

Optical Wavelength Analyzer

Operation Manual

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TheFibers

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Page 2 / 43

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Contents

Summary of general safety matters	6
Environmental considerations	8
Chapter 1: Introduction	9
1.1 Main functions	9
1.2 Checking the Instrument	10
1.3 Optical standards	11
1.4 About the charger	12
1.5 About the user manual	13
1.6 Considerations in operation	14
1.7 Maintenance management	15
1.8 Technological support and other services	16
Chapter 2: Getting Started	17
2.1 Explanation of equipment user interface and operating keys	17
2.2 Screen information	18
2.3 Power	19
2.4 Menu Tree	20
2.4.1 Scanning all channels (USER SCAN)	22
2.4.2 Offset (VOLATILE)	24
2.4.3 Communication speed set up (USB, RS232C BAUDRATE)	25
2.4.4 Power management set up (AUTO POWER OFF)	25
2.4.5 Button LED set up (KEY LIGHT OFF)	26
2.4.6 File System	27
2.4.7 Set time	29
2.4.8 System information	30
Chapter 3 Basic Measurement	31
3.1 User specification (CWDM SCAN)	31
3.2 User defined channel (User Scan)	33
3.3 Scanning all channels (ALL SCAN)	35
3.4 General Power Meter	37
3.5 dB/dBm	38

3.6 Grach data display (Graph/Text)	40
3.7 Saving information and calling	41
3.7.1 Saving files	41
3.7.2 Opening files	43
Troubleshooting	44
Warranty of quality	45

Summary of General Safety Matters

Take the following precautionary measures to prevent injury and damage of the product or related products.

To prevent potential danger of injury use this product only as stated.

Only staff certified by TheFibers should carry out the service process.

◆ To prevent fire or injury

1. Use an appropriate battery. Use only a battery approved for the product.
2. Connect and disconnect the battery properly.
3. Do not disconnect the battery when the product is on.
4. Check the standard of Optic Jumper Cord. Use the appropriate type of connector for the product to prevent damage of connector or error of measured value by checking whether the adaptor type is right for the connector at time of purchase.
5. Follow all connector standards. To avoid damage or shock of product, follow all instructions for connectors and product. Refer to the product manual before connecting the product and check additional information on adaptor.
6. Turn the power off. Turn off the product's power using the power button. Refer to the indicator for location.
7. Do not operate the product with the cover or panel removed.
8. Do not operate products suspected of breakdown. Have it checked by a certified professional technician if the product is suspected of being damaged.
9. Do not touch exposed circuits. Do not touch exposed connections or parts when power is being supplied.
10. Do not use in damp environments.
11. Do not use in environments where explosion is a danger.
12. Keep the surface of product clean and dry.

Terms used in this manual

The following terms may be seen in this manual.



Warning. A warning sign states a condition or situation that can cause injury or death.



Caution. A caution sign states a condition or situation that can give damage to this product or other properties.

Environmental Considerations

Information of the product's effect on environment is provided in this section.

Disposal matters

Observe the following guide when recycling the equipment or composing parts.

Recycle of equipment. We extracted and used natural resources to produce this equipment. If the product is wrongly disposed of, the substance inside the equipment can cause harm to one's health or the environment. In order to prevent such substance to penetrate into the environment and reduce usage of natural resources, it is adequate to recycle the product in an appropriate system for the material to be properly reused or recycled.



Chapter 1 Introduction

TheFibers made the Optical Wavelength Analyzer to be capable of measuring and marking wavelengths in order to measure the exact power and apply to such network situations. This instrument is portable and made to be appropriate to the outside environment.

If there is already an existing power meter, the exact value can be measured only when the wavelength of the previously input signal is known. When several wavelengths are sent at once, the exact value of each wavelength cannot be measured. Thus for WCDMA, CWDM-PON and WDM-PON etc. which have several wavelengths, a device that can distinguish the wavelengths must be used.

OWA-100 is developed to measure exact power and frequency adoptable to the various network conditions. Especially it is suitable for outer environment and compact to carry.

1.1 Main Functions

- Simultaneous measurement of both optical power and power of each wavelength which are the key factors in the field of installment, maintenance and repair.
- Works as a typical power meter (1nm Calibration, 850 ~ 1650nm)
- It is compact in size and lightweight for excellent portability, and is easy operation
- Provides linkage with various wavelength network such as CWDM and Wibro etc.
- Can use the existing charger and USB Data Communication Cable by adopting typical cell phone 24 Pin Connector
- Adopted Color LCD
- Various additional functions
 - Sorts measured data
 - Saves/Reads measured data
 - Displays measured time

1.2 Check the Instrument

Check the instrument using the following steps.

(1) Separate the instrument from the case and check the exterior for damage. If the product package is damaged at time of separating the case from the package, keep the original damaged package, as the damage was caused during air transportation and damages should be claimed from the flight and transportation related firm.

(2) Check for all accessories and data of table 1-1 below.

Accessories	Notice
OWA user manual	English
Installation CD	1 EA
USB Data cable	1 EA
Necklace	1 EA
Urethane protector	1 EA
Portable bag	1 EA
Typical 24pin charger	1 EA

1.3 Optical Standards

Optical Standards		
Parameter	Unit	Typical
Wavelength		
Range	Nm	1260–1620
Number of Channels		16
Measuring Wavelengths	Nm	1270/1290/1310/1330/1350/1430/1450 1470/1490/1510/1530/1550/1570/1610
Resolving Power	Nm	20
General Power Meter		
Range	Nm	850–1650
Optical Power		
Range of display	dBm	+10 to –70
Accuracy	dB	< ± 0.5
Resolvability	dB	0.01
Measuring unit		dBm / dB / mW
General		
Power device		Rechargeable Lithium ion batteries
Optical adaptor for input from outside		9/125um SC/APC or FC/APC
Operating temperature	°C	0 ~ +50

1.4 About the charger

A rechargeable battery is installed inside the measuring instrument, and this charger module has the Ministry of Information and Communication standard 24 pin charger port. When the charger module is connected to the measuring instrument, the circular picture on the connecting part points to the bottom of the instrument.



Standard 24pin charger

- LED Indicator of Charger module

LED color	Action of LED	Conditions for battery charge
Red	ON (continuous)	The charger module is in charging mode
Green	ON (continuous)	Charge complete. Waiting for use.
Red	Blinking	Error or damage to battery



1. Charging time is about five hours. If the indicating lamp has changed add one more hour.
2. Do not allow battery to short circuit.
3. Keep the battery away from fire. There is danger of explosion when the battery is near fire.
4. Never dismantle, change structure or distort the battery.
5. Do not dip the battery in water or other liquid.
6. Do not store the battery in places warmer than 60 degrees Celsius.
7. Do not drop or give a shock to the battery.
8. Ensure the battery is oriented correctly.
9. Power of charger is 110~220V@50/60Hz.
10. Remove the battery when it is not in use for a long time.

1.5. About the User Manual

To make best use of the produce, read the user manual carefully before using. This manual includes the following preparation steps regarding the use of this equipment.

(1) Brief introduction on the equipment features: Main accessories, features of outer model and operating principles etc.

(2) Main operations of equipment: The user manual describes in detail the operating methods of functions used daily etc.

1.7 Maintenance Management

● Cleaning

Clean the cable and optic connector before measuring because optical elements are very sensitive to dust. Use a cleaner specially made for cleaning the adaptor and a soft cloth to clean the surface of the equipment. Use 75% isopropanol in water solution for efficient cleaning. Note: check the solution I'm not sure but I think that's it.

- ① It is important not to expose the optic connector and surface to oil, dust or other contamination to maintain proper operation.
- ② Use one type of adaptor. Difference in loss value can occur due to use of different types of adaptors.
- ③ Use a dustproof cap when not operating to protect from scratches and contamination.
- ④ Plug and connector need to be pulled out carefully as the connector surface is sensitive.
- ⑤ Separate the battery when not in use for a long time.



Caution. To prevent damage of equipment surface, do not use abrasives or chemical cleaners.



Caution. Use lens paper and lil cleaner to clean the sensor surface clockwise.

Technological Support and Other Services

1.8 Technological Support and Other Services

Inquire to the product supplier to solve problems in using the equipment or repairing damage.



Caution. Be aware no A/S will be provided if the equipment is disassembled.

To find information on the OWA, use the following.

Contents to read: Document to use

Installation and operation: This OWA user manual

Checking settings and performance: Refer to OWA technology (<http://www.thefibers.com>)

Chapter 2. Getting Started

2.1 Explanation of user interface and operating keys

The picture below shows the whole surface of the OWA, and the usage of the key pad essential in operating the measuring instrument.



- ① Key UP, Key Down, Key Left, Key Right

Are used to select menus or change channels according to their direction.

- ② Enter

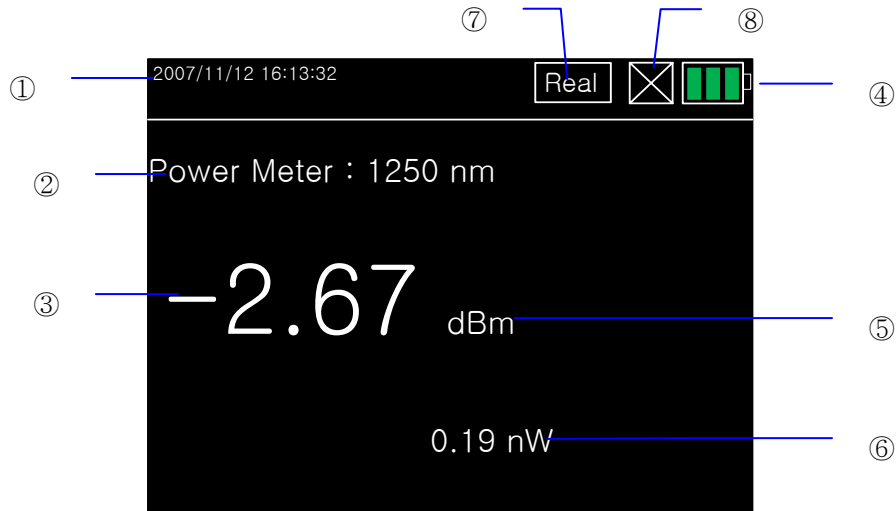
Is also used to operate OWA and directs the implementation of command.

- ③ ESC

Used when negotiating the menu to return to the previously selected screen. Also used to end certain applications.

2.2 Screen Information


The picture below shows the display screen when measuring a single channel.

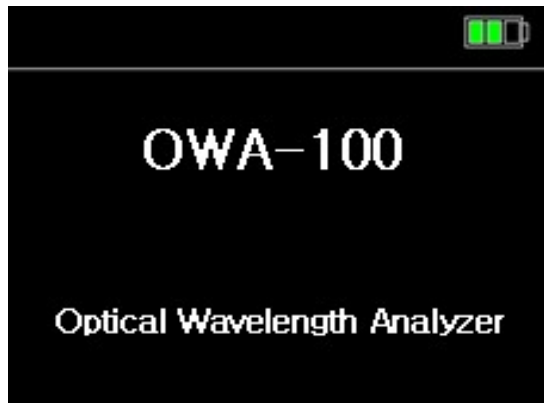



Item	Name
①	Date and time
②	Channel mode
③	Current channel power
④	Residual battery power
⑤	Unit of power (Log Scale)
⑥	Unit of power (Linear Scale)
⑦	Current measuring mode (MODE)
⑧	State of adjusting starting point

2-3. . Power




- Is used to turn the instrument power on and off.
- If you press the Power  button for more than 1.5 seconds, the logo shown below appears with a “bbi” sound and it moves to Total Power, which is the basic channel.



- Press the Power  button for more than two seconds to turn the power off.
- To adjust LCD Back Light
 - It is possible to adjust the brightness of LCD's back light to one of two levels by pressing the power button for just a short time.

2.4 Menu Tree

- If you press the Menu  button, it changes to a screen where you can configure the operating environment of OWA and set up calibration, special operations, etc.




- Contents of Menu

Item	Description
2.4.1 <u>USER SCAN/</u>	User defining channel
2.4.2 <u>OFFSET (VOLATILE)</u>	Offset function
2.4.3 <u>USB,RS232C BAUDRATE</u>	Establishes communication speed
2.4.4 <u>AUTO POWER OFF</u>	Function of managing power
2.4.5 <u>KEY LIGHT OFF</u>	Manages lighting of buttons
2.4.6 <u>FILE SYSTEM/</u>	Function of managing files
2.4.7 <u>SYSINFO/</u>	Information on equipment
2.4.8 <u>CALIBRATION</u>	Corrects equipment




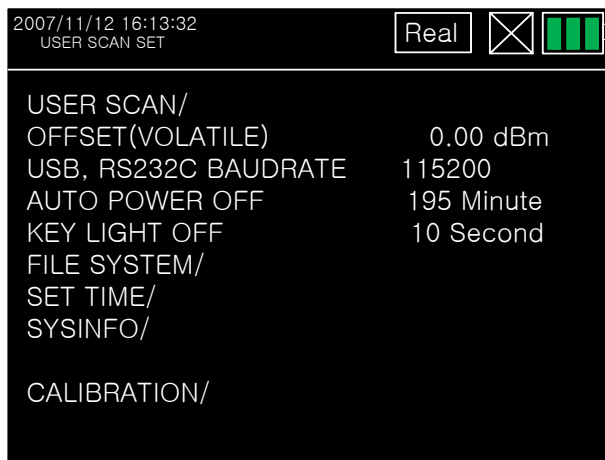
Caution. Note that malfunction of the OWA can occur due to incorrect set up of functions.

2.4.1 User Defined channel (USER SCAN)

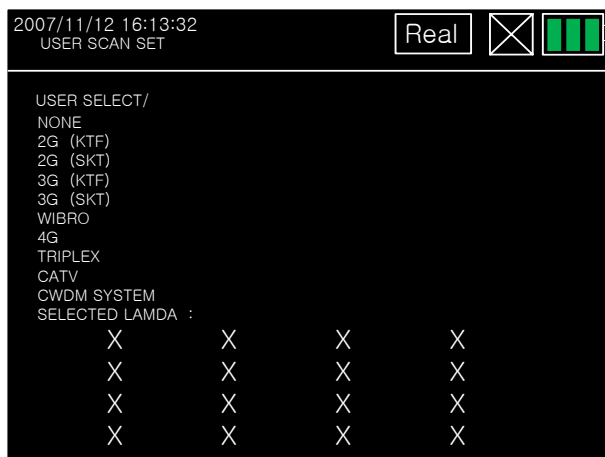
- USER SCAN  Is a button assigned to scan only channels defined by the user.

- How to set up USER SCAN


① Press the MENU  button to change to the menu screen. You move to the screen below once you press the button.

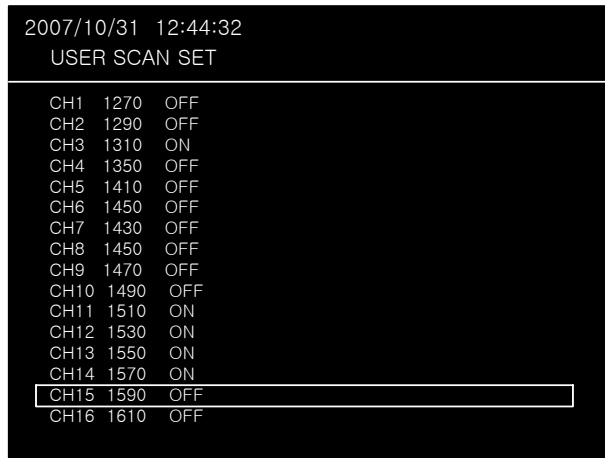


② If you press the enter key after moving the cursor to USER SCAN using arrow keys, a set up screen for USER SCAN shows up.



- As the channel values that users mainly use are provided in the above screen, it is easy to set up the channel value that the user wants.

③ If you press the ENT button after selecting **USER SELECT**, you can select the channel that you want. If you then press the **ENTER**  button, it changes from OFF to ON.



Channel	Frequency (nm)	Status
CH1	1270	OFF
CH2	1290	OFF
CH3	1310	ON
CH4	1350	OFF
CH5	1410	OFF
CH6	1450	OFF
CH7	1430	OFF
CH8	1450	OFF
CH9	1470	OFF
CH10	1490	OFF
CH11	1510	ON
CH12	1530	ON
CH13	1550	ON
CH14	1570	ON
CH15	1590	OFF
CH16	1610	OFF

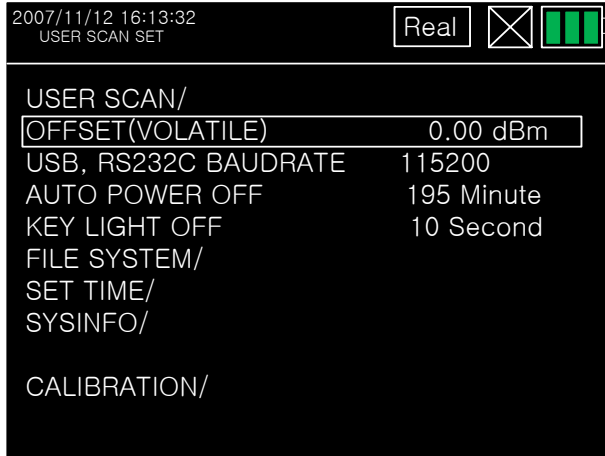
④ The set up value is automatically saved if you come out using the ESC key after finishing channel selection.

* If you scan and generate all 16 channels on the screen you will scan unnecessary channels also, so it becomes complicated and readability decreases as letters become small. However, If only channels that the user set up are scanned, readability is excellent and fast scanning is possible.

- Mobile telecommunication companies use 1310, 1550 nm for 2G optic wave lengths and 1510, 1530, 1570 nm for 3g optic wave lengths. Thus you should set up the user channel to (1310, 1510, 1530, 1550, 1570) in the menu.

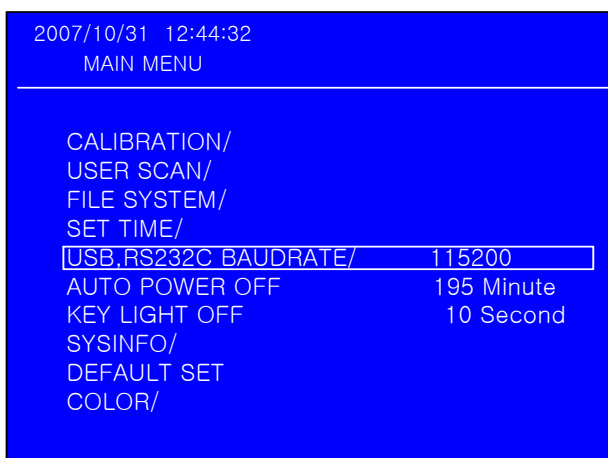
2.4.2 OFFSET (**OFFSET**)



- The OFFSET function displays the addition of set up dBm value and the optic power value on the screen.



*As this value is saved in the volatile memory, it becomes zero after booting and is not remembered if you turn the power off after set up.

2.4.3 Communication Speed Set Up (**USB,RS232C Baudrate**)



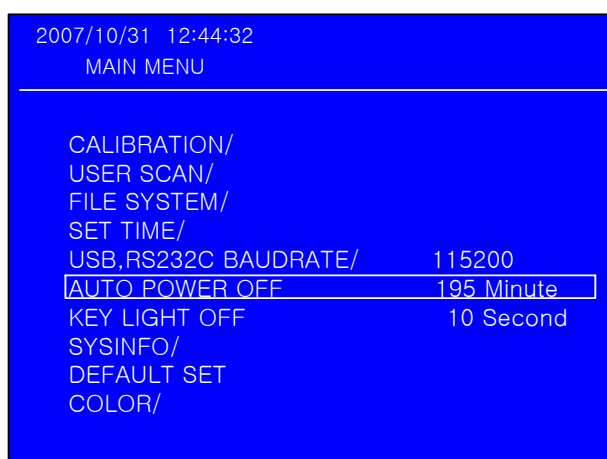
If you press  Key Left,  Key Right in **USB, RS232C Baudrate**, you can set up the transmission speed of the COM Port, and the default value is 115200bps.

2.4.4 Power management set up (**Auto Power**)

- The power automatically goes off if the user does not input any key in the determined time.

You can activate or de-activate the option by pressing the ENT key and set the time in

minutes using Key Left , Key Right  buttons.



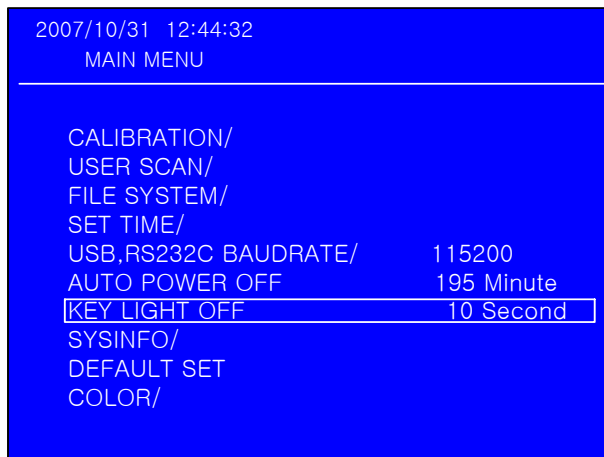
2.4.5 LED Management Set Up (KEY LIGHT OFF)

- This is a function to set up power management of the OWA like **Auto Power.**

The LED lighting goes off if the user does not input any key during the determined time.

You can activate and de-activate the option by pressing the ENT key, and set up the


time in seconds by using Key Left , Key Right  buttons.

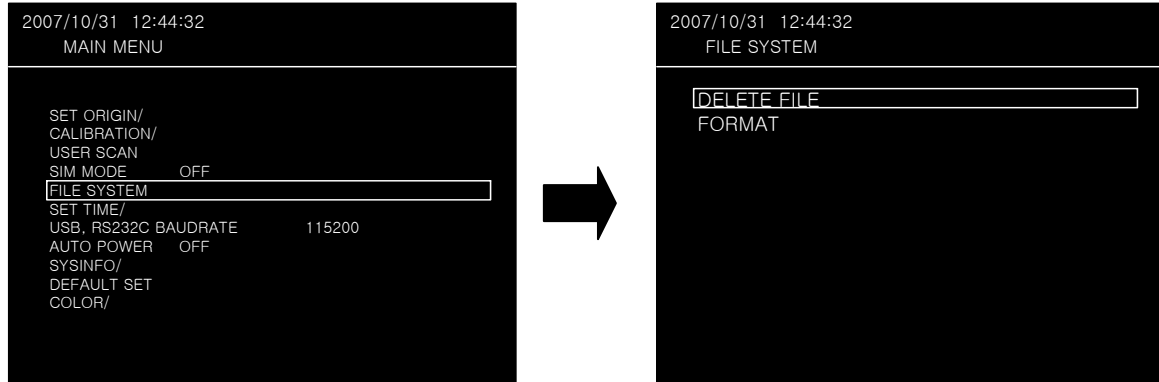


- The user can increase reliability and continuously maintain the measuring instrument's own features and settings by synchronizing the output value with other measuring instruments using the calibration function for each channel.


2.4.6 File System Set Up (**File System**)

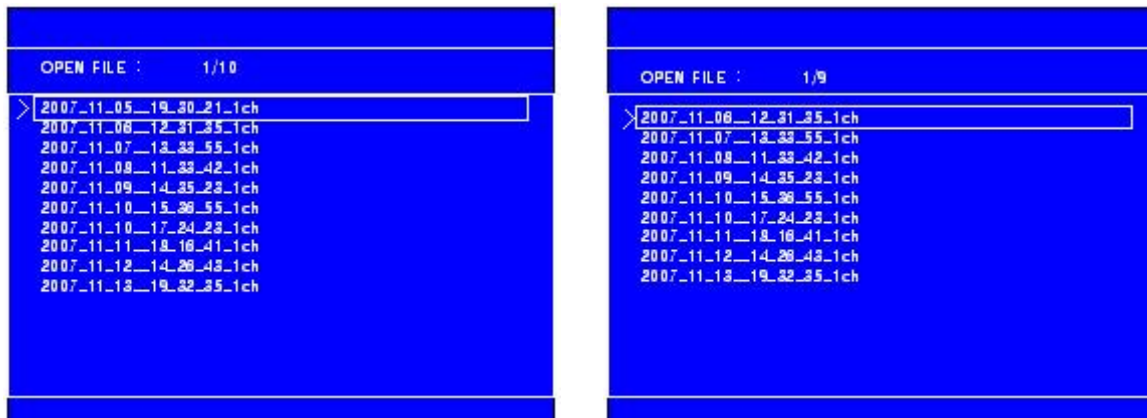
This provides a function to delete the files saved in the OWA and format transportable memory.

The following shows the screen when you press **ENT**  at **File System**



① Delete File **DELETE FILE**

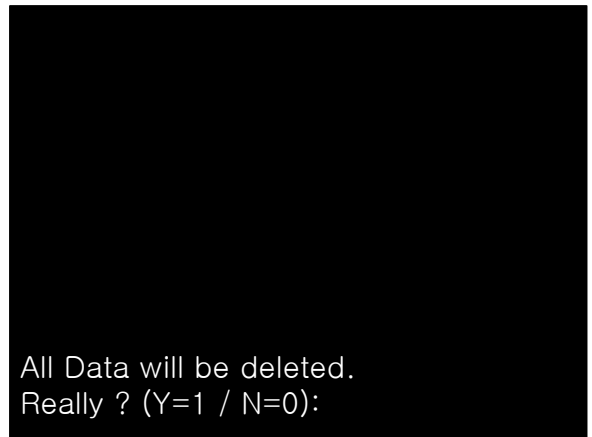
If you press **ENT**  key after choosing the file you want to delete from the screen below, it is deleted from the memory.



② Memory Format **FORMAT**

You can delete all saved files by formatting the transportable memory.

The screen below is shown if you press **ENT** at **FORMAT**, and you press key number 1 for format and 0 for delete.



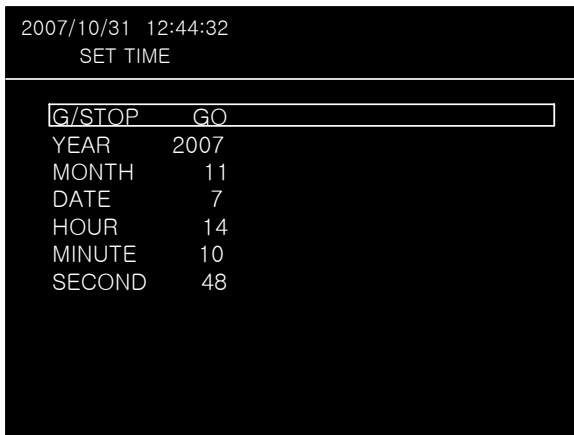
Caution. The user needs to be aware that formatted memory and deleted data cannot be recovered.

2.4.7 Set Time (Set Time)

This sets up the date and time on the OWA, and is not deleted even after the power goes off.

You change the value by pressing the ENT key after moving the selecting window using the arrow keys.

It is automatically saved if you press the ESC button.



Item	Description
G/STOP	Stops or proceeds the time
YEAR	Year
MONTH	Month
DATE	Day
HOUR	Hour
MINUTE	Minute
SECOND	Second

2.4.8 System Information (Sysinfo)

- Generates information about the equipment.

```

2007/10/31 12:44:32
SYSINFO

MODEL NAME : OWA-100
SERIES : N-0099
CALIBRATION DATE : 2007.08.09
S/W VERSION : zooTo920

```

Description of System Information Items

Item	Description
MODEL NAME :	Name of equipment
SERIES :	Product series
CALIBRATION DATE :	Last calibration date of equipment
S/W VERSION :	Firmware version

Chapter 3. Basic Measurement

3-1. User Specification (CWDM SCAN)

- If you press the CWDM SCAN button, the display mode changes to One Channel text view like the Power Meter button.

The only difference is that you personally have to choose the wavelength. Thus it asks you which wavelength as in the following screens. If you choose one from 1~17 and press the ENT button, it shows you the corresponding channel.

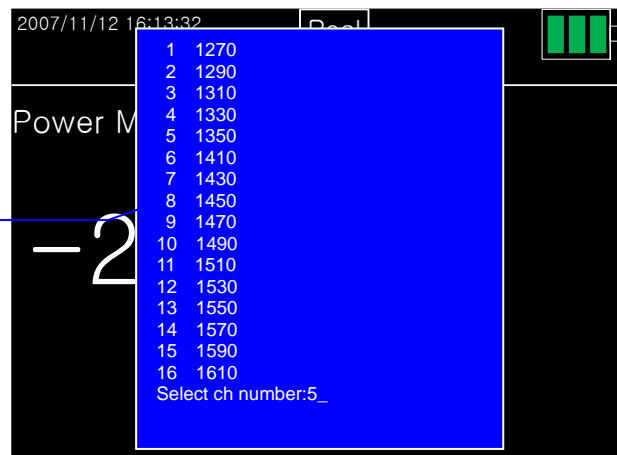
Using method is as follows.


- Press the CWDM SCAN button in display mode.





- If a screen shows asking for a channel selection, as below, input the channel you want and press the ENT key.

Input the channel you want using the number keys where the cursor blinks and press the Enter key.




③. Next press number 5 and press ENTER .




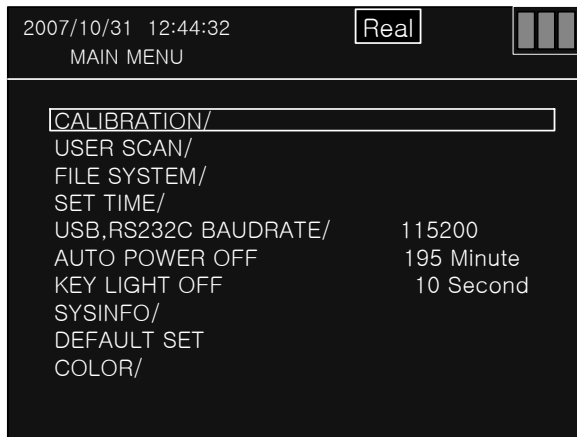
- If you keep pressing the Up arrow  button from the above picture, it moves to 1610nm, 1590nm, 1570nm, 1550nm, 1530nm, 1510nm, 1490nm, 1470nm, 1450nm, 1430nm, 1410nm 1350nm, 1330nm, 1310nm, 1290nm, 1270nm.
- Again, if you keep pressing the down arrow  button, it moves to 1270nm, 1290nm, 1310nm, 1330nm, 1350nm, 1410nm, 1430nm, 1450nm, 1470nm, 1490nm, 1510nm, 1530nm 1550nm, 1570nm, 1590nm, 1610nm.


3-2. User Defining Channel (USER SCAN)

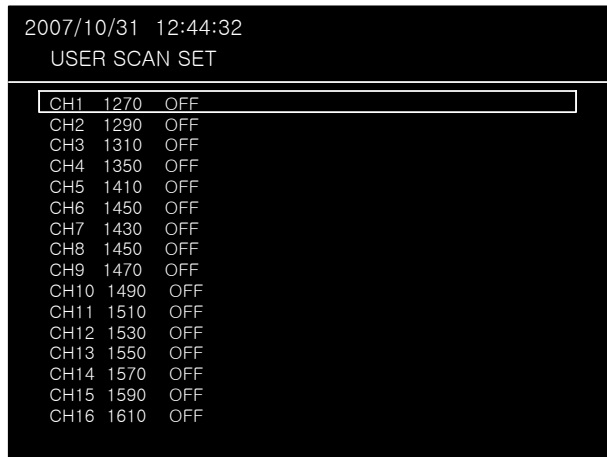



- USER SCAN  is a button assigned to scan only the channels that the user defined.
- How To Set Up USER SCAN

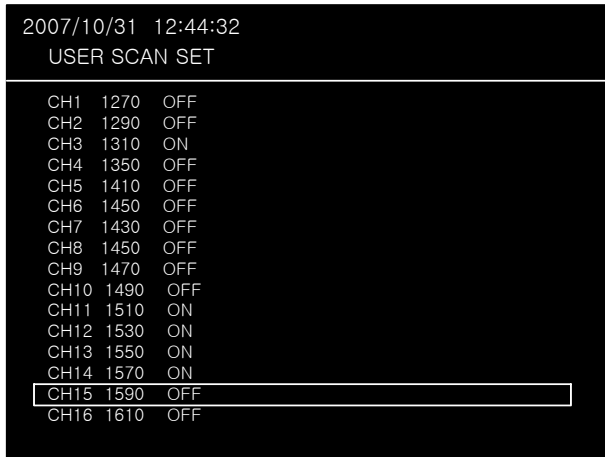
① Press the MENU  button to go to the MENU screen. It changes to the screen below if you press the button.



② The USER SCAN set up screen shows up if you press the ENTER  key after moving the cursor to USER SCAN using arrow keys.





③It changes from OFF to ON if you press the ENTER  button after moving to the channel the user wants using arrow keys.



Channel	Frequency	Status
CH1	1270	OFF
CH2	1290	OFF
CH3	1310	ON
CH4	1350	OFF
CH5	1410	OFF
CH6	1450	OFF
CH7	1430	OFF
CH8	1450	OFF
CH9	1470	OFF
CH10	1490	OFF
CH11	1510	ON
CH12	1530	ON
CH13	1550	ON
CH14	1570	ON
CH15	1590	OFF
CH16	1610	OFF

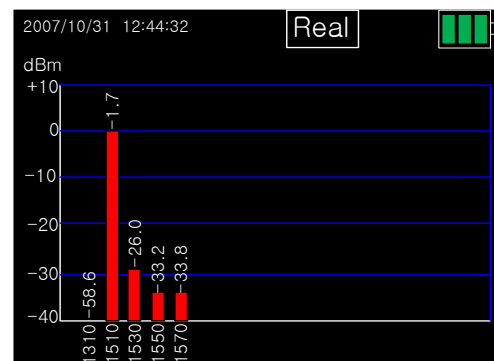
*If you scan and generate all 16 channels on the screen, unnecessary channels are also scanned, so it becomes complicated and hard to read as the letters become small. However, if you only scan the channels that the user set up, quick scanning and easier reading is possible.

- Mobile telecommunication companies use 1310, 1550 nm for 2G optic wavelength and 1510, 1530, 1570 nm for 3G optic wavelength. Thus you should set up the user channel to (1310, 1510, 1530, 1550, 1570) in the menu.
- When you press the Graph/Text  button following scanning after pressing the USER SCAN  button, it shows a user scan graph screen like the following.




Ch	λ (nm)	PWR(dBm)
3	1310	-58.6
11	1510	-1.7
12	1530	-26.0
13	1550	-33.2
14	1570	-33.8

User Channel Text Mode



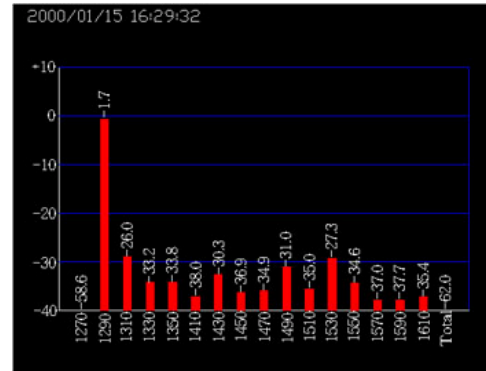
User Channel Graph Mode

3-3. Scanning All Channels (ALL SCAN )


- It scans all channels (= 1270, 1290, 1310, 1330, 1350, 1410, 1430, 1450, 1470, 1490, 1510, 1530, 1550, 1570, 1590, 1610) and shows a screen like the following.

CH	λ (nm)	CUR(dBm)	REF(dBm)	LOSS(dB)
1	1270	- 5.27	- 5.27	0.00
2	1290	-43.85	-43.85	0.00
3	1310	-46.38	-46.38	0.00
4	1330	-46.29	-46.29	0.00
5	1350	-46.12	-46.12	0.00
6	1410	-34.56	-34.56	0.00
7	1430	- 5.75	- 5.75	0.00
8	1450	-31.55	-31.55	0.00
9	1470	-37.51	-37.51	0.00
10	1490	-41.38	-41.38	0.00
11	1510	-44.42	-44.42	0.00
12	1530	-46.63	-46.63	0.00
13	1550	-46.46	-46.46	0.00
14	1570	-46.75	-46.75	0.00
15	1590	-45.66	-45.66	0.00
16	1610	-45.70	-45.70	0.00

SCAN ALL (TEXT MODE)




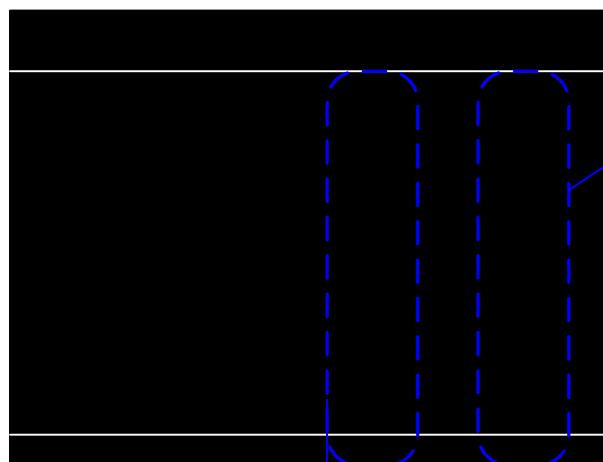
SCAN ALL (GRAPH MODE)

If you press the Graph/Text  button after scanning, a graph screen like the one on the right shows. If you press the button again it returns to text mode.

- Finding relative value (dB) of all channels


① The following shows the relative value (dB) of all channels based on independent standard value (dBm), which appears when you press the

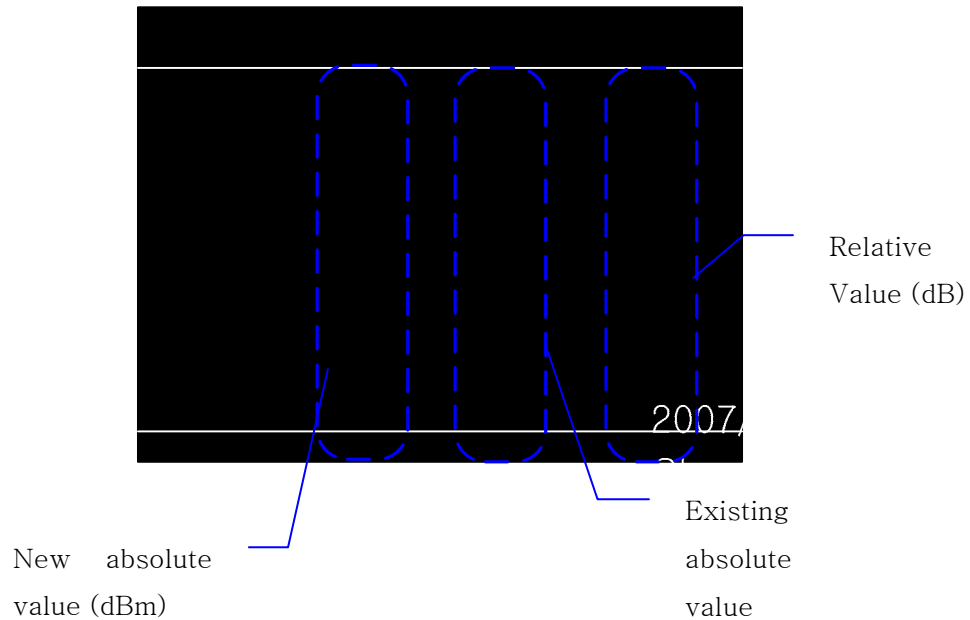
dB/dBm  button on the SCAN ALL screen.




Standard Value (dBm)

Relative value (dB)

② If you press the ALL SCAN  button from the current state, it scans the newly measured value (dBm) to compare with the existing standard value (Ref.dBm) and generates the relative value (dB).




③. Press the dB/dBm  once more to cancel the relative value (dB/dBm) mode.

3-4. General Power Meter (Power meter )

- This shows the Power Meter in the basic set up screen with out special manipulation when you turn on OWA's power.

Pressing the Power Meter button changes the Display mode into one channel text view. One channel text view is good for observing one channel in detail with big letters. It also continuously scans the current channel.

- If you press the Power Meter  button in any area except the menu set up screen, it changes to Power Meter which is the basic channel.



You can change the scan channel by pressing the Up or Down Arrow button in the one channel text view mode.

- If you keep pressing the Up arrow  button from the above screen it keeps changing from 850nm~1650nm.

- If you keep pressing the down arrow  button, it keeps changing from 1650 nm~ 850 nm.

3-5. dB/dBm



- The Optical Spectrum Analyzer automatically changes to the absolute power value (dBm or mW) display mode when the power goes on.
- The latest scan value is saved as reference value when you press the dB/dBm button.

If you press scan after connecting the connector to the optical port that you want to measure, the standard value and relative value of the current value are displayed.

- Example of using dB/dBm



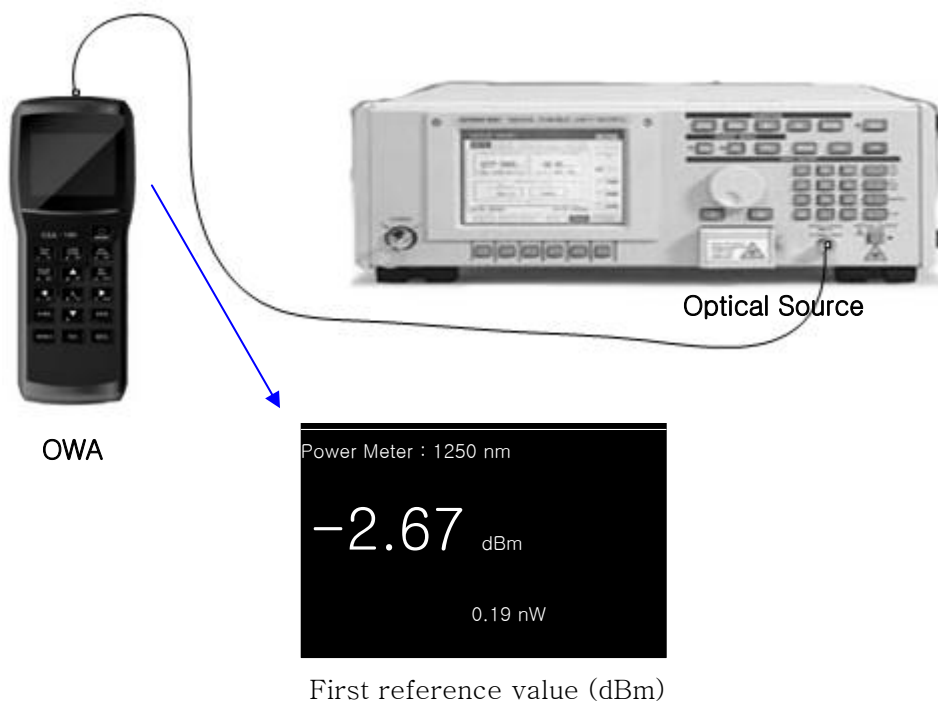
- ① Select the wavelength for measurement using CWDN SCAN button or Key




Left button, Key Right button.



- ② Connect the optic source connector which will be saved as the first reference value to the optic adaptor of OWA.




- ② To set up the first reference value (dBm) as relative value (dB), press the  button and ensure it displays 0 dB as the following.




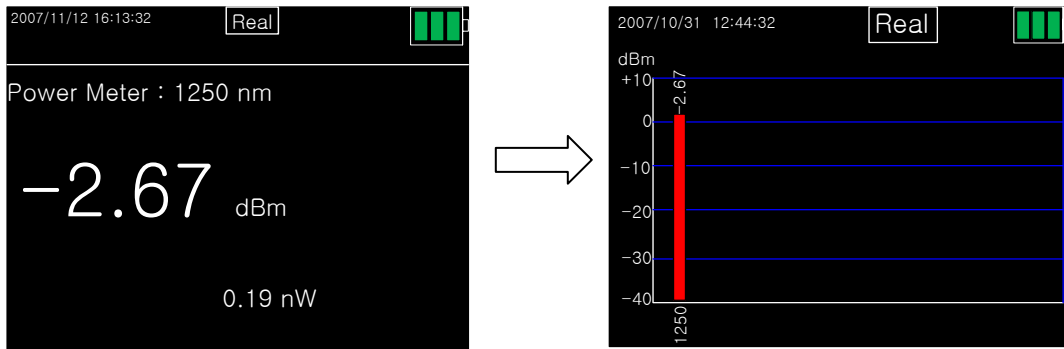
- ③ After removing the optic source connector from the OWA, connect the real light source to OWA to get the loss value and check the loss value as below.




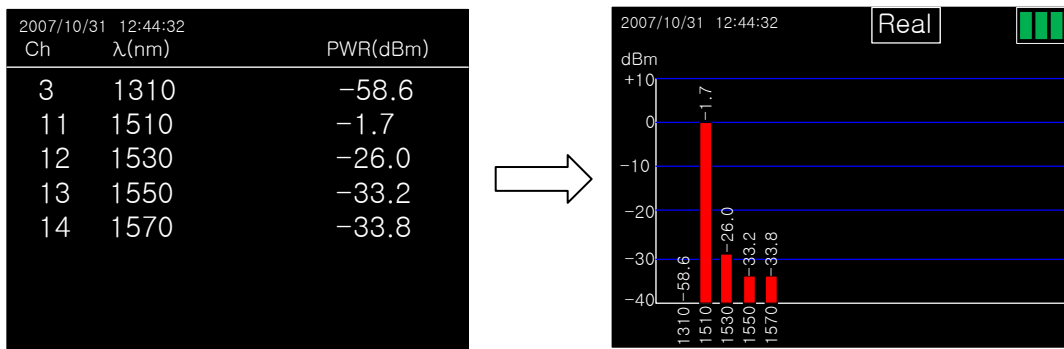
3.6 Graph Data Display


- If you press the Graph/Text  button, a bar graph is displayed for each channel's value in an easy to read format.
- It is usable in channel 1, USER SCAN and SCAN ALL, and the following shows how it is displayed.

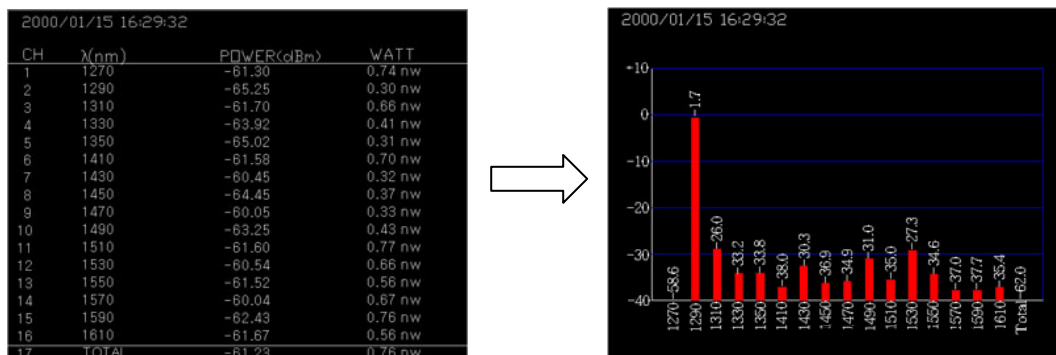
① In the case of pressing Graph/Text  in channel 1 text mode.



② In the case of pressing Graph/Text  in user defining channel.




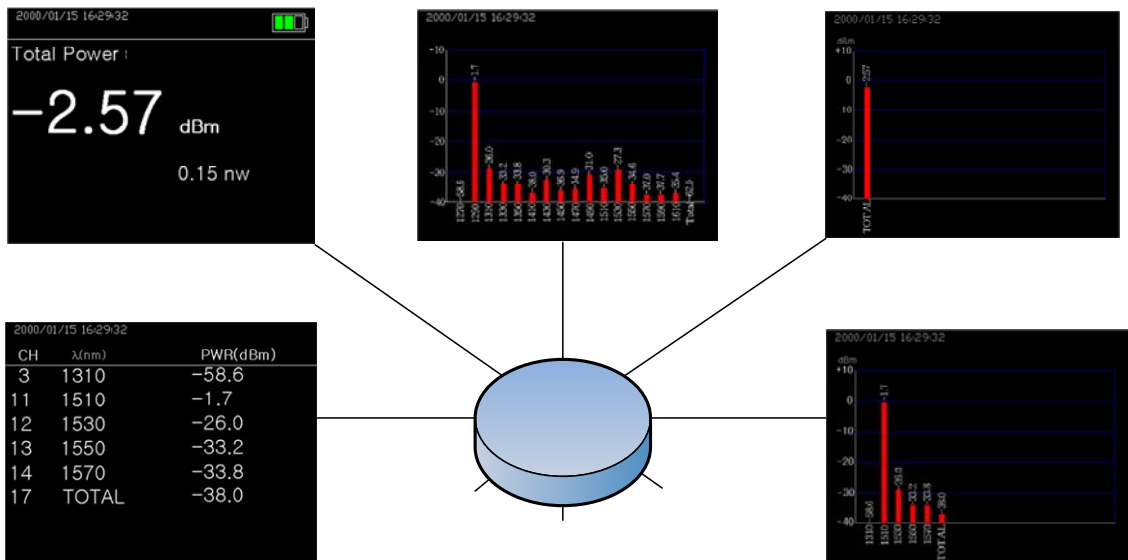
③ In the case of pressing Graph/Text  in scanning all channels.




3.7 Saving Information and Calling

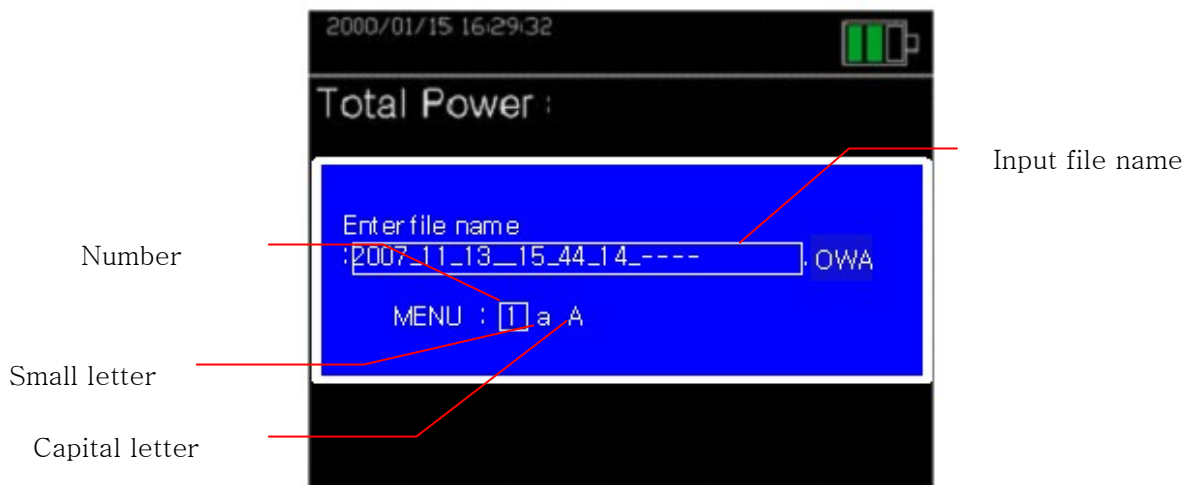
3.7.1 Saving Files (Save)


- This saves the currently displayed value, and all text and graph modes are savable using the SAVE  button.





In the display mode the reference values and the absolute power values of the 17 scanned channels are saved as a relative value (dB) and the file extension is .OWA.


- When you press the SAVE  button the following message shows and asks the name of the file to be saved, and the file based on the current date and time is saved if you press the ENT button.

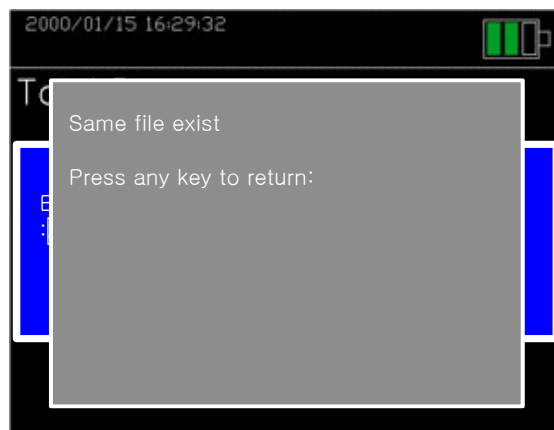


- You can choose the number, small letter and capital letter by moving the selecting box using the MENU  button in the above screen when the user wants to type in the file name.

Letter is erased from the back if you press the MENU  button.



Press the ENT  key when finishing input.

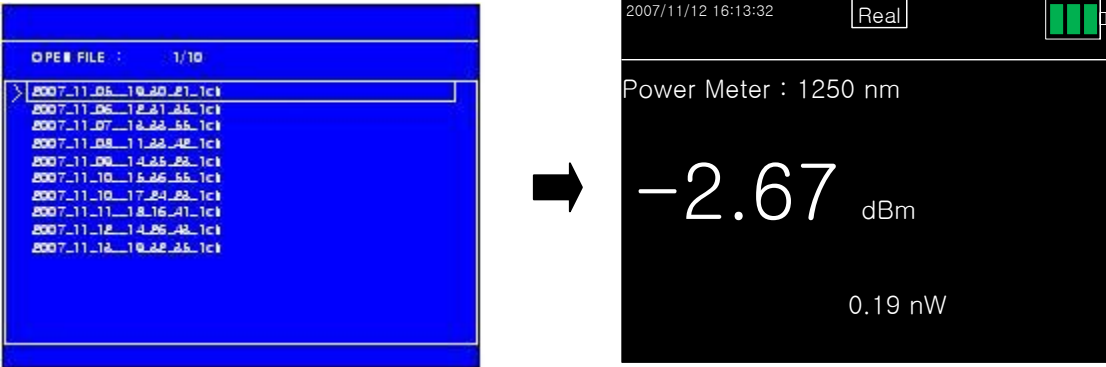
 Caution. Note that the following message shows and the file is not saved when you enter the name of an existing file.




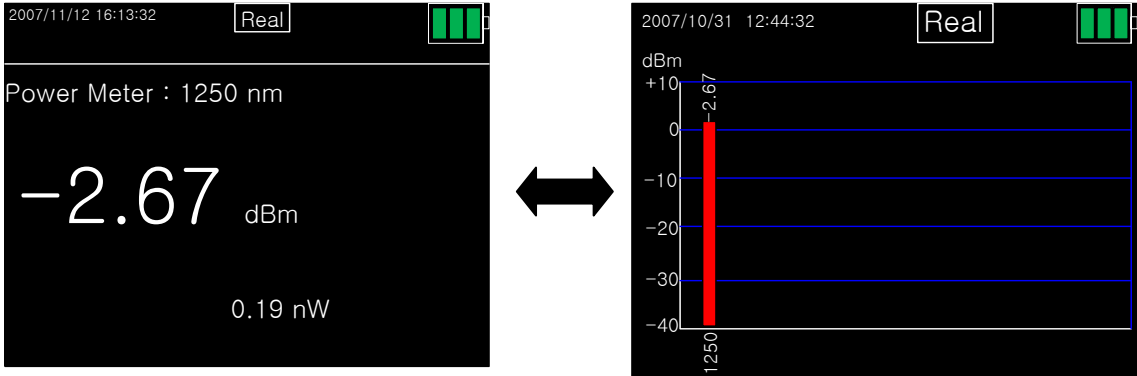
 Caution. Be careful not to exceed saving the maximum number of 100 files.

3.7.2 Opening Files (Open) 

- Press the OPEN  button to access the menu that calls the measured result of optic power for each channel in the form of text and graphs, and press the OPEN  button again to select the file you want and press the ENT button, the files saved are displayed.



TIP: If the opened file is in graph mode you can use the Graph/TEXT  button to change to text mode, which is also the same as text mode.



Troubleshooting

Problem	Probable Cause	How to solve
Inferior sensitivity of LCD	Battery exhausted	Change and Recharge battery/charge for 5 hours
No display when pressing power button	Battery exhausted /incorrect battery	Press the power button again /change battery
No response from LCD		

- Product A/S and Repair

When a problem occurs in operating the equipment or the equipment itself, do not disassemble the equipment but please contact TheFibers Inc.



Caution. Please note that A/S is not provided if you disassemble the equipment.

Warranty of Quality

We guarantee the following.

1. This product is made through strict quality management and inspection processes.
2. We provide repairing service free of charge during the warranty period if a breakdown occurred in the process of normal use by the customer.
3. If charged service is required, we provide repairing service with payment even if it occurs during the warranty period.
4. Please show the warranty statement when asking for repair.
5. Please keep warranty statement with care since it is not reissued.
6. Please register (FAX: +82-31-381-6109) after filling in the contents below.
7. You may have disadvantage in receiving A/S if you do not register the warranty statement.

Name of product		Warranty period	
Name of model			
Serial number			
Date of purchase	Yr 20 Month Day	Till Yr	Month Day
Address of purchaser			
Name			
Name of enterprise			

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