M-210 OTDR TRAINING

NOYES
Test & Inspection

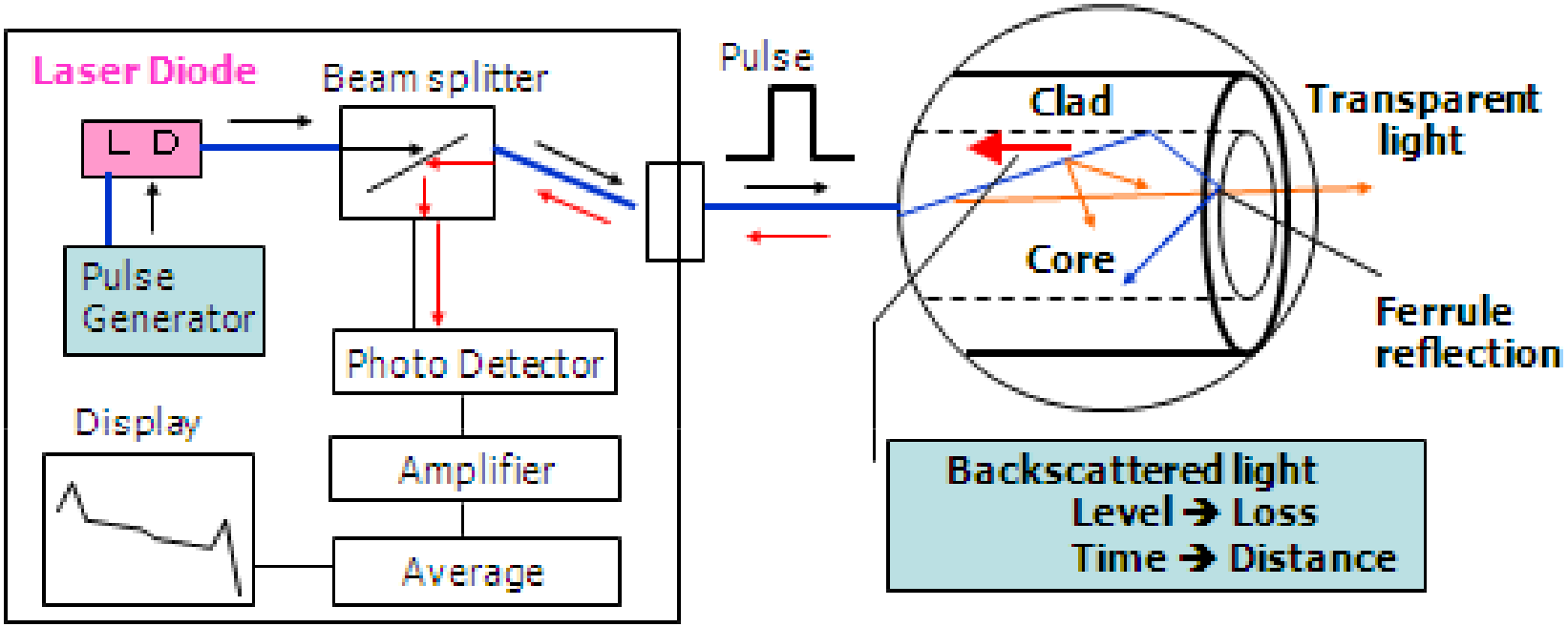
AFL Telecommunications
A Fujikura Business

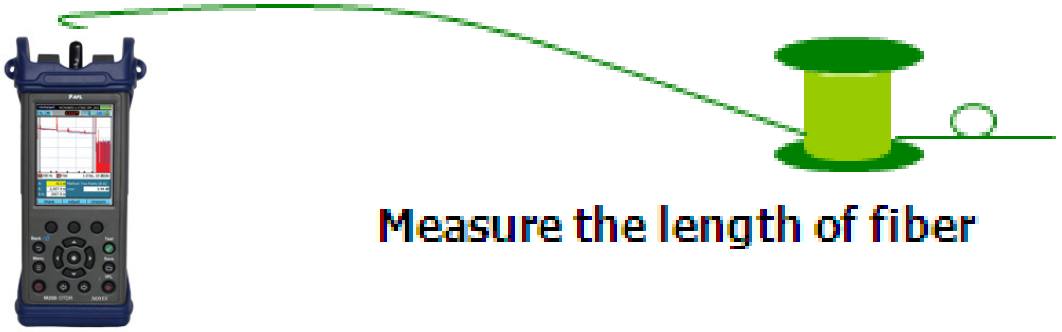
Measurement items

Distance	**: Fiber Length, connection (reflective & non-reflective), fiber break**
Loss	**: Transmission loss, connection loss**
Return loss	**: Connectors, end of fibers**

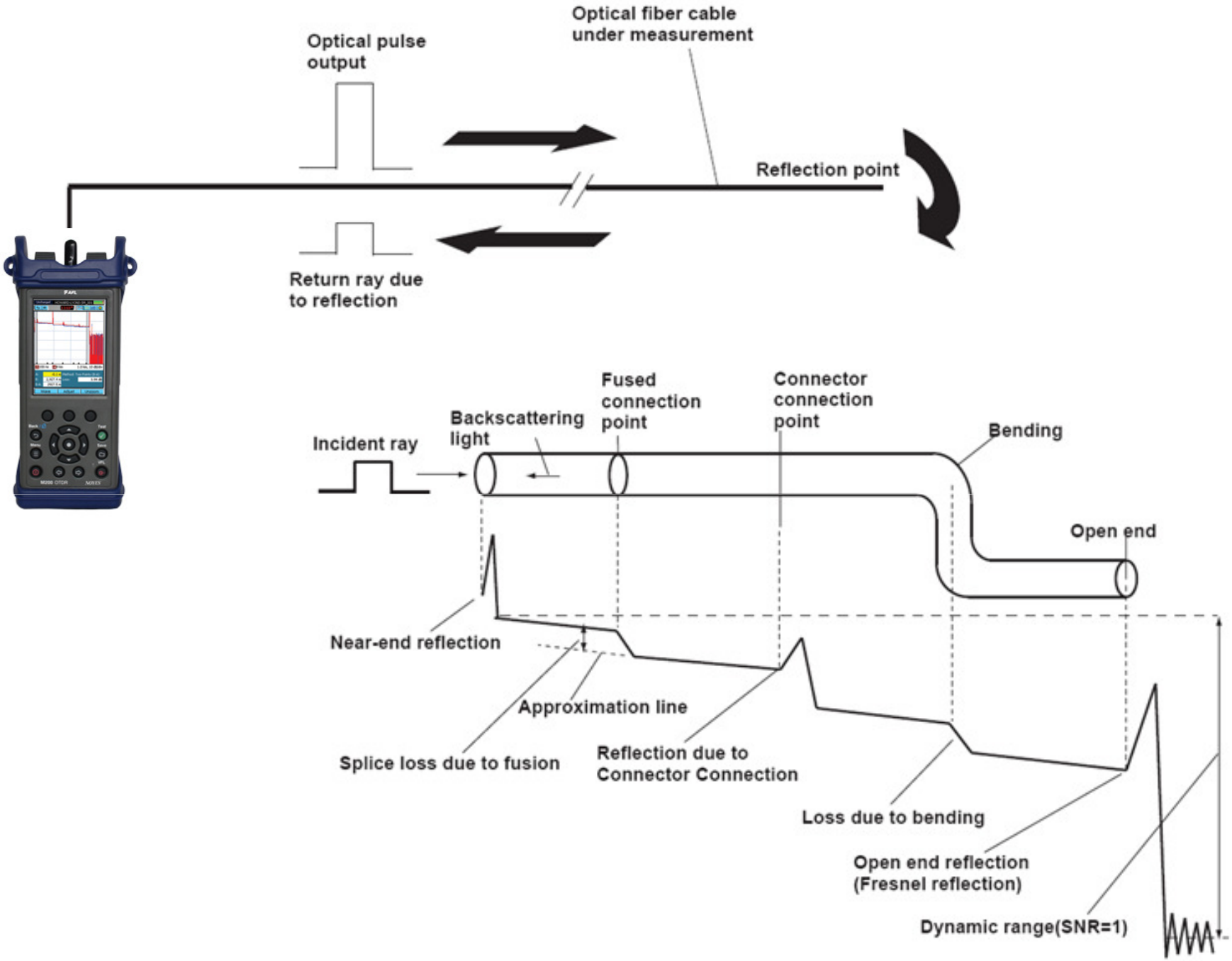
OPTICAL TIME DOMAIN REFLECTOMETER

Measurement Principle



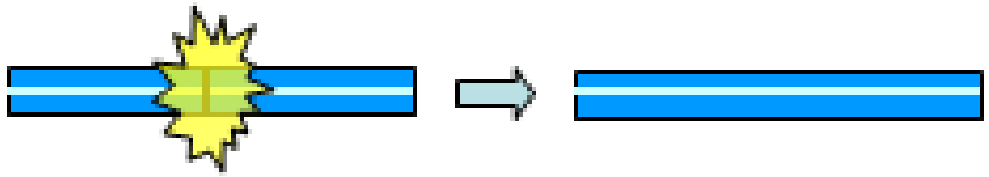


Measure the length of fiber

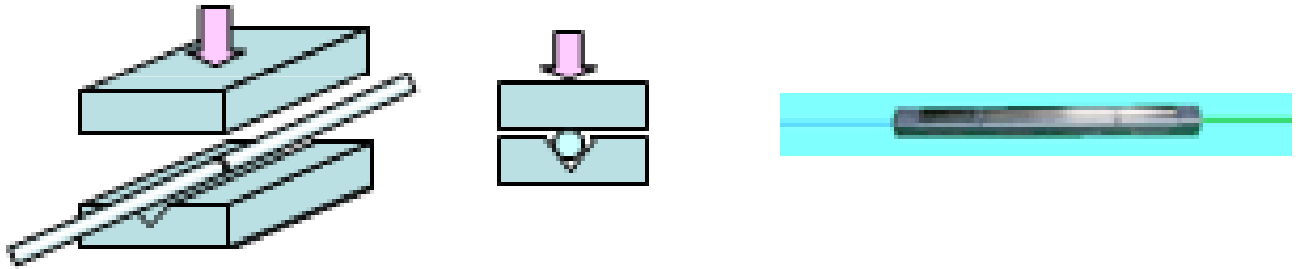

Optical pulse output
Optical fiber cable under measurement
Reflection point
Return ray due to reflection
Incident ray
Backscattering light
Fused connection point
Connector connection point
Bending
Open end
Near-end reflection
Approximation line
Splice loss due to fusion
Reflection due to Connector Connection
Loss due to bending
Open end reflection (Fresnel reflection)
Dynamic range(SNR=1)

Connection Method

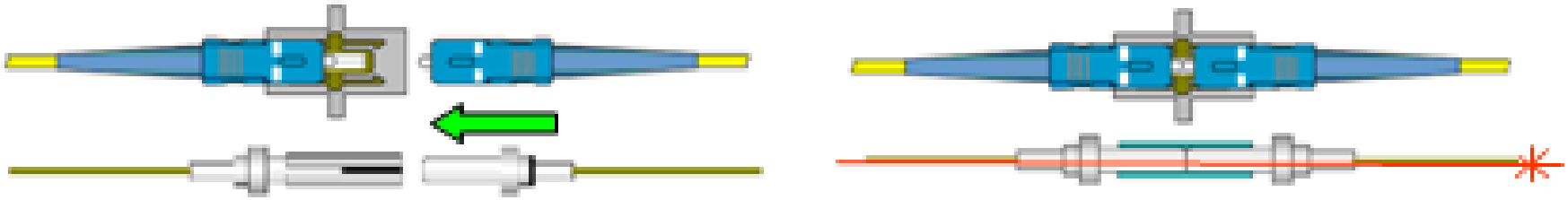
- **Fusion splice**
  Fusing the tips of fibers to connect one another



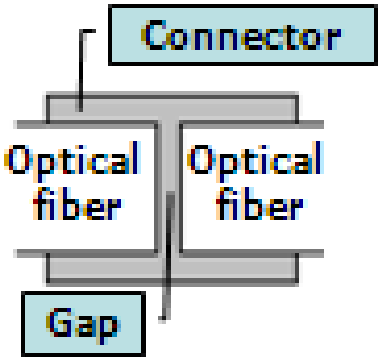
- **Mechanical splice**
  Physically connecting the fibers using "V-groove" device



- **Connector**
  Physically connecting the fibers using adapter

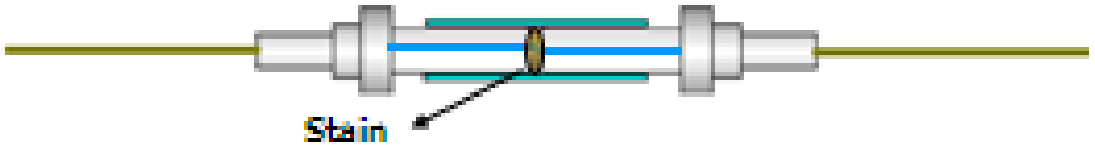


Cause of Reflective Losses

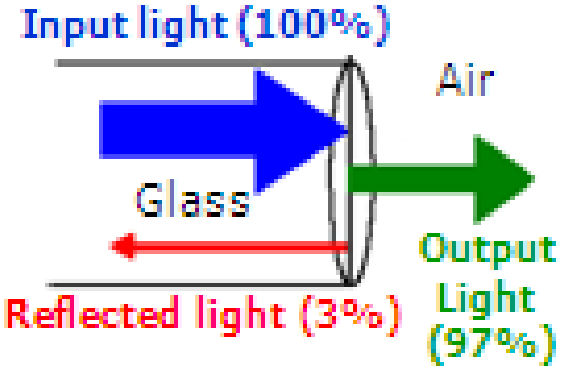


- **Connector point**
  Caused by a small gap between ferrules joined by a connector.
  Refractive index varies at this gap which makes a reflection.
  ※ Normal connector loss is less than 0.5dB

- **Connector point**
  Caused by stains on the tips of ferrules which disturbs the alignment of the cores of fibers. Stains increase losses and reflections
  ※ Normal connector loss is less than 0.5dB

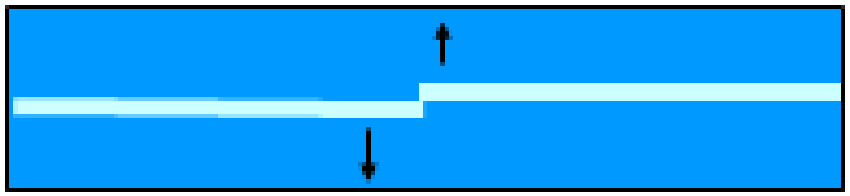


- **Open End**
  A Fresnel reflection occurs at breakage point or edge of optical fiber where refractive index changes. There is approximate 3% (-14.7dB) of reflection when optical fiber is cut in perpendicular to the fiber.

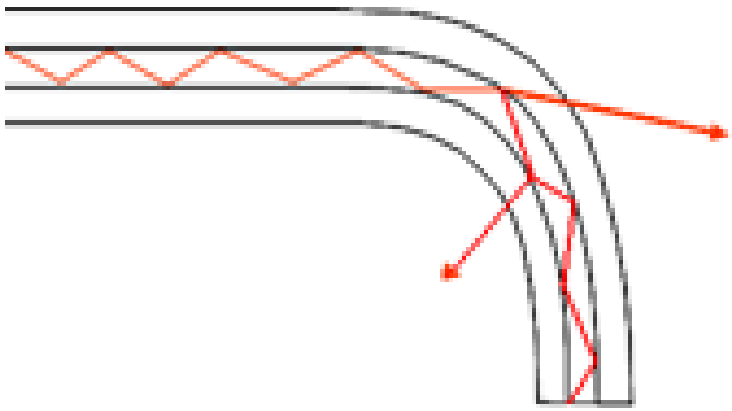


Cause of Non-Reflective Losses

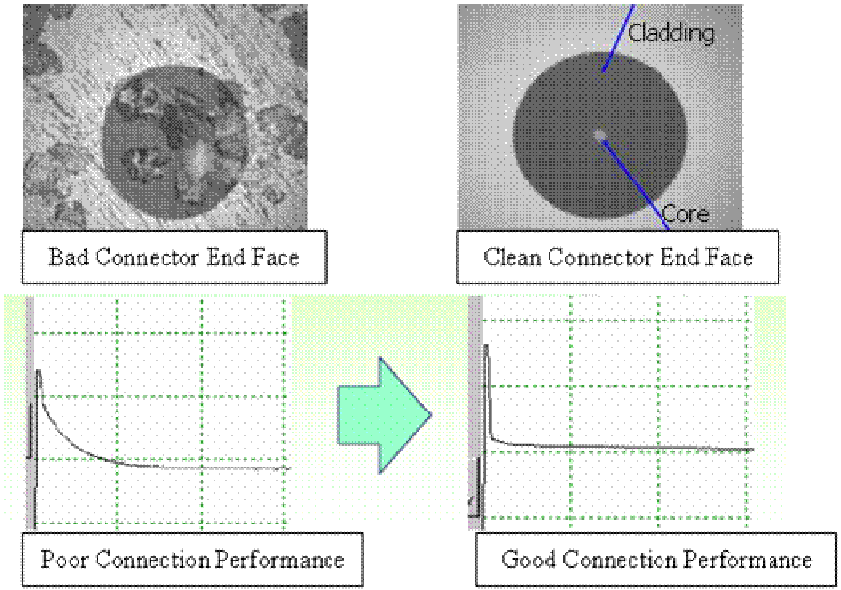
- **Fusion Splice point**
  Caused by misalignment of cores when fused each other.
  ※ Normal fusion splice loss is less than 0.1dB



- **Macro bend**
  Caused by transmitting light leaks from optical fiber when the fiber is bended sharply.

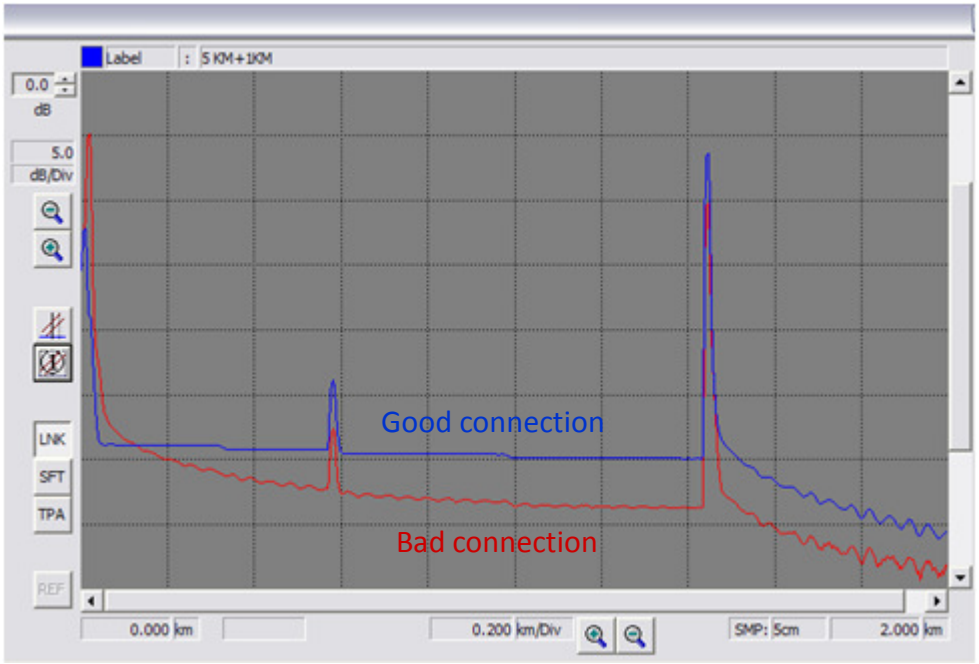


Good vs. Bad Connector End Face



Near end performance

Overall Trace performance



Wavelengths

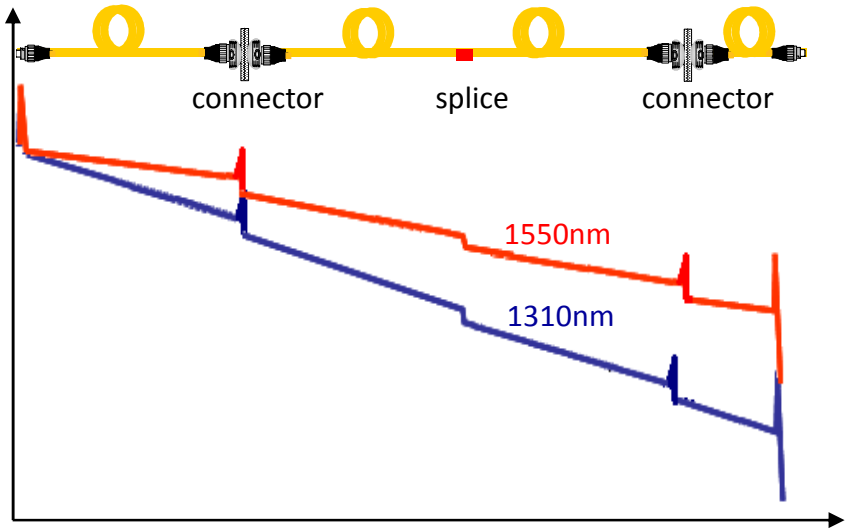
Select the measurement wavelength based on the wavelength(s) used for the designated fiber.

Transmission & Connector Loss

1310nm: 0.3dB/km (typical)

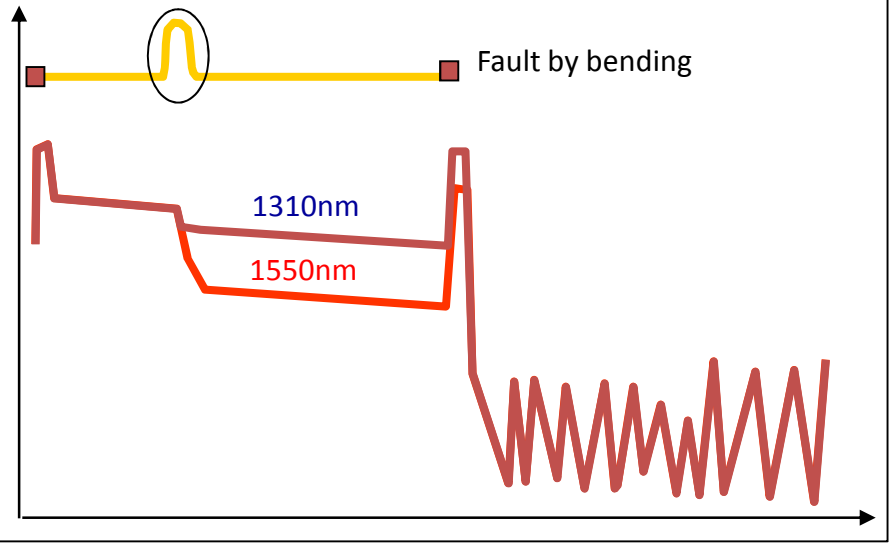
1550nm: 0.2dB/km (typical)

Longer wavelength has smaller transmission & connector loss



Bending loss

Longer wavelength gives higher bending loss



M-200 OTDR TRAINING

NOYES
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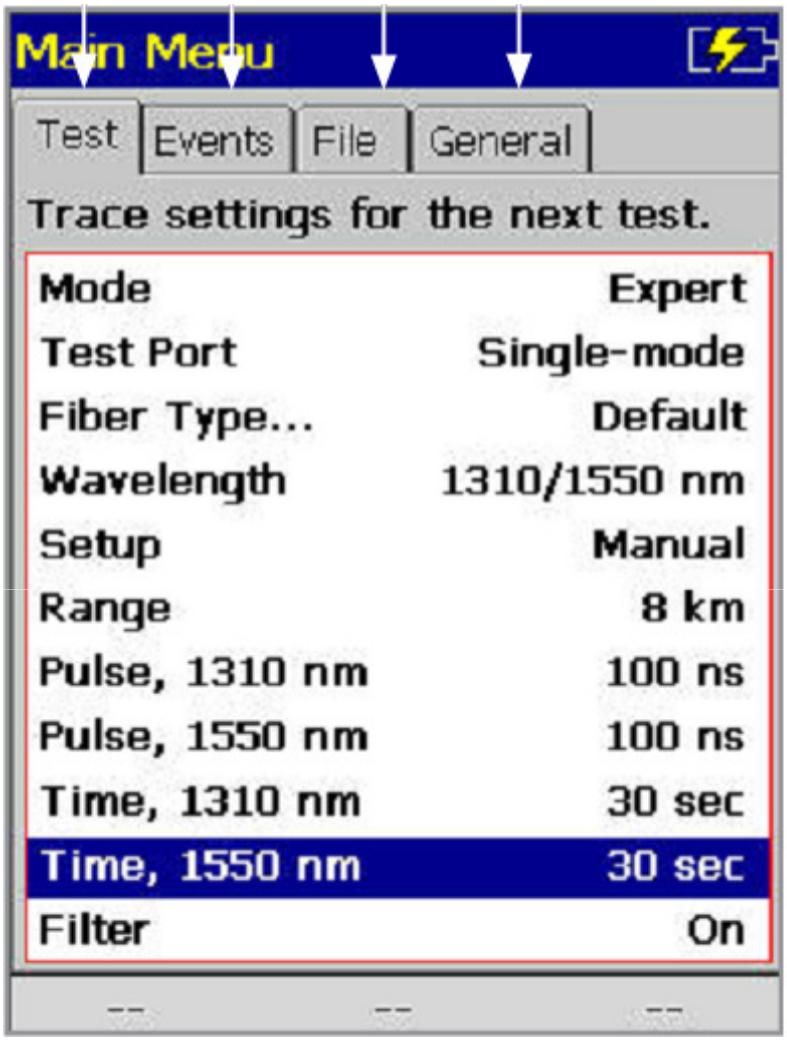
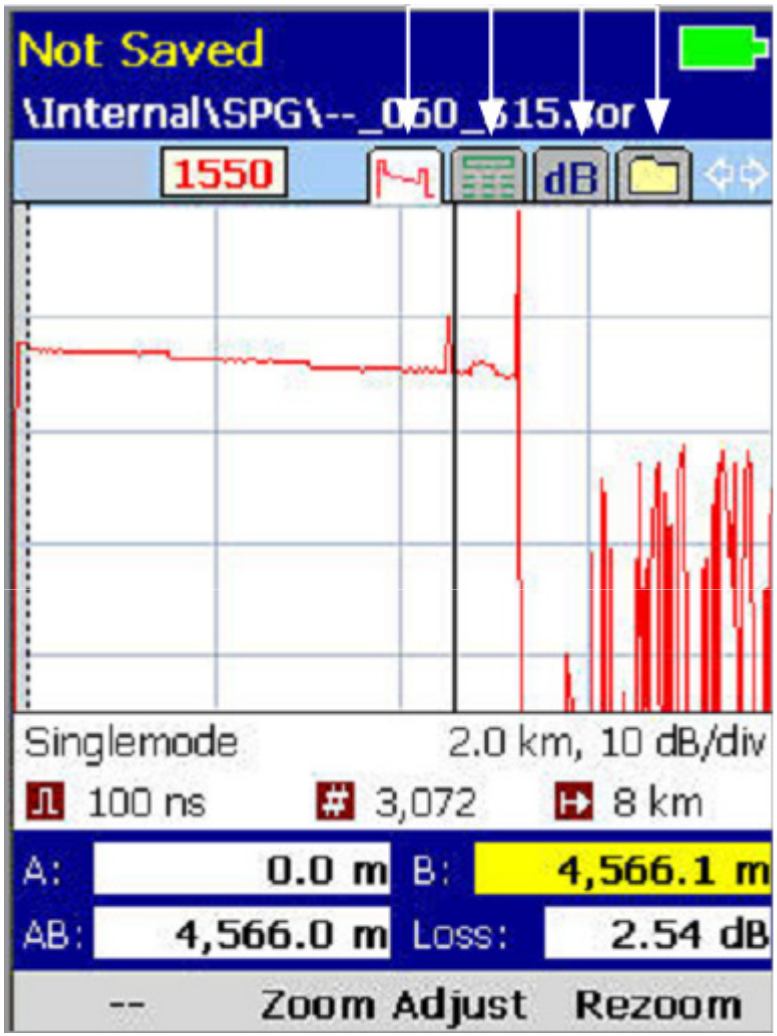
Key Symbol	Key Name	Key Function
	Power	Press and hold (approx. 1 sec.) to turn the M200 on or off.
	VFL laser	**ON 2Hz** - Press and hold (approx. 2 sec.) LED will flash **ON CW** - Press and hold (approx. 4 sec.) LED will be solid **OFF** - Press and hold (approx. 1 sec.) LED should be OFF
	Menu	Press to access the Main Menu.
	Left and Right Tab keys	Press to display the next/previous available Menu Tab or View Tab.
	Arrow keys (Navigation Keys)	The arrow keys provide several functions as follows: • In the Main Menu, these keys are used to navigate menus and change setup parameters. • In the Trace Page, the Left and Right arrow keys are used to move cursors. • In the Zoom Adjust Page, these keys are used to change horizontal and vertical zoom levels.

	Select	This key provides several functions as follows: • In the Main Menu, press this key to display a submenu (if available). • In the Trace Page, press this key to toggle between [A] and [B] cursor.
	Back	Press once to return to the previous menu. Press one or more times, depending on which menu or editor submenu is displayed, to return to the Home page.
	Test	Press to start or stop a test.
	Save	Press to save the currently displayed test results.
	Soft keys	The label shown on the display above each key indicates the current use of each function key.

Main Menu tabs



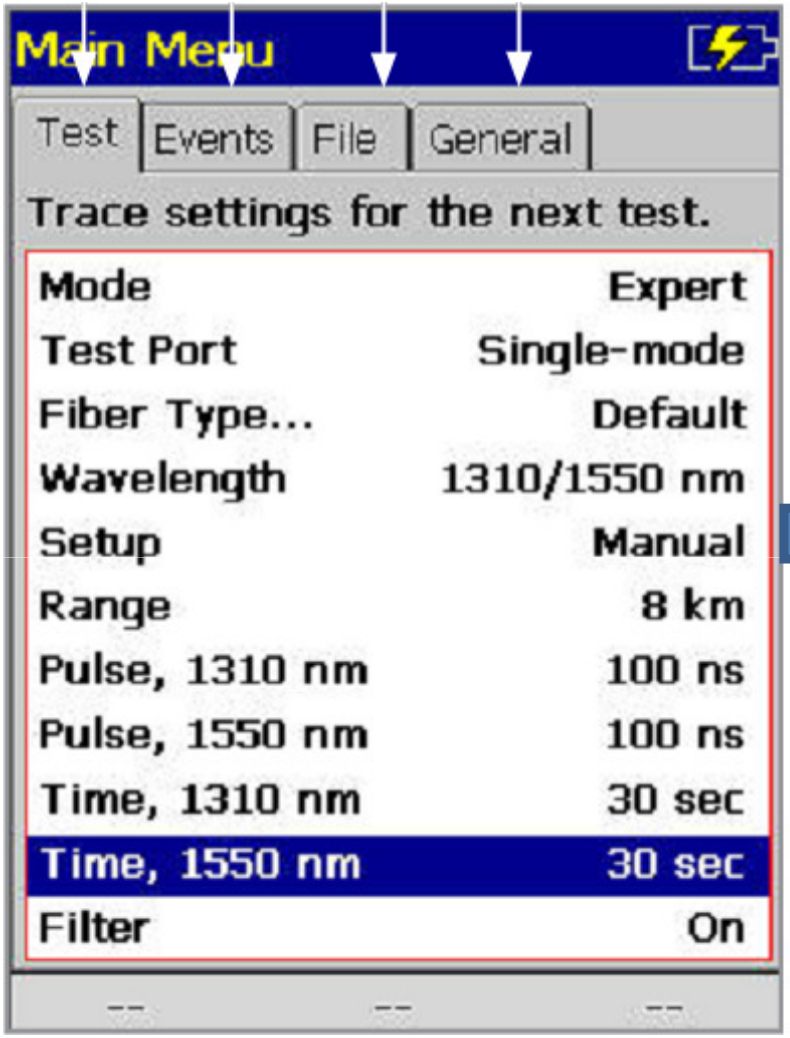
Test Viewer tabs



Mode : Expert ,Full Auto ,Live

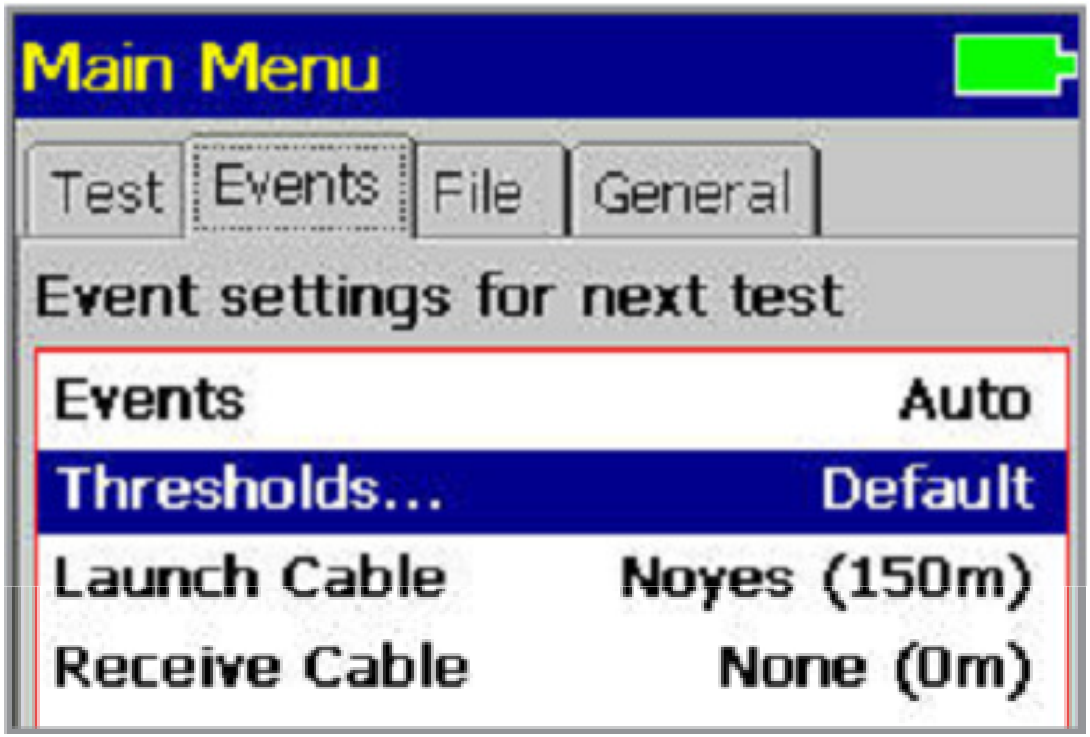
: Full Auto , Live test always an Even Table and Summary Page

Main Menu tabs

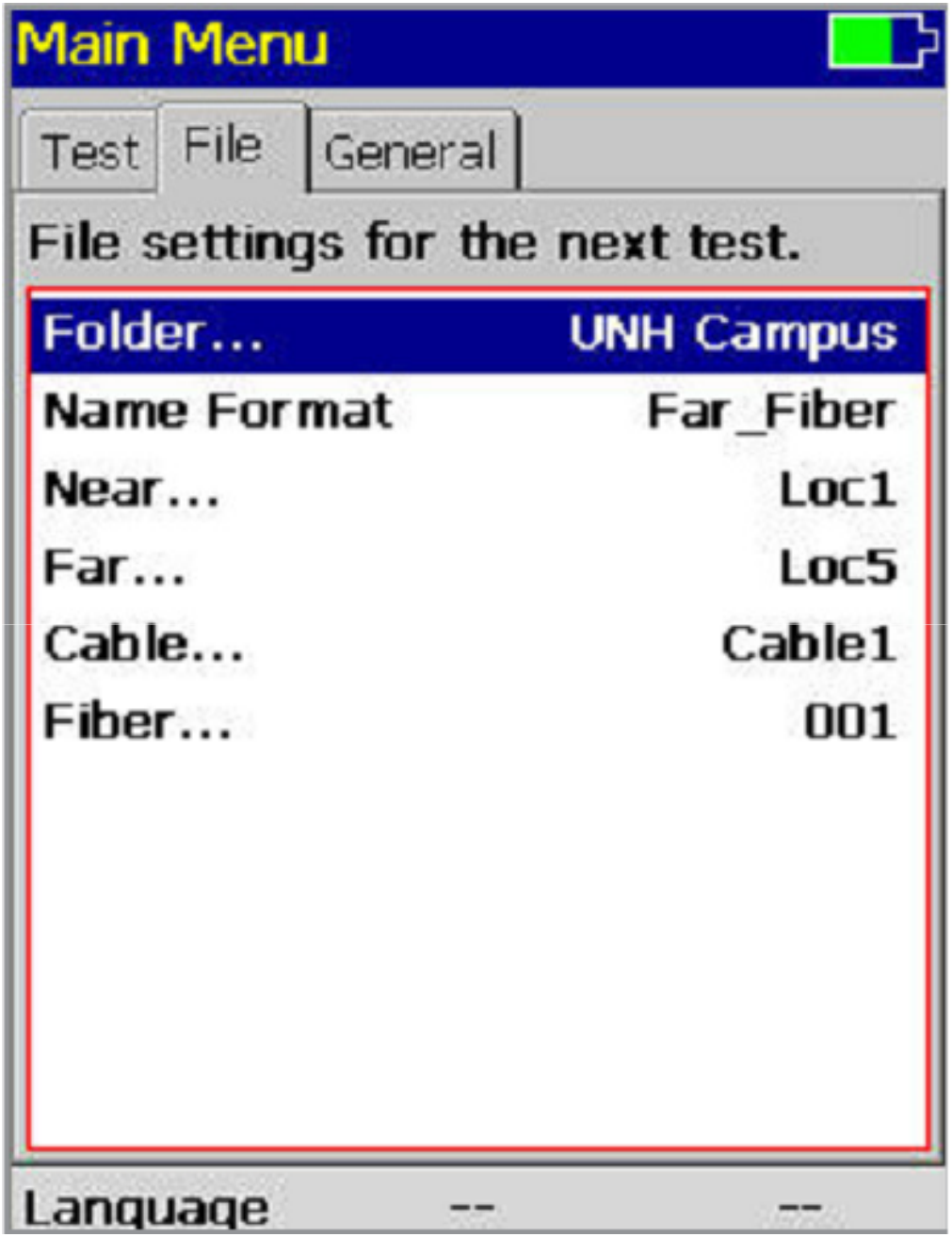


Setup Test

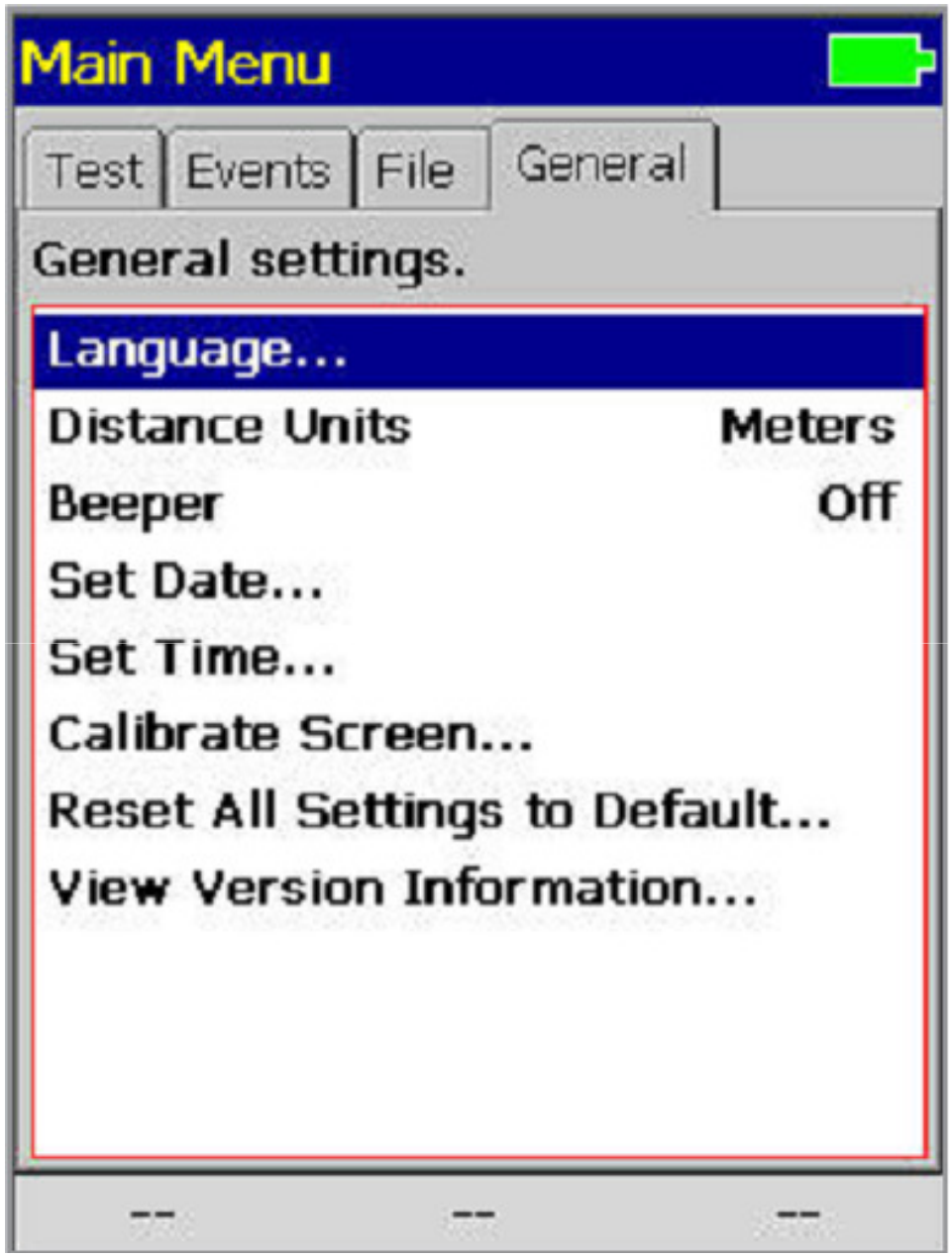
Setup Events



Threshold	Min Value	Default Value	Max Value
Event Loss	0.05 dB	0.20 dB	1.0 dB
Event Reflection	-65.0 dB	-65.0dB	-45.0 dB
Event End	1.0 dB	6.0dB	6.0 dB

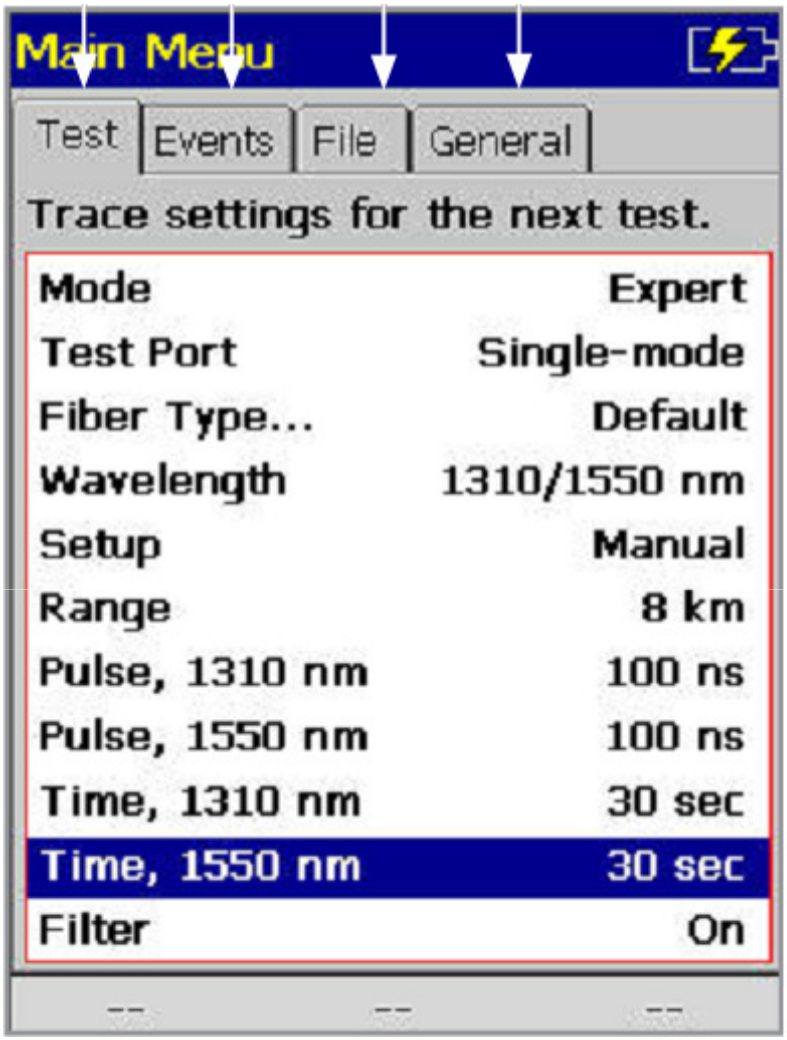

Main Menu
Test
File
General
File settings for the next test.
Folder... UNH Campus
Name Format Far_Fiber
Near... Loc1
Far... Loc5
Cable... Cable1
Fiber... 001
Language -- --

Setup File

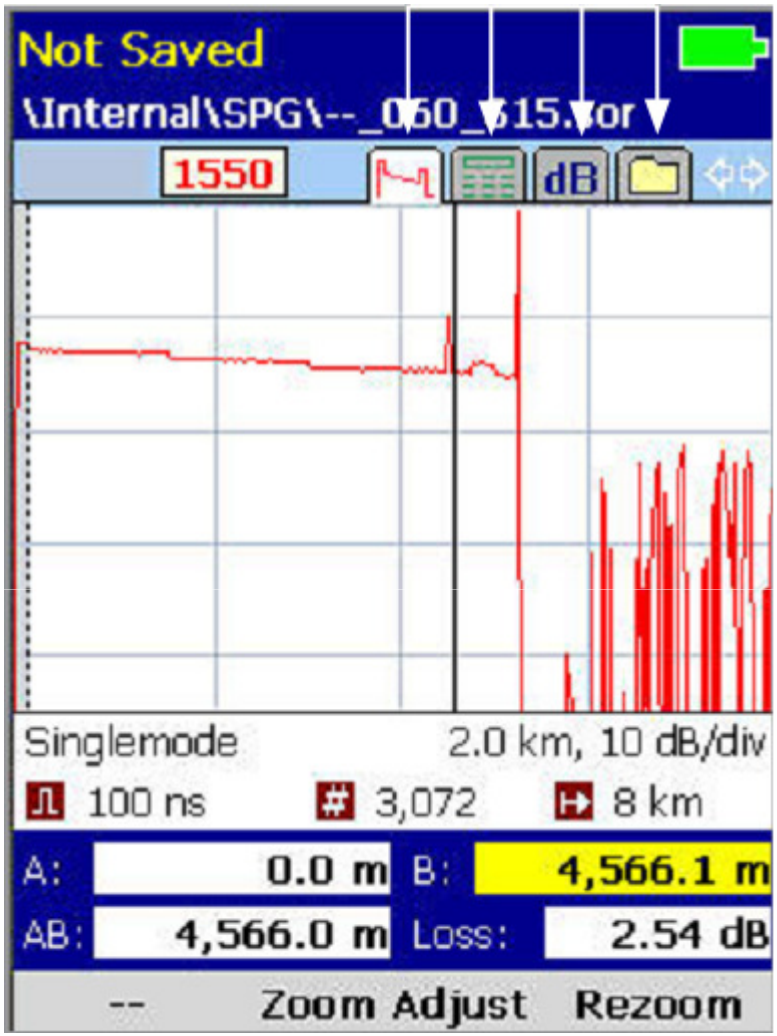


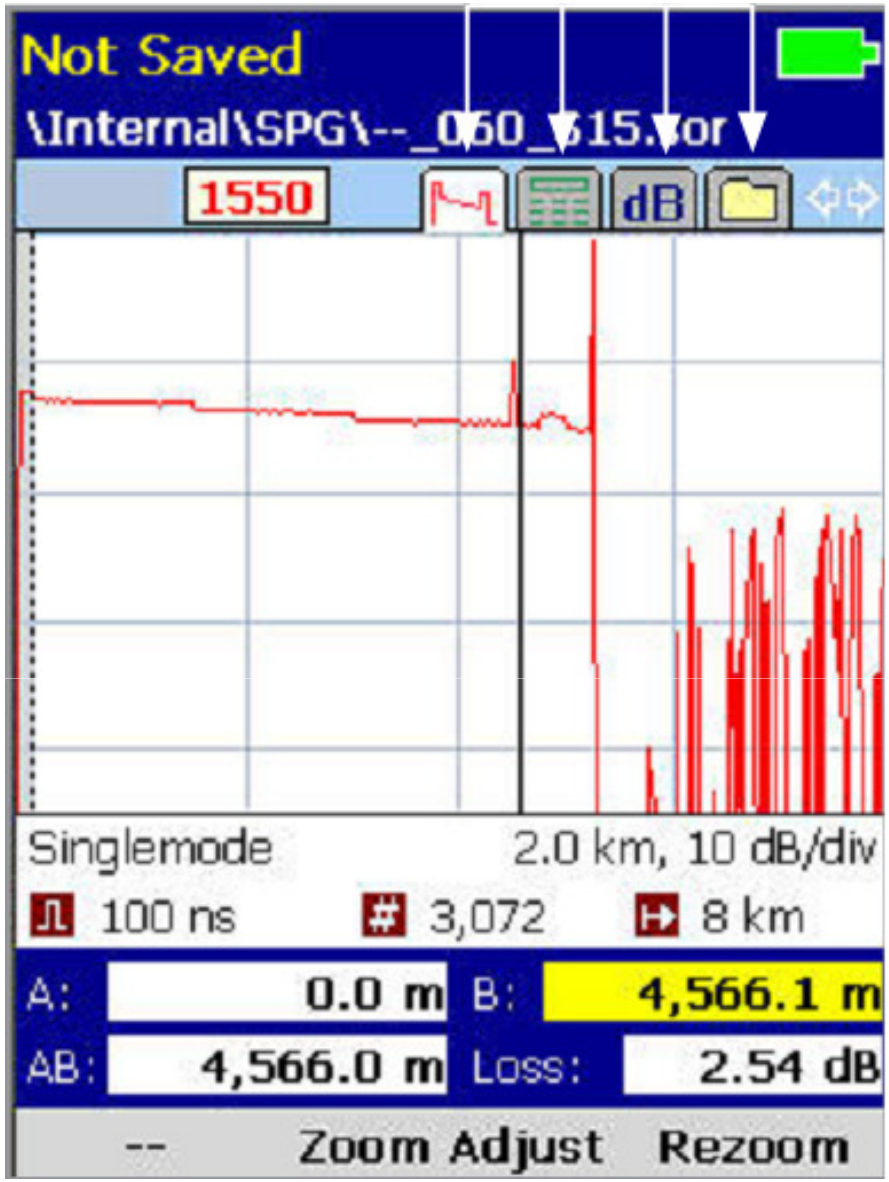
Setup General

Main Menu tabs



Test Viewer tabs





Trace Page

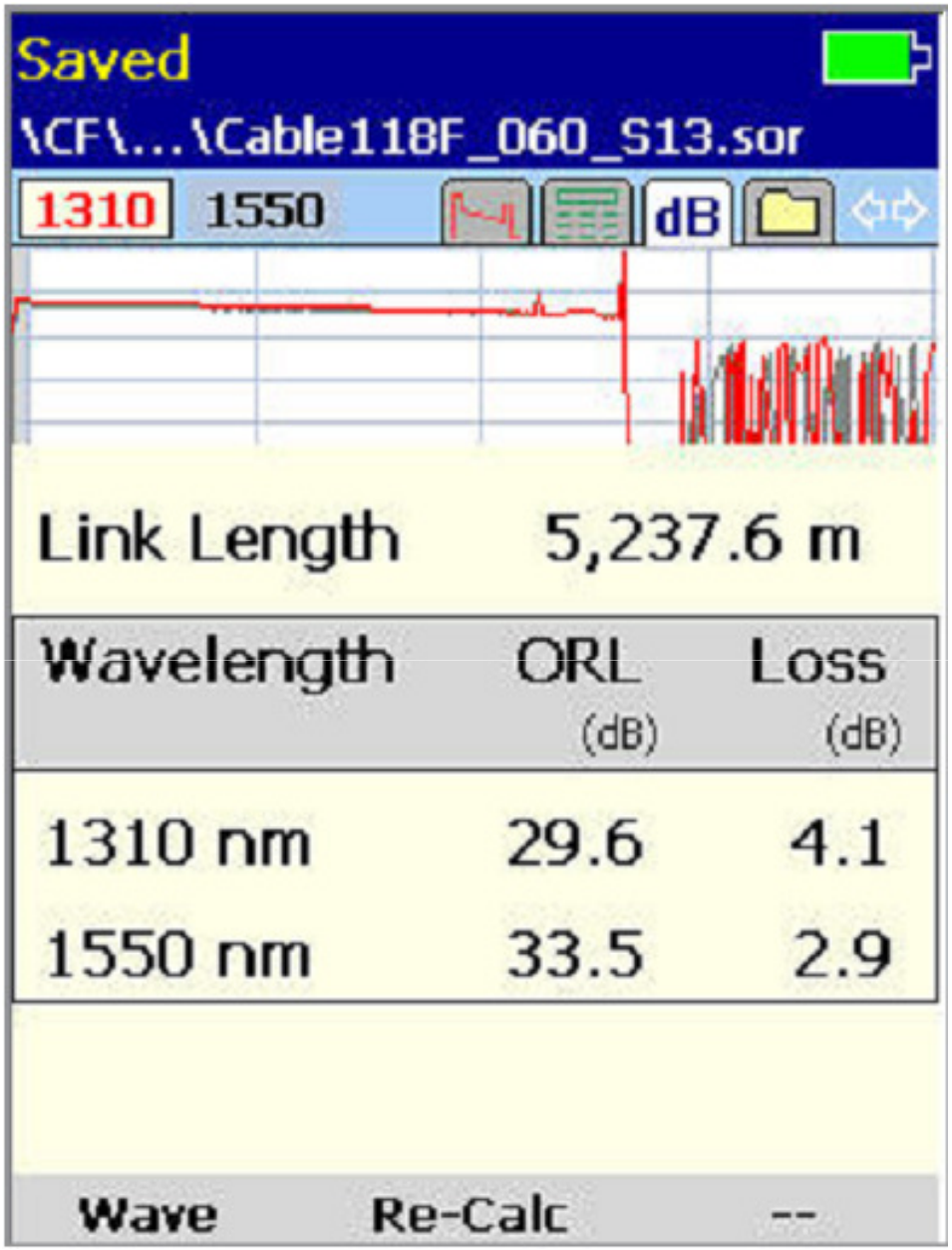
Displays OTDR trace, Setup A/B Cursors, Loss and Distance Between A&B cursors

 # Data Points up to 16,000 SM,MM

Event Icon	Event Type
	Start of Fiber Under Test
	End of Fiber Under Test
	Reflective Event
	Non-Reflective Event
	Gainer
	Multiple Event

Event page

Event location, Event type, reflectance, loss



Summary Page

Displays OTDR trace, Link Length, ORL and insertion loss

File information Page

Displays file and fiber Parameters of the currently displayed trace

Thank You !