Sintec Optronics

SMR Series Femtosecond Pulse Fiber Lasers

1. 1560nm Femtosecond Pulse Fiber Laser

E-fiber series ultrafast lasers integrate the latest femtosecond laser technology. The stable output of 1560 nm femtosecond pulse laser is realized by using high-performance erbium-doped fiber as working medium and high-precision dispersion compensation technology. The output laser pulse has the characteristics of extremely narrow duration and high pulse peak power. The laser is a turnkey product with long-term stable operation and maintenance free. It can be widely used in the research fields of optical frequency comb, supercontinuum, terahertz and so on. Specific combination of pulse duration, repetition rate and average power is customizable.

Features

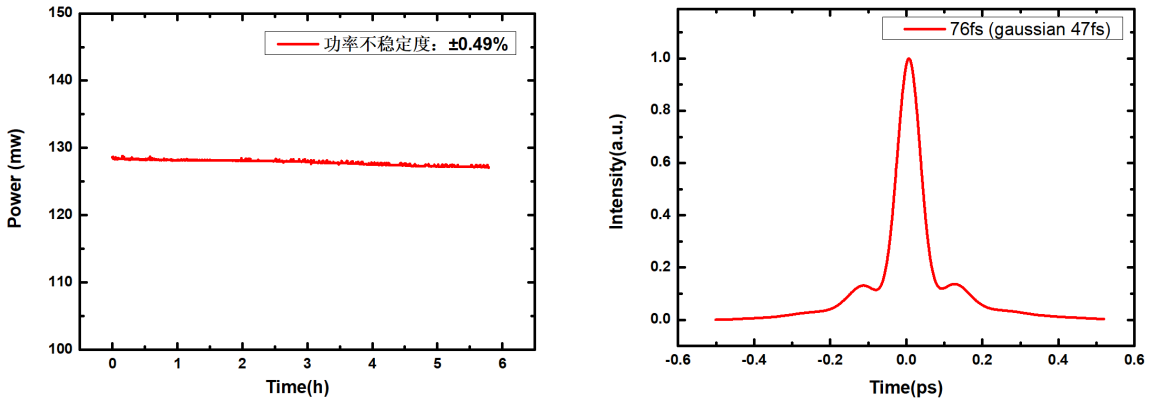
- Pulse duration<50fs
- 1560 nm wavelength
- Turn-Key Product
- ALL PM fiber Laser cavity

Applications

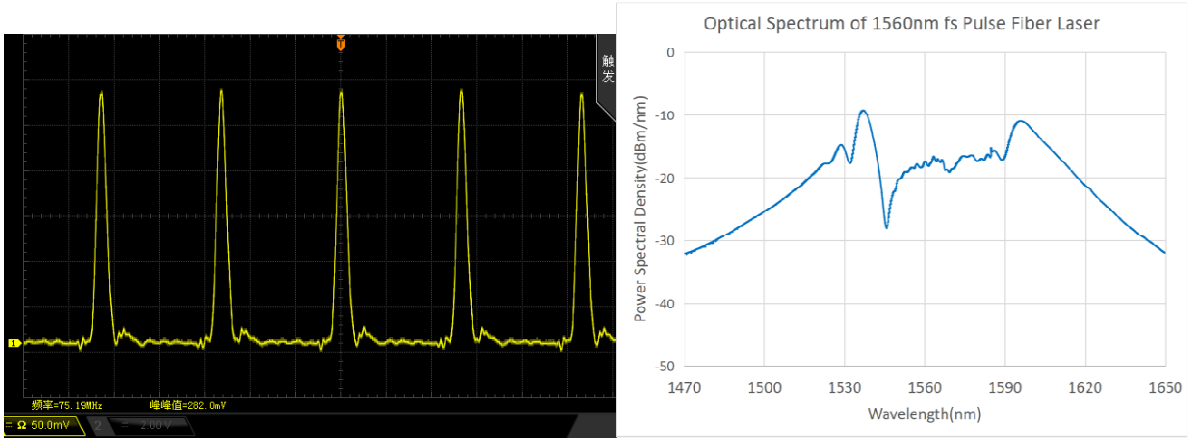
- Optical Frequency Comb
- Supercontinuum
- THz
- Ultra Fast Laser Research

Parameters	Unit	Typical Value		Remarks
Center Wavelength	nm	1560±10		
Spectrum Width	nm	20	60	
Pulse Duration	fs	50/100/200/500		Customizable
Average Power	mW	1~120		Customizable
Power Instability	-	< ±1%		
Repetition Rate	MHz	80		
Repetition Rate Instability	Hz	< 100		
Pulse Energy	nJ	>1		
Polarization	-	Linear		Aligned to Slow Axis
Fiber Type	-	PM Fiber 0.5m	PM Fiber 2m	
Fiber connector	-	FC/APC		
Worm Up time	min	< 1		

General Parameters	Benchtop	Module
Control function	Push Button in Front Panel	RS232 Serial Port
Synchronous electrical signal port	SMA	SMA
Power Supply	AC100~240V, <30W	DC5V, <20W
Dimensions(mm)	260(W)×280(D)×120(H)	200(W)×121(D)×65(H)
Operation Temperature	5 ~ 35°C	
Operation Humidity	0~70%	



Autocorrelation pulse duration<50fs Power Instability



Pulse Train Typical Optical Spectrum

Ordering Information/Product Code						
SMR-FSPL	WL (nm)	Pulse Duration(fs)	Power(mW)	Freq (MHz)	Fiber	Packaging
	1560	50/100/200/ 500	10/50/100	80/100	SM PM	B=Benchtop M=Module

2. 1560nm High-Power Femtosecond Pulse Fiber Laser

E-fiber series ultrafast lasers integrate the latest femtosecond laser technology. The stable output of 1560 nm femtosecond pulse laser is realized by using high-performance erbium-doped fiber as working medium and high-precision dispersion compensation technology. The average power can be 1 Watt. The laser is a turnkey product with long-term stable operation and maintenance free. It can be widely used in the research fields of optical frequency comb, supercontinuum, terahertz and so on. Specific combination of pulse duration, repetition rate and average power is customizable.

Features

- Pulse duration < 120fs
- Average Power 1W
- Turn-Key Product
- ALL PM fiber Laser cavity

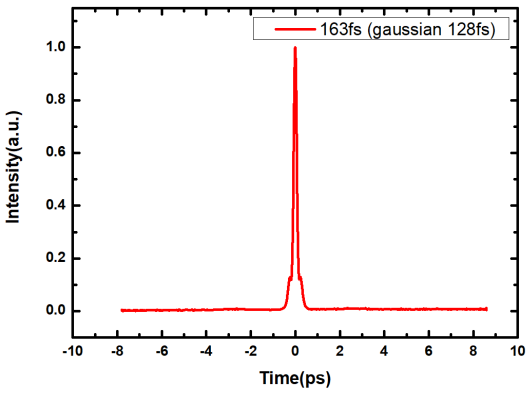
Applications

- Optical Frequency Comb
- Supercontinuum Light
- THz Generation
- Ultra Fast Laser Research

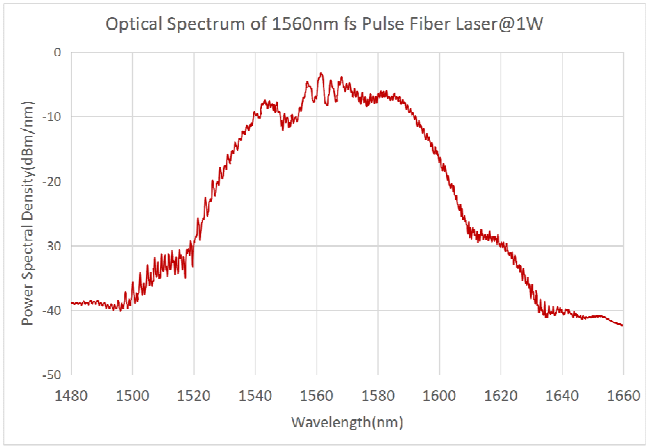
Parameters	Unit	Typical Value	Remarks

Center Wavelength	nm	1560±10	
Pulse Duration	fs	≤120	Customizable
Average Power	W	1	Customizable
Power Instability	-	< ±1%	24h@25°C
Repetition Rate	MHz	80~100	Customizable
Pulse Energy	nJ	>10	
Polarization	-	Line	Vertical
DOP	dB	>20dB	
Output	-	Free Space	
M^2	-	<1.2	TEM00
Beam Diameter	mm	≤1.6	* $1/e^2$ Waist Diameter
Divergence Angle	mrad	<1.5	
Worm Up time	min	< 1	

General Parameters	Unit	Value	Remarks
Synchronous signal Port	-	SMA	
Operation temperature	°C	5 ~ 45	
Power Supply	-	AC 110~240VAC	Power <40W
Dimension	mm	330(W)×398(D)×112(H)	Benchtop
Weight	kg	≤5	



Autocorrelation Curve Pulse Train



Optical Spectrum

Ordering Information/Product Code						
SMR-FSPL	WL(nm)	Pulse Duration(fs)	Power(mW)	Freq (MHz)	Fiber	Packaging

	1560	120	1000	80/100	FS=Free Space	B=Benchtop

3. 1560nm High Frequency Femtosecond Pulse Fiber Laser

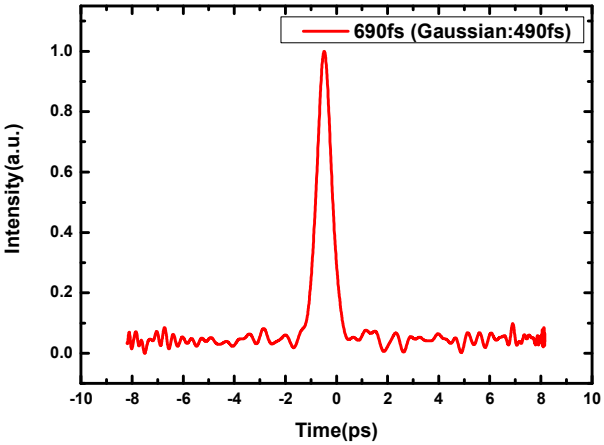
E-fiber series ultrafast lasers integrate the latest femtosecond laser technology. The stable output of 1560 nm femtosecond pulse laser is realized by using high-performance erbium-doped fiber as working medium and high-precision dispersion compensation technology. The laser has high repetition rate. The laser is a turnkey product with long-term stable operation and maintenance free. It can be widely used in the research fields of optical frequency comb, supercontinuum, terahertz and so on. Specific combination of pulse duration, repetition rate and average power is customizable.

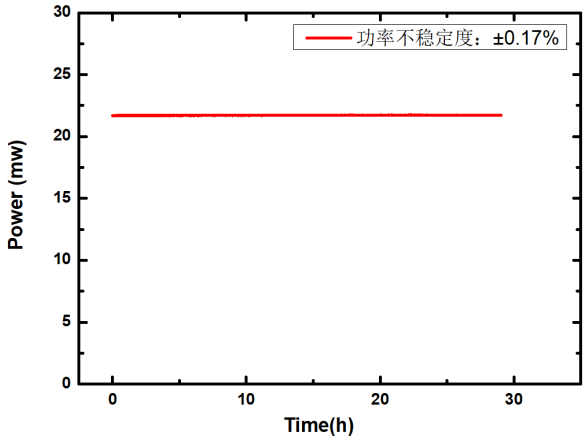
Features
- Pulse duration 50~500 fs
- Repetition Rate 200MHz~1GHz Customizable
- Turn-Key Product
- ALL PM fiber Laser cavity

Applications
- Optical Frequency Comb
- Supercontinuum Light
- THz Generation
- Ultra fast Laser Research

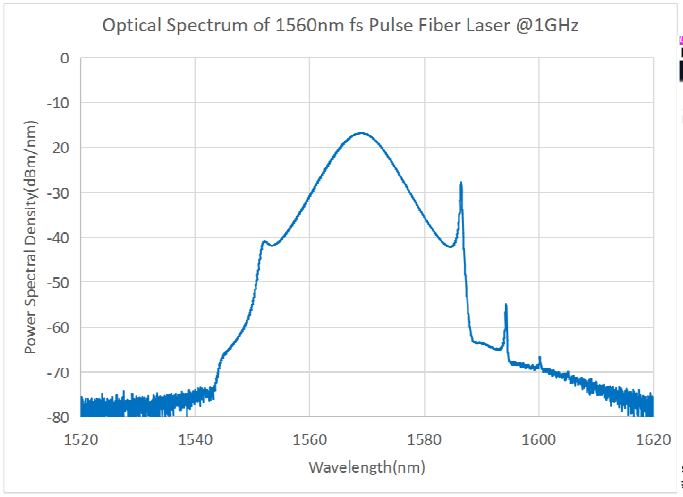
Parameters	Unit	Typical Value	Remarks
Center Wavelength	nm	1560±10	
Spectrum Width	nm	20	
Pulse Duration	fs	50 ~ 500	Customizable
Average Power	mW	1 ~ 200	Customizable
Power Instability	-	< ±1%	
Repetition Rate	MHz	≥ 200	200MHz~1GHz
Repetition Rate Instability	Hz	< 200	
Pulse Energy	nJ	> 1	
Polarization	-	Linear	Aligned to Slow Axis
Fiber Type	-	PM fiber, 1m	
Fiber connector	-	FC/APC	
Worm Up time	min	< 1	

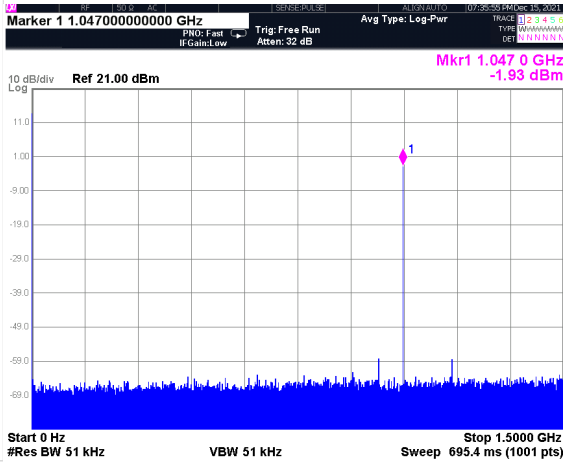
General Parameters	Benchtop	Module
Control function	Push Button in Front Panel	RS232 Serial Port
Synchronous electrical signal port	SMA	SMA
Power Supply	AC100~240V, <30W	DC5V, <20W
Dimensions(mm)	260(W)×280(D)×120(H)	200(W)×121(D)×65(H)
Operation Temperature	5 ~ 35°C	
Operation Humidity	0~70%	





Autocorrelation Curve Power Stability





Frequency Optical Spectrum

Ordering Information/Product Code						
SMR-FSPL	WL(nm)	Pulse Duration(fs)	Power(mW)	Freq (MHz)	Fiber	Packaging
	1560	50/100/200/500	10/50/100	200/600/1000	SM PM	B=Benchtop M=Module

4. 1560nm Picosecond Pulse Fiber Laser

Specific combination of pulse duration, repetition rate and average power is customizable.

Features

- Pulse Duration 1~100ps
- Center Wavelength 1530~1560 nm
- Turn-Key Product
- ALL PM fiber Laser cavity

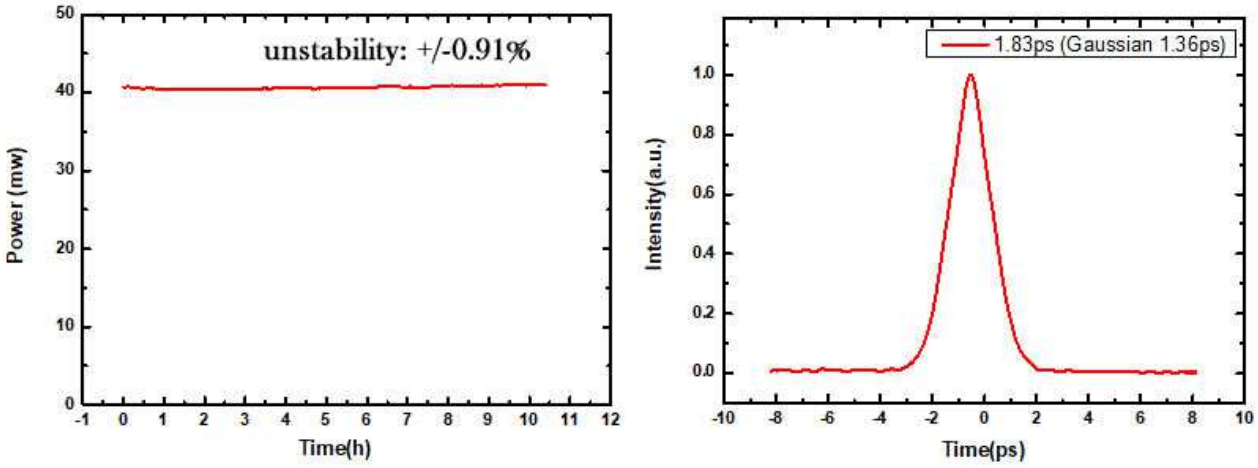
Applications

- Optical Frequency Comb
- Supercontinuum Light
- THz Generation
- Ultra fast Laser Research

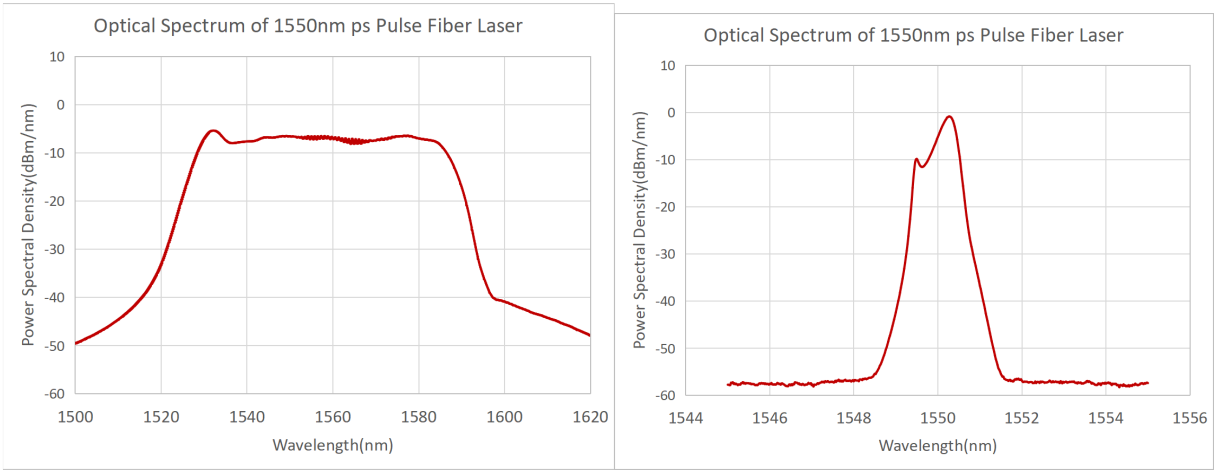
Parameters	Unit	Typical Value	Remarks
Center Wavelength	nm	1530~1560	Customizable
Spectrum Width	nm	0.5~50	

Pulse Duration	ps	1/10/50/100	Customizable
Average Power	mW	1~120	Customizable
Power Instability	-	< ±1%	
Repetition Rate	MHz	80	Customizable
Repetition Rate Instability	Hz	< 100	
Pulse Energy	nJ	>1	
Polarization	-	Linear	Aligned to Slow Axis
Fiber Type	-	PM Fiber	
Fiber connector	-	FC/APC	
Worm Up time	min	< 1	

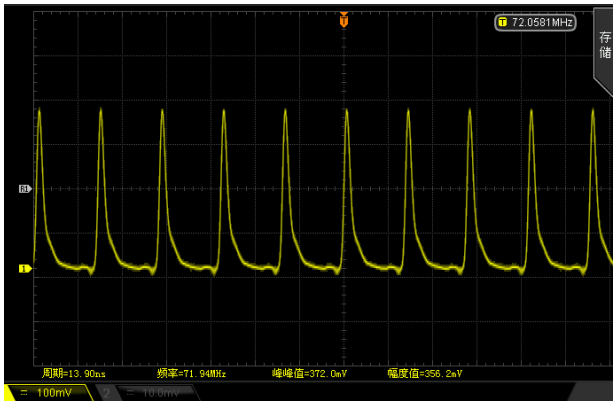
General Parameters	Benchtop	Module
Control function	Push Button in Front Panel	Push Button in Front Panel
Synchronous electrical signal port	SMA	SMA
Power Supply	AC100~240V, <30W	DC5V, <20W
Dimensions(mm)	260(W)×280(D)×120(H)	200(W)×121(D)×65(H)mm
Operation Temperature	5 ~ 35°C	
Operation Humidity	0~70%	



Autocorrelation Curve Power Stability



Optical Spectrum (narrow linewidth) Optical Spectrum (broadband)

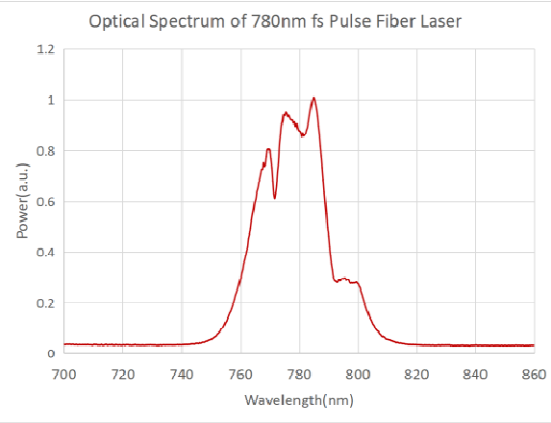


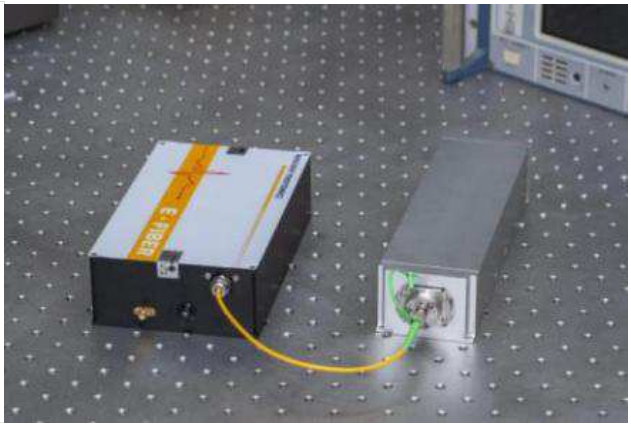
Pulse Train

Ordering Information/Product Code						
SMR-PSPL	WL(nm)	Pulse Duration(fs)	Power(mW)	Freq (MHz)	Fiber	Packaging
	1560	50/100/200/ 500	10/50/100	80/100	SM PM	B= benchtop M=Module

5. 780nm Femtosecond Pulse Fiber Laser

The 780nm is generated by second-harmonic of 1560nm. The laser is a turnkey product with long-term stable operation and maintenance free. It can be widely used in the research fields of optical frequency comb, supercontinuum, terahertz and so on. Specific combination of pulse duration, repetition rate and average power is customizable.





Features
- 100fs
- Turn-Key Product
- All PM fiber Laser cavity

Applications
- multiphoton
- two-photon absorption
- Ultrafast Optics

Parameters	Unit	Typical Value	Remarks
Center Wavelength	nm	780±10	
Spectrum Width	nm	20	
Pulse Duration	fs	<100	Customizable
Average Power	mW	>30	Customizable
Power Instability	-	< ±1%	

Repetition Rate	MHz	80	Customizable
Repetition Rate Instability	Hz	< 100	
Pulse Energy	nJ	> 0.4	
Polarization	-	Linear	
Fiber Type	-	Free Space	
Fiber connector	min	< 1	

General Parameters	Benchtop	Module
Control function	Push Button in Front Panel	Push Button in Front Panel
Synchronous electrical signal port	SMA	SMA
Power Supply	AC100~240V, <30W	DC5V, <20W
Dimensions(mm)	260(W)×280(D)×120(H)mm	200(W)×121(D)×65(H)mm
Operation Temperature	5 ~ 35°C	
Operation Humidity	0~70%	

Ordering Information/Product Code						
SMR-FSPL	WL (nm)	Pulse Duration(fs)	Power (mW)	Freq (MHz)	Fiber	Packaging
	780	50/100/200/500	1/10/50/ 100	80/100	FS=Free Space	B= benchtop M=Module

Sintec Optronics

GHz Low-noise 1555nm Femtosecond Laser

Our femtosecond laser sources are based on robust and well-engineered designs, offering an excellent reliability with the low-noise performance from soliton mode-locking. Robust 24/7 operation, user-friendly and self-starting, our lasers have been made to facilitate OEM integration and enable customers' applications.

Key Features:
- Ultra low-noise
- Transform-limited pulses
- Hermetically sealed laser
- Compact industrial design
- User-friendly
- 24/7 operation
- All-in-one system

Main Applications:
- Optical communication
- Precision microwave
- THz generation
- Amplifier seeder
- Timing distribution
- Frequency comb
- A/O converter

Key Specifications:
- Wavelength: 1555nm
- Repetition rate: up to 2.5GHz
- Clean soliton pulses: <200fs

Options:
- Repetition rate stabilization
- Customised repetition rate
- OEM version

Front view

Rear view

Specifications

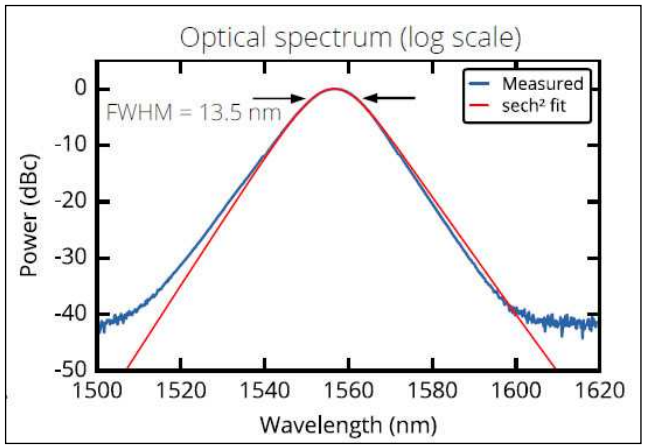
	STMH-1550	STMH-1550+
Construction	Oscillator, no amplifier	With amplifier
Average power	>50mW	Up to 2W
Peak power	>0.1kW	Up to 4kW
Pulse energy	>0.05nJ	Up to 1nJ
Repetition rate	Standard – 250, 500MHz, 1, 1.25, 2 or 2.5GHz. Custom design – 200MHz to 2.5GHz	Standard – 250, 500MHz, 1, 1.25, 2 or 2.5GHz. Custom design – 200MHz to 2.5GHz
Center wavelength	1555nm +/- 10nm	1555nm +/- 10nm
Spectral bandwidth	>10nm at 3dB	>10nm at 3dB
Pulse width	<250fs, transform-limited	<250fs, transform-limited
Optical output port	Fiber output (PM FC/APC), free-space	Fiber output (PM FC/APC), free-space
Beam quality	TEM_{00}, M^2<1.05	TEM_{00}, M^2<1.05
Polarisation	Linear (PER>23dB, >200:1)	Linear (PER>23dB, >200:1)
Amplitude noise	<0.1% RMS (24h)	<0.1% RMS (24h)
Timing jitter	<30fs (1kHz – 10MHz)	<30fs (1kHz – 10MHz)
Power supply	5VDC/2A	24VDC/2A
Power consumption	<10W	<50W
Cooling	Passively air-cooled	Passively air-cooled
Warm-up time	<10s (cold start)	<10s (cold start)
Laser head size/weight	240x160x89mm/5kg	240x160x89mm/5kg
Control unit	No control unit required	No control unit required
Operation temperature	+5°C to +45°C	+5°C to +45°C
Storage temperature	-10°C to +60°C	-10°C to +60°C
Relative humidity	<80% (non-condensing)	<80% (non-condensing)
Analog interface	Eg. Power mod, alarm, interlock, trigger, status	Eg. Power mod, alarm, interlock, trigger, status

Digital interface	USA, RS232, ETHERNET, CAN	USA, RS232, ETHERNET, CAN

And find more about the full characterization of two versions of our lasers: STMH-1550 at 1 GHz laser and STMH-1550 at 250 MHz.

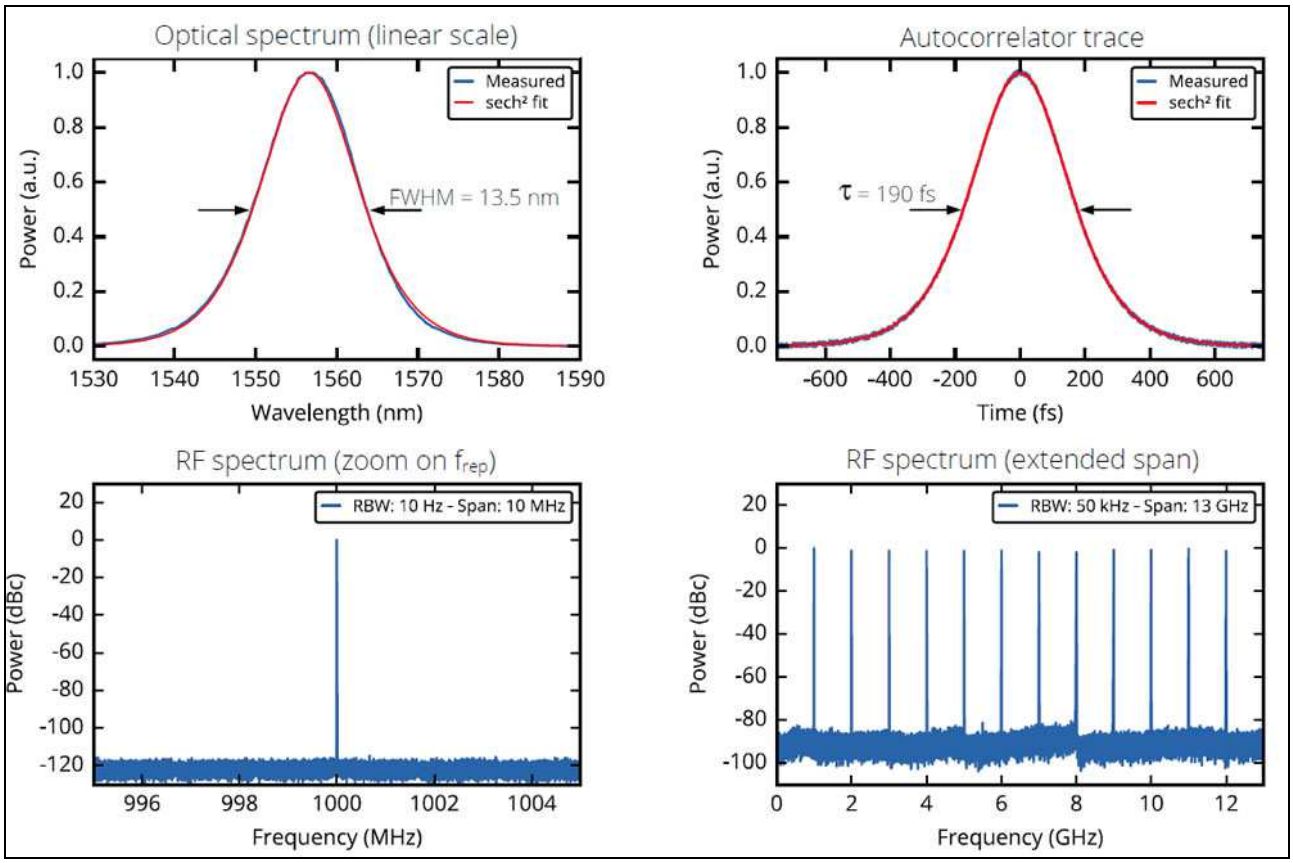
1. STMH-1550 SERIES at 1 GHz

It is the first industrial-grade laser of its kind that operates at telecom wavelengths and achieves the lowest phase noise and timing jitter on the market. In this document, we report the full characterization of the product operating at a repetition rate of 1 GHz.



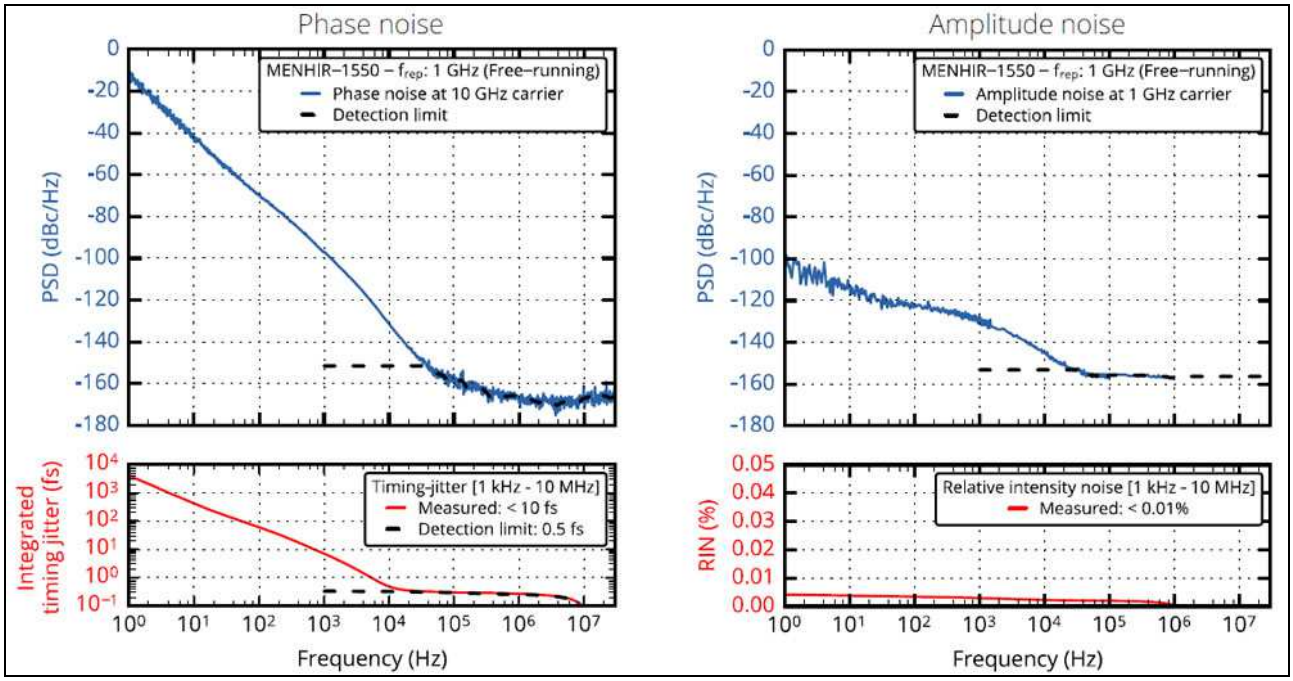
Key product specifications

- Frep: 1 GHz
- Power: > 50 mW
- λ0 : 1545 – 1565 nm
- Clean soliton pulse
- Bandwidth: > 10 nm
- Pulse width: < 250 fs (Transform limited)
- Sech^2-shaped spectrum
- Beam characteristics: TEM00, M^2 < 1.05



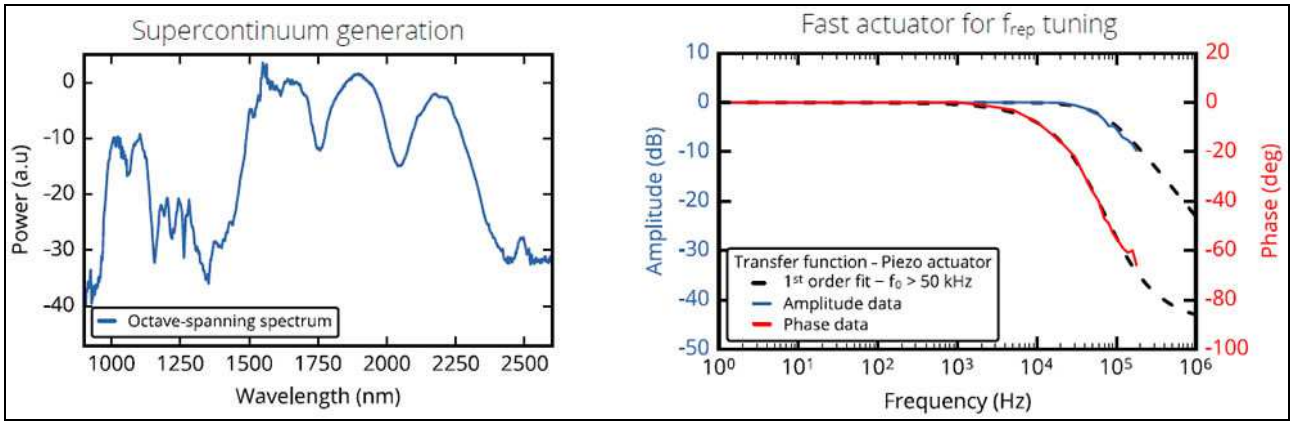
Noise characterization (Free-running)

The free-running phase and amplitude noise of a STMH-1550 at 1 GHz is reported here. The phase noise was measured on the 10th harmonic, i.e., at 10 GHz.



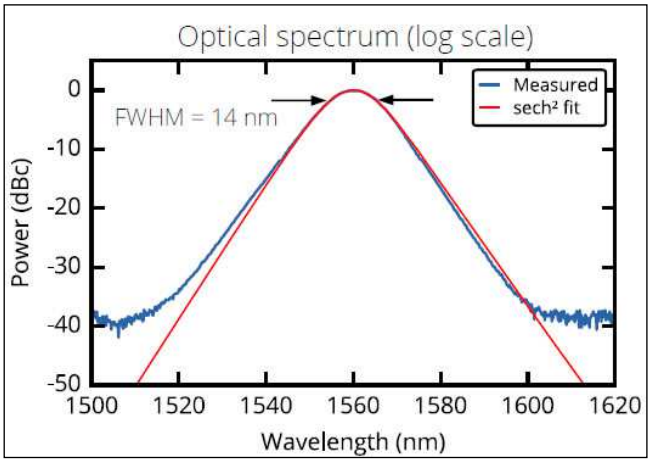
Offset frequency (fc)	Phase noise (dBc/Hz) 1 GHz carrier	10 GHz carrier	Timing-jitter (fs) [fc – 10 MHz]	Amplitude noise (RMS) [fc – 10 MHz]
10 kHz	< -150	< -130	< 1	< 0.01%
1 kHz	< -115	< -95	< 10	< 0.01%
100 Hz	< -90	< -70	< 100	< 0.01%
1 Hz	< -30	< -10	< 5000	< 0.02%

Possibilities and options:



2. STMH-1550 SERIES — 250 MHz

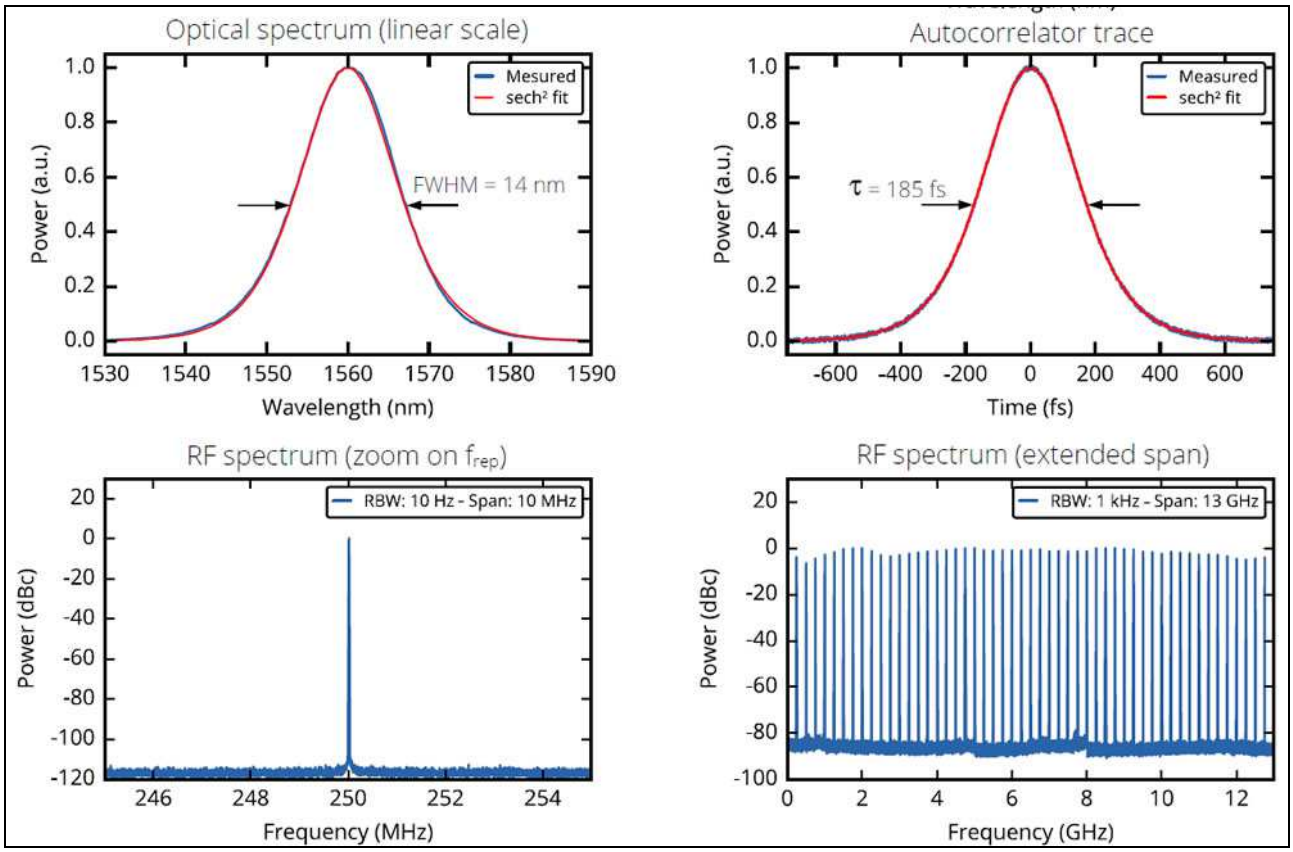
The STMH-1550 SERIES is the first industrial-grade laser of its kind that operates at telecom wavelengths and achieves the lowest phase noise and timing jitter on the market. In this document, we report the full characterization of the product operating at a repetition rate of 250 MHz.



Key product specifications

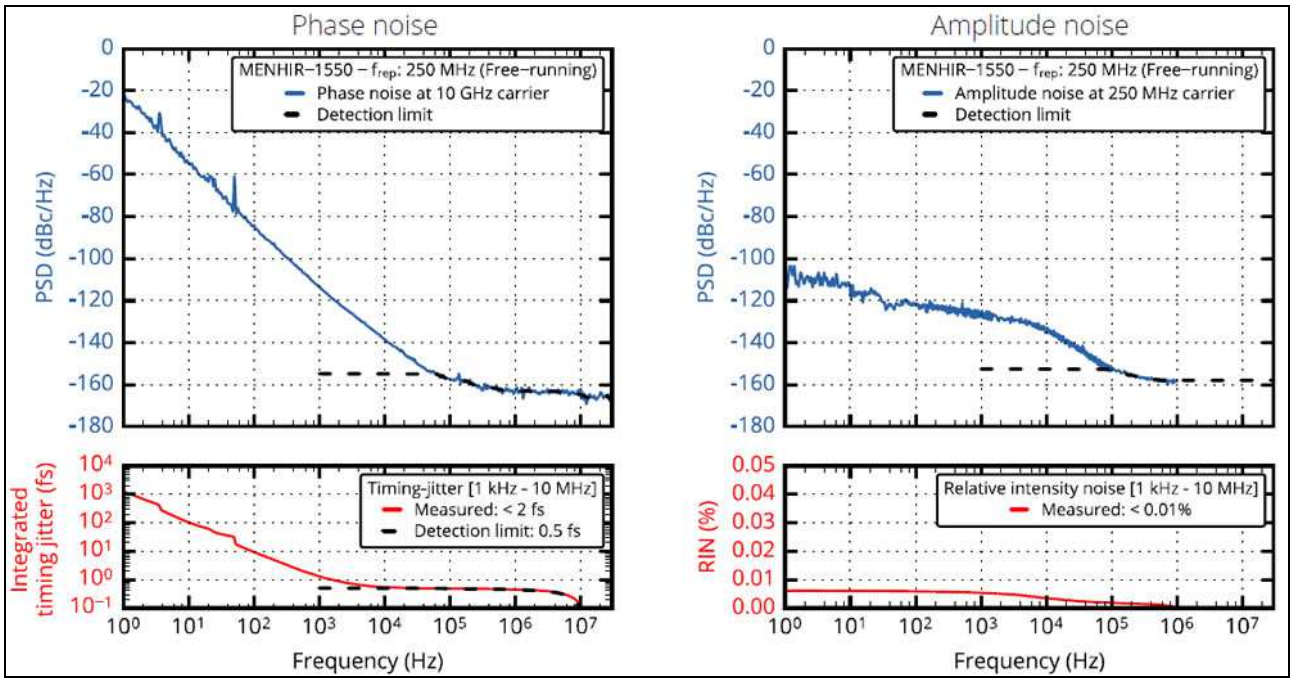
- Frep: 250 MHz
- Power: > 100 mW
- λ0 : 1545 – 1565 nm
- Clean soliton pulse
- Bandwidth: > 10 nm

- Pulse width: < 250 fs (Transform limited)
- Sech2-shaped spectrum
- Beam characteristics: TEM00, M2 < 1.05



Noise characterization (Free-running)

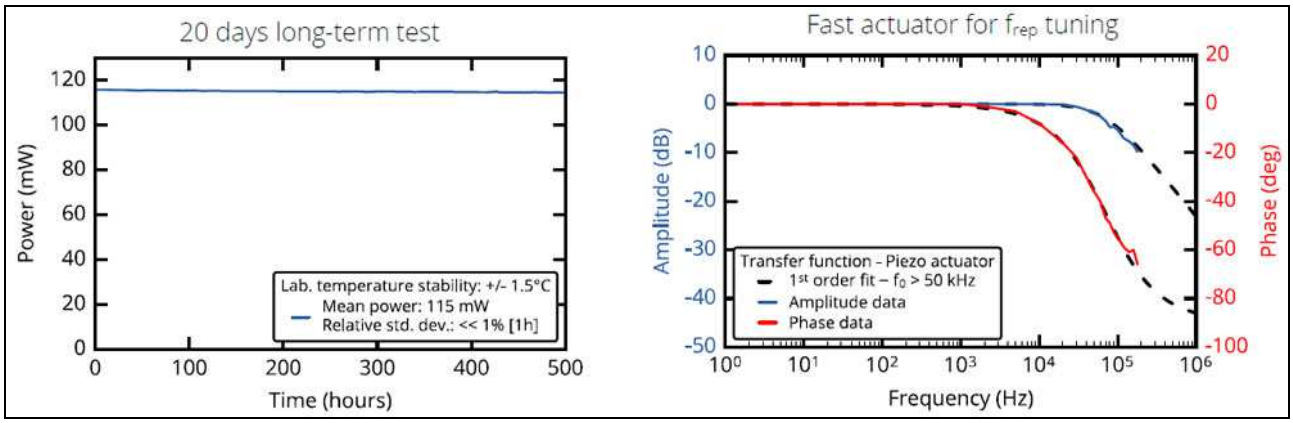
The free-running phase and amplitude noise of a MENHIR-1550 at 250 MHz is reported here. The phase noise was measured on the 40th harmonic, i.e., at 10 GHz.

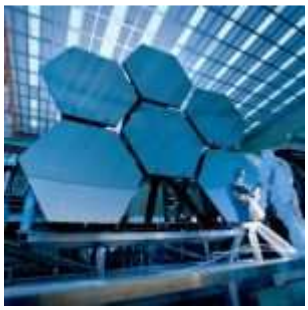


Offset frequency (fc)	Phase noise (dBc/Hz) 1 GHz carrier	10 GHz carrier	Timing-jitter (fs) [fc – 10 MHz]	Amplitude noise (RMS) [fc – 10 MHz]
10 kHz	< -155	< -135	< 1	< 0.01%
1 kHz	< -140	< -110	< 2	< 0.01%

100 Hz	< -110	< -80	< 10	< 0.01%
1 Hz	< -50	< -20	< 1500	< 0.02%

Possibilities and options:





Space
- Clock distribution
- Spectrometer calibration
- Optical wireless communication

Microwave
- Radioastronomy
- Analog to digital convector
- Low-noise RF generation

Research
- Frequency-comb
- THz generation
- Spectroscopy
- Quantum

Communication
- Ultrastable Clock
- Single-source for WDM
- Free-space communication

Industry
- RF signal generator
- Fast digitizing
- LIDAR