SPA-100

Swept Photonics Analyzer

Product Overview

Santec's Swept Photonics Analyzer, SPA-100, is a convenient add-on module to a Santec tunable laser, and when paired together, the system can analyze the most compact and complex optical components yielding results for reflectance, transmission and distance to events.

The complete system employs OFDR (Optical Frequency Domain Reflectometry) technology enabling it to analyze the back reflection and transmission characteristics of fiber optic devices/components in the spatial domain. The system produces a trace like an OTDR (Optical Time Domain Reflectometer), but with much higher resolution and precision. The system has a sampling resolution of 5 µm allowing it to discern structures within PIC and silicon photonic (SiPh) devices with ease.

The system is available in two configurations: O-band (1260 nm to 1350 nm) and CL band (1480 nm to 1640 nm).

Features

- Measure IL and RL on optical components
- Configurable based on Santec TSL
- Specify regions of interest to analyze events/feature of the optical device
- Define multiple refractive indexes for different areas of the trace
- Spectral analysis with 70 dB of dynamic range
- Spectral analysis of reflective events
- Proximity sensing for SiPh and PIC waveguide alignment
- Low sensitivity for reflective events with virtually no dead zone

Applications

- Analysis of silicon photonic waveguides
- Automated SiPh wafer alignment
- Optical component reflectance and analysis
- Wavelength dependent component characterization
- Fiber optic connector and cable assembly mating analysis
- High resolution reflectance analysis and length measurement (5 µm)

Requirements

- Compatible Santec tunable lasers: TSL-570, TSL-710, and TSL-770

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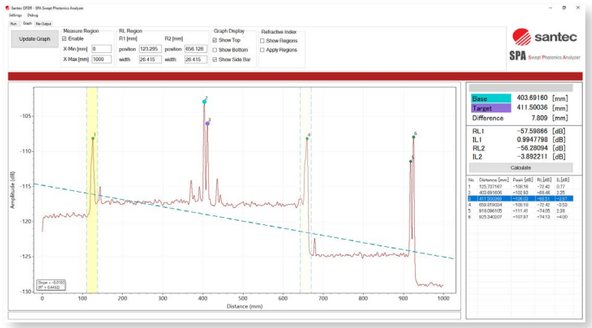
Swept Photonics Analyzer

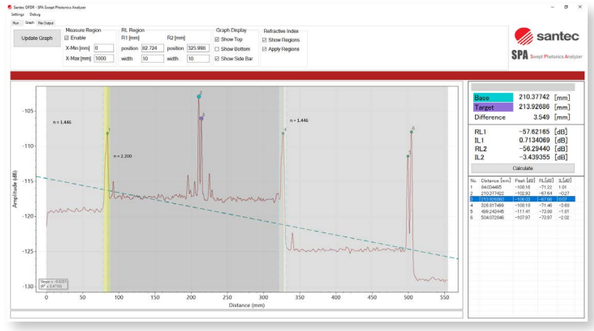


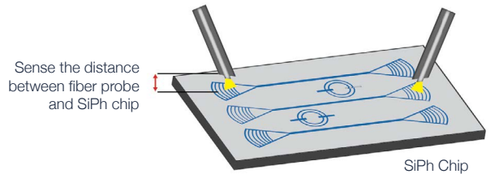
Define Areas of Interest

Select sections of the trace to automatically perform analysis of insertion loss and return loss with the region of interest.

Specify Multiple Refractive Indexes for a Trace

User can specify multiple indexes of refraction within a single trace when analyzing signals that may pass through different mediums, i.e. from fiber to air to silicon.



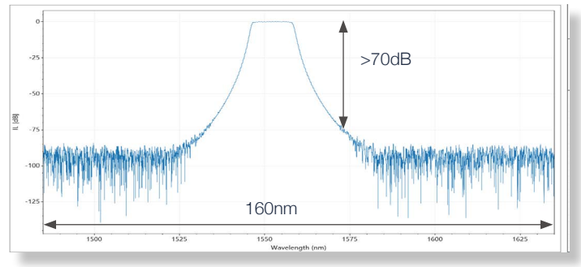


Proximity Sensing for Fiber to SiPh Alignment

Use OFDR system and fiber probe to align with SiPh for qualification of silicon wafer. No need for capacitive sensors.

Wavelength Dependent Loss Measurement

Measure transmission wavelength dependent loss across the full TSL range with over 70 dB of dynamic range with no gain switching. Single sweep and saves time.



SPA Optical / Electrical Specifications

Parameter		Unit	Performance		Notes
Wavelength Range		nm	1260 - 1350	1480 - 1640	Depends on the tunable laser range
Back Reflection Measurement	Measurement Range	m	4.5	4.5	In fiber length
	Sampling Resolution [1,2]	µm	6	5	In fiber length
	Repeatability (typ.) [1]	µm	± 30	± 30	In fiber length
Insertion Loss Measurement	Measurement Dynamic Range	dB	≥ 70	≥ 70	In transmission mode
			≥ 10	≥ 10	In reflection mode [3]
	Sensitivity	dB	-135	-135	In reflection mode
	Accuracy (typ.)	dB	± 0.1	± 0.1	In transmission & reflection mode
	Resolution	dB	0.1	0.1	
	Wavelength Resolution	pm	≤ 2	≤ 2	
Proximity Distance Measurement	Measurement Range [4]	µm	50 - 10,000 (10 mm)	50 - 10,000 (10 mm)	Normal to surface using a flat ended fiber
	Display Resolution	µm	1	1	
	Repeatability (typ.)	µm	± 1	± 1	In optical length
	Relative Accuracy (typ.)	µm	± 2	± 2	In optical length
Measurement Time (typ.)		sec	5	5	Sweep Speed: 100nm/s (CL band), 50nm/s (O-band) Tuning range: 40nm Sampling resolution: 20um
Interface	Measurement Port	-	2	2	2 ports are assigned input and output for IL measurement
	Fiber	-	PMF	PMF	
	Connector/Polish	-	FC/APC or SC/APC	FC/APC or SC/APC	
	Remote Control	-	USB	USB	

Notes:
[1] These specifications are only guaranteed when measuring with PMF.
[2] 90nm scan range for O-band, 160nm scan range for CL-band
[3] Two-way loss before backscatter reaches noise floor.
[4] This range varies depending on the reflectance of the measured object and surface structure (light scattering).

Ordering Scheme & Instructions

1. Configure SPA Swept Photonics Analyzer

SPA-100-□-P-□-AP-□-AP-2-0

WAVELENGTH RANGE	
1	1260- 1350nm
2	1480 - 1640nm

FIBER TYPE	
P	PMF (fixed)

INPUT CONNECTOR TYPE	
F	FC
S	SC

INPUT CONNECTOR POLISH	
AP	AP (fixed)

OUTPUT CONNECTOR TYPE	
F	FC
S	SC

OUTPUT CONNECTOR POLISH	
AP	AP (fixed)

OUTPUT PORT NUMBER	
2	2 port

2. PMF Patch Cord

A PMF patch cord is required to connect the TSL (tunable laser) to the SPA-100. Please define the ordering code for the PMF patch cord depending on the connector and polish type of the TSL output and the connector and polish type of the SPA-100 input.

PPC - □ - □P - □ - AP

CONNECTOR A TYPE (To TSL)	
F	FC
S	SC

CONNECTOR A POLISH (To TSL)	
SP	SPC
AP	APC (angled PC)

CONNECTOR B TYPE (To SPA-100)	
F	FC
S	SC

CONNECTOR B POLISH (To SPA-100)	
AP	APC (angled PC)

In the Box

SPA - Swept Photonics Analyzer

- SPA-100
- Power Cord AC
- USB A to B
- BNC Cable

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