Wide Temperature EDFA -40 to 70 °C

for out space, vehicles, outdoor

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Agiltron Erbium doped fiber amplifier (EDFA) provides cost-effective solutions for high power optical amplification. It is built using semiconductor lasers, WDM, isolator, and erbium-doped fiber. The product has the advantages of high reliability, high power output, high gain and low noise. Two configurations are available: Pre-Amplifier for small optical signal amplification and Booster amplifier for maximum output power. We make both random polarization and polarization maintain versions. The compact module is suited for system integration with universal control interface. Remote control through GUI and UART is available, including power adjustment, input/output power monitoring, device temperature monitoring. Customer configurations are available with a NRE fee.

The EDFA has isolators on both input and output.

These Erbium-Doped Fiber Amplifiers (EDFAs) are engineered for a long operational lifespan, typically designed to function reliably for over 10 years. This durability is achieved through high-quality components and robust manufacturing processes. The design considerations include thermal management, component selection, and rigorous testing to maximize the amplifier's longevity and efficiency.

For narrow-linewidth CW seeds below several MHz, the maximum output power is limited by stimulated Brillouin scattering (SBS). As an example, for linewidths around 500 kHz, SBS limits output powers above a few watts.

Features

- Low Noise
- High Output at 33dBm
- High stability
- High Reliability
- Customizable

Applications

- BOTDR
- OTDR
- LiDAR
- Fiber sensing

Specifications

Parameter	Min	Typical	Max	Unit
Wavelength	1545	1550	1565	nm
Input Power	-5	0	10	dBm
Output Power	17	26	37	dBm
Power Conversion Efficiency [2]	8		11	
Total Max Output Power		33		dBm
Noise Figure		6		dB
Polarization Dependent Gain			0.5	dB
Polarization Mode Dispersion [4]			0.5	ps
Input/Output Isolation	40			dB
Adjustable Output Power only		Yes		
Fiber Type	SMF-28e 9/125um NA = 0.13			
Working Temperature [6], [7]	-40		70	°C
Storage Temperature	-40		85	°C
Power Supply	DC +12V			
Communication	USB (GUI & UART)			

Notes:

[1]. Maximum optical output power. For Booster type only

[2]. Define as the ratio of Electrical Input Power/Optical Output Power

[3]. Amplification. Output power = Gain X Input power. For weak signals, buy a preamplifier

[4]. Random polarization version only

[5]. Polarization Maintaining only

[6]. The regular range is -5 to 40°C, for extended range requires additional cost

[7]. Require box to have good thermal contact with a heat sink

* Preamplifier output power is limited to 25dBm

Note: The specifications provided are for general applications with a cost-effective approach. If you need to narrow or expand the tolerance, coverage, limit, or qualifications, please [click this link]:

RoHS COMPLIANT

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Rev 09/09/26

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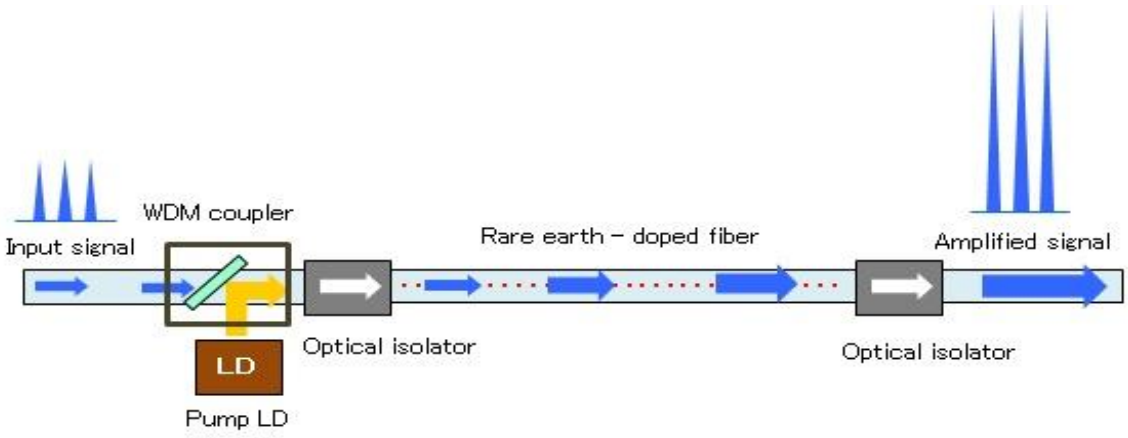
Function Diagram



Ordering Information (Part Number) System

	☐	☐	☐	☐	☐	☐	☐	☐
Prefix	**Type**	**Wavelength**	**Power [1]**	**Polarization**	**Package**	**Cable Type**	**Fiber Length [3]**	**Connector [4][5]**
EDFA-	Booster = A Preamp = B	1535-1565nm = C L Band = L Red Band = R Blue Band = B Special = 0	17dBm/50mW = 2 23dBm/200mW = 3 27dBm/500mW = 4 30dBm/1W = 6 33dBm/2W = 5 34dBm/2.5W = 8 36dBm/4W = 9 37dBm/5W = 7 Special = 0	Random = 1 Polarized = 2	Component = 1 Benchtop = 2 Pluggable = 3 Plug/Rack = 4 Special = 0	Bare fiber = 1 0.9mm tube = 3 Special = 0	0.25m = 1 0.5m = 2 1.0m = 3 Special = 0	None = 1 FC/PC = 2 FC/APC = 3 SC/PC = 4 SC/APC = 5 LC/PC = 7 LC/APC = A LC/UPC = U Special = 0

[1]. For Booster, Power means maximum output power. For Preamp, Power means maximum amplification gain.
[2]. Gain not adjustable
[3]. For >1W modules, the fiber cables extrude out of the front.
[4]. Regular connector only rated to 0.5W and will burn at higher power. We make a special beam expanded connector to handle up to 5W
[5]. The connector cannot be installed directly onto bare fiber, as it is prone to damage during shipping. However, the connector can be assembled on bare fiber if a 3 cm protective loose tube is added for reinforcement. The customer can remove this protective tube after testing. The optical power handling of a standard connector is less than 0.5 W for SM28 fiber and decreases further with smaller core fibers.

Note:

- ❑ Preamplifier output power is limited to 25dBm

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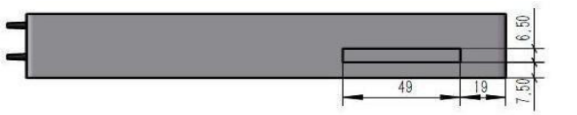
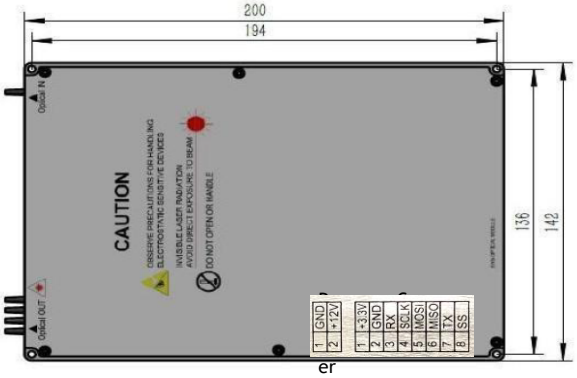
Mechanical Dimension (31dBm)



Unit in mm



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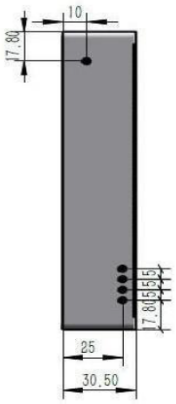

*Product dimensions may change without notice. This is sometimes required for non-standard specifications.

Electronic Connector Pin Assignment/ Communication (33dBm)

Power Port（The pin interval is 5mm）

Pin	Description
1	GND
2	+12V

Communication（The pin interval is 2.54mm）

Pin	Description
1	+3.3V
2	GND
3	RX
4	SCLK
5	MOSI
6	MISO
7	TX
8	SS

Device status by UART Protocol vs RS232

Cmd start	0x45,0x53,0x43,0x4F,0x4D
Cmd length	0x19
Cmd code	0x00
Input light power	0x00,0x00
Output light power	0x00,0x00
Pump 1 current	0x00,0x00
Pump 1 TEC current	0x00,0x00
Pump 1 temperature	0x00,0x00
Pump 2 (940) current	0x00,0x00
Core temperature	0x00,0x00
Output light power of 980 preamplifier	0x00,0x00
NC	0x00,0x00
NC	0x00,0x00
NC	0x00,0x00
NC	0x00,0x00
Checksum	0x19

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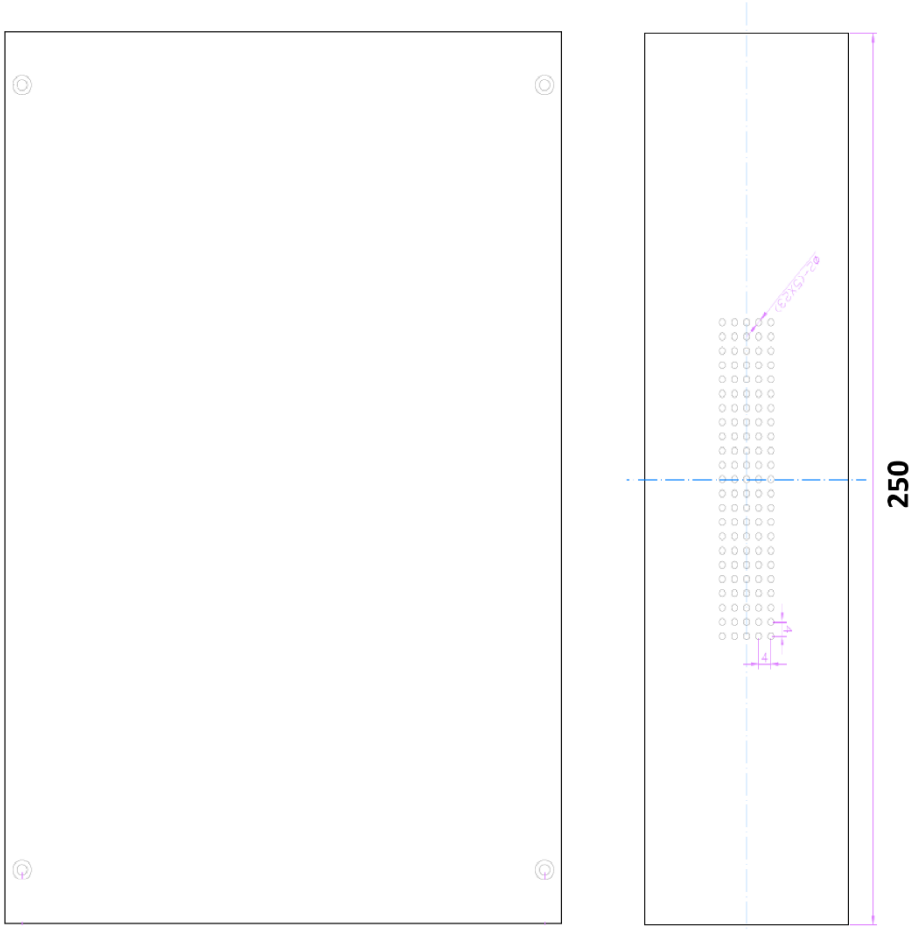
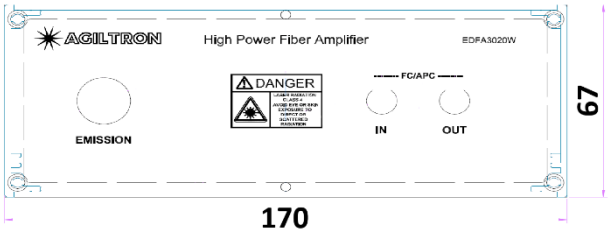
Mechanical Dimensions (mm) 37 dBm





Small-size Benchtop

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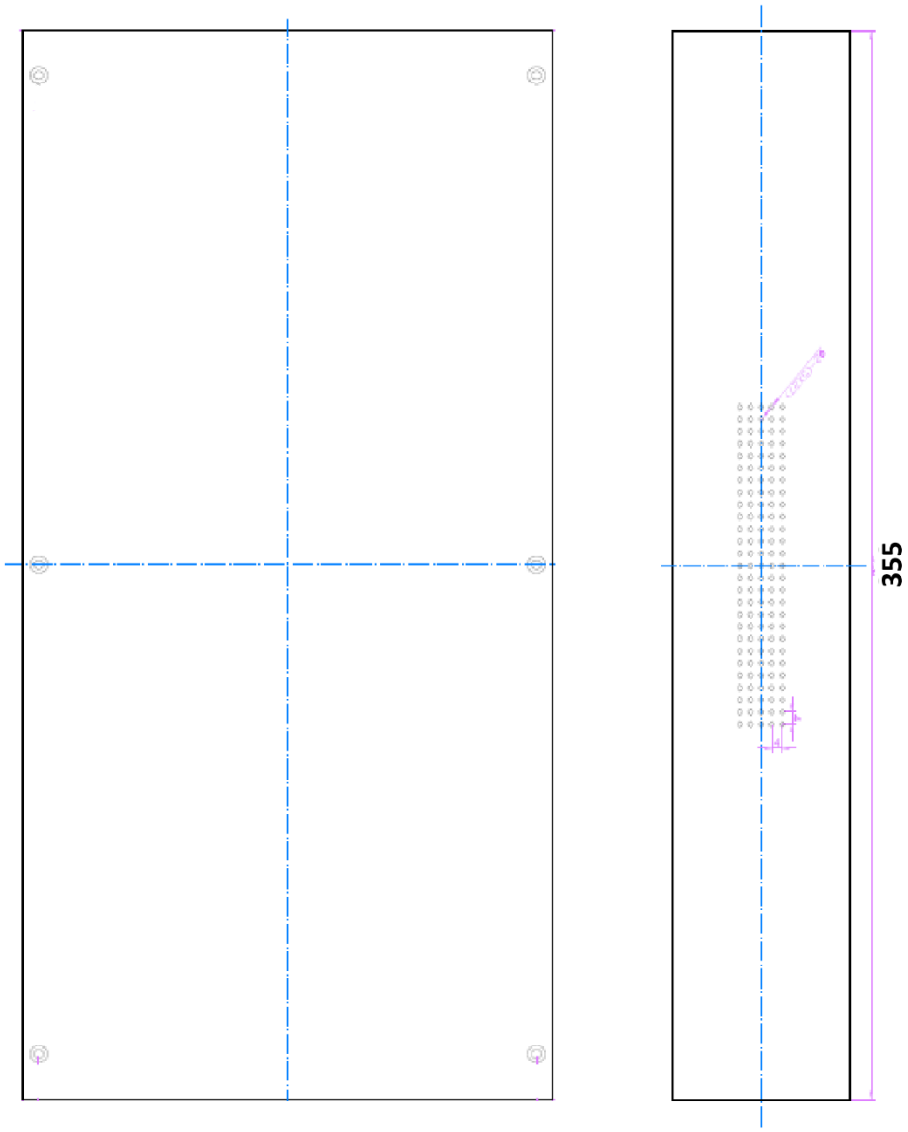
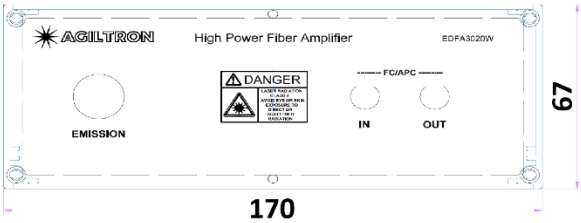
Mechanical Dimensions (mm)





Mid-size Benchtop

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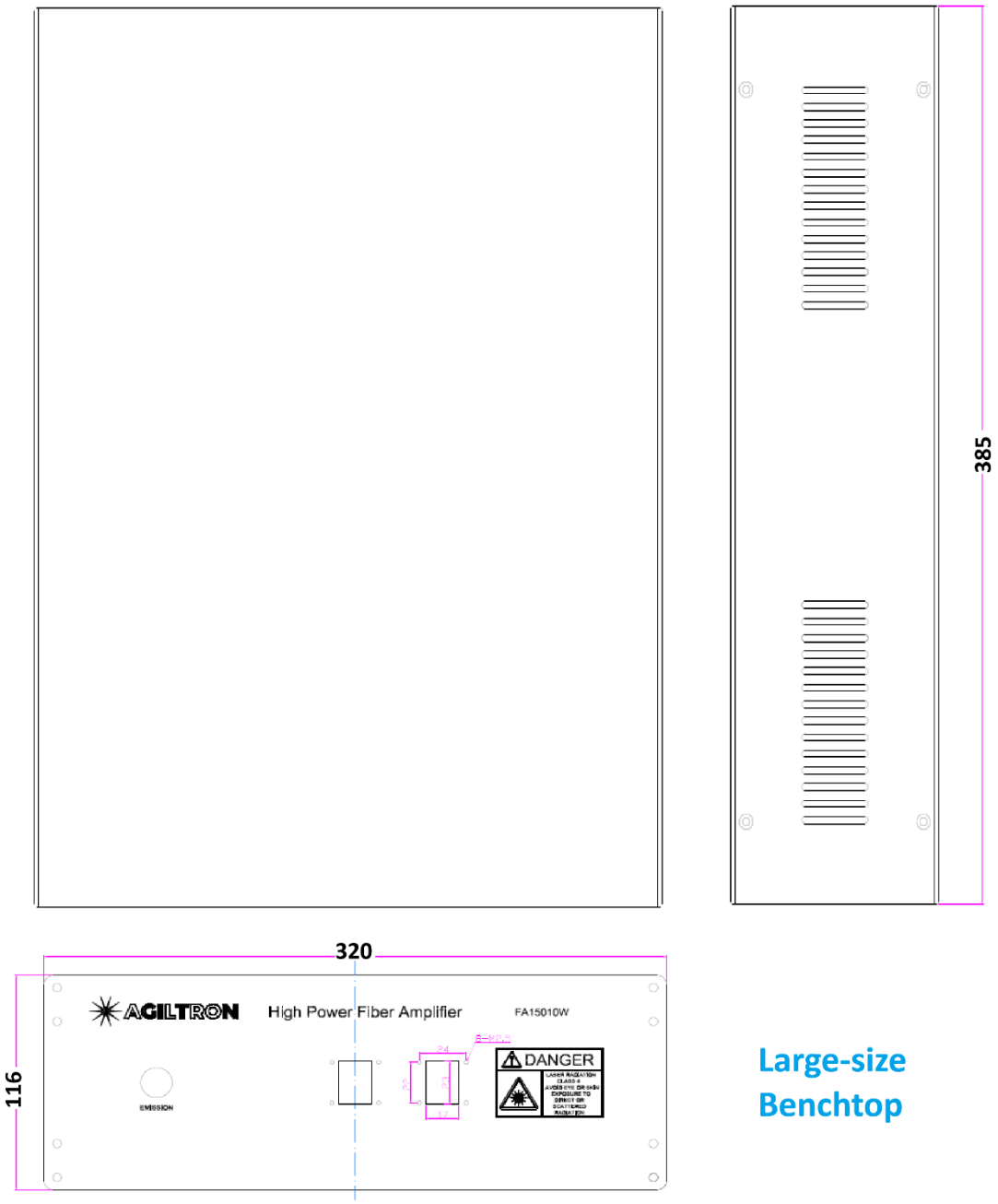
Mechanical Dimensions (mm)



Large-size Benchtop

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Modes Description

The EDFAs have both ACC mode - automatic current control or constant current control and APC mode - automatic power control settable via GUI. In the ACC mode, the pump laser's current is set by the user and automatically locked by the EDFA to achieve a constant pumping current. The EDFA's output power is proportional to the input power and has output even though the input signal is weak. In the APC mode, the user sets the output power, and the EDFA automatically maintains the output constant in a feedback laser pump control way. When the input optical power fluctuates, the APC mode minimizes the fluctuation of the output power and is suitable for power type and line type EDFA.

Package Choices

Component

Benchtop

Net-Control Rack

Application Notes

Fiber Core Alignment
Note that the minimum attenuation for these devices depends on excellent core-to-core alignment when the connectors are mated. This is crucial for shorter wavelengths with smaller fiber core diameters that can increase the loss of many decibels above the specification if they are not perfectly aligned. Different vendors' connectors may not mate well with each other, especially for angled APC.

Fiber Cleanliness
Fibers with smaller core diameters (<5 μm) must be kept extremely clean, contamination at fiber-fiber interfaces, combined with the high optical power density, can lead to significant optical damage. This type of damage usually requires re-polishing or replacement of the connector.

Maximum Optical Input Power
Due to their small fiber core diameters for short wavelength and high photon energies, the damage thresholds for device is substantially reduced than the common 1550nm fiber. To avoid damage to the exposed fiber end faces and internal components, the optical input power should never exceed 20 mW for wavelengths shorter 650nm. We produce a special version to increase the how handling by expanding the core side at the fiber ends.

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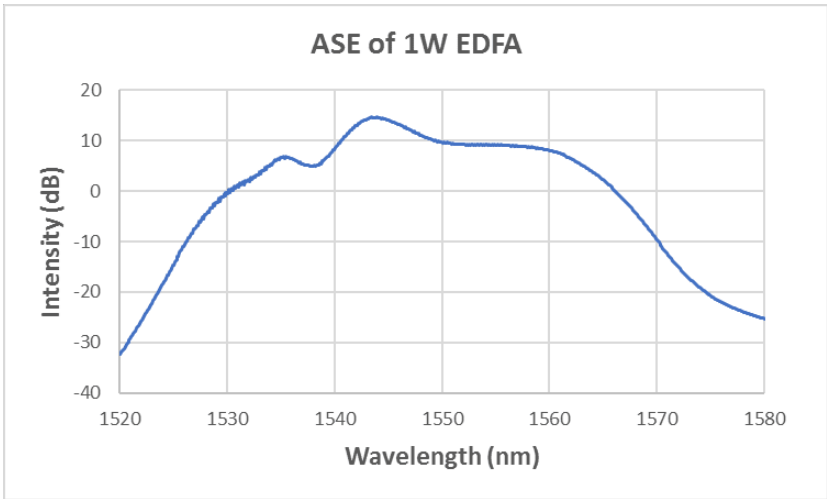
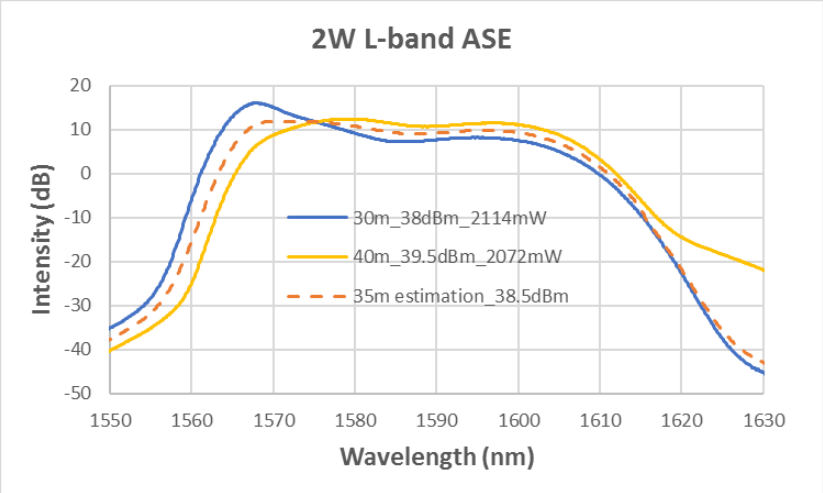
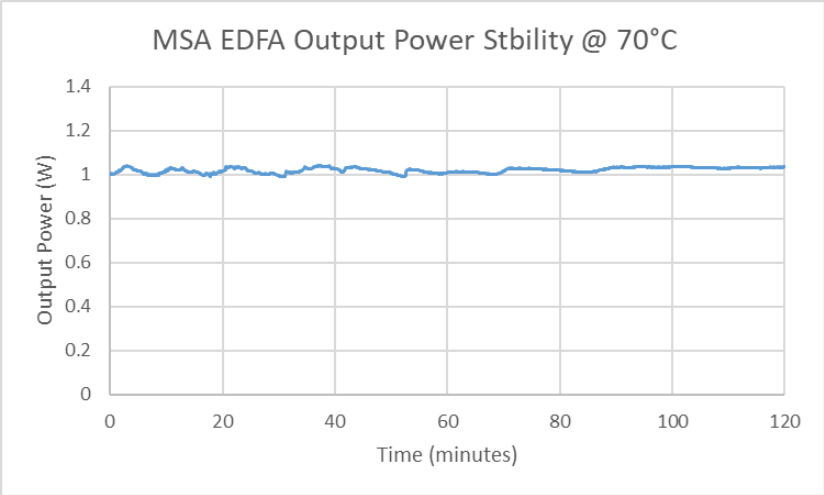
Typical Spectrums







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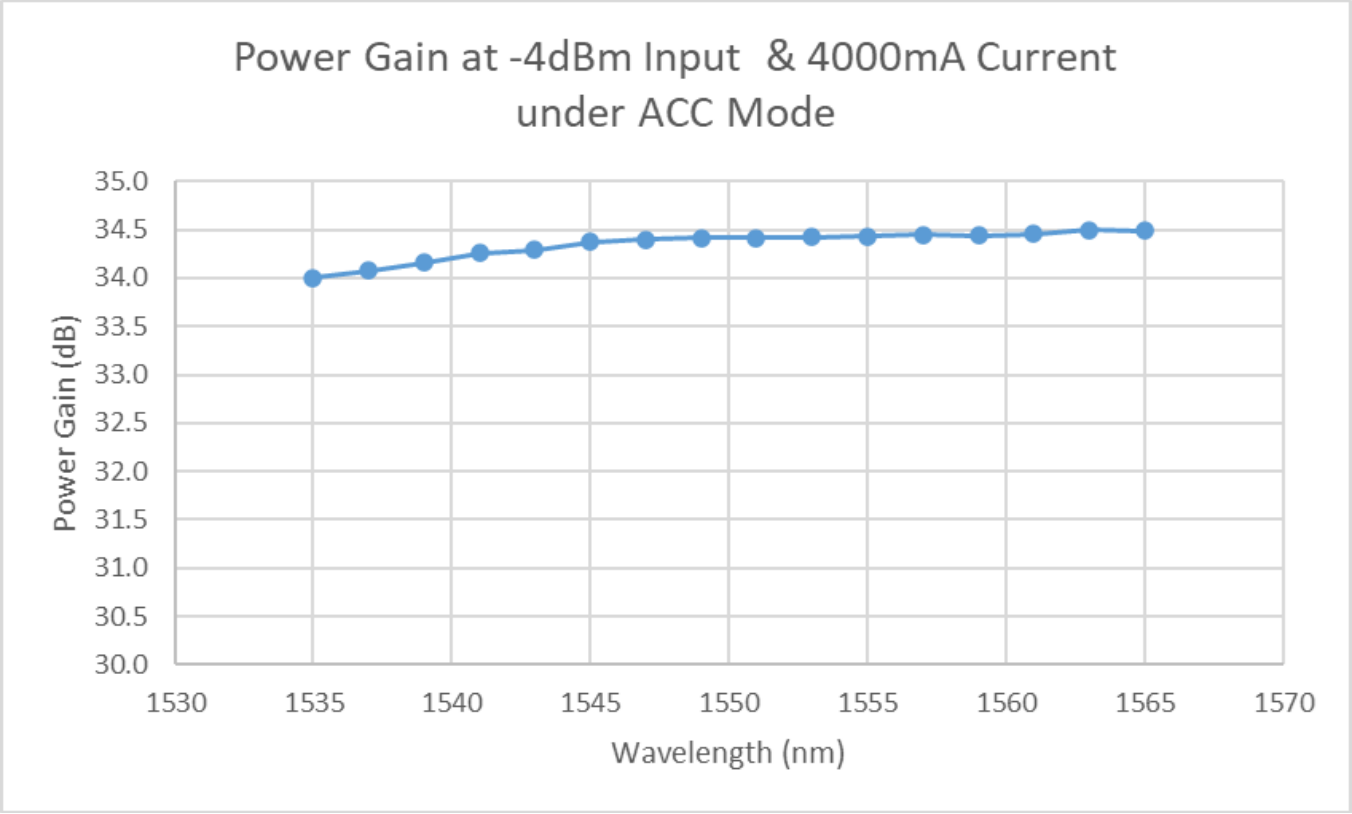
Power gain



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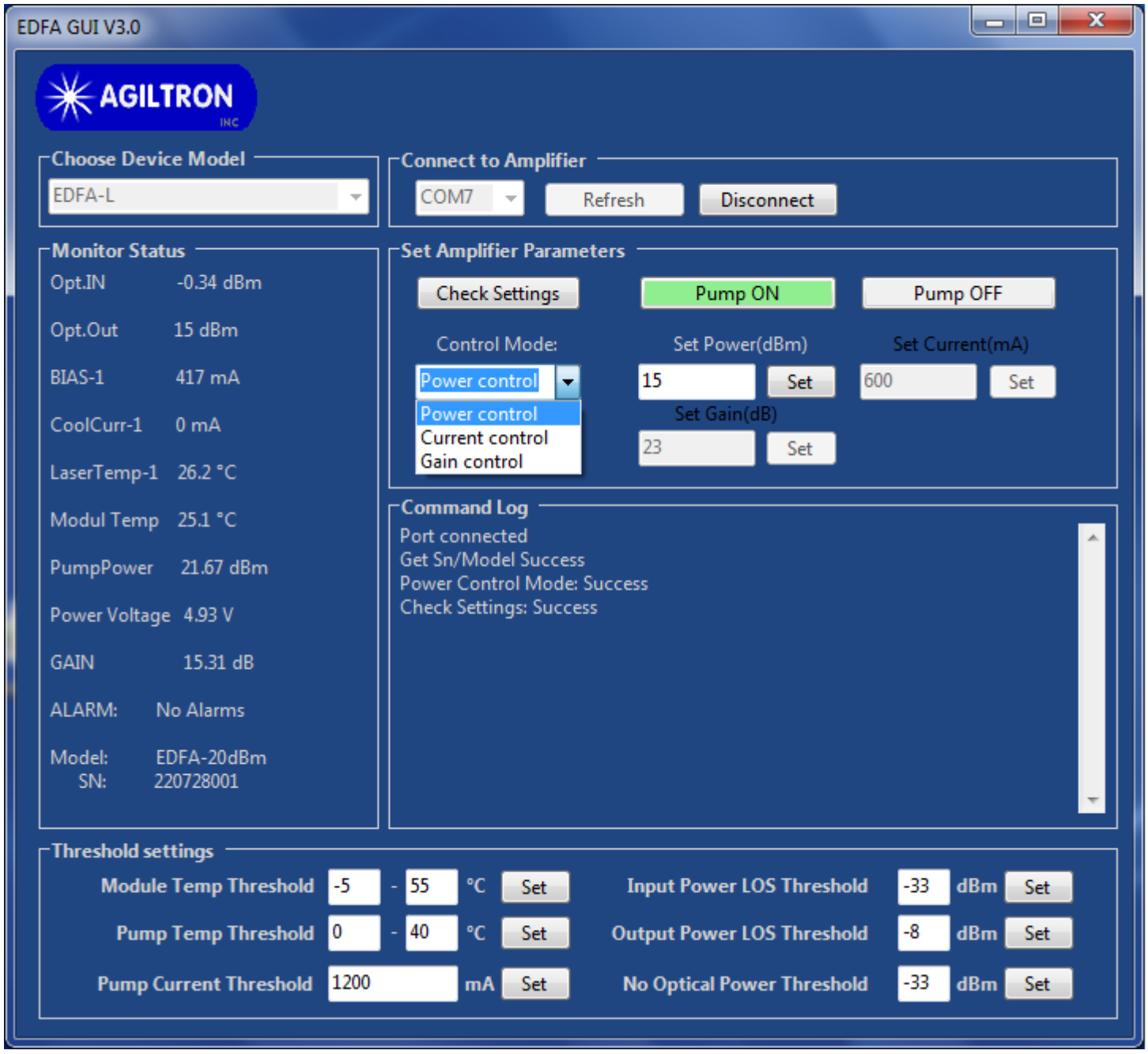
Control GUI



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