SOLICITATION/CONTRACT/ORDER FOR COMMERCIAL ITEMS

Offeror to complete blocks 12, 17, 23, 24, & 30

1. REQUISITION NUMBER

2. CONTRACT NO. **NBC030009**

3. AWARD/EFFECTIVE DATE

4. ORDER NUMBER

5. SOLICITATION NUMBER

6. SOLICITATION ISSUE DATE

7. FOR SOLICITATION INFORMATION CALL ➡ A. NAME B. TELEPHONE *(No Collect Calls)*

8. OFFER DUE DATE/ LOCAL TIME

9. ISSUED BY CODE **BC662**

BLM NATIONAL BUSINESS CENTER
BC 662 BLDG. 50, DFC, PO BOX 25047
DENVER, CO 80225-0047

10. THIS ACQUISITION IS

☒ UNRESTRICTED

☐ SET-ASIDE: % FOR
☐ SMALL BUSINESS
☐ SMALL DISADV. BUS.
☐ 8(A)

SIC: 3663

SIZE STANDARD: 750

11. DELIVERY FOR FOB DESTINATION UNLESS BLOCK IS MARKED
☒ SEE SCHEDULE

12. DISCOUNT TERMS **2.25%/20 days,**

☐ 13a. THIS CONTRACT IS A RATED ORDER UNDER DPAS (15 CFR 700)

13b. RATING

14. METHOD OF SOLICITATION
☐ RFQ ☐ IFB ☐ RFP

15. DELIVER TO: CODE

SEE SF1449 CONTINUATION

16. ADMINISTERED BY CODE

SAME AS BLOCK 9

17a. CONTRACTOR/OFFEROR CODE FACILITY

Motorola USFGMD
7230 Parkway Drive
Hanover, MD 21076

☒ 17b. CHECK IF REMITTANCE IS DIFFERENT AND PUT SUCH ADDRESS IN OFFER

18a. PAYMENT WILL BE MADE BY CODE

SEE SF1449 CONTINUATION

18b. SUBMIT INVOICES TO ADDRESS SHOWN IN BLOCK 18a UNLESS BLOCK BELOW IS CHECKED:
☒ SEE ADDENDUM

19. ITEM NO,	20. SCHEDULE OF SUPPLIES/SERVICES	21. QUANTITY	22. UNIT	23. UNIT PRICE	24. AMOUNT
	***** See SF1449 CONTINUATION*****				

25. ACCOUNTING AND APPROPRIATION DATA
Funds will be cited on each delivery order

26. TOTAL AWARD AMOUNT *(For Govt.Use Only)*

☐ 27a. SOLICITATIONS INCORPORATE BY REFERENCE FAR 52.212-1, 52.212-4. FAR 52.212-3 AND 52.212-5 ARE ATTACHED. ADDENDA ☐ ARE ☐ ARE NOT ATTACHED.
☒ 27b. CONTRACTS/PURCHASE ORDERS INCORPORATE BY REFERENCE FAR 52.212-4. FAR 52.212-5 IS ATTACHED. ADDENDA ☒ ARE ☐ ARE NOT ATTACHED.

28. ☒ CONTRACTOR IS REQUIRED TO SIGN THIS DOCUMENT AND RETURN 2 COPIES TO ISSUING OFFICE. CONTRACTOR AGREES TO FURNISH AND DELIVER ALL ITEMS SET FORTH OR OTHERWISE IDENTIFIED ABOVE AND ON ANY ADDITIONAL SHEETS SUBJECT TO THE TERMS AND CONDITIONS SPECIFIED HEREIN.

29. ☒ AWARD OF CONTRACT: REFERENCE Motorola OFFER DATED 7/19/02. YOUR OFFER ON SOLICITATION (BLOCK 5), INCLUDING ANY ADDITIONS OR CHANGES WHICH ARE SET FORTH HEREIN, IS ACCEPTED AS TO ITEMS: (see CLINs)

30a. SIGNATURE OF OFFEROR/CONTRACTOR

31a. **UNITED STATES OF AMERICA** *(SIGNATURE OF CONTRACTING OFFICER)*

30b. NAME AND TITLE OF SIGNER *(TYPE OR PRINT)*

30c. DATE SIGNED

31b. NAME OF CONTRACTING OFFICER

31c. DATE SIGNED

32a. QUANTITY IN COLUMN 20 HAS BEEN
☐ RECEIVED ☐ INSPECTED ☐ ACCEPTED, AND CONFORMS TO THE CONTRACT, EXCEPT AS NOTED

32b. SIGNATURE OF AUTHORIZED GOVT. REPRESENTATIVE

32c. DATE

33. SHIP NUMBER
PARTIAL FINAL

34. DO VOUCHER NUMBER

35. AMOUNT VERIFIED CORRECT FOR

36. PAYMENT
☐ COMPLETE ☐ PARTIAL ☐ FINAL

37. CHECK NUMBER

38. S/R ACCOUNT NUMBER

39. S/R VOUCHER NUMBER

40. PAID BY

41a. I CERTIFY THIS ACCOUNT IS CORRECT AND PROPER FOR PAYMENT

41b. SIGNATURE AND TITLE OF CERTIFYING OFFICER

41c. DATE

42a. RECEIVED BY *(Print)*

42b. RECEIVED AT *(Location)*

42c. DATE REC'D *(YY/MM/DD)*

42d. TOTAL CONTAINERS

STANDARD FORM 1449 **(10-95)**

SF 1449 CONTINUATION

BLOCK 15 – Delivery to:

Delivery shall be f.o.b. destination to any location within the continental United States (conus). Delivery to other locations may be negotiated for individual orders. Such delivery conditions will be included on the delivery orders.

Delivery of the scheduled supplies/services shall be made within 90 days after order issue date unless otherwise specified in the deliver orders. Shorter or longer delivery schedules may be negotiated for individual orders. Partial shipments will be accepted unless otherwise stated in the delivery order.

BLOCK 17b

Payments, to Motorola, if by check, are to be directed to Bank One at One Bank One Plaza, P.O. Box 93267, Chicago, IL 60670.

Payments, to Motorola, if by Electronic Funds Transfer, are to be directed to the following: ABA Identification Number 071000013 for routing transfer of funds. The telegraphic abbreviation for the financial institution is Bank One. The Account Number is 52–66092.

Questions related to payments are to be directed to Alan Hurley at (847) 725–4639

BLOCK 18b – Payment will be made by:

This contract is open to all federal agencies for ordering purposes. The ordering activities will identify the payment office and the address for submission of invoices on the individual delivery orders.

BLOCKS 19 to 24 – Item No., Schedule of Supplies/Services, Quantity, Unit, Unit Prices, Amount

Item Description – General

This contract provides for Project 25 compliant radio communication and control equipment, test equipment, and miscellaneous services. The contract is a firm fixed priced multiple award Indefinite Quantity Indefinite Delivery contract, open to all federal agencies, with a base contract year and four option years. The base year expires upon close of business, November 7, 2003. The Schedule of Supplies and Services is provided as Attachment 2.

Quantity Discounts

The following quantity discounts to the scheduled prices are offered for large orders.

Portables Quantity	Discounts
251-500	4%
501-750	5%
751-1000	6%
1001+	7%

Mobiles, Consolettes, & Infrastructure Quantity	
251-500	3%
501-750	4%
751-1000	5%
1001+	6%

Minimum/Maximum Quantities

The minimum quantity guaranteed, in accordance with FAR 16.504, is $25,000 for each contract and $2,500,000 for all contracts awarded under Solicitation Number NAR010099, for the life of the contract(s), including options. The maximum quantity applies to all contracts in total and is established at $1,000,000,000, of which $500,000,000 is reserved for the Department of Interior, for the life of the contracts, including options.

In order to monitor contract usage and ensure the maximum limitations are not exceeded, the contractor shall submit semi-annual reports to the Contracting Officer within 30 days after periods ending March 31 and September 30. The report shall identify the number of major equipment items (excludes accessories, manuals, etc.) and total sales value (including accessories, manuals, etc.) for each major equipment category (i.e. X01, X02, etc.), as well as cumulative contract-to-date amounts, broken out by DOI and non-DOI orders. As contract usage nears the maximum amounts, the Contractor shall provide more frequent reports as determined necessary by the Contracting Officer. Reports shall be provided in Excel or Lotus spreadsheet format and submitted in electronic form on 3.5 inch floppy disks, CD-ROMs, or emailed electronic copies.

Unit of Measure

Block 22 is not printed on the following schedules, but the unit of measure is “each” for all equipment items, service manuals, installation/removal services, and maintenance service. For training classes and any other services, the description shall indicate the unit of measure.

Open Market Items

Orders that include open market items valued no greater than $2,500, irrespective of the total order value, will be accepted pursuant to Motorola’s Communication Products Limited Warranty and/or Motorola’s Parts Warranty, as appropriate.

CONTRACT CLAUSES

52.252-2 CLAUSES INCORPORATED BY REFERENCE FEBRUARY 1998

This contract incorporates one or more clauses by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available. Also, the full text of a clause may be accessed electronically at this/these address(es):

http://www.arnet.gov/far/

Clause	Title	Date
52.212-4	Contract Terms and Conditions – Commercial Items	May 2001

ADDENDUM TO 52.212-4

(a) Paragraph (a), Inspection/Acceptance, of contract clause 52.212-4 is replaced with the following:

Prior to shipping any unit of Motorola equipment to the Government, Motorola will perform its standard factory inspection and acceptance tests on the unit. Acceptance will be deemed to have occurred upon receipt at the shipping destination delivery of the supplies to the Government at the destination(s) specified in the contract delivery order(s), unless subsequently rejected. The Government will have the right within a reasonable period of time (not to exceed 30 days) to conduct its own incoming inspection and testing of the equipment. The Government may reject any equipment for failure to conform to the requirements of the contract or any resultant delivery order; however, the Government must notify Motorola in writing within thirty days after its receipt of shipment that the equipment is being rejected. The Government may return, seek replacement or a refund of any equipment for failure to conform to the requirements of the contract or any resultant delivery order. For prompt payment purposes only, acceptance will be deemed to occur on the actual date of Government inspection, if not rejected, or seven calendar days after receipt, whichever is less.

(b) Paragraph (c), Changes, of contract clause 52.212-4 is replaced with the following:

Changes in the terms and conditions of this contract may be made only by written agreement of the parties, except as follows:

(1) The contract prices may be reviewed annually to assess the reasonableness of the firm fixed pricing. If prices are determined to be higher than prices available through other Government acquisition vehicles, after consideration of contractual differences, Motorola will negotiate in good faith changes to the contract prices.

(2) Due to the multiple award nature of this acquisition, the contractor may deem it appropriate to offer price reductions due to market conditions or other factors. The contractor may unilaterally, at any time during the life of the contract, reduce the price of any line item(s) on this contract for a specific order, grouping of orders, or for a specific period of time. Any price reduction(s) for a specific contract year or for the remainder of the life of the contract shall be incorporated into the contract by modification.

(3) Product upgrades and engineering changes are within the scope of this changes clause and may be incorporated into the contract provided those upgrades and/or changes are determined to be within the scope of the contract. Generally, product upgrades and engineering changes will only be determined to be within the scope of the contract if the contractor already has items under the major equipment categories (i.e. portable radios, mobile radios, transportable radios, etc.) which the upgrades and/or changes affect. The determination of whether or not the upgrades and/or changes fall within the scope of the contract is solely at the discretion of the contracting officer and not subject to the "Disputes" clause of the contract.

(c) Paragraph (o), Warranty, of contract clause 52.212-4 is replaced with the following:

The Contractor warrants the items identified on this contract for the period(s) as defined within its standard commercial warranties. Items of supply generally carry a one-year warranty, although battery warranties range from one to two years. Services carry a 90-day warranty.

All warranty work shall be without charge for labor, materials or shipping (no shipping costs for portables and mobiles to Motorola Federal Technical Center or for fixed equipment if the local Motorola Service Center is involved in the repair effort). Other terms and conditions shall be in accordance with the Contractor's commercial warranty.

52.212-5 CONTRACT TERMS AND CONDITIONS REQUIRED TO IMPLEMENT STATUTES OR EXECUTIVE ORDERS--COMMERCIAL ITEMS MAY 2001

(a) The Contractor agrees to comply with the following FAR clauses, which are incorporated in this contract by reference, to implement provisions of law or executive orders applicable to acquisitions of commercial items:

(1) 52.222-3, Convict Labor (E.O. 11 7 5 5).
(2) 52.233-3, Protest after Award (31 U.S.C. 3553).

(b) The Contractor shall comply with the FAR clauses in this paragraph (b) that the Contracting Officer has indicated as being incorporated in this contract by reference to implement provisions of law or Executive orders applicable to acquisitions of commercial items or components:

[Contracting Officer shall check as appropriate.]

_X__ (1) 52.203-6, Restrictions on Subcontractor Sales to the Government, with Alternate I (41 U.S.C. 253g and 10 U.S.C. 2402).

___ (2) 52.219-3, Notice of Total HUBZone Small Business Set-Aside (Jan 1999).

_X_ (3) 52.219-4, Notice of Price Evaluation Preference for HUBZone Small Business Concerns (Jan 1999) (if the offeror elects to waive the preference, it shall so indicate in its offer).

___ (4)(i) 52.219-5, Very Small Business Set-Aside (Pub. L. 103-403, section 304, Small Business Reauthorization and Amendments Act of 1994).

___ (ii) Alternate I to 52.219-5.

___ (iii) Alternate II to 52.219-5.

_X_ (5) 52.219-8, Utilization of Small Business Concerns (15 U.S.C. 637 (d)(2) and (3)).

_X_ (6) 52.219-9, Small Business Subcontracting Plan (15 U.S.C. 637(d)(4)).

___ (7) 52.219-14, Limitations on Subcontracting (15 U.S.C. 637(a)(14)).

_X_ (8)(i) 52.219-23, Notice of Price Evaluation Adjustment for Small Disadvantaged Business Concerns (Pub. L. 103-355, section 7102, and 10 U.S.C. 2323) (if the offeror elects to waive the adjustment, it shall so indicate in its offer).

52.219-23(b) – “10” percent

(ii)___ Alternate I of 52.219-23.

_X_ (9) 52.219-25, Small Disadvantaged Business Participation Program-Disadvantaged Status and Reporting (Pub. L. 103-355, section 7102, and 10 U.S.C. 2323).

___ (10) 52.219-26, Small Disadvantaged Business Participation Program-Incentive Subcontracting (Pub. L. 103-355, section 7102, and 10 U.S.C. 2323).

_X_ (11) 52.222-21, Prohibition of Segregated Facilities (Feb 1999)

_X_ (12) 52.222-26, Equal Opportunity (E.O. 11246).

_X_ (13) 52.222-35, Affirmative Action for Disabled Veterans and Veterans of the Vietnam Era (38 U.S.C. 4212).

_X_ (14) 52.222-36, Affirmative Action for Workers with Disabilities (29 U.S.C. 793).

_X_ (15) 52.222-37, Employment Reports on Disabled Veterans and Veterans of the Vietnam Era (38 U.S.C. 4212).

___ (16) 52.222-19, Child Labor--Cooperation with Authorities and Remedies (E.O. 13126).

___ (17)(i) 52.223-9, Estimate of Percentage of Recovered Material Content for EPA-Designated Products (42 U.S.C. 6962(c)(3)(A)(ii)).

___ (ii) Alternate I of 52.223-9 (42 U.S.C. 6962(i)(2)(C)).

___ (18) 52.225-1, Buy American Act--Balance of Payments Program--Supplies (41 U.S.C. 10a - 10d).

___ (19)(i) 52.225-3, Buy American Act--North American Free Trade Agreement--Israeli Trade Act--Balance of Payments Program (41 U.S.C. 10a - 10d, 19 U.S.C. 3301 note, 19 U.S.C. 2112 note).

___ (ii) Alternate I of 52.225-3.

___ (iii) Alternate II of 52.225-3.

_X_ (20) 52.225-5, Trade Agreements (19 U.S.C. 2501, et seq., 19 U.S.C. 3301 note).

___ (21) 52.225-13, Restriction on Certain Foreign Purchases (E.O. 12722, 12724, 13059, 13067, 13121, and 13129).

___ (22) 52.225-15, Sanctioned European Union Country End Products (E.O. 12849).

___ (23) 52.225-16, Sanctioned European Union Country Services (E.O. 12849).

___ (24) 52.232-33, Payment by Electronic Funds Transfer--Central Contractor Registration (31 U.S.C. 3332).

_X_ (25) 52.232-34, Payment by Electronic Funds Transfer--Other than Central Contractor Registration (31 U.S.C. 3332).

___ (26) 52.232-36, Payment by Third Party (31 U.S.C. 3332).

___ (27) 52.239-1, Privacy or Security Safeguards (5 U.S.C. 552a).

___ (28)(i) 52.247-64, Preference for Privately Owned U.S.-Flag Commercial Vessels (46 U.S.C. 1241).

___ (ii) Alternate I of 52.247-64.

(c) The Contractor agrees to comply with the FAR clauses in this paragraph (c), applicable to commercial services, which the Contracting Officer has indicated as being incorporated in this contract by reference to implement provisions of law or executive orders applicable to acquisitions of commercial items or components:

[Contracting Officer check as appropriate.]

___ (1) 52.222-41, Service Contract Act of 1965, As Amended (41 U.S.C. 351, et seq.).

___ (2) 52.222-42, Statement of Equivalent Rates for Federal Hires (29 U.S.C. 206 and 41 U.S.C. 351, et seq.).

___ (3) 52.222-43, Fair Labor Standards Act and Service Contract Act--Price Adjustment (Multiple Year and Option Contracts) (29 U.S.C. 206 and 41 U.S.C. 351, et seq.).

___ (4) 52.222-44, Fair Labor Standards Act and Service Contract Act--Price Adjustment (29 U.S.C. 206 and 41 U.S.C. 351, et seq.).

___ (5) 52.222-47, SCA Minimum Wages and Fringe Benefits Applicable to Successor Contract Pursuant to Predecessor Contractor Collective Bargaining Agreement (CBA) (41U.S.C. 351 et seq.).

(d) Comptroller General Examination of Record. The Contractor agrees to comply with the provisions of this paragraph (d) if this contract was awarded using other than sealed bid, is in excess of the simplified acquisition threshold, and does not contain the clause at 52.215-2, Audit and Records--Negotiation.

(1) The Comptroller General of the United States, or an authorized representative of the Comptroller General, shall have access to and right to examine any of the Contractor's directly pertinent records involving transactions related to this contract.

(2) The Contractor shall make available at its offices at all reasonable times the records, materials, and other evidence for examination, audit, or reproduction, until 3 years after final payment under this contract or for any shorter period specified in FAR Subpart 4.7, Contractor Records Retention, of the other clauses of this contract. If this contract is completely or partially terminated, the records relating to the work terminated shall be made available for 3 years after any resulting final termination settlement. Records relating to appeals under the disputes clause or to litigation or the settlement of claims arising under or relating to this contract shall be made available until such appeals, litigation, or claims are finally resolved.

(3) As used in this clause, records include books, documents, accounting procedures and practices, and other data, regardless of type and regardless of form. This does not require the Contractor to create or maintain any record that the Contractor does not maintain in the ordinary course of business or pursuant to a provision of law.

(e) Notwithstanding the requirements of the clauses in paragraphs (a), (b), (c) or (d) of this clause, the Contractor is not required to include any FAR clause, other than those listed below (and as may be required by an addenda to this paragraph to establish the reasonableness of prices under Part 15), in a subcontract for commercial items or commercial components--

(1) 52.222-26, Equal Opportunity (E.O. 11246);

(2) 52.222-35, Affirmative Action for Disabled Veterans and Veterans of the Vietnam Era (38 U.S.C. 4212);

(3) 52.222-36, Affirmative Action for Workers with Disabilities (29 U.S.C. 793);

(4) 52.247-64, Preference for Privately-Owned U.S. Flag Commercial Vessels (46 U.S.C. 1241) (flow down not required for subcontracts awarded beginning May 1, 1996); and

(5) 52.222-41, Service Contract Act of 1965, As Amended (41 U.S.C. 351, et seq.).

52.216-18 ORDERING OCTOBER 1995

(a) Any supplies and services to be furnished under this contract shall be ordered by issuance of delivery orders or task orders by the individuals or activities designated in the Schedule. Such orders may be issued from the date of contract award through the date of contract expiration.

(b) All delivery orders or task orders are subject to the terms and conditions of this contract. In the event of conflict between a delivery order or task order and this contract, the contract shall control.

(c) If mailed, a delivery order or task order is considered "issued" when the Government deposits the order in the mail. Orders may be issued orally, by facsimile, or by electronic commerce methods only if authorized in the Schedule.

52.216-19 ORDER LIMITATIONS OCTOBER 1995

(a) Minimum order. When the Government requires supplies or services covered by this contract in an amount of less than $500.00, the Government is not obligated to purchase, nor is the Contractor obligated to furnish, those supplies or services under the contract.

(b) Maximum order. The Contractor is not obligated to honor:

(1) Any order for a single item in excess of $3,000,000.00;

(2) Any order for a combination of items in excess of $7,000,000; or

(3) A series of orders from the same ordering office within 30 days that together call for quantities exceeding the limitation in subparagraph (1) or (2) above.

(c) If this is a requirements contract (i.e., includes the Requirements clause at subsection 52.216-21 of the Federal Acquisition Regulation (FAR)), the Government is not required to order a part of any one requirement from the Contractor if that requirement exceeds the maximum-order limitations in paragraph (b) above.

(d) Notwithstanding paragraphs (b) and (c) above, the Contractor shall honor any order exceeding the maximum order limitations in paragraph (b), unless that order (or orders) is returned to the ordering office within five (5) days after issuance, with written notice stating the Contractor's intent not to ship the item (or items) called for and the reasons. Upon receiving this notice, the Government may acquire the supplies or services from another source.

52.216-22 INDEFINITE QUANTITY OCTOBER 1995

(a) This is an indefinite-quantity contract for the supplies or services specified, and effective for the period stated, in the Schedule. The quantities of supplies and services specified in the Schedule are estimates only and are not purchased by this contract.

(b) Delivery or performance shall be made only as authorized by orders issued in accordance with the Ordering clause. The Contractor shall furnish to the Government, when and if ordered, the supplies or services specified in the Schedule up to and including the quantity designated in the Schedule as the "maximum". The Government shall order at least the quantity of supplies or services designated in the Schedule as the "minimum".

(c) Except for any limitations on quantities in the Order Limitations clause or in the Schedule, there is no limit on the number of orders that may be issued. The Government may issue orders requiring delivery to multiple destinations or performance at multiple locations.

(d) Any order issued during the effective period of this contract and not completed within that period shall be completed by the Contractor within the time specified in the order. The contract shall govern the Contractor's and Government's rights and obligations with respect to that order to the same extent as if the order were completed during the contract's effective period; provided, that the Contractor shall not be required to make any deliveries under this contract after 90 days from the date of contract expiration.

52.217-9 OPTION TO EXTEND THE TERM OF THE CONTRACT MARCH 2000

(a) The Government may extend the term of this contract by written notice to the Contractor within 10 days of contract expiration; provided, that the Government gives the Contractor a preliminary written notice of its intent to extend at least 60 days before the contract expires. The preliminary notice does not commit the Government to an extension.

(b) If the Government exercises this option, the extended contract shall be considered to include this option provision.

(c) The total duration of this contract, including the exercise of any options under this clause, shall not exceed five years.

1510-52.216-70 DELIVERY/TASK ORDER OMBUDSMAN JUNE 2000

The delivery/task order ombudsman for this contract is: Department of Interior, Director, Office of Information Resources Management. In accordance with FAR 16.505(b)(4), the ombudsman shall review complaints from contractors regarding issuance of task/delivery orders for contracts award under Solicitation No. NAR010099, Narrowband Radio Equipment.

BLM-BC660 ORDERING PROCEDURES JULY 2001

Ordering activities may employ either a lowest price technically acceptable source selection process or a tradeoff process in issuing orders under this contract. If a tradeoff selection process is used, ordering activities may consider any or a combination of the following factors in relation to price to determine the best value to the government:

- Quality/Functionality of Deliverables - The ability of the equipment to meet the ordering activity's technical requirements (i.e. durability, radio housing type, feature sets, software options, programmability options , primary power options/battery types, antenna accessory connections, equipment performance factors, etc.).

- Product Compatibility – The ability to efficiently and effectively integrate the equipment into the ordering activities operations.
- Past Performance - The ability of the Contractor to provide reliable TIA-102 (Project 25) compliant equipment (and services) in a timely manner.
- Vendor Support – The availability of service support available for installation/removal of equipment, programming services, etc.
- Warranty – The duration and extent of warranty coverage.
- Other factors the ordering contracting officer deems appropriate.

BLM-BC660 ADMINISTRATIVE FEE/SURCHARGE JULY 2001

All orders placed under this contract shall be subject to a one-half percent (½%) administrative fee/surcharge. The contractor shall collect this fee/surcharge on all orders placed and shall tender the collected amount no later than thirty (30) working days after the end of a calendar quarter, starting with the calendar quarter ending March 31, 2003. The fee/surcharge shall be incorporated in the pricing of the contract line items and not as a separate charge on individual orders. Payment shall be remitted in the form of a check made payable to:

Department of the Interior, Bureau of Land Management
BC610, Bldg. 50, PO Box 25047
Denver Service Center, Denver Federal Center
Denver, CO 80225-0047

CONTRACT DOCUMENTS, EXHIBITS, OR ATTACHMENTS

Attachment 1A – Specifications (see below)
Attachment 1B – Motorola's Point by Point Response to Specifications (1.8MB PDF)

Attachment 2 – Schedule of Supplies and Services (2.8MB PDF)

Attachment 3A – Description of Services (801KB PDF)
Attachment 3B – Services Statement of Work (1.6MB PDF)
Attachment 3C – Site Surveys (1.4MB PDF)
Attachment 3D – Supplemental Terms Applicable to Maintenance Services (383KB PDF)
Attachment 3E – Supplemental Terms Applicable to Site Surveys/Engineering Designs (194KB PDF)

Attachment 4A – Motorola Communication Products Limited Warranty (290KB PDF)
Attachment 4B – Motorola's Parts Warranty (920KB PDF)

Attachment 5A – Software License Agreement (684KB PDF)
Attachment 5B – Software Subscription Agreement (410KB PDF)

Corrective actions contained in the contractor's July 19, 2002 final proposal revision are incorporated by reference.

The subcontracting plan contained in the contractor's proposal is incorporated by reference.

U.S. DEPARTMENT OF THE INTERIOR
NARROWBAND RADIO EQUIPMENT CONTRACT

SPECIFICATIONS

1 INTRODUCTION

The National Telecommunications and Information Administration (NTIA) requires that all Federal Government radio systems, Very High Frequency (VHF, 162-174 MHz) and Ultra High Frequency (UHF, 406-420 MHz), be converted to narrowband (12.5 kHz channel spacing) operation. Transition must be completed by January 1, 2005 for VHF systems and January 1, 2008 for UHF systems. The number of discrete channels available for assignment will basically double after the transition is completed. This will allow more radio systems to be put into operation.

2 SCOPE

These specifications are for a national contract to provide Telecommunications Industry Association - TIA-102 (Association of Public-Safety Communications Officials International (APCO) Project 25) compliant narrow-band, VHF high-band and UHF land mobile radio systems including warranty maintenance. These radio systems must meet National Telecommunications and Information Administration (NTIA) multimode 12.5/25 kilohertz (kHz) channel spacing and TIA-102 standards. Project 25 documents are available from APCO Automated Frequency Coordination, Inc., South Daytona Florida, telephone (800) 949-2726, ext. 231 or from Global Engineering Documents, 15 Inverness Way East, Englewood, Colorado, 80112-5776, telephone (800) 624-3974 or (303) 792-2181. Additional standards are available from the National Institute of Standards and Technology, 325 Broadway, Boulder, Colorado, 80303-3328.

This contract will be used to purchase VHF/UHF multimode narrowband radio equipment for various U.S. government agencies. Any U.S. Federal government agency may place an order under this contract.

Alternate physical configurations are acceptable (e.g. multiple radios sharing a common chassis).

3 STANDARDS - GENERAL

All radio equipment must meet the requirements listed below.

All control, functional and other specifications shall be as specified in TIA-102 Series, Phase I, FDMA (Frequency Division Multiple Access).

All testing and measurement methods shall be as specified in TIA-102.

TIA-102 compliance is required.

Some examples of TIA-102 requirements are that the equipment shall:

1. Support the APCO Project 25 Common Air Interface (CAI),
2. Be capable of transmitting and receiving both APCO Project 25 digital and FM analog modulation,
3. Support full backwards compatibility to 7.5, 12.5, 15, 25 and 30 kHz channel spacing,
4. Support 12.5 kHz channelization using C4FM modulation,
5. Be migratable to 6.25 kHz channelization QSPK-c modulation, as technology allows,
6. Use Frequency Division Multiple Access (FDMA) as the modulation technique,
7. Support the Improved Multi-Band Excitation (IMBE) vocoder standard, and

8. Meet or exceed the Digital C4FM/CQPSK Transceiver Performance Standards, TIA-102.CAAB, utilizing the Digital C4FM/CQPSK Transceiver Measurement Methods, as given in the TIA-102.CAAA standard.

4 BASIC SPECIFICATIONS

Compliance with these standards and basic specifications will insure that radios manufactured to these specifications by any supplier will interoperate in the same system on a basic feature set. The radios must be backward compatible with existing wide-band/narrowband (25 / 12.5 kHz) analog frequency modulation (FM) type systems and forward migratable to future digital modes. Radios provided shall be manufactured to meet the requirements of TIA-102.

Radios are required by government agencies to support their mandated missions. This involves operations in rural areas over unpaved and temporary mountain and desert roads. Four-wheel drive and track vehicles are commonplace. The equipment must withstand severe temperature, shock, vibration, dust, and rain in their daily operations. The equipment must have high reliability to support wildfire suppression, search and rescue, law enforcement and other emergency operational requirements.

This section defines the basic specifications for all equipment. Unless stated herein, all equipment shall meet or exceed the Telecommunications Industry Association/Electronics Industry Association, TIA/EIA-603.

4.1 Finish: - All finishes shall conform to commercial practices for high quality equipment.

4.2 Construction and Components: - All component parts shall meet the applicable TIA/EIA standards and shall operate within specified ratings.

Construction, including assembly and wiring, shall conform to commercial practices for high quality equipment. The equipment shall be mechanically sound.

4.3 Equipment Stability: - Equipment shall not display instability due to any electronic, mechanical, or other causes that tend to make the receiver or transmitter critical in tuning or unstable in operation.

4.4 Fuses and Overload Protection: - All equipment shall be provided with adequate fuses or other standard devices to protect the equipment in case of overloads or short circuits within the equipment. The protective device shall be conveniently located for quick easy replacement or reset.

All base station and remote control equipment shall be equipped with lightning and surge protectors on primary power and control lines.

4.5 Alignment/Ease of Service: - Test points shall be provided for routine checks and alignment/service of the transmitter and receiver. These test points shall be readily accessible and marked for ease of servicing. Measurement shall be possible using conventional test instruments and/or personal computer (PC) and software.

Alignment: The receiver and transmitter alignment procedures shall be clear, straightforward and easy to accomplish.

4.6 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. (Equipment with a self-contained antenna shall have provisions for external connection of RF termination with 50 ohm impedance).

4.7 Users Manuals: - One hard copy of the Users Manual will be furnished per base, mobile, portable, and aircraft unit. The User Manual shall describe the features of the specific radio equipment furnished and how to use it. This User Manual shall be the same English language manual that is provided to commercial customers.

4.8 Warranty: - The contractor agrees that proper operation of the equipment as per these specifications is unconditionally guaranteed (user caused damage excepted) for the time specified in the contractor's commercial warranty or a period of one (1) year from the date of acceptance, whichever is greater.

The contractor shall either restore to proper operating condition or replace any defective unit within thirty (30) days of receipt. All warranty work shall be without charge for labor, materials or shipping. In the event of equipment repair or replacement period exceeds 30 days, the warranty period shall be extended by the time required for the shipment and repair/replacement of the equipment. Other terms and conditions shall be in accordance with the Contractor's commercial warranty.

4.9 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 and serial number shall be given.

4.10 Operating Frequency Bands and Channel Spacing: - Unless otherwise specified, the operating frequency bands will be at least 136 to 174 MHz or 406 to 470 MHz. The channel spacing in any band shall be 7.5 kHz, 12.5 kHz, 15 kHz, 25 kHz and 30 kHz.

Mobile, portable and base station radio equipment shall be individually programmable by channel for operation on any frequency in the NTIA and FCC channeling plans that fall within the frequency band and frequency spread of the equipment.

4.11 Rated System Frequency Deviation: - The rated system frequency deviation shall be in accordance with the TIA-102 standard.

4.12 Connectors: - The contractor shall supply a mating connector for all connectors necessary to place the equipment into service. (RF connectors are not required.)

4.13 Spare Parts Availability: - A source for spare parts for all equipment ordered under this contract, shall be identified and made available for a period of at least five (5) years for portable and mobile radios and seven (7) years for all other radio equipment from the date production is discontinued.

4.14 Vibration and Shock Stability: - The radio shall meet the standards specified in TIA-102.CAAA and TIA-102.CAAB.

5 EQUIPMENT TYPE and PRIMARY POWER

The equipment types listed in this section describe the intended use and primary power requirements.

The primary power standard test voltage shall be as specified in TIA/EIA-603 and EIA-374 unless otherwise specified or with stated exceptions.

5.1 Base and Repeater Station: - Base and repeater stations shall be designed for installation and operation in an office or other fixed location. Primary power shall be from 120 VAC, 60 Hz. Optional 12, 24 or 48 VDC (nominal), 240 VAC, 50 Hz capability is desirable.

5.2 Mobile: - A mobile radio shall be designed for installation and operation in a motor vehicle.

Primary power shall be from a negative ground 12 volt vehicle battery.

Transient protection shall be provided in accordance with EIA-374-A, Section 5.1, to allow the equipment to withstand brief power surges generated by ancillary equipment connected to the power source.

5.3 Portable: - A portable radio shall be a compact unit designed for carrying and operation by one individual.

Primary power shall be from standard commercially available battery packs containing either rechargeable batteries or an AA battery compartment (AA cell “clamshell”). The radio shall be furnished without batteries.

1. Minimum Battery Life: - Minimum battery life must meet the requirements as defined in TIA-102 and TIA/EIA-603 as applicable.

2) The minimum battery life shall be eight (8) hours:

Standard duty cycle shall be 6 seconds receive, 6 seconds transmit and 48 seconds standby (10-10-80) for primary dry-batteries and 3 seconds receive, 3 seconds transmit and 54 seconds standby (5-5-90) for rechargeable batteries.

5.3.1 An option for an AA battery compartment (AA cell "clamshell") shall be provided for Personal Portable radios and is a required component of "Fire" Personal Portable radios.

The battery compartment shall be constructed in such a way that access to the inside of the battery compartment can be easily accomplished to facilitate the replacement of the AA batteries without tools. The outside shell shall be constructed in such a way that will allow its removal under extreme field conditions, i.e. dust and dirt, rain and / or fire retardant.

The electrical contacts that will mate with the AA batteries within the holder shall be nickel plated at a minimum. Silver plating or gold plating is optional. The contacts will be made of a material that will continue to provide a secure fit and electrical contact even if the AA batteries were to be inserted backwards and then correctly inserted.

The holder shall securely hold the AA batteries. The inside holder and outside shell shall be made of a non-conducting plastic that will provide electrical insulation as well as a durable lightweight holder. The outside shell of the AA battery holder shall be provided in the color of the radio. For "Fire" radios, the outside battery shell shall also be available in international orange.

No electrical or mechanical degradation beyond superficial scratches and marks shall occur when a holder is dropped from a height of 80 cm (31.49 inches) onto a smooth concrete surface. The battery holder shall securely hold the AA batteries in place during such a drop. Electrical contact with the AA batteries or between the holder and the radio shall not be lost during the drop test.

The battery holder shall be clearly marked indicating the polarity and position of each battery that is to be installed in the holder. The holder shall be constructed so that all AA batteries are inserted in the same direction, i.e. no alternating of the positive (+) and negative (-) electrical contacts.

5.4 Remote Control: - A remote control unit shall be designed for installation and operation from an office or other fixed location. Primary power shall be from 120 VAC, 60 Hz, with optional 12 VDC capability available. Remotes with volatile memory shall be furnished with battery backup capability.

5.5 Non-Commercially Powered Transportable Repeater: - A transportable repeater is defined as a repeater that is designed to be primary battery powered (12 VDC (nominal)), easily transported and operated as a self-contained system. If battery supply is self-contained, an external power connection must be provided. The transportable repeater shall contain the radio(s) and all necessary controls and control functions for independent operation. It shall be capable of being installed and operated in an unprotected environment.

5.6 Aeronautical Radio – An aeronautical radio is defined as a radio that is designed to be installed and operated in an aircraft. Primary power shall be from 24 volt (nominal) aircraft power source.

6 CONTROLS

This section describes the controls required to achieve the desired mode of operation. All non-programmable controls shall be clearly labeled.

Whenever more than one parallel method of control is provided, the priority order shall be local, extended local, remote, microwave interface and repeat. The transmitter operating frequency shall be determined by the channel selection switch, which is associated with the last control position in use.

Adjustable squelch control is not required to be accessible to the operator if otherwise provided in the equipment.

6.1 Local: - Local controls shall be on the basic housing, and readily accessible to the operator.

A speaker, speaker volume control, primary power on/off switch, channel selection switch, microphone, and PTT switch shall be provided as a minimum.

A dash-mount mobile is identified as a mobile with local integral controls.

“Fire” personal portable radios shall not use "ramp" up/down channel selection switching.

6.2 Extended Local (Mobile, Trunk-Mount): - A trunk-mount mobile is identified as a mobile with extended local control. The control unit for a trunk-mount mobile shall be a compact unit designed for multiple type installations in a motor vehicle and shall provide, at a minimum, volume control, squelch control, primary power on/off switch, channel selection switch, microphone with PTT switch, and external remote speaker.

A multiconductor control cable shall be supplied that is not less than 14 feet (4.2672m) long.

6.3 Base Station Remote Control: - The equipment shall have provisions for connecting a standard telephone type wire line or IEEE 802.3 network interface to provide the control facilities and functions described in Section 9, REMOTE CONTROL.

6.4 Test Controls: - Test controls or connections shall be provided for operation of the transmitter and receiver for test purposes. Provision for test controls or connections shall not preclude or degrade operation of the equipment by any primary controls otherwise provided.

A speaker, speaker volume control, primary power on/off switch, channel selection switch and microphone with PTT switch shall be provided.

Audio output for local test shall not be less than 0.5 watt.

6.5 Encoder Keypad: - A standard 12-digit or 16-digit (16 button preferred) encoder keypad shall be provided to interface to the Public Switch Telephone Network (PSTN) or provide other user defined control operations.

In analog operation, a standard Dual Tone Multi Frequency (DTMF) keypad shall be provided.

In the digital mode of operation, the output of the keypad will be in accordance with the TIA-102 specification.

In either mode of operation, a side-tone or other means of indication shall be provided so that the operator is informed that a key has been depressed.

6.6 Microwave Interface: - Microwave interface controls shall provide for control of the base/repeater station via a microwave multiplex channel modem.

7 MICROPHONE

This section describes the various types of microphones.

7.1 Palm-Held: - A palm-size microphone with PTT switch. A coiled cord and mounting bracket shall be included.

Options for the palm-held microphone may include a received audio speaker, an encoder keypad and/or display.

7.2 Desk Stand: - A desk stand microphone shall be a self-supporting microphone with PTT switch intended for use on a table or desktop.

7.3 Self-Contained: - A self-contained microphone and PTT switch shall be one that is contained in the basic equipment housing.

8 HOUSING

This section provides a description of the cabinet or case in which the equipment is housed. The housing shall be designed to protect the communications equipment and provide easy access for servicing.

Attachments, such as mounting hardware, connectors etc., shall be compact and configured in a manner commensurate with its purpose.

8.1 DeskTop Station: - A desktop housing shall be a small durable cabinet for desktop or tabletop mounting. The complete radio (transmitter, receiver, power supply and speaker) shall be contained within the housing.

8.2 Compact Vertical: - A compact vertical housing shall be a metal cabinet designed to sit on the floor of an office near a desk. It shall accept units of standard 19 inches (48.26 cm) rack width. All doors shall be lock-equipped.

8.3 Floor Mount: - A floor mount housing shall be a metal cabinet designed to sit on the floor. It shall have lock-equipped removable doors front and back. It shall accept units of standard 19 inches (48.26 cm) rack width.

8.4 Mobile: - A mobile radio housing shall be a heavy-duty sturdy housing designed for installation and use in a motor vehicle. It shall be totally enclosed to protect against the entry of dirt, dust, and water. Connectors (i.e., antenna, microphone, power, remote control cable), if permanently mounted to the chassis/housing, shall not protrude more than 2 inches (5.08 cm) beyond the protective surface of the housing.

Optional External Speaker - The optional external speaker shall be mounted in a separate compact housing designed for multiple type installation in a motor vehicle.
An installation kit with hardware to provide for a typical installation shall be supplied.

8.5 Personal Portable: - A personal portable radio housing shall be a sturdy case having the speaker, microphone, and the antenna connector as integral parts and so arranged that the entire unit is held in the hand for operation.

The portable station shall be supplied with a flexible helical whip antenna.

The portable station shall have provisions for externally connecting the receiver audio output, external microphone input, a standard 50 ohm RF input/output connection.

The portable station shall have provisions for external data transfer capability.

“Fire” personal portable radios shall not use "ramp" up/down channel selection switching.

8.6 19" (48.26 cm) Rack Mounting: - Rack mounted equipment shall be provided with all hardware necessary for racking on a standard 19" (48.26 cm) equipment mounting rack (supplied by the purchaser). It shall utilize minimum rack mounting space (19" (48.26 cm) mounting rack or other housing is not required). Maximum depth shall be 18" (45.72 cm).

8.7 Transportable Repeater: - A transportable repeater housing shall be a sturdy, weatherproof case designed for convenient hand carrying and operation on a flat surface. It shall be capable of containing the radio and necessary controls and will have space for optional batteries and "mobile-style" duplexer. It shall be totally enclosed to protect against the entry of dirt, dust, and water. It shall be capable of operation with all access covers closed. The antenna connector(s) shall be permanently mounted to the chassis/housing and shall not protrude more than 2 inches (5.08 cm) beyond the protective surface of the housing.

Primary power shall be 12 VDC (nominal).

8.8 Desktop Remote Control Console: - A remote control console shall consist of a desktop type housing. The remote control desk set shall be a compact version of the remote control console.

8.9 Aeronautical Transceiver: - An aeronautical transceiver shall be standard avionics nonreflective flat black or gray in color. The metal housing shall be anodized aluminum or similar avionics grade material and made resistant to corrosion. ARINC standards for panel mounted dzus radios shall be used (panel width shall be 5.75 inches). Maximum depth shall be 7.75 inches, and maximum height shall be 3.00 inches. The maximum allowable weight shall be four (4) pounds. The radio/aircraft interface connectors (for audio, microphone, power, etc.) shall be on the rear of the radio. The radio’s antenna connector shall be BNC type (UG-290 A/U or equivalent).

9 REMOTE CONTROL

9.1 Tone/Digital/Internet Protocol (IP) Remote Control Console: - A remote control console shall consist of a desktop unit incorporating the following facilities and functions. As a minimum, the digital remote control shall provide the same functionality as the analog remote control. The control console shall have an indicator that identifies the mode of the received call (i.e. analog or digital transmission). An additional indicator shall be provided to display whether the received transmission is encrypted on non-encrypted.

9.1.1 All control and operational functions shall be provided over a two-wire or four-wire line of standard telephone type construction, IEEE 802.3 network interface, or microwave.

9.1.2 The remote control shall be designed to permit normal operation with simultaneous attachment of at least three control units to a base station.

9.1.3 The line amplifier shall have sufficient gain, while in compression, to produce at least 2 watts of audio output at the speaker. The audio output distortion shall be less than 5 percent. The hum and noise level shall be at least 40 dB below the specified audio output.

9.1.4 The remote control unit shall be adequately filtered or protected against interference caused by high ambient radio frequency fields from nearby transmitters or from static atmospheric discharges.

9.1.5 Intercommunications facilities between two or more remote control units shall be provided.

9.1.6 Speaker, speaker volume control, and an indicator indicating that the PTT is activated shall be provided. Selected and unselected speakers shall have separate volume controls.

9.1.7 The microphone shall be a desk stand or a telephone-style handset with positive PTT action to preclude inadvertent airing of conversation from other remote units when one unit is actively operating the base station transmitter.

9.1.7.1 In multichannel remotes, the transmitter operating frequency shall depend on the position of the channel switch associated with the remote unit in use. Receiver operating mode selection shall be determined by the associated transmitter operating channel selection, and shall remain until another channel is selected.

9.1.8 Remote control shall provide all base station operation controls such as PTT, frequency selection. (No DC operation controls acceptable.) There shall be no false operation due to normal voice operation. Channel selection and station activation shall not require more than 300 milliseconds to accomplish.

9.1.9 Remote Control Desk Set: - The remote control desk set shall be a compact version of the remote control console. It shall include all facilities and functions of the remote control console except the following:

9.1.9.1 The line amplifier shall have sufficient gain, while in compression, to produce 500 milliwatts of audio output at the speaker.

9.1.9.2 A compression amplifier is not required in the microphone amplifier circuit.

10 SPECIFIC ITEMS

10.1 Base Stations (120 VAC, 60 Hz powered) with Control Options

All features listed below are subject to the standards and specifications listed in Sections 3, 4 and 5.

10.1.1 Frequency Tolerance - Frequency tolerance (stability) shall be in accordance with the NTIA manual.

10.1.2 Programmable Channel Scan - Programmable channel scan for all of the channels furnished is required.

10.1.3 Extender Cards - Where applicable, extender cards and/or cables shall be furnished.

10.1.4 Microphone - A microphone shall be available for each station.

10.1.5 Speaker - An integral 0.5 watt, or greater, speaker matched to the audio amplifier shall be furnished.

10.1.6 Transmitter Power Output - The base station transmitter shall be capable of producing a minimum adjustable range of continuous RF power output as follows:

A. High power stations at 60 to 100 watts
B. Mid power stations at 30 to 50 watts
C. Low power stations at 2 to 5 watts

10.1.7 Control capabilities - Each base station will be capable of being configured for control operation with the options listed below.

10.1.7.1 Wireline operation - The base station will be capable of being configured for wireline control operation.

10.1.7.2 RF link control operation - Each base station will provide RF links, including UHF and microwave control options.

10.1.7.3 Local Control Operation - Each base station will provide for Local Control.

10.1.7.4 Network Management and Control - It is desired that the radio be provided with a standard network interface for management of the device via a standard IP computer network. This port should also be used for remote control of the radio.

10.1.8 Multi-mode Operation - The receiver and transmitter shall be capable of operating in analog wide-band (25 kHz channel spacing/16 kHz bandwith/5 kHz modulation), analog narrow-band (12.5 kHz channel spacing/11 kHz bandwith/2.5 kHz modulation), and narrow-band TIA-102 digital mode. The receiver shall be capable of being programmed to automatically receive any of the three modes of operation without operator intervention.

It is desired that the radio be capable of being programmed to automatically change modes of transmission to operate in the last received mode (analog wide-band, analog narrow-band, or narrow-band TIA-102 digital). A programmable "revert" timer must also be included to define the time the transmitter will stay in the alternate received mode of operation.

10.2 Base Stations (120 VAC, 60 Hz powered) without Remote Control

All features listed below are subject to the standards and specifications listed in Sections 3, 4 and 5.

10.2.1 Frequency Tolerance - Frequency tolerance (stability) shall be in accordance with the NTIA manual.

10.2.2 Programmable Channel Scan - Programmable channel scan for all of the channels furnished is required.

10.2.3 Extender Cards - Where applicable, extender cards and/or cables shall be furnished.

10.2.4 Microphone - A local desk stand microphone shall be available for each station.

10.2.5 Speaker - An integral 0.5 watt, or greater speaker, matched to the audio amplifier shall be furnished.

10.2.6 Transmitter Power Output - The base station transmitter shall be capable of producing a minimum adjustable range of intermittent-duty RF as follows:

A. High power stations at 60 to 100 watts
B. Mid power stations at 30 to 50 watts
C. Low power stations at 2 to 5 watts

10.2.7 Multi-mode Operation - The receiver and transmitter shall be capable of operating in analog wide-band (25 kHz channel spacing/16 kHz bandwith/5 kHz modulation), analog narrow-band (12.5 kHz channel spacing/11 kHz bandwith/2.5 kHz modulation), and narrow-band TIA-102 digital mode. The receiver shall be capable of being programmed to automatically receive any of the three modes of operation without operator intervention.

It is desired that the radio be capable of being programmed to automatically change modes of transmission to operate in the last received mode (analog wide-band, analog narrow-band, or narrow-band TIA-102 digital). A programmable "revert" timer must also be included to define the time the transmitter will stay in the alternate received mode of operation.

10.3 Repeater Stations

All features listed below are subject to the standards and specifications listed in Sections 3, 4 and 5.

10.3.1 Frequency Tolerance - Frequency tolerance (stability) shall be in accordance with the NTIA manual.

10.3.2 Multi-mode Operation - The receiver and transmitter shall be capable of operating in analog wide-band (25 kHz channel spacing/16 kHz bandwith/5 kHz modulation), analog narrow-band (12.5 kHz channel spacing/11 kHz bandwith/2.5 kHz modulation), and narrow-band TIA-102 digital mode. The receiver shall be capable of being programmed to automatically receive any of the three modes of operation without operator intervention.

Multimode radios must have the capability to automatically re-transmit in the mode that they receive in.

10.3.3 Extender Cards - Where applicable, extender cards and/or cables shall be furnished.

10.3.4 Microphone - A microphone shall be available for each station.

10.3.5 Repeat Function: - Repeater controls are to provide for automatic repeater operation of the equipment as follows:

10.3.5.1 The receiver shall provide positive and stable operation of the associated transmitter.

10.3.5.2 Minimum receiver input sensitivity shall be in accordance with TIA-102.CAAB.

10.3.5.3 In analog mode, the audio from the receiver shall be capable of modulating the transmitter at its rated deviation. The speaker volume control shall not affect the repeated deviation or signal when adjusted from minimum to the specified audio power output.

10.3.5.4 In analog mode, the automatic repeat circuitry shall repeat a standard input-signal in compliance with transmitter audio frequency harmonic distortion and FM hum and noise level specifications.

10.3.5.5 The repeat deviation shall not change more than 10 percent when the unit is operated over a primary power supply voltage range of 20 percent of the specified operating voltage.

10.3.5.6 There shall not be false operation due to transmitter emissions or transients of any nature during switching cycles of the transmitter.

10.3.6 Transmitter carrier power output shall meet TIA-102 CAAA continuous duty cycle specifications.

10.3.7 A programmable time-out timer shall be included in all repeaters to turn off the transmitter from a minimum of zero to three minutes of continuous operation. It shall reset within one second after the transmitter PTT circuit is deactivated.

10.3.8 Within Cabinet Desensitization: - Automatic repeater within cabinet desensitization is the degradation of receiver performance when the associated transmitter is operated into a standard non-radiating load. There shall be no more than 0.5 dB within cabinet desensitization.

10.3.8.1 Isolation to Prevent Desensitization: - Isolation to prevent desensitization is the attenuation of the signal between the transmitter output and the receiver input necessary to prevent degradation in the receiver operation. Isolation between the transmitter output and the receiver input shall not be less than the following with the stated difference in operating frequencies of the transmitter and receiver.

Band	Difference in Operating Frequency (MHz)	Isolation(dB)
VHF Low	0.300	80
VHF Low	0.500	75
VHF High	0.600	75
VHF High	2.000	60
UHF	4.000	55

(The specified amount of isolation is the total allowable for transmitter carrier power outputs up to 90 watts).

10.3.9 Network Management and Control - It is desired that the radio be provided with a standard network interface for management of the device via a standard IP computer network. This port should also be used for remote control of the radio. This port should also be capable of interconnecting multiple repeater stations via the IP network. Routing to other repeater stations should be accomplished through the transmitted talk group ID.

10.3.10 Commercially Powered Repeater Sites

Commercially powered sites (120 VAC, 60Hz) will conform to the following:

10.3.10.1 Transmitter Power Output - The repeater station transmitter shall be capable of producing a minimum adjustable range of continuous RF power output as follows:

A. High power stations at 60 to 100 watts
B. Mid power stations at 30 to 50 watts
C. Low power stations at 2 to 5 watts

10.3.11 Non-Commercially Powered Repeater Sites

Non-Commercially powered sites (e.g. solar or battery powered) will conform to the following:

10.3.11.1 Transmitter Power Output - The repeater station transmitter shall be capable of producing a minimum adjustable range of continuous RF power output as follows:

A. High power stations at 60 to 100 watts
B. Mid power stations at 30 to 50 watts
C. Low power stations at 2 to 5 watts

10.3.11.2 Current Drain: Maximum allowable current drain is 150 mA while in standby operation.

10.4 Mobile Stations

All features listed below are subject to the standards and specifications listed in Sections 3, 4 and 5.

All mobile stations shall meet MIL-STD 810 F standards as specified in TIA-102.CAAB and meet standards TIA-102 and TIA/EIA 603.

10.4.1 Frequency Tolerance - Frequency tolerance (stability) shall be in accordance with the NTIA manual.

10.4.2 Programmable Channel Scan - All mobile stations shall include functional receiver scanning.

10.4.3 Priority Channel - Any single channel shall be capable of being designated as the priority channel.

10.4.4 Antenna - A "standard" one-quarter (1/4) wave roof mount mobile antenna shall be provided.

10.4.5 Transmitter Power Output - The mobile transmitter shall be capable of producing a minimum adjustable range of intermittent RF power output as follows:

A. High power stations at 60 to 100 watts
B. Mid power stations at 30 to 50 watts

10.4.6 Channel Capability - Each radio shall provide a minimum channel capability of two hundred fifty six (256) channels.

10.4.7 Multi-mode Operation - The receiver and transmitter shall be capable of operating in analog wide-band (25 kHz channel spacing/16 kHz bandwith/5 kHz modulation), analog narrow-band (12.5 kHz channel spacing/11 kHz bandwith/2.5 kHz modulation), and narrow-band TIA-102 digital mode. The receiver shall be capable of being programmed to automatically receive any of the three modes of operation without operator intervention.

It is desired that the radio be capable of being programmed to automatically change modes of transmission to operate in the last received mode (analog wide-band, analog narrow-band, or narrow-band TIA-102 digital). A programmable “revert” timer must also be included to define the time the transmitter will stay in the alternate received mode of operation.

10.5 Portable Stations

All features listed below are subject to the standards and specifications listed in Sections 3, 4 and 5.

All portable radios shall meet MIL-STD 810 F standards as specified in TIA-102.CAAB and meet standards TIA-102 and TIA/EIA 603.

10.5.1 Frequency Tolerance - Frequency tolerance (stability) shall be in accordance with the NTIA manual.

10.5.2 Programmable Channel Scan - All portable stations shall include functional receiver scanning.

10.5.3 Priority Channel - Any single channel shall be capable of being designated as the priority channel.

10.5.4 Battery - Batteries shall be available as specified in Section 5.

10.5.5 External RF Jack - Each portable radio will provide an external RF connection (RF Jack) of 50 ohms impedance, unbalanced.

10.5.6 Accessories Jack - Each portable radio will contain an accessories jack to support a speaker/microphone and provisions for external data transfer capability.

10.5.7 Channel Capability - Each radio shall provide a minimum channel capability of two hundred fifty six (256) channels.

10.5.8 Transmitter Power Output - Each radio shall provide a programmable high/low power output with minimum adjustable range between 1 and 5 watts.

10.5.9 Channel Selection – “Fire” personal portable radio equipment channel selection shall be by rotary detent channel selector switch with mechanical end stops. “Fire” personal portable radio equipment shall not use "ramp" up/down channel selection switching.

10.5.10 Carrying Case – "Fire" personal portable radios shall be supplied with a carrying case made of leather designed to protect the radio and permit operation without removal from the case. The case shall have a loop for fastening to a belt. A swivel type belt loop is unacceptable for "fire" portable radio use.

10.5.11 Antenna - The portable station shall be supplied with a flexible helical whip antenna of the user's selection from the vendor's available offerings.

10.5.12 Multi-mode Operation - The receiver and transmitter shall be capable of operating in analog wide-band (25 kHz channel spacing/16 kHz bandwith/5 kHz modulation), analog narrow-band (12.5 kHz channel spacing/11 kHz bandwith/2.5 kHz modulation), and narrow-band TIA-102 digital mode. The receiver shall be capable of being programmed to automatically receive any of the three modes of operation without operator intervention.

It is desired that the radio be capable of being programmed to automatically change modes of transmission to operate in the last received mode (analog wide-band, analog narrow-band, or narrow-band TIA-102 digital). A programmable "revert" timer must also be included to define the time the transmitter will stay in the alternate received mode of operation.

10.6 Non-Commercially Powered Transportable Repeater

All features listed below are subject to the standards and specifications listed in Sections 3, 4 and 5.

10.6.1 Frequency Tolerance - Frequency tolerance (stability) shall be in accordance with the NTIA manual.

10.6.2 Operating Voltage - Each Non-Commercially Powered Transportable station will have an operating voltage range of 10 - 18 VDC.

10.6.3 Current drain - Maximum allowable current drain is 150 mA while in standby operation.

10.6.4 Transmitter Power Output - The transmitter shall be capable of producing a minimum adjustable power output range of 2 to 8 watts rated at continuous duty.

10.6.5 Multi-mode Operation - The receiver and transmitter shall be capable of operating in analog wide-band (25 kHz channel spacing/16 kHz bandwith/5 kHz modulation), analog narrow-band (12.5 kHz channel spacing/11 kHz bandwith/2.5 kHz modulation), and narrow-band TIA-102 digital mode. The receiver shall be capable of being programmed to automatically receive any of the three modes of operation without operator intervention.

Multimode radios must have the capability to automatically re-transmit in the mode that they receive in.

10.7 Commercially Powered Transportable Repeater

All features listed below are subject to the standards and specifications listed in Sections 3, 4 and 5.

10.7.1 Frequency Tolerance - Frequency tolerance (stability) shall be in accordance with the NTIA manual.

10.7.2 Operating Voltage - Each Commercially Powered Transportable station will have an operating voltage range of 120 VAC, 60 Hz, and /or 10 - 18 VDC.

10.7.3 Transmitter Power Output - The transmitter shall be capable of producing a continuous minimum adjustable power output range of:

A. High power stations at 60 to 100 watts
B. Mid power stations at 30 to 50 watts
C. Low power stations at 2 to 5 watts

10.7.4 Multi-mode Operation - The receiver and transmitter shall be capable of operating in analog wide-band (25 kHz channel spacing/16 kHz bandwith/5 kHz modulation), analog narrow-band (12.5 kHz channel spacing/11 kHz bandwith/2.5 kHz modulation), and narrow-band TIA-102 digital mode. The receiver shall be capable of being programmed to automatically receive any of the three modes of operation without operator intervention.

Multimode radios must have the capability to automatically re-transmit in the mode that they receive in.

10.8 Aeronautical VHF-FM Transceiver

All features listed below are subject to the standards and specifications listed in Sections 3, 4 and 5. The transceiver must also meet all applicable Radio Technical Committee for Avionics (RTCA) and Federal Aviation Administration (FAA) requirements for transceivers operated in an aircraft. The main receiver and transmitter shall operate over a minimum frequency range of 136 MHz to 174 MHz in 2.5 kHz channel steps. Maritime Mobile Station requirements are not required.

Operating Standards - The radio shall conform to applicable sections of 14 CFR Part 23.1309. Radio systems shall meet or exceed the following RTCA DO-160D specifications.

Control Heads and Panel Mounted Transceivers:
DO-160D Env. Cat. [A1Z]BAA[SU]XXXXXXABBBAUMXXXA
Remote Mounted Transceivers:
DO-160D Env. Cat. [B2Z]BAA[SU]XXXXXXBBBBAUMXXXA

10.8.1 Main Receiver and Transmitter

10.8.1.1 Channel/Frequency Selection: Channel and frequency selection shall be provided to permit the operator (pilot) to select any preset channel, frequency, frequency pair, CTCSS tones, CDCSS digital code word, NAC, and Talk Group ID while in flight. The sole exception is the guard receiver and transmitter whose frequency shall be preset.

10.8.1.2 Channel Presets – The main radio shall be a minimum of one hundred (100) operator selectable preset channels. The guard radio shall have a maximum of two (2) selectable preset channels. Preset channels shall contain receive and transmit frequencies, CTCSS tones, CDCSS digital code words, NAC codes, Talk Group ID's, Scan settings, and alphanumeric channel information.

10.8.1.3 Transmitter - The transmitter shall have an operator selectable ten (10) watt nominal (high) and one (1) watt nominal (low) output power selection. The transmitter shall not be designed for operation of more than 10 watts nominal. The transmitter shall operate at the rated power and meet specifications after operation for a 30 second interval of transmitting into both a short circuit and an open circuit load connected to the antenna port via a proper coaxial cable varied uniformly over a half-wave length.

10.8.2 Guard Receiver

10.8.2.1 Frequency Generation - The guard receiver shall be either synthesized or crystal controlled. The guard receiver shall meet the same requirements as the main receiver but channel one (1) must operate on 168.6250 MHz in either analog or digital modes.

10.8.2.2 Guard Receiver Frequency - The frequency of 168.6250 MHz shall be simultaneously monitored with the main frequency for guard reception.

10.8.2.3 Guard Transmit - A means of quickly selecting the guard transmitter frequency shall be provided (i.e. a main/guard toggle switch). A second transmitter selector shall be available if two guard presets are provided (i.e., guard 1/guard 2).

10.8.3 Multi-mode Operation - The receiver and transmitter shall be capable of operating in analog wide-band (25 kHz channel spacing/16 kHz bandwith/5 kHz modulation), analog narrow-band (12.5 kHz channel spacing/11 kHz bandwith/2.5 kHz modulation), and narrow-band TIA-102 digital mode. The receiver shall be capable of being programmed to automatically receive any of the three modes of operation without operator intervention.

It is desired that the radio be capable of being programmed to automatically change modes of transmission to operate in the last received mode (analog wide-band, analog narrow-band, or narrow-band TIA-102 digital). A

programmable "revert" timer must also be included to define the time the transmitter will stay in the alternate received mode of operation.

10.8.4 Encryption/OTAR - The radio shall be capable of encryption and Over the Air Re-keying (OTAR). When optioned, voice and data encryption shall be TIA-102 compliant.

10.8.5 Audio Input Sensitivity

10.8.5.1. The audio required to fully modulate the transmitter shall not exceed that normally produced by the aircraft's audio system and/or microphone (reference 14 CFR Part 21, FAA AC 21-110(*), RTCA DO-214, and RTCA DO-160D).

10.8.5.2. The radio shall have microphone audio, push-to-talk (PTT), and receive audio available for interface with the aircraft audio system. Audio shall be 600-ohm impedance. The microphone will normally be a noise canceling, single button carbon or amplified dynamic microphone, commonly used in aircraft communications (typically 100 ohm impedance, 250 millivolts). PTT operation shall be provided by contact closure to airframe ground.

10.8.6 Transmit Sidetone Audio

10.8.6.1 Sidetone audio shall be provided to permit the operator to monitor audio input to the transmitter and to assist the operator with word annunciation during high ambient noise conditions.

10.8.6.2 Sidetone output shall be 3 to 10 dB below the adjusted receiver output level. Sidetone distortion shall not exceed 5%. Sidetone level shall be adjustable (up to 5 VRMS minimum) while the radio is connected to the aircraft's audio system without disassembling the radio.

10.8.7 Display - The radio shall simultaneously display the channel number in use, and either the frequency in use or an operator programmable eight character (minimum) alpha numeric channel designator. The display of the frequency and alpha numeric channel designator must be operator selectable if it is not simultaneously displayed. A means of identifying wide-band, narrow-band, and digital operation shall be displayed. Controls and the display shall meet human factors and have a minimum acceptable viewing angle of +/- 80 degrees. Display information shall be easily visible in direct sunlight.

10.8.8 Volume Controls - Separate volume controls shall be provided for the main and guard receive audio outputs. The audio outputs shall be combined as a single output.

10.8.9 Primary Power - A primary power on/off switch shall be provided. The radio shall operate on a nominal +27.5 VDC and draw no more than 10 amperes in transmit operation.

10.8.10 Indicators - Indicators shall be provided to indicate transmitter activation and signal reception for the main and guard radios.

10.8.11 Squelch Override - A squelch override switch shall be provided to the operator for audio testing and volume adjustment..

10.8.12 Scanning/Priority - All main preset channels shall be capable of being scanned. Scanning shall be enabled/disabled by the operator on a per channel basis. A priority channel shall be operator selectable. A means of identifying that the radio is scanning shall be displayed.

10.8.13 DTMF - A standard 12-digit Dual-Tone Multi-Frequency (DTMF) encoder pad shall be included.

10.8.14 Time-Out-Timer - A time-out-timer shall be operator enabled/disabled. The time-out-timer shall turn off the transmitter after 90 seconds of continuous operation. It shall reset when the transmitter PTT circuit is deactivated.

10.8.15 Cooling - The radio shall be self cooled.

10.8.16 Front Panel - The front panel shall be a backlit panel operable from the avionics dimming bus operating on a nominal 27.5 VDC.

10.8.17 Identification Tag - An identification tag(s) containing all required markings will be permanently affixed to the exterior of each unit for quick identification. Minimum information shall include: Manufacturer, model number, part number, serial number, revision/modification status, and all software versions currently loaded into major radio components.

10.8.18 Labeling - All controls shall be clearly and permanently labeled and shall be easily discernible whenever the backlit panel is illuminated.

10.8.19 Programming

10.8.19.1 Presets - All preset channels shall be operator programmable utilizing front panel controls with the pilot wearing the required personal protective equipment (i.e. flight gloves) while in flight. The main and guard receivers shall not be disabled during programming. Programming shall not require that the radio be turned off to enable new operator-programmed settings.

10.8.19.2 Guard Frequency - Guard frequency programming and edit functions shall be disabled during normal programming operations to ensure that the guard preset frequency assignment remains undisturbed during main frequency programming operations. A means of disabling operator guard programming shall be provided thus limiting guard programming functions to maintenance or computer-to-radio capability.

11 SOFTWARE - OPERATING, PROGRAMMING AND DIAGNOSTIC

All operating, programming and diagnostic software shall be available to program and test the radios in all three operating modes, TIA-102 digital narrowband, analog narrowband and analog wideband, and shall be available at the time of offer.

11.1 Licenses - All applicable software licenses shall be furnished for each radio purchased under this contract. The license shall allow unlimited use of the software for each specific facility location. This unlimited use of software shall also be applicable to keyloader operations (encryption), where required.

11.2 Media - Software shall be provided on 3-1/2" IBM formatted diskette(s) or CD-ROM. CD-ROM is preferred.

11.2.1 Quantities - Quantities shall be established on a per order basis.

11.3 Programming interface equipment - Quantities shall be established on a per order basis.

11.4 Computer Operating System - Diagnostic and programming software shall run under Windows 95, Windows 98, or Windows NT. DOS based software is not acceptable.

11.5 Software Updates - Updates of radio programming and radio operating software/firmware, and any associated hardware required, (e.g., ROM and/or EEPROM) shall be provided for the first three years after delivery at no additional cost to the Government. Software updates shall be provided to all delivery locations in the same quantities as delivered for the initial software orders.

11.6 Software Password Protection - Password protection of all programmable input data shall be available. For multiple zone radios, password protection shall also be available on a zone by zone basis. Each zone shall be able to have its own unique password.

11.7 Cloning for “Fire” Personal Portable - Cloning capability in portables (portable-to-portable), including interface cabling as required, will be supplied as listed above. “Complete” radio-to-radio and “zone-by-zone” cloning capability is required and will be consistent throughout a radio's life cycle. Radio-to-radio and zone-by-zone cloning ability/capability will not be limited to a specific software revision or hardware version (e.g., software version or ROM and/or EEPROM revision) but will extend to all radios of the same type regardless of date of manufacture.

In a “complete” radio-to-radio clone, the following items shall not be cloned:

1. Electronic serial number
2. Unit Identifier (ID)
3. Encryption Keys
4. IP Address, if applicable

It is desired to have portable-to-mobile radio cloning capability if a manufacturer produces both a portable and a mobile radio.

11.8 Keyboard Programmability for "Fire" Portable Radios – "Fire" portable radios shall have the following capabilities programmable from the keyboard.

11.8.1 Frequencies - Transmit and receive frequencies shall be individually programmable by channel.

11.8.2 Analog Mode Squelch Control - In analog mode, input of CTCSS tone frequencies or CDCSS codes (code words) shall be available on a frequency by frequency (receive or transmit channel) basis. The ability to enable or disable this function shall also be available on a receive or transmit channel basis.

11.8.3 Digital Mode Controls - In digital mode, the input of Network Access Codes (NAC) and Talk Group IDs shall be available on a frequency by frequency (receive or transmit channel) basis.

11.8.4 Mode Selection List - A sixteen (16) item selection list or equivalent, from the keyboard, shall be available for the selection of the desired CTCSS, CDCSS, NAC and Talk Group on a channel by channel basis.

11.8.5 Password Protection - The ability to input or change software passwords shall be available from the keyboard.

12 MANUALS

12.1 Technical Service Manuals (TSM) - TSMs shall be packaged with the associated equipment and shall furnish adequate information for installation and maintenance. As a minimum, the following shall be included in each TSM as applicable:

(a) Initial installation instructions,
(b) Service adjustment instructions,
(c) Complete schematic diagrams and parts list, photographs, diagrams or other aids showing the location of all components. Printed circuit board diagrams showing all component locations and printed circuit traces,
(d) Complete alignment instructions,
(e) Description of circuit operation,
(f) Intercabling diagrams,
(g) Block diagrams,
(h) Maintenance and troubleshooting procedures,
(i) Technical specifications
(j) Specific configurations, such as VHF/UHF crossband linking and RF or Microwave interface Links, remote control, etc.

12.1.1 Quantities - Quantities shall be established on a per order basis.

12.1.2 CD-ROM Option - If a CD-ROM version of the TSM is available, it may be ordered on a per order basis.

12.2 User Manuals

One hard copy of the Users Manual will be furnished per base, mobile, portable and aircraft unit. The User Manual shall describe the features of the specific radio equipment furnished and how to use it. This User Manual shall be the same manual provided to commercial customers.

13 TRAINING

Complete technical diagnostic and maintenance training courses shall be offered for each specific type of radio equipment furnished under this contract. Courses covering more than one equipment type will be acceptable. Each training course shall be offered at least semi-annually. Each shall be available at fixed price throughout the base year and each option year of the contract.

All student training materials required for the training shall be included in the cost of the training and shall become the property of the Government upon completion of the training.

14 COMMUNICATION TEST SET

A communications service monitor/analyzer is a consolidated electronic test device that is capable of providing various performance tests on amplitude modulated, analog frequency modulated, and digitally modulated receivers and transmitters. The digital mode must conform to the TIA-102 Common-Air-Interface standard. The service monitor must have the capability of performing all tests in the minimum frequency range of 1 MHz to 1000 MHz. Time based aging must be better than 0.5 PPM per year. Time base stability must be better than 0.05PPM

The monitor shall operate with the functionality of the following discrete test instruments.

- RF frequency meter
- RF signal generator
- Spectrum analyzer with tracking generator
- Modulation meter
- BER meter
- Power meter
- SINAD and distortion meter
- Audio frequency counter
- Audio tone signal generator
- CTCSS, CDCSS, and DTMF encoder
- CTCSS and CDCSS decoder
- DTMF tone sequence decoder
- TDMR Cable fault locator
- Oscilloscope
- Signal strength meter

The monitor must be capable of performing the following digital diagnostic tests and measurements;

- Free running BER capability. Measurement range from 0 to 20% BER.
- Encryption /decryption capable : DES, DES XL, DES OFB (optional feature)
- P25 Trunking (Optional Feature)
- Generation of digital 1011Hz test tone frame
- Generation of digital 5%BER calibration tone
- Generation of digital silence signal frame
- P25 Link control field decoder
- Decoding of P25 code words, including Link Control Format, high speed data, low speed data, and raw data stream
- P25 digital keypad decoder
- P25 digital voice frame encoder/decoder

15 SCANNING MONITOR RECEIVER

All features listed below are subject to the Receiver Standards and Specifications listed in Sections 3, 4 and 5.

The Scanning Monitor Receiver shall be capable of being dash mounted in a vehicle or used as a desk-top base station. Primary power shall be from 12 VDC (nominal) with external 120 VAC, 60 Hz wall transformer/power pack available, or internal integrated 120 VAC power supply, for base station operation. The receiver shall be provided with a telescopic antenna, AC adapter (if applicable), cigarette lighter cord, DC power cord, and mobile mounting bracket and screws.

15.1 Frequency Coverage - Frequency coverage shall be continuous in the range of 25 MHz to1300 MHz, excluding the cellular bands (824 to 849 and 869 to 894 MHz) and the UHF television bands (512 to 745 MHz). The 700 MHz Public Safety band shall be included.

15.2 Programmable Channel Scan - The Scanning Monitor Receiver shall have at least 500 individual memory channels that are capable of being scanned. The channel configuration shall be arranged such that each zone or bank shall contain approximately 50 channels. For example: 10 zones of 50 channels.

15.3 Squelch/Selective Calling Systems - In analog mode of operation, the receiver shall support CTCSS and CDCSS as defined in TIA/EIA-603, on a per channel basis. In the TIA-102 digital mode of operation, the receiver shall support the use of NACs (Network Access Codes) and TGIDs (Talk-Group IDs), on a per channel basis.

15.4 Priority Channels - Any single channel shall be capable of being designated as a priority channel. At least 10 channels shall be capable of being designated as a priority channel.

15.5 Antenna Connector - A "standard" 50 ohm BNC type connector shall be provided for connection to an external antenna. An internal switchable in-line attenuator shall be provided for use in high RF environments.

15.6 Alpha-Numeric Display - The receiver shall be provided with a backlit LCD display and have the capability to display all pertinent channel information, such as frequency, channel number, alpha channel tag, received signal strength indicator, selective calling code (CTCSS, CDCSS, NAC, TGID), and other scanning mode status indicators.

15.7 Front Panel Controls - The front panel keypad and control knobs shall be backlit to enhance operation in low light conditions.

15.8 Multi-mode Operation - The receiver shall be capable of operating in analog wide-band (25 kHz bandwidth/5 kHz modulation), analog narrow-band (12.5 kHz bandwidth/2.5 kHz modulation), narrow-band TIA-102 digital mode, wide broadcast FM mode (75 kHz modulation), and AM. Conventional, as well as trunked operation is required. The scanning receiver shall support TIA-102 trunked operation. Support of other commonly used trunking formats is desirable.

15.9 Speaker - An integral 2 watt, or greater, speaker matched to the audio amplifier shall be furnished. A jack for connection to an external speaker shall be provided.

15.10 Remote Control Operation - A standard RS-232C port shall be provided for PC control and remote operation of all aspects of the receiver.

15.11 Cloning Feature - Cloning capability, on a zone-by-zone basis, of programmed channels, from one unit to another shall be provided.

16 SERVICES

Specific services may be offered as an option. Such services shall be performed at the customer and/or vendor's service locations during normal business hours. Services shall be provided by qualified personnel and performed in accordance with any manufacturer's instructions and good commercial practices. Special transportation needs (helicopter, boat, snowmobile, horses) may be provided by the government.

16.1 Equipment Installation/Removal – This service category is self-explanatory in that it provides for the installation and removal of fixed equipment, including mobile radios with antennas. Mobile installations should be quoted for both Front mount and trunk mount radios. Installation shall include hookup to power supply, antenna leads, and telephone lines, and system grounding (TIA/EIA-607, Commercial Building Grounding and Bonding Requirements for Telecommunications (ANSI/TIA/EAI-607-94)), antenna systems, photo-voltaic systems, programming, and operational checks as applicable. Radio programming may be provided by the Government. Removal shall only be required in conjunction with orders for installation of new equipment. When removing old radios, cables are not to be cut. Antenna holes when not being reused will have rubber plugs installed in them. Repeater installation shall include installation of duplexers, RF isolators, combiners and shall include documented duplexer desensitization measurements, duplexer insertion loss measurements, adjacent channel rejection measurements, and site noise levels. Documented site measurements, as per TIA/EIA-603, will be provided to the customer.

16.2 Maintenance Service – This service category is similar to extended warranty service, whereby the vendor agrees to keep the equipment up to manufacturer specifications and make all necessary repairs, if and when needed. This service includes the labor and parts required to repair units that have become defective through normal wear and usage, as well as shipping cost to and from the repair facility.