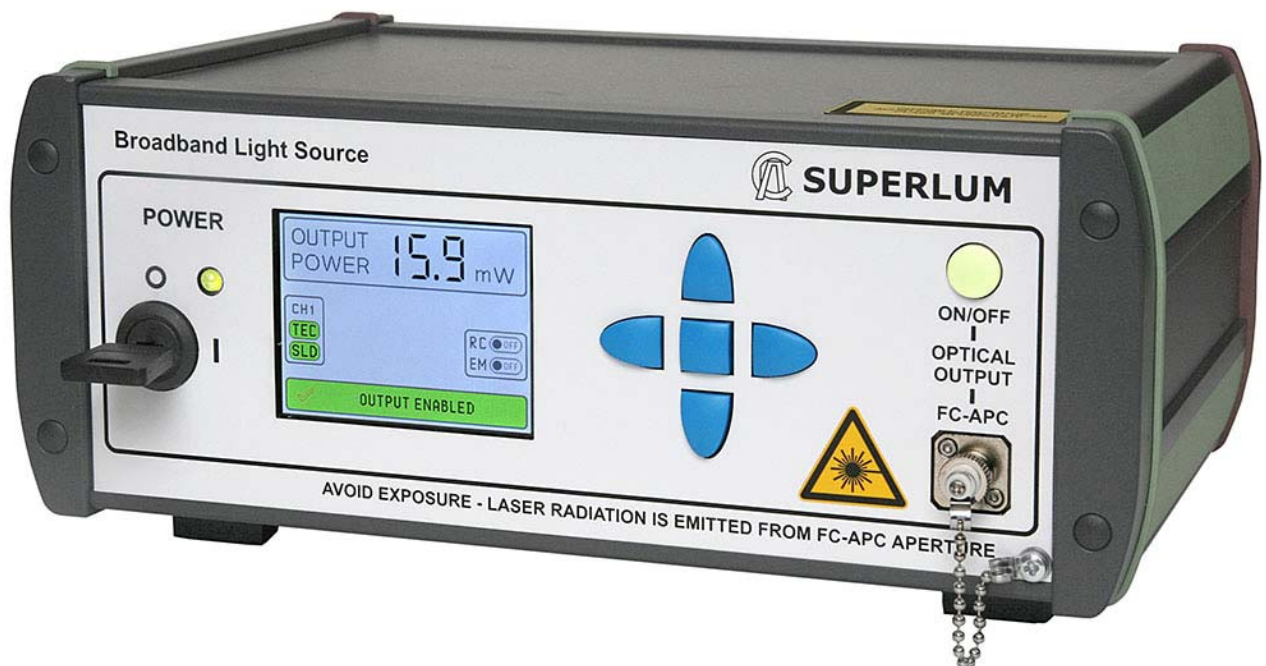


M-S-series BroadLighter. Benchtop Broadband Light Source.

Technical Product Specification



Document ID: SL.RD.04.001.150723
July 2015
Revision: 001



Product Description

Superlum M-S-series BroadLighters are high-power, wide spectrum and low coherence AC powered benchtop light sources based on a single mode fiber coupled superluminescent diode modules (SLD) of Superlum.

Superlum offers two types of M-S BroadLighters, namely, with and without a Variable Optical Attenuator (VOA). The former has the suffix "-VA" in the model number. In both designs, output power is changeable within 0–100% with the step of 10%. Spectral performance is guaranteed at the full (100%) output power.

In M-S-series light sources without VOAs, the optical output power is changed by varying the SLD drive current, entailing a change in the shape of the SLD spectrum. The change is not significant for models with a bell-shaped spectrum but may be large for models with a complex, multi-humped spectrum (see the examples below).

In M-S-series BroadLighters with VOAs, SLD itself always emits 100% of its power. The output power is changed with the help of a broadband VOA that is placed after the SLD module and the optical isolator. For these BroadLighters, changes of optical spectrum with output power are negligible (see the examples below). As a rule, Superlum offers M-S-series light sources with VOAs when the light source is based on an SLD with multi-humped spectrum. However, M-S-series devices with VOAs and SLDs with bell-shaped spectrum are available upon request. M-S-series light sources with VOAs are recommended for applications requiring changeable output power but stable spectral shape and center wavelength.

All standard light sources have an appropriate built-in optical isolator to protect the SLD from optical feedback.

Optical performance parameters

M-S-series Broadlighters without VOA.

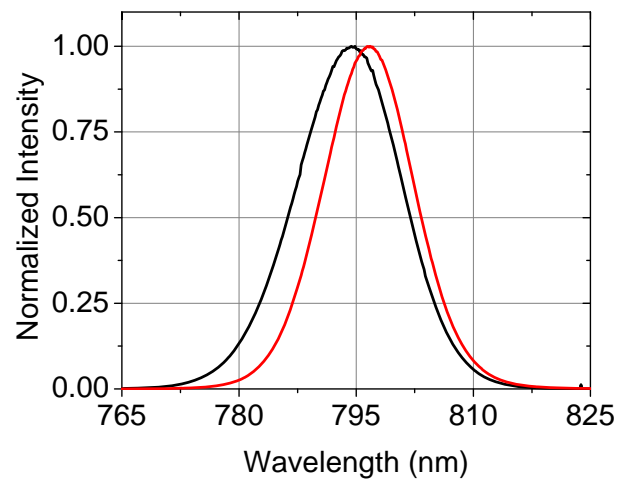
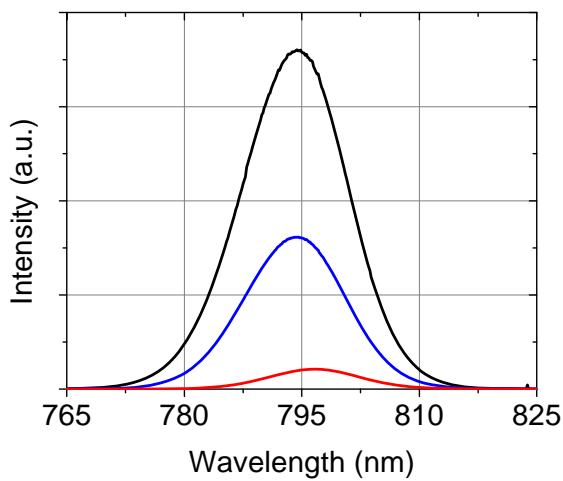
Model number	Power, mW		Wavelength, nm	3 dB spectrum width, nm		Spectral ripple, %	Minimum isolation, dB	Spectral shape
	Min.	Typ.		Min.	Typ.			
M-S-670-G-I-4	4.0	5.0	670 ± 10	4.0	5.0	<5	-30	Bell-shaped
M-S-785-B-I-15	15.0	20.0	785 ± 10	40	45	<5	-30	Multi-humped
M-S-795-G-I-15	15.0	20.0	795 ± 5	13	15	<5	-30	Bell-shaped
M-S-840-B-I-7	7.0	9.0	840 ± 10	45	50	<5	-30	Multi-humped
M-S-840-B-I-15	15.0	20.0	840 ± 10	45	50	<5	-30	Multi-humped
M-S-840-G-I-20	20.0	25.0	840 ± 10	20	25	<5	-30	Bell-shaped
M-S-840-G-I-30	30.0	35.0	840 ± 10	20	25	<5	-30	Bell-shaped
M-S-850-G-I-20	20.0	25.0	850 ± 10	15	20	<5	-30	Bell-shaped
M-S-880-G-I-10	10.0	15.0	880 ± 10	30	40	<5	-30	Bell-shaped
M-S-930-B-I-8	8.0	10.0	930 ± 10	90	95	<5	-30	Multi-humped
M-S-1050-G-I-15	15.0	20.0	1050 ± 10	30	35	<5	-30	Bell-shaped
M-S-1050-B-I-10	10.0	15.0	1050 ± 10	60	70	<5	-30	Multi-humped

M-S-series Broadlighters with VOA. Optical Performance Parameters

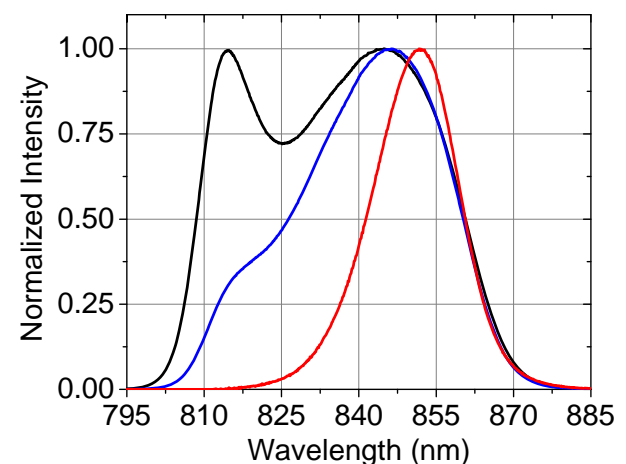
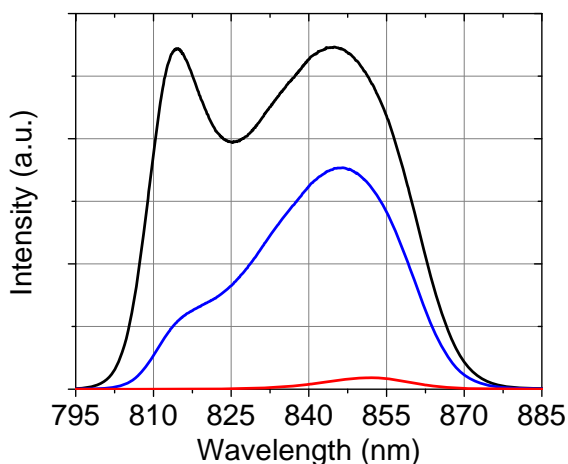
Model number	Power, mW		Wavelength, nm	3 dB spectrum width, nm		Spectral ripple, %	Minimum isolation, dB	Spectral shape
	Min.	Typ.		Min.	Typ.			
M-S-785-B-I-15-VA	15.0	16.0	785 ± 10	40	45	<5	-30	Multi-humped
M-S-840-B-I-15-VA	15.0	16.0	840 ± 10	45	50	<5	-30	Multi-humped

Notes :

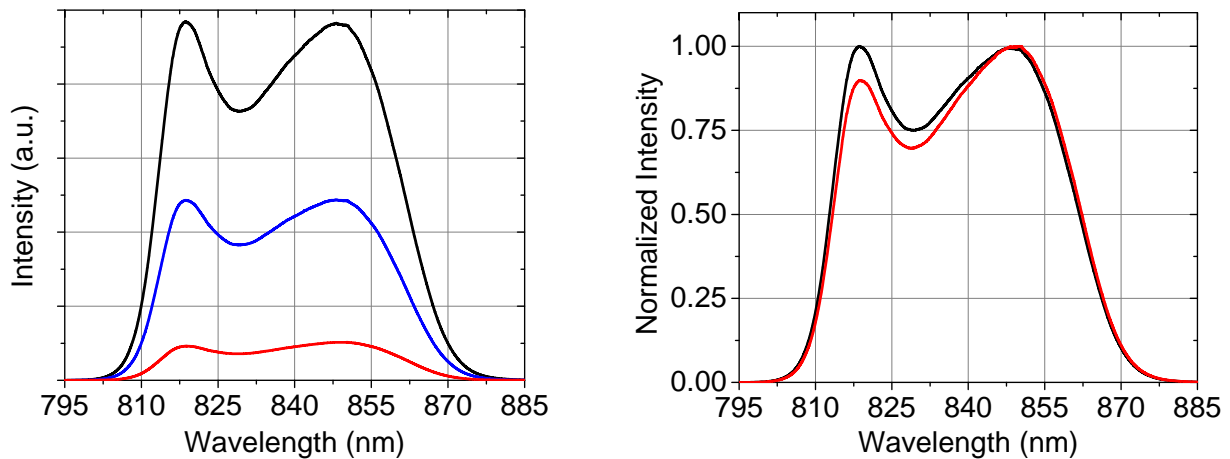
- minimum isolation at the center wavelength is shown;
- in all light sources with multi-humped spectrum spectral density never drops below 3 dB at any wavelength within specified 3 dB bandwidth. Details about spectral flatness within 3 dB bandwidth are available upon request.

Performance Examples – M-S light sources with and without VOAs


Spectrum of BroadLighter M-S-795-G-I-15. Left – optical spectrum at output levels: 100% (20 mW SMF, black line); 50% (10 mW SMF, blue line); 10% (2 mW SMF, red line). Right – same but normalized: 100% (black line); 10% (red line).



Spectrum of BroadLighter M-S-840-B-I-15. Left – optical spectrum at output levels: 100% (20 mW SMF, black line); 50% (10 mW SMF, blue line); 10% (2 mW SMF, red line). Right – same but normalized: 100% (black line); 10% (red line).



Spectrum of BroadLighter M-S-840-B-I-15-VA. Left – optical spectrum at output levels: 100% (15 mW SMF, black line); 50% (7.5 mW SMF, blue line); 10% (1.5 mW SMF, red line). Right – same but normalized: 100% (black line); 10% (red line).

Physical Specifications

- Overall dimensions (W×H×D): 251×112×192 mm.
- Weight (max): 4 kg.

Electrical Power Specifications

- 100-240 V AC, 50/60 Hz, 40 VA MAX.

Environmental Specifications

- Operating temperature range: +5 °C to +35 °C.
- Storage temperature range: -30 °C to +70 °C.
- Operating relative humidity: < 80%, non-condensing.

Note: Operating and storage temperatures may be different for different models. The ranges shown are valid for all standard models.

Stability

- Long-term (8 h): maximum drift 0.5%.
- Short term (15 min) : maximum drift 0.1%

Laser Safety Measures

The most of high-power SLDs of Superlum are Class 3B according to IEC/EN 60825-1:2014. All M-S-series BroadLighter light sources are equipped with the master key control, remote interlock connection, visual/audible alarm (including a “beep” and 3-seconds delay of switching the emission on after pushing the ON button), and information and warning stickers.

Additionally, each M-series Broadlighter features a built-in protection against optical power overshoot. It is based on an output power monitor placed before the output FC/APC socket and an electrical circuit which immediately switches the emission off if the optical power exceeds the maximum value shown in the Acceptance Test Report (delivered with each device) by more than 30%.

Warranty

Superlum provides 2 years/10,000 operating hours (whichever happens first) warranty for every M-series Broadlighter including S-, D-, T- and Q- devices, except devices with output power exceeding 30 mW from SM-fiber and custom made instruments. For M-series Broadlighters with output power exceeding 30 mW, the warranty period is 2 years/7,500 operating hours unless otherwise specified in writing by Superlum. Operating hours are tracked by a built-in hour meter which records the total time the device emits light. Warranty may be extended to 2 years without limitation of operating hours for the most of S- and D- models, and for some T- models upon request. Custom made instruments have warranty of one year unless otherwise specified in the contract documents.

Service

SLD parameters degrade in time due to aging. Unexpected device failure may cause serious problems, especially in “sensitive” applications like a permanent use at manufacturing lines, permanent process monitoring systems, and others. Superlum provides a unique service of monitoring the parameters of the SLD installed in the M-series Broadlighter. The customer may, at any time, generate a test file with the main parameters of the SLD, and email the file to Superlum. Superlum will analyse the data, including changes (if any) in the SLD parameters with respect to initial values, and email comments (including recommendations regarding probability of failure in case of further use) within 2 working days upon receipt of the file. This service is extremely useful for applications at manufacturing floors, permanent tests during manufacturing process, 24/7 sensing/monitoring systems, especially those used in sensitive applications, and others.

Acceptance Test Report

Each device is delivered with the Acceptance Test Report (ATR) showing at least optical power, spectral data and plot of spectrum at maximum output power, and some other relevant details. An example of ATR is presented in the end of this document.

Package Contents

- BroadLighter-M Broadband Light Source
- AC Power Cord.
- Master Key.
- Optical Patchcable.
- Quick Start Guide.
- Acceptance Test Report.
- CD-ROM with the companion software.
- USB Interface Cable.

ACCEPTANCE TEST REPORT (Example Only)

Date: 17.06.2015

Superlum BroadLighters M-S-790-B-I-15-VA SM Fiber Light Source at 790 nm Serial No. M00013

Optical Performance Parameters

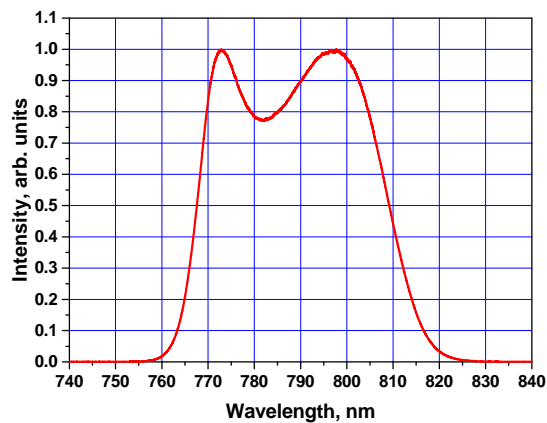
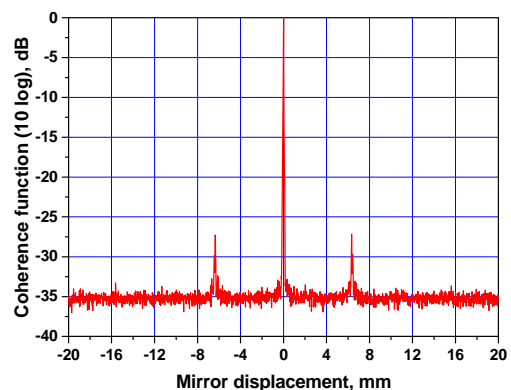
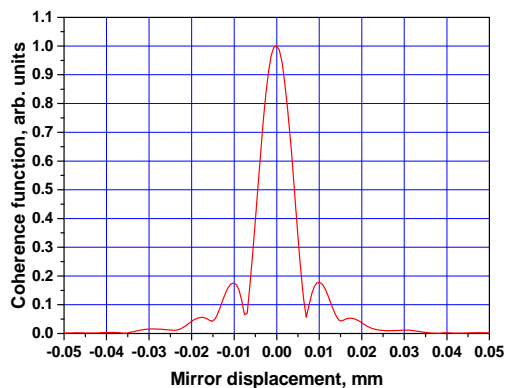
Parameter	Rated	Actual
SM fiber output power, mW	>15	19.6
Mean wavelength, nm	785	788.9
Spectrum width, nm	>40	41.2
Maximum spectral ripple, %	<5	0.2
Spectral Flatness, dB	=<2	1.25
Long-term stability, %*		<0.5
Short-term stability, %**		<0.1

Other specifications

Operating temperature range, °C	+5...+35
Physical dimensions, mm:	251x112x192
Weight, kg	4
Optical Output	FC/APC socket
Fiber	Corning Pure-Mode HI 780

* 8 h, measurements every minute 100 ms integration.

** 15 minutes, measurements every second, 100 ms integration. All measurements after 1 h warm-up. Ambient temperature 20±2 °C.

Optical Spectrum at maximum output power

Coherence at maximum output power

Spectrum may be altered by attenuation.
www.superlumdiodes.com