T-BERD®/MTS-4000 Multiple Services Test Platform

Metro-Access (MA) OTDR Module

Key Features

- Best-in-class OTDR module with 37/35 dB dynamic range and high resolution.
- First-to-market OTDR integrating a true Loss Test Set function
- Traditional and in-service filtered wavelengths coupled into a single port
- Optimized for testing through PON splitters
- Instantaneous traffic detection when connecting live fiber
- Automated bend detection
- Possible combination with Triple-Play function, xDSL, Copper, and CWDM OSA modules

Applications

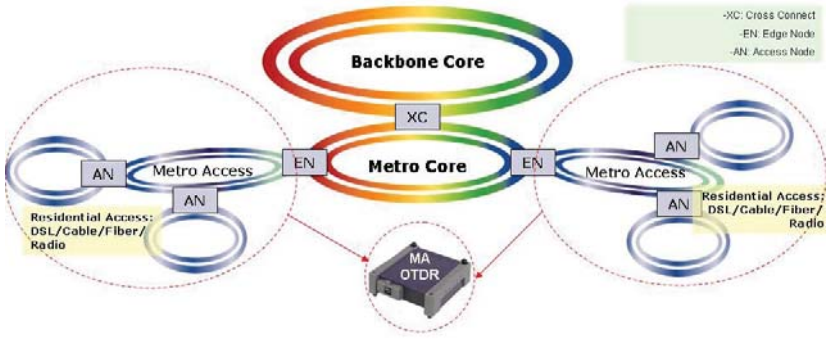
- Installation, maintenance, and troubleshooting of Metro and Metro-Access networks (wireless backhaul and CWDM)
- Fiber characterization solution for use in Access/FTTx networks (P2P Ethernet, PON, and NG- PON) of today and tomorrow

Testing Metro and Access networks calls for using cost-effective, versatile, high performance test equipment. JDSU has designed an optical time domain reflectometer (OTDR) with the required performance and functions for the characterization of various optical networks, such as CWDM, wireless backhaul, and FTTx. The Metro-Access (MA) OTDR Module meets the challenges of commissioning a complete metro ring, troubleshooting a bend in a distribution frame, and qualifying high-port-count optical splitters.

The MA OTDR Module, part of the T-BERD/MTS-4000 family of products, offers a lightweight, rugged, battery-operated handheld test solution. Its large display combined with comprehensive user interface makes it the ideal OTDR in response to any test scenario.

Performance Versatility for Both Metro & Access Networks

The MA OTDR provides field technicians with a broad range of testing tools for installation, maintenance, and troubleshooting of Metro-Access (Ethernet), Access/FTTx, and passive optical networks (PON).



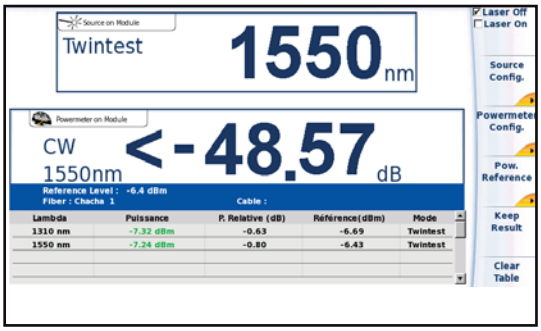
The Optimum Performance for Metro-Access Applications

Metro-Access networks enable multiservice delivery and handoff to larger Metro core networks. Because distances and fiber-counts vary significantly, the ideal test solution must outperform in any test scenario. The MA OTDR module provides fiber installers and service providers the performance to fulfill these test challenges. Combining fast acquisition time, high resolution (<1 m event dead zone), and a 37 dB dynamic range makes the MA OTDR module an ideal tool for:

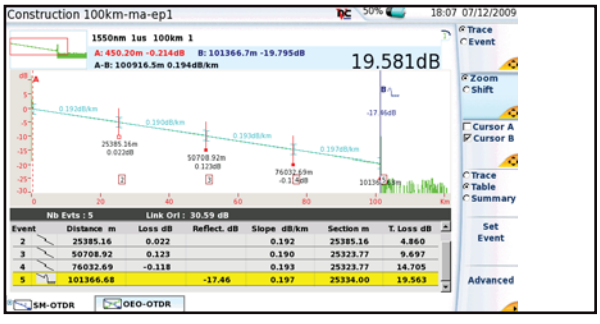
– Detailed events commissioning of point-to-point fiber links with splices, connectors, and fiber section characterization

– OTDR acceptance testing with the addition of end-to-end and optical return loss (ORL) measurements

– Troubleshooting any fault in the network



Loss test set feature (light source and power meter)

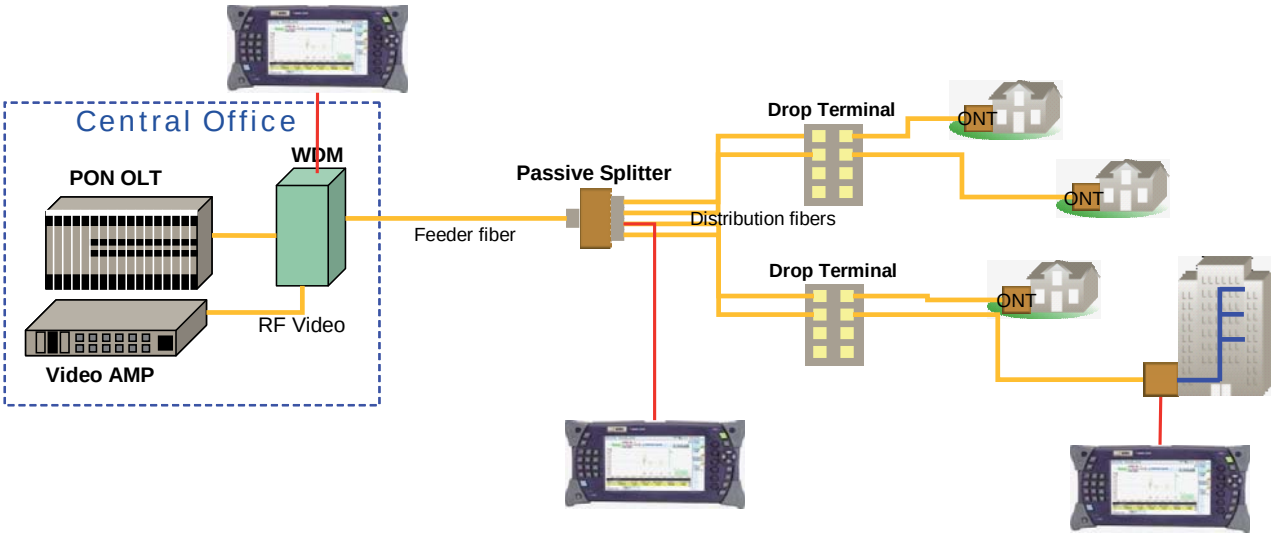


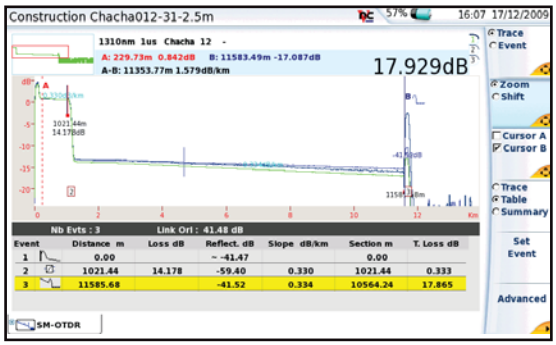
Typical Metro network measurement: 100 km

The Ideal Test Tool for Access/FTTx Applications (PON, NG-PON, RFoG)

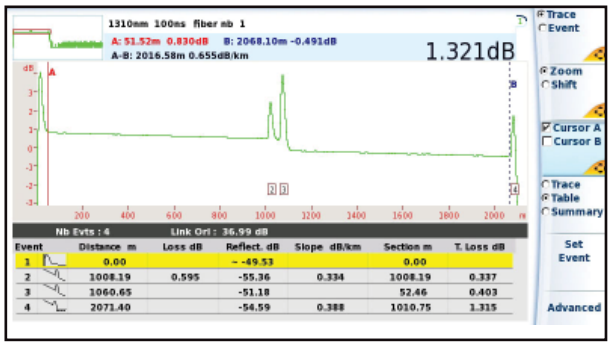
The Access network extends from a Central Office (CO) or headend out to individual businesses or homes using different technologies such as point-to-point Ethernet or PON. It typically spans a few meters to several kilometers (or miles). The measurement of very short distances associated with high point losses, due to passive splitters, brings new testing challenges by compromising dynamic range and resolution. The MA OTDR Module is "PON-optimized" as a result of:

- Improved dynamic range at short pulses to qualify PON systems
- Sharp resolution to precisely identify closely spaced events and near-end faults
- In-service wavelengths (1625 or 1650 nm) for troubleshooting faulty customers without disturbing live traffic





PON system measurement from the customer premises



Short distance measurement with closely spaced events

Enhanced User Interface for Improved Productivity

Traffic Detection

The automatic traffic detection capability verifies the presence of a signal as soon as the fiber under test is connected to the OTDR port and reduces the chance of conducting unwanted measurements on live fiber. In one direction, the OTDR signal emission could affect the optical transmitter; and in the other direction, the transmission signal could affect the measurement quality and perhaps damage the OTDR receiver. To avoid these risks, the OTDR displays an on-screen warning when detecting a signal—or modulation—that prompts technicians to confirm or cancel the measurement.

The Right Test Mode for the Right Job!

The MA OTDR features four operating modes to meet the needs of technicians:

- A Fault Locator to boost productivity in the field with a fully automatic, one-button operating mode that requires no additional settings. It gives the location of the fiber end, total loss, and ORL of the link.

- The Quick-link Test combines automatic acquisition setup with detailed trace analysis, offering unmatched ease of use for novice or intermittent users.

- The Construction mode offers high-level trace analysis, making the MA OTDR a powerful instrument for fiber commissioning.

- The Real-time mode helps technicians achieve optimal setups by providing instant measurement values and feedback on changes with direct access to the acquisition parameters in the result view. This mode also offers an auto "Zoom to End" key that is useful when adjusting connectors or splicing.

Initial Fiber Connection Check

At the beginning of an acquisition, a measurement of the front connection is provided with level indication so that field technicians perform measurements in optimal conditions.

Macro-Bend Detection

With its dual-wavelength testing capability, the MA OTDR automatically locates and displayes macro-bends, shortening analysis time, especially when troubleshooting a fiber link.

Summary Table

Laser	T. Loss	Total Orl	TLength
nm	dB	dB	m
1550	5.759	< -9.00	1294.13
1625		< -9.00	

Bend Table

	Bend dB	Distance m
1	0.652	1271.88
2	0.497	884.42

Innovative and Audacious Test Function Implementation

In-Service Maintenance

The MA OTDR module supports in-service PON measurements based on the ITU-T L41 Recommendation: Maintenance Wavelength on Fibers Carrying Signals, which enables in-service measurements using out-of-band wavelengths (1625 or 1650 nm) to avoid interference with the optical link or CO laser transmitter performance. The MA OTDR module features filtered 1625 and 1650 nm out-of-band wavelengths (where traffic would not be distributed) allowing for rejection of unwanted signals (1310, 1490, and 1550 nm) that could interfere with the OTDR measurement.

Traditional 1310/1550 nm and filtered 1625 nm wavelengths are coupled into one single OTDR port allowing error-free testing and avoiding multiple connection/disconnection.

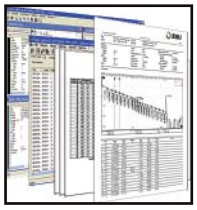
Integrated Loss Test Set

The OTDR port operates as a laser source to provide continuous wave and standard modulations, as well as integrating a power meter. These two functions enable a full-featured loss test set, reducing the cost of goods, the number of tools to carry in the field, and the time for testing Metro-Access networks.

Error-Free Professional Report

Featuring a PDF writer and reader, the T-BERD/MTS-4000 platform enables generating and recalling .pdf test reports directly from the built-in explorer without using an offline software program.

For more integrated reports, a PC-based software application within a true Microsoft Windows environment enables detailed generation of professional OTDR trace reports.



- Proof-of-performance
- Full-customizable report
- Dedicated tables for each test result
- Out-of-range value summary with Pass/Fail indicators
- Analysis of macro-bends

General technical (Typical at 25°C)

Weight	0.35 kg (0.77 lb)
Dimensions (w × h × d)	128 × 134 × 40 mm (5.04 × 5.28 × 1.58 in)
Storage	Bellcore/Telcordia-compatible (Version 1.1 and Version 2.0

Optical interfaces

Applicable fiber	SMF 9/125 µm
Interchangeable optical connectors	FC, SC, DIN, LC (PC or APC) and ST (PC)

Reflectance/ORL measurements

Reflectance accuracy	±2 dB
Display resolution	0.01 dB
Threshold	-11 to -99 dB in 1 dB step

Technical characteristics

Laser safety class (21 CFR)	Class 1
Distance units	Kilometers, feet, and miles
Group index range	1.30000 to 1.70000 in 0.00001 steps
Number of data points	Up to 128,000 data points
Distance measurement	Automatic or dual cursor
Display range	0,5 to 260 km
Cursor resolution	1 cm
Sampling resolution	4 cm
Accuracy (Excluding group index uncertainties)	±1 m ±sampling resolution ±1.10-5 x distance

Attenuation measurement

Automatic, manual, 2-point, 5-point, and LSA	
Display range	1.25 to 55 dB
Display resolution	0.001 dB
Cursor resolution	0.001 dB
Linearity	±0.03 dB/dB
Threshold	0.01 to 5.99 dB in 0.01 dB steps

Power meter (optional)

Power level range	0 to -55 dBm
Measurement wavelengths	1310, 1490, 1550, 1625 and 1650 nm
Calibrated wavelengths	1310, 1490, 1550, 1625, and 1650 nm
Measurement accuracy	±0.5 dB

Ordering information

Metro Access 1310/1550 nm OTDR Module	E4126MA
Metro Access 1310/1550/1625 nm OTDR Module	E4136MA
Metro Access 1310/1550 & Filtered 1625 nm OTDR Module	E4136RMA
Metro Access Filtered 1650 nm OTDR Module	E4118RMA65
Continuous and modulated source option	E410TDRLS
Power meter option	E410TDRPM

Universal optical connectors

Straight connectors EUNIPCFC, EUNIPCSC, EUNIPCST, EUNIPCDIN, EUNIPCLC

8° angled connectors EUNIAPCFC, EUNIAPCSC, EUNIAPCDIN, EUNIAPCLC

OTDR Module Technical (Typical at 25°C)

These are standard specifications, representing only a selection of the JDSU offerings. For specific requirements, please contact your local JDSU representative.

Central Wavelength (1)	Pulse Width	RMS Dynamic Range (2)	Event Dead Zone (3)	Attenuation Dead Zone (4)
1310 ± 20 nm	3 ns to 20 µs	37 dB	90 cm	4 m
1550 ± 20 nm		35 dB		
1625 ± 10 nm		35 dB		
1650 ± 20 nm		34 dB		

(1) Laser at 25°C and measured at 10 µs.
(2) The one-way difference between the extrapolated backscattering level at the start of the fiber and the RMS noise level, after 3 minutes averaging.
(3) Measured at ±1.5 dB down from the peak of an unsaturated reflective event.
(4) Measured at 1310 nm and ± 0.5 dB from the linear regression using a FC/PC type reflectance.

For more information on the T-BERD/MTS-4000 test platform, please refer to the separate data sheet and brochure.

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