

INCH-POUND

A-A-59604  
12 July 2004

COMMERCIAL ITEM DESCRIPTION  
TEST SET, RADIO FREQUENCY POWER  
(50 MHz to 40 GHz)

The General Services Administration has authorized the use of this commercial item description for all federal agencies.

1. **SCOPE.** This commercial item description describes the minimum requirements for a Radio Frequency Power Test Set, which consists of a dual channel radio frequency (RF) power meter, sensors, and applicable accessories. The equipment, as described in this CID, has a minimum frequency range of 50 MHz to 40 GHz and will be used for measuring RF average power over selected frequencies. Sensors supplied with the test set have a minimum frequency range of 50 MHz to 18 GHz. This CID is meant as a minimum requirement for the power meter in which only those manufacturers that meet or surpass the following requirements are supplied per this CID.

2. **SALIENT CHARACTERISTICS.** The equipment shall be capable of operation within the accuracies, limits, and specifications herein.

2.1 Classification. Equipment covered by this CID shall be commercially available equipment and may be modified to the extent necessary to meet the following description. The equipment shall be Class 3, in accordance with MIL-PRF-28800, except as specified herein.

2.2 Safety and Environmental. The equipment shall meet all safety and environmental requirements as specified in MIL-PRF-28800 for the classification as stated herein except as specified herein.

2.2.1 Temperature Operating. The equipment shall conform to its specified performance and accuracy while being operated in a temperature range of 0°C to +50°C.

Comments, suggestions, or questions on this document should be addressed to: WR-ALC/LEEC, 295 Byron Street, Robins AFB, GA 31098-1611. Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at [www.dodssp.daps.mil](http://www.dodssp.daps.mil).

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2.2.2 Temperature Non-operating. The equipment shall conform to its specified performance and accuracy after being stored in an environment in the temperature range of  $-20^{\circ}\text{C}$  to  $+70^{\circ}\text{C}$ .

2.3. Electrical Power Sources. The equipment shall operate from nominal commercial, military, and shipboard power sources of 120 VAC ( $\pm 10\%$ ) at line frequencies of 48 Hz to 63 Hz and 380 to 420 Hz and 240 VAC ( $\pm 10\%$ ) at line frequencies of 47 Hz to 63 Hz. Transient state conditions shall meet MIL-PRF-28800 requirements for the classification specified herein.

2.4 Reliability. The design of the equipment shall be such that under normal use and operation the equipment does not fail within 10000 hours of operation with a statistical certainty of 95%.

2.5 Calibration and Maintenance Adjustments. The design of the system shall provide for readily accessible calibration adjustments and maintenance adjustments. The calibration adjustments, wherever possible, shall be accessible without removal of the equipment case or modules. The calibration interval shall be a period of one year or greater based on an operating time of 2000 hours. No special tools shall be required for alignment or adjustment except those furnished with the equipment.

2.6 Performance Requirements. The equipment shall meet all requirements specified herein, after the warm-up period specified in MIL-PRF-28800, under all combinations of input power conditions, output signal conditions and operating service condition as specified in MIL-PRF-28800.

2.6.1 Meter/Chassis. The averaging power meter shall have a minimum of two measurement channels.

2.6.1.1 Remote Operation. The averaging power meter shall have an IEEE-488 interface for remote set up, control, and measurement operation.

2.6.1.2 Front Panel Controls. Controls for the power meter shall be included on the front-panel.

2.6.1.3 Modes. The power meter shall have the selection of either linear (mW) or logarithmic (dBm) modes for the display of the power measurements.

2.6.1.4 Frequency Measurement Range. The minimum frequency range of the averaging power meter without regard to sensors shall be 50 MHz to 40 GHz. The minimum frequency range of the averaging power meter with sensors supplied shall be 50 MHz to 18 GHz.

2.6.1.5 Power Measurement Range. The averaging power meter with sensors shall have, as a minimum, a range of -30 dBm to 20 dBm, regardless of modulation format.

2.6.1.5.1 Power Meter Accuracy. The instrument uncertainty shall be within  $\pm 0.02$  dB at full scale in logarithmic mode and within  $\pm 0.5\%$  in linear mode.

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2.6.1.6 Display/Time Base. The averaging power meter shall have a digital display for all functions. The display shall provide, as a minimum, information on the amplitude of the measured signal.

2.6.1.6.1 Indicators. The display shall have indicators for measurement mode, display units (watts, dBm, dB), calibration factor, error conditions, and offset value.

2.6.1.6.2 Amplitude Information Display. As a minimum, averaging power amplitude information shall be available for display in logarithmic form. The equipment shall be capable of displaying the amplitude measurement range specified herein.

2.6.1.6.2.1 Range. The equipment shall include a display range of  $-99.99$  dB to  $+99.99$  dB.

2.6.1.6.2.2 Offset. The equipment shall have an amplitude offset capability to include a range from  $-99.99$  dB to  $+99.99$  dB.

2.6.1.7 Instrument Zeroing. The power meter shall have automatic zeroing to within  $\pm 0.5$  % of full scale using the highest sensitivity range.

2.6.1.8 Power Reference Calibration Source. An internal power reference source, and associated operating mode, shall be provided to allow user-selected automatic calibration of the combination of the sensor(s) and the equipment.

2.6.1.8.1 Frequency. The power calibration source frequency shall be 50 MHz  $\pm 5$ %.

2.6.1.8.2 Amplitude. The power reference source amplitude shall be within  $\pm 1.2$ % at 1 milliwatt (0 dBm) for one year.

2.6.1.8.3 Power Reference Standing Wave Ratio (SWR). The SWR shall be 1.05 or less, at 0 dBm, 50 ohms.

2.6.1.8.4 Calibration Factor. The calibration factors shall be in steps of percent or dB. The calibration factors shall be stored in non-volatile memory.

2.6.1.9 Connectors, Cables, and Adapters.

2.6.1.9.1 Power Reference RF Connector. The power calibration source shall have a Type N RF connector mounted on the front panel of the equipment.

2.6.1.9.2 Interconnect cable. The power meter shall include interconnect cables for connecting sensors to the equipment. Each sensor cable shall be detachable from the sensor head and shall be a minimum of 5 feet (1.5 meters) in length. An interconnect cable shall be provided for each channel.

2.6.1.9.3 Adapters. The equipment shall include adapters to connect sensors, which do not have a compatible Type N RF connector, to the power calibration output.

2.6.2 Sensors. Sensors or sensor sets which meet the following characteristics shall be provided for each measurement channel.

2.6.2.1 Sensor Frequency Measurement Range. The minimum frequency range of the averaging power sensors shall be 50 MHz to 18 GHz.

2.6.2.2 Sensor Power Measurement Range. The sensors shall have, as a minimum, a power range of -30 dBm to 20 dBm, regardless of modulation format. The sensors shall withstand at least +23 dBm average input power without damage.

2.6.2.3 Sensor VSWR. The sensor VSWR shall be 1.30 or less for the operational frequency range specified herein.

2.6.2.4 Additional Sensor Capability. The power meter shall be compatible with microwave averaging power sensors, available as options, which extend the equipment's capability to measure the additional frequency/power ranges listed in the following table, regardless of modulation format.

FREQUENCY RANGE	POWER RANGE	VSWR
18 GHz to 26.5 GHz	-30 dBm to +20 dBm	1.35 or less
26.5 GHz to 40 GHz	-30 dBm to +20 dBm	1.40 or less

2.6.2.5 Sensor RF Connection. The sensor RF interconnects shall be compatible with coaxial cable connectors of Type N, Type APC-3.5mm, Type K, 2.4mm, or equivalents.

2.6.2.6 Sensor Calibration Data. Sensors shall be capable of containing calibration data in non-volatile memory which can be electronically loaded directly from the sensor to the meter, without operator intervention after the transfer is initiated.

2.6.3 Physical Characteristics. The test set's component dimensions and weight shall be consistent with current commercial offerings. The equipment shall have the following physical characteristics.

2.6.3.1 Dimensions. The width and depth of the equipment shall be compatible with mounting in an ANSI/EIA-310-D standard equipment rack. The height shall be compatible with three standard height units, 3U. One unit or "U" is defined by ANSI/EIA-310-D to be 1.75 inches or 44.45 mm.

2.6.3.2 Weight. The total weight of the equipment, excluding accessories and manuals, shall not exceed 15 pounds (or 6.8 kilograms). If the depth of the equipment is greater than 24 inches the maximum allowable weight shall be reduced by 33 percent.

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2.6.3.3 Rackmount. Rackmount capability shall be available as an option for the equipment specified herein.

2.6.4 Manuals. The equipment shall be delivered with operator, maintenance, illustrated parts, and calibration manuals. Format and quantity shall be as specified in the contract or order. Level of maintenance philosophy, as defined in MIL-PRF-28800, shall be as specified in the contract or order.

### 3. REGULATORY REQUIREMENTS.

3.1 The offeror/contractor is encouraged to use recovered materials to the maximum extent practicable, in accordance with paragraph 23.403 of the Federal Acquisition Regulation (FAR).

### 4. PRODUCT CONFORMANCE.

4.1 Product Conformance. The products provided shall meet the salient characteristics of this CID, conform to the producer's own drawings, specifications, standards and quality assurance practices, and be the same product offered for sale in the commercial market. The government reserves the right to require proof of such conformance.

4.2 Metric Products. Products manufactured to metric dimensions will be considered on an equal basis with those manufactured using inch-pound units, provided they fall within the specified tolerances using conversion tables contained in the latest revision of Federal Standard No. 376, and all other requirements of this CID are met. If a product manufactured to metric dimensions exceeds the tolerances specified in the inch/pound units, a request should be made to the contracting officer to determine if the product is acceptable.

4.3 The contracting officer has the option of accepting or rejecting the product.

5. PACKAGING. Preservation, packing, and marking shall be as specified in the contract or order.

### 6. NOTES.

#### 6.1 Sources of documents.

6.1.1 Military Specifications, Standards, and Handbooks referenced herein may be obtained from the Standardization Documents Order Desk, 700 Robbins Ave, Bldg 4, Section D, Philadelphia, PA 19111-5094.

6.1.2 The Code of Federal Regulations (CFR) may be obtained from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC, 20402.

6.1.3 IEEE standards can be obtained from IEEE Customer Service Center, 445 Hoes Lane, P.O. Box 1331, Piscataway, NJ 08855-1331, U.S.A. Phone: 800-678-4333 (Toll-Free, USA & Canada), 732-981-0060 (Worldwide), Fax: 732-981-9667. Website: [www.ieee.org](http://www.ieee.org).

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6.1.4 ANSI/EIA standards can be obtained from the Electronics Industry Association, Engineering Department, 2001 Pennsylvania Ave., N.W., Washington, D.C., 20006. Phone: 800-854-7179 (USA and Canada).

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(Project 6625-F088)