EMPOWER RF SYSTEMS, INC.

Solid State Broadband High Power Amplifier

1215 | 2000 – 6000 MHz / 80 Watts

The SKU 1215 is a 2000 to 6000 MHz amplifier which is guaranteed to deliver 80W minimum output power and related RF performance under all specified temperature and environmental conditions. Typical power output is 100W and other typical performance parameters are also listed as a guide for consideration, but not guaranteed. This amplifier is suitable for broadband mobile jamming and band specific high power applications in the S and C frequency bands. This compact module utilizes the latest high power RF GaN transistors and also features built-in control and monitoring, with protection functions to ensure high availability.

- Solid-state Class AB design
- Instantaneous ultra-broadband
- Suitable for CW, AM, and FM (Consult factory for other modulation types)
- Small, lightweight, high reliability and ruggedness
- 50 ohm input/output impedance
- Built-in control, monitoring and protection circuits
- RS485 serial interface for monitoring and control

ELECTRICAL SPECIFICATIONS @ 28.0V_{DC}, Over Temperature and Environmental Conditions, as specified.

Parameter	Symbol	Unit	Test Condition	Min	Typ	Max
Operating frequency	BW	MHz		2000		6000
Peak output power	P_{SAT}	W	CW input signal	80	100	
Input for rated output power	P_{IN}	dBm	Variable Attenuator set to nominal attenuation. CW signal source at an output power of 80 watts.		-3	
Gain, small signal	G_{SS}	dB	Measured with VNA in swept frequency mode at -20dBm CW. Input power calibrated / measured at the amplifier input port. Variable attenuator set to nominal attenuation.	58	61	66
Gain flatness – small signal	ΔG_{SS}	dB	Test conditions the same as G_{SS}			±3
Gain adjustment range	G_{ADJ}	dB	Test conditions the same as G_{SS}	15	20	
Gain adjustment step size	G_{STEP}	dB	Test conditions the same as G_{SS}	0.5		
Maximum input power without damage	$P_{IN, Max}$	dBm	CW input signal for unlimited duration.			10
Input return loss	IRL	dB	Measured with VNA in swept frequency mode at -20dBm and 0dBm CW. Input power calibrated / measured at the amplifier input port. Variable attenuator set to nominal attenuation.			-10
Noise figure	NF	dB	Variable attenuator set to nominal attenuation.			10
2nd harmonics	2nd	dBc	Variable attenuator set to nominal attenuation. CW signal source at an output power of 80W.			-20
3rd harmonics	3rd	dBc	Variable attenuator set to nominal attenuation. CW signal source at an output power of 80W.			-20
Spurious	Spur	dBc	Variable attenuator set to nominal attenuation. CW signal at an output power of 80 watts. Spurious defined as any non-harmonic amplifier output. Spurious measured in a 1kHz resolution bandwidth, 10kHz video bandwidth. Specifications apply at offsets of greater than or equal to +/- 10kHz from the RF carrier. Maximum measurement frequency is 6.5GHz.			-60
Operating voltage	V_{DC}	V	Note: Output power capabilities and gain will vary with voltage.	24	28	30
Current consumption	I_{DC}	A	Variable attenuator set to nominal attenuation. Measurement at an output power of 80W with a CW source.			16
PA enable / Disable time	$T_{ON/OFF}$	uSec	Variable attenuator set to nominal attenuation. Measurement with 80 watts CW output. Rise and fall times of amplifier output envelope recorded. Rise and fall times at 10% / 90% of the output power in linear scale. PA Enable / Disable signal set to 10kHz repetition rate and 50% duty cycle.			1

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PA PROTECTION / RUGGEDNESS

The PA includes protection circuits for:

- Over temperature
- Over voltage
- Reverse polarity
- Over current

In addition to protection circuits, the PA will withstand full reflection at the RF output port at any angle for up to 1 minute at rated P_{OUT}.

ENVIRONMENTAL SPECIFICATIONS

Parameter	Symbol	Min	Typ	Max	Unit
Operating Case Temperature	T_C	-40		+85	°C
Storage Temperature	T_{STG}	-40		+85	°C
Relative Humidity (non-condensing)	RH			95	%
Altitude (MIL-STD-810F Method 500.4)	ALT			30,000	Feet
Vibration/Shock MIL-STD-810F Method 514.5/516.5 – Proc 1	VI/SH		Airborne		

MECHANICAL SPECIFICATIONS

Parameter	Value	Unit
Dimension (L x W x H) (excludes connectors)	9.00 x 5.00 x 1.11	Inch
Weight	2.5	Pound
RF Connectors Input / Output	Input: Type-SMA, Female / Output: Type-N, Female	J1 / J2
DC Interface Connector	Hybrid – D-Sub 17-Pin, Male (17W2)	J3
Cooling	External Heatsink Required (not supplied)	-

DC INTERFACE CONNECTOR

Pin #	Description	Specification
A1	GND	Ground Return
A2	VDD	Supply Voltage: +24.0 – 30.0V_{DC}, 28.0V_{DC} Nominal
1	RS485 (-)	Serial Communication Bus
2	Temperature Reporting	Analog Output Voltage @ 10mV/°C with a 500mV offset, (i.e. 0.75V = 25°C)
3	Address 1	Hardware Address 1
4	Address 3	Hardware Address 3
5	Attenuator Setting	Voltage input in the range of 0.5 – 3.0V_{DC}, 0.5V_{DC} corresponds with minimum attenuation, 3.0V_{DC} is maximum attenuation. Leave pin open or grounded to utilize RS-485 interface. (See RS-485 details below)
6	PA Enable	0/3.3V logic levels: Power Amplifier disable is a TTL Logic Low (0V), (*Internally Pulled-High 3.3V*) Leave pin open or pulled high to utilize RS-485 interface.(See RS-485 details below)
7	Alarm	Amplifier Alarm indicator: Normally TTL Low A logic High indicates a fault condition, 0/3.3V Logic Levels
8	RS485 (+)	Serial Communication Bus
9	Current Reporting	Analog output voltage range of 1V/10A, (i.e. 1.5V = 15A)
10	Address 0	Hardware Address 0 – Least significant bit
11	Address 2	Hardware Address 2
12	Address 4	Hardware Address 4 – Most significant bit
13&14	Not Used	No Connection
15	Reset	Hardware reset: Logic 0 to reset PA and clear latched faults

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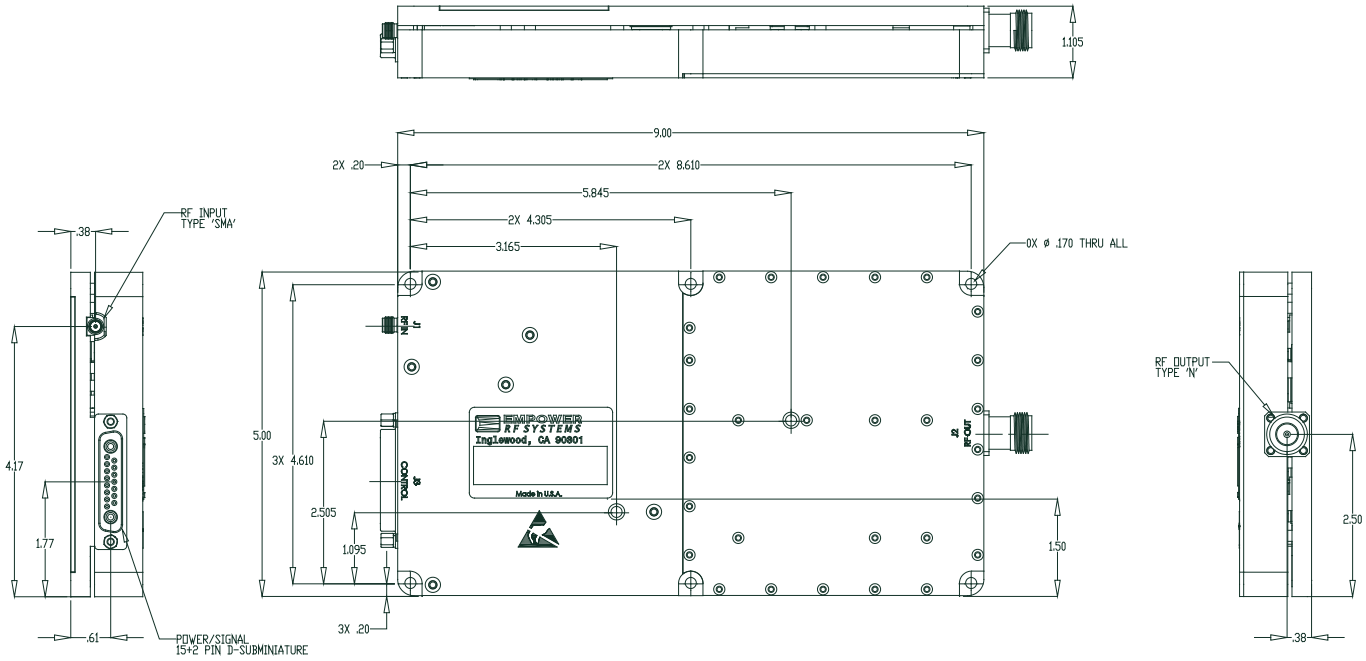
MECHANICAL OUTLINE



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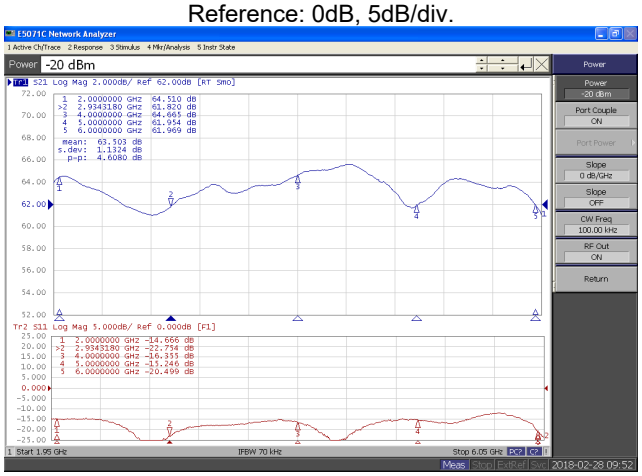
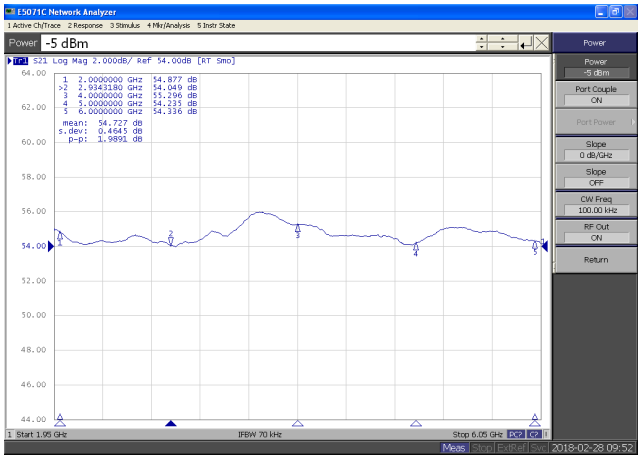
TYPICAL PERFORMANCE PLOTS

Plot 1 – Small Signal Gain
Top Curve: Small Signal Gain @ P_{IN} = -30dBm
Reference: 62dB, 2dB/div.
Bottom Curve: Input Return Loss
Reference: 0dB, 5dB/div.



Plot 2 – Power Gain
Response Curve: Power Gain @ P_{IN} = -5dBm
Reference: 54dB, 2dB/div.



Plot 3 – Gain Adjustment Range @ P_{IN} = -20dBm
Top Curve: Maximum Gain
Bottom Curve: Minimum Gain
Reference: 62dB, 10dB/div.