

# RF-LAMBDA

THE LEADER OF RF BROADBAND SOLUTIONS

50W Wideband EMC  
Benchtop Power Amplifier  
0.02GHz - 3GHz

## REMC02M20MH



Note: Photo is for illustration purposes only. Please refer to outline drawing.

Sales: [sales@rflambda.com](mailto:sales@rflambda.com)

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Rev 5. 01-06-2026 | Subject to change without notice

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

# PRODUCT SUMMARY

## PRODUCT OVERVIEW

### GENERAL DESCRIPTION

REMC02M20MH is a wideband EMC power amplifier with a frequency range of 0.02 to 3GHz.

The power output of this amplifier is 47dBm typical. The typical small signal gain is 55dB with a flatness of  $\pm 3$ dB. This performance is achieved through the use of GaN devices. The power amplifier's input connector is N-Female and Output connector is N-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°C to +50°C.



### FEATURES

- » Wide band EMC Solid State Power Amplifier
- » Small Signal Gain 55dB Typical
- » Output Saturation Power 47dBm Typical
- » Supply Voltage 110/220 VAC
- » 50 Ohm Matched Input / Output
- » Fast RF Blanking
- » 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	0°C to +50°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	-40°C to +85°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



OUTPUT POWER LOCK

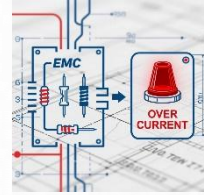


### Local/Remote Control Toggle

Remote Control



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



### 1 EMC Functions

- Output Power Lock
- Automatic Calibration

### 2 Mode Selections

- Local
- Remote Control

### 3 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"/>
	Fan Abnormality Protection	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
User Operation Functions	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 checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	AGC - Automatic Gain Control Function	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input 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 checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Single Frequency Output	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Frequency Auto Sweeping	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Frequency Hopping	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	External Signal	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## REMOTE CONTROL

EMC Amplifier Control Panel

Files Functions Help

**RF-LAMBDA**  
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Control Interface  USB  ETHERNET

COM: COM170

Baudrate: 115200

Connect

No Device Connected!

**Notes:**

1. Please click help menu to select Operation Manual.
2. Please refer to the Operation Manual to configure the port.

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EMC Amplifier Control Panel

Files Functions Help

**RF-LAMBDA**  
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Back ?

Input Power  $-/-$  dBm Output VSWR 1.29

Output Power **41.4** dBm

Temperature 25.5 °C

Frequency 6.000 GHz  
Range: 0.600 - 6.000

Attenuation 0.0 dB  
Range: 0.0 - 31.5

**RF OUTPUT**  
ON

Disconnect

Set Freq

Set Atte

ALC

AGC

Current  
 Current Imbalance  
 Temperature  
 Input Power  
 Output VSWR  
 General

Info Record

Time	Record
2025-10-10 09:00	Start Reading Real-Time Data!
2025-10-10 09:00	Device Connected!
2025-10-10 09:00	Set RF-Output ON Successful!
2025-10-10 09:00	Set Frequency as 6.000GHz Su

Save Clear

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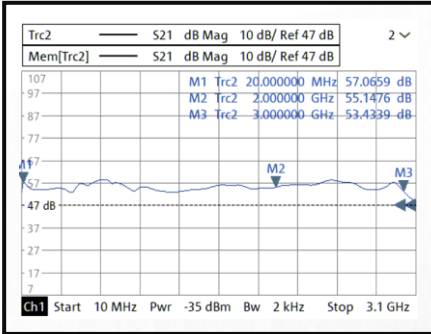
## TECHNICAL DATA SPECIFICATIONS

Parameter	Min	Typ	Max	Min	Typ	Max	Units
<b>Frequency Range</b>	0.02		2	2		3	GHz
<b>Small Signal Gain</b>	50	55		50	55		dB
<b>Gain Flatness</b>		±3			±3		dB
<b>Gain Variation Over Temperature (0°C to 50°C)</b>		±2			±2		dB
<b>Input VSWR</b>		1.5	2.5		1.5	2.0	:1
<b>Output 1dB Compression Point (P1dB)</b>		45.5			45		dBm
<b>Saturated Output Power (Psat)(CW)</b>	46	47.5		45	46		dBm
<b>Supply Current (220V AC)</b>		0.5	2		0.5	2	A
<b>Power Added Efficiency (PAE)</b>		20			20		%
<b>IM3</b>		-30			-30		dBc
<b>Turn On/Off Speed (Switch Disable)</b>	ON		1000				ns
	OFF		250				ns
<b>Turn On/Off Speed (Drain Disable)</b>	ON		50				us
	OFF		2500				us
<b>Turn On/Off Speed (Gate Disable)</b>	ON		500				us
	OFF		1				us
<b>RF Fast Blanking Speed (Optional)</b>	ON		/				us
(Mute RF Output signal and noise)	OFF		/				us
<b>Optional RF Fast Blanking Frequency (Optional)</b>			/				kHz
<b>Weight</b>			50 Max				lbs.
<b>Impedance</b>			50				Ohms
<b>*RF Input Power (RFIN)</b>			Psat – Large Signal Gain				
<b>Package</b>			5U Rack-mount/Tabletop Chassis				
<b>Cooling System</b>			<b>Forced air (Self-contained fan)</b>				
<b>Supply Voltage</b>			90 to 264				VAC
<b>Supply Frequency</b>			47 to 63				Hz
<b>Supply Power</b>			500				W

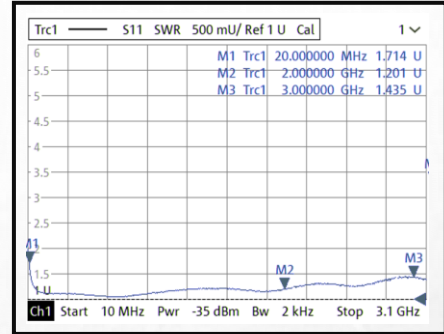
\*Maximum RF input power is set to assure safety of amplifier. Input power may be increased at own risk to achieve full power of amplifier. Please reference gain and power curves.

## TYPICAL PERFORMANCE PLOTS

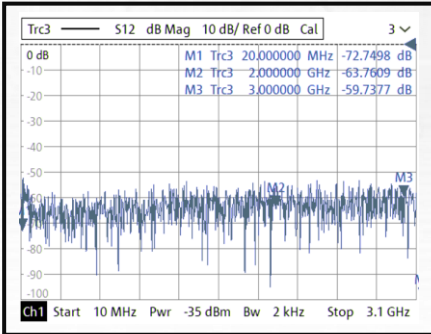
### Gain



### Input VSWR



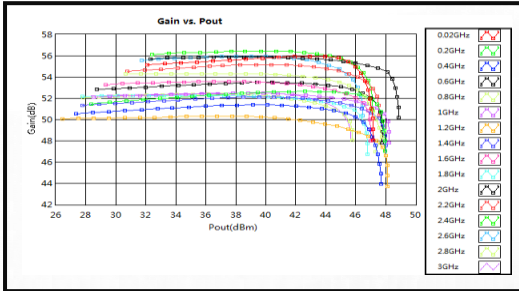
### Isolation



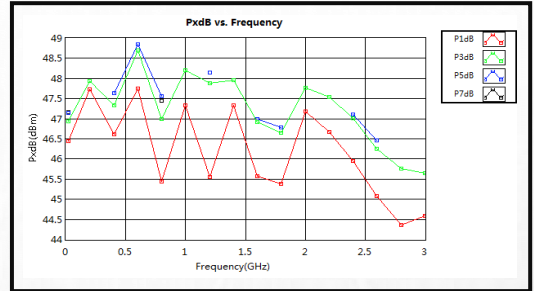
Note: Small signal VNA measurements include attenuators to protect equipment.

## TYPICAL PERFORMANCE PLOTS

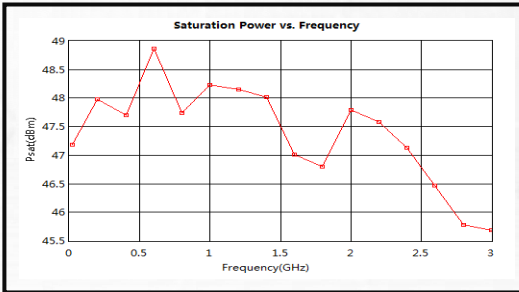
### Gain vs. Output Power CW



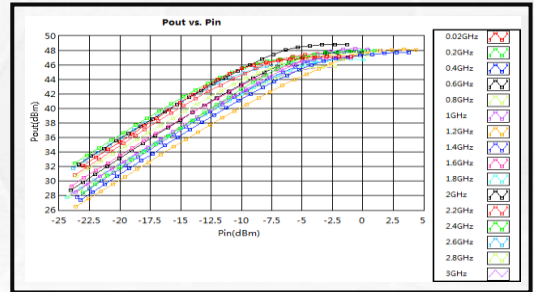
### PndB vs. Frequency CW



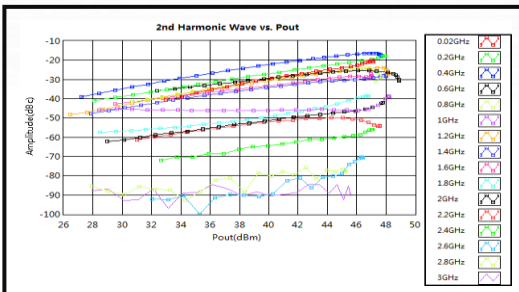
### Saturation Power vs. Frequency CW



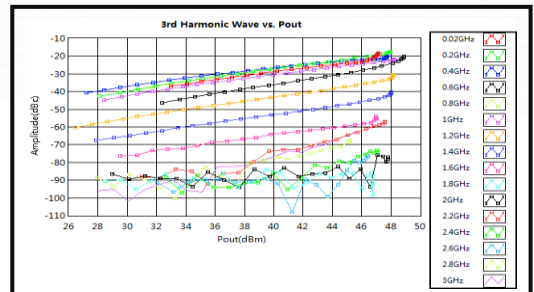
### Pout vs. Pin



### 2<sup>nd</sup> Harmonics

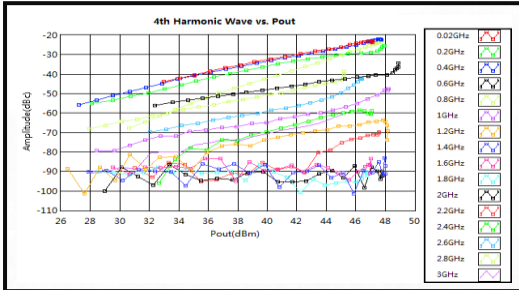


### 3<sup>rd</sup> Harmonics

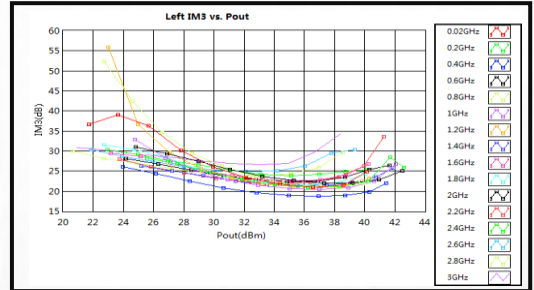


## TYPICAL PERFORMANCE PLOTS

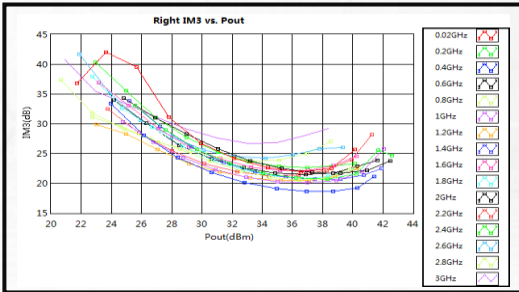
### 4<sup>th</sup> Harmonics



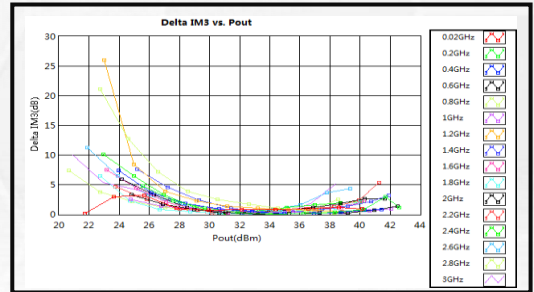
### Left IM3 vs. Pout



### Right IM3 vs. Pout



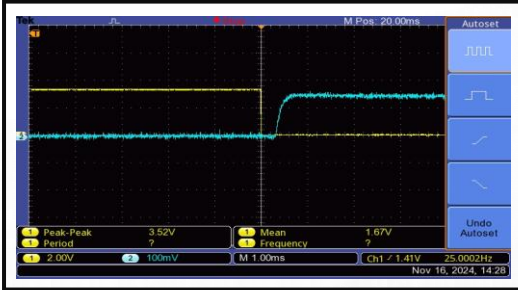
### Delta IM3 vs. Pout



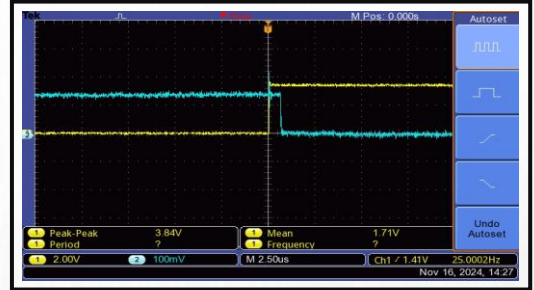
Note: IM3 test performed with 1 MHz tone spacing

## TYPICAL PERFORMANCE PLOTS

The Gates Open Time is 500 us

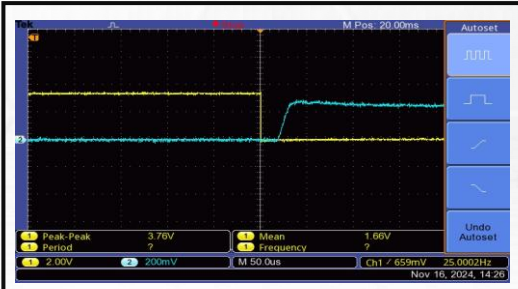


The Gates Closure Time is 1 us

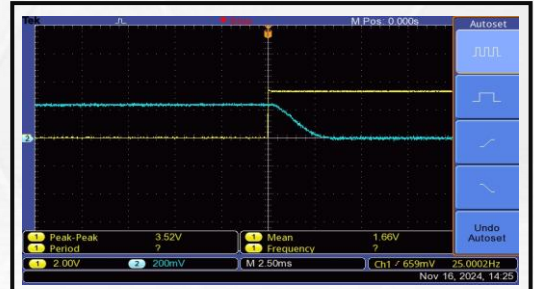


The gate control port : D-sub 15 PIN #2 (Gate Disable).  
The yellow curve is the gate control signal, the blue curve is RF output envelope.

The Drains Open Time is 50 us

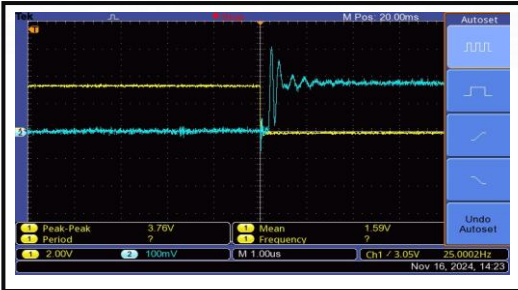


The Drains Closure Time is 2.5 ms

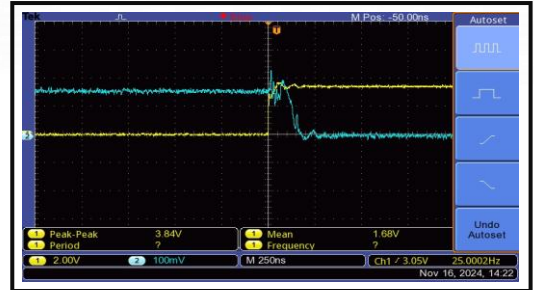


The drain control port : D-sub 15 PIN #3(Drain Disable).  
The yellow curve is the drain control signal, the blue curve is RF output envelope.

The RF Switch On Time is 1000 ns

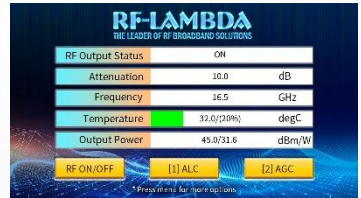


The RF Switch Off Time is 250 ns



Switch control port: D-sub 15 PIN #10(Switch Disable).  
The yellow curve is the switch control signal, the blue curve is RF output envelope.

## INSTRUCTIONS FOR USE



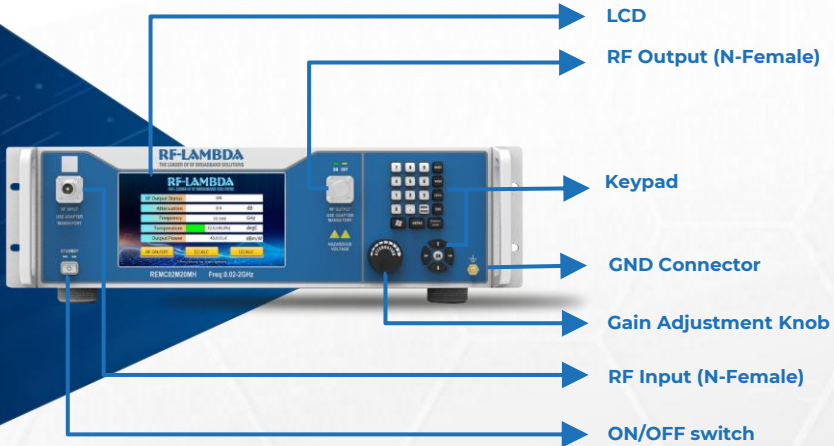
Please follow the instructions on the front panel LCD screen after switching on the power. Press “1” on keypad to continue.

*Please follow the instructions.*

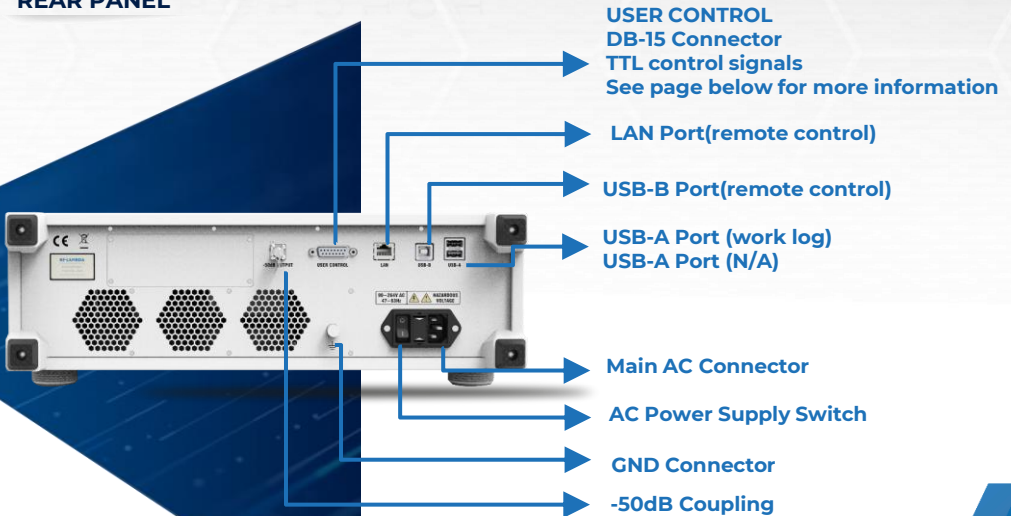
Name	Description
RF Output Status	Indicates instrument RF output status. It will display: ON or OFF
Attenuation	RF output attenuation (change with adjustment knob)
Frequency	RF input signal frequency (For illustrative purposes only)
Temperature	Instrument temperature (For illustrative purposes only)
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
AGC	AGC mode, Automatic Gain Control, <b>this function is invalid</b>

### INTERFACE DESCRIPTION

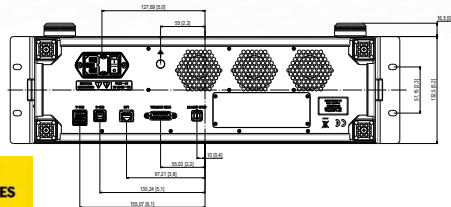
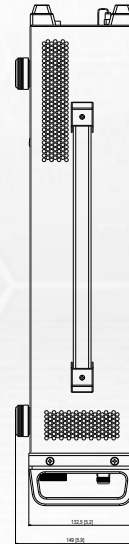
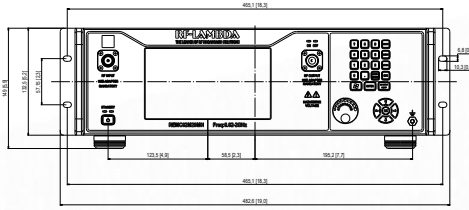
#### FRONT PANEL



#### REAR PANEL



## OUTLINE DRAWING

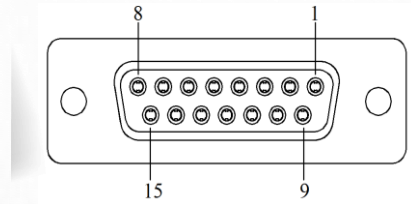


**Notes:**

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-E15-113R001



Pin #	Name	Function	Initial State	Description	Applied
1	Reset	Control	HIGH	Resets PA when logic LOW is applied for five more seconds and released	Yes
2	Gate Disable	Control	LOW	Applying logic HIGH disable gates of amplifiers	Yes
3	Drain Disable	Control	LOW	Applying logic HIGH disable drains of amplifiers	Yes
4	RF Input Over Drive	Indicator	LOW	Pin will be latched to logic HIGH when input signal is over limit	Yes
5	Temperature 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	Current Imbalance	Indicator	LOW	Pin will be latched to logic HIGH when an imbalance in the drain current of the combining branches occurs	No
8	PA Off Alarm	Indicator	LOW	Pin will be latched to logic HIGH when any of the protection limit is reached	Yes
9	Fan Alarm	Indicator	LOW	Pin will be latched to logic HIGH when Fan limit is reached	Yes
10	RF Input Switch	Control	LOW	Applying logic HIGH turns OFF RF front-end switch to terminator	Yes
11	VSWR	Indicator	LOW	Pin will be latched to logic HIGH when output reflection is over limit	Yes
12	Fixed Attenuation 10dB	Control	LOW	Applying and holding logic HIGH to enable 10dB fixed attenuation	Yes
13	Fixed Attenuation 20dB	Control	LOW	Applying and holding logic HIGH to enable 20dB fixed attenuation	Yes
14	+5V	Power Supply	+5V	+5V DC is supplied for reference (200mA)	Yes
15	GND	Ground	GND	Ground	Yes

Notes:

- HIGH/LOW voltages are standard TTL signals 0.0V-0.8V = LOW, 2.8V-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.

## PACKING LIST

ID	Description	QTY
1	Fig a. AC power supply line (Consulting sales)	1
2	Fig b. DB15 cable (RFCBLADB15)	1



Fig a.



Fig b.

## ORDERING INFORMATION

Part Number	Modification	Description
REMC02M20MH	Input connector N-Female and Output connector N-Female	0.02GHz - 3GHz 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

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.

RF-Lambda products are not warranted or authorized for use as critical components in medical, life-saving, or life sustaining applications, or other applications where a failure would reasonably be expected to cause severe personal injury or death.