User Manual

KI6503 / T6503 series 48-Channel Optical DWDM Power Meter

Warranty:

Information in this manual is given in good faith for the benefit of the user. It cannot be used as the basis for claims against Kingfisher International or its representatives if accidental damage or inconvenience results from use or attempted repair of the equipment.

This Kingfisher International product is guaranteed against defective components and workmanship for a period of 1 year from the date of delivery, unless specifically stated in the original purchase contract or agreement. This warranty excludes optical connectors or incorrect use.

The warranty will be voided if the following instance happens,

1) Dismantling the instrument.
2) The instrument has been immersed in water or subjected to extreme environmental conditions.

Liability is limited solely to repair of the equipment.

CONTENTS

1. Summary

The instrument is an easy and economical handheld DWDM Power Meter for testing multi-λ single mode fiber optic systems.

It scans and stores the absolute or relative power levels of all 48 CWDM λ in 3 seconds. Test data can be viewed in graphical or numerical form, and reference values can be stored for easy loss testing.

The instrument has good ergonomics. It features a large, sunlight readable and backlit color display, and a well laid out and easy to use front panel.

Data Management Software enables stored test data to be downloaded to PC.

Applications of the DWDM Power Meter include the following:

- Wavelength Selective Power Meter for systems with DWDM channel spacing.
- Quickly determine active channels.

For application support, please visit www.kingfisherfiber.com to see our comprehensive Application Notes written to support instrument users or an updated version of this manual. FAQ can be found in the “Support” section of our website.

Look at ww.kingfisherfiber.com to find distributor and service centre details from the Contact Us section.

Otherwise, if you are having difficulties, please feel free to contact sales@kingfisher.com.au for application support.

2. Main Instrument Features

- Compact, rugged & light weight
- Simple to use
- Fast measurement speed
- Scan range of 48 calibrated wavelengths
- Larger, sunlight readable, backlit color display
- Simultaneous 9 wavelengths loss display
- Tabular and graphical display modes
- Internal memory for 300 records of 48 λ test with time stamp
- Test data transfer via USB port
- Programmable auto shut off
- External power / charging via mini-USB port
- LED indicator battery charging status
- Low cost
- 1-year warranty

3. Specifications

Parameters	Value
Technical	
Channel wavelength/frequency (nm / THz)	1526.44 ~ 1563.86 / 196.4 ~ 191.7 (ITU-T compliant)
Number of channels	48
Channel spacing (nm / GHz)	0.8 / 100
Measurement speed (sec)	3 (for all channels)
Measurement range (dBm)	-40 ~ 10
Measurement accuracy (dB)	±1.0 @ -30 dBm
Damaged level (dBm)	+27 (composition of 18 λ)
Fiber type	Single Mode
General	
Optical connector/ interface	SC/PC
Display	2.8” Colour LCD with backlight
Display unit	dBm, dB
Display resolution	0.01 dB
Memory	300 records of 48-λ tests in internal memory
PC interface	Data transfer via USB
Battery type	Built-in rechargeable Li-Polymer (3.7V, 1800mAH)
Battery life	7 hours (min)
Auto off function	Programmable
External power /charging	Via USB port
Operate temperature / Relative humidity	-20 ~ 55 °C / 10 ~ 90% @ 0 ~ 40°C
Size / Weight	77.9 x 154.9 x 33.5 mm (3.07 x 6.10 x 1.32 “) / 0.33 kg (0.73 lb.)
Warranty	1 year

4. Safety

	Take appropriate eye-safe precautions when handling live fibre.

Avoid condensation

The instrument is resistant to normal dust and moisture however it is not waterproof. If moisture gets into the instrument, remove the batteries, and dry it out carefully for at least one hour before using it again.

Storage

The equipment can be stored at the specified temperatures and relative humidity. Protect the unit from temperature extremes that may cause condensation within it.

Make sure to switch off the instrument whenever it is not in use. Keep the optical connector always covered with the dustcover.

5. Instrument Layout

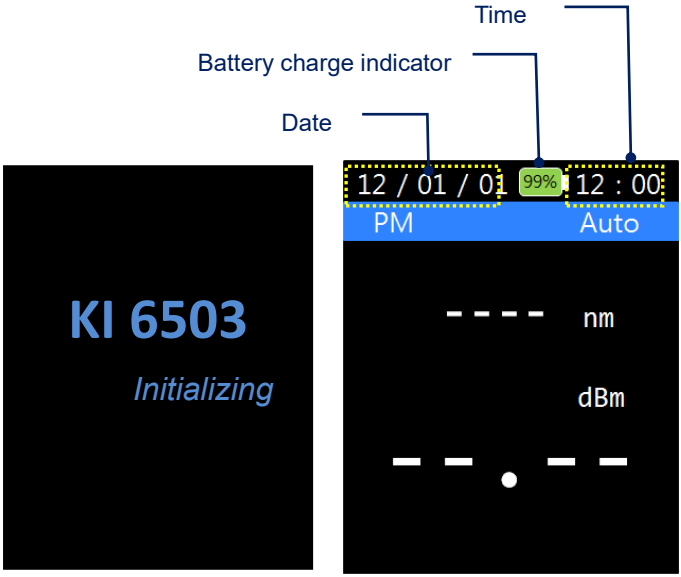
6. Operation instructions

6.1 General functions of instrument keys

Key	Function
[Backlight]	ON / OFF Instrument, ON/OFF LCD display backlight
[PM]	AUTO / MANUAL Power Meter Mode
[DWDM]	Scan & present dBm in single-wavelength display mode
[SCAN]	Scan & present dBm in multiple-wavelength display mode
[dB/dBm]	Toggle between measurement absolute and relative modes
[Graph]	Present scanned dBm/wavelength in graphical format
[Save]	Save scanned data to instrument's memory
[Recall]	Retrieve saved data from instrument's memory
[ENTER]	Enter
[ESC]	Cancel / quit
[Menu]	Instrument Setup
[▲]	Scroll up
[▼]	Scroll down

6.2 Switching Instrument ON/OFF

To switch ON instrument, press and hold [Backlight] for 2 seconds. The instrument will be defaulted to PM Auto (Auto Power Meter) Mode upon initialization; see pictures below for instrument displays.



When the instrument is switched ON, its LCD backlight can be toggled ON or OFF by pressing [Backlight]. The backlight will turn off automatically approx. 30 seconds after the last keypress.

To switch OFF the instrument, press and hold [Backlight] for 2 seconds. The instrument will switch OFF a few seconds after the display shown below.

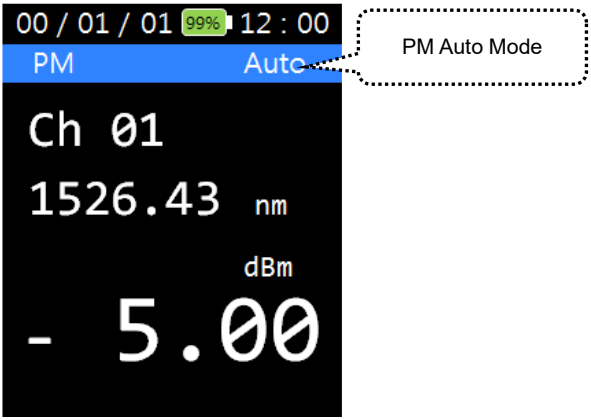
6.3 PM (Power Meter) Mode

Power Meter can be operated either in PM Auto Mode or PM Manual Mode. PM Manual mode displays real time power measurement values.

PM Auto Mode:

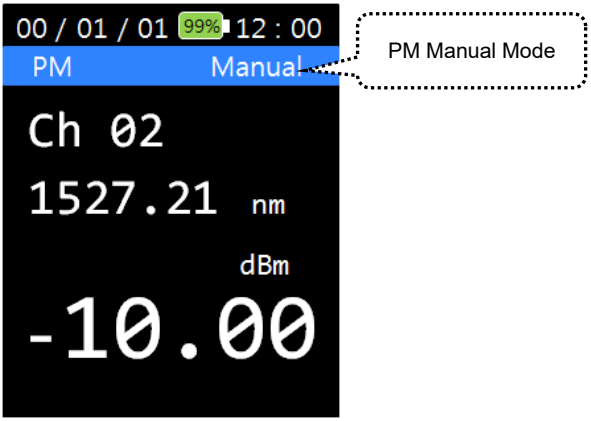
In this operation mode, the instrument automatically scans the optical input and displays the wavelength (along with its corresponding measured power value) which has been detected with the highest level of power.

The instrument defaults to PM Auto Mode upon power-ON; otherwise, it can be switched from other operation modes to this by pressing [PM], see picture below for instruments user interface.



PM Manual Mode:

Use this operation mode to manually select and display real time power values of the wavelengths available at the optical input. See picture below for user interface of this mode.

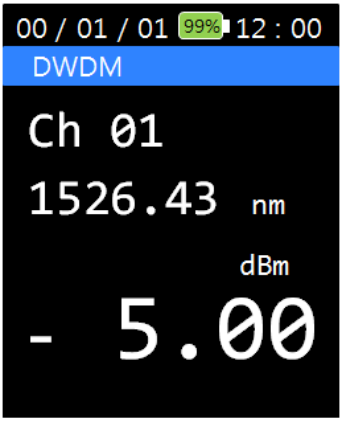


In PM auto Mode, press [PM] once to switch to PM Manual Mode. Use [▲, ▼] to select the desired wavelengths for power values displays.

Press [PM] again to return the instrument to PM Auto Mode.

6.4 DWDM Mode

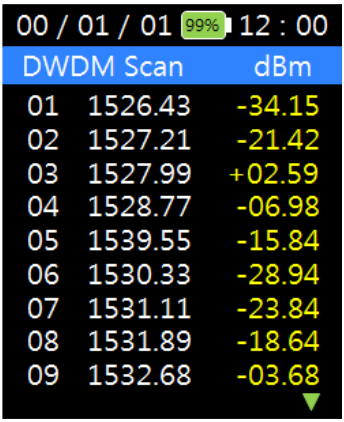
Press [DWDM] to scan optical input once and display power values in single-wavelength display mode. See picture below for CWDM user interface.



Use [▲, ▼] to display the power values of other wavelengths scanned at the optical input.

6.5 SCAN Mode

When [SCAN] is pressed, the wavelengths and their corresponding power values scanned at the optical input will be displayed in multiple-wavelength format. A max of 9 wavelengths can be displayed simultaneously. Use [▲, ▼] to scroll between available display pages. See picture below for SCAN Mode User Interface.



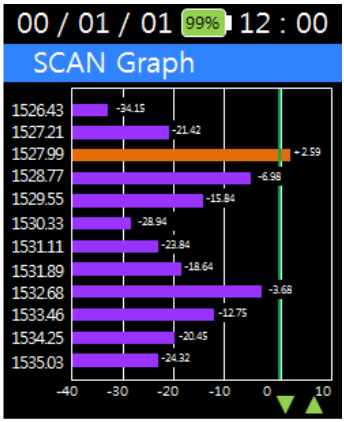
6.6 Absolute (dBm) / relative (dB) measurement modes

In PM (Power Meter) Modes, press [dB/dBm] to toggle between absolute and relative measurement modes.

When relative mode is selected, the displayed power will become “0.00 dB”, see figure below.

6.7 Graphical Display Mode

Press [Graph] to display the wavelengths/power values scanned at the optical input in graphical format, see picture below for an example.

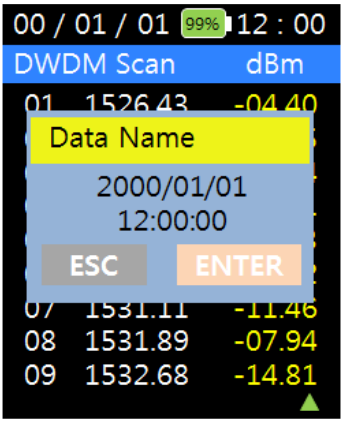


Press [Graph] again will switch the display back to multiple-wavelength format shown in example of section 6.5.

6.8 Saving Scanned Data in Instrument's Memory

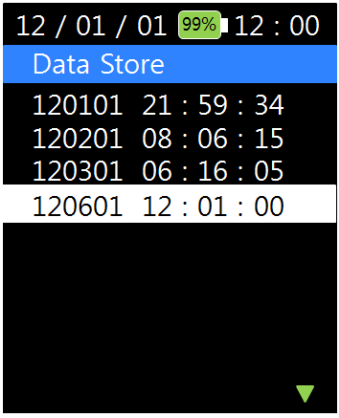
In SCAN Mode, press [Save] to save test data in the instrument's internal memory, see below user interface. Press [ENTER] to continue with data saving or press [ESC] to quit without saving.

A maximum of 300 records of 48-λ test can be saved in the instrument's memory.

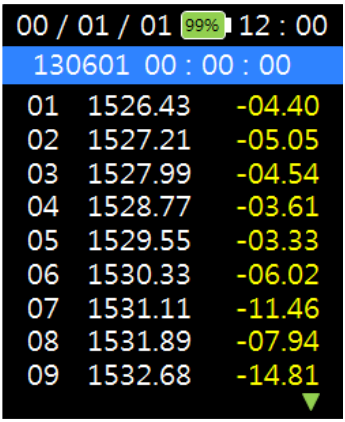


6.9 Retrieving Data Save in Instrument's Memory

Press [Recall] to display all the test records saved in the instrument memory. Each record is identified with a file name comprising the data and time the test data was saved.



Use [▲, ▼] to highlight the desired record followed by pressing [ENTER]. The data will be retrieved and displayed on LCD as shown in picture below.



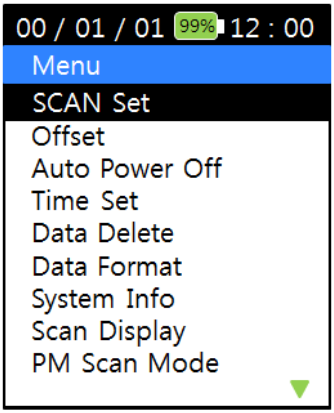
Use [▲, ▼] to scroll between the available displays pages to read all data in the retrieved record.

Toggle [Graph] to display the retrieved data in graphical or tabular (multiple-wavelength) format.

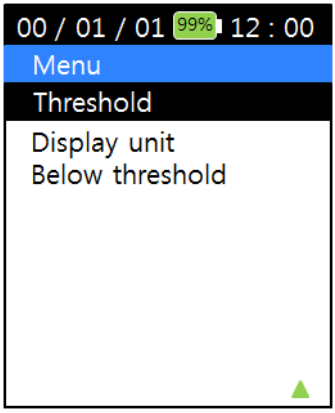
6.10 Instrument Setup options

Press [Menu] to display the available instrument setup options in the Menu Option List. Pictures below show the Menu Option list (in 2 display pages).

Use [▲, ▼] to scroll between available pages and to highlight the desired option. Press [ENTER] to select the highlighted option.



Menu Option list, page 1/2



Menu Option list, page 2/2

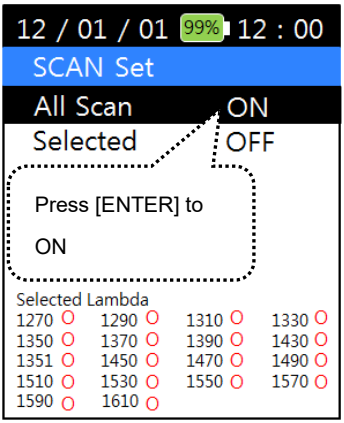
6.10.1 SCAN Set option:

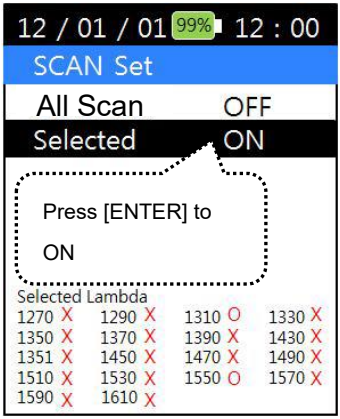
This option provides the user with the choice of turning the “All Scan” function ON (activated) or OFF (deactivated). See picture below for the user interface.

When “All Scan” is “ON”: The instrument will perform measurements for all available 48 wavelengths.

When “All Scan” is “OFF”: The instrument will perform measurements for the preselected wavelengths only.

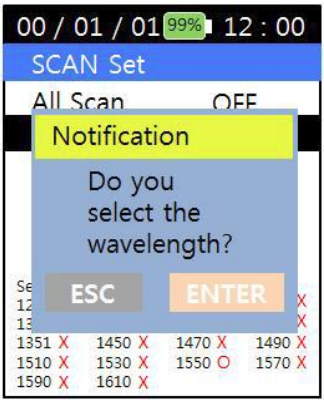
Use [▲, ▼] to highlight “Selected” or “All Scan” and press [ENTER] to ON (activate). When “All Scan” is ON, “Selected” will be automatically set to OFF and vice versa.



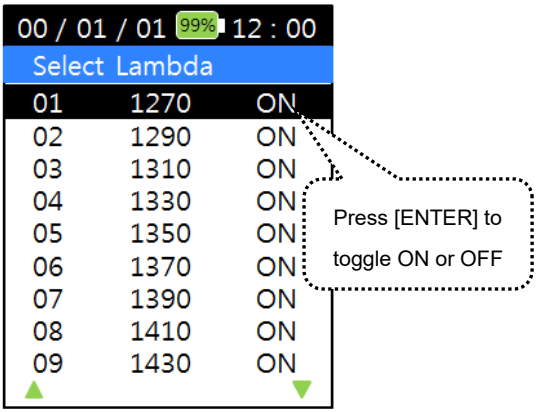


"O" indicates the selected wavelengths.
"X" or **"–"** indicates the unselected wavelengths.

When "Selected" is ON; press [ENTER] on the display below to do wavelength selection.



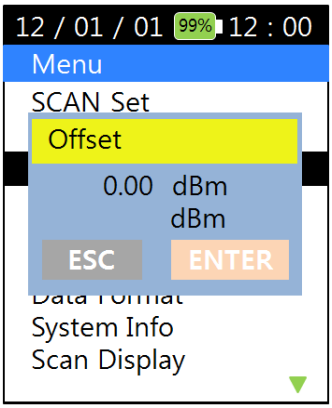
Use [▲, ▼] to highlight the desired wavelength/s from the list of available wavelengths. Press arrow keys to highlight the desired wavelengths and press [ENTER] to toggle ON (select) or OFF (unselect). Press [ESC] to return to the option list of Menu.



6.10.2 Offset option

In PM (Power Meter) Modes, the displayed power measurements of all wavelengths will be offset by the value pre-programmed in this option. See picture below for this option's user interface.

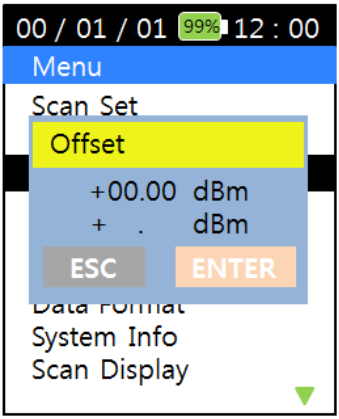
Press [ENTER], use the numerical keys to input the desired offset values (between -25.99 ~ +25.99 dBm). Use [▲ or ▼] to select "+" or "–" sign. Press [ENTER] to save the saving or press [ESC] to return to option list of Menu without saving.



6.10.3 Auto Power Off

Use this option to program the time elapsed before the instrument is automatically switched off after the last keypress. See picture below for this option's user interface.

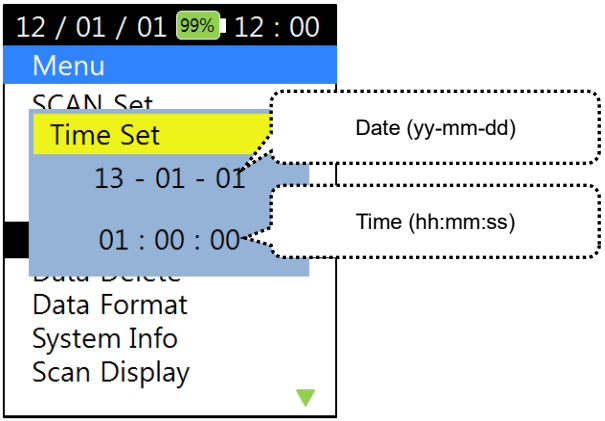
Press [ENTER], use numerical keys to input a time (between 5 ~ 600 minutes) and press [ENTER] again to save setting or press [ESC] to return to Menu Option list without saving.



6.10.4 Time Set option

Use this option to set the date and time of the instrument. See picture below for this option's user interface.

Use the numerical keys to enter the date and time and press [ENTER] to save setting or press [ESC] to return to Menu Option list without saving.

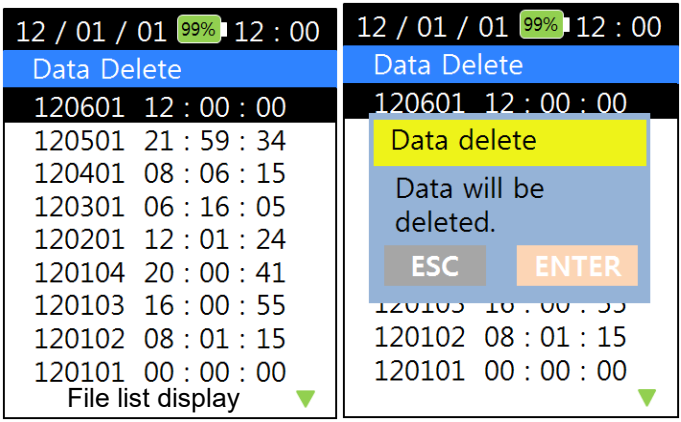


6.10.5 Data Delete option

Use this option to delete selected test data records from instrument's internal memory. See picture below for this option's user interface.

Use [▲, ▼] to highlight the test data record file to be deleted and press [ENTER] to select the file. Press [ENTER] to confirm that "Data will be deleted" or press [ESC] to quit without deleting and return to the file list display.

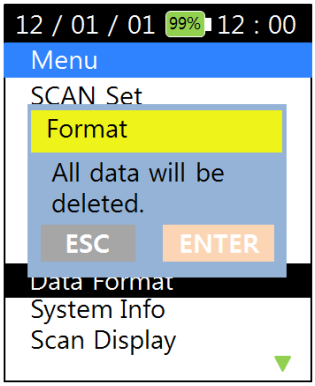
Press [ESC] to return to Menu Option list.



6.10.6 Data Format option

Use this option to delete all test record files saved in instrument's internal memory. See picture below for user interface of this option.

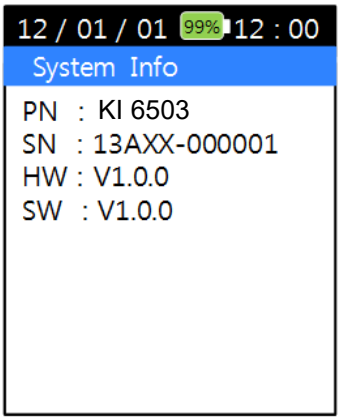
Press [ENTER] to confirm that "All data will be deleted" or press [ESC] to return to Menu Option list without deleting any record file. See picture below.



6.10.7 System Info option

Use this option to display the instrument's system information, see picture

below.



6.10.8 Scan Display option

Use this option to program instrument to display (work only with Scan Mode, section 6.5) power measurement results in the following options,

- Display only the wavelengths measured with power values.

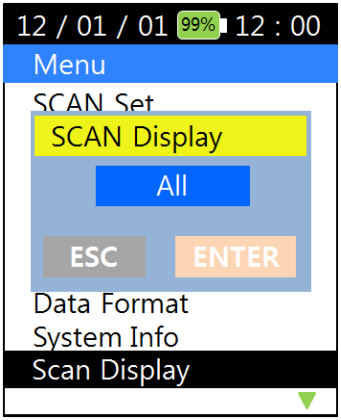
  OR

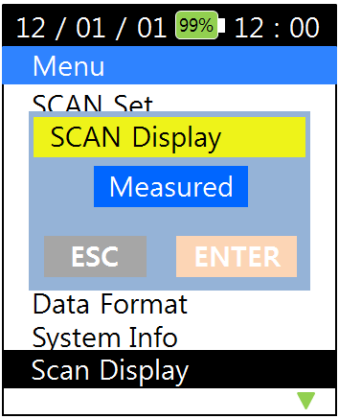
- Display all the wavelengths selected for measurement.

See pictures below for the user interface. Use [▲, ▼] to toggle between “All” and “Measured” and press [ENTER] to select the desired display mode.

Display mode “Measured” – to display wavelengths detected with power values only.

Display mode “All” – to display all wavelengths selected for scanning.

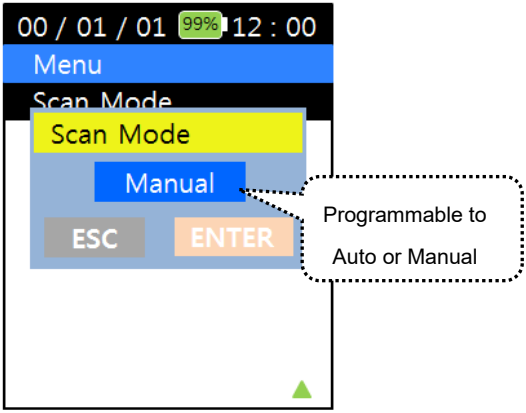




6.10.9 PM Scan Mode option

This option provides an alternative method (to that in section 6.3) of programming PM Modes (see section 6.4) to operate in Auto or Manual condition. See picture below for the user interface.

Use [▲, ▼] to toggle between Auto and Manual. Press [ENTER] to save setting or press [ESC] to return to option list of Menu without saving.

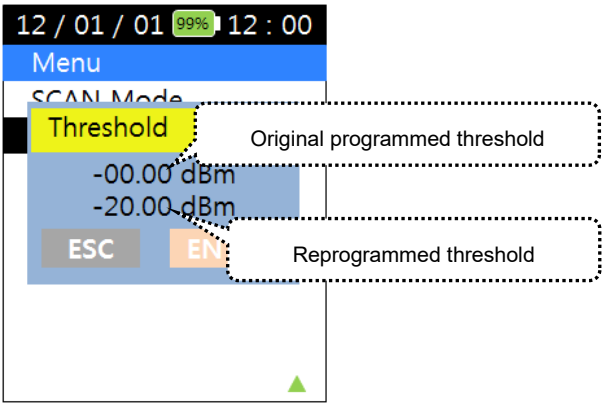


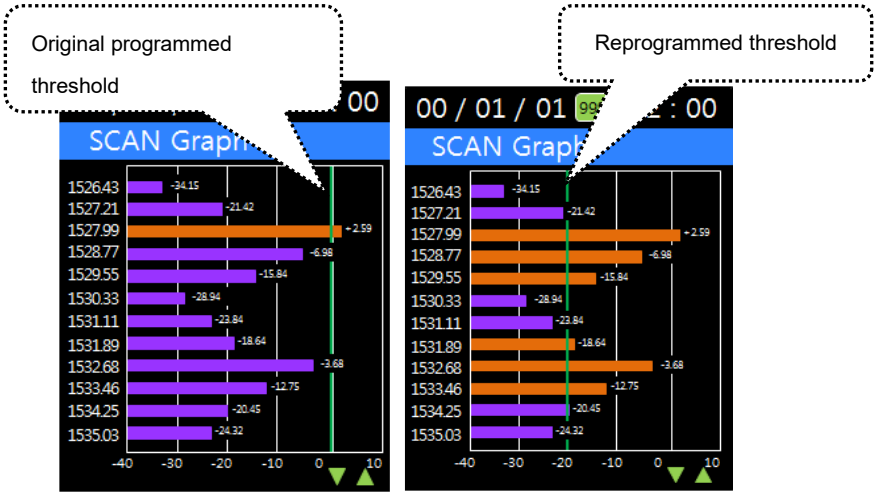
6.10.10 Threshold option

Use this option to program the threshold level which is visible when the measured data is presented on graphical format.

Use the numerical keys to enter a new valid threshold value (-40dBm ~ +10 dBm) and use [▲, ▼] for "+" or "-" sign selection. Press [ENTER] to save the new threshold setting.

See pictures below for examples.

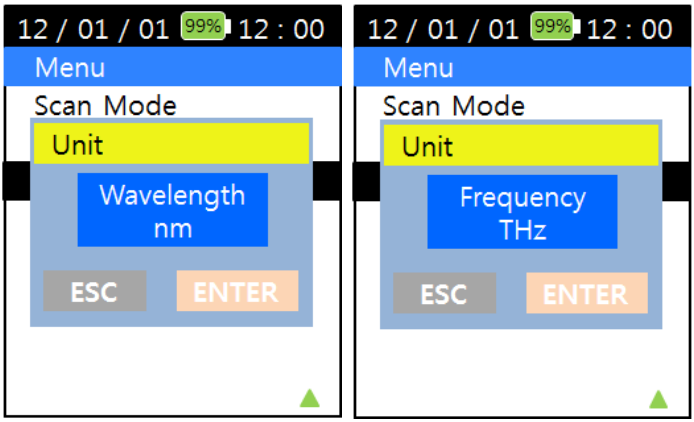




6.10.11 Display Unit option

Use this option to display channel as either “Wavelength” (nm) or “Frequency” (THz).

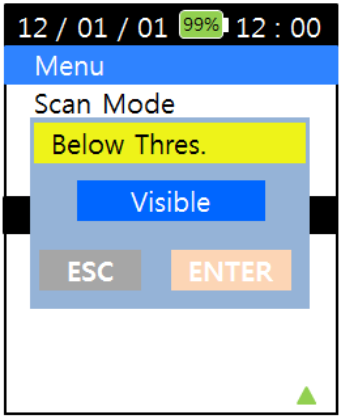
Use [▲, ▼] to select “Wavelength” (nm) or “Frequency” (THz), and press [ENTER] to confirm selection.

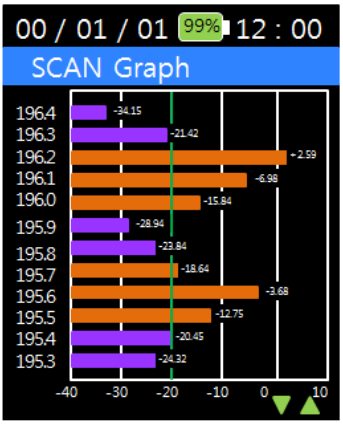


6.10.11 Below Threshold option

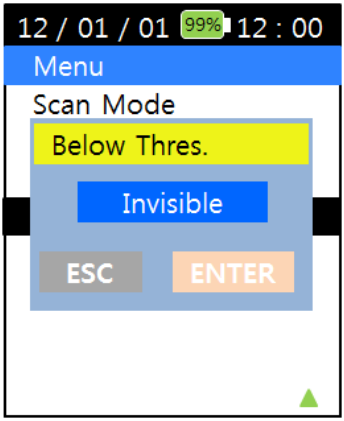
Use this option to select either to or not to display on the graph, the value bars which are below the threshold set.

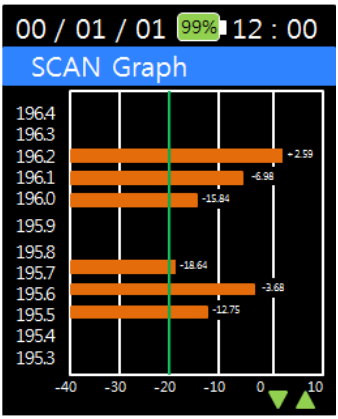
Use [▲, ▼] to select “Visible” or “Invisible” and follow by [ENTER] to confirm selection. See examples below,





E.g. 1: When “Visible” is selected, the purple bars for measurement values below the set threshold are displayed.





E.g.2: When “Invisible” is selected, the purple bars for measurement values below the set threshold are NOT displayed.

7. Charging of Instrument

Link the mini-USB connector on instrument (see section 5, Instrument Layout) to a PC's USB port or a USB-charger using the provided USB cable. The Charging Status LED (see section 5, Instrument Layout) will light up to indicate the status of charging as described below,

Red light – charging in progress.

Green light – fully charged.

This battery indicator,  displayed on instrument's LCD indicates that the instrument is being charged.

Note that when linked to an external power supply, the instrument is still operable in the events that,

- the internal battery has been totally discharged.
- the internal battery has been removed.

8. Packaging Content

Item Description	Quantity
Optical CWDM Power Meter	1
USB cable	1
CD (Data Management Software & user manual)	1
Carry strap	1
Carry pouch	1
User manual	1
Calibration certificate	1
QA certificate	1

9. Maintenance

1. Keep the sensor's surface in the optical connector clean and free of dust or other contaminant by cleaning them regularly.
2. Do not use unclean or nonstandard adapters.
3. Change adapter carefully if necessary and keep any spare adapter in a dirt/dust free environment.
4. When the instrument is not in use, keep the optical connectors covered with a dust cap all the time. Exposing the sensor for a long period of time will allow dust to be accumulated on surface of the sensor; this will in turn result in measurement inaccuracy.
5. Consider leaving test cords always connected to the instrument. This will prolong the life of the instrument's optical connector.