



Applications

- Microwave antenna signal distribution
- Broadband delay-line and signal processing systems
- Frequency distribution systems
- Radar system calibration
- Phased array antenna systems, interferometric antenna arrays

Features

- 50 MHz – 18 GHz
- High dynamic range
- Fully integrated unit
- Bias control circuits for laser and modulator

Externally Modulated Transmitter SITU3000

0.05 – 18 GHz, 1550nm Externally Modulated Self-Contained Transmitter

The Emcore Small Integrated Transmitter Unit (SITU) is a high performance externally modulated transmitter for applications from 50 MHz to 18 GHz. The SITU3000 is a fully integrated unit that contains both the optics and the control electronics. Only DC input voltages and the RF signal are required for operation.

The units can be used to construct transparent links for antenna remoting. The broad bandwidth is intended for applications such as electronic warfare and Ku band systems. Other applications include delay lines and signal processing systems.

The system operates at a nominal wavelength of 1550 nm. Wavelength selected lasers on the ITU grid are also available for WDM applications.

Performance Highlights

	Min	Typical	Max	Units
Frequency Range	.05	--	18	GHz
RF input power dBm (damage threshold)	0	--	+25	dBm
Wavelength		1550		nm
Optical Output Power	8	9	10	dBm
Temperature Range	-40	--	70	°C

See following pages for complete specifications and conditions.

For more information on this and other products:

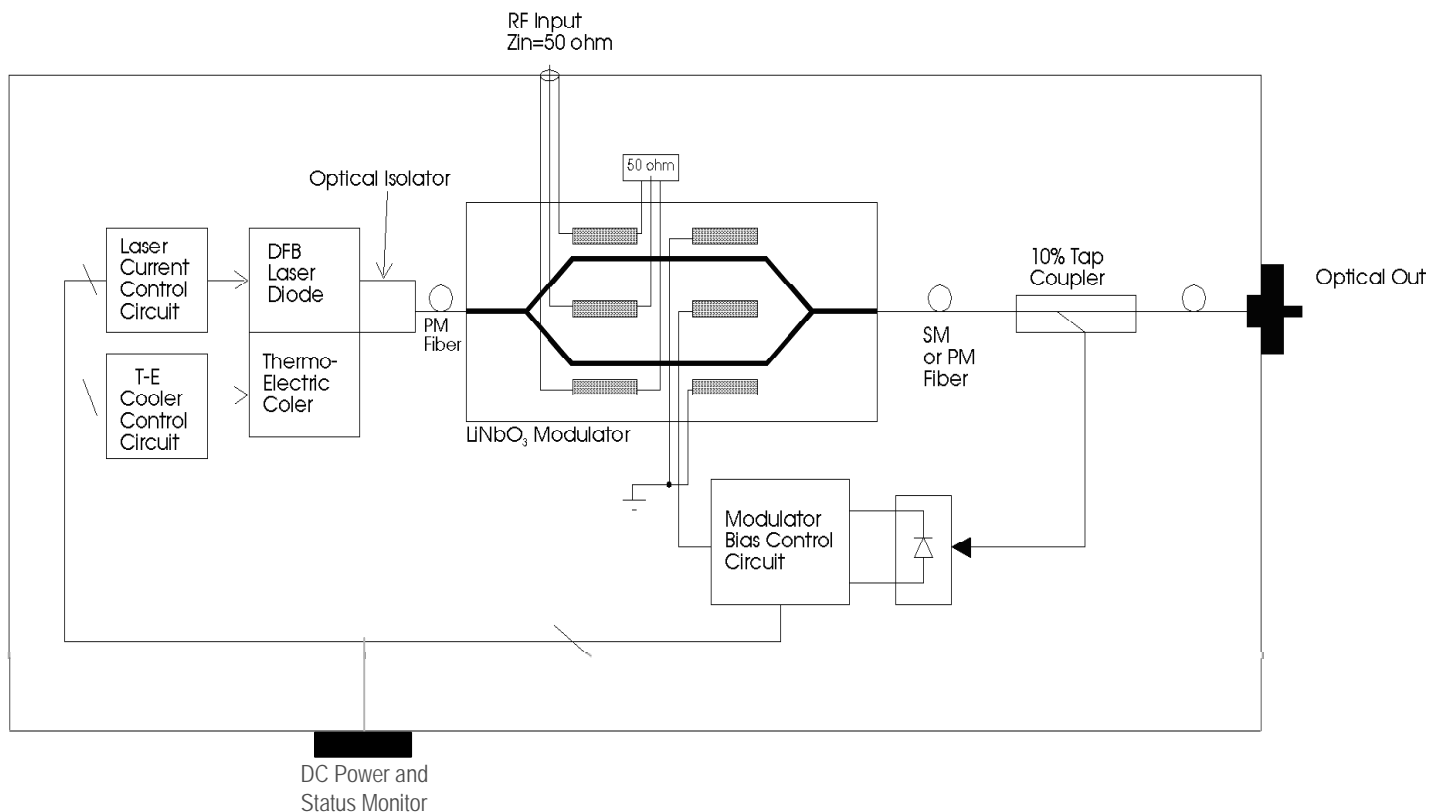
Contact Sales at Emcore 626-293-3400, or visit www.emcore.com.

Absolute Maximum Ratings

Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. These are absolute stress ratings only. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of the data sheet. Exposure to absolute maximum ratings for extended periods can adversely affect device reliability.

Parameter	Symbol	Min	Max	Units
Operating Temperature (within specifications)	T_{OP}	-40	70	°C
Storage Temperature	T_{STG}	-40	70	°C
RF Input	S_{in}	0	25	dBm

Reference Block Diagram



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Optical Characteristics

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Wavelength*	λ	-	1520	1550	1580	nm
Optical Output Power	P_L	-	8	9	10	dBm
Connector Return Loss**	-	-	65	--	--	dB
Optical Connector Type		FC/APC				

Notes:

* Optical wavelength must be between 1530 – 1562 nm for use with Emcore PONA2100-series EDFA, and between 1545 – 1562 nm for use with Emcore PONA3000-series high power optical amplifier.

** In order to prevent reflection-induced distortion degradation, the laser should be connected to an optical cable having a return loss of at least 55 dB for discrete reflections and 30 dB for distributed reflections.

RF Characteristics

Parameter	Condition	Min	Typ	Max	Unit
Operational Bandwidth		0.05		18	GHz
RF Input Impedance	-		50	-	Ω
RF Return Loss		9.5	15		dB
2 nd Harmonic Suppression	RF input 0 dBm		-65	-45	dBc
1 dB Compression Point		+15	+17		dBm
RF Connector	SMA (F) Type				

Transmitter Performance

(SITU3000 transmitter with 0 dBm RF input measured with HP83440C photodiode with 0 dBm optical input power)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Link Gain	G	@ 1 GHz		-35		dB
		@ 18 GHz		-44		
Noise Figure	NF	@ 10 GHz		41		dB
Input IP3	IIP3	@10 GHz		+30		dBm
Spurious Free Dynamic Range	SFDR	@ 10 GHz		108		dB·Hz ^{2/3}
Gain Variation		50 MHz to 1 GHz			5	dB
		1 GHz to 18 GHz		9	10	

Link Performance

(SITU3000 transmitter with 0 dBm RF input and SIRU3000 receiver with +10 dBm optical input power)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Link Gain	G	@ 1 GHz		-22		dB
		@ 18 GHz		-22		
Noise Figure	NF	@ 10 GHz		37		dB
Input IP3	IIP3	@10 GHz		+27		dBm
Spurious Free Dynamic Range	SFDR	@ 10 GHz		109		dB·Hz ^{2/3}
Gain Variation		50 MHz to 1 GHz		2	5	dB
		1 GHz to 18 GHz		5	10	

DC Power

Input Voltage	Max Current
+5	2 A
+15	0.1 A
-5	0.4 A
-15	0.1 A

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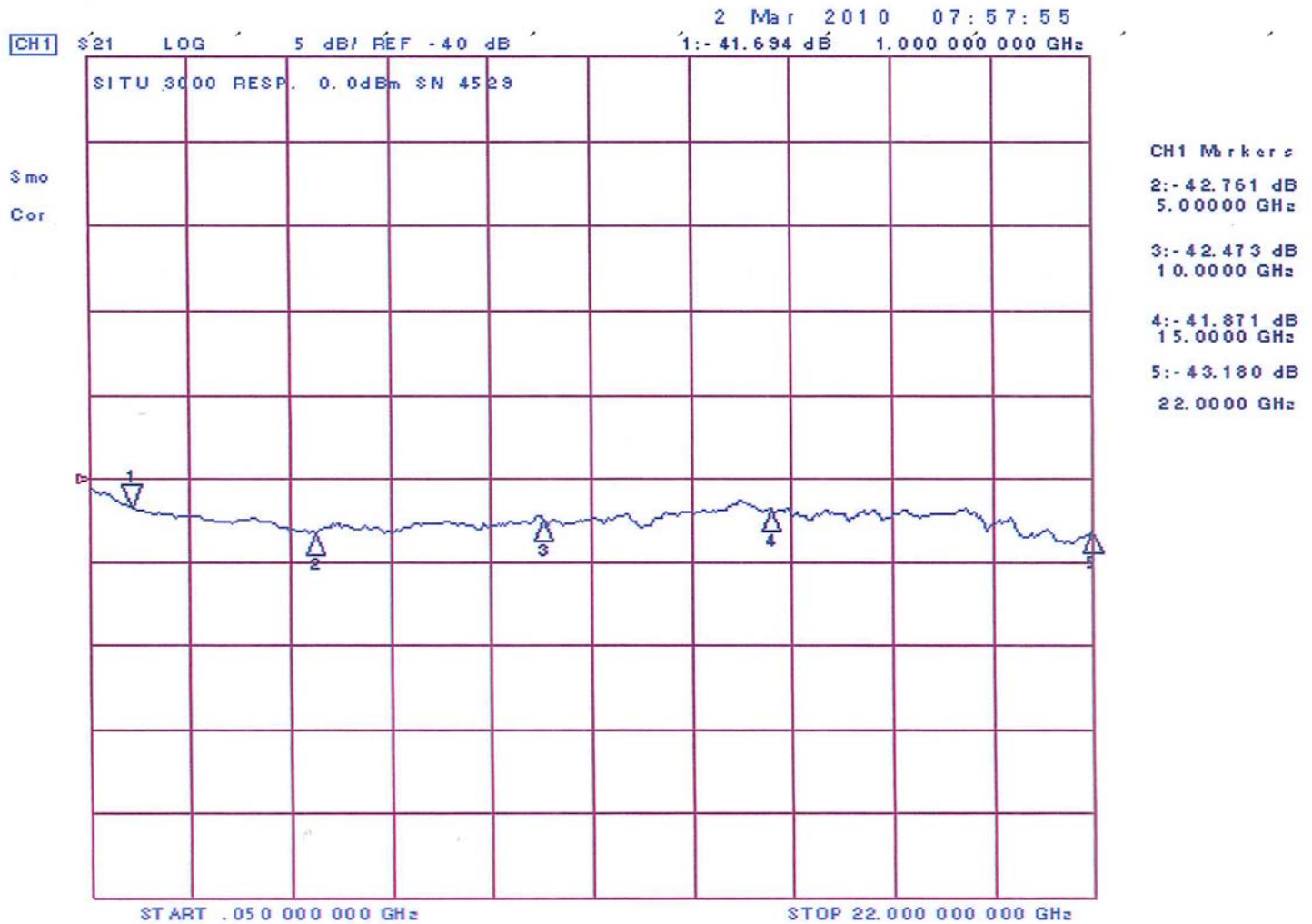
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Typical Frequency Response

(SITU3000 transmitter with 0 dBm RF input and SIRU3000 receiver with 0 dBm optical input. Link RF power level output will change 2 dB for each 1 dB change in RX optical input power level)



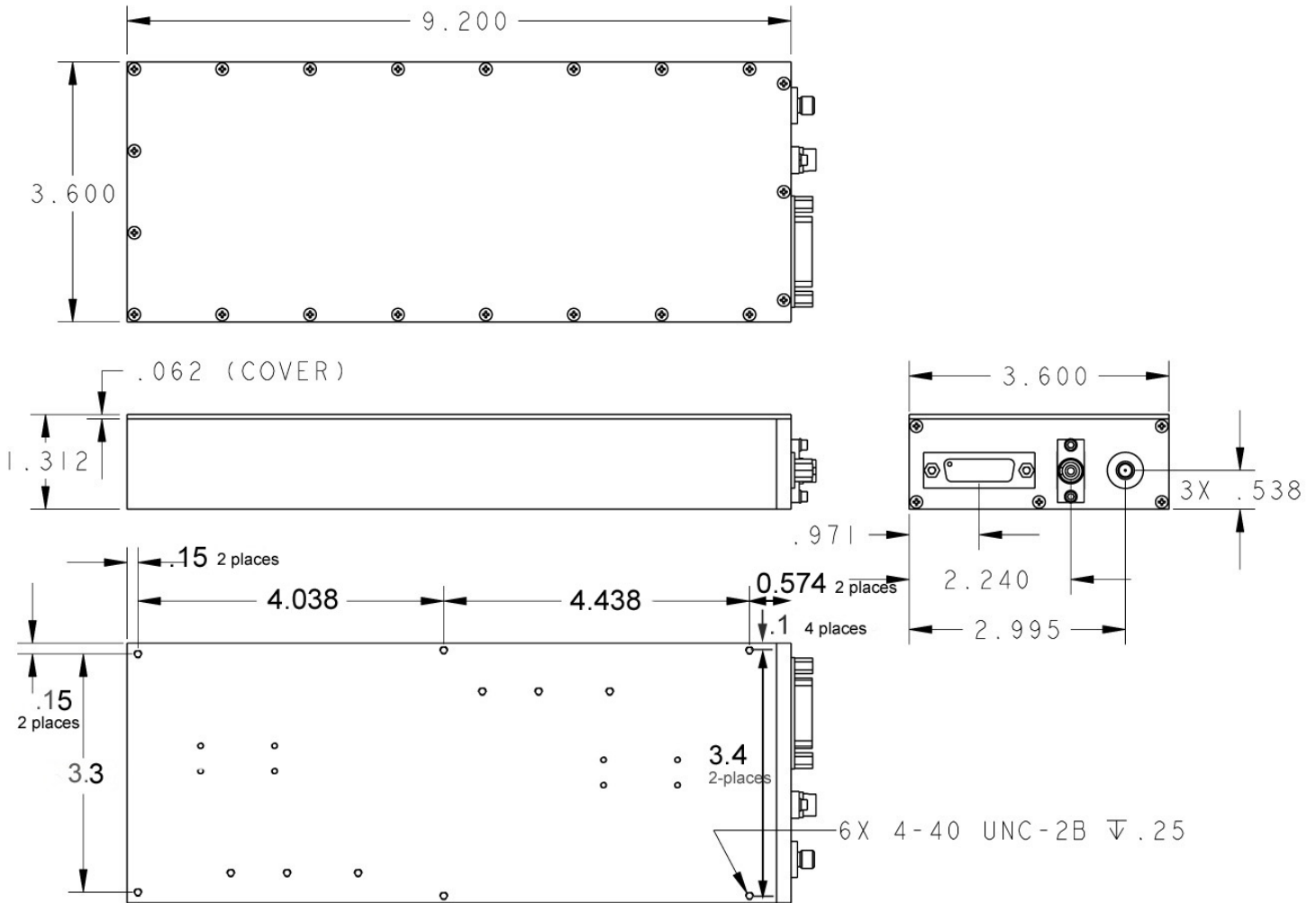
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Ordering Information

SITU3000 0.05 – 18 GHz Externally Modulated Transmitter, 8 dBm min Optical Output Power

Mechanical Dimensions



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D-Connector Pin Out

Pin	Function	Comments
1	+15 VDC	
2	-15 VDC	
3	+5 VDC	
4	-5 VDC	
5	Laser Current Monitor	1 V/A
6	Optical Power Monitor	0.25 V/mW
7	Reserved for factory use	
8	Reserved for factory use	
9	TX Power Control	0V off; 5V, on
10	NC	
11	NC	
12	GND	
13	GND	
14	GND	
15	Reserved for factory use	

Laser Safety

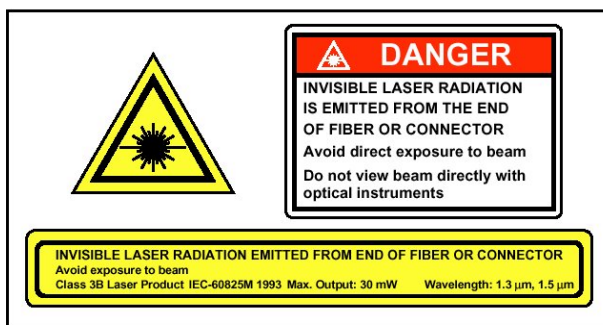
Class IIIb Laser Product

FDA/CDRH Class IIIb laser product. All transmitter versions are Class IIIB laser products per CDRH, 21 CFR 2040 Laser Safety requirements. All versions are Class 3B laser products per IEC*60825-1:1993.

Maximum Power = 10 dBm

Caution: Use of controls, adjustments and procedures other than those specified herein may result in hazardous laser radiation exposure.

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



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