

Do you need to see with greater details ?



AP2040 series/AP2050 series
Optical Spectrum Analyzer

5 MHz
Resolution

+/- 3 pm
WL accuracy

2 channels
1 per polarization axis

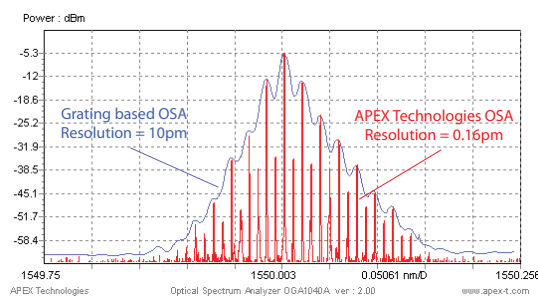
Optical Spectrum Analyzer principle

BASED ON AN INTERFEROMETRIC PRINCIPLE, APEX TECHNOLOGIES ULTRA HIGH RESOLUTION OPTICAL SPECTRUM ANALYZER CAN ACHIEVE A 500 TIMES BETTER RESOLUTION THAN MONOCHROMATOR OPTICAL SPECTRUM ANALYZER

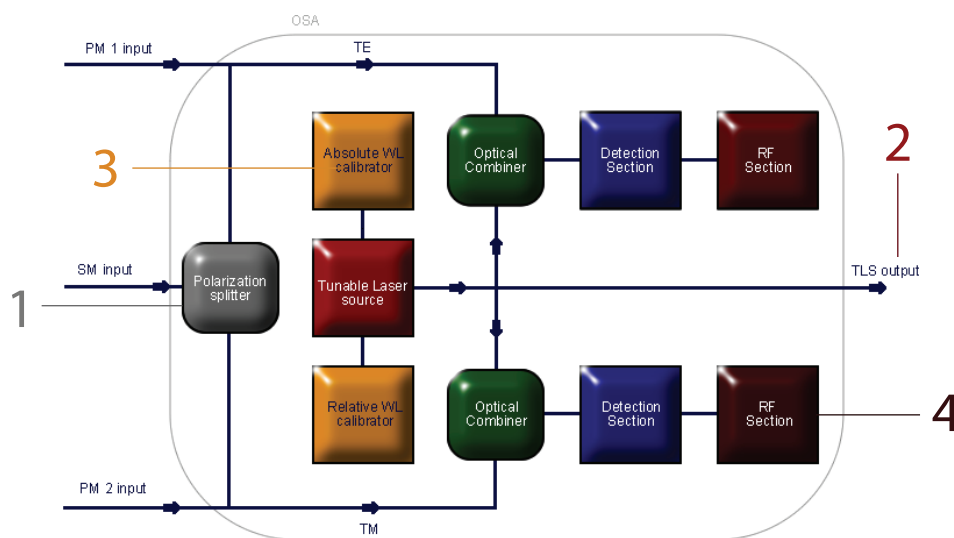
The APEX Technologies Optical Spectrum Analyzers clearly show much more details than the grating based OSA and leaves any kind of guess work behind.

Features:

- From 250 GHz to 5 MHz resolution
- C, L & O Band
- +/-3 pm wavelength accuracy
- Close-in dynamic range > 60dB @ +/- 0.4pm
- Rectangular shape resolution filters
- 2 channels, one per polarization axis
- Built in tunable laser source
- Component transmission analysis



Direct comparison between the two different Optical Spectrum Analyzers types measuring a 1.25 GHz modulated signal.



Ultra high resolutions :

140 MHz/1.12 pm ;
20 MHz/0.16 pm ;
5 MHz/0.04 pm...

1- Two internal channels (one OSA per polarization axis)

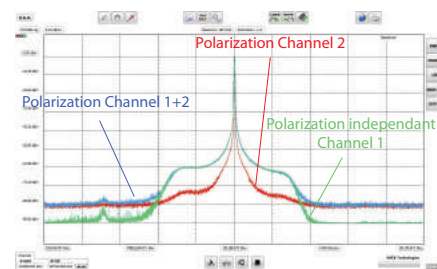
Optionally two different additional PM inputs are available. The user can select between the input independent of polarization or the two PM inputs.

Input independent of polarization:

After splitting the input signal into two orthogonal polarization axis, these polarization axes are analysed simultaneously by two internal independent channels. By using this method, APEX OSA can display the two polarization channels separately or recombine them and display a polarization independent measurement.

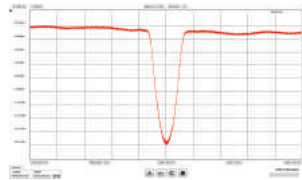
Two PM inputs:

The two input signals can be analysed simultaneously by two internal independent channels. By using this method, APEX OSA can display the two signals separately



2- Tunable Laser Source & Tracking generator

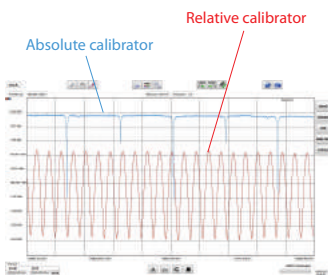
- The built-in Tunable Laser Source local oscillator can also be used as an independent TLS. In option a TLS optical output and a control software can be integrated into the equipment.
- The tracking generator option allows the user to synchronise the wavelength TLS output with the OSA measurement. With this combination, active and passive components transmission measurements (insertion loss/gain) are possible with a dynamic range of 63 dB and a resolution of 1 MHz.



Bragg grating profile measurement using the tracking generator option

3- Wavelength accuracy

The two different internal wavelength calibrators (absolute and relative) furnish to the equipment an accurate wavelength value of the TLS position. This technique provides a very high wavelength accuracy specification of +/- 3 pm.



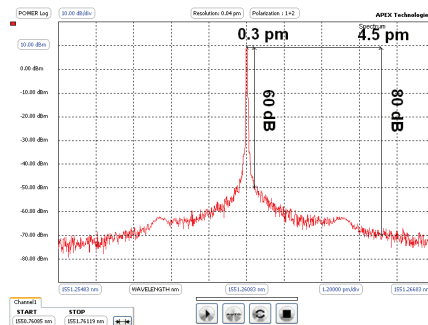
The absolute wavelength calibrator is a gas cell.

The relative one is a Fabry Perot with a fixed free spectral range.

4- Close-in dynamic range

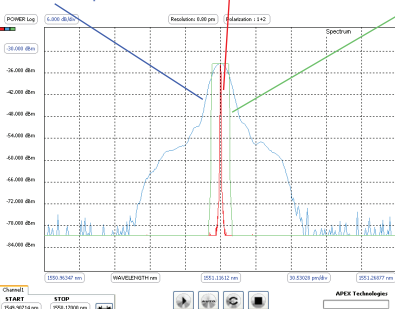
The resolution of APEX Technologies OSA aren't related to optical filters but electrical ones. These electrical filters are close to rectangular shape. Thanks to these special electrical filter forms, the close-in dynamic range is very high:

- @ +/- 0.4 pm from the peak, the dynamic > 60 dB
- @ +/- 6 pm from the peak, the dynamic > 80 dB



... and typical resolutions from 250 GHz/2 nm to 5 MHz/0.04 pm

- (*) Grating based OSA Resolution = 15pm
- APEX Technologies OSA Resolution = 1.12pm
- (*) APEX Technologies OSA Resolution = 15pm



(*) APEX Technologies and grating based OSA wavelength resolution filters shapes comparison.

APEX Technologies OSA rectangular shape filters allow a nearly perfect integration of the signal over the selected resolution, while a grating based OSA filter integrates inside a wide base triangular shape. This sharp integration allows our OSA to perform a much more realistic level measurement.



INTUITIVE SOFTWARE

APEX Technologies OSA software is appreciated by unexperienced as well as expert users. It combines a full panel of functions with an impressive usability.

STORAGE

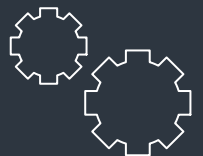
The equipment is equipped with a 32 Gb hard drive and 3 USB inputs. bmp, txt and setup file formats are available.



EQUIPMENT CONTROL

The equipment can be controlled by 3 different ways:

- The front panel
- The sensitive screen
- A mouse and a keyboard



REMOTE CONTROL

The remote control allows the operator to set measurement parameters and to execute a measurement. The user can take the control and perform data transfer with a computer through GPIB or ethernet. It is also possible to take the control of the equipment through internet from everywhere in the world.

Optical Spectrum Analyzer software

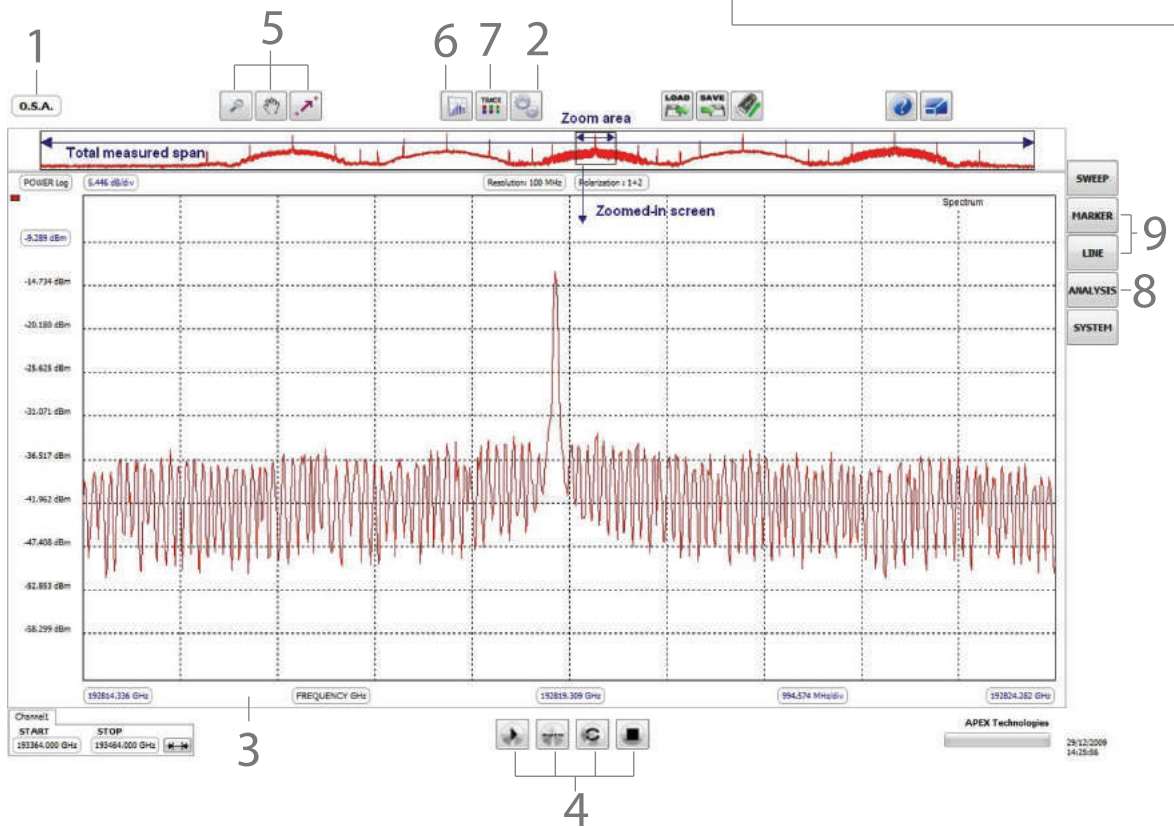
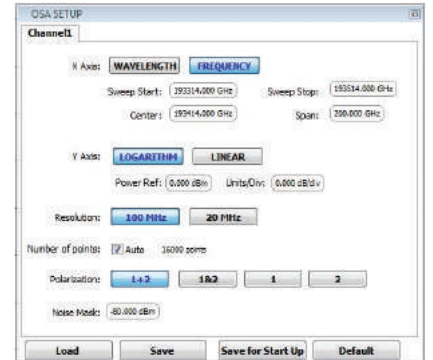
APEX TECHNOLOGIES TEAM DEVELOPED AN INTUITIVE SOFTWARE. THE GOAL OF THIS SOFTWARE IS TO JOIN SIMPLICITY AND POSSIBILITIES. LINES, MARKERS, AUTO SCALE MODE, 6 DIFFERENT TRACES, ZOOM, SCROLL, SETUP AND ANALYSIS FUNCTION ARE AVAILABLE

1- Instrument selection

This button allows the user to select which function you want to display (Optical Spectrum Analyzer, Tunable Laser Source, Power meter, OS Settings).

2- Setup Function

This menu groups all the measurement configuration parameters for easy review. In just one window the OSA measurement parameters can be configured, loaded or saved.



3- Scale

The scale can be modified very quickly. Just press the button corresponding to the value or the unit you want to change and modify it.

The scale values can be modified with this following button type:

192814.336 GHz

The scale units can be modified with this following button type:

FREQUENCY GHz

4- Sweep

Three different sweep modes are always displayed and available on the screen



Auto Sweep: Automatic search and display of the signal inside the equipment wavelength range.



Single Sweep: A one time sweeping is done according to the start/stop or the center/span parameters.




Repeat Sweep: This Sweeping mode repeats a sweep as many times as you need until you press the stop button.

5- Cursors settings


Three different cursors can be selected:

Zoom function: 

While the top trace shows the complete span, the larger bottom trace represents the "zoomed-in" area. The Zoom function can easily be activated by drawing a rectangle at a specific area on the touch sensitive screen and can be repeated multiple times until the desired details become visible.

Delta function: 

This function is very useful for performing a quick delta measurement. This function draws a line and gives the (WL and power) deltas between the two extreme points of the line.

Scroll function: 

The "zoomed-in" area can easily be moved by using the scroll function. The zoom can be kept and displaced inside the entire span.

6- Full span display



This function will enable/disable the panoramic full span graph display.

7- Traces



Up to 6 different traces are available. Each trace can be displayed or blanked.

9- Analysis functions

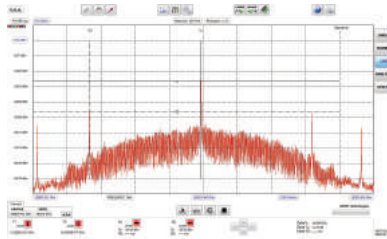
Useful functions are provided for fast analysis:

- Peak Search
- Line Width
- SMSR
- SNR
- Trace A - B
- etc.

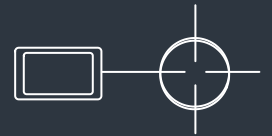
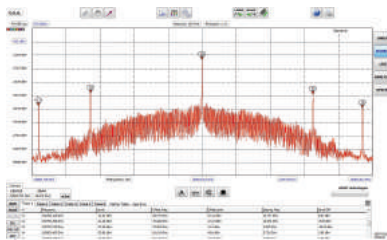
8- Lines and Markers

These 2 functions allow you to position benchmarks accurately on the trace.

- Two horizontal and two vertical lines can be displayed on the graph providing the absolute positions and the delta values between them.

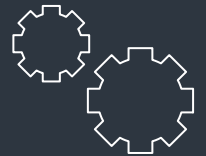


- Up to five hundred markers can be positioned. A marker table can be displayed with all the marker information and saved in txt format.



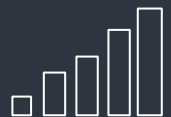
TUNABLE LASER SOURCE SOFTWARE

This optional software allows you to control the internal Tunable Laser Source. Fixed wavelength or sweeping modes are possible. Two kinds of sweeps are available, continuous or step by step.



TRACKING GENERATOR

Thanks to this option, the internal TLS and the OSA sweepings are synchronised. The OSA is able to measure the insertion loss/gain of a DUT (Bragg grating, multiplexer, tunable filter, amplifier...) with a dynamic of 70 dB,



POWER METER

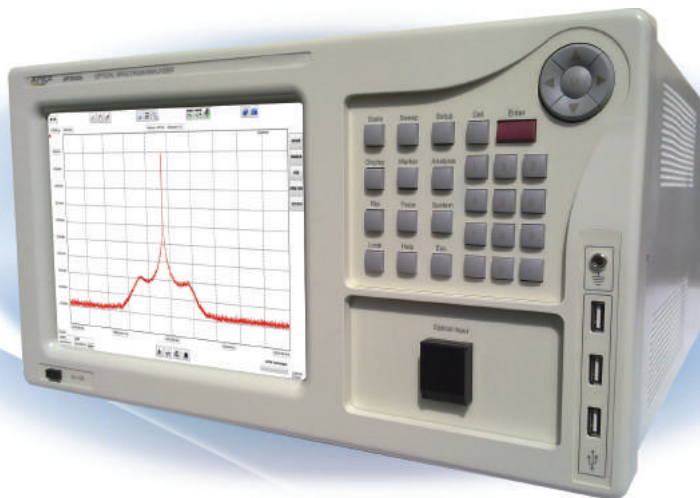
The internal power meter measures the average power value of the input signal. The power of the two independent polarization channels and the total power can be displayed simultaneously.



Optical Spectrum Analyzer specifications

AP2040 AND AP2050 SERIES OFFER ULTRA HIGH PERFORMANCES SPECIFICATIONS AND USEFUL FUNCTIONALITIES:

TWO INDEPENDENT OSA (ONE PER POLARIZATION AXIS) IN EACH EQUIPMENT,
TWO INDEPENDENT POWER METERS (ONE PER POLARIZATION AXIS) IN EACH EQUIPMENT,
TRANSMISSION ANALYSIS, TUNABLE LASER SOURCE, PLUS POWERFUL SOFTWARE ANALYSIS
FOR EASE OF MEASUREMENT.



Ultra high resolution OSA AP2040 series

	AP2041B	AP2043B	AP2045B	AP2046B	AP2047B
Wavelength measurement range	1525 nm to 1607 nm	1520 nm to 1630 nm	1265 nm to 1345 nm	1525 nm to 1607 nm 1265 nm to 1345 nm	1520 nm to 1630 nm 1265 nm to 1345 nm
Wavelength span range ^a	80 pm to 82 nm	80 pm to 110 nm	80 pm to 80 nm	80 pm to 82 nm	80 pm to 110 nm
Wavelength resolution (@ 3 dB) ^b	5MHz/0.04pm 20GHz/160pm	100MHz/0.8pm 50GHz/0.4nm	140MHz/1.12pm 100GHz/1.6nm	2GHz/16pm 200GHz/1.6nm	10GHz/80pm 400GHz/3.2nm
Dynamic range ^{a,f}	83 dB		79 dB	83 dB (1525 nm to 1607 nm) 79 dB (1265 nm to 1345 nm)	83 dB (1520 nm to 1630 nm) 79 dB (1265 nm to 1345 nm)
Close-in dynamic range ^{a,f}	>40 dB @ +/- 0.1 pm >60 dB @ +/- 0.4 pm >80 dB @ +/- 6 pm				
Spurious free dynamic ^d	55 dB Typical (50 dB min)				
Sweep time ^{d,g}	1s for 18 nm				
Wavelength absolute accuracy ^{a,c}	+/- 2 pm typical (+/- 3 pm Max.)				
Measurement level range ^{a,f}	-73 dBm (monochromatic) to +10dBm		-69 dBm to +10dBm	-73 dBm to +10dBm (1525 nm to 1607 nm) -69 dBm to +10dBm (1265 nm to 1345 nm)	-73 dBm to +10dBm (1520 nm to 1630 nm) -69 dBm to +10dBm (1265 nm to 1345 nm)
Absolute level accuracy ^{a,b,e}	+/- 0.3 dB (monochromatic)				
Level repeatability ^{a,b,d,e}	+/- 0.2 dB				
Optical input	FC/PC for SM fiber				
Internal absolute WL calibrator	Yes				
Display capabilities					
X scale	Wavelength in nm or frequency in GHz				
Y scale	Optical power in mW or dBm				
Option OSA01					
Optical tunable laser source specifications					
Wavelength range	1525 nm to 1607 nm	1520 nm to 1630 nm	1265 nm to 1345 nm	1265 nm to 1345 nm 1525 nm to 1607 nm	1265 nm to 1345 nm 1520 nm to 1630 nm
Spectrum line width (@ 3 dB)	500 kHz typical				
Output power	-8 dBm typical		-12 dBm typical	-8 dBm typical (1525 nm to 1607 nm) -12 dBm typical (1265 nm to 1345 nm)	-8 dBm typical (1520 nm to 1630 nm) -12 dBm typical (1265 nm to 1345 nm)
SMSR	>45 dBc				
ASE	< -40 dBc over 0.1 nm				
RIN	< -135 dB/Hz				
Wavelength stability	+/- 10 pm over 1 hour				
Power stability	+/- 0.09 dB over 1 hour				
Fiber/connector type	Polarization maintaining fiber FC/APC connector				
Option OSA02					
Optical tracking generator specifications					
Dynamic ^e	63 dB		59 dB	63 dB (1525 nm to 1607 nm) 59 dB (1265 nm to 1345 nm)	63 dB (1520 nm to 1630 nm) 59 dB (1265 nm to 1345 nm)
Resolution ^e	1 MHz				
Option OSA08					
Optical inputs	1 FC/PC for SM fiber input 2 FC/APC for PM fiber inputs				

- a) At 1550 nm
b) At 0 dBm
c) After Wavelength calibration
d) Typical
e) Resolution 140 MHz
f) Resolution 5 MHz
g) Resolution 100 MHz
1) Relative to total signal power
2) Inside spurious free dynamic
Otherwise: possible power offset (mW) < 10⁻⁶x total signal power (mW)



OSA software functionalities:
Auto measurement,
zoom function,
zoom to scale,
auto calibration,
peak search,
line width,
SMSR,
SNR,
markers,
horizontal and vertical lines,
peak center
...

Tunable Laser Source

Transmission analysis

Input trigger
(typ. recirculating loop application)

Up to 6 traces

10.4 Inch,
color TFT screen

Front keyboard

3 USB connectors

32 Gb internal
hard drive

File format:

Trace file (.dat, .txt)
setup file
screen copy (.bmp)
marker table

Mouse & keyboard
USB type in front panel

GPIO

Ethernet

Operating temperature:
+10°C to +35°C

Power requirement:
AC 100 to 120V/200 to 250V
50/60Hz

Compact high resolution OSA AP2050 series

	AP2050A	AP2052A	AP2051A
Wavelength measurement range	1526 nm to 1567 nm	1567 nm to 1607 nm	1526 nm to 1607 nm
Wavelength span range	170 pm to 41 nm	170 pm to 40 nm	170 pm to 81 nm
Wavelength resolution (@ 3 dB) ^d	20MHz/0.16pm 140MHz/1.12pm 2GHz/16pm	10GHz/80pm 20GHz/160pm 50GHz/0.4nm	100GHz/0.8nm 200GHz/1.6nm 400GHz/3.2nm
Dynamic range ^{a,g}	83 dB		
Close-in dynamic range ^{a,g}	>40 dB @ +/- 1.3 pm	>60 dB @ +/- 8 pm	>70 dB @ +/- 30 pm
Spurious free dynamic ^{d,g}	50 dB ⁽¹⁾		
Sweep time ^d	Between 0.4 nm/s (min) & 1.2 nm/s (max)		
Wavelength absolute accuracy ^{a,c}	+/- 3 pm		
Measurement level range ^{a,g}	-73 dBm (monochromatic) to +10 dBm		
Absolute level accuracy ^{a,e}	+/- 0.3dB ⁽²⁾		
Level repeatability ^{a,b,d,e}	+/- 0.2dB		
Optical input	FC/PC for SM fiber		
Internal absolute WL calibrator	Yes		
Display capabilities			
X scale	Wavelength in nm or frequency in GHz		
Y scale	Optical power in mW or dBm		
Option OSA07			
Optical tunable laser source specifications			
Wavelength range	1526 nm to 1567 nm	1567 nm to 1607 nm	1526 nm to 1607
Spectrum line width (@ 3 dB)	3 MHz Typical		
Output power	-8 dBm typical		
SMSR	> 50 dBc		
ASE	< - 50 dBc over 0.1 nm		
RIN	-135 dB/Hz		
Wavelength stability	1 pm @ 15 min, 2 pm @ 1 h		
Power stability	0.07 dB @ 15 min, 0.09 dB @ 1 h		
Fiber/connector type	Polarization maintaining fiber FC/APC connector		
Optical tracking generator specifications			
Dynamic ^e	60 dB		
Resolution ^e	10 MHz		
Option OSA08			
3 inputs specifications			
Optical inputs	1 FC/PC for SM fiber input 2 FC/PC for PM fiber inputs		
Option OSA09			
5 MHz wavelength resolution instead of 20 MHz			
Close-in dynamic range ^{a,f}	>40 dB @ +/- 0.1 pm	>60 dB @ +/- 0.4 pm	>80 dB @ +/- 6 pm

a) At 1550 nm

b) At 0 dBm

c) After Wavelength calibration

d) Typical

e) Resolution 140 MHz

f) Resolution 5 MHz

g) Resolution 20 MHz

1) Relative to total signal power

2) Inside spurious free dynamic

Otherwise: possible power offset (mW) < 10⁻⁶ x total signal power (mW)



APEX Technologies

APEX Technologies is located in Marcoussis in the French Optics Valley. The company was founded in 1998 and our first equipment has been shipped in 2001. We develop and produce innovative ultra high performance test equipment intended for fiber optic telecommunications research. Our policy "knowledge is power" reflects our work ethic. APEX Technologies is a company centred around a strong research team, our goal is to stay at the top of the advanced technology...

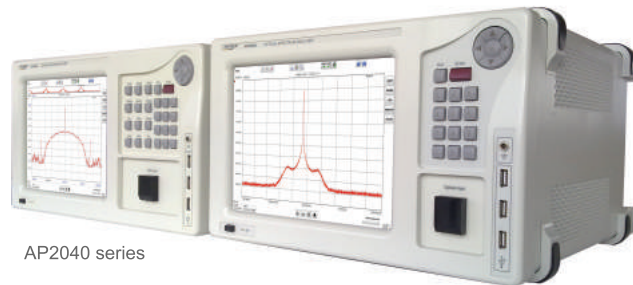
Related products

Optical Complex Spectrum Analyzer:

This equipment is also based on an interferometric method and is able to measure spectrums with the same specifications as the AP2040 series instruments. It also has the added benefit of measuring phase as a function of frequency. The phase and intensity information can then be used to calculate chirp, phase, alpha parameter or pulse shape as a function of time, furthermore it can display constellation, phase and intensity eye diagrams. This equipment has no modulation format and bit rate limitation.

Multitest platform and plug-in modules:

A mainframe can control several plug-in modules (Tunable Laser source, DFB lasers, power meters, EDFA, variable attenuators, tunable filters, switches...). Special methods has been developed for these products to be cost effective and offer ultra high performance.



AP2040 series

AP2050 series

For further information or to book a demonstration, contact us or your local distributor.

Your local contact.

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TECHNOLOGIES

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