MILITARY
SPECIFICATION

MIL-R-11539B(SigC)

7 November 1958
Superseding
MIL-R-11539A(SigC)
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RADIO SETS
(NON-TACTICAL RADIO EQUIPMENT)
(COMPONENTS OF)

1. SCOPE

1.1 This specification covers the following major components of non-tactical radio equipments operating in the frequency ranges of 25 to 50 mc and 152 to 174 mc. The transmitters have power outputs of 25 and 45 watts, which can be increased to power output of 250 watts by use of the requisite amplifier and associated power supply.

Component	Rqt. para.
Antenna AS-612( )/U	3.13
Antenna AT-438( )/GR	3.13
Base Stand MT-1176( )/FR	3.21
*Cabinet, Electrical Equipment CY-938( )/VRC	3.22
Cabinet, Electrical Equipment CY-1150( )/U	3.23
Cabinet, Electrical Equipment CY-1221( )/G	3.24
*Dynamotor, Power Supply DY-93( )/G	3.17
*Dynamotor, Power Supply DY-98( )/U	3.17
*Dynamotor, Power Supply DY-100( )/U	3.17
*Power Supply PP-638( )/U	3.18
*Power Supply PP-804( )/U	3.19
*Power Supply PP-846( )/U	3.20
*Power Supply PP-867( )/U	3.20
*Power Supply PP-868( )/U	3.20
*Power Supply PP-869( )/U	3.20
*Power Supply PP-1126( )/U	3.20
*Power Supply PP-1127( )/U	3.20
*Power Supply PP-1128( )/U	3.20
*Rack, Electrical Equipment MT-1236( )/VRC	3.25
*Radio Frequency Amplifier AM-494( )/GR	3.11
*Radio Frequency Amplifier AM-495( )/GR	3.12
*Radio Receiver R-257( )/U	3.6
*Radio Receiver R-394( )/U	3.7
*Radio Set Control C-844( )/U	3.14
*Radio Set Control C-845( )/U	3.15
*Radio Set Control C-847( )/U	3.16
*Radio Transmitter T-208( )/U	3.9
*Radio Transmitter T-278( )/U	3.10
*Radio Transmitter T-416( )/GR	3.10
*Radio Transmitter T-417( )/GR	3.9
*Subassembly, Receiver MX-1547( )/G	3.8

*See 3.3.3

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1.2 Specific components comprise the major items of Radio Sets AN/FRC-15( ), AN/TRC-22( ), AN/TRC-33( ), AN/VRC-6( ), AN/VRC-6X( ), AN/VRC-6Y( ), AN/FRC-27( ), AN/FRC-28( ), AN/TRC-28( ), AN/TRC-34( ), AN/VRC-19( ), AN/VRC-19X( ), AN/VRC-19Y( ); Receiving Sets, Radio AN/FRR-44( ) and AN/FRR-36( ).

2. APPLICABLE DOCUMENTS

2.1 The following specifications, standards, drawings, and publications of the issue in effect on the date of invitation for bids, form a part of this specification.

SPECIFICATIONS

FEDERAL

UU-T-111	Tape; Paper, Gummed (Sealing and Securing)
QQ-S-571	Solder, Lead Alloy, Tin Lead Alloy, and Tin Alloy; Flux Cored Ribbon and Wire, dried Solid Form
TT-C-595	Colors, (for) Ready-Mixed Paints
LLL-F-291	Fiberboard; Corrugated, Single Face (Flexible)
PPP-B-585	Boxes; Wood, Wirebound
PPP-B-601	Boxes; Wood, Cleated Plywood
PPP-B-621	Boxes; Wood, Nailed and Lock-Corner
PPP-B-636	Boxes, Fiber
PPP-T-76	Tape; Pressure Sensitive, Adhesive, Paper, Water-Resistant-Q

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MIL-D-24	Dynamotors
MIL-P-75	Packaging, Packing, and Container-Marking of Electron Tubes.
MIL-V-95	Vibrators, Interrupter and Self-Rectifying
MIL-P-116	Preservation, Methods of
MIL-B-117	Bags, Interior Packaging
MIL-T-152	Treatment, Moisture and Fungus-Resistant, of Communications, Electronic and Associated Electrical Equipment.
MIL-V-173	Varnish, Moisture-and-Fungus-Resistant for treatment of Communications, Electronic and Associated Electrical Equipment.
MIL-S-901	Shockproof Equipment, Class HI (High impact), Shipboard Applications, Tests for
MIL-C-3098	Crystal Units, Quartz
MIL-I-11748	Interference Reduction for Electrical and Electronic Equipment.
MIL-L-12606	Loudspeaker, Dynamic (4-inch diameter)
MIL-M-13231	Marking of Electronic Items.
MIL-F-14072	Finishes for Ground Signal Equipment.

STANDARDS

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MIL-STD-105	Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-129	Marking of Shipments
MIL-STD-169	Extreme Temperature Cycle
MIL-STD-170	Moisture Resistance Test Cycle for Ground Signal Equipment
MIL-STD-252	Wired Equipment, Classification of Visual and Mechanical Defects for

SC-C-33073	Form to be used for Pilot Pack Process
SC-C-34089	Vibrator (12 Volt) Interrupter
SC-C-34090	Vibrator (6 Volt) Interrupter
SC-C-34091	Vibrator (24) Volt) Interrupter
SC-DL-154505	Control, Radio Set C-847( )/U
SC-DL-154790	Radio Receiver R-30[illegible]( )/U
SC-DL-154803	Power Supply PP-867( )/U
SC-DL-154834	Dynamotor, Power Supply DY-98( )/U
SC-DL-154876	Control, Radio Set C-844( )/U
SC-DL-154906	Power Supply PP-869( )/U
SC-DL-154915	Control, Radio Set C-845( )/U
SC-DL-154997	Radio Receiver R-257( )/U
SC-DL-155000	Power Supply PP-846( )/U
SC-DL-155014	Radio Transmitters T-278( )/U
SC-DL-155132	Cabinet, Electrical Equipment CY-938( )/VRC
SC-DL-155205	Rack, Electrical Equipment MT-1236( )/VRC
SC-DL-155211	Cabinet, Electrical Equipment CY-1150( )/U
SC-DL-155234	Radio Frequency Amplifier AM-494( )/GR
SC-DL-155319	Power Supply PP-804( )/U
SC-DL-155369	Dynamotor, Power Supply DY-93( )/G
SC-DL-155378	Dynamotor, Power Supply DY-100( )/U
SC-DL-155387	Power Supply PP-868( )/U
SC-DL-155395	Power Supply PP-638( )/U
SM-D- 155535	Antenna AS-612( )/U
SC-DL-155540	Antenna AT-438( )/GR
SC-DL-155563	Cabinet, Electrical Equipment CY-1221( )/G
SC-DL-155624	Radio Frequency Amplifier AM-495( )/U
SC-DL-155689	Radio Transmitters T-208( )/U
SC-DL-155821	Subassembly, Receiver MX-1547( )/G
SC-DL-155831	Rack, Electrical Equipment MT-1176( )/FR
SC-DL-155872	Radio, Transmitter T-416( )/GR
SC-DL-155913	Radio Transmitter T-417( )/GR
SC-DL-155782	Power Supply PP-1128( )/U
SC-DL-155792	Power Supply PP-1127( )/U
SC-DL-155798	Power Supply PP-1126( )/U

2.2 Other publications.- The following documents form a part of this specification. Unless otherwise indicated, the issue in effect on date of invitation for bids shall apply.

UNIFORM FREIGHT CLASSIFICATION NO. 4

Uniform Freight Classification
202 Union Station
Chicago 6, Illinois

CONSOLIDATED FREIGHT CLASSIFICATION RULES NO. 21

Consolidated Classification Committee
1 Park Avenue and 33rd Street
New York 16, New York

(Copies of specifications, standards, drawings and publications required by contractors in connection with specific procurement functions should be obtained from the processing activity or as directed by the contracting officer. Both the title and identifying number or symbol should be stipulated when requesting copies.)

3. REQUIREMENTS

3.1 Construction.- The components covered by this specification shall be constructed in accordance with the applicable drawings listed in Section 2, and shall meet the requirements of this specification. In case of conflict between the requirements of this specification and the referenced drawings, the specification shall govern.

3.2 Parts, materials and processes.-

3.2.1 Wiring and cabling.- Wiring and cabling shall be neat and sturdy.

3.2.2 Slack.- Wires and cables shall be as short as practicable except that sufficient slack shall be provided to prevent undue stress on cable forms, wires, and connections, to enable parts to be removed and replaced during servicing without disconnecting other parts, and to facilitate field repair of broken or cut wires.

3.2.3 Protection.- Wires and cables shall be so placed and protected as to avoid contact under specified service conditions with rough or irregular surfaces or sharp edges. Wires shall not be bent sharply where they enter insulation material. Where wires run through holes or slots in metal (partitions, shields, and similar items), they shall be protected by suitable grommets or bushings.

3.2.4 Support.- Wires and cables shall be properly supported and secured, to prevent undue stress on conductors and terminals and undue change in position of the wires and cables after the equipment has been subjected to specified service conditions or has been serviced or repaired in a normal manner.

3.2.5 Clearance.- Clearance between wires or cables and parts such as electron tubes and resistors shall be sufficient to avoid deterioration of the wires or cables because of the heat dissipated by such parts when the equipment is subjected to specified service conditions. Clearance between solder connections, bare conductors on terminal boards, or other parts shall be at least 1/4-inch unless use of specified parts makes such clearance impracticable.

3.2.6 Splicing.- Wires in a continuous run between two terminals shall not be spliced during assembly of equipment.

3.2.7 Connections.- Before being soldered to terminals, wires shall be mechanically secured so that the connections are not dependent for strength on solder alone. Fraying of textile ends of wires shall be prevented mechanically or by application of varnish conforming to Specification MIL-V-173. Except during overall tropicalization of the equipment, no varnish, lacquer, inspection paint, or other coating shall be applied to completed electrical connections.

3.2.8 Grounding.- Ground connection to shields and to other mechanical parts, except the chassis or frame, shall not be made to complete electrical circuits but only to eliminate high-potential AC points. Intermediate-frequency transformers, however, may be grounded through their cases if other means of grounding are impracticable.

3.2.9 Solder.- Solder used for electrical connections shall be composition Sn60 conforming to Specification QQ-S-571.

3.2.10 Flux and cleaning agents.- No acid or acid salts shall be used in preparation for or during soldering. Exception is permitted for preliminary tinning of electrical connections and for tinning or soldering of mechanical joints not used

to complete electrical circuits, but in no case shall acid or acid salts be used where they can come in contact with insulation material. Where acid or acid salts are used, as permitted above, they shall be completely neutralized and removed immediately after use. Flux for soldering electrical connections shall be rosin, rosin and alcohol, or rosin and turpentine.

3.2.11 Process.- There shall be no sharp points or rough surfaces resulting from insufficient heating. The solder shall feather out to a thin edge, indicating proper flowing and wetting action, and shall not be crystallized, overheated, or underheated. The minimum necessary amount of flux and solder shall be used for electrical connections. Any means employed to remove an unavoidable excess of flux shall not incur the risk of loose particles of flux, brush bristles, or other foreign material remaining in the equipment; flux being spread over a larger area; or damage to the equipment. Insulation material that has been subjected to heating during the soldering operation shall be undamaged, and parts fastened thereto shall not have become loosened.

3.2.12 Cleaning.- Metal parts, after fabrication, shall be cleaned in accordance with good commercial practice, or as specified in an applicable document. Cleaning processes shall have no deleterious effect on the equipment. Corrosive material shall be removed completely before parts are assembled into the equipment. After assembly, components shall be cleaned thoroughly and shall be free from particles of solder, flux, and other foreign material. If necessary, such cleaning shall also be performed before final assembly of components.

3.2.13 Plastic material and parts.- Where not machined, plastic material and parts shall have the original smooth or polished surfaces. Surfaces that have been sawed, cut, punched, or otherwise machined shall be as smooth as practicable in accordance with good manufacturing practice for the intended application.

3.2.14 Metals.- The metals used shall be of the proper alloy and hardness necessary to provide the required strength and rigidity. Materials shall be of corrosion-resisting types or shall be suitably processed to resist corrosion. Dissimilar metals used in contact with each other shall be carefully selected in accordance with the requirements of Specification MIL-F-14072 to prevent electrolytic corrosion in the presence of moisture.

3.2.15 Finish of Assembled Equipment.- Finishes of assembled equipment shall be in accordance with Specification MIL-F-14072. This includes finish of hardware type items such as handles, hinges, screws, etc., and necessary touch-up after mounting. The final paint film on type I surfaces shall be green color (olive drab) semigloss enamel matching a color chip provided by the procuring agency. (See 6.2k and 6.8).

3.2.16 Tropicalization.- The assembled components shall be treated in accordance with Specification MIL-T-152.

3.3 Marking

3.3.1 General.- Marking shall conform to Specification MIL-M-13231.

3.3.2 Visibility.- Wherever practicable, parts and assemblies shall be mounted so that their identification markings will be readily visible with minimum disassembly of the equipment.

3.3.3 Serial numbers.- The esterisked components listed in 1.2 shall be serial numbered.

3.4 Service conditions.- The components shall meet the following service conditions.

3.4.1 Equipment operating.-

(a) Temperature--Exposure in the range +132°F to -40°F; however, exposure at the high temperature extreme not to exceed 4 hours and at the low temperature extreme not to exceed 72 hours at any one time.

(b) Elevation--Any elevation up to 10,000 feet above sea level.

(c) Relative humidity--Any relative humidity up to 95 percent.

(d) Operation--Continuous operation for a period of at least 500 hours at a duty cycle of 1 minute transmit, 3 minutes receive, alternating 8 hours on and 16 hours off with no more than normal maintenance and replacement of parts.

3.4.2 Equipment, nonoperating.- The components shall meet the requirements of 3.4.1 after subjection to any one or more of the following nonoperating conditions:

(a) Temperature--Continuous exposure for 4 hours at 150°F and 24 hours at -80°F, at any orientation.

(b) Elevation--Elevations up to 25,000 feet above sea level.

(c) Relative humidity--Relative humidity up to 100 percent, including condensation caused by temperature changes.

(d) Storage--Indefinite storage in any orientation.

(e) Vibration--Except for internal resonance of specified parts and subassemblies, the equipment shall have no mechanical resonance below 55 cps.

(f) Bounce--The equipment shall meet full specification performance and shall have no physical damage after tests of 4.23.5 or 4.23.5.1.

(g) Shock; bench handling--The equipment shall meet full specification performance and show no physical damage when subjected to test of 4.23.6.

(h) Shock--The vehicular equipment shall meet full specification performance and shall have no physical damage after tests of 4.23.7.

(i) Rain--Two inches of rainfall per hour, with wind at nominal 20 miles per hour.

(j) Immersion--Radio Set Control C-847( )/U shall be immersed in three feet of water for 2 hours.

3.5 Operational and system requirements.- Each component shall operate and meet specified requirements. The system shall operate and meet specified requirements using those components which comprise the radio set on order. The power

output and sensitivity at high and low input voltages, squelch operation, operation of all controls and switches, quality of transmission and quality of received signal of the radio set shall meet specified requirements.

3.6 Radio Receiver R-257( )/U.- Radio Receiver R-257( )/U shall be constructed in accordance with Drawing SC-DL-154997.

3.6.1 Temperature.- The radio receiver shall be subjected to the temperatures listed in TABLE I and meet all the requirements listed therein when subjected to the temperature test (4.23.1).

Table I
Radio Receiver performance at temperature limits

	+132°F	-40°F
Discriminator freq. stability	Not more than .001% change from frequency at room temp.	Not more than .001% change from frequency at room temp.
Squelch	0.9 microvolt signal to open squelch	3.0 microvolts to open squelch
Audio power output incl. distortion (max.)	10 percent distortion or less with 0.5 watt output	10 percent distortion or less with 0.5 watt output

3.6.2 Frequency range.- The frequency range shall be from 25 to 50 mc.

3.6.3 Frequency control.- All oscillators shall be crystal controlled. Each oscillator used for frequency conversion shall use a crystal unit per Military Specification MIL-C-3098. The first local oscillator shall use a Crystal Unit CR-32/U in a temperature-controlled oven which shall be type JK02 (Modified) made by James Knight Co. or equal. A warping control capable of providing a frequency variation of 4 kc about the series resonant frequency of the crystal shall be part of the first local oscillator circuit. The second local oscillator shall use a Crystal Unit CR-18/U per Specification MIL-C-3098, which shall be furnished by the contractor as part of the receiver.

3.6.4 Frequency stability.- The receiver oscillator shall have a stability within 0.001 percent of the specified frequency under any or all of the following conditions.

(a) Variation in supply voltage from 5.5 to 7.5, 11.0 to 15.0, or 22 to 30 volts DC and 105 to 125 or 210 to 250 volts AC, as applicable.

(b) Temperature variation from minus 40°F to plus 132°F.

(c) Relative humidity variation from 10 percent to 95 percent.

(d) Conditions of vibration specified in 3.4.2 (e).

A five minute warmup time will be allowed before the above limits will apply.

3.6.5 IF bandwidth.- The points of 6 db attenuation shall be not less than 15 kc either side of the resonant frequency. The elements which primarily determine this bandwidth and the discriminator characteristics shall be adjusted at the time of manufacture and shall be sealed in a suitable thermosetting resin. The IF response shall be smooth and shall show no dips or more than 2 db when measured in accordance with Section 4. If due to replacements of tubes an adjustment must be made, the adjusting element shall have a range large enough to compensate for any bandwidth change caused by variations in the tube parameters.

3.6.6 Sensitivity.- The unmodulated signal required to produce 20 db noise quieting shall be 1.0 microvolt or less.

3.6.7 Audio-frequency response.- The audio-frequency response, not including de-emphasis networks, shall be as follows with reference to the response at 1000 cps:

(a) At 100 cps, ±1 db.

(b) At 300 to 2500 cps, ±1 db.

(c) Above 3500 cps, the response shall be attenuated as rapidly as possible.

3.6.8 Squelch.- The squelch circuit shall mute the receiver audio output in the absence of signal. The squelch control shall provide a range of squelch sensitivity as follows:

3.6.8.1 Maximum sensitivity.- The receiver shall operate with a signal which produces 10 db or less of quieting and shall be muted when the signal is removed.

3.6.8.2 Minimum sensitivity.- The receiver shall operate with a signal which produces 20 db or more of quieting and shall be muted when the signal is removed.

3.6.9 Antenna system.- The receiver shall be capable of operation from Antenna AS-612( )/U or antenna systems composed of the components listed in 3.9.8.

3.6.10 Spurious responses.- All spurious responses, including images and IF, shall be attenuated at least 90 db below the desired frequency.

3.6.11 Power output.- The receiver shall have a power output at the speaker terminals of not less than 0.5 watt. The power output at the handset terminals shall be not less than 10 milliwatts. The above outputs shall be obtainable at 1000 cps with no more than 10 percent distortion. Both of these outputs shall be obtainable simultaneously.

3.6.12 Adjacent channel selectivity.- The adjacent channel frequency (resonant frequency ±40 kc) shall be attenuated at least 90 db below the resonant frequency.

3.6.13 Alternate channel selectivity.- The alternate channel frequency (resonant frequency ±80 kc) shall be attenuated at least 90 db below the resonant frequency.

3.6.14 Maximum quieting.- The maximum quieting shall be at least 35 db below 0.5 watt at the speaker terminals, with the power supply operating from a 115-volt, 60-cps, AC source and shall be at least 35 db below 0.5 watt with the power supply operating from a battery source.

3.6.15 Discriminator characteristics.- When tested in accordance with 4.7.10 the discriminator shall meet the following requirements:

(a) The points of maximum voltage either side of resonant frequency shall be at least 35 kc.

(b) The minimum voltage peak shall not be below 65 percent of the maximum voltage peak.

3.6.16 Intermodulation.- The artifical carrier produced by the introduction of two off-resonance signals, as described in 4.7.11, shall produce less than 20 db quieting.

3.6.17 De-emphasis.- The de-emphasis network shall have a dropping characteristic of 6 db ±1 db per octave from 300 to 3500 cps.

3.6.18 Spurious radiations.- All spurious radiations from oscillators, multipliers, and mixers shall be reduced to a level such that two receivers--one under test and the other capable of tuning over the range of 2 to 250 mc can be mounted side by side. Any spurious radiation from the receiver under test shall not exceed 0.4 microvolt when the second receiver is tuned over its complete range. This requirement does not apply where the receiver is tuned to the first injection frequency or oscillator frequency of the other receiver.

3.6.19 IF and discriminator stability.- The center frequency of the IF bandpass (located by measuring 10 db down on each side from maximum response) and the point of zero on the discriminator shall not deviate more than 2.5 kc over the temperature range specified in 3.4.1.

3.6.20 Power supply.- The receiver shall meet the requirements of this specification when operating from Power Supply PP-867( )/U, PP-868( )/U, PP-869( )/U, or PP-846( )/U.

3.7 Radio receiver R-394( )/U shall be constructed in accordance with Drawing SC-DL-154790.

3.7.1 Temperature.- The radio receiver shall be subjected to the temperatures listed in TABLE II and meet all the requirements listed therein when subjected to the temperature test (4.23.1).

Table II
Radio Receiver performance at temperature limits

	+ 132°F	-40°F
Discriminator freq. stability	Not more than .001% change from frequency at room temp.	Not more than .001% change from frequency at room temp.
Sensitivity at 174 mc	0.8 microvolts or less for 20 db of quieting	0.7 microvolts or less 20 db of quieting
Squelch (min.)	1.25 microvolts signal to open squelch	4.0 microvolts signal to open squelch
Audio power output incl. distortion (max.)	10 percent distortion or less with 0.5 watt output	10 percent distortion or less with 0.5 watt output

3.7.2 Frequency range.- The frequency range shall be from 152 to 174 mc.

3.7.3 Frequency control.- All oscillators shall be crystal controlled. Each oscillator used for frequency conversion shall use a separate standard military-type crystal unit per Specification MIL-C-3098. The first local oscillator shall use a Crystal Unit CR-32( )/U in a temperature-controlled oven. A warping control capable of providing a frequency variation of ±4kc about the series resonant frequency of the crystal shall be part of the first local oscillator circuit. The second local oscillator shall use a Crystal Unit CR-18( )/U per Specification MIL-C-3098 which shall be furnished by the contractor as part of the receiver.

3.7.4 Frequency stability.- The receiver shall have a stability within the requirements of 3.6.4.

3.7.5 IF bandwidth.- The receiver shall meet the requirements specified in 3.6.5.

3.7.6 Sensitivity.- The unmodulated signal required to produce 20 db noise quieting shall be 1.0 microvolts or less.

3.7.7 Audio-frequency response.- Radio Receiver R-394( )/U shall be capable of meeting the frequency response requirements specified in 3.6.7.

3.7.8 Squelch.- Radio Receiver R-394( )/U shall be capable of meeting the requirements specified in 3.6.8, 3.6.8.1, and 3.6.8.2.

3.7.9 Antenna system.- The receiver shall be capable of operating from any one of the following types of antennas:

a. Antenna AT-438( )/GR (see 3.13.2).
b. Coaxial vehicular antenna.

3.7.10 Spurious responses.- All spurious responses, including IF and images, shall be attenuated at least 90 db below the desired frequency.

3.7.11 Power output.- The receiver shall be capable of meeting the same power output requirements as those specified in 3.6.11.

3.7.12 Adjacent channel selectivity.- The adjacent channel frequency (resonant frequency ± 60 kc) shall be attenuated at least 90 db below the resonant frequency.

3.7.13 Alternate channel selectivity.- The alternate channel frequency (resonant frequency ± 120 kc) shall be attenuated at least 90 db below the resonant frequency.

3.7.14 Maximum quieting.- The receiver shall be capable of meeting the maximum quieting requirements of 3.6.14.

3.7.15 Discriminator characteristics.- The discriminator shall meet the requirements of 3.6.15.

3.7.16 Intermodulation.- The artificial carrier produced by the introduction of two off-resonance signals, as described in Section 4.7.11 shall produce less than 20 db of quieting.

3.7.17 Radio Receiver R-394( )/U.- The receiver shall be capable of meeting all the requirements specified in 3.6.17 through 3.6.20.

3.8 Subassembly, receiver MX-1547( )/G.- Subassembly, receiver MX-1547( )/G shall be constructed in accordance with Drawing SC-DL-155821. The unit shall operate in conjunction with Radio Receiver R-257( )/U or Radio Receiver R-394( )/U and provide retransmission facilities.

3.9 Radio transmitters T-208( )/U and T-417( )/GR.- Radio Transmitters T-208( )/U and T-417( )GR shall be constructed in accordance with Drawing and Data Lists SC-DL-155689 and SC-DL-155913 respectively.

3.9.1 Temperature.- The radio transmitters shall be subjected to the temperatures listed in TABLE III and meet all the requirements listed therein when subjected to the Temperature Test (4.23.1).

Table III
Radio Transmitter Performance at Temperature Limits

Transmitter	+ 132°F	-40°F
Frequency stability	Not more than .001% change of freq. from freq. at room temp.	Not more than .001% change of freq. from freq. at room temp.
Power output (fixed station)	Not less than 45 watts	After 5 min. continuous transmit, not less than 40 watts. After 15 min., not less than 45 watts.
Power output (vehicular)	Not less than 23 watts	After 5 min. continuous transmit, not less than 20 watts. After 15 min., not less than 25 watts.
Minimum voltage to modulate transmitter ± 15kc at 1000 cps	Not more than 0.2 volt	Not more than 0.2 volt

3.9.2 Frequency range.- The frequency range of both transmitters shall be from 25 to 50 mc.

3.9.3 Frequency control.- All oscillators shall be crystal controlled, using Crystal Unit CR-27/U per Specification MIL-C-3098.

3.9.4 Frequency stability.- The transmitters shall have a stability within 0.001 percent of the specified frequency under any or all of the following conditions:

(a) Variation in supply voltage from 5.5 to 7.5, 11 to 15, or 22 to 30 volts DC and 105 to 125 or 210 to 250 volts AC, as applicable.

(b) Temperature variation from minus 40°F to plus 132°F.

(c) Relative humidity variation from 10 percent to 95 percent.

(d) Conditions of vibration specified in 3.4.2(e).

A five minute warm-up time will be allowed before the above limit shall apply. Suitable means shall be provided to permit variation of oscillator frequency to compensate for frequency variations due to the above tolerances. A variable reactance shall be provided for accurate frequency setting.

3.9.5 Modulation.- Phase modulation shall be employed.

3.9.6 Frequency deviation.- A deviation of 15 kc shall be considered 100 percent modulation. It shall be obtainable at 1000 cps with an audio input of 0.1 volt to the transmitter microphone terminals, or 0.2 volt to the transmitter line terminals. The deviation, when 100 to 3500 cps is applied to the microphone or wire line terminals at a level where no limiting is taking place, shall be as follows after correction for a 6 db per octave rising characteristic:

(a) At 100 cps, ±3 db with reference to 1000 cps.

(b) At 3500 cps, not more than 6 db down from 1000 cps.

(c) Above 3500 cps, the response shall be attenuated as rapidly as possible.

3.9.7 Frequency selection.- Either type transmitter shall be capable of operating on either of two pre-selected frequencies separated by no more than 0.25 megacycle.

3.9.8 Antenna system.- The transmitters shall be capable of operation from Antenna AS-612( )/U (see 3.13.1) or antenna systems consisting of the following:

Antenna System AT-532( )/VR

Antenna System (25-30 mc)
1-AB-15/GR Mast Base
2-AB-21/GR Mast Section
1-AB-22/GR Mast Section
1-MS-118A Mast Section
50"-RG-58/U Cable

Antenna System (30-36 mc)
1-AB-15/GR Mast Section
1-AB-21/GR Mast Section
1-AB-22/GR Mast Section
1-MS-118-A Mast Section
50" -RG-58/U Cable

Antenna System (36-44 mc)
1-AB-15/GR Mast Base
1-AB-22/GR Mast Section
1-MS-118-A Mast Section
50" -RG-58/U Cable

Antenna System (44-50 mc)
1-AB-15/GR Mast Base
1-AB-22/GR Mast Section
1-AB-24/GR Mast Section
50" -RG-58/U Cable

3.9.9 Spurious radiations.- Harmonic spurious radiations shall be attenuated at least 50 db and all other spurious radiations shall be attenuated at least 60 db below the output of the operating frequency.

3.9.10 Power output.- The power output of the transmitters shall be as follows T-208( )/U-25 watts; T-417( )/GR -45 watts.

3.9.11 Deviation limiting.- The deviation shall be limited at any modulating frequency to a maximum of 18 kc regardless of input level. Modulation in excess of 18 kc due to sudden sharp peaks in the modulating voltages shall be reduced as much as possible by audio limiter, audio input voltages up to 5.0 volts RMS shall not cause greater than 18 kc. deviation.

3.9.12 Power sources.- Radio transmitter T-208( )/U shall meet the requirements of this specification when operating from Dynamotor Operation Power Supplies DY-93( )/G, DY-98( )/U, DY-100( )/U. Radio Transmitter T-417( )/GR shall meet the requirements when operating from power supplies DY-98( )/U or PP-804( )/U.

3.10 Radio Transmitters T-278( )/U and T-416( )/GR.- Radio transmitters shall be constructed in accordance with Drawing and Data Lists SC-DL-155014 and SC-DL-155872 respectively.

3.10.1 Temperature.- The radio transmitters shall be subjected to the temperatures listed in Table IV and meet all the requirements listed therein when subjected to the temperature tests of 4.23.1.

TABLE IV
Radio Transmitter Performance at Temperature Limits

Transmitter	+ 132°F	-40°F
Frequency stability	Not more than .001% change of freq. from freq. at room temp.	Not more than .001% change of freq. from freq. at room temp.
Power output (fixed station)	Not less than 45 watts	After 5 min. continuous transmit, not less than 40 watts. After 15 min., not less than 45 watts.
Power output (vehicular)	Not less than 23 watts	After 5 min. continuous transmit, not less than 20 watts. After 15 min., not less than 25 watts.
Minimum voltage to modulate transmitter ± 15kc at 1000 cps	Not more than 0.2 volt	Not more than 0.2 volt

3.10.2 Frequency range.- Both transmitters shall operate in the frequency range of 152 to 174 mc.

3.10.3 Frequency control.- The oscillators shall be crystal controlled using Crystal Unit type CR-27/U crystals per Military Specification MIL-C-3098.

3.10.4 Frequency stability.- The transmitters shall have a stability within .001 percent of the specified frequency under any or all of the following conditions:

(a) Variation in supply voltage: 5.5 to 7.5 volts DC, 11.0 to 15.0 volts DC, 22 to 30 volts DC, 105 to 125 or 210 to 250 volts AC.

(b) Temperature variation from minus 40°F to plus 132°F.

(c) Relative humidity variation from 10 percent to 95 percent.

(d) Conditions of vibration specified in 3.4.2 (e).

3.10.5 Modulation.- Phase modulation shall be employed.

3.10.6 Frequency deviation.- The transmitters shall meet the frequency deviation requirements specified in 3.9.6.

3.10.7 Frequency selection.- The transmitters shall be capable of operating on either of two preset frequencies separated by no more than 0.5 mc.

3.10.8 Antenna system.- The transmitters shall be capable of operation on any of the antenna systems specified in 3.13.2.

3.10.9 Spurious radiations.- Harmonic spurious radiations shall be attenuated at least 50 db and all other spurious radiations shall be attenuated at least 60 db below the output at the operating frequency.

3.10.10 Power output.- The power output of transmitter T-278( )/U shall be as follows:

152 mc	Not less than 25 watts
165.075 mc	Not less than 23 watts
174 mc	Not less than 20 watts

The power output of transmitter T-416( )/GR shall be not less than 45 watts.

3.10.11 Deviation limiting.- The transmitter shall meet deviation limiting requirements of 3.9.11.

3.10.12 Power sources.- Radio transmitter T-278( )/U shall meet the requirements of this specification when operating from Dynamotor Power Supplies DY-93( )/G, DY-98( )/U, DY-100( )/U. Radio Transmitter T-416( )/GR shall meet the requirements when operating from power supplies DY-98( )/U or PP-804( )/U.

3.11 Radio Frequency Amplifier AM-494( )/GR.- Radio Frequency Amplifier AM-494( )/GR shall be constructed in accordance with Drawing SC-DL-155234.

3.11.1 Frequency range.- The frequency range shall be from 152 to 174 mc. The amplifier shall increase the RF power output of Radio Transmitter T-416( )/GR from 45 to 250 watts. The radio frequency input shall be provided by Radio Transmitter T-416 ( )/GR. The amplifier shall be designed to work into Antenna AT-438( )/GR. The amplifier shall be powered from Power Supply PP-638( )/U.

3.11.2 Power output.- The power output into a 50 ohm nonreactive load shall be at least 250 watts at any frequency in the specified range.

3.11.3 Plate circuit.- When tested in accordance with 4.11.3 the "Plate Volts" meter on Power Supply PP-638( )/U shall read 1140 volts ± 50volts, and the "Plate Current" meter shall read at any point between 320 to 370 milliamperes.

3.11.4 Screen circuit.- When tested in accordance with 4.11.3, the test meter on Power Supply PP-638( )/U shall read at any point between 15 to 25 milliamperes when set at "Screen 1" position. When set at "Screen 2" position, the test meter shall read at any point between 15 to 25 milliamperes. This reading shall not differ from the "Screen 1" position reading by more than 5 milliamperes.

3.11.5 Harmonic filter.- The second harmonic output of the amplifier shall be reduced by 70 db with the harmonic filter set at 304 mcs.

3.11.6 Control grid current.- When tested in accordance with 4.11.3 the control grid current meter shall read from 25 to 30 milliamperes.

3.12 Radio Frequency Amplifier AM-495( )/GR.- Radio Frequency Amplifier AM-495 ( )/U shall be constructed in accordance with Drawing SC-DL-155624.

3.12.1 Frequency range.- The frequency range shall be from 25 to 50 mc. The amplifier shall increase the RF power output of Radio Transmitter T-417( )/GR from 45 to 250 watts. The radio frequency input shall be provided by Radio Transmitter T-417 ( )/GR. The amplifier shall be designed to work into AS-612( )/U. The amplifier shall be powered from Power Supply PP-638( )/U.

3.12.2 Power output.- The power output into a 50 ohm nonreactive load shall be at least 250 watts at any frequency in the specified range.

3.12.3 Plate circuit.- The requirements are the same as 3.11.3.

3.12.4 Screen circuit.- The requirements are the same as 3.11.4.

3.12.5 Harmonic Filter.- The second harmonic output of the amplifier shall be reduced by 70 db with the harmonic filter set at either of the two preset positions at 52 mcs. and 74 mcs.

3.12.6 Control grid current.- When tested in accordance with 4.11.3 the control grid current meter shall read from 25 to 30 milliamperes.

3.13 Antenna Systems

3.13.1 Antenna AS-612( )/U.- Antenna AS-612( )/U shall be constructed in accordance with Drawing SM-D-155535.

3.13.2 Antenna AT-438( )/GR.- Antenna AT-438( )/GR shall be constructed in accordance with Drawing SC-DL-155540.

3.14 Radio set control C-844( )/U.- Radio Set Control C-844( )/U shall be constructed in accordance with Drawing SC-DL-154876.

This unit is required when operating the radio set from a remote point and provides facilities for selection of transmitter frequency and one or both receivers. The unit is installed in Electrical Equipment Cabinet CY-1221( )/G when used with the radio set.

3.15 Radio set control C-845( )/U.- Radio Set control C-845( )/U shall be constructed in accordance with Drawing SC-DL-154915. The unit shall provide remote push-to-talk facilities for either Radio Transmitter T-417( )/GR and Radio Receiver R-257( )/U or Radio Transmitter T-416( )/GR and Radio Receiver R-394( )/U.

3.15.1 Power requirements.- The input power for the radio set control shall be supplied by the appropriate receiver-type power supply.

3.15.2 Line output.- The audio output level shall be at least 0.62 volt at

1000 cps with an input to the microphone terminals of 0.1 volt. This level shall be obtainable with two control units connected in parallel across the 600 ohm remote line.

3.15.3 Frequency response.- The frequency response from 300 to 3500 cps shall be ±2.5 db of the response at 1000 cps. Above 3500 cps the output shall be attenuated as rapidly as possible. The output at 100 cps shall not be more than 10 db down from the value at 1000 cps.

3.15.4 Loudspeaker, dynamic (4-inch dia.).- The loudspeaker of C-845( )/U shall meet the requirements of Specification MIL-L-12606.

3.15.5 Output.- The power available at the speaker terminals shall be at least 0.5 watt at 1000 cps with no more than 10 percent distortion.

3.15.6 Handset output.- The power output delivered to the handset shall be 10 milliwatts when the volume control is set for 0.5 watt at the speaker terminals.

3.15.7 Hum level.- The hum level in both transmit and receive directions shall be at least 55 db below signal level.

3.16. Radio Set Control C-847( )/U.- Radio Set Control C-847( )/U shall be constructed in accordance with Drawing SC-DL-154505. The unit shall provide control and monitoring facilities for either Radio Transmitter T-208( )/U and Radio Receiver R-394( )/U or Radio Transmitter T-278( )/U and Radio Receiver R-257( )/U. The unit shall be immersion proof and meet the immersion test (4.23.9).

3.16.1 Loudspeaker, dynamic (4-inch dia.).- The loudspeaker of C-847( )/U shall meet the requirements of Specification MIL-L-12606.

3.16.2 Control functions.- The control provides the following operating controls:

(a) Power on and off for the radio set.

(b) Selection of either of two preset transmitter frequencies.

(c) Volume of the monitor speaker and handset.

(d) Receiver squelch operating level, and means of disabling the squelch circuit.

3.16.3 Handset output.- The requirements are the same as 3.15.6.

3.17 Dynamotor Power Supplies DY-93( )/G; DY-98( )/U; DY-100( )/U. Each of these dynamotor power supplies shall be constructed in accordance with the respective drawings listed in TABLE V. The dynamotors shall be of the continuous duty type and conform to the applicable requirements of Specification MIL-D-24, except that the word "qualification" is to be deleted wherever it appears therein.

3.17.1 Input voltage.- The dynamotor power supplies shall be capable of satisfactory operation under full load at any input voltage between the limits specified in TABLE V.

3.17.2 Output voltages.- The dynamotor power supplies shall be capable of delivering the output voltages listed in TABLE VI.

3.17.3 The dynamotor power supplies shall meet the regulation, ripple, and efficiency requirements listed in TABLE V.

3.17.4 Life.- The dynamotor power supplies shall be capable of satisfactory operation without permanent degradation for 1000 hours under full load at room temperature, with any input voltage between the limits specified in TABLE V.

TABLE V
Dynamotor voltage requirements

Dynamotor	Drawing Number	Input (volts DC)	Max. Ripple Pin 28	Max. Ripple Pin 4	Regulation	Efficiency
DY-93( )/G	SC-DL-155369	11 to 15	0.04 v	3.5 v	20%	60%
DY-98( )/U	SC-DL-154834	22 to 30	"	"	"	"
DY-100( )/U	SC-DL-155378	5.5 to 7.5	"	"	"	"

TABLE VI
Dynamotor output voltages

Output conn. pin numbers DY-93( )/U	DY-98( )/G	DY-100( )/U	Max. output (volts DC)	Min. output (volts DC)	Equiv. Load Resistance (ohms)
3	3	3	240	205	5700
4	4	4	445	380	1700
5	5	5	345	285	19000
6	6	6	-35	-27	4700
7	8	7	Continuity	Continuity	light indic.
9	9	9	240	205	3520
10	10*	10	Gnd	Gnd	-
14	14	14	8	5	14.5
15	15*	15	7.5	5.5	3.3
16	16	16	1.55	1.25	6.4
20	-	21	Continuity	Continuity	light indic.
28	28	28	1.55	1.25	1.4

* NOTE: On DY-98( )/G only, 5.8 to 7.0 volts AC between pins 10 and 15.

3.18 Power supply PP-638( )/U.- The power supply shall be constructed in accordance with Drawing SC-DL-155395.

3.18.1 Input voltage.- The power supply shall operate from any of the following input voltages:

(a) Nominal 115 v, 60 cps AC; voltage 105 to 125 volts, 50 to 60 cps.

(b) Nominal 230 v, 60 cps AC; voltage 210 to 250 volts, 50 to 65 cps.

3.18.2 Output voltage.- The output voltages of PP-638( )/U shall be as given in Table VII.

3.18.3 Humidity.- The power supply shall be subjected to the moisture-resistance test in Section 4 and meet full specification performance without degradation.

3.18.4 Life.- The power supply shall be capable of continuous operation for a minimum of 500 hours when tested in accordance with paragraph 4.16.3.

TABLE VII
Power Supply PP-638( )/U

Output Pin No.	Min. Voltage	Max. Voltage	Max. Ripple	Load Resistor (ohms)
P-1401	1050	1150	30 v	3200 500 watt
A	210	250	10 v	3800 20 watt
C	5.8	7.0	-	1.15 40 watt

3.19 Power Supply PP-804( )/U.- Power Supply PP-804( )/U shall be constructed in accordance with Drawing SC-DL-155319.

3.19.1 Input voltage.- The power supply shall operate from any of the following input voltages:

(a) Nominal 115 volts, 60 cps, AC; 105 to 125 volts, 50 to 60 cps AC voltage

(b) Nominal 230 volts, 60 cps AC; 210 to 250 volts, 50 to 65 cps AC voltage

3.19.2 Output voltage.- With nominal input voltage, the output voltages of PP-804( )/U shall be as listed in Table VIII.

3.19.3 Humidity.- The power supply shall be subjected to the moisture-resistance test in Section 4 and meet full specification performance without degradation.

3.19.4 Life.- The power supply shall be capable of continuous operation for a minimum of 500 hours when tested in accordance with paragraph 4.17.3.

TABLE VIII
Power Supply PP-804( )/U

Pin No.	Min. Voltage	Max. Voltage	Max. All. Ripple	Load Resistor (ohms) One end connected to Pin No. 2	
3	230	270	10 v	5,000	15 watt
4	480	530	15 v	1,800	170 watt
5	230	270	10 v	12,000	6 watt
6	-17	-27	5 v	5,000	¼ watt
7	5.8	7.0	- -	6	9 watt
9	230	270	10 v	- -	- -
14	5.0	7.0	- -	20	- -
15	5.8	7.0	- -	2.9	15 watt
16	1.25	1.55	0.05	6.5	½ watt
20	1.25	1.55	0.01	1.35	2 watt
17	Ground	- -	- -	- -	- -
2	Ground	- -	- -	- -	- -

3.20 Power Supplies PP-846( )/U, PP-867( )/U, PP-868( )/U, PP-869( )/U, PP-1126( )/U, PP-1127( )/U, and PP1128( )/U.- These power supplies shall be constructed in accordance with the following drawings:

PP-846( )/U	SC-DL-155000	PP-1126( )/U	SC-DL-155798
PP-867( )/U	SC-DL-154803	PP-1127( )/U	SC-DL-155792
PP-868( )/U	SC-DL-155387	PP-1128( )/U	SC-DL-155782
PP-869( )/U	SC-DL-154906		

3.20.1 Input voltage.- The power supplies shall be capable of operating satisfactorily at any input voltage within the ranges listed in TABLE IX under full load conditions.

TABLE IX
Power Supply Input Voltage

Input Voltage	PP-846 60 cps AC	PP-867 V DC	PP-868 V DC	PP-869 V DC	PP-1126 V DC	PP-1127 V DC	PP-1128 V DC
Maximum	250 or 125 V	30	15	7.5	40 V	80	137
Rated	230 or 115 V	25.2	12.6	6.3	32 V	64	110
Minimum	210 or 105 V	22	11	5.5	29 V	58	101

3.20.2 Output voltage.- With the rated input indicated in paragraph 3.20.1, the outputs of the power supplies shall be within the limits of Table X when the power supply load resistors listed in TABLE XI are connected at the output connector.

TABLE X
Power Supply Output Voltages

Output voltage	Pin 8	Pin 5	Pin 4	Pin 6	Pin 13	Pin 2
Maximum	185 V DC	175 V DC	170 V DC	-60 V DC	1.55 V DC	7.5 V AC
Nominal	165 V DC	155 V DC	150 V DC	-80 V DC	1.40 V DC	6.3 V AC
Minimum	145 V DC	135 V DC	130 V DC	-40 V DC	1.25 V DC	5.5 V AC

TABLE XI
POWER SUPPLY LOAD RESISTORS
PP-846( )/U, PP-867( )/U, PP-868( )/U, PP-869( )/U, PP-1126( )/U, PP-1127( )/U, and PP-1128( )/U.

Load Resistance Ohms--power rating	Across Output Pin Number	Note
15,272 -5 watt	8 to 14	
46,285 -5 watt	5 to 14	
3,511 -25 watt	4 to 14	
150,000 -1 watt	6 to 14	
1.27 -5 watt	13 to 14	
14.0 -10 watt	2 to 14	
Light Indicator	9 to 14	
100 -10 watt	7 to 14	on PP-867( )/U and PP-1126( )/U only
Ground	14	

3.20.3 Ripple.- With the maximum input indicated in paragraph 3.20.1, the ripple in the output shall not exceed the following:

Pin No.	4	5	6	8	13
Ripple (Volts AC)	0.75	0.775	0.25	1.65	0.01

3.20.4 Input current drain.- The maximum full load current drain shall not exceed the following, with the maximum input indicated in paragraph 3.20.1.

Current drain	PP-846( )/U	PP-867( )/U	PP-868( )/U	PP-869( )/U
Amperes	2.90	1.4	2.8	4.6

3.20.5 Overvoltage.- There shall be no failure of parts when the power supply is tested for overvoltage operation in accordance with paragraph 4.18.4.

3.20.6 Vibrator.- The vibrator used in power supplies PP-867( )/U, PP-868( )/U and PP-869( )/U shall be of the dual interrupter type and shall conform to Specification MIL-V-95 and Drawing SC-C-34091 for PP-867( )/U, and Drawing SC-C-34090 for PP-869( )/U and Drawing SC-C-34089 for PP-868( )/U.

3.20.7 Humidity.- The power supplies shall be subjected to the moisture-resistance test in Section 4 and meet full specification performance with degradation.

3.20.8 Life.- The power supply shall be capable of continuous operation for a minimum of 500 hours when tested in accordance with paragraph 4.18.6.

3.21 Base Stand MT-1176( )/FR.- Base Stand MT-1176( )/FR shall be constructed in accordance with Drawing SC-DL-155831. It shall be capable of being used for mounting Electrical Equipment Cabinet CY-1221( )/G, including components outlined in paragraph 3.24.

3.22 Cabinet, Electrical Equipment CY-938( )/VRC.- Electrical equipment cabinet CY-938( )/VRC shall be constructed in accordance with Drawing SC-DL-155132. This cabinet shall be capable of withstanding shock and vibration encountered in vehicular operations. It shall provide rainproof housing and facilities, including electrical connections, for mounting one of either type of Receiver or R-257( )/U, and one of either type of Transmitter T-278( )/U or T-208( )/U and the necessary power supply.

3.23 Cabinet, Electrical Equipment CY-1150( )/U.- Electrical Equipment Cabinet CY-1150( )/U shall be constructed in accordance with Drawing SC-DL-155211. This cabinet shall provide rainproof mounting facilities and electrical connections for Radio Receiver R-257( )/U or R-394( )/U.

3.24 Cabinet, Electrical Equipment CY-1221( )/G.- Electrical equipment cabinet CY-1221( )/G shall be constructed in accordance with Drawing SC-DL-155563. This unit shall provide a rainproof housing and mounting facility for two Radio Receivers R-257( )/U or two Radio Receivers R-394( )/U and either one Radio Transmitter T-417( )/GR or Radio Transmitter T-416( )/GR, plus one Transmitter Power Supply PP-804( )/U and one Control Radio Set C-844( )/U.

3.24.1 Control functions.- The controls on cabinet provide the following functions:-

(a) Control main ac power

(b) Control intercommunications with remote control C-845( )/U

(c) Select alternate transmitter frequency.

(d) Squelch control setting of receiver or receivers.

(e) Control of power unit.

3.24.2 Cabinet wiring.- Cabinet wiring provides inter-connection between various units making up radio sets.

3.25 Rack, electrical equipment MT-1236( )/G.- Electrical equipment rack MT-1236( )/G shall be constructed in accordance with Drawing SC-DL-155205. This rack with shock mounts shall provide facilities for mounting Electrical Equipment Cabinet CY-938( )/VRC used with Radio Sets AN/VRC-6( ) and AN/VRC-19( ).

3.26 Interchangeability.- Corresponding components and replaceable subassemblies and parts on contract shall be physically and functionally interchangeable as units without modification thereof or other articles with which the items are used. (See 4.22.1) When dimensions, rating, characteristics, and so forth, are not specified, the manufacturer's design limits shall be used to determine compliance with the foregoing. If the contractor is in doubt as to whether a particular assembly, subassembly, or part is to be considered replaceable, the contracting officer shall be consulted.

3.27 Preproduction samples.- The contractor shall furnish preproduction samples for approval, as required by the invitation for bids and contract.

3.28 Technical literature, tools, and running spare parts.- Technical literature, tools, and running spare parts shall be furnished as specified in the contract. Running spare parts shall be identical to corresponding parts in the items furnished on the order.

3.29 Preconditioning.- Items shall be capable of meeting the inspection requirements of Section 4 without subsequent processing after subjection to the bounce preconditioning of paragraph 4.4.

3.30 Radio interference suppression.- The equipments shall conform to the requirements of Specification MIL-I-11748 and the interference limits set forth therein.

3.31 Workmanship.- Workmanship on the components covered by this specification shall be such as to meet all the requirements of this specification and any referenced subsidiary specification, drawing, or other document, when inspected in accordance with 4.6 including the applicable portions of the following paragraphs.

3.2.1	Wiring and cabling	3.2.11	Process for soldering
3.2.2	Slack in wires and cables	3.2.12	Cleaning of equipment
3.2.3	Protection for wires and cables	3.2.13	Plastic material and parts
3.2.5	Clearance in wiring and cabling	3.2.14	Metals
3.2.6	Splicing of wires	3.2.15	Finish of Assemblies Equipment
3.2.7	Connection	3.2.16	Tropicalization
3.2.10	Flux and cleaning agents for soldering	3.3	Marking

4. QUALITY ASSURANCE PROVISIONS

4.1 Inspection; responsibility and classification of.-

4.1.1 Contractor responsibility.- Unless otherwise specified herein the supplier is responsible for the performance of all inspection requirements prior to submission for Government inspection and acceptance. Except as otherwise specified, the supplier may utilize his own facilities or any commercial laboratory acceptable to the Government. Inspection records of the examinations and tests shall be kept complete and available to the Government as specified in the contract or order.

4.1.2 Classification of inspection.- Inspection shall be classified as follows:

(a) Preproduction inspection (does not include preparation for delivery). (See 4.2).

(b) Procurement inspection. (Procurement inspection shall be the inspection performed by the contractor and by the Government, as specified by 4.3 and 4.25.)

(1) Procurement inspection of items before preparation for delivery (see 4.3.).

(2) Procurement inspection of preparation for delivery (see 4.25 and section 5.).

4.2 Preproduction inspection.- This inspection shall consist of the preproduction inspection specified in Table XII and the group A, group B, and group C inspections specified in Tables XIII, XIV, and XV respectively. Other nondestructive tests on preproduction samples may be performed to determine compliance with specified requirements. The preproduction inspection will normally be performed in this order: (1) vibration, (2) bounce, (3) shock, bench handling, (4) shock, ballistic, and (5) immersion. Other preproduction inspection may precede, follow, or be interspersed between the foregoing.

TABLE XII
Preproduction Inspection

Inspection	Requirement Paragraph	Inspection Paragraph
Temperature	3.4	4.23.1
Moisture-resistance	3.4	4.23.2
Altitude	3.4	4.23.3
Vibration	3.4.2	4.23.4
Bounce	3.4.2	4.23.5
Bounce; vehicular equipment	3.4.2	4.23.5.1
Shock; bench handling	3.4.2	4.23.6
Shock; ballistic (vehicular only)	3.4.2	4.23.7
Rain	3.4.2	4.23.8
Immersion (C-847( )/U only)	3.4.2	4.23.9
Interference Suppression	3.30	4.24

4.3 Procurement inspection of items before preparation for delivery.- The minimum inspection performed by the Contractor shall be as specified by (a) through (d) below to demonstrate compliance with specified requirements. The Government will review and evaluate the contractor's inspection procedures and examine the contractor's records. In addition, the Government at its discretion will verify by product inspection the contractor's compliance with the specified requirements.

(a) Procurement inspection shall consist of Group A, Group B, and Group C inspection as specified in 4.3.1 through 4.3.3.2.

(b) When Standard MIL-STD-105 specifies actions by the Government, the Government may authorize the contractor to perform any of such actions except that responsibility for acceptance rests with the Government.

(c) Group B inspection should normally be performed on inspection lots that have passed Group A inspection and on samples selected from units that have been subjected to and met Group A inspection. In addition, Group C inspection shall normally be performed on sample units that have been subjected to and met Group B inspection. However, the order may be varied when it is considered more practical to select separate samples for Group B or Group C inspection or both.

(d) Each unit to be subjected to Group A, Group B, or Group C inspection shall be pre-conditioned after final assembly. (See 3.29).

4.3.1 Group A inspection.- This inspection (including sampling) shall conform to Table XIII and Standard MIL-STD-105. Unless otherwise specified, normal inspection shall be used at the start of the contract. Group A inspection shall be performed in any order which is satisfactory to the government.

Table XIII Group A inspection

Inspection	Req't Para.	Insp. Para.	AQL Major	AQL Minor
Visual and Mechanical	3.31	4.22		
Receiver, Radio R-257( )/U	3.6	4.22	6.5dphu	25dphu
Receiver, Radio R-394( )/U	3.7	4.22	6.5dphu	25dphu
Radio Receiver Base Unit		4.22	1.0dphu	4dphu
Radio Receiver R.F. Amplifier Unit		4.22	1.0dphu	4.0dphu
Radio Receiver LOC. OSC Unit		4.22	1.0dphu	4.0dphu
Radio Receiver 1st I.F. Unit		4.22	1.0dphu	4.0dphu
Radio Receiver 2nd I.F. Discr Unit		4.22	1.0dphu	4.0dphu
Radio Receiver Audio & Squelch Unit		4.22	1.0dphu	4.0dphu
Radio Receiver Relay Unit		4.22	1.0dphu	4.0dphu
Transmitter, Radio T-208( )/U	3.9	4.22	6.5dphu	25.0dphu
Transmitter, Radio T-278( )/U	3.10	4.22	6.5dphu	25.0dphu
Transmitter, Radio T-416( )/GR	3.10	4.22	6.5dphu	25.0dphu
Transmitter, Radio T-417( )/GR	3.9	4.22	6.5dphu	25.0dphu
Amplifier, radio frequency AM-494( )/U	3.11	4.22	1.5dphu	6.5dphu
Amplifier, radio frequency AM-495( )/U	3.12	4.22	1.5dphu	6.5dphu
Control, radio set C-844( )/U	3.14	4.22	1.5dphu	6.5dphu
Control, radio set C-845( )/U	3.15	4.22	2.5dphu	10.0dphu
Control, radio set C-847( )/U	3.16	4.22	1.5dphu	6.5dphu

Table IX (Cont'd)

Inspection	Req't Para.	Insp Para.	AQL Major	AQL Minor
Dynamotors				
DY-93( )/G	3.17	Per Military Specification MIL-D-24		
DY-98( )/U	3.17			
DY-100( )/U	3.17			
Power Supplies				
PP-638( )/U	3.18	4.22	4.0dphu	15.0dphu
PP-804( )/U	3.19	4.22	2.5dphu	10.0dphu
PP-846( )/U	3.20	4.22	1.0dphu	4.0dphu
PP-867( )/U	3.20	4.22	1.0dphu	4.0dphu
PP-868( )/U	3.20	4.22	1.0dphu	4.0dphu
PP-869( )/U	3.20	4.22	1.0dphu	4.0dphu
PP-1126( )/U	3.20	4.22	1.0dphu	4.0dphu
PP-1127( )/U	3.20	4.22	1.0dphu	4.0dphu
PP-1128( )/U	3.20	4.22	1.0dphu	4.0dphu
Base stand MT-1176( )/FR	3.21	4.22	1.0dphu	4.0dphu
Cabinets, electrical equipment				
CY-938( )/VRC	3.22	4.22	1.5dphu	6.5dphu
CY-1150( )/U	3.23	4.22	1.5dphu	6.5dphu
CY-1221( )/G	3.24	4.22	1.5dphu	6.5dphu
Rack, Electrical Equipment MT-1236( )G	3.25	4.22	1.0%	4.0%
Antennas				
AS-612/U	3.13.1	4.22	1.0%	4.0%
AT-438/GR	3.13.2	4.22	1.0%	4.0%
Electrical				
Radio Receiver R-257( )/U				
Radio Receiver R-394( )/U				
IF Bandwidth	3.6.5	4.7.1		
	3.7.5	4.8.1		
Sensitivity	3.6.6	4.7.2		
	3.7.6	4.8.2		
Max. Squelch Sensitivity	3.6.8.1	4.7.4.1		
	3.7.8	4.8.4		
Min. Squelch Sensitivity	3.6.8.2	4.7.4.2		
	3.7.8	4.8.4		
Power Output	3.6.11	4.7.6		
	3.7.11	4.8.6		
Maximum Quieting	3.6.14	4.7.9		
	3.7.14	4.8.9		
Discriminator Characteristics	3.6.15	4.7.10		
	3.7.15	4.8.10		
Intermodulation	3.6.16	4.7.11		
	3.7.16	4.8.11		
			6.5 dphu*	

Table IX (Cont'd)

Inspection	Req't Para.	Insp Para.	AQL Major	AQL Minor
De-emphasis IF and Discriminator Stability	3.6.17 3.7.17 3.6.19 3.7.17	4.7.12) 4.8.12) 4.7.14) 4.8.14)		
Radio Transmitters T-208( )/U & T-417( )/GR Radio Transmitters T-278( )/U & T-416( )/GR				
Frequency Deviation Power Output Deviation Limiting	3.9.6 3.10.6 3.9.10 3.10.10 3.9.11 3.10.11	4.9.1) 4.10) 4.9.3) 4.10) 4.9.4) 4.10)	6.5 dphu for each transmitter	
RF Amplifier AM-494( )/GR RF Amplifier AM-495( )/GR				
Power output Plate Circuit Control Grid Circuit	3.11.2 3.12.2 3.11.3 3.12.3 3.11.6 3.12.6	4.11.2) 4.12.2) 4.11.3) 4.12.2) 4.11.3) 4.12.2)	1.5 dphu	
Radio Set Control C-844( )/U Continuity	3.14	4.21.1	1.5 dphu	
Radio Set Control C-845( )/U Line output Frequency response Loudspeaker Output Handset output Hum level	3.15.2 3.15.3 3.15.4 3.15.5 3.15.6 3.15.7	4.13.1 4.13.2 4.13.3 4.13.3.1 4.13.4 4.13.5	1.5 dphu	
Radio Set Control C-847( )/U Loudspeaker Control functions Handset output Continuity	3.16.1 3.16.2 3.16.3 3.16	4.14.1) 4.14.3) 4.14.2) 4.14.3)	1.5 dphu	

Table IX (Cont'd)

Inspection	Req't Para.	Insp Para.	AQL Major	AQL Minor
Dynamotor DY-93( )/G Dynamotor DY-98( )/U Dynamotor DY-100( )/U				
Input voltage Output voltages Regulation Ripple Efficiency	3.17.1 3.17.2 3.17.3 3.17.3 3.17.3	4.15.1) 4.15.2) 4.15.3) 4.15.4) 4.15.5)	1.5 dphu for each dynamotor	
Power Supply PP-638( )/U Power Supply PP-804( )/U				
Input voltage Output voltage	3.18.1 3.19.1 3.18.2 3.19.2	4.16.1 4.17.1 4.16.2 4.17.2	1.5 dphu for each power supply	
Power Supply PP-846( )/U Power Supply PP-867( )/U Power Supply PP-868( )/U Power Supply PP-869( )/U Power Supply PP-1126( )/U Power Supply PP-1127( )/U Power Supply PP-1128( )/U				
Input voltage Output voltage Ripple Input current Overvoltage	3.20.1 3.20.2 3.20.3 3.20.4 3.20.5	4.18.1) 4.18.2) 4.18.3) 4.18.5) 4.18.4)	1.5 dphu for each power supply	
Subassembly, Receiver MX-1547( )/G	3.8	4.7.17) 4.8.17)	1.5 dphu	
Cabinet CY-938( )/VRC	3.22	4.19	1 %	
Cabinet CY-1150( )/U	3.23	4.20	1 %	
Cabinet CY-1221( )/G				
Control Functions Cabinet Wiring	3.24.1 3.24.2	4.21 4.21.1	1 %	
Operational and Systems Tests	3.5	4.6	1 %	

* All electrical defects are considered major.

... services should include and identify a prudent quantity o

4.3.2 Group B inspection.- This inspection (including sampling) shall conform to Table XIV and the "Sampling for Expensive Testing by Attributes" in Standard MIL-STD-105. Unless otherwise specified herein, normal inspection shall be used at the start of the contract. The reduced inspection procedures shall be R-1. Disposition of non-conforming products (sample units and inspection lots) shall be in accordance with 4.3.4 and the requirements of Standard MIL-STD-105 for disposition of rejected products.

4.3.2.1 Group B sample plans.- The group B sample plans shall be as listed in Table XIV.

4.3.2.2 Order of inspection within group B.- Group B inspection shall be performed in any order which is satisfactory to the Government.

4.3.2.3 Procedure in case of failure.- When an inspection lot fails, the contractor shall immediately investigate the cause of failure and shall report to the government inspector the results thereof and details of corrective action taken. If the contractor and government inspector cannot agree on the effectiveness of the corrective action, the matter shall be referred to the contracting officer for resolution.

Table XIV Group B Inspection

Inspection	Requirement Paragraph	Inspection Paragraph	Group B Plans
Radio Receivers			
R-257( )/U			
Oscillator Warping Control	3.6.3	4.7.15	B-2 for group
Audio Frequency Response	3.6.7	4.7.3	
Spurious Radiation	3.6.18	4.7.13	
R-394( )/U			
Oscillator Warping Control	3.7.3	4.8.15	B-2 for group
Audio Frequency Response	3.7.7	4.8.3	
Spurious Radiation	3.7.17	4.8.5	
Radio Frequency Amplifiers			
AM-494( )/U			
Harmonic Filter	3.11.5	4.11.4	B-2
AM-495( )/U			
Harmonic Filter	3.12.5	4.12.2	B-2
Interchangeability	3.26	4.22.1	B-2

4.3.3 Group C inspection.- This inspection shall be as listed in Table XV.

4.3.3.1 Sample for inspection of equipment.- Two equipments for each Group C inspection shall be selected each month without regard to quality.

4.3.3.2 Noncompliance.- If a sample unit fails Group C inspection, the contractor shall immediately investigate the cause of failure. He shall report to the government inspector the results thereof and detail the corrective action taken on production units manufactured under the same conditions, materials, processes, etc. If the government inspector does not consider that such corrective action will enable the product to meet specified requirements, or if the contractor cannot determine the cause of failure, the matter shall be referred to the contracting officer.

4.3.4 Disposition of nonconforming products.- The following shall be suitably tagged to indicate cause of failure and means employed to correct the fault:

Sample units found defective during Group A, B, or C inspection.

Inspection lots which failed during Group A or B inspection.

Product which has been re-worked as result of failure during Group C inspection.

The required information shall be presented to the Government when the product is submitted and shall become the property of the Government.

Table XV Group C Inspection

Inspection	Requirement Paragraph	Inspection Paragraph
Radio Receivers		
R-257( )/U R-394( )/U		
Spurious Response	3.6.10 3.7.10	4.7.5 4.8.5
Adjacent Channel Selectivity	3.6.12 3.7.12	4.7.7 4.8.8
Alternate Channel Selectivity	3.6.13 3.7.13	4.7.8 4.8.8
Intermodulation	3.6.16 3.7.16	4.7.11 4.8.11
De-emphasis	3.6.17 3.7.17	4.7.12 4.8.12

Table XV (Cont'd)

Inspection	Requirement Paragraph	Inspection Paragraph
Frequency Stability	3.6.4 3.7.4	4.7.16 4.8.16
Radio Transmitters		
T-208( )/U; T-417( )/GR T-278( )/U; T-416( )/GR		
Frequency Stability	3.9.4 3.10.4	4.9.5 4.10
Dynamotor Power Supply		
DY-93( )/G; DY-98( )/U; DY-100( )/U		
Life	3.17.4	4.15.6*
Power Supply		
PP-638( )/U; PP-804( )/U; PP-846( )/U; PP-867( )/U; PP-868( )/U; PP-869( )/U PP-1126( )/U; PP-1127( )/U; PP-1128( )/U		
Life	3.18.4 3.19.4 3.20.8	4.16.3* 4.17.3* 4.18.6*

* Vibrators and dry disk rectifiers shall be replaced after completion of the life test.

4.4 Bounce preconditioning.- The unit with shockmounts (if any) removed or blocked shall be placed in its normal operating position on the table of a Package Tester made by L. A. B. Corp., Skaneateles, New York, or equal. The Package Tester, shafts in phase, shall have a speed such that it is just possible to insert a 1/32-inch thick strip of material under one corner or edge of the unit to a distance of 3 inches as the unit bounces. The unit shall be subjected to this preconditioning for one minute. After bounce preconditioning, the unit shall not be repaired, aligned, cleaned, or otherwise changed prior to being subjected to the procurement inspection.

4.5 Standard test conditions.- Standard test conditions are those which are to be maintained for the particular performance requirements described herein except when modification is necessary to perform a particular test:

(a) Audio output shall be 0.5 watt at the speaker terminals.

(b) Audio output shall be 10 milliwatts at the handset terminals.

(c) Quieting sensitivity shall be 20 db.

(d) Signal to noise ratio shall be 10 db.

(e) Speaker output impedance shall be 8 ohms.

(f) Line output impedance shall be 600 ohms.

(g) Transmitter dummy antenna shall be 50 ohms non-reactive.

(h) Input voltage shall be 6.3, 12.6, 26.2, VDC or 115/250 V 60 cps AC, as applicable.

(i) Temperature and humidity shall be in the range 59°F to 86°F with 50 to 70 percent relative humidity.

(j) Standard deviation shall be ±[illegible] kc with input line level of -2dbm at standard test frequency of 1000 cps.

(k) Warm-up period shall be 5 minutes.

(l) Line output or input -2dbm.

4.6 Operational and system test.- The necessary connections and adjustments shall be made on the components and subassemblies of the component or system under test for the mode of operation specified in section 3. Each component shall be tested for proper operation of all operating controls, switches and indicator lights. The frequencies to be used shall be selected by the Government. Actual transmission and reception of voice signals shall be accomplished. Satisfactory quality in transmission, reception, amplification in conformance with the requirements herein, in each combination of service, power and frequencies specified shall be an indication of acceptable operational performance. Functioning of associated circuits in each mode of operation specified shall also be checked.

4.7 Radio receiver R-257( )/U

4.7.1 IF bandwidth.- AVC shall be disabled. An unmodulated signal shall be coupled into the signal grid of the first converter tube. The generator input level shall be adjusted to give a limiter grid voltage reading below saturation. Record the voltage reading. The generator frequency shall be varied on both sides of the resonant frequency point until the limiter voltage returns to the level recorded. The generator frequency at these points shall be recorded and the difference between the resonant frequency and these recorded points shall be taken as a measure of the IF bandwidth.

4.7.2 Sensitivity.- A signal generator with 50 ohms output impedance shall be connected to the receiver antenna terminal through a 50 ohm coaxial cable. A 50 ohm, 6 db coaxial pad shall be inserted between the signal generator output jack and the cable. The minimum unmodulated carrier signal input in microvolts required to reduce the noise level at the receiver audio output circuit by 20 db shall be considered the quieting signal sensitivity. The measurements shall be made at the low end, middle, and high end of the frequency range specified in 3.6.2 and shall show compliance with paragraph 3.6.6.

NOTE: The signal as read on the generator should show two microvolts or less which, due to the 6 db pad, results in compliance with paragraph 3.6.6.

4.7.3 Audio frequency response.- An audio oscillator with an output impedance adjusted to simulate the output impedance of the discriminator shall be applied to the input of the audio amplifier (including the de-emphasis network). The output of the oscillator shall be adjusted so that it does not overload the audio amplifier at 100 cps. The frequency shall be varied from 100 to 4000 cps, and the audio output into an 8 ohm load shall be measured. These measurements shall be corrected for the 6 db per octave de-emphasis characteristic. The de-emphasis network of 3.6.17 may be included in the audio system, in which case the response shall be taken with reference to a 6 db per octave de-emphasis characteristic.

4.7.4 Squelch.- A signal generator with a 50 ohm output impedance shall be connected to the receiver antenna terminal through a 50 ohm coaxial cable. A 50 ohm, 6 db coaxial pad shall be inserted between the signal generator output jack and the cable.

4.7.4.1 Maximum squelch sensitivity.- With the RF signal input to the receiver set to zero, advance the squelch control slowly until the receiver just quiets (threshold). The unmodulated RF signal input to the receiver shall be increased slowly. The minimum signal input required to open the squelch shall be taken as the maximum squelch sensitivity.

4.7.4.2 Minimum squelch sensitivity.- With the squelch control in the least sensitive position, the RF signal input shall be increased slowly. The minimum signal input required to open the squelch shall be taken as the minimum squelch sensitivity.

4.7.5 Spurious response.- The minimum unmodulated RF signal at the operating frequency necessary to produce 20 decibels of quieting shall be measured. The signal generator shall then be adjusted for 50,000 microvolts output and slowly tuned through the frequency range of 2 to 250 megacycles. The minimum signal input at any other frequency, including images and IF, necessary to produce 20 db of quieting, shall be measured. The ratio of the input at the operating frequency to the input at any other frequency shall be taken as the spurious rejecteon ratio. This test shall be conducted with the receiver tuned to the high, middle, and low ends of the band.

4.7.6 Power output.- A 1000 cycle tone shall be fed into the grid of the first audio amplifier and the volume control set for maximum volume. With a distortion meter connected to the audio output circuit, the input tone level shall be increased until 10% distortion is indicated. The audio power output under these conditions shall be considered the maximum power output.

4.7.7 Adjacent channel selectivity.- The unmodulated signal at the operating frequency necessary to provide 20 db of quieting shall be measured. The unmodulated signal at the operating frequency plus 40 kc necessary to produce 20 db of quieting shall be measured. The unmodulated signal on the operating frequency minus 40 kc necessary to produce 20 db of quieting shall be measured. The ratio of either of these two off-resonant inputs to the resonant input shall be considered the adjacent channel selectivity.

4.7.8 Alternate channel selectivity.- The unmodulated signal at the operating frequency necessary to produce 20 db of quieting shall be measured. The unmodulated signal at the operating frequency plus 80 kc necessary to produce 20 db of quieting shall be measured. The unmodulated signal at the operating frequency minus 80 kc necessary to produce 20 db of quieting shall be measured. The ratio of either of the two off-resonant inputs to the off-resonant input shall be considered the alternate channel selectivity.

4.7.9 Maximum quieting.- A signal of 100 microvolts modulated ±15 kc at 1000 cycles shall be fed into the antenna terminals. Adjust audio gain control for 0.5 watts output or 2 volts. Turn off modulation. The ratio of the output with modulation to the output without modulation shall be considered the maximum quieting and shall meet the requirements of paragraph 3.6.14.

4.7.10 Discriminator characteristic.- A signal generator shall be connected to the signal grid of the first 455 kc intermediate amplifier and a vacuum tube voltmeter connected across the discriminator load. With no signal from the generator, the voltage should be read across the discriminator load and recorded. (This is a fixed DC value due to the effect of the dropping resistor). An unmodulated signal of sufficient value to saturate the limiter shall be fed into the intermediate amplifier. The input frequency shall be varied above and below the resonant frequency. The frequency at which the voltage becomes maximum in both polarities, as well as the voltage value, shall be recorded.

4.7.11 Intermodulation.- The outputs of two signal generators shall be connected in parallel to the antenna terminals of the receiver. The input necessary at resonance to produce 20 db of quieting for each generator separately, with both generators connected, shall be measured. One generator shall be adjusted 80 kc above the resonant frequency and the output adjusted to 55 db above the level at resonance. The second generator shall be adjusted to approximately 40 kc above the resonant frequency, and the output adjusted to 55 db above the resonant output. The frequency of the second generator shall be adjusted slightly until the artificial carrier produced by the two generators is properly tuned in. Less than 20 db of quieting shall be obtained under these conditions.

4.7.12 De-emphasis.- An audio oscillator shall be connected to the input to the de-emphasis network and an AC voltmeter shall be connected to the output. The frequency shall be varied from 300 to 3500 cycles, and the output measured.

4.7.13 Spurious radiations.- Two receivers shall be mounted side by side. The antenna of the receiver under test shall be connected to a receiver with a tunable frequency range from 2 to 250 mcs. (Example: Empire Devices Products Corporation Noise and Field Intensity Meter, or equal.) The test shall be performed with the receiver tuned to the low, middle, and high frequencies. The entire tuning range of the second receiver shall be scanned. Any spurious radiations from the receiver under test shall be measured, and shall be in accordance with 3.6.18.

4.7.14 IF and discriminator stability.- Measure the frequency at which the voltage response across the discriminator load is maximum, as in paragraph 4.7.10. Record the frequency at which the vacuum tube voltmeter indicated 10 db down from maximum response on each side of resonance. Determine the center of this IF bandpass. Subject the radio receiver to the temperature range specified in 3.4.1. The center of the bandpass and the point of zero on the discriminator shall meet the requirements specified in paragraph 3.6.19.

4.7.15 Frequency warping control.- Measure the change in frequency of the first local oscillator caused by varying the warping control. This change shall be in accordance with 3.7.3.

4.7.16 Frequency stability.- Frequency stability shall comply with 3.7.4.

4.7.17 Re-transmission Sub-assembly MX-1547/G.- Sub-assembly MX-1547/G shall be checked for compliance with 3.8.

4.8 Radio Receiver R-3[illegible]( )/U

4.8.1 IF bandwidth.- The IF bandwidth shall be tested in accordance with 4.7.1.

4.8.2 Sensitivity.- Sensitivity shall be tested in accordance with 4.7.2.

4.8.3 Audio frequency response.- The frequency response shall be tested in accordance with 4.7.3.

4.8.4 Squelch.- Squelch shall be measured in accordance with 4.7.4, 4.7.4.1, 4.7.4.2.

4.8.5 Spurious response.- Spurious response shall be tested in accordance with 4.7.5.

4.8.6 Power output.- Power output shall be measured in accordance with 4.7.6.

4.8.7 Adjacent channel selectivity.- Adjacent channel selectivity shall be tested in accordance with 4.7.7 except that frequencies shall be resonant frequency ±60 kc..

4.8.8 Alternate channel selectivity.- Alternate channel selectivity shall be tested in accordance with 4.7.8 except that frequencies shall be resonant frequency ±120 kc.

4.8.9 Maximum quieting.- Maximum quieting shall be tested in accordance with 4.7.9.

4.8.10 Discriminator characteristics.- Discriminator characteristics shall be tested in accordance with 4.7.10.

4.8.11 Intermodulation.- Intermodulation shall be tested in accordance with 4.7.11, except that frequencies shall be 50 kc and 100 kc above the resonant frequency.

4.8.12 De-emphasis.- De-emphasis shall be tested in accordance with 4.7.12.

4.8.13 Spurious radiations.- Spurious radiations shall be tested in accordance with 4.7.13.

4.8.14 IF and discriminator stability.- IF and discriminator stability shall be measured in accordance with 4.7.14.

4.8.15 Frequency Warping Control.- Measure the change in frequency of the first local oscillator caused by varying the warping control. This change shall be in accordance with 3.7.3.

4.8.16 Frequency stability.- Frequency stability shall comply with 3.7.4.

4.8.17 Re-transmission Sub-assembly MX-1547/G.- Sub-assembly MX-1547/G shall be checked for compliance with 3.8.

4.9 Transmitter, radio T-208( )/U and T-417( )/GR.-

4.9.1 Frequency deviation.- The transmitter shall be operated at approximately the middle of the frequency range. A signal of 1000 cps, 0.1 volt shall be applied to the transmitter microphone terminal or 0.2 volt to the transmitter line terminals. The deviation as measured on a calibrated receiver shall meet the requirements of 3.9.6. An audio signal of 40 millivolts shall then be applied to the 600 ohm input terminals and the frequency varied from 100 to 3500 cps. The deviation shall meet the requirements of 3.9.6.

4.9.2 Spurious radiations.- The transmitters shall be tested for spurious radiations and shall meet the specification requirements of MIL-I-11748.

4.9.3 Power output.-Tune Transmitter T-208( )/U and Transmitter T-417( )/U to frequencies at the high end, low end and middle of their frequency ranges. Measure outputs into a standard 52 ohm dummy antenna at each frequency, Outputs shall conform to 3.9.10. Final plate current of the T-208( )/U shall not exceed 155 milliamperes, and final plate current of the T-417( )/U shall not exceed 200 milliamperes.

4.9.4 Deviation limiting.- With the equipment set up as in 4.9.1, the deviation limiter control shall be set for a maximum of 18 kc deviation. Deviations up to ±12 kc shall show no more than 10 percent overall distortion for any modulating frequency from 300 to 3500 cps. Audio input voltage shall be increased to check compliance with 3.9.11.

4.9.5 Frequency Stability.- Frequency stability shall meet the requirements of 3.9.4.

4.10 Radio transmitters T-278( )/U and T-416( )/GR.- Radio transmitters T-278( )/U and T-416( )/GR shall be tested in accordance with 4.9.1 through 4.9.5 inclusive.

4.11 Radio frequency amplifier AM-494( )/GR.-

4.11.1 RF Input.- Radio transmitter T-416( )/GR shall be connected to the input of amplifier AM-494( )/GR. When the transmitter is properly tuned and adjusted, the RF excitation fed to AM-494( )/GR from the T-416( )/GR shall be as required to permit the amplifier to meet specified requirements.

4.11.2 Power output.- With the output of Radio Transmitters T-278( )/U or T-416( )/GR connected to the RF input of the amplifier, the power into the standard dummy antenna shall be measured at the low, middle and high points of the frequency range. The requirements of 3.11.2 shall be met.

4.11.3 Plate, screen and grid circuits.- Under the same test conditions and connections of 4.11.2, and the amplifier tuned for rated power output at mid-frequency, the amplifier shall be tested for compliance with 3.11.3. When the test switch is set at Screen 1 and Screen 2 positions, the amplifier shall meet the requirements of 3.11.4. With the test switch in the control grid position, the requirements of 3.11.6 shall be met.

4.11.4 Harmonic filter.- The transmitter and power amplifier shall be operated under standard test conditions. Modulation may be applied to aid in identifying some of the spurious radiation. Measurements shall be made with receivers covering the second harmonic range. The receiver sensitivity and detector output circuits shall be of suitable design for establishing reference detector readings which are 70 db below the carrier frequency level. Measurements shall be made in a screen room.

4.12 Radio frequency amplifier AM-495( )/GR.-

4.12.1 RF input.- Radio Frequency Amplifier AM-495( )/GR shall be connected in accordance with 4.11.1 except that the transmitter providing the input excitation shall be transmitter T-417( )/GR.

4.12.2 Other tests.- AM-495( )/GR shall be tested in accordance with 4.11.2 throug 4.11.4, inclusive.

4.13 Radio Set Control C-845( )/U.-

4.13.1 Line output.- An audio oscillator shall be connected to the microphone inpu terminals and the output adjusted to 0.10 volt at 1000 cps. The power at line output term inals shall be measured. The requirements of 3.15.2 shall be met.

4.13.2 Frequency response.- An audio oscillator shall be connected to the microphc input terminals and the output adjusted to 0.10 volt at 1000 cps. Adjust the microphone level control for 0.62 volt at the line terminals. The voltage developed across a 600 ohm resistor connected to the line output terminals shall be measured as the frequency is vari from 100 to 3500 cps. The requirements of 3.15.3 shall be met.

4.13.3 Loudspeaker, dynamic (4" dia.) for radio set control C-845( )/U.- The loud- speaker shall be tested for compliance with 3.15.4 in accordance with Specification MIL-L- 12606.

4.13.3.1 Output.- An audio oscillator shall be connected to the wire line terminal and adjusted to 1000 cps at -2 dbm. With the volume control at maximum , the power output and the distortion at the speaker terminals shall be measured. The requirements of 3.15.5 shall be met.

4.13.4 Handset output.- An audio oscillator shall be connected to the wire line terminals and adjusted to 1000 cps at -2 dbm. The power output at the handset terminals with the volume control at maximum shall be measured. The requirements of 3.15.6 shall be met.

4.13.5 Hum level.- Load input and output with equivalent matching resistive loads including resistor in place of loudspeaker.

4.13.5.1 In transmit condition, feed an audio voltage of .1 volt (RMS) in to micro- phone terminals. Adjust gain for .62 volts output across line. Remove audio voltage and measure hum and noise across line for compliance with 3.15.7.

4.13.5.2 In receive condition, feed an audio voltage at -4 dbm into line terminals. Adjust gain for 0.5 watt across dummy loudspeaker resistor. Remove audio voltage and measure hum and noise in output for compliance with 3.15.7.

4.14 Radio Set Control C-847( )/U.-

4.14.1 Loudspeaker, dynamic (4" dia) for radio set control C-847( )/U.- The loud- speaker shall be tested for compliance with 3.16.1 in accordance with Specification MIL- L-12606.

4.14.2 Handset output.- Radio set control C-847( )/U shall be tested in accordance with 4.13.4.

4.14.3 Control functions specified in 3.16.2 shall be checked for proper operation. Electrical continuity of wiring and other connections shall be verified by a point to point test.

4.15 Dynamotor, power supplies DY-93( )/G, DY-98( )/U, DY-100( )/U.-

4.15.1 Input voltage test.- The dynamotor power supply shall be operated with the minimum input voltage and maximum input voltage listed in Table III, under full load conditions. The dynamotor shall meet the requirements of 3.17.1.

4.15.2 Output voltage test.- The voltages for the dynamotor power supply required in 3.17.2 shall be measured with a high resistance voltmeter having an accuracy of 1 percent or better.

4.15.3 Regulation.- The voltage regulation shall be determined by operating the power supply with the required DC input voltage listed in Table V at no load and with a 1650 ohm resistive load across output jacks 1 and 2 (located on top of the dynamotor). The regulation shall be calculated by using the following formula:

$$\text{Percent regulation} = \frac{(E_1 - E_2)}{E_2} \times 100$$

Where E_1 equals voltage output of the dynamotor with no load and E_2 equals voltage output of the dynamotor with a 1650 ohm resistor connected as the load.

4.15.4 Ripple voltage tests.- Ripple voltage measurements shall be made with an electronic voltmeter, Ballantine Model 300 or equal, connected in series with a 2 mfd., capacitor.

4.15.5 Efficiency tests.- Efficiency shall be determined by measuring the input to the power supply and by measuring the output of the dynamotor component at jacks No. 1 and No. 2. A resistive load of 1650 ohms shall be connected to the output of the dynamotor. Efficiency shall be computed by using the following formula:

$$\% \text{ Efficiency} = \frac{\text{Output Wattage}}{\text{Input Wattage}} \times 100$$

$$\text{Input Wattage} = \text{Input Current} \times \text{Input Voltage}$$

$$\text{Output Wattage} = \frac{(\text{Output Voltage})^2}{1650 \text{ ohms}}$$

4.15.6 Life test.- The power supply shall be operated at room temperature, continuously for 1000 hours with the maximum input voltage specified in Table V and the loads specified in Table VI after which it shall meet the requirements of Table VI.

4.16 Power supply 77-638( )/U.-

4.16.1 Input voltage test.- The power supply shall be operated with the minimum input voltage and maximum input voltage listed in 3.18.1, under full load conditions. The power supply shall meet the requirements of 3.18.1.

4.16.2 Output voltage test.- When operated with an input voltage within the limits specified in 3.18.1, the power supply shall meet the requirements of 3.18.2.

4.16.3 Life test.- The power supply shall be operated at room temperature continuously for 500 hours with the maximum input voltage specified in 3.18.1 and with the load specified in 3.18.2. Once each day the input voltage shall be reduced to the minimum voltage specified in 3.18.1 and the power supply shall be turned off and on five times. Failure of the power supply to start shall constitute failure of the life test. The volt shall then be returned to its former value and the life test continued. At the conclusi of the life test, the outputs and ripple shall not have changed by more than 10 percent the initial values.

4.17 Power supply PP-804( )/U.-

4.17.1 Input voltage test.- The power supply shall be operated with the minimum put voltage and maximum input voltage listed in 3.19.1 under full load conditions. The power supply shall meet the requirements of 3.19.1.

4.17.2 Output voltage test.- When operated with an input voltage within the limi specified in 3.19.1, the power supply shall meet the requirements of 3.19.2.

4.17.3 Life test.- The power supply shall be subjected to the same life test as 4.16.3, except that the input voltages and loads in 3.19.1 and 3.19.2, respectively shall apply.

4.18 Power supplies PP-846( )/U, PP-867( )/U, PP-868( )/U, PP-869( )/U, PP-1126( )/U, PP-11_( )/U, and PP-1126( )/U.-

4.18.1 Input voltage test.- The power supply shall be operated with the minimum i put voltage and maximum input voltage listed in Table IX under full load conditions. The power supply shall meet the requirements of 3.20.1.

4.18.2 Voltage output test.- The power supplies shall be tested for voltage outpu by means of the load resistors in Table XI. The units when tested shall meet the requirements of Table X and paragraph 3.20.2.

4.18.3 Ripple test.- The ripple voltage of the power supplies shall not exceed the values specified in 3.20.3 when the equipment is operated with the inputs specified in 3.20.1 and with the load resistances specified in Table XI. Ripple measurements shall be made with an electronic voltmeter, Ballantine Model 300, or equal.

4.18.4 Overvoltage test.- The equipment shall be operated for a period of five minutes with the maximum input voltage specified in Table IX.

4.18.5 Input current drain.- With maximum voltages applied, the maximum input current shall not exceed the requirements of 3.20.4.

4.18.6 Life test.- The power supply shall be operated at room temperature continuously for 500 hours with the maximum input voltage specified in Table IX and with the load specified in Table X. Once each day the output voltage and ripple readings shall be taken. Once each day the input voltage shall be reduced to the minimum voltage specified in Table IX and the power supply shall be turned off for approximately five seconds, after which it shall be turned on for five seconds and off for five seconds repeatedly for a total of five such starting cycles daily during the 500 hour life testing period. Each day, immediately after the conclusion of the ON-OFF test cycles, the voltage shall be increased to its former maximum value and the life test operational procedure resumed daily throughout the prescribed 500 hour period, provided the power supply has not failed this test in the interim by becoming inoperative at any time subsequent to each daily ON-OFF test cycles. Failure of the power supply to start shall constitute failure of the life test. The voltage shall then be returned to its former value and the life test continued. At the conclusion of the life test, the outputs shall not have changed by more than 10 percent, nor the ripple increased by more than 10 percent of their respective initial values.

4.19 Cabinet, Electrical Equipment CY-938( )/VRC.- Electrical Equipment Cabinet CY-938( )/VRC shall be checked by means of continuity measurements for compliance with electrical provisions of 3.22.

4.20 Cabinet, Electrical Equipment CY-1150( )/U.- Electrical Equipment Cabinet CY-1150( )/U shall be checked by means of continuity measurements for compliance with electrical provisions of 3.23.

4.21 Cabinet, Electrical Equipment CY-1221( )/G and Radio Set Control C-844( )/U.- Electrical Equipment Cabinet CY-1221( )/G shall be checked for control function as specifi in 3.24.1.

4.21.1 Continuity measurements shall verify compliance with 3.24.2 and 3.14.

4.22 Visual and mechanical inspection.- Parts and equipments shall be examined for the defects listed in Standard MIL-STD-252.

4.22.1 Inspection for interchangeability.- The dimensions listed below shall be gaged or measured to determine compliance with the physical interchangeability requirement of 3.26. When a listed dimension is not within specified or design limits, it shall be considered a major defect.

(a) External and internal dimensions of cases, covers, and insertable subassemblies, when such dimensions affect mating of parts.

(b) Internal dimensions of cavities in cases and assemblies, when such dimensions affect acceptability of insertable subassemblies.

(c) Location of hinges and fasteners on separable parts or assemblies which must mate together, such as cases, covers and mountings.

(d) Location of connectors, locking pins, fasteners, slides, and mountings which receive mating parts of plug-in assemblies and major components.

(e) Location of connectors, locking pins, fasteners, slides, and mountings on plug-in assemblies.

(f) Size and form of special threads.

4.23 Service conditions tests.- The following service conditions tests shall be performed. During the service conditions tests, the equipment shall be operated continuou or intermittently as the specification requires, and performance data recorded. Between te the equipment shall be checked for such defects as low dielectric strength, loss of electri continuity, loose parts, excessive corrosion, breakage, etc. Performance checks shall be made on the equipment at the conclusion of each service condition test. These performance checks shall be sufficiently adequate in number and scope to uncover any defect resulting from the preceding service conditions test. Any evidence of degradation of performance below limits specified herein shall be cause for rejection.

4.23.1 Temperature.- All components shall be tested for compliance with 3.4 in accordance with procedures of MIL-STD-169. After a 15 minute warm-up period the equipment shall show full compliance.

4.23.2 Moisture-resistance test for equipment.- The equipment shall be tested as follows:

4.23.2.1 Test conditions.-

(a) Do not remove equipment from the humidity chamber for measurements.

(b) Start measurements not more than 5 minutes after power is applied to the equipment. Complete measurements as rapidly as possible. Do not leave power on after measurements have been completed.

(c) Test sealed equipment with the seal intact except during last two cycles. Bring out leads for electrical measurements through a hole in the equipment enclosure and seal against entrance of moisture. Perform last two cycles with the chassis removed from its enclosure.

4.23.2.2 Test method.-

(a) Dry at 130° ± 5°F for 24 hours with covers removed.

(b) Condition at 77° ± 5°F and 40 to 50 percent relative humidity for 24 hours.

(c) Make the required measurements and readjust or realine as necessary to meet full specification requirements.

(d) Subject to continuous cycling for five 48 hour cycles. Temperature, relative humidity, and period of time for each portion of the cycle shall conform to Standard MIL-STD-170. Measure performance in accordance with the periods indicated on temperature chart for the first four cycles.

(e) After cycling has been completed, condition the equipment for 24 hours at 77° ± 5°F and 40 to 60 percent relative humidity. Then adjust for optimum performance, using only those means provided by the equipment. No repair or replacement of parts shall be made. After adjustment, the equipment shall meet full specified performance.

4.23.2.3 Failure.- If any equipment fails to meet specified performance during cycling, it shall be realined or readjusted once. If the equipment then fails to meet specified performance or fails subsequently during cycling, it does not pass the test. In addition, if the equipment fails to meet full specification requirements after conditioning and adjustment, it does not pass the test.

4.23.3 Altitude tests.- The equipment shall be placed in an altitude chamber at normal conditions of temperature, pressure, and humidity and the performance measured. The pressure shall then be reduced to 20 inches of mercury and stabilized for two hours. The performance of the equipment shall be measured. The pressure shall then be lowered to 11 inches of mercury and again stabilized for a two-hour period. The pressure shall be increased to 29.9 inches of mercury and performance measured again. The equipment shall meet the requirements of paragraph 3.4.2.

4.23.4 Vibration tests.- The equipment shall be tested for resonant frequencies below 55 cps to determine compliance with paragraph 3.4.2(e) as follows:

(a) The equipment shall be fastened in its normal mounting position (shock mounts, if any, shall be blocked) on a vibration table controllable within 10 percent of the specified amplitude. The vibration table shall provide approximately sinusoidal vibration.

(b) The equipments shall be vibrated successively in three mutually perpendicular directions that are parallel respectively to the edges of the equipment, over a frequency range of 10 to 55 cps, in one cycle per second increments. The total excursion shall be constant at a 1/64 inch.

(c) Mechanical resonance, if any, of the complete structure of subassemblies and of component parts shall be detected finally by means of a Strobotac as made by the General Radio Corporation, Cambridge, Massachusetts, or equal, or by energizing the equipment and detecting mechanical vibration through electrical output indications.

(d) If, because of compactness or inaccessibility it is not practical to determine completely any resonance on the assembled equipment by the above means, the equipment shall be broken down into logical subassemblies for this test. These subassembli shall be secured in the vibration table in the same manner that they are secured in the equipment unit. After vibration tests, equipment shall be capable of full compliance with all specification requirements.

4.23.5 Bounce test.- The equipment, as packed for field transport shall be placed on the table of the Package Tester as made by the L.A.B. Corporation, Skaneateles, New York, or equal, and shall be constrained from horizontal motion of more than 2 inches by suitable wooden fences. The Package Tester, shafts in phase, shall be operated at a speed of 285 rpm ± 1 percent for a total of 3 hours. The adapter plate shall be rotated through 90 degrees at the end of each 3/4 hour period, in the same direction.

4.23.5.1 Bounce Test for vehicular equipment.- The equipment, as packed for field transport, shall be placed on the table of the Package Tester, as made by the L.A.B. Corporation, Skaneateles, New York., or equal.

(a) The speed of the package tester shall be 285 ±1 RPM.

(b) The table top of the machine shall be inclined at the rate of 1/8 inch per foot. The direction of the incline to be towards the rear of the table when the table is viewed from a position such that the driving motor is at the viewer's left.

(c) The back stop provided at the rear of the table top (when viewed per (b) above) shall include rubber bumpers spaced as required. The bumpers shall be of a high grade natural rubber of 60 or 70 durometer.

(d) The sides of the table top shall have restricting barriers bolted to the table to allow maximum table top use.

(e) No restricing barrier shall be used at the front end of the table top. (The front is the side nearest the viewer per (b) above.)

(f) The table top shall be covered with Douglas fir plywood ½ inch thick. The plywood should be installed with the top veneer grain perpendicular to the backstop. The plywood top shall be treated with Johnson's Heavy Traffic Wax, or equal. The top shall be rewaxed after every ½ hour increment of the test period, if necessary.

4.23.5.1 Bounce test for vehicular equipment.- (cont'd)

(g) The vehicular equipment with its Mounting MT-1236/VRC shall be bolted in the center of a vehicular adapter plate 48 inches x 48 inches. The plate as obtained from L.A.B. Corporation, or equal, shall have a .125 inch thick steel top and 2 inche sq. solid steel outside edge members. Flatness of the adapter plate is critical.

(h) The equipment shall be tested first in a vertical mounting jeep installation in its Mounting MT-1236/VRC in each of four 90° positions for a period of ½ hour for each position.

(i) Stopping the bounce shall be permitted after each 15 minutes of bounce to allow a 10 minute cooling off period for the shock mounts. Should replacement of any or all mounts be necessary, it shall be done. Breakdown of the rubber shock mounts does not constitute a failure for this test.

(j) After completion of the two (2) hours of bounce per (h), above, the unit under test shall be mounted in a horizontal position (sedan mounting) in its Mounting MT-1236/VRC and the test repeated in each of four positions at ½ hour per position. Total bounce, therefore, is four (4) hours. Conditions per (i), above, also apply.

4.23.6 Bench handling test.- The chassis and front panel assembly shall be removed from its inclosure as for servicing and placed in a suitable position for servicing on a solid 2 inch fir bench-top. The test shall be performed as follows, in a manner simulating shocks liable to occur during servicing:

(a) Tilt up the assembly through an angle of 30 degrees, using one edge of the assembly as a pivot and permit the assembly to drop back fully to the horizontal. Repeat, using other practical edges of the same horizontal. Repeat, using other practical edges of the same horizontal face as pivots, for a total of four drops.

(b) Repeat (a) with the assembly resting on other faces, until it has been dropped for a total of four times on each face on which the assembly could be placed practicably during servicing. At the completion of this test the equipment shall show no evidence of degradation in performance.

4.23.7 Shock test; ballistic.- This test shall be conducted on the vehicular equipments only. The test shall be made on the "shock testing machine for light-weight equipment" shown in specification MIL-S-901. The equipment including shock mounts, if any, shall be secured in its normal operating condition to the steel test plate by use of the same fasteners used for vehicular installation of the equipment. The tests shall consist of total of 9 blows; one each of a one foot blow, a three foot blow, and a five foot blow on the back, side, and top of the test plate for the blows on the side of the plate, equivalent rotation of the equipment under test is permissible.

4.23.8 Rain tests.- The transit case with the equipment or equivalent weight in it. shall be tested step by step as follows:

4.23.8.1 Dry at 150° ± 5°F for 48 hours.

4.23.8.2 Condition for 4 hours at 77° ± 5°F and 40 to 60 percent relative humidity.

4.23.8.3 Place the case in its normal operating position in a test chamber maintained at 77° ± 5°F. Allow simulated rainfall to fall on exposed surface of the component. The water shall be at ambient temperatures and shall fall freely at a rate of 2 inches per hour. Maintain this condition for one hour.

4.23.8.4 With the rainfall continuing at the 2-inch rate, introduce a simulated wind blowing horizontally at 20 ± 5 miles per hour against one side of the case. The water sha fall on exposed surfaces and shall be blown by the wind against one side of the case. Main tain this condition for one hour.

4.23.8.5 Rotate the case 90 degrees horizontally to expose a second side of the case to the wind and rain. Maintain this condition for one hour.

4.23.8.6 Continue as in 4.23.8.5 until all four sides of the case have been exposed to the wind and rain, each side for one hour.

4.23.8.7 Open the case. There shall be no visible evidence of leakage.

4.23.9 Immersion test.- The radio set control C-847( )/U, as prepared for field transportation, shall be immersed to a minimum depth of 3 feet of fresh water for 2 hours. Immediately prior to immersion, the temperature of the equipment shall be 40°F, or more, above the temperature of the water. The tank in which the equipment is immersed shall be of sufficient capacity to maintain the water within ± 2°F of its initial temperature, or the temperature of the water shall be maintained within these limits by other means. After completion of the 2-hour period of immersion, the equipment shall be removed from the water and wiped dry on exterior surfaces. When the equipment is opened, there shall be no evidence of leakage.

4.24 Interference suppression test.- The equipment suppressed in accordance with MIL-I-11748 will be tested for radiated and conducted interference. The tests for radiated interferences will be conducted with the antenna of the test equipment located at a distance of two feet from the equipment.

4.25 Procurement inspection of preparation for delivery.- The minimum inspection performed by the contractor shall be as specified in 4.25.1 and 4.25.2. The Government will review and evaluate the contractor's inspection procedures and examine the contractor's records. In addition, the Government - at its discretion - will verify, by product inspection, the contractor's compliance with specified requirements. (See 6.7.) Such verification shall not exceed the amount of inspection required herein of the contractor. When Standard MIL-STD-105 specifies actions by the Government, the Government may authorize the contractor to perform any of such actions except that responsibility for acceptance rests with the Government.

4.25.1 Preservation and packaging.- Inspection of preservation and packaging shall be as specified in Specification MIL-P-116. Classification of defects shall be as shown on table XVI.

Table XVI

PRESERVATION, AND PACKAGING AND MARKING THEREOF

MAJOR	MINOR
1. Use of improper or defective material.	1. Item not properly blocked or braced within the unit package to prevent movement.
2. Quantity in unit package not as specified.	2. Packaging material damaged.
3. Incorrect packaging method applied.	3. Conforming wraps are not snug-fitting and contain voids.
4. Cushioning or padding omitted.	
5. Cushioning or padding inadequate for protection from projection s, sharp edges, or other similar features of the item.	
6. Cushioning inadequate for the physical and mechanical protection of the item.	
7. Unsealed, punctured, or improperly sealed barrier bag, wrap, or envelope.	
8. Stock number omitted, incorrect, or illegible.	
9. Nomenclature omitted, incorrect, or illegible.	
10. Marking of quantity of items in package omitted, incorrect or illegible.	

4.25.2 Packing and marking of exterior containers.- Packing and marking of exterior containers shall be given visual inspection for the defects listed below and to determine conformance with the approved process sheet furnished by the contractor as required by the contract. This inspection shall conform to the Appendix to Standard MIL-STD-105. Inspection level L-8 shall be used for normal inspection and L-6 for reduced inspection. Unless otherwise specified herein, normal inspection shall be used at the start of the contract. The reduced inspection procedure shall be R-1. The AQL for major defects shall be four percent and the AQL for minor defects shall be ten percent. Classification of defects shall be as shown on table XVII.

Table XVII

PACKING, AND MARKING THEREOF

MAJOR	MINOR
1. Use of improper or defective material.	1. Unsealed carton.
2. Quantity in pack not as specified.	2. Defective taping or sealing of carton.
3. Gross weight in excess of specified amount.	3. Any other box defect which may be considered minor by definition of Standard MIL-STD-105.
4. Box closure not as specified.	4. Any item of required marking information other than 10 thru 16 listed under major defects omitted, incorrect, or illegible.
5. Type, grade, class, and style of the shipping container not as specified.	
6. Strapping omitted.	
7. Strapping inadequate or incorrectly applied.	
8. Items not adequately blocked, braced, or cushioned within the shipping container to prevent movement or damage.	
9. Shipping documents or packing list omitted.	
10. Stock number omitted, incorrect, or illegible.	
11. Nomenclature omitted, incorrect, or illegible.	
12. Marking of quantity of items in pack omitted, incorrect, or illegible.	
13. Destination marking omitted, incorrect, or illegible.	
14. Service designation (color marking) omitted.	
15. Specified special marking and labeling such as NAP labels, shipment digit markings, etc., omitted, incorrect, or illegible.	
16. Overseas code marking omitted, incorrect, or illegible.	

4.25.2.1 Inspection lot.- A lot for visual inspection of the pack shall be all completed packs which are identical and will be submitted for acceptance at one time.

4.25.2.2 Procedure in case of failure.- If an inspection lot fails, the contractor shall immediately investigate the cause of failure and shall report to the Government inspector the results thereof and details of the corrective action taken. If the contractor and Government inspector cannot agree on the effectiveness of the corrective action, the matter shall be referred to the contracting officer for resolution.

4.25.2.3 Disposition of nonconforming product.- Disposition of nonconforming product (sample units and inspection lots) shall be in accordance with the requirements of Standard MIL-STD-105 for disposition of rejected product. When submitted for acceptance, such product shall be suitably tagged or identified by equivalent means to indicate the cause of failure and means employed to correct the fault. The required information shall be presented to the Government when the product is submitted and shall become the property of the Government.

4.26 Rough handling test (preparation for delivery).- When rough handling test is required by the contract (see 6.2 (e)), the operational test (4.6) shall be conducted to determine freedom from operational malfunction caused by the rough handling.

5. PREPARATION FOR DELIVERY

5.1 Preservation and packaging.

5.1.1 Level A.- Components of Radio Sets, (Non-Tactical Radio Equipment) shall be preserved, packaged and tested in accordance with the procedures specified for the designated methods as prescribed in Specification MIL-P-116, and as described herein.

5.1.1.1 Technical manual.- Each technical manual shall be packaged Method IC-3 as follows: Inclose each technical manual within a close-fitting type I class b bag conforming to Specification MIL-B-117. Heat seal the bag to effect closure.

5.1.1.2 Tubes.- All tubes over 4 inches in length, not securely clamped in place, shall be removed, and together with spare tubes, packaged individually in accordance with the applicable provisions of Specification MIL-P-75.

5.1.1.3 Accessories and spare parts.- Accessories and spare parts, determined in quantity and number from the bid request or contract shall be packaged in accordance with the applicable provisions of Specification MIL-P-116.

5.1.1.4 Consolidated package.- Consolidate the items packaged as specified in 5.1.1.2 and 5.1.1.3 together within a close-fitting regular slotted style class 2 fiber box (W5c) conforming to Specification PPP-B-636. Box closure shall be in conformance with the appendix of the referenced box specification.

5.1.1.5 Antenna AS-612( )/U.- Each antenna shall be packaged Method III, as follows: Cushion each antenna by wrapping in flexible single face corrugated fiberboard, type I conforming to Specification LLL-F-291. Secure the cushioning with class 1 gummed paper tape conforming to Specification UU-T-111. Place the cushioned antenna within a close-fitting class 2 regular slotted style fiber box (W5c) conforming to Specification PPP-B-636. Box closure shall be in accordance with the appendix of the referenced box specification.

5.1.1.6 Base, Stand MT-1176( )/FR.- Each base stand shall be packaged Method III. Follow the procedures specified in 5.1.1.5.

5.1.1.7 Cabinet Electrical Equipment CY-1150( )/U. CY-1221( )/G, CY-938( )/VRC, Rack Electrical Equipment MT-1236( )/VRC.- Each item shall be packaged individually Method IC-5 as follows: Cushion all corners and sharp projections with flexible single face corrugated fiberboard and secure the cushioning with gummed paper tape. Fabricate a sleeve of double faced corrugated fiberboard having a minimum dry bursting strength of 275 pounds and in accordance with the applicable provisions of Specification PPP-B-636, class 2, and 2 end caps (half slotted cartons). Inclose the item within the sleeve and on caps and seal all seams and joints with water resistant pressure sensitive tape conforming to Specification PPP-T-76.

*5.1.1.8 Radio Set Control, C-844()/U, C-845()/U, C-847()/U, and Receiver Subassembly MX-1547()/G.-Each item shall be packaged Method IC-5 as follows: Cushion each item on all surfaces with cells or pads or both, fabricated of double faced corrugated fiberboard having a minimum dry bursting strength of 200 pounds and designed to absorb the shock of impact encountered in handling and transit. Cells and pads shall have a water resistance equal to that of the box in which they are used. Place the cushioned item within a close-fitting, regular slotted style, fiber box, Class 2, W5c, conforming to Specification PP-B-636. Box closure shall be as follows: Seal all seams and joints with pressure-sensitive water resistant teperconforming to Specification PPP-B-76.

5.1.1.9 Power Supply PP-638( )/U, PP-804( )/U, PP-846( )/U, PP-867( )/U, PP-868( )/U, PP-869( )/U, PP-1126( )/U, PP-1127( )/U, and PP-1128( )/U.-

5.1.1.9.1 Technical manuals.- Each technical manual shall be packaged Method IC-3 as specified in 5.1.1.1.

5.1.1.9.2 Power supplies.- Each power supply shall be packaged individually Method IC-5 as follows: Place the applicable technical manual together with the respective power supply and continue packaging, following the applicable procedures specified in 5.1.1.8.

5.1.1.10 Antenna AT-438( )/GR.- Each antenna shall be packaged Method III as specified in 5.1.1.5.

5.1.1.11 Receiver Radio R-394( )/U.-

5.1.1.11.1 Technical manual.- Each technical manual shall be packaged Method IC-3 as specified in 5.1.1.1.

5.1.1.11.2 Tubes (spares).- Spare tubes shall be packaged as specified in 5.1.1.2.

5.1.1.11.3 Consolidated package.- Consolidate the packaged tubes (see 5.1.1.11.2) within a close-fitting fiber box, class 1, regular slotted style conforming to Specification PPP-B-636. Box closure shall be made with class 2 gummed paper tape (UU-T-111).

5.1.1.11.4 Receiver Radio R-394( )/U.- Each receiver shall be packaged Method IC-5 as follows: Place the technical manual (5.1.1.11.1) and consolidated package (5.1.1.11.3) together and continue packaging as specified in 5.1.1.8.

5.1.1.12 Receiver, Radio R-257()/U.- Each radio reciever shall be packaged Method IC-5 following applicable procedures specified in 5.1.1.11.

5.1.1.13 Transmitter Radio T-416()/GR.- Each radio transmitter shall be packaged Method IC-5 following applicable procedures specified in 5.1.1.11.

5.1.1.14 Transmitter, Radio T 417( )/GR.- Each radio transmitter shall be packaged Method IC 5 following applicable procedures specified in 5.1.1.11.

5.1.1.15 Transmitter, Radio T-208( )/U.- Each radio transmitter shall be packaged Method IC-5 following applicable procedures specified in 5.1.1.11.

5.1.1.16 Transmitter, Radio T-278( )/U.- Each radio transmitter shall be packaged Method IC-5 following applicable procedures specified in 5.1.1.11.

5.1.1.17 Dynamotor Power Supply DY-93( )/G, DY-98( )/U, and DY-100( )/U.- Each dynamotor shall be packaged Method IC-5, following applicable procedures specified in 5.1.1.8.

5.1.1.18 Amplifier, Radio Frequency AM-494( )/GR and AM-495( )/GR.-

5.1.1.18.1 Technical manual.- Each technical manual shall be packaged Method IC-3 as specified in 5.1.1.1.

5.1.1.18.2 Amplifier, Radio Frequency, AM-494( )/GR and AM-495( )/GR.- Each amplifier shall be packaged Method IC-5 following the applicable procedures specified in 5.1.1.11.

5.1.2 Level C.- Components of Radio Sets (Non-Tactical Radio Equipment) shall be packaged in accordance with commercial practice and in a manner that will afford protection against corrosion, deterioration and physical damage during direct shipment to the first receiving activity.

5.2 Packing.-

5.2.1 Level A.- Components of Radio Sets (Non-Tactical Radio Equipment) shall be packed for shipment within close-fitting overseas class nailed wood boxes, wood wirebound boxes, or wood cleated-plywood boxes conforming to Specification PPP-B-621, PPP-B-585, or PPP-B-601 as applicable. Unless otherwise specified, the technical manual (see 5.1.1.1) shall be placed between the contents and lid of the box. The weight of any one box with contents shall not exceed 200 pounds. Box closure shall be in conformance with the applicable box specification.

5.2.1.1 Metal strapping.- Shipping containers shall be strapped in conformance with the requirements of the appendix of the applicable container specification.

5.2.2 Level B.- Components of Radio Sets (Non-Tactical Radio Equipment) shall be packed for shipment as specified in 5.2.1 except boxes shall be domestic type or class. No strapping required.

5.2.3 Level C.- Components of Radio Sets (Non-Tactical Radio Equipment) shall be packed for shipment in a manner conforming to the requirements of Uniform Freight Classification No. 4, Consolidated Freight Classification Rules 21 for rail shipment, National Motor Freight Classification No. A-3 and No. 14 for truck shipment, Parcel Post Regulations and the regulations of other carriers as applicable to the mode of transportation employed at lowest transportation rate.

5.3 Marking.- Interior packages and exterior shipping containers shall be marked in accordance with the applicable provisions of Standard MIL-STD-129.

6. NOTES.-

6.1 Intended use.- The components covered by this Specification are intended for use in non-tactical applications.

6.2 Ordering data.- Procurement documents should specify the following:

(a) Title, number, and date of this specification and any amendment thereto.

(b) Components required.

(c) Level of packaging and level of packing required for shipment. (Level A, level B, or level C)

(d) The specific paragraphs of Section 5 which are applicable to the particular procurement.

(e) Preproduction inspection:

(1) Number of preproduction samples required (see 3.25.) Two samples of each item cited in section 1 are generally required so that lengthy environmental tests can be completed on one sample while complete performance measurements can be made on the second sample.

(2) Preproduction pack(s) as follows:

a. Makeup of pack(s)

b. Number of each kind of pack to be submitted.

c. Inspection to be performed thereon--including rough handling test, which will not be performed as procurement inspection.

d. Five copies of process sheet using format shown on Drawing SC-C-33073 and accompanied by such drawings, sketches, and other data as may be necessary to completely describe the procedure followed in fabrication of the preproduction pack(s) and to identify the items therein. These data should be submitted to the contracting officer with the preproduction pack.

e. A packaging technician from the procuring agency will evaluate the preproduction pack(s).

(f) Marking and shipping of samples.

(g) Place of final inspection.

(h) Technical literature required.

(i) Quantity of tools and running spare parts required. (see 3.26.)

(j) Submission of the statement of treatment referenced in 3.2.16 as soon as possible after award of contract. This statement should be submitted to the contracting officer.

(k) Source of color chips. (see 3.2.15)

6.3 Nomenclature.- The parentheses in the nomenclature will be deleted or replaced by a letter identifying the particular design; for example: R-257W/U. The contractor should apply for nomenclature in accordance with the applicable clause in the contract. (See 1.2.)

6.4 Location of system operational inspection.- It is desirable that the operational inspection (4.6) be performed at a location that will minimize handling (which might cause damage to the equipment) after this inspection is completed. It is recommended that the entire lot (including all previously inspected sample units) be sampled and inspected immediately prior to packaging.

6.5 Group C inspection.- Approval to ship may be withheld, at the discretion of the Government, pending the decision from the contracting officer on the adequacy of corrective action. (See 4.3.3.2.)

6.6 Inspection.- Inspection is the examination or testing, or both, of supplies to determine compliance with applicable requirements.

6.6.1 Examination.- Examination consists of simple, generally nor destructive, determinations of compliance without use of special testing equipment.

6.6.2 Testing.- Testing consists of determinations of compliance using technical means.

6.7 Verification inspection.- The amount of verification inspection (by the Government) will be adjusted to make maximum utilization of the contractor's quality control system and the quality history of the product and will normally be identified by the categories listed below:

(a) Type A.- The total of that inspection set forth in the Quality Assurance Provisions of this specification or contract. Included in this category is that amount of inspection referred to as normal and tightened inspection by Military Standard MIL-STD-105.

(b) Type B.- That inspection set forth in the Quality Assurance Provisions of this specification or the contract reduced in amount under the reduced inspection provisions of Military Standard MIL-STD-105.

(c) Type C.- A reduced inspection procedure resulting in a material reduction in the amount of inspection set forth in the Quality Assurance Provisions of this specification. The amount of inspection is less than that provided for in Type B and is based upon a consistently acceptable product resulting from a planned quality control system voluntarily employed by the contractor in the production of the product.

6.8 Color.- The color chip furnished by the procuring agency will match color chip No. 2430 of superseded Specification TT-C-595. No matching color chip has been provided in superseding Federal Standard No. 595 (see 3.2.15.)

SPECIFICATION ANALYSIS SHEET

Form Approved
Budget Bureau No. 119-R004

INSTRUCTIONS

This sheet is to be filled out by personnel either Government or contractor, involved in the use of the specification in procurement of products for ultimate use by the Department of Defense. This sheet is provided for obtaining information on the use of this specification which will insure that suitable products can be procured with a minimum amount of delay and at the least cost. Comments and the return of this form will be appreciated. Fold on lines on reverse side, staple in corner, and send to preparing activity *(as indicated on reverse hereof)*.

SPECIFICATION

ORGANIZATION *(Of submitter)*	CITY AND STATE

CONTRACT NO.	QUANTITY OF ITEMS PROCURED	DOLLAR AMOUNT
		$

MATERIAL PROCURED UNDER A

☐ DIRECT GOVERNMENT CONTRACT ☐ SUBCONTRACT

1. HAS ANY PART OF THE SPECIFICATION CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE?

A. GIVE PARAGRAPH NUMBER AND WORDING.

B. RECOMMENDATIONS FOR CORRECTING THE DEFICIENCIES.

2. COMMENTS ON ANY SPECIFICATION REQUIREMENT CONSIDERED TOO RIGID

3. IS THE SPECIFICATION RESTRICTIVE?

☐ YES ☐ NO IF "YES", IN WHAT WAY?

4. REMARKS *(Attach any pertinent data which may be of use in improving this specification. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity)*

SUBMITTED BY *(Printed or typed name and activity)*	DATE

DD, FORM 1 APR 63 1426 REPLACES NAVSHIPS FORM 4863, WHICH IS OBSOLETE C-8278

There are several specialized analysis techniques which can identify problem

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