SUBMITTAL TO THE BOARD OF SUPERVISORS
COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

ITEM
3.33
(ID # 8504)

MEETING DATE:
Tuesday, December 11, 2018

FROM : RIVERSIDE COUNTY INFORMATION TECHNOLOGY AND EXECUTIVE OFFICE & PSEC STEERING COMMITTEE :

SUBJECT: RIVERSIDE COUNTY INFORMATION TECHNOLOGY: Approval of the Microwave Network Replacement Proposal, including the Communications System and Services Agreement (CSSA), and the Motorola Equipment Lease Purchase Agreement for Replacement of Public Safety Enterprise Communication (PSEC) microwave network equipment. All Districts [Total Cost: $20,254,493.87, RCIT PSEC Operations Fund] (4/5 Vote Required)

RECOMMENDED MOTION: That the Board of Supervisors:

1. Approve the Microwave Network Replacement Proposal, including the Communications System and Services Agreement ("CSSA") with Motorola Solutions Inc., for a total contract amount of $20,254,493.87, and authorize the Chairman of the Board to execute the CSSA on behalf of the County;
2. Approve the Motorola Equipment Lease Purchase Agreement #24483 for the financing of the aforementioned procurement under the CSSA, and authorize the Chairman of the Board to execute said Lease Purchase Agreement and the attached Certificate of Incumbency on behalf of the County; and
3. Authorize the Purchasing Agent, in accordance with Ordinance No. 459, based on the availability of fiscal funding and as approved by County Counsel, to execute amendments that do not change the substantive terms of the CSSA.

ACTION:

Dave Rogers, Chief Information Officer 11/28/2018 Kevin Vest, Assistant Sheriff 11/28/2018

MINUTES OF THE BOARD OF SUPERVISORS

On motion of Supervisor Tavaglione, seconded by Supervisor Jeffries and duly carried by unanimous vote, IT WAS ORDERED that the above matter is approved as recommended.

Ayes:	Jeffries, Tavaglione, Washington, Perez and Ashley
Nays:	None
Absent:	None
Date:	December 11, 2018
xc:	RCIT, EO, PSEC, Purchasing

Kecia Harper-Ihem
Clerk of the Board
By: Deputy

SUBMITTAL TO THE BOARD OF SUPERVISORS COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

FINANCIAL DATA	Current Fiscal Year:	Next Fiscal Year:	Total Cost:	Ongoing Cost
COST	$ 0	$ 0	$ 20,254,493.87	$ 0
NET COUNTY COST	$ 0	$ 0	$ 0	$ 0
SOURCE OF FUNDS: $20,254,493.87 RCIT PSEC Operations Fund			**Budget Adjustment:** No **For Fiscal Year:** 18/19 – 21/22	

C.E.O. RECOMMENDATION: [CEO use]

BACKGROUND:

Summary

In 2000, the County of Riverside (the "County") purchased the MDR 8000 microwave system (84 hops) to support the Sheriff's Department, Fire Department, and other public safety agencies. While the microwave equipment is a separate system, it was integrated into the Public Safety Enterprise Communication (PSEC) system to provide the backbone and enhance communication capabilities. The MDR 8000 microwave system has reached the end of life and must be upgraded/replaced in support of the PSEC Radio system. The County will not be able to take advantage of the next radio system upgrade without this microwave backbone upgrade.

Motorola Solutions, Inc. in partnership with Nokia, are proposing the "Microwave Network Replacement" project to replace the existing MDR 8000 microwave system with the latest architecture. The project will take 4 years to complete and upon completion, the PSEC radio system will be upgraded to the latest Motorola Solutions system release. To that end, the County and Motorola Solutions, Inc. will be executing the Communications System and Services Agreement (the "CSSA").

Having Motorola Solutions partnered with Nokia minimizes the risk to the County when upgrading a live network that our users rely on for communications. Motorola and Nokia are familiar with the implementation of microwave equipment and how it ties into the network.

Impact on Residents and Businesses

Public safety agencies in Riverside County, as well as City of Corona, City of Riverside, City of Banning, City of Murrieta Police Departments, and University of California, Riverside rely on the PSEC system to serve and protect the community. It is required that the radio system and microwave backbone are updated to remain operational and support the need for Public Safety-first responders to communicate. In the event of any incident, large or small, Public Safety-First Responders will continue to rely on an operational communication system as they serve the needs of the public.

Additional Fiscal Information

This purchase is going to be financed using financing provided by Motorola under the Equipment Lease Purchase Agreement #24483 (the "Lease Agreement"). To complete the financing, Motorola is requesting the County to execute certain closing documents, as identified in the Lease Agreement, including the Certificate of Incumbency, to be signed by the Chairman of the Board on behalf of the County. Said closing documents are attached to the Lease Agreement for reference. The lease payments will be made with PSEC funds, supplemented by repurposed NCC funds. Funds that are currently given to Sheriff and Fire for PSEC rates will be repurposed towards this Lease Agreement as existing equipment lease payments are paid in full in the coming years. This will allow PSEC to have a better product and to entice users to join the radio system. With increased users, PSEC will be able to lower the rates for all making the PSEC system the favored system for all county users.

This item was taken to the Debt Advisory committee and received their approval on December 6, 2018.

Contract History and Price Reasonableness

The subject procurement will be made under the terms and conditions of the Cooperative Agreement between Houston-Galveston Area Council of Governments ("HGAC") and Motorola to take advantage of the competitive pricing secured by HGAC, as referenced in the recitals of the CSSA. After a competitively bid process, HGAC's Cooperative Purchasing Program (also known as the H-GACBuy) awarded the contract to Motorola Solutions starting on May 1, 2018. Motorola Solutions Inc. can be directly contracted by the County and assured of best available pricing for the microwave equipment and Motorola services by using this Cooperative Agreement. In addition to the prices negotiated by HGAC, Motorola offered Riverside County a System Pricing Incentive which represents a one-time discount applied to the HGAC contract level pricing in the amount of $1,362,884. Based on this this information the cost for the equipment is deemed to be "fair and reasonable".

County Counsel has approved the CSSA and the Lease Agreement as to legal form.

Tina Grande, Assistant Purchasing Director 11/29/2018

Ivan Chand, Deputy County Executive Officer 12/4/2018

Gregory P. Priamos, Director County Counsel 12/4/2018

Dave Rogers, Chief Information Officer 11/28/2018

WHEN DOCUMENT IS FULLY EXECUTED RETURN
CLERK'S COPY
to Riverside County Clerk of the Board, Stop 1010
Post Office Box 1147, Riverside, Ca 92502-1147
Thank you.

LESSEE FACT SHEET

1. Complete **Billing** Address — **Riverside County Information Technology**

3450 14th Street

Riverside, CA 92501

Attention: **Accounts Payable, 4th Floor**

Phone: **(951) 955-7721**

2. Lessee County Location: **4080 Lemon Street, Riverside, CA 92501**

3. Federal Tax I.D. Number **95 6000930**

4. Purchase Order Number to be referenced on invoice (if necessary) or other "descriptions" that May assist in determining the applicable cost center or department: _____

5. Equipment description that you would like to appear on your invoicing: Motorola Microwave

Appropriate Contact for Documentation / System Acceptance Follow-up:

6. Appropriate Contact & Mailing Address — **Gustavo Vazquez**

7195 Alessandro Blvd

Riverside, CA 92506

Phone: **(951) 955-0563**

Fax: **(951) 955-0603**

7. Payment remit to address: **Motorola Credit Corp.**
P.O. Box 71132
Chicago IL 60694-1132

Thank you

DEC 11 2018 3.33

EQUIPMENT LEASE-PURCHASE AGREEMENT

Lease Number: 24483

LESSEE:

COUNTY OF RIVERSIDE
4080 Lemon Street
Riverside, CA 92501

LESSOR:

MOTOROLA SOLUTIONS, INC.
500 West Monroe
Chicago IL 60661

Lessor agrees to lease to Lessee and Lessee agrees to lease from Lessor, the Equipment described in any Schedule A now or hereafter attached hereto ("Equipment") in accordance with the following terms and conditions of this Equipment Lease-Purchase Agreement ("Lease").

1. TERM. This Lease will become effective upon the execution hereof by Lessor. The Term of this Lease will commence on date specified in Schedule A and unless terminated according to terms hereof or the purchase option provided in Section 18 is exercised, this Lease will continue until the Expiration Date set forth in Schedule B attached hereto ("Lease Term").

2. RENT. Lessee agrees to pay to Lessor or its assignee the Lease Payments (herein so called), including the interest portion, in the amounts specified in Schedule B. The Lease Payments will be payable without notice or demand at the office of the Lessor (or such other place as Lessor or its assignee May from time to time designate in writing), and will commence on the first Lease Payment Date as set forth in Schedule B and thereafter on each of the Lease Payment Dates set forth in Schedule B. Any payments received later than ten (10) days from the due date will bear interest at the highest lawful rate from the due date. Except as specifically provided in Section 5 hereof, the Lease Payments will be absolute and unconditional in all events and will not be subject to any set-off, defense, counterclaim, or recoupment for any reason whatsoever. Lessee reasonably believes that funds can be obtained sufficient to make all Lease Payments during the Lease Term and hereby covenants that it will do all things lawfully within its power to obtain, maintain and properly request and pursue funds from which the Lease Payments may be made, including making provisions for such payments to the extent necessary in each budget submitted for the purpose of obtaining funding, using its bona fide best efforts to have such portion of the budget approved and exhausting all available administrative reviews and appeals in the event such portion of the budget is not approved. It is Lessee's intent to make Lease Payments for the full Lease Term if funds are legally available therefor and in that regard Lessee represents that the Equipment will be used for one or more authorized governmental or proprietary functions essential to its proper, efficient and economic operation.

3. DELIVERY AND ACCEPTANCE. Lessor will cause the Equipment to be delivered to Lessee at the location specified in Schedule A ("Equipment Location"). Lessee will accept the Equipment as soon as it has been delivered and is operational. Lessee will evidence its acceptance of the Equipment by executing and delivering to Lessor a Delivery and Acceptance Certificate in the form provided by Lessor.

4. REPRESENTATIONS AND WARRANTIES. Lessor acknowledges that the Equipment leased hereunder is being manufactured and installed by Motorola Solutions, Inc. pursuant to the terms and conditions contained in the Microwave Network Replacement Proposal dated November 19, 2018 (the "Proposal"), including the Communications System and Services Agreement contained therein (the "Contract"), covering the Equipment. Lessee acknowledges that on or prior to the date of acceptance of the Equipment, Lessor intends to sell and assign Lessor's right, title and interest in and to this Agreement and the Equipment to an assignee ("Assignee"). LESSEE FURTHER ACKNOWLEDGES THAT EXCEPT AS EXPRESSLY SET FORTH IN THE CONTRACT, LESSOR MAKES NO EXPRESS OR IMPLIED WARRANTIES OF ANY NATURE OR KIND WHATSOEVER, AND AS BETWEEN LESSEE AND THE ASSIGNEE, THE PROPERTY SHALL BE ACCEPTED BY LESSEE "AS IS" AND "WITH ALL FAULTS". LESSEE AGREES TO SETTLE ALL CLAIMS DIRECTLY WITH LESSOR AND WILL NOT ASSERT OR SEEK TO ENFORCE ANY SUCH CLAIMS AGAINST THE ASSIGNEE. NEITHER LESSOR NOR THE ASSIGNEE SHALL BE LIABLE FOR ANY INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES OF ANY CHARACTER AS A RESULT OF THE LEASE OF THE EQUIPMENT, INCLUDING WITHOUT LIMITATION, LOSS OF PROFITS OR LOST PRODUCTION WHETHER SUFFERED BY LESSEE OR ANY THIRD PARTY.

Lessor is not responsible for, and shall not be liable to Lessee for damages relating to loss of value of the Equipment for any cause or situation (including, without limitation, governmental actions or regulations or actions of other third parties).

5. NON-APPROPRIATION OF FUNDS. Notwithstanding anything contained in this Lease to the contrary, in the event the funds appropriated by Lessee's governing body or otherwise available by any means whatsoever in any fiscal period of Lessee for Lease Payments or other amounts due under this Lease are insufficient therefor, this Lease shall terminate on the last day of the fiscal period for which appropriations were received without penalty or expense to Lessee of any kind whatsoever, except as to the portions of Lease Payments or other amounts herein agreed upon for which funds shall have been appropriated and budgeted or are otherwise available. The Lessee will immediately notify the Lessor or its Assignee of such occurrence. In the event of such termination, Lessee agrees to peaceably surrender possession of the Equipment to Lessor or its Assignee on the date of such termination, packed for shipment in accordance with manufacturer specifications and freight prepaid and insured to any location in the continental United States designated by Lessor. Lessor will have all legal and equitable rights and remedies to take possession of the Equipment. Notwithstanding the foregoing, Lessee agrees, to the extent not prohibited by law, that it will not cancel this Lease under the provisions of this Section if any funds are appropriated to it, or by it, for the acquisition, retention or operation of the Equipment for the fiscal period in which such termination occurs or the next succeeding fiscal period thereafter.

6. LESSEE CERTIFICATION. Lessee represents, covenants and warrants that: (i) Lessee is a state or a duly constituted political subdivision or agency of the state of the Equipment Location; (ii) the interest portion of the Lease Payments shall be excludable from Lessor's gross income pursuant to Section 103 of the Internal Revenue Code of 1986, as it May be amended from time to time (the "Code"); (iii) the execution, delivery and performance by the Lessee of this Lease have been duly authorized by all necessary action on the part of the Lessee; (iv) this Lease constitutes a legal, valid and binding obligation of the Lessee enforceable in accordance with its terms; (v) Lessee will comply with the information reporting requirements of Section 149(e) of the Code, and such compliance shall include but not be limited to the execution of information statements requested by Lessor; (vi) Lessee will not do or cause to be done any act which will cause, or by omission of any act allow, the Lease to be an arbitrage bond within the meaning of Section 148(a) of the Code; (vii) Lessee will not do or cause to be done any act which will cause, or by omission of any act allow, this Lease to be a private activity bond within the meaning of Section 141(a) of the Code; (viii) Lessee will not do or cause to be done any act which will cause, or by omission of any act allow, the interest portion of the Lease Payments to be or become includible in gross income for Federal income taxation purposes under the Code; and (ix) Lessee will be the only entity to own, use and operate the Equipment during the Lease Term.

Lessee represents, covenants and warrants that (i) it will do or cause to be done all things necessary to preserve and keep the Lease in full force and effect, (ii) it has complied with all public bidding and Bond Commission requirements (as defined in the Code) where necessary and by due notification presented this Lease for approval and adoption as a valid obligation on its part, and (iii) it has sufficient appropriations or other funds available to pay all amounts due hereunder for the current fiscal period.

If Lessee breaches the covenant contained in this Section, the interest component of Lease Payments May become includible in gross income of the owner or owners thereof for federal income tax purposes. In such event, notwithstanding anything to the contrary contained in Section 11 of this Agreement, Lessee agrees to pay promptly after any such determination of taxability and on each Lease Payment date thereafter to Lessor an additional amount determined by Lessor to compensate such owner or owners for the loss of such excludibility (including, without limitation, compensation relating to interest expense, penalties or additions to tax), which determination shall be conclusive (absent manifest error). Notwithstanding anything herein to the contrary, any additional amount payable by Lessee pursuant to this Section 6 shall be payable solely from Legally Available Funds.

It is Lessor's and Lessee's intention that this Agreement not constitute a "true" lease for federal income tax purposes and, therefore, it is Lessor's and Lessee's intention that Lessee be considered the owner of the Equipment for federal income tax purposes.

7. TITLE TO EQUIPMENT; SECURITY INTEREST. Upon shipment of the Equipment to Lessee hereunder, title to the Equipment will vest in Lessee; provided, however, that (i) in the event of termination of this Lease by Lessee pursuant to Section 5 hereof; (ii) upon the occurrence of an Event of Default hereunder, and as long as such Event of Default is continuing; or (iii) in the event that the purchase option has not been exercised prior to the Expiration Date, title will immediately vest in Lessor or its Assignee. In order to secure all of its obligations hereunder, Lessee hereby (i) grants to Lessor a first and prior security interest in any and all right, title and interest of Lessee in the Equipment and in all additions, attachments, accessions, and substitutions thereto, and on any proceeds therefrom; (ii) agrees that this Lease May be filed as a financing statement evidencing such security interest; and (iii) agrees to execute and deliver all financing statements, certificates of title and other instruments necessary or appropriate to evidence such security interest.

8. USE; REPAIRS. Lessee will use the Equipment in a reasonably careful manner for the use contemplated by the manufacturer of the Equipment and shall comply with all laws, ordinances, insurance policies and regulations relating to, and will pay all costs, claims, damages, fees and charges arising out of the possession, use or maintenance of the Equipment. Lessee, at its expense will keep the Equipment in good repair and furnish all parts, mechanisms and devices required therefor.

9. ALTERATIONS. Lessee will not make any alterations, additions or improvements to the Equipment without Lessor's prior written consent unless such alterations, additions or improvements may be readily removed without damage to the Equipment.

10. LOCATION; INSPECTION. The Equipment will not be removed from, [or if the Equipment consists of rolling stock, its permanent base will not be changed from the County of Riverside] the Equipment Location, as defined in Schedule A, without Lessor's prior written consent which will not be unreasonably withheld. Lessor will be entitled to enter upon the Equipment Location or elsewhere during reasonable business hours to inspect the Equipment or observe its use and operation.

11. LIENS AND TAXES. Lessee shall keep the Equipment free and clear of all levies, liens and encumbrances except those created under this Lease. Lessee shall pay, when due, all charges and taxes (local, state and federal) which May now or hereafter be imposed upon the ownership, leasing, rental, sale, purchase, possession or use of the Equipment, excluding however, all taxes on or measured by Lessor's income. If Lessee fails to pay said charges and taxes when due, Lessor shall have the right, but shall not be obligated, to pay said charges and taxes. If Lessor pays any charges or taxes, Lessee shall reimburse Lessor therefor within ten days of written demand.

12. RISK OF LOSS: DAMAGE; DESTRUCTION. Lessee assumes all risk of loss or damage to the Equipment from any cause whatsoever, and no such loss of or damage to the Equipment shall relieve Lessee of the obligation to make Lease Payments or to perform any other obligation under this Lease. In the event of damage to any item of Equipment, Lessee will immediately place the same in good repair with the proceeds of any insurance recovery applied to the cost of such repair. If Lessor determines that any item of Equipment, while in the care of Lessee, is lost, stolen, destroyed or damaged beyond repair, Lessee at the option of Lessor will: either (a) replace the same with like equipment in good repair; or (b) on the next Lease Payment date, pay Lessor the sum of : (i) all amounts then owed by Lessee to Lessor under this Lease, including the Lease payment due on such date; and (ii) an amount equal to all remaining Lease Payments to be paid during the Lease Term as set forth in Schedule B.

In the event that Lessee is obligated to make such payment with respect to less than all of the Equipment, Lessor will provide Lessee with the pro rata amount of the Lease Payment and the Balance Payment (as set forth in Schedule B) to be made by Lessee with respect to that part of the Equipment which has suffered the Event of Loss.

13. INSURANCE. Lessee will, at its expense, maintain at all times during the Lease Term, fire and extended coverage, public liability and property damage insurance with respect to the Equipment in such amounts, covering such risks, and with such insurers as shall be satisfactory to Lessor, or, with Lessor's prior written consent, Lessee May self-insure against any or all such risks. All insurance covering loss of or damage to the Equipment shall be carried in an amount no less than the amount of the then applicable Balance Payment with respect to such Equipment. The initial amount of insurance required is set forth in Schedule B. Each insurance policy will name Lessee as an insured and Lessor or it's Assigns as an additional insured, and will contain a clause requiring the insurer to give Lessor at least thirty (30) days prior written notice of any alteration in the terms of such policy or the cancellation thereof. The proceeds of any such policies will be payable to Lessee and Lessor or it's Assigns as their interests May appear. Upon acceptance of the Equipment and upon each insurance renewal date, Lessee will deliver to Lessor a certificate evidencing such insurance. In the event that Lessee has been permitted to self-insure, Lessee will furnish Lessor with a letter or certificate to such effect. In the event of any loss, damage, injury or accident involving the Equipment, Lessee will promptly provide Lessor with written notice thereof and make available to Lessor all information and documentation relating thereto.

14. INDEMNIFICATION. Lessee shall, to the extent permitted by law, indemnify Lessor against, and hold Lessor harmless from, any and all claims, actions, proceedings, expenses, damages or liabilities, including attorneys' fees and court costs, arising in connection with Lessee's obligations and responsibilities under this Lease, including, but not limited to, its selection, purchase, delivery, possession, use, operation, rejection, or return of the Equipment and the recovery of claims under insurance policies thereon. Nothing in this Lease shall be construed to limit any rights and remedies that may be available to Lessee under the Contract, or at law or in equity.

15. ASSIGNMENT. Without Lessor's prior written consent, Lessee will not either (i) assign, transfer, pledge, hypothecate, grant any security interest in or otherwise dispose of this Lease or the Equipment or any interest in this Lease or the Equipment or; (ii) sublet or lend the Equipment or permit it to be used by anyone other than Lessee or Lessee's employees. Lessor May assign its rights, title and interest in and to this Lease, the Equipment and any documents executed with respect to this Lease and/or grant or assign a security interest in this Lease and the Equipment, in whole or in part. Any such assignees shall have all of the rights of Lessor under this Lease. Subject to the foregoing, this Lease inures to the benefit of and is binding upon the heirs, executors, administrators, successors and assigns of the parties hereto.

Lessee covenants and agrees not to assert against the Assignee any claims or defenses by way of abatement, setoff, counterclaim, recoupment or the like which Lessee may have against Lessor. No assignment or reassignment of any Lessor's right, title or interest in this Lease or the Equipment shall be effective unless and until Lessee shall have received a notice of assignment, disclosing the name and address of each such assignee; provided, however, that if such assignment is made to a bank or trust company as paying or escrow agent for holders of certificates of participation in the Lease, it shall thereafter be sufficient that a copy of the agency agreement shall have been deposited with Lessee until Lessee shall have been advised that such agency agreement is no longer in effect. During the Lease Term Lessee shall keep a complete and accurate record of all such assignments in form necessary to comply with Section 149(a) of the Code, and the regulations, proposed or existing, from time to time promulgated thereunder. No further action will be required by Lessor or by Lessee to evidence the assignment, but Lessee will acknowledge such assignments in writing if so requested.

After notice of such assignment, Lessee shall name the Assignee as additional insured and loss payee in any insurance policies obtained or in force. Any Assignee of Lessor May reassign this Lease and its interest in the Equipment and the Lease Payments to any other person who, thereupon, shall be deemed to be Lessor's Assignee hereunder.

16. EVENT OF DEFAULT. The term "Event of Default", as used herein, means the occurrence of any one or more of the following events: (i) Lessee fails to make any Lease Payment (or any other payment) as it becomes due in accordance with the terms of the Lease, and any such failure continues for thirty (30) days after Lessee's receipt of written notice of said failure; (ii) Lessee fails to perform or observe any other covenant, condition, or agreement to be performed or observed by it hereunder and such failure is not cured within thirty (30) days after Lessee's receipt of written notice of said failure; (iii) the discovery by Lessor that any statement, representation, or warranty made by Lessee in this Lease or in writing ever delivered by Lessee pursuant hereto or in connection herewith is false, misleading or erroneous in any material respect; (iv) proceedings under any bankruptcy, insolvency, reorganization or similar legislation shall be instituted against or by Lessee, or a receiver or similar officer shall be appointed for Lessee or any of its property, and such proceedings or appointments shall not be vacated, or fully stayed, within twenty (20) days after the institution or occurrence thereof; or (v) an attachment, levy or execution is threatened or levied upon or against the Equipment.

17. REMEDIES. Upon the occurrence of an Event of Default, and as long as such Event of Default is continuing, Lessor may, at its option, exercise any one or more of the following remedies: (i) by written notice to Lessee, declare all amounts then due under the Lease, and all remaining Lease Payments due during the Fiscal Year in effect when the default occurs to be immediately due and payable, whereupon the same shall become immediately due and payable; (ii) by written notice to Lessee, request Lessee to (and Lessee agrees that it will), at Lessee's expense, promptly return the Equipment to Lessor in the manner set forth in Section 5 hereof, or Lessor, at its option, may enter upon the premises where the Equipment is located and take immediate possession of and remove the same; (iii) sell or lease the Equipment or sublease it for the account of Lessee, holding Lessee liable for all Lease Payments and other amounts due prior to the effective date of such selling, leasing or subleasing and for the difference between the purchase price, rental and other amounts paid by the purchaser, Lessee or sublessee pursuant to such sale, lease or sublease and the amounts payable by Lessee hereunder; and (iv) exercise any other right, remedy or privilege which may be available to it under applicable laws of the state of the Equipment Location or any other applicable law or proceed by appropriate court action to enforce the terms of the Lease or to recover damages for the breach of this Lease or to rescind this Lease as to any or all of the Equipment. In addition, Lessee will remain liable for all covenants and indemnities under this Lease and for all legal fees and other costs and expenses, including court costs, incurred by Lessor with respect to the enforcement of any of the remedies listed above or any other remedy available to Lessor.

18. PURCHASE OPTION. Upon thirty (30) days prior written notice from Lessee to Lessor, and provided that no Event of Default has occurred and is continuing, or no event, which with notice or lapse of time, or both, could become an Event of Default, then exists, Lessee will have the right to purchase the Equipment on the Lease Payment dates set forth in Schedule B by paying to Lessor, on such date, the Lease Payment then due together with the Balance Payment amount set forth opposite such date. Upon satisfaction by Lessee of such purchase conditions, Lessor will transfer any and all of its right, title and interest in the Equipment to Lessee as is, without warranty, express or implied, except that the Equipment is free and clear of any liens created by Lessor. Nothing in this Lease shall be construed to limit any warranty provided by Lessor under the Contract and/or the Proposal.

19. NOTICES. All notices to be given under this Lease shall be made in writing and mailed by certified mail, return receipt requested, to the other party at its address set forth herein or at such address as the party May provide in writing from time to time. Any such notice shall be deemed to have been received five days subsequent to such mailing.

20. SECTION HEADINGS. All section headings contained herein are for the convenience of reference only and are not intended to define or limit the scope of any provision of this Lease.

21. GOVERNING LAW. This Lease shall be construed in accordance with, and governed by the laws of, the state of the Equipment Location.

22. DELIVERY OF RELATED DOCUMENTS. Lessee will execute or provide, as requested by Lessor, such other documents and information as are reasonably necessary with respect to the transaction contemplated by this Lease.

23. ENTIRE AGREEMENT; WAIVER. This Lease, together with the Delivery and Acceptance Certificate and other attachments hereto, and other documents or instruments executed by Lessee and Lessor in connection herewith, constitutes the entire agreement between the parties with respect to the Lease of the Equipment, and this Lease shall not be modified, amended, altered, or changed except with the written consent of Lessee and Lessor. Any provision of the Lease found to be prohibited by law shall be ineffective to the extent of such prohibition without invalidating the remainder of the Lease. The attached Evidence of Insurance, the Statement of Essential Use/Source of Funds, the Opinion of Counsel, the Certificate of Incumbency, and the Equipment Lease Purchase Agreement Delivery and Acceptance Certificate shall be verified and completed by relevant Lessee representatives separately. Lessor agrees to accept a written approval or minute order by Lessee's Board of Supervisors, in lieu of the attached form Lessee Resolution.

The waiver by Lessor of any breach by Lessee of any term, covenant or condition hereof shall not operate as a waiver of any subsequent breach thereof.

24. EXECUTION IN COUNTERPARTS. This Lease may be executed in several counterparts, each of which shall be deemed an original and all of which shall constitute but one and the same instrument.

IN WITNESS WHEREOF, the parties have executed this Agreement as of the 11th day of December, 2018.

LESSEE: COUNTY OF RIVERSIDE, a political Subdivision of the State of California

By: _____
Chuck Washington, Chairman
Board of Supervisors

Dated: December 11, 2018

LESSOR: MOTOROLA SOLUTIONS, INC., a Delaware corporation

By: _____
Name: Uygar Gazioglu
Title: Treasurer

Dated:

ATTEST:
Kecia Harper-Ihem
Clerk of the Board

By: _____
Deputy

APPROVED AS TO FORM:
Gregory P. Priamos
County Counsel

By: _____
Susanna Oh,
Deputy County Counsel

same room or nearby test bed for practical sessions, or made remotely available through Remote Lab.

The results of the training session evaluation are stored in Nokia' Learning Management System.

Variations of Classroom Training

The Classroom Training can be tailored and customized to meet specific requirements, strategy, goals and/or the corporate identity of the customer. Tailoring means skipping or adding parts to an existing training. It could as well mean extending or shortening (within pedagogical limits) the course duration. Customization means adding new content to a training.

The Classroom Training can also be provided in the form of a seminar. A seminar is an instructor-led face-to-face learning event provided by Nokia. The seminar is delivered in an instructive manner and is always knowledge focused. Skills are not taught in seminars. The target audience is varied and size of participation is governed by the room size. Venues are selected based on demand and target audience location.

A workshop is an instructor-led face-to-face learning event provided by Nokia to the participants. A workshop is delivered in an informal collaborative manner between the instructor and participants. The workshop is typically skill-oriented, delivered on a test bed in either a Nokia Training Center or at the mobile operator premises. Workshops normally focus on specific tasks or skills. Workshops are an ideal environment for troubleshooting sessions.

Deliverables

The deliverables of Classroom Training include:

- Classroom Training event delivered by Nokia instructor.
- Learning material.
- Training confirmation of attendance.

Prerequisites and Assumptions

Participants are enrolled according to the target group and prerequisites defined in the training descriptions available on the Nokia internet. Nokia shall not be obliged to take special care or to take special steps to meet the demands of participants that do not meet the prerequisites.

Unless otherwise agreed, the standard length of a training day is seven (7) hours, including a one-hour lunch break and appropriate morning/afternoon breaks.

6.4.4 On-The-Job Training

Content and Scope

On-the-Job Training (OJT) is practical and theoretical learning event that takes place at the customer's premises in an informal environment using operational equipment.

The participants can be trained on job tasks and task related tools within specified network technologies. The tasks and topics that the participants are trained on are selected based on the learning objectives set by the customer. The service is delivered in a workshop manner: observing and guiding daily activities, reviewing and proposing best practices in operations of the network, holding instructional sessions. Workplace manuals and learning documents are used to assist in learning.

The results of the Virtual Classroom Training evaluations are stored in Nokia' Learning Management System.

Variations of Virtual Classroom Training

The Virtual Classroom Training can be tailored or customized to meet the needs of the specific requirements, strategy, goals and/or corporate identity of the customer.

Deliverables

The deliverables of Virtual Classroom Training include:

- Virtual Classroom Training event delivered by Nokia instructor
- Learning material
- Training confirmation of attendance

Prerequisites and Assumptions

The participant should have a secluded and peaceful area around the computer while attending Virtual Classroom Training. To be sure of this, it is worthwhile to check that PC facilities are available in case employees do not have offices and/or sufficient PCs of their own. Another option is to allow employees to use PCs at home from where they have a connection to the Internet.

Participants are selected according to the target group and prerequisites defined in the learning program descriptions. Nokia shall not be obliged to take special care or to take special steps to meet the demands of participants that do not meet the prerequisites.

A Virtual Classroom solution may comprise multiple learning sessions. The length of a session shall not exceed 120 minutes. Two sessions may be delivered per day.

Tools

A synchronous e-Learning tool using the internet technology to provide real-time interaction between the instructor and a group of participants is used as platform for Virtual Classroom Training.

End-user computer requirements include internet connection, audio capabilities, and Virtual Classroom client software.

6.4.3 Instructor Led Classroom Training

Content and Scope

Classroom Training can be either face-to-face or virtual however face-to-face classroom training is an event provided by Nokia EDU qualified instructors carried out in a physical learning environment and fits well for initial and advanced competence development.

The Classroom Training standard offering is continuously visible through Nokia internet including training descriptions. The training description consists of name of the training, target group(s), objectives, nominal duration, prerequisites, modules, maximum amount of participants and a basic description of the learning environment. The training offering is continuously updated on the internet.

Classroom Training is provided in a suitably appointed room located in either a Nokia Training Center, customer premises or training facility. Training equipment may be located within the

basic description of the learning environment. The training offering is continuously updated on the internet.

Variations of e-Learning

Depending on the customer requirements, offered services can include different e-Learning types.

Web Based Training, are learning events that use Internet technology to impart knowledge. To increase the efficiency, the content is provided to users in a highly animated and interactive style. Contents are presented in a structured way so that students can retrieve them rapidly and easily.

e-Presentations are recorded training presentations in the form of a slide presentation with audio, recorded video interviews or recorded parts of a seminar. Participant can watch and listen to the edited user-friendly explanations of the trainer during the presentation.

Deliverables

The deliverables of e-Learning include:

- Actual e-Learning event delivered by Nokia instructor
- Learning material
- Training confirmation of attendance

Prerequisites and Assumptions

Participants are enrolled to the e-Learning individually according to the target group and prerequisites defined in the training descriptions available at the Nokia internet. Nokia shall not be obliged to take special care or to take special steps to meet the demands of participants that do not meet the prerequisites.

6.4.2 Instructor Led Virtual Classroom Training

Content and Scope

The Virtual Classroom Training is a learning event provided in a virtual classroom through the Internet, where participants can meet up and take part in guided online sessions even if they work at different locations. Virtual Classroom Training is particularly suited for topics that can be conveyed within one or two hours.

The Virtual Classroom Training standard offering is continuously visible through Nokia internet including training descriptions. The training description consists of name of the training, target group(s), objectives, nominal duration, prerequisites, modules, maximum amount of participants and a basic description of the learning environment. The training offering is continuously updated on the internet.

Enrolment to Virtual Classroom Training includes access to the Virtual Classroom environment. Participants receive an enrolment notification email for the Virtual Classroom sessions, providing instructions on how to access the environment.

The learning sessions may include practical exercises on Nokia learning equipment, made remotely available through Remote Lab access.

Expert	- "Expert" level learning provides mainly product based background knowledge to experts in the operator's organization. - The goal is to provide deeper background knowledge for experts to make them better planners or troubleshooters.

6.3 LEARNING SERVICES

Learning Support Services covers the following:

Learning Consulting	- Supports identification of areas where competence development adds value to operations and business needs.
Curriculum Planning	- Analysis and assessment of current skills-sets to deliver a training curriculum targeted at job roles and levels of competences to be achieved.
Learning Content Development	- Learning content build from existing training modules as well as customized deliverables to fit into your unique needs.
Assessment Services	- Confirm the learning outcomes through assessment, including pre- and post-tests, self-assessment, task-based assessments and skill level certification programs.

6.4 FLEXIBLE DELIVERY MODES FOR BLENDED LEARNING

Nokia believes in using training delivery models which fits in customers' business models, competence needs and learning solutions. Blended learning helps people learn per their convenience of time, place and path.

6.4.1 Self-Paced Learning

Content and Scope

Nokia supports the delivery model where customers can learn and gain knowledge at their own pace by requesting Nokia eLearning Services on demand. Nokia eLearning Services include a wide range of online learning events (e.g. Web-Based Training (WBT) courses, e-Presentations, etc.)

With eLearning Services Nokia helps its customers in enhancing their learning environment by extending the availability of effective knowledge resources in their organization.

Nokia e-Learning includes a wide range of content covering systems, network architecture, products and platforms as well as new releases. If needed, customer specific content can be developed.

The eLearning standard offering is continuously visible through Nokia internet including training descriptions. The training description consists of name of the training, target group(s), objectives, nominal duration, prerequisites, modules, maximum amount of participants and a

6.2 PRODUCT AND TECHNOLOGY TRAINING

Nokia Product and Technology training includes predefined curriculum paths to gain necessary knowledge and generic skills to build, operate and optimize your network and services.

Nokia's extensive training portfolio offers everything to get customers skilled on Nokia products and technology solutions. The courses are categorized further per job functions in the network:

Dimensioning and Planning Courses	- Focus on skills for the definition, planning and implementation of all necessary infrastructures. - Identify new requirements, new capabilities and design and develop new or enhanced infrastructure to support products. - Respond to requirements of unit cost reductions, product quality improvements, new products, etc.
Installation and Commissioning Courses	- Focus on skills for the allocation, installation, configuration, activation and testing of specific services and resources to meet the customer requirements.
Operation and Maintenance Courses	- Focus on skills for the execution of proactive and reactive maintenance activities. - Ensure continuous availability and attainment of SLA or QoS performance levels. - Perform continuous status and performance monitoring to proactively detect possible failures.
Network Optimization Courses	- Focus on skills to analyse root causes of performance problems like capacity bottlenecks, sub optimal-configurations etc. - Skills to come up with the proposal for resolving actions.

6.2.1 Course Levels

Aware	- "Aware" level learning provides a general overview of a network element, product or technology. - The "Aware" level also includes technology and product independent courses. - The courses offered under "Aware" level are common for all technical personnel and some of these courses are also recommended for non-technical staff.
Standard	- "Standard" level learning typically takes place in the early phases of network implementation. - These combined theory and practical sessions aim to make the participants adept at operating and maintaining a specific network element or subsystem. - These are designed to equip installation, commissioning, operation and maintenance personnel with the fundamental skills required to perform the day-to-day tasks associated with the equipment.
Advanced	- "Advanced" level learning provides the participants with the knowledge and skills to perform higher level tasks required in a telecommunications network. - These tasks involve network troubleshooting, network design, and reconfiguration as well as network performance analysis.

SECTION 6

TRAINING

Motorola Solutions is passing through Nokia's training program and specific courses described herein.

6.1 CUSTOMER TRAINING SERVICES

Evolving networks and subscriber demands require a skilled workforce that acts as a differentiator. Nokia Customer Training Services portfolio consists of Training and Learning services to enable customers to gain product and technology knowledge and customize solutions focused on individual learning. Also the flexible delivery models for blended learning supports customers to learn per the convenience of their time, place and path to complement their business objectives.

The Training Service portfolio is represented in Figure 6-1.

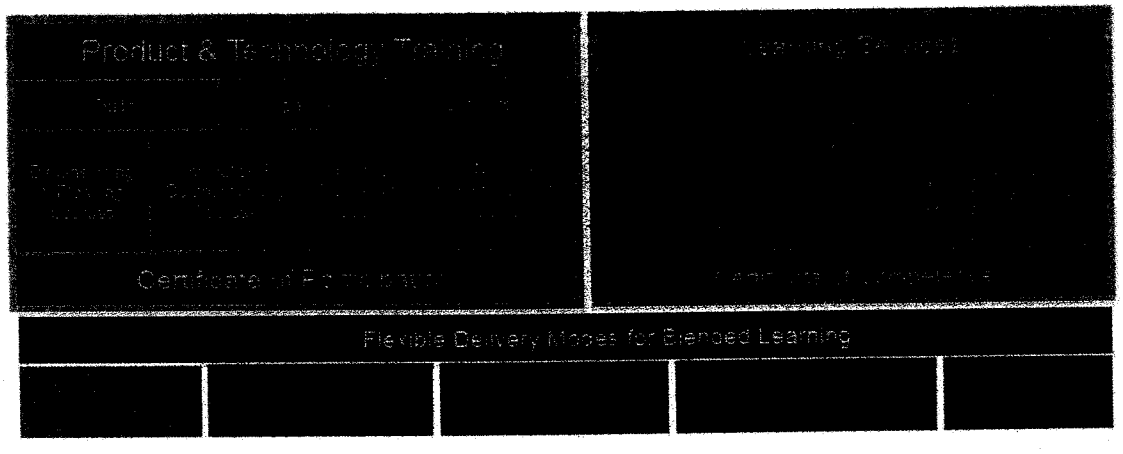


Figure 6-1: Customer Training Services Portfolio

5.2.8 Customer 9500MPR Radio System Acceptance

To be signed by the all representatives upon satisfactory completion of all tests witnessed in this Test Plan.

	Motorola Solutions Representative	Date
Print	_____	_____
Sign	_____	_____

	CUSTOMER Representative	Date
Print	_____	_____
Sign	_____	_____

Exceptions / Comments / Notes: _____

_____

_____

_____

_____

_____

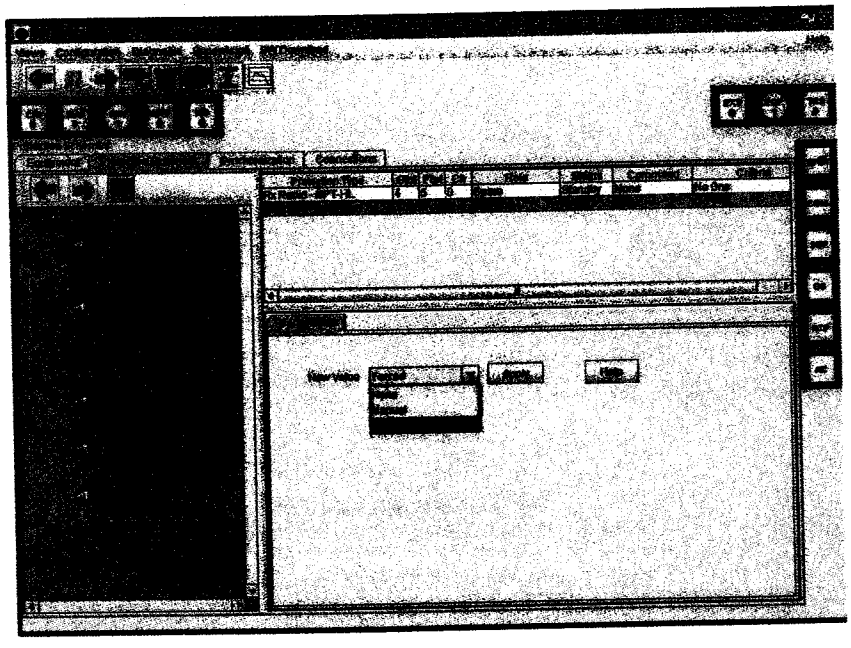


Figure 5-7: Receiver Manual Protection Switching

Test Requirement: Confirm receiver manual switching functionality.

Pass / Fail: _____

Customer Representative: _____ Date: _____

Motorola Solutions Representative: _____ Date: _____

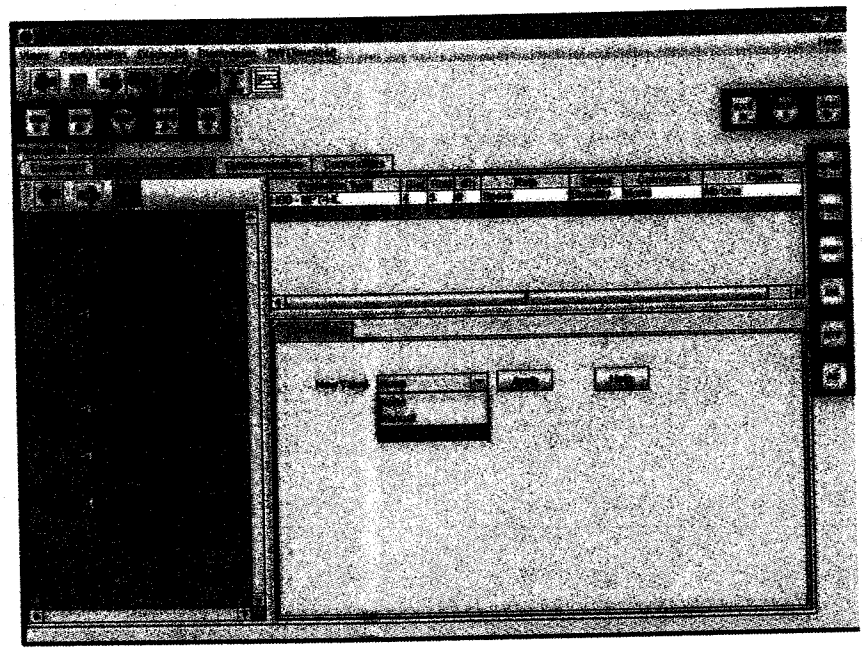


Figure 5-6: Transmitter Manual Protection Switching

Test Requirement: Confirm transmitter manual switching functionality.

Pass / Fail: _____

Customer Representative: _____ Date: _____

Motorola Solutions Representative: _____ Date: _____

5.2.7.11 Receiver Manual Protection Switching

- Select Protection Schemes tab as shown in Figure 5-7.
- Monitor screen to determine Active/Standby status of the main and protect MPT-HLC receivers. Main equipment should indicate as Active and protect as Standby.
- Under Rx Radio Protection, select the active Rx Radio MPT-HLC.
- Select "Forced" or "Manual' in the New Value drop-down menu.
- Click Apply.
- Validate change of status of main and protect equipment.
- To switch it back to normal state, first refresh the window, then select "None" from the drop-down menu.
- Click Apply.
- Check main and protect MPT-HLC receivers revert to Active and Standby status respectively.

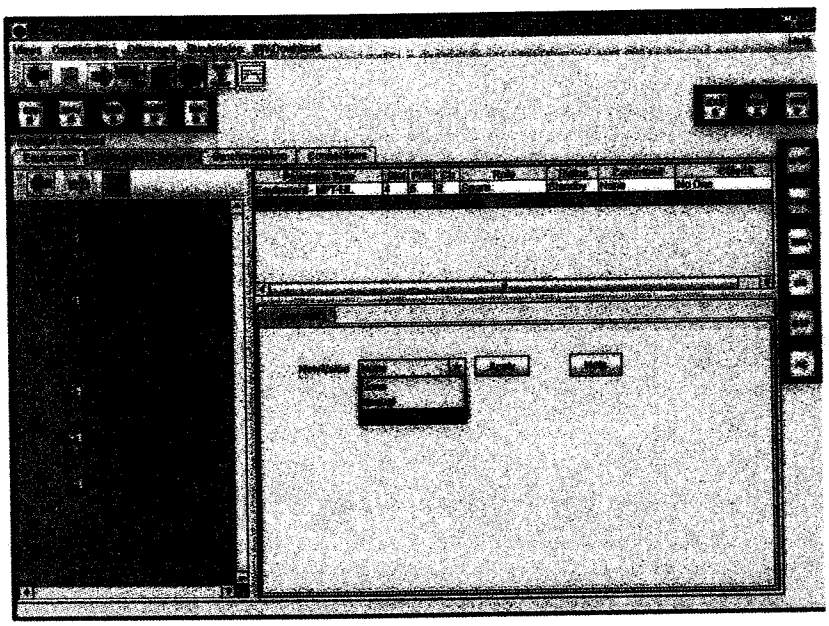


Figure 5-5: Automatic Protection Switching

Test Requirement: Verify automatic switching functions properly.

Pass / Fail: _____

Customer Representative: _____ Date: _____

Motorola Solutions Representative: _____ Date: _____

5.2.7.10 Transmitter Manual Protection Switching

- Select Protection Schemes Tab as shown in Figure 5-6.
- Monitor screen to determine Active/Standby status of the main and protect MPT-HLC transmitters. Main equipment should indicate as Active and protect as Standby.
- Under HSB Protection, select the main HSB MPT-HLC
- Select "Forced" or "Manual" in the New Value drop-down menu.
- Click Apply.
- Validate change of status of main and protect equipment.
- Verify sub-second traffic outage.
- To switch back to normal state, refresh the window, then select "None" from the drop-down menu.
- Click Apply.
- Check main and protect MPT-HLC transmitters revert to Active and Standby status respectively.

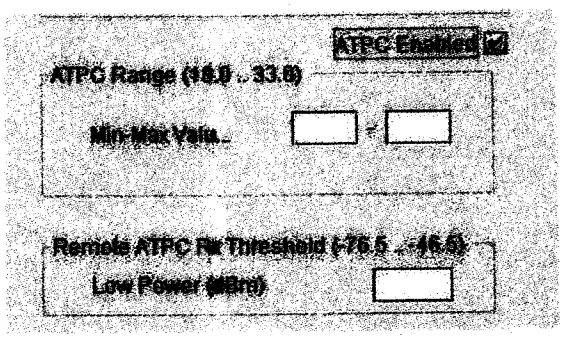


Figure 5-4: ATPC Configuration MPT Settings window

Test Requirement: Confirm ATPC adjusts transmit power accordingly as RSL is decreased and increased.

Pass / Fail: _____

Customer Representative: _____ Date: _____

Motorola Solutions Representative: _____ Date: _____

5.2.7.9 Failover and Recovery

Automatic Protection Switching

- Select Protection Schemes tab as shown in Figure 5-5.
- Monitor screen to determine Active/Standby status of the main and protect MPT-HLC transceivers. Main equipment should indicate as Active and protect as Standby.
- Remove power to the main MPT-HLC transceiver to simulate an equipment failure.
- Verify sub-second traffic outage.
- Check Active/Standby status of the Equipment MPT-HLC changes accordingly.
- Restore power to the main MPT-HLC transceiver module.
- Check that main and protect MPT-HLC transceivers revert to Active and Standby status respectively. Note that revertive switching is the default operational mode.

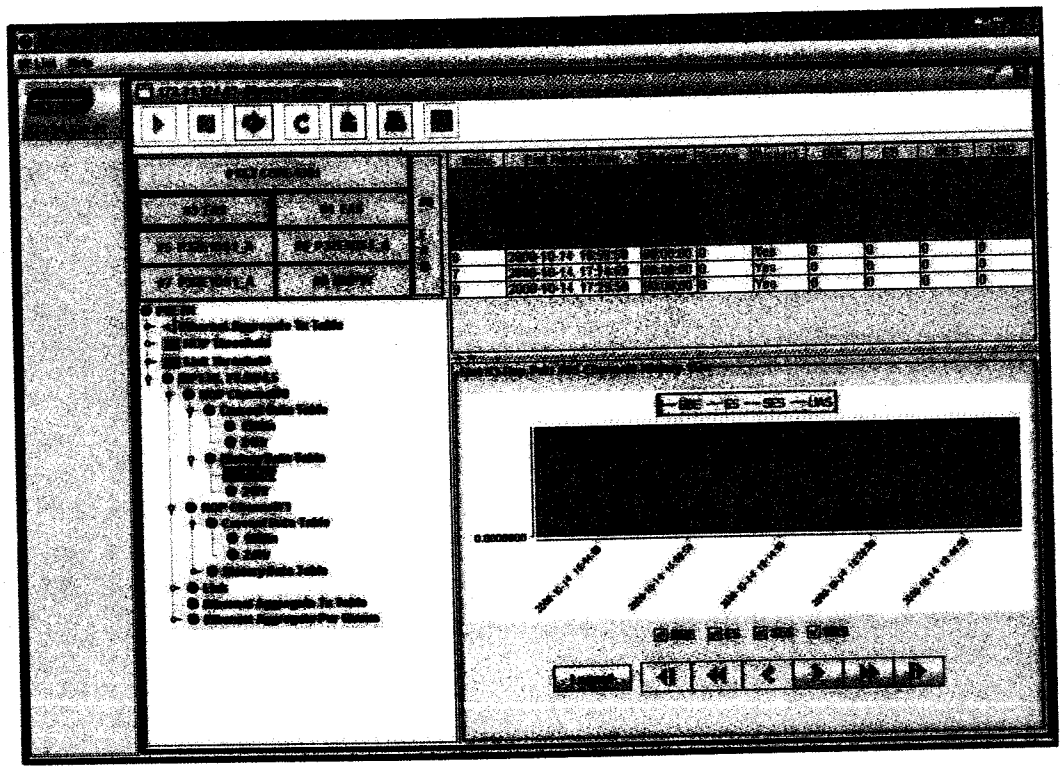


Figure 5-3: Performance Monitoring Window

Test Requirement: Verify performance monitoring data is displayed.

Pass / Fail: _____

Customer Representative: _____ Date: _____

Motorola Solutions Representative: _____ Date: _____

5.2.7.8 Automatic Transmit Power Control

- On NEtO main view, double-click on the MPT-HLC (or MPT-HC) where ATPC is to be enabled
- In the Settings tab, check-mark ATPC Enabled (in the center of the window)
- An ATPC configuration area expands within the window, as shown in Figure 4.
- Enter the desired Min-Max Values, and the Remote RX Threshold
- Click Apply
- Fade the path and check the ATPC increases transmit power as RSL is reduced.

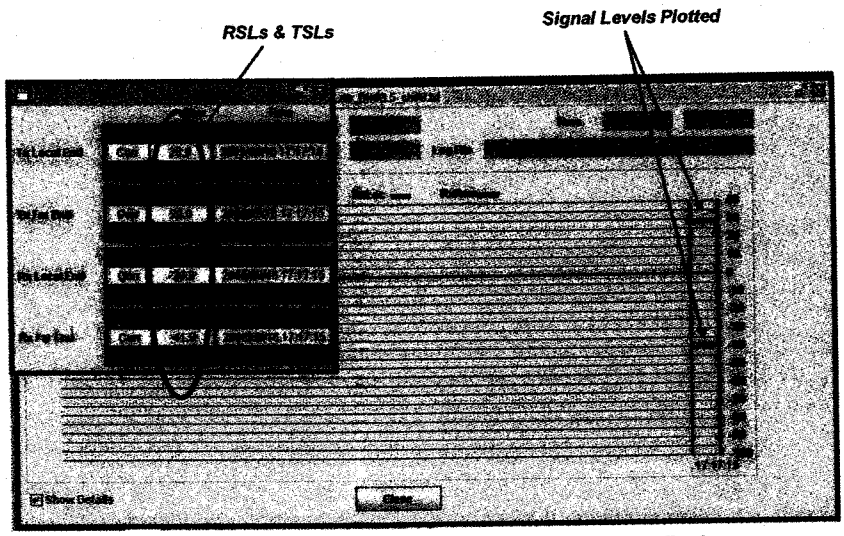


Figure 5-2: Receive Signal Level Measurement Window

5.2.7.7 Ethernet Performance Monitoring

- Refer to Figure 5-3.
- From the top drop-down menus, select Diagnosis -> Performance Monitoring.
- Select Slot1 Core or Slot3 EAS (depending on Ethernet circuit assignment).
- Expand the Ethernet Aggregate Tables.
- Select port to be monitored.
- Click on the Start icon in the upper left corner.
- Note the above performance monitoring procedure is for the highlighted NE icon with IP address in the upper left corner. If only one 9500MPR GUI (NEtO) is open, then only one icon will show in the upper left corner. An additional performance monitoring icon will show in that left column for every NEtO that is open.
- Repeat the above steps from the other side of the hop to populate the PM icons column.

Motorola Solutions Representative: _____ Date: _____

5.2.7.5 Receive Signal Level, MPT-HLC (NEtO Software)

- With a RF power meter, measure RSL at diplexer filter output for the MPT-HLC. Compare measured valued with that indicated by NEtO software taking into account any necessary cable, connector and other applicable losses.

Test Requirement: Confirm NEtO software indicated RSL is within +/- 2.0 dB of measured value.

Pass / Fail: _____

Customer Representative: _____ Date: _____

Motorola Solutions Representative: _____ Date: _____

5.2.7.6 Receiver Threshold

- Adjust path simulator in 1 dB increments until NEtO software indicates Early Warning Alarm. This alarm is set to activate at a radio BER of 10-6. Note RSL for transceiver under test as shown on NEtO screen. Indicated value should be close to typical threshold value.
- For the MPT-HLC, using the RF power meter, measure RSL at diplexer filter output taking into account any cable, connector and other losses to determine actual RSL at transceiver input.

Test Requirement: Confirm actual RSL at transceiver input is no more than +1.5 dB of typical threshold value for the transceiver under test.

Pass / Fail: _____

Customer Representative: _____ Date: _____

Motorola Solutions Representative: _____ Date: _____

Notes:

1001. Ethernet capacity in MBPS is the total capacity for a given channel bandwidth and modulation rate.

1002. Receiver thresholds specified are those measured at the MPT-HLC transceiver input and are typical for a 10E-6 BER.

1003. Transmit power indicated is specified at the transceiver output.

1004. System gain values do not include diplexer insertion, filter, coupler, cabling or other losses.

1005. Diplexer insertion loss indicated is typical and includes losses associated with transmit RF switch and cabling.

- Ensure Radio configurations are completed on both ends of the hop.

5.2.7.3 Transmit Power

- Using a RF power meter, measure power output taking into account applicable diplexer or coupler loss as appropriate. Guaranteed value is specified at the output of the transceiver.

Test Requirement: Verify transmit power meets guaranteed value at the output of the transceiver.

Pass / Fail: _____

Customer Representative: _____ Date: _____

Motorola Solutions Representative: _____ Date: _____

5.2.7.4 RF Signal Levels (NEtO Software)

- Using NEtO software double-click on the MPT-HLC as applicable.
- Select the Measurements tab.
- Select Channel 0 (if 1+1 protected).
- Select the desired time intervals, and press Start.
- Check RF signal levels are displayed as shown in Figure 3. The displayed RSL will include cable, connector, filter, attenuator and couplers losses as applicable to the particular 9500 MPR configuration.

Test Requirement: Verify RF signal levels are displayed and that indicated transmit power is within +/- 1.0 dB of measure value.

Pass / Fail: _____

Customer Representative: _____ Date: _____

Typical Insertion Loss Table (Diplexers) **Note: 1005**

Frequency Band	Total Transmit Insertion Loss (Typical Values) 1+0	1+1	Total Receive Insertion Loss (Typical Values) 1+0	1+1
5725–5850	1.85 dB	2.40 dB	1.81 dB	2.41 dB
5925–6425	1.20 dB	1.85 dB	1.46 dB	2.01 dB
6525–6875	1.20 dB	1.95 dB	2.06 dB	2.56 dB
10550–10680	2.20 dB	3.10 dB	3.20 dB	3.70 dB
10700–11700	1.60 dB	2.50 dB	2.00 dB	2.50 dB

11 GHz Band (MPT–HC)

Channel BW	Modulation	Radio Capacity Eth or Equivalent MBPS	Threshold (Typical) 10700–11700 Hot Standby	1+0	System Gain (dB) Hot Standby	1+0
10 MHz	64 QAM	44.73	–77.5 dBm	–78.0 dBm	96.5 dB	96.0 dB
10 MHz	128 QAM	52.69	–75.0 dBm	–75.5 dBm	94.0 dB	94.5 dB
10 MHz	256 QAM	60.30	–71.5 dBm	–72.0 dBm	92.5 dB	93.0 dB
30 MHz	64 QAM	136.02	–74.0 dBm	–74.5 dBm	95.0 dB	95.5 dB
30 MHz	128 QAM	162.88	–71.0 dBm	–71.5 dBm	92.0 dB	92.5 dB
30 MHz	256 QAM	185.37	–68.0 dBm	–68.5 dBm	89.0 dB	89.5 dB
40 MHz	64 QAM	186.97	–72.5 dBm	–73.0 dBm	93.5 dB	94.0 dB
40 MHz	128 QAM	220.63	–70.0 dBm	–70.5 dBm	91.0 dB	91.5 dB
40 MHz	256 QAM	251.09	–66.5 dBm	–67.0 dBm	87.5 dB	88.0 dB

1+1 Hot Standby Coupler loss is not greater than 1.2 dB for main path and 10.8 dB for protect.

Radio Hop Example

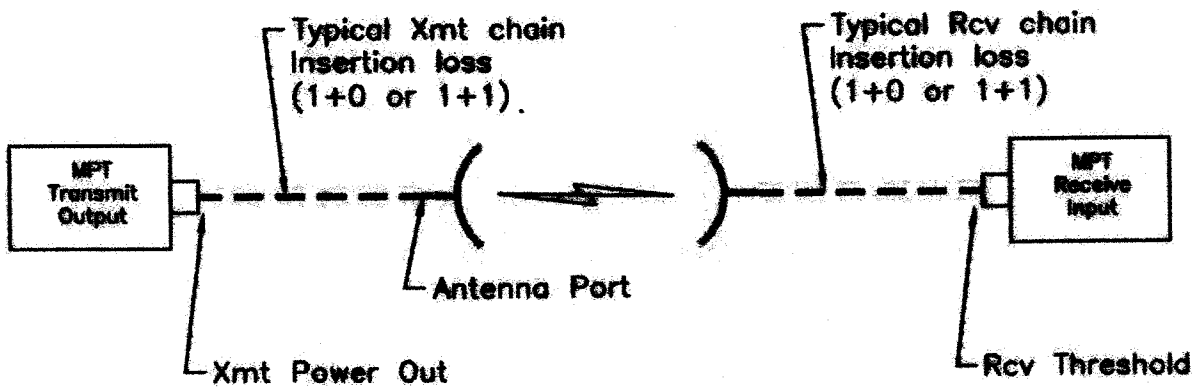


Figure 5-1: Radio Hop

5.2.7.2 Measure Transmit/Received RF Signal Levels

List of Specifications:

6 GHz Band (MPT-HL) 5925-6425

Channel BW	Modulation	Radio Capacity Eth or Equivalent MBPS	Threshold (Typical) @10^-6	Transmit Power Standard	System Gain (dB) Tx-Rx	Transmit Power High	System Gain (dB) Tx-Rx
5 MHz	32 QAM	18.254					
5 MHz	128 QAM	25.757					
10 MHz	32 QAM	37.323	-82.5 dBm	+32.0 dBm	114.5 dB	+34.0 dBm	116.5 dB
10 MHz	128 QAM	52.640	-76.0 dBm	+31.0 dBm	107.0 dB	+33.0 dBm	109.0 dB
30 MHz	32 QAM	114.22	-77.5 dBm	+32.0 dBm	109.5 dB	+34.0 dBm	111.5 dB
30 MHz	128 QAM	160.17	-71.0 dBm	+31.0 dBm	102.0 dB	+33.0 dBm	104.0 dB
30 MHz	256 QAM	183.30	-67.5 dBm	+28.0 dBm	95.5 dB	+30.0 dBm	97.5 dB

6U GHz Band (MPT-HL) 6525-6875

Channel BW	Modulation	Radio Capacity Eth or Equivalent MBPS	Threshold (Typical) @10^-6	Transmit Power Standard	System Gain (dB) Tx-Rx	Transmit Power High	System Gain (dB) Tx-Rx
5 MHz	32 QAM	18.254					
5 MHz	128 QAM	25.757					
10 MHz	32 QAM	37.323	-82.5 dBm	+32.0 dBm	114.5 dB	+34.0 dBm	116.5 dB
10 MHz	128 QAM	52.640	-76.0 dBm	+31.0 dBm	107.0 dB	+33.0 dBm	109.0 dB
30 MHz	32 QAM	114.22	-77.5 dBm	+32.0 dBm	109.5 dB	+34.0 dBm	111.5 dB
30 MHz	128 QAM	160.17	-71.0 dBm	+31.0 dBm	102.0 dB	+33.0 dBm	104.0 dB
30 MHz	256 QAM	183.30	-67.5 dBm	+28.0 dBm	95.5 dB	+30.0 dBm	97.5 dB

11 GHz Band (MPT-HL) 10700-11700

Channel BW	Modulation	Radio Capacity Eth or Equivalent MBPS	Threshold (Typical) @10^-6	Transmit Power	System Gain (dB) Tx-Rx
5 MHz	32 QAM	18.254			
5 MHz	128 QAM	25.757			
10 MHz	32 QAM	37.323	-82.5 dBm	+30.0 dBm	112.5 dB
10 MHz	128 QAM	52.640	-76.0 dBm	+28.0 dBm	105.0 dB
30 MHz	32 QAM	114.22	-77.5 dBm	+30.0 dBm	107.5 dB
30 MHz	128 QAM	160.17	-71.0 dBm	+29.0 dBm	100.0 dB
30 MHz	256 QAM	183.30	-67.5 dBm	+26.0 dBm	93.5 dB

Manufacturer	Description	Model Number	Testing Use
N/A	Laptop with NEtO software	N/A	Craft interface

In addition, various quantities and types of cables, rf attenuators, waveguide-coaxial adaptors and other accessories are required for testing purposes and to complete a simulated system configuration. These are listed as follows:

- N Type male-male cable, 6'
- SMA Type male-male, 6'
- UBR-100 Waveguide-SMA adapter
- WR75 Waveguide-SMA adapter
- SMA male -to-Type N female adapter
- Fixed RF Attenuator (20dB and 30dB), N Type
- Fixed RF Attenuators (20dB and 30dB), SMA Type

Test Requirement: Verify Test equipment has current calibration sticker. Calibration of attenuators is not necessary for the tests required in this document.

Pass / Fail: _____

Customer Representative: _____ Date: _____

Motorola Solutions Representative: _____ Date: _____

5.2.6.2 Static Configuration

- Check that racks under test are correctly configured and all the modules properly installed.
- Check racks and installed equipment are grounded.

Test Requirement: Confirm correct rack configurations, module content and grounding.

5.2.7 Basic Configuration

5.2.7.1 CSM (Core E)

- The software will automatically initial the main CSM and the FAN card for each MSS shelf in the system.
- Check that there are no alarms for the main CSM card and protection CSM card (if equipped).

Test Requirement: Confirm CSM cards are free of alarms.

Pass / Fail: _____

Customer Representative: _____ Date: _____

Motorola Solutions Representative: _____ Date: _____

CAUTION:

Units with handles having an "ESS" symbol contain electrostatic sensitive (ESS) items. These units should be stored in an antistatic container when not in use, and anyone handling these units should observe antistatic precautions. Damage to the unit may result if antistatic protection is not maintained.

WARNING:

Exposure to energy radiated at microwave frequencies can cause eye damage and even eventual blindness. DO NOT operate the system with either antenna port un-terminated.

5.2.5 Definitions and Abbreviations

EAS	Ethernet Access Switch
ERP	Ethernet Ring Protection
CSM	Core E Control and Switching Module
GUI	Graphical User Interface
HSB	Hot Standby
JUSM	Java User-based Security Model
MSS	Microwave Service Switch
MPR	Microwave Packet Radio
MPT	Microwave Packet Transport
MPT-HLC	Microwave Packet Transport- Long Haul
MPT-HC	Microwave Packet Transport- High Capacity
NEtO	Network Element Overview (GUI Craft Terminal)
PM	Performance Monitoring
QAM	Quadrature Amplitude Modulation
RU	Rack Unit
RSL	Received Signal Level
RPL	Ring Protection Link
SNR	Signal to Noise Ratio
TTO	Total Transmitted Octets
TTF	Total Transmitted Frames
TDF	Total Discarded Frame

5.2.6 Set-Up

5.2.6.1 Test Equipment

The required test equipment to perform the test is shown in Table 1.

Table 5-4: Required Test Equipment

Manufacturer	Description	Model Number	Testing Use
Acterna		5802	Ethernet
Agilent	Power Meter	E4419B	RF power measurement
Agilent	High Power Sensor	8481H	RF power measurement
Agilent	Medium Power Sensor	E9300A	RF power measurement
Arra	Path Simulator, 0-100 dB	NA	Path attenuation

5.2 MPR SAMPLE TEST PLAN

5.2.1 General

The 9500 MPR is a "Microwave Packet Radio" that provides a transmission platform for IP and/or TDM traffic within with a multitude of frequency bands and capacity options.

For the CUSTOMER Communications Backhaul, the 9500 MPR is furnished to operate in the L6 GHz (5.945-6425 GHz), U6 GHz (6.525-6.875 GHz), 11 GHz (10.700-11.700 GHz) spectrums with a capacity of 25Mbps, 52Mbps,167 Mbps. The modulation employed is 128 QAM.

The MPT-HLC 9500 MPR will be deployed in a non-standby rings configuration with hot-standby spur arrangement in the network. The MPT-HLC is an all-indoor configuration.

The following plan will test the functionality of the 9500 MPR in a simulated network arrangement.

5.2.2 Type and Function of Equipment

The Nokia 9500 Microwave Packet Radio (MPR) consists of:

- A Microwave Service Switch (MSS-8) shelf containing the necessary modules that provide baseband processing and tributaries interfaces as well as supervisory functions
- A MPT-HLCC shelf which houses the indoor radio transceiver modules.

5.2.3 Equipment Interface Options

- 10/100/1000 Ethernet RJ45
- GigE Optical, 1310 nm, SFP
- GigE Optical, 850 nm, SFP

5.2.4 Common Test Requirements

WARNING:

Short circuiting low-voltage low-impedance DC circuits can cause severe arcing that may result in burns or eye damage. Remove rings, watches, and other metal jewelry while working with primary circuits. Exercise caution to avoid shorting power terminals.

WARNING:

If the rack power supply and ground wiring is reversed to the rack terminals, the power supplies may be damaged on power-up. This wiring must be verified prior to application of power.

CAUTION:

When removing or installing voltage regulators, set the appropriate power source OFF to avoid damaging printed circuit contacts

Table 5-3: Traffic Queues with DSCP Mapping

Q	DSCP	Forwarding Class	Traffic Type	CIR	Max	test VLAN
5	High	NC, EF	LMR	10M	—	500
4	8	H1	network management	10M	10M	600
3	4	HW	T1 voice	—	—	100
3	4	H2	public safety data, data	10M	—	400
2	2	BE, AF	SF WiFi (in profile)	10M	10M	300
1	1	L2, AF	SF WiFi (out profile)	—	—	300

Functional Testing – Notes

Note Functional Test discrepancies below:

Test Step	Comments		

Step	Test	NDE Reference	P/F
12	**SAM Discovery and Management** Add existing Site1-1 and Site1-2 ring nodes to be discovered by Router System IP Address using the previously defined Policy rules and begin node discovery. Verify that a resync of the node MIBs occurs either by 1) Alarm/Service State icon on Equipment Topology turns YELLOW or 2) Node icon turns YELLOW on Discovery Topology map. Verify that terminal sessions can be established via ssh or telnet to each node. Save the current node configuration to SAM	4.24, 6	
13	**SAM Client** Connect laptop configured with SAM Client Software, version 12.0, to port 1/4/6 at Site1. Verify that the client can communicate with the SAM server. Create alarms by shutting down links or forcing a CSM redundancy switch on a couple of nodes. Verify receipt of the alarm on SAM and the SAM Client. Delete/Clear Alarms from the alarm log.		

Table 5-1: Microwave Path Testing Endpoints

Router	Port A	Router	Port Z	Circuit Description
Site1	1/3/4	Site2	1/3/4	Site1 1/3/1 to Site2 1/3/1
Site1	1/3/6	Site2	1/3/6	Site1 1/4/1 to Site2 1/4/1
Site1	1/3/7	Site3	1/3/5	Site1 1/3/2 to Site3 1/3/2
Site1	1/3/8	Site3	1/3/6	Site1 1/4/2 to Site3 1/4/2
Site2	1/3/7	Site3	1/3/7	Site2 1/3/2 to Site3 1/3/1
Site2	1/3/8	Site3	1/3/8	Site2 1/4/2 to Site3 1/4/1

Table 5-2: 10GB Ring Path Testing Endpoints – VPLS 10000, SAM Client Endpoints

Router	Port A	Router	Port Z	Circuit Description
Site1	1/4/5			to SAM Server
Site1	1/4/6			rate limited, for client access
Site2	1/4/5			to SAM Server
				ports configured in L2 Bridge

Step	Test	NDE Reference	P/F
	On the Local Network Settings page, configure the services listed in Table 3. Traffic Queues with DSCP Mapping. Encapsulation will be VLAN. On the SLA Throughput page, set the CIR as required; 0 if not required. For H1 and BE/AF Traffic, EIR == 1 to allow for a small delta burst before being clipped/policed. Check "Allow True 100% traffic" to allow for burst size to be double the committed rate. SLA Burst page SLA Performance page Test Controls page Number of Steps - 4 (20%) change in data rate to CIR value Step Duration – 2 Test Duration – 10 (10 minutes in each direction, total test time is 20 minutes) Save the test profiles SAM Complete Tests From the Y.1564 Tests page, Enable the Service Performance and Service Configuration tests. Select Max throughput allowed. Run the SAMComplete tests. Verify results. Note discrepancies. Maximum Throughputs expected: 251Mbps – links between Site1 and One Market Plaza 2, Site1 to Third Street (Site3) 314Mbps – links between Third Street to One Market Plaza 2		

Step	Test	NDE Reference	P/F

9	**Traffic Reroute – Secondary LSPs**
	This procedure will verify LSPs will reestablish at the loss of a microwave hop.
	
	Verify all lsps on all nodes are up
	Perform `show router mpls lsp` at each 7705
	Verify that the active lsp path is the primary one
	`show router mpls lsp activepath`
	Shut down MDA 3 at the Public Safety, 3rd Street site, Site3, save the config, then reboot the node.
	Wait 5 minutes for the node to come out of reboot.
	Verify lsps are up on all nodes as before.
	Perform `show router mpls lsp` at each 7705
	Verify that the active lsp path is the secondary one
	`show router mpls lsp activepath`
	Restore MDA 3 to service at Site3, save the configuration change, then reboot the node.
	After about 5 minutes, verify lsps are up on the original lsp path on all 7705s.
	`show router mpls`
	`show router mpls lsp activepath`		

10	**Traffic Reroute – Layer 3, fiber** This test will use ports dedicated to SAM Server connections. Connect test equipment to ports 1/4/5 of Site1 and Site2. Establish a continual ping between the two devices. Break fiber direct fiber connection between Site1 and Site2; port 1/1/1. Traffic should re-establish on port 1/2/2. `show router mpls lsp xxxx path detail` Restore service to all links shut down or removed. There may be a short disruption in ping traffic as service restores to the shorter path.		
11	**Quality of Service (QoS) – Y.1564** Testing to be performed over the 9500 MPR microwave links using ports specified in Table 1, below. Refer to page 250 of "21160056_r009_MTS_5800_EtheretTestingManual.pdf" to assist in setting up for ITU-T Y.1564 testing setup and execution. Throughput – Symmetric Measurement – Downstream and Upstream Local Settings – define a valid IP address, one to each test set.		

Step	Test	NDE Reference	P/F
	detail Shutdown port 1/1/1 on Site1 or Site2. Ensure active path is on the other fiber path i.e. port 1/2/2 and 1/1/2 on Site1 and Site2 respectively show router mpls lsp Site1-to-Site2-inner path detail Shutdown port 1/2/2 or 1/1/2 on Site1 or Site2. Ensure active path is on either port 1/3/2 or 1/4/2 show router mpls lsp Site1-to-Site2-inner path detail Shutdown port 1/3/2 or 1/4/2 (whichever is active) on either Site1 or Site2. Ensure active path is either 1/3/2 or 1/4/2. show router mpls lsp Site1-to-Site2-inner path detail Shutdown port 1/3/2 or 1/4/2 (whichever is active) on either Site1 or Site2. Ensure active path is 1/3/1 which doesn't satisfy SRLG constraint. show router mpls lsp Site1-to-Site2-inner path detail Unshut all the ports.		

Step	Test	NDE Reference	P/F
	An lsp-trace will be established to either of the other two nodes and the link (configure port x/y/z shutdown) between the two will be shut down. The trace will verify that the path taken is not one of the excluded ones on the originating 7705. syntax: `oam lsp-trace [lsp name/label] detail` From Site1: oam lsp-trace "Site1-to-Site2-inner" detail oam lsp-trace "Site1-to-Site3-inner" detail oam lsp-trace "Site1-to-Site2-outer" detail oam lsp-trace "Site1-to-Site3-outer" detail oam lsp-trace "Site1-to-Site2-fiber" detail oam lsp-trace "Site1-to-Site3-fiber" detail From Site2: oam lsp-trace "Site2-to-Site1-inner" detail oam lsp-trace "Site2-to-Site3-inner" detail oam lsp-trace "Site2-to-Site1-outer" detail oam lsp-trace "Site2-to-Site3-outer" detail oam lsp-trace "Site2-to-Site1-fiber" detail oam lsp-trace "Site2-to-Site3-fiber" detail From Site3: oam lsp-trace "Site3-to-Site1-inner" detail oam lsp-trace "Site3-to-Site2-inner" detail oam lsp-trace "Site3-to-Site1-outer" detail oam lsp-trace "Site3-to-Site2-outer" detail oam lsp-trace "Site3-to-Site1-fiber" detail oam lsp-trace "Site3-to-Site2-fiber" detail		

8	**Traffic Reroute - Microwave - Fast Reroute (FRR), Shared Risk Link Group (SRLG)**
	This test is similar to Step 7, above, but functions at Layer 3. The test setup will be same as the preceding Step 8.
	
	Site1 to Site2 (inner hop):
	Connect test sets to ports 1/3/6 to the Site1 and Site2 7705s.
	Establish a continual ping between test sets.
	verify path follows admin-group "inner"
	`show router mpls lsp Site1-to-Site2-inner path detail`
	Shutdown port 1/4/1 on Site1 or Site2
	Verify active path is on fiber 1/1/1 on Site1 and Site2
	`show router mpls lsp Site1-to-Site2-inner path`		

Step	Test	NDE Reference	P/F
	ping 10.1.0.94 source 10.1.0.93 size 9666 do-not-fragment ping 10.1.0.82 source 10.1.0.81 size 9666 do-not-fragment ping 10.1.0.98 source 10.1.0.97 size 9666 do-not-fragment ping 10.1.0.102 source 10.1.0.101 size 9666 do-not-fragment From Site2: ping 10.1.0.77 source 10.1.0.78 size 9666 do-not-fragment ping 10.1.0.89 source 10.1.0.90 size 9666 do-not-fragment ping 10.1.0.93 source 10.1.0.94 size 9666 do-not-fragment ping 10.1.0.86 source 10.1.0.85 size 9666 do-not-fragment ping 10.1.0.106 source 10.1.0.105 size 9666 do-not-fragment ping 10.1.0.110 source 10.1.0.109 size 9666 do-not-fragment From Site3: ping 10.1.0.81 source 10.1.0.82 size 9666 do-not-fragment ping 10.1.0.97 source 10.1.0.98 size 9666 do-not-fragment ping 10.1.0.101 source 10.1.0.102 size 9666 do-not-fragment ping 10.1.0.85 source 10.1.0.86 size 9666 do-not-fragment ping 10.1.0.105 source 10.1.0.106 size 9666 do-not-fragment ping 10.1.0.109 source 10.1.0.110 size 9666 do-not-fragment		
6	VPRN although provided for purposes of example, we show the VPRNs configured work between nodes. From Site1: ping router 1000 192.168.11.26 source 192.168.11.25 ping router 1000 192.168.11.27 source 192.168.11.25 From Site2: ping router 1000 192.168.11.25 source 192.168.11.26 ping router 1000 192.168.11.27 source 192.168.11.26 From Site3: ping router 1000 192.168.11.25 source 192.168.11.27 ping router 1000 192.168.11.26 source 192.168.11.27	4.25	
7	Traffic Steering – Traffic Engineering and Basic Path Redundancy Testing LSP-Trace, with source port identified, will be used to verify the reroute of traffic between nodes as the reroute will follow the admin groups of inner, outer, and fiber as well as the Shared Risk Link Group (SRLG association) configured in the MPLS router interface context. Loose hop routing will allow for reroute keeping in mind the traffic exclusions.	4.14, 4.15	

Step	Test	NDE Reference	P/F
4	**Jumbo Frames – SDP Ping** All point to point links on the 10GE and microwave hops are equipped to handle jumbo frames as a single entity. sdp-ping will verify that jumbo frames can pass in both directions along a path. Since SDPs are one-way transmission devices, both SDPs must be specified for round-trip testing. Enter one sdp-ping at a time, let run for 10 cycles, then enter <ctrl-c> to terminate the test. Note tests not passing. Repeat jumbo frame tests with traffic on FRR path as FRR has an overhead of 4 bytes in facility mode. From Site1: oam sdp-ping 260 resp-sdp 250 size 9694 oam sdp-ping 261 resp-sdp 251 size 9694 oam sdp-ping 262 resp-sdp 252 size 9694 oam sdp-ping 270 resp-sdp 250 size 9694 oam sdp-ping 271 resp-sdp 251 size 9694 oam sdp-ping 272 resp-sdp 252 size 9694 From Site2: oam sdp-ping 250 resp-sdp 260 size 9694 oam sdp-ping 251 resp-sdp 261 size 9694 oam sdp-ping 252 resp-sdp 262 size 9694 oam sdp-ping 270 resp-sdp 260 size 9694 oam sdp-ping 271 resp-sdp 261 size 9694 oam sdp-ping 272 resp-sdp 262 size 9694 From Site3: oam sdp-ping 250 resp-sdp 270 size 9694 oam sdp-ping 251 resp-sdp 271 size 9694 oam sdp-ping 252 resp-sdp 272 size 9694 oam sdp-ping 260 resp-sdp 270 size 9694 oam sdp-ping 261 resp-sdp 271 size 9694 oam sdp-ping 262 resp-sdp 272 size 9694	4.13, 4.14	
5	**Jumbo Frames – Ping** Jumbo Frame configuration will be verified at L3 using ping. Source ping is used so that the ping can be directed across a particular interface without having to shut down possibly other lower cost interfaces. Test is designed to verify jumbo frames passing as the do-not-fragment flag is set. From Site1: ping 10.1.0.78 source 10.1.0.77 size 9666 do-not-fragment ping 10.1.0.90 source 10.1.0.89 size 9666 do-not-fragment		

Step	Test	NDE Reference	P/F
3	Verify Service Distribution Points (SDP) have been created for each unique Label Switched Path (LSP) `show service sdp-using`	4.17	

4	Verify the establishment of multipoint VLL services (VPLS).
	`show service service-using`
	`configure service info`
	Services may not be in the Operational UP state due to lack of connectivity on the Access ports.
		4.21	

MPLS Configuration – Notes

Note MPLS configuration discrepancies below:

Test Step	Comments		

5.1.4 Functional Testing

This section will test the performance of the nodal configurations, including the microwave hops, as well as management capability by the 5620 Service Aware Manager (SAM). Depending upon site access, it is possible to perform several test steps at one site before proceeding to the next. Other functions can be performed by remotely logging in to the remote node then logging the test execution.

Step	Test	NDE Reference	P/F
1	From each 7705 connect to the other 7705 nodes in this cluster using the default credentials.		

2	Verify 9500 transmitters are enabled at each hop
	`configure port mw-link-1 (also mw-link-2, mw-link-3, mw-link-4)`
	`info`
	enable transmitter as necessary
	`mw radio 1/3/1 (or 1/3/2, 1/4/1, 1/4/2)`
	`no tx-mute`
	`exit all`
		4.11, 4.13 (WAN Addressing)	

3	**9500 MPR Commissioning and Microwave Path Testing - RFC 2544** 9500 MPR Installation Crew has completed installation and commissioning of 3 microwave sites (6 hops total). Path test results agree with site survey requirements with no exceptions.	MPRe 4.1 Test Data Sheet	

Step	Test	NDE Reference	P/F
8	Verify SAR-8v2 chassis is connected to two power feeds and fans are running properly `show chassis`	2.1	

9	Verify MDAs are equipped and ports are properly configured, including Quality of Service Parameters. Verify unused ports are in a `shutdown` state.
	`show card`
	`show card detail`
	`show port`
	`show port detail`
		4.9, 4.10, 4.11, 4.12, 5.2, 5.3, 5.4, 5.5, 5.6, 5.7, 5.8	

10	Verify Router System and Point to Point addressing `show router interface`	4.13	

Basic System Configuration – Notes

Note configuration discrepancies below:

Test Step	Comments		

5.1.3.2 MPLS Configuration

This will verify the Open Short Path First (OSPF) Interior Gateway Protocol (IGP) is operational and that MPLS and other supporting protocols have been properly configured.

Step	Test	NDE Reference	P/F

1	Verify the OSPF routing protocol has been configured, the required Point to Point interfaces have been properly configured within OSPF Area 0, bidirectional fault detection (bfd) sessions have been established, and that the OSPF neighbors are visible.
	`show router status`
	`show router ospf interface`
	`show router ospf neighbor`
	`show router bfd session`
		4.13, 4.14	

2	Verify that Traffic Engineering has been setup using Admin Groups
	`configure router mpls`
	`info`
	`show router mpls lsp xxxx path detail`
		4.15, 4.16	

Step	Test	NDE Reference	P/F
1	Verify Pre-Login message is displayed and contents match Network Design Guide.	4.2	
2	Verify the contents of the Boot Options File (bof). `show bof`	3.1, 3.2, 3,4	

3	Save the bof and site unique chassis configuration file
	`bof save`
	`admin save`
	`show redundancy synchronization`
	Verify the bof and site unique configuration file have been successfully saved to the CF card on the Standby CSM
	`file dir cf3-a:*.bof`
	`file dir cf3-b:*.bof`
	`file dir cf3-a:Site1.cfg`
	`file dir cf3-a:Site1.cfg`
	Verify persistence is set. This is required for SNMP Management of the node
	`file dir cf3-a:*.ndx`
	`file dir cf3-b:*.ndx`
	Perform an admin save to create the .ndx files if not already created.
	Verify the tar file for the 9500MPR is present on both Compact Flash cards
	`file dir cf3-a:*.tar`
	`file dir cf3-a:*.tar`
		3.3, 3.4, 3.5, 4.1, 4.11	

4	Verify the correct SR OS release has been installed. `show system information` The above command will display the current software version running (System Version) and verify that the Microwave Aware (MWA) release has been boot to (Microwave S/W Package).	1.1, 3.1	
5	Using the table displayed in the previous step, verify the settings called out for in the reference paragraphs as System Name and basic contact information.	4.4, 4.5	
6	Using the information supplied in step 3, above, verify telnet and ftp have been enabled. ftp is required when transferring tar files to the MPR Outdoor Unit (ODU). telnet is a customer option. ssh is enabled by default.	4.2	
7	Verify time zone setting is set for Pacific Standard Time and that NTP server is reachable by viewing the correct time. `environment time-stamp` NTP is required by 7705s to provide time-correlated event hacks to 5620 SAM.	4.3, 4.6	

5.1.2.3 Work Hours and Cautions

The tests prescribed will not be service affecting as the Units Under Test will not have been put into production. Work hours will depend upon to site access.

5.1.2.4 7705 SR OS 6.1.R4 Software and Manuals

The relevant 7705 SR OS 6.1.R4 Software Release package and accompanying manuals are obtained via the Nokia (ALU) OnLine Customer Support (OLCS) website. Recommended manuals (but not limited to) to review before installing and turning up a 7705 chassis are:

- 3HE08660AAACTQZZA01_V1_7705 SAR-8 Chassis Installation Guide R6.1.R4
- 3HE08659AAACTQZZA01_V1_7705 SAR-18 Chassis Installation Guide R6.1.R4
- 3HE08640AAACTQZZA01_V1_7705 SAR 2-port 10GigE (Ethernet) Adapter Card Module Installation Guide R6.1.R4
- 3HE08650AAACTQZZA01_V1_7705 SAR Ethernet Gigabit Ethernet Adapter Card Installation Guide R6.1.R4
- 3HE08670AAACTQZZA01_V1_7705 SAR OS Basic System Configuration Guide R6.1.R4
- 3HE086790006TQZZA01_V1_7705 SAR OS 6.1.R6 Software Release Notice (SRN)

As of this writing, manuals related to the 6.1.R4 7705 SR OS release have not been published to the OLCS. Please refer to the SRN to learn of the differences between the two releases.

5.1.2.5 Other References

- [Add applicable documents]

5.1.3 Testing Strategy

Testing procedures will be in two parts. A static process will involve inspection of files generated and system tables created between the three 7705 nodes. A functional test will involve the passing of traffic between two or more nodes including the observation of traffic reroute around a failed link. Scoring of results is via Pass or Fail, dependent upon meeting of the test criteria. All terminal sessions will be logged.

The test steps are specified by order of appearance in the Network Design Guide. Some of the tests can be performed out of sequence without detriment to the testing overall. Examples are connecting to remote nodes using ssh to verify configuration information contained on those 7705s and RFC-2544 testing of microwave links which is a function of installation verification of microwave equipment and path alignment.

5.1.3.1 Basic System Configuration

This will verify the basic nodal configuration as specified in Section 3 and 4 of the Network Design Guide. References to the particular sections of the NDE will be cited to call out specific design goals.

SECTION 5

SAMPLE ACCEPTANCE TEST PLANS

5.1 MPLS SAMPLE ACCEPTANCE TEST PLAN

[redacted]

This Acceptance Test Procedure will verify the implementation of the [Customer Name] 10G Network Expansion with Microwave Transport. The requirements for this expansion have been set for in CSF_design_guide_10G_NetworkExpansion_1r1-draft3, also referred to as the Network Design Guide.

5.1.1 Acceptance Test Procedure

This Acceptance Test Procedure will verify the implementation of the [Customer Name] 10G Network Expansion with Microwave Transport. The requirements for this expansion have been set for in CSF_design_guide_10G_NetworkExpansion_1r1-draft3, also referred to as the Network Design Guide.

5.1.2 Preliminary Assumptions

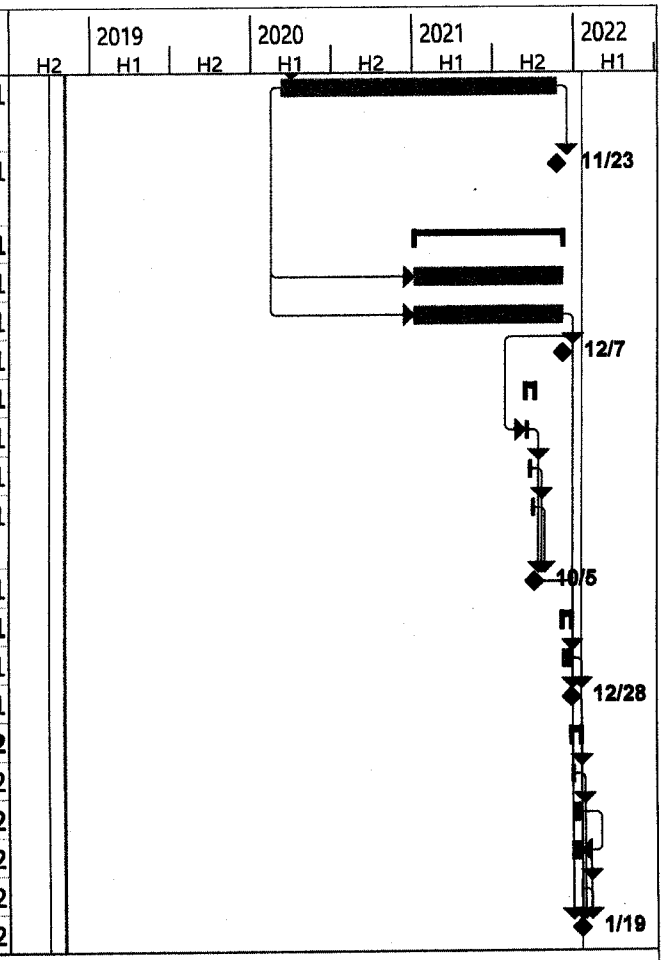
5.1.2.1 Nodes to be Affected

[Insert site names]

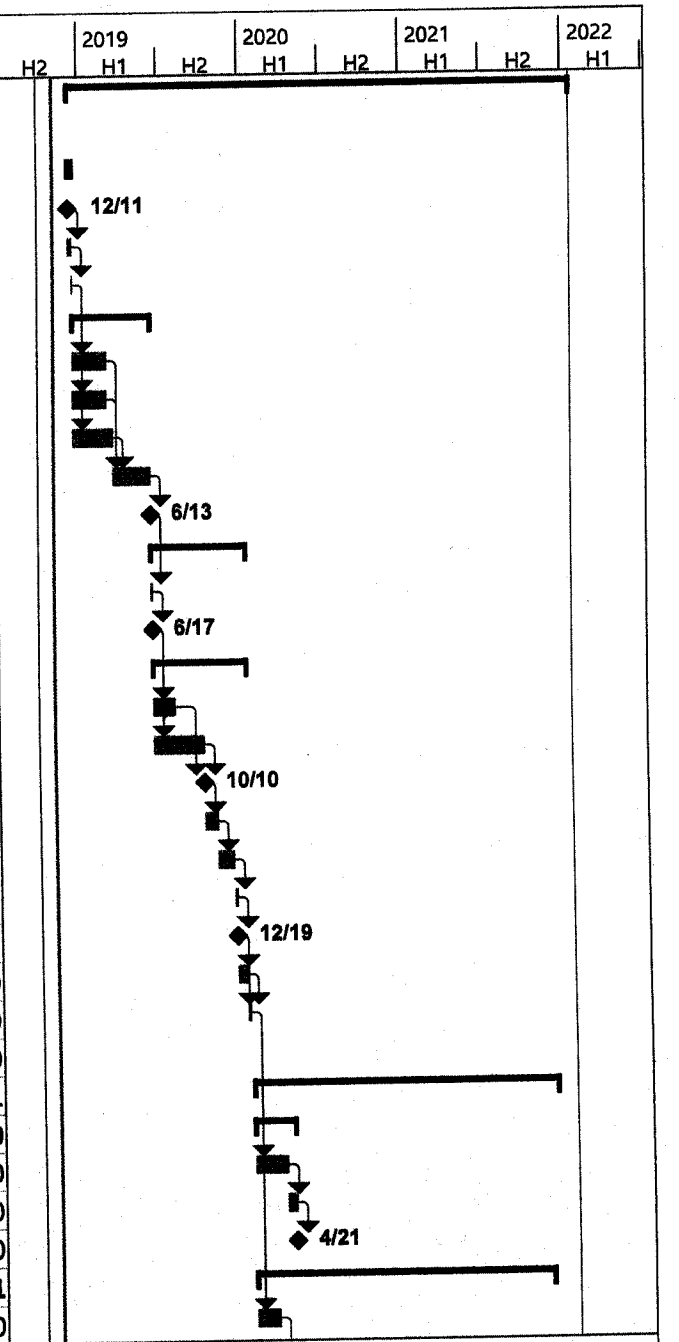
5.1.2.2 Additional Features

- Each 7705 SAR-8v2 chassis in this phase will be tested with an embedded Packet Microwave Controller (PMC) which serves as the In-Door Unit (IDU) for the 9500 MPR transport. In addition to providing control and monitoring of the microwave transport, the PMC will serve as an attachment point for various MPLS services that will be deployed across the transport.
- The 5620 SAM (Service Aware Manager) will be used as a surveillance device to monitor the new and legacy 7705 equipment deployed in the network.

ID	Task Name	Duration	Start	Finish
33	MW Radio / Router Installation, Migration and Decommisioning	445d	Wed 3/11/20	Tue 11/23/21
34	Microwave / Router Installation, Migration and Decommisioning Complete	0d	Tue 11/23/21	Tue 11/23/21
35	**System Optimization**	**240d**	**Wed 1/6/21**	**Tue 12/7/21**
36	Link Verification	240d	Wed 1/6/21	Tue 12/7/21
37	Optimization	240d	Wed 1/6/21	Tue 12/7/21
38	System Optimization Complete	0d	Tue 12/7/21	Tue 12/7/21
39	**Training - Training Dates TBD**	**15d**	**Wed 9/15/21**	**Tue 10/5/21**
40	Perform 9500 MPR Training	5d	Wed 9/15/21	Tue 9/21/21
41	Perform 7705 Training	5d	Wed 9/22/21	Tue 9/28/21
42	Perform 5620 SAM for 9500 MPR Operation and Maintenance Training	5d	Wed 9/29/21	Tue 10/5/21
43	Training Complete	0d	Tue 10/5/21	Tue 10/5/21
44	**Acceptance Testing**	**15d**	**Wed 12/8/21**	**Tue 12/28/21**
45	Perform System Testing	15d	Wed 12/8/21	Tue 12/28/21
46	SATP Acceptance	0d	Tue 12/28/21	Tue 12/28/21
47	**Finalize**	**16d**	**Wed 12/29/21**	**Wed 1/19/22**
48	Final Inspection w/Customer	5d	Wed 12/29/21	Tue 1/4/22
49	Punchlist Resolution	10d	Wed 1/5/22	Tue 1/18/22
50	Finalize Documentation	15d	Wed 12/29/21	Tue 1/18/22
51	Transition to Service	1d	Wed 1/19/22	Wed 1/19/22
52	Final Acceptance	0d	Wed 1/19/22	Wed 1/19/22



ID	Task Name	Duration	Start	Finish
1	**County of Riverside Microwave Network Replacement Implementation Project**	**812d**	**Tue 12/11/18**	**Wed 1/19/22**
2	**Contract**	**7d**	**Tue 12/11/18**	**Wed 12/19/18**
3	Contract Award	0d	Tue 12/11/18	Tue 12/11/18
4	Contract Administration	6d	Tue 12/11/18	Tue 12/18/18
5	Project Kick-Off	1d	Wed 12/19/18	Wed 12/19/18
6	**Contract Design Review**	**126d**	**Thu 12/20/18**	**Thu 6/13/19**
7	Review Contract Design	55d	Thu 12/20/18	Wed 3/6/19
8	Network Engineering and Design	55d	Thu 12/20/18	Wed 3/6/19
9	Site Design and Site Engineering	66d	Thu 12/20/18	Thu 3/21/19
10	Frequency Licensing	60d	Fri 3/22/19	Thu 6/13/19
11	Design Approval for Equipment Ordering	0d	Thu 6/13/19	Thu 6/13/19
12	**Order Processing**	**153d**	**Fri 6/14/19**	**Tue 1/14/20**
13	Process Equipment List	2d	Fri 6/14/19	Mon 6/17/19
14	Order Bridged	0d	Mon 6/17/19	Mon 6/17/19
15	**Manufacturing and Staging**	**151d**	**Tue 6/18/19**	**Tue 1/14/20**
16	Manufacture Motorola FNE	35d	Tue 6/18/19	Mon 8/5/19
17	Manufacture Non-Motorola Equipment	83d	Tue 6/18/19	Thu 10/10/19
18	Ship to Staging	0d	Thu 10/10/19	Thu 10/10/19
19	Stage System	20d	Fri 10/11/19	Thu 11/7/19
20	Perform Staging Integration Testing	26d	Fri 11/8/19	Fri 12/13/19
21	Perform Staging ATP	4d	Mon 12/16/19	Thu 12/19/19
22	Factory Acceptance	0d	Thu 12/19/19	Thu 12/19/19
23	Ship Equipment to Field	15d	Fri 12/20/19	Thu 1/9/20
24	Receive and Inventory Equipment in Field	3d	Fri 1/10/20	Tue 1/14/20
25	Warehouse	0d	Fri 1/10/20	Fri 1/10/20
26	**Site Installation and Migration**	**490d**	**Wed 1/22/20**	**Tue 12/7/21**
27	**DC Power Systems Installation**	**65d**	**Wed 1/22/20**	**Tue 4/21/20**
28	Install DC Power Systems at 13 Sites	52d	Wed 1/22/20	Thu 4/2/20
29	Turn up DC Power Systems	13d	Fri 4/3/20	Tue 4/21/20
30	DC Power Installation Complete	0d	Tue 4/21/20	Tue 4/21/20
31	**Microwave / Router Installation**	**480d**	**Wed 1/22/20**	**Tue 11/23/21**
32	Install and Configure NSP-17 (5620 SAM)	35d	Wed 1/22/20	Tue 3/10/20



SECTION 4

PROJECT SCHEDULE

Motorola Solutions has provided a preliminary project schedule on the following pages.

- 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, frequency interference is detected during the implementation of a microwave line in which Motorola Solutions provided the frequency planning services, Motorola Solutions' total liability is limited to selection of an alternate frequency or frequencies. Should interference occur after the microwave link is deemed operational and accepted, Motorola Solutions will work with the County of Riverside to identify the source of interference but the County of Riverside will be responsible for resolution.

3.15.5 Warranty

Motorola Solutions 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 County of Riverside. Motorola Solutions 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 County of Riverside. Motorola Solutions 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. In the event that, during the warranty period, a documented defect proven to be responsibility of Motorola Solutions, occurs, the County of Riverside's sole remedy under this warranty provisions, shall be that Motorola Solutions will provide the incremental labor and material beyond what would have been required during initial installation to correct the particular error in the path survey or path design at no cost to the County of Riverside. In no case, shall Motorola Solutions 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 Motorola Solutions' path engineering efforts, expenses for such labor and material shall be borne by the County of Riverside.

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 Motorola Solutions 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 County of Riverside: (i) a system map, (ii) a final path profile, (iii) final path performance calculations, and (iv) a technical report.

If radio path using Motorola Solutions provided equipment is installed based on Motorola Solutions' recommended path design, then Motorola Solutions warrants the radio path calculations shall conform to the County of Riverside's availability objective for normal atmospheric multipath fading. Motorola Solutions 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 exceed the published rates or charts used to predict rain induced outages.

If Motorola Solutions suspects that abnormal propagation conditions are the cause of degraded system performance, Motorola Solutions will verify the conditions leading to the degraded system performance. After the problem, has been identified, Motorola Solutions will assist 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 County of Riverside.

3.15.4 Frequency Planning

Motorola Solutions offers frequency planning services including frequency selection, prior coordination process, interference case resolution, and FCC license application documentation preparation and submittal. Motorola Solutions 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. Motorola Solutions 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 County of Riverside:

3.15 MICROWAVE DEPLOYMENT: MICROWAVE PATH ENGINEERING WARRANTY

3.15.1 Feasibility Studies

Motorola Solutions provides feasibility studies of microwave radio paths in support of bidding efforts or when purchased by Motorola Solutions or the County of Riverside. Feasibility studies are performed using information provided by or on behalf of Motorola Solutions or the County of Riverside. Results of the feasibility study are provided to Motorola Solutions and/or the County of Riverside 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. Motorola Solutions and/or the County of Riverside agrees to assume all risks associated with installing any equipment based on spider web 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.

3.15.2 Path Surveys (Detailed Survey with Report)

Motorola Solutions 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 County of Riverside. 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, Motorola Solutions 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. Motorola warrants only the actual paths surveyed.

3.15.3 Path Design

Motorola Solutions offers path design services. Path design services are based on formal field survey data gathered by Motorola Solutions' 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 County of Riverside's microwave link performance and availability objectives.

Changes in Services: *(describe change or write "none")*
Schedule Changes: *(describe change or write "none")*
Pricing Changes: *(describe change or write "none")*
Customer Responsibilities: *(describe change or write "none")*
Payment Schedule for this Change Order: *(describe new payment terms applicable to this change order)*

Unless amended above, all other terms and conditions of the Contract shall remain in full force. If there are any inconsistencies between the provisions of this Change Order and the provisions of the Contract, the provisions of this Change Order will prevail.

IN WITNESS WHEREOF the parties have executed this Change Order as of the last date signed below.

Motorola Solutions, Inc.		**Customer**	
By:	_____	By:	_____
Printed Name:	_____	Printed Name:	_____
Title:	_____	Title:	_____
Date:	_____	Date:	_____

Reviewed by: _____ Date: _____
Motorola Solutions Project Manager

3.14.3.1 Change Order Form

MOTOROLA SOLUTIONS

CHANGE ORDER

[type co# here]

Change Order No. _____

Date: _____

Project Name: _____

Customer Name: _____

Customer Project Mgr: _____

The purpose of this Change Order is to: *(highlight the key reasons for this Change Order)*

Contract # **REQUIRED** _____ **Contract Date:** _____

In accordance with the terms and conditions of the contract identified above between

[enter customer name] and Motorola Solutions, Inc., the following changes are approved:

Contract Price Adjustments

Original Contract Value:	$
Previous Change Order amounts for Change Order numbers [ ] through [ ]	$
This Change Order:	$
New Contract Value:	$

Completion Date Adjustments

Original Completion Date:	
Current Completion Date prior to this Change Order:	
New Completion Date:	

Changes in Equipment *(additions, deletions or modifications)* **below (attach if needed)**

3.14 PROJECT ADMINISTRATION

3.14.1 Project Status Meetings

Motorola Solutions Responsibilities:

- Provide Communication Plan.
  - Set up and host weekly status calls or meetings.
  - Provide Change Request Process.
  - Provide Project Documentation Process.
- Once a month, Motorola Solutions Project Manager, or designee (if Project Manager is unavailable due to unforeseen circumstances), will attend all project status meetings with the County of Riverside, as determined during the CDR.
- Record the meeting minutes and supply the report within 5 business days.
- The agenda will include the following:
  - Overall project status compared to the Project Schedule.
  - Product or service related issues that may affect the Project Schedule.
  - Status of the action items and the responsibilities associated with them, in accordance with the Project Schedule.
  - Any miscellaneous concerns of either the County of Riverside or Motorola Solutions.

County of Riverside Responsibilities:

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

Completion Criteria:

- Completion of the meetings and submission of meeting minutes.

3.14.2 Progress Milestone Submittal

Motorola Solutions Responsibilities:

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

County of Riverside Responsibilities:

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

Completion Criteria:

- The County of Riverside approval of the Milestone Completion document(s).

3.14.3 Change Order Process

- Either Party may request changes within the general scope of this Agreement. If a requested change causes an increase or decrease in the cost, change in system configuration or adds time to the project's timeline required to perform this Agreement, the Parties will agree to an equitable adjustment of the Contract Price, Performance Schedule, or both, and will reflect the adjustment in a change order. Neither Party is obligated to perform requested changes unless both Parties execute a written change order.
- Please see sample Change Order Form on the following pages.

County of Riverside Responsibilities:

- Participate in the transition to Service.

Completion Criteria:

- All service information has been delivered and approved by the County of Riverside.

3.13.4 Finalize Documentation

Motorola Solutions Responsibilities:

- Provide an electronic as-built system manual on a USB drive. The documentation will include the following:
  - Logical Connection Diagrams/Table.
  - IP Plan.
  - Physical Connectivity Diagrams.
  - Transport Specific Documentation.
  - MPLS Workbook (Design and path information for how the MPLS transport is setup).
  - System-Level Diagram.
  - Site Block Diagrams.
  - Site Floor Plans.
  - Site Equipment Rack Configurations.
  - Antenna Network Drawings for RF Sites (where applicable).
  - ATP Test Checklists.
  - Functional Acceptance Test Plan Test Sheets and Results.
  - Link Specifications and Verification/Validation of Test Results.
  - Equipment Inventory List.
  - Instruction Manuals.
  - Access to maintenance documentation will be provided.

Drawings are created utilizing AutoCAD design software and will be delivered in Adobe PDF format and native format. All other system manual documents converted from native format to Adobe PDF format will be included on the System Manual CD.

County of Riverside Responsibilities:

- Receive and approve all documentation provided by Motorola Solutions.

Completion Criteria:

- All required documentation is provided and approved by the County of Riverside.

3.13.5 Final Acceptance (Milestone)

- All deliverables completed, as contractually required.
- Final System Acceptance received from the County of Riverside.

3.12.4 System Acceptance Test Procedures (Milestone)

- The County of Riverside approves the completion of all the required tests.

3.13 FINALIZE

3.13.1 Cutover

Motorola Solutions Responsibilities:

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

County of Riverside Responsibilities:

- Attend cutover meetings and approve the cutover plan.
- Notify the user group(s) affected by the cutover (date and time).
- Conduct a roll call of all users working during the cutover, in an organized and methodical manner.

Completion Criteria:

- Successful migration from the old system to the new system.

3.13.2 Resolve Punchlist

Motorola Solutions Responsibilities:

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

County of Riverside Responsibilities:

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

Completion Criteria:

- All punchlist items resolved and approved by the County of Riverside.

3.13.3 Transition to Service

Motorola Solutions Responsibilities:

- Review the items necessary for transitioning the project to warranty support and service.
- Provide a Customer Support Plan detailing the warranty and post-warranty support, if applicable, associated with the Contract equipment.

Completion Criteria:

- Link verification successfully completed.

3.11.3 Optimization Complete

- System optimization is completed. Motorola Solutions and the County of Riverside agree that the equipment is ready for acceptance testing.

3.12 TRAINING

3.12.1 Perform Training

Motorola Solutions Responsibilities:

- Finalize training schedules purchased as part of this project with the County of Riverside Project Manager.
- Conduct the training classes outlined in the Training Plan.
- Supply soft copy of training materials.

County of Riverside Responsibilities:

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

Completion Criteria:

- All training classes completed.

3.12.2 Training Complete

- All training classes completed.

3.12.3 Perform Functional Testing

Motorola Solutions Responsibilities:

- Validate element-level, network-level, and system-level functionality supplied by Motorola Solutions, as contracted.
- If any major task as contractually described fails, repeat that particular task after Motorola Solutions determines that corrective action has been taken.
- Document all issues that arise during the acceptance tests.
- Document the results of the acceptance tests and present to the County of Riverside for review.
- Resolve any minor task failures before Final System Acceptance.

County of Riverside Responsibilities:

- Witness the functional testing.

Completion Criteria:

- Successful completion of the functional testing.
- County of Riverside approval of the functional testing.

equipment that will be stored by Motorola Solutions. Motorola Solutions encourages the County to insure all of the warehoused equipment.
- Install fiber optic cabling and fiber management trays as necessary.
- Provide remote access to the new network 7705 connection to reach the 9500 MPR, and remote connection to the 5620 SAM for installation and configuration for the project duration.
- Provide access to the sites, as necessary.

3.10.2 Fixed Network Equipment Installation Complete

- All fixed network equipment installed and accepted by the County of Riverside.

3.10.3 System Installation Acceptance (Milestone)

- All equipment installations are completed and accepted by the County of Riverside.

3.11 SYSTEM OPTIMIZATION

3.11.1 Optimize System FNE

Motorola Solutions Responsibilities:

- Motorola Solutions and its subcontractors optimize each subsystem.
- Verify that all equipment is operating properly and that all electrical and signal levels are set accurately.
- Motorola Network Engineering to gather, validate and input TNCT parameters for configuration generation and validation, and configuration file generation.
- Verify communication interfaces between devices for proper operation.
- Test features and functionality are in accordance with manufacturers' specifications and that they comply with the final configuration established during the CDR/system staging.

County of Riverside Responsibilities:

- Provide access
- Provide escort to the sites when needed.

Completion Criteria:

- System FNE optimization is complete.

3.11.2 Link Verification

Motorola Solutions Responsibilities:

- Perform logical link testing.
  - Each service path will be tested, over a period of 2 to 24 hours, using the Y.1564 testing method to validate the Design Review specifications have been met.
  - If diverse paths exist, each path will be tested independently to ensure it meets the specifications.

County of Riverside Responsibilities:

- None.

- Power on radio, warm up and provision.

3.10.1.3 5620 SAM and 7705 Service Aggregation Routers

- Install all in-scope system hardware purchased in existing rack or other existing assigned location per installation documents. Includes shelves, cards, circuit packs, modules, system cables, etc.
- Run and connect shelf power drops to existing fuse panel or power source in same rack - 10' (3 m) maximum.
- Run and connect shelf ground drop to existing ground point in same rack - 10' (3 m) maximum.
- Run and connect system and interface cabling (alarm, communications, clock, fiber, DSx, Ethernet, etc.) from shelves to existing demarcs, up to 50' (15.2 m), for the equipped ports specified on the Equipment List. Includes continuity check.
- Label equipment and cables, if not already done in staging.
- Load base SW configuration file provided.
- Perform basic power-up and green light testing of in-scope system equipment purchased prior to integration/optimization.
- Perform existing equipment removals at time of new equipment installation.

3.10.1.4 Antenna and Transmission Line Systems Installation (As needed, up to 24 sites)

- Antennas systems delivered from local warehouse to site and inventoried.
- Assemble antennas, rig towers and de-rig towers upon completion.
- Provide and install standard "4.5" OD leg pipe mounts.
- Provide and install steel support members for side braces, as required, to stabilize the newly provided microwave dishes.
- Penetrate building wall or roof for transmission line entry ports and install entry plates as required.
- Provide and install transmission line boot.
- Install antennas and radomes at specified centerlines.
- Cap the unused polarity of a dual pole antenna with a termination load.
- Install transmission Line runs, hanger kits and ground kits in accordance with manufacturer's specifications.
- Terminate transmission Line runs within three feet of the proposed radio location.
- Perform antenna and transmission Line tests to confirm compliance with manufacturer's specifications.
- Ground to the County of Riverside provided existing tower ground bus bar and ground system.
- Perform antenna alignment. Net path loss of the final path will allow for 2.0 dB of additional field margin with respect to performance calculation sheets provided.
- Perform existing equipment removals at time of new equipment installation.
- Perform trash clean-up at the end of each working day.

County of Riverside Responsibilities:

- County of Riverside will provide a 4,600 to 5,000 square foot storage / unpacking location for the Motorola Solutions-provided equipment with the exception of the DC Power Systems

- Motorola Solutions will remove legacy microwave radios and relocate other terminal equipment as required at installation sites to accommodate installation of new equipment.
- Motorola Solutions will remove legacy microwave antennas and transmission line from tower to accommodate new antenna system.
- Motorola Solutions will pack removed equipment and deliver it to a County of Riverside specified location within the County.
- Motorola Solutions will not dispose of existing equipment.

3.10.1.1 DC Power Systems Installation

For Each Site

- DC Power System and Batteries delivered from local warehouse to site and inventoried.
- Install one (1) 80A amp Flatpack S DC Power System rack in the County's designated location using concrete anchors.
- Install one (1) Battery rack in the County's designated location using concrete anchors. It is assumed that Battery rack shall be installed next to Power System rack location.
- Install two (2) 48V 125AH 12V125F or (2) Strings of 48V 92AH 12V92F Enersys battery strings on battery trays mounted in the Power System and Battery racks, depending upon the configuration of the site.
- Install two (2) #4 L4 Gray cables from Power System distribution to Battery rack. Maximum distance not to exceed 20' one-way. It will be one (1) per polarity.
- Install two (2) #4 Green System Ground cables from the DC Power System to the County supplied Master Ground Bar. Maximum cable length not to exceed 35' each.
- Install one (1) #4 Aisle Ground Feeder cable from the MGB to the Power System rack. Maximum cable length not to exceed 50' total.
- Install two (2) #4 AWG Ground Feeder down to the lower portion of Power System rack and Battery rack via H-tap connection. Maximum cable length not to exceed 10' total.
- Install two (2) #4 Frame Ground whips for the rack and H-Tap to 1/0 Aisle Ground Feeder.
- Install one (1) #4 AWG Frame Ground whips for the rack and rectifier chassis from the #4 Ground Feeder via H-Tap connection. Maximum cable lengths not to exceed 5' total each.
- Install two (2) #4 AWG Frame Ground whips for the Battery Trays from the #2 Ground Feeder cable via H-Tap connection. Maximum cable lengths not to exceed 24' total.
- Terminate the County supplied Liquid Tight AC conduit feeds from the shelter's AC panel, and then terminate in the Flatpack2 rectifier shelves.
- Install Flatpack2 rectifiers and blank covers.
- Turn up DC Power System; adjust/verify proper settings, operation.

3.10.1.2 Radio Installation

- Radio and ancillary equipment delivered from local warehouse to site and inventoried.
- Uncrate radio and locate in general vicinity of final equipment location
- Install new radio in existing rack.
- Complete power connections at radio location and circuit breaker within 30 feet of radio locations.
- Complete radio ground connection to station ground ring or bus bar within 50 feet of radio location.
- Complete radio /transmission line interface connection.
- Complete alarm, and repeater cabling if required.
- Install and test Order-wire.

- Motorola Solutions is not responsible for current site environmental conditions including, but not limited to, asbestos, structural integrity (rooftop, water tank, tower, etc.).
- Arrange for space on the tower for installation of new antennas at the proposed heights.
- Perform structural analysis of existing tower and rooftops as required to confirm that the structure is capable of supporting proposed and future antenna loads.
- Supply all permits.
- Supply interior building cable trays, raceways, conduits, and wire supports.
- Supply engineering and drafting as required for modifications to existing building drawings for site construction, if applicable.
- Pay for usage costs of power and generator fueling, both during the construction and installation effort, and on an ongoing basis.
- Complete all County of Riverside deliverables in accordance within the mutually approved Project Schedule.

Completion Criteria:

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

3.10 SYSTEM INSTALLATION

3.10.1 Install Fixed Network Equipment

Motorola Solutions Responsibilities:

- Motorola Solutions will be responsible for the installation of all fixed equipment contained in the equipment list and outlined in the System Description based upon the agreed to floor plans, at the sites where the physical facility improvement is complete and the site is ready for installation. All equipment will be properly secured to the floor and installed in a neat and professional manner, employing a standard of workmanship consistent with its own R56 installation standards and in compliance with applicable National Electrical Code (NEC), EIA, Federal Aviation Administration (FAA)/Transport Canada, and FCC standards and regulations/Industry Canada.
- For installation of the fixed equipment at the various sites, Motorola Solutions will furnish all cables for power, audio, control, and radio transmission to connect the Motorola Solutions-supplied equipment to the power panels or receptacles and the audio/control line connection point.
- During field installation of the equipment, any required changes to the installation will be noted and assembled with the final 'as-built' documentation of the system.
- Motorola Solutions will provide a storage location for the Motorola Solutions-provided DC Power Systems equipment only. DC Power System batteries have a shelf life of 6 months if they are stored in the proper controlled environment. If they are not installed in that time frame, they will be monitored (measure the voltage) by Motorola Solutions and recharged as needed.
- Receive and inventory all equipment.
- Bond the supplied equipment to the site ground system in accordance with Motorola Solutions' R56 standards.
- Motorola Solutions will interface with the following network connections:
  - ASTRO Network

3.9 SITE UPGRADES (AS NEEDED) FOR THE COUNTY OF RIVERSIDE-PROVIDED FACILITIES

Motorola Solutions Responsibilities:

- Provide electrical requirements for equipment to be installed in the County of Riverside-provided facilities.
- Provide heat load for equipment to be installed in the County of Riverside-provided facilities.
- Provide space requirements.
- Provide BTU requirements.
- Please be advised that R56 site audits have not been included at the request of the County of Riverside.

County of Riverside Responsibilities:

- If applicable and based on local jurisdictional authority, the County of Riverside will be responsible for any installation or up-grades of the Critical Operation Power Systems in order to comply with NFPA 70, Article 708.
- Secure site lease/ownership, zoning, permits, regulatory approvals, easements, power, and Telco connections.
- Provide clear and stable access to the sites for transporting electronics and other materials. Sufficient site access must be available for trucks to deliver materials under their own power and for personnel to move materials to the facility without assistance from special equipment such as cranes, helicopters and special transport other than standard vehicles.
- Design and construct facilities for housing communications equipment such as shelters, towers, generators, fuel tanks, fenced compounds, etc.
- Supply adequately sized electrical service, backup power (UPS, generator, batteries, etc.) including the installation of conduit, circuit breakers, outlets, etc., at each equipment location.
- Provide AC power (dedicated 20A, AC outlets - simplex with ground) for each major piece of equipment within 6 feet of the location of the Motorola Solutions-supplied equipment, including the associated electrical service and wiring (conduit, circuit breakers, etc.).
- Provide adequate HVAC, grounding, lighting, cable routing, and surge protection (also, among existing and Motorola Solutions-provided equipment) based upon Motorola Solutions' Standards and Guidelines for Communication Sites (R56). Ceiling (minimum 9 feet) and cable tray heights (minimum 8 feet) in the equipment rooms in order to accommodate 7-foot, 6-inch equipment racks.
- Provide floor space and desk space for the System equipment at the County of Riverside-provided facilities. Each rack shall be provided a minimum of 24-inch x 24-inch footprint with 36-inch clearance in the front and back. The DC rack specifications are: Width – 19 inch, Height – 84 inch, Side Rail Width – 5 inch. Microwave rack specifications are: Width – 22 inch, Height – 7 feet, Depth – 22 inch.
- Relocate existing equipment, if needed, to provide required space for the installation of Motorola-supplied equipment. (Motorola Solutions is providing new racks for equipment specified in this proposal.)
- Motorola Solutions is not responsible to upgrade current site grounding system. County of Riverside is responsible to upgrade current site grounding system, if needed.
- Supply grounding tie point within 10 feet from the Motorola Solutions-supplied equipment.
- Provide obstruction-free area for the cable run between the demarcation point and the communications equipment.

County of Riverside Responsibilities:

- Provide information on existing system interfaces as may be required.
- Provide information on room layouts or other information necessary for the assembly to meet field conditions.
- Review and approve proposed Factory Acceptance Test Plan.

Completion Criteria:

- System staging completed and ready for testing.

3.8.6 Perform Staging Acceptance Test Procedures

Motorola Solutions Responsibilities:

- Provide travel, lodging, meals, and all incidental expenses for two County of Riverside representatives to witness the Factory Acceptance Testing.
- Test and validate system software and features.
- Functional testing of standard system features.
- Conduct site and system level testing.
- Power-up site equipment and perform standardized functionality tests.
- Perform system burn-in 24 hours a day during staging to isolate and capture any defects.
- Provide all hardware test results reports to Riverside County.
- Provide equipment configuration files to Riverside County.
- Provide all network configuration settings to Riverside County.
- Provide all drawings, cable matrix and other staging documentation to Riverside County.
- County of Riverside understands documentation delivered at staging is not the "As-built product".

County of Riverside Responsibilities:

- Send two County of Riverside representatives to witness Factory Acceptance Testing.
- Approve Factory Acceptance Testing.

Completion Criteria:

- System staging testing successfully completed and signed-off by County of Riverside.

3.8.7 Ship Equipment to Field

Motorola Solutions Responsibilities:

- Pack system for shipment to final destination.
- Arrange for shipment to the field.

County of Riverside Responsibilities:

- None.

Completion Criteria:

- Equipment ready for shipment to the field.

3.8.8 Ship Acceptance (Milestone)

- All equipment shipped to the field.

County of Riverside Responsibilities:

- None.

Completion Criteria:

- Ship non-Motorola Solutions manufactured equipment to the Nokia staging facility in Dallas, TX or to the field if not being staged (e.g. DC Power Systems).

3.8.3 Staging Preparation

Motorola Solutions Responsibilities:

- Motorola Network Engineering to prepare for MPLS subsystem staging.

  Backhaul Network Programming

  - Validation of service requirements - Review and validate all requirements for the services as compared to the transport requirements and the transport hardware and connectivity being provided.
  - Network Design - Build the underlying transport topology based on system scale and requirements presented. Take into consideration the physical connectivity, Bandwidth requirements and diverse path requirements.
  - Network IP Plan - Define and build the Transport IP Plan for the physical connectivity of the network.

3.8.4 Ship to Staging (Milestone)

- Ship all equipment needed for staging to the Nokia staging facility in Dallas, TX.

3.8.5 Stage System

Motorola Solutions Responsibilities:

- Set up the system equipment on a site-by-site basis, as it will be configured in the field at each of the transmitter/receiver sites.
- Cut and label cables according to the approved CDR documentation.
- Label the cables with to/from information to specify interconnection for field installation and future servicing needs.
- Complete the cabling/connecting of the subsystems to each other ("connectorization" of the subsystems).
- Assemble required subsystems to assure system functionality.
- Power up, program, and test all staged equipment.
- Confirm system configuration and software compatibility to the existing system.
- Load application parameters on all equipment according to input from Systems Engineering.
- Complete programming of the Fixed Network Equipment.
- Motorola Network Engineering to integrate Application layer(s) with the backhaul transport. This includes all Network Management subsystems.
- Inventory the equipment with serial numbers and installation references.
- Complete system documentation.
- Provide a Factory Acceptance Test Plan.

3.7 ORDER PROCESSING

3.7.1 Process Equipment List

Motorola Solutions Responsibilities:

- Validate Equipment List by checking for valid model numbers, versions, compatible options to main equipment, and delivery data.
- Enter order into Motorola Solutions' Customer Order Fulfillment (COF) system.
- Create Ship Views, to confirm with the County of Riverside the secure storage location(s) to which the equipment will ship. Ship Views are the mailing labels that carry complete equipment shipping information, which direct the timing, method of shipment, and ship path for ultimate destination receipt.
- Create equipment orders.
- Reconcile the Equipment List(s) to the Contract.
- Procure third-party equipment as applicable.

County of Riverside Responsibilities:

- Approve Equipment Lists.
- Approve shipping location(s).
- Complete and provide Tax Certificate information verifying tax status of shipping location.

Completion Criteria:

- Verify that the Equipment List contains the correct model numbers, version, options, and delivery data.
- Trial validation completed.
- Bridge the equipment order to the manufacturing facility.

3.8 MANUFACTURING AND STAGING

3.8.1 Manufacture Motorola Solutions Fixed Network Equipment

Motorola Solutions Responsibilities:

- Manufacture the Fixed Network Equipment (FNE) necessary for the system based on equipment order.

County of Riverside Responsibilities:

- None.

Completion Criteria:

- FNE shipped to the Nokia staging facility in Dallas, TX.

3.8.2 Manufacture Non-Motorola Solutions Equipment

Motorola Solutions Responsibilities:

- Procure non-Motorola Solutions equipment necessary for the system based on the equipment order.

- Provide existing network channel plan.

Completion Criteria:

- Complete Design Documentation, which will include updated Equipment List, system drawings, or other documents applicable to the project.
- Incorporate any deviations from the proposed system into the contract documents accordingly.
- The system design is "frozen" in preparation for subsequent project phases such as Order Processing and Manufacturing.
- A Change Order to the contract is executed in accordance with all material changes resulting from the Design Review.

3.5.2 Design Approval (Milestone)

- The County of Riverside executes a Design Approval milestone document.

3.6 SITE ACQUISITION AND ZONING

3.6.1 Site Acquisition

Motorola Solutions Responsibilities:

- None.

County of Riverside Responsibilities:

- Ensure sites are acquired and all permissions are obtained to install the new equipment.

Completion Criteria:

- Site acquisition completed and approved by the County of Riverside.

3.6.2 Site Zoning

Motorola Solutions Responsibilities:

- None.

County of Riverside Responsibilities:

- Ensure sites are properly zoned for the system.

Completion Criteria:

- Site zoning completed and approved by the County of Riverside.

3.6.3 Site Acquisition and Zoning Complete

- Site acquisition and zoning completed and approved by the County of Riverside.

- Submit design documents to the County of Riverside for approval. These documents form the basis of the system, which Motorola Solutions will manufacture, assemble, stage, install and test.
- Prepare equipment layout plans for staging.
- Establish demarcation point (supplied by the Motorola Solutions system engineer and approved by the County of Riverside).
- Finalize site plan.
  - Determine each site's ability to accommodate proposed equipment based upon physical capacity.
- Provide the County of Riverside with frequency planning services including 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 accurate. During the detailed design phase of the project, Motorola Solutions will incorporate the interference study results into the final system, including impacts to equipment and path. The County of Riverside must be aware that a resolution to the frequency plan (Interference Resolution) may require antenna upgrades or other changes in system design, and additional costs. Motorola Solutions will explore all reasonable non-cost-impact design change options first.
- Complete frequency selection and provide frequency coordination data sheets.
- Complete the Prior Coordination Notice and associated Supplemental Showing documents under FCC Part 101.103(d) rules.
- Complete the FCC 601 license application.
- File the license application with the FCC.

Restrictions:

- Motorola Solutions assumes no liability or responsibility for inadequate frequency availability or frequency licensing issues.
- Motorola Solutions is not responsible for issues outside of its immediate control. Such issues include, but are not restricted to, improper frequency coordination by others and non-compliant operation of other radios.
- Motorola Solutions is not responsible for 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.
- If, for any reason, any of the proposed sites cannot be utilized due to reasons beyond Motorola Solutions' control, the costs associated with site changes or delays including, but not limited to, re-engineering, frequency re-licensing, site zoning, site permitting, schedule delays, site abnormalities, re-mobilization, etc., will be documented by Motorola Solutions in a change order proposal provided to the County of Riverside for review and approval.

County of Riverside Responsibilities:

- The County of Riverside's key project team participants attend the meeting.
- Make timely decisions, according to the Project Schedule. Review periods will be determined during the development of the mutually agreed to Project Schedule.
- Approve Acceptance Test Plan.
- Frequency Licensing and Interference:
  - As mandated by the FCC, the County of Riverside, as the licensee, has the ultimate responsibility for providing all required radio licensing or licensing modifications for the system prior to system staging.
  - Provide the FCC "call sign" station identifier for each site prior to system staging.

Application, Management and Maintenance Services

- Service Type Definitions –Determine type of service needed to meet performance and redundancy requirements of the application.
- Logical Connectivity – Establish the system architecture and logically identify which networks/sites need to communicate within the system.
- Redundancy/Resiliency Requirements – Identify redundancy requirements in the backhaul to allow the application (ASTRO) to be more resilient (resilient hardware vs redundant hardware). Define path diversity requirements (ring and spur sites) based on system design.
- Network Management Requirements - Identify management requirement as it pertains to the FCAPS model to meet the design requirements.

Service Link Specifications

- Latency - IP Packet Transfer Delay (IPTD); Packet Loss – IP Packet Loss Rate (IPLR); and Jitter – IP Packet Delay Variation (IPDV) – Calculate the required specifications for each site link based on the sites logical communication path. These values will also be a minimum requirement for each microwave path. Additionally, these values will be used to request leased line services from carriers (when needed) and will be used during the deployment, commissioning and testing phases of the project.
- Service Bandwidth requirements – Define and build Bandwidth requirements document (TNDT report) for the County of Riverside sites identified in the contract.
- Quality of Service values – Define the translation of the QoS values between the ASTRO application and the backhaul network. Values need to be negotiated and agreed upon to ensure proper prioritization of services on the backhaul.

Physical Transport Requirements

- Interconnectivity link Specifications - Design and build the physical transport topology based on Motorola Network Engineering tasks directly above.
- Physical Connectivity, Port Counts etc. - Determine demarcation points at each site.
- Transport Media to be used (uWave, Fiber, etc.) - Work with subcontractor to quote the appropriate microwave paths and fiber connectivity to provide the correct topology (ring, Spur, hot Standby, etc.) based on the County of Riverside's requirements.

Customer Network Programming (RNI / TNCT)

- Validation of services requirements - Review and validate all the requirements identified in Motorola Network Engineering tasks directly above tasks.
- Network IP Plan – Define and build the WAN Transport IP Plan for the County of Riverside's ASTRO application based on the logical design.

Cutover Planning and Documentation

- Build, document and validate a cutover Method of Procedure (MOP) and an Impact Timeline (ITL) that ensures a seamless transition onto the new transport network.

- Motorola Solutions and the County of Riverside will develop a mutually agreed upon acceptance test plan based upon discussions held during the CDR.
- Provide and review the System Design, Statement of Work, Project Schedule, Acceptance Test Plans, Warranty and Maintenance Plan and update the contract documents accordingly.
- Discuss the proposed Cutover Plan and methods to document a detailed procedure.

Completion Criteria:

- Project kickoff meeting completed.
- Meeting notes identify the next action items.

3.5 CONTRACT DESIGN REVIEW

3.5.1 Review Contract Design

Motorola Solutions Responsibilities:

- Meet with the County of Riverside project team.
- Review the operational requirements and the impact of those requirements on various equipment configurations.
- Establish a defined baseline for the system design and identify any special product requirements and their impact on system implementation.
- Conduct a Path Survey. Microwave path surveys are conducted 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 of 10 feet beginning at time of path profiles, is evaluated and incorporated into the path design where applicable.
- Provide microwave path design based on formal field survey data gathered as described above. The project can move to the implementation stage based on Riverside County's approval and acceptance of the system design and project schedule.
  - Unless otherwise noted on the path calculation sheets, paths are designed using the following criteria:

Path Design Criteria	Nokia
Availability Objective	99.9999%
1-way or 2-way Objective	2-way
Bit Error Rate at Threshold	BER (10^{-6})
One-Way Latency (ms)	10
Jitter (ms)	10
Packet Loss (%)	0.01
One-Way Latency (ms)	8
Jitter (ms)	10
Packet Loss (%)	0.01

- Submit a final path design report, including system maps, path profiles and availability calculations.
- Motorola Network Engineering to provide MPLS subsystem design.

3.4 CONTRACT

3.4.1 Contract Award (Milestone)

- The County of Riverside and Motorola Solutions execute the contract and both parties receive all the necessary documentation.

3.4.2 Contract Administration

Motorola Solutions Responsibilities:

- Assign a Project Manager as the single point of contact with authority to make project decisions.
- Assign resources necessary for project implementation.
- Set up the project in the Motorola Solutions information system.
- Schedule the project kickoff meeting with the County of Riverside.

County of Riverside Responsibilities:

- Assign a Project Manager as the single point of contact responsible for County of Riverside-signed approvals.
- Assign other resources necessary to ensure completion of project tasks for which the County of Riverside is responsible.

Completion Criteria:

- Motorola Solutions internal processes are set up for project management.
- Both Motorola Solutions and the County of Riverside assign all required resources.
- Project kickoff meeting is scheduled.

3.4.3 Project Kickoff

Motorola Solutions Responsibilities:

- Conduct a project kickoff meeting during the CDR phase of the project.
- Ensure key project team participants attend the meeting.
- Introduce all project participants attending the meeting.
- Review the roles of the project participants to identify communication flows and decision-making authority between project participants.
- Review the overall project scope and objectives with the County of Riverside.
- Review the resource and scheduling requirements with the County of Riverside.
- Review the Project Schedule with the County of Riverside to address upcoming milestones and/or events.
- Review the teams' interactions (Motorola Solutions, and the County of Riverside), meetings, reports, milestone acceptance, and the County of Riverside's participation in particular phases.

County of Riverside Responsibilities:

- The County of Riverside's key project team participants attend the meeting.
- Review Motorola Solutions and the County of Riverside responsibilities.

5. Any service type configuration, variants to those service or hierarchical service topologies that have not been described fully by the County of Riverside prior to commencement of the network design.
6. Low-Level Design ("LLD") document.
7. Configuration file examples (these can be provided as part of a Low-Level Design ("LLD") Service.)
8. Onsite design workshop.
9. Any design changes initiated by the County after the sign-off of the mutually agreed network design will be subject to change orders.

Network Integration does not include:

1. Any integration services for nodes in excess of the numbers listed in this proposal.
2. Any updates to existing County of Riverside inventory systems.
3. Any integration with external 3rd party OSS/BSS systems.
4. Any updates/additions potentially required to existing traffic monitoring/planning tools.
5. Any provisioning work on Motorola Solutions management/DCN network or firewalls required to make the new network elements reachable from the management network.
6. The provisioning or testing of new services added directly, by the County of Riverside or its agents, to the new Next Generation IP/MPLS Network.
7. Burn in testing.

5620 SAM Software Integration does not include:

1. Any software Right to Use (RTU) fees.
2. The detailed physical design of the network (i.e., design and engineering related to the physical aspects of the network such as cabling, fiber, physical-layer repeaters, passive optical components, power, air flow, and other physical issues.)
3. OSS/BSS integration of the network elements, or network management system, with any third party OSS systems.
4. Third party software support during warranty.
5. OS RAID deployment, hardening of the OS and disk mirroring OS tasks.
6. Network element configuration or troubleshooting.
7. Workstation hardware installation.
8. Discovery of Generic Network Elements (GNE) or non-Motorola Solutions provided equipment.
9. Any service, unless explicitly described in this proposal (e.g.: Software upgrades of any kind after the initial installation; re-installation if the 5620 SAM is moved from one location to another, etc.), subject to the understanding that the SAM will be installed with the most current compatible release.

Network Migration – IP Service Routers does not include:

1. DS0 migration.
2. A per DS1 or per DS3 traffic cut-over Method of Procedure (MOP).
3. A DS1 and / or DS3 site specific cut sheet including patch panel information and other physical inventory data.
4. Migration services for DS1 or DS3 circuits in excess of the numbers listed in this proposal. Should there be any additional circuits or services to be migrated, these will increase scope and need to be handled by a change order.

21. If the County requests a change to the system configuration after successful installation of the SAM that would require a re-installation of the SAM, then the County will be required to request a change order for such re-installation.

DC Power Systems

1. A minimum of five (5) DC Power System sites will be completed in consecutive order during one visit. Only three (3) visits are included in this proposal.
2. Motorola will transport the DC Power System equipment and Batteries from local warehouse location to the site locations.
3. Work will take place on the first floor.
4. Work will be executable during a single shift, in a continuous manner, without restriction or expedited schedules.
5. Roads are accessible for onsite delivery.
6. Equipment and Battery delivery doesn't require any special arrangements (e.g. any crane etc.) Separate charges shall be applied if any special delivery arrangements are required. For the purposes of this assumption, Motorola Solutions agrees that battery weight will not require special delivery arrangements.
7. All work is assumed to be completed within normal business hours Monday - Friday. If the project work extends into Saturday and/or Sunday and is not due to the fault of the vendor, additional overtime labor charges may apply.

3.3 EXCLUSIONS

Microwave Deployment does not include:

1. Motorola Solutions is not responsible for the condition of the County of Riverside's existing equipment or the deficiencies of non-Motorola Solutions work related items. If the project requires equipment and services in addition to the equipment and services provided by Motorola Solutions, based on a reasonable verification of the deficiencies in the existing equipment or the non-Motorola Solutions work related items, then the County of Riverside bears the sole responsibility of acquiring that equipment and those services.
2. Special Roof Mounts, Water tank top mounts (designs, stamped drawings and fabrication) if required will be provided and installed by the County of Riverside.

MPLS Network Architecture and Design does not include:

1. Design pertaining to transport planning/availability (e.g., analysis of available fiber/transport options, design of optical transport network, DWDM/CWDM design/wavelength assignments, link budget calculations, specifications of XFPs/SFPs to be used for various inter-nodal transport links.)
2. Optional designs – these can be custom quoted, as needed:
   a. IPSec or firewall services.
   b. Network Group Encryption (NGE).
   c. MEF design for standardized MEF L2 services (e.g., E-LINE, E-LAN, E-TREE, E-ACCESS).
   d. OAM (Y.1731, TWAMP, 802.3ah, 802.1ag).
   e. IPTV, AA, multicast VPN's, BNG, IPv6, CG-NAT, BGP Peering (ISP), PBB services
3. Service offerings which Motorola Solutions may want to provide in the future.
4. Additional service designs or configurations beyond what is outlined in the "Overview" section above.

2. Field integration verification testing is contingent upon the successful integration and testing performed at the staging location.
3. All network elements have been successfully reinstalled at the production locations, prior to the start of field integration verification.
4. Network element re-configuration work due to non-Motorola Solutions attributable reasons will be subject to a change order.
5. The migration service is for the DS1s and DS3s circuits listed in this SOW.
6. The DS1s / DS3s migration takes place during maintenance windows.

[redacted]

8. Motorola Solutions developed and approved High-Level Network Migration Strategy and High-Level Migration MOP documents are available prior to the start of this Service.
9. The Migration Test Plan (MTP) is approved and signed-off prior to the development of migration delta configuration files. MTP is based on a subset of the ATP developed during integration at the staging location.
10. Delta configuration files to support migration are developed prior to the start of migration service.
11. Network element re-configuration work due to non-Motorola Solutions attributable reasons will be subject to a change order.
12. The 7705s are deployed in an overlay network to the current network.

[redacted]

15. Motorola Solutions cannot commit to the migration of a specific quantity of DS1s / DS3s during on-site migration support, this depends on many factors including schedule with the County of Riverside, type of circuits scheduled (DS1 vs. DS3), type of node getting supported (single nodes vs. ring nodes), field integration verification tasks, etc.

[redacted]

18. All preparation work will be performed remotely, these include: development and testing of migration delta configuration files, migration MOP development, meetings and reviews.
19. 5620 SAM System field verification is performed remotely over a period of up to three (3) days. During this period and once completed verification tasks, the SAM SME may assist integration teams and the County of Riverside as needed.
20. During the SAM field verification, Motorola Solutions and the Nokia SME will perform tasks to verify the health of the system and normal operations.

5620 SAM Installation

1. The service is for one (1) 5620 SAM system.
2. The network elements are remotely accessible from the 5620 SAM system.
3. The network elements are ready for SNMP V2 and V3 management.
4. Linux OS includes the latest Linux OS patches to ensure their system is not vulnerable to any security threats or known software defects at the Linux OS level.
5. The workstation hardware is installed, cabled and turned up prior to the scheduling of the 5620 SAM application installation.
6. All preparation work is performed remotely.
7. Actual software installation is performed onsite at the staging location.
8. The service must be scheduled when most of the routers or after all routers have been integrated, so they can be discovered by the 5620 SAM.
9. [redacted]

Network Integration – IP Service Routers

Pre-requisites:

- The delivery of this service is contingent upon the availability of an up-to-date network design.
- The Network Integration Service builds upon the Network Design Service, and is based upon the design documentation generated by that design service. This documentation can take the form of either a general Detailed Design document, or a combination of High Level and Low Level design documentation. Regardless of the type of design documentation, in order for the Network Integration Service phase to begin, there must be a sign-off of all Network Design documentation between Motorola and the County of Riverside.

1. The Acceptance Test Plan (ATP) is approved and signed-off prior to the development of configuration files.
2. Configuration files are generated prior to the start of integration.
3. [redacted]
4. [redacted]
5. Network element re-configuration work due to non-Motorola Solutions attributable reasons will be subject to a change order.

Network Migration – IP Service Routers

Pre-requisites:

- The delivery of this Service is contingent upon the sign-off between Motorola Solutions and County of Riverside, of the Network Design (HLD), High-Level Network Migration Strategy and High Level Master Migration MOP document(s). Without the bi-lateral approval of these documents, the Network Migration service cannot commence.

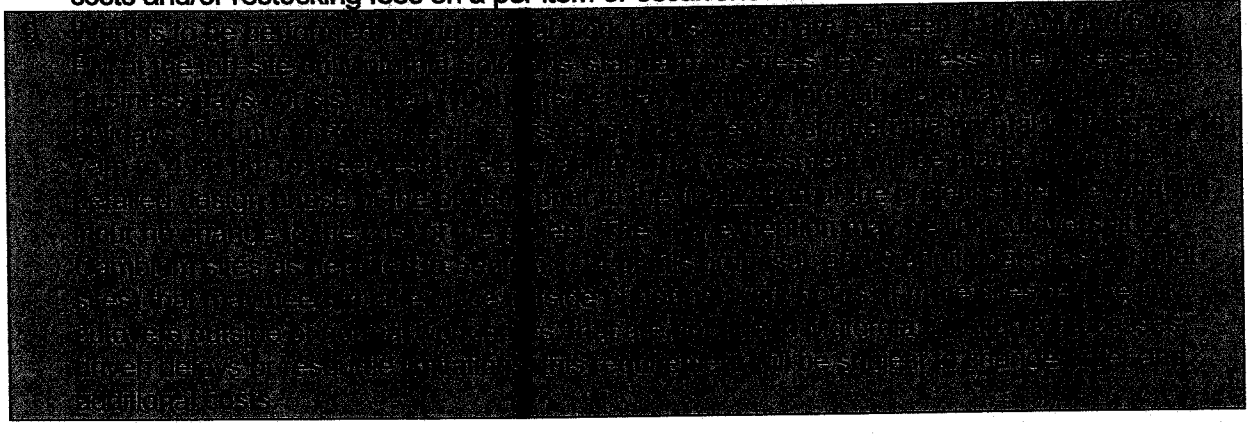
1. [redacted]

Motorola Solutions' assumptions be deemed incorrect or not agreeable to the County of Riverside, a revised proposal with the necessary changes and adjusted costs may be required. ~~Errors in assumption due to Motorola's error will be addressed by the vendor at their cost.~~ Changes to the equipment or scope of the project after contract may require a change order.

1. Feasibility studies, like the one attached, are preliminary in nature and are not intended to represent a final design. Therefore, no representations, warranty or guarantee is implied or provided. The County of Riverside agrees to assume all risks associated with installing any equipment based on spider web 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.
2. Feasibility studies, like the one attached, use preliminary and unverified microwave path information provided by others, prior to the conductance of a site survey. Feasibility studies are used to form a baseline for equipment and radio frequency system design and budgetary estimates. Final design inputs and costs are determined in the Design Review phase of the contracted project.

[redacted]

4. No more than 30 sites will require new antennas, mounts and transmission lines. If additional replacement antenna systems are required, they will be subject to additional charges.
5. Space exists on the towers for installation of new antennas at the proposed heights.
6. Existing structures are capable of capable of supporting proposed and future antenna loads. The County of Riverside will perform or contract for structural analyses of existing towers and rooftops, if needed, to confirm that the structures can support the equipment load.
7. This SOW assumes that site grounding at the identified sites is sufficient.
8. Motorola Solutions anticipates the use of industry standard materials that are fit for use for the proposed system. If the County of Riverside requires that Motorola Solutions use other materials, then the County of Riverside will reimburse Motorola Solutions for any additional costs and/or restocking fees on a per item or occurrence basis.



MPLS Network Architecture and Design – IP Service Routers

1. All network elements are designed in a single batch.
2. The network audit is for data gathering to be used by the High-Level migration strategy service. It is not intended to produce a report of any kind or performance analysis of the current network.

The MPLS microwave design will include performance calculations, microwave path design, sweeps for newly installed waveguide runs and as built drawings, MPLS network architecture and design, network integration and migration services for the IP/MPLS network as well as NSP 5620 Service Aware Manager (SAM) software integration.

The Services described in this SOW are exclusively for the following products:

Microwave Services

- 71 x MPT-HL Shelf Kit Single T-R.
- 114 x MPT-HL Shelf Kit Dual T-R.
- 6 x MPT-HLC XCVR L6 GHz (5720 - 6425).
- 2 x MPT-HLC XCVR L6 GHz WITH COMBINER (5720 - 6425).
- 20 x MPT-HLC XCVR L6 GHz HP (5720 - 6425).
- 12 x MPT-HLC XCVR L6 GHz HP WITH COMBINER (5720 - 6425).
- 10 x MPT-HLC XCVR U6 GHz (6425 - 7125).
- 10 x MPT-HLC XCVR U6 GHz WITH COMBINER (6425 - 7125).
- 96 x MPT-HLC XCVR U6 GHz HP (6425 - 7125).
- 84 x MPT-HLC XCVR 10.5 GHZ.
- 13 x MPT-HLC XCVR 11 GHz (10700 - 11700).
- 34 x MPT-HLC XCVR 11 GHz HP TX HIGH (TX 11200 - 11700, RX 10700 - 11700).
- 12 x MPT-HLC XCVR 11 GHz HP W/COMBINER TX HIGH (TX 11200 - 11700, RX 10700 - 11700).
- Associated antenna equipment and cabling.
- Equipment racks.

IP / MPLS Professional Services

- 10 x 7705 SAR-18 with PMC cards.
- 72 x 7705 SAR-8 with PMC cards.

5620 Service Aware Manager (SAM)

The configuration may include the following:

- 2 x 5620 SAM Server (See hardware specifications, called "NSP Platform recommendation 25May" in separate document.)
- 5620 SAM Database.
- Co-located (two Bare Metal or Virtual Machines).
- Redundant setup.
- Standard suite.
- Red Hat Enterprise Linux (RHEL, Linux).
- 109 x Auxiliary Alarm Cards
- No limitation of simultaneous users.

DC Power Systems

- DC Power Systems (including batteries) for the microwave equipment at thirteen (13) sites.

3.2 ASSUMPTIONS

Motorola Solutions has based the system design on information provided by the County of Riverside and the Feasibility Study. All assumptions have been listed below for review. Should

SECTION 3

STATEMENT OF WORK

3.1 OVERVIEW

This Statement of Work (SOW) describes the deliverables to be furnished to the County of Riverside. The tasks described herein will be performed by Motorola Solutions and the County of Riverside to implement the solution described below and in the Feasibility Study in Section 8 - Attachments. The Feasibility Study was prepared using preliminary and unverified microwave path information. Feasibility studies are used to form a baseline for equipment and radio frequency system design. This baseline can then be used for budgetary estimates. Within the project, actual Path Surveys will verify final project requirements and associated costs.

Extrapolating from the findings in the Feasibility Study, this SOW describes the work involved in installation, identifies the installation standards to be followed, and clarifies the responsibilities for both Motorola Solutions and the County of Riverside during the project implementation. Specifically, this SOW provides:

- A summary of the phases and tasks to be completed within the project lifecycle.
- A list of the deliverables associated with the project.
- A description of the responsibilities for both Motorola Solutions and the County of Riverside.
- The qualifications and assumptions taken into consideration during the development of this project.

This SOW provides the most current understanding of the work required by both parties to ensure a successful project implementation. In particular, Motorola Solutions has made assumptions of the sites to be used for the new system. Should any of the sites change, a revision to the SOW and associated pricing will be required. The SOW may only be revised through the change order process to incorporate any changes associated with contract negotiations, Contract Design Review (CDR), and any other change orders that may occur during the execution of the project.

This project covers deployment of a ninety-one (91) HOP 9500MPR-HLC Microwave System and eighty-two (82) 7705 Service Aggregation Routers (SARs) as part of the solution for the County of Riverside's microwave/MPLS network. Motorola Solutions will

- Design, furnish and integrate the microwave backhaul based IP / MPLS network.
- Furnish and install ninety-one (91) hops of microwave radios and seventy-two (72) 7705 SAR-8 and ten (10) 7705 SAR18 Routers in new racks.
- Use existing waveguide and antennas where possible. Assessment will be based on onsite visual inspections of antennas and waveguide. Review and formal agreement from County of Riverside is required to proceed with replacement of existing antennas and waveguide.
- Furnish and install antennas, mounts and transmission lines at all sites that require them (up to 24 sites).
- Complete the microwave radio to transmission line connections and inter-bay cabling.
- Test and turn-up the newly installed microwave radios.
- Provide, install and test DC Power Systems for the microwave equipment at thirteen (13) sites.

1	DSFPSS030100012	FPS -48V, REAR WIRE, 80A MAX, LVBD & SHUNT (1U US SERIES)
2	DS241122125	FLATPACK S 48V/1800W HE RECTIFIER
1	DS331E00116500	FLATPACK S BLANK PANEL FOR EMPTY RECTIFIER SLOTS
2	DSLA1012UU	LINE CORD,10',12AWG,MOLEX TO UU
1	DS217035	19" RELAY RACK MOUNT BATTERY TRAY, HEAVY DUTY
1	DS289248	KIT CABLE BAT TRAY 100 AMP CB (FRONT WIRED SYSTEMS)
1	DSCBB080E	80A BATTERY BREAKER
1	DS502877	48V 125AH 12V125F ENERSYS BATT SET
1	DS331E27364200	SEISMIC RELAY RACK 19" INCHES WIDE 7' FEET HIGH WITH A 5" RAIL WIDTH
4	DS0830186019	LOAD BREAKERS
1	DSFPSS030100012	FPS -48V, REAR WIRE, 80A MAX, LVBD & SHUNT (1U US SERIES)
2	DS241122125	FLATPACK S 48V/1800W HE RECTIFIER
1	DS331E00116500	FLATPACK S BLANK PANEL FOR EMPTY RECTIFIER SLOTS
2	DSLA1012UU	LINE CORD,10',12AWG,MOLEX TO UU
1	DS217035	19" RELAY RACK MOUNT BATTERY TRAY, HEAVY DUTY
1	DS289248	KIT CABLE BAT TRAY 100 AMP CB (FRONT WIRED SYSTEMS)
1	DSCBB080E	80A BATTERY BREAKER
1	DS502877	48V 125AH 12V125F ENERSYS BATT SET
1	DS331E27364200	SEISMIC RELAY RACK 19" INCHES WIDE 7' FEET HIGH WITH A 5" RAIL WIDTH
4	DS0830186019	LOAD BREAKERS
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1	DS331E00116500	FLATPACK S BLANK PANEL FOR EMPTY RECTIFIER SLOTS
2	DSLA1012UU	LINE CORD,10',12AWG,MOLEX TO UU
2	DS217035	19" RELAY RACK MOUNT BATTERY TRAY, HEAVY DUTY
2	DS289248	KIT CABLE BAT TRAY 100 AMP CB (FRONT WIRED SYSTEMS)
2	DSCBB080E	80A BATTERY BREAKER
2	DS502877	48V 125AH 12V125F ENERSYS BATT SET
1	DS331E27364200	SEISMIC RELAY RACK 19" INCHES WIDE 7' FEET HIGH WITH A 5" RAIL WIDTH
4	DS0830186019	LOAD BREAKERS
1	DQMWAUX	MPLS HARDWARE (AUX ALARM CARD)
1	DQMWAUXSP	MPLS HARDWARE (AUX ALARM CARD) SPARES
1	DQMWSAMLIC	5620 SAM ADDITIONAL LICENSES FOR ALARMS

2	DS241122125	FLATPACK S 48V/1800W HE RECTIFIER
1	DS331E00116500	FLATPACK S BLANK PANEL FOR EMPTY RECTIFIER SLOTS
2	DSLA1012UU	LINE CORD,10',12AWG,MOLEX TO UU
1	DS217035	19" RELAY RACK MOUNT BATTERY TRAY
2	DS289248	KIT CABLE BAT TRAY 100 AMP CB (FRONT WIRED SYSTEMS)
2	DSCBB080E	80A BATTERY BREAKER
2	DS507034	48V 92AH 12V92F ENERSYS BATTERY SET
1	DS331E27364200	SEISMIC RELAY RACK 19" INCHES WIDE 7' FEET HIGH WITH A 5" RAIL WIDTH
4	DS0830186019	LOAD BREAKERS
1	DSFPSS030100012	FPS -48V, REAR WIRE, 80A MAX, LVBD & SHUNT (1U US SERIES)
2	DS241122125	FLATPACK S 48V/1800W HE RECTIFIER
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2	DSLA1012UU	LINE CORD,10',12AWG,MOLEX TO UU
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2	DSLA1012UU	LINE CORD,10',12AWG,MOLEX TO UU
1	DS217035	19" RELAY RACK MOUNT BATTERY TRAY
2	DS289248	KIT CABLE BAT TRAY 100 AMP CB (FRONT WIRED SYSTEMS)
2	DSCBB080E	80A BATTERY BREAKER
2	DS507034	48V 92AH 12V92F ENERSYS BATTERY SET
1	DS331E27364200	SEISMIC RELAY RACK 19" INCHES WIDE 7' FEET HIGH WITH A 5" RAIL WIDTH
4	DS0830186019	LOAD BREAKERS
1	DSFPSS030100012	FPS -48V, REAR WIRE, 80A MAX, LVBD & SHUNT (1U US SERIES)
2	DS241122125	FLATPACK S 48V/1800W HE RECTIFIER
1	DS331E00116500	FLATPACK S BLANK PANEL FOR EMPTY RECTIFIER SLOTS
2	DSLA1012UU	LINE CORD,10',12AWG,MOLEX TO UU
1	DS217035	19" RELAY RACK MOUNT BATTERY TRAY, HEAVY DUTY
1	DS289248	KIT CABLE BAT TRAY 100 AMP CB (FRONT WIRED SYSTEMS)
1	DSCBB080E	80A BATTERY BREAKER
1	DS502877	48V 125AH 12V125F ENERSYS BATT SET
1	DS331E27364200	SEISMIC RELAY RACK 19" INCHES WIDE 7' FEET HIGH WITH A 5" RAIL WIDTH
4	DS0830186019	LOAD BREAKERS

1	DS331E00116500	FLATPACK S BLANK PANEL FOR EMPTY RECTIFIER SLOTS
2	DSLA1012UU	LINE CORD,10',12AWG,MOLEX TO UU
1	DS217035	19" RELAY RACK MOUNT BATTERY TRAY
2	DS289248	KIT CABLE BAT TRAY 100 AMP CB (FRONT WIRED SYSTEMS)
2	DSCBB080E	80A BATTERY BREAKER
2	DS507034	48V 92AH 12V92F ENERSYS BATTERY SET
1	DS331E27364200	SEISMIC RELAY RACK 19" INCHES WIDE 7' FEET HIGH WITH A 5" RAIL WIDTH
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2	DS289248	KIT CABLE BAT TRAY 100 AMP CB (FRONT WIRED SYSTEMS)
2	DSCBB080E	80A BATTERY BREAKER
2	DS507034	48V 92AH 12V92F Enersys Battery Set
1	DS331E27364200	SEISMIC RELAY RACK 19" INCHES WIDE 7' FEET HIGH WITH A 5" RAIL WIDTH
4	DS0830186019	LOAD BREAKERS
1	DSFPSS030100012	FPS -48V, REAR WIRE, 80A MAX, LVBD & SHUNT (1U US SERIES)

SECTION 2

EQUIPMENT LIST

2.1 EQUIPMENT LIST

QTY	NOMENCLATURE	DESCRIPTION
2	DLN7001	HIGH CAPACITY NON REDUNDANT SERVER FRE
2	DVN4381	SOFTWARE,VMWARE VSPHERE 6.X ENT PLUS 2 CPU SW
2	CVN7151	RED HAT 7.X - MULTI CPU AND 4 GUESTS
2	DSTG221B	TECH GLOBAL EVOLUTION SERIES 22INCH NON TOUCH
10	DSTRAK91111	FOUR PORT T1 FRAMED AND CLOCK TELECOM MODULE
1	DQMWRVRSIDERERF	INCLUDES 1.01-1.70 RACKED RADIOS & ADJ
1	DQMWRVRSIDERESP	INCLUDES 2.01-2.12 SPARES & ADJ
1	DQMWRVRSIDERERT	INCLUDES 3.01-4.19 MPLS HW SPARES & ADJ
1	DQMWRVRSIDERENM	INCLUDES 5.01-5.05 NETWORK MGMNT & ADJ
1	DQMWRVRSIDEREAD	INCLUDES 6.01-6.67 ANTENNA SYS & ADJ
1	DSFPSS030100012	FPS -48V, REAR WIRE, 80A MAX, LVBD & SHUNT (1U US SERIES)
2	DS241122125	FLATPACK S 48V/1800W HE RECTIFIER
1	DS331E00116500	FLATPACK S BLANK PANEL FOR EMPTY RECTIFIER SLOTS
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1	DSFPSS030100012	FPS -48V, REAR WIRE, 80A MAX, LVBD & SHUNT (1U US SERIES)
2	DS241122125	FLATPACK S 48V/1800W HE RECTIFIER

Cambium radios are associated with the following sites.

SITE #	CAMBIUM SITE NAME	SITE #	CAMBIUM SITE NAME
1	Belle Mtn.	12	Morongo
2	Ben Clark	13	Palen McCoy
3	Billy Goat	14	Ranger Peak
4	Black Eagle	15	Redondo Mesa
5	Black Jack	16	Road 177
6	Box Canyon	17	Road 62
7	Box Springs	18	Santa Rosa Peak
8	Indio	19	Snow Peak
9	Lake Hemet	20	Spring Hill
10	Mecca Land Fill	21	Toro Peak
11	Midland	22	Wileys Well

1.5 DC POWER SYSTEMS

Motorola Solutions has included DC Power Systems for the microwave equipment at thirteen (13) sites. The sites and power calculations are listed below.

SITE #	SITE NAME	WATTS	EQUIPMENT LOAD @ 48VDC (AMPS)	TOTAL LOAD WITH GROWTH FACTOR (AMPS)	MIN BATTERY CAPACITY @ 16 HOURS (AH)	CALCULATED CHARGER SIZE
1	Belle Mtn.	334	7	9	141	15
2	Ben Clark	322	7	9	136	15
3	Billy Goat	334	7	9	141	15
4	Box Canyon	334	7	9	141	15
5	Lake Hemet	322	7	8	134	15
6	Mecca Land Fill	334	7	9	141	15
7	Midland	444	9	12	187	20
8	Morongo	322	7	9	136	15
9	Palen McCoy	322	7	9	136	15
10	Road 62	322	7	8	134	15
11	Snow Peak	322	7	8	134	15
12	Spring Hill	334	7	9	141	15
13	Toro Peak	644	14	17	270	29

- Equipment racks.

1.3.2 IP/MPLS

- 10 x 7705 SAR-18 with PMC cards.
- 72 x 7705 SAR-8 with PMC cards.

1.3.3 5620 Service Aware Manager (SAM)

- 2 x 5620 SAM Server.
- 5620 SAM Database.
- Co-located (two Bare Metal or Virtual Machines).
- Redundant setup.
- Standard suite.
- Red Hat Enterprise Linux (RHEL, Linux).
- 109 x Auxiliary Alarm Cards

1.4 CAMBIUM PATH DETAIL

Motorola Solutions will replace existing Cambium radios and antennas (including required ancillary equipment) associated with the following paths.

PATH #	FROM	TO
1	Box Springs	Ben Clark
2	Redondo Mesa	Billy Goat
3	Santa Rosa Peak	Lake Hemet
4	Snow Peak	Ranger Peak
5	Morongo	Ranger Peak
6	Mecca Land Fill	Indio
7	Toro Peak	Box Canyon
8	Belle Mtn.	Black Eagle
9	Spring Hill	Wileys Well
10	Road 62	Road 177
11	Palen McCoy	Midland
12	Black Jack	Midland

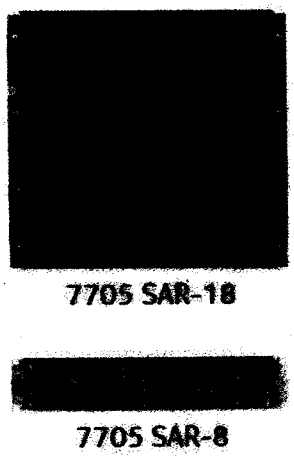


Figure 1-2: Nokia 7705 Service Aggregation Router (SAR)

1.2.3 Nokia 5620 Service Aware Manager (SAM)

The Nokia 5620 Service Aware Manager (SAM) provides the comprehensive IP infrastructure management for configuration, provisioning, assurance and mediation of IP network devices, domains and services across IP access, aggregation, metro, and core. Through the 5620 SAM, users are able to quickly maximize operational efficiencies through fast provisioning and troubleshooting, proactive assurance and flexibility to ease integration into the network.

The 5620 SAM provides a collection of key performance indicators (KPIs) to monitor network-wide performance and service health. In addition, the 5620 SAM includes advanced troubleshooting and service assurance help to resolve problems fast, before they impact end users or applications.

1.3 MICROWAVE EQUIPMENT

1.3.1 Microwave

- 71 x MPT-HL Shelf Kit Single T-R.
- 114 x MPT-HL Shelf Kit Dual T-R.
- 6 x MPT-HLC XCVR L6 GHz (5720 - 6425).
- 2 x MPT-HLC XCVR L6 GHz WITH COMBINER (5720 - 6425).
- 20 x MPT-HLC XCVR L6 GHz HP (5720 - 6425).
- 12 x MPT-HLC XCVR L6 GHz HP WITH COMBINER (5720 - 6425).
- 10 x MPT-HLC XCVR U6 GHz (6425 - 7125).
- 10 x MPT-HLC XCVR U6 GHz WITH COMBINER (6425 - 7125).
- 96 x MPT-HLC XCVR U6 GHz HP (6425 - 7125).
- 84 x MPT-HLC XCVR 10.5 GHZ.
- 13 x MPT-HLC XCVR 11 GHz (10700 - 11700).
- 34 x MPT-HLC XCVR 11 GHz HP TX HIGH (TX 11200 - 11700, RX 10700 - 11700).
- 12 x MPT-HLC XCVR 11 GHz HP W/COMBINER TX HIGH (TX 11200 - 11700, RX 10700 - 11700).
- Associated antenna equipment and cabling.

1.2 MICROWAVE COMPONENTS

1.2.1 Nokia 9500 Microwave Packet Radio (MPR)

The Nokia 9500 Microwave Packet Radio (MPR) includes a range of Microwave Packet Transport (MPT) units for long-haul applications in a full-indoor configuration. The 9500 MPR is designed to support long-distance, high-capacity mission-critical applications, the MPT-HLC units provide flexible, secure, scalable and highly reliable networks that also support a seamless TDM-to-packet migration path option. The MPT-HLC units are integrated in the Nokia 5620 Service Aware Manager (SAM) for common management, enabling consistent operations across end-to-end packet microwave networks. See Figure 1-1.

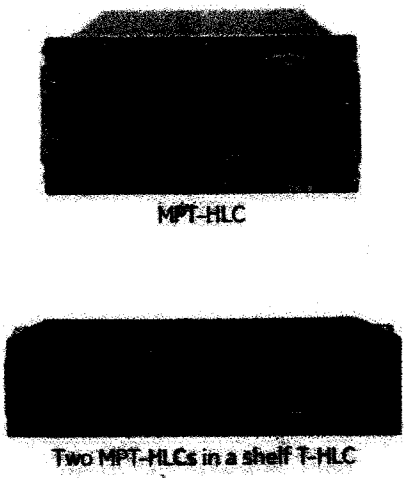
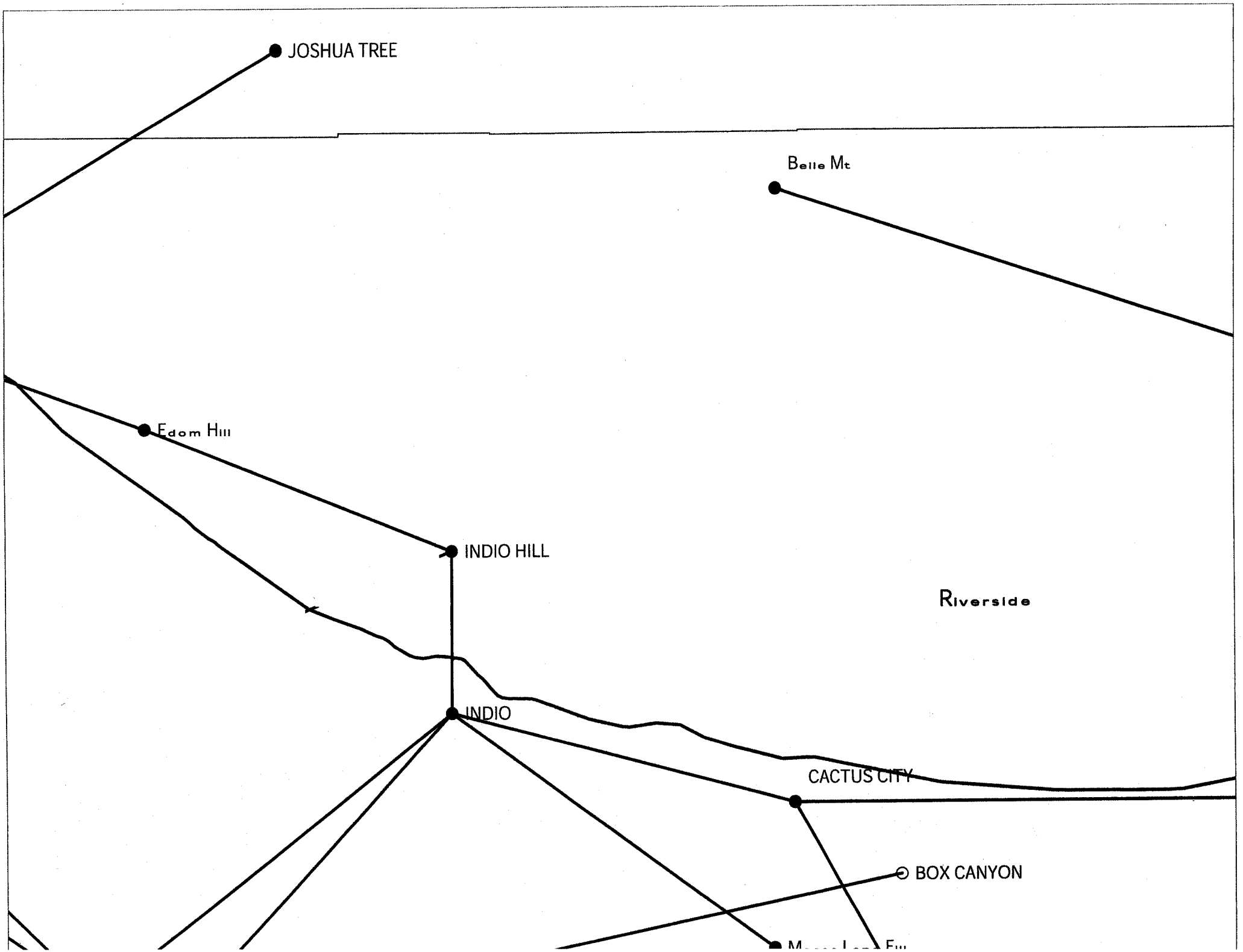


Figure 1-1: Nokia 9500 Microwave Packet Radio (MPR)

1.2.2 Nokia 7705 Service Aggregation Router (SAR)

The Nokia 7705 Service Aggregation Router (SAR) delivers industry –leading IP/MPLS and pseudowire capabilities. Designed for scalability, it will give the County of Riverside the greatest potential to grow their network, adding unprecedented numbers of end users and applications, without having to make additional capital investment. In addition, the 7705 SAR portfolio offers a comprehensive set of T1/E1, T3/E3, SONET/SDH, serial data and analog voice interfaces. With these features, the County of Riverside can gracefully migrate their applications onto their new IP/MPLS network. Critical traffic is expedited when using either high-speed Ethernet or legacy low-bandwidth links to ensure application performance. See Figure 1-2.


JOSHUA TREE
Belle Mt
Edom Hill
INDIO HILL
Riverside
INDIO
CACTUS CITY
BOX CANYON

SECTION 1

SYSTEM DESCRIPTION

1.1 SYSTEM OVERVIEW

Motorola Solutions is pleased to provide Riverside County a proposal to upgrade the existing microwave system with a Multi-Protocol Label Switching (MPLS) microwave network solution. The MPLS microwave network solution will provide the backhaul transport of radio traffic between the primary master site at Alessandro and the backup master site at Blythe to the dispatch sites and RF sites.

Motorola Solutions has partnered with Nokia to provide a highly reliable, robust MPLS microwave solution consisting of a ninety-one (91) hop 9500 Microwave Packet Radio (MPR)-HLC microwave system and eighty-two (82) 7705 Service Aggregation Routers (SARs). Motorola Solutions/Nokia will design and integrate the microwave backhaul based IP/MPLS network. The design includes installing ninety-one(91) hops of microwave radios and seventy-two (72) 7705 SAR-8 and ten (10) 7705 SAR-18 routers in new racks. Motorola Solutions will install antennas, mounts, transmission lines at the sites that require them (up to 24 sites). A high level diagram of the MPLS microwave system can be found on the following page.

The MPLS microwave design will include performance calculations, microwave path design, sweeps for newly installed waveguide runs and as built drawings, MPLS network architecture and design, network integration and migration services for the IP/MPLS network as well as NSP 5620 Service Aware Manager (SAM) software integration.

Motorola Solutions has included DC Power Systems for the microwave equipment at thirteen (13) sites.

Section 4

Section 5

Section 6

TABLE OF CONTENTS

MOTOROLA SOLUTIONS

November 19, 2018

Gustavo Vazquez
County of Riverside
7195 Alessandro Blvd
Riverside, CA 92506
RE: County of Riverside Microwave Proposal

Dear Mr. Vazquez:

Motorola Solutions, Inc. ("Motorola") is pleased to have the opportunity to provide the County of Riverside with quality communications equipment and services. The Motorola project team has taken great care to propose a solution that will meet your needs and provide unsurpassed value.

To best meet the functional and operational specifications of the County of Riverside, Motorola's solution includes a combination of hardware, software, and services. Specifically, this solution covers deployment of a ninety-one (91) hop 9500 Microwave Packet Radio (MPR)-HLC microwave system and eighty-two (82) 7705 Service Aggregation Routers (SARs). Motorola Solutions/Nokia will design and integrate the microwave backhaul based IP/MPLS network. The design includes installing ninety-one (91) hops of microwave radios and seventy-two (72) 7705 SAR-8 and ten (10) 7705 SAR-18 routers in new racks.

This proposal is subject to the enclosed Communications Systems and Services Agreement (CSSA), together with its Exhibits. This proposal shall remain valid through December 28, 2018. The County of Riverside may accept the proposal by delivering to Motorola the CSSA signed by the County of Riverside. Alternatively, Motorola would be pleased to address any concerns you may have regarding the proposal. Any questions can be directed to your Motorola Account Executive, Joe Warner, at (312) 204-9300, (Joseph.warner@motorolasolutions.com).

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

Sincerely,
MOTOROLA SOLUTIONS, INC.

Travis Boettcher
Vice President

MOTOROLA SOLUTIONS

WHEN DOCUMENT IS FULLY EXECUTED RETURN
CLERK'S COPY
to Riverside County Clerk of the Board, Stop 1010
Post Office Box 1147, Riverside, Ca 92502-1147
Thank you.

COUNTY OF RIVERSIDE, CALIFORNIA

MICROWAVE NETWORK REPLACEMENT NOVEMBER 19, 2018

DEC 11 2018 3.33

EQUIPMENT LEASE PURCHASE AGREEMENT DELIVERY AND ACCEPTANCE CERTIFICATE

The undersigned Lessee hereby acknowledges receipt of the Equipment described below ("Equipment") and Lessee hereby accepts the Equipment after full inspection thereof as satisfactory for all purposes of lease Schedule A #24483 to the Equipment Lease Purchase Agreement executed by Lessee and Lessor.

Equipment Lease Purchase Agreement Date: December 11, 2018

Lease Schedule A Date: December 11, 2018

Equipment Lease Purchase Agreement No.: 24483 Lease Schedule A No. : 24483

EQUIPMENT INFORMATION

QUANTITY	MODEL NUMBER	EQUIPMENT DESCRIPTION
		Refer to Equipment List in Section 2 of the Proposal.

LESSEE:

COUNTY OF RIVERSIDE

Date Accepted: _____ By: _____

STATEMENT OF ESSENTIAL USE/SOURCE OF FUNDS

To further understand the essential governmental use intended for the equipment together with an understanding of the sources from which payments will be made, please address the following questions by completing this form or by sending a separate letter:

1. What is the specific use of the equipment financed under Schedule A #24483?

Lessee response:

2. Why is the equipment essential to the operation of **COUNTY OF RIVERSIDE?**

Lessee response:

3. Does the equipment replace existing equipment?

Lessee response:

If so, why is the replacement being made?

Lessee response:

4. Is there a specific cost justification for the new equipment?

Lessee response:

If yes, please attach outline of justification.

Lessee response:

5. What is the expected source of funds for the payments due under the Lease for the current fiscal year and future fiscal years?

Lessee response:

Evidence of Insurance

Fire, extended coverage, public liability and property damage insurance for all of the Equipment listed on Schedule A number **24483** dated December 11, 2018 to that certain Equipment Lease Purchase Agreement number **24483** dated December 11, 2018 will be maintained by the **COUNTY OF RIVERSIDE as** stated in the Equipment Lease Purchase Agreement.

This insurance shall name MOTOROLA SOLUTIONS, INC. or its assignee as additional insured and loss payee for the term of the Schedule A number **24483** dated December 11, 2018.

This insurance is provided by:

_____ A CSAC Excess Insurance Certificate of coverage will be provided

Name of insurance provider

_____

Address of insurance provider

_____

City, State and Zip Code

_____

Phone number of insurance provider

_____

Fax number of insurance provider and email contact information

In accordance with Schedule No. **A** 24483 dated as of December 11, 2018 **to** the Equipment Lease Purchase Agreement Number **24483**, **COUNTY OF RIVERSIDE,** hereby certifies that following coverage are or will be in full force and effect:

Type	**Amount**	**Effective Date**	**Expiration Date**	**Policy Number**
Fire and Extended Coverage	_____	_____	_____	_____
Property Damage	_____	_____	_____	_____
Public Liability	_____	_____	_____	_____

FORM LESSEE RESOLUTION

At a duly called meeting of the Governing Body of the Lessee (as defined in the Agreement) held on December_____, 2018 the following resolution was introduced and adopted.

BE IT RESOLVED by the Governing Board of Lessee as follows:

1. **Determination of Need.** The Governing Body of Lessee has determined that a true and very real need exists for the acquisition of the Equipment or other personal property described in the Lease Schedule No. A 24483 dated as of December 11, 2018 (the "Lease"), between **COUNTY OF RIVERSIDE** (Lessee) and Motorola Solutions, Inc. (Lessor).
2. **Approval and Authorization.** The Governing body of Lessee has determined that the Lease, substantially in the form presented to this meeting, is in the best interests of the Lessee for the acquisition of such Equipment or other personal property, and the Governing Board hereby approves the entering into of the Lease by the Lessee and hereby designates and authorizes the following person(s) to execute and deliver the Lease on Lessee's behalf with such changes thereto as such person deems appropriate, and any related documents, including any escrow agreement, necessary to the consummation of the transactions contemplated by the Lease.

   Authorized Individual(s): _____

   Printed or typed name(s) and title(s) of Individual(s) authorized to execute the Lease.

3. **Adoption of Resolution.** The signatures below from the designated individuals for the Governing Body of the Lessee evidence the adoption by the Governing Body of this Resolution.

   Signature: _____

   Name: _____

   Title: Chairman of the Board of Supervisors

ATTEST:

_____
Clerk of the Board

By:_____
Deputy

Schedule B-24483 (Cont'd)

ORIGINAL ISSUE DISCOUNT:

Lessee acknowledges that the amount financed by Lessor is $15,056,544.73 and that such amount is the issue price for this Lease Payment Schedule for federal income tax purposes. The difference between the principal amount of this Lease Payment Schedule and the issue price is original issue discount as defined in Section 1288 of the Code. The yield for this Lease Payment Schedule for federal income tax purposes is 3.91%. Such issue price and yield will be stated in the applicable Form 8038-G.

Note: To the extent that the Lease is prepaid on any regularly scheduled Lease Payment date, no prepayment penalties shall apply.

INITIAL INSURANCE REQUIREMENT: $15,334,004.00

Except as specifically provided in Section five of the Agreement, Lessee agrees to pay to Lessor or its assignee the Lease Payments, including the interest portion, in the amounts and dates specified in the above payment schedule.

County of Riverside (Schedule B-24483)						
Compound Period:		Annual				
Nominal Annual Rate:		3.657%				
CASH FLOW DATA						
	Event	Date	Amount	Number	Period	End Date
1	Lease	1/1/2019	$ 15,334,000.00	1		
2	Lease Payment	1/1/2021	$ 1,558,037.99	13	Annual	1/1/2033
AMORTIZATION SCHEDULE - Normal Amortization, 360 Day Year						
	Date	Lease Payment	Interest	Principal	Balance	
Lease	1/1/2019				$ 15,334,000.00	
1	1/1/2021	$ 1,558,037.99	$ 1,141,950.15	$ 416,087.84	$ 14,917,912.16	
2	1/1/2022	$ 1,558,037.99	$ 545,507.80	$ 1,012,530.19	$ 13,905,381.97	
3	1/1/2023	$ 1,558,037.99	$ 508,482.30	$ 1,049,555.69	$ 12,855,826.28	
4	1/1/2024	$ 1,558,037.99	$ 470,102.88	$ 1,087,935.11	$ 11,767,891.17	
5	1/1/2025	$ 1,558,037.99	$ 430,320.03	$ 1,127,717.96	$ 10,640,173.21	
6	1/1/2026	$ 1,558,037.99	$ 389,082.43	$ 1,168,955.56	$ 9,471,217.65	
7	1/1/2027	$ 1,558,037.99	$ 346,336.88	$ 1,211,701.11	$ 8,259,516.54	
8	1/1/2028	$ 1,558,037.99	$ 302,028.24	$ 1,256,009.75	$ 7,003,506.79	
9	1/1/2029	$ 1,558,037.99	$ 256,099.35	$ 1,301,938.64	$ 5,701,568.15	
10	1/1/2030	$ 1,558,037.99	$ 208,490.96	$ 1,349,547.03	$ 4,352,021.12	
11	1/1/2031	$ 1,558,037.99	$ 159,141.67	$ 1,398,896.32	$ 2,953,124.80	
12	1/1/2032	$ 1,558,037.99	$ 107,987.81	$ 1,450,050.18	$ 1,503,074.62	
13	1/1/2033	$ 1,558,037.99	$ 54,963.37	$ 1,503,074.62	$ -	
Grand Totals		$ 20,254,493.87	$ 4,920,493.87	$ 15,334,000.00		

SCHEDULE A
EQUIPMENT LEASE-PURCHASE AGREEMENT

Schedule A Lease Number: **24483**

This Equipment Schedule dated as of December 11, 2018 between MOTOROLA SOLUTIONS, INC. ("Lessor") and **COUNTY OF RIVERSIDE** ("Lessee"), is a supplement to, and is hereby attached to and made a part of that certain Equipment Lease-Purchase Agreement Number **24483** dated as of December 11, 2018, between Lessor and Lessee.

Lessor hereby leases to Lessee under and pursuant to the Lease, and Lessee hereby accepts and leases from Lessor under and pursuant to the Lease, subject to and upon the terms and conditions set forth in the Lease and upon the terms set forth below, the following items of Equipment

QUANTITY	DESCRIPTION (Manufacturer, Model, and Serial Nos.)
	Refer to Equipment List in Section 2 of the Proposal.
Equipment Location:	Refer to site coordinates as described in greater detail in Attachment 9.1 of the Proposal ("Nokia Microwave System Feasibility Report")

Initial Term: 168 Months **Commencement Date:** **1/1/2019**

First Payment Due Date: **1/1/2021**

13 Annual Payments as outlined in the attached Schedule B, plus Sales/Use Tax of $0.00, payable on the Lease Payment Dates set forth in Schedule B.