

**D.P. CULP CENTER: ETSU  
DISTRIBUTED ANTENNA SYSTEM (DAS)  
REQUEST FOR PROPOSALS  
SBC No. 166/005-01-2014CM**

**OVERVIEW**

In order to meet 2012 International Fire Code (IFC) requirements adopted by Washington County and Johnson City Fire Department, the East Tennessee State University DP Culp Center Building (hereafter CULP) shall have approved radio coverage for emergency responders within 95% of all areas of the building.

To meet these requirements, CULP shall have installed a hybrid Distributed Antenna System (DAS). The DAS will be designed to enhance the radio signal coverage of the existing Washington County 911 public safety communications system to meet or exceed the radio signal requirements mandated in the 2012 IFC, Section 510, et al. Washington County currently operates a multi-channel radio system in the 700 to 900 Mhz frequency band. The DAS shall support two-way communications on all 911 frequencies. The DAS infrastructure shall also have the capability of expansion to cover commercial cellular bands and/or extension to other buildings on campus.

**SYSTEM DESIGN & INSTALLATION CRITERIA**

System design and solution is to include Bi-Directional Amplifier(s) (BDA) and a hybrid DAS. The hybrid DAS is to be a broadband arrangement of BDA base station equipment, annunciator, coax cable, single mode fiber optic cable, optical distribution units, remote units, directional couplers, power splitters, and indoor and outdoor antennas tactically positioned throughout the FACB to achieve minimal signal loss and optimal signal strength. The DAS must be capable of remote monitoring solution that provides alarming, diagnostics and provisioning and control of the system. The DAS must meet all technical requirements referenced UL2524, 2012 IFC - Section 510 and all subsections, NFPA 72, and NFPA 1221.

The Vendor is to provide all equipment, wiring and installation to result in a turn-key solution including, but not limited to, the following:

- Pre- and Post-Installation Testing – by an FCC-GROL Licensed Vendor
- System Design
- Engineering Services
- Bi-Directional Amplifier Infrastructure
- Indoor and Outdoor Antenna Systems (including Directional Couplers and/or Splitters)
- Coaxial Cabling and Connectors (meeting or exceeding manufacturer's line loss specifications) – 2 Hour Rated Circuit Integrity Cables for Backbone Fiber and Coax
- Lightning/Surge Suppression

- Grounding
- Ancillary Equipment and Power for BDA units
- Miscellaneous Hardware and Installation Supplies (as required for job completion)

The DAS, as designed and installed, shall cover all frequencies utilized by Washington County 911, and shall not cause interference to other licensed FCC users in the 700 to 900 Mhz band. The DAS shall be capable of modification or expansion in the event frequency changes are required by the FCC or additional frequencies are made available by the FCC to Washington County 911.

Approval Prior to Installation: Amplification systems capable of operating on frequencies licensed to any public safety agency by the FCC shall not be installed without the prior review and approval of the fire department official.

FCC Compliance: The emergency responder radio coverage system installation and components shall also comply with all applicable federal regulations including, but not limited to, FCC47 CFR, Part 90.219.

Vendor shall provide a complete written design of the proposed DAS network and shall include specifications sheets for all proposed equipment. Included within the design will be a written description of lightning and surge suppression measures.

Installation services shall include tuning, alignment, and optimization, as needed. Installation services shall also include system testing & approval in association with the Washington County Fire Marshal's Office.

### **TECHNICAL REQUIREMENTS**

The DAS shall meet the following technical requirements:

- **95% coverage in all areas of the building.** The building shall be considered to have acceptable emergency responder radio coverage when signal strength measurements in 95% of all areas on each floor of the building.
- **Minimum Signal Strength:** The DAS shall be capable of enhancing the radio signal of the 911 system so that a signal strength of -95 dBm or greater is received within and transmitted from 95% of all areas on each floor of the building.
- **Secondary Power:** Emergency responder radio coverage systems shall be provided with an approved secondary power source. The secondary power source shall be capable of operating the emergency responder radio coverage system for a minimum of 24 hours. When primary power is lost, the system shall automatically transfer to the secondary power source.

- **Signal Booster Requirements:**
  - All signal booster components shall be contained in a National Electrical Manufacturer’s Association NEMA-4 type waterproof cabinet.
  - Battery systems (if applicable) used for emergency power source shall be contained in a NEMA-4 type waterproof cabinet.
  - The signal booster and secondary power source shall be electrically supervised and monitored with a local annunciator and monitored for Supervisory Signal by the building Fire Alarm Control Panel (FACP).
  - Equipment shall have FCC certification prior to installation.
- **Cellular Carrier and Expansion Requirements:** The DAS shall be capable of expansion to include all commercial cellular bands. The backbone of the system shall also be capable of expansion to other buildings and/or locations on campus.

**REQUIRED QUALIFICATIONS OF VENDORS**

The design and implementation of an optimally functional DAS requires substantial radio frequency (RF) technical knowledge. Vendors must have the required qualifications within their organizations in order to be considered. As follows are the minimum requirements for consideration:

- A valid FCC-issued general radio operator’s license
- Certification of in-building system training, issued by a nationally recognized organization, school or a certificate issued by the manufacturer of the equipment being proposed
- Electronics Technicians Association Senior Level certification
- References from at least two previous and still operating DAS installations of similar size and scope, within a 25-mile radius of Johnson City and/or Washington County.
- At least 25 years combined experience in the RF installation and services industry, clearly demonstrating adequate skills and experience to perform required installation, performance testing and subsequent services.
- 24/7 on-call service with an on-site response time of no more than two hours from receipt of initial service call.

**ACCEPTANCE TESTING**

Upon installation completion, system acceptance testing shall be performed in accordance with Section 510.5.3 (IFC). Testing shall be conducted using a calibrated portable radio of the latest

brand and model used by the agency talking through the agency's radio communication system. A spectrum analyzer or other suitable testing equipment shall be utilized to ensure no spurious oscillations are being generated by the system's signal booster. Written testing reports shall be submitted to the designated ETSU representative and the Johnson City Fire Marshal.