

# Frequency Mixer

# SBL-1Z

## 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=+1dBm (dB)		
		@LO (dBm)					@LO (dBm)					@LO (dBm)		
		+4	+7	+10			+4	+7	+10			+4	+7	+10
10.1	40.1	6.26	5.84	5.67	10.1	40.1	22.14	17.62	16.69	10.1	40.1	0.84	0.56	0.37
50.4	80.4	6.33	5.98	5.75	50.4	80.4	12.78	14.11	18.24	50.4	80.4	0.80	0.49	0.33
90.8	120.8	6.43	6.04	5.82	90.8	120.8	12.98	18.52	21.49	90.8	120.8	0.84	0.48	0.32
110.9	140.9	6.32	6.03	5.84	110.9	140.9	12.88	19.03	23.30	110.9	140.9	0.70	0.46	0.32
151.3	181.3	6.47	6.10	5.89	151.3	181.3	14.41	17.54	19.82	151.3	181.3	0.77	0.53	0.40
171.5	201.5	6.56	6.19	5.99	171.5	201.5	14.98	17.33	20.73	171.5	201.5	0.78	0.56	0.42
211.8	241.8	6.55	6.20	5.99	211.8	241.8	15.78	18.60	20.88	211.8	241.8	0.94	0.70	0.53
232.0	262.0	6.65	6.28	6.00	232.0	262.0	14.65	16.28	18.58	232.0	262.0	1.01	0.78	0.60
272.3	302.3	6.89	6.45	6.15	272.3	302.3	14.35	18.04	19.02	272.3	302.3	1.11	0.87	0.70
292.5	322.5	6.91	6.46	6.15	292.5	322.5	15.79	15.94	17.91	292.5	322.5	1.12	0.92	0.77
332.8	362.8	6.91	6.41	6.14	332.8	362.8	15.34	21.18	19.53	332.8	362.8	1.24	1.00	0.84
353.0	383.0	6.98	6.45	6.12	353.0	383.0	14.28	17.81	21.54	353.0	383.0	1.24	1.10	0.92
393.3	423.3	7.10	6.55	6.15	393.3	423.3	9.60	11.45	13.04	393.3	423.3	1.00	0.87	0.75
413.5	443.5	7.05	6.56	6.13	413.5	443.5	8.42	10.17	11.74	413.5	443.5	1.01	0.84	0.75
453.8	483.8	6.96	6.55	6.20	453.8	483.8	7.74	9.02	10.70	453.8	483.8	1.01	0.77	0.63
474.0	504.0	6.76	6.44	6.13	474.0	504.0	7.91	9.37	10.31	474.0	504.0	0.97	0.76	0.61
514.3	544.3	6.68	6.34	6.07	514.3	544.3	8.50	9.86	11.25	514.3	544.3	0.93	0.69	0.57
534.5	564.5	6.58	6.30	6.06	534.5	564.5	9.09	10.36	12.55	534.5	564.5	0.86	0.63	0.52
574.8	604.8	6.49	6.22	6.04	574.8	604.8	10.82	11.96	15.62	574.8	604.8	0.78	0.53	0.42
595.0	625.0	6.51	6.25	6.09	595.0	625.0	12.78	12.51	14.97	595.0	625.0	0.74	0.48	0.38
635.4	665.4	6.50	6.25	6.13	635.4	665.4	14.76	16.44	14.75	635.4	665.4	0.81	0.47	0.30
655.5	685.5	6.54	6.24	6.08	655.5	685.5	12.28	16.04	16.84	655.5	685.5	0.77	0.45	0.31
695.9	725.9	6.45	6.29	6.14	695.9	725.9	10.41	12.49	14.76	695.9	725.9	0.92	0.59	0.44
716.0	746.0	6.46	6.24	6.13	716.0	746.0	9.16	11.13	13.11	716.0	746.0	1.03	0.67	0.50
756.4	786.4	6.60	6.31	6.15	756.4	786.4	7.48	9.50	11.28	756.4	786.4	1.41	1.01	0.79
776.5	806.5	6.84	6.46	6.23	776.5	806.5	7.92	9.72	11.42	776.5	806.5	1.53	1.16	0.92
816.9	846.9	7.40	6.81	6.37	816.9	846.9	10.04	13.43	22.31	816.9	846.9	1.47	1.18	0.97
837.0	867.0	7.68	6.94	6.40	837.0	867.0	11.90	20.91	17.97	837.0	867.0	1.50	1.26	1.06
877.4	907.4	7.91	7.12	6.58	877.4	907.4	17.30	16.52	16.23	877.4	907.4	1.40	1.15	0.97
897.6	927.6	7.80	7.06	6.54	897.6	927.6	16.39	15.04	15.00	897.6	927.6	1.37	1.14	0.95
937.9	967.9	8.14	7.30	6.78	937.9	967.9	13.87	14.31	14.48	937.9	967.9	1.34	1.06	0.90
958.1	988.1	8.25	7.45	6.94	958.1	988.1	12.48	13.84	14.42	958.1	988.1	1.40	1.09	0.91
998.4	1028.4	8.56	7.72	7.20	998.4	1028.4	12.75	14.18	14.12	998.4	1028.4	1.32	1.06	0.91
1018.6	1048.6	8.80	7.88	7.37	1018.6	1048.6	12.08	13.97	15.33	1018.6	1048.6	1.30	1.05	0.92
1058.9	1088.9	9.27	8.32	7.77	1058.9	1088.9	11.93	12.70	13.74	1058.9	1088.9	1.15	1.04	0.91
1079.1	1109.1	9.35	8.47	7.97	1079.1	1109.1	12.20	12.71	15.14	1079.1	1109.1	0.94	0.87	0.80
1119.4	1149.4	9.90	9.00	8.37	1119.4	1149.4	10.80	12.55	12.61	1119.4	1149.4	0.70	0.77	0.74
1139.6	1169.6	10.11	9.27	8.54	1139.6	1169.6	11.31	11.96	11.71	1139.6	1169.6	0.69	0.70	0.79
1179.9	1209.9	10.37	9.71	8.98	1179.9	1209.9	10.75	11.12	10.22	1179.9	1209.9	0.68	0.72	0.98
1200.1	1230.1	10.68	10.09	9.38	1200.1	1230.1	10.28	10.62	9.37	1200.1	1230.1	0.67	0.66	0.93



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## Typical Performance Data

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=500.1MHz (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)=1000.1MHz (dB)
		@LO (dBm)			@LO (dBm)			@LO (dBm)
		+7			+7			+7
480.0	20.1	6.66	10.0	20.1	5.89	500.0	500.1	6.78
467.9	32.2	6.71	22.6	32.7	5.77	487.4	512.7	6.83
455.9	44.2	6.74	35.1	45.2	5.78	474.9	525.2	6.80
443.8	56.3	6.74	47.7	57.8	5.82	462.3	537.8	6.70
431.8	68.3	6.69	60.3	70.4	5.77	449.7	550.4	6.65
419.7	80.4	6.69	72.8	82.9	5.79	437.2	562.9	6.67
407.7	92.4	6.68	85.4	95.5	5.78	424.6	575.5	6.70
395.6	104.5	6.65	97.9	108.0	5.79	412.1	588.0	6.73
383.6	116.5	6.59	110.5	120.6	5.79	399.5	600.6	6.77
371.5	128.6	6.57	123.1	133.2	5.76	386.9	613.2	6.94
359.5	140.6	6.53	135.6	145.7	5.78	374.4	625.7	7.00
347.4	152.7	6.56	148.2	158.3	5.82	361.8	638.3	7.09
335.4	164.7	6.56	160.8	170.9	5.83	349.2	650.9	7.24
323.3	176.8	6.49	173.3	183.4	5.83	336.7	663.4	7.41
311.3	188.8	6.44	185.9	196.0	5.86	324.1	676.0	7.47
299.2	200.9	6.53	198.5	208.6	5.81	311.5	688.6	7.58
287.2	212.9	6.51	211.0	221.1	5.82	299.0	701.1	7.70
275.1	225.0	6.48	223.6	233.7	5.84	286.4	713.7	7.77
263.1	237.0	6.54	236.2	246.3	5.84	273.8	726.3	7.87
251.0	249.1	6.42	248.7	258.8	5.93	261.3	738.8	7.82
239.0	261.1	6.45	261.3	271.4	5.89	248.7	751.4	7.99
226.9	273.2	6.42	273.8	283.9	5.90	236.2	763.9	8.07
214.9	285.2	6.34	286.4	296.5	5.94	223.6	776.5	8.09
202.8	297.3	6.34	299.0	309.1	5.93	211.0	789.1	8.10
190.8	309.3	6.32	311.5	321.6	5.95	198.5	801.6	8.13
178.7	321.4	6.26	324.1	334.2	5.96	185.9	814.2	8.10
166.7	333.4	6.29	336.7	346.8	5.92	173.3	826.8	8.05
154.6	345.5	6.32	349.2	359.3	5.96	160.8	839.3	8.01
142.6	357.5	6.33	361.8	371.9	5.96	148.2	851.9	8.03
130.5	369.6	6.39	374.4	384.5	6.01	135.6	864.5	8.00
118.5	381.6	6.45	386.9	397.0	6.04	123.1	877.0	7.81
106.4	393.7	6.43	399.5	409.6	5.98	110.5	889.6	7.86
94.4	405.7	6.41	412.1	422.2	6.02	97.9	902.2	7.82
82.3	417.8	6.34	424.6	434.7	6.08	85.4	914.7	7.74
70.3	429.8	6.35	437.2	447.3	6.11	72.8	927.3	7.69
58.2	441.9	6.38	449.7	459.8	6.17	60.3	939.8	7.76
46.2	453.9	6.29	462.3	472.4	6.22	47.7	952.4	7.73
34.1	466.0	6.35	474.9	485.0	6.24	35.1	965.0	7.71
22.1	478.0	6.40	487.4	497.5	6.28	22.6	977.5	7.69
10.0	490.1	6.45	500.0	510.1	6.32	10.0	990.1	7.85



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## Typical Performance Data

LO (MHz)	LO-RF ISOLATION (dB)			LO-IF ISOLATION (dB)		
	@LO (dBm)			@LO (dBm)		
	+4	+7	+10	+4	+7	+10
10.1	56.28	59.07	62.04	49.03	49.75	50.27
50.4	55.56	58.49	61.60	37.88	38.63	39.49
90.8	53.24	56.03	58.81	33.72	34.71	35.31
110.9	52.43	55.16	58.00	32.68	33.72	33.80
151.3	51.07	53.85	56.80	30.55	31.35	31.57
171.5	50.00	52.66	55.12	29.94	30.45	30.69
211.8	48.76	51.22	53.52	28.44	28.98	29.20
232.0	48.28	51.24	54.21	27.80	28.30	28.50
272.3	46.56	49.34	51.72	26.57	27.06	27.34
292.5	45.67	48.09	50.55	25.96	26.53	26.91
332.8	44.72	47.13	49.84	24.88	25.58	26.12
353.0	44.53	46.96	49.63	24.45	25.15	25.58
393.3	43.40	45.26	46.79	23.73	24.51	25.16
413.5	43.82	46.22	48.16	23.37	24.16	24.87
453.8	42.85	45.13	46.78	22.94	23.95	24.83
474.0	42.65	44.66	46.20	22.58	23.58	24.41
514.3	41.71	43.38	44.78	22.29	23.47	24.54
534.5	41.39	42.89	43.75	22.12	23.31	24.38
574.8	41.01	42.44	42.83	21.93	23.22	24.45
595.0	42.16	44.18	44.12	21.74	23.21	24.46
635.4	42.66	44.22	42.72	21.90	23.52	24.97
655.5	42.50	44.44	43.23	22.02	23.78	25.28
695.9	42.62	44.80	43.15	22.27	24.18	25.97
716.0	40.98	42.99	42.01	22.31	24.23	26.13
756.4	39.84	41.97	42.32	22.49	24.49	26.52
776.5	39.68	42.28	43.01	22.72	24.75	26.75
816.9	37.20	39.23	40.22	23.18	25.17	26.91
837.0	35.65	37.20	38.02	23.62	25.56	26.98
877.4	33.48	34.62	35.32	23.74	25.64	27.07
897.6	32.57	33.53	34.04	23.57	25.55	26.98
937.9	31.03	31.67	31.81	23.27	25.12	26.18
958.1	30.48	30.93	31.12	23.07	24.70	25.72
998.4	28.82	29.05	29.00	22.55	23.77	24.35
1018.6	28.05	28.08	27.97	22.47	23.31	23.63
1058.9	26.25	26.01	25.86	21.56	21.90	22.05
1079.1	25.50	25.14	24.93	21.16	21.27	21.35
1119.4	23.83	23.15	22.83	20.57	20.09	19.94
1139.6	23.10	22.26	21.80	20.37	19.61	19.25
1179.9	21.86	20.67	20.00	20.08	18.79	18.13
1200.1	20.99	19.80	19.09	19.72	18.36	17.60

RF (IN) (MHz)	LO (MHz)	RF-IF ISOLATION (dB)		
		@LO (dBm)		
		+4	+7	+10
10.1	40.1	50.63	46.81	56.29
50.4	80.4	49.46	48.15	48.97
90.8	120.8	45.62	44.55	45.31
110.9	140.9	43.71	42.52	42.02
151.3	181.3	41.04	41.15	40.70
171.5	201.5	40.75	39.84	39.58
211.8	241.8	40.45	39.95	39.02
232.0	262.0	39.05	38.83	38.48
272.3	302.3	37.79	36.97	36.87
292.5	322.5	38.72	36.96	36.33
332.8	362.8	40.74	39.25	37.24
353.0	383.0	40.76	40.05	38.95
393.3	423.3	37.67	37.62	37.79
413.5	443.5	36.81	36.75	36.49
453.8	483.8	34.17	33.95	33.72
474.0	504.0	33.24	32.90	32.57
514.3	544.3	31.88	30.85	30.26
534.5	564.5	31.36	29.92	29.20
574.8	604.8	30.75	28.75	27.84
595.0	625.0	31.04	28.95	27.82
635.4	665.4	31.52	29.56	28.09
655.5	685.5	32.39	30.50	28.96
695.9	725.9	32.98	31.81	30.64
716.0	746.0	33.53	32.36	31.21
756.4	786.4	39.95	39.16	38.09
776.5	806.5	40.66	41.38	40.71
816.9	846.9	32.47	33.10	33.85
837.0	867.0	29.45	29.80	30.30
877.4	907.4	27.18	27.31	27.58
897.6	927.6	26.38	26.42	26.49
937.9	967.9	25.50	25.19	25.27
958.1	988.1	25.26	24.88	24.80
998.4	1028.4	24.67	24.16	24.03
1018.6	1048.6	24.83	24.18	23.89
1058.9	1088.9	24.69	23.86	23.41
1079.1	1109.1	24.43	23.55	23.03
1119.4	1149.4	24.50	23.68	22.90
1139.6	1169.6	24.28	23.50	22.78
1179.9	1209.9	23.97	23.32	22.44
1200.1	1230.1	24.07	23.33	22.36



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## Typical Performance Data

RF (IN) (MHz)	LO (MHz)	RF VSWR (:1)		
		@LO (dBm)		
		+4	+7	+10
10.1	40.1	1.11	1.13	1.16
50.4	80.4	1.02	1.04	1.09
90.8	120.8	1.05	1.05	1.09
110.9	140.9	1.06	1.06	1.10
151.3	181.3	1.09	1.07	1.09
171.5	201.5	1.11	1.08	1.08
211.8	241.8	1.16	1.12	1.11
232.0	262.0	1.20	1.16	1.14
272.3	302.3	1.31	1.26	1.23
292.5	322.5	1.36	1.31	1.28
332.8	362.8	1.49	1.43	1.41
353.0	383.0	1.57	1.51	1.47
393.3	423.3	1.75	1.70	1.65
413.5	443.5	1.85	1.81	1.77
453.8	483.8	1.99	1.97	1.94
474.0	504.0	2.03	2.03	2.02
514.3	544.3	2.12	2.15	2.18
534.5	564.5	2.15	2.21	2.25
574.8	604.8	2.21	2.32	2.40
595.0	625.0	2.20	2.31	2.42
635.4	665.4	2.12	2.21	2.31
655.5	685.5	2.08	2.14	2.23
695.9	725.9	1.96	2.00	2.06
716.0	746.0	1.87	1.90	1.93
756.4	786.4	1.79	1.76	1.76
776.5	806.5	1.85	1.80	1.77
816.9	846.9	2.24	2.14	2.08
837.0	867.0	2.49	2.36	2.27
877.4	907.4	2.96	2.80	2.69
897.6	927.6	3.13	2.96	2.84
937.9	967.9	3.54	3.34	3.20
958.1	988.1	3.70	3.51	3.37
998.4	1028.4	4.01	3.84	3.70
1018.6	1048.6	4.14	3.97	3.85
1058.9	1088.9	4.36	4.22	4.13
1079.1	1109.1	4.41	4.32	4.23
1119.4	1149.4	4.48	4.40	4.33
1139.6	1169.6	4.53	4.42	4.34
1179.9	1209.9	4.68	4.51	4.36
1200.1	1230.1	4.78	4.54	4.36

LO (MHz)	LO VSWR (:1)		
	@LO (dBm)		
	+4	+7	+10
10.1	1.64	2.25	3.28
50.4	1.72	2.47	3.50
90.8	1.62	2.41	3.35
110.9	1.65	2.35	3.29
151.3	1.70	2.41	3.34
171.5	1.66	2.34	3.21
211.8	1.72	2.43	3.34
232.0	1.76	2.54	3.46
272.3	1.80	2.55	3.45
292.5	1.77	2.44	3.32
332.8	1.89	2.59	3.47
353.0	1.90	2.57	3.42
393.3	1.95	2.62	3.46
413.5	2.01	2.74	3.61
453.8	2.07	2.81	3.68
474.0	2.07	2.72	3.53
514.3	2.20	2.86	3.70
534.5	2.25	2.89	3.70
574.8	2.31	2.93	3.72
595.0	2.39	3.03	3.82
635.4	2.49	3.12	3.90
655.5	2.55	3.20	3.95
695.9	2.67	3.33	4.12
716.0	2.69	3.30	4.09
756.4	2.74	3.31	4.08
776.5	2.80	3.36	4.11
816.9	2.89	3.42	4.15
837.0	2.98	3.55	4.27
877.4	3.04	3.54	4.25
897.6	3.07	3.51	4.20
937.9	3.20	3.58	4.21
958.1	3.26	3.61	4.24
998.4	3.42	3.70	4.29
1018.6	3.52	3.85	4.43
1058.9	3.66	3.89	4.39
1079.1	3.72	3.87	4.31
1119.4	3.80	3.92	4.27
1139.6	3.83	3.89	4.21
1179.9	3.79	3.78	4.02
1200.1	3.73	3.73	3.95

IF (OUT) (MHz)	IF VSWR @LO=1000.1MHz (:1)		
	@LO (dBm)		
	+4	+7	+10
10.0	1.58	1.23	1.03
22.6	1.68	1.33	1.13
35.1	1.58	1.26	1.06
47.7	1.54	1.26	1.07
60.3	1.57	1.28	1.09
72.8	1.61	1.30	1.11
85.4	1.59	1.29	1.10
97.9	1.57	1.27	1.08
110.5	1.59	1.27	1.09
123.1	1.61	1.29	1.10
135.6	1.60	1.30	1.11
148.2	1.57	1.29	1.10
160.8	1.55	1.26	1.08
173.3	1.52	1.24	1.07
185.9	1.53	1.25	1.10
198.5	1.56	1.26	1.11
211.0	1.55	1.26	1.10
223.6	1.49	1.22	1.07
236.2	1.46	1.20	1.08
248.7	1.45	1.20	1.10
261.3	1.47	1.22	1.11
273.8	1.46	1.21	1.11
286.4	1.42	1.18	1.09
299.0	1.39	1.15	1.10
311.5	1.35	1.13	1.12
324.1	1.32	1.13	1.13
336.7	1.31	1.11	1.13
349.2	1.28	1.08	1.12
361.8	1.24	1.05	1.13
374.4	1.19	1.05	1.16
386.9	1.16	1.06	1.19
399.5	1.14	1.07	1.20
412.1	1.10	1.08	1.21
424.6	1.06	1.12	1.25
437.2	1.03	1.17	1.31
449.7	1.06	1.22	1.36
462.3	1.09	1.26	1.40
474.9	1.13	1.30	1.45
487.4	1.19	1.38	1.52
500.0	1.27	1.47	1.62

## Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	+4	25	30	47	41	35	36	52	54	68
1	-	25	+0	37	19	43	49	53	50	45	60	71
2	>100	63	45	65	45	70	57	>80	66	62	65	76
3	>100	>80	65	68	58	69	69	>80	>80	>80	79	77
4	>100	>80	>80	>80	72	78	73	>80	>80	>80	>80	>80
5	>100	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80
6	>100	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80
7	>100	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80
8	>100	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80
9	>100	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80
10	>100	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

### LO HARMONICS ORDER

Test conditions: RF IN: 500.1 MHz; -14.00 dBm.  
 LO IN: 530.01 MHz; +7.00 dBm  
 IF OUT: 29.91 MHz; -20.5 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	6	35	44	58	50	51	53	80	88	79
1	-	24	+0	45	20	45	51	58	59	55	76	88
2	97	56	40	56	40	62	53	77	67	58	62	77
3	>100	56	45	56	40	54	51	70	70	71	68	66
4	>100	>89	62	72	50	69	51	73	67	87	74	68
5	>100	>89	>89	76	64	69	57	73	65	>89	82	86
6	>100	89	89	>89	73	76	62	74	64	>89	80	>89
7	>100	>89	>89	>89	>89	>89	83	82	77	85	86	>89
8	>100	>89	>89	>89	>89	>89	86	86	74	81	77	>89
9	>100	>89	>89	>89	>89	>89	>89	>89	>89	>89	>89	>89
10	>100	>89	>89	>89	>89	>89	>89	>89	>89	>89	88	89
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

### LO HARMONICS ORDER

Test conditions: RF IN: 500.1 MHz; -4.00 dBm.  
 LO IN: 530.01 MHz; +7.00 dBm  
 IF OUT: 29.91 MHz; -10.54 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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