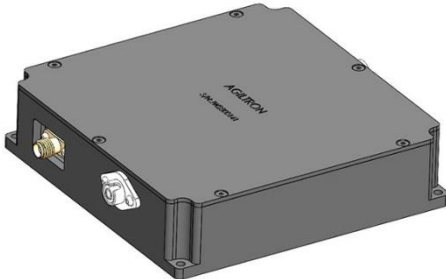


12 GHz EAM Fiber Optical Transmitter



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The EMTX is a 12 GHz fiber optic transmitter designed for RF-over-fiber, antenna remoting, and broadband digital communication, offering high-fidelity RF-to-optical signal conversion. It features a monolithically integrated distributed feedback (DFB) laser coupled with a high-speed electro-absorption modulator (EAM) for efficiently converting both analog and digital RF signals into optical signals with high fidelity. The module contains a precision laser and TEC controller and includes a built-in DC bias circuit to ensure a linear response, while a USB interface enables laser power adjustment, bias control voltage adjustment, and status monitoring. The EMTX operates on a low-noise $\pm 5V$ DC power supply, available as an optional accessory.

Features

- Wide Bandwidth up to 12 GHz
- USB Optical Power/Bias Control
- Integrated Bias-Tee
- Low RF Drive Voltage

Applications

- Phased and interferometric array antenna
- Broadband delay-line and signal processing
- 12 GHz RF over Fiber
- RF/IF signal distribution
- Radar system link
- Satellite antenna signal distribution



Specifications

Parameter	Min	Typical	Max	Unit
DFB Laser Wavelength	1540	1550	1560	nm
S21 3 dB Bandwidth (includes bias-T)		10		GHz
Optical Output Level @ 0V bias	0			dBm
Optical Return Loss		30		dB
DFB Linewidth (FWHM)			3	MHz
DFB Side Mode Suppression Ratio		40		dB
Relative Intensity Noise (RIN)			-135	dB/Hz
Input Impedance		50		Ω
Frequency Response Flatness (in any 1 GHz bandwidth)		$< \pm 0.5$		dB
VSWR			1.0:1	
Analog				
Operational RF Bandwidth		12		GHz
Max. RF Input		+13		dBm
1 dB Compression Point		+8		dBm
Harmonic Distortion @ 0 dBm RF input		40		dBc
Input IP3		12		dBm
Digital				
Data Rate		125		Gb/s
Drive Voltage		3		V
Pulse Response (10% rise time)		40		ps
Extinction Response		10		dB
Mechanical				
Operating Temperature	-20		70	$^{\circ}C$
Storage Temperature	-55		85	$^{\circ}C$
Operating Humidity		85		%
Power Supply Requirements	± 5 V DC, 2A max			
Optical Connector	FC/APC, other optional			
RF Input Connector	SMA female			
Electrical Power Connector	3-pin Molex			
Remote Interface	USB			
Accessories Included	Matching power supply			

Rev 01/28/25

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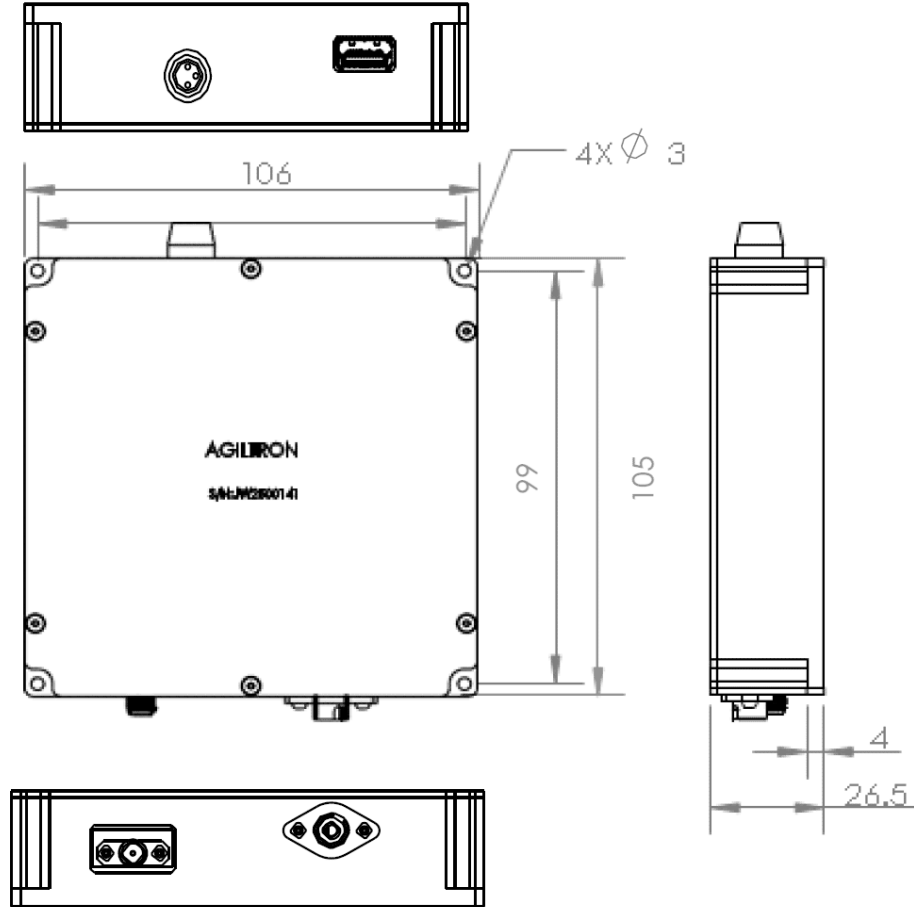
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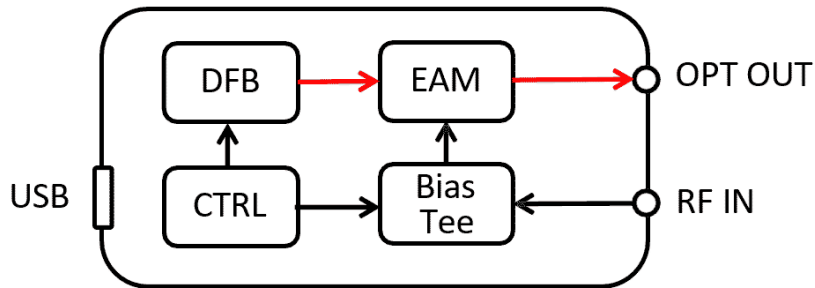
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Mechanical Drawing



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

Functional Diagram

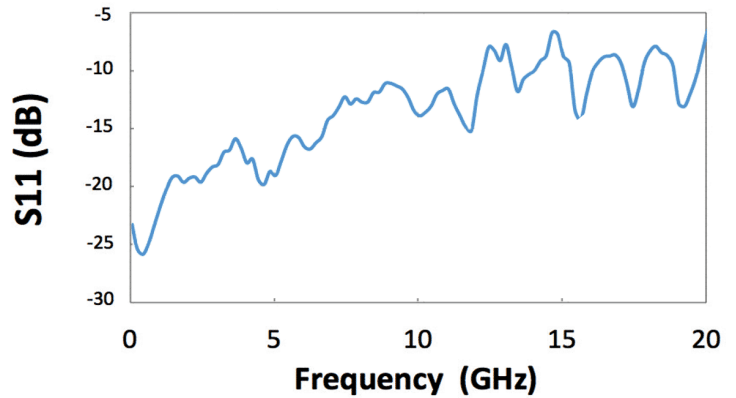
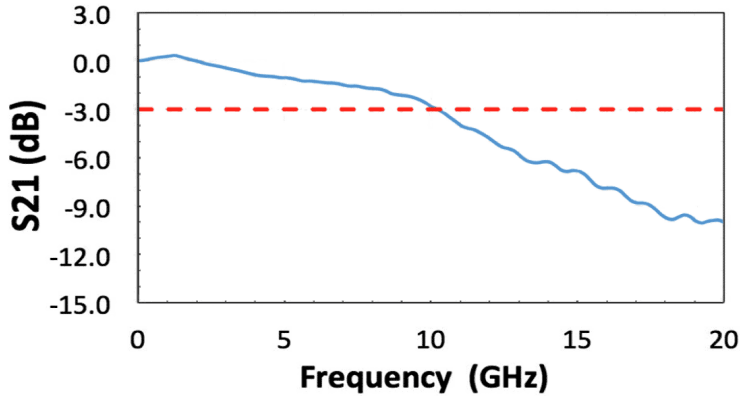


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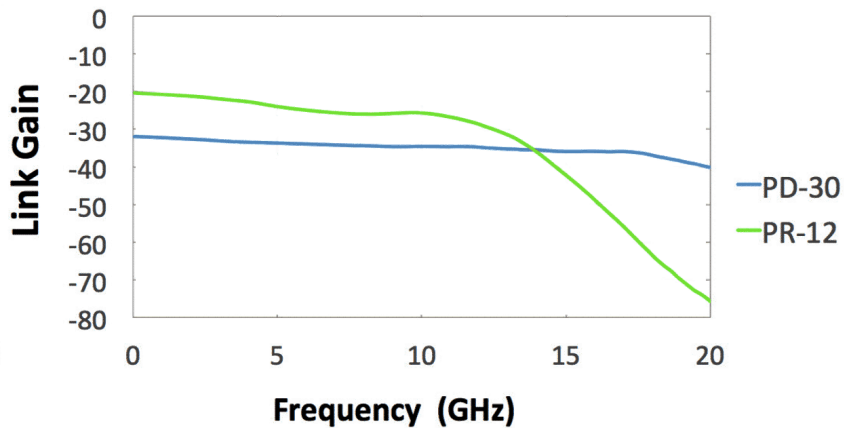
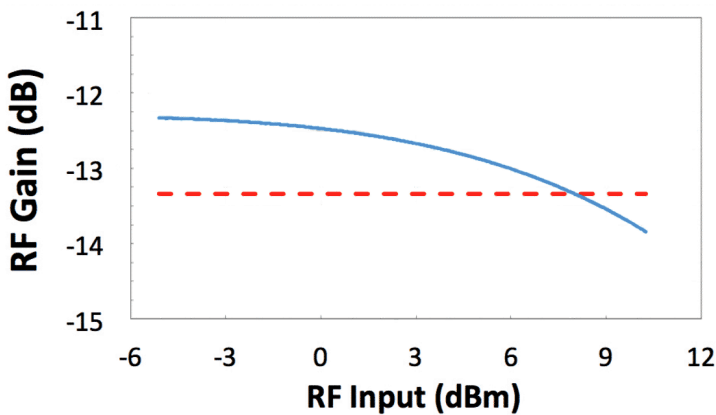


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Typical S21 and S11 Response



1 dB Compression and Link Gain Comparison

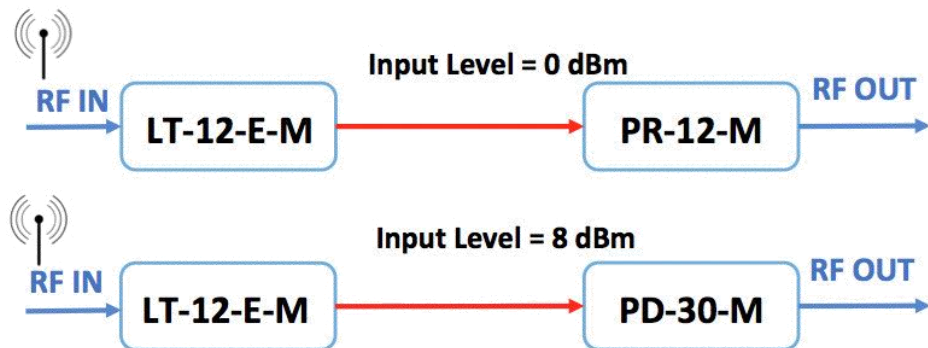


Test Conditions & Link Gain Measurements

LT-12-E-M Output = 3.5 dBm

Link Gain w/PR-12 = -20 dB @ 1 GHz

Link Gain w/PD-30 = -32 dB @ 1 GHz

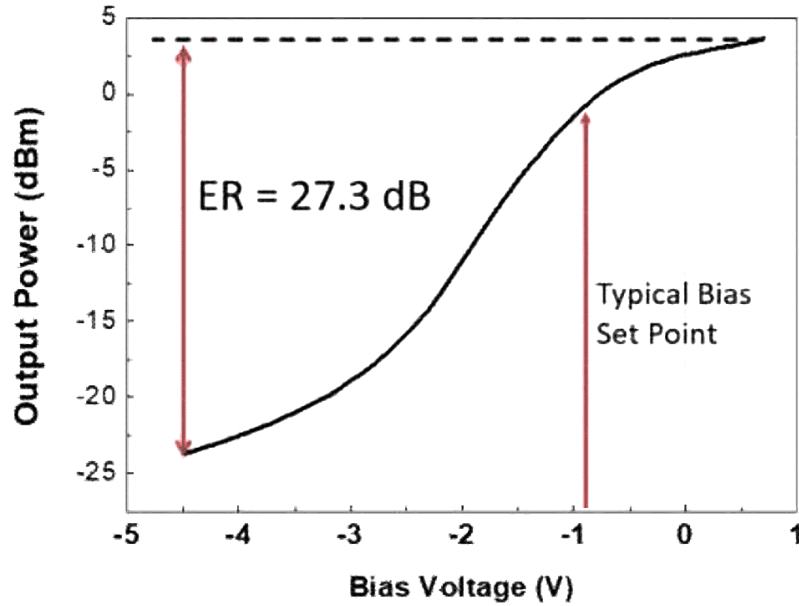


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Transfer Function



Note: Max bias is -5 ~ 1 V. Exceeding this range may damage the device.

Ordering Information

Prefix	Bandwidth	Wavelength	DC Power Supply*	Package	Fiber Type	Connector
EMTX-	12GHz = 12	1550nm = 5	Non = 1 DPPS5V = 2	Standard = 111	SM28 = 1 PM1550 = 2 Special = 0	FC/APC = 3 Special = 0

*DPPS5V wall pluggable DC power supply is \$165 ea

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Caution Electrostatic Sensitivity



- Never touch laser diode and the module using hands
- Always use protections when handle a laser diode
- Recommend mounting the laser diode using an ionic gun and ESD finger cots

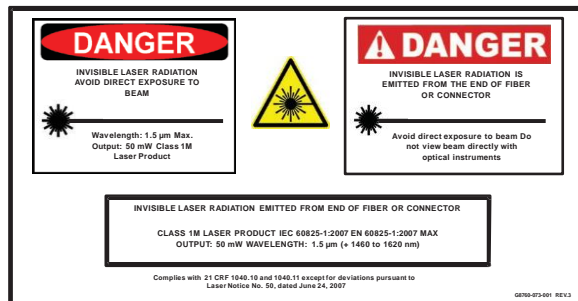


Laser Safety

This product meets the appropriate standard in Title 21 of the Code of Federal Regulations (CFR). FDA/CDRH Class 1M laser product. This device has been classified with the FDA/CDRH under accession number 0220191. All versions of this laser are Class 1M laser products, tested according to IEC 60825-1:2007 / EN 60825-1:2007. An additional warning for Class 1M laser products. For diverging beams, this warning shall state that viewing the laser output with certain optical instruments (for example eye loupes, magnifiers, and microscopes) within a distance of 100 mm may pose an eye hazard. For collimated beams, this warning shall state that viewing the laser output with certain instruments designed for use at a distance (for example telescopes and binoculars) may pose an eye hazard.

Wavelength = 1.3/1.5 μm .

Maximum power = 30 mW.



*Caution - Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

*IEC is a registered trademark of the International Electrotechnical Commission.