

PUBLIC NOTICE OF REQUEST FOR PROPOSAL (RFP)

Request for Proposals (RFP) will be accepted by DeKalb County Government until 2:00 PM CDT, Tuesday, October 31, 2017 at the DeKalb County Finance Office, 200 N. Main Street, Sycamore, IL 60178 for a new P25 digital public safety radio system for DeKalb County. RFP details and instructions are available on the County's website www.dekalbcounty.org. DeKalb County Government reserves the right to reject any RFP and to accept the RFP that is in the best interest of the County.

DeKalb County Illinois – P25 Radio Project

This is an invitation to provide a request for proposal (RFP) for the above mentioned project for DeKalb County Illinois, hereinafter referred to as “Owner”.

A. Project Information

- a. Project Name:
DeKalb County Illinois Project 25 Radio System
- b. Project Description:
Upgrade of the County Public Safety wireless radio system to APCO Project 25 Compliance.
- c. RFP Prepared By:
PYRAMID Consulting
203 Good Ave.
Indianapolis, IN 46219
Phone: 317-396-9426
Fax: 317-396-9427

B. RFP Format

- 1. The RFP includes a scoring system, which is included in the project documents. A technical committee has been established by the Owner to score the RFP.
- 2. The RFP includes several alternates that the owner will have scored separately as part of the RFP process.
- 3. There are seven teams that will be reviewing and scoring the responses.
- 4. There are two (2) parts to the RFP that will be scored:
 - a. Infrastructure
 - b. Subscribers

C. RFP Documents

- a. RFP documents will be made available after August 25, 2017.
- b. This is an invitation to provide a request for proposal for the P25 radio System. Documents may be obtained from:

- a. PYRAMID Consulting tbutrnworth@pyramidarch.com
- b. County's website www.dekalbcounty.org

There is no charge for the RFP documents.

- c. There is a pre-submission meeting at 2:00pm (CDT) on September 6, 2017 at the Community Outreach Building; 5 Seasons Rm; 2550 N. Annie Glidden, DeKalb, IL 60115. Direct all questions to Pyramid by e-mail at tbutrnworth@pyramidarch.com.

D. RFP Delivery:

1. RFP's shall be sent or delivered in person to:
 - a. DeKalb County Finance Office
200 N. Main Street
Sycamore, IL 60178
 - b. Faxed or e-mailed responses will not be accepted.
2. RFP's will be received by DeKalb County 2:00 pm (local time), Tuesday, October 3, 2017 (This will be considered "due time" unless subsequently revised by addendum). RFP's received after "due time" will be returned unopened.
3. Binders for response to RFP need to be included in a non-sealed box(s) along with a single sealed envelope for the cost of the proposal. Number of binders are indicated in Section 002000.
4. Portable radios shall be included in box(s) along with appropriate accessories. Include any instructions on talkgroup usage in box. Number of units are listed in Section 002000.
5. RFP's are required to enclose one sealed envelope with each quotation the following forms:
 - a. Section 001300 Bid, Offer, or Proposal for Sale or Lease of Materials (signed and notarized)
 - b. Stipulated Offer Form
 - c. RFP Security (bid bond)
6. Label the outside of the sealed envelope indicating project name as well as the vendor's name and address.

E. Miscellaneous Provisions

1. The Owner reserves the right to reject any RFP, or all RFPs, or to accept any RFP that may seem desirable, and to waive any and all informalities in the RFPs. Any RFP may be withdrawn prior to the above scheduled time for the opening of the RFPs or authorized postponement thereof. Any RFP received after the time and date specified shall not be considered. The Owner reserves the right to accept or reject any RFP or waive any informality or errors in RFP for a period of 90 days after the RFP due time.
2. All applicable laws, ordinances, and the rules and regulations of all authorities having jurisdiction over the project shall apply to the project throughout.

3. RFPs shall be properly and completely executed on offer forms included in the Project Documents. The Owner may make such investigations as deemed necessary to determine the ability of the Vendor to perform the work and the Vendor shall furnish to the Owner all such information and data for this purpose as the Owner may request. The Owner reserves the right to reject any RFP if the evidence submitted by, or investigation of, such Vendor fails to satisfy the Owner that such Vendor is properly qualified to carry out the obligations of the Agreement and to complete the work contemplated therein.
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DeKalb County Illinois

Request for Proposal

For

Public Safety Radio System

Dated: August 25, 2017



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SECTION 001020 – DEKALB COUNTY PROJECT 25 RADIO SYSTEM OVERVIEW

PART 1 - GENERAL

1.1 SUMMARY - General Information

- 1.1.1. DeKalb County (County/Owner) is hereby requesting a proposal for an APCO Project 25 trunked-simulcast radio communications system for use throughout the DeKalb County, Illinois area. The system should be a highly reliable, fault tolerant system which will meet current needs and provide a growth path for future expansion. Since the system is expected to serve the communication needs of the County for the next 15-20 years, it must have the flexibility of adapting to changing system requirements and new technology without the need to replace major equipment elements. In particular, the system must be compliant with the specified Project 25 Phase 1 and Phase 2 protocols with full implementation no later than 12 months from contract signing. The County intends to implement future data applications and add additional users beyond the initial identified requirements, and requires that this system allow for future growth of the system. The system must also allow for the addition of simulcast repeater sites to increase coverage should the need arise.
- 1.1.2. The Owner is looking for responses to this RFP from qualified manufactures. It is possible to provide a response to only one portion of the RFP (i.e. base offer vs. alternates or Base Offer #1 vs. Base Offer #2). The overall concept of the Owner is to have one Vendor or joint venture agreement for each offer for the final design, development, implementation, verification and ongoing support of this very critical network. There may be one Vendor for the Base Offer #1 and another Vendor for Base Offer #2.
- 1.1.3. This RFP intends to provide the Vendors with sufficient information to fully understand the system's specific requirements and the environment in which the proposed system must be implemented and will operate. To aid the evaluation committee in fully understanding the proposal submitted by each vendor, and to ensure full awareness is given to each aspect of the proposal, any exception taken to, or alternative methodology proposed to the requirements specified in this proposal must be clearly noted and referenced to the subject area of this proposal. Any exceptions taken to the requirements of the proposal will be considered in the evaluation process. Any deviations from the requirements of this proposal must be clearly identified on an item-by-item basis.
- 1.1.4. This proposal identifies the requirements of the system. Venders may identify additional functions their system offers. Any functionality beyond that required by this proposal that involves additional costs must be clearly identified as a voluntary

alternative proposal item. The cost issues must be included in the “sealed envelope” included in the response to the RFP.

1.2 Brief Overview of Current Operations

- 1.2.1. Currently DeKalb County’s dispatch is located at the DeKalb County Sheriff’s Department at 150 N. Main Street in Sycamore Illinois, this is the primary PSAP location for DeKalb County.
- 1.2.2. DeKalb County currently operates an analog VHF conventional system with 3 channels. The current system is over 25 years old and has multiple repeaters throughout the County. DeKalb County maintains 7 lines and seven (7) console positions.
- 1.2.3. There will be three (3) mobile console systems located in the “Mobile Command Post”.
- 1.2.4. DeKalb County’s current system includes a variety of equipment. There is no single Vendor as part of the current system.
- 1.2.5. DeKalb County also operates a limited microwave system for selected site.
- 1.2.6. DeKalb County uses the VHF System for a two-tone sequential paging as well as voice communication for the fire services.
- 1.2.7. Tornado sirens are currently maintained and operated by multiple agencies within the county and need to be able to be activated by the console (VHF) system.

1.1. System Overview

- 1.1.1. Provide a 6-channel “roundtrip” coverage for DeKalb County. The coverage shall be a minimum of DAQ 3.4 transmitting and receiving at the at the hip level using speaker mic and swivel case at 3watts. The coverage shall be 8dB loss in less populated areas and 24dB loss in cities and towns.
- 1.1.2. The roundtrip shall be with a five tower simulcast system. Paragraph 1.3 of this section indicates the locations of the tower sites.
- 1.1.3. The Project 25 Phase I (FDMA) or Phase II (TDMA) trunked radio system shall operate in the 800 MHz range.
- 1.1.4. The backbone of the system shall consist of multiple simulcast repeater sites connected to a wide area controller, or switch, to provide reliable wide area voice and data communications to and from mobile and portable units throughout the desired area of coverage. To provide best value to the County, proposer shall

maximize the use of commercial, off-the-shelf (COTS) Internet Protocol (IP) networking technologies for interconnectivity of network elements. If multiple wide area controllers are necessary to provide the required network coverage, they must be capable of being linked for extended system wide communications.

- 1.1.5. The router/switch system is required to be a layer-3 system that allows for individual IP addresses as part of the system.
 - 1.1.6. The network communications architecture shall provide the radio user transparent radio communications across the entire area of coverage.
 - 1.1.7. The proposed Project 25 trunked radio system shall permit the radio user to roam across the entire area of coverage without requiring manual switching or changing of site information.
 - 1.1.8. Dispatch consoles based upon the latest dispatch console and digital switching technology shall be utilized at the dispatch center sites. LCD based dispatch consoles shall provide the dispatcher with all the features and capabilities of a large traditional panel mounted console in a compact unit. To provide the best value and flexibility to the County, proposer shall maximize the use of commercial, off-the-shelf (COTS) Internet Protocol (IP) networking technologies for dispatch console interconnectivity.
 - 1.1.9. Consistent with the goals of Project 25, vendors shall provide evidence, in the form of installed systems, or multi-vendor interoperability both through support of Project 25 Trunked Air Interfaces and the Project 25 Inter-Subsystem Interface.
 - 1.1.10. The Project 25 trunked radio system shall provide automatic interoperability with existing conventional radio systems from the same or different manufacturers. Dispatch console connectivity is the desired method for this to occur. Interoperability with other P25 systems shall be supported.
 - 1.1.11. The infrastructure for the new P25 system shall be able to have connectivity to Illinois's Integrated Public Safety Commission (IPSC) multiple site system.
- 1.2. Architecture of System (**Part of Offer #1**)
- 1.2.1. Block Diagram
 - 1.2.1.1. Vendor shall provide a complete high level block diagram for the entire proposed system showing the sites or simulcast cells, wide area controller(s), dispatch consoles, and any other major system components (such as extended network controller, system administration and management computer(s), data gateway, , etc.).

1.3. Repeater Site Locations (**Part of Offer #1**)

1.3.1. Vendor shall provide a block diagram and floor plan for each Project 25 trunked repeater site configuration, showing all major components at the site and the quantity and type of communication circuits required to connect the site to the wide area controller. Vendor shall provide an equipment shelter, UPS and generator for each location. The Vendor will provide a list of all contingency items that would be needed, such as power requirements, telephone or data utility, etc. The Vendor shall provide a design that provides 95% coverage of the designate area.

1.3.2. Proposed Site locations (**Part of Offer #1**)

1.3.2.1. There are three pre-defined sites as follows:

1.3.2.1.1. Dispatch Tower (existing mono-pole)

1.3.2.1.1.1.

1.3.2.1.1.2. 150 N. Main Sycamore, IL

1.3.2.1.1.3. 230 ft (____' Elevation)

1.3.2.1.2. Northern Tower-New Greenfield Site (Genoa School)

1.3.2.1.2.1. 42°-05'-05"N; 88°-43'-43"W

1.3.2.1.2.2. 11750 IL Rt 72, Genoa, IL 60135

1.3.2.1.2.3. 400 ft (____' Elevation)

1.3.2.1.3. Central Tower-New Greenfield Site (UP Site)

1.3.2.1.3.1. 41°-48'-48"N; 88°-46'-46"W

1.3.2.1.3.2. , IL

1.3.2.1.3.3. 400 ft (____' Elevation)

1.3.2.1.4. South Tower-New Greenfield Site (Sandwich Site)

1.3.2.1.4.1. 41°-38'-38"N; 88°-36'-36"W

1.3.2.1.4.2. Sandwich, IL

1.3.2.1.4.3. 400 ft (____' Elevation)

1.3.2.1.5. **ALTERNATE** – DeKalb Tower (existing mon-pole)

1.3.2.1.5.1. DeKalb Police Station

1.3.2.1.5.2. DeKalb, IL

1.3.2.1.5.3. 190 ft (____' Elevation)

1.3.2.2. The design must support ten (10) licensed frequencies on 800 MHz and three (3) VHF frequencies.

1.3.2.3. Linear simulcast will be required for coverage, spectral efficiency and capacity requirements. Proposer shall provide a block diagram and floor plan for the simulcast control point (or master site) and each Project 25 trunked repeater site within the simulcast cell. The proposer shall specify the simulcast configuration, showing all major components at the control point (or master site) and the quantity and type of communication circuits required to connect the control point to the wide area controller. Proposer shall also specify the simulcast transmit/receive (TX/RX) site configuration, showing all major

components at the TX/RX site and the quantity and type of communication circuits required to connect the TX/RX site to the control point.

1.3.2.4. VHF repeaters will also be placed on towers to accommodate for county wide coverage for VHF paging to all fire departments and emergency sirens.

1.3.2.5. Propagation maps are required to be included as part of the response to prove the 95% coverage requires.

1.3.2.5.1. 8dB loss in rural areas (800 MHz)

1.3.2.5.2. 24dB loss in Sycamore and DeKalb (800 MHz)

1.3.2.5.3. 18dB loss in Sandwich, Somonauk, Waterman, Kirkland, Kingston, Malta, Hinckley, Shabbona, Cortland, Maple Park, and Genoa

1.3.2.5.4. 18dB loss in Sycamore and DeKalb

1.3.2.5.5. 12dB loss in Sandwich, Somonauk, Waterman, Kirkland, Kingston, Malta, Hinckley, Shabbona, Cortland, Maple Park, and Genoa

1.3.2.5.6. 8dB loss for all rural areas

1.3.2.5.7. 153.485 channel 8dB loss countywide.

1.3.2.6. County shall provide the FCC permits for the WT's locations.

1.3.2.7. Meet ground requirements listed in Section 35900.

1.3.2.8. Shelters for new (Greenfield) locations as listed in Section 034150 to be provided by Owner.

1.3.2.9. Towers for new (greenfield) locations as listed in Section 1.3.2 to be provided by Owner. Offsets to be provided by Vendor.

1.4. Site Development

1.4.1. Owner is responsible for any and all site development, including shelters, delivery and placement, concrete footings, excavation, grounding, landscaping, fencing, zoning, sidewalks, security cameras, equipment alarms, security alarms, permitting, etc.

1.4.2. The County will be responsible for all site land acquisitions and leasing agreements. Vendor may need to provide compound drawings as an inclusion with site lease agreement. (To be determined after site requirements are finalized).

1.4.3. Owner will provide new shelters, UPS and generators. Refer to various sections in the RFP for specifications for these products, manufacturers', and specific sizes. The generators and UPS's will be required to be monitored at the remote management terminals. Generators shall utilize propane and must be sized to accommodate a minimum 96 hour run time under full load.

1.4.4. The UPS's will be provided by the Owner. UPS is required to support each site's equipment with an additional 30% load factor. Run time shall no less than 180 minutes at full load.

1.4.5. The UPS, generators and shelters will be required to be sized for a 30% growth factor or a minimum of 35KVA. All provided by the County.

1.5. Dispatch Center Location

1.5.1. Vendor shall provide a block diagram for the equipment at the dispatch center location, showing all major components and the quantity and type of communication circuits required to connect the dispatch center equipment to the wide area controller. Vendor shall provide a list of all power and air conditioning requirements for the dispatch center equipment. The main dispatch center will be located at 150 Main Street, Sycamore, Illinois.

1.5.2. Vendor shall provide seven (7) new IP dispatch consoles. Consoles shall have the capability to accept NG911 systems.

1.5.3. New consoles shall meet the requirements listed in Section 355000.

1.5.4. There shall be more than one “prime site” as part of the architecture of the system.

1.6. Simulcast Prime Site Location

1.6.1. Vendor shall provide a block diagram and floor plan for each wide area (multisite) controller location, showing all major components and the quantity and type of communication circuits required to connect the wide area controller to repeater sites, remote consoles, conventional repeaters, other wide area controllers, extended network controllers, data networks, etc. Vendor shall provide a list of all power and air conditioning requirements for the wide area controller equipment.

1.7. Radio Frequencies

1.7.1. Ten (10) 800 MHz frequencies and three (3) VHF frequency are to be used for the radio system.

1.7.2. The licensed 800 MHz frequencies are as follows (all to be Tx/Rx):

- 1.7.2.1. _____
- 1.7.2.2. _____
- 1.7.2.3. _____
- 1.7.2.4. _____
- 1.7.2.5. _____
- 1.7.2.6. _____
- 1.7.2.7. _____
- 1.7.2.8. _____
- 1.7.2.9. _____
- 1.7.2.10. _____

1.7.3. The licensed VHF frequencies are as follows (all to be Tx/Rx):

- 1.7.3.1. _____

- 1.7.3.2. _____
- 1.7.3.3. _____

1.8. Radio Coverage Requirements

- 1.8.1. Proposer will be responsible for demonstrating portable in-building radio coverage performance in accordance with the test plan defined in this RFP.

1.9. Coverage Predictions

- 1.9.1. Radio system coverage shall be predicted through use of a radio wave propagation model that has been developed on the basis of theoretical and empirical data, which will take into account terrain irregularity, foliage, urban clutter, noise and long and short term signal variations. The model used for the purposes of the coverage prediction shall be identified, and the rationale for system losses (e.g., power, gain, and loss information used in the model for each site) shall be described in the proposal.

- 1.9.2. With simulcast cells being required, the coverage maps must reflect non-coverage due to simulcast interference effects.

1.10. Voice Quality

- 1.10.1. Coverage is defined as the minimum signal required to provide Delivered Audio Quality 3.4 (DAQ 3.4) voice quality, which also will be measured as a BER of 2%. The acceptance threshold will be a DAQ 3.4 defined by TIA TSB-88.1-C, §5.4.2, Table 2 as Speech understandable with slight effort, occasional repetition required due to noise / distortion. Proposer shall relate this voice quality to a signal level for acceptance testing purposes.

1.11. Portable In-building Coverage Requirements

- 1.11.1. Portable in-building voice coverage assuming 24dB penetration loss in Sycamore and Dekalb as well as coverages listed in section 1.3.2.5. All other areas of the County require 8dB loss coverage for all the structures shall be provided to at least 95% of the service area with 95% reliability throughout the County. The boundary of the portable in-building service area shall be clearly indicated on the proposer's coverage maps provided with their proposal and the estimated percentage coverage within this area also shown to validate that the predicted coverage meets the 95% requirement. This requirement includes simulcast interference effects. Proposer shall provide all parameters and assumptions used to generate the coverage maps. Portable configuration shall be modeled for operation in a swivel case located at belt level with a half wave antenna, using a remote speaker microphone (3watt assumed).

1.12. RF Coverage Testing

1.12.1. The Acceptance Test Plan (ATP) shall demonstrate in building portable radio coverage using the Delivered Audio Quality (DAQ) methodology. The DeKalb County service area will be subdivided into a uniform and statistically significant number of equal-sized test grids and a DAQ test point will be selected randomly from within each grid. Testing shall comply with TIA TSB-88.3-C, and shall demonstrate that radio coverage is being achieved in accordance with the specifications required by this RFP.

1.13. Portable Outdoor Coverage requirements

1.13.1. Portable voice coverage shall be provided to at least 95% of the service area with 95% reliability throughout the County. The boundary of the portable outdoor service area shall be clearly indicated on the bidder's coverage maps provided with their proposal and the estimated percentage coverage within this area also shown to validate that the predicted coverage meets the 95% requirement. This requirement includes simulcast interference effects. Proposer shall provide all parameters and assumptions used to generate the coverage maps. Portable configuration shall be modeled for operation in a swivel case located at belt level with a half wave antenna, using a remote speaker microphone.

1.14. Tower Top Amplifiers

1.14.1. For 800 MHz systems, receiver tower top amplifiers may be required to compensate for coaxial cable loss in order to provide the level of portable or mobile radio talk-back coverage specified. Proposer shall indicate whether tower top amplifiers are recommended and which sites include the tower top amplifier in the propagation predictions. Dual redundant tower top amplifiers are recommended.

1.15. General System Features

1.15.1. The basic operational mode of the system will be Project 25 Phase 1 or Phase 2 trunked per TIA/EIA 102 standards. Most of the communications will use this mode with communications taking place over trunked repeater sites located throughout the coverage area. Mobile and portable radios will also be able to have users manually select communication modes such as the use of conventional channels or talk-around mode when in or out of range of the Project 25 system.

1.15.2. All sites shall be linked to the radio network via a licensed microwave link that is primary and an optional method that is a redundant (secondary) link such as fiber.

1.15.3. Vendor's proposal shall include equipment for dual/redundant links between extended network controller location and all console locations.

- 1.15.4. Vendor's proposal will include equipment for dual/redundant links between the simulcast control site (location of comparators/voters, trunking control) and the simulcast remote RF sites (the case station sites).
 - 1.15.5. For all redundant site links (extended network controller, console, simulcast control site, RF remote sites), a hardware based external switch between links is not acceptable, the function will be inherent to the Project 25 system infrastructure.
 - 1.15.6. Proposed system must keep both connections active and monitored at all times. System infrastructure must be able to, via software, decide to send IP traffic down either link at any time.
- 1.16. Data, Voice and Control Operations
- 1.16.1. The system will incorporate a dedicated control channel for use with signal processing. This control channel can rotate to multiple channels if required.
 - 1.16.2. The Project 25 trunked radio system shall be equipped to support both voice and data communications.
 - 1.16.3. Mobile and portable radios shall be capable of voice and data operations.
- 1.17. System Features
- 1.17.1. Maintenance/fault management terminals. The system should provide a minimum of 4 terminals capable of all backbone programming/system features/maintenance/fault management options, with one terminal located at the systems prime site, two terminals at the assigned maintenance provider and one located at the master 911 center.
 - 1.17.2. Radio Inhibit. This feature is to prevent a stolen or lost radio from being used to transmit and receive on the system. The system shall have the ability to selectively disable or enable a radio from a network management computer.
 - 1.17.3. PTT (Push To Talk) Identification. Each mobile radio, portable radio, control station and dispatch console must be able to transmit and display a radio ID and an alphanumeric alias corresponding to the individual unit ID.
 - 1.17.4. GPS (Geographical Positioning Systems) Each mobile radio, portable radio, must be able to have coordinates easily identifiable and accessed to locate any radio in field.
 - 1.17.5. Subscriber access. The system shall prevent access by all unauthorized subscriber devices. Proposer shall indicate how this is accomplished.

1.17.6. OTAP Over the air programming. The system shall be capable of programming radio parameters to all subscriber devices over the air (without the need to physically connect the radio to a programming computer). Programming features should include radio ID, personality and channel information, talkgroup lists, scan features and user privileges. The system shall support batch programming (able to program multiple radios via a single command from a network management terminal). While radios are being programmed, if a voice conversation is initiated, the programming must pause and allow the voice call to proceed. When the voice call is over, the programming will continue where it was interrupted. After the radio receives the programming information, a visual indication must be provided to the user asking if they want their reprogramming to take effect. The choice will be yes or no.

1.17.7. Encryption. The system shall support digital voice encryption such as DES-OFB, DES-XL, Project 25 encryption (AES), etc. Alternative methods of encryption that are cost effective and that can be utilized along with the Project 25 encryption should be supported by the system. Please describe the methodology if alternative encryption options are available.

1.18. Functional System Description – Project 25 Phase 1 FDMA Voice & Data Communication System capable of Phase 2 TDMA

1.18.1. This section should include a complete description/design of the system proposed. At a minimum, the description should include an overview of the following:

- 1.18.1.1. Proposed server hardware
- 1.18.1.2. Options for redundancy / high availability backup
- 1.18.1.3. Audit Trail / Logging capabilities
- 1.18.1.4. Server Statistical Reporting - Provide sample of administrative reports available to the County
- 1.18.1.5. Ability to Interface and Communicate with third-party systems (such as CAD/RMS/AVL/Mapping, etc)
- 1.18.1.6. Support for future Interoperability with neighboring systems
- 1.18.1.7. User Registry for Adding / Deleting / Modifying User Profiles
- 1.18.1.8. Throughput Optimization
- 1.18.1.9. Security and Encryption (Current FIPS Standard available at the time of installation for Digital Radio Systems and Information Processing)
- 1.18.1.10. Over the Air Re-keying (OTAR) and Over the Air Programming (OTAP)

1.19. Subscribers

1.19.1. This section refers to the requirements of user radios consisting of mobile radios and portable radios. It is the intent of the Owner to procure a state of the art digital, simulcast trunked radio system capable of supporting generally mission critical communications requirements. The Owner expects proposers to offer a range of end user radio equipment and accessories, to include a variety of mobile installation

options, providing a performance range from highest quality, highest duty rating, and high performance, robust electronic components down to less fully featured, less mission critical end user devices.

1.19.2. To reduce costs, the County requires a trade-in value for the existing radio inventory. A subscriber matrix is included in section 001055 of this RFP showing departmental needs.

1.20. General

1.20.1. A single vendor for mobile and portable radios is preferred. The separate agencies need to have the opportunity to select units that meet P25.

1.20.2. A single Vendor for the Infrastructure is preferred. The system must be able to have connectivity to the IPSC system.

1.20.3. Radios must be at minimum APCO Project 25 Phase 1 trunking equipped. Bidder must identify the cost of the Phase 1 and Phase II features.

1.20.4. Radios must support 800 MHz Analog SmartNet/Smart Zone Digital Trunking and Analog Conventional operation for interoperability requirements. Radios must be able to fully operate on the State of Illinois's SmartNet system.

1.20.5. Winning Vendor will be responsible for creating new programming templates for all new radios and modifying programming templates for existing radios. There shall be no more than 15 templates for this system.

1.20.6. Radios will be programmed to interop with all adjoining Counties and Illinois State police Talk Groups.

1.20.7. Radios must support the ability to change radio parameters while unit is deployed in the field.

1.20.7.1. Add System Talkgroup

1.20.7.2. Replace Talkgroup

1.20.7.3. Add Talkgroup to the Zone Table

1.20.7.4. Replace Talkgroup with another Talkgroup in the Zone Table

1.20.7.5. Update any other Radio's Parameter

1.20.7.6. Radio must be able to receive audio transmissions during a OTAP (Over-the-Air Programming) programming session

1.20.7.7. OTAP programming session cannot be aborted if interrupted by receive audio

1.20.7.8. Voice transmissions must take priority over the data transmission.

- 1.20.8. Portable and mobiles must have the option to be able to send and receive free-form or pre-stored text messages to other radios or dispatch operators.
- 1.20.9. The units shall be of current production and shall meet the applicable sections of MIL-STD-810E "Environmental Test Methods and Engineering Guidelines". Also, all radio equipment shall meet the requirements of TIA/EIA-603 "Land Mobile FM or PM Communications Equipment Measurement and Performance Standards" when operated in the analog mode.
- 1.20.10. Radios must be equipped with an emergency button that presents an alarm at the console with ID, and opens the channel for a prescribed time. In addition, the emergency alert shall be initiated by the subscriber unit user or by a console operator. Receipt of an emergency alert at a console shall cause a latch up output for operation of external alarms. The console operator shall be able to release this latch.
- 1.20.11. Radios shall provide multiple user selected or automatic operating behaviors such as lighting, audio level and tones as an aid to the user.
- 1.20.12. Radios must be configurable to adjust audio level, lighting and tones through user selected or automated options.
- 1.20.13. Radios must use color to notify the user of the radio mode, potential emergencies or specific events.
- 1.20.14. Radios must have adjustable microphone audio gain and microphone Automatic Gain Control.
- 1.20.15. Radios must have adjustable speaker treble.
- 1.20.16. Radio must be equipped with an internal USB port for high speed programming of radio configuration and software upgrades.
- 1.20.17. Radios must have a Signal Strength Indicator ICON (Trunking feature only - Radios w/ display).
- 1.20.18. Copying of radio channel information and radio configuration between portable and mobiles should be achieved by simple "Drag and Drop" operation.
- 1.20.19. Radios should meet MIL Spec 810C, D, E and F.
- 1.20.20. Radios must support Project 25 encryption.
- 1.20.21. Radios must support multiple encryption keys.

- 1.20.22. The radios shall be capable in the future to provide a means to reprogram or re-key “Over the Air” while the unit remains in the field.
- 1.20.23. Radios must have the option of supporting software-based encryption algorithms to allow for different cost choices for users.
- 1.20.24. Radios must have the option of being equipped with FIPS certified Type 3 encryption.
- 1.20.25. Radios must provide the ability to consolidate all call lists underneath one unified call list.
- 1.20.26. A subscriber matrix is included in Section 001055 of this RFP showing departmental requirements.

SECTION 002000 – GENERAL CHECKLIST FOR VENDORS

PART 1 - GENERAL

1.1 SUMMARY

Below is a general checklist for Vendors to assist in completion of the Request for Proposal (RFP) response. Please note that this list is not all inclusive and reading of the entire RFP is critical. Failure to follow the RFP proposal requirements may result in rejection of proposal. It is important in understand the some items are required to be in a separate SEALED envelope within the submittal package.

- Section 002010-DeKalb County Disclosure Statement must be completed and signed and included in the proposal package.
- Section 003000-Stipulated Vendor Offer Form must be filled out and signed and included in the SEALED envelope with the proposal package.
- Written detail clearly indicating any deviation to the RFP and why the deviation was included. If there are no deviations, include a statement indicating that the RFP response package requirements have been satisfied.
- In writing on Company letterhead indicate the following:
 - a. Person(s) that are allowed to negotiate the RFP response.
 - b. Allow permission for the information in the RFP response to be shared with the DeKalb County Public Safety Personal, County Administration, and County Consultants for purposes for evaluation, critic, comparison, and related issues to allow a thorough and complete understanding of the RFP response.
 - c. List any and all issues that deviate from the RFP (this may be an attachment) and why the deviation(s) are included.
 - d. Indicate the warranty and maintenance by attachment.
 - e. The response to the RFP is complete and responsive.
- DO NOT list any cost issues outside of the SEALED envelope.
- Vendor must submit one (1) original RFP packet plus seven (7) hard copies plus eight (8) soft copies on USB drives.
- Vendor must seven (7) portable radios for demonstration purposes. Units shall be public safety grade units as listed in the RFP and the devices being proposed by the Vendor.
- Section 006160-Joint Venture Agreement (or equivalent) document must be included in package if applicable.
- Section 007100-Subcontractors list must be completed and included in package.

- Section 005100-Contractor's Qualification Statement must be completed and included in the package. This document is to be notarized.
- Section 004500-Bid Bond is required to be included in SEALED envelope. Bid bond shall be 5% of the base bid amount to guarantee bid. Failure to include bid bond will disqualify bid.
- Company Financial Statement (FS) is required to be included in the package.
- Propagation evaluation (with 3.4 DAQ) including 95% coverage at 8dB, 18dB, and 24dB loss factors as indicated in the RFP must be included in the RFP response package. This is for 800MHz and VHF.
- Block Diagram(s) as indicated in the RFP of the architecture of the system.
- All items that are not listed in this checklist must be included in the RFP response package.
- Proposal must be received by "due date/time" as listed in the Section 001000-Notice to Vendors and any addenda that may have extended the "due date/time". E-mailed or faxed proposals will **NOT** be accepted.
- The RFP response must be included in an enclosed package. The package must clearly indicate the following information on the outside:
 - a. Company name
 - b. RFP Name and Number
 - c. Include a separate SEALED envelope inside of the package that indicates the following on the outside: "Seal Bid"
 - d. The separate SEALED envelope inside of the package must include the following:
 - 1. Section 003000-Stipulated Bid Form (signed)
 - 2. Section 004500-Bid Bond (5% of base bid amount)
- The package is required to be delivered on or before the "due date/time" as indicated in the Notice to Vendors and any addenda to the following:

DeKalb County Sheriff's Office
150 N. Main Street
Sycamore, IL 60178

SECTION 003000 – STIPULATED OFFER FORM

Project: DeKalb County – PSR Radio System

Submit Offer to: DeKalb County Sheriff's Office
 150 N. Main St.
 Sycamore, IL _____

Owner: DeKalb County
 150 N. Main St.
 Sycamore, IL _____

Consulting Firm: Pyramid Consulting
 203 Good Ave
 Indianapolis, IN 46219

Date: _____

Submitted by:

Name of Vendor(s): _____

Address of Vendor(s): _____

Phone No. of Vendor(s): _____

Contact Name/Title: _____

E-Mail Contact: _____

1. ADDENDA

We the undersigned acknowledge that the following Addenda have been received. The modifications to the RFP Documents noted below have been considered and all costs are included in the Offer(s) indicated on the Stipulated Vendor Offer Form.

<i>√ Acknowledge those</i>		
	Addendum No.	Date

2 OFFER:

Use this form for base and alternate offers.

Base Offer #1 Infrastructure	Alt. 1: ISSI for VHF to 800 MHz Systems	Alt. 2: Sandwich Dispatch Consoles	Alt. 3: DeKalb Dispatch Console	Alt. 4: DeKalb Tower System	Alt. 5: 10-Year Maintenance	Alt. 6: 20-Year Maintenance	Alt. 7: Mobile Console Systems
\$	\$	\$	\$	\$	\$	\$	\$
Base Offer #2 Subscribers	Alt. 1: 10-Year Maintenance	Alt. 2: 20-Year Maintenance	Alt. 3: BDA Units				
\$	\$	\$	\$	\$	\$	\$	\$

4. ALLOWANCE

We the undersigned acknowledge that we have incorporated into our offer the following contingency allowance specified in the Project Manual (Section 012100 unless noted elsewhere) to be part of our scope of work (or as modified in subsequent Addenda), and that we will return any unused allowance to the Owner upon completion of the contract.

<input checked="" type="checkbox"/> Acknowledge those included in			
	Allowance		
	No.	Description	Amount
	1	Base Offer #1	\$50,000
	2	Base Offer #2	\$10,000

5. ACCEPTANCE

This offer shall be open to acceptance and is irrevocable for 90 days from the bid closing date. If this offer is accepted, we agree to the following:

- To accept the provisions in the Instruction to Vendors Section 001100 (and Supplemental Instructions to Vendors Section 001200 when applicable).
- To provide, furnish and install the work in accordance with the requirements of the RFP, local ordinances/codes, and the codes of the State of Indiana.
- To submit Certificates of Insurance for the coverage specified and indicated in the RFP.

4. To accept the General Implementation Schedule as outlined in the RFP.
5. Submit Bid Form ____ (State Form _____) that has been signed & notarized. Refer Section 001300.
6. Refer to Section 002000 for “General Checklist for Vendors”
7. AUTHORIZATION

Company Name

Company Representative

Title

SECTION 009000 – WAGE DETERMINATION SCHEDULE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The general provisions of the Contract, including General and Supplementary Conditions, instructions to bidders, including supplementary instructions as well as Division 0 and Division 1 specification sections apply to this Section.

1.2 SUMMARY

- A. In accordance with Illinois Code, a wage determination schedule has been established for this Project and is included in this section.

PART 2 – PRODUCTS (not applicable)

PART 3 – EXECUTION

- A. All contractors and subcontractors must file a Schedule of Wages to be paid to all employees working on this project. This schedule shall be provided on the form provided and will be made available to the public if requested.
- B. This form must be filed with the Consultant and Owner by the Vendor(s) prior to beginning any work.
- C. The contractor submitting his Schedule of Wages shall indemnify the Owner and Consultant for the Vendor's failure to pay any employees in accordance with this Schedule of Wages.

END OF SECTION 009000

Attachment: Wage Determination Schedule

SECTION 009900 – SELECTION PROCEDURE AND CRITERIA FOR EVALUATION

PART 1 - GENERAL

1.1 SUMMARY – Proposal Evaluation

Based upon this evaluation, the County intends to select the response which is the most advantageous to DeKalb County. The factors or criteria that will be used in evaluating the responses are as follows:

- 1.1.1. Responsiveness to the requirements set forth in this RFP.
- 1.1.2. Scoring procedure detailed in Section 009900, Part 1.2.
- 1.1.3. Cost will be a consideration, constituting 30% of the total score per Section 009910- Scoring Criteria.
- 1.1.4. Any discussions with or information obtained from any references provided.
- 1.1.5. Which response is the most advantageous to DeKalb County.
- 1.1.6. This evaluation process notwithstanding, the County reserves the right to reject all responses.

1.2 SCORING PROCEDURE

- A. Vendors will be scored based on the attached 5-category scoring criteria. Each offer (#1 and #2) will be scored independently. There are two steps to the scoring:
 1. First, the County committee will be scoring categories #1, #2, #3, & #4 following the “due date/time” for the RFP.
 2. Second, category #5 (cost issues) will be opened after categories #1, #2, #3, & #4 have been scored. The Vendor(s) will be requested to provide “best-and-final offer” during the process of clarifying the scope provided in the response to the RFP. At no time will a vendor know another’s Vendor’s cost of category #5 during this phase.
 3. Third, once the best and final offer has been provide following negotiations, category #5 will be scored and added to the first four category scores to make an overall score.

The highest scored Vendor(s) will be required to participate in an interview. The purpose of the interview is to meet key members of the Vendor’s team and discuss the solution and related experience. As part of the interview, the Vendor will be required to deliver a presentation to the County evaluation team. Additionally, pursuant to Illinois Code and at the sole option of the County, discussions may be conducted with, and best and final offers obtained from, other responsible Vendors who have submitted proposals determined to be reasonably susceptible of being selected for award.

1.3 SCORING CRITERIA

A. Compliance to RFP = 5% of total score of RFP

1. Detail of block/schematic diagrams for the system
2. Project Implementation Schedule; time and details.
3. Compliance with technical specifications listed in the RFP. This is a quantitative measure.
4. Demonstrate Owner requirements are being satisfied.
5. List of propriety features and why this is part of the system.

B. Company Background, Experience, and Qualifications = 10% of total score of RFP

1. Experience of company in the deployment of public safety communications systems. Number of installations must be listed. Systems need to be similar to the DeKalb County System. Demonstrate implemented public safety communication projects in Illinois. This includes the interoperability across various systems. Provide examples of cross-vendor interoperability.
2. Size of the Vendor public safety customer base.
3. Reputation of Vendor and quality of references. Requires at least six references with customer, cost, and contact person. Systems need to be similar to the DeKalb County System.
4. Qualifications of the staff assigned to the project. Include years of experience of personnel in public safety communications.
5. Include a financial statement.
6. Demonstrated industry leadership as evidence by technological innovations and application enhancements in the public safety marketplace.
7. Demonstrate satisfying Owner warranty issues and trouble shooting. Need to include three specific examples of issues and resolutions.
8. Demonstration of the maintenance and support programs for the project. Demonstrate the response time for the trouble shooting and correction of the problem. This needs to be tiered for the problem situation; ie. Tower issues, software, issue, RF issue. What is the locality of the maintenance personal to the system.

C. System Functionality = 35% of total score of RFP

1. Ability to prove variances from the RFP still meet requirements of RFP.
2. Ability to prove how coverage requirements will be met (dB levels in RFP)
3. Ability to demonstrate the ease of use of the entire system and components.
4. Ability to demonstration that design requirements listed in the RFP are satisfied.
5. Ability to demonstrate innovative technologies in the equipment. (i.e how does encryption work in the system)
6. Identify the interface that will occur with the County's current CAD system.
7. Identify how the system works with the County's ESInet.
8. Ability to demonstrate that the technology in the system will be adaptable for future add-ons.

9. Demonstrate the P25 capability to integrate third-party subscriber vendors.
10. Demonstrate the ability to connect to the State and national FirstNet system.
11. Ability to demonstrate that the system will support future growth. This includes additional subscriber units as well and additional or remote console systems.
12. Demonstrate the backhaul system used for the simulcast. This include the round-about and backwards capability. Problem scenarios of system functionality with the disconnection of one site.
13. Demonstrate the use of the router/switch for the two (2) potential backhaul system and how they work together for redundancy.
14. Demonstrate the ability to interface the land mobile radio (LMR) with an LTE system. This includes how the County
15. Demonstrate priority and preemption for the dispatch console system.
16. Demonstrate the IP connectivity of the console systems with outside third-party systems. This includes the use of ISSI and CSSI systems.
17. Capability of Vendor to have Owner test and use equipment off-site prior to shipment to sites. This includes the details of the Functional Acceptance Testing (FAT).
18. Demonstrate the functionality and usage of the current analog VHF system can interface with the new 800MHz digital system.
19. Ability to demonstrate that all components will be provided for a complete working system per the RFP.
20. Provide a written statement verifying that all components are in working order prior to shipment to Owner sites; includes completeness of listing.

D. Project Services = 20% of total score of RFP

1. Over project management for implementation; includes listing of details of the management system. Details of project implementation.
2. Acceptance test plan in compliance with RFP.
3. Adherence to project timeline, including details of implementation.
4. Hours of training; dispatchers, responders, and administrators. Include individual sessions versus “train-the-trainer” concepts. On-site versus remote training. Breakdown the subscriber and dispatch training.
5. Migration plan implementation; details of plan revealed. This includes the cut-over plan details and duration. Provide examples of past cut-over plans.
6. Hours of testing for acceptance by Owner.
7. Listing of warranties for various equipment, including extended warranties. This includes infrastructure and subscribers.

DI. Cost = 30% of total score of RFP

1. Overall Cost for Base Bid
2. Trade-in value of existing equipment
3. Value engineering issues proposed
4. Overall Cost for Project, including all alternates
5. 10-yr Maintenance cost issues
6. 20-yr Maintenance cost issues

CATEGORY #1													
Compliance to RFP = 5% of total score of RFP													
Item #	Description	Scoring System										Final Score	
1	Detail of block/schematic diagrams for the system	1	2	3	4	5	6	7	8	9	10		
2	Project Implementation Schedule; time and details.	1	2	3	4	5	6	7	8	9	10		
3	Compliance with technical specifications listed in the RFP. This is a quantitative measure.	1	2	3	4	5	6	7	8	9	10		
4	Demonstrate Owner requirements are being satisfied.	1	2	3	4	5	6	7	8	9	10		
5	List of propriety features and why this is part of the system.	1	2	3	4	5	6	7	8	9	10		
Sub-Total score for this category											0		
Multiplier											0.05		
Total score for this category											0		

CATEGORY #2													
Company Background, Experience, and Qualifications = 10% of total score of RFP													
Item #	Description	Scoring System										Final Score	
1	Experience of company in the deployment of public safety communications systems. Number of installations must be listed.	1	2	3	4	5	6	7	8	9	10		
2	Size of the Vendor public safety customer base.	1	2	3	4	5	6	7	8	9	10		
3	Reputation of Vendor and quality of references. Requires at least six references with customer, cost, and contact person.	1	2	3	4	5	6	7	8	9	10		
4	Qualifications of the staff assigned to the project. Include years of experience of personnel in public safety communications.	1	2	3	4	5	6	7	8	9	10		
5	Include a financial statement.	1	2	3	4	5	6	7	8	9	10		
6	Demonstrated industry leadership as evidence by technological innovations and application enhancements in the public safety marketplace.	1	2	3	4	5	6	7	8	9	10		
7	Demonstrate satisfying Owner warranty issues and trouble shooting.	1	2	3	4	5	6	7	8	9	10		
8	Demonstrate implemented public safety communication projects in Illinois.	1	2	3	4	5	6	7	8	9	10		
9	Demonstration of the maintenance and support programs for the project.	1	2	3	4	5	6	7	8	9	10		
Sub-Total score for this category											0		
Multiplier											0.1		
Total score for this category											0		

CATEGORY #3												
System Functionality = 35% of total score of RFP												
Item #	Description	Scoring System										Final Score
		1	2	3	4	5	6	7	8	9	10	
1	Ability to prove variances from the RFP still meet requirements of RFP.											
2	Ability to prove how coverage requirements will be met (dB levels in RFP)											
3	Ability to demonstrate the ease of use of the entire system and components.											
4	Ability to demonstration that design requirements listed in the RFP are satisfied.											
5	Ability to demonstrate innovative technologies in the equipment.											
6	Ability to demonstrate that the technology in the system will be adaptable for future add-ons.											
7	Ability to demonstrate that the system will support future growth.											
8	Capability of Vendor to have Owner test and use equipment off-site prior to shipment to sites.											
9	Ability to demonstrate that all components will be provided for a complete working system per the RFP.											
10	Provide a written statement verifying that all components are in working order prior to shipment to Owner sites; includes completeness of listing.											
Sub-Total score for this category											0	
Multiplier											0.35	
Total score for this category											0	

CATEGORY #4												
Project Services = 20% of total score of RFP												
Item #	Description	Scoring System										Final Score
		1	2	3	4	5	6	7	8	9	10	
1	Over project management for implementation; includes listing of details of the management system.											
2	Acceptance test plan in compliance with RFP.											
3	Adherence to project timeline, including details of implementation											
4	Hours of training; dispatchers, responders, and administrators.											
5	Migration plan implementation; details of plan revealed.											
6	Hours of testing for acceptance by Owner.											
7	Details of project implementation.											
8	Listing of warranties for various equipment, including extended warranties.											
Sub-Total score for this category											0	
Multiplier											0.2	
Total score for this category											0	

<i>This category will be opened at a public meeting following the scoring of the first four categories.</i>													
CATEGORY #5													
Cost = 30% of total score of RFP													
This will be ranked with comparison to all RFP responses													
Item #	Description	Scoring System										Final Score	
1	Overall Cost for Base Bid	1	2	3	4	5	6	7	8	9	10		
2	Trade-in value of existing equipment	1	2	3	4	5	6	7	8	9	10		
3	Value engineering issues proposed	1	2	3	4	5	6	7	8	9	10		
4	Overall Cost for Project, including all alternates	1	2	3	4	5	6	7	8	9	10		
5	10-yr Maintenance cost issues	1	2	3	4	5	6	7	8	9	10		
6	20-yr Maintenance cost issues	1	2	3	4	5	6	7	8	9	10		
Sub-Total score for this category											0		
Multiplier											0.3		
Total score for this category											0		

SECTION 350040 MICROWAVE COMMUNICATION/SIGNALLY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

The general provisions of the Contract, including General and Supplementary Conditions, instructions to bidders, including supplementary instructions as well as Division 0 and Division 1 specification sections apply to this Section.

- A. Providing a new licensed Ethernet Microwave network for DeKalb County Illinois. The wireless backhaul network consists of four (4) links in a ring configuration.
- B. The microwave radio equipment will be manufactured and installed by the same company or the manufacturer requires a certified installer.
- C. The microwave equipment manufacturer is required to have installations serving critical infrastructure entities (public safety, power utilities, pipelines and railroads, etc.).
- D. The microwave network radios are required to have an Adaptive Coding & Modulation (ACM) which dynamically adjusts the radio's modulation level to compensate for propagation anomalies.
- E. The system is required to provide greater than 99.999% two-way availability at 16 QAM (87 MB).
- F. The Ethernet traffic on the loop is required to be protected per requirements

PART 2 – PRODUCTS

- A. Suppliers of microwave communication systems must have been performing this work for a minimum ten (10) consecutive years.
- B. Provide block diagram on the functionality of the microwave system as part of the 4-site simulcast system. This includes the integration of the 800MHz and VHF systems.
- C. Layer 3 switching systems shall be utilized with the capability of individual IP addresses per port.

PART 3 – EXECUTION

- A. County and Consultant must approve the implementation plan for the installation of the microwave systems.
- B. Microwave transmitter/receiver shall be inn shelter (interior unit). Antenna, cabling and required equipment to be exterior.

END OF SECTION 350040

SECTION 355500 – MOBILE AND PORTABLE RADIO SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY - Portable Radio Specification

- A. Radios must be equipped with dual microphones on the front display side of the radio and its opposite side to allow for background noise reduction DSP algorithm to adaptively suppress background noise picked up by the radio microphones.
- B. Radios must have programmable switches.
- C. Radios must offer option to meet submersibility standards. This includes all accessories (excluding charger).
- D. Portables must support the ability to provide the radio user with a pre-recorded voice announcement containing unique audio announcements of the radios' talkgroups and channels, and to several radio features such as scan, monitor, direct mode, and transmit inhibit.
 - a. Audio files must be recorded in .WAV format.
 - b. Audio files must be programmed to radio and assigned to the respected talkgroup, channel or feature via programming software.
 - c. The radio programmer can configure the priority of the announcement over the audio of a call received.
 - d. Voice transmissions must take priority over the data transmissions. The housing shall be constructed of high impact polycarbonate plastic or other suitable high impact material.
- F. The radios must employ an immersion-sealed metal housing encased in high-grade polymer.
- G. Radios should ensure a secure grip, while providing a wider control top area.
- H. Radios must be equipped with the AMBE+2 Vocoder.
- I. Radios must have multiple color housing options for easy identification.
- J. Radios must have a front display.
- K. Radios must be equipped with soft front programmable buttons that show the function of the button on the radio display.
- L. Radios must have GPS capability.

M. Radios must have a distress button that is clearly visible.

1.2 Portable Radio Accessories

- A. Portable radios must be equipped with smart batteries that can provide automated battery maintenance that evaluates the details of the battery's usage pattern to determine the optimal reconditioning interval.
- B. Portable radio chargers must be able to provide the following information: (1) battery capacity and voltage while charging, (2) time remaining to complete rapid charging, (3) battery charge status, and (4) battery's unique serial number, part number and chemistry.
- C. Portable radio batteries may be left in the chargers for extended periods without heat damage due to the charger.
- D. Portable radio batteries shall be subjected to rigorous drop, vibration and ESD (Electrostatic Discharge) tests.
- E. Remote Speaker Microphones (RSMs) and Public Safety Microphones (PSMs) shall be available for portable radios and meet requirements for submersibility and ruggedness.
- F. RSMs shall be available with user configurable programmable buttons and user configured and with multiple character display. In addition, volume control, channel selector and emergency button shall be available.
- G. RSMs and PSMs should lessen noise caused by severe weather conditions or ambient noise.

1.3 Mobile Radio Specifications

- A. Mobile radios must be equipped with soft programmable keys.
- B. Mobile radios must be equipped with programmable switches.
- C. Mobile radios must be available in remote mount configuration.
- D. Mobile radios must offer an external speaker option
- E. Mobile radio must provide the ability to receive a single shutdown command from the dispatcher unit to disable a disruptive, lost or stolen unit.
- F. The mobile radio display shall not display less than 14 characters and its brightness shall be user adjustable.
- G. The unit shall be equipped with an external data port. This data port shall allow for connection of test equipment and radio programming devices. Radio needs to be able to be programmed from the front of the radio, eliminating the need for the radio to be removed from the vehicle center console mounting equipment.

1.4 Mobile Radio Accessories Specifications

- A. The units shall be equipped with a palm type microphone with coiled cord of the plug-in type. Remote units for outside vehicle use shall have, at a minimum, a weatherproof rating.
- B. Each unit shall be equipped with an in-vehicle speaker of the plug-in type. Remote speakers for outside vehicle use shall have, at a minimum, a weatherproof rating.
- C. Each unit shall be equipped with a large enough emergency button to be activated with heavy gloves on.
- D. Fire apparatus mobile radios must be able to utilize noise cancelling headsets for in-cab intercom system.

1.5 Security Requirements

- A. All subscribers shall be capable of the Project 25 radio authentication algorithm to keep unauthorized subscribers / users from gaining access to the system. This shall be listed as an option and is not a definite requirement at this time. The Project 25 radio authentication algorithm shall eliminate the ability for illegally cloned radios from interfering with agencies operations. The desired method shall include a process that includes:
 - a. When a radio initially powers on or attempts to register with the system, it will send a registration request to the system.
 - b. The system will issue a challenge to the radio requesting an authentication key that has been loaded into the user radio (physically connected to a device to load this authentication key, not an over-the-air download).
 - c. The radio will respond to this challenge with a response (its authentication key).
 - d. The system will verify that the response is correct (based on an internally stored database).
 - e. If the response matches the challenge, the radio will be allowed to access the system.
 - f. If the response does not match, the system will reject the request and the radio will not be allowed to access the network.
- B. The network administrator shall have the capability to configure the system to support:
 - a. All users requiring authentication.
 - b. Only selective users requiring authentication.
 - c. No authentication required.
- C. This will allow for a smooth migration from no authentication to full authentication as required over time and will allow for non-PSICB roaming radios to have access to the system when required.

1.6 Subscriber Units Specification Compliance Tables

- A. Radios shall adhere to the following specifications to provide for optimum audio quality and coverage. If a proposed radio does not meet these requirements, they will be evaluated accordingly.

B. Table 1: Portable Subscriber Transmitter Typical Performance Specification - 700/800 MHz

Portable Subscriber Radio Units Specifications	
Transmitter Typical Performance Specification - 700/800 MHz	Requirement
Frequency Range/Bandsplits	700 MHz: 764-776, 794-806, 800 MHz: 806-824, 851-870
Channel Spacing	12.5 / 20/ 25KHz
Maximum Frequency Separation	Full Bandsplit
Rated RF Output Power Adj	1 to 3 Watt Max
Frequency Stability (-30° C to +60°C; +25°C Ref.)	±0.00015%
Modulation Limiting 25 KHz channel NPSPAC channel 12.5 KHz channel	±5.0 KHz ±4.0 KHz ±2.5 KHz
Emissions (Conducted & Rated)	-75 dBc
Audio Response (6db/Octave Pre-emphasis from 300 to 3000 Hz)	+1, -3 dB
FM Hum and Noise 25 KHz 12.5 KHz	-45 dB -40 dB
Audio Distortion	1.5 %

C. Table 2: Portable Subscriber Receiver Typical Performance Specification - 700/800 MHz

Portable Subscriber Radio Units Specifications	
Receiver Typical Performance Specification - 700/800 MHz	Requirement
Frequency Range/Bandsplits	700 MHz: 764-777 800 MHz: 851-870
Channel Spacing	12.5 / 25 KHz
Maximum Frequency Separation	Full Bandsplit
Audio Output Power at Rated	500 mWatt
Frequency Stability (-30° C to +60°C; +25°C Ref.)	±0.00015%
Analog Sensitivity 12 dB SINAD	.25 uV
Digital Sensitivity 1% BER 5% BER	.40 uV .25 uV
Selectivity 25 KHz channel 12.5 KHz channel	-72 dB -63 dB
Intermodulation	-80 dB
Spurious Rejection	-75 dB
FM Hum and Noise	12.5 KHz : -40 dB 25 KHz : -47 dB
Audio Distortion	1.50%

D. Table 3: Mobile Subscriber Transmitter Typical Performance Specification - 700/800 MHz

Mobile Subscriber Radio Units Specifications	
Transmitter Typical Performance Specification - 700/800 MHz	Requirement
Frequency	764-776 MHz, 794-806 MHz 806-825 MHz, 851-870 MHz
RF Power	10-30 Watt (764-806 MHz) 10-35 Watt (806-870 MHz)
Maximum Frequency Separation	Full Bandsplit
Freq Stability Operating Freq Accuracy (-30C to +60C; +25C Ref) - 700/800 MHz	1.5 ppm
Modulation Limiting 25/20 KHz, 25 KHz, 25/30 KHz channel 12.5 KHz channel	±5 KHz, +/-4 KHz (NPSAC) ±2.5 KHz
Modulation Fidelity (C4FM) 12.5 KHz digital channel	±2.8 KHz
Channel Spacing Analog	12.5 / 20 / 25 KHz
FM Hum and Noise 20/25 KHz, 25 KHz, 20/25 KHz, 12.5 KHz	40 dB 34 dB
Emissions (GNSS = Global Navigation Satellite System) Conducted Radiated	-70 dBc, -85 dBc (GNSS)
Audio Response (6 dB/Octave Pre-Emphasis from 300 to 3000 Hz)	+1, -3 db (EIA)
Audio Distortion per EIA	3%

E. Table 4: Mobile Subscriber Receiver Typical Performance Specification - 700/800 MHz

Mobile Subscriber Radio Units Specifications	
Receiver Typical Performance Specification - 700/800 MHz	Requirement
Frequency Range/Bandsplits	764-776 MHz, 851-870 MHz
Channel Spacing	12.5 / 20/ 25 KHz
Maximum Frequency Separation	Full Bandsplit
Analog Sensitivity	
20 dB Quieting	.30 uV
12 dB SINAD	.25 uV
Digital Sensitivity	
1% BER	.30 uV
5% BER	.25 uV
Imtermodulation Distortion	80 dB
Spurious Response Rejection	90 dB
Audio Output Power at 3% distortion (external/internal speaker)	7.5 W (8 Ω ext speaker) 3 W (3.2 Ω ext speaker)
Adjacent Channel Rejection Selectivity (12.5 KHz/25 KHz)	65 dB / 80 dB
Audio Response (6 dB/Octave Pre-Emphasis from 300 to 3000 Hz)	+1, -3 db (EIA)

1.7 Encryption

- A. All subscriber units will need to be encrypted with an encryption solution. This encryption can be a hardware or software based solution. Alternative methods of encryption methodologies including Project 25 DES, AES, or other technologies. Proposer will need to explain their method in detail. A select amount of mobile and portable subscribers will require Project 25 AES encryption.