

Wide Band Solid State EMC-Benchtop Power Amplifier 8GHz-11GHz



Product Description

REMC08G11GE is a wideband solid-state EMC-Benchtop power amplifier with a frequency range of 8 to 11GHz.

The power output of this amplifier is 55dBm typical. The typical small signal gain is 56dB. This performance is achieved using GaN devices. This power amplifier works with a 110/220 VAC supply.

The power amplifier's input connector is N and output connector is WR-90 waveguide. This product has a calibration feature which enables customer to obtain great performance through time and temperature changes.

The operating temperature of this product is within -30 to +70°C.

Features

- Wideband EMC Solid State Power Amplifier
- Small Signal Gain 56dB Typical
- Output Saturation Power 55dBm Typical
- Supply Voltage 110/220 VAC
- 50 Ohm Matched Input/Output
- Built in Temperature Compensation
- Adjustable Attenuation: 31.5dB Range, 0.5dB Step Size
- Auto Calibration

Typical Applications

- Wireless Infrastructure
- Military and Aerospace Applications
- Test Instrumentation
- Radar Systems
- 5G Wireless Communications
- Microwave Radio Systems
- TR Modules
- Research and Development
- Cellular Base Stations

Electrical Specifications (T_A=+25°C)

Parameter	Min	Typ	Max	Units
Frequency Range		8 - 11		GHz
Small Signal Gain		56		dB
Gain Variation Over Temperature (-30°C~+70°C)		±3		dB
Input Return Loss		15		dB
*Saturated Output Power (Psat)		55		dBm
Input Max Power (No Damage)		Psat – Gain		dBm
Weight		35		lbs.
Impedance		50		Ohms
Supply Voltage		110 - 240		VAC
Supply Current (110VAC)		25		A
Power Supply Connector		COMBO 3POS		
Input / Output Connectors		N-Female(Input) – WR90 Waveguide (Output)		
Package		4U 19" Rack-mount/Tabletop Chassis		

Absolute Maximum Ratings

Parameter	Rating
Supply Voltage Range	110VAC to 220VAC
*RF Input Power (RFIN)	Psat – Large Signal Gain

Bias Up Procedure

1. Connect input and output with 50 Ohm source/load.
(In band VSWR < 1.9:1 or >10dB return loss.)

2. Connect Power Cable

3. Turn On Back Panel AC Power Supply Switch

4. Press Front Panel Power Switch to Power Display

Bias Down Procedure

1. Press Front Panel Power Switch to Power Off Display

2. Turn Off Back Panel AC Power Supply Switch

3. Remove Power Cable (If Moving Equipment)

4. Disconnect input and output with 50 Ohm source/load. (In band VSWR < 1.9:1 or >10dB return loss.)

Environmental Specifications and Test Standards

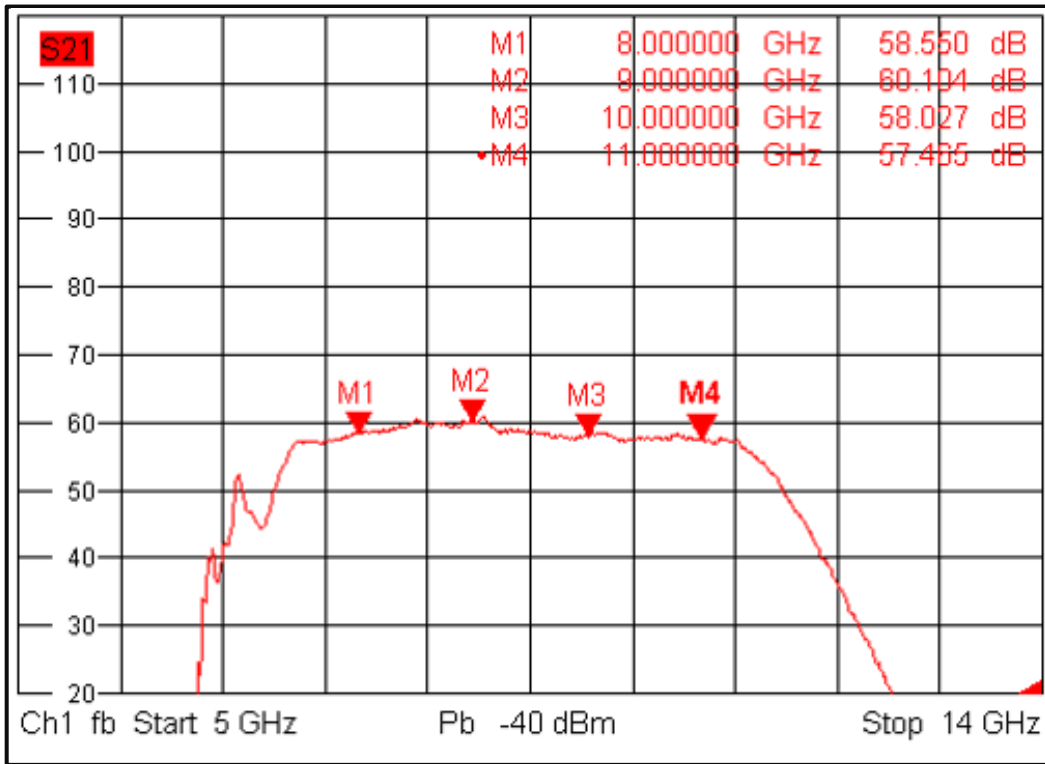
Parameter	Description
Operational Temperature	-30°C to +70°C (Ambient Temperature)
Storage Temperature	-55°C to +125°C
Thermal Shock	-40°C → +85°C (5 Cycles / 10 hours)
**Random Vibration	MIL-STD-202G Table 214-I, Test Condition Letter C 1.5 Hours Per Axis
High Temperature Burn In	Temperature +70°C for 72 Hours
Shock	1. Weight >20g, 50g half sine wave for 11ms, Speed variation 3.44m/s 2. Weight <=20g, 100g Half sine wave for 6ms, Speed variation 3.75m/s 3. Total 18 times (6 directions, 3 repetitions per direction).
Altitude	Standard: 30,000 Ft (Epoxy Sealed Controlled Environment) Optional: Hermetically Sealed (60,000 ft. 1.0 PSI min)
Hermetically Sealed (Optional)	MIL-STD-883 (For Hermetically Sealed Units)

*Maximum RF input power is set to assure safety of amplifier. Input power may be increased at own risk to achieve full power of amplifier. Please reference gain and power curves.

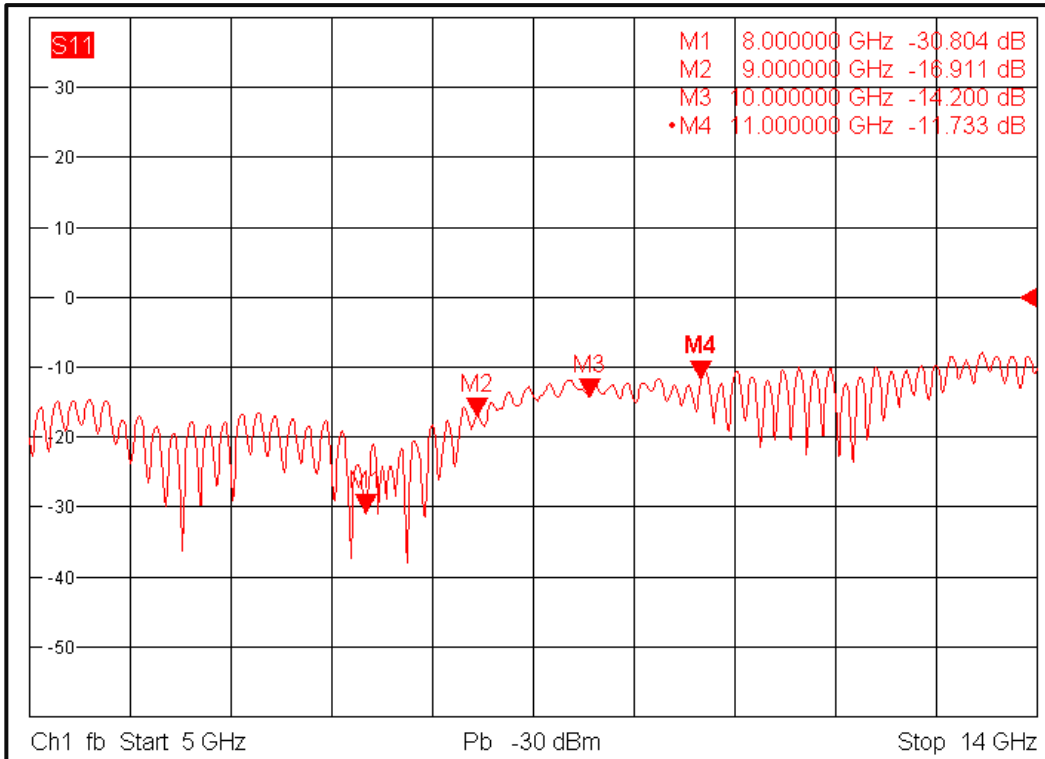
**For vibration testing details please see additional information section.

Typical Performance Plots

Gain vs. Frequency



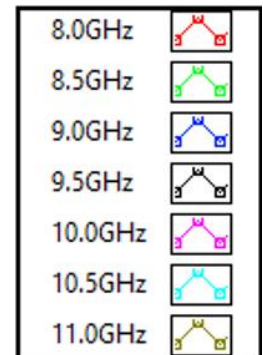
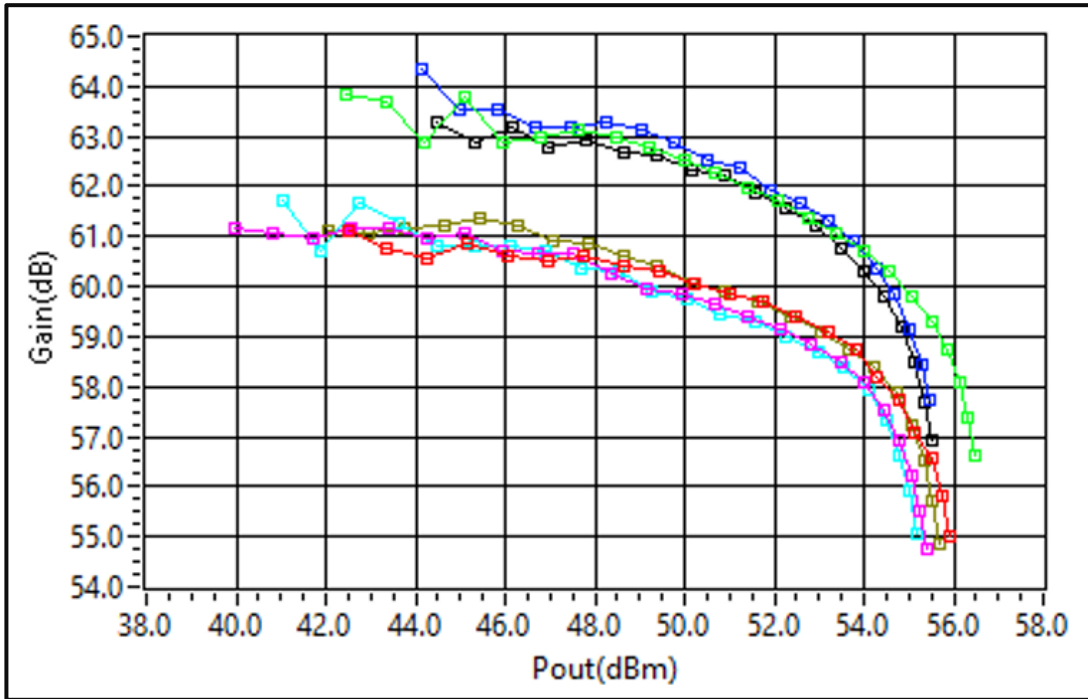
Input Return Loss vs. Frequency



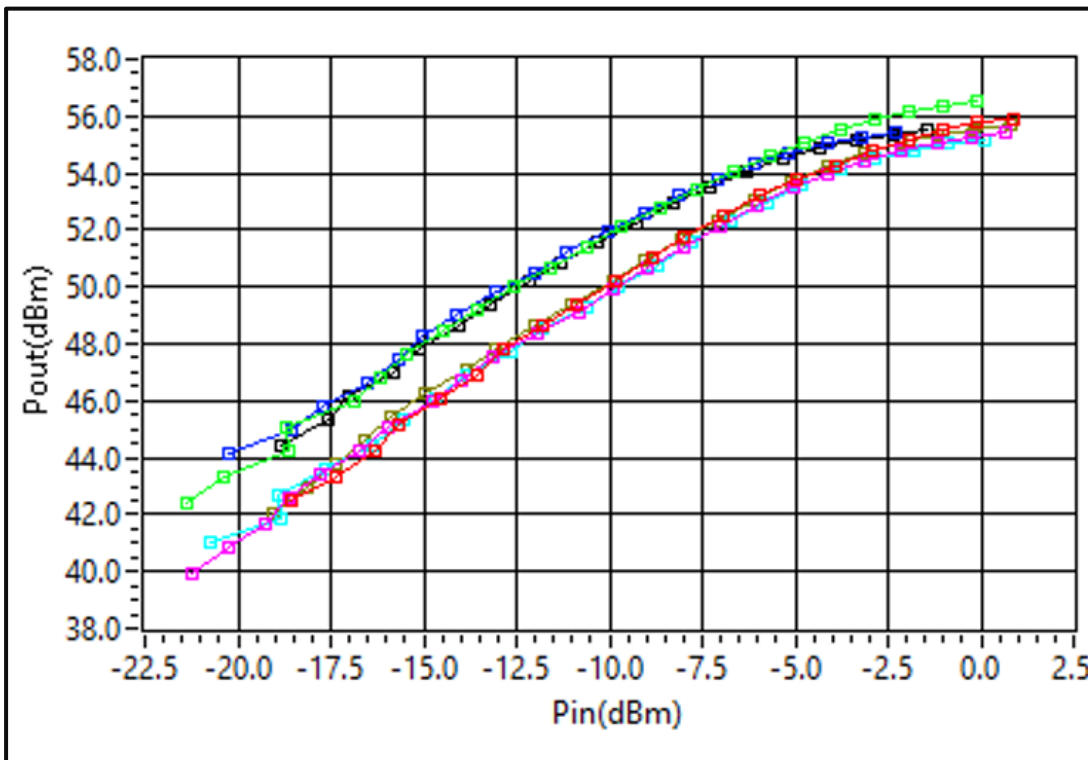
Note: Small signal VNA measurements include attenuators to protect equipment

Typical Performance Plots

Gain vs. Output Power



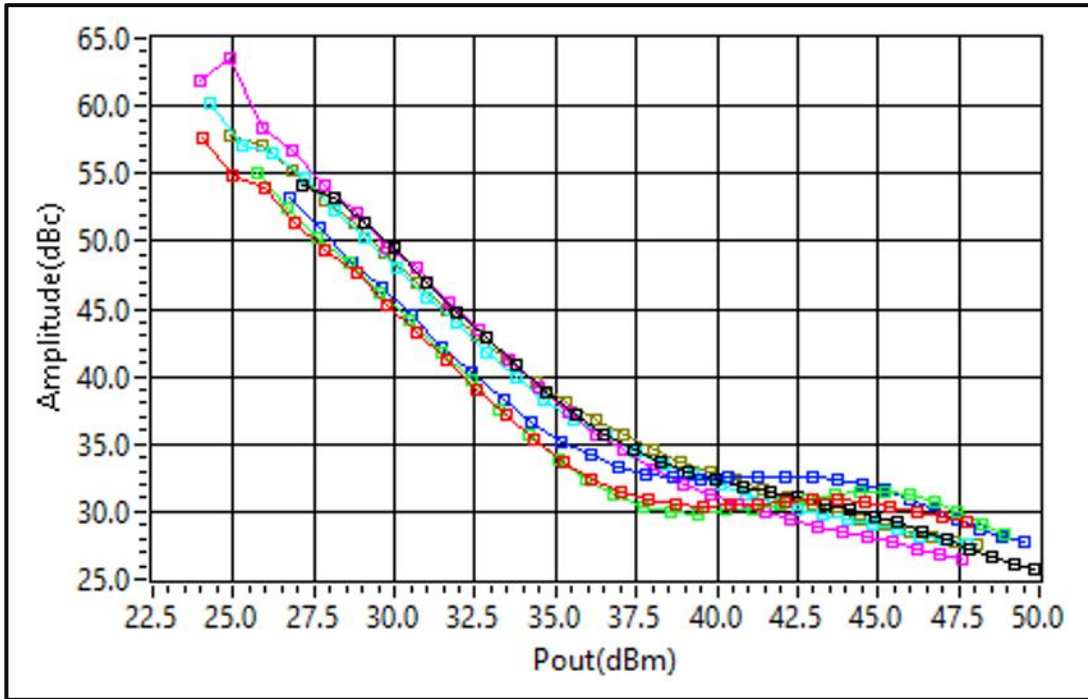
Input Power vs. Output Power



Note: Small signal VNA measurements include attenuators to protect equipment

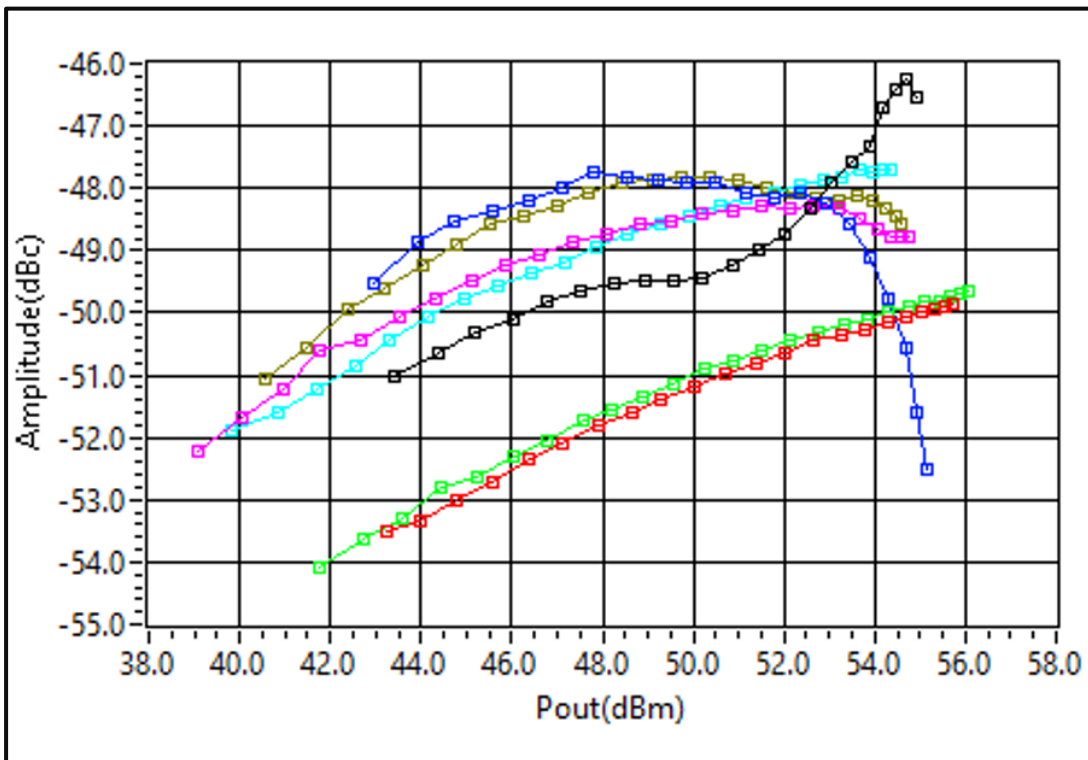
Typical Performance Plots

IM3 (Two Tone Test Separated by 10MHz)



8.0GHz	
8.5GHz	
9.0GHz	
9.5GHz	
10.0GHz	
10.5GHz	
11.0GHz	

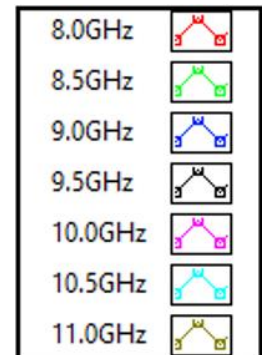
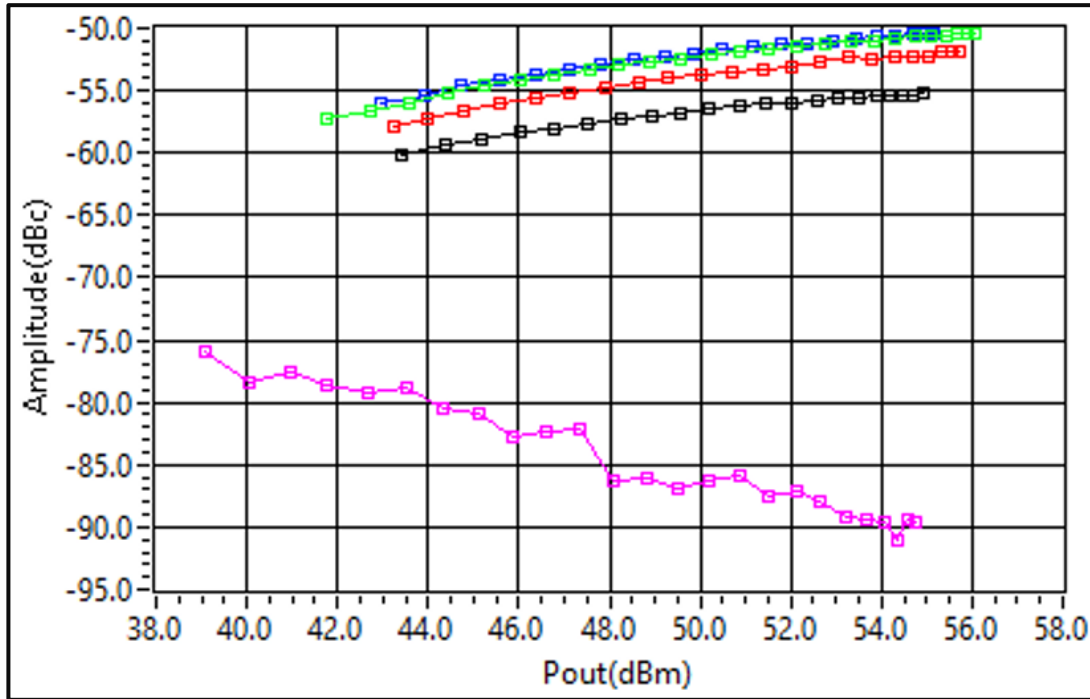
Second Harmonic vs. Output Power



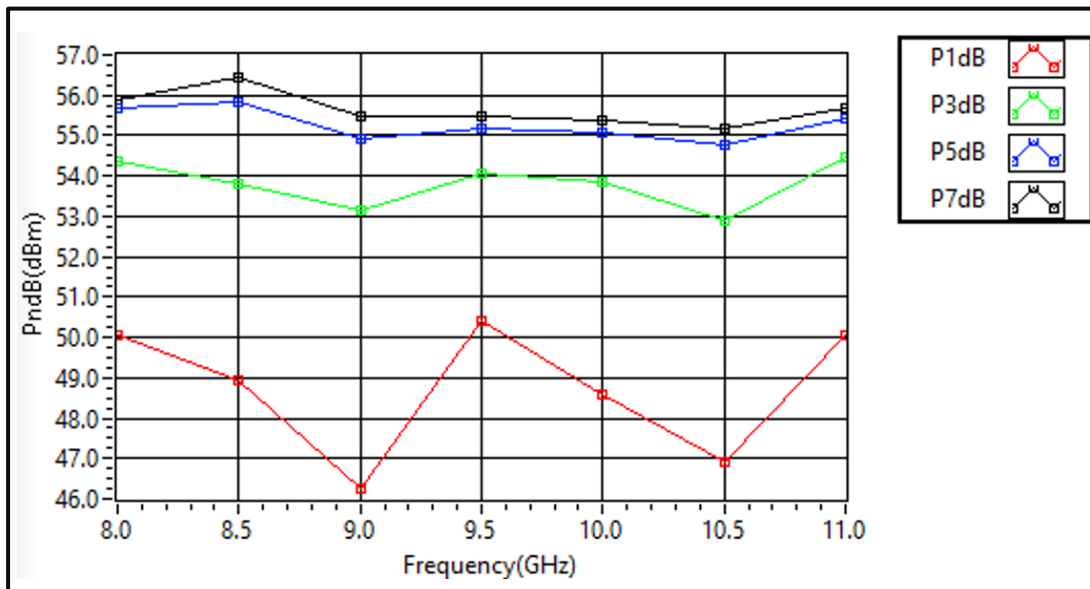
Note: Small signal VNA measurements include attenuators to protect equipment

Typical Performance Plots

Third Harmonic vs. Output Power



PxdB vs. Frequency



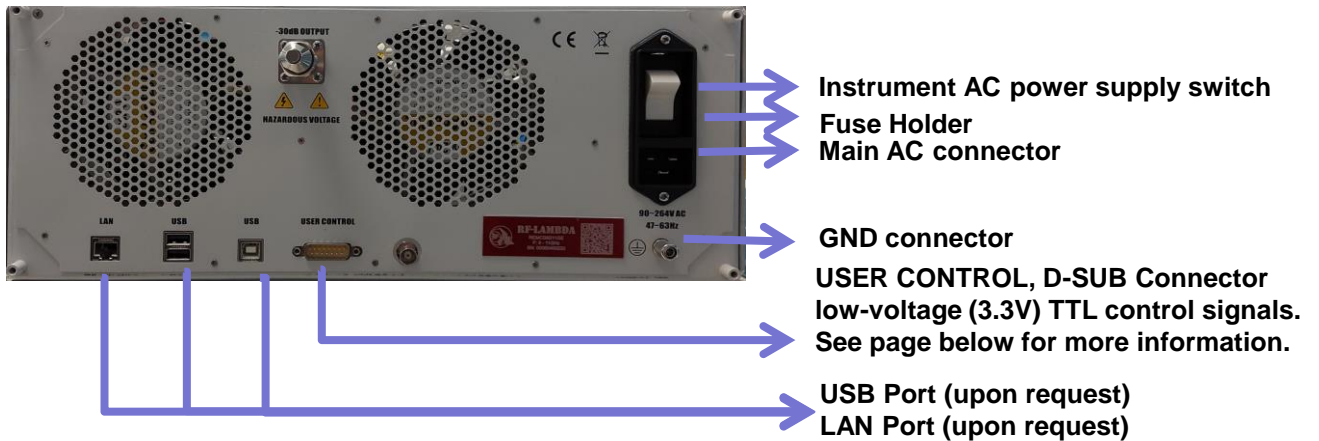
Note: Small signal VNA measurements include attenuators to protect equipment

EMC Equipment Specifications

Front Panel



Rear Panel



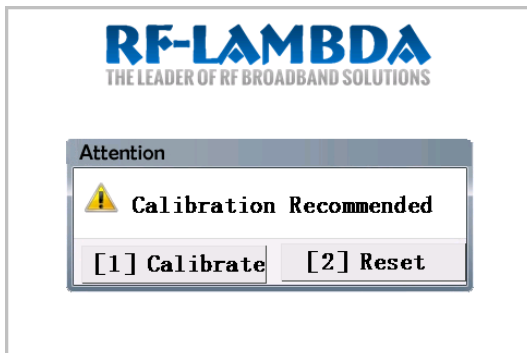
Front Panel LCD Screen Display

Switching On Instrument



Please follow the instructions on the front panel LCD screen after switching on the power. Press "1" on keypad to continue.

Self Calibration Screen

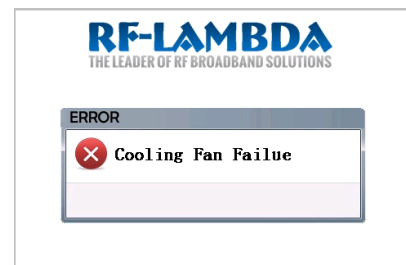
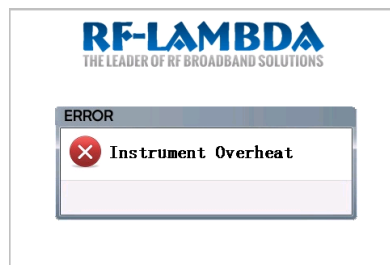
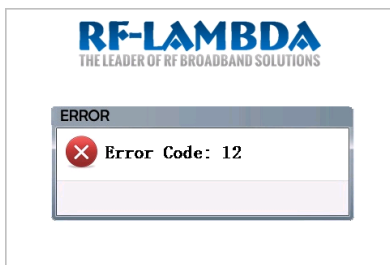


Calibration is may be recommended
"[1] Calibrate" to execute instrument self calibration process.

"[2] Reset" to reboot the instrument.

*Please turn OFF RF input power, and terminate the RF output port while applying calibration function

Instrument Protection Alarms



The front panel LCD screen will display the error code or error message when instrument self protection is triggered. Front panel alarm indicator will light up.

To eliminate the error code, press "RESET" on front panel keypad to reboot the instrument and clear the alarms.

If error code can not be eliminated after reboot, please contact support@rflambda.com

Front Panel LCD Screen Function

Instrument Status Display Page

The screenshot shows the Instrument Status Display Page with the following fields and buttons:

- Caution:** A blue bar at the top.
- Temperature:** 85 / 29.4 F/C
- Attenuation:** 15 dB
- Frequency:** 27 GHz
- Output Power:** 50 dBm
- [1] RF ON/OFF** button
- [2] Gain Lock** button
- *press menu for more options

Callouts explain the following:

- Caution:** Indicates instrument RF output status. It will display: Output is Ready to Turn on or RF Output is ON
- Temperature:** Instrument temperature
- Attenuation:** RF output attenuation (change with adjustment knob)
- Frequency:** RF input signal center frequency
- Output Power:** Instrument RF output power
- [1] RF ON/OFF**: Switches On or Off for instrument RF output port
- [2] Gain Lock**: User can set a constant gain for the unit. Equipment will automatically adjust the gain at certain frequency
- *press menu for more options**: Press "Menu" on keypad to enter instrument functions selection menu

Instrument Function Selection Page

The screenshot shows the Instrument Function Selection Page with the following buttons:

- [1] Calibrate**
- [2] Frequency**
- [3] RF ON/OFF**
- [4] Reset**
- [5] Status**
- [6] Product Info**

To enter this function selection page, press "Menu" on front panel keypad while the instrument is showing the status page. Press the corresponding number on front panel keypad to select:

- "[1] **Calibrate**" calibrates the instruments.
- "[2] **Frequency**" enters RF input signal center frequency.
- "[3] **RF ON/OFF**" switches the RF output port on or off.
- "[4] **Reset**" Restarts the instrument (Turns RF output off)
- "[5] **Status**" enters instrument status display page.
- "[6] **Product Info**" displays product part number and serial number

Attention
Excute Calibration?
[1] YES [2] NO

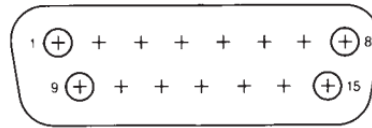
Attention
Excute Reset?
[1] YES [2] NO

Attention
Turn Off RF Output?
[1] YES [2] NO

All action functions will ask for confirming execution when selected from function selection menu.

Protection Connector Table

Male D-Sub is on the housing
The mating Female part number: 747908-2

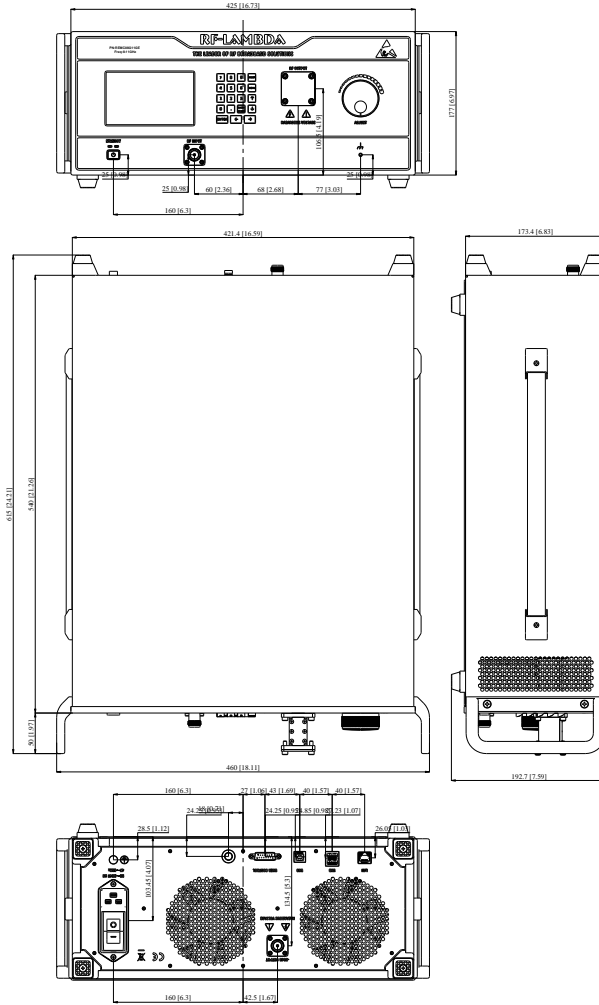


Pin #	Name	Function	Initial State	Description	Applied
1	Reset	Control		Resets PA when logic LOW is applied and released	Yes
2	Driver Disable	Control	LOW	Applying logic HIGH disables driver of amplifiers	Yes
3	Drain Disable	Control	LOW	Applying logic HIGH disables drain of amplifiers	Yes
4	RF IN Over	Indicator	LOW	Pin will be latched to logic HIGH when input signal is over limit	No
5	Temp Over	Indicator	LOW	Pin will be latched to logic HIGH when amplifier is driven over temperature	Yes
6	Current Over	Indicator	LOW	Pin will be latched to logic HIGH when drain current limit is reached	Yes
7	ID Imbalance	Indicator	LOW	Pin will be latched to logic HIGH when an imbalance in the drain current of the combining branches occurs	Yes
8	PA input power	Indicator		PA input power is represented by voltage	No
9	PA output power	Indicator		PA output power is represented by voltage	No
10	PA output reflection power	Indicator		PA output reflection power is represented by voltage	No
11	VSWR	Indicator	LOW	Pin will be latched to logic HIGH when output reflection is over limit	No
13	+5V	Power Supply	+5V	+5V DC is supplied for reference	Yes
14	GND	Ground	GND	Ground	Yes
15	GND	Ground	GND	Ground	Yes

Notes:

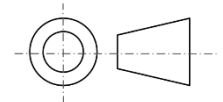
- HIGH/LOW voltages are standard TTL signals 0.0V-0.8V = LOW. 2V-5V = HIGH. Input current is 10uA.
- Matching connector and cable will be shipped with the product.
- Applied=Yes means the feature is included. Applied=No means the feature is not included with this model.
- 5V reference supply can source 700mA.
- Indicator output signals can source 24mA.

Outline Drawing



Notes:

1. Package Material: Aluminum and Copper
2. Plating: white Paint
3. All dimensions are in millimeters [inches].
4. Tolerances ± 0.2 [0.008] unless otherwise specified.
5. Heat sink required during operation (sold separately). Matching heatsink is listed on our website. If customer would like to use their own cooling method, please make sure the amplifier will operate under the specs that listed in page 2 of this datasheet.



Additional Information

Documentation	Webpage
ESD Policy	https://rflambda.com/pdf/rflambda_esd_control.pdf
Heatsink Lookup Specifications	https://rflambda.com/search_heatsink.jsp
Connector Torque Specifications	https://www.rflambda.com/pdf/Torque_Specifications.pdf
Random Vibration Test Standard	https://www.rflambda.com/pdf/rflambda_random_vibration_MIL-STD-202G.pdf

Ordering Information

Part Number	Modification	Description
REMC08G11GE	Input connector N-Female Output WR90	8GHz-11GHz Power Amplifier

Amplifier Use

Ensure that the amplifier input and output ports are safely terminated into a proper 50 ohm load before turning on the power. Never operate the amplifier without a load. A proper 50 ohm load is defined as a load with impedance less than 1.9:1 or return loss larger than 10dB relative to 50 Ohm within the specified operating band width.

Power Supply Requirements

Power supply must be able to provide adequate current for the amplifier. Power supply should be able to provide 1.5 times the typical current or 1.2 times the maximum current (whichever is greater).

In most cases, RF - Lambda amplifiers will withstand severe mismatches without damage. However, operation with poor loads is discouraged. If prolonged operation with poor or unknown loads is expected, an external device such as an isolator or circulator should be used to protect the amplifier.

Ensure that the power is off when connecting or disconnecting the input or output of the amp.

Prevent overdriving the amplifier. Do not exceed the recommended input power level.

Adequate heat-sinking required for RF amplifier modules. Please inquire.

Amplifiers do not contain Thermal protection, Reverse DC polarity or Over voltage protection with the exception of a few models. Please inquire.

Proper electrostatic discharge (ESD) precautions are recommended to avoid performance degradation or loss of functionality.

What is not covered with warranty?

Each RF - Lambda amplifier will go through power and temperature stress testing. Since the die, ICs or MMICs are fragile, these are not covered by warranty. Any damage to these will NOT be free to repair.

Important Notice

The information contained herein is believed to be reliable. RF-Lambda makes no warranties regarding the information contained herein. RF-Lambda assumes no responsibility or liability whatsoever for any of the information contained herein. RF-Lambda assumes no responsibility or liability whatsoever for the use of the information contained herein. The information contained herein is provided "AS IS, WHERE IS" and with all faults, and the entire risk associated with such information is entirely with the user. All information contained herein is subject to change without notice. Customers should obtain and verify the latest relevant information before placing orders for RF-Lambda products. The information contained herein or any use of such information does not grant, explicitly or implicitly, to any party any patent rights, licenses, or any other intellectual property rights, whether with regard to such information itself or anything described by such information.

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