

MIL-C-49204 (CR)

12 May 1980

MILITARY SPECIFICATION

ANTENNA GROUP OE-254/GRC

This specifications is approved for use by the Communications Research and Development Command, Department of the Army, and is available for use by all Departments and Agencies of the Department of Defense.

1. SCOPE.

1.1 This specification covers production engineering, test and production of a broadband omni-directional VHF antenna system to be designated Antenna Group OE-254/GRC. The OE-254 is also referenced herein as: the antenna system.

2. APPLICABLE DOCUMENTS

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

MILITARY

| | |
|-------------|--|
| MIL-P-116 | Preservation-Packaging, Methods of |
| MIL-P-11268 | Parts, Materials and Processes Used in Electronic Equipment |
| MIL-E-55585 | Electronics Equipment and Parts, Packaging of |

STANDARDS

MILITARY

| | |
|-------------|--|
| MIL-STD-105 | Sampling Procedures and Tables for Inspection by Attributes |
| MIL-STD-202 | Test Methods for Electronic and Electrical Component Parts |
| MIL-STD-810 | Environmental Test Methods |
| MIL-STD-726 | Packaging Requirements Code |

Beneficial comments (recommendations, addition, deletions) and any pertinent data which may be of use in improving this document should be addressed to US Army Communication Research and Development Command, ATTN: DRDCO-PE-EC-1, Fort Monmouth, New Jersey 07703 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

FSC 5985

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DRAWINGS

SC-D-17226

Bend Test Jig For Mast Sections
MS-116-A, MS-117-A, MS-118-A,
AB-21/GR, AB-22/GR, AB-23/GR
and AB-24/GR, Assembly

SC-D-17227

Bend Test Jig for Mast Sections
MS-116-A, MS-117-A, MS-118-A,
AB-21/GR, AB-22/GR, AB-23/GR
and AB-24/GR, Details

SC-D-17228

Bend Test Jig for Mast Sections
MS-116-A, MS-117-A, MS-118-A,
AB-21/GR, AB-22/GR, AB-23/GR
and AB-24/GR, Details

SC-GL-57620

Gages for Mast Section MS-117-()

GL-SM-A-57621

Gages for Mast Section MS-116-()

SC-GL-57626

Gages for Mast Section AB-24()/GR

SC-GL-323064

Gages for Mast Base AB-652()/GR

DL-SM-B-944750

Antenna Group OE-254/GRC

(Copies of specifications, standards, handbooks, 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).

2.2 Other Publications.

Electronic Industries Association Standard

RS-329

Minimum Standards for Land-Mobile
Communication Antennas, Part I -
Base or Fixed Station Antennas,
Dec. 1966

(Applications for copies should be addressed to the Electronic Industries Association, 2001 Eye Street NW, Washington, DC 20006).

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3. REQUIREMENTS

3.1 First Article. Unless otherwise specified by the contract or purchase order, the contractor shall furnish First Article units in accordance with 4.3.

3.2 Construction. The equipment shall be constructed in accordance with the requirements of this specification and of Drawing and Data List DL-SM-B-955750 including the requirements for parts, materials, and processes thereon. In case of conflict between the requirements of the specification and the requirements of the drawings, the drawings shall govern.

3.3 Parts, Materials, and Processes; General. In addition to the requirements of this specification, the requirement of MIL-P-11268, including selection requirement therein shall apply.

3.4 Configuration. The configuration of every Antenna Group OE-254/GRC on order shall include the following:

| <u>ITEM</u> | <u>QUANTITY</u> |
|-----------------------|-----------------|
| Antenna AS-3166()/GRC | 1 each |
| Transmission Line | 1 each |
| Mast AB-1244()/GRC | 1 each |
| Accessory Items | 1 of each |
| Bag | 1 each |
| Running Spares | 1 set |

3.4.1 Transmission Line. The transmission line shall be Cable Assembly, Radio Frequency CG-1889 B/U (80 ft. 0 in) in accordance with Data List SM-D-944789. The cable assembly shall consist of RG-213/U Cable terminated at each end with RF Coaxial - Connector M-39012/01-0005 per specification MIL-C-39012/1.

3.5 Basic Antenna. The basic antenna shall be a radial biconical design having three equally spaced elements angled upward and three equally spaced elements angled downward from a feedcone structure. A field mast assembled from mating sections shall elevate the antenna and the antenna feed arrangement. The system shall be capable of continuous duty.

3.6 Electrical Requirements. The following electrical requirements apply to the completely assembled Antenna System, including the transmission line, unless otherwise stated.

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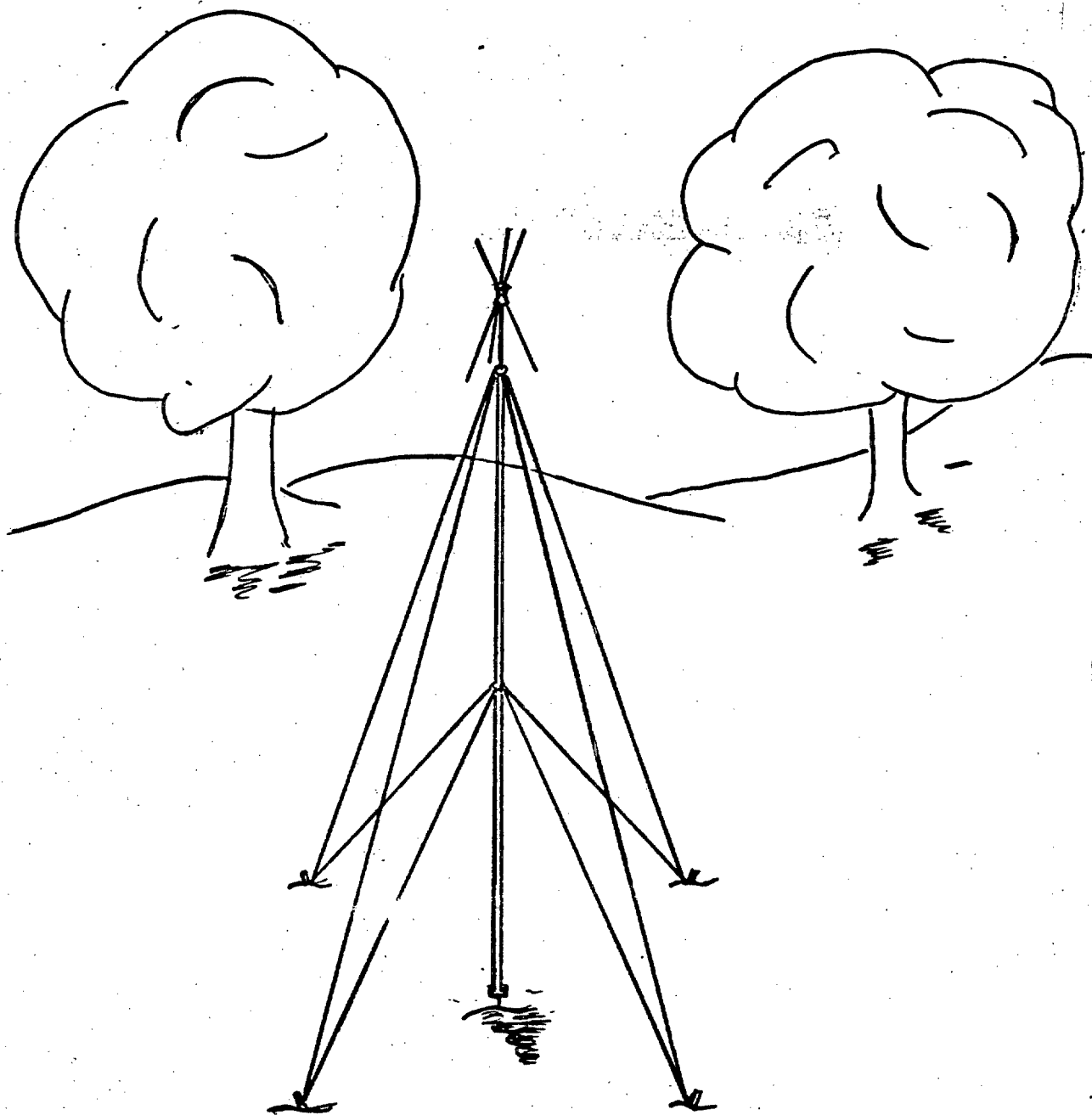


FIG. 1 ARTIST CONCEPT: ANTENNA GROUP OE-254()/GRC

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3.6.1 Bandwidth. The assembled antenna system shall comply with all the following electrical characteristics, at all frequencies within the specified range of frequency coverage, without electrical tuning, switching, or physical adjustment.

3.6.2 Frequency Range. The frequency range of the antenna system shall be at least from 30 to 88 MHz.

3.6.3 Impedance. The reference load impedance for all measurements, at the end of the transmission line opposite the antenna, shall be 50 ohms, unbalanced to ground.

3.6.4 Free Space VSWR. Free space voltage standing wave ratio for the complete antenna system, including the transmission line, shall not exceed 3.0 to 1 in the frequency range of 30 to 88 MHz.

3.6.5 Antenna Gain. Antenna Gain over the required frequency range shall be no less than 3 dB below the gain of the reference dipole antenna of 4.16.

3.6.6 Radiation Pattern. In accordance with 2.5.2 of Electronic Industries Assoc Standard RS-329 over the frequency range of 30 to 84 MHz. Over the frequency range of 84 to 88 MHz, the relative gain in any azimuth direction shall not vary from the mean value by more than + 3 dB for 360 degrees of rotation.

3.6.7 RF Power Level. Continuous duty RF power capability of the complete antenna system shall be 350 watts.

3.6.8 Dielectric Withstanding Voltage. Insulation material in the feedcone structure and the insulating extension shall show no visible effects or evidence of dielectric breakdown due to an applied voltage of 10,000 volts after the system has been subjected to environmental stresses of the service conditions specified herein.

3.6.9 Balun.

3.6.9.1 Power Rating. The balun shall be capable of continuous duty operation with a continuous wave input power of 350 watts, over the frequency range specified herein.

3.6.9.2 Coupling Loss. Coupling loss through the balun shall not exceed 0.5 dB.

3.6.9.3 Balun VSWR. VSWR at the input of the balun connector shall not exceed 2.0:1 in the frequency range 30 to 88 MHz, to be consistent with the free space VSWR requirements of paragraph 3.6.4 for the complete system, when tested in accordance with paragraph 4.19.3.

3.7 Mechanical Requirements. The following mechanical requirements shall apply.

3.7.1 Gages, Jigs and Fixtures.

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3.7.1.1 Gages. The contractor shall employ the following contractor furnished gages to test mechanical dimensions of the applicable threaded items.

| <u>GAGE LIST</u> | <u>APPLICABLE ITEM</u> |
|------------------|----------------------------|
| SC-GL-323064 | Feedcone Structure Sockets |
| SC-GS-57620 | MS-117/A |
| GL-SM-A-57621 | MS-116/A |
| SC-GL-57626 | AB-24/GR |

3.7.1.2 Fixtures. The contractor shall furnish fixtures for measuring cone angle of the feedcone structure and for performing the structural integrity test of the feedcone.

3.7.2 Height. Height of the assembled antenna system from the mast base plate to the vertical center of the feedcone structure shall be no less than 32 feet and no greater than 34 feet.

3.7.3 Weight. Weight of the complete antenna system, with all parts and the technical manual stowed in the bag, shall not exceed 45 pounds, 8 ounces. Weight of the feedcone structure, including the balun, shall not exceed 3 pounds, 6 ounces.

3.7.4 Transport Size. The outside dimensions of the closed bag, with all items properly stowed, shall not exceed 42 inches in length and 40 inches in perimeter.

3.7.5 Interchangeability. The system shall provide for two way interchangeability of parts. Selection of tolerances as shown on the drawing shall permit any part selected from one system, to be substituted into any other system of those on order without any problem of function or fit. Like units, assemblies and replaceable parts shall conform to Requirement 7 of MIL-STD-454.

3.7.6 Uniformity. All units manufactured according to this specification shall be constructed from the same drawings, fabricated from the same tools, and assembled to the same procedures.

3.7.7 Feedcone Structural Integrity. The feedcone structure shall be capable of withstanding, without damage or indication of separation, a tensile force of 2000 pounds applied in a manner to separate the two cones. This 2000 pound force shall be reduced to 1500 pounds for all Group "C" environmental post-tests. The feedcone structure shall also be capable of withstanding a tensile force of 250 pounds applied at the balun unbalanced connector and to the two cones in a manner tending to separate the balun from the feedcone structure.

3.7.8 Air Pressure. The feedcone assembly shall be capable of maintaining an air pressure, applied at the air pressure test vent to test the balun seal points, to within 0.01PSI.

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3.8 Service Conditions. As a result of being subjected to the following environmental conditions, according to the methods set forth in the test schedules, the antenna system shall not exhibit any effect which would be harmful to performance or reliability. The parts of the system shall not be deformed, defaced, frayed in any manner or exhibit evidence of corrosion. Corrosion is any visible degradation that can be attributed to flaky, pitted, blistered or otherwise loosened finish or metal surface. Harmful electrical performance is performance below the test limits stated herein.

3.8.1 Temperature.

a. High Temperature.

(1) Operating. The antenna system shall be operable without degradation in specified performance and shall sustain no physical deterioration, at ambient air temperature as high as 71°C (+160 F). This includes effects of solar radiation at a rate of 360 BTU/ft²/hr.

(2) Storage and Transportation. The antenna system shall withstand exposure to ambient temperatures as high as 71°C (+160 F).

b. Low Temperature.

(1) Operating. The antenna system shall be operable without degradation in specified performance and shall sustain no physical deterioration at ambient air temperatures as low as -45.6°C (-50°F).

(2) Storage and Transportation. The antenna system shall withstand exposure to ambient temperatures as low as 57°C (-70°F).

3.8.2 Humidity. The antenna system shall be operable without degradation in specified performance and shall sustain no harmful physical deterioration, during and after prolonged exposure to extreme high humidity levels encountered in tropical areas.

3.8.3 Fungus. The antenna system shall show no evidence of viable fungus or corrosion when subjected to environmental conditions which would be favorable to their development, namely high humidity, warm atmosphere, and presence of inorganic salts.

3.8.4 Salt Fog. The antenna system shall be capable of operation for extended periods in the saline atmosphere of a seacoast environment without harmful structural deterioration, without degradation in specified performance, without insulator breakdown and without electrical flashover.

3.8.5 Dust. The antenna system shall be capable of operating for extended periods in a dry, windy (17 knots), sandy environment without harmful structural deterioration, without degradation in specified performance, without insulator breakdown and without electrical flashover.

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3.8.6 Bounce, Loose Cargo. The antenna system, disassembled and stowed in its bag, shall be capable of withstanding shocks and exposure to wear induced during field transport as loose cargo. Some wear to the bag is expected as a result of the test of 4.18.6. However, the bag shall not be frayed or torn to the extent that it ceases to perform its function of containing and protecting its contents.

3.8.7 Drop. The antenna system, disassembled and stowed in its bag, shall be capable of being repeatedly dropped a distance of 30 in. onto any surface or edge without harmful damage to any component or to the bag.

3.8.8 Wind/ice Load. The antenna system, when erected for field operation according to the instructions, shall be capable of withstanding 90 mile per hour winds without ice load and 60 mile per hour winds with 1/2 inch of radical ice and remain erected, without harmful damage to the feedcone structure, to the balun, or to the mast including the guy system. (Note that the test specified herein is for 90 mph winds only since this is easier to implement and performs essentially the same purpose as a combined wind/ice load test).

3.8.9 Immersion. The antenna system, stowed in its bag (less Technical Manual and Cable Assembly CG-1889 B/U), shall be capable of being immersed to a covering of 3 feet of fresh water for a period of 2 hours. The immersion shall not result in any form of physical deterioration, loss of fit, or reduction in electrical performance below specified limits.

3.9 Running Spares. A set of running spares shall be furnished consisting of the following:

| | |
|----------------------------------|-------------------------------|
| 2 ea Mast Section MS-116A | per MIL-M-12320 |
| 1 ea Mast Section MS-117A | per MIL-M-12320 |
| 1 ea Mast Section AB-24 | per MIL-M-12320 |
| 1 ea Guy Assembly | per SM-D-659410-Gp1 |
| 1 ea Guy Assembly | per SM-D-659410-Gp2 |
| 1 ea Stake Assembly | per SM-C-659375 |
| 1 ea Guy Plate | per SM-B-659290-1 |
| 1 ea Guy Plate | per SM-B-659290-2 |
| 1 ea Connector Adapter UC-349B/U | per Bu Ships Drawing REB49102 |

3.10 Systems Safety Engineering.

3.10.1 Personnel Hazards. Personnel hazards shall be kept to a minimum through compliance with requirement 1 of MIL-STD-454 and the paragraph entitled "Hazards and Safety" of MIL-STD-1472. Compliance with these requirements will be verified through visual inspection (See 4.18.1).

3.10.2 Corona. The feedcone structure shall be free of sharp edges and points.

3.10.3 Radioactive Materials. Radioactive materials shall not be used.

3.11 Workmanship. Workmanship shall be in accordance with requirement 9, MIL-STD-454. (See 4.3.1). Classification of defects shall be in accordance with MIL-STD-252. The specified camouflage paint has a flat, dull finish which is easily polished (marked) when parts are rubbed together. Occasional small marks are expected and can be tolerated. Excessive polishing is considered to exist when greater than ten percent of the surface area of a given part is marked. Such a condition may be induced by certain mechanical tests. When excessive polishing exists the finish shall be given a paint touch-up prior to final acceptance.

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4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the supplier may utilize his own facilities, or any commercial laboratory, acceptable to the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure that supplies and services conform to prescribed requirements.

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

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

b. Inspection covered by subsidiary documents. (See 4.4).

c. Quality conformance inspection.

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

(2) Quality conformance inspection of preparation for delivery. (See 4.23).

4.3 First article inspection. This inspection shall consist of the inspection specified in Table I and shall include, as referenced on inspection data sheets, inspection specified in subsidiary documents and the supplementary tests. Order and quantity of equipments to be subjected to First Article Testing shall be as specified in Table I.

4.3.1 Standard of workmanship. Standard of workmanship, 3.12, shall be established during the Visual Inspection of 4.18.1.

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TABLE I
FIRST ARTICLE TEST SCHEDULE

| TITLE | RQT PARA | DATA SHEET | UNIT 1 | SEQUENCE | | | | |
|------------------------------|----------------|------------|-----------|-----------|-----------|-----------|-----------|--|
| | | | | UNIT 2 | UNIT 3 | UNIT 4 | UNIT 5 | |
| Visual Inspection | 3.7.6, 3.11 | 4.19.1 | 1 | 1 | 1 | 1 | | |
| Transmission Line | 3.4.1 | 4.19.2 | 2 | 2 | 2 | 2 | 2 | |
| Balun VSWR | 3.6.9.3 | 4.19.3 | 3 | 3 | 3 | 3 | 3 | |
| Air Pressure | 3.7.8 | 4.19.4 | 4 | 4 | 4 | 4 | 4 | |
| Item Count | 3.4, 3.9 | 4.19.5 | 5 | 5 | 5 | 5 | 5 | |
| Weight | 3.7.3 | 4.20.1 | 6 | 6 | 6 | 6 | 6 | |
| Transport Size | 3.7.4 | 4.20.2 | 7 | 7 | 7 | 7 | 7 | |
| Coupling Loss | 3.6.9.2 | 4.20.3 | 8 | 8 | 8 | 8 | 8 | |
| Interchangeability | 3.7.5 | 4.20.4 | 9 | 9 | 9 | 9 | 9 | |
| High Temperature | 3.8.1a | 4.21.1 | | 10 | | | | |
| Low Temperature | 3.8.1b | 4.21.2 | | 11 | | | | |
| Humidity | 3.8.2 | 4.21.3 | | | | 10 | | |
| Antenna Gain | 3.6.5 | 4.21.4 | 11 | 13 | | 11 | 10 | |
| Drop | 3.8.7 | 4.21.5 | | | | 12 | | |
| Wind Load | 3.8.8 | 4.21.6 | | | 15 | 13 | | |
| Immersion | 3.8.9 | 4.21.7 | 14 | 17 | | | | |
| Initial Visual Inspection | | 4.18.1 | | | | | 1 | |
| Salt Fog | 3.8.4 | 4.18.3 | 10 | | | | | |
| Dust | 3.8.5 | 4.18.4 | | 12 | | | | |
| Radiation Pattern | 3.6.6 | 4.18.5 | 12 | | | | | |
| Bounce Loose Cargo | 3.8.6 | 4.18.6 | | 14 | | | | |
| Fungus | 3.8.3 | 4.18.2 | | | 10 | | | |
| Feedcone | 3.7.7 | 4.20.5 | 13 | 16 | 11 | 14 | 11 | |
| Structural Integrity | | | | | | | | |

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4.3.2 Procedure in the Event of Failure During First Article Inspection. In the event of failure to pass First Article Inspection, the unit shall be corrected as necessary and then resubmitted to First Article Inspection. After successful retest, the same corrections shall be applied to all other systems on order.

4.3.3 First Article Sample. Following acceptance of the First Article samples, the units shall remain in the custody of the Government Quality Assurance Representative for his use as a reference. Following completion of production on order, the unit, or units shall be reconditioned to whatever extent necessary and then shipped according to the contract.

4.4 Inspection Covered by Subsidiary Documents. The following shall be inspected under the applicable subsidiary documents as part of the inspection of equipment before preparation for delivery.

| <u>ITEM</u> | <u>PARAGRAPH</u> |
|---|------------------|
| Parts, Materials and Processes Used In Electronic Equipment | 3.3 |

4.5 Quality Conformance Inspection of Equipment Before Preparation for Delivery. The contractor shall perform the inspection specified in 4.4 and 4.6 through 4.9. 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. Test equipment for Government verification inspection shall be made available by the contractor. Further, all facilities and services necessary for the placement, operation and maintenance of these test equipments shall be provided by the contractor.

4.6 Group A Inspection. Each unit on contract or purchase order shall be inspected for conformance to inspections specified in Table II. Discrete lots shall be formed from units that pass this inspection. Factors of lot composition not defined herein, or in the contract or purchase order shall be in accordance with MIL-STD-105. Each lot shall be subjected to sampling inspection, utilizing the procedures of MIL-STD-105, using the general inspection levels, and AQL's indicated in Table II.

TABLE II
GROUP A INSPECTION

| <u>TITLE</u> | <u>REF. PARA</u> | <u>DATA SHEET</u> | <u>AQL</u> | |
|-------------------|------------------|-------------------|--------------|--------------|
| | | | <u>MAJOR</u> | <u>MINOR</u> |
| Visual Inspection | 3.7.6 3.12 | 4.19.1 | 1.0 | 4.0 |
| Transmission Line | 3.4.1 | 4.19.2 | 1.0 | — |
| Balun VSWR | 3.6.9.3 | 4.19.3 | 1.0 | — |
| Air Pressure | 3.7.8 | 4.19.4 | 1.0 | — |
| Item Count | 3.4 | 4.19.5 | 1.0 | — |

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4.6.1 Procedure in the event of failure during Group A inspection. In the event of failure to pass any Group A Inspection item, the unit shall be corrected as necessary and then resubmitted to Group A. inspection.

4.7 Group B inspection. This inspection (including sampling) shall conform to Table III, and to the procedures for small-sample inspection of MIL-STD-105, using the special inspection levels. 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 Group A inspection.

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

TABLE III
GROUP B INSPECTION

| TITLE | RQT PARA. | DATA SHEET | AQL | |
|-------------------------------|-----------------------|------------|-------|-------|
| | | | MAJOR | MINOR |
| Weight | 3.7.3 | 4.20.1 | 4.0 | -- |
| Transport Size | 3.7.4 | 4.20.2 | 4.0 | -- |
| Coupling Loss | 3.6.9.2 | 4.20.3 | 4.0 | -- |
| Interchangeability | 3.7.1, 3.7.5 3.7.6 | 4.20.4 | 6.5 | -- |
| Feedcone Structural Integrity | 3.7.7 | 4.20.5 | 4.0 | -- |

4.7.2 Procedure in the event of failure during Group B inspection. In the event of failure to pass any Group B Inspection item, the unit shall be corrected as necessary and then resubmitted to Group B Inspection. After successful retest, the same corrections shall be applied to all other undelivered systems on order.

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4.8 Group C Inspection. This inspection shall be as specified in Table IV and shall be performed on units that met Group A and Group B inspection.

TABLE IV
GROUP C INSPECTION

| TITLE | RQT PARA | DATA SHEET | SUB GROUP |
|--------------------|----------|------------|-----------|
| Immersion | 3.8.9 | 4.21.7 | II |
| High Temperature | 3.8.1.a | 4.21.1 | II |
| Low Temperature | 3.8.1.b | 4.21.2 | II |
| Humidity | 3.8.2 | 4.21.3 | III |
| Antenna Gain | 3.6.5 | 4.21.4 | IV |
| Drop | 3.8.7 | 4.21.5 | IV |
| Wind Load | 3.8.8 | 4.21.6 | IV |
| Salt Fog | 3.8.4 | 4.18.3 | IV |
| Dust | 3.8.5 | 4.18.4 | IV |
| Bounce Loose Cargo | 3.8.6 | 4.18.6 | IV |
| Fungus | 3.8.3 | 4.18.2 | IV |

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4.8.1 Sampling for Inspection of Equipment. Units selected for each Group C inspection shall be selected without regard to their quality in accordance with the following:

Subgroup II. For this subgroup, two units from the first 50 production units shall be selected for this Group C inspection. For subsequent Group C inspections, two units from each successive 500, or two every two months, if less than 500 are produced during a two month period.

Subgroup III. For this subgroup, two units from the first 50 production units shall be selected for the first Group C inspection. For subsequent Group C inspections, two units shall be selected from each successive 600, or two every three months, if less than 600 are produced during this three month period.

Subgroup IV. For this subgroup, two units from the first 50 production units only shall be selected. Subsequently, 2 units shall be tested every six (6) months until completion of production.

4.8.2 Procedure in the Event of Failure During Group C Inspection. The contractor shall immediately report in writing each Group C failure occurrence, including details of the failure and characteristics affected. The contractor shall immediately investigate the cause of failure and further report the results of investigation and details of the proposed corrective action on (1) the process and materials, as applicable, and (2) all units of product which were manufactured under the same conditions and which the Government considers subject to the same failure. Reports shall be forwarded to the responsible technical activity designated in the contract through the Quality Assurance Representative for evaluation. After corrective action has been taken, additional sample units shall be subjected to Group C inspection (all inspections, or the inspections which the sample failed, at the option of the Government) and Groups A and B inspection may be reinstated; however, final acceptance and shipment will be withheld until the Group C reinspection results have shown that the corrective action was effective.

4.8.3 Reinspection of Conforming Group C Sample Units. Unless otherwise specified, sample units which have been subjected and passed Group C inspection may be accepted on the contract or order provided all damage is repaired and the sample units are resubjected to and pass Groups A and B inspection.

4.9 Supplementary tests. Supplementary tests are defined as those tests herein which are only conducted as a pretest and/or post test to a First Article or Group C test. The Supplementary Tests are referenced on Inspection Data Sheets where they apply.

4.10 Inspection data sheets. All inspection shall be performed according to the inspection data sheets contained in this specification. Data for each inspection shall be recorded on photo copies or other direct reproductions of these sheets prepared by the contractor. All inspection sheets shall be properly dated on the date the inspection is performed.

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4.10.1 Page numbering of inspection data sheets. For any antenna system tested and for any group of tests, data sheets shall be hand numbered at the bottom of the page in the sequence in which the tests were conducted. Pretest and Post test inspections which are part of environmental and mechanical tests shall bear a number and letter where the number indicates the environmental test and the letter indicates the pre or post test, such as 5a, 5b, 5c. Failure reports shall be similarly inserted in the set of data sheets.

4.10.2 Authentication of inspection data sheets. The data sheets shall be signed in the space provided by the contractor's test technician(s) who performed the testing and by the contractor's quality assurance representative responsible for acting on the results of testing.

4.11 Government witness to inspection. The contractor shall permit all inspections to be witnessed by a representative or representatives of the contracting officer.

4.12 Recycling of inspection schedule. When corrective action has been applied as a result of failure and the nature of the corrective action may influence other specified requirements, testing shall be recycled to the extent necessary to insure that the end design represents full compliance with the specifications.

4.13 Failure reports. Failure reports shall be prepared for each instance where the antenna system fails to comply with a test requirement. The failure report shall contain a failure analysis statement and a corrective action statement. The test data sheet recording the initial failure and the failure report shall be attached to the data sheet recording compliance after corrective action. The failure report shall be signed by the contractor's quality assurance representative who conducted the investigation and by the contractor's chief of Quality Assurance.

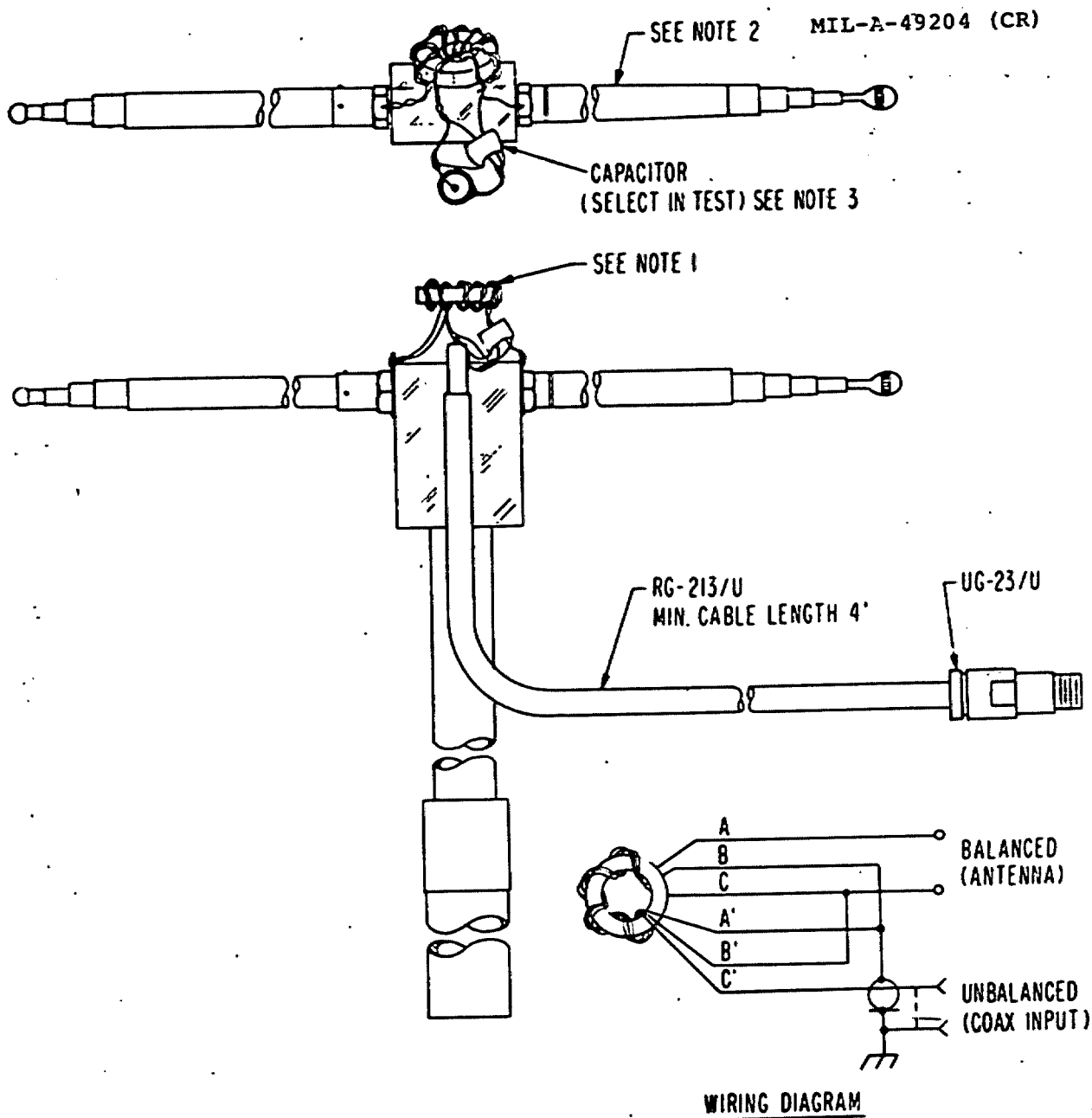
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4.14 Standard test conditions. Unless otherwise specified, the following standard test conditions shall prevail during testing.

| <u>Condition</u> | <u>Value/Tolerance</u> |
|------------------|------------------------|
| Temperature | Prevailing Ambient |
| Altitude | Ground level |

4.15 Test equipment. All electrical test equipment employed, except for the 350 Watt RF power source, shall be commercially available items for which calibration service, referencing back to primary standards, is available. The 350 Watt RF power source for balun testing may be any unmodulated generator capable of adjustment to the required power level, capable of adjustment to the designated test frequency, and having a harmonic content of less than 10%. All test equipment shall be supplied by the contractor.

4.16 Reference dipole antenna. The reference dipole antenna for gain measurements shall be a vertically polarized balanced dipole. Length of the dipole shall be continuously adjustable. At each test frequency, length shall be adjusted to half-wave length resonance, considering end effects (usually 95% to 97% of one half wave length). When so adjusted, free space VSWR shall be less than 2.0 to 1. The coupling balun shall have a 1 to 1 impedance ratio. Balun coupling loss shall be less than 1 dB. The transmission line shall be the same line or an identical line to that of the antenna under test. Free space VSWR of the antenna and coupling loss of the balun shall be measured over the frequency range of the antenna under test. Maximum VSWR and maximum coupling loss shall be recorded in the space provided for on the test data sheet for gain measurements. A typical antenna for this purpose is shown in Figure 2.



NOTES:

- 1- INDIANA GENERAL PART # F624-19,02, FERRAMIC TOROID OR EQUAL WITH 10 TURNS # 18 ENAMELED WIRE, TRIFILAR WINDING.
- 2- WHIP SECTIONS MUST EXTEND ANYWHERE FROM 2.5 FEET TO 8.5 FEET TO ADJUST TO FREQUENCY OF MEASUREMENT.
- 3- VALUE OF CAPACITOR TO BE SELECTED SO AS VSWR OF THE BALUN IS 1:1 ACROSS THE FREQUENCY RANGE OF THE BALUN.

FIGURE 2 REFERENCE DIPOLE ANTENNA

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4.17 First Article Test Report. A first article test report shall be supplied if required by the bid request and contract. When so required the report shall contain reproductions of the data sheets reporting all tests on first article samples, failure reports, test equipment lists, and drawings, sketches and check lists where required to be attached to data sheets. The report shall contain a statement that all testing required by the contract has been conducted and that all specification requirements have been compiled with. The report shall be signed by an officer of the contractor's company.

4.18

First Article Inspection

Data Sheets

for use in Acceptance of

Antenna Group OE-254()/GRC

Name of Contractor _____

Contract Number _____

Contract Item Number _____

Equipment Serial Number _____

Tested by _____

Verified by _____

Date _____

MIL-A-49204(CR)

4.18.1 Initial Visual Inspection.

Method. The equipment shall be visually inspected for compliance with the requirements of this specification and Drawing DL-SM-B-944750.

| <u>REQUIREMENT</u> | <u>RECORD OF VISUAL INSPECTION</u> | | |
|------------------------|------------------------------------|---------------|---------------|
| | <u>INSPECTED</u> | <u>PASSED</u> | <u>FAILED</u> |
| <u>TITLE</u> | | | |
| Radiating Elements | _____ | _____ | _____ |
| Feedcone Structure | _____ | _____ | _____ |
| Corona | _____ | _____ | _____ |
| Notice | _____ | _____ | _____ |
| Balun | _____ | _____ | _____ |
| Repairability | _____ | _____ | _____ |
| Air Pressure Test Vent | _____ | _____ | _____ |
| Protective Cap | _____ | _____ | _____ |
| Insulating Extension | _____ | _____ | _____ |
| Transmission Line | _____ | _____ | _____ |
| Mast AB-1244()/GRC | _____ | _____ | _____ |

MIL-A-49204 (CR)

4.18.1 Initial Visual Inspection. (Cont'd)

| <u>Requirement.</u> | <u>RECORD OF VISUAL INSPECTION</u> | | |
|--------------------------------------|------------------------------------|----------------------|----------------------|
| | <u>INSPECTED</u> (X) | <u>PASSED</u> (X) | <u>FAILED</u> (X) |
| Connector Adapter | _____ | _____ | _____ |
| Anti-Corrosion Compound | _____ | _____ | _____ |
| Electrical Tape | _____ | _____ | _____ |
| Construction | _____ | _____ | _____ |
| Compartmentation | _____ | _____ | _____ |
| Straps | _____ | _____ | _____ |
| Materials and Methods | _____ | _____ | _____ |
| Instructions | _____ | _____ | _____ |
| Height | _____ | _____ | _____ |
| Ground Area | _____ | _____ | _____ |
| Galvanic Corrosion | _____ | _____ | _____ |
| Castings | _____ | _____ | _____ |
| Impregnation of Aluminum Castings | _____ | _____ | _____ |
| Uniformity | _____ | _____ | _____ |
| Resistance to Precipitation | _____ | _____ | _____ |
| Parts, Materials & Processes | _____ | _____ | _____ |
| Finishes | _____ | _____ | _____ |
| Marking | _____ | _____ | _____ |
| Systems Safety Engineering | _____ | _____ | _____ |
| Human Engineering | _____ | _____ | _____ |
| Workmanship | _____ | _____ | _____ |

MIL-A-49204 (CR)

4.18.2 Fungus.**Requirement.** See 3.8.3.

Method. As a pretest, the antenna system shall be subjected to the Free space VSWR test, 4.22.1. After pretest, the antenna system shall be subjected to the test of Method 508.1, Procedure 1 of MIL-STD-810. The system shall be installed in the chamber but with radiating elements and support mast sections removed to the extent required to accommodate the chamber size. Other parts and the bag shall be arranged in the chamber so that the other parts are unprotected by the bag. After exposure, the following shall be conducted: RF power capability, 4.22.3, Dielectric withstanding voltage, 4.22.5, Air pressure, 4.19.4, Free space VSWR, 4.22.1, and Inspection for physical condition, 4.22.2. During Inspection for physical condition the items of the system shall be examined for evidence of fungus growth or damage

Test Result.

| | <u>Data Sheets</u> <u>Attached</u> (X) | <u>Passed</u> (X) | <u>Failed</u> (X) |
|--------------------------------------|--|----------------------|----------------------|
| <u>Pretest</u> | | | |
| Free Space VSWR | _____ | _____ | _____ |
| <u>Post Test</u> | | | |
| RF Power Capability | _____ | _____ | _____ |
| Dielectric With- standing Voltage | _____ | _____ | _____ |
| Air Pressure | _____ | _____ | _____ |
| Free Space VSWR | _____ | _____ | _____ |
| Inspection for Physical Condition | _____ | _____ | _____ |

MIL-A-49204 (CR)

4.18.3 Salt fog.Requirement. See 3.8.4.

Method. As a pretest, the antenna system shall be subjected to the Free space VSWR test, 4.22.1. After pretest, the antenna system shall be subjected to the test of Method 509.1, Procedure I of MIL-STD-810. The system shall be installed in the chamber but with radiating elements and support mast sections removed to the extent required to accommodate the chamber size. Other parts and the bag shall be arranged in the chamber so that the other parts are unprotected by the bag. After exposure, the following shall be conducted: RF power capability, 4.22.3; Dielectric withstanding voltage, 4.22.5; Air pressure, 4.19.4; Inspection for physical condition, 4.22.2 and Free space VSWR, 4.22.1.

Test Result.

| | <u>Data Sheets</u> <u>Attached</u> (X) | <u>Passed</u> (X) | <u>Failed</u> (X) |
|--------------------------------------|--|----------------------|----------------------|
| <u>Pretest</u> | | | |
| Free Space VSWR | _____ | _____ | _____ |
| <u>Post Test</u> | | | |
| RF Power Capability | _____ | _____ | _____ |
| Dielectric With- standing Voltage | _____ | _____ | _____ |
| Air Pressure | _____ | _____ | _____ |
| Inspection for Physical Condition | _____ | _____ | _____ |
| Free Space VSWR | _____ | _____ | _____ |

MIL-A-49204 (CR)

4.18.4 Dust.Requirement. See 3.8.5.

Method. As a pretest, the antenna system shall be subjected to the Free space VSWR test, 4.22.1. After pretest, the antenna system shall be subjected to the test of Method 510.1, Procedure I of MIL-STD-810. Step 3 shall be performed immediately after temperature has stabilized during Step 2. After exposure, the following shall be conducted without any cleaning other than due to necessary handling of the equipment: RF power capability, 4.22.3; Dielectric withstanding voltage, 4.22.5; Air pressure, 4.19.4; Inspection for physical condition, 4.22.2; and Free space VSWR, 4.22.1.

Test Result.

| | <u>Data Sheets</u> <u>Attached</u> (X) | <u>Passed</u> (X) | <u>Failed</u> (X) |
|--------------------------------------|--|----------------------|----------------------|
| <u>Pretest</u> | | | |
| Free Space VSWR | _____ | _____ | _____ |
| <u>Post Test</u> | | | |
| RF Power Capability | _____ | _____ | _____ |
| Dielectric With- standing Voltage | _____ | _____ | _____ |
| Air Pressure | _____ | _____ | _____ |
| Inspection for Physical Condition | _____ | _____ | _____ |
| Free Space VSWR | _____ | _____ | _____ |

MIL-A-49204 (CR)

4.18.5 Radiation Pattern.Requirement. See 3.6.6Method. In accordance with paragraph 2.5.3 of Electronic Industries Association Standard RS-329 except the antenna under test shall be full scale size.Test Result.

| <u>Plot of Pattern Attached</u> (X) | <u>Passed</u> (X) | <u>Failed</u> (X) |
|--|----------------------|----------------------|
|--|----------------------|----------------------|

| | | |
|-------|-------|-------|
| _____ | _____ | _____ |
|-------|-------|-------|

4.18.6 Bounce, Loose Cargo.Requirement. See 3.8.6.Method. The antenna system, with all components stored in the bag, and without any additional container, shall be subjected to the test of Method 514.2, Procedure XI of MIL-STD-810. As a pretest, the antenna shall be subjected to the Free space VSWR test, 4.22.1. After bounce, the following tests shall be conducted: RF power capability, 4.22.3; Free space VSWR, 4.22.1; Air Pressure, 4.19.4; and Inspection for physical condition, 4.22.2.Test Result.

| <u>Data Sheets Attached</u> (X) | <u>Passed</u> (X) | <u>Failed</u> (X) |
|--|----------------------|----------------------|
|--|----------------------|----------------------|

Pretest

Free Space VSWR

| | | |
|-------|-------|-------|
| _____ | _____ | _____ |
|-------|-------|-------|

Post Test

RF Power Capability

| | | |
|-------|-------|-------|
| _____ | _____ | _____ |
|-------|-------|-------|

Free Space VSWR

| | | |
|-------|-------|-------|
| _____ | _____ | _____ |
|-------|-------|-------|

Air Pressure

| | | |
|-------|-------|-------|
| _____ | _____ | _____ |
|-------|-------|-------|

Inspection for
Physical Condition

| | | |
|-------|-------|-------|
| _____ | _____ | _____ |
|-------|-------|-------|

4.18.7 List of Test Equipment Employed for First Article Tests.

| <u>Item Name</u> | <u>Manufacturer</u> | <u>Model No.</u> | <u>Serial No.</u> |
|------------------|---------------------|------------------|-------------------|
|------------------|---------------------|------------------|-------------------|

MIL-A-49204 (CR)

4.19

GROUP A

Inspection Data Sheets

for use in Acceptance of

Antenna Group OE-254()/GRC

Name of Contractor _____

Contract Number _____

Contract Item Number _____

Equipment Serial Number _____

Tested by _____

Verified by _____

Date _____

MIL-A-49204 (CR)

4.19.1 Visual Inspection.

Note. The First Article visual inspection of 4.18.1 must be completed before the following test can be conducted.

Requirement. See 3.7.6 and 3.11.

Method. Visual inspection, item by item. The First Article Test unit subjected to visual inspection of 4.18.1, shall serve as a reference. In-process inspection records shall be checked.

Test Result

| <u>Conducted</u> (X) | <u>Passed</u> (X) | <u>Failed</u> (X) |
|-------------------------|----------------------|----------------------|
| _____ | _____ | _____ |

4.19.2 Transmission Line.

Requirement. See 3.4.1

Method. A reflectometer shall be used to test for correct impedance and continuity.

Test Result.

| <u>Conducted</u> (X) | <u>Passed</u> (X) | <u>Failed</u> (X) |
|-------------------------|----------------------|----------------------|
| _____ | _____ | _____ |

4.19.3 Balun VSWR.

Requirement. See 3.6.9.3

Method. A 200 OHM dummy load* shall be placed across the balanced terminals of the balun. VSWR shall be measured at the balun unbalanced connector using commercially available equipment having a load impedance of 50 ohms and having the capability of displaying VSWR over the complete required frequency range. VSWR shall be observed over the complete range and recorded at the frequency having the largest VSWR.

Test Result.

| <u>Frequency</u> | <u>VSWR</u> | <u>Passed</u> (X) | <u>Failed</u> (X) |
|------------------|-------------|----------------------|----------------------|
| _____ | _____ | _____ | _____ |

*DUMMY LOAD - Resistive

$R_p = 200 \text{ ohms } (+10\%)$

$CP = +0.2 \text{ Picofarads (when measured with a Boonton 250A RX meter or equivalent).}$

MIL-A-49204 (CR)

4.19.4 Air Pressure.Requirement.

Method. An air pressure of 1 1/2 pounds per square inch \pm 1/4 psi shall be applied at the air pressure test vent so as to test balun seal points. Pressure shall be applied for 1 minute during which time there shall be no more than 0.01 psi change in pressure.

Test Result.

| <u>Conducted</u> | <u>Passed</u> | <u>Failed</u> |
|------------------|---------------|---------------|
| (X) | (X) | (X) |
| _____ | _____ | _____ |

4.19.5 Item Count.

Requirement. See 3.4.

Method. Each item required to complete the antenna system shall be inventoried as it is placed in its assigned position in the bag.

Test Result.

| <u>Passed</u> | <u>Failed</u> |
|---------------------------------------|---------------|
| (X) | (X) |
| <u>Completed Check: List Attached</u> | |
| (X) | |

4.19.6 List of Test Equipment Employed for Group A Tests.

| <u>Item Name</u> | <u>Manufacturer</u> | <u>Model No.</u> | <u>Serial No.</u> |
|------------------|---------------------|------------------|-------------------|
|------------------|---------------------|------------------|-------------------|

MIL-A-49204 (CR)

4.20

GROUP B

Inspection Data Sheets
for use in Acceptance of
Antenna Group OE-254 ()/GRC

Name of Contractor _____

Contract Number _____

Contract Item Number _____

Equipment Serial Number _____

Tested by _____

Verified by _____

date _____

MIL-A-49204 (CR)

4.20.1 Weight.Requirement. See 3.7.3Step IMethod. The bag shall be weighed with all items of the system contained therein.Test Result.

| <u>Weight</u> | <u>Passed</u> | <u>Failed</u> |
|---------------------------|---------------|---------------|
| | (X) | (X) |
| _____ pounds _____ ounces | _____ | _____ |

Step 2Method. The feedcone structure, with balun attached, shall be weighed.Test Result.

| <u>Weight</u> | <u>Passed</u> | <u>Failed</u> |
|---------------------------|---------------|---------------|
| | (X) | (X) |
| _____ pounds _____ ounces | _____ | _____ |

4.20.2 Transport Size.Requirement. See 3.7.4.Method. The bag shall be closed and fastened with all system items in place. Length and perimeter shall be measured.Test Result.

| | <u>Measured</u> | <u>Passed</u> | <u>Failed</u> |
|-----------|-----------------|---------------|---------------|
| | | (X) | (X) |
| Length | _____ inches | _____ | _____ |
| Perimeter | _____ inches | _____ | _____ |

MIL-A-49204 (CR)

4.20.3 Coupling Loss.Requirement. See 3.6.9.2

Method. For convenience of test instrumentation, two baluns are employed in the test with the balanced sides joined together by the shortest possible connections. Test results are adjusted to account for the doubling of effects of the test. Power from a radio frequency source having a 50 ohm output impedance shall be fed to the unbalanced side of one balun through an in-line RF wattmeter. The unbalanced side of the second balun shall be connected to an RF wattmeter having a 50 ohm load impedance. The signal source shall be adjusted to supply a fixed forward power at the in-line wattmeter. Power at the load wattmeter shall be measured and loss computed.

Test Result.

| | <u>Measured Loss</u> | <u>Adjusted Data (Loss)</u> | <u>Passed (X)</u> | <u>Failed (X)</u> |
|--------------|--------------------------|---------------------------------|-----------------------|-----------------------|
| Output Power | _____ | _____ dB | _____ | _____ |

4.20.4 Interchangeability.Requirements. See 3.7.1, 3.7.5, 3.7.6a. Method when conducted as part of First Article testing.

Step 1. Contractor gages shall be employed to test threads of the feedcone structure and Mast Sections MS-116-A, MS-117-A and AB-24/GR. The cone angled of the feedcone structure shall also be measured with the appropriate fixture.

Step 2. Within each system all parts not included in Step 1, and required by the design to be fitted together, shall be assembled or fitted together. Observation for correctness of fit shall be conducted. These parts shall then be interchanged among other first article samples and assembled or fitted together. Observation of correctness of fit shall be repeated.

Test Result.

| | <u>Conducted (X)</u> | <u>Passed (X)</u> | <u>Failed (X)</u> |
|--------|--------------------------|-----------------------|-----------------------|
| Step 1 | _____ | _____ | _____ |
| Step 2 | _____ | _____ | _____ |

MIL-A-49204 (CR)

4.20.4 Interchangeability. (Cont'd)b. Method when conducted as part of Group B Acceptance Tests

Step 1. Same as Step 1 above.

Step 2. Within each antenna system under Group B test, parts not included in Step 1 shall be designated by the Government Quality Assurance Representative for interchangeability test. These parts shall be interchanged two ways with like parts in the accepted First Article sample in the custody of the Government QAR. Observation of correctness of fit in both systems shall be observed.

Test Result.

| | <u>Conducted</u> (X) | <u>Passed</u> (X) | <u>Failed</u> (X) |
|--------|-------------------------|----------------------|----------------------|
| Step 1 | _____ | _____ | _____ |
| Step 2 | _____ | _____ | _____ |

4.20.5 Feedcone Structural Integrity.Requirement. See 3.7.7Method.

Step 1. A manufacturer's fixture shall be arranged which is capable of attaching individually to each cone and then applying a tensile force tending to separate the cones from the joining insulator. A force of 2000 pounds shall be applied for 1 minute. This force shall be reduced to 1500 pounds for all Group C environmental post tests.

Step 2. A manufacturer's fixture shall be arranged which is capable of attaching to the two cones and to the balun unbalanced connector and then applying a tensile force tending to separate the balun from the feedcone structure. A force of 250 pounds shall be applied for 1 minute.

Pretest/post test. Pretest and post test shall be visual inspection. Any indication of damage or indication of separation of the assembly shall constitute failure.

Test Result.

| | <u>Conducted</u> (X) | <u>Passed</u> (X) | <u>Failed</u> (X) |
|--|-------------------------|----------------------|----------------------|
| 4.20.6 <u>List of Test Equipment Employed for Group B Tests.</u> | | | |

| <u>Item Name</u> | <u>Manufacturer</u> | <u>Model No.</u> | <u>Serial No.</u> |
|------------------|---------------------|------------------|-------------------|
|------------------|---------------------|------------------|-------------------|

MIL-A-49204 (CR)

4.21

GROUP C

Inspection Data Sheets
for use in acceptance of
Antenna Group OE-254 ()/GRC

Name of Contractor _____

Contract Number _____

Contract Item Number _____

Equipment Serial Number _____

Tested by _____

Verified by _____

date _____

MIL-A-49204 (CR)

4.21.1 High temperature.Requirement. See 3.8.1.a

Method. The antenna system shall be subjected to the test of Method 501.1, Procedure II of MIL-STD-810. As a pretest, the antenna shall be subjected to the Free Space VSWR Test, 4.22.1. At Step 4 the chamber temperature shall be 71°C (160°F). At Step 7 the chamber temperature shall be 71°C (160°F). During Step 8 the balun shall be subject to the Balun Power Test, 4.22.4, for 2 minutes. During the test all items of the antenna system shall be stowed in the bag except for the balun. After exposure the following tests shall be conducted: Free space VSWR, 4.22.1; Air pressure, 4.19.4; Feedcone Structural Integrity, 4.20.5; and Inspection for Physical Condition, 4.22.2.

Test Result.

| | <u>Data Sheets Attached</u> (X) | <u>Passed</u> (X) | <u>Failed</u> (X) |
|-----------------------------------|--|----------------------|----------------------|
| <u>Pretest</u> | | | |
| Free Space VSWR | _____ | _____ | _____ |
| <u>Operational Test</u> | | | |
| Balun Power Test | _____ | _____ | _____ |
| <u>Post Test</u> | | | |
| Free Space VSWR | _____ | _____ | _____ |
| Air Pressure | _____ | _____ | _____ |
| Feedcone Structural Integrity | _____ | _____ | _____ |
| Inspection for Physical Condition | _____ | _____ | _____ |

MIL-A-49204(CR)

4.21.2 Low temperature.**Requirement.** See 3.8.1.b

Method. The antenna system shall be subjected to the test of Method 502.1, Procedure I of MIL-STD-810. As a pretest, the antenna shall be subjected to the Free space VSWR test, 4.22.1. During Step 2, the chamber temperature shall be maintained at -57°C (-70°F) for not less than 2 hours after stabilization of the test items. Delete Step 3. During Step 4, the chamber temperature shall be maintained at -45.6°C (-50°F) for not less than 4 hours after stabilization of the test items. During Step 5, the balun shall be subjected to the Balun power test, 4.22.4, for 2 minutes. During the test all items of the antenna system shall be stowed in the bag, except for the balun. After exposure, the following tests shall be conducted: Free space VSWR, 4.22.1; Air pressure, 4.19.4; Feedcone Structural Integrity, 4.20.5; and Inspection for Physical Condition, 4.22.2.

Test Result.

| | <u>Data Sheets</u> <u>Attached</u> (X) | <u>Passed</u> (X) | <u>Failed</u> (X) |
|-----------------------------------|--|----------------------|----------------------|
| <u>Pretest</u> | | | |
| Free Space VSWR | _____ | _____ | _____ |
| <u>Operational Test</u> | | | |
| Balun Power Test | _____ | _____ | _____ |
| <u>Post Test</u> | | | |
| Free Space VSWR | _____ | _____ | _____ |
| Air Pressure | _____ | _____ | _____ |
| Feedcone Structural Integrity | _____ | _____ | _____ |
| Inspection for Physical Condition | _____ | _____ | _____ |

MIL-A-49204 (CR)

4.21.3 Humidity.Requirement. See 3.8.2

Method. The antenna system shall be subjected to the test of Method 507.1, Procedure II of MIL-STD-810. The equipment shall be arranged in the test chamber with the balun, feedcone structure and the six innermost radiating elements assembled together. Other radiating elements shall be assembled in pairs as in use. Other parts and the bag shall be arranged in the chamber so that the parts are unprotected by the bag. As a pretest, at Step 4, the antenna shall be removed from the chamber and subjected to the Free Space VSWR test of 4.22.1. Following the VSWR test the equipment shall be returned to the chamber. At Step 8 the equipment shall be removed from the chamber and the following tests shall be conducted: RF power capability, 4.22.3; Dielectric withstanding voltage, 4.22.5; Air pressure, 4.19.4 and Free space VSWR, 4.22.1. During Step 9 the equipment shall be subjected to Feedcone structural integrity, 4.20.5; and to the Inspection for Physical condition, 4.22.2. Particular attention shall be given to the effectiveness of anti-corrosion compound used on mast section threaded joints and to the effectiveness of corrosion resistant design at the joint between the mast sections and the feedcone structure.

Test Result.

| | <u>Data Sheets</u> <u>Attached</u> (X) | <u>Passed</u> (X) | <u>Failed</u> (X) |
|-----------------------------------|--|----------------------|----------------------|
| <u>Pretest</u> | | | |
| Free Space VSWR | _____ | _____ | _____ |
| <u>Post Test</u> | | | |
| RF Power Capability | _____ | _____ | _____ |
| Dielectric Withstanding Voltage | _____ | _____ | _____ |
| Air Pressure | _____ | _____ | _____ |
| Free Space VSWR | _____ | _____ | _____ |
| Feedcone Structural Integrity | _____ | _____ | _____ |
| Inspection for Physical Condition | _____ | _____ | _____ |

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4.21.4 Antenna Gain.

Definition. The gain of the antenna is the ratio of the radiation intensity of the antenna in a given direction, usually on the horizon, to the maximum radiation intensity of a lossless reference antenna, usually a half-wave dipole, with same input power.

Requirement. See 3.6.5

Method. In accordance with paragraph 2.11.3 of Electronic Industries Association Standards RS-329 except that the standard antenna shall conform to 4.16 and the antenna under test shall be full scale size. Test frequencies shall be at least every 2 MHz over the required frequency range and shall be sufficient so that a plot of gain vs frequency will faithfully include maximum and minimum points within that range.

Test Result.

| <u>Plot of gain vs frequency attached</u> | <u>Passed</u> | <u>Failed</u> |
|---|---------------|---------------|
| (X) | (X) | (X) |
| _____ | _____ | _____ |

4.21.5 Drop.

Requirement. See 3.8.7

Method. The antenna system, with all components stowed in the bag, shall be subjected to the test of Method 516.2, Procedure II of MIL-STD-810. As a pretest the antenna shall be subjected to the Free Space VSWR Test, 4.22.1. After drop, the following tests shall be conducted: RF power capability, 4.22.3; Free space VSWR, 4.22.1; Air pressure, 4.19.4; Feedcone structural integrity, 4.20.5; and Inspection for Physical Condition, 4.22.2.

Test Result.

| | <u>Data Sheets Attached</u> | <u>Passed</u> | <u>Failed</u> |
|-----------------------------------|---------------------------------|---------------|---------------|
| | (X) | (X) | (X) |
| <u>Pretest</u> | | | |
| Free Space VSWR | _____ | _____ | _____ |
| <u>Post Test</u> | | | |
| RF Power Capability | _____ | _____ | _____ |
| Free Space VSWR | _____ | _____ | _____ |
| Air Pressure | _____ | _____ | _____ |
| Feedcone Structural Integrity | _____ | _____ | _____ |
| Inspection for Physical Condition | _____ | _____ | _____ |

MIL-A-49204 (CR)

4.21.6 Wind load.Requirement. See 3.8.8

Method. The antenna system shall be subjected to the load test of Figure 3. Inspection for physical condition, 4.22.2, shall be conducted as pretest and post test.

Test Result.Pretest

| | <u>Conducted</u> (X) | <u>Passed</u> (X) | <u>Failed</u> (X) |
|-----------------------------------|-------------------------|----------------------|----------------------|
| Inspection for Physical Condition | _____ | _____ | _____ |

Post Test

| | <u>Conducted</u> (X) | <u>Passed</u> (X) | <u>Failed</u> (X) |
|-----------------------------------|-------------------------|----------------------|----------------------|
| Inspection for Physical Condition | _____ | _____ | _____ |

MIL-A-49204 (CR)

4.21.7 Immersion.Requirement. See 3.8.9

Test Conditions. See para 3.1.2, Method 512.1, Procedure I of MIL-STD-810. Remove technical manual, cable assembly CG-1889B/U, electrical tape, and anti-corrosion compound.

Method. As a pretest the antenna system shall be subjected to the Free Space VSWR Test, 4.22.1. After pretest the antenna system shall be stowed in its bag and immersed in water so that the uppermost point of the bag is at least 36 inches below the surface of the water. Immersion shall continue for at least 2 hours. On removal from the water, the antenna system shall be subjected to post test procedures without being dried in any manner other than induced by necessary handling. Post tests shall be completed within 4 hours after removal. Post tests, to be done in the following sequence, shall be RF Power Capability, 4.22.3; Test 4.22.5; inspection 4.22.2; test 4.19.4; and Free Space VSWR, 4.22.1. During Inspection for physical condition the balun shall be checked for leakage of moisture by opening the air pressure test vent and orienting the balun to allow drainage. Presence of moisture shall constitute a failure.

Test Result.

| | <u>Data Sheets</u> <u>Attached</u> (X) | <u>Passed</u> (X) | <u>Failed</u> (X) |
|------------------------------------|--|----------------------|----------------------|
| <u>Pretest</u> | | | |
| Free Space VSWR | _____ | _____ | _____ |
| <u>Post Test</u> | | | |
| RF Power Capability | _____ | _____ | _____ |
| Dielectric Withstanding Voltage | _____ | _____ | _____ |
| Inspection for Physical Condition | _____ | _____ | _____ |
| Inspection for Leakage of Moisture | _____ | _____ | _____ |
| Air Pressure | _____ | _____ | _____ |
| Free Space VSWR | _____ | _____ | _____ |

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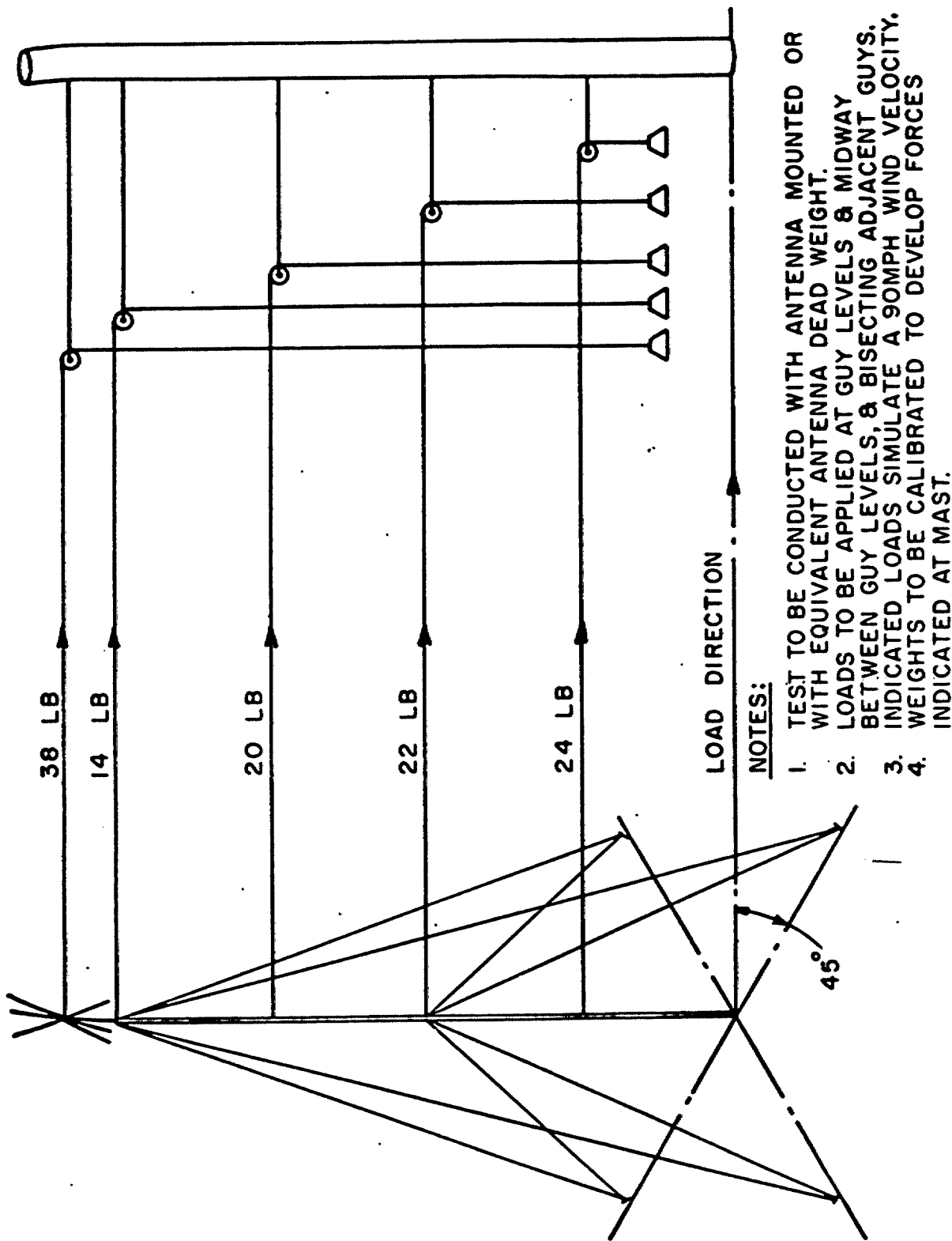


FIG. 3 ANTENNA GROUP OE-254 ()/GRC WIND LOAD TEST

MIL-A-49204 (CR)

4.22 Supplementary Tests.

4.22.1 Free Space VSWR.

Application. To be conducted where otherwise specified as part of service condition tests.

Required Performance. See 3.6.4

Method of Measurement. In accordance with paragraph 2.3.3 of Electronic Industries Association Standard RS-329 except that the measurement shall be performed with a vector impedance meter or other instrument of equivalent accuracy.

Test Result.

| | <u>Passed</u> (X) | <u>Failed</u> (X) |
|-------------------------------------|----------------------|----------------------|
| Attach plot of VSWR vs frequency | _____ | _____ |
| <u>Attached</u> (X) | _____ | _____ |

4.22.2 Inspection for Physical Condition

Application. To be conducted where otherwise specified as part of service condition tests.

Requirement. See 3.8.

Method Visual Inspection.

Test Result.

| | <u>Conducted</u> (X) | <u>Passed</u> (X) | <u>Failed</u> (X) |
|--|-------------------------|----------------------|----------------------|
| | _____ | _____ | _____ |

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4.22.3 RF power capability.

Application. To be conducted where otherwise specified as part of service condition tests.

Requirement. See 3.6.7.

Method. The feedcone structure, balun, insulating extension and uppermost support mast section shall be connected together. A load impedance shall be connected across the two sections of the feedcone structure. The load shall be such that VSWR, referenced to 50 ohms, is less than 3 to 1 at the balun unbalanced connection. Since the manner of the test set-up may introduce stray inductance or capacitance, load reactance may be tuned out. To electrically include the insulating extension in the test, a ground connection shall be completed between the support mast section and the ground side of the unbalanced balun connector. Three hundred fifty watts of power shall be applied to the assembly at the balun unbalanced connector. The power source shall be a continuous wave, radio frequency source having a nominal output impedance of 50 ohms. The test frequency shall be at the high end of the specified frequency range. Power shall be applied for a period of 2 minutes. During the period when power is applied, the insulation material shall be observed for evidence of RF flashover or leakage. After power is removed the insulation material shall be inspected for evidence of RF flashover or leakage. Evidence of RF flashover or leakage shall constitute a failure. The test shall be completed within 1 hour of the time of completion of exposure to the environmental condition tests of 4.21.3, 4.21.5, 4.18.6, 4.18.2, 4.18.3 and 4.18.4.

Test Result.

| <u>Test Conducted</u> | <u>Passed</u> | <u>Failed</u> |
|-----------------------|---------------|---------------|
| (X) | (X) | (X) |
| _____ | _____ | _____ |

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4.22.4 Balun Power.

Application. To be conducted where otherwise specified as part of service condition tests.

Requirement. See 3.6.9.1, 3.6.9.2, 3.6.9.3

Method. For convenience of test instrumentation, two baluns are employed in the test with the balanced sides joined together by the shortest possible connections. Both baluns are subjected to the service condition tests of 4.18.2, 4.18.3, 4.18.4, 4.18.6, 4.21.1, 4.21.2, 4.21.3, 4.21.5, 4.21.6 and the results are adjusted to account for the doubling of effects of the test. Power from a radio frequency source having a 50 ohm output impedance shall be fed to the unbalanced side of one balun through an in-line RF Wattmeter capable of measuring forward and reverse power. The unbalanced side of the second balun shall be connected to an RF Wattmeter having a 50 ohm load impedance. The signal source shall be adjusted to supply 350 watts forward power at the in-line wattmeter. VSWR shall be measured at the in-line wattmeter and coupling efficiency shall be observed by measuring power at the load wattmeter.

Test Result.

| | Measured Data | Adjusted Data (Loss) | Passed | Failed |
|----------|------------------|-------------------------|--------|--------|
| | _____ | _____ | (X) | (X) |
| Coupling | _____ watts | _____ dB | _____ | _____ |
| Loss | _____ | _____ | _____ | _____ |
| VSWR | _____ | _____ | _____ | _____ |

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4.22.5 Dielectric Withstanding Voltage.

Application. To be conducted where otherwise specified as part of service condition tests.

Requirement. See 3.6.8

Method. The test shall be performed in accordance with MIL-STD-202, Method 301.

Test Result.

| <u>Conducted</u> | <u>Passed</u> | <u>Failed</u> |
|------------------|---------------|---------------|
| (X) | (X) | (X) |
| _____ | _____ | _____ |

4.23 Quality Conformance Inspection of Preparation for Delivery. Preparation for delivery shall be inspected in accordance with MIL-P-116 to determine compliance with the requirements of Section 5.

SECTION 5 Packaging.

5.1 Preservation. Preservation shall be as specified in MIL-STD-726, coded as follows:

5.1.1 Level A. JR-1-1-00-00-NS-X-ED-0-00-A.

5.1.2 Level B. JR-1-1-00-00-NS-X-ED-0-00-B.

5.2 Packing and Marking. Packing and marking shall be in accordance with MIL-E-55585.

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6. NOTES

6.1 Intended use. Antenna Group OE-254()/GRC is intended for use with Radio Sets AN/VRC-12, AN/VRC-43 through AN/VRC-49, AN/VRC-53, AN/VRC-64, AN/GRC-125, and AN/GRC-160.

6.2 Ordering data. Procurement documents should specify the following:

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

b. Level A, level B or Commercial preservation and packing (see Section 5).

c. The specific paragraphs of Section 5 which are applicable to the particular procurement.

d. Place of final inspection.

e. When the rough handling test is required.

6.3 Environmental. Environmental pollution prevention measures are contained in the packaging material specifications referenced herein. Refer to material specifications or preparing activity for recommended disposability methods.

6.4 Group C inspection. Approval to ship may be withheld, at the discretion of the Government, pending the decision from the Contracting Officer on the adequacy of corrective action (see 4.8.2).

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PREPARING ACTIVITY:
ARMY - CR

PROJECT NO. 5985-A486

| STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL | |
|--|--|
| <p>INSTRUCTIONS: This form is provided to solicit beneficial comments which may improve this document and enhance its use. DoD contractors, government activities, manufacturers, vendors, or other prospective users of the document are invited to submit comments to the government. Fold on lines on reverse side, staple in corner, and send to preparing activity. Attach any pertinent data which may be of use in improving this document. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity. A response will be provided to the submitter, when name and address is provided, within 30 days indicating that the 1426 was received and when any appropriate action on it will be completed.</p> <p>NOTE: This form shall not be used to submit requests for waivers, deviations or clarification of specification requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.</p> | |
| DOCUMENT IDENTIFIER (Number) AND TITLE | |
| MIL-C-49204 | |
| NAME OF ORGANIZATION AND ADDRESS OF SUBMITTER | |
| <p>HQ. USA CORADCOM ATTN: DRDCO-CM-DM Fort Monmouth, NJ 07703</p> | |
| <input type="checkbox"/> VENDOR <input type="checkbox"/> USER <input type="checkbox"/> MANUFACTURER | |
| <p>1. <input type="checkbox"/> HAS ANY PART OF THE DOCUMENT CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE? <input type="checkbox"/> IS ANY PART OF IT TOO RIGID, RESTRICTIVE, LOOSE OR AMBIGUOUS? PLEASE EXPLAIN BELOW.</p> <p>A. GIVE PARAGRAPH NUMBER AND WORDING</p> <p>B. RECOMMENDED WORDING CHANGE</p> <p>C. REASON FOR RECOMMENDED CHANGE(S)</p> | |
| 2. REMARKS | |
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| TELEPHONE NO. | |
| DATE | |

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EDITION OF 1 JAN 72 WILL BE USED UNTIL EXHAUSTED.