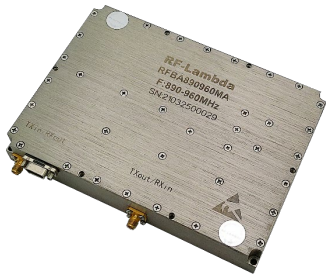
Bi-directional Power Amplifier
890MHz-960MHz



Product Description

The RFBA890960MA is a bi-directional power amplifier with a frequency range of 890 to 960MHz.

The power output of this amplifier is 46dBm typical. The typical small signal gain is 15dB with a gain flatness of ±1dB. This power amplifier works with a +24 VDC power supply.

The power amplifier's connectors are SMA.

The operating temperature of this product is from -10 to +55ºC.

Features

- Receiver gain: 15dB typical
- Receiver NF: <2.5dB
- Transmitter gain : 15dB typical
- Transmitter P1dB : 45dBm
- ACPR : ≤-35dBc (@±5MHz Bandwidth)

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 = +25ºC Vcc +24V; TX Input Power needs to be greater than 20dBm

Parameter	RX			TX (Input Power >20dBm)			
	Min	Typ	Max	Min	Typ	Max	Units
Frequency Range	890		915	935		960	MHz
Gain		15			15		dB
Gain Flatness		±1			±1		dB
Noise Figure		2.0			--		dB
Input Return Loss		-10			-18		dB
Output Power for 1dB Compression (P1dB)		21			45		dBm
TX Group delay		--			50		ns
ACPR(@±5MHz Bandwidth)		--			-35		dBc
Efficiency @ Output Power		7			40		%
Power Supply (+24V)		0.085			0.77	5.5	A
Weight			2.02				lbs
Input / Output Connectors			SMA-Female				
Package Seal			Epoxy Sealed (Standard)				
			Hermetically Sealed (Optional)				

Note: The input current of the interface input level is less than 500uA and the output current of the output level is less than 1mA.

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Absolute Maximum Ratings

Parameter	Rating
Supply Voltage Range	+24.5VDC
*RF Input Power (RFIN)	Psat – Large Signal Gain

Bias Up Procedure

1. Connect ground
2. Connect input and output with 50 Ohm source/load. (In band VSWR < 1.9:1 or >10dB return loss.)
3. Connect +24VDC and make sure power supply can handle max current.

Bias Down Procedure

1. Turn off +24VDC
2. Remove +24VDC Connection
3. Remove RF Connection
4. Remove ground

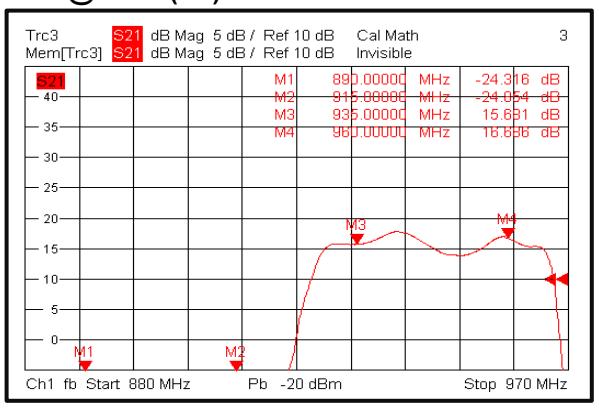
Environmental Specifications and Test Standards

Parameter	Description
Operational Temperature	-10ºC to +55ºC (Case Temperature)
Storage Temperature	-50ºC to +105ºC
Thermal Shock	-10ºC → +55ºC (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 +85ºC 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)

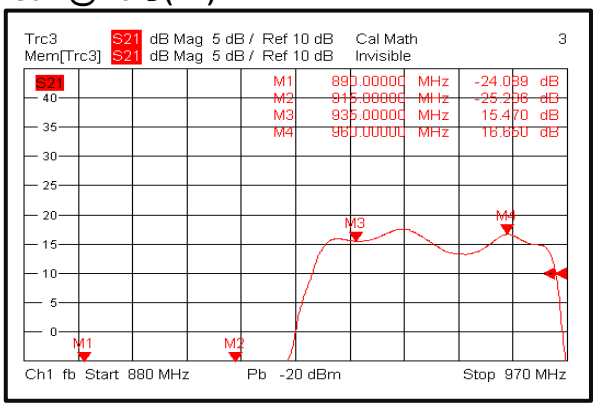
*Maximum RF input power is set to assure safety of amplifier. Input power may be increased at own risk to achieve full power of amplifier. Please reference gain and power curves.
**For vibration testing details please see additional information section.

Typical Performance Plots

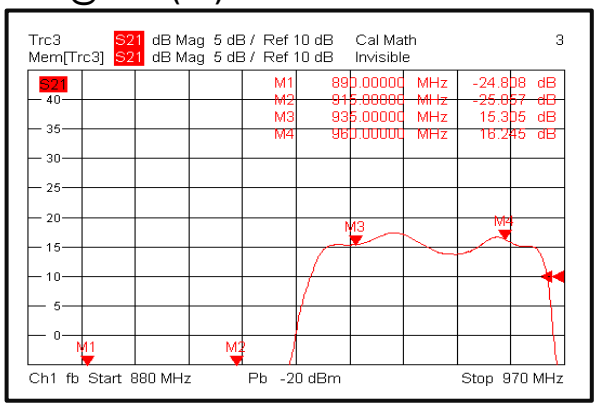
Gain@+25℃ (TX)



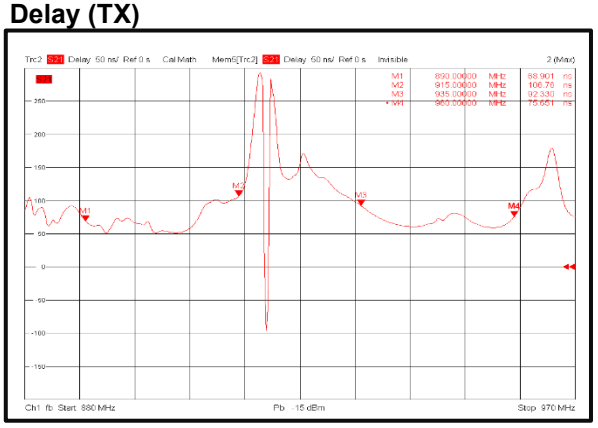
Gain@-10℃ (TX)



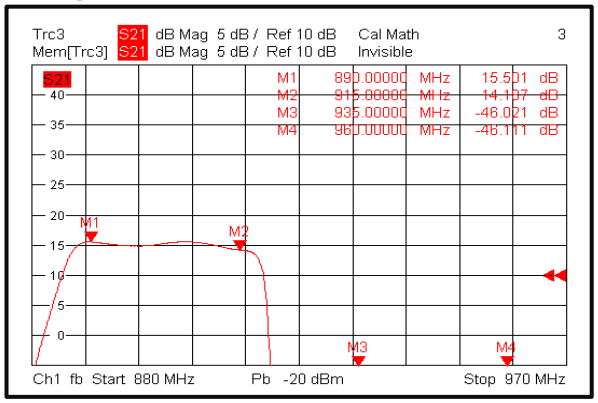
Gain@+55℃ (TX)



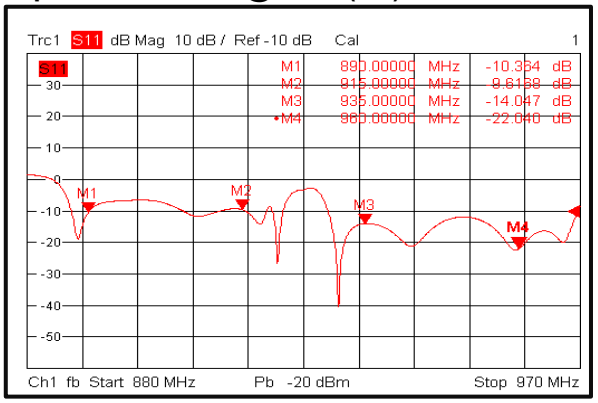
Delay (TX)



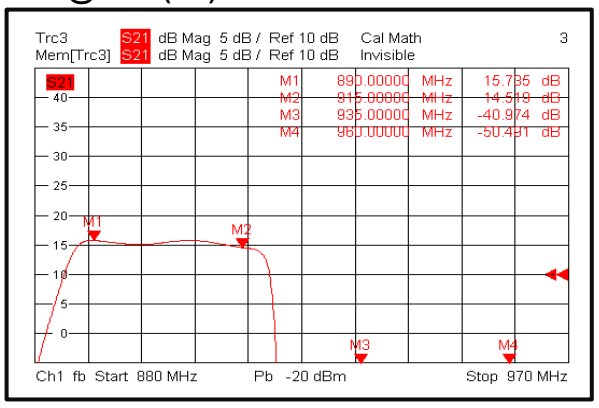
Gain@+25℃ (RX)



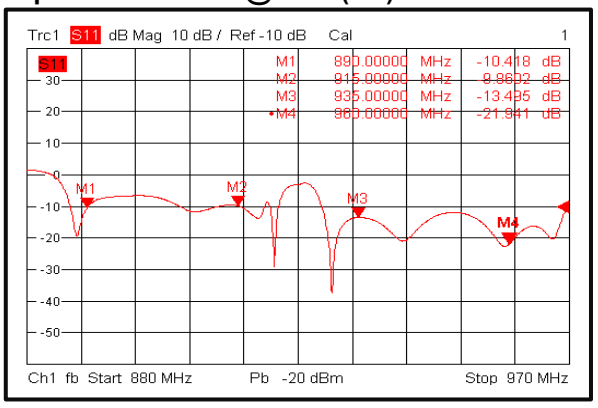
Input Return Loss @+25℃ (RX)



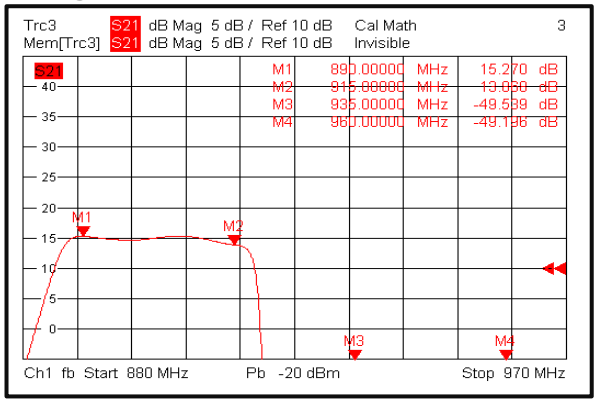
Gain@-10℃ (RX)



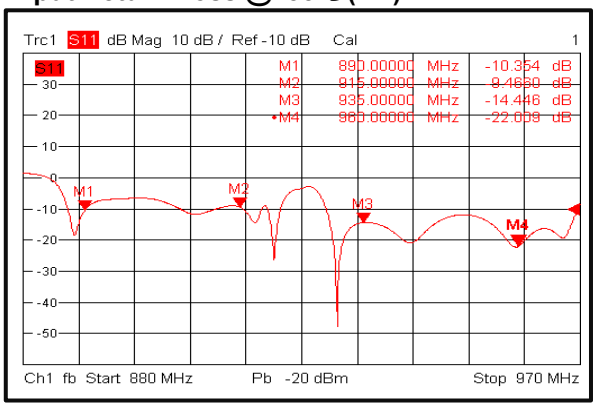
Input Return Loss @-10℃ (RX)



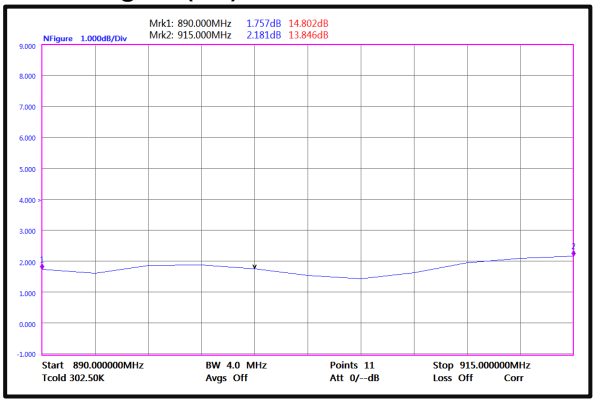
Gain@+55℃ (RX)



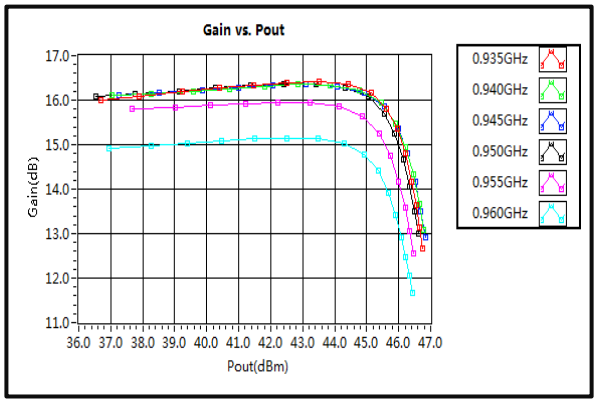
Input Return Loss @+55℃ (RX)



Noise Figure (RX)



Gain vs. Output Power (TX)



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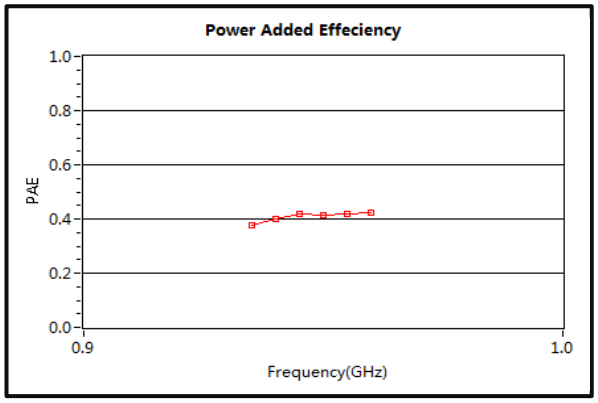
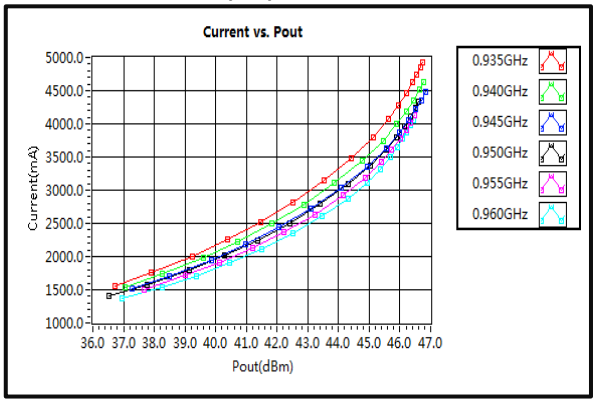
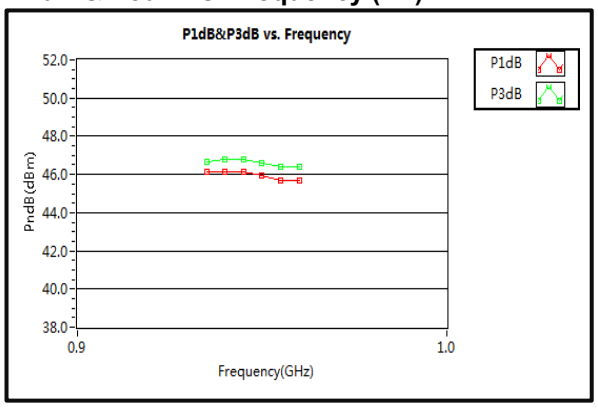
Power Added Efficiency (TX)



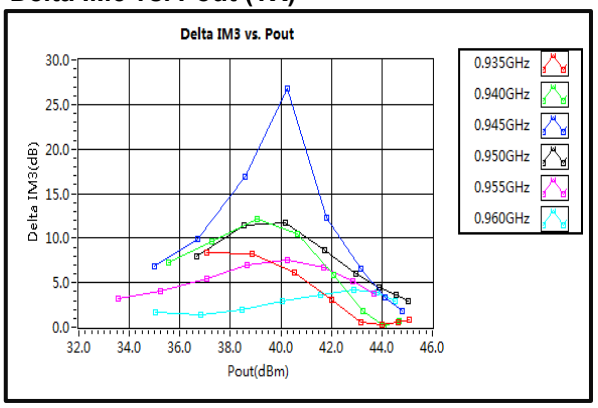
Current vs. Pout (TX)



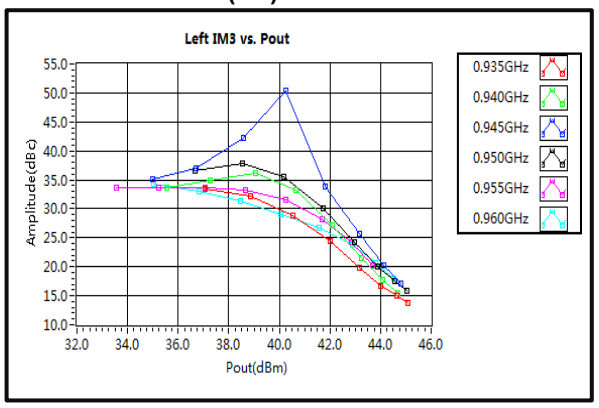
P1dB & P3dB vs. Frequency (TX)



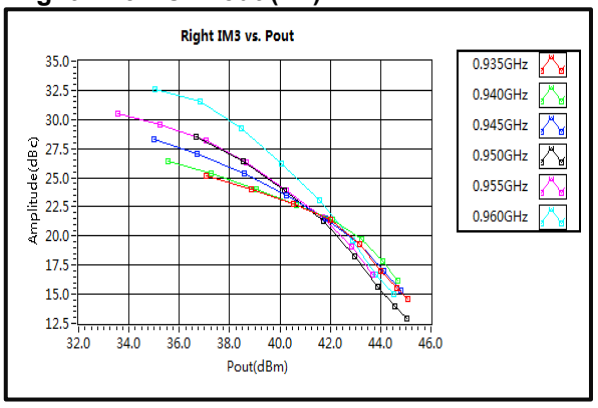
Delta IM3 vs. Pout (TX)



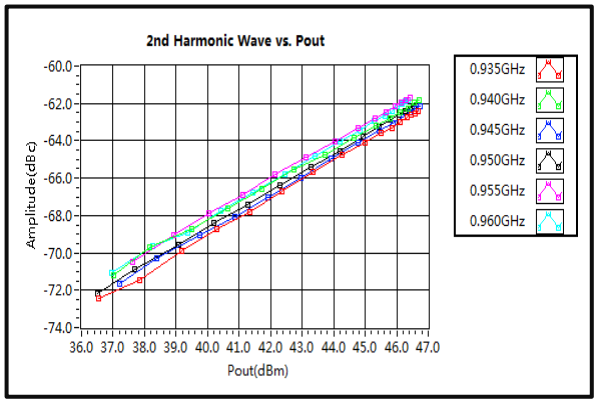
Left IM3 vs. Pout (TX)



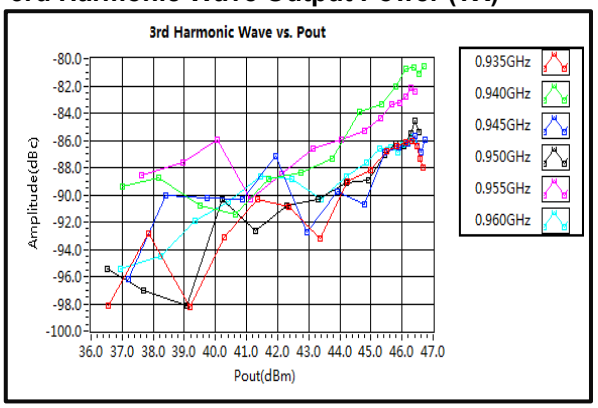
Right IM3 vs. Pout (TX)



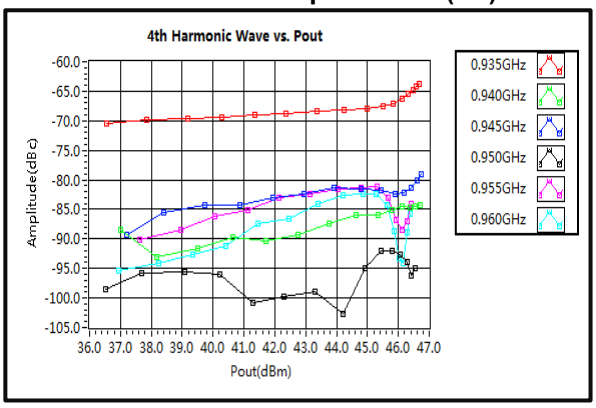
2nd Harmonic Wave Output Power (TX)



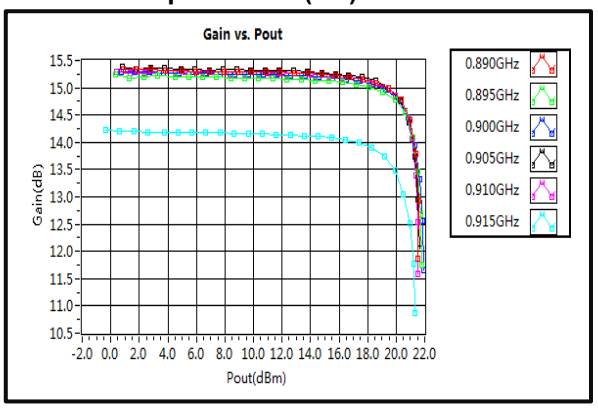
3rd Harmonic Wave Output Power (TX)



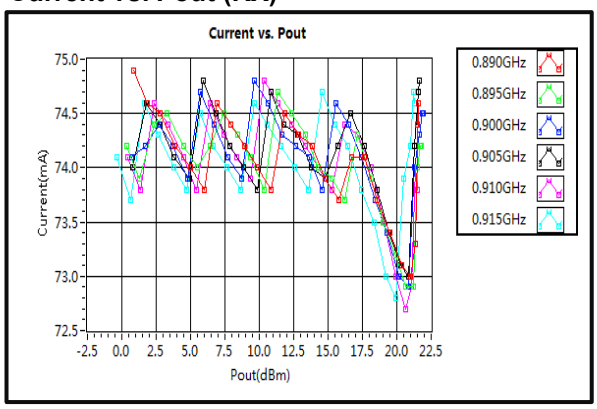
4th Harmonic Wave Output Power (TX)



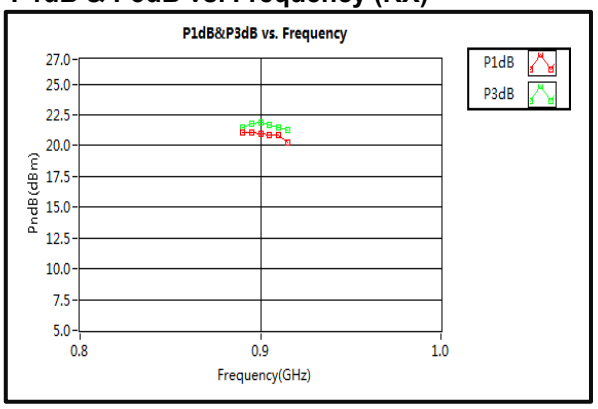
Gain vs. Output Power (RX)



Current vs. Pout (RX)



P1dB & P3dB vs. Frequency (RX)



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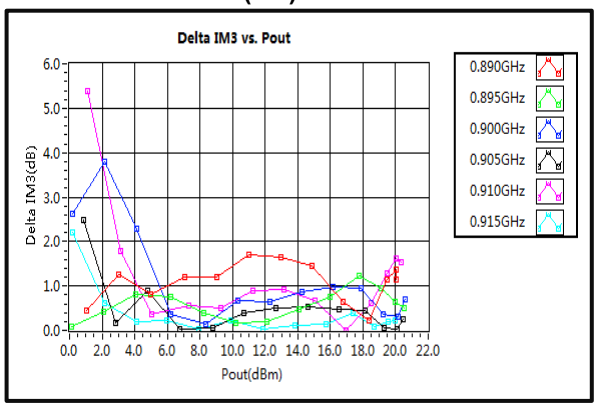
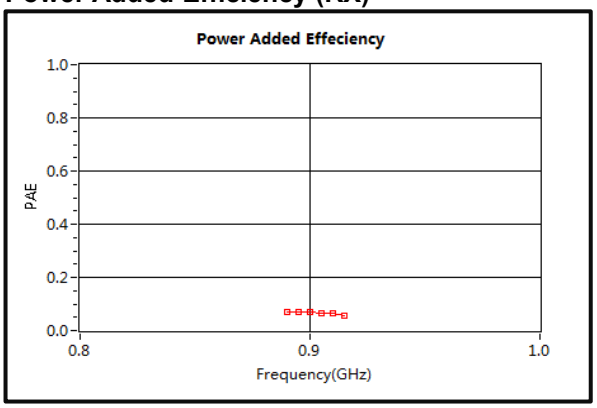
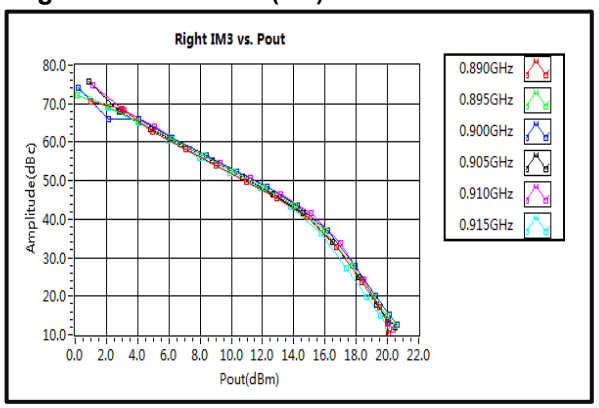
Delta IM3 vs. Pout (RX)



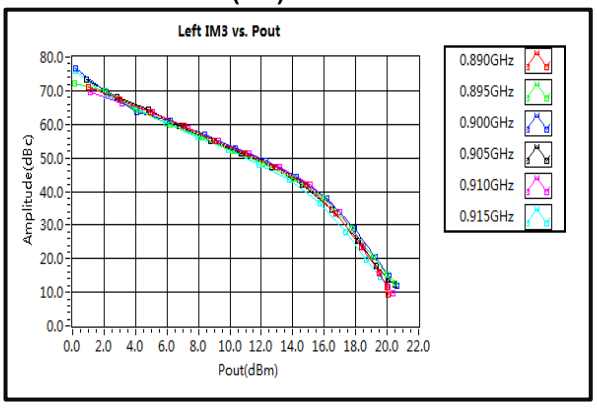
Power Added Efficiency (RX)



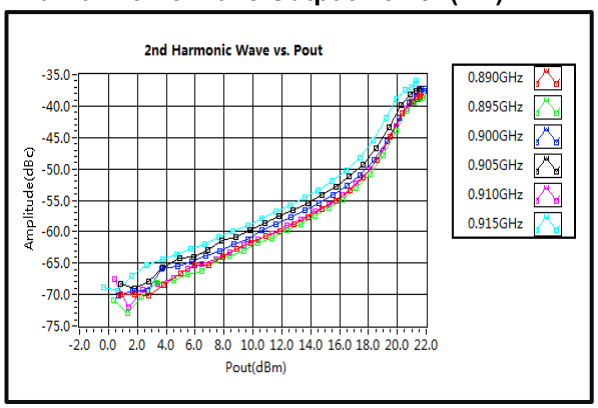
Right IM3 vs. Pout (RX)



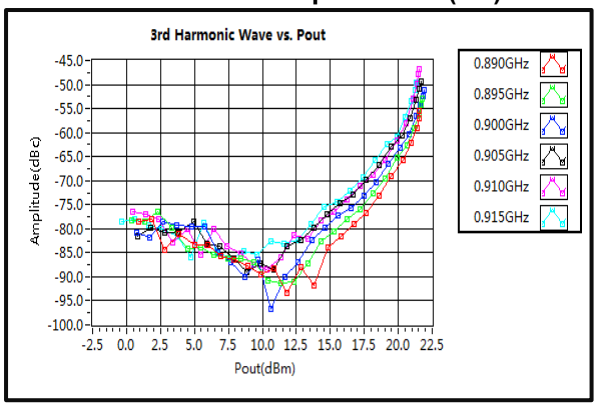
Left IM3 vs. Pout (RX)



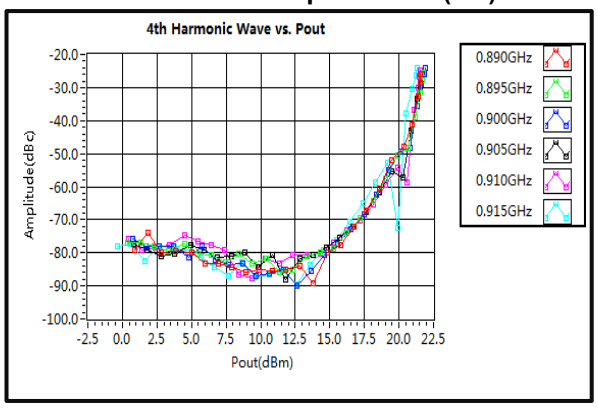
2nd Harmonic Wave Output Power (RX)



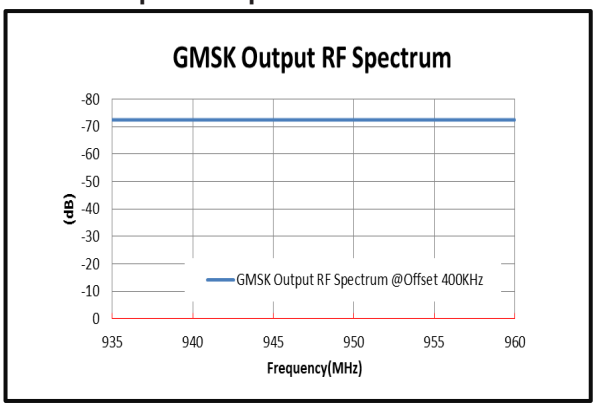
3rd Harmonic Wave Output Power (RX)



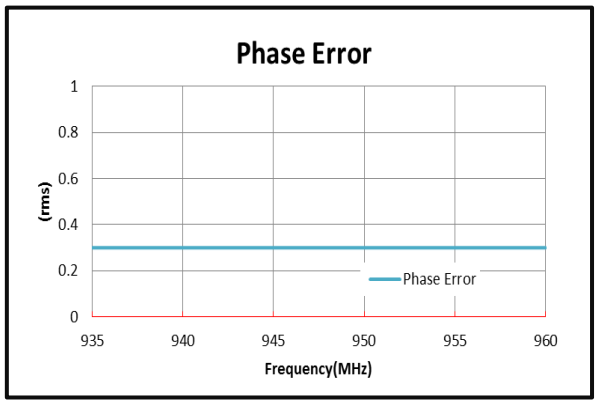
4th Harmonic Wave Output Power (RX)



GMSK Output RF Spectrum

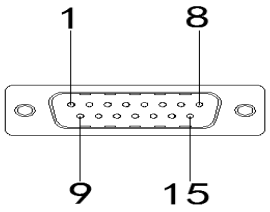


Phase Error



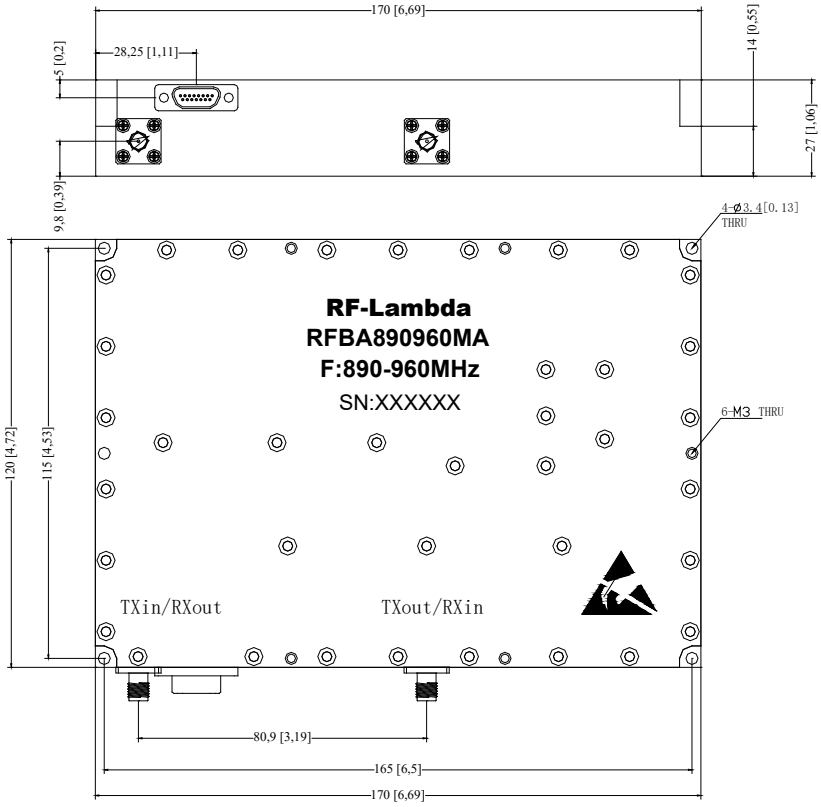
User Control Connector (Rear Panel)

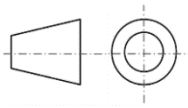
Male Micro-D-plug 15 is on the housing
The mating male part number: 380-015-113L001



Pin #	Name	Function	Initial State	Description	Applied
1,2,3	+24V	Power Supply	+24V	+24V DC is supply Voltage	Yes
4,5,6,7,8	NC	--	--	NC	NO
9,10,11,12, 13,14,15	GND	Ground	GND	Ground	Yes

Outline Drawing





Notes:
1. Package Material: Aluminum
2. Plating: Nickel Plated
3. All dimensions are in millimeters [inches].
4. Tolerances ±0.2 [0.008] unless otherwise specified.

Additional Information

Documentation	Webpage
ESD Policy	https://rflambda.com/pdf/rflambda_esd_control.pdf
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
RFBA890960MA	Standard	890MHz-960MHz Bi-Directional 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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