DATA SHEET – FEBRUARY 2011

Integrated Microwave Transmitter

RACK2200-11

2 – 18 GHz, 1550 nm Externally Modulated Transmitter with Optical Output Switching and Control

The Emcore RACK2200-11 is an integrated, 1 RU high-performance transmitter with guaranteed performance over the 2 – 18 GHz frequency band. It incorporates a high dynamic range externally modulated transmitter and provides +6 dBm minimum of optical output power. It also provides user-control for optical output on-off switching for transmit control, which based on the status of a control line input, reduces the optical output power by a minimum of 6 dBm.

The unit can be used to construct transparent optical links for microwave test cell antenna remoting, microwave signal distribution, microwave delay lines, point-to-point data links and other applications where it is necessary to transport RF and microwave signals over long distances without signal degradation.

The unit operates at a nominal optical wavelength of 1550 nm.

Applications

- **Microwave Test Cell Antenna Signal Remoting**
- **Microwave Data Links**
- **Broadband Delay-Line and Signal Processing Systems**
- **Frequency Distribution Systems**

Features

- **Integrated externally modulated transmitter**
- **0.05 – 18 GHz bandwidth**
- **High dynamic range**
- **Optical output transmit control**
- **1 RU rack mount package**
- **Rear panel RF and optical connections**

Specifications

Electrical

RF Connectors	SMA (female, 50Ω), Rear Panel Mounted
Frequency Range	2 to 18 GHz
TX RF Input Power – No Damage	+30 dBm, max
Input IP3 at 18 GHz	+26.5 dBm, typical
Input P1dB at 18 GHz	+25 dBm, typical
Noise Figure	50 dB, typical

Optical

Wavelength	1550 ± 30 nm
Connectors	SC/APC, Rear Panel Mounted*
TX Optical Output Power	+6.5 +/- 0.7 dBm
Optical Power Stability	<± 0.5 dBm over temperature and time

Physical

Configuration	Self Contained 1 RU Housing, 19” Rack
Dimensions	1.75” H x 17” W x 14” D
Operating/Storage Temperature	0°C to +50°C
Power Requirements	110 VAC @ 20W

Interface and Control

Front Panel Indicators & Controls	Power Toggle Switch, Red and Green Status LEDs
Rear Panel Indicators & Controls	50Ω BNC (female) for Laser Blanking Control, 9-Pin Sub-D Connector

Optical Characteristics

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Wavelength	λ	-	1520	1550	1580	nm
Optical Output Power	P_L	-	5.8	-	7.2	dBm
Optical RIN	-		-	-	-153	dB/Hz
Connector Return Loss	-	-	55	-	-	dB
Optical Connector Type	-	FC/APC				

*Note: 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. APC optical connectors provide this level of reflection performance.

RF Characteristics

Parameter	Condition	Min	Typ	Max	Unit
Operational Bandwidth	-	2		18	GHz
RF Input Impedance	-	-	50	-	Ω
RF Return Loss	2 – 18 GHz	9.5	15	-	dB
2nd Harmonic Suppression	RF input 0 dBm		-65	-45	dBc
1 dB Compression Point	2 GHz	22.2	-	25.2	dBm
	6 GHz	23.1	-	26.1	dBm
	10 GHz	23.8	-	26.8	dBm
	14 GHz	24.2	-	27.2	dBm
	18 GHz	24.6	-	28.6	dBm
Input IP3	2 GHz	31.6	-	34.6	dBm
	6 GHz	32.7	-	35.7	dBm
	10 GHz	32.9	-	35.9	dBm
	14 GHz	32.8	-	35.8	dBm
	18 GHz	33.1	-	36.1	dBm
RF Connector	SMA (F) Type				

Optical Output Control

Rear-panel DB-9 and BNC connectors provide an interface to control optical output power attenuation.

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Optical Output Attenuation "Blanking"	-	Transmit control "off"	6	-	-	dB
Transmit Laser On – Off Control	-	TTL Input				
Optical Output Power Switching Pulse Characteristics	TTL Input: Tf = Control pulse fall time TTL Input: Tr = Control pulse rise time					
	-	Tr/Tf	-	-	30	nsec

Status Bit LEDs

A RED and GREEN LED are provided on the unit front panel to provide status of laser power and temperature. The GREEN LED is illuminated for no failure conditions and the RED LED will illuminate for any or all failure conditions shown below:

Parameter	Condition	LED Color
Laser Status Optical Output Power	Optical Output Power Degraded > 10 dBmo	Red
	Optical Output Power within Specification	Green
Laser Temperature	Reported Laser Temperature < 85ºC	Green
	Reported Laser Temperature > 85ºC	Red

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For more information on this and other products:

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

Rear Panel D-Connector Pin-Out

Pin	Function	Comments
1	Transmitter Interlock	
2	Transmitter Interlock - Return	
3		
4	Laser Enable- Return	
5		
6	Laser Enable	TTL level – controls bias voltage to internal DFB source laser to control transmitter optical output (on/off)
7		
8		
9		

Link Performance

(Measured with 0 dBm TX RF Input and +10 dBm Optical Receiver Input to SIRU3000 Optical Receiver)

Parameter	Symbol	Condition	Typ	Unit
Link Gain	G	@ 10 GHz	-32	dB
Gain Variation		2 GHz to 18 GHz	7	dB
Noise Figure	NF	@ 10 GHz	50	dB
Spurious Free Dynamic Range	SFDR	@ 10 GHz	105	$dB \cdot Hz^{2/3}$

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Ordering Information

RACK2200-11

Laser Safety

Class IIIb Laser Product

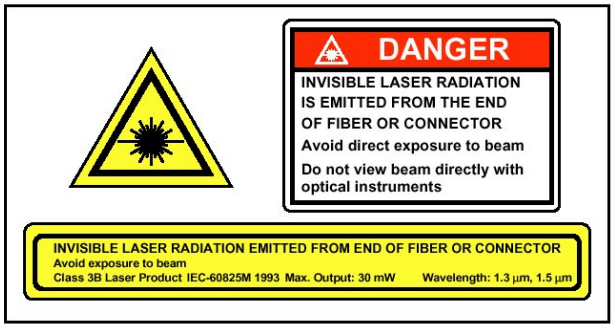
FDA/CDRH Class IIIb laser product. All transmitter versions are Class IIIB laser products per CDRH, 21 CFR 2040 Laser Safety requirements. All versions are Class 3B laser products per IEC*60825-1:1993.

Maximum Power = 8 dBm

Laser key switch not provider per customer requirement.

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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