

BALANCED MIXERS



DESCRIPTION

Millitech series MXP balanced mixers are high performance broadband mixers in a very compact size. They offer low conversion loss and low noise figure over a wide range of IF and local oscillator frequencies. Series MXP covers frequencies from 26.5 to 140 GHz in seven waveguide bands. LO agility (swept LO) and extremely broadband IF are attainable.

MXP single-balanced mixers use GaAs Schottky Barrier Diodes and can operate with relatively low local oscillator power, generally 13 to 15 dBm. Custom models can be made to your specification. Special designs with

FEATURES:

- Low conversion loss and noise figure
- 13 dBm LO drive power
- Matched IF amplifier and LO offered
- Small, rugged package

APPLICATIONS:

- Radars and radiometry
- Electronic warfare/ELINT
- Communications
- Test equipment

LO input waveguide in a higher or lower waveguide band can be provided. External waveguide filters, LO reject filters, and compact 90° waveguide twists allow the user to change the mixer waveguide orientation (LO, RF or both) without taking much additional space. Detachable low-noise IF amplifiers are offered as options with these mixers.

When only a limited local oscillator power (0 to +3 dBm) is available, DC biasable series MB1 mixers are recommended. Millitech also offers a harmonic mixer to operate with fractional LO frequencies (series MSH).

ELECTRICAL SPECIFICATIONS

Model Number	Outline	STEP File	RF		Local Oscillator		IF		Conversion Loss (dB) (typ)	
			Frequency Range (GHz)	WG Band	Frequency Range (GHz)	WG Band	Frequency Range (GHz)	Connector	IF=1 GHz, LO=13 dBm	Fixed LO, LO=13 dBm
MXP-28	MXP-28	28	26.5-40	WR-28	26.5-40	WR-28	0.1-13.5	SMA	7 dB, RF=28-38	8.3 dB, see plot
MXP-22	MXP-22	22	33-50	WR-22	33-50	WR-22	0.1-17	2.92 mm	6.5 dB, RF=34-50	8.3 dB, see plot
MXP-19	MXP-19	19	40-60	WR-19	40-60	WR-19	0.1-20	2.92 mm	6.2 dB, RF=42-60	9 dB, see plot
MXP-15	MXP-15	15	50-75	WR-15	50-75	WR-15	0.1-25	2.92 mm	6.5 dB, RF=50-71	11 dB, see plot
MXP-15*	MXP-15L	15L	50-75	WR-15	40-50	WR-19	0.1-25	2.92 mm	NA	10 dB, see plot
MXP-12	MXP-12	12	60-90	WR-12	60-90	WR-12	0.1-30	2.92 mm	6.5 dB, RF=62-90	9.5 dB, see plot
MXP-10	MXP-10	10	75-110	WR-10	75-110	WR-10	0.1-35	2.92 mm	6.5 dB, RF=75-108	9 dB, see plot
MXP-08	MXP-08	08	90-140	WR-08	90-140**	WR-08	0.1-40	2.92 mm	7 dB, RF=95-100	See plot

* Note that the LO waveguide is WR-19 for this model

** Currently testing MXP-08 only for LO from 90-100 GHz

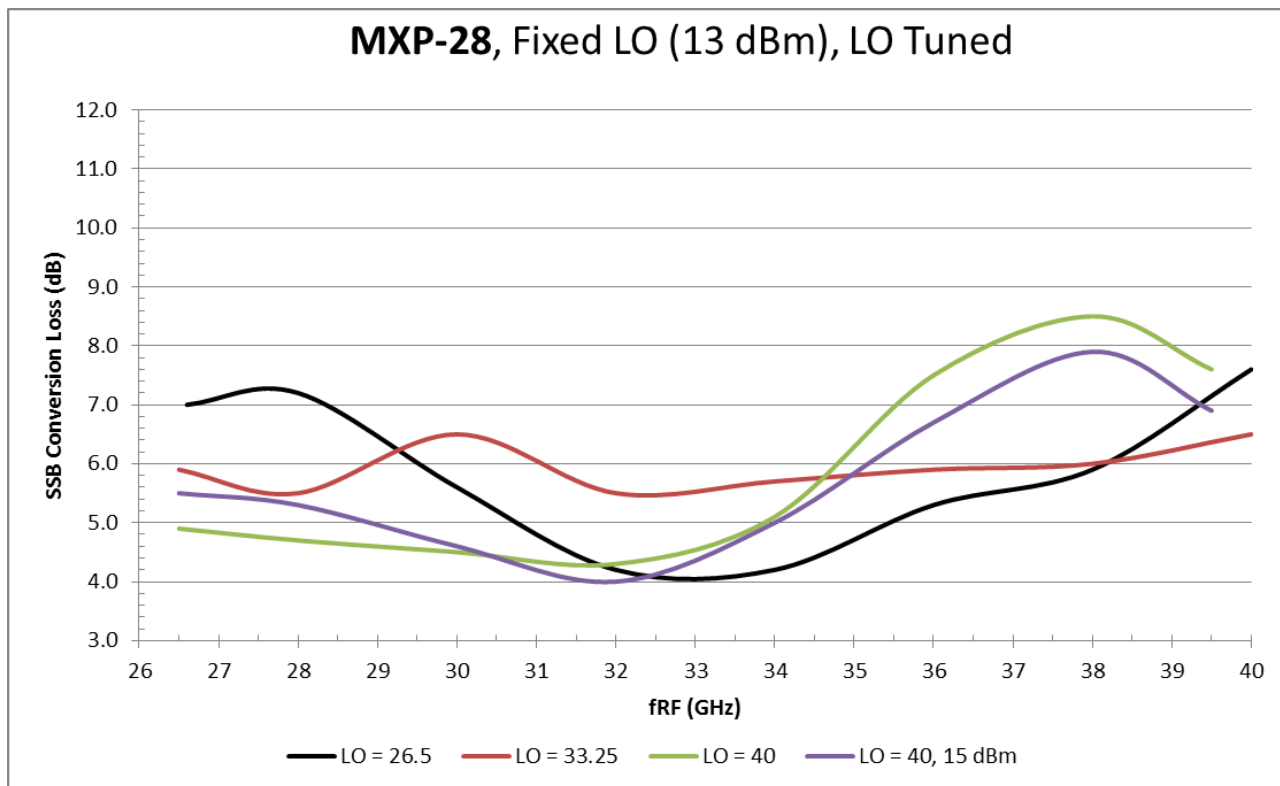
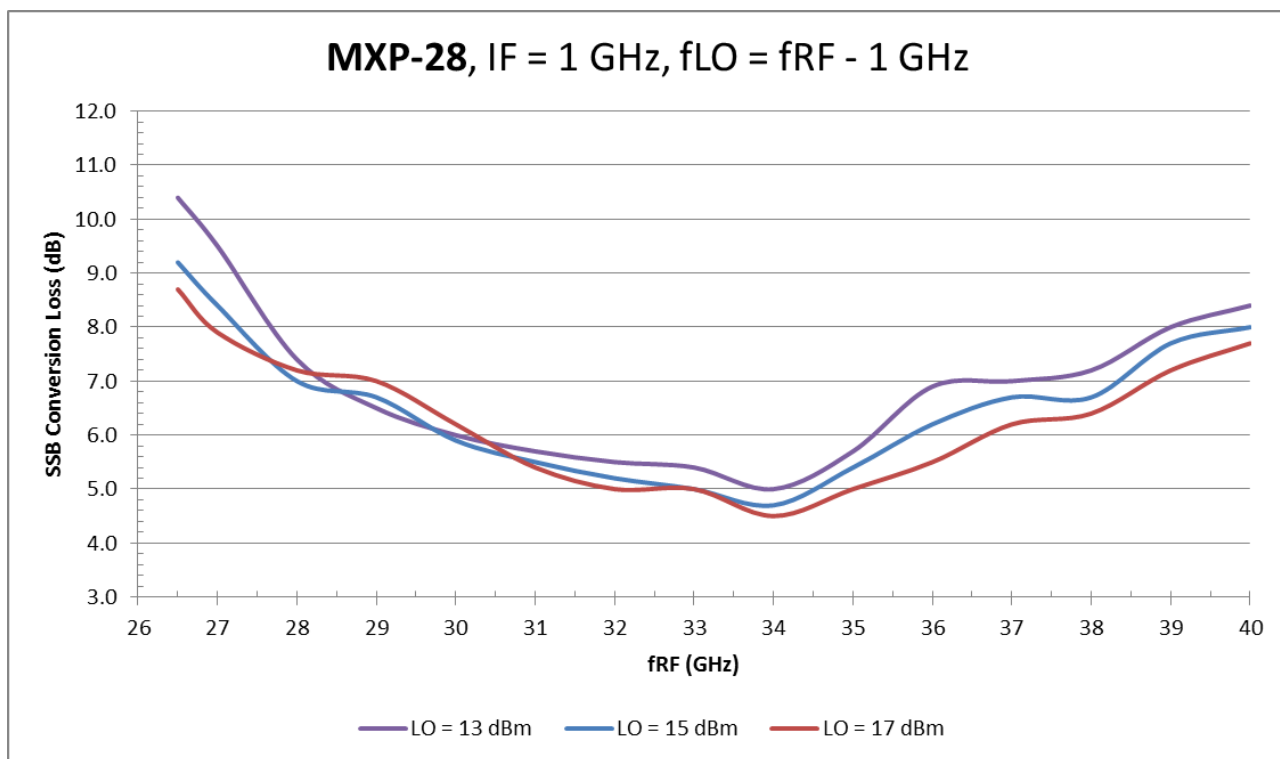
Noise figure (DSB) is typically the conversion loss minus 3 dB, plus the IF amplifier noise figure. Some typical amplifier choices:

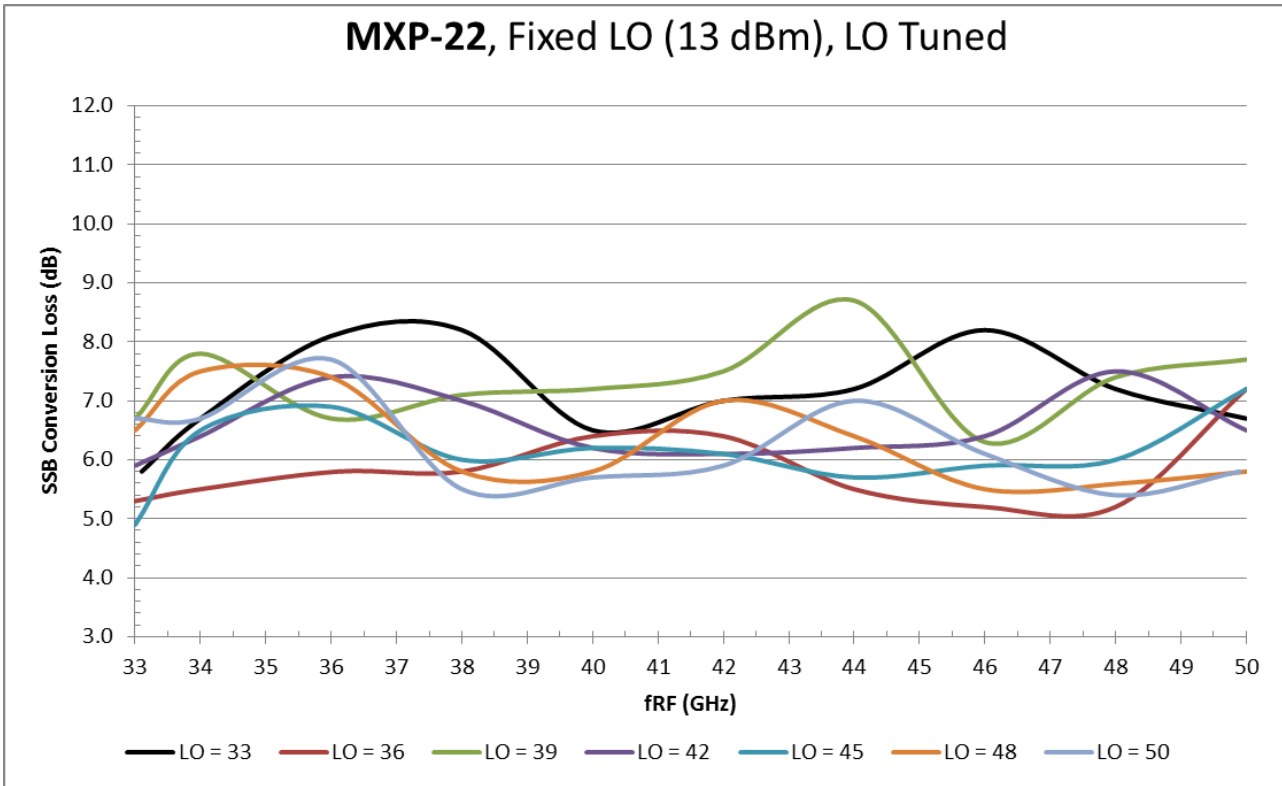
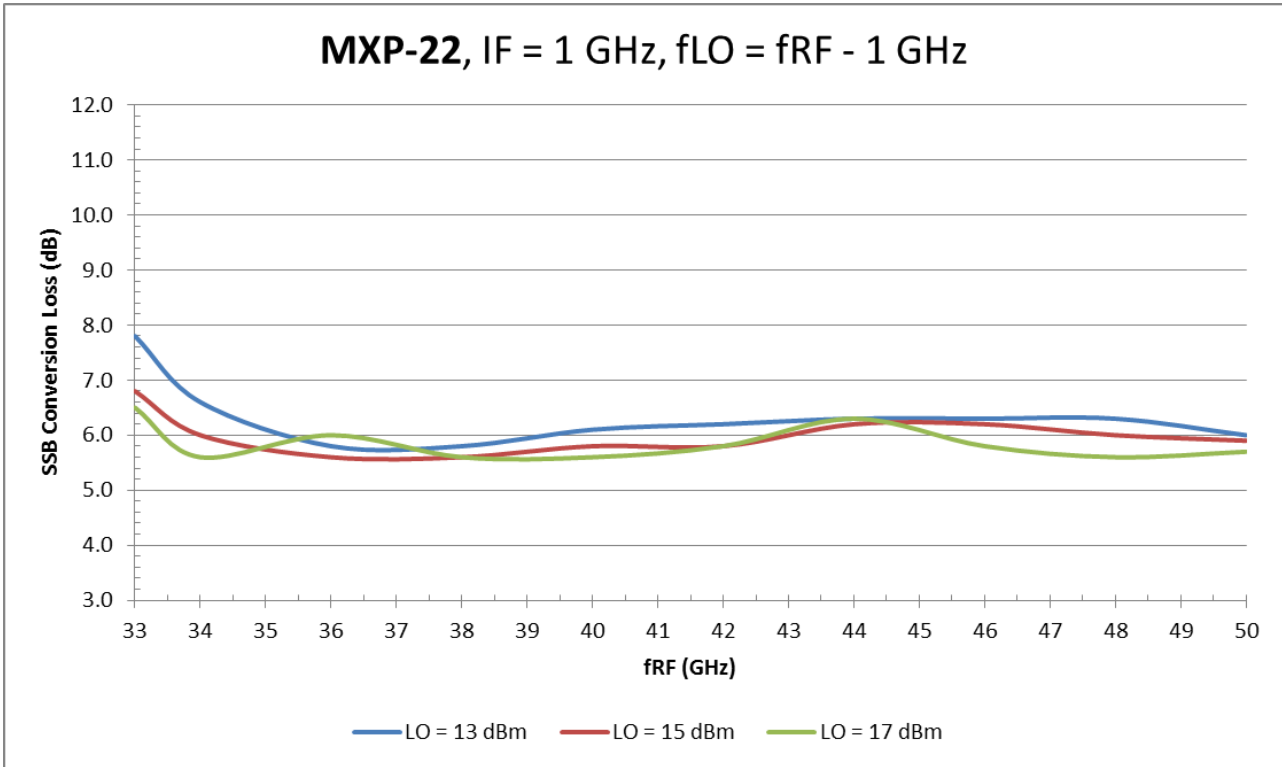
IF Amplifier Frequency	IF Amplifier Noise Figure (typ/max)	Gain (typ)
0.1-4 GHz	1.5 dB / 1.7 dB	35 dB
1-8 GHz	1.5 dB / 2.0 dB	33 dB
2-18 GHz	3.0 dB / 5.0 dB	33 dB
6-18 GHz	2.0 dB / 2.75 dB	30 dB
26.5-40 GHz	3.5 dB / 4.5 dB	22 dB

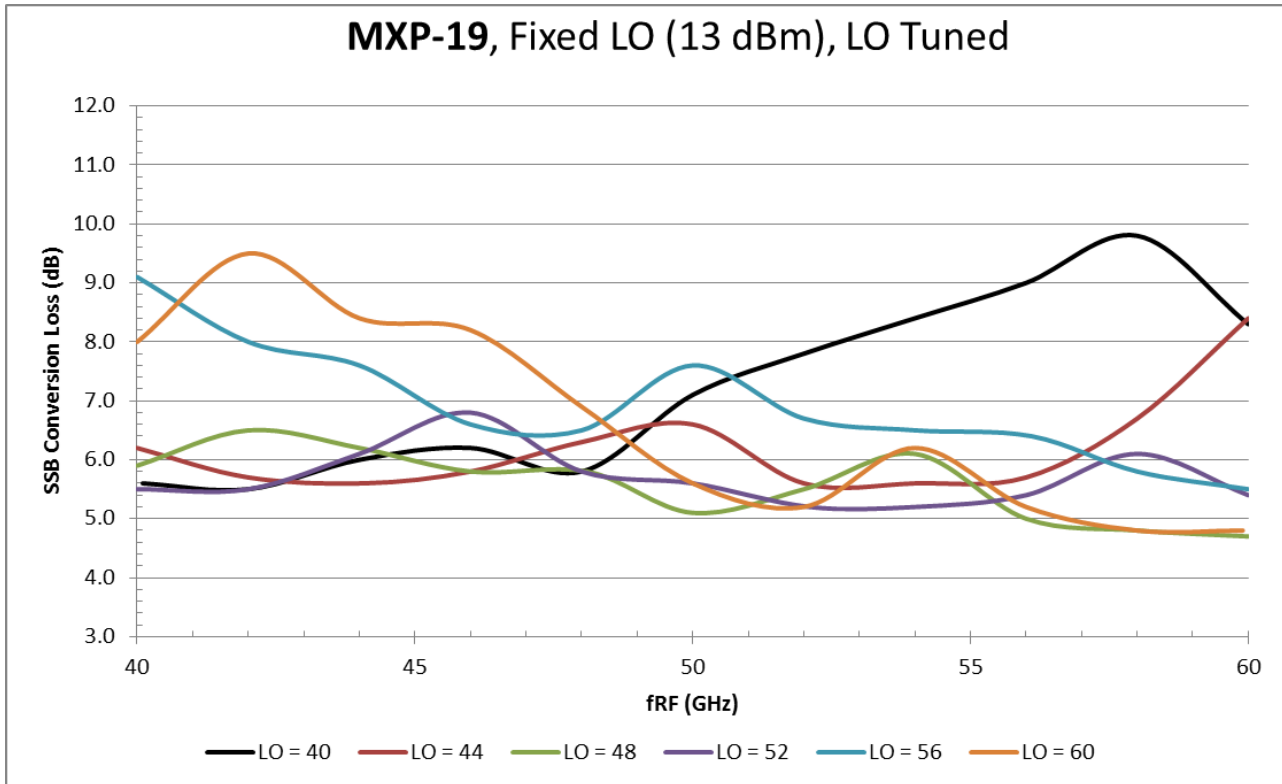
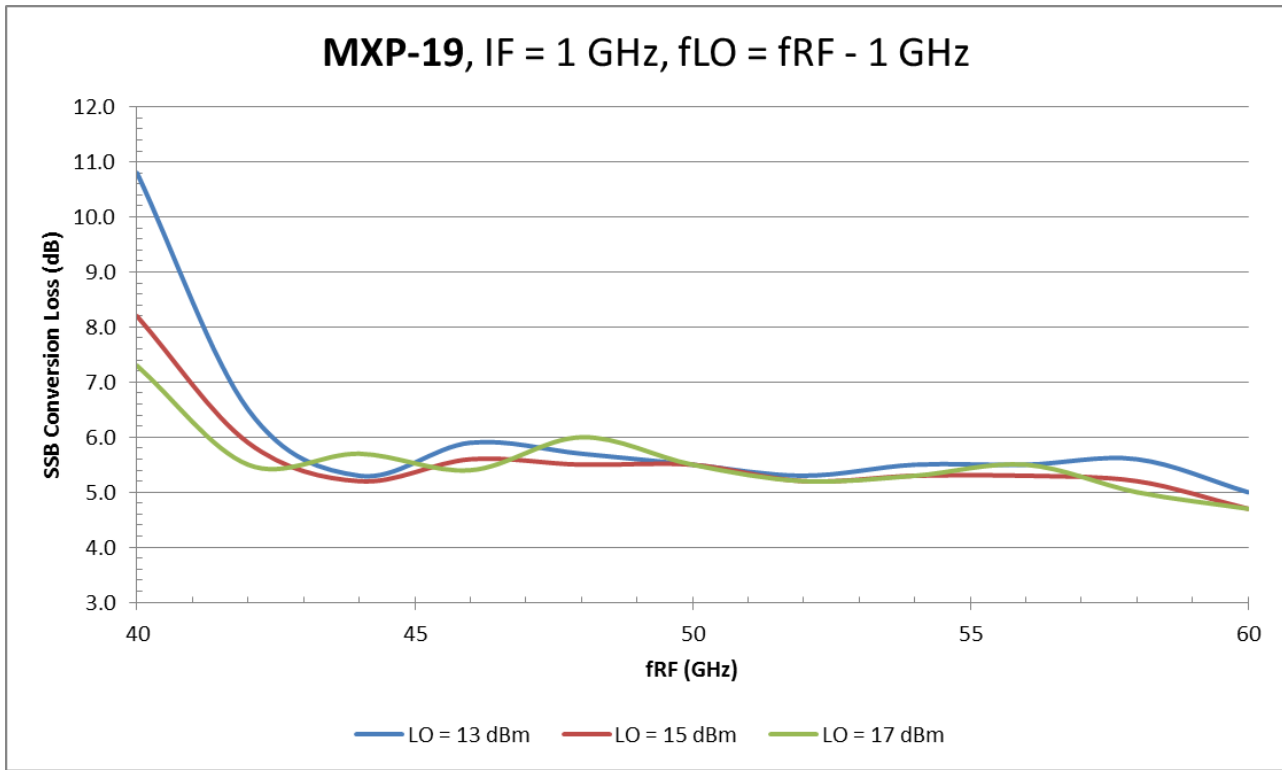
Other IF ranges are also available, some with lower noise figure. Consult Millitech.

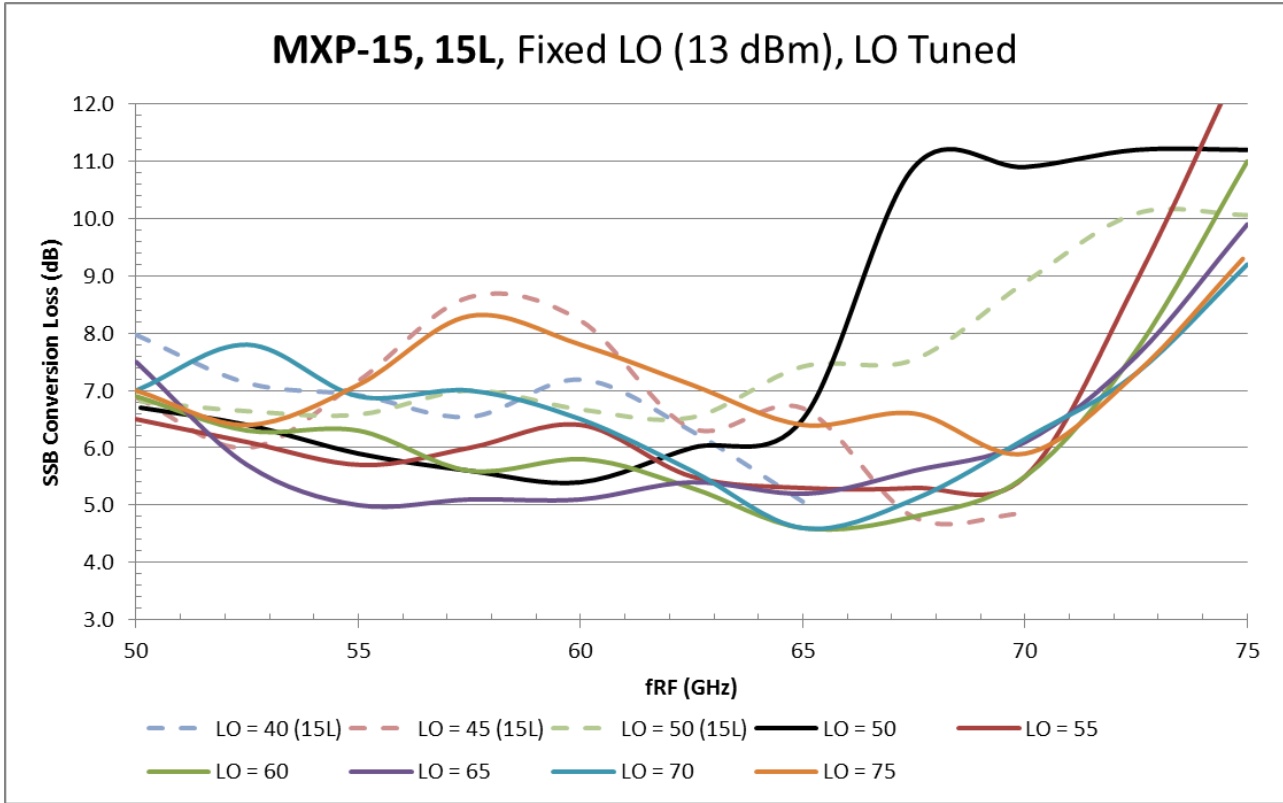
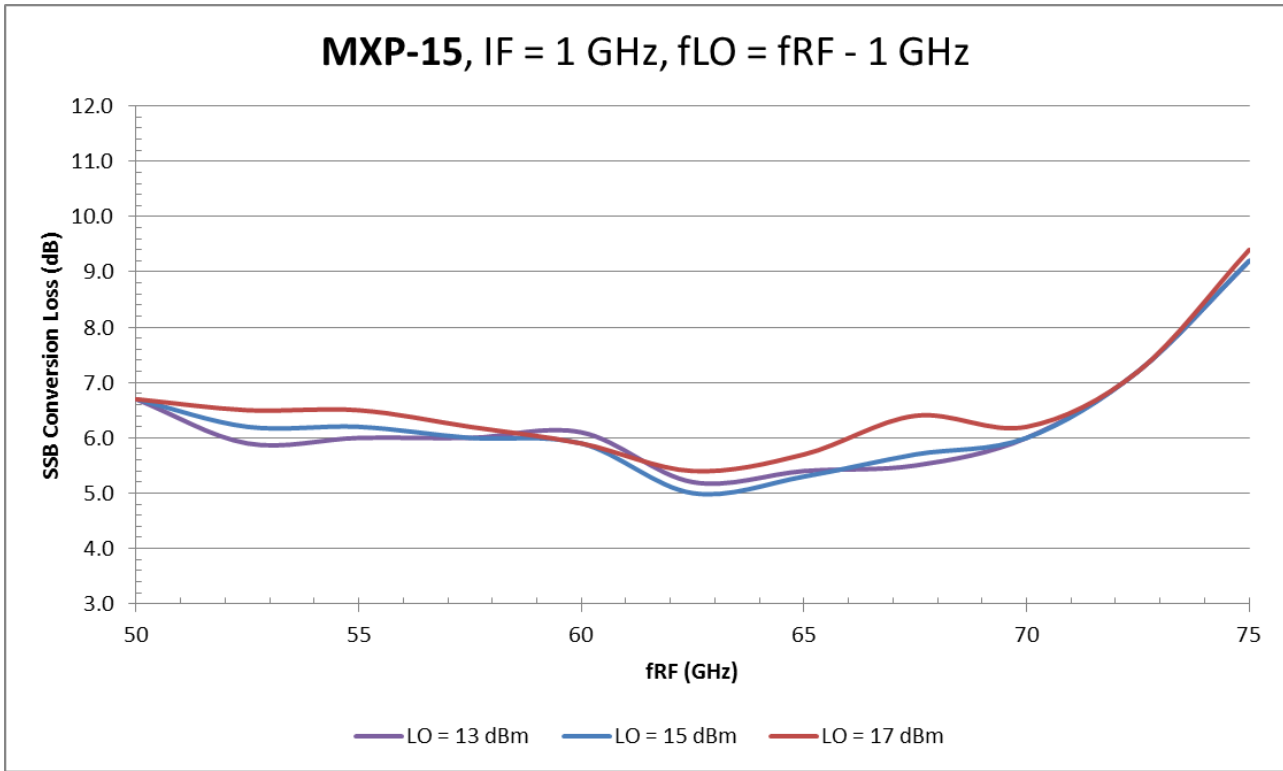
COMMON OPERATING CHARACTERISTICS:

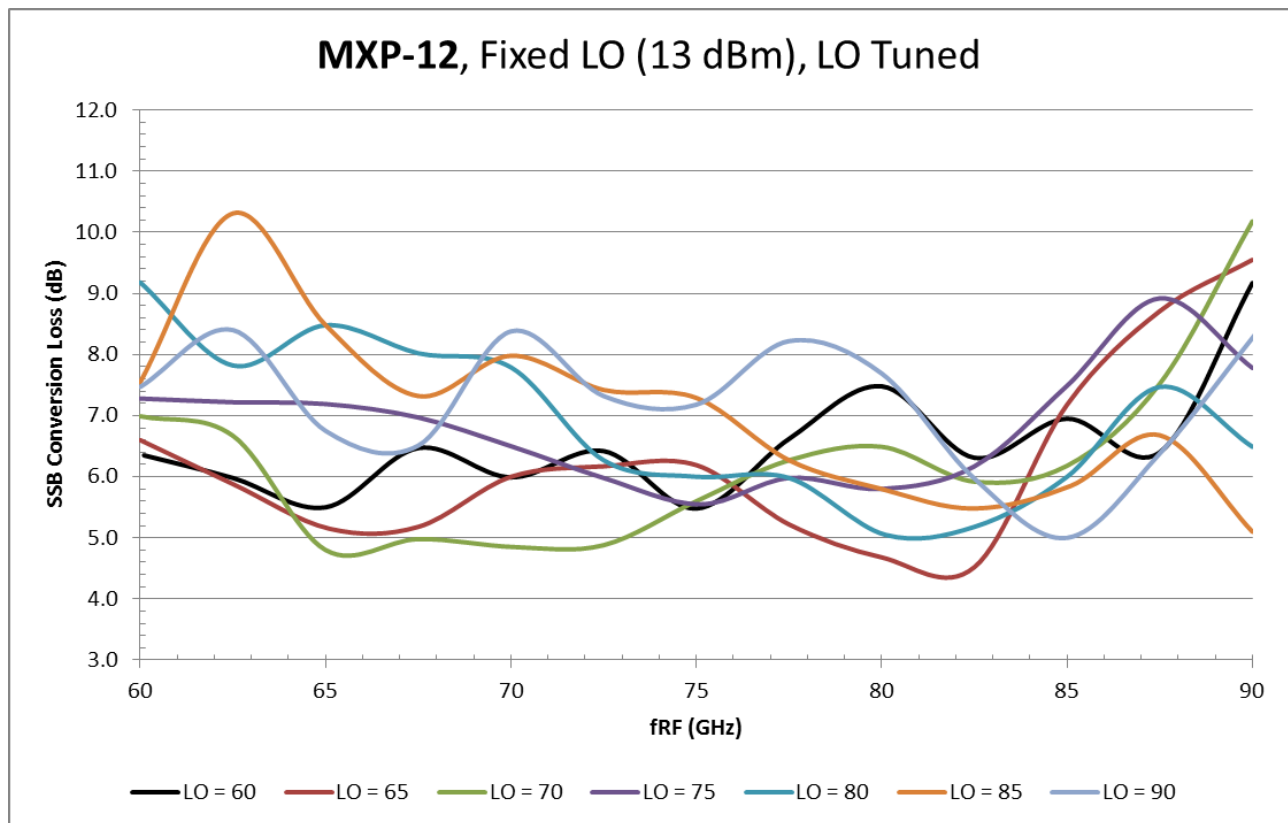
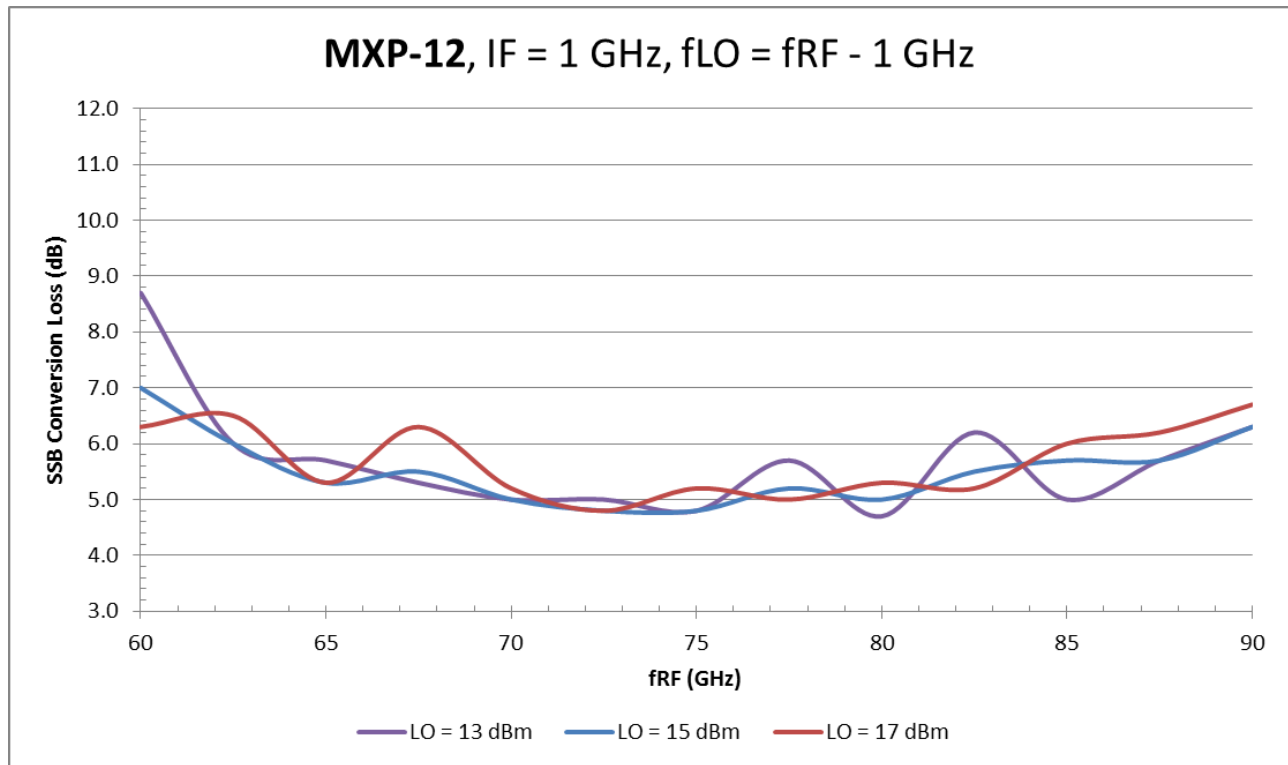
- VSWR at RF Port: 2:1 (typ)
- 1dB Compression Point : +3 dBm (typ) input, either as a downconverter or an upconverter
- LO Drive Power: +13 dBm (typ)
- LO/RF Isolation: 25 dB (typ)
- LO/IF Isolation: 25 dB (typ)
- Maximum RF/IF Power: +19 dBm CW, +25 dBm pulse with 25% duty cycle or less (no damage, 25 C)

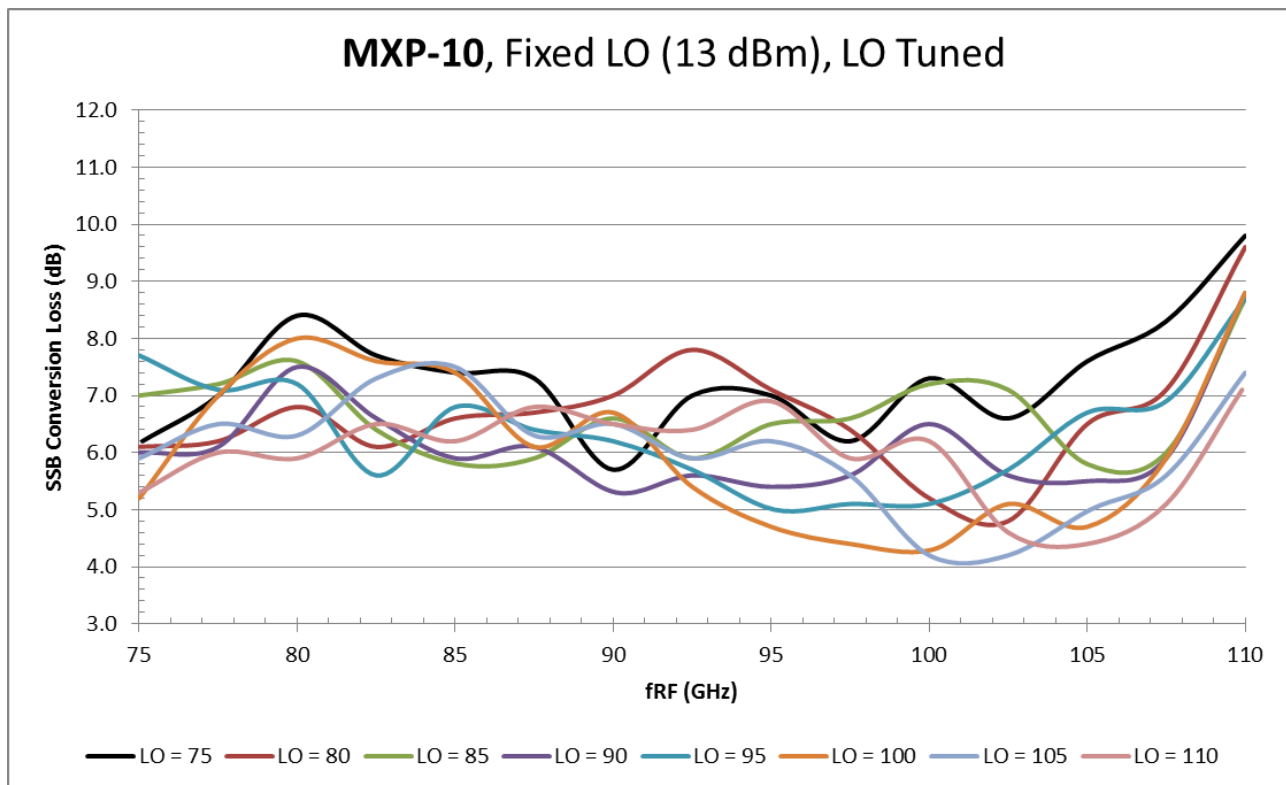
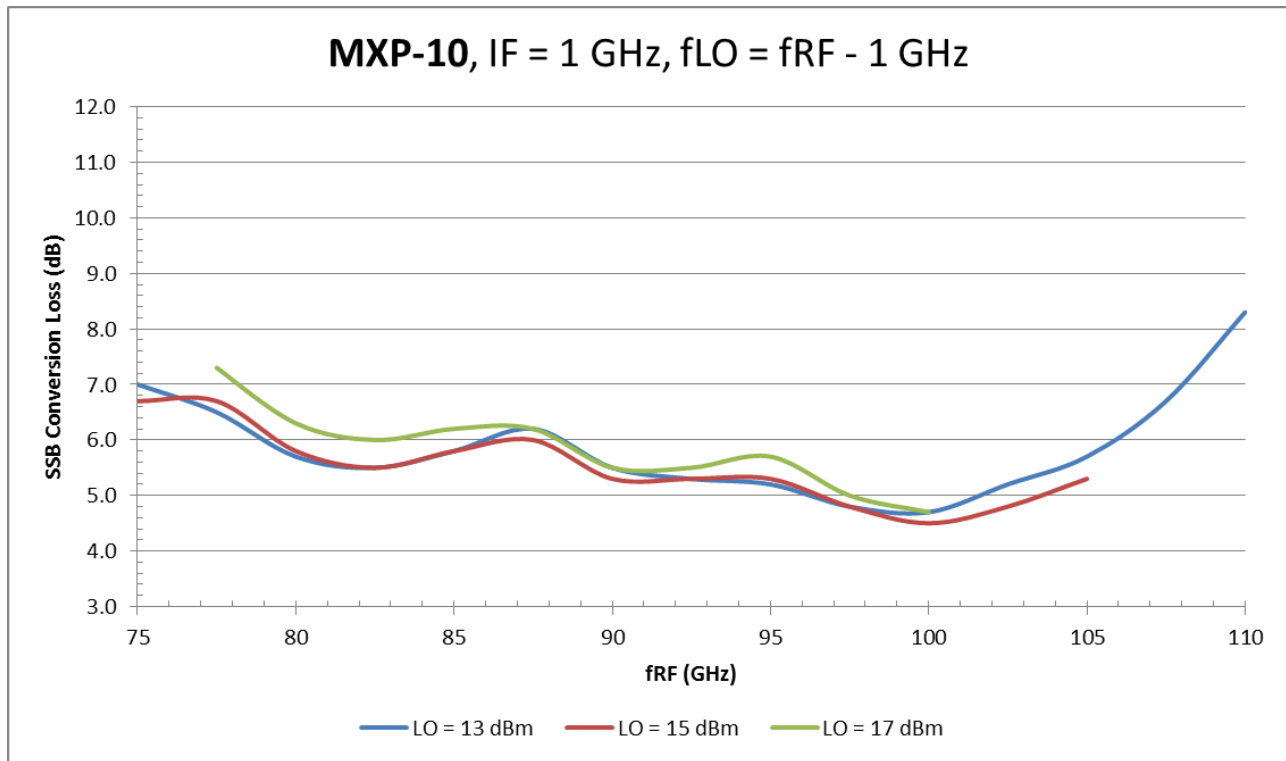


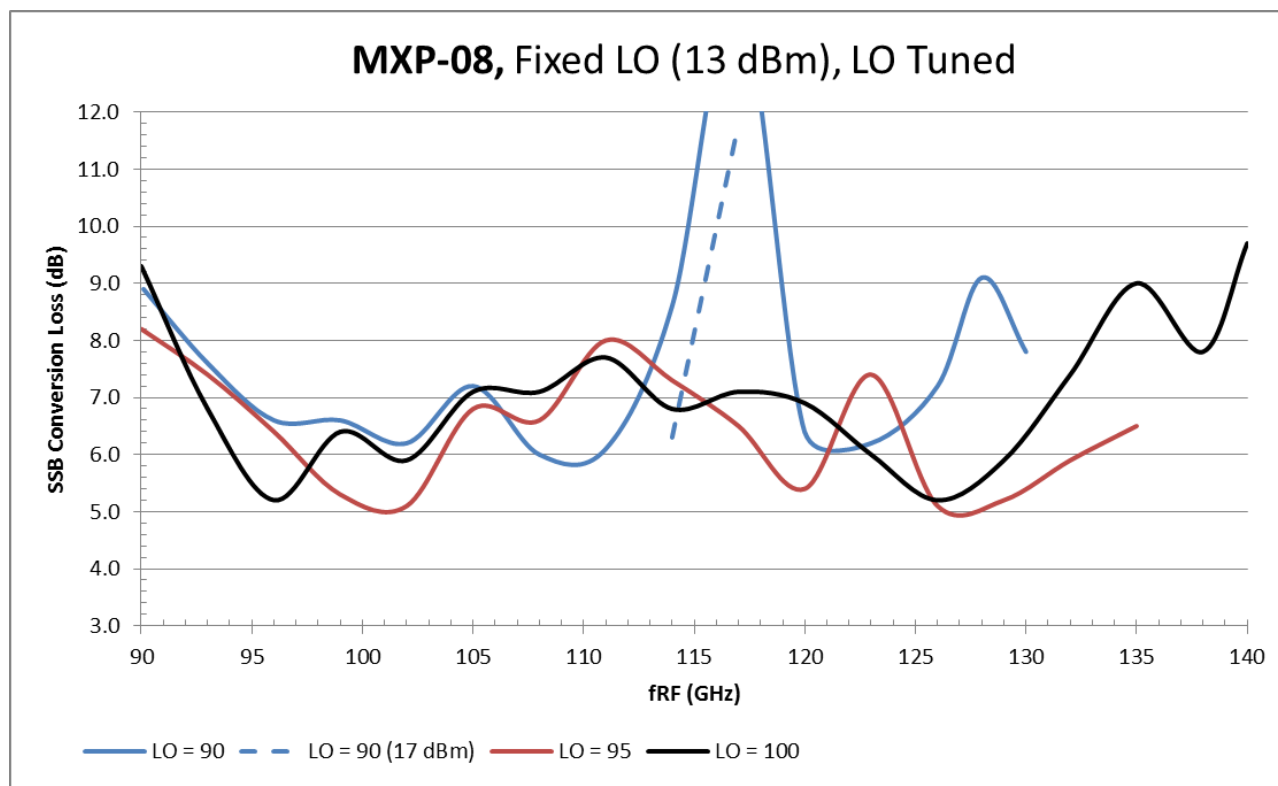












HOW TO ORDER

Specify Model Number MXP-XX-ABCD1
XX = Waveguide Band WR – number
A = RF Range F – fullband S – specified bandwidth (please specify) X – fixed frequency (please specify)
B = IF Range S – specified IF bandwidth (please specify, IF amplifier not included) X – fixed frequency (please specify, IF amplifier not included) W – specified IF bandwidth (please specify, IF amplifier included)
C = LO Range F – fullband L – lower waveguide band (band below RF band) S – specified bandwidth (please specify) X – fixed frequency (please specify)
D = Measurement/Data Options (test conditions) <u>Mixer offered without IF amplifier:</u> L – tested for conversion loss alone. <u>Mixer offered with IF amplifier (tested for noise figure and conversion gain):</u> 0 – 0.1 – 4 GHz 1 – 1 – 8 GHz 2 – 2 – 18 GHz 3 – 6 – 18 GHz 4 – 26.5 – 40 GHz N - Other

EXAMPLES:

To Order: a fullband fundamental mixer in WR-10 with LO and RF swept

Specify: MXP-10-FXFL1, with the IF specified by the customer for what IF that the mixer will be tested. Generally, the test data will be ~ 10 test points across the RF band at the IF chosen. Additional test data or a specific test plan can be quoted.

To Order: a fullband fundamental mixer in WR-10 with LO fixed and RF swept

Specify: MXP-10-FSXL1, with the fixed LO specified by the customer. Test data will again generally be ~ 10 test points across the RF band with the LO fixed, constrained by the maximum IF shown in the spec. table (35 GHz for MXP-10).