

# Frequency Mixer

# SBL-1-1LH

## Typical Performance Data

RF (IN) (MHz)	LO (MHz)	CONVERSION LOSS IF FIXED @IF(OUT)=30MHz (dB)			RF (IN) (MHz)	LO (MHz)	IP3 INPUT (dBm)			RF (IN) (MHz)	LO (MHz)	COMPRESSION @RF IN=+5dBm (dB)		
		@LO (dBm)					@LO (dBm)					@LO (dBm)		
		+7	+10	+13			+7	+10	+13			+7	+10	+13
0.2	30.2	5.41	5.14	5.02	10.1	40.1	20.87	24.69	24.09	10.1	40.1	1.20	0.89	0.68
0.4	30.4	5.30	5.04	4.93	27.8	57.8	23.73	23.30	28.71	27.8	57.8	1.16	0.83	0.64
0.5	30.5	5.29	5.03	4.93	45.5	75.5	23.32	23.10	24.53	45.5	75.5	1.09	0.83	0.62
1.0	31.0	5.21	4.96	4.85	63.2	93.2	26.47	25.46	19.87	63.2	93.2	1.03	0.80	0.59
2.0	32.0	5.10	4.83	4.73	80.9	110.9	22.55	22.42	17.68	80.9	110.9	1.03	0.73	0.57
5.0	35.0	5.14	4.81	4.68	98.6	128.6	23.46	17.75	15.65	98.6	128.6	0.89	0.64	0.50
10.0	40.0	5.06	4.75	4.66	116.3	146.3	21.15	19.53	17.14	116.3	146.3	0.90	0.65	0.52
45.5	75.5	5.20	4.91	4.78	133.9	163.9	15.46	13.13	12.44	133.9	163.9	0.90	0.68	0.57
63.2	93.2	5.13	4.87	4.78	151.6	181.6	15.75	13.85	13.71	151.6	181.6	0.88	0.64	0.54
80.9	110.9	5.10	4.89	4.79	169.3	199.3	16.50	17.81	19.85	169.3	199.3	0.71	0.60	0.47
98.6	128.6	5.15	4.95	4.82	187.0	217.0	13.73	13.01	14.69	187.0	217.0	0.69	0.54	0.47
116.3	146.3	5.19	4.95	4.80	204.7	234.7	15.72	13.93	14.01	204.7	234.7	0.98	0.73	0.63
151.6	181.6	5.24	5.00	4.87	222.4	252.4	15.68	14.61	14.58	222.4	252.4	1.18	0.87	0.73
169.3	199.3	5.42	5.09	4.85	240.1	270.1	13.19	12.98	16.31	240.1	270.1	1.44	1.02	0.76
187.0	217.0	5.55	5.32	5.08	257.8	287.8	14.00	14.86	16.07	257.8	287.8	1.72	1.17	0.93
204.7	234.7	5.43	5.26	5.11	275.5	305.5	11.40	15.91	16.83	275.5	305.5	1.88	1.39	1.07
222.4	252.4	5.48	5.27	5.17	293.2	323.2	6.11	10.41	15.05	293.2	323.2	2.02	1.66	1.28
257.8	287.8	5.50	5.25	5.15	310.9	340.9	4.17	5.39	9.78	310.9	340.9	2.23	1.80	1.52
275.5	305.5	5.85	5.44	5.31	328.6	358.6	3.42	3.69	5.27	328.6	358.6	2.24	1.82	1.52
293.2	323.2	6.25	5.74	5.46	346.3	376.3	3.31	3.54	4.25	346.3	376.3	1.90	1.56	1.28
310.9	340.9	6.49	6.24	5.74	363.9	393.9	3.51	3.87	4.66	363.9	393.9	1.56	1.26	1.05
328.6	358.6	6.85	6.57	6.23	381.6	411.6	4.87	5.92	7.49	381.6	411.6	1.42	1.21	1.11
363.9	393.9	7.81	7.45	7.05	399.3	429.3	6.48	8.08	10.73	399.3	429.3	1.43	1.31	1.29
381.6	411.6	7.90	7.42	6.89	417.0	447.0	8.10	11.26	16.34	417.0	447.0	1.51	1.50	1.42
399.3	429.3	7.84	7.20	6.42	434.7	464.7	11.00	17.26	24.93	434.7	464.7	1.75	1.66	1.38
417.0	447.0	7.71	6.75	6.01	452.4	482.4	18.02	17.55	32.05	452.4	482.4	2.17	1.80	1.46
434.7	464.7	7.32	6.37	5.94	470.1	500.1	16.57	19.97	21.37	470.1	500.1	2.21	1.73	1.42
470.1	500.1	6.51	6.13	5.94	487.8	517.8	17.76	20.50	19.51	487.8	517.8	2.09	1.59	1.29
487.8	517.8	6.57	6.24	6.12	505.5	535.5	18.03	18.42	19.54	505.5	535.5	1.88	1.33	1.02
505.5	535.5	6.82	6.58	6.43	523.2	553.2	16.21	17.33	20.61	523.2	553.2	1.71	1.21	0.91
523.2	553.2	7.12	6.85	6.73	540.9	570.9	15.76	19.29	20.05	540.9	570.9	1.75	1.29	1.01
540.9	570.9	7.31	7.02	6.84	558.6	588.6	15.55	15.59	14.18	558.6	588.6	1.86	1.45	1.20
576.3	606.3	7.48	7.13	7.00	576.3	606.3	13.15	12.27	11.88	576.3	606.3	1.97	1.57	1.39
593.9	623.9	7.89	7.55	7.42	593.9	623.9	11.51	11.30	10.60	593.9	623.9	2.03	1.55	1.42
611.6	641.6	8.36	8.11	7.96	611.6	641.6	10.76	11.55	10.93	611.6	641.6	2.01	1.47	1.35
629.3	659.3	8.88	8.51	8.40	629.3	659.3	11.04	12.74	12.66	629.3	659.3	2.06	1.50	1.35
647.0	677.0	9.34	8.91	8.77	647.0	677.0	11.86	13.73	14.50	647.0	677.0	2.08	1.45	1.25
664.7	694.7	9.93	9.45	9.22	664.7	694.7	11.94	14.08	14.76	664.7	694.7	2.00	1.31	1.08
682.4	712.4	10.62	10.08	9.78	682.4	712.4	12.28	14.52	17.31	682.4	712.4	1.99	1.16	0.89
700.1	730.1	11.38	10.69	10.32	700.1	730.1	12.32	15.23	19.27	700.1	730.1	2.00	1.15	0.84



# Frequency Mixer

# SBL-1-1LH

## Typical Performance Data

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=200.1MHz (dB)	IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=10.1MHz (dB)	IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=400.1MHz (dB)
		@LO (dBm)			@LO (dBm)			@LO (dBm)
		+10			+10			+10
190.0	10.1	5.22	10.0	20.1	4.77	390.0	10.1	6.53
185.4	14.7	5.20	19.7	29.8	4.69	380.3	19.8	6.49
180.8	19.3	5.14	29.5	39.6	4.65	370.5	29.6	6.42
176.2	23.9	5.06	39.2	49.3	4.71	360.8	39.3	6.36
171.5	28.6	5.05	49.0	59.1	4.75	351.0	49.1	6.34
166.9	33.2	4.97	58.7	68.8	4.74	341.3	58.8	6.30
162.3	37.8	4.95	68.5	78.6	4.78	331.5	68.6	6.29
157.7	42.4	4.95	78.2	88.3	4.85	321.8	78.3	6.31
153.1	47.0	4.95	87.9	98.0	4.86	312.1	88.0	6.29
148.5	51.6	4.94	97.7	107.8	4.83	302.3	97.8	6.25
143.8	56.3	4.92	107.4	117.5	4.86	292.6	107.5	6.28
139.2	60.9	4.92	117.2	127.3	4.89	282.8	117.3	6.32
134.6	65.5	4.90	126.9	137.0	4.88	273.1	127.0	6.31
130.0	70.1	4.90	136.7	146.8	4.93	263.3	136.8	6.33
125.4	74.7	4.92	146.4	156.5	5.03	253.6	146.5	6.41
120.8	79.3	4.93	156.2	166.3	5.01	243.8	156.3	6.38
116.2	83.9	4.93	165.9	176.0	4.94	234.1	166.0	6.31
111.5	88.6	4.93	175.6	185.7	4.91	224.4	175.7	6.36
106.9	93.2	4.93	185.4	195.5	4.93	214.6	185.5	6.33
102.3	97.8	4.91	195.1	205.2	5.03	204.9	195.2	6.27
97.7	102.4	4.93	204.9	215.0	5.19	195.1	205.0	6.33
93.1	107.0	4.97	214.6	224.7	5.35	185.4	214.7	6.32
88.5	111.6	4.99	224.4	234.5	5.41	175.6	224.5	6.28
83.8	116.3	4.99	234.1	244.2	5.49	165.9	234.2	6.26
79.2	120.9	4.97	243.8	253.9	5.53	156.2	243.9	6.27
74.6	125.5	4.96	253.6	263.7	5.41	146.4	253.7	6.25
70.0	130.1	4.94	263.3	273.4	5.22	136.7	263.4	6.08
65.4	134.7	4.94	273.1	283.2	5.16	126.9	273.2	5.90
60.8	139.3	4.96	282.8	292.9	5.10	117.2	282.9	5.85
56.2	143.9	5.00	292.6	302.7	5.03	107.4	292.7	5.77
51.5	148.6	5.01	302.3	312.4	5.09	97.7	302.4	5.72
46.9	153.2	5.03	312.1	322.2	5.29	87.9	312.2	5.78
42.3	157.8	5.05	321.8	331.9	5.37	78.2	321.9	6.01
37.7	162.4	5.06	331.5	341.6	5.31	68.5	331.6	6.35
33.1	167.0	5.07	341.3	351.4	5.32	58.7	341.4	6.77
28.5	171.6	5.10	351.0	361.1	5.29	49.0	351.1	7.16
23.8	176.3	5.11	360.8	370.9	5.21	39.2	360.9	7.41
19.2	180.9	5.07	370.5	380.6	5.21	29.5	370.6	7.57
14.6	185.5	5.10	380.3	390.4	5.17	19.7	380.4	7.71
10.0	190.1	5.14	390.0	400.1	5.05	10.0	390.1	7.72



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## Typical Performance Data

LO (MHz)	LO-RF ISOLATION (dB)			LO-IF ISOLATION (dB)			RF (IN) (MHz)	LO (MHz)	RF-IF ISOLATION (dB)		
	@LO (dBm)			@LO (dBm)					@LO (dBm)		
	+7	+10	+13	+7	+10	+13			+7	+10	+13
0.2	62.99	63.24	63.23	56.72	56.21	55.79	10.1	40.1	40.22	41.14	44.00
0.4	63.07	62.65	62.65	56.39	55.99	55.49	27.8	57.8	35.10	35.63	35.48
0.5	63.12	62.91	62.56	56.36	55.96	55.42	45.5	75.5	31.17	31.79	31.72
1.0	62.80	62.77	62.50	56.72	55.82	55.32	63.2	93.2	29.52	29.95	30.02
2.0	62.73	62.68	62.43	56.21	55.70	55.30	80.9	110.9	28.00	28.26	28.61
5.0	63.11	62.88	62.54	56.73	56.04	55.51	98.6	128.6	27.35	27.58	27.72
10.0	62.85	63.10	62.85	56.90	56.40	55.89	116.3	146.3	26.88	27.64	28.00
45.5	68.23	70.28	72.94	59.75	71.68	60.30	133.9	163.9	26.00	26.63	27.21
63.2	65.48	68.72	71.29	57.32	84.16	57.85	151.6	181.6	26.09	26.67	27.41
80.9	63.74	67.31	70.29	51.93	69.39	58.11	169.3	199.3	26.16	26.64	27.15
98.6	62.21	64.14	65.97	51.29	65.50	55.75	187.0	217.0	27.19	27.69	27.88
116.3	61.88	67.85	71.31	49.18	59.04	54.52	204.7	234.7	27.69	28.11	28.74
151.6	61.45	63.33	64.14	47.42	53.95	50.18	222.4	252.4	27.22	27.91	28.96
169.3	64.44	71.15	75.08	44.53	49.07	52.96	240.1	270.1	25.42	26.31	26.94
187.0	60.73	66.74	72.94	44.90	48.59	53.15	257.8	287.8	23.34	23.64	23.72
204.7	53.04	56.60	60.77	43.85	53.40	50.80	275.5	305.5	21.55	21.13	20.90
222.4	51.95	54.45	57.19	39.93	44.16	50.85	293.2	323.2	20.18	19.44	18.83
257.8	48.66	53.46	62.87	38.93	38.78	39.29	310.9	340.9	19.27	19.00	18.54
275.5	49.47	58.42	69.01	39.49	37.68	38.57	328.6	358.6	18.33	18.21	18.12
293.2	54.36	58.62	56.65	37.45	36.78	37.77	346.3	376.3	18.07	17.82	17.80
310.9	52.00	52.58	52.04	40.53	36.06	37.31	363.9	393.9	18.01	17.66	17.51
328.6	51.80	53.61	54.87	42.01	40.27	38.25	381.6	411.6	18.57	18.26	18.06
363.9	48.44	48.30	48.74	33.32	36.48	41.32	399.3	429.3	18.76	18.45	18.16
381.6	49.01	48.64	48.31	31.30	33.17	35.36	417.0	447.0	18.85	18.35	17.67
399.3	46.83	46.37	45.86	29.52	30.79	32.10	434.7	464.7	18.28	17.48	16.99
417.0	48.69	49.00	49.19	27.92	28.68	29.40	452.4	482.4	17.22	16.55	16.23
434.7	46.84	45.18	42.90	26.96	27.54	27.56	470.1	500.1	16.14	15.73	15.50
470.1	42.52	39.61	38.44	24.89	24.73	24.29	487.8	517.8	15.43	15.08	14.86
487.8	39.67	38.42	37.93	23.47	23.60	23.59	505.5	535.5	14.62	14.30	14.03
505.5	37.30	36.95	36.74	22.86	23.28	23.39	523.2	553.2	13.93	13.56	13.31
523.2	35.26	34.87	34.24	22.20	22.69	22.68	540.9	570.9	13.23	12.84	12.44
540.9	34.19	34.03	33.48	21.03	21.72	21.69	558.6	588.6	12.30	11.85	11.46
576.3	30.77	30.82	30.37	18.63	19.66	19.71	576.3	606.3	11.22	10.78	10.42
593.9	29.00	29.18	28.92	17.58	18.67	18.70	593.9	623.9	10.36	9.82	9.51
611.6	27.07	27.34	27.10	16.71	17.83	17.90	611.6	641.6	9.69	9.16	8.79
629.3	26.03	26.48	26.40	16.04	17.08	17.21	629.3	659.3	9.07	8.56	8.23
647.0	25.09	25.36	25.24	15.67	16.54	16.61	647.0	677.0	8.50	8.06	7.70
664.7	24.28	24.55	24.29	15.44	16.23	16.16	664.7	694.7	7.92	7.56	7.31
682.4	23.53	24.00	23.72	15.22	15.90	15.66	682.4	712.4	7.48	7.12	6.91
700.1	22.45	23.07	22.78	14.78	15.57	15.34	700.1	730.1	7.00	6.74	6.50

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## Typical Performance Data

RF (IN) (MHz)	LO (MHz)	RF VSWR (:1)		
		@LO (dBm)		
		+7	+10	+13
0.3	30.3	1.42	1.36	1.33
0.4	30.4	1.34	1.28	1.25
1.0	31.0	1.27	1.19	1.14
2.0	32.0	1.29	1.19	1.11
5.0	35.0	1.30	1.19	1.10
10.0	40.0	1.31	1.20	1.10
27.8	57.8	1.32	1.19	1.12
45.5	75.5	1.31	1.19	1.12
63.2	93.2	1.26	1.15	1.08
80.9	110.9	1.24	1.12	1.06
98.6	128.6	1.20	1.11	1.06
116.3	146.3	1.18	1.07	1.03
133.9	163.9	1.18	1.10	1.05
151.6	181.6	1.17	1.10	1.08
169.3	199.3	1.15	1.06	1.08
187.0	217.0	1.12	1.06	1.06
204.7	234.7	1.06	1.06	1.10
222.4	252.4	1.08	1.12	1.17
240.1	270.1	1.14	1.23	1.28
257.8	287.8	1.20	1.28	1.31
275.5	305.5	1.20	1.27	1.29
293.2	323.2	1.24	1.26	1.26
310.9	340.9	1.32	1.29	1.26
328.6	358.6	1.40	1.35	1.30
346.3	376.3	1.52	1.46	1.39
363.9	393.9	1.67	1.60	1.53
381.6	411.6	1.72	1.64	1.55
399.3	429.3	1.72	1.62	1.51
417.0	447.0	1.78	1.66	1.60
434.7	464.7	1.83	1.75	1.75
452.4	482.4	1.93	1.90	1.90
470.1	500.1	1.98	1.98	1.99
487.8	517.8	2.05	2.05	2.06
505.5	535.5	2.21	2.20	2.21
523.2	553.2	2.38	2.37	2.36
540.9	570.9	2.53	2.49	2.46
558.6	588.6	2.59	2.54	2.51
576.3	606.3	2.64	2.59	2.57
593.9	623.9	2.78	2.71	2.67
611.6	641.6	2.92	2.84	2.81
629.3	659.3	3.02	2.94	2.89
647.0	677.0	3.09	3.01	2.99
664.7	694.7	3.16	3.08	3.08
682.4	712.4	3.27	3.20	3.20
700.1	730.1	3.33	3.26	3.28

LO (MHz)	LO VSWR (:1)		
	@LO (dBm)		
	+7	+10	+13
0.3	1.83	2.66	3.77
0.4	1.79	2.62	3.73
1.0	1.74	2.58	3.68
2.0	1.71	2.53	3.62
5.0	1.67	2.49	3.57
10.0	1.53	2.33	3.37
27.8	1.47	2.26	3.34
45.5	1.42	2.20	3.22
63.2	1.36	2.06	2.96
80.9	1.35	2.00	2.85
98.6	1.38	2.07	2.92
116.3	1.43	2.16	3.08
133.9	1.47	2.21	3.14
151.6	1.46	2.17	3.03
169.3	1.46	2.13	2.97
187.0	1.50	2.16	2.99
204.7	1.59	2.29	3.15
222.4	1.64	2.38	3.27
240.1	1.66	2.36	3.22
257.8	1.66	2.31	3.14
275.5	1.69	2.33	3.17
293.2	1.81	2.46	3.31
310.9	1.96	2.64	3.48
328.6	2.03	2.75	3.58
346.3	2.04	2.77	3.62
363.9	2.06	2.79	3.65
381.6	2.12	2.86	3.75
399.3	2.18	2.95	3.83
417.0	2.21	2.96	3.82
434.7	2.19	2.90	3.75
452.4	2.17	2.86	3.69
470.1	2.16	2.86	3.73
487.8	2.20	2.93	3.84
505.5	2.27	3.01	3.91
523.2	2.38	3.09	3.95
540.9	2.53	3.18	4.01
558.6	2.73	3.32	4.12
576.3	2.96	3.50	4.28
593.9	3.20	3.67	4.40
611.6	3.43	3.82	4.47
629.3	3.62	3.95	4.54
647.0	3.76	4.11	4.64
664.7	3.86	4.27	4.78
682.4	3.89	4.36	4.87
700.1	3.86	4.38	4.89

IF (OUT) (MHz)	IF VSWR @LO=400.1MHz (:1)		
	@LO (dBm)		
	+7	+10	+13
0.3	1.97	1.72	1.47
0.4	1.97	1.72	1.47
1.0	1.98	1.72	1.47
2.0	1.98	1.72	1.47
5.0	1.99	1.73	1.47
10.0	2.01	1.74	1.47
20.0	2.93	2.59	2.36
30.0	3.16	2.85	2.53
40.0	3.27	2.95	2.61
50.0	3.34	3.03	2.65
60.0	3.29	2.98	2.61
70.0	3.25	2.96	2.60
80.0	3.28	3.00	2.61
90.0	3.30	2.98	2.66
100.0	3.29	2.99	2.69
110.0	3.26	2.95	2.68
120.0	3.24	2.92	2.65
130.0	3.24	2.95	2.66
140.0	3.27	2.99	2.68
150.0	3.28	3.02	2.72
160.0	3.31	3.05	2.76
170.0	3.32	3.06	2.77
180.0	3.27	3.02	2.75
190.0	3.16	2.92	2.69
200.0	3.07	2.84	2.63
210.0	3.04	2.81	2.60
220.0	3.10	2.86	2.63
230.0	3.13	2.91	2.68
240.0	3.11	2.90	2.67
250.0	3.04	2.84	2.61
260.0	2.98	2.77	2.54
270.0	2.91	2.70	2.48
280.0	2.84	2.63	2.44
290.0	2.80	2.60	2.41
300.0	2.83	2.61	2.42
310.0	2.86	2.63	2.43
320.0	2.82	2.61	2.41
330.0	2.74	2.54	2.34
340.0	2.71	2.49	2.28
350.0	2.75	2.51	2.28
360.0	2.76	2.53	2.29
370.0	2.72	2.50	2.27
380.0	2.68	2.45	2.21
390.0	2.68	2.43	2.19
400.0	2.76	2.54	2.31

## Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	27	47	24	52	28	50	55	52	52	72
1	-	24	+0	29	12	35	30	41	38	39	50	54
2	94	54	47	56	51	49	48	54	47	55	60	57
3	>100	47	35	48	41	59	39	59	48	51	50	49
4	>100	62	69	66	59	71	57	75	56	66	64	66
5	>100	77	69	52	51	54	48	58	47	57	60	63
6	>100	80	72	73	72	69	86	68	74	69	74	79
7	>100	73	81	82	69	63	68	66	64	68	62	78
8	>100	80	92	91	79	80	88	85	81	86	81	76
9	>100	81	78	85	85	85	82	71	74	71	73	73
10	>100	>94	88	94	>94	>94	89	89	94	85	92	89
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

### LO HARMONICS ORDER

Test conditions: RF IN: 200.1 MHz; 0.00 dBm.  
 LO IN: 230.01 MHz; +10.00 dBm  
 IF OUT: 29.91 MHz; -5.51 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	16	30	13	42	16	37	40	34	39	51
1	-	22	+0	33	11	34	30	34	33	31	49	45
2	>100	55	51	55	53	53	50	67	53	62	64	62
3	>100	61	54	60	55	65	52	61	59	64	59	64
4	>100	81	78	>84	83	>84	82	>84	80	>84	>84	>84
5	>100	>84	80	>84	82	84	79	>84	78	>84	>84	>84
6	>100	>84	>84	>84	>84	>84	73	>84	>84	>84	>84	>84
7	>100	>84	>84	>84	>84	>84	>84	75	>84	>84	>84	>84
8	>100	>84	>84	>84	>84	>84	>84	>84	65	>84	>84	>84
9	>100	>84	>84	>84	>84	>84	>84	>84	>84	70	>84	>84
10	>100	>84	>84	>84	>84	>84	>84	>84	>84	>84	81	>84
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

### LO HARMONICS ORDER

Test conditions: RF IN: 200.1 MHz; -10.00 dBm.  
 LO IN: 230.01 MHz; +10.00 dBm  
 IF OUT: 29.91 MHz; -15.57 dBm

- Notes: 1. All Harmonics are in (dBc) relative to IF OUTPUT.  
 2. + entry denotes harmonics are in (dBc) above IF OUTPUT.  
 3. RF Cal represent the Harmonics level of the RF input signal to the mixer.

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