

# High Performance Tunable Laser **TSL-550**

The TSL-550 is a high performance tunable laser with a wide tuning range and an output combining high power and high signal-to-noise ratio. The mod-hop-free tuning TSL-550 is equipped with features such as fine tuning and coherence control making it a must have tool for precision optical testing. Santec has used an innovative cavity design to lower the optical ASE noise, resulting in an extraordinarily high signal-to-noise ratio of over 90 dB/0.1 nm, while also maintaining a high output power of over +10 dBm. GPIB and USB interfaces with the industry standard SCPI command set provide a convenient automated measurement solution.

The TSL-550 has two separate versions: Type A includes a wavelength meter with  $\pm 15$  pm wavelength accuracy and Type C, the high accuracy version, with an absolute wavelength accuracy of  $\pm 3$  pm.

The TSL-550 is ideal for next generation components testing driven by innovations in Dense Wavelength Division Multiplexing (DWDM), passives and Wavelength Selective Switches (WSS) that require characterization of multi-input, high extinction ratio devices. The TSL-550 is designed to improve production inspection throughput by doubling the scan repetition rate over conventional lasers. In addition, the TSL-550 is available for WDL and PDL measurement with the support of our power meter, MPM-210 and dedicated software.

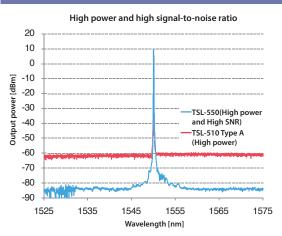
## Features

- Wide tuning range: from 1260 to 1680 nm
- ▶ High output power: +10 dBm
- ▶ High signal-to-noise ratio: 90 dB/0.1 nm
- ▶ High wavelength accuracy:

Type A: ±15 pm Type C: ±3 pm



#### **Measurement Data**



## Applications

- Optical component characterization
- Fiber optic transmission testing
- Photonic material characterization
- Interferometry
- Optical spectroscopy



# Optical Specifications

## Wavelength range: 1260 to 1360nm and 1500 to 1630nm

Category	Parameter		Unit	Performance		
				ТуреА	ТуреС	
Wavelength Characteristics	Wavelength Tuning Range		nm	1260 to 1360 /	1500 to 1630	
	Wavelength Setting Resolution		pm	0.1	0.1	
	Absolute Wavelength Accuracy *1, *2		pm	±15	±3	
	Absolute Wavelength Accuracy (operating temperature) *1		pm	±20	±5	
	Wavelength Repeatability (typ.)*1		pm	±5	±1	
	Wavelength Stability (typ.) *3		pm	≤±5	≤±1	
	Sweep Speed		nm/sec	1 to 100		
	Output Power	Peak (typ.)	dBm	≥1	3	
		Full Tuning Range	dBm	≥1	0	
Optical power	Power Repeatability *1, *4		dB	±0.01		
Characteristics	Power Stability *3, *4		dB	±0.01		
	Power Flatness vs. Wavelength *1, *4		dB	±0.2		
	Relative Intensity Noise (RIN) (typ.) <sup>*7</sup>		dB/Hz	-145 (1 MHz to 3 GHz)		
Spectrum	Linewidth (typ.)	Coherence Ctrl. Off	kHz	200		
		Coherence Ctrl. On	MHz	40		
	SMSR (typ.)		dB	≥ 45		
	Signal to Total Source Spontaneous Emission Ratio*5		dB	≥ 70		
	Signal to Source Spontaneous Emission Ratio *6		dB/nm	≥ 80 (≥ 90 dB/0.1 nm)		

\* All specifications are quoted after 1 hour warm-up period. Specifications apply for wavelengths not equal to any water absorption line.
\*1: At static condition or "Step" sweep mode.
\*2: At 25± 1 °C. \*3: For period of 1 hour. Within ± 0.5 °C. \*4: At "Auto" power mode.
\*5: Ratio of signal power to total spontaneous emission power within ±15nm of the signal wavelength (typical value).

\*6: Ratio of signal power to maximum spontaneous emission power in a 1 nm band within a ±3 nm band around the signal wavelength (typical value). \*7: At maximum output power.

#### Wavelength range: 1355 to 1485nm and 1480 to 1630nm

Category	Parameter		Unit	Performance	
				ТуреА	ТуреС
Wavelength Characteristics	Wavelength Tuning Range		nm	1355 to 1485 / 1480 to 1630	
	Wavelength Setting Resolution		pm	0.1	
	Absolute Wavelength Accuracy *1, *2		pm	±15	±3
	Absolute Wavelength Accuracy (operating temperature) *1		pm	±20	±5
	Wavelength Repeatability (typ.) *1		pm	±5	±1
	Wavelength Stability (typ.) *3		pm	≤±5	≤±1
	Sweep Speed		nm/sec	1 to 100	
	Output Power	Peak (typ.)	dBm	≥ 13	
		≥ 10dBm Range	dBm	≥ 10 (1380 to 1485 nm) @1355 to 1485 nm model	
				≥ 10 (1500 to 1630 nm) @1480 to 1630 nm model	
Optical power Characteristics		Full Tuning Range	dBm	≥7	
	Power Repeatability *1, *4		dB	±0.01	
	Power Stability *3, *4		dB	±0.01	
	Power Flatness vs. Wavelength *1, *4		dB	±0.2	
	Relative Intensity Noise (RIN) (typ.)*7		dB/Hz	-145 (1 MHz to 3 GHz)	
Spectrum	Linewidth (typ.)	Coherence Ctrl. Off	kHz	200	
		Coherence Ctrl. On	MHz	40	
	SMSR (typ.)		dB	≥ 45	
	Signal to Total Source Spontaneous Emission Ratio *5		dB	≥ 70	
	Signal to Source Spontaneous Emission Ratio *6		dB/nm	≥ 80 (≥ 90 dB/0.1 nm)	

\* All specifications are quoted after 1 hour warm-up period. Specifications apply for wavelengths not equal to any water absorption line.
\*1: At static condition or "Step" sweep mode. \*2: At 25± 1 °C. \*3: For period of 1 hour. Within ± 0.5 °C. \*4: At "Auto" power mode.
\*5: Ratio of signal power to total spontaneous emission power within ±15 nm of the signal wavelength (typical value).

\*6: Ratio of signal power to maximum spontaneous emission power in a 1 nm band within a ±3 nm band around the signal wavelength (typical value). \*7: At maximum output power.

## Optical Specifications

## Wavelength range: 1560 to 1680nm

Category	Parameter		Unit	Performance	
				ТуреА	ТуреС
	Wavelength Tuning Range		nm	1560 to 1680	
	Wavelength Setting Resolution		pm	0.1	
Wavelength	Absolute Wavelength Accuracy <sup>*1,*2</sup>		pm	±15	±3
Characteristics	Absolute Wavelength Accuracy (operating temperature) <sup>*1</sup>		pm	±20	±5
	Wavelength Repeatability*1		pm	±5	±1
	Wavelength Stability (typ.)*3		pm	≤±5	≤±1
	Sweep Speed		nm/sec	1 to 100	
	Output Power*8	Peak (typ.)	dBm	≥ 13	
		Full Tuning Range	dBm	≥ 10	
Optical power	Power Repeatability *1, *4		dB	±0.01	
Characteristics	Power Stability <sup>*3, *4</sup>		dB	±0.01	
	Power Flatness vs. Wavelength *1, *4		dB	±0.2	
	Relative Intensity Noise (RIN) (typ.)*7		dB/Hz	-145 (1 MHz to 3 GHz)	
	Linewidth (typ.)	Coherence Ctrl. Off	kHz	200	
		Coherence Ctrl. On	MHz	40	
Spectrum	SMSR (typ.)		dB	≥ 45	
-	Signal to Total Source Spontaneous Emission Ratio*5		dB	≥ 35	
	Signal to Source Spontaneous Emission Ratio *6		dB/nm	n ≥ 45 (≥ 55 dB/0.1 nm)	

\* All specifications are quoted after 1 hour warm-up period. Specifications apply for wavelengths not equal to any water absorption line.
\*1: At static condition or "Step" sweep mode. \*2: At 25± 1 °C. \*3: For period of 1 hour. Within ± 0.5 °C. \*4: At "Auto" power mode.
\*5: Ratio of signal power to total spontaneous emission power within ±15 nm of the signal wavelength (typical value).
\*6: Ratio of signal power to maximum spontaneous emission power in a 1 nm band within a ±3 nm band around the signal wavelength (typical value).
\*7: At maximum output power. \*8: Warrant range is 1560 to 1650 nm

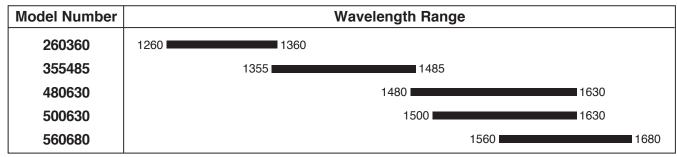
## General specifications

	Optical Output Connector		-	FC or SC, SPC or APC	
Interface	Optical Fiber		-	SMF or PMF <sup>*1</sup>	
	Communication		-	GP-IB (IEEE 488.2), USB, RS-232C	
	Power Monitor		V	0 to 3	
Modulation	LF Modulation		kHz	DC to 400	
			KI IZ	(Input level -2 to 0V, Modulation depth >50%/V (typ.))	
	RF Modulation (option)		MHz	2 to 100	
				(Input level 5Vp-p, Modulation depth >10% (typ.))	
Environmental Conditions and others	Operating	Temperature	°C	15 to 35	
		Humidity	%	< 80 (non-condensing)	
	Power Supply		-	AC 100-240 V±10%, 50/60 Hz	
	Power Consumption		VA	100	
	Dimensions (W) x (D) x (H)		mm	210x440x110	
	Weight		kg	6.5	

\*1: In case of PMF, polarization axis in alignment with connector key. Polarization extinction ratio is 17 dB (typical value).

# SANTEC TUNABLE LASERS

## Model selection

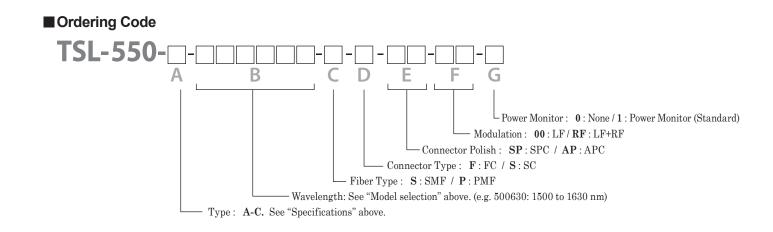


Other wavelength range model is available on request. Please contact Santec Sales.

## Laser safety information



This product is classified class 1M laser product according to IEC 60825-1 (2007). This product complies with FDA performance standards for laser products except for deviations pursuant to Laser Notice No. 50 dated June 24, 2007.



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