

**The City of Bella Vista, Arkansas**

**Fire Department Digital Communication  
System Bid Specifications**

**Chief Steve Sims  
PO Box 5655, Bella Vista AR 72714  
(479) 855-8248**

**Bids must be submitted by 12:00pm on September 23<sup>rd</sup>, 2010**

**SPECIFICATION**  
**Multi Site Digital Trunked Radio System**

**1. Description.** This Item shall govern for and establish requirements for a multi-site digital trunked radio system for the City of Bella Vista Fire Department.

**2. Applicable Specifications and Standards.** Reference to specifications, standards, test methods, and other documents shall be to the issues in effect on the date of the Invitation for Bids. Copies of the referenced documents may be obtained from the issuing organizations at the addresses shown. The following publications form a part of this Item to the extent specified herein:

(1) Electronic Industries Association (EIA), 2001 Pennsylvania Ave., N.W., Washington, DC 20006:

(a) ANSI/EIA 152C Minimum Standards for Land Mobile Communication, FM or PM Transmitters, 25-866 MHZ.

(b) ANSI/EIA 204D Minimum Standards for Land Mobile Communication FM or PM Receivers, 25-866 MHZ.

(2) Federal Communications Commission (FCC), 1919 M St. N.W., Washington, D. C.20554:

(a) Code of Federal Regulations 47 CFR 90, Private Land Mobile Radio Services.

**3. Definitions.** Terminology used in this Item is intended to be generic in nature and consistent with meanings that have been defined through general use, accepted trade practices, regulatory authorities, and/or industry standards. Where variant meanings may exist, the applicable interpretation shall be determined by the City of Bella Vista, Arkansas.

**4. Requirements.** Products purchased under this Item shall meet or exceed the following requirements:

(1) General Requirements.

(a) Equipment and accessories shall be new, unused, currently standard products of an established manufacturer. Submitting contractor must be authorized by manufacturer to represent for sale and warrant all products contained in the submittal for the specific geographical area of Bella Vista, AR.

(b) Equipment and accessories shall be free of rust, corrosion, scratches, dents, or other defects which might affect appearance, normal life, or serviceability.

(c) Parts and components not specifically mentioned in this Item but which are required to provide a complete operating system or which are standard for the model bid, shall be included as part of the equipment furnished.

(e) Component selection shall be in accordance with the component manufacturer's recommendations for maximum life.

(f) Modular construction, with maximum use of integrated circuitry, plug-in-circuit boards and modules, and printed circuits, shall be employed.

(g) Details not specified herein shall be in accordance with standard commercial practices for products of this type.

(2) Registration. All equipment shall comply with all applicable FCC requirements. All components shall meet or exceed all applicable EIA standards. 3-6 8646 6-01

(4) Performance. All proposed equipment shall meet or exceed the performance requirements specified herein.

(5) AC Power Supply. Stations shall operate from a 120 VAC (+/-10%), 60 Hz input.

(6) Special Requirements. Special requirements, if any, not contained in this Item, shall be described on the plans.

**5. Testing.** All tests and measurements shall be in accordance with applicable EIA Standards. In the event products tested fail to meet or exceed all conditions and requirements of this Item, the cost of the samples used and the cost of testing shall be borne by the Contractor.

**6. Samples.** No pre-purchase or pre-shipment samples shall be required.

**7. Submittal Requirements.** Three (3) sets of submittal data, i.e. cut sheets (data sheets) for the equipment shall be submitted.

**8. Inspection.** Products furnished under this Item shall be inspected by, or at the direction of, the The City of Bella Vista's designated representative.

**9. Warranty.** Warranty for the system and terminals shall be (3) Years. During this warranty period, the Contractor shall repair or replace defective components/units at no cost to The City of Bella Vista, AR.

**10. Availability of Service.** Factory authorized service shall be available with a One (1) hour response time for critical component failures.

**11. Instruction Books/Manuals.** The supplier shall furnish a copy of operating instructions for each item delivered. An address for reordering manuals shall also be included.

(1) Installation and Maintenance Manuals. Printed, comprehensive installation and maintenance manuals assembled with covers and conforming to the specific equipment supplied shall be furnished. The manual shall include a material list which shall contain the replacement part numbers and description with applicable values of all components used.

(2) Quantity. Two complete sets of manuals, for the system infrastructure shall be furnished to The City of Bella Vista.

(3) Deviations. Any changes to, or modifications to, standard units or components required to meet these specifications shall be fully documented and included in the manuals provided.

**12. Labeling.** Each station shall bear a securely affixed and durable label on the outside of the case with the following information:

1. Manufacturer's name or recognized trademark,
2. Model number,
3. Serial number,
4. FCC identification number or Part 15 compliance statement if required.

**13. Compliance.** In order for consideration to be given to the bid on an item under this Item, the Contractor must comply with the following conditions:

(1) Equipment Identification. The make, model number, name of manufacturer, brand or trade name, etc., as applicable, of the item which the Contractor proposes to furnish must be stated as part of the bid.

(2) Proof. The Contractor shall bear the burden of proof of compliance with this Item.

(3) All contractors must comply all laws imposed by the State of Arkansas Licensing Board for General Contractors.

**14. Installation.** The Contractor shall install the systems at the locations indicated below.

1. **Trafalgar Water Tower** (Location: Trafalgar Rd near Highway 340)
2. **London Rd Water Tower** (Location: Corner of London Rd and Chelsea Rd).
3. **Highlands Water Tower** (Location: Next to Fire Station #3)

**15. Digital Trunked Radio System General:**

The system consists of the 3 mentioned sites with 2 digital trunked channels per site. City of Bella Vista Fire Department owns 2 UHF narrow band frequency sets. 4 additional UHF 12.5k or 6.25k frequency sets will be needed. Any fees associated with obtaining these frequencies must be included as part of this proposal. Contractor is responsible for all equipment and labor necessary to connect systems for multisite operation. Multisite operation allows users to roam from one site to the next without user intervention. Equipment at each site will be installed in 19 inch equipment racks. Each rack to be secured and grounded per industry-standard specifications. Each channel in the system will utilize 100 Watt power amplifiers with uninterruptable power supplies. Contractor is responsible for supplying all material and labor necessary to complete a turnkey multisite digital trunked radio system including antenna systems, combining systems, multi-coupler systems, power systems and software required to control and manage the system. Some minimal specifications for each site listed below. Contractor is responsible for providing ALL equipment (listed below or not) necessary to complete system installation.

Qty	Description
6	UHF Digital Repeaters with trunking and multisite operation included
6	100 Watt UHF amplifiers
3	UHF Combiner multicoupler TXRX 74-70-09048-E or equal Managed VPN Router(s)
3	Network Switches
1	System manager software
	7/8"-1" Helix
	450-470 Repeater antennas for 3 sites
3	Lightning Arrestors TX and RX
3	Power Supplies with battery backup and AC circuit protection

### ***15.1 Interoperable Gateways:***

Contractor must provide all equipment and labor necessary to construct a mutual aid gateway between the UHF digital system and Arkansas's 700/800mhz AWIN system. It is up to the contractor to determine the absolute best overall location for these gateways and method of control. Contractor is responsible for providing all equipment and labor to build these gateways.

### **16. Point to Point Backhaul:**

The systems will be linked via RF link. Contractor will be responsible for any FCC filing and co-ordination fees if required for this link. Contractor will also be responsible for determining the equipment necessary to provide RF path/signal strength of 99% or greater between all 3 sites. Contractor must submit RF Path study analysis showing the proposed Linking method, technology, Frequency, and installation that will result in desired signal strength as described.

### **17. Radio System Specifications:**

#### ***17.1 Digital Repeaters:***

UHF Models ( 450-480 MHz)

Available for both Digital and Analog mode  
RF & Controller packed in an 1U height (44 mm) unit  
Repeater or Base Station Operation  
Available  
100 W Output Power  
Maximum 30 Channels Programmable per site  
16-Site Trunked IP Network Capability  
10/100 Base-T Ethernet Network Interface  
DB-25 Accessory Connector  
Programmable AUX I/O's  
DTMF AUX Output Control / Input  
Monitoring  
External LTR® Controller Interface  
Built-in 16 QT/DQT Repeater Control

## ***17.2 Minimum Digital Systems & Networks Features***

Digital System networks must be designed to provide all the benefits of the latest DAP-driven LMR digital voice technologies, trunked system efficiency, IP network, wide area calling, secure digital voice and an array of advanced digital communications feature sets.

- Digital Trunking
- Digital Conventional
- FM Conventional
- IP Wide Area Networks
- Advanced Digital Audio
- AMBE+2 VOCODER
- Secure Voice
- GPS with Voice
- Individual & Group Calling
- Over-the-Air Caller ID

## ***17.3 General System Requirements***

### **Multi-Mode**

All equipment proposed must support digital trunking, digital conventional and FM conventional for mixed system use and graceful migration. Base units include FM conventional repeater control and external interface for conventional or LTR® trunking controllers. Subscriber units also include LTR® operation.

### **Advanced Digital Audio**

All equipment proposed must utilize advanced DSP coding, DVSI AMBE+2 VOCODER technology and have a field-proven low BER rate modulation method resulting in high quality digital audio performance that extends the effective communication range more than FM.

### **Secure Voice**

All equipment proposed must provide an inherent level of security via its digitally encoded air interface. Proposed radios must also include a digital voice scrambler for digital modes and an inversion scrambler for basic security in FM mode.

### **Integrated Data Services**

Proposed system must contain integrated data services allowing for, GPS location data sent for fleet management tracking and emergency location. Proposed system must also support status and text messaging features for routine canned and free-form text messaging.

### **System Management**

The proposed system must have Windows® System Manager provides local and remote PSTN or LAN/WAN site provisioning, activity monitoring, firmware updates, and call log retrieval. Call logs are downloadable in standard formats for traffic loading and security analysis.

#### **Mission Critical Assurance**

Proposed digital System must provide conventional failsoft operation for continued communications and self-healing control channel switching in the event disaster disables certain channels or network resources.

#### **Spectrum Efficient Technology**

Proposed digital system must allow for digital air interface operating in 12.5 kHz narrow bandwidth mode for current channel assignments and in **6.25 kHz** bandwidth mode if future regulatory mandates require.

### ***17.4 Digital Trunking Requirements***

#### **IP Multi-Site Networking**

Digital system must utilize VOIP technologies to eliminate costly leased line expenses. Digital System networks must use commercial 10/100 Base-T Ethernet switches and routers eliminating costly hardware switch solutions.

#### **Automatic Roaming**

Subscribers automatically search for the best accessible sites while moving throughout a network using advanced control channel RSSI & BER hunting algorithms.

#### **Message Trunked Mode**

Proposed subscriber units must hold a traffic channel for the length of a two-way conversation without busy system interruptions.

#### **Call Queue Pre-emption (Message Trunked Mode only)**

Proposed system must cancel the hold timer for the lowest priority message trunked call on the system thereby releasing the channel sooner to the preempting caller. For dispatcher, supervisors & emergencies.

#### **Late Entry (GID & now also UID Calls)**

Proposed subscriber units must automatically join group or individual calls already in progress after powering on or entering system coverage.

#### **ESN Validation-**

Proposed subscriber units must have a unique factory embedded Electronic Serial Number. Each subscriber unit can be validated for network access at the time of registration (networks only).

#### **UID Registration-**

Proposed system must register individual UID's to receive individual private calls as a unit roams through the network.

## **16 Site Networks**

Proposed digital System network must accommodate up to 16 sites of 30 channels per site for seamless wide area calling and fleet unit roaming.

## **Individual & Group Calling**

For dispatch operations, the digital system must support up to 60,000 Talk Group IDs per network and 3000 per site. The digital trunked system must support 60,000 Individual Unit IDs per network and 3,000 per site for private unit-to-unit calling. These IDs can be partitioned for shared system use and agency, department and sub-user groupings.

## **Advanced Trunked Features Sets**

Digital trunked system must support traditional mission critical features such as call queuing for system busies, priority levels for preferred system access, emergency call and signaling for life-threatening incidents and broadcast all calls for all fleet calling during emergency and storm plan scenarios. Each subscriber unit must have a unique factory embedded ESN that the system can validate to protect against unauthorized access. Remote Inhibit permit a dispatcher to disable a compromised unit in the field.

Proposed repeaters must be full featured, integrated high specification repeater station. It is specially designed for the demanding requirements of public safety applications where large fleets are supported and continuous duty operation is needed.

### **Repeater Digital features must include:**

- ESN checking
- Individual call
- Group call
- Auto registration & deregistration
- Stun & Kill
- Password protection
- Up to 30 channels per site

### **Conventional features must include (some specific to protocol):**

- Maximum 512 channels
- QT/DQT encode and decode
- Priority scan
- Time-out-timer
- Talk around
- Busy channel lockout
- Compandor

1. The radio adaptor must support a TX delay, RX delay, and Squelch tail delay for the purposes of delaying transmit audio, receive audio (to eliminate first syllable loss when using VOX), and for muting the squelch tail of some radios when they key down from transmission.
2. The radio adaptor shall provide for a locally controlled crosspatch between the two attached radios.

### **18. Contractor Qualifications:**

The minimum qualifications of the contractor will be as follows:

- The contractor shall have an overall knowledge of the system design, verified experience working with communications systems, and an understanding of the Cities communications infrastructure.
- The contractor must be an authorized agent of all proposed equipment and have service technicians certified by the FCC for 2-way radio repair.
- The contractor must have a safety certified tower climber on site during all climbing work.
- The contractor shall demonstrate by reference that they can implement and maintain a system of this type.
- The contractor must have a service facility located within forty miles of The City of Bella Vista's facilities and capable of 24/7 response for both emergency and non-emergency service.
- Submitting Contractor must be authorized by the manufacturer to represent the products submitted. The City of Bella Vista will not accept bids from any third party (agents) that do not have a direct authorized relationship with contractor.

## 19. System Pricing

We, the undersigned, propose to furnish the equipment, installation, training, and other goods and services listed below and guarantee that if we are awarded the contract, we will furnish all this in accordance with the attached specifications.

### I. Complete Turnkey system Including .

3 Site, 2 Channel, IP Linked, Digital Trunking System with Auto-Roaming  
Antenna System  
Point to Point Backhaul System  
Labor, Shipping, training and installation  
FCC Charges

Attach complete list of equipment, labor, training, etc. being proposed with pricing. (include brochures/specification documents)

Total \$ \_\_\_\_\_

Exceptions to specifications:

(List on Separate Page)

PROPOSAL PRICES ARE GUARANTEED FOR NINETY (90) DAYS AFTER BEING OPENED BY THE CITY OF BELLA VISTA, ARKANSAS.

Name of Firm Authorized Signature \_\_\_\_\_

Printed Name of Signee \_\_\_\_\_

Address \_\_\_\_\_

City, State, Zip \_\_\_\_\_

Please mail completed sealed bid to:

Jane A. Wilms, City Clerk-Treasurer  
City of Bella Vista  
416 Town Center East  
P.O. Box 5655  
Bella Vista, AR 72714-5655