

## GRANDWAY FHO5000PRO SERIES OTDR

Convenient multi-function fiber optic tester

Design for tough outdoor environment

Comprehensive performance improvement, more accurate and stable test performance



### Description:

FHO5000PRO series Optical Time Domain Reflectometer (OTDR) is an intelligent meter for the detection of fiber communications systems. The new generation FHO5000PRO series has higher test performance and product stability. Larger dynamics and optimized deadzone can provide more accurate fiber testing.

Whether you want to detect link layer in the construction and installation of optical network or proceed efficient maintenance and trouble shooting, FHO5000PRO can be your best assistant.

### FEATURES

- ◆ 7 inch anti-reflection LCD touch screen
- ◆ Dynamic range from 26dB to 50dB, small deadzone 0.8m/3m
- ◆ Excellent FLM(Fiber Link Map)performance make fiber testing simpler and more efficient
- ◆ PON online test module (1625nm/1650nm) is optional
- ◆ MMF test module (850/1300nm) is optional
- ◆ Optimized PON test capability to pass through 1x128 splitter with 30m PON deadzone
- ◆ Multi function Integrated design, smart and rugged
- ◆ Support remote control on PC software via RJ45 cable
- ◆ Built-in OTDR trace and FLM testing PDF report generation
- ◆ Bluetooth and mobile APP is available on PRO version
- ◆ Multi-language display and input(more than 14 languages)

**APPLICATIONS**

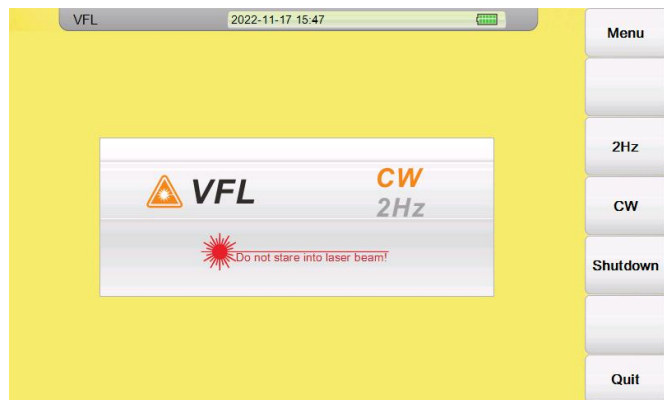
- ◆ FTTX test with PON networks
- ◆ CATV network testing
- ◆ Access network testing
- ◆ LAN network testing
- ◆ Metro network testing
- ◆ Long-distance backbone network testing
- ◆ Lab and Factory testing
- ◆ Live fiber troubleshooting

**What you need is all-in-one!**

FHO5000 series OTDR is a highly integrated platform that features with four optical module slots, with a large 7-inch color touch screen and built-in optical test functions, making it qualified in the installation, activation and maintenance of FTTx/Access/Metropolitan area/backbone network.

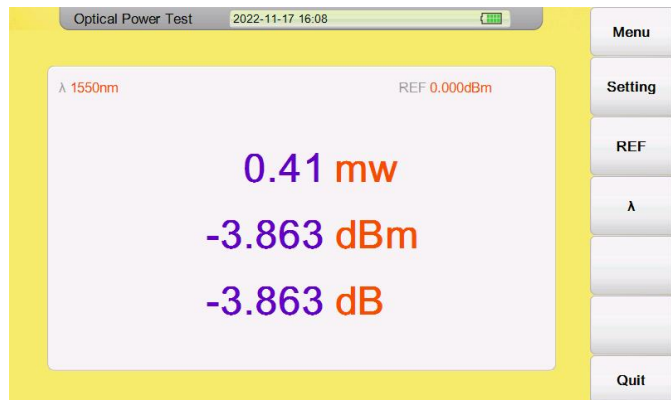
**VFL (Visual fault locator)**

The 10mw VFL, available as a standard module in FHO5000, offers built-in 650nm visual red light can test up to 10km.



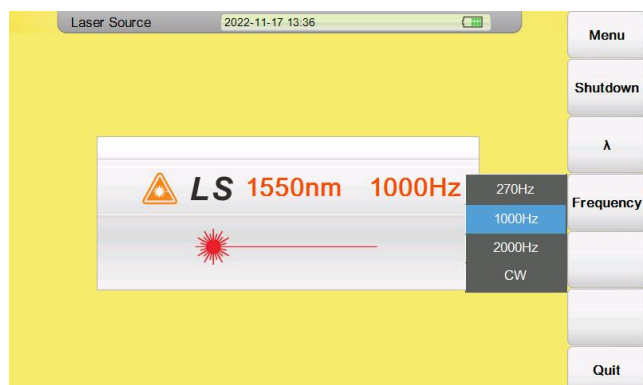
**OPM (Optical power meter)**

FHO5000 comes with high-precision built-in power meter that let technicians easily verify the presence and the power of a signal.



**OLS (Optical laser source)**

FHO5000 comes with built-in laser source that let technicians easily verify the total loss with a power meter.



**Optical Loss Tester**

OLS and OPM functions can be enabled at the same time for fiber loss test, No additional test instruments are required.



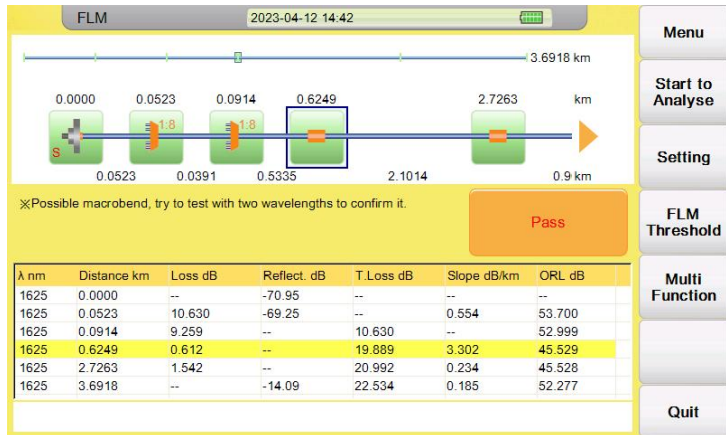
## PON Network Online Test

### Optimized PON Test Capability

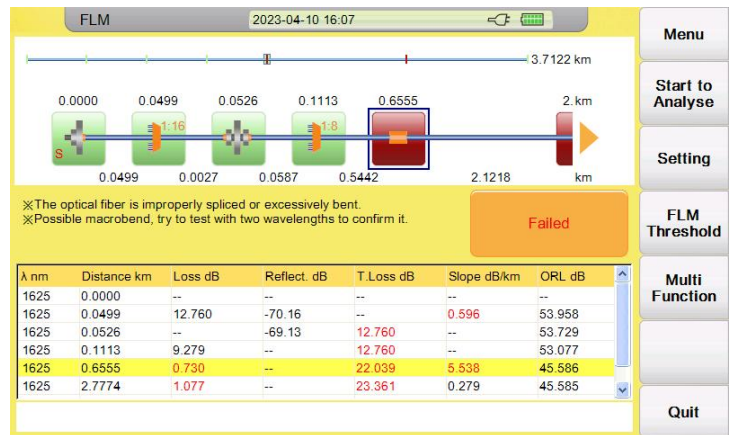
With improved hardware and advanced algorithm, FHO5000 PON series(T40F/T43F/T45F/T50F) can easily pass through 1x64 splitter even 1x128 splitter and accurately describe the overall structure of PON network.



In particular, with FLM mode, users can automatically test without complicated settings to obtain the most accurate and intuitively test results. In addition, FLM provides the Pass/Fail function of the PON network, which can intuitively display the failure event in PON network. In a typical scenario of two 1x8 splitters, the shortest distance between splitters can be as short as 30m.



Pass through 1x8+1x8 splitter network



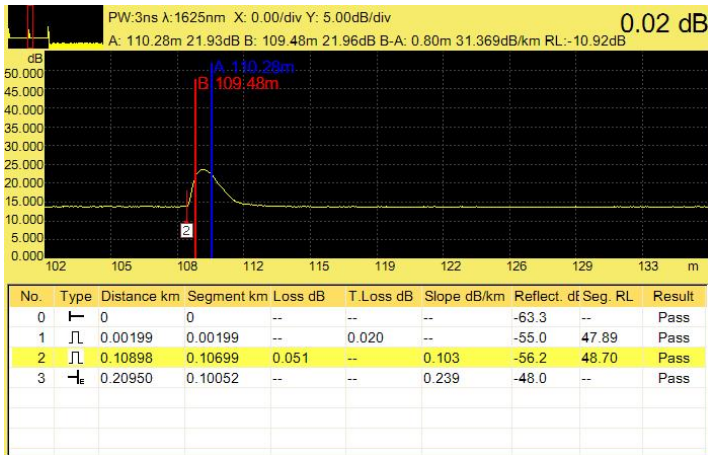
Pass through 1x16+1x8 splitter network

Through the built-in optical cut-off filter, the FHO5000 can realize the testing for PON network activation, online measurement and maintenance via 1625nm/1650nm testing wavelength.

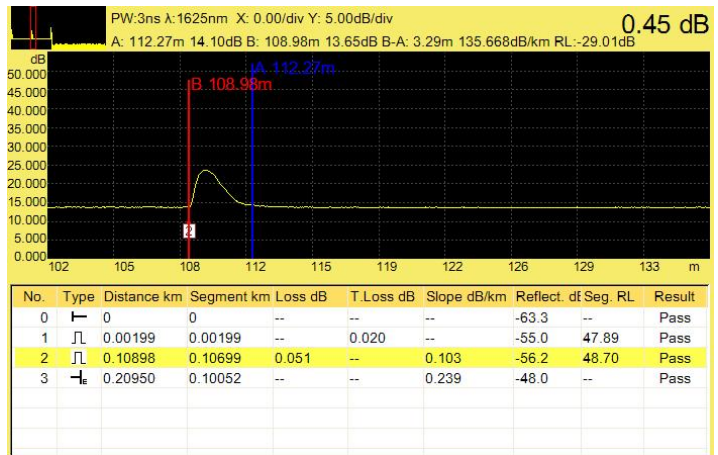
\*\* (Link condition: No reflection FUT, No reflection splitter.)

### Synchronous optimization of deadzone and dynamic

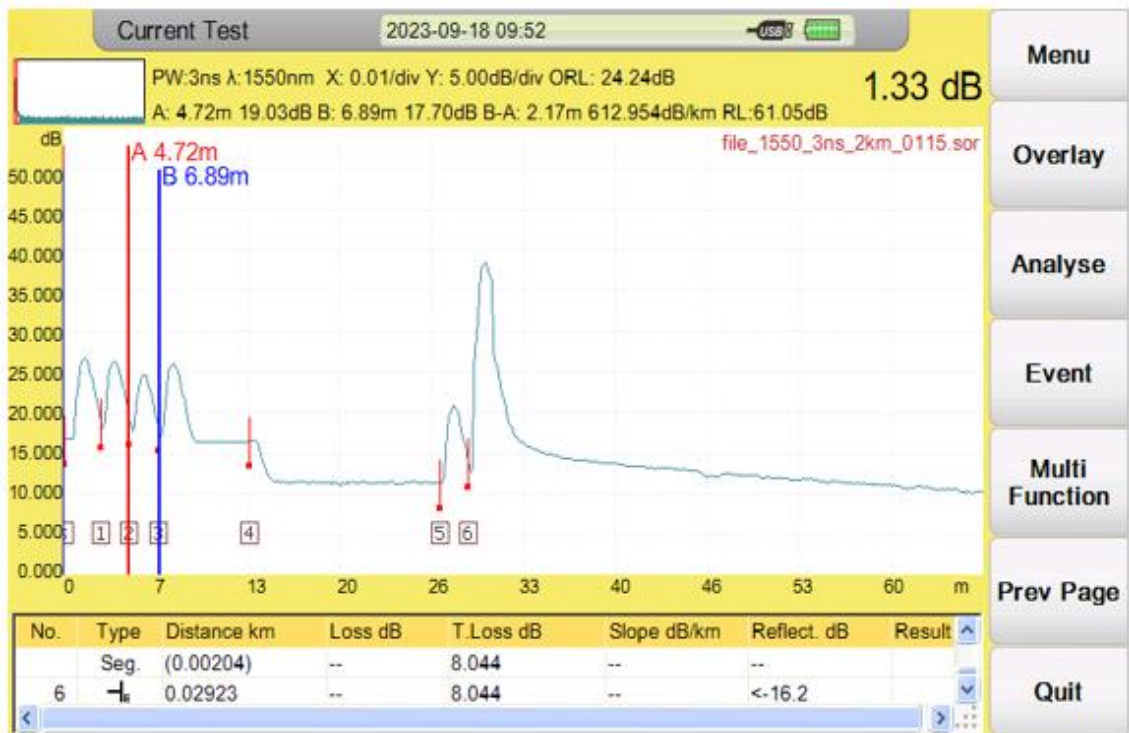
The FHO5000 optimizes the deadzone and dynamic range performance in both directions, enabling the FHO5000 to have greater dynamic performance at small pulse width and maintain smaller deadzone performance at large pulse width.



Event deadzone:0.8m



Attenuation deadzone: 3.29m



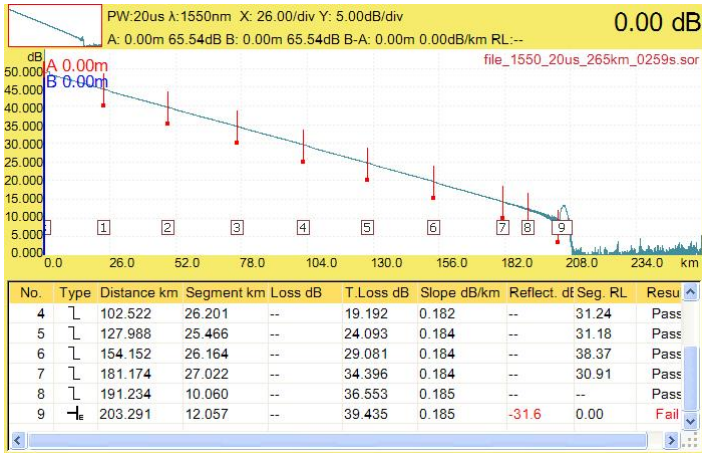
(Test link:2m+2m+2m patchcord+20m patchcord(middle big attenuation )+2m patchcord)

★ Easy detection of 2 meters continuous patchcord and fiber attenuation within 10 meters

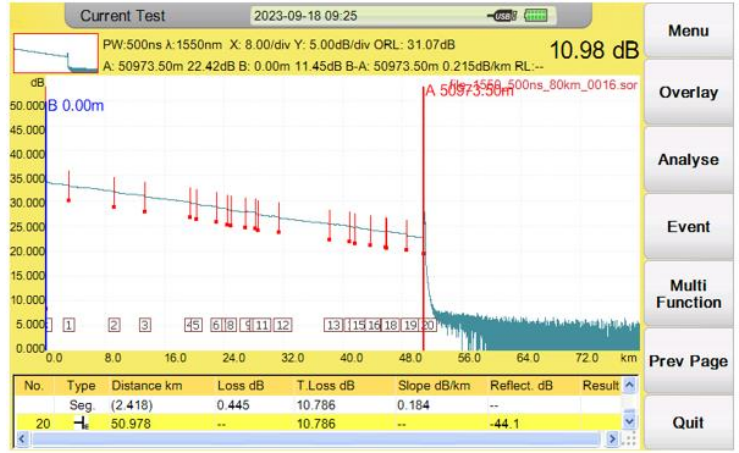
### Multiple Dynamic Range (26dB~50dB)

### Long Distance Test Capability (over 200km@FHO5000-D45)

The FHO5000 includes various dynamic test modules from a short-distance access network to a long-distance backbone network, support 45dB dynamic range which can test up to 200km.



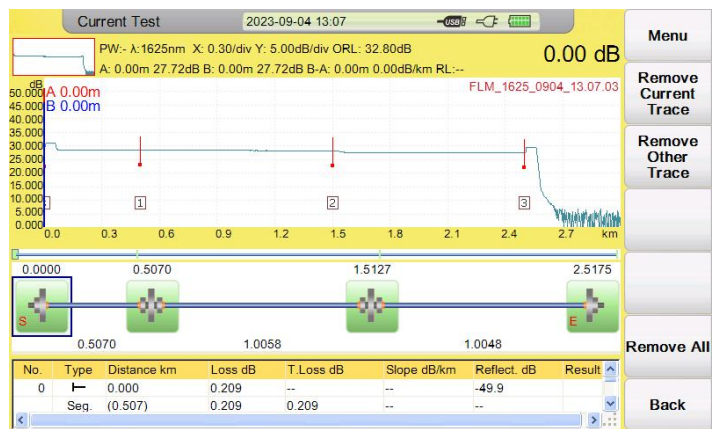
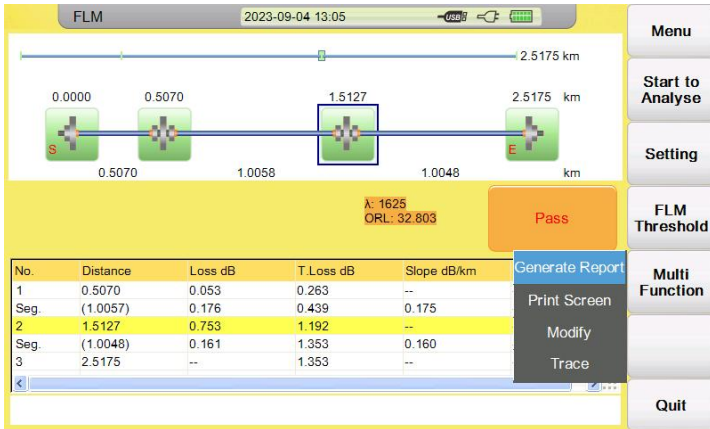
20us pulse width > 200km



500ns pulse width > 50km

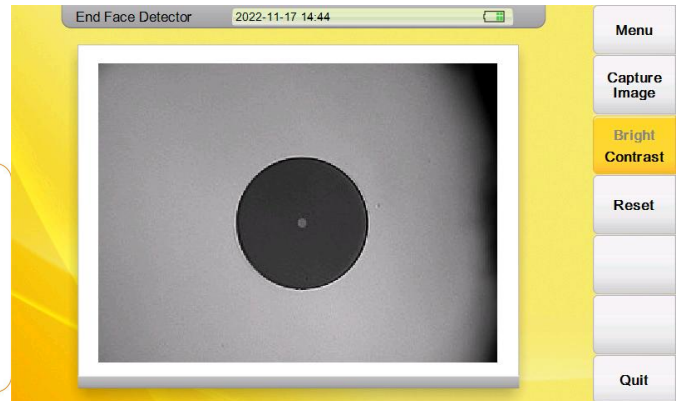
### Conversion of OTDR trace and Fiber link map


The OTDR trace and event map can be displayed simultaneously, making the test results more intuitive; By using the conversion button, the FLM test result can be converted to trace mode.



**EFD (Endface Fiber Detector)**

The optional fiber inspection probe facilitates the inspection before the connection. FHO5000 series OTDR offers this capability through a USB port connection, which allows quick and easy inspection of connector end faces for contamination and also enables it capture and store the image. There are two fiber microscope models can work with FHO5000 OTDR.



Model	FIM-4	FIM-18
Picture		
Magnification	400X	400X
Resolution	<1μm	0.75um
Tips	2.5PC-M(for 2.5mm/PC male connector) FC-PC-F(for FC/PC female bulkhead) SC-PC-F(for SC/PC female bulkhead) LC-PC-F(for LC/PC female bulkhead)	25-U-M (for 2.5mm/PC male connector) 125-U-M(for 1.25mm/PC male connector) FC-U-F(for FC/PC female bulkhead) SC-U-F(for SC/PC female bulkhead) LC-U-F(for LC/PC female bulkhead)
<b>Note: Contact us for more optional tips.</b>		

### Built-in PDF Report Generation

Multi language OTDR trace PDF report and FLM testing PDF report can be generated directly in the machine.

#### OTDR Test Report

**Pass**

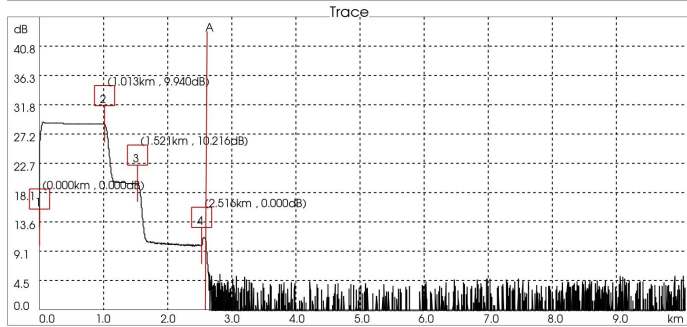
**Task**  
 JobID : 123 File Name: file\_1625\_500ns\_10km\_0294.sor  
 Contractor : Test Date : 2022-10-29 11:07:12  
 Customer : Operator : 1

**Machine Information**  
 Module : FHO5000 Supplier : 00  
 Serial No. : E5FHA09298 Cal. date:

**Overview**  
 Total Length(km) : 2.516 Average Loss(dB/km): 8.303  
 Cumulation Loss(dB): 20.891 OTRL(dB) : -54.404

**Configuration**  
 Test Wave(nm) : 1625 Attenuation Threshold(dB): 0 Start Location End Location  
 PW(ns) : 500 Reflection Threshold(dB) : 0 Location: Location:  
 Distance(km) : 10.0 End Threshold(dB) : 0 Cable ID: Cable ID:  
 Test Time(s) : 15 Refraction : 1.468 Fiber ID : Fiber ID :  
 Scattering Coefficient(dB): 0 Sampling Resolution(m) : 2.042 Color : Color :

**Note**  
 olkifs



**Marker**  
 A: 2569.07m 12.194dB B: 0.00m 14.12dB A-B: 2569.066m 1.93dB | 10.750dB/km

**Threshold**  
 Splice loss(dB) : 0.200 Reflection(dB): -40.0 Span loss(dB): 10.000  
 Connector loss(dB): 0.800 Slope dB/km : 0.400

Type	Distance	Segment	Loss dB	T.Loss dB	Slope dB/km	Reflect. dB
1Reflect(S)	0.000	0.000	0.000	--	0.000	-63.836
2NonReflect(F)	1.013	1.013	9.940	0.224	0.202	--
3NonReflect(F)	1.521	0.509	10.216	10.261	0.169	--
4Reflect(E)	2.516	0.995	0.000	20.891	0.530	-54.404

OTDR Trace PDF Report

#### FLM Report

**Fail**

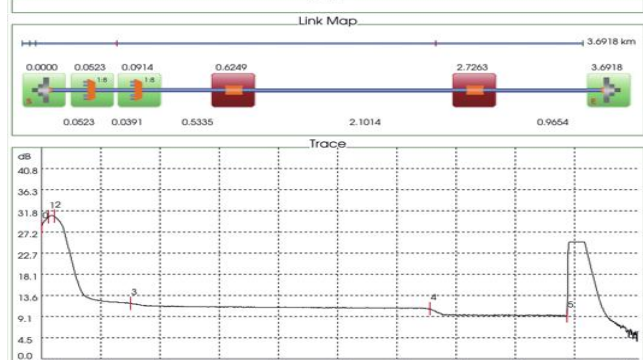
**Task**  
 JobID : File Name: FLM\_1625\_144352.pdf  
 Contractor : Test Date : 2023-04-12 14:43:52  
 Customer : Operator :

**Machine Information**  
 Module : FHO5000-143FPRO Supplier :  
 Serial No. : E5FHA20039 Col. date:

**Overview**  
 Total Length(km) : 3.692 1625nm  
 Data Acquisition Status: Completed Cumulation Loss(dB): 22.534  
 OTRL(dB) : 52.277

**Configuration**  
 Test Wave(nm) : 1625 Start Location End Location  
 First splitter : 1:8 Location: Location:  
 Second splitter : 1:8 Cable ID: Cable ID:  
 Refraction : 1.46800 Fiber ID : Fiber ID :  
 Scattering Coefficient(dB): -81.0 Color : Color :

**Note**



**Threshold**

Type	Splice loss	Connector loss	Reflection	Slope dB/km	Span loss
1625	0.300	0.700	-40.0	0.400	10.000

**Prepared By:** \_\_\_\_\_ **Verified By:** \_\_\_\_\_ **Approved By:** \_\_\_\_\_

**Splitter Threshold**

Type	1625Max Loss dB	1625Max Reflection dB
First splitter 1:8	12.000	-40.0
Second splitter 1:8	12.000	-40.0

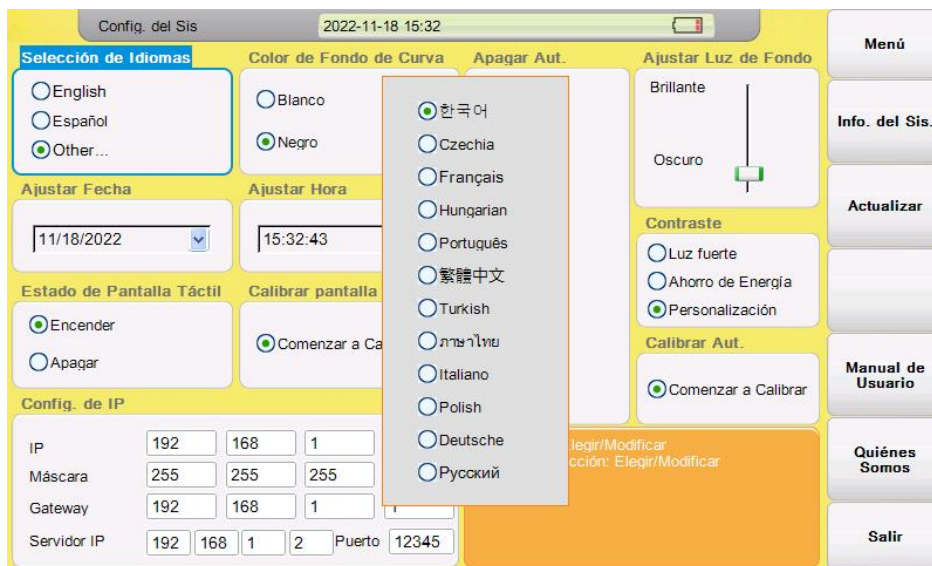
**Event**

No.	*	Distance km	Loss dB	Reflect. dB	T.Loss dB	Slope dB/km	OTRL dB
0	1625	0.000	--	-70.95	--	--	--
1	1625	0.052	10.630	-69.25	--	0.554	53.700
2	1625	0.091	9.259	--	10.630	--	52.999
3	1625	0.625	0.612	--	19.889	3.302	45.529

FLM Testing Report

### Multi-language Display and Input

FHO5000 supports multiple overseas languages and is applicable to customers in different countries.



Config. del Sis 2022-11-18 15:32

**Selección de Idiomas**  
 English  
 Español  
 Other...

**Color de Fondo de Curva**  
 Blanco  
 Negro

**Ajustar Fecha**  
 11/18/2022

**Ajustar Hora**  
 15:32:43

**Estado de Pantalla Táctil**  
 Encender  
 Apagar

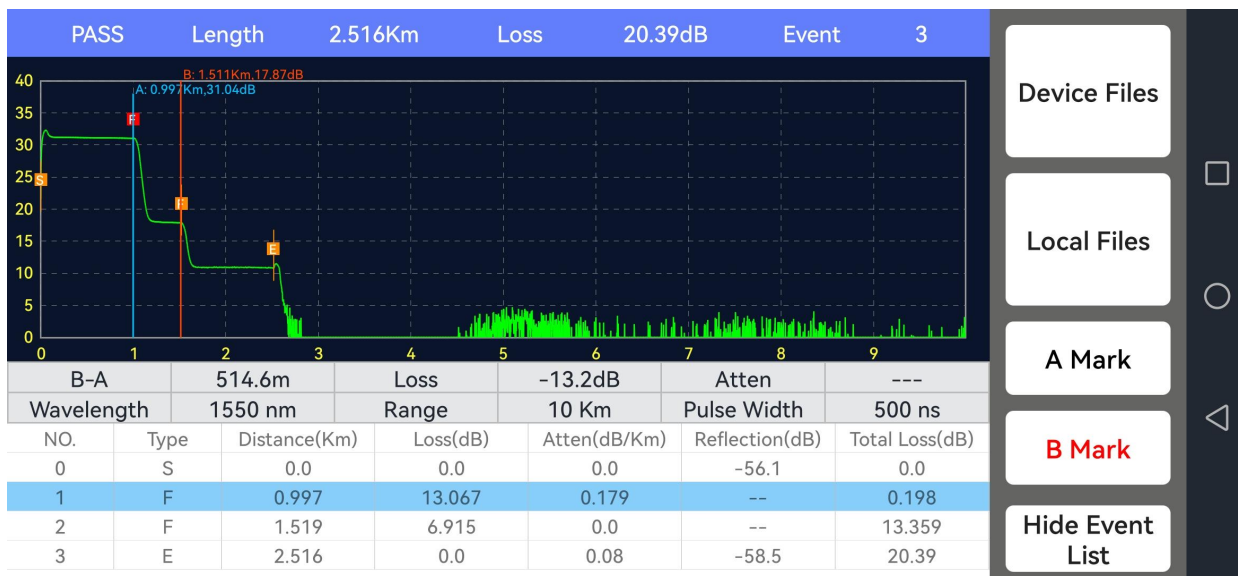
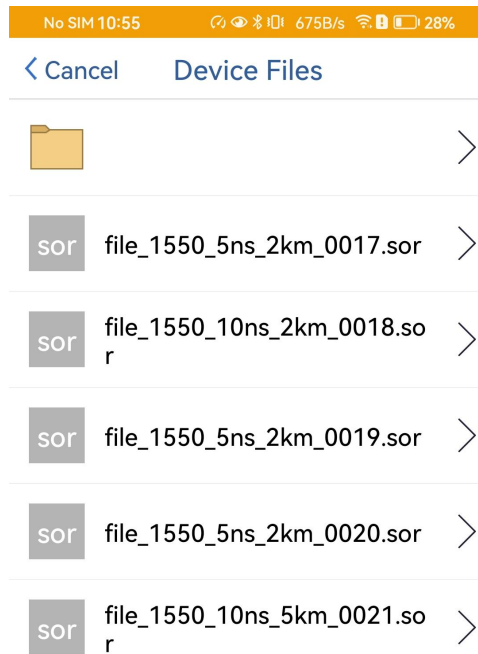
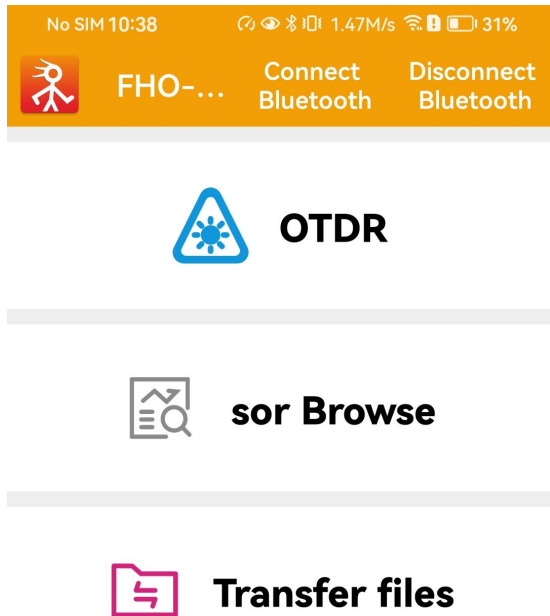
**Calibrar pantalla**  
 Comenzar a Calibrar

**Config. de IP**  
 IP: 192.168.1  
 Máscara: 255.255.255  
 Gateway: 192.168.1  
 Servidor IP: 192.168.1.2 Puerto: 12345

**Menú**  
 Info. del Sis.  
 Actualizar  
 Manual de Usuario  
 Quiénes Somos  
 Salir

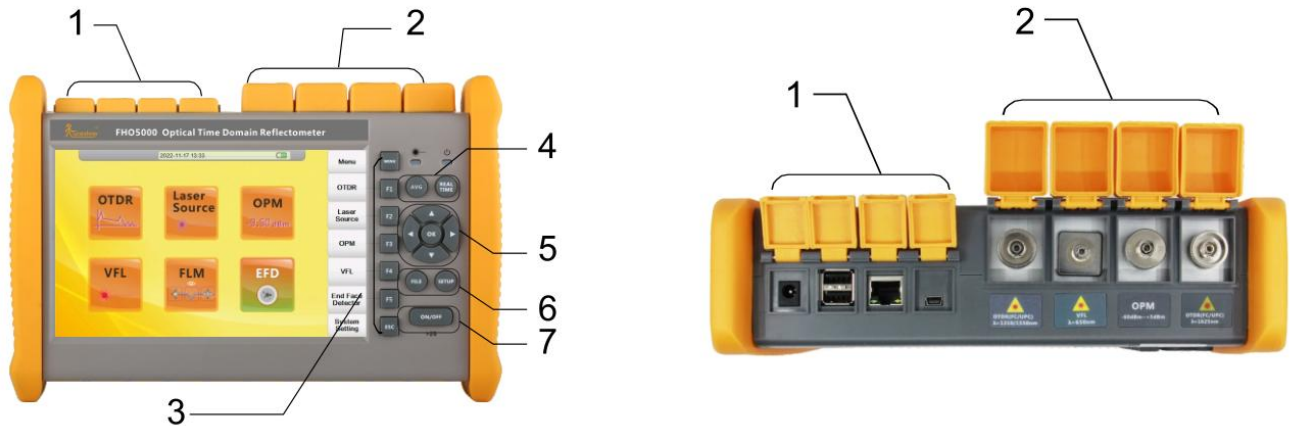
### Bluetooth Mobile Phone APP

FHO5000 PRO supports Bluetooth function and can connect to Android mobile app. On mobile phone software, OTDR testing, OTDR file viewing and sor file sending can be performed.





## Interface Definition



No	Name	Description
1	Electric ports (From left to right)	Charging port: DC input 10V/4A USB 2.0 port: Insert USB disk to upgrade RJ45 Ethernet port: remote control port Mini USB port: Transfer file to PC via USB cable
2	Optical ports (From left to right)	OTDR port1: for 1310nm/1550nm testing VFL port: 2.5mm universal port OPM port: for optical power testing OTDR port2(optional): for 1625nm testing
3	Function key	Menu: Enter the Main menu interface F1-F5: Enter the corresponding menu option ESC: Enter the system setting or back to main menu You can check "System info/language/date/power saving/bright light/IP setting, etc" in system setting
4	Test key	AVG: Perform OTDR average test ; REAL TIME: Perform OTDR realtime test
5	Direction key	Move cursor and confirm
6	File and Setup	File: To enter the saved file storage ; Setup: To enter the OTDR testing setting
7	ON/OFF key	Long press>2s to power on/off the OTDR

Note: Product appearance and parameters are subject to change without notice.

## General Specification

<b>Dimension</b>	253×168×73.5mm/1.5kg (battery included)
<b>Display</b>	7 inch touch screen TFT-LCD with LED backlight
<b>Interface</b>	1×RJ45 port, 3×USB port (USB 2.0, Type A USB×2, Type B USB×1)
<b>Power Supply</b>	10V(dc)/4A, 100V(ac) to 240V(ac), 50~60Hz
<b>Battery</b>	7.4V(dc)/5.2Ah lithium battery (with air traffic certification) Operating time: 6 hours①, Telcordia GR-196-CORE Charging time: <4 hours (power off)

<b>Power Saving</b>	Backlight off: Disable/1 to 99 minutes Auto shutdown: Disable/1 to 99 minutes
<b>Data Storage</b>	Internal memory: 16GB
<b>Language</b>	User selectable (English, traditional Chinese, French, Korean, Russian, Spanish, Portuguese, Turkish, Italian, German, Thai, Hungarian, Czech, Vietnamese, Polish-contact us for availability of others)
<b>Environmental Conditions</b>	Operating temperature and humidity: -10°C~+50°C, ≤95% (non-condensation) Storage temperature and humidity: -20°C~+75°C, ≤95% (non-condensation)
<b>Accessories</b>	Standard: Main unit, power adapter, Lithium battery, FC adapter, USB cord, User guide, carrying case Optional: SC/ST/LC adapter, Bare fiber adapter, Fiber microscope, Launch cable box

### Model Selection

Type <sup>②</sup>	Testing Wavelength (MM: ±20nm, SM: ±20nm)	Dynamic Range (dB) <sup>③</sup>	Event/Attenuation Dead-zone (m) <sup>④</sup>
FHO5000-M21	850/1300	19/21	1/4
FHO5000-MD21	850/1300	19/21	1/4
	1310/1550	35/33	1/4
FHO5000-MD22	850/1300	19/21	1/4
	1310/1550	40/38	0.8/3
FHO5000-D26	1310/1550	26/24	1/4
FHO5000-D35	1310/1550	35/33	1/4
FHO5000-D40	1310/1550	40/38	0.8/3
FHO5000-D43	1310/1550	43/41	0.8/3
FHO5000-D45	1310/1550	45/43	0.8/3
FHO5000-D50	1310/1550	50/48	0.8/3
FHO5000-T26F	1310/1550/1625	26/24/24	1/4
FHO5000-T35F	1310/1550/1625	35/33/33	1/4

FHO5000-T40F	1310/1550/1625	40/38/38	0.8/3
FHO5000-T43F	1310/1550/1625	43/41/41	0.8/3
FHO5000-T45F	1310/1550/1625	45/43/43	0.8/3
FHO5000-T50F	1310/1550/1625	50/48/48	0.8/3
FHO5000-TC35F	1310/1550/1650	35/33/33	1/4
FHO5000-TP35	1310/1490/1550	35/33/33	1/4

### Test Parameter

<b>Pulse Width</b>	3ns, 5ns, 10ns, 30ns, 50ns, 100ns, 275ns, 500ns, 1μs, 2μs, 5μs, 10μs, 20μs
<b>Testing Distance</b>	500m, 2km, 5km, 10km, 20km, 33km, 40km, 80km, 120km, 160km, 265km
<b>Sampling Resolution</b>	Minimum 5cm
<b>Sampling Point</b>	Maximum 256,000 points
<b>Linearity</b>	≤0.05dB/dB
<b>scale Indication</b>	X axis: 4m~70m/div, Y axis: Minimum 0.09dB/div
<b>Distance Resolution</b>	0.01m
<b>Distance Accuracy</b>	±(0.75m+measuring distance×3×10 <sup>-5</sup> +sampling resolution) (excluding IOR uncertainty)
<b>Reflectance Accuracy</b>	Single mode: ±2dB, multi-mode: ±4dB
<b>IOR Setting</b>	1.2000~1.7000, 0.0001 step
<b>Units</b>	Km, miles, feet
<b>OTDR Trace Format</b>	Telcordia universal, SOR, issue 2 (SR-4731) OTDR: User selectable automatic or manual set-up
<b>Fiber Event Analysis</b>	-Reflective and non-reflective events: 0.01 to 1.99dB (0.01dB steps) -Reflective: 0.01 to 32dB (0.01dB steps) -Fiber end/break: 3 to 20dB (1dB steps)
<b>Other Functions</b>	<ul style="list-style-type: none"> <li>◆ Built in multi-language OTDR/FLM PDF report generation</li> <li>◆ Live Fiber detect: Verifies presence communication light in optical fiber</li> <li>◆ Dual wavelength(1310nm/1550nm) analysis-Macro bending detection</li> <li>◆ OTDR trace and Fiber link map conversion</li> </ul>

- ◆ Manually modifying incorrect fiber optic event types
- ◆ Start launching cable and end receiving fiber function
- ◆ Built-in Bidirectional test analysis function
- ◆ Trace overlay and comparison (most 8 traces)
- ◆ Define the Pass/Fail result of each event through threshold settings
- ◆ Powerful PC analysis software “OTDRviewer”
- ◆ Remote control on PC software “Server” via RJ45 cable
- ◆ Bluetooth and Android mobile APP is available on PRO version

### VFL Module

<b>Wavelength</b>	650nm(±20nm)
<b>Output Power</b>	10mw,CLASSIII B
<b>Test Range</b>	12km
<b>Connector</b>	Universal 2.5mm interface
<b>Launching Mode</b>	CW/2Hz

### OPM Module

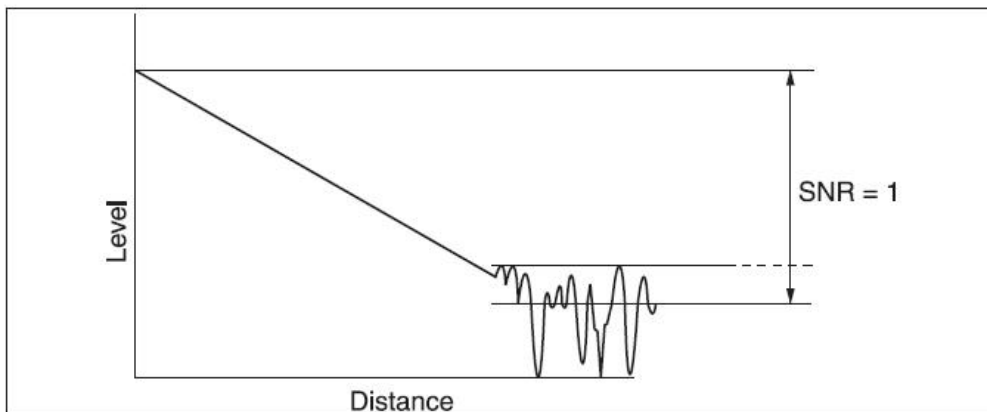
<b>Wavelength Range</b>	800~1700nm
<b>Calibrated Wavelength</b>	850/1300/1310/1490/1550/1625/1650nm
<b>Test Range</b>	Type A: -60~+5dBm (standard); Type B: -40~+23dBm (optional)
<b>Resolution</b>	0.01dB
<b>Accuracy</b>	±0.35dB±1nW
<b>Connector</b>	FC/UPC or SC/UPC or customized

### LS Module (Laser Source)

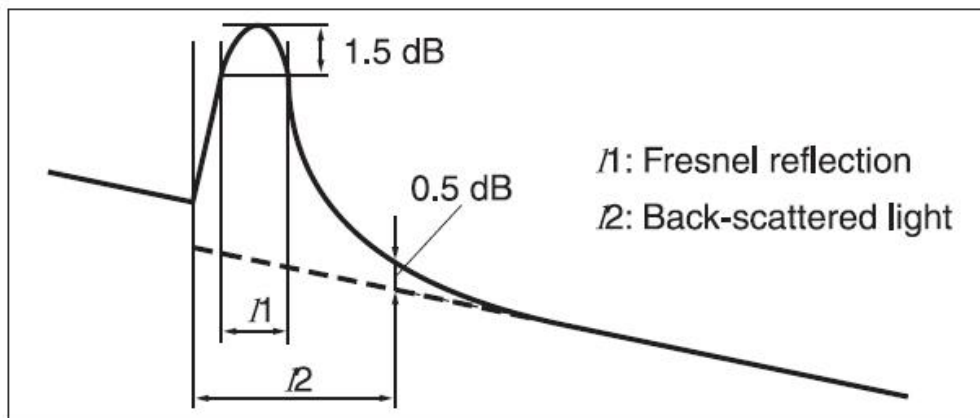
<b>Working Wavelength</b>	Consistent with OTDR (Except 850nm/1300nm)
<b>Output Power</b>	≥-10dBm
<b>Output Mode</b>	CW/270Hz/1kHz/2kHz
<b>Accuracy</b>	±0.5dB
<b>Connector</b>	FC/UPC or SC/UPC or customized

**Notes:**

- ① Typical, backlight off, sweeping halted at 25°C, 6 hours typical continuous testing.
- ② Model T26F/T35F/T40F/T43F/T45F/T50F/TC35F are integrated with optical filter, which allow them to test live fiber (by using 1625nm/1650nm wavelength) and will not interrupt the online signal of fiber.
- ③ Dynamic range is measured with maximum pulse width, averaging time is 3 minutes, SNR=1; The level difference between the RMS noise level and the level where near end back-scattering occurs.

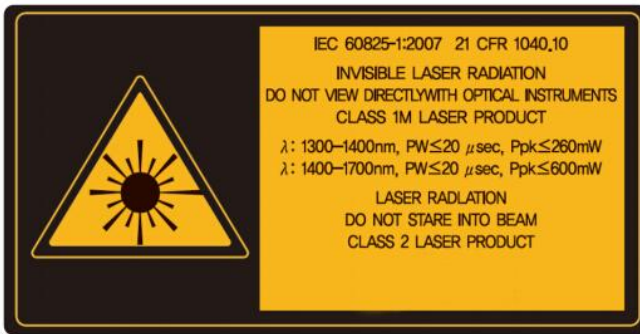


- ④ Event dead zone is measured with pulse width of 3ns and return loss  $\geq -45$ dB. Dynamic range  $> 5$ dB
- Attenuation dead zone is measured with pulse width of 3ns and return loss  $\geq -55$ dB. Dynamic range  $> 5$ dB

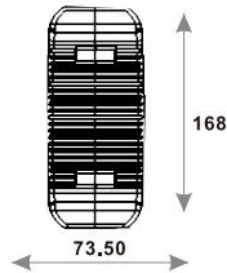
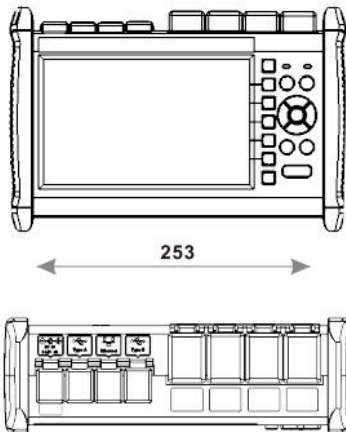


- ⑤ 1310/1550nm uses OTDR1 port, and 1625nm/850nm/1300nm uses OTDR2 port.

**CAUTION:**



VIEING THE LASER OUTPUT WITH CERTAIN OPTICAL INSTRUMENTS(FOR EXAMPLE: EYS LOUPES, MAGNIFIERS AND MICROSCOPES) WITHIN A DISTANCE OF 100 MM MAY POSE AN EYS HAZARD.



Unit:mm  
 Except where noted, tolerance default as:±3%  
 (if size<10mm, tolerance:±0.3mm)

**\*Specifications are subject to change without notice.**