BOSA

High-Resolution Optical Spectrum Analyzer

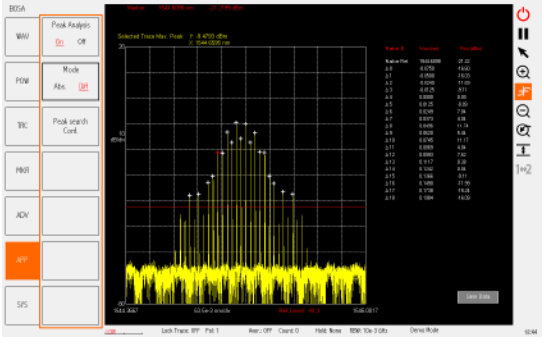
ARAGÓN PHOTONICS

BOSA

TECHNOLOGY

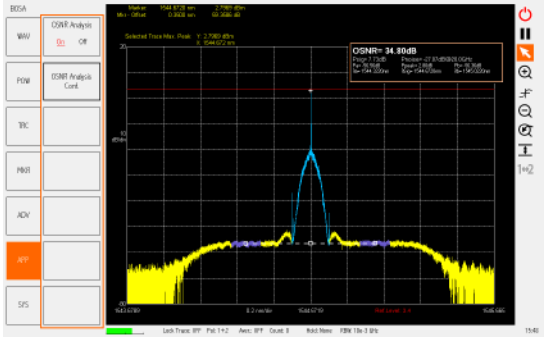
Aragon Photonics all-optical patented technology use the stimulated Brillouin scattering (SBS) as a non-linear optical effect that causes a very narrow filtering effect. By pumping the SBS with an external cavity tunable laser source (TLS), the filter is swept along the spectral region of interest, giving the high-resolution optical spectrum. SBS gain enhances the dynamic range of the measurement compared to passive filtering, and the threshold imposed by SBS eliminates all the spurious effects of the local oscillator sidemodes and lineshape that produce measurement artifacts in heterodyne OSAs, giving the highest spurious-free dynamic range measurement available in any high-resolution OSA.

Based on our core SBS technology we have also developed unique measurements solutions for the characterization of the polarization and phase of the optical spectrum, providing the most complete characterization of an optical signal available in the market.



INTRODUCTION

Latest advances in optical communication technologies require a precise characterization of the signals, components and subsystems involved. Measuring the optical spectrum with enough resolution is a must to test the performance and ensure compatibility and compliance. Aragon Photonics Labs manufactures the most advanced and versatile high resolution optical spectrum analyzers, the BOSA line.



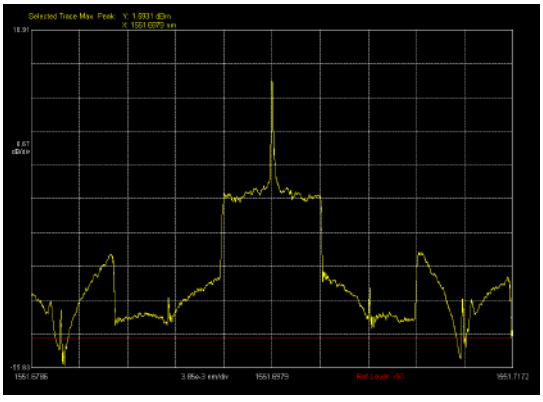
SOFTWARE FEATURES

- Peak analysis function, that lets you characterize a comb in a second and export the data in a csv file.
- OSNR measurement application, configure the width of the signal and noise, and the distance between them and automatically get the OSNR value.
- Trace locking, uses an automatic or user-defined portion of the spectrum for reference to lock traces and obtain the most accurate averaging results.
- Variable resolution, to get results more easily comparable with your old OSA.
- Power integral, that allows measuring the total power of the signal in a user-defined portion of the spectrum.
- Dual-channel polarization measurement, that allow seeing the separate orthogonal polarization components of the signal simultaneously.
- Easy automation. Control your BOSA remotely through GPIB or Ethernet using SCPI commands.

High-resolution Optical Spectrum Analyzer

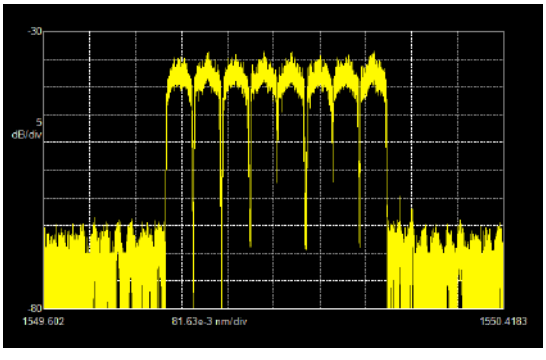
KEY ADVANTAGES

- High resolution (10 MHz / 0.08 pm) and narrow filter profile
- Best accuracy in the market (0.5 pm)
- Great dynamic range (>80 dB) with no artifacts. Maximum reliability.
- Unique spectrally-resolved polarization measurement
- Patented optical phase spectrum measurement: chirp measurement, eye diagram, constellation…
- Integrated tunable laser and component analyzer for maximum versatility

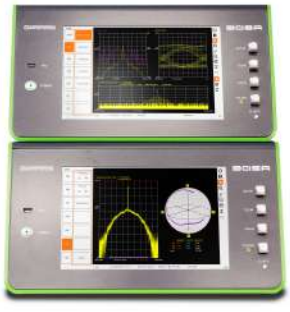


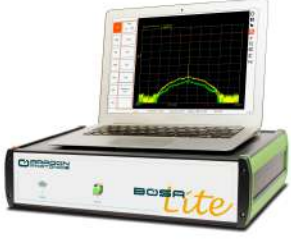
APPLICATIONS

- 100G/400G transceiver testing
- Laser & source spectrum
- Non-linear laser dynamics
- Network analysis: DWDM, Flexigrid, OSNR
- New modulation formats: OFDM, Nyquist, QAM, DP-QPSK…
- Pulsed lasers & frequency combs



BOSA MODELS





BOSA 100

- Use your own compatible TLS and save money
- 10 MHz resolution
- All options available for upgrade

BOSA 400

- Fully standalone
- 10 MHz resolution
- Fast scan (20 nm/s)
- Highest precision (0.5 pm)

BOSA lite

- Cost effective
- 20 MHz resolution
- 2.5 nm/s scan
- Available in standalone model (BOSA lite+)

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Additional upgrades

Option 10
TUNABLE LASER OUTPUT

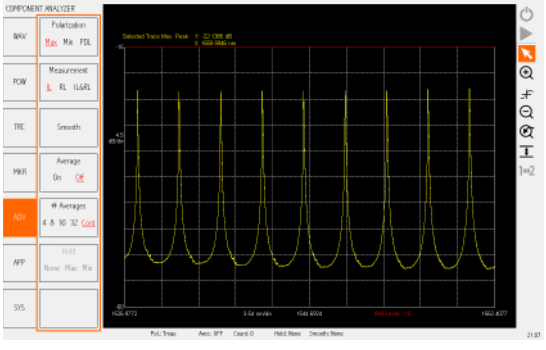
This option provides access to the internal tunable laser source included in BOSA 400 series and in BOSA Lite+, so that it can be used for additional applications.

- High accuracy & scanning repeatability.
- Output power >0dBm.
- Trigger synchronization.
- Use our TLS for your own purposes!

Option 20
COMPONENT ANALYZER

This option turns your BOSA into a passive component analyzer (tunable laser output option is required) by including a high-dynamic range measurement port synchronized with the TLS sweep.

- Insertion Losses
- Return Losses
- Polarization Dependent Losses
- 100 nm/s scanning speed



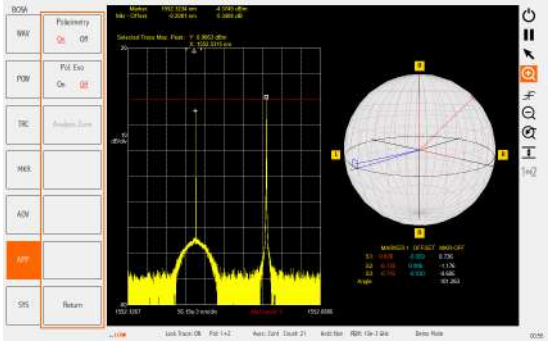
Connect a passive optical device between the AUX Output and AUX Input ports of your BOSA and the spectral profile of insertion loss (IL) and return loss (RL) of your passive optical devices can be measured with great detail and precision thanks to the benefits of BOSA technology.

- Fiber Bragg gratings
- Waveguides or photonic integrated circuits
- WDM network components

Option 30
SPECTRAL POLARIMETRY

With this option, you can turn your BOSA into the most advanced tool for polarization analysis. This option is not a stand-alone module but an extension to the spectrum analysis module and the component analyzer module.

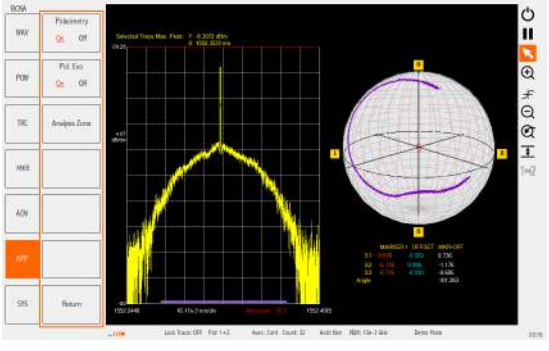
- Simultaneous measurement of Optical spectrum and Poincare sphere
- DGD & PMD measurement



When using the optical spectrum analysis module with option 30 activated, the spectrally-resolved state of polarization (SOP) can be measured. Use markers to measure polarization differences between different light sources or different spectral components.

The continuous evolution of the state of polarization can also be measured. Select a portion of the measured span to plot the evolution of the SOP with high resolution.

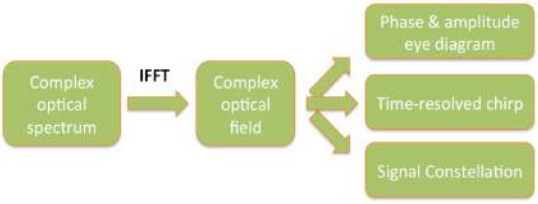
- Polarization alignment of different optical sources
- Evolution of Polarization with wavelength

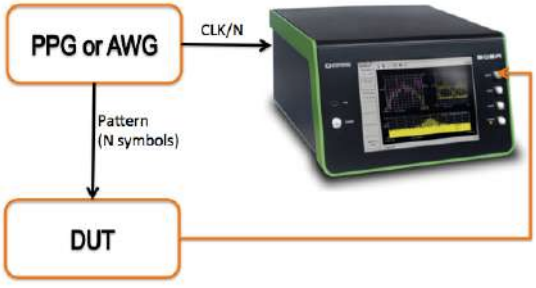


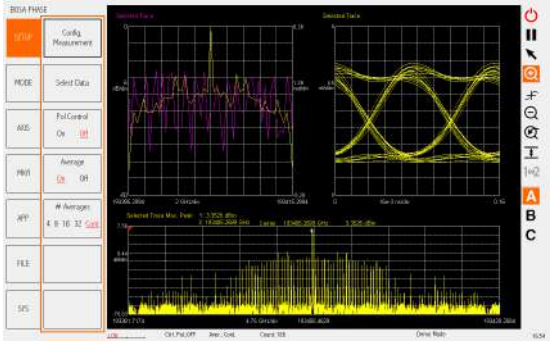
Option 40
PHASE MEASUREMENT

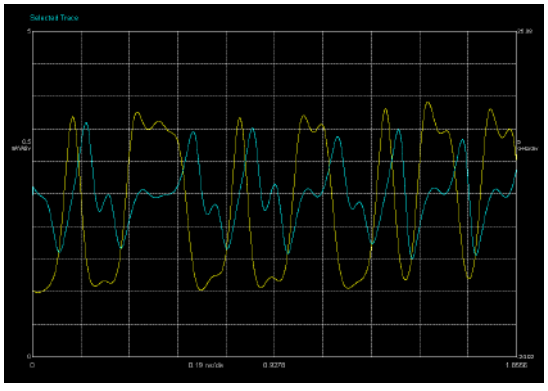
Option 40 turns the BOSA into a whole new type of instrument: an optical complex spectrum analyzer (OCSA), capable of measuring both the amplitude and the phase of the optical spectrum of the signal under test, fully characterizing the signal. With the complex spectrum information and through inverse Fourier transform, all the time-domain information can be retrieved: eye diagram, constellation, time-resolved chirp, etc.

The phase of any optical signal modulated with a pattern that is repeated with a pattern frequency between 70 MHz and 2 GHz can be measured. You can easily generate these test signals with most commercially available PPGs or AWGs. The BOSA just requires the optical signal to measure and a reference pattern clock (pattern repetition frequency = baud rate divided by the number of symbols in the pattern).









- Get a future-proof analyzer, capable of measuring any bit rate and modulation format thanks to its spectral measurement.
- Measure the eye diagram for any magnitude of the signal (power, phase, I, Q)
- Assess the quality of your transmitters without the need of expensive coherent scopes or
- Get the constellation diagram of any signal, not only in the sampling point but also in the complete I-Q transitions.
- Obtain straightforward measurements of the time resolved chirp (TRC).
- Analyze the complex transfer function of passive devices, by measuring a comb signal at the input and output of the DUT.

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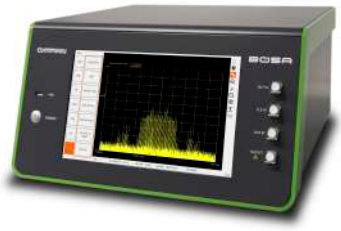
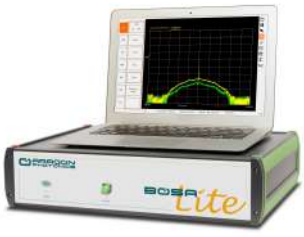
BOSA Specifications





Series	BOSA 400 / 100			BOSA Lite / Lite+	
Measured bands	C	C+L	O	C	C+L
Performance					
Optical Resolution	10 MHz @1550 nm		10 MHz @1310 nm	20 MHz @1550 nm	
Wavelength range	1525-1565 nm	1525-1615 nm	1265-1345 nm	1525-1565 nm	1525-1605 nm
Wavelength accuracy	±0.5 pm	±0.5 pm	±1.0 pm	±2.0 pm	±2.0 pm
Spurious-free dynamic range	>80 dB			>80 dB	
Close-in dynamic range	>40 dB @ ±0.2 pm >60 dB @ ±0.4 pm			>40 dB @ ±0.8 pm >60 dB @ ±2.0 pm	
Calibrated Input Power Range	+13 to -70 dBm			+13 to -70 dBm	
Maximum Safe Total Input Power	+20 dBm			+20 dBm	
Sensitivity	-70 dBm / 10 MHz			-70 dBm / 10 MHz	
Power Accuracy	±0.5 dB			±0.5 dB	
Polarization Measurement	Two Orthogonal Polarizations. Full spectral polarimetry (Option 30)				
Measurement time	20 nm/s			2.5 nm/s	
Wavelength Calibrator	Yes	Yes	Yes	Yes	Yes
Physical & electrical					
Operating Temperature	+15 °C to +35 °C			+15 °C to +35 °C	
Power Requirements	110/220V; 50/60Hz Máx. 150W. (BOSA 400) Máx. 130W. (BOSA 100)			110/220V; 50/60Hz Máx. 100W.	110/220V; 50/60Hz Máx. 150W.
Dimmension & Mass	430x230x470 (mm). Máx. 18Kg. (BOSA 400) Máx. 15Kg. (BOSA 100)			420x310x100 (mm). Máx. 7Kg	430x230x470 (mm). Máx 17Kg
Optical Connections	FC/APC Others on request			FC/APC Others on request	
Available interfaces	Ethernet, USB, GPIB			Ethernet, USB (laptop)	Ethernet, GPIB, USB

Specifications for add-on options

	BOSA 400 series		BOSA Lite+	
Measured bands	C band	C+L band	C band	C+L bands
Option 10 – Tunable laser output				
Wavelength Range	1516-1565 nm	1521-1630 nm	1525-1565 nm	1525-1605 nm
Absolute accuracy	±1.5 pm	±2.0 pm	±2.0 pm	
Tunning speed	1-100 nm/s		2.5 nm/s	
Output power	>1 mW		>1 mW	
Side-mode suppresion	>43 dB	>45 dB	>43 dB	>45 dB
RIN	<-145 dB/Hz	<-140 dB/Hz	<-145 dB/Hz	<-140 dB/Hz
Linewidth	<1 MHz		<5 MHz	
Trigger output	BNC		BNC	
Option 20 – Component analyzer				
Wavelength range	1516-1565 nm	1521-1630 nm	1525-1565 nm	1525-1605 nm
Wavelength accuracy	±1.0 pm	±2.0 pm	±2.0 pm	
Power accuracy	±0.2 dB		±0.2 dB	
Polarization Measurement	Two orthogonal states. PDL with Opt.430		Two orthogonal states	
Output power	>0 dBm		>0 dBm	
Sensitivity	-70 dBm (IL) -45 dBm (RL)		-70 dBm (IL) -45 dBm (RL)	
Calibrated input range	-10 to -70 dBm		-10 to -70 dBm	
Spurious-free dynamic range	>80 dB		>70 dB	
Measurement time	1 s for 100 nm		1 s for 2.5 nm	
Option 30 – Spectral polarimetry				
Polarization repeatability	±5°		±5°	
Temperature dependence	±0.2°/°C		±0.2°/°C	
Measurement time	6 scans at 20 nm/s		6 scans at 2.5 nm/s	
Polarization sensitivity	-40 dBm		-40 dBm	
Polarization crosstalk	<20 dB		<20 dB	
Option 40 – Phase measurement				
Wavelength range	1525-1565 nm	1525-1615 nm	1525-1565 nm	1525-1605 nm
Bandwidth	80 MHz to full span		80 MHz to full span	
Pattern Frequency Range	70 MHz to 2 GHz		70 MHz to 2 GHz	
Phase accuracy	±1°		±1°	
Sensitivity	-70 dBm		-70 dBm	
Electrical Reference input power	+5 to -15 dBm		+5 to -15 dBm	
Measurement time	1 s for 10 nm		1 s for 2.5 nm	

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INDUSTRIES & PRODUCTS

HDAS:
High-fidelity Distributed Acoustic Sensor

INCUS
Receiver tube spectrophotometer

CONDOR
Portable solar reflectometer

BOSA
High-resolution Optical Spectrum Analyzer

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