

## DLT-FT-1550

### Ultra-narrow linewidth frequency-agile laser @ 1550 nm

Product datasheet / Ver 1.1

#### Ultra-narrow linewidth laser

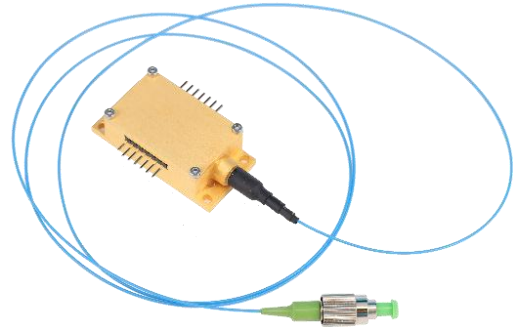
- Ultra-narrow linewidth <100 Hz
- Technology based on photonic integrated circuits
- Compact form factor

#### Frequency-agile

- Frequency actuation BW >2 MHz
- RMS nonlinearity <0.5 %

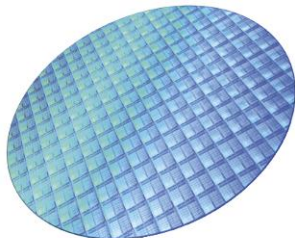
#### Applications

- Distributed fiber optic sensing
- FMCW Lidar
- AMO physics
- Coherent communication
- Photonic computing
- Test & Measurement, metrology

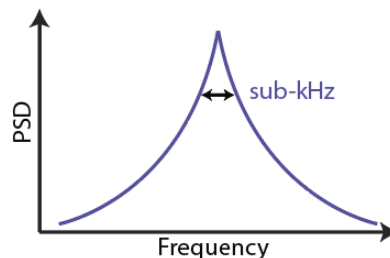


Deeplight's leading product is an ultra-narrow linewidth and frequency-agile laser at 1550 nm in a compact form factor. This next-generation laser is designed for applications in **coherent sensing** (such as Distributed Fiber Optic Sensing). Our technology is based on Silicon Nitride Photonic Integrated Circuits. The laser provides best-in-class frequency noise and high stability in an incredibly small form factor.

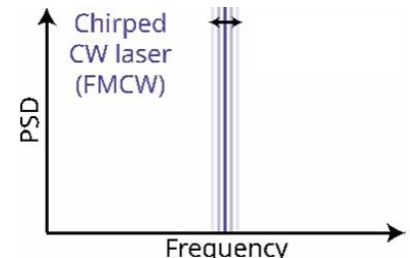
The key feature of our laser is a fast, linear, and hysteresis-free frequency tuning response with a range of up to >1 GHz and a bandwidth of >2 MHz. This performance is enabled by the core technology of Deeplight: monolithically integrated piezoelectric actuators on photonic chips based on industry-proven MEMS technology. The performance of actuators allows **linearization-free FMCW operation with rms nonlinearity <0.5%**.



**Wafer-scale production:**  
high-volume manufacture



**Excellent spectral purity:**  
high signal-to-noise ratio



**Frequency-agility:**  
high-speed applications



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The following performance parameters are given for a typical DLT-FT-1550 device and may vary from device to device.

Parameters	Min.	Typ.	Max.	Units	Comments
Output Interface		FC/APC			PM Panda fiber
Wavelength	1530	1550	1565	nm	Optional: ITU grid channels upon request
Output Power	1	5	10	mW	
Operation Current	100	200	300	mA	
Optical Side Mode Suppression Ratio	45	50	60	dB	
Intrinsic Linewidth	<10	<50	<100	Hz	Lorentzian; instantaneous
Integrated Linewidth	<3	<5	<10	kHz	100ms integration time
Coarse Wavelength Tuning	0.5	0.75	1	nm	BW < 1kHz
Laser frequency modulation range	0.25	0.35	0.5	GHz	>1 GHz on request
Laser Frequency Actuation Bandwidth	>1	>2	>5	MHz	Flat frequency actuation response, starts at DC.
Actuation efficiency	2	2.5	5	MHz/V	
Chirp nonlinearity	<0.1	<0.3	<0.5	%	@10-100 kHz sweep rates;

The laser is available in a custom 14-pin butterfly unit. This unit can be shipped inside a laser head for easy connection to temperature and current controllers.



**Figure 1.** Laser head with external connection to temperature and current controllers. PM FC/APC output connector



**Figure 2.** Custom 14-pin butterfly package with PM fiber output



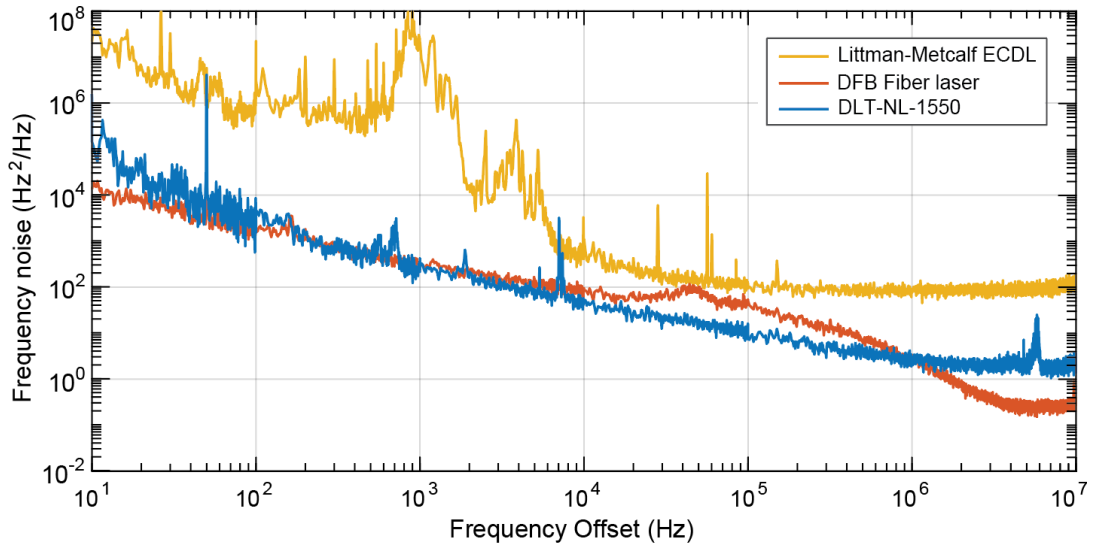


Figure 3. Frequency noise spectrum of the laser, compared with standard External Cavity Diode Laser (ECDL) and Fiber Laser

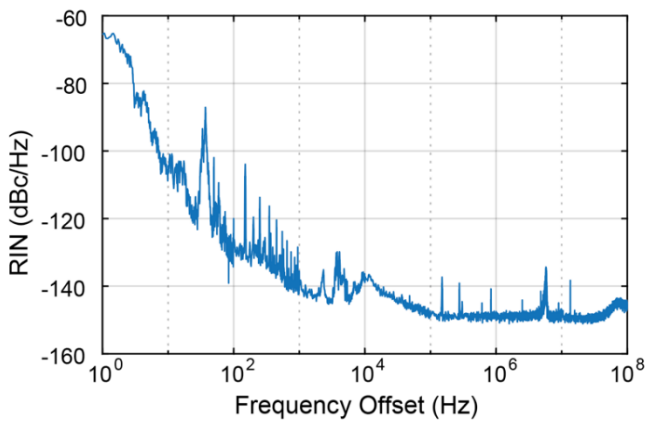


Figure 4. Relative Intensity Noise (RIN) of the laser

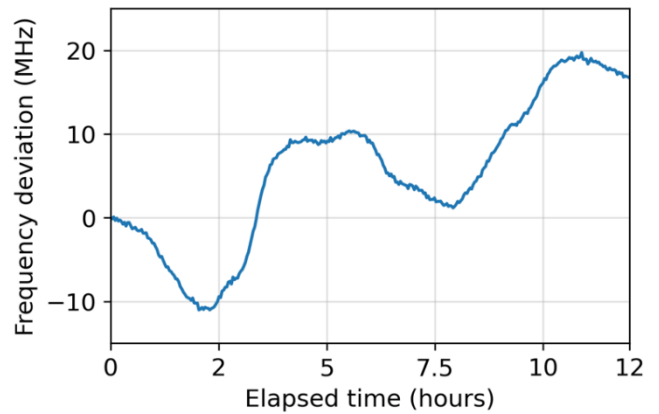


Figure 5. Frequency stability of the free-running laser measured against a fully stabilized frequency comb

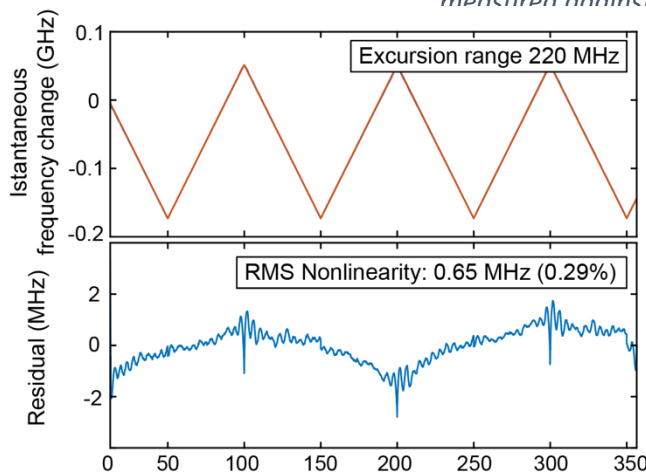


Figure 6. FMCW optical signal generation at 10 kHz sweep rate



