

## Solid State Broadband High Power Amplifier

**2180**
**1000 - 2500 MHz / 2000 Watts**

The 2180 is suitable for octave bandwidth high power CW, modulated, and pulse applications. This amplifier utilizes high power GaN devices that provide wide frequency response, high gain, high peak power capability, and low distortions. Exceptional performance, long-term reliability and high efficiency are achieved by employing advanced broadband RF matching networks and combining techniques, EMI/RFI filters, and all qualified components. The drawers are constructed in 5RU and 3RU including the forced air-cooling with optional enclosure. The system comes standard to operate at 208VAC line-to-line 3-phase AC supply.

The amplifier includes a built-in control and monitoring system, with protection functions which preserve high availability. Remote management and diagnostics are via an embedded web server allowing network managed site status and control simply by connecting the unit's Ethernet port to a LAN. Using a web browser and the unit's IP address (IPV4) allows ease of access with the benefit of multi-level security. The control system core runs an embedded OS (Linux), has a built-in non-volatile memory for event recording, and factory setup recovery features. The extended memory option allows storage of control parameters and event logs.



Empower RF's ISO9001 Quality Assurance Program assures consistent performance and the highest reliability.

- Solid-state class AB design
- Suitable for CW, AM, FM, Pulse and some linear applications (Consult factory for other modulation types)
- Compact Modular design
- 50 ohm input/output impedance
- Built-in Control, Monitoring and Protection functions
- High reliability and ruggedness

### ELECTRICAL SPECIFICATIONS over temperature conditions (-10 to +40°C)

Parameter	Symbol	Min	Typ	Max	Unit
Operating Frequency	BW	1000		2500	MHz
Power Output CW	P <sub>OUT</sub>	2000			Watt
Power Output @ 1dB Gain Compression <sup>(Note 2)</sup>	P <sub>1dB</sub>	1500			Watt
Power Gain @ 1dB Gain Compression	G <sub>1dB</sub>		63		dB
Input Power for Rated P <sub>OUT</sub> – MGC Mode	P <sub>IN</sub>		-10	-3	dBm
Input Power Range	P <sub>IN</sub>	-3.0		+3.0	dBm
Small Signal Gain (MGC)/Leveled ALC – Flatness	ΔG			±3.5 / ±1.0	dB
Gain Adjustment Range	VVA	15	20		dB
Input Return Loss	S <sub>11</sub>			-10	dB
Noise Figure @ maximum gain	NF		20	25	dB
Third Order Intermodulation 2-Tone @ 57dBm/Tone, 1MHz Spacing	IM3	-20	-25		dBc
Harmonics @ P <sub>OUT</sub> = 2000W	2 <sup>ND</sup>		-20	-17	dBc
	3 <sup>RD</sup>			-20	
Spurious Signals	Spur			-60	dBc
Operating Voltage – (3-phase, line-to-line)	V <sub>AC</sub>		208		Volt
Power Consumption @ 2000W CW	P <sub>D</sub>			10,000	VA

Notes: 1. CW measurement performed in MGC Mode (Manual Gain Control)  
 2. P<sub>1dB</sub> measurement is performed with AM 80% depth of modulation at 1kHz modulation signal.

### MECHANICAL SPECIFICATIONS

Parameter	Value	Unit
Dimensions W x H x D (not include handles, connectors and brackets)	17.5 x 14.0 x 22 (3RU + 5RU)	Inch
Weight	230	Pound
RF Connectors Input/Output	Input: Type-N, Female Output: Type-1-5/8 EIA	-
RF Sample	Type-N, Female, Forward and Reverse	-
Blanking Input	Type-BNC, Female	-
Cooling	Built-in forced air cooling system	-

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**ENVIRONMENTAL CHARACTERISTICS (Qualification Data available for review):**

Parameter	Symbol	Min	Typ	Max	Unit
Operating Ambient Temperature	T <sub>A</sub>	-10		+40	°C
Non-operating Temperature	T <sub>STG</sub>	-40		+85	°C
Relative Humidity (non-condensing)	RH			95	%
Shock / Vibration - MIL-STD-810F Shock Method 516.5, Vibration Method 514.5	SH / VI				

**PROTECTIONS:**

Parameter	Specification	Unit
Input Overdrive	+10 dBm	Max
VSWR Protection	At 2:1 – PA backs-off output power to a safe operating level – no system shutdown, “On Air” time is maximized	-
Thermal – Graceful Degradation	Ambient 40°C	Min
Default Data Recovery	Factory Default Calibration Recovery	

**COMMUNICATION INTERFACES:**

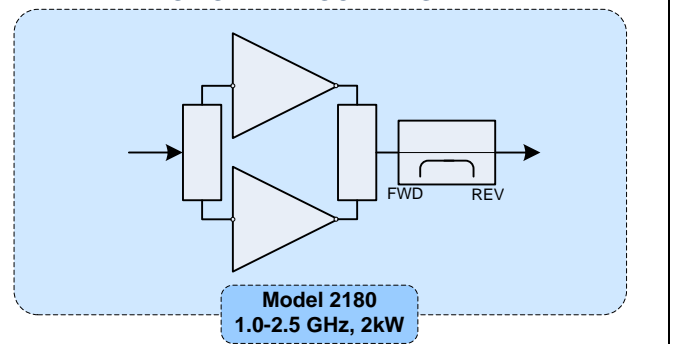
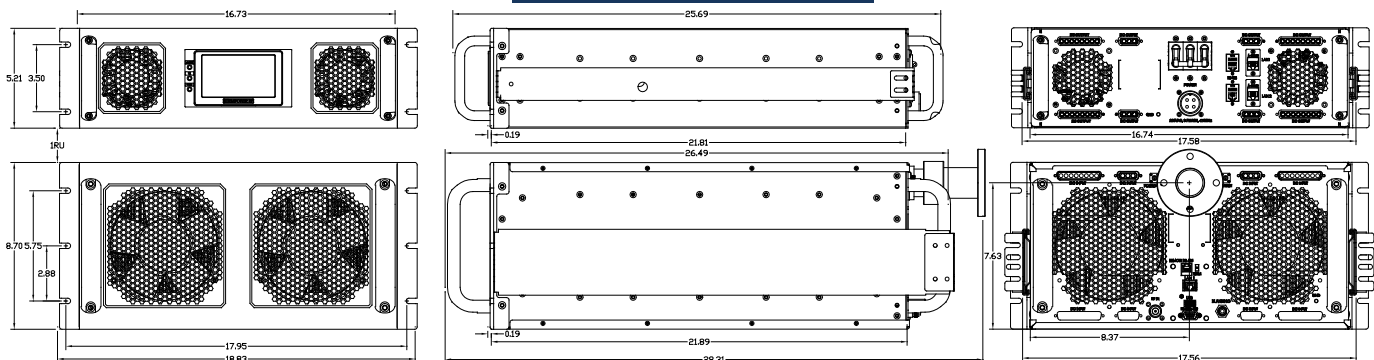
Function	Utility	Connector
Ethernet	Network management of device / web interface	RJ45
USB	Mass storage / Expansion Bus	USB 1.x/2.0 compatible
RS-232 Standard, RS-422 (optional)	Serial management of device / local operator access	D-Sub 9-position Male

**Available Options**

<b>2180-xxx</b>
<b>-002</b> 208 VAC, 3-phase-Delta, 47-63 Hz, Rear RF Connectors
<b>-003</b> 208 VAC, 3-phase-Delta, 400 Hz, Rear RF Connectors
<b>-00X</b>
<b>-00X</b>
Contact us for other available options; <a href="mailto:sales@empowerrf.com">sales@empowerrf.com</a>

**Standard Feature:**

- LCD Control, Ethernet & Serial Comm
- Sample Port: SMA-F [Forward & Reverse]
- Blanking/Gating Port: BNC-F
- Rack Slides, Handles and Rackmount Bracket

**NOTIONAL BLOCK DIAGRAM**

**SYSTEM OUTLINE  
(Options: 2180-002 or 2180-003)**


# Solid State Broadband High Power Amplifier

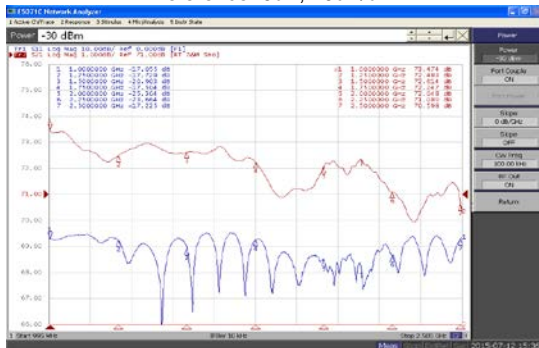
2180

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## TYPICAL PERFORMANCE

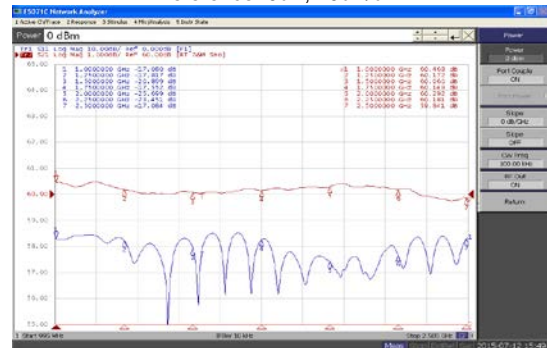
### Plot 1 – Small Signal Gain

Top Curve: Small Signal Gain @  $P_{IN} = -30\text{dBm}$   
 Reference: 71dB, 1dB/div.  
 Bottom Curve: Input Return Loss  
 Reference: 0dB, 10dB/div.



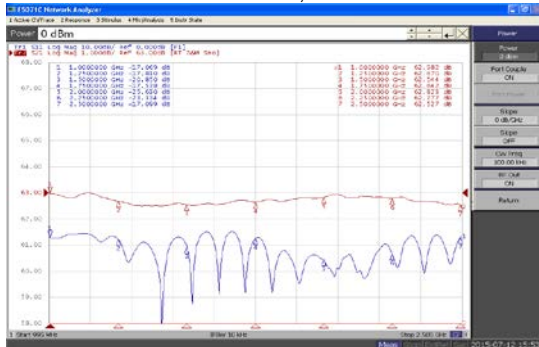
### Plot 2 – Output Power Flatness @ ALC Mode

Top Curve: Output Power @ 1000W,  $P_{IN} = 0\text{dBm}$   
 Reference: 60dBm, 1dB/div.  
 Bottom Curve: Input Return Loss  
 Reference: 0dB, 10dB/div.



### Plot 3 – Output Power Flatness @ ALC Mode

Top Curve: Output Power @ 2000W,  $P_{IN} = 0\text{dBm}$   
 Reference: 60dBm, 1dB/div.  
 Bottom Curve: Input Return Loss  
 Reference: 0dB, 10dB/div.



### Plot 4 – Power Gain Adjustment Range

Top Curve: Maximum Gain @  $P_{IN} = 0\text{dBm}$   
 Reference: 65dB, 5dB/div.  
 Bottom Curve: Minimum Gain @  $P_{IN} = 0\text{dBm}$   
 Reference: 65dB, 5dB/div.

