OSA-4100 / OCV-4100

User manual

BN 2332/91.11
2021.04
English

Please direct all enquiries to your local Viavi sales company.
The addresses can be found at:
www.viavisolutions.com/en-us/contact-sales-expert

The description of additional features of the device can be found at:
www.viavisolutions.com/en-us/products/network-test-and-certification

Viavi Solutions Deutschland GmbH
Arbachtalstraße 5, D-72800 Eningen u. A.

Order number: BN 2332/91.11
Issue: 2021.04
Previous issue: -.-

Notes
Changes may be made to specifications, designations and delivery information.

Contents

1 INTRODUCTION

This user manual is an addition to the MTS / 5800 Base Unit user manual. For all questions not covered in this user manual – particularly concerning safety – please refer to the Base Unit user manual.

Nano-OSA module

Figure 1.1: Nano-OSA module

The Nano-OSA is Viavi's new generation of DWDM analyzer modules. It scans the full C-band wavelength range between 1260 and 1650 nm for commissioning, upgrade, and trouble shooting of DWDM networks. The Nano-OSA offers the functionality and speed of an optical spectrum analyzer in a handheld form at a fraction of the price of an conventional OSA. The measurement result is displayed in a graphical (trace) and numerical (table) format providing detailed information of the power level and the wavelength of DWDM channels.

SFP Slots

The Nano-OSA offers 1 integrated SFP slot for mounting one SFP transceiver module or tunable laser (to be ordered separately). These SFP+ modules can be used as a DWDM stimulus to check DWDM networks together with the DWDM analyzer.
An activated transceiver module connected to the SFP+ slot emits optical radiation at the output “TX”. The input “RX” of the transceiver module has no function. The optical laser radiation is indicated by LEDs assigned to the SFP slots. The SFP modules are hot pluggable and can be changed during operation of the Nano-OSA.

Symbols used in this user manual

The following character formats are used in this user manual:

✓	**Requirement** This requirement must be met first; e.g. ✓ The device is switched on.
► 1. 2.	**Instruction** Follow the instructions given (the numbers indicate the order in which the instructions should be followed); e.g. ► Select mode.
Italics	**Result** Indicates the result of following an instruction; e.g. *The page opens.*
Bold type face	**Pages, controls, and display elements** Screen pages, controls, and display elements are indicated in bold type.
Text in blue	**Cross references** Cross references are indicated in blue type. When using the PDF version, just click on the blue text to skip to the cross reference.
[MODE]	**Device keys** Device keys are indicated within square brackets.

2 SAFETY INFORMATION

Intended and proper use

The Nano-OSA devices are meant for professional use only.
User must meet the the user requirements to operate the device.(see next section)
Intended use also includes reading and following all user information available for the devices. In particular, the safety instructions in this book and in the user manual of the device.
This instrument is intended for measurements on optical fiber devices and systems.

- The instrument is intended for indoor usage only.
- Please make sure the instrument is not operated outside the permitted ambient conditions.
- Observe the specified measurement range.
- Always make sure that the instrument is in proper working order before switching it on.
- The module shall only be operated in VIAVI approved mainframes.

User requirements

OSA devices must be operated by skilled and trained people only.
Skilled and trained people are those, who successfully completed an appropriate training for handling laser products or have been instructed in detail in handling these products.

General laser safety

Laser radiation can cause irreparable damage to the eyes and skin.
The Nano-OSA SFP-Bay laser sources are Class 1 laser products according to DIN EN IEC 60825-1:2014 or 60825-1:2007. Class 1 lasers are safe under reasonably foreseeable operating conditions, including the use of optical aids.

- Nevertheless, heed the normal precautions for working with laser radiation and consider local regulations.

The laser class to be observed depends on the laser source connected to the OSA module. This can reach up to laser Class 4 for the high power versions. The beam as well as reflections of a Class 4 laser can be dangerous for eyes and skin, even without an optical instrument (magnifying glass, microscope, binoculars) in front of the eye).

- **Always be aware of the hazard level of the device to be connected!** To find out the appropriate laser classification, associated wavelengths and optical power levels, see the specifications in the operating manual of the connected laser and follow the instructions given there.
- Connect all optical fibers before switching on the radiation source.
- Switch off the laser source before disconnecting the optical fibers.
- Never look directly into the output of a laser source or into an optical fiber connected to it.
- Do note expose skin to the beam.
- Always cover unused ports.
- Heed the normal precautions for working with laser radiation and consider local regulations.

Specific laser safety

Laser classification of the SFP module

SFP laser classification
Laser radiation can cause irreparable damage to eyes and skin.
Always be aware of the laser classification of the device to be connected! To find out the appropriate laser classification, associated wavelengths and optical power levels, see: – the label on the SFP module – the "Specifications" chapter in the user manual of the SFP

- ▶ Use only class 1 laser products in the SFP slots.
- ▶ However, the user is free to use any other SFP transceiver compatible with the SFP Multi Source Agreement (MSA).
- ▶ In this case you must observe the laser classification of the inserted SFP transceiver and its safety instructions!

Safety instructions for class 1 laser products

Invisible laser radiation
Class 1 laser products are defined as safe in normal operation mode

- ▶ Although the laser radiation from a class 1 laser product will not harm eyes or skin, follow the general laser safety instructions (see General laser safety instructions) to ensure maximum safety when working with laser sources.

Safety instructions for class 1M laser products

Visible & Invisible laser radiation
Viewing the laser output of a class 1M laser product with cer- tain optical instruments (for ex ample eye loupes, magnifiers, microscopes) within a distance of 100 mm may pose an eye hazard.

- ▶ Do not expose eyes to the beam within a distance of 100 mm.
- ▶ Do not view the laser output with optical instruments.
- ▶ Follow the general laser safety instructions.

General warning symbol

A warning symbol on the device indicates a potential hazard. In all cases where a warning symbol is shown on the display or labeled on the device, the operating manual must be consulted to learn more about the nature of the potential hazard and any actions that have to be taken.

Environmental conditions

The Nano-OSA device must not be operated outside the specified environmental conditions. The specified environmental conditions can be found in the technical specifications of the user guide delivered with your device.

Ventilation

Insufficient ventilation can damage the device or adversely affect its function and safety.

- ▶ Ensure adequate ventilation when operating the instrument.

Maintenance

Invisible laser radiation

Maintenance or cleaning of the instrument while it is connected or operating may damage the instrument or injure you.

- ▶ Make sure that the instrument is switched off and disconnected from all power sources and optical radiation sources before maintenance or cleaning.
- ▶ Do not open the instrument for maintenance or service. Service shall be performed by Viavi trained personnel only.

Water and cleaning fluids

The instrument may be damaged or destroyed if water or cleaning fluids penetrate it.

- ▶ Make sure that water or cleaning fluids do not get inside the instrument.

3 GETTING STARTED

Starting the OSA application

The fiber to be tested is connected to the optical connector.

1. Select the **Home** button.
2. To start the OSA application, click on the OSA Icon.

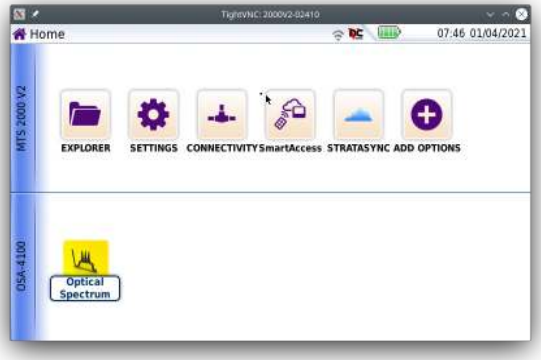

Figure 3.1: Home screen with Nano-OSA Application

4 CONFIGURATION

After connecting the fiber to be tested to the optical connector, you must select the Nano-OSA module (see the Base Unit user manual).
To configure the Base Unit in preparation for an OSA test on a fiber, press the **SETUP** button. Two configuration procedures are available:

- "Auto-set mode"
  In this case the parameters are selected automatically.
- "Manual configuration"
  In this case you may define your own configuration.

Auto-set mode

▶ Press the Auto-set softkey.
Following configuration will automatically be set.

Parameter	Setting
Acquisition settings	
Sweep	Single
Measurements setting	
Channel detection	All
Signal threshold	Auto
Splitter compensation	No
Results screen settings	
Grid	conventional
Channel Width	Auto
Alarms	No
Unit of x-axis	last setting used (THz or nm)

In case of any parameter setting the **Test Auto WDM** softkey appears.

Figure 4.1: Auto-set softkey (1)

Manual configuration

Instead of selecting the Auto-set mode, the configuration parameters can be set manually.
The parameter to be modified must be selected by means of the direction keys ▼, ▲, ◄ and ► .
The possible options then appear on the screen: make your choice and confirm by using the Enter key .
Alternatively, change the parameters via the touchscreen.
The various parameters proposed are defined below.

Measurement parameters

Sweep

Single	There will be one single measurement and the display of its results.
Continue	There will be a measurement with refreshment of the trace and real time display of results.
Statistics	In this mode, the number of samples concerned by statistics must be entered (next parameter).
Drift	For measuring power and wavelength over time. The number of sweeps and the latency between the sweeps need to be set.

Note: For Drift measurements a Grid needs to be defined and the Channel Detection parameter is set to Grid.

Number of sweeps

- In Statistics mode: between 2 and 1000
- In Drift mode: between 2 and 10000

Statistics mode

Wait Period

The Wait Period parameter allows to enter a wait period prior to the measurement start.

Up to ..	Increments of ...
1 minute	5 seconds
10 minute	1 minute
60 minute	5 minutes
24 hours	1 hour

Drift mode

Monitoring Time
The Monitoring Time parameter sets the time frame for completing all measurements
Intervall
The Interval sets the timedelay between measurements

OO-OSNR method

The OO-OSNR* mode is used to measure the channel OSNR in a two step process. When selecting the OO-OSNR in the **Setup** Measurement menu, a new button on the second result-screen is presented.

Table 4.1: OO-OSNR measurement softkey

the first measurement is used as reference scan with the channel signal being switched on.

- Select the Ref.Acq checkbox
- hit start to begin acquisition

the second scan will measure the noise-floor within this channel, while the signal has to be switched off by the user.

- switch off the signal of the desired channels
- select Noise Acq checkbox
- hit start to begin acquisition

*On-Off OSNR methode

Signal Threshold

Threshold for detection of channels.

Auto	• The threshold is determined automatically.
Manual	• Editable from -54.9 to +10 dBm • To modify values: use direction keys or **Edit Number**

Note: Modification of the parameters **Channel settings** and **Signal threshold** will only modify the results if the Nano-OSA module in use is the one that was used for the acquisition

Channel detection

Grid	The grid serves as a detection reference: it must therefore be : • ITU DWDM • ITU CWDM • Regular • Manual The choice of grid takes priority over the choice **Channel detection**. For example, it is not possible to choose Channel detection = Grid, if the option selected for the grid is «None» or «Conventional».
All	Automatic detection of the channel on each acquisition. In this mode the channels are always detected without making a reference measurement.

Note: At the end of an acquisition in All mode, it is possible to create a grid on the basis of the channels detected. To do this, press the softkey **Adopt Grid** in the menu header of **Measurement**.

Channel Width

Parameter for preset the spectral width of channels. Used to determine whether channels are seperated from each other or should be interpreted as a combined channel

Auto	Channels spectral width is smaller than 50 Ghz = 0.4 nm
Manual	editable from 12.5 to 2500 GHz

Splitter Compensation

When the measurement is accessed by a splitter, it is possible to compensate for the loss introduced by this element and to display the value measured before or after it. Go to the **Splitter compensation** line to display a sub-menu proposing the following options:

Value	Amount of compensation
Unit	dB or %

Grid

Four possible types of grid are proposed with different corresponding values, some of which are fixed or non- applicable, others editable. The type Conventional and the option None do not give access to the parameters of the Grid sub-menu; the others give access to certain options, as shown in the table of the figure :

Grid name	ITU DWDM	ITU CWDM	Regular	Manual
type	fixed	fixed	editable	editable
ITU std	G.692	G.694.2	-	N/A
1st channel	196.10 to 191.20 THz, by increments of 50GHz		-	N/A
Channel spacing	auto,manual			
Number of channels	from 1-99, by increments of 1	from 1-256	-	N/A
Channels order	-	-	-	N/A
Channel settings	Sub-menu accessible to display the wavelengths of each channel, name the band, and name each channel.		-	N/A

Note: The maximum real number of channels for ITU grids depends on the value selected for the first channel and the spacing between the channels.

Note: It is possible to display the grid with the View Grid softkey. A table appears showing the channel number, the name of the channel, the reference wavelength and the alarm thresholds for delta frequency, minimum power and maximum power.

OSNR

For measurement the OSNR , one has the possibility to vary boundary conditions in order to optimize the measurement precision and/or display OSNR in different bandwidths

OSNR method	• Left & Right both slopes of channel are investigated to find the noise floor • Left only left slope of channel is investigated to find the noise floor • Right only right slope of channel is investigated to find the noise floor • Worst Case the worst of both slopes of channel is used to find the noise floor
S↔N Distance	dB or %
Noise Acq BW	0.1 nm (Standard) = Noise Acquisition Bandwidth %

Display

Configuration of various properties concerning the presented information on the screen

Auto Zoom	• On Display is zooming automatically depending on measurement range • Off auto-zooming is disabled
Unit of x-axis	• nm (wavelenght in nanometer) • THz (frequency in terahertz)
Table Content	• Standard • OSNR
Alarms	• None • Active

Alarms

When **Channel Ssettings** is positioned on Grid, it is possible to activate an alarm system. This system is based on a system of thresholds. Any measurement results that exceed these thresholds are displayed in red in the table, and the icon appears at the top right of the screen. If all the results are within the thresholds (no result is in red), the icon becomes a green checkmark .

- ▶ To activate the alarm system, go to the Alarms line and select Active.

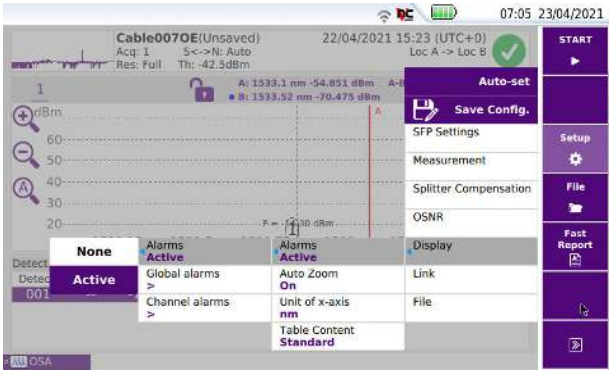

Figure 4.2: Alarm parameters

Global alarms

Number of channels [1]	Yes/No
Delta channel power	'no' or threshold modifiable from 0.1 to 60dB
Delta OSNR	'no' or threshold modifiable from 0.1 to 60dB
Composite power [2]	'no' or threshold modifiable from -59.9 to 20dBm

1) Max. acceptable variation between max & min power on all channels
2) Maximum composite power

Channel alarms

Max channel offset [1]	Yes/No
Min channel power [2]	Yes/No
Max channel power [3]	Yes/No
Min OSNR	Yes/No
channel number	From «001» to the max. number of channels.
channel value	Display of the wavelength of the channel number selected.
Delta Offset [4]	From 0 to 10nm
P Min [5]	From -55 dBm to P Max
P Max [6]	From P Min to +10 dBm

1) Wavelength drift. Selection of the alarm on the basis of the value of Delta Offset
2) The values are then defined in P Min
3) The values are then defined in P Max
4) Delta of frequency
5) Minimum power
6) Maximum power

Link Discription

Define the parameters in the Link Description menu and add a comment.

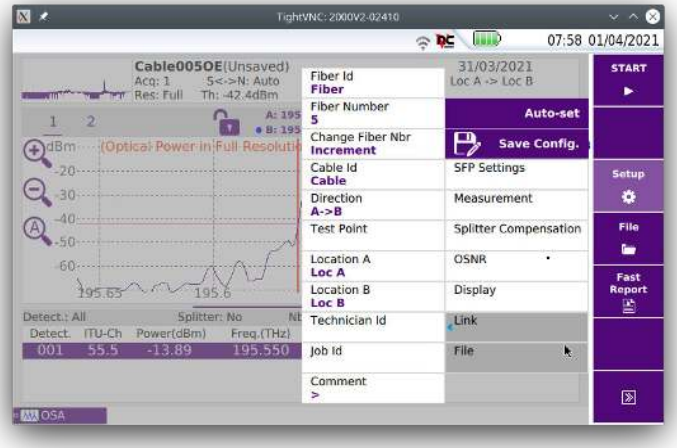

Figure 4.3: Link Discription parameters

Figure 4.4: Change Fiber Number choices

File Configuration

In the File Configuration menu, the memory management is set.

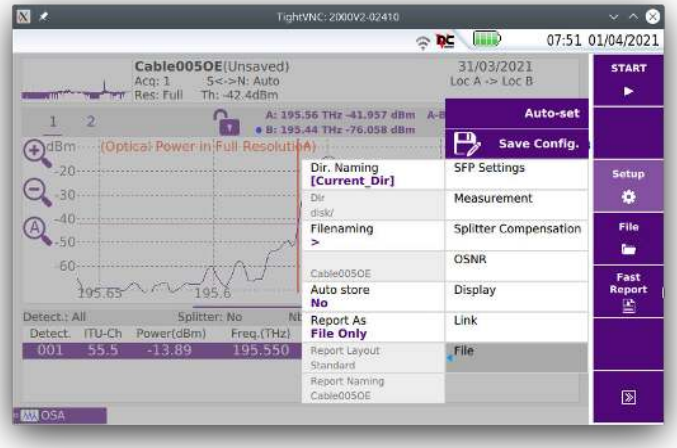

Figure 4.5: File parameters

Figure 4.6: Change File Auto store choices

SFP Settings

The **SFP Settings** menu allows to set certain properties and parameters of the SFP (Small Form-factor Pluggable) laser module.

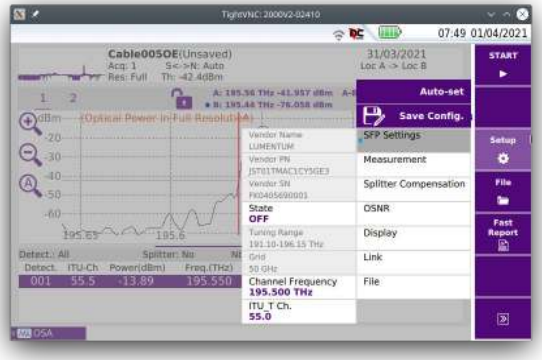

Figure 4.7: SFP parameters and information

State	to turn the SFP on, set state to ‘ON‘ laser indicator LED of SFP is lit.
Channel Frequency	if a tunable SFP is used, the frequency can be set
ITU_T Ch.	information on the ITU.T channel

5 Measurement

To start a measurement:

- Press the **START** key. The Nano-OSA will scan over the entire wavelength range and the measurement result will be displayed in graphical and tabular format.
- During a measurement the Nano-OSA has a status LED at the connector side of the module indicating activity with RED color. The Fiber-Optic application has a small green dot on the OSA-tab in the left lower corner when the OSA is measuring.

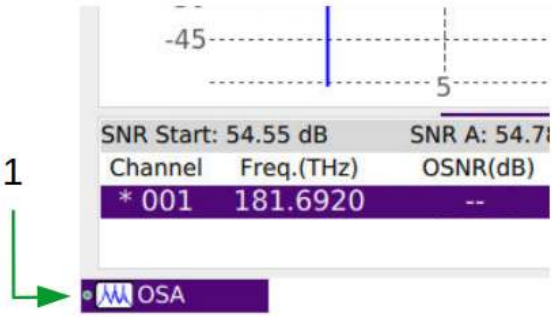

Figure 5.1: (1) indicator LED in the OSA-tab

Trace display

By pressing the **RESULTS** button the results window is displayed. The Trace/Table layout on the screen can be customized by grabbing/touching the pink thin line between the graph and table section. This separation line can be moved to get the desired size of the graph and/or table

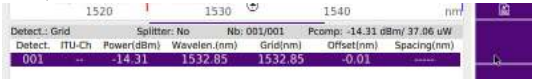

Figure 5.2: pink separtion line between table and graph

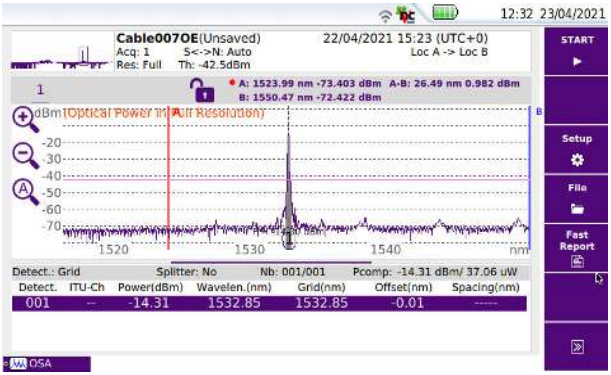

Figure 5.3: custom layout for table and graph

6 RESULT DISPLAY

Overview

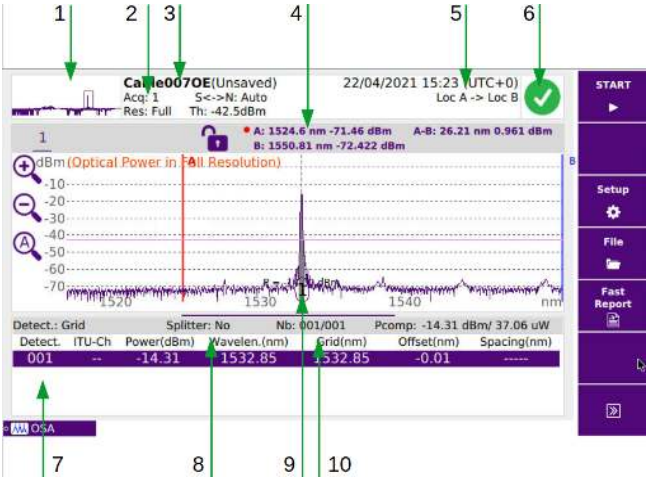

Figure 6.1: Example of results display

1	Mini-trace
2	Number of acquisition
3	Filename (only if file was stored)
4	Trace results associated with cursors A and B: • A, B: Wavelengths and power at cursors A and B position • A-B: Wavelength and power difference between cursors A and B
5	link direction
6	Alarm result (see "Alarms" on page 24)
7	Table of results (see "Table display" on page 40).
8	Splitter setting
9	Channel number mark in display
10	Channel number

The trace represents power (in dBm) as a function of frequency (in THz) or wavelength (in nm).

Note If several acquisitions are performed, the trace displayed, is the one corresponding to the last acquisition.
The softkeys enable access to following functions and menus:

Fast report	display and table results can be stored as PDF report or trace-data
Overlay	to compare different measurements or verify changes in the spectrum. 2 or more traces can be plotted together in the overlay mode
Total Power A ↔ B	with the usage of the cursors a individual intervall can be defined where the optical power is calculated.

Using the cursor

By means of the two cursors A and B following functions are available:

- displaying the power level at the cursor position
- measuring delta power and total power between two points
- zooming and shifting the trace according to the cursor positions

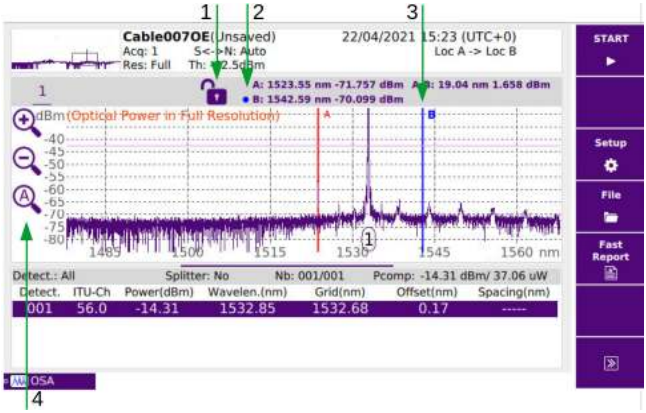

Figure 6.2: using the cursor on the display

1	lock cursor distance
2	a colored dot indicates the actual used cursor
3	a colored solid line indicates the position of the cursor
4	in order to place the cursor on the desired position use the zoom options

Selecting a cursor

The cursors can be selected by using the touch-screen.

Moving the cursor

The cursor can be moved on the trace from one measurement point to the next or by jumping from one channel to the next (both forward and backward).

To move the cursor on the trace:

1. Select the cursor
2. Press the direction keys ◄ and ► to move the cursor backward or forward. If the cursors distance is locked, both cursors will be moved in parallel.

To jump from one channel to the next:

1. Select a channel in the table
2. Press the direction keys ◄ and ► to to jump one channel backward or forward.

The zoom function

Both x- and y-axis can be zoomed.
When zooming the x-axis, the area to be zoomed is defined by the selected cursor and its position:

- If only one cursor is selected, the cursor position is kept while the areas left and right to the cursor are zoomed.
- If both cursors are selected the center between both cursors is kept.

Zooming

1. Select a cursor or both cursors and move them to the desired position.
2. Press the zoom softkeys on the left side of the graph (In , Out, Auto)

The shift function

The shift functions moves the trace and keeps the cursor on this positions. Shifting the trace is independent from the cursor settings.

To shift the trace

1. Select the graph by touchscreen
2. To shift the trace left or right: press the direction keys ◀ and ▶.
3. To shift the trace up or down: press the direction keys ▲ and ▼.

The measurement function

By setting both cursors two values can be measured:

- **Difference Power (A-B):** the difference power between the two cursor positions
- **Total Power:** the total power between the two cursor positions
- **Delta Power:** slope and difference power between the first and the last detected channel within the area marked by the cursors.

To measure the Difference Power:

- ▶ Set the cursors to the desired positions. The difference power is displayed in the trace result field above the diagram (**A-B**).

To measure the Total Power:

1. Set the cursors to the desired positions.
2. Press the softkeys Total Power A↔B . The space between the trace and the two cursors is greyed out and the power is displayed.
3. Pressing the key Total Power A↔B a second time removes the result of the total power measurement.

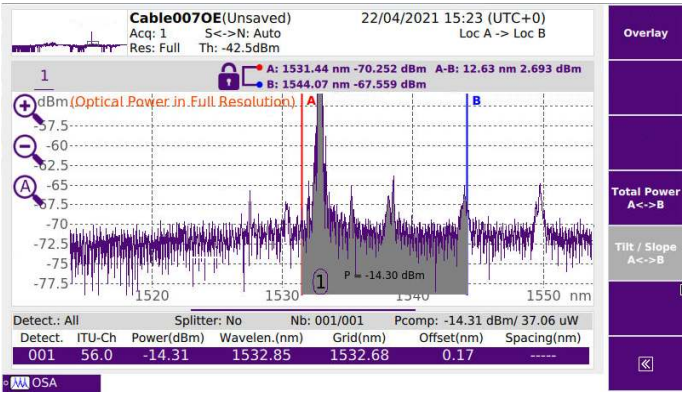

Figure 6.3: measuring the total power between cursor positions

Channel detection threshold

On the trace, some peaks corresponding to noise could be mistaken for channels. It is therefore necessary to introduce a power threshold level: only peaks that exceed this threshold will be considered as channels and included in the table of results. To display or modify this threshold, press the **SETUP** key, then select Signal threshold in menu measurement. Select 'auto" or a insert a fixed threshold value. When set to Auto, the signal threshold is calculated from the actual trace.

Display of a grid

The graph window can include a grid to facilitate verification of the position of the channels. Several grids are possible (see the chapter "Grid" on page 21).

Multiple traces (Overlay)

The Overlay functions allows you to display multiple traces in one view and to compare them.

Note: The Overlay function is not available in Drift mode.

To add a new trace:

1. Navigate to page 2 of the softkeys on the right side, then select Overlay.
2. Press the **Set New Trace** softkey.
   copy of the previously active trace is added to the display. A new number is added to the trace tab line.
3. Start a new measurement or open the **File** menu and select a trace to be loaded.
   The selected trace is overwritten by the new one.

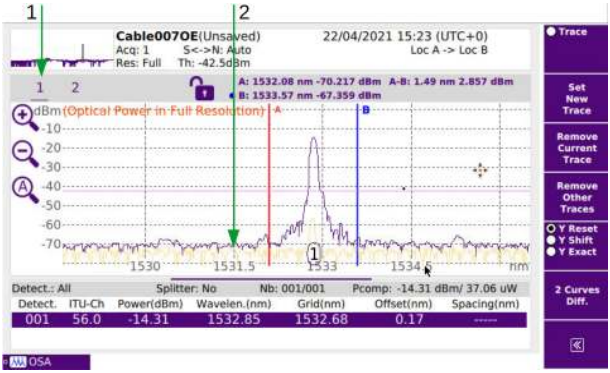

Figure 6.4: Overlay of two measurments / traces

1	actual selected trace
2	highlighted selected trace in graph

To remove a trace:

1. Select the trace by touchscreen in the left upper region of the display
2. Press the **Remove Current Trace** softkey.

Adjusting the y axis

To compare curves, the y axis of the curves can be adjusted by the **Y Reset**/**Y Shift**/**Y Exact** softkey.

- ▶ Press the softkex to select one of he following settings:
  - **Y Reset**:All traces are on the the same level at the intersection with the active cursor.
  - **Y Shift**: Each trace is shifted 5 dB from the other.
  - **Y Exact**: The traces displayed are on the same position according to their injection level.

Displaying the difference of two curves

A difference can be build from two curves.

1. Measure/Load or Select the two curves.
2. Press the **Overlay** softkey and then 2 Curves Diff. *The difference curve is displayed as a new trace in the diagramm.*

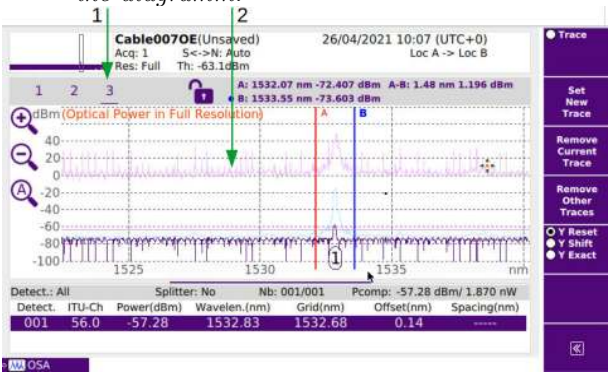

Figure 6.5: Overlay of two measurments / traces

1	traace number of the generated difference-curve
2	new difference trace in graph window

7 TABLE DISPLAY

The table may be displayed in a single line, on half of the screen or the whole screen as a function of the Trace/Table key.

Overview

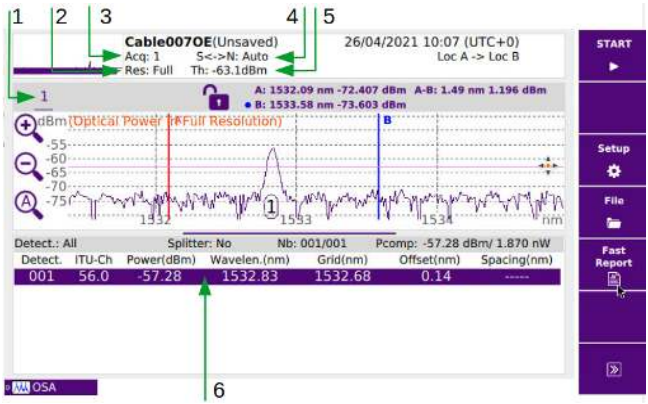

Figure 7.1: Example of results display

1	trace number
2	Resolution of aquisition
3	Number of aquisition
4	OSNR method
5	threshold for channel detection
6	Channel information / Table contents: For further details see following sections “Table contents” on page 42, and “Table statistics” on page 42.

Table contents

According to the choice made in the **SETUP** menu, the table of results may include:

- either a line for each channel detected (if Channel Selection = All)
- or a line for each graduation, (if Channel Selection = Grid and a grid is selected)

In the absence of statistics (see "Measurement parameters" on page 16) the parameters given for each channel are as following:

Dect.	Number of detected channel
ITU-Ch	The ITU number of the channel
Power(dBm)	the measured power within the channel bandwidth
Wavelength	the frequency or the wavelength of the selected channel in [THz] or in [nm]
Grid	the frequency or the wavelength of the selected grid in [THz] or in [nm]
Offset	the frequency or the wavelength offset to the channel center in [THz] or in [nm]
Spacing	The spectral distance in to the next channel in [THz] or in [nm]
P/Pcomp	The ratio between the power of the channel and the composite power in [%].

Table statistics

When selecting the Statistics measurement mode and multiple acquisitions are performed, statistics are calculated on the results.

To display these results in the table:

- ▶ Select the **Table Content** key in Display menu, to either see statics for OSNR or Power/Wavelength measurements

Result colors

When Channel Selection is positioned on Grid and the alarm system is activated, measurement results that exceed the defined thresholds are displayed in red, results within the thresholds are displayed in green.

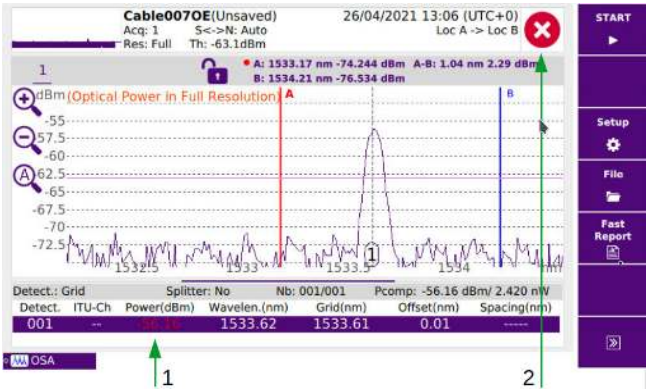

Figure 7.2: Example of alarm indicator

1	Red color indicates violated alarm thresholds
2	Alarm Icon indicator

(Additionally the icon indicates that at least one result exceeds the threshold and if all results are within the thresholds (no result is in red), the icon becomes . See see Alarm results on page 24)

8 DRIFT MEASUREMENT

The Nano-OSA modules provide a Drift measurement application to perform multiple measurements and display the recorded results in a graphical format (trace) over the time.
This can be used to monitor the drift of power and wavelength of optical systems or components. This is important to measure the drift of non temperature stabilized transmitter in CWDM networks.

Note: A Drift measurement can only be done at predefined wavelengths or frequencies, for this reason a reference Grid needs to be defined and the Channel Detection parameter is set to Grid.
The following parameters need to be set for Drift measurements:

Sweep	Set to Drift.
Monitoring time	Set the timeframe for monitoring
Interval	Defines the time between the measurements.

Note: Wait period specifies the time between start of one measurement and start of the next measurement and includes the instrument measurement time.
All channels defined by the channel Grid can be monitored simultaneously with the drift application. To show the monitored measurement parameter use the **Trace/Channel/Drift** softkey on second page in the result screen. This button has a toggle function with the following selections:

Freq.	Frequency monitoring
Power	Power monitoring
OSNR	OSNR monitoring

Activating the Drift measurement will enable the following screen:

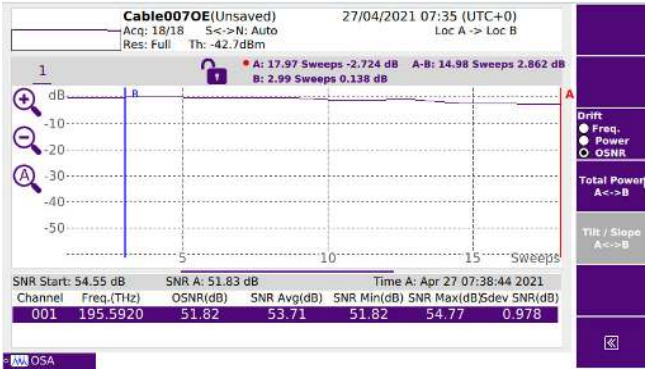

Figure 8.1: Example of drift measurment, figure shows osnr drift over time

In the Drift display, the measurement result is shown in a graphical format (trace over time / scans) and a tabular format. The table shows the following parameters:
(the units in brackets depend on selected choice in display menu : nm or THz)

Wavelength	Power	OSNR	Description
Channel	Channel	Channel	Number of channel
Frequency ()	Frequency ()	Frequency ()	Wavelength or Frequency of the displayed channel.
F Ref()	Power(dBm)	OSNR(dB)	value of last measurement
F Avg()	P Avg(dBm)	SNR Avg(dB)	average of all measurements
F Min()	P Min(dBm)	SNR Min(dB)	minimum of all measurements
F Max()	P Max(dBm)	SNR Max(dB)	maximum of all measurements
Sdev F()	Sdev P(dB)	Sdev SNR(dB)	standard deviation of all measurements

All Zoom and Shift functions are available in Drift mode. By using the cursor A it is possible to get access to each measured data point. The Start value as well as the actual cursor position including the time information is shown in the gray area above the table.

Note: If the channel power drifts to a power level below the channel detection threshold, the measurement will indicate “No Signal” in the bar above the table.

9 Reports

Fast report

Fast Report generates a report which is stored in file system

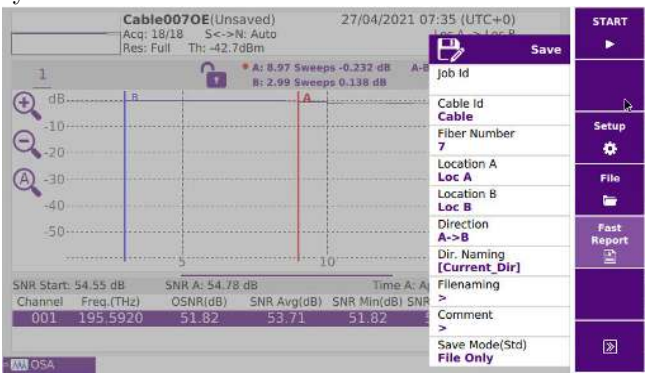

Figure 9.1: Example of Fast Report

Change the Fast Report parameters to your needs, and then press the save button/icon in the title bar

PDF File system report

To view the reports on the file system, select the **File** button

Select the corresponding PDF File to which your report was stored.

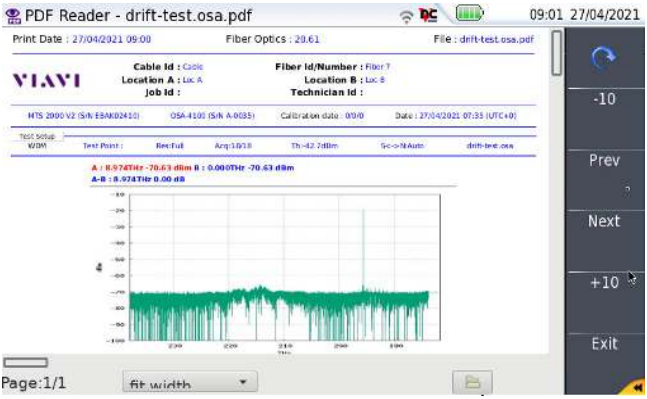

Figure 9.2: PDF Report loaded from file system

10 FILE MANAGEMENT

Storing OSA measurements

If Auto store has been selected, then results will be saved automatically. If not, or if you want to save the results under another name, directory etc.:

1. Click on **FILE** Icon.
2. navigate to the destination directory or create your own folder
3. Click on **Store**
   The trace is saved with the extension "OSA".

Recalling OSA files

Once an OSA file has been stored, recall it using the Explorer:

1. Click on **File** Icon.
2. Using directions keys, select the directory and then the file to open.
3. Click on **Load**
4. Click on **View Trace(s)**
   or **Load Trace + Config**.
   The selected file is opened.

For further informations on file management, please see the chapter "File Management" in the Base Unit user manual.

11 MAINTENANCE

WARNING

Invisible laser radiation

Maintenance or cleaning of the instrument while it is connected or operating may damage the instrument or injure yourself.

- ▶ Make sure that the instrument is switched off and disconnected from all optical radiation sources before maintenance or cleaning.

Cleaning the instrument

If the instrument gets dirty through use, you can clean it using a soft cloth moistened with a mild solution of detergent.

NOTICE

Water and cleaning fluids

The device may be damaged or destroyed if water or cleaning fluids get inside the housing.

- ▶ Make sure that water or cleaning fluids do not get inside the instrument.

Optical surfaces

Dust and fingerprints can damage optical surfaces, particularly when such surfaces are pressed together. To protect the instrument and cables, every cable should be cleaned before it is connected to the instrument. The optical connectors on the instrument should also be cleaned regularly.

To clean the optical connectors:

1. Remove the test adapters.
2. Dab the end surfaces of the plug pins with cleaning tape and blow out the test adapter using compressed air.

Note: Always fit protective caps to optical connectors that are not in use.

12 SPECIFICATIONS

typical at 23°C ±5°C

Measurement Modes	
Operating Modes	WDM, OO-OSNR, drift
Display Modes	Graph (trace + overview) WDM table and graph + table
Measurement parameters	Ch-# , Ch-power, Ch-wavelength, Ch-OSNR, Ch-offset, drift
Spectral Measurement Ranges	
Wavelength range	1260 nm to 1650 nm 237.93 to 181.69 THz
Wavelength accuracy	±0.15nm (±18.75GHz)
Wavelength reference	internal
Readout resolution	0.01 nm
Resolution bandwidth FWHM	< 0.12 nm (15 GHz)
Channel spacing	37.5 ... 200 GHz , CWDM
Number of channels	max. 256
Power Measurement Ranges	
Dynamic range	-55 to +23 dBm (per channel)
Noise floor RMS	-60 dBm
Absolute accuracy	±0.8 dB
Readout resolution	0.01 dB
Scanning time (full band)	< 5s (full band)
Optical Port	
Input Port	SM/APC and SM/PC
Switchable optical adapters	SC/APC mounted (FC,LC and ST on request)
Optical return loss	> 35dB
Total safe power	+25 dBm all channels +23 dBm one channel

SFP/SFP+ Bay	
	Can host one SFP/SFP+ transceiver or one tunable laser (not included)
General	
Weight	0.45 kg (0.99 lbs)
Dimensions (W x H x D)	128 x 134 x 40 mm (5.04 x 5.28 x 1.57 in)
Environment	
Operation	+5 to +40 °C (41 to 104 °F)
Relative Humidity up to +31 °C	15 to 85 %
Absolute Humidity >+31 °C	1 to 29 $\frac{g}{m^3}$
Storage	–20 to +60 °C (–4 to 140 °F)
Altitude	2000 m max. (6500 ft. max.)
Pollution Degree	2
Supply Voltage, Power Consumption	
Supply Voltage	12 V DC
Power Consumption	6 W max.

13 ORDERING INFORMATION

Modules	Part Number
OCV-4100 Optical Channel Verifier APC	41OCV-APC
OCV-4100 Optical Channel Verifier PC	41OCV-PC
OSA-4100 Optical Spectrum Analyzer APC	41OSA-APC
OSA-4100 Optical Spectrum Analyzer PC	41OSA-PC
SW-Options	**Part Number**
When ordered with mainframe	
OCV Drift SW Option (for OCV-4100)	41DRIFT
OCV OSNR SW Option (for OCV-4100)	41OSNR
SFP SW Option	41SFP
When ordered as an upgrade, without mainframe	
OCV Drift SW Option (for OCV-4100)	41DRIFT-UPG
OCV OSNR SW Option (for OCV-4100)	41OSNR-UPG
SFP SW Option	41SFP-UPG
Accessories: Adapters	**Part Number**
Switchable ST adapter	2155/00.32
Switchable FC adapter	2155/00.05
Switchable SC adapter	2155/00.06
Switchable LC adapter	2155/00.07

14 PRODUCT REGULATORY COMPLIANCE

Viavi Environmental Management Program

Superb performance and high quality have always characterized Viavi datacom and telecom measurement technology products. In this same world-class tradition, Viavi has an established, proactive program of environmental management.
Environmental management is an integral part of Viavi's business philosophy and strategy requiring the development of long-term, productive solutions to problems in the key areas of economics, technology, and ecology.
A systematic environmental management program at Viavi is essential in regard to environmental policy and enhances cooperation between ourselves and our business partners.

The Viavi Environmental Management Program considers:

Product design and manufacture
Environmental restrictions and requirements are taken into account during planning and manufacture of Viavi products. This attention ranges from the raw materials and finished components selected for use and the manufacturing processes employed, through to the use of energy in the factory, and right on up to the final stages in the life of a product, including dismantling.
Hazardous materials
Viavi avoids or uses with care any hazardous or dangerous material in the manufacturing process or the end product. If the use of a dangerous material cannot be avoided, it is identified in product documentation and clearly labeled on the product itself.
Packaging materials
Preference is given to reusable or biodegradable singlesubstance packaging materials whenever possible.
Environmental management partnerships
Viavi encourages our customers and suppliers who take this responsibility seriously to join Viavi in establishing their own environmental management programs.

EU WEEE and Battery Directives

This product, and the accumulator used to power the product, should not be disposed of as unsorted municipal waste and should be collected separately and disposed of according to your national regulations. Viavi has established a take-back process in compliance with the EU Waste Electrical and Electronic Equipment (WEEE) Directive, 2012/19/EU, and the EU Battery Directive, 2006/66/EC.

Protecting the environment

- Please dispose the rechargeable accumulator carefully. It should also be removed from the instrument if it is to be scrapped.
- If facilities in your country exist for collecting waste or for recycling, please make use of them rather than throwing the accumulator in the normal trash. You will often be able to return used batteries to the place where you purchase new ones.
- Any rechargeable accumultors that you purchased from Viavi can be returned to one of our Service Centers for disposal.

Further instructions for returning waste equipment and batteries to VIAVI can be found in the WEEE section of **Viavi's Standards and Policies web page**

(https://www.viavisolutions.com/en-us/corporate/legal/policies-standards#sustain).

If you have questions concerning disposal of your equipment or batteries, contact JDSU's WEEE Program Management team at

WEEE.EMEA@ViaviSolutions.com.

EU REACH

Article 33 of EU REACH regulation (EC) No 1907/2006 requires article suppliers to provide information if a listed Substances of Very High Concern (SVHC) is present in an article above a certain threshold.
For information on the presence of REACH SVHCs in Viavi products, see the Hazardous Substance Control section of **Viavi's Standards and Policies web page**.

EU CE Marking Directives

(LV certified by TÜV SÜD; EMC, RoHS,RE)

This product conforms with all applicable CE marking directives. Please see EU Declaration of Conformity for details.

California Proposition 65

California Proposition 65, officially known as the Safe Drinking Water and Toxic Enforcement Act of 1986, was enacted in November 1986 with the aim of protecting individuals in the state of California and the state's drinking water and environment from excessive exposure to chemicals known to the state to cause cancer, birth defects or other reproductive harm.
For the Viavi position statement on the use of Proposition 65 chemicals in Viavi products, see the Hazardous Substance Control section of **Viavi's Standards and Policies web page**.

RoHS

"中国RoHS"

《电子信息产品污染控制管理办法》（信息产业部，第39号）
附录 (Additional Information required for the Chinese Market only)

本附录按照"中国RoHS"的要求说明了有关电子信息产品环保使用期限的情况，并列出了产品中含有的有毒、有害物质的种类和所在部件。本附录适用于产品主体和所有配件。

环保使用期限：

本标识标注于产品主体之上，表明该产品或其配件含有有毒、有害物质（详情见下表）。

其中的数字代表在正常操作条件下至少在产品生产日期之后数年内该产品或其配件内含有的有毒、有害物质不会变异或泄漏。该期限不适用于诸如电池等易耗品。

有关正常操作条件，请参见产品用户手册。

产品生产日期请参见产品的原始校准证书。

有毒、有害物质的类型和所在部件

元器件 (Component)	有毒、有害物质和元素					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (CR^{6+})	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
产品主体 (Main Product)						
印刷电路板组件 (PCB Assemblies)	X	O	O	O	O	O
内部配线 (Internal wiring)	O	O	O	O	O	O
显示器 (Display)	O	O	O	O	O	O
键盘 (Keyboard)	O	O	O	O	O	O
塑料外壳零件 (Plastic case parts)	O	O	O	O	O	O
配件 (Accessories)	O	O	O	O	O	O

O：代表该部分中所有均质材料含有的该有毒、有害物质含量低于SJ/T11363-2006标准的限值。
X：代表该部分中所有均质材料含有的该有毒、有害物质含量高于SJ/T11363-2006标准的限值。

North America +1 844-468 4284
Latin America +1 954 688 5660
China +86 21 6859 5260
Germany +49 7121 86 0