

FOT-5200

CWDM Analyzer



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Units of measurement in this publication conform to SI standards and practices.

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Certification Information

Federal Communications Commission (FCC) and Industry Canada Information

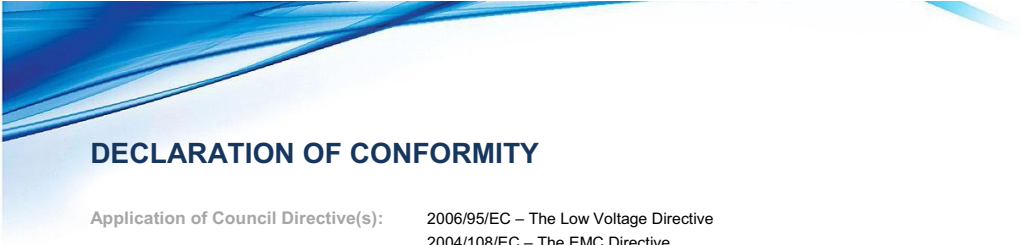
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The limits set by these standards are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the user guide, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

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Electronic test equipment is subject to the EMC Directive in the European Union. The IEC 61326-1 standard prescribes both emission and immunity requirements for laboratory, measurement, and control equipment. This unit has undergone extensive testing according to the European Union Directive and Standards.



DECLARATION OF CONFORMITY

Application of Council Directive(s):

2006/95/EC – The Low Voltage Directive
2004/108/EC – The EMC Directive
93/68/EEC – CE Marking
And their amendments

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**Equipment Type/Environment:
Trade Name/Model No.:**

Test & Measurement / Industrial
CWDM ANALYZER / FOT-5200

Standard(s) to which Conformity is declared:

EN 61010-1:2001 Edition 2.0

Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 1: General requirements

EN 61326-1:2006

Electrical equipment for measurement, control and laboratory use – EMC requirements – Part 1: General requirements

EN 60825-1:2007 Edition 2.0

Safety of laser products – Part 1: Equipment classification and requirements

I, the undersigned, hereby declare that the equipment specified above conforms to the above Directive and Standards.

Manufacturer:



Stephen Bull, E. Eng
Vice-President Research and Development

400 Godin Avenue,
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G1M 2K2 CANADA
August 18, 2010

1

Introducing the FOT-5200 CWDM Analyzer

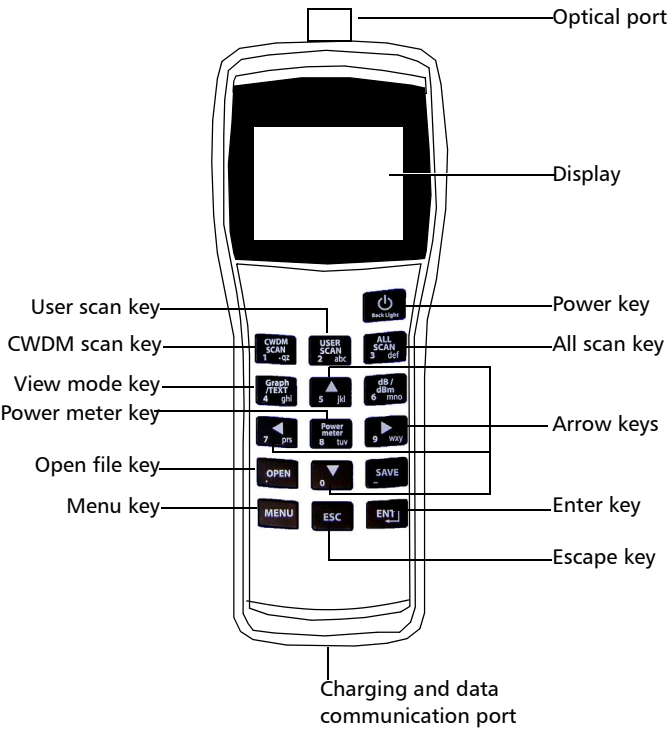
The FOT-5200 CWDM Analyzer is designed to measure and mark wavelengths in order to measure the exact power independently for each coarse wavelength division multiplexing (CWDM) channel. This instrument is portable and made to be appropriate to the outside environment.

When using a broadband powermeter, only the total optical power of the combined CWDM channels can be measured. When several wavelengths are sent at once, the exact value of each wavelength cannot be measured. Thus for CWDM, which functions over several wavelengths, a device that can distinguish the wavelengths must be used.

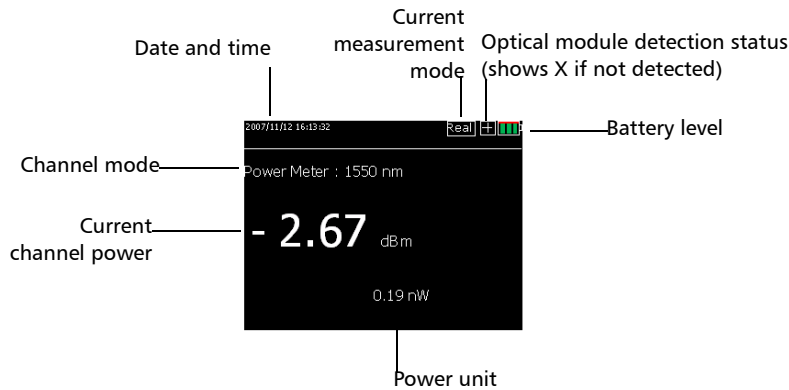
The FOT-5200 is developed to measure exact power and is adaptable to the various network conditions. It is especially suitable for outer environments and is compact, therefore easy to carry.

Introducing the FOT-5200 CWDM Analyzer

The picture below shows the FOT-5200, and the usage of the keypad essential in operating the measuring instrument.



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



Main Functions

- Simultaneous measurement of optical power in all channels in a single scan, which is the key factor in the field of installation, maintenance and repair.
- Works as a broadband power meter and as a loss meter.
- It is compact in size and lightweight for excellent portability.
- Can use the existing charger and USB Data Communication Cable by using a typical cell phone 24-pin connector
- Features a color LCD
- Sorts measured data
- Saves/Reads measured data
- Displays measured time

Conventions

Before using the product described in this guide, you should understand the following conventions:



WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in *death or serious injury*. Do not proceed unless you understand and meet the required conditions.



CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in *minor or moderate injury*. Do not proceed unless you understand and meet the required conditions.



CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in *component damage*. Do not proceed unless you understand and meet the required conditions.



IMPORTANT

Refers to information about this product you should not overlook.

2 ***Safety Information***



WARNING

Do not install or terminate fibers while a light source is active. Never look directly into a live fiber and ensure that your eyes are protected at all times.



WARNING

Use of controls, adjustments and procedures for operation and maintenance other than those specified herein may result in hazardous radiation exposure or impair the protection provided by this unit.



IMPORTANT



When you see the following symbol on your unit , make sure that you refer to the instructions provided in your user documentation. Ensure that you understand and meet the required conditions before using your product.

To prevent fire or injury:

- Use an appropriate battery. Use only a battery approved for the product.
- Connect and disconnect the battery properly.
- Do not disconnect the battery when the product is on.
- Check the patchcord standard. 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.
- 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.

Safety Information

Battery Charger

- Turn off the product's power using the Power button.
- Do not operate the product with the cover removed.
- Do not operate a product suspected of being damaged. Have it checked by a certified professional technician.
- Do not touch exposed circuits. Do not touch exposed connections or parts when power is being supplied.
- Do not use in damp environments.
- Keep the surface of product clean and dry.

Battery Charger

A rechargeable battery is installed inside the measuring instrument, and this charger module has a 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.

The LED on the charger module indicates different situations depending on its color and state:

Color	Status
Red, ON (continuous)	The charger module is in charging mode.
Green, ON (continuous)	Charge complete. Ready to use.
Red, Blinking	Error or damage to battery.

Here are additional precautions pertaining to battery use:

- Charging time is about five hours. If the indicating lamp has changed add one more hour.
- Do not allow battery to short circuit.
- Keep the battery away from fire. There is danger of explosion when the battery is near fire.
- Never dismantle, change structure or distort the battery. See on page 27 for more information.
- Do not dip the battery in water or other liquids.
- Do not store the battery in places warmer than 40 degrees Celsius.
- Do not drop or give a shock to the battery.
- Ensure the battery is oriented correctly.
- Power of charger is 110~220V at 50/60 Hz.
- Remove the battery when it is not in use for a long time.

3 *Setting Up and Operating your FOT-5200*

Cleaning and Connecting Optical Fibers



IMPORTANT

To ensure maximum power and to avoid erroneous readings:

- Always inspect fiber ends and make sure that they are clean as explained below before inserting them into the port. EXFO is not responsible for damage or errors caused by bad fiber cleaning or handling.
- Ensure that your patchcord has appropriate connectors. Joining mismatched connectors will damage the ferrules.

To connect the fiber-optic cable to the port:

- 1.** Inspect the fiber using a fiber inspection microscope. If the fiber is clean, proceed to connecting it to the port. If the fiber is dirty, clean it as explained below.
- 2.** Clean the fiber ends as follows:
 - 2a.** Gently wipe the fiber end with a lint-free swab dipped in isopropyl alcohol.
 - 2b.** Use compressed air to dry completely.
 - 2c.** Visually inspect the fiber end to ensure its cleanliness.

Setting Up and Operating your FOT-5200

Turning Unit On and Off

3. Carefully align the connector and port to prevent the fiber end from touching the outside of the port or rubbing against other surfaces.

If your connector features a key, ensure that it is fully fitted into the port's corresponding notch.

4. Push the connector in so that the fiber-optic cable is firmly in place, thus ensuring adequate contact.

If your connector features a screwsleeve, tighten the connector enough to firmly maintain the fiber in place. Do not overtighten, as this will damage the fiber and the port.

Note: *If your fiber-optic cable is not properly aligned and/or connected, you will notice heavy loss and reflection.*

Turning Unit On and Off

The Power button () is used to turn the unit on and off.

If you press Power for more than 1.5 seconds, the logo appears and the unit beeps. It then moves to Total Power, which is the basic channel.

Press Power for more than two seconds to turn the power off.

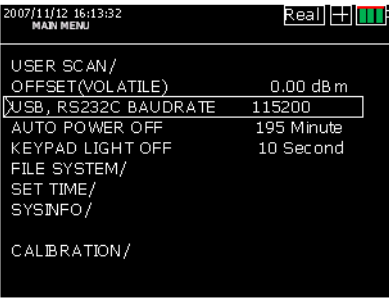
To adjust LCD Back Light:

It is possible to adjust the brightness of LCD's back light to one of two levels by pressing Power for just a short time.



Menu Tree

If you press MENU (), it changes to a screen where you can configure the operating environment of FOT-5200 and set up calibration, special operations, etc.



The menu includes the features below:

Item	Description
USER SCAN	User defined channels
OFFSET (VOLATILE)	Offset function
USB, RS232 C BAUDRATE	Establishes communication speed
AUTO POWER OFF	Setup for auto-off feature
KEY LIGHT OFF	Manages lighting of keypad
FILE SYSTEM	Functions for file management
SET TIME	To set time and date.
SYSINFO	Information on equipment
CALIBRATION	EXFO use only.

Note: Malfunction of the FOT-5200 can occur due to incorrect setup of functions.

User-Defined Channels (USER SCAN)

USER SCAN () is a button assigned to scan only channels defined by the user.

To set up USER SCAN:

- 1. Press MENU to change to the menu screen.
- 2. Use the arrow buttons to select USER SCAN, then press ENT.

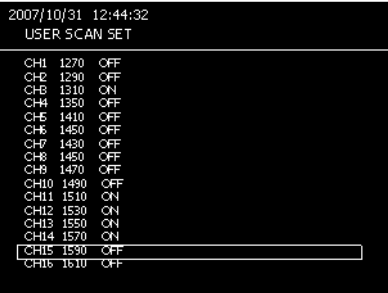
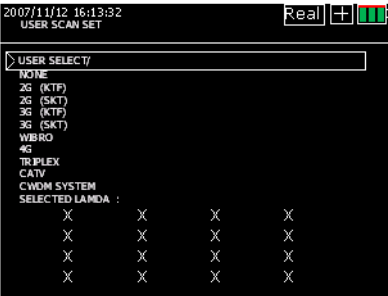
As the channel values that users mainly use are provided in the above screen, it is easy to set up the channel value that you want.

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

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

Note: The measurement time depends on the number of channels selected. Choosing the correct channels to be measured minimizes measurement time.

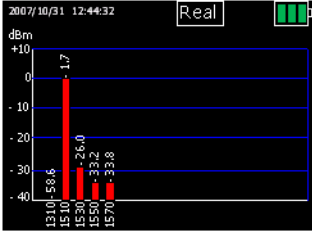
Mobile telecommunication companies use 1310, 1550 nm for 2 G optic wavelengths and 1510, 1530, 1570 nm for 3 G optic wavelengths. Thus you should set up the user channel to (1310, 1510, 1530, 1550, 1570) in the menu.



When you press Graph/TEXT () after performing a scan with the USER SCAN button, you can see a user scan graph screen such as the following.

2007/10/31 12:44:32		
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

OFFSET (VOLATILE)

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

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.

2007/11/12 16:13:32	
MAIN MENU	
Real 	
USER SCAN /	
OFFSET(VOLATILE)	0.00 dBm
USB, RS232C BAUDRATE	115200
AUTO POWER OFF	195 Minute
KEYPAD LIGHT OFF	10 Second
FILE SYSTEM /	
SET TIME /	
SYSINFO /	
CALIBRATION /	

Note: 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.

Communication Speed Set Up (USB, RS-232C, Baudrate)

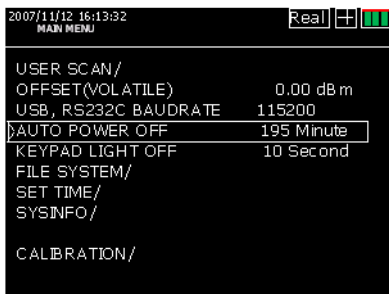
If you press the arrow keys in USB RS232C Baudrate, you can set up the transmission speed of the COM Port, and the default value is 115200 bps.



Power management Set Up (Auto Power)

The power automatically goes off if the user does not press a key in the determined time.

You can activate or de-activate the option by pressing ENT and set the time in minutes using the arrow keys.

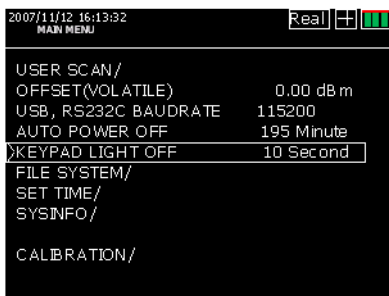


LED Management Set Up (KEYPAD LIGHT OFF)

This is a function to set up power management of the FOT-5200 like Auto Power.

The lighting goes off if the user does not press a key during the determined time.

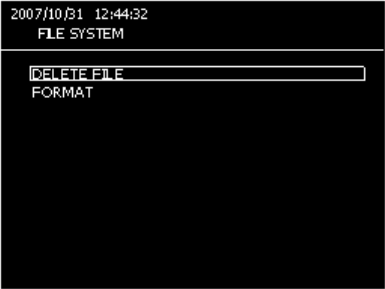
You can activate and de-activate the option by pressing ENT, and set up the time in seconds by using the arrow keys.



File System Set Up (File System)

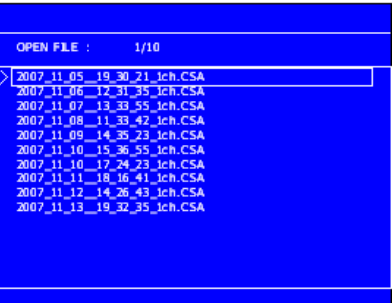
This provides a function to delete the files saved in the FOT-5200 and format transportable memory.

The following shows the screen when you select FILE SYSTEM in the menu, then press ENT.



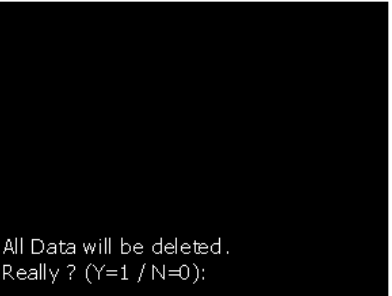
➤ DELETE FILE

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



➤ Memory FORMAT

You can delete all saved files by formatting the transportable memory. Once you have selected FORMAT, confirm your choice.



IMPORTANT

Formatted memory and deleted data cannot be recovered.

Setting Up and Operating your FOT-5200

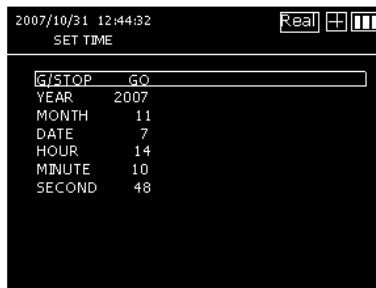
User Specification (CWDM SCAN)

Set Time (Set Time)

This sets up the date and time on the FOT-5200, and is not deleted even after the power goes off.

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

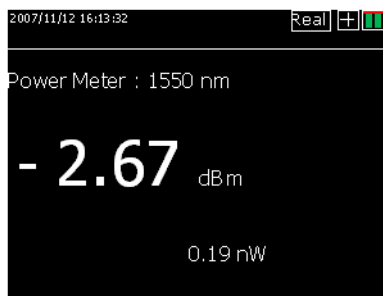
It is automatically saved if you press ESC.



User Specification (CWDM SCAN)

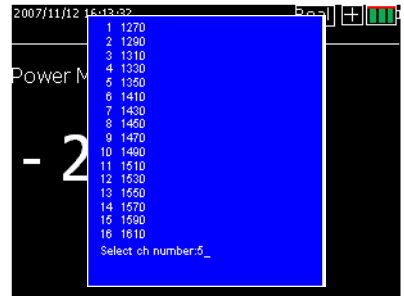
If you press the CWDM SCAN button (), the display mode changes to One Channel text view like the Power meter button ().

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 to 16 and press ENT, it shows you the corresponding channel.



To use the feature:

- 1.** Press CWDM SCAN in display mode.
- 2.** When you are asked for a channel selection, input the channel you want and press ENT.
- 3.** Enter the channel you want using the number keys where the cursor blinks and press ENT.



Setting Up and Operating your FOT-5200

Scanning All Channels (ALL SCAN)

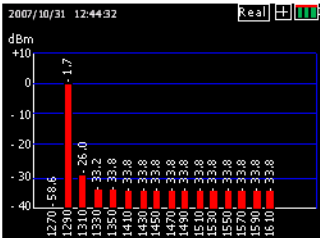
Scanning All Channels (ALL SCAN)

The  button scans all channels and shows a screen like the following.

2007/11/12 16:13:32 Real 

CH	λ (nm)	POWER(dBm)	WATT
1	1270	-5.27	0.98 uW
2	1290	-43.85	0.43 nW
3	1310	-46.38	1.38 uW
4	1330	-46.29	1.23 uW
5	1350	-46.12	0.43 uW
6	1410	-34.56	0.43 uW
7	1430	-5.75	0.43 mW
8	1450	-31.85	0.43 uW
9	1470	-37.51	0.43 nW
10	1490	-41.38	0.43 uW
11	1510	-44.42	0.43 uW
12	1530	-46.63	0.43 uW
13	1550	-46.46	0.43 uW
14	1570	-46.75	0.43 uW
15	1590	-45.86	0.43 uW
16	1610	-45.70	0.43 uW

Scan all (Text Mode)



Scan all (Graph Mode)

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

When in text mode, if you can use the right and left arrow buttons to switch between the different text display types.

2007/11/12 16:13:32 Real 

CH	λ (nm)	POWER(dBm)	WATT
1	1270	-5.27	0.98 uW
2	1290	-43.85	0.43 nW
3	1310	-46.38	1.38 uW
4	1330	-46.29	1.23 uW
5	1350	-46.12	0.43 uW
6	1410	-34.56	0.43 uW
7	1430	-5.75	0.43 mW
8	1450	-31.85	0.43 uW
9	1470	-37.51	0.43 nW
10	1490	-41.38	0.43 uW
11	1510	-44.42	0.43 uW
12	1530	-46.63	0.43 uW
13	1550	-46.46	0.43 uW
14	1570	-46.75	0.43 uW
15	1590	-45.86	0.43 uW
16	1610	-45.70	0.43 uW

Scan all (Full View)

2011/12/13 17:20:20 Real 

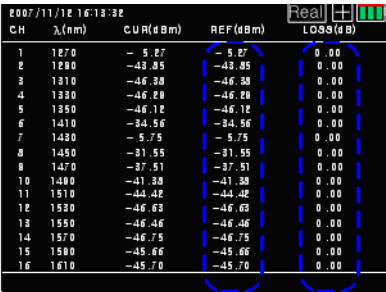
CH	λ (nm)	Pwr (dBm)
1	1270	-89.30
2	1290	-89.25
3	1310	-89.84
4	1330	-90.22
5	1350	-91.03
6	1410	-92.70
7	1430	-93.59
8	1450	-85.50

Scan all (Enlarged View)

Once in the enlarged view, you can use the up and down arrows to switch between channels 1 to 8, and 9 to 16. The dB / dBm button () switches between the loss and power values.

Finding Relative Value (dB) of All Channels

The following shows the relative value (dB) of all channels based on independent standard value (dBm), which appears when you press dB/dBm () on the SCAN ALL screen.

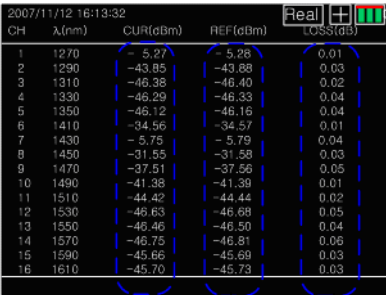


CH	λ(nm)	CUR(dBm)	REF(dBm)	LOSS(dB)
1	1270	-5.27	-5.27	0.00
2	1290	-43.85	-43.85	0.00
3	1310	-46.38	-46.38	0.00
4	1330	-46.29	-46.29	0.00
5	1350	-46.12	-46.12	0.00
6	1410	-34.56	-34.56	0.00
7	1430	-5.75	-5.75	0.00
8	1450	-31.55	-31.55	0.00
9	1470	-37.51	-37.51	0.00
10	1490	-41.38	-41.38	0.00
11	1510	-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

Standard value (dBm)

Relative value (dB)

If you press ALL SCAN 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).



CH	λ(nm)	CUR(dBm)	REF(dBm)	LOSS(dB)
1	1270	-5.27	-5.28	0.01
2	1290	-43.85	-43.88	0.03
3	1310	-46.38	-46.40	0.02
4	1330	-46.29	-46.33	0.04
5	1350	-46.12	-46.16	0.04
6	1410	-34.56	-34.57	0.01
7	1430	-5.75	-5.79	0.04
8	1450	-31.55	-31.58	0.03
9	1470	-37.51	-37.56	0.05
10	1490	-41.38	-41.39	0.01
11	1510	-44.42	-44.44	0.02
12	1530	-46.63	-46.68	0.05
13	1550	-46.46	-46.50	0.04
14	1570	-46.75	-46.81	0.06
15	1590	-45.66	-45.69	0.03
16	1610	-45.70	-45.73	0.03

New absolute value (dBm)

Existing absolute value (dBm)

Relative value (dB)

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

General Power Meter

This shows the Power Meter in the basic set up screen without special manipulation when you turn on FOT-5200's power.

Pressing Power meter () changes the display mode into one-channel text view. One channel text view is good for observing one channel with a better visibility of the measurement. It also continuously scans the current channel.

If you press Power Meter 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 buttons in the one channel text view mode.

If you keep pressing the Up arrow button from the above screen it keeps changing from 1260 nm to 1620 nm.

If you keep pressing the Down arrow button, it keeps changing from 1620 nm to 1260 nm.



dB/dBm

The CWDM 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 dB/dBm ().

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:

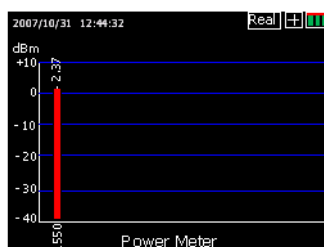
1. Select the wavelength for measurement using CWDN SCAN button or the arrow buttons.
2. Connect the optical source connector which will be saved as the first reference value to the optic adaptor of FOT-5200.
3. To set up the first reference value (dBm) as relative value (dB), press dB/dBm and ensure it displays 0 dB.
4. After removing the optical source connector from the FOT-5200, connect the actual light source to the FOT-5200 to get the loss value and check the loss value as shown to the right.



If you press the  button, a bar graph is displayed for each channel value in an easy to read format.

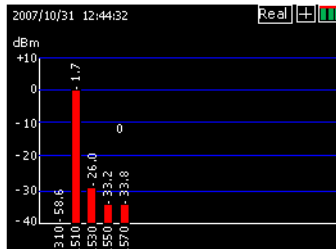
You can use this feature in CWDM SCAN, USER SCAN and SCAN ALL, and the following shows how it is displayed.

- In the case of pressing Graph/Text in CWDM SCAN mode.



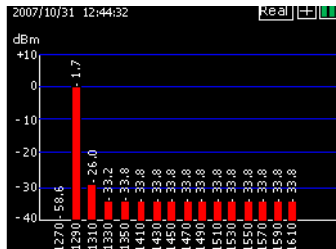
- In the case of pressing Graph/Text in user-defined channel mode.

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



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

CH	λ (nm)	POWER(dBm)	WATT
1	1270	- 5,27	0,98 uW
2	1290	- 43,95	0,43 nW
3	1310	- 46,38	1,38 uW
4	1330	- 46,29	1,23 uW
5	1350	- 46,12	0,43 uW
6	1410	- 34,56	0,43 uW
7	1430	- 5,25	0,43 nW
8	1450	- 31,55	0,43 uW
9	1470	- 37,51	0,43 nW
10	1490	- 41,38	0,43 uW
11	1510	- 44,42	0,43 uW
12	1530	- 46,63	0,43 uW
13	1550	- 46,46	0,43 uW
14	1570	- 46,75	0,43 uW
15	1590	- 45,66	0,43 uW
16	1610	- 45,70	0,43 uW



Saving Information and Naming Files

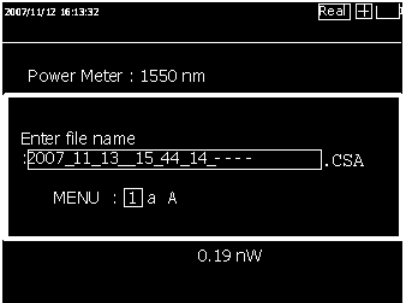
Saving Files (Save)

This saves the currently displayed value, and you can save all text and graph modes using the SAVE button ().

In the display mode the reference values and the absolute power values of the 16 scanned channels are saved as a relative value (dB) and the file extension is .CSA.

When you press SAVE, you must enter a name for the file to be saved; the file based on the current date and time is saved if you press ENT.

You can choose to enter numbers, small letters or capital letters by moving the selecting box using the MENU button when you want to type in the file name.



Setting Up and Operating your FOT-5200

Opening Files

The  key acts as a backspace button.

If you want to exit without saving, press the ESC key until all of the file name letters have been deleted. Press once more on the ESC key. Press ENT when you are done.



IMPORTANT

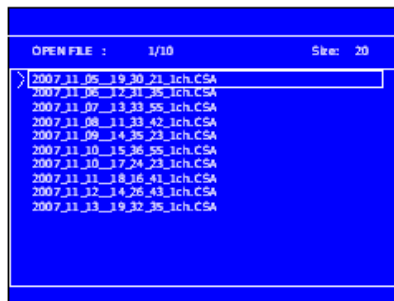
If you try to save the file using a name and that it already exists, you will be notified and the file is not saved.

Note: You can save up to 100 files.

Opening Files

Press OPEN () to access the menu that calls the measured result of optic power for each channel in the form of text and graphs. Press OPEN again to select the file you want and press ENT, the file is displayed.

Note: If the opened file is in graph mode you can use the Graph/TEXT button to change to text mode.



4 **Maintenance**

To help ensure long, trouble-free operation:

- Always inspect fiber-optic connectors before using them and clean them if necessary.
- Keep the unit free of dust.
- Clean the unit casing and front panel with a cloth slightly dampened with water.
- Store unit at room temperature in a clean and dry area. Keep the unit out of direct sunlight.
- Avoid high humidity or significant temperature fluctuations.
- Avoid unnecessary shocks and vibrations.
- If any liquids are spilled on or into the unit, turn off the power immediately, disconnect from any external power source, remove the batteries and let the unit dry completely.



WARNING

Use of controls, adjustments, and procedures for operation and maintenance other than those specified herein may result in hazardous radiation exposure.

Maintenance

Cleaning Detector Ports

- Use a dustproof cap when not operating to protect from scratches and contamination.
- Plug and connector need to be pulled out carefully as the connector surface is sensitive.
- Remove the battery when not using the unit for a long time.



CAUTION

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



CAUTION

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

Cleaning Detector Ports

Regular cleaning of detectors will help maintain measurement accuracy.

To clean detector ports:

1. If the detector is dusty, blow dry with compressed air.
2. Being careful not to touch the soft end of the swab, moisten a cleaning tip with *only one drop* of isopropyl alcohol.



IMPORTANT

Alcohol may leave traces if used abundantly. Do not use bottles that distribute too much alcohol at a time.

3. While applying light pressure, gently rotate the cleaning tip on the detector window.
4. Repeat step 3 with a dry cleaning tip or blow dry with compressed air.
5. Discard the cleaning tips after one use.

Recalibrating the Unit

Manufacturing and service center calibrations are based on the ISO/IEC 17025 Standard, which states that calibration documents must not contain a recommended calibration interval, unless this has been previously agreed upon with the customer.

Validity of specifications depends on operating conditions. For example, the calibration validity period can be longer or shorter depending on the intensity of use, environmental conditions and unit maintenance. You should determine the adequate calibration interval for your unit according to your accuracy requirements.

Under normal use, EXFO recommends calibrating your unit every year.

Recycling and Disposal (Applies to European Union Only)

For complete recycling/disposal information as per European Directive WEEE 2002/96/EC, visit the EXFO Web site at www.exfo.com/recycle.

5 **Troubleshooting**

Solving Common Problems

Here are some common situations, their possible cause and solutions.

Problem	Possible Cause	Solution
Inferior sensitivity of LCD	Battery drained	Change and recharge battery.
No display when pressing the power button	Battery drained Wrong battery format	Change and recharge battery

Contacting the Technical Support Group

To obtain after-sales service or technical support for this product, contact EXFO at one of the following numbers. The Technical Support Group is available to take your calls from Monday to Friday, 8:00 a.m. to 7:00 p.m. (Eastern Time in North America).

For detailed information about technical support, visit the EXFO Web site at www.exfo.com.

Technical Support Group

400 Godin Avenue
Quebec (Quebec) G1M 2K2
CANADA

1 866 683-0155 (USA and Canada)
Tel.: 1 418 683-5498
Fax: 1 418 683-9224
support@exfo.com

To accelerate the process, please have information such as the name and the serial number (see the product identification label), as well as a description of your problem, close at hand.

Viewing System Information

You can view information about your unit such as the serial number or calibration date in the SYSINFO window.

To view the information:

Press MENU, then use the arrow keys to select **SYSINFO**.



Transportation

Maintain a temperature range within specifications when transporting the unit. Transportation damage can occur from improper handling. The following steps are recommended to minimize the possibility of damage:

- Pack the unit in its original packing material when shipping.
- Avoid high humidity or large temperature fluctuations.
- Keep the unit out of direct sunlight.
- Avoid unnecessary shocks and vibrations.

6 **Warranty**

General Information

EXFO Inc. (EXFO) warrants this equipment against defects in material and workmanship for a period of one year from the date of original shipment. EXFO also warrants that this equipment will meet applicable specifications under normal use.

During the warranty period, EXFO will, at its discretion, repair, replace, or issue credit for any defective product, as well as verify and adjust the product free of charge should the equipment need to be repaired or if the original calibration is erroneous. If the equipment is sent back for verification of calibration during the warranty period and found to meet all published specifications, EXFO will charge standard calibration fees.



IMPORTANT

The warranty can become null and void if:

- unit has been tampered with, repaired, or worked upon by unauthorized individuals or non-EXFO personnel.
- warranty sticker has been removed.
- case screws, other than those specified in this guide, have been removed.
- case has been opened, other than as explained in this guide.
- unit serial number has been altered, erased, or removed.
- unit has been misused, neglected, or damaged by accident.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES EXPRESSED, IMPLIED, OR STATUTORY, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL EXFO BE LIABLE FOR SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES.

Warranty

Liability

Liability

EXFO shall not be liable for damages resulting from the use of the product, nor shall be responsible for any failure in the performance of other items to which the product is connected or the operation of any system of which the product may be a part.

EXFO shall not be liable for damages resulting from improper usage or unauthorized modification of the product, its accompanying accessories and software.

Exclusions

EXFO reserves the right to make changes in the design or construction of any of its products at any time without incurring obligation to make any changes whatsoever on units purchased. Accessories, including but not limited to fuses, pilot lamps, batteries and universal interfaces (EUI) used with EXFO products are not covered by this warranty.

This warranty excludes failure resulting from: improper use or installation, normal wear and tear, accident, abuse, neglect, fire, water, lightning or other acts of nature, causes external to the product or other factors beyond the control of EXFO.



IMPORTANT

EXFO will charge a fee for replacing optical connectors that were damaged due to misuse or bad cleaning.

Certification

EXFO certifies that this equipment met its published specifications at the time of shipment from the factory.

Service and Repairs

EXFO commits to providing product service and repair for five years following the date of purchase.

To send any equipment for service or repair:

- 1.** Call one of EXFO's authorized service centers (see *EXFO Service Centers Worldwide* on page 35). Support personnel will determine if the equipment requires service, repair, or calibration.
- 2.** If equipment must be returned to EXFO or an authorized service center, support personnel will issue a Return Merchandise Authorization (RMA) number and provide an address for return.
- 3.** If possible, back up your data before sending the unit for repair.
- 4.** Pack the equipment in its original shipping material. Be sure to include a statement or report fully detailing the defect and the conditions under which it was observed.
- 5.** Return the equipment, prepaid, to the address given to you by support personnel. Be sure to write the RMA number on the shipping slip. *EXFO will refuse and return any package that does not bear an RMA number.*

Note: *A test setup fee will apply to any returned unit that, after test, is found to meet the applicable specifications.*

After repair, the equipment will be returned with a repair report. If the equipment is not under warranty, you will be invoiced for the cost appearing on this report. EXFO will pay return-to-customer shipping costs for equipment under warranty. Shipping insurance is at your expense.

Routine recalibration is not included in any of the warranty plans. Since calibrations/verifications are not covered by the basic or extended warranties, you may elect to purchase FlexCare Calibration/Verification Packages for a definite period of time. Contact an authorized service center (see *EXFO Service Centers Worldwide* on page 35).

EXFO Service Centers Worldwide

If your product requires servicing, contact your nearest authorized service center.

EXFO Headquarters Service Center

400 Godin Avenue
Quebec (Quebec) G1M 2K2
CANADA

1 866 683-0155 (USA and Canada)
Tel.: 1 418 683-5498
Fax: 1 418 683-9224
support@exfo.com

EXFO Europe Service Center

Omega Enterprise Park, Electron Way
Chandlers Ford, Hampshire S053 4SE
ENGLAND

Tel.: +44 2380 246810
Fax: +44 2380 246801
support.europe@exfo.com

EXFO Telecom Equipment (Shenzhen) Ltd.

3rd Floor, Building 10,
Yu Sheng Industrial Park (Gu Shu
Crossing), No. 467,
National Highway 107,
Xixiang, Bao An District,
Shenzhen, China, 518126

Tel: +86 (755) 2955 3100
Fax: +86 (755) 2955 3101
support.asia@exfo.com

A *Technical Specifications*



IMPORTANT

The following technical specifications can change without notice. The information presented in this section is provided as a reference only. To obtain this product's most recent technical specifications, visit the EXFO Web site at www.exfo.com.

SPECIFICATIONS	
Range (nm)	1260 to 1620
Number of channels	16
Measuring wavelengths (nm)	1270/1290/1310/1330/1350/1410/1430/ 1450/1470/1490/1510/1530/1550/1570/ 1590/1610
Range of display (dBm)	+10 to -70
Accuracy (dB) ^a	≤ ± 0.5
Measuring unit	dBm/dB/mW

GENERAL SPECIFICATIONS	
Size (H x W x D) ^b	210 mm x 80 mm x 48 mm (8 ¼ in x 3 ½ in x 2 ⅙ in)
Weight ^c	0.5 kg (1.1 lb)
Temperature operating	0 °C to 50 °C (32 °F to 122 °F)
Relative humidity	0 % to 90 % non-condensing

Notes

- a. Typical specification, unpolarized source; -5 dBm, 23°C ± 5°C
- b. Including cover
- c. Including cover and battery

NOTICE

通告

CHINESE REGULATION ON RESTRICTION OF HAZARDOUS SUBSTANCES

中国关于危害物质限制的规定

NAMES AND CONTENTS OF THE TOXIC OR HAZARDOUS SUBSTANCES OR ELEMENTS CONTAINED IN THIS EXFO PRODUCT

包含在本 **EXFO** 产品中的有毒有害物质或元素的名称和含量

O	Indicates that this toxic or hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in SJ/T11363-2006 表示该有毒有害物质在该部件所有均质材料中的含量均在 SJ/T11363-2006 标准规定的限量要求以下。
X	Indicates that this toxic or hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement in SJ/T11363-2006 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 SJ/T11363-2006 标准规定的限量要求。

Part Name 部件名称	Toxic or hazardous Substances and Elements 有毒有害物质和元素					
	Lead 铅 (Pb)	Mercury 汞 (Hg)	Cadmium 镉 (Cd)	Hexavalent Chromium 六价铬 (Cr VI)	Polybrominated biphenyls 多溴联苯 (PBB)	Polybrominated diphenyl ethers 多溴二苯醚 (PBDE)
Enclosure 外壳	O	O	O	O	O	O
Electronic and electrical sub-assembly 电子和电子组件	X	O	X	O	X	X
Optical sub-assembly ^a 光学组件 ^a	X	O	O	O	O	O
Mechanical sub-assembly ^a 机械组件 ^a	O	O	O	O	O	O

a. If applicable.
如果适用。

MARKING REQUIREMENTS
标注要求

Product 产品	Environmental protection use period (years) 环境保护使用期限 (年)	Logo 标志
This Exfo product 本 EXFO 产品	10	
Battery ^a 电池 ^a	5	

a. If applicable.
如果适用。

P/N: 1062382

www.EXFO.com · info@exfo.com

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EXFO SERVICE ASSURANCE	270 Billerica Road	Chelmsford MA, 01824 USA Tel.: 1 978 367-5600 · Fax: 1 978 367-5700
EXFO NETHAWK	Elektroniikkatie 2	FI-90590 Oulu, FINLAND Tel.: +358 (0) 403 010 300 · Fax: +358 (0) 8 564 5203
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