

# Solid State Broadband High Power Amplifier

**2227**
**100 – 1000 MHz / 1600 Watts**

The 2227 is suitable for multi-octave bandwidth high power CW, modulated, and pulse applications. This amplifier utilizes high power LDMOS 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 amplifier is constructed with 11RU multi-drawer system including the forced air-cooling.

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 ISO9001:2015 Quality Assurance Program assures consistent performance and the highest reliability.

- Solid-state class AB compact modular design
- Suitable for CW, AM, FM, Pulse and some linear applications (Consult factory for other modulation types)
- Embedded directional coupler – Eliminates the need for external component
- 50 ohm input/output impedance
- Built-in Control, Monitoring and Protection functions
- High reliability and ruggedness



## ELECTRICAL SPECIFICATIONS over temperature conditions (-10 to +50°C)

Parameter	Symbol	Min	Typ	Max	Unit
Operating Frequency	BW	100		1000	MHz
Power Output CW <i>Note 1</i>	P <sub>SAT</sub>	1600	2000		Watt
Power Output @ 1dB Gain Compression <i>Note 2</i>	P <sub>1dB</sub>	1300			Watt
Power Gain @ 1dB Gain Compression	G <sub>1dB</sub>	63			dB
Input Power for Rated P <sub>SAT</sub>	P <sub>IN</sub>		0		dBm
Input Power Range	P <sub>IN</sub>	-3.0		+3.0	dBm
Small Signal Gain / Leveled (ALC) – Flatness	ΔG			±3.5/±1.0	dB
Gain Adjustment Range @ P <sub>IN</sub> = -25dBm	VVA	20			dB
Input Return Loss	S <sub>11</sub>			-10	dB
Noise Figure @ maximum gain	NF			20/15	dB
Third Order Intermodulation Distortion 2-Tone @ 54dBm/Tone, 1MHz Spacing	IM3		-20		dBc
Harmonics @ P <sub>OUT</sub> = 1600W	2 <sup>ND</sup>			-20	dBc
	3 <sup>RD</sup>			-10	
Spurious Signals	Spur			-60	dBc
Operating Voltage – [3-ph, line-to-line]	V <sub>AC</sub>	180	208	260	Volt
Power Consumption @ 1600W CW	P <sub>D</sub>			10	kVA

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

## MECHANICAL SPECIFICATIONS

Parameter	Value	Unit
Dimensions W x H x D (excluding handles, connectors and brackets)	17.00 x 19.25 x 22.00 (3U +5U+3U)	Inch
Weight	300	Pound
RF Connectors Input/Output	Input: N-type, Female Output: 7/16-DIN, Female	RF INPUT RF OUTPUT
RF Sample Connectors	SMA, Female	Forward / Reverse
Blanking/Gating Input Connector	BNC, Female	Blanking
Cooling	Built-in forced air-cooling system – front to rear	Airflow direction

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## ENVIRONMENTAL CHARACTERISTICS

Parameter	Symbol	Min	Typ	Max	Unit
Operating Ambient Temperature *	T <sub>A</sub>	-10 *		+50	°C
Non-operating Temperature *	T <sub>STG</sub>	-20 *		+85	°C
Relative Humidity (non-condensing)	RH			95	%
Shock / Vibration - MIL-STD-810F Shock Method 516.5, Vibration Method 514.5	SH / VI				

**Note:** [ \* ] Consult Empower RF for application conditions below -10°C / -20°C temperatures (Operational / Non-operational).

## PROTECTIONS

Parameter	Specification	Unit
Input Overdrive	≥10 dBm	Max
VSWR Protection	At 3:1 – PA backs-off output power to a safe operating level – no system shutdown, “On Air” time is maximized	-
Thermal – Graceful Degradation	Ambient 50°C	Min
Default Data Recovery	Factory Default Calibration Recovery	-

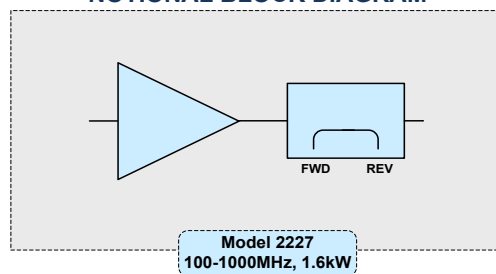
## COMMUNICATION INTERFACES

Function	Utility	Connector
Ethernet	Network Management of Device / Web Interface	RJ45
USB	Mass Storage / Expansion Bus	USB 1.x/2.0 compatible
RS232, default [RS422, factory configurable]	Serial Management of Device / Local Operator Access	D-Sub 9-position Male

## AVAILABLE OPTIONS

<b>2227-00X</b>
<b>-001</b> 180-260 VAC, 3-phase-Delta, 47-440 Hz, Rear RF Connectors
Contact us for other available options
<b>Standard Feature:</b>
-LCD Control, Ethernet & Serial Comm
-RF Sample Ports: Forward & Reverse [SMA Female]
-Blanking/Gating Port: BNC Female
-Rack Slides, Handles and Rack Mount Brackets

## NOTIONAL BLOCK DIAGRAM



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## TYPICAL PERFORMANCE

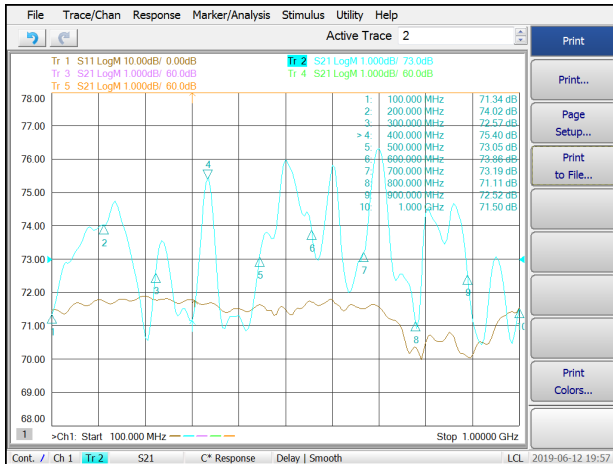
### Plot 1 – Small Signal Gain

Top Curve: Small Signal Gain @  $P_{IN} = -30\text{dBm}$

Reference:

Bottom Curve: Input Return Loss

Reference:



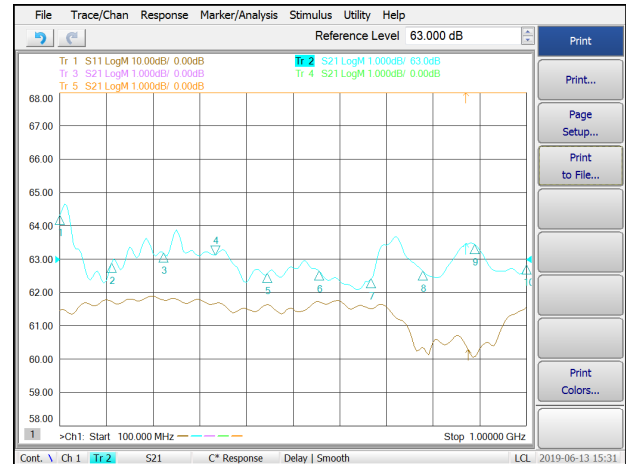
### Plot 2 – ALC Mode Flatness @ 2000W

Top Curve: ALC Flatness @ 63dBm,  $P_{IN} = 0\text{dBm}$

Reference: 63dB, 1dB/div.

Bottom Curve: Input Return Loss

Reference: 0dB, 10dB/div.



### Plot 3 – Gain Adjustment Range @ $P_{IN} = -25\text{dBm}$

Top Curve: Maximum Gain

Middle Curve: Minimum Gain

Reference: 40dB, 10dB/div.

Bottom Curve: Input Return Loss @ Minimum Gain

Reference: 0dB, 10dB/div.

