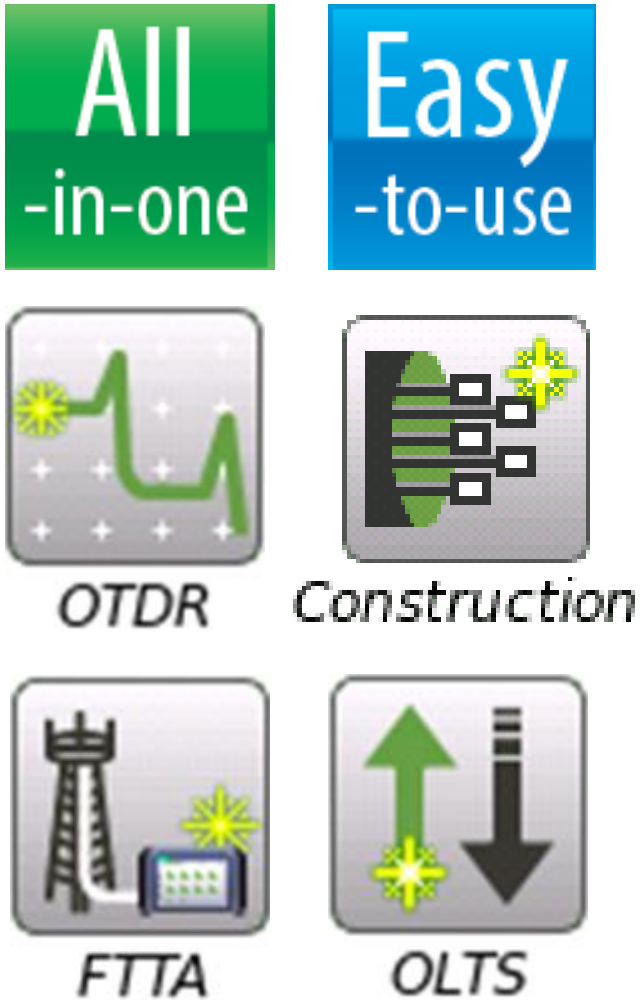
Anritsu envision:ensure

MT1000A OTDR Module

Network Master Pro
MT1000A

OTDR Module
MU100020A 1310/1550 nm SMF
MU100021A 1310/1550/850/1300 nm SMF/MMF
MU100022A 1310/1550/1625 nm SMF
MU100023A 1310/1550 nm, 1650 nm SMF

Contents



1. Market trends

Mobile Network I&M Solutions

MT1000A platform for more efficient and higher reliability antenna, base station, and backhaul I&M

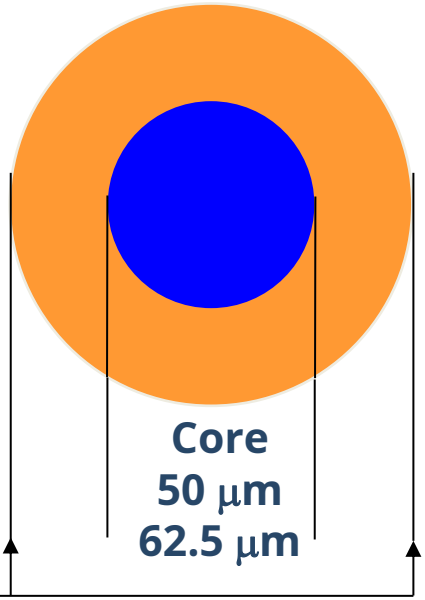
2. Fiber Connectors (1/3)

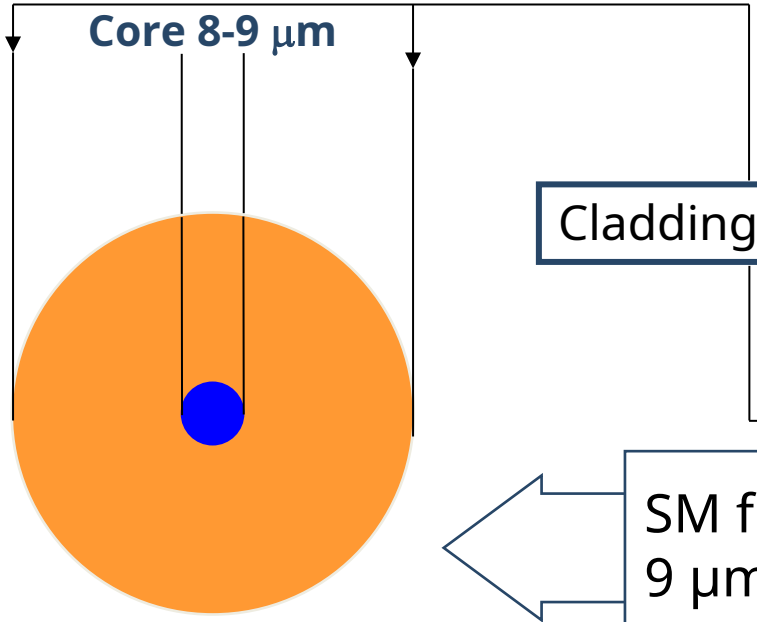
Back

What is fiber?

There are two types of fiber: Single Mode (SM) and Multimode (MM).

MM fiber has a core diameter of either 50 or 62.5 µm. The cladding is 125 µm.





SM fiber has a core diameter of just 8 to 9 µm, and the cladding is 125 µm.

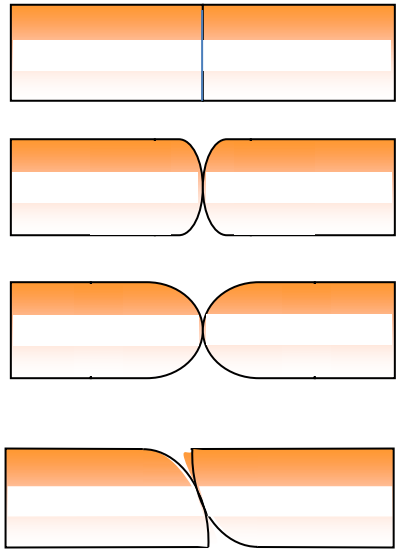
2. Fiber Connectors (2/3)

Back

What is a connector?

Causes Loss and reflectance

- Poor mating at fiber end faces (physical connectors)
- Reflections due to different refractive indexes (called Fresnel Reflection)
- Connection with degraded transmissions due to light returning to source and multiple reflections



(FC) Flat Polished (Flat Connectors)

(PC) Spherical Polished (Physical Contact)

(SPC) Super Polish PC
(UPC) Ultra Polish PC

(APC) Angular Polished

2. Fiber Connectors (3/3)

Back

Connector Types

- Mechanical Connection
- Connect/Disconnect
- Connection Loss: 0.1 to 0.5 dB *1
- Reflection Attenuation (-40 to -60 dB) *1
- **"Blue"** usually indicated UPC (ultra/flat)
- **"Green"** usually indicated APC (angled polished connector)

*1: Typical value

3. OTDR Fundamentals (1/5)

Back

What is OTDR and what does it do?

Distance/Length

Loss/Attenuation

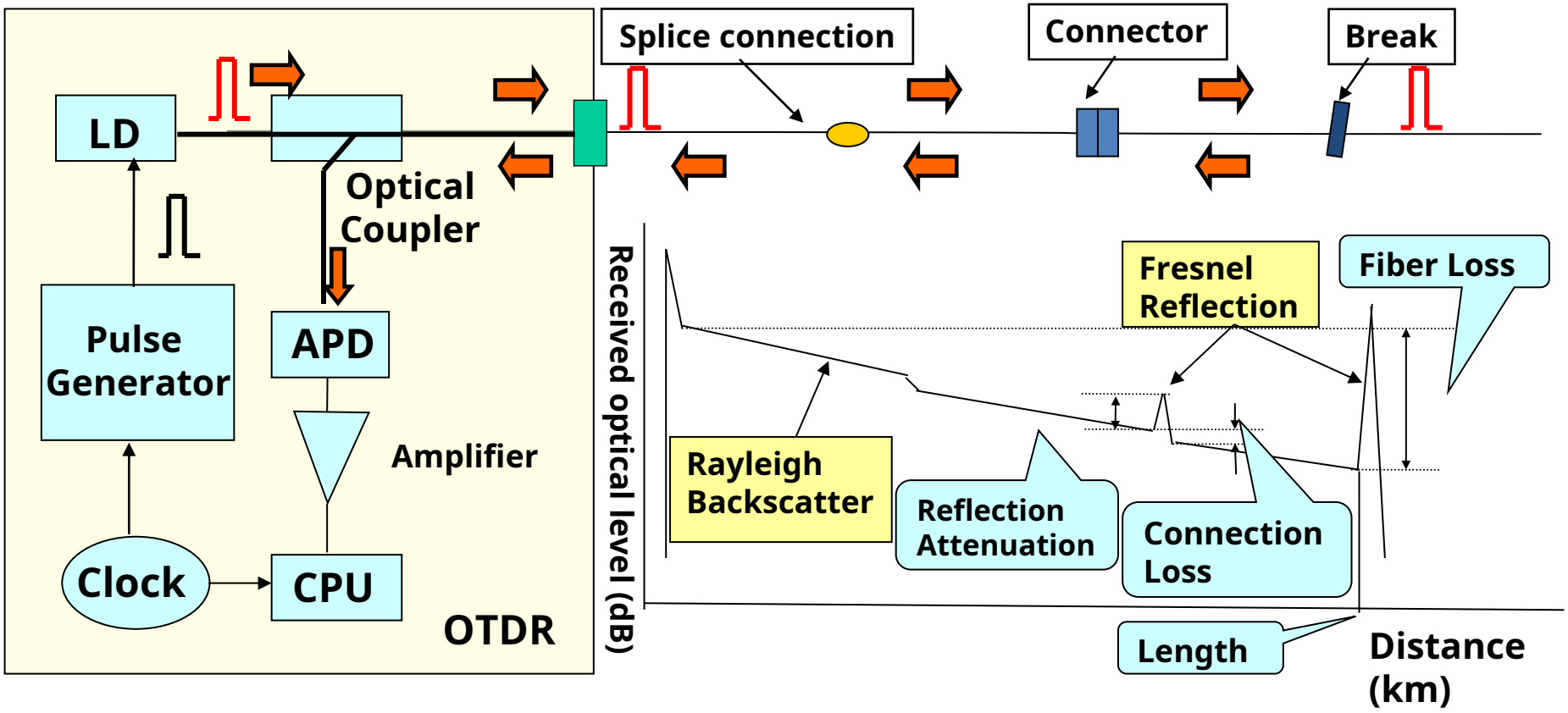
Reflectance/ORL

OTDR can measure from one end!

3. OTDR Fundamentals (2/5)

OTDR Basic Principles

An optical pulse is launched into the optical fiber and Rayleigh backscattered light and Fresnel reflections occurring in the optical fiber are received to measure the fiber length, loss, and return loss from the received light waveform.

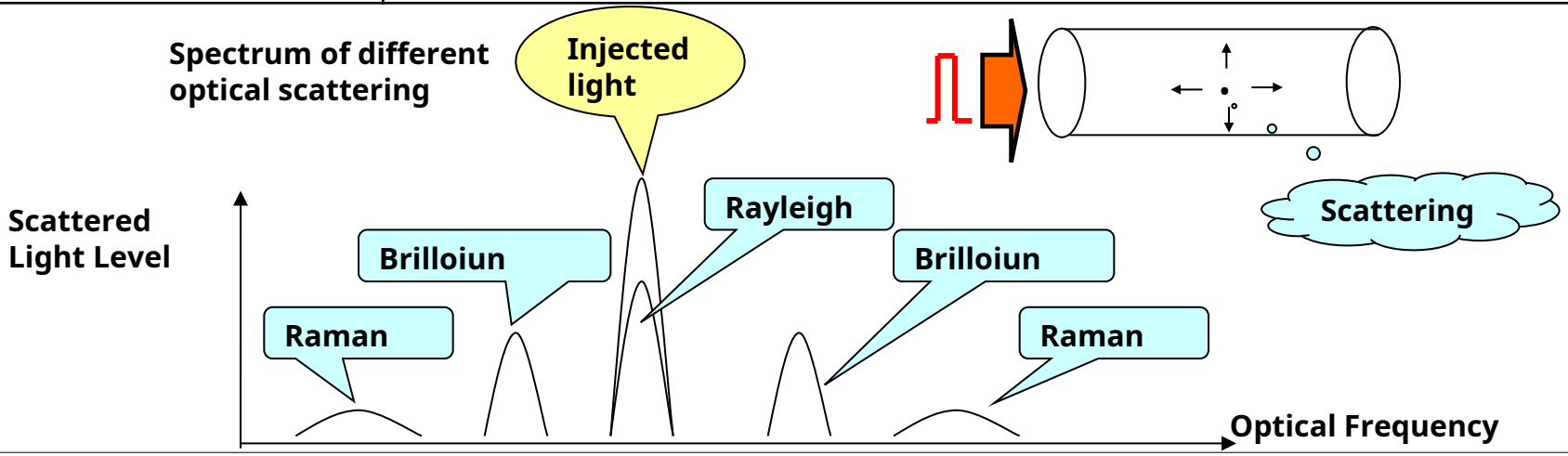


3. OTDR Fundamentals (3/5)

Rayleigh Backscatter

This scattered light is generated by small random density differences in the optical fiber. It causes transmission path loss.

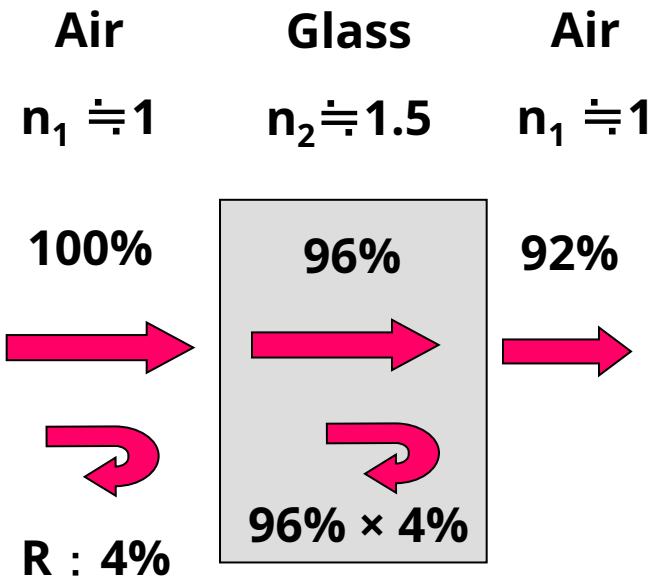
Fiber Scattering Types	Explanation
Rayleigh	**Scattered light has same frequency as injected light ; caused by small random differences in fiber internal density.** **Can be used for measuring loss distribution → OTDR measurement**
Raman	Scattered light has different frequency to injected light ; caused by interactions in fiber such as molecular vibration. Can be used to measure temperature distribution because has clear temperature dependency related to anti-Stokes light.
Brillouin	Scattered light has slightly different frequency to injected light ; caused by interactions with sound waves in fiber. Can used for distortion distribution measurements because Quarts-fiber Brilloiun frequency shift related to strain distortion.



3. OTDR Fundamentals (4/5)

Fresnel Backscatter

This scattering is caused by differences in the refractive index at boundary planes. It is one cause of loss. It can also causes degraded transmission waveforms due to light and reflections returning to the optical source.



$$R = | (n_1 - n_2) / (n_1 + n_2) |^2$$

$$= (0.5 / 2.5)^2$$

$$= 1/25 \quad (:4\%, -14\ dB)$$

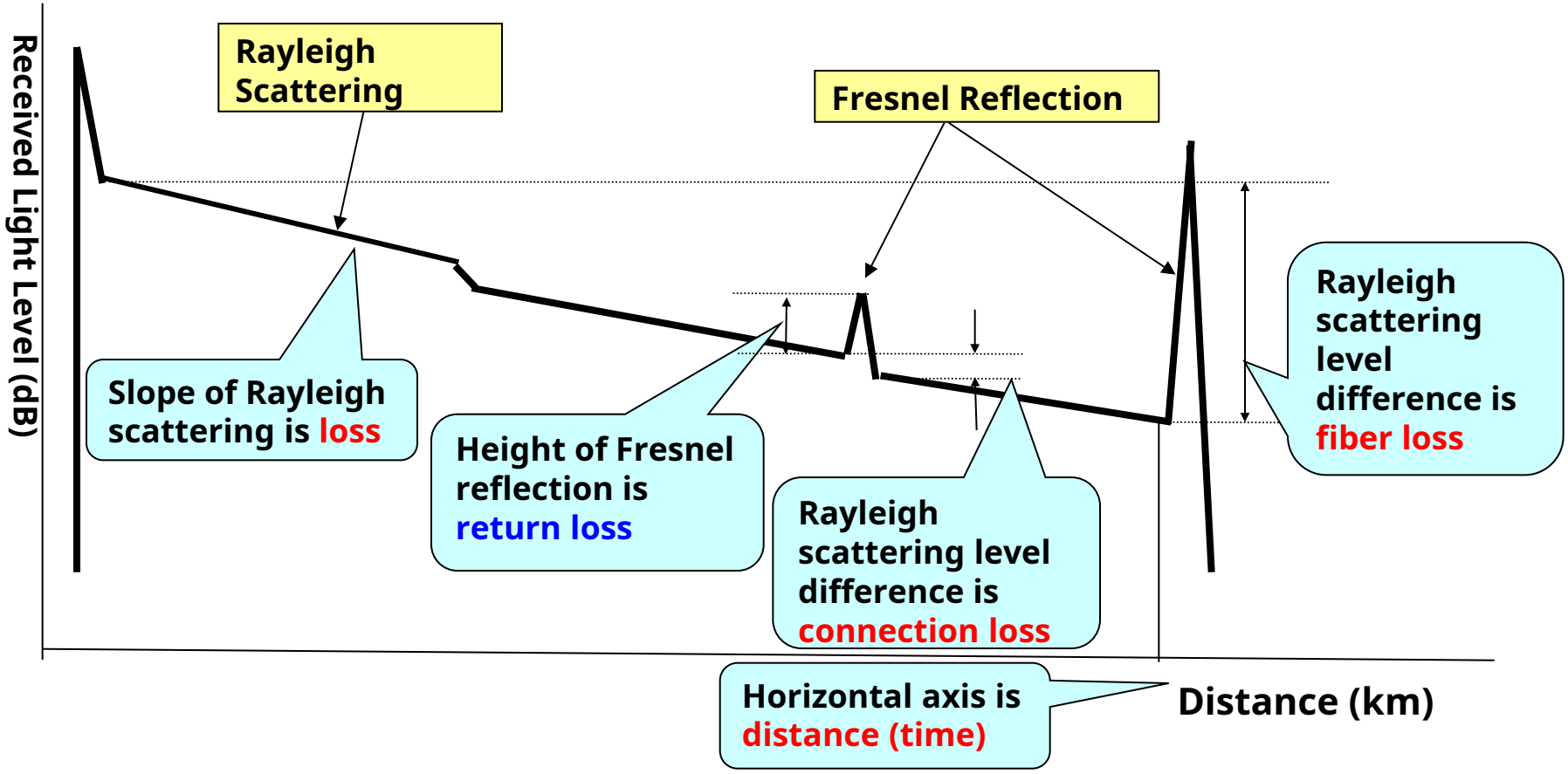
Return Loss (Typical)

Polish type	RL
Flat Polished (FC)	25 dB
Spherical Polished (PC)	40 dB
Super Polish PC (SPC)	50 dB
Ultra Polish PC (UPC)	55 dB
Angled Polish (APC)	65 dB

3. OTDR Fundamentals (5/5)

OTDR trace

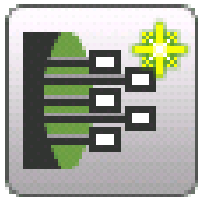
Since distance is displayed on the horizontal time axis, the transmission path loss can be found from the Rayleigh backscatter slope, the connection loss can be found from the level difference in the Rayleigh backscatter, and the return loss can be found from the height of the Fresnel reflection level.



4. MT1000A Features

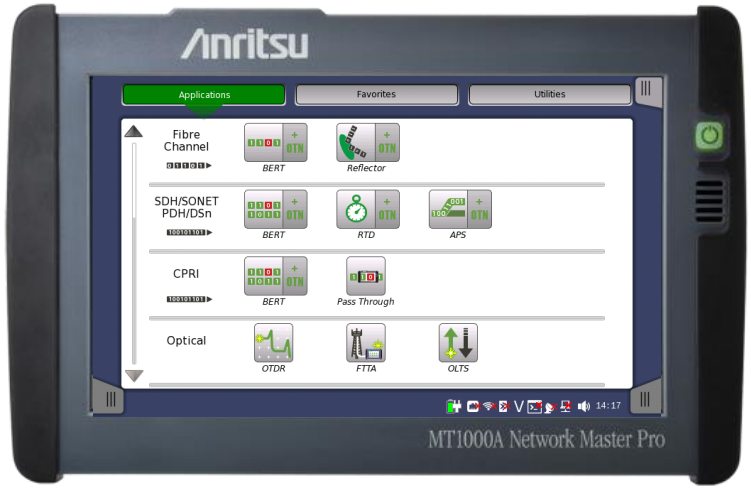
- All-in-one
- Easy-to-use GUI
- Easy-to-see and easy-to-use 9” high-resolution touch panel
- Portable size
- Long-life battery
- All functions for I&M PHY layer tests


OTDR

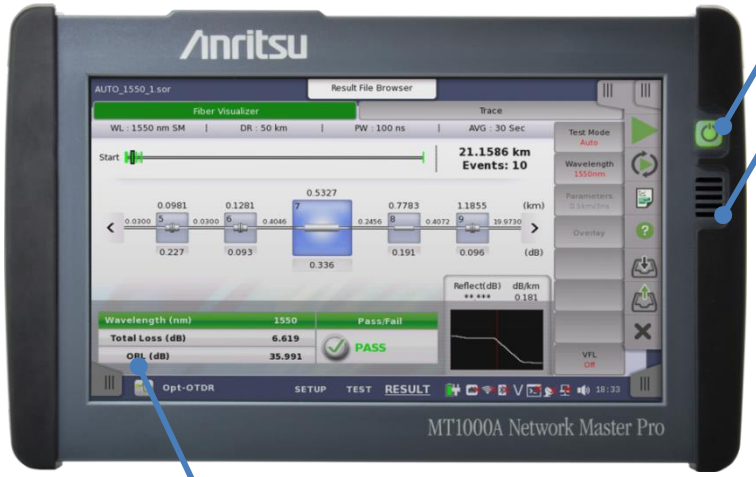

Construction


FTTA


OLTS



5. External Appearance (1/3)



Power switch

Speaker (not used)

9” high-resolution touch panel

Back Panel

MU100020A 1310/1550 nm SMF OTDR module

MU100021A 1310/1550/850/1300 nm SMF/MMF OTDR module

MU100022A 1310/1550/1625 nm SMF OTDR module

MU100023A 1310/1550/1650 nm SMF OTDR module

Replaceable Battery

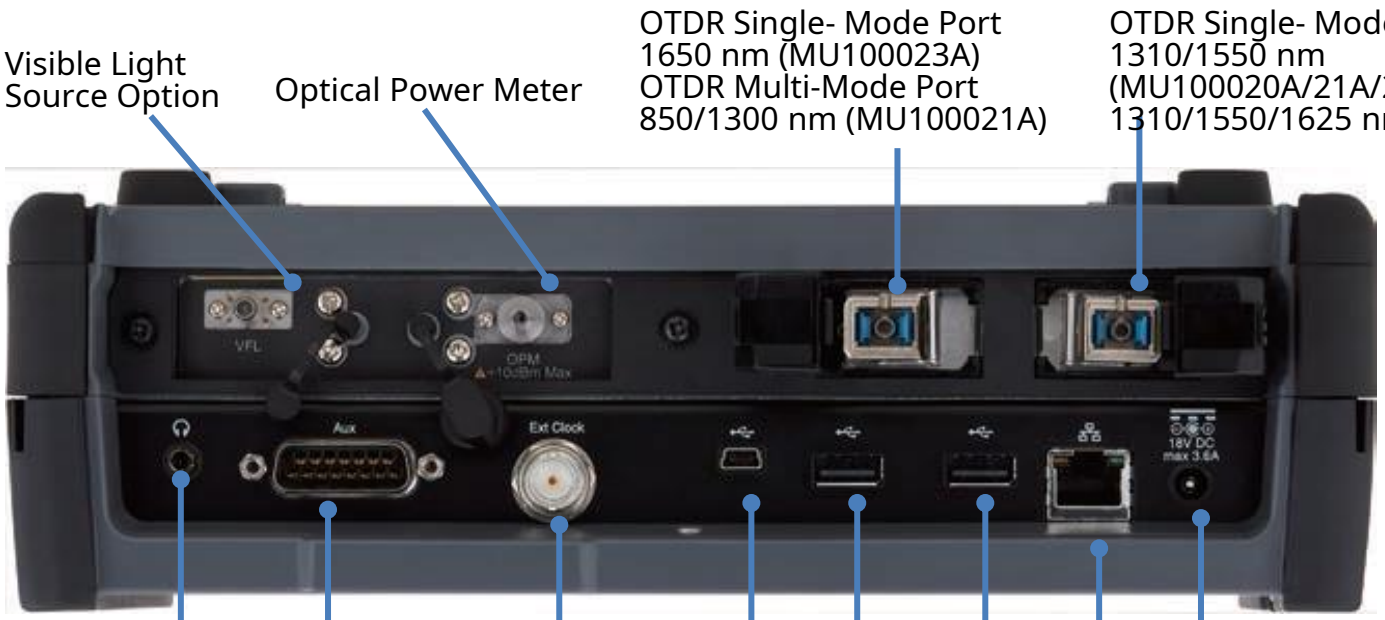
Carrying Strap and Handle

5. External Appearance (2/3)

Back

- MT1000A + MU100020A/21A/22A/23A

  Main Frame + OTDR Module



5. External Appearance (3/3)

- MT1000A + MU100020A/21A/22A/23A + MU100010A

  Main Frame + OTDR Module + 10G Multi-rate Module

10G Multi-rate Module
MU100010A

OTDR Module
MU100020A/21A/22A/23A

Main Frame
MT1000A

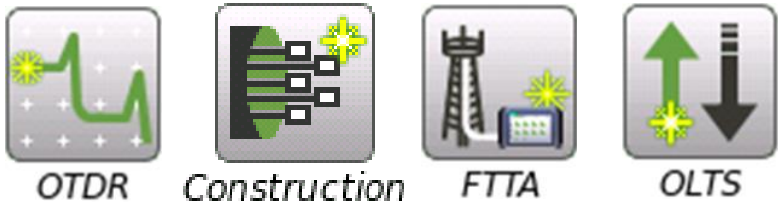
OTDR Module
MU100020A/21A/22A/23A

*Please refer to the Configuration Guide for other configurations.

6. OTDR Applications

Back

1) Easy-to-understand Pass/Fail evaluation using Fiber Visualizer function
2) High-accuracy event detection using multi-pulse measurement
3) Intuitive manual waveform analysis using touch panel
4) Supports long-distance optical fibers & 1 x 128 splitter PON measurement
5) Various high-accuracy OTDR measurement functions



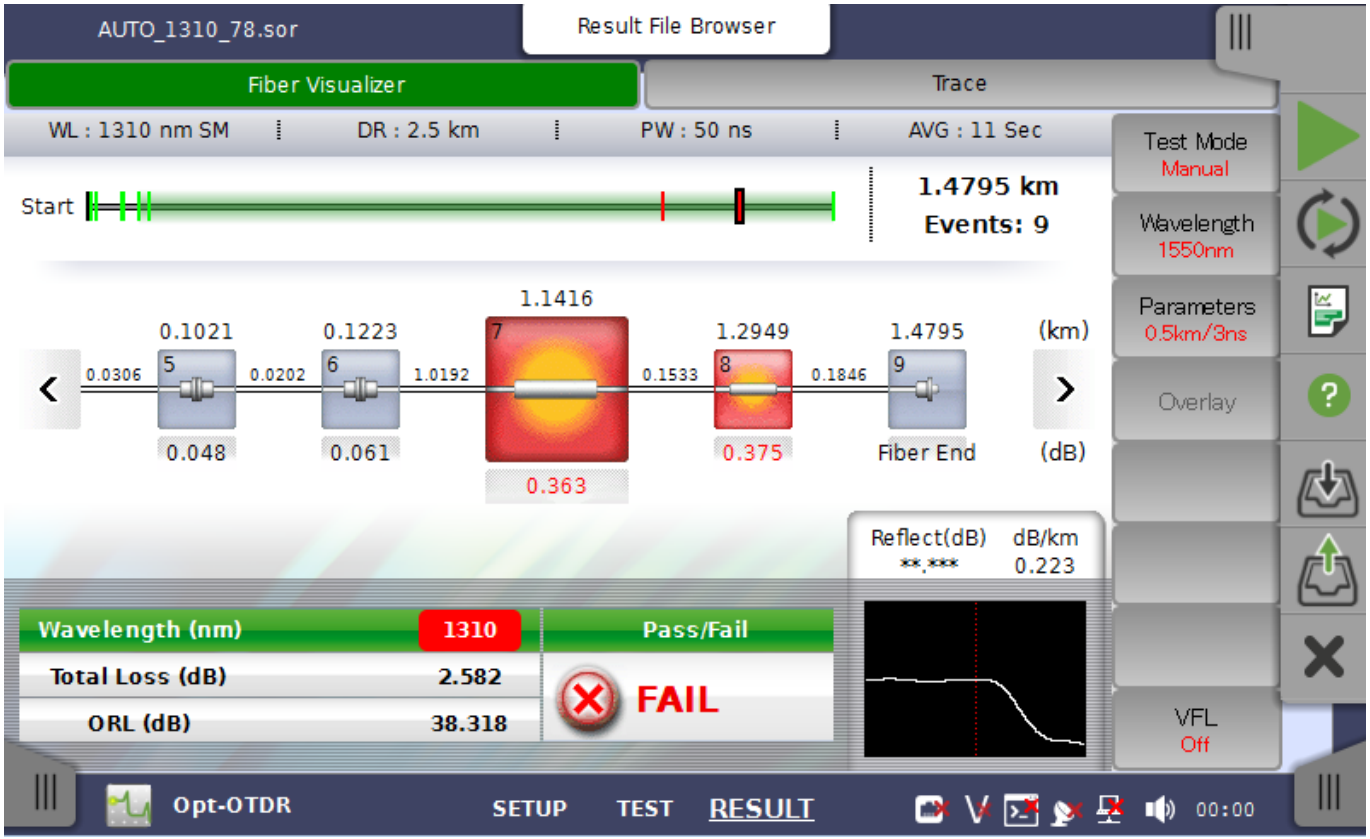
6. OTDR Applications (1/5)

Fiber Visualizer

Back

1: Easy-to-understand Pass/Fail evaluation using Fiber Visualizer function

- Fiber Visualizer displays optical fiber events using icons for simple display of analysis results
- Instant Pass/Fail output and evaluation based on preset thresholds
- Summarized analysis results displayed on Fiber Visualizer screen and measurement results on OTDR trace screen

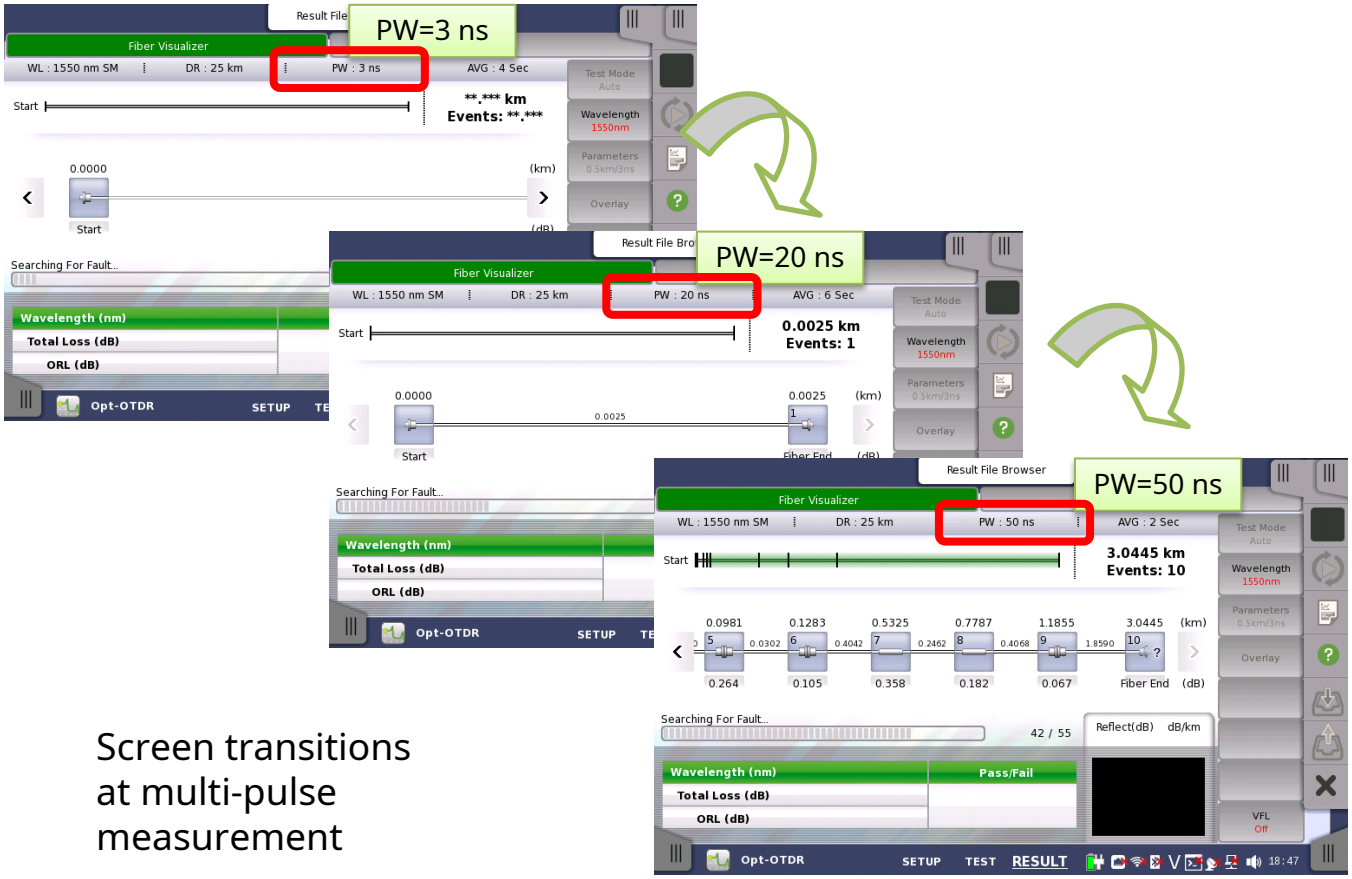


Fiber Visualizer Screen

6. OTDR Applications (2/5)

2: High-accuracy event detection using multi-pulse measurement

- Function using one measurement with multiple pulse widths
- High-accuracy measurement using multi-pulse measurement of even previously-difficult-to-measure short fibers
- Ideal for evaluation of complex optical lines, such as mobile fronthaul

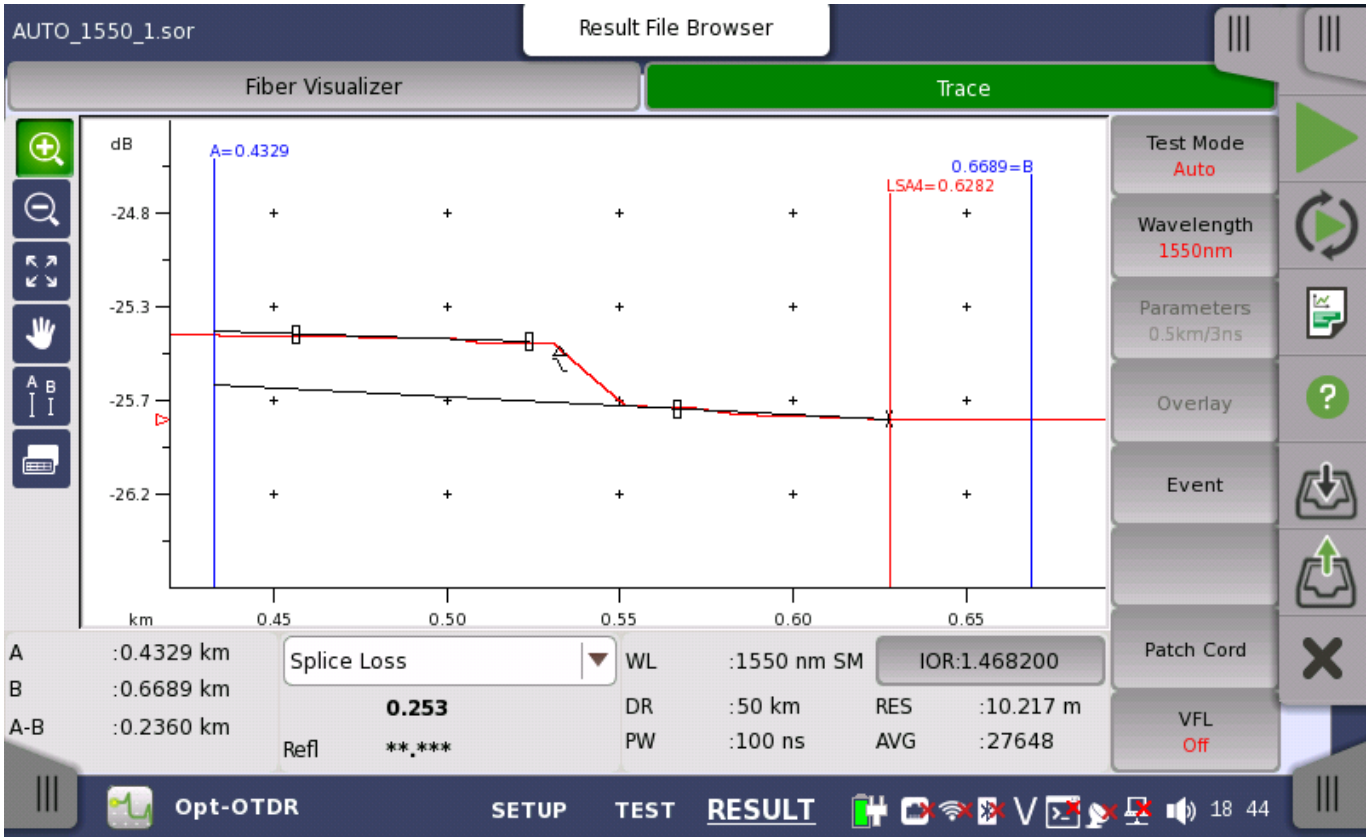


Screen transitions at multi-pulse measurement

6. OTDR Applications (3/5)

3: Intuitive manual waveform analysis using touch panel

- Simple manual analyses such as fiber distance, losses and return loss using intuitive operation
- 9 inch full-color, high-resolution touch panel
- Easy-to-use with same GUI as Network Master series

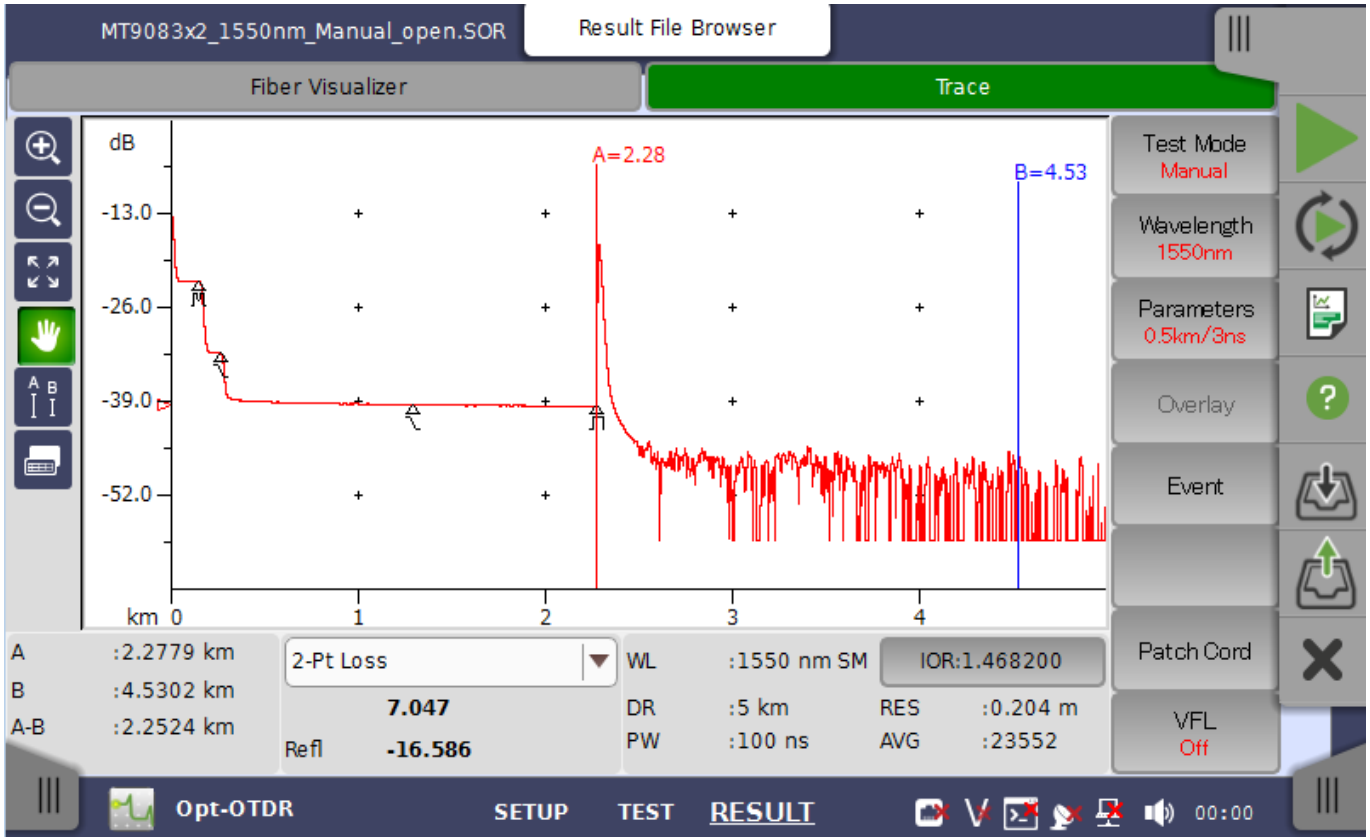


Manual Analysis Screen

6. OTDR Applications (4/5)

4: Supports long-distance optical fibers & 1 x 128 splitter PON measurement

- MU100020A has dynamic range of 46 dB (typical)
- Supports long-distance fiber evaluation up to 100 km, such as Core and Metro networks
- Supports evaluation of PON systems, such as FTTH including splitter (up to 128 branches)



PON Measurement Screen

6. OTDR Applications (5/5)

Back

5: Various high-accuracy OTDR measurement functions

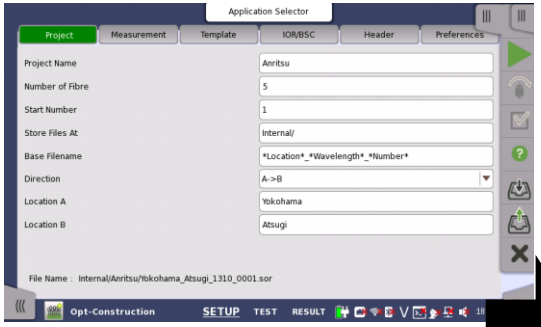
- 0.8-m Event Dead Zone
- Up to 250,001 Sampling Points
- Optical Communications Signal/Connection Check Function
- Supports Shared OTDR Data Format
- Macro-bend Detection/Analysis
- Bi-Directional Measurement
- Multi-waveform Measurement/Display Functions

7. Construction Mode

Back

Construction Mode

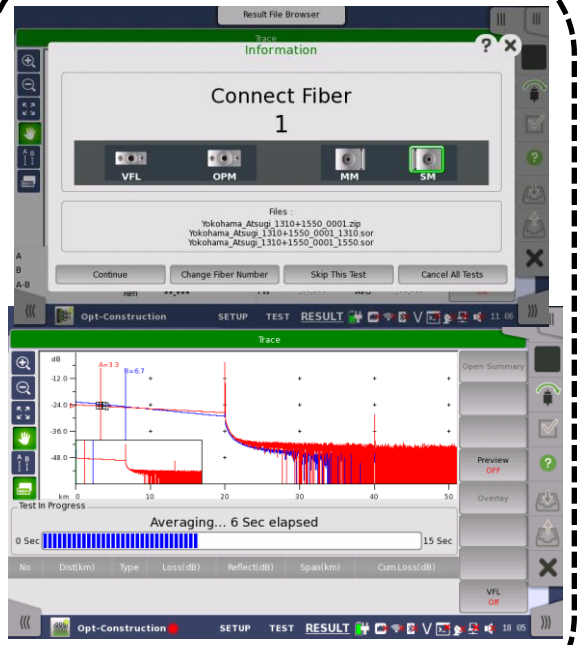
The Construction mode simplifies installation work and is especially useful when pulling multi-core fiber cables. Work mistakes are eliminated by automated operation using pre-settings, such as project data (number of fibers, file names, etc.) and measurement conditions, to facilitate efficient measurement of multi-core fiber cables.



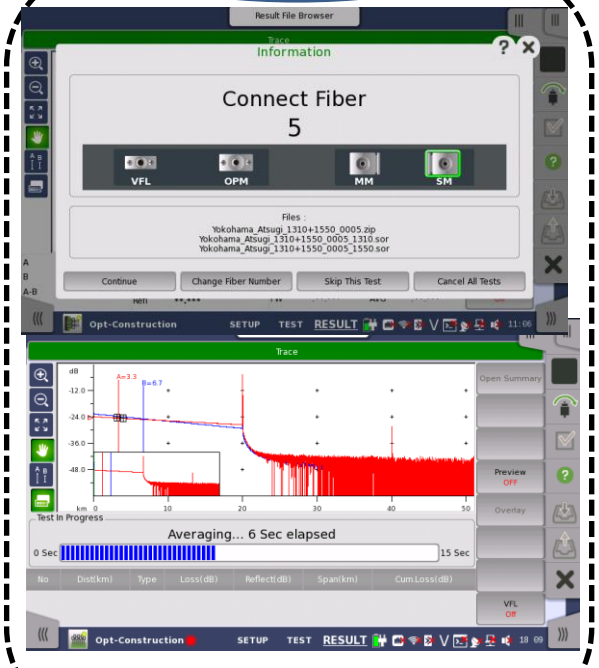
Project Information

- ✓ Project Name
- ✓ Number of Fibers
- ✓ Direction
- ✓ Locations
- ✓ …etc

Fiber 1



Fiber 5

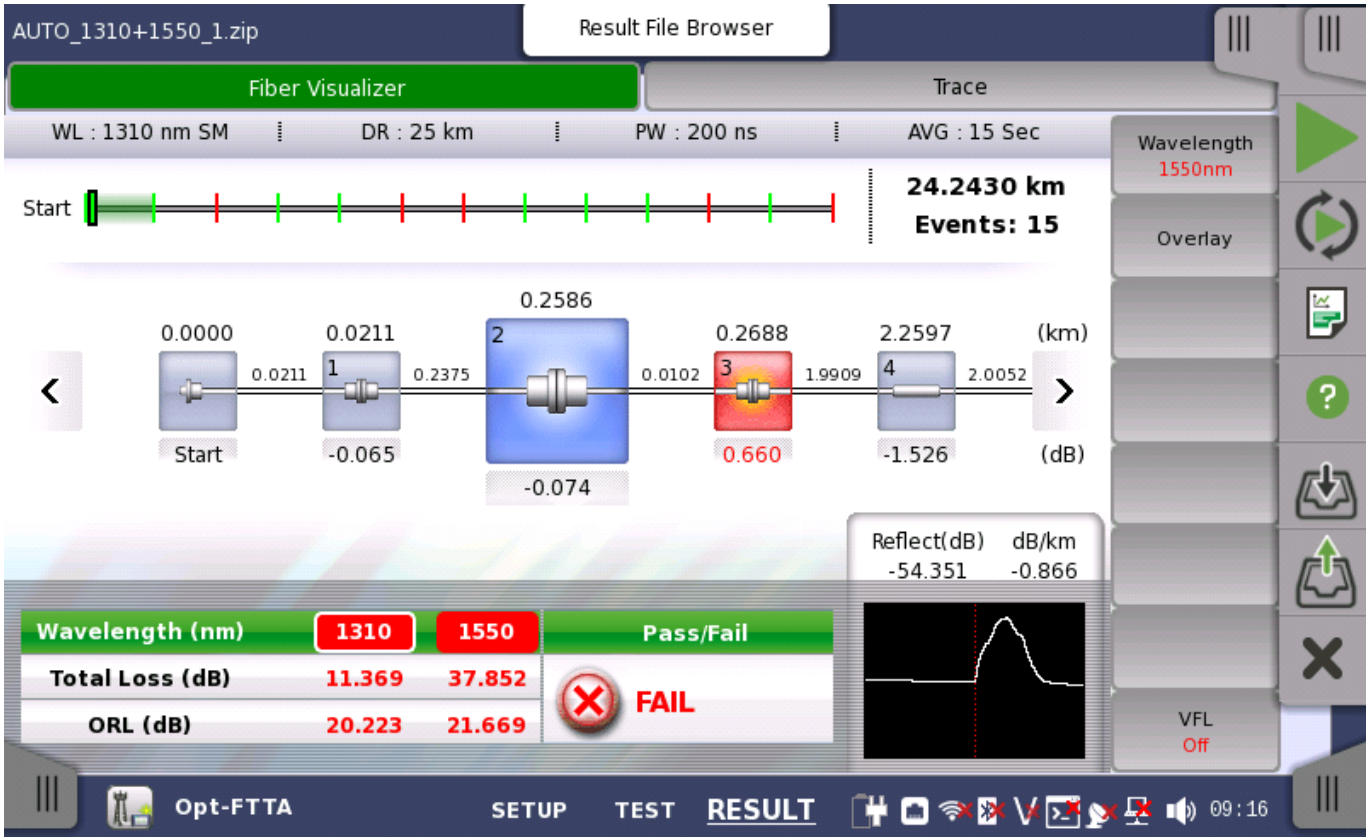


8. FTTA Measurements

Back

FTTA (Fiber To The Antenna) Measurements

- Optimized for measurement parameters such as distance range used for short optical fibers used in RRH base stations
- Measurement results displayed as Fiber Visualizer and waveform eliminating analysis parameter settings



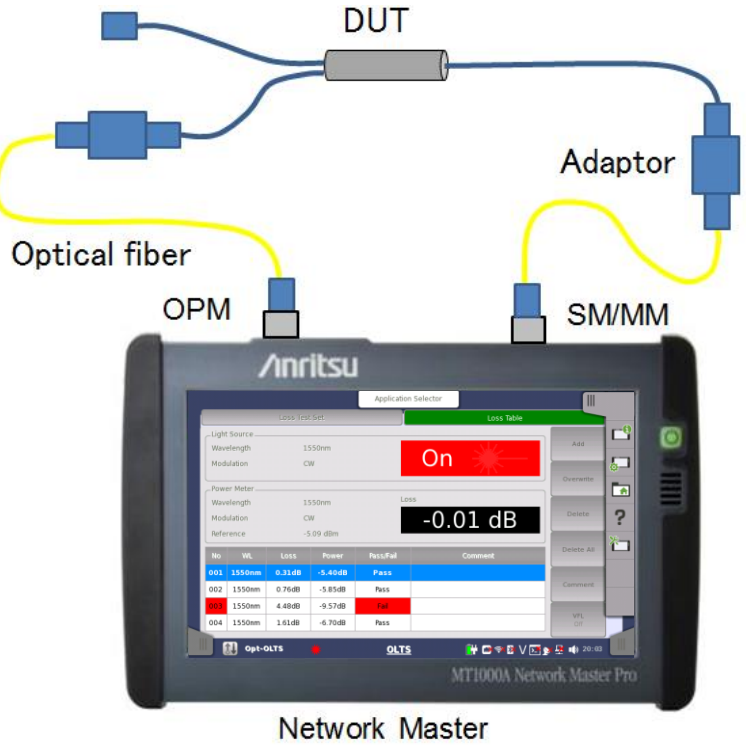
FTTA Measurement

9. OLTS Measurements

Back

OLTS Measurement (Optical Loss Test Set)

- Measures optical fiber loss using Light source and Optical power meter
- Measurement results managed with Loss Table
- Pass/Fail evaluation using preset threshold values



10. Others Applications VIP

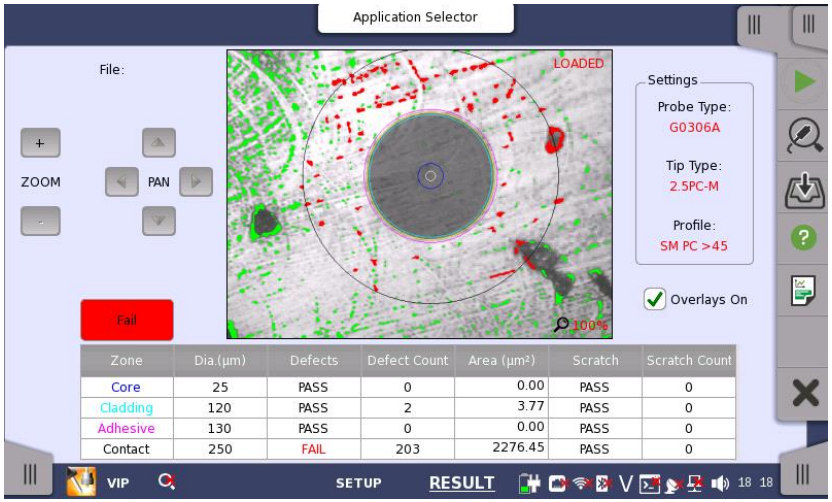
Optical Connector End Face Analysis (VIP: Video Inspection Probe)

- Function for detecting presence of scratches and dirt on optical connector end face
- Displays results as Pass/Fail evaluation based on IEC61300-3-35 standard
- Supports various connector types

Anritsu supports VIP Series G0382A (USB Autofocus Type) and G0306B (USB Standard Type).

G0382A
Autofocus Video
Inspection Probe

G0306B
Video Inspection Probe

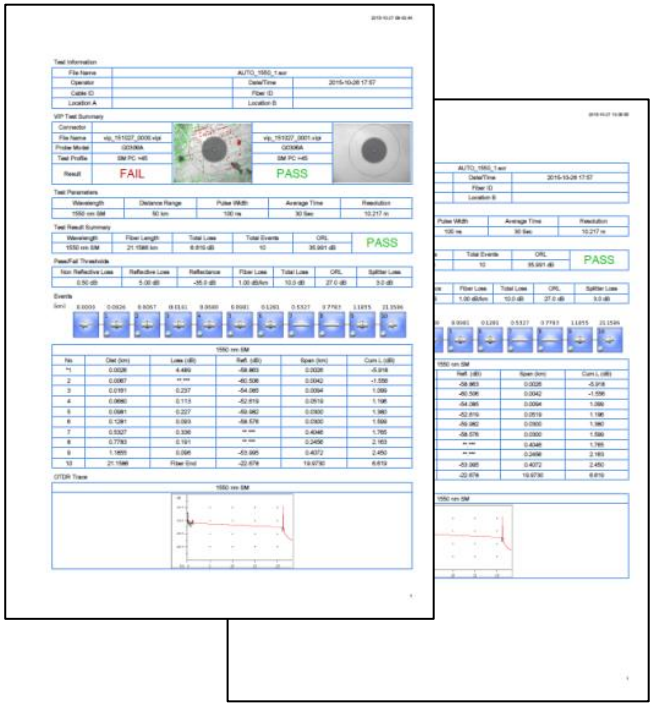


Optical Connector End Face
Inspection Evaluation Screen

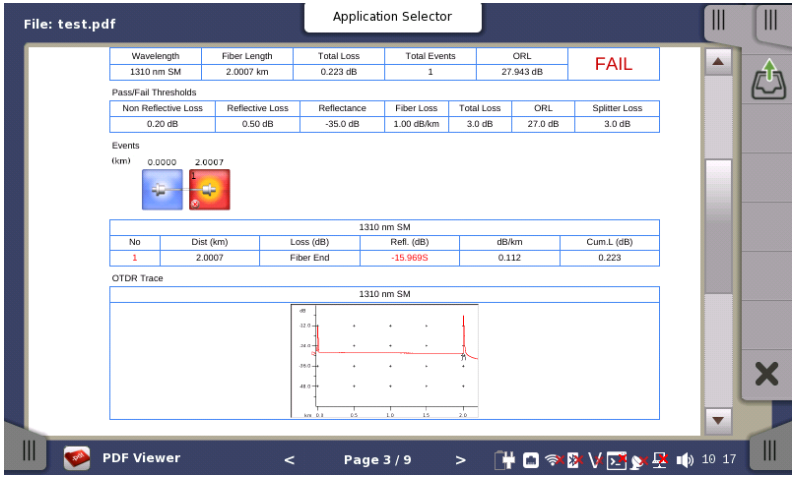
10. Others Applications PDF Report Output

PDF Report Output

- Outputs results of OTDR/FTTA measurement as PDF report
- Outputs Fiber Visualizer, Event Table, waveforms, and VIP result displays
- Creates complete report of all results for easy Pass/Fail verification



Example of PDF Report

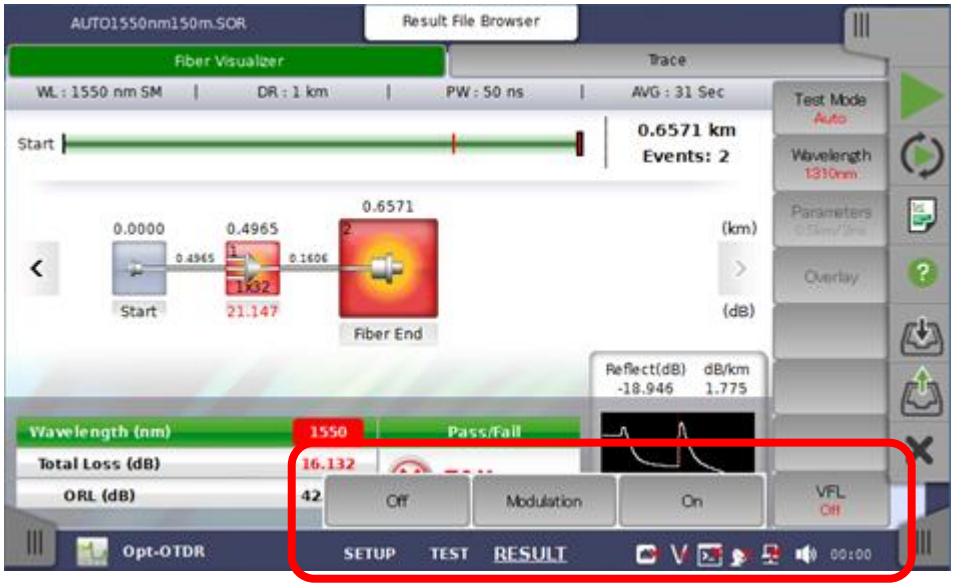


PDF File Display Screen

10. Others Applications OPM/VFL

Simultaneous measurements using Optical Power Meter (OPM) and Visible Fault Locator(VFL) source option functions

- Supports simultaneous use of OPM/VFL at OTDR and FTTA application
- Supports simultaneous use of visible light source (Opt-002) at each of OTDR, FTTA, and OLTS applications
- Increases work efficiency for multi-core fiber measurements, etc.



VFL

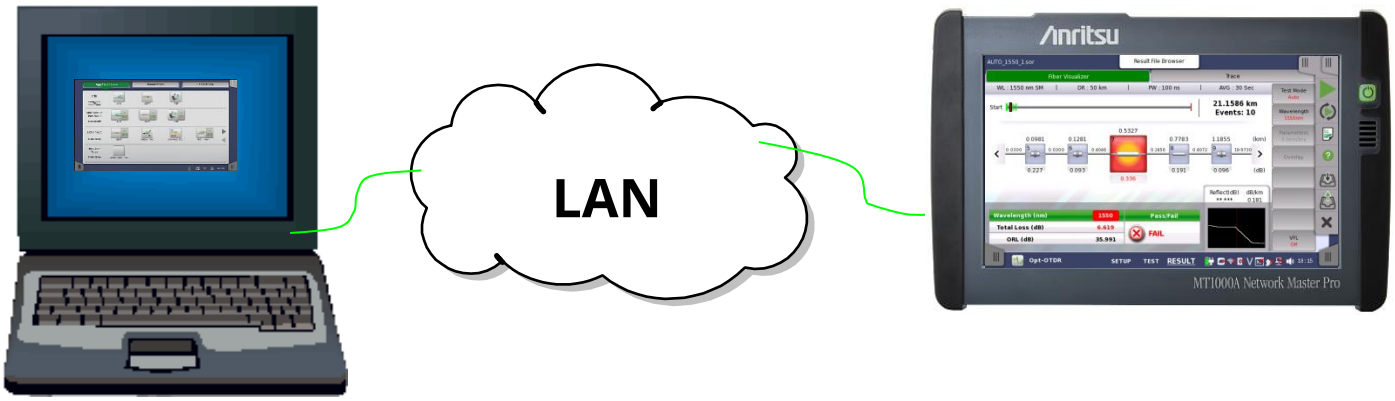
OPM

10. Others Applications Remote Operation

Remote Operation Functions (1/2)

Remote operation of MU100020A/21A/22A/23A OTDR Module using VNC connection from PC over Ethernet

- Remote access
- Remote troubleshooting
- Long-term multi-site monitoring from central office
- Multi-user access to one MT1000A set
- Screen projection via PC
- Transfer of test settings files
- Transfer of results to other PCs



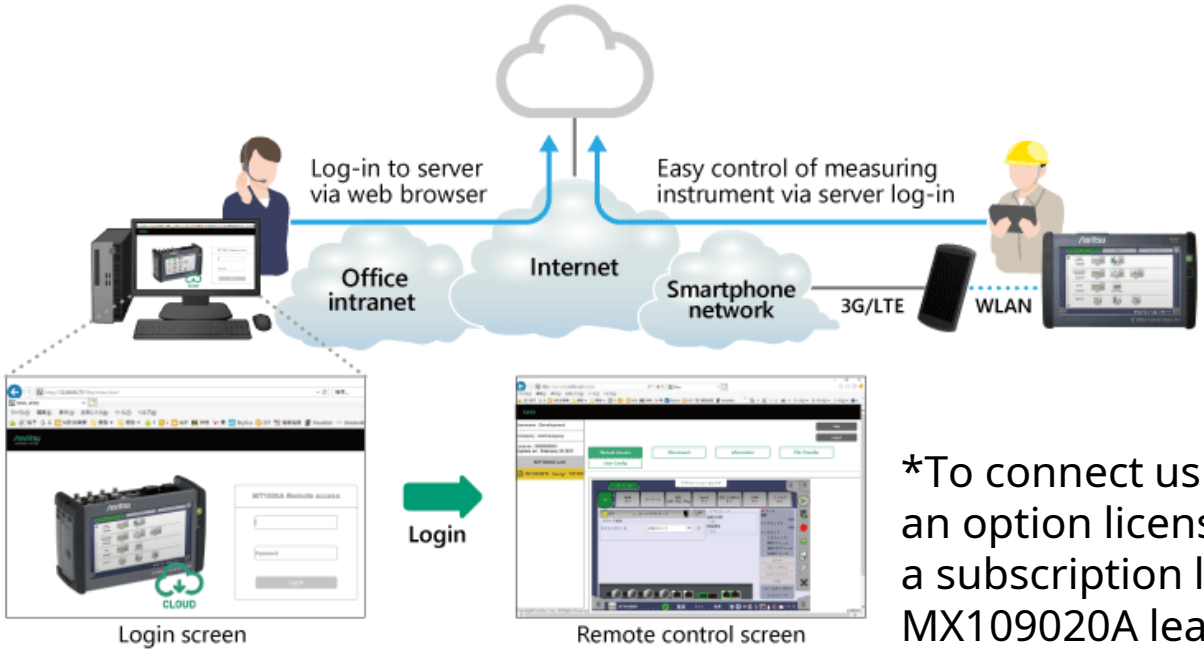
10. Others Applications Remote Operation

Remote Operation Functions (2/2)

Easy Connections Anywhere Using SORA (Site Over Remote Access)

Using the Site Over Remote Access MX109020A (SORA hereafter) software measuring instruments can be remotely controlled easily anywhere.

The SORA cloud-based service allows office users to log-in to an Internet webpage to control the measuring instrument from the office via a smartphone.



*To connect using SORA, you must purchase an option license for the main unit as well as a subscription license. Refer to the MX109020A leaflet and product introduction for more details.

10. Others Applications 10G Module

Simultaneous built-in OTDR and Transport functions (10G OTN)
MT1000A + MU100010A + MU10002xA

- Functions for I&M of Remote Radio Head (RRH) base stations and reduction of operating costs
- Supports cable and transport quality evaluations using actual data at base station installation
- Easy-to-use with same GUI as Network Master series

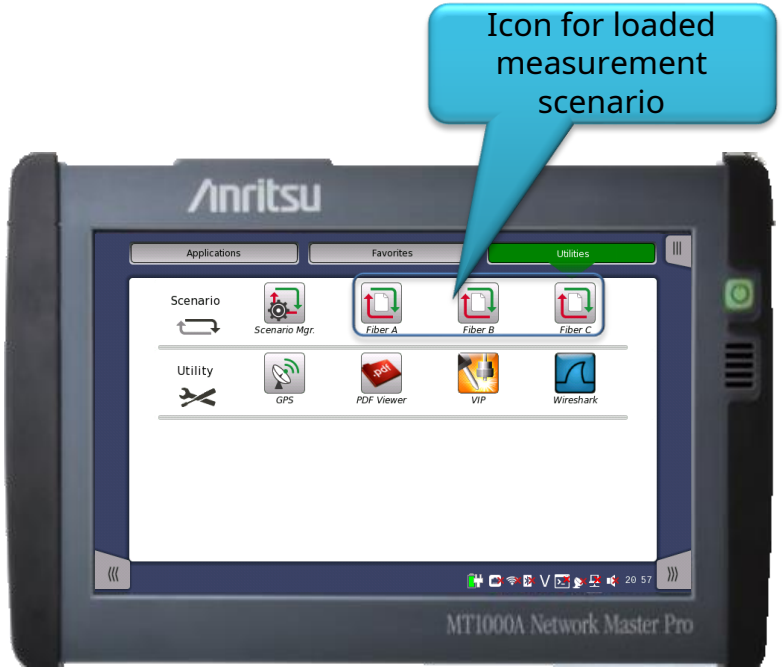
Line Error Rate Measurement

Line Delay Measurement

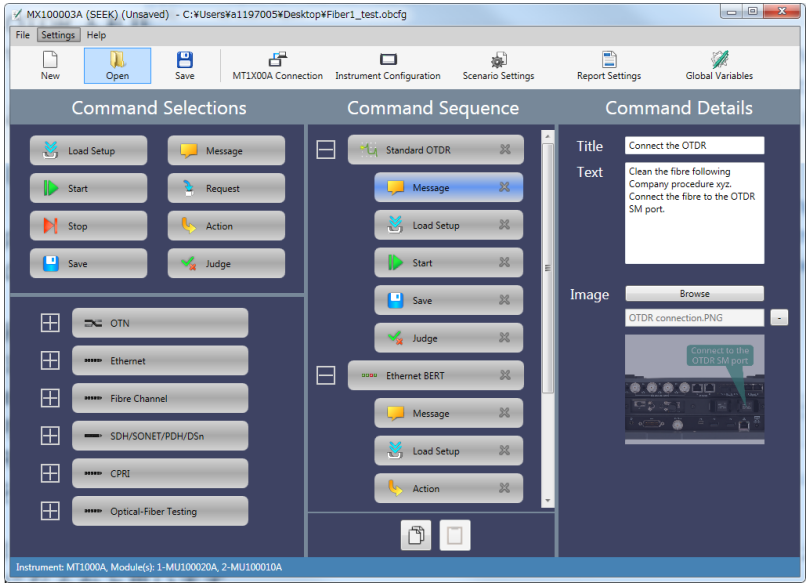
10. Others Applications One -button

Value of Offering Automatic Measurement Solutions

- Simplifies multiple testing work, shortens on-site test time, eliminates human operation errors.
- Supports simultaneous multiple tests.
- Download free editing software (MX100003A) to create scenarios without need for programing skills.



Automation Test select



SEEK (Scenario Edit Environment Kit)
MX100003A

APPENDIX

Specifications (MT1000A Mainframe 1/2)

MT1000A Mainframe Common Specifications	
Display	9-inch active TFT display (800x480 pixels) and touch screen
Supported Languages	User selectable (English, Japanese, Simplified Chinese, Russian, French, Spanish)
USB Data Interface	MT1000A operates as host: USB 2.0 type A (2 ports), MT1000A operates as device: USB 2.0 type Mini-B (1 port)
Ethernet Interface	Ethernet 10M/100M/1000M, Connector: RJ45
Audio Interface	For connection of optional head set, Connector: 3.5-mm diameter jack
AUX Connector	For connection of optional G0325A GPS receiver
Built-in Loudspeaker	Monitors speech of voice channel, Output level: user-controlled from user Interface
Ext. Clock Input	For connection of external clock signals: SETS (E1: 2.048 Mbps), BITS (DS1: 1.544 Mbps) or 2.048 MHz TTL signal in accordance with ITU-T G.703, 10 MHz, Connector: BNC

∗: Available for certified countries and regions including USA, Canada, Japan and all EU countries.
Please contact Anritsu for updated information.

Specifications (MT1000A Mainframe 2/2)

Back

Miscellaneous		
Dimensions and Mass	MT1000A+ MU100020A/21A/22A/23A	Dimensions: 257.6 (W) × 163 (H) × 84.3 (D) mm
		Mass: 2.7 kg including battery (G0310A)
	MT1000A+ MU100020A/21A/22A/23A +MU100010A	Dimensions: 257.6 (W) × 163 (H) × 102.2 (D) mm
		Mass: 3.5 kg including battery (G0310A)
	MU100020A/21A/22A/23A	Dimensions: 257.6 (W) × 163 (H) × 25 (D) mm (without rear panel)
		Mass: ≤0.8 kg
Mains Adapter	Input: 100 V (ac) to 240 V (ac), 50 Hz/60 Hz Output: 18 V (dc)	
Battery	10.8V rechargeable and replaceable intelligent Li-ion battery Operating time: 6.0 h (with MU100020A/21A), Telcordia GR-196-CORE Issue2, September 2010, 25°C	
Environmental Conditions	Operating Temperature : 0°C to +50°C, ≤85%RH (non-condensing) with MU100020A/21A/22A/23A Storage Temperature: -30°C to +60°C, ≤90%RH (non-condensing, without battery or AC adapter) with MU100020A/21A/22A/23A -20°C to +50°C, ≤90%RH (non-condensing, with battery and AC adapter) with MU100020A/21A/22A/23A	
EMC	EN61326-1, EN61000-3-2	
LVD	EN61010-1	

Specifications (OTDR Module 1/6)

Back

MU100020A/MU100021A/MU100022A/MU100023A OTDR Module Common Specifications(1/2)	
IOR Setting	1.300000 to 1.700000 (0.000001 steps)
Units	km, m, kft, ft, mi
Sampling Points	Up to 250,001
Sampling Resolution	0.02, 0.05, 0.1, 0.2, 0.5, 1, 2, 5, 10, 20, 40m
Loss measurement accuracy (linearity)	±0.05 dB/dB or ±0.1 dB (whichever is greater)
Reflectance Accuracy	Single mode: ±2 dB, Multi mode: ±4 dB
Distance Accuracy	±1 m ±3 × measurement distance × 10^{-5} ± marker resolution (excluding IOR uncertainty)
Distance Range (IOR=1.50000)	Single mode: 0.5, 1, 2.5, 5, 10, 25, 50, 100, 200, 300 km Multi mode: 0.5, 1, 2.5, 5, 10, 25, 50, 100 km
Fiber Type	Single Mode (SMF) 10/125 µm ITU-T G.652 Multi mode (MMF) 62.5/125 µm
Pulse width	Single mode: 3, 10, 20, 50, 100, 200, 500, 1000, 2000, 4000,10000, 20000 ns Multi mode (1300 nm): 3, 10, 20, 50, 100, 200, 500, 1000, 2000, 4000 nm Multi mode (850 nm): 3, 10, 20, 50, 100, 200, 500 nm
Realtime Sweep Time	≤0.2 sec. (Test Mode: Manual, Distance Range: 50 km, Resolution: Coarse)

Specifications (OTDR Module 2/6)

Back

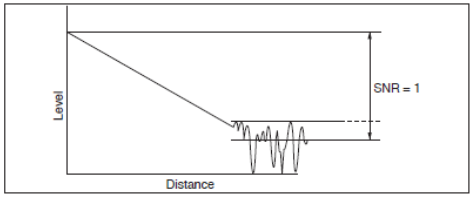
MU100020A/MU100021A/MU100022A/MU100023A OTDR Module Common Specifications(2/2)	
Testing Modes	OTDR application: Selectable automatic or manual set-up, Fiber Visualizer, Trace analysis, Light source, Power meter, Visual fault locator (Optional)
	FTTA application: Automatic set-up, Fiber Visualizer, Trace analysis, Light source, Power meter, Visual fault locator (Optional)
	Construction application: OTDR Measurement, Auto Save, Multi-core fiber measurements, Power meter
	OLTS application: Power meter and Light source, Loss Table
Fiber Event Analysis	Fiber condition setup: Patch-cord setup (Launch/Receive), Splitter Setup (Up to 128 branch)
	User defined Auto detect threshold: Event loss (Reflective and non-reflective), Reflectance, Fiber end, Macro bend detect On/OFF, Splitter detect: Up to 128 branch
	User defined PASS/FAIL thresholds: Non-reflective event loss (fusion), Reflective event loss (connector, mechanical), Reflectance, Fiber loss (dB/km), Total loss, ORL, Splitter loss (Up to 128 branch)
OTDR Trace Format	Telcordia universal. SOR, issue 2 (SR-4731)
Other Functions	Loss modes: Splice loss, 2-pt loss, 2-pt LSA, dB/km loss, dB/km LSA, ORL Averaging modes: Timed (5, 10, 15, 30sec, 1, 2, 3, 5, 10 min.) Live Fiber detect : Verifies presence of communication light in optical fiber Connection check: Automatic check of OTDR to FUT connection quality

Specifications (OTDR Module 3/6)

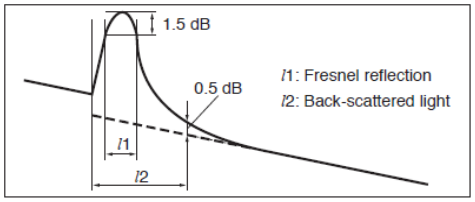
Back

MU100020A OTDR Module Common Specifications				
Options	Wavelength*1	Dynamic Range*2, *3	Deadzone (Fresnel)*4 (IOR=1.500000)	Deadzone (Backscatter)*5 (IOR=1.500000)
MU100020A-020	1310/1550 nm ±25 nm	39/37.5 dB *6	≤80 cm (typ.)	≤3.8/4.3 m
MU100020A-021		42/41 dB *6		
MU100020A-022		46/46 dB *6 25/25 dB*6 (PW:100 ns)		

∗1: 25°C, Pulse width: 1 µs (1310/1550 nm),
Except for when charging the battery.
∗2: Pulse widths: 20 µs (1310/1550 nm)
Distance range: 100 km (1310/1550 nm)
Averaging: 180 sec., SNR = 1, 25°C
Except for when charging the battery.
∗3: Dynamic range (one-way back-scattered light), SNR = 1: The level difference between the RMS noise level and the level where near end back-scattering occurs.



∗4: Pulse width: 3 ns,
Return loss: 40 dB, 25˚C (Refer to the figure below)
Except for when charging the battery.
∗5: Pulse width 10 ns, return loss 55 dB,
Deviation ±0.5 dB, 25°C ±5°C



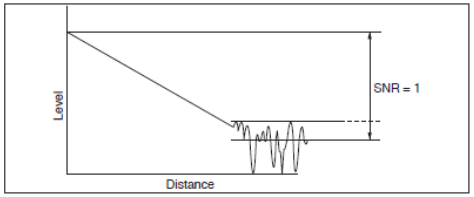
∗6: Typical. Subtract 1 dB for guarantee

Specifications (OTDR Module 4/6)

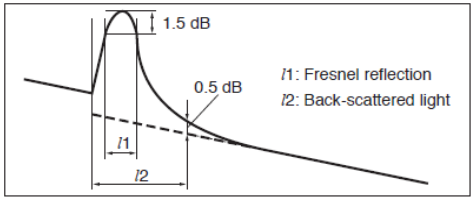
Back

MU100021A OTDR Module Common Specifications				
Options	Wavelength*1	Dynamic Range*2, *3	Deadzone (Fresnel)*4 (IOR=1.500000)	Deadzone (Backscatter)*5 (IOR=1.500000)
MU100021A-021	1310/1550 nm ±25 nm, 850/1300 nm ±30 nm	42/41 dB *6 29/28 dB *6,7	≤80 cm (typ.)	≤3.8/4.3 m ≤4/5 m

∗1: 25°C, Pulse width: 1 µs (1310/1550 nm),
100 ns (850 nm/1300 nm)
Except for when charging the battery.
∗2: Pulse widths: 20 µs (1310/1550 nm)
500 ns/4 µs (850/1300 nm)
Distance range: 100 km (1310/1550 nm)
25 km (850/1300 nm)
Averaging: 180 sec., SNR = 1, 25°C
Except for when charging the battery.
∗3: Dynamic range (one-way back-scattered light), SNR = 1:
The level difference between the RMS noise level and the level where near end back-scattering occurs.



∗4: Pulse width: 3 ns,
Return loss: 40 dB, 25°C (Refer to the figure below)
Except for when charging the battery.
∗5: Pulse width 10 ns, return loss 55 dB,
Deviation ±0.5 dB, 25°C ±5°C



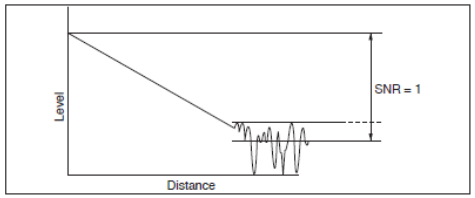
∗6: Typical. Subtract 1 dB for guarantee
∗7: At measurement of 50 µm/125 µm MM Fiber, the dynamic range drops by about 3.0 dB

Specifications (OTDR Module 5/6)

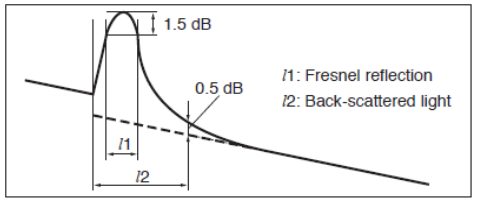
Back

MU100022A OTDR Module Common Specifications				
Options	Wavelength*1	Dynamic Range*2, *3	Deadzone (Fresnel)*4 (IOR=1.500000)	Deadzone (Backscatter)*5 (IOR=1.500000)
MU100022A-022	1310/1550/1625 nm ±25 nm	46/46/44 dB *6 25/25/23dB*6 (PW:100 ns)	≤80 cm (typ.)	≤3.8/4.3/4.8 m

∗1: 25°C, Pulse width: 1 µs (1310/1550/1625 nm),
Except for when charging the battery.
∗2: Pulse widths: 20 µs (1310/1550/1625 nm)
Distance range: 100 km (1310/1550/1625 nm)
Averaging: 180 sec., SNR = 1, 25°C
Except for when charging the battery.
∗3: Dynamic range (one-way back-scattered light),
SNR = 1: The level difference between the RMS noise level and the level where near end back-scattering occurs.



∗4: Pulse width: 3 ns,
Return loss: 40 dB, 25°C (Refer to the figure below)
Except for when charging the battery.
∗5: Pulse width 10 ns, return loss 55 dB,
Deviation ±0.5 dB, 25°C ±5°C



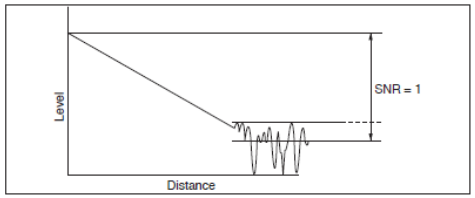
∗6: Typical. Subtract 1 dB for guarantee

Specifications (OTDR Module 6/6)

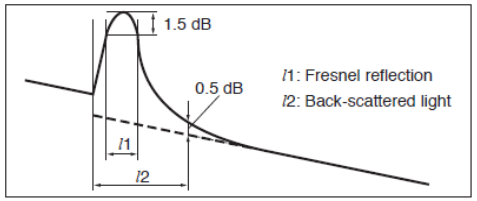
Back

MU100023A OTDR Module Common Specifications				
Options	Wavelength*1	Dynamic Range*2, *3, *7	Deadzone (Fresnel)*4 (IOR=1.500000)	Deadzone (Backscatter)*5 (IOR=1.500000)
MU100023A-021	1310/1550 nm ±25 nm, 1645 to 1655 nm	41/41/35 dB *6	≤80 cm (typ.)	≤5.0/5.5/6.5 m

∗1: 25°C, Pulse width: 1 µs (1310/1550/1650 nm),
Except for when charging the battery.
∗2: Pulse widths: 20 µs (1310/1550/1650 nm)
Distance range: 100 km (1310/1550/1650 nm)
Averaging: 180 sec., SNR = 1, 25°C
Except for when charging the battery.
∗3: Dynamic range (one-way back-scattered light),
SNR = 1: The level difference between the RMS noise level and the level where near end back-scattering occurs.



∗4: Pulse width: 3 ns,
Return loss: 40 dB, 25°C (Refer to the figure below)
Except for when charging the battery.
∗5: Pulse width 10 ns, return loss 55 dB,
Deviation ±0.5 dB, 25°C ±5°C



∗6: Typical. Subtract 1 dB for guarantee
∗7: At 1650 nm: With background light, 1310/1550 nm,
-19 dBm CW light

Specifications (Light Source)

- Light Source Specifications – Standard on all models

Stabilized Light Source (through OTDR port)				
Items	MU100020A	MU100021A	MU100022A	MU100023A
Wavelength*1	1310/1550 nm ±30 nm	1310/1550 nm ±30 nm, 850/1300 nm ±30 nm	1310/1550/1625 nm ±30 nm	1310/1550 nm ±30 nm, 1650 nm ±5 nm
Spectral Width*1	≤5 nm (1310 nm), ≤10 nm (850/1300/1550/1625 nm), ≤3 nm (1650 nm)			
Fiber Type	Single Mode (SMF) 10/125 µm ITU-T G.652	Single Mode (SMF) 10/125 µm ITU-T G.652, GI Fiber 62.5/125 µm	Single Mode (SMF) 10/125 µm ITU-T G.652	Single Mode (SMF) 10/125 µm ITU-T G.652
Optical Connector	Same as OTDR			
Output Power*1	–5 ±1.5 dBm			
Output Stability*2	≤0.1 dB (1310/1550/1625/1650 nm)			
Modes of Operation	CW, 270 Hz, 1 kHz, 2 kHz			
Warm up time	10 min.			
Laser Safety	Same as OTDR			

∗1: CW, 25°C
∗2: CW, -10°C to 50°C (±1˚C) difference between max/min. values over 1 minute, SM fiber 2 m, when an optical power meter with 40 dB or greater return loss is used (SM), after warming up.

Specifications (Power Meter)

Back

- Standard Power Meter (Dedicated port)

Standard Power Meter (Dedicated port)	
Standard Power Meter (Dedicated port)	Single Mode (SMF) 10/125 µm ITU-T G.652, GI Fiber 62.5/125 µm
Wavelength Range	800 to 1700 nm
Setting Wavelengths	1310, 1490, 1550, 1625, 1650, 850, 1300 nm
Measurement Range	-67 to +6 dBm (CW, 1550 nm, -60 to +3 dBm@850 nm) -70 to +3 dBm (Modulation, 1550 nm, -63 to 0 dBm@850 nm)
Optical Connector	2.5 mm/1.25 mm Universal
Accuracy*3	±5% (-10 dBm, 1310/1550 nm, CW, 25°C, Using Master FC fiber and 2.5 mm universal connector) ±10% (-10 dBm, 850 nm, CW, 25°C, Using Master FC fiber and 2.5 mm universal connector)
Modes of Operation	CW, 270 Hz, 1 kHz, 2 kHz

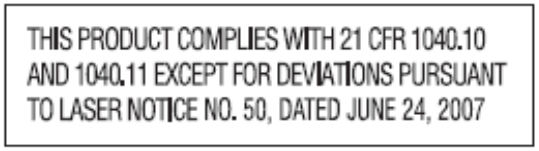
*3: After zero offset

Specifications (Visible Light Source)

- Visible Light Source (Option 002)

Visible Light Source (Option 002)	
Central Wavelength	650 nm±15 nm (at 25°C)
Optical Output	0 ±3 dBm (CW, 25°C)
Output Optical Fiber	10 µm/125 µm, SMF (ITU-T G.652)
Optical Connector	2.5 mm universal
Output Function	OFF, CW, Blink
Laser Safety *4	IEC 60825-1: 2007 CLASS 3R 21CFR1040.10 and 1040.11 Excludes deviations caused by conformance to Laser Notice No.50 dated June 24, 2007

*4: Safety measures for laser products
This option complies with optical safety standards in IEC 60825-1, 21CFR1040.10 and 1040.11; the following descriptive labels are affixed to the product



Anritsu

envision : ensure

公知 2020-5 MJM No. MT1000A_OTDR-E-L-1-(8.00)