TekLaser™

QTekLaser™ 619 nm Fiber Laser

Product Description

The **QTekLaser™ 619 nm Fiber Laser** is a precision-engineered light source designed for cutting-edge quantum technologies, including quantum networking. By leveraging advanced Sum-Frequency Generation (SFG), it delivers up to 100 mW of ultra-stable, narrow-linewidth light at 619 nm, making it an ideal choice for applications that demand coherence, stability, and seamless integration. Housed in a compact 3U, 19″ rack-mount chassis with an IoT-enabled control interface, it combines laboratory-grade performance with industrial reliability.

Features

- Output power 100 mW
- Narrow linewidth (2 MHz)
- Excellent power stability (<1%)
- User-friendly interface via IoT technology
- 3U 19" Rack mount
- Certified to IEC 60825-1:2014 safety standards

Applications

- Quantum networking
- Quantum computing
- PIC validation
- Laser cooling and trapping
- Spectroscopy
- Research

Sum-Frequency Generation (SFG) Technology

The wavelength range of QTekLaserTM products can be further extended using the nonlinear process of sum-frequency generation (SFG). This architecture is illustrated in figure 2. The two fundamental lasers are usually made of different gain fiber amplifiers. The extended wavelength values are summarized in the blue-shaded cells of table 1. This method achieves high power at certain wavelengths.

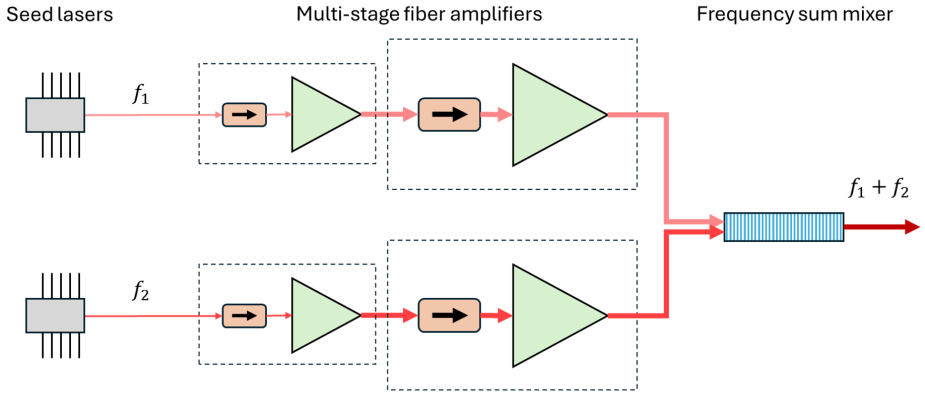

Figure 2. QTekLaser™ sum-frequency generation (SFG) fiber laser. The frequency sum mixer is integrated into the product.

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Table 1 – Wavelength extension of QTekLaser™ products using nonlinear frequency conversion.

	SF-AMP-Yb (1012 – 1080 nm)	SF-AMP-Er (1530 – 1610 nm)	SF-AMP-Tm (1776 – 2040 nm)
SF-AMP-Yb (1012 – 1080 nm)	506 – 540 nm		
SF-AMP-Er (1530 – 1610 nm)	609 – 646 nm	765 – 805 nm	
SF-AMP-Tm (1776 – 2040 nm)	645 – 706 nm	822 – 900 nm	888 – 1020 nm

Specifications

Parameter	**Value**
Wavelength	619 nm
Max. Output Power	100 mW
Operation Mode	CW
Polarization Extinction Ratio (PER)	18 dB
Polarization Direction	Slow axis
Power Stability	< 1%
Laser Linewidth	2 MHz
Operating Temperature	17–25 °C
Frequency Modulation (FM) Gain	500 (-323) uA/V (MHz/V)
FM Bandwidth	DC-10 MHz
FM Input Impedance	50 Ohm
FM Input Range	+/-1.3 V
Cooling Mode	Air cooling
Beam Quality	TEM00; $M^2 \sim 1.0$
Output Mode	PM630 with FC/APC connector
Output Fiber Length	2 m
Relative Intensity Noise (RIN)	–130 dBc/Hz @ >10 kHz
Side-Mode Suppression Ratio (SMSR)	58 dB
Chassis	3U, 19″ rack mount

Safety & Retro-Reflection Advisory

The 619 nm laser system complies with 21 CFR Subchapter J, Part 1040 (as enforced by FDA) and IEC 60825-1:2014 safety standards.

Users must ensure that significant light is not retroreflected into the system—doing so may harm performance or damage the laser. Use of an external optical isolator is strongly recommended. Damage from retroreflected light is not covered under warranty.

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Ordering Information

Part Number: QT-LASR-SFG-619-0.1-A-2-2.0-0
Configuration: Seed lasers + YDFA+EDFA + SFG

Performance Figures

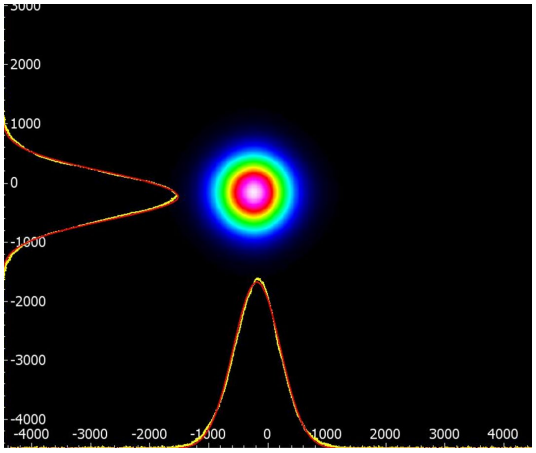

Figure 3. Beam Profile.

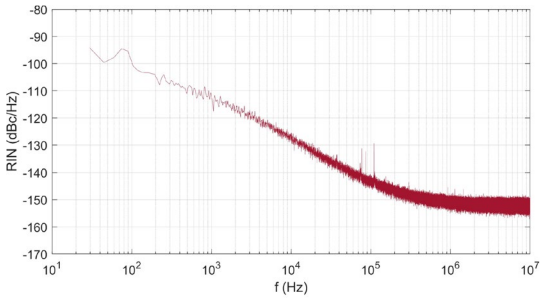

Figure 4. Relative Intensity Noise (RIN): <-125 dBc/Hz >10kHz.

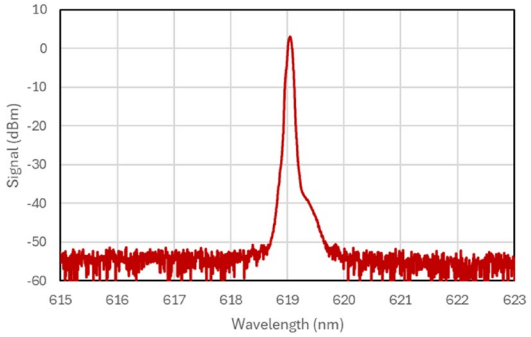

Figure 5. Optical Spectrum: SMSR 59 dB.

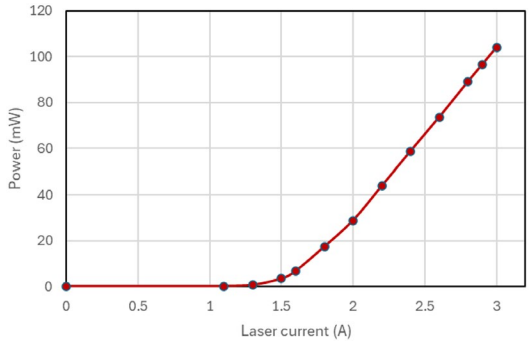

Figure 6. Laser Power vs Current.

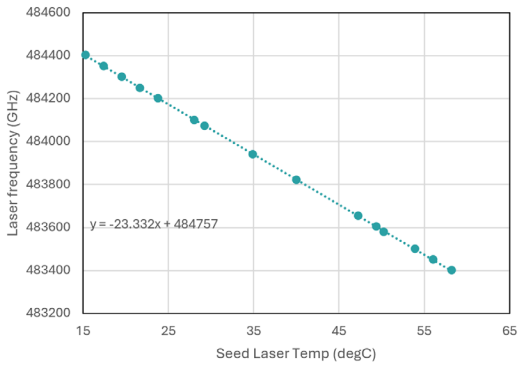

Figure 7. Tunability: Frequency vs. Seed Laser Temp.

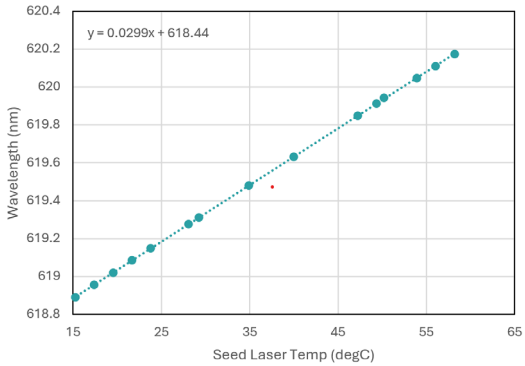

Figure 8. Tunability: Wavelength vs. Seed Laser Temp.

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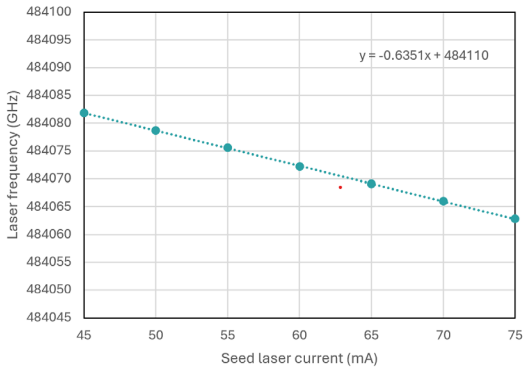

Figure 9. Tunability: Frequency vs. Seed Laser Current.

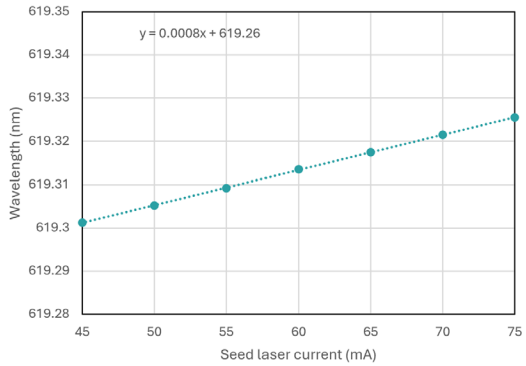

Figure 10. Tunability: Wavelength vs. Seed Laser Current.

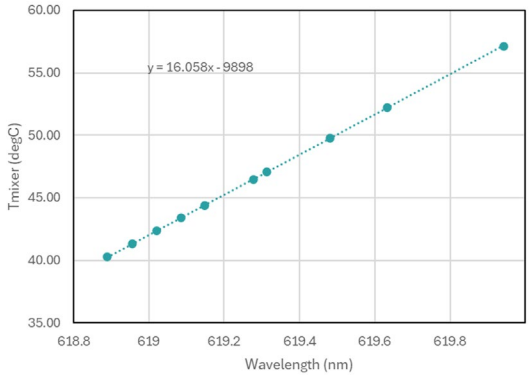

Figure 11. Optimal SFG Temperature vs. Wavelength.

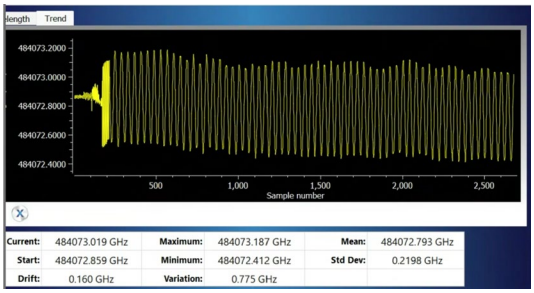

Figure 12. Frequency Modulation via the SMA port.

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Mechanical Details

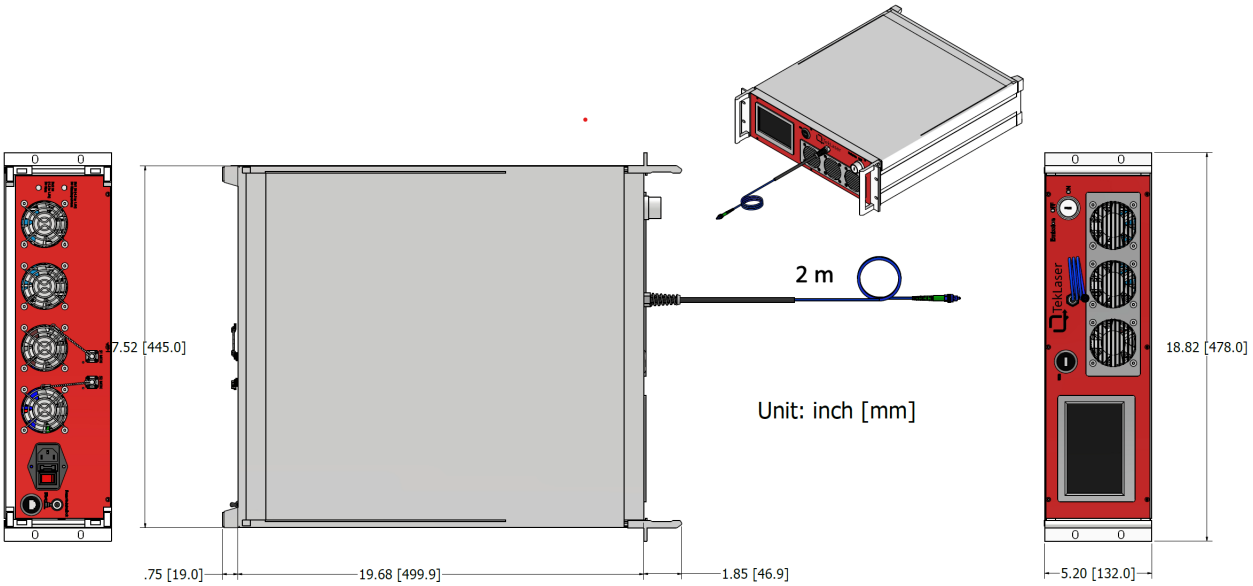

Figure 12. Mechanical dimensions of the 619 nm fiber laser.

Product Photographs

Figure 13. 619 nm fiber laser 3U chassis air cooled.

Figure 14. 619 nm fiber laser 3U chassis back panel air cooled.

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