

## **Production Specification**

### **Antenna 1350 - 2690 MHz**

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**1. SCOPE.**

The Antenna specified herein shall be of lightweight construction and shall be designed for use in a military radio relay operating in 1350-2690 MHz. The antenna system comprises of two modules: Reflector and Antenna Feed.

**2. APPLICABLE DOCUMENTS.**

The following documents of the exact issue listed, form a part of this specification to the extent referenced herein. In the event of conflict between the requirements of this specification and a referenced document, the requirements of this specification shall govern. The latest date of issue shall apply to all documents.

|                   |                                                                             |
|-------------------|-----------------------------------------------------------------------------|
| MIL-C-53039 (ME)  | Coating, Aliphatic Polyurethane, Single Component, Chemical Agent Resistant |
| MIL-C-46168D (ME) | Coating, Aliphatic Polyurethane, Chemical Agent Resistant                   |
| MIL-F-14072D      | Finishing                                                                   |
| MIL-STD-810E      | Environmental                                                               |
| FED-STD-595B      | Colors used in Government Procurement                                       |
| MIL-HDBK-454      | General Guidelines for Electronic Equipment                                 |

**3. REQUIREMENTS.**

**3.1. ITEM DEFINITION.**

The antenna shall have a unidirectional radiation characteristic and be robustly constructed for severe field use. It shall have an integral mast-mounting clamp, which shall provide for use in either vertical or horizontal polarization.

The antenna shall be comprised of a feed unit for the operating frequency band and a paraboloidal reflector. A quick release mechanism shall allow rapid attachment of feed unit.



## **3.2. CHARACTERISTICS.**

### **3.2.1. Electrical.**

#### **3.2.1.1. Frequency Range.**

1350-2690 MHz

#### **3.2.1.2. Input Impedance.**

50 ohms

#### **3.2.1.3. VSWR.**

$\leq 2.0: 1$  (90% of band)

$\leq 2.5:1$  (100% of band)

**3.2.1.4. Polarization.**

Linear -  
Horizontal or vertical

**3.2.1.5. Gain dBi (minimum).**

|          |          |
|----------|----------|
| 1350 MHz | 20.0 dBi |
| 1850 MHz | 22.0 dBi |
| 2690 MHz | 25.0 dBi |

**3.2.1.6. Secondary Lobes.**

|                   |                                |
|-------------------|--------------------------------|
| 10 - 30 degrees   | >13 dB (1350MHz ... 1850MHz)   |
|                   | >15 dB (1850MHz ... 2690MHz)   |
| 30 - 100 degrees  | >20 dB (1350MHz ... 1850MHz)   |
|                   | >23 dB (1850MHz ... 2690MHz)   |
| 100 - 140 degrees | >20 dB (1350MHz ... 1850MHz)   |
|                   | >23 dB (1850MHz ... 2690MHz)   |
| 140 - 180 degrees | >28 dB (entire frequency band) |

**3.2.1.7. Cross-Polar Discrimination**

in axial direction                      > 28 dB

**3.2.1.8. 3dB Beam Width**

| (deg.) (maximum) | E Plane | H Plane |
|------------------|---------|---------|
| 1350 MHz         | 15      | 15      |
| 1850 MHz         | 12      | 12      |
| 2690 MHz         | 9       | 9       |



3.2.1.9. **Input Power.**

20 watts maximum

3.2.1.10. **DC Input conditions.**

The antenna shall provide a shunt DC short to ground.

3.2.1.11. **Connector**

The antenna shall allow the connection of a RF cable terminated N-Type male connector.

3.2.2. **Physical.**

3.2.2.1. **Dimensions. (max.)**

|              |                                       |
|--------------|---------------------------------------|
| Reflector    | 1000mm x 1000 mm (39.37in x 39.37in). |
| depth        | 400 mm (15.75in).                     |
| Antenna Feed | length 750 mm (29.53in).              |
|              | diameter 190 mm (7.48in).             |

3.2.2.2. **Weights.**

Reflector + feed 8.5 Kg. (18.74lbs)max.

Effective wind area of antenna  
(frontal area) 0.6 m<sup>2</sup> (6.45ft<sup>2</sup>) max.

3.2.2.3. **Mounting Spigot.**

Sleeve to suit 50 mm outside diameter mast adapter.

3.2.3. **Reliability.**

The Antenna shall achieve a Mean Time Between Failures of 100,000 hours.

3.2.4. **Maintainability.**

The feed and / or reflector can be replaced by any other identical feed/reflector and there is no requirement in any matching between

the two items.

**3.2.5. Environmental.**

**3.2.5.1. Wind Load.**

The antenna shall be operable and sustain no physical or electrical damage or performance degradation before, during and after being subjected to winds up to 60 mph (96.56 km/hr) from any direction and ice load specified in paragraph 3.2.5.2. The antenna shall withstand winds of up to 80 mph (128.75 km/hr) without permanent physical or electrical damage and meet the specified performance when redeployed.

**3.2.5.2. Ice Load**

The antenna shall be operable and sustain no physical or electrical damage or performance degradation before, during and after being subjected to the requirements of MIL-STD-810E Method 521.1, Procedure I. The antenna shall be capable of operation when subjected to icing accumulation of 12.5 mm (.49 in) clear glaze with specific gravity of 0.85.

**3.2.5.3. Temperature.**

Storage: -47°C to +71°C (-52.6°F to +159.8°F)

Operational: -40°C to +65°C (-40°F to +149°F)

**3.2.5.4. Relative Humidity.**

100 percent up to 27°C (80.6°F)

**3.2.5.5. Rainfall.**

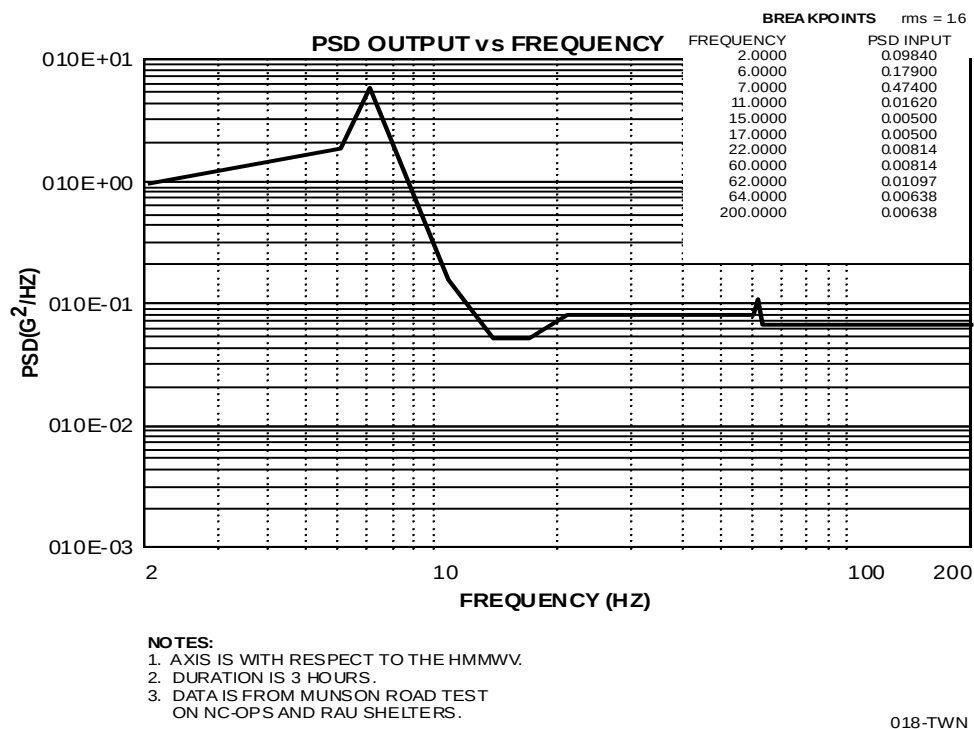
11 mm./minute (.43 in/minute) maximum.

### 3.2.5.6. **Snow.**

Will operate with loading of 20 Kg/m<sup>2</sup>.

### 3.2.5.7. **Vibration**

Method 514.4, Category 8 of MIL-STD-810 – ground module; based on vibration curves shown in Figure 3.2.5.7-1, Figure 3.2.5.7-2 and Figure 3.2.5.7-3 or commercially equivalent standards, in the non-operating transit configuration.



**Figure 3.2.5.7-1 Vertical Vibration Characteristics**

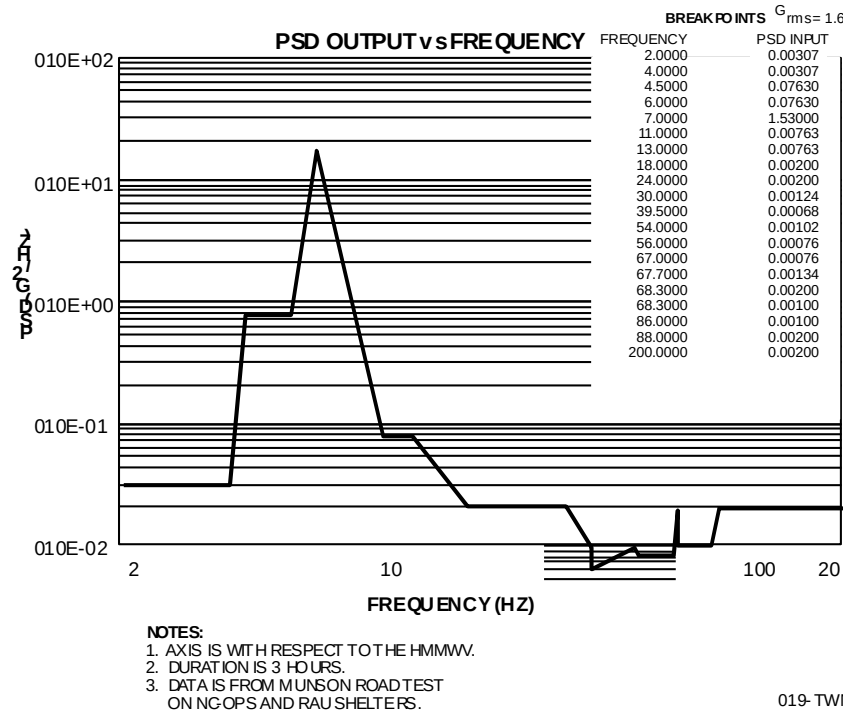


Figure 3.2.5.7-2 Longitudinal Vibration Characteristics

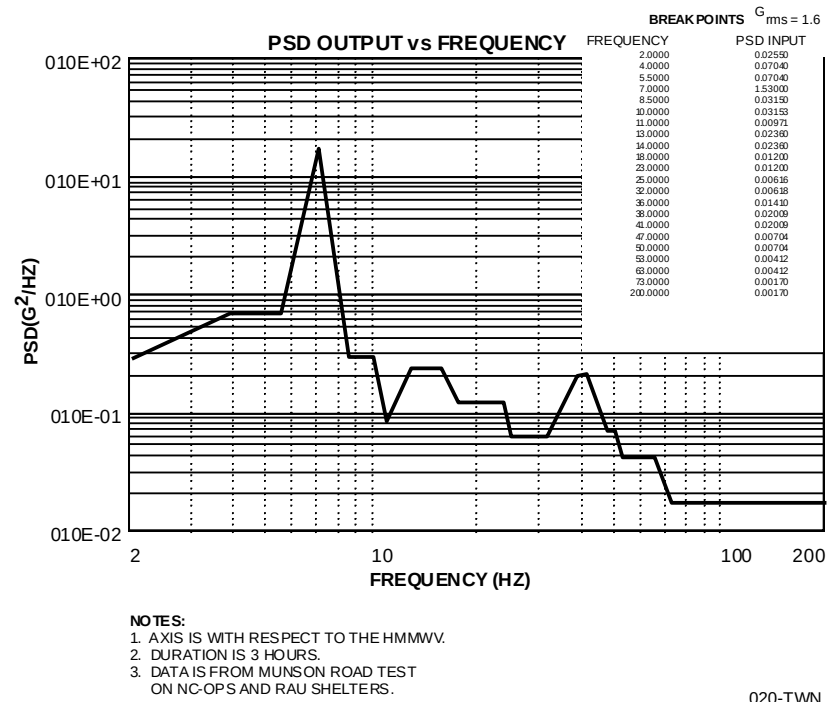


Figure 3.2.5.7-3 Lateral Vibration Characteristics

**3.2.5.8 Bounce, Loose Cargo**

Packed equipment shall be tested in accordance with MIL-STD-810E, Method 514.4, Procedure III, Category 3. After the test, the equipment shall meet the requirements of para. 3.2.1.5.

**3.3. DESIGN AND CONSTRUCTION.**

**3.3.1. Electrical**

**3.3.1.1. Reflector**

The reflector shall be shaped to provide high aperture efficiency and low wind load area.

**3.3.1.2. Spacing of Aluminum Alloy Tubes**

The spacing of the aluminum alloy tubes, which form a grid reflector shall be designed to keep leakage of the energy from the feed to such a level that side lobes between  $90^0$  and  $180^0$  do not exceed the specification limit.

**3.3.1.3. Feed**

The radiator shall be fed by a matching network. The complete feed shall be enclosed in a fiberglass shroud, foam filled to make it fully waterproof.

**3.3.2. Mechanical**

**3.3.2.1. Grid Reflector**

The grid reflector and radiating elements shall be constructed in aluminum alloy tube, rod and strip. Joints are welded or bonded. The coaxial input connector on the feed shall be protected, enabling the antenna to be placed on the ground without any damage to the connector.

**3.3.2.2. Antenna**

The antenna shall be fitted with a sleeve of 40-mm nominal inside diameter for securing the antenna to a suitable mast adapter. A quick release mechanism shall be provided at the center front of the reflector, which enables the exchange of feed units while the reflector remains in its original position on the mast. A second sleeve shall provide the facility for changing polarization by permitting rotation of the complete antenna.

**3.3.2.3. Reserved**

**3.3.3. Finish**

The antenna finish shall be in accordance with the requirements of MIL-F-14072D using chemical agent resistant coatings MIL-C-53039 or MIL-C-46168 TYPE II. Color shall be Green 383, 34094 per FED-STD-595B.

3.3.4. **Nameplates and Product Marking.**

Nameplates shall conform to Guidelines 67 of MIL- HDBK -454, and to the requirements of the purchase order.

3.3.5. **Interchangeability**

Attachment of the feed shall be achieved by releasing the clamp at the rear of the reflector by means of its operating lever. The feed unit may then be withdrawn from the front of the reflector. All feeds shall be fully interchangeable without effect of the electrical performance characteristics identified in Para. 3.2.1

4. **QUALITY ASSURANCE PROVISION**

This section establishes the requirements for the Test and Evaluation (T&E) of the Antenna. The scope to T&E includes verification of the antenna and the inspection and testing of all antenna equipment.

4.1. **GENERAL**

The overall objective of the test program specified herein is to verify that the requirements of this document have been met. The quality assurance provisions described in this section define the verification process that shall be used to confirm that the Antenna hardware complies with the performance requirements of this specification. Successful completion of this verification process is a necessary condition for acceptance of the goods and services specified herein. The T&E program shall provide independent verification and demonstration methods for the antenna. The subcontractor shall conduct and document all verification and demonstration activities for antenna performance.

Except as otherwise specified in the contract or purchase, the subcontractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein.