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SPECIFICATION NO. 55-A-1036-A

RR-11BB DEVELOPMENT SPECIFICATION

26 JANUARY 1955

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1. GENERAL

1.1. Purpose of this specification

This specification shall stipulate the performance requirements of the RR-11EB communications receiver and present the electrical and mechanical design characteristics that shall guide the development and production of prototype models of such equipment.

1.2. Development Test Specification

Completed prototypes shall be tested in accordance with the RR-11EB Test Specification No. 55-A-1036-1-F. The test specification outlines the test methods and procedures and established the minimum requirements to be met when so tested. Specification No. 55-A-1036-A-F shall be a part of this specification.

1.3. RR-11EB Description

The RR-11EB shall be a completely transistorized superheterodyne communications receiver having a tunable frequency coverage of from 12 to 30 megacycles. The unit shall be capable of radio reception of emission types A1, A2, and A3. The equipment shall be battery powered and capable of providing a minimum of 100 hours of continuous operation with a minimum reduction in sensitivity. The batteries shall be housed within the receiver case with provision made to connect external batteries.

2. QUALITY OF DESIGN AND FABRICATION

2.1. The electrical and mechanical design of the RR-11EB shall be directed towards the development of a quality product reflecting the highest possible degree of equipment reliability when exposed to the normally rough handling encountered in field usage.

2.2. JAN Specifications

The contractor shall utilize components, materials, and fabrication procedures meeting JAN specifications of the issue in effect on the date of initiation of the contract.

2.2.1. JAN Specification Waiver

In any instance where the Contractor may deem it necessary to utilize other than components, materials, and fabrication procedures meeting JAN specifications, specific waivers may be authorized by the Government, but only after review by Government engineers and prior to the submission of any prototype models.

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2.2.2. Fungus Treatment and Moisture Proofing

Materials which are not fungus nutrient are desired and are acceptable without further [redacted] fungus proofing. Where the use of fungus nutrient materials are necessary, fungus treatment and moisture proofing shall be done in accordance with JAN Specifications JAN - T - 152 and JAN - C - 173, Class 1.

2.3. Temperature Extremes

2.3.1. Operating Temperature

The design considerations of the RR-118B shall be such as to preclude equipment malfunctioning when exposed to operating temperatures of from plus 40 degrees C. to minus 40 degrees C.

2.3.2. Storage Temperature

The equipment, less batteries, shall be capable of being stored at temperatures within the range from plus 60 degrees C. to minus 60 degrees C. without injurious effects.

3. ELECTRICAL DESIGN CHARACTERISTICS

3.1. General

It is not the intent of the Government to restrict the design ingenuity of the contractor in this development program. The R.F. circuitry may incorporate either capacitor or inductor tuning, and the contractor is invited to investigate printed circuitry or conductor patterns for design inclusion. The equipment as visualized shall represent the foremost degree of transistor development design consistent with maximum reliability. Double conversion and/or high frequency I.F. may be used provided the stated specifications are met.

3.3. Receiver Frequency Calibration

The realization of the dial calibration accuracy and dial resetability required, and the development of a feasible method of calibrating this unit of equipment when manufactured in production quantities, shall constitute a specific aim of this development. A straight line frequency tuning characteristic is required.

3.3.1. Dial Calibration Accuracy - The calibration accuracy of the tuning dial shall be within 0.1% throughout the tuning range.

3.3.2. Dial Resetability - The accuracy of resetability shall be within 0.01% when approached from either the high or low end of the tuning range.

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3.7. Antenna Coupling

The antenna impedance for this equipment will vary between 70 and 3,000 ohms. The antenna input impedance shall be 300 ohms ± 100 ohms.

3.8. Oscillator Frequency Pulling

Oscillator pulling with control of gain or with variation in signal strength shall be held to a minimum. Maximum oscillator frequency change with variation in gain shall not exceed 100 cycles when the gain control is varied between minimum and maximum. Oscillator frequency change with variation in input signal shall not shift more than 100 cycles between signal input levels of 5 microvolts and 200,000 microvolts.

3.9. Oscillator Drift

After a two minute warm-up, the rate of change of frequency of the high frequency oscillator due to any cause shall be less than .0004 per cent per minute.

3.10. I.F. and Image Rejection

The I.F. rejection ratio shall exceed 60 decibels and the image rejection ratio shall exceed 30 decibels over the entire frequency range.

3.11. Over-all Selectivity

The over-all selectivity shall approximate the following:

Response (Decibels)	Bandwidth (Kilocycles)
- 3	5.0
- 6	5.4
-10	6.2
-20	7.8
-40	11.2
-60	16.0

3.12. Oscillator Radiation

Radiation from any, or all, oscillators to include harmonic or other spurious radiation shall not exceed 400 micromicrowatts over a frequency span of 15 kilocycles to 220 megacycles when measured in accordance with the RR-11BB Test Specifications.

3.13. Spurious Response

The receiver shall be free from any internal spurious response. Spurious responses resulting from the application of a signal to the receiver input shall be down 70 decibels from the signal level at the receiver input.

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3.14. Microphonics

The receiver shall be free from microphonics under any condition of operation.

3.15. Frequency Stability

Frequency instability due to thermal effects after a two minute warmup shall not exceed a rate of change of 0.0001% per minute. Frequency shift due to mechanical shock shall not exceed 0.0001%. Frequency stability shall not be affected by load capacity.

4. MECHANICAL DESIGN CHARACTERISTICS

4.1. General

Receiver construction to include hardware, components, and case assembly shall be sufficiently rugged to withstand face fall drop and vibration tests without damage or impairment of operation. The form factor of the unit shall possess a smooth contour when packaged for transport or storage.

4.2. Dimensions

The maximum dimensions of the RR-1135 Receiver shall not exceed the following:

Width	Depth	Length
3 13/32	1 19/32	6 1/4 (6.75)

Miniaturized dimensions being of paramount importance, the contractor is urged to reduce the size of the equipment wherever possible.

4.3. Weight

The weight of the equipment, including batteries, shall not exceed two pounds.

4.4. Receiver Case Construction

The contractor shall determine the suitability of magnesium versus welded aluminum for fabrication of the equipment case. As a third possibility, the contractor may recommend a particular plastic for fabrication of the receiver case. The contractor shall seek Government approval of his choice of fabrication material prior to prototype assembly.

4.4.1. Case Corners and Edges. All corners and edges of the equipment cases shall be rounded to a $\frac{1}{4}$" radius.

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