PERFORMANCE REQUIREMENTS DOCUMENT (PRD)
FOR
PROGRAM EXECUTIVE OFFICE
COMMAND CONTROL COMMUNICATIONS – TACTICAL (PEO C3T)
HANDHELD, MANPACK, SMALL FORM FIT (HMS)
2- CHANNEL LEADER RADIO
PROCUREMENT

18 AUGUST 2017

PROGRAM EXECUTIVE OFFICE
COMMAND CONTROL COMMUNICATIONS –
TACTICAL (PEO C3T)
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1 Scope/Introduction

1.1 Scope

This Performance Requirement Document (PRD) defines the technical requirements for the Leader Radio contract under the authority of the PEO C3T/PM TR/HMS. The requirements within the PRD are based on Joint Tactical Radio System (JTRS) Operational Requirements Document (ORD), and the Capability Production Document (CPD) for Rifleman Radio Increment 2. All requirements in this document apply to all Leader Radio configurations unless otherwise specified for a particular configuration(s).

1.2 System Description

This PRD defines a common set of requirements for a 2-channel handheld, software-defined radio and related ancillary items that provide flexibility and adaptability to support the varied Warfighter mission requirements. This solicitation is for a National Security Agency (NSA) and Joint Interoperability Test Center (JITC) certified, single radio solution with two channels. Any solution that lacks NSA or JITC certification or uses multiple radios to meet these requirements will be deemed unsuitable.

The 2-channel Increment 2 Rifleman Radio will be referred to as the Leader Radio for the purpose of this PRD. The Leader Radio allows users to operate in tactical voice networks with other team members and team leaders. The radio also enables users to exchange Position Location Information (PLI) within a network via a networking waveform, transmit and receive data for attached devices, and act as the data transport method for Mission Command or Nett Warrior systems.

The Leader Radio is a 2-channel handheld and mounted radio to be used at the Team, Squad, and Platoon leader's level to provide the capability for these leaders to have interoperable voice communications with tactical enablers such as aviation, fires, coalition, host nation, or other adjacent units that use legacy Single Channel Ground and Airborne Radio System (SINCGARS) while simultaneously maintaining voice and data communication with subordinates and peers in one handheld device. Data devices may be attached to the Leader Radio and will communicate using USB signaling standards. The Leader Radio shall also allow the ability to attach ancillary devices that may access the Leader Radio for power only. The Leader Radio enables simultaneous use of the legacy Single Channel Ground and Airborne Radio System (SINCGARS) and Soldier Radio Waveform (SRW) waveforms.

The Leader Radio shall be fielded in a handheld and mounted configuration. Both handheld and mounted configurations shall use a common receiver transmitter.

1.3 Terms and Definitions

The Leader Radios' capabilities are defined as a combination of the actual performance, functional and physical attributes of the system. The performance, functional and physical attributes of the system are defined by requirements in this document which includes the referenced Leader Radio Statement of Work (SOW).

1.3.1 Threshold Requirements (T)
Threshold requirements, indicated by "(T)" prior to the requirement text, shall be met or exceeded for the PRD item(s) to remain technically acceptable during the contract ordering period.

1.3.2 Delayed Threshold Requirements (DT)
Delayed Threshold requirements, indicated by "(DT)" prior to the requirement text, shall be met or exceeded during a future order award. The Government anticipates raising these requirements to Threshold (T) requirements after contract award.

1.3.3 Objective Requirements (O)
Objective requirements, indicated by "(O)" are desired requirements. Items not marked with (T), (DT) or (O) are considered (T) by default. To ensure Objective requirements provide enhanced capability, there are minimum standards within the Objective requirements that the Contractor shall meet if providing the Objective Requirement. For example, the single bay AC/DC charger is an Objective (O) requirement. The Contractor does not have to offer the charger. However, if the Contractor offers the charger, it shall meet all Thresholds (T) identified in paragraph 3.5.35.

1.3.4 Mission-Ready
A Mission-Ready Leader Radio provides a fieldable capability that is operationally suitable and reliable for the intended mission (i.e. handheld, mounted, variant, FMS).

1.3.5 Mission-Ready Handheld Weight and Size
The Mission-Ready weight and size includes: Leader Radio Receiver Transmitter, GPS antenna, SINCGARS antenna, SRW UHF and L-Band antennas and battery power for an 8 hour mission. Weight is measured in pounds and size is measured in cubic inches.

2 Applicable Documents

2.1 Specifications
A partial list of specifications and standards (Leader Radio References) integral to this procurement is included at the end of this document. Additional standards apply in accordance with Best Practices. The specifications and standards in effect at contract award shall be the revision listed in the Department of Defense Index of Specifications and Standards (DODISS) at the time of contract award.

3 (T) Leader Radio

3.1 (T) Leader Radio Set (LR) Receiver-Transmitter (RT) (LR-RT)
The LR-RT shall demonstrate:

- NSA Certification.
- JITC Waveform Conformance
- JITC Interoperability Assessment
- SCA Certification 2.2 or later from the Joint Tactical Networking Center (JTNC)
- Spectrum Standards Compliance

- Analysis which documents that personnel in full Mission Oriented Protective Posture (MOPP) IV protective gear can successfully operate and maintain the radio.
- Analysis which documents that the radio can be decontaminated using existing solvents.
- Technical Specifications

3.1.1 (T) Characteristics

3.1.1.1 (T) Frequency Range

3.1.1.1.1 (T) Shall cover the frequency range from 30-88 MHz (SINCGARS), 225-450 MHz for the Soldier Radio Waveform (SRW), 1300-1390 MHz (SRW) and 1755-1850 MHz (SRW).

3.1.1.1.2 (O) Shall cover the frequency range 1250-1450 MHz (SRW) waveform.

3.1.1.1.3 (O) Shall cover the frequency range from 118-137 MHz (P-25, ATC, AM/FM PSK Military Tactical, and FM Military Tactical).

3.1.1.1.4 (O) Shall cover the frequency range from 108-156 MHz (P-25, ATC, AM/FM PSK Military Tactical, and FM Military Tactical).

3.1.1.1.5 (O) Shall cover an extended, continuous frequency range from 30 MHz to 2.5 GHz.

3.1.1.2 (T) Receive Characteristics

3.1.1.2.1 (T) Receive sensitivity shall be at least -97.1 dBm for the 936.6 kbps burst rate in SRW Combat Communication (CC) mode.

3.1.1.3 (T) Transmit Characteristics

Shall meet all range, call completion rate and message completion rate requirements for each channel while operating both singly and simultaneously.

3.1.1.3.1 (T) SRW voice shall have a 90% or greater Call Completion Rate (CCR) while meeting range requirements.

3.1.1.3.2 (T) SRW data shall have an 85% or greater Message Completion Rate (MCR) while meeting range requirements.

3.1.1.3.3 (T) SINCGARS voice shall have a 90% or greater Call Completion Rate (CCR) while meeting range requirements.

3.1.1.3.4 (T) SINCGARS data shall have an 85% or greater Message Completion Rate (MCR) while meeting range requirements.

3.1.1.3.5 (T) Leader Radio SRW service shall have a single hop (point-to-point unobstructed without relaying) range in open terrain no less than 3km.

3.1.1.3.6 (T) Mounted Leader Radio SRW service shall have a single hop (point-to-point without relaying) range in open terrain no less than 10km.

3.1.1.3.7 (O) Mounted Leader Radio SRW service shall have a single hop (point-to-point without relaying) range in open terrain no less than 20km.

3.1.1.3.8 (T) Leader Radio SINCGARS service shall have a single hop (point-to-point without relaying) range in open terrain no less than 5km.

3.1.1.3.9 (O) Leader Radio SINCGARS service shall have a single hop (point-to-point without relaying) range in open terrain no less than 10km.

3.1.1.3.10 (T) Mounted Leader Radio SINCGARS service shall have a single hop (point-to-point without relaying) range in open terrain no less than 10km.

3.1.1.3.11 (O) Mounted Leader Radio SINCGARS service shall have a single hop (point-to-point without relaying) range in open terrain no less than 20km for SINCGARS.

3.1.1.3.12 (O) Mounted Leader Radio SINCGARS service shall have a single hop (point-to-point without relaying) range in open terrain no less than 30km for SINCGARS.

3.1.1.3.13 (O) Mounted Leader Radio SINCGARS service shall have a single hop (point-to-point without relaying) range in open terrain no less than 40km for SINCGARS.

3.1.1.3.14 (T) Shall permit multiple channels to transmit and receive simultaneously without degradation to either channel at threshold range.

3.1.1.3.15 (T) Mounted Leader Radio shall permit multiple channels to transmit and receive simultaneously and meet the LR Environmental Testing criterion.

3.1.1.3.16 (T) SRW data rates shall meet or exceed the following in clear Line of Sight (LOS) unobstructed terrain:

3.1.1.3.16.1 (T) 200 kbps (User throughput – 2 node network)

3.1.1.3.16.2 (O) 1Mbps (User throughput – 2 node network)

3.1.1.3.16.3 (T) 50 kbps (16 nodes, SRW static, aggregate Network Throughput)

3.1.1.3.16.4 (T) 25 kbps (16 nodes, SRW mobile, aggregate Network Throughput)

3.1.1.3.17 (T) The LR-RT shall sustain no damage when a Radio Frequency (RF) output port is open or shorted.

3.1.1.4 (T) Physical Characteristics

3.1.1.4.1 (T) The size of the Leader Radio, including the antenna(s) and battery shall be less than 60 cubic inches when configured as Mission-Ready, IAW para 1.3.4 and 1.3.5, with enough power for an eight hour mission.

3.1.1.4.1.1 (O) The size of the Leader Radio, including the antenna(s) and battery shall be less than 55 cubic inches when configured as Mission-Ready, IAW para 1.3.4 and 1.3.5, with enough power for an eight hour mission.

3.1.1.4.1.2 (O) The size of the Leader Radio, including the antenna(s) and battery shall be less than 45 cubic inches when configured as Mission-Ready, IAW para 1.3.4 and 1.3.5, with enough power for an eight hour mission.

3.1.1.4.2 (T) The weight of the Leader Radio, with antenna(s) shall be less than or equal to 4.0 lbs when configured as Mission-Ready, IAW para 1.3.4 and 1.3.5, with enough power for an eight hour mission.

3.1.1.4.2.1 (O) The weight of the Leader Radio, with antenna(s) shall be less than or equal to 3.0 lbs when configured as Mission-Ready, IAW para 1.3.4 and 1.3.5, with one battery for an eight hour mission.

3.1.1.4.2.2 (O) The weight of the Leader Radio, with antenna(s) shall be less than or equal to 2.0 lbs when configured as Mission-Ready, IAW para 1.3.4 and 1.3.5, with one battery for an 8 hour mission.

3.1.1.5 (T) Built-in-Tests

3.1.1.5.1 (T) The Leader Radio shall perform Power On Self-Test (POST) to determine operational status.

3.1.1.5.2 (T) For field and organizational level maintenance, the Leader Radio shall provide Built In Test (BIT) functionality to troubleshoot down to Line Replaceable Unit (LRU) level. The BIT diagnostics shall be capable of fault detection of at least 95% of all faults and must be capable of fault isolation to a single channel of at least 90% of detected faults.

3.1.1.6 (T) Connectors and Interfaces

3.1.1.6.1 (T) Shall provide an audio connector and support U-283/U key fill or adapter.

3.1.1.6.2 (T) Shall provide electrical interface for headsets, speaker/microphone, and handset in accordance with MIL-DTL-55116C or adapter per channel.

3.1.1.6.3 (T) Shall provide the capability to receive and transfer digital data between a Mobile Hand-Held Common Operating Environment End User Device (MHH COE EUD) and the LR-RT via Ethernet over Universal Serial Bus (USB) 2.0 or higher Type B Micro or provide applicable adapter to support data applications over Universal Serial Bus (USB) 2.0 or higher Type B Micro, and have quick release capability.

3.1.1.6.4 (T) Shall be able to connect an external Precision GPS device. An external Precision GPS is defined as an external Precision GPS that meets current Selective Availability Anti-Spoofing Module (SAASM) requirements.

3.1.1.6.5 (T) Shall provide Simple Network Management Protocol Version 3 (SNMPv3) interface to allow monitoring and control of the radio.

3.1.1.6.6 (T) Shall provide a push-button or other mechanical interface to allow the radio operator and maintainer to access operational status, control functions and parameters, and zeroize the LR-RT.

3.1.1.6.7 (T) Shall provide built-in display / Human Machine Interface (HMI).

3.1.1.6.7.1 (T) The LR-RT HMI shall provide operators and maintainers with the ability to check the following functions with precise visual feedback at any given time:

3.1.1.6.7.2 (T) For the LR-RT's functions:

3.1.1.6.7.2.1 (T) Radio power (battery charge) status

3.1.1.6.7.2.2 (T) Most recent Built-in test Status.

3.1.1.6.7.2.3 Reserved

3.1.1.6.7.2.4 (T) Radio software version number

3.1.1.6.7.2.5 (T) Crypto status

3.1.1.6.7.3 (T) For a Narrowband Channel:

3.1.1.6.7.3.1 (T) Frequency Hopping Mode: (SC and FH)

3.1.1.6.7.3.2 (T) Plain text vs. Cypher text

3.1.1.6.7.3.3 (O) Transmitting power/signal strength

3.1.1.6.7.3.4 (O) Receive signal strength

3.1.1.6.7.3.5 (T) Alphanumeric Pre-set numbers with at least 5 digits

3.1.1.6.7.3.6 (O) Net ID (identification).

3.1.1.6.7.3.7 (T) Narrowband Operating Frequency

3.1.1.6.7.3.8 (T) Volume level

3.1.1.6.7.3.9 (T) Shall display the results of the last BIT for review

3.1.1.6.7.3.10 (O) Shall display the results of the last 25 BITs for review

3.1.1.6.7.4 (T) For a Wideband Channel

3.1.1.6.7.4.1 (O) Transmitting power/signal strength

3.1.1.6.7.4.2 (O) Receive signal strength

3.1.1.6.7.4.3 (T) Alphanumeric Pre-set numbers with at least 5 digits

3.1.1.6.7.4.4 (T) Alphanumeric Group number

3.1.1.6.7.4.5 (T) Network status

3.1.1.6.7.4.6 (O) Number of nodes visible in network

3.1.1.6.7.4.7 (T) Wideband Operating Frequency

3.1.1.6.7.4.8 (T) Volume level

3.1.1.6.7.4.9 (T) Shall display the results of the last 25 BITs for review

3.1.1.6.7.5 (T) All presets must be accessible and the radio's controls must be able to perform all tasks without need for an ancillary device or detachable HMI.

3.1.1.6.7.6 (O) The HMI shall provide operators and maintainers with the ability to check the GPS confidence with precise visual feedback at any given time. (When an anti-spoofing GPS is used, the radio shall present a message to indicate when interference with the GPS signal was detected.)

3.1.1.6.7.7 (O) The HMI shall provide operators and maintainers with the ability to check for Interference. (When the radio receives RF energy within either channel that degrades reception, the radio shall report to the user. Applicable equally to intentional jamming and unintentional interference.)

3.1.1.6.7.8 (T) The HMI shall be readable with 10,000 foot-candle, direct sunlight.

3.1.1.6.7.9 (T) The HMI shall be readable with Generation III Night Vision Goggles.

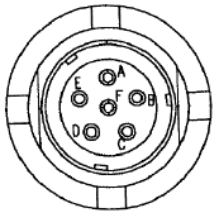
3.1.1.6.7.10 (T) LR-RT shall allow control of the HMI display brightness from off to maximum.

3.1.1.6.7.11 (T) The Leader Radio shall provide the user the capability to input numerical and alpha numeric characters via a keypad device.

3.1.1.6.7.12 (O) The built-in display shall be readable when the LR-RT is mounted. If the radio's display is intended to be used when mounted and the radio is mounted horizontally, the information shall be rotated on the screen so that it is presented in an easy to read format and be lockable to this orientation.

3.1.1.6.7.13 (T) A remote HMI in the form of an application for the NW device shall be provided that is capable of selecting presets, controlling the radio's volume, and displaying relevant information for dismounted operation.

3.1.1.6.8 (T) The Leader Radio RT shall provide an adapter or legacy serial data interface in accordance with MIL-STD-188-114A as shown below for compatibility with Fires support systems:



Part Number:	MILCON MC283-1	Mating Part Number:	MILCON MC329

3.1.1.6.8.1 (T) The audio/data connectors shall be compatible with the following physical electrical interface requirements:

PIN	SIGNAL NAME	SIGNAL TYPE	SIGNAL CHARACTERISTICS	LRU INPUT IMPEDANCE	EXTERNAL LOAD IMPEDANCE	Applicable Requirements
A	GND	Ground				Ground
B	DGTL DATA RCV	Digital Data Output	1 = -5V ± 1V 0 = +5V ± 1V		≥ 4K Ohms < 0.01microF	3.2.1.5.8.2 i)
C	PUSH TO TALK-N (PTT-N)	Control Input	XMT = 0V - 0.5/+0.25V RCV = OPEN, +1.4Vdc to 0V	≥ 10K Ohms to + 5.0V		3.2.1.5.8.2 ii) and 3.2.1.5.8.2 iii)
D	DGTL DATA CLOCK	Control Output	OFF = -5V ± 1V ON = +5V ± 1V		≥ 4K Ohms ≤ 0.01microF	3.2.1.5.8.2 i)
E	DGTL DATA MODE CONT-N (DDMC-N)	Control Input	INACTIVE = -6.75V Pin Open) ACTIVE = 1.0V ± 0.5V (Pin Grounded)	≥ 100K Ohms to -6.75V ≤ 3500pF		3.2.1.5.8.2 iv) and 3.2.1.5.8.2 v)
F	DGTL DATA XMT	Digital Data Input	1 = - 5V ± 1V 0 = + 5V ± 1V	> 9K Ohms to -6.75V ≤ 3500pF		3.2.1.5.8.2 i)

3.1.1.6.8.2 (O) The audio/data connector shall meet the following requirements:

3.1.1.6.8.2.1 (T) Voltage levels per MIL-188-114A into a single load.

3.1.1.6.8.2.2 (T) To assure RCV mode, the external device shall satisfy one of the following:

3.1.1.6.8.2.2.1 (T) No more than 100microA may flow out of pin into an (unbiased) open circuit.

3.1.1.6.8.2.2.2 (T) Present greater than +3.5 Vdc if external voltage source is applied to pin.

3.1.1.6.8.2.2.3 (T) Apply a resistance of 25K Ohms to ground for pure resistive loads.

3.1.1.6.8.2.3 (T) To assure XMT mode, the external device shall satisfy at least one of the following:

3.1.1.6.8.2.3.1 (T) External circuit shall be capable of sinking up to 500microA while ensuring 0.0V – 0.5/+0.25V at the pin.

3.1.1.6.8.2.3.2 (O) External load resistance shall be less than or equal to 400 Ohms to ground for pure resistive loads.

3.1.1.6.8.2.4 (T) To assure INACTIVE state, the external device shall satisfy one of the following:

3.1.1.6.8.2.4.1 (T) No more than 100microA may flow out of pin into an (unbiased) open circuit.

3.1.1.6.8.2.4.2 (O) Present less than -3.5Vdc if external voltage source is applied to pin.

3.1.1.6.8.2.4.3 (O) Apply a resistance of greater than or equal to 150K Ohms to ground for pure resistive loads.

3.1.1.6.8.2.5 (T) To assure ACTIVE state, the external device shall satisfy at least one of the following:

3.1.1.6.8.2.5.1 (O) External circuit shall be capable of sinking up to 200microA while ensuring 0.0V plus or minus 0.5Vat the pin.

3.1.1.6.8.2.5.2 (T) External load resistance shall be less than or equal to 25k Ohms to ground for pure resistive loads.

3.1.1.6.8.3 (T) The radio shall be able to support Fires Missions by communicating with at least the following sub-systems that use the standards of the TACLINK card:

3.1.1.6.8.3.1 (T) Forward Observer System (FOS)

3.1.1.6.8.3.2 (T) Mortars Fire Control System (MFCS)

3.1.1.6.8.3.3 (T) Advanced Field Artillery Tactical Data System (AFATDS)

3.1.1.6.8.3.4 (T) Pocket Sized Forward Entry Device (PFED Increment II)

3.1.1.6.8.4 (T) The LR-RT shall support the following Physical/Link modulation & rates (in bps) when interfacing using a digital synchronous interface to the TACLINK card: NRZ at rates 600, 1200, 1200N, 2400, 2400N, 4800, 4800N, 9600N, 16K.

3.1.1.7 (T) Power

3.1.1.7.1 (T) Shall provide capability to use external power, common primary batteries, and rechargeable batteries.

3.1.1.7.2 (T) Shall allow the replacement of primary power source(s) without any special tools and/or equipment.

3.1.1.7.3 (T) The LR-RT shall operate SRW in a dismounted network for both voice and data operations at maximum transmit power in an operational environment, with a 30 second PLI rate and a 10% Push-To-Talk (PTT) switch voice transmission duty and SINCGARS with 6:3:1 (Listen, Receive, Transmit) for no less than 8 hours.

3.1.1.7.4 (O) The LR-RT shall operate SRW in a dismounted network for both voice and data operations at maximum transmit power in an operational environment, with a 30 second PLI rate and a 10% Push-To-Talk (PTT) switch voice transmission duty and SINCGARS with 6:3:1 (Listen, Receive, Transmit) for no less than 24 hours.

3.1.1.8 (T) Shall have built-in speaker and microphone with ability to Push-to-Talk (PTT) and choose which channel is being used to communicate, and ability to choose simultaneous transmission on both channels, in addition to providing an external microphone and speaker capability.

3.1.2 (T) Waveforms

3.1.2.1 (T) Soldier Radio Waveform (SRW)
Shall use the Soldier Radio Waveform Soldier System Combat Communications Mode IAW MIL-STD-188/204 Change 1 or newer specification.

3.1.2.1.1 (T) Shall utilize SRW version 1.0.1.1C available in the Joint Tactical Networking Center (JTNC) Information Repository.

3.1.2.1.2 (O) Shall utilize SRW version 1.2.2 available in the JTNC Information Repository.

3.1.2.1.3 (T) The RF selectivity in Soldier Radio Waveform (SRW) Combat Communication (CC) mode shall be sufficient to tolerate the presence of any other SRW network separated in frequency by 10 MHz center frequency spacing at full (handheld) power and 100 meters distance with no degradation in performance.

3.1.2.2 (T) SINCGARS.

3.1.2.2.1 (T) Shall include an interoperable version of SINCGARS. SINCGARS with Enhanced SINCGARS Improvement Program (ESIP), version 1.4 is available in the JTNC Information Repository.

491 3.1.2.2.1.1 (T) Shall meet MIL-STD-188-220B for the modes of
492 SINCGARS identified as threshold in Table 1: SINCGARS Waveform Modes
493 Threshold Requirements below:

Table 1: SINCGARS Waveform Modes Threshold Requirements
SINCGARS MODE / FEATURE
Voice
1200 bps SDM
2400 bps SDM
4800 bps SDM
16 kbps Transparent Data Mode (TDM)
1200 bps Enhanced Data Mode
2400 bps EDM
4800 bps EDM
9600 bps EDM
1200 bps RS-232 EDM
2400 bps RS-232 EDM
4800 bps RS-232 EDM
9600 bps RS-232 EDM
FH1 (frequency hopping) Master
Electronic Remote Fill (ERF)
Saville Automatic Remote Keying (SARK) receive

494

495 3.1.2.2.1.2 (O) Leader Radio shall meet MIL-STD-188-220B for the
496 modes for SINCGARS, identified as objectives in Table 2: SINCGARS
497 Waveform Modes Objectives below:
498

Table 2: SINCGARS Waveform Modes Objective		
3.1.2.2.1.2.1	(O)	Saville Automatic Remote Keying (SARK) transmit
3.1.2.2.1.2.2	(O)	FH2 (frequency hopping) Master
3.1.2.2.1.2.3	(O)	FSK (e.g. TACFIRE)
3.1.2.2.1.2.4	(O)	CUE Mode (Network Control Station)
3.1.2.2.1.2.5	(O)	5kHz / 10kHz channel offset
3.1.2.2.1.2.6	(O)	Scan Mode
3.1.2.2.1.2.7	(O)	F1/F2 Retransmit
3.1.2.2.1.2.8	(O)	75 through 600 bps SINCGARS Data Mode (SDM)
3.1.2.2.1.2.9	(O)	Packet Mode (shared voice/data)
3.1.2.2.1.2.10	(O)	GPS Mode
3.1.2.2.1.2.11	(O)	Homing Mode (aircraft radio only)
3.1.2.2.1.2.12	(O)	Remote Control (Vehicular and TACP Radio Only)
3.1.2.2.1.2.13	(O)	SINCGARS Crypto Modernization (CMI)

3.1.2.2.1.3 RESERVED

3.1.2.3 (O) Shall include other waveforms identified in paragraph 3.5 Ancillary Items and Capabilities while completing the associated Waveform Conformance and Interoperability Assessment.

3.1.2.4 (T) Waveform Mode Storage, Planning and Network Management

3.1.2.4.1 (T) Shall store all provided waveforms and required operational parameters simultaneously.

3.1.2.4.2 (T) Shall store all data encrypted while at rest in accordance with current National Security Agency (NSA) guidelines.

3.1.2.4.3 (T) Shall provide the ability for SRW software and mission data to be loaded via USB mass storage device drag and drop method.

3.1.2.5 (T) Waveform and Mode Selection:

3.1.2.5.1 (T) Waveform modes shall be user selectable. Example: Change mode of SINCGARS.

3.1.2.5.2 (T) Shall be able to switch any waveform and mode to a different waveform and mode within the same channel in less than 2 minutes.

3.1.2.6 (T) Cold Start/Warm Start

Cold start and warm start timelines are not applicable for non-terrestrial waveforms such as MUOS where network join times are outside of local control.

3.1.2.6.1 (T) During cold start the radio shall power on, instantiate waveform(s) and assign mode(s) or configuration parameters and be fully operational within 11 minutes. Cold start is the process of configuring HW (installing antennas, and handmics, etc.), powering up, loading cryptographic keying material and mission plan, entering necessary parameters, and configuring a radio's software/applications to allow the radio to enter into its operational state and join a network.

Cold start is normally required after such software items as waveforms, waveform operating parameters, crypto keys, and presets have been uninstalled from the radio and powered down. Cold start does not include the reloading of the radio operating environment (OE) or those radio services applications necessary to put the LR-RT into a state in order to receive the software required to operationally configure the radio.

3.1.2.6.2 (T) During warm start the radio shall power on, instantiate waveform(s) and assign mode(s) and configuration parameters to be fully operational within 5 minutes. Warm start is conducted after a radio has been successfully loaded by the operator (completion of cold start) or has previously been in an operational state and contains all the necessary radio software/ applications and assembly of components to allow the set to enter into a state of operation.

Warm start process may consist of using a channel instantiated waveform and modifying its waveform parameter sets, (e.g., keys, presets, frequencies) to allow the operator to enter into a different network using the same waveform that is currently instantiated on the channel. Warm start may also consist of tearing down a radio's channel and instantiating a new waveform and its parameter sets from memory unto the channel to allow the operator to enter into a new required network.

3.1.2.7 (T) In the event of an EW (in-band jamming) attack, the Leaders Radio shall be able to rejoin an established voice network within 60 seconds from the end of the attack.

3.1.2.8 (O) In the event of an EW (in-band jamming) attack, the Leaders Radio shall be able to rejoin an established voice network within 15 seconds from the end of the attack.

3.1.2.9 (T) The LR-RT shall allow transmit and receive operations simultaneously without interference to/from other dismounted or mounted systems with appropriate frequency management practices and utilization of appropriately filtered antennas.

3.1.3 (T) Common Management Information Base (MIB)

3.1.3.1 (T) Shall implement the Program Manager for Tactical Radios (PM TR) Common MIB V1 for SRW status monitoring. The PM TR Common MIB V1 specification is available in the PM TR Configuration Control Repository (PM TR CCR).

3.1.3.2 (O) Shall implement the Program Manager for Tactical Radios (PM TR) Common MIB V1 for all channels and control of the radio. The PM TR Common MIB V1 specification is available in the PM TR Configuration Control Repository (PM TR CCR).

3.1.4 (T) Multiple channels

3.1.4.1 (T) The LR-RT shall have the capability of operating two channels simultaneously while at threshold range.

3.1.4.2 (O) The LR-RT shall have the capability of operating each of the available waveforms on either channel.

3.1.4.3 (O) The LR-RT shall have the capability of powering on or off each channel independently.

3.1.4.4 (T) The Leaders Radio shall support Multiple Levels of Security (MLS). MLS is an achievable data processing environment with high enough assurance to attain approval to operate.

3.1.4.5 (O) The Leaders Radio shall support Multiple Independent Levels of Security (MILS). MILS is an achievable data processing environment with high enough assurance to attain approval to operate. MILS is achieved through NSA-approved separation of the operated radio channels for each waveform channel, physically or logically, independently supporting required security classification levels up to SECRET. For example: SRW secret operation while SINCGARS is in plain text mode.

3.1.5 (T) Global Positioning System (GPS)

3.1.5.1 (T) Internal GPS

3.1.5.1.1 (T) Shall provide an integrated GPS capability. The integrated GPS may be a semi-permanently affixed module.

3.1.5.1.2 (T) Shall be able to connect external SAASM GPS or M-Code GPS to radio via cable in lieu of internal non-SAASM.

3.1.5.1.3 (T) Shall include an integrated antenna to receive GPS signal as part of the system.

3.1.5.1.4 (T) The Leader Radio, when operating waveforms for transmitting Position Location Information (PLI) over Internet Protocol (IP) data, shall use Variable Message Format (VMF) K5.01 in accordance with the MIL-STD-6017 and MIL-STD-6017A series with VMF header in accordance with MIL-STD-2045-47001C.

3.1.5.1.5 (T) Position location information (PLI) shall be accurate within 10 meters, with clear sky view and a minimum of 4 satellite signals acquired, where GPS signal is available.

3.1.5.2 (T) External GPS Interface Requirements

3.1.5.2.1 (T) Shall utilize Precise Position Service (PPS) GPS when both PPS and commercial GPS signals are available.

3.1.5.2.2 (T) Shall be able to receive time and position data via GPS-153 formatted message from external devices. Examples: DAGR or M-Code module.

3.1.5.3 (O) Semi-Permanently Affixed GPS Module (SAGM).

3.1.5.3.1 (T) Shall provide a semi-permanently affixed module which can be easily upgraded to SASSM and M-Code.

3.1.5.3.2 (T) Shall permit connection to external SAASM GPS to radio via cable.

3.1.5.3.3 (T) The Leader Radio, when operating waveforms for transmitting Position Location Information (PLI) over Internet Protocol (IP) data, shall use Variable Message Format (VMF) K5.01 in accordance with the MIL-STD-6017 and MIL-STD-6017A series with VMF header in accordance with MIL-STD-2045-47001C.

3.1.5.3.4 (T) Position location information (PLI) shall be accurate within 10 meters, with clear sky view and a minimum of 4 satellite signals acquired, where GPS signal is available.

3.1.5.3.5 (O) The Leaders Radio shall support determination of absolute position location with GPS and relative position location without GPS (if provided multiple external reference points of nodes).

3.1.6 (T) Communications Security (COMSEC).

For the purposes of this section, the term "keys" includes system keys, certificates, and Firefly vectors as well as user traffic keys.

3.1.6.1 (T) Key Management

3.1.6.1.1 (T) Shall be capable of using the existing Simple Key Loader (SKL) to load COMSEC and presets.

3.1.6.1.2 (O) Shall be capable of using the Next Generation Simple Key Loader (SKL) to load COMSEC and presets.

3.1.6.1.3 (O) Shall be compatible with the Key Management Infrastructure (KMI) and follow-on KMI systems.

3.1.6.1.4 (O) Shall support transmit and receipt of Over-the-Air Rekey (OTAR), Over-the-Air Transfer (OTAT), and Over-the-Air Zeroization (OTAZ), of cryptographic keying material using a Government approved method such as the Joint Tactical Networking Center (JTNC) Information Repository (IR) Over-the-Air Management (OTAM) Application Note 1.1 dated 19 August 2015, or newer.

3.1.6.1.5 (O) Shall support remote zeroization of keys individually or collectively.

3.1.6.2 (T) Key Handling and Storage

3.1.6.2.1 (T) Shall be capable of operating with Unclassified and Classified COMSEC.

3.1.6.2.2 (T) Shall support update of an existing COMSEC key from an attached SKL without requiring human intervention to modify existing presets.

3.1.6.2.2.1 (T) Shall support update of an existing COMSEC key from an attached Next Generation Key Loader device without requiring human intervention to modify existing presets.

3.1.6.2.2.2 (T) Shall support manual zeroization of keys individually or collectively.

3.1.6.3 (T) Key Retention

3.1.6.3.1 (O) Shall be capable of retaining key variables for at least 96 hours after loss of primary power.

3.1.6.3.2 (O) Shall be capable of retaining key variables for at least 144 hours after loss of primary power.

3.1.6.3.3 (T) The Leaders Radio shall provide a hold up battery (HUB) with a greater than 6 month operational life.

3.1.6.3.4 (O) Holdup battery shall be field replaceable.

3.1.6.3.5 (O) Holdup battery shall automatically recharge itself from the radio's power.

3.1.7 (T) LR Environmental Testing

3.1.7.1 (T) Altitude (Low Pressure)

3.1.7.1.1 (T) Shall withstand low pressure storage at an altitude of 15,000 ft. above sea-level in accordance with MIL-STD-810G, Method 500.5, Procedure I – Storage/Air Transport.

3.1.7.1.2 (T) Shall be operable at an unpressurized altitude of 15,000 ft. in accordance with MIL-STD-810G, Method 500.5, Procedure II – Operation/Air Carriage.

3.1.7.2 (T) Temperature

3.1.7.2.1 (T) Shall operate in temperatures ranging from -30° C to +55° C verified by testing in accordance with MIL-STD-810G, Methods 501.5, Procedure II – Operation and 502.5, Procedure II – Operation.

3.1.7.2.2 (T) Shall withstand storage temperatures from -30° C to +71° C verified by testing in accordance with MIL-STD-810G, Methods 501.5, Procedure I – High Temperature Storage and 502.5, Procedure I – Low Temperature Storage.

3.1.7.2.3 (O) Shall operate in temperatures ranging from -30° C to +60° C verified by testing in accordance with MIL-STD-810G, Methods 501.5, Procedure II – Operation and 502.5, Procedure II – Operation.

3.1.7.2.4 (O) Shall withstand storage temperatures from -55° C to +71° C verified by testing in accordance with MIL-STD-810G, Methods 501.5, Procedure I – High Temperature Storage and 502.5, Procedure I – Low Temperature Storage.

3.1.7.3 (T) Rain

3.1.7.3.1 (T) Shall be capable of operating in 10.2 cm (4 inches) of rain per hour and 64 kph (40 mph) wind for 40 minutes verified by testing in accordance with MIL-STD-810G, Method 506.5, Procedure I – Rain and Blowing Rain.

3.1.7.4 (T) Humidity

3.1.7.4.1 (T) Shall operate and be impervious to humidity with relative humidity from 5% to 95% non-condensing and conditions of mist and fog as verified by testing in accordance with MIL-STD-810G, Method 507.5, Procedure II - Aggravated.

3.1.7.4.2 (T) Shall survive storage in hot, humid conditions as verified by testing in accordance with MIL-STD-810G, Method 507.5, Procedure II - Aggravated.

3.1.7.5 (T) Fungus

3.1.7.5.1 (T) Shall withstand, in both operating and non-operating conditions, exposure to fungus growth as encountered in tropical climates and not support fungal growth verified by testing in accordance with MIL-STD-810G, Method 508.6 using Table 508.6-I.

3.1.7.6 (T) Salt-Fog

3.1.7.6.1 (T) Shall be resistant to the corrosive effects of salt-sea atmosphere verified by testing in accordance with MIL-STD-810G, Method 509.5.

3.1.7.7 (T) Sand and Dust

3.1.7.7.1 (T) Shall withstand exposure to fine dust particles, in wind speeds of 1,750 feet per minute, and sand particles, in wind speeds of 5,700 feet per minute, verified by testing in accordance with MIL-STD-810G, Method 510.5, Procedure I, Blowing Dust and Procedure II, Blowing Sand.

3.1.7.8 (T) Vibration

3.1.7.8.1 (T) Shall be operational during and after undergoing vibration induced by vehicular transport (both tracked and wheeled) over all types of roads and cross country terrain and vibration associated with transportation verified by testing in accordance with MIL-STD-810G, Method 514.6, Procedure II, Loose Cargo Transportation.

3.1.7.9 (T) Shock

3.1.7.9.1 (T) The specified system and individual items within the equipment shall be operational during and after undergoing shock associated with servicing and handling, and during ground, rail, sea and air transport. Vehicular mounted equipment shall not break away when subjected to crash hazard conditions verified by testing in accordance with MIL-STD-810G, Method 516.6, Procedure I – Functional Shock and Procedure V – Crash Hazard Shock Test.

3.1.7.10 (T) Temperature Shock

3.1.7.10.1 (T) Shall be tested in accordance with MIL-STD 810G, Method 503.5, Procedure I, using the low temperate of -30° C ,and successfully pass such test.

3.1.7.11 (T) Immersion

3.1.7.11.1 (T) Shall be capable of being powered on during and operational after immersion of the RT in at least 2 meters of seawater for 30 minutes verified by testing in accordance with MIL-STD-810G, Method 512.5, Procedure I – Immersion.

3.1.7.11.2 (T) Shall include a watertight battery connection that interfaces with batteries and permits immediate operation of the LR after immersion in at least 2 meters of seawater for 30 minutes.

3.1.7.11.3 (T) Shall include a watertight RF connection that interfaces with an antenna and permits immediate operation of the LR after immersion in at least 2 meters of seawater for 30 minutes.

3.1.7.12 (T) Solar Radiation

3.1.7.12.1 (T) Shall operate in an environment with solar loading and operate after exposure as specified in accordance with MIL-STD-810G, Method 505.5, Procedure I – Cycling, Temperature Cycle A1.

3.1.7.13 (T) Electromagnetic Environmental Effects (E3) Survivability

3.1.7.13.1 (T) Shall withstand the effects of High Altitude Electromagnetic Pulse (HEMP) in accordance with MIL-STD-2169B.

3.1.7.13.2 (T) Shall be able to perform mission essential communication functions following exposure to Near Strike Lightening (NSL) events in accordance with MIL-STD-464C.

3.1.7.13.3 (T) Shall comply with Electro Static Discharge (ESD) requirements of MIL-STD-464C.

3.1.8 (T) Other Requirements and Capabilities

3.1.8.1 (T) Presets

3.1.8.1.1 (T) Shall have the storage capacity to store 50 presets for each channel.

3.1.8.2 (O) Over The Air Preset Updates
Shall support the reception of new presets over the air in accordance with Waveform Conformance and Interoperability Assessment for the Soldier Radio Waveform using a Government approved method such as the JTNC IR OTAM Application Note 1.1 dated 19 August 2015, or newer.

3.1.8.3 (T) Talk Group: Under SRW operation, shall be capable of actively participating in one voice call group in half duplex mode while monitoring two other voice call groups.

3.1.8.4 (T) Audible Status: The radio shall provide audible status, alerts and cues.

3.1.8.5 (O) Route and Retransmission
Shall provide 1 or more additional route and retransmission objective capabilities as defined by "O" in Table 3: Route and Retransmission Capabilities:

Table 3: Route and Retransmission Capabilities

Channel 1 \ Channel 2	SINCGARS Voice	SINCGARS Data	SRW Voice	SRW IP Data	UHF SATCOM "DAMA" Voice	UHF SATCOM IW Voice	HAVEQUICK II	VHF/UHF LOS (ATC) Voice	VHF FM Military Tactical Voice	UHF AM/FM PSK Military voice	MUOS Voice	MUOS Data	WNW IP
SINCGARS Voice	O		O								O		
SINCGARS Data		O		O								O	
SRW Voice	O		O								O		
SRW IP Data		O		O								O	O
UHF SATCOM "DAMA" Voice													
UHF SATCOM IW Voice													
HAVEQUICK II							O	O	O	O			
VHF/UHF LOS (ATC) Voice							O	O	O	O			
VHF FM Military Tactical Voice							O	O	O	O			
UHF AM/FM PSK Military voice							O	O	O	O			
MUOS Voice	O		O										
MUOS Data		O		O									O
WNW IP				O								O	O

3.1.8.5.1 (O) Shall provide route and retransmission capability between SINCGARS Voice and SINCGARS Voice.

3.1.8.5.2 (O) Shall provide route and retransmission capability between SINCGARS Data and SINCGARS Data.

3.1.8.5.3 (O) Shall provide route and retransmission capability between SINCGARS Voice and SRW Voice.

3.1.8.5.4 (O) Shall provide route and retransmission capability between SRW Voice and SRW Voice.

3.1.8.5.5 (O) Shall provide route and retransmission capability between SRW IP Data and SINCGARS Data.

3.1.8.5.6 (O) Shall provide route and retransmission capability between SRW IP Data and SRW IP Data.

3.1.8.5.7 (O) Shall provide route and retransmission capability between Havequick II and Havequick II.

3.1.8.5.8 (O) Shall provide route and retransmission capability between VHF/UHF LOS (ATC) Voice and Havequick II.

3.1.8.5.9 (O) Shall provide route and retransmission capability between VHF/UHF LOS (ATC) Voice and VHF/UHF LOS (ATC) Voice.

3.1.8.5.10 (O) Shall provide route and retransmission capability between VHF FM Military tactical Voice and VHF FM Military tactical Voice.

3.1.8.5.11 (O) Shall provide route and retransmission capability between VHF FM Military tactical Voice and Havequick II.

3.1.8.5.12 (O) Shall provide route and retransmission capability between VHF FM Military tactical Voice and VHF/UHF LOS (ATC) Voice.

3.1.8.5.13 (O) Shall provide route and retransmission capability between UHF AM/FM PSK Military Voice and VHF/UHF LOS (ATC) Voice.

3.1.8.5.14 (O) Shall provide route and retransmission capability between UHF AM/FM PSK Military Voice and VHF FM Military tactical Voice.

3.1.8.5.15 (O) Shall provide route and retransmission capability between UHF AM/FM PSK Military Voice and Havequick II.

3.1.8.5.16 (O) Shall provide route and retransmission capability between UHF AM/FM PSK Military Voice and UHF AM/FM PSK Military Voice.

3.1.8.5.17 (O) Shall provide route and retransmission capability between MUOS Voice and SINCGARS Voice.

3.1.8.5.18 (O) Shall provide route and retransmission capability between MUOS Voice and SRW Voice.

3.1.8.5.19 (O) Shall provide route and retransmission capability between MUOS Data and SINCGARS Data.

3.1.8.5.20 (O) Shall provide route and retransmission capability between MUOS Data and SRW IP Data.

3.1.8.5.21 (O) Shall provide route and retransmission capability between SRW IP Data and WNW IP.

3.1.8.5.22 (O) Shall provide route and retransmission capability between MUOS Data and WNW IP.

3.1.8.5.23 (O) Shall provide route and retransmission capability between WNW IP and WNW IP.

3.1.8.6 (O) Shall utilize Tactical Public Key Infrastructure (PKI) certificates issued from Army to validate communications from the network manager and prevent unauthorized remote procedure calls.

3.1.8.7 (T) The Leaders Radio shall be interoperable with Army network management tools and shall support the network manager capabilities to plan, implement, manage, control, identify, and configure user access and profile parameters of the network to include, but not limited to; voice call group participation and physical network presets.

3.1.8.8 (O) Shall receive a Certificate Revocation List (CRL) from the network manager and store and validate certificates that accompany local and over-the-air commands against the CRL. Commands determined to possess no certificate or a revoked certificate shall not be processed.

3.1.8.9 (T) The LR shall implement Cyber and EW defense.

3.1.8.9.1 (T) The LR shall implement TRANSEC to mitigate RF playback attacks.

3.1.8.9.2 (O) The LR shall log invalid emissions as potential EW events and alert the user within 10 seconds.

3.1.8.9.3 (O) The LR shall transmit a report to higher via the Electronic Warfare Program Management (EWPMT) any invalid or interfering emissions as potential EW events.

3.1.8.9.4 (O) The LR shall log invalid attempts to execute commands as potential Cyber events and alert the user within 10 seconds.

3.1.8.9.5 (O) The LR shall transmit a report to higher via the Electronic Warfare Program Management (EWPMT) any invalid attempts to execute commands as potential Cyber events.

3.1.8.10 (O) The LR shall be capable of radio set cloning between other LRs.

3.2 (T) Leader Radio Set (LR) Capability

The LR shall demonstrate:

- Operational Availability (Ao) of 96% (Threshold) and 99% (Objective) per channel.
- Material Availability (Am) of 75% (Threshold), 96% (Objective) for the population of 100,000 radios.
- Mean Time Between Essential Function Failure (MTBEFF) no less than 477 (Threshold) and 683 (Objective) hours per channel.
- Each channel has an 86% (Threshold) and 90% (Objective) probability of operating over a 72-hour period without an essential function failure.
- Ability to adjust data rates, revert to voice-only, change waveform modes, and alternate between channels and transmission bands to continue operations, in a degraded mode, during Cyber and EW threat conditions.

The Mission-Ready Leader Radio Set (LR) capability includes the following:

3.2.1 (T) LR-RT IAW Para 3.1

3.2.2 (T) LR GPS Antenna

Shall provide LR GPS Antenna(s) to receive GPS signals and meet performance requirements for the LR-RT IAW Para 3.1.5.

3.2.3 (T) LR Multi-band Antenna(s)

3.2.3.1 (T) Shall provide a LR Multi-band Antenna(s) to receive signals for waveforms in UHF and L-Band frequencies and meet performance requirements for the LR-RT IAW Para 3.1.1.1.

3.2.3.2 (T) Shall be capable of operation with R/F extension cables IAW the Nett Warrior Interconnect Architecture White Paper, dated 30 January 2017 permitting antenna to be located on the soldier's equipment to prevent body masking while the radio remains in the holster.

3.2.4 (T) LR VHF Antenna(s)

Shall provide LR VHF Antenna(s) to receive signals for waveforms in VHF frequencies and meet performance requirements for the LR-RT IAW Para 3.1.1.1.

3.2.4.1 (T) Shall be capable of operation with R/F extension cable NSN 5996-01-628-3011 permitting antenna to be located on the soldier's equipment to prevent body masking while the radio remains in the holster.

3.2.5 (T) LR Rechargeable Battery

Shall meet performance requirements for the LR-RT IAW Para 3.1.

3.2.5.1 (T) Shall provide one rechargeable battery approved by Department of Transportation/Air Transportation Association (DOT/ATA).

3.2.5.2 (T) Shall preclude damage caused by battery reverse polarity.

3.2.5.3 (T) Shall be able to be exchanged wearing full Mission Oriented Protective Posture (MOPP) IV protective gear.

3.2.5.4 (T) Shall comply with hazardous material (HAZMAT), demilitarization, and disposal.

3.2.5.5 (T) Shall be compatible with Army's Modular Universal Battery Charger, NSN 6130-01-642-6468, and provide the required charging adapter.

3.2.5.5.1 (O) Shall be compatible with Army's Modular Universal Battery Charger, NSN 6130-01-642-6468, without an adapter in lieu of 3.2.5.5.

3.2.5.6 (O) Shall be compatible with Army's Expeditionary Modular Universal Battery Charger.

3.2.5.7 (T) Any vendor-unique battery offered shall be in compliance with MIL-PRF-32383 and MIL-STD-882E and obtain Army safety release before Operational Test.

3.2.6 (T) LR Loudspeaker – Microphone, External

Shall meet performance requirements for the LR-RT IAW Para 3.1.

3.2.6.1 (T) Shall consist of a half-duplex, dual function device (acting as both a speaker and a microphone) that provides remote audio input/output from a radio.

3.2.6.2 (T) Shall provide a PTT switch to activate the microphone and engage the LR-RT.

3.2.6.3 (T) Shall be able to be operated with a single hand.

3.2.6.4 (T) Shall provide volume control for the speaker.

3.2.6.5 (T) Shall attach to web gear or armored vest.

3.2.6.6 (T) Shall provide interface to U- 329/U, that can be used by an audio cable.

3.2.6.7 (T) Shall provide a non-proprietary 2.5mm or 3.5mm audio connector jack to enable use of an earphone in lieu of the speaker.

3.2.7 (T) LR Talk Group Selector Capability

Shall meet performance requirements for the LR-RT IAW Para 3.1.8.3.

3.2.7.1 (T) Shall enable simultaneous participation in multiple talk groups.

3.2.7.2 (T) Shall be compatible with Headset and External Speaker/Microphone.

3.2.8 (T) LR Earphone

Shall meet performance requirements for the LR-RT IAW Para 3.2.6.7.

3.2.8.1 (T) Shall provide audio output to permit the operator to monitor received communications transmissions.

3.2.8.2 (T) Shall be electrically and mechanically compatible with the External Speaker/Microphone.

3.2.8.3 (T) Shall be capable of listening on all channels simultaneously.

3.2.9 (T) LR Case, Electronic (Radio Pouch, Camouflage)

Shall meet performance requirements for the LR-RT IAW Para 3.1.

3.2.9.1 (T) Shall hold the radio including attached antennas, battery, earphone, NW Data Adapter and NW Power Adapter.

3.2.9.2 (T) Shall provide access and permit operation of radio controls with the radio placed in the holster.

3.2.9.3 (T) Shall permit user access to all radio external interfaces while radio is in the holster.

3.2.9.4 (T) Shall be mountable to standard issue body armor systems. Shall utilize straps or clips compatible with Army standard Modular Lightweight Load Carrying Equipment (MOLLE) attachment points in accordance with TM 10-8465-236-10.

3.2.9.5 (T) Shall incorporate the Army Operational Camouflage Pattern or primarily be Tan 499 in accordance with Army uniform regulations AR 670-1.

3.2.10 (T) LR GPS Cable

Shall meet performance requirements for the LR-RT IAW Para 3.1.

3.2.10.1 (T) Shall provide connection from the LR-RT to a Defense Advanced GPS Receiver to receive Precise Position Service (PPS) data (i.e. DAGR or DAPS) on the LR-RT if the PPS device is not physically attached to or inside of the LR-RT body. Shall not require removal of the NW data cable.

3.2.11 (T) LR Mission Module Capability

Shall not degrade performance requirements for the LR-RT IAW Para 3.1. The below capabilities may be met with hardware and/or software.

3.2.11.1 (T) Shall allow connection of a Full Motion Video (FMV) terminal that consumes power only.

3.2.11.2 (O) Shall allow connection of a Full Motion Video (FMV) terminal that integrates power and data into a single connection.

3.2.11.3 (T) Shall allow connection of devices supporting conversion of data for transmission over SINCGARS waveform e.g. supporting Field Artillery PFED with capability equal, similar, or better than TACLINK. If the TACLINK modem is operated internally, no external device is required. This requirement can be met with a serial data interface.

3.2.11.4 (O) Shall provide capability for Electronic Warfare sensor module enabling RF detection and position identification.

3.2.11.5 (T) Shall provide capability for Electronic Warfare sensor and transmit module or internal function enabling RF detection, position identification and ancillary emission.

3.2.11.6 (O) Shall allow connection of additional ancillary devices.

3.2.11.7 (O) Shall allow for integration of capability to switch seamlessly and autonomously among supported networks and communications paths as those resources become available.

3.3 (T) Mounted Leader Radio Set (M-LR) Capability

The M-LR shall demonstrate:

- Operational Availability (Ao) of 94% (Threshold) and 97% (Objective) per channel.
- Mean Time Between Essential Function Failure (MTBEFF) of no less than 386 (Threshold) and 517 (Objective) hours per channel.
- Each channel has an 83% (Threshold) and 87% (Objective) probability of operating over a 72-hour period without an essential function failure.
- Configuration power consumption draw of no more than 15 Amps.

The mission-ready Mounted Leader Radio Set (M-LR) capability includes the following:

3.3.1 (T) Leader Radio Set (LR) IAW para 3.2.

Shall include all components of the Leader Radio Set (LR) IAW paragraph 3.2 except:

3.3.1.1 LR Case, Electronic (Radio Pouch, Camouflage) IAW paragraph 3.2.9, and

3.3.1.2 LR GPS Cable IAW paragraph 3.2.10.

3.3.2 (T) M-LR Case, Electronic

This radio accessory pouch must accommodate the LR GPS Antenna (IAW 3.2.2), LR Multi-band Antenna (IAW 3.2.3), LR VHF Antenna (IAW 3.2.4), and LR Earphone (IAW 3.2.8) for storage while the LR is in the mounted configuration.

3.3.3 (T) M-LR Installation Kit

Variants shall include the vehicle mount, vehicle adapter, amplifier(s), antennas, installation kit ancillaries, power management, and VICTORY integration items. The Leader Radio vehicle installation kit shall be VICTORY compliant and meet performance requirements for the LR-RT IAW Para 3.1.1.3.

3.3.3.1 (T) Vendor shall provide equipment that shall fit in the Mounting Tray (MT-6352) hardware footprint and space envelope of the VRC-91 radio that is 9.1”H x 15.9”W x 16.1”D.

3.3.3.2 (T) Vehicle Mount

3.3.3.2.1 (T) Vendor shall provide equipment that shall fit in the Mounting Tray (MT-6352) hardware footprint of the VRC-91 radio set. The space envelope of the VRC-91 radio is 9.1”H x 15.9”W x 16.1”D.

3.3.3.2.2 (T) The vehicle mount shall hold the vehicle adapter with installed LR-RT securely.

3.3.3.2.3 (T) The vehicle mount shall provide grounding of the vehicle adapter to the vehicle.

3.3.3.3 (T) Vehicle Adapter

3.3.3.3.1 (T) Shall hold at least a single LR-RT with a rechargeable battery.

3.3.3.3.2 (T) Shall be capable of locking the LR-RT in place.

3.3.3.3.3 (T) Shall permit user access to and permit operation of all radio functions while the LR-RT is installed in the mount unless a separate M-LR HMI is provided. A separate vehicle HMI is preferable for this requirement.

3.3.3.3.4 (T) Shall allow the LR-RT to be installed/uninstalled without any special tools and/or equipment.

3.3.3.4 (T) Amplifier(s)

3.3.3.4.1 (T) Shall be capable of meeting mounted range requirements for waveforms in the VHF band IAW Para 3.1.1.3.

3.3.3.4.2 (T) Shall be capable of meeting mounted range requirements for waveforms in the UHF/L-Band IAW Para 3.1.1.3.

3.3.3.5 (T) Antennas

Shall provide a M-LR VHF Antenna and a Multi-Band UHF/L-Band Antenna Capability.

3.3.3.5.1 (T) Shall provide a M-LR VHF Antenna. Shall have a power rating equal to or exceeding the maximum output power for the mounted radio's amplifier IAW Para 3.1.1.3.10.

3.3.3.5.2 (T) Shall provide a Multi-Band UHF/L-Band Antenna. Shall have a power rating equal to or exceeding the maximum output power for the mounted radio's amplifier IAW Para 3.1.1.3.6.

3.3.3.5.3 (O) In lieu of having separate antennas for VHF and UHF/L-Band, shall provide a Vehicle Tri-Band Antenna to support VHF/UHF/L-Band operation. Shall have a power rating equal to or exceeding the maximum output power for the mounted radio's amplifiers IAW Para 3.1.1.3.6 and 3.1.1.3.10.

3.3.3.6 (T) M-LR Installation Kit Ancillaries and Capabilities

Shall provide required ancillary items (e.g., filters, connectors, precision GPS, etc.) as necessary to complete vehicle integration IAW with the As Built Configuration List (ABCL) for each variant of the M-LR Installation Kit.

3.3.3.7 (T) Power Management

3.3.3.7.1 (T) Shall operate continuously when powered from vehicle power of 20-32 VDC.

3.3.3.7.2 (T) Shall provide prime power to the LR-RT and its rechargeable battery and run off the vehicular power.

3.3.3.7.3 (T) Shall charge the battery of the LR-RT.

3.3.3.7.4 (O) Shall permit use of the radio's battery while vehicle power is off, for low power operation without use of vehicle power amplifier while vehicle electricity is offline, or while the platform is restarting. Ability to operate while the vehicle is powered off is a soldier selectable capability so that the radio does not require reboot or waveform re-instantiation.

3.3.3.7.5 (T) Shall provide protection from power surges and spikes per MIL-STD-1275D.

3.3.3.8 (T) VICTORY

3.3.3.8.1 (T) Shall be compliant with VICTORY standard specifications Version 1.6.2 or later.

3.3.3.8.1.1 (T) The Mounted Leader Radio, shall provide an interface to an Ethernet-based In-Vehicle-Network (IVN) as specified in section 9.6.1.1 of the VICTORY 1.6.2 specification.

3.3.3.8.1.2 (T) The Mounted Leader Radio, shall provide a Precision Time Protocol (PTP) client to receive time information via PTPv2 as specified in section 8.1.1.1.2 of the VICTORY 1.6.2 specification.

3.3.3.8.1.3 (O) The Mounted Leader Radio, shall subscribe to and receive multicast position information from the data interface of a position service as specified in section 8.1.2.1 of the VICTORY 1.6.2 specification.

3.3.3.8.1.4 (O) The Mounted Leader Radio, shall support the VICTORY IVN Data Radio Management interface in accordance with section 9.6.1.4 of the VICTORY 1.6.2 specification.

3.3.4 (O) M-LR Install Kit Equipment Reuse

In lieu of providing a complete M-LR Installation Kit, the vendor shall minimize integration complexity by reuse of MT-6352 mount, AM-7239 VAA or Universal Mounting Tray, legacy AM-7238 VHF amplifiers and Government provided antenna(s). The vendor's solution shall not require additional hardware that is redundant to the capability extant in the vehicle or the handheld radio. Redundant hardware includes but is not limited to replacement VHF amplifiers, display, and controls. The integrated capability shall meet performance requirements for the LR-RT.

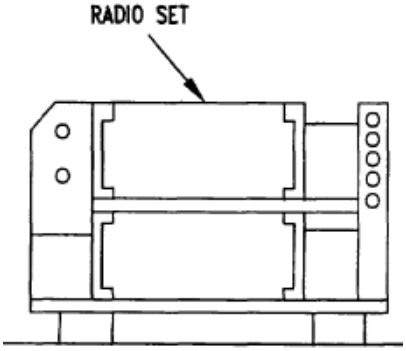
3.3.4.1 (T) Shall allow the Leader Radio LR-RT to be secured with a lock.

3.3.4.2 (O) Vendor shall reuse the Mounting Tray (MT-6352) hardware of the VRC-91 radio set.

3.3.4.3 (O) Vendor shall reuse SINCGARS VAA (Vehicular Amplifier - Adapter: AM-7239E/VRC).

3.3.4.4 (O) Vendor shall reuse SINCGARS AM-7238/VRC Amplifier.

3.3.4.5 (O) Shall fit the LR-RT into only an upper or lower tray of the space envelope of the SINCGARS vehicle mount. See figure below:



3.3.5 (T) M-LR Environmental Testing

3.3.5.1 (T) The M-LR shall meet Environmental Testing standards of the LR system IAW 3.1.7 unless specified otherwise for the mounted production configuration system.

3.3.5.2 (T) Vehicular Vibration

3.3.5.2.1 (T) Shall be operational during and after undergoing vibration induced by vehicular transport (both tracked and wheeled) over all types of roads and cross country terrain and vibration associated with transportation verified by testing in accordance with MIL-STD-810G, Method 514.6, Procedure I, General vibration category 20.

3.3.5.3 (T) Vehicular Immersion

3.3.5.3.1 (T) Shall be capable of being powered on and operational during and after immersion in at least 1 meter of seawater for 30 minutes verified by testing in accordance with MIL-STD-810G, Method 512.5, Procedure I – Immersion.

3.3.5.3.2 (T) Shall be capable of immediate radio operation after immersion in at least 1 meter of seawater for 30 minutes.

3.3.5.3.3 (T) Shall include a watertight RF connections that interfaces with an antenna that permits immediate operation after immersion in at least 1 meter of seawater for 30 minutes.

3.4 (O) Leader Radio Set Enhanced (LR- Enhanced)

3.4.1 (T) Leader Radio Set - Enhanced (LR-Enhanced)

The Mission-Ready Leader Radio Set – Enhanced (LR-Enhanced) capability includes the following:

3.4.1.1 (T) The LR-Enhanced use the same receiver - transmitter (RT) IAW para 3.1 and meet the performance requirements IAW 3.2 Leader Radio Set Capability when configured as the Mission-Ready Leader Radio IAW para 1.3.4, 1.3.5, and 3.2.

3.4.1.2 (T) The LR-Enhanced configuration shall meet all certified requirements under 3.5 when configured with the LR-Enhanced Upgrade Kit IAW para 1.3.4 and 3.4.1.3.

3.4.1.3 (T) The LR-Enhanced Upgrade Kit (antenna, battery, earphone, case, etc) shall include all ancillary items necessary to meet 3.4.1.2 when combined with the LR-RT IAW para 3.1. The upgrade Kit does not include LR-RT IAW para 3.1 or LR Mission Modules IAW para 3.5.27.

3.4.1.4 (T) LR-Enhanced configuration may exceed the size, weight, and power requirements of para 3.1.1.4, when operating in the LR-Enhanced configuration.

3.4.1.5 (O) LR-Enhanced configuration shall meet the size, weight, and power requirements of para 3.1.1.4, when operating in a variant configuration.

3.4.2 (T) Mounted Leader Radio Set – Enhanced (M-LR-Enhanced)

The Mission-Ready Mounted Leader Radio Set – Enhanced (M-LR-Enhanced) capability includes the following:

3.4.2.1 (T) The M-LR-Enhanced use the same receiver - transmitter (RT) IAW para 3.1 and meet the performance requirements IAW 3.3 Mounted Leader Radio Set Capability when configured as the Mission-Ready Mounted Leader Radio IAW para 1.3.4 and 3.3.

3.4.2.2 (T) The M-LR-Enhanced configuration shall meet all certified requirements under 3.5 when configured with the M-LR-Enhanced Upgrade Kit IAW para 1.3.4 and 3.4.2.3.

3.4.2.3 (T) The M-LR-Enhanced Upgrade Kit (antenna, battery, earphone, case, etc) shall include all ancillary items necessary to meet 3.4.2.2 when combined with the LR-RT IAW para 3.1. The upgrade Kit does not include LR-RT IAW para 3.1 or LR Mission Modules IAW para 3.5.27.

3.5 (O) Objective Capabilities: Waveform and Services

3.5.1 (O) Air Traffic Control Waveform

Shall include Air Traffic Control (ATC), V/U LOS waveform. A version is available in the JTNC Information Repository.

3.5.2 (O) SATURN Waveform

Shall include SATURN waveform. A version is available in the JTNC Information Repository.

3.5.3 (O) VHF AM/FM PSK Waveform

Shall include Very High Frequency (VHF) Amplitude Modulation (AM)/Frequency Modulation (FM) while completing the associated Waveform Conformance and Interoperability Assessment. (Compliance with MIL-STD-188-242). A version is available in the JTNC Information Repository.

3.5.4 (O) UHF AM/FM PSK Waveform

Shall include Ultra High Frequency (UHF) Amplitude Modulation (AM)/Frequency Modulation (FM)/Phase-Shift Keying (PSK) while completing the associated Waveform Conformance and Interoperability Assessment. (Compliance with MIL-STD-188-243). A version is available in the JTNC Information Repository.

3.5.5 (O) P25 Lowband Waveform

Shall include Project 25 (P25) Conventional Lowband.

3.5.6 (O) P25 Highband Waveform

Shall include Project 25 (P25) Conventional Highband.

3.5.7 (O) UHF SATCOM Waveform

Shall include UHF SATCOM version (MIL-STD-188-181B, 182A, 183A).

3.5.8 (O) Integrated Waveform

Shall include Integrated Waveform (IW) UHF SATCOM version (MIL-STD-188-181C, 182B, 183B).

3.5.9 (O) Data Control Waveform (MIL-STD-188-184A) waveform

Shall provide capability for Data Control waveform.

3.5.10 (O) MUOS Waveform

Shall include Mobile User Objective System (MUOS) waveform version 3.1.5 or newer.

3.5.11 (O) WNW

Shall include Wideband Networking Waveform (WNW) version 4.2.2 or newer.

3.5.12 (O) Land Mobile Radio (APCO-25 Phase2) waveform

Shall provide capability for Land Mobile radio.

3.5.13 (O) LINK 16/TADIL-J waveform

Shall provide capability for LINK 16/TADIL-J.

3.5.14 (O) 4G/LTE waveform

Shall provide capability 4G/LTE waveform.

3.5.15 (O) Cellular Radio & PCS waveform

Shall provide capability for Cellular Radio & PCS waveform.

3.5.16 (O) Advanced Special Communications Mode (ASCM) waveform

Shall provide capability for ASCM waveforms.

3.5.17 (O) VHF/UHF FM LMR waveform

Shall provide capability for VHF/UHF FM LMR waveform.

3.5.18 (O) Enhanced Collection of Broadcasts from Remote Assets (eCOBRA) waveform

Shall provide capability for eCOBRA waveform.

3.5.19 (O) TSM-X (High Throughput MANET Waveform)

Shall provide capability TSM-X waveforms.

3.5.20 (O) ISR Receiver waveform

Shall provide capability for ISR Receiver waveform.

3.5.21 (O) Netted Iridium waveform

Shall provide capability for Netted Iridium waveform.

3.5.22 (O) BOWMAN VHF waveform

Shall provide capability for Bowman UHF waveform.

3.5.23 (O) VHF ATC Data Link Next Generation Air/Ground Communications (NEXCOM) waveform

Shall provide capability for VHF ATC Data Link Next Generation Air/Ground Communication waveform.

3.5.24 (O) Commercial Broadcasts Downlinked Via XM (No Modulation) Radio Channels waveform

Shall provide capability for Commercial Broadcasts Downlined via XM.

3.5.25 (O) Other Waveforms

Shall include other waveforms while completing the associated Waveform Conformance and Interoperability Assessment.

3.5.26 (O) Route and Retransmission

Shall provide route and retransmission for objective waveforms not specified in paragraph 3.1.8.5.

3.5.27 (O) LR Mission Module

3.5.27.1 (O) LR Mission Module Variant 1 – ISR (MMV1 – ISR)

Shall provide Mission Module to expand the capability of the LR to enable receiving ISR broadcast Full Motion Video. Shall not degrade performance requirements for the LR-RT IAW Para 3.1, LR-RT. Shall provide Mission Module(s) that expand the functional capabilities of the LR IAW para 3.2.11, LR Mission Module Capability.

3.5.27.2 (O) LR Mission Module Variant 2 – EW Detect (MMV2 – EW Detect)

Shall provide Mission Module to expand the capability of the LR to enable operation as an electronic warfare sensor to detect other emitters/interference in its local environment. Sensor will be able to identify emissions geolocation, signal strength, and threat to operational communications and alert the user. The capability shall allow the user to analyze the local RF environment and select the best available channel. Collaboration between multiple LRs to achieve the goals is permissible. Shall not degrade performance requirements for the LR-RT IAW Para 3.1, LR-RT. Shall provide Mission Module(s) that expand the functional capabilities of the LR IAW para 3.2.11, LR Mission Module Capability.

3.5.27.3 (O) LR Mission Module Variant 3 – EW Emitter (MMV3 – EW Emitter)

Shall provide Mission Module to expand the capability of the LR to enable operation as an electronic warfare emitter. Module shall be able to be operated by qualified personnel in a coordinated, non-kinetic effects support operation. Collaboration between multiple LRs to achieve the goal is permissible. Shall not degrade performance requirements for the LR-RT IAW Para 3.1, LR-RT. Shall provide Mission Module(s) that expand the functional capabilities of the LR IAW para 3.2.11, LR Mission Module Capability.

3.5.27.4 (O) LR Mission Module Variant 4 – MMV4 – Geolocation (MMV4 - Geolocation)

Shall provide Mission Module to expand the capability of the LR to enable geolocation of friendly force transmissions through trilateration or other means in the absence of GPS signals. Shall not degrade performance requirements for the LR-RT IAW Para 3.1, LR-RT. Shall provide Mission Module(s) that expand the functional capabilities of the LR IAW para 3.2.11, LR Mission Module Capability.

3.5.27.5 (O) LR Mission Module Variant 5 – MMV5 – Resources Reuse (MMV5 – Resource Resue)

Shall provide Mission Module to expand the capability of the LR to switch seamlessly and autonomously among supported networks and communications paths as those resources become available. Shall not degrade performance requirements for the LR-RT IAW Para 3.1, LR-RT. Shall provide Mission Module(s) that expand the functional capabilities of the LR IAW para 3.2.11, LR Mission Module Capability.

3.5.27.6 (O) LR Mission Module Variant 6 – (MMV6)

Shall provide Mission Module to expand the capability of the LR. Shall not degrade performance requirements for the LR-RT IAW Para 3.1, LR-RT. Shall provide Mission Module(s) that expand the functional capabilities of the LR IAW para 3.2.11, LR Mission Module Capability.

3.5.28 (O) Extended frequency capability: C Band

Shall provide capability for operation in extended frequency ranges in C Band.

3.5.29 (O) Extended frequency capability: S Band

Shall provide capability for operation in extended frequency ranges in S Band.

3.6 Ancillary Items

3.6.1 (T) LR Ready-Based Spares Kit

Shall provide spare parts (e.g., gasket seals, battery cover, battery o-ring, channel knob, knob screw set) that can be easily1 replaced by the operator IAW with the As Built Configuration List (ABCL) for the LR Ready-Based Spares Kit. The kit should be sufficient for approximately twenty LR.

3.6.2 (T) M-LR Ready-Based Spares Kit

Shall provide spare parts (e.g., gasket seals, battery cover, battery o-ring, channel knob, knob screw set) that can be easily replaced by the operator IAW with the As Built Configuration List (ABCL) for the M-LR Ready-Based Spares Kit. The kit should be sufficient for approximately twenty M-LR HMMWV installations. Other ABCL variants will be identified at the order level.

3.6.3 (T) M-LR Replacement items for Installation Kit Ancillaries

Shall include replacement individual cables, connectors, wires and hardware (filters, connectors, precision GPS, etc.) as necessary to complete vehicle integration IAW with the As Built Configuration List (ABCL) for each variant of the M-LR. The kit should be sufficient for approximately twenty M-LR HMMWV installations. Other ABCL variants will be identified at the order level.

3.6.4 (T) Data Mode Control Device Cable(s)

3.6.4.1 (T) Shall provide the capability to transfer digital data between a Mobile Hand Held Common Operating Environment End User Device (MHH COE EUD) and the radio via Ethernet over Universal Serial Bus (USB) 2.0 or higher Type B Micro or provide applicable adapter to support data applications over Universal Serial Bus (USB) 2.0 or higher Type B Micro, and have quick release capability.

3.6.4.2 (T) Shall provide the capability to transfer digital data (COMSEC and presets) between the radio and SKL device.

3.6.4.3 (O) Shall provide the capability to transfer digital data (COMSEC and presets) between the radio and Next Generation Key Loader device.

3.6.4.4 (T) Shall provide the capability totransfer digital data between the LR-RT and an approved Network Manager.

3.6.4.5 (T) Shall provide the capability to interface data/peripherals with each channel independently and without interference to the other channel. e.g. TACLINK connected to SINCGARS while NW connected to SRW.

3.6.5 (T) Nett Warrior (NW) Data Adapter

3.6.5.1 (T) The NW Data Adapter shall provide a data interface between the radio, the NW Power Adapter, and the NW EUD as defined in the Nett Warrior Interconnect Architecture White Paper dated 30 Jan 2017 (NWPAN-WP-01112013 Version: 5).

3.6.5.2 (T) Vendor supplied equipment (radio and adapters) for the NW Ensemble shall not negatively contribute to Electromagnetic Interference (EMI).

3.6.5.3 (T) Vendor supplied equipment (radio and adapters) for the NW Ensemble shall not negatively contribute to Electromagnetic Environmental Effects (E3) Survivability.

3.6.6 (T) Nett Warrior (NW) Power Adapter

Vendor supplied equipment (radio and adapters) shall be validated as suitable by PdM HMS as meeting requirements for the Nett Warrior Interconnect Architecture White Paper dated 30 Jan 2017 (NWPAN-WP-01112013 Version: 5).

3.6.6.1 (T) The NW Power Adapter for the radio shall support mission module capability.

3.6.6.2 Reserved

3.6.6.3 (O) Shall permit the radio to remain operational while replacing the radio set's main battery.

3.6.7 (O) Nett Warrior (NW) Data and Power Adapter

Shall meet specifications for combined data and power while meeting requirements detailed in the Nett Warrior Interconnect Architecture White Paper dated 30 Jan 2017 (NWPAN-WP-01112013 Version: 5).

3.6.8 (O) LR SINCGARS Blade Antenna

Shall provide a SINCGARS folding blade antenna providing improved gain over the 30-88 MHz portion of the VHF band IAW paragraph 3.1.1.1.

3.6.9 (O) LR SATCOM Antenna

Shall provide a SATCOM Antenna with Carrying Case to support enhanced waveform(s) capabilities IAW paragraphs 3.1.2.9 and 3.1.2.10.

3.6.10 (O) LR Lightweight SATCOM Antenna

Shall provide a Lightweight SATCOM Antenna with Carrying Case to support enhanced waveform(s) capabilities IAW paragraphs 3.1.2.9 and 3.1.2.10.

3.6.11 (O) LR Enhanced Loudspeaker – Microphone, External

3.6.11.1 (T) Shall consist of a half-duplex, dual function device (acting as both a speaker and a microphone) that provides remote audio input/output to/from a multi-channel radio.

3.6.11.2 (T) Shall provide a PTT switch to activate the microphone. Soldiers shall be able to choose which channel to engage or choose to engage both channels.

3.6.11.3 (T) Shall be able to be operated with a single hand.

3.6.11.4 (T) Shall provide volume control for the speaker.

3.6.11.5 (T) Shall attach to web gear or armored vest.

3.6.11.6 (T) Shall provide interface to U- 329/ U, that can be used by an audio cable.

3.6.11.7 (T) Shall provide a non-proprietary 2.5mm or 3.5mm audio connector jack to enable use of an earbud in lieu of the speaker.

3.6.11.8 (T) Shall provide external speaker/microphone that is selectable for talk on SINCGARS, SRW Call Group 1, SRW Call Group 2, and enable simultaneous transmission on threshold channels.

3.6.12 (O) LR Headset

3.6.12.1 (T) Shall be compatible with Personnel Armor System, ground troop helmets, Tactical Communications and Protective System headset.

3.6.12.2 (T) Shall be compatible with the Advanced Combat Helmet.

3.6.12.3 (T) Shall activate built-in microphone via Push-To-Talk (PTT) switch.

3.6.12.4 (T) Shall be capable of listening on all channels simultaneously.

3.6.12.5 (T) Shall be capable of transmitting on all channels independently and simultaneously.

3.6.13 (O) LR Remote HMI

Shall provide a LR remote physical HMI that is capable of selecting presets, controlling the radio's volume, and displaying the same information as required in paragraph 3.1.1.6.7.

3.6.14 (O) M-LR GPS Antenna

Replacement M-LR GPS antenna IAW paragraph 3.3.3.6, M-LR Installation Kit Ancillaries and Capabilities.

3.6.15 (O) M-LR Tri-Band Antenna

Replacement Vehicle Tri-Band Antenna to support VHF/UHF/L-Band operation. Shall have a power rating equal to or exceeding the maximum output power for the mounted radio's amplifiers IAW paragraph 3.3.3.5.3 in lieu of separate antennas for VHF/UHF/L-Band.

3.6.16 (O) M-LR SATCOM Antenna

Shall provide a Vehicle SATCOM Antenna to support enhanced waveform(s) capabilities IAW paragraphs 3.1.2.9 and 3.1.2.10.

3.6.17 (O) M-LR HMI

Shall provide a M-LR HMI that will mount securely in the vehicle interior and is capable of selecting presets, controlling the radio's volume, and displaying the same information as required in paragraph 3.1.1.6.7.

3.6.18 (O) VICTORY Integration Items

Shall provide a Defense Information Systems Agency (DISA) compliant user-configurable router and/or switch to enable Ethernet interface in accordance with VICTORY standards.

3.6.19 (O) M-LR Dual Mount

Shall permit mounting and operation of two Leader Radios in the space claim of a SINCGARS VRC-91. Externally mounted amplifiers that are located under the antenna in a riser assembly will not count against space/volume claim.

3.6.20 (O) Single-Bay AC/DC Charger

3.6.20.1 (T) Shall recharge fully depleted/discharged rechargeable battery to full capacity within seven hours.

3.6.20.2 (T) Shall provide a visual display of battery charge status.

3.6.20.3 (T) Shall operate from a source voltage of 90-240 VAC at 50-60 Hz.

3.6.20.4 (T) Shall protect from power surges, spikes, and transients. Allowable transients for system operation in 60 Hz/120 VAC electrical systems are defined in MIL-STD-704F (Figure 8 (for voltage) and Figure 10 (for frequency)).

3.6.20.5 (T) Shall operate from a source voltage of 12-32 VDC.

3.6.20.6 (T) Shall protect from power surges, spikes, and transients. Surge and spike envelopes for system operation in DC electrical systems are defined in Figure 5 and Figure 6 of MIL-STD- 1275D or newer.

3.6.20.7 (T) Shall provide DC power connections compatible with multiple DC sources.

3.6.20.8 (T) Shall charge a single rechargeable battery at a time.

3.6.20.9 (O) Shall have means of controlled discharge of batteries down to 20-30% of capacity to render them safe for shipping IAW transportation requirements.

3.6.21 (O) Multi-bay battery charger

3.6.21.1 (T) Shall recharge at least six fully depleted/discharged rechargeable batteries simultaneously, to full capacity within seven hours.

3.6.21.2 (T) Shall provide a visual display of battery charge status.

3.6.21.3 (T) Shall operate from a source voltage of 90-240 VAC at 50-60 Hz.

3.6.21.4 (T) Shall protect from power surges, spikes, and transients. Allowable transients for system operation in 60 Hz/120 VAC electrical systems are defined in MIL-STD-704F (Figure 8 (for voltage) and Figure 10 (for frequency)).

3.6.21.5 (T) Shall operate from a source voltage of 12-32 VDC.

3.6.21.6 (T) Shall protect from power surges, spikes, and transients. Surge and spike envelopes for system operation in DC electrical systems are defined in Figure 5 and Figure 6 of MIL-STD- 1275D or newer.

3.6.21.7 (T) Shall provide DC power connections compatible with multiple DC sources.

3.6.21.8 (T) Shall not recharge batteries incrementally.

3.6.21.9 (O) Shall have means of controlled discharge of batteries down to 20-30% of capacity to render them safe for shipping IAW transportation requirements.

3.6.22 (O) Shelf life extension module

Shall provide capability for extended storage of the LR-RT without the battery, without key or fill loss, and without reduced drain on the LR-RT hold up battery.

3.6.23 (O) Extended power capability

Shall provide capability for energy sources in lieu of or in addition to basic battery functionality.

3.6.24 (O) LR Multi-band Antenna(s)

Shall provide capability for improved performance in UHF and L-Band.

3.6.25 (O) Modular Universal Battery Charger Adapter

Shall provide capability for Modular Universal Battery Charger Adapter and provide the interface between the Army's Universal Battery Charger and the LR battery, if required, IAW 3.2.5.5

3.7 (O) Additional Leader Radio Set Variant

Variants and Foreign Military Sales (FMS) Leader Radio Set configurations to be defined at the order level.

Acronyms	
Acronym	Definition
AC	Alternating Current
AM	Amplitude Modulation
ANDVT	Advanced Narrowband Digital Voice Terminal
ASMO	Army Spectrum Management Office
ATO	Authorization to Operate
BDD	Baseline Description Document
API	Application Program Interface
C	Celsius
CC	Combat Communication
CCI	Controlled Cryptographic Items
CCR	Call Completion Rate
CDRL	Contract Data Requirements List
CECOM	Communications Electronics Command
Cm	Centimeter
COMSEC	Communications Security
CONUS	Continental United States
COR	Contracting Officer Representative
CPD	Capability Production Document
Cyber	Cybersecurity
DAMA	Demand Assigned Multiple Access
DAPS	Dismounted Assured Precision Navigation and Timing (PNT) System
dB	Decibel
dBc	Decibel (referenced to the carrier)
dBm	Decibel (referenced to milliwatts)
DC	Direct Current
DODISS	Department of Defense Index of Specifications and Standards
DFARS	Defense Federal Acquisition Regulation Supplement
DIACAP	DoD Information Assurance Certification and Accreditation Process
DISA	Defense Information Systems Agency
DRIP	Design Review Information Package
ECP	Engineering Change Proposals
EID	Electrically Initiated Devices
EKMS	Electronic Key Management System

Acronyms	
Acronym	Definition
EMC	Electromagnetic Compatibility
EMI	Electromagnetic Interference
EMRADHAZ	Electromagnetic Radiation Hazards
EOM	Enhanced Operating Mode
ESD	Electro Static Discharge
ESIP	Enhanced SINCGARS Improvement Program
EWPMT	Electronic Warfare Planning and Management Tool
FAR	Federal Acquisition Regulation
FFP	Firm Fixed Price
FM	Frequency Modulation
FOCI	Foreign Ownership, Control, or Influence
FOUO	For Official Use Only
GHz	Gigahertz
GPS	Global Positioning System
HAZMAT	Hazardous Material
HEMP	High Altitude Electromagnetic Pulse
HERO	Hazards of Electromagnetic Radiation to Ordnance
HMI	Human Machine Interface
HMS	Handheld, Manpack, Small Form Fit
HQDA	Headquarters, Department of Army
Hz	Hertz
IATO	Interim Authorization to Operate
IATT	Interim Authorization to Test
IAW	In Accordance With
ICD	Interface Control Document
IDIQ	Indefinite Delivery - Indefinite Quantity
IEEE	Institute of Electrical and Electronics Engineers
INFOSEC	Information Security
IT	Information Technology
IVN	In-Vehicle-Network
IW	Integrated Waveform
JENM	Joint Enterprise Network Manager
JITC	Joint Interoperability Test Command
JPEO	Joint Program Executive Office

Acronyms	
Acronym	Definition
JTN	Joint Tactical Networks
JTRS	Joint Tactical Radio System
JTNC	Joint Tactical Networking Center
Kbps	Kilobits per second
KO	Contracting Officer
MHz	Megahertz
MCR	Message Completion Rate
MDA	Milestone Decision Authority
MIL-DTL	Military Detail
MIL-STD	Military Standard
MOPP	Mission Oriented Protective Posture
MUOS	Mobile User Objective System
mW/cm^2	Milliwatts Per Square Centimeter
NATO	North Atlantic Treaty Organization
NBC	Nuclear, Biological and Chemical
NSA	National Security Agency
NSL	Near Strike Lightening
NTIA	National Telecommunication and Information Administration
NW	Nett Warrior
O	Objective Requirement
OCI	Organizational Conflict of Interests
OCONUS	Outside Continental United States
OE	Operating Environment
OPSEC	Operational Security
OTAC	Over The Air Cloning
OTA	Over-the-Air
OTAM	Over The Air Management
OTAR	Over The Air Re-keying
OTAT	Over The Air Transfer
OTAZ	Over The Air Zeroize
PEO C3T	Program Executive Office Command Control Communications – Tactical
PKI	Public Key Infrastructure
PLI	Position Location Information
PM HMS	Program Manager Handheld, Manpack and Small Form Factor

Acronyms	
Acronym	Definition
PM JTN	Project Manager Joint Tactical Networks
POC	Point of Contact
PPS	Precise Position Service
PRD	Performance Requirements Document
PTT	Push-To-Talk
PWS	Performance Work Statement
RT	Receiver-Transmitter
RR	Rifleman Radio
RF	Radio Frequency
SAB	SECRET And Below
SCA	Software Communications Architecture
SCP	Secure Copy
SCG	Security Classification Guides
SCIF	Sensitive Compartmented Information Facility
SKL	Simple Key Loader
SINCGARS	Single Channel Ground and Airborne Radio System
SM	System Management
SRW	Soldier Radio Waveform
SSH	Secure Shell
SSP	System Security Plan
SSL	Secured Sockets Layer
T	Threshold Requirement
UHF	Ultra High Frequency
USB	Universal Serial Bus
USM	User Security Manual (USM)
V/m	Volts per meter
VAA	Vehicle Adapter and Amplifier
VAC	Volts AC
VDC	Volts DC
VMF	Variable Message Format
W	Watt(s)
W/kg	Watts per kilogram

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Leader Radio References	
AR 670-1	Army Uniform Policy and Operational Camouflage Pattern, 11 May 2012
DISR 14-3.0	Tactical Radio API(s), Version: (as specified in DISR 14-3.0 or later)
DoD 6055.09-STD	DoD Ammunition and Explosives Safety Standards
DoDI 4650.01	Policy and Procedure for Management and use of the Electromagnetic Spectrum
DoDI 6055.11	Protecting Personnel from Electromagnetic Fields
ICD-GPS-154	GPS Interface Specification
JENM Target ICD	Joint Enterprise Networking Manager (JENM) Target Interface Control Document
JTRS ORD	Joint Tactical Radio System Operational Requirements Document, V3.2, 9 April 2003. Amended by JTRS ORD v3.2.1 approved by Joint Requirements Oversight Committee Memorandum (JROCM), 171-06, 28 August 2006
MIL-DTL-55116C	Military Detail Specification. Connectors: Miniature Audio, Five Pin, and Six Pin General Specification, 22 March 2004
MIL-STD-1275D	Characteristics of 28 Volt DC Electrical Systems in Military Vehicles
MIL-STD-188/204 Change 1	Soldier Radio Waveform Soldier System Combat Communications Mode
MIL-STD-188-114A	Electrical Characteristics of Digital Interface Circuits
MIL-STD-188-241-1	SINCGARS Waveform Specification, February 10, 1989
MIL-STD-2045-47001C	Connectionless Data Transfer Application Layer Standard
MIL-STD-461F	Requirements For The Control of Electromagnetic Interference Characteristics of Subsystem and Equipment, dated 10 December 2007
MIL-STD-464C	Electromagnetic Environmental Effects Requirements for Systems, dated 1 December 2010
MIL-STD-6017C	Variable Message Format (VMF)
MIL-STD-810G	Environmental Engineering Considerations and Laboratory Tests, dated 31 October 2008
N/A	Joint Services Guide for the Development Spectrum Supportability Risk Assessment
NTIA Redbook	National Telecommunication and Information Administration (NTIA) Manual of Regulations and Procedures for Federal Radio Frequency Management
NW Interface	Nett Warrior Interconnect Architecture White Paper dated 30 Jan 2017 (NWPAN-WP-01112013 Version: 5)
OTAM 1.1	JTNC OTAM Application Note v1.1

Leader Radio References	
PRS RR	Performance Requirements Specification Rifleman Radio, v1.0, 5 April 2011
RR Inc 2 CPD	Rifleman Radio Increment 2 Capability Production Document, Revision TBD, DATE TBD.
SCA 2.2.2:2006 (DISR 14-3.0)	Software Communications Architecture Specification, Version 2.2.2, 15 May 2006
SCA 4.1:2015 (DISR 15-2.0)	Software Communications Architecture Specification, Version 4.1, 20 August 2015
SRW WDS	Soldier Radio Waveform (SRW) 1.2.2.1 Waveform Design Specification (WDS)
TM 10-8465-236-10	TECHNICAL MANUAL OPERATOR'S MANUAL FOR MODULAR LIGHTWEIGHT LOAD-CARRYING EQUIPMENT (MOLLE) II
VICTORY Standard Specifications V1.6.1	Vehicular Integration for C4ISR/EW Interoperability (VICTORY) Standard Specifications Version 1.6.1, June 30, 2014
SRW WDS	Soldier Radio Waveform (SRW) 1.2.2.1 Waveform Design Specification (WDS)
TM 10-8465-236-10	TECHNICAL MANUAL OPERATOR'S MANUAL FOR MODULAR LIGHTWEIGHT LOAD-CARRYING EQUIPMENT (MOLLE) II
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