EMPOWER
RF SYSTEMS, INC.

Solid State Broadband High Power Amplifier

2215 | 1900 - 6000 MHz / 200 Watts

The 2215 is suitable for octave bandwidth high power CW, modulated, and pulse applications. This amplifier utilizes high power GaN on SiC 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 within a single 5RU drawer including the forced air-cooling. Available operating voltage configurations are single-phase 220 VAC up to 400 Hz and 28 VDC.

Rear RF Connectors

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 (Class "A" consult factory)
- 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 +40ºC)

Parameter	Symbol	Min	Typ	Max	Unit
Operating Frequency	BW	1900		6000	MHz
Power Output CW *(Notes 1, 2)*	P_{SAT}	200			Watt
Power Gain	G_P	53			dB
Input Power for Rated P_{SAT}	P_{IN}		0		dBm
Input Power Range	P_{IN}	-5.0		+5.0	dBm
Small Signal Gain Flatness / Leveled ALC	ΔG			±3.5/±1.0	dB
Gain Adjustment Range @ P_{IN} = -30dBm	VVA	20			dB
Input Return Loss	S_{11}			-10	dB
Noise Figure @ maximum gain	NF			20	dB
Third Order Intermodulation Distortion 2-Tone @ 47dBm/Tone, 1MHz Spacing	IM3		-23	-20	dBc
Harmonics @ P_{OUT} = 200W	2^{ND}		-30	-25	dBc
	3^{RD}		-40	-35	
Spurious Signals	Spur		-70	-60	dBc
Operating Voltage (1-phase)	V_{AC}	180	220	260	Volt
Power Consumption @ 200W CW	P_D		1500	2300	VA
Switching Speed	T_{ON}/T_{OFF}		1	2	µSec

Notes: ***1. CW measurement performed in MGC Mode (Manual Gain Control)***
2. The front RF connectors option output power is less by up to 1.50 dB due to added insertion loss of the RF cable routed to the front panel.

MECHANICAL SPECIFICATIONS

Parameter	Value	Unit
Dimensions W x H x D (excludes connectors, handles and brackets)	17 x 8.75 x 22	Inch
Weight	95	Pound
RF Connectors Input/Output	N-type, Female	RF INPUT / RF OUTPUT
RF Sample Connectors	SMA, Female	FWD / REV
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_A	-10		+40	°C
Non-operating Temperature	T_{STG}	-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	Remark
Input Overdrive	≥10 dBm	-
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 40ºC	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, default, (RS-422, factory configurable)	Serial management of device / local operator access	D-Sub 9-position Male

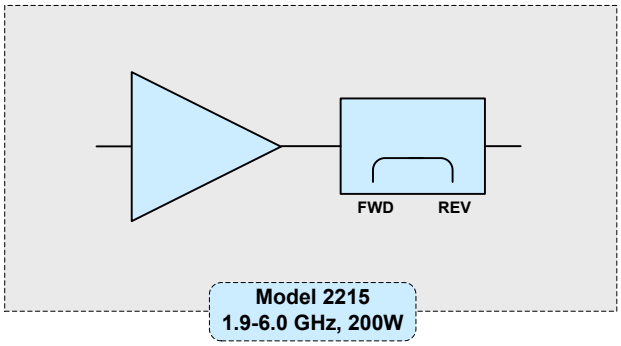
SYSTEM I/O CONNECTOR – 14-Position

Pin #	Description	Specification
1	FWD Test Point	Forward detected power (analog voltage: 0-5 Volt)
2	REV Test Point	Reverse detected power (analog voltage: 0-5 Volt)
3	Summary Fault	Summary Fault: Active TTL Logic Low (≤0.7V), (*Internally Pulled-High*)
4	Reserved	No Connection
5	Shutdown	Amplifier Disable: TTL Logic Low (≤0.7V), (*Internally Pulled-High*)
6	Aux P/S Test Point	+12.0V_{DC} ±2.0V (resettable 0.5amp fuse)
7	Main P/S Test Point	+44.0V_{DC} ±4.8V (resettable 0.5amp fuse)
8	GND	Ground
9-11	Open drain control	Site management utility (reserved)
12&13	Digital I/O (configurable)	Site management utility (reserved)
14	GND	Ground

Available Options

2215-00X
-002 28 VDC, Rear RF Connectors
-003 180-260 VAC, 1-ph, 47-63 Hz, Front RF Connectors *Note 2*
-004 28 VDC, Front RF Connectors *Note 2*
-006 180-260 VAC, 1-ph, 47-63 Hz, Rear RF Connectors
Contact us for other available options; sales@empowerrf.com
Standard Feature: *-LCD Control, Ethernet & Serial Com* *-Main RF Connectors: N-type, Female* *-SMA-F Sample Ports: Forward & Reverse* *-Blanking/Gating Port: BNC-F* *-Rack Slides, Handles and Rack mount Bracket*

NOTIONAL BLOCK DIAGRAM



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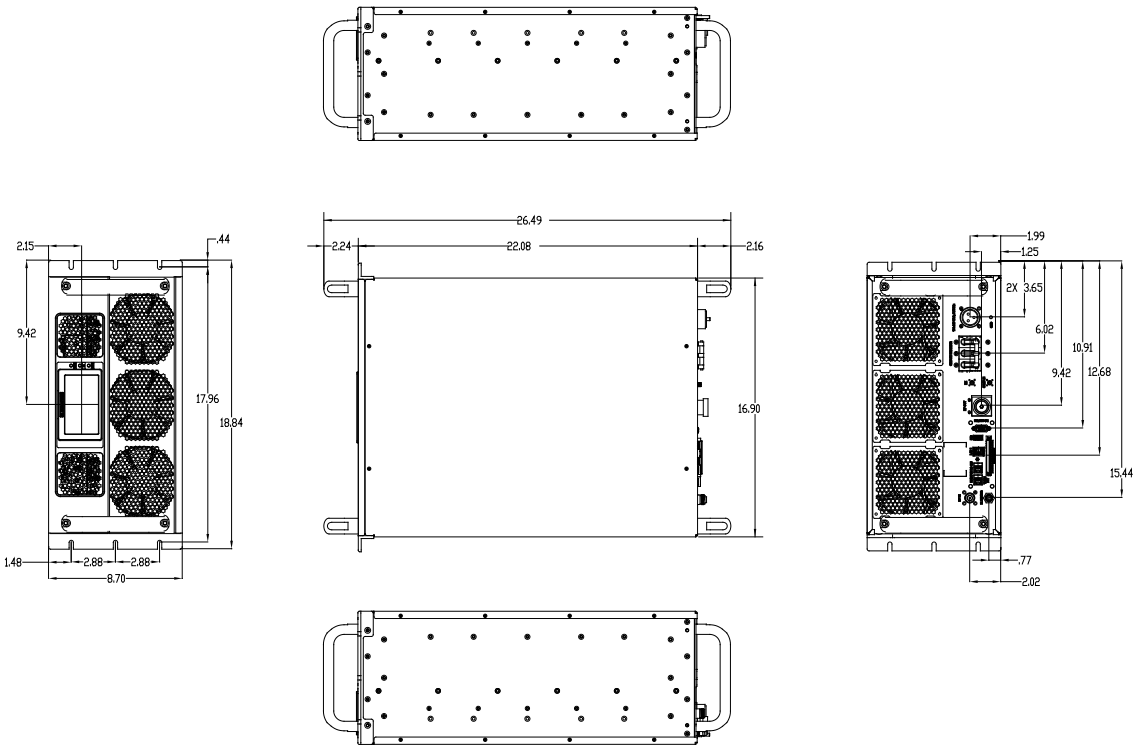
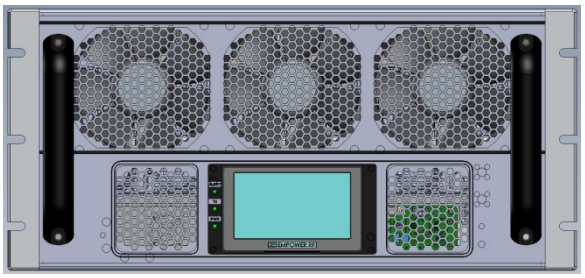
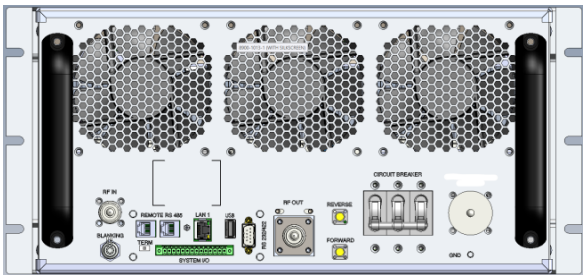
OUTLINE DRAWING - [*2215-006 shown*]



2215-003 - Front and Rear View with rear RF connectors





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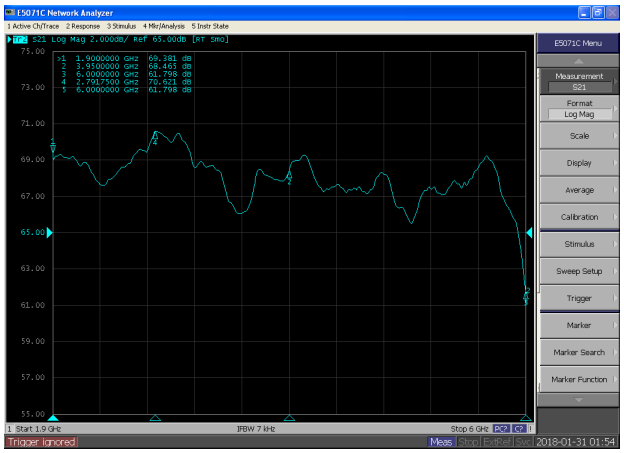
AMPLIFER w/o FILTER TYPICAL PERFORMANCE

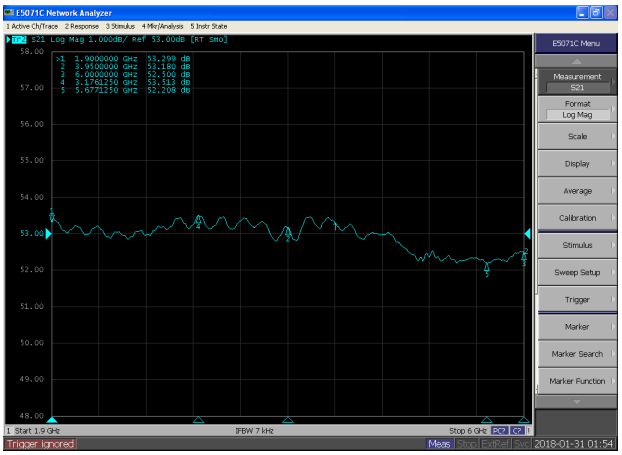
Plot 1 – Small Signal Gain @ P_{IN}= -30dBm

Reference: 65dB, 2dB/div.

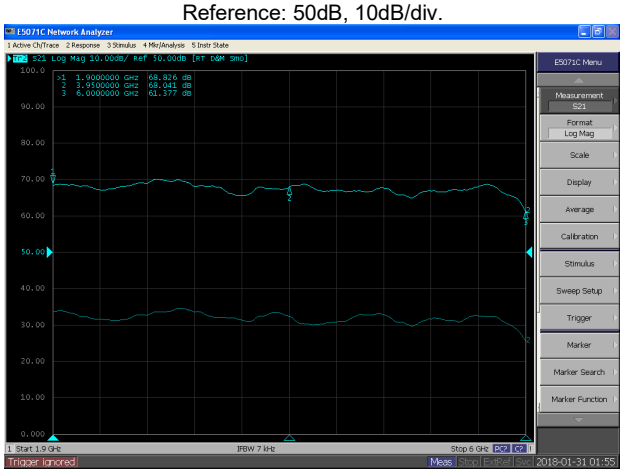


Plot 2 – Leveled ALC Flatness @ 200 watts (53dBm)

Reference: 53dB, 1dB/div.



Plot 3 – Gain Adjusment Range @ P_{IN} = -30dBm
Top Curve: Maximum Gain
Bottom Curve: Minimum Gain
Reference: 50dB, 10dB/div.



Plot 4 – Input Return Loss

Reference: -10dB, 10dB/div.