MTS/T-BERD Platforms
WDMPMD Module

Key Features

- A unique solution combining OSA, PMD, and SA test functions in one plug-in module
- The most compact PMD/WDM/SA test solution
- The core product for the installation, verification and maintenance of high-speed DWDM networks
- A shock-proof and vibration-proof module with no moving parts (drop tested at 70 cm!)
- A compact and high-performance module with maximum portability (0.6 kg/1.1lb)

A multi-test module for WDM system installation, verification and maintenance

Network operators and system installers, who provide quality of service testing, require constant network verification to ensure that the infrastructure and equipment meet performance standards precisely and that they operate reliably.

The JDSU 81WDMPMD plug-in module is designed to meet the sophisticated test requirements of today's and tomorrow's complex DWDM networks. This plug-in module, combined with the MTS/T-BERD platforms, offers a fast, accurate, and cost-effective solution for installation, verification and maintenance testing. Using the optical spectrum analyzer (OSA) function of the 81WDMPDM module, all critical network parameters of a DWDM system can be verified, including channel wavelength, channel spacing, frequency, power, and optical signal-to-noise ratio (OSNR). The 81WDMPMD module also contains fiber spectral attenuation (SA) and polarization mode dispersion (PMD) functions.

The combination of the OSA, SA, and PMD test functions allows technicians to validate the link's compatibility with the DWDM system implementation and the high bit rate transmission. In addition to its various measurement capabilities, the flexibility of the MTS/T-BERD platforms enable easy evolution toward additional measurement capabilities and functionality enhancements.
A rugged field solution

The 81WDMPMD module is the ideal solution for DWDM- and CWDM-oriented applications. Due to its innovative technology, combining the MTS/T-BERD platforms with the 81WDMPMD module offers a portable, battery-powered, shock-proof, and drop-tested instrument for complete reliability in harsh environmental conditions. The 81WDMPMD module is the only WDM analyzer that passes a 70 cm drop test!

Three modules in one!

Not only does the WDMPMD module support the qualification of DWDM systems, but it also provides physical layer testing, including spectrum attenuation and PMD measurements. These two additional measurements are required for high-speed and full-band DWDM transmission capability verification. Having three test functions in a single module, capital expenses are optimized and the number of instruments to carry in the field is reduced (Figure 1).

Full-band optical spectrum analyzer

The 81DWMPMD module uses bands of 1260 nm to 1640 nm for the characterization of DWDM and CWDM transmission networks with an optimized dynamic range (Figure 2). This module is the most compact solution on the market today, providing dedicated performance for system verification.

High-performance PMD measurement

The PMD test function is based on the Fixed Analyzer method, which is standardized by ITU-T G.650.2, IEC 60793-1-48, and EIA/TIA 455 FOTP 113. The PMD test function provides the following features:
- Characterization of any fiber optic link, including optical fiber amplifiers, which provides a differential group delay (DGD) measurement range of 0.08 ps to 60 ps and a high dynamic range of 45 dB.
- Automatic calculation of the second order PMD Delay and PMD Coefficient, providing information for future very high-speed transmission systems such as 40 Gb/s (Figure 3).
- Optimized for field applications, the OBS-55 handheld is a mandatory tool for high-performance and high dynamic range PMD testing.
- A broadband source module can be plugged into the MTS/T-BERD platform, offering an all-in-one solution for the remote product (an OTDR, for example) and increasing the dynamic range to 47 dB.
Spectral attenuation

As WDM systems expand (S+C+L or CWDM), it is becoming essential to characterize the fiber spectral attenuation in order to better adjust EDFA gain and laser output power. The SA test function offers the following features:

- In combination with the OBS-55 handheld, the SA function provides the total loss and the dB/km values over a 1485 nm to 1640 nm wavelength range, with a dynamic range of 45 dB (Figure 4).
- A broadband source module can be plugged into the MTS/T-BERD platform, offering full range (1260 nm to 1640 nm) spectral qualification.

Multi-testing made easy!

The Test Auto mode allows for one button testing. Technicians no longer need special training to carry out the three tests (Figure 5). Available for each of the individual functions, the Test Auto mode configures the product according to the device under test (DUT). It identifies DWDM channels, performs the PMD acquisition, and selects the appropriate wavelength range for the SA measurement.

Powerful pass/fail link manager

Graphical and tabular display formats can be selected to assist in installation, verification, and troubleshooting (Figure 6). Built-in test functions deliver automatic pass/fail evaluations based on defined alarms according to the DWDM grid configuration, saving time with a quick and intuitive overview of the complete set of results.

Error-free professional report generation

A complete PC-based software application within a Microsoft Windows environment offers detailed generation of professional WDMPMD reports.

- Proof-of-performance reports with a high degree of customization capabilities
- Simultaneous WDM, PMD, and SA report generation
- Out-of-range value summaries
- Complete fiber characterization reports, including OTDR, CD, PMD, and spectral attenuation
Enhanced testing solution

With the scalable design of the MTS/T-BERD platforms, field technicians can quickly and easily plug-in the appropriate test module to perform precise measurement from the outside plant to the central office. The optical test platforms offer a full range of fiber characterization test modules with OTDR, CD, and spectral attenuation measurement, as well as DWDM testing capabilities.

The WDMPMD test module can be combined with additional measurement capabilities in JDSU's optical test platforms so that technicians can fully characterize the fiber network with an all-in-one solution:

- Optical insertion loss
- Optical return loss
- OTDR
- Chromatic dispersion
- Polarization mode dispersion
- Spectral attenuation profile

A complete range of DWDM test solutions

JDSU offers a complete portfolio of products to better match your application and your test requirements (Table 1).

<table>
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<th>Product</th>
<th>Applications</th>
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| OSA-30x     | • DWDM system turn-up, verification, and maintenance (including channel isolation for BER testing)  
|             | • Component qualifications (DFB, FP laser, and EDFA)              |
|             | • Very high optical rejection ratio (ORR) values                   |
|             | • Dedicated for the central office (CO): Provides “overkill” performance for CWDM networks |
| OSA-16x/20x | • DWDM/CWDM system turn-up, verification, and maintenance (including channel isolation for BER testing)  
|             | • Network element verifications (EDFA): High ORR values          |
|             | • Dedicated for the CO                                             |
| 81WDMPMD    | • DWDM/CWDM network installation (including physical layer testing with PMD and SA)  
|             | • DWDM system verification and maintenance-CWDM system turn-up, verification, and maintenance Medium ORR values  
|             | • Dedicated for the outside plant (OSP)                           |
| 81WDM       | • C+L DWDM maintenance and troubleshooting                        |
|             | • Medium ORR values                                                |
|             | • Dedicated for the OSP                                            |

Table 1: JDSU’s DWDM product offerings.
Specifications

**81WDMPMD module**
(typical at 25°C)

**General specifications**
- **Weight**: 0.6 kg (1.1 lb)
- **Dimensions (w x h x d)**: 213 x 124 x 32 mm (8.38 x 4.88 x 1.26 in)

**Optical interfaces**
- **Applicable fiber**: SMF 9/125 µm
- **Interchangeable optical connectors**: FC, SC, DIN, etc.

**WDM technical specifications**
- **Wavelength range**: 1260 nm to 1640 nm
- **Sweep time (real time)**: 3 s
- **Accuracy**\( (1) \): ±10 pm
- **Display resolution**: 1 pm
- **Minimum spacing between channels**: 10 GHz
- **Optical bandwidth (FWHM)**\( (2) \): 30 pm

**Power level**
- **Display range**: -90 dBm at +30 dBm
- **Display resolution**: 0.01 dB
- **Measurement range on a channel**: -79 dBm at +10 dBm
- **Noise floor**: -86 dBm

**Maximum admissible power** (before signal cut off)
- **Total**: +20 dBm
- **For one channel**: +10 dBm

**Accuracy**\( (4) \): ±0.5 dB max

**Linearity**\( (5) \): ±0.2 dB

**Flatness**\( (6) \): ±0.2 dB

**Polarization Dependence Loss (PDL)**: ±0.15 dB

**Optical return loss (ORL)**: 35 dB

**Optical rejection ratio (ORR)**\( (7) \): 40 dB

- at 100 GHz from the carrier
- 35 dB at 50 GHz from the carrier

(1) Between 1525 nm and 1620 nm from -40 dBm to +5 dBm
(2) Between 1525 nm and 1570 nm
(3) With averaging at 1550 nm
(4) At -30 dBm and 1550 nm (excluding the uncertainty due to the input connector)
(5) At 1590 nm from 0 to -40 dBm
(6) Between 1525 nm and 1620 nm (reference = 1550 nm)
(7) From the top of a carrier, between 1530 nm and 1605 nm at 0 dBm

**PMD technical specifications**
- **Dynamic range**: 45 dB
- **DGD measurement range**\( (1) \): 0.08 ps to 60 ps
- **DGD absolute uncertainty**\( (2) , (3) \): ± 0.02 ps ± 2% PMD
- **DGD repeatability**\( (2) , (3) \): ± 0.025 ps
- **Measurement time**: 6 seconds, independent of the PMD value

(1) Up to 150 ps in weak mode coupling
(2) Weak mode coupling, between the DGD range of 0.1 ps and 60 ps
(3) NPL standard traceable
(4) Without averaging

**SA technical specifications**
- **Dynamic range**: 45 dB
- **Measurement time**\( (1) \): 6 seconds

(1) Without averaging

**Ordering information**

**WDM module**
- **81WDMPMD**: 1260 to 1640 nm WDM module, including PMD and SA functions
- **2279/31**: Handheld Broadband Source (1480 to 1610 nm)
- **EBBS1**: Broadband Source Module 1 (1485 to 1640 nm)
- **EBBS2**: Broadband Source Module 2 (1260 to 1640 nm)

**Handheld broadband source**

**Optical specifications**
- **Applicable fiber**: SMF 9/125 µm
- **Interchangeable optical connectors**: FC, SC, DIN, etc.
- **Peak power at 1550 nm**: >0 dBm
- **Spectral density**: -42 dBm/0.1 nm
- **Wavelength range**: 1520 to 1620 nm

**General specifications**
- **Battery operation**: 4 rechargeable NiMH batteries
- **Operating time**: 5 h
- **Power supply**: AC/DC adapter/charger 100 to 250 V, 50/60 Hz
- **Operating temperature**: -10 to +55 °C

**Dimensions (w x h x d)**: 95 x 60 x 195 mm (3.74 x 2.36 x 7.67 inches)

**Weight**: 500g

**Broadband source module**

**Wavelength range**
- **BBS1**: 1485 nm to 1640 nm
- **BBS2**: 1260 nm to 1640 nm

**Optical interfaces**
- **Applicable fiber**: SMF 9/125 µm
- **Interchangeable optical connectors**: FC, SC, DIN, etc.

**Weight**: 0.5 kg (1.1 lb)

**Dimensions (w x h x d)**: 213 x 124 x 32 mm (8.38 x 4.88 x 1.26 in)
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