

SUBHARMONIC MIXERS



DESCRIPTION

Millitech series MSH subharmonic mixers are broadband mixers that operate at the second harmonic of the local oscillator. Hence, the local oscillator frequency is one-half of the RF in the applicable waveguide band. These mixers offer the advantage of a lower frequency local oscillator, typically between 6 and 12 dBm, while achieving single sideband conversion loss typically between 6 and 9 dB.

The MSH subharmonic mixers have been optimized to operate at either a fixed LO frequency and provide a broad IF frequency coverage, using a 2.92 mm connector, or a broad RF and LO frequency coverage, tested at a fixed IF. The LO and RF ports use waveguide flanges and are available in WR-10, 08, 6.5, 5.1, 4.3, and 3.4. Performance is shown in SSB conversion loss. DSB noise figure is approximately 3 dB lower

FEATURES:

- SSB Lc of 6.5 dB typ. @ 183GHz
- Second harmonic operation
- 6-12 dBm LO drive power at half the RF frequency

APPLICATIONS:

- Heterodyne radiometer
- Frequency extension to 310 GHz
- Automated test equipment
- Instrumentation

than the SSB conversion loss plus the noise figure of an IF amplifier. DSB noise figure can be measured, if preferred, upon request.

Fundamental mixers are available from 26.5 GHz to 140 GHz as series MXP, and biased fundamental mixers from 60 GHz to 140 GHz as series MB1.

ELECTRICAL SPECIFICATIONS

Model	RF (GHz)	LO (GHz)	IF (GHz)	Swept LO SSB Conversion Loss (dB,typ)	LO Power (dBm) for Swept LO	Fixed LO SSB Conversion Loss (dB,typ)	LO Power (dBm) for Fixed LO	LO Waveguide	RF Waveguide
MSH-10	75-108	37.5-54	0.1-20	8	12	8	8	WR-22	WR-10
MSH-08	95-136	47.5-68	0.1-30	8	12	8	8	WR-15	WR-08
MSH-06	120-165	60-82.5	0.1-35	8	10	8	8	WR-12	WR-6.5
MSH-05	150-210	75-105	0.1-40	7.5	8	7	6	WR-10	WR-5.1
MSH-04	180-255	90-127.5	0.1-40	8	8	8	6	WR-08	WR-4.3
MSH-03	236-310	118-155	0.1-40	9	8	9	6	WR-6.5	WR-3.4

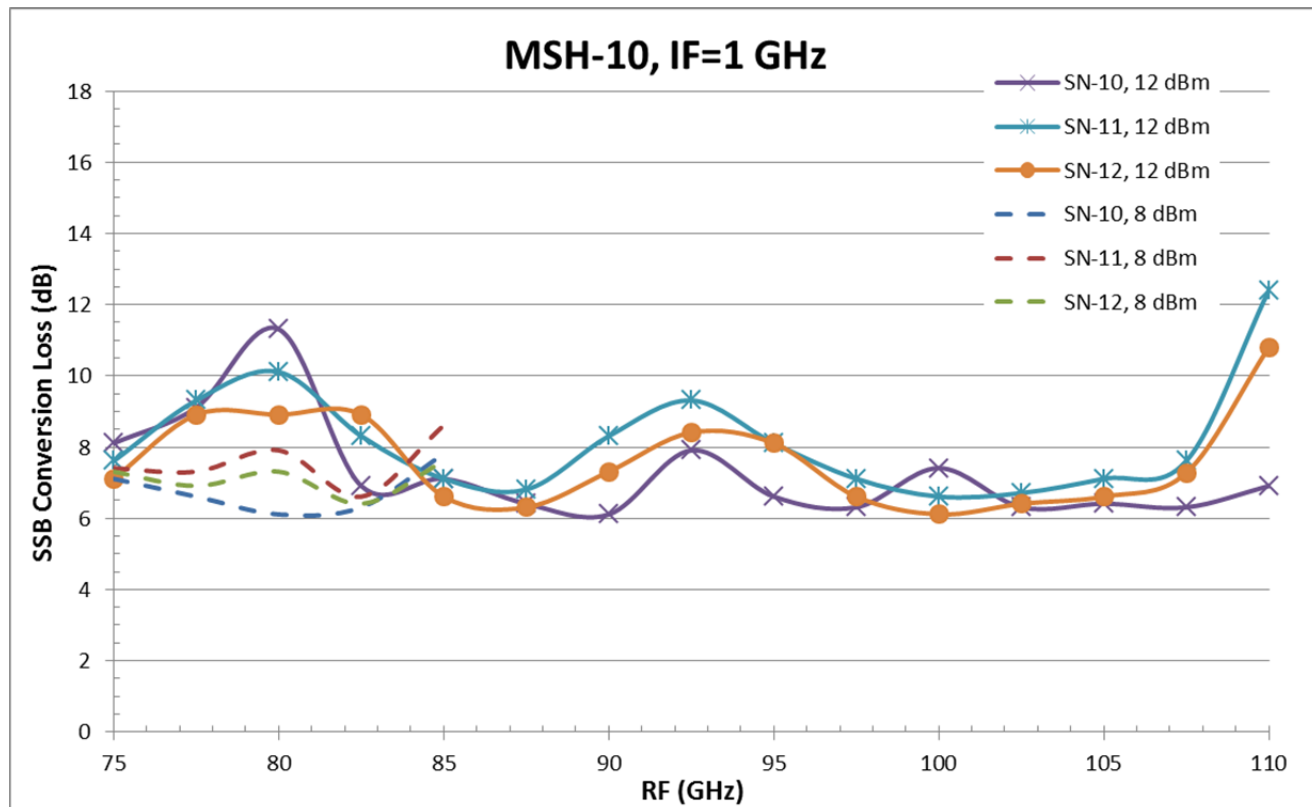
Input $P_{1dB} = -4$ dBm typ., either upconverting or downconverting
 Max $P_{in} = 15$ dBm, combining LO, RF, and IF input power levels

A STEP file viewer is required to view the links in the 'STEP file' column.

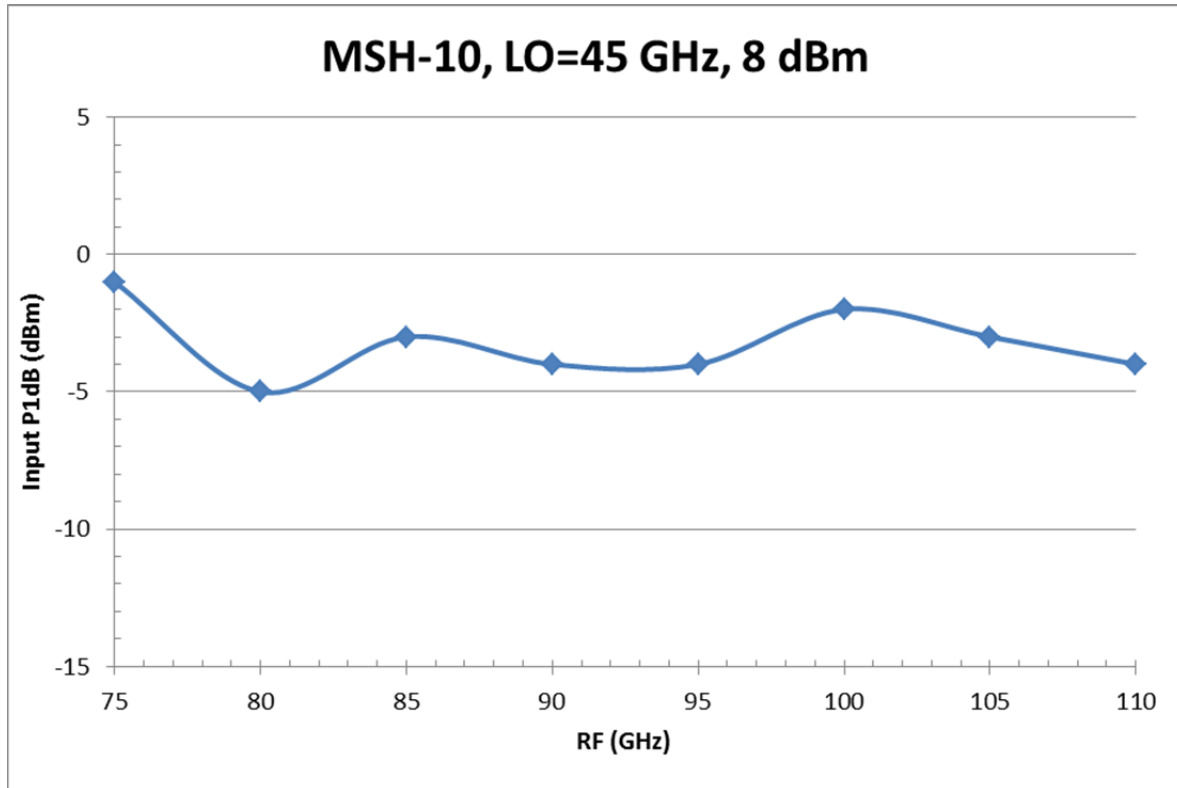
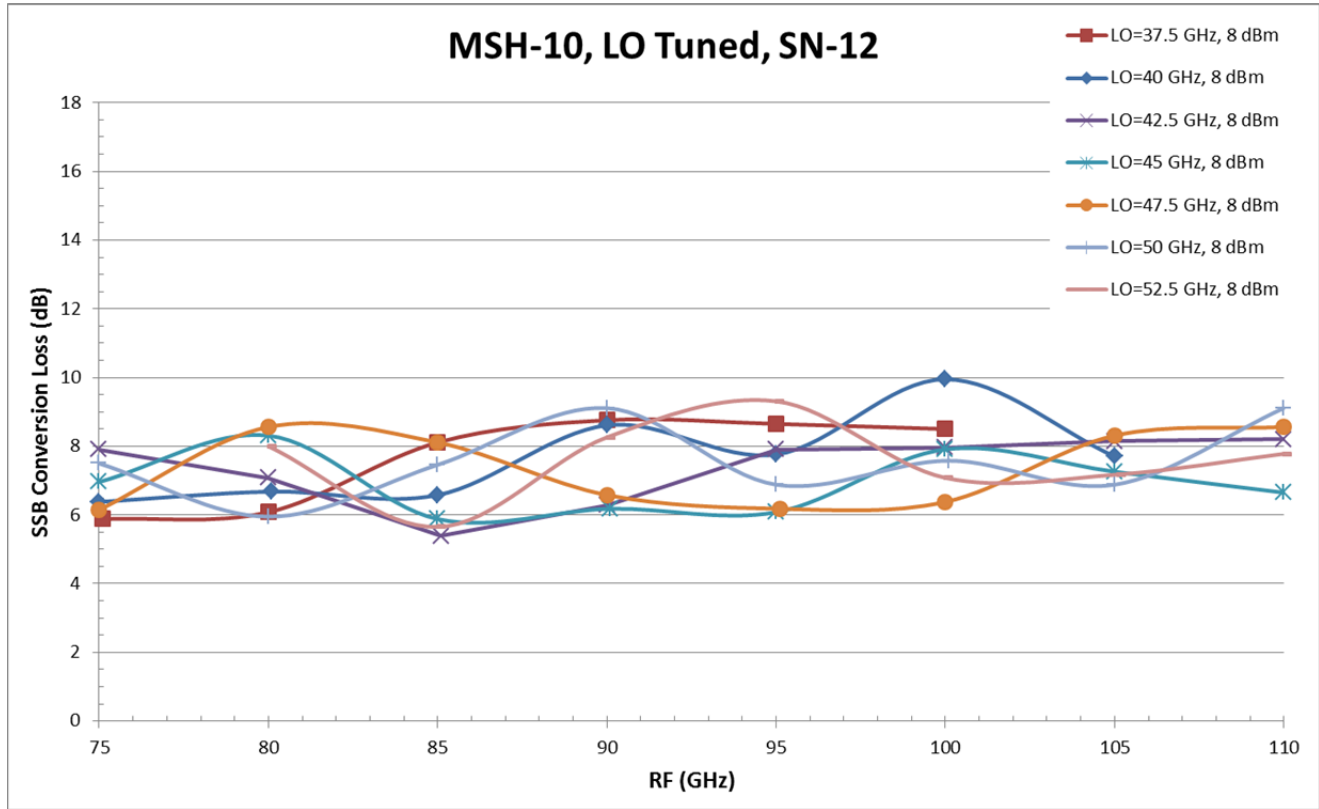
Model	Outline	STEP file
MSH-10	GS3384 A MSH-10.PDF	GS3384.STEP
MSH-08	GS3383 A OD, MSH-08.PDF	GS3383.STEP
MSH-06	GS3382 A OD, MSH-06.PDF	GS3382.STEP
MSH-05	GS3374 A OD, MSH-05.PDF	GS3374.STEP
MSH-04	GS3373 B MSH-04.PDF	GS3373.STEP
MSH-03	GS3372 B MSH-03.PDF	GS3372.STEP

TYPICAL PERFORMANCE

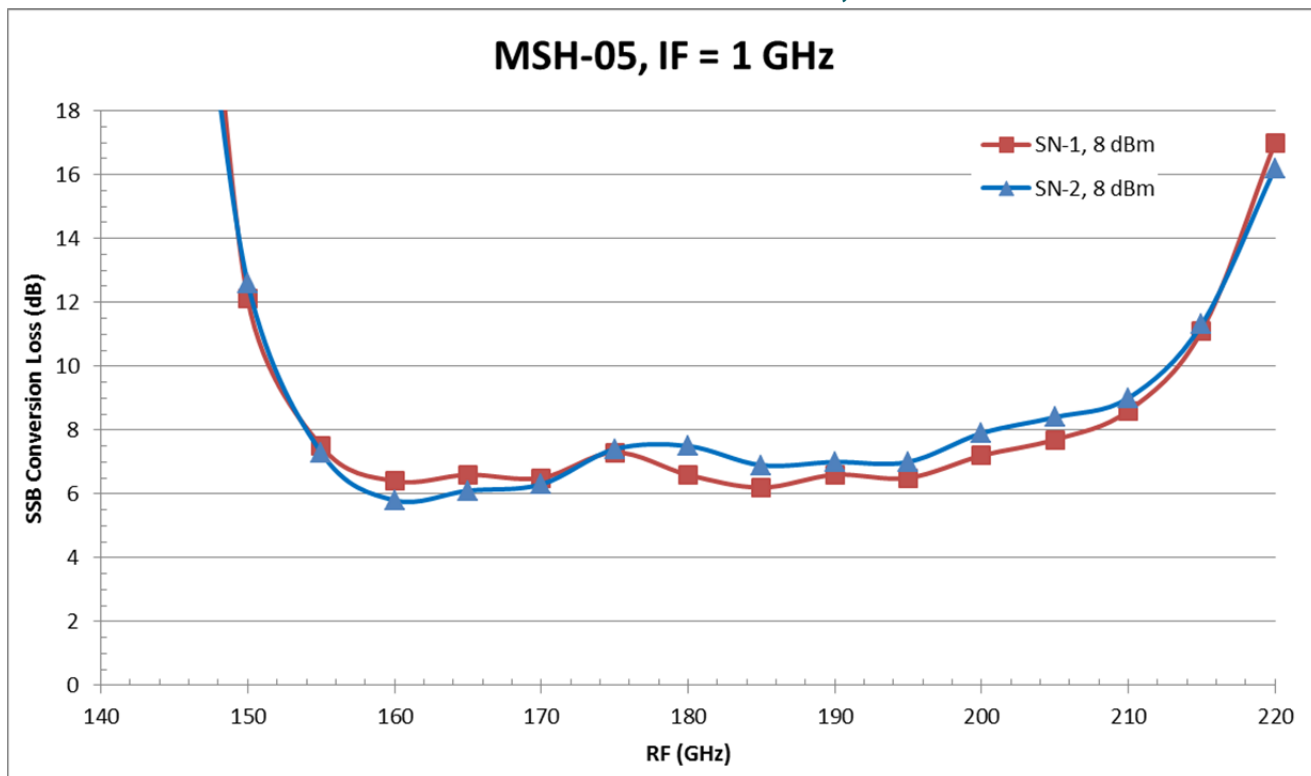
MSH-10 SSB CONVERSION LOSS, SWEEPED LO



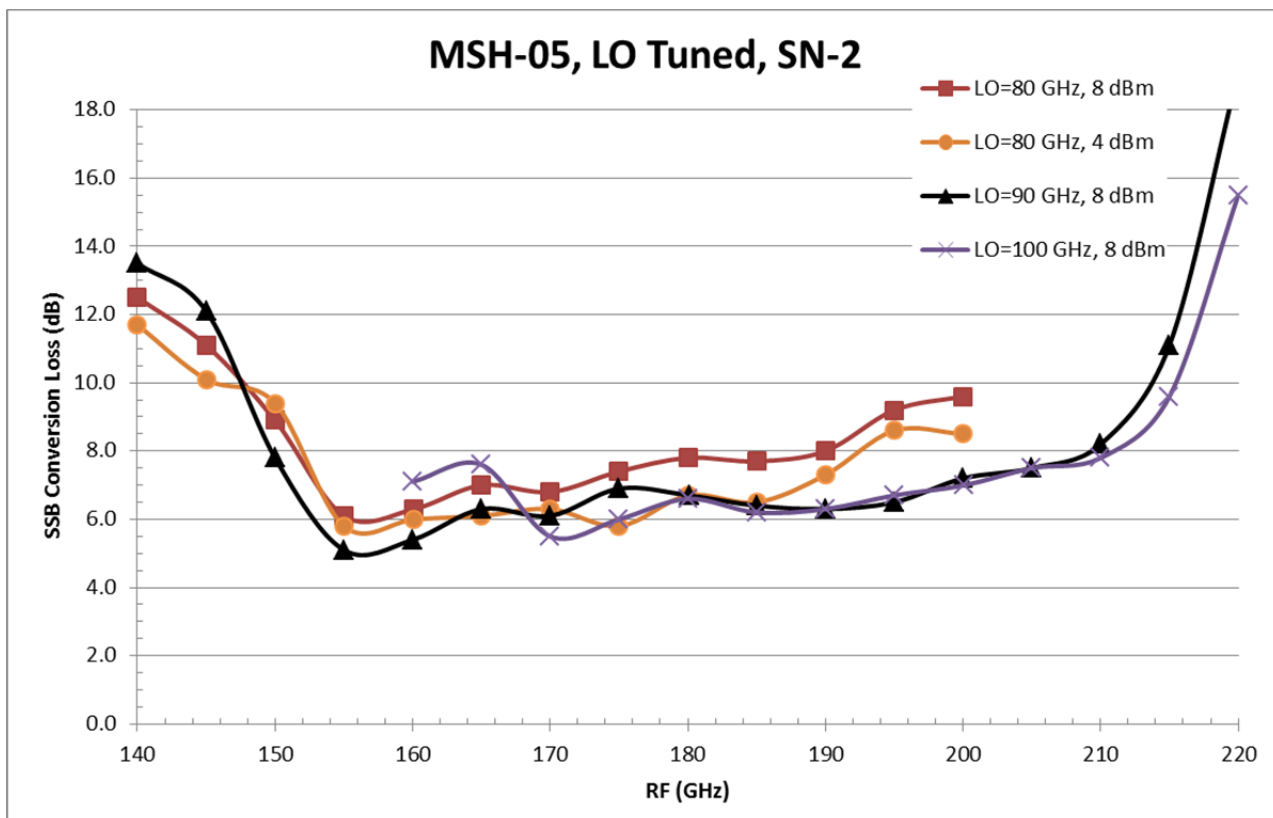
MSH-10 SSB CONVERSION LOSS, FIXED LO



MSH-05 SSB CONVERSION LOSS, SWEEPED LO



MSH-05 SSB CONVERSION LOSS, FIXED LO



OUTLINE DRAWINGS

Model	ARF (mil/mm)	BRF (mil/mm)	ALO (mil/mm)	BLO (mil/mm)	IF (mil/mm)	Figure
MSH-10	100/2.54	50/1.27	224/5.69	112/2.84	883/22.43	2
MSH-08	80/2.03	40/1.02	148/3.76	74/1.88	616/15.65	1
MSH-06	65/1.65	32.5/.826	122/3.10	61/1.55	596/15.14	1
MSH-05	51/1.30	25.5/.648	100/2.54	50/1.27	596/15.14	1
MSH-04	43/1.09	21.5/.546	80/2.03	40/1.02	596/15.14	1
MSH-03	34/.864	17/.432	65/1.65	32.5/.826	596/15.14	1

FIGURE 1

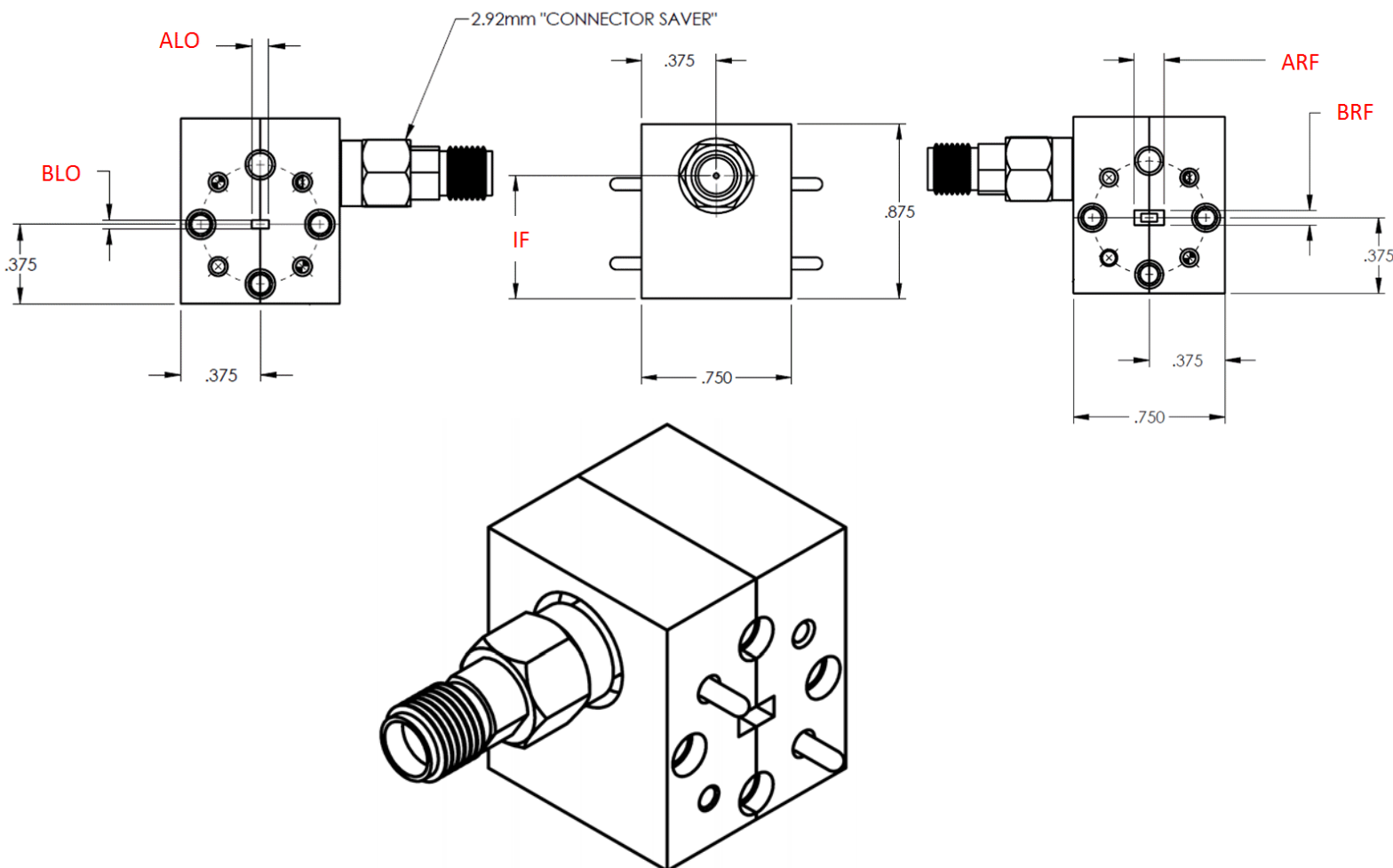
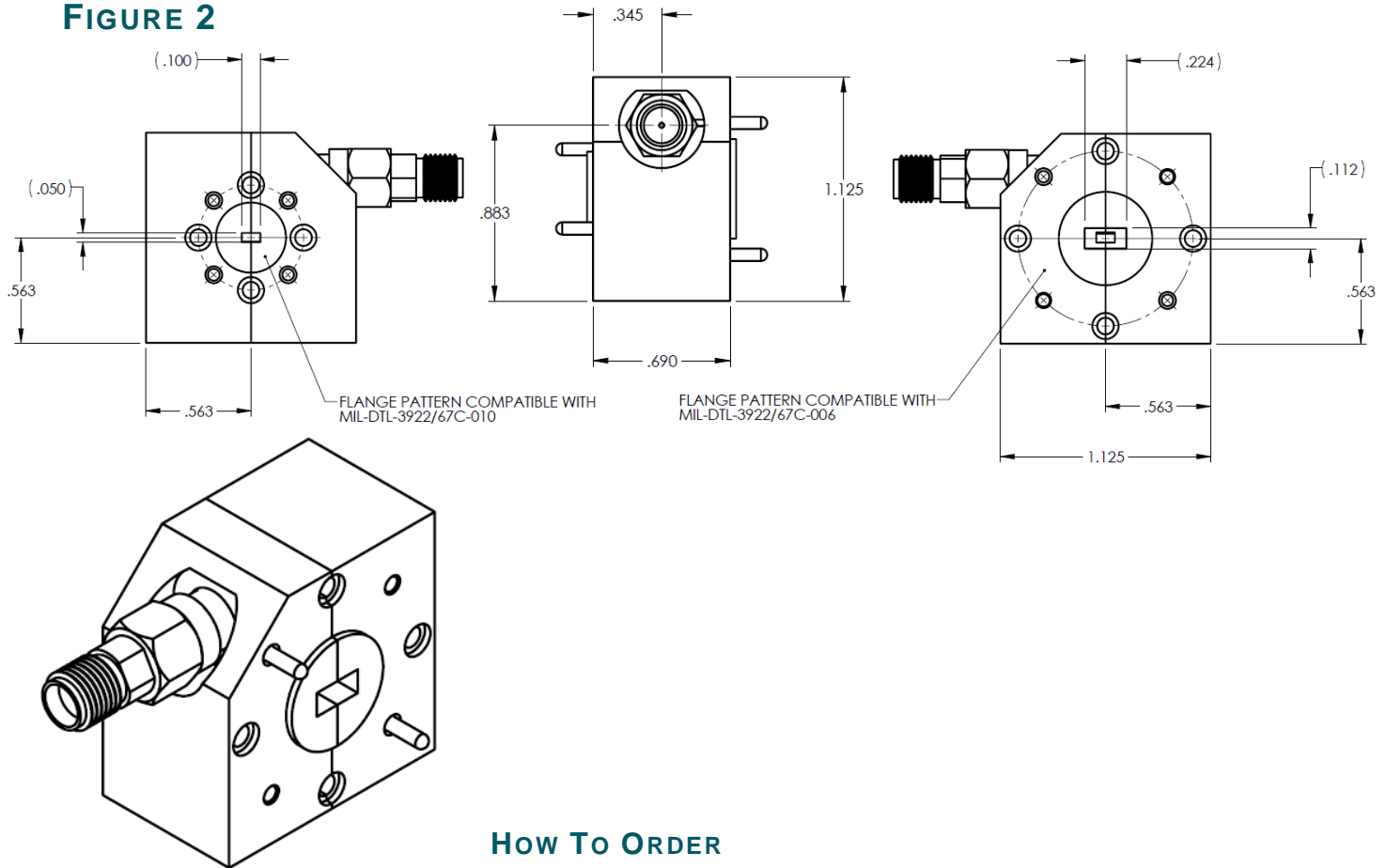


FIGURE 2



HOW TO ORDER

Specify Model Number* MSH-XX-ABBBØ
XX = RF waveguide size See table above (Electrical Specifications)
A = Swept LO (S) or FiXed LO (X)
BBB = LO Frequency (GHz) for Fixed LO = 000 for Swept LO
Ø = Special Options 0 - standard N - nonstandard (specify requirements)

EXAMPLE:

To Order: A harmonic mixer in WR-5.1 with fixed LO at 90 GHz

Specify: MSH-05-F0900. The LO port will be tuned for an LO of 90 GHz and an RF of 150-210 GHz. The optimum LO power (~8dBm) will be used for testing and reported in the test data.