20 GHz EAM Fiber Optical Transmitter

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The EMTX is a 20 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 ±5V DC power supply, available as an optional accessory.

The bias T voltage is adjustable via USB to optimize the performance.

Features

- Wide Bandwidth up to 20 GHz
- USB Optical Power/Bias Control
- Integrated Bias-Tee
- Low RF Drive Voltage

Applications

- 20 GHz RF over Fiber
- Phased and Interferometric Array Antenna
- 40 Gb/s NRZ / RZ Data Communication
- RF/IF Signal Distribution

Specifications

Parameter	Min	Typical	Max	Unit
Frequency Range [1]	0.01		20	GHz
RF Gain [2,3]		-18		dB
Gain Flatness for the entire frequency range [4]		±1.6		dB
1dB Input gain compression point [3]		11		dBm
Noise Figure [2,3]		24		dB
SFDR (calculated) [3,5]		114		$dBm/H^{2/3}$
Maximum RF input level (No damage)		16		dB
VSWR Input		2:1		-
VSWR Output		2:1		-
Spurious [4]		≤ -90		dBc
Phase Noise at 10KHz Offset		≤ -130		dBc/Hz
Input / Output impedance		50		Ω
Laser diode optical wavelength		1.55		µm
Receiver photodiode optical wavelength	1.5		1.58	µm
Operating temperature range	0		+70	°C
Storage temperature	-40		+85	°C
LED status indicators (Tx/Rx)		Blue/Green/Red		-
Input voltage [7]		5		VDC
Power consumption Tx module [8]		2		W
Power consumption Rx module [8]		0.25		W
RF Input / Output connectors		SMA		-
Optical Connector		FC/APC		-
Power connector and Data/monitor connector [9]		DB15		-

Notes:

[1]. Extended low frequency 0.01-20.0 GHz is optional.
[2]. Excluding customer fiber loss.
[3]. Measured at 10GHz. Typical values of Gain, P1dB and NF with Pre/Post Amps are indicated in the table below.
[4]. Each of the pre/post amplifiers (optional) add about ±1.2dB to the gain flatness.
[5]. Excluding in-band harmonics. SFDR (calculated) ≈ $2/3x[(IP1dB+10)+174-NF]$ $dB/Hz^{2/3}$.
[6]. Measured with input signal at Ip1dBc - 3dB at 1GHz. Ultra with 30dB post amplifier spurious level is about -85dBc
[7]. Recommended Power Supplies: Meanwell P/N GSM25U05-P1J (USA); GSM25E05-P1J (Europe); GE40I05-P1J (all purpose).
[8]. Each of the pre/post amplifiers (optional) add about 1.8W to the module power consumption.
[9]. For USB monitor software please contact us.

RoHS COMPLIANT

ATTENTION
OBSERVE PRECAUTIONS FOR HANDLING ELECTROSTATIC

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]:

Rev 01/20/26

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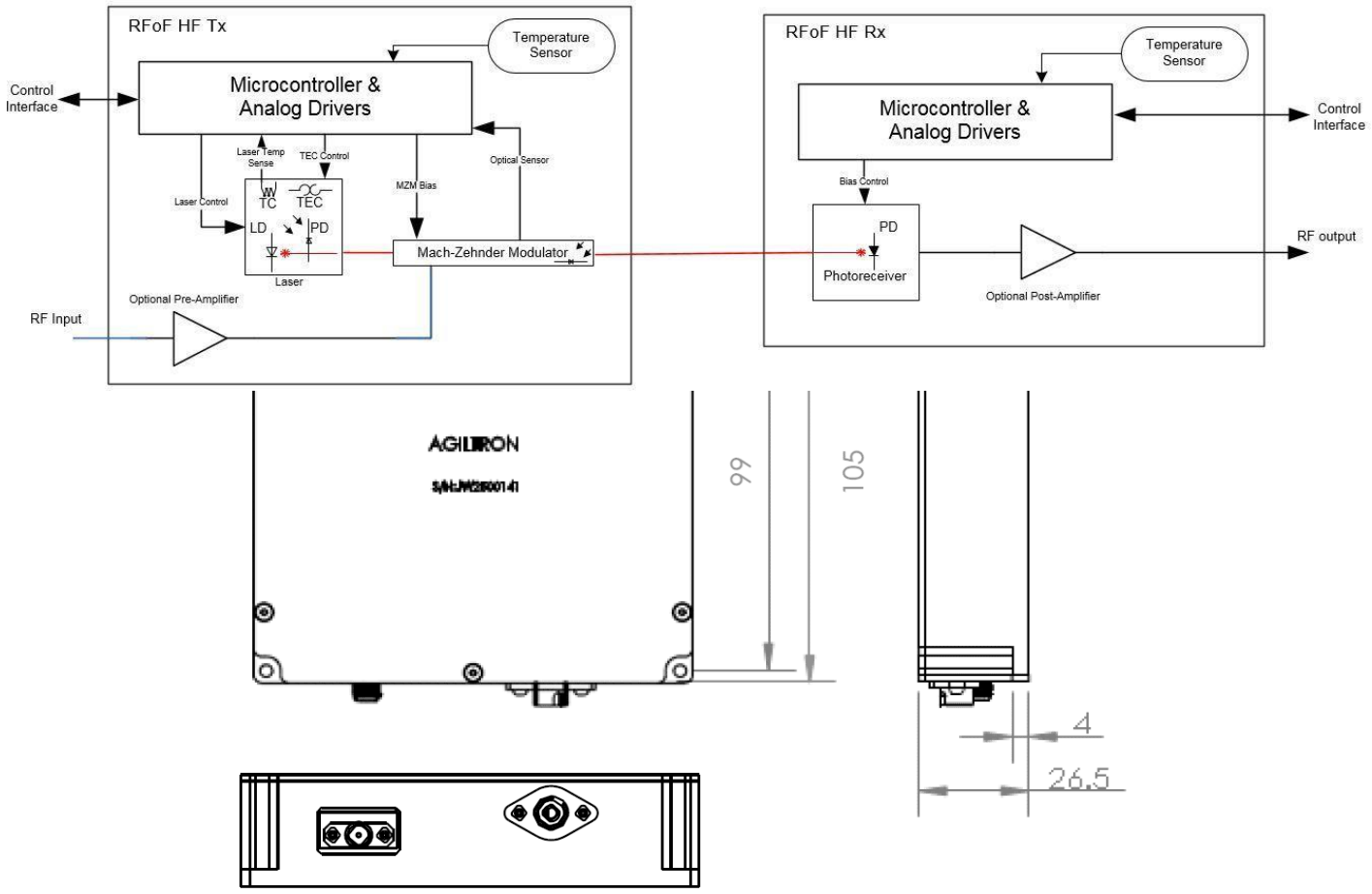
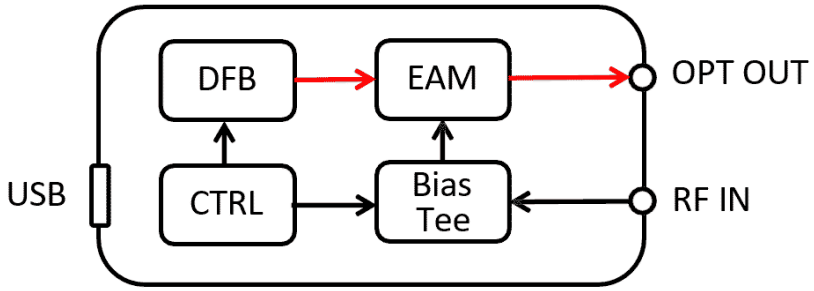
Mechanical Drawing (mm)



*Due to our continuous product improvement program, specifications are subject to change without notice.

Functional Diagram



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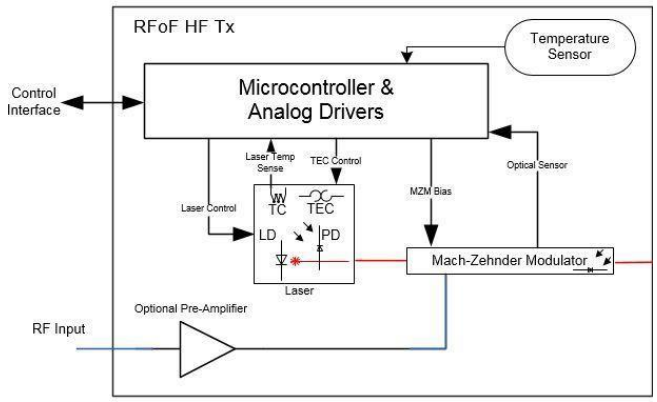
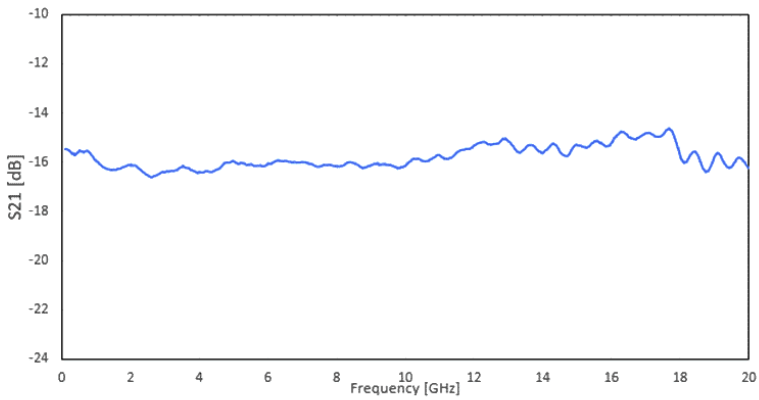
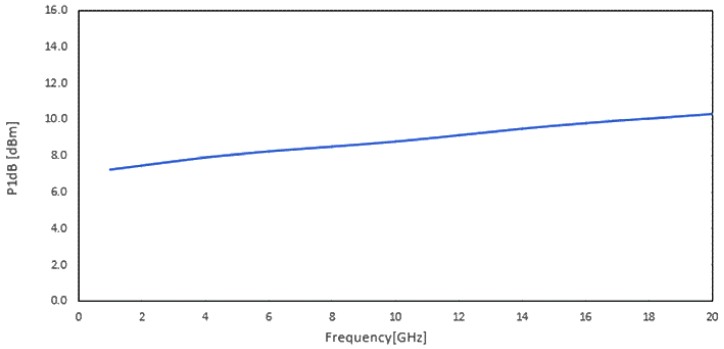
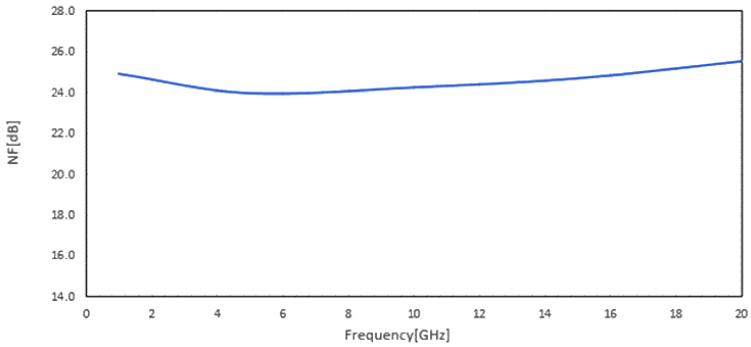
Simplified Block Diagram



Typical Response







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Ordering Information

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Prefix	**Bandwidth**	**Wavelength**	**DC Power Supply ***	**Package**	**Fiber Type**	**Connector**
EMTX-	20GHz = 20	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

Caution Electrostatic Sensitivity

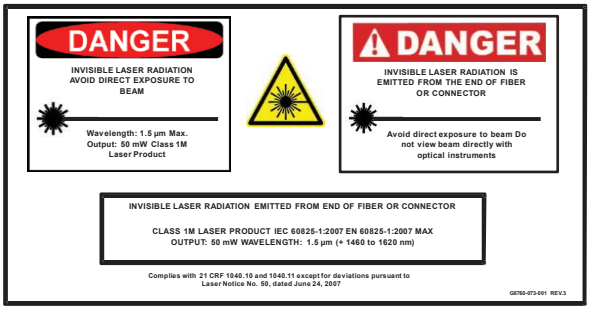
- Never touch laser diode and the module using hands
- Always use protections when handle a laser diode
- Recommend mounting the laser diode using an ionic gun and ESD finger cots

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.
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