RIVERSIDE COUNTY INFORMATION TECHNOLOGY
SMITH CORRECTIONAL MEDICAL CLINIC
“PUBLIC SAFETY” DISTRIBUTED ANTENNA SYSTEM (DAS)
SUPPLEMENTAL TESTING AND INSTALLATION SOLUTION INSTRUCTIONS
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GENERAL REQUIREMENTS:

Background

Smith Correctional Facility is a Riverside County Jail located in Banning, CA. The complex has multiple buildings/detention facilities that have been added over time. As buildings have been added and two-way radio systems in-building systems have been added.

Recently a medical holding and treatment unit was identified as an area needing 700/800/VHF coverage. A contract was awarded to a company who installed an ADRF 700/800/VHF BDA and DAS systems. The company was unable to make the system work reliably.

Adjacent to the medical holding and treatment unit is a detention building that has a working 700/800/VHF BDA and DAS system (SOLID VHF BDA, TX/RX 800 MHz BDA, CommScope 700 MHZ BDA feeding a combination fiber and transmission line DAS). There is a conduit that runs between this working in building system and the non-working in building system is in the medical holding and treatment center.

Scope

The main focus on this project should be on making the existing equipment perform to specification if at all possible. The Scope of this project as follows:

First portion of the project is to test the ADRF BDA system; the County is requesting the Contractor to provide a detailed cost breakdown (i.e. time, labor, tools, description of test, etc..) that will be required for Contractor to test all of the currently installed equipment to determine if the existing system can be repaired or does it need to be replaced with a new system.

The awarded contractor for this RFB will move forward with the second portion of this project, after testing has been completed, the county will require the Contractor to provide an economical solution to bring the medical clinic into compliance with in-building radio communications.

Solution shall meet the County Requirements for the ADR BDA System specification as follows:

1. Voice Radio Coverage
   1.1. Design shall use iBwave (RF-Vu + RF-Propagation) software.
   1.1.2. The In-Building coverage shall be designed to achieve a minimum Delivered Audio Quality (DAQ) of 3.4, for 95% of the area (each floor of the building, elevators, tunnels, basements and jail cells) at 95% reliability using a portable radio worn at hip level operating over the county’s VHF Fire and 700/800 MHz PSEC radio systems.
   1.1.3. Proposals shall include equipment and costs to achieve the coverage requirements exactly as stated in this specification, regardless of cost.
1.1.4. Contractor’s Proposals shall thoroughly document the challenges to this installation if any are present.

1.2 System Description
1.2.1 When building size dictates an active Fiber DAS, the Fiber Optic Head-end (Master) equipment shall convert radio over coax to Radio-Over-Fiber (RoF).
1.2.2. Bi-directional signal boosters must be channelized Class A type as defined in 47CFR Part 90.7 and must be FCC approved for Part 90 use
1.2.3. The DAS shall have a Network Management System capable of alarm monitor. Configuration and control of all Active Components.
1.2.4. The DAS shall be capable of integration with 3rd party SNMP based NMS (Network Management System) products for alarm purposes and provide alarming information.
1.2.5. Head-end equipment shall be installed in a wall mount rack located in the building’s communication room. Contractor shall coordinate wall mount rack location and electrical with General Contractor.

1.2.6. Electrical shall be provided by the General Contractor as part of their requirements, Contractor shall coordinate all electrical outlet locations needed for the head-end and remote locations with the General Contractor prior to installation.

1.3 Building Configuration:
1.3.1. Bi-directional signal boosters must be channelized Class A type as defined in 47CFR Part 90.7 and must be FCC approved for Part 90 use.
1.3.2. BDA's must be equipped with a self-contained emergency power system capable of maintaining full operation for a minimum 2 hours.
1.3.3. The DAS system shall support the following list of frequencies: All required

### Smith Correctional Medical Clinic Frequencies

<table>
<thead>
<tr>
<th>San Jacinto Cell</th>
<th>CH #</th>
<th>Transmit (MHz)</th>
<th>Receive (MHz)</th>
</tr>
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<tbody>
<tr>
<td>CH1,</td>
<td>772.85625</td>
<td>802.85625</td>
<td></td>
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<tr>
<td>CH2,</td>
<td>772.13125</td>
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</tr>
<tr>
<td>CH3,</td>
<td>771.69375</td>
<td>801.69375</td>
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<tr>
<td>CH5,</td>
<td>771.81875</td>
<td>801.81875</td>
<td></td>
</tr>
<tr>
<td>CH6,</td>
<td>771.64375</td>
<td>801.64375</td>
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</table>

### County of Riverside (New) 800Mhz Frequencies

<table>
<thead>
<tr>
<th>800Mhz</th>
<th>CALAW8</th>
<th>853.5125TX</th>
<th>808.5125RX</th>
</tr>
</thead>
</table>

### County of Riverside County Fire Frequencies

<table>
<thead>
<tr>
<th>Channel</th>
<th>Description</th>
<th>Frequency</th>
<th>Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>VHF</td>
<td>Fire</td>
<td>154.1300 MHz</td>
<td>Downlink</td>
</tr>
<tr>
<td>VHF</td>
<td>Fire</td>
<td>158.9550 MHz</td>
<td>Uplink</td>
</tr>
</tbody>
</table>

1.3.4. In-building coverage must include basements, tunnels, corridors, elevators, mechanical rooms and chases.
1.3.5. A detailed installation plan shall be developed in coordination with the General Contractor and submitted for approval by RCIT prior to any installation work. Likewise, a final as-built drawing shall be provided by the Contractor upon completion of this work.

### 1.4 Coaxial Installation

1.4.1. Coaxial cabling or other feeder cables inside a building shall be plenum rated. Coaxial cabling and other feeders located on the outside of a building shall be rated for the environment in which they are installed. In instances where plenum rated cables may not be appropriate, RCIT shall be notified for final determination. Coaxial cable size shall be determined per the manufacture requirements based on Db loss and length.

1.4.2. Coaxial cabling installed indoors shall be installed with J-hooks, Pencil-rod (P-rod), and stringers (wire hangers) to support coaxial cabling. All supports shall be no more than 4-5’ between supports. Coaxial cabling installed outdoors on a roof top shall be installed in cable tray and supported on Dura-Blocks every 3-4’. Coaxial cables installed on a side of a building shall be supported with unistrut and cable supports. Cable supports and method of installation shall be coordinated and approved by RCIT. Coaxial cabling shall not exceed the manufactures bend radius.

1.4.3. Coaxial cable lightning suppression devices and transmission line ground kits shall be installed outdoors before entry and indoors at the point the coaxial cable enters the building and shall be connected to a suitable ground using the appropriate gauge solid or stranded copper wire based on the distance to the ground point. The cable shall be run in the shortest, straightest manner possible. Bends shall not to exceed manufacturer’s minimum bend radius. Installation shall be consistent with the Motorola R-56 Standard. All methods of grounding must be approved by RCIT.

1.4.4. Transmission line ground kits shall be installed per manufacturer specifications and shall be sealed from the weather to prevent water and corrosion damage to the transmission line (ANSI T1.313-2003, section 10.5). Transmission line ground kits shall be installed at the first point of contact, near the antenna (ANSI T1.334-2002, section 6.6; ANSI T1.313-2003, section 10.5.1; and MIL-HDBK-419A) and before entry of a building for a minimum of two-point prior of entry.

1.4.5 All surge protection devices and outside coaxial cable metallic shields shall be effectively bonded back to the external grounding system with a tinned copper Class I or Class II lightning...
protection conductor for outdoor installations and a green insulated #2 AWG for indoor installations. Indoor conductors gauges shall be based on the distance chart below.

1.5 Pathways
All pathways shall be provided by the General Contractor and are referenced on the CD’s (Construction Drawings). There are a series of 2” and 4” conduits dedicated for the DAS.
1.5.1. Contractor shall verify and coordinate all needed pathways with the General Contractor such as: sleeves, ceiling hatches, and penetrations prior to installation.

1.6 Fiber Distribution
1.6.1. Single-mode fiber optic cable shall be used for active distribution.
1.6.2. Single-mode fiber optic cable shall be an armored plenum cable type.
1.6.3. Single-mode fiber optic cable shall be six strand or greater, designed for point-to-point applications as well as mid-span access, shall provide a high-level of protection for optical fiber installed in interior building environments. Example: Berk-Tek Fiber Single Mode Fiber Part# LTPK12B024AB043
1.6.4. All splicing shall be fusion splices and utilize a sub-unitized design with color coded subunits for easy identification. All fusion splices shall be installed in a rack mount fiber enclosure and fusion splice trays shall be utilized. Note: Link loss budget shall meet the manufactured specified requirements.
1.6.5. Single-mode fiber optic cable shall be 8.3um and use standard colored tight buffered construction.
1.6.7. Fiber-Optic Pigtails shall be fusion spliced and utilized for each remote unit installed and connector type shall meet the manufacture requirements for each remote installed.
1.6.8. Fiber-Optic Pigtails shall be fabricated to meet the performance parameters corresponding to the optical fiber cable.

2. Antenna Installation
2.1.1. Donor antennas shall be mounted and secured using unistrut on parapets if present. In the event that a parapet is not available, non-penetrating roof mounts shall be used.

2.1.2. Non-penetrating roof mounts and parapet installations shall be secured and installed in accordance to the TIA 222G standard and shall be rated to withstand 120MPH wind speed. The method in which the antennas are mounted shall be approved and coordinated with RCIT.
2.1.3. In-building antennas must be Omni, White in color and shall be installed per the manufacture specifications.
2.1.4. In-building antennas installed within Inmate Accessible Areas require a fully tamper-proof design and installation, intended for high security correctional areas.

2.2 Grounding
2.2.1 Any additional grounding required must be installed in compliance with the County’s R56 standards.
2.3 Acceptance Testing
2.3.1. Successful completion of Acceptance Testing is required for Final Acceptance and contract closure. A minimum of one (1) County communications engineer, one (1) Sheriff Deputy, and one (1) Fire Representative shall be present at the time of testing and shall witness all tests. Should any Acceptance Test fail, the Contractor shall immediately correct the cause of the failure and the failed test shall be repeated.

The Contractor shall provide a detailed step by step Acceptance Test.

Acceptance testing shall consist of two phases which are described below:

2.3.2. Each major component (example: Bi-Directional Amplifiers) and major sub-system shall be tested to verify proper operation and compliance with this Specification and the manufacturer's published specifications.

The actual radio coverage obtained from the In-Building Solution shall be measured and compared.

2.3.3. Tests shall include the following as a minimum. The tests may be conducted concurrently.

1. The first test shall be conducted with a portable radio carried in a holster at waist level for both transmit and receive.
2. Since DAQ (Delivered Audio Quality) is, in part, evaluated on the need to repeat transmissions, the voice tests shall be performed using a pre-prepared list of short, random phrases. This is to prevent test participants from knowing or guessing the content of a transmission in advance and consequently scoring the transmission higher than it deserves because repetition was not required.
3. The list of random phrases shall be similar in length and content but not necessarily identical to the Harvard Sentences. The list shall be prepared ahead of time but not revealed to either the Field Testers or the Dispatch Testers until the time of the test. The Field Testers shall not be given the list of phrases at any time. The list shall contain enough phrases so that each phrase will be repeated no more than once during the course of the test.
4. Each floor of the building shall be tested including underground areas. Each floor will be divided into grids per the construction drawings. A minimum of twenty grids will be tested per floor. In the event that the floor does not pass, the floor will be divided into smaller grids and retested to identify the problem areas in more detail.
5. Voice Radio Coverage Verification Testing shall be deemed successful if 95% or more of all grid squares achieve a DAQ (Delivered Audio Quality) of 3.4 or better.

2.3.4. Adjustments to correct coverage issues revealed by initial testing, shall be performed within 3 business days of testing.

3.0 Submittals
3.1.1. Submittal Requirements with Bid Response:

- Detailed testing methodology
3.1.2. Submittal Requirements Prior to Start of Construction:

- Detailed Installation Plan
- Bill of Material (BOM)
- Acceptance Test Plan (ATP): The Contractor shall submit an ATP that has been accepted by the customer or customer’s designated representative.

3.1.3. Submittal Requirements at Close Out:
1. Drawings: Submit as-built drawings indicate:
   - Donor Antenna, grounding, and lightning protection details
   - Cable routing, splitters, couplers and coverage antenna locations
   - Active component locations, layout and configuration

2. Test Reports:
   - Submit accepted ATP reports confirming the requirements of all sections of this document have been met.
   - Field Reports: Submit sweep testing results for all cable runs.
   - Field Reports: Submit OTDR test results for all fiber runs.
   - Operation and Maintenance Data: Submit hardware and software manuals for all Active Components.

3.1.4. Warranty Documents:
   - Submit for all manufactured components specified in this section
   - Submit Contractor’s System Warranty (1) Year
   - Submit Manufacture’s Extended Warranty (2) year

3.1.5. Warranty shall begin on final acceptance and sign off from the County Communications engineer, Sheriff Representative, and Fire Representative.

4 Quality Assurance

1.1.1. Qualifications: Contractor and/or Sub-Contractor shall have a minimum of 5 years full time experience executing work of similar scope and complexity

1. Certifications:
   - Contractor of Subcontractor shall provide manufacture certification that their personnel have been trained on the components being installed.
   - Active Components: Contractor or Subcontractor shall provide manufacture certification that their personnel have been trained on the components being installed.
   - Motorola R-56 Installation Guidelines: Contractor or Sub Contractor shall provide certification that their personnel have been trained.

2. Contingency

   - Contractor shall include a project contingency equivalent to 10% of the total estimated labor and material cost.