Bench Series Tunable Semiconductor Light Sources

Technical Product Specification

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Brief Product Overview

Superlum offers a new bench series tunable semiconductor light sources — the Broadsweeper family. This new family of products is a result of our 10-year experience in constructing external cavity lasers. With our state-of-the-art technical solutions implemented in this series, engineers will have a tunable light source with no-ASE (Amplified Spontaneous Emission), high output power, high wavelength accuracy and mode-hope-free operation over a wide wavelength range.

The Broadsweepers series is a family of swept-wavelength semiconductor lasers based on an external fiber-optic ring cavity and a broadband Semiconductor Optical Amplifier (SOA), working as a gain medium. The wavelength tuning technique involves the use of an Acousto-Optical Tunable Filter (AOTF) that features a very narrow spectral passband. The filter is thermally controlled that provides high spectral stability of the laser radiation by eliminating any temperature-dependent drift of the AOTF performance. Since the laser cavity contains no mechanically moving components, high accuracy of wavelength selectivity and excellent wavelength reproducibility in sweep operation are ensured. As well as the SOA and the AOTF, the other important elements of the laser construction are a fiber-optic coupler, optical isolator and in-line optical power monitor. All of them feature a unique customized design perfectly fitted for broadband spectral applications. The important point here is that all the components are tested both optically and electronically before integration into the optical scheme of the laser.

One Laser For All Applications:

- ✓ Biomedical Imaging
- ✓ Optical Coherence Tomography
- ✓ Optical Metrology
- ✓ Fiber-Optic Sensing
- ✓ Interferometric Applications
- ✓ Optical Component Characterization

Best-in-class Characteristics In One Single Unit:

- ✓ Wide Wavelength Tuning Range
- ✓ Wide Range of Sweep Speeds:
  - 2 nm/s to 10000 nm/s (for Slow Sweep Speed Models)
  - 100 nm/s to 100000 nm/s (for High Sweep Speed Models)
- ✓ Mode-Hop-Free Wavelength Tuning
- ✓ No Mechanically Moving Parts in the Wavelength Tuning Technique
- ✓ High Stability and Repeatability of the Output Wavelengths
- ✓ ASE-Free Operation for High Dynamic Measurements
- ✓ Flat-Top-Shaped Tuning Characteristic
- ✓ PM-Fiber Output with a PER of 18 dB
- ✓ Laser Safety Measures (as per IEC 60825-1 Ed. 2 2007-03)
- ✓ RS-232 Interface for Remote Control
- ✓ Product Customization According to Your Technical Requirements

The external cavity of the laser is based on a PANDA-type polarization maintaining (PM) fiber. This provides a well-defined state of polarization with a minimal PER of 18 dB as well as high stability of laser polarization in time and under different ambient conditions. In addition, most of the fiber-optic components are built on the fast-axis-blocked technology that also guarantees high values of the PER at the laser output. The output polarization is provided in the slow axis of the fiber that is precisely aligned to the connector key.

The standard model of the Broadsweeper comes in a small benchtop footprint making it suitable in laboratory situations where space is often at a premium. The overall dimensions (W × H × D) are 257 × 170 × 325 mm. The device construction has a modular design that combines the optical scheme of the laser and driving electronics in one single mainframe. The unique design of the electronics provides precise, reliable and safe control of the laser in all modes of operation. The optical power control loop along with the very fast laser driver adjusted for automatic power control operation make it possible to reach a flat-top-shaped tuning characteristic at all specified sweep speeds (see examples of operation at the end of the document).

To ensure ASE-free operation (signal-to-ASE ratio > 50 dB), the output power is uncoupled out of the ring cavity with the fiber-optic coupler located behind the AOTF (Fig. 1). A customized version of the laser scheme with the optical output before the AOTF is also possible upon request. The advantage of this scheme over the standard version is higher output powers, up to 10 mW; however, the signal-to-ASE ratio will be lower — between 35 dB and 45 dB (Fig. 2). The exact value of this parameter will strongly depend on the SOA-module being used and the level of the optical output power.

Operational Modes

The laser provides the following modes of operation:

- CW operation at any single wavelength within the full tuning range. The operating wavelength is adjustable from the front panel or from a computer. Under computer control, typical switching between two different wavelengths is done in less than 100 ms. The user can select any wavelength within the full wavelength range with a 50-pm resolution.
- Continuous sweeps over the full tuning range or over the band of interest (within the full tuning range) not shorter than 5 nm. Both the internal triggering and the external triggering are available.
- Continuous switching between any two wavelengths within the full tuning range at a certain repetition frequency. The range of frequencies includes 13 factory-set values. Customized settings for the repetition frequency are possible upon request.

When internally triggered, the device produces synchronizing pulses. BNC-connectors necessary to synchronize the laser with your measuring equipment are incorporated on the rear panel of the device. In the external triggering mode, the device responds to incoming TTL-compatible trigger signals.

The laser is equipped with the front-panel high precision PM optical socket for an FC/APC connector with the narrow key (2.0 mm). The standard version of the device is supplied with a PM optical patch cable of 1 m long. (An SM optical patch cable is also available on request.) The PM fiber and the connector key are aligned to the slow axis of the fiber. Each patch cable coming with the device is carefully checked to guarantee minimal optical losses in the cable-to-device connection. Different lengths of the optical patch cables are possible on request.

Boosting the Output Power

The maximum value of the output power for the standard version of the Broadsweeper is 3 mW. For powerful applications, the device can additionally be equipped with an optical power booster elevating the power up to 20 mW. The booster is offered as a plug-in module inserted into a special slot of the Broadsweeper mainframe. In this case, the Broadsweeper has the following physical specifications: a) overall dimensions (W × H × D): 362 × 160 × 326 mm, b) weight: 12 kg.

Warning!
Laser Hazard

Depending on the output power and the spectral band, each Broadsweeper is assigned to a certain class of laser hazard. To fulfill the requirements of IEC 60825-1 Ed. 2 2007-03, the instrument is equipped with all the necessary laser safety measures, such as: the master key control, remote interlock connection, visual/audible alarm, informational warning stickers etc.

Since the Broadsweeper is a very complicated device with unique operating characteristics, it is individually built per order with delivery time for the standard models of 12 weeks.

To best match your practical needs, a number of the technical characteristics of the product (e.g. the output power level, target wavelengths for the full tuning range, the sweep speed limits etc.) can be customized.

For further discussion of your tunable laser requirements, please call +353 21 4533666 or email sales@superlum.ie.

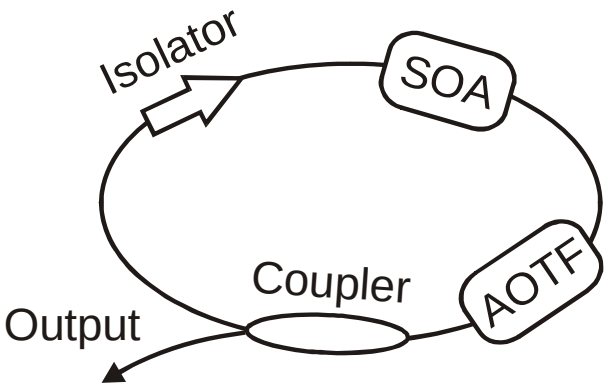

Fig.1. Laser Cavity Schematic for the Standard Version of the Broadsweeper (Simplified)

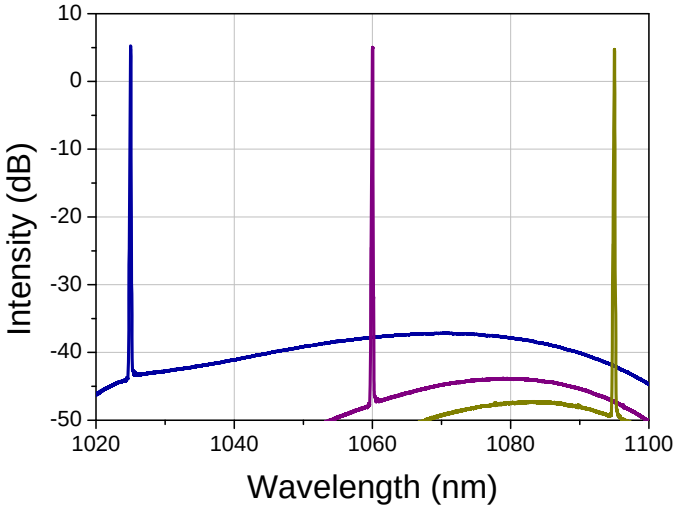

Fig. 2. Signal-to-ASE Ratio for the Optical Output before the Filter*

* ANY EXAMPLES CONTAINED HEREIN ARE PROVIDED "AS IS" AND ARE SUBJECT TO CHANGE WITHOUT NOTICE.

See product specifications on the next page

Broadsweeper BS-785-1

Technical Specification[1]:

Laser Cavity Type	Fiber ring cavity with the blocked ASE-pedestal output
Intracavity Spectrally Tunable Element	Ultra narrow bandpass quasi-collinear AOTF (FWHM = 0.2 nm (@ 785 nm)
Full Wavelength Tuning Range	50 nm (765 ± 2 nm to 815 ± 2 nm)
Minimum Wavelength Tuning Range[2]	5 nm
Wavelength Adjustment Step	0.05 nm
Output Wavelength Repeatability	±10 pm
Sweep Speed Adjustment Step	10 nm/s @ 10-10000 nm/s / 1 nm/s @ 2-10 nm/s
Output Power, Low Power Mode/High Power Mode	1 mW / 3 mW
Output Power Flatness vs. Wavelength for the full wavelength tuning range	1.2 dB (max.)
Ouput Power Stability[3]	< 0.5%
Sweep Speed Range	2 nm/s to 10000 nm/s
Spectral Linewidth, Low Power Mode/High Power Mode	<0.05 nm / <0.06 nm
Signal-to-ASE Ratio	50 dB
Polarization Extinction Ratio	18 dB (typ.)
Optical Fiber Type	Corning PANDA PM 850
Polarization Orientation in the Output Fiber	Slow axis (aligned with the connector key)
Output Optical Connector	FC/APC type with the narrow key (2.0 mm)
Operating Modes	Manual, Automatic, External, Modulation
2-Wavelength Switching Frequency	0.1/0.2/0.5/1/2/5/10/20/50/100/200/500/1000 Hz
I/O Interface[4]	RS-232
Operating Temperature Range	+15 °C to + 30 °C
Storage Temperature Range	0 °C to +40 °C
Power Requirements[5]	110 VAC or 220 VAC, 50 Hz or 60 Hz
Power Consumption	20 W
Warm-up Time	10 min
Continuous Operation[6]	16 hrs/day
Outline Dimensions (W × H × D)	257 × 170 × 325 mm
Approximate Weight	9 kg
Options	PM/SM patch cables of different lengths, optical power booster
Warranty	12 months

[1] ALL SPECIFICATIONS ARE QUOTED AFTER 1 HR WARM-UP PERIOD AT A ROOM TEMPERATURE OF 22 ± 2 °C.
[2] SELECTABLE BY THE USER WITHIN THE FULL TUNING WAVELENGHT RANGE.
[3] DURING 3 HOURS.
[4] MALE CONNECTOR WITH DTE PIN FUNCTIONS.
[5] YOUR LOCAL OPERATING VOLTAGE SHOULD BE SPECIFIED WHEN PLACING THE ORDER.
[6] FOR THE VERSIONS WITH THE PROLONGED OPERATIONAL TIME (UP TO ROUND-THE-CLOCK OPERATION), PLEASE CONTACT SUPERLUM BEFORE PLACING THE ORDER.

Broadsweeper BS-840-1

Technical Specification[1]:

Laser Cavity Type	Fiber ring cavity with the blocked ASE-pedestal output
Intracavity Spectrally Tunable Element	Ultra narrow bandpass quasi-collinear AOTF (FWHM = 0.24 nm(@ 850 nm)
Full Wavelength Tuning Range	75 nm (805 ± 2 nm to 880 ± 2 nm)
Minimum Wavelength Tuning Range[2]	5 nm
Wavelength Adjustment Step	0.05 nm
Output Wavelength Repeatability	±10 pm
Sweep Speed Adjustment Step	10 nm/s @ 10-10000 nm/s / 1 nm/s @ 2-10 nm/s
Output Power, Low Power Mode/High Power Mode	1 mW / 3 mW
Optical Power Flatness vs. Wavelength for the full wavelength tuning range	1.2 dB (max.)
Ouput Power Stability[3]	< 0.5%
Sweep Speed Range	2 nm/s to 10000 nm/s
Spectral Linewidth, Low Power Mode/High Power Mode	<0.05 nm / <0.06 nm
Signal to ASE Ratio	50 dB
Polarization Extinction Ratio	18 dB (typ.)
Optical Fiber Type	Corning PANDA PM 850
Polarization Orientation in the Output Fiber	Slow axis (aligned with the connector key)
Output Optical Connector	FC/APC type with the narrow key (2.0 mm)
Operating Modes	Manual, Automatic, External, Modulation
2-Wavelength Switching Frequency	0.1/0.2/0.5/1/2/5/10/20/50/100/200/500/1000 Hz
I/O Interface[4]	RS-232
Operating Temperature Range	+15 °C to + 30 °C
Storage Temperature Range	0 °C to +40 °C
Power Requirements[5]	110 VAC or 220 VAC, 50 Hz or 60 Hz
Power Consumption	20 W
Warm-up Time	10 min
Continuous Operation[6]	16 hrs/day
Outline Dimensions (W × H × D)	257 × 170 × 325 mm
Approximate Weight	9 kg
Options	PM/SM patch cables of different lengths, optical power booster
Warranty	12 months

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[2] SELECTABLE BY THE USER WITHIN THE FULL TUNING WAVELENGHT RANGE.
[3] DURING 3 HOURS.
[4] MALE CONNECTOR WITH DTE PIN FUNCTIONS.
[5] YOUR LOCAL OPERATING VOLTAGE SHOULD BE SPECIFIED WHEN PLACING THE ORDER.
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Broadsweeper BS-930-1

Technical Specification[1]:

Laser Cavity Type	Fiber ring cavity with the blocked ASE-pedestal output
Intracavity Spectrally Tunable Element	Ultra narrow bandpass quasi-collinear AOTF (FWHM = 0.28 nm(@ 930 nm)
Full Wavelength Tuning Range	80 nm (900 ± 2 nm to 980 ± 2 nm)
Minimum Wavelength Tuning Range[2]	5 nm
Wavelength Adjustment Step	0.05 nm
Output Wavelength Repeatability	±10 pm
Sweep Speed Adjustment Step	10 nm/s @ 10-10000 nm/s / 1 nm/s @ 2-10 nm/s
Output Power, Low Power Mode/High Power Mode	1 mW / 3 mW
Optical Power Flatness vs. Wavelength for the full wavelength tuning range	1.2 dB (max.)
Ouput Power Stability[3]	< 0.5%
Sweep Speed Range	2 nm/s to 10000 nm/s
Spectral Linewidth, Low Power Mode/High Power Mode	<0.07 nm / <0.09 nm
Signal to ASE Ratio	50 dB
Polarization Extinction Ratio	18 dB (typ.)
Optical Fiber Type	Corning PANDA PM 850
Polarization Orientation in the Output Fiber	Slow axis (aligned with the connector key)
Output Optical Connector	FC/APC type with the narrow key (2.0 mm)
Operating Modes	Manual, Automatic, External, Modulation
2-Wavelength Switching Frequency	0.1/0.2/0.5/1/2/5/10/20/50/100/200/500/1000 Hz
I/O Interface[4]	RS-232
Operating Temperature Range	+15 °C to + 30 °C
Storage Temperature Range	0 °C to +40 °C
Power Requirements[5]	110 VAC or 220 VAC, 50 Hz or 60 Hz
Power Consumption	20 W
Warm-up Time	10 min
Continuous Operation[6]	16 hrs/day
Outline Dimensions (W × H × D)	257 × 170 × 325 mm
Approximate Weight	9 kg
Options	PM/SM patch cables of different lengths, optical power booster
Warranty	12 months

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[3] DURING 3 HOURS.
[4] MALE CONNECTOR WITH DTE PIN FUNCTIONS.
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Broadsweeper BS-1060-1

Technical Specification[1]:

Laser Cavity Type	Fiber ring cavity with the blocked ASE-pedestal output
Intracavity Spectrally Tunable Element	Ultra narrow bandpass quasi-collinear AOTF (FWHM = 0.37 nm(@ 1060 nm)
Full Wavelength Tuning Range	70 nm (1020 ± 2 nm to 1090 ± 2 nm)
Minimum Wavelength Tuning Range[2]	5 nm
Wavelength Adjustment Step	0.05 nm
Output Wavelength Repeatability	±10 pm
Sweep Speed Adjustment Step	10 nm/s @ 10-10000 nm/s / 1 nm/s @ 2-10 nm/s
Output Power, Low Power Mode/High Power Mode	1 mW / 3 mW
Optical Power Flatness vs. Wavelength for the full wavelength tuning range	1.2 dB (max.)
Ouput Power Stability[3]	< 0.5%
Sweep Speed Range	2 nm/s to 10000 nm/s
Spectral Linewidth, Low Power Mode/High Power Mode	<0.07 nm / <0.09 nm
Signal to ASE Ratio	50 dB
Polarization Extinction Ratio	18 dB (typ.)
Optical Fiber Type	Corning PANDA PM 980
Polarization Orientation in the Output Fiber	Slow axis (aligned with the connector key)
Output Optical Connector	FC/APC type with the narrow key (2.0 mm)
Operating Modes	Manual, Automatic, External, Modulation
2-Wavelength Switching Frequency	0.1/0.2/0.5/1/2/5/10/20/50/100/200/500/1000 Hz
I/O Interface[4]	RS-232
Operating Temperature Range	+15 °C to + 30 °C
Storage Temperature Range	0 °C to +40 °C
Power Requirements[5]	110 VAC or 220 VAC, 50 Hz or 60 Hz
Power Consumption	20 W
Warm-up Time	10 min
Continuous Operation[6]	16 hrs/day
Outline Dimensions (W × H × D)	257 × 170 × 325 mm
Approximate Weight	9 kg
Options	PM/SM patch cables of different lengths, optical power booster
Warranty	12 months

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[2] SELECTABLE BY THE USER WITHIN THE FULL TUNING WAVELENGHT RANGE.
[3] DURING 3 HOURS.
[4] MALE CONNECTOR WITH DTE PIN FUNCTIONS.
[5] YOUR LOCAL OPERATING VOLTAGE SHOULD BE SPECIFIED WHEN PLACING THE ORDER.
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Broadsweeper BS-785-2

Technical Specification[1]:

Laser Cavity Type	Fiber ring cavity with the blocked ASE-pedestal output
Intracavity Spectrally Tunable Element	Narrow bandpass non-collinear AOTF with a large angular aperture (FWHM = 0.6 nm @ 785 nm)
Full Wavelength Tuning Range	50 nm (765 ± 2 nm to 815 ± 2 nm)
Minimum Wavelength Tuning Range[2]	5 nm
Wavelength Adjustment Step	0.05 nm
Output Wavelength Repeatability	±10 pm
Sweep Speed Adjustment Step	100 nm/s
Output Power, Low Power Mode/High Power Mode	1 mW / 3 mW
Output Power Flatness vs. Wavelength for the full wavelength tuning range	1.2 dB (max.)
Ouput Power Stability[3]	< 0.5%
Sweep Speed Range	100 nm/s to 100000 nm/s
Spectral Linewidth, Low Power Mode/High Power Mode	<0.1 nm / <0.12 nm
Signal-to-ASE Ratio	50 dB
Polarization Extinction Ratio	18 dB (typ.)
Optical Fiber Type	Corning PANDA PM 850
Polarization Orientation in the Output Fiber	Slow axis (aligned with the connector key)
Output Optical Connector	FC/APC type with the narrow key (2.0 mm)
Operating Modes	Manual, Automatic, External, Modulation
2-Wavelength Switching Frequency	1/2/5/10/20/50/100/200/500/1k/2k/5k/10k Hz
I/O Interface[4]	RS-232
Operating Temperature Range	+15 °C to + 30 °C
Storage Temperature Range	0 °C to +40 °C
Power Requirements[5]	110 VAC or 220 VAC, 50 Hz or 60 Hz
Power Consumption	20 W
Warm-up Time	10 min
Continuous Operation[6]	16 hrs/day
Outline Dimensions (W × H × D)	257 × 170 × 325 mm
Approximate Weight	9 kg
Options	PM/SM patch cables of different lengths, optical power booster
Warranty	12 months

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Broadsweeper BS-840-2

Technical Specification[1]:

Laser Cavity Type	Fiber ring cavity with the blocked ASE-pedestal output
Intracavity Spectrally Tunable Element	Narrow bandpass non-collinear AOTF with a large angular aperture (FWHM = 0.7 nm @ 860 nm)
Full Wavelength Tuning Range	75 nm (805 ± 2 nm to 880 ± 2 nm)
Minimum Wavelength Tuning Range[2]	5 nm
Wavelength Adjustment Step	0.05 nm
Output Wavelength Repeatability	±10 pm
Sweep Speed Adjustment Step	100 nm/s
Output Power, Low Power Mode/High Power Mode	1 mW / 3 mW
Optical Power Flatness vs. Wavelength for the full wavelength tuning range	1.2 dB (max.)
Ouput Power Stability[3]	< 0.5%
Sweep Speed Range	100 nm/s to 100000 nm/s
Spectral Linewidth, Low Power Mode/High Power Mode	<0.1 nm / <0.12 nm
Signal to ASE Ratio	50 dB
Polarization Extinction Ratio	18 dB (typ.)
Optical Fiber Type	Corning PANDA PM 850
Polarization Orientation in the Output Fiber	Slow axis (aligned with the connector key)
Output Optical Connector	FC/APC type with the narrow key (2.0 mm)
Operating Modes	Manual, Automatic, External, Modulation
2-Wavelength Switching Frequency	1/2/5/10/20/50/100/200/500/1k/2k/5k/10k Hz
I/O Interface[4]	RS-232
Operating Temperature Range	+15 °C to + 30 °C
Storage Temperature Range	0 °C to +40 °C
Power Requirements[5]	110 VAC or 220 VAC, 50 Hz or 60 Hz
Power Consumption	20 W
Warm-up Time	10 min
Continuous Operation[6]	16 hrs/day
Outline Dimensions (W × H × D)	257 × 170 × 325 mm
Approximate Weight	9 kg
Options	PM/SM patch cables of different lengths, optical power booster
Warranty	12 months

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Broadsweeper BS-930-2

Technical Specification[1]:

Laser Cavity Type	Fiber ring cavity with the blocked ASE-pedestal output
Intracavity Spectrally Tunable Element	Narrow bandpass non-collinear AOTF with a large angular aperture (FWHM = 0.84 nm @ 930 nm)
Full Wavelength Tuning Range	80 nm (900 ± 2 nm to 980 ± 2 nm)
Minimum Wavelength Tuning Range[2]	5 nm
Wavelength Adjustment Step	0.05 nm
Output Wavelength Repeatability	±10 pm
Sweep Speed Adjustment Step	100 nm/s
Output Power, Low Power Mode/High Power Mode	1 mW / 3 mW
Optical Power Flatness vs. Wavelength for the full wavelength tuning range	1.2 dB (max.)
Ouput Power Stability[3]	< 0.5%
Sweep Speed Range	100 nm/s to 100000 nm/s
Spectral Linewidth, Low Power Mode/High Power Mode	<0.12 nm / <0.15 nm
Signal to ASE Ratio	50 dB
Polarization Extinction Ratio	18 dB (typ.)
Optical Fiber Type	Corning PANDA PM 850
Polarization Orientation in the Output Fiber	Slow axis (aligned with the connector key)
Output Optical Connector	FC/APC type with the narrow key (2.0 mm)
Operating Modes	Manual, Automatic, External, Modulation
2-Wavelength Switching Frequency	1/2/5/10/20/50/100/200/500/1k/2k/5k/10k Hz
I/O Interface[4]	RS-232
Operating Temperature Range	+15 °C to + 30 °C
Storage Temperature Range	0 °C to +40 °C
Power Requirements[5]	110 VAC or 220 VAC, 50 Hz or 60 Hz
Power Consumption	20 W
Warm-up Time	10 min
Continuous Operation[6]	16 hrs/day
Outline Dimensions (W × H × D)	257 × 170 × 325 mm
Approximate Weight	9 kg
Options	PM/SM patch cables of different lengths, optical power booster
Warranty	12 months

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Broadsweeper BS-1060-2

Technical Specification[1]:

Laser Cavity Type	Fiber ring cavity with the blocked ASE-pedestal output
Intracavity Spectrally Tunable Element	Narrow bandpass non-collinear AOTF with a large angular aperture (FWHM = 0.8 nm @ 1060 nm)
Full Wavelength Tuning Range	70 nm (1020 ± 2 nm to 1090 ± 2 nm)
Minimum Wavelength Tuning Range[2]	5 nm
Wavelength Adjustment Step	0.05 nm
Output Wavelength Repeatability	±10 pm
Sweep Speed Adjustment Step	100 nm/s
Output Power, Low Power Mode/High Power Mode	1 mW / 3 mW
Optical Power Flatness vs. Wavelength for the full wavelength tuning range	1.2 dB (max.)
Ouput Power Stability[3]	< 0.5%
Sweep Speed Range	100 nm/s to 100000 nm/s
Spectral Linewidth, Low Power Mode/High Power Mode	<0.12 nm / <0.15 nm
Signal to ASE Ratio	50 dB
Polarization Extinction Ratio	18 dB (typ.)
Optical Fiber Type	Corning PANDA PM 980
Polarization Orientation in the Output Fiber	Slow axis (aligned with the connector key)
Output Optical Connector	FC/APC type with the narrow key (2.0 mm)
Operating Modes	Manual, Automatic, External, Modulation
2-Wavelength Switching Frequency	1/2/5/10/20/50/100/200/500/1k/2k/5k/10k Hz
I/O Interface[4]	RS-232
Operating Temperature Range	+15 °C to + 30 °C
Storage Temperature Range	0 °C to +40 °C
Power Requirements[5]	110 VAC or 220 VAC, 50 Hz or 60 Hz
Power Consumption	20 W
Warm-up Time	10 min
Continuous Operation[6]	16 hrs/day
Outline Dimensions (W × H × D)	257 × 170 × 325 mm
Approximate Weight	9 kg
Options	PM/SM patch cables of different lengths, optical power booster
Warranty	12 months

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Typical Examples of Operation *

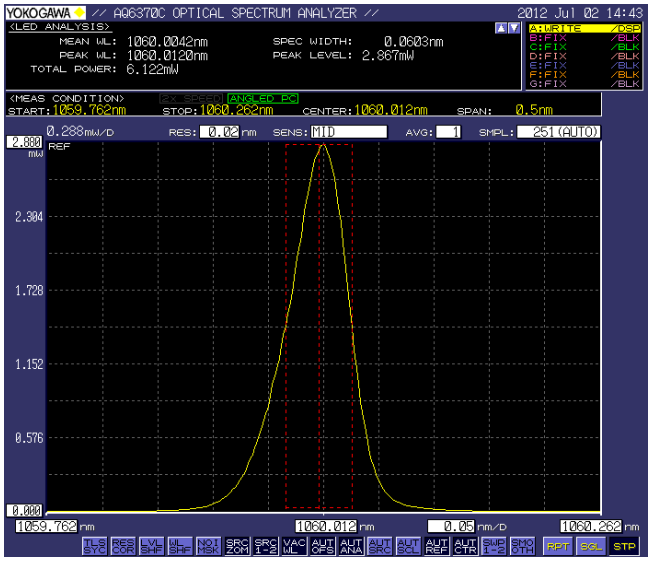


Fig. 3. Optical Spectrum in Linear Scale

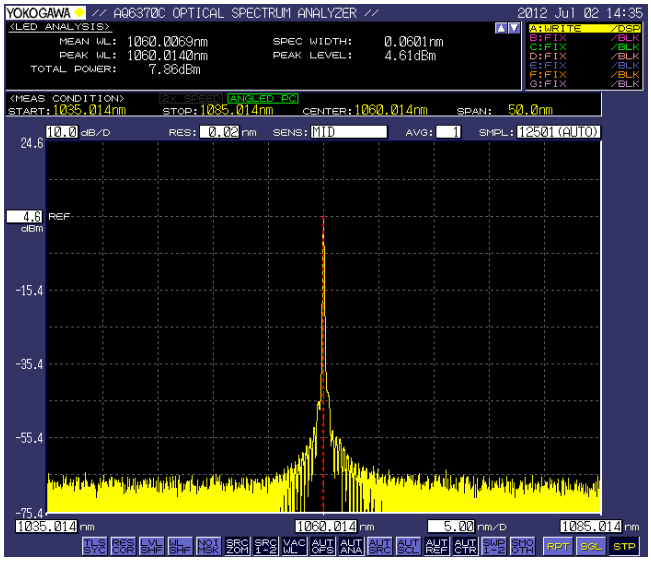


Fig. 4. Optical Spectrum in Logarithmical Scale

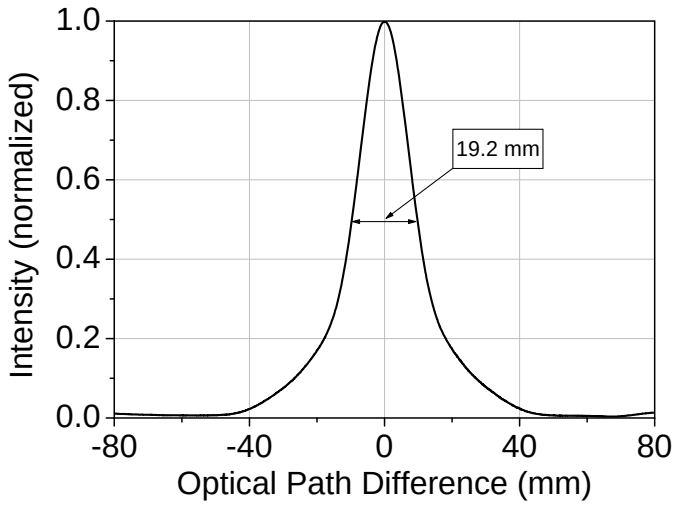


Fig. 5. Coherence Function

* ANY EXAMPLES CONTAINED HEREIN ARE PROVIDED "AS IS" AND ARE SUBJECT TO CHANGE WITHOUT NOTICE.

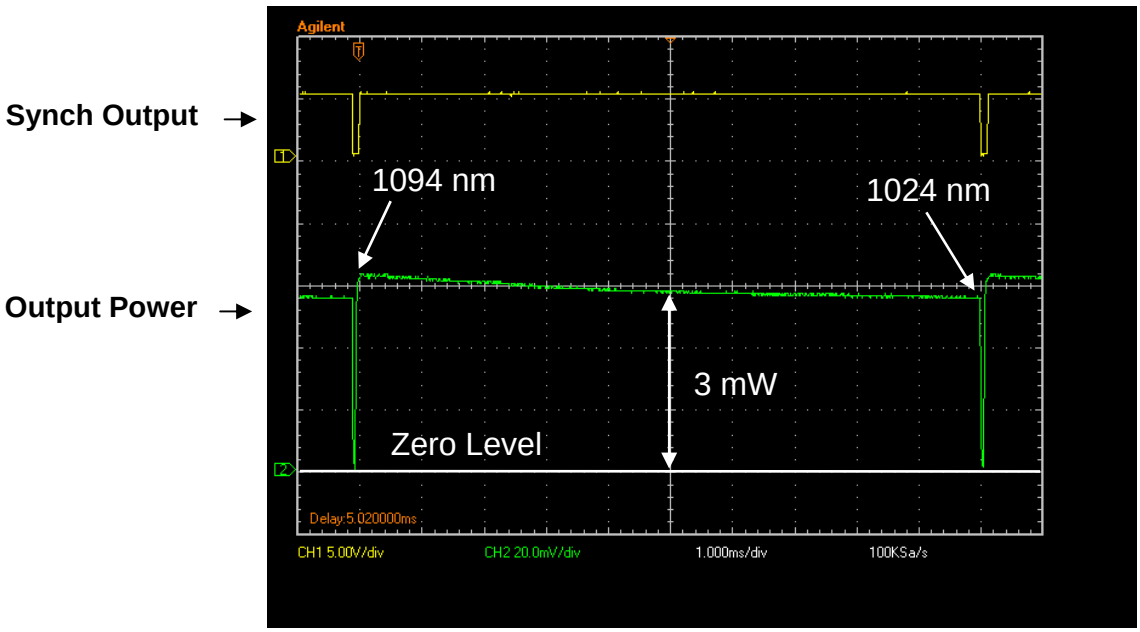


Fig. 6. Sweep Oscillogram in Internal Triggering Operation
(Test Conditions: Sweep Range = 1094-1024 nm, Output Power = 3 mW, Sweep Speed = 7000 nm/s, Sweep Time = 10 ms.)

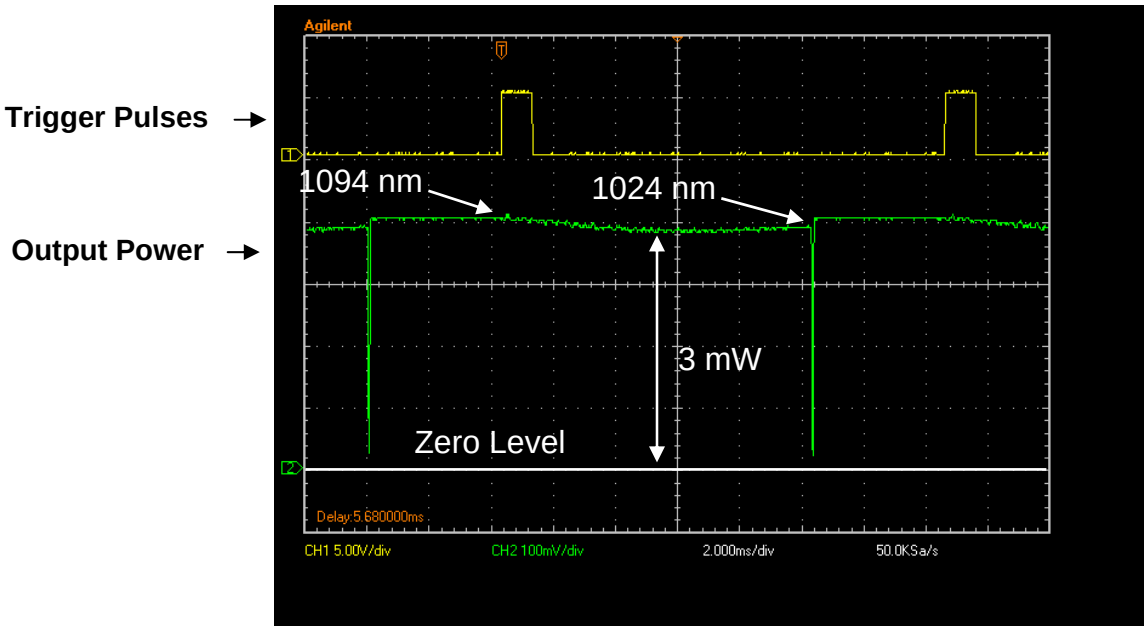


Fig. 7. Sweep Oscillogram in External Triggering Operation
(Test Conditions: Sweep Range = 1094-1024 nm, Output Power = 3 mW, Sweep Speed = 7000 nm/s, Sweep Time = 10 ms, Synch Pulse Frequency = 70 Hz)

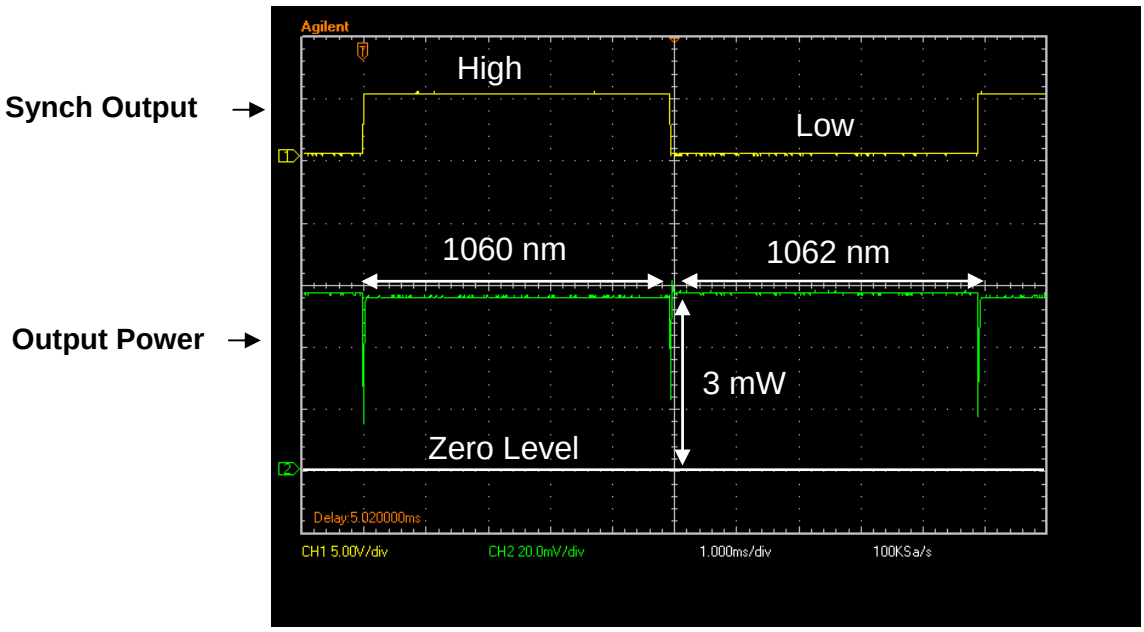


Fig. 8. Sweep Operation in Two-Wavelength Switching Mode
(Test Conditions: Wavelength 1 = 1062 nm, Wavelength 2 = 1060 nm, Output Power = 3 mW, Switching Frequency = 100 Hz)

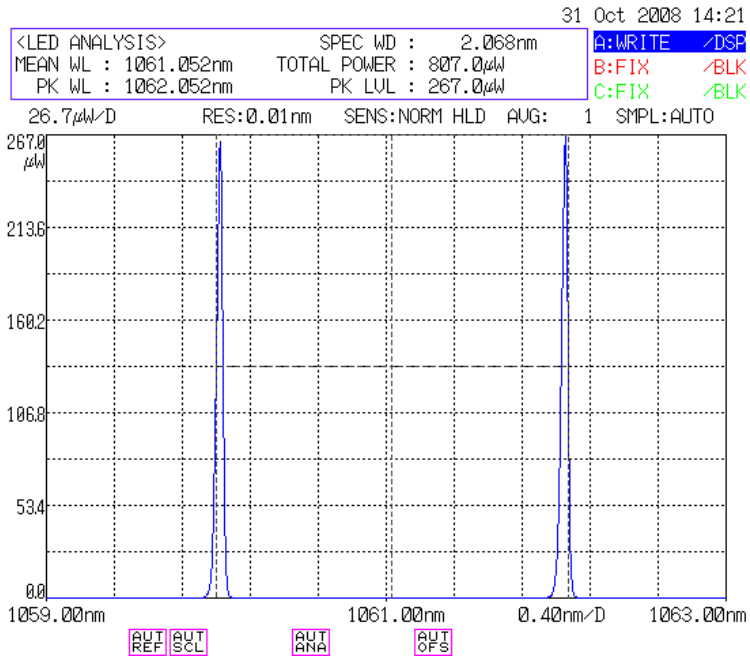


Fig. 9. Average Optical Spectrum in Two-Wavelength Switching Mode
(Test Conditions: Wavelength 1 = 1062 nm, Wavelength 2 = 1060 nm, Output Power = 3 mW, Switching Frequency = 2 Hz)

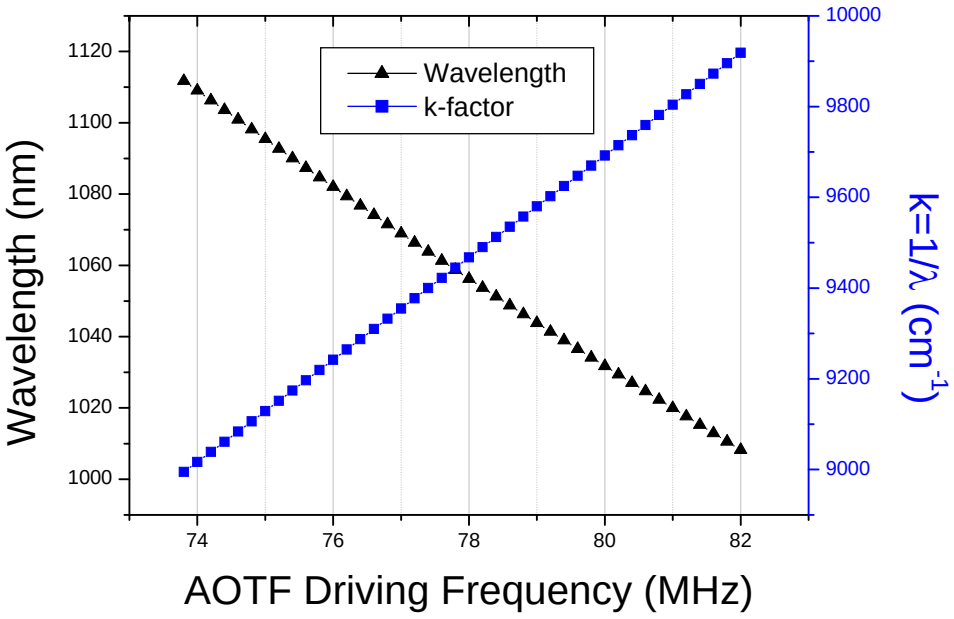


Fig. 10. AOTF Tuning Characteristic

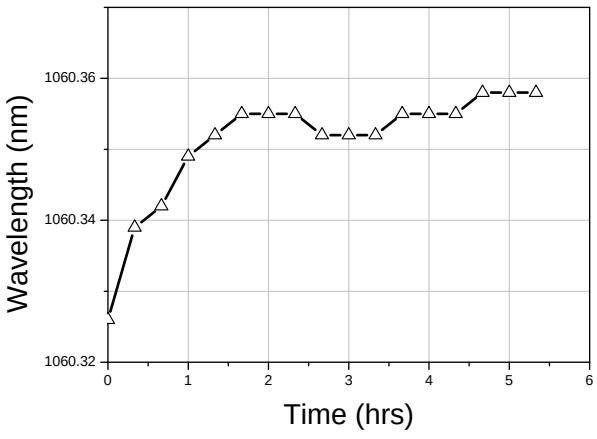


Fig. 11. Output Wavelength Stability

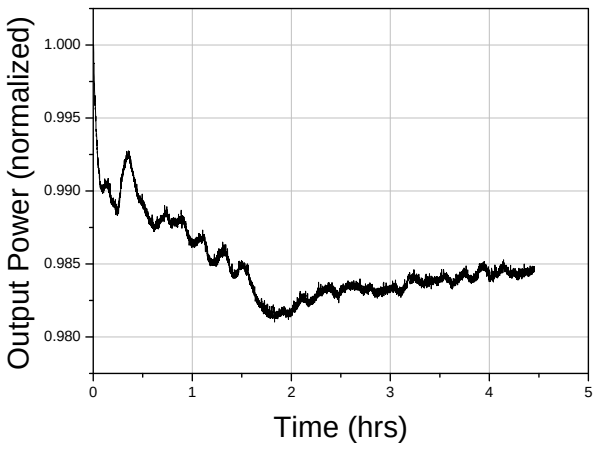
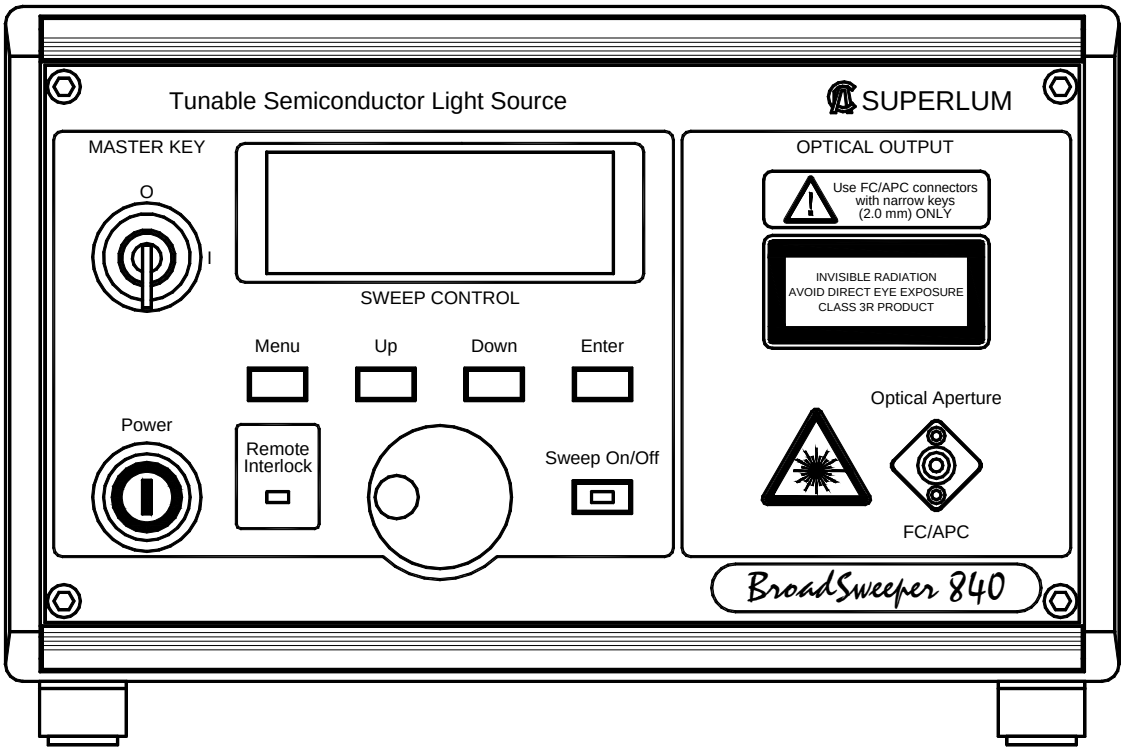
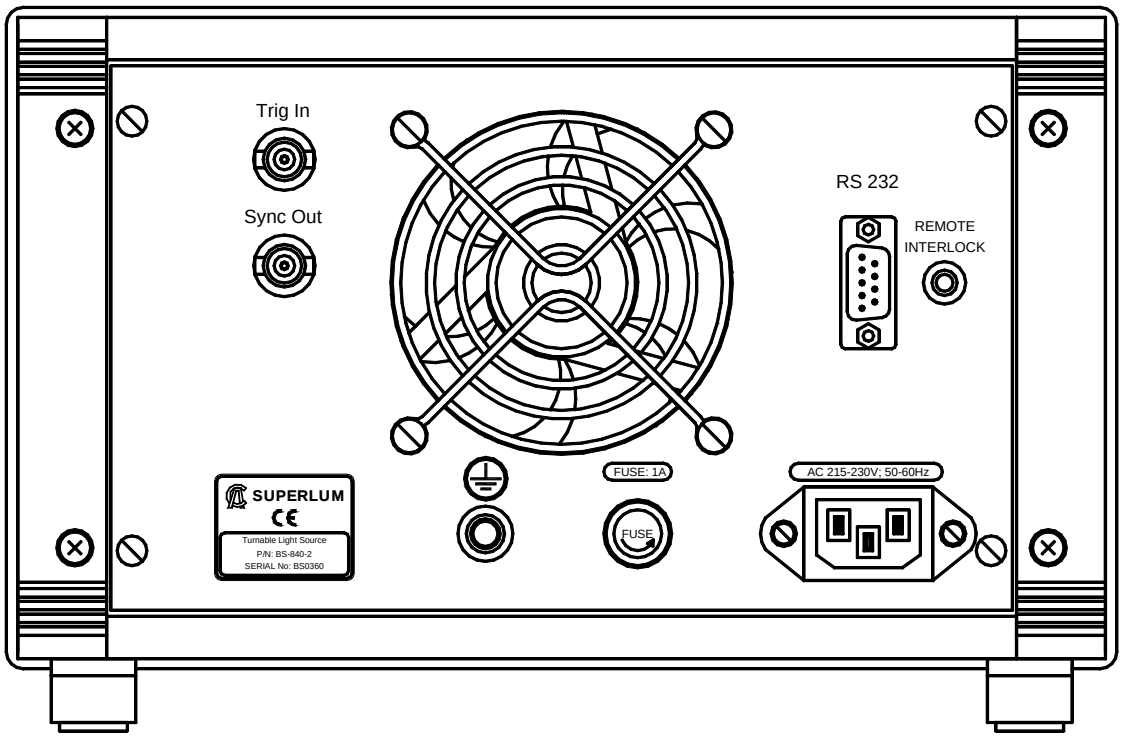


Fig. 12. Output Power Stability

Front and Rear Panels of the Broadsweeper





Ordering Information

The Broadsweeper Tunable Semiconductor Light Source is available for ordering in several standard configurations. Please refer to the table below when ordering.

Example: BS-840-1 Tunable semiconductor light source with the standard spectral characteristics, output power of 1 mW / 3 mW (low power mode / high power mode) and a sweep speed range of 2-10000 nm/s.

Superlum also offers product customization services. We are ready to discuss your tunable laser requirements, and we will do our best to meet your needs. For further discussion of the product customization, please call +353 21 4533666 or email sales@superlum.ie.

Part Number	Description
BS-785-1, BS-840-1, BS-930-1, BS-1060-1.	Tunable semiconductor light source with the standard spectral characteristics, output power of 1 mW / 3 mW (low power mode / high power mode) and a sweep speed range of 2-10000 nm/s.
BS-785-2, BS-840-2, BS-930-2, BS-1060-2.	Tunable semiconductor light source with the standard spectral characteristics, output power of 1 mW / 3 mW (low power mode / high power mode) and a sweep speed range of 100-100000 nm/s.
BS-785-1-HP, BS-840-1-HP, BS-930-1-HP, BS-1060-1-HP.	Tunable semiconductor light source with the standard spectral characteristics, output power of 1 mW / 3 mW (low power mode / high power mode) and a sweep speed range of 2-10000 nm/s. An internal optical power booster with the output power of 20 mW is included.
BS-785-2-HP, BS-840-2-HP, BS-930-2-HP, BS-1060-2-HP.	Tunable semiconductor light source with the standard spectral characteristics, output power of 1 mW / 3 mW (low power mode / high power mode) and a sweep speed range of 100-100000 nm/s. An internal optical power booster with the output power of 20 mW is included.

For the standard version of the device without the optical power booster, the shipment will include:

- One Tunable Semiconductor Light Source
- One optical patch cable of 1 m long
- Two keys for the device's master control
- One remote interlock connector
- One AC power cord
- One RS-232 null-modem cable
- Connectivity software and user's manual on the disk
- Acceptance Test Report (ATR)

For the standard version of the device with the integrated optical power booster, the shipment will include:

- One Tunable Semiconductor Light Source
- Two fiber patch cables of 1 m long for optical connections
- Two keys for the device's master control
- One remote interlock connector
- One AC power cord
- One RS-232 null-modem cable
- Connectivity software and user's manual on the disk
- Acceptance Test Report (ATR)