MMIC DIE

IQ Mixer

SMIQ-1844H-D+

50Ω 18 to 43.5 GHz Level 18 (LO Power +18 dBm)

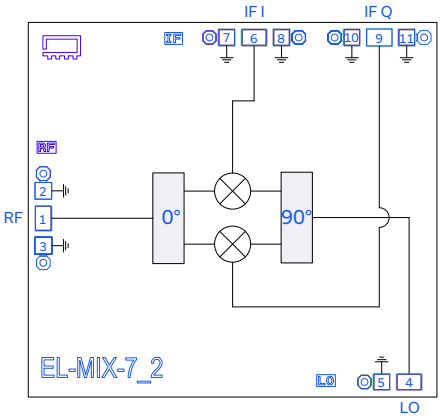
THE BIG DEAL

- Wideband RF & LO, 18 to 43.5 GHz
- Wideband IF, DC to 7 GHz
- Excellent Image Rejection, Typ. 30 dB
- High LO-RF Isolation, Typ. 38 dB
- High Input IP3, Typ. +31 dBm
- Usable as Image Reject Mixer & SSB Converter

APPLICATIONS

- Test and Measurement Equipment
- 5G mmWave and Back Haul Radio
- Satellite Communications
- Radar, EW, and ECM Defense Systems

FUNCTIONAL DIAGRAM



SEE ORDERING INFORMATION ON THE LAST PAGE

PRODUCT OVERVIEW

The SMIQ-1844H-D+ is a passive wideband in phase/quadrature (I/Q) mixer die fabricated using GaAs HBT technology. The SMIQ-1844H-D+ is usable as a single-sideband upconverter for transmit applications or an image rejection mixer for receiver applications. The SMIQ-1844H-D+ is ideal for wideband frequency translation applications that require inherent rejection of image signals and spurious mixing products. The mixer covers a broad band with RF and LO frequency range of 18 to 43.5 GHz and an IF frequency range of DC to 7 GHz. As a passive mixer, the SMIQ-1844H-D+ offers lower noise figure than active mixers enabling superior dynamic range for high performance applications. No DC bias is needed for operation.

KEY FEATURES

Features	Advantages
High Image Rejection, 30 dB typ.	Provides inherent rejection of unwanted image signals without the need for external filtering.
High Isolation • LO-RF, 38 dB typ. • LO-IF, 40 dB typ.	Enables excellent carrier rejection in single-sideband upconverter applications. Minimizes filtering requirements needed to ensure signal integrity.
Wide RF/LO Bandwidth, 18 to 43.5 GHz	Useful in wideband systems or in reconfigurable narrowband systems across multiple bands with minimal changes.
Wide IF Bandwidth, DC to 7 GHz	Enables use of high IF conversion to reduce filtering requirements. IF operation as low as DC enables use in phase detector applications.
Unpackaged Die	Enables integration into hybrid chip and wire assemblies

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ELECTRICAL SPECIFICATIONS[1] AT +25°C, LO POWER= +18 dBm, UNLESS NOTED OTHERWISE

Parameter	Frequency (GHz)	Min.	Typ.	Max.	Unit
RF Frequency Range		18		43.5	GHz
LO Frequency Range		18		43.5	GHz
IF Frequency Range		DC		7	GHz
LO Power		+17	+18	+19	dBm
Conversion Loss[2]	18 – 26.5		8.8		dB
	26.5 – 40		9.4		
	40 – 43.5		10.8		
Amplitude Unbalance	18 – 26.5		±0.2		dB
	26.5 – 40		±0.2		
	40 – 43.5		±1.0		
Phase Unbalance (Relative to 90°)	18 – 26.5		±2.7		Deg.
	26.5 – 40		±1.8		
	40 – 43.5		±7.5		
Image Rejection[3,5] (Tested as a Downconverter)	18 – 26.5		30		dBc
	26.5 – 40		31		
	40 – 43.5		19		
Single Sideband Rejection[4,5] (Tested as an Upconverter)	18 – 26.5		26		dBc
	26.5 – 40		25		
	40 – 43.5		17		
LO-RF Isolation	18 – 26.5		41		dB
	26.5 – 40		38		
	40 – 43.5		33		
LO-I Isolation	18 – 26.5		42		dB
	26.5 – 40		41		
	40 – 43.5		31		
LO-Q Isolation	18 – 26.5		49		dB
	26.5 – 40		39		
	40 – 43.5		25		
RF-I Isolation	18 – 26.5		24		dB
	26.5 – 40		28		
	40 – 43.5		29		
RF-Q Isolation	18 – 26.5		32		dB
	26.5 – 40		31		
	40 – 43.5		37		
Input Power at 1dB Compression[5]	18 – 43.5		+10		dBm
Input IP3[5]	18 – 26.5		+29		dBm
	26.5 – 40		+29		
	40 – 43.5		+27		

1. Electrical specifications are measured on Mini-Circuits Die Characterization Test Board. Board loss is de-embedded to the device. Unless otherwise specified IF = 200 MHz.
2. Conversion loss (dB) = RF Power (dBm) minus worse of I/Q Port Power (dBm) minus 3 dB theoretical loss of an Ideal External Hybrid, measured as a Downconverter. See measurement block diagram Figure 3 .
3. Level of undesired image signal below desired RF signal. See measurement block diagram Figure 4.
4. Level of undesired sideband below desired sideband. See measurement block diagram Figure 4.
5. Tested in 4x4 mm 24-Lead Package (SMIQ-1844H+).

IQ Mixer

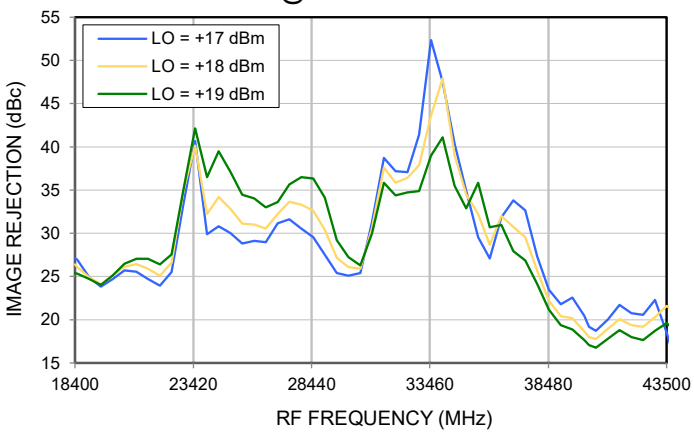
SMIQ-1844H-D+

50Ω 18 to 43.5 GHz Level 18 (LO Power +18 dBm)

TYPICAL PERFORMANCE GRAPHS

Note: All data on this page represents the Die attached in a 4x4mm 24-Lead QFN style package and measured on Mini-Circuits Characterization Test Board TB-SMIQ-1844HC+

IMAGE REJECTION (DOWNCONVERTER) @ IF = 200 MHz



SSB REJECTION (UPCONVERTER) @ IF = 200 MHz

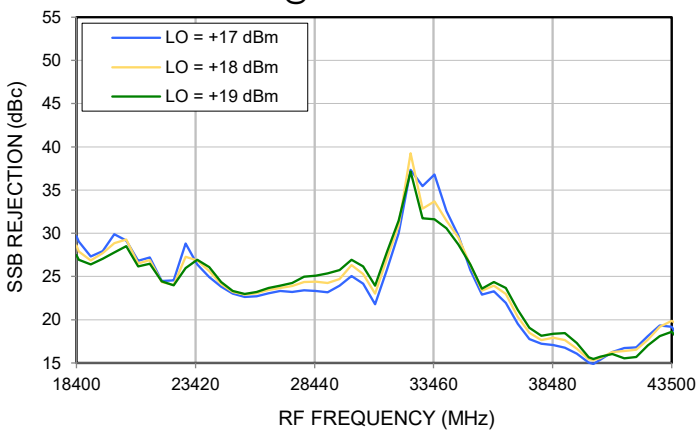
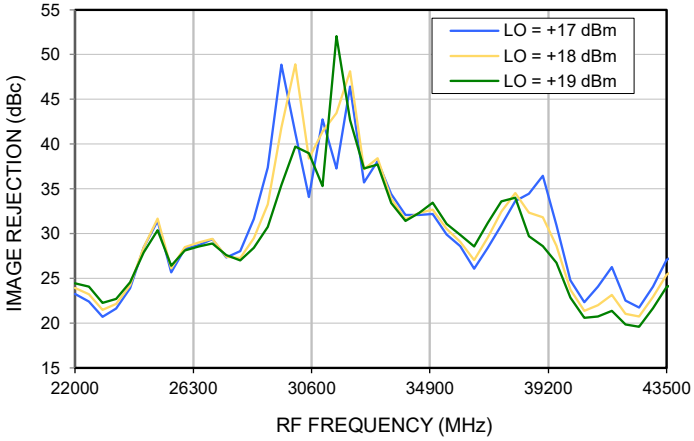


IMAGE REJECTION (DOWNCONVERTER) @ IF = 2 GHz



SSB REJECTION (UPCONVERTER) @ IF = 2 GHz

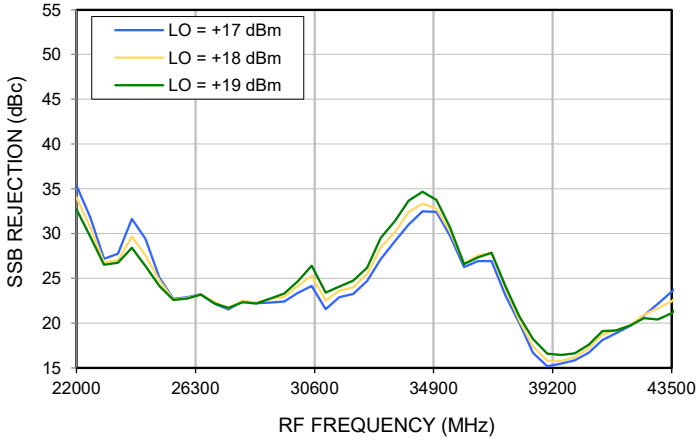
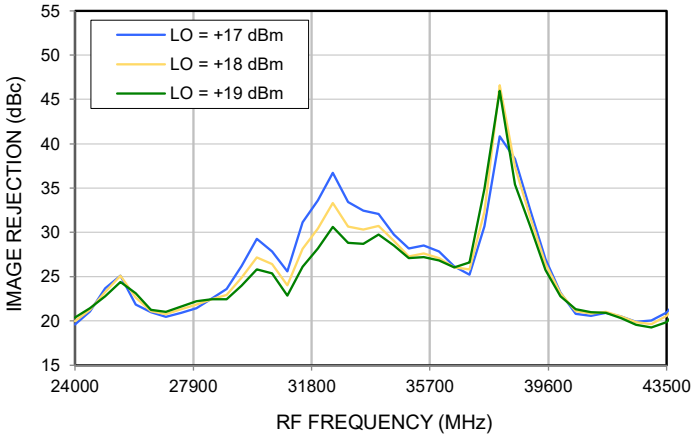
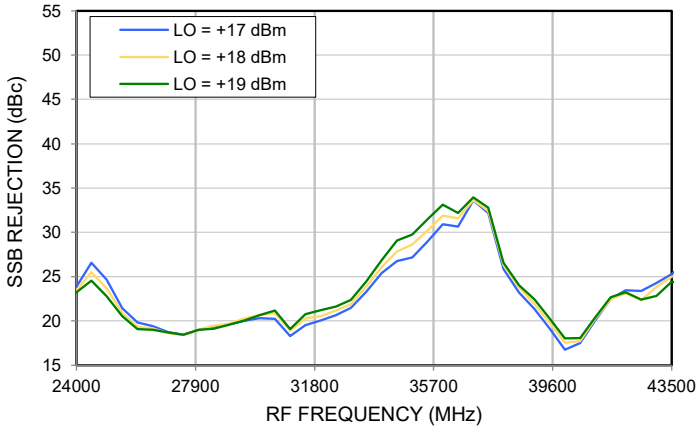


IMAGE REJECTION (DOWNCONVERTER) @ IF = 3 GHz



SSB REJECTION (UPCONVERTER) @ IF = 3 GHz



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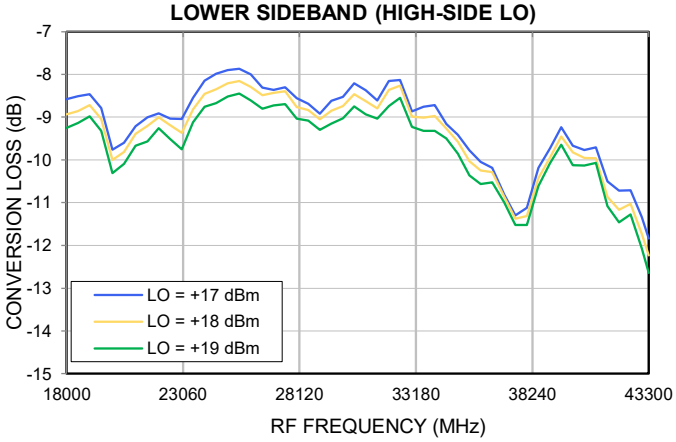
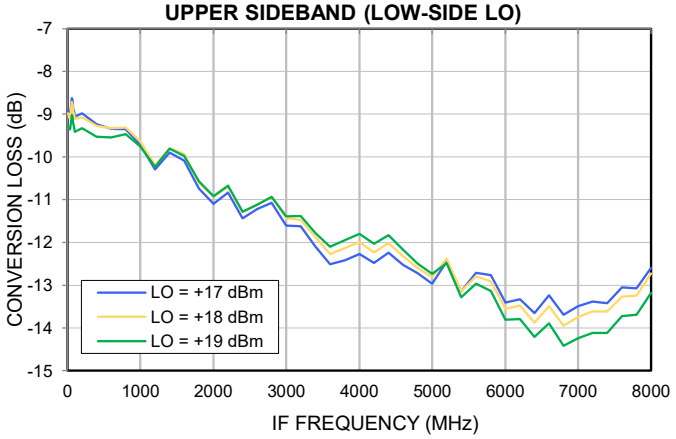
TYPICAL PERFORMANCE GRAPHS

Note: Conversion loss (dB) = RF Power (dBm) minus worse of I/Q Port Power (dBm) minus 3 dB theoretical loss of an Ideal External Hybrid, measured as a Downconverter.

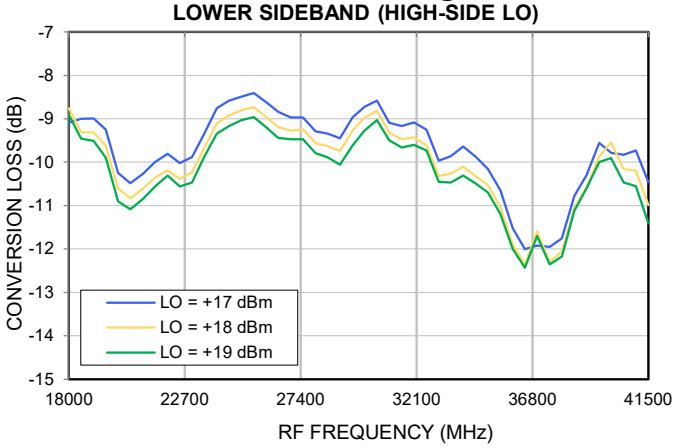
CONVERSION LOSS VS. RF @ IF = 200 MHz
LOWER SIDEBAND (HIGH-SIDE LO)



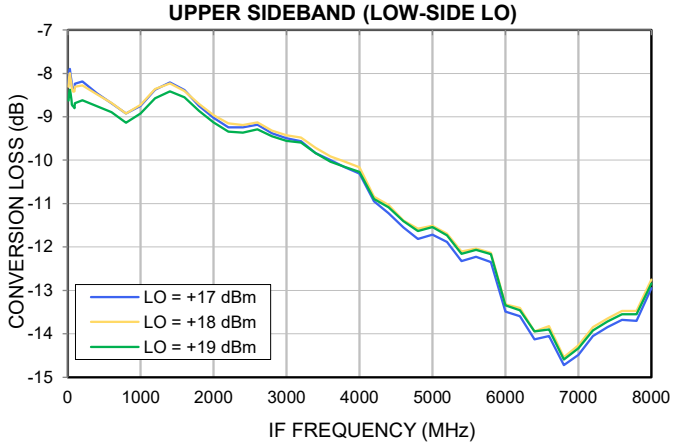
CONVERSION LOSS VS. IF @ FIXED LO = 18 GHz
UPPER SIDEBAND (LOW-SIDE LO)



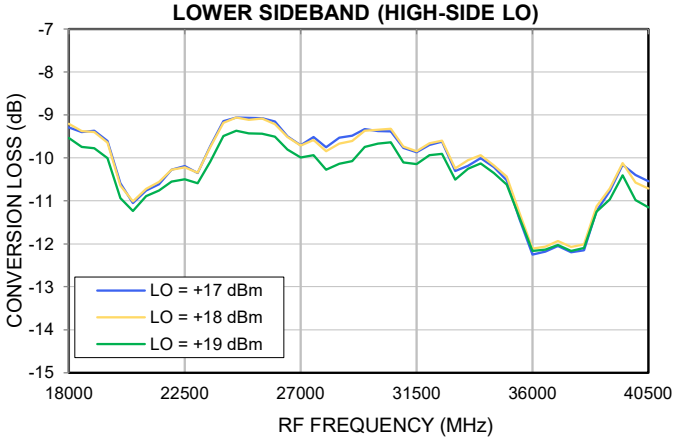
CONVERSION LOSS VS. RF @ IF = 2 GHz
LOWER SIDEBAND (HIGH-SIDE LO)



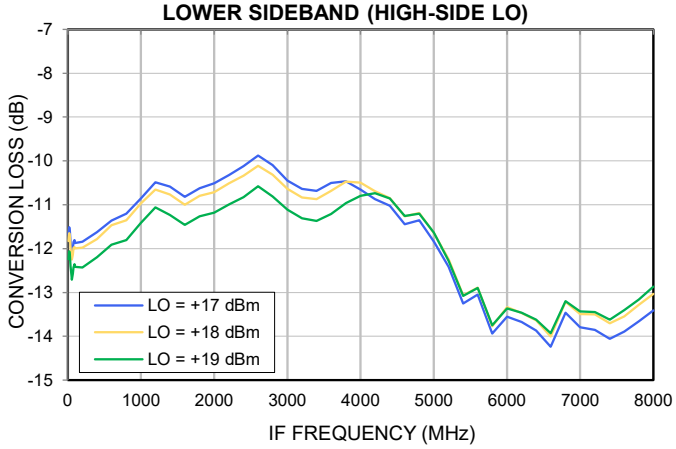
CONVERSION LOSS VS. IF @ FIXED LO = 30.75 GHz
UPPER SIDEBAND (LOW-SIDE LO)



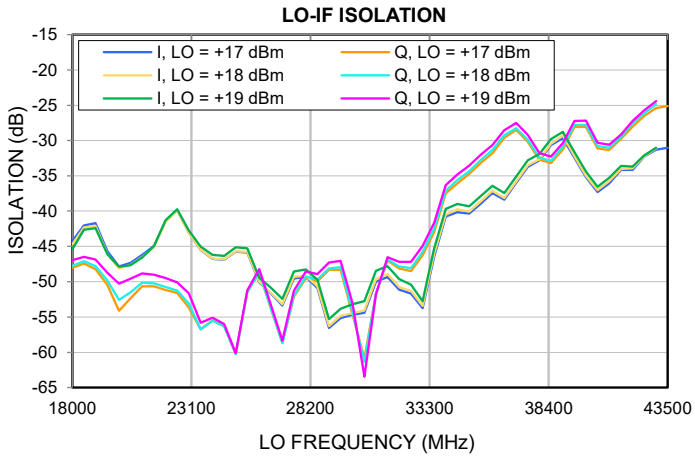
CONVERSION LOSS VS. RF @ IF = 3 GHz
LOWER SIDEBAND (HIGH-SIDE LO)

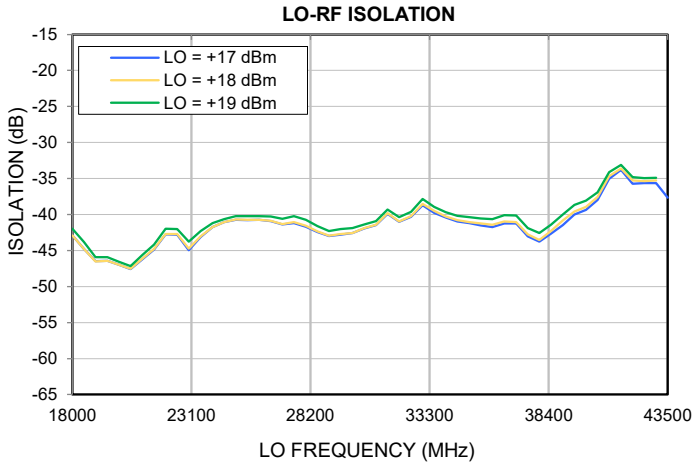


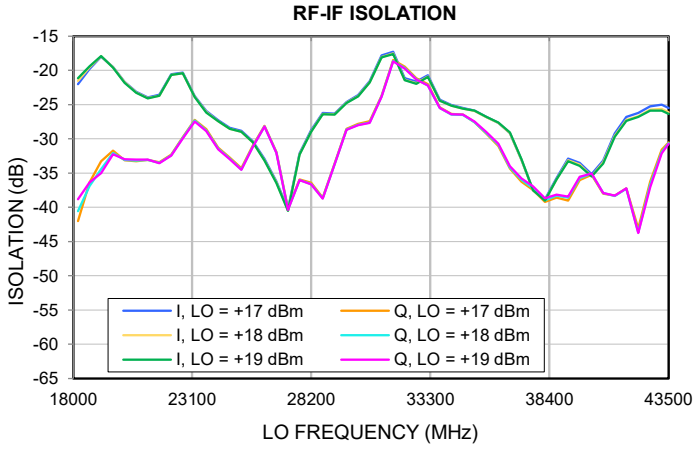
CONVERSION LOSS VS. IF @ FIXED LO = 43.5 GHz
LOWER SIDEBAND (HIGH-SIDE LO)



TYPICAL PERFORMANCE GRAPHS







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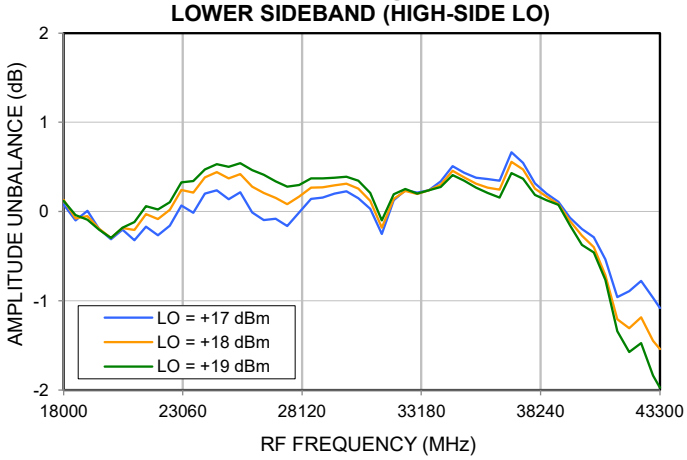
SMIQ-1844H-D+

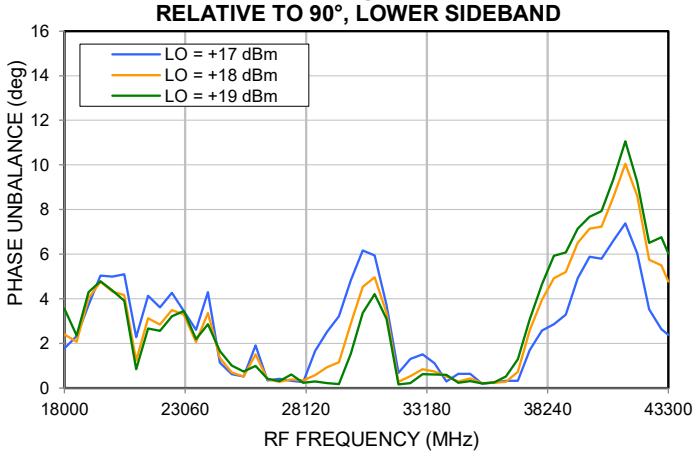
50Ω 18 to 43.5 GHz Level 18 (LO Power +18 dBm)

TYPICAL PERFORMANCE GRAPHS

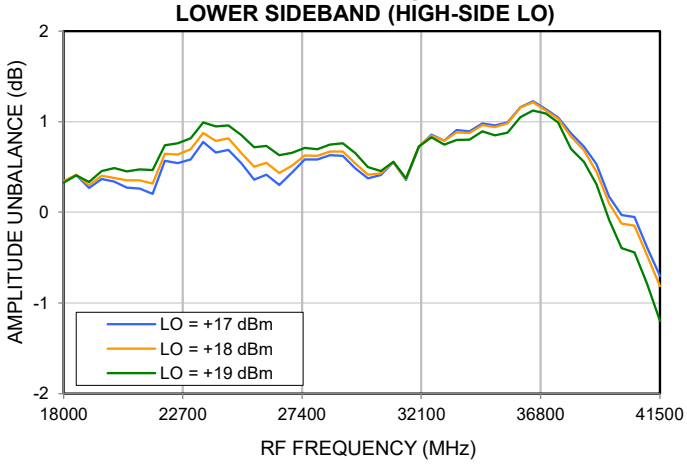
AMPLITUDE UNBALANCE @ FIXED IF = 200 MHz
LOWER SIDEBAND (HIGH-SIDE LO)



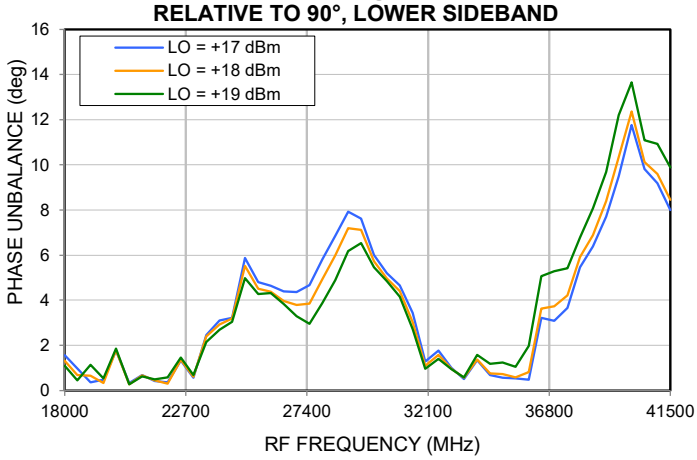
PHASE UNBALANCE @ FIXED IF = 200 MHz
RELATIVE TO 90°, LOWER SIDEBAND



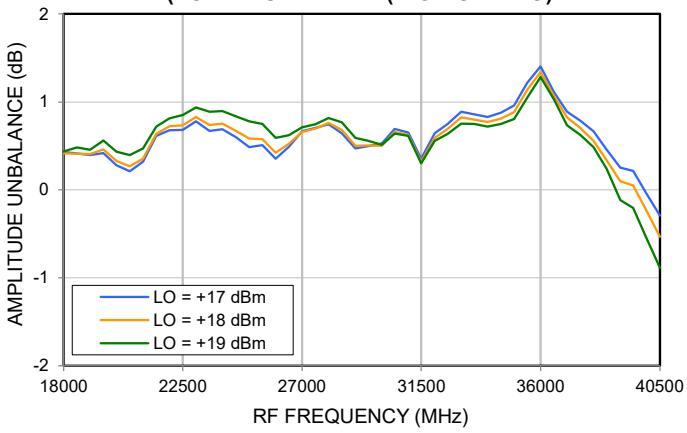
AMPLITUDE UNBALANCE @ FIXED IF = 2 GHz
LOWER SIDEBAND (HIGH-SIDE LO)



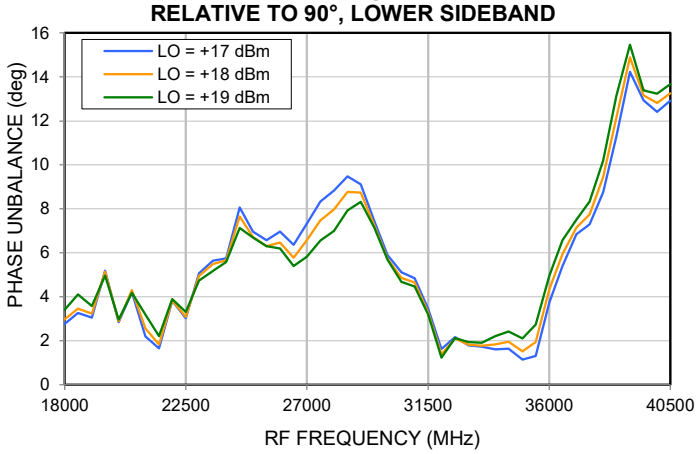
PHASE UNBALANCE @ FIXED IF = 2 GHz
RELATIVE TO 90°, LOWER SIDEBAND



AMPLITUDE UNBALANCE @ FIXED IF = 3 GHz
(LOWER SIDEBAND (HIGH-SIDE LO)



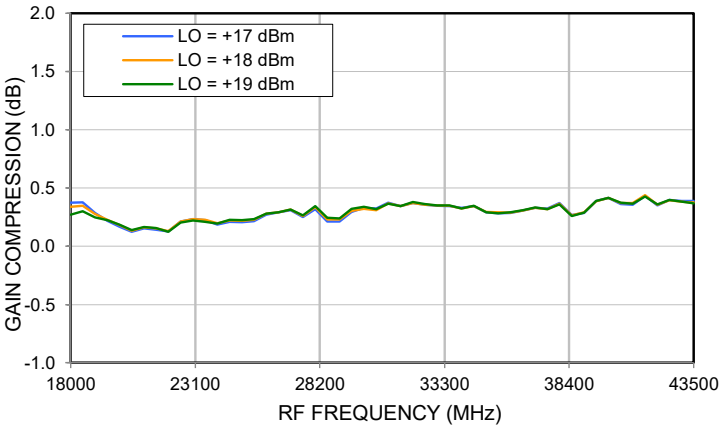
PHASE UNBALANCE @ FIXED IF = 3 GHz
RELATIVE TO 90°, LOWER SIDEBAND



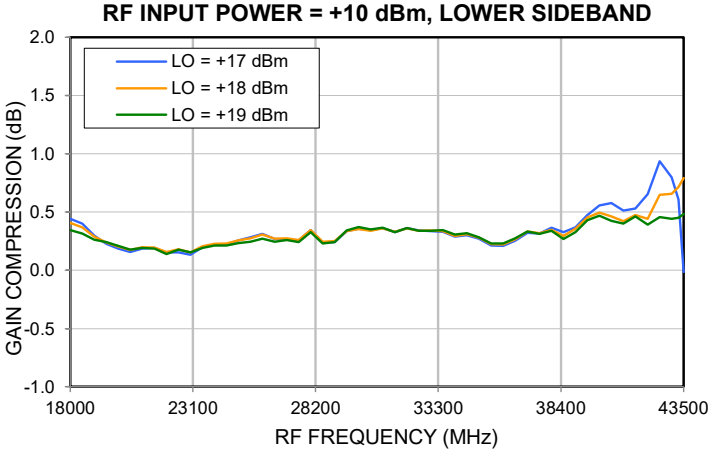
TYPICAL PERFORMANCE GRAPHS

Note: All data on this page represents the Die attached in a 4x4mm 24-Lead QFN style package and measured on Mini-Circuits Characterization Test Board TB-SMIQ-1844HC+

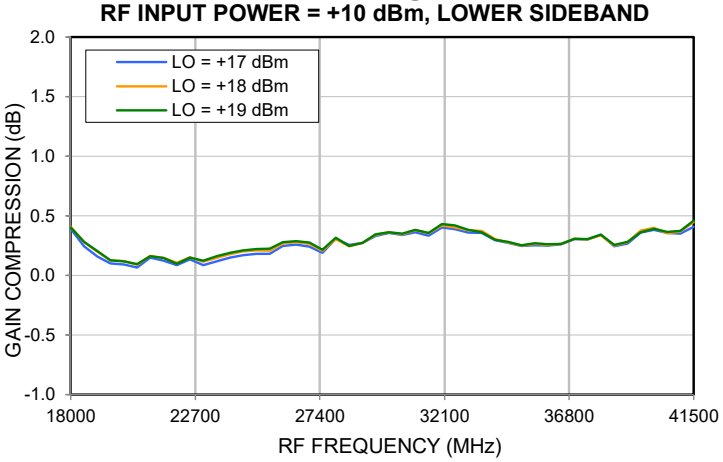
GAIN COMPRESSION (I) @ FIXED IF = 200 MHz
RF INPUT POWER = +10 dBm, LOWER SIDEBAND



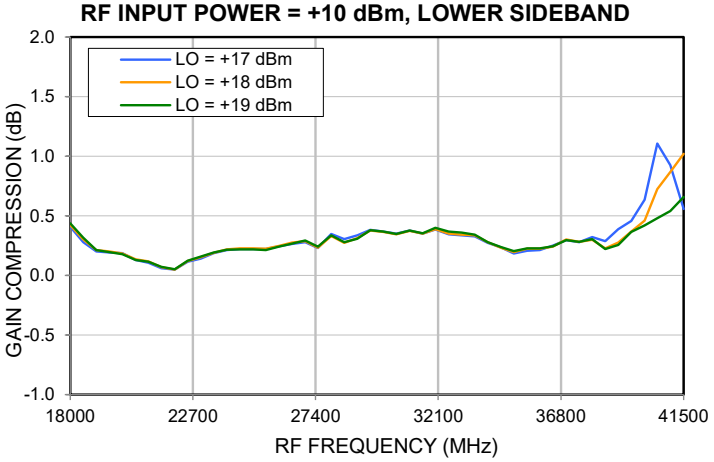
GAIN COMPRESSION (Q) @ FIXED IF = 200 MHz
RF INPUT POWER = +10 dBm, LOWER SIDEBAND



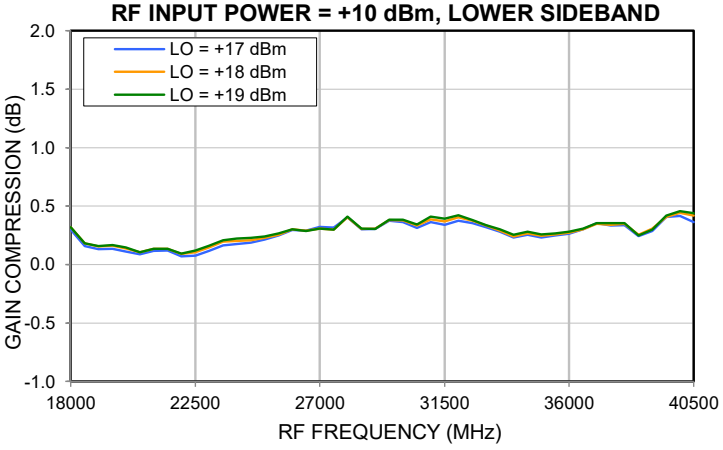
GAIN COMPRESSION (I) @ FIXED IF = 2 GHz
RF INPUT POWER = +10 dBm, LOWER SIDEBAND



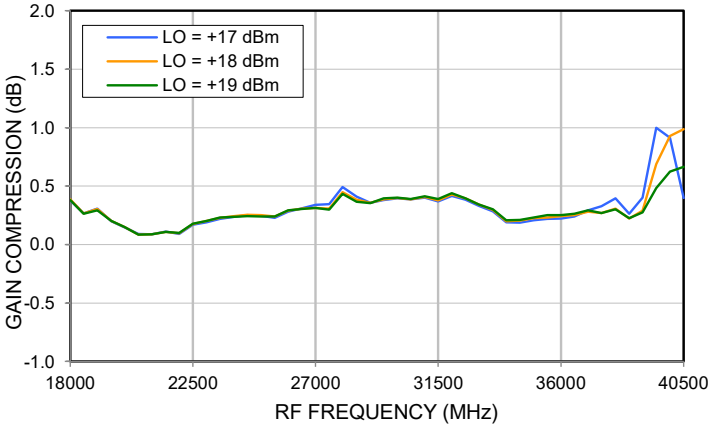
GAIN COMPRESSION (Q) @ FIXED IF = 2 GHz
RF INPUT POWER = +10 dBm, LOWER SIDEBAND



GAIN COMPRESSION (I) @ FIXED IF = 3 GHz
RF INPUT POWER = +10 dBm, LOWER SIDEBAND



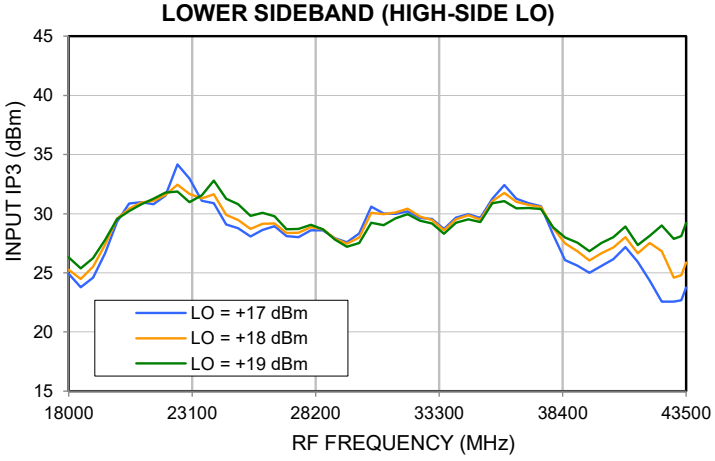
GAIN COMPRESSION (Q) @ FIXED IF = 3 GHz
RF INPUT POWER = +10 dBm, LOWER SIDEBAND



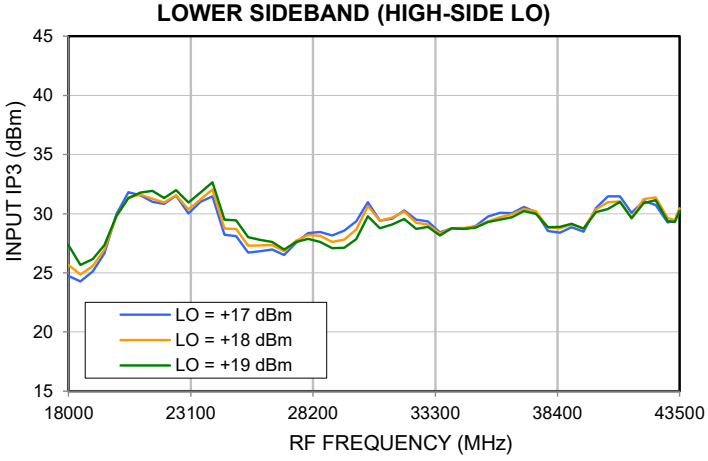
TYPICAL PERFORMANCE GRAPHS

Note: All data on this page represents the Die attached in a 4x4mm 24-Lead QFN style package and measured on Mini-Circuits Characterization Test Board TB-SMIQ-1844HC+
P_{IN} = 0 dBm/Tone with 1 MHz spacing (RF2 = RF1 + 1 MHz)

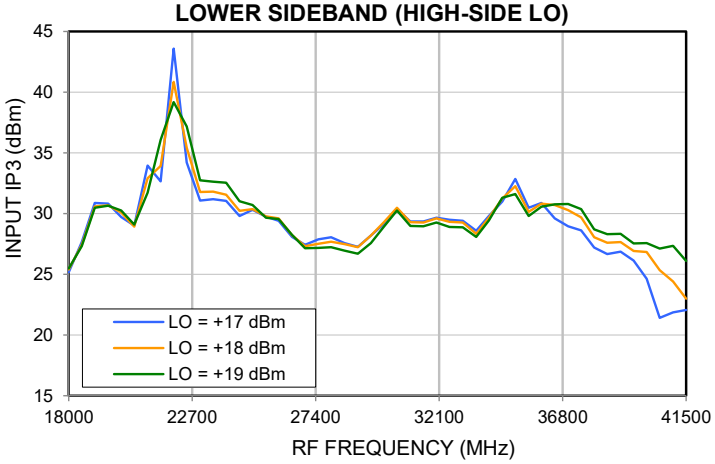
**INPUT IP3 (I) @ FIXED IF = 200 MHz
LOWER SIDEBAND (HIGH-SIDE LO)**



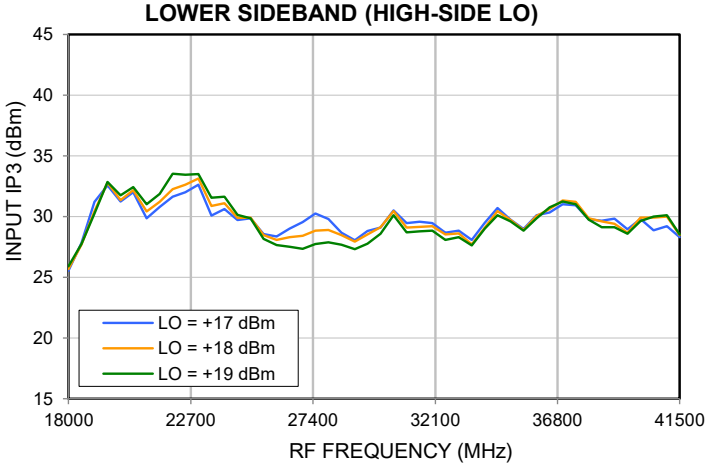
**INPUT IP3 (Q) @ FIXED IF = 200 MHz
LOWER SIDEBAND (HIGH-SIDE LO)**



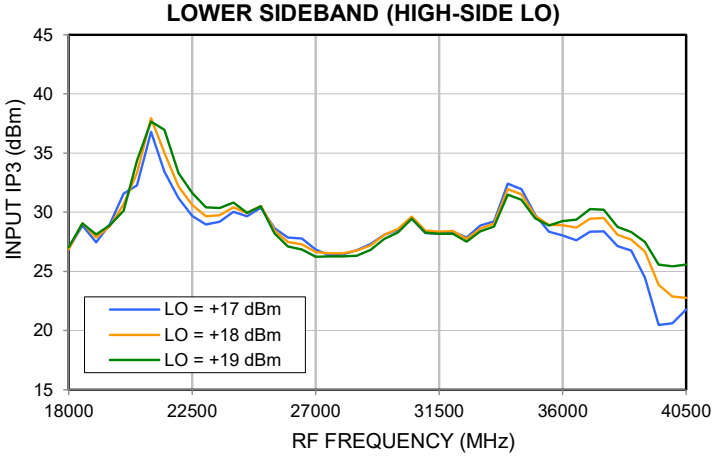
**INPUT IP3 (I) @ FIXED IF = 2 GHz
LOWER SIDEBAND (HIGH-SIDE LO)**



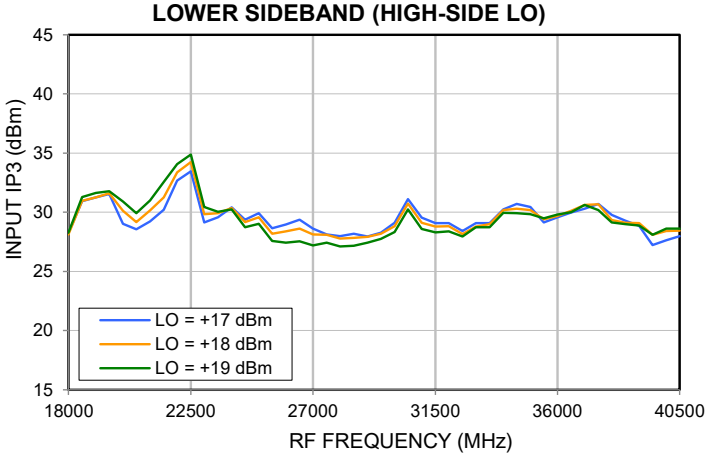
**INPUT IP3 (Q) @ FIXED IF = 2 GHz
LOWER SIDEBAND (HIGH-SIDE LO)**



**INPUT IP3 (I) @ FIXED IF = 3 GHz
LOWER SIDEBAND (HIGH-SIDE LO)**



**INPUT IP3 (Q) @ FIXED IF = 3 GHz
LOWER SIDEBAND (HIGH-SIDE LO)**



ABSOLUTE MAXIMUM RATINGS[6]

Parameter	Ratings
Operating Temperature[7]	-55°C to +105°C
Storage Temperature (for Die)[8]	-65°C to +150°C
Junction Temperature[9]	+175°C
LO Power	+24 dBm
RF Power	+24 dBm
I/Q Power	+23 dBm
DC Current on I & Q Ports	16 mA

6. Permanent damage may occur if any of these limits are exceeded. Maximum ratings are not intended for continuous normal operation.
7. Bottom of Die
8. For die shipped in Gel-Pak see ENV-80 (limited by packaging).
9. Hot spot temperature on die.

ESD RATING[10]

	Class	Voltage Range	Reference Standard
HBM	1B	500 to < 1000 V	ANSI/ESDA/JEDEC JS-001-2017
CDM	C3	≥ 1000 V	JESD22-C101F

ESD HANDLING PRECAUTION: This device is designed to be Class 1B for HBM. Static charges may easily produce potentials higher than this with improper handling and can discharge into DUT and damage it. As a preventive measure Industry standard ESD handling precautions should be used at all times to protect the device from ESD damage.

10. ESD tested in 4x4mm 24-Lead QFN-Style package.

IQ Mixer

SMIQ-1844H-D+

50Ω 18 to 43.5 GHz Level 18 (LO Power +18 dBm)

FUNCTIONAL DIAGRAM

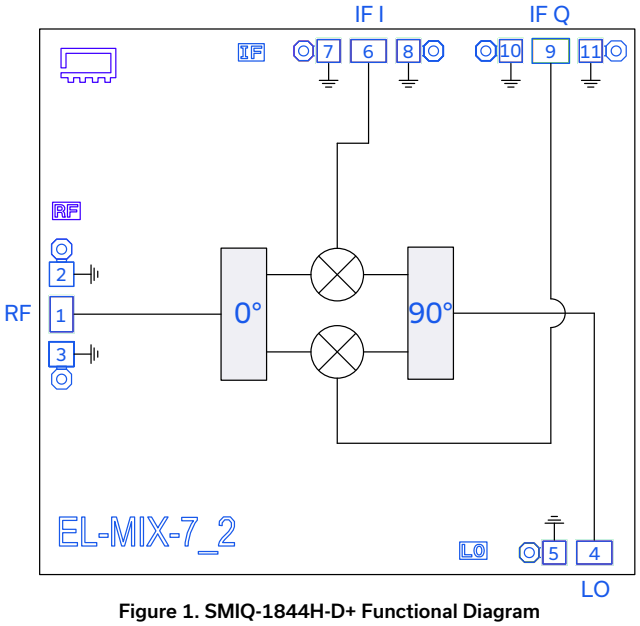


Figure 1. SMIQ-1844H-D+ Functional Diagram

PAD DESCRIPTION

Function	Pad #	Description (Refer to Figure 1)
RF	1	RF Port. Connects to RF Output for Upconverters and RF Input for Downconverters.
LO	4	LO Port. Connects to LO Input
IF I	6	IF I Port. Connects to the IF I Input for Upconverters and IF I Output for Downconverters
IF Q	9	IF Q Port. Connects to the IF Q Input for Upconverters and IF Q Output for Downconverters
GND	2, 3, 5, 7, 8, 10, 11	Connected to backside of Die thru vias. Bond wires to ground are optional.

DIE OUTLINE: inches [mm], Typical

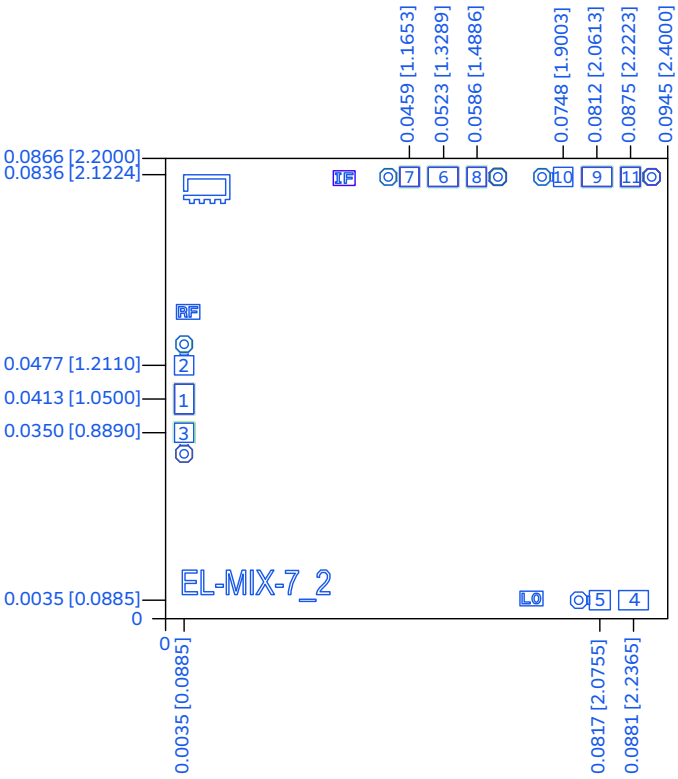
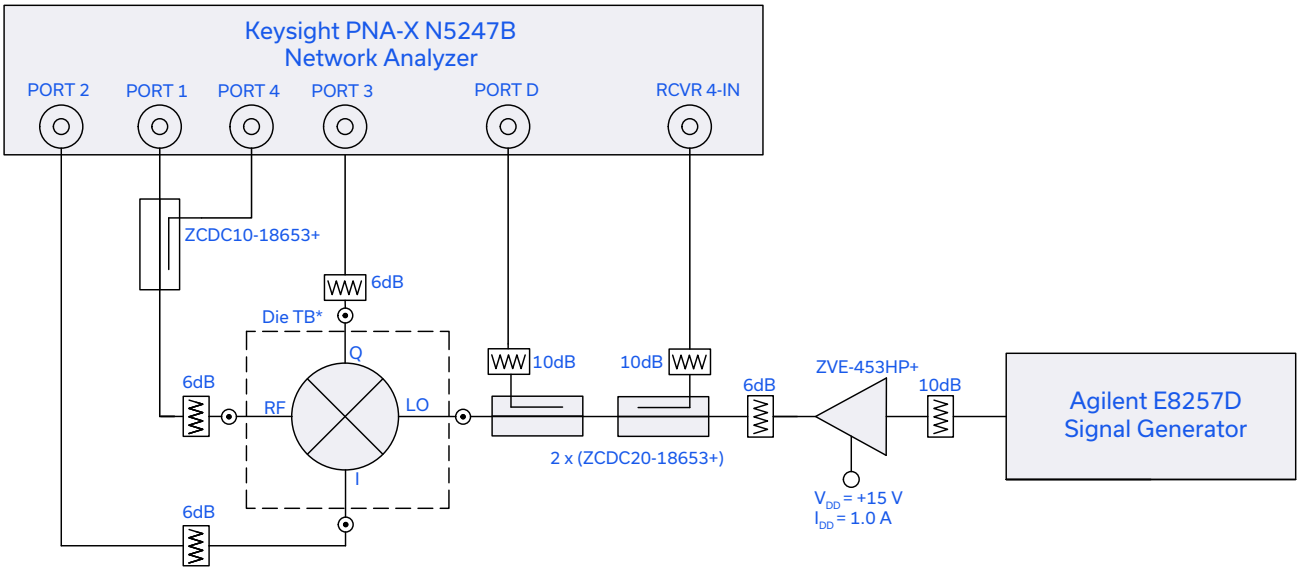


Figure 2: SMIQ-1844H-D+ Die Outline.

DIMENSIONS: inches [mm], Typical

Die Size	0.0866 x 0.0945 [2.200 x 2.400]
Die Thickness	0.0040 [0.1000]
Bond Pad Sizes:	
Pads 1, 4, 6, & 9	0.0059 x 0.0040 [0.1500 x 0.1000]
Pads 2, 3, 5, 7, 8, 10, & 11	0.0040 x 0.0040 [0.1000 x 0.1000]
Plating (Pads & Bottom of Die)	Gold

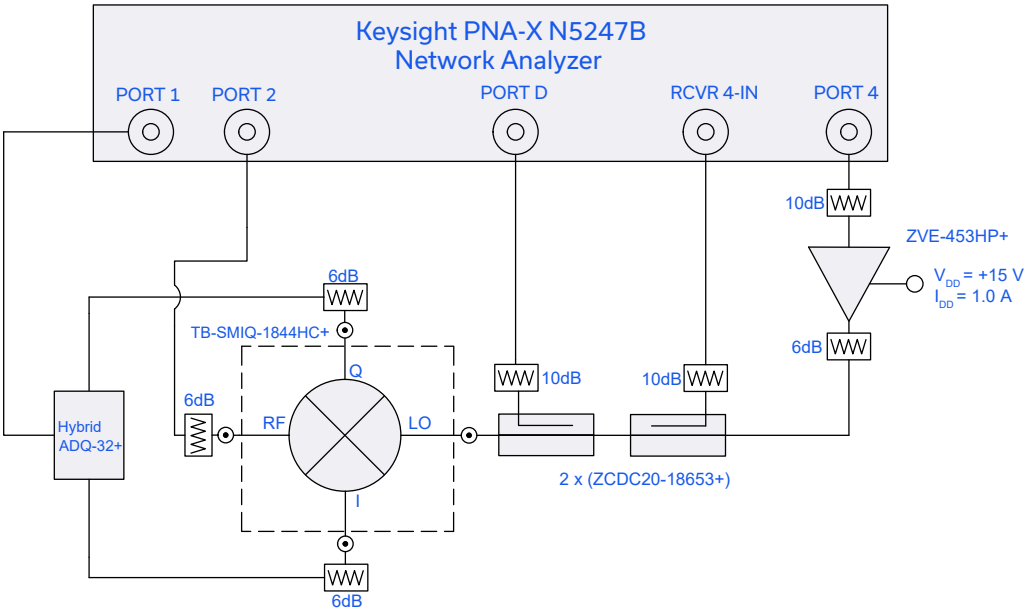
CHARACTERIZATION TEST BLOCK DIAGRAMS



10 dB attenuators P/N BW-E10-1W653+
6 dB attenuators P/N BW-E6-1W653+

Figure 3. Block diagram of test circuit used to characterize: Conversion Loss (CL), Amplitude Unbalance, Phase Unbalance, Isolation, Return Loss (RF, LO, I&Q) & Input IP3

Test conditions:
For CL, Return Loss and Isolation:
RF Input Power = -10 dBm, LO Input Power = +17 to +19 dBm, IF = 200 MHz, 2 GHz, 3 GHz
For Input IP3: RF = 0 dBm/Tone, LO Input Power = +17 to +19 dBm. Two tones, spaced 1 MHz apart.
*IIP3Tested in 4x4 mm 24-Lead package using TB-SMIQ-1844HC+



10 dB attenuators P/N BW-E10-1W653+
6 dB attenuators P/N BW-E6-1W653+

Figure 4. Block diagram of Test Circuit used for characterization of Image Rejection and Single Side Band Rejection

Test conditions:
RF Input Power = -10 dBm, LO Input Power = +17 to +19 dBm, IF = 200 MHz, 2 GHz, 3 GHz

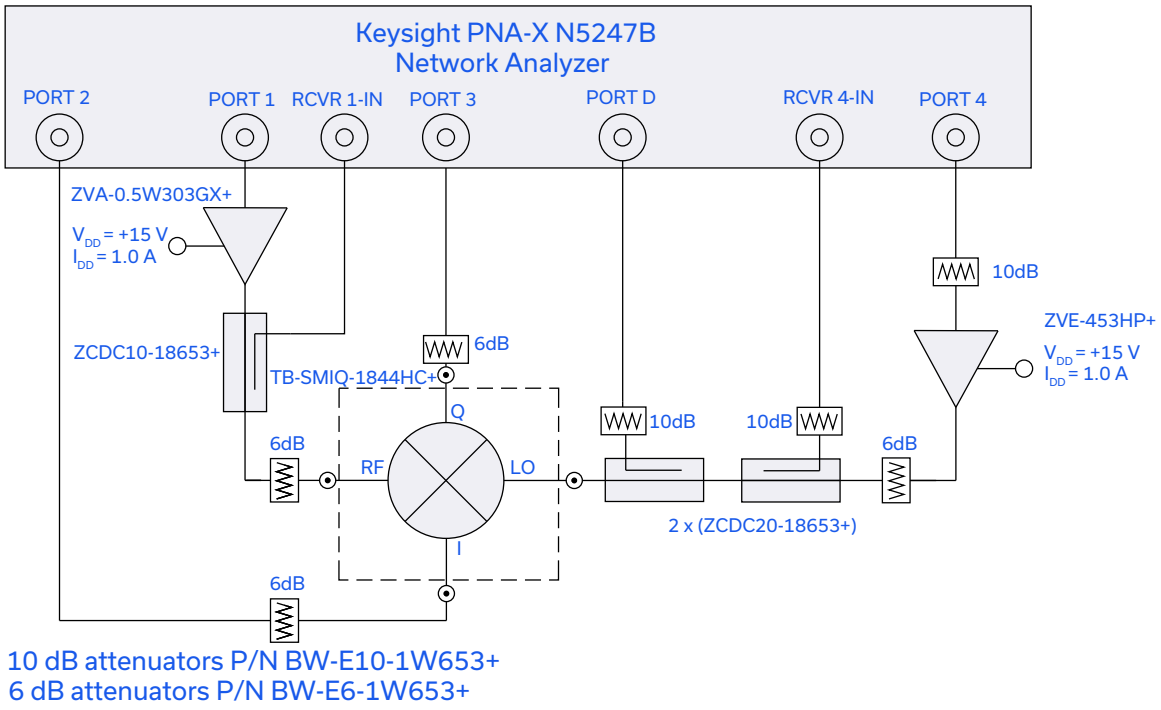


Figure 5. Block diagram of test circuit used to characterize Compression

Test Conditions:
RF Input Power = -10 dBm to +10 dBm, LO Input Power = +17 to +19 dBm, IF = 200 MHz, 2 GHz, and 3 GHz
Compression = (Conversion Loss @ RF Power = +10 dBm) – (Conversion Loss @ RF Power = -10 dBm)

APPLICATION CONFIGURATION FOR IMAGE REJECT AND SINGLE SIDE BAND MIXER

In Image Reject or Single Sideband Upconverter applications an external 90° Hybrid is needed. Refer to Mini-Circuits extensive portfolio of 90° Hybrids.

IMAGE REJECT MIXER APPLICATION

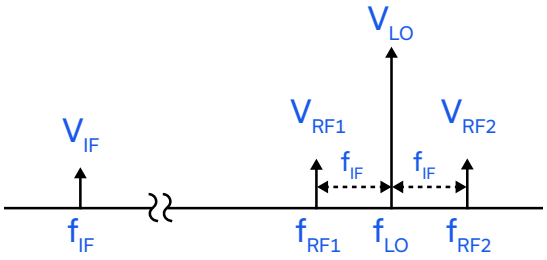


Figure 6. Spectral representation of Signals

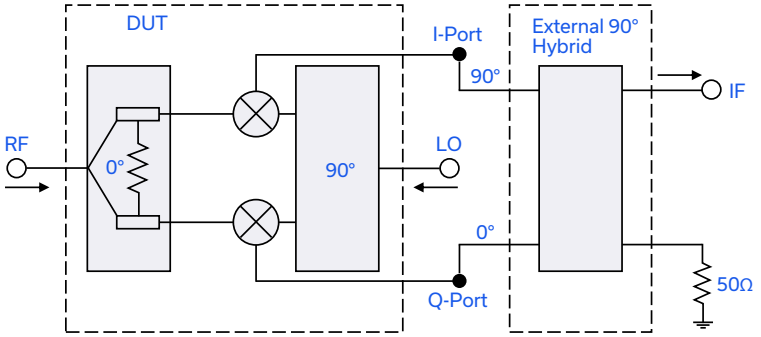


Figure 7. Block Diagram of Image Reject Mixer

If f_{RF1} is the desired signal and f_{RF2} is the image, connect the I port of DUT to the 90° port of the external hybrid and the Q port to the 0° port of the hybrid. This will send the f_{RF2}-f_{LO} IF signal to the terminated output of the external 90° hybrid and desired IF signal f_{LO}- f_{RF1} to IF port.

If f_{RF2} is the desired signal and f_{RF1} is the image signal, connect the I port of DUT to the 0 deg port of the external 90° hybrid and the Q port to the 90° port of the external hybrid. This will send f_{LO}- f_{RF1} IF signal to the terminated output of the external 90° hybrid and desired IF signal f_{RF2}- f_{LO} to IF port.

SINGLE SIDE BAND (SSB) UPCONVERTER APPLICATION

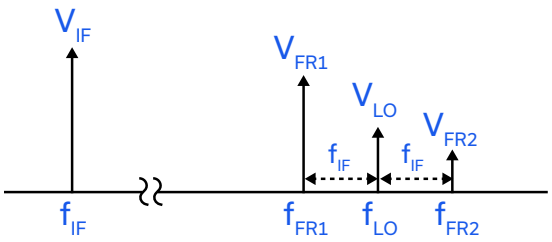


Figure 8. Spectral representation of Signals

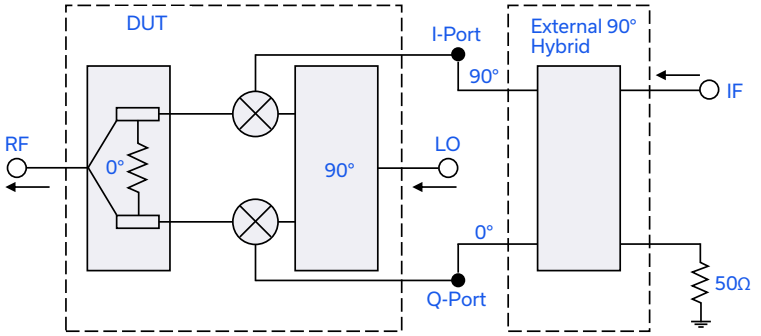


Figure 9. Block Diagram of Single Side Band Mixer

For upper sideband selection connect the I port to the 90° port of the external 90° hybrid and the Q port to the 0° port of the external hybrid. This will cause cancellation of the lower sideband signal in the 0° RF splitter of the DUT and the upper sideband signal will be present at the RF port.

For lower sideband selection connect the I port to the 0° port of the external 90° hybrid and the Q port to the 90° port of the hybrid. This will cause cancellation of the upper sideband signal in the 0° RF splitter of the DUT and the lower sideband signal will be present at the RF port.

Refer to Mini-Circuits blog, I&Q Mixers, Image Reject Down-Conversion & Single Sideband (SSB) Up-Conversion for a detailed explanation.

ASSEMBLY DIAGRAM

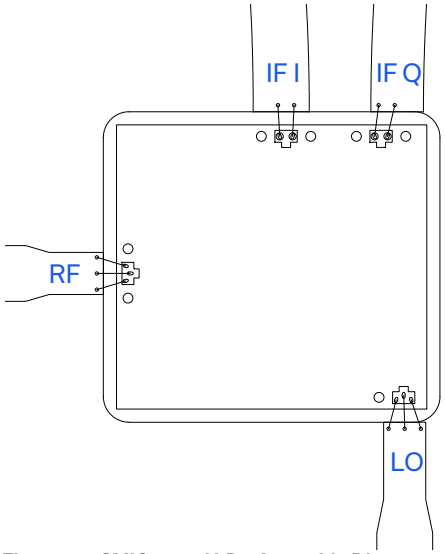


Figure 10. SMIQ-1844H-D+ Assembly Diagram

- Bond wire diameter: 1 mil
- Bond wire lengths from Die Pad to PCB at RF port: 19 ± 2 mils
- Bond wire lengths from Die Pad to PCB at LO port: 19 ± 2 mils
- Bond wire lengths from Die Pad to PCB at IF ports: 36 ± 2 mils
- Typical Gap from Die edge to PCB edge: 3 mils
- PCB thickness and material: 8 mil RO4003C (Thickness: 10.8 mils copper to copper).

ASSEMBLY AND HANDLING PROCEDURE

1. Storage
   Die should be stored in a dry nitrogen purged desiccator or equivalent.
2.
   ESD Precautions
   MMIC mixer die are susceptible to electrostatic and mechanical damage. Die are supplied in anti-static protected material, which should be opened only in clean room conditions at an appropriately grounded anti-static workstation.
3. Die Handling and Attachment
   Devices require careful handling using tools appropriate for manipulating semiconductor chips. It is recommended to handle the chips along the edges with a custom designed collet. The surface of the chips have exposed air bridges and should not be touched with a vacuum collet, tweezers or fingers.
   The die mounting surface must be clean and flat. Using conductive silver-filled epoxy, apply sufficient adhesive to meet the required bond line thickness, fillet height and coverage around the total periphery of the device. The recommended epoxy is Ablestik 84-1 LMISR4 or equivalent. Parts should be cured in a nitrogen-filled atmosphere per manufacturer's recommended cure profile.
4. Wire Bonding
   Openings in the surface passivation above the gold bond pads are provided to allow wire bonding to the die. Thermosonic bonding is recommended with minimized ultrasonic content. Bond force, time, ultrasonic power and temperature are all critical parameters. The suggested interconnect is pure gold, 1 mil diameter wire. Bonds are recommended to be made from the bond pads on the die to the package or substrate. All bond wire length and bond wire height should be kept as short as possible, unless specified by design, to minimize performance degradation due to undesirable series inductance.

MMIC DIE

IQ Mixer

SMIQ-1844H-D+

50Ω 18 to 43.5 GHz Level 18 (LO Power +18 dBm)

ADDITIONAL DETAILED INFORMATION IS AVAILABLE ON OUR DASH BOARD CLICK HERE

Performance Data	Table Graphs	
Case Style	Die	
RoHS Status	Compliant	
Die Ordering and Packaging Information	Quantity, Package	Model No.
	Gel - Pak: 5, 10, 50 KGD*	SMIQ-1844H-DG+
	Medium†, Partial wafer: KGD*<440	SMIQ-1844H-DP+
	Full wafer†	SMIQ-1844H-DF+
	†Available upon request contact sales representative. Refer to AN-60-067	
Die Marking	EL-MIX-7-2	
Environmental Ratings	ENV-80	

* Known Good Dice ("KGD") means that the dice in question are taken from PCM good wafer and visually inspected according to Mini-Circuits inspection criteria. While this is not definitive, it does help to provide a high degree of confidence that dice are capable of meeting typical RF electrical parameters specified by Mini-Circuits.

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B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuits' applicable established test performance criteria and measurement instructions.

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Frequency Mixer Die

SMIQ-1844H-D+

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	Image Rejection (Upconverter Mode) IF Fixed @IF(OUT)=200MHz (dB) @LO (dBm)			RF (IN) (MHz)	LO (MHz)	Image Rejection (Upconverter Mode) IF Fixed @IF(OUT)=2000MHz (dB) @LO (dBm)			RF (IN) (MHz)	LO (MHz)	Image Rejection (Upconverter Mode) IF Fixed @IF(OUT)=3000MHz (dB) @LO (dBm)		
		+17	+18	+19			+17	+18	+19			+17	+18	+19
18400	18200	29.65	28.59	27.50	22000	20000	35.39	34.03	32.68	24000	21000	23.86	23.47	23.23
18500	18300	29.04	27.89	26.94	22500	20500	31.79	30.66	29.63	24500	21500	26.58	25.45	24.55
19000	18800	27.33	26.87	26.38	23000	21000	27.19	26.79	26.53	25000	22000	24.65	23.69	22.76
19500	19300	27.92	27.69	27.03	23500	21500	27.74	27.01	26.73	25500	22500	21.44	20.91	20.54
20000	19800	29.92	28.85	27.76	24000	22000	31.64	29.66	28.39	26000	23000	19.84	19.34	19.05
20500	20300	29.13	29.28	28.49	24500	22500	29.42	27.56	26.37	26500	23500	19.41	19.15	19.00
21000	20800	26.84	26.50	26.17	25000	23000	25.10	24.79	24.16	27000	24000	18.73	18.62	18.68
21500	21300	27.20	26.89	26.47	25500	23500	22.70	22.62	22.59	27500	24500	18.47	18.39	18.44
22000	21800	24.49	24.35	24.45	26000	24000	22.90	22.81	22.73	28000	25000	18.96	18.95	18.98
22500	22300	24.54	24.02	23.96	26500	24500	23.22	23.19	23.18	28500	25500	19.38	19.46	19.12
23000	22800	28.81	27.28	25.97	27000	25000	22.16	22.31	22.20	29000	26000	19.60	19.66	19.57
23500	23300	26.39	26.88	26.93	27500	25500	21.53	21.67	21.68	29500	26500	19.99	20.26	20.05
24000	23800	24.93	25.64	26.10	28000	26000	22.48	22.48	22.31	30000	27000	20.31	20.67	20.66
24500	24300	23.82	24.15	24.36	28500	26500	22.23	22.28	22.19	30500	27500	20.23	20.87	21.17
25000	24800	23.03	23.21	23.31	29000	27000	22.27	22.68	22.74	31000	28000	18.30	18.91	19.11
25500	25300	22.65	22.90	22.97	29500	27500	22.38	22.92	23.30	31500	28500	19.54	20.27	20.74
26000	25800	22.73	23.07	23.20	30000	28000	23.34	24.14	24.66	32000	29000	20.05	20.55	21.22
26500	26300	23.06	23.43	23.69	30500	28500	24.17	25.29	26.39	32500	29500	20.65	21.18	21.64
27000	26800	23.32	23.67	23.93	31000	29000	21.55	22.53	23.41	33000	30000	21.48	21.90	22.36
27500	27300	23.22	23.91	24.24	31500	29500	22.87	23.64	24.08	33500	30500	23.26	23.87	24.43
28000	27800	23.42	24.34	24.97	32000	30000	23.24	23.98	24.71	34000	31000	25.40	26.07	26.89
28500	28300	23.33	24.42	25.11	32500	30500	24.70	25.50	26.18	34500	31500	26.75	27.86	29.06
29000	28800	23.16	24.25	25.34	33000	31000	27.16	28.46	29.53	35000	32000	27.17	28.62	29.74
29500	29300	23.93	24.68	25.73	33500	31500	29.16	30.21	31.44	35500	32500	28.96	30.21	31.47
30000	29800	25.04	26.33	26.92	34000	32000	30.99	32.39	33.66	36000	33000	30.93	31.87	33.10
30500	30300	24.18	25.27	26.18	34500	32500	32.51	33.34	34.68	36500	33500	30.65	31.61	32.18
31000	30800	21.79	23.03	23.93	35000	33000	32.39	32.79	33.74	37000	34000	33.59	33.64	33.93
31500	31300	25.83	27.07	27.87	35500	33500	29.72	30.22	30.66	37500	34500	32.15	32.42	32.78
32000	31800	29.99	30.88	31.48	36000	34000	26.26	26.66	26.61	38000	35000	25.88	26.31	26.57
32500	32300	37.35	39.27	37.13	36500	34500	26.93	27.57	27.34	38500	35500	23.20	23.78	24.03
33000	32800	35.45	32.85	31.73	37000	35000	26.92	27.86	27.85	39000	36000	21.37	21.94	22.45
33500	33300	36.81	33.72	31.61	37500	35500	23.11	23.81	24.11	39500	36500	19.17	19.80	20.26
34000	33800	32.56	31.48	30.60	38000	36000	19.98	20.27	20.76	40000	37000	16.76	17.55	18.04
34500	34300	29.72	29.49	28.69	38500	36500	16.65	17.39	18.23	40500	37500	17.51	17.75	18.08
35000	34800	25.72	26.30	26.37	39000	37000	15.19	15.76	16.58	41000	38000	20.10	20.28	20.41
35500	35300	22.88	23.38	23.59	39500	37500	15.50	15.80	16.46	41500	38500	22.51	22.45	22.66
36000	35800	23.27	23.92	24.36	40000	38000	15.86	16.18	16.61	42000	39000	23.48	23.16	23.23
36500	36300	21.96	22.98	23.64	40500	38500	16.69	17.21	17.60	42500	39500	23.36	22.33	22.39
37000	36800	19.49	20.32	21.13	41000	39000	18.13	18.75	19.11	43000	40000	24.28	23.83	22.82
37500	37300	17.75	18.46	19.07	41500	39500	18.87	19.22	19.19	43500	40500	25.30	24.98	24.41
38000	37800	17.21	17.63	18.11	42000	40000	19.68	19.78	19.73	44000	41000	26.74	25.62	24.13
38500	38300	17.04	17.93	18.36	42500	40500	20.84	20.93	20.56	44500	41500	26.90	25.62	23.57
39000	38800	16.75	17.65	18.45	43000	41000	22.16	21.67	20.41	45000	42000	28.30	26.87	24.17
39500	39300	16.04	16.65	17.30	43500	41500	23.52	22.45	21.13	45500	42500	29.33	27.39	25.23
40000	39800	15.04	15.41	15.65	44000	42000	24.83	23.87	22.67	46000	43000	28.59	27.81	25.45
40200	40000	14.89	15.35	15.45	44500	42500	25.24	25.16	23.54	46500	43500	28.27	28.79	25.66
40500	40300	15.35	15.58	15.73	45000	43000	23.14	24.55	23.69					
41000	40800	16.27	16.25	16.01	45500	43500	21.34	23.18	22.12					
41500	41300	16.71	16.34	15.54										
42000	41800	16.82	16.55	15.68										
42500	42300	18.09	17.67	17.02										
43000	42800	19.34	19.17	18.09										
43500	43300	19.14	19.84	18.61										
43700	43500	18.34	19.54	17.97										

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	Image Rejection (Downconverter Mode) IF Fixed @IF(OUT)=200MHz (dB) @LO (dBm)			RF (IN) (MHz)	LO (MHz)	Image Rejection (Downconverter Mode) IF Fixed @IF(OUT)=2000MHz (dB) @LO (dBm)			RF (IN) (MHz)	LO (MHz)	Image Rejection (Downconverter Mode) IF Fixed @IF(OUT)=3000MHz (dB) @LO (dBm)		
		+17	+18	+19			+17	+18	+19			+17	+18	+19
18400	18200	27.12	26.38	25.42	22000	20000	23.25	23.92	24.46	24000	21000	19.61	19.98	20.37
18500	18300	26.93	26.10	25.30	22500	20500	22.43	23.21	24.05	24500	21500	21.05	21.24	21.41
19000	18800	24.91	24.89	24.70	23000	21000	20.70	21.49	22.26	25000	22000	23.68	23.28	22.76
19500	19300	23.82	24.09	24.01	23500	21500	21.61	22.15	22.69	25500	22500	25.08	25.11	24.40
20000	19800	24.71	25.17	25.13	24000	22000	23.90	24.22	24.55	26000	23000	21.87	22.62	23.10
20500	20300	25.70	26.13	26.48	24500	22500	28.46	28.46	27.90	26500	23500	20.97	21.12	21.26
21000	20800	25.55	26.41	27.04	25000	23000	31.43	31.65	30.38	27000	24000	20.48	20.75	21.01
21500	21300	24.70	25.89	27.04	25500	23500	25.67	26.11	26.38	27500	24500	20.92	21.33	21.64
22000	21800	23.92	25.12	26.39	26000	24000	28.30	28.51	28.13	28000	25000	21.44	21.85	22.24
22500	22300	25.51	26.58	27.57	26500	24500	28.68	28.98	28.54	28500	25500	22.54	22.43	22.43
23000	22800	33.43	34.95	35.09	27000	25000	29.37	29.42	28.89	29000	26000	23.62	22.95	22.45
23500	23300	40.70	40.14	42.14	27500	25500	27.34	27.42	27.58	29500	26500	26.21	24.89	23.99
24000	23800	29.88	32.22	36.51	28000	26000	28.03	27.27	26.98	30000	27000	29.28	27.15	25.82
24500	24300	30.79	34.20	39.49	28500	26500	31.63	29.50	28.44	30500	27500	27.85	26.39	25.36
25000	24800	30.00	32.79	37.05	29000	27000	37.38	33.27	30.75	31000	28000	25.58	24.00	22.87
25500	25300	28.79	31.10	34.45	29500	27500	48.86	41.82	35.41	31500	28500	31.12	28.14	26.09
26000	25800	29.10	30.99	34.03	30000	28000	41.23	48.92	39.71	32000	29000	33.61	30.42	28.15
26500	26300	28.99	30.53	32.96	30500	28500	34.09	38.37	38.98	32500	29500	36.71	33.30	30.61
27000	26800	31.17	32.21	33.59	31000	29000	42.75	41.38	35.29	33000	30000	33.41	30.67	28.81
27500	27300	31.62	33.63	35.63	31500	29500	37.28	43.46	52.04	33500	30500	32.43	30.32	28.70
28000	27800	30.53	33.29	36.52	32000	30000	46.43	48.15	42.68	34000	31000	32.05	30.74	29.74
28500	28300	29.51	32.60	36.34	32500	30500	35.71	37.21	37.27	34500	31500	29.76	29.02	28.49
29000	28800	27.51	30.39	34.11	33000	31000	38.07	38.43	37.70	35000	32000	28.18	27.29	27.07
29500	29300	25.40	27.17	29.22	33500	31500	34.42	33.89	33.43	35500	32500	28.54	27.61	27.21
30000	29800	25.11	26.08	27.23	34000	32000	32.06	31.60	31.44	36000	33000	27.81	27.09	26.81
30500	30300	25.43	25.89	26.28	34500	32500	32.08	32.30	32.30	36500	33500	26.19	26.05	26.02
31000	30800	31.30	30.58	29.97	35000	33000	32.18	32.65	33.48	37000	34000	25.24	25.82	26.59
31500	31300	38.72	37.62	35.85	35500	33500	29.89	30.52	31.10	37500	34500	30.69	32.33	34.92
32000	31800	37.21	35.86	34.39	36000	34000	28.59	29.05	29.86	38000	35000	40.84	46.58	45.97
32500	32300	37.06	36.39	34.74	36500	34500	26.07	27.04	28.57	38500	35500	38.26	37.39	35.39
33000	32800	41.40	37.89	34.88	37000	35000	28.41	29.55	31.19	39000	36000	32.51	31.69	30.67
33500	33300	52.35	43.58	39.00	37500	35500	30.94	32.46	33.60	39500	36500	26.97	26.44	25.75
34000	33800	47.50	47.92	41.12	38000	36000	33.64	34.53	33.98	40000	37000	23.19	23.14	22.81
34500	34300	40.37	39.01	35.49	38500	36500	34.46	32.33	29.68	40500	37500	20.80	21.10	21.30
35000	34800	34.91	34.52	32.87	39000	37000	36.45	31.83	28.58	41000	38000	20.59	20.83	20.98
35500	35300	29.53	32.22	35.86	39500	37500	30.94	28.61	26.75	41500	38500	20.92	21.00	20.90
36000	35800	27.07	28.65	30.70	40000	38000	24.78	23.76	22.84	42000	39000	20.50	20.50	20.31
36500	36300	31.84	32.02	30.96	40500	38500	22.32	21.35	20.58	42500	39500	19.89	19.88	19.57
37000	36800	33.82	30.72	27.92	41000	39000	24.10	21.99	20.77	43000	40000	20.03	19.63	19.27
37500	37300	32.68	29.56	26.88	41500	39500	26.26	23.17	21.36	43500	40500	20.96	20.58	19.87
38000	37800	27.30	25.65	24.13	42000	40000	22.51	21.01	19.86	44000	41000	22.89	22.41	21.81
38500	38300	23.47	22.21	21.16	42500	40500	21.71	20.74	19.59	44500	41500	23.66	23.18	22.64
39000	38800	21.80	20.42	19.38	43000	41000	24.07	22.92	21.67	45000	42000	22.92	22.62	21.83
39500	39300	22.54	20.17	18.88	43500	41500	27.05	25.42	24.03	45500	42500	22.34	22.02	21.21
40000	39800	20.45	18.64	17.63	44000	42000	27.84	26.36	24.58	46000	43000	20.23	21.25	21.26
40200	40000	19.18	17.97	17.06	44500	42500	27.53	26.44	24.29	46500	43500	14.60	18.68	19.58
40500	40300	18.71	17.76	16.76	45000	43000	21.84	24.23	23.68					
41000	40800	20.03	18.95	17.79	45500	43500	13.89	20.96	21.42					
41500	41300	21.71	20.05	18.80										
42000	41800	20.75	19.37	17.98										
42500	42300	20.59	19.20	17.64										
43000	42800	22.26	20.30	18.72										
43500	43300	18.55	21.57	19.62										
43700	43500	16.73	21.20	19.13										

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	CONVERSION LOSS VS. RF FREQUENCY @IF = 200 MHz @LO (dBm)		
		+17	+18	+19
18000	18200	8.58	8.93	9.25
18500	18700	8.51	8.86	9.14
19000	19200	8.46	8.72	8.98
19500	19700	8.79	9.04	9.32
20000	20200	9.76	10.00	10.31
20500	20700	9.60	9.82	10.10
21000	21200	9.21	9.40	9.67
21500	21700	9.00	9.21	9.56
22000	22200	8.91	9.01	9.26
22500	22700	9.03	9.19	9.51
23000	23200	9.04	9.37	9.75
23500	23700	8.54	8.82	9.12
24000	24200	8.15	8.46	8.75
24500	24700	7.98	8.34	8.67
25000	25200	7.90	8.20	8.52
25500	25700	7.86	8.16	8.45
26000	26200	8.00	8.30	8.61
26500	26700	8.31	8.49	8.80
27000	27200	8.36	8.44	8.73
27500	27700	8.30	8.39	8.69
28000	28200	8.56	8.76	9.03
28500	28700	8.68	8.83	9.08
29000	29200	8.92	9.05	9.29
29500	29700	8.62	8.85	9.15
30000	30200	8.52	8.74	9.03
30500	30700	8.20	8.46	8.75
31000	31200	8.37	8.63	8.93
31500	31700	8.60	8.80	9.03
32000	32200	8.15	8.36	8.74
32500	32700	8.13	8.26	8.55
33000	33200	8.86	8.99	9.23
33500	33700	8.76	9.01	9.32
34000	34200	8.72	8.97	9.32
34500	34700	9.15	9.27	9.50
35000	35200	9.42	9.57	9.85
35500	35700	9.78	10.03	10.36
36000	36200	10.05	10.25	10.56
36500	36700	10.19	10.28	10.53
37000	37200	10.80	10.86	10.98
37500	37700	11.30	11.37	11.52
38000	38200	11.12	11.31	11.52
38500	38700	10.18	10.42	10.61
39000	39200	9.72	9.94	10.08
39500	39700	9.23	9.45	9.64
40000	40200	9.67	9.82	10.12
40500	40700	9.77	9.96	10.13
41000	41200	9.71	9.96	10.07
41500	41700	10.50	10.87	11.08
42000	42200	10.72	11.16	11.46
42500	42700	10.71	11.03	11.28
43000	43200	11.34	11.73	12.07
43300	43500	11.84	12.23	12.64

RF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. RF FREQUENCY @IF = 2000 MHz @LO (dBm)		
		+17	+18	+19
18000	20000	9.09	8.75	8.91
18500	20500	9.00	9.32	9.46
19000	21000	9.00	9.32	9.51
19500	21500	9.26	9.63	9.90
20000	22000	10.24	10.61	10.90
20500	22500	10.49	10.83	11.08
21000	23000	10.28	10.62	10.85
21500	23500	10.00	10.36	10.56
22000	24000	9.81	10.18	10.31
22500	24500	10.02	10.39	10.56
23000	25000	9.89	10.23	10.47
23500	25500	9.35	9.67	9.88
24000	26000	8.77	9.11	9.35
24500	26500	8.59	8.93	9.17
25000	27000	8.50	8.80	9.03
25500	27500	8.41	8.74	8.97
26000	28000	8.63	8.96	9.20
26500	28500	8.84	9.19	9.44
27000	29000	8.97	9.28	9.48
27500	29500	8.98	9.25	9.48
28000	30000	9.29	9.56	9.80
28500	30500	9.34	9.63	9.89
29000	31000	9.46	9.75	10.06
29500	31500	8.98	9.28	9.62
30000	32000	8.73	8.98	9.28
30500	32500	8.59	8.81	9.03
31000	33000	9.09	9.32	9.50
31500	33500	9.16	9.48	9.67
32000	34000	9.08	9.43	9.60
32500	34500	9.26	9.62	9.74
33000	35000	9.97	10.32	10.45
33500	35500	9.86	10.26	10.47
34000	36000	9.64	10.10	10.31
34500	36500	9.88	10.32	10.50
35000	37000	10.16	10.53	10.70
35500	37500	10.65	11.05	11.20
36000	38000	11.52	11.89	12.00
36500	38500	12.01	12.36	12.44
37000	39000	11.92	11.60	11.70
37500	39500	11.95	12.29	12.35
38000	40000	11.75	12.06	12.17
38500	40500	10.77	11.04	11.12
39000	41000	10.30	10.59	10.60
39500	41500	9.56	9.87	10.00
40000	42000	9.78	9.55	9.91
40500	42500	9.83	10.16	10.48
41000	43000	9.74	10.20	10.55
41500	43500	10.46	10.99	11.41

RF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. RF FREQUENCY @IF = 3000 MHz @LO (dBm)		
		+17	+18	+19
18000	21000	9.29	9.21	9.53
18500	21500	9.40	9.38	9.75
19000	22000	9.37	9.40	9.77
19500	22500	9.61	9.65	10.00
20000	23000	10.59	10.65	10.93
20500	23500	11.05	11.02	11.23
21000	24000	10.76	10.73	10.89
21500	24500	10.61	10.56	10.76
22000	25000	10.28	10.28	10.55
22500	25500	10.19	10.22	10.49
23000	26000	10.35	10.34	10.59
23500	26500	9.73	9.75	10.08
24000	27000	9.15	9.18	9.49
24500	27500	9.06	9.06	9.37
25000	28000	9.07	9.11	9.43
25500	28500	9.08	9.09	9.44
26000	29000	9.15	9.21	9.50
26500	29500	9.50	9.51	9.80
27000	30000	9.71	9.72	9.99
27500	30500	9.51	9.58	9.93
28000	31000	9.75	9.85	10.27
28500	31500	9.53	9.67	10.13
29000	32000	9.48	9.61	10.08
29500	32500	9.33	9.37	9.74
30000	33000	9.38	9.35	9.67
30500	33500	9.38	9.32	9.64
31000	34000	9.77	9.73	10.10
31500	34500	9.87	9.85	10.14
32000	35000	9.70	9.66	9.94
32500	35500	9.62	9.60	9.91
33000	36000	10.31	10.25	10.50
33500	36500	10.18	10.05	10.25
34000	37000	10.00	9.93	10.13
34500	37500	10.21	10.18	10.35
35000	38000	10.52	10.43	10.62
35500	38500	11.42	11.27	11.38
36000	39000	12.25	12.11	12.17
36500	39500	12.19	12.06	12.13
37000	40000	12.05	11.93	12.03
37500	40500	12.20	12.07	12.16
38000	41000	12.15	12.01	12.10
38500	41500	11.23	11.12	11.25
39000	42000	10.77	10.72	10.97
39500	42500	10.15	10.12	10.40
40000	43000	10.40	10.58	10.98
40500	43500	10.54	10.71	11.15

Typical Performance Data

IF (MHz)	RF (IN) (MHz)	CONVERSION LOSS VS. IF FREQUENCY @ Fixed LO = 18000 MHz @LO (dBm)			IF (MHz)	RF (IN) (MHz)	CONVERSION LOSS VS. IF FREQUENCY @ Fixed LO = 30750 MHz @LO (dBm)			IF (MHz)	RF (IN) (MHz)	CONVERSION LOSS VS. IF FREQUENCY @ Fixed LO = 43500 GHz @LO (dBm)		
		+17	+18	+19			+17	+18	+19			+17	+18	+19
10	18010	8.91	8.98	9.30	10	30760	8.24	8.31	8.63	10	43490	11.67	11.83	12.25
20	18020	8.98	9.03	9.33	20	30770	7.97	8.08	8.45	20	43480	11.51	11.64	12.06
30	18030	9.01	9.09	9.36	30	30780	7.90	8.00	8.37	30	43470	11.60	11.74	12.15
40	18040	8.99	9.06	9.35	40	30790	8.03	8.12	8.46	40	43460	11.85	11.98	12.40
50	18050	8.80	8.87	9.15	50	30800	8.18	8.27	8.62	50	43450	12.07	12.21	12.62
60	18060	8.63	8.72	9.02	60	30810	8.30	8.35	8.72	60	43440	12.12	12.25	12.71
70	18070	8.67	8.78	9.07	70	30820	8.34	8.42	8.75	70	43430	12.00	12.13	12.57
80	18080	8.87	8.92	9.22	80	30830	8.36	8.43	8.77	80	43420	11.85	11.99	12.43
90	18090	8.94	9.02	9.31	90	30840	8.34	8.41	8.80	90	43410	11.80	11.96	12.36
100	18100	9.06	9.11	9.41	100	30850	8.24	8.31	8.69	100	43400	11.87	11.99	12.41
200	18200	8.98	9.07	9.33	200	30950	8.19	8.28	8.62	200	43300	11.85	11.98	12.43
400	18400	9.23	9.28	9.53	400	31150	8.46	8.49	8.76	400	43100	11.63	11.78	12.20
600	18600	9.35	9.33	9.55	600	31350	8.69	8.68	8.90	600	42900	11.36	11.47	11.91
800	18800	9.35	9.31	9.47	800	31550	8.93	8.93	9.14	800	42700	11.21	11.35	11.80
1000	19000	9.71	9.63	9.75	1000	31750	8.75	8.73	8.93	1000	42500	10.85	10.97	11.42
1200	19200	10.30	10.19	10.23	1200	31950	8.38	8.37	8.58	1200	42300	10.49	10.65	11.07
1400	19400	9.90	9.79	9.81	1400	32150	8.22	8.23	8.42	1400	42100	10.59	10.77	11.23
1600	19600	10.09	9.93	9.98	1600	32350	8.39	8.40	8.56	1600	41900	10.82	11.00	11.46
1800	19800	10.74	10.61	10.57	1800	32550	8.75	8.71	8.87	1800	41700	10.62	10.80	11.27
2000	20000	11.09	10.93	10.92	2000	32750	9.02	8.97	9.13	2000	41500	10.51	10.71	11.18
2200	20200	10.83	10.70	10.67	2200	32950	9.25	9.15	9.34	2200	41300	10.33	10.51	11.00
2400	20400	11.44	11.29	11.29	2400	33150	9.25	9.19	9.36	2400	41100	10.12	10.34	10.83
2600	20600	11.22	11.11	11.12	2600	33350	9.19	9.13	9.29	2600	40900	9.88	10.11	10.58
2800	20800	11.07	10.94	10.94	2800	33550	9.38	9.33	9.45	2800	40700	10.09	10.32	10.81
3000	21000	11.61	11.43	11.39	3000	33750	9.49	9.43	9.56	3000	40500	10.45	10.64	11.11
3200	21200	11.63	11.47	11.38	3200	33950	9.57	9.48	9.60	3200	40300	10.63	10.83	11.31
3400	21400	12.09	11.87	11.78	3400	34150	9.84	9.72	9.84	3400	40100	10.68	10.87	11.37
3600	21600	12.51	12.27	12.11	3600	34350	10.00	9.91	10.03	3600	39900	10.50	10.69	11.21
3800	21800	12.41	12.13	11.94	3800	34550	10.16	10.03	10.16	3800	39700	10.47	10.47	10.96
4000	22000	12.27	12.00	11.80	4000	34750	10.31	10.17	10.27	4000	39500	10.65	10.50	10.80
4200	22200	12.48	12.23	12.04	4200	34950	10.95	10.84	10.90	4200	39300	10.87	10.69	10.74
4400	22400	12.24	12.01	11.83	4400	35150	11.23	11.03	11.09	4400	39100	11.02	10.84	10.86
4600	22600	12.53	12.33	12.17	4600	35350	11.55	11.39	11.41	4600	38900	11.45	11.26	11.25
4800	22800	12.72	12.60	12.50	4800	35550	11.81	11.58	11.63	4800	38700	11.36	11.19	11.21
5000	23000	12.97	12.81	12.74	5000	35750	11.72	11.51	11.54	5000	38500	11.84	11.64	11.63
5200	23200	12.44	12.38	12.49	5200	35950	11.89	11.69	11.74	5200	38300	12.41	12.24	12.28
5400	23400	13.14	13.15	13.29	5400	36150	12.33	12.10	12.16	5400	38100	13.25	13.06	13.07
5600	23600	12.71	12.79	12.97	5600	36350	12.22	12.03	12.07	5600	37900	13.05	12.89	12.90
5800	23800	12.77	12.91	13.13	5800	36550	12.35	12.14	12.16	5800	37700	13.94	13.77	13.75
6000	24000	13.41	13.55	13.81	6000	36750	13.49	13.32	13.34	6000	37500	13.55	13.33	13.36
6200	24200	13.33	13.48	13.79	6200	36950	13.59	13.40	13.46	6200	37300	13.68	13.47	13.46
6400	24400	13.65	13.88	14.21	6400	37150	14.13	13.94	13.94	6400	37100	13.87	13.64	13.62
6600	24600	13.24	13.49	13.89	6600	37350	14.06	13.83	13.90	6600	36900	14.24	14.00	13.93
6800	24800	13.70	13.94	14.42	6800	37550	14.72	14.54	14.59	6800	36700	13.46	13.22	13.20
7000	25000	13.49	13.74	14.24	7000	37750	14.48	14.26	14.33	7000	36500	13.80	13.49	13.43
7200	25200	13.38	13.61	14.12	7200	37950	14.05	13.85	13.93	7200	36300	13.86	13.50	13.45
7400	25400	13.42	13.61	14.11	7400	38150	13.85	13.65	13.72	7400	36100	14.06	13.71	13.62
7600	25600	13.05	13.26	13.72	7600	38350	13.68	13.47	13.55	7600	35900	13.89	13.54	13.40
7800	25800	13.07	13.24	13.69	7800	38550	13.70	13.47	13.55	7800	35700	13.66	13.28	13.16
8000	26000	12.60	12.73	13.18	8000	38750	12.95	12.76	12.84	8000	35500	13.41	13.04	12.87

Frequency Mixer Die SMIQ-1844H-D+

Typical Performance Data

LO (IN) (MHz)	LO-RF ISOLATION (dB)			LO-IF (I) ISOLATION (dB)			LO-IF (Q) ISOLATION (dB)		
	@LO (dBm)			@LO (dBm)			@LO (dBm)		
	+17	+18	+19	+17	+18	+19	+17	+18	+19
18000	42.89	42.91	41.98	44.24	44.72	45.42	48.05	47.72	46.92
18500	44.81	44.77	43.80	42.03	42.32	42.63	47.40	47.11	46.47
19000	46.48	46.55	45.92	41.69	42.07	42.39	48.21	47.77	46.87
19500	46.40	46.40	45.90	45.66	46.06	46.10	50.47	49.85	48.76
20000	47.00	46.97	46.55	47.82	48.14	47.92	54.09	52.59	50.27
20500	47.56	47.53	47.17	47.30	47.62	47.66	52.35	51.47	49.59
21000	46.24	46.15	45.66	46.20	46.49	46.55	50.65	50.13	48.82
21500	44.86	44.77	44.18	44.94	45.10	44.92	50.66	50.22	49.01
22000	42.78	42.67	41.97	41.42	41.55	41.31	51.15	50.73	49.47
22500	42.81	42.68	42.00	39.83	39.92	39.74	51.59	51.22	50.10
23000	44.94	44.72	43.75	43.03	43.05	42.70	53.64	53.09	51.61
23500	43.09	43.02	42.29	45.50	45.46	45.02	56.74	56.72	55.79
24000	41.74	41.74	41.21	46.77	46.72	46.16	55.50	55.53	55.13
24500	41.05	41.05	40.66	46.89	46.84	46.33	56.33	56.33	56.00
25000	40.74	40.72	40.22	45.72	45.66	45.13	60.22	60.24	60.08
25500	40.80	40.74	40.22	45.87	45.78	45.26	51.49	51.44	51.20
26000	40.76	40.74	40.21	50.10	50.01	49.42	48.67	48.61	48.20
26500	40.92	40.88	40.28	51.63	51.51	50.87	53.78	53.70	53.23
27000	41.34	41.30	40.59	53.33	53.20	52.43	58.67	58.71	58.33
27500	41.18	41.06	40.20	49.49	49.30	48.54	52.08	51.92	51.28
28000	41.67	41.58	40.75	49.35	49.13	48.23	49.51	49.30	48.54
28500	42.43	42.37	41.62	50.90	50.64	49.72	49.91	49.67	48.92
29000	42.96	42.93	42.26	56.56	56.28	55.28	48.34	48.10	47.29
29500	42.80	42.71	42.01	55.17	54.84	53.83	48.32	47.96	47.06
30000	42.58	42.57	41.91	54.70	54.42	53.18	54.63	54.26	53.06
30500	41.92	41.89	41.36	54.42	54.04	52.75	60.84	61.39	63.42
31000	41.44	41.39	40.91	50.03	49.65	48.47	51.69	51.75	51.77
31500	39.92	39.83	39.29	49.32	48.93	47.77	46.97	46.83	46.53
32000	41.00	40.96	40.36	51.09	50.75	49.63	48.10	47.83	47.21
32500	40.31	40.19	39.62	51.68	51.34	50.37	48.52	48.08	47.18
33000	38.71	38.50	37.86	53.73	53.44	52.74	46.26	45.80	44.94
33500	39.73	39.52	38.93	46.41	46.01	45.24	42.97	42.48	41.67
34000	40.42	40.29	39.67	40.77	40.49	39.69	37.49	37.13	36.33
34500	40.96	40.77	40.17	40.14	39.71	38.96	36.10	35.60	34.85
35000	41.18	41.03	40.37	40.37	40.08	39.32	34.72	34.32	33.53
35500	41.51	41.25	40.53	38.93	38.60	37.87	33.20	32.76	32.01
36000	41.73	41.41	40.64	37.45	37.11	36.41	31.79	31.34	30.64
36500	41.24	40.93	40.08	38.38	38.13	37.44	29.60	29.24	28.54
37000	41.24	41.04	40.13	35.98	35.81	35.10	28.52	28.26	27.51
37500	43.03	42.75	41.86	33.74	33.49	32.80	30.21	29.89	29.19
38000	43.77	43.53	42.54	32.81	32.65	31.94	32.69	32.45	31.76
38500	42.66	42.31	41.38	30.67	30.45	29.83	33.19	32.90	32.31
39000	41.44	40.83	40.00	29.65	29.28	28.76	31.29	30.85	30.36
39500	40.01	39.60	38.66	32.42	32.19	31.61	28.10	27.80	27.23
40000	39.33	38.93	38.07	35.19	35.00	34.43	28.06	27.78	27.18
40500	37.98	37.56	36.92	37.30	37.03	36.57	31.13	30.77	30.33
41000	35.04	34.68	34.13	36.05	35.77	35.32	31.33	30.98	30.59
41500	33.81	33.62	33.11	34.18	34.01	33.59	29.73	29.49	29.14
42000	35.75	35.25	34.77	34.17	33.90	33.71	28.01	27.54	27.19
42500	35.63	35.38	34.95	32.31	32.22	32.11	26.51	26.14	25.71
43000	35.60	35.26	34.92	31.27	31.13	31.04	25.40	24.85	24.43
43500	37.65			31.00			25.13		

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	RF-IF (I) ISOLATION (dB) @LO (dBm)			RF-IF (Q) ISOLATION (dB) @LO (dBm)		
		+17	+18	+19	+17	+18	+19
18000	18200	22.01	21.52	21.16	42.02	40.55	38.80
18500	18700	19.77	19.55	19.40	36.33	36.89	36.37
19000	19200	18.01	17.94	17.92	33.26	34.41	34.98
19500	19700	19.51	19.57	19.62	31.73	32.07	32.24
20000	20200	21.69	21.76	21.81	33.11	33.09	32.98
20500	20700	23.13	23.21	23.24	33.25	33.15	33.02
21000	21200	23.94	24.03	24.08	33.08	33.06	33.02
21500	21700	23.58	23.68	23.71	33.43	33.53	33.55
22000	22200	20.58	20.65	20.66	32.31	32.40	32.46
22500	22700	20.33	20.43	20.45	29.72	29.88	29.95
23000	23200	23.78	23.88	23.91	27.24	27.36	27.47
23500	23700	25.93	26.09	26.16	28.62	28.76	28.85
24000	24200	27.30	27.42	27.45	31.28	31.43	31.50
24500	24700	28.40	28.52	28.53	32.73	32.92	33.00
25000	25200	28.84	28.96	28.96	34.30	34.48	34.53
25500	25700	30.40	30.52	30.51	30.96	31.09	31.12
26000	26200	32.96	33.12	33.15	28.09	28.21	28.23
26500	26700	36.21	36.40	36.47	31.90	32.04	32.08
27000	27200	40.29	40.46	40.49	40.18	40.33	40.38
27500	27700	32.13	32.27	32.31	35.91	36.04	36.05
28000	28200	28.73	28.92	28.97	36.43	36.60	36.63
28500	28700	26.23	26.40	26.45	38.58	38.68	38.74
29000	29200	26.29	26.44	26.47	33.60	33.68	33.70
29500	29700	24.59	24.75	24.78	28.55	28.66	28.69
30000	30200	23.63	23.79	23.83	27.83	27.95	27.98
30500	30700	21.55	21.74	21.78	27.45	27.59	27.63
31000	31200	17.83	18.03	18.08	23.70	23.84	23.87
31500	31700	17.31	17.52	17.60	18.48	18.63	18.68
32000	32200	21.13	21.37	21.44	19.47	19.66	19.73
32500	32700	21.67	21.89	21.96	21.14	21.31	21.37
33000	33200	20.71	20.91	20.96	22.06	22.21	22.23
33500	33700	24.29	24.42	24.43	25.41	25.49	25.50
34000	34200	25.03	25.16	25.16	26.41	26.48	26.45
34500	34700	25.50	25.61	25.62	26.46	26.51	26.48
35000	35200	25.86	25.94	25.88	27.55	27.54	27.48
35500	35700	26.84	26.88	26.81	29.24	29.15	29.03
36000	36200	27.70	27.69	27.62	31.04	30.88	30.75
36500	36700	29.18	29.15	29.06	34.36	34.15	33.97
37000	37200	33.09	33.06	33.01	36.26	35.97	35.76
37500	37700	37.46	37.52	37.51	37.48	37.20	36.96
38000	38200	38.81	38.95	39.02	39.21	38.95	38.70
38500	38700	35.71	35.94	35.96	38.60	38.31	38.17
39000	39200	32.88	33.14	33.24	39.02	38.60	38.41
39500	39700	33.51	33.79	33.96	36.05	35.74	35.58
40000	40200	35.18	35.45	35.52	35.27	35.11	35.03
40500	40700	33.15	33.44	33.60	37.99	37.92	37.91
41000	41200	29.20	29.54	29.68	38.32	38.36	38.31
41500	41700	26.83	27.21	27.37	37.23	37.30	37.19
42000	42200	26.21	26.69	26.79	43.09	43.64	43.74
42500	42700	25.26	25.74	25.86	36.24	36.69	37.09
43000	43200	25.00	25.64	25.85	31.62	31.89	32.13
43300	43500	25.51	26.13	26.33	30.51	30.62	30.74

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	AMP UNBALANCE VS. RF FREQUENCY @IF = 200 MHz			PHASE UNBALANCE VS. RF FREQUENCY @IF = 200 MHz		
		@LO (dBm)			@LO (dBm)		
		+17	+18	+19	+17	+18	+19
18000	18200	0.08	0.13	0.12	1.78	2.40	3.56
18500	18700	-0.10	-0.08	-0.04	2.33	2.08	2.36
19000	19200	0.01	-0.05	-0.09	3.72	4.04	4.29
19500	19700	-0.20	-0.19	-0.20	5.04	4.76	4.79
20000	20200	-0.31	-0.30	-0.30	5.00	4.33	4.37
20500	20700	-0.20	-0.18	-0.18	5.10	4.17	3.92
21000	21200	-0.32	-0.21	-0.12	2.27	1.23	0.85
21500	21700	-0.17	-0.03	0.06	4.13	3.14	2.66
22000	22200	-0.26	-0.08	0.02	3.62	2.85	2.56
22500	22700	-0.16	0.02	0.10	4.26	3.50	3.21
23000	23200	0.07	0.24	0.33	3.46	3.30	3.45
23500	23700	-0.01	0.21	0.34	2.62	2.06	2.20
24000	24200	0.20	0.38	0.47	4.30	3.37	2.86
24500	24700	0.24	0.44	0.53	1.15	1.34	1.67
25000	25200	0.14	0.37	0.50	0.63	0.69	1.01
25500	25700	0.22	0.42	0.54	0.51	0.52	0.74
26000	26200	-0.01	0.28	0.46	1.92	1.51	1.00
26500	26700	-0.10	0.21	0.41	0.34	0.38	0.41
27000	27200	-0.08	0.15	0.34	0.40	0.28	0.32
27500	27700	-0.16	0.08	0.28	0.33	0.38	0.61
28000	28200	-0.01	0.17	0.30	0.27	0.34	0.24
28500	28700	0.14	0.27	0.37	1.66	0.58	0.29
29000	29200	0.16	0.27	0.37	2.51	0.93	0.23
29500	29700	0.20	0.29	0.38	3.21	1.16	0.18
30000	30200	0.23	0.31	0.39	4.83	2.89	1.55
30500	30700	0.15	0.26	0.35	6.18	4.53	3.36
31000	31200	0.03	0.12	0.21	5.95	4.98	4.21
31500	31700	-0.25	-0.18	-0.10	3.71	3.37	3.10
32000	32200	0.13	0.14	0.19	0.68	0.28	0.17
32500	32700	0.24	0.23	0.25	1.30	0.54	0.22
33000	33200	0.21	0.20	0.20	1.52	0.86	0.63
33500	33700	0.24	0.24	0.24	1.11	0.74	0.62
34000	34200	0.34	0.30	0.28	0.29	0.52	0.60
34500	34700	0.51	0.46	0.41	0.64	0.31	0.24
35000	35200	0.44	0.38	0.35	0.64	0.42	0.31
35500	35700	0.38	0.31	0.27	0.20	0.23	0.21
36000	36200	0.36	0.27	0.21	0.25	0.23	0.24
36500	36700	0.35	0.25	0.16	0.33	0.28	0.51
37000	37200	0.66	0.56	0.43	0.33	0.73	1.29
37500	37700	0.55	0.47	0.37	1.70	2.60	3.08
38000	38200	0.32	0.26	0.19	2.58	3.95	4.65
38500	38700	0.20	0.17	0.13	2.86	4.92	5.94
39000	39200	0.11	0.08	0.07	3.29	5.21	6.08
39500	39700	-0.07	-0.11	-0.15	4.92	6.51	7.15
40000	40200	-0.19	-0.27	-0.37	5.89	7.15	7.68
40500	40700	-0.29	-0.40	-0.46	5.79	7.24	7.94
41000	41200	-0.54	-0.71	-0.77	6.61	8.57	9.37
41500	41700	-0.96	-1.21	-1.34	7.39	10.06	11.06
42000	42200	-0.89	-1.31	-1.57	6.04	8.62	9.22
42500	42700	-0.78	-1.18	-1.47	3.53	5.74	6.51
43000	43200	-0.97	-1.45	-1.84	2.64	5.49	6.76
43300	43500	-1.08	-1.54	-1.97	2.39	4.77	6.03

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	AMP UNBALANCE VS. RF FREQUENCY @IF = 2000 MHz			PHASE UNBALANCE VS. RF FREQUENCY @IF = 2000 MHz		
		@LO (dBm)			@LO (dBm)		
		+17	+18	+19	+17	+18	+19
18000	20000	0.34	0.34	0.33	1.56	1.32	1.09
18500	20500	0.41	0.42	0.41	0.99	0.68	0.46
19000	21000	0.27	0.30	0.34	0.37	0.65	1.14
19500	21500	0.36	0.41	0.45	0.48	0.34	0.54
20000	22000	0.34	0.38	0.49	1.77	1.79	1.85
20500	22500	0.27	0.35	0.45	0.34	0.28	0.28
21000	23000	0.26	0.35	0.47	0.68	0.68	0.63
21500	23500	0.20	0.32	0.46	0.42	0.46	0.49
22000	24000	0.57	0.65	0.74	0.36	0.30	0.58
22500	24500	0.54	0.64	0.76	1.32	1.36	1.46
23000	25000	0.58	0.69	0.82	0.57	0.62	0.68
23500	25500	0.78	0.87	0.99	2.47	2.40	2.15
24000	26000	0.66	0.79	0.95	3.10	2.93	2.69
24500	26500	0.69	0.81	0.96	3.22	3.18	3.05
25000	27000	0.54	0.66	0.85	5.88	5.52	4.98
25500	27500	0.36	0.50	0.72	4.80	4.51	4.29
26000	28000	0.41	0.55	0.73	4.64	4.38	4.32
26500	28500	0.31	0.43	0.63	4.39	3.97	3.83
27000	29000	0.44	0.51	0.65	4.36	3.79	3.29
27500	29500	0.58	0.62	0.71	4.66	3.85	2.95
28000	30000	0.58	0.62	0.70	5.81	4.93	3.87
28500	30500	0.63	0.67	0.75	6.86	6.00	4.89
29000	31000	0.62	0.67	0.76	7.92	7.19	6.18
29500	31500	0.49	0.54	0.65	7.62	7.12	6.54
30000	32000	0.38	0.42	0.50	6.01	5.72	5.46
30500	32500	0.41	0.43	0.46	5.19	4.97	4.86
31000	33000	0.55	0.55	0.56	4.65	4.41	4.17
31500	33500	0.36	0.37	0.37	3.43	3.03	2.72
32000	34000	0.72	0.73	0.72	1.29	1.09	0.96
32500	34500	0.85	0.85	0.83	1.76	1.57	1.41
33000	35000	0.79	0.79	0.75	1.02	0.96	0.95
33500	35500	0.91	0.88	0.80	0.51	0.56	0.58
34000	36000	0.89	0.88	0.80	1.34	1.37	1.57
34500	36500	0.98	0.96	0.89	0.68	0.77	1.19
35000	37000	0.96	0.94	0.85	0.57	0.73	1.25
35500	37500	0.99	0.98	0.88	0.54	0.57	1.06
36000	38000	1.16	1.15	1.05	0.48	0.81	1.98
36500	38500	1.23	1.22	1.12	3.21	3.64	5.06
37000	39000	1.14	1.13	1.09	3.10	3.73	5.29
37500	39500	1.05	1.03	0.99	3.66	4.22	5.41
38000	40000	0.87	0.84	0.70	5.46	5.92	6.78
38500	40500	0.72	0.68	0.56	6.38	6.88	8.06
39000	41000	0.53	0.45	0.31	7.71	8.40	9.69
39500	41500	0.18	0.10	-0.08	9.49	10.34	12.21
40000	42000	-0.03	-0.13	-0.40	11.76	12.37	13.66
40500	42500	-0.05	-0.15	-0.44	9.81	10.12	11.09
41000	43000	-0.39	-0.48	-0.79	9.19	9.60	10.93
41500	43500	-0.70	-0.81	-1.20	8.00	8.44	9.89

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	AMP UNBALANCE VS. RF FREQUENCY @IF = 3000 MHz @LO (dBm)			PHASE UNBALANCE VS. RF FREQUENCY @IF = 3000 MHz @LO (dBm)		
		+17	+18	+19	+17	+18	+19
18000	21000	0.43	0.41	0.44	2.77	2.98	3.41
18500	21500	0.41	0.41	0.48	3.26	3.47	4.11
19000	22000	0.40	0.41	0.46	3.06	3.23	3.58
19500	22500	0.42	0.46	0.56	5.19	5.14	4.97
20000	23000	0.28	0.33	0.43	2.84	2.88	2.97
20500	23500	0.21	0.27	0.40	4.20	4.31	4.18
21000	24000	0.32	0.36	0.47	2.19	2.56	3.18
21500	24500	0.61	0.64	0.72	1.65	1.82	2.21
22000	25000	0.68	0.72	0.81	3.82	3.83	3.89
22500	25500	0.68	0.73	0.85	3.02	3.09	3.30
23000	26000	0.78	0.83	0.94	5.06	4.95	4.73
23500	26500	0.67	0.74	0.89	5.64	5.48	5.17
24000	27000	0.69	0.75	0.89	5.75	5.66	5.58
24500	27500	0.60	0.67	0.84	8.05	7.66	7.13
25000	28000	0.48	0.58	0.78	6.96	6.73	6.68
25500	28500	0.51	0.57	0.75	6.57	6.30	6.30
26000	29000	0.36	0.42	0.59	6.96	6.48	6.20
26500	29500	0.49	0.52	0.62	6.37	5.77	5.40
27000	30000	0.67	0.66	0.71	7.32	6.57	5.82
27500	30500	0.70	0.70	0.74	8.34	7.47	6.55
28000	31000	0.75	0.76	0.82	8.83	7.97	6.99
28500	31500	0.64	0.68	0.77	9.48	8.77	7.93
29000	32000	0.47	0.50	0.59	9.11	8.74	8.31
29500	32500	0.50	0.50	0.56	7.45	7.26	7.15
30000	33000	0.53	0.50	0.51	5.89	5.72	5.68
30500	33500	0.69	0.66	0.64	5.12	4.86	4.66
31000	34000	0.65	0.62	0.61	4.84	4.64	4.46
31500	34500	0.36	0.32	0.30	3.44	3.27	3.19
32000	35000	0.64	0.59	0.56	1.62	1.39	1.23
32500	35500	0.75	0.69	0.64	2.16	2.12	2.12
33000	36000	0.89	0.82	0.75	1.79	1.81	1.94
33500	36500	0.86	0.80	0.75	1.74	1.78	1.91
34000	37000	0.83	0.77	0.72	1.61	1.83	2.21
34500	37500	0.88	0.81	0.75	1.64	1.95	2.42
35000	38000	0.96	0.88	0.81	1.15	1.52	2.10
35500	38500	1.22	1.14	1.05	1.32	1.94	2.73
36000	39000	1.40	1.34	1.28	3.72	4.33	4.95
36500	39500	1.11	1.07	1.03	5.40	5.94	6.56
37000	40000	0.89	0.82	0.73	6.83	7.15	7.49
37500	40500	0.79	0.70	0.62	7.29	7.75	8.33
38000	41000	0.67	0.56	0.48	8.76	9.45	10.19
38500	41500	0.46	0.33	0.24	11.29	12.15	13.14
39000	42000	0.25	0.10	-0.12	14.23	14.89	15.47
39500	42500	0.21	0.05	-0.21	12.94	13.16	13.39
40000	43000	-0.05	-0.24	-0.56	12.42	12.82	13.24
40500	43500	-0.29	-0.53	-0.89	12.91	13.25	13.68

Typical Performance Data

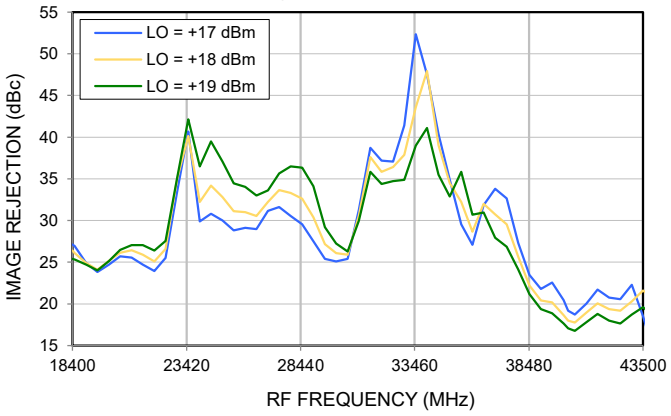
RF (IN) (MHz)	GAIN COMPRESSION (I)			GAIN COMPRESSION (Q)			GAIN COMPRESSION (I)			GAIN COMPRESSION (Q)			GAIN COMPRESSION (I)			GAIN COMPRESSION (Q)		
	IF = LO-RF = 200MHz						IF = LO-RF = 2000MHz						IF = LO-RF = 3000MHz					
	@LO (dBm)			@LO (dBm)			@LO (dBm)			@LO (dBm)			@LO (dBm)			@LO (dBm)		
	+17	+18	+19	+17	+18	+19	+17	+18	+19	+17	+18	+19	+17	+18	+19	+17	+18	+19
18000	0.38	0.34	0.27	0.44	0.41	0.34	0.39	0.41	0.40	0.41	0.42	0.44	0.30	0.32	0.32	0.38	0.38	0.38
18500	0.38	0.35	0.30	0.40	0.37	0.31	0.25	0.28	0.28	0.28	0.30	0.32	0.16	0.18	0.18	0.27	0.27	0.26
19000	0.29	0.28	0.25	0.30	0.29	0.26	0.16	0.20	0.20	0.20	0.21	0.21	0.13	0.16	0.16	0.31	0.30	0.29
19500	0.22	0.23	0.22	0.23	0.24	0.24	0.10	0.13	0.13	0.19	0.20	0.20	0.14	0.16	0.17	0.20	0.20	0.20
20000	0.17	0.18	0.18	0.19	0.20	0.21	0.09	0.12	0.12	0.19	0.18	0.18	0.11	0.14	0.14	0.14	0.15	0.15
20500	0.12	0.14	0.14	0.16	0.18	0.18	0.07	0.09	0.09	0.13	0.14	0.13	0.09	0.11	0.11	0.09	0.08	0.08
21000	0.15	0.16	0.17	0.19	0.20	0.19	0.15	0.17	0.16	0.11	0.12	0.12	0.12	0.13	0.14	0.09	0.09	0.09
21500	0.14	0.15	0.16	0.19	0.20	0.19	0.13	0.15	0.15	0.06	0.07	0.07	0.12	0.14	0.14	0.11	0.11	0.11
22000	0.13	0.13	0.12	0.15	0.16	0.14	0.09	0.11	0.10	0.05	0.05	0.05	0.07	0.09	0.09	0.09	0.10	0.10
22500	0.21	0.21	0.20	0.15	0.18	0.18	0.13	0.15	0.15	0.12	0.12	0.12	0.08	0.11	0.12	0.17	0.18	0.18
23000	0.23	0.23	0.22	0.13	0.15	0.15	0.09	0.11	0.12	0.14	0.15	0.16	0.12	0.15	0.16	0.19	0.20	0.20
23500	0.22	0.23	0.21	0.20	0.20	0.19	0.12	0.15	0.16	0.19	0.19	0.19	0.16	0.19	0.21	0.22	0.23	0.23
24000	0.19	0.20	0.20	0.22	0.23	0.21	0.15	0.18	0.19	0.21	0.22	0.22	0.17	0.20	0.22	0.24	0.24	0.24
24500	0.21	0.22	0.23	0.22	0.23	0.21	0.17	0.20	0.21	0.22	0.23	0.22	0.19	0.21	0.23	0.25	0.25	0.24
25000	0.20	0.22	0.22	0.25	0.26	0.23	0.18	0.21	0.22	0.22	0.23	0.22	0.21	0.23	0.24	0.25	0.25	0.24
25500	0.22	0.23	0.23	0.28	0.27	0.25	0.18	0.21	0.22	0.22	0.22	0.21	0.25	0.26	0.27	0.23	0.24	0.24
26000	0.27	0.28	0.28	0.31	0.31	0.27	0.25	0.27	0.28	0.24	0.25	0.24	0.30	0.30	0.30	0.28	0.29	0.29
26500	0.29	0.29	0.29	0.27	0.27	0.25	0.26	0.28	0.29	0.27	0.27	0.27	0.29	0.29	0.29	0.31	0.31	0.30
27000	0.31	0.31	0.31	0.27	0.27	0.26	0.24	0.27	0.28	0.28	0.29	0.29	0.32	0.31	0.31	0.34	0.31	0.32
27500	0.25	0.26	0.27	0.26	0.26	0.24	0.19	0.21	0.22	0.23	0.23	0.24	0.32	0.30	0.30	0.35	0.31	0.30
28000	0.32	0.34	0.35	0.35	0.34	0.33	0.31	0.31	0.32	0.35	0.33	0.34	0.40	0.40	0.41	0.49	0.45	0.43
28500	0.21	0.23	0.24	0.24	0.25	0.23	0.26	0.24	0.25	0.31	0.27	0.28	0.30	0.30	0.31	0.41	0.38	0.37
29000	0.21	0.23	0.24	0.24	0.25	0.24	0.27	0.27	0.27	0.34	0.31	0.31	0.30	0.30	0.30	0.36	0.36	0.35
29500	0.30	0.30	0.32	0.34	0.34	0.34	0.33	0.34	0.35	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.39	0.40
30000	0.33	0.32	0.34	0.36	0.35	0.37	0.36	0.36	0.36	0.37	0.37	0.37	0.36	0.38	0.38	0.40	0.40	0.40
30500	0.33	0.31	0.32	0.34	0.34	0.35	0.34	0.35	0.35	0.35	0.34	0.35	0.32	0.34	0.34	0.39	0.39	0.39
31000	0.38	0.37	0.37	0.36	0.36	0.36	0.36	0.38	0.38	0.38	0.37	0.38	0.37	0.39	0.41	0.40	0.41	0.42
31500	0.34	0.34	0.34	0.33	0.33	0.33	0.33	0.35	0.36	0.35	0.35	0.35	0.34	0.37	0.39	0.37	0.38	0.39
32000	0.37	0.37	0.38	0.36	0.36	0.36	0.40	0.42	0.43	0.39	0.39	0.40	0.38	0.40	0.42	0.42	0.43	0.44
32500	0.36	0.36	0.36	0.34	0.34	0.34	0.39	0.40	0.42	0.34	0.35	0.37	0.35	0.38	0.38	0.38	0.40	0.40
33000	0.35	0.35	0.35	0.34	0.34	0.34	0.36	0.38	0.38	0.34	0.34	0.36	0.32	0.34	0.34	0.33	0.34	0.34
33500	0.35	0.35	0.35	0.33	0.34	0.34	0.36	0.37	0.36	0.33	0.34	0.34	0.28	0.29	0.30	0.29	0.29	0.30
34000	0.33	0.32	0.33	0.29	0.30	0.31	0.30	0.31	0.30	0.27	0.28	0.28	0.23	0.24	0.25	0.19	0.20	0.21
34500	0.35	0.35	0.35	0.30	0.31	0.32	0.27	0.28	0.28	0.24	0.23	0.24	0.25	0.27	0.28	0.19	0.20	0.21
35000	0.29	0.30	0.29	0.27	0.28	0.28	0.25	0.25	0.25	0.18	0.20	0.20	0.23	0.25	0.26	0.21	0.22	0.23
35500	0.28	0.29	0.28	0.21	0.23	0.23	0.26	0.26	0.27	0.21	0.22	0.23	0.25	0.26	0.27	0.22	0.23	0.25
36000	0.28	0.29	0.29	0.21	0.22	0.23	0.25	0.26	0.26	0.21	0.22	0.23	0.26	0.27	0.28	0.22	0.24	0.25
36500	0.31	0.31	0.31	0.25	0.27	0.27	0.26	0.26	0.26	0.25	0.24	0.24	0.30	0.30	0.31	0.24	0.25	0.26
37000	0.33	0.33	0.33	0.32	0.33	0.33	0.31	0.31	0.31	0.29	0.30	0.30	0.35	0.35	0.35	0.29	0.28	0.29
37500	0.32	0.32	0.32	0.31	0.32	0.31	0.30	0.30	0.31	0.28	0.28	0.28	0.33	0.34	0.35	0.33	0.27	0.27
38000	0.37	0.36	0.36	0.36	0.35	0.34	0.34	0.34	0.34	0.32	0.30	0.31	0.34	0.35	0.35	0.40	0.31	0.30
38500	0.27	0.26	0.26	0.33	0.29	0.27	0.24	0.25	0.26	0.29	0.23	0.22	0.24	0.26	0.25	0.26	0.22	0.22
39000	0.29	0.29	0.29	0.37	0.36	0.33	0.27	0.28	0.28	0.39	0.27	0.26	0.29	0.31	0.30	0.40	0.29	0.27
39500	0.39	0.39	0.39	0.47	0.45	0.43	0.36	0.38	0.36	0.46	0.37	0.36	0.41	0.41	0.42	1.00	0.69	0.48
40000	0.42	0.42	0.42	0.56	0.49	0.47	0.38	0.40	0.39	0.63	0.46	0.42	0.42	0.44	0.46	0.91	0.93	0.63
40500	0.36	0.37	0.37	0.58	0.46	0.43	0.36	0.35	0.36	1.11	0.73	0.48	0.36	0.42	0.44	0.40	0.99	0.66
41000	0.36	0.37	0.37	0.51	0.42	0.40	0.35	0.37	0.37	0.93	0.87	0.54						
41500	0.43	0.44	0.43	0.53	0.47	0.46	0.41	0.45	0.46	0.56	1.02	0.66						
42000	0.35	0.36	0.36	0.65	0.44	0.39												
42500	0.40	0.39	0.40	0.94	0.65	0.46												
43000	0.39	0.38	0.38	0.80	0.66	0.44												
43300	0.39	0.38	0.37	0.60	0.71	0.45												
43500	0.39	0.38	0.37	-0.01	0.79	0.48												

Typical Performance Data

RF (IN) (MHz)	Input IP3 (I)			Input IP3 (Q)			Input IP3 (I)			Input IP3 (Q)			Input IP3 (I)			Input IP3 (Q)		
	IF = LO-RF = 200MHz						IF = LO-RF = 2000MHz						IF = LO-RF = 3000MHz					
	@LO (dBm)			@LO (dBm)			@LO (dBm)			@LO (dBm)			@LO (dBm)			@LO (dBm)		
	+17	+18	+19	+17	+18	+19	+17	+18	+19	+17	+18	+19	+17	+18	+19	+17	+18	+19
18000	24.91	25.29	26.31	24.74	25.67	27.35	25.17	25.40	25.48	25.53	25.69	25.91	26.97	26.88	27.03	28.23	28.12	28.27
18500	23.78	24.48	25.39	24.29	24.85	25.68	27.66	27.43	27.30	27.82	27.69	27.74	28.88	29.06	29.06	30.93	30.95	31.28
19000	24.59	25.53	26.25	25.13	25.59	26.17	30.86	30.60	30.48	31.23	30.47	30.25	27.45	27.87	28.13	31.27	31.25	31.62
19500	26.65	27.38	27.77	26.66	26.97	27.35	30.81	30.70	30.67	32.58	32.81	32.86	29.00	28.81	28.90	31.54	31.59	31.78
20000	29.31	29.57	29.57	29.95	29.79	29.82	29.73	30.07	30.26	31.24	31.36	31.75	31.57	30.66	30.11	29.03	30.11	30.89
20500	30.86	30.42	30.22	31.82	31.37	31.32	29.02	28.93	29.08	32.02	32.18	32.46	32.26	33.30	34.36	28.54	29.17	29.94
21000	30.97	30.94	30.81	31.56	31.61	31.79	33.97	32.90	31.73	29.86	30.44	31.03	36.78	37.95	37.66	29.22	30.14	31.01
21500	30.82	31.09	31.27	31.02	31.29	31.93	32.66	33.96	36.08	30.80	31.22	31.87	33.44	35.03	36.95	30.21	31.25	32.56
22000	31.54	31.60	31.79	30.83	30.93	31.34	43.60	40.86	39.18	31.64	32.27	33.55	31.20	32.16	33.29	32.67	33.37	34.05
22500	34.16	32.46	31.88	31.52	31.57	31.97	34.22	35.43	37.18	32.01	32.62	33.46	29.71	30.62	31.64	33.46	34.23	34.88
23000	32.99	31.68	30.96	30.03	30.35	30.94	31.07	31.78	32.75	32.63	33.13	33.50	28.96	29.68	30.41	29.16	29.83	30.45
23500	31.10	31.31	31.56	31.01	31.21	31.78	31.21	31.82	32.62	30.09	30.85	31.54	29.21	29.75	30.34	29.56	29.90	30.04
24000	30.89	31.63	32.80	31.46	32.04	32.64	31.04	31.56	32.55	30.64	31.10	31.63	30.03	30.40	30.82	30.40	30.36	30.26
24500	29.09	29.90	31.28	28.23	28.76	29.51	29.81	30.22	31.01	29.71	29.89	30.17	29.66	29.90	29.95	29.36	29.17	28.74
25000	28.77	29.48	30.80	28.10	28.71	29.42	30.30	30.39	30.73	29.89	29.92	29.88	30.38	30.54	30.52	29.91	29.56	29.02
25500	28.08	28.71	29.82	26.71	27.29	28.01	29.75	29.78	29.66	28.56	28.47	28.18	28.65	28.46	28.20	28.64	28.19	27.56
26000	28.62	29.15	30.08	26.85	27.31	27.78	29.43	29.61	29.54	28.39	28.09	27.66	27.86	27.47	27.12	28.95	28.39	27.43
26500	28.96	29.19	29.80	26.98	27.35	27.60	28.08	28.22	28.25	29.00	28.30	27.52	27.76	27.27	26.85	29.36	28.59	27.54
27000	28.10	28.36	28.68	26.50	26.83	26.97	27.45	27.30	27.15	29.56	28.42	27.36	26.84	26.64	26.23	28.60	28.14	27.20
27500	28.01	28.42	28.71	27.56	27.73	27.63	27.90	27.51	27.19	30.26	28.84	27.73	26.35	26.53	26.28	28.13	28.11	27.44
28000	28.59	28.86	29.07	28.36	28.19	27.88	28.06	27.68	27.24	29.81	28.92	27.89	26.44	26.53	26.25	27.99	27.77	27.11
28500	28.59	28.69	28.70	28.47	28.13	27.60	27.59	27.49	26.94	28.68	28.47	27.68	26.76	26.76	26.32	28.18	27.84	27.16
29000	27.93	27.92	27.80	28.18	27.62	27.09	27.26	27.22	26.70	28.05	27.95	27.35	27.32	27.20	26.83	27.96	27.91	27.42
29500	27.58	27.46	27.20	28.57	27.80	27.13	28.20	28.21	27.57	28.80	28.52	27.77	28.10	28.11	27.75	28.27	28.20	27.75
30000	28.34	27.99	27.51	29.34	28.65	27.83	29.16	29.30	28.94	29.11	29.13	28.58	28.51	28.57	28.30	29.09	28.82	28.32
30500	30.59	30.08	29.24	30.97	30.65	29.80	30.38	30.50	30.26	30.51	30.45	30.11	29.47	29.62	29.47	31.11	30.75	30.24
31000	30.03	29.94	29.04	29.39	29.39	28.77	29.36	29.29	28.98	29.47	29.12	28.69	28.23	28.43	28.25	29.55	29.08	28.59
31500	30.01	30.12	29.60	29.58	29.65	29.10	29.34	29.27	28.97	29.58	29.16	28.79	28.18	28.35	28.17	29.08	28.78	28.29
32000	30.20	30.41	29.98	30.27	30.19	29.56	29.67	29.58	29.27	29.46	29.23	28.84	28.35	28.42	28.18	29.08	28.81	28.40
32500	29.64	29.78	29.41	29.50	29.23	28.72	29.50	29.32	28.90	28.68	28.53	28.11	27.88	27.74	27.52	28.41	28.15	27.95
33000	29.55	29.47	29.20	29.36	29.10	28.87	29.43	29.28	28.88	28.86	28.63	28.30	28.86	28.62	28.40	29.08	28.79	28.73
33500	28.73	28.59	28.30	28.44	28.34	28.19	28.61	28.35	28.06	28.08	27.72	27.65	29.22	29.05	28.77	29.06	28.99	28.74
34000	29.65	29.53	29.24	28.78	28.79	28.76	29.80	29.66	29.44	29.50	29.12	29.01	32.41	31.93	31.48	30.25	30.21	29.95
34500	29.97	29.87	29.54	28.73	28.80	28.72	30.98	31.24	31.30	30.71	30.46	30.12	31.95	31.52	31.06	30.68	30.30	29.92
35000	29.64	29.51	29.30	28.97	28.89	28.84	32.86	32.26	31.61	29.74	29.74	29.58	29.78	29.70	29.50	30.45	30.16	29.83
35500	31.29	31.08	30.89	29.76	29.36	29.31	30.47	30.15	29.79	28.97	28.91	28.85	28.35	28.94	28.88	29.11	29.39	29.50
36000	32.43	31.75	31.06	30.07	29.71	29.49	30.86	30.83	30.55	30.14	30.05	29.88	28.02	28.90	29.26	29.57	29.71	29.80
36500	31.27	31.01	30.44	30.05	29.95	29.72	29.60	30.73	30.78	30.32	30.65	30.77	27.64	28.70	29.37	29.97	30.10	30.01
37000	30.90	30.77	30.50	30.58	30.38	30.20	28.95	30.27	30.79	31.03	31.33	31.24	28.37	29.45	30.27	30.30	30.60	30.61
37500	30.64	30.57	30.38	30.12	30.20	30.01	28.64	29.69	30.36	30.95	31.24	31.03	28.40	29.50	30.23	30.69	30.65	30.17
38000	28.26	28.79	28.86	28.55	28.82	28.86	27.20	28.04	28.71	29.76	29.84	29.74	27.13	28.07	28.76	29.79	29.34	29.15
38500	26.07	27.48	27.99	28.42	28.77	28.88	26.66	27.61	28.31	29.68	29.63	29.15	26.75	27.68	28.31	29.28	29.10	28.99
39000	25.63	26.84	27.55	28.86	29.08	29.14	26.87	27.66	28.36	29.83	29.43	29.13	24.49	26.66	27.48	28.85	29.06	28.87
39500	24.98	26.05	26.83	28.50	28.75	28.75	26.13	26.93	27.54	28.96	28.69	28.58	20.46	23.86	25.57	27.23	28.09	28.07
40000	25.59	26.66	27.53	30.46	30.36	30.12	24.64	26.86	27.60	29.79	29.92	29.65	20.62	22.85	25.43	27.63	28.43	28.60
40500	26.16	27.16	28.01	31.46	30.95	30.40	21.42	25.35	27.13	28.89	29.94	29.99	21.76	22.76	25.58	27.97	28.43	28.63
41000	27.17	28.02	28.93	31.46	31.04	31.00	21.86	24.40	27.35	29.21	29.99	30.11						
41500	25.93	26.66	27.34	30.09	29.71	29.60	22.06	23.01	26.10	28.29	28.47	28.53						
42000	24.35	27.52	28.15	31.07	31.22	30.90												
42500	22.56	26.86	29.01	30.72	31.39	31.14												
43000	22.57	24.61	27.90	29.27	29.64	29.37												
43300	22.70	24.82	28.10	29.36	29.49	29.31												
43500	23.77	25.88	29.21	30.45	30.44	30.25												

Typical Performance Curves

IMAGE REJECTION (DOWNCONVERTER)
@ IF = 200 MHz



SSB REJECTION (UPCONVERTER)
@ IF = 200 MHz

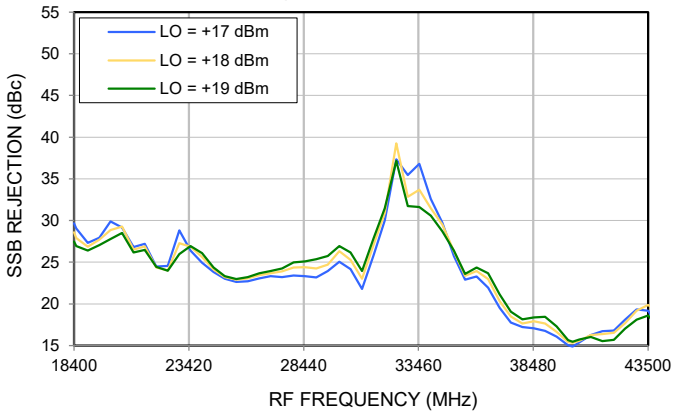
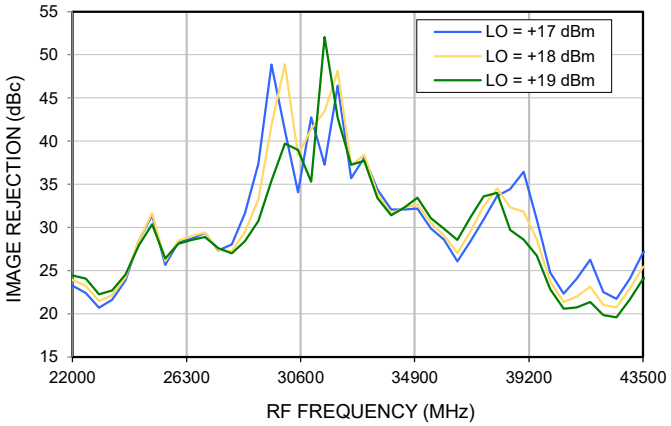


IMAGE REJECTION (DOWNCONVERTER)
@ IF = 2 GHz



SSB REJECTION (UPCONVERTER)
@ IF = 2 GHz

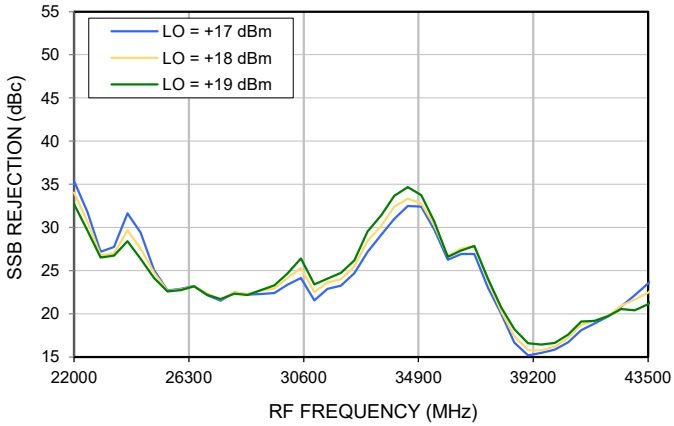
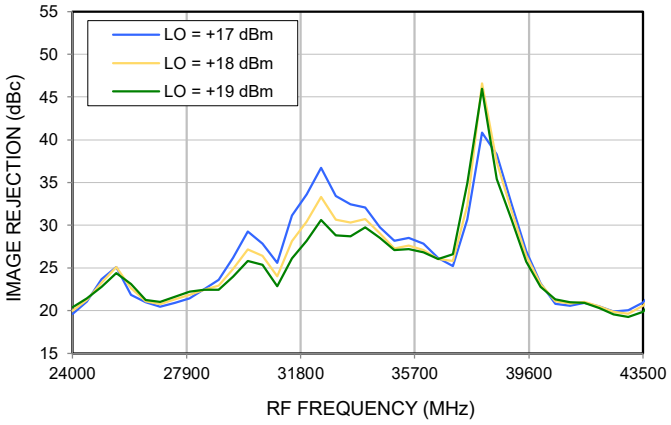
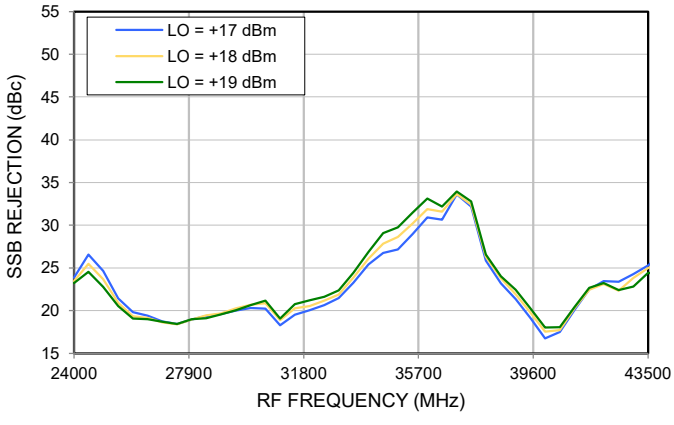


IMAGE REJECTION (DOWNCONVERTER)
@ IF = 3 GHz

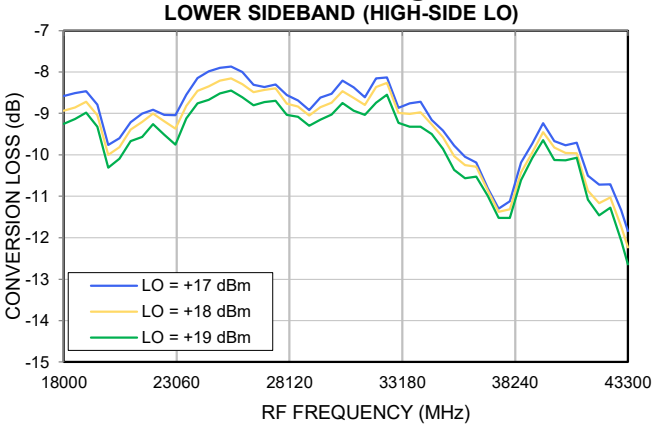


SSB REJECTION (UPCONVERTER)
@ IF = 3 GHz

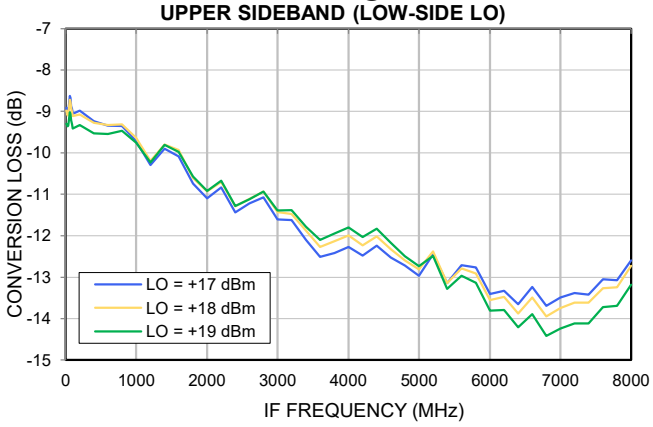


Typical Performance Curves

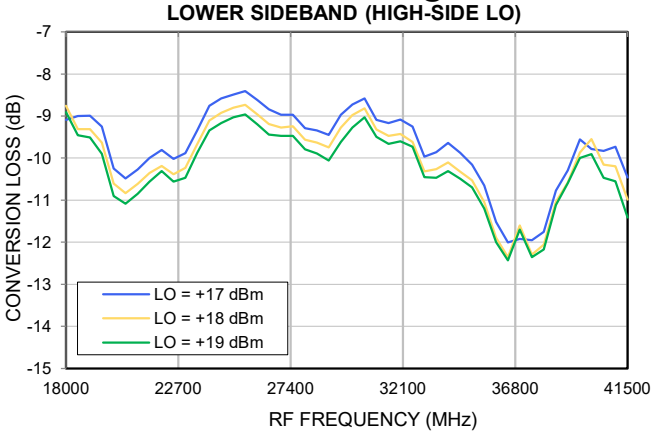
CONVERSION LOSS VS. RF @ IF = 200 MHz
LOWER SIDEBAND (HIGH-SIDE LO)



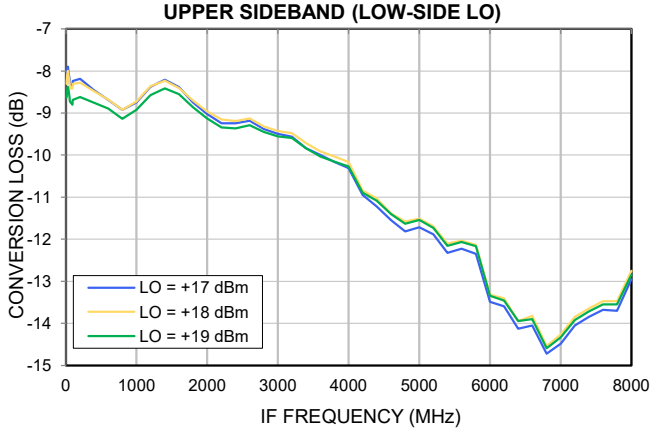
CONVERSION LOSS VS. IF @ FIXED LO = 18 GHz
UPPER SIDEBAND (LOW-SIDE LO)



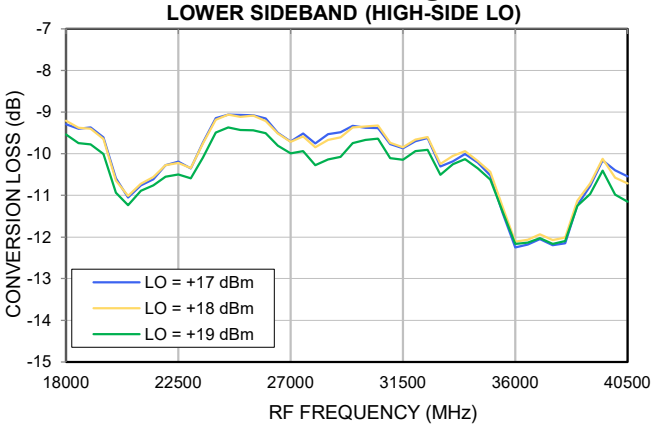
CONVERSION LOSS VS. RF @ IF = 2 GHz
LOWER SIDEBAND (HIGH-SIDE LO)



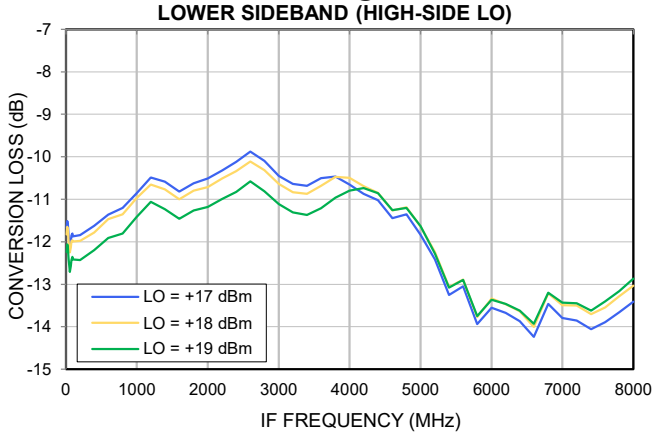
CONVERSION LOSS VS. IF @ FIXED LO = 30.75 GHz
UPPER SIDEBAND (LOW-SIDE LO)



CONVERSION LOSS VS. RF @ IF = 3 GHz
LOWER SIDEBAND (HIGH-SIDE LO)

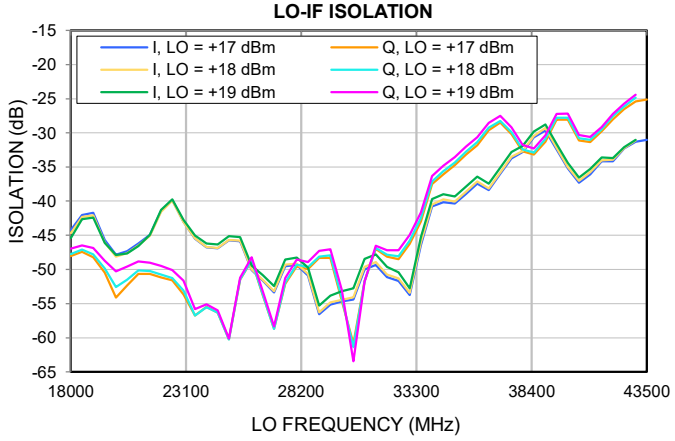


CONVERSION LOSS VS. IF @ FIXED LO = 43.5 GHz
LOWER SIDEBAND (HIGH-SIDE LO)

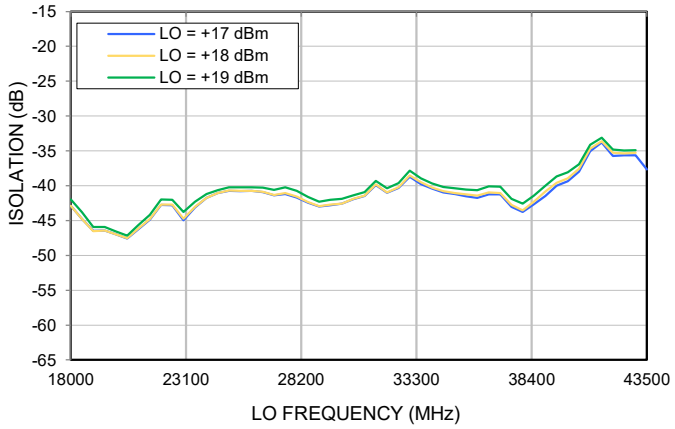


Typical Performance Curves

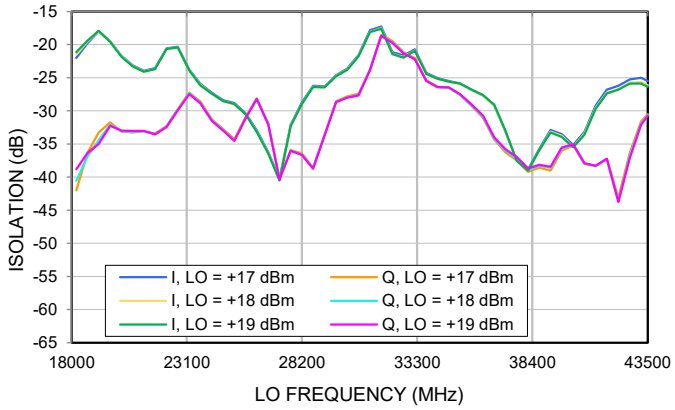
LO-IF ISOLATION



LO-RF ISOLATION

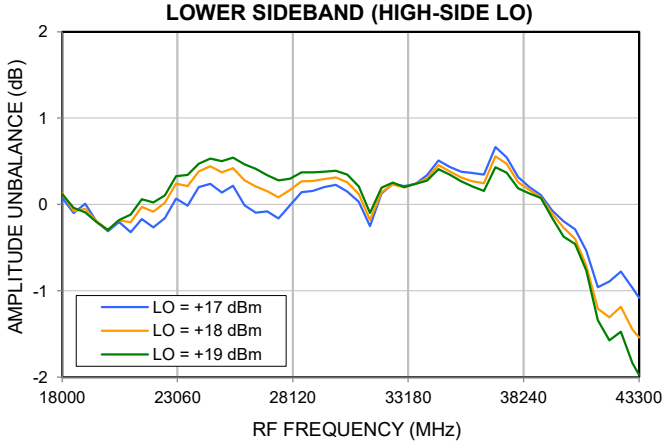


RF-IF ISOLATION

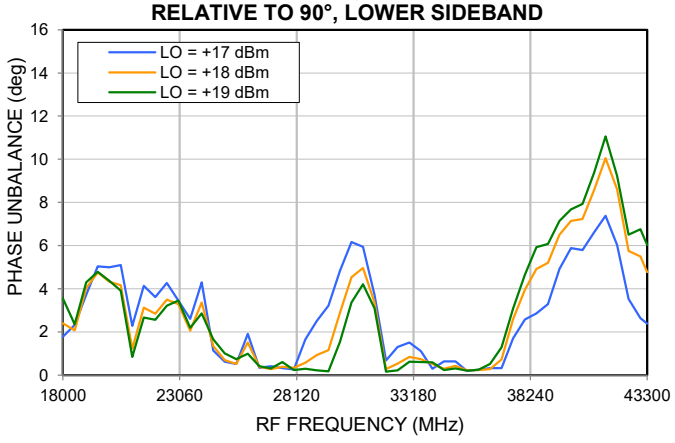


Typical Performance Curves

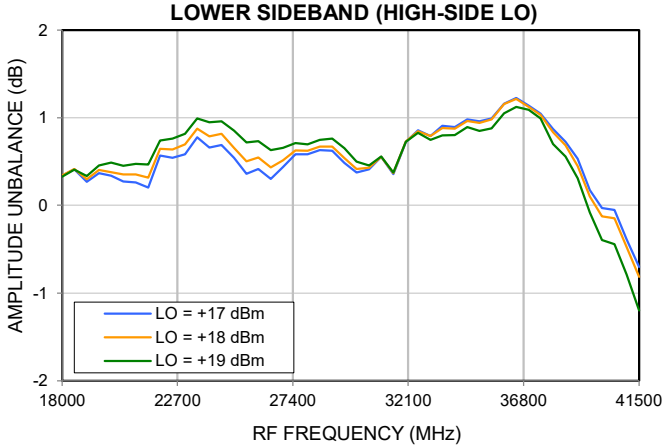
AMPLITUDE UNBALANCE @ FIXED IF = 200 MHz
LOWER SIDEBAND (HIGH-SIDE LO)



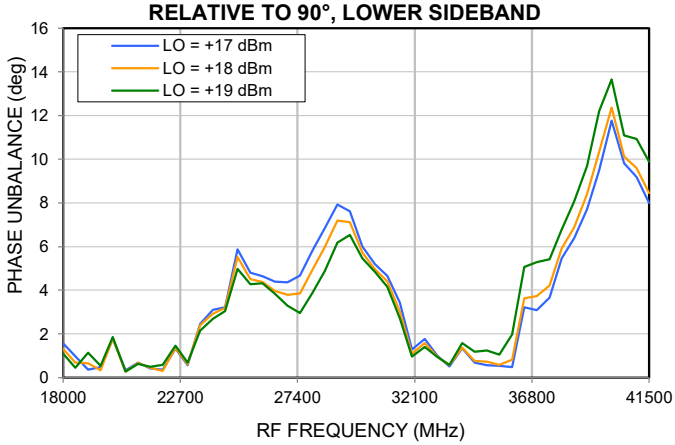
PHASE UNBALANCE @ FIXED IF = 200 MHz
RELATIVE TO 90°, LOWER SIDEBAND



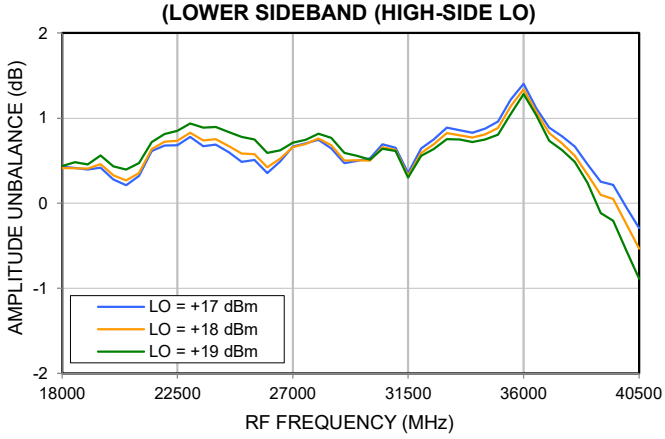
AMPLITUDE UNBALANCE @ FIXED IF = 2 GHz
LOWER SIDEBAND (HIGH-SIDE LO)



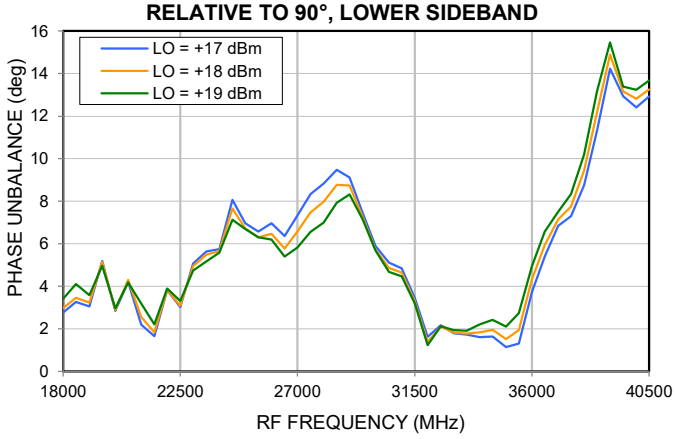
PHASE UNBALANCE @ FIXED IF = 2 GHz
RELATIVE TO 90°, LOWER SIDEBAND



AMPLITUDE UNBALANCE @ FIXED IF = 3 GHz
(LOWER SIDEBAND (HIGH-SIDE LO)

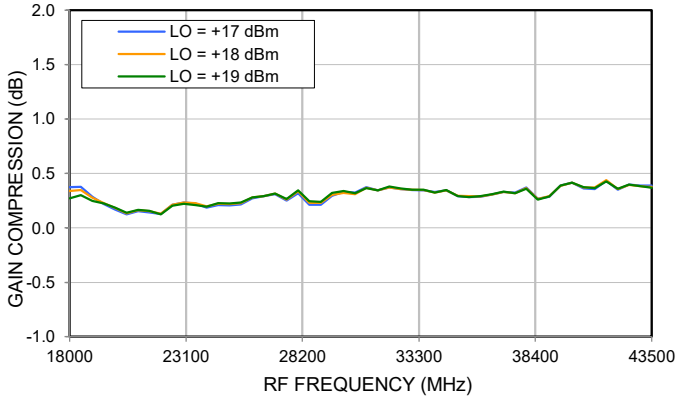


PHASE UNBALANCE @ FIXED IF = 3 GHz
RELATIVE TO 90°, LOWER SIDEBAND

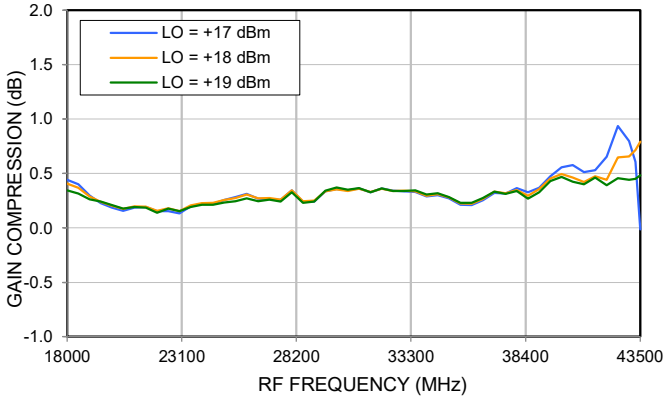


Typical Performance Curves

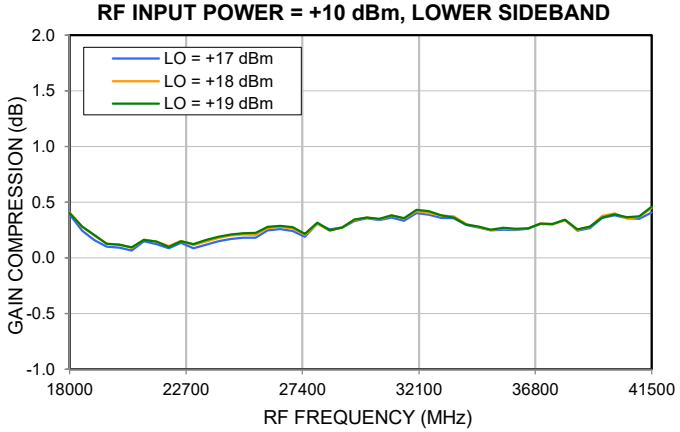
GAIN COMPRESSION (I) @ FIXED IF = 200 MHz
RF INPUT POWER = +10 dBm, LOWER SIDEBAND



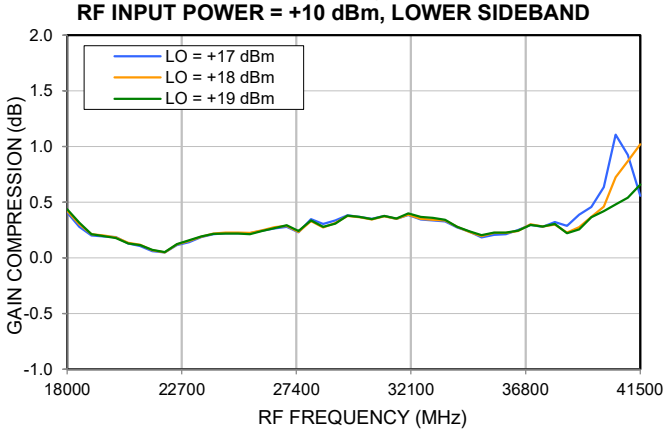
GAIN COMPRESSION (Q) @ FIXED IF = 200 MHz
RF INPUT POWER = +10 dBm, LOWER SIDEBAND



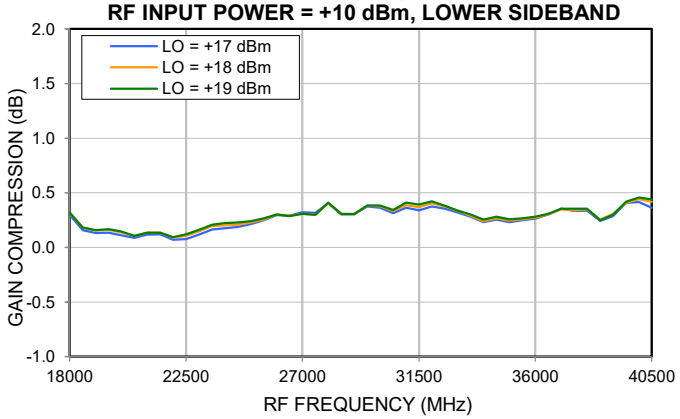
GAIN COMPRESSION (I) @ FIXED IF = 2 GHz
RF INPUT POWER = +10 dBm, LOWER SIDEBAND



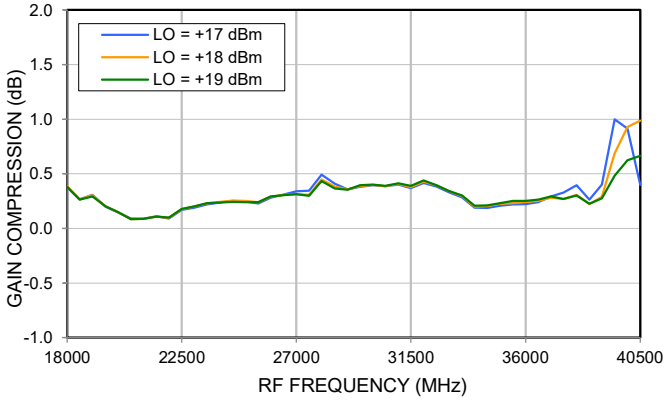
GAIN COMPRESSION (Q) @ FIXED IF = 2 GHz
RF INPUT POWER = +10 dBm, LOWER SIDEBAND



GAIN COMPRESSION (I) @ FIXED IF = 3 GHz
RF INPUT POWER = +10 dBm, LOWER SIDEBAND

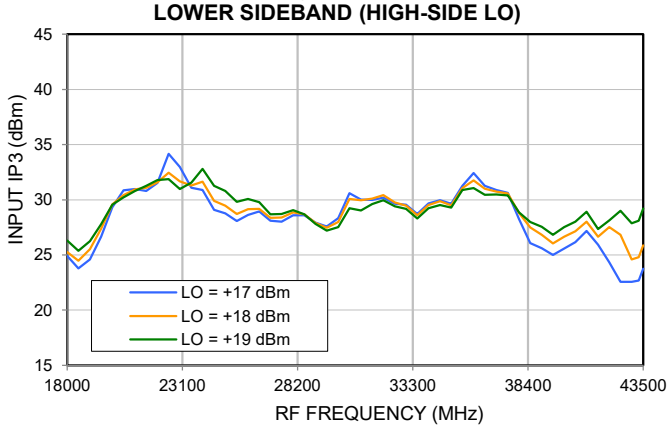


GAIN COMPRESSION (Q) @ FIXED IF = 3 GHz
RF INPUT POWER = +10 dBm, LOWER SIDEBAND

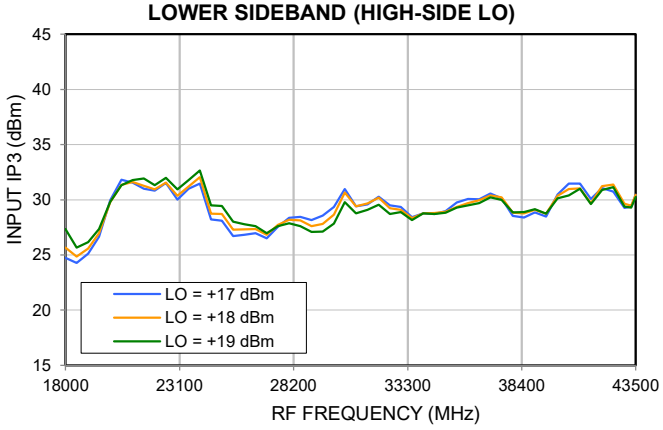


Typical Performance Curves

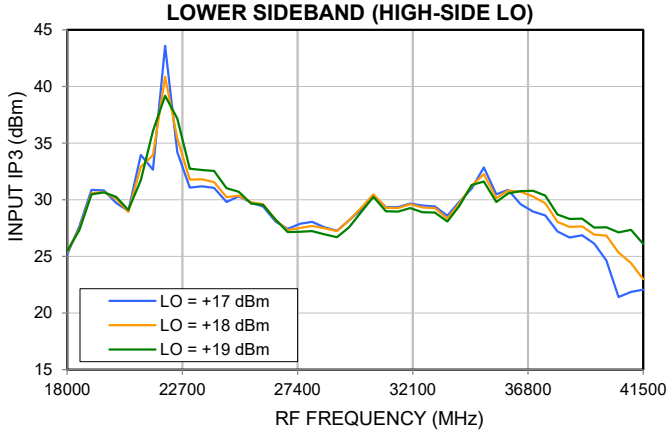
INPUT IP3 (I) @ FIXED IF = 200 MHz
LOWER SIDEBAND (HIGH-SIDE LO)



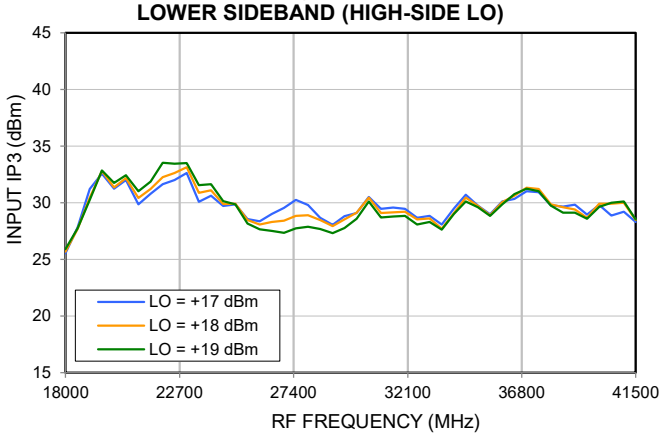
INPUT IP3 (Q) @ FIXED IF = 200 MHz
LOWER SIDEBAND (HIGH-SIDE LO)



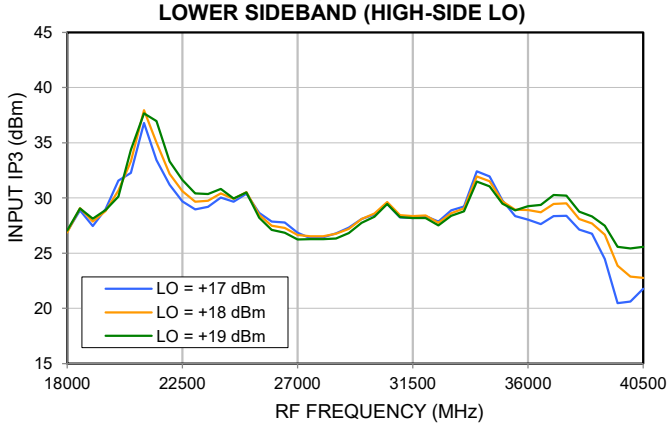
INPUT IP3 (I) @ FIXED IF = 2 GHz
LOWER SIDEBAND (HIGH-SIDE LO)



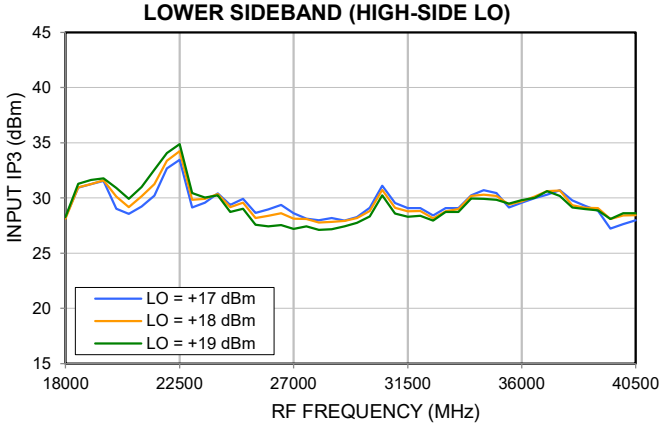
INPUT IP3 (Q) @ FIXED IF = 2 GHz
LOWER SIDEBAND (HIGH-SIDE LO)



INPUT IP3 (I) @ FIXED IF = 3 GHz
LOWER SIDEBAND (HIGH-SIDE LO)



INPUT IP3 (Q) @ FIXED IF = 3 GHz
LOWER SIDEBAND (HIGH-SIDE LO)



Mini-Circuits

Environmental Specifications ENV80

All Mini-Circuits products are manufactured under exacting quality assurance and control standards, and are capable of meeting published specifications after being subjected to any or all of the following physical and environmental test.

Specification	Test/Inspection Condition	Reference/Spec
Operating Temperature	-40° to 85° C or -40° to 105° C or -55° to 105° C or -45° to 105° C Ambient Environment	Refer to Individual Model Data Sheet
Storage Environment (Die)	-65° to 150°C	Individual Model Data Sheet
Storage Environment(Packaging)	-40° to 70°C and 40 to 60% humidity (In Factory Shipped Package)	

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