Introduction

This project was initiated to fill a gap in the documentation that was electronically available for the R-390A receiver.

In July, of 1996, Tom Marcotte, N5OFF made available paper copies of the Military Specification for the R-390A/URR receiver that he obtained under a FOIA request to Fort Monmouth, NJ, home of the U.S. Army Signal Corps.

In March, 1999, I scanned the document into my computer, but the results were less than useful because of the 'fat' font used in typing the document and the poor registration of some of the characters. I ended up re-producing the document using a bold Windows "Courier" font in MS Word and transferring it to an Adobe Acrobat (".pdf") format.

I, as others have, left in all of the original errors as a tribute to an unknown typist at Collins Radio.

The known original errors are:

1. Page 6, paragraph 3.12.3, line 2 - The character within the quotes could not be determined from the copy.
2. Page 11, paragraph 3.13.42, line 3 - "e positions" is as written in the original.
3. Page 19, paragraph 4.6, line 7 - "alined" is as written in the original.
4. Page 24, paragraph 4.13.2, line 2, column 5 "Mc" is mis-aligned as written in the original.
5. Page 32, paragraph 4.5.3, line 2 - "inclosure" is as written in the original.
6. Page 34, paragraph 4.61, line 2 = "gaged" is as written in the original.
7. Page 39, table IV - Use of mixed fonts is as written in the original.

If there are other errors that need to be pointed out, or if I have introduced new errors, I would like to know about then so that I can document them or correct them.

1999-March-12
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MILITARY
SPECIFICATION

MIL-R-13947B(SigC)
26 October 1960
Superseding
MIL-R-13947A(SigC)
14 February 1958

RECEIVER, RADIO
(RADIO RECEIVER R-390( )/URR)

1. SCOPE

1.1 This specification covers one type of communications receiver that operates from a nominal 115/230 volt, 50-60 cycle power source, designated as Receiver, Radio R-390( )/URR. (See 6.1 and 6.3)

2. APPLICABLE DOCUMENTS

2.1 The following documents, of the issue in effect on date of invitation for bids form a part of this specification to the extent specified herein:

SPECIFICATIONS

FEDERAL

C-F-202	Felt, Hair
NN-P-530	Plywood, Flat Panel
PPP-B-566	Boxes, Folding, Paperboard
PPP-B-621	Boxes, Wood, Nailed and Lock-Corner
PPP-B-636	Boxes, Fiber
PPP-T-60	Tape; Pressure Sensitive Adhesive, Waterproof for Packaging and Sealing
QQ-S-781	Strapping, Flat; Steel
UU-T-116	Tape, Paper, Gummed, Water-Resistant
QQ-S-561	Solder, Silver
QQ-S-571	Solder, Lead Alloy, Tin Lead Alloy, and Tin Alloy; Flux Cored Ribbon and Wire, and Solid Form

MILITARY

MIL-V-173	Varnish, Moisture and Fungus-Resistant for the Treatment of Communications, Electronic, and Associated Electrical Equipment
MIL-S-901	Shockproof Equipment, Class HI (High-Impact), Shipload

FSC 5820

MILITARY (Contd)

MIL-C-3098	Crystal Units, Quartz
MIL-I-11748	Interference Reduction for Electronic and Electrical Equipment
MIL-M-13231	Marking of Electronic Items
MIL-F-14072	Finishes for Ground Signal Equipment
MIL-I-16910(Ships)	Interference Measurement, Radio Methods and Limits, 14 kc to 100 mc.
MIL-F-15733	Filters, Radio Interference

STANDARDS

MILITARY

MIL-STD-105	Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-129	Marking for Shipment and Storage
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

DRAWINGS

SIGNAL CORPS

SC-B-61578	Grounding to Chassis
SC-DL-248775	Radio Receiver R-390( )/URR
SC-DL-57592	Gages for Receiver R-390( )/URR
SC-GL-57655	Electrical Gage for Receiver R-390( )/URR

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

3. REQUIREMENTS

3.1 Description.- Radio Receiver R-390( )/URR is a general purpose receiver intended for fixed or mobile service. Its frequency range is 500 kc to 32 mc. With use of suitable accessory equipment, it is capable of receiving all types of signals normally used for communications purposes: Namely, continuous wave (cw), modulated continuous wave (mcw), amplitude modulated (am), frequency-shift keyed (fsk) and single sideband (ssb) signals.

3.2 Construction.- Radio receiver R-390( )/URR shall be constructed in accordance with Drawing SC-DL-248775.

3.3 Plastic materials and parts.- Where not matched, 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.

3.4 Wiring and Cabling.- Wiring and cabling shall be neat and sturdy

3.4.1 Slack.- Wires and cables shall be as short as practical except that sufficient slack shall be provided for the following purposes:

(a) To prevent undue stress on cable forms, wires, and connections, including connections to resiliently supported parts.

(b) To enable parts to be removed and replaced during servicing without disconnection of other parts.

(c) To provide for at least two replacements of the part to which the wire or cable is connected.

(d) to ensure freedom of motion of lugs or terminals normally intended to have some degree of motion. (For example: Floating contacts on electron tube sockets).

(e) To facilitate field repair of broken or cut wires.

3.4.2 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 in metal partitions, shields, or similar items less than 1/8 inch in thickness, the wires shall be protected by suitable grommets or bushings.

3.4.3 Splicing.- Wires in a continuous run between two terminals shall not be spliced during the wiring operation.

3.4.4 Connections.- Before being soldered to terminal lugs or fixed terminal, wires shall be mechanically secured so that the connections are not dependent for strength on solder alone. Electrical connections shall not be made by clamping between a metallic and a nonmetallic material. Fraying of textile ends of wires shall be prevented mechanically or by application of varnish conforming to Specification MIL-V-173. No varnish, lacquer, inspection paint, or other coating shall be applied to completed electrical connections.

3.4.5 Grounding.- Ground connection to shields or other mechanical parts, except the chassis or frame, shall not be made to complete electrical circuits but only to eliminate high-potential ac points. Grounding to the chassis shall conform to Drawing SC-B-61578.

3.5 Soldering.-

3.5.1 Solder. - Solder shall conform to Specification Q-S-571. For soldering electrical connections, composition SN60, type AR or S shall be used for general purposes. When type S solder is used for soldering electrical connections, a rosin type flux shall be employed and shall meet the applicable requirements for Specification QQ-S-571 for the core of type AR solder.

3.5.2 Acid or acid salts.- No acid or acid salts shall be used in preparation for or during soldering; however, 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.

3.5.3 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 unit; flux being spread over a larger area; or damage to the unit. Insulation material that has been subjected to heating during soldering operation shall be undamaged and parts fastened thereto shall not have become loosened.

3.6 Cleaning.-

3.6.1 Parts.- After fabrication, parts shall be cleaned in accordance with good commercial practice, or as specified in an applicable document. Cleaning processes shall have no deleterious effect. Corrosive material shall be removed completely before the parts are mounted on the chassis.

3.6.2 Units.- After assembly, units shall be cleaned thoroughly and shall be free from particles of solder, flux, and other foreign material. In addition, when necessary, such cleaning shall also be performed before final assembly of the units.

3.7 Marking.-

3.7.1 General.- Marking shall conform to Specification MIL-M-13231. (See 4.4). Front panel marking shall be Group I as described in that specification.

3.7.2 Visibility.- Whenever practicable, parts shall be so mounted that their identification markings will be readily visible with minimum disassembly of the equipment.

3.7.3 Serial Numbers.- Radio Receiver R-390( )/URR shall have serial numbers.

3.8 Tropicalization of material.- Material shall be tested as follows:

3.8.1 Treating materials.- Treating materials containing a mercury-bearing fungicide shall not be used. The contractor shall determine that the treating material is compatible with the material or surface to be treated. Selection of treating materials shall be such that any increase in flammability of treated material is held to the practical minimum.

3.8.2 Toxicity.- Treatment of materials shall cause no skin irritation or other injury to personnel handling the treated material either during fabrication of the unit or when carrying, operating, or maintaining the unit, or in use of the finished items when used for the purpose intended.

3.8.3 Flexibility.- Treatment shall not affect flexibility of treated materials, to the extent that the unit may fail to meet specified requirements when subjected to specified service conditions.

3.8.4 Statement of treatment.- The contractor shall submit, to the contracting officer for approval, a statement describing in detail the materials to be treated and the treating materials and processes that he proposes to use. (See 6.2).

3.9 Finish, protective.- The equipment shall be given protective finish in accordance with Specification MIL-F-14072. This includes finish of hardware, such as handles, screws, etc., and necessary touch-up after mounting. The final paint film on type I surfaces shall be final film E, semigloss, light-gray enamel, conforming to Specification MIL-F-14072.

3.10 Tubes, electron.- The equipment shall be furnished with the same tubes used when the set was inspected. The tubes shall remain in their respective sockets occupied during inspection of the units in which they are used, unless separate packaging is specified.

3.10.1 Microphonics.- There shall be no microphonic noises when the top and sides of the receiver are tapped in accordance with the test of 4.38.1.

3.11 Interchangeability.- Like units, assemblies, subassemblies, and replaceable parts shall be physically and functionally interchangeable, without modification of such items or of the radio receiver. (See 4.61 and 4.61.1). Individual items shall not be hand-picked for fit or performance; however, matched pairs or sets, when permitted, may be interchangeable as such. Reliance shall not be placed on any unspecified dimension, rating, characteristics, etc.

3.12 Mechanical requirements.-

3.12.1 Silver solder in accordance with Specification QQ-S-561 shall be use for securing hubs to gears.

3.12.2 Tuning knob shaft torque.- The stops on the kilocycle and megacycle tuning knob shafts shall be capable of withstanding repeated torque of 72 inch/pounds in each direction, without permanent deformation. (See 4.54).

3.12.3 Filter, radio interference.- The radio interference filter shall be in accordance with Specification MIL-F-15733, characteristic "ð", covering insertion loss, shall be 40 db at 0.15mc; 50 db at 0.3 mc., and 60 db from 0.6 mc. to 1000mc. A current rating of "C" is required, and the capacitors shall be in accordance with the applicable portion of Specification MIL-C-11693.

3.13 Electrical requirements.-

3.13.1 Frequency Range.- The receiver shall cover the frequency range of 500 kc to 32 mc without hiatus.

3.13.2 Antenna input balance ratio.- Antenna input balance ratio as measured at the input connector shall be within the following limits. (See 4.8)

Frequency range	Test limit
500 kc - 1.0 mc	Not less than 45 db
1.0 mc - 2.0 mc	Not less than 40 db
2.0 mc - 4.0 mc	Not less than 40 db
4.0 mc - 8.0 mc	Not less than 35 db
8.0 mc - 16.0 mc	Not less than 30 db
16.0 mc - 32.0 mc	Not less than 20 db

3.13.3 Antenna input impedance.- The rated input impedance for the balanced input circuit shall be 125 ohms. In the range from 500 kc to 16 mc, the measured input impedance shall not be less than 50 ohms nor greater than 375 ohms; for the range from 16 mc to 32 mc the measured input impedance shall be not less than 100 ohms nor greater than 700 ohms. (See 4.9).

3.13.4 Antenna grounding relay attenuation.- Attenuation of incoming signals due to the action of the antenna grounding relay shall be not less than 50 db when measured at 30.05 mc. (See 4.10).

3.13.5 Sensitivity.- The sensitivity of the receiver for a signal-plus-noise to noise power output ratio of 10 to 1, with a power output of 10 milliwatts and with the IF bandwidth switch in the 8 kc position, shall be as specified below. A 125 ohm resistor dummy antenna shall be used for the balanced input, a 50 mmfd capacitor dummy antenna shall be used for the unbalanced input. (See 4.11).

Balanced input

Frequency range	AM	CW
0.5 mc - 16.0 mc	3.3 microvolts	1.0 microvolt
16.0 mc - 32.0 mc	4.4 microvolts	1.0 microvolt

3.13.5 Sensitivity.- (contd)

Balanced input

Frequency range	AM	CW
0.5 mc - 1.0 mc	15 uv at 0.5 mc to 10 uv at 1.0 mc	3 microvolts
1.0 mc - 2.0 mc	10 uv.	2.5 microvolts
2.0 mc - 32.0 mc	6.5 uv at 2.0 mc to 5.5 uv from 2.1 mc to 32.0 mc	2.0 microvolts

3.13.6 Overall gain.- The overall gain of the equipment shall be such that a signal input of not greater that four microvolts shall produce a diode load voltage of seven volts. Across any coil range, there shall be no greater than a four to one variation in the input voltage required to produce seven volts across the diode load. (See 4.13).

3.13.7 Tracking of tuned circuits.- Mistracking in the antenna circuit with the antenna trimmer set at 0, shall not exceed 1 db. Mistracking in the three succeeding RF circuits shall not exceed a total of 3 db. Mistracking in the three 2 to 3 mc and the three 17.5 to 25 mc variable IF tuned circuits shall not exceed a total of 3 db. (See 4.14).

3.13.8 AGC Characteristic.- The automatic gain control shall be such that the receiver power output will increase not more than 5 db when the RF input is increased from 5 microvolts to 1000 microvolts; or not more than 10 db when the RF input is increased from 5 microvolts to 100,000 microvolts; or not more than 18 db when the RF input is increased from 5 microvolts to 1 volt. The output shall not decrease with increasing input from 5 microvolts to 1 volt. (See 4.15).

3.13.9 AGC Time constant.- With the AGC time constant switch in the SLOW position, AGC time constant (discharge time) shall be 4.0 ± 1.0 seconds. With the time constant switch in the MEDIUM position, the time constant shall be 0.2 ± 0.1 seconds. With the switch in the FAST position, the time constant shall be 0.015 ± 0.01 seconds. (See 4.16).

3.13.10 Carrier level meter.- As the signal input to the receiver is increased in 20 db steps, the reading on the carrier level meter shall increase by 20 db ± 10db. (See 4.17).

3.13.11 Blocking.- With AGC on, the receiver shall not block with signal inputs up to 1 volt. The input required to cause blocking shall be determined by noting the point at which audio output begins to decrease with increasing signal input. (See 4.18).

3.13.12 Cross Modulation.- Cross modulation when tested in accordance with 4.19 shall conform to the following limits:

Undesired signal R.F. Level Test frequency	1000 microvolts sum freq. NMT*	10000 microvolts sum freq. NMT	100000 microvolts sum freq. NMT*	1-volt sum freq. NMT	2-volt sum freq. NMT
.75 mc	21 kc	24 kc	50 kc	140 kc	240 kc
1.5 mc	21 kc	26 kc	80 kc	320 kc	400 kc
3.0 mc	21 kc	28 kc	100 kc	700 kc	700 kc
6.0 mc	21 kc	32 kc	120 kc	800 kc	840 kc
12.0 mc	21 kc	36 kc	140 kc	1100 kc	1800 kc
24.0 mc	21 kc	40 kc	160 kc	1500 kc	3200 kc

*NMT - Not More Than

(See 4.19).

3.13.13 IF Rejection Ratio.- IF rejection ratio at the 17.5 to 25 mc and 3 to 2 mc variable IF amplifiers shall be not less than 70 db. (See 4.20).

3.13.14 Image rejection ratio.- Over the frequency range of the receiver, image interference rejection due to the 2-3 mc variable IF shall be not less than 60 db, and image interference rejection due to the 455 fixed IF shall be not less than 10 db. (See 4.21).

3.13.15 Spurious response rejection ratio.- Throughout the range of the receiver, rejection of spurious response of the cross-over type shall be not less than 50 db. (See 4.22).

3.13.16 Internal signals.- Internally generated signals shall not be greater than the equivalent of a 3.5 microvolt signal injected into the balanced input circuit at 0.910, 2.727, and 3.227 mc through a 125 ohm dummy antenna. At any other frequency over the tuning range of the receiver, internally generated signals shall not be greater than one microvolt. (See 4.23).

3.13.17 Radiation.- The receiver shall produce not more than 400 micro-micro-watts radiation at any frequency, when measured using the method described in Specification MIL-I-16910. (See 4.24).

3.13.18 Frequency identification accuracy.- It shall be possible to tune the receiver visually to any frequency to an accuracy within 300 cps, when the indicating counter has been adjusted to the nearest 100 kc calibration point. When the indicating counter has been adjusted at the low end of the range, error at the high end of the range shall be within -1500 to +200 cps. (See 4.25).

3.13.19 VFO frequency stability vs temperature.- Frequency temperature stability of 2.455 to 3.455 mc VFO shall be such that anywhere within the tuning range the frequency shall change NMT 300 cycles as the temperature is changed from +104* F to +140* F, and NMT 70 cycles as the temperature id changed from +86* F to 176* F. (See 4.26).

3.13.19.1 VFO frequency stability vs time.- With ambient temperature held constant, frequency stability of the variable frequency oscillator vs time shall not exceed 10 cycles per day when measured over a period of at least 10 days starting 5 days after temperature has stabilized.

3.13.20 Overall frequency stability vs temperature.- With the ovens turned on, overall frequency change as measured at the IF output shall be within 400 cycles, and within 300 cycles at the audio output over the temperature range of -40°F to +149°F, as the temperature is varied in steps of-40°F to -4° F to +32°F to +68°F to +104°F to +149°F. (See 4.27).

3.13.21 20-hour frequency stability.- During the 20 hour frequency stability test, frequency change from the point just before the ovens are turned on, to 1 1/2 hours later shall be within -300 to +800 cps. Frequency change from the 1 1/2 hour point to the end of the 20 hours shall not exceed 300 cps. (See 4.28).

3.13.22 Frequency variations due to oven cycling.- Frequency variations due to oven cycling, when measured under conditions of the tape recorded 20 hour frequency stability test of 4.28, shall not exceed ±60 cps.

3.13.23 Rapid frequency variations.- When measured under conditions of the 20-hour frequency stability test of 4.28 by the automatic recording method, any instantaneous frequency changes (jumps) in excess of 10 cps shall be noted. Not more than 3 instantaneous changes in excess of 10 cps but less than 25 cps shall occur during the 20-hour test period. An instantaneous frequency change in excess of 25 cps shall be cause for rejection.

3.13.24 Frequency stability vs line voltage.- With a constant frequency input anywhere within the frequency range of the receiver, the frequency change due to the receiver, as measured at the audio output with the BFO on, shall be not more than 30 cps, with a change in line voltage from 105 to 125 volts. (See 4.29).

3.13.25 Mobile frequency stability.- While being subjected to the bounce test of 4.49, the receiver shall be capable of copying standard 850 cycle frequency shift keyed radio teletype signals. Not more than one error shall be permitted for every ten lines of copy. (See 4.50).

3.13.26 Backlash.- Backlash between the main tuning knob and the frequency indicating counter shall not exceed 100 cps. Backlash between the main tuning knob and the variable frequency oscillator shall not exceed 100 cps.

3.13.27 Dial lock frequency shift.- Frequency shift due to action of locking the dial shall not exceed 20 cps. (See 4.30).

3.13.28 Crystals.- Type CR-36U per Specification MIL-C-3098 crystal units shall be used in all circuits except the 455 kc IF, 200 kc IF and 17 mc IF.

3.13.29 Megacycle dial calibration error.- Frequency error between any two 1 megacycle tuning ranges, due to error in crystal oscillator injection frequencies, shall not exceed 4 kc, (See 4.31).

3.13.30 100 kcs crystal calibrator.- The crystal calibrator circuit shall furnish usable 100 kc calibration signals across the range of the receiver. Not more than three such signals shall fail to energize the carrier level meter. These signals shall provide at least a 10 to 1 signal-plus-noise to noise ratio. (See 4.32).

3.13.31 IF Frequency.- The center frequency of the fixed IF amplifier shall be 455 kc. A type CR-45 Crystal Unit shall be used in the crystal filter circuit.

3.13.32 Overall selectivity.- Overall selectivity for each position of the IF bandwidth switch shall be as follows, in the temperature range of +149°F to -40°F. (See 4.33).

	Bandwidth at diode load				Bandwidth at IF output	
Panel Switch	0.1 kc	1kc	2 kc	4 kc	8 kc	16 kc
	limit	limit	limit	limit	limit	limit
db down					*NLT	NLT
3.0 +					3.5 kc	6.5
-					3.5	6.5
total					7.5	13.5
			NLT	NLT	*NMT	NMT
6.0 +			0.8 kc	1.5 kc		
-			0.8	1.5		
total	.1-.15	0.8-1.3	1.9-2.3	3.6-4.4	11.0	16
			NMT	NMT		NMT
20.0 +						
-						
total			3.0	5.5	12.0	17.5
			NMT	NMT	NMT	NMT
40.0 +						
-						
total			4.0	7.0	15.0	21.5
	NMT	NMT	NMT	NMT	NMT	NMT
60.0 +						13.0
-						13.0
total	4.0	4.5	5.0	8.5	18.5	25.5

*NMT = not more than *NLT = not less than

Peak to valley ratio shall not be more than 3db for the 2, 4, and 8 kc bandwidth, and not more than 3 db (± 6.0 kc from 455 kc) for the 16 kc bandwidth.

3.13.33 IF output characteristics.- With 3 microvolts signal input through a 125 ohm dummy antenna, the function switch in the AGC position, and the IF bandwidth switch in any position, the IF output voltage across 60 ohms shall be no less than 20 millivolts. With the function switch in the MGC position, the RF gain control adjusted for 20 millivolts at the IF output, an increase in signal input from 3 to 30 microvolts shall produce an increase in IF output to at least 180 millivolts, but not more than 220 millivolts. (See 4.34).

3.13.34 BFO Neutralization.- The BFO neutralization circuit shall be adjusted in the 2 kc IF bandwidth position for minimum BFO leakage into the IF output.

3.13.35 BFO leakage at IF output.- With the BFO tuned for minimum leakage, BFO leakage at the IF output shall not exceed 700 microvolts.

3.13.36 BFO tuning range.- With the beat frequency oscillator tuned to 455 kc, and the control knob set at the vertical 0 position, rotation of the control in either direction to the panel marking 3 shall produce a change in frequency of not less than 2.4 kc and not more than 3.6 kc. (See 4.36).

3.13.37 Audio output impedance.- Audio output impedance of the line audio channel shall be within 540 to 660 ohms. Audio output impedance of the local audio channel shall be within 560 to 840 ohms. (See 4.37).

3.13.338 Audio power output.- Audio power output of at least 500, 10, and 1 milliwatts shall be available at the local line and phone outputs respectively, with a signal input of 10 microvolts. (See 4.38)

3.13.39 Overall audio response.- With 1000 cps as a reference level, the overall audio response shall be flat within ±1 db to 300 cps, and within +1 to -3 db to 3500 cps. (See 4.39).

3.13.40 Sharp audio response characteristic.- The peak response shall be centered at approximately 800 cps. Bandwidth at 6 db down shall be not less than 130 cps, and at 30 db down not more than 600 cps. (See 4.40).

3.13.41 Audio harmonic distortion.- Harmonic distortion shall be no greater than 1- percent with 500 milliwatts outputs at the local audio channel, and no greater than 6 percent at the line audio channel. (See 4.41)

3.13.42 Output level meter switch calibration accuracy.- Error in output level meter reading, with the meter set to read 0 VU, and the companion switch in any of its e positions, shall not exceed 1.5 VU. (See 4.42)

3.13.43 Noise Limiter clipping level.- Modulation level at which the noise limiter starts to clip shall conform to the following:

Control setting	Percent modulation
off	NLT 85
1	40-55
10	NMT 55

There shall be a smooth variation in clipping level over the range of the control.

3.13.44 Hum level.- Hum level shall be not less than 37 db below the 500 milliwatt output of the local channel, or 10 milliwatt output of the line audio channel. (See 4.44).

3.13.45 Power supply.- The power supply shall be capable of furnishing necessary plate and filament power to the receiver when supplied with 115 or 230 volts at ± 10 percent 48 to 62 cps power.

3.13.46 Power input.- Power input to the receiver, with ovens on, shall not exceed 275 watts. Power input, with ovens off, shall not exceed 175 watts. (See 4.45).

3.13.47 Duty Cycle.- The receiver shall be capable of continuous operation under any of the environmental conditions specified herein.

3.13.48 Electro-Mechanical Filter Unit.- The following performance characteristics of the electro-mechanical filter unit shall be verified at room ambient conditions. Radio Receiver R-390( )/URR shall meet full specification performance with random selection of production electro-mechanical filter units.

a. Bandpass at 3, 6, 20, 40, 60 and 80 db points
b. Peak to valley ratios
c. Spurious response in the spectrum 0.5 mc above and below the center frequency.
d. Symmetry and center frequency accuracy.
e. All the above characteristics at -40 and +149*F, and 70*F at 95 percent relative humidity. (See 4.46).

3.14 Service conditions.- The equipment shall meet the following service conditions:

3.14.1 Operation.- Continuous use for a period of one year under the world-wide environmental conditions specified in 3.14.2 through 3.14.6, with a duty cycle of 18 hours on and 6 hours off with no more than normal maintenance and replacement of parts. Approval of the preproduction sample (See 3.16) shall be considered as compliance with this requirement.

3.14.2 Temperature, (See 4.55).-

(a) Operating: Ambient temperature in the range of 149*F to -40*F. (The 149*F temperature includes effect of sun-load). 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) Nonoperating: Exposure in the range of +160°F to -80°F; exposure at the high temperature extreme not to exceed 4 hours, and at the low temperature extreme not to exceed 242 hours, at any one time.

3.14.3 Relative humidity.- (See 4.57). Up to 97 percent relative humidity for 20 hours; and exposure at 100 percent relative humidity, with condensation, for 4 hours.

3.14.4 Elevation.- (See 4.56).

(a) Operating: Up to 10,000 feet above sea level.

(b) Nonoperating: Up to 15,000 feet above sea level.

3.14.4 Orientation.-

(a) Operating: Any orientation up to 20 degrees from normal operating position (that is: forward, backward, left and right).

(b) Nonoperating.- Storage in any position for a period of two years. Where the contractor is required to make a selection of parts, materials, processes, construction methods, etc., he shall be guided by this requirement. Approval of the preproduction sample (See 3.16) shall be considered as compliance with this requirement.

3.14.6 Vibration, bounce, and shock.- As described in 3.14.7.

3.14.7 Vibration, internal.- The amplitude of vibration of any part, subassembly, or structural member of the equipment shall not exceed twice the amplitude of the vibration applied to the equipment at any frequency between 10 and 55 cycles per second. (See 4.51).

3.14.7.1 Vibration, equipment.- The natural frequency of the equipment shall be between 25 and 35 cycles per second. The amplitude of vibration in the mounted equipment shall not exceed three times the amplitude of the applied vibration at any frequency between 10 and 25, or between 35 and 55, cycles per second. (see (4.51.2)

3.14.7.2 Bounce and shock.- The equipment shall meet the requirements of Table I.

Table I - Bounce and Shock

Inspection	Inspection paragraph	Performance after inspection
Bounce test	4.49	Specified performance (Note A) No physical damage.
Shock, Ballistic	4.52	Operable. (Note B). Any physical damage shall be minor only.
Shock, benchhandling	4.53	Specified performance (Note A). No physical damage.

Note A: The equipment shall meet the tests of 4.58.

Note B: The equipment shall be energized during the test. After each blow, the equipment shall continue to operate without replacement of parts. Momentary failure during this test is permissible. There shall be no evidence of collision between any parts of the equipment during the test.

3.14.8 Suppression of radio interference.- The equipment shall meet the emanation and susceptibility limits of Specification MIL-I-11748 for Class I. (See 4.4) Application of suppression components and techniques shall conform to that specification. If the contractor considers it desirable to modify the equipment proper in order to facilitate conformance with the specified emanation and susceptibility limits, he shall obtain approval from the contracting officer before proceeding with the modification.

3.15 Preconditioning.- The equipment shall be capable of meeting the inspection of section 4, without subsequent processing, after subjection to the bounce preconditioning of 4.6.

3.16 Preproduction samples.- The contractor shall furnish preproduction samples for approval, as required by the invitation for bids and contract. (See 6.2(e)(1).)

3.17 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 equipment furnished on the order. (See 6.2).

3.18 Workmanship.- The equipment shall be manufactured and assembled in accordance with the applicable portions of the following paragraphs:

3.3 Plastic materials and parts.
3.4 Wiring and cabling.
3.4.1 Slack
3.4.2 Protection
3.4.3 Splicing
3.4.5 Grounding
3.4.6
3.5 Soldering
3.5.2 Acid and acid salts
3.5.3 Process
3.6 Cleaning
3.8 Tropicalization

4. QUALITY ASSURANCE PROVISIONS

4.1 Contractor's 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.

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

(a) Preproduction inspection (does not include preparation for delivery). (See 4.3).

(b) Acceptance inspection. (Procurement inspection shall be the inspection performed by the contractor and by the Government, as specified by 4.5 and 4.63).

(1) Acceptance inspection of equipment before preparation for delivery. (See 4.5).

(2) Acceptance inspection of preparation for delivery. (See 4.64).

4.3 Preproduction inspection.- This inspection will be performed by the Government unless otherwise specified in the contract. It shall consist of the preproduction inspection specified in Table II, the inspection specified in the subsidiary documents covering the items listed in 4.4, and the inspection specified for group A, group B, and group C. 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 II - Preproduction inspection

Inspection (For Additional Preproduction Inspection see 4.3)	Req. Para.	Test Para.
Operating and storage temperature	3.14	4.55
Altitude	3.14	4.56
Moisture resistance test	3.14	4.57
Mobile frequency stability	3.13.25	4.50
Power Supply	3.13.45	4.62
Suppression of radio interference	3.14.8	4.63
Shock test, ballistic	3.14.7.2	4.52

4.4 Acceptance inspection covered by subsidiary documents.- The following shall be inspected under the applicable subsidiary documents as part of the acceptance inspection before preparation for delivery:

Item	Where required
Marking	3.7
Finish	3.9
Suppression	3.14.8

4.5 Acceptance inspection of equipment before preparation for delivery.- The contractor, to demonstrate compliance with specified requirements, shall perform the inspection specified in 4.4 and 4.5.1 through 4.5.6. This does not relieve the contractor of his responsibility for performing any additional inspection which is necessary to control the quality of the product and to assure compliance with all specification requirements. The Government will review and evaluate the contractor's inspection procedures and examine the contractor's inspection records. In addition the Government-- at its discretion, may perform all or any part of the specified inspection, to verify the contractor's compliance with specified requirements. (See 6.8). Each unit which will be subjected to group A, group B, or group C inspection shall be preconditioned after final assembly. (See 3.15).

4.5.1 Group A inspection.- This inspection, including sampling, shall conform to Table III and the ordinary inspection procedures of Standard MIL-STD-105. Group A inspection shall be performed in any order which is satisfactory to the Government, except that the operational inspection (4.58) shall be last. (See 6.4).

Table III - Group A Inspection

Inspection or Test	Req. Para.	Test. Para.	AQL Major	AQL Minor
Visual and Mechanical				
R.F. Sub-chassis	3.18	4.59	4.0 DPHU	15.0 DPHU
I. F. Sub-chassis			1.5 DPHU	6.5 DPHU
VFO Sub-chassis			1.0 DPHU	4.0 DPHU
A. F. Sub-chassis			2.5 DPHU	10.0 DPHU
Crystal OSC Sub-chassis			1.0 DPHU	4.0 DPHU
Power supply Sub-chassis			1.0 DPHU	4.0 DPHU
Completed Receiver R-390( )/URR			1.5 DPHU	6.5 DPHU
Electrical				
Antenna grounding relay attenuation	3.13.4	4.10)		
A. M. Sensitivity	3.13.5	4.11)		
C. W. Sensitivity	3.13.5	4.12)		
Overall gain	3.13.6	4.13)		
AGC Characteristic	3.13.8	4.15)		
AGC time constant	3.13.9	4.16)	4.0 DPHU *	
Carrier Level meter	3.13.10	4.17)	for the	
Blocking	3.13.11	4.18)	entire group	
Internal signals	3.13.16	4.23)	of Electrical	
		)	characteristics combined	

Table III - Group A Inspection (Continued)

Inspection or Test	Req Para	Test Para	AQL Major	AQL Minor
Frequency identification accuracy	3.13.8	4.25		
Frequency stability vs line voltage	3.13.24	4.29		
Dial lock frequency shift	3.13.27	4.30		
Megacycle dial ca. error	3.13.29	4.31		
100 Kc crystal calibrator	3.13.30	4.32		
Overall selectivity	3.13.32	4.33		
Audio power output	3.13.38	4.38		
Sharp audio response characteristic	3.13.40	4.40		
Audio Harmonic distortion	3.13.41	4.41		
Output level meter switch cal	3.13.42	4.42		
Hum level	3.13.44	4.44		
20 hour frequency stability	3.13.21	4.28		
Frequency variations-oven cycling	3.13.22	4.28	1%*	
Operational test		4.58	1%*	
Rapid frequency variations	3.13.23	4.28		

NOTES:-
* All electrical defects are in major category.

4.5.2 Group B inspection.- This inspection, including sampling, shall conform to Table IV and to the special procedures for small-sample inspection of Standard MIL-STD-105. The reduced inspection procedure shall be R-1. Group B inspection shall 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 the group A inspection.

4.5.2.1 Group B sampling plans.- The group b sampling plans, as listed in Table IV, shall be as follows:

Group B plan	AQL	Inspection level for normal inspection	Inspection level for reduced inspection
B-1	4.0%	L-8	L-6
B-2	6.5%	L-7	L-5

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

Table IV - Group B inspection

Inspection or test	Req. Para.	Test Para	Sampling Plan
Antenna input balance ratio	3.13.2	4.8	)
Antenna input impedance	3.13.3	4.9	)
IF rejection ratio	3.13.13	4.20	)
Image rejection ratio	3.13.14	4.21	)
Spurious response rejection ratio	3.13.15	4.22	) B-1)
Backlash	3.13.26	4.31	) for
IF output characteristic	3.13.33	4.34	)
BFO neutralization	3.13.34	4.35	) the
BFO leakage at IF output	3.13.35	4.35	)
BFO tuning range	3.13.36	4.36	) group
Audio output impedance	3.13.37	4.37	)
Overall audio response	3.13.39	4.39	)
Noise limiter clipping level	3.13.43	4.43	)
Power input	3.13.46	4.45	
Electro-mechanical filters	3.13.48	4.46	) B-1
Interchangeability	3.11	4.61	) B-2
Microphonics	3.10.11	4.38.1	) B-2

4.5.3 Group C inspection.- This inspection shall be as listed in table V.

4.5.3.1 Sampling procedures for group C inspection.- One receiver for each subgroup in table V from each 200 or fraction thereof produced shall be selected without regard to quality by the Government inspector.

Table V - Group C Inspection

Inspection	Req Para.	Insp. Para.
Subgroup 1		
VFO frequency stability vs temperature	3.13.19	4.26
VFO frequency stability vs time	3.13.19.1	4.26.1
Overall frequency stability vs temperature	3.13.20	4.27
Shock test; bench-handling	3.14.7.2	4.53
Subgroup 2		
Bounce test	3.14.7.2	4.49
Tuning knob shaft torque test	3.12.2	4.54
Tracking of tuning circuits	3.13.7	4.14
Radiation	3.13.17	4.24
Mobile frequency stability	3.13.25	4.50
Subgroup 3		
Vibration	3.14.7 - 3.14.7.1	4.51
Cross modulation	3.13.12	4.19
Subgroup 4		
Interchangeability, electrical	3.11	4.61.1

4.5.4 Noncompliance.- If a sample unit fails group C inspection, 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 on the process and all units of product which were manufactured with the same conditions, materials, processes, etc. If the Government inspector does not consider the 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. (See 6.5).

4.5.5 Reinspection of conforming group B and group C sample units.- Unless otherwise specified, sample units which have been subjected to and passed group B or group C inspection, or both, may be accepted on contract, provided that they are resubjected to and pass group A inspection after repair of all visible damage.

4.6 Bounce preconditioning.- The unit shall be placed in its normal operating position on the table of the Package Tester as made by the L. A. B. Corporation, Skaneateles, N.Y., 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 1 minute. After bounce preconditioning, the unit shall not be repaired, alined, cleaned, or otherwise changed prior to subjection to acceptance inspection.

4.7 Standard test conditions.- Unless otherwise specified, the following standard test conditions shall apply:

Test signal	Measurements Corp Model 82 signal Generator, or equal with external crystal modulator.
AF output level	General Radio Output Power Meter Type 583, or equal.
Diode load voltage	RCA Voltohmist, VTVM or equal.
IF output voltage	Ballantine Model 310A AC voltmeter, or equal.
AF output frequency	Berkley Eput Meter Model 554M, or equal.
Balanced input dummy antenna	125 ohm nonreactive resistor, less generator impedance.
Unbalanced input dummy antenna	50 UUfd capacitor.
AF output load impedance	600 ohms
Temperature	Normal room ambient.
Humidity	Normal room ambient.
Line voltage and frequency	115 volts AC, at 60 cps.
Warm-up period	5 minutes.
Modulation	30% AM at 400 cps.
Input	Balanced antenna input.
Output	Local audio channel.

Control Settings

Line Meter	Off
Line Gain	0
AGC	Med
Limiter	Off
Audio Response	Wide
Break-in	Off
Bandwidth	8.0 KC
BFO pitch	0
Function	AGC
Ant trim	Adjust for maximum output
BFO	Off
Dial Lock	Unlocked

Control Settings (Continued)

Zero Adjust	Unengaged
Local Gain	As needed
RF Gain	10 (maximum)
Kilocycle Change)	
Megacycle Change)	At desired test frequency
Ovens	Off

4.8 Antenna input balance ratio.- The signal generator shall be connected to the balanced antenna input through a pair of 65 ohm resistors using Connector Plug UG-421/U. Each resistor shall be connected to one side of the generator output, and one side of the receiver antenna input. With the function switch set in the MGC position, the output of the signal generator shall be adjusted to produce a potential of seven volts across the receiver diode load. The required generator output shall then be recorded. The ends of the resistors tied to the generator output shall then be removed from the generator, tied together, and connected to the high side of the generator output. The ground side of the generator output shall be connected to the receiver chassis. Generator output shall then be increased to again produce a potential of seven volts across the receiver diode load. The output shall again be recorded. The ratio, in db, between the two recorded generator settings shall be taken as the balance ratio. Test frequencies shall be the high end of each of the six tuning ranges.

4.9 Antenna input impedance.- The measurement shall be made with a General radio type 916 impedance Bridge, or equal. The balanced input shall be measured with one side grounded in accordance with instructions issued with the bridge. The measurement shall be conducted at each end, and the centers of each RF tuning range.

4.10 Antenna grounding relay attenuation.- The receiver shall be tuned to 30.05 mc. The function switch shall be set in the AGC position. Signal input shall be adjusted to produce a potential of 5 volts at the receiver diode load. The input shall be recorded. The function switch shall then be set to CAL and the input shall be increased until a potential of 5 volts is again produced at the diode load. The second input shall be recorded. The ratio between the two recordings in db, shall be the measure of attenuation.

4.11 AM Sensitivity.- The receiver function switch shall be set in the MGC position. The signal generator output, and the AF gain control shall be mutually adjusted for a condition where 10 milliwatts of signal plus noise is produced with modulation on, and 1 milliwatt of noise is produced with modulation off. The generator output for this condition shall be the sensitivity figure.

4.11.1 AM sensitivity test frequencies.- Normal test frequencies for AM sensitivity shall be as follows:

Balanced antenna input

.75 mc	14.0 mc	26.0 mc
1.5 mc	20.0 mc	27.0 mc
3.0 mc	21.0 mc	28.0 mc
6.0 mc	22.0 mc	29.0 mc
11.0 mc	23.0 mc	30.0 mc

Unbalanced antenna input

.5 mc	5.0 mc
1.0 mc	10.0 mc
2.0 mc	18.0 mc

4.11.2 Alternate AM sensitivity test frequencies.- The test shall be conducted at the following test frequencies:

Balanced antenna input

0.999 mc	11.999 mc	22.0 mc
1.999 mc	12.0 mc	23.0 mc
2.999 mc	13.0 mc	24.0 mc
3.999 mc	14.0 mc	25.0 mc
4.0 mc	15.999 mc	26.0 mc
5.0 mc	16.0 mc	27.0 mc
6.999 mc	17.0 mc	28.0 mc
7.999 mc	18.0 mc	29.0 mc
8.999 mc	19.0 mc	30.0 mc
9.999 mc	20.0 mc	31.999 mc
10.999 mc	21.0 mc	

Unbalanced antenna input

0.5 mc	11.0 mc	23.0 mc
1.5 mc	12.5 mc	24.5 mc
2.5 mc	14.0 mc	26.0 mc
3.5 mc	15.5 mc	27.0 mc
5.0 mc	17.0 mc	29.0 mc
7.0 mc	18.0 mc	30.5 mc
8.0 mc	20.0 mc	31.999 mc
9.0 mc	21.0 mc	

4.12 CW sensitivity.- The receiver function switch shall be set in the MGC position. The BFO switch shall be set ON. The signal generator output shall be unmodulated. At each test frequency, the receiver shall be tuned to the test signal to produce zero beat with the BFO pitch control set at 0. The control shall then be adjusted to produce a beat note of approximately 1000 cps. The signal generator output and the AF gain control shall be mutually adjusted for a condition where 10 milliwatts of signal plus noise is produced with the test signal present, and 1 milliwatt of noise is produced with the test signal removed. The generator output for this condition shall be the sensitivity figure.

4.12.1 CW sensitivity test frequencies.- Normal test frequencies for CW sensitivity shall be 13.0, 19.0, and 25.0 mc. The balanced antenna input shall be used.

4.12.2 Alternate CW sensitivity test frequencies.- The test shall be conducted at the following test frequencies:

4.12.2 Alternate CW sensitivity test frequencies.- (Continued)

Balanced antenna input

0.75 mc	9.5 mc	20.5 mc
1.0 mc	10.5 mc	22.5 mc
2.0 mc	11.5 mc	23.5 mc
4.5 mc	13.0 mc	25.5 mc
5.5 mc	14.5 mc	26.5 mc
6.5 mc	16.0 mc	28.5 mc
7.5 mc	17.5 mc	29.5 mc
8.5 mc	19.5 mc	31.0 mc

Unbalanced antenna input

0.5 mc	11.0 mc	23.0 mc
1.5 mc	12.0 mc	24.5 mc
2.5 mc	14.0 mc	26.0 mc
3.5 mc	15.5 mc	27.0 mc
5.0 mc	17.0 mc	29.0 mc
7.0 mc	18.0 mc	30.5 mc
8.0 mc	20.0 mc	31.999 mc
9.0 mc	21.0 mc	

4.13 Overall gain.- The signal generator shall be connected to the balanced antenna input through a 125 ohm resistor dummy antenna, or to the unbalanced input through a 50 mmfd capacitor dummy antenna. The function switch shall be set in the MGC position. The receiver diode load voltage shall be measured with a vacuum tube voltmeter. At each test frequency, the signal input required to produce a potential of 7 volts across the diode load shall be measured and recorded.

4.13.1 Overall gain test frequencies.- Normal test frequencies for overall gain shall be as follows:

Balanced antenna input

0.5 mc	2.0 mc	8.0 mc
0.75 mc	3.0 mc	12.0 mc
0.999 mc	3.999 mc	15.999 mc
1.0 mc	4.0 mc	16.0 mc
1.5 mc	6.0 mc	24.0 mc
1.999 mc	7.999 mc	31.999 mc

Unbalanced antenna input

0.5 mc	2.0 mc	8.0 mc
1.0 mc	4.0 mc	16.0 mc

4.13.2 Alternate overall gain test frequencies.- The test shall be conducted at the following test frequencies. The balanced antenna input shall be used.

4.13.2 Alternate overall gain test frequencies.- (Continued)

0.5 mc	3.999 mc	11.0 mc	19.0 mc	27.0 mc
0.75 mc	4.0 mc	12.0 mc	20.0 mc	28.0 mc
0.999 mc	5.0 mc	13.0 mc	21.0 mc	29.0 mc
1.0 mc	6.999 mc	14.0 mc	22.0 mc	30.0 mc
1.5 mc	7.999 mc	15.999 mc	23.0 mc	31.999 mc
1.999 mc	8.0 mc	16.0 mc	24.0 mc	
3.0 mc	10.0 mc	18.0 mc	26.0 mc	

4.14 Tracking of tuned circuits.- The function switch shall be set in the MGC position. Diode load voltage shall be observed, and signal input shall be below the blocking level as observed by change in diode load voltage with change in input signal. At each test frequency, mistracking shall be measured by adjusting the tuning slug for maximum diode load voltage. The increase in diode load voltage, in db, shall be the amount of mistracking. The slug shall be readjusted to its original position before proceeding to the next test frequency. Test frequencies (dial frequencies) shall be as follows:

RF Circuits.

0.5 mc	1.00 mc	2.00 mc	4.00 mc	8.00 mc	16.00 mc
0.65 mc	1.25 mc	2.50 mc	5.00 mc	10.00 mc	20.00 mc
0.75 mc	1.50 mc	3.00 mc	6.00 mc	12.00 mc	24.00 mc
0.85 mc	1.75 mc	3.50 mc	7.00 mc	14.00 mc	28.00 mc
+0.00 mc	+1.00 mc	+3.00 mc	+7.00 mc	+15.00 mc	+31.00 mc

17.5-25 mc variable IF	2-3 mc Variable IF
1.0 mc	1.999 mc
2.5 mc	1.75 mc
4.5 mc	1.50 mc
6.5 mc	1.25 mc
7.999 mc	1.00 mc

4.15 AGC characteristic.- With 5 microvolts signal input, the AF gain shall be set to produce 5 milliwatts power output. Change in power output shall then be recorded for each step as the input is changed in steps of 1000, 100000 microvolts and 1 volt. Test frequencies shall be 0.75, 1.5, 3.0, 6.0, 12.0, and 24.0 mc selected to be successively on every seventh unit to be tested.

4.16 AGC time constant.- The AGC time constant switch shall be set in the SLOW position. Signal input to the receiver shall be adjusted to produce a reading of 100 on the carrier level meter. The signal input shall be removed abruptly, and the time required for the meter pointer to drop to 1/3 scale reading shall be recorded as a measurement of the slow time constant. By observation, the MED and FAST time constants shall be checked in a similar manner for correct operation, but the time constant need not be recorded.

4.17 Carrier level meter.- The reading of the carrier level meter shall be observed as the signal generator output is increased by 20 db steps from 5 to 500,000 microvolts.

4.18 Blocking.- To determine compliance with the requirements of 3.13.11, the following test frequencies shall be used: 0.75, 1.5, 3.0, 6.0, 12.0 and 24.0 mcs.

4.19 Cross modulation.- Two signal generators of like design shall be connected to the balanced antenna input in a manner which will present a 125 ohm impedance at the receiver input. A 10 microvolt signal, 30 percent modulated at 400 cps shall be fed into the receiver, at the test frequency, from one generator. The second generator shall be set successively to produce levels of 1000, 10,000, 100,000 microvolts, and 1 volt and 2 volts. At each level, the second signal generator (undesired signal) 30 percent modulated at 400 cps, shall be tuned, first from one side, then the other, toward the desired signal, until the desired signal is modulated to a level 10 db below the initial reference level. At each point, the separation between the desired and undesired signal shall be measured and the separation above the desired signal shall be added to the separation below, the desired signal. Test frequencies shall be 0.75, 1.5, 3.0, 6.0, 12.0, and 24.0 mc.

4.20 IF rejection ratio.- IF rejection ratios shall be measured with the receiver tuned to 7.99 mc and set in the MGC position. The signal generator shall be tuned to 7.99 mc and set to produce 3 microvolts output. The receiver audio gain control shall be set to produce 10 milliwatts audio output. Without changing the receiver controls, the signal generator shall be tuned to the specified interference frequency, and the output increased until 10 milliwatts is again produced at the audio output. The ratio between the initial 3 microvolts input, and the second input shall be the rejection ration. Interference frequencies shall be 17.00 (17.5-25 mc) and 21.01 mc. (2-3 mc IF.)

4.21 Image rejection ratio.- The manner in which the test is conducted shall be similar to that for IF rejection ratio. The receiver shall be tuned to 31.99 mc. The interference frequencies shall be 36.01 mc. (2-3 mc IF) and 2.92 mc. (455 kc IF).

4.22 Spurious response rejection ratio.- The manner in which the test is conducted shall be similar to that for IF rejection ratio. The following test frequencies shall be used.

Receiver frequency	Interference frequency
2.480 mc	2.520 mc
3.920 mc	3.940 mc
6.020 mc	5.990 mc
8.230 mc	8.257 mc
9.020 mc	8.993 mc
13.320 mc	13.340 mc
14.150 mc	14.174 mc
15.020 mc	14.990 mc
24.100 mc	23.950 mc

4.23 Internal signals.- With the function switch to MGC, the receiver shall be tuned for maximum diode load voltage at the internal signal frequency. The diode load voltage shall be noted, and the receiver shall be detuned approximately 10 kc. The signal generator shall be tuned to the new frequency, and the output level shall be adjusted to produce the same diode load voltage. The generator level shall be recorded.

4.23.1 Internal signal test frequencies.- Internal signals normally observed shall be at 0.910, 2.727, and 3.227 mc.

4.23.2 Alternate internal signal test.- At the discretion of the inspector, the receiver shall be tuned over its range with the BFO on. All internal signals above the equivalent level of 1 microvolt shall be recorded and measured.

4.24 Radiation.- Radiation from the 2.455-3.455 mc variable frequency oscillator shall be checked at one frequency. Radiation of each crystal oscillator frequency shall be measured.

4.25 Frequency identification accuracy.- A multiple 25 kc signal shall be injected into the antenna input. Error shall be recorded at each frequency ending in 25, 50 or 75 kc. Over a one megacycle range, the counter shall be zero adjusted at each multiple 100 kc point by adjusting the BFO so that the zero beat occurs as the counter reads exactly on the 100 kc multiple. Backlash error shall be minimized by tuning in one direction, through the 100 kc point, to the frequency at which error is to be measured. Error shall be measured with a Berkley Eput meter, Model 554M, or equal.

4.26 VFO frequency stability vs temperature.- Test frequencies shall be 2.5, 3.0, and 3.4 mc. The oscillator shall be placed in a temperature chamber. Temperature shall be changed in steps of 5.0°F. Temperature shall be held constant until the oscillator frequency has stabilized. The extent of frequency change between 10 degree steps shall be measured from one point where frequency stabilized to the next point where frequency stabilized. Maximum change shall be considered the difference between the highest and lowest points on a frequency-temperature curve plotted from the data.

4.26.1 VFO frequency stability vs time.- Output frequency of the oscillator shall be continuously tape recorded for a period of 15 days while the room ambient temperature around the oscillator is maintained constant.

4.27 Overall frequency stability.- The test frequency shall be 8.5 mc. With the BFO on, the receiver shall be tuned to a stable external signal to produce a convenient audio output frequency which shall be continuously recorded. The IF output signal shall be mixed with a stable external signal to produce a convenient audio frequency which shall also be continuously recorded. At each temperature step, the temperature shall be held constant until the recorded frequencies are stabilized.

4.28 20-hour frequency stability test.- The receiver shall be placed so the chassis rests flat on the test bench. The test frequency shall be 8.5 mc. With the oven switch turned off, and with the BFO turned on, the receiver shall be tuned to a signal from a frequency standard. The receiver shall be tuned to produce a convenient audio output frequency, so that a positive drift in receiver

4.28 20-hour frequency stability test.- (Continued)

frequency will produce a positive change in the audio output frequency. The receiver may have been in operation and warmed up prior to the start of the test. At the start of the test, the receiver shall be operated with ovens off for at least two hours, and until drift of the output frequency is less than a rate of 40 cps per hour. The oven switch shall then be turned on for the remainder of the test. Total test time shall be 20 hours starting at the point the oven switch is turned on. The ambient temperature shall be approximately 68 degrees F. The frequency of the audio output of the receiver shall be measured just before the oven switch is turned on, 1-1/2 hours later, and at the end of the test. The output frequency of the receiver shall be continuously recorded by automatic methods.

4.29 Frequency stability vs line voltage.- The test frequency shall be 25 mc. Apparatus shall be provided to change rapidly the supply voltage from 105 to 125 volts AC. With BFO on, the receiver shall be tuned to a stable external signal to produce a convenient audio output frequency. The receiver shall be allowed to stabilize at 105 volts AC input. Change in audio output frequency shall then be recorded as the supply is changed to 125 volts.

4.30 Dial lock frequency shift.- A convenient audio output frequency shall be secured by tuning to a CAL signal with the BFO on. Change in audio frequency shall then be observed and recorded as the dial lock is locked.

4.31 Megacycle dial calibration error.- The measurement shall be made with a Berkley Eput Meter Model 544M, or equal, connected to the audio output. With the BFO on, the function switch set at CAL, the receiver shall be tuned to zero beat with the 100 kc calibrator signal at 500 kc. Without further adjustment of the BFO or kilocycle tuning knob, the megacycle knob shall be rocked without movement of the counter and shall be operated through its 32 steps. At each step, the audio frequency output of the receiver shall be measured.

4.32 100 kcs crystal calibrator.- The signal-plus-noise to noise ratio of the calibration signal having the lowest output level shall be recorded. To determine the lowest point, the receiver shall be tuned to maximum response at the center of each band, and the band where minimum response is obtained shall be noted. The minimum response in that band shall be recorded.

4.33 Overall selectivity.- An unmodulated signal shall be applied to the receiver balanced antenna input through a 125 ohm resistor dummy antenna. The receiver function switch shall be set in the MGC position. Using the 0.1 kc bandwidth position, the incoming signal shall be tuned to produce a signal at 455 kc in the IF amplifier. With a signal input of 15 microvolts, the RF gain control shall be set to produce a reference potential of 5 volts across the receiver diode load. IF output voltage (measured with an RF voltmeter across 60 ohms) produced under the same conditions, shall be used as an additional

4.33 Overall selectivity.- (Continued)

reference voltage for the 16 kc bandwidth. For each bandwidth, the signal input shall be then multiplied in steps of 1.41, 2, 10, 100, and 1000 times, or as otherwise required. At each step, the generator shall be detuned to each side of resonance until the reference voltage is again observed. Frequency deviation from resonant for each step shall be recorded. Test frequencies shall be 0.55 mc for the 0.1, 1.0, and 2.0 kc bandwidths, and 4.4 mc for the 4.0, 7.0, and 16.0 kc bandwidths.

4.33.1 Overall selectivity attenuation measurement requirements.- The attenuations normally measured shall be the 3 and 60 db points for the 8 and 16 kc bandwidth, and the 6 and 60 db points for the 0.1, 1.0, 2.0, and 4.0 kc bandwidths.

4.33.2 Alternate overall selectivity attenuation measurement requirements.- At the discretion of the inspector, the 6, 20, and 40 db points for each bandwidth position, shall also be measured.

4.34 IF output characteristic.- The measurement shall be made with an RF voltmeter. With 3 microvolts signal input, and the RF gain control set to maximum the IF output voltage shall be recorded. With function switch at MGC the RF gain control shall be reduced until an IF output voltage of 20 millivolts is obtained. The signal input shall then be increased to 30 microvolts, and the IF output voltage again be recorded.

4.35 BFO leakage at IF output.- The IF bandwidth control shall be set in the 2kc position. Leakage shall be measured across a 60 ohm resistor at J106.

4.36 BFO tuning range.- The measurement shall be made with a Berkley Eput meter, Model 554M, or equal. The receiver function switch shall be set to CAL, and the BFO switch to ON. With the BFO pitch control set to 0, the receiver shall be tuned to zero beat with any 100 kc calibration signal. The pitch control shall then be adjusted to both the + 3 and - 3 positions, and the audio output of the receiver shall be recorded for each position.

4.37 Audio output impedance.- The signal generator shall supply a test signal 30 percent modulated at 1000 cps to the receiver. The receiver gain controls shall be set to produce approximately 50 milliwatts across the local audio output, and 1 milliwatt across the line audio output with a 600 ohm load. The load shall be removed and the output voltage shall be measured with and AC voltmeter. The output shall then be loaded with trial resistance values until a resistance is found which causes the output voltage to drop by one half its unloaded value. The value of this resistance shall be considered the output impedance.

4.38 Audio power output.- Power output shall be measured with a General Radio Output Power Meter Type 583, or equal, set to present a load impedance of 600 ohms. The Signal generator shall be connected to the balanced antenna input through a 125 ohm resistor dummy antenna, and the signal shall be 30 percent modulated at 400 cps. The IF bandwidth switch shall be set in the 8 kc position. The requirements of 3.13.38 shall be met.

4.38.1 Microphonics.- With the receiver R-390( )/URR energized and while being tuned throughout its range, it shall be tapped on its top and sides with a 1/4 lb. rubber mallet. Tapping the equipment shall not result in any microphonic noises.

4.39 Overall audio response.- Overall audio response shall be measured with an Output Power Meter, General Radio Type 583, or equal, set to present a load impedance of 600 ohms. The input signal shall be 1000 microvolts. The reference audio output shall be 500 milliwatts at 1000 cps. The change in audio output shall be recorded as the modulating frequency is changed to 300 and 3500 cps without change in percentage modulation.

4.40 Sharp audio response characteristic.- The measurement shall be made by varying the audio modulating frequency, and recording the 6 and 30 db attenuation points.

4.41 Audio harmonic distortion.- Audio harmonic distortion shall be measured with a Distortion Analyzer Hewlett-Packard Company Type 330-B, or equal, to determine compliance with the requirements of 3.13.41. Signal input shall be 1000 microvolts. The receiver audio outputs shall be loaded with a non-inductive resistance of 600 ohms, one Watt rating or larger.

4.42 Output level meter switch calibration accuracy.- Accuracy shall be checked by comparing the level meter reading with that of a standard volume level meter connected to the line audio channel. The audio modulation frequency shall be 1000 cps.

4.43 Noise limiter clipping level.- The AC input of an oscilloscope shall be connected to pin 1 of limiter tube V510. A 1000 microvolt signal modulated at 400 cps, shall be injected into the balanced antenna input through a 125 ohm resistor dummy antenna. The percentage of modulation at which clipping just starts shall be observed on the oscilloscope, and shall be recorded for control settings of OFF, 1 and 10.

4.44 Hum level.- The measurements shall be made with a Distortion Analyzer, Hewlett-Packard Type 330B, or equal. A 1000 microvolt signal, 30 percent modulated at 400 cps, shall be injected into the balanced antenna input. The AF gain controls shall be set to produce the required audio output. The measurement shall be conducted in accordance with the instructions issued with the distortion analyzer. The measurement shall be made with the noise limiter disabled, and again with the noise limiter turned on, and the threshold control set to 1. Test results shall meet the requirements of 3.13.44.

4.45 Power input.- Power input shall be measured with a wattmeter at 115 volts, 60 cps. As an alternative test, the power input at 230 volts shall be measured and shall be within 10 percent of the power measured at 115 volts.

4.46 Electro-mechanical filters.- Characteristics cited in 3.9.50 shall be verified by means of the test procedures required for IF selectivity testing of the receiver using the test equipment listed in paragraph 4.7 as applicable.

4.47 Service Conditions verification test.- Deleted.

4.48 Orientation test.- Deleted.

4.49 Bounce test.- The test shall be conducted using the "vehicular Adapter Plate" (300 lbs, 45 inches square) and "package Tester" both as made by L.A.B. Corporation, Skaneateles, New York, or equal. The receiver shall be installed in a frame which shall secure the receiver at the front panel mounting holes and at the retaining holes in the rear panel runners. The frame shall be secured to the Vehicular Adapter Plate through 4 each Mount, Vibration MT-1179A/U, each mounted under a corner of the receiver. The Vehicular Adapter Plate shall be placed (not secured) on the table of the package tester. The package tester, shafts in place, shall be operated at a speed of 285 rpm +/- 1 percent, for a total of 3 hours. The Vehicular Adapter Plate shall be rotated through 90 degrees at the end of each 3/4 hour period, in the same direction.

4.50 Mobile frequency stability.- During the bounce test, the receiver shall be connected to an antenna and tuned to a radio teletype transmission. The IF output of the receiver shall be connected to Frequency Shift Converter CV-115/URR or equal, which in turn shall be connected to a teletype printer. Copy shall be secured for 15 minutes in each direction of the bounce test.

4.51 Vibration tests.-

4.51.1 Test for internal vibration.- Internal vibration of the equipment shall be measured as follows, to determine conformance to 3.14.7:

(a) Secure the equipment directly to a vibration table that can be controlled within 10 percent of the specified amplitude. Mounting method shall be such that vibration within the equipment can be observed and measured. To facilitate this observation and measurement, subassemblies may be tested separately provided they are secured to the table in a manner similar to that used to mount them in the equipment.

(b) Vibrate the equipment successively in three mutually perpendicular directions over a frequency range of 10 to 55 cycles per second. The total excursion of the applied vibration shall be not less than 0.030 inch.

(c) In each of the three directions, change the frequency in steps of one cycle per second and maintain each frequency for at least 10 seconds.

(d) Measure vibration amplitudes by optical means, or by other means provided that vibration of the part is not affected by the measurement.

4.51.2 Test for equipment vibration.- The equipment shall be tested as follows, to determine conformance to 3.14.7.1:

(a) Secure the equipment to a vibration table that can be controlled within 10 percent of the specified amplitude. The equipment shall be mounted in its normal operating position with connections (such as cable assemblies) in place.

(b) Vibrate the equipment successively, in three mutually perpendicular directions, over a frequency range of 10 to 55 cycles per second. The total excursion of the applied vibration shall be 0.030 inch; however, this may be reduced, if necessary, to prevent excessive excursion at or near resonance provided that the excursion can still be measured.

(c) In each of the three directions, change the frequency in steps of one cycle per second and maintain each frequency for at least 10 seconds.

(d) Measure amplitude of the applied vibration and the vibration of the equipment for frequencies between 10 and 25 and between 35 and 55 cycles per second.

(e) Determine the natural frequency of the equipment; the frequency at which the ratio of the equipment vibration to the applied vibration is greatest shall be considered the natural frequency.

4.51.3 90 minute vibration test.- The equipment shall be rigidly fastened in its normal mounting position to a vibration table. The vibration machine shall provide sinusoidal vibration at all specified frequencies and amplitudes. The equipment shall be vibrated for 30 minutes in each of three mutually perpendicular directions that are respectively parallel to the edges of the equipment. The range of frequencies between 10-55 cycles shall be traversed once up and once down every minute. The slug racks shall be removed during vertical vibration. The total excursion of the vibration table shall be in accordance with the following:

Frequency of vibration	Total excursion	
	Horizontal	Vertical
10-55 cps	.06 inch	.04 inch

4.52 Shock test; ballistic.- The test shall be conducted on the shock testing machine for lightweight equipment as shown in Specification MIL-S-901. The receiver shall be installed in a frame which shall secure the receiver at the front panel mounting holes, and at the retaining holes in the rear panel runners. The frame shall be secured to the steel plate of the shock testing machine through 4 each Mount, Vibration MT-1179A/U, each mounted under a corner of the receiver. The test shall consist of a total of nine blows; one each 1-foot blow, 3-foot blow and 5-foot blow on the back, side and top of the test plate. An alternative to reorienting the test plate for blows on the side of the plate, equivalent rotation of the equipment under test is permissible.

4.53 Shock test; bench-handling.- 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 freely to the horizontal. Repeat, using other practicable edges of the same horizontal face as a pivot, 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.

4.54 Tuning knob shafts torque test.- A torque of 72 inch lbs shall be applied, alternately 50 times in each direction, to the kc and mc tuning knob shafts, and the stops shall not be damaged or broken.

4.55 Operating and storage temperature test.- The receiver shall be temperature cycled in accordance with Standard MIL-STD-169.

4.55.1 At step 2A, the equipment shall be stored for a minimum of 72 hours.

4.55.2 At step 3, the power shall be applied and the receiver operated for 72 hours. Gain, power output, and selectivity tests shall be conducted at the end of the 72 hour period.

4.55.3 At step 6, the equipment shall be stored for a minimum of 72 hours.

4.55.4 At step 8, the power shall be applied and the receiver shall be operated for 24 hours. Gain, power output and selectivity tests shall be conducted at the end of the 24 hour period.

4.56 Altitude.- The receiver shall be placed in an altitude chamber at normal conditions of temperature, pressure and humidity, and shall be subjected to gain and power tests. The pressure shall than be reduced to 20 inches of mercury and stabilized for 2 hours. The receiver shall again be subjected to gain and power output tests. The pressure shall then be lowered to 7 inches of mercury and the chamber maintained at this pressure for another 2 hours period. The pressure shall then be increased to 29.9 inches of mercury and the receiver again subjected to gain and power output tests. Performance shall meet full specification requirements for all measurements.

4.57 Moisture resistance test for equipment.-

4.57.1 Test Conditions.-

a. Do not move the equipment from the humidity chamber for measurements

b. Complete measurements as quickly as possible

c. The receiver shall be placed in the humidity chamber without further protection that that provided by the dust covers. Power shall be applied to the receiver during the test periods between cycles. At the completion of the five humidity cycles, and 48 hours thereafter, the receiver shall be subjected to sensitivity, gain, tracking and selectivity tests.

4.57.2 Test method.-

a. Dry at +130° +/- 5° for 24 hours.

b. Condition at +77° +/-5° F and 40 to 50 percent relative humidity for 24 hours.

c. Take measurements as specified in 4.11, 4.12, 4.13, 4.14 and 4.33 and readjust or realign 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.

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 requirements for those measurements specified in 4.11, 4.12, 4.13, 4.14 and 4.33.

4.58 Operational inspection.- This inspection shall be performed to determine that all controls and their associated circuits function satisfactorily, and the radio set is in operable condition prior to packaging for shipment.

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

4.60 Test of operating functions.- Deleted

4.61 Interchangeability, mechanical.- The physical dimensions as shown on the drawings as listed on gage list SC-GL-57592 shall be gaged or measured to determine conformance to the physical interchangeability requirements of 3.11. When listed dimension is not within specified or design limits, it shall be considered a major defect.

4.61.1 Interchangeability, electrical.- The electrical parameters and limits as shown on the drawings as listed on gage list SC-GL-57655 shall be measured to determine conformance to the electrical interchangeability requirements of 3.11. When a listed parameter is not within specified or design limits, it shall be considered a major defect.

4.62 Power supply.- Plate and filament voltages shall be measured when the voltage is varied from 103.5 to 126.5 volts and 207 to 243 volts with the frequency varied between 48 and 62 cps. Such variation of primary voltage and frequency shall not degrade the performance of the equipment.

4.63 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 at a distance of two feet from the equipment.

4.64 Acceptance inspection of preparation for delivery.- Preparation for delivery shall be inspected in accordance with Specification MIL-P-116 to determine conformance to the requirements of section 5.

4.64.1 Preservation and packaging.- Preservation and packaging shall be inspected in accordance with Specification MIL-P-116.

4.64.2 Packing and marking of exterior containers.- Packing and marking of exterior containers shall be given visual inspection for the defects listed in table VI 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 procedure 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.

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

4.64.2.2 Procedure in case of failure.- If an inspection lot is rejected 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.

4.65 Rough handling test.- When rough handling test is required by the contract, the following functional test shall be conducted to determine freedom from operational malfunction caused by rough handling:

Operational inspection, (see 4.58).

5. PREPARATION FOR DELIVERY

5.1 Preservative and packaging.-

5.1.1 Level A.- Each Radio Receiver R-390( )/URR shall be packaged in accordance with Items 1 through 15 of Figure 1 and Table VI.

5.1.2 Level C.- Each Radio Receiver R-390( )/URR shall be packaged as in 5.1.1.

5.1.3 Package performance.- Package Testing shall be performed in accordance with the requirements of MIL-P-116. The rough handling test or the cyclic exposure test will be performed only when invoked by the bid request or contract (see 6.2).

5.2 Packing.-

5.2.1 Level A.- Each Radio Receiver R-390( )/URR shall be packed in accordance with Items 16 and 17 of Figure 1 and Table VI Box closure shall be as specified in the appendix of the applicable box specifications.

5.2.2 Level B.- Each Radio Receiver R-390( )/URR shall be packed in accordance with Items 16 and 17 of Figure 1 and Table VI, except nailed wood box shall be Class 1, Style 4, or cleated plywood box, Style A, Type IV, Class 1.

5.2.3 Level C.- There shall be no additional packing to the packaging specified in 5.1.

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

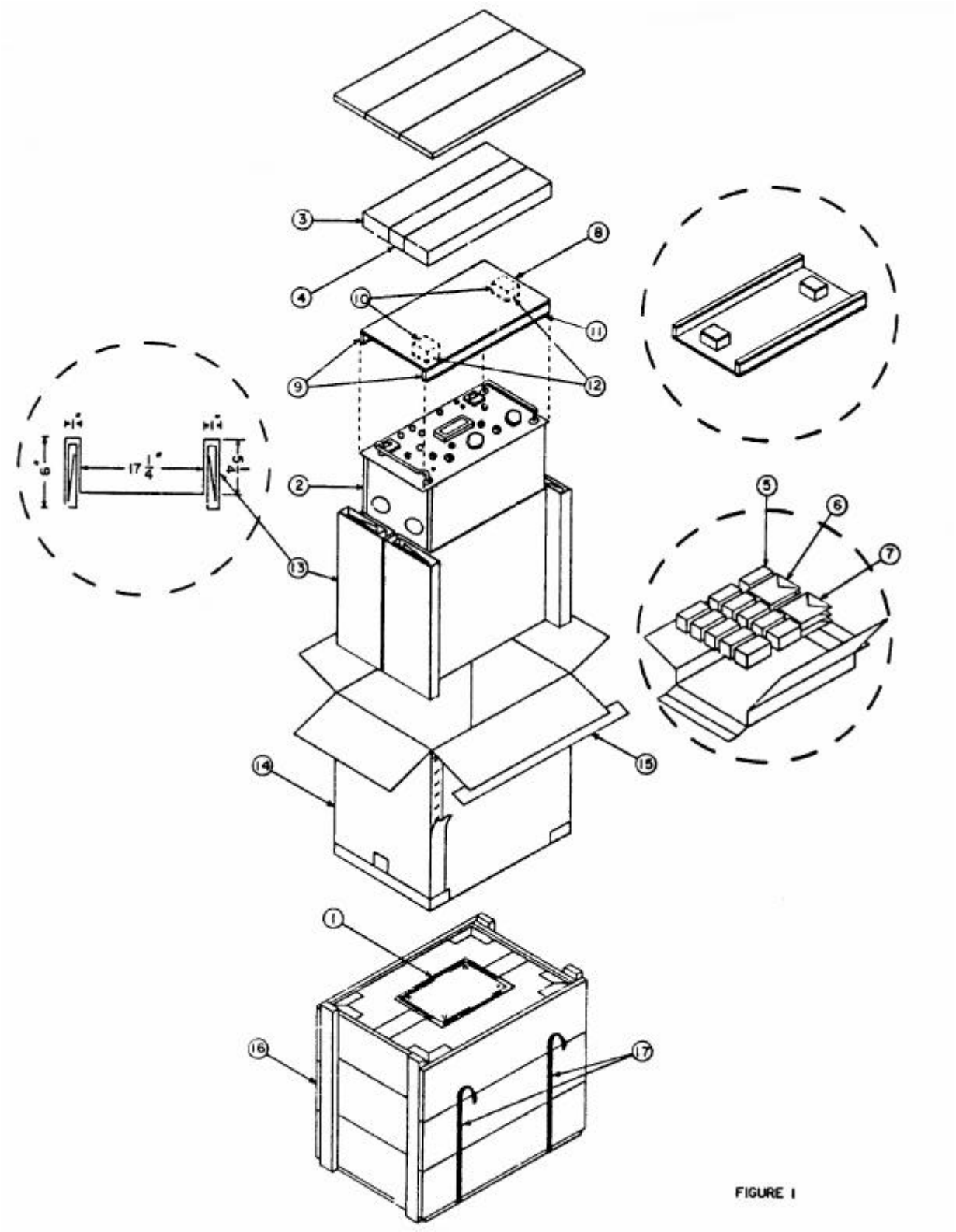

FIGURE 1

BILL OF MATERIAL
TABLE VI

REF NO	ITEM Nomenclature	No Reqd	Method MIL-P-116	SIZE - INCHES L	W	D	REQUIREMENTS Spec No.	T	G	C	S	Flute	PSI
1	Technical Literature	2	IC-6	12	15								
2	Radio Receiver R390()/URR		IC-5	19	10-1/2	16-1/2							
3	Bookfold Consolidated carton	1		19	10-1/2	1-3/4	PPB-B-636		W6	2	0PF	C	
4	Tape, G.T. (Spare Parts Packaging)	1											
5	Paperboard Set-up Boxes	11		3	1-1/4	1-1/4	PPB-B-566						
6	Kraft Bag	2		4	4		Comm. Coin	Env					
7	Kraft Bag	3		4	4		Comm. Coin	Env					
8	Plywood Panel	1		19	10-1/2	¼	NN-P-530	III					
9	Lumber(Blocks)	2		19	½	1-7/8	PPP-B-621			2			
10	Lumber(Blocks)	2		3	2	1/7/8	PPP-B-621			2			
11	Felt	2		19	½	1/8	C-F-202						
12	Felt	2		3	2	1/8	C-F-202						
13	Fiberboard Cells	2		19-1/4	6	15-1/2	PPP_B-636	I	6	2		C	
14	Fiberboard Carton	1		19-3/8	12-1/4	19-1/2	PPP-B-636	I	3	2			
15	Tape, P. S.			142	3		PPP-T-60	III		2			
16	Nailed, Wood, Box	1		20	12-7/8	20	PPB-B-621		2	4			
17	Steel Strapping	2		152	1/2	.020	QQ-S-781	I	2	B			

PACKED WEIGHT - 90 lbs
PACKED VOLUME - 3.75 cu. ft.

Legend
T - Type **S - Style**
G - Grade **C - Class**

6. NOTES

6.1 Intended Use.- Radio Receiver R-390( )/URR is a general purpose communications receiver used for fixed and mobile service.

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

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

(b) Type 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) Two sample units of each item cited in section 1 are generally required so that lengthy environmental tests can be completed on one sample unit while complete performance measurements can be made on the second sample unit. (See 3.16).

(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.

(f) Marking and shipping of samples.

(g) Technical literature required. (see 3.17).

(h) Quantity of tools and running spare parts required.

(i) Submission of statement of treatment referenced in 3.8.4, as soon as possible after award of contract. This statement should be submitted to the contracting officer.

6.3. Nomenclature.- The parentheses in the nomenclature will be deleted or replaced by a letter identifying the particular design; for example: R-390W/URR. The contractor should apply for nomenclature in accordance with the applicable clause in the contract.

6.4 Location of operational inspection.- It is desirable that the operational inspection (4.58) be performed at a location that will minimize handling (which might cause damage to the equipment) after this inspection is completed.

6.5 Group C inspection.- Approval to ship may be withheld, at the discretion of the Government inspector, pending the decision from the contracting officer on the adequacy of corrective action. (See 4.5.5).

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

6.6.1 Examination.- Examination consists of simple, generally nondestructive determinations of compliance, without the use of special testing equipment.

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

6.7 Equipment divisions.- The terms used herein for equipment divisions conform to Standard MIL-STD-280.

6.8 Verification inspection.- Verification by the Government will be limited to the amount deemed necessary to determine compliance with the contract and will be limited in severity to the definitive quality assurance provisions establishes in this specification and the contract. 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 the contract. Included in this category is that amount of inspection referred to as normal and tightened inspection by Military Standard 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 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 that6 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.

6.9 Dimension data.- Sizes of packaging materials prescribed in Section 5 are based on the dimensions of the equipment cited on the applicable Bill of Material. When the dimensions of the equipment vary from those cited, the sizes of the packaging materials shall be adjusted accordingly. When shown in the Bill of Materials (See Section 5), corrugated fiberboard manufactured with A, B, or C fluting may be used at the option of the contractor. When the fluting used is not the same as that cited in the Bill of Material, the dimensions of the affected packaging and packing materials will be adjusted accordingly.

NOTICE: When Government drawings, specifications, or other data are used for any purpose other than in connection with a definitely related Government procurement operation, the United States Government thereby incurs no responsibility nor any obligation whatsoever; and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use, or sell any patented invention that may in any way be related thereto.