

INCH-POUND

A-A-59942

20 FEB 2014

## COMMERCIAL ITEM DESCRIPTION

### VOLTMETER, VECTOR

The General Services Administration has authorized the use of this Commercial Item Description for all federal agencies.

1. **SCOPE.** This Commercial Item Description (CID) describes a Vector Voltmeter capable of making RF voltage and phase measurements. This CID is meant as a minimum requirement for the Vector Voltmeter, and only those manufacturers that meet or surpass the following requirements are to supply the Vector Voltmeter per this CID.

2. **CLASSIFICATION.** The test set covered by this CID shall be commercially available equipment and may be modify to the extent necessary to meet the following description. The equipment shall be Class 3, in accordance with MIL-PRF-28800. The equipment shall be capable of operation within the accuracies, limits, and specifications herein.

### 3. SALIENT CHARACTERISTICS.

3.1 Item Description. This Vector Voltmeter shall be capable of making RF voltage and phase measurements. The Vector Voltmeter shall be capable of measuring electrical length, impedance, magnitude, and phase.

3.2 Frequency Range. The Vector Voltmeter shall have a minimum frequency range of 2 MHz to 3 GHz.

3.3 Bandwidth. The Vector Voltmeter shall have a measurement bandwidth range of at least 300 Hz to 30 kHz.

3.4 Frequency Resolution. The Vector Voltmeter shall have a minimum frequency resolution of at least 1 Hz.

Comments, suggestions, or questions on this document should be addressed to: 404 SCMS/GUEEA, Robins AFB GA 31098-1813. Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at <https://assist.dla.mil>.

AMSC N/A

FSC 6625

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

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3.5 Input Protection. The Vector Voltmeter input port shall be capable of withstanding up to 2.52 V, +21 dBm (typical) levels without any damage to the equipment.

3.6 Input Impedance. The Vector Voltmeter shall have an input impedance of 50  $\Omega$  that covers the minimum frequency range. The instrument shall be able to cover other impedances with the use of matching impedance. This can be accomplished with the use of commercially available accessories that need to be provided with each instrument.

3.7 Dynamic Range. The Vector Voltmeter shall have a dynamic range of at least 80 dB at frequencies below 10 MHz and a dynamic range of 95 dB or better for frequencies at or above 10 MHz.

3.8 Phase Resolution. The Vector Voltmeter shall have a phase resolution of  $\leq 0.1$  degree.

3.9 Magnitude and Phase Measurement. The Vector Voltmeter shall have two-port transmission magnitude and phase measurements capable to be displayed simultaneously.

3.10 Vector Voltmeter Mode. The Vector Voltmeter shall be capable of measuring absolute and relative amplitude and phase of device under test.

3.11 Source. The Vector Voltmeter shall provide an internal source to provide a CW signal that covers the minimum frequency range to sufficiently produce specified amplitude and accuracy.

3.12 Measurement Capability. The Vector Voltmeter shall be capable of measuring electrical length, impedance, magnitude, and phase.

3.13 Frequency Generator. The Vector Voltmeter shall meet the following frequency generation specifications.

3.13.1 Voltmeter Power. The Vector Voltmeter shall have a power output capable to have a measurement range of at least -20 dBm to 0 dBm.

3.13.2 Frequency Range. The Vector Voltmeter shall be able to sweep through at least a 200 MHz frequency range with minimal amplitude distortion.

3.13.3 Wave Accuracy. The Vector Voltmeter shall have a continuous wave accuracy of  $\pm 5$  ppm at  $23^{\circ}\text{C} \pm 5^{\circ}\text{C}$ .

3.14 Accessories. Accessories to be supplied by the manufacturer with each deliverable Vector Voltmeter shall include but not limited to AC adapter (s), carrying case, user manual, and a traceable calibration certificate if required.

3.15 Interface. The Vector Voltmeter shall be capable of interfacing with industry standard data interchangeable formats for files, format, storage, communication, plotting including but not limited to USB, GPIB port compatible with IEEE 488.2, LAN, BNC connectors, N-Type connectors.

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3.16 Battery. The Vector Voltmeter shall have a rechargeable battery for use when it is not connected to main power or external charge source that provides a minimum of 3 Hours operating time. The Vector Voltmeter must meet the full performance and accuracy requirements of the instrument when operating on battery. A fully discharge battery shall take up to 4 Hours to recharge to 100% level and an automatic protective device shall be included to prevent overcharging the batteries.

3.17 Electrical Power Sources. The equipment power consumption of all components combined shall not exceed 400 watt and the Vector Voltmeter shall operate from nominal commercial military and shipboard/ flight power source over the ranges: 120Vrms ( $\pm 10\%$  tolerance) at frequencies of 50 Hz, 60 Hz single-phase ( $\pm 5\%$  tolerance), and 220/240 Vrms at 50 Hz, 60 Hz single-phase as outlined in MIL-PRF-28800 paragraph 3.5.1.

3.18 Design and Construction. The Vector Voltmeter shall be design and constructed for commercial use and shall meet the definition of Commercial Off-The-Shelf (COTS) items in FAR 2.101 The Vector Voltmeter shall be designed and constructed in accordance with all applicable European Union (EU) requirements in order to have the "CE" marking affixed, International Organization for Standardization (ISO), the International Electro-technical Commission (IEC), the International Telecommunication Union (ITU), Underwriters Laboratories (UL) and the American National Standards Institute (ANSI). It shall be designed and constructed so that no parts will work loose in service, and to withstand the strains, jars, vibrations, and other conditions incident to shipping, storage, installation, and service.

3.19 Noise. The design shall ensure that noise created by the Vector Voltmeter is compatible with the environment and minimize exposure of personnel to noise hazards during operations and maintenance activities.

3.20 Electrostatic Discharge (ESD). The design of the Vector Voltmeter shall preclude equipment damage due to ESD, protect personnel from electrical shock due to static charging, and prevent ignition of explosive atmospheres due to sparking.

3.21 Operating Temperature Range. The Vector Voltmeter shall meet the performance and accuracy requirements for operating temperature ranges 0 to 50 degree Celsius as outlined in class 3 of MIL-PRF-28800 paragraph 3.8.2.2.3 and Table 2.

3.22 Storage Temperature Range. The Vector Voltmeter shall meet the performance and accuracy requirements for non-operating temperature ranges -40 to 71 degree Celsius as outlined in class 3 of MIL-PRF-28800 paragraph 3.8.2.1.2 and Table 2.

3.23 Humidity. The Vector Voltmeter shall conform to the specified performance and accuracy for conditions where the relative humidity is 5 to 95  $\pm 5$  percent in the temperature range of 10 to 30 degrees Celsius, and it shall be subjected to conditions where the relative humidity is 5 to 75  $\pm 5$  percent in the temperature range of 30 to 40 degrees Celsius, and where the relative humidity

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is 5 to 45  $\pm$ 5 percent in the temperature range above 40 degrees Celsius as outlined in class 3 of MIL-PRF-28800 paragraph 3.8.2.3 and 3.8.2.3.2.

3.24 Altitude. The Vector Voltmeter shall conform to the specified performance and accuracy requirements when operated at an altitude of up to 15091.9 ft. or 4600 meters as outlined in MIL-PRF- 28800 paragraph 3.8.3.

3.25 Weight and dimensions. The Vector Voltmeter dimension shall be suitable for use to make field measurements or easily portable and its weight including battery shall not exceed 30 lbs., (13.6 kg).

3.26 Calibration. The Vector Voltmeter shall have a minimum of 12 months interval between calibrations that meets calibration interval requirements as outlined in MIL-PRF-28800 paragraph 3.12.

3.27 Reliability. The Vector Voltmeter shall have a mean time between failures (MTBF) of at least 5,000 hours of operation with statistical certainty of 95% as outlined in MIL-PRF-28800 paragraph 3.13.

3.28 Preventive maintenance. The recommended routine preventive maintenance interval (PMI) shall be more than 15 minutes per a 30-day period. Preventive maintenance shall not require breaking of the equipment seams where calibration seals would normally be placed in accordance with MIL-PRF-28800 paragraph 3.14.2.

#### 4. REGULATORY REQUIREMENTS.

4.1 Recycled Recovered Materials. Recycled, recovered, or environmentally preferable materials should be used to the maximum extent possible provided that the material meets or exceeds the operational and maintenance requirements, and promotes economically advantageous life cycle costs. The offeror/contractor is encouraged to use recovered materials to the maximum extent practicable, in accordance with 23.403 of the Federal Acquisition Regulation (FAR). However, used, rebuilt, or refurbished items shall not be provided.

4.2 Green Procurement Program. Green Procurement Program (GPP) is a mandatory federal acquisition program that focuses on the purchase and use of environmentally preferable products and services. GPP requirements apply to all acquisitions using appropriated funds, including services and new requirements. FAR 23.404(b) applies and states the GPP requires 100% of EPA designated product purchase that are included in the Comprehensive Procurement Guidelines list that contains recovered materials, unless the item cannot be acquired: a) competitively within a reasonable timeframe; b) meet appropriate performance standards, or c) at a reasonable price. The prime contractor is responsible for ensuring that all subcontractors comply with this requirement.

#### 5. PRODUCT CONFORMANCE PROVISIONS.

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5.1 Contractor Certification. The contractor shall certify and maintain substantiating evidence that the product offered meets the salient characteristics of this commercial item description, and the product conforms to the producer's engineering drawings, specifications, standards, and quality assurance practices. The government reserves the right to require proof of such conformance prior to first delivery and thereafter as may be otherwise provided for under the provisions of the contract.

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

## 7. NOTES

7.1 Source of Documents.

7.1.1 Military Specifications, Standards and Handbooks referenced herein may be obtained at <https://assist.dla.mil> or available from the Standardization Documents Order Desk, 700 Robbins Ave, Bldg. 4, Section D, Philadelphia, PA 19111-5094.

7.1.2 FAR may be obtained from the Superintendent of Documents, P.O. Box 371954, Pittsburgh PA 15250-7954. Electronic copies of the FAR may be obtained from <https://www.acquisition.gov/far/>.

7.1.3 IEEE copies can be obtained online at [www.ieee.org](http://www.ieee.org).

7.1.4 Underwriters Laboratories (UL) copies may be obtained online at <http://ulstandardsinfonet.ul.com> or from: COMM 2000, 1414 Brook Drive, Downers Grove, IL 60515-5000.

7.1.5 IEC documents may be obtained at <http://www.eciaonline.org/default.aspx> or from Electronic Components Industry Association, 111 Alderman Drive, Suite 400, Alpharetta, GA 30005.

7.1.6 ISO documents can be obtained online at <http://www.iso.org> or from the International Organization for Standardization, ISO Central Secretariat, 1, ch de la Voie-Creuse, CP 56-CH-1211 Geneva 20, Switzerland.

7.1.7 ITU copies can be obtained at <http://www.itu.int/en/Pages/default.aspx>

7.1.8 ANSI/ASME documents may be obtained online at <http://www.asme.org/> or from the American Society of Mechanical Engineers, 345 East 47<sup>th</sup> Street, New York, NY 10017.

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## 7.2 Key Words.

Bandwidth  
Frequency  
Impedance  
Phase

Custodians:  
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Reviewers:  
Air Force – 99

Agent:  
Air Force – 99

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