19 October 2016
NRL 5524

PURCHASE DESCRIPTION

TEST SET, AVERAGE POWER METER

Amendment

GMG: TSPWRAVE-16A
TAMCN: A7051 / SCAT: 4957
Solicitation No: SPRMM1-16-R-YN23

1.0 **GENERAL** This procurement requires an average power meter capable of measuring Continuous Wave (CW) power levels over the frequency range of 10 MHz to 40 GHz. The meter shall also have the capability to obtain peak power measurements by entry of the pulse's duty cycle. Power meter must be a discrete unit; virtual meters are not acceptable.

2.0 **CLASSIFICATION** The equipment shall meet the requirements of MIL-PRF-28800F, Class 3 for Navy shipboard, submarine, shore, and Marine Corps applications.

3.0 **OPERATIONAL REQUIREMENTS** The specifications provided below are the minimum requirements and accuracies that will meet the Government's need. The power meter shall at least meet these requirements and accuracies and may provide better performance.

3.1 Power Meter

3.1.1 Frequency Range: 10 MHz to 40 GHz

3.1.2 Power:
3.1.2.1 Power range (F=10 MHz to 18 GHz): -60 dBm (1 nW) to +20 dBm (100 mW)
3.1.2.2 Power range (F=18 GHz to 40 GHz): -30 dBm (1 uW) to +20 dBm (100 mW)
3.1.2.3 Range selection: Auto and manual

3.1.3 Meter Indicator/ Readout
3.1.3.1 Display: Digital
3.1.3.1.1 Resolution: At least 0.01 dB
3.1.3.1.2 Analog peaking indicator: Meter or bar graph
3.1.3.1.3 Units: dBm, dB and watts
3.1.3.2 Stability: Drift shall be ≤ 1.5% of full scale on the most sensitive scale (in a 5 minute period following warm-up @ 25°C ±10°C) in a non-averaging mode of operation and irrespective of the power sensor configuration. Drift shall be ≤ 0.1 dB @ -50 dBm input (in a 5 minute period following warm-up 25°C ±10°C) in a non-averaging mode of operation and irrespective of the power sensor configuration.
3.1.3.3 Zero Set: Manual (local) or automatic (remote) zeroing of power sensor indication.

3.1.4 Reference
3.1.4.1 Frequency: 50 MHz nominal
3.1.4.2 Level: 1 mW (0.0 dBm)
3.1.4.2.1 Accuracy: ±1.5% (±0.06 dB)/year @ 25ºC ± 10ºC

3.2 Sensor Requirements Sensor(s) shall be provided for average power with True RMS reading.

3.2.1 Overload protection: +23 dBm (200 mW) continuous or peak causes no damage
3.2.2 Overload indication: The meter shall indicate an over range condition when the rms power level exceeds the operating range of the sensor.
3.2.3 Connector:
3.2.3.1 Type:
3.2.3.1.1 F=10 MHz to 18 GHz: N (male).
3.2.3.1.2 F=18 GHz to 40 GHz: 2.92mm (male), adapters are acceptable.
3.2.3.2 Impedance: 50 ohms
3.2.3.3 VSWR: ≤ 1.4:1 to 15GHz, ≤ 1.5:1 to 40 GHz

3.2.4 Measurement uncertainty (RSS): ±4.0%, not including source mismatch

3.2.5 Sensor calibration: Manual entry or automatically reads in calibration factors from attached sensor. Calibration factors may be stored in attached sensor provided that the sensor processes and applies calibration factor to the measurement value before passing measurement result to the meter.
3.2.5.1 Non-volatile storage: The meter must be able to store calibration factors for at least two sensors with at least 10 calibration factor/frequency points if the calibration factors are manually entered. Calibration factors may be stored on sensor non-volatile memory provided that the sensor processes and applies calibration factor to the power measurement value before passing measurement result to the meter.

3.2.6 Sensor cables:
3.2.6.1 Length: 1.5 meters (5ft) minimum

3.3 Pulse characteristics The meter/sensor shall be capable of measuring pulsed signal with the following characteristics:

3.3.1 Minimum pulse width: ≤0.2μsec

3.3.2 Minimum duty cycle: ≤0.05%

3.4 Outputs
3.4.1 Recorder: DC level proportional to indicated level on each range.

4.0 **GENERAL REQUIREMENTS**

4.1 Warm-up period 30 minutes maximum

4.2 Temperature
4.2.1 Operating temperature: 0°C to +50°C
4.2.2 Non-operating temperature: - 20°C to +70°C

4.3 Power Source Nominal power source requirements of MIL-PRF-28800F. Maximum power: 80 W

4.4 Weight Not to exceed 6.8kg (15 lb).

4.5 Dimensions 27.4 cm x11.2 cm x 35 cm (10.79 in x 4.41 in x 14 in) typical.

4.6 Battery Restrictions Per MIL-PRF-28800F, Lithium and Mercury batteries are prohibited without prior authorization. A request for approval for the use of Lithium and Mercury batteries shall be submitted with production lot delivery, after contract award. Approval shall apply only to the specific model proposed.

Exceptions: Per Naval Ordnance Safety and Security Activity (NOSSA), the use of Lithium primary (non-rechargeable) coin cell batteries meeting the following criteria is authorized for Naval personnel and on Naval activities, surface ships, submarines, and aircraft:

- Commercially available coin cell batteries, unmodified, and used in the device recommended by the application manufacturer.
- Coin cell batteries shall only be used in single cell configurations.
- Coin cell batteries shall not be rated for more than 3 volts (maximum nominal output voltage).
- Coin cell batteries shall not be rated for more than 1 Ampere-Hour nameplate capacity.

The coin cell manufacturer and model identification/part number shall be provided at the time of submission of proposals.

4.7 Calibration Interval The calibration interval shall be 12 months minimum. At the end of this interval a minimum of 85% of the unit shall remain in tolerance.

4.8 Calibration Procedure The procedure, software and special interfaces/adapters that are needed for the equipment calibration shall be provided.

4.9 Remote Operation The unit will be capable of remote operation via IEEE-488 bus interface in accordance with MIL-PRF-28800F. It shall operate as a talker and/or listener such that all functions except the power on/off switch are controllable.

4.10 Wireless Connectivity Any capability of the equipment to communicate wirelessly, including but not limited to Wi-Fi and Bluetooth, shall be disabled.

4.11 Hard Transit Case A protective hard carrying case according to MIL-PRF-28800F shall be provided. The case shall be capable of accommodating the equipment, accessories, and operator's manual.

4.12 Technical Manual The maintenance philosophy for this unit shall be level 2 (per MIL-PRF-28800F) and require maintenance to the module level of the unit. The technical manual shall conform to the level 2 maintenance philosophy. This level would be used for most equipment where maintenance and repair is an expected phase of equipment lifecycle. Board level maintenance and troubleshooting information is required. A Use and Installation manual (Operator's Manual) shall be provided separately. Maintenance and Servicing manual shall be provided to two levels of maintenance, unit operational verification level and the module level.

Information required for performance verification shall include:

- Instructions to verify equipment performance,
- List the equipment required for verification tests,
- Step-by-step instructions for test connections,
- Acceptable result criteria,
- Calibration information,
- Self-test routines.

Maintenance information shall include:

- Parts lists to the component level,
- Schematics and component layout drawings,
- Block and schematic diagrams.
- List of required test equipment and connection diagrams, and
- Sequential instructions for disassembly, repair, replacement, and reassembly shall be provided.
- Board level maintenance and troubleshooting information,
- Step-by-step instructions for troubleshooting and fault isolation,
- Expected signal levels,
- Test data sheets will be included, and as required,
- The instructions will define localizing a defective circuit card.

Parts lists shall include:

- Parts lists shall be shown on illustrations or a separate listing that includes an index or reference to other illustrations.
- Part number, cage code, and generic description.

The technical manual shall be provided in both printed and electronic formats. The printed format shall be otherwise normally provided. The electronic format shall be in Portable Document Format (PDF) - ISO 32000-1:2008. Two separate CD/DVDs are required, one shall contain the Use and Installation manual and one shall contain the Maintenance and Service manual.

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shall be printed in the first two pages of each technical manual and on the surface of the CD/DVD supplied.

4.13 Training Materials Training materials that demonstrate the features, detailed operations and procedures with step-by-step instructions for using the equipment shall be provided. The training material shall be delivered in technical manual or interactive CD-ROM formats.

4.14 Additional Requirements

4.14.1 Human Readable Identification Labeling:

4.14.1.1 Equipment: Per MIL-PRF-28800F, a human readable label shall be provided for all production lot units conforming with MIL-STD-130N and permanently affixed on the equipment in an easily readable location. Required fields on the label are; CAGE,

part number, and serial number. Size of the label shall conform to the size of the equipment.

4.14.1.2 Case labeling: When a hard transit case is required, a human readable metal plate per MIL-PRF-28800F shall be provided for all production lot units conforming with MIL-STD-130N and permanently affixed to the front of the transit case. Required fields on the label are; CAGE, part number, and serial number. Size of the label shall conform to the size of the case. Pressure sensitive adhesive transfer tape is required to hold the plate to the hard transit case such as 3M™ 9472LE. When a soft transit case is required, labeling with permanent placement such as a metal plate affixed with rivets, screws or adhesives shall be provided.

4.14.2 Shipping container: For production lot units the package or carton containing the equipment for shipment shall be marked per MIL-STD-129P.

4.14.3 Other Additional Requirements: Shall be specified in the CDRL of the solicitation.