

30 GHz – 67 GHz LO Driver Amplifier

A-3567UC

1. Device Overview

1.1 General Description

The A-3567UC is a broadband MMIC LO buffer amplifier that is capable of producing at least +18 dBm up to 67 GHz. This amplifier can be used to drive L- or H-diode mixers from 35-67 GHz, or L- or H-diode IQ mixers from 35-60 GHz. It also has built-in DC blocking capacitors on the input and output.



UC Module

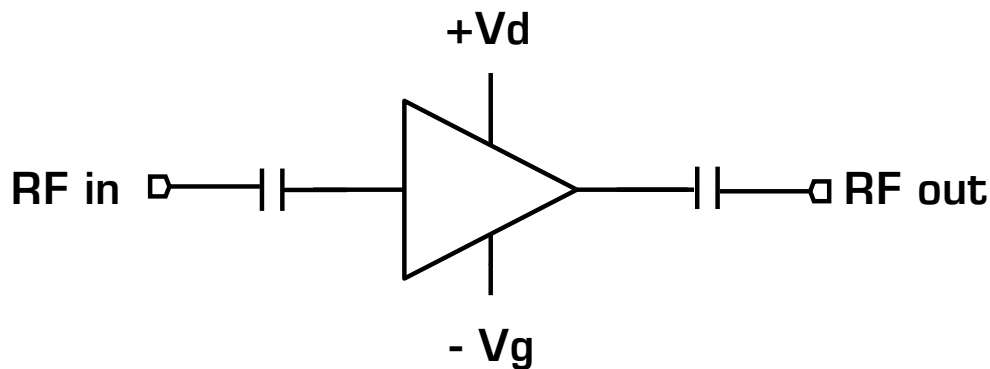
1.2 Features

- +20dBm Saturated Power
- Broadband Performance
- .s2p S-Parameters: [A-3567UC.zip](#)

1.3 Applications

- LO Driver amplifier for L-, H-, or S-diode mixers
- Mobile test and measurement equipment
- Radar and satellite communications
- 5G Transceivers

1.4 Functional Block Diagram



1.5 Part Ordering Options¹

Part Number	Description	Package	Green Status	Product Lifecycle	Export Classification
A-3567UC	Connectorized Module	UC	RoHS	Pre-Release	EAR99

¹ Refer to our [website](#) for a list of definitions for terminology presented in this table.

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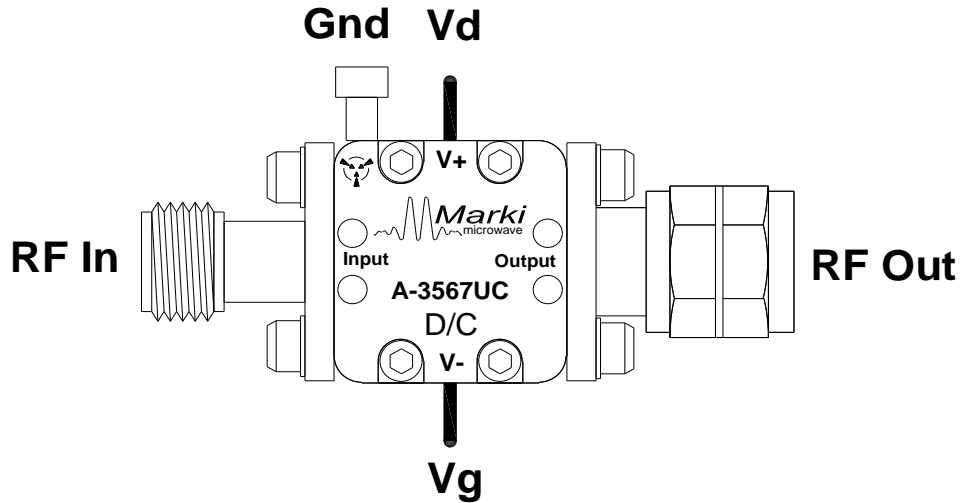
Revision History

Revision Code	Revision Date	Comment
-	May 2021	Datasheet Initial Release

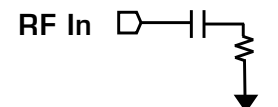
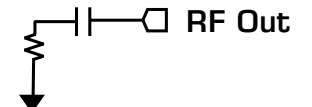

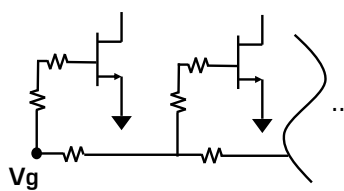

2. A-3567UC Port Configurations and Functions

2.3 A-3567UC Port Diagram

A port diagram of the A-3567UC is shown below.



2.4 A-3567UC Port Functions

Port	Function	Description	Equivalent Circuit for Package
RF In	RF Input	This is the RF Input port of the amplifier. It is internally DC blocked and RF matched to 50 Ω .	
RF Out	RF Output	This is the RF Output port of the amplifier. It is internally DC blocked and RF matched to 50 Ω .	
Vd	Drain Supply Pin	The Vd pin supplies drain voltage to the amplifier IC. Apply gate voltage Vg before applying drain voltage.	
Vg	Gate Bias Pin	The Vg pin supplies negative control voltage to the amplifier and controls the amplifier gain. The user should apply between -0.4V and -0.6V to Vg pad before applying positive DC voltage to Vd port . Lower (more negative) voltages on Vg pad will result in lower drain current and lower small signal gain.	
GND	Ground	Exterior housing must be connected to a DC/RF ground potential with high thermal and electrical conductivity.	

3. Specifications

3.1 Absolute Maximum Ratings

The Absolute Maximum Ratings indicate limits beyond which damage may occur to the device. If these limits are exceeded, the device may become inoperable or have a reduced lifetime.

Parameter	Maximum Rating	Units
Positive Drain Supply Voltage (Vd)	4.5	V
Total Positive Drain Supply Current (Id)	600	mA
Negative Bias Voltage (Vg)	-2	V
RF Input Power	+22	dBm
Operating Temperature	-40 to +85	°C
Storage Temperature	-65 to +150	°C

3.2 Package Information

Parameter	Details	Rating
ESD	Human Body Model (HBM), per MIL-STD-750, Method 1020	0B
Weight	A-3567UC	11.8 g

3.3 Recommended Operating Conditions

The Recommended Operating Conditions indicate the limits, inside which the device should be operated, to guarantee the performance given in Electrical Specifications. Operating outside these limits may not necessarily cause damage to the device, but the performance may degrade outside the limits of the electrical specifications. For limits, above which damage may occur, see Absolute Maximum Ratings.

Recommended Operating Conditions	Min	Nominal	Max	Units
T _A , Ambient Temperature	-40	+25	+85	°C
Power Supply DC Voltage (V _d)	+3	+3.5	+4	V
Power Supply DC Current (I _d) (No RF Input)	200	300	400	mA
Power Supply DC Current (with RF Input)	-	-	500	mA
Negative Bias Voltage (V _g)	-0.6	-0.5	-0.4	V

3.4 A-3567UC Sequencing Requirements

Turn-on Procedure:

- 1) Apply negative bias to V_g
- 2) Apply V_d

Turn-off Procedure:

- 1) Turn off V_d
- 2) Turn off V_g

3.5 Electrical Specifications

The electrical specifications apply at $T_A=+25^{\circ}\text{C}$ in a 50Ω system.

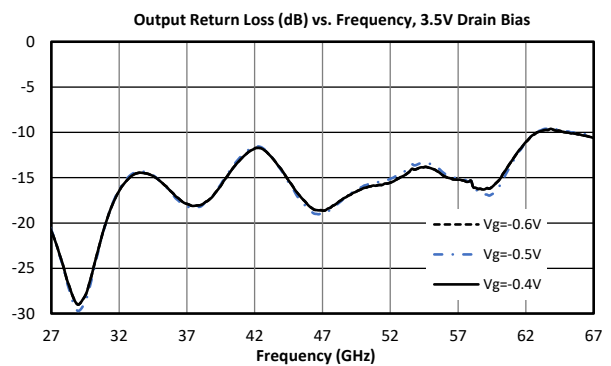
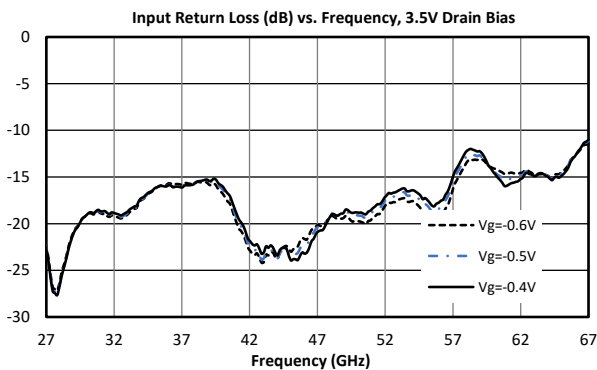
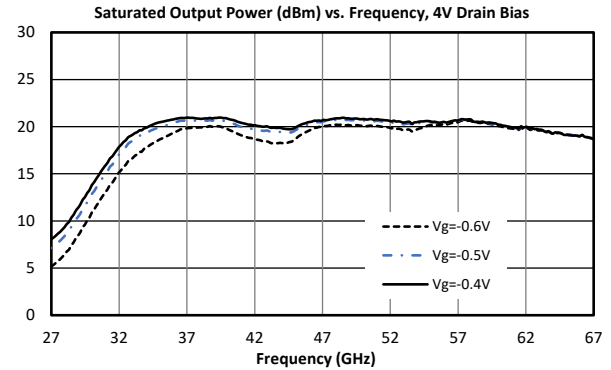
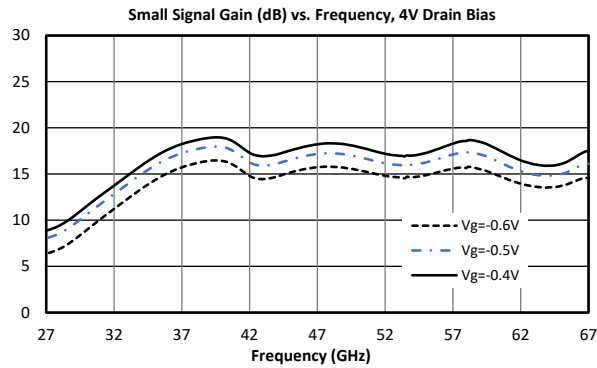
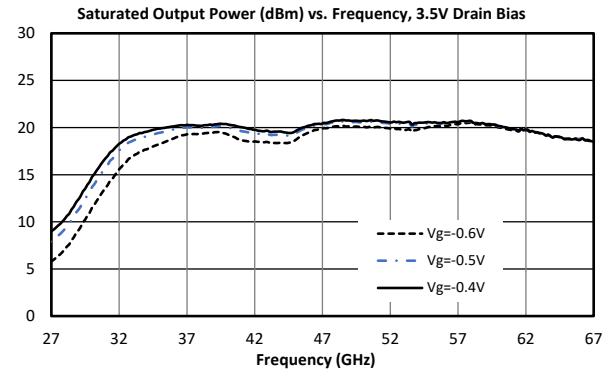
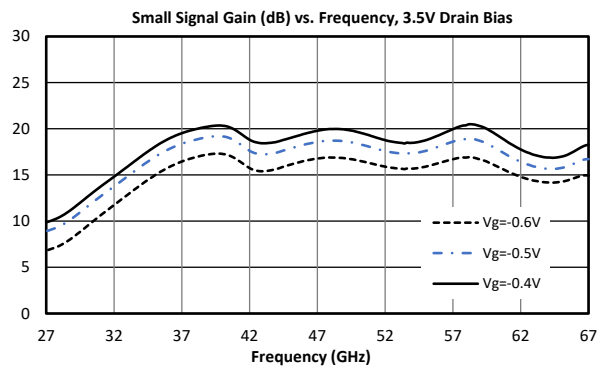
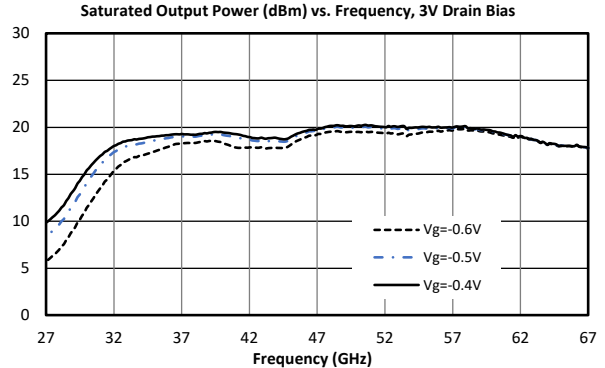
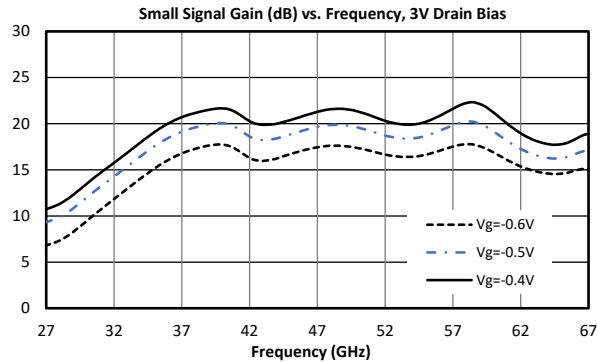
Min and Max limits apply only to our connectorized units and are guaranteed at $T_A=+25^{\circ}\text{C}$.

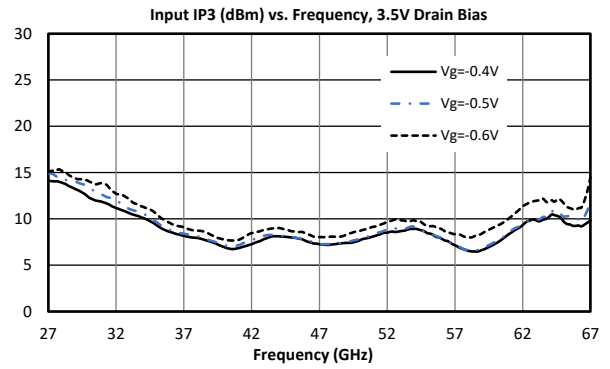
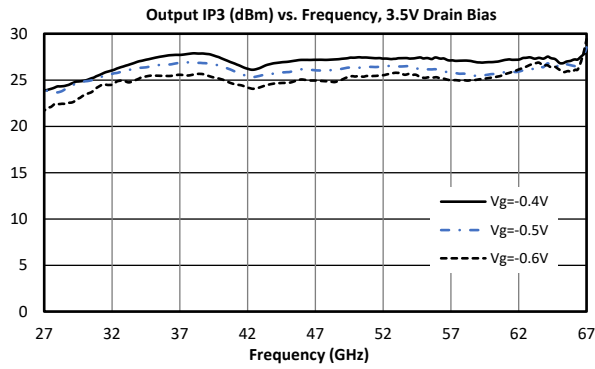
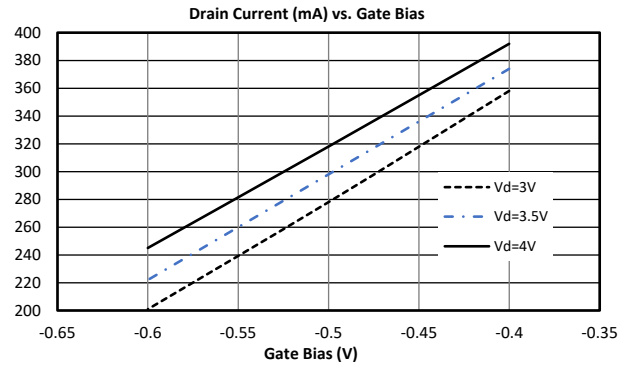
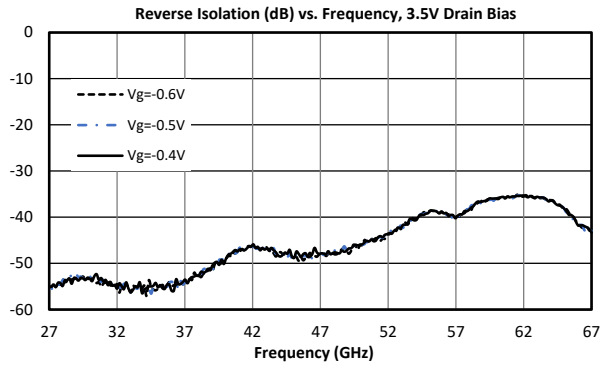
Parameter	Test Conditions	Frequency	Min	Typical	Units
Small Signal Gain	3.5V/-0.4V Bias	35 GHz – 67 GHz		16	dB
	3.5V/-0.5V Bias	35 GHz – 67 GHz	13	18	
	3.5V/-0.6V Bias	35 GHz – 67 GHz		19	
Input Return Loss	3.5V/-0.5V Bias	35 GHz – 67 GHz		-17	dB
Output Return Loss				-15	
Reverse Isolation				44	
Saturated Output Power ²	3.5V/-0.5V Bias	35 GHz – 67 GHz	+15	+20	dBm
Input IP3 (IIP3)	3.5V/-0.5V, -20 dBm Input Power	35 GHz – 67 GHz		8	dBm
Output IP3 (OIP3)				26	
Bias Requirements ³	3.5V/-0.4V	-		374	mA
	3.5V/-0.5V	-		298	
	3.5V/-0.6V	-		222	
Input Power for Saturation	3.5V/-0.5V	35 GHz – 67 GHz		+5	dBm

² Saturated Output Power measured with A-3567UC driver biased at 3.5V/-0.5V input to A-3567 DUT at specified bias condition. Input power to driver nominally 0dBm with 6dB attenuator, corresponding to +8dBm to +10dBm input power.

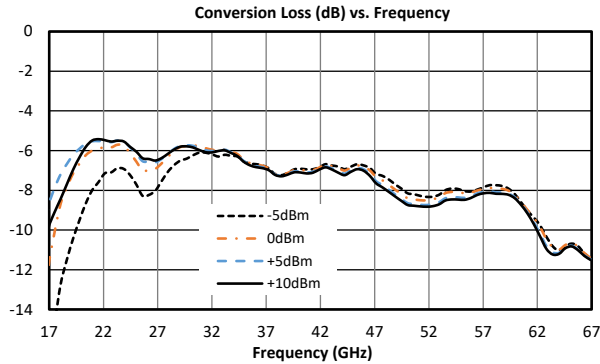
³ Bias conditions tested with no RF input power. Bias conditions presented as Vd/Vg.

3.6 A-3567UC Typical Performance Plots

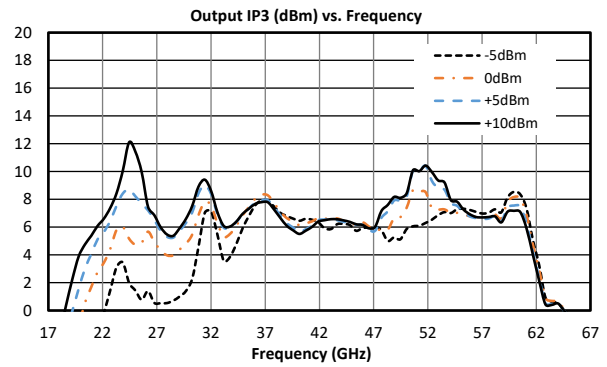
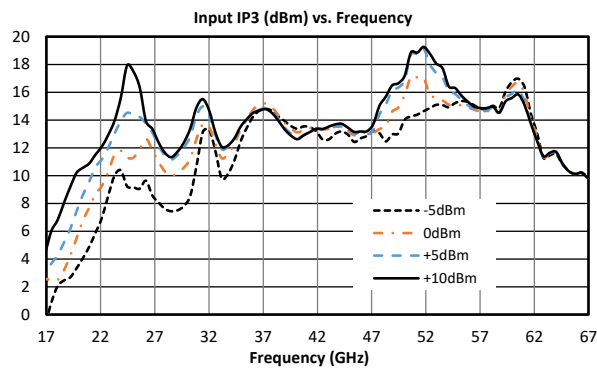




3.7 MM1-1467LUB Mixer Performance with A-3567UC LO Driver⁴

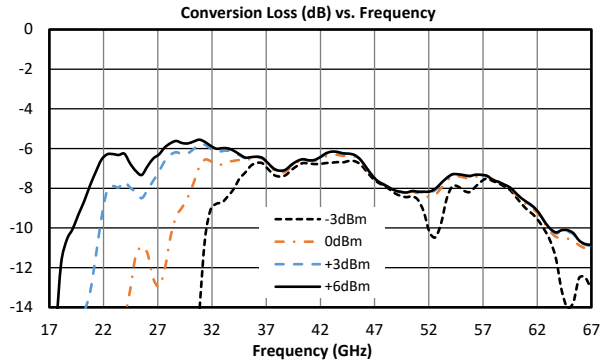


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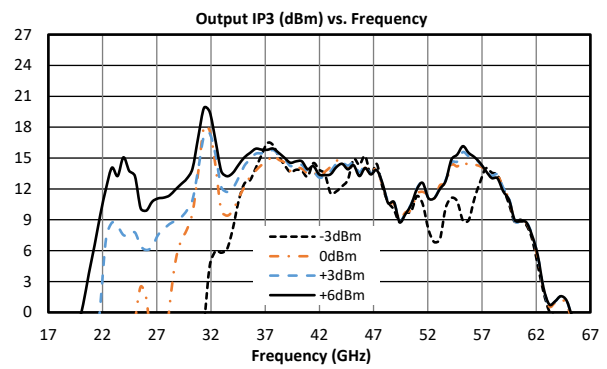
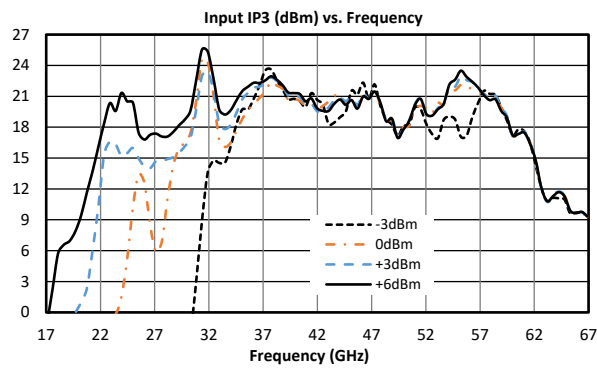


⁴ Data taken by driving MM1-1467LUB module LO port with A-3567UC module in Config A biased at 3.5V_d and -0.5V_g. Specified power is at input to A-3567UC driver. IF frequency 91MHz.

3.8 MM1-1467HUB Mixer Performance with A-3567UC LO Driver⁵

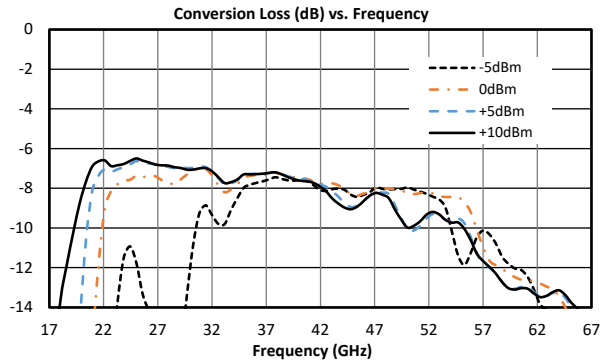


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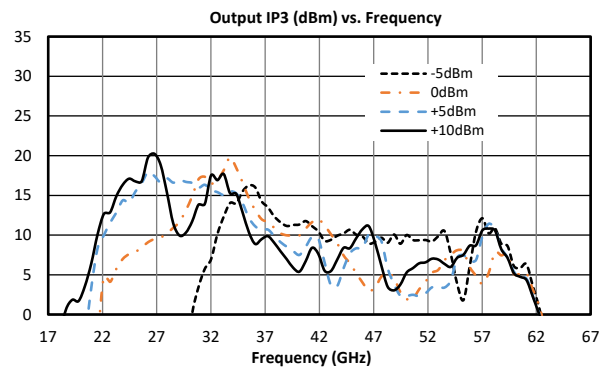
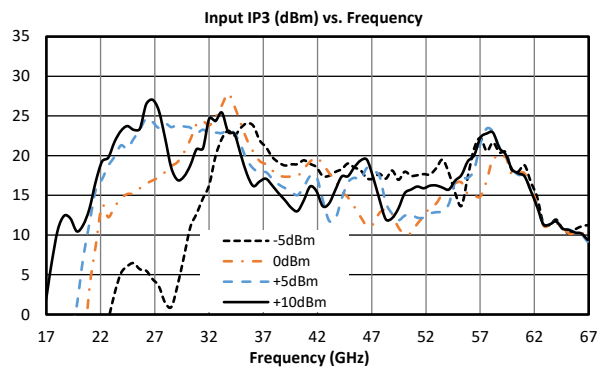


⁵ Data taken by driving MM1-1467HUB module LO port with A-3567UC module in Config A biased at 3.5V_d and -0.5V_g. Specified power is at input to A-3567UC driver. IF frequency 91MHz.

3.9 MM1-1857HS Mixer Performance with A-3567UC LO Driver⁶

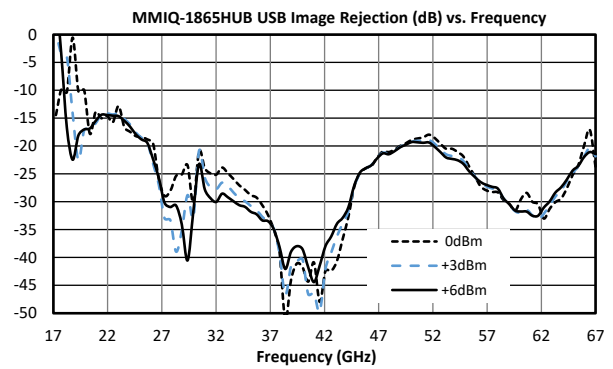
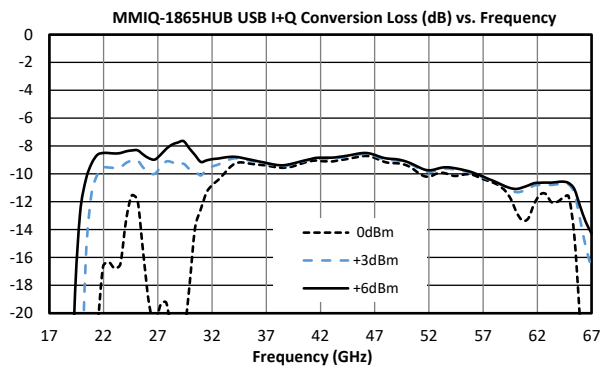
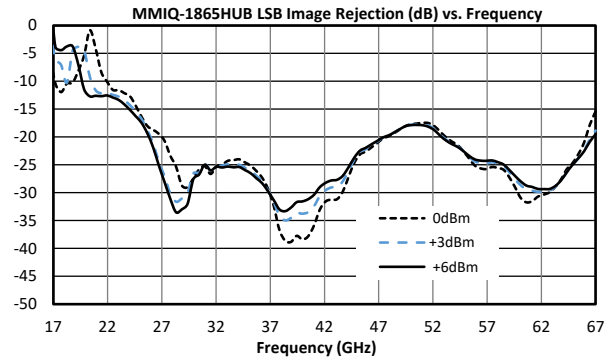
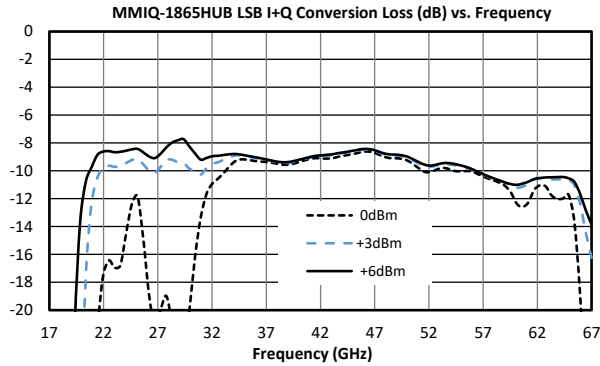


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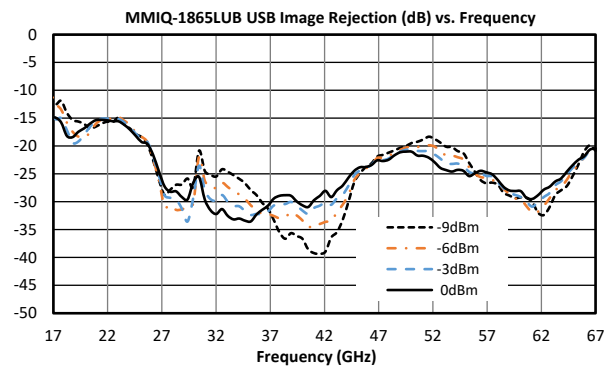
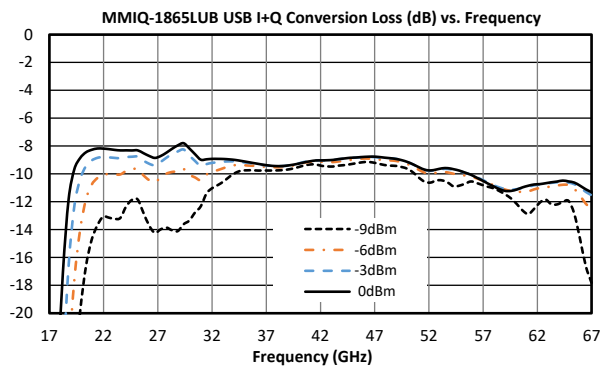
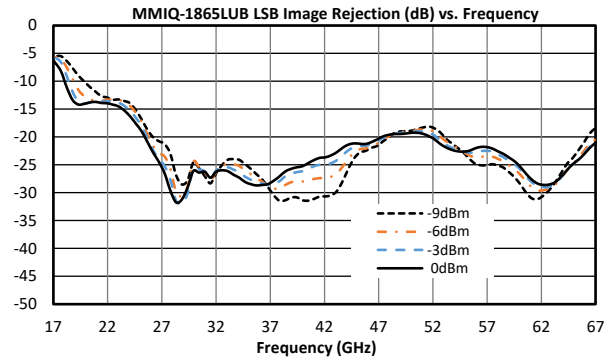
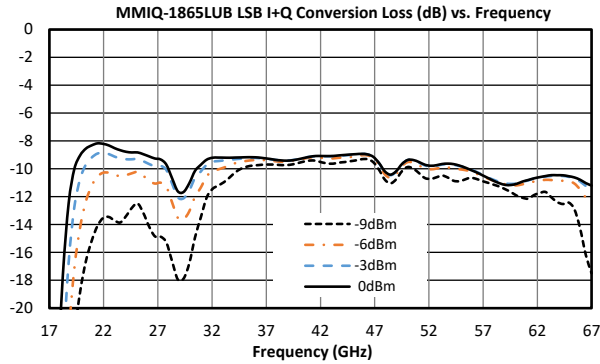
⁶ Data taken by driving MM1-1857HS module LO port with A-3567UC module with a biased at 3.5V_d and -0.5V_g. Specified power is at input to A-3567UC driver. IF frequency 91MHz.

3.10 MMIQ-1865HUB IQ Mixer Performance with A-3567UC LO Driver⁷



⁷ Data taken by driving MMIQ-1465HUB module LO port with A-3567UC module biased at $3.5V_d$ and $-0.5V_g$. Specified power is at input to A-3567UC driver. Combined I+Q frequency 91MHz.

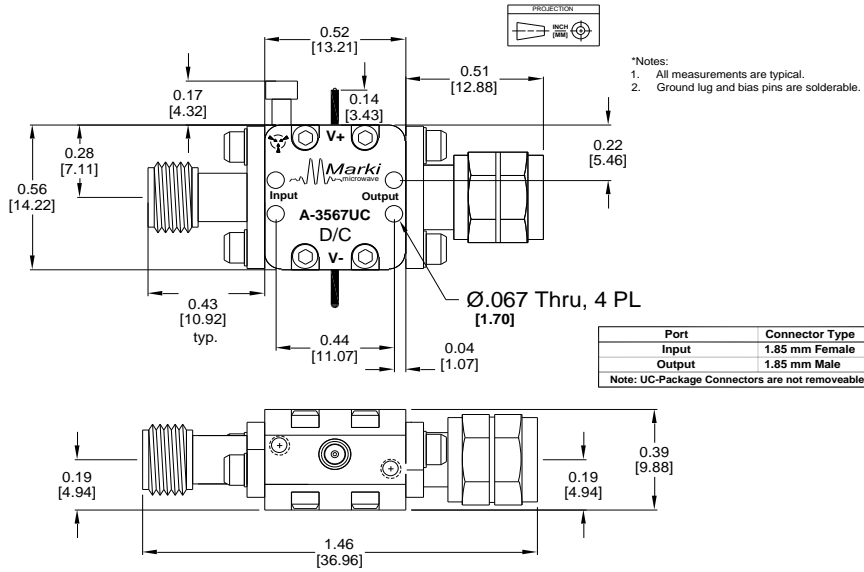
3.11 MMIQ-1865LUB IQ Mixer Performance with A-3567UC LO Driver⁸



⁸ Data taken by driving MMIQ-1465HUB module LO port with A-3567UC module biased at $3.5V_d$ and $-0.5V_g$. Specified power is at input to A-3567UC driver. Combined I+Q frequency 91MHz.

4. Mechanical Data

4.1 A-3567UC UC Package Outline Drawing



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