

Brand New  
7<sup>th</sup> generation

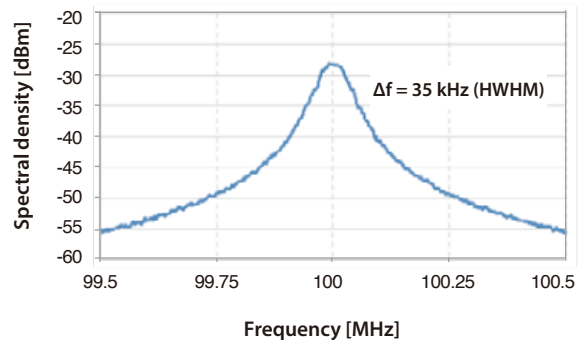
Flagship model  
high performance tunable laser  
**TSL-770**



Santec has brought all its experience and knowledge gained over the past 30 years to its all-new 7th generation tunable laser. The TSL-770 is a very high specification tunable laser with flexibility in operation to ensure suitability for a wide range of applications. A ground up redesign of the laser cavity together with ultra-low noise electronics combine to provide market leading scan speed, high optical power, wide tuning range, low noise and narrow linewidth in the same laser. The new proprietary cavity design enhances Q-factor and wavelength stability enabling accurate measurements in even the most cutting-edge research applications.

Measurement Data

Linewidth



Features

- ▶ Wide tuning range from 1480-1640 nm
- ▶ Mode-hop-free continuous tuning
- ▶ Fast, up to 200 nm/s, wavelength sweeps
- ▶ High output power +13 dBm
- ▶ High signal-to noise ratio 90 dB/0.1 nm
- ▶ High wavelength accuracy 0.3 pm (typ.)
- ▶ Narrow linewidth < 60 kHz

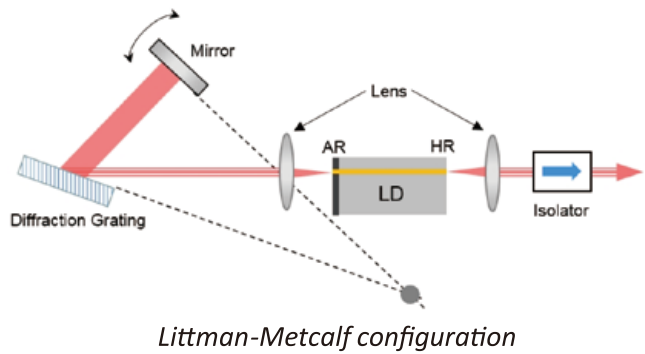
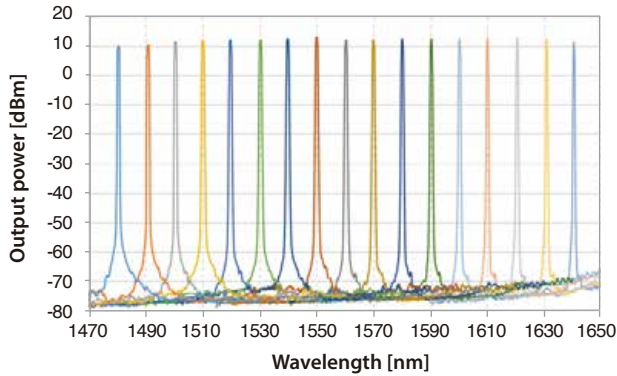
Applications

- ▶ Optical component & photonics material characterization
- ▶ Fiber optic transmission testing (Carrier LD, Local oscillator, etc.)
- ▶ Interferometry, Spectroscopy, Metrology (OFDR, Gas sensing, Terahertz generation, etc.)

## Technologies & typical performance

### Wide tuning range

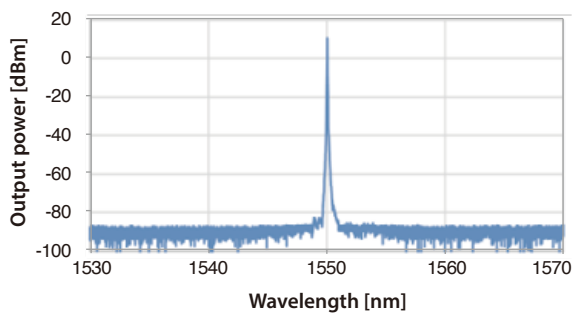
The TSL-770 adopts the Littman-Metcalf configuration to achieve a mode-hop-free tuning range of 160 nm. The drive mechanism is robust to ensure long term performance, and is isolated to eliminate acoustic and mechanical noise in the laser.



### High S/N and high power

An innovative external cavity design has been implemented to lower the optical SSE noise, leading to a high signal-to-noise ratio of over 90 dB/0.1 nm while still maintaining a high output power of up to +13 dBm. It is ideal for next generation components testing driven by extremely high dynamic range filters and Wavelength Selective Switches (WSS).

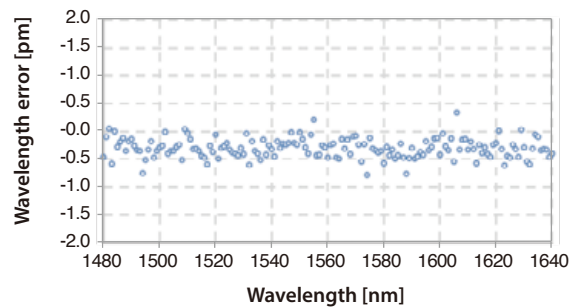
#### High power and high signal-to-noise ratio



### Built-in high performance wavelength meter

The TSL-770 includes a built-in high performance wavelength meter with an absolute wavelength accuracy of +/-2 pm and stores (logs) wavelength data when in continuous sweep mode.

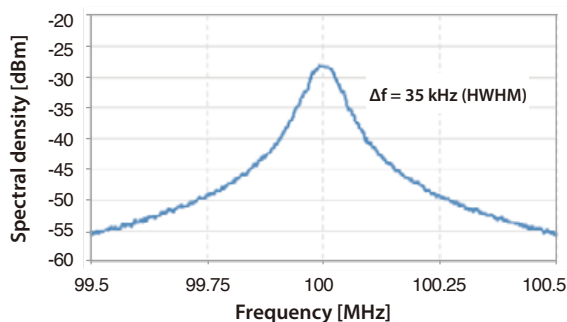
#### Wavelength accuracy



### Narrow linewidth & low jitter

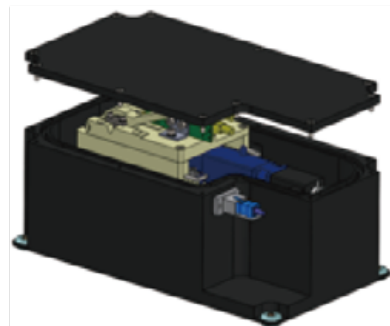
The Q-value of the laser cavity has been maximized by isolating the optical cavity from mechanical vibrations. This results in ultra-narrow laser linewidth and market leading wavelength stability.

#### Linewidth



### Rapid sweep technology

Santec's advanced optomechanical design enables fast sweeps, up to 200 nm/s with high precision and repeatability. Acceleration and deceleration periods are minimized to further reduce the measurement time for repeated scans.



■ Specifications

Category	Parameter		Unit	Performance	
Wavelength Characteristics	Wavelength Tuning Range		nm	SCL-band: 1480-1640 (160 nm)   CL-band: 1490-1630 (140 nm)	
	Wavelength Setting Resolution		pm	0.1	
	Wavelength Absolute Accuracy <sup>*1</sup>	Operating Temperature	pm	± 2	
		25±1 °C (typ.)	pm	± 0.5	
	Wavelength Repeatability <sup>*1</sup>		pm	± 1 (± 0.3 (typ.))	
	Wavelength Stability (typ.) <sup>*2</sup>		pm	< ± 1	
Sweep Speed			nm/sec	0.5 to 200	
Optical Power Characteristics	Output Power	Peak (typ.)	dBm	≥ 13	≥ 13
		>10dBm range	dBm	≥ 10 (1500-1630)	≥ 10 (1500-1630)
		Full Tuning Range	dBm	≥ 7	≥ 8
	Power Repeatability <sup>*1, *3</sup>		dB	± 0.01	
	Power Stability <sup>*2</sup>		dB	± 0.01	
	Power Flatness vs. Wavelength <sup>*1, *3</sup>		dB	± 0.2	
Relative Intensity Noise (RIN) (typ.) <sup>*4</sup>			dB/Hz	-145 (1 MHz to 3 GHz)	
Spectrum	Linewidth (typ.)	Coherence Ctrl. Off	kHz	60	
		Coherence Ctrl. On	MHz	40	
	SMSR (typ.)		dB	≥ 50	
	Signal to Total Source Spontaneous Emission Ratio <sup>5</sup>		dB	≥ 70	
	Signal to Source Spontaneous Emission Ratio <sup>6</sup>		dB/nm	≥ 80 (≥ 90 dB/0.1 nm)	
Interface	Optical Output Connector		-	FC or SC, SPC or APC	
	Optical Fiber		-	PMF <sup>*7</sup>	
	Communication		-	GP-IB (IEEE 488.2), USB, Ethernet	
Modulation	LF Modulation		kHz	DC to 400 (typ.)	
	RF Modulation (option)		MHz	2 to 100 (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) (Except for the protrusion)		mm	440 x 416 x 133	
Weight			kg	16	

\* 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: For period of 1 hour. Within ± 0.5 °C.

\*3: At "Auto" power mode.

\*4: At maximum output power.

\*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 1nm band within a ± 3 nm band around the signal wavelength (typical value).

\*7: Polarization axis in alignment with connector key. Polarization extinction ratio is 17 dB (typical value).

