



**Request for Proposals  
Project 25 Subscriber Units  
Functional Specification**

**Appendix A  
BID # 2022-005**

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**FINAL**

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## 1. Functional Specifications

### 1.1 Overview

Rowan County (County) intends to purchase and implement new Project 25 (P25) compliant subscriber devices for use by Public Safety and Non-Public Safety departments within Rowan County. The County's current P25 system supports multiple manufacturer subscriber devices in both portable and mobile applications. The County plans to refresh the existing subscriber devices with current models supporting future enhancements not currently supported by existing devices. The County is releasing this Request for Proposal to obtain pricing for both immediate and future purchases of P25 subscriber devices. It is anticipated that approximately 2,000 units shall be initially acquired through this competitive procurement process. These 2,000 units will serve Law Enforcement, Fire Service and Public Service personnel.

- A. Respondents shall be responsible for providing the following:
  - 1. Project 25 portable units and associated accessories
  - 2. Project 25 mobile units and associated accessories
  - 3. Test procedures to fulfill the Subscriber Radio Testing and Verification Program requirements described in this document
  - 4. Programming software and cables for all model proposed
  - 5. Installation of mobiles

### 1.2 General Requirements

- A. Subscriber devices shall have been successfully tested to operate on Motorola ASTRO® 25 radio systems.
- B. Subscriber pricing shall be valid for two years with an option to renew additional two-year increments.
- C. Subscriber devices shall be P25 certified to support P25 Phase 2 trunked operations on 800 MHz private land mobile radio channels.
- D. Subscriber devices shall be capable of placing and receiving analog conventional mode calls.

- E. Subscriber devices shall be capable of placing and receiving P25 conventional mode calls.
- F. Subscriber devices shall be capable of placing and receiving P25 trunked mode calls.
- G. Subscriber devices software shall be flash programmable for adding future software enhancements.
- H. Subscriber devices shall be capable of being programmed via Wi-Fi.
- I. Subscriber devices shall be compatible with the P25 Tier 2 Unit location standard (GPS/AVL solution).
- J. Subscriber devices shall be compatible with the ASTRO® 25 failsoft operation.
- K. Subscriber devices shall support the Project 25 Enhanced Full Rate Vocoder (AMBE + 2).
- L. Subscriber devices shall support scanning of both trunked talkgroups and conventional channels (within one group).
- M. Subscriber devices shall support scan groups of at least 16 members and priority scan.
- N. Subscriber devices shall support the ability for users to configure or alter scan operations including the definition of a scan list.
- O. Subscriber devices user scan selections shall be retained after power cycles.
- P. Subscriber devices shall support hardware-based authenticated programming permission protections ensuring programming is performed by authorized personnel.
- Q. Subscriber devices shall be compatible with system security features including password protection.
- R. The programming of encryption and authentication keys into subscriber devices shall be accomplished via a key management tool ("key fill device") that complies with TIA-102.AACD, current version.
- S. Three key management tools shall be provided and include the appropriate cables for all proposed subscribers.

- T. The key management tool shall be used to view, change, erase, and activate keys individually or in groups.
- U. Subscriber units shall be provided with a 3-year warranty period.
- V. Respondents shall include in their proposal any information related to discounts, promotions or trade-in offers available to the County.

### **1.3 Portable Subscribers Requirements**

- A. All portable subscriber devices shall provide the following capabilities:
  - 1. Push-to-talk switch
  - 2. On-Off/Volume knob, mounted on top
  - 3. Minimum of three soft keys
  - 4. Minimum of 3 navigation keys
  - 5. Emergency button, mounted on top with easy access
  - 6. Top-mounted switches allowing use of "banks" of channels/talkgroups, each bank consisting of a minimum of 16 channels/talkgroups
  - 7. Front display with two lines of text (minimum 12 characters per line) and status icons for battery status and in-range/RSSI indicator
  - 8. Display shall be readable in all conditions from direct sunlight to total darkness
  - 9. Internal GPS unit capable of transmitting unit's GPS location information via the P25 radio system
- B. All portable subscriber radios shall be equipped with a flexible, covered antenna (readily removable utilizing a screw-in connector).
- C. All portable subscriber radios shall be equipped with standard-capacity batteries that, when starting with a full charge, allow operations for 10 hours at a duty cycle of 5% transmit, 5% receive, and 90% idle.
- D. Portable subscriber radios shall be OPTIONALLY equipped with high-capacity batteries that, when starting with a full charge, allow operations for 16 hours at a duty cycle of 5% transmit, 5% receive, and 90% idle.

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- E. Batteries shall connect securely to portable subscriber radios and shall not require the use of tools to attach or remove.
  - F. All portable subscriber devices shall be equipped with chargers that operate from 110 VAC sources, support rapid charge of batteries (complete charge in 1 to 2 hours) and support both standard and high-capacity batteries with or without radios connected to battery.
  - G. Internal speaker/ microphone shall include:
    - 1. Connection of an external speaker/microphone that mutes the internal speaker/ microphone
    - 2. Connection of an external earpiece that mutes the internal speaker
  - H. Universal or individual connectors with the following features:
    - 1. Microphone and earpiece connections must be capable of supporting the following types of microphone/earpiece devices (including types used in surveillance):
      - a. External speaker/ microphone
      - b. Earpiece
      - c. Programming interface
  - I. All Portable subscriber radios shall meet or exceed the following environmental specifications per MIL-STD-810E (or equivalent items in 810 F):
    - 1. Operating Temperature: -30 C to +60 C
    - 2. Low Pressure Operation: 500.3 Procedure II
    - 3. High Temperature, Storage / Operation: 501.3 Procedure I / II
    - 4. Low Temperature, Storage / Operation: 502.3 Procedure I / II
    - 5. Temperature Shock: 503.3 Procedure I
    - 6. Solar Radiation: 505.3 Procedure I
    - 7. Humidity: 507.3 Procedure II

8. Dust, Blowing: 510.3 Procedure I
9. Vibration: 514.4 Procedure I
10. Shock, Functional: 516.4 Procedure I
11. Rain, Blowing / Dripping Water (for metal case): 506.3 Procedure I / II
12. Salt Fog (for metal case): 509.3 Procedure I

### **1.3.1 Portable Subscribers - Models to be Proposed**

- A. Respondents shall propose, describe and price at least three models ("tiers") of portable radios to include:
  1. Law Enforcement Portable
  2. Fire Service Portable
  3. Public Service Portable
- B. Respondents shall provide information detailing the differences between the proposed portable subscriber models and how each model's features and functions are beneficial to the three user groups (Law Enforcement, Fire Service and Public Service)
- C. In addition to these three tiers Respondents are encouraged to propose additional models that meet the minimum requirements of this functional specification.

#### **1.3.1.1 Portable Subscriber Radio – Law Enforcement Model**

- A. In addition to the requirements listed for portable subscriber devices, the Law Enforcement model shall include the following capabilities:
  1. TDMA/P25 Phase 2 trunking operation.
  2. AES Encryption
  3. Multikey option
  4. Over the Air Rekey (OTAR)

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5. Surveillance mode allowing for covert operation (lights dimmed, tones muted, etc.)
- B. Respondents shall detail which of the following features may be supported by their proposed subscriber devices:
1. Over the Air Programming (OTAP)
  2. Programming over Wi-Fi
  3. P25 link layer authentication
  4. GPS location services
  5. Use of broadband (LTE and/or Wi-Fi) when P25 is unavailable.
- C. The Law Enforcement subscriber devices shall include a remote speaker-microphone (heavy-duty, palm-type with push-to-talk switch, emergency button and self-retracting coil cord)

### ***1.3.1.2 Portable Subscriber Radio – Fire Service Model***

- A. In addition to the requirements listed for portable subscriber devices, the Fire Service model shall include the following capabilities:
1. TDMA/P25 Phase 2 trunking operation.
  2. Extended environmental specifications
  3. Larger and easier to access knobs and controls.
  4. Highly visible color(s)
  5. OPTIONAL Intrinsic Safety certification
  6. Noise reduction technology for fire service environments
- B. Respondents shall detail which of the following features may be supported by their proposed subscriber devices:
1. Over the Air Programming (OTAP)
  2. Programming over Wi-Fi



3. P25 link layer authentication
  4. GPS location services
  5. Use of broadband (LTE and/or Wi-Fi) when P25 is unavailable.
- C. The Fire Service subscriber devices shall include a remote speaker-microphone designed for Fire Service operation including the following:
1. Extended environmental specifications
  2. Larger and easier to access knobs and controls.
  3. Highly visible color(s)
  4. Emergency button

#### ***1.3.1.3 Portable Subscriber Radio – Public Service Model***

- A. In addition to the requirements listed for portable subscriber devices, the Public Service model shall include the following capabilities:
1. TDMA/P25 Phase 2 trunking operation.
- B. Respondents shall detail which of the following features may be supported by their proposed subscriber devices:
1. Over the Air Programming (OTAP)
  2. Programming over Wi-Fi
  3. P25 link layer authentication
  4. GPS location services
- C. The Public Service subscriber devices shall include a remote speaker-microphone (standard-duty, palm-type with push-to-talk switch, emergency button and self-retracting coil cord)

#### ***1.4 Mobile Subscribers Requirements***

- A. The Mobile subscriber radios shall be constructed with the following distinct components:

1. A chassis configured for mounting in the trunk of a vehicle or other similar compartment.
  2. A control head configured for mounting in the dash in the front of a vehicle or, remote mounting (e.g., trunk) with a cable length of 17 feet minimum and a round-type cable with single protective outer sheath enclosing all other conductors.
  3. Options for multiple control heads controlling a single RF unit
  4. A microphone with a self-retracting coil cord that shall be 4 feet long (minimum) when extended
  5. An internal speaker of at least 5W or an external speaker
  6. Installation brackets and interface cables for all above components
- B. The mobile subscriber radios shall provide the following minimum capabilities for user controls and displays:
1. Push-to-talk switch on microphone
  2. On-Off button
  3. Volume knob
  4. Rotary knob for mode or zone selection, each bank consisting of 16 channels/talkgroups
  5. Minimum five soft keys
  6. Emergency button
  7. External speaker
- C. Display with two lines of text (minimum 12 characters per line) plus one line of icons and one line of menus.
- D. Display shall be readable in all conditions from direct sunlight to total darkness.
- E. All mobile subscriber radios shall meet or exceed the following environmental specifications per MIL-STD-810E (or equivalent items in 810 F):

1. Operating Temperature: -30 c to +60 C
  2. Low Pressure Operation: 500.3 Procedure II
  3. High Temperature, Storage / Operation: 501.3 Procedure I / II
  4. Low Temperature, Storage / Operation: 502.3 Procedure I / II
  5. Temperature Shock: 503.3 Procedure I
  6. Solar Radiation: 505.3 Procedure I
  7. Humidity: 507.3 Procedure II
  8. Dust, Blowing: 510.3 Procedure I
  9. Vibration: 514.4 Procedure I
  10. Shock, Functional: 516.4 Procedure I
  11. Rain, Blowing / Dripping Water (for metal case): 506.3 Procedure I / II
  12. Salt Fog (for metal case): 509.3 Procedure I
- F. The Selected Vendor shall be responsible for programming and installation of mobile subscribers. Installations shall include the following:
1. Installation of new antennas and lines, power cords and any control cables required for a complete working unit.
  2. Maintaining and providing to the County a log containing serial numbers, vehicle number, date of installation, forward and reflected power readings, and radio ID numbers.
  3. Removal and retention of legacy units and associated wiring in a secure location until turned over to the County or retained by the Selected Vendor in the event a trade-in is offered.
  4. The Selected Vendor shall maintain and provide to the County an inventory of all legacy units removed from service.

### **1.4.1 Mobile Subscribers - Models to be Proposed**

- A. Respondents shall propose, describe and price at least three models ("tiers") of mobile radios to include:
  - 1. Law Enforcement Mobile
  - 2. Fire Service Mobile
  - 3. Public Service Mobile
- B. Respondents shall provide information detailing the differences between the proposed mobile subscriber models and how each model's features and functions are beneficial to the three user groups (Law Enforcement, Fire Service and Public Service)
- C. Respondents shall bid a minimum of these three models ("tiers") of mobile radios; however, they are encouraged to propose more than three so long as they meet or exceed the following requirements.

#### **1.4.1.1 Mobile Subscriber Radio – Law Enforcement Model**

- A. In addition to the requirements listed for all subscriber devices, the Law Enforcement model shall include the following capabilities:
  - 1. TDMA/P25 Phase 2 trunking operation.
  - 2. AES Encryption
  - 3. Multikey option
  - 4. Over the Air Rekey (OTAR)
- B. Respondents shall detail which of the following features may be supported by their proposed subscriber devices:
  - 1. Over the Air Programming (OTAP)
  - 2. Programming over Wi-Fi
  - 3. P25 link layer authentication
  - 4. GPS location services

5. Use of broadband (LTE and/or Wi-Fi) when P25 is unavailable.
- C. The Law Enforcement model shall include a "Motorcycle" Optional configuration that is the same as above, but shall contain:
1. A water-resistant palm microphone (instead of a standard palm microphone)
  2. A water-resistant speaker (instead of a standard speaker)
  3. Motorcycle power and radio interface cables

#### **1.4.1.2 Mobile Subscriber Radio – Fire Service Model**

- A. In addition to the requirements listed for all subscriber devices, the Fire Service model shall include the following capabilities:
1. TDMA/P25 Phase 2 trunking operation.
- B. Extended environmental specifications
- C. Respondents shall detail which of the following features may be supported by their proposed subscriber devices:
1. Over the Air Programming (OTAP)
  2. Programming over Wi-Fi
  3. P25 link layer authentication
  4. GPS location services
  5. Use of broadband (LTE and/or Wi-Fi) when P25 is unavailable.

#### **1.4.1.3 Mobile Subscriber Radio – Public Service-Model**

- A. In addition to the requirements listed for all subscriber devices, the Public Service model shall include the following capabilities:
1. TDMA/P25 Phase 2 trunking operation.
- B. Respondents shall detail which of the following features may be supported by their proposed subscriber devices:

1. Over the Air Programming (OTAP)
2. Programming over Wi-Fi
3. P25 link layer authentication
4. GPS location services

#### **1.4.2 Subscriber Radios - Multiband OPTIONS**

Respondents shall also provide pricing for all-band and multi-band portables and mobiles. Multi-band devices shall be capable of operating in the 700/800 MHz band as well as a minimum of one other band, either VHF or UHF. All-band devices shall operate in the VHF, UHF, and 7/800 MHz bands.

#### **1.5 Subscriber Radios - Programming Equipment**

The Selected Vendor shall also include 12 full sets of programming equipment to support the proposed subscriber radios. This includes programming cables and programming software. Respondents shall provide the PC requirements.

#### **1.6 Subscriber Radios – NFPA Standard 1802**

The National Fire Protection Association (NFPA) is currently working to develop a standard on Two-Way Portable RF Voice Communications Devices for Use by Emergency Services Personnel in the Hazard Zone or, NFPA Standard 1802. The County understands that this standard has not been finalized and desires input from the vendors on their subscriber offerings and how they might meet the requirements of the NFPA 1802 standard (as currently released in draft from).

- A. Respondents shall provide any design requirements (NFPA 1802 Chapter 6) that are currently met or exceeded by their proposed devices.
- B. Respondents shall provide any performance requirements (NFPA 1802 Chapter 7) that are currently met or exceeded by their proposed devices.

## 2. Testing and Verification Program

### 2.1 *Portable Subscriber Testing*

- A. Respondents shall develop and conduct subscriber testing procedures to allow the County personnel to evaluate subscriber units for operation and durability.
- B. Respondents shall provide demonstration units and participate in the following test scenarios:
  - 1. Baseline test with no additional interfering noise
  - 2. Operator wearing air pack
  - 3. Operator wearing air pack with voice amp
  - 4. Operator wearing air pack with Bluetooth connectivity
  - 5. Operator wearing air pack with PASS alarm activated
  - 6. Operator standing in simulated rain
  - 7. Operator standing in environment containing two fire trucks parked parallel running at high idle adding the following:
    - a. Gasoline powered chainsaw
    - b. Portable generator w/electric ventilation fan blowing towards operator
- C. Respondents shall provide demonstration units and provide the following durability tests:
  - 1. Unit immersed in bucket of water for five minutes
  - 2. Drop radio from five feet on each side and antenna
  - 3. Test display screen for scratch resistance
  - 4. Test operability with operator rolling several times on the ground
  - 5. Unit immersed in bucket of water for five minutes after performing items 1-4 above

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6. Place radio in oven at 350 degrees for ten minutes
  7. Unit immersed in bucket of water for five minutes after performing items 1-6 above
- D. Respondents shall provide test units to operate on the County's existing radio system to test the following:
1. Ability to make and receive voice calls
  2. Compatibility with system security features
  3. Compatibility with the AVL/GPS feature
  4. System failsoft compatibility
  5. Compliance with all items contained within Section 1.2 General Requirements





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## Appendix A – Subscriber Pricing

Subscriber pricing provided in Excel format, file – *Rowan Subscriber Pricing Sheets.xlsx*

