

**TABLE OF CONTENTS**

<b>SECTION</b>	<b>PAGE</b>
<b>C.1 INTRODUCTION/SCOPE .....</b>	<b>1</b>
C.1.1 NARROWBAND MIGRATION .....	1
C.1.2 SCOPE.....	1
<b>C.2 GENERAL REQUIREMENTS.....</b>	<b>1</b>
C.2.1 FREQUENCY RANGES.....	2
C.2.1.1 VHF (Low-Split) .....	2
C.2.1.2 VHF (High-Split) .....	2
C.2.1.3 UHF (Low-Split) .....	2
C.2.1.4 UHF (High-Split) .....	2
C.2.1.5 800 MHz.....	2
C.2.2 OPERATING MODES .....	2
C.2.2.1 Analog .....	2
C.2.2.2 Digital .....	2
C.2.3 SPECIAL RADIO FUNCTIONS .....	2
C.2.3.1 Encryption .....	3
C.2.3.2 TIA/EIA-102 Digital OTAR.....	3
C.2.3.3 TIA/EIA-102 Trunking.....	3
<b>C.3 EQUIPMENT - GENERAL .....</b>	<b>4</b>
C.3.1 GENERAL.....	4
C.3.1.1 Construction and Equipment.....	4
C.3.1.2 Alignment/Ease of Service .....	4
C.3.1.3 RF Termination.....	5
C.3.1.4 Service Manuals.....	5
C.3.1.5 Identification Tag.....	5
C.3.1.6 Spare Parts Availability .....	5
C.3.1.7 Environmental .....	5
C.3.2 TRANSMIT AND RECEIVE EQUIPMENT - GENERAL .....	6
C.3.2.1 Programmability .....	6
C.3.2.2 Software .....	6
C.3.2.3 Hardware.....	6
C.3.2.4 Transmitter .....	6
C.3.2.5 Receiver .....	7
C.3.2.6 Channel and Group Capacity.....	7
<b>C.4 SUBSCRIBER UNITS.....</b>	<b>8</b>
C.4.1 PORTABLE RADIOS.....	8
C.4.1.1 General Requirements .....	8
C.4.1.2 Portable Radio Configurations .....	10
C.4.1.3 Additional Capabilities or Features.....	10
C.4.2 MOBILE RADIOS .....	15
C.4.2.1 General Requirements .....	15
C.4.2.2 Mobile Radio Configurations .....	17

Land Mobile Radio (LMR) Contracts with the Internal Revenue Service  
 PART I – THE SCHEDULE  
 SECTION C- LAND MOBILE RADIO SUBSCRIBER UNIT SPECIFICATION

C.4.2.3	<i>Additional Capabilities or Features</i> .....	18
C.4.3	DESKTOP STATIONS .....	19
C.4.3.1	<i>General Requirements</i> .....	19
C.4.3.2	<i>Desktop Radio Configurations</i> .....	21
C.4.3.3	<i>Additional Capabilities and Features</i> .....	22
C.4.4	PORTABLE REPEATERS.....	23
C.4.4.1	<i>Portable Repeater Encryption Operation Without Encryption Keys</i> .....	23
C.4.4.2	<i>Portable Repeater Encryption Operation With Encryption Keys</i> .....	23
C.4.4.3	<i>Portable Repeater Configurations</i> .....	23
C.4.4.4	<i>Additional Capabilities and Features</i> .....	25
C.4.5	PORTABLE BASE STATIONS .....	25
C.4.5.1	<i>General Requirements</i> .....	25
C.4.5.2	<i>Portable Base Station Configurations</i> .....	26
C.4.5.3	<i>Additional Capabilities and Features</i> .....	27
<b>C.5</b>	<b>PORTABLE ENCRYPTION KEY LOADING DEVICE</b> .....	<b>29</b>
C.5.1	KEY STORAGE .....	29
C.5.2	KEY LOADING METHOD .....	29
C.5.3	KEY TRANSFER METHOD.....	29
C.5.4	DISPLAY .....	29
C.5.5	VERIFICATION TEST.....	29
C.5.6	KEY RECALL .....	29
C.5.7	PROGRAMMABLE LOCK.....	29
C.5.8	NON-VOLATILE MEMORY .....	30
C.5.9	POWER-DOWN TIMER .....	30
C.5.10	POWER-UP MEMORY .....	30
C.5.11	OTAR COMPATIBILITY.....	30
C.5.12	POWER SOURCE.....	30
C.5.13	BATTERY POWER SOURCE .....	30
<b>C.6</b>	<b>TRAINING</b> .....	<b>30</b>
C.6.1	SUBSCRIBER UNIT OPERATIONS TRAINING.....	30
C.6.2	SUBSCRIBER UNIT MAINTENANCE TRAINING.....	31
<b>C.7</b>	<b>INSTALLATION</b> .....	<b>31</b>
	<b>TIA 102-SERIES STANDARDS SUMMARY PAGE</b> .....	<b>34</b>
	<b>GLOSSARY</b> .....	<b>36</b>

**LIST OF TABLES**

<b>TABLE</b>	<b>PAGE</b>
TABLE C.3-1, RF POWER OUTPUT .....	7
TABLE C.4-1, PORTABLE RADIO VEHICULAR ADAPTER GENERAL REQUIREMENTS.....	14
TABLE C.4-2, PORTABLE RADIO VEHICULAR ADAPTER MANDATORY ACCESSORIES .....	15
TABLE C.7-1, SPECIFICATIONS FOR INSTALLATION, REMOVAL, AND RELOCATION OF PORTABLE RADIO VEHICULAR ADAPTERS.....	31
TABLE C.7-2, SPECIFICATIONS FOR INSTALLATION, REMOVAL, AND RELOCATION OF MOBILE RADIOS .....	32

## **C.1 INTRODUCTION/SCOPE**

### **C.1.1 Narrowband Migration**

The National Telecommunications and Information Administration (NTIA) requires that all VHF (162-174 MHz) and UHF (406-420) Federal Government radio systems to migrate to narrowband (12.5 kHz) channel operation. To meet this requirement, the NTIA *Manual of Regulations and Procedures for Federal Radio Frequency Management Chapter 5 Spectrum Standards* is consistent with TIA/EIA Telecommunications Systems Bulletin (TSB) 102A standards (TIA/EIA-102) for the Class A level of requirements in TIA/EIA-TSB 102.CAAB.

The TIA/EIA-102 standards, also known as the Project 25 Standards, specify radio equipment that allows for a smooth migration from analog operating in the 25kHz bandwidth to 12.5 kHz digital operations. TIA/EIA-102 standards also provide for a “Common Air Interface” (CAI) across which radio equipment from multiple contractors will interoperate.

### **C.1.2 Scope**

Because of the importance of interoperability and the mandatory requirement to comply with the narrowbanding requirement set forth by the NTIA, the Department of the Treasury (Treasury) and the Department of Justice (Justice) have determined that newly procured digital radio equipment and systems shall be compliant with TIA/EIA-TSB 102.CAAB Class A standards and TIA/EIA 603 standards.

This specification includes TIA/EIA-102 compliant narrowband digital radio equipment, software, systems, services, and ancillary equipment. Where applicable, TIA/EIA-102 standards and requirements will take precedence over expressly stated specifications. As new features and functions become available, the Government recognizes that the P25.1.UN.(02)12 Statement of Requirements (SOR) will evolve and reserves the right to procure available compatible products. The Government requests detailed information and pricing on any additional offered capabilities or features that are in accordance with the most recently approved version of the P25.1.UN.(02)12 SOR but that may not be expressly listed herein.

This contract will be used to purchase VHF, UHF, and 800 MHz radio equipment for both Treasury and Justice and available for use by the agencies listed in H.1.

Items that are identified as additional capabilities or features in this specification will be purchased only when required and not in all cases. The additional capabilities or features would be added to enhance the capability of the equipment being fielded. Items such as encryption, scanning, display, and keypads are all additional capabilities or features that may or may not be ordered to configure radio equipment appropriately for use.

## **C.2 GENERAL REQUIREMENTS**

The following terms, standards, functions and protocols apply to this specification.

## **C.2.1 Frequency Ranges**

### **C.2.1.1 VHF (Low-Split)**

VHF low-split radios shall operate in a frequency range of 136 – 150.8 MHz at a minimum.

### **C.2.1.2 VHF (High-Split)**

VHF high-split radios shall operate in a frequency range of 150.8 – 174 MHz at a minimum.

### **C.2.1.3 UHF (Low-Split)**

UHF low-split radios shall operate in a frequency range of 406 – 420 MHz at a minimum.

### **C.2.1.4 UHF (High-Split)**

UHF high-split radios shall operate in a frequency range of 450 – 512 MHz at a minimum.

### **C.2.1.5 800 MHz**

800 MHz radios shall operate in a frequency range of 806 – 824 MHz and 851 – 870 MHz.

## **C.2.2 Operating Modes**

### **C.2.2.1 Analog**

All radio transmit and receive equipment shall be capable of analog operation in the following modes, employing standard signaling (TIA-603):

- Analog Conventional, emission designator 16K0F3E
- Analog Conventional, emissions designator 20K0F3E where applicable
- Analog Narrowband emission designator 11K0F3E

### **C.2.2.2 Digital**

Digital radio transmit and receive equipment shall be capable of operation in the above mentioned analog modes, as well as the digital narrowband mode (TIA/IS 102 series). Mobile and portable units must have, without user intervention, the ability to receive a properly coded analog (11K0F3E/16K0F3E) or digital signal on the same programmed channel.

## **C.2.3 Special Radio Functions**

At the discretion of the Government, the portable radio units may be ordered with the following special radio functions. When offered by the contractor and ordered by the Government, each of the supplied special radio functions shall be in accordance with the appropriate section or sections from C.2.3.1 through C.2.3.3.

### **C.2.3.1 Encryption**

Equipment specified to have encryption capabilities shall be equipped with the necessary software for the encryption identified in Sections C.2.3.1.1 or C.2.3.1.2. The traffic encryption key shall be changed using a portable key loading device, personal computer (PC) key loader, or Over-The-Air-Rekeying (OTAR). Equipment must be interoperable with existing Motorola KVL-3000 Key Variable Loader for the Unique Key Encryption Key (UKEK), traffic encryption keys, and Common Key Encryption Key (CKEK). In addition, the device shall be capable of holding a minimum of eight (8) traffic encryption keys. When specified, the radio shall be capable of a minimum of two encryption algorithms. Also, when specified, the equipment must support the encryption identified in Section C.2.3.1.2. The radio shall have the capability of a Clear/Coded Select function switching between unencrypted communications and encrypted communications.

#### **C.2.3.1.1 TIA/EIA-102 Encryption**

When specified, the units shall be compliant with Federal Information Processing Standard (FIPS) 140-2 and 46-3 (Data Encryption Standard) and have the capability of operation in the TIA/EIA-102 OFB-DES encrypted mode. For interoperability purposes, all units utilizing encryption shall be capable of operation using the DES algorithm, or an encryption algorithm compatible with the DES. Encryption shall be field-upgradeable to allow for implementation of FIPS 197, Advanced Encryption Standard (AES) and the TIA/EIA-102.AAAD Project 25 Block Encryption Standard, when available. The encryption shall be compliant with TIA IS-102.AAAA-A (APCO Project 25 DES Encryption Protocol), IS-102.AAAC (Conformance Test for Project 25 DES Encryption Protocol), along with subsidiary document, *Interoperability Testing of Data: Over the Air Rekeying (OTAR)* dated August 3, 2001.

#### **C.2.3.1.2 Legacy and Existing Federal Encryption**

When specified to support backwards compatibility, the radio unit shall have the capability of operating with a 12.0 kbps Continuous Variable Slope Differential (CVSD) Cipher FeedBack (CFB)-DES encryption method in accordance with the FIPS documents 140-1 and 46-3.

#### **C.2.3.2 TIA/EIA-102 Digital OTAR**

When specified, equipment shall have OTAR capability to change encryption keys. The OTAR capability shall be compliant with TIA/EIA TSB-102.AACA (APCO Project 25 OTAR), TIA/EIA TSB-102.AACB (OTAR Operational Description), and TIA/EIA TSB-102.AACC (Conformance Tests for the Project 25 OTAR).

#### **C.2.3.3 TIA/EIA-102 Trunking**

When specified, the equipment shall have the capability for trunking functionality. The trunking method and control channels shall conform to TIA TSB-102.AABA (APCO Project 25 Trunking Overview), TSB-102.AABB (APCO Project 25 Trunking Control Channel Formats), and IS-102.AABC (Project 25 Trunking Control Channel Messages).

When specified, trunked equipment shall support an encrypted control channel.

### **C.3 EQUIPMENT - GENERAL**

The TIA/EIA-102 suite of documents describes a radio system that is comprised of subscriber units, a Radio Frequency (RF) subsystem, and a CAI between all communicating parties. The documents define how the subscriber units and the RF subsystem shall conform to the CAI. It also provides specifications for transmitters and receivers (reference TIA/EIA TSB-102.CAAB Transceiver Performance Recommendations), as well as details concerning other interfaces. Refer to TSB-102A for an overview of equipment and systems requirements and capabilities.

This section describes the general requirements that apply to all equipment, as well as transmit and receive requirements for applicable equipment.

#### **C.3.1 General**

The following shall apply to all equipment, unless otherwise noted.

##### **C.3.1.1 Construction and Equipment**

In accordance with TSB-102A, requirements are based on MIL-STD 810 "Environmental Test Methods and Engineering Guide", which are specified in detail in TSB102.CAAB. All equipment parts shall meet the applicable EIA standards and shall operate within specified ratings. Construction, including assembly and wiring, and finishes shall conform to commercial practices for high quality equipment. The equipment shall be mechanically sound. The mobile and portable equipment shall meet or exceed the applicable sections of MIL-STD-810E "Environmental Test Methods and Engineering Guidelines" as follows.

Method 500.3 Low Pressure	Procedure II - Operation
Method 501.3 High Temperature	Procedure I - Storage
Method 502.3 Low Temperature	Procedure I - Storage
Method 503.3 Temperature Shock	Procedure I
Method 505.3 Solar Radiation	Procedure I - Cycling for Heat Effects
Method 506.3 Rain	Procedure I - Blowing Rain Procedure II - Drip
Method 507.3 Humidity	Procedure II - Induced
Method 509.3 Salt Fog	Procedure I - Aggravated Screening
Method 510.3 Sand and Dust	Procedure I - Blowing Dust
Method 514.4 Vibration	Procedure I, Category 10 - Minimum Integrity Test (3 axes)
Method 516.4 Shock	Procedure I - Functional Shock Procedure IV – Transit Drop Procedure VI – Bench Handling

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.

##### **C.3.1.2 Alignment/Ease of Service**

The manufacturer shall provide the Government with any alignment or service procedures that need to be performed in order to guarantee the continued proper operation of the unit. Test points and indicators shall be provided for the operator to perform these routine checks and

Land Mobile Radio (LMR) Contracts with the Internal Revenue Service  
PART I – THE SCHEDULE  
SECTION C- LAND MOBILE RADIO SUBSCRIBER UNIT SPECIFICATION

alignments. These test points and indicators shall be readily accessible and marked for ease of use. Measurements shall be possible using conventional test instruments and/or PC and software. Any alignment procedures shall be efficient, and accomplished in a minimum number of steps. The contractor shall update the procedures as necessary and provide such updates to the Government.

#### **C.3.1.3 RF Termination**

The radio frequency input circuit of all receivers and the output circuit of all transmitters shall be designed for operation into unbalanced transmission lines having a nominal impedance of 50 ohms.

#### **C.3.1.4 Service Manuals**

Service manuals shall describe the maintenance features of the specific radio equipment and shall include schematics, programming instructions and options, test points, power usage and dissipation levels, characteristic waveforms, lists of Lowest Replaceable Units (LRU), and other information necessary or useful for the extended care and troubleshooting of the equipment. Service manuals shall be available for all types of equipment to include subscriber units as well as fixed-end equipment. Each manual type shall be a separate line item in the contract defined by the contractor as an accessory. If available, the contractor shall provide on-line access capability for updates to the manual via the Internet or other electronic form, for the life of the contract.

#### **C.3.1.5 Identification Tag**

Each complete piece of communications equipment shall have an identification tag permanently affixed on the exterior of the unit for quick, positive identification. At a minimum, the equipment model number, serial number, and FCC type acceptance number shall be provided.

If specified by the Government at the time of delivery order placement, the contractor shall affix Government-provided property management bar codes to all subscriber units in an easy to scan location, or in close proximity to the manufacturer's model and serial number label. Bar code labels will be provided to the contractor within fourteen (14) days of order placement.

When requested by the Government, the contractor shall provide the ordering agency with an electronic data file that contains, at a minimum, the information set forth in Section G.12.2 of the contract.

#### **C.3.1.6 Spare Parts Availability**

The contractor shall make available spare parts for all equipment ordered under this contract for the life expectancy of the unit, starting from the date of delivery.

#### **C.3.1.7 Environmental**

Refer to TIA/EIA TSB-102.CAAB (Digital C4FM/CQPSK Transceiver Performance Recommendations) for Class A type radios and radio equipment.



### **C.3.2 Transmit and Receive Equipment - General**

The following shall apply to all transmit and receive equipment, unless otherwise noted.

#### **C.3.2.1 Programmability**

The equipment shall be capable of being programmed from a PC with appropriate *Windows* based software and equipment.

All radios shall be capable of being *flash* upgraded to implement additional features and functions specified herein.

#### **C.3.2.2 Software**

The contractor shall provide programming software that can be loaded on a PC that will allow technicians to program the equipment to operate with all applicable features and functions listed within the specifications.

The contractor shall notify the Government representatives identified in G.2.2(a) and (c) in the event of updated software version, and, as a separately priced item, the contractor shall make the updated versions of the software available.

All software and/or flash upgrades to repair software defects or deficiencies shall be provided at no charge to the Government. Additionally, software and/or flash upgrades meant to repair defects shall not be bundled with standard and/or recurring device feature upgrades, unless approved by the Government.

All defect or feature software and flash upgrades shall be provided with site licensing provisions only and shall not be based on quantities of subscriber devices. The upgrades shall include a three-year software subscription that is renewable thereafter.

#### **C.3.2.3 Hardware**

To facilitate maintenance and upgrades, the equipment shall have field-replaceable hardware modules that allow easy removal and replacement.

#### **C.3.2.4 Transmitter**

##### **C.3.2.4.1 Power Levels**

Refer to Table C.3-1 for a listing of the required power ranges for portables, mobiles, and base stations/repeaters. Ranges for low-power, mid-power, and high-power models are listed. The specified power levels shall meet the requirements of TIA TSB-102.CAAB paragraph 3.2.1. The level of power output shall be incrementally adjustable from a low power setting to be used for longer battery life, to a high power setting for better communication range. The power levels indicated in Table C.3-1 are nominal. The actual unit power output range may exceed the range indicated in Table C.3-1. Powers listed for the portable repeater and portable base station are rated pre-duplexer. Portable repeaters and portable base stations require minimum 100% and 50% duty cycles, respectively.

Land Mobile Radio (LMR) Contracts with the Internal Revenue Service  
 PART I – THE SCHEDULE  
 SECTION C- LAND MOBILE RADIO SUBSCRIBER UNIT SPECIFICATION

Table C.3-1, RF Power Output

Power Range	Portable			Mobile			Desktop			Portable Repeater			Portable Base Station		
	VHF	UHF	800 MHz	VHF	UHF	800 MHz	VHF	UHF	800 MHz	VHF	UHF	800 MHz	VHF	UHF	800 MHz
Low				10 - 25W	10 - 25W	35W	10 - 25W	10 - 25W	35W	10 - 25W	10 - 25W	10 - 25W	10 - 25W	10 - 25W	10 - 25W
Mid	1 - 5W	1 - 4W	1 - 3W	25 - 50W	20 – 40W		25 - 50W	20 – 40W		25 - 50W	20 – 40W	20 – 35W	25 - 50W	20 – 40W	20 – 35W
High				50 - 110W	50 – 110W		50 - 110W	50 – 110W		50 - 110W	50 – 110W	50 – 100W	50 - 110W	50 – 110W	50 – 100W

**C.3.2.4.2 Analog Specifications**

Transmitters shall meet or exceed all applicable specifications in TIA/EIA 603 equipment under the transmitter section of standards.

**C.3.2.4.3 Digital Specifications**

Digital transmitters shall meet or exceed all applicable specifications listed in TIA/EIA TSB-102.CAAB (Digital C4FM/CQPSK Transceiver Performance Recommendations) under the transmitter section of standards for Class A equipment.

**C.3.2.5 Receiver**

The receivers shall also meet or exceed the standards as defined in section 5.3.5.2, of the NTIA manual, *Standards for Fixed and Mobile Analog or Digital FM/PM Narrowband Operations*.

**C.3.2.5.1 Analog Specifications**

Receivers shall meet or exceed all standards specified in TIA/EIA 603 equipment under the receiver section of standards.

**C.3.2.5.2 Digital Specifications**

Digital receivers shall meet or exceed all applicable specifications listed in TIA/EIA TSB-102.CAAB (Digital C4FM/CQPSK Transceiver Performance Recommendations) under the receiver section of standards for Class A equipment.

**C.3.2.6 Channel and Group Capacity**

All radios shall support multiple channel operations. When specified for trunking functionality, radios shall also support multiple group operations.

#### **C.3.2.6.1 Channel Capacity**

Radios shall support multiple channel operations, providing, as a minimum, 16 channels per radio. When specified, other radio channel capacity requirements shall be required as follows:

- 48 Channel capacity minimum
- 128 Channel capacity minimum
- 256 Channel capacity minimum.

#### **C.3.2.6.2 Group Capacity**

Radios shall support multiple group operations, providing, as a minimum, 16 groups per radio. When specified, other radio group capacity requirements shall be required as follows:

- 48 Group capacity minimum
- 128 Group capacity minimum
- 256 Group capacity minimum
- 512 Group capacity minimum.

### **C.4 SUBSCRIBER UNITS**

The baseline requirements for a subscriber unit are defined in the TIA/EIA-102 suite of documents (see TIA/EIA-102 Series Standards Summary Page of this document). The following is a description of the Government's specific requirements.

Subscriber units are grouped into five categories:

- Portable radios
- Mobile radios
- Desktop stations
- Portable repeaters
- Portable base stations.

Subscriber units from any of these five categories shall be provided that operate in one or more of the frequency ranges identified in Section C.2.1; VHF (Low-Split), VHF (High-Split), UHF (Low-Split), UHF (High-Split), and 800MHz. Other than VHF portable units, which must operate in both the VHF High-Split and Low-Split frequency ranges, a single subscriber unit need not operate in more than one of these frequency ranges. It is, however, preferable for any subscriber unit to provide complete band coverage.

#### **C.4.1 PORTABLE RADIOS**

Portable radios shall have the following features/functionality.

##### **C.4.1.1 General Requirements**

The portable radios shall have the following features as part of its standard capability of operation.

#### **C.4.1.1.1 Conventional Operation**

##### **C.4.1.1.1.1 Simplex Peer-to-Peer Operation**

The radio shall have the capability to communicate with other subscriber units independent of fixed infrastructure.

##### **C.4.1.1.1.2 Repeater Access**

The radio shall have the capability to communicate with other subscriber units via a repeater station in a half-duplex mode of operation.

##### **C.4.1.1.2 Flash Programming**

The portable units shall be capable of flash programming any of the features that the radio is capable of supporting to allow the user to add additional features and functions after delivery of the unit. The unit shall have the capability to digitally store functional characteristics, including, but not limited to, channel frequencies, minimum volume settings, and channel scanning patterns.

##### **C.4.1.1.3 Features and Controls**

At a minimum the radio shall have external controls for Push-To-Talk (PTT), and on/off volume with graduated control. In accordance with TSB-102A, control knobs shall be of an ergonomic design.

Where applicable, the radio shall have channel selection and emergency buttons.

##### **C.4.1.1.4 Accessory Support**

The portable shall be capable of supporting the following accessories.

- External speaker/microphone
- Belt clip
- External antenna

##### **C.4.1.1.5 External Interface Support**

The portable shall be capable of interfacing with the following:

- External key load device
- Personal computer

##### **C.4.1.1.6 Power Source**

The portable radios shall be capable of being powered by a detachable battery pack containing rechargeable cells. Rechargeable batteries shall be capable of delivering the power level and quality required to enable the portable radio to operate under the required technical, environmental, and operational standards. Battery life shall conform to all requirements

specified under TIA TSB-102.A (APCO Project 25 System and Standards Definition). However, the Government desires longer battery life when possible.

#### **C.4.1.2 Portable Radio Configurations**

The basic portable radios shall have the following configurations.

##### **C.4.1.2.1 Baseline VHF Low-Split and High-Split Combined Configuration**

The baseline VHF band portable radio shall be fully compliant with the TIA 102 family of specifications for Project 25 radios and provide the following:

- VHF band coverage as specified in paragraphs C.2.1.1 and C.2.1.2, combined
- Low power output as specified in Table C.3-1
- A minimum channel capacity of 16 channels as specified in paragraph C.3.2.6

##### **C.4.1.2.2 Baseline UHF Low-Split Configuration**

The baseline UHF low-split portable radio shall be fully compliant with the TIA 102 family of specifications for Project 25 radios and provide the following:

- UHF low-split coverage as specified in paragraph C.2.1.3
- Low power output as specified in Table C.3-1
- A minimum channel capacity of 16 channels as specified in paragraph C.3.2.6

##### **C.4.1.2.3 Baseline UHF High-Split Configuration**

The baseline UHF high-split portable radio shall be fully compliant with the TIA 102 family of specifications for Project 25 radios and provide the following:

- UHF high-split coverage as specified in paragraph C.2.1.4
- Low power output as specified in Table C.3-1
- A minimum channel capacity of 16 channels as specified in paragraph C.3.2.6

##### **C.4.1.2.4 Baseline 800 MHz Configuration**

The baseline 800 MHz band portable radio shall be fully compliant with the TIA 102 family of specifications for Project 25 radios and provide the following:

- 800 MHz band coverage as specified in paragraph C.2.1.5
- Low power output as specified in Table C.3-1
- A minimum channel capacity of 16 channels as specified in paragraph C.3.2.6

#### **C.4.1.3 Additional Capabilities or Features**

At the discretion of the Government, the portable radio units may be ordered with the following capabilities or features. When offered by the contractor and ordered by the Government, each of the supplied capabilities or features shall be in accordance with the appropriate section or sections from C.4.1.3.1 through C.4.1.3.25.

#### **C.4.1.3.1 DTMF Keypad**

A DTMF Keypad, as defined in the Glossary, shall be provided and incorporated into the selected radio control configuration.

#### **C.4.1.3.2 Display**

A display shall be provided as defined in the Glossary section of this document.

#### **C.4.1.3.3 Scanning**

In accordance with TSB-102A, the radio shall have the capability of scanning from a list of programmed frequencies or groups, or user selected frequencies or groups. The scan shall be selectable priority, which means that the transmitter channel or talk-group selected by the user is the priority channel or talk-group.

#### **C.4.1.3.4 Surveillance Mode**

The unit shall include the ability to disable any lights and tones, including back-lighting (but not the screen display text), associated with the radio, on a personality by personality basis in order to support covert or surveillance modes of operation. The unit shall be capable of disabling these lights and tones by both of the following methods. The first method is PC programming of selected channels to be used during surveillance operation. If programmed in this manner, the unit shall automatically know to disable these lights and tones when a surveillance mode channel is selected for use. The second method to disable these lights and tones shall be by operator selection, using the radio controls available to the operator.

#### **C.4.1.3.5 Power Source**

The portable units shall be capable of being powered by disposable alkaline cells.

#### **C.4.1.3.6 Radio Programming Equipment and Cables**

The contractor shall provide radio programming equipment cables including all software, equipment and cabling necessary to program standard features, as well as software upgrades, from PC to radio.

#### **C.4.1.3.7 External Data Port**

When specified, the units shall support an external data port to an attached mobile data terminal (MDT), portable computer or other peripheral device. The MDT interface must be able to present an addressable MDT data stream to a host-attached port, physically over an RS-232 or V.35 electrical interface or via Universal Serial Bus (USB). When RS-232 interface is implemented, the physical layer shall be capable of conforming with EIA RS-232-C for data rates under 19.2 kbps and CCITT V.35 for data rates above 19.2 kbps.

#### **C.4.1.3.8 Batteries – Rechargeable**

Rechargeable batteries shall be resistant to the memory effect and shall not drop below 95% of their rated capacity (amp-hours) for the first 18 months of use through standard charging without requiring the use of a battery conditioner.

#### **C.4.1.3.9 Batteries – Disposable**

Disposable batteries shall contain battery cells enclosed in a lightweight metal or plastic housing. The battery shall be capable of delivering the power level and quality required to enable the portable radio to operate under the required technical, environmental, and operational standards. Battery life shall conform to all requirements specified under TIA TSB-102.A (APCO Project 25 System and Standards Definition).

#### **C.4.1.3.10 Re-Loadable Battery Pack**

A re-loadable battery pack (housing unit) shall consist of a device that will accept disposable Commercial off-the-Shelf (COTS) alkaline batteries (i.e., Triple A, Double A, “D”, or 9 volt style). The battery pack with the appropriate COTS batteries installed shall be capable of delivering the quality required to enable the portable radio to operate under the required technical, environmental, and operational standards. A reduction in radio output power is acceptable when powered by the re-loadable battery pack, as long as the radio continues to operate normally in all other regards, and reverts to normal power output levels with the normal power source is used. Battery pack with appropriate batteries installed shall conform to all requirements specified under TIA TSB-102.A (APCO Project 25 System and Standards Definition).

#### **C.4.1.3.11 Single Unit Battery Charger**

The unit shall be capable of charging a single rechargeable battery. It shall be powered by 110/240 VAC, 50/60 Hz power. The unit shall have an indicator LED for the status of the battery, such as charging, and charged indicators. The Government desires that the unit be rated for rapid, one-hour re-charge time.

#### **C.4.1.3.12 Single Unit Tri-Chemistry Battery Charger**

The unit shall be a tri-chemistry (Ni-CD, Ni-MH, or Li-Ion) battery charger. The tri-chemistry battery charger shall include a universal power source (90 to 265 VAC, 50 – 400 Hz), and shall be rated for rapid, one hour re-charge time.

#### **C.4.1.3.13 Multi-Unit Battery Charger**

The unit shall be capable of charging a minimum of six (6) rechargeable batteries simultaneously. The charger shall have the same requirements as the single battery charger unit specified above, and shall have LED indication for each battery. The Government desires optional sleeves to accommodate different battery types, especially different batteries from multiple manufacturers.

**C.4.1.3.14 Multi-Unit Tri-Chemistry Battery Charger**

The unit shall be a tri-chemistry (Ni-CD, Ni-MH, or Li-Ion) multi-unit battery charger. The tri-chemistry multi-unit battery charger shall be capable of charging six batteries at once. The charger shall have a universal power source (90 to 265 VAC, 50 – 400 Hz), and shall be rated for rapid, one hour re-charge time. The Government desires optional sleeves to accommodate different battery types, especially different batteries from multiple manufacturers.

**C.4.1.3.15 Automobile Adapter Battery Charger**

The unit shall be capable of charging a single rechargeable battery. It shall be powered by a 13.8V DC car battery, and shall have LED indication as required by the single unit battery charger specified above. It shall have a cigarette lighter/12V accessory adapter plug.

**C.4.1.3.16 Multi-Unit Battery Reconditioner**

The system shall be capable of recharging as well as reconditioning “memorized” batteries, if necessary, as is the case with nickel-cadmium rechargeable batteries. The system shall be capable of handling a minimum of six (6) rechargeable batteries simultaneously. It shall be powered by 110/240 VAC, 50/60 Hz power. The unit shall have several function buttons to perform charging and recycling operations, and a minimum of one display showing battery status for each battery.

**C.4.1.3.17 Carrying Cases**

Leather, including belt loop and T-strap.

**C.4.1.3.18 Belt Clips**

- Spring-loaded Belt Clips fitting a 1 inch belt width
- Spring-loaded Belt Clips fitting a 3 inch belt width
- Fixed Belt Clip fitting a 1 inch belt width
- Fixed Belt Clip fitting a 3 inch belt width

**C.4.1.3.19 Two-Piece Surveillance Kit**

The contractor shall provide a combination earpiece assembly with standard earphone and urethane ear-loop and PTT microphone.

**C.4.1.3.20 Three-Piece Surveillance Kit**

The contractor shall provide a combination earpiece assembly with standard earphone and urethane ear-loop, pin-on mini lapel microphone, and palm-held PTT switch for microphone.

**C.4.1.3.21 Wireless Earpiece and Microphone Kit**

The contractor shall provide an easily concealed wireless earpiece including a mini-lapel microphone and palm-held PTT switch for microphone. The earphone shall receive its signal from a short-range transmitter included with the kit.



**C.4.1.3.22 Handheld Speaker/Microphone**

The handheld speaker/microphone shall, at a minimum, include a large Push-To-Talk switch, a swivel clip, and a minimum 12” (retracted) coiled cord. It shall comply with MIL-STD-810E standards for:

- Driven Rain
- Humidity
- Salt Fog
- Blowing Dust
- Shock

**C.4.1.3.23 Antenna for Portable Radios**

The antenna shall be low-profile, non-adjustable, unity gain or better, and covered with injection-molded rubber. The standard antenna shall be optimized for use in the applicable frequency band.

**C.4.1.3.24 Portable Radio Vehicular Adapter**

The offeror shall provide vehicular adapters and their associated accessories for portable radios that satisfy the requirements specified in Tables C.4-1 and C.4-2. When a portable radio vehicular adapter is specified, at least one of the mandatory accessories must be offered from Table C.4-2. The accessories shall extend the functions of the radio to the operator to improve the ease of operation while the radio is placed in the vehicular adapter.

**Table C.4-1, Portable Radio Vehicular Adapter General Requirements**

<b>Portable Radio Vehicular Adapter: General Requirements</b>	
<b>Description</b>	<b>Specification</b>
Charging Console	Shall include an integrated vehicular charger for the radio to be charged from a vehicle power source. Tri-chemistry (Ni-CD, Ni-MH, and Li-Ion) conditioning and charging equipment shall be available
Power Amplifier	Shall be capable of incrementally boosting portable radio output power to 40, 60 or 100 watts
Audio Speaker	Shall include at least a 10 watt audio speaker and shall deliver optimum sound output in the voice range used by the radio
Mobile Antenna	A mobile antenna shall operate in the specified frequency range; shall include a quarter-wave unity gain antenna with cable and installation hardware
Mounting Hardware and Cables	Shall include all required mounting hardware and cables to interface to the radio and shall have ruggedized performance to withstand a mobile environment. In-line fuse holders (with appropriately rated fuses) should be included in all non-RF power-carrying wiring

Land Mobile Radio (LMR) Contracts with the Internal Revenue Service  
 PART I – THE SCHEDULE  
 SECTION C- LAND MOBILE RADIO SUBSCRIBER UNIT SPECIFICATION

<b>Portable Radio Vehicular Adapter: General Requirements</b>	
<b>Description</b>	<b>Specification</b>
Audio Power Amplifier	Shall be available for use with the vehicular adapter console. The audio power amplifier shall operate from the vehicle power supply (nominal 12 VDC) and provide 100 W continuous power suitable for driving an external speaker
Recording Output Jack	Shall be equipped with a jack that provides transmitted and received audio suitable for driving the line level input of a portable recorder.
Reliability	The MTBF for the unit shall be at least 16,000 hours for both electrical and mechanical components, based on radio insertion and removal up to 20 times a day.

**Table C.4-2, Portable Radio Vehicular Adapter Mandatory Accessories**

<b>Portable Radio Vehicular Adapter: Mandatory Accessories</b>	
<b>Description</b>	<b>Specification</b>
Extended Microphone	Shall be weather resistant and shall include a coil connecting cord
Handheld Control Extended Microphone Kit	Shall include all controls and cabling required for operation of the radio (in dash or in trunk installation) and shall be included as part of the microphone. The control device shall provide control of all features supported by the radio

**C.4.1.3.25 Global Positioning Satellite Functionality**

When requested by the Government, the unit shall provide Global Positioning Satellite (GPS) functionality in accordance with P25.1.UN.(02)12 April 18 2002 SOR.

**C.4.2 MOBILE RADIOS**

Mobile radios shall have the following features/functionality.

**C.4.2.1 General Requirements**

The mobile radios shall have the capability of being securely mounted in a mobile environment, such as, but not limited to trunk or under seat, as an example. The mobile radio shall have the following features as part of its standard capability of operation.

**C.4.2.1.1 Conventional Operation**

**C.4.2.1.1.1 Simplex Peer-to-Peer Operation**

The radio shall have the capability to communicate with other subscriber units independent of fixed infrastructure.

**C.4.2.1.1.2 Repeater Access**

The radio shall have the capability to communicate with other subscriber units via a repeater station in a half-duplex mode of operation.

#### **C.4.2.1.2 Flash Programming**

The mobile units shall be capable of flash programming any of the features that the radio is capable of supporting to allow the user to add additional features and functions after delivery of the unit. The unit shall have the capability to digitally store functional characteristics, including, but not limited to, channel frequencies, minimum volume settings, and channel scanning patterns.

#### **C.4.2.1.3 Radio Controls**

At a minimum, the radio shall have a display, volume control, channel select, emergency button, and an on/off switch. In accordance with TSB-102A, control knobs shall be of an ergonomic design. The Government has a need for three (3) different configurations of radio controls:

1. Radio-mounted control head with external microphone and external speaker
2. Remote-mounted control head with external microphone and external speaker
3. Hand-held control head with integrated microphone and external speaker

#### **C.4.2.1.4 Surveillance Mode**

The unit shall include the ability to disable any lights and tones, including back-lighting (but not the screen display text), associated with the radio, on a personality by personality basis in order to support covert or surveillance modes of operation. The unit shall be capable of disabling these lights and tones by both of the following methods. The first method is PC programming of selected channels to be used during surveillance operation. If programmed in this manner, the unit shall automatically know to disable these lights and tones when a surveillance mode channel is selected for use. The second method to disable these lights and tones shall be by operator selection, using the radio controls available to the operator.

#### **C.4.2.1.5 Speaker**

The radio shall include a 12W (minimum), internal or external speaker. If the speaker is internal to the assembly, the unit shall have a jack to be able to accommodate an external speaker.

#### **C.4.2.1.6 External Microphone**

The radio shall include an external microphone that shall, at a minimum, include a PTT switch, with a mounting bracket.

#### **C.4.2.1.7 External Interface Support**

The mobile shall be capable of interfacing with an external key load device and a personal computer.

#### **C.4.2.1.8 Power Source**

Mobile radios shall be powered from a negative ground 12-volt or 13.8-volt vehicle battery. The unit shall be protected from transient power surges generated by ancillary equipment connected to the source.

#### **C.4.2.2 Mobile Radio Configurations**

The basic mobile radios shall have the following configurations.

##### **C.4.2.2.1 Baseline VHF Low-Split Configuration**

The baseline VHF low-split mobile radio shall be fully compliant with the TIA 102 family of specifications for Project 25 radios and provide the following:

- VHF band coverage as specified in paragraph C.2.1.1
- Radio-mounted control head with external microphone and external speaker as specified in paragraph C.4.2.1.3-1
- Power output as specified in Table C.3-1
- A minimum channel capacity of 16 channels as specified in paragraph C.3.2.6

##### **C.4.2.2.2 Baseline VHF High-Split Configuration**

The baseline VHF high-split mobile radio shall be fully compliant with the TIA 102 family of specifications for Project 25 radios and provide the following:

- VHF band coverage as specified in paragraph C.2.1.2
- Radio-mounted control head with external microphone and external speaker as specified in paragraph C.4.2.1.3-1
- Power output as specified in Table C.3-1
- A minimum channel capacity of 16 channels as specified in paragraph C.3.2.6

##### **C.4.2.2.3 Baseline UHF Low-Split Configuration**

The baseline UHF low-split mobile radio shall be fully compliant with the TIA 102 family of specifications for Project 25 radios and provide the following:

- UHF low-split coverage as specified in paragraph C.2.1.3
- Radio-mounted control head with external microphone and external speaker as specified in paragraph C.4.2.1.3-1
- Power output as specified in Table C.3-1
- A minimum channel capacity of 16 channels as specified in paragraph C.3.2.6

##### **C.4.2.2.4 Baseline UHF High-Split Configuration**

The baseline UHF high-split mobile radio shall be fully compliant with the TIA 102 family of specifications for Project 25 radios and provide the following:

- UHF high-split coverage as specified in paragraph C.2.1.4

Land Mobile Radio (LMR) Contracts with the Internal Revenue Service  
PART I – THE SCHEDULE  
SECTION C- LAND MOBILE RADIO SUBSCRIBER UNIT SPECIFICATION

- Radio-mounted control head with external microphone and external speaker as specified in paragraph C.4.2.1.3-1
- Power output as specified in Table C.3-1
- And a minimum channel capacity of 16 channels as specified in paragraph C.3.2.6

**C.4.2.2.5 Baseline 800 MHz Configuration**

The baseline 800 MHz band mobile radio shall be fully compliant with the TIA 102 family of specifications for Project 25 radios and provide the following:

- 800 MHz band coverage as specified in paragraph C.2.1.5
- Radio-mounted control head with external microphone and external speaker as specified in paragraph C.4.2.1.3-1
- Power output as specified in Table C.3-1
- A minimum channel capacity of 16 channels as specified in paragraph C.3.2.6

**C.4.2.3 Additional Capabilities or Features**

At the discretion of the Government, the mobile radio units may be ordered with the following capabilities or features. When offered by the contractor and ordered by the Government, each of the supplied capabilities or features shall be in accordance with the appropriate section or sections from C.4.2.3.1 through C.4.2.3.11.

**C.4.2.3.1 DTMF Keypad**

A DTMF Keypad, as defined in the glossary, shall be provided and incorporated into the selected radio control configuration.

**C.4.2.3.2 Display**

A display shall be provided as defined in the Glossary section of this document.

**C.4.2.3.3 Scanning**

In accordance with TSB-102A, the radio shall have the capability of scanning from a list of programmed frequencies or groups or user selected frequencies or groups. The scan shall be selectable priority, which means that the transmitter channel or talk-group selected by the user is the priority channel or talk-group.

**C.4.2.3.4 Radio Programming Equipment and Cables**

The contractor shall provide radio programming equipment cables include all software, equipment and cabling necessary to program standard features, as well as software upgrades, from PC to radio.

**C.4.2.3.5 External Data Port**

When specified, the units shall support an external data port to an attached mobile data terminal (MDT), portable computer or other peripheral device. The MDT interface must be able to present an addressable MDT data stream to a host-attached port, physically over an RS-232 or

Land Mobile Radio (LMR) Contracts with the Internal Revenue Service  
PART I – THE SCHEDULE  
SECTION C- LAND MOBILE RADIO SUBSCRIBER UNIT SPECIFICATION

V.35 electrical interface or via Universal Serial Bus (USB). When RS-232 interface is implemented, the physical layer must be capable of conforming with EIA RS-232-C for data rates under 19.2 kbps and CCITT V.35 for data rates above 19.2 kbps.

**C.4.2.3.6 Audio Output Jack**

The audio output jack shall be accessible, allowing the user to plug in an earpiece or an audio recorder to monitor received audio.

**C.4.2.3.7 Siren/PA Capable Radio Control**

When specified, the radio unit shall be capable of controlling the siren/PA functions.

**C.4.2.3.8 Handheld Microphone for Mobile Radios**

The radio shall include a handheld microphone, and at a minimum, include a PTT switch, a swivel clip, and a minimum 12" (retracted) coiled cord.

**C.4.2.3.9 External Speaker for Mobile Radios**

The speaker shall be capable of being driven by a 12W power output, and shall include an engine noise filter and the wiring and adapter necessary for connection to the mobile unit.

**C.4.2.3.10 Antenna for Mobile Radios**

At a minimum, the antenna shall have unity gain, and be roof, trunk, or magnetically mountable. Maximum power input shall be 150W. The antenna shall be optimized for use in the applicable frequency band.

**C.4.2.3.11 Global Positioning Satellite Functionality**

When requested by the Government, the unit shall provide Global Positioning Satellite (GPS) functionality in accordance with P25.1.UN.(02)12 April 18 2002 SOR.

**C.4.3 DESKTOP STATIONS**

Desktop stations shall have the following features/functionality.

**C.4.3.1 General Requirements**

The device shall have the same transmit and receive characteristics as a mobile radio subscriber unit. However, it shall be capable of being powered by 120/240VAC, 50/60 Hz power.

The desktop stations shall also have the following features as part of its standard capability of operation.

#### **C.4.3.1.1 Conventional Operation**

##### **C.4.3.1.1.1 Simplex Peer-to-Peer Operation**

The radio shall have the capability to communicate with other subscriber units independent of fixed infrastructure.

##### **C.4.3.1.1.2 Repeater Access**

The radio shall have the capability to communicate with other subscriber units via a repeater station in a half-duplex mode of operation.

##### **C.4.3.1.2 Flash Programming**

The desktop units shall be capable of flash programming any of the features that the radio is capable of supporting to allow the user to add additional features and functions after delivery of the unit. The unit shall have the capability to digitally store functional characteristics, including, but not limited to, channel frequencies, minimum volume settings, and channel scanning patterns.

##### **C.4.3.1.3 Radio Controls**

At a minimum, the radio shall have a volume control, channel select, and an on/off switch. In accordance with TSB-102A, control knobs shall be of an ergonomic design.

##### **C.4.3.1.4 Control Capabilities**

The radio unit shall have the ability to control a single transmit/repeater site. There are four versions required for the radio controls:

1. Local control head on the same assembly
2. Remote control interface, capable of controlling a single radio unit
3. Multiple control head interface, providing single radio unit control to multiple control heads
4. Remote control interface, capable of controlling multiple radio units

##### **C.4.3.1.5 Speaker**

The radio shall include a 12W (minimum), internal or external speaker. If the speaker is internal to the assembly, the unit shall have a jack to be able to accommodate an external speaker or audio recording device.

##### **C.4.3.1.6 External Microphone**

The radio shall include an external microphone that shall, at a minimum, include a PTT switch.

#### **C.4.3.1.7 External Interface Support**

The radio shall be capable of interfacing with an external key load device and a personal computer.

#### **C.4.3.1.8 Power Sources**

Desktop station equipment shall be powered from a 110/240 VAC 50/60 Hz source.

#### **C.4.3.2 Desktop Radio Configurations**

The basic desktop radios shall have the following configurations.

##### **C.4.3.2.1 Baseline VHF Low-Split Configuration**

The baseline VHF low-split desktop radio shall be fully compliant with the TIA 102 family of specifications for Project 25 radios and provide the following:

- VHF band coverage as specified in paragraph C.2.1.1
- Low power output as specified in Table C.3-1
- Local control head as specified in paragraph C.4.3.1.4-1
- A minimum channel capacity of 16 channels as specified in paragraph C.3.2.6

##### **C.4.3.2.2 Baseline VHF High-Split Configuration**

The baseline VHF high-split desktop radio shall be fully compliant with the TIA 102 family of specifications for Project 25 radios and provide the following:

- VHF band coverage as specified in paragraph C.2.1.2
- Low power output as specified in Table C.3-1
- Local control head as specified in paragraph C.4.3.1.4-1
- A minimum channel capacity of 16 channels as specified in paragraph C.3.2.6

##### **C.4.3.2.3 Baseline UHF Low-Split Configuration**

The baseline UHF low-split desktop radio shall be fully compliant with the TIA 102 family of specifications for Project 25 radios and provide the following:

- UHF low-split coverage as specified in paragraph C.2.1.3
- Low power output as specified in Table C.3-1
- Local control head as specified in paragraph C.4.3.1.4-1
- A minimum channel capacity of 16 channels as specified in paragraph C.3.2.6

##### **C.4.3.2.4 Baseline UHF High-Split Configuration**

The baseline UHF high-split desktop radio shall be fully compliant with the TIA 102 family of specifications for Project 25 radios and provide the following:

- UHF high-split coverage as specified in paragraph C.2.1.4



Land Mobile Radio (LMR) Contracts with the Internal Revenue Service  
PART I – THE SCHEDULE  
SECTION C- LAND MOBILE RADIO SUBSCRIBER UNIT SPECIFICATION

- Low power output as specified in Table C.3-1
- Local control head as specified in paragraph C.4.3.1.4-1
- A minimum channel capacity of 16 channels as specified in paragraph C.3.2.6

**C.4.3.2.5 Baseline 800 MHz Configuration**

The baseline 800 MHz band desktop radio shall be fully compliant with the TIA 102 family of specifications for Project 25 radios and provide the following:

- 800 MHz band coverage as specified in paragraph C.2.1.5
- Low power output as specified in Table C.3-1
- Local control head as specified in paragraph C.4.3.1.4-1
- A minimum channel capacity of 16 channels as specified in paragraph C.3.2.6

**C.4.3.3 Additional Capabilities and Features**

At the discretion of the Government, the desktop station units may be ordered with the following capabilities or features. When offered by the contractor and ordered by the Government, each of the supplied capabilities or features shall be in accordance with the appropriate section or sections from C.4.3.3.1 through C.4.3.3.7.

**C.4.3.3.1 DTMF Keypad**

A DTMF Keypad, as defined in the glossary, shall be provided and incorporated into the selected radio control configuration.

**C.4.3.3.2 Display**

A display shall be provided as defined in the Glossary section of this document.

**C.4.3.3.3 Scanning**

In accordance with TSB-102A, the radio shall have the capability of scanning from a list of programmed frequencies or groups or user selected frequencies or groups. The scan shall be selectable priority, which means that the transmitter channel or talk-group selected by the user is the priority channel or talk-group.

**C.4.3.3.4 Power Sources**

Desktop station equipment shall be powered from a 13.8 VDC battery with revert capability.

**C.4.3.3.5 Radio Programming Equipment and Cables**

The contractor shall provide radio programming equipment cables include all software, equipment and cabling necessary to program standard features, as well as software upgrades, from PC to radio.

#### **C.4.3.3.6 External Data Port**

When specified, the units shall support an external data port to an attached mobile data terminal (MDT), portable computer or other peripheral device. The MDT interface must be able to present an addressable MDT data stream to a host-attached port, physically over an RS-232 or V.35 electrical interface or via Universal Serial Bus (USB). When RS-232 interface is implemented, the physical layer must be capable of conforming with EIA RS-232-C for data rates under 19.2 kbps and CCITT V.35 for data rates above 19.2 kbps.

#### **C.4.3.3.7 Global Positioning Satellite Functionality**

When requested by the Government, the unit shall provide Global Positioning Satellite (GPS) functionality in accordance with P25.1.UN.(02)12 April 18 2002 SOR.

#### **C.4.4 PORTABLE REPEATERS**

The portable repeater shall be capable of use in a temporary trip environment. A rugged shipping container shall be furnished with the unit. The container shall be capable of withstanding frequent travel and rough handling while protecting the equipment from damage. When specified, the repeater shall be capable of local control.

Portable repeaters shall be capable of being powered from 120/240 VAC 50/60 Hz and 12 VDC (nominal).

Maximum dimensions and weight shall be within the limits of overnight shipping carriers as follows:

- The container length, width, and height dimensions shall not exceed 62 inches total (Height inches + Width inches + Length inches =< 62 inches)
- The container and equipment assembly shall not exceed 70 pounds

#### **C.4.4.1 Portable Repeater Encryption Operation Without Encryption Keys**

The portable repeater shall be capable of passing encrypted communications without the need to decrypt and re-encrypt the communication, making the operation transparent to the encrypted communications.

#### **C.4.4.2 Portable Repeater Encryption Operation With Encryption Keys**

The portable repeater shall be capable of passing encrypted communications with the use of the correct encryption key in order to decrypt the communication on the receiving end and re-encrypt the communication before retransmission. The portable repeater shall be capable of initiating encrypted transmission if local control is specified.

#### **C.4.4.3 Portable Repeater Configurations**

The basic portable repeaters shall have the following configurations.

#### **C.4.4.3.1 Baseline VHF Low-Split Configuration**

The baseline VHF low-split portable repeater shall be fully compliant with the TIA 102 family of specifications for Project 25 radios and provide the following:

- VHF band coverage as specified in paragraph C.2.1.1
- Low power output as specified in Table C.3-1
- A minimum channel capacity of 16 channels as specified in paragraph C.3.2.6

#### **C.4.4.3.2 Baseline VHF High-Split Configuration**

The baseline VHF portable repeater shall be fully compliant with the TIA 102 family of specifications for Project 25 radios and provide the following:

- VHF band coverage as specified in paragraph C.2.1.2
- Low power output as specified in Table C.3-1
- A minimum channel capacity of 16 channels as specified in paragraph C.3.2.6

#### **C.4.4.3.3 Baseline UHF Low-Split Configuration**

The baseline UHF low split portable repeater shall be fully compliant with the TIA 102 family of specifications for Project 25 radios and provide the following:

- UHF low-split coverage as specified in paragraph C.2.1.3
- Low power output as specified in Table C.3-1
- A minimum channel capacity of 16 channels as specified in paragraph C.3.2.6

#### **C.4.4.3.4 Baseline UHF High-Split Configuration**

The baseline UHF high-split portable repeater shall be fully compliant with the TIA 102 family of specifications for Project 25 radios and provide the following:

- UHF high-split coverage as specified in paragraph C.2.1.4
- Low power output as specified in Table C.3-1
- A minimum channel capacity of 16 channels as specified in paragraph C.3.2.6

#### **C.4.4.3.5 Baseline 800 MHz Configuration**

The baseline 800 MHz portable repeater shall be fully compliant with the TIA 102 family of specifications for Project 25 radios and provide the following:

- 800 MHz band coverage as specified in paragraph C.2.1.5
- Low power output as specified in Table C.3-1
- A minimum channel capacity of 16 channels as specified in paragraph C.3.2.6

#### **C.4.4.4 Additional Capabilities and Features**

At the discretion of the Government, the portable repeater units may be ordered with the following capabilities or features. When offered by the contractor and ordered by the Government, each of the supplied capabilities or features shall be in accordance with C.4.4.4.1.

##### **C.4.4.4.1 Global Positioning Satellite Functionality**

When requested by the Government, the unit shall provide Global Positioning Satellite (GPS) functionality in accordance with P25.1.Un.(02)12 April 18 2002 SOR.

#### **C.4.5 PORTABLE BASE STATIONS**

The portable base stations shall have the following features/functionality.

##### **C.4.5.1 General Requirements**

The portable base stations shall not exceed 20.4 kg (45 lbs.), excluding battery pack and duplexer, and shall be in a ruggedized portable carry case configuration. The units shall not exceed 59 cm (23") W x 33 cm (13") H x 43 cm (17") D. The portable base stations shall have the following features as part of its standard capability of operation.

##### **C.4.5.1.1 Conventional Operation**

###### **C.4.5.1.1.1 Simplex Peer-to-Peer Operation**

The unit shall have the capability to communicate with other subscriber units independent of fixed infrastructure.

###### **C.4.5.1.1.2 Repeater Access**

The unit shall have the capability to communicate with other subscriber units via a repeater station in a half-duplex mode of operation.

###### **C.4.5.1.2 Flash Programming**

The unit shall be capable of flash programming any of the features that the radio is capable of supporting to allow the user to add additional features and functions after delivery of the unit. The unit shall have the capability to digitally store functional characteristics, including, but not limited to, channel frequencies, minimum volume settings, and channel scanning patterns.

###### **C.4.5.1.3 Radio Controls**

The unit shall have at a minimum volume control, channel select, and an on/off switch. In accordance with TSB-102A, control knobs shall be of an ergonomic design.

#### **C.4.5.1.4 Speaker**

The unit shall include a 10W (minimum), internal or external speaker. If the speaker is internal to the assembly, the unit shall have a jack to be able to accommodate an external speaker or audio recording device.

#### **C.4.5.1.5 External Microphone**

The radio shall include an external microphone that shall, at a minimum, include a PTT switch, with a mounting bracket.

#### **C.4.5.1.6 External Interface Support**

The unit shall have a connector for programming, or DIP switches. The unit shall have a connector for external battery pack, including cabling and connectors for powering from a vehicle lighter socket.

#### **C.4.5.1.7 Power Sources**

The unit shall operate from an internal nominal 13.6 V negative common DC battery pack (NiCd, Ni-MH, or Li-Ion) and have the capability to operate from 110/220VAC 50/60 Hz. The unit shall be capable of supporting portable base station system operation while charging the battery. Rechargeable batteries shall be capable of delivering the power level and quality required to enable the portable base station to operate under the required technical, environmental, and operational standards. Each battery pack shall be capable of supporting the portable base station for 8 hours given a 50% duty cycle. However, the Government desires longer battery life when possible.

#### **C.4.5.1.8 Antenna Relay**

The unit shall be equipped with an antenna relay that automatically switches the antenna from the receiver to the transmitter when the transmitter is keyed.

### **C.4.5.2 Portable Base Station Configurations**

The basic portable base station radios shall have the following configurations.

#### **C.4.5.2.1 Baseline VHF Low-Split Configuration**

The baseline VHF low-split portable base station shall be fully compliant with the TIA 102 family of specifications for Project 25 radios and provide the following:

- VHF band coverage as specified in paragraph C.2.1.1
- Low power output as specified in Table C.3-1
- A minimum channel capacity of 16 channels as specified in paragraph C.3.2.6

#### **C.4.5.2.2 Baseline VHF High-Split Configuration**

The baseline VHF high-split portable base station shall be fully compliant with the TIA 102 family of specifications for Project 25 radios and provide the following:

- VHF band coverage as specified in paragraph C.2.1.2
- Low power output as specified in Table C.3-1
- A minimum channel capacity of 16 channels as specified in paragraph C.3.2.6

#### **C.4.5.2.3 Baseline UHF Low-Split Configuration**

The baseline UHF low split portable base station shall be fully compliant with the TIA 102 family of specifications for Project 25 radios and provide the following:

- UHF low-split coverage as specified in paragraph C.2.1.3
- Low power output as specified in Table C.3-1
- A minimum channel capacity of 16 channels as specified in paragraph C.3.2.6

#### **C.4.5.2.4 Baseline UHF High-Split Configuration**

The baseline UHF high-split portable base station shall be fully compliant with the TIA 102 family of specifications for Project 25 radios and provide the following:

- UHF high-split coverage as specified in paragraph C.2.1.4
- Low power output as specified in Table C.3-1
- A minimum channel capacity of 16 channels as specified in paragraph C.3.2.6

#### **C.4.5.2.5 Baseline 800 MHz Configuration**

The baseline 800 MHz portable base station shall be fully compliant with the TIA 102 family of specifications for Project 25 radios and provide the following:

- 800 MHz band coverage as specified in paragraph C.2.1.5
- Low power output as specified in Table C.3-1
- A minimum channel capacity of 16 channels as specified in paragraph C.3.2.6

#### **C.4.5.3 Additional Capabilities and Features**

At the discretion of the Government, the portable base station units may be ordered with the following capabilities or features. When offered by the contractor and ordered by the Government, each of the supplied capabilities or features shall be in accordance with the appropriate section or sections from C.4.5.3.1 through C.4.5.3.8.

##### **C.4.5.3.1 DTMF Keypad**

A DTMF Keypad, as defined in the Glossary, shall be provided and incorporated into the selected radio control configuration.

##### **C.4.5.3.2 Display**

A display shall be provided as defined in the Glossary section of this document.

#### **C.4.5.3.3 Antenna for Portable Base Stations**

When specified, portable base station antennas shall operate in the specified frequency range; shall include a quarter wave magnetic mount whip antenna. The bandwidth of the antenna shall be such that it will support operation over the entire operating band of the portable base station.

When specified, portable fixed station antennas shall operate in the specified frequency range; 3 dB gain collinear (136–174, or 406.1–420 MHz) or 5 dB gain collinear (806-869 MHz), broadband portable base antenna with cable and a lightning suppressor. The bandwidth of the antenna shall be such that it will support operation over the entire operating band of the portable base station. For ruggedness and portability, the antenna shall have a slim profile, fiberglass radome construction, and no exposed elements.

When specified, a portable, collapsible antenna support shall be capable of supporting the portable fixed station antenna at a height of 20 feet AGL to the base of the antenna.

#### **C.4.5.3.4 Programming Equipment and Cables**

The contractor shall provide radio programming equipment cables include all software, equipment and cabling necessary to program standard features, as well as software upgrades, from PC to radio.

#### **C.4.5.3.5 External Data Port**

When specified, the units shall support an external data port to an attached mobile data terminal (MDT), portable computer or other peripheral device. The MDT interface must be able to present an addressable MDT data stream to a host-attached port, physically over an RS-232 or V.35 electrical interface or via Universal Serial Bus (USB). When RS-232 interface is implemented, the physical layer must be capable of conforming with EIA RS-232-C for data rates under 19.2 kbps and CCITT V.35 for data rates above 19.2 kbps.

#### **C.4.5.3.6 Batteries – Rechargeable**

Rechargeable batteries shall be resistant to the memory effect and shall not drop below 95% of their rated capacity (amp-hours) for the first 18 months of use through standard charging without requiring the use of a battery conditioner.

#### **C.4.5.3.7 Battery Charger**

The charger shall be capable of operation from either 110/240 VAC, 50/60 Hz power or 13.6 VDC (such as from a vehicle's accessory outlet), and shall be capable of supporting the portable base station system while charging a battery attached to the system. The unit shall have an indicator for the status of the battery, such as charging, and charged indicators. The charger shall be capable of separately charging a fully depleted battery pack in 4 hours.

#### **C.4.5.3.8 Global Positioning Satellite Functionality**

When requested by the Government, the unit shall provide Global Positioning Satellite (GPS) functionality in accordance with P25.1.Un.(02)12 April 18 2002 SOR.

## **C.5 PORTABLE ENCRYPTION KEY LOADING DEVICE**

The following is a specification for a portable encryption key loading device that will assemble and transfer encryption keys into radios and peripheral equipment where applicable. Cabling to connect between the radio equipment and the portable encryption key loading device will be identified at time of order.

The device shall be compliant with the testing procedures listed in IS102.AAAA-A (APCO Project 25 DES Encryption Protocol), TSB102.AAAB (APCO Project 25 Security Services Overview) and IS102.AAAC (Conformance Test for Project 25 Over-The-Air-Rekeying (OTAR) Protocol). The Government recognizes the development of the related Project 25 key-fill protocol interface standard. The portable encryption key loading device shall be compatible with the key-fill protocol interface standard upon adoption.

### **C.5.1 Key Storage**

The unit shall have the ability to store multiple keys in non-volatile electronic memory to include traffic keys and shadow keys.

### **C.5.2 Key Loading Method**

At a minimum, manual operator entry via keypad shall be available. The device shall provide selective key transfer to download codes from one portable key loading device to another. The device shall be capable of receiving keys via a standard telephone line via a MODEM from an Encryption Key Management Facility or another portable key loading device.

### **C.5.3 Key Transfer Method**

Key transfer shall be accomplished via temporary patch cord connection to the radio

### **C.5.4 Display**

The device shall have a display to monitor the operational status and provide the capability to review manually entered key variables prior to transfer into non-recallable memory.

### **C.5.5 Verification Test**

The device shall conduct verification tests after each key is transferred to the radio. For each key transfer attempt, an audible tone shall be emitted from the radio's speaker, and a visual message shall be displayed on the device display, indicating the success or failure of the key transfer attempt. The key transfer attempt shall not be considered successful unless the key is transferred successfully and the unit confirms that it is operating correctly.

### **C.5.6 Key Recall**

After keys have been loaded into the device memory, they cannot be recalled and displayed by the device.

### **C.5.7 Programmable Lock**

The device shall have a programmable electric lock that will allow the user to enter a "combination" into the device memory to lock the unit. The device shall remain inoperable once the unit has been locked until the same "combination" is re-entered into the device.



**C.5.8 Non-Volatile Memory**

The device shall have non-volatile memory to eliminate the potential for losing lock or key information due to weak or removed batteries.

**C.5.9 Power-Down Timer**

The unit shall be equipped with an automatic power-down timer to extend battery life.

**C.5.10 Power-Up Memory**

The unit shall be equipped with power-up memory, remembering the last key used.

**C.5.11 OTAR Compatibility**

The device shall be compatible with other communications equipment used in the TIA/EIA-102 compliant OTAR environment.

**C.5.12 Power Source**

The device shall be capable of being powered by a detachable battery pack containing rechargeable cells.

**C.5.13 Battery Power Source**

When specified, the device shall be capable of being powered by disposable alkaline cells.

**C.6 TRAINING**

The contractor shall provide training on proposed equipment. Each training item shall be provided in the form of classroom training. Each class period shall be no longer than 8 hours, and provide instruction for a minimum of four (4) students. Multiple day classes shall be provided for courses requiring more than 8 hours of training. The site for training shall be determined in cooperation with the ordering agency at the time of issuing a delivery order.

The training shall take the form of operations and maintenance courses. The instructor for the training shall be a qualified individual with subject matter expertise in the training topic. The Government reserves the right of refusal of the proposed Instructor.

The contractor shall provide a videotape of each training course on standard-sized VHS high-quality tape and DVD, and deliver the recorded session to the Government. The contractor shall give all rights to the Government to replay at the discretion of the Government.

The contractor shall provide all relevant and necessary manuals, publications, and equipment required. The contents of the course shall be summarized in a 3-ring binder for each student.

**C.6.1 Subscriber Unit Operations Training**

*Duration: One 2-hour course*

*Class Size: Minimum of 4 students/Maximum of 10 students*

Land Mobile Radio (LMR) Contracts with the Internal Revenue Service  
 PART I – THE SCHEDULE  
 SECTION C- LAND MOBILE RADIO SUBSCRIBER UNIT SPECIFICATION

This training shall explain the details of operating the subscriber units, and differences with the Government’s existing radio units, and potential problems that may arise. The course shall review the capabilities of each radio and explain any special features.

**C.6.2 Subscriber Unit Maintenance Training**

*Duration: One 40-hour course per equipment type (as appropriate)*  
*Class Size: Minimum of 4 students/Maximum of 10 students*

The contractor shall provide fundamental maintenance training designed to familiarize the Government maintenance personnel with subscriber unit (mobiles/portables) equipment and to enable them to set up radio operation and perform routine maintenance and repair practices on all equipment.

**C.7 INSTALLATION**

As requested by the Government, the contractor shall install, remove, or relocate contractor-provided mobile radios or portable radio vehicular adapters in Government vehicles. Contractor personnel performing installations must possess a security clearance at the Public Trust Low Risk Level, with a favorable National Agency Check with Inquiries (NACI) background investigation. The contractor shall be able to install equipment in a full range of vehicles. Government components may require different installations to meet mission requirements. With the delivery of each equipment order, the contractor shall provide a schedule for installation of the mobile radios or vehicular adapters. The schedule shall be determined in cooperation with the ordering agency.

Installation, removal, and relocation of portable radio vehicular adapters and mobile radios shall include the services listed in Tables C.7-1 and C.7-2.

**Table C.7-1, Specifications for Installation, Removal, and Relocation of Portable Radio Vehicular Adapters**

Installation Removal, and Relocation of Portable Radio Vehicular Adapters: General Requirements
Description
Complete standard (non-disguised) installation, including:
Non-disguised installation of vehicular adapter
Installation of handheld control head microphone
Mounting of amplifier
Non-disguised installation of antenna
Non-disguised installation of siren
Non-disguised installation of speaker
Complete covert installation, including:
Disguised installation of vehicular adapter
Trunk mounting of amplifier
Disguised installation of handheld control head microphone
Disguised installation of antenna
Disguised installation of siren

Land Mobile Radio (LMR) Contracts with the Internal Revenue Service  
 PART I – THE SCHEDULE  
 SECTION C- LAND MOBILE RADIO SUBSCRIBER UNIT SPECIFICATION

Installation Removal, and Relocation of Portable Radio Vehicular Adapters: General Requirements
Description
Installation of hidden speaker
Installation/removal/relocation of individual parts, accessories, and ancillary devices, including, but not limited to:
Non-disguised installation of vehicular adapter
Disguised installation of vehicular adapter
Removal of vehicular adapter
Non-disguised installation of handheld control head microphone
Disguised installation of handheld control head microphone
Removal of handheld control head microphone
Non-disguised mounting of amplifier
Disguised mounting of amplifier
Removal of amplifier
Installation of non-disguised antenna
Removal of non-disguised antenna
Installation of disguised antenna
Removal of disguised antenna
Non-disguised installation of siren
Disguised installation of siren
Removal of siren
Non-disguised installation of speaker
Disguised installation of speaker
Removal of speaker
Installation and removal of other equipment offered by contractor (contractor's choice)

**Table C.7-2, Specifications for Installation, Removal, and Relocation of Mobile Radios**

Installation, Removal, and Relocation of Mobile Radios: General Requirements
Description
Complete standard (non-disguised) installation, including:
Non-disguised installation of mobile radio
Non-disguised installation of handheld control head microphone (if ordered)
Non-disguised installation of amplifier (if ordered)
Non-disguised installation of antenna
Non-disguised installation of siren
Non-disguised installation of speaker
Complete covert installation, including:
Disguised installation of mobile radio
Disguised installation of handheld control head microphone
Trunk mounting of amplifier (if ordered)
Disguised installation of antenna
Disguised installation of siren
Installation of hidden speaker

Land Mobile Radio (LMR) Contracts with the Internal Revenue Service  
 PART I – THE SCHEDULE  
 SECTION C- LAND MOBILE RADIO SUBSCRIBER UNIT SPECIFICATION

Installation, Removal, and Relocation of Mobile Radios: General Requirements
Description
Installation/removal/relocation of individual parts, accessories, and ancillary devices, including, but not limited to:
Non-disguised installation of mobile radio
Disguised installation of mobile radio
Removal of mobile radio
Non-disguised installation of handheld control head microphone
Disguised installation of handheld control head microphone
Removal of handheld control head microphone
Non-disguised mounting of amplifier
Disguised mounting of amplifier
Removal of amplifier
Installation of non-disguised antenna
Removal of non-disguised antenna
Installation of disguised antenna
Removal of disguised antenna
Non-disguised installation of siren
Disguised installation of siren
Removal of siren
Non-disguised installation of speaker
Disguised installation of speaker
Removal of speaker
Installation and removal of other equipment offered by contractor (contractor's choice)

Land Mobile Radio (LMR) Contracts with the Internal Revenue Service  
PART I – THE SCHEDULE  
SECTION C- LAND MOBILE RADIO SUBSCRIBER UNIT SPECIFICATION

**TIA 102-SERIES STANDARDS SUMMARY PAGE**

TSB102-A	APCO Project 25 System and Standards Definition, Nov 95
ANSI/TIA/EIA102.AAAA-A	APCO Project 25 DES Encryption Protocol
TIA/EIA-102.AAAD	APCO Project 25 Block Encryption Standard
TSB102.AAAB	APCO Project 25 Security Services Overview, Jan 96
ANSI/TIA/EIA102.AAAC	Conformance Test for Project 25 DES Encryption Protocol
TSB102.AABA	APCO Project 25 Trunking Overview, Apr 95
ANSI/TIA/EIA 102.AABB	APCO Project 25 Trunking Control Channel Formats, May 00
ANSI/TIA/EIA 102.AABC	Project 25 Trunking Control Channel Messages, May 00
TSB102AABD	Project 25 Trunking Procedures, Oct 97
TSB102.AABF	APCO Project 25 Link Control Word Formats and Messages, May 96
TSB102.AABG	APCO Project 25 Conventional Control Messages, Jul 96
TSB102.AACA-1	APCO Project 25 Over-The-Air-Rekeying (OTAR) Protocol
TSB102.AACB	Over-The-Air-Rekeying (OTAR) Operational Description, Jan 97
TSB102.AACC	Conformance Tests for the Project 25 Over-The-Air-Rekeying (OTAR) Protocol, Feb 97
ANSI/TIA/EIA 102.BAAA	Project 25 FDMA Common Air Interface (CAI), May 98
TSB102.BAAB-A	APCO Project 25 CAI Conformance Test, Aug 95 (includes Addendum 1 dated Apr 99)
ANSI/TIA/EIA 102.BAAC	Project 25 CAI Reserved Values, Dec 95
TSB102.BAAD	APCO Project 25 CAI Operational Description for Conventional Channels, Oct 94
ANSI/TIA/EIA 102.BABA	Project 25 Vocoder Description, May 98
ANSI/TIA/EIA 102.BABB-A	Project 25 Vocoder Mean Opinion Score (MOS) Test, May 99
ANSI/TIA/EIA 102.BABC	APCO Project 25 Vocoder Reference Test, Apr 99

Land Mobile Radio (LMR) Contracts with the Internal Revenue Service  
PART I – THE SCHEDULE  
SECTION C- LAND MOBILE RADIO SUBSCRIBER UNIT SPECIFICATION

ANSI/TIA/EIA 102.BADA	Telephone Interface Requirements and Definitions (Voice Service), Mar 00
ANSI/TIA/EIA 102.BAEA	Project 25 Data Overview, Mar 00
ANSI/TIA/EIA 102.BAEB	Project 25 Packet Data Specification, Mar 00
ANSI/TIA/EIA 102.BAEC	Project 25 Circuit Data Specification, Jun 00
ANSI/TIA/EIA 102.BAEE	Project 25 Radio Control Protocol, Mar 00
ANSI/TIA/EIA 102.CAAA	Digital C4FM/CQPSK Transceiver Measurement Methods, Jun 99
ANSI/TIA/EIA102.CAAB	Digital C4FM/CQPSK Transceiver Performance Recommendations
TSB 102 CABA	Conventional Voice Encrypted and Unencrypted Test Procedures

Land Mobile Radio (LMR) Contracts with the Internal Revenue Service  
PART I – THE SCHEDULE  
SECTION C- LAND MOBILE RADIO SUBSCRIBER UNIT SPECIFICATION

**GLOSSARY**

AES (Advanced Encryption Standard)	The Advanced Encryption Standard in accordance with FIPS PUB 197, the successor to the current Data Encryption Standard (DES)
Auxiliary Buttons	Buttons that may be programmed by the user to effect customized preferences. Auxiliary buttons are in addition to buttons on the device used to activate standard features or functions.
C4FM/CQPSK	The acronym for 4-ary FM modulation using Quadrature Phase Shift Keying
CAI	Common Air Interface. The radio communication protocol defined by the TIA-102 series of specifications
Conformance Testing	Testing performed that demonstrates strict compliance with the parameters established in the P25 family of specifications.
Cypher Feedback	A mode of encryption that supports low error rates
DC Battery Revert Power	Battery power for emergency situations where normal power has been interrupted. This should be provided by an Uninterruptible Power Supply (UPS) with alert indicator function.
DES	Data Encryption Standard (FIPS PUB 46-3).
Desktop Station	A radio suited for a stationary environment, designed to be small enough to fit on a desk, and provides station control capabilities.
Digital Narrowband Mode	Modulation method that enables the transmission of 9600 bps within a spectrum allocation of 12.5 KHz
Display	Any of the technologies that may be used for man-machine communication, such as, but not limited to, light-emitting-diodes, flat-panel displays, or cathode-ray tubes
DTMF Keypad	The backlit 4 x 3 DTMF keypad conforming to the specifications in TSB-102A section 5.8.1.1. The keypad shall be capable of backlit illumination when a key is pressed. The following additional features shall be capable of being programmed via the keypad: keypad backlighting (intensity,

Land Mobile Radio (LMR) Contracts with the Internal Revenue Service  
PART I – THE SCHEDULE  
SECTION C- LAND MOBILE RADIO SUBSCRIBER UNIT SPECIFICATION

	on/off), scan editing, and the capability of password protection.
Encryption Key Equipment	Equipment used to load and store encryption keys, such as a Portable Encryption Key Loading Device and Encryption Key Management Facility
Fixed End Equipment	Fixed, stationary equipment such as desktop stations, transmit and receive stations, repeater stations, voting stations, consoles, and Encryption Key Management Facility
Flash	Software programming used to upgrade or update features stored in electronically re-writable non-volatile memory.
Half-Duplex	That mode of operation in which communications occurs between two terminals in either direction, but only one direction at a time. May occur on a half-duplex or duplex circuit but not on a simplex circuit.
LRU	Lowest Replaceable Unit. The smallest equipment component that is capable of replacement by field technicians.
MDT	Mobile Data Terminal.
Mobile Radio	A radio capable of operation in a mobile environment, designed for installation and operation in a motor vehicle.
OTAR	Over-The-Air-Rekeying. A method of initiating or updating encryption keys
Performance Testing	Testing performed to demonstrate that the item operates in accordance with the established product specification.
Portable Radio	A radio capable of operation in a mobile environment, and suitable for handheld operation.
Repeater	A device that receives a transmission on a reverse channel and retransmits the exact same transmission on the forward channel. It is commonly used to extend the range of subscriber units. The repeated transmission message and encryption is typically transparent to the equipment.
Reverse Channel	This describes a transmission from a subscriber



Land Mobile Radio (LMR) Contracts with the Internal Revenue Service  
PART I – THE SCHEDULE  
SECTION C- LAND MOBILE RADIO SUBSCRIBER UNIT SPECIFICATION

	unit to a fixed station receiver.
Scalability	Increase capability that is accomplished by populating the basic unit with additional modules of the same type
Simplex	A form of communication where the same frequency is used for transmit and receive. Often it refers to subscriber units communicating directly with each other without using a repeater station.
Subscriber Units	A portable radio, mobile radio, or desktop station.
TIA/EIA-102 Encryption	Encryption of the communication signal as defined by the TIA/EIA-102 documents.
Transmit and Receive Equipment	Equipment that transmits, receives, or interprets radio messages. Includes portable and mobile radios, base stations, repeaters, receivers, and other associated interface equipment.
Tri-Mode Operation	Operation in three modes: one for digital, digital coded, and analog.
USB	Universal Serial Bus.
Voting Station	A device that interfaces with multiple external receiving stations to combine or select the best possible receive signal to be relayed back to a central station.