



Enabling Australia's Field Technicians to build, troubleshoot and maintain better communications networks.



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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 81WDMPMD 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.

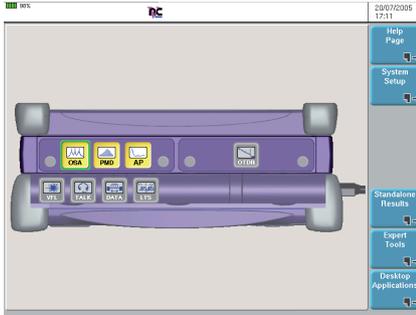


Figure 1: The MTS/T-BERD platform with three test functions (OSA, PMD, and SA) in one module

A rugged field solution

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

Three modules in one!

Not only does the WDM/PMD 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).

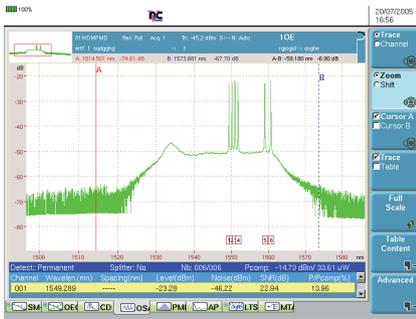


Figure 2: Amplified DWDM system analysis

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.

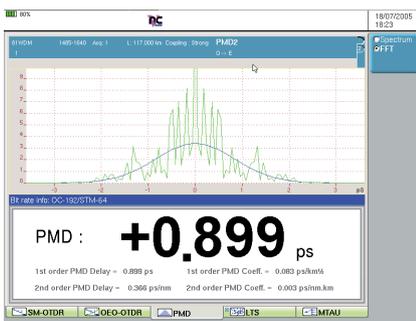


Figure 3: Test results showing the first order and second order PMD values

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Figure 4: A spectral attenuation profile showing a loss vs. wavelength measurement



Figure 5: The Test Auto button simplifies testing

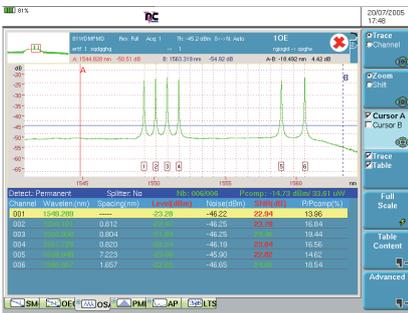


Figure 6: Graphical and tabular results display pass/fail indication and out-of-range values

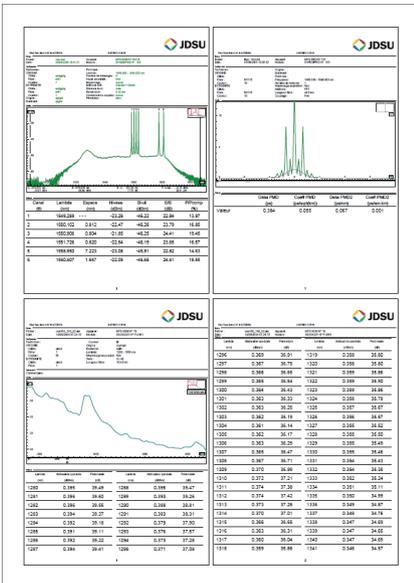


Figure 7: Simultaneous WDM, PMD, and SA report generation

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



8000 platform



6000 platform

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).

Product	Applications
OSA-30x	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • C+L DWDM maintenance and troubleshooting • Medium ORR values • Dedicated for the OSP

Table 1: JDSU's DWDM product offerings.

Specifications

81WDM/PMD module

(typical at 25°C)

General specifications

Weight	0.6 kg (1.1 lb)
Dimensions (w × h × d)	213 × 124 × 32 mm (8.38 × 4.88 × 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 ⁽³⁾	-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 ⁽⁴⁾	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

Handheld broadband source

Optical specifications

Applicable fiber	SMF 9/125 μm
Interchangeable optical connectors	FC, SC, DIN, etc...
Peak power at 1550nm	>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 × h × d)	95 × 60 × 195 mm (3.74 × 2.36 × 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 × h × d)	213 × 124 × 32 mm (8.38 × 4.88 × 1.26 in)

Ordering information

WDM module

E81WDM/PMD	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)



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Test & Measurement Regional Sales

NORTH AMERICA TEL: 1 866 228 3762 FAX: +1 301 353 9216	LATIN AMERICA TEL:+55 11 5503 3800 FAX:+55 11 5505 1598	ASIA PACIFIC TEL:+852 2892 0990 FAX:+852 2892 0770	EMEA TEL:+49 7121 86 2222 FAX:+49 7121 86 1222	WEBSITE: www.jdsu.com
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