To users：

Dear users of Dimension product，Thank you for choosing to use OTDR products.

OTDR products have excellent quality and performance. In order to make full use of

the maximum performance of this product, Please read this manual carefully before

use, And follow the steps in the manual, After reading this manual, please keep it

properly, For reference at any time. If you have any questions during use, please

contact the phone and address in the attached text, we are always waiting to serve

you

Sign

The following signs are important reminders in this manual

Attention

Indicates the precautions and usage restrictions that must be followed during use.

Matters needing attention

1 There will be no further notice for any changes to this manual. Please

understand.

2 The content of this manual is made with the goal of accuracy and error -free.

However, if you find any unclear, wrong or ambiguous content, please use the

contact information in the appendix of the manual.

3 If there is a missing page or binding error, the company will replace it

Precautions about the product

1、Pay attention to keep the optical parts clean and free from pollution

2、Keep the display clean to prevent the LCD from being scratched by sharp objects

or squeezed by heavy objects

3、When the equipment is not in use for a long time, please put it in the packing box.

4、Please check the power of the device before use. If only one battery indicator is on and flashing, please charge it before use

Product warranty

In principle, the company undertakes the following warranty for this product

`Warranty period`

Within 1 year after purchase

`Warranty content`

During the warranty period, the company will repair or replace parts free of charge

if the failure is caused by the Dimension's responsibility

`Warranty exemptions`

Even during the warranty period, failures caused by the following reasons

are not covered by the company's warranty

1) The product is damaged due to incorrect operation;

2) Repair or modification by non-maintenance company personnel;

3) Failures caused by causes other than the instrument;

4) Use under harsh conditions such as high temperature and humidity, corrosive

gas, strong vibration, etc;

5) When encountering natural disasters such as fires, earthquakes, pollution caused

by radioactive materials, hazardous materials, and other force majeure such as wars,

riots, crimes, etc;

6) Consumables and consumable components.

Structure of this brochure

| 1 |

Summary

This chapter describes the name and function of each component.

| 2 |

Preparation before use

This chapter outlines the preparations for using the device.

| 3 |

OTDR introduction

This chapter describes the installation and removal of the device, startup and

shutdown, and software introduction.

| 4 |

OTDR Set

This chapter introduces the settings of parameters such as general, threshold, link,

and user information.

| 5 |

OTDR Test

This chapter describes the use of cleaning and connecting fibers, testing equipment

in automatic, manual, and real-time modes and the use of auxiliary tools

6 **Managing test results**

This chapter introduces the detailed functions and names of each information interface and functional interface in detail.

CONTENTS

1 Summary

OTDR is a unique product specially designed for on-site opening, acceptance, maintenance and repair of optical communication networks, accurately locating existing and potential problems, and ensuring network service quality..

OTDR can quickly locate the cable/optical fault point, connection point/breakpoint position, describe the optical cable and optical fiber loss distribution curve, measure the optical cable, optical fiber length, distance between two points, loss, attenuation coefficient, measure the insertion of optical cable and optical fiber connector Loss, measure fiber optic cable, fiber reflection loss, test network connectivity, etc.

Hand-held design, light and portable, easy to operate without training; Single-mode fiber 1310nm 、 1550nm wavelength optional , 5ns/10ns/30ns/100ns/300ns、1us/2.5us/10us/20us Pulse width optional ,Intelligent analysis of event nodes, graphical display of the characteristics of the fiber optic line under test, and simultaneous testing of attenuation and reflection events.Its interchangeable optical connector design meets the application needs of a variety of connector types. At the same time, the equipment is also equipped with a visual fault locator (VFL), an optical power meter, and a light source, which are used for accurate optical fiber fault location and optical power measurement.

OTDR can fully meet the needs of fast fiber troubleshooting and repair, and is currently the most suitable test tool for grassroots fiber maintenance personnel..

1.1 The main function

- Can emit lasers with wavelengths of 1310 nm and 1550 nm to test single-mode fibers

- Can measure cable/fiber length, distance between two points, loss, attenuation coefficient

- Can measure optical cable/fiber reflection loss, insertion loss of connector

- Supports automatic and manual test modes, and can display fiber status in real-time mode

- Support default tasks and custom task functions

- The summary pane, event pane, and curve pane display detailed measurement parameters and curve information, etc.

- Preset threshold parameters, automatically display pass/fail

- Visual light source fault location (VFL), cooperate with OTDR function, quickly find the fault point
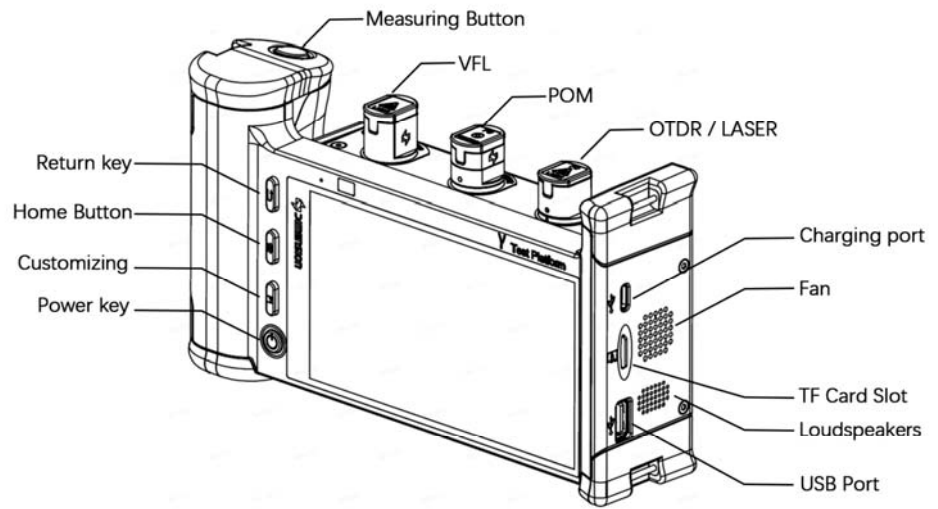
- Optical power test

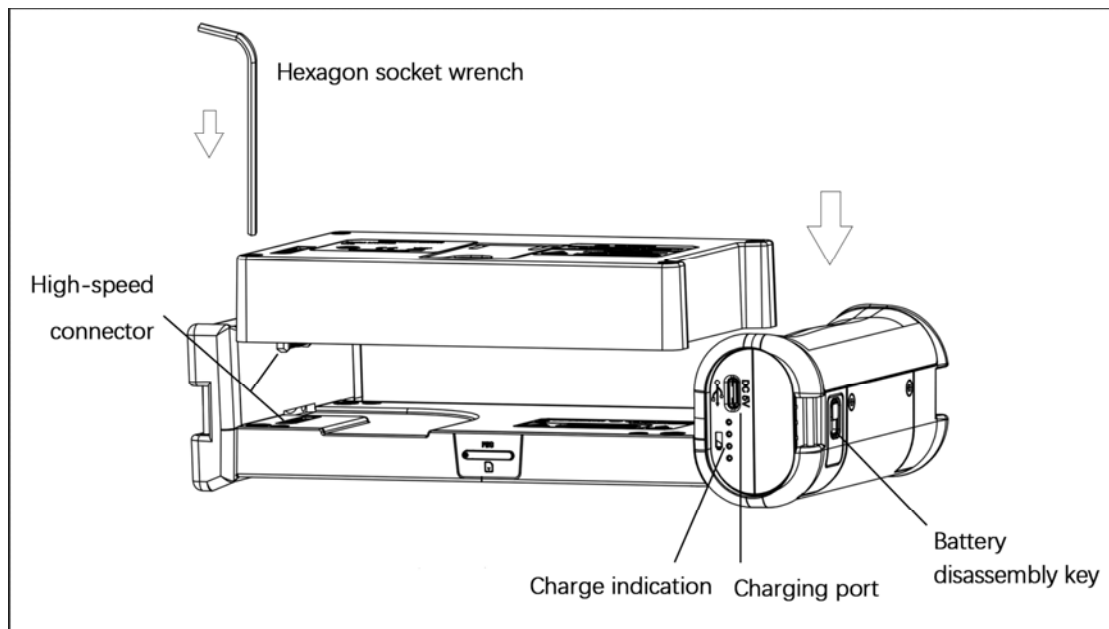- light source

Figure 1-1   OTDR side view

Figure 1-2   OTDR Assembly drawing

1.2 Product composition

OTDR Includes the following parts：

- Hardware: GAMMA, OTDR module, removable battery

- Software：OTDR、OPM

- Accessories: soft case, converter head, lithium battery charger, etc.；

1.2.1 Instrument composition

- Front: HD display, power indicator, microphone；

- Back: bracket, serial number label, rear camera；

- Top: OTDR/Laser, OPM and VFL connectors；

- Bottom: charging port, battery indicator；

- Right side: charging port, TF card slot, USB port, fan, speaker；

- Left: battery removal key；

- Inside: High-speed connector, GAMMA label；

1.2.2 Instrument appearance

The appearance of the instrument is shown in Figure 1-1 and Figure 1-2.

2 Preparation before use

During operation, packaging, transportation and maintenance of the instrument, please read the following safety precautions carefully. Failure to fully

follow the safety warnings and special warnings in other parts of this manual may result in damage to the instrument or related equipment. Our company will not take any responsibility for the consequences caused by this.

warning :

Do not operate the damaged instrument: no matter if the protective circuit inside the instrument is damaged or physically damaged, or damaged due to excessive humidity or other reasons, the instrument must be disconnected from the power supply in time and the instrument must not be used again until the professional service personnel of the instrument verify the safety. If necessary, please contact the instrument supplier for necessary service or maintenance in time to ensure safety.

2.1 Unpacking inspection

In order to ensure the safety of transportation, the outer packaging of the OTDR is in a carton, and the product qualification certificate, product warranty card, charger and other accessories are placed in the waterproof soft bag.

Please check when you receive the product:

- Whether the outer packaging carton of the instrument is damaged, and

whether the appearance of the product is damaged;

- Check whether the products and accessories are complete according to the standard configuration and the ordered option configuration list;

-

attention :

Please check the products item by item according to the packing list. If there is any missing, please contact the supplier in time.

Please fill in the product warranty card carefully and keep it properly.

If necessary, save the packing material for future use in case of transshipment.

2.2 Power supply information

The charger supplied with this device is specially designed for use with the OTDR.

When you need to use an external power supply for charging and operation, please use the lithium battery charger provided by the supplier. The main parameters of the charger are :

AC input: 100V ~ 240V, 50/60 Hz, maximum 0.5A;

DC output: 5V, max 2000mA ;

warning :

Do not use the charger that is not included with the machine to avoid

damage to the power supply and battery of the instrument.

When connecting the charger, please make sure that the voltage of

the connected power supply is within the specified range.

The supplied charger is for indoor use only.

2.3 Laser Safety Information

This instrument is a Class 3R laser product, which complies with IEC60825-1

Amendment 2 Standard: 2001 and 21CFR1040.10. Looking directly at the beam can

cause physical harm.

warning :

Do not install or terminate fibers while the light source is active,

never look directly into the signal-loaded fiber, and ensure your eyes

are protected at all times.

Hazardous radiation exposure may result if controls, adjustments,

and operation and maintenance procedures are not carried out in

accordance with the operating procedures specified below.

3 OTDR introduction

3.1 Install and remove equipment

OTDR can be divided into GAMMA and OTDR modules (as shown in Figure 3.1) , Both are assembled and disassembled by hexagon socket screwdriver. It is not recommended to disassemble the OTDR module. After disassembly, it is necessary to cover the high-speed connector with a protective shell to avoid short circuit caused by pin connection.
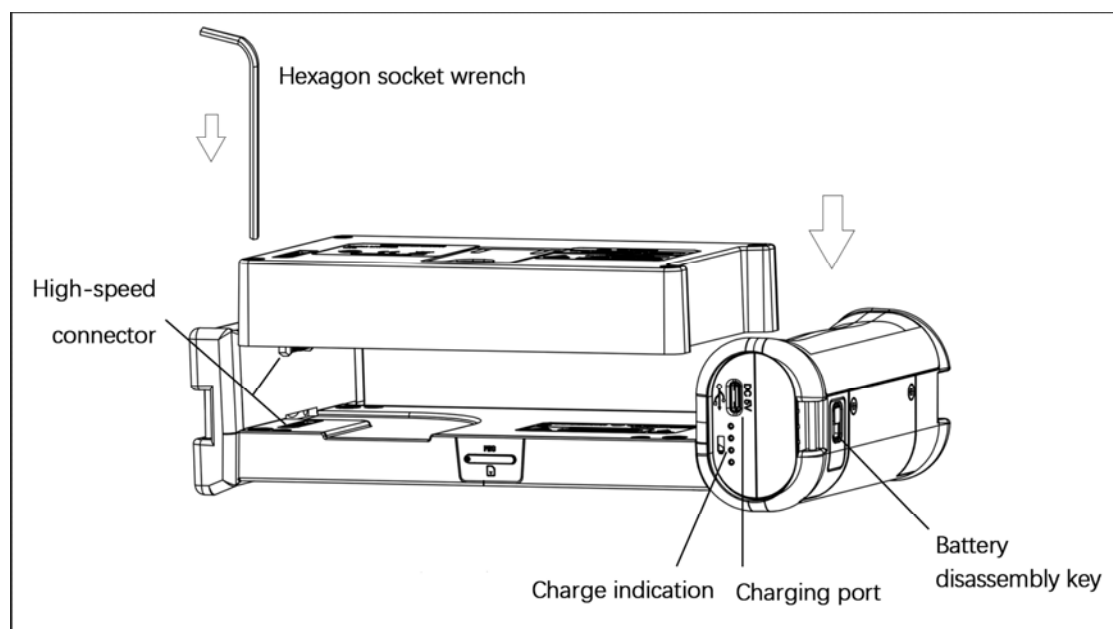
Figure 3.1 OTDR   Separation diagram

3.2 Start and shut down the equipment

3.2.1 Start equipment

When the device is in the shutdown state, long press the power key for more than 4 seconds, the device will initialize for several seconds, and then the main

menu interface will be displayed. From left to right, you can see OTDR, opm-vfl-laser and system tools.

3.2.2 Shutdown equipment

When the device is powered on, click the power button, and the device will enter the sleep state. Click the power button again to wake up the device

When the device is powered on, press and hold the power key for more than 4 seconds, and the device will shut down. (please do not do this during the use of the APP, which may lead to the loss of files saved by the user)

3.3 OTDR introduce

3.3.1 Software introduction

Figure 3.2-1 GAMMA main interface

OTDR Icon: the leftmost is the OTDR software icon. Click "OTDR" to enter the OTDR interface. The odtr main interface can be divided into four areas: Area 1 is the parameter display area, area 2 is the curve display area, area 3 is the function

button area, and area 4 is the event point display area. The functions of each area will be introduced below.
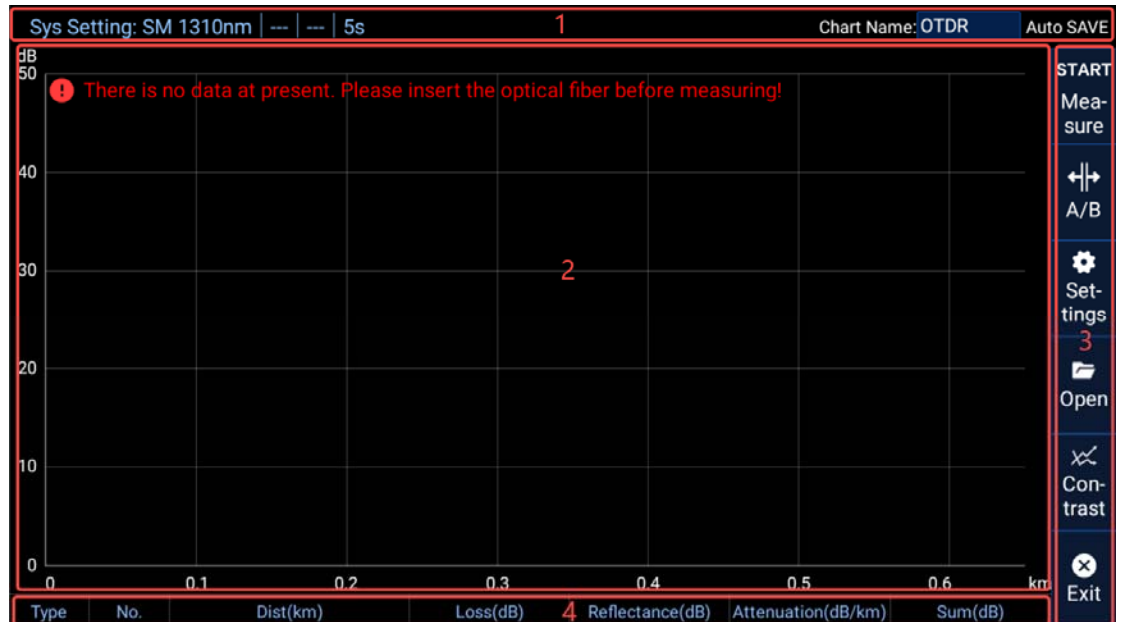
Figure 3.2-1 OTDR main interface

① Parameter display area: Area 1 mainly displays the parameters of the setting page, including the wavelength, distance, pulse and duration in the conventional parameters, as well as the curve name and saving method in the stored parameters. When the "measurement area 1..." prompt in the measurement area 1 will also be displayed.Area 1 also has a measurement status display bar. During measurement, Prompt message"Measuring..." will be displayed in the middle of area 1.

② OTDR curve interface area: the trend of the curve can display various problems existing in the tested optical fiber. The operation logic of the curve is complex. Users can check the curve. For details, see section 6 - management test results.

③ Function button area: the function buttons in area 3 include six main function buttons on the left and two hidden buttons on the right. The functions of the buttons are as follows: :
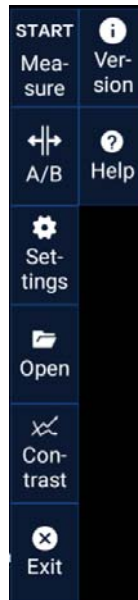
Figure 3.2-1 Button area

a) Start & stop measurement button: when there is no measurement, it is displayed as start measurement. Click to start measurement; During the measurement process, it is displayed as stop measurement. Click to stop the measurement. During the measurement, there will be prompt information on the main interface, indicating that the current software is under measurement.

b) A /B calibration line button: it can assist in viewing curve data (see 6.4-A /B function introduction for details).

c) Setting button: Click to jump to the setting page and set relevant

OTDR

parameters (see 4 - setting OTDR for details).

d) Open button: Click to jump to the curve file page and operate relevant

files (see 6.5 - view curves and pictures for details).

e) Comparison button: Click to jump to the operation page of

comparison documents (see 6.6 - adding comparison curve for

details).

f) Exit button: click the button and a pop-up box will appear asking

whether to exit. Click "yes" to exit OTDR. Click "no" to cancel the exit

operation.
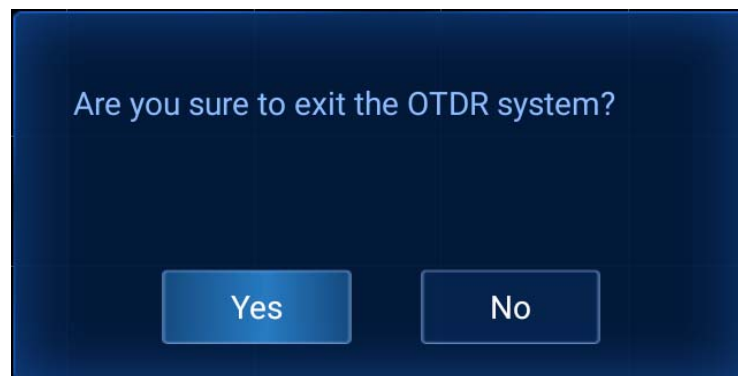
Figure 3.2-1 Confirm whether to exit the pop-up window

g) Version button: click this button to pop up the version information of

GAMMA and software.

序列号:88888888888888888888

OS版本:0.14.05.23

软件版本:V1.0.2

FPGA版本:1.0.2

DSP版本:1.3.2
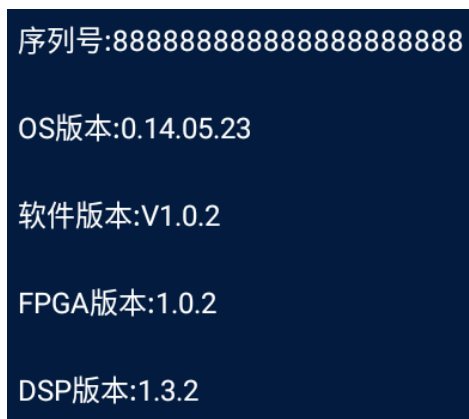
Figure 3.2-1 Version information

h) Help button: click the help button to view the product manual.

④ Event point display area: slide on the screen to display the event point interface, which is used to display detailed event point data (see 6.3 event point interface for details)

OPM laser VFL Icon: Click to enter the auxiliary tool page. There are three detection tools in the auxiliary tool interface: visible light source VFL, invisible light source laser and optical power meter OPM (see 5.3 auxiliary tool test for details).
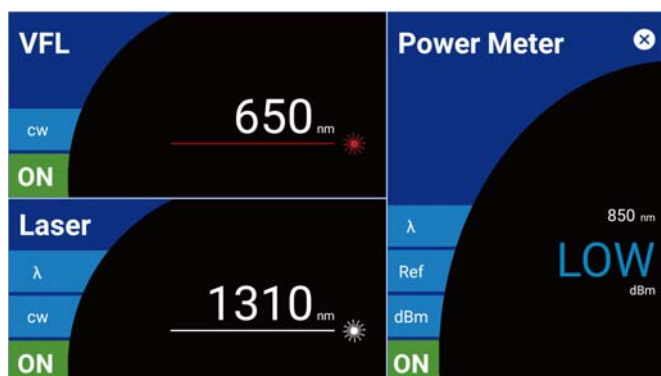
(一) System tool icon: Click to enter the system tool page, which contains some common gadgets such as camera, photo album, computer and clock.

3.3.2 Start OTDR

After clicking "OTDR", GAMMA will supply power to the OTDR module, and then the built-in program of the OTDR module will be awakened. The whole process will take about 35S, during which the main interface of the software will also prompt the wake-up time. When the power supply of OTDR module is completed, the program in the module will continue to run. When exiting OTDR or OPM-Laser VFL, GAMMA will not terminate the power supply to OTDR module. The OTDR module will stop running only when there is a problem with GAMMA power supply caused by GAMMA shutdown or other misoperation.
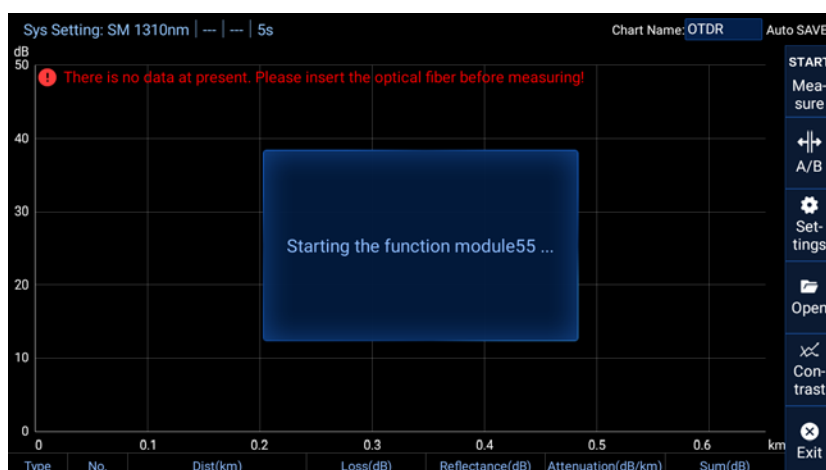
Figure 3.2-6 Start function module pop-up window

After each restart, when the OTDR software is opened, the OTDR interface will display "starting function module" (Figure 3.2-6). At this time, GAMMA will re supply power to the OTDR module (30-40s). After the pop-up window disappears, the main menu of OTDR will be displayed (Figure 3.2-5).

If the initialization timeout is prompted (Figure 3.2-7), it indicates that there is a

problem in the communication between GAMMA and OTDR module. At this time,

it is necessary to check the Ethernet configuration (see 3.2.4 and 3.2.5 Ethernet

settings). If there is no problem in the Ethernet configuration, it indicates that

there is a problem in the power supply of GAMMA and OTDR module. You can

check the power supply of GAMMA and OTDR module by yourself, Or consult the
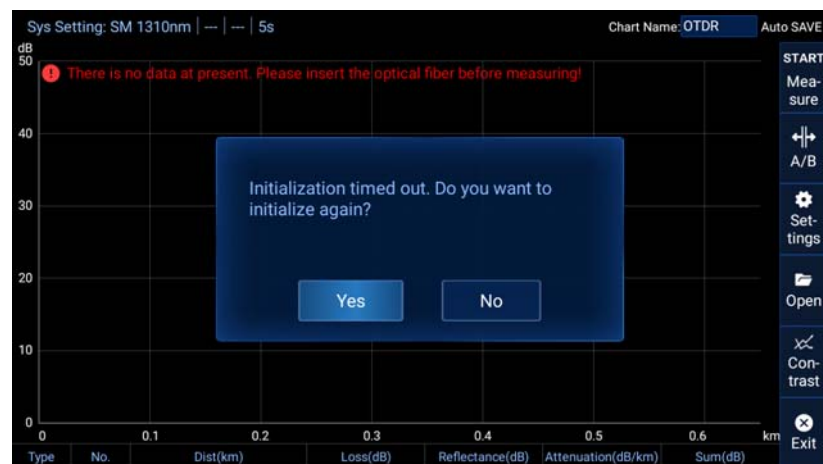
sales staff directly.

Figure 3.2-7 Initialization timeout

3.3.3 Turn off OTDR

Click the exit button in the lower right corner (or the return button on GAMMA),

and a prompt box "OK to exit OTDR" will pop up. Click "yes" to exit OTDR. (please

do not exit during the measurement process or when operating the setting page,

which will lead to errors in the parameters edited by the user or the saved data)
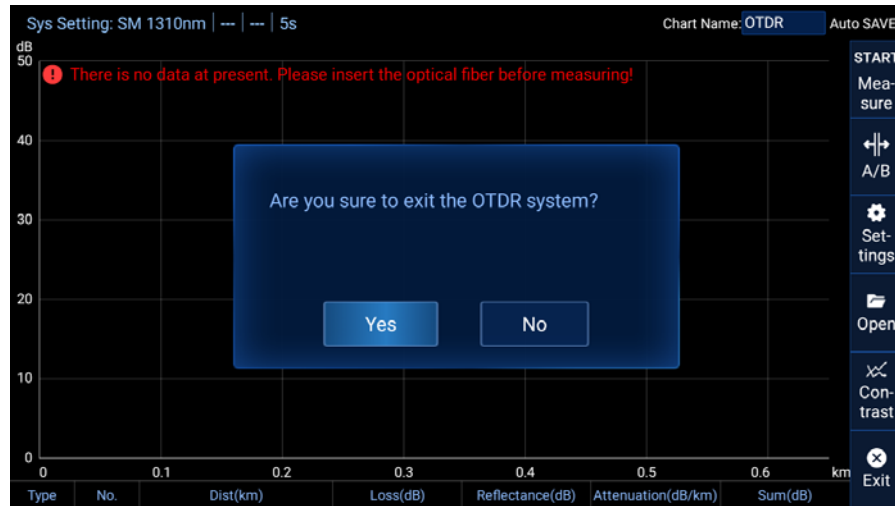
Figure 3.2-7 Confirm whether to exit the pop-up window

3.3.4 Check Ethernet and WiFi status

Before OTDR software starts, it is necessary to ensure that Ethernet is fully configured, Ethernet is on and WiFi is off. Click the system tool icon in the main interface, then click the setting icon, and then click Network and Internet. After entering the network setting page, you will see the network status setting column as shown in figure 3.2-2. Please ensure that the WLAN column is turned off and the Ethernet column is turned on.
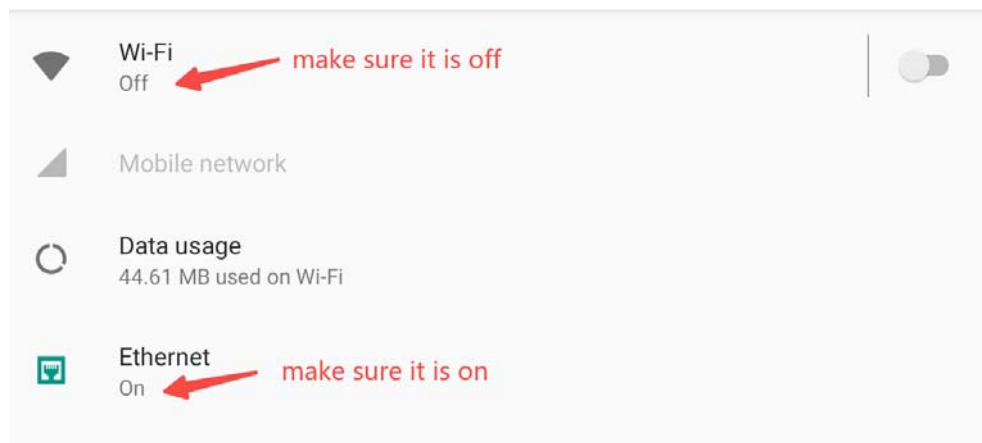
Figure 3.2-2 Network settings page

3.3.5 Configure Ethernet

Ethernet is set by default when leaving the factory, but if the Ethernet data is cleared due to deletion of Ethernet data, update of underlying driver and other misoperations, there will be problems in the communication between GAMMA and OTDR module. At this time, it is necessary to reconfigure the Ethernet.
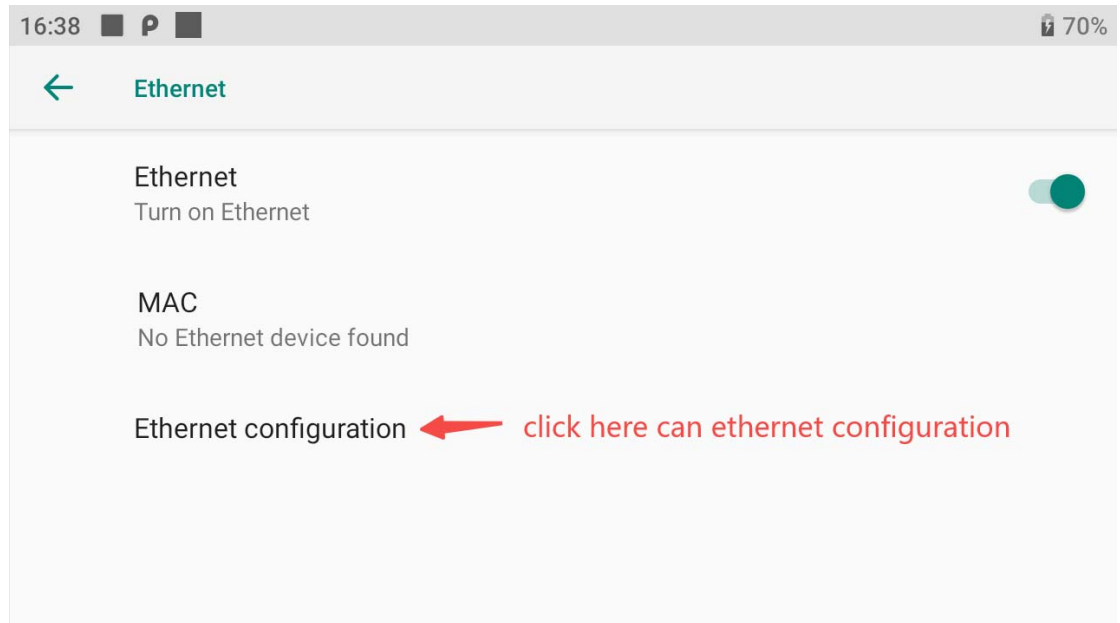
Figure 3.2-3 Ethernet switch page

Click the Ethernet column (Figure 3.2-2) to enter the Ethernet configuration page, and then click Configure Ethernet to check whether the Ethernet configuration is correct (IP address: 192.168.1.150, default gateway: 0.0.0, subnet mask: 255.255.255.0, domain name 1:8.8.8, domain name 2 is empty). If there is Ethernet data that does not meet the above settings, you need to manually configure the Ethernet data of the corresponding item. Click the data column that does not meet the settings (Figure 3.2-4), and then the input box will pop up. Click the input box to edit the corresponding data.
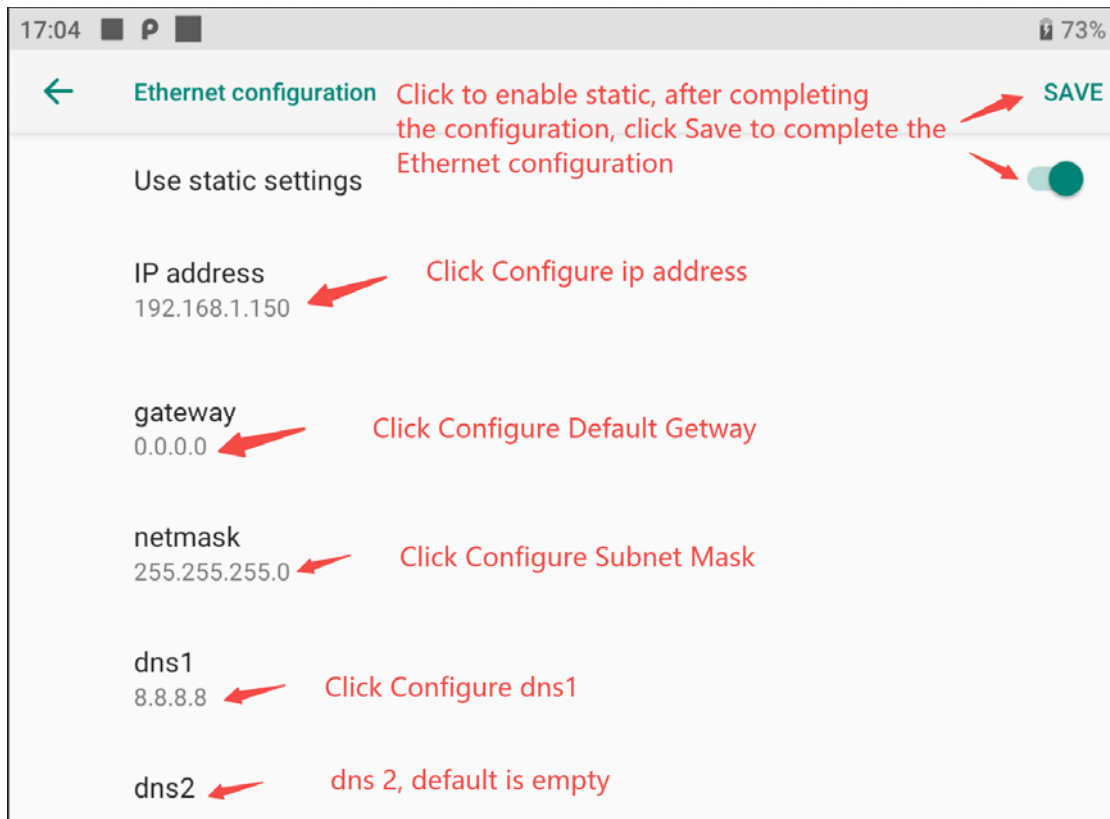
Figure 3.2-4 Ethernet configuration page

4 Set OTDR

4.1 Set general parameters

Click the setting button to open the setting page to see the general parameter setting interface. The specific functions of each function bar of the general parameter setting page will be introduced below :
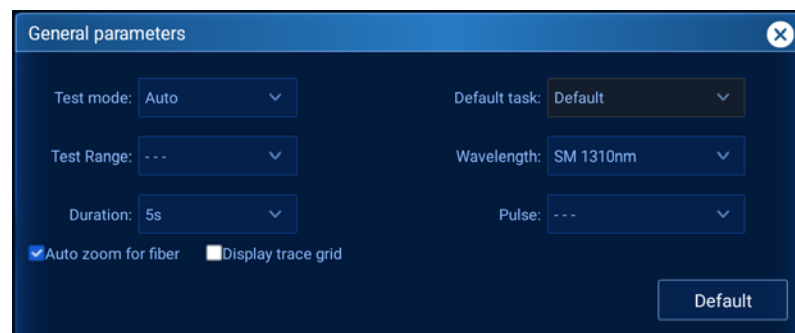
Figure 4.2-1 General parameter setting page

OTDR

- **Test mode**: click the "measurement mode" box to pop up five modes of measurement tasks (automatic, manual, real-time, fault finder and task mode), which have different functions :

① Automatic mode: the wavelength type and duration can be customized in the automatic mode, and the test range and pulse are returned by the OTDR module. When you are not clear about the length and pulse size of the measured optical fiber, you can choose the automatic mode.
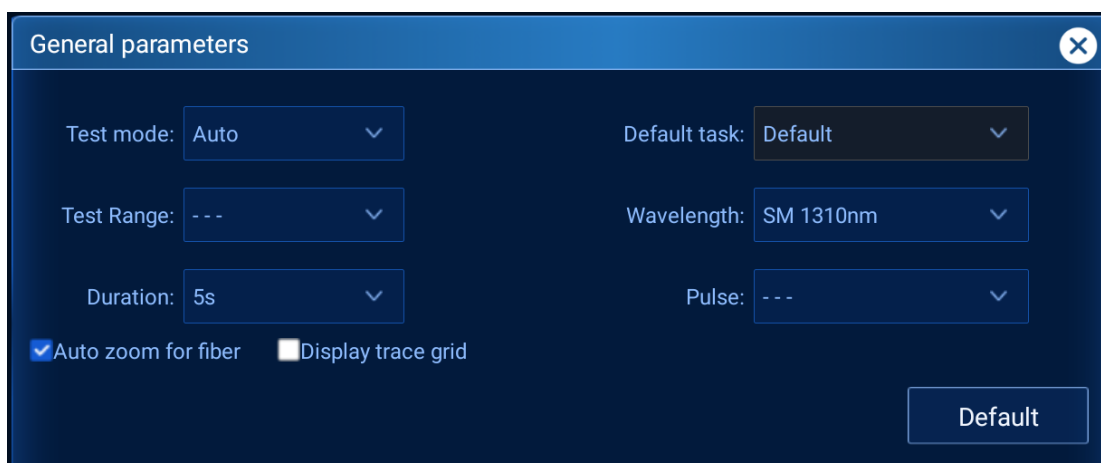
Figure 4.2-3   Automatic mode

② Manual mode: in manual mode, you can customize the wavelength type, test range, pulse and duration. Manual mode can cooperate with automatic mode for more accurate measurement. When you know enough about the measured optical fiber, you can choose manual mode.
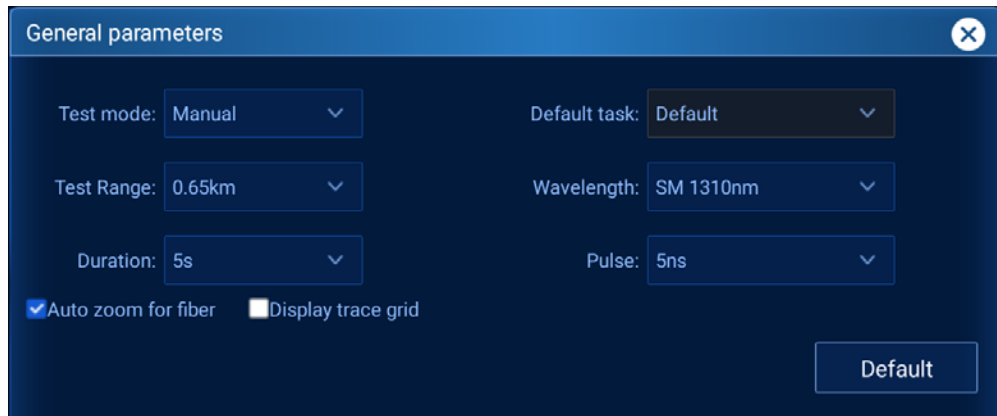
Figure 4.2-4 Manual mode

③ Real time mode: the real-time mode can customize the wavelength type, test range and pulse; However, the duration cannot be changed. It is fixed to test all the time, and the measurement needs to be stopped manually. Real time mode is a method we provide to observe the curve trend for a long time.
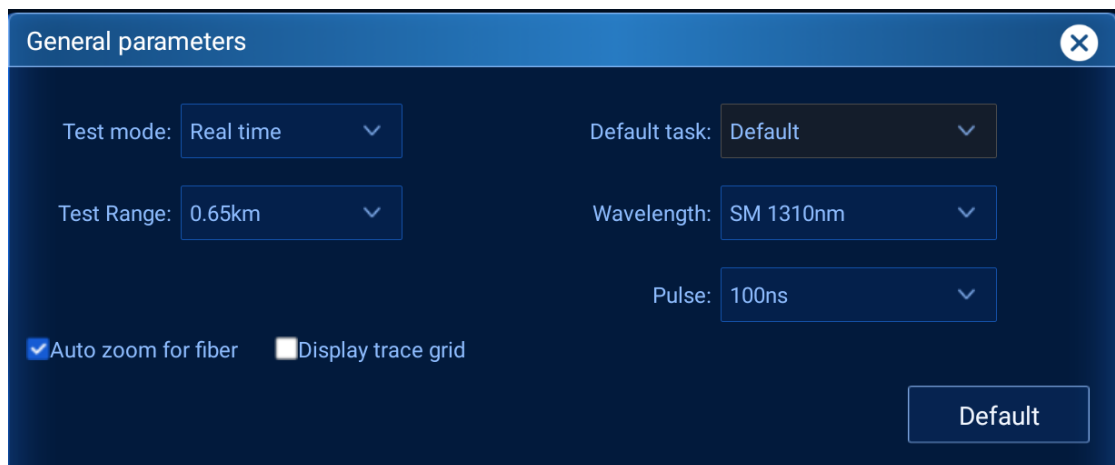

Figure 4.2-4 Real time mode

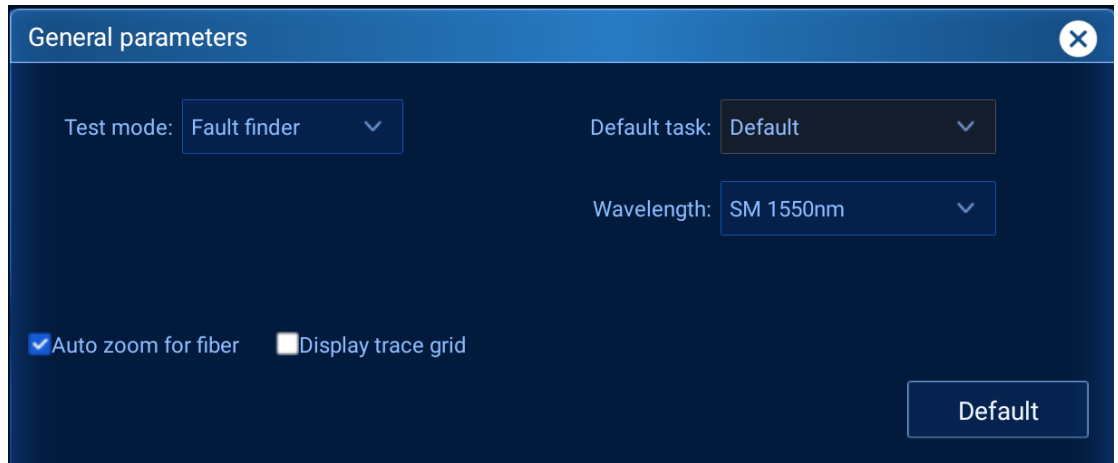④ Fault Finder mode: the wavelength can be customized, others cannot be set, and the test time is 45s

Figure 4.2-5 Fault Finder mode

⑤ Task mode: task mode is a mode provided by us to facilitate users to quickly use OTDR. When the measurement mode selects the default task, the "default task" column on the right is no longer grayed out and becomes operable. We can see some built-in tasks in the task list. Various parameters of these tasks have been set. Just select them and click the measurement button to start the test.
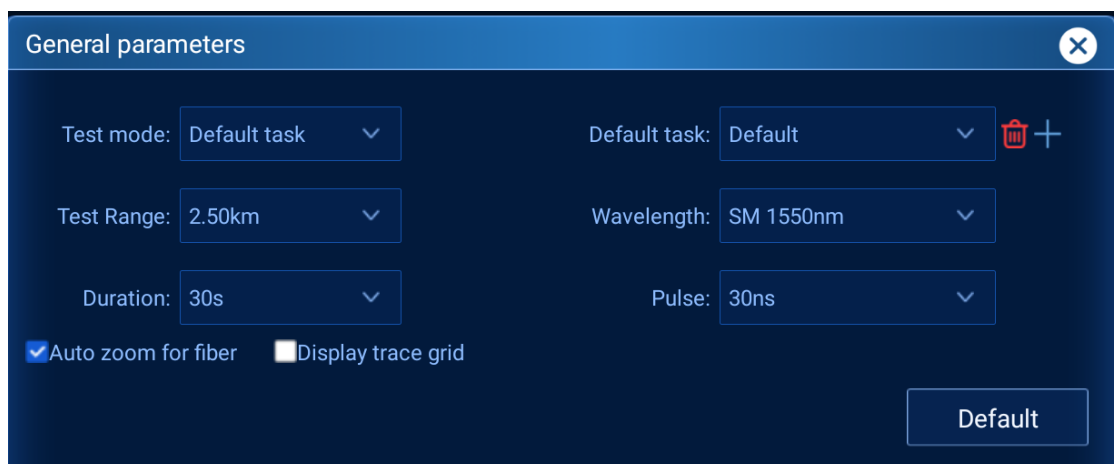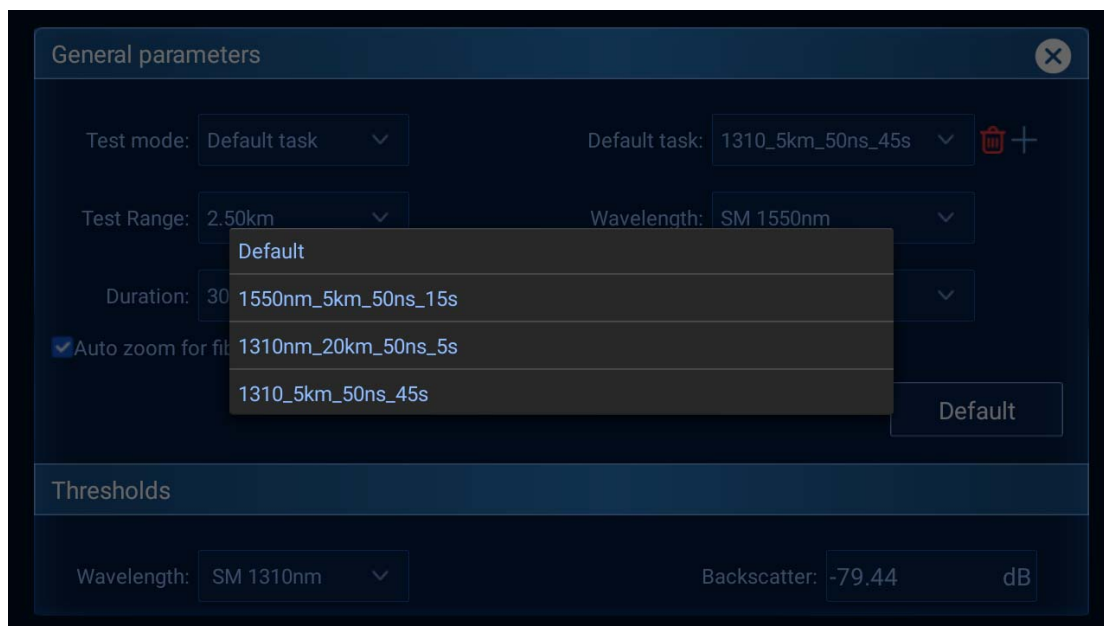

Figure 4.2-5 Task mode

Figure 4.2-6 task list

Default task: in the default task column, you can select some tasks brought by the system to help you quickly complete parameter settings. Click the default task column to see a list of some common tasks preset by us. The parameters are separated by underline. From left to right, they are wavelength, range, pulse and duration.
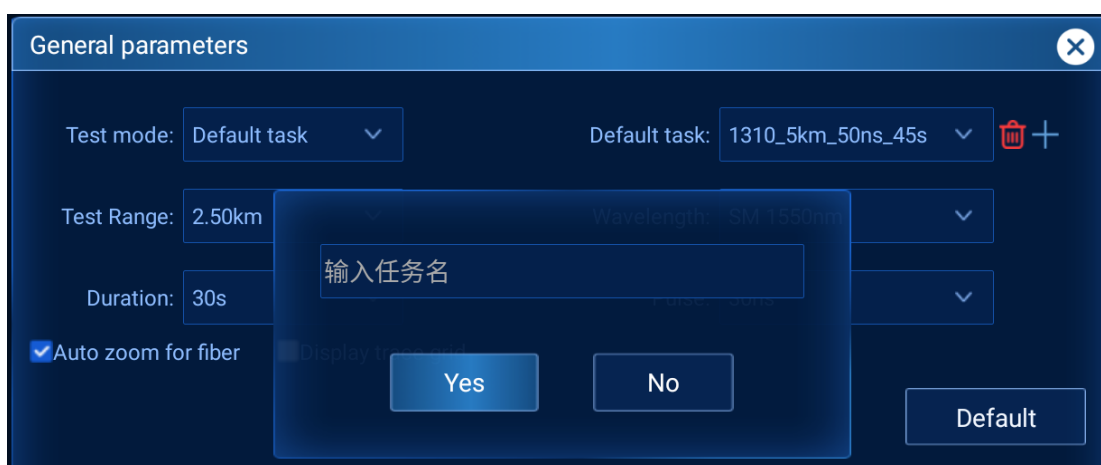

Figure 4.2-7 Custom task

If these preset tasks cannot meet your needs, you can also add some custom tasks to facilitate your multiple measurement and use. Click "+" on the right, and the task name input box will pop up. After entering the user-defined task name, the task will be added to the default task list. Then you can select the custom task to measure.

Wavelength: click the wavelength box to switch the wavelength. The system provides two types of wavelengths (1310nm and 1550nm) for measurement. You can also choose 1310&1550nm. After selecting this wavelength, it will emit 1310nm and 1550nm for measurement
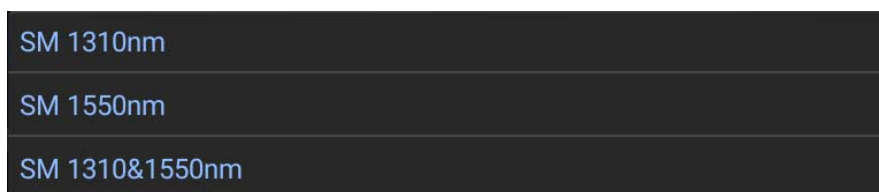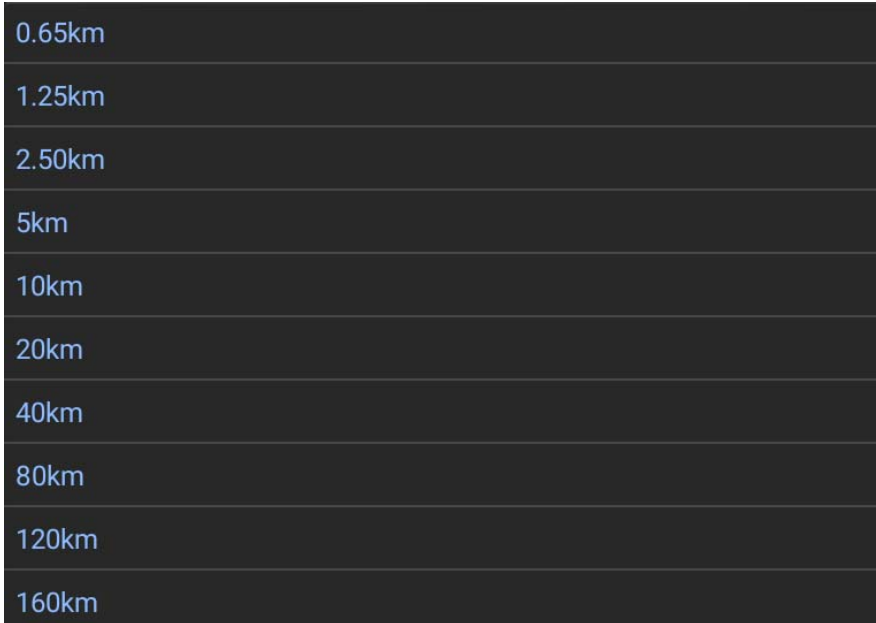
SM 1310nm
SM 1550nm
SM 1310&1550nm

Figure 4.2-8 Wavelength selection

- **Test range**: click the test range box to switch the test range. The system provides 11 types of test ranges (0.65km, 1.25km, 2.5km, 5km, 10km, 20km, 40km, 80km, 120km, 160km and 260km). Selecting an appropriate range can improve the accuracy of the test. Here, we recommend that the test range be 1.5-2 times the length of the tested optical fiber.

0.65km
1.25km
2.50km
5km
10km
20km
40km
80km
120km
160km

Figure 4.2-9 Test range selection

- **Pulse**: click the pulse box to switch the test range. The system provides 11 types of pulses (5ns, 10ns, 30ns, 50ns, 100ns, 275ns, 500ns, 1us, 2.5us, 10us and 20us). The selection of pulses needs to be changed according to the test range. Selecting appropriate pulses can improve the accuracy of the test.

5ns
10ns
30ns
50ns
100ns
275ns
500ns
1us
2.5us

Figure 4.2-10 Test pulse selection

⚫ **Duration**: click the duration box to switch the duration. The system provides nine test durations (5S, 10s, 15s, 30s, 45s, 60s, 90s, 120s and 180s). Theoretically, the length of time will affect the accuracy of the test. The longer the time, the higher the accuracy of the event point.
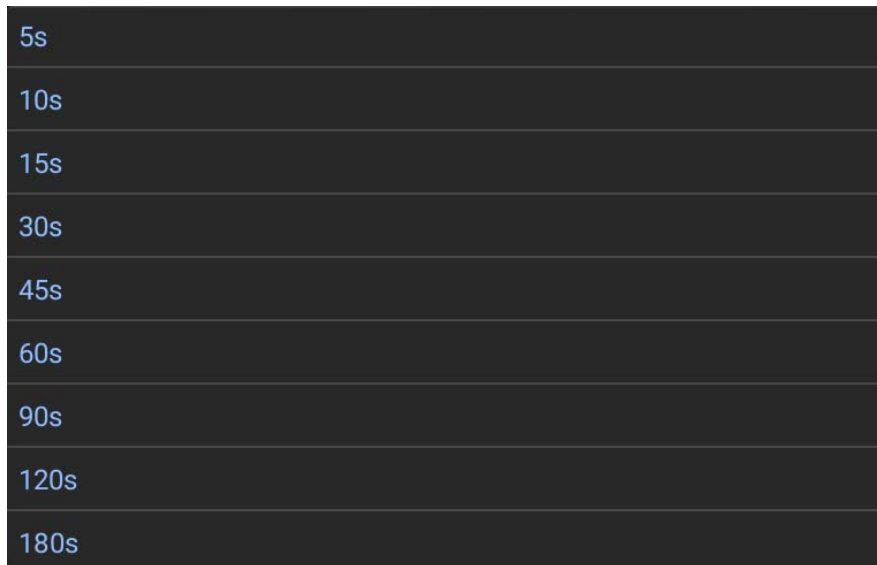

| 5s |
| 10s |
| 15s |
| 30s |
| 45s |
| 60s |
| 90s |
| 120s |
| 180s |

Figure 4.2-11 Duration selection

⚫ **Automatic scaling of diameter distance**: click the "automatic scaling of diameter distance" box to enable automatic diameter distance or cancel automatic diameter distance. Automatic scaling of optical fiber diameter distance can set the curve display to display only the complete curve view from the diameter distance starting point of the curve to the diameter distance ending point. By default, this function is selected. Even if the application automatically enlarges the fiber diameter, the scaling can still be adjusted manually. The specific effects are as follows :
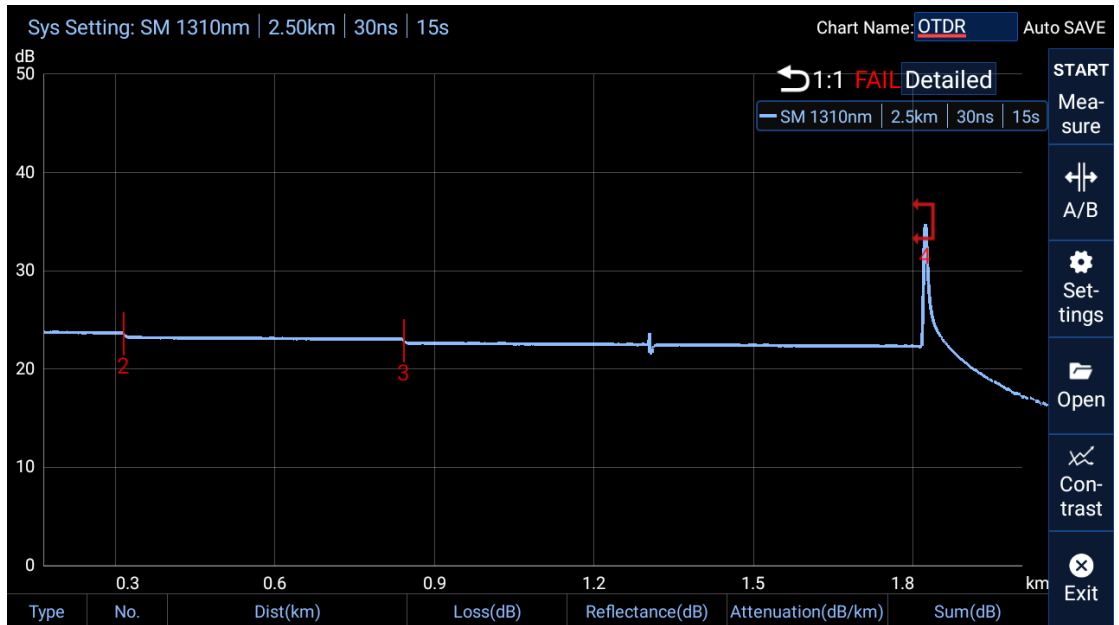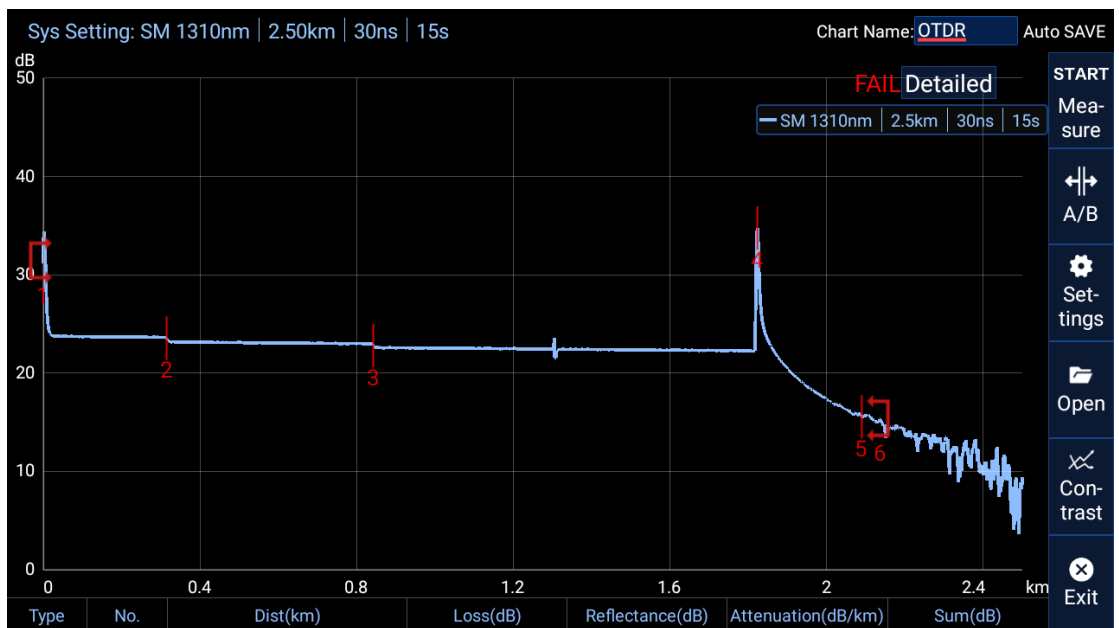
Figure 4.2-8 Check automatic diametral distance

Figure 4.2-9 Cancel automatic diametral distance

● **Display event are**a: click the "display event area" box to enable or cancel the display of event area. The event (optical fiber) area can be displayed or hidden in the event pane, depending on the value type to be viewed. If an event area is displayed, the event pane contains the area length and

area attenuation values. The specific effects are as follows :

Type	No.	Dist(km)	Loss(dB)	Reflectance(dB)	Attenuation(dB/km)	Sum(dB)
⌐ →	1	0.0000	---	-39.5		0.000
⊢⊣		0.3156	0.130		0.4	0.130
⌐⌐	2	0.3156	0.442			0.572
⊢⊣		0.5271	0.177		0.3	0.749
⌐⌐	3	0.8427	0.376			1.125
⊢⊣		0.9808	0.329		0.3	1.454
⌐ ⊓	4	1.8235	---	-33.1		1.454

Figure 4.2-10 Check the display event area

Type	No.	Dist(km)	Loss(dB)	Reflectance(dB)	Attenuation(dB/km)	Sum(dB)
⌐ →	1	0.0000	---	-39.5		0.000
⌐⌐	2	0.3158	0.441			0.441
⌐⌐	3	0.8429	0.383			0.824
⌐ ⊓	4	1.8235	---	-33.1		0.824

Figure 4.2-11 Cancel the display of the event area

● **Restore default**: click the "restore default" box to restore the previous

general parameters.

4.2 Set threshold parameters

Click the setting button to open the setting page. On the setting page, you can see

the threshold parameter setting interface. The parameters in the threshold

parameters are related to whether the optical fiber passes or not :

Figure 4.3-1 Threshold parameters page

Wavelength: 1310nm and 1550nm wavelengths can be selected in the "wavelength" box in the threshold parameter. The two wavelengths can be switched with each other. After editing the relevant parameters of the corresponding wavelength separately, the parameters of other wavelengths will not change. When measuring, the threshold parameter of the corresponding wavelength will be read to judge whether the curve passes or not.

Figure 4.3-2 Parameter page of 1550nm

For example, after the wavelength is 1310nm, adjust the welding loss to 0.06, and then switch the wavelength to 1550nm. It is found that the parameter in the column of welding loss is still 0.5 and has not changed. When the wavelength is switched to 1310nm again, the welding loss will be displayed as 0.06.

Backscattering: the "backscattering" box in the threshold parameter can change the value of backscattering. The backscattering (RBS) coefficient represents the backscattering amount of a specific fiber. RBS coefficient is used to calculate the loss and reflectivity of events, which is usually obtained from the optical cable manufacturer. The system determines a default value for each wavelength.

IOR: the "IOR" box in the threshold parameter can change the set value of IOR, and the refractive index (IOR) value can be used to convert the flight time into distance. Therefore, knowledge of the correct IOR is critical for all distance related OTDR measurements (event point location, attenuation, area length, total length, etc.). IOR is provided by optical cable or optical fiber manufacturer. The system also determines a default value for each wavelength.

Type	No.	Dist(km)	Loss(dB)	Reflectance(dB)	Attenuation(dB/km)	Sum(dB)
⌐→	1	0.0000	---	-39.5		0.000
⌐_	2	0.3158	0.441			0.441
⌐_	3	0.8429	0.383			0.824
⌐ ⊓	4	1.8235	---	-33.1		0.824

Figure 4.3-3 Event point interface

Welding loss: the "welding loss" box in the threshold parameter can change the threshold of welding loss. When "welding loss" is checked, the test result will verify the welding loss. When the welding loss in the measurement result is greater than the set value, the curve judgment will not pass, and the threshold range of welding loss is 0.06 ~ 0.5dB.

If event points 2 and 3 in figure (4.3-3) are welding events (see Appendix A for the meaning of event type icon), the values in the loss column of event points 2 and 3 will participate in the determination of welding loss. (when the welding loss is set to 0.5, the values in the loss column of event points 2 and 3 are less than 0.5, so they are not marked in red (Figure 4.3-4-1); When the welding loss is set to 0.3, the values in the loss column of event points 2 and 3 are greater than 0.3, so they will be marked in red (Figure 4.3-4-2); When the welding loss is set to 0.4, the loss column of event point 2 will not be marked red, and the loss column of event point 3 will be marked red (Figure 4.3-4-3)).

Type	No.	Dist(km)	Loss(dB)
	1	0.0000	---
	2	0.3158	0.441
	3	0.8429	0.383

Type	No.	Dist(km)	Loss(dB)
	1	0.0000	---
	2	0.3153	0.457
	3	0.8448	0.376

Figure 4.3-4-1   Figure 4.3-4-2

Type	No.	Dist(km)	Loss(dB)
	1	0.0000	---
	2	0.3155	0.447
	3	0.8435	0.377

Figure 4.3-4-3

Reflectivity: the "reflectivity" box in the threshold parameter can change the threshold of reflectivity. When "reflectivity" is checked, the test result will be verified for reflectivity. When the reflectivity in the measurement result is greater than the set value, the curve judgment will not pass, and the threshold range of reflectivity is - 80 ~ 0dB.

For example, 1, 4 and 5 in figure (4.3-5) are reflection events (see Appendix A for the meaning of event type icon), Then the values in the reflectivity column of 1, 4 and 5 will participate in the determination of reflectivity (the principle is consistent with the determination of welding loss. When the welding loss is set to - 40, the reflectivity values of event points 1 and 4 are less than - 40, so the reflectivity column will not be marked in red, while the reflectivity column of event point 5 is greater than - 40, the reflectivity value will be marked in red (Figure 4.3-5)).

Type	No.	Dist(km)	Loss(dB)	Reflectance(dB)	Attenuation(dB/km)	Sum(dB)
⌐→	1	0.0000	---	-39.5		0.000
⌐	2	0.3158	0.441			0.441
⌐	3	0.8429	0.383			0.824
⌐ ⊓	4	1.8235	---	-33.1		0.824

Figure 4.3-5 Event point interface

Diameter distance loss: the "diameter distance loss" box in the threshold parameter can change the threshold of diameter distance loss. When "diameter distance loss" is checked, the test result will be verified for diameter distance loss.

When the diameter distance loss in the measurement result is greater than the set value, the curve judgment will not pass, and the threshold range of diameter distance loss is 0 ~ 45dB.

As shown in the column of diameter distance loss in figure (4.3-6). (the principle is consistent with the determination of welding loss and reflectivity, but the judgment parameter position is transferred from the event point list to the detailed information interface. When the value of diameter loss is greater than the set threshold, the value of diameter loss will also be marked in red)

Figure 4.3-6 Detail interface

Connector loss: the "connector loss" box in the threshold parameter can change the threshold of connector loss. When "connector loss" is checked, the test result will verify the connector loss. When the connector loss in the measurement result is greater than the set value, the curve judgment will not pass, and the range of

connector loss is 0.06 ~ 5dB.

For example, 1, 4 and 5 in figure (4.3-3) are reflection events (the meaning of the event type icon can be seen in the event type description in Appendix A). The values in the loss column of 1, 4 and 5 will participate in the determination of connector loss. However, since the loss values at the starting point and end point will not participate in the determination, only the values in the loss column of reflection event 4 will participate in the determination of connector loss. (the principle is consistent with the determination of welding loss. When the loss value of reflection event is greater than the set threshold, the loss value of reflection event will be marked in red)

Type	No.	Dist(km)	Loss(dB)	Reflectance(dB)	Attenuation(dB/km)	Sum(dB)
⌐→	1	0.0000	---	-39.6		0.000
⌐_	2	0.3153	0.449			0.449
⌐_	3	0.8416	0.377			0.826
⊓	4	1.8233	1.760	-33.0		2.586
⌐⊓	5	3.6540	---	-28.3		2.586

connector loss

Figure 4.3-5 Event point interface

Diametral ORL: the "diametral ORL" box in the threshold parameter can change the threshold of diametral ORL. When "diametral ORL" is checked, the test result will be verified. When the diametral ORL in the measurement result is less than the set value, the curve judgment will not pass, and the range of diametral ORL is 15 ~ 45dB.

As shown in the column of radial distance ORL in figure (4.3-4). (the principle is consistent with the determination of welding loss and reflectivity, but the judgment parameter position is transferred from the event point list to the detailed information interface. When the value of diameter distance ORL is greater than the set threshold, the value of diameter distance ORL will also be marked in red)

Figure 4.3-6 Detail interface

Restore default: click "restore default" to restore the previous general parameters.

4.3 Set link parameters

Click the setting button to open the setting page. Slide down the setting page to see the following interface. The specific functions of each function bar will be introduced below :

Figure 4.4-1 Link parameter setting page

Helix Factor : It is used to represent the actual length of the optical cable. The optical fiber revolves around the central axis in the optical cable tray. If it is necessary to test the length of the optical cable, the Helix Factor needs to be used. After setting the Helix Factor, the measured "position / length" follows the following formula: D (position, length) = (1 - reinforcement coefficient) * measured value.

To define the actual pitch starting point of the fiber, you can set the starting fiber length. When testing the equipment, connect a starting optical fiber between the equipment and the tested optical fiber. This is why the fiber pitch includes the startup fiber by default. When defining the length of the start-up fiber, the application sets the fiber diameter at the beginning of the measured fiber. Therefore, only events related to the defined fiber diameter are considered. The application will include the loss caused by the pitch start event in the displayed value. The radial distance start event will also be considered in determining the loss and reflectivity status of the machine (pass / fail). The starting point of the

radial distance becomes event 1 and its distance reference becomes 0. Events that

are excluded from the fiber pitch are grayed out in the event table and no longer

appear in the curve display. The cumulative loss is calculated only for the defined

fiber diameter.

4.4 Set user information

Click the setting button to open the setting page. The following interface can be

seen on the setting page :

Figure 4.5-1 User information setting page

Figure 4.5-2 Details page

This function can provide some user-defined parameters, including optical cable identification, optical fiber identification, company name, operator, customer information and remarks. The specific functions of each parameter can be seen in the 6.1 detailed information interface.

4.6 save setting

Click the setting button to open the setting page. The following interface can be seen on the setting page :
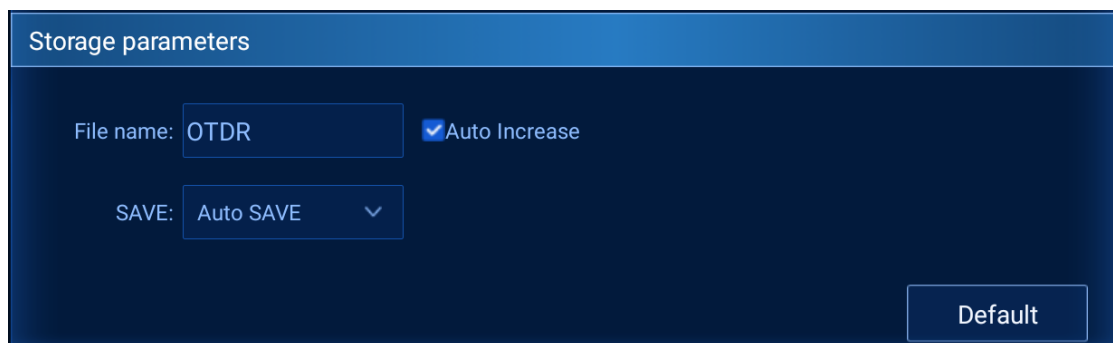
Figure 4.6-1 save settings page

File name: the file name is related to the name of the curve and figure (the name group of the curve becomes: file name + wavelength + automatic suffix)
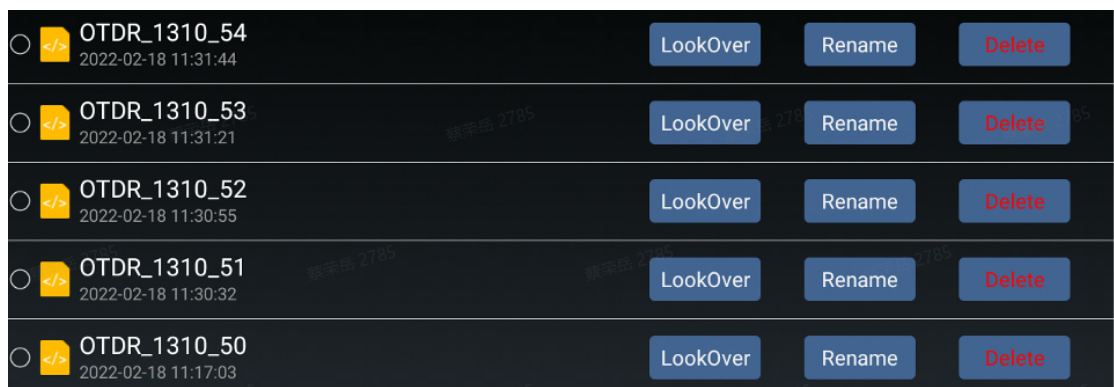
Figure 4.6-2 Curve list page

Auto increase: check the box. After the file is saved successfully, the file name will be automatically increased by 1 (it will not be accumulated when saving is cancelled); When unchecked, no matter whether the file is saved or not, it will not grow. It is checked by default.

The system provides a total of five save modes for selection. Click the save mode column to pop up the save setting item.
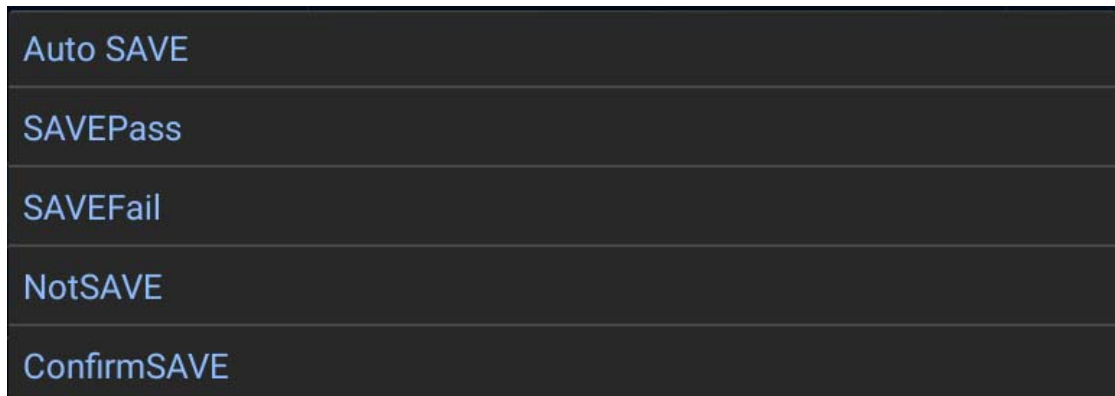
Figure 4.6-3 Set save mode

Auto save: automatically save curve data after measurement, and ask whether to save it after repetition.

Save when passing: after the measurement is completed, only the curve passing the measurement will be saved. and ask whether to save it after repetition.

Save in case of failure: after the measurement is completed, only the curves that fail to pass the measurement will be saved. and ask whether to save it after repetition.

Do not save: the results of this measurement will not be recorded.

Confirm before saving: after the measurement is completed, you will be asked whether to save. Click "yes" to confirm the saving, and click "no" to cancel the saving.

5 OTDR Test

5.1 Cleaning and connecting optical fibers

Attention:

To ensure maximum power and avoid false readings:

● Always clean the end of the optical fiber according to the following instructions before inserting it into the port. OTDR is not responsible for damage or errors resulting from improper fiber cleaning or handling.

● Ensure that the optical fiber jumper has the correct connector. If the connector does not match, it may cause damage.

To connect the optical cable to the optical port

1. Clean the end of the optical fiber as follows:

a. Gently wipe the end of the optical fiber with a lint free swab soaked in isopropyl alcohol

b. Dry completely with compressed air

2. Carefully align the connector with the port to prevent the end of the fiber from touching the outside of the port or rubbing with other surfaces

If the connector interface has a convex fixed design, please confirm that it can be correctly inserted into the corresponding groove of the port during connection

3. Push in the connector to secure the cable in the correct position and ensure full contact

If the connector has a screw sleeve, tighten the connector to secure the fiber in the correct position. Do not over tighten the connector, otherwise the fiber and port will be damaged

Note: if the optical cable is not fully aligned or connected, serious loss and reflection will occur

5.2 Test

Click OTDR in the main menu to enter the test option. When conducting OTDR test, the type of optical fiber mode shall be specified and the optical fiber shall be connected to the correct port to obtain the correct test curve and results. (1.2 product composition in the overview, you can view the interface description)

5.2.1 Test in automatic mode

The application automatically evaluates the best location based on the fiber connection currently connected to the device. By default, fiber characteristics are

evaluated every time you start the test, which is especially useful if you often have

to test fiber connections of different lengths.

If you wish, you can set the device to maintain the same settings (range and pulse)

for all samples. This method is very useful if you need to test several similar fibers

in the same optical cable.

Sampling curves in automatic mode:

1. Clean the connector correctly

2. Connect a startup optical fiber between the tested equipment and the OTDR

port, and set the startup optical fiber length if necessary (refer to setting link

parameters in Section 4.3).

Attention：

Do not connect the load signal fiber to the OTDR port. Any

external signal with strength exceeding - 40 DBM will affect OTDR

sampling. Any external signal with strength exceeding - 20 DBM will

cause permanent damage to OTDR.

3、Click the OTDR icon to enter the OTDR software, and then click the setting

button to enter the parameter setting interface
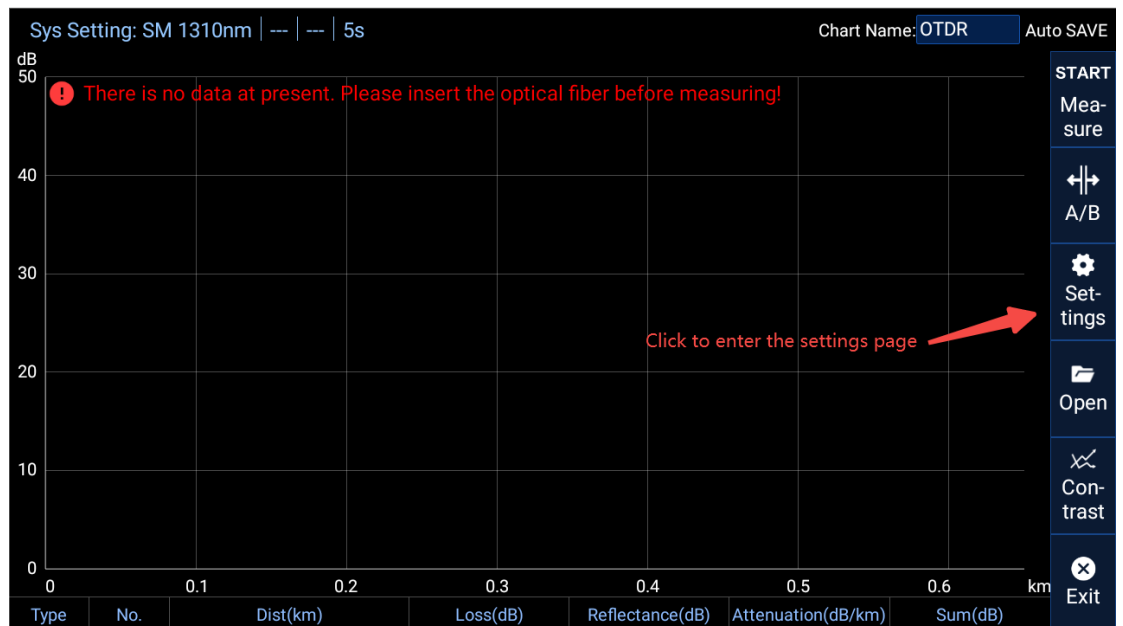
Figure 5.2-1 OTDR software interface

4、Click the drop-down box behind the test mode in the software interface, and select "automatic" in the pop-up window of measurement mode. Then click the drop-down box behind the wavelength and select the wavelength you want to test (the wavelength can be selected by yourself. 1310nm-1550nm is dual wavelength. When dual wavelength is selected, it will be measured twice continuously). Duration (more than 45s is recommended).

Figure 5.2-2 OTDR Measurement mode selection interface

SM 1310nm

SM 1550nm

SM 1310&1550nm

Figure 5.2-3 OTDR Wavelength selection interface

5s

10s

15s

30s

45s

60s

90s

120s

180s

Figure 5.2-4 OTDR Duration selection interface

General parameters ⊗

Test mode: Auto ∨   Default task: Default ∨

Test Range: - - - ∨   Wavelength: SM 1310nm ∨

Duration: 5s ∨   Pulse: - - - ∨

☑Auto zoom for fiber   ☐Display trace grid

Default

Figure 5.2-5 OTDR Setting interface

5. After selecting conventional parameters, click the exit button in the upper right

corner to exit the setting page, and then click "start measurement" in the OTDR

interface or click the physical measurement button above the equipment to start the test.

6. After starting the measurement, there will be corresponding prompt on the OTDR interface, indicating that the equipment is in the process of measurement. You can observe the "measuring..." on the main interface .And the timer behind "Sys setting" to judge whether the measurement is completed. Wait for the timer above the device to zero and the "measuring..." prompt disappears, indicating that the measurement is completed.

Figure 5.2-6 OTDR Measuring

7、 After the measurement is completed, the OTDR interface will display the measurement results. Sliding the screen up and down can view the detailed data of event points. The double finger operation curve interface can zoom the curve, and use A/B to view the specific information of each positioning. (see Chapter 6 management test results for detailed operation procedures)

OTDR

Figure 5.2-7 OTDR Measurement complete

5.2.2 Manual mode test

Compared with the automatic mode, the measurement range and measurement pulse need to be set independently. The measurement range is recommended to be between 1.5-2 times of the actual length of the optical fiber, and the pulse size can be selected by ourselves. (low pulse can improve the accuracy of events, but the measurement range is small; high pulse can improve the measurement range, but the accuracy of events will decrease)

The operation process of manual mode is as follows:

1. Clean the connector correctly

2. Connect a startup optical fiber between the tested equipment and the OTDR port, and set the startup optical fiber length if necessary (refer to setting link parameters in Section 4.3).

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3. Click the OTDR icon to enter the OTDR software, and then click the setting button to enter the parameter setting interface
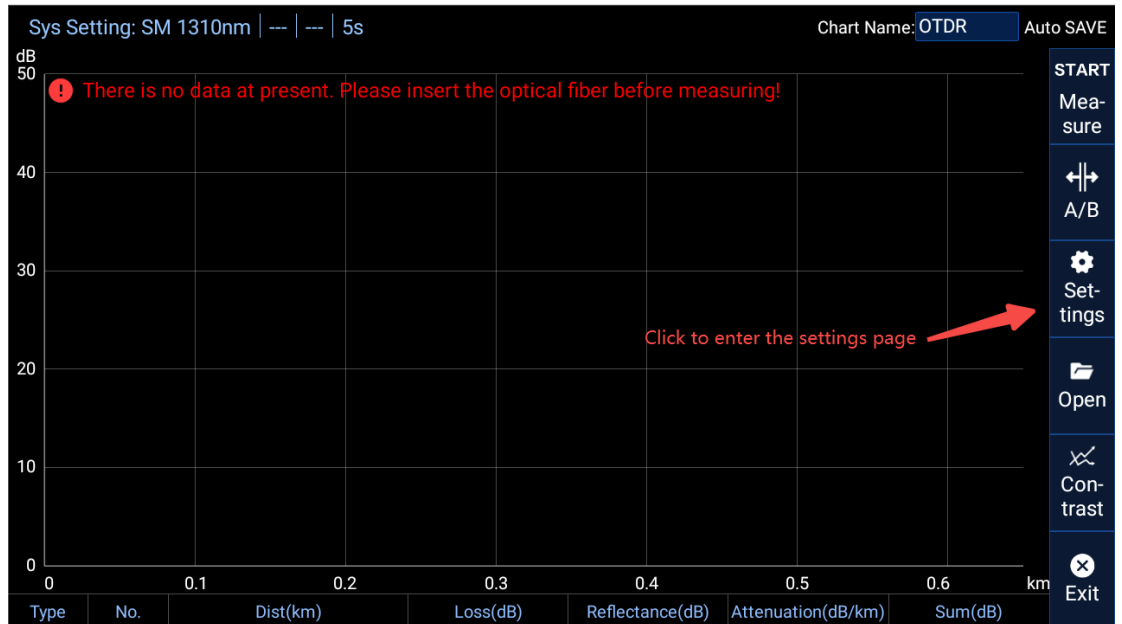
Figure 5.2-8 OTDR software interface

4、 Click the drop-down box behind the test mode and select "manual" in the pop-up window of measurement mode. Then click the drop-down box behind the wavelength and select the wavelength you want to test (the wavelength can be selected by yourself. 1310nm-1550nm is dual wavelength. When dual wavelength is selected, it will be measured twice continuously), duration (the duration is recommended to be more than 45s), click the "test range" and select the measurement range. The measurement range is recommended to be between 1.5-2 times the actual length of the optical fiber. Click pulse and select the pulse size. The "pulse" size can be selected by yourself. (low pulse can improve the accuracy of events, but the measurement range is small; high pulse can improve the measurement range, but the accuracy of events will decrease).

Auto	
Manual	
Real time	
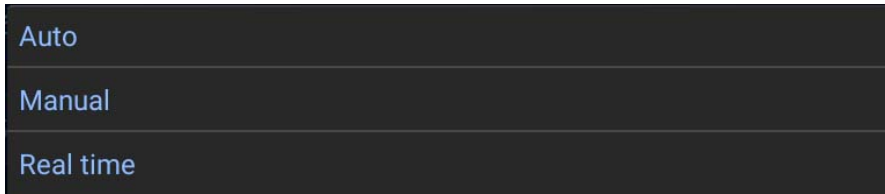
Figure 5.2-9 OTDR Measurement mode selection

SM 1310nm
SM 1550nm
SM 1310&1550nm
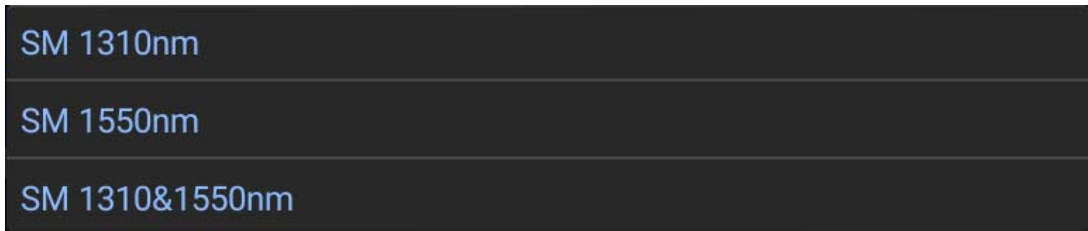
Figure 5.2-10 OTDR Wavelength selection interface

5s
10s
15s
30s
45s
60s
90s
120s
180s

Figure 5.2-11 OTDR Duration selection interface
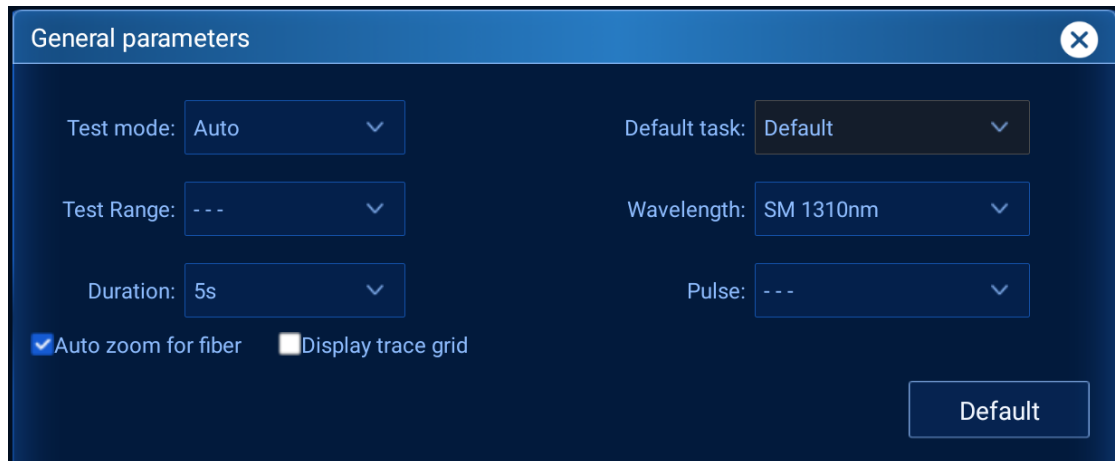
Figure 5.2-12 OTDRSetting interface

5、After selecting the general parameters, click the exit button in the upper right corner to exit the setting page, and then click "start measurement" in the OTDR interface or click the physical measurement button above the equipment to start the test.

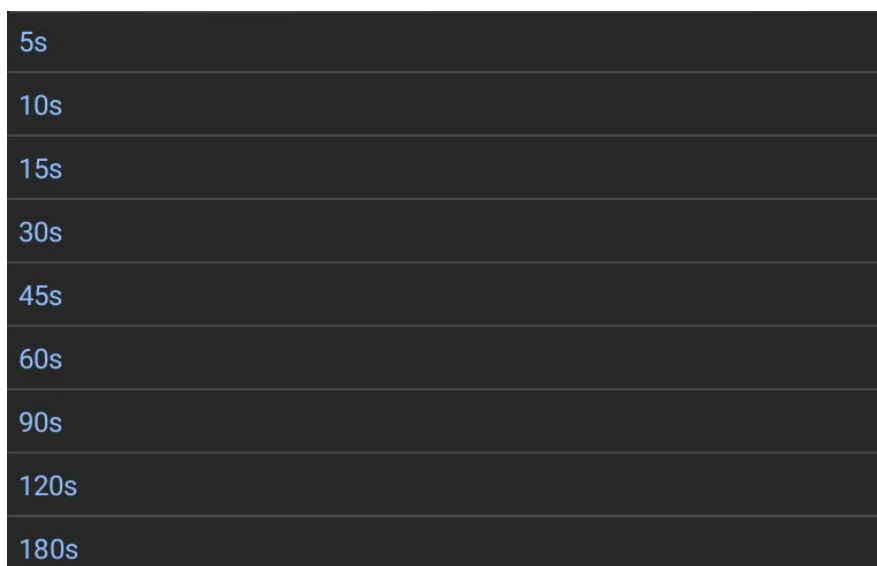6. After starting the measurement, there will be corresponding prompt on the OTDR interface, indicating that the equipment is in the process of measurement. You can observe the "measuring..." on the main interface. And the timer behind "sys setting" to judge whether the measurement is completed. Wait for the timer above the device to zero and the "measuring..." prompt disappears, indicating that the measurement is completed.

Figure 5.2-13 OTDR measuring…

7、After the measurement is completed, the OTDR interface will display the measurement results. Sliding the screen up and down can view the detailed data of event points. The double finger operation curve interface can zoom the curve, and use A/B to view the specific information of each positioning. (see Chapter 6 management test results for detailed operation procedures)
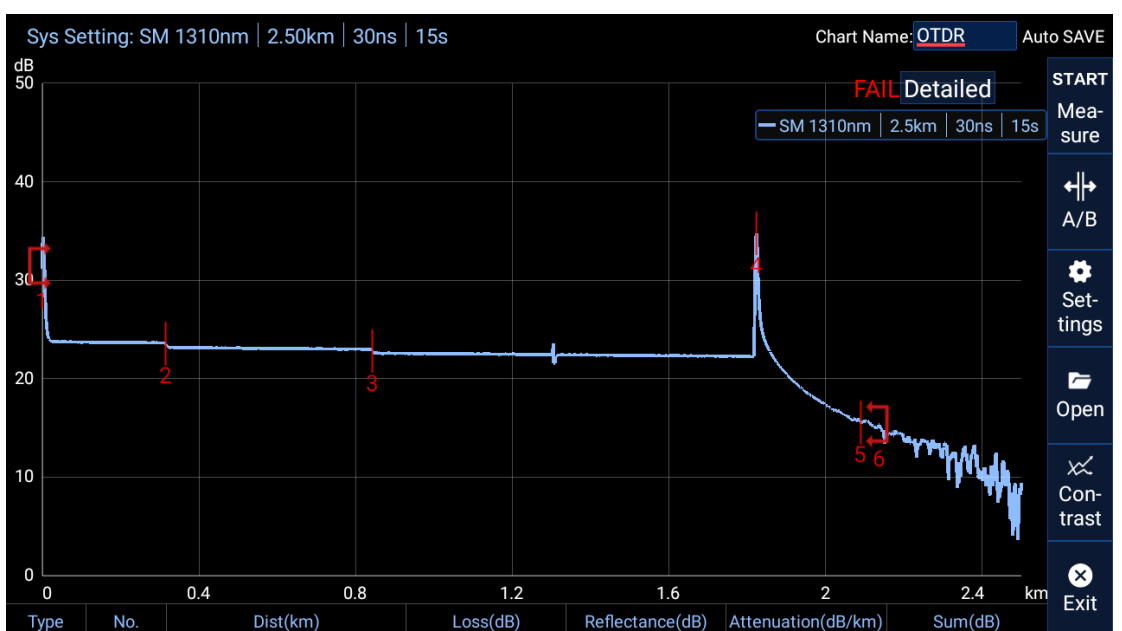
Figure 5.2-14 OTDR Measurement complete

5.2.3 Real time mode test

The wavelength type, test range and pulse can be customized in the real-time mode. The duration cannot be changed. It is fixed to be tested all the time, and the measurement needs to be stopped manually. Real time mode is a measurement mode that we provide to observe the curve trend for a long time.

The measurement process in real-time mode is as follows:

1. Clean the connector correctly

2. Connect a startup optical fiber between the tested equipment and the OTDR port, and set the startup optical fiber length if necessary (see setting analysis parameters in section 5.4).

3. Click the OTDR icon to enter the OTDR software, and then click the setting button to enter the parameter setting interface
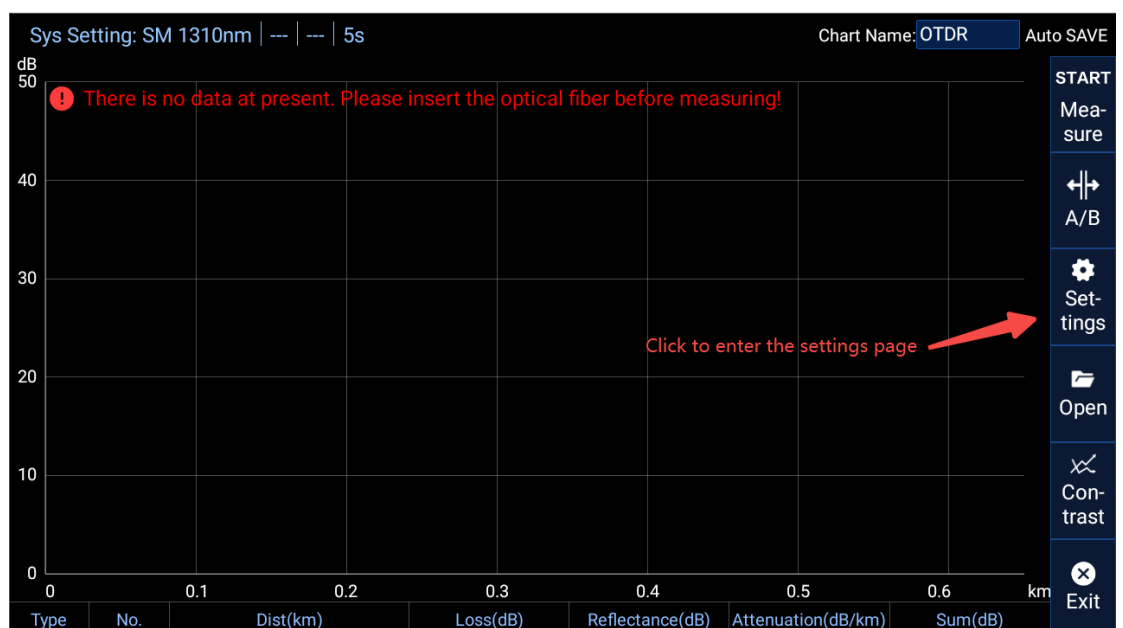
Figure 5.2-1 OTDR software interface

4、 Click the drop-down box behind the test mode and select "real time" in the measurement mode pop-up window. Then click the drop-down box behind the wavelength and select the wavelength to be tested (the wavelength can be 1310nm or 1550nm, which can only be a single wavelength).
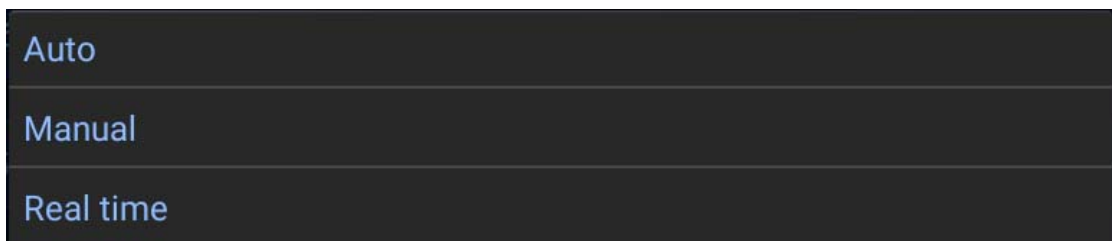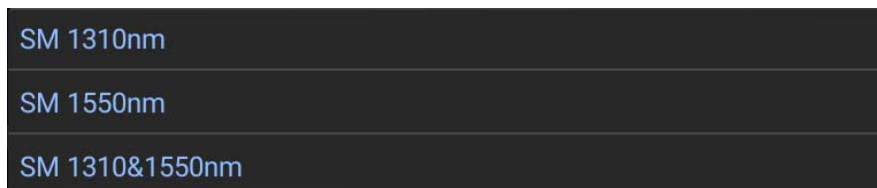
Auto

Manual

Real time

Figure 5.2-2 OTDR Measurement mode selection

SM 1310nm

SM 1550nm

SM 1310&1550nm

Figure 5.2-3 OTDR Wavelength selection interface

5s

10s

15s

30s

45s

60s

90s

120s

180s

Figure 5.2-4 OTDR Duration selection interface

Figure 5.2-5 OTDR Setting interface

5. After selecting conventional parameters, click the exit button in the upper right corner to exit the setting page, and then click "start measurement" in the OTDR interface or click the physical measurement button above the equipment to start the test.

6. After starting the measurement, there will be corresponding prompt on the OTDR interface, indicating that the equipment is in the process of measurement. You can observe the "measuring..." on the main interface , And the timer behind Sys setting to judge whether the measurement is completed. Wait for the timer above the device to zero and the "measuring..." prompt disappears, indicating that the measurement is completed.

Figure 5.2-6 OTDR measuring

7. After the measurement is completed, the OTDR interface will display the measurement results. Sliding the screen up and down can view the detailed data of event points. The double finger operation curve interface can zoom the curve, and use A /B to view the specific information of each positioning. (see Chapter 6 management test results for detailed operation procedures)

Figure 5.2-7 OTDR Measurement complete

5.3 Use of auxiliary tools

Click the icon in the main interface to enter the auxiliary tool interface.

There are three detection tools in the auxiliary tool interface: VFL、Laser and OPM.
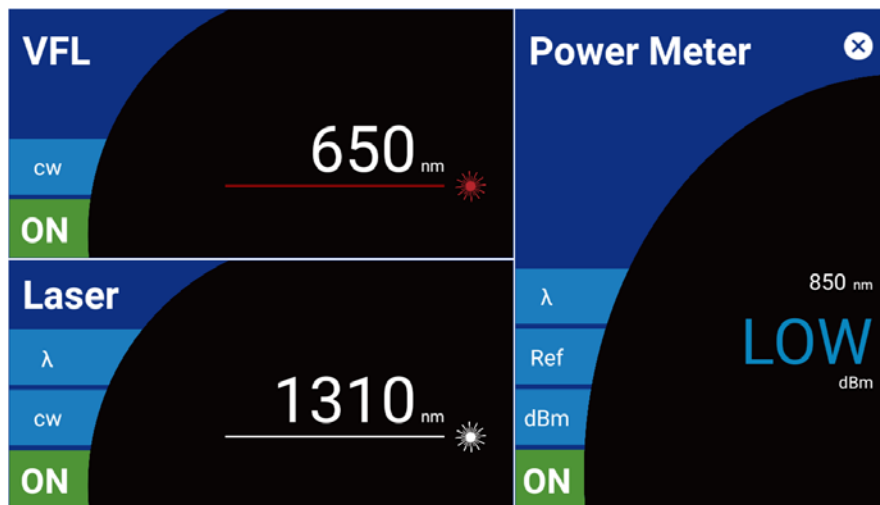
Figure 6-5 Auxiliary testing tool interface

5.3.1 Laser

Click off on the laser interface to open the laser. Click " γ" The wavelength type (1310nm, 1550nm) can be switched. Click "CW" to switch the laser emission mode. When this function is not used, it should be set to off. Otherwise, when entering other interfaces, the laser still emits laser (when OTDR function test is carried out, the light source will be turned off automatically); Click the options after the mode: CW, 270Hz flashing (1Hz), 1kHz flashing (1Hz), 2KHz flashing (1Hz), and you can select the corresponding laser emission mode. (When selecting different modes or different wavelengths, first select off at the wavelength, and then select the corresponding wavelength)
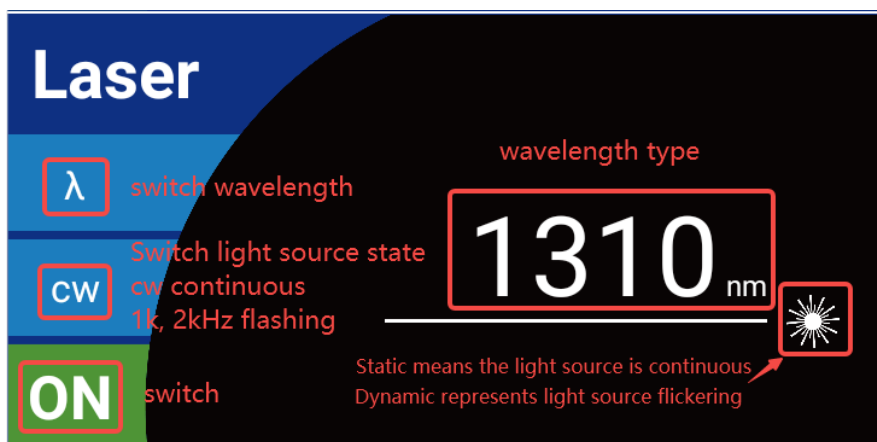
Figure 6-4 laser interface