

# TeraScan 780 / 1550

TOPSellers for Frequency-Domain Spectroscopy

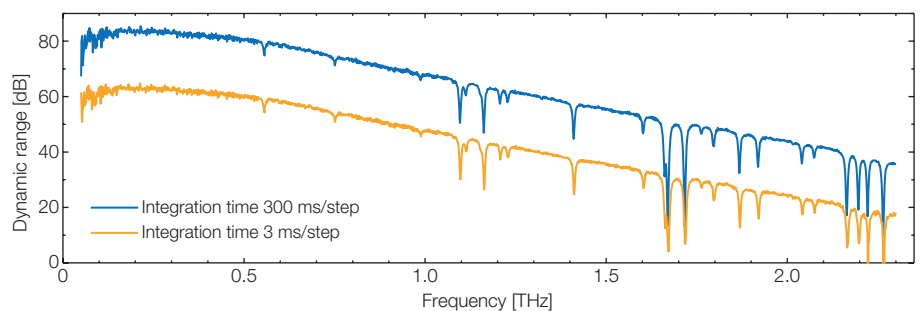


## Key Features

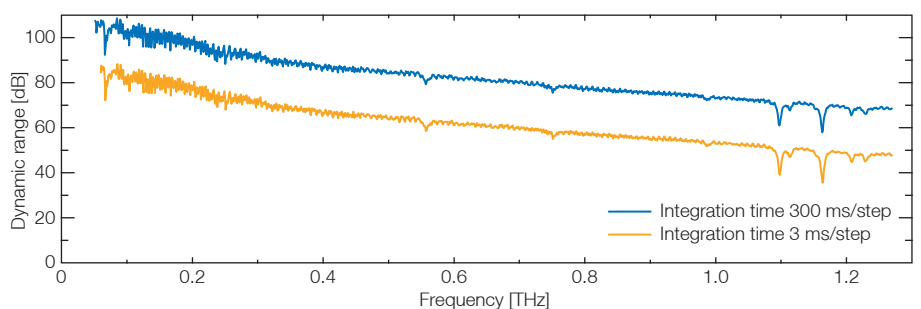
- Complete systems with high-end GaAs or InGaAs photomixers
- Highest bandwidth: TeraScan 780
- Highest dynamic range: TeraScan 1550

## TeraScan 780 / 1550

TOPTICA's TeraScan platforms are "TOPSeller" configurations for frequency-domain terahertz spectroscopy. The systems combine mature DFB diode lasers with state-of-the-art GaAs or InGaAs photomixer technology. The TeraScan 780 offers an outstanding bandwidth, owing to the wide tuning range of carefully selected near-infrared DFB diodes. The TeraScan 1550, in turn, sets new benchmarks in terms of terahertz power and dynamic range. Both systems feature TOPTICA's proprietary "DLC smart" control electronics, and an intuitive software interface. The TeraScan systems lend themselves both as a versatile setup for cw-terahertz research, and as a base unit for system integrators.



Dynamic-range spectrum of a TeraScan 780. The dips are absorption lines of water vapor.

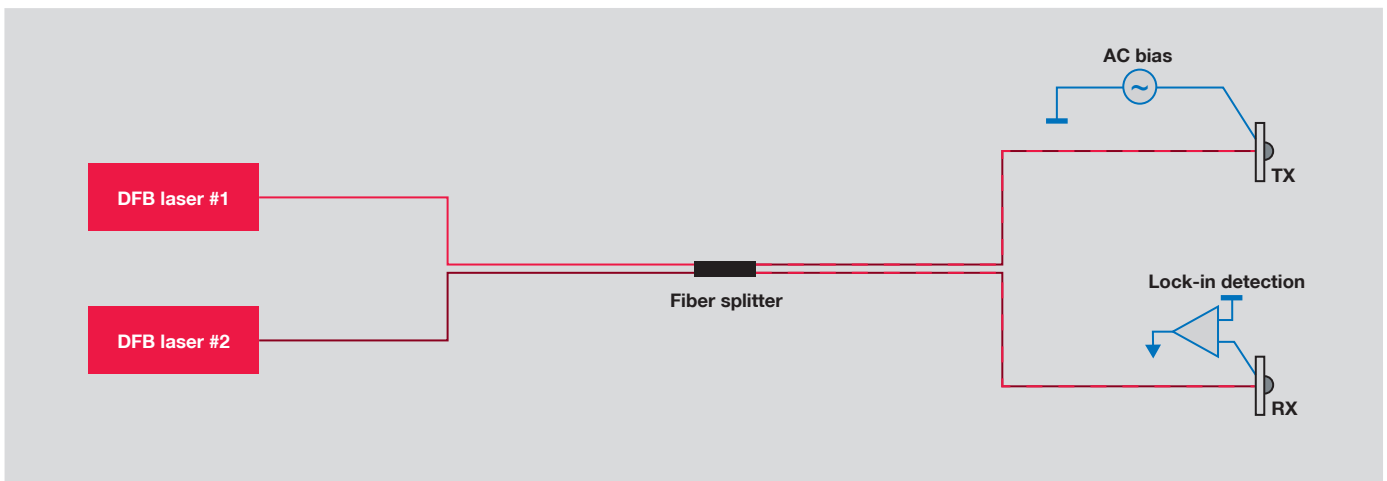


Spectrum of a TeraScan 1550.



Class 1 Laser Product EN 60825-1:2014.  
Invisible laser radiation. Avoid direct exposure to beam.

Specifications TeraScan 780 / 1550		
System	TeraScan 780	TeraScan 1550
Difference frequency tuning	1.8 THz (typ. 2.0 THz)	1.2 THz (up to 2.7 THz with Tuning Range Extension)
Tuning speed	Up to 0.1 THz/s	
Frequency accuracy	< 2 GHz	
Minimum frequency step size	< 10 MHz	
Terahertz emitter	#EK-000831, GaAs photomixer	#EK-000724, InGaAs photodiode
Terahertz receiver	#EK-000832, GaAs photomixer	#EK-000725, InGaAs photomixer
Antenna type	Log-spiral	Bow-tie
Terahertz polarization	Circular	Linear
Emitter and receiver package	Cylindrical, $\phi$ 1" Integrated Si lens and SM/PM fiber pigtail	Cylindrical, $\phi$ 25 mm Integrated Si lens and SM/PM fiber pigtail
Terahertz power (typ.)	2 $\mu$ W @ 100 GHz, 0.3 $\mu$ W @ 500 GHz	100 $\mu$ W @ 100 GHz, 10 $\mu$ W @ 500 GHz
Terahertz dynamic range (300 ms integration time)	80 dB @ 100 GHz 70 dB @ 500 GHz	90 dB @ 100 GHz 70 dB @ 500 GHz
Laser size (H x W x D) and weight	Two DFB pro L laser heads, each with dimensions 90 x 90 x 244 mm <sup>3</sup> (H x W x D), weight 2.8 kg	Two DFB pro BFY laser heads, each with dimensions 60 x 120 x 165 mm <sup>3</sup> (H x W x D), weight 1 kg
Control unit	DLC smart	
Controller size (H x W x D) and weight	50 x 480 x 290 mm <sup>3</sup> , 4 kg	
Computer interface	Ethernet	
Software	Control software with GUI + Remote command interface	
Key advantages	High bandwidth with one set of lasers	High terahertz power, compact laser units



Schematic of TeraScan systems.

**Further reading:**

- A. Roggenbuck et al., *Coherent broadband continuous-wave terahertz spectroscopy on solid-state samples*; New J. Phys. **12** (2010) 43017-43029.  
A.J. Deninger et al., *2.75 THz tuning with a triple-DFB laser system at 1550 nm and InGaAs photomixers*; J Infrared Milli. Terahz. Waves **36** (2015) 269-277.