SIGNAL CORPS
TENTATIVE
SPECIFICATION

NO. REP-255
29 August 1945

INSPECTION REQUIREMENTS FOR REPAIRED RADIO RECEIVER AND TRANSMITTER BC-1335-(*)

A. APPLICABLE SPECIFICATIONS

A-1. The current issues of the following technical publications, or publications superseding them, form a part of this specification.

A-1a. Specifications:
Signal Corps Tentative 271-3096 Radio Receiver and Transmitter BC-1335-(*) and Associated Equipment (For Radio Set SCR-619-(*).

A-1b. Modification Work Orders:
Applicable Modification Work Orders pertaining to subject equipment.

B. APPLICATION

B-1. The following sections of this specification set forth the minimum inspection requirements to be used in determining the quality and acceptability of repaired Radio Receiver and Transmitter BC-1335-(*).

C. TEST EQUIPMENT

C-1. Test equipment shall be such as to provide satisfactory inspection meeting the requirements of this specification.

D. STANDARD INSPECTION REQUIREMENTS, BASIS FOR ACCEPTANCE.

D-1. Cables: Neatly dressed and not frayed, cut nor broken in any way that could impair their proper functioning.

D-2. Capacitors:

D-2a. No breaks in protective covering.

D-2b. No oil leaks nor oil on cases, when applicable.

D-2c. No evidence of swelling nor leakage in electrolytic capacitors.

D-3. Cleaning: No dirt, dust, grease, superfluous solder, particles of metal nor any other foreign material on any parts.

D-4. Clearance:

D-4a. Sufficient clearance between parts to prevent any undersired electrical contact.

D-4b. No interference with movement and operation of parts.

D-5. Connectors:

D-5a. No broken, cracked nor bent parts.

D-5b. All threads in good condition. Not stripped, marred nor crossed.

D-6. Controls amd Moving Parts:

D-6a. No cutting, binding, scraping, sticking nor excessive lost motion.

D-6b. Smooth action at all points and no dead spots. Proper electrical contact maintained at all points when parts are operated or when tapped or jarred by hand.

D-6c. No undesired contacts when operated.

D-7. Finishes:

D-7a. Finishes conforming to requirements of Specification 271-3096.

D-7b. No severe scratches nor bare spots revealing the base material. No corrosion, flaking nor peeling of the finish.

D-7c. Touching up of the finish is acceptable.

D-8. Insulation:

D-8a. Conforming to the requirements of Specification 271-3096.

D-8b. No cracks, chipping, pits nor breaks that could impair the proper function of the insulation.

D-8c. No burnt insulation nor loose parts attached to insulation due to heating during a soldering operation.

D-9. Jacks:

D-9a. Correct alignment of springs and sleeve.

D-9b. Jacks capable of fully seating the proper plug and holding it firmly.

D-9c. Metallic parts not excessively worn nor corroded.

D-9d. Contact points clean and making proper mechanical contact when plugs are in or out of jack seats.

D-9e. Securely mounted on panel with a washer under the mounting nut.

D-10. Hinged Parts:

D-10a. No binding, sticking, freezing, cutting or excessive side-play.

D-10b. No strain on hinge or hinged parts when closed.

D-11. Locks and Spring Catches:

D-11a. Lock and unlock easily without sticking or catching and without undue force being applied.

D-11b. Hold parts firmly when engaged.

D-12. Modification Work Orders: Applicable Modification Work Orders complied with.

D-13. Moisture and Fungus Proofing Treatment: The equipment shall meet the following requirements to ascertain that it has received proper moisture and fungus proofing treatment:

D-13a. There shall be no blushing, milky appearance, or darkening of the varnish film. The varnish shall adhere firmly to the surfaces of the equipment.

D-13b. The varnished surfaces shall be touched with the bare hand. There shall be no stickiness and the varnish shall be thoroughly dry.

D-13c. The equipment shall be tested under ultra-violet light to insure that all parts except the following have been properly coated:

(1) Clear plastic insulators and parts
(2) High-voltage ceramic insulators
(3) Open movable electric contacts
(4) Relay contacts
(5) Variable capacitors
(6) Bearing surfaces whose electrical and/or mechanical operations will be affected by the application of the coating material.

D-13d. Each unit of equipment that has been moisture and fungus proofed shall bear a marking reading "MFP" and the date (month and year) of treatment. The date shall be accurate to within one month. The month and year may be abbreviated. The marking shall appear on the exterior of the case and on the chassis of the component (not on a control panel). A rubber stamp marking or a decalcomania label is acceptable.

D-14. Mounting of Parts:

D-14a. No sharp protruding edges on bolts or screws.

D-14b. No badly worn, rough nor ragged slots on bolts or screws that could create a safety hazard or prevent the proper removal of the bolt or screws.

D-14c. Nuts tight and having no worn edges that could prevent their easy removal.

D-14d. Bolts and screws equipped with washers.

D-14e. Rivet ends well rolled or spun.

D-14f. Riveted, bolted and screwed-on parts shall hold tightly when tested by hand or with a suitable pry bar.

D-15. Nameplates, Markings and Stencilling:

D-15a. Securely fastened or marked in proper location.

D-15b. Neat, correct and clearly legible.

D-15c. Circuit symbols on or adjacent to designated parts, except where space does not permit.

D-15d. Transparent, protective coating covering ink, unless ink is waterproof.

D-16. Parts: Parts conforming to Specification 271-3096, or to the current applicable higher echelon spare parts list.

D-17. Plugs and Receptacles:

D-17a. Securely attached to equipment.

D-17b. Threads clean and not stripped or crossed.

D-17c. Insulation in good condition.

D-18. Plug-In Devices:

D-18a. Tubes and other parts firmly seated.

D-18b. Electrical contact at all required points.

D-19. Resistors:

D-19a. Legible identification markings.

D-19b. No breaks, chips, nor cracks in protective coating.

D-19c. No broken nor frayed terminals or leads.

D-19d. Variable resistors securely mounted with straight shafts and terminals in good condition.

D-20. Soldering:

D-20a. Joints as small as is practicable.

D-20b. Joints intact. No breaks, cracks nor looseness.

D-20c. No cold solder nor rosin joints.

D-20d. Solder feathering out to a thin edge.

D-20e. No flux other than rosin, or rosin and alcohol shall have been used.

D-21. Switches:

D-21a. Positive snapping into position without searching for contacts.

D-21b. Maintain good mechanical and electrical contact when equipment is jarred by hand or tapped with a padded mallet.

D-21c. Contact points clean.

D-22. Terminal Blocks and Strips:

D-22a. Terminals securely attached to mountings.

D-22b. Clean. No dirt, rosin, solder, nor particles or metal that could cause an undesired electrical contact between two or more terminals or from a terminal to ground.

D-22c. Lugs tightly attached to terminal blocks or strips.

D-23. Wiring:

D-23a. As little bare wire as practicable extending beyond any insulation.

D-23b. Wires securely attached to terminals by being threaded through or around them.

D-23c. No broken wires nor strands.

D-23d. No corrosion, peeling, flaking, bare spots, nor nicks in tinning or in other protective coating on bare wires.

D-23e. No sharp bends, particularly where wires connect to plastic or ceramic parts and in r-f circuits.

D-23f. Wires dressed away from heat dissipating parts, when practicable.

D-23g. Sufficient clearance at all points to prevent any undesired electrical or mechanical contact.

D-23h. Sleeving on wire where there is danger of making an undesired electrical contact.

D-23i. Sufficient slack in wiring to permit removal of any part except in cases where the shortness of connecting wires is of prime importance, such as in high frequency r-f circuits.

D-23j. Wiring as short as is consistent with meeting the other requirements of this paragraph.

D-24. Knobs and Pointers:

D-24a. Clearly and completely marked.

D-24b. Securely attached to control shaft.

E. ELECTRICAL REQUIREMENTS

E-1. Standard Test Conditions: Unless otherwise specified, all electrical tests shall be made under the following conditions:

E-1a. At normal room temperature.

E-1b. The input supply voltage shall be of sufficient value to produce plate and filament supply voltage within the following limits, but shall be between 5.4 and 7.5 volts with the 6V-12V switch in 6V position or between 10.8 and 15 volts with the 6V-12V switch in 12V position.

Transmitter Plate Voltage	-	120 to 130 volts
Transmitter Filament Voltage	-	4.0 to 5.0 volts
Receiver Plate Voltage	-	85 to 95 volts
Receiver Filament Voltage	-	2.7 to 3.3 volts

E-1c. The set shall be properly aligned.

E-1d. The proper crystal units shall be plugged in.

E-1e. Specified voltages shall be measured with a vacuum tube voltmeter.

E-1f. The set shall be tested in a screened room.

E-1g. The VOLUME control shall be turned ON and rotated to its most clockwise position.

E-2. Input Current: With the 6V-12V switch in 6V position, and with 6.0 volts d-c input, the input current shall not exceed 3.8 amperes in receiving position, and shall not exceed 6.3 amperes in transmitting position.

E-3. Power Supply Output Voltages: With the 6V-12V switch in 6V position and with 6.0 volts d-c input, the output voltage of the power supply shall be within the following limits:

Receiver Plate	-	85 to 95 volts
Transmitter Plate	-	115 to 130 volts
Receiver Filament	-	2.5 to 3.3 volts
Transmitter Filament	-	3.8 to 4.8 volts

E-3a. This test shall be repeated with the 6V-12V switch in 12V position and with 12.0 volts d-c input. The output voltages shall be within the above limits.

E-4. D.C. Amplifier Gain: A change of voltage of 0.1 volt at the discriminator output (pin no. 3 of the discriminator tube) shall cause a change of modulator grid voltage (measured at the low side of the microphone transformer secondary) of not less than 1.5 volts. The voltage change at the discriminator output may be produced either by shifting the frequency of a signal applied to the mixer grid, or by using a battery and potentiometer connected to the discriminator

output. If the latter method is used, the discriminator output shall first be grounded and the grid voltage to the modulator adjusted to between minus 7 and 12 volts with potentiometer R-48.

E-5. Sensitivity Test: The sensitivity of the receiver shall be measured at 27.0 mc. and 38.9 mc., and shall be such that an input of 20 microvolts or less applied to the antenna terminal through a 1800 ohm, non-inductive resistor shall deliver 1.0 volt on the limiter grid.

E-6. Discriminator Test: The discriminator shall be tested by connecting a signal generator to the signal grid of the mixer tube through a 0.01 mfd. capacitor and by measuring the discriminator output at pin no. 3 of the discriminator tube. The signal generator shall be adjusted to provide 10 volts on the limiter grid. This signal generator output shall remain unchanged throughout the remainder of the test. The following values shall be obtained:

E-6a. With the frequency of the signal generator set at 4.3 mc., the discriminator voltage shall be zero plus or minus 0.9 volt.

E-6b. With the frequency of the signal generator 25 kc. above 4.3 mc., the discriminator voltage shall be minus 5 volts or more.

E-6c. With the frequency of the signal generator 25 kc. below 4.3 mc., the discriminator voltage shall be plus 5 volts or more.

E-6d. The difference between the values of the discriminator voltage, without regard to sign, as measured under the conditions specified in E-6 b and E-6 c above, shall be no greater than 2.3 volts.

E-6e. The frequency of the signal generator shall be varied above and below 4.3 mc. to determine the maximum voltages, negative and positive which can be obtained at the discriminator output. The signal generator frequencies corresponding to these maximum voltages shall be separated by not less than 70 kc.

E-7. IF Selectivity Test: A signal generator shall be connected through a 0.01 mfd. capacitor to the signal grid of the mixer tube and set at 4.3 mc. The signal generator output shall be adjusted to obtain 1.0 volt on the limiter grid. The signal generator output voltage shall then be adjusted successively by 2 and 10 times that value. For each such value of signal generator output, the frequency shall be varied both sides of 4.3 mc. until the voltage on the limiter grid returns to 1.0 volt. The band width between the two points, one each side of 4.3 mc., shall be as specified below:

REPAIRED RADIO RECEIVER AND TRANSMITTER BC-1335-(*).

INPUT	TOTAL BAND WIDTH IN KC	
	MIN.	MAX.
2 times normal	35	65
10 times normal	35	145

E-8. Audio Output Test: With an audio oscillator delivering a 1000 cps signal of 2.7 volts to pin no. 3 of the discriminator tube, the audio output into a 4000 ohm load shall be not less than 15 milliwatts.

E-9. Transmitter Power Output: Transmitter power output shall be measured at 27.0 mc. and 38.9 mc. by connecting an r-f milliameter in series with a 73 ohm, non-inductive resistor across the 73 ohm output of the transmitter. A variable capacitor of approximately 100 mmf. in series with the dummy antenna may be used, if necessary, and should be adjusted for maximum indication on the r-f milliameter. The r-f current shall be measured and power output determined by I^2R, where R is the sum of the resistance of the meter and 73 ohm resistor, and I is the r-f current. The power output shall not be less than 1.25 watts. During this test, the antenna loading circuit shall be disconnected from the final tank coil.

E-10. Modulation Capability: The frequency deviation of the transmitter shall be tested at 27.0 mc. and 38.9 mc. A change of grid bias on the modulator tube from minus 8 volts to zero volts, or from minus 8 volts to minus 16 volts, shall produce a change of frequency of not less than 25 kc. or more than 75 kc.

E-11. Alignment Indicator: With the ALIGN-OPERATE switch set to ALIGN and with a voltage of between minus 4 and minus 8 volts applied to the receiver-transmitter test prod, it shall be possible to close the "eye" of the indicator tube by adjusting the VOLUME control.

E-12. Operational Test: Radio Receiver and Transmitter BC-1335-(*) shall be given an operational test to determine that the equipment is functioning properly. This test shall be performed utilizing a test radio receiver and transmitter. Signals received and transmitted by the set under test shall be clear and intelligible. Extraneous noises, intermittent or microphonic conditions shall not be present when the set under test is either tapped several times with a padded mallet to simulate vibration or is operated on a vibrating table for at least thirty seconds.

NOTE

Copies of this specification for the purpose of bidding on the repair of the equipment covered should be obtained direct from the Philadelphia Signal Corps Procurement District, 128 North Broad Street, Philadelphia 2, Penna.