

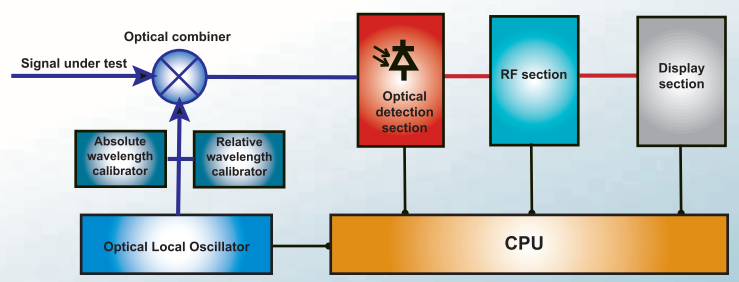
AP2040A series Optical Spectrum Analyzer



- **Ultra-high resolution : 0.16pm (20MHz)**
- **High absolute wavelength accuracy : +/-3pm**
- **Measurement level range : -70dBm up to +20dBm**
- **High close-in dynamic range : 60dB@+/-10pm**
- **Ethernet and GPIB remote control**
- **All-in-one equipment (no need of external equipment)**

Principle

With the AP2040A series Apex Technologies sets a new standard in Optical Spectrum Analysis, its different approach enables it to measure in far greater detail than ever before. While monochromator based Optical Spectrum Analyzers can achieve a maximum resolution of 10pm, the AP2040A series is based on an interferometric principle which is able to dramatically increase this resolution by a factor 62, achieving a 0.16pm resolution (20MHz) at an absolute wavelength accuracy of +/-3pm and a close-in dynamic range of 60dB at 10pm. With a price in the same order as conventional monochromator based OSA's, it makes the AP2040A the first of its kind in the next generation Optical Spectrum Analyzers.



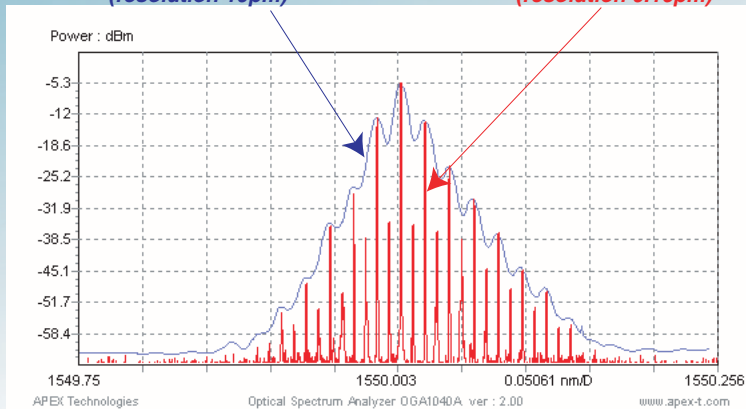
Principle block diagram

AP2040A Series Optical Spectrum Analyzer

Measurement examples

Conventional grating based OSA
(resolution 10pm)

Apex Technologies AP2040A OSA
(resolution 0.16pm)



AP2040A comparison with a grating based OSA :

This is a direct comparison between the two different Optical Spectrum Analyzer types measuring a 1.25GHz modulated signal.

The AP2040A clearly shows approx. 62 times more detail than the grating based OSA and leaves any kind of guess work behind.

Zoom function :

This is a 10Gb/s modulated signal (PRBS 2⁷-1) measured with the AP2040A.

By utilizing the AP2040A's built-in zoom function, all frequencies generated by the modulation can be made visible and used for analysis.

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 available.

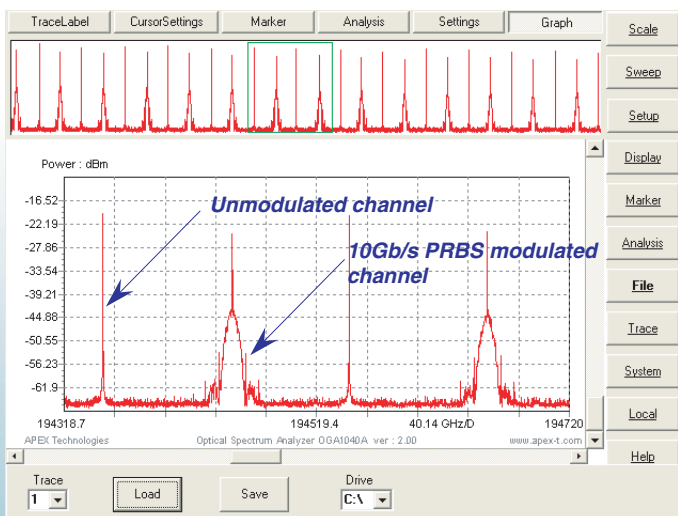


(C/D)WDM applications:

This is an AP2040A measurement of a 100GHz spaced WDM system carrying modulated and unmodulated signals.

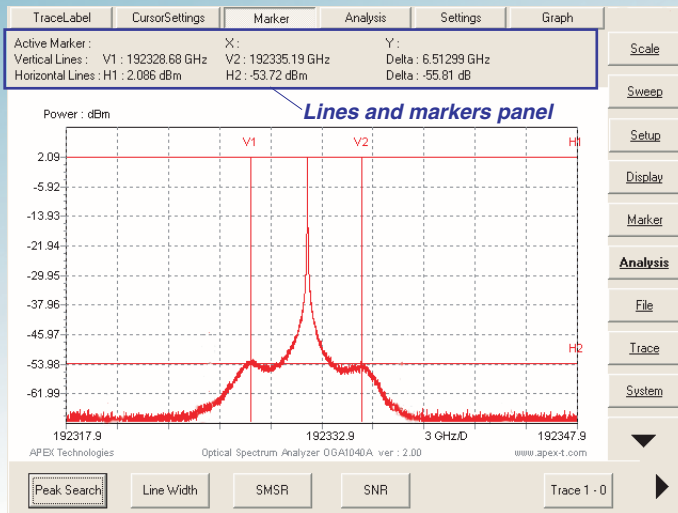
Thanks to the ultra high resolution of the AP2040A, channel and even modulation types can easily be identified; in this particular case the 10Gb/s NRZ modulated signal is clearly recognized.

In D-WDM systems low channel crosstalk is crucial for optimum system performance and can easily be analyzed due to the AP2040A's 0.16pm wavelength resolution, and adjusting channels in the ITU grid is no longer a challenge thanks to the +/-3pm absolute wavelength accuracy of the AP2040A.



AP2040A Optical Spectrum Analyzer

Measurement examples

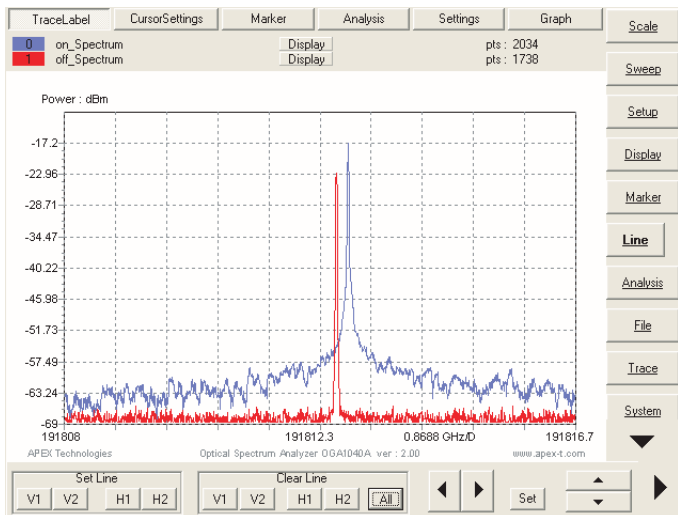


DFB relaxation oscillation :

AP2040A is the perfect tool for active device spectrum measurement.

In this example, a DFB laser is measured and the relaxation oscillation resonance can be analyzed giving information on the maximum direct modulation capability of the laser.

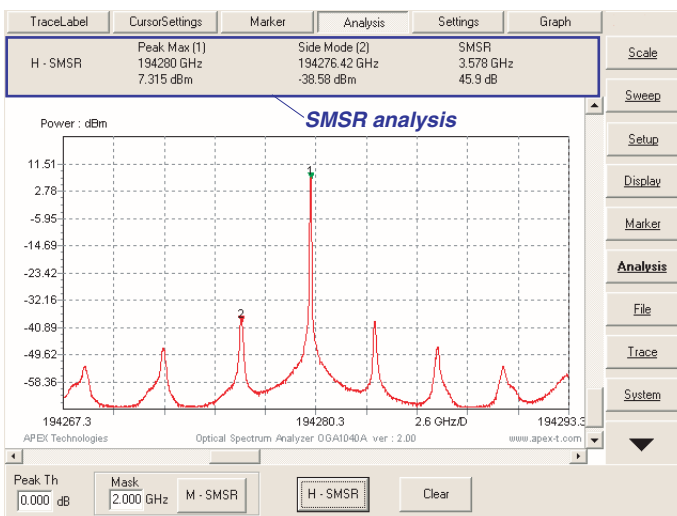
Horizontal and vertical lines can be used to measure this parameter. Lines can be moved directly by pointing on the screen or by using a mouse. Lines and marker value are displayed on the top of the screen.



Laser spectrum widening :

In this example the same laser have been measured before and after transmission thru different optical components. The widening of the spectrum can be seen and measured.

The built-in linewidth analysis function can be use to easily characterize the linewidth of the signal under test.



Side Mode Suppression Ratio of tunable lasers :

Tunable lasers source (TLS) are commonly used in WDM systems but cavity modes generating sidebands close to the main peak can have an influence on system performance (when TLS is modulated).

With AP2040A sidebands can be measured easily with the built-in SMSR function.

AP2040A Optical Spectrum Analyzer

Specifications

	AP2040A	AP2041A	AP2043A
Wavelength measurement range	1520nm to 1567nm	1520nm to 1567nm & 1557nm to 1607nm	1520nm to 1630nm
Wavelength span range	1.6pm to 47nm	1.6pm to 87nm	1.6pm to 110nm
Wavelength absolute accuracy ^{a b c}	+/-3pm		
Wavelength resolution (@3db) ^d	20MHz (0.16pm) and 100MHz (0.8pm)		
Measurement level range ^{a e}	-70dBm to +20dBm		-67dBm to +20dBm
Absolute level accuracy ^{a b e}	+/-0.3dB		
Level repeatability ^{a b d e}	+/-0.2dB		
Close-in dynamic range ^{a b e}	>40dB @ +/-2pm 60dB @ +/-10pm		60dB @ +/-1.7pm
Spurious free dynamic ^d	>60dB		>45dB
Sweep time ^{d e}	5s for 55nm		8s for 110nm
Optical input	FC/PC for SM fiber		
Tunable laser output	>-7dBm		>-9dBm
Internal absolute WL calibrator	Yes		

Software functionalities	Auto measurement, Zoom function, Zoom to scale, Auto calibration, Peak search, Line width, SMSR, Markers, Horizontal and vertical lines, Peak center, ...
Display capabilities	
X scale	Wavelength in nm or Frequency in THz
Y scale	Power in linear or log
Trace	Up to 6 traces
Screen	10.4inch, color TFT, 640x480pixels
Front keyboard	Yes
Touch sensitive screen	Yes
USB connector	1x front panel, 2x back panel
Internal memory	More than 1,000 traces
File format	Trace file (.dat, .txt), Setup file, Screen copy (.bmp), Marker table
Mouse and keyboard connector	Yes (PS2 type in front panel)
GPIB	Yes
Ethernet	Yes (10/100 base T)
Operating temperature	+10°C to +35°C
Power requirement	AC 100 to 120V / 200 to 250V, 50/60Hz
Accessories	Touch sensitive pen

a) At 1550nm

b) At 0dBm

c) After wavelength calibration

d) Characteristic

e) Resolution 100MHz

Ordering informations

AP2040A : C band Optical Spectrum analyzer

AP2041A : C&L band Optical Spectrum analyzer

AP2043A : C+L band Optical Spectrum analyzer

Specifications are subject to change without notice.

Apex Technologies
9 bis, rue Angiboust, 91460 MARCOUSSIS, FRANCE
Tél : +33 1 69 63 26 30 - Fax : +33 1 69 63 26 37
Website : www.apex-t.com - E-Mail : info@apex-t.com

Apex Technologies USA
501-I South Reino Road #332, Newbury Park, CA91320, USA
Tel: (805)277-0628, Fax: (805)277-0632
Email: apex.usa@apex-t.com

Janvier 2007