ARAGÓN PHOTONICS

T&M EQUIPMENT
OPTICAL
COMMUNICATIONS

OPTICAL T&M EQUIPMENT COMMUNICATIONS

The current demand on high bandwidth data services and applications is growing at high speed. Data centers can already reach 400G thanks to the latest optical modules. The optical network architectures are more and more adaptive, and the capacity and reach is directly related with the spectrum utilization of the channels. Therefore, the future network architecture needs extremely precise characterization of the optics and photonics elements involved.

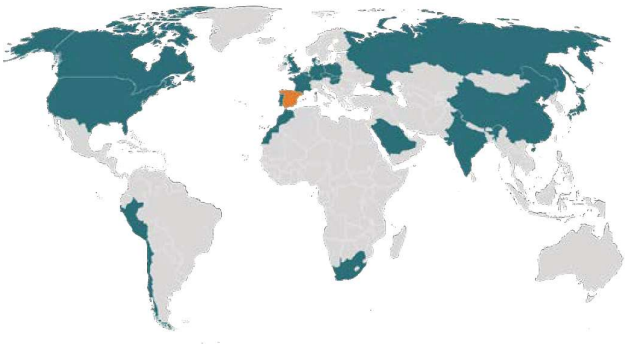
Today, optical communication technologies require a precise portrait of the signals, components and subsystems. And that includes the optical spectra. Although a regular optical spectrum analyzer (OSA) can provide good spectral information for many applications, most of optical technologies require much higher resolution in order to see further, to analyze in depth and even save time when exploring new ideas and launching new devices.

CONVENTIONAL USERS & APPLICATIONS

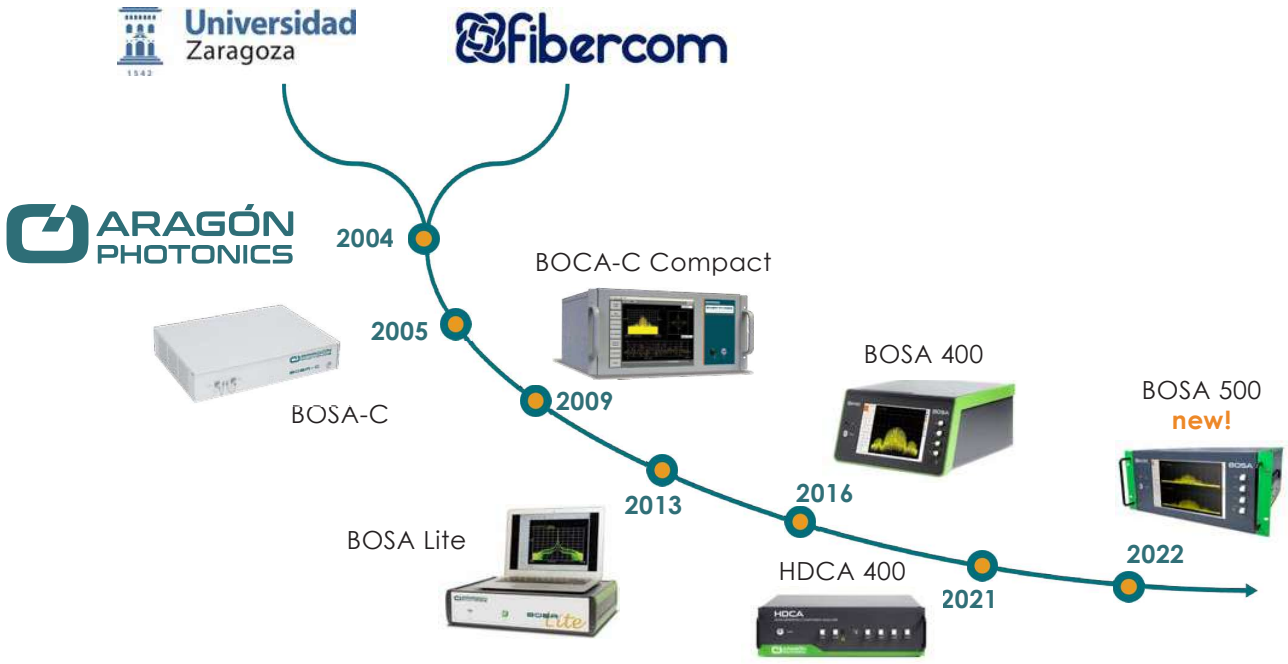
	THE CUSTOMER	THE APPS	OUR SOLUTION
1	**Educational & Universities**	Optical sources characterization	Optical engineering departments at Universities around the world can take advantage of Aragon Photonics high precision solutions to confirm their investigations.
2	**Research & development**	Optical communications Quantum photonics	R&D labs invest huge amounts of money in new developments and equipment. High end products such as BOSA and HDCA help companies make the invest profitable .
3	**Manufacturers**	Transceivers FBGs PICs	Only the fastest and most accurate instruments are reliable for working on a 24/7 basis, thus saving time and money in production.

OUR JOURNEY IN OPTICAL COMMUNICATIONS

Aragon Photonics was created in 2004 as a result from the collaboration between Fibercom and University of Zaragoza to develop and market a recently discovered spectroscopy technology based in Brillouin scattering: the BOSA.



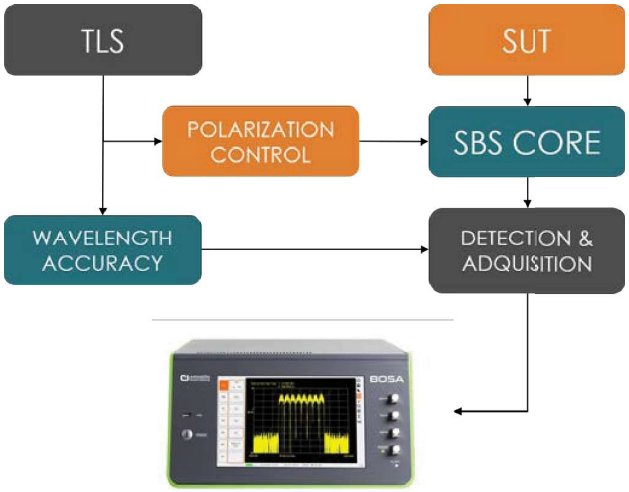
Since then, Aragon Photonics has been evolving this product to adapt it to the needs of the market. Thanks to all this, it has been possible to develop a portfolio of products that meet the requirement of our customers.



BOSA

BOSA is the most advanced and versatile High Resolution Optical Spectrum Analyzer in the market. Thanks to our unique optical filtering and full spurious free dynamic range the BOSA achieves reliable measurements avoiding artifacts and undesired effects on your measurements.

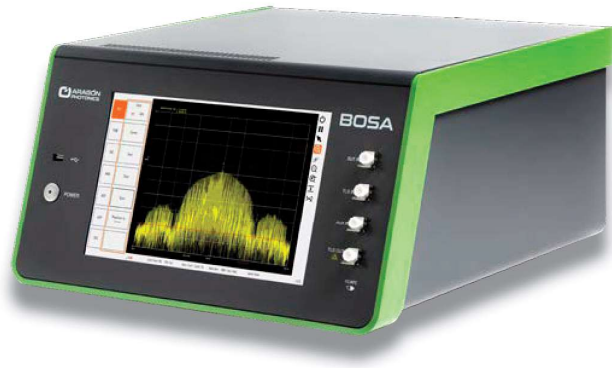
BOSA's unique combination of high-resolution and high dynamic-range brings a new range of measurement possibilities to the optical domain. BOSA reveals the optical spectra of the signals with a detail and precision that enables direct measurement of performance parameters for lasers and modulated signals.



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 market.

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 any HR-OSA.



KEY FEATURES

- High resolution (10 MHz / 0.08 pm) and narrow filter profile purely optical
- 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
- Wavelength Range: O, S, C, L bands

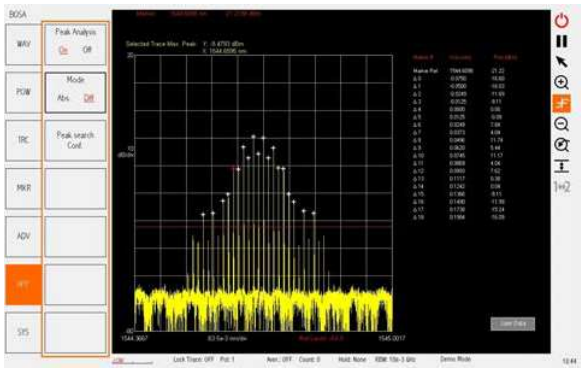
APPLICATIONS

- Pulsed lasers & frequency combs
- 100G/400G transceiver testing
- Advanced modulation formats: OFDM, Nyquist, QAM, DP-QPSK…
- Chirp effects analysis
- Network analysis: DWDM, Flexigrid, OSNR

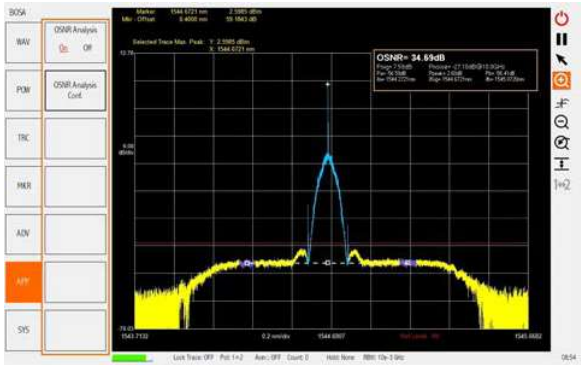
SOFTWARE FEATURES

BOSA includes some software applications that allows users performing their typical demands for an easier measurement automation.

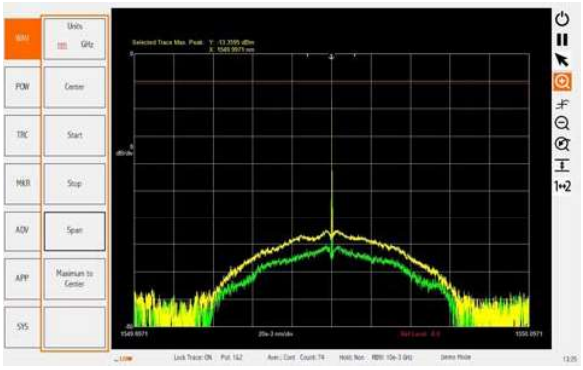
- Easy automation, that allows you to control your BOSA remotely through GPIB or Ethernet using SCPI commands
- Peak analysis function, allows you to identify all the maximum or minimum values that are present in the spectral trace within a user defined threshold. This lets you characterize a comb or ring resonators in a second and export the data in a csv file.



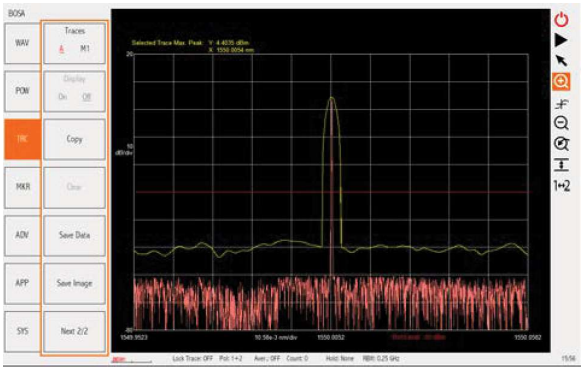
- OSNR measurement application, configure the width of the signal and noise by using the traditional approach where the power density of the noise is integrated over a 0.1 nm or a user defined bandwidth, which allows multiple channel spacing possibilities, to automatically get the OSNR value.



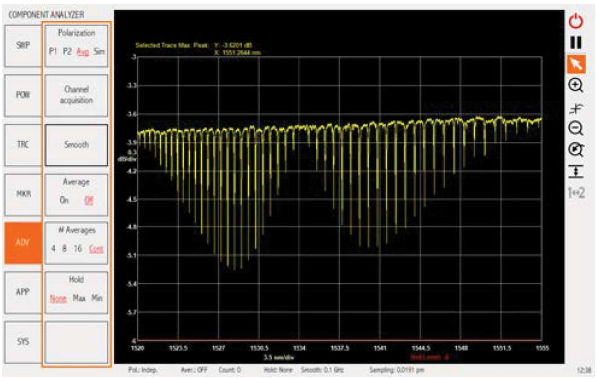
- Trace locking, uses an automatic or user-defined portion of the spectrum for reference to lock traces and obtain the most accurate averaging results.
- Dual-channel polarization measurement, that allows seeing the separate orthogonal polarization components of the signal simultaneously, and so, visualize its polarization dependence.



- Variable resolution, despite BOSA resolution is fixed to 10 MHz, this allows you to get results more easily comparable with your old OSA by applying a software filtering based on the user defined resolution bandwidth.



- Autocalibration. The BOSA has internal absolute and relative wavelength calibrators that can be checked by user.



ARAGÓN PHOTONICS

BOSA

MODELS

BOSA 500

Unique multiband high resolution Optical Spectrum Analyzer:

- Dual built-in TLS
- Up to 4 bands
- 10 MHz resolution
- 80 dB SFDR

BOSA 400

The most advanced high resolution Optical Spectrum Analyzer:

- Single built-in TLS
- 10 MHz resolution
- 20 nm/s scan
- 0.5 pm accuracy

BOSA 100

Maximum performance at minimum cost:

- Use your own compatible TLS and save money
- 10 MHz resolution
- Upgradable

BOSA lite

The best balanced high resolution Optical Spectrum Analyzer:

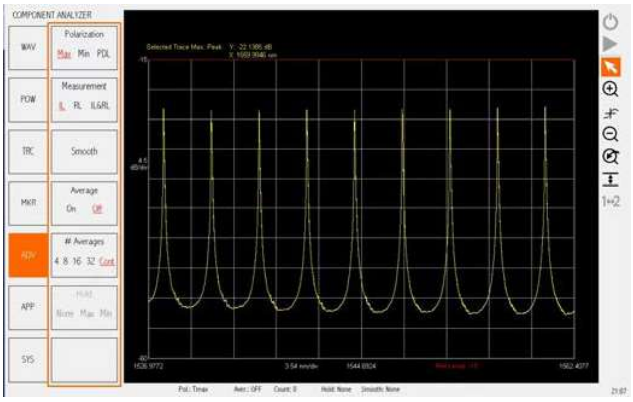
- Cost effective
- 20 MHz resolution
- 2.5 nm/s scan
- Upgradable

ADDITIONAL UPGRADES

OPTION 10. TUNABLE LASER OUTPUT

This option provides access to the internal tunable laser source included in BOSA so that it can be used for additional applications.

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



OPTION 20. COMPONENT ANALYZER

This option turns your BOSA into a passive component analyzer by including a high-dynamic range measurement port synchronized with the TLS sweep.

Connect a passive optical device to measure the spectral profile of insertion loss (IL) and return loss (RL) of your passive optical devices with detail and precision thanks to the 10 MHz resolution.

- Insertion & Return Losses
- Polarization Dependent Losses (option)
- 100 nm/s scanning speed
- FBGs, PICs, Chips, Resonators

An evolution of the component analyzer is the new option 21, with the highest performance, same as in the new High Definition Component Analyzer (HDCA) product released in Sept'21. See last two pages of this catalog for further information.

High Resolution Optical Spectrum Analyzer

TECHNICAL SPECIFICATIONS

	BOSA 500	BOSA 400 /100	BOSA lite
Measurement bands	O+C+L, O+S+C+L	C, C+L, S+C+L, O	C, C+L
Performance			
Optical Resolution	10 MHz @1550 nm 10 MHz @1310 nm		20 MHz @1550 nm
Wavelength range	1265-1345 nm, 1525-1615 nm (O+C+L) 1265-1345 nm, 1480-1615 nm (O+S+C+L)	1525-1565 nm (C) 1525-1615 nm (C+L) 1480-1615 nm (S+C+L) 1265-1345 nm (O)	1525-1565 nm (C) 1525-1605 nm (C+L)
Wavelength accuracy	±0.5 pm (C, C+L, S+C+L) ±1.0 pm (O)		±2.0 pm
Spurious-free dynamic range	>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		
Maximum safe total power input	+20 dBm		
Sensivity	-70 dBm / 10 MHz		
Power accuracy	±0.5 dB		
Polarization measurement	Two Orthogonal Polarizations. Full State of Polarization (Option 30)		
Sweep time	20 nm/s		2.5 nm/s
Wavelength calibrator	Yes		Optional

OTHER SPECIFICATIONS

	BOSA 500	BOSA 400 /100	BOSA lite
Physical & electrical			
Operating Temperature	+15 °C to +35 °C		
Power requirements	110/220V; 50/60Hz; Max. 200W		
Dimmension & Mass (L x W x D)	525 x 460 x 220 mm. Max. 23 kg.	470 x 430 x 230 mm. Max. 20 kg.	470 x 445 x 140 mm. Max. 10 kg.
Optical Connections	FC/APC (others on request)		
Operating Temperature	Ethernet, USB, GPIB		

ADDITIONAL UPGRADES

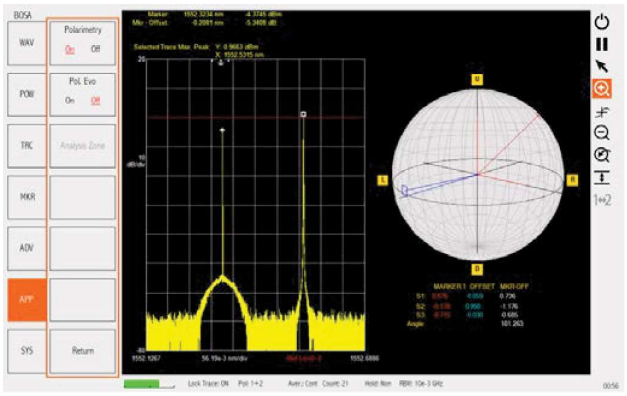
OPTION 30. SPECTRAL POLARIMETRY

With this option, you can turn your BOSA into the most advanced tool for polarization analysis: the spectrally-resolved state of polarization (SOP) can be measured. 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
- Polarization alignment of different sources
- Evolution of Polarization with wavelength
- PDL measurement for components

Use markers to measure polarization differences between different light sources or different spectral components.

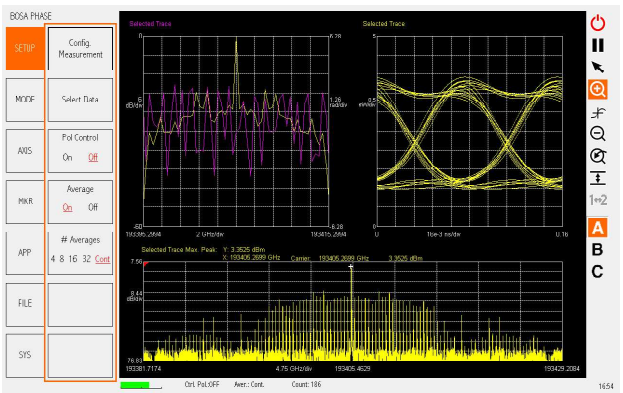
The continuous evolution of the state of polarization can also be measured. Select a portion of the measured span to plot the evolution of the SOP with high resolution.

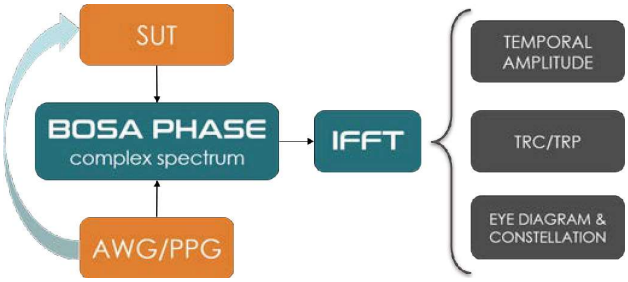


OPTION 40. PHASE MEASUREMENT

This option turns the BOSA into an optical complex spectrum analyzer (OCSA), capable of measuring both the amplitude and the phase of the optical 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 with a repetitive spectrum with spectral lines separated between 70 MHz and 2 GHz can be measured. You can easily generate these test signals with most commercially available PPGs or AWGs configuring the pattern repetition frequency as the 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)
- 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
- Amplitude optical spectrum always plotted for setup adjustment

TECHNICAL SPECIFICATIONS

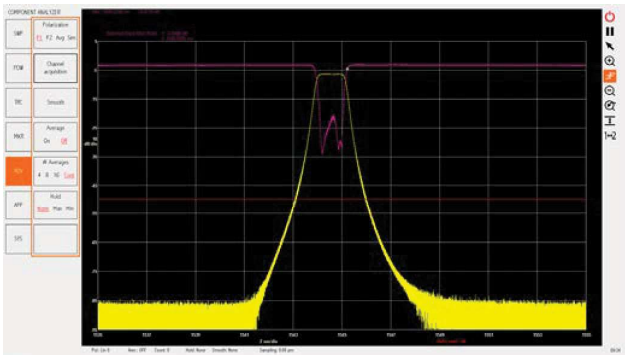
	BOSA 500 / 400 / 100 / Lite			
Measurement bands	C Band	C+L band	S+C+L band	O band
Option 10 - Tunable laser output				
Wavelenth range	1515-1565 nm [a]	1520-1630 nm [b]	1480-1630 nm	1265-1345 nm
Absolute accuracy	±1.5 pm	±2.0 pm		
Tunning speed	1-100 nm/s [c]			
Output power	>1 mW			
Side-mode suppresion	>43 dB	>45 dB		
RIN	<-145 dB/Hz	<-140 dB/Hz		
Linewidth	<1 MHz [d]			
Trigger output	BNC			
Option 20 - Component analyzer				
Wavelenth range	1516-1565 nm [a]	1521-1630 nm [b]	1481-1630 nm	1265-1345 nm
Absolute accuracy	±1.0 pm	±2.0 pm		
Power accuraccy	±0.2 dB			
Polarization measurement	Two orthogonal states. PDL with option 30			
Output power	>0 dBm			
Sensitivity	70 dBm (IL) -45 dBm (RL)			
Calibrated input range	-10 to -70 dBm			
Spurious-free dynamic range	>80 dB [e]			
Measurement time	1 s for 100 nm [f]			
Option 30 - Spectral polarimetry				
Polarization repeatability	±5°			
Temperature dependence	±0.2°/°C			
Polarization sensitivity	-40 dBm			
Polarization crosstalk	<20 dB			
Measurement time	6 scans at 20 nm/s [g]			
Option 40 - Phase measurement				
Wavelength range	1516-1565 nm [a]	1525-1615 nm [b]	1481-1615 nm	1265-1345 nm
Bandwidth	80 MHz to full span			
Pattern frequency range	70 MHz to 2 GHz			
Phase accuracy	±1°			
Sensitivity	-70 dBm			
Electrical reference input power	+5 to -15 dBm			
Measurement time	1 s for 20 nm [f]			

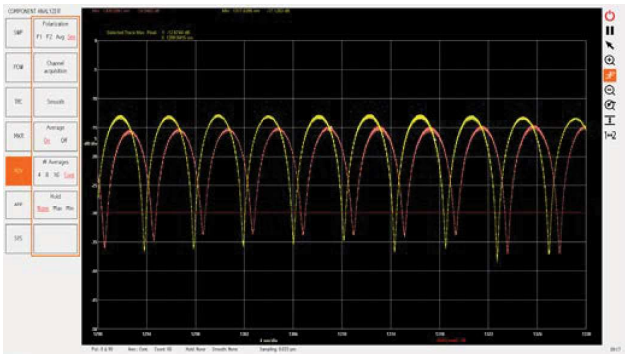
a. 1525-1565 nm for BOSA Lite
b. 1525-1605 nm for BOSA Lite
c. 2.5 nm/s for BOSA Lite
d. < 5 MHz for BOSA Lite
e. >70 dB for BOSA Lite
f. 1 s for 2.5 nm for BOSA Lite
g. 6 scans at 2.5 nm/s for BOSA Lite

ARAGÓN PHOTONICS

HDCA

The new High Definition Component Analyzer (HDCA) from Aragon Photonics lands to characterize passive optical devices with the highest resolution and wavelength accuracy, the fastest measurement time and largest dynamic range. The spectra profile of insertion losses (IL), return losses (RL) and polarization dependent losses (PDL) of passive optical devices can be measured with femtometric resolution and fully automated.





APPLICATIONS

- Quantum photonics (chips)
- Ring resonators
- Arrayed Waveguide grating (AWG)
- Fiber Bragg gratings (FBG)
- Photonic integrated circuits (PICs)
- Wavelength selective switches (WSS)
- Ultra-DWDM network components

TECHNOLOGY

Based on the technology developed for the passive optical component analysis for the BOSA 400 option 20, the HDCA is capable of measuring devices under test (DUTs) with extraordinary wavelength accuracy, repeatability and unmatched resolution.

KEY FEATURES

- Real time measurement: 0.4 sec.
- Resolution down to 2.4 fm
- Dynamic range: >85 dB in a single sweep
- Wavelength repeatability: ±0.15 pm
- Wavelength accuracy: ±0.5 pm
- Wavelength range:
  - O band (1265-1345 nm)
  - C+L band (1510-1620 nm)
  - S+C+L bands (1480-1630 nm)
  - T band (1030-1130 nm)
- TE/TM spectra characterization
- Configurable total data points (up to 10 million points)
- Referenced measurements using NIST traceable absorption lines
- External TLS compatible (100 series)
- HDCA performance can be included in BOSA 400 as option 21

MODELS

HDCA 400

- Fully standalone
- The fastest HDCA

HDCA 100

- Compatible with external lasers. *Contact us for further information*

TECHNICAL SPECIFICATIONS

		HDCA 400	HDCA 100
Measurement bands		O, C+L, S+C+L	T, O, C+L, S+C+L
Performance			
Wavelength range		1510-1620 nm (C+L) 1265-1345 nm (O) 1480-1630 nm (S+C+L)	Depends on TLS model
Wavelength accuracy		±0.5 pm (Typ.)	Depends on TLS model
Wavelength repeatability		±0.15 pm (Min.) ±0.35 pm (Typ.)	Depends on TLS model Highest performance (option)
Resolution		0.3 MHz (0.0024 pm) (Min.) 1 MHz (Typ.)	Depends on TLS model
Number of channels		1 to 4	
Calibrated Input Power Range		+10 to -90 dBm	
Dynamic range	IL	>85 dB @ 100 nm/s	
	RL	> 55 dB	
Power accuracy	IL	±0.1 dB (Typ.)	
	RL	±0.5 dB (Typ.)	
Power resolution		0.001 dB	
Polarization Measurement		Two orthogonal polarizations PDL measurement as option	
PDL accuracy		±0.04 dB	
PDL repeatability		±0.02 dB	
Output power		0 dBm (Min.) 0 to 30 dB attenuation (option)	Depends on TLS model 0 to 30 dB attenuation (option)
Sweep speed		1 to 400 nm/s 100 nm/s (Typ.)	Depends on TLS model 100 nm/s (Typ.)
Data points		10 Million (Max.) *Configurable*	
Measurement time		0.4 sec @ 400nm/s C+L band	<1 sec (Typ.)
Referenced measurement		Yes	
Wavelength Calibrator		Yes	

OTHER SPECIFICATIONS

Physical & electrical		
Dimensions (L x W x D)	Type A: 470 x 445 x 140 mm (3 UA) Type B: 550 x 430 x 180 mm (4 UA)	
Weigth	Max. 20 kg	Max. 10 kg
Operating Temperature	+15 °C to +35 °C	
Power requierments	110/220V; 50/60Hz Máx. 200W.	
Optical Connections	FC/APC Others on request	
Available interfaces	Ethernet, USB, GPIB	

ARAGÓN PHOTONICS

INDUSTRIES & PRODUCTS

HDAS
High Fidelity Distributed Acoustic Sensor

BLAST
Brillouin Loop Analyzer of Strain & Temperature

BOSA
High Resolution Optical Spectrum Analyzer

HDCA
High Definition Component Analyzer

CONDOR
Portable solar reflectometer

INCUS
Receiver tube spectrophotometer

wavetel
a simac group company

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ARAGÓN PHOTONICS

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