F7 Optical Time Domain Reflectometer

Quick User Guide

Statement

(1) This instruction manual is the internal instruction manual of the TFN Optical Time Domain Reflectometer instrument, which is used to guide the operation and use of the instrument. The version number is V1.0.

(2) The illustrations in this manual are for reference only, and the instrument interfaces of different product series may be different.

(3) The (options) in this manual require the purchase of corresponding accessories and the software function module authorization before they can be used.

(4) The OTDR function, light source function, and red light function of the instrument will emit laser light that is harmful to human eyes. Do not look directly at the light output port while working.

Catalogue

Product Description

1. Product introduction

This product is a new generation of 8-inch capacitive touch screen comprehensive tester. It has rich functions, sturdy and durable structure, and beautiful and novel appearance. It adopts excellent intelligent hardware and software design and is used to measure parameters such as the length, loss and connection quality of optical fibers and optical cables. It integrates rich Ethernet test functions and provides convenient test methods for Ethernet fault diagnosis. The main components of the product are: Part of it is shown below.
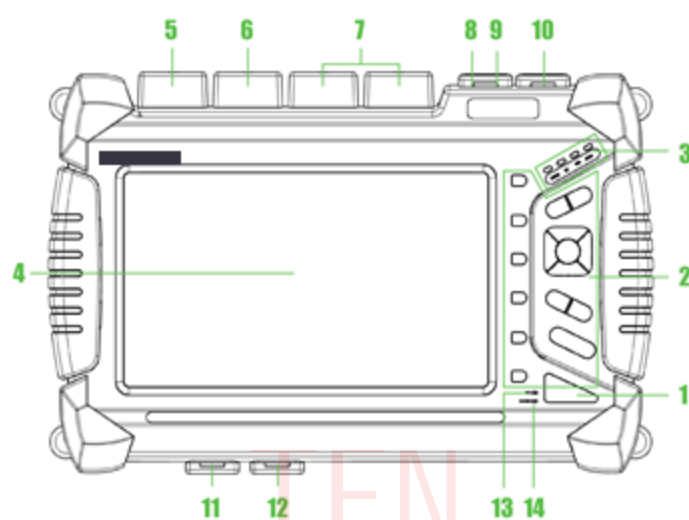
Serial Number	Content	Remarks
1	Power on/off button	
2	Function area buttons	OTDR test and direction buttons
3	Status indicator area	
4	LCD screen 1024 × 600	
5	VFL	Visual Fault Locator
6	OPM	Optical power meter
7	OTDR interface	Multiplexed as light source interface
8	USB-A	U disk interface
9	Type-C USB	Charging/data transfer
10	DC charging port	DC 12V~19V
11	LAN1	Line sequence and line length test
12	LAN2	Ethernet communication
13	Power indicator light	Lights up when powering on
14	Charge and discharge indicator light	Indicates battery status

2. Main Functional Features of The Product

(1) OTDR function: Supports functions such as transmitting fiber and receiving fiber settings, Pass/Fail threshold determination, and test report generation.

(2) Event map function: intelligent link test (multi-pulse width test) and visual event list.

(3) Light source function: generate CW, 270Hz, 1kHz, 2kHz laser light sources.

(4) Optical power meter function: multi-wavelength power detection range of -70dBm~+6dBm or -50dBm~+26dBm, supporting the identification of light source modulation frequency.

(5) Red light function (VFL): Continuous, 1Hz, 2Hz visible red light to visually locate fiber faults.

(6) Optical loss test function: supports the light source and optical power meter to be turned on at the same time to test the insertion loss of devices and links.

(7) End face detection function: visual fiber end face diagnosis.

(8) Ethernet test function: The network test function includes PING, PPPOE, and IP scanning; the link test function includes link speed measurement, line sequence, and line length.

(9) Remote test function: Remotely connect the instrument through Ethernet to realize remote control of the OTDR function.

3. Other Features

● Mobile APP wireless operation

The mobile APP connects to the instrument through wireless interfaces such as Bluetooth to achieve basic control testing and file acquisition.

● User-defined power-on password

Flexible power-on password settings ensure instrument management and test data security.

● Quick screenshot

The convenient drop-down window provides a quick screenshot function to record the status of the instrument at any time.

● Quick and convenient help

The quick drop-down window provides customized help services to ensure worry-free operation of this instrument.

● Large capacity battery, long battery life

Built-in 15,600mAh rechargeable lithium-ion battery, with long battery life and worry-free outdoor testing.

Note: Typical battery life is about 12 hours (OTDR function is refreshed in real time, backlight brightness is 50%).

● One-click automatic testing

Excellent automatic testing function provides you with convenient one-click automatic testing.

4. Switching On And Off And Charging And Discharging Operations

## 4.1 Turn on and off the machine

4.1.1 Power-on operation: In the power-off state, press the power button for >2s and the battery power is >3%. When the instrument is powered on, the power-on indicator light will light up.

4.1.2 Soft shutdown operation:

(1) When the instrument is on, press the power button for >2 seconds, and a shutdown prompt box will pop up. Select "Yes" to shut down the instrument.

(2) When the instrument is powered on, pull down the status bar to pop up the quick operation menu. Click Shut Down. A shutdown prompt box will pop up. Select "Yes" to shut down the instrument.

4.1.3 Forced shutdown operation: In the power-on state, after pressing the power button for >8 seconds, the power indicator light goes out and the instrument shuts down.
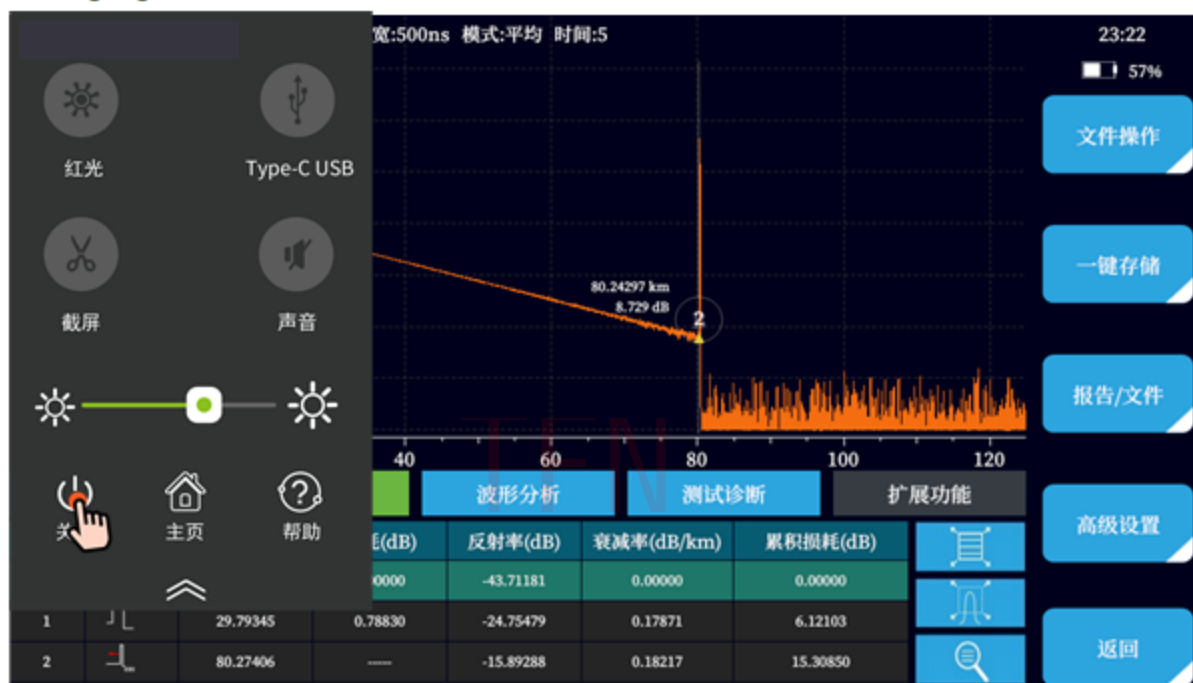
4.2 Charge and discharge

Charging: The instrument is charged through the DC input port. When charging, the indicator light lights up and the status bar displays the charging icon.
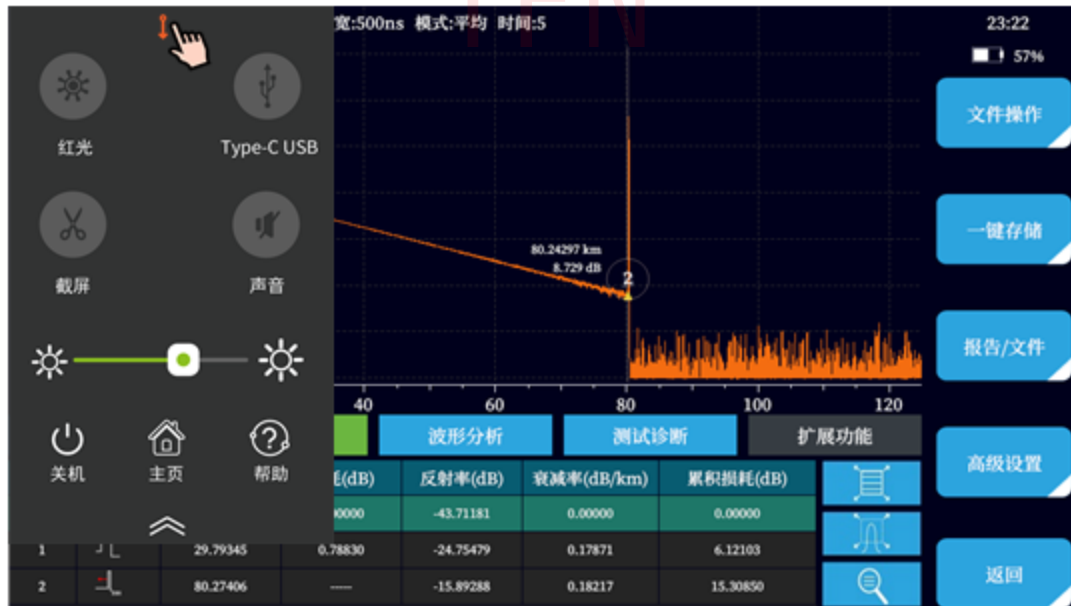
Chapter 1 Home Page

Status Bar: Indicates light source, red light, U disk, Bluetooth, TF card, charging status, and battery capacity in sequence.

Pull down the status bar to pop up the following quick operation interface. Click on other areas to close the quick operation interface.


The quick operation interface controls the Bluetooth switch, Type-C USB (data transmission) switch, red light switch, quick screenshot, sound master switch, and brightness adjustment. It can also perform quick operations of shutting down and returning to the home page.

Click to take a screenshot and save the current screen display content in real time.

Click Help to quickly open the operation guide for the current interface.

Chapter 2 OTDR

1. Setting
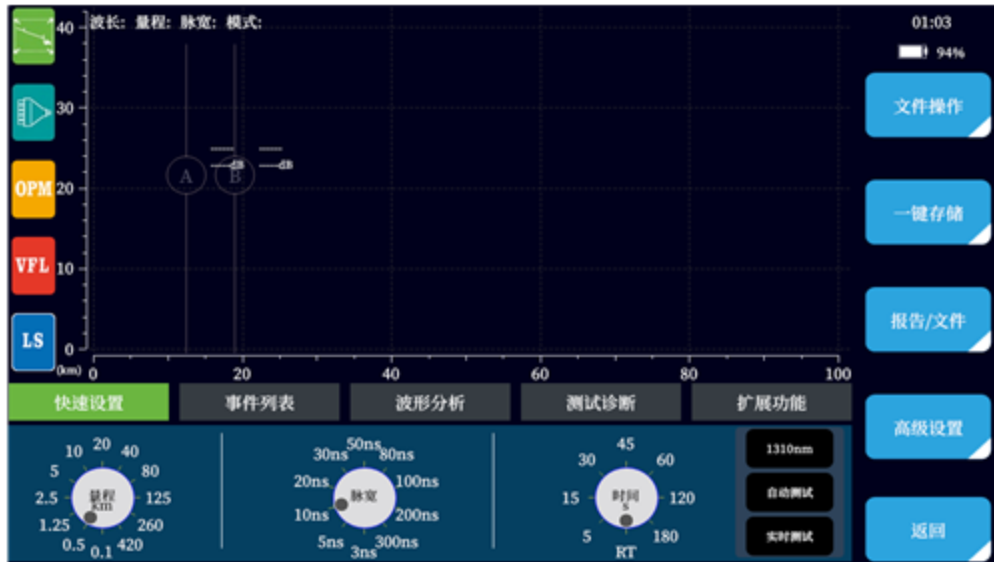
The setting interface is the first interface of the OTDR function: select the test range, pulse width, time, wavelength, and mode in sequence. Different ranges correspond to different optional pulse widths. RT is the real-time test mode, and the test time is selected as the average mode.

- Automatic test: automatic test mode;
- File: Open, copy, delete and other operations on the SOR saved by the OTDR and the generated PDF report;
- Advanced settings: consists of measurement settings, analysis settings, pass/fail (Pass/Fail), and general settings;
- Curve operation: After the test is completed, it automatically enters the curve operation interface, including event list, waveform analysis, curve saving, etc.
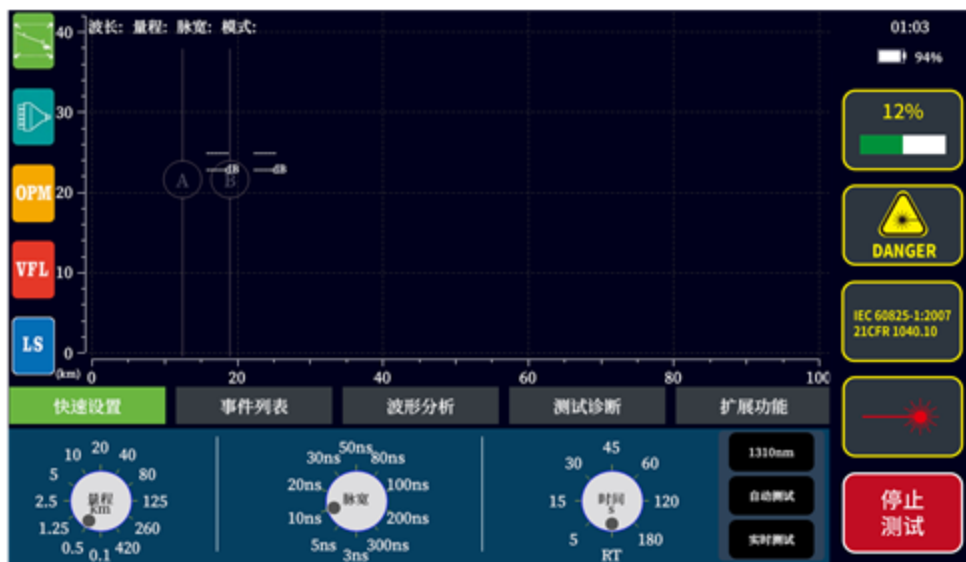
Note: Test parameters can be modified in real time during the test process (except for automatic test and multi-wavelength real-time test). Do not look directly at the output port.

2. Advanced Settings

Settings->Advanced Settings (click)

Options: Click "Options"/Settings title to switch setting content;

Restore default: Restore the current interface setting parameters to factory settings.

2.1 Measurement settings:

Set the refractive index, backs-cattering coefficient, transmitting fiber, receiving fiber, and measurement unit;
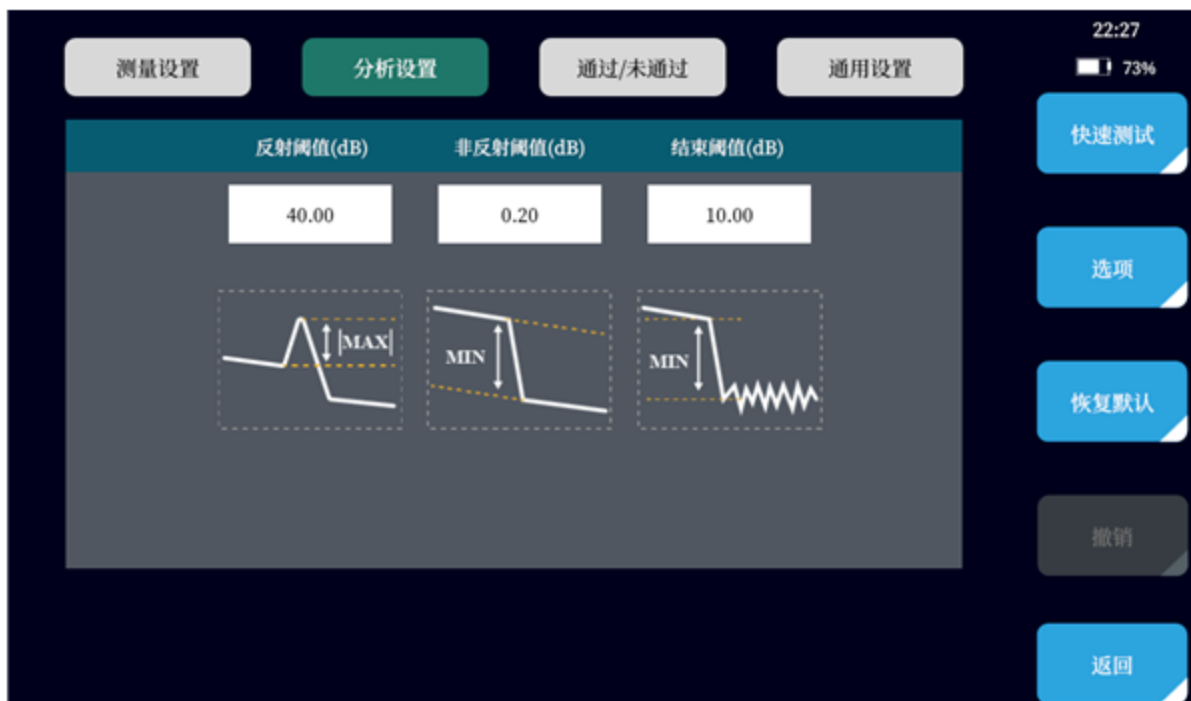
PON mode: After the OTDR with PON function turns on PON mode, the PON network test performance is improved;

High resolution mode: After turning on high resolution mode, the maximum sampling point is >256k.

When the transmitting fiber and receiving fiber are set to 10km, the test is as shown in the figure below:
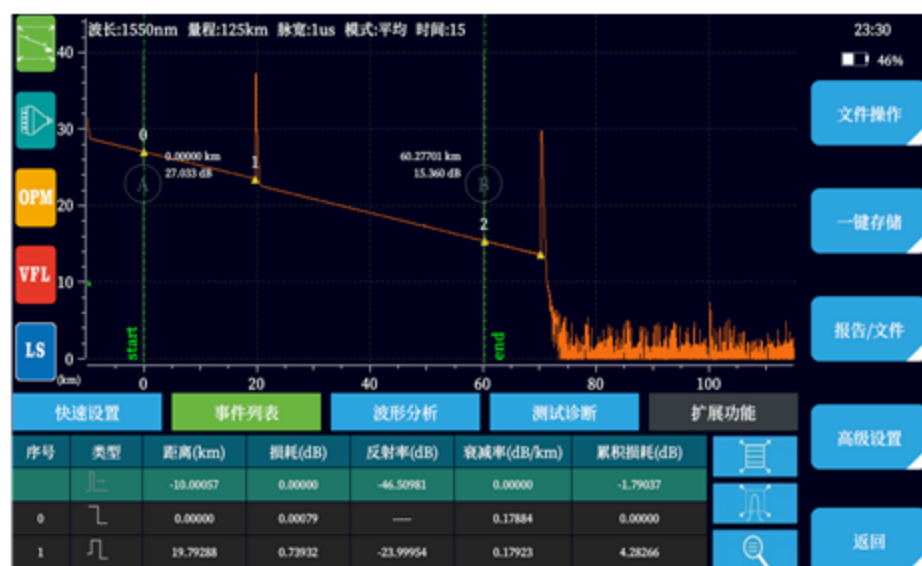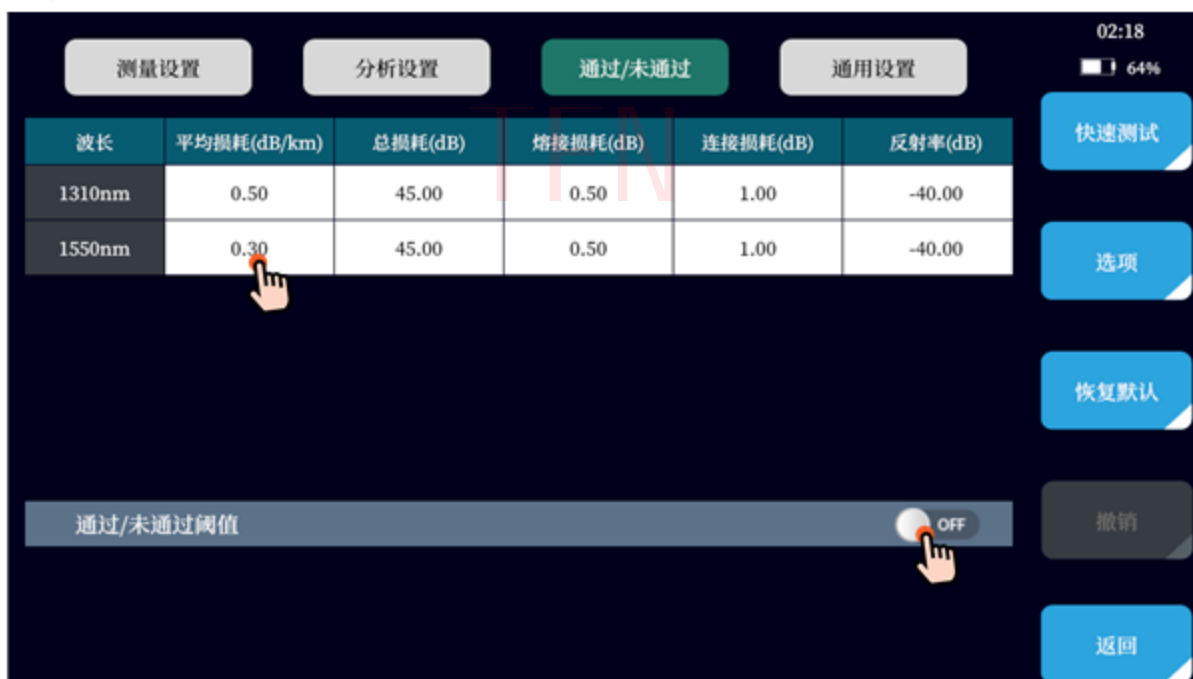
2.2 Analysis Settings:

Set the reflection threshold, non-reflection threshold and end threshold required for event analysis.
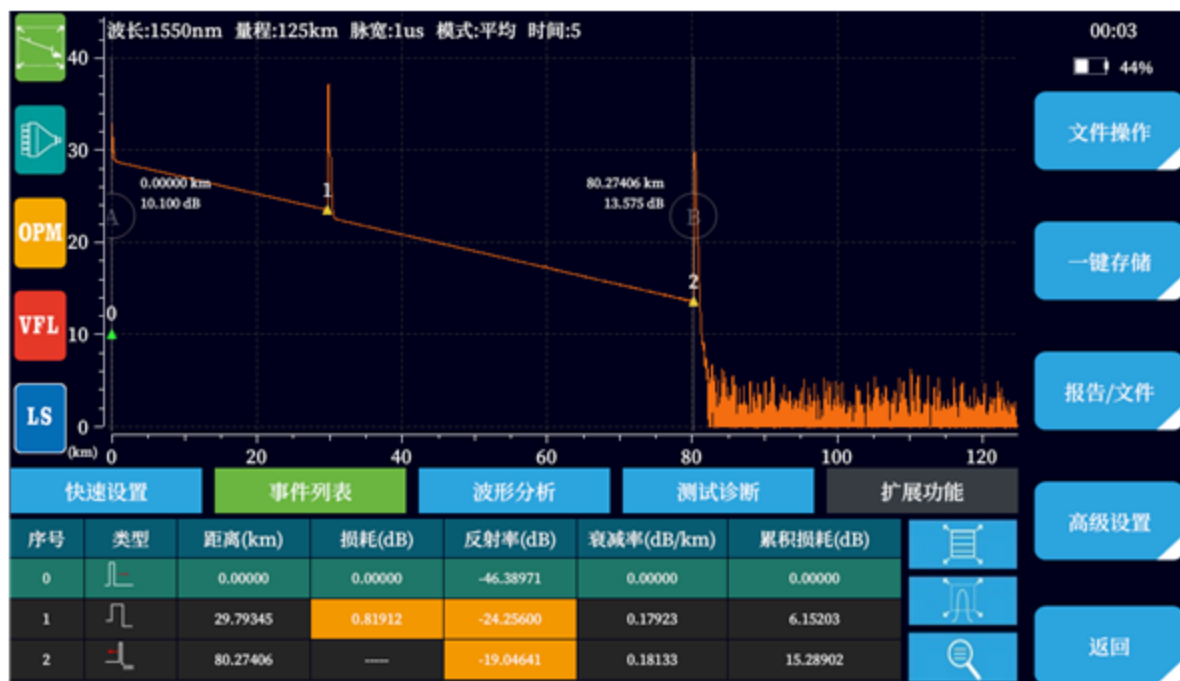
2.3. Pass/Fail:

Pass/Fail is used to set Pass/Fail function parameters. The average loss of different wavelengths, total link loss, splice loss, connection loss and reflectivity judgment thresholds can be set. If the set threshold is exceeded, it will be marked in the event list.

Step 1: Click the "Pass/Fail Threshold" switch to enable the Pass/Fail function;

Step 2: Click the number area to pop up the keyboard to modify parameters;

Step Three: Test.

After the pass/fail threshold function is turned on, the event list display effect is as shown in the figure below.

| 波长:1550nm | 量程:125km | 脉宽:1us | 模式:平均 | 时间:5 | | | 00:03 |

序号	类型	距离(km)	损耗(dB)	反射率(dB)	衰减率(dB/km)	累积损耗(dB)
0		0.00000	0.00000	-46.38971	0.00000	0.00000
1		29.79345	0.81912	-24.25600	0.17923	6.15203
2		80.27406	-----	-19.04641	0.18133	15.28902

快速设置　事件列表　波形分析　测试诊断　扩展功能

文件操作　一键存储　报告/文件　高级设置　返回

2.4 General settings:

- Auto-save: The OTDR curve tested after being turned on is automatically saved according to the default save name;

- Prompt to save: prompt the user whether to save the test curve when testing again after turning it on;

- Grid: When turned on, the OTDR curve background displays a grid;

- The event list is displayed in sections: After turning it on, the event list will be displayed in sections;

- Save name prefix: user-defined automatic naming, quick naming prefix, name is incremented by numbers;

- Save path: select the storage path;

- Display from the user-defined starting point: After turning on, the display starts from the set launch fiber position;

- Display thumbnails: After turning on, the OTDR displays curve thumbnails.

3. Documents

File (click)

"File" in OTDR can operate the SOR file saved by the OTDR test and the generated test report PDF file. The SOR file is saved in a folder named by date.
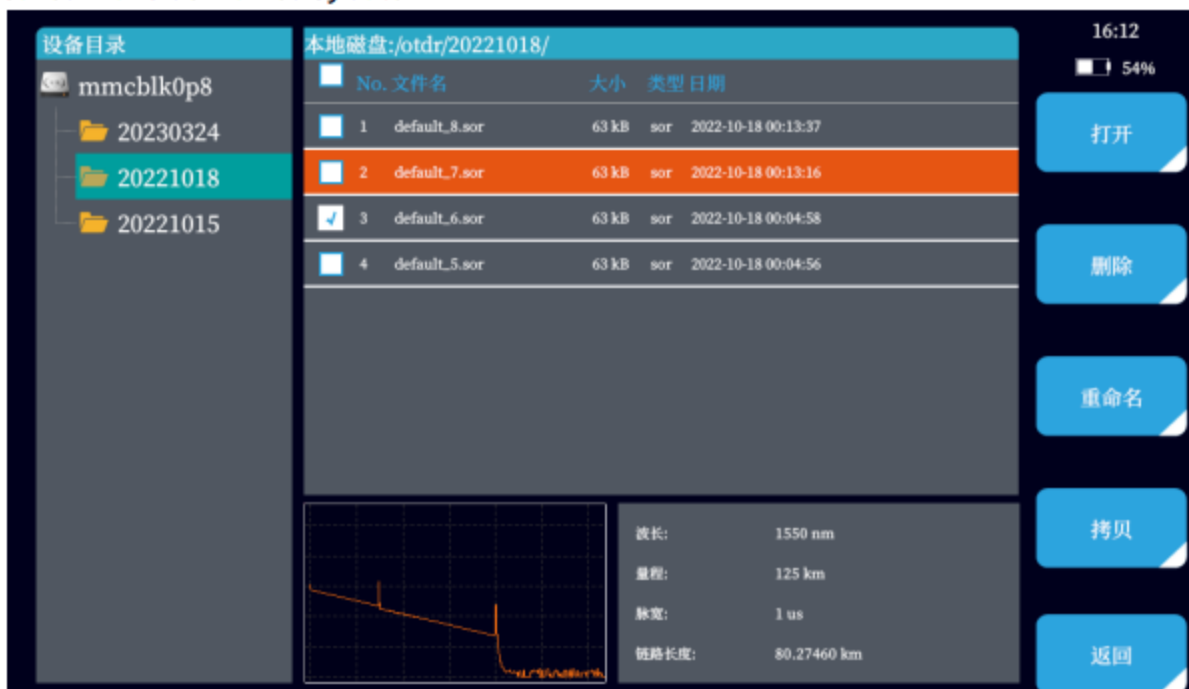
"Check" means selected, and operations such as opening, deleting, renaming, and copying can be performed on the selected operation object.


"Changing color" indicates the current cursor position, and you can view the SOR file curve thumbnail at the cursor position.

4. Curve Operation

- Save: Save the current curve and generate a test report by SOR;

- Settings: Click to return to the setting interface and set test parameters;

- Waveform analysis: perform operations such as amplifying the test curve, moving the cursor, and comparing curves;

- One-click storage: Quickly save the currently displayed test curve (automatically named according to the common setting name prefix).
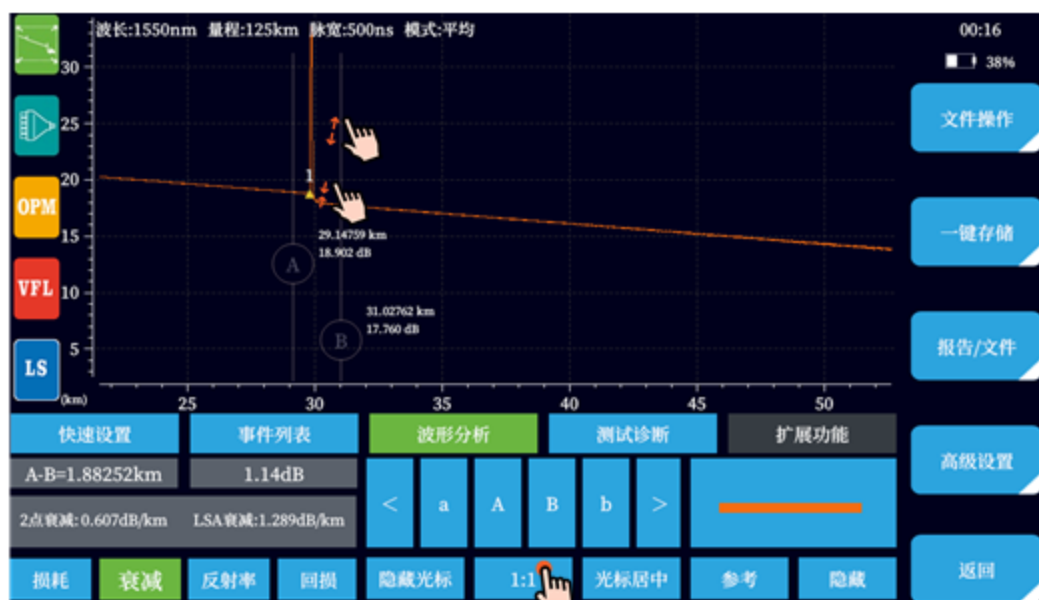
4.1 Event list:
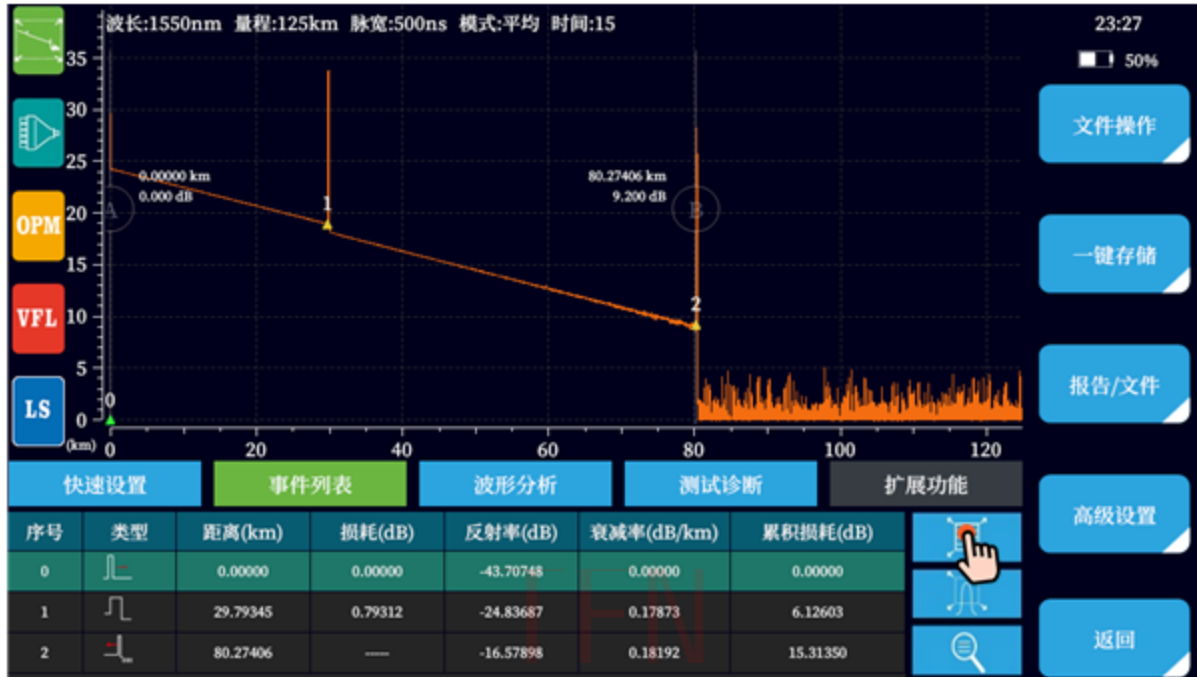
After the OTDR test completes the analysis, it automatically jumps to the curve operation interface. Click the zoom icon to zoom in on the event list.
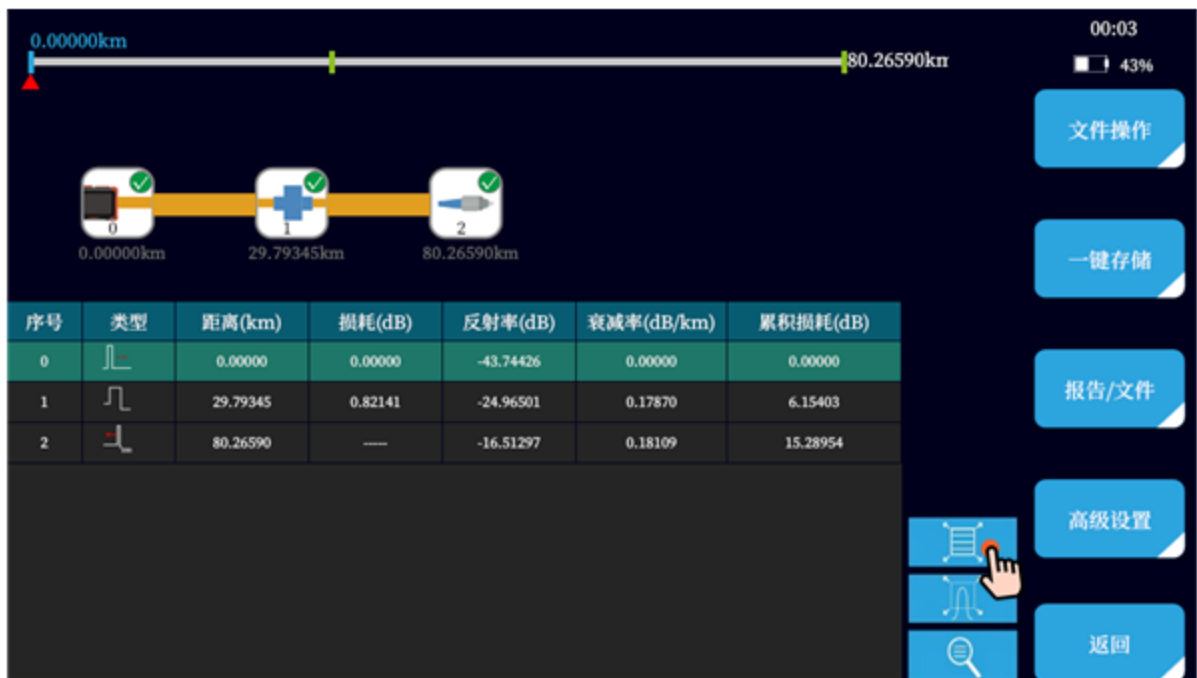
Click "Waveform Analysis" to enter the waveform analysis interface.

4.2. Waveform analysis

(1) Waveform scaling and moving operations:

- Waveform amplification: Full touch screen gestures expand outward to amplify in the center area of the amplification;

- Waveform zooming out: The full touch screen gesture moves inward in the zooming out center area to zoom out;

- Waveform reset: Click the "1:1" button or double-click the screen to reset the waveform;

- Waveform movement: Click and hold the curve and drag.

(2) Cursor operation
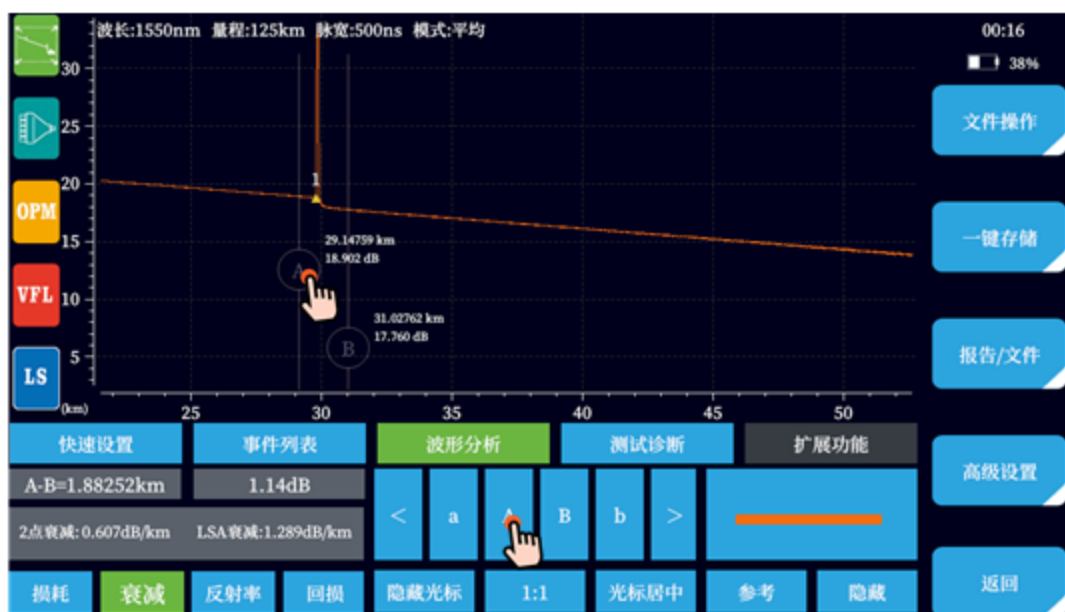
- Cursor movement: click and hold the cursor symbol and drag or select the cursor in the key area and click the direction of movement;

- Cursor hiding: All cursors can be hidden, and cursor centering will reset all cursors to the middle of the screen.

4.3 Open multiple curves

File->Target SOR file->Open

- Supports opening 3 SOR files at the same time for curve analysis and comparison operations.
- ████████ The currently selected curve can be switched by clicking;
- Hide: hide the currently selected curve;
- Reference: Select a curve as a reference and then test. The test curve can be compared and analyzed with the reference curve.
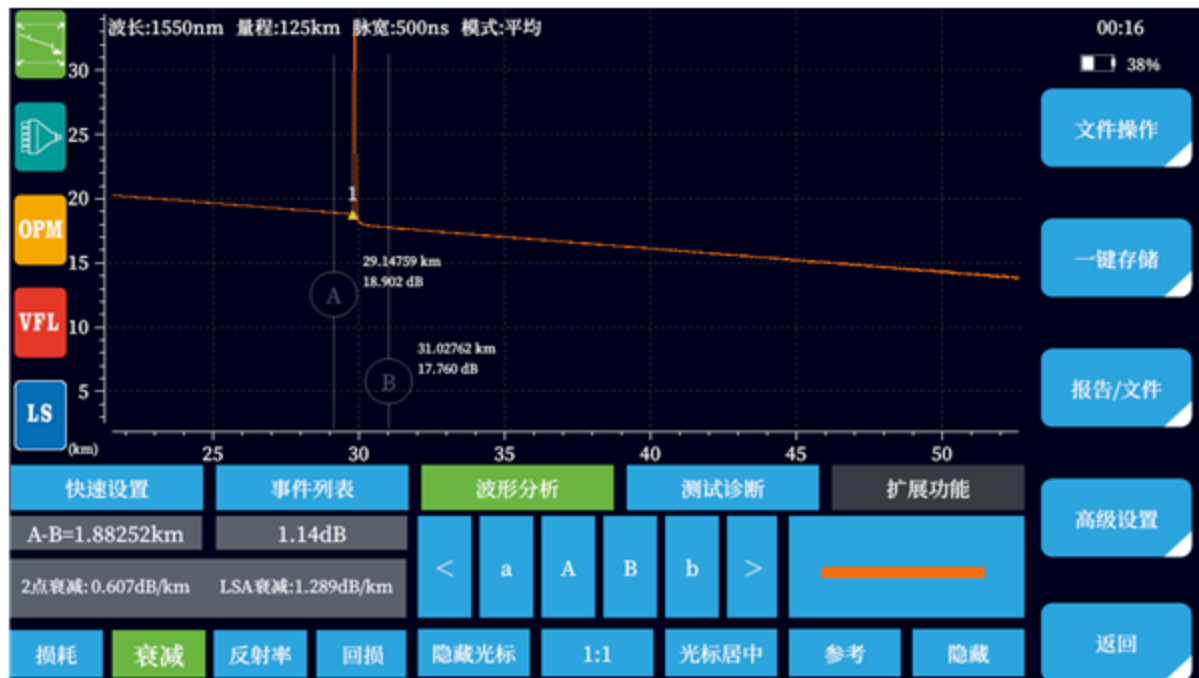
4.4 Loss, attenuation, reflectivity and return loss analysis

Loss analysis: When calculating the loss of "Event 1" in the diagram, the cursor sequence position is as shown in the figure below.


- ![A-B=14.47622km 2.60dB] The 2-point method displays the distance and loss of the A-B cursor in real time;

- ![4点法损耗:-0.002dB AB LSA损耗:0.003dB] The 4-point method calculates event loss in real time, and the LSA method calculates A-B cursor loss in real time.

- Attenuation analysis: When calculating the attenuation of event 1 in the graph, the cursor sequence position is as shown in the figure below.

- ![2点衰减:0.607dB/km LSA衰减:1.289dB/km] The 2-point method calculates the A-B cursor area attenuation in real time, and the LSA method calculates the A-B area attenuation in real time.

Reflectance analysis: When calculating the reflectivity of event 1 in the figure, the cursor sequence position is as shown in the figure below.
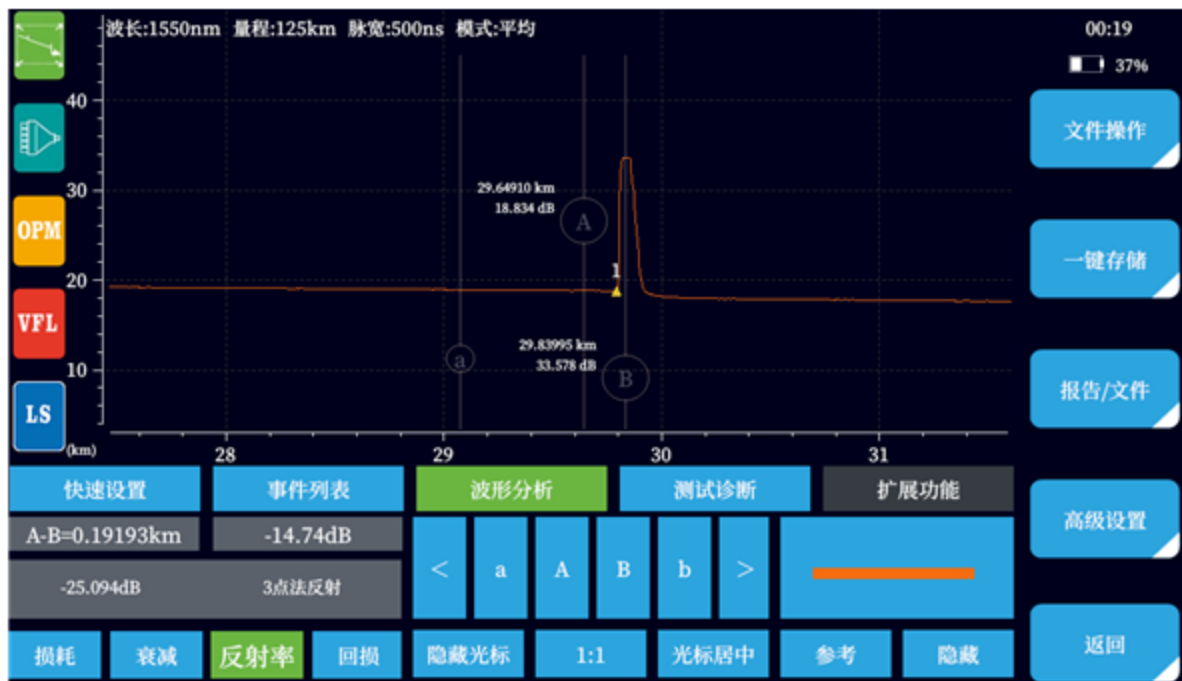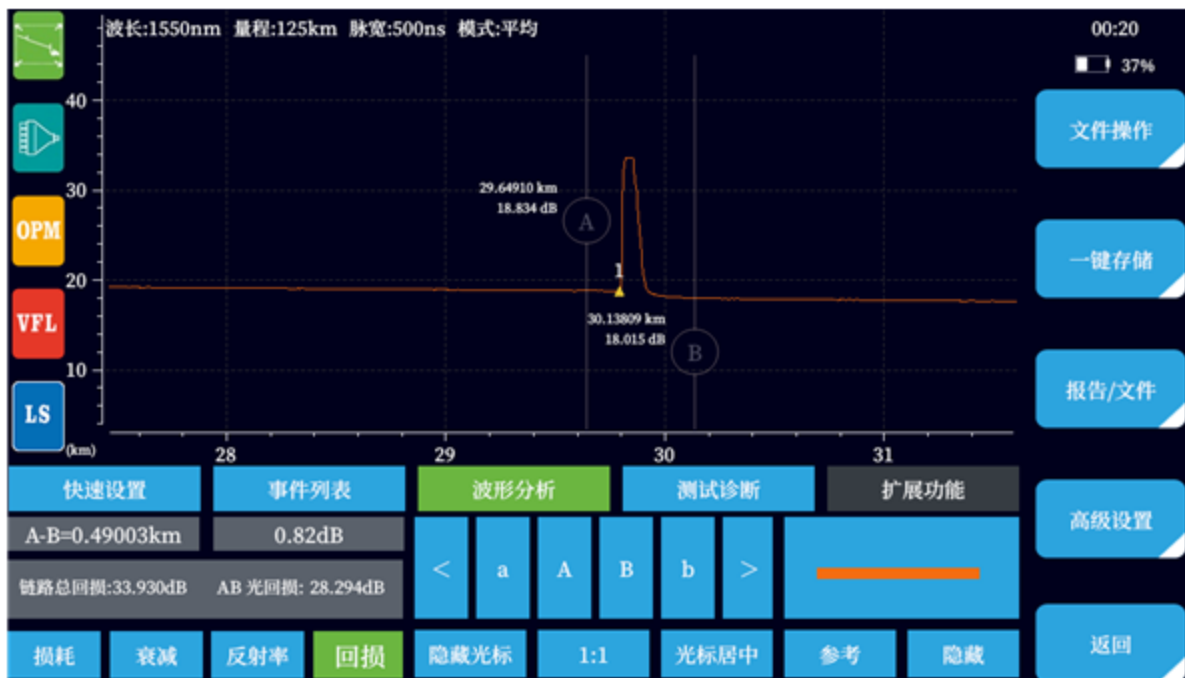

A-B=0.19193km   -14.74dB   2-point method calculates A-B cursor distance and loss in real time;

-25.094dB   3点法反射   The 3-point method calculates the reflectivity of the measured event in real time.

● Return loss (ORL) analysis: Analyze the total return loss of the link under test and the return loss within the A-B cursor position.

A-B=0.49003km   0.82dB

链路总回损:33.930dB   AB 光回损: 28.294dB   Calculate the total return loss of the link and the return loss within the A-B cursor position in real time.

5 Save

Save SOR file: Curve operation->Save->Save file

Step 1: Set the name and save parameters, select the storage path,

Step 2: Confirm to save.

Curve operation->Save->Save file->Save settings

Save settings are used to set the SOR file saving content such as fiber optic identification, optical cable identification, optical cable coding, location and project type, project code, company name, operator, direction, etc.

Generate PDF test report: Curve operation->Save->Generate report

Step 1: Set the name and save parameters, select the storage path,

Step 2: Confirm to save.

Curve operation->Save->Generate report->Save settings

Save settings are used to set the test information included in the generated PDF report.

Chapter 3 Event Map

1 Test

Step 1: Select the test wavelength, you can choose single wavelength or dual wavelength test mode;

Step 2: Click Auto Test.
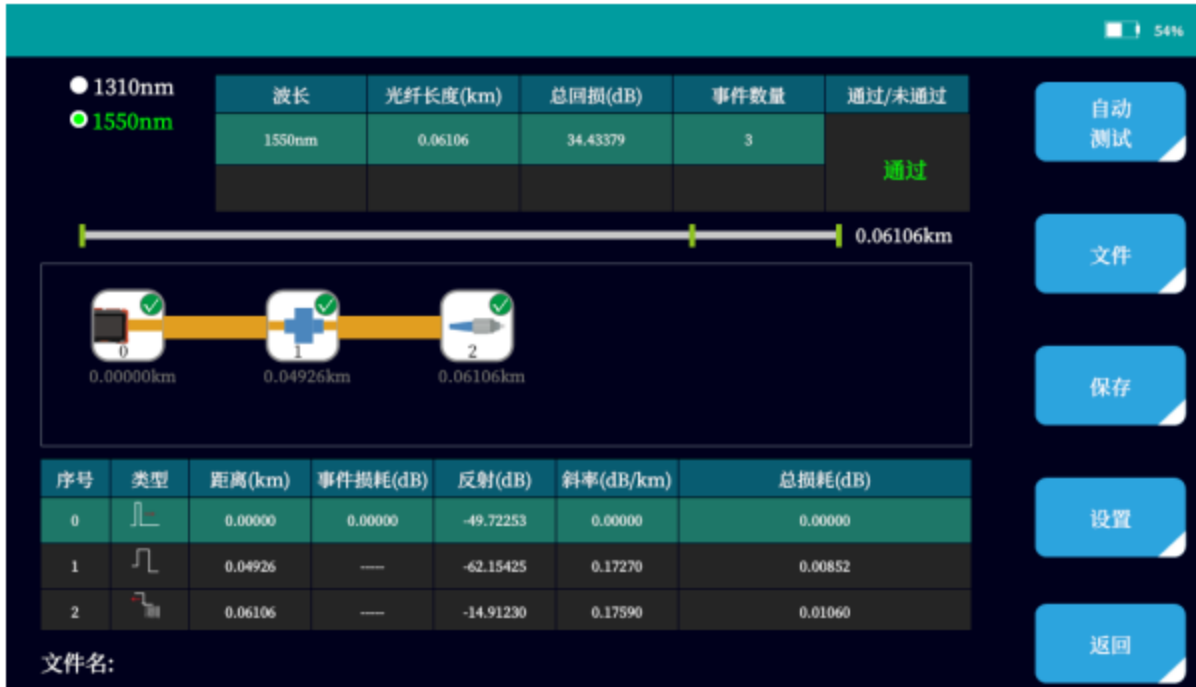
After the test is completed, the test results are displayed in two ways: event map and list. Click the corresponding wavelength to view the event list of each wavelength.

Note:

1. Supports OTDR in PON mode. Enable PON mode in settings to improve PON network test performance.

2. After the PON mode is turned on, you can select the link splitter for testing.

2 Documents

The file can open, delete, rename and copy the saved event map in .emp format.
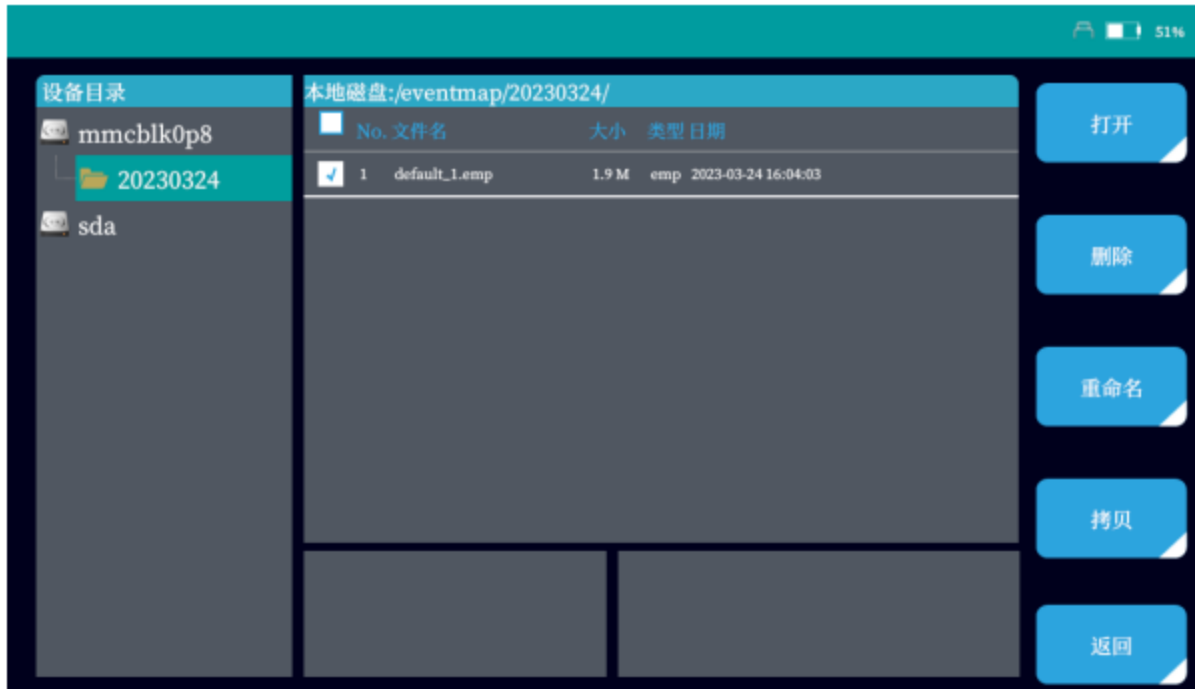
3 Save

Save the test results of the event map as an .emp file or generate a pdf test report.
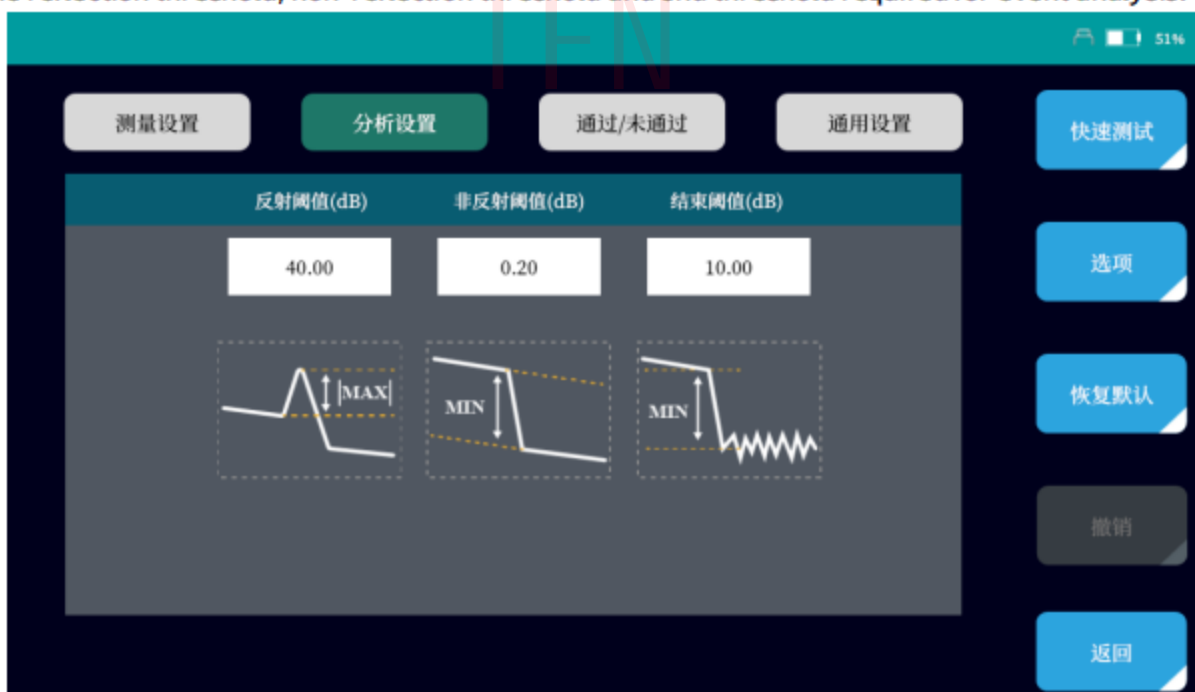
4 Settings

4.1 Measurement Setup

Set the refractive index, backscattering coefficient, transmitting fiber, receiving fiber and measurement unit.

4.2. Analysis Settings

Set the reflection threshold, non-reflection threshold and end threshold required for event analysis.

4.3 Pass/Fail

Pass/Fail is used to set Pass/Fail function parameters. It can set the average loss of different wavelengths, total link loss, splicing loss, connection loss, reflectivity and splitter loss judgment thresholds. If the set threshold is exceeded, an event will occur. mark in the list.

4.4 General settings

Set the display mode of automatic saving, prompt saving, saving name prefix, saving path and event list.

Chapter 4 Light Source

The wavelength of the light source function is consistent with the OTDR wavelength, and supports the output of CW continuous light and 270Hz, 1kHz, and 2kHz modulated light.

Step 1: Connect the LS interface (consistent with the OTDR interface);

Step 2: Click the switch button to turn on the light source and select the output mode. The status bar shows on.
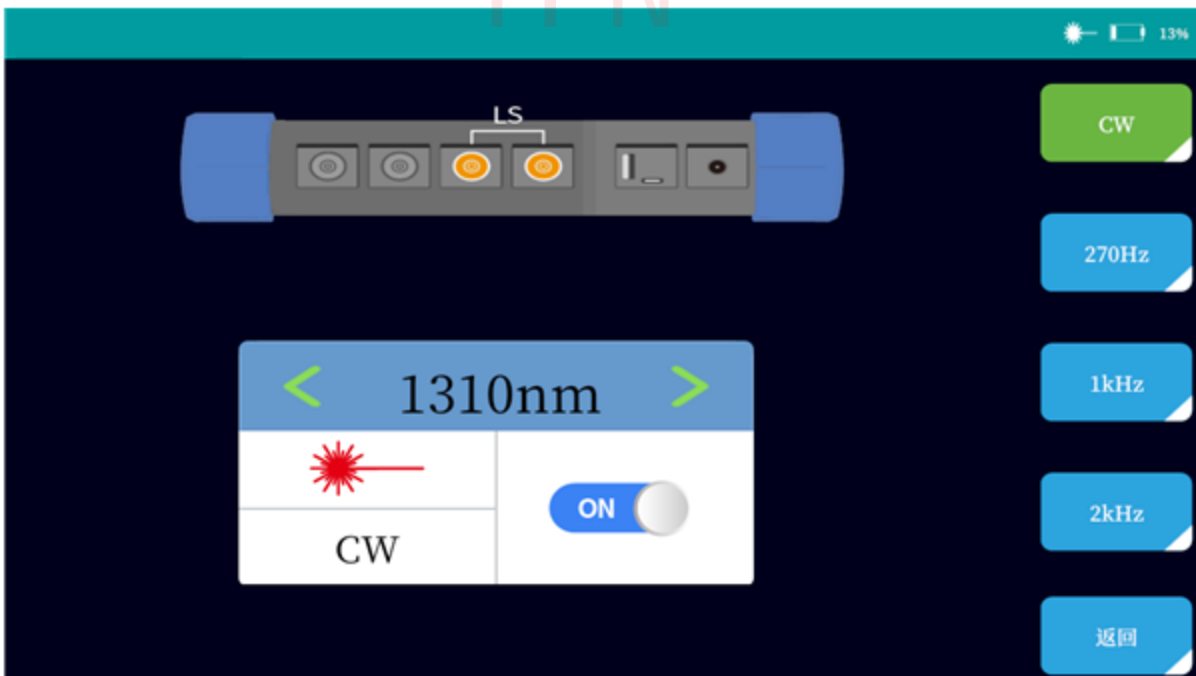
Switching the wavelength of the light source can be operated by clicking the "option key" in the picture above.

Note: Laser can cause damage to human eyes. Long-wavelength laser is not visible to the naked eye. Do not look directly at the output port after turning on the light source.

Chapter 5 VFL(Visual Fault Locator)

The red light function, that is, the visual fault locator has a wavelength of 650nm and supports constant light and 1Hz and 2Hz debugging light output.

Step 1: Connect the VFL interface;

Step 2: Click Always on to turn on the red light function or pull down the status bar to turn the red light on and off through the shortcut menu, and the status bar will display the status.

The red light function supports background operation and can remain on after exiting the operation interface.

Note: Red light is a laser and can cause damage to human eyes. Do not look directly at the output port after turning on the red light.

Chapter 6 OPM (Optical Power Meter)

The optical power meter function displays the optical power value of the device under test in dBm and mW units in real time, and automatically determines and displays the frequency of the device under test (power value >-20dBm).

Step 1: Connect to the device under test and click Start;

Step 2: Select a wavelength.

The optical power meter supports user self-calibration, and the calibration deviation range does not exceed ±10dB.

Calibration: Enter the target value and click Save;

Restore default: Clear calibration values and restore power calibration to factory settings.

Chapter 7 Optical Loss Test

The optical loss test function supports turning on the light source and optical power meter at the same time, and is mainly used to measure the insertion loss of the device under test.

Step 1: Click Start;

Step 2: Use a short jumper to short-circuit the light source LS and optical power meter OPM port, click Reference;

Step 3: Connect the DUT of the device under test between the light source LS and the optical power meter OPM. The IL displayed in real time is the tested insertion loss value.

Chapter 8 End Face Inspection (Option)

End-face inspection enables real-time viewing of the cleanliness of fiber optic connectors.
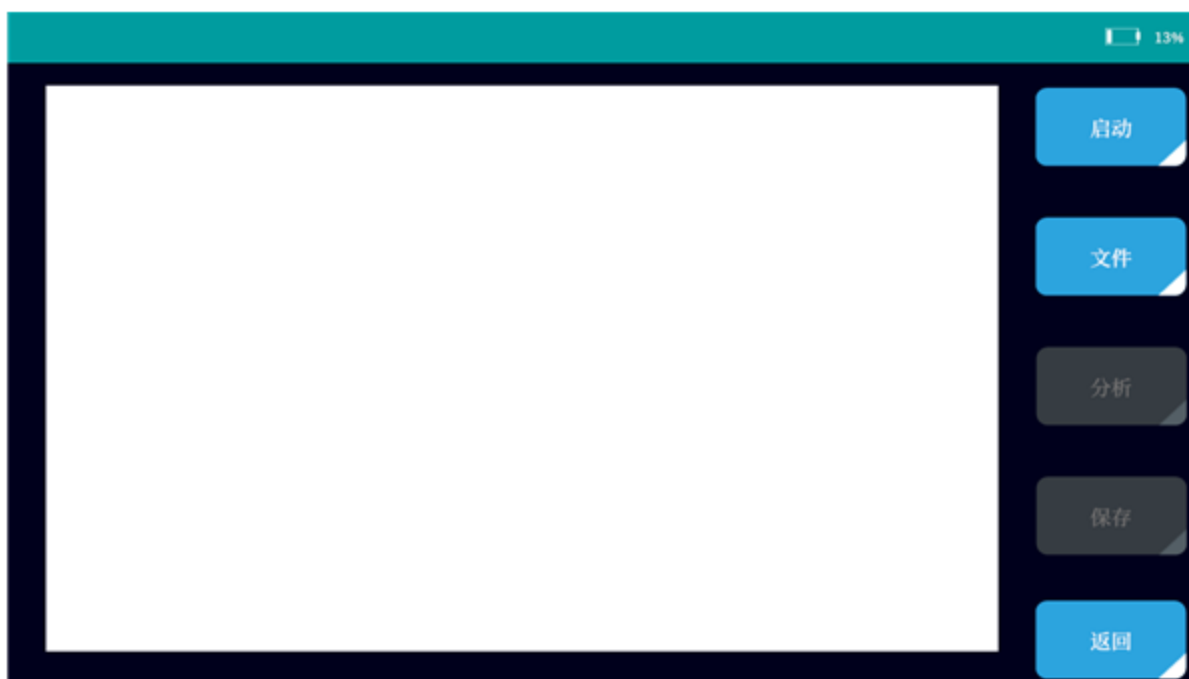
Step 1: Connect the end face detection probe to the USB-A interface;

Step 2: Click Start;

Step 3: Connect to the device under test and check the cleanliness of the end face under test in real time.
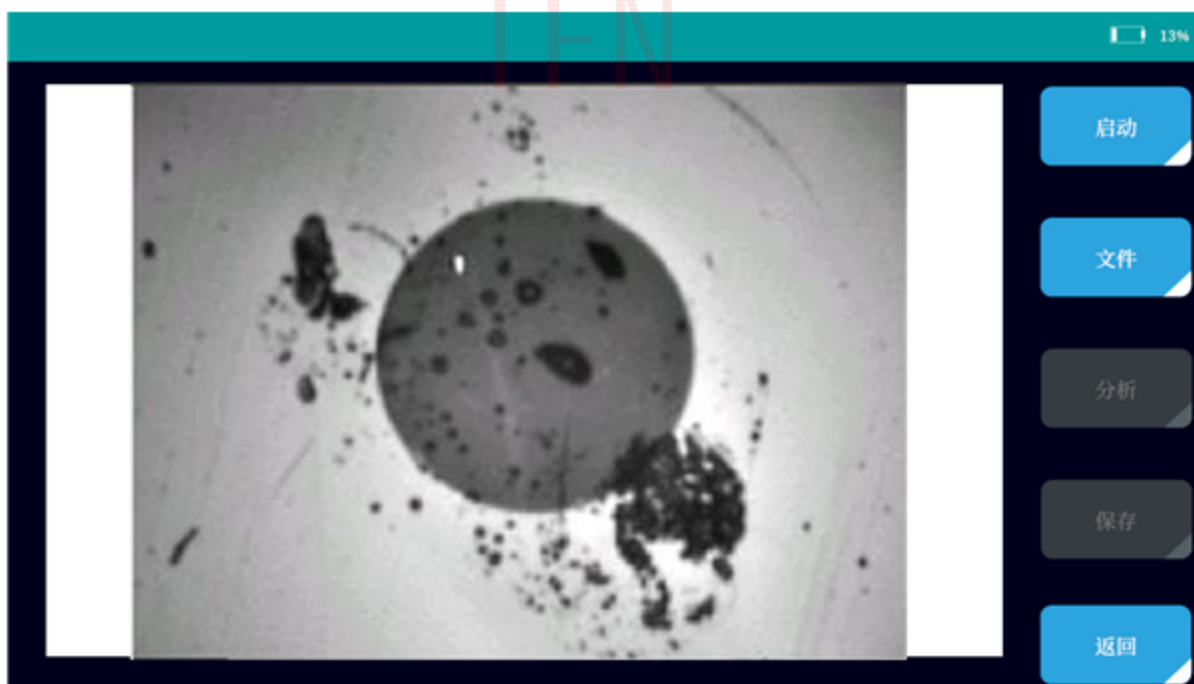
Chapter 9 Ethernet Testing

1. Network Testing Tools

1.1. PING test

Connect to Ethernet LAN2, enter the remote host IP in the PING test, and click Start. Determine whether the Ethernet physical link is connected successfully. The test results can be saved as a txt format file.

1.2 PPPOE Test

Connect to Ethernet LAN2, enter the user name and password in PPPOE, select the remote host, click Start, and determine whether the network can dial-up Internet access and whether network communication is normal.

1.3 IP Scan

Connect to Ethernet LAN2, enter the starting scanning IP and ending scanning IP in the same IP section, and scan the IP used in this IP section.

2. Link Test Tools

2.1 Link speed measurement

Link testing is used to test the speed performance between two instruments' physical links, routers, switches, photoelectric conversion devices, etc., and supports speed testing up to 100Mbps.

Step 1: Connect the device under test between the two instruments through the LAN2 interface;

Step 2: Set one instrument as the server and the other instrument as the client;

Step 3: Set the other party's IP address, port number and other information, and click Test.

3. Line Sequence (Optional)

Step 1: Connect the network cable under test to the Ethernet interface LAN1;

Step 2: Connect the remote end of the network cable under test;

Step 3: Click Start.

4. Cable length (Optional)

Step 1: Connect the network cable under test to the Ethernet interface LAN1;

Step 2: Click Start.

Chapter 10 Ethernet Remote

The host computer connects to the instrument through Ethernet, and the host computer software implements parameter distribution, startup testing and graphic display for remote control (please refer to Appendix 1 for remote test operations).


Step 1: Set the IP address and port number of the machine;

Step 2: Start the listening service:

Step 3: Enter the IP and port number of the instrument into the host computer software, and conduct a control test after the connection is successful.

Chapter 11 File Management

System-level file management can open, delete, copy, rename and other operations on internal files of local disks, external U disks, TF cards and other storage devices (files can be imported through the Type-C USB interface).
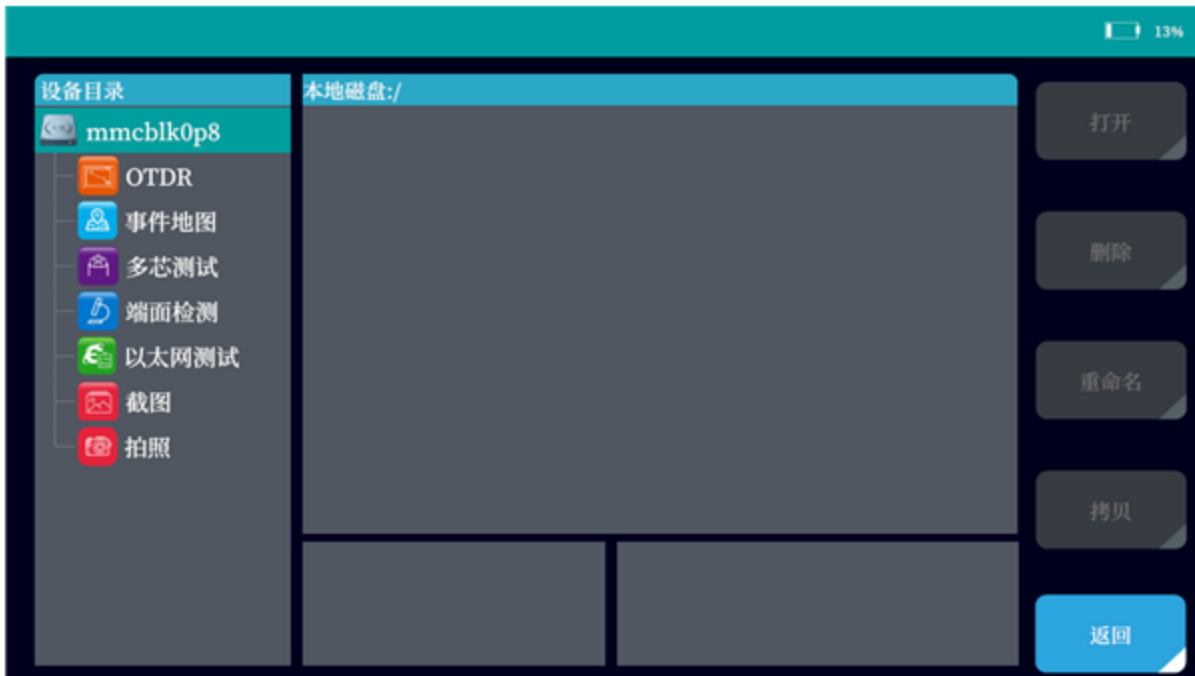
Files in the local disk are stored and displayed according to functional module categories.

Chapter 12 System Settings

1. Backlight Settings

Set the backlight brightness and backlight sleep time. If there is no operation during the backlight sleep period, the backlight will be automatically lowered and restored after operation.

2. Date and Time Settings

Set the system date and time, and click Save settings after modification.

3. Language Settings

Select the system language.

4.Power Options

Set the automatic shutdown time of the instrument. If no operation is performed on the instrument within the set time, it will automatically shut down.

5. Connection

The main connections include Type-C interface USB switch and Bluetooth switch.

Turn on the Type-C USB switch, connect the instrument to the computer through the data cable, and export or import the internal test files of the instrument on the computer;

Turn on Bluetooth, set the Bluetooth connection name, and connect to the instrument through the mobile APP to control the instrument's OTDR, VFL, optical power meter, and light source functions and obtain and upload the instrument's internal files (for Bluetooth operations, please refer to Appendix 2).
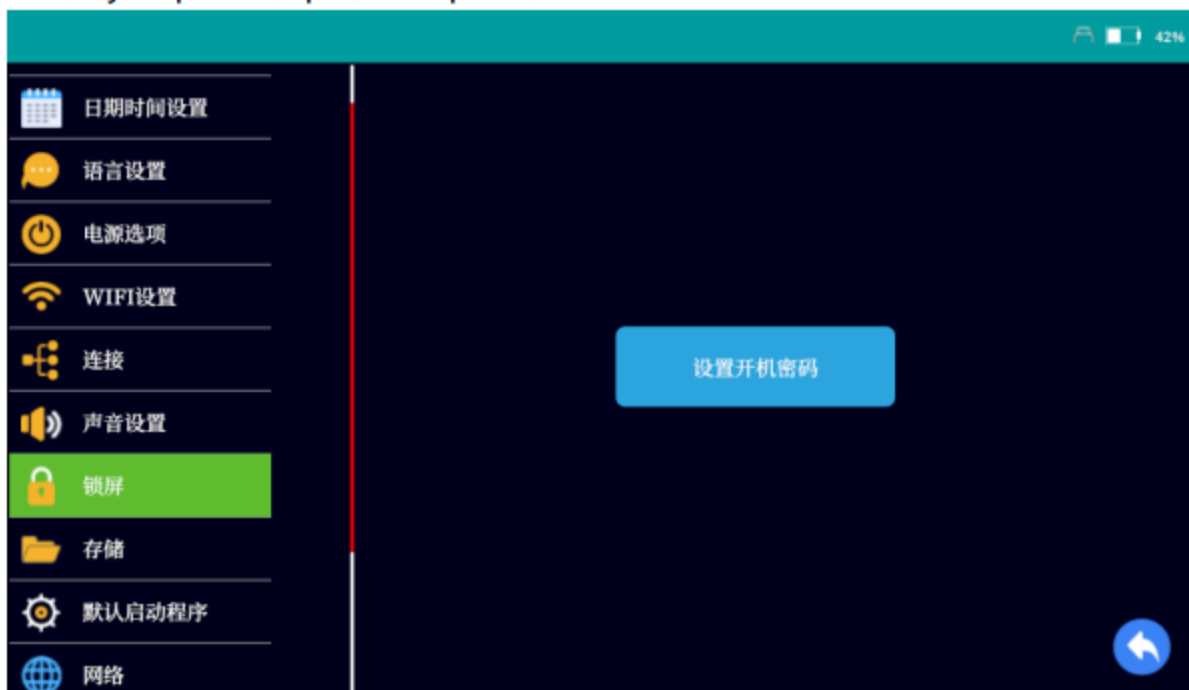

6. Sound Settings

Instrument sound switch setting options.

7. Lock Screen

Set and modify the power-on password operation of the instrument.

8. Storage

Check the storage space usage of internal storage, external USB flash drive, and TF card.

9. Default Startup Program

Set the default startup add-on when the instrument is powered on.

10. Network

Set the IP address and other information inside the instrument. The IP is consistent with the Ethernet test and Ethernet remote.

11. Software Update

U disk upgrade: The upgrade file is located in the root directory of the U disk. Insert the U disk and click U disk upgrade.

12. Restore Factory Settings

Click "Restore Factory Settings" and all the internal setting parameters of the instrument will be restored to the factory settings.
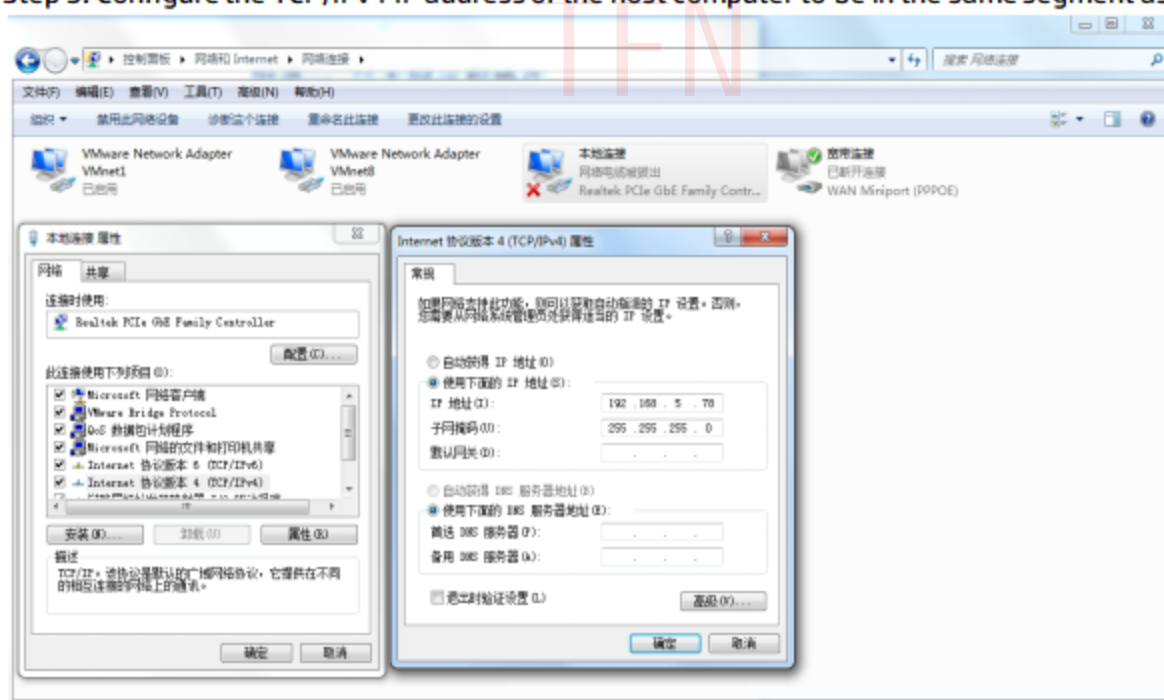
Appendix 1 Ethernet Remote Operation

Step 1: Connect the device to the remote computer through the Ethernet LAN2 interface (modify the IP address in the system settings);
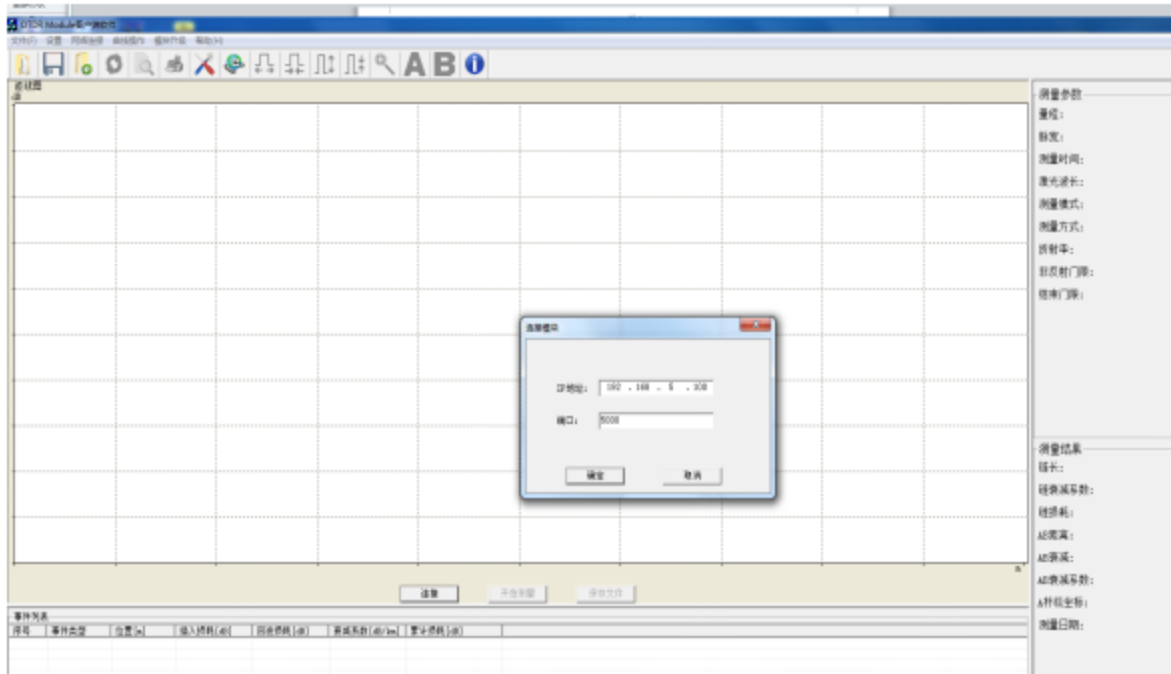
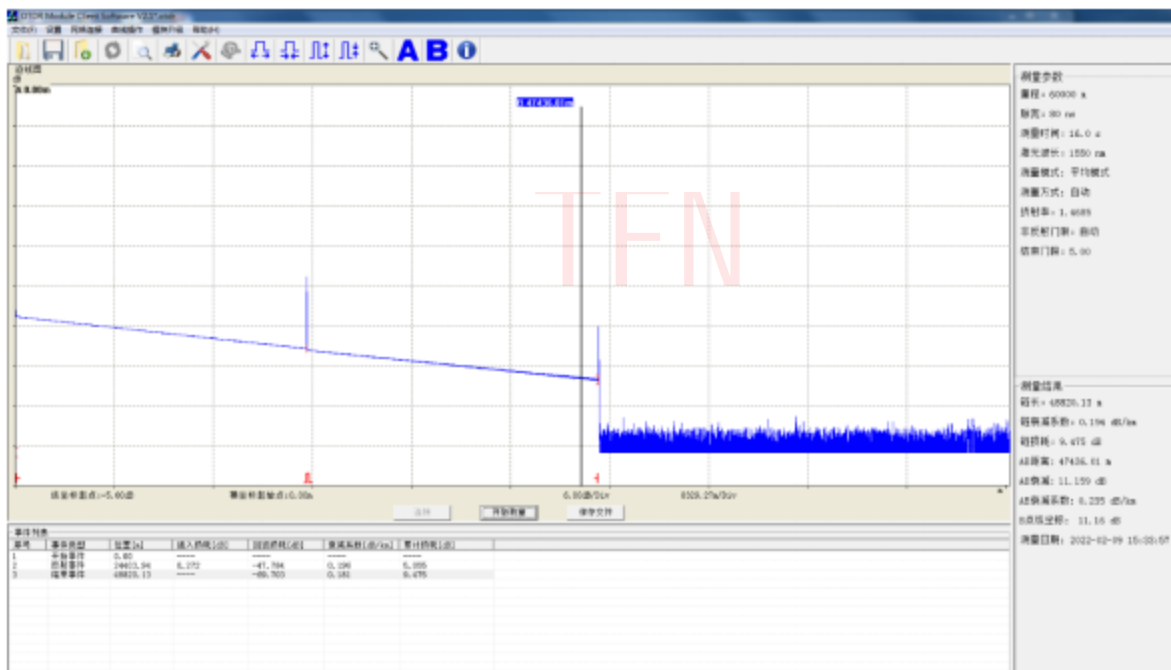Step 2: Enter the Ethernet remote test function and start the monitoring service;

Step 3: Configure the TCP/IPv4 IP address of the host computer to be in the same segment as the device;

Step 4: Open the host computer control program and connect the device;

Step 5: After setting the parameters, complete the test.

Appendix 2 Bluetooth Control Device on APP (Optional)

Please scan the QR code to download Bluetooth APP

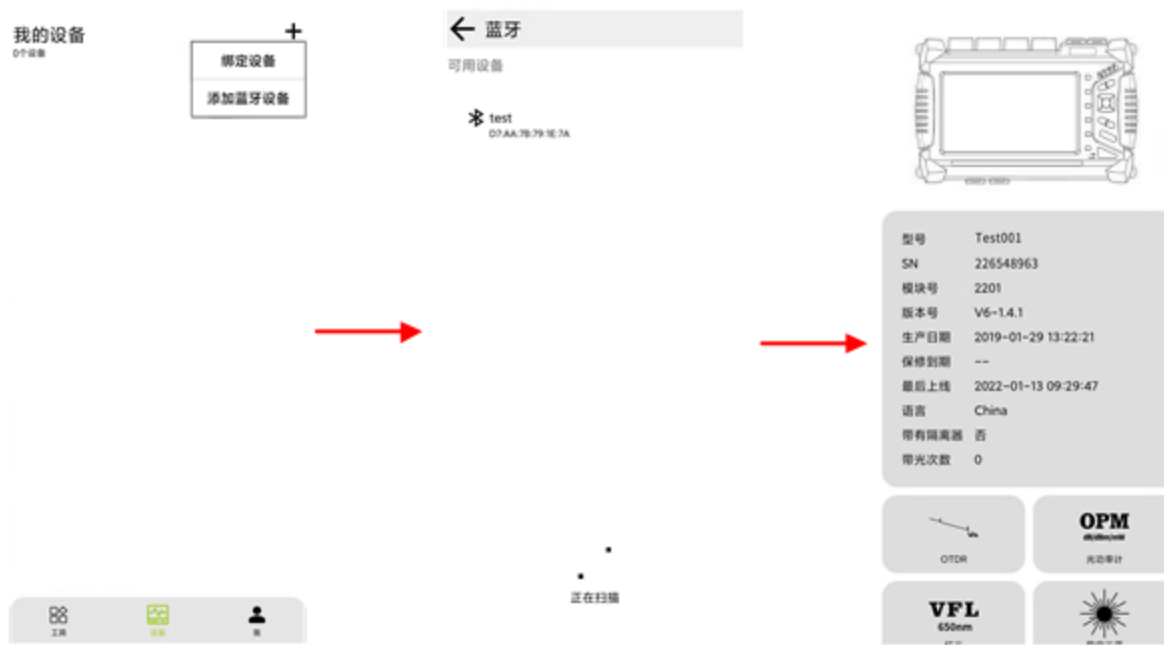| Android System	IOS System

安卓系统下载   IOS系统下载

Step 1: Turn on Bluetooth in System Settings->Connection Options and display the Bluetooth MAC address;
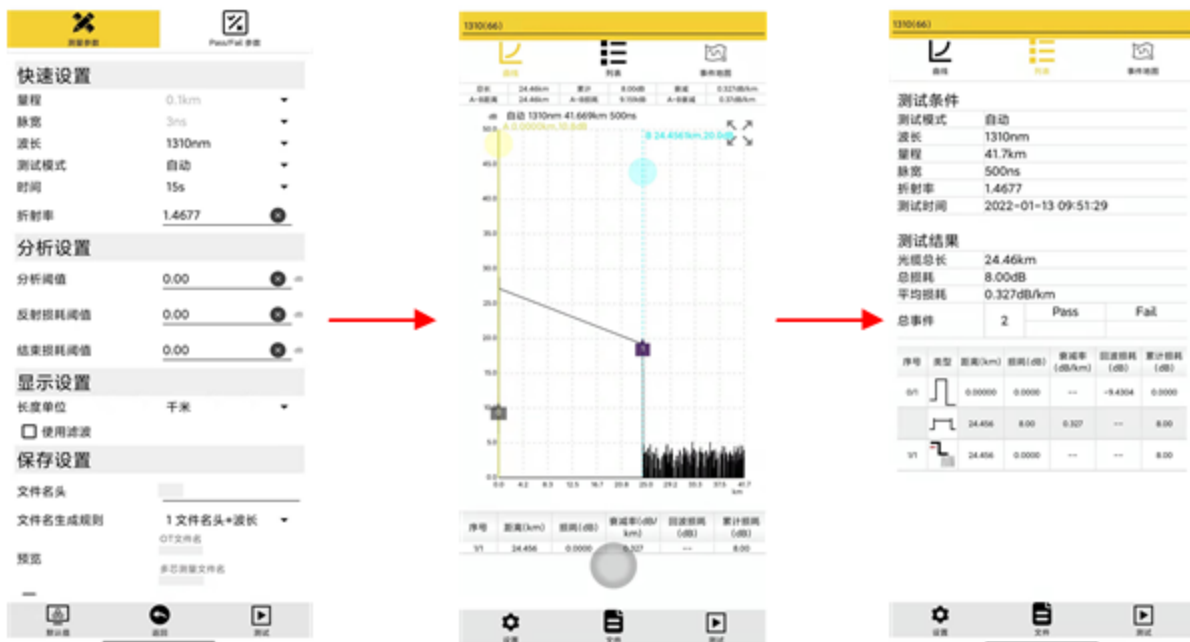
Step 2: On the mobile APP, add a Bluetooth device, scan the corresponding MAC information, and the connection is successful;

Step 3: The Bluetooth APP can control the light source function, optical power meter function (OPM) and red light function (VFL);

Step 4: Operate the OTDR function on the Bluetooth APP, set the test parameters, start the test and view the test results;

Step 5: Transmit and share test results.