

## CoSF-R-ER-M Single Frequency Fiber Laser Module



### Description:

Connet CoSF-R optimized traveling wave cavity ultra-narrow linewidth single-frequency fiber laser is a low-noise ultra-narrow linewidth fiber laser independently developed by patented technology. CoSF-R single-frequency fiber laser uses a unique "optimized traveling wave cavity". The design eliminates the standing wave space hole burning phenomenon which is easy to occur in the linear cavity fiber laser. In conjunction with the ultra-narrow bandwidth fiber filter designed by Connet, the single longitudinal mode output is selected and the single frequency operation of the fiber laser is guaranteed. The polarization control technology eliminates the polarization hole burning effect based on the all-fiber design, thereby achieving stable linear polarization, single longitudinal mode, and ultra-narrow linewidth single-frequency laser output.

CoSF-R ultra-narrow linewidth single-frequency fiber laser has excellent performance with the linewidth of less than 1kHz, and the ultra-low phase noise and frequency noise. The ultra-long laser cavity design makes the overall noise level of CoSF-R significantly lower than other commercial short-cavity single frequency lasers.

CoSF-R-ER-M works in the 1.5um band and the output power of the basic module is optional from 5mW to 200mW. Higher output power products can be provided on request. The standard wavelength is 1550.12nm with the wavelength being optional in the range of 1535-1605nm, such as the standard wavelength under the ITU framework.

### Features:

- Ultra-narrow linewidth  $<< 1\text{kHz}$
- Ultra-low phase noise and frequency noise
- Low relative intensity noise (RIN)
- Stable single frequency, single polarization output
- No mode-hopping
- Small sized package 175x130x29mm
- High reliability

### Applications:

- Distributed optical fiber sensing
- Coherent LiDAR
- Fiber optic hydrophone
- Laser spectroscopy
- Coherent communication
- Gas absorption measurement
- Cold atomic physics
- Other scientific research

**Specifications:**

Parameter	Unit	Specification		
		Min	Typ.	Max
Part no.		<b>CoSF-R-ER-M</b>		
Center wavelength	nm	1530-1572nm fixed, other specify		
Output power	mW	5	-	100
Laser output		CW, Single frequency & Single longitudinal mode		
Beam quality	M <sup>2</sup>	-	1.05	1.1
Linewidth	kHz	-	-	<<1
RIN peak frequency	kHz	40	70	100
RIN peak	dBc/Hz	-	-105	-95
RIN @10MHz	dBc/Hz	-	-150	-140
Phase noise (1m OPD)	urad/√Hz	100@10Hz		
	urad/√Hz	0.6@10kHz		
	urad/√Hz	0.1@100kHz		
SMSR (50pm resolution)	dB	60	>70	-
Output polarization		Linear		
Polarization extinction ratio (PER)	dB	20	23	-
Output power stability	%	-	0.5	1
Output isolation	dB	50	-	-
Wavelength thermal tuning	nm	0.6	0.8	1.0
PZT wavelength modulation		Optional		
Modulation frequency (linear)	kHz	DC	10	20
Modulation wavelength range	GHz	-	>8	>10
Operating temperature	°C	0	-	60
Storage temperature	°C	-40	-	85
Power supply	V <sub>DC</sub>	12		
Communication interface		RS485		
Output fiber type		Panda PM1550		
Output fiber length	m	> 0.5		
Optical connector		FC/APC		
Dimension	mm	175x130x29		
Weight	kg	<0.5		

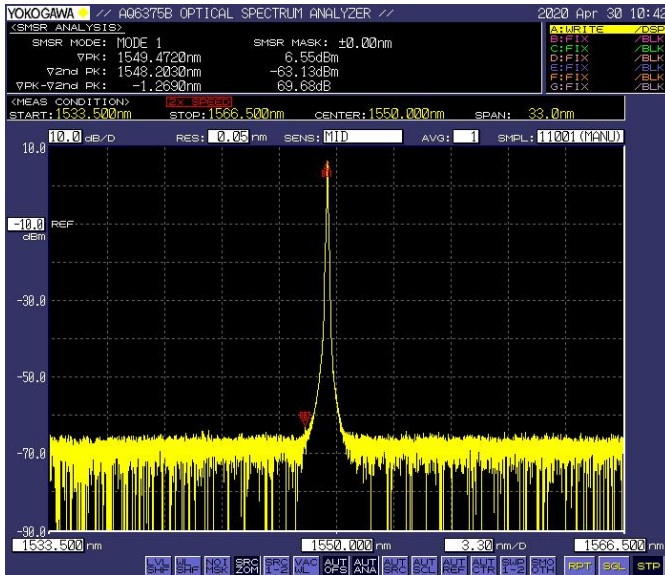
**Ordering Information:**

**CoSF-R-ER-M- <15xx> - <PW> -PMF/SMF-PZT-FA**

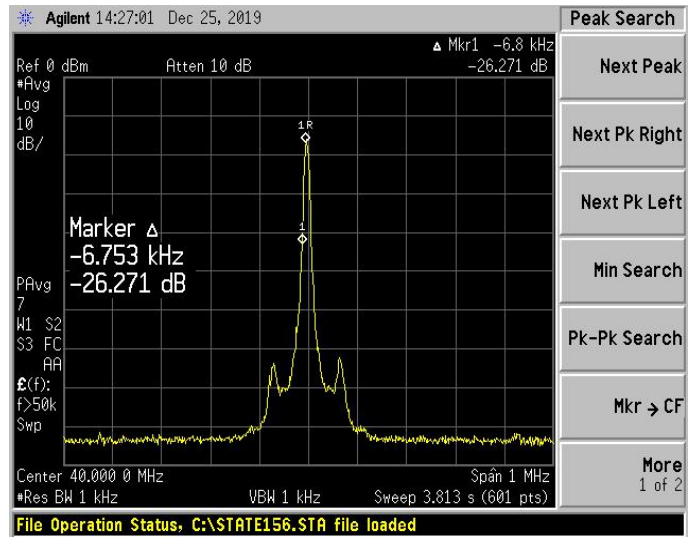
PW: Output power, 5mW is fixed, 50mW and 100mW output power are adjustable

Options: 1. SMF output 2. Monitoring output 3. PZT fast modulation

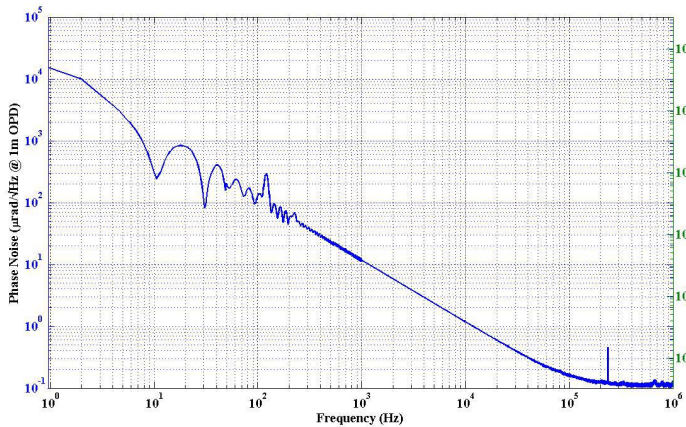
**Typical Spectrum:**



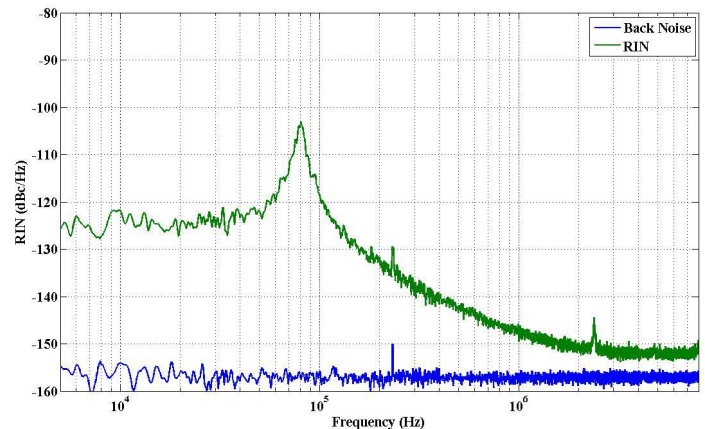
**Linewidth:**



**Phase Noise & Frequency Noise:**



**Relative Intensity Noise (RIN):**



**Technical Notes:**

1. Typical CoSF-R-ER-M spectrum SMSR>70dB. OSNR is much higher.
2. The linewidth of CoSF-R-ER-M can not be obtained directly from the beat spectrum of linewidth test based on unbalanced M-Z interferometer, which is limited by the resolution of the test platform. Its integral time is 240us.
3. The linewidth of CoSF-R-ER-M is calculated based on the power spectral density of frequency fluctuation.
4. Typical RIN test results do not include RIN suppression technology. For lower RIN level, please refer to CoSF-R-RS-ER-M.
5. The phase noise and frequency noise tests are based on the normal conditions of the laboratory room temperature, and no sound insulation, vibration isolation and other measures are taken.