

PURCHASE DESCRIPTION

TEST SET, TWISTED PAIR CABLE

SCAT: 4465

Solicitation No: SPRMM116RYL36

- 1.0** **GENERAL** This procurement requires a battery operated handheld analyzer capable of testing balanced 100 ohm Unshielded Twisted Pair (UTP) and Shielded Twisted Pair (STP) cabling systems.
- 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 twisted pair cable test set shall at least meet these requirements and accuracies and may provide better performance.
- 3.1** Cabling systems and standards Testing shall be performed in accordance with ANSI/TIA-568-C.2 on Category 5e, 6 and 6A cabling systems and components.
- 3.2** Test configurations The equipment shall be capable of performing tests on both permanent links and channels using UTP or STP cabling.
- 3.3** Tests to perform The equipment shall be capable of performing the following tests in accordance to the standard that is applicable to the category of cable under test.
- Wire Map
  - Length
  - Insertion Loss
  - Near-end Crosstalk (NEXT)
  - Power Sum Near-end Crosstalk (PSNEXT)
  - Equal Level Far End Crosstalk (ELFEXT)
  - Attenuation to Crosstalk Ratio – Near End (ACRN)
  - Attenuation to Crosstalk Ratio – Far End (ACRF)
  - Power Sum Alien Near End Crosstalk (PSANEXT)
  - Power Sum Attenuation to Alien Crosstalk Ratio – Far End (PSAACRF)
  - Power Sum Attenuation to Crosstalk Ratio – Near End (PSACRN)
  - Power Sum Attenuation to Crosstalk Ratio – Far End (PSACRF)
  - Return Loss
  - Propagation Delay
  - Propagation Delay Skew
- 3.4** Testing Frequency Step Size The testing maximum frequency step size in shall be in accordance to TIA standard 568, as shown in Table 1.

Frequency Range (MHz)	Maximum Step Size (MHz)
1 – 31.25	0.15
31.25 – 100	0.25
100 – 250	0.50
250 – 500	1.00

Table 1: Maximum frequency step size

- 3.5 Test Modes The equipment shall be capable of performing testing in both auto and manual modes.
- 3.5.1 Autotest: The equipment shall be capable of performing all the tests specified in section 3.3 via Autotest button; except the Alien Crosstalk tests.
- 3.5.2 Single test: In manual mode the equipment shall be capable of performing each of the tests specified in section 3.3 separately (where applicable).
- 3.6 Test results
- 3.6.1 Pass/Fail assessment: The equipment shall be capable of providing Pass/Fail diagnosis for each test against the allowable limits set under the standard ANSI/TIA-568-C.2 that is applicable to the cabling system under test (e.g. Category 5e, Category 6, or Category 6A).
- 3.6.2 Test result display: Beside the Pass/Fail indicators, the equipment shall be capable of displaying test results in both numerical and graphical formats.
- 3.6.2.1 Numerical format: The equipment shall display the worst case and the worst-case margin value along with the frequency at which it is observed.
- 3.6.2.2 Graphical format: The equipment shall be able to display a test result as a curve vs. frequency as well as the Pass/Fail limit line.
- 3.7 Accuracy The equipment shall provide test results with accuracies of Level IIIe according to standard ANSI/TIA-1152 for all three configurations; Baseline, Permanent Link, and Channel Link.
- 3.8 Display The equipment shall have a high resolution color graphic LCD display to display the measured waveforms and associated values.
- 3.9 Test result management
- 3.9.1 Test result storage: The equipment shall be capable of storing at least 100 test results in nonvolatile memory. The user shall have the capability of naming each test result in alpha-numeric characters.
- 3.9.2 Test result upload: The equipment shall provide the capability to upload the stored test results to a computer running Microsoft® Windows 7 operating system for viewing and printing. The software and necessary accessories for uploading, viewing, and printing shall be provided; printer is not required.
- 3.10 Wireless Connectivity Any capability of the equipment to communicate wirelessly, including but not limited to Wi-Fi and Bluetooth, shall be disabled.

## 4.0 GENERAL REQUIREMENTS

### 4.1 Temperature

4.1.1 Operating temperature: 0 °C to 45 °C

4.1.2 Non-operating temperature: -20 °C to 50 °C

4.2 Power The equipment shall be operational with both AC and internal DC battery.

4.2.1 AC power: The equipment shall be operational with a nominal 110/220 Volt @ 50/60 Hz single phase power supply.

4.2.2 Internal DC battery: Internal rechargeable batteries shall be provided for portable operation. The battery's minimum operating time shall be at least 6 hours following a maximum recharge time of 4 hours from 10% to 90% battery. A charger that accepts 110/220 ±10% Volt @ 50/60 Hz single phase shall be provided for each unit.

4.2.3 Battery indicator: A battery life indicator shall be incorporated into the display.

4.2.4 Auto power off: The equipment shall automatically turn off when the absence of keyboard activity exceeds a set interval (10 to 20 minutes nominal). This feature shall be enabled/disabled with ON/OFF options.

4.3 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 aircrafts:

- 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.

4.4 Calibration interval The calibration interval shall be 12 months minimum. At the end of this interval, a minimum of 85% of the equipment shall remain in tolerance.

4.5 Dimension 28 cm (11 in) x 15 cm (6 in) x 7 cm (2.75 in), HxWxD nominal.

4.6 Weight 1.5 kg (3.5 lb) nominal.

4.7 Transit case

4.7.1 Soft transit case: A soft transit case shall be provided for carrying the equipment around the operational environment. The case shall be capable of accommodating the equipment, accessories, and the operator's manual.

4.8 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.

- 4.9 Training material 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.
- 4.10 Additional Requirements
  - 4.10.1 Human Readable Identification Labeling:
    - 4.10.1.1 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.
    - 4.10.1.2 Case: Per MIL-PRF-28800F, a human readable metal plate 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. Soft transit cases also require labeling with permanent placement such as a metal plate affixed with rivets, screws or adhesives.
  - 4.10.2 Shipping container: For production lot units the package or carton containing the equipment for shipment shall be marked per MIL-STD-129P.
  - 4.10.3 Other Additional Requirements: Shall be specified in the CDRL of the solicitation.