EMPOWER RF SYSTEMS, INC.

Solid State Broadband High Power Amplifier

2002 - BBS2C4AEL

10 – 1000 MHz / 25 Watts

The BBS2C4AEL (SKU 2002) is suitable for ultra broadband high power applications. This amplifier utilizes high power MOSFET devices that provide wide frequency response and dynamic range, high gain, low distortions, and good linearity. Employing advanced broadband RF matching networks and combining techniques, EMI/RFI filters, and all qualified components achieve exceptional performance, and high efficiency. The system includes a universal voltage, single phase, power supply and a built in forced air-cooling system. Empower RF's ISO9001 Quality Assurance Program assures consistent performance and the highest reliability.

SKU#: 2002CLRAAXLXX

- Solid-state class AB design
- Instantaneous ultra broadband
- Small and lightweight
- Standard front panel manual gain adjust
- Suitable for CW/FM/AM (Consult factory for other modulation types)
- 50 ohm input/output impedance
- High reliability and ruggedness
- Built-in protection and monitoring circuits

ELECTRICAL SPECIFICATIONS @ $120V_{AC}$, 25°C, 50Ω System

Parameter	Symbol	Min	Typ	Max	Unit
Operating Frequency	BW	10		1000	MHz
Output Power CW	P_{SAT}	25	30		Watt
Output Power @ 1dB Gain Compression	P_{1dB}	12	15		Watt
Power Gain @ 1dB Gain Compression	G_{1dB}	44			dB
Input Power for Rated P_{SAT}	P_{IN}		0	3	dBm
Small Signal Gain Flatness	ΔG		±1.0	±1.5	dB
Gain Adjustment Range	FGA	25			dB
Input Return Loss	S_{11}			-10	dB
Noise Figure	NF		10		dB
Third Order Intercept Point 2-Tone @ 33dBm/Tone, 100kHz Spacing	IP3		+52		dBm
Harmonics @ P_{OUT} = 12W	H		-20		dBc
Spurious Signals	Spur		<-70	-60	dBc
Operating Voltage (1-phase)	V_{AC}	100		240	Volt
Power Consumption @ P_{OUT} = 25W	P_D		180	230	Watt

MECHANICAL SPECIFICATIONS

Parameter	Value	Units
Dimensions – Bench Top / Rack Mount	8.5 x 3.5 x 16 / 19 x 3.5 x 18	Inch
Weight – Bench Top / Rack Mount	20 / 30	lb.
RF Connectors Input/Output	Type-N, Female	
Cooling	Built-in internal forced air cooling system	

ENVIRONMENTAL CHARACTERISTICS (Designed to Meet)

Parameter	Symbol	Min	Typ	Max	Unit
Operating Ambient Temperature	T_A	0		+50	°C
Non-operating 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 541.5/516.5 – Proc I	SH / VI		Airborne		

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LIMITS

Input RF drive level without damage	+10dBm	Max
Load VSWR @ P_{OUT} = 12W	∞ @ all load phase & magnitude for duration of 1 minute 3:1 @ all load phase & amplitude continuous	-
Thermal Overload	85°C shutdown	Max

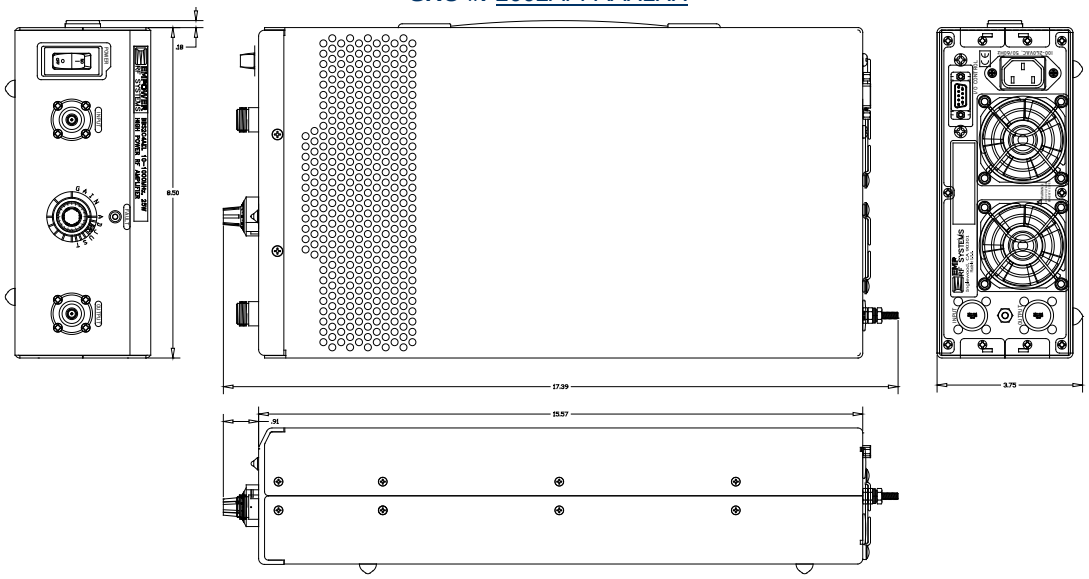
AVAILABLE OPTIONS

SKU Number	Description	LCD Touchscreen
2002CLFAAXLXX	LCD controller, Front RF connectors 100-240VAC, 50/60Hz.	Touchscreen Digital Display, including FWD/REV Power indication (dBm or Watt scale), Gain Adjustment, ALC Fast/Slow, On/Off, Standby mode, Fault indication, Rear panel GPIB/HPIB IEEE-488.2 and Half Duplex RS232.
2002CLRAAXLXX	LCD controller, Rear RF connectors 100-240VAC, 50/60Hz.	
2002CFFAAXXXX	FGA (Front Gain Adjust) Front RF Connectors, 100-240VAC, 50/60Hz	
2002CFRAAXXXX	FGA (Front Gain Adjust) Rear RF Connectors, 100-240VAC, 50/60Hz	
Optional	Rack Slides (Call for price)	
2002AFFAAXLXX	Bench Top, FGA (Front Gain Adjust), Front RF connectors, 100-240VAC, 50/60Hz	
2002AFRAAXXXX	Bench Top, FGA (Front Gain Adjust), Rear RF connectors, 100-240VAC, 50/60Hz	

I/O INTERFACE CONNECTOR – D-Sub 9-Pin, Female

Pin #	Description	Specifications	Options FGA	Options LCD	Options Bench Top
1	Forward Test Point	Analog Voltage 0-5V_{DC} relative to Forward Power Level		√	
2	Reverse Test Point	Analog Voltage 0-5V_{DC} relative to Reverse Power Level		√	
3	5V Test Point	+5.0V_{DC} ±0.2V	√	√	
4	VVA Test Point	VVA Gain Control +5.6V_{DC} ±0.2V	√		√
5	EXT Shutdown	Amplifier Disable: TTL Logic High (5V) (*Internally Pulled-Low*)	√	√	√
6	12V Test Point	+12.0V_{DC} ±0.5V	√	√	
7	P/S Test Point	+26.0-30.0V_{DC}	√	√	√
8&9	GND	Ground	√	√	√

OUTLINE DRAWING SHOWN
SKU #: 2002AFFAAXLXX



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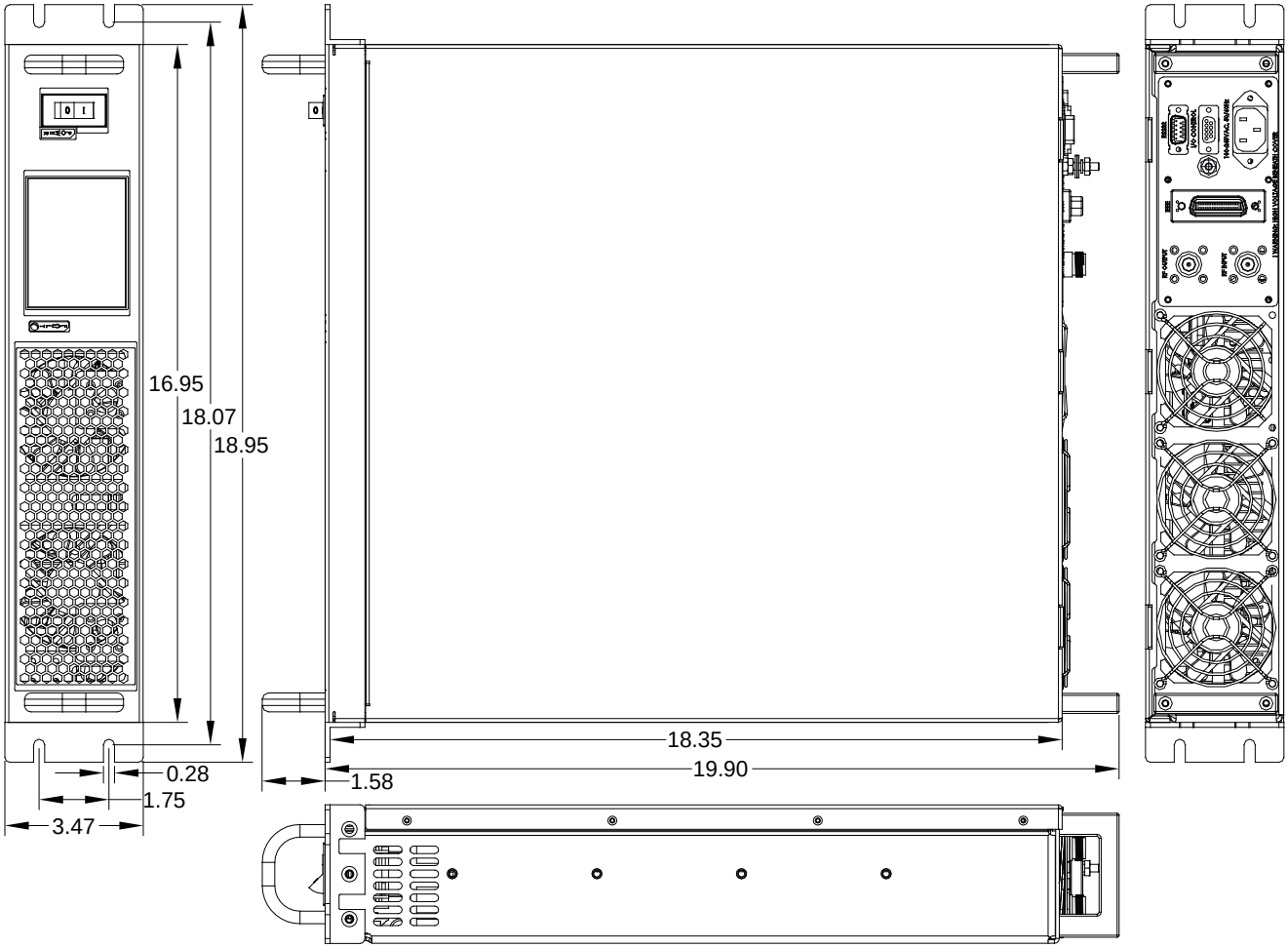

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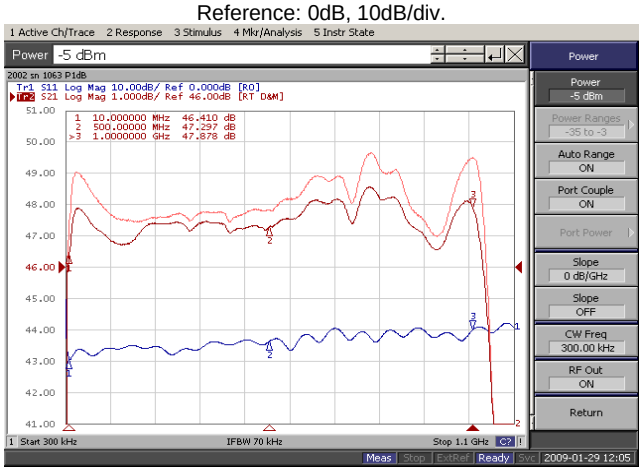
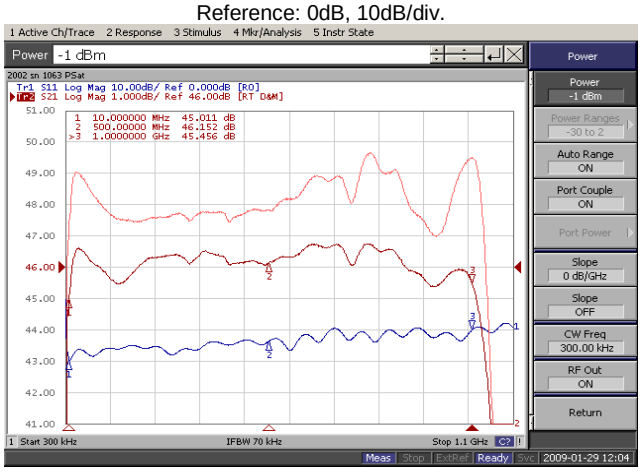
TYPICAL PERFORMANCE PLOTS

Plot 1 – Small Signal Gain and P_{1dB}
Top Curve: Small Signal Gain @ P_{IN} = -20dBm
Middle Curve: Power Gain @ P_{1dB}, P_{IN} = -5.0dBm
Reference: 46dB, 1dB/div.
Bottom Curve: Input Return Loss
Reference: 0dB, 10dB/div.



Plot 2 – Small Signal Gain and P_{SAT}
Top Curve: Small Signal Gain @ P_{IN} = -20dBm
Middle Curve: Power Gain @ P_{SAT}, P_{IN} = 1.0dBm
Reference: 46dB, 1dB/div.
Bottom Curve: Input Return Loss
Reference: 0dB, 10dB/div.



Plot 3 – Gain Adjustment Range
Top Curve: Maximum Gain @ P_{IN} = -20dBm
Middle Curve: Minimum Gain @ P_{IN} = -20dBm
Reference: 20dB, 10dB/div.
Bottom Curve: Input Return Loss @ Minimum Gain
Reference: 0dB, 10dB/div.