in any manner to anyone other than those required to evaluate the Information without the express written permission of Motorola Solutions. Photo credits:

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EXHIBIT C-1

SYSTEM DESCRIPTION

1.1 SYSTEM OVERVIEW

The system will provide Humboldt County with a VHF conventional RF system with nine Project 25 digital sites and six analog sites. The system includes conventional simulcast/voting sites, fixed DVRS (Digital Vehicular Repeater System) sites, Ethernet based microwave backhaul links, UHF control links, fault monitoring systems, and dispatch consoles. Listed below in Table 1-1 is a summary of Project 25 digital and analog sites used in the system design.

Table 1-1: Summary of Sites in the P25 and Analog System

Site	Power	Link Type	Analog	Project 25
County Courthouse (K1 core, Redundant Prime Site, Dispatch Consoles)	DC	Loop Microwave	Simulcast	North Simulcast
Horse Mountain	DC	Loop Microwave	Simulcast	North Simulcast
Green Diamond	State-provided Solar Power	Loop Microwave	Simulcast	North Simulcast
Trinidad	DC	Spur Microwave		North Simulcast
Mount Pierce (Main Prime Site)	DC	Loop Microwave	Simulcast	South Simulcast
Pratt Mountain	DC	Spur Microwave	Simulcast	South Simulcast
Sugarpine	Solar Power	UHF Link to Horse Mtn	50 Watt DVRS	50 Watt DVRS
Shelter Cove	DC	UHF Link to Pratt		50 Watt DVRS
Orleans Mountain	Solar Power	UHF Link to Horse Mtn		10 Watt DVRS

1.2 DIGITAL P25 CONVENTIONAL SYSTEM FOR SHERIFF'S DEPARTMENT

The P25 digital system consists of two simulcast cells and three standalone sites. The North Simulcast Cell consists of four sites, while the South Simulcast Cell consists of two sites. The three stand-alone sites will utilize a fixed DVRS to relay received

audio to a common comparator, or voting shelf. A single FCC licensed VHF channel pair is required at each site.

In order to reduce the number of transmit frequencies required to support the system, simulcast operation has been used wherever possible. Motorola Solutions has included a loop-based microwave backhaul design to support Ethernet connectivity to each of these locations:

- County Courthouse
- Green Diamond
- Horse Mountain
- Pierce Mountain

A loop-based microwave system has two dishes at each loop site, with each dish pointed at a different site. Microwave traffic traverses the network in a circular fashion and in the event of a break between two sites due to failure, the loop switching action of the network allows the traffic to reverse its course and travel in the opposite direction in order to deliver its payload traffic. In this manner the loop system is highly redundant by providing diverse paths for traffic delivery.

For site links that are not loop-protected the microwave radios are configured in a hot-standby configuration using redundant microwave radios. Hot-standby microwave links are provided at these locations:

- Pratt Mountain
- Trinidad

In a Hot-Standby configuration, if the primary microwave radio fails the standby unit becomes the primary unit and takes over for delivering traffic to the distant site. Although this method does not provide diverse routing as in a loop switch configuration, it is still redundant and provides for an overall highly reliable microwave backbone network. The overall microwave network is depicted in Figure 1-1.

There are five transmit frequencies: one for the North Simulcast Cell, one for the South Simulcast Cell, and one each for the three DVRS sites. In addition, each DVRS site will utilize a UHF control station as its method to link the VHF repeater into the main system. Each control station will require a distinct UHF frequency pair for a total of three FCC licensed UHF transmit/receive pairs.

The receiver-voting system utilizes one FCC licensed VHF receive frequency across all nine sites. While the three DVRS sites will each use the same receive frequency as the simulcast sites, each DVRS site will utilize a different input Continuous Tone-coded Squelch System (CTCSS) tone. This CTCSS tone is encoded automatically by the user radio equipment and is defined through the initial radio programming.

At the heart of the receiver-voting system is the voting comparator. The voting comparator takes the received audio from all receivers, both simulcast cell and DVRS sites, via the microwave network and performs a comparison between all received audio inputs. The received audio with the lowest bit-error rate (BER) will be selected

to be repeated and sent to all sites, both simulcast cells and DVRS sites, for re-transmission in a countywide repeat fashion. In this manner, countywide repeat ensures that users operating within the coverage area of any site will be able to communicate with another user operating within the coverage area of any other site.

The Static Geofence feature is being utilized to provide automatic mode change/mobility or user assisted roaming with announcements as users enter/exit a geographic area. The Static Geofence feature utilizes Global Positioning System (GPS) signals at the user radio to determine the radio's location. When a radio enters a pre-defined geofence area the radio will automatically change modes to the appropriate channel/site that provides radio coverage for that area. Using this feature provides roaming countywide without user intervention.

A single console resource, or channel control window, is utilized at dispatch to communicate with the entire P25 system. The console system is directly connected to the voting comparator and will receive voted audio as well as send transmit audio countywide during transmit.

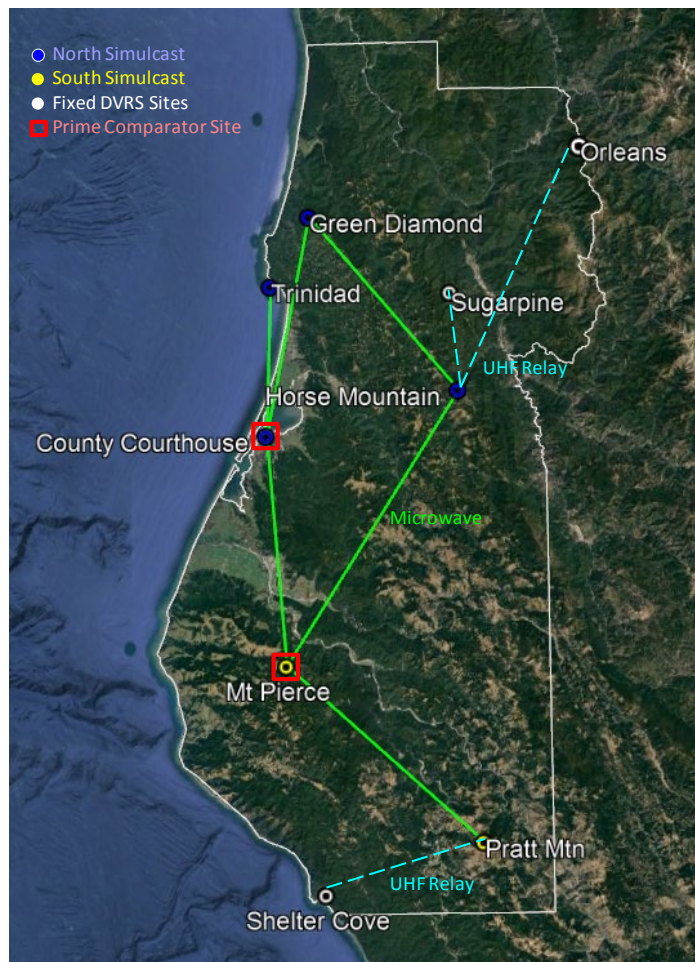


Figure 1-1: Public Safety P25 Digital System Overview.

1.2.1 Countywide Repeat

Countywide repeat occurs via a comparator. The comparator votes/combines audio from multiple sites and sends a single voted stream of audio back out to all sites connected to the comparator.

To connect to the comparator and provide countywide repeat, an Internet Protocol (IP) link to a GTR8000 base station is required. Where feasible, microwave is provided to the simulcast sites to provide IP link connectivity. For sites where microwave is not feasible, a VHF DVRS repeater is provided with a co-located UHF control station link to a UHF GTR8000 station located at a site with microwave link connectivity to the comparator. For the Sugarpine and Orleans sites, Horse Mountain will house the UHF GTR8000. For the Shelter Cove site, Pratt Mountain will house the UHF GTR8000.

The DVRS is providing P25 VHF to users as well as a UHF link with P25 signaling such as PTT-ID and emergency to the comparator.

1.2.2 Audio Interrupt/Smart Push-To-Talk Feature

The SmartPTT feature will be activated in the programming for all radios that will use P25 digital conventional. The SmartPTT feature provides a tone to users indicating that the channel is already in use, and prevents a radio from transmitting while the channel is busy. Preventing users from attempting to interrupt audio while another user is transmitting will help to reduce the possibility of collision which could result in missing audio.

As the existing County users operate on an analog system, when multiple users simultaneously transmit, the users can typically hear garbled and mixed audio which is an indicator that multiple radios attempting to communicate on top of each other. In P25 digital operation, when multiple users attempt to communicate simultaneously, the digital bit stream can be corrupted to the point where it is unrecoverable even with error correction and nothing is heard. The SmartPTT feature reduces the possibility of users interfering with each other to allow clear voice transmissions to occur.

1.2.3 Digital Operation

1.2.3.1 Simplex Operation

Simplex operation is simple unit-to-unit communications without system infrastructure such as a repeater or a simulcast system. It is also referred to as car-to-car, direct, or talkaround. In P25 digital simplex, there is delay between the transmitting radio and the receiving radio associated with the encode/decode of audio and digital processing. This is noticeable when users operating in simplex stand next to each other, and results in a slight echo as users can hear see or hear the other user talking and then hearing the received audio come through their radio speaker a ½ second later. Below is a diagram to show the steps in audio processing within the radios.

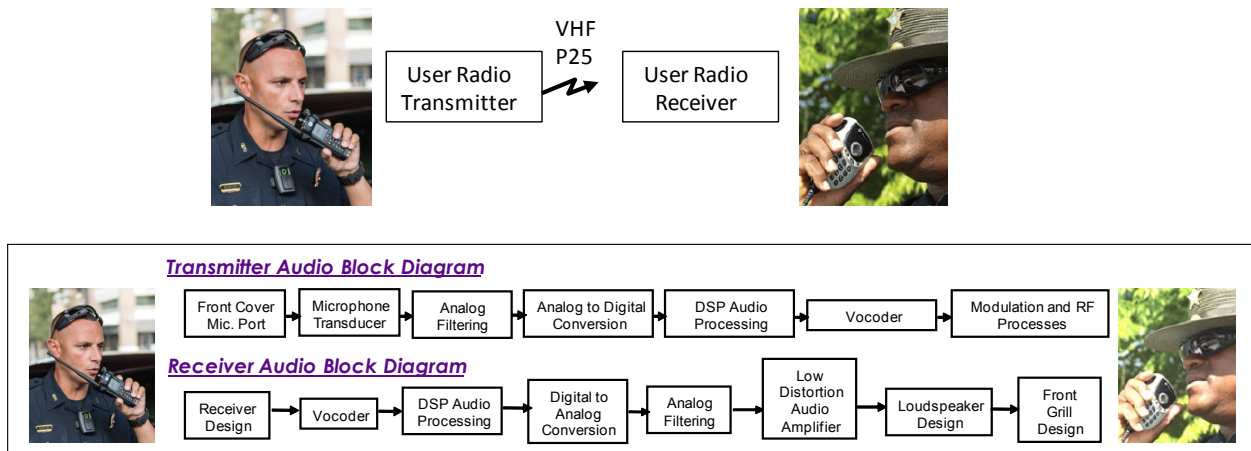


Figure 1-2: Public Safety P25 Digital Simplex.

1.2.3.2 Repeater Operation

When operating on the P25 system, the net delay from when a user transmits to when it is heard on another radio is the encode/decode delay that exists in P25 conventional simplex that is shown in the previous section, plus the additional network delay.

Below is a simplified diagram of a user's audio going through a site, via the comparator, and then repeated by being sent to other sites.

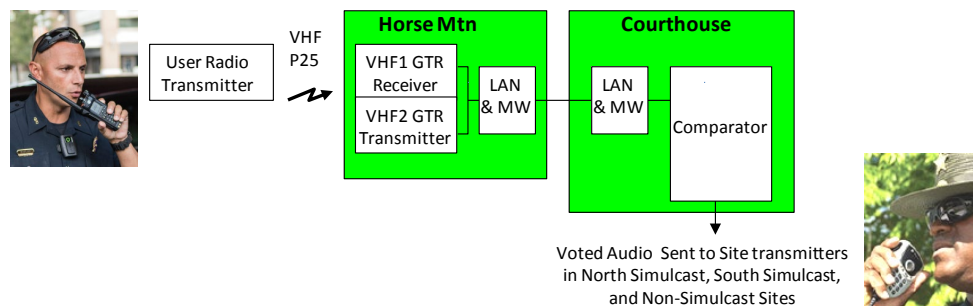


Figure 1-3: Simplified P25 Communications Diagram.

Below is a simplified diagram of a user transmitting to a DVRS site. Effectively, an additional encode/decode delay shown in the simplex diagram in the previous section exists at the DVRS site because the DVRS receiver decodes the audio and sends the signal to an APX that is acting as a site link to a UHF station connected to the comparator via microwave.

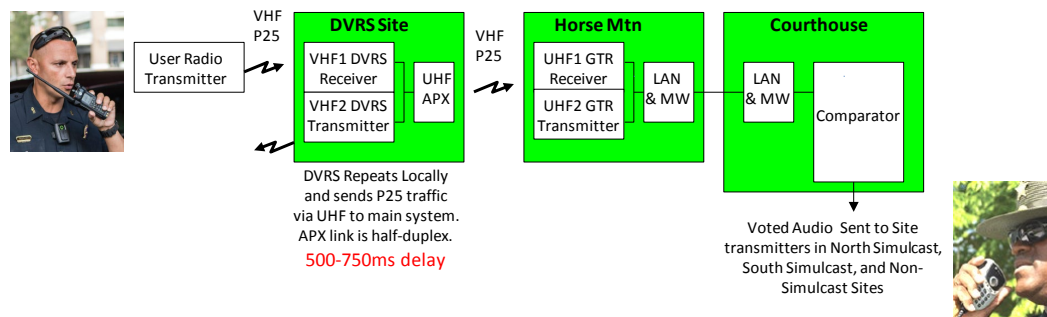


Figure 1-4: Simplified P25 DVRS Operation.

At a DVRS site, audio from a user operating at the DVRS site is received by the DVRS, and transmitted locally without going back to the comparator. In addition to repeating the local audio, the DVRS sends the audio to the comparator so that it can be repeated countywide to all other sites via the comparator. When a local user is not actively transmitting at a DVRS site, the audio that is transmitted at the DVRS site comes from the comparator via other sites in the system.

Since the receive frequency at all sites is the same some method of differentiating the DVRS sites from each other as well as the simulcast sites. To accommodate this the DVRS sites will each have a different CTCSS on the fixed station receive.

1.2.4 User Radio Mobility with Geo-Fencing

Static geofencing provides mobility based on GPS and a Google Earth boundary file on the radios supplied with this project. When a radio enters or exits a geographic boundary, a set of pre-programmed actions are automatically executed. The end of this section contains a table of the different actions that can occur. These pre-programmed actions will be determined as part of the Fleetmapping process programmed into the user radios as part of the implementation process.

More than one action can occur when entering or exiting a single geofence and geofences can overlap. When two or more geofences overlap with each other, the radio will prioritize the execution of the actions based on each geofence's priority programmed in the radio. The radio can be programmed with up to 100 geofences. A geofence can be a radius from a coordinate, or a polygon KMZ file from Google earth. A polygon can have up to 100 vertices.

Table 1-2: Geofence Action Consolidation

Action	Description	Action type	Entry	Exit
<mode change>	Go to mode with matching zone and channel alias	Continuous	Yes	Revert to user selection
<talkgroup change>	Go to specified talkgroup	Continuous	Yes	Revert to user selection
<text message>	Display specified text message	Momentary	Yes	Yes
<voice announcement>	Play specified voice announcement at specified interval	Both	Yes	Cancels the continuous entry VA and sound the exit momentary tone
<mute site selectable alerts>	Mute all site selectable alerts	Continuous	Yes	Revert to unmute the tones
<intelligent lighting>	Set backlight(s) to specified color.	Continuous	Yes	Revert to normal backlight color.
<status>	Set radio to specified status and send to system	Continuous	Yes	Cancel the sending of status
<message>	Send specified message to system	Continuous	Yes	Cancel the sending of message
<tx power level>	Set TX power to specified level	Continuous	Yes	Revert to normal operation.
<location report>	Send current location to UNS	Momentary	Yes	Yes

When more than one action is to occur, the action occurs according to the following sequence.

Table 1-3: Geofence Action Consolidation Sequence

Actions	Enter Sequence	Exit Sequence
<mute site selectable alerts>	1	1
<text message>	2	2
<intelligent lighting>	3	3
<voice announcement>	4	4
<mode change>	5	7
<talkgroup change>	5	7
<tx power level>	6	6
<status>	7	5
<message>	7	5

1.3 ANALOG CONVENTIONAL SYSTEM FOR PUBLIC WORKS DEPARTMENT

The analog system consists of a single simulcast cell and one standalone site. The Simulcast Cell consists of four sites: Horse Mountain, Green Diamond, County Courthouse, Pierce Mountain, and Pratt Mountain. The stand-alone site located at Sugarpine will utilize a fixed DVRS to relay received audio to a common comparator, or voting shelf. A single FCC licensed VHF channel pair is required at each site.

The analog system will utilize the same microwave network that is being provided for the digital P25 system.

There are two transmit frequencies: one for the Simulcast Cell and one each for the single DVRS site. In addition, the DVRS site will utilize a UHF control station as its method to link the VHF repeater into the main system. The control station will require a distinct FCC licensed UHF transmit/receive pair.

The existing station at Shelter Cove will be retained and will not have Countywide repeat capabilities. The County plans to utilize existing user radios for the analog system, and users will manually switch between the simulcast system and standalone sites.

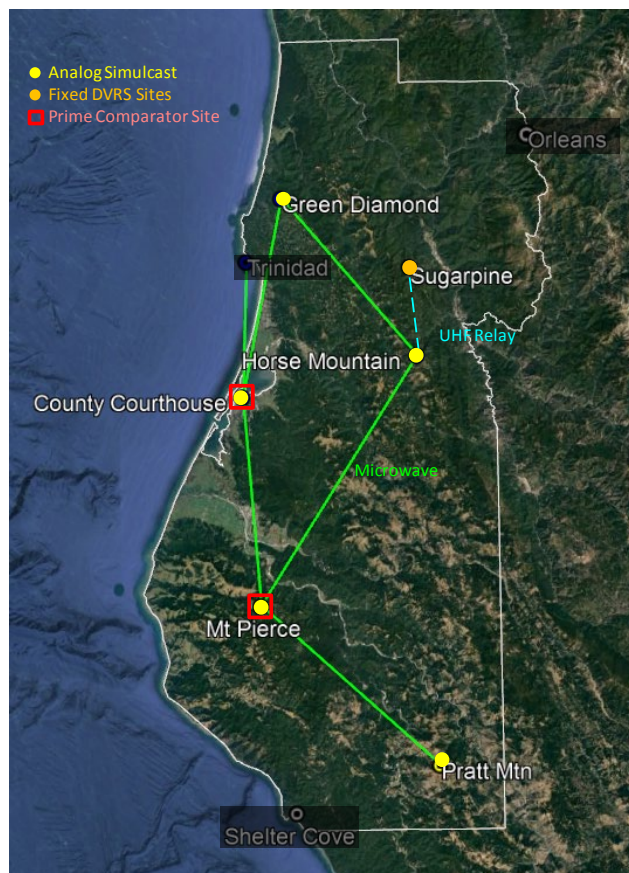


Figure 1-5: Analog System Overview.

1.4 FREQUENCY PLAN

Below is the frequency plan with candidate frequencies identified.

Table 1-4: Frequency Plan

Site name	Link	Use	Proposed System				Current Tx Freqs	Current Rx Freqs
			Twr Ht	P25 TX	P25 RX	Analog TX	Analog RX	
Court house	uw loop	N Simulcast	130	155.6475	159.225	155.3175	158.985	154.74, 155.07, 155.85, 153.9050
Trinidad	uw spur	N Simulcast	50	154.6475	159.225			155.79
Hourse Mtn	uw loop	N Simulcast	100	155.6475	159.225	155.3175	158.985	154.74, 153.9050
Green Diamond	uw loop	N Simulcast	199	155.6475	159.225	155.3175	158.985	154.74, 153.9050, 151.19
Mt Pierce	uw loop	S Simulcast	100	155.5425	159.225	155.3175	158.985	154.74, 153.9050, 154.1150
Pratt Mtn	uw spur	S Simulcast	100	155.5425	159.225	155.3175	158.985	154.74, 153.9050
Orleans	UHF DVRS	DVRS	25	155.975	159.225			155.79, 155.8950
Sugar Pine Mtn	UHF DVRS	DVRS	80	155.5575	159.225	153.905	158.985	154.74, 153.9050
Shelter Cove	UHF DVRS	DVRS	120	155.5575	159.225			155.79
Unless otherwise noted, RFP suggested Fre								
Freqs identified by preliminary FCC DB search								
Current system Freq - can be reused based on the addendum								
Other Freq: 155.625								
154.8								

Below is the multicoupler/combiner plan at County Courthouse, Mount Pierce, and Pratt Mountain.

Table 1-5: Multicoupler/Combiner Plan

Transmit Frequencies	County CH	Mt. Pierce	Pratt Mtn.
Sheriff's Office Dispatch	154.74	154.74	154.74
District Attorney		154.115	
New Sheriff's Frequency	155.6475	155.5425	155.5425
New Public Works Frequency	155.3175	155.3175	155.3175
Receive Frequencies	County CH	Mt. Pierce	Pratt Mtn
Sheriff's Office Dispatch	155.79	155.79	155.79
District Attorney		154.87	
New Sheriff's Frequency	159.225	159.225	159.225
New Public Works Frequency	158.985	158.985	158.985

UHF Frequency Plan

UHF candidate frequencies that have been identified are provided in a table below. The DVRS links are duplex, and the site monitoring links are simplex. These are all Part 90 public safety channels above 450 MHz that returned no active incumbents within 81 miles of each site from the center frequency +/- 12.5kHz.

Table 1-6: UHF Candidate Frequencies

Frequency	Horse Mountain	Orleans Mtn	Sugarpine	Shelter Cove	Pratt
453.3563	TRUE		TRUE	TRUE	TRUE
453.3938	TRUE		TRUE	TRUE	TRUE
453.4	TRUE		TRUE	TRUE	TRUE
453.4063	TRUE	TRUE	TRUE	TRUE	TRUE
453.4563	TRUE	TRUE	TRUE	TRUE	TRUE
453.5813	TRUE		TRUE	TRUE	TRUE
453.6688	TRUE	TRUE	TRUE	TRUE	TRUE
453.7188	TRUE	TRUE	TRUE	TRUE	TRUE
453.725	TRUE	TRUE	TRUE	TRUE	TRUE
453.7313	TRUE	TRUE	TRUE	TRUE	TRUE
453.7375	TRUE	TRUE	TRUE	TRUE	
453.7438	TRUE	TRUE	TRUE	TRUE	
453.8688	TRUE		TRUE		
453.875	TRUE		TRUE		
453.8813	TRUE		TRUE		

NOTE: "TRUE" for a particular frequency denotes that there are no incumbents +/- 12.5kHz within 81 miles of the site defined in the column header.

1.5 RODGERS PEAK DVRS SITE

The Green Diamond site is not anticipated to be ready for system installation until the 2020 timeframe. In order to maintain some level of coverage in the northern part of the County during this interim period a DVRS is provided as an interim solution for Rodgers Peak. The DVRS will utilize the existing analog VHF frequencies, as well the existing VHF antenna. A UHF Yagi antenna will be installed for the APX4500 control station link. A UHF GTR8000 base station will be installed at Horse Mountain to complete the link back to the comparator.

There will be no site monitoring at Rodgers Peak as site monitoring equipment has not been included.

1.6 DISPATCH

The MCC7500 console provides full duplex operation. Console priority means that user audio is not repeated, and the console can take over the channel to speak over the user. When this occurs with a Motorola MCC7500 console, the user's inbound audio is still heard at dispatch while the console is heard by end users.

Console priority and full duplex at the DVRS sites is slightly different. When console priority occurs with a DVRS site, the local user's audio is repeated at the DVRS site, but it is not repeated at other sites. The DVRS user's audio is heard at

dispatch while the dispatcher's audio is repeated at all sites, except the originating DVRS. The operation is different because a DVRS repeats locally and relays the link via UHF to the main system.

MCC7500 console solution:

- 4 Operator Positions
- 1 Enhanced Instant Recall Recorder per operator position
- 4 Speakers per operator position
- 15 Radio Resources per operator position
- 5 Conventional Channel Gateway Low Density (4 ports)
- 1 Conventional Channel Gateway High Density (8 ports)

Logging can occur via connection to a CCGW or the local logging port on the dispatch operator position.

1.7 RADIO EQUIPMENT BY SITE

The following section provides a description of the equipment at each site type of site.

1.7.1 Project 25 and Analog Prime Sites

This conventional radio network design is supported by geographically redundant prime sites featuring the system's RF voting comparators to increase the system's overall fault tolerance & reliability. The prime sites feature all of the conventional multicast system's control equipment. County Courthouse and Mount Pierce have been selected to house the two geo-redundant prime sites. These locations were specifically chosen as both are provided with ring protection as part of the microwave system offering a greater level of reliability. A K1 core is also included, which consists of a conventional controller to facilitate switching between the conventional prime sites.

The conventional prime sites are each comprised of the following primary components:

- One (1) Backhaul Switch
- One (1) Site Router
- One (1) Site Switch
- One (1) Analog Conventional GRV 8000 Comparator
- One (1) P25/Digital Conventional GRV 8000 Comparator
- One (1) TRAK 8835 GPS Time/Frequency Reference
- Two (2) Co-Located GTR 8000 Base Radios
- One (1) SDM 3000 Remote Terminal Unit (RTU)

The geographically redundant architecture is primarily supported by the deployment of GRV 8000 comparators at the primary prime site and redundant units, supporting the same channels, at the backup prime site. In the event that connectivity to the primary prime site is lost or the primary comparator fails the redundant backup

comparator will automatically become active and resume comparator operation for its associated channel without user intervention.

Motorola's new GRV 8000 conventional comparators are provided to support the analog and P25/digital multicast channels. This comparator establishes IP based connections to the system's GTR 8000 base radios to acquire received audio from all base radios associated with each channel. Upon acquiring the received audio from each station, the GRV 8000 compares and combines the signal before redistributing it for transmission by the base stations to ensure the best audio quality is constantly provided to the system's subscribers. The GRV 8000 comparators are also responsible for coordinating the timing and transmissions of the GTR 8000 base radios to achieve proper phasing for simulcast transmissions.

1.7.2 Radio Site Equipment

The RF sites have all been designed to include the following primary components:

- One (1) Backhaul Switch
- One (1) Site Router
- One (1) Site Switch
- One (1) SDM 3000 RTU
- One (1) TRAK 8835 GPS Time/Freq Reference
- GTR 8000 Base Radios (Per Table 1-7 Indicated quantities)

Table 1-7: Summary of Radio Stations in the P25 and Analog System

Site	VHF GTR800	UHF GTR8000	50 Watt DVRS	10 Watt DVRS	Alarm Control Stn
County Courthouse	2				
Horse Mountain	2	3			2
Green Diamond	2				
Trinidad	1				
Mount Pierce	2				
Pratt Mountain	2	1			1
Sugarpine			2		1
Shelter Cove			1		1
Orleans Mountain				1	1
Rogders Peak			1		

Each of the radio sites feature Motorola's versatile GTR 8000 radio configured for analog or P25/digital operation and equipped with the required conventional simulcast software. The analog or P25/digital GTR 8000s will be programmed to communicate with their respective analog or P25 GRV 8000 comparator which in turn provide receive audio voting and coordinate simulcast transmissions to ensure proper timing/phasing is achieved to avoid destructive interference.

With the exception of County Courthouse, Pierce Mountain, and Pratt Mountain, sites featuring a single GTR 8000 will use a single channel duplexer, while the two (2) channel sites will use a two (2) channel duplexer. One (1) antenna with associated line and connectors has also been quoted to support each site's duplexer.

The County Courthouse, Pierce Mountain, and Pratt Mountain sites will use a transmitter combiner/receiver multicoupler scheme to accommodate additional channels as outlined in Section 1.4 above. Two (2) antennas with associated line and connectors has also been quoted to support each site's combiner and multicoupler.

Please see the system overview drawing for details regarding each location's multicast site equipment and its associated frequency plan.

1.7.3 DVRS Sites

In order to extend Humboldt County's coverage in the northern and southern portion of the county, DVRS sites are included in the design. These DVRS sites are connected via a UHF Backhaul.

The DVRS sites consist of:

- VHF Fixed-mount DVRS with duplex antenna system
- UHF APX4500 with Yagi antenna system
- UHF GTR800 located at a site with microwave for UHF Link (Horse Mtn or Pratt as noted in Table 1-6)
- UHF APX4500 with Yagi antenna system, and DTMF encoder alarm monitoring

Please see the system overview drawing for details regarding each location's standalone site equipment and its associated frequency plan.

1.7.4 Component Descriptions

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.

GRV 8000 Comparator

The GRV 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 or analog 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. This signal is then redistributed across the radio IP network to every connected base station for rebroadcasting.

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. The system primarily relies upon a compact single and dual channel VHF duplexers designed by Bird Technologies to meet Motorola's RF requirements. Duplexers allow transmitters and receivers to share a single antenna while also ensuring proper antenna isolation.

The isolation provided by Bird Technologies' 26-36H series duplexers exceed the minimum isolation that is required for repeaters. This eliminates the need to achieve transmit to receive antenna isolation through horizontal or vertical separation of the system's antennas. The 26-36H series duplexers also feature active receiver amplifier to bolster system receive performance.

This combining system is comprised of a special PIM-hardened multi-channel RF Combiner/Filter, special cavity-type window filter, and receive multicoupler.

The receiver multicoupler is a key element of a radio communications system, not only connecting the receivers onto a single antenna but even improving receiver sensitivity. Because the low noise amplifier (LNA) of the multicoupler is placed before all system receivers, it determines the ultimate sensitivity of the entire system.

RF Site Gateway

The Site Gateway provides an interface that handles all of the IP Network Management traffic between the conventional hub site and the remote RF Sites. 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 8835 Simulcast Site Reference

The equipment used to synchronize a simulcast system is the TRAK 8835 which is a Global Positioning Satellite (GPS)-based frequency and time reference unit. This model incorporates a 12 channel GPS receiver, disciplined oscillator and time and frequency signal generation in a small form factor enclosure.



TRAK 8835 Site Reference (SSR) unit provides the following outputs/features to meet the network time and network transport synchronization requirement of the Analog and Digital system:

- 10 MHz time reference.
- Composite (1pps/5MHz) time reference.
- GPS Referenced Time and Frequency.
- Stratum 1 Accuracy.
- Small Form Factor.
- 10/100 base-T Ethernet Port.
- Network Timer Sever.
- SNMP.
- 48VDC Power Input.

1.7.5 Site Monitoring Solution

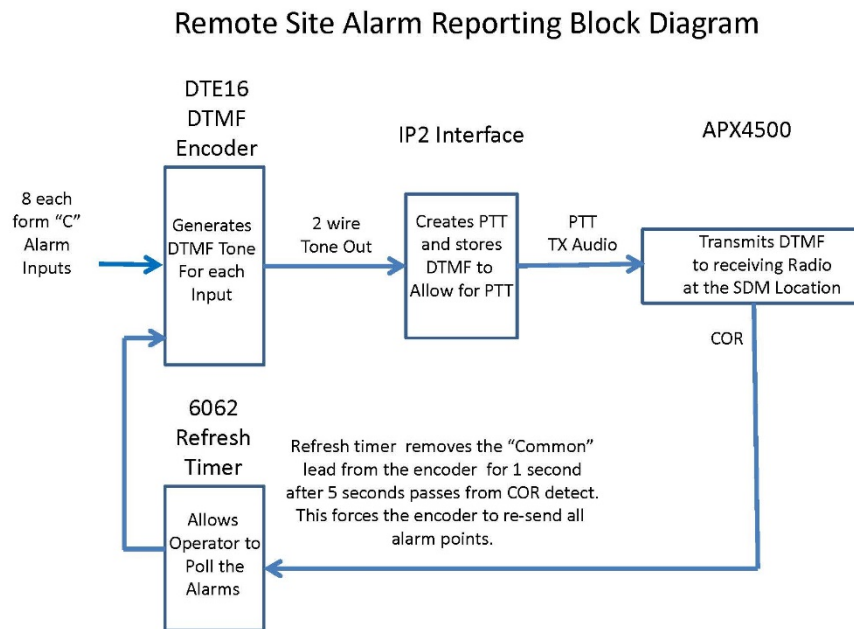
Motorola is providing its standalone UEM Lite based network fault management (NFM) system to monitor the RF equipment at each of the networked multicast system's sites. This solution offers an SNMP and relay-based monitoring system that is part of the full core/master site. The NFM system is primarily comprised of a server running the UEM Lite server application, an NFM workstation with the UEM Lite client, and six (6) SDM 3000 RTUs. One (1) SDM 3000 RTU will be deployed at each of the six (6) multicast system's sites and will be connected to the site switch to achieve network connectivity. The UEM Lite Server and NFM workstation will be located at the County Courthouse.

The UEM Lite applications provide users with a customizable graphical aggregation of the system's failures and provide the ability to "drill-down" to determine the details surrounding each fault. The standalone NFM system is capable of monitoring/reporting faults experienced by the site's network equipment and GTR 8000 base radios through SNMP management and is capable of monitoring additional

site equipment through physical relays. Licensing to provide email-based alarm notification has also been provided to support the NFM system.

Each SDM 3000 RTU is capable of capturing up to 48 relay-based alarms in addition to 8 analog based inputs. 16 separate output control relays can also be configured for use at each location. All physical relay-based connections are achieved through the use of three (3) punchblocks supplied for each site.

1.7.5.1 Monitoring at DVRS Sites



Alarm contact closures for existing equipment is to be provided by the County, and the alarm inputs need to be Form C.

The solution for monitoring sites with no microwave is a DTE-16 Plus DTMF encoder transmitting over UHF control station relay to a fixed site (i.e. Horse Mountain or Pratt Mountain). The alarms are decoded at the fixed site and connected to the SDM 3000 RTU inputs. The SDM 3000 RTU provides SNMP traps to the Unified Event Manager for centralized monitoring. The total number of alarms that can be monitored from a DVRS site are limited to 8. When an alarm is cleared at the site, the decoder is cleared, so only 8 alarm points can be used with a 16 DI/DO DTMF device.

DTE is a feature rich DTMF tone/sequence encoder that is user programmable to encode tone sequences up to 15 characters in length or a single tone via any one of 16

contact closure inputs and/or commands from the USB COM port. Each input may be programmed to generate a tone for the duration of the closure or tone burst immediately on command. A passive mixing network is provided to mix both program input audio and tone encoder audio if required. Programming is performed using a non-dedicated PC's USB port equipped with Windows HyperTerminal or PuTTY.

1.7.6 DC Power Systems

Motorola is using direct current (DC) at all of the RF site communications facilities, where applicable, to power the radio equipment, microwave equipment, and other critical site equipment. The power systems will be based on -48 Volt DC for power. The system will utilize LaMarche equipment at non-solar sites, which has proven successful in providing highly reliable power systems in mission-critical networks.

The RF remote site wireless communications facilities will remain fully operational in the event of a commercial power failure. This expectation is met by use of an emergency power design strategy that meets Humboldt County's requirements based on travel time and criticality of the sites. The backup battery time for each site is as follows:

- Pratt Mountain – 5 hours
- Horse Mountain – 5 hours
- Mt. Pierce – 5 hours
- Trinidad – 3 hours
- County Courthouse – 2 hours

The design also includes 20% additional capacity to account for future growth. Running a site on DC power with battery backup is the most efficient way to provide continuous power during the period of time between commercial power failure and when power can be restored, or when an alternative source of power can be supplied by a generator. It also reduces the power transients that potentially occur in other systems not "floated" on DC batteries during the small but critical milliseconds or seconds as standby power systems transfer and come on line.

County Courthouse and Mt. Pierce have a combination of DC and AC (alternating current) power requirements. At these sites N+1 inverters are included. These N+1 inverters are fault tolerant and convert -48 VDC power to standard 120 VAC power to power AC only devices.

Note that no power systems for Green Diamond and Shelter Cove are being provided for these sites as they are State controlled facilities and do not allow separate DC systems in them. Rodgers Peak is also not being provided with a power system as this site will only be used on an interim basis and will be vacated by this system once the Green Diamond site is fully operational.

Solar power equipment is provided for the Sugarpine site.

- Sugarpine - DVRS site (configured to use Motorola provided solar powered DC system with a 4 hour total runtime)
- Rodgers Peak – DVRS site (configured to use existing site solar power)
- Shelter Cove – DVRS site (configured to use site Owner provided AC power)
- Green Diamond – Simulcast site (configured to use site Owner provided DC power)
- Orleans/Shelton Butte - DVRS site (configured to use existing site solar power)

1.8 COVERAGE DESIGN OVERVIEW

The following design criteria was utilized for DAQ 3.4 95% reliability:

1. Project 25 Conventional Digital Portable Coverage.
2. Project 25 Conventional Digital Mobile Coverage.
3. Analog Mobile Coverage.

Coverage is designed for a portable worn on the hip (3 ft. height) in a swivel holster for the portable coverage, and a mobile with the antenna mounted in the center roof (5 ft. height) for the mobile coverage.

Motorola Solutions guarantees 95% reliability in the covered area shown on the included maps in Appendix 1. In order to demonstrate this guarantee, Motorola Solutions will perform a coverage test for the design as described in the Acceptance Test Plan (Exhibit C-4). If the sites or assumptions in the coverage design change, the coverage test will change accordingly.

1.8.1 System Parameters

The predicted coverage on the maps is based on the availability of the sites located at the coordinates specified in the below site locations with the antenna site equipment parameters shown below. The transmit site coordinates and antenna heights were verified against the information provided in the RFP and its addendums

The table below provides parameters for all sites.

Table 1-8: Sheriff Digital P25 Site Parameters.

Site Name	Group Name	Latitude	Longitude	Database Elevation (feet)	Mounting Height (feet)
County Courthouse	North Cell	40°48'11.18" N	124°9'43.7" W	39.3700788	120
Green Diamond	North Cell	41°10'16.05" N	124°3'46.37" W	1896.33	199
Horse Mountain	North Cell	40°52'27.09" N	123°44'0.84" W	4911.41733	100
Trinidad	North Cell	41°3'15.8" N	124°9'2.7" W	344.4881895	60
Mt Pierce	South Cell	40°25'2.3" N	124°7'13" W	3162.729664	100

Site Name	Group Name	Latitude	Longitude	Database Elevation (feet)	Mounting Height (feet)
Pratt Mountain	South Cell	40°7'13.5" N	123°41'35.76" W	3868.110242	100
Shelter Cove	DVRS	40°2'1.83" N	124°2'25.63" W	2014.435699	112
Orleans	DVRS	41°16'44.22" N	123°27'12.26" W	6177.82	30
Sugar Pine Mountain	DVRS	41°2'18.7" N	123°44'54.89" W	3815.616804	80

Table 1-9: Public Works Analog Site Parameters.

Site Name	Group Name	Latitude	Longitude	Database Elevation (feet)	Mounting Height (feet)
County Courthouse	Cell1	40°48'11.18" N	124°9'43.7" W	39.3700788	120
Horse Mountain	Cell1	40°52'27.09" N	123°44'0.84" W	4911.41733	100
Mt Pierce	Cell1	40°25'2.3" N	124°7'13" W	3162.729664	100
Pratt Mountain	Cell1	40°7'13.5" N	123°41'35.76" W	3868.110242	100
Green Diamond	DVRS	41°10'16.05" N	124°3'46.37" W	1896.33	199
Sugar Pine Mountain	DVRS	41°2'18.7" N	123°44'54.89" W	3815.616804	80

1.8.2 Subscriber Parameters

Portable antenna performance can vary widely depending on the type of antenna used and the location of the portable antenna on the user's body. Similarly, Mobile antenna performance can vary based the location of the antenna on the car or truck. The coverage maps included for portable and radios show the coverage predicted for portable and mobiles operation with the following configuration:

- The 6-Watt Motorola APX 6000 portable with a half wave flexible whip antenna located on the portable. The RF Subsystem was designed to utilize portable radios that are worn in a swivel holster at a height of three (3) feet for coverage and testing purposes. Both transmission and reception shall occur from this position using a remote speaker microphone.
- The 35-Watt Motorola APX 4500 mobile. The RF Subsystem was designed to utilize mobile transceivers mounted in the trunk of a typical sedan with a unity gain antenna mounted in the center of the roof at a height of five (5) feet for coverage and testing purposes.

Deviation from the specified portable/mobile antenna and/or configuration will result in a change of the coverage performance of the portable radio and may can the

coverage maps substantially. If the configuration of the portable/mobile and/or its antenna changes, Motorola will have to run coverage maps to determine the change in coverage performance.

1.8.3 RF LINK BUDGET (RFP SECTION 7.6.B.2.A)

It is critical to understand the gains and losses within the links, commonly referred to as the link budget. The following sections include the link budget for each Project 25 digital site and analog site. Humboldt County requested a 1dB difference in link budget between inbound/talk-in and outbound/talk-out. We have provided the raw link budgets because we recommend optimization of the link budgets after installation and measurement of the sites and noise.

1.8.3.1 Sheriff System Project 25 Digital Link Budget

The link budget data for each site in the proposed system Project 25 digital system is shown in following tables.

1.9 MICROWAVE AND UHF LINKS

The microwave and UHF links are designed with paper feasibility studies. Both the UHF links and microwave paths require a physical path survey prior to finalization of the path design. The UHF links may utilize an RF test to confirm the links have adequate signal margin with the obstructions in the path prior to finalization of the link design. The microwave design is based on the Nokia feasibility study, which is included as an appendix to the system description.

Motorola is providing the following for Humboldt County:

- 6 Hops – Backhaul Microwave Network – Wavence split-mount configuration
- Carrier-class reliability to support mission critical and reliable wireless data communications
- High spectral efficiency
- Modular scalability, all equipment proposed are modular and can be scaled
- Design that guarantees advanced queuing, QoS and low latency

The Nokia Wavence, new antennas, waveguide lengths, frequencies and RF bandwidth were used in the feasibility study as required. The feasibility study document provides a preliminary assessment to show, based on the information provided, that all links will meet the required availability as requested. The microwave feasibility study can be found in Exhibit C-1, Appendix 2 – Microwave Feasibility Study

The provided network will utilize the Nokia Wavence with a layer-2 Microwave Service Switch (MSS). The solution utilizes the high capacity and high system gain of the split-mount (MPT-XP-HQAM) and the Microwave Service Switch (MSS-8) providing a MEF 2 and MEF 8 Carrier Ethernet compliant solution. The Wavence radios are designed utilizing seven 6 GHz paths with one RF channel each at 64 to

2048 QAM providing up to 257 Mbps of traffic capacity utilizing adaptive modulation technology. Four of the paths are designed using 8032v2 ring switching to provide route protection for the core of the network. The hot-standby spurs off the ring provide equipment redundancy where route protection is not available. The Wavence MPT-XP-HQAM radio transceivers will interface directly with the MSS-8 in the case of a desired Layer 2 solution. The system capacity is scaled to the direction of 32 DS1's per site and Ethernet packet size of 1518-bytes IPv4 frame.

The Wavence system provided installs all indoor equipment in one seven-foot standard aluminum rack providing solutions for congested sites. When indoor equipment is used the Wavence offers the highest rack density permitting sixteen all in-door RF direction within one rack.

The Wavence solution consists of a combination of a radio unit — the Microwave Packet Transceiver (MPT) — and a networking unit — the Microwave Service Switch (MSS), both shown in the figure. Three segments are served: small cell backhaul, short-haul and long-haul. Several types of wireless cell site connection options are required to support mobile network capacity and coverage expansions. Nokia's Wavence solutions support a full suite of wireless frequency options including unlicensed 5.8GHz, for macro cell backhaul, 80 GHz millimeter wave (e-band) solutions for both macro and small cells, unlicensed 60 GHz millimeter wave (v-band) and sub-6 GHz solutions that are typically used to support the backhaul of small cells.

The Nokia Wavence product portfolio offers a comprehensive set of microwave solutions for short-haul, long-haul and small cell backhaul applications for telecom operators, public sectors and large enterprises. Based on a full packet architecture, it offers superior performance with its high radio density and unique multiservice link aggregation capability. This common transport of legacy TDM and Ethernet traffic positions the Wavence as the ideal product family to seamlessly support backhaul transformation to full packet and provide your network the capacity to evolve.

1.9.1 Microwave Links

The Nokia Wavence microwave network provides the communication links between the Green Diamond, County Court House, Trinidad, Horse Mountain, Mt Pierce and Pratt Mountain sites. Nokia Wavence microwave radio will be co-located at each site with the Motorola P25 simulcast radio. The Wavence microwave radio will be connected to the Motorola P25 base station via a Cat5e cable providing Ethernet connectivity. The Nokia Wavence network is organized into a 4 node ring with a two hop linear spur. The Wavence EAS v2 cards supporting Ethernet and radio connection located in the Microwave Service Switch (MSS-8) are used to offer two radio directions in the ring and hot standby radio connections for the linear spur. Ring sites are designed with G.8032 V2 Ethernet Ring Protection Switching protocol native to the radio which handles the switching to the opposite direction around the ring in the event of an equipment failure of the radio. All Wavence links proposed operate in the Lower 6 GHz band (5924-6425 MHz).

1.9.2 Microwave Link Protection

The Nokia Wavence microwave radio system provides redundancy at several levels. The main CPU/switch cards (Cor-Evo) located in the Microwave Service Switch (MSS-8) shelf are redundant at every site. The Cor-Evo protects one for one all features including the data plan and network management channel.

Ethernet cards (EAS v2) are used for the incoming Ethernet interface as well as the connections to the outdoor radios (MPT-HQAM). In the case of the ring, two cards are provided to support the two directions around the ring. In the case of a radio failure, the G.8032v2 protocol automatically switches traffic to the opposite direction around the ring. The ring switching is sub 50 ms. In the case of the hot standby and space diversity hot standby links, receivers in switch automatically and without errors.

Transmitters will automatically switch upon a failure detection in less than 50 msec. Also included in each MSS are redundant 32 DS1 interface cards. DS1 circuits from each DS1 card are connected to a protection panel. Decisions on which DS1 signal to take are based on decisions made by the Cor-Evo.

1.9.3 Microwave Functional Capabilities

The Wavence MPT-HQAM radios complies with the required operation range of -27 F to 131 F continuously without direct solar loading and up to 149 F for extended periods without solar loading. The indoor Microwave Service Switch (MSS-8) complies with the required operation from 23 F to 131 F in up to 93% humidity non-condensing. The MSS-8 operates from -40 F to 149 F in 95% relative humidity non-condensing.

1.10 SUBSCRIBERS

The following radio quantities are included with the system:

Sheriff's Office

- 135 APX 6000Li Model 2.5 Portable Radios
- 12 APX 1000 Portable Radios (for Court Bailiffs)
- 100 APX 4500 Mobile Radios
- 4 APX 4500 Control Stations
- 2 APX 7500 Consolettes

District Attorney's Office

- 13 APX 6000Li Model 2.5 Portable Radios
- 13 APX 4500 Mobile Radios

Probation

- 30 APX 6000Li Model 2.5 Portable Radios
- 30 APX 4500 Mobile Radios

Public Works (Supervisor radios)

- 43 APX 4500 Mobile Radios

1.10.1 APX™ 6000Li Project 25 Portable Radio

Motorola is providing the APX 6000Li Portable radio. Motorola designed the APX 6000Li fourth generation P25 portable with direct input from first responders. Engineered with high performance technology and utilizing innovative designs, the APX 6000Li provides users with an ergonomic and rugged device that delivers superior audio performance with real-time information in a smaller package. The APX 6000Li is easy to use, allowing personnel to focus on their job at hand, rather than the technology. In addition, the APX 6000Li equips first responders with the clearest audio of any Motorola portable on the market.

The APX 6000Li is Motorola's fourth-generation, P25 Phase 2 capable portable radio, created specifically for public-safety first responders who need to communicate on Project 25 systems. It offers outstanding performance in a compact, ruggedly reliable design, with the clearest audio of any Motorola portable on the market. The APX 6000Li improves public safety and emergency response times by incorporating innovative technology and design features developed based on direct input from first responder radio users

The T-Grip design offers a secure grip and easy handling. The full bitmap monochromatic LCD Top Displays allow users to quickly read messages at a glance, and a high-contrast color display screen ensures easy viewing in difficult lighting conditions or when viewing at an angle. The enhanced grooves of the Push-to-Talk (PTT) button allow users to easily locate by "touch."

Heavy-duty design features provides additional durability. The APX 6000Li meets Submersible IP67 standards. Additionally, the APX 6000Li will function even when immersed in water. Meets all applicable MIL-STD-810C, D, E, F and G standards for withstanding dust, heat, shock, and drops, making it the most reliable portable radio in any situation.

The APX 6000 comes in three different base configurations. These models include:

- Model 1.5 (Dual-Display and no keypad)
- Model 2.5 (Dual-Display with limited keypad)
- Model 3.4 (Dual-display with full keypad)

Motorola is providing the APX 6000Li Model 2.5

1.10.2 APX™ 1000 Project 25 Portable Radio

The APX 1000 provides a complete and complementary look and feel to the APX family of P25 radios. Engineered with a simplified control top to ensure ease of use, the APX 1000 is the ideal solution for local government and public works users who require quality P25 functionality.



The APX 1000 is an easy-to-use, reliable radio designed to keep radio users connected, providing them with P25 radio communications while adhering to a budget Humboldt County can afford. It provides users with a customizable radio in a simple, compact design, with the versatility to suit any type of radio user and the attributes of a high-quality Motorola portable radio.

The APX 1000's customizable feature set will provide Humboldt County's users with efficient communications while keeping costs down. Some of its standard features and benefits are identified below:

- **Economical Communications** – A reliable, simplified, and fully customizable P25 radio made to give your users the functionality they need within Humboldt County's budget. The APX 1000 portable radio operates on both on analog and Project 25 conventional systems, and supports a variety of software capabilities and feature sets.
- **Excellent Audio Qualities** –Coordination and communication efforts are intelligible in high-noise environments. Dual-sided two-microphone noise canceling technology ensures clear audio. An AMBE digital voice vocoder provides unmatched speed and voice quality, while reducing costs by requiring less data, memory and power consumption.
- **Uncompromising Design**– The APX1000 meets all applicable MIL-STD-810C, D, E, F and G standards for withstanding dust, heat, shock, and drops, making it the most reliable portable radio in any situation.
- **Simplified Controls** – The multifunction knob provides ease of use by combining volume, channel, and ON/OFF settings in one.

Motorola is providing Humboldt County the following model of APX 1000:

- Model 1.5 (Display and backlit keypad with 3 softkeys).

1.10.3 APX™ 4500 Project 25 Mobile Radio

Motorola is providing the APX 4500 Mobile Radio. The APX 4500 brings together powerful technology in a compact, rugged, budget-friendly mobile radio, providing seamless, secure interoperability to a wide variety of agencies and users. By providing a wide range of budget-friendly configuration options, the APX 4500 offers the functionality and security required by public works, public safety, and mission critical first responders. Its compatible APX 02 Control Head, easy installation, and durability ensure that users can be safely and effectively complete the mission at hand.



APX 4500 Mobile Radio

Motorola's APX 4500 offers a sophisticated feature set that meets the needs of public servants, including utilities and public works personnel, public safety, and first responders, while being easy on agency budgets. Some of its standard features and benefits are identified below:

- **Ergonomic Controls** - The compatible O2 Control Head with color display is easy to read and operate in all lighting conditions, from bright sunlight to dark streets. Intelligent lighting notifies users when the radio receives a call, an emergency arises, or when they are out of range. Enlarged multifunctional knobs allow radio users to easily adjust talkgroup and volume settings while wearing bulky gloves.
- **Easy to Install** -The APX 4500's simplified dash mount design makes installation quick and easy.
- **Ruggedized Construction** – Uncompromising durability and world-class quality enables the APX 4500 to withstand wet, dusty, and hazardous conditions. Its IP56 durability rating is the highest level of certification for mobile radios, and it meets applicable MIL-STD 810C, D, E, F, G standards.

1.10.4 APX™ 7500 Project 25 Console

Motorola is providing the APX 7500 Console for the Console Backup Control Stations. The APX 7500 Console provides a low-cost, mid-power wireless dispatch solution as an ideal complement to a modern P25 dispatch center. The APX 7500 Console can also be used as an emergency backup station when infrastructure is offline, or for wireless access to different system types for increased interoperability between agencies.

The APX 7500 Console's P25 operation and compatibility with legacy systems ensures that communications are clear, continuous, and coordinated across multiple users, agencies and systems.



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APPENDIX 1 – COVERAGE MAPS

The following coverage maps are included on the following pages:

1. REFERENCE 60 - Digital Portable Inbound - System Description
2. REFERENCE 61 - Digital Portable Outbound - System Description
3. REFERENCE 62 - Digital Portable Roundtrip - System Description
4. REFERENCE 63 - Digital Mobile Inbound - System Description
5. REFERENCE 64 - Digital Mobile Outbound - System Description
6. REFERENCE 65 - Digital Mobile Roundtrip - System Description
7. REFERENCE 66 - Analog Mobile Inbound - System Description
8. REFERENCE 67 - Analog Mobile Outbound - System Description
9. REFERENCE 68 - Analog Mobile Roundtrip - System Description



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Humboldt County, CA

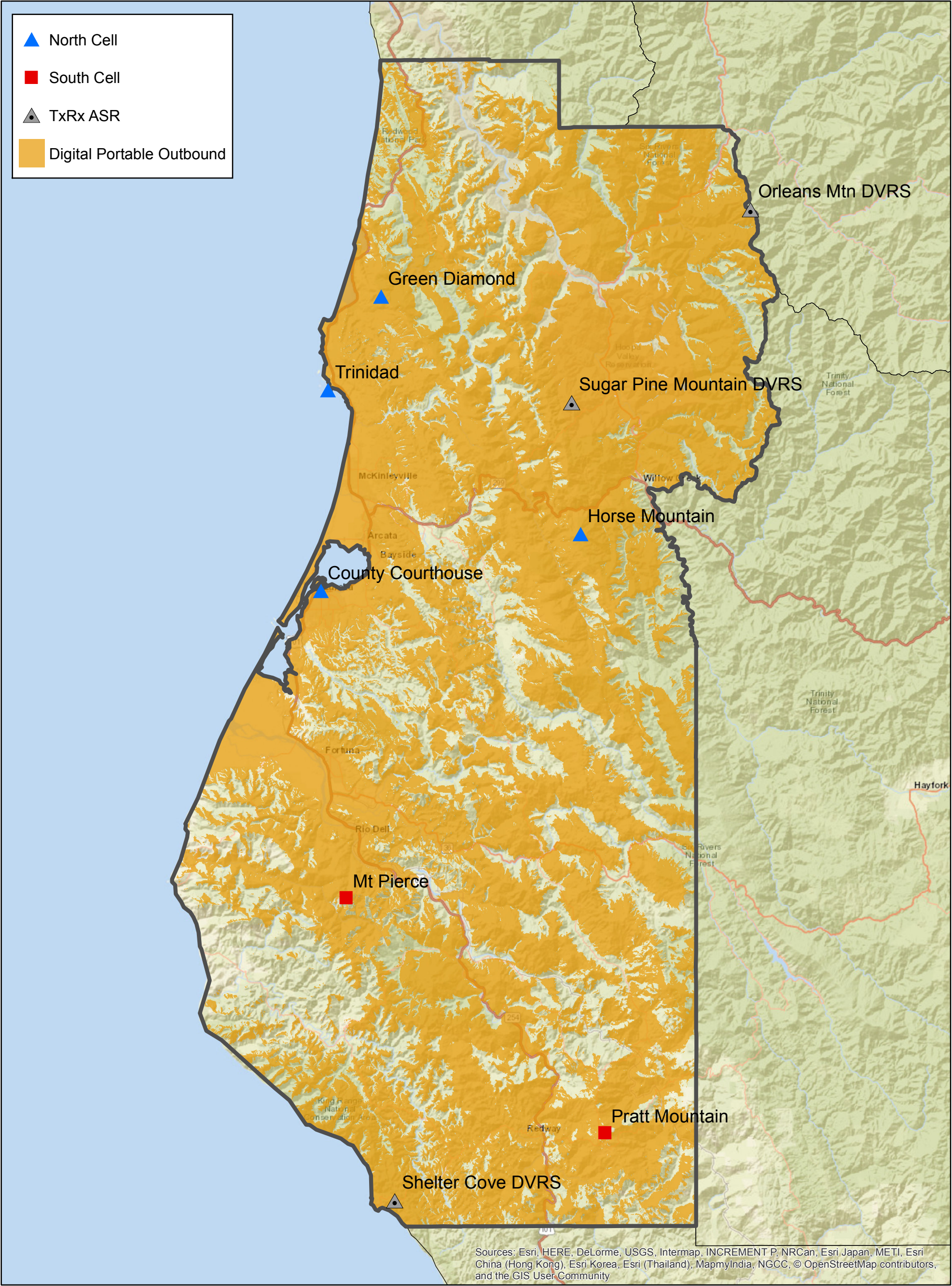
9-Site (2-Cell, 3-ASR) VHF Phase 1 (FDMA) P25 Simulcast System
Painted Area Represents 95% Covered Area Reliability at DAQ 3.4



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Humboldt County, CA

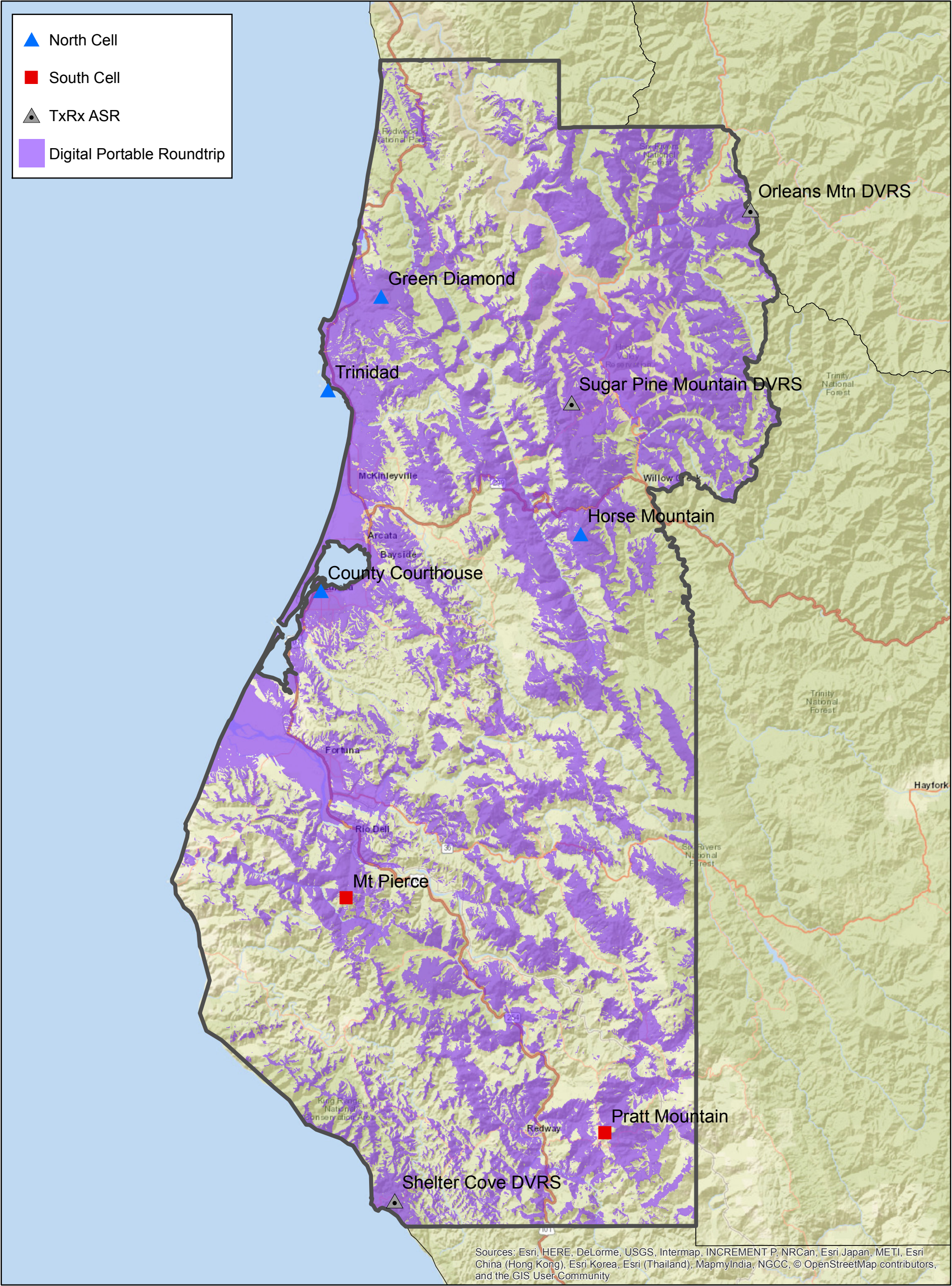
9-Site (2-Cell, 3-ASR) VHF Phase 1 (FDMA) P25 Simulcast System
Painted Area Represents 95% Covered Area Reliability at DAQ 3.4



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Humboldt County, CA

9-Site (2-Cell, 3-ASR) VHF Phase 1 (FDMA) P25 Simulcast System
Painted Area Represents 95% Covered Area Reliability at DAQ 3.4



0 3.25 6.5 13 Miles
1 in = 8 mile

Portable Configuration:
APX 6000 Portable, 6W
Tx/Rx at Hip in Swivel Case with Remote Speaker Mic
Wideband Antenna

CA - Humboldt County
Proposed Sheriff Digital
Design 172
DFRJ83

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Humboldt County, CA

9-Site (2-Cell, 3-ASR) VHF Phase 1 (FDMA) P25 Simulcast System
Painted Area Represents 95% Covered Area Reliability at DAQ 3.4



0 3.25 6.5 13 Miles
1 in = 8 mile

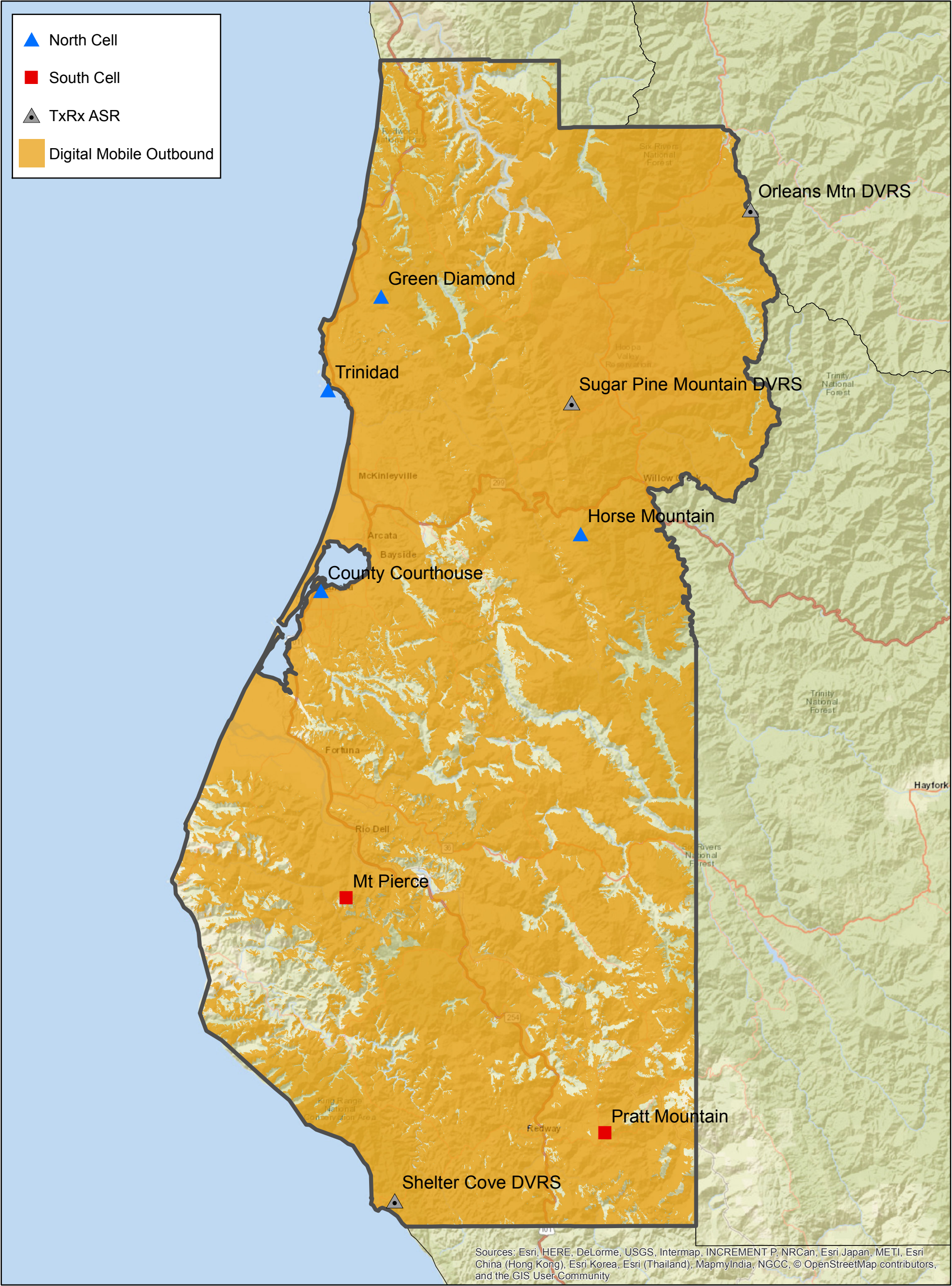
Mobile Configuration:
APX 4500 Mobile, 10W
Tx/Rx Roof Center Mount
1/4-Wave Dipole

CA - Humboldt County
Proposed Sheriff Digital
Design 172
DFRJ83

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Humboldt County, CA

9-Site (2-Cell, 3-ASR) VHF Phase 1 (FDMA) P25 Simulcast System
Painted Area Represents 95% Covered Area Reliability at DAQ 3.4



0 3.25 6.5 13 Miles
1 in = 8 mile

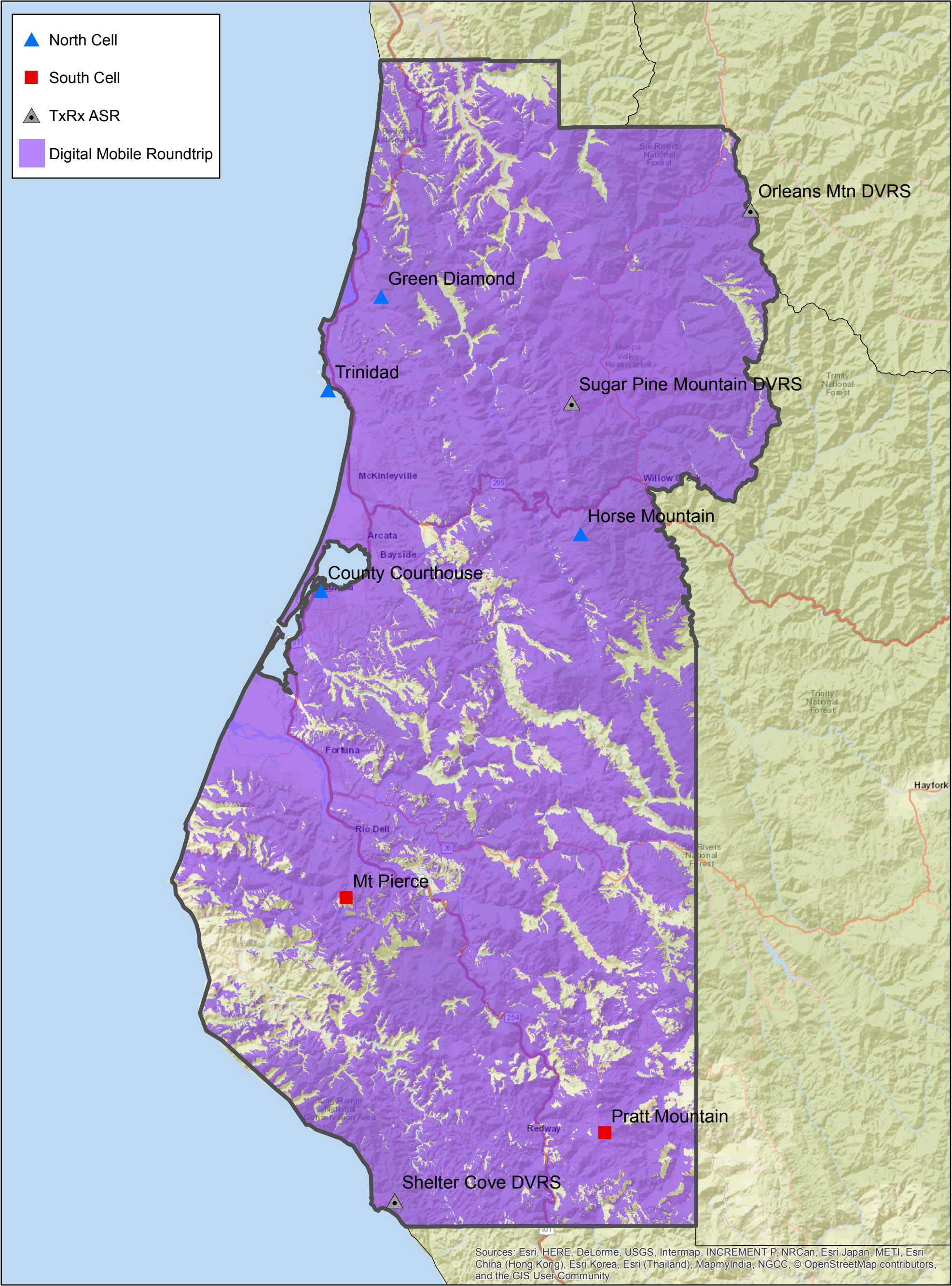
Mobile Configuration:
APX 4500 Mobile, 10W
Tx/Rx Roof Center Mount
1/4-Wave Dipole

CA - Humboldt County
Proposed Sheriff Digital
Design 172
DFRJ83

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Humboldt County, CA

9-Site (2-Cell, 3-ASR) VHF Phase 1 (FDMA) P25 Simulcast System
Painted Area Represents 95% Covered Area Reliability at DAQ 3.4



0 3.25 6.5 13 Miles
1 in = 8 mile

Mobile Configuration:
APX 4500 Mobile, 10W
Tx/Rx Roof Center Mount
1/4-Wave Dipole

CA - Humboldt County
Proposed Sheriff Digital
Design 172
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Humboldt County, CA

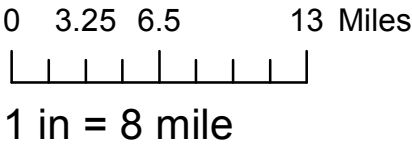
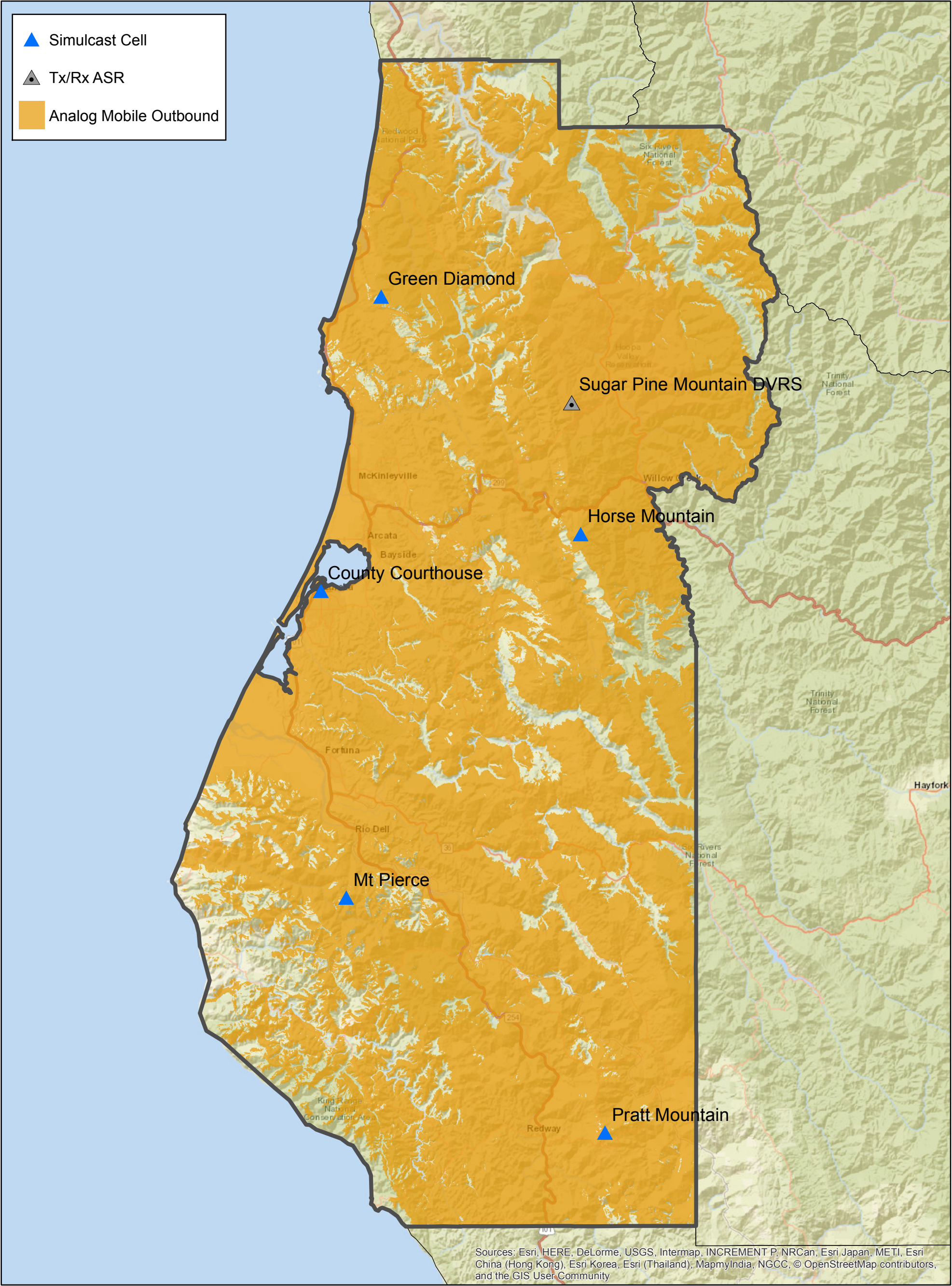
6-Site (Single Cell, 1-ASR) VHF Analog Simulcast System
Painted Area Represents 95% Covered Area Reliability at DAQ 3.0



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Humboldt County, CA

6-Site (Single Cell, 1-ASR) VHF Analog Simulcast System
Painted Area Represents 95% Covered Area Reliability at DAQ 3.0



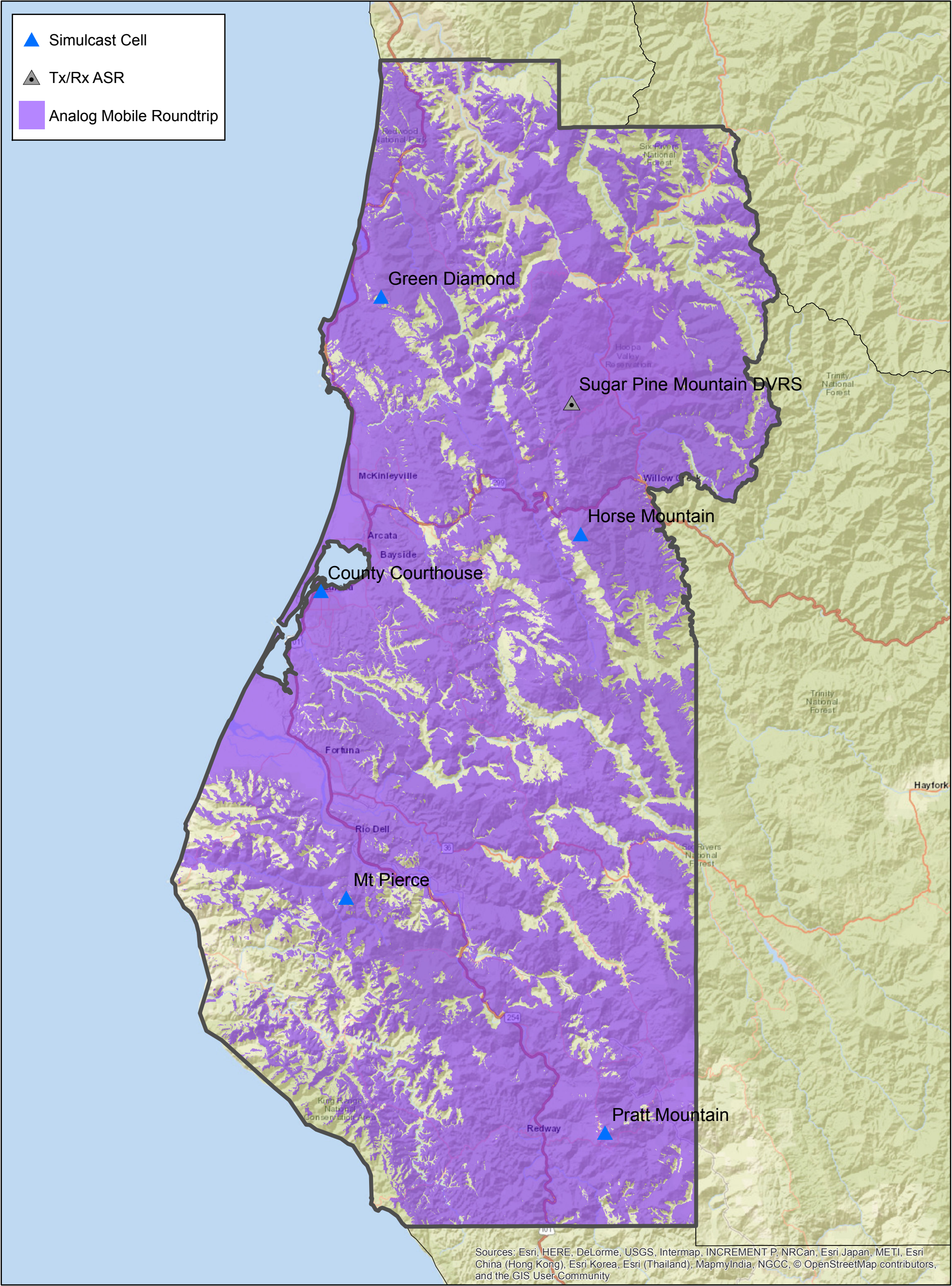
Mobile Configuration:
APX 4500 Mobile, 10W
Tx/Rx Roof Center Mount
1/4-Wave Dipole

CA - Humboldt County
Proposed PW Analog
Design 90
DFRJ83

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Humboldt County, CA

6-Site (Single Cell, 1-ASR) VHF Analog Simulcast System
Painted Area Represents 95% Covered Area Reliability at DAQ 3.0



0 3.25 6.5 13 Miles
1 in = 8 mile

Mobile Configuration:
APX 4500 Mobile, 10W
Tx/Rx Roof Center Mount
1/4-Wave Dipole

CA - Humboldt County
Proposed PW Analog
Design 90
DFRJ83

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APPENDIX 2 – MICROWAVE FEASABILITY STUDY

Microwave Feasibility Study is included on the following pages.



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Microwave System Feasibility Report

Motorola
Humboldt County Radio Upgrade

This report is intended to discover the feasibility of constructing a microwave system to meet the customer's needs as outlined to Nokia. It is based on customer supplied data unless noted otherwise. This information should be used solely to determine if a more formal engineering effort is worthwhile.

No equipment orders, site work, tower structural analysis, frequency coordination or similar activity should be based on this document.

This document was prepared by: Jody Hamilton
MW Transmission Engineer
Jody.Hamilton@Nokia.com
(972) 477-7057

Nokia
Wireless Transmission
Microwave Transmission Engineering
601 Data Drive
Plano, Texas, 75075

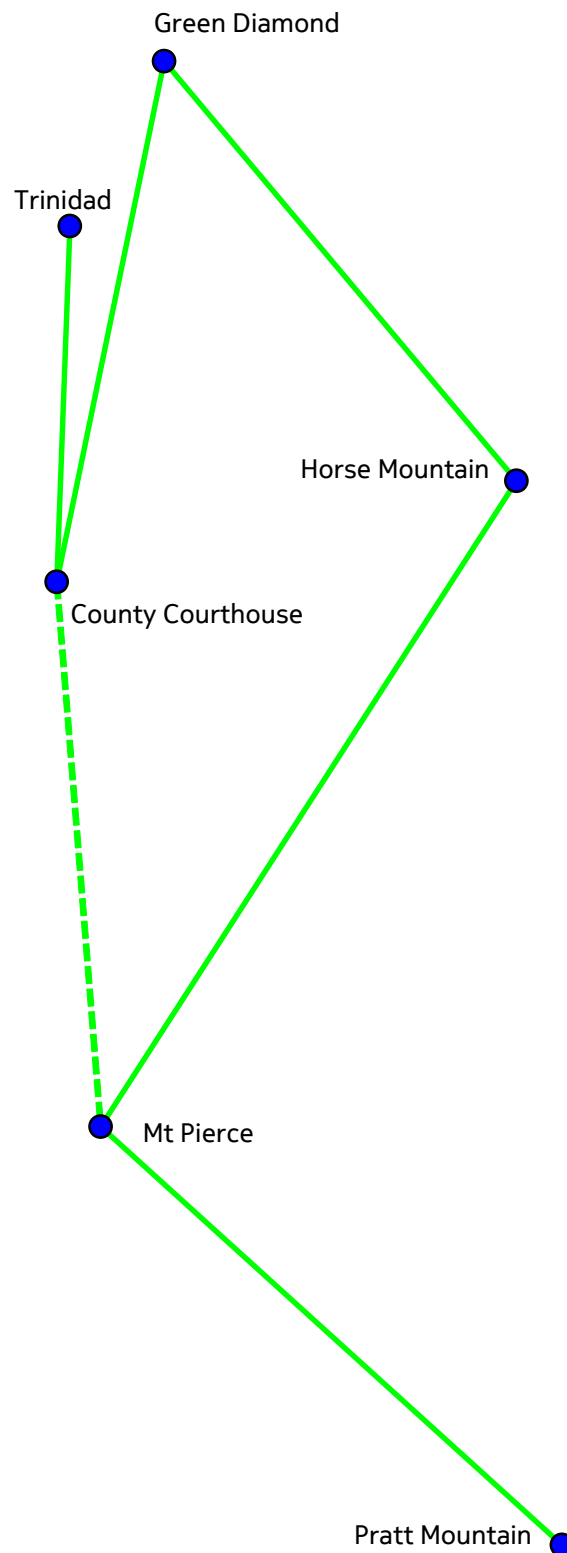
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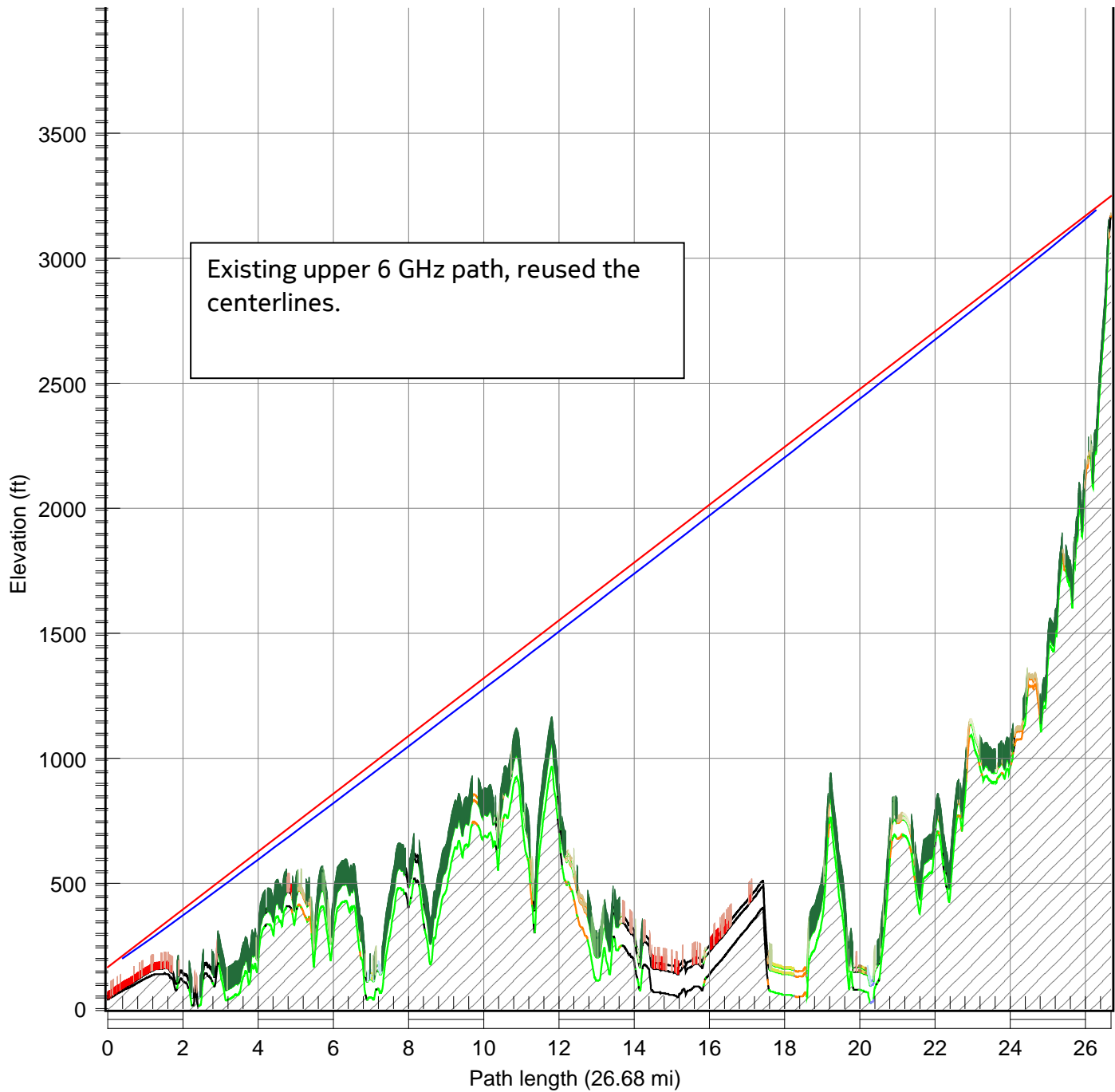
ENGINEERING NOTES

1.1 PATH DESIGN CRITERIA

- Site coordinates are from the customer. The site coordinates were assumed to be referenced to the North American Datum of 1983 (NAD83).
- The site elevations and profile data are taken from the USGS 10 m electronic terrain database. Obstructions are shown on the path based on the USGS 2011 NLCD database with assumed tree heights a total of 200 feet.
- The paths are designed for an average propagation area using a climate factor of 1.0.
- The main antenna clearance criteria are 1.0 F1 @ $K=4/3$ or 0.3 F1 @ $K=2/3$ depending on which one results in the high centerline. The path length and geometry typically decide the controlling clearance criteria.
- The paths are designed to a 2-way availability of 99.999% using the 10⁻⁶ bit error rate threshold. Additionally, paths are designed to meet a minimum fade margin consistent with the propagation region.

All designs should be considered preliminary until field surveys and frequency coordination has been completed. Until such time antenna centerlines, sizes and types are subject to change.



**County Courthouse**

Latitude 40 48 09.40 N
Longitude 124 09 43.20 W
Azimuth 175.26°
Elevation 44 ft ASL
Antenna CL 121.0 ft AGL

Frequency (MHz) = 6175.0

K = 1.00, 1.33

%F1 = 60.00

Mt Pierce

Latitude 40 25 02.30 N
Longitude 124 07 12.70 W
Azimuth 355.29°
Elevation 3171 ft ASL
Antenna CL 77.0 ft AGL

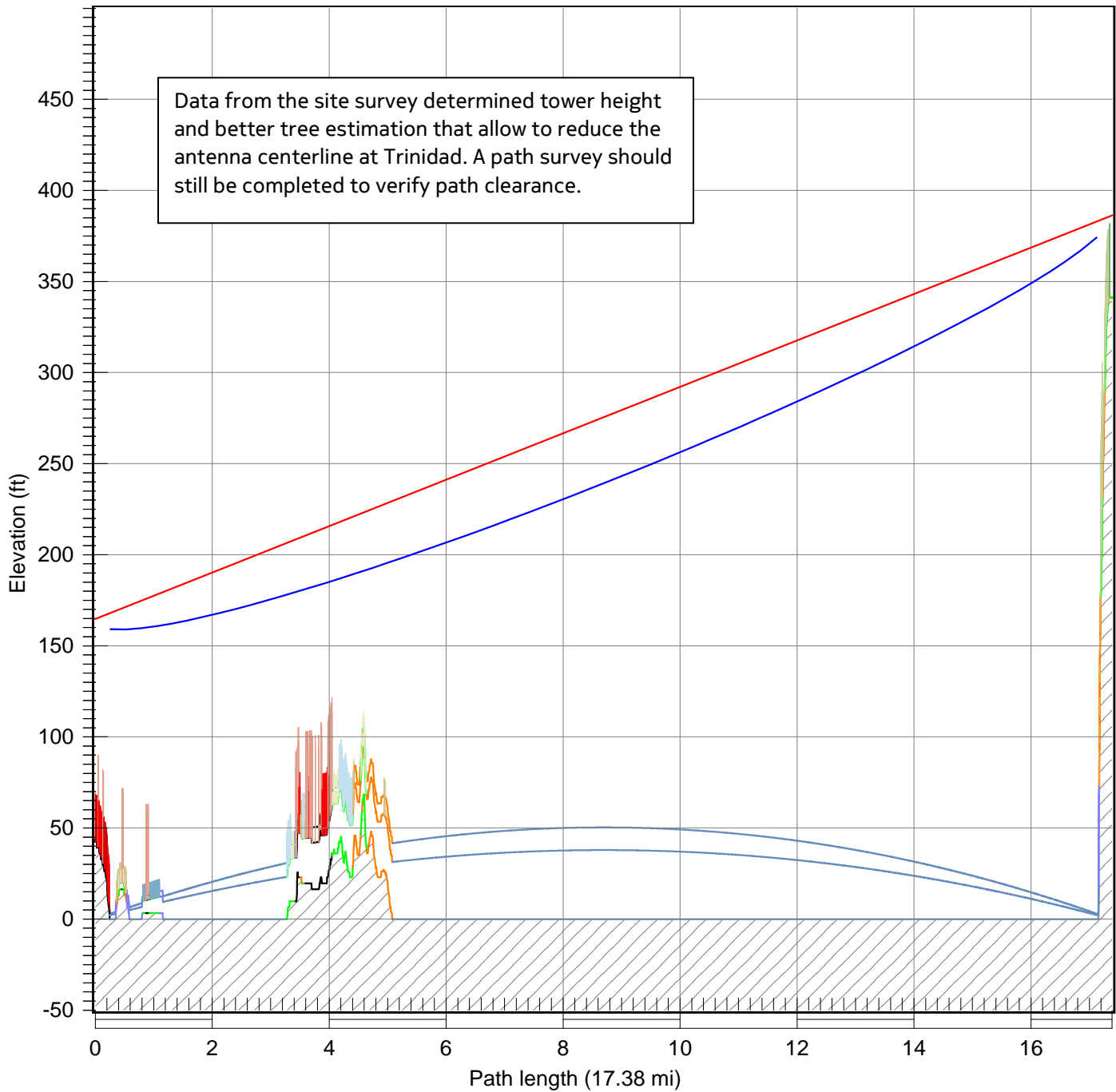
Transmission details (County Courthouse-Mt Pierce.pl5)

	County Courthouse	Mt Pierce
Call sign	KMN36	WQOP601
Latitude	40 48 09.40 N	40 25 02.30 N
Longitude	124 09 43.20 W	124 07 12.70 W
True azimuth (°)	175.26	355.29
Vertical angle (°)	1.11	-1.40
Elevation (ft)	43.64	3171.26
Tower height (ft)	120.00	80.00
Antenna model	SB 6 - W60 C (TR)	SB 6 - W60 C (TR)
Antenna gain (dBi)	39.40	39.40
Antenna diameter (ft)	6.00	6.00
Antenna height (ft)	121.00	77.00
TX line model	IFL	IFL
Frequency (MHz)	6175.00	
Polarization	Vertical	
Path length (mi)	26.69	
Free space loss (dB)	140.94	
Atmospheric absorption loss (dB)	0.37	
Net path loss (dB)	62.51	62.51
Configuration	NSB (1:0)	NSB (1:0)
Radio model	WVCE61-Q-2048A30S-257	WVCE61-Q-2048A30S-257
TX Power option	High	High
Emission designator	30M0D7W	30M0D7W
Climatic factor	1.00	
Terrain roughness (ft)	140.00	
C factor	0.26	
Average annual temperature (°F)	54.55	
Fade occurrence factor (Po)	7.693E-002	

	TX power (dBm)		RX threshold level (dBm)		EIRP (dBm)		Receive signal (dBm)		Thermal fade margin (dB)		Flat fade margin - multipath (dB)	
2048 257	26.00	26.00	-55.50	-55.50	65.40	65.40	-36.51	-36.51	18.99	18.99	18.99	18.99
1024 232	26.00	26.00	-59.00	-59.00	65.40	65.40	-36.51	-36.51	22.49	22.49	22.49	22.49
512 209	26.00	26.00	-63.00	-63.00	65.40	65.40	-36.51	-36.51	26.49	26.49	26.49	26.49
256 186	28.00	28.00	-65.00	-65.00	67.40	67.40	-34.51	-34.51	30.49	30.49	30.49	30.49
128 163	29.00	29.00	-68.00	-68.00	68.40	68.40	-33.51	-33.51	34.49	34.49	34.49	34.49
64 139	29.00	29.00	-71.00	-71.00	68.40	68.40	-33.51	-33.51	37.49	37.49	37.49	37.49
32 109	31.00	31.00	-74.00	-74.00	70.40	70.40	-31.51	-31.51	42.49	42.49	42.49	42.49
16 88	31.00	31.00	-76.50	-76.50	70.40	70.40	-31.51	-31.51	44.99	44.99	44.99	44.99
4 44	32.00	32.00	-87.50	-87.50	71.40	71.40	-30.51	-30.51	56.99	56.99	56.99	56.99

	Worst month multipath		Annual multipath		Annual rain		Total annual (2 way)	Time in mode (2 way)
2048 257	99.9028	99.9028	99.9735	99.9735			99.9470	99.9470
1024 232	99.9566	99.9566	99.9882	99.9882			99.9763	0.0293
512 209	99.9827	99.9827	99.9953	99.9953			99.9906	0.0142
256 186	99.9931	99.9931	99.9981	99.9981			99.9962	0.0057
128 163	99.9972	99.9972	99.9992	99.9992			99.9985	0.0023
64 139	99.9986	99.9986	99.9996	99.9996			99.9992	0.0007
32 109	99.9996	99.9996	99.9999	99.9999			99.9998	0.0005
16 88	99.9998	99.9998	99.9999	99.9999			99.9999	0.0001
4 44	99.9999	99.9999	99.9999	99.9999			99.9999	0.0001

Multipath fading method - Vigants - Barnett



County Courthouse	
Latitude	40 48 09.40 N
Longitude	124 09 43.20 W
Azimuth	1.94°
Elevation	44 ft ASL
Antenna CL	121.0 ft AGL

Frequency (MHz) = 6175.0
K = 1.00, 1.33
%F1 = 60.00

Trinidad	
Latitude	41 03 15.80 N
Longitude	124 09 02.70 W
Azimuth	181.94°
Elevation	341 ft ASL
Antenna CL	45.0 ft AGL

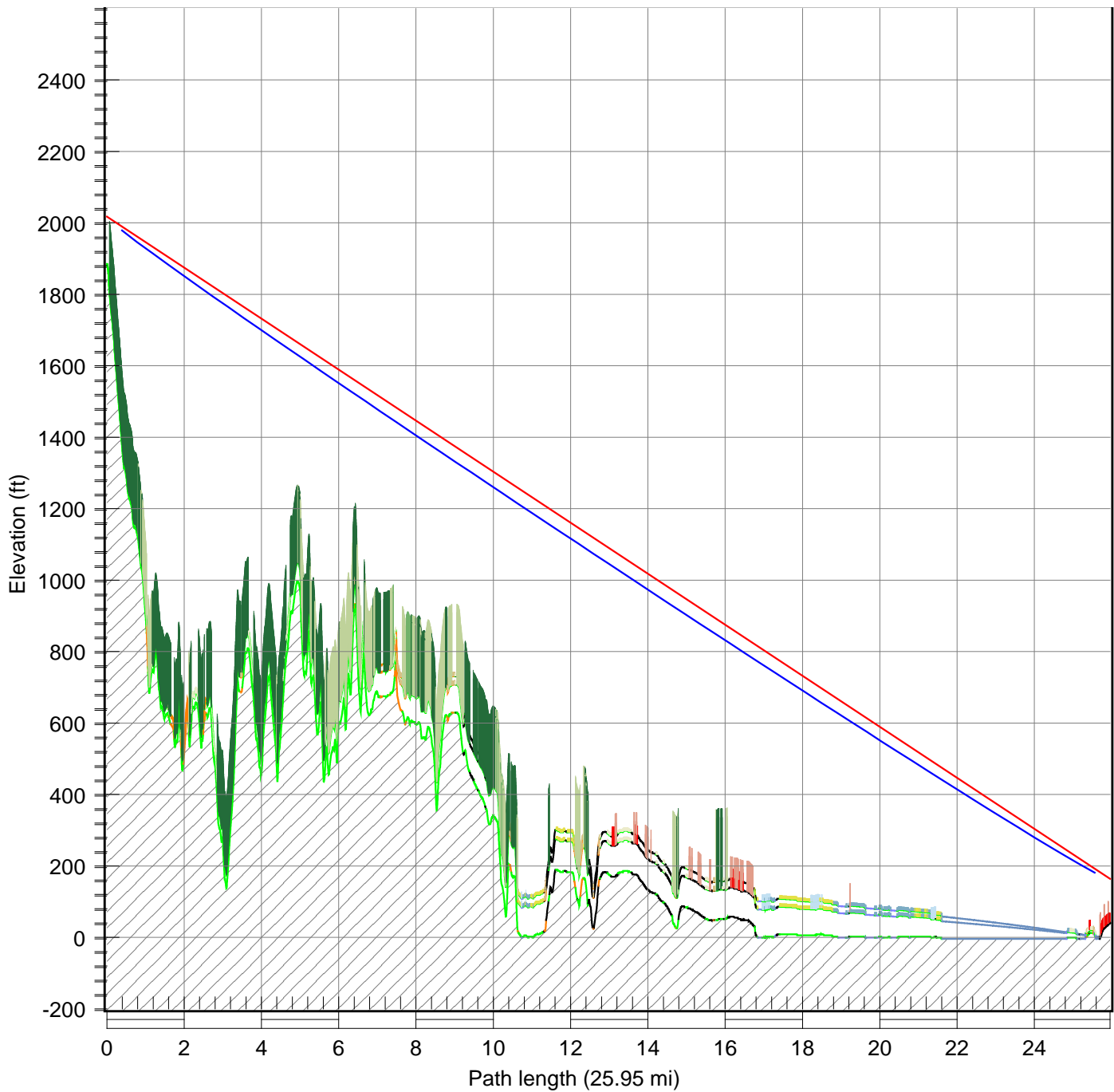
Transmission details (County Courthouse-Trinidad.pl5)

	County Courthouse	Trinidad
Call sign	KMN36	
Latitude	40 48 09.40 N	41 03 15.80 N
Longitude	124 09 43.20 W	124 09 02.70 W
True azimuth (°)	1.94	181.94
Vertical angle (°)	0.04	-0.23
Elevation (ft)	43.64	341.21
Tower height (ft)	120.00	60.00
Antenna model	SB 6 - W60 C (TR)	SB 6 - W60 C (TR)
Antenna gain (dBi)	39.40	39.40
Antenna diameter (ft)	6.00	6.00
Antenna height (ft)	121.00	45.00
TX line model	IFL	IFL
TX filter loss (dB)	1.30	1.30
RX filter loss (dB)	1.30	1.30
Frequency (MHz)	6175.00	
Polarization	Vertical	
Path length (mi)	17.38	
Free space loss (dB)	137.22	
Atmospheric absorption loss (dB)	0.24	
Net path loss (dB)	61.26	61.26
Configuration	HSB (1:10) Unequal Loss Couplers	HSB (1:10) Unequal Loss Couplers
Radio model	WVCE61-Q-2048A30S-257	WVCE61-Q-2048A30S-257
TX Power option	High	High
Emission designator	30M0D7W	30M0D7W
Climatic factor	1.00	
Terrain roughness (ft)	48.37	
C factor	1.04	
Average annual temperature (°F)	54.06	
Fade occurrence factor (Po)	8.468E-002	

	TX power (dBm)		RX threshold level (dBm)		EIRP (dBm)		Receive signal (dBm)		Thermal fade margin (dB)		Flat fade margin - multipath (dB)	
2048 257	26.00	26.00	-55.50	-55.50	64.10	64.10	-35.26	-35.26	20.24	20.24	20.24	20.24
1024 232	26.00	26.00	-59.00	-59.00	64.10	64.10	-35.26	-35.26	23.74	23.74	23.74	23.74
512 209	26.00	26.00	-63.00	-63.00	64.10	64.10	-35.26	-35.26	27.74	27.74	27.74	27.74
256 186	28.00	28.00	-65.00	-65.00	66.10	66.10	-33.26	-33.26	31.74	31.74	31.74	31.74
128 163	29.00	29.00	-68.00	-68.00	67.10	67.10	-32.26	-32.26	35.74	35.74	35.74	35.74
64 139	29.00	29.00	-71.00	-71.00	67.10	67.10	-32.26	-32.26	38.74	38.74	38.74	38.74
32 109	31.00	31.00	-74.00	-74.00	69.10	69.10	-30.26	-30.26	43.74	43.74	43.74	43.74
16 88	31.00	31.00	-76.50	-76.50	69.10	69.10	-30.26	-30.26	46.24	46.24	46.24	46.24
4 44	32.00	32.00	-87.50	-87.50	70.10	70.10	-29.26	-29.26	58.24	58.24	58.24	58.24

	Worst month multipath		Annual multipath		Annual rain		Total annual (2 way)	Time in mode (2 way)
2048 257	99.9198	99.9198	99.9783	99.9783			99.9566	99.9566
1024 232	99.9642	99.9642	99.9903	99.9903			99.9806	0.0240
512 209	99.9857	99.9857	99.9961	99.9961			99.9923	0.0117
256 186	99.9943	99.9943	99.9985	99.9985			99.9969	0.0046
128 163	99.9977	99.9977	99.9994	99.9994			99.9988	0.0019
64 139	99.9989	99.9989	99.9997	99.9997			99.9994	0.0006
32 109	99.9996	99.9996	99.9999	99.9999			99.9998	0.0004
16 88	99.9998	99.9998	99.9999	99.9999			99.9999	0.0001
4 44	99.9999	99.9999	99.9999	99.9999			99.9999	0.0001

Multipath fading method - Vigants - Barnett

**Green Diamond**

Latitude 41 10 16.05 N
Longitude 124 03 46.38 W
Azimuth 191.55°
Elevation 1887 ft ASL
Antenna CL 130.0 ft AGL

Frequency (MHz) = 6175.0

K = 1.00, 1.33

%F1 = 60.00

County Courthouse

Latitude 40 48 09.40 N
Longitude 124 09 43.20 W
Azimuth 11.49°
Elevation 44 ft ASL
Antenna CL 120.0 ft AGL

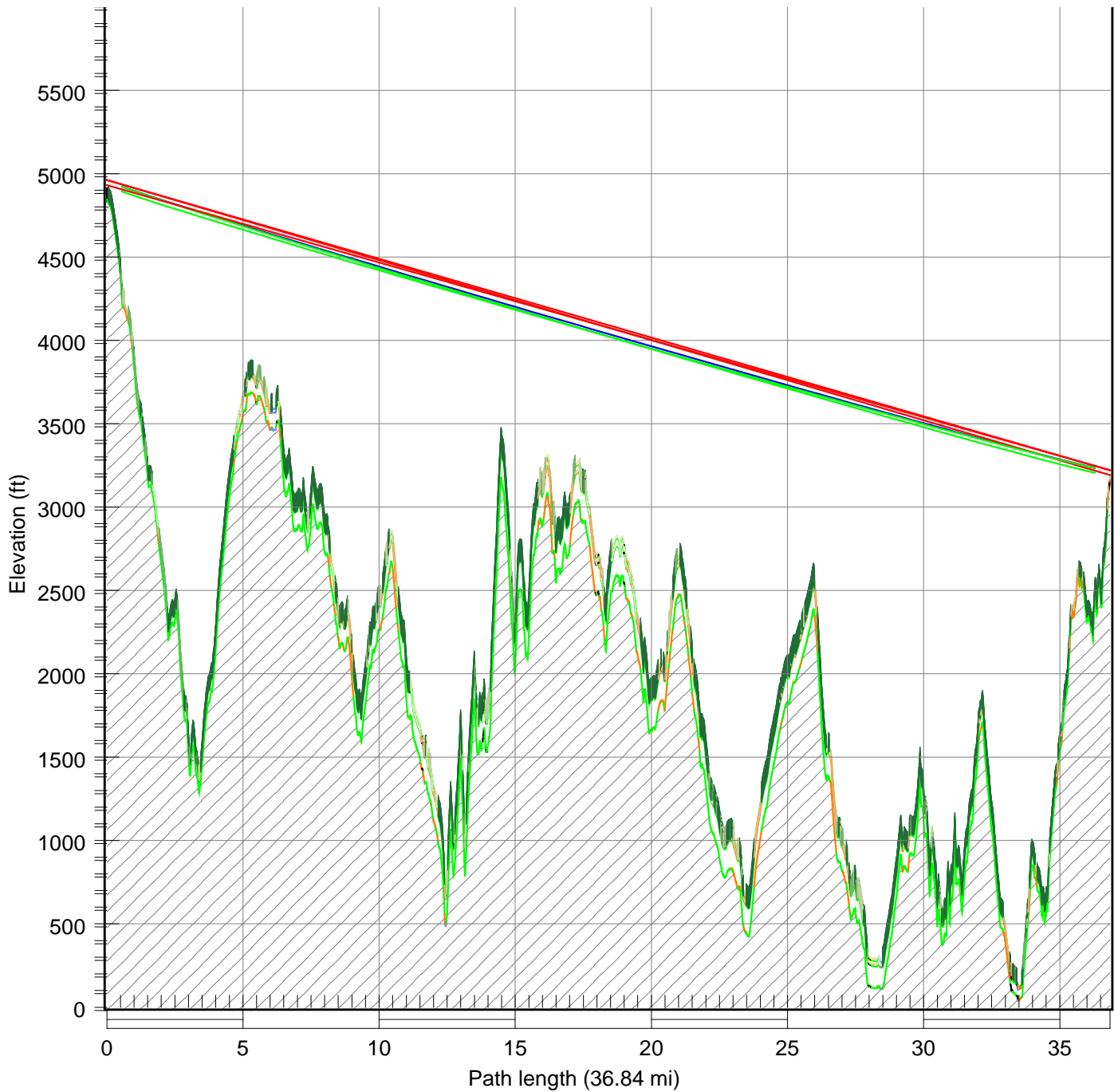
Transmission details (Green Diamond-County Courthouse.pl5)

	Green Diamond	County Courthouse
Call sign		KMN36
Latitude	41 10 16.05 N	40 48 09.40 N
Longitude	124 03 46.38 W	124 09 43.20 W
True azimuth (°)	191.55	11.49
Vertical angle (°)	-0.92	0.63
Elevation (ft)	1887.25	43.64
Tower height (ft)		120.00
Antenna model	SB 6 - W60 C (TR)	SB 6 - W60 C (TR)
Antenna gain (dBi)	39.40	39.40
Antenna diameter (ft)	6.00	6.00
Antenna height (ft)	130.00	120.00
TX line model	IFL	IFL
Frequency (MHz)	6175.00	
Polarization	Vertical	
Path length (mi)	25.96	
Free space loss (dB)	140.70	
Atmospheric absorption loss (dB)	0.36	
Net path loss (dB)	62.26	62.26
Configuration	NSB (1:0)	NSB (1:0)
Radio model	WVCE61-Q-2048A30S-257	WVCE61-Q-2048A30S-257
TX Power option	High	High
Emission designator	30M0D7W	30M0D7W
Climatic factor	1.00	
Terrain roughness (ft)	140.00	
C factor	0.26	
Average annual temperature (°F)	53.72	
Fade occurrence factor (Po)	7.079E-002	

	TX power (dBm)		RX threshold level (dBm)		EIRP (dBm)		Receive signal (dBm)		Thermal fade margin (dB)		Flat fade margin - multipath (dB)	
2048 257	26.00	26.00	-55.50	-55.50	65.40	65.40	-36.26	-36.26	19.24	19.24	19.24	19.24
1024 232	26.00	26.00	-59.00	-59.00	65.40	65.40	-36.26	-36.26	22.74	22.74	22.74	22.74
512 209	26.00	26.00	-63.00	-63.00	65.40	65.40	-36.26	-36.26	26.74	26.74	26.74	26.74
256 186	28.00	28.00	-65.00	-65.00	67.40	67.40	-34.26	-34.26	30.74	30.74	30.74	30.74
128 163	29.00	29.00	-68.00	-68.00	68.40	68.40	-33.26	-33.26	34.74	34.74	34.74	34.74
64 139	29.00	29.00	-71.00	-71.00	68.40	68.40	-33.26	-33.26	37.74	37.74	37.74	37.74
32 109	31.00	31.00	-74.00	-74.00	70.40	70.40	-31.26	-31.26	42.74	42.74	42.74	42.74
16 88	31.00	31.00	-76.50	-76.50	70.40	70.40	-31.26	-31.26	45.24	45.24	45.24	45.24
4 44	32.00	32.00	-87.50	-87.50	71.40	71.40	-30.26	-30.26	57.24	57.24	57.24	57.24

	Worst month multipath		Annual multipath		Annual rain		Total annual (2 way)	Time in mode (2 way)
2048 257	99.9156	99.9156	99.9773	99.9773			99.9546	99.9546
1024 232	99.9623	99.9623	99.9899	99.9899			99.9797	0.0251
512 209	99.9850	99.9850	99.9960	99.9960			99.9919	0.0122
256 186	99.9940	99.9940	99.9984	99.9984			99.9968	0.0049
128 163	99.9976	99.9976	99.9994	99.9994			99.9987	0.0019
64 139	99.9988	99.9988	99.9997	99.9997			99.9994	0.0006
32 109	99.9996	99.9996	99.9999	99.9999			99.9998	0.0004
16 88	99.9998	99.9998	99.9999	99.9999			99.9999	0.0001
4 44	99.9999	99.9999	99.9999	99.9999			99.9999	0.0001

Multipath fading method - Vigants - Barnett

**Horse Mountain**

Latitude 40 52 27.10 N
Longitude 123 44 00.86 W
Azimuth 212.93°
Elevation 4921 ft ASL
Antenna CL 40.0, 10.0 ft AGL

Frequency (MHz) = 6175.0

K = 1.00, 1.33

%F1 = 60.00, 60.00

Mt Pierce

Latitude 40 25 02.30 N
Longitude 124 07 12.70 W
Azimuth 32.68°
Elevation 3171 ft ASL
Antenna CL 50.0, 20.0 ft AGL

Transmission details (Horse Mountain-Mt Pierce.pl5)

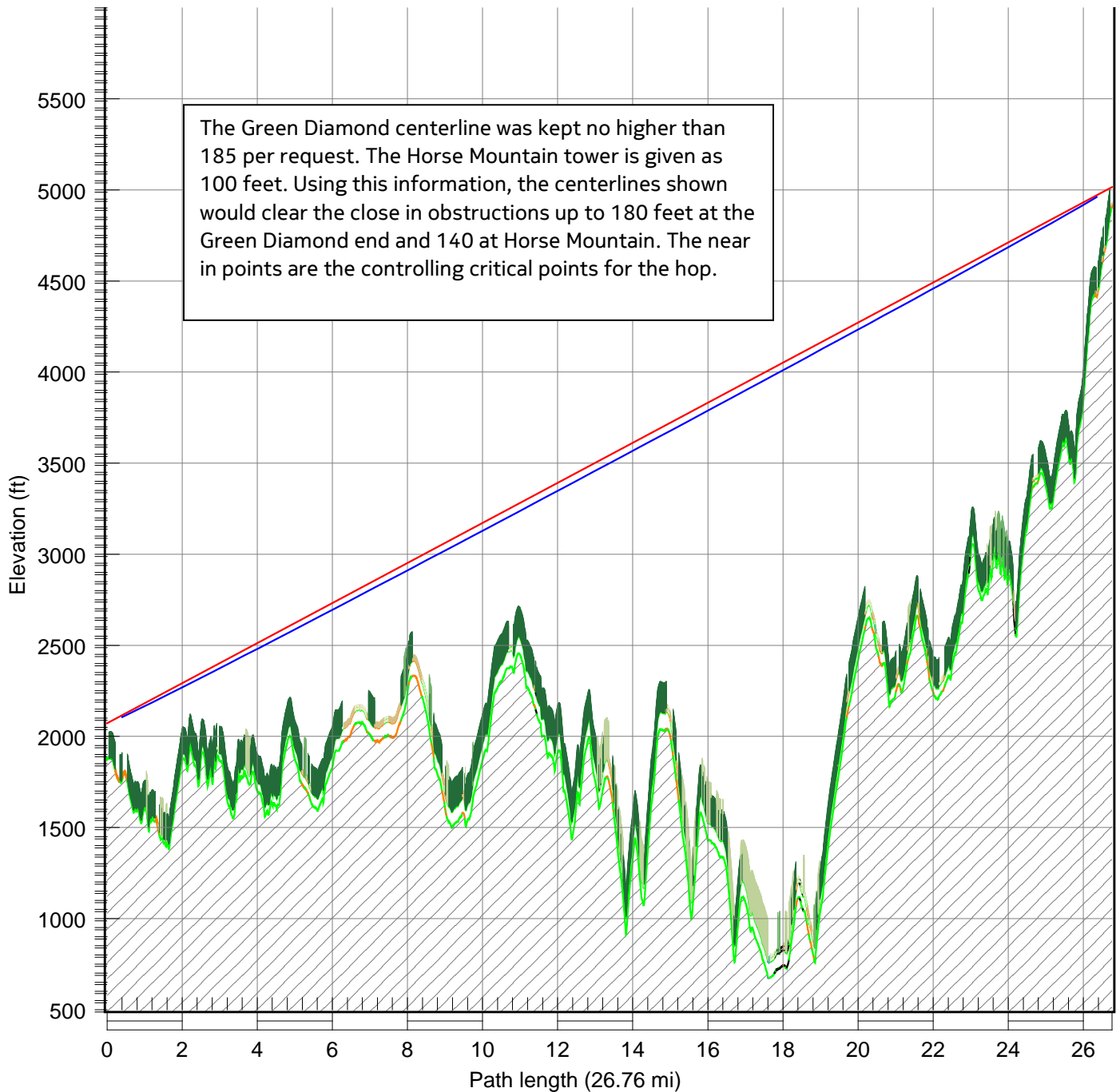
	Horse Mountain	Mt Pierce
Call sign	WNTS407	WQOP601
Latitude	40 52 27.10 N	40 25 02.30 N
Longitude	123 44 00.86 W	124 07 12.70 W
True azimuth (°)	212.93	32.68
Vertical angle (°)	-0.71	0.31
Elevation (ft)	4921.00	3171.26
Tower height (ft)	100.00	80.00
Antenna model	SB 6 - W60 C (TR)	SB 6 - W60 C (TR)
Antenna gain (dBi)	39.40	39.40
Antenna diameter (ft)	6.00	6.00
Antenna height (ft)	40.00	50.00
TX line model	IFL	IFL
Antenna model	SB 4 - W60C (DR)	SB 4 - W60C (DR)
Antenna gain (dBi)	35.70	35.70
Antenna diameter (ft)	4.00	4.00
Antenna height (ft)	10.00	20.00
TX line model	IFL	IFL
Frequency (MHz)	6175.00	
Polarization	Vertical	
Path length (mi)	36.85	
Free space loss (dB)	143.74	
Atmospheric absorption loss (dB)	0.51	
Main net path loss (dB)	65.45	65.45
Diversity net path loss (dB)	69.15	69.15
Configuration	HSB (1:1) SD	HSB (1:1) SD
Radio model	WVCE61-Q-2048A30S-257	WVCE61-Q-2048A30S-257
TX Power option	High	High
Emission designator	30M0D7W	30M0D7W
Climatic factor	1.00	
Terrain roughness (ft)	140.00	

	Horse Mountain	Mt Pierce
C factor	0.26	
Average annual temperature (°F)	53.50	
Fade occurrence factor (Po)	2.025E-001	
SD improvement factor	12.86	12.86

	TX power (dBm)		RX threshold level (dBm)		EIRP (dBm)		Receive signal (dBm)		Thermal fade margin (dB)		Flat fade margin - multipath (dB)	
2048 257	26.00	26.00	-55.50	-55.50	65.40	65.40	-39.45	-39.45	16.05	16.05	16.05	16.05
1024 232	26.00	26.00	-59.00	-59.00	65.40	65.40	-39.45	-39.45	19.55	19.55	19.55	19.55
512 209	26.00	26.00	-63.00	-63.00	65.40	65.40	-39.45	-39.45	23.55	23.55	23.55	23.55
256 186	28.00	28.00	-65.00	-65.00	67.40	67.40	-37.45	-37.45	27.55	27.55	27.55	27.55
128 163	29.00	29.00	-68.00	-68.00	68.40	68.40	-36.45	-36.45	31.55	31.55	31.55	31.55
64 139	29.00	29.00	-71.00	-71.00	68.40	68.40	-36.45	-36.45	34.55	34.55	34.55	34.55
32 109	31.00	31.00	-74.00	-74.00	70.40	70.40	-34.45	-34.45	39.55	39.55	39.55	39.55
16 88	31.00	31.00	-76.50	-76.50	70.40	70.40	-34.45	-34.45	42.05	42.05	42.05	42.05
4 44	32.00	32.00	-87.50	-87.50	71.40	71.40	-33.45	-33.45	54.05	54.05	54.05	54.05

	Worst month multipath		Annual multipath		Annual rain		Total annual (2 way)	Time in mode (2 way)
2048 257	99.4967	99.4967	99.8654	99.8654			99.7308	99.7308
1024 232	99.7752	99.7752	99.9399	99.9399			99.8797	0.1490
512 209	99.9122	99.9122	99.9765	99.9765			99.9530	0.0733
256 186	99.9861	99.9861	99.9963	99.9963			99.9926	0.0395
128 163	99.9978	99.9978	99.9994	99.9994			99.9988	0.0063
64 139	99.9994	99.9994	99.9999	99.9999			99.9997	0.0009
32 109	99.9999	99.9999	99.9999	99.9999			99.9999	0.0003
16 88	99.9999	99.9999	99.9999	99.9999			99.9999	0.0000
4 44	99.9999	99.9999	99.9999	99.9999			99.9999	0.0000

Multipath fading method - Vigants - Barnett



Green Diamond	
Latitude	41 10 16.05 N
Longitude	124 03 46.38 W
Azimuth	139.86°
Elevation	1887 ft ASL
Antenna CL	185.0 ft AGL

Frequency (MHz) = 6175.0
 K = 1.00, 1.33
 %F1 = 60.00

Horse Mountain	
Latitude	40 52 27.10 N
Longitude	123 44 00.86 W
Azimuth	320.08°
Elevation	4921 ft ASL
Antenna CL	95.0 ft AGL

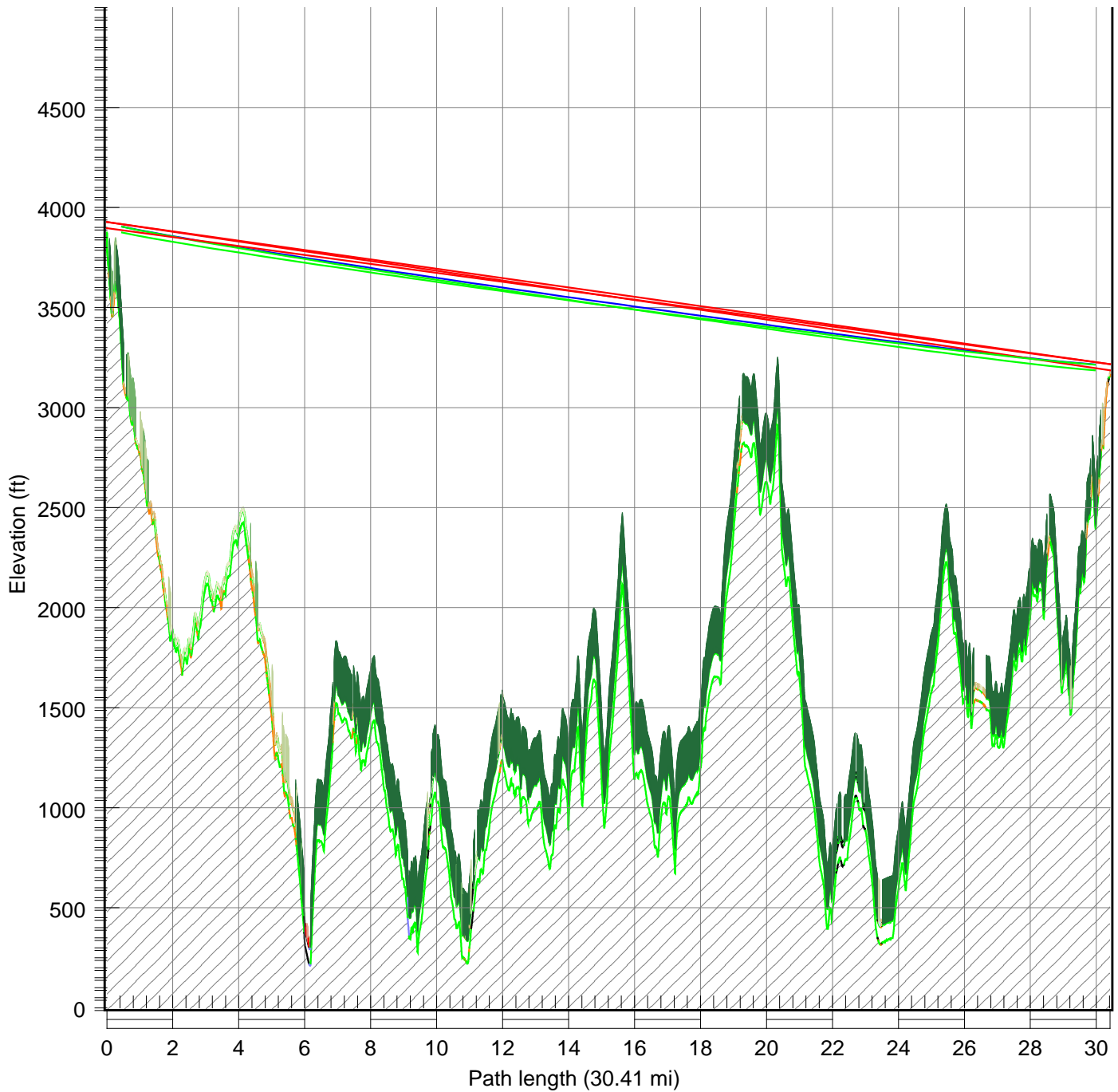
Transmission details (Green Diamond-Horse Mountain.pl5)

	Green Diamond	Horse Mountain
Call sign		WNTS407
Latitude	41 10 16.05 N	40 52 27.10 N
Longitude	124 03 46.38 W	123 44 00.86 W
True azimuth (°)	139.86	320.08
Vertical angle (°)	1.05	-1.34
Elevation (ft)	1887.25	4921.00
Tower height (ft)		100.00
Antenna model	SB 6 - W60 C (TR)	SB 6 - W60 C (TR)
Antenna gain (dBi)	39.40	39.40
Antenna diameter (ft)	6.00	6.00
Antenna height (ft)	185.00	95.00
TX line model	IFL	IFL
Frequency (MHz)	6175.00	
Polarization	Vertical	
Path length (mi)	26.77	
Free space loss (dB)	140.97	
Atmospheric absorption loss (dB)	0.37	
Net path loss (dB)	62.54	62.54
Configuration	NSB (1:0)	NSB (1:0)
Radio model	WVCE61-Q-2048A30S-257	WVCE61-Q-2048A30S-257
TX Power option	High	High
Emission designator	30M0D7W	30M0D7W
Climatic factor	1.00	
Terrain roughness (ft)	140.00	
C factor	0.26	
Average annual temperature (°F)	52.47	
Fade occurrence factor (Po)	7.765E-002	

	TX power (dBm)		RX threshold level (dBm)		EIRP (dBm)		Receive signal (dBm)		Thermal fade margin (dB)		Flat fade margin - multipath (dB)	
2048 257	26.00	26.00	-55.50	-55.50	65.40	65.40	-36.54	-36.54	18.96	18.96	18.96	18.96
1024 232	26.00	26.00	-59.00	-59.00	65.40	65.40	-36.54	-36.54	22.46	22.46	22.46	22.46
512 209	26.00	26.00	-63.00	-63.00	65.40	65.40	-36.54	-36.54	26.46	26.46	26.46	26.46
256 186	28.00	28.00	-65.00	-65.00	67.40	67.40	-34.54	-34.54	30.46	30.46	30.46	30.46
128 163	29.00	29.00	-68.00	-68.00	68.40	68.40	-33.54	-33.54	34.46	34.46	34.46	34.46
64 139	29.00	29.00	-71.00	-71.00	68.40	68.40	-33.54	-33.54	37.46	37.46	37.46	37.46
32 109	31.00	31.00	-74.00	-74.00	70.40	70.40	-31.54	-31.54	42.46	42.46	42.46	42.46
16 88	31.00	31.00	-76.50	-76.50	70.40	70.40	-31.54	-31.54	44.96	44.96	44.96	44.96
4 44	32.00	32.00	-87.50	-87.50	71.40	71.40	-30.54	-30.54	56.96	56.96	56.96	56.96

	Worst month multipath		Annual multipath		Annual rain		Total annual (2 way)	Time in mode (2 way)
2048 257	99.9013	99.9013	99.9741	99.9741			99.9482	99.9482
1024 232	99.9559	99.9559	99.9884	99.9884			99.9769	0.0287
512 209	99.9824	99.9824	99.9954	99.9954			99.9908	0.0139
256 186	99.9930	99.9930	99.9982	99.9982			99.9963	0.0055
128 163	99.9972	99.9972	99.9993	99.9993			99.9985	0.0022
64 139	99.9986	99.9986	99.9996	99.9996			99.9993	0.0007
32 109	99.9996	99.9996	99.9999	99.9999			99.9998	0.0005
16 88	99.9998	99.9998	99.9999	99.9999			99.9999	0.0001
4 44	99.9999	99.9999	99.9999	99.9999			99.9999	0.0001

Multipath fading method - Vigants - Barnett

**Pratt Mountain**

Latitude 40 07 16.50 N
Longitude 123 41 38.10 W
Azimuth 312.34°
Elevation 3882 ft ASL
Antenna CL 45.0, 15.0 ft AGL

Frequency (MHz) = 6175.0

K = 1.00, 1.33

%F1 = 60.00, 60.00

Mt Pierce

Latitude 40 25 02.30 N
Longitude 124 07 12.70 W
Azimuth 132.06°
Elevation 3171 ft ASL
Antenna CL 45.0, 15.0 ft AGL

Transmission details (Pratt Mountain-Mt Pierce.pl5)

	Pratt Mountain	Mt Pierce
Call sign	KNCR242	WQOP601
Latitude	40 07 16.50 N	40 25 02.30 N
Longitude	123 41 38.10 W	124 07 12.70 W
True azimuth (°)	312.34	132.06
Vertical angle (°)	-0.42	0.09
Elevation (ft)	3881.76	3171.26
Tower height (ft)	50.00	80.00
Antenna model	SB 6 - W60 C (TR)	SB 6 - W60 C (TR)
Antenna gain (dBi)	39.40	39.40
Antenna diameter (ft)	6.00	6.00
Antenna height (ft)	45.00	45.00
TX line model	IFL	IFL
Antenna model	SB 4 - W60C (DR)	SB 4 - W60C (DR)
Antenna gain (dBi)	35.70	35.70
Antenna diameter (ft)	4.00	4.00
Antenna height (ft)	15.00	15.00
TX line model	IFL	IFL
Frequency (MHz)	6175.00	
Polarization	Vertical	
Path length (mi)	30.42	
Free space loss (dB)	142.07	
Atmospheric absorption loss (dB)	0.42	
Main net path loss (dB)	63.70	63.70
Diversity net path loss (dB)	67.40	67.40
Configuration	HSB (1:1) SD	HSB (1:1) SD
Radio model	WVCE61-Q-2048A30S-257	WVCE61-Q-2048A30S-257
TX Power option	High	High
Emission designator	30M0D7W	30M0D7W
Climatic factor	1.00	
Terrain roughness (ft)	140.00	

	Pratt Mountain	Mt Pierce
C factor	0.26	
Average annual temperature (°F)	54.21	
Fade occurrence factor (Po)	1.139E-001	
SD improvement factor	23.37	23.37

	TX power (dBm)		RX threshold level (dBm)		EIRP (dBm)		Receive signal (dBm)		Thermal fade margin (dB)		Flat fade margin - multipath (dB)	
2048 257	26.00	26.00	-55.50	-55.50	65.40	65.40	-37.70	-37.70	17.80	17.80	17.80	17.80
1024 232	26.00	26.00	-59.00	-59.00	65.40	65.40	-37.70	-37.70	21.30	21.30	21.30	21.30
512 209	26.00	26.00	-63.00	-63.00	65.40	65.40	-37.70	-37.70	25.30	25.30	25.30	25.30
256 186	28.00	28.00	-65.00	-65.00	67.40	67.40	-35.70	-35.70	29.30	29.30	29.30	29.30
128 163	29.00	29.00	-68.00	-68.00	68.40	68.40	-34.70	-34.70	33.30	33.30	33.30	33.30
64 139	29.00	29.00	-71.00	-71.00	68.40	68.40	-34.70	-34.70	36.30	36.30	36.30	36.30
32 109	31.00	31.00	-74.00	-74.00	70.40	70.40	-32.70	-32.70	41.30	41.30	41.30	41.30
16 88	31.00	31.00	-76.50	-76.50	70.40	70.40	-32.70	-32.70	43.80	43.80	43.80	43.80
4 44	32.00	32.00	-87.50	-87.50	71.40	71.40	-31.70	-31.70	55.80	55.80	55.80	55.80

	Worst month multipath		Annual multipath		Annual rain		Total annual (2 way)	Time in mode (2 way)
2048 257	99.8110	99.8110	99.9488	99.9488			99.8976	99.8976
1024 232	99.9156	99.9156	99.9771	99.9771			99.9542	0.0567
512 209	99.9818	99.9818	99.9951	99.9951			99.9902	0.0359
256 186	99.9971	99.9971	99.9992	99.9992			99.9984	0.0083
128 163	99.9995	99.9995	99.9999	99.9999			99.9998	0.0013
64 139	99.9999	99.9999	99.9999	99.9999			99.9999	0.0002
32 109	99.9999	99.9999	99.9999	99.9999			99.9999	0.0001
16 88	99.9999	99.9999	99.9999	99.9999			99.9999	0.0000
4 44	99.9999	99.9999	99.9999	99.9999			99.9999	0.0000

Multipath fading method - Vigants - Barnett



MICROWAVE PATH ENGINEERING WARRANTY

FEASIBILITY STUDIES

Nokia provides feasibility studies of microwave radio paths in support of bidding efforts or when purchased by the Customer. Feasibility studies are performed using information provided by or on behalf of the Customer. Results of the feasibility study are provided to the Customer and may include (i) a system map, (ii) a path profile, (iii) path performance calculations, and (iv) a technical report.

Feasibility studies are preliminary in nature and are not intended to represent a final design. Therefore no representations, warranty or guarantee is implied or provided. Customer agrees to assume all risks associated with installing any equipment based on spiderweb maps, preliminary network and system maps, preliminary path profiles (including antenna size and location), path calculations (estimated performance), Google Earth, and topology studies normally presented with a feasibility study.

PATH SURVEYS (DETAILED SURVEY WITH REPORT)

Nokia offers detailed path surveying services to determine or verify site coordinates, site access, location, ground elevation, on-path obstruction location and height, tower information, proposed antenna centerline information, and other parameters required to engineer and implement a microwave radio link. The present and anticipated future effect of observable on-path obstructions, such as vegetation and buildings, are also evaluated and incorporated into the path design where applicable. Where appropriate, roof top access may be utilized in the survey effort. Existing towers are not climbed as a part of this activity.

The results of the path survey are documented and presented in a formal survey report or technical report, as required, to the Customer. Some items performed and included in a formal survey report may include: site location map, site topographic map, access information, site plot plans, existing tower elevation profile, site photographs, site and path observations, path terrain feature descriptions, critical point data, engineering notes, path profiles, and proposed performance calculations.

For detailed Path Surveys, Nokia warrants that geodetic coordinates are accurate to within +/- 1- second of latitude, +/- 1-second of longitude, ground elevations are accurate to within +/- 1 meter, and that heights of identified on-path obstructions at critical points are accurate to within 5-feet. Nokia warrants only the actual paths surveyed.

LINE OF SIGHT SURVEYS (LOS - CLEARANCE VERIFICATION)

Nokia offers a simplified microwave path survey service (from that described above) to determine "line of sight" (LOS) and adequate clearance conditions exist for a planned microwave link. This survey approach is best suited for urban and suburban environments. It can include driving the path as done in a traditional path survey, flashing the path, mirrors, or binoculars methodology. The line of sight survey may also ascertain site coordinates, site access and location, ground elevation, on-path obstruction location and height, tower information, proposed antenna centerline information, and other basic parameters required to

evaluate and design a microwave radio link. The present and anticipated future effect of observable onpath obstructions, such as existing vegetation and existing buildings, are evaluated and incorporated into the path design where applicable and appropriate. Where appropriate, roof top access may be utilized in the survey effort. Existing towers are not climbed as a part of this activity.

For line of sight (LOS) surveys, Nokia warrants that geodetic coordinates are accurate to within +/- 1-second of latitude, +/- 1-second of longitude, and ground elevations are accurate to within +/- 1 meter. Nokia warrants only the actual paths surveyed.

PATH DESIGN

Nokia offers path design services. Path design services are based on formal field survey data gathered by Nokia path surveyors and is warranted. Path designs include profiling a path to determine antenna centerline requirements, and path calculations to determine the antenna and radio types necessary to meet the Customer's microwave link performance and availability objectives. Recommended antenna centerlines are determined for a range of K-factors expected to occur during an average year and by the Fresnel zone clearance criteria stipulated by Bell Laboratories. For areas where poor propagation conditions are known to exist, paths are assessed for susceptibility to obstruction fading outages using the Bell Laboratories Obstruction Fading (OBSFAD) model. Additionally, paths are analyzed for ground-based reflections.

Microwave link availability (path availability) is evaluated using current North American industry accepted models for predicting outage times and diversity improvement factors associated with normal atmospheric multipath fading (flat and dispersive), rain fading, and obstruction fading. Every effort is made by Nokia to anticipate the probable occurrence of abnormal propagation conditions based on historical documentation, experience, geographical location, and field survey data.

The final path design documentation will include one or more of the following, depending on the services purchased by the Customer: (i) a system map, (ii) a final path profile, (iii) final path performance calculations, and (iv) a technical report.

If a radio path using Nokia equipment is installed based on Nokia's recommended path design, then Nokia warrants the radio path calculations shall conform to the Customer's availability objective for normal atmospheric multipath fading. Nokia will not be held responsible for excessive outages or degraded performance due to abnormal fading conditions. Abnormal fading conditions include, but are not limited to:

Formation of extreme radio refractivity gradients associated with:

- Exceptionally large temperature inversions
- Abnormal temperature/humidity layers
- Fog formation
- Signal trapping caused by surface or atmospheric ducting

Reflections from unusual or unidentifiable on-path or off-path terrain features, physical structures, or atmospheric layers.

Rain fading due to rainfall rates that are in excess of the published rates or charts used to predict rain induced outages.

If Nokia suspects that abnormal propagation conditions are the cause of degraded system performance, Nokia will assist the Customer in verifying the conditions leading to the degraded system performance. After the problem has been identified, Nokia will support the Customer in identifying possible solutions to the problem and assess the incremental improvement expected from corrective actions. Any Implementation of corrective action to remedy this type of problem shall be the sole responsibility of the Customer.

FREQUENCY PLANNING

Nokia offers frequency planning services including frequency selection, prior coordination process, interference case resolution, and FCC license application documentation preparation and submittal. Nokia warrants that the interference studies will be conducted using industry-accepted North American methods, hardware, software and algorithms; and that the frequency database will be maintained as accurately as possible at the time of the study. Nokia will not be held responsible for interference cases that arise due to errors or omissions in the database. Upon completion of the frequency planning services, some or all of the following documentation is provided to the Customer:

- Prior Coordination Notice
- Frequency Coordination Data Sheet
- Supplemental Showing pursuant to FCC Rules Part 101.103(d)
- Completed FCC Form 601 License Application and Preparation

In the event harmful frequency interference is detected during the implementation of a microwave line in which Nokia provided the frequency planning services, Nokia's total liability is limited to selection of an alternate frequency or frequencies. Should harmful interference occur after the microwave link is deemed operational and accepted, corrective action is the sole responsibility of the Customer.

WARRANTY

Nokia warrants its path surveys and path designs to be substantially free of engineering defects and errors for a period of 12 months from the date of delivery of the study to the Customer. Nokia warrants its line of sight surveys to be substantially free of engineering defects and errors for a period of 6 months from the date of delivery of the study to the Customer. Nokia warrants its frequency planning and Form 601 License Application preparation to be substantially free of engineering defects and errors for a period of 6 months from the date the path was prior coordinated. Except as further limited above, in the event of a proven breach of warranty, the Customer's sole remedy under this warranty shall be that Nokia will provide the incremental labor and material beyond what would have been required during initial installation to correct for the particular error in the path survey or path design. In no case shall Nokia be held liable for any indirect damages including but not limited to incidental, consequential or loss of capital, data, revenue or profit. In the event that such error is not solely and directly related to Nokia's path engineering efforts, expenses for such labor and material shall be borne by the Customer.

APPENDIX 3 – LINK BUDGETS

Link budgets are included on the following pages.



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DIGITAL MOBILE LINK BUDGETS - APX4500

County Courthouse			Base TX Antenna Height (ft) / Az (deg)		Base RX Antenna Height (ft) / Az (deg)	
Latitude			80 / 135		120 / 135	
40°48'11.18" N			Antenna Model		Antenna Model	
Longitude			RFI OA40-41-DIN		RFI OA40-41-DIN	
124°9'43.7" W						
Link Budget		Units	Outbound		Inbound	
			Base StationTX	SubscriberRX	SubscriberTX	Base StationRX
RX SYSTEM STATIC SENSITIVITY W NOISE		dBm		-114.83		-112.72
RX SYSTEM FADED (DAQ 3.4 CPC) SENSITIVITY W NOISE		dBm		-105.17		-102.22
DIVERSITY GAIN (if applicable)		dB		n/a		n/a
RX ANTENNA GAIN		dBd		-1		9
COMBINED GAINS/LOSSES OR NOISEDEG		dB		-0.8		0.4
REQUIRED MINIMUM POWER		dBm		-103.37		-111.62
OUTPUT POWER		W	60		10	
OUTPUT POWER		dBm	47.78		40	
TX ANTENNA GAIN		dBd	9		-1	
COMBINED LOSSES		dB	7.5		0.8	
TRANSMITTED POWER		dBm	49.28		38.2	
ERP		W	84.75		6.61	
MAXIMUM PATH LOSS		dB	152.65		149.82	

Green Diamond			Base TX Antenna Height (ft) / Az (deg)		Base RX Antenna Height (ft) / Az (deg)		
Latitude			199 / 60		see tx / see tx		
41°10'16.05" N			Antenna Model		Antenna Model		
Longitude			RFI OA40-41-DIN		see tx see tx		
124°3'46.37" W							
Link Budget		Units	Outbound		Inbound		
			Base StationTX	SubscriberRX	SubscriberTX	Base StationRX	
RX SYSTEM STATIC SENSITIVITY W NOISE		dBm		-114.83		-114.34	
RX SYSTEM FADED (DAQ 3.4 CPC) SENSITIVITY W NOISE		dBm		-105.17		-100.24	
DIVERSITY GAIN (if applicable)		dB		n/a		n/a	
RX ANTENNA GAIN		dBd		-1		9	
COMBINED GAINS/LOSSES OR NOISEDEG		dB		-0.8		4	
REQUIRED MINIMUM POWER		dBm		-103.37		-113.24	
OUTPUT POWER		W	60		10		
OUTPUT POWER		dBm	47.78		40		
TX ANTENNA GAIN		dBd	9		-1		
COMBINED LOSSES		dB	7.59		0.8		
TRANSMITTED POWER		dBm	49.19		38.2		
ERP		W	83.01		6.61		
MAXIMUM PATH LOSS		dB	152.56		151.44		

Horse Mountain			Base TX Antenna Height (ft) / Az (deg)		Base RX Antenna Height (ft) / Az (deg)		
Latitude			100 / 0		see tx / see tx		
40°52'27.09" N			Antenna Model		Antenna Model		
Longitude			RFI EA80-41-DIN-T3		see tx see tx		
123°44'0.84" W							
Link Budget		Units	Outbound		Inbound		
			Base StationTX	SubscriberRX	SubscriberTX	Base StationRX	
RX SYSTEM STATIC SENSITIVITY W NOISE		dBm		-114.83		-114.38	
RX SYSTEM FADED (DAQ 3.4 CPC) SENSITIVITY W NOISE		dBm		-105.17		-100.28	
DIVERSITY GAIN (if applicable)		dB		n/a		n/a	
RX ANTENNA GAIN		dBd		-1		8	
COMBINED GAINS/LOSSES OR NOISEDEG		dB		-0.8		4	
REQUIRED MINIMUM POWER		dBm		-103.37		-112.28	
OUTPUT POWER		W	60		10		
OUTPUT POWER		dBm	47.78		40		
TX ANTENNA GAIN		dBd	8		-1		
COMBINED LOSSES		dB	7.35		0.8		
TRANSMITTED POWER		dBm	48.43		38.2		
ERP		W	69.69		6.61		
MAXIMUM PATH LOSS		dB	151.8		150.48		

Mt Pierce			Base TX Antenna Height (ft) / Az (deg)		Base RX Antenna Height (ft) / Az (deg)		
Latitude			60 / 60		100 / 60		
40°25'2.3" N			Antenna Model		Antenna Model		
Longitude			RFI OA40-41-DIN		RFI OA40-41-DIN		
124°7'13" W							
Link Budget		Units	Outbound		Inbound		
			Base StationTX	SubscriberRX	SubscriberTX	Base StationRX	
RX SYSTEM STATIC SENSITIVITY W NOISE		dBm		-114.83		-113.3	
RX SYSTEM FADED (DAQ 3.4 CPC) SENSITIVITY W NOISE		dBm		-105.17		-99.25	
DIVERSITY GAIN (if applicable)		dB		n/a		n/a	
RX ANTENNA GAIN		dBd		-1		9	
COMBINED GAINS/LOSSES OR NOISEDEG		dB		-0.8		3.95	
REQUIRED MINIMUM POWER		dBm		-103.37		-112.2	
OUTPUT POWER	W	60		10			
OUTPUT POWER	dBm	47.78		40			
TX ANTENNA GAIN	dBd	9		-1			
COMBINED LOSSES	dB	7.45		0.8			
TRANSMITTED POWER	dBm	49.33		38.2			
ERP	W	85.73		6.61			
MAXIMUM PATH LOSS	dB	152.7		150.4			

Pratt Mountain			Base TX Antenna Height (ft) / Az (deg)		Base RX Antenna Height (ft) / Az (deg)		
Latitude			60 / 315		100 / 315		
40°7'13.5" N			Antenna Model		Antenna Model		
Longitude			RFI OA40-41-DIN-T3		RFI OA40-41-DIN-T3		
123°41'35.76" W							
Link Budget		Units	Outbound		Inbound		
			Base StationTX	SubscriberRX	SubscriberTX	Base StationRX	
RX SYSTEM STATIC SENSITIVITY W NOISE		dBm		-114.83		-112.74	
RX SYSTEM FADED (DAQ 3.4 CPC) SENSITIVITY W NOISE		dBm		-105.17		-102.19	
DIVERSITY GAIN (if applicable)		dB		n/a		n/a	
RX ANTENNA GAIN		dBd		-1		9	
COMBINED GAINS/LOSSES OR NOISEDEG		dB		-0.8		0.45	
REQUIRED MINIMUM POWER		dBm		-103.37		-111.64	
OUTPUT POWER		W	60		10		
OUTPUT POWER		dBm	47.78		40		
TX ANTENNA GAIN		dBd	9		-1		
COMBINED LOSSES		dB	7.45		0.8		
TRANSMITTED POWER		dBm	49.33		38.2		
ERP		W	85.73		6.61		
MAXIMUM PATH LOSS		dB	152.7		149.84		

Trinidad			Base TX Antenna Height (ft) / Az (deg)		Base RX Antenna Height (ft) / Az (deg)	
Latitude			60 / 135		see tx / see tx	
39°49'60" N			Antenna Model		Antenna Model	
Longitude			RFI OA40-41-DIN		see tx see tx	
124°30'0" W						
Link Budget		Units	Outbound		Inbound	
			Base StationTX	SubscriberRX	SubscriberTX	Base StationRX
RX SYSTEM STATIC SENSITIVITY W NOISE		dBm		-114.83		-114.06
RX SYSTEM FADED (DAQ 3.4 CPC) SENSITIVITY W NOISE		dBm		-105.17		-101.96
DIVERSITY GAIN (if applicable)		dB		n/a		n/a
RX ANTENNA GAIN		dBd		-1		9
COMBINED GAINS/LOSSES OR NOISEDEG		dB		-0.8		2
REQUIRED MINIMUM POWER		dBm		-103.37		-112.96
OUTPUT POWER		W	60		10	
OUTPUT POWER		dBm	47.78		40	
TX ANTENNA GAIN		dBd	9		-1	
COMBINED LOSSES		dB	4.25		0.8	
TRANSMITTED POWER		dBm	52.53		38.2	
ERP		W	179.12		6.61	
MAXIMUM PATH LOSS		dB	155.9		151.16	

Shelter Cove DVRS			Base TX Antenna Height (ft) / Az (deg)		Base RX Antenna Height (ft) / Az (deg)	
Latitude			112 / 0		see tx / see tx	
40°2'1.83" N			Antenna Model		Antenna Model	
Longitude			RFI EA40-41-DIN		see tx see tx	
124°2'25.63" W						
Link Budget		Units	Outbound		Inbound	
			Base StationTX	SubscriberRX	SubscriberTX	Base StationRX
RX SYSTEM STATIC SENSITIVITY W NOISE		dBm		-114.83		-112.89
RX SYSTEM FADED (DAQ 3.4 CPC) SENSITIVITY W NOISE		dBm		-105.17		-100.79
DIVERSITY GAIN (if applicable)		dB		n/a		n/a
RX ANTENNA GAIN		dBd		-1		5
COMBINED GAINS/LOSSES OR NOISEDEG		dB		-0.8		2
REQUIRED MINIMUM POWER		dBm		-103.37		-107.79
OUTPUT POWER		W	50		10	
OUTPUT POWER		dBm	46.99		40	
TX ANTENNA GAIN		dBd	5		-1	
COMBINED LOSSES		dB	4.38		0.8	
TRANSMITTED POWER		dBm	47.61		38.2	
ERP		W	57.67		6.61	
MAXIMUM PATH LOSS		dB	150.98	145.99		

Sugar Pine Mountain DVRS			Base TX Antenna Height (ft) / Az (deg)		Base RX Antenna Height (ft) / Az (deg)	
Latitude			80 / 30		see tx / see tx	
41°2'18.7" N			Antenna Model		Antenna Model	
Longitude			RFI EA80-41-DIN-T3		see tx see tx	
123°44'54.89" W						
Link Budget		Units	Outbound		Inbound	
			Base StationTX	SubscriberRX	SubscriberTX	Base StationRX
RX SYSTEM STATIC SENSITIVITY W NOISE		dBm		-114.83		-113.57
RX SYSTEM FADED (DAQ 3.4 CPC) SENSITIVITY W NOISE		dBm		-105.17		-99.47
DIVERSITY GAIN (if applicable)		dB		n/a		n/a
RX ANTENNA GAIN		dBd		-1		8
COMBINED GAINS/LOSSES OR NOISEDEG		dB		-0.8		4
REQUIRED MINIMUM POWER		dBm		-103.37		-111.47
OUTPUT POWER		W	50		10	
OUTPUT POWER		dBm	46.99		40	
TX ANTENNA GAIN		dBd	8		-1	
COMBINED LOSSES		dB	7.3		0.8	
TRANSMITTED POWER		dBm	47.69		38.2	
ERP		W	58.74		6.61	
MAXIMUM PATH LOSS		dB	151.06		149.67	

Orleans Mtn DVRS			Base TX Antenna Height (ft) / Az (deg)		Base RX Antenna Height (ft) / Az (deg)	
Latitude			30 / 270		see tx / see tx	
41°16'44.22" N			Antenna Model		Antenna Model	
Longitude			RFI CSA20-41-DIN		see tx see tx	
123°27'12.26" W						
Link Budget		Units	Outbound		Inbound	
			Base StationTX	SubscriberRX	SubscriberTX	Base StationRX
RX SYSTEM STATIC SENSITIVITY W NOISE		dBm		-114.83		-113.58
RX SYSTEM FADED (DAQ 3.4 CPC) SENSITIVITY W NOISE		dBm		-105.17		-99.48
DIVERSITY GAIN (if applicable)		dB		n/a		n/a
RX ANTENNA GAIN		dBd		-1		9
COMBINED GAINS/LOSSES OR NOISEDEG		dB		-0.8		4
REQUIRED MINIMUM POWER		dBm		-103.37		-112.48
OUTPUT POWER		W	10		10	
OUTPUT POWER		dBm	40		40	
TX ANTENNA GAIN		dBd	9		-1	
COMBINED LOSSES		dB	4.18		0.8	
TRANSMITTED POWER		dBm	44.82		38.2	
ERP		W	30.34		6.61	
MAXIMUM PATH LOSS		dB	148.19		150.68	

DIGITAL PORTABLE LINK BUDGETS - APX6000

County Courthouse			Base TX Antenna Height (ft) / Az (deg)		Base RX Antenna Height (ft) / Az (deg)	
Latitude			80 / 135		120 / 135	
40°48'11.18" N			Antenna Model		Antenna Model	
Longitude			RFI OA40-41-DIN		RFI OA40-41-DIN	
124°9'43.7" W						
Link Budget		Units	Outbound		Inbound	
			Base StationTX	SubscriberRX	SubscriberTX	Base StationRX
RX SYSTEM STATIC SENSITIVITY W NOISE		dBm		-120.51		-112.72
RX SYSTEM FADED (DAQ 3.4 CPC) SENSITIVITY W NOISE		dBm		-111.05		-102.22
DIVERSITY GAIN (if applicable)		dB		n/a		n/a
RX ANTENNA GAIN		dBd		-16.6		9
COMBINED GAINS/LOSSES OR NOISEDEG		dB		-1		0.4
REQUIRED MINIMUM POWER		dBm		-93.45		-111.62
OUTPUT POWER		W	60		6	
OUTPUT POWER		dBm	47.78		37.78	
TX ANTENNA GAIN		dBd	9		-16.6	
COMBINED LOSSES		dB	7.5		0	
TRANSMITTED POWER		dBm	49.28		21.18	
ERP		W	84.75		0.13	
MAXIMUM PATH LOSS		dB	142.73		132.8	

Green Diamond			Base TX Antenna Height (ft) / Az (deg)		Base RX Antenna Height (ft) / Az (deg)		
Latitude			199 / 60		see tx / see tx		
41°10'16.05" N			Antenna Model		Antenna Model		
Longitude			RFI OA40-41-DIN		see tx see tx		
124°3'46.37" W							
Link Budget		Units	Outbound		Inbound		
			Base StationTX	SubscriberRX	SubscriberTX	Base StationRX	
RX SYSTEM STATIC SENSITIVITY W NOISE		dBm		-120.51		-114.34	
RX SYSTEM FADED (DAQ 3.4 CPC) SENSITIVITY W NOISE		dBm		-111.05		-100.24	
DIVERSITY GAIN (if applicable)		dB		n/a		n/a	
RX ANTENNA GAIN		dBd		-16.6		9	
COMBINED GAINS/LOSSES OR NOISEDEG		dB		-1		4	
REQUIRED MINIMUM POWER		dBm		-93.45		-113.24	
OUTPUT POWER		W	60		6		
OUTPUT POWER		dBm	47.78		37.78		
TX ANTENNA GAIN		dBd	9		-16.6		
COMBINED LOSSES		dB	7.59		0		
TRANSMITTED POWER		dBm	49.19		21.18		
ERP		W	83.01		0.13		
MAXIMUM PATH LOSS		dB	142.64		134.42		

Horse Mountain			Base TX Antenna Height (ft) / Az (deg)		Base RX Antenna Height (ft) / Az (deg)	
Latitude			100 / 0		see tx / see tx	
40°52'27.09" N			Antenna Model		Antenna Model	
Longitude			RFI EA80-41-DIN-T3		see tx see tx	
123°44'0.84" W						
Link Budget		Units	Outbound		Inbound	
			Base StationTX	SubscriberRX	SubscriberTX	Base StationRX
RX SYSTEM STATIC SENSITIVITY W NOISE		dBm		-120.51		-114.38
RX SYSTEM FADED (DAQ 3.4 CPC) SENSITIVITY W NOISE		dBm		-111.05		-100.28
DIVERSITY GAIN (if applicable)		dB		n/a		n/a
RX ANTENNA GAIN		dBd		-16.6		8
COMBINED GAINS/LOSSES OR NOISEDEG		dB		-1		4
REQUIRED MINIMUM POWER		dBm		-93.45		-112.28
OUTPUT POWER		W	60		6	
OUTPUT POWER		dBm	47.78		37.78	
TX ANTENNA GAIN		dBd	8		-16.6	
COMBINED LOSSES		dB	7.35		0	
TRANSMITTED POWER		dBm	48.43		21.18	
ERP		W	69.69		0.13	
MAXIMUM PATH LOSS		dB	141.88		133.46	

Mt Pierce			Base TX Antenna Height (ft) / Az (deg)		Base RX Antenna Height (ft) / Az (deg)		
Latitude			60 / 60		100 / 60		
40°25'2.3" N			Antenna Model		Antenna Model		
Longitude			RFI OA40-41-DIN		RFI OA40-41-DIN		
124°7'13" W							
Link Budget		Units	Outbound		Inbound		
			Base StationTX	SubscriberRX	SubscriberTX	Base StationRX	
RX SYSTEM STATIC SENSITIVITY W NOISE		dBm		-120.51		-113.3	
RX SYSTEM FADED (DAQ 3.4 CPC) SENSITIVITY W NOISE		dBm		-111.05		-99.25	
DIVERSITY GAIN (if applicable)		dB		n/a		n/a	
RX ANTENNA GAIN		dBd		-16.6		9	
COMBINED GAINS/LOSSES OR NOISEDEG		dB		-1		3.95	
REQUIRED MINIMUM POWER		dBm		-93.45		-112.2	
OUTPUT POWER		W	60		6		
OUTPUT POWER		dBm	47.78		37.78		
TX ANTENNA GAIN		dBd	9		-16.6		
COMBINED LOSSES		dB	7.45		0		
TRANSMITTED POWER		dBm	49.33		21.18		
ERP		W	85.73		0.13		
MAXIMUM PATH LOSS		dB	142.78		133.38		

Pratt Mountain			Base TX Antenna Height (ft) / Az (deg)		Base RX Antenna Height (ft) / Az (deg)		
Latitude			60 / 315		100 / 315		
40°7'13.5" N			Antenna Model		Antenna Model		
Longitude			RFI OA40-41-DIN-T3		RFI OA40-41-DIN-T3		
123°41'35.76" W							
Link Budget		Units	Outbound		Inbound		
			Base StationTX	SubscriberRX	SubscriberTX	Base StationRX	
RX SYSTEM STATIC SENSITIVITY W NOISE		dBm		-120.51		-112.74	
RX SYSTEM FADED (DAQ 3.4 CPC) SENSITIVITY W NOISE		dBm		-111.05		-102.19	
DIVERSITY GAIN (if applicable)		dB		n/a		n/a	
RX ANTENNA GAIN		dBd		-16.6		9	
COMBINED GAINS/LOSSES OR NOISEDEG		dB		-1		0.45	
REQUIRED MINIMUM POWER		dBm		-93.45		-111.64	
OUTPUT POWER		W	60		6		
OUTPUT POWER		dBm	47.78		37.78		
TX ANTENNA GAIN		dBd	9		-16.6		
COMBINED LOSSES		dB	7.45		0		
TRANSMITTED POWER		dBm	49.33		21.18		
ERP		W	85.73		0.13		
MAXIMUM PATH LOSS		dB	142.78		132.82		

Trinidad			Base TX Antenna Height (ft) / Az (deg)		Base RX Antenna Height (ft) / Az (deg)	
Latitude			60 / 135		see tx / see tx	
39°49'60" N			Antenna Model		Antenna Model	
Longitude			RFI OA40-41-DIN		see tx see tx	
124°30'0" W						
Link Budget		Units	Outbound		Inbound	
			Base StationTX	SubscriberRX	SubscriberTX	Base StationRX
RX SYSTEM STATIC SENSITIVITY W NOISE		dBm		-120.51		-114.06
RX SYSTEM FADED (DAQ 3.4 CPC) SENSITIVITY W NOISE		dBm		-111.05		-101.96
DIVERSITY GAIN (if applicable)		dB		n/a		n/a
RX ANTENNA GAIN		dBd		-16.6		9
COMBINED GAINS/LOSSES OR NOISEDEG		dB		-1		2
REQUIRED MINIMUM POWER		dBm		-93.45		-112.96
OUTPUT POWER	W	60		6		
OUTPUT POWER	dBm	47.78		37.78		
TX ANTENNA GAIN	dBd	9		-16.6		
COMBINED LOSSES	dB	4.25		0		
TRANSMITTED POWER	dBm	52.53		21.18		
ERP	W	179.12		0.13		
MAXIMUM PATH LOSS	dB	145.98		134.14		

Shelter Cove DVRS			Base TX Antenna Height (ft) / Az (deg)		Base RX Antenna Height (ft) / Az (deg)		
Latitude			112 / 0		see tx / see tx		
40°2'1.83" N			Antenna Model		Antenna Model		
Longitude			RFI EA40-41-DIN		see tx see tx		
124°2'25.63" W							
Link Budget		Units	Outbound		Inbound		
			Base StationTX	SubscriberRX	SubscriberTX	Base StationRX	
RX SYSTEM STATIC SENSITIVITY W NOISE		dBm		-120.51		-112.89	
RX SYSTEM FADED (DAQ 3.4 CPC) SENSITIVITY W NOISE		dBm		-111.05		-100.79	
DIVERSITY GAIN (if applicable)		dB		n/a		n/a	
RX ANTENNA GAIN		dBd		-16.6		5	
COMBINED GAINS/LOSSES OR NOISEDEG		dB		-1		2	
REQUIRED MINIMUM POWER		dBm		-93.45		-107.79	
OUTPUT POWER		W	50		6		
OUTPUT POWER		dBm	46.99		37.78		
TX ANTENNA GAIN		dBd	5		-16.6		
COMBINED LOSSES		dB	4.38		0		
TRANSMITTED POWER		dBm	47.61		21.18		
ERP		W	57.67		0.13		
MAXIMUM PATH LOSS		dB	141.06		128.97		

Sugar Pine Mountain DVRS			Base TX Antenna Height (ft) / Az (deg)		Base RX Antenna Height (ft) / Az (deg)	
Latitude			80 / 30		see tx / see tx	
41°2'18.7" N			Antenna Model		Antenna Model	
Longitude			RFI EA80-41-DIN-T3		see tx see tx	
123°44'54.89" W						
Link Budget		Units	Outbound		Inbound	
			Base StationTX	SubscriberRX	SubscriberTX	Base StationRX
RX SYSTEM STATIC SENSITIVITY W NOISE		dBm		-120.51		-113.57
RX SYSTEM FADED (DAQ 3.4 CPC) SENSITIVITY W NOISE		dBm		-111.05		-99.47
DIVERSITY GAIN (if applicable)		dB		n/a		n/a
RX ANTENNA GAIN		dBd		-16.6		8
COMBINED GAINS/LOSSES OR NOISEDEG		dB		-1		4
REQUIRED MINIMUM POWER		dBm		-93.45		-111.47
OUTPUT POWER		W	50		6	
OUTPUT POWER		dBm	46.99		37.78	
TX ANTENNA GAIN		dBd	8		-16.6	
COMBINED LOSSES		dB	7.3		0	
TRANSMITTED POWER		dBm	47.69		21.18	
ERP		W	58.74		0.13	
MAXIMUM PATH LOSS		dB	141.14		132.65	

Orleans Mtn DVRS			Base TX Antenna Height (ft) / Az (deg)		Base RX Antenna Height (ft) / Az (deg)		
Latitude			30 / 270		see tx / see tx		
41°16'44.22" N			Antenna Model		Antenna Model		
Longitude			RFI CSA20-41-DIN		see tx see tx		
123°27'12.26" W							
Link Budget		Units	Outbound		Inbound		
			Base StationTX	SubscriberRX	SubscriberTX	Base StationRX	
RX SYSTEM STATIC SENSITIVITY W NOISE		dBm		-120.51		-113.58	
RX SYSTEM FADED (DAQ 3.4 CPC) SENSITIVITY W NOISE		dBm		-111.05		-99.48	
DIVERSITY GAIN (if applicable)		dB		n/a		n/a	
RX ANTENNA GAIN		dBd		-16.6		9	
COMBINED GAINS/LOSSES OR NOISEDEG		dB		-1		4	
REQUIRED MINIMUM POWER		dBm		-93.45		-112.48	
OUTPUT POWER		W	10		6		
OUTPUT POWER		dBm	40		37.78		
TX ANTENNA GAIN		dBd	9		-16.6		
COMBINED LOSSES		dB	4.18		0		
TRANSMITTED POWER		dBm	44.82		21.18		
ERP		W	30.34		0.13		
MAXIMUM PATH LOSS		dB	138.27		133.66		

ANALOG MOBILE LINK BUDGETS - APX4500 - 12.5kHz - DAQ3.0

County Courthouse		Base TX Antenna Height (ft) / Az (deg)		Base RX Antenna Height (ft) / Az (deg)	
Latitude 40°48'11.18" N		80 / 135		120 / 135	
Longitude 124°9'43.7" W		Antenna Model RFI OA40-41-DIN		Antenna Model RFI OA40-41-DIN	
Link Budget	Units	Outbound		Inbound	
		Base StationTX	SubscriberRX	SubscriberTX	Base StationRX
RX SYSTEM STATIC SENSITIVITY W NOISE	dBm		-113.6		-112.4
RX SYSTEM FADED (DAQ 3.0 CPC) SENSITIVITY W NOISE	dBm		-98.4		-96
DIVERSITY GAIN (if applicable)	dB		n/a		n/a
RX ANTENNA GAIN	dBd		-1		9
COMBINED GAINS/LOSSES OR NOISEDEG	dB		-0.8		0.4
REQUIRED MINIMUM POWER	dBm		-96.6		-105.4
OUTPUT POWER	W	100		10	
OUTPUT POWER	dBm	50		40	
TX ANTENNA GAIN	dBd	9		-1	
COMBINED LOSSES	dB	7.5		0.8	
TRANSMITTED POWER	dBm	51.5		38.2	
ERP	W	141.25		6.61	
MAXIMUM PATH LOSS	dB	148.1		143.6	

Horse Mountain			Base TX Antenna Height (ft) / Az (deg)		Base RX Antenna Height (ft) / Az (deg)	
Latitude			100 / 0		see tx / see tx	
40°52'27.09" N			Antenna Model		Antenna Model	
Longitude			RFI EA80-41-DIN-T3		see tx see tx	
123°44'0.84" W						
Link Budget		Units	Outbound		Inbound	
			Base StationTX	SubscriberRX	SubscriberTX	Base StationRX
RX SYSTEM STATIC SENSITIVITY W NOISE		dBm		-113.6		-114.04
RX SYSTEM FADED (DAQ 3.0 CPC) SENSITIVITY W NOISE		dBm		-98.4		-94.04
DIVERSITY GAIN (if applicable)		dB		n/a		n/a
RX ANTENNA GAIN		dBd		-1		8
COMBINED GAINS/LOSSES OR NOISEDEG		dB		-0.8		4
REQUIRED MINIMUM POWER		dBm		-96.6		-106.04
OUTPUT POWER		W	90		10	
OUTPUT POWER		dBm	49.54		40	
TX ANTENNA GAIN		dBd	8		-1	
COMBINED LOSSES		dB	7.35		0.8	
TRANSMITTED POWER		dBm	50.19		38.2	
ERP		W	104.53		6.61	
MAXIMUM PATH LOSS		dB	146.79		144.24	

Mt Pierce		Base TX Antenna Height (ft) / Az (deg)		Base RX Antenna Height (ft) / Az (deg)	
Latitude 40°25'2.3" N		60 / 60		100 / 60	
Longitude 124°7'13" W		Antenna Model RFI OA40-41-DIN		Antenna Model RFI OA40-41-DIN	
Link Budget	Units	Outbound		Inbound	
		Base StationTX	SubscriberRX	SubscriberTX	Base StationRX
RX SYSTEM STATIC SENSITIVITY W NOISE	dBm		-113.6		-112.94
RX SYSTEM FADED (DAQ 3.0 CPC) SENSITIVITY W NOISE	dBm		-98.4		-92.99
DIVERSITY GAIN (if applicable)	dB		n/a		n/a
RX ANTENNA GAIN	dBd		-1		9
COMBINED GAINS/LOSSES OR NOISEDEG	dB		-0.8		3.95
REQUIRED MINIMUM POWER	dBm		-96.6		-105.94
OUTPUT POWER	W	100		10	
OUTPUT POWER	dBm	50		40	
TX ANTENNA GAIN	dBd	9		-1	
COMBINED LOSSES	dB	7.45		0.8	
TRANSMITTED POWER	dBm	51.55		38.2	
ERP	W	142.89		6.61	
MAXIMUM PATH LOSS	dB	148.15		144.14	

Pratt Mountain			Base TX Antenna Height (ft) / Az (deg)		Base RX Antenna Height (ft) / Az (deg)	
Latitude			60 / 315		100 / 315	
40°7'13.5" N						
Longitude		Antenna Model		Antenna Model		
123°41'35.76" W		RFI OA40-41-DIN-T3		RFI OA40-41-DIN-T3		
Link Budget	Units	Outbound		Inbound		
		Base StationTX	SubscriberRX	SubscriberTX	Base StationRX	
RX SYSTEM STATIC SENSITIVITY W NOISE	dBm		-113.6		-112.43	
RX SYSTEM FADED (DAQ 3.0 CPC) SENSITIVITY W NOISE	dBm		-98.4		-95.98	
DIVERSITY GAIN (if applicable)	dB		n/a		n/a	
RX ANTENNA GAIN	dBd		-1		9	
COMBINED GAINS/LOSSES OR NOISEDEG	dB		-0.8		0.45	
REQUIRED MINIMUM POWER	dBm		-96.6		-105.43	
OUTPUT POWER	W	75		10		
OUTPUT POWER	dBm	48.75		40		
TX ANTENNA GAIN	dBd	9		-1		
COMBINED LOSSES	dB	7.45		0.8		
TRANSMITTED POWER	dBm	50.3		38.2		
ERP	W	107.17		6.61		
MAXIMUM PATH LOSS	dB	146.9		143.63		

Green Diamond			Base TX Antenna Height (ft) / Az (deg)		Base RX Antenna Height (ft) / Az (deg)		
Latitude			199 / 60		see tx / see tx		
41°10'16.05" N			Antenna Model		Antenna Model		
Longitude			RFI OA40-41-DIN		see tx see tx		
124°3'46.37" W							
Link Budget		Units	Outbound		Inbound		
			Base StationTX	SubscriberRX	SubscriberTX	Base StationRX	
RX SYSTEM STATIC SENSITIVITY W NOISE		dBm		-113.6		-114	
RX SYSTEM FADED (DAQ 3.0 CPC) SENSITIVITY W NOISE		dBm		-98.4		-94	
DIVERSITY GAIN (if applicable)		dB		n/a		n/a	
RX ANTENNA GAIN		dBd		-1		9	
COMBINED GAINS/LOSSES OR NOISEDEG		dB		-0.8		4	
REQUIRED MINIMUM POWER		dBm		-96.6		-107	
OUTPUT POWER		W	100		10		
OUTPUT POWER		dBm	50		40		
TX ANTENNA GAIN		dBd	9		-1		
COMBINED LOSSES		dB	7.59		0.8		
TRANSMITTED POWER		dBm	51.41		38.2		
ERP		W	138.36		6.61		
MAXIMUM PATH LOSS		dB	148.01		145.2		

Sugar Pine Mountain DVRS			Base TX Antenna Height (ft) / Az (deg)		Base RX Antenna Height (ft) / Az (deg)	
Latitude			80 / 30		see tx / see tx	
41°2'18.7" N			Antenna Model		Antenna Model	
Longitude			RFI EA80-41-DIN-T3		see tx see tx	
123°44'54.89" W						
Link Budget		Units	Outbound		Inbound	
			Base StationTX	SubscriberRX	SubscriberTX	Base StationRX
RX SYSTEM STATIC SENSITIVITY W NOISE		dBm		-113.6		-113.28
RX SYSTEM FADED (DAQ 3.0 CPC) SENSITIVITY W NOISE		dBm		-98.4		-93.28
DIVERSITY GAIN (if applicable)		dB		n/a		n/a
RX ANTENNA GAIN		dBd		-1		8
COMBINED GAINS/LOSSES OR NOISEDEG		dB		-0.8		4
REQUIRED MINIMUM POWER		dBm		-96.6		-105.28
OUTPUT POWER	W	50		10		
OUTPUT POWER	dBm	46.99		40		
TX ANTENNA GAIN	dBd	8		-1		
COMBINED LOSSES	dB	7.3		0.8		
TRANSMITTED POWER	dBm	47.69		38.2		
ERP	W	58.74		6.61		
MAXIMUM PATH LOSS		dB	144.29		143.48	

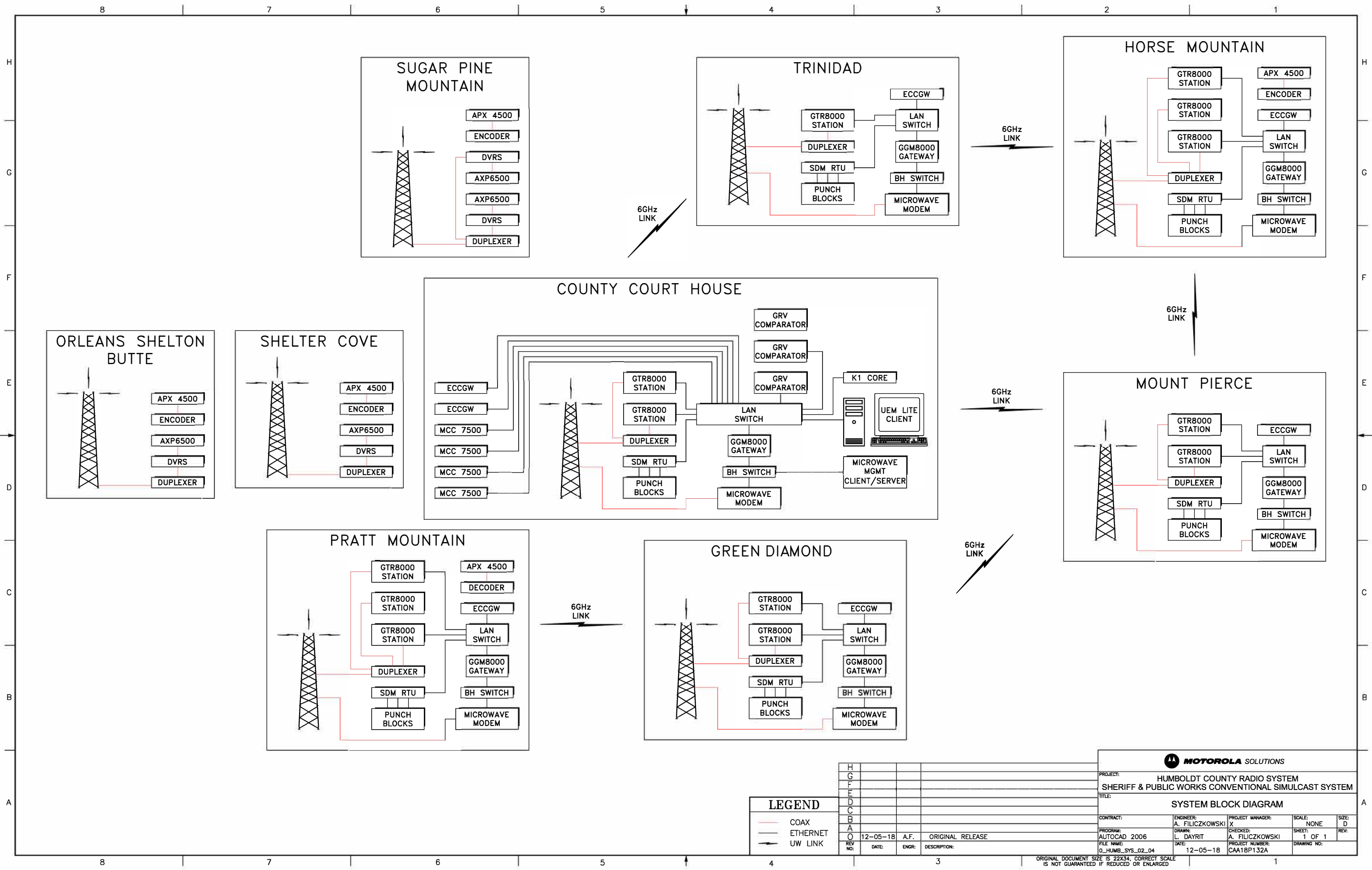
APPENDIX 4 – SYSTEM DRAWINGS

The following system drawings are included on the following pages:

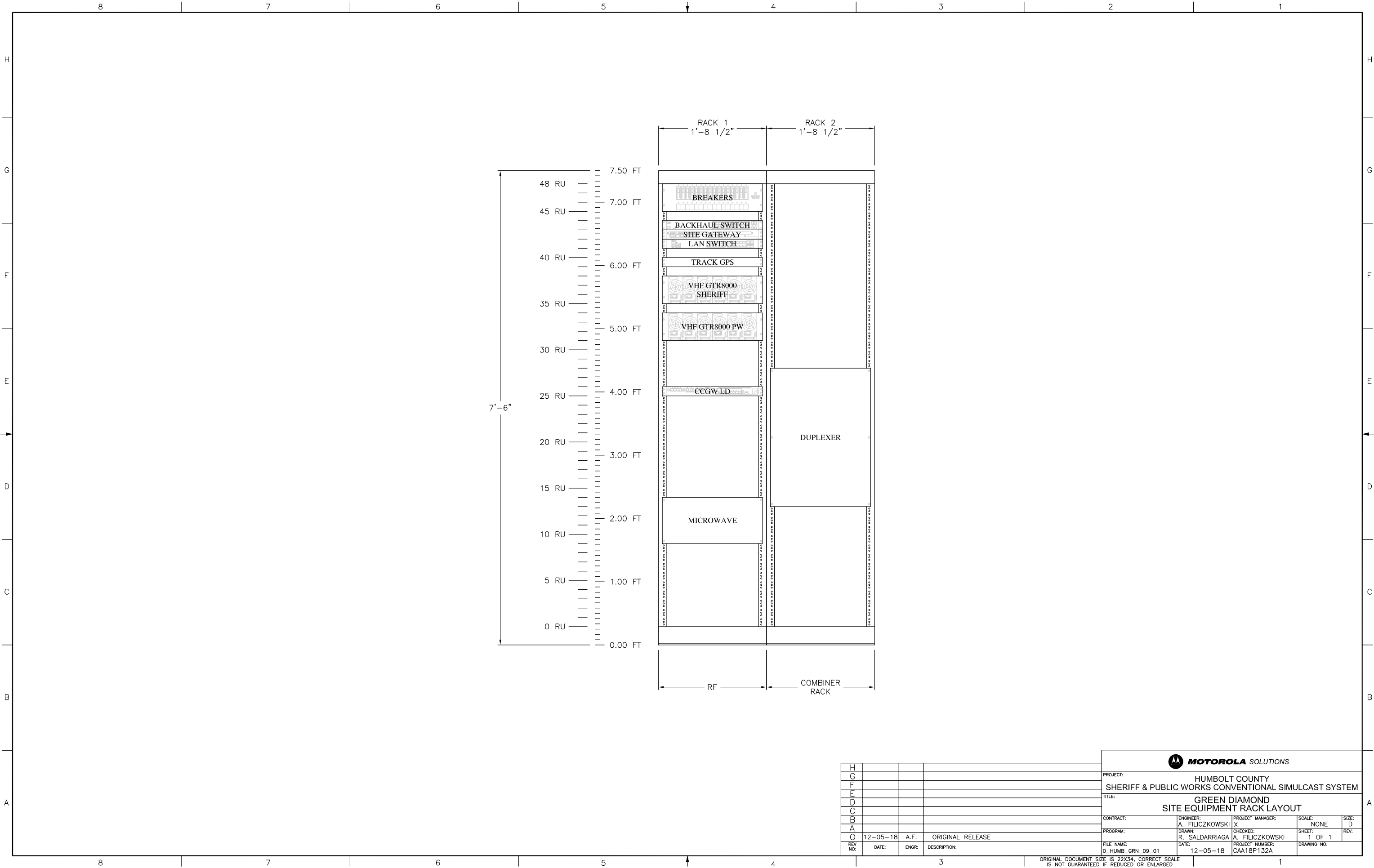
1. Humboldt System Diagram
2. Green Diamond Rackface
3. Horse Mountain Rackface
4. Mt Pierce Rackface
5. Orleans Rackface
6. Pratt Mountain Rackface
7. Shelter Cove Rackface
8. Sugarpine Rackface
9. Trinidad Rackface



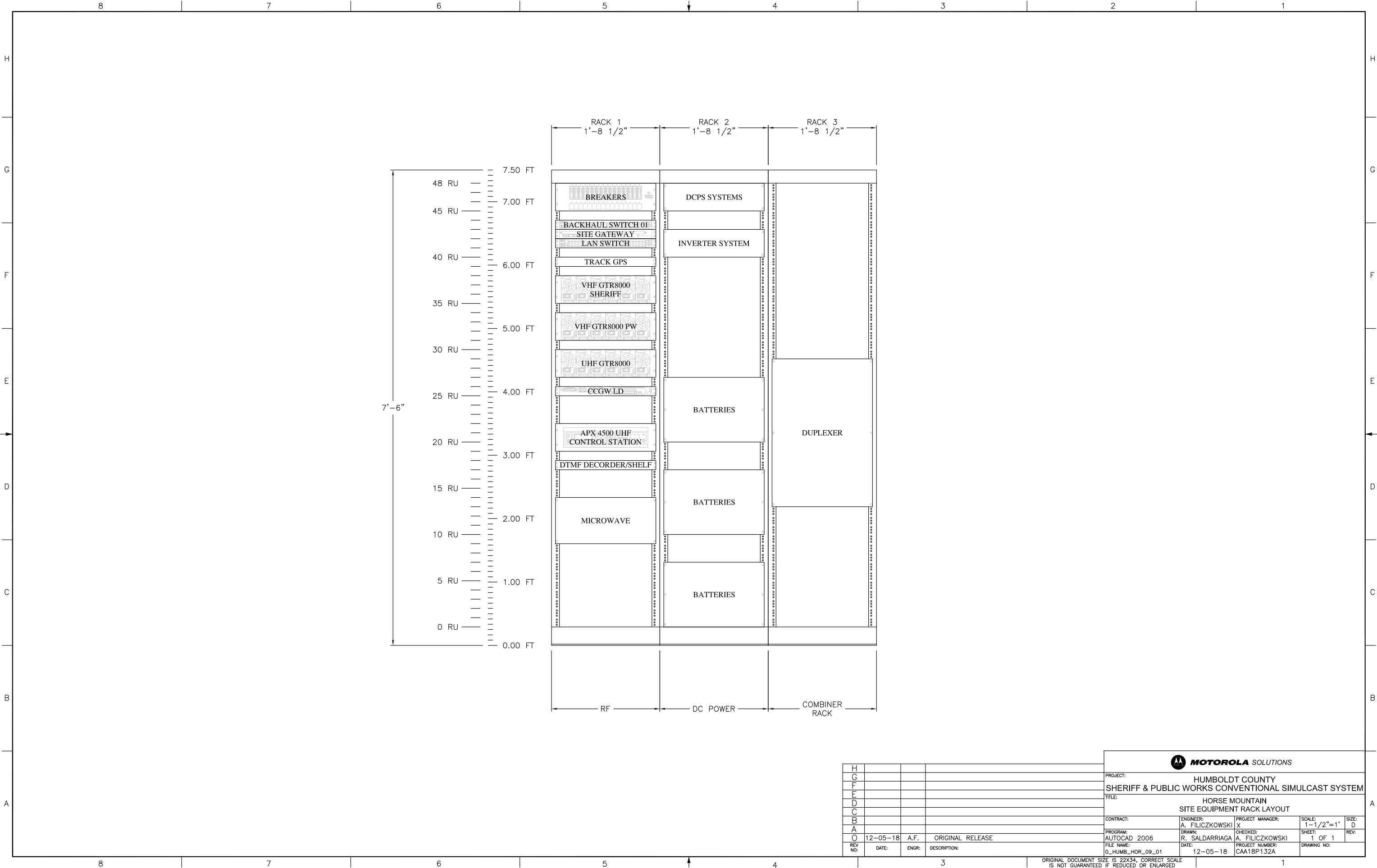
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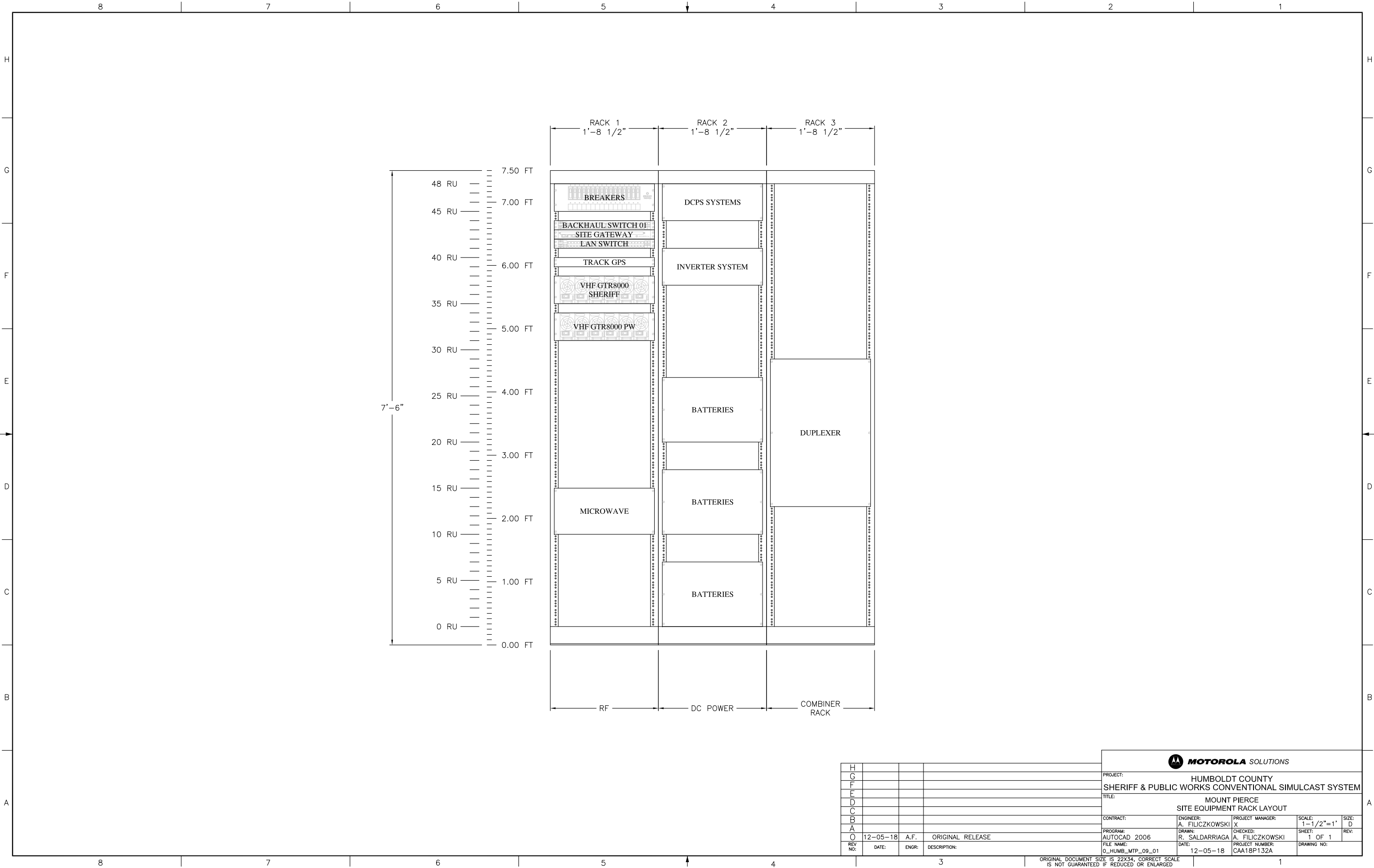


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TITLE: HORSE MOUNTAIN SITE EQUIPMENT RACK LAYOUT				
CONTRACT:	ENGINEER: A. FILICZKOWSKI	PROJECT MANAGER: X	SCALE: 1-1/2"=1'	SIZE: D
PROGRAM: AUTOCAD 2006	DRAWN: R. SALDARRIAGA	CHECKED: A. FILICZKOWSKI	SHEET: 1 OF 1	REV:
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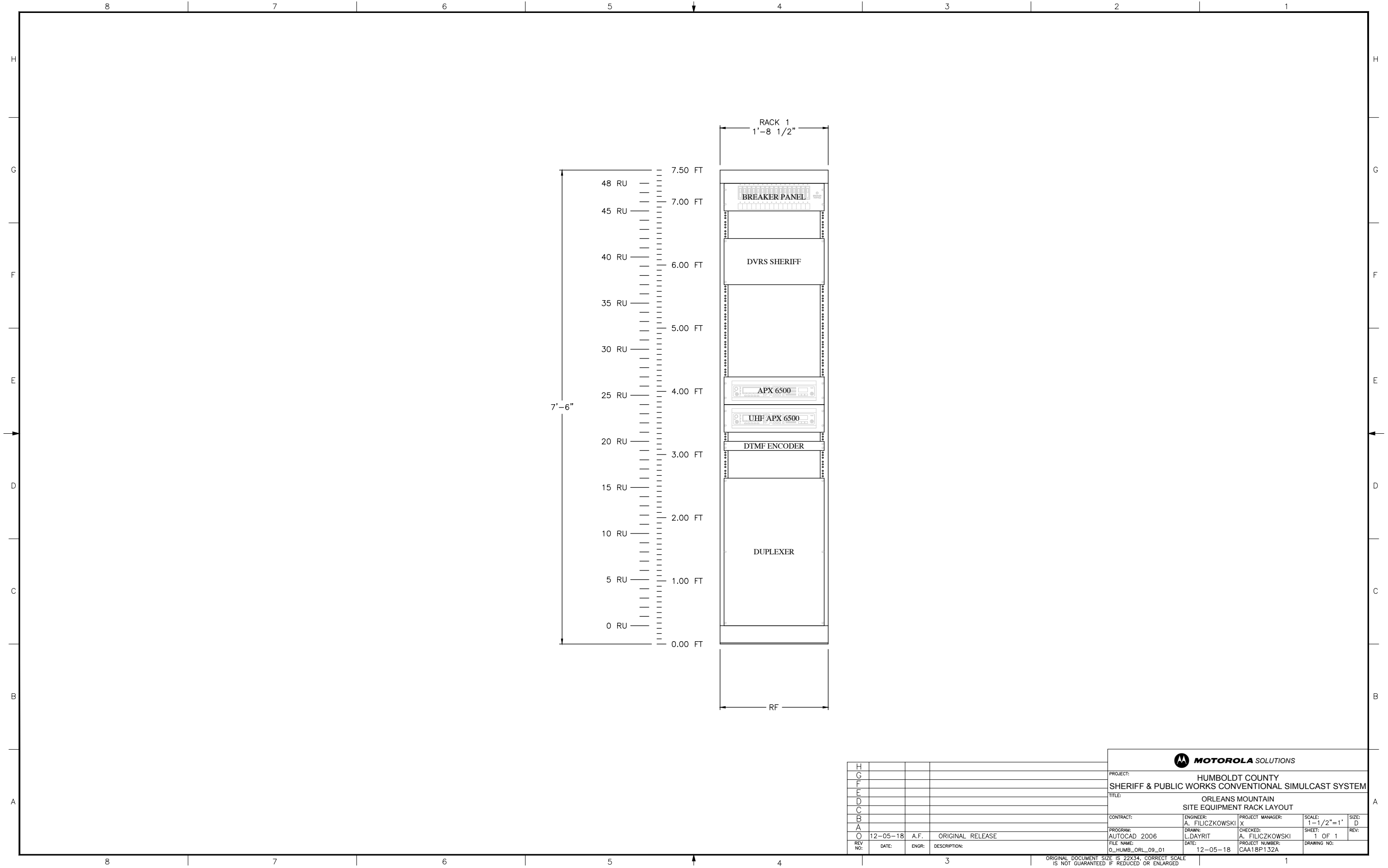


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PROJECT: HUMBOLDT COUNTY SHERIFF & PUBLIC WORKS CONVENTIONAL SIMULCAST SYSTEM				
TITLE: MOUNT PIERCE SITE EQUIPMENT RACK LAYOUT				
CONTRACT:	ENGINEER: A. FILICZKOWSKI	PROJECT MANAGER: X	SCALE: 1-1/2"=1'	SIZE: D
PROGRAM: AUTOCAD 2006	DRAWN: R. SALDARRIAGA	CHECKED: A. FILICZKOWSKI	SHEET: 1 OF 1	REV:
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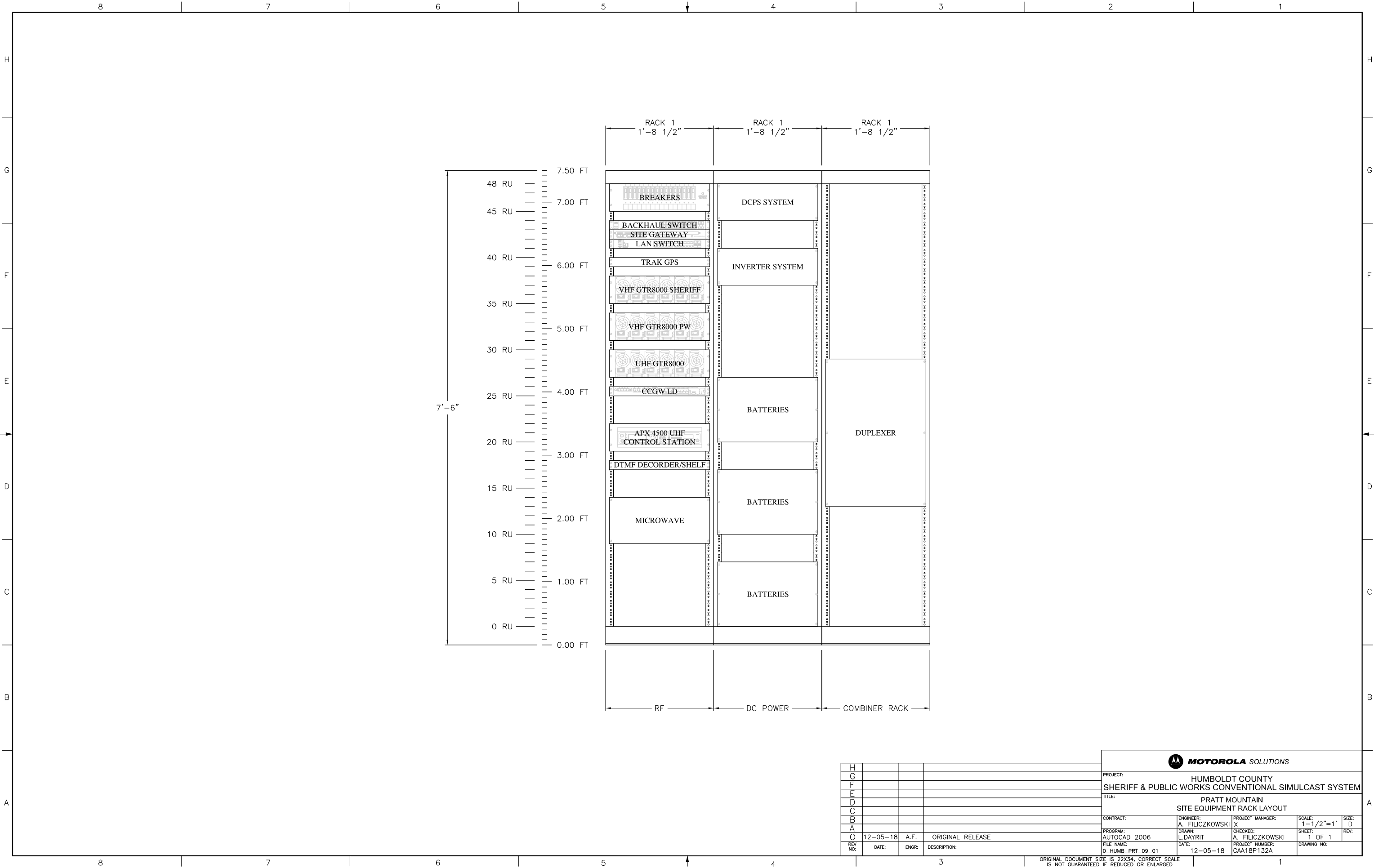


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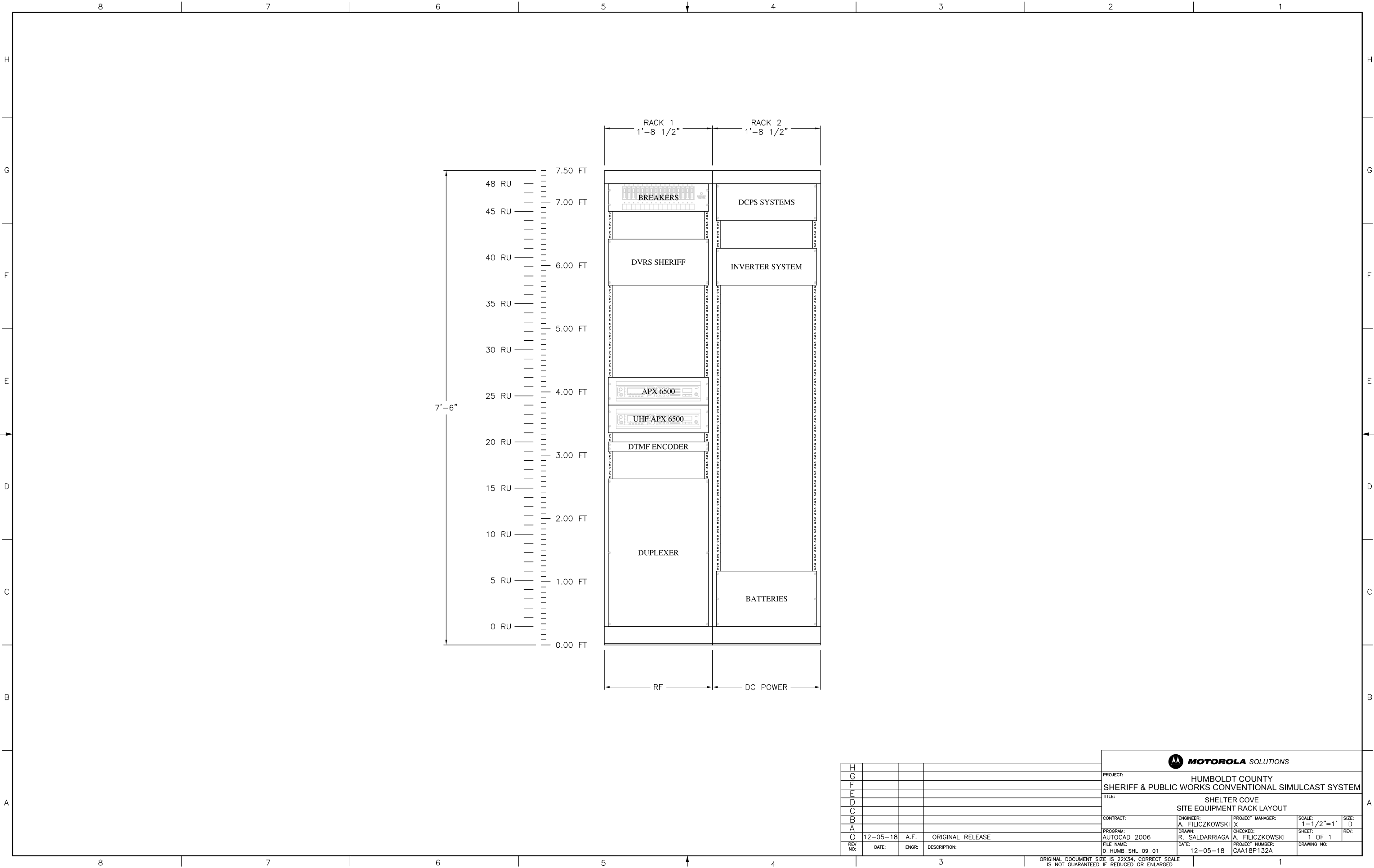
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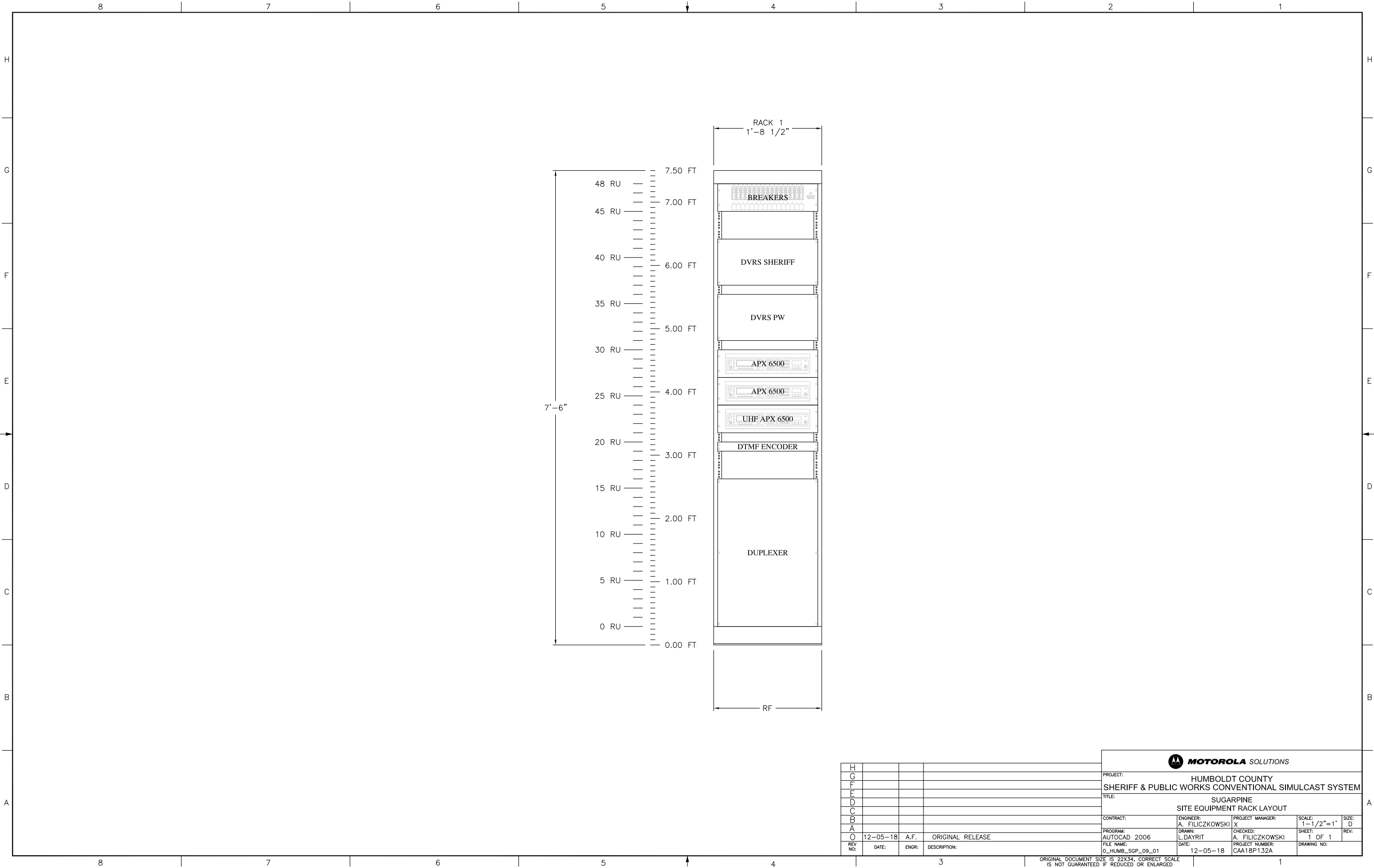
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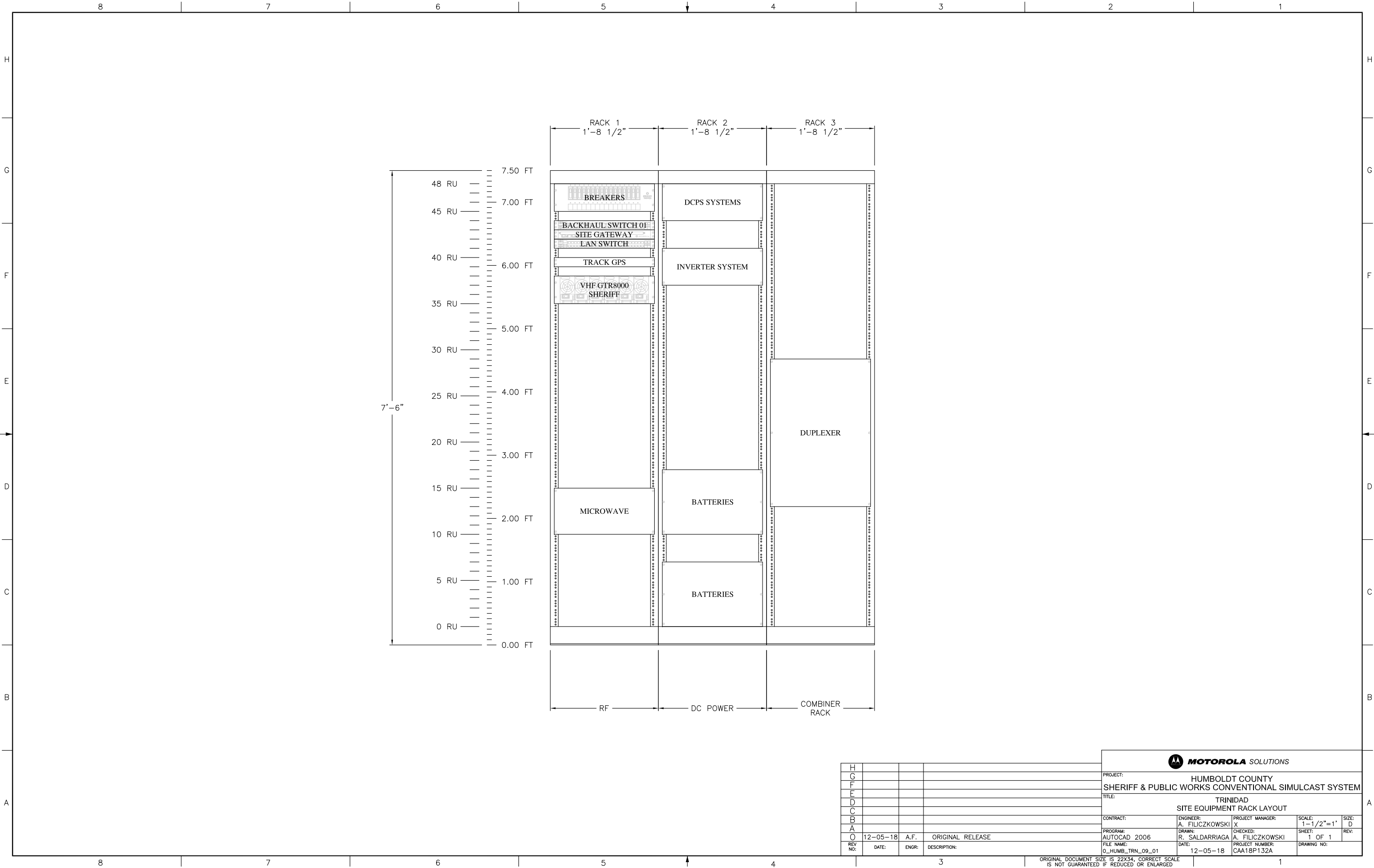


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TITLE: SUGARPINE SITE EQUIPMENT RACK LAYOUT				
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COUNTY OF HUMBOLDT, CALIFORNIA

EXHIBIT C-2

PRICING SUMMARY & EQUIPMENT LIST

HUMBOLDT COUNTY RADIO SYSTEM REPLACEMENT PROJECT

DECEMBER 5, 2018

RFP#18-100-COMM



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Exhibit C-2

Pricing Summary & Equipment List2-1

2.1 Equipment List2-2

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EXHIBIT C-2

PRICING SUMMARY & EQUIPMENT LIST

Below is the pricing without taxes. An incentive of \$135,525 is based upon payment of the first milestone prior to December 31, 2018.

Humboldt County Radio Project	
Fixed Network Equipment	\$3,593,631
DC Power Equipment	\$153,289
Microwave Network Equipment	\$870,984
User Radio Equipment	
Sheriff's Office	\$723,960
District Attorney's Office, Public Works Supervisors, Probation	\$362,763
User Radio Accessories	\$58,818
User Radio Labor	\$181,281
Spectrum Fingerprinting Labor	\$117,647
MCC 7500 Dispatch Console Equipment	\$124,060
Site Development Labor	\$435,756
Frequency Coordination Labor	\$17,647
VHF Combining Equipment	\$67,090
Site Monitoring Equipment	\$38,618
Sugarpine – Site Equipment	\$175,123
Sugarpine Solar Equipment	\$15,824
Discounted Total Before Incentives	\$6,936,489
System Incentive	(\$650,964)
Contract Execution by December 21, 2018	(\$500,000)
Incentive to Pay First Milestone before December 31, 2018	(\$135,525)
Total with Incentives	\$5,650,000



2.1 EQUIPMENT LIST

ITEM	SUB SYS	BLOCK	LI	O	APC	QTY	NOMENCLATURE	DESCRIPTION
FNE	County Courthouse	K1-Core	1	-	405	1	SQM01SUM0237	SINGLE ZONE CONV NON-RED CORE
FNE	County Courthouse	NETWORK	1	a	425	1	CA01896AB	ADD: BACKHAUL SWITCH
FNE	County Courthouse	UEM LITE	1	b	425	1	CA02258AC	ADD: APPLICATION SERVER
FNE	County Courthouse	UEM LITE	1	c	877	1	UA00247AA	ADD: UEM LITE SESSION
FNE	County Courthouse	UEM LITE	1	d	877	1	UA00256AA	ADD: UEM LITE EMAIL NOTIFICATION
FNE	County Courthouse	FIREWALL	1	e	425	1	CA02635AA	ADD: Fortinet Firewall Appliance
FNE	County Courthouse	SWITCH EXP	2	-	147	1	CLN1868	2930F 24-PORT SWITCH
FNE	County Courthouse	ECCGW-4Port	3	-	147	2	SQM01SUM0205	GGM 8000 GATEWAY
FNE	County Courthouse	ECCGW-4Port	3	a	147	2	CA02141AA	ADD: LOW DENSITY ENH CONV GATEWAY
FNE	County Courthouse	ECCGW-4Port	3	b	147	2	CA01619AA	ADD: DC POWER
FNE	County Courthouse	NFM	4	-	708	1	TT3225	Z2 MINI WORKSTATION 258G 8G NON RET
FNE	County Courthouse	NFM	5	-	382	1	T8407	ASTRO LITE CLIENT APPL SW 7.17
FNE	County Courthouse	NFM			877	1	CA02193AA	ADD: ANTI-MALWARE DEF UPDATE LIC
FNE	County Courthouse	NFM	6	-	708	1	T7885	MCAFEЕ WINDOWS AV CLIENT
FNE	County Courthouse	NFM	7	-	708	1	DSTG191B	TECH GLOBAL EVOLUTION SERIES 19INCH NON TOUCH
FNE	SDM3000s	MOSCAD	8	-	469	6	F4544	SITE MANAGER ADVANCED
FNE	SDM3000s	MOSCAD	8	a	469	6	VA00905	ADD:24/48 VDC PS TO SM
FNE	SDM3000s	MOSCAD	8	b	469	6	VA00872	ADD: SDM ASTRO RTU FW CURR ASTRO REL
FNE	SDM3000s	MOSCAD	8	c	469	18	V592	AAD TERM BLCK & CONN WI
FNE	County Courthouse	GPS	9	-	906	1	DSTRAK88358M	GPS CLOCK, 10MHZ, DOCXO, 48VDC INCL ANT,100' COAX W/DONGLE SNMPV3
FNE	County Courthouse	GPS	10	-	906	1	DSTRAK4008245101	MOUNTING SHELF FOR 8835 GPS CLOCK
FNE	County Courthouse	GPS	11	-	351	50	L1700	FSJ1-50A CABLE: 1/4

ITEM	SUB SYS	BLOCK	LI	O	APC	QTY	NOMENCLATURE	DESCRIPTION
FNE	County Courthouse	GPS	12	-	351	4	DDN9769	F1PNM-HC 1/4
FNE	County Courthouse	GRV 8000	13	-	112	1	T8341	GRV 8000 COMPARATOR
FNE	County Courthouse	GRV 8000	13	a	112	1	CA03084AA	ADD: COMPARATOR
FNE	County Courthouse	GRV 8000	13	b	595	1	CA03320AA	ADD: ASTRO 25 CONVENTIONAL SOFTWARE
FNE	County Courthouse	GRV 8000	13	c	595	1	CA03317AA	ADD: DIGITAL CONV SIMULCAST SOFTWARE
FNE	County Courthouse	GRV 8000	13	d	595	1	CA03085AA	ADD: GEO REDUNDANCY
FNE	County Courthouse	GRV 8000			112	1	CA01953AA	ADD: POWER EFFICIENCY PACKAGE
FNE	County Courthouse	GRV 8000	13	e	112	1	CA03111AA	ADD: CEC COMPLIANCE
FNE	County Courthouse	GRV 8000	13	f	112	1	CA01400AA	ADD: POWER CABLE, DC
FNE	County Courthouse	GRV 8000	13	g	112	1	X153AW	ADD: RACK MOUNT HARDWARE
FNE	County Courthouse	GRV 8000	14	-	112	1	T8341	GRV 8000 COMPARATOR
FNE	County Courthouse	GRV 8000	14	a	112	1	CA03084AA	ADD: COMPARATOR
FNE	County Courthouse	GRV 8000	14	b	595	1	CA01949AC	ADD: ANALOG CONV ONLY SW
FNE	County Courthouse	GRV 8000	14	c	595	1	CA01952AC	ADD: ANALOG CONV SIMULCAST SW
FNE	County Courthouse	GRV 8000	14	d	595	1	CA03085AA	ADD: GEO REDUNDANCY
FNE	County Courthouse	GRV 8000			112	1	CA01953AA	ADD: POWER EFFICIENCY PACKAGE
FNE	County Courthouse	GRV 8000	14	e	112	1	CA03111AA	ADD: CEC COMPLIANCE
FNE	County Courthouse	GRV 8000	14	f	112	1	CA01400AA	ADD: POWER CABLE, DC
FNE	County Courthouse	GRV 8000	14	g	112	1	X153AW	ADD: RACK MOUNT HARDWARE
FNE	County Courthouse	GRV 8000	1	-	112	1	T8341	GRV 8000 COMPARATOR
FNE	County Courthouse	GRV 8000			112	1	CA03084AA	ADD: COMPARATOR
FNE	County Courthouse	GRV 8000			595	1	CA01949AC	ADD: ANALOG CONV ONLY SW



ITEM	SUB SYS	BLOCK	LI	O	APC	QTY	NOMENCLATURE	DESCRIPTION
FNE	County Courthouse	GRV 8000			595	1	CA01952AC	ADD: ANALOG CONV SIMULCAST SW
FNE	County Courthouse	GRV 8000			112	1	CA01953AA	ADD: POWER EFFICIENCY PACKAGE
FNE	County Courthouse	GRV 8000			112	1	CA03111AA	ADD: CEC COMPLIANCE
FNE	County Courthouse	GRV 8000			112	1	CA01400AA	ADD: POWER CABLE, DC
FNE	County Courthouse	GRV 8000			112	1	X153AW	ADD: RACK MOUNT HARDWARE
FNE	County Courthouse	CONV_GTR	15	-	112	1	T7039	GTR 8000 Base Radio
FNE	County Courthouse	CONV_GTR	15	a	595	1	CA00717AA	ADD: ASTRO SYSTEM RELEASE 7.17
FNE	County Courthouse	CONV_GTR	15	b	112	1	X530BG	ADD: VHF (136-174 MHZ)
FNE	County Courthouse	CONV_GTR	15	c	595	1	CA01948AA	ADD: CONVENTIONAL SOFTWARE
FNE	County Courthouse	CONV_GTR	15	d	595	1	CA01502AA	ADD: ASTRO 25 CONVENTIONAL SIMULCAST SOFTWARE
FNE	County Courthouse	CONV_GTR	15	e	112	1	CA01953AA	ADD: POWER EFFICIENCY PACKAGE
FNE	County Courthouse	CONV_GTR	15	f	112	1	CA03111AA	ADD: CEC COMPLIANCE
FNE	County Courthouse	CONV_GTR	15	g	112	1	X265AM	BR PRESECTOR, 150-174 MHZ
FNE	County Courthouse	CONV_GTR	15	h	112	1	X153AW	ADD: RACK MOUNT HARDWARE
FNE	County Courthouse	CONV_GTR	16	-	112	1	T7039	GTR 8000 Base Radio
FNE	County Courthouse	CONV_GTR	16	a	595	1	CA00717AA	ADD: ASTRO SYSTEM RELEASE 7.17
FNE	County Courthouse	CONV_GTR	16	b	112	1	X530BG	ADD: VHF (136-174 MHZ)
FNE	County Courthouse	CONV_GTR	16	c	595	1	CA01949AA	ADD: ANALOG ONLY CONV SW
FNE	County Courthouse	CONV_GTR	16	d	595	1	CA01952AA	ADD: ANALOG CONVENTIONAL SIMULCAST SOFTWARE
FNE	County Courthouse	CONV_GTR	16	e	112	1	CA01953AA	ADD: POWER EFFICIENCY PACKAGE
FNE	County Courthouse	CONV_GTR	16	f	112	1	CA03111AA	ADD: CEC COMPLIANCE
FNE	County Courthouse	CONV_GTR	16	g	112	1	X265AM	BR PRESECTOR, 150-174 MHZ

ITEM	SUB SYS	BLOCK	LI	O	APC	QTY	NOMENCLATURE	DESCRIPTION
FNE	County Courthouse	CONV_GTR	16	h	112	1	X153AW	ADD: RACK MOUNT HARDWARE
FNE	County Courthouse	RACK	17	-	509	2	TRN7343	SEVEN AND A HALF FOOT RACK
FNE	County Courthouse	ANTENNA	19	-	351	1	DSOA4041DIN	OFFSET, EXPOSED DIPOLE ARRAY, 9 DBD, 136-174 MHZ, PIM RATED
FNE	County Courthouse	UPPERJUMPR	20	-	351	15	L1705	LDF4-50A CABLE: 1/2
FNE	County Courthouse	UPPERJUMPR	21	-	351	2	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
FNE	County Courthouse	JUMPER	22	-	515	2	TDN9289	221213 CABLE WRAP WEATHERPROOFING
FNE	County Courthouse	MAINLINE	23	-	207	100	L3323	AVA5-50, 7/8 IN VIRTUAL AIR COAXIAL CABLE, CORRUGATED COPPER
FNE	County Courthouse	MAINLINE	24	-	351	2	DDN1077	7-16IN DIN FEMALE CONNECTOR EZ-FIT FOR 7/8IN CABLE (MOTOROLA SPECIFIC)
FNE	County Courthouse	MAINLINE	25	-	351	3	DSSG7806B2A	SG78-06B2A GROUNDING KIT FOR 7/8 IN COAXIAL CABLE
FNE	County Courthouse	MAINLINE	26	-	351	1	DSL5SGRIP	L5SGRIP 7/8" SUPPORT HOIST GRIP
FNE	County Courthouse	ANTACC	27	-	351	5	DSSSH78	SSH-78 7/8" SNAPSTAK HANGER 10PK
FNE	County Courthouse	SURGE	28	-	207	1	DSVHF50DMPGR	RF SPD, 100-512MHZ, DC BLOCK HIGH POWER DIN MALE ANT, DIN FEMALE EQUIP
FNE	County Courthouse	LOWERJUMPR	29	-	351	25	L1705	LDF4-50A CABLE: 1/2
FNE	County Courthouse	LOWERJUMPR	30	-	351	1	DDN1088	L4TNM-PSA TYPE N MALE PS FOR 1/2 IN CABLE
FNE	County Courthouse	LOWERJUMPR	31	-	351	1	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
FNE	County Courthouse	ANTENNA	1	-	351	1	DSOA4041DIN	OFFSET, EXPOSED DIPOLE ARRAY, 9 DBD, 136-174 MHZ, PIM RATED
FNE	County Courthouse	UPPERJUMPR	1	-	351	15	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
FNE	County Courthouse	UPPERJUMPR	1	-	351	2	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
FNE	County Courthouse	JUMPER	1	-	515	2	TDN9289	221213 CABLE WRAP WEATHERPROOFING
FNE	County Courthouse	MAINLINE	1	-	207	100	L3323	AVA5-50, 7/8 IN VIRTUAL AIR COAXIAL CABLE, CORRUGATED COPPER



ITEM	SUB SYS	BLOCK	LI	O	APC	QTY	NOMENCLATURE	DESCRIPTION
FNE	County Courthouse	MAINLINE	1	-	351	2	DDN1077	7-16IN DIN FEMALE CONNECTOR EZ-FIT FOR 7/8IN CABLE (MOTOROLA SPECIFIC)
FNE	County Courthouse	MAINLINE	1	-	351	3	DSSG7806B2A	SG78-06B2A GROUNDING KIT FOR 7/8 IN COAXIAL CABLE
FNE	County Courthouse	MAINLINE	1	-	351	1	DSL5SGRIP	L5SGRIP 7/8" SUPPORT HOIST GRIP
FNE	County Courthouse	ANTACC	1	-	351	5	DSSSH78	SSH-78 7/8" SNAPSTAK HANGER 10PK
FNE	County Courthouse	SURGE	1	-	207	1	DSVHF50DMPGR	RF SPD, 100-512MHZ, DC BLOCK HIGH POWER DIN MALE ANT, DIN FEMALE EQUIP
FNE	County Courthouse	LOWERJUMPR	1	-	351	25	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
FNE	County Courthouse	LOWERJUMPR	1	-	351	1	DDN1088	L4TNM-PSA TYPE N MALE PS FOR 1/2 IN CABLE
FNE	County Courthouse	LOWERJUMPR	1	-	351	1	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
FNE	County Courthouse	RFDS			457	1	DSSPD23251	Courthouse Custom Combining
FNE	County Courthouse	SURGE	1	-	207	1	DS570SA16FNRJ1S	SPD, TYPE 1, SAD/MOV, 120/240 VAC 1-PHASE
FNE	County Courthouse	SURGE	1	-	207	1	DS560SA16FNRJ1S	SPD, TYPE 2, MOV, 120/240 VAC 1-PHASE
FNE	Horse Mtn	NETWORK	32	-	147	2	CLN1868	2930F 24-PORT SWITCH
FNE	Horse Mtn	NETWORK	33	-	147	1	SQM01SUM0205	GGM 8000 GATEWAY
FNE	Horse Mtn	NETWORK	33	a	147	1	CA01619AA	ADD: DC POWER
FNE	Horse Mtn	ECCGW-4Port	1	-	147	1	SQM01SUM0205	GGM 8000 GATEWAY
FNE	Horse Mtn	ECCGW-4Port			147	1	CA02141AA	ADD: LOW DENSITY ENH CONV GATEWAY
FNE	Horse Mtn	ECCGW-4Port			147	1	CA01619AA	ADD: DC POWER
FNE	Horse Mtn	GPS	34	-	906	1	DSTRAK88358M	GPS CLOCK, 10MHZ, DOCXO, 48VDC INCL ANT, 100' COAX W/DONGLE SNMPV3
FNE	Horse Mtn	GPS	35	-	906	1	DSTRAK4008245101	MOUNTING SHELF FOR 8835 GPS CLOCK
FNE	Horse Mtn	GPS	36	-	351	50	L1700	FSJ1-50A CABLE: 1/4
FNE	Horse Mtn	GPS	37	-	351	4	DDN9769	F1PNM-HC 1/4
FNE	Horse Mtn	CONV_GTR	38	-	112	1	T7039	GTR 8000 Base Radio
FNE	Horse Mtn	CONV_GTR	38	a	595	1	CA00717AA	ADD: ASTRO SYSTEM RELEASE 7.17
FNE	Horse Mtn	CONV_GTR	38	b	112	1	X530BG	ADD: VHF (136-174 MHZ)
FNE	Horse Mtn	CONV_GTR	38	c	595	1	CA01948AA	ADD: CONVENTIONAL SOFTWARE

ITEM	SUB SYS	BLOCK	LI	O	APC	QTY	NOMENCLATURE	DESCRIPTION
FNE	Horse Mtn	CONV_GTR	38	d	595	1	CA01502AA	ADD: ASTRO 25 CONVENTIONAL SIMULCAST SOFTWARE
FNE	Horse Mtn	CONV_GTR	38	e	112	1	CA01953AA	ADD: POWER EFFICIENCY PACKAGE
FNE	Horse Mtn	CONV_GTR	38	f	112	1	CA03111AA	ADD: CEC COMPLIANCE
FNE	Horse Mtn	CONV_GTR	38	g	112	1	X265AM	BR PRESELECTOR, 150-174 MHZ
FNE	Horse Mtn	CONV_GTR	38	h	112	1	X153AW	ADD: RACK MOUNT HARDWARE
FNE	Horse Mtn	CONV_GTR	39	-	112	1	T7039	GTR 8000 Base Radio
FNE	Horse Mtn	CONV_GTR	39	a	595	1	CA00717AA	ADD: ASTRO SYSTEM RELEASE 7.17
FNE	Horse Mtn	CONV_GTR	39	b	112	1	X530BG	ADD: VHF (136-174 MHZ)
FNE	Horse Mtn	CONV_GTR	39	c	595	1	CA01949AA	ADD: ANALOG ONLY CONV SW
FNE	Horse Mtn	CONV_GTR	39	d	595	1	CA01952AA	ADD: ANALOG CONVENTIONAL SIMULCAST SOFTWARE
FNE	Horse Mtn	CONV_GTR	39	e	112	1	CA01953AA	ADD: POWER EFFICIENCY PACKAGE
FNE	Horse Mtn	CONV_GTR	39	f	112	1	CA03111AA	ADD: CEC COMPLIANCE
FNE	Horse Mtn	CONV_GTR	39	g	112	1	X265AM	BR PRESELECTOR, 150-174 MHZ
FNE	Horse Mtn	CONV_GTR	39	h	112	1	X153AW	ADD: RACK MOUNT HARDWARE
FNE	Horse Mtn	CONV_GTR	228	-	112	3	T7039	GTR 8000 Base Radio
FNE	Horse Mtn	CONV_GTR	228	a	595	3	CA00717AA	ADD: ASTRO SYSTEM RELEASE 7.17
FNE	Horse Mtn	CONV_GTR	228	b	112	3	X448AA	ADD: UHF R1 (380-435 MHZ)
FNE	Horse Mtn	CONV_GTR	228	c	595	3	CA01948AA	ADD: CONVENTIONAL SOFTWARE
FNE	Horse Mtn	CONV_GTR	228	d	595	3	CA01502AA	ADD: ASTRO 25 CONVENTIONAL SIMULCAST SOFTWARE
FNE	Horse Mtn	CONV_GTR	228	e	112	3	CA01953AA	ADD: POWER EFFICIENCY PACKAGE
FNE	Horse Mtn	CONV_GTR	228	f	112	3	CA03111AA	ADD: CEC COMPLIANCE
FNE	Horse Mtn	CONV_GTR	228	g	112	3	X265AM	BR PRESELECTOR, 150-174 MHZ
FNE	Horse Mtn	CONV_GTR	228	h	112	3	X153AW	ADD: RACK MOUNT HARDWARE
FNE	Horse Mtn	RACK	40	-	509	1	TRN7343	SEVEN AND A HALF FOOT RACK
FNE	Horse Mtn	RFDS	41	-	457	1	DS2636H0102	DUPLEXING SYSTEM 137-174 MHZ 2 CHANNEL INPUT ISOLATORS AC
FNE	Horse Mtn	ANTENNA	42	-	351	1	DSEA8041DINT3	ELLIPTICAL, EXPOSED DIPOLE ARRAY, 8DBD, 136-174MHZ, 3DEG DT, PIM RATED
FNE	Horse Mtn	UPPERJUMPR	43	-	351	15	L1705	LDF4-50A CABLE: 1/2
FNE	Horse Mtn	UPPERJUMPR	44	-	351	2	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
FNE	Horse Mtn	JUMPER	45	-	515	2	TDN9289	221213 CABLE WRAP WEATHERPROOFING



ITEM	SUB SYS	BLOCK	LI	O	APC	QTY	NOMENCLATURE	DESCRIPTION
FNE	Horse Mtn	MAINLINE	46	-	207	140	L3323	AVA5-50, 7/8 IN VIRTUAL AIR COAXIAL CABLE, CORRUGATED COPPER
FNE	Horse Mtn	MAINLINE	47	-	351	2	DDN1077	7-16IN DIN FEMALE CONNECTOR EZ-FIT FOR 7/8IN CABLE (MOTOROLA SPECIFIC)
FNE	Horse Mtn	MAINLINE	48	-	351	3	DSSG7806B2A	SG78-06B2A GROUNDING KIT FOR 7/8 IN COAXIAL CABLE
FNE	Horse Mtn	MAINLINE	49	-	351	1	DSL5SGRIP	L5SGRIP 7/8" SUPPORT HOIST GRIP
FNE	Horse Mtn	ANTACC	50	-	351	5	DSSSH78	SSH-78 7/8" SNAPSTAK HANGER 10PK
FNE	Horse Mtn	SURGE	51	-	207	1	DSVHF50DMPGR	RF SPD, 100-512MHZ, DC BLOCK HIGH POWER DIN MALE ANT, DIN FEMALE EQUIP
FNE	Horse Mtn	LOWERJUMPR	52	-	351	25	L1705	LDF4-50A CABLE: 1/2
FNE	Horse Mtn	LOWERJUMPR	53	-	351	1	DDN1088	L4TNM-PSA TYPE N MALE PS FOR 1/2 IN CABLE
FNE	Horse Mtn	LOWERJUMPR	54	-	351	1	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
FNE	Horse Mtn	ANTENNA			351	1	DSCSA2067DIN	DIRECTIONAL DIPOLE ARRAY, 9 DBD, 60 DEG BW, 406-512 MHZ, PIM RATED
FNE	Horse Mtn	UPPERJUMPR	231	-	351	15	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
FNE	Horse Mtn	UPPERJUMPR	232	-	351	2	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
FNE	Horse Mtn	JUMPER	233	-	515	2	TDN9289	221213 CABLE WRAP WEATHERPROOFING
FNE	Horse Mtn	MAINLINE	234	-	207	140	L3323	AVA5-50, 7/8 IN VIRTUAL AIR COAXIAL CABLE, CORRUGATED COPPER
FNE	Horse Mtn	MAINLINE	235	-	351	2	DDN1077	7-16IN DIN FEMALE CONNECTOR EZ-FIT FOR 7/8IN CABLE (MOTOROLA SPECIFIC)
FNE	Horse Mtn	MAINLINE	236	-	351	3	DSSG7806B2A	SG78-06B2A GROUNDING KIT FOR 7/8 IN COAXIAL CABLE
FNE	Horse Mtn	MAINLINE	237	-	351	1	DSL5SGRIP	L5SGRIP 7/8" SUPPORT HOIST GRIP
FNE	Horse Mtn	ANTACC	238	-	351	5	DSSSH78	SSH-78 7/8" SNAPSTAK HANGER 10PK
FNE	Horse Mtn	SURGE	239	-	207	1	DSVHF50DMPGR	RF SPD, 100-512MHZ, DC BLOCK HIGH POWER DIN MALE ANT, DIN FEMALE EQUIP
FNE	Horse Mtn	LOWERJUMPR	240	-	351	25	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT

ITEM	SUB SYS	BLOCK	LI	O	APC	QTY	NOMENCLATURE	DESCRIPTION
FNE	Horse Mtn	LOWERJUMPR	241	-	351	1	DDN1088	L4TNM-PSA TYPE N MALE PS FOR 1/2 IN CABLE
FNE	Horse Mtn	LOWERJUMPR	242	-	351	1	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
FNE	Horse Mtn	APX4500			471	2	M22QSS9PW1 N	APX4500 UHF R1
FNE	Horse Mtn	APX4500			412	2	G806	ENH: SOFTWARE ASTRO DIGITAL COMMON AIR INTERFACE OPERATION
FNE	Horse Mtn	APX4500			430	2	Q811AQ	ENH: SOFTWARE P25 CONVENTIONAL FLASHPORT
FNE	Horse Mtn	APX4500			656	2	GA00804	ADD: APX O2 CONTROL HEAD (Grey)
FNE	Horse Mtn	APX4500			656	2	G444	ADD: APX CONTROL HEAD SOFTWARE
FNE	Horse Mtn	APX4500			656	2	G67	ADD: REMOTE MOUNT MID POWER
FNE	Horse Mtn	APX4500			656	2	G90	ADD: NO MICROPHONE NEEDED
FNE	Horse Mtn	APX4500			656	2	G142	ADD: NO SPEAKER NEEDED
FNE	Horse Mtn	APX4500			656	2	G618	ADD:CBL REMOTE MOUNT 10 FEET
FNE	Horse Mtn	APX4500			656	2	GA00235	ADD: NO GPS ANTENNA NEEDED
FNE	Horse Mtn	APX4500			185	2	G24	ADD: 3Y ESSENTIAL SERVICE
FNE	Horse Mtn	ANTENNA	1	-	351	1	DSCSA2067DIN	DIRECTIONAL DIPOLE ARRAY, 9 DBD, 60 DEG BW, 406-512 MHZ, PIM RATED
FNE	Horse Mtn	UPPERJUMPR	1	-	351	15	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
FNE	Horse Mtn	UPPERJUMPR	1	-	351	2	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
FNE	Horse Mtn	JUMPER	1	-	515	2	TDN9289	221213 CABLE WRAP WEATHERPROOFING
FNE	Horse Mtn	MAINLINE	1	-	207	110	L3323	AVA5-50, 7/8 IN VIRTUAL AIR COAXIAL CABLE, CORRUGATED COPPER
FNE	Horse Mtn	MAINLINE	1	-	351	2	DDN1077	7-16IN DIN FEMALE CONNECTOR EZ-FIT FOR 7/8IN CABLE (MOTOROLA SPECIFIC)
FNE	Horse Mtn	MAINLINE	1	-	351	3	DSSG7806B2A	SG78-06B2A GROUNDING KIT FOR 7/8 IN COAXIAL CABLE
FNE	Horse Mtn	MAINLINE	1	-	351	1	DSL5SGRIP	L5SGRIP 7/8" SUPPORT HOIST GRIP
FNE	Horse Mtn	ANTACC	1	-	351	5	DSSSH78	SSH-78 7/8" SNAPSTAK HANGER 10PK



ITEM	SUB SYS	BLOCK	LI	O	APC	QTY	NOMENCLATURE	DESCRIPTION
FNE	Horse Mtn	SURGE	1	-	207	1	DSVHF50DMPGR	RF SPD, 100-512MHZ, DC BLOCK HIGH POWER DIN MALE ANT, DIN FEMALE EQUIP
FNE	Horse Mtn	LOWERJUMPR	1	-	351	25	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
FNE	Horse Mtn	LOWERJUMPR	1	-	351	1	DDN1088	L4TNM-PSA TYPE N MALE PS FOR 1/2 IN CABLE
FNE	Horse Mtn	ANTENNA	1	-	351	1	DSCSA2067DIN	DIRECTIONAL DIPOLE ARRAY, 9 DBD, 60 DEG BW, 406-512 MHZ, PIM RATED
FNE	Horse Mtn	UPPERJUMPR	1	-	351	15	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
FNE	Horse Mtn	UPPERJUMPR	1	-	351	2	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
FNE	Horse Mtn	JUMPER	1	-	515	2	TDN9289	221213 CABLE WRAP WEATHERPROOFING
FNE	Horse Mtn	MAINLINE	1	-	207	110	L3323	AVA5-50, 7/8 IN VIRTUAL AIR COAXIAL CABLE, CORRUGATED COPPER
FNE	Horse Mtn	MAINLINE	1	-	351	2	DDN1077	7-16IN DIN FEMALE CONNECTOR EZ-FIT FOR 7/8IN CABLE (MOTOROLA SPECIFIC)
FNE	Horse Mtn	MAINLINE	1	-	351	3	DSSG7806B2A	SG78-06B2A GROUNDING KIT FOR 7/8 IN COAXIAL CABLE
FNE	Horse Mtn	MAINLINE	1	-	351	1	DSL5SGRIP	L5SGRIP 7/8" SUPPORT HOIST GRIP
FNE	Horse Mtn	ANTACC	1	-	351	5	DSSSH78	SSH-78 7/8" SNAPSTAK HANGER 10PK
FNE	Horse Mtn	SURGE	1	-	207	1	DSVHF50DMPGR	RF SPD, 100-512MHZ, DC BLOCK HIGH POWER DIN MALE ANT, DIN FEMALE EQUIP
FNE	Horse Mtn	LOWERJUMPR	1	-	351	25	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
FNE	Horse Mtn	LOWERJUMPR	1	-	351	1	DDN1088	L4TNM-PSA TYPE N MALE PS FOR 1/2 IN CABLE
FNE	Horse Mtn	SURGE	1	-	207	1	DS570SA16FNRJ1 S	SPD, TYPE 1, SAD/MOV, 120/240 VAC 1-PHASE
FNE	Horse Mtn	SURGE	1	-	207	1	DS560SA16FNRJ1 S	SPD, TYPE 2, MOV, 120/240 VAC 1- PHASE
FNE	Trinidad	NETWORK	55	-	147	2	CLN1868	2930F 24-PORT SWITCH
FNE	Trinidad	NETWORK	56	-	147	1	SQM01SUM0205	GGM 8000 GATEWAY
FNE	Trinidad	NETWORK	56	a	147	1	CA01619AA	ADD: DC POWER
FNE	Trinidad	ECCGW-4Port	1	-	147	1	SQM01SUM0205	GGM 8000 GATEWAY
FNE	Trinidad	ECCGW-4Port			147	1	CA02141AA	ADD: LOW DENSITY ENH CONV GATEWAY

ITEM	SUB SYS	BLOCK	LI	O	APC	QTY	NOMENCLATURE	DESCRIPTION
FNE	Trinidad	ECCGW-4Port			147	1	CA01619AA	ADD: DC POWER
FNE	Trinidad	GPS	57	-	906	1	DSTRAK88358M	GPS CLOCK, 10MHZ, DOXO, 48VDC INCL ANT,100' COAX W/DONGLE SNMPV3
FNE	Trinidad	GPS	58	-	906	1	DSTRAK4008245101	MOUNTING SHELF FOR 8835 GPS CLOCK
FNE	Trinidad	GPS	59	-	351	50	L1700	FSJ1-50A CABLE: 1/4
FNE	Trinidad	GPS	60	-	351	4	DDN9769	F1PNM-HC 1/4
FNE	Trinidad	CONV_GTR	61	-	112	1	T7039	GTR 8000 Base Radio
FNE	Trinidad	CONV_GTR	61	a	595	1	CA00717AA	ADD: ASTRO SYSTEM RELEASE 7.17
FNE	Trinidad	CONV_GTR	61	b	112	1	X530BG	ADD: VHF (136-174 MHZ)
FNE	Trinidad	CONV_GTR	61	c	595	1	CA01948AA	ADD: CONVENTIONAL SOFTWARE
FNE	Trinidad	CONV_GTR	61	d	595	1	CA01502AA	ADD: ASTRO 25 CONVENTIONAL SIMULCAST SOFTWARE
FNE	Trinidad	CONV_GTR	61	e	112	1	CA01953AA	ADD: POWER EFFICIENCY PACKAGE
FNE	Trinidad	CONV_GTR	61	f	112	1	CA03111AA	ADD: CEC COMPLIANCE
FNE	Trinidad	CONV_GTR	61	g	112	1	X265AM	BR PRESECTOR, 150-174 MHZ
FNE	Trinidad	CONV_GTR	61	h	112	1	X153AW	ADD: RACK MOUNT HARDWARE
FNE	Trinidad	RACK	62	-	509	1	TRN7343	SEVEN AND A HALF FOOT RACK
FNE	Trinidad	RFDS	63	-	457	1	DS2636H0101	DUPLEXING SYSTEM,137-174 MHZ 1 CHANNEL INPUT ISOLATORS AC
FNE	Trinidad	ANTENNA	64	-	351	1	DSOA4041DIN	OFFSET, EXPOSED DIPOLE ARRAY, 9 DBD, 136-174 MHZ, PIM RATED
FNE	Trinidad	UPPERJUMPR	65	-	351	15	L1705	LDF4-50A CABLE: 1/2
FNE	Trinidad	UPPERJUMPR	66	-	351	2	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
FNE	Trinidad	JUMPER	67	-	515	2	TDN9289	221213 CABLE WRAP WEATHERPROOFING
FNE	Trinidad	MAINLINE	68	-	207	100	L3323	AVA5-50, 7/8 IN VIRTUAL AIR COAXIAL CABLE, CORRUGATED COPPER
FNE	Trinidad	MAINLINE	69	-	351	2	DDN1077	7-16IN DIN FEMALE CONNECTOR EZ-FIT FOR 7/8IN CABLE (MOTOROLA SPECIFIC)
FNE	Trinidad	MAINLINE	70	-	351	3	DSSG7806B2A	SG78-06B2A GROUNDING KIT FOR 7/8 IN COAXIAL CABLE
FNE	Trinidad	MAINLINE	71	-	351	1	DSL5SGRIP	L5SGRIP 7/8" SUPPORT HOIST GRIP
FNE	Trinidad	ANTACC	72	-	351	5	DSSSH78	SSH-78 7/8" SNAPSTAK HANGER 10PK



ITEM	SUB SYS	BLOCK	LI	O	APC	QTY	NOMENCLATURE	DESCRIPTION
FNE	Trinidad	SURGE	73	-	207	1	DSVHF50DMPGR	RF SPD, 100-512MHZ, DC BLOCK HIGH POWER DIN MALE ANT, DIN FEMALE EQUIP
FNE	Trinidad	LOWERJUMPR	74	-	351	25	L1705	LDF4-50A CABLE: 1/2
FNE	Trinidad	LOWERJUMPR	75	-	351	1	DDN1088	L4TNM-PSA TYPE N MALE PS FOR 1/2 IN CABLE
FNE	Trinidad	LOWERJUMPR	76	-	351	1	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
FNE	Mt Pierce	NETWORK	77	-	147	2	CLN1868	2930F 24-PORT SWITCH
FNE	Mt Pierce	NETWORK	78	-	147	1	SQM01SUM0205	GGM 8000 GATEWAY
FNE	Mt Pierce	NETWORK	78	a	147	1	CA01619AA	ADD: DC POWER
FNE	Mt Pierce	ECCGW-4Port	79	-	147	2	SQM01SUM0205	GGM 8000 GATEWAY
FNE	Mt Pierce	ECCGW-4Port	79	a	147	2	CA02141AA	ADD: LOW DENSITY ENH CONV GATEWAY
FNE	Mt Pierce	ECCGW-4Port	79	b	147	2	CA01619AA	ADD: DC POWER
FNE	Mt Pierce	GPS	80	-	906	1	DSTRAK88358M	GPS CLOCK, 10MHZ, DOXO, 48VDC INCL ANT,100' COAX W/DONGLE SNMPV3
FNE	Mt Pierce	GPS	81	-	906	1	DSTRAK400824510 1	MOUNTING SHELF FOR 8835 GPS CLOCK
FNE	Mt Pierce	GPS	82	-	351	50	L1700	FSJ1-50A CABLE: 1/4
FNE	Mt Pierce	GPS	83	-	351	4	DDN9769	F1PNM-HC 1/4
FNE	Mt Pierce	GRV 8000	84	-	112	1	T8341	GRV 8000 COMPARATOR
FNE	Mt Pierce	GRV 8000	84	a	112	1	CA03084AA	ADD: COMPARATOR
FNE	Mt Pierce	GRV 8000	84	b	595	1	CA03320AA	ADD: ASTRO 25 CONVENTIONAL SOFTWARE
FNE	Mt Pierce	GRV 8000	84	c	595	1	CA03317AA	ADD: DIGITAL CONV SIMULCAST SOFTWARE
FNE	Mt Pierce	GRV 8000	84	d	595	1	CA03085AA	ADD: GEO REDUNDANCY
FNE	Mt Pierce	GRV 8000	61	i	112	1	CA01953AA	ADD: POWER EFFICIENCY PACKAGE
FNE	Mt Pierce	GRV 8000	84	e	112	1	CA03111AA	ADD: CEC COMPLIANCE
FNE	Mt Pierce	GRV 8000	84	f	112	1	CA01400AA	ADD: POWER CABLE, DC
FNE	Mt Pierce	GRV 8000	84	g	112	1	X153AW	ADD: RACK MOUNT HARDWARE
FNE	Mt Pierce	GRV 8000	85	-	112	1	T8341	GRV 8000 COMPARATOR
FNE	Mt Pierce	GRV 8000	85	a	112	1	CA03084AA	ADD: COMPARATOR
FNE	Mt Pierce	GRV 8000	85	b	595	1	CA01949AC	ADD: ANALOG CONV ONLY SW
FNE	Mt Pierce	GRV 8000	85	c	595	1	CA01952AC	ADD: ANALOG CONV SIMULCAST SW
FNE	Mt Pierce	GRV 8000	85	d	595	1	CA03085AA	ADD: GEO REDUNDANCY
FNE	Mt Pierce	GRV 8000	61	j	112	1	CA01953AA	ADD: POWER EFFICIENCY PACKAGE

ITEM	SUB SYS	BLOCK	LI	O	APC	QTY	NOMENCLATURE	DESCRIPTION
FNE	Mt Pierce	GRV 8000	85	e	112	1	CA03111AA	ADD: CEC COMPLIANCE
FNE	Mt Pierce	GRV 8000	85	f	112	1	CA01400AA	ADD: POWER CABLE, DC
FNE	Mt Pierce	GRV 8000	85	g	112	1	X153AW	ADD: RACK MOUNT HARDWARE
FNE	Mt Pierce	CONV_GTR	86	-	112	1	T7039	GTR 8000 Base Radio
FNE	Mt Pierce	CONV_GTR	86	a	595	1	CA00717AA	ADD: ASTRO SYSTEM RELEASE 7.17
FNE	Mt Pierce	CONV_GTR	86	b	112	1	X530BG	ADD: VHF (136-174 MHZ)
FNE	Mt Pierce	CONV_GTR	86	c	595	1	CA01948AA	ADD: CONVENTIONAL SOFTWARE
FNE	Mt Pierce	CONV_GTR	86	d	595	1	CA01502AA	ADD: ASTRO 25 CONVENTIONAL SIMULCAST SOFTWARE
FNE	Mt Pierce	CONV_GTR	86	e	112	1	CA01953AA	ADD: POWER EFFICIENCY PACKAGE
FNE	Mt Pierce	CONV_GTR	86	f	112	1	CA03111AA	ADD: CEC COMPLIANCE
FNE	Mt Pierce	CONV_GTR	86	g	112	1	X265AM	BR PRESECTOR, 150-174 MHZ
FNE	Mt Pierce	CONV_GTR	86	h	112	1	X153AW	ADD: RACK MOUNT HARDWARE
FNE	Mt Pierce	CONV_GTR	87	-	112	1	T7039	GTR 8000 Base Radio
FNE	Mt Pierce	CONV_GTR	87	a	595	1	CA00717AA	ADD: ASTRO SYSTEM RELEASE 7.17
FNE	Mt Pierce	CONV_GTR	87	b	112	1	X530BG	ADD: VHF (136-174 MHZ)
FNE	Mt Pierce	CONV_GTR	87	c	595	1	CA01949AA	ADD: ANALOG ONLY CONV SW
FNE	Mt Pierce	CONV_GTR	87	d	595	1	CA01952AA	ADD: ANALOG CONVENTIONAL SIMULCAST SOFTWARE
FNE	Mt Pierce	CONV_GTR	87	e	112	1	CA01953AA	ADD: POWER EFFICIENCY PACKAGE
FNE	Mt Pierce	CONV_GTR	87	f	112	1	CA03111AA	ADD: CEC COMPLIANCE
FNE	Mt Pierce	CONV_GTR	87	g	112	1	X265AM	BR PRESECTOR, 150-174 MHZ
FNE	Mt Pierce	CONV_GTR	87	h	112	1	X153AW	ADD: RACK MOUNT HARDWARE
FNE	Mt Pierce	RACK	88	-	509	2	TRN7343	SEVEN AND A HALF FOOT RACK
FNE	Mt Pierce	ANTENNA	90	-	351	1	DSOA4041DIN	OFFSET, EXPOSED DIPOLE ARRAY, 9 DBD, 136-174 MHZ, PIM RATED
FNE	Mt Pierce	UPPERJUMPR	91	-	351	15	L1705	LDF4-50A CABLE: 1/2
FNE	Mt Pierce	UPPERJUMPR	92	-	351	2	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
FNE	Mt Pierce	UPPERJUMPR	93	-	515	2	TDN9289	221213 CABLE WRAP WEATHERPROOFING
FNE	Mt Pierce	MAINLINE	94	-	207	140	L3323	AVA5-50, 7/8 IN VIRTUAL AIR COAXIAL CABLE, CORRUGATED COPPER
FNE	Mt Pierce	MAINLINE	95	-	351	2	DDN1077	7-16IN DIN FEMALE CONNECTOR EZ-FIT FOR 7/8IN CABLE (MOTOROLA SPECIFIC)

ITEM	SUB SYS	BLOCK	LI	O	APC	QTY	NOMENCLATURE	DESCRIPTION
FNE	Mt Pierce	MAINLINE	96	-	351	3	DSSG7806B2A	SG78-06B2A GROUNDING KIT FOR 7/8 IN COAXIAL CABLE
FNE	Mt Pierce	MAINLINE	97	-	351	1	DSL5SGRIP	L5SGRIP 7/8" SUPPORT HOIST GRIP
FNE	Mt Pierce	MAINLINE	98	-	351	5	DSSSH78	SSH-78 7/8" SNAPSTAK HANGER 10PK
FNE	Mt Pierce	ANTACC	99	-	207	1	DSVHF50DMPGR	RF SPD, 100-512MHZ, DC BLOCK HIGH POWER DIN MALE ANT, DIN FEMALE EQUIP
FNE	Mt Pierce	SURGE	100	-	351	25	L1705	LDF4-50A CABLE: 1/2
FNE	Mt Pierce	LOWERJUMPR	101	-	351	1	DDN1088	L4TNM-PSA TYPE N MALE PS FOR 1/2 IN CABLE
FNE	Mt Pierce	LOWERJUMPR	102	-	351	1	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
FNE	Mt Pierce	ANTENNA	1	-	351	1	DSOA4041DIN	OFFSET, EXPOSED DIPOLE ARRAY, 9 DBD, 136-174 MHZ, PIM RATED
FNE	Mt Pierce	UPPERJUMPR	1	-	351	15	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
FNE	Mt Pierce	UPPERJUMPR	1	-	351	2	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
FNE	Mt Pierce	UPPERJUMPR	1	-	515	2	TDN9289	221213 CABLE WRAP WEATHERPROOFING
FNE	Mt Pierce	MAINLINE	1	-	207	140	L3323	AVA5-50, 7/8 IN VIRTUAL AIR COAXIAL CABLE, CORRUGATED COPPER
FNE	Mt Pierce	MAINLINE	1	-	351	2	DDN1077	7-16IN DIN FEMALE CONNECTOR EZ-FIT FOR 7/8IN CABLE (MOTOROLA SPECIFIC)
FNE	Mt Pierce	MAINLINE	1	-	351	3	DSSG7806B2A	SG78-06B2A GROUNDING KIT FOR 7/8 IN COAXIAL CABLE
FNE	Mt Pierce	MAINLINE	1	-	351	1	DSL5SGRIP	L5SGRIP 7/8" SUPPORT HOIST GRIP
FNE	Mt Pierce	MAINLINE	1	-	351	5	DSSSH78	SSH-78 7/8" SNAPSTAK HANGER 10PK
FNE	Mt Pierce	ANTACC	1	-	207	1	DSVHF50DMPGR	RF SPD, 100-512MHZ, DC BLOCK HIGH POWER DIN MALE ANT, DIN FEMALE EQUIP
FNE	Mt Pierce	SURGE	1	-	351	25	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
FNE	Mt Pierce	LOWERJUMPR	1	-	351	1	DDN1088	L4TNM-PSA TYPE N MALE PS FOR 1/2 IN CABLE
FNE	Mt Pierce	LOWERJUMPR	1	-	351	1	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
FNE	Mt Pierce	RFDS			457	1	DSSPD23253	Custom Combining Mt Pierce

ITEM	SUB SYS	BLOCK	LI	O	APC	QTY	NOMENCLATURE	DESCRIPTION
FNE	Mt Pierce	SURGE	1	-	207	1	DS570SA16FNRJ1S	SPD, TYPE 1, SAD/MOV, 120/240 VAC 1-PHASE
FNE	Mt Pierce	SURGE	1	-	207	1	DS560SA16FNRJ1S	SPD, TYPE 2, MOV, 120/240 VAC 1-PHASE
FNE	Pratt Mtn	NETWORK	103	-	147	2	CLN1868	2930F 24-PORT SWITCH
FNE	Pratt Mtn	NETWORK	104	-	147	1	SQM01SUM0205	GGM 8000 GATEWAY
FNE	Pratt Mtn	NETWORK	104	a	147	1	CA01619AA	ADD: DC POWER
FNE	Pratt Mtn	ECCGW-4Port	1	-	147	1	SQM01SUM0205	GGM 8000 GATEWAY
FNE	Pratt Mtn	ECCGW-4Port			147	1	CA02141AA	ADD: LOW DENSITY ENH CONV GATEWAY
FNE	Pratt Mtn	ECCGW-4Port			147	1	CA01619AA	ADD: DC POWER
FNE	Pratt Mtn	GPS	105	-	906	1	DSTRAK88358M	GPS CLOCK, 10MHZ, DOCXO, 48VDC INCL ANT,100' COAX W/DONGLE SNMPV3
FNE	Pratt Mtn	GPS	106	-	906	1	DSTRAK4008245101	MOUNTING SHELF FOR 8835 GPS CLOCK
FNE	Pratt Mtn	GPS	107	-	351	50	L1700	FSJ1-50A CABLE: 1/4
FNE	Pratt Mtn	GPS	108	-	351	4	DDN9769	F1PNM-HC 1/4
FNE	Pratt Mtn	CONV_GTR	109	-	112	1	T7039	GTR 8000 Base Radio
FNE	Pratt Mtn	CONV_GTR	109	a	595	1	CA00717AA	ADD: ASTRO SYSTEM RELEASE 7.17
FNE	Pratt Mtn	CONV_GTR	109	b	112	1	X530BG	ADD: VHF (136-174 MHZ)
FNE	Pratt Mtn	CONV_GTR	109	c	595	1	CA01948AA	ADD: CONVENTIONAL SOFTWARE
FNE	Pratt Mtn	CONV_GTR	109	d	595	1	CA01502AA	ADD: ASTRO 25 CONVENTIONAL SIMULCAST SOFTWARE
FNE	Pratt Mtn	CONV_GTR	109	e	112	1	CA01953AA	ADD: POWER EFFICIENCY PACKAGE
FNE	Pratt Mtn	CONV_GTR	109	f	112	1	CA03111AA	ADD: CEC COMPLIANCE
FNE	Pratt Mtn	CONV_GTR	109	g	112	1	X265AM	BR PRESECTOR, 150-174 MHZ
FNE	Pratt Mtn	CONV_GTR	109	h	112	1	X153AW	ADD: RACK MOUNT HARDWARE
FNE	Pratt Mtn	CONV_GTR	110	-	112	1	T7039	GTR 8000 Base Radio
FNE	Pratt Mtn	CONV_GTR	110	a	595	1	CA00717AA	ADD: ASTRO SYSTEM RELEASE 7.17
FNE	Pratt Mtn	CONV_GTR	110	b	112	1	X530BG	ADD: VHF (136-174 MHZ)
FNE	Pratt Mtn	CONV_GTR	110	c	595	1	CA01949AA	ADD: ANALOG ONLY CONV SW
FNE	Pratt Mtn	CONV_GTR	110	d	595	1	CA01952AA	ADD: ANALOG CONVENTIONAL SIMULCAST SOFTWARE
FNE	Pratt Mtn	CONV_GTR	110	e	112	1	CA01953AA	ADD: POWER EFFICIENCY PACKAGE
FNE	Pratt Mtn	CONV_GTR	110	f	112	1	CA03111AA	ADD: CEC COMPLIANCE
FNE	Pratt Mtn	CONV_GTR	110	g	112	1	X265AM	BR PRESECTOR, 150-174 MHZ
FNE	Pratt Mtn	CONV_GTR	110	h	112	1	X153AW	ADD: RACK MOUNT HARDWARE



ITEM	SUB SYS	BLOCK	LI	O	APC	QTY	NOMENCLATURE	DESCRIPTION
FNE	Pratt Mtn	CONV_GTR	1	-	112	1	T7039	GTR 8000 Base Radio
FNE	Pratt Mtn	CONV_GTR	1	-	595	1	CA00717AA	ADD: ASTRO SYSTEM RELEASE 7.17
FNE	Pratt Mtn	CONV_GTR			112	1	X448AA	ADD: UHF R1 (380-435 MHZ)
FNE	Pratt Mtn	CONV_GTR			595	1	CA01949AA	ADD: ANALOG ONLY CONV SW
FNE	Pratt Mtn	CONV_GTR			595	1	CA01952AA	ADD: ANALOG CONVENTIONAL SIMULCAST SOFTWARE
FNE	Pratt Mtn	CONV_GTR			112	1	CA01953AA	ADD: POWER EFFICIENCY PACKAGE
FNE	Pratt Mtn	CONV_GTR			112	1	CA03111AA	ADD: CEC COMPLIANCE
FNE	Pratt Mtn	CONV_GTR			112	1	X265AM	BR PRESECTOR, 150-174 MHZ
FNE	Pratt Mtn	CONV_GTR			112	1	X153AW	ADD: RACK MOUNT HARDWARE
FNE	Pratt Mtn	RACK	111	-	509	1	TRN7343	SEVEN AND A HALF FOOT RACK
FNE	Pratt Mtn	ANTENNA	113	-	351	1	DSOA4041DINT3	OFFSET, EXPOSED DIPOLE ARRAY, 9DBD, 136-174MHZ, 3DEG DT, PIM RATED
FNE	Pratt Mtn	UPPERJUMPR	114	-	351	15	L1705	LDF4-50A CABLE: 1/2
FNE	Pratt Mtn	UPPERJUMPR	115	-	351	2	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
FNE	Pratt Mtn	JUMPER	116	-	515	2	TDN9289	221213 CABLE WRAP WEATHERPROOFING
FNE	Pratt Mtn	MAINLINE	117	-	207	140	L3323	AVA5-50, 7/8 IN VIRTUAL AIR COAXIAL CABLE, CORRUGATED COPPER
FNE	Pratt Mtn	MAINLINE	118	-	351	2	DDN1077	7-16IN DIN FEMALE CONNECTOR EZ-FIT FOR 7/8IN CABLE (MOTOROLA SPECIFIC)
FNE	Pratt Mtn	MAINLINE	119	-	351	3	DSSG7806B2A	SG78-06B2A GROUNDING KIT FOR 7/8 IN COAXIAL CABLE
FNE	Pratt Mtn	MAINLINE	120	-	351	1	DSL5SGRIP	L5SGRIP 7/8" SUPPORT HOIST GRIP
FNE	Pratt Mtn	MAINLINE	121	-	351	5	DSSSH78	SSH-78 7/8" SNAPSTAK HANGER 10PK
FNE	Pratt Mtn	POLYPHASER	122	-	207	1	DSVHF50DMPGR	RF SPD, 100-512MHZ, DC BLOCK HIGH POWER DIN MALE ANT, DIN FEMALE EQUIP
FNE	Pratt Mtn	LOWERJUMPR	123	-	351	25	DSSSH78	LDF4-50A CABLE: 1/2
FNE	Pratt Mtn	LOWERJUMPR	124	-	351	1	DDN1088	L4TNM-PSA TYPE N MALE PS FOR 1/2 IN CABLE
FNE	Pratt Mtn	LOWERJUMPR	125	-	351	1	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
FNE	Pratt Mtn	ANTENNA	1	-	351	1	DSOA4041DINT3	OFFSET, EXPOSED DIPOLE ARRAY, 9DBD, 136-174MHZ, 3DEG DT, PIM RATED

ITEM	SUB SYS	BLOCK	LI	O	APC	QTY	NOMENCLATURE	DESCRIPTION
FNE	Pratt Mtn	UPPERJUMPR	1	-	351	15	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
FNE	Pratt Mtn	UPPERJUMPR	1	-	351	2	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
FNE	Pratt Mtn	JUMPER	1	-	515	2	TDN9289	221213 CABLE WRAP WEATHERPROOFING
FNE	Pratt Mtn	MAINLINE	1	-	207	140	L3323	AVA5-50, 7/8 IN VIRTUAL AIR COAXIAL CABLE, CORRUGATED COPPER
FNE	Pratt Mtn	MAINLINE	1	-	351	2	DDN1077	7-16IN DIN FEMALE CONNECTOR EZ-FIT FOR 7/8IN CABLE (MOTOROLA SPECIFIC)
FNE	Pratt Mtn	MAINLINE	1	-	351	3	DSSG7806B2A	SG78-06B2A GROUNDING KIT FOR 7/8 IN COAXIAL CABLE
FNE	Pratt Mtn	MAINLINE	1	-	351	1	DSL5SGRIP	L5SGRIP 7/8" SUPPORT HOIST GRIP
FNE	Pratt Mtn	MAINLINE	1	-	351	5	DSSSH78	SSH-78 7/8" SNAPSTAK HANGER 10PK
FNE	Pratt Mtn	POLYPHASER	1	-	207	1	DSVHF50DMPGR	RF SPD, 100-512MHZ, DC BLOCK HIGH POWER DIN MALE ANT, DIN FEMALE EQUIP
FNE	Pratt Mtn	LOWERJUMPR	1	-	351	25	DSSSH78	SSH-78 7/8" SNAPSTAK HANGER 10PK
FNE	Pratt Mtn	LOWERJUMPR	1	-	351	1	DDN1088	L4TNM-PSA TYPE N MALE PS FOR 1/2 IN CABLE
FNE	Pratt Mtn	LOWERJUMPR	1	-	351	1	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
FNE	Pratt Mtn	APX4500	1	-	471	1	M22QSS9PW1 N	APX4500 UHF R1
FNE	Pratt Mtn	APX4500			412	1	G806	ENH: SOFTWARE ASTRO DIGITAL COMMON AIR INTERFACE OPERATION
FNE	Pratt Mtn	APX4500			430	1	Q811AQ	ENH: SOFTWARE P25 CONVENTIONAL FLASHPORT
FNE	Pratt Mtn	APX4500			656	1	GA00804	ADD: APX O2 CONTROL HEAD (Grey)
FNE	Pratt Mtn	APX4500			656	1	G444	ADD: APX CONTROL HEAD SOFTWARE
FNE	Pratt Mtn	APX4500			656	1	G67	ADD: REMOTE MOUNT MID POWER
FNE	Pratt Mtn	APX4500			656	1	G90	ADD: NO MICROPHONE NEEDED
FNE	Pratt Mtn	APX4500			656	1	G142	ADD: NO SPEAKER NEEDED
FNE	Pratt Mtn	APX4500			656	1	G618	ADD:CBL REMOTE MOUNT 10 FEET
FNE	Pratt Mtn	APX4500			656	1	GA00235	ADD: NO GPS ANTENNA NEEDED
FNE	Pratt Mtn	APX4500			185	1	G24	ADD: 3Y ESSENTIAL SERVICE



ITEM	SUB SYS	BLOCK	LI	O	APC	QTY	NOMENCLATURE	DESCRIPTION
FNE	Pratt Mtn	ANTENNA			351	1	DSRDA699	RUGGEDISED UHF DIRECTIONAL YAGI ANT, 380-400 MHZ, 9.0 DBD
FNE	Pratt Mtn	UPPERJUMPR	1	-	351	15	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
FNE	Pratt Mtn	UPPERJUMPR	1	-	351	2	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
FNE	Pratt Mtn	JUMPER	1	-	515	2	TDN9289	221213 CABLE WRAP WEATHERPROOFING
FNE	Pratt Mtn	MAINLINE	1	-	207	110	L3323	AVA5-50, 7/8 IN VIRTUAL AIR COAXIAL CABLE, CORRUGATED COPPER
FNE	Pratt Mtn	MAINLINE	1	-	351	2	DDN1077	7-16IN DIN FEMALE CONNECTOR EZ-FIT FOR 7/8IN CABLE (MOTOROLA SPECIFIC)
FNE	Pratt Mtn	MAINLINE	1	-	351	3	DSSG7806B2A	SG78-06B2A GROUNDING KIT FOR 7/8 IN COAXIAL CABLE
FNE	Pratt Mtn	MAINLINE	1	-	351	1	DSL5SGRIP	L5SGRIP 7/8" SUPPORT HOIST GRIP
FNE	Pratt Mtn	ANTACC	1	-	351	5	DSSSH78	SSH-78 7/8" SNAPSTAK HANGER 10PK
FNE	Pratt Mtn	SURGE	1	-	207	1	DSVHF50DMPGR	RF SPD, 100-512MHZ, DC BLOCK HIGH POWER DIN MALE ANT, DIN FEMALE EQUIP
FNE	Pratt Mtn	LOWERJUMPR	1	-	351	25	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
FNE	Pratt Mtn	LOWERJUMPR	1	-	351	1	DDN1088	L4TNM-PSA TYPE N MALE PS FOR 1/2 IN CABLE
FNE	Pratt Mtn	RFDS			457	1	DSSPD23252	Custom Combinig Pratt Mountain
FNE	Pratt Mtn	SURGE	1	-	207	1	DS570SA16FNRJ1S	SPD, TYPE 1, SAD/MOV, 120/240 VAC 1-PHASE
FNE	Pratt Mtn	SURGE	1	-	207	1	DS560SA16FNRJ1S	SPD, TYPE 2, MOV, 120/240 VAC 1-PHASE
FNE	Green Diamond	NETWORK	1	-	147	2	CLN1868	2930F 24-PORT SWITCH
FNE	Green Diamond	NETWORK	1	-	147	1	SQM01SUM0205	GGM 8000 GATEWAY
FNE	Green Diamond	NETWORK			147	1	CA01619AA	ADD: DC POWER
FNE	Green Diamond	ECCGW-4Port	1	-	147	1	SQM01SUM0205	GGM 8000 GATEWAY
FNE	Green Diamond	ECCGW-4Port			147	1	CA02141AA	ADD: LOW DENSITY ENH CONV GATEWAY
FNE	Green Diamond	ECCGW-4Port			147	1	CA01619AA	ADD: DC POWER

ITEM	SUB SYS	BLOCK	LI	O	APC	QTY	NOMENCLATURE	DESCRIPTION
FNE	Green Diamond	GPS	1	-	906	1	DSTRAK88358M	GPS CLOCK, 10MHZ, DOCXO, 48VDC INCL ANT,100' COAX W/DONGLE SNMPV3
FNE	Green Diamond	GPS	1	-	906	1	DSTRAK4008245101	MOUNTING SHELF FOR 8835 GPS CLOCK
FNE	Green Diamond	GPS	1	-	351	50	L1700	FSJ1-50A CABLE: 1/4" SUPERFLEX POLY JKT PER FOOT
FNE	Green Diamond	GPS	1	-	351	4	DDN9769	F1PNM-HC 1/4" TYPE N MALE CONNECTOR FOR FSJ1-50A CABLE
FNE	Green Diamond	CONV_GTR	1	-	112	1	T7039	GTR 8000 Base Radio
FNE	Green Diamond	CONV_GTR			595	1	CA00717AA	ADD: ASTRO SYSTEM RELEASE 7.17
FNE	Green Diamond	CONV_GTR			112	1	X530BG	ADD: VHF (136-174 MHZ)
FNE	Green Diamond	CONV_GTR			595	1	CA01948AA	ADD: CONVENTIONAL SOFTWARE
FNE	Green Diamond	CONV_GTR			595	1	CA01502AA	ADD: ASTRO 25 CONVENTIONAL SIMULCAST SOFTWARE
FNE	Green Diamond	CONV_GTR			112	1	CA01953AA	ADD: POWER EFFICIENCY PACKAGE
FNE	Green Diamond	CONV_GTR			112	1	CA03111AA	ADD: CEC COMPLIANCE
FNE	Green Diamond	CONV_GTR			112	1	X265AM	BR PRESECTOR, 150-174 MHZ
FNE	Green Diamond	CONV_GTR			112	1	X153AW	ADD: RACK MOUNT HARDWARE
FNE	Green Diamond	CONV_GTR	1	-	112	1	T7039	GTR 8000 Base Radio
FNE	Green Diamond	CONV_GTR			595	1	CA00717AA	ADD: ASTRO SYSTEM RELEASE 7.17
FNE	Green Diamond	CONV_GTR			112	1	X530BG	ADD: VHF (136-174 MHZ)
FNE	Green Diamond	CONV_GTR			595	1	CA01949AA	ADD: ANALOG ONLY CONV SW
FNE	Green Diamond	CONV_GTR			595	1	CA01952AA	ADD: ANALOG CONVENTIONAL SIMULCAST SOFTWARE
FNE	Green Diamond	CONV_GTR			112	1	CA01953AA	ADD: POWER EFFICIENCY PACKAGE
FNE	Green Diamond	CONV_GTR			112	1	CA03111AA	ADD: CEC COMPLIANCE
FNE	Green Diamond	CONV_GTR			112	1	X265AM	BR PRESECTOR, 150-174 MHZ



ITEM	SUB SYS	BLOCK	LI	O	APC	QTY	NOMENCLATURE	DESCRIPTION
FNE	Green Diamond	CONV_GTR			112	1	X153AW	ADD: RACK MOUNT HARDWARE
FNE	Green Diamond	RACK	1	-	509	1	TRN7343	SEVEN AND A HALF FOOT RACK
FNE	Green Diamond	RFDS	1	-	457	1	DS2636H0102	DUPLEXING SYSTEM 137-174 MHZ 2 CHANNEL INPUT ISOLATORS AC
FNE	Green Diamond	ANTENNA	1	-	351	1	DSOA4041DINT3	OFFSET, EXPOSED DIPOLE ARRAY, 9DBD, 136-174MHZ, 3DEG DT, PIM RATED
FNE	Green Diamond	UPPERJUMPR	1	-	351	15	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
FNE	Green Diamond	UPPERJUMPR	1	-	351	2	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
FNE	Green Diamond	JUMPER	1	-	515	2	TDN9289	221213 CABLE WRAP WEATHERPROOFING
FNE	Green Diamond	MAINLINE	1	-	207	140	L3323	AVA5-50, 7/8 IN VIRTUAL AIR COAXIAL CABLE, CORRUGATED COPPER
FNE	Green Diamond	MAINLINE	1	-	351	2	DDN1077	7-16IN DIN FEMALE CONNECTOR EZ-FIT FOR 7/8IN CABLE (MOTOROLA SPECIFIC)
FNE	Green Diamond	MAINLINE	1	-	351	3	DSSG7806B2A	SG78-06B2A GROUNDING KIT FOR 7/8 IN COAXIAL CABLE
FNE	Green Diamond	MAINLINE	1	-	351	1	DSL5SGRIP	L5SGRIP 7/8" SUPPORT HOIST GRIP
FNE	Green Diamond	MAINLINE	1	-	351	5	DSSSH78	SSH-78 7/8" SNAPSTAK HANGER 10PK
FNE	Green Diamond	POLYPHASER	1	-	207	1	DSVHF50DMPGR	RF SPD, 100-512MHZ, DC BLOCK HIGH POWER DIN MALE ANT, DIN FEMALE EQUIP
FNE	Green Diamond	LOWERJUMPR	1	-	351	25	DSSSH78	SSH-78 7/8" SNAPSTAK HANGER 10PK
FNE	Green Diamond	LOWERJUMPR	1	-	351	1	DDN1088	L4TNM-PSA TYPE N MALE PS FOR 1/2 IN CABLE
FNE	Green Diamond	LOWERJUMPR	1	-	351	1	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
FNE	Orleans	DVRS	126	-	571	1	DQ50WDVRS	DVR VHF CABINET IN BAND APPLICATION A
FNE	Orleans	DVRS	126	a	571	1	TT05715AA	DVR/VRX FOR USE WITH SINGLE BAND APX MOBILE
FNE	Orleans	DVRS	126	b	571	1	TT05130AA	FIXED MOUNT OUTDOOR ENCLOSURE UPGRADE
FNE	Orleans	DVRS	127	-	351	1	DSBA8041DIN	OMNI, EXPOSED DIPOLE ARRAY, 6 DBD, 136-174 MHZ, PIM RATED
FNE	Orleans	DVRS	128	-	571	1	DDN1576	DVR PROGRAMMING SOFTWARE FOR APX DVRS

ITEM	SUB SYS	BLOCK	LI	O	APC	QTY	NOMENCLATURE	DESCRIPTION
FNE	Orleans	DVRS	129	-	571	1	DDN2088	DVR IN-BAND 1 YEAR EXTENDED WARRANT
FNE	Orleans	APX6500	130	-	527	1	M25KSS9PW1 N	APX6500 VHF MID POWER
FNE	Orleans	APX6500	130	a	656	1	G806	ADD: ASTRO DIGITAL CAI OPERATION
FNE	Orleans	APX6500	130	b	527	1	G48	ENH: CONVENTIONAL OPERATION APX6500
FNE	Orleans	APX6500			430	1	GA00631AB	ADD: DVRS MSU ACTIVATION APX MOBILE
FNE	Orleans	APX6500	130	d	656	1	GA00804	ADD: APX O2 CONTROL HEAD (Grey)
FNE	Orleans	APX6500	130	e	656	1	G444	ADD: APX CONTROL HEAD SOFTWARE
FNE	Orleans	APX6500	130	f	656	1	G67	ADD: REMOTE MOUNT MID POWER
FNE	Orleans	APX6500	130	h	656	1	G90	ADD: NO MICROPHONE NEEDED
FNE	Orleans	APX6500	130	i	656	1	G142	ADD: NO SPEAKER NEEDED
FNE	Orleans	APX6500	130	j	656	1	G618	ADD:CBL REMOTE MOUNT 10 FEET
FNE	Orleans	APX6500	130	k	656	1	GA00235	ADD: NO GPS ANTENNA NEEDED
FNE	Orleans	APX6500	130	l	185	1	G24	ADD: 3Y ESSENTIAL SERVICE
FNE	Orleans	ANTENNA	1	-	351	1	DSEA8041DIN	ELLIPTICAL, EXPOSED DIPOLE ARRAY, 8 DBD 136-174 MHZ, PIM RATED
FNE	Orleans	UPPERJUMPR	1	-	351	15	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
FNE	Orleans	UPPERJUMPR	1	-	351	2	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
FNE	Orleans	JUMPER	1	-	515	2	TDN9289	221213 CABLE WRAP WEATHERPROOFING
FNE	Orleans	MAINLINE	1	-	207	110	L3323	AVA5-50, 7/8 IN VIRTUAL AIR COAXIAL CABLE, CORRUGATED COPPER
FNE	Orleans	MAINLINE	1	-	351	2	DDN1077	7-16IN DIN FEMALE CONNECTOR EZ-FIT FOR 7/8IN CABLE (MOTOROLA SPECIFIC)
FNE	Orleans	MAINLINE	1	-	351	3	DSSG7806B2A	SG78-06B2A GROUNDING KIT FOR 7/8 IN COAXIAL CABLE
FNE	Orleans	MAINLINE	1	-	351	1	DSL5SGRIP	L5SGRIP 7/8" SUPPORT HOIST GRIP
FNE	Orleans	ANTACC	1	-	351	5	DSSSH78	SSH-78 7/8" SNAPSTAK HANGER 10PK
FNE	Orleans	SURGE	1	-	207	1	DSVHF50DMPGR	RF SPD, 100-512MHZ, DC BLOCK HIGH POWER DIN MALE ANT, DIN FEMALE EQUIP



ITEM	SUB SYS	BLOCK	LI	O	APC	QTY	NOMENCLATURE	DESCRIPTION
FNE	Orleans	LOWERJUMPR	1	-	351	25	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
FNE	Orleans	LOWERJUMPR	1	-	351	1	DDN1088	L4TNM-PSA TYPE N MALE PS FOR 1/2 IN CABLE
FNE	Orleans	LOWERJUMPR	1	-	351	1	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
FNE	Orleans	ANTENNA	1	-	351	1	DSRDA699	RUGGEDISED UHF DIRECTIONAL YAGI ANT, 380-400 MHZ, 9.0 DBD
FNE	Orleans	UPPERJUMPR	1	-	351	15	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
FNE	Orleans	UPPERJUMPR	1	-	351	2	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
FNE	Orleans	JUMPER	1	-	515	2	TDN9289	221213 CABLE WRAP WEATHERPROOFING
FNE	Orleans	MAINLINE	1	-	207	110	L3323	AVA5-50, 7/8 IN VIRTUAL AIR COAXIAL CABLE, CORRUGATED COPPER
FNE	Orleans	MAINLINE	1	-	351	2	DDN1077	7-16IN DIN FEMALE CONNECTOR EZ-FIT FOR 7/8IN CABLE (MOTOROLA SPECIFIC)
FNE	Orleans	MAINLINE	1	-	351	3	DSSG7806B2A	SG78-06B2A GROUNDING KIT FOR 7/8 IN COAXIAL CABLE
FNE	Orleans	MAINLINE	1	-	351	1	DSL5SGRIP	L5SGRIP 7/8" SUPPORT HOIST GRIP
FNE	Orleans	ANTACC	1	-	351	5	DSSSH78	SSH-78 7/8" SNAPSTAK HANGER 10PK
FNE	Orleans	SURGE	1	-	207	1	DSVHF50DMPGR	RF SPD, 100-512MHZ, DC BLOCK HIGH POWER DIN MALE ANT, DIN FEMALE EQUIP
FNE	Orleans	LOWERJUMPR	1	-	351	25	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
FNE	Orleans	LOWERJUMPR	1	-	351	1	DDN1088	L4TNM-PSA TYPE N MALE PS FOR 1/2 IN CABLE
FNE	Orleans	APX4500			471	1	M22QSS9PW1 N	APX4500 UHF R1
FNE	Orleans	APX4500			412	1	G806	ENH: SOFTWARE ASTRO DIGITAL COMMON AIR INTERFACE OPERATION
FNE	Orleans	APX4500			430	1	Q811AQ	ENH: SOFTWARE P25 CONVENTIONAL FLASHPORT
FNE	Orleans	APX4500			656	1	GA00804	ADD: APX O2 CONTROL HEAD (Grey)
FNE	Orleans	APX4500			656	1	G444	ADD: APX CONTROL HEAD SOFTWARE
FNE	Orleans	APX4500			656	1	G67	ADD: REMOTE MOUNT MID POWER

ITEM	SUB SYS	BLOCK	LI	O	APC	QTY	NOMENCLATURE	DESCRIPTION
FNE	Orleans	APX4500			656	1	G90	ADD: NO MICROPHONE NEEDED
FNE	Orleans	APX4500			656	1	G142	ADD: NO SPEAKER NEEDED
FNE	Orleans	APX4500			656	1	G618	ADD:CBL REMOTE MOUNT 10 FEET
FNE	Orleans	APX4500			656	1	GA00235	ADD: NO GPS ANTENNA NEEDED
FNE	Orleans	APX4500			185	1	G24	ADD: 3Y ESSENTIAL SERVICE
FNE	Orleans	ANTENNA			351	1	DSRDA699	RUGGEDISED UHF DIRECTIONAL YAGI ANT, 380-400 MHZ, 9.0 DBD
FNE	Orleans	UPPERJUMPR	1	-	351	15	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
FNE	Orleans	UPPERJUMPR	1	-	351	2	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
FNE	Orleans	JUMPER	1	-	515	2	TDN9289	221213 CABLE WRAP WEATHERPROOFING
FNE	Orleans	MAINLINE	1	-	207	110	L3323	AVA5-50, 7/8 IN VIRTUAL AIR COAXIAL CABLE, CORRUGATED COPPER
FNE	Orleans	MAINLINE	1	-	351	2	DDN1077	7-16IN DIN FEMALE CONNECTOR EZ-FIT FOR 7/8IN CABLE (MOTOROLA SPECIFIC)
FNE	Orleans	MAINLINE	1	-	351	3	DSSG7806B2A	SG78-06B2A GROUNDING KIT FOR 7/8 IN COAXIAL CABLE
FNE	Orleans	MAINLINE	1	-	351	1	DSL5SGRIP	L5SGRIP 7/8" SUPPORT HOIST GRIP
FNE	Orleans	ANTACC	1	-	351	5	DSSSH78	SSH-78 7/8" SNAPSTAK HANGER 10PK
FNE	Orleans	SURGE	1	-	207	1	DSVHF50DMPGR	RF SPD, 100-512MHZ, DC BLOCK HIGH POWER DIN MALE ANT, DIN FEMALE EQUIP
FNE	Orleans	LOWERJUMPR	1	-	351	25	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
FNE	Orleans	LOWERJUMPR	1	-	351	1	DDN1088	L4TNM-PSA TYPE N MALE PS FOR 1/2 IN CABLE
FNE	Shelter Cove	RACK	165	-	509	1	TRN7343	SEVEN AND A HALF FOOT RACK
FNE	Shelter Cove	DVRS	1	-	571	1	DQ50WDVRS	DVR VHF CABINET IN BAND APPLICATION A
FNE	Shelter Cove	DVRS	132	-	571	1	TT05715AA	DVR/VRX FOR USE WITH SINGLE BAND APX MOBILE
FNE	Shelter Cove	DVRS	133	-	571	1	TT05130AA	FIXED MOUNT OUTDOOR ENCLOSURE UPGRADE
FNE	Shelter Cove	DVRS	1	-	351	1	DSEA4041DIN	ELLIPTICAL, EXPOSED DIPOLE ARRAY, 5 DBD, 136-174 MHZ, PIM RATED
FNE	Shelter Cove	DVRS	1	-	571	1	DDN1576	DVR PROGRAMMING SOFTWARE FOR APX DVRS



ITEM	SUB SYS	BLOCK	LI	O	APC	QTY	NOMENCLATURE	DESCRIPTION
FNE	Shelter Cove	DVRS	1	-	571	1	DDN2088	DVR IN-BAND 1 YEAR EXTENDED WARRANT
FNE	Shelter Cove	APX6500	1	-	527	1	M25QSS9PW1 N	APX6500 UHF R1 MID POWER
FNE	Shelter Cove	APX6500	1	a	412	1	G806	ADD: ASTRO DIGITAL CAI OPERATION
FNE	Shelter Cove	APX6500	1	b	527	1	G48	ENH: CONVENTIONAL OPERATION APX6500
FNE	Shelter Cove	APX6500			430	1	GA00631AB	ADD: DVRS MSU ACTIVATION APX MOBILE
FNE	Shelter Cove	APX6500	1	d	656	1	GA00804	ADD: APX O2 CONTROL HEAD (Grey)
FNE	Shelter Cove	APX6500	1	e	656	1	G444	ADD: APX CONTROL HEAD SOFTWARE
FNE	Shelter Cove	APX6500	1	f	656	1	G67	ADD: REMOTE MOUNT MID POWER
FNE	Shelter Cove	APX6500	1	h	656	1	G90	ADD: NO MICROPHONE NEEDED
FNE	Shelter Cove	APX6500	1	i	656	1	G142	ADD: NO SPEAKER NEEDED
FNE	Shelter Cove	APX6500	1	j	656	1	G618	ADD:CBL REMOTE MOUNT 10 FEET
FNE	Shelter Cove	APX6500	1	k	656	1	GA00235	ADD: NO GPS ANTENNA NEEDED
FNE	Shelter Cove	APX6500	1	l	185	1	G24	ADD: 3Y ESSENTIAL SERVICE
FNE	Shelter Cove	APX4500			471	1	M22QSS9PW1 N	APX4500 UHF R1
FNE	Shelter Cove	APX4500			412	1	G806	ENH: SOFTWARE ASTRO DIGITAL COMMON AIR INTERFACE OPERATION
FNE	Shelter Cove	APX4500			430	1	Q811AQ	ENH: SOFTWARE P25 CONVENTIONAL FLASHPORT
FNE	Shelter Cove	APX4500			656	1	GA00804	ADD: APX O2 CONTROL HEAD (Grey)
FNE	Shelter Cove	APX4500			656	1	G444	ADD: APX CONTROL HEAD SOFTWARE
FNE	Shelter Cove	APX4500			656	1	G67	ADD: REMOTE MOUNT MID POWER
FNE	Shelter Cove	APX4500			656	1	G90	ADD: NO MICROPHONE NEEDED
FNE	Shelter Cove	APX4500			656	1	G142	ADD: NO SPEAKER NEEDED
FNE	Shelter Cove	APX4500			656	1	G618	ADD:CBL REMOTE MOUNT 10 FEET
FNE	Shelter Cove	APX4500			656	1	GA00235	ADD: NO GPS ANTENNA NEEDED
FNE	Shelter Cove	APX4500			185	1	G24	ADD: 3Y ESSENTIAL SERVICE
FNE	Shelter Cove	SURGE	1	-	207	1	DS570SA16FNRJ1 S	SPD, TYPE 1, SAD/MOV, 120/240 VAC 1-PHASE
FNE	Shelter Cove	SURGE	1	-	207	1	DS560SA16FNRJ1 S	SPD, TYPE 2, MOV, 120/240 VAC 1-PHASE

ITEM	SUB SYS	BLOCK	LI	O	APC	QTY	NOMENCLATURE	DESCRIPTION
FNE	Rodgers Peak	ANTENNA	183	-	351	1	DSRDA699	RUGGEDISED UHF DIRECTIONAL YAGI ANT, 380-400 MHZ, 9.0 DBD
FNE	Rodgers Peak	UPPERJUMPR	185	-	351	15	L1705	LDF4-50A CABLE: 1/2
FNE	Rodgers Peak	UPPERJUMPR	186	-	351	2	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
FNE	Rodgers Peak	JUMPER	187	-	515	2	TDN9289	221213 CABLE WRAP WEATHERPROOFING
FNE	Rodgers Peak	MAINLINE	188	-	207	140	L3323	AVA5-50, 7/8 IN VIRTUAL AIR COAXIAL CABLE, CORRUGATED COPPER
FNE	Rodgers Peak	MAINLINE	189	-	351	2	DDN1077	7-16IN DIN FEMALE CONNECTOR EZ-FIT FOR 7/8IN CABLE (MOTOROLA SPECIFIC)
FNE	Rodgers Peak	MAINLINE	190	-	351	3	DSSG7806B2A	SG78-06B2A GROUNDING KIT FOR 7/8 IN COAXIAL CABLE
FNE	Rodgers Peak	MAINLINE	191	-	351	1	DSL5SGRIP	L5SGRIP 7/8" SUPPORT HOIST GRIP
FNE	Rodgers Peak	ANTACC	192	-	351	5	DSSSH78	SSH-78 7/8" SNAPSTAK HANGER 10PK
FNE	Rodgers Peak	SURGE	193	-	207	1	DSVHF50DMPGR	RF SPD, 100-512MHZ, DC BLOCK HIGH POWER DIN MALE ANT, DIN FEMALE EQUIP
FNE	Rodgers Peak	LOWERJUMPR	194	-	351	25	L1705	LDF4-50A CABLE: 1/2
FNE	Rodgers Peak	LOWERJUMPR	195	-	351	1	DDN1088	L4TNM-PSA TYPE N MALE PS FOR 1/2 IN CABLE
FNE	Rodgers Peak	LOWERJUMPR	196	-	351	1	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
FNE	Rodgers Peak	DVRS			571	1	DQ50WDVRS	DVR VHF CABINET IN BAND APPLICATION A
FNE	Rodgers Peak	DVRS			571	1	TT05715AA	DVR/VRX FOR USE WITH SINGLE BAND APX MOBILE
FNE	Rodgers Peak	DVRS			571	1	TT05130AA	FIXED MOUNT OUTDOOR ENCLOSURE UPGRADE
FNE	Rodgers Peak	DVRS	1	-	571	1	DDN1576	DVR PROGRAMMING SOFTWARE FOR APX DVRS
FNE	Rodgers Peak	DVRS	1	-	571	1	DDN2088	DVR IN-BAND 1 YEAR EXTENDED WARRANT
FNE	Rodgers Peak	APX6500	1	-	527	1	M25KSS9PW1 N	APX6500 VHF MID POWER
FNE	Rodgers Peak	APX6500			412	1	G806	ADD: ASTRO DIGITAL CAI OPERATION
FNE	Rodgers Peak	APX6500			527	1	G48	ENH: CONVENTIONAL OPERATION APX6500
FNE	Rodgers Peak	APX6500			430	1	GA00631AB	ADD: DVRS MSU ACTIVATION APX MOBILE



ITEM	SUB SYS	BLOCK	LI	O	APC	QTY	NOMENCLATURE	DESCRIPTION
FNE	Rodgers Peak	APX6500			656	1	GA00804	ADD: APX O2 CONTROL HEAD (Grey)
FNE	Rodgers Peak	APX6500			656	1	G444	ADD: APX CONTROL HEAD SOFTWARE
FNE	Rodgers Peak	APX6500			656	1	G67	ADD: REMOTE MOUNT MID POWER
FNE	Rodgers Peak	APX6500			656	1	G90	ADD: NO MICROPHONE NEEDED
FNE	Rodgers Peak	APX6500			656	1	G142	ADD: NO SPEAKER NEEDED
FNE	Rodgers Peak	APX6500			656	1	G618	ADD:CBL REMOTE MOUNT 10 FEET
FNE	Rodgers Peak	APX6500			656	1	GA00235	ADD: NO GPS ANTENNA NEEDED
FNE	Rodgers Peak	APX6500			185	1	G24	ADD: 3Y ESSENTIAL SERVICE
FNE	SPARES	DVRS			571	1	DQ50WDVRS	DVR VHF CABINET IN BAND APPLICATION A
FNE	SPARES	DVRS			571	1	TT05715AA	DVR/VRX FOR USE WITH SINGLE BAND APX MOBILE
FNE	SPARES	DVRS			571	1	TT05130AA	FIXED MOUNT OUTDOOR ENCLOSURE UPGRADE
FNE	SPARES	DVRS	1	-	351	1	DSEA4041DIN	ELLIPTICAL, EXPOSED DIPOLE ARRAY, 5 DBD, 136-174 MHZ, PIM RATED
FNE	SPARES	DVRS	1	-	571	1	DDN1576	DVR PROGRAMMING SOFTWARE FOR APX DVRS
FNE	SPARES	DVRS	1	-	571	1	DDN2088	DVR IN-BAND 1 YEAR EXTENDED WARRANT
FNE	SPARES	APX6500	1	-	527	1	M25KSS9PW1 N	APX6500 VHF MID POWER
FNE	SPARES	APX6500			412	1	G806	ADD: ASTRO DIGITAL CAI OPERATION
FNE	SPARES	APX6500			527	1	G48	ENH: CONVENTIONAL OPERATION APX6500
FNE	SPARES	APX6500			430	1	GA00631AB	ADD: DVRS MSU ACTIVATION APX MOBILE
FNE	SPARES	APX6500			656	1	GA00804	ADD: APX O2 CONTROL HEAD (Grey)
FNE	SPARES	APX6500			656	1	G444	ADD: APX CONTROL HEAD SOFTWARE
FNE	SPARES	APX6500			656	1	G67	ADD: REMOTE MOUNT MID POWER
FNE	SPARES	APX6500			656	1	G90	ADD: NO MICROPHONE NEEDED
FNE	SPARES	APX6500			656	1	G142	ADD: NO SPEAKER NEEDED
FNE	SPARES	APX6500			656	1	G618	ADD:CBL REMOTE MOUNT 10 FEET
FNE	SPARES	APX6500			656	1	GA00235	ADD: NO GPS ANTENNA NEEDED
FNE	SPARES	APX6500			185	1	G24	ADD: 3Y ESSENTIAL SERVICE

ITEM	SUB SYS	BLOCK	LI	O	APC	QTY	NOMENCLATURE	DESCRIPTION
FNE	Sugar Pine	ANTENNA			351	1	DSRDA699	RUGGEDISED UHF DIRECTIONAL YAGI ANT, 380-400 MHZ, 9.0 DBD
FNE	Sugar Pine	UPPERJUMPR	1	-	351	15	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
FNE	Sugar Pine	UPPERJUMPR	1	-	351	2	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
FNE	Sugar Pine	JUMPER	1	-	515	2	TDN9289	221213 CABLE WRAP WEATHERPROOFING
FNE	Sugar Pine	MAINLINE	1	-	207	140	L3323	AVA5-50, 7/8 IN VIRTUAL AIR COAXIAL CABLE, CORRUGATED COPPER
FNE	Sugar Pine	MAINLINE	1	-	351	2	DDN1077	7-16IN DIN FEMALE CONNECTOR EZ-FIT FOR 7/8IN CABLE (MOTOROLA SPECIFIC)
FNE	Sugar Pine	MAINLINE	1	-	351	3	DSSG7806B2A	SG78-06B2A GROUNDING KIT FOR 7/8 IN COAXIAL CABLE
FNE	Sugar Pine	MAINLINE	1	-	351	1	DSL5SGRIP	L5SGRIP 7/8" SUPPORT HOIST GRIP
FNE	Sugar Pine	ANTACC	1	-	351	5	DSSSH78	SSH-78 7/8" SNAPSTAK HANGER 10PK
FNE	Sugar Pine	SURGE	1	-	207	1	DSVHF50DMPGR	RF SPD, 100-512MHZ, DC BLOCK HIGH POWER DIN MALE ANT, DIN FEMALE EQUIP
FNE	Sugar Pine	LOWERJUMPR	1	-	351	25	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
FNE	Sugar Pine	LOWERJUMPR	1	-	351	1	DDN1088	L4TNM-PSA TYPE N MALE PS FOR 1/2 IN CABLE
FNE	Sugar Pine	LOWERJUMPR	1	-	351	1	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
FNE	Sugar Pine	DVRS			571	1	DQ50WDVRS	DVR VHF CABINET IN BAND APPLICATION A
FNE	Sugar Pine	DVRS			571	1	TT05715AA	DVR/VRX FOR USE WITH SINGLE BAND APX MOBILE
FNE	Sugar Pine	DVRS			571	1	TT05130AA	FIXED MOUNT OUTDOOR ENCLOSURE UPGRADE
FNE	Sugar Pine	DVRS	1	-	351	1	DSEA4041DIN	ELLIPTICAL, EXPOSED DIPOLE ARRAY, 5 DBD, 136-174 MHZ, PIM RATED
FNE	Sugar Pine	DVRS	1	-	571	1	DDN1576	DVR PROGRAMMING SOFTWARE FOR APX DVRS
FNE	Sugar Pine	DVRS	1	-	571	1	DDN2088	DVR IN-BAND 1 YEAR EXTENDED WARRANT
FNE	Sugar Pine	APX6500	1	-	527	1	M25KSS9PW1 N	APX6500 VHF MID POWER
FNE	Sugar Pine	APX6500			412	1	G806	ADD: ASTRO DIGITAL CAI OPERATION



ITEM	SUB SYS	BLOCK	LI	O	APC	QTY	NOMENCLATURE	DESCRIPTION
FNE	Sugar Pine	APX6500			527	1	G48	ENH: CONVENTIONAL OPERATION APX6500
FNE	Sugar Pine	APX6500			430	1	GA00631AB	ADD: DVRS MSU ACTIVATION APX MOBILE
FNE	Sugar Pine	APX6500			656	1	GA00804	ADD: APX O2 CONTROL HEAD (Grey)
FNE	Sugar Pine	APX6500			656	1	G444	ADD: APX CONTROL HEAD SOFTWARE
FNE	Sugar Pine	APX6500			656	1	G67	ADD: REMOTE MOUNT MID POWER
FNE	Sugar Pine	APX6500			656	1	G90	ADD: NO MICROPHONE NEEDED
FNE	Sugar Pine	APX6500			656	1	G142	ADD: NO SPEAKER NEEDED
FNE	Sugar Pine	APX6500			656	1	G618	ADD:CBL REMOTE MOUNT 10 FEET
FNE	Sugar Pine	APX6500			656	1	GA00235	ADD: NO GPS ANTENNA NEEDED
FNE	Sugar Pine	APX6500			185	1	G24	ADD: 3Y ESSENTIAL SERVICE
FNE	Sugar Pine	ANTENNA	200	-	351	1	DSEA8041DINT3	ELLIPTICAL, EXPOSED DIPOLE ARRAY, 8DBD, 136-174MHZ, 3DEG DT, PIM RATED
FNE	Sugar Pine	RFDS	201	-	457	1	DS2636H0102	DUPLEXING SYSTEM 137-174 MHZ 2 CHANNEL INPUT ISOLATORS AC
FNE	Sugar Pine	UPPERJUMPR	202	-	351	15	L1705	LDF4-50A CABLE: 1/2
FNE	Sugar Pine	UPPERJUMPR	203	-	351	2	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
FNE	Sugar Pine	JUMPER	204	-	515	2	TDN9289	221213 CABLE WRAP WEATHERPROOFING
FNE	Sugar Pine	MAINLINE	205	-	207	120	L3323	AVA5-50, 7/8 IN VIRTUAL AIR COAXIAL CABLE, CORRUGATED COPPER
FNE	Sugar Pine	MAINLINE	206	-	351	2	DDN1077	7-16IN DIN FEMALE CONNECTOR EZ-FIT FOR 7/8IN CABLE (MOTOROLA SPECIFIC)
FNE	Sugar Pine	MAINLINE	207	-	351	3	DSSG7806B2A	SG78-06B2A GROUNDING KIT FOR 7/8 IN COAXIAL CABLE
FNE	Sugar Pine	MAINLINE	208	-	351	1	DSL5SGRIP	L5SGRIP 7/8" SUPPORT HOIST GRIP
FNE	Sugar Pine	ANTACC	209	-	351	5	DSSSH78	SSH-78 7/8" SNAPSTAK HANGER 10PK
FNE	Sugar Pine	SURGE	210	-	207	1	DSVHF50DMPGR	RF SPD, 100-512MHZ, DC BLOCK HIGH POWER DIN MALE ANT, DIN FEMALE EQUIP
FNE	Sugar Pine	LOWERJUMPR	211	-	351	25	L1705	LDF4-50A CABLE: 1/2
FNE	Sugar Pine	LOWERJUMPR	212	-	351	1	DDN1088	L4TNM-PSA TYPE N MALE PS FOR 1/2 IN CABLE

ITEM	SUB SYS	BLOCK	LI	O	APC	QTY	NOMENCLATURE	DESCRIPTION
FNE	Sugar Pine	LOWERJUMPR	213	-	351	1	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
FNE	Sugar Pine	DVRS			571	1	DQ50WDVRS	DVR VHF CABINET IN BAND APPLICATION A
FNE	Sugar Pine	DVRS			571	1	TT05715AA	DVR/VRX FOR USE WITH SINGLE BAND APX MOBILE
FNE	Sugar Pine	DVRS			571	1	TT05130AA	FIXED MOUNT OUTDOOR ENCLOSURE UPGRADE
FNE	Sugar Pine	DVRS	1	-	351	1	DSEA4041DIN	ELLIPTICAL, EXPOSED DIPOLE ARRAY, 5 DBD, 136-174 MHZ, PIM RATED
FNE	Sugar Pine	DVRS	1	-	571	1	DDN1576	DVR PROGRAMMING SOFTWARE FOR APX DVRS
FNE	Sugar Pine	DVRS	1	-	571	1	DDN2088	DVR IN-BAND 1 YEAR EXTENDED WARRANTY
FNE	Sugar Pine	APX6500	1	-	527	1	M25KSS9PW1 N	APX6500 VHF MID POWER
FNE	Sugar Pine	APX6500			412	1	G806	ADD: ASTRO DIGITAL CAI OPERATION
FNE	Sugar Pine	APX6500			527	1	G48	ENH: CONVENTIONAL OPERATION APX6500
FNE	Sugar Pine	APX6500			430	1	GA00631AB	ADD: DVRS MSU ACTIVATION APX MOBILE
FNE	Sugar Pine	APX6500			656	1	GA00804	ADD: APX O2 CONTROL HEAD (Grey)
FNE	Sugar Pine	APX6500			656	1	G444	ADD: APX CONTROL HEAD SOFTWARE
FNE	Sugar Pine	APX6500			656	1	G67	ADD: REMOTE MOUNT MID POWER
FNE	Sugar Pine	APX6500			656	1	G90	ADD: NO MICROPHONE NEEDED
FNE	Sugar Pine	APX6500			656	1	G142	ADD: NO SPEAKER NEEDED
FNE	Sugar Pine	APX6500			656	1	G618	ADD:CBL REMOTE MOUNT 10 FEET
FNE	Sugar Pine	APX6500			656	1	GA00235	ADD: NO GPS ANTENNA NEEDED
FNE	Sugar Pine	APX6500			185	1	G24	ADD: 3Y ESSENTIAL SERVICE
FNE	Sugar Pine	APX4500			471	1	M22QSS9PW1 N	APX4500 UHF R1
FNE	Sugar Pine	APX4500			412	1	G806	ENH: SOFTWARE ASTRO DIGITAL COMMON AIR INTERFACE OPERATION
FNE	Sugar Pine	APX4500			430	1	Q811AQ	ENH: SOFTWARE P25 CONVENTIONAL FLASHPORT
FNE	Sugar Pine	APX4500			656	1	GA00804	ADD: APX O2 CONTROL HEAD (Grey)
FNE	Sugar Pine	APX4500			656	1	G444	ADD: APX CONTROL HEAD SOFTWARE



ITEM	SUB SYS	BLOCK	LI	O	APC	QTY	NOMENCLATURE	DESCRIPTION
FNE	Sugar Pine	APX4500			656	1	G67	ADD: REMOTE MOUNT MID POWER
FNE	Sugar Pine	APX4500			656	1	G90	ADD: NO MICROPHONE NEEDED
FNE	Sugar Pine	APX4500			656	1	G142	ADD: NO SPEAKER NEEDED
FNE	Sugar Pine	APX4500			656	1	G618	ADD:CBL REMOTE MOUNT 10 FEET
FNE	Sugar Pine	APX4500			656	1	GA00235	ADD: NO GPS ANTENNA NEEDED
FNE	Sugar Pine	APX4500			185	1	G24	ADD: 3Y ESSENTIAL SERVICE
FNE	Sugar Pine	ANTENNA	1	-	351	1	DSRDA699	RUGGEDISED UHF DIRECTIONAL YAGI ANT, 380-400 MHZ, 9.0 DBD
FNE	Sugar Pine	UPPERJUMPR	1	-	351	15	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
FNE	Sugar Pine	UPPERJUMPR	1	-	351	2	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
FNE	Sugar Pine	JUMPER	1	-	515	2	TDN9289	221213 CABLE WRAP WEATHERPROOFING
FNE	Sugar Pine	MAINLINE	1	-	207	110	L3323	AVA5-50, 7/8 IN VIRTUAL AIR COAXIAL CABLE, CORRUGATED COPPER
FNE	Sugar Pine	MAINLINE	1	-	351	2	DDN1077	7-16IN DIN FEMALE CONNECTOR EZ-FIT FOR 7/8IN CABLE (MOTOROLA SPECIFIC)
FNE	Sugar Pine	MAINLINE	1	-	351	3	DSSG7806B2A	SG78-06B2A GROUNDING KIT FOR 7/8 IN COAXIAL CABLE
FNE	Sugar Pine	MAINLINE	1	-	351	1	DSL5SGRIP	L5SGRIP 7/8" SUPPORT HOIST GRIP
FNE	Sugar Pine	ANTACC	1	-	351	5	DSSSH78	SSH-78 7/8" SNAPSTAK HANGER 10PK
FNE	Sugar Pine	SURGE	1	-	207	1	DSVHF50DMPGR	RF SPD, 100-512MHZ, DC BLOCK HIGH POWER DIN MALE ANT, DIN FEMALE EQUIP
FNE	Sugar Pine	LOWERJUMPR	1	-	351	25	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
FNE	Sugar Pine	LOWERJUMPR	1	-	351	1	DDN1088	L4TNM-PSA TYPE N MALE PS FOR 1/2 IN CABLE
FNE	TX STA JMPR	TX STA JMPR	214	-	351	240	L1702	FSJ4-50B CABLE: 1/2" SUPERFLEX POLY JKT PER FOOT
FNE	TX STA JMPR	TX STA JMPR	215	-	351	32	DSF4NRHC	F4NR-HC 1/2" TYPE N MALE RIGHT ANGLE CONNECTOR
FNE	RX STA JMPR	RX STA JMPR	216	-	351	240	L1700	FSJ1-50A CABLE: 1/4" SUPERFLEX POLY JKT PER FOOT
FNE	RX STA JMPR	RX STA JMPR	217	-	351	32	DSF1TBMC	F1TBM-C 1/4" BNC MALE CONNECTOR

ITEM	SUB SYS	BLOCK	LI	O	APC	QTY	NOMENCLATURE	DESCRIPTION
FNE	SPARES	SPARES	218	-	906	1	DSTRAK88358M	GPS CLOCK, 10MHZ, DOCXO, 48VDC INCL ANT,100' COAX W/DONGLE SNMPV3
FNE	SPARES	SPARES	219	-	112	1	DLN6886	FRU: GRV8000 SPARE
FNE	SPARES	SPARES	220	-	112	2	DLN6898	FRU: FAN MODULE
FNE	SPARES	SPARES	221	-	112	2	DLN6805	FRU: ENERGY EFFICIENT POWER SUPPLY
FNE	SPARES	SPARES	222	-	112	2	DLN6897	FRU: PA VHF
FNE	SPARES	SPARES	223	-	112	2	DLN6892	FRU: XCVR VHF V2
FNE	SPARES	SPARES	224	-	469	6	F4544	SITE MANAGER ADVANCED
FNE	SPARES	SPARES	224	a	469	6	VA00905	ADD:24/48 VDC PS TO SM
FNE	SPARES	SPARES	224	b	469	6	VA00872	ADD: SDM ASTRO RTU FW CURR ASTRO REL
FNE	SPARES	SPARES	225	-	147	1	SQM01SUM0205	GGM 8000 GATEWAY
FNE	SPARES	SPARES	225	a	147	1	CA01619AA	ADD: DC POWER
FNE	SPARES	SPARES	226	-	147	1	CLN1868	2930F 24-PORT SWITCH
FNE	SPARES	SPARES	227	-	708	1	TT3225	Z2 MINI WORKSTATION 258G 8G NON RET
DC	County Courthouse		1		207	1	DSDCPSX2002S	48V, 200A DC POWER SYS, 84X23X22 RACK, 2 BATT TRAY, 2 BATT BRK
DC	County Courthouse		2	-	207	3	DSDCR50	50AMP DC RECTIFIER, DCPS50A
DC	County Courthouse		3	-	207	1	DSIX4US23KIT1	IX SYSTEM, INCLUDING CONTROLLER, STATIC SWITCH, MANUAL BYPASS SWITCH
DC	County Courthouse		1	-	207	1	DSP4ALMB80D1B	INVERTER BREAKER
DC	County Courthouse		4	-	207	2	DSWL4GM155F	BATTERY, 155AH 48VDC STRING CONSISTING OF (4) 12V CELLS FR CONN VLRA
DC	Mt. Pierce		5	-	207	1	DSDCPSX2003BS	48V, 200A DC POWER SYS, SEISMIC, 84X23X22 RACK, 3 BATT TRAY, 2 BATT BK
DC	Mt. Pierce		6	-	207	4	DSDCR50	50AMP DC RECTIFIER, DCPS50A
DC	Mt. Pierce		7	-	207	1	DSIX4US23KIT1	IX SYSTEM, INCLUDING CONTROLLER, STATIC SWITCH, MANUAL BYPASS SWITCH
DC	Mt. Pierce				207	1	DSP4ALMB80D1B	INVERTER BREAKER
DC	Mt. Pierce		8	-	207	3	DSWL4GM180F	BATTERY, 180AH 48VDC STRING CONSISTING OF (4) 12V CELLS FR CONN VLRA
DC	Horse Mountain		13	-	207	1	DSDCPSX2003BS	48V, 200A DC POWER SYS, SEISMIC, 84X23X22 RACK, 3 BATT TRAY, 2 BATT BK



ITEM	SUB SYS	BLOCK	LI	O	APC	QTY	NOMENCLATURE	DESCRIPTION
DC	Horse Mountain		14	-	207	4	DSDCR50	50AMP DC RECTIFIER, DCPS50A
DC	Horse Mountain		15	-	207	1	DSIX4US23KIT1	IX SYSTEM, INCLUDING CONTROLLER, STATIC SWITCH, MANUAL BYPASS SWITCH
DC	Horse Mountain				207	1	DSP4ALMB80D1B	INVERTER BREAKER
DC	Horse Mountain		16	-	207	3	DSWL4GM155F	BATTERY, 155AH 48VDC STRING CONSISTING OF (4) 12V CELLS FR CONN VLRA
DC	Mt. Pratt		17	-	207	1	DSDCPSX2003BS	48V, 200A DC POWER SYS, SEISMIC, 84X23X22 RACK, 3 BATT TRAY, 2 BATT BK
DC	Mt. Pratt		18	-	207	4	DSDCR50	50AMP DC RECTIFIER, DCPS50A
DC	Mt. Pratt		19	-	207	1	DSIX4US23KIT1	IX SYSTEM, INCLUDING CONTROLLER, STATIC SWITCH, MANUAL BYPASS SWITCH
DC	Mt. Pratt				207	1	DSP4ALMB80D1B	INVERTER BREAKER
DC	Mt. Pratt		20	-	207	3	DSWL4GM155F	BATTERY, 155AH 48VDC STRING CONSISTING OF (4) 12V CELLS FR CONN VLRA
DC	Trinidad		24	-	207	1	DSDCPSX2002S	48V, 200A DC POWER SYS, 84X23X22 RACK, 2 BATT TRAY, 2 BATT BRK
DC	Trinidad		25	-	207	3	DSDCR50	50AMP DC RECTIFIER, DCPS50A
DC	Trinidad		26	-	207	1	DSIX4US23KIT1	IX SYSTEM, INCLUDING CONTROLLER, STATIC SWITCH, MANUAL BYPASS SWITCH
DC	Trinidad		27	-	207	2	DSWL4GM155F	BATTERY, 155AH 48VDC STRING CONSISTING OF (4) 12V CELLS FR CONN VLRA
DC	Trinidad				207	1	DSP4ALMB80D1B	INVERTER BREAKER
DC	Breakers		31	-	207	10	DSP4AIELB20D1B	BREAKER 20 AMP FOR DCPS POWER SYSTEM
DC	Breakers		32	-	207	20	DSP4AIELB15D1B	BREAKER 15 AMP FOR DCPS POWER SYSTEM
DC	Breakers		33	-	207	60	DSP4AIELB5D1B	BREAKER 5 AMP FOR DCPS POWER SYSTEM
MCC	HC	OP_POS			244	4	B1948	MCC 7500E DISPATCH POSITION LICENSES
MCC	HC	OP_POS_LIC			244	4	UA00653AA	ADD: BASIC CONSOLE OPERATION
MCC	HC	OP_POSIT			244	4	UA00249AA	ADD: 15 RADIO RESOURCES LICENSE
MCC	HC	OP_POSIT			244	4	UA00661AA	ADD: ENHANCED IRR

ITEM	SUB SYS	BLOCK	LI	O	APC	QTY	NOMENCLATURE	DESCRIPTION
MCC	HC	OP_POSIT			244	1	B1949	MCC 7500E SOFTWARE DVD
MCC	HC	OP_POSIT			708	4	DSTG221B	TECH GLOBAL EVOLUTION SERIES 22INCH NON TOUCH
MCC	HC	OP_POSIT			708	16	DSY7B61AA	HP Z2 MINI ARM WALL VESA MOUNT
MCC	HC	OP_POSIT			708	4	TT3225	Z2 MINI WORKSTATION 258G 8G NON RET
MCC	HC	OP_POSIT			244	16	B1952	SPEAKER, DESKTOP, USB
MCC	HC	OP_POSIT			244	16	CA03413AA	ADD: USB CABLE, TYPE A TO TYPE C, 4.5M
MCC	HC	OP_POSIT			443	4	B1941	USB AUDIO INTERFACE MODULE
MCC	HC	OP_POSIT			443	4	B1914	MCC SERIES DESKTOP GOOSENECK MICROPHONE
MCC	HC	OP_POSIT			443	8	B1913	MCC SERIES HEADSET JACK
MCC	HC	OP_POSIT			706	4	RLN6098	HDST MODULE BASE W/PTT, 15 FT CBL
MCC	HC	OP_POSIT			706	4	RMN5078B	SUPRAPLUS NC SINGLE MUFF HEADSET
MCC	HC	OP_POSIT			708	4	DSTWIN6328A	PROVIDES ONE DUAL PEDAL FOOTSWITCH FOR USE WITH MOTOROLA MCC 7500 DISP
MCC	HC	OP_POSIT			708	4	T7885	MCAFFEE WINDOWS AV CLIENT
MCC	HC	OP_POSIT			708	1	DSF2B56AA	USB EXTERNAL DVD DRIVE
MCC	HC	OP_POSIT			708	4	DSST7300U3M	7 PORT USB HUB
MCC	HC	SWITCH			147	2	CLN1868	2930F 24-PORT SWITCH
MCC	HC	ROUTER			147	2	T8492	SITE AND HUB ROUTER AND FIREWALL- AC
MCC	HC	ROUTER			147	2	CA03445AA	ADD: MISSION CRITICAL HARDENING
MCC	HC	ROUTER			147	2	CA03448AA	ADD: STATEFUL FIREWALL
MCC	HC	AUX_IO			469	1	F4543	SITE MANAGER BASIC
MCC	HC	AUX_IO			469	1	VA00874	ADD: AUX I-O SERV FW CURR ASTRO REL
MCC	HC	AUX_IO			469	1	V266	ADD: 90VAC TO 260VAC PS TO SM
MCC	HC	AUX_IO			469	3	V592	AAD TERM BLCK & CONN WI
MCC	HC	CCGW			147	1	SQM01SUM0205	GGM 8000 GATEWAY
MCC	HC	CCGW			147	1	CA01616AA	ADD: AC POWER
MCC	HC	CCGW			147	1	CA02141AA	ADD: LOW DENSITY ENH CONV GATEWAY
MCC	HC	CCGW			147	1	SQM01SUM0205	GGM 8000 GATEWAY
MCC	HC	CCGW			147	1	CA01616AA	ADD: AC POWER



ITEM	SUB SYS	BLOCK	LI	O	APC	QTY	NOMENCLATURE	DESCRIPTION
MCC	HC	CCGW			147	1	CA02086AA	ADD: HIGH DENSITY ENH CONV GATEWAY
MCC	HC	RACK			207	2	DS1101990	SPD, SHIELDED RJ-45 JACK, SINGLE LINE GBE (1000MBPS) R56 COMPLIANT
MCC	HC	RACK			207	2	DSTSJADP	RACK MOUNT GROUND BAR, 19 IN FOR TSJ AND WPH SERIES DATA SPDS
MCC	HC	SPARES			147	2	T8492	SITE AND HUB ROUTER AND FIREWALL- AC
MCC	HC	SPARES			147	2	CA03445AA	ADD: MISSION CRITICAL HARDENING
MCC	HC	SPARES			147	2	CA03448AA	ADD: STATEFUL FIREWALL
MCC	HC	SPARES			443	1	B1941	USB AUDIO INTERFACE MODULE
MCC	HC	SPARES			244	4	B1952	SPEAKER, DESKTOP, USB
MCC	HC	SPARES			244	4	CA03413AA	ADD: USB CABLE, TYPE A TO TYPE C, 4.5M
MCC	HC	SPARES			443	4	B1914	MCC SERIES DESKTOP GOOSENECK MICROPHONE
MCC	HC	SPARES			443	8	B1913	MCC SERIES HEADSET JACK
MCC	HC	SPARES			708	1	TT3225	Z2 MINI WORKSTATION 258G 8G NON RET
MCC	HC	SPARES			147	1	CLN1868	2930F 24-PORT SWITCH
SUB1A	Humboldt Portables	APX6000	1	-	481	135	H98KGF9PW6BN	APX6000 VHF MHZ MODEL 2.5 PORTABLE
SUB1A	Humboldt Portables	APX6000	1	a	655	3	Q157	ADD: APX DATA CABLE
SUB1A	Humboldt Portables	APX6000LI	1	a	481	135	H207	DEL: BATTERY
SUB1A	Humboldt Portables	APX6000LI			562	135	QA05570	ALT: LI-ION IMPRES 2 IP68 3400 MAH
SUB1A	Humboldt Portables	APX6000	1	b	755	135	Q811	ENH: LI DIGITAL CONVENTIONAL
SUB1A	Humboldt Portables	APX6000	1	c	185	135	H885BK	ADD: 3Y ESSENTIAL SERVICE
SUB1A	Humboldt Portables	APX6000	1	d	481	135	QA00782	ENH: APX GPS ACTIVATION
SUB1A	Humboldt Portables	APX6000	1	e	426	135	QA09012	ADD: MISSION CRITICAL GEOFENCING
SUB2	DA	APX6000	1	-	481	13	H98KGF9PW6BN	APX6000 VHF MHZ MODEL 2.5 PORTABLE
SUB2	DA	APX6000	1	f	755	13	Q811	ENH: LI DIGITAL CONVENTIONAL
SUB2	DA	APX6000	1	g	185	13	H885BK	ADD: 3Y ESSENTIAL SERVICE
SUB2	DA	APX6000	1	h	481	13	QA00782	ENH: APX GPS ACTIVATION

ITEM	SUB SYS	BLOCK	LI	O	APC	QTY	NOMENCLATURE	DESCRIPTION
SUB2	DA	APX6000	1	i	426	13	QA09012	ADD: MISSION CRITICAL GEOFENCING
SUB2	DA	APX4500	20	-	471	13	M22KSS9PW1 N	APX4500 VHF
SUB2	DA	APX4500	20	a	471	13	Q811	ADD: SOFTWARE P25 CONVENTIONAL
SUB2	DA	APX4500	20	c	656	13	GA00804	ADD: APX O2 CONTROL HEAD (Green)
SUB2	DA	APX4500	20	d	656	13	G444	ADD: APX CONTROL HEAD SOFTWARE
SUB2	DA	APX4500	20	e	471	13	G66	ADD: DASH MOUNT O2 WWM
SUB2	DA	APX4500			623	13	G493	ADD: ANTENNA, UHF (470-495MHZ) 3.5DB ROOF TOP
SUB2	DA	APX4500	20	f	656	13	G90	ADD: NO MICROPHONE NEEDED
SUB2	DA	APX4500	20	g	656	13	B18	ADD: AUXILARY SPKR 7.5 WATT
SUB2	DA	APX4500	20	h	656	13	GA00235	ADD: NO GPS ANTENNA NEEDED
SUB2	DA	APX4500	20	i	185	13	G24	ADD: 3Y ESSENTIAL SERVICE
SUB2	DA	APX4500	1	j	481	13	QA00782	ENH: APX GPS ACTIVATION
SUB2	DA	APX4500	1	k	426	13	QA09012	ADD: MISSION CRITICAL GEOFENCING
SUB2	Probation	APX6000	21	-	481	30	H98KGF9PW6BN	APX6000 VHF MHZ MODEL 2.5 PORTABLE
SUB2	Probation	APX6000	21	a	755	30	Q811	ENH: LI DIGITAL CONVENTIONAL
SUB2	Probation	APX6000	21	b	185	30	H885BK	ADD: 3Y ESSENTIAL SERVICE
SUB2	Probation	APX6000	21	c	481	30	QA00782	ENH: APX GPS ACTIVATION
SUB2	Probation	APX6000	21	d	426	30	QA09012	ADD: MISSION CRITICAL GEOFENCING
SUB2	Probation	APX4500	22	-	471	30	M22KSS9PW1 N	APX4500 VHF
SUB2	Probation	APX4500	22	a	471	30	Q811	ADD: SOFTWARE P25 CONVENTIONAL
SUB2	Probation	APX4500	22	c	656	30	GA00804	ADD: APX O2 CONTROL HEAD (Green)
SUB2	Probation	APX4500	22	d	656	30	G444	ADD: APX CONTROL HEAD SOFTWARE
SUB2	Probation	APX4500	22	e	471	30	G66	ADD: DASH MOUNT O2 WWM
SUB2	Probation	APX4500			623	30	G493	ADD: ANTENNA, UHF (470-495MHZ) 3.5DB ROOF TOP
SUB2	Probation	APX4500	22	f	656	30	G90	ADD: NO MICROPHONE NEEDED
SUB2	Probation	APX4500	22	g	656	30	B18	ADD: AUXILARY SPKR 7.5 WATT
SUB2	Probation	APX4500	22	h	656	30	GA00235	ADD: NO GPS ANTENNA NEEDED
SUB2	Probation	APX4500	22	i	185	30	G24	ADD: 3Y ESSENTIAL SERVICE
SUB2	Probation	APX4500	21	e	481	30	QA00782	ENH: APX GPS ACTIVATION

ITEM	SUB SYS	BLOCK	LI	O	APC	QTY	NOMENCLATURE	DESCRIPTION
SUB2	Probation	APX4500	21	f	426	30	QA09012	ADD: MISSION CRITICAL GEOFENCING
SUB2	Public Works	APX4500	23	-	471	43	M22KSS9PW1 N	APX4500 VHF
SUB2	Public Works	APX6000	23	a	471	43	Q811	ADD: SOFTWARE P25 CONVENTIONAL
SUB2	Public Works	APX6000	23	c	656	43	GA00804	ADD: APX O2 CONTROL HEAD (Green)
SUB2	Public Works	APX6000	23	d	656	43	G444	ADD: APX CONTROL HEAD SOFTWARE
SUB2	Public Works	APX6000	23	e	471	43	G66	ADD: DASH MOUNT O2 WWM
SUB2	Public Works	APX6000			623	43	G493	ADD: ANTENNA, UHF (470-495MHZ) 3.5DB ROOF TOP
SUB2	Public Works	APX6000	23	f	656	43	G90	ADD: NO MICROPHONE NEEDED
SUB2	Public Works	APX6000	23	g	656	43	B18	ADD: AUXILARY SPKR 7.5 WATT
SUB2	Public Works	APX6000	23	h	656	43	GA00235	ADD: NO GPS ANTENNA NEEDED
SUB2	Public Works	APX6000	23	i	185	43	G24	ADD: 3Y ESSENTIAL SERVICE
SUB2	Public Works	APX6000	21	g	481	43	QA00782	ENH: APX GPS ACTIVATION
SUB2	Public Works	APX6000	21	h	426	43	QA09012	ADD: MISSION CRITICAL GEOFENCING
SUB1A	Humboldt Mobiles	APX4500	2	-	471	100	M22KSS9PW1 N	APX4500 VHF
SUB1A	Humboldt Mobiles	APX4500	2	a	471	100	Q811	ADD: SOFTWARE P25 CONVENTIONAL
SUB1A	Humboldt Mobiles	APX4500	2	c	656	100	GA00804	ADD: APX O2 CONTROL HEAD (Green)
SUB1A	Humboldt Mobiles	APX4500	2	d	656	100	G444	ADD: APX CONTROL HEAD SOFTWARE
SUB1A	Humboldt Mobiles	APX4500	2	e	471	100	G66	ADD: DASH MOUNT
SUB1A	Humboldt Mobiles	APX4500	2	l	623	100	G493	ADD: ANTENNA, UHF (470-495MHZ) 3.5DB ROOF TOP
SUB1A	Humboldt Mobiles	APX4500	2	f	656	100	G90	ADD: NO MICROPHONE NEEDED
SUB1A	Humboldt Mobiles	APX4500	2	g	656	100	B18	ADD: AUXILARY SPKR 7.5 WATT
SUB1A	Humboldt Mobiles	APX4500	2	h	656	100	GA00235	ADD: NO GPS ANTENNA NEEDED
SUB1A	Humboldt Mobiles	APX4500	2	i	185	100	G24	ADD: 3Y ESSENTIAL SERVICE
SUB1A	Humboldt Mobiles	APX4500	2	k	655	100	QA00782	ADD: ENABLE INTERNAL GPS OPERATION
SUB1A	Humboldt Mobiles	APX4500	1	g	426	100	QA09012	ADD: MISSION CRITICAL GEOFENCING
SUB1A	Humboldt CS	APX4500	3	-	471	7	M22KSS9PW1 N	APX4500 VHF

ITEM	SUB SYS	BLOCK	LI	O	APC	QTY	NOMENCLATURE	DESCRIPTION
SUB1A	Humboldt CS	APX4500	3	a	471	7	Q811	ADD: SOFTWARE P25 CONVENTIONAL
SUB1A	Humboldt CS	APX4500	3	c	656	7	GA00804	ADD: APX O2 CONTROL HEAD (Green)
SUB1A	Humboldt CS	APX4500	3	d	656	7	G444	ADD: APX CONTROL HEAD SOFTWARE
SUB1A	Humboldt CS	APX4500	3	e	471	7	G66	ADD: DASH MOUNT
SUB1A	Humboldt CS	APX4500	3	f	656	7	G89	ADD: NO RF ANTENNA NEEDED
SUB1A	Humboldt CS	APX4500	3	g	656	7	W382	ADD: CONTROL STATION DESK GCAI MIC
SUB1A	Humboldt CS	APX4500	3	h	656	7	G142	ADD: NO SPEAKER NEEDED
SUB1A	Humboldt CS	APX4500	3	i	656	7	G91	ADD: CONTROL STATION POWER SUPPLY
SUB1A	Humboldt CS	APX4500	3	j	656	7	W665	ADD: CONTROL STATION OPERATION
SUB1A	Humboldt CS	APX4500	3	k	656	7	GA00235	ADD: NO GPS ANTENNA NEEDED
SUB1A	Humboldt CS	APX4500	3	l	185	7	G24	ADD: 3Y ESSENTIAL SERVICE
SUB1A	Console Backup CS	APX7500CON	4	-	761	2	L30KSS9PW1 N	APX CONSOLETTTE VHF
SUB1A	Console Backup CS	APX7500CON	4	a	656	2	GA00306	ADD: VHF MP PRIMARY BAND
SUB1A	Console Backup CS	APX7500CON	4	b	656	2	G806	ADD: ASTRO DIGITAL CAI OPERATION
SUB1A	Console Backup CS	APX7500CON	4	c	656	2	G48	ENH: CONVENTIONAL OPERATION
SUB1A	Console Backup CS	APX7500CON	4	e	656	2	W382	ADD: CONTROL STATION DESK GCAI MIC
SUB1A	Console Backup CS	APX7500CON	4	f	761	2	CA01598	ADD: AC LINE CORD US
SUB1A	Console Backup CS	APX7500CON	4	g	761	2	L999	ADD: FULL FP W/05/KEYPAD/CLOCK/VU
SUB1A	Console Backup CS	APX7500CON	4	h	185	2	G78	ADD: 3Y ESSENTIAL SERVICE
SUB1A	Console Backup CS	APX7500CON	5	-	706	2	RMN5070A	AS. SPECTRA & XTL5000 DESKTOP MIC
SUB1A	Console Backup CS	APX7500CON	6	-	761	2	HKN6233	ASSEMBLY,ACCESSORY,APX CONSOLETTTE RACK MOUNT TRAY HARDWARE KIT
SUB1A	Console Backup CS	ANTENNA	7	-	351	2	DSANT150Y10H	TELEWAVE 144-174 MHZ 10DB 6 ELELMENT YAGI ANTENNA
SUB1A	Console Backup CS	UPPERJUMPR	8	-	351	60	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
SUB1A	Console Backup CS	UPPERJUMPR	9	-	351	8	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE



ITEM	SUB SYS	BLOCK	LI	O	APC	QTY	NOMENCLATURE	DESCRIPTION
SUB1A	Console Backup CS	JUMPER	10	-	515	8	TDN9289	221213 CABLE WRAP WEATHERPROOFING
SUB1A	Console Backup CS	MAINLINE	11	-	351	250	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
SUB1A	Console Backup CS	MAINLINE	12	-	351	8	DDN1091	L4TDF-PSA 7-16 DIN FEMALE PS FOR 1/2 IN CABLE
SUB1A	Console Backup CS	MAINLINE	13	-	351	20	DSSG1212B2U	SG12-12B2U, SUREGROUND 1/2", 48"
SUB1A	Console Backup CS	MAINLINE	14	-	351	4	DSL4SGRIP	L4SGRIP SUPPORT HOIST GRIP 1/2" LDF
SUB1A	Console Backup CS	ANTACC	15	-	554	28	MDN6816	STD HANGERS FOR 1/2IN CABLE & EW180/EW220/EW-HANGER KIT STAINLESS-10PK
SUB1A	Console Backup CS	SURGE	16	-	207	4	DSVHF50DMPGR	RF SPD, 100-512MHZ, DC BLOCK HIGH POWER DIN MALE ANT, DIN FEMALE EQUIP
SUB1A	Console Backup CS	LOWERJUMPR	17	-	351	100	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
SUB1A	Console Backup CS	LOWERJUMPR	18	-	351	4	DDN1088	L4TNM-PSA TYPE N MALE PS FOR 1/2 IN CABLE
SUB1A	Console Backup CS	LOWERJUMPR	19	-	351	4	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
ACCY	Sheriff 6000s	BATT	1	-	453	135	PMNN4486	BATT IMPRES 2 LIION R IP68 3400T
ACCY	Sheriff 1000s	BATT	1	-	453	12	PMNN4448AR	BATTERY PACK, MAH,BATT IMP STD IP67 LIION2700M2800T
ACCY	Spares 6000s	BATT	1	-	453	15	PMNN4486	BATT IMPRES 2 LIION R IP68 3400T
ACCY	Spares 1000s	BATT	1	-	453	5	PMNN4448AR	BATTERY PACK, MAH,BATT IMP STD IP67 LIION2700M2800T
ACCY		CHARGER	1	-	785	147	NNTN8860A	CHARGER, SINGLE-UNIT, IMPRES 2, 3A, 115VAC, US/NA
ACCY		CHARGER	1	-	785	7	NNTN8844A	CHARGER, MULTI-UNIT, IMPRES 2, 6-DISP, NA/LA-PLUG, ACC USB CHGR
ACCY		RSM	1	-	372	147	PMMN4069A	IMPRES RSM, 3.5MM AUDIO JACK
ACCY		Earpieces	1	-	742	147	PMLN7560A	REC ONLY EARPIECE W/TRANSLUCENT TUBE
MW	MICROWAVE				131	1	DQMWHUMBOLDT	HUMBOLDT NOKIA MICROWAVE
MW	MICROWAVE		1	-	708	1	TT3225	Z2 MINI WORKSTATION 258G 8G NON RET
MW	MICROWAVE		1	-	392	1	DSA019BLK	19" LCD, BLACK, NON-TOUCH
MW	MICROWAVE				131	1	DQMWTMS	HUMBOLDT NOKIA MICROWAVE

COUNTY OF HUMBOLDT, CALIFORNIA

EXHIBIT C-3

PROJECT MANAGEMENT PLAN – STATEMENT OF WORK

HUMBOLDT COUNTY RADIO SYSTEM REPLACEMENT PROJECT

DECEMBER 5, 2018

RFP#18-100-COMM

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EXHIBIT C-3

PROJECT MANAGEMENT PLAN – STATEMENT OF WORK

3.1 INTRODUCTION

This Statement of Work (SOW) provides the most current understanding of the work required by both parties to ensure a successful project implementation. It is understood that this SOW is a working document, and that it will be revised as needed to incorporate any changes associated with contract negotiations, Contract Design Review (CDR), and any other changes that may occur during the execution of the project. The scope of work and deliverables described in this SOW are designed to lead to the successful implementation, testing and cutover of a new conventional radio system. The work to be performed is as specified herein and other work is excluded, and Customer responsibilities will occur within the mutually agreeable schedule.

3.1.1 Project Management Responsibilities

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

- Starting at contract award, participate with Humboldt County in mutually agreed upon meetings and submitting status reports that identify the action items, as well as activities planned.
- Maintaining project communications with Humboldt County Project Manager and project team members. Motorola will provide a record of correspondence as part of the progress reports provided prior to each progress meeting.
- Managing the efforts of Motorola staff and coordinate Motorola activities with Humboldt County project team members.
- Issuing status reports that include the project status and milestones achieved.
- Measuring, evaluating, and reporting the progress against the Project Schedule.
- Resolving deviations from the Project Schedule.
- Monitoring and managing risks via a Risk Management Plan.
- Maintaining a documentation schedule that identifies and shows the status of documents to be transmitted for review during the next two reporting periods.



- Monitoring the project to ensure that support resources are available as scheduled and as identified in the contract.
- Assuming accountability for all Motorola contractor and subcontractor supplied tasks within the Project Schedule.
- Reviewing and administering change control procedures through Humboldt County Project Manager, commonly referenced as a “Project Change Request” (PCR), issued by the Motorola Project Manager.
- Providing timely responses to issues related to project progress raised by Humboldt County Project Manager.
- Working with Humboldt County Project Manager in designing and approving the format of an action item log to be used in conjunction with the Project Schedule. The purpose of the log is to identify outstanding issues, provide continual status updates on specific tasks and to identify responsibilities of the parties.
- In the event that Motorola must replace or substitute a Project Manager, Motorola will immediately notify Humboldt County of such a change and will provide Humboldt County with a résumé of the person Motorola intends to substitute or change.

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

- Reviewing the preliminary Project Schedule with Motorola’s Project Manager and assisting Motorola in developing a Project Schedule to defining the detailed tasks and timeline for the completion of Motorola and Humboldt County responsibilities.
- Interfacing with members of Humboldt County team and the Executive Committee to ensure appropriate participation in meetings and timely decisions.
- Providing timely responses to issues related to project progress raised by Motorola’s Project Manager.
- Acting as liaison for and coordinating with other Humboldt County agencies, other governmental agencies and Humboldt County vendors, contractors, and common carriers.
- Approving and releasing payments in a timely manner predicated on project deliverables.
- Assigning one or more personnel who will work with Motorola staff as needed for the duration of the project, including at least one system administrator.
- Ensuring acceptable Standard Change Requests and Approval Letters are approved by authorized signatures.
- Providing building access to Motorola personnel to all facilities where the system is to be installed during the project. Access must be available as necessary to meet the project schedule.

- Reviewing and approving or revising delivered design documents within 7 days of submission.

3.1.2 Summary of Work Breakdown Structure

Humboldt County wants to develop and implement the new system as soon as possible. Motorola has provided a tentative project schedule including the below listed tasks.

- Contract Initiation and Kick-off.
- Radio Deployment Plan.
- Design Review.
- Order Processing, Manufacturing, and Staging.
- Site Improvements.
- Microwave.
- Develop Fleetmap and Operational Configuration.
- Mobile and control station Installation
- Infrastructure Installation.
- Systems Integration and Optimization.
- Acceptance Testing.
- Documentation.
- Training.
- Acceptance Testing.
- Warranty Begins.
- Project Completion.

3.1.3 Contract Initiation and Project Kickoff

Upon contract award, Humboldt County and Motorola execute the contract, both parties receive all the necessary documentation, and schedule a project kick-off meeting. Contract initiation and project kickoff responsibilities are summarized in Table 3-1.

Table 3-1: Contract Initiation and Project Kickoff.

Tasks	Motorola	Humboldt County	Comments
Assign a Project Manager as Single Point of Contact.	X	X	
Assign Resources as necessary.	X	X	
Introduce Team, Review Roles, and Decision Authority.	X	X	
Present Overview of Project Scope and Objectives.	X		
Provide Communication Plan, Risk Management Plan, Change Control Procedures, Preliminary Schedule.	X		

Tasks	Motorola	Humboldt County	Comments
Action Item Log.	X		
Provide Site Access, Necessary Site Permissions, and Resource for Site Walks.		X	
Begin Detailed Site Walks for Civil Work, Design Review, and Transition Planning.	X		

3.1.4 Design Review

The purpose of the Design Review is to review and finalize detailed aspects of the project, including the final System Design, Statement of Work, and Schedule. Any changes determined in Design Review will be documented through a Change Order. The Design Review responsibilities are summarized in Table 3-2.

Table 3-2: Design Review.

Tasks	Motorola	Humboldt County	Comments
Present requirements and impact on equipment.	X		
Present overall project goals and requirements.		X	
Provide existing fleetmap and codeplugs to be used to aid configuration of new system		X	
Present System and Coverage Design.	X		
Provide all rights and agreements necessary for Motorola Solutions to operationally configure, access and deploy the system equipment, including sites and equipment owned by third parties. Any delays in providing such agreements will cause the schedule to be extended one day for each day of delay.		X	
Provide existing system information.		X	
Present preliminary Transition and Cutover plan and methods to document a detailed procedure. Final cut over details may be completed nearer cut over in consultation with the participating user agencies.	X		
Present Equipment Layout Plans and System Design Drawings.	X		
Review Shelter and Compound Configurations.	X		
Review Power Requirements.	X		
Review demarcation between Motorola-supplied equipment and Customer interfaces.	X		

Tasks	Motorola	Humboldt County	Comments
Present Acceptance Test Procedures. Deviations from the proposed ATP will be mutually agreed upon and may represent a change in scope.	X		
Review Preliminary Work Breakdown, Project Tasks and Responsibilities.	X	X	
Review Project Communications Plan.	X	X	
Present Quality Assurance Plan.	X		
Review Detailed Schedule.	X		
Review Training Plan.	X		
Provide Existing Frequency and Site Data for an Intermodulation Study		X	
Perform Intermodulation Study	X		
Resolve Interference caused or received by the Non-Motorola-provided equipment.		X	
Provide Existing Frequency and Radio Information for Sites.		X	
Identify and license frequencies.	X	X	
As mandated by the FCC, Humboldt County, as the licensee, has the ultimate responsibility for providing all required radio licensing or licensing modifications for the system prior to system staging. This responsibility includes paying for FCC licensing and frequency coordination fees. Provide the FCC "call sign" station identifier for each site prior to system staging.		X	
Complete Design Documentation, which may include updated System Description, Equipment List, system drawings, or other documents applicable to the project. Incorporate any deviations from the proposed system into the contract documents accordingly.	X		
Prepare Change Order to Reflect Updated System Design and Documentation.	X		
System design is "frozen" in preparation for subsequent project phases such as Order Processing and Manufacturing.	X	X	
Approve Design Review within 10 days of submission.		X	

3.1.5 Order Processing, Manufacturing, and Staging

The order processing, manufacturing, and staging responsibilities are summarized in Table 3-3.

Table 3-3: Order Processing, Manufacturing, and Staging

Tasks	Motorola	Humboldt County	Comments
Place and track equipment orders.	X		
Provide warehouse for infrastructure equipment.	X		
Determine equipment shipping locations.	X		
Approve shipping locations.		X	
Ship equipment to either staging or the field.	X		
Setup and rack equipment on a site basis per site plans.	X		
Cut and label cables according to site plans and with to/from information to specify interconnection for field installation and future servicing needs.	X		
Complete the cabling/connecting of the subsystems to each other ("connectorization" of the subsystems).	X		
Assemble required subsystems to assure system functionality.	X		
Load application parameters on all equipment according to input from Systems Engineering.	X		
Complete programming of the Fixed Network Equipment.	X		
Program sample radios for the Factory Acceptance Test.	X		
Inventory the equipment with serial numbers and installation references.	X		
Update system documentation.	X		
Perform Factory Acceptance Test in Elgin, IL for radio infrastructure equipment. Microwave equipment will be staged separately.	X		
Witness and Approve Factory Acceptance Test.		X	
Pack System and Ship Equipment to Field.	X		

3.1.6 Site Improvements

Please see the site development statement of work in Appendix 1 for more detail. Below are general responsibilities.

Table 3-4: Civil Work- Site Development and Construction.

Tasks	Motorola	Humboldt County	Comments
Existing sites will be utilized. Provide sites with permissions, lease agreements, zoning variances, right of entry, space, power to the top of the rack, cable raceways, and antenna mounting locations as necessary. There will be a day for day schedule extension until all necessary permissions and agreements are complete. It is assumed existing electrical panels have capacity and breakers for DC power.		X	
Provide Existing NEPA studies, Tower Mapping, Foundation/Tower Design, Tower Analysis, and Geotechnical studies.		X	
Perform tower structural analysis. (Antenna inventory, tower mapping, foundation mapping and geotech, if needed, to further evaluate existing towers, are not included.)	X		
Permitting and permitting fees.		X	
Install antenna systems, except at State sites Shelter Cove and Green Diamond	X		
Provide alarm monitoring of proposed equipment.	X		
Provide existing alarms to building punchblock (e.g. existing door opening, high temp, etc.).		X	

3.1.7 Microwave

The microwave backhaul responsibilities are summarized Table 3-5 below.

Table 3-5: Microwave.

Tasks	Motorola	Humboldt County	Comments
Preliminary feasibility studies which are subject to change after physical path surveys. The feasibility study includes (i) a system map, (ii) a path profile, (iii) path performance calculations, and (iv) a technical report.	X		
Site Surveys for installation	X	X	
Physical path surveys to determine or verify site coordinates, ground elevation, on-path obstructions (location and height), tower information, and other parameters required to develop the final design of a radio link. The present and anticipated future effect of on-path obstructions, such as tree growth, is evaluated and incorporated into the path design where applicable. Provide Path Survey Report. The report based on final design and observed conditions observed in the field.	X		
Final path design. The project can move to the implementation stage based on the recommendations within the final design report.	X		
Approve and pay for changes, if any, that are recommended in the final path design.		X	
Frequency Planning, Coordination, Licensing and Engineering - includes frequency selection, prior coordination, interference case resolution, and FCC license application documentation preparation. Interference studies will be conducted utilizing industry accepted methods, hardware, and software to build a database that is as accurate as possible at the time of the study. The deliverable is frequency coordination data sheets (PCN).	X		
Resolution to the frequency plan (Interference Resolution) may require antenna upgrades or other charges in system design.		X	

Tasks	Motorola	Humboldt County	Comments
In the event, that frequency interference is detected during the Acceptance Testing of a radio system, Motorola's total responsibility for correcting the problem is limited to selecting new frequencies.	X	X	
Ice shields are not included at this time and the need to utilize ice shields will be reviewed with Humboldt County prior to installation to determine if Humboldt County would like to purchase them.	X	X	
Installation includes performing the assembly, wiring, turn-up, and testing for the proposed radio system traffic only. Configuration of orderwire, DSI, and fiber interconnect are not included.	X		
Provide Turn-up and Test Documentation Measure and record transmit power Measure and record RSL at 9500MPR radio Record receiver fade margin RFC2544 Ethernet test results LLD for MW Radio	X		
Acceptance tests will be performed in accordance with the standard procedures listed in the applicable Instruction Manuals for the proposed equipment.	X		
Approve acceptance tests	X		

3.1.8 Develop Fleetmap and Operational Configuration

The fleetmap process defines the talkgroups and operational configuration of the infrastructure and subscriber radios. The fleetmap development and operational configuration responsibilities are summarized in Table 3-6.

Table 3-6: Develop Fleetmap and Operational Configuration.

Tasks	Motorola	Humboldt	Comments
Provide radio programming point of contact.	X		
Provide existing radio template and designate a representative for Humboldt user groups, to make timely decisions on their behalf related to radio programming.		X	
Develop an electronic version of a Master radio programming containing the Humboldt conventional features	X		
Approve the electronic version of the Master radio programming.		X	

Tasks	Motorola	Humboldt	Comments
Provide up to 20 codeplugs for user radio programming.	X		
Program sample radios with approved templates and deliver for Humboldt evaluation.	X		
Approve radio programming.		X	
Radio programming of Motorola provided radios, and alignment as needed. If radios are deployed within 6 months of shipment, factory alignment is sufficient and additional alignment is not required.	X		
Console configuration is included.	X		

3.1.9 Mobile and control station Installation

Tasks	Motorola	Humboldt	Comments
Provide mobile installation point of contact to manage installations.	X	X	
Motorola has provided a trade-in, and Motorola will assume ownership of mobile and portable radios as they are removed.	X		
Prototype installation in several vehicles. Installation is based upon removal of existing mobiles without equipment relocation. During installation, reasonable modifications to the prototype installations may occur if a Humboldt representative is onsite during the installation process and able to approve a modification.	X		
Approve Prototype Vehicle Installation.		X	
Provide vehicles and control station locations per the mutually agreed schedule.		X	
Control stations will be installed as outlined in the pricing and design review for indoor, outdoor, or consolidated locations.	X		

3.1.10 System Installation and Optimization–Fixed Network Equipment

Installation of equipment will occur in existing shelters. The system installation and optimization- fixed network equipment responsibilities are summarized in Table 3-7.

Table 3-7: System Installation and Optimization- Fixed Network Equipment.

Tasks	Motorola	Humboldt County	Comments
Install infrastructure equipment per floor plans, rack drawings, and system description.	X		
Install equipment per R56 installation guidelines, NEC, EIA, FAA, and FCC.	X		
Provide backhaul demarcation within 25ft of site routers per network requirements provided by Motorola.		X	
Provide as-built documentation.	X		
Configure, optimize, program and integrate all Motorola provided equipment.	X		
Verify that all equipment is operating properly and that all signal levels are set accurately and measured values are within the design parameters.	X		
Record site optimization data for the as-built.	X		
System Ready for Acceptance Testing.	X		
R56 Site Audits.	X		

3.1.11 Acceptance Testing

Acceptance testing will be performed per the Acceptance Test Plan requirements of the RFCSP. Acceptance testing responsibilities are summarized in Table 3-8.

Table 3-8: Acceptance Testing.

Tasks	Motorola	Humboldt County	Comments
Perform Factory Functional Acceptance Test.	X		
Witness and Approve Factory Functional Acceptance Test.		X	
Perform Field Functional Acceptance Test.	X		
Witness and Approve Field Functional Acceptance Test.		X	
Perform Coverage Acceptance Test.	X		
Provide Dispatch personnel and vehicles as required per the Acceptance Test Plan and schedule.	X	X	
Provide Coverage Acceptance Test Report.	X		
Approve Coverage Acceptance Test report within 7 days of submittal.		X	

Tasks	Motorola	Humboldt County	Comments
Provide Customer Support Plan detailing the warranty and post-warranty support.	X		
Transition to Warranty/Service.	X	X	

3.1.12 Transition

Training is important to the success of the radio project and end user experience. Training needs to occur prior to transition of new equipment or the Project 25 radio network. After training is complete, there will be a readiness review to confirm the network, users, and support team are ready to transition. Transition responsibilities are summarized in Table 3-9.

Table 3-9: Transition.

Tasks	Motorola	Humboldt County	Comments
Finalize training schedules.	X		
Conduct the training classes outlined in the Training Plan based on Design Review.	X		
Attend Training Classes and comply with prerequisites.		X	
Review and Update Transition Plan as needed	X	X	
Readiness Review for Cutover.	X	X	
Cutover System.	X		

3.1.13 Equipment Removal

Infrastructure equipment removal is not included, except for antenna systems at Pratt, Mount Pierce, and County Courthouse, as noted in the site development Statement of Work. Mobile radios will be removed during mobile installation.

3.1.14 Finalize Project

The finalization of project responsibilities is summarized in Table 3-10.

Table 3-10: Finalize Project.

Tasks	Motorola	Humboldt County	Comments
Resolve punchlists documented in order to meet all the criteria for final system acceptance.	X		
Provide support, such as access to the sites, equipment and system.		X	

Tasks	Motorola	Humboldt County	Comments
Approve punchlist resolution.		X	
Provide as-built documentation in .PDF System Manual with native documents on the System Manual CD/DVD.	X		
As-builts to include: <ul style="list-style-type: none"> - System-Level Diagram. - Site Equipment Rack Configurations from staging. - ATP Test Checklists. - Functional Acceptance Test Plan Test Sheets and Results. - Equipment Inventory List from staging. - Maintenance Manuals. - Technical Service Manuals. - Schedule of antenna heights and positions. 	X		
Review and Approve as-built documentation.		X	

3.1.14.1 General Assumptions

Unless otherwise noted above, the Motorola proposal is based on the following assumptions:

- The Work Breakdown Structure and Project schedule with Humboldt County site and resource availability assume all work is to be performed during normal work hours, Monday through Friday 7:30 AM to 5:30 PM, except site development and construction work which is daylight hours. The impact due to Humboldt County (including other contractors) delays in the agreed-upon project schedule has not been included in this scope of work. Changes to this scope of work will be documented through the change order process.
- Motorola cannot be responsible for issues outside of our immediate control such as, improper frequency coordination by others and non-compliant operation of other radios.
- Although Motorola cannot be responsible for any cost impacts occurring from co-channel interference due to errors in frequency coordination by APCO or any other unlisted frequencies, or the improper design, installation, or operation of systems installed or operated by others; Motorola will support Humboldt County in identifying potential mitigation approaches and recommended course of action to resolve.
- If any of the proposed sites cannot be utilized due to reasons beyond Motorola's control, any changes in costs associated with required site changes or delays will be identified by Motorola for presentation and approval by Humboldt County for the change order process.

- Maximum of 30 days will be required for obtaining approved building permits from time of submission, and a maximum of 60 days will be required to obtain zoning/SUP and NEPA approvals from time of submittal.
- If extremely harsh or difficult weather conditions delay the site work for more than a week, Motorola will seek excusable delays rather than risk job site safety.
- AM detuning or electromagnetic emission studies will not be required.
- Humboldt County has FCC-licensed frequencies for the new system and subsystem equipment that will be installed at the site.
- No hazardous material will be found at sites.
- The cost of non-standard delivery, while not expected, is not included. Examples of non-standard delivery methods include air-lifts, deployment of swamp mats, barge delivery, or the improvements or installation of temporary roads, bridges, or access-ways.
- Existing Humboldt County facilities have adequate space, electrical service, breakers at power panel, HVAC and generator.
- Towers, Cable ladders, and Cable Raceways/Trays at all existing installation locations will have adequate space at time of installation.
- Physical improvements to walls, roofing, flooring, painting, etc. in existing facilities has not been included.
- Existing towers are sufficient to support any new antenna. Tower remediation is not included.
- Sites in conceptual design will be approved for permitting, zoning, FAA, FCC, NEPA.
- Foundations are based on normal soil TIA/EIA-222F, and no underground water, boulders, caverns, or anomalies that prevent the drilling or pouring of foundations.
- Lead paint testing of existing painted towers has not been included.
- Underground utilities are not present in the construction area and as such no relocation will be required.
- Unless otherwise noted, existing utility service and backup power facilities (UPS, generators) have sufficient extra capacity to support the proposed new equipment load.
- Plenum cable and routing is not required.
- As applicable at existing sites, Humboldt County will be responsible for any installation or up-grades of the electrical system in order to comply with NFPA 70, Article 708.

APPENDIX 1 – SITE DEVELOPMENT STATEMENT OF WORK

The Site Development Statement of Work is included on the following pages.



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Section 1. Statement of Work

1.1 Site Improvement Statement of Work

1.1.1 Site Development at Courthouse Site

Site Scope Summary

- ♦ Engineering services for site drawings and regulatory approvals – Included.
- ♦ Site acquisition services – Not included.
- ♦ Zoning Services – Not included.
- ♦ Existing tower to be used for antennas – 60 ' Self supported Tower.

Motorola Responsibilities:

Site Engineering

- ♦ Prepare site construction drawings, showing the layout of various new and existing site components.
- ♦ Conduct site walks to collect pertinent information from the sites (e.g., location of Telco, power, existing facilities, etc.).
- ♦ Prepare a lease exhibit and sketch of the site to communicate to the property owner the proposed lease space and planned development at the particular site location.
- ♦ Prepare record drawings of the site showing the as-built information.
- ♦ Perform National Environmental Policy Act (NEPA) Threshold Screening, including limited literature and records search and brief reporting, as necessary to identify sensitive natural and cultural features referenced in 47 Code of Federal Regulations (CFR) Chapter 1, subsection 1.1307 that may be potentially impacted by the proposed construction activity. This does not include the additional field investigations to document site conditions if it is determined that the proposed communication facility “may have a significant environmental impact” and thus require additional documentation, submittals, or work.
- ♦ Provide a structural engineering analysis for antenna support structure, if necessary, to support the proposed antenna system. If the tower structure fails the analysis, the cost of any site relocation or modifications to the tower required to support the antenna system will be the responsibility of Humboldt County.
NOTE: This task does not include mapping, structural measurement survey,

materials testing, geotechnical investigation, and/or other field investigation to acquire the data. If applicable, these tasks will be noted separately in the SOW.

- ◆ Preparation, submission and tracking of application for local permit fees (zoning, electrical, building etc.) and procurement of information necessary for filing.

Site Preparation

- ◆ Obtain the permits such as electrical, building, and construction permits, and coordinate any inspections with local authorities that may be needed to complete site development work.
- ◆ Provide one-time mobilization costs for the construction crews. Any remobilization due to interruptions/delays that are out of Motorola's control will result in additional costs.

Antenna and Transmission Line Installation

- ◆ Install 2 antenna(s) for the RF system.
- ◆ Supply and install 2 6-foot side arm(s) for antenna mounts.
- ◆ Install up to 120 (2 runs 60ft) linear feet of 7/8-inch transmission line.
- ◆ Perform sweep tests on transmission lines.
- ◆ Provide and install 100 linear ft of PVC sleepers and attachment hardware for supporting transmission lines on rooftop every three feet.
- ◆ Supply and install 1 ground buss bar at the bottom of the antenna support structure for grounding RF cables before they make horizontal transition.
- ◆ Supply and install #2/0 stranded copper ground (not to exceed 120 linear feet) for grounding the bus bars to the building ground.

Existing Facility Improvement Work

- ◆ Supply and install four 40-amp breakers in the distribution panel and wire to outlets located on an average within 35 cable feet.
- ◆ Install 1 Type 2 surge protector on electrical service side of the ATS.
- ◆ Install 1 primary Type 1 surge protector on the room electrical feed to protect the equipment from surges.
- ◆ Ground all metallic objects in the interior of the existing room, to meet current Motorola's Standards and Guidelines for Communications Sites (R56) requirements and terminate near equipment locations.
- ◆ Supply and install 1 cable entry panel with 6 ports.
- ◆ Supply and install 2 copper ground buss bars.

Miscellaneous Work

- ◆ PM/CM Management.
- ◆ Pick up materials at local warehouse.
- ◆ Crane rental and street closure.
- ◆ Create hole for coax ports.
- ◆ Supply and install 2pole 60A disconnect as required by code for inline tap on line side of ATS for secondary surge protector (MOV).
- ◆ Removal of 2 antennas, 2 mounts, 2 lines from existing tower in separate mobilization, subsequent to initial install, turn up and successful integration. Haul off and disposal of all antennas, mounts and lines.



1.1.2 Site Development at Horse Mtn Site

Site Scope Summary

- ♦ Engineering services for site drawings and regulatory approvals – Included.
- ♦ Site acquisition services – Not included.
- ♦ Zoning Services – Not included.
- ♦ Existing tower to be used for antennas – 100 ' Self supported Tower.

Motorola Responsibilities:

Site Engineering

- ♦ Prepare site construction drawings, showing the layout of various new and existing site components.
- ♦ Conduct site walks to collect pertinent information from the sites (e.g., location of Telco, power, existing facilities, etc.).
- ♦ Prepare a lease exhibit and sketch of the site to communicate to the property owner the proposed lease space and planned development at the particular site location.
- ♦ Perform National Environmental Policy Act (NEPA) Threshold Screening, including limited literature and records search and brief reporting, as necessary to identify sensitive natural and cultural features referenced in 47 Code of Federal Regulations (CFR) Chapter 1, subsection 1.1307 that may be potentially impacted by the proposed construction activity. This does not include the additional field investigations to document site conditions if it is determined that the proposed communication facility “may have a significant environmental impact” and thus require additional documentation, submittals, or work.
- ♦ Provide a structural engineering analysis for antenna support structure, if necessary, to support the proposed antenna system. If the tower structure fails the analysis, the cost of any site relocation or modifications to the tower required to support the antenna system will be the responsibility of Humboldt County.
NOTE: This task does not include mapping, structural measurement survey, materials testing, geotechnical investigation, and/or other field investigation to acquire the data. If applicable, these tasks will be noted separately in the SOW.
- ♦ Preparation, submission and tracking of application for local permit fees (zoning, electrical, building etc.) and procurement of information necessary for filing.
- ♦ Obtain the permits such as electrical, building, and construction permits, and coordinate any inspections with local authorities that may be needed to complete site development work.
- ♦ Provide one-time mobilization costs for the construction crews. Any remobilization due to interruptions/delays that are out of Motorola's control will result in additional costs.

Antenna and Transmission Line Installation

- ♦ Install 3 antenna(s) for the RF system.
- ♦ Supply and install 3 6-foot side arm(s) for antenna mounts.



- ◆ Install up to 450 linear feet of 7/8-inch transmission line.
- ◆ Perform sweep tests on transmission lines.
- ◆ Provide and install six-hole hanger blocks and attachment hardware for supporting transmission lines on the antenna support structure every three feet.
- ◆ Supply and install 1 ground buss bar at the bottom of the antenna support structure for grounding RF cables before they make horizontal transition.

Existing Facility Improvement Work

- ◆ Supply and install four 40-amp breakers in the distribution panel and wire to outlets located on an average within 35 cable feet.
- ◆ Supply and install 100A breaker panel with capacity for 20 circuits.
- ◆ Install 1 Type 2 surge protector on electrical service side of the ATS.
- ◆ Install 1 primary Type 1 surge protector on the room electrical feed to protect the equipment from surges.
- ◆ Supply and install 1 cable entry panel with 6 ports.
- ◆ Ground all new metallic objects in the interior of the existing room, to meet current Motorola's Standards and Guidelines for Communications Sites (R56) requirements and terminate near equipment locations.
- ◆ Supply and install 2 copper ground buss bar(s).

Miscellaneous Work

- ◆ PM/CM Management.
- ◆ Pick up materials at local warehouse.
- ◆ 3rd Party Utility Mark Out.
- ◆ Create hole for coax ports.
- ◆ Re-wire existing circuits in panel on load side of ATS and relocate them to new 100A panel.
- ◆ Supply and install 2pole 60A disconnect as required by code for inline tap on line side of ATS for secondary surge protector (MOV).

1.1.3 Site Development at Mt Pierce (aka Monument Peak) Site

Site Scope Summary

- ◆ Engineering services for site drawings and regulatory approvals – Included.
- ◆ Site acquisition services – Not included.
- ◆ Zoning Services – Not included.
- ◆ Existing tower to be used for antennas – 100 ' Self supported Tower.

Motorola Responsibilities:

Site Engineering

- ◆ Prepare site construction drawings, showing the layout of various new and existing site components.
- ◆ Conduct site walks to collect pertinent information from the sites (e.g., location of Telco, power, existing facilities, etc.).



- ◆ Prepare a lease exhibit and sketch of the site to communicate to the property owner the proposed lease space and planned development at the particular site location.
- ◆ Prepare record drawings of the site showing the as-built information.
- ◆ Perform National Environmental Policy Act (NEPA) Threshold Screening, including limited literature and records search and brief reporting, as necessary to identify sensitive natural and cultural features referenced in 47 Code of Federal Regulations (CFR) Chapter 1, subsection 1.1307 that may be potentially impacted by the proposed construction activity. This does not include the additional field investigations to document site conditions if it is determined that the proposed communication facility “may have a significant environmental impact” and thus require additional documentation, submittals, or work.
- ◆ Provide a structural engineering analysis for antenna support structure, if necessary, to support the proposed antenna system. If the tower structure fails the analysis, the cost of any site relocation or modifications to the tower required to support the antenna system will be the responsibility of Humboldt County.
NOTE: This task does not include mapping, structural measurement survey, materials testing, geotechnical investigation, and/or other field investigation to acquire the data. If applicable, these tasks will be noted separately in the SOW.
- ◆ Preparation, submission and tracking of application for local permit fees (zoning, electrical, building etc.) and procurement of information necessary for filing.

Site Preparation

- ◆ Obtain the permits such as electrical, building, and construction permits, and coordinate any inspections with local authorities that may be needed to complete site development work.
- ◆ Provide one-time mobilization costs for the construction crews. Any remobilization due to interruptions/delays that are out of Motorola's control will result in additional costs.

Antenna and Transmission Line Installation

- ◆ Install 2 antenna(s) for the RF system.
- ◆ Supply and install 2 6-foot side arm(s) for antenna mounts.
- ◆ Install up to 300 linear feet of 7/8-inch transmission line.
- ◆ Perform sweep tests on transmission lines.
- ◆ Provide and install six-hole hanger blocks and attachment hardware for supporting transmission lines on the antenna support structure every three feet.
- ◆ Supply and install 1 ground buss bar at the bottom of the antenna support structure for grounding RF cables before they make horizontal transition.

Existing Facility Improvement Work

- ◆ Supply and install four 40-amp breakers in the distribution panel and wire to outlets located on an average within 35 cable feet.
- ◆ Supply and install 1 cable entry panel with 6 ports.
- ◆ Ground all new metallic objects in the interior of the existing room, to meet current Motorola's Standards and Guidelines for Communications Sites (R56) requirements and terminate near equipment locations.



- ◆ Supply and install 2 copper ground buss bars.
- ◆ Install 1 Type 2 surge protector on electrical service side of the ATS.
- ◆ Install 1 primary Type 1 surge protector on the room electrical feed to protect the equipment from surges.

Miscellaneous Work

- ◆ PM/CM Management.
- ◆ Pick up materials at local warehouse.
- ◆ 3rd Party Utility Mark Out.
- ◆ Create hole for coax ports.
- ◆ Supply and install 2pole 60A disconnect as required by code for inline tap on line side of ATS for secondary surge protector (MOV).
- ◆ Removal of 2 antennas, 2 mounts, 2 lines from existing tower in separate mobilization, subsequent to initial install, turn up and successful integration. Haul off and disposal of all antennas, mounts and lines.

1.1.4 Site Development at Pratt Mtn Site

Site Scope Summary

- ◆ Engineering services for site drawings and regulatory approvals – Included.
- ◆ Site acquisition services – Not included.
- ◆ Zoning Services – Not included.
- ◆ Existing tower to be used for antennas – 100 ' Self supported Tower.

Motorola Responsibilities:

Site Engineering

- ◆ Prepare site construction drawings, showing the layout of various new and existing site components.
- ◆ Conduct site walks to collect pertinent information from the sites (e.g., location of Telco, power, existing facilities, etc.).
- ◆ Prepare a lease exhibit and sketch of the site to communicate to the property owner the proposed lease space and planned development at the particular site location.
- ◆ Prepare record drawings of the site showing the as-built information.
- ◆ Perform National Environmental Policy Act (NEPA) Threshold Screening, including limited literature and records search and brief reporting, as necessary to identify sensitive natural and cultural features referenced in 47 Code of Federal Regulations (CFR) Chapter 1, subsection 1.1307 that may be potentially impacted by the proposed construction activity. This does not include the additional field investigations to document site conditions if it is determined that the proposed communication facility “may have a significant environmental impact” and thus require additional documentation, submittals, or work.
- ◆ Provide a structural engineering analysis for antenna support structure, if necessary, to support the proposed antenna system. If the tower structure fails the analysis, the cost of any site relocation or modifications to the tower required to support the antenna system will be the responsibility of Humboldt County.



NOTE: This task does not include mapping, structural measurement survey, materials testing, geotechnical investigation, and/or other field investigation to acquire the data. If applicable, these tasks will be noted separately in the SOW.

- ◆ Preparation, submission and tracking of application for local permit fees (zoning, electrical, building etc.) and procurement of information necessary for filing.

Site Preparation

- ◆ Obtain the permits such as electrical, building, and construction permits, and coordinate any inspections with local authorities that may be needed to complete site development work.
- ◆ Provide one-time mobilization costs for the construction crews. Any remobilization due to interruptions/delays that are out of Motorola's control will result in additional costs.

Antenna and Transmission Line Installation

- ◆ Install 3 antenna(s) for the RF system.
- ◆ Supply and install 3 6-foot side arm(s) for antenna mounts.
- ◆ Install up to 450 linear feet of 7/8-inch transmission line.
- ◆ Perform sweep tests on transmission lines.
- ◆ Provide and install six-hole hanger blocks and attachment hardware for supporting transmission lines on the antenna support structure every three feet.
- ◆ Supply and install 1 ground buss bar at the bottom of the antenna support structure for grounding RF cables before they make horizontal transition.

Existing Facility Improvement Work

- ◆ Supply and install four 40-amp breakers in the distribution panel and wire to outlets located on an average within 35 cable feet.
- ◆ Install 1 Type 2 surge protector on electrical service side of the ATS.
- ◆ Install 1 primary Type 1 surge protector on the room electrical feed to protect the equipment from surges.
- ◆ Ground all new metallic objects in the interior of the existing room, to meet current Motorola's Standards and Guidelines for Communications Sites (R56) requirements and terminate near equipment locations.

Miscellaneous Work

- ◆ PM/CM Management.
- ◆ Pick up materials at local warehouse.
- ◆ 3rd Party Utility Mark Out.
- ◆ Create hole for coax ports.
- ◆ Supply and install 2pole 60A disconnect as required by code for inline tap on line side of ATS for secondary surge protector (MOV).
- ◆ Removal of 2 antennas, 2 mounts, 2 lines from existing tower in separate mobilization, subsequent to initial install, turn up and successful integration. Haul off and disposal of all antennas, mounts and lines.



1.1.5 Site Development at Trinidad Site

Site Scope Summary

- ♦ Engineering services for site drawings and regulatory approvals – Included.
- ♦ Site acquisition services – Not included.
- ♦ Zoning Services – Not included.
- ♦ Existing tower to be used for antennas – 60 ' Guyed Tower.

Motorola Responsibilities:

Site Engineering

- ♦ Prepare site construction drawings, showing the layout of various new and existing site components.
- ♦ Conduct site walks to collect pertinent information from the sites (e.g., location of Telco, power, existing facilities, etc.).
- ♦ Prepare a lease exhibit and sketch of the site to communicate to the property owner the proposed lease space and planned development at the particular site location.
- ♦ Prepare record drawings of the site showing the as-built information.
- ♦ Perform National Environmental Policy Act (NEPA) Threshold Screening, including limited literature and records search and brief reporting, as necessary to identify sensitive natural and cultural features referenced in 47 Code of Federal Regulations (CFR) Chapter 1, subsection 1.1307 that may be potentially impacted by the proposed construction activity. This does not include the additional field investigations to document site conditions if it is determined that the proposed communication facility “may have a significant environmental impact” and thus require additional documentation, submittals, or work.
- ♦ Provide a structural engineering analysis for antenna support structure, if necessary, to support the proposed antenna system. If the tower structure fails the analysis, the cost of any site relocation or modifications to the tower required to support the antenna system will be the responsibility of Humboldt County.
NOTE: This task does not include mapping, structural measurement survey, materials testing, geotechnical investigation, and/or other field investigation to acquire the data. If applicable, these tasks will be noted separately in the SOW.
- ♦ Preparation, submission and tracking of application for local permit fees (zoning, electrical, building etc.) and procurement of information necessary for filing.

Site Preparation

- ♦ Obtain the permits such as electrical, building, and construction permits, and coordinate any inspections with local authorities that may be needed to complete site development work.
- ♦ Provide one-time mobilization costs for the construction crews. Any remobilization due to interruptions/delays that are out of Motorola's control will result in additional costs.
- ♦ Conduct 1 three-point ground resistance test of the site. Should any improvements to grounding system be necessary after ground testing, the cost of such improvements shall be the responsibility of Humboldt County.



Site Components Installation

- ◆ Supply and install 1 freestanding 24-inch-wide cable/ice bridge from the tower to the shelter (up to 10 linear feet).

Antenna and Transmission Line Installation

- ◆ Install 1 antenna(s) for the RF system.
- ◆ Supply and install 1 6-foot side arm(s) for antenna mounts.
- ◆ Install up to 110 linear feet of 7/8-inch transmission line.
- ◆ Perform sweep tests on transmission lines.
- ◆ Supply and install 1 ground buss bar at the bottom of the antenna support structure for grounding RF cables before they make horizontal transition.

Existing Facility Improvement Work

- ◆ Supply and install four 40-amp breakers in the distribution panel and wire to outlets located on an average within 35 cable feet.
- ◆ Supply and install 1 cable entry panel with 6 ports.
- ◆ Ground all new metallic objects in the interior of the existing room, to meet current Motorola's Standards and Guidelines for Communications Sites (R56) requirements and terminate near equipment locations.

Miscellaneous Work

- ◆ PM/CM Management.
- ◆ Pick up materials at local warehouse.
- ◆ 3rd Party Utility Mark Out.
- ◆ Create hole for coax ports.

1.1.6 Site Development at Sugar Pine Mtn Site

Site Scope Summary

- ◆ Engineering services for site drawings and regulatory approvals – Included.
- ◆ Site acquisition services – Not included.
- ◆ Zoning Services – Not included.
- ◆ Existing tower to be used for antennas – 80 ' Guyed Tower.

Motorola Responsibilities:

Site Engineering

- ◆ Prepare site construction drawings, showing the layout of various new and existing site components.
- ◆ Conduct site walks to collect pertinent information from the sites (e.g., location of Telco, power, existing facilities, etc.).
- ◆ Prepare a lease exhibit and sketch of the site to communicate to the property owner the proposed lease space and planned development at the particular site location.
- ◆ Prepare record drawings of the site showing the as-built information.
- ◆ Perform National Environmental Policy Act (NEPA) Threshold Screening, including limited literature and records search and brief reporting, as necessary to



identify sensitive natural and cultural features referenced in 47 Code of Federal Regulations (CFR) Chapter 1, subsection 1.1307 that may be potentially impacted by the proposed construction activity. This does not include the additional field investigations to document site conditions if it is determined that the proposed communication facility “may have a significant environmental impact” and thus require additional documentation, submittals, or work.

- ◆ Provide a structural engineering analysis for antenna support structure, if necessary, to support the proposed antenna system. If the tower structure fails the analysis, the cost of any site relocation or modifications to the tower required to support the antenna system will be the responsibility of Humboldt County.
NOTE: This task does not include mapping, structural measurement survey, materials testing, geotechnical investigation, and/or other field investigation to acquire the data. If applicable, these tasks will be noted separately in the SOW.
- ◆ Preparation, submission and tracking of application for local permit fees (zoning, electrical, building etc.) and procurement of information necessary for filing.

Site Preparation

- ◆ Obtain the permits such as electrical, building, and construction permits, and coordinate any inspections with local authorities that may be needed to complete site development work.
- ◆ Provide one-time mobilization costs for the construction crews. Any remobilization due to interruptions/delays that are out of Motorola's control will result in additional costs.
- ◆ Conduct 1 three-point ground resistance test of the site. Should any improvements to grounding system be necessary after ground testing, the cost of such improvements shall be the responsibility of Humboldt County.

Site Components Installation

- ◆ Supply and install 1 freestanding 24-inch-wide cable/ice bridge from the tower to the shelter (up to 10 linear feet).

Antenna and Transmission Line Installation

- ◆ Install 3 antenna(s) for the RF system.
- ◆ Supply and install 3 6-foot side arm(s) for antenna mounts.
- ◆ Install up to 390 linear feet of 7/8-inch transmission line.
- ◆ Perform sweep tests on transmission lines.
- ◆ Supply and install 1 ground buss bar at the bottom of the antenna support structure for grounding RF cables before they make horizontal transition.

Existing Facility Improvement Work

- ◆ Supply and install four 40-amp breakers in the distribution panel and wire to outlets located on an average within 35 cable feet.
- ◆ Supply and install 1 cable entry panel with 6 ports.
- ◆ Install 1 Type 2 surge protector on electrical service side of the ATS.
- ◆ Install 1 primary Type 1 surge protector on the room electrical feed to protect the equipment from surges.
- ◆ Supply and install 2 copper ground buss bar(s).



- ◆ Ground all new metallic objects in the interior of the existing room, to meet current Motorola's Standards and Guidelines for Communications Sites (R56) requirements and terminate near equipment locations.

Miscellaneous Work

- ◆ PM/CM Management.
- ◆ Pick up materials at local warehouse.
- ◆ 3rd Party Utility Mark Out.
- ◆ Create hole for coax ports.
- ◆ Supply and install 2pole 60A disconnect as required by code for inline tap on line side of ATS for secondary surge protector (MOV).

1.1.7 Site Development at Orleans Mountain Site

Site Scope Summary

- ◆ Engineering services for site drawings and regulatory approvals – Not included.
- ◆ Site acquisition services – Not included.
- ◆ Zoning Services – Not included.

Motorola Responsibilities:

Site Preparation

- ◆ No work included.

Site Components Installation

- ◆ No work included.

Tower Work

- ◆ No work included.

Antenna and Transmission Line Installation

- ◆ No work included.

Existing Facility Improvement Work

- ◆ No work included.

Miscellaneous Work

- ◆ No Work included.

1.2 County Responsibilities, as applicable

- ◆ If required, prepare and submit Electromagnetic Energy (EME) plans for the site (as a licensee) to demonstrate compliance with FCC RF Exposure guidelines.
- ◆ As applicable, coordinate, prepare, submit, and pay for all required permits and inspections for the work that is the County's responsibility.
- ◆ Pay for all utility connection, pole or line extensions, and any easement or usage fees.



- ◆ Pay for the usage costs of power, leased lines and generator fueling both during the construction/installation effort and on an on-going basis.
- ◆ Pay for application fees, taxes and recurring payments for lease/ownership of the property.
- ◆ Provide personnel to observe construction progress and testing of site equipment according to the schedule provided by Motorola.
- ◆ As applicable (based on local jurisdictional authority), the County will be responsible for any installation or up-grades of the electrical system in order to comply with NFPA 70, Article 708
- ◆ Provide property deed or lease agreement, and boundary survey, along with existing as-built drawings of the site and site components to Motorola for conducting site engineering.
- ◆ Provide a right of entry letter from the site owner for Motorola to conduct field investigations.
- ◆ Maintain existing access road in order to provide clear and stable entry to the site for heavy-duty construction vehicles, cement trucks and cranes. Sufficient space must be available at the site for these vehicles to maneuver under their own power, without assistance from other equipment.
- ◆ Arrange for space on the structure for installation of new antennas at the proposed heights on designated existing antenna-mounting structures.
- ◆ If available, provide as-built structural and foundation drawings of the structure and site location(s) along with geotechnical report(s) for Motorola to conduct a structural analysis.
- ◆ Secure power connection to the site, associated permitting and installation of a meter and disconnect within 50 feet of the proposed equipment room location.
- ◆ Provide space, HVAC, backup power (UPS, generator), outlets, grounding, surge suppression, lighting, fire suppression and cabling facilities for the equipment room per Motorola's R56 specifications. Ceiling and cable tray heights in the equipment rooms should be such as to accommodate 7-1/2-foot equipment racks, and the ceiling should be 9 feet or greater.
- ◆ Confirm that there is adequate utility service to support the new equipment and ancillary equipment.
- ◆ Confirm that the existing generator is sufficient to support the new equipment and ancillary equipment loads.
- ◆ If required, remove or relocate any existing facilities, equipment and utilities to create space for new site facilities and equipment.
- ◆ If required, provide any physical improvements (walls, roofing, flooring, painting, etc.) necessary to house the equipment in the existing room.
- ◆ Supply required standby generator power to support the additional proposed equipment. This power source shall be adequate to back up all radio equipment, future equipment growth, and ancillary equipment such as, but not limited to, interior lighting, tower lighting and HVAC.
- ◆ Supply required UPS Power to support the additional proposed equipment. This uninterruptible power source shall be adequate to back up all radio equipment as well as future equipment growth.
- ◆ Secure power connection to the room, associated permitting, and installation of a meter and disconnect within 50 feet of the proposed shelter location.



- ♦ County to pay costs for local permits (zoning, electrical, building, etc.) and procurement of information necessary for filing.
- ♦ County responsible for CEQA compliance.

1.3 Assumptions, as required:

- ♦ All work is assumed to be done during normal business hours as dictated by time zone (Monday thru Friday, 7:30 a.m. to 5:00 p.m.).
- ♦ All recurring and non-recurring utility costs [including, but not limited to, generator fuel (except first fill), electrical, telco] will be borne by the County.
- ♦ All utility installations shall be coordinated and paid for by the site owner and located at jointly agreed to location within or around the new communications shelter or equipment room, as applicable.
- ♦ Site will have adequate electrical service for the new shelter and tower. Utility transformer, transformer upgrades, line, or pole extensions have not been included, as applicable.
- ♦ Pricing has been based on National codes such as IBC or BOCA. Local codes or jurisdictional requirements have not been considered in this proposal.
- ♦ Hazardous materials are not present at the work location. Testing and removal of hazardous materials, found during site investigations, construction or equipment installation will be the responsibility of the County.
- ♦ A maximum of 30 days will be required for obtaining approved building permits from time of submission, and a maximum of 60 days will be required for zoning approvals from time of submittal.
- ♦ No road or site improvements are required for construction vehicle access.
- ♦ If extremely harsh or difficult weather conditions delay the site work for more than a week, Motorola will seek excusable delays rather than risk job site safety.
- ♦ Ground rings installed only in non-rocky soils. Rock excavation costs, if applicable, are excluded.
- ♦ The soil resistivity at the site is sufficient to achieve resistance of 10 ohms or less. Communication site grounding will be designed and installed per Motorola's R56 standards.
- ♦ The existing site has adequate room to expand and install the shelter, including lay down and staging areas, without encroaching on wetlands, easements, setbacks, rights of way or property lines.
- ♦ AM detuning or electromagnetic emission studies will not be required.
- ♦ Protective grating over microwave dishes or the communications shelter has not been included in this proposal.
- ♦ Structural and foundation drawings of the antenna support structure will be made available to preclude the need for ultrasonic testing, geotechnical borings or mapping of existing tower structural members.
- ♦ Lead paint testing of existing painted towers has not been included.
- ♦ On the existing tower, the antenna locations for the proposed antenna system design will be available at the time of installation.
- ♦ The new shelter can be located within 20 feet of the existing tower location and the generator/fuel tank can be located within 25 feet of the shelter.



- ◆ Restoration of the site surroundings by fertilizing, seeding, and strawing the disturbed areas will be adequate.
- ◆ The site has adequate utility service to support the proposed equipment loading. Utility transformer upgrades or step-up or down transformers will not be required.
- ◆ Underground utilities are not present in the construction area and as such no relocation will be required.
- ◆ The existing antenna support structure is structurally capable of supporting the new antenna, cables, and ancillary equipment proposed and will not need to be removed or rebuilt at the existing site. The tower or supporting structure meets all applicable EIA/TIA-222 structural, foundation, ice, wind, and twist and sway requirements. Motorola has not included any cost for structural or foundation upgrades to the antenna support structure.
- ◆ Any existing cable support facilities from the antenna to the cable entry port can be used for supporting the new antenna cables.
- ◆ Structural analyses for towers or other structures that have not been performed by Motorola will relinquish Motorola from any responsibility for the analysis report contents and/or recommendation therein.
- ◆ Foundations for shelter, generator, and fuel tank are based on “normal soil” conditions as defined by TIA/EIA 222-F. Footings deeper than 30 inches, raised piers, rock coring, dewatering, or hazardous material removal have not been included.
- ◆ Alarming at existing sites will be limited to new component installations and will have to be discussed and agreed to on a site-by-site basis.
- ◆ The site will have adequate room for installation of proposed equipment, based on applicable codes and Motorola’s R56 standards.
- ◆ The existing utility service and backup power facilities (UPS, generators) have sufficient extra capacity to support the proposed new equipment load.
- ◆ A clear obstruction-free access exists from the antenna location to the equipment room.
- ◆ The County does not desire upgrade of the existing site to meet Motorola’s R56 standards.
- ◆ The floor can support the proposed new loading. Physical or structural improvements to the existing room will not be required.
- ◆ Electrical panels can support addition of DC power plant and rectifier both in service capacity and breaker availability.
- ◆ "Adequate primary and back-up electrical service.
- ◆ Adequate communications room HVAC, structural integrity, waterproofing.
- ◆ Adequate room for equipment racks and coax.
- ◆ Tower and building are both structurally capable of supporting additional load without steel or foundation modifications.
- ◆ Electrical panels can support addition of DC power plant and rectifier.
- ◆ Adequate primary and back-up electrical service is available.
- ◆ Adequate communications room, including HVAC, structural integrity and waterproofing is available.
- ◆ Adequate space for equipment racks and coax is available.
- ◆ Tower and building are both structurally capable of supporting additional load without steel or foundation modifications.



- ◆ Electrical panels can support addition of DC power plant and rectifiers.
- ◆ Site Development Schedule assumes the County is providing unencumbered property and gives us the right build - if during the due diligence there are encumbrances or issues, this may impact the new site design and MSI may have to regroup/redesign.
- ◆ Site Development Schedule assumes no soils, NEPA or environmental issues are found during design phase.
- ◆ Site Development Schedule assumes no zoning approvals or jurisdictional permitting problems (maximum 60 days).

1.4 Completion Criteria

- ◆ Site development completed per issued for construction (IFC) construction drawings, project requirements, contractual obligations (including any customer/Motorola approved changes) and approved by Humboldt County.
- ◆ This shall be confirmed by Motorola's subcontractor and reviewed with Motorola construction manager and project manager before inspections occur.
- ◆ Site turn-over package completed and turned over to Motorola (As defined and agreed to with project team and customer).
- ◆ All punch list and deficiencies shall be completed prior to customer and Motorola inspections.
- ◆ Motorola site development checklist shall be completed and signed off by Motorola's subcontractor prior to Humboldt County's inspection. (Review with project team and customer and amend checklist as required at project kick off or before work begins).



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APPENDIX 2 – TRAINING PLAN

3.1.15 Training Overview for Humboldt County

In order to achieve the training goals identified by Humboldt County, Motorola will deliver the following courses.

It is necessary that participants bring their laptop computers for all system administrator and technician classes. Materials will be delivered electronically via USB drives.

3.1.16 Training Plan – Motorola Facility

Course Title	Target Audience	Sessions	Duration	Location	Date	Participants
ASTRO 25 IV&D System Overview Course#: AST1038 (Self-paced; On-Line) Prerequisite	System Technicians	1	2.5 hours	Online; Self-paced	Prior to Workshops	1
ASTRO 25 Systems Fleetmapping Course#: RDS1017 (Instructor-led)	System Managers & Technicians	1	4.5 days	Schaumburg, IL	Prior to managing	1
ASTRO 25 IV&D Conventional RF Site Workshop Course #: ACS717440 (Instructor-led)	System Technicians	1	3 days	Schaumburg, IL	Prior to maintaining	1
Standalone GTR8000 Conventional Based Radio Course#: AST2006 (Instructor-led)	System Technicians	1	2 days	Schaumburg, IL	Prior to maintaining	1



3.1.17 Console Operator Training Plan – Field Class

Course Title	Target Audience	Sessions	Duration	Location	Date	Participants
MCC7500 Console Operator and Admin Train-the-Trainer 1 Training console required Ratio 2 per console Course#: AST1054 (Instructor-led)	Dispatch Console Supervisors	1 (8 hr) Session	1 day	Humboldt County, CA	Prior to cutover	2
MCC7500 Console Operator 1 Training console required Ratio 2 per console Course#: AST1054 (Instructor-led)	Console Dispatchers	2 (4 hr) Sessions	1 day	Humboldt County, CA	Prior to cutover	4 (2 per session)

3.1.18 Subscriber Training Plan – Field Class

Course Title	Target Audience	Sessions	Duration	Location	Date	Participants
APX6000 Li Portable and APX4500 Mobile (1 model of each) User Train-the-Trainer Training Utilizing the Interactive End User Tool Kits Course#: AST1059 (Instructor-led)	Trainers	1	1 day	Humboldt County, CA	Prior to training users	10

3.1.19 Course Descriptions for Humboldt County

Course descriptions for Humboldt County are included on the following pages.

3.1.19.1 ASTRO® 25 IV&D System Overview

AST1038

Course Synopsis and Objectives:	<p>The ASTRO®25 IV&D System Overview course will provide participants with knowledge and understanding of the ASTRO®25 IV&D system. This course will address M, L and K Core systems. System architecture, components and features will be explained. In addition, RF and console sites and their architecture, features and components will be discussed. Finally, call processing for voice and mobile data applications will be covered, and an introduction to applications available in the ASTRO®25 system will be provided.</p> <p>At the end of this course, the participant should:</p> <ul style="list-style-type: none"> ▪ Understand the general architecture of an ASTRO®25 IV&D Radio System. ▪ Understand key features of available in the ASTRO®25 IV&D Radio System. ▪ Understand the components of the ASTRO®25 Zone Core. ▪ Understand site components in the ASTRO®25 system. ▪ Understand the features, capabilities and components of the MCC 7000 series dispatch consoles. ▪ Understand concepts of Mobility and Call Processing in the ASTRO®25. ▪ Understand the applications for managing the ASTRO®25 system.
Delivery Method:	▪ OLT = Online Training.
Duration:	2.5 hours
Participants:	<ul style="list-style-type: none"> ▪ Core Technicians. ▪ Site Technicians. ▪ Console Technicians. ▪ Core Managers.
Class Size:	Class Size varies by region
Prerequisite:	None
Curriculum:	<p>M Core/L Core:</p> <ul style="list-style-type: none"> ▪ System Architecture. ▪ System Features and Options. ▪ Zone Core Components. ▪ Repeater Sites. ▪ Simulcast Sites. ▪ Console Sites. ▪ Conventional Sites. ▪ Site Status. ▪ Information Types and Paths. ▪ Voice and Data Processing. ▪ Mobility Management. ▪ Applications Overview.



	K Core: <ul style="list-style-type: none"> ▪ System Architecture. ▪ System Features and Options. ▪ Zone Core Components. ▪ Console Sites. ▪ Conventional Sites. ▪ Information Types and Paths. ▪ Voice and Data Processing. ▪ Mobility Management. ▪ Applications Overview.
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3.1.19.2 ASTRO® 25 Systems Fleetmapping Workshop

RDS1017

Course Synopsis and Objectives:	<p>This workshop addresses topics necessary for the effective planning and mapping of an ASTRO 25 IV&D radio system. During this course, the participants will learn about ASTRO 25 features, capabilities, and restrictions in order to effectively plan for a new or upgraded ASTRO 25 system.</p> <p>After completing the course, the participant will be able to:</p> <ul style="list-style-type: none"> ▪ Understand the methodologies used to configure radio users and groups with the goal of optimizing system resources. ▪ Enable participants to knowledgeably assist with fleetmapping decisions. ▪ Perform the basic planning requirements and complete a simple fleetmap information template. ▪ Create a sample fleetmap based on sample operational requirement information.
Delivery Method:	ILT – Instructor-led training
Duration:	4.5 days
Participants:	Pre-Sale System Owners, Planners, Administrators, and Technicians
Class Size:	Up to 12
Prerequisite:	None
Curriculum:	N/A

3.1.19.3 ASTRO® 25 IV&D Conventional RF Site Workshop

ACS717440

Course Synopsis and Objectives:	<p>The ASTRO® 25 IV&D Conventional RF Site workshop describes the components in the different ASTRO® 25 IV&D Conventional RF Sites topologies. This course also presents how the different ASTRO® 25 IV&D Conventional RF Sites topologies operate and explains the tools and methods available for troubleshooting components within the different ASTRO® 25 IV&D Conventional RF Sites topologies.</p> <p>By the end of the course, you will be able to:</p> <ul style="list-style-type: none"> Describe the ASTRO® 25 Conventional RF Site components and site configurations. Configure and optimize the GTR 8000 Base Radio, GPW 8000 Receiver, GCM 8000 Comparator, and MLC 8000 Site Link Converter/Analog Comparator. Diagnose and troubleshoot the GTR 8000 Base Radio, GPW 8000 Receiver, GCM 8000 Comparator, and MLC 8000 Site Link Converter/Analog Comparator. Configure, diagnose and troubleshoot the components of the Conventional RF Site Network Transport subsystem.
Delivery Method:	ILT = Instructor Led Training
Duration:	3 days
Participants:	Site Technicians
Class Size:	Up to 12
Prerequisite:	<ul style="list-style-type: none"> AST1038–ASTRO® 25 with IV&D System Overview. ACT100-E–Bridging the Knowledge Gap–Technicians. NST762–Networking Essentials in Communication Equipment. NWT003–ASTRO® Systems Applied Networking.
Curriculum:	<p>Module 1: Course Introduction</p> <p>Module 2: Conventional Topologies:</p> <ul style="list-style-type: none"> Topic 2-1: Conventional Subsystems Overview (Distributed/Centralized). Topic 2-2: Conventional Site Architecture. Topic 2-3: Conventional Call Processing Concepts. <p>Module 3: Component Descriptions:</p> <ul style="list-style-type: none"> Topic 3-1: GTR 8000 Conventional Base Radio. Topic 3-2: GGM 8000 Gateway. Topic 3-3: GPW 8000 Receiver. Topic 3-4: GCM 8000 Comparator. Topic 3-5: MLC 8000 Analog Comparator/Site Link Converter. Topic 3-6: Site Timing Preferences. Topic 3-7: HP 2610/2620 Ethernet Switch. Topic 3-8: Legacy Site Components. <p>Module 4: Configuration:</p> <ul style="list-style-type: none"> Topic 4-1: Configuration Software/Tools. Topic 4-2: GTR 8000 Base Radio Configuration. Topic 4-3: GCM 8000 Comparator Configuration. <p>Module 5: Site Links and Network Transport Subsystem:</p> <ul style="list-style-type: none"> Topic 5-1: Supported Link Types. Topic 5-2: Site Gateway.

- Topic 5-3: Ethernet Switch.
 - Topic 5-4: Configuration of Network Transport Components.
 - Topic 5-5: MLC 8000 Site Link Converter.
- Module 6: Conventional Site Maintenance and Troubleshooting:
- Topic 6-1: GTR 8000 Optimization, Alignments and Verification.
 - Topic 6-2: GCM 8000 Optimization.
 - Topic 6-3: MLC 8000 Optimization.
 - Topic 6-4: Troubleshooting Tools.
 - Topic 6-5: Unified Event Manager.
 - Topic 6-6: GTR 8000 Diagnostics and Troubleshooting.
 - Topic 6-7: G-Series FRU Procedures.
 - Topic 6-8: Troubleshooting RF Site Links.
 - Topic 6-9: Gateway Diagnostics and Troubleshooting.
 - Topic 6-10: MLC 8000 Diagnostics and Troubleshooting.

3.1.19.4 Standalone GTR8000 Conventional Base Radio

AST2006

Course Synopsis and Objectives:	<p>This course is designed to give the participants the ability to align, troubleshoot and repair the Standalone GTR8000 Base Station/Repeater to Motorola Solutions recommended service levels. Emphasis is placed on the use of Configuration Service Software (CSS) and its role in configuration, maintenance, diagnostics, alignments, and optimization of the Standalone GTR8000 Base Radio/Repeater</p> <p>Upon completing this course, the participant will be able to:</p> <ul style="list-style-type: none"> ▪ Understand basic concepts of the various radio systems supported by the GTR8000 Conventional Base Radio ▪ Identify the equipment modules of the GTR8000 Conventional Base Radio ▪ Operate and perform routine maintenance on the GTR8000 Conventional Base Radio ▪ Understand basic operational theory of GTR8000 Conventional Base Radio components ▪ Configure the GTR8000 Conventional Base Radio using Configuration Service Software (CSS) ▪ Identify the different backplane connections on the GTR8000 Conventional Base Radio ▪ Perform calibration and alignment adjustments for the GTR8000 Conventional Base Radio ▪ Troubleshoot problems and identify/replace faulty modules in the GTR8000 Conventional Base Radio
Delivery Method:	ILT = Instructor Led Training (Field Delivery Only)
Duration:	2 days
Participants:	Maintenance Technicians
Class Size:	Up to 12
Prerequisite:	<ul style="list-style-type: none"> ▪ General RF Knowledge and Skills ▪ Basic Knowledge of Two-Way Radio systems
Curriculum:	<p>CONVENTIONAL GTR COURSE OUTLINE</p> <ol style="list-style-type: none"> 1. GTR8000 Base Radio <ol style="list-style-type: none"> a. Topologies In A Conventional System b. Description c. Configurations d. Capabilities <ol style="list-style-type: none"> i. Clear and Encrypted CAI Digital Voice ii. Clear and Encrypted Packet Data e. GTR8000 Modules <ol style="list-style-type: none"> i. Transceiver <ol style="list-style-type: none"> 1. LED's 2. Reset Button 3. Intercom Button 4. Front Connections 5. Rear Connections ii. Transceiver Option Board iii. Power Amplifier



- 1. LED's
 - 2. Modules
 - 3. Input/Output
 - iv. Fan
 - 1. LED's
 - v. Power Supply
 - 1. LED's
 - vi. Backplane Connections
 - vii. AC Power Distribution in the Base Radio
- f. Base Radio Connections to System
- g. Software Applications
 - i. CSS
 - 1. Accessing CSS
 - 2. GTR Configuration
 - 3. Site Configuration
 - 4. Channel Configuration
 - 5. Subsite Configuration
 - 6. Hardware Configuration
 - 7. Station Configuration
 - 8. Repeater Configuration
 - 9. Infrastructure Configuration
 - 10. Status Report Screen
 - 11. Status Panel Screen
 - 12. Hardware/Software Screen
 - 13. CSS Tools Menu
 - 14. GTR8000 Alignments
 - a. ASTRO Simulcast
 - b. Frequency Reference
 - c. ASTRO Test Pattern
 - d. ASTRO BER and RSSI
 - ii. SWDL
 - 1. Performing A SWDL on a GTR8000 Base Radio
 - 2. Upgrading Software
 - 3. Converting Software
- h. Conventional Site Maintenance and Troubleshooting
 - i. Optimization, Alignment, and Verification
 - ii. Troubleshooting Tools
 - iii. Troubleshooting Methodology
 - iv. GTR8000 Diagnostics and Troubleshooting
 - v. FRU Procedures

3.1.19.5 MCC7500 Console Operator

Course Synopsis and Objectives:	<p>This course provides participants with an introduction to the dispatch console, its basic operation and tailored job aids which will be available for assistance in operation. Through facilitation and hands-on activities, the user learns how to perform common tasks associated with the console operation.</p> <p>After completing this training course, you will be able to:</p> <ul style="list-style-type: none">▪ Perform basic operational tasks of the dispatch console.▪ Utilize the provided job aids to perform specific tasks associated with the console.▪ Understand a high level view of the system configuration.▪ Understand a high-level overview of the customer system configuration.▪ Understand general console operation.▪ Understand proper operating procedures for specific customer features.
Delivery Method:	ILT - Instructor-led training
Duration:	4 hours
Participants:	Dispatch Console Operators, Supervisors, System Administrators, and Support Personnel
Class Size:	Based on number of Training Consoles available (2 students per Console)
Prerequisite:	None
Curriculum:	<ul style="list-style-type: none">▪ Overview▪ Communicating with Radios▪ Advanced Signaling Features▪ Resource Groups▪ Working with Configurations▪ Working with Aux IOs▪ Troubleshooting



3.1.19.6 MCC7500 Console Supervisor

Course Synopsis and Objectives:	<p>This course provides participants with the knowledge and skills to manage and utilize the MCC7500 console administrator functions. Through facilitation and hands-on activities, the participant learns how to customize the console screens. After completing this training course, you will be able to:</p> <ul style="list-style-type: none"> ▪ Understand the menu items and tool bar icons. ▪ Edit folders, multi-select/patch groups, auxiliary input output groups, windows and toolbars. ▪ Add/delete folders.
Delivery Method:	ILT - Instructor-led training
Duration:	<p>4 hours Operator, plus 4 hours Admin</p>
Participants:	Dispatch Supervisors and System Administrators
Class Size:	Based on number of Training Consoles available (2 students per Console)
Prerequisite:	None
Curriculum:	<ul style="list-style-type: none"> ▪ Introduction ▪ Configurations ▪ Folders and Resource Setup ▪ Customizing Folders ▪ Auto Starting the MCC 7500 Dispatch Console ▪ Editing Preferences ▪ Configuring the Toolbar ▪ Setting Up Aux IOs ▪ Resource Groups

3.1.19.7 APX Portable and APX Mobile Operator Train-the-Trainer

Course Synopsis and Objectives:	<p>This course provides APX radio trainers with an introduction to their radio, its basic operation and tailored job aids available for assistance in operation. The learning experience is a mix of facilitation and hands-on activities to help users perform common tasks associated with their radio operation. Segmentation between user groups (i.e. Police, Fire/EMS, and Public Service) is encouraged to help focus instruction on the specific operational issues of the individual user group. This course is geared for customers who have an experienced dedicated training staff in their organization. It provides the customer's identified training personnel with the knowledge and practice applying training techniques that will enable them to successfully train their students. Trainers will use audio visual (Interactive End User Toolkits–iEUTK), facilitation and “hands-on” activities to facilitate learning events supported by tailored or customized training materials and job aides. They will become proficient in discussing common tasks associated with the operation of the customer's radios.</p> <p>After completing the course the participant will be able to:</p> <ul style="list-style-type: none"> ▪ Understand a high-level overview of the customer system configuration. ▪ Understand the general radio operation. ▪ Understand proper operating procedures for specific customer features. ▪ Perform basic operational tasks of the radio. ▪ Utilize the provided job aids to perform specific tasks associated with the radio.
Delivery Method:	ILT - Instructor-led training
Duration:	8 hours
Participants:	APX Trainers, Supervisors and Support Personnel
Class Size:	Up to 15
Prerequisite:	Previous two-way radio and training experience
Curriculum:	<p>Basics:</p> <ul style="list-style-type: none"> ▪ Controls. ▪ Top and Side Buttons. ▪ Switches. ▪ 3 Position toggle. ▪ 2 Position Concentric. ▪ Home key. ▪ Data Key. ▪ Display. ▪ Front Display. ▪ Top Display. ▪ Display light. ▪ Intelligent Lighting. ▪ Push to Talk or Accessory PTT found on the microphone. ▪ Hub, hang up box (Mobile). <p>Menu:</p> <ul style="list-style-type: none"> ▪ Menu Screen Anatomy. ▪ Navigating Menu Screen.

- Recent Call List (Model 3.5).
 - Unified Call List - Contacts (Model 3.5).
 - Dual Sided Radio (Model 3.5).
 - Dual Mics.
 - Dual Speakers.
 - Accessory Connector.
- Specific Features:**
- Changing Talkgroups/Channels.
 - Changing Zones.
 - Mute tones of keypad.
 - Talkgroup Call.
 - Private Call.
 - Accessing Private Call Feature.
 - Initiating Private Call.
 - Call List Programming.
 - Announcement/All Call (Calls involving Multiple Talkgroups).
 - Initiating Announcement/All Call.
 - Direct/Talkaround.
 - Failsoft.
 - Radio Profiles.
 - Accessing and changing Radio Profile.
- Optional Features:**
- Scan.
 - Scan program.
 - Priority Scan.
 - Dynamic Priority.
 - Telephone Interconnect.
 - Accessing Telephone Interconnect Feature.
 - Initiating a Phone Call.
 - Phone List Programming.
- Data Services:**
- Text Messaging.
 - Accessing the Text Messaging Feature.
 - Creating a Free Form Text Message.
 - Sending a "Canned " Text Message
 - GPS.
 - OTAP.
 - Encryption.
 - Emergency.

COUNTY OF HUMBOLDT, CALIFORNIA

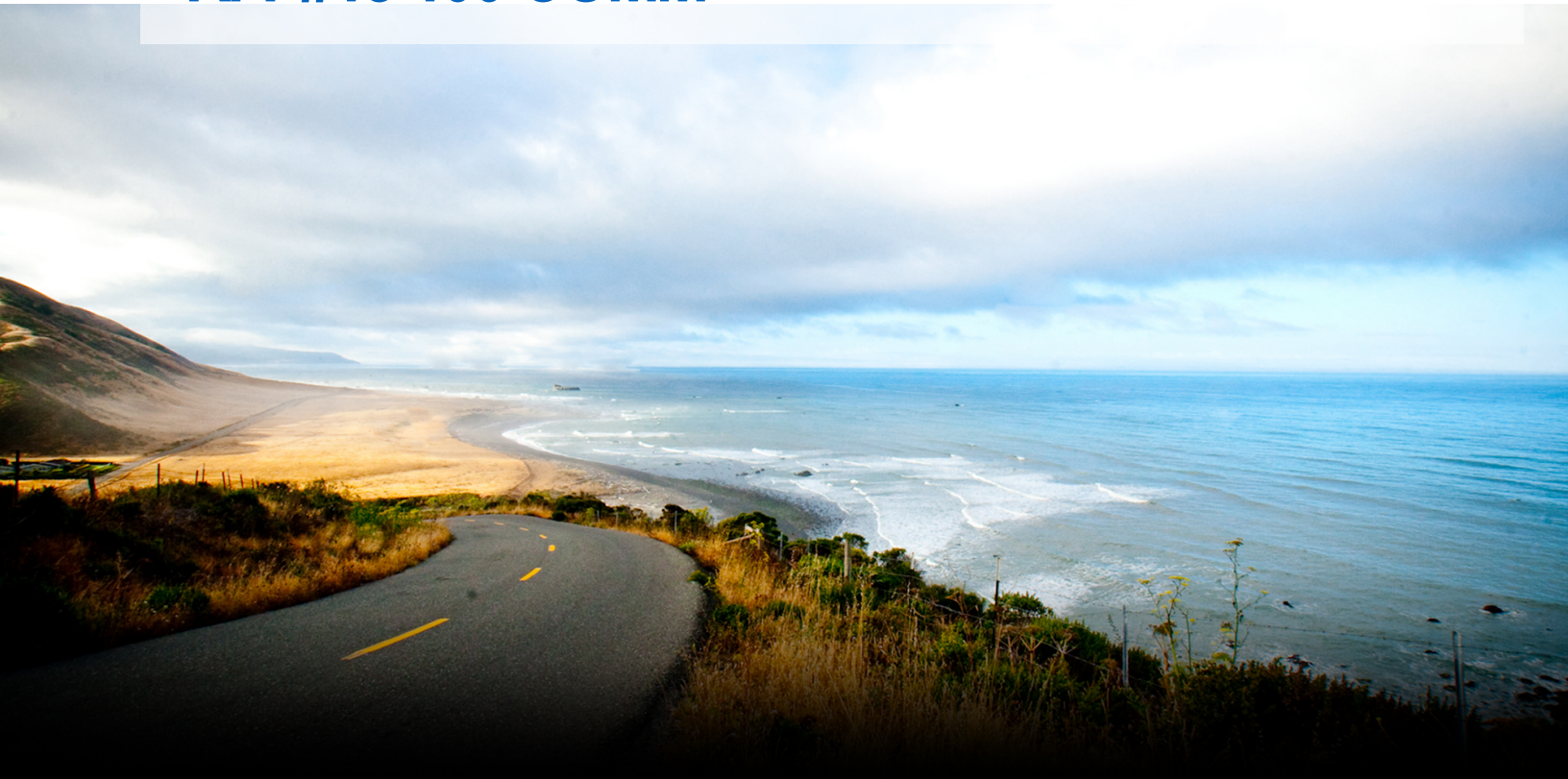
EXHIBIT C-4

ACCEPTANCE TEST PLAN

HUMBOLDT COUNTY RADIO SYSTEM REPLACEMENT PROJECT

DECEMBER 5, 2018

RFP#18-100-COMM



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EXHIBIT C-4

ACCEPTANCE TEST PLAN

4.1 FUNCTIONAL ACCEPTANCE TEST PLAN

The following is the Functional Acceptance Test plan which identifies the individual procedures, including the goals, methods, and acceptance criteria.

Below is a summary of the tests to be performed.

Functional Acceptance Test	Factory Staging	Field
Radio to Radio Features		
Conventional Radio Resource Call - Clear Mode	X	X
Conventional Radio Scan	X	X
Conventional Radio Resource via Comparator	X	X
Conventional ASTRO Emergency	X	X
Radio to Radio Features		
Call Alert Page - Conventional	X	X
Activity Log	X	X
Console Priority	X	X
Multi-Select Operation	X	X
Patch	X	X
Alert Tones	X	X
System Reliability Features		
Single Comparator Failure at Primary GEO-Prime Site	X	X
Loop Microwave Switch		X
DC Power Systems		X
Enhanced Geo Select		
Enter/Exit Geofence Boundary with Momentary Action	X	X
Enter/Exit Boundaries with Continuous Actions	X	X
Enter Exit Overlapping Geofence Boundaries with Zone-Channel Change	X	X
Fault Management		
Fault Manager - Unified Event Manager Lite	X	X
Site Alarm (Microwave and DVRS Site)	X	X
Unified Event Manager - Digital Notifications for Events (Email)	X	X

Radio to Radio Features

Conventional Radio Resource Call - Clear Mode

1. DESCRIPTION

Subscribers can communicate to each other through a repeater that is selected via the channel selector on the individual radio.

The signals that are received from the subscriber radio are repeated so that other radios on that channel will be able to hear and participate in the conversation.

SETUP

RADIO-1 - CONVENTIONAL CHANNEL 1
RADIO-1 - CONVSITE 1
RADIO-2 - CONVENTIONAL CHANNEL 1
RADIO-2 - CONVSITE 1

VERSION #1.050

2. TEST

- Step 1. Initiate a CONVENTIONAL CHANNEL 1 call on RADIO-1.
- Step 2. Verify RADIO-2 can monitor and respond to the call on CONVENTIONAL CHANNEL 1.
- Step 3. Initiate a CONVENTIONAL CHANNEL 1 call on RADIO-2.
- Step 4. Verify RADIO-1 can monitor and respond to the call on CONVENTIONAL CHANNEL 1.
- Step 5. Repeat above tests for each repeater channel.

Pass____ Fail____

Radio to Radio Features

Conventional Radio Scan

A subscriber can be programmed to scan through a list of conventional frequencies and lock on to one that has activity. This allows a user to monitor multiple frequencies at one time.

This scan will cycle through its list and if activity is detected, will change to that personality for the duration of the transmission. After the transmission ends and after a preset hang time, the subscriber reverts to its home channel.

SETUP

RADIO-1 - SITE 1 (SCANNING)
RADIO-2 - SITE 2

RADIO-1 must have SITE 1 and SITE 2 in its active scan list.

VERSION #1.070

2. TEST

- Step 1. Verify that on RADIO-1 scan is enabled.
- Step 2. From RADIO-2, transmit on SITE 2, which is a channel programmed in the active scan list.
- Step 3. Verify that RADIO-1 changes to SITE 2.
- Step 4. Verify communications between RADIO-1 and RADIO-2.
- Step 5. Verify that RADIO-1 will return to its home channel of SITE 1.
- Step 6. Repeat steps 2-5 for all channels in the active scan list.

Pass_____ Fail_____



Radio to Radio Features

Conventional Radio Resource Via Comparator

1. DESCRIPTION

A comparator will vote all receive capable sites and transmit on specified transmit capable sites. As a comparator will construct a signal from multiple sites, it is necessary to test each site individually.

SETUP

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

VERSION #1.040

2. TEST

- Step 1. Disable all sites on the comparator except SITE 1.
- Step 2. Verify communications between RADIO-1 and RADIO-2.
- Step 3. Disable SITE 1 and enable the next site. Change the channel on the subscriber if necessary.
- Step 4. Verify communications between RADIO-1 and RADIO-2.
- Step 5. Repeat steps 3 & 4 until all sites on the comparator have been individually tested.
- Step 6. Enable all sites on the comparator.
- Step 7. Verify communications between RADIO-1 and RADIO-2 with all sites enabled.

Pass____ Fail____

Radio to Radio Features

Conventional ASTRO Emergency

1. DESCRIPTION

Users in life threatening situations can use the Emergency button on the radio to notify the dispatch and other radio users on the channel of an Emergency.

SETUP

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

VERSION #1.070

2. TEST

- Step 1. Using RADIO-1, initiate an Emergency Alarm by depressing the emergency button.
- Step 2. If a dispatch console is attached, observe that the console shows the alarm. The console will also acknowledge the alarm and cause RADIO-1 to sound an Emergency Alarm acknowledgment.
- Step 3. If no dispatch console is attached, or if the radio is out of range, observe that RADIO-1 will continue to transmit the emergency. RADIO-1 will stop transmitting the Emergency once the emergency has been acknowledged or the retry limit has been reached.
- Step 4. Using RADIO-1, initiate an Emergency Call by depressing the PTT button.
- Step 5. Observe that RADIO-2 displays "EMERGENCY CALL" along with "RADIO-1".
- Step 6. Using RADIO1, clear the emergency by depressing the emergency button for 2 seconds.

Pass____ Fail____



MCC 7500 Conventional Resources

Call Alert Page - Conventional

1. DESCRIPTION

This test will demonstrate that an MCC7500 console using a Conventional Channel is able to transmit Call Alert pages. Call Alert Page allows a dispatcher to selectively alert another radio unit. The initiating console will receive notification as to whether or not the call alert was received. Units receiving a Call Alert will sound an alert tone and show a visual alert indication. The display will also show the individual ID of the initiating console.

This test can be run using Mixed Mode or MDC1200 Channels.

SETUP

RADIO-1 - SITE 1 - CONVENTIONAL
CHANNEL 1

RADIO-2 - SITE 1 - CONVENTIONAL
CHANNEL 1

RADIO-3 - SITE 1 - CONVENTIONAL
CHANNEL 1

CONSOLE-1 - CONVENTIONAL CHANNEL 1

VERSION #1.040

2. TEST

- Step 1. From CONSOLE-1 create a paging queue containing Call Alerts to RADIO-1, RADIO-2 and RADIO-3.
- Step 2. From CONSOLE-1 start the pages on CONVENTIONAL CHANNEL 1
- Step 3. Verify that RADIO-1, RADIO-2 and RADIO-3 receive the Call Alerts.

Pass____ Fail____

MCC 7500 Conventional Resources

Activity Log – Conventional

1. DESCRIPTION

The MCC7500 Console activity log will show all traffic for the resource assigned to that console to include the time, radio alias, Channel, PTT ID and Emergency Call.

The dispatcher has the capability of selecting a logged call within in the "Activity Log Window" for instant transmit on the corresponding logged resource.

This activity log can be logged to a text file for archival purposes.

Note: The log file in the ops will only be seen if you first check Log Activity in Elite Admin application then in folder options uncheck hide hidden system files. The location will be
c:\Program
Data\MCC7500\MessageMonitorLogs.

SETUP

RADIO-1 – CONVENTIONAL CHANNEL 1
RADIO-2 – CONVENTIONAL CHANNEL 2
RADIO-3 – CONVENTIONAL CHANNEL 1
RADIO-4 – CONVENTIONAL CHANNEL 2

CONSOLE-1 – CONVENTIONAL CHANNEL 1,
CONVENTIONAL CHANNEL 2

VERSION #1.060

2. TEST

- Step 1. On CONSOLE-1 select the "Show Activity Log" button on the tool bar to open the Activity Log Window.
- Step 2. Initiate calls on RADIO-1, RADIO-2, RADIO-3 and RADIO-4 to log call information and verify calls are displayed in the activity log window.
- Step 3. Select a logged call in the Activity Log Window and verify that the Channel Control Window (CCW) at the top of the Activity log window changes to the corresponding resource. Verify the dispatcher is capable of responding via the instant transmit button.
- Step 4. Open the text file created by the Activity Log and verify call traffic has been archived to the document file.

Pass____ Fail____



MCC 7500 Conventional Resources

Console Priority

1. DESCRIPTION

Console Operator Positions have ultimate control of transmitted audio on an assigned resource. The Console Position has the capability to take control of an assigned voice channel for a channel/talkgroup call so that the operator's audio overrides any subscriber audio. Console priority is a feature that enables dispatchers to gain immediate access to an assigned voice channel so that a central point of audio control exists.

SETUP

RADIO-1 - CONVENTIONAL CHANNEL 1
RADIO-2 - CONVENTIONAL CHANNEL 1

CONSOLE-1 - CONVENTIONAL CHANNEL 1

VERSION #1.040

2. TEST

- Step 1. Initiate a call from RADIO-1 on CONVENTIONAL CHANNEL 1. Keep this call in progress until the test has completed.
- Step 2. Observe that RADIO-2 receives the call.
- Step 3. While the call is in progress, key up CONSOLE-1 on CONVENTIONAL CHANNEL 1.
- Step 4. Observe that RADIO-2 is now receiving audio from CONSOLE-1 on CONVENTIONAL CHANNEL 1
- Step 5. De-key CONSOLE-1.
- Step 6. Verify RADIO-2 now receives RADIO-1 audio.
- Step 7. End the CONVENTIONAL CHANNEL 1 call from RADIO-1.

Pass____ Fail____

MCC 7500 Conventional Resources

Multi-Select Operation

1. DESCRIPTION

Multi-Select (Msel) allows the console operator to group a number of channels/talkgroups together such that when the general transmit bar is depressed, all of the multi-selected channels/talkgroups will transmit at the same time with the same information. Multi-Select is one way communication call. If a radio user responds to a Multi-Select call the talkgroup the user is affiliated to will be the only one to hear the call. There is no super-group formed, so radio communication is still at the single channel level. Multi-Select is utilized to send an APB to several channels/talkgroups. A Multi-Select has a limit of twenty (20) trunking/conventional resources

SETUP

RADIO-1 - CONVENTIONAL CHANNEL 1
RADIO-2 - CONVENTIONAL CHANNEL 2 (or
suitable channel)

CONSOLE-1 - CONVENTIONAL CHANNEL 1,
CONVENTIONAL CHANNEL 2

VERSION #1.030

2. TEST

- Step 1. From CONSOLE-1, create an Msel group with CONVENTIONAL CHANNEL 1 and CONVENTIONAL CHANNEL 2.
- Step 2. Transmit on the Msel using the Msel instant transmit button.
- Step 3. Verify that RADIO-1 and RADIO-2 hear the call.
- Step 4. Initiate a call with RADIO-1.
- Step 5. Verify the call is heard on CONSOLE-1 but not on RADIO-2.
- Step 6. Initiate a call with RADIO-2.
- Step 7. Verify the call is heard on CONSOLE-1 but not on RADIO-1.
- Step 8. On CONSOLE-1 dissolve the Msel.

Pass____ Fail____



MCC 7500 Conventional Resources

Patch Operation – Conventional

1. DESCRIPTION

The Patch feature allows more than one Radio Resource to be grouped simultaneously. This can be used for temporarily merging two or more channels/frequencies together to act as one larger group. Telephones and radio resources can be patched together. In a patch group, the members can receive messages from the console and they can transmit to all other members of the patch group.

SETUP

RADIO-1 - CONVENTIONAL CHANNEL 1
RADIO-2 - CONVENTIONAL CHANNEL 2 (or suitable channel)

CONSOLE-1 - CONVENTIONAL CHANNEL 1
and CONVENTIONAL CHANNEL 2

VERSION #1.020

2. TEST

- Step 1. Select the tab for patch 1, 2 or 3. Verify that the patch edit button and patch transmit button appear.
- Step 2. Select the "Patch Edit" icon. The selected patch will turn blue.
- Step 3. Select the CONVENTIONAL CHANNEL 1 and CONVENTIONAL CHANNEL 2 Radio Resource by moving the cursor over the Radio Resources' names and selecting them.
- Step 4. Verify that the selected Radio Resources display a "Patch Edit" icon.
- Step 5. Press and hold the "Patch Transmit" icon to initiate the patch transmission.
- Step 6. Verify that the RADIO-1 and RADIO-2 monitor the console outbound audio.
- Step 7. Verify that RADIO-1 can communicate with RADIO-2 even though they are on separate channels.
- Step 8. To knock down the patch, select the Radio Resources by moving the mouse cursor over the resource window and clicking over the patch icon. Repeat this process until all the resources have been removed from the Patch window.
- Step 9. Select the Patch Edit icon and idle the current patch.

Pass____ Fail____

MCC 7500 Conventional Resources

Alert Tones - Conventional Channel

1. DESCRIPTION

Pre-defined alert tones can be transmitted on the selected Radio Resource to subscribers which can alert members of a channel / talkgroup to a particular event or signify to radio users special instructions are to follow. The Console has the ability to send an Alert-Tone signal on selected conventional or talkgroup resources.

SETUP

RADIO-1 - CONVENTIONAL CHANNEL 1
RADIO-2 - CONVENTIONAL CHANNEL 1
CONSOLE-1 - CONVENTIONAL CHANNEL 1

VERSION #1.030

2. TEST

- Step 1. Select CONVENTIONAL CHANNEL 1 on CONSOLE-1.
- Step 2. Select Alert Tone 1 and depress the Alert Tone button.
- Step 3. Verify that RADIO-1 and RADIO-2 hear Alert Tone 1.
- Step 4. Repeat Steps 2-3 for Alert Tone 2 and 3.

Pass____ Fail____



System Reliability Features

Single Comparator Failure at Primary GEO-Prime Site

1. DESCRIPTION

This test shows that in the event of a failure of any comparator at the primary prime site, channel capacity will be restored via the redundant comparator at the secondary prime site. Simulcast remote site audio for that channel is rerouted to the corresponding comparator at the secondary prime site and that comparator assumes voting functionality for that channel.

SETUP

NOTE: If there are a large number of channels, you may want to reduce the number of available channels.

RADIO-1 CONVENTIONAL CH 1 - SITE 1
RADIO-2 CONVENTIONAL CH 1 - SITE 1

VERSION #1.030

2. TEST

- Step 1. Initiate a conventional call from RADIO-1 on CONVENTIONAL CH 1 on the channel to be demonstrated. Keep the radio keyed until instructed to release. Observe that RADIO-2 receives the audio.
- Step 2. Create a comparator failure at the primary prime site by disconnecting the Ethernet LAN cable between the comparator and the corresponding Prime Site LAN Switch.
- Step 3. Observe the call is dropped.
- Step 4. Observe, in the Unified Event Manager, that the comparator has failed.
- Step 5. Using RADIO-1, initiate a conventional call. Observe that RADIO-2 receives the audio.
- Step 6. Dekey RADIO-1.
- Step 7. Reconnect the Ethernet LAN cable between the comparator and the Prime Site LAN switch at the primary prime site. Observe that the comparator is brought back online and that any alarms are cleared in the UEM.
- Step 8. Using RADIO-1, initiate a conventional call. Observe that RADIO-2 receives the audio. Dekey RADIO-1.

Pass____ Fail____

System Reliability Features

Loop Microwave Switch

1. DESCRIPTION

This test shows that in the event of a failure of a microwave link in the loop system that microwave traffic will switch directions and continue to deliver its payload data.

SETUP

Loop microwave system configured per system design documents

VERSION #1.000

2. TEST

- Step 1. Observe that microwave traffic is operating normally.
- Step 2. Simulate a link failure by disconnecting the Ethernet cable connection between the Indoor Unit (IDU) and Outdoor Unit (ODU).
- Step 3. Observe that an alarm is generated on the Alarm System. The conditions that cause contact closure alarms may vary from this test, and an alarm may or may not be able to be observed with this test.
- Step 4. Observe that traffic is rerouted in the opposite direction on the loop.
- Step 5. Reconnect the Ethernet cable. Observe that any alarms are cleared on the Alarm System.

Pass____ Fail____



System Reliability Features

DC Power Systems

1. DESCRIPTION

This test shows that in the event of a failure of a DC rectifier in the DC power system that DC power is still supplied system interruption.

SETUP

DC power system configured per system design documents

VERSION #1.000

2. TEST

- Step 1. Observe that DC power system is operating normally.
- Step 2. Simulate a rectifier failure by disconnecting one rectifier cable connection between the DC Power System and the associated rectifier.
- Step 3. Observe that an alarm is generated on the DC Power System. The conditions that cause contact closure alarms may vary from this test, and an alarm may or may not be able to be observed with this test.
- Step 4. Observe that DC power is still being supplied to the system.
- Step 5. Reconnect the rectifier cable. Observe that any alarms are cleared on the DC Power System.

Pass____ Fail____

Enhanced Geo Select

Enter/Exit Geofence Boundary with Momentary Actions

1. DESCRIPTION

This test shows that when a Subscriber moves into/out of overlapping geofence boundaries, the subscriber executes the momentary entry and exit actions associated with the Geofences.

SETUP

RADIO-1 – CONVENTIONAL CH 1
RADIO-1 - SITE - SITE 1
CONSOLE-1 – CONSOLE SITE 1

NOTES:

RADIO-1 is configured for GEO 1 that has an action consolidation to play a specified announcement upon entry to a geofence.

VERSION #1.030

2. TEST

- Step 1. Move RADIO-1 into geofence boundary GEO 1.
- Step 2. Observe the radio plays the specified announcement.

Pass____ Fail____



Enhanced Geo Select

Enter/Exit Overlapping Geofence Boundaries with Continuous Actions

1. DESCRIPTION

This test shows that when a Subscriber moves into/out of overlapping geofence boundaries, the subscriber executes the continuous actions associated with the Geofences.

SETUP

RADIO-1 – CONVENTIONAL CH 1
RADIO-1 - SITE - SITE 1

NOTES:

RADIO-1 is configured with geofence GEO 2 and geofence boundary GEO 3.

GEO 2 is configured for Repeating Alert Tone and priority 2.

GEO 3 is configured for Geofence Alias Highlight and priority 3.

VERSION #1.030

2. TEST

- Step 1. Move RADIO-1 into geofence boundary GEO 3.
- Step 2. Observe on RADIO-1 that the Geofence Alias appears and is highlighted the chosen color.
- Step 3. Move RADIO-1 into the overlapping area of GEO 2 and GEO 3.
- Step 4. Observe on RADIO-1 that in addition to the Geofence Alias Highlight, the chosen Repeating Tone plays on the Subscriber.
- Step 5. Move RADIO-1 out of the overlapping area and into GEO 2.
- Step 6. Observe on RADIO-1 that the Geofence Alias is no longer highlighted, but the Repeating Tone continues to play.
- Step 7. Move RADIO-1 out of the GEO 2 (to an area with no geofence boundary).
- Step 8. Observe on RADIO-1 that the Repeating Tone no longer plays on the Subscriber.

Pass____ Fail____

Enhanced Geo Select

Enter/Exit Overlapping Geofence Boundaries with Conventional Zone-Channel Change

1. DESCRIPTION

This test shows that when a Subscriber moves into/out of overlapping geofence boundaries, the subscriber executes the Zone-Channel Change action associated with the Geofences according to the priorities assigned to the Geofences.

SETUP

RADIO-1 - CONVENTIONAL CHANNEL 1
RADIO-1 - CONVENTIONAL CHANNEL 2
RADIO-1 - CONVENTIONAL CHANNEL 3

NOTES:

RADIO-1 is configured with geofence GEO 5 and geofence GEO 4.

GEO 4 is configured for ZONE 1 CHANNEL 3 and priority 3.

GEO 5 is configured for ZONE 1 CHANNEL 2 and priority 2, which makes it the higher priority geofence boundary.

VERSION #1.030

2. TEST

- Step 1. Move RADIO-1 into geofence boundary GEO 4.
- Step 2. Observe on RADIO-1 that the voice announcement associated with the ZONE 1 CHANNEL 3 plays and the display indicates that the Subscriber is operating on ZONE 1 CHANNEL 3.
- Step 3. Move RADIO-1 into the overlapping area of GEO 5 and GEO 4.
- Step 4. Observe on RADIO-1 that the voice announcement associated with the ZONE 1 CHANNEL 2 plays and the display indicates that the Subscriber is operating on ZONE 1 CHANNEL 2.
- Step 5. Move RADIO-1 out of the overlapping area and into GEO 5.
- Step 6. Observe that the Zone-Channel setting does not change on RADIO-1.
- Step 7. Move RADIO-1 out of the GEO 5 (to an area with no geofence boundary).
- Step 8. Observe on RADIO-1 that the voice announcement associated with the ZONE 1 CHANNEL 1 plays and the display indicates that the Subscriber is operating on ZONE 1 CHANNEL 1.

Pass____ Fail____



Fault Management

Fault Manager - Unified Event Manager Lite

1. DESCRIPTION

The K Series configuration may be enhanced with Unified Event Manager Lite which is similar to UEM used in M and L system configurations. All test that applied to M and L can be used to demonstrate system capability including the MOSCAD Extension

Note that base installation will not provide following views: Zone Map, Performance Management.

SETUP

Unified Event Manager Lite Installed with necessary licenses.

VERSION #1.030

2. TEST

- Step 1. Go to K PC Client and Open UEM Client using web browser.
- Step 2. Login to UEM Client using appropriate user name and password.
- Step 3. Verify that main UEM Client window is loaded correctly.
- Step 4. Open basic views and review presented information: Network Database, Alarms and Events.

Pass____ Fail____

Fault Management

Site Alarm (Microwave and DVRS Site)

1. DESCRIPTION

The Enhanced Navigation feature extends Unified Event Manager (UEM) provides a single point of alarm management for the system.

SETUP

UEM lite.

2. TEST

- Step 1. Generate a site alarm at a remote site that is connected to the network.
- Step 2. Verify the alarm is present at the UEM client.
- Step 3. Repeat the test for a DVRS site. Verify the alarm is present at the UEM client.

Pass____ Fail____



Fault Management

Unified Event Manager - Digital Notifications for Events (Email)

1. DESCRIPTION

The Unified Event Manager (UEM) is an element management system which manages network elements of the ASTRO® 25 Network. One of the main functions of the UEM is to receive events from network elements, process them, correlate events to alarms, and present them to the operator. The UEM supports the Digital Notification functionality which allows sending an e-mail notification upon receiving an event or alarm matching user-defined criteria. The e-mails are sent to an external mail server using Simple Mail Transfer Protocol (SMTP). This test demonstrates the configuration for digital notifications and that they get routed to the proper destination.

SETUP

UEM with the digital notification option

VERSION #1.040

2. TEST

- Step 1. On a UEM client session, configure a digital notification rule for a logical element and a physical device. On the UEM select, Fault Management and then Alarms. Select Edit from toolbar at top of window. Next select configure and then Alarm Filter. Enter your configuration parameters and alarm filtering information.
- Step 2. Perform action(s) on the system (including the logical element, physical device, and other managed objects) that would cause events to be generated.
- Step 3. Verify the alarms are displayed in the UEM.
- Step 4. Verify only the events from the specified logical element and physical device are forwarded to the external system (such as the configured Email Server).
- Step 5. Verify events from other managed objects which do not have any digital notification rules are not forwarded.
- Step 6. Return the system to normal operation. (Clear the alarm conditions) Verify that the alarms clear in the UEM.


Pass____ Fail____

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: _____

4.2 COVERAGE ACCEPTANCE TEST PLAN

4.2.1 Overview

Motorola will validate the coverage for Humboldt County with a Coverage Acceptance Test (CAT) that proves 95% Covered Area Reliability with DAQ 3.4 channel performance criteria for digital, and DAQ 3.0 for analog. Motorola guarantees the coverage per TSB-88.1-D, where the painted area on the coverage map represents a tile-based area reliability that is calculated by averaging the individual tile reliabilities only for those tiles that meet or exceed the minimum Channel Performance Criteria (CPC). Motorola will perform coverage testing, as prescribed in this document, and guarantee that the painted areas on the coverage maps have 95% or better average reliability.

4.2.2 Coverage Test Method

The system consists of sites connected to a comparator for county-wide repeat, and sites that are stand alone with a fixed Digital Vehicular Repeater. The DVRS sites are not capable of an objective Bit Error Rate (BER) test.

Project 25 - For P25 sites connected to the comparator, an objective V.52 DAQ 3.4 Bit Error Rate (BER) test per TSB-88 is used to verify the digital subsystem's performance. Both mobile and portable configurations will be tested independently. The coverage test will be performed outbound only, as BER testing is not feasible inbound. For P25 sites that are a DVRS, a subjective audio quality test will be performed.

Analog - All analog tests will be subjective audio quality tests.

This Coverage Acceptance Test Plan (CATP) is designed to verify that the voice radio system implemented by Motorola Solutions for Humboldt County meets or exceeds the required reliability as shown on Motorola Solutions' maps. The CATP defines the coverage testing method and procedure, the coverage acceptance criterion, the test documentation, and the responsibilities of both Motorola Solutions and Humboldt County.

Coverage Acceptance Testing is based upon a coverage prediction that accurately represents the implemented infrastructure and parameters that are consistent with the contract agreements. To characterize system performance accurately, the actual user equipment radio series deployed for Humboldt County will be used to conduct the coverage test.

The subsequent sections of this document provide a detailed definition of the coverage acceptance test configuration(s) and test criteria.

4.2.3 CATP Definitions

Several definitions are needed to accurately describe the coverage acceptance test method and criteria. Where cited, these terms or methods are defined in TIA TSB-88.1-D¹ or TSB-88.3-D².

4.2.3.1 Defined Test Area

The defined test area is the geographical area in which communications will be provided that meet or exceed the specified Channel Performance Criterion (CPC) at the specified reliability for the specified equipment configuration(s). The defined test area(s) are listed in Table 4-2 Coverage Acceptance Test Summary, along with names of the corresponding Motorola Solutions map(s) which show the defined test areas. The defined test area for a Covered Area Reliability Test is the shaded area on the Motorola provided coverage maps for the various test configurations.

For the defined test areas (identified in Table 4-2 Coverage Acceptance Test Summary), the coverage reliability commitment is only on-roads. The roads included in the on-road commitment are defined by the US Census Bureau TIGER streets that are accessible by 2-wheel drive vehicles.

For coverage testing, each defined test area will be divided into a grid pattern by Motorola Solutions to produce at least the number of uniformly sized test locations (or tiles) required by the Estimate of Proportions formula. [TSB-88.3-D, §5.2.1, equation 2] The minimum number of test tiles required varies, from a hundred to many thousands, depending on the size of the defined test area, desired confidence in results, type of coverage test, and the predicted versus required reliability.

For sites where Motorola is not providing the antenna system (Shelter Cove and Green Diamond), coverage will be tested for informational purposes; and those sites are not part of the CATP pass/fail criteria.

4.2.3.2 Channel Performance Criterion (CPC)

The CPC is the specified minimum design performance level in a faded channel. [TSB-88.1-D, §5.2] For this system, the CPC is the Delivered Audio Quality (DAQ) as stated in Table 4-2 Coverage Acceptance Test Summary. The DAQ definitions are provided in Table 4-1 [TSB-88.1-D, §5.4.2, Table 3].

¹ *Wireless Communications Systems --- Performance in Noise- and Interference-Limited Situations --- Part 1: Recommended Methods for Technology Independent Performance Modeling* Technical Service Bulletin TSB-88.1-D, Telecommunications Industry Association (TIA), Arlington VA, 2012.

² *Wireless Communications Systems --- Performance in Noise- and Interference-Limited Situations --- Part 3: Recommended Methods for Technology Independent Performance Verification*, Technical Service Bulletin TSB-88.3-D, Telecommunications Industry Association (TIA), Arlington VA, 2013.



Table 4-1: DAQ Definitions

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

The CPC pass/fail criterion is the faded performance threshold, plus any adjustments for antenna performance, external noise, and in-building or in-vehicle losses. [TSB-88.1-D, §5.4.2, Figure 5] The faded performance threshold for the specified CPC is determined using the receiver's static reference sensitivity adjusted by the projected CPC parameters for the applicable Modulation Type and DAQ as listed in the current version of TSB-88.1, Annex A, Table A-1. For coverage testing of digital voice radio systems, the faded performance threshold is the applicable Bit Error Rate (BER) from the projected CPC parameters.

The CPC for digital is DAQ 3.4 and DAQ 3.0 for analog.

4.2.3.3 Reliability

The Covered Area reliability is the percentage of locations within the defined test area that are predicted to meet or exceed the specified CPC. The Motorola Solutions map(s) indicate the Covered Area(s) within which this system is predicted to provide at least the reliability of meeting or exceeding the CPC as stated in Table 4-2 Coverage Acceptance Test Summary.

For the defined test area(s) guaranteed for Covered Area reliability, only the painted covered area on Motorola Solutions' maps will be tested for coverage acceptance. No acceptance testing will be performed in locations predicted on Motorola Solutions' maps to be below the required Covered Area reliability.

After all accessible tiles in the defined test area have been tested, the Covered Area reliability will be determined by dividing the number of tiles tested that meet or exceed the CPC pass/fail criterion by the total number of tiles tested. [TSB-88.3-D, §5.1, equation 1]

Motorola's coverage acceptance test will prove 95% Covered Area Reliability based on the as-built maps provided to Humboldt county post implementation. Project 25 test area will be tested with both Bit Error Rate and subjective audio quality. The total composite result of both tests across the entire Covered Area is the basis of the pas/fail criteria.

Test Criterion: The proportion of the bounded area which is predicted to meet the specified Covered Area Reliability has a Covered Area Reliability equal or greater than the specified area reliability (e.g. 95%).

Result: This criterion is met by validating the as-built Covered Area Reliability maps within the defined test area (Humboldt County Boundaries)

4.2.3.4 Direction(s) of Test

The direction(s) of test in Table 4-2 Coverage Acceptance Test Summary defines the direction(s) which will be tested for coverage acceptance. Outbound (also called forward link, downlink, or talk-out) is the path from the fixed equipment outward to the mobile or portable radios. Inbound (also called reverse link, uplink, or talk-in) is the path from the mobile or portable radios inward to the fixed equipment. Outbound and Inbound independently means each direction will be evaluated as a separate independent test.

Table 4-2 provides the test directions for the system.

4.2.3.5 Equipment Configurations

This section defines the equipment configurations and infrastructure design parameters upon which the coverage guarantee and the coverage acceptance test are based. The equipment configurations are defined in Table 4-2 Coverage Acceptance Test Summary, and include user equipment, outdoor/in-building definition, defined test area, number of test tiles, reliability, CPC, CPC pass/fail, and the direction(s) of test. The infrastructure design parameters are defined in Table 4-3 and Table 4-4 Infrastructure Design Parameters, and include site names, site locations, and antenna system parameters. If the implemented system equipment configuration and/or infrastructure design parameters vary from these configurations and/or parameters, a revised coverage map will be used to define the test configuration and potential areas from which test tiles will be included in the revised coverage acceptance test.

Coverage testing will be conducted with equipment installed per the configurations in Table 4-2 Coverage Acceptance Test Summary, and with the mobile antennas in unobstructed locations that are not adjacent to other large objects or metallic items which would distort the antenna patterns.

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Table 4-2: Humboldt County Coverage Acceptance Test Summary

User Equipment	Outdoor / In-Building	Defined Test Area & Map Name	Number of Test Tiles	Reliability	CPC	CPC Pass/Fail	Direction(s) of Test
Analog System 1 Simulcast Cell (5 sub-sites), 1 Standalone DVRS Site							
APX Mobile in Car vehicle with unity gain antenna mounted on the roof at least 5 ft high and 14 ft or less of coax	Outdoor	Painted area within Humboldt County Boundaries – per Map 71 and 72	Please see grid file	95% Covered Area Reliability	DAQ-3.0	Subjective DAQ for the Areas best served by the simulcast subsystem and Standalone DVRS	Inbound and Outbound Independent
P25 Digital System 2 Simulcast Cell (North 4 sub-sites South 2 sub-sites), 3 Standalone DVRS Sites							
APX Mobile in Car vehicle with unity gain antenna mounted on the roof at least 5 ft high and 14 ft or less of coax	Outdoor	Painted area within Humboldt County Boundaries per Map 69	Please see grid file	95% Covered Area Reliability	DAQ-3.4	Composite 2.0% BER Objective with 15% subjective retries allowed for sites connected to comparator, and DAQ for DVRS sites	Outbound (Talk-Out)
APX Portable transmitting and receiving at hip in Swivel Case using a wired remote corded speaker microphone	Outdoor	Painted area within Humboldt County Boundaries per Map 70	Please see grid file	95% Covered Area Reliability	DAQ-3.4	Composite 2.0% BER with 15% subjective retries for sites connected to comparator, DAQ for DVRS sites	Outbound (Talk-Out)

Table 4-3: Humboldt County Analog System Infrastructure Design Parameters (Design 90)

Site Name	Latitude	Longitude	Transmit Antenna System			Receive Antenna System			Effective Faded Sensitivity
			Mount Height / Azimuth	Antenna Model	ERP (dBm)	Mount Height / Azimuth	Antenna Model	External Noise assumed (relative to KToB)	
Standalone DVRS Sites									
Sugar Pine Mountain	41° 2' 18.7" N	123° 44' 54.89" W	80 ft	RFI - EA80-41-DIN-T3	47.69 dbm	80 ft	RFI - EA80-41-DIN-T3	12.6 dB	-105.28 dBm
Simulcast/Voting Subsystem									
County Courthouse	40° 48' 11.18" N	124° 9' 43.7" W	80 ft	RFI - OA40-41-DIN	51.5 dBm	120 ft	RFI - OA40-41-DIN	12.6 dB	-105.40 dBm
Horse Mountain	40° 52' 27.09" N	123° 44' 0.84" W	100 ft	RFI - EA80-41-DIN-T3	50.19 dBm	100 ft	RFI - EA80-41-DIN-T3	12.6 dB	-106.03 dBm
Mt Pierce	40° 25' 2.3" N	124° 7' 13" W	60 ft	RFI - OA40-41-DIN	51.55 dBm	100 ft	RFI - OA40-41-DIN	12.6 dB	-105.94 dBm
Pratt Mountain	40° 7' 13.5" N	123° 41' 35.76" W	60 ft	RFI - OA40-41-DIN-T3	50.30 dBm	100 ft	RFI - OA40-41-DIN-T3	12.6 dB	-105.42 dBm
Green Diamond (Informational)	41° 10' 16.05" N	124° 3' 46.38" W	199 ft	RFI - OA40-41-DIN	51.41 dBm	199 ft	RFI - OA40-41-DIN	12.6 dB	-106.99 dBm

Table 4-4: Humboldt County Digital Infrastructure Design Parameters

Site Name	Latitude	Longitude	Transmit Antenna System			Receive Antenna System			Effective Faded Sensitivity
			Mount Height	Antenna Model	ERP (dBm)	Mount Height	Antenna Model	External Noise assumed (relative to KToB)	
Trunking North Simulcast Subsystem									
County Courthouse	40° 48' 11.18" N	124° 9' 43.7" W	80 ft	RFI - OA40-41-DIN	49.28 dBm	120 ft	RFI - OA40-41-DIN	12.6 dB	-111.61 dBm
Horse Mountain	40° 52' 27.09" N	123° 44' 0.84" W	100 ft	RFI - EA80-41-DIN-T3	48.43 dBm	100 ft	RFI - EA80-41-DIN-T3	12.6 dB	-112.28 dBm
Trinidad	41° 3' 15.8" N	124° 9' 2.7" W	60 ft	RFI - OA40-41-DIN	52.53 dBm	60 ft	RFI - OA40-41-DIN	12.6 dB	-112.96 dBm
Green Diamond (Informational)	41° 10' 16.05" N	124° 3' 46.38" W	199 ft	RFI - OA40-41-DIN	49.19 dBm	199 ft	RFI - OA40-41-DIN	12.6 dB	-113.24 dBm
Trunking South Simulcast Subsystem									
Mt Pierce	40° 25' 2.3" N	124° 7' 13" W	60 ft	RFI - OA40-41-DIN	49.33 dBm	100 ft	RFI - OA40-41-DIN	12.6 dB	-112.20 dBm
Pratt Mountain	40° 7' 13.5" N	123° 41' 35.76" W	60 ft	RFI - OA40-41-DIN-T3	49.33 dBm	100 ft	RFI - OA40-41-DIN-T3	12.6 dB	-111.64 dBm

Standalone DVRS Sites									
Shelter Cove (Informational)	40° 2' 1.83" N	124° 2' 25.63" W	112 ft	RFI - EA40-41- DIN	47.61 dBm	112 ft	RFI - EA40-41- DIN	12.6 dB	-107.78 dBm
Orleans Mountain	41° 16' 44.22" N	123° 27' 12.26" W	30 ft	RFI - CSA20- 41-DIN	44.82 dBm	30 ft	RFI - CSA20- 41-DIN	12.6 dB	-112.48 dBm
Sugar Pine Mountain	41° 2' 18.7" N	123° 44' 54.89" W	80 ft	RFI - EA80-41- DIN-T3	47.69 dBm	80 ft	RFI - EA80-41- DIN-T3	12.6 dB	-111.46 dBm

4.2.3.6 CPC Pass/Fail Criterion for a Test Tile

For each equipment configuration, the CPC pass/fail criterion for a test tile is as stated in Table 4-2 Coverage Acceptance Test Summary. Each equipment configuration will have only one CPC pass/fail criterion for a test tile.

As defined in Table 4-2, the acceptance test for the analog design includes two pass/fail criteria for areas best served by the simulcast cell and the standalone DVRS sites with inbound and outbound coverage tested independently. Motorola Solutions reserves the right to re-test areas. Should any subjective DAQ test tile fail, a retry of the transmission will occur. Should the retry pass, the test tile will be considered a pass. If a retry should occur, it will be noted in the test log notes for that test tile.

The pass/fail criteria for P25 is the area best served by a combination of sites connected to the comparator and DVRS sites. The DVRS sites are not capable of BER. As a result, the simulcast/comparator areas will be tested with BER, and the DVRS sites will be tested with subjective audio quality. Motorola reserves the right to re-test areas. Should any BER or audio quality test tile fail, a subjective audio quality retry will occur. Should the retry pass, the test tile will be considered a pass. If a retry should occur, it will be noted in the test log notes for that test tile.

Below are the attenuator values required to evaluate each equipment configuration. The methodology to determine the attenuator value is demonstrated in TSB-88.1-D §5.4.2, Figure 5. The attenuator value includes the proper values for the equipment configuration requirement plus adjustments for the test equipment setup. Should the test equipment setup losses (e.g. cable length) vary, an adjustment to the attenuator value may be required to represent the required equipment configuration accurately. These values will be defined at the time of the test.

Table 4-5: Attenuator Values to Evaluate Each Equipment Configuration

User Equipment Configuration and Outdoor / In-Building	Attenuator Value
Mobile	0 dB
Portable Outdoors	16.6 dB – Cable Loss + Height Compensation

The 16.6 dB is a Motorola Coverage Standards value that corresponds to the median body loss for a portable at hip level (3.3 ft) on a swivel case with a wired remote speaker microphone on VHF.

The attenuator value used in performance of the coverage test, takes into account the body loss, cable loss, test antenna gain compensation, and height compensation. Height compensation values are based on Okumura's original paper. Below is a reference from that paper:

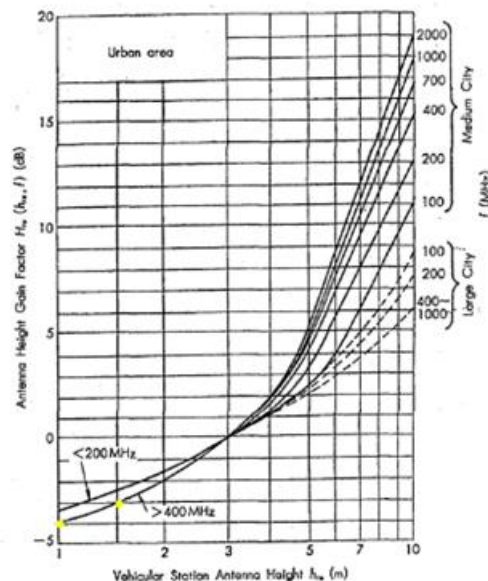


Fig. 27—Prediction curves for vehicular antenna height gain factor in urban area.

For VHF, the 0.5m difference in height (3.3 ft hip level height assumed in the coverage model vs 4.9 ft assumed car roof height) provides a 0.8 dB advantage. This is therefore added to the attenuator.

The test antenna gain compensation accounts for the difference in antenna gain in dBi (referred to an isotropic antenna) between a half-wave dipole, used in the portable radio, and a quarter-wave monopole, used in the coverage test.

4.2.3.7 Required Number of Test Tiles in the Defined Test Area

The method used to test coverage is a statistical sampling of the defined test area to verify that the CPC is met or exceeded in the covered area with 95% reliability for each of the defined equipment configurations. It is impossible to verify every point within a defined test area, because there are infinite points; therefore, coverage reliability will be verified by sampling a statistically significant number of randomly selected locations, quasi-uniformly distributed throughout the defined test area. There is one test sample per test tile, where a sample consists of multiple sub-samples.

Coverage acceptance testing will be performed in the defined test area as indicated on Motorola Solutions-provided maps. To verify that the reliability requirement is met, the defined test area indicated on Motorola Solutions' maps will be divided into uniformly sized test tiles, with at least the number of test tiles indicated in Table 4-2 Coverage Acceptance Test Summary. The number of test tiles indicated in Table 4-2

is at least the minimum required by the Estimate of Proportions formula as stated in section 4.2.3.1 (Defined Test Area) of this document.

Per TSB-88.3-D, the stated minimum outdoor tile size is 100 by 100 wavelengths; however, the minimum *practical* test tile size is typically about 400 by 400 meters (about 0.25 by 0.25 miles). The minimum practical tile size for any system is determined by the distance traveled at the speed of the test vehicle while sampling, GPS error margin, and availability of road access within very small test tiles. A related consideration is the time, resources, and cost involved in testing very large numbers of very small tiles. For a given defined test area, all test tiles must be of equal size. The maximum test tile size is 2 by 2 km (1.24 by 1.24 miles) [TSB-88.3-D, §5.5.1]. In some wide-area systems, this constraint on maximum tile size may dictate a greater number of test tiles than the minimum number required by the Estimate of Proportions formula.

No acceptance testing will be performed in locations outside the defined test area as indicated on the Motorola Solutions-provided maps. Motorola Solutions and Humboldt County may agree to perform “information only” tests in locations outside the defined test area; however, these “information only” test results will not be used for coverage acceptance. Any “information only” test locations must be defined before starting the test. If the added locations require significant additional time and resources to test, a change order will be required and Motorola Solutions may charge Humboldt County on a time-and-materials basis.

4.2.3.8 Accessibility to Test Tiles

Prior to testing, Motorola Solutions and Humboldt County will plan the route for the test vehicle(s) through the defined test area, to ensure that at least the minimum required number of tiles is tested. While planning the route (if possible) or during the test, Motorola Solutions and Humboldt County will identify any test tiles that are inaccessible for the coverage test (due to lack of roads, restricted land, etc.). Inaccessible tiles will be eliminated from the acceptance test calculation. [TSB-88.3-D, §5.5.4]

If elimination of inaccessible test tiles results in less than a statistically significant number of test tiles or substantially alters the defined test area, Motorola Solutions reserves the right to adjust the committed reliability based on the reduced number of accessible test tiles within the altered test area and the Estimate of Proportions formula. [TSB-88.3-D, §5.2.1, equation 2]

4.2.3.9 Random Selection of a Test Location in Each Tile

This CATP provides an objective method of randomly selecting and tracking test locations using Motorola Solutions’ VoyagerSM coverage testing tool. This method correlates directly with Motorola Solutions’ coverage prediction methodology.

Using Voyager, the actual test location within each test tile will be randomly selected by the test vehicle crossing into the tile at an arbitrary point, with an arbitrary speed



and direction. If the selected test location is in a shielded area such as a tunnel or underground parking garage, the data from that test location must be eliminated and a replacement test location must be used.

4.2.3.10 CPC Measurements in Each Tile

For a subjective audio quality test, a voice test exchange will be initiated using predetermined text typical of a common voice exchange between the fixed location and the location. The person conducting the test at the mobile will be moving at a typical speed for the surrounding conditions. Inbound and outbound audio paths are being tested independently for analog.

Project 25 BER testing is measured automatically by Voyager upon entering a grid. P25 is primarily an outbound objective BER test, with testing from DVRS sites subjective audio quality. For DVRS subjective testing, an inbound call may be necessary to initiate the outbound test. The best served combination of sites connected to the comparator tested via BER and DVRS sites tested via subjective audio quality constitute the P25 test. The P25 test is outbound only because BER is only able to be tested outbound.

4.2.4 Responsibilities and Preparation

This section identifies the responsibilities of Humboldt County and Motorola Solutions regarding requirements for equipment, personnel, and time during the coverage test.

Humboldt County will provide the following for the duration of the coverage test:

- At least two test vehicles that are representative of the vehicles to be installed with radios
- Two drive teams comprised of at least one Humboldt County personnel acting as a driver. A second Humboldt County representative is also recommended (though not required) per each drive test team to act as a tie-breaker for subjective audio tests.
- Exclusive use of the test channels required by Motorola Solutions during the test.
- For mobile coverage testing, the antenna must be mounted per the equipment configuration utilized in the coverage models.
- Two evaluator teams each with two or more representatives designated by Humboldt County per team to evaluate and record the pass/fail result of each subjective audio transmission. The required quantity of test participants shall be available a minimum of eight hours a day.
- Access to a facility with the MCC console that can facilitate fixed end subjective audio test.

Motorola Solutions will provide the following for the duration of the coverage test:

- One Motorola Solutions representative per each of the two drive teams to navigate, operate Voyager, operate the mobile radio, and to evaluate and record the pass/fail result of each subjective audio transmission.

- One or more Motorola Solutions evaluator representatives to operate the fixed equipment, and to evaluate and record the pass/fail result of each subjective audio transmission.
- At least one Motorola Solutions Voyager coverage testing tool.
- Portable and Mobile subscribers matching those utilized in coverage predictions to execute the testing.

As required, Motorola Solutions will provide a receiver signal strength calibration file for the test radio(s) used with the Voyager coverage testing tool.

Before starting the test, Humboldt County and Motorola Solutions will agree upon the time frame for Motorola Solutions' submission of a report containing the coverage test results.

4.2.5 CATP Procedures

A coverage acceptance test will be performed using Motorola Solutions' Voyager tool to randomly select test locations.

Voyager consists of the following:

- A Global Positioning System (GPS) receiver, which will provide the computer with the location and speed of the test vehicle.
- A laptop computer with Voyager software and a mapping database, which includes highways and local streets.

The procedure for the subjective DAQ coverage test outdoors will be as follows:

- A subjective listening test will be performed for coverage acceptance testing, to verify talk-out DAQ performance of the system. Talk-in evaluation is optional.
- In case is agreed that both directions will be evaluated, talk-out and talk-in will be evaluated independently
- To perform a statistically valid subjective DAQ test, a large group of people is required to ensure high confidence in the results. However, obtaining a large group of people for a subjective listening test is usually impractical; therefore, 3 people in a car or van must be used for the test. Since a group this small cannot provide statistically significant results, it is very important that the personnel participating in the subjective test be familiar with the sound of radio conversations. Before subjectively testing, all personnel who will evaluate audio quality must be "calibrated" by listening to examples of audio that pass and fail the subjective DAQ test.
- The dispatch console will be used during the coverage test. Prior to testing, Humboldt County and Motorola Solutions will agree upon a procedure to allow each audio transmission to be evaluated for approximately five seconds.
- The test participants will be divided into teams, each consisting of personnel from both Humboldt County and Motorola Solutions. Each team will have members that operate a mobile radio in the field, and members that are stationed at the fixed dispatch location.



- As the field test teams drive through the coverage area, test locations within each test tile will be selected randomly by Voyager's GPS location indication. Voyager will be used to measure the outbound BER and talk-out pass/fail result as well as any pertinent notes for the location.
- At each test tile location, each field test team member will listen to a talk-out audio transmission, and will record his or her subjective pass/fail evaluation of the DAQ for the tile. Team members stationed at the fixed location will evaluate, as required, talk-in audio quality of transmissions from the test radio(s) in that tile. Each team member will maintain a test log to record date, time, and subjective pass/fail evaluation for each test tile location. Subjective pass/fail evaluation will be based on the DAQ descriptions in Table 4-1. The determination of whether each test tile passes or fails the required DAQ value will be the majority vote of all team members' pass/fail subjective evaluations for that tile. An odd number of team members are required to avoid ties for the pass/fail majority vote.
- Should any objective BER or subjective DAQ test tile fail, a retry of the transmission will occur. Should the retry pass, the test tile will be considered a pass. If a retry should occur, it will be noted in the test log notes for that test tile.

4.2.6 CATP Documentation and Coverage Acceptance

During the coverage acceptance test, Voyager generates computer files that include the raw test data. A copy of this data will be provided to Humboldt County at the conclusion of the coverage test. Motorola Solutions will process this data to produce a map detailing the coverage test results, and to determine whether the coverage test was passed for each user equipment configuration.

The coverage acceptance criterion for a user equipment configuration will be that the voice radio system implemented by Motorola Solutions for Humboldt County meets or exceeds the reliability stated in Table 4-2 Coverage Acceptance Test Summary for that user equipment configuration. The system coverage acceptance criterion will be the successful passing of each of the user equipment configurations defined in Table 4-2 Coverage Acceptance Test Summary.

Motorola Solutions reserves the right to review any test tiles that fail. If a coverage test, or a portion thereof, is suspected by Motorola Solutions to have failed due to external interference or local clutter obstructions, those tiles suspected of being affected by an interferer or clutter may be re-tested. If the test tiles re-tested are confirmed to have failed due to interference, external noise, or local clutter those test tiles will be excluded from all acceptance calculations and Motorola Solutions will work with Humboldt County to identify potential solutions to the interference and clutter issues.

Motorola Solutions will conduct this Coverage Acceptance Test only once. If any portion of the test is determined to be affected by proven equipment malfunctions or failures, Motorola Solutions will repeat the portion of the test affected by the equipment malfunction or failure. Humboldt County will have the option to accept the coverage at any time prior to completion of the coverage test or documentation process.

Motorola Solutions will submit to Humboldt County a report detailing the coverage test results. This report will include a document, which is to be signed by both Humboldt County and Motorola Solutions, indicating the test was performed in accordance with this CATP and the results of the test indicate the acceptance or non-acceptance of the coverage portion of the system.

4.2.7 Coverage Map Appendix

The following coverage maps are the basis of the coverage test.

1. REFERENCE 69 - Digital Mobile OB CATP
2. REFERENCE 70 - Digital Portable OB CATP
3. REFERENCE 71 - Analog Mobile IB CATP
4. REFERENCE 72 - Analog Mobile OB CATP

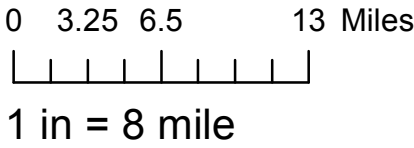
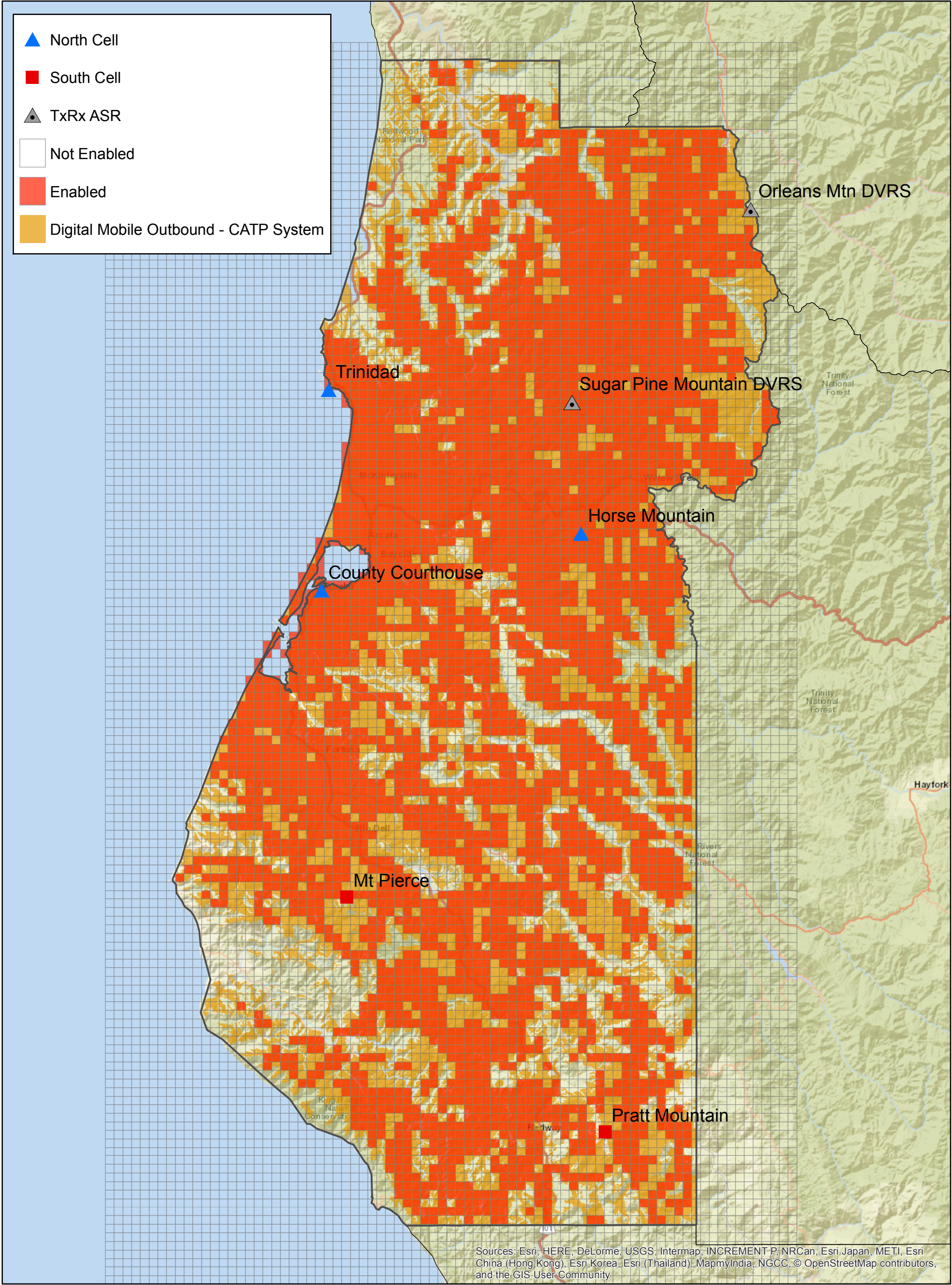
Grid Counts are as follows:

1. Digital Mobile OB (Ref 69): 3806 Enabled Tiles
2. Digital Portable OB (Ref 70): 2728 Enabled Tiles
3. Analog Mobile IB (Ref 71): 2226 Enabled Tiles
4. Analog Mobile OB (Ref 72): 2169 Enabled Tiles

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Humboldt County, CA

7-Site (2-Cell, 2-ASR) VHF Phase 1 (FDMA) P25 Simulcast System
Painted Area Represents 95% Covered Area Reliability at DAQ 3.4



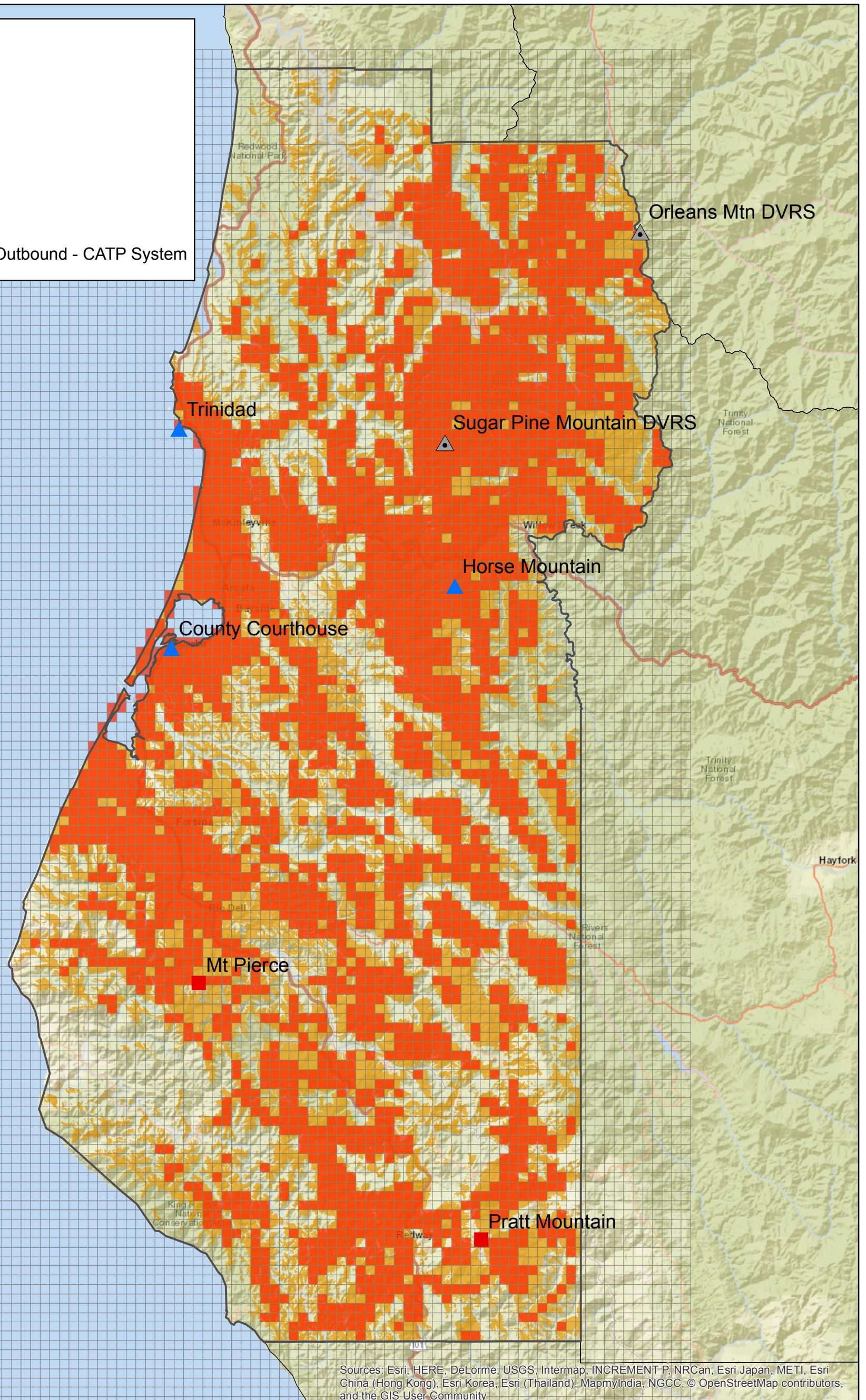
Mobile Configuration:
APX 4500 Mobile, 10W
Tx/Rx Roof Center Mount
1/4-Wave Dipole

CA - Humboldt County
CATP System - Digital
Design 2
DFRJ83

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- ▲ North Cell
- South Cell
- ▲ TxRx ASR
- Not Enabled
- Enabled
- Digital Portable Outbound - CATP System



Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community

Age Group	Number of People
13-17	10
18-24	20
25-34	20
35-44	20
45-54	30
55-64	20
65-74	20
75-84	20
85+	30

1 in = 8 mile

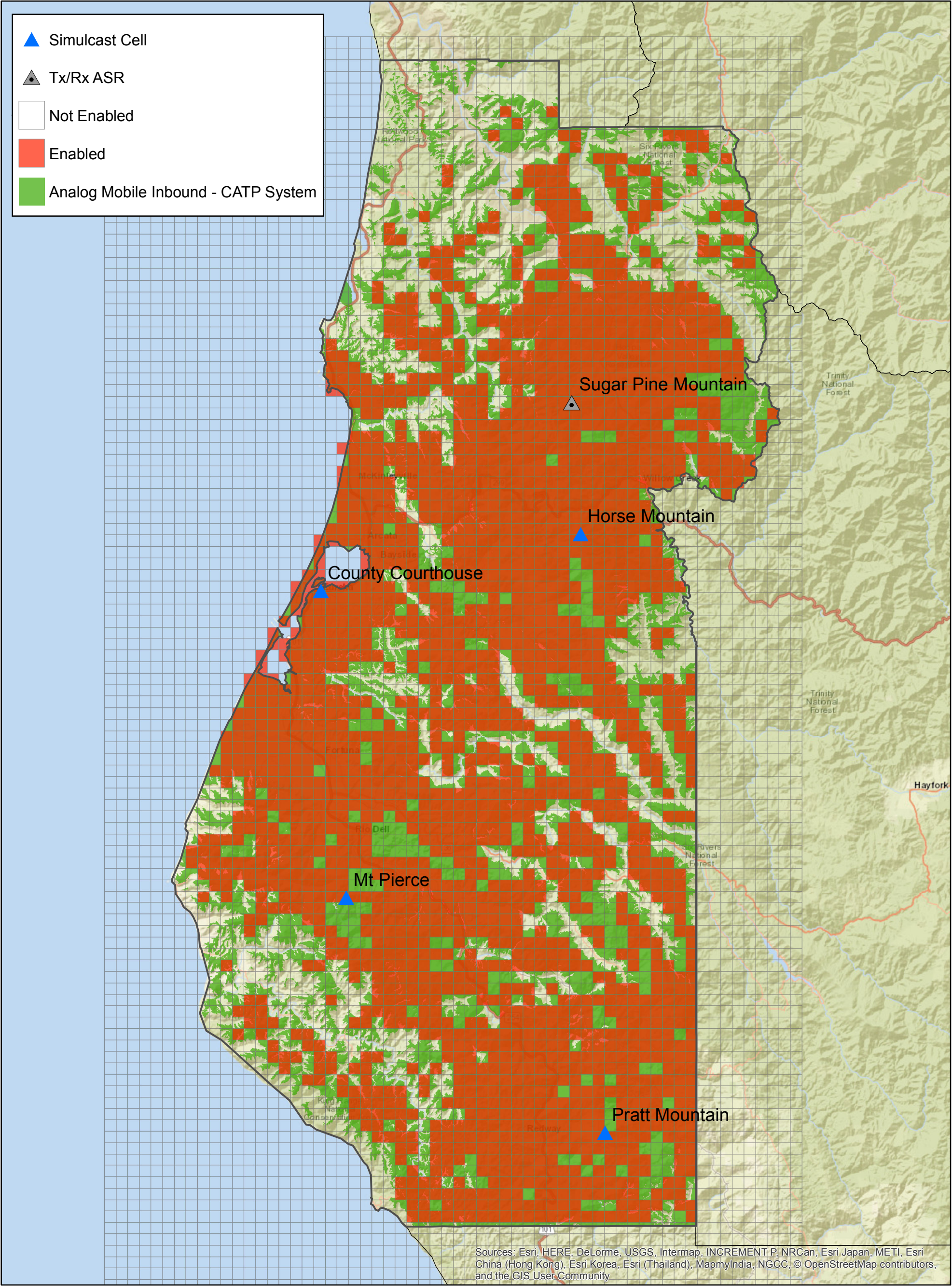
Portable Configuration:
APX 6000 Portable, 6W
Tx/Rx at Hip in Swivel Case with Remote Speaker Mic
Wideband Antenna

CA - Humboldt County
CATP System - Digital
Design 2
DFRJ83

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Humboldt County, CA

5-Site (Single Cell, 1-ASR) VHF Analog Simulcast System
Painted Area Represents 95% Covered Area Reliability at DAQ 3.0



0 3.25 6.5 13 Miles
1 in = 8 mile

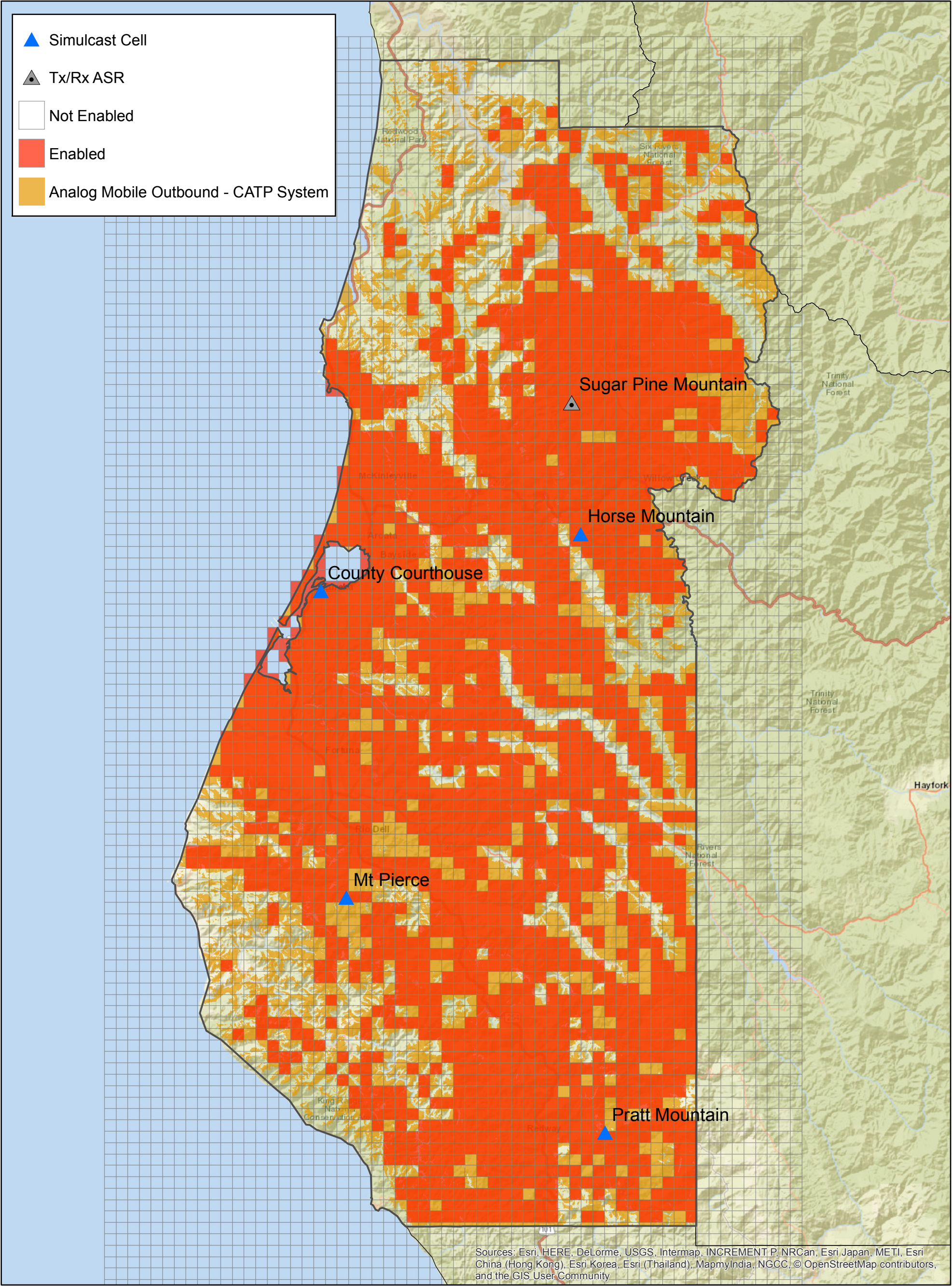
Mobile Configuration:
APX 4500 Mobile, 10W
Tx/Rx Roof Center Mount
1/4-Wave Dipole

CA - Humboldt County
CATP System - Analog
Design 2
DFRJ83

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Humboldt County, CA

5-Site (Single Cell, 1-ASR) VHF Analog Simulcast System
Painted Area Represents 95% Covered Area Reliability at DAQ 3.0



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COUNTY OF HUMBOLDT, CALIFORNIA

EXHIBIT C-5

PERFORMANCE

SCHEDULE

HUMBOLDT COUNTY RADIO SYSTEM REPLACEMENT PROJECT

DECEMBER 5, 2018

RFP#18-100-COMM



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EXHIBIT C-5

PERFORMANCE SCHEDULE

Motorola's Performance Schedule is included on the following pages.



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Exhibit C5 Performance Schedule December 5, 2018

ID	Task	Start Date	Complete	Duration	Resource
1.0	Contract Execution	Friday, December 21, 2018	Friday, December 21, 2018	0	MOT, Humboldt
2.0	Project Plan Kick-off and Project Plan	Tuesday, January 08, 2019	Tuesday, January 08, 2019	0	MOT, Humboldt
2.1	Team Roles and Points of Contact				MOT, Humboldt
2.2	Present Overview of Scope and Objectives				MOT, Humboldt
	Provide Preliminary Communication Plan, Risk Management Plan,				
2.3	Change Control Procedures, Schedule				MOT
2.4	Provide Access to Humboldt Sites so site walks can begin.				Humboldt
2.5	Start Action Item Log				MOT
3.0	Design Review	Tuesday, January 29, 2019	Tuesday, April 23, 2019	60	MOT, Humboldt
3.1	Present System Design, Block Diagrams, and Details				MOT
3.2	Agreements to Operationally Configure, Access and Deploy	Wednesday, March 13, 2019	Wednesday, March 13, 2019	0	Humboldt
3.3	Site Visits for All Sites				MOT
3.4	Tower Analysis All Existing Sites				MOT
3.5	Power Analysis All Sites				MOT
3.6	Site Sketches, Floor Plans, Rack Drawings for All Sites				MOT
3.7	Approve Site Sketches for All Sites within 7 days of submittal				Humboldt
	Review Backhaul Performance Requirements (BER, bandwidth, jitter,				
3.8	QoS, latency), IP Plan, Network Design, and Demarcation.				MOT, Humboldt
	Provide Existing Frequency and Radio Site Information for				
3.9	Interference Study.				Humboldt
3.10	Review Preliminary Training Plan				MOT, Humboldt
3.11	Review Interfaces for Cutover				MOT, Humboldt
3.12	Present Preliminary Transition Plan				MOT
3.13	Present Acceptance Test Procedures				MOT
	Complete Design Documentation, which may include and not be				
	limited to updated Schedule, System Description, Equipment List,				
	System Drawings, Statement of Work, or other documents applicable				
	to the project to incorporate mutually agreed updates from the				
3.14	proposed system.				MOT
	Approve Design Documentation reflects any mutually agreed updates				
3.15	within 10 days of submittal				Humboldt
3.16	Detailed Design Review Complete				MOT, Humboldt
4.0	FCC Licensing	Tuesday, April 23, 2019	Wednesday, August 21, 2019	86	MOT, Humboldt
	Pay LMR FCC licensing and frequency coordination fees. Provide the				
4.1	FCC "call sign" station identifier for each site prior to system staging.				Humboldt
4.2	Approve Frequency Plan				Humboldt
4.3	Coordinate LMR Frequencies (except Orleans/Shelton Butte and UHF)				Humboldt
4.4	Coordinate Microwave Frequencies				MOT
4.5	Sign FCC License				Humboldt
5.0	Order Processing, Manufacturing, and Factory Staging	Tuesday, April 23, 2019	Wednesday, August 28, 2019	91	MOT, Humboldt
5.1	Place and Track Equipment Orders				MOT
5.2	Provide Warehouse for Infrastructure and user radio equipment				MOT

5.3	Determine Equipment Shipping Locations				days	MOT
5.4	Setup and rack equipment per approved DDR site plans				days	MOT
	Cut and label cables according to site plans and with to/from information to specify interconnection for field installation and future servicing needs				days	MOT
5.5	Complete the cabling/connecting of the subsystems to each other				days	MOT
5.6	("connectorization" of the subsystems).				days	MOT
5.7	Assemble required subsystems to assure system functionality.				days	MOT
5.8	Complete Programming of Fixed Network Equipment				days	MOT
5.9	Program sample radios for the Factory Acceptance Test.				days	MOT
	Inventory the equipment with serial numbers and installation references.				days	MOT
5.10	Update system documentation.				days	MOT
5.11	Microwave staged separately.				days	MOT
5.12	Witness and Approve Factory Acceptance Test.				days	Humboldt
5.13	Pack System and Ship Equipment to Field.				days	MOT
5.14						
6.0	Develop Fleetmap, Operational Configuration, and Programming	Tuesday, September 17, 2019	Tuesday, October 29, 2019	30	days	MOT, Humboldt
	Provide Fleetmap point of contact to organize and plan meetings with user groups.				days	MOT
6.1	Designate a representative for Customer user groups, to make timely decisions on their behalf.				days	Humboldt
6.2	Provide existing programming and fleetmap information				days	Humboldt
6.3	Develop an electronic version of a Master Fleetmap				days	MOT
6.4	Approve the electronic version of the Master Fleetmap.				days	Humboldt
6.5	Provide up to 20 codeplugs that include both new APX radios and existing radios for user radio programming.				days	MOT
6.6	Program sample radios with approved templates and deliver for Customer evaluation.				days	MOT
6.7	Approve radio programming.				days	Humboldt
6.8	Program radios, and once installed, configure console positions per approved fleetmap and configuration.				days	MOT
6.9					days	MOT
7.0	Agreements and Finalization of Sites	Tuesday, January 29, 2019	Wednesday, March 13, 2019	31	days	MOT, Humboldt
8.0	Microwave	Wednesday, August 21, 2019	Tuesday, January 07, 2020	99	days	MOT, Humboldt
8.1	Microwave Physical Path Survey	Wednesday, March 13, 2019	Friday, April 12, 2019	21	days	MOT
8.2	Microwave frequency coordination complete	Wednesday, August 21, 2019	Wednesday, August 21, 2019	0	days	MOT
8.3	Order Microwave Equipment	Wednesday, August 21, 2019	Wednesday, August 28, 2019	5	days	MOT
8.4	Stage Microwave Equipment in Longview Texas	Wednesday, August 28, 2019	Wednesday, November 20, 2019	60	days	MOT
	Configure Motorola provided equipment per IP Plan and Demarcation defined during DDR	Wednesday, August 28, 2019	Wednesday, November 20, 2019	60	days	MOT
8.5	Witness Microwave Factory Test (Optional)	Wednesday, November 20, 2019	Wednesday, November 20, 2019	0	days	Humboldt
8.6	New Installation and Test of Microwave Paths	Tuesday, October 29, 2019	Tuesday, January 07, 2020	50	days	MOT
8.7	Courthouse				days	
8.7.1	Trinidad				days	
8.7.2	Horse Mountain				days	
8.7.3	Mt Pierce				days	
8.7.4	Pratt				days	
8.7.5					days	

8.8	Backhaul complete	Tuesday, January 07, 2020	Tuesday, January 07, 2020	0	days	MOT, Humboldt
9.0	Installation and Optimization of Fixed Network Equipment	Wednesday, August 28, 2019	Tuesday, March 17, 2020	144	days	MOT
9.1	Configure, optimize, program and integrate all Motorola provided equipment				days	MOT
	Verify that all equipment is operating properly and that all signal levels are set accurately and measured values are within the design parameters.				days	MOT
9.2					days	MOT
9.3	Record site optimization data for the as-built.				days	MOT
9.4	System Ready for Acceptance Testing.				days	MOT
9.5	R56 Quality Site Audits.				days	MOT
9.6	Installation of Training and ATP Consoles per Agreed Plan	Tuesday, March 17, 2020	Tuesday, March 31, 2020	10	days	MOT
10.0	Acceptance Testing	Wednesday, August 28, 2019	Wednesday, May 27, 2020	195	days	MOT, Humboldt
10.1	Factory Functional Acceptance Test	Wednesday, August 28, 2019	Monday, September 02, 2019	4	days	MOT, Humboldt
10.2	Perform Field Functional Acceptance Test.	Tuesday, March 31, 2020	Tuesday, March 31, 2020	0	days	MOT
10.3	Witness and Approve Field Functional Acceptance Test.	Tuesday, March 31, 2020	Tuesday, March 31, 2020	0	days	Humboldt
10.4	Perform Coverage Acceptance Test.	Tuesday, March 31, 2020	Wednesday, May 06, 2020	26	days	MOT
	Provide 2 dispatch and 2 vehicles with a driver, tester, and witness (min 8 people total)	Tuesday, March 31, 2020	Wednesday, May 06, 2020	26	days	Humboldt
10.4.1						
10.4.2	Provide Coverage Acceptance Test Report.	Wednesday, May 06, 2020	Wednesday, May 20, 2020	10	days	MOT
10.4.3	Approve Coverage Acceptance Test report	Wednesday, May 20, 2020	Wednesday, May 27, 2020	5	days	Humboldt
11.0	Migration and Transition of Users	Saturday, March 28, 2020	Wednesday, June 24, 2020	63	days	MOT, Humboldt
	Conduct the training classes outlined in the Training Plan based on Design Review	Saturday, March 28, 2020	Wednesday, May 27, 2020	43	days	MOT, Humboldt
11.1						
11.2	Mobile Radios Installed as agreed to during Design Review	Wednesday, May 27, 2020	Wednesday, June 24, 2020	20	days	
11.2	Readiness Review Checklist	Friday, May 22, 2020	Tuesday, May 26, 2020	3	days	MOT
11.2.1	Review and Update Technical Cutover Plan				days	MOT
	Confirm system optimized and baseline performance documented.				days	MOT
11.2.2					days	MOT
11.2.3	Verify R56 Quality Audits.				days	MOT
11.2.4	Verify FCC and Tower ID.				days	MOT
11.2.5	Confirm Customer Approval of Templates.				days	MOT
11.2.6	User Training.				days	MOT
	Review Customer Support Plan, Escalation Procedures, Technical and User Help Line.				days	MOT
11.2.7					days	MOT
11.2.8	Confirm SSC Remote Monitoring.				days	MOT
11.2.9	Confirm Spares.				days	MOT
12.0	Install, Test, Cutover Green Diamond	Wednesday, June 24, 2020	Wednesday, August 05, 2020	30	days	MOT, Humboldt
13.0	Finalize Project	Wednesday, August 05, 2020	Wednesday, August 12, 2020	5	days	MOT
	Resolve punchlists documented in order to meet all the criteria for final system acceptance.	Wednesday, August 05, 2020	Wednesday, August 19, 2020	10	days	MOT
13.1						
13.2	Approve punchlist resolution.	Wednesday, August 19, 2020	Wednesday, August 26, 2020	5	days	Humboldt
	Provide Customer Support Plan detailing the warranty and post-warranty support.					
13.3		Wednesday, August 05, 2020	Wednesday, August 05, 2020	0	days	MOT
	Provide as-built documentation in pdf System Manual with native documents on the System Manual CD/DVD.	Wednesday, August 05, 2020	Wednesday, August 05, 2020	0	days	MOT
13.4						
13.5	Review and Approve as-built documentation.	Wednesday, August 05, 2020	Wednesday, August 12, 2020	5	days	Humboldt
14.0	Final Project Completion	Wednesday, August 12, 2020	Wednesday, August 12, 2020	0	days	Humboldt

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EXHIBIT D
SYSTEM ACCEPTANCE CERTIFICATE

Customer Name: _____

Project Name: _____

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

SECTION 11

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: _____
Print Name: _____
Title: _____
Date: _____

Signature: _____
Print Name: _____
Title: _____
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: _____
Print Name: _____
Title: _____
Date: _____

Signature: _____
Print Name: _____
Title: _____
Date: _____



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