



### 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   | 0   | --      | +25 | dBm   |
| Wavelength           |     | 1550    |     | nm    |
| Optical Output Power | 6   | 7       | 8   | dBm   |
| Temperature Range    | -40 | --      | 70  | °C    |

See following pages for complete specifications and conditions.

***For more information on this and other products:***

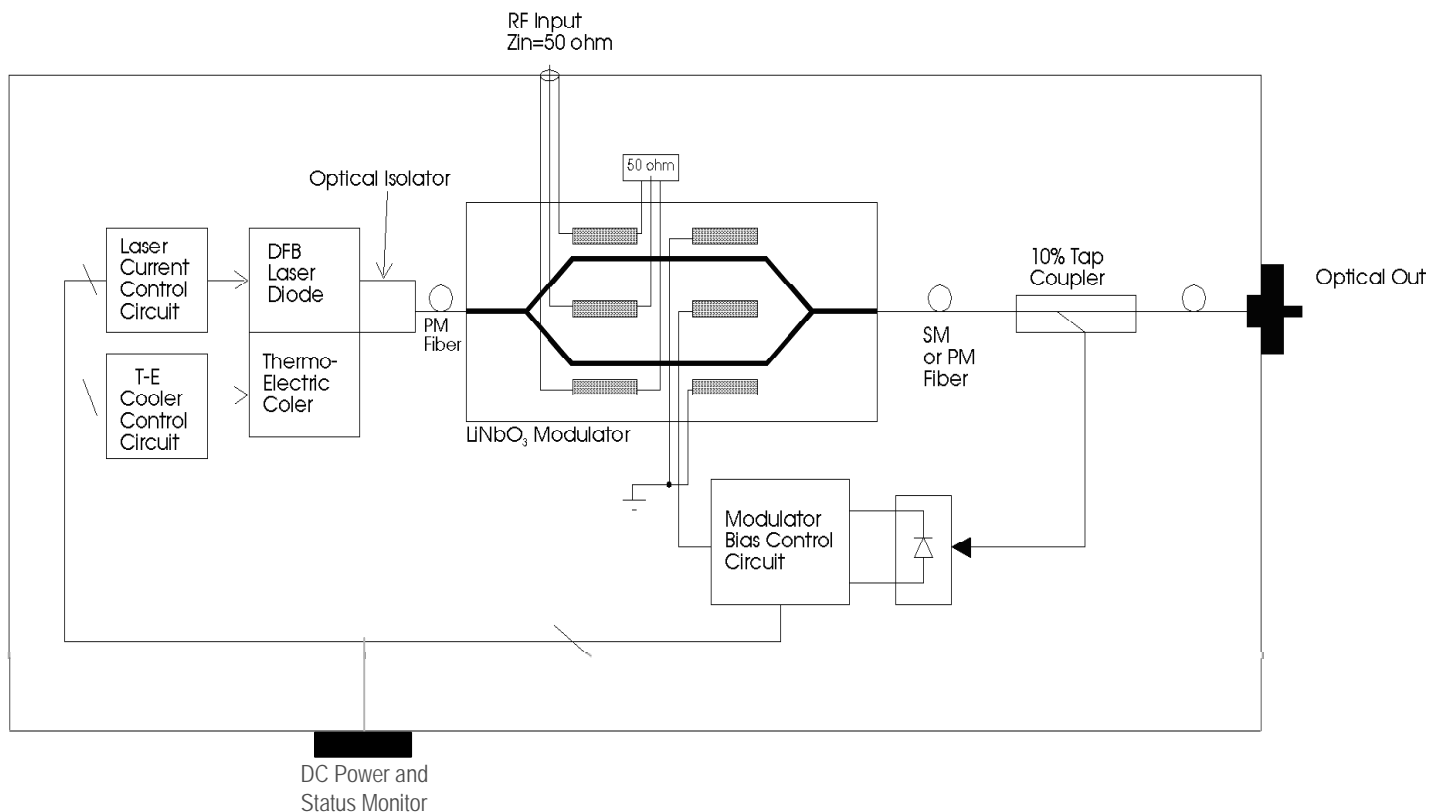
Contact Sales at Emcore 626-293-3400, or visit [www.emcore.com](http://www.emcore.com).

## 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             | $\lambda$ | -         | 1544 | 1550 | 1556 | nm   |
| Optical Output Power   | $P_L$     | -         | 6    | 7    | 8    | dBm  |
| Connector Return Loss  | -         | -         | 65   | --   | --   | 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.

## RF Characteristics

| Parameter                            | Condition      | Min  | Typ | Max | Unit     |
|--------------------------------------|----------------|------|-----|-----|----------|
| Operational Bandwidth                |                | 0.05 |     | 18  | GHz      |
| RF Input Impedance                   | -              |      | 50  | -   | $\Omega$ |
| RF Return Loss                       |                | 9.5  | 15  |     | dB       |
| 2 <sup>nd</sup> Harmonic Suppression | RF input 0 dBm |      | -60 | -45 | dBc      |
| 1 dB Compression Point               |                | +20  | +25 |     | 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        |     | 105 |     | dB/Hz <sup>2/3</sup> |
| 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 0 dBm optical input)

| Parameter                   | Symbol | Condition       | Min | Typ | Max | Unit                 |
|-----------------------------|--------|-----------------|-----|-----|-----|----------------------|
| Link Gain                   | G      | @ 1 GHz         |     | -44 |     | dB                   |
|                             |        | @ 18 GHz        |     | -48 |     |                      |
| Noise Figure                | NF     | @ 10 GHz        |     | 44  |     | dB                   |
| Input IP3                   | IIP3   | @10 GHz         |     | +30 |     | dBm                  |
| Spurious Free Dynamic Range | SFDR   | @ 10 GHz        |     | 100 |     | dB/Hz <sup>2/3</sup> |
| 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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## EMCORE

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*For more information on this and other products:*

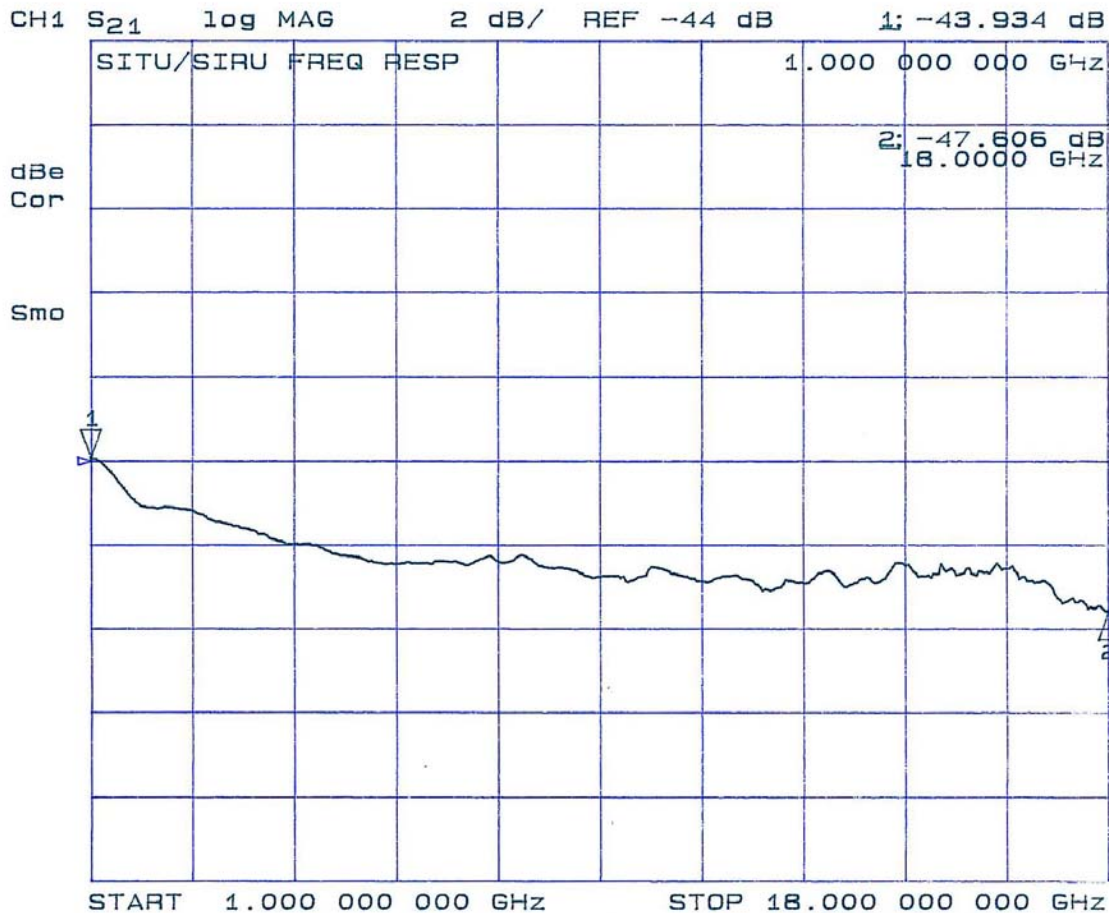
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### Typical Frequency Response

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



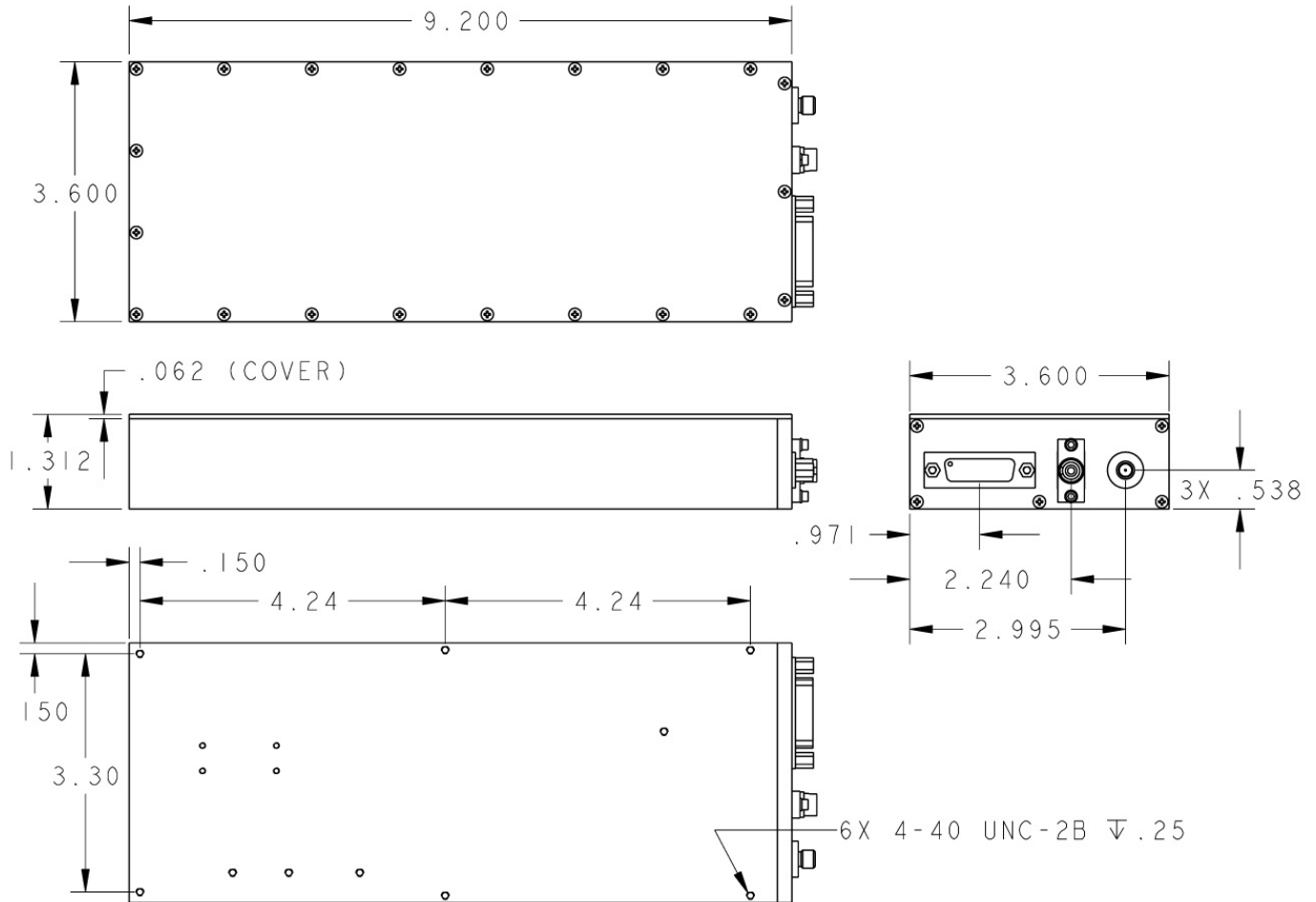
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Ordering Information

SITU-3000

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

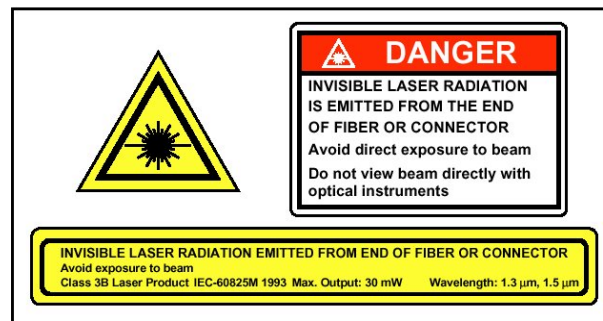
### Class IIIb Laser Product

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 = 8 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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