

# RF-LAMBDA

THE LEADER OF RF BROADBAND SOLUTIONS

10W Wideband EMC Benchtop  
Power Amplifier  
0.2GHz-31GHz

## REMC01G31GE



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notice

[www.rflambda.com](http://www.rflambda.com)

# PRODUCT SUMMARY

## PRODUCT OVERVIEW

### GENERAL DESCRIPTION

**REMC01G31GE** is a wideband EMC power amplifier with a frequency range of **0.2 to 31GHz**.

The power output of this amplifier is **39dBm** typical. The typical small signal gain is **52dB** with a flatness of  $\pm 8\text{dB}$ . This performance is achieved through the use of GaN devices. The power amplifier's input connector is **2.92-Female** and Output connector is **2.92-Female**. 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  $0^{\circ}\text{C}$  to  $+50^{\circ}\text{C}$ .



### FEATURES

- » Wide band EMC Solid State Power Amplifier
- » Small Signal Gain **52dB** Typical
- » Output Saturation Power **39dBm** Typical
- » Supply Voltage **110/220 VAC**
- » 50 Ohm Matched Input / Output
- » Fast RF Blanking – Optional
- » Real Time VSWR measurement
- » Internal Signal Generator – Optional
- » Over temperature Protection
- » Over current Protection
- » Over voltage Protection
- » 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

# QUALITY STANDARDS



## ESD Policy

[https://rflambda.com/pdf/rflambda\\_esd\\_control.pdf](https://rflambda.com/pdf/rflambda_esd_control.pdf)

## Random Vibration Test Standard

[https://www.rflambda.com/pdf/rflambda\\_random\\_vibration\\_MIL-STD-202G.pdf](https://www.rflambda.com/pdf/rflambda_random_vibration_MIL-STD-202G.pdf)

## Connector Torque Specifications

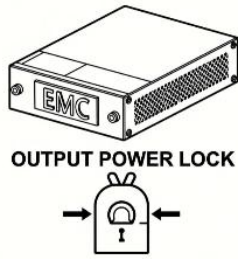
[https://www.rflambda.com/pdf/Torque\\_Specifications.pdf](https://www.rflambda.com/pdf/Torque_Specifications.pdf)

Parameter	Description
Operational Temperature	0°C to +50°C (Ambient Temperature)
Thermal Shock	40°C → +85°C (5 Cycles / 10 hours, Only internal modules tested prior to final assembly)
*Random Vibration	MIL-STD-202G, Table 214-I, Test Condition Letter C, 1.5 Hours Per Axis
High Temperature Burn In	Temperature +50°C for 72 Hours
Storage Temperature	0°C to +125°C

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

RF-Lambda is ISO: 9000 certified with 25,000 ft<sup>2</sup> combined R&D and production space, including an ISO7 10K Clean Room to meet ISO-14644-1.

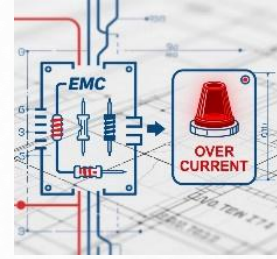
## PRODUCT FUNCTIONS



Local/Remote Control Toggle  
Remote Control



Select control mode:  
Local (direct) or Remote (network)



### EMC Functions

- Output Power Lock
- Automatic Calibration

### Mode Selections

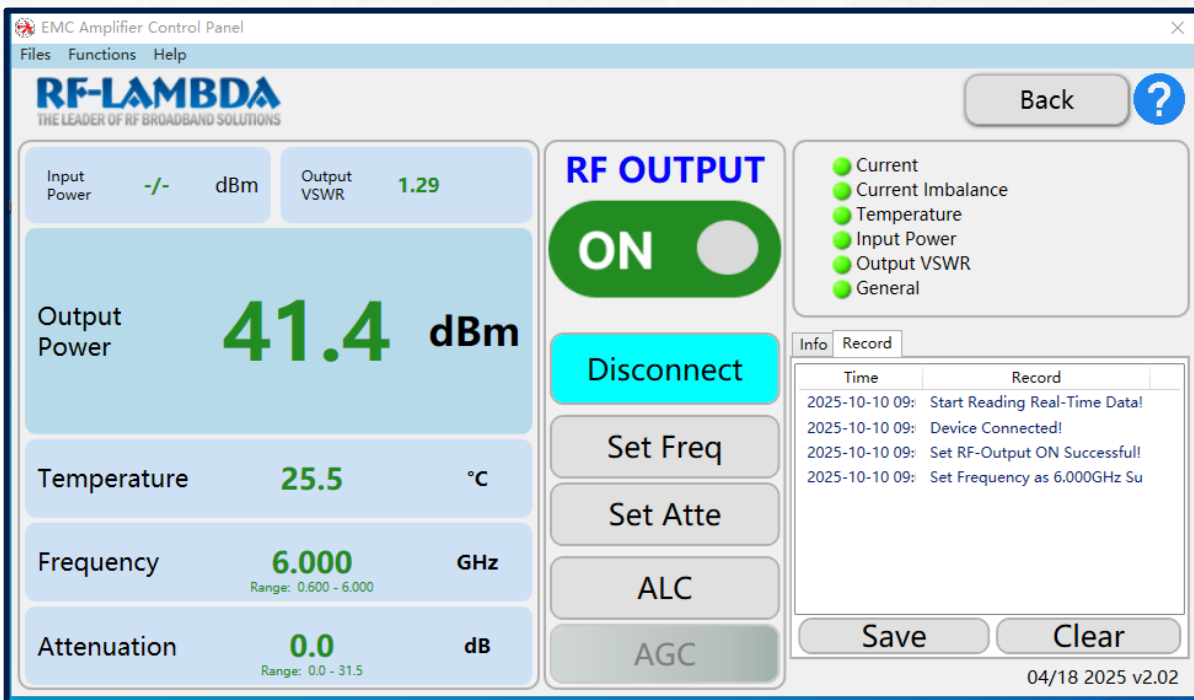
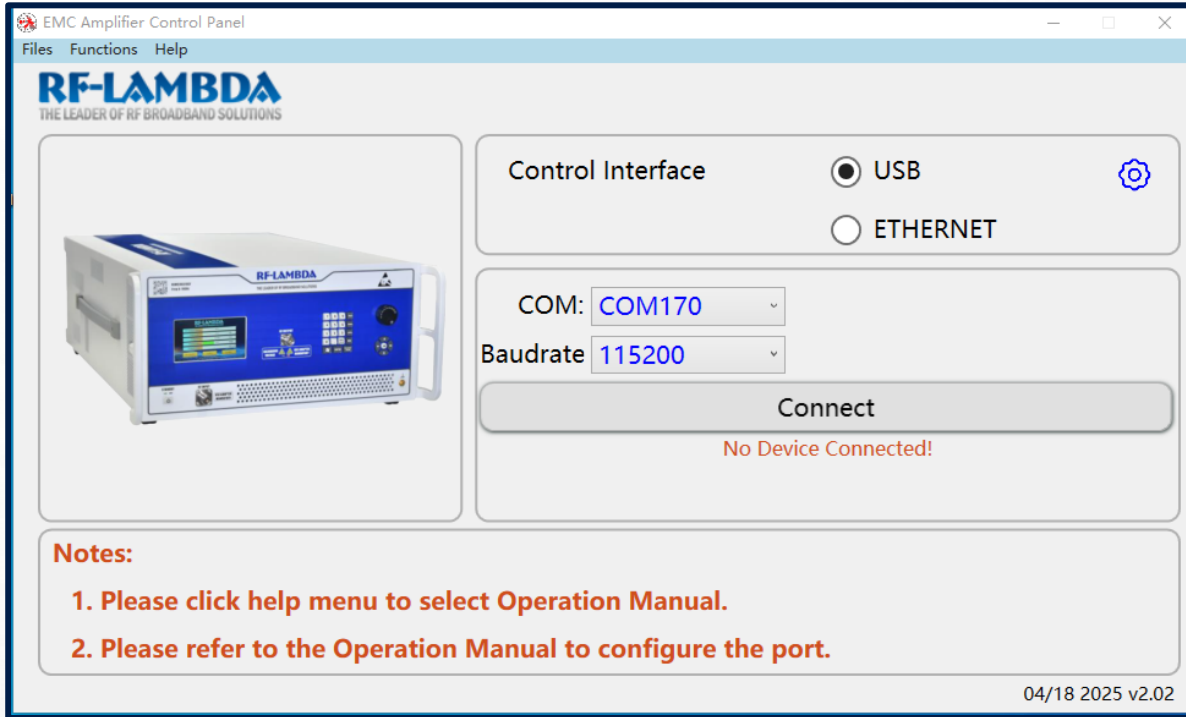
- Local
- Remote Control

### Product Safety Interlock

- Input Power Overload Protection
- Output Mismatch Protection
- Over temperature Protection
- Over current Protection
- Cooling System Anomaly Protection

Category	Function	Included	Optional (Licensing)	Optional (Hardware)	NOT Applicable
Product Safety Interlock	Input Overload Protection	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Output VSWR Protection	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Current Overload Protection	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Temperature Protection	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Current Imbalance Protection	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Overvoltage and Undervoltage Protection	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	AC Power Abnormality Protection	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
User Operation Functions	Fan Abnormality Protection	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	USB, LAN Communication	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	DB Interface	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Self-Calibration Function	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Gain Compensation Over Temperature	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Current Compensation Over Temperature	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	TDD Control - RF Switch Enable	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	TDD Control - Positive Voltage Enable	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	TDD Control - Negative Voltage Enable	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	GUI Interface	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Parameter Setting	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Gain Calibration Each Stage	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Software ON/OFF Function	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Modularized System Integration	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Remote Software Control ON/OFF	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
EMC Functions	Rotary Gain Adjustment	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Screen Protection Function	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Touch Screen Display	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Developer Interface	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
User Customization Functions	System Log Recording	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Output VSWR Measurement	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Input Power Measurement	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	ALC - Automatic Loop Control Gain	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	AGC - Automatic Gain Control Function	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	Input Circulator Protection (Internal Load)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	Output Circulator Protection (Internal Load)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	Waveguide Adapter (E-H)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Internal Signal Generator	Fast RF Blanking	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	Single Frequency Output	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	Frequency Auto Sweeping	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	Frequency Hopping	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	External Signal	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

## REMOTE CONTROL

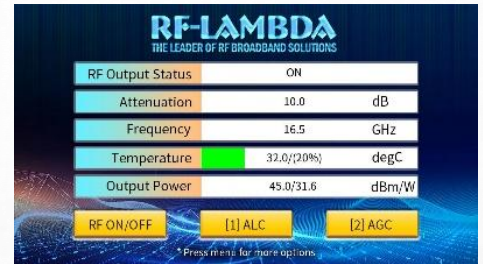


# TECHNICAL DATA SPECIFICATIONS

Parameter	Min	Typ	Max	Min	Typ	Max	Units
Frequency Range	0.2		22	23		31	GHz
Small Signal Gain		52			46		dB
Gain Flatness		±5			±5		dB
Gain Variation Over Temperature (0°C to 50°C)		±3			±3		dB
Input Return Loss		-10			-10		dB
Saturated Output Power (Psat)		39			36		dBm
Power Added Efficiency (PAE)		20			20		%
IM3		25			20		dBc
Turn On/Off Speed (Switch Disable)	ON			100			ns
	OFF			100			ns
Weight			45				lbs.
Impedance			50				Ohms
Input / Output Connectors			2.92 Female				
*RF Input Power (RFIN)			Psat – Large Signal Gain				
Package			3U Rack-mount/Tabletop Chassis				
Cooling System			Forced air (self contained fans)				
Supply Voltage			110/220 AC				V
Supply Frequency			47 to 63				Hz

\*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.

# INSTRUCTIONS FOR USE



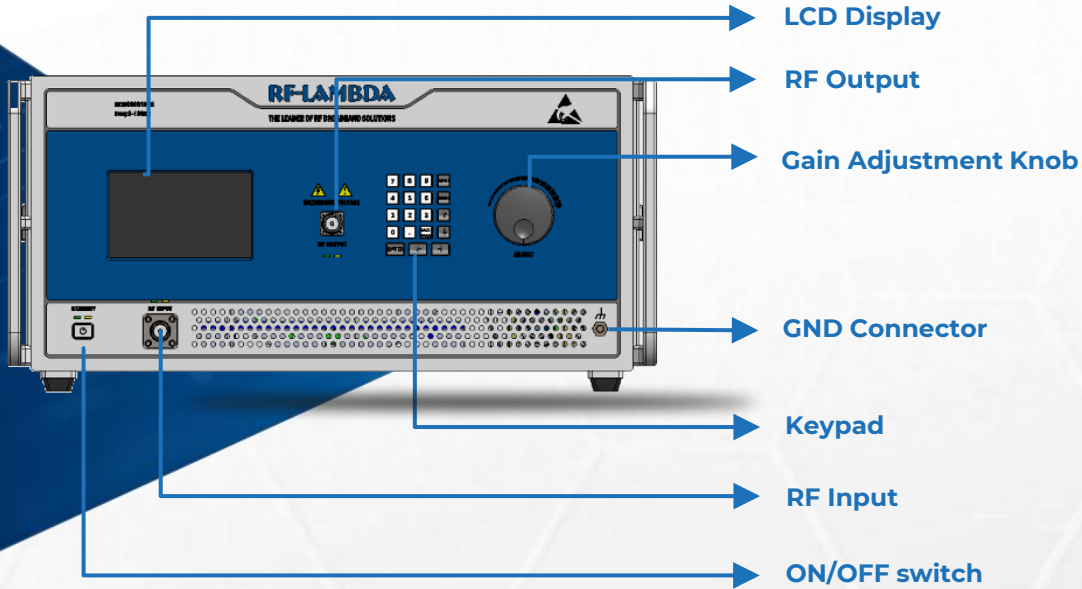
Please follow the instructions on the front panel LCD screen after switching on the power. Press “1” on keypad to continue.

*Please follow the instructions.*

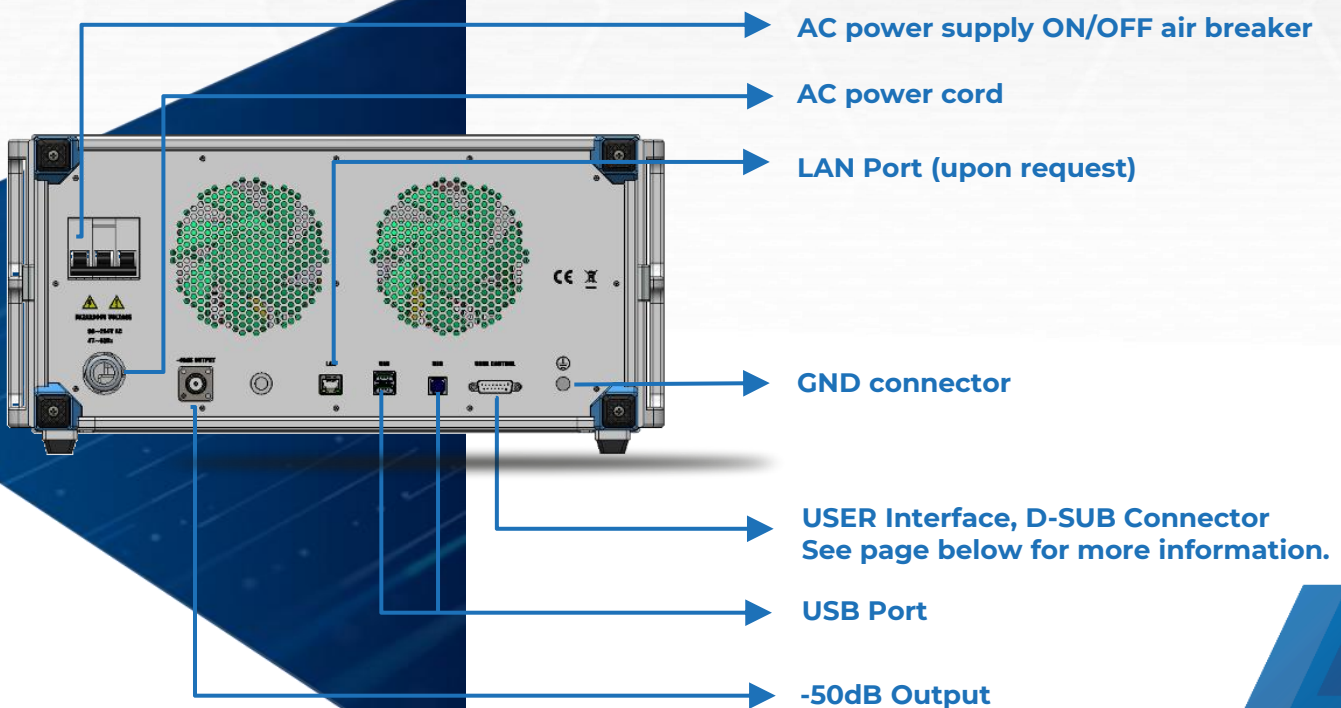
Name	Description
RF Output Status	Indicates instrument RF output status. It will display: ON or OFF
Attenuation	RF output attenuation (change with adjustment knob)
Frequency	RF input signal frequency (For illustrative purposes only)
Temperature	Instrument temperature (For illustrative purposes only)
Output Power	Instrument RF output power (For illustrative purposes only)
RF ON/OFF	Switches On or Off for instrument RF output port
ALC	ALC mode, Automatic Loop Control (optional)
AGC	AGC mode, Automatic Gain Control (optional)

# INTERFACE DESCRIPTION

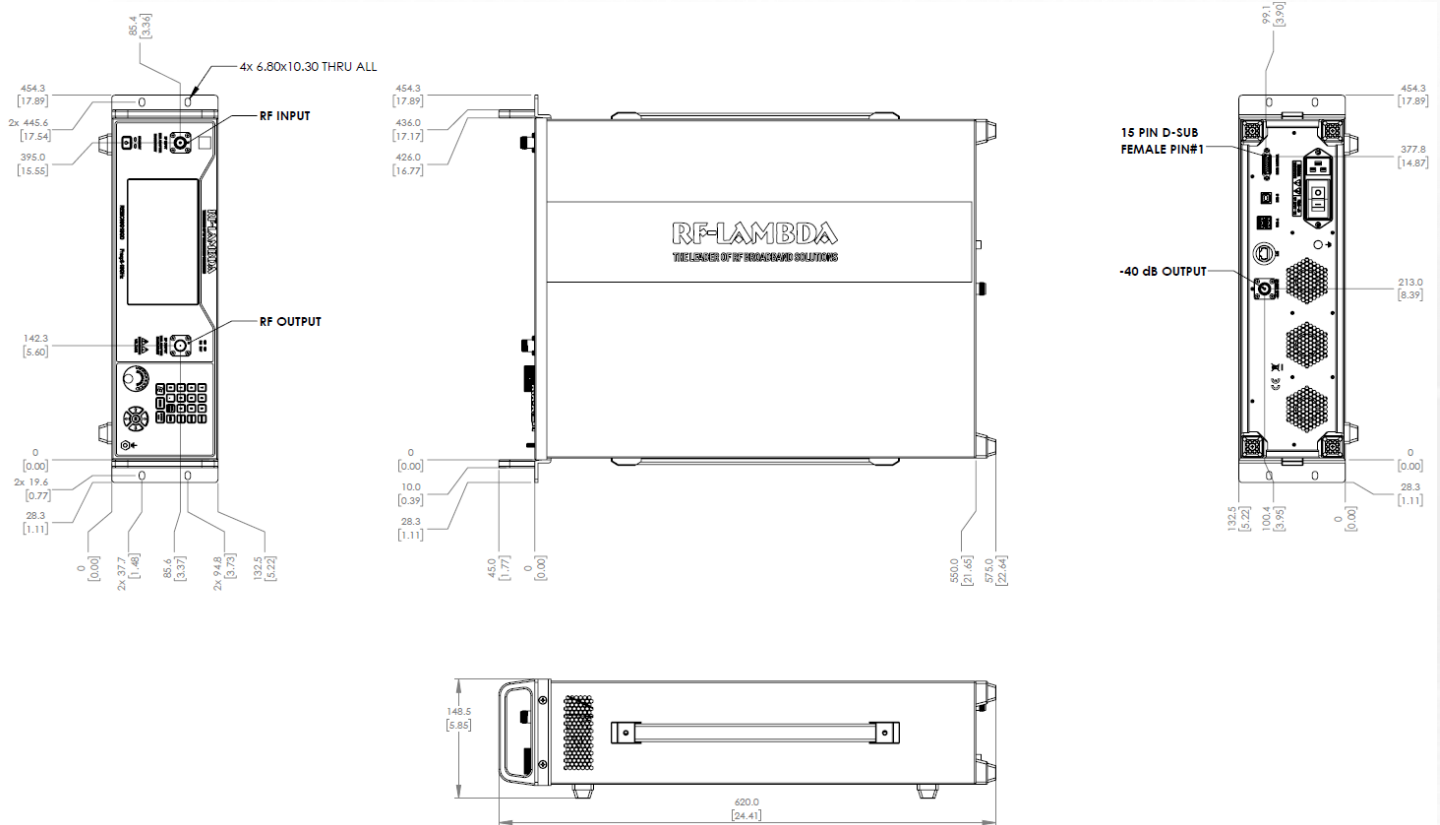
## FRONT PANEL



## REAR PANEL



### OUTLINE DRAWING

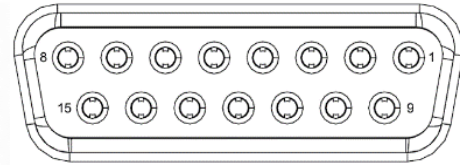


**Notes:**

1. Package Material: Aluminum
2. Finish: White Baking Paint
3. All dimensions are in millimeters [inches].
4. Standard torque wrench must be used to secure RF connectors.

# PROTECTION CONNECTOR TABLE

Female D-Sub is on the housing  
The mating male part number: 172-E15-203R001



Pin #	Name	Function	Initial State	Description	Applied
1	Reset	Control	HIGH	Resets PA when logic <u>LOW</u> is applied and released	Yes
2	Gate Disable	Control	LOW	Applying logic <u>HIGH</u> disables gate of amplifiers	Yes
3	Drain Disable	Control	LOW	Applying logic <u>HIGH</u> disables drain of amplifiers	Yes
4	RF Input Over Drive	Indicator	LOW	Pin will be latched to logic <u>HIGH</u> when input signal is over limit	Yes
5	Temp Over	Indicator	LOW	Pin will be latched to logic <u>HIGH</u> when amplifier is driven over temperature	Yes
6	Current Over	Indicator	LOW	Pin will be latched to logic <u>HIGH</u> when drain current limit is reached	Yes
7	Current Imbalance	Indicator	LOW	Pin will be latched to logic <u>HIGH</u> when an imbalance in the drain current of the combining branches occurs	Yes
8	PA Off Alarm	Indicator	LOW	Pin will be latched to logic <u>HIGH</u> when any of the protection limit is reached	Yes
9	Fan Alarm	Indicator	LOW	Pin will be latched to logic <u>HIGH</u> when Fan limit is reached	Yes
10	RF Input Switch	Control	LOW	Applying logic <u>HIGH</u> turns RF switch to load path	Yes
11	VSWR	Indicator	LOW	Pin will be latched to logic <u>HIGH</u> when output reflection is over limit	Yes
12	Fixed Attenuation 5dB	Control	LOW	Applying logic <u>HIGH</u> enables 5dB attenuation	Yes
13	Fixed Attenuation 10dB	Control	LOW	Applying logic <u>HIGH</u> enables 10dB attenuation	Yes
14	+5V	Power Supply	+5V	+5V DC is available for reference	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 250mA.
- Indicator output signals can source 24mA.

## PACKING LIST



Each amplifier is shipped in a well protected package.

## ORDERING INFORMATION

Part Number	Modification	Description
REMC01G31GE	Input connector SMA-Female and Output connector SMA-Female	0.2GHz-31GHz Wideband EMC Benchtop 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

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