

## Solid State Broadband High Power Amplifier

**2144-BBS3Q8CEJ - Dual Band**
**800 – 6000 MHz / 25W / 10W**

The BBS3Q8CCJ (SKU 2144) is a Dual-Band multi-octave ultra broadband high power amplifier. This amplifier utilizes GaN power devices that provide wide frequency response and dynamic range, high gain, low distortions, and good linearity. 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 system includes a universal voltage, single phase PFC 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#: 2144CLRAAXLXX

- Solid-state class AB design
- Dual-Band switching for ultra broadband operation
- Small and lightweight
- Suitable for CW, AM, and FM (Consult factory for other modulation types)
- 50 ohm input/output impedance
- High reliability and ruggedness

### ELECTRICAL SPECIFICATIONS @ 120V<sub>AC</sub>, 25°C, 50 Ω system

Parameter	Symbol	Min	Typ	Max	Unit
Operating Frequency	BW <sup>1</sup>	800		2500	MHz
	BW <sup>2</sup>	2500		6000	
Output Power CW @ 800-2500 MHz	P <sub>SAT1</sub>	25			Watt
Output Power CW @ 2500-6000 MHz	P <sub>SAT2</sub>	10			Watt
Output Power @ 1dB Gain Compression	P <sub>1dB</sub> <sup>1/2</sup>		20/5		Watt
Power Gain @ 1dB Gain Compression	G <sub>1dB</sub> <sup>1/2</sup>	40			dB
Input Power for Rated P <sub>SAT</sub>	P <sub>IN</sub>		0	3	dBm
Gain Flatness	ΔG <sub>SS</sub>			±2.0	dB
Gain Adjustment Range	FGA	25			dB
Input Return Loss	S <sub>11</sub>			-10	dB
Noise Figure	NF		10		dB
Third Order Intercept Point	IP3 <sup>1</sup>				dBm
2-Tone @ 30dBm/Tone, 100kHz Spacing	IP3 <sup>2</sup>		+45		
Harmonics @ P <sub>OUT</sub> = 20W/5W	H		-20		dBc
Spurious Signals	Spur		-70	-60	dBc
Operating Voltage (1-phase)	VAC	100		240	Volt
Power Consumption @ P <sub>OUT</sub> = 25W/10W CW	P <sub>D</sub>		-	200	Watt

### MECHANICAL SPECIFICATIONS

Parameter	Value	Units	Limits
Dimensions	19 x 3.5 x 18.5	Inch	Max
Weight	27	lb.	Max
RF Connectors Input/Output	Type-N, Female		
Cooling	Built-in internal forced air cooling system		

### ENVIRONMENTAL CHARACTERISTICS (Design to Meet)

Parameter	Symbol	Min	Typ	Max	Unit
Operating Ambient Temperature	T <sub>A</sub>	0		+50	°C
Non-operating Temperature	T <sub>STG</sub>	-40		+85	°C
Relative Humidity w/o condensation	RH			95	%
Altitude (MIL-STD-810F Method 500.4)	ALT			30,000	Feet
Vibration/Shock	SH / VI		Airborne		
MIL-STD-810F - Method 514.5/516.5 – Proc I					

# Solid State Broadband High Power Amplifier

**2144-BBS3Q8CEJ - Dual Band**
**800 – 6000 MHz / 25W / 10W**
**LIMITS**

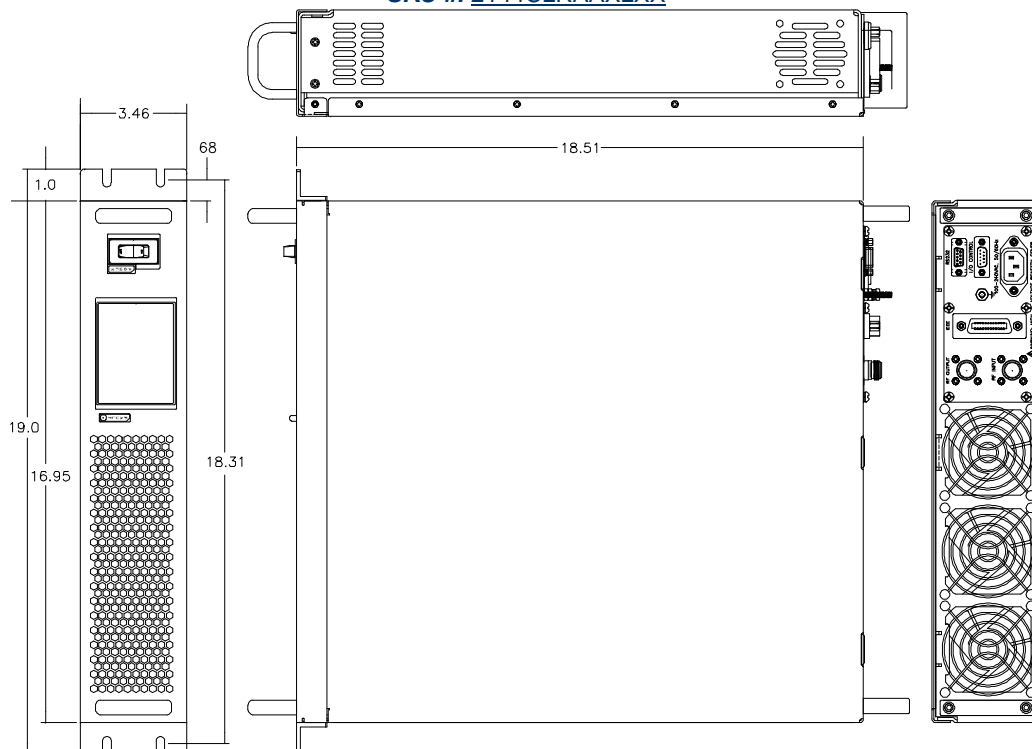
Input RF drive level without damage	+10 dBm	Max
Load VSWR @ P <sub>OUT</sub> = 20W/5W	∞ @ all load phase & amplitude for duration of 1 minute 3:1 @ all load phase & amplitude continuous	-
Thermal Overload	85°C shutdown	Max

**AVAILABLE OPTION**

SKU Number	Description	LCD Touchscreen
2144CLRAAXLXX	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.
Optional	Rack Slides (Call for price)	

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

Pin #	Description	Specifications
1	Forward Test Point	Analog Voltage 0-5V <sub>DC</sub> relative to Forward Power Level
2	Reverse Test Point	Analog Voltage 0-5V <sub>DC</sub> relative to Reverse Power Level
3	5V Test Point	+5.0V <sub>DC</sub> ±0.2V
4	N/C	No Connection
5	EXT Shutdown	Amplifier Disable: TTL Logic High (5V) <i>(Internally Pulled-Low)</i>
6	12V Test Point	+12.0V <sub>DC</sub> ±0.5V
7	P/S Test Point	+26.0-30.0V <sub>DC</sub>
8&9	GND	Ground

**SYSTEM OUTLINE SHOWN**
**SKU #: 2144CLRAAXLXX**


# Solid State Broadband High Power Amplifier

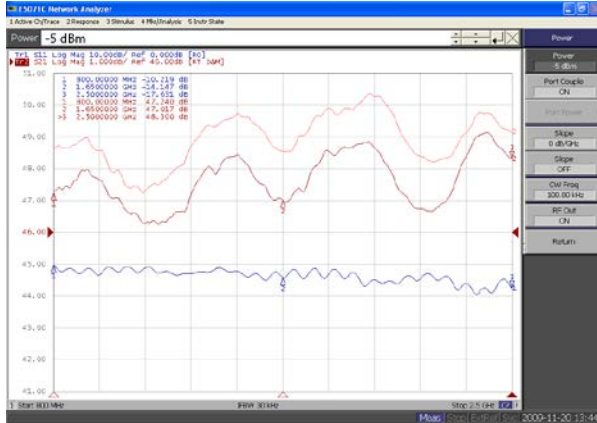
2144-BBS3Q8CEJ - Dual Band

800 – 6000 MHz / 25W / 10W

## PERFORMANCE PLOTS – LOW BAND

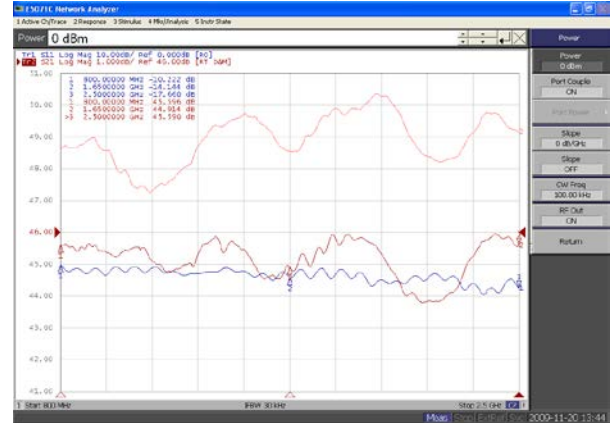
### Plot 1 – Small Signal Gain and P<sub>1dB</sub>

Top Curve: Small Signal Gain @ P<sub>IN</sub> = -20dBm  
 Middle Curve: Power Gain @ P<sub>1dB</sub>, P<sub>IN</sub> = -5.0dBm  
 Reference: 46dB, 1dB/Div.  
 Bottom Curve: Input Return Loss  
 Reference: 0dB, 10dB/Div.



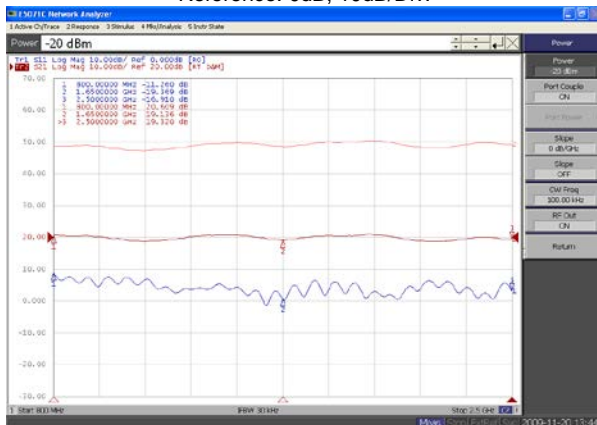
### Plot 2 – Small Signal Gain and P<sub>SAT</sub>

Top Curve: Small Signal Gain @ P<sub>IN</sub> = -20dBm  
 Middle Curve: Power Gain @ P<sub>SAT</sub>, P<sub>IN</sub> = 0.0dBm  
 Reference: 46dB, 1dB/Div.  
 Bottom Curve: Input Return Loss  
 Reference: 0dB, 10dB/Div.



### Plot 3 – Gain Adjustment Range

Top Curve: Maximum Gain @ P<sub>IN</sub> = -20dBm  
 Middle Curve: Minimum Gain @ P<sub>IN</sub> = -20dBm  
 Reference: 20dB, 10dB/Div.  
 Bottom Curve: Input Return Loss  
 Reference: 0dB, 10dB/Div.



### Plot 4 – ALC Flatness

Top Curve: ALC @ 37dBm, P<sub>IN</sub> = 0dBm  
 Bottom Curve: ALC @ 30dBm, P<sub>IN</sub> = 0dBm  
 Middle Curve: Input Return Loss  
 Reference: 0dB, 10dB/Div.



# Solid State Broadband High Power Amplifier

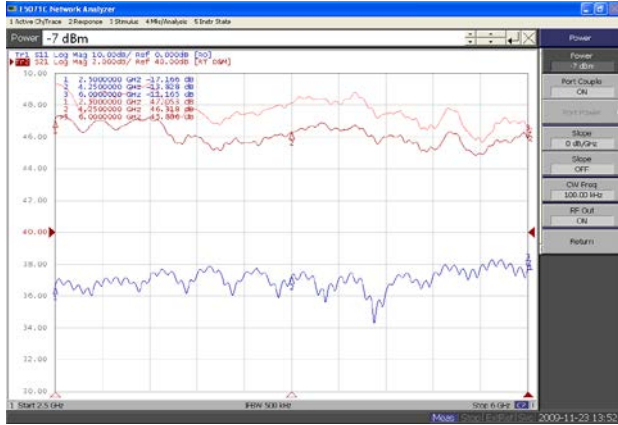
2144-BBS3Q8CEJ - Dual Band

800 – 6000 MHz / 25W / 10W

## PERFORMANCE PLOTS – HIGH BAND

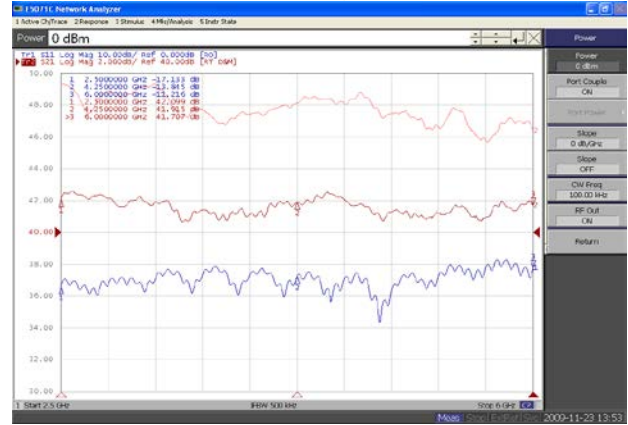
### Plot 5 – Small Signal Gain and P<sub>1dB</sub>

Top Curve: Small Signal Gain @ P<sub>IN</sub> = -20dBm  
 Middle Curve: Power Gain @ P<sub>1dB</sub>, P<sub>IN</sub> = -7.0dBm  
 Reference: 40dB, 1dB/Div.  
 Bottom Curve: Input Return Loss  
 Reference: 0dB, 10dB/Div.



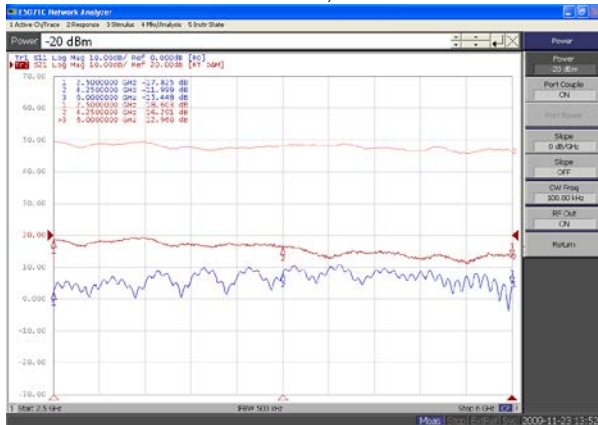
### Plot 6 – Small Signal Gain and P<sub>SAT</sub>

Top Curve: Small Signal Gain @ P<sub>IN</sub> = -20dBm  
 Middle Curve: Power Gain @ P<sub>SAT</sub>, P<sub>IN</sub> = 0.0dBm  
 Reference: 40dB, 1dB/Div.  
 Bottom Curve: Input Return Loss  
 Reference: 0dB, 10dB/Div.



### Plot 7 – Gain Adjustment Range

Top Curve: Maximum Gain @ P<sub>IN</sub> = -20dBm  
 Middle Curve: Minimum Gain @ P<sub>IN</sub> = -20dBm  
 Reference: 20dB, 10dB/Div.  
 Bottom Curve: Input Return Loss  
 Reference: 0dB, 10dB/Div.



### Plot 8 – ALC Flatness

Top Curve: ALC @ 37dBm, P<sub>IN</sub> = 0dBm  
 Bottom Curve: ALC @ 30dBm, P<sub>IN</sub> = 0dBm  
 Reference: 35dB, 1dB/Div.  
 Middle Curve: Input Return Loss  
 Reference: 0dB, 10dB/Div.

