Bandwidth-Adjustable Tunable Filter

WLTF-BA-

Bandwidth-Adjustable Filters of WLTF-BA-series are built based on free-space optical Fourier transformation combing with diffraction grating. Unique optics design provides an access of selecting spatially desired spectral ingredients of input light and offers flat- top transmission spectral shape with flexible bandwidth and unprecedented low insertion loss and polarization dependent loss (PDL). Both center wavelength and bandwidth of transmission band can be tuned independently. Precise tuning mechanism enables filters to provide high wavelength resolution and excellent wavelength repeatability.

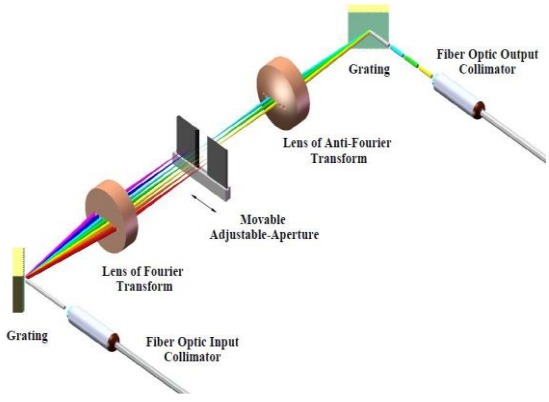
Manual version filter is available over X-, O-, S, C-, & L-bands. Center wavelength-tuning and bandwidth-adjusting of a transmission band are actuated by individual precise micrometer drivers separately. Due to the optimized linear dispersion with the filter, the center wavelength and bandwidth can be read easily from the micrometers. Electric version of such the filter is available only for OEM applications on request.

Key Features

- Both center wavelength and bandwidth tunable
- No moving optical part platform
- Unprecedented low insertion loss and polarization-dependent loss (PDL)
- Sharp filter edge roll-off slop
- Flat-top profile of transmission band
- Up to 120nm wavelength tuning range
- High out-band suppression
- High optical power handling

Applications

- ASE noise suppression
- Wideband WDM channel filtering
- Wideband continuous light source
- Pulse Shaping
- Signal filtering



Operating Principle and Tuning Mechanism

Manual Version of WLTF-BA-

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Specifications of Manual Tunable Filter (WLTF-BA-)

Center Wavelength	1060nm±15nm	1310nm±15nm	1550nm±20nm	1600nm±20nm
Tuning Range (TR)	80nm-BW	100nm-BW	120nm-BW	120nm-BW
Insertion Loss	1.5dB typ. and 3.0dB max. (Connector exclusive)			
FWHM Bandwidth (BW)[2]	BW[1]$_{min}$ to 90nm	BW $_{min}$ to 100nm	BW $_{min}$ to 120nm	BW $_{min}$ to 120nm
	BW $_{min}$=1.40nm for S-grade	BW $_{min}$=2.00nm for S-grade	BW $_{min}$=2.70nm for S-grade	BW $_{min}$=3.00nm for S-grade
	BW $_{min}$=0.60nm for P-grade	BW $_{min}$=0.80nm for P-grade	BW $_{min}$=1.00nm for P-grade	BW $_{min}$=1.20nm for P-grade
Wavelength Resolution	0.02nm			
Wavelength Repeatability	±0.02nm			
Polarization-Dependent Loss	0.15dB typ./0.30dB max. over tuning range (SM fiber pigtail only)			
Extinction Ratio	20dB (PM fiber pigtail only without connector)			
Spectral Shape	Flat-top			
Passband Flatness	<0.15dB (Measured with BW $_{min}$)			
Filter Edge Roll-Off Slop[3]	30dB/nm for S-grade	25dB/nm for S-grade	22dB/nm for S-grade	20dB/nm for S-grade
	90dB/nm For P-grade	70dB/nm For P-grade	60dB/nm For P-grade	55dB/nm For P-grade
Max. Optical Power[4]	500mW (CW)			
Return Loss	>45dB			
Out-Band Suppression	>40dB for BW<10nm (Transmission peak to the average of background)			
Polarization Mode Dispersion	<0.2ps (SM fiber pigtail only)			
Group Delay	<0.1ps/nm			
Pigtail Fiber Type[5]	HI1060	SMF-28 or SMF-28e		
	Panda PM980	Panda PM1300	Panda PM1550	
Operating Temp.	10°C to 50°C			
Storage Temp.	-10°C to 75°C			
Dimension	38mm (H)x95mm (W)x110mm (L)			
Weight	<0.75kg			
Other	RoHS compliant			
Note	[1] BW $_{min}$ is minimum available flat-top bandwidth			
	[2] Any bandwidth between BW $_{min}$ and TR can be specified as a standard			
	[3] Measured from -3dB to -33dB level			
	[4] High power up to 5.0W (CW) is available on request.			
	[5] PM fibers aligned in PM slow axes (fast-axis blocking) unless specified as others.			

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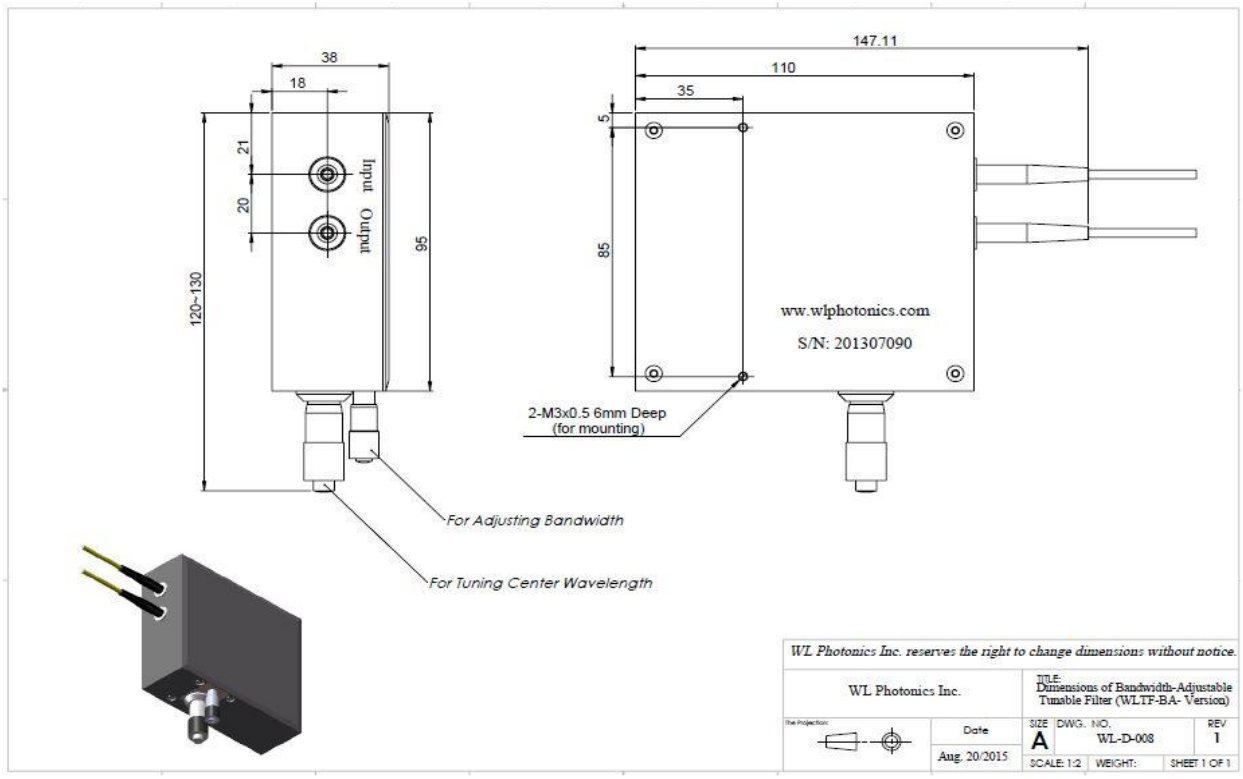
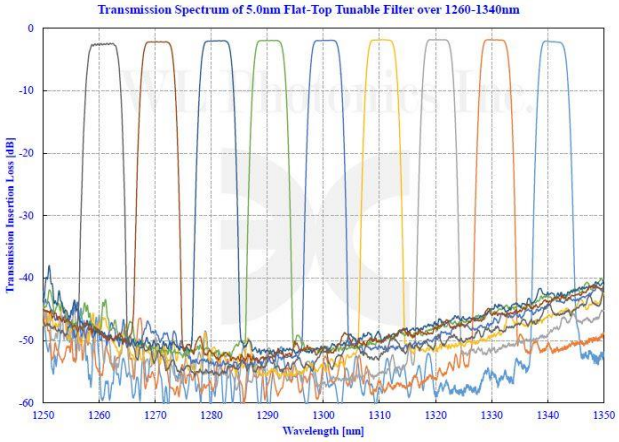
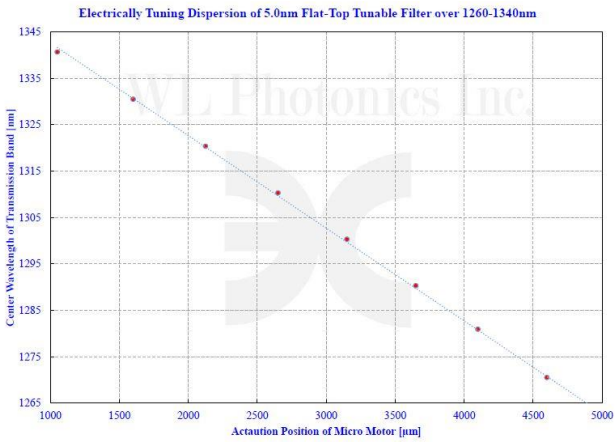
Dimensions of Manual Tunable Filter (WLTF-BA-version)



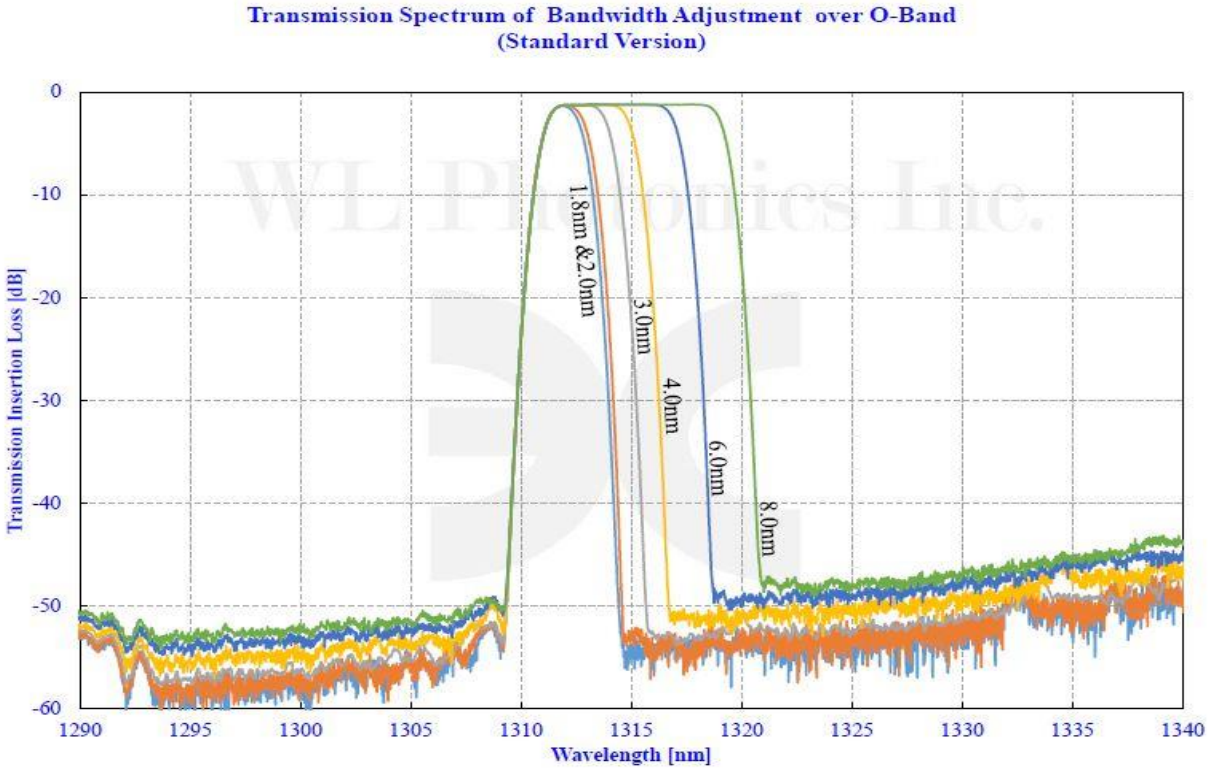
Example: Typical Transmission Spectrum and Tuning Dispersion of 5.0nm Filter over O-Band

Tuning Center Wavelength of Transmission Band over O-Band.

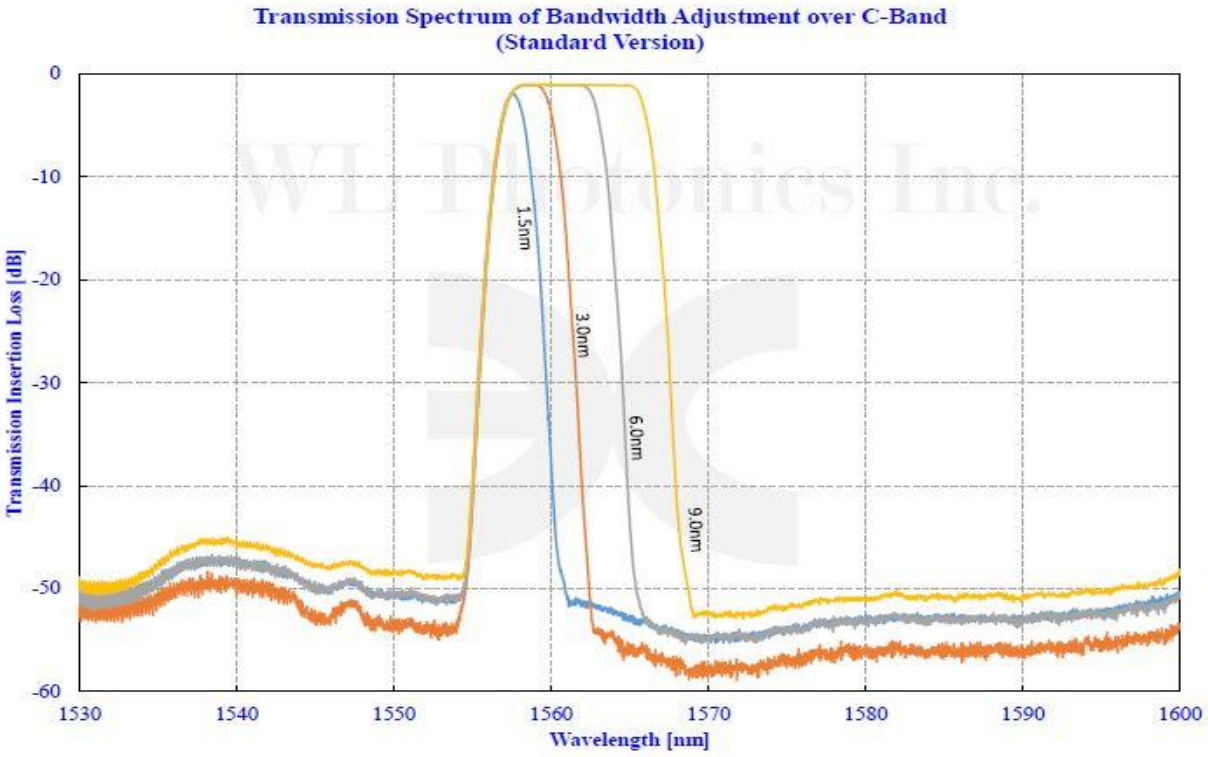




Example: Adjusting Bandwidth of S-Grade Tunable Filter over O-Band



Example: Adjusting Bandwidth of S-Grade Tunable Filter over C-Band



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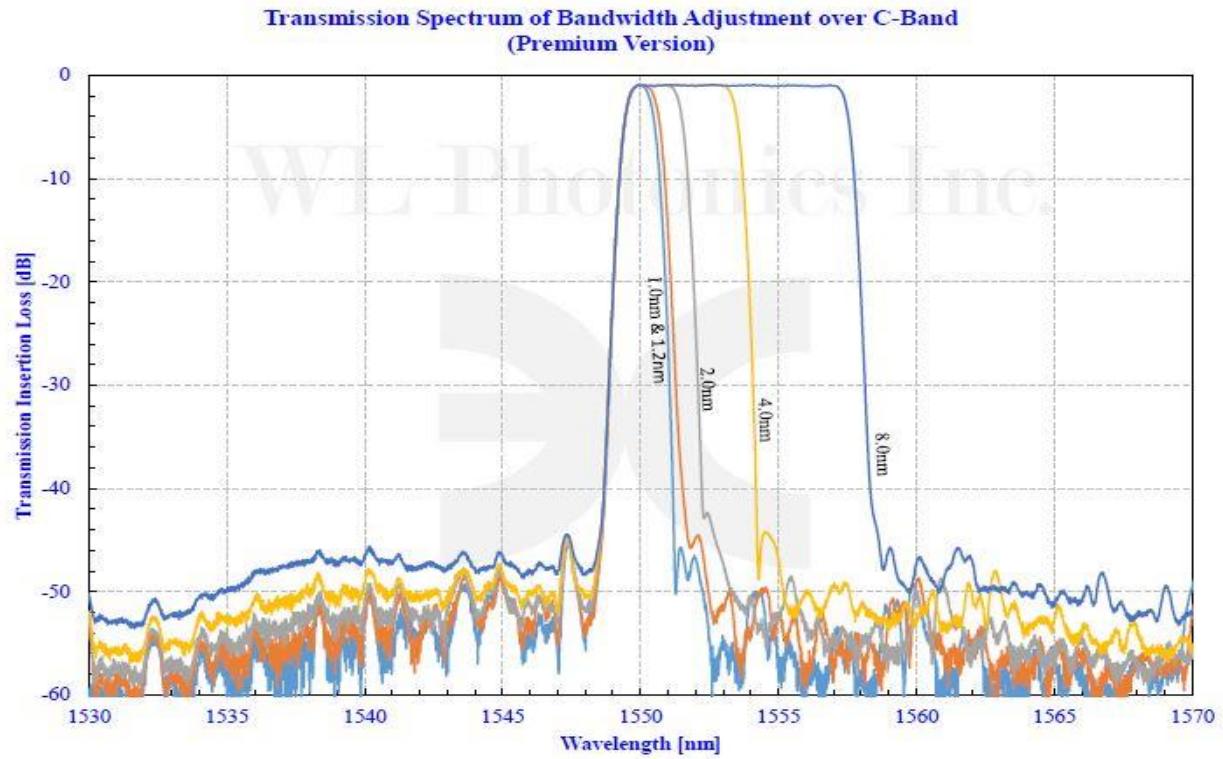
Example: Adjusting Bandwidth of P-Grade Tunable Filter over C-Band



Ordering Information

Part Number of Manual Version: WLTF-BM-A-B-C-D-E/F-G

A. Version grade: S is for S-grade and P is for P-grade
B. Center wavelength in nanometer: 1550 is for 1550nm center wavelength and 1310 is for 1310nm center wavelength.
C. Tuning wavelength range in nanometer: 80 is for 80nm tuning range and 100 is for 100nm tuning wavelength range.
D. Fiber type: SM is for single mode fiber and PM is for Panda polarization maintaining fiber.
E. Pigtail cable diameter in millimeter: 0.25 is for 250μm OD buffer fiber, 0.9 is for 900μm OD loose tube and 3.0 is for 3.0mm OD cable (only existing for pigtail version).
F. Pigtail length in meter: 0.5 is for 0.5m long and 1.0 is for 1M long (only existing for pigtail version).
G. Connector type of either pigtail termination or receptacle adapter, such as FC/APC, FC/UPC SC/APC or LU/UPC and 00 is for no connector.

Example 1: **WLTF-BA-S-1550-120-SM-3.0/1.0-FC/APC**
Description: S-grade fiber optic polarization-insensitive manually bandwidth-adjustable tunable optical filter over 120nm tuning range @1550nm center wavelength with 1M long, 3.0mm OD loose cabled SMF-28 single mode fiber pigtails terminated with FC/APC connectors on both ends. 2.7nm minimum accessible flat-top FWHM bandwidth and 500mW (CW) optical input power.

Example 2: **WLTF-BA-P-1310-100-PM-3.0/1.0-SC/APC**
Description: P-grade fiber optic polarization-sensitive manually bandwidth-adjustable tunable optical filter over 100nm tuning range @1310nm center wavelength with 1M long, 3.0mm OD loose cabled Panda PM1300 fiber pigtails aligned in PM slow axes (fast axis blocking) and SC/APC connectors on both ports. 1.0nm minimum accessible flat-top FWHM bandwidth and 500mW (CW) optical input power.

Example 3: **WLTF-BA-P-1060-100-SM-0.9/1.0-FC/UPC-3.0**
Description: P-grade fiber optic polarization-insensitive manually bandwidth-adjustable tunable optical filter over 80nm tuning range @1060nm center wavelength with 1M long, 900μm OD loose cabled HI1060 PM1300 fiber pigtails and FC/UPC connectors on both pigtail ends. 0.7nm minimum accessible flat-top FWHM bandwidth and 3.0W (CW) optical input power.

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