

Frequency Mixer

SBL-11LH

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
5.0	35.0	6.93	6.55	6.32	10.1	40.1	18.04	18.97	18.81	10.1	40.1	1.22	0.91	0.72
10.0	40.0	6.62	6.31	6.09	90.4	120.4	12.72	11.34	11.04	90.4	120.4	1.10	0.79	0.62
90.4	120.4	6.73	6.50	6.30	170.7	200.7	8.82	9.26	11.12	170.7	200.7	1.04	0.81	0.67
170.7	200.7	7.03	6.75	6.48	251.0	281.0	7.75	9.59	12.26	251.0	281.0	1.13	0.94	0.86
251.0	281.0	7.38	6.95	6.57	331.3	361.3	7.71	10.25	13.64	331.3	361.3	1.24	1.14	1.03
331.3	361.3	7.76	7.13	6.64	411.5	441.5	8.94	12.00	15.40	411.5	441.5	1.36	1.27	1.14
411.5	441.5	7.87	7.15	6.66	491.8	521.8	9.92	13.96	16.58	491.8	521.8	1.47	1.48	1.29
491.8	521.8	8.07	7.21	6.70	552.0	582.0	9.87	13.74	17.12	552.0	582.0	1.36	1.50	1.40
552.0	582.0	8.29	7.31	6.72	632.3	662.3	10.72	13.50	15.73	632.3	662.3	1.32	1.39	1.33
632.3	662.3	8.45	7.52	6.97	692.5	722.5	10.56	13.06	15.01	692.5	722.5	1.15	1.20	1.15
692.5	722.5	8.69	7.82	7.30	772.8	802.8	10.64	12.69	14.54	772.8	802.8	1.04	0.96	0.90
772.8	802.8	8.78	8.09	7.60	833.0	863.0	10.99	12.34	13.90	833.0	863.0	1.07	0.91	0.79
833.0	863.0	8.49	7.97	7.55	913.3	943.3	11.39	12.14	12.97	913.3	943.3	1.03	0.81	0.69
913.3	943.3	8.20	7.75	7.46	973.6	1003.6	11.25	12.35	13.36	973.6	1003.6	0.94	0.77	0.61
973.6	1003.6	7.98	7.60	7.33	1053.8	1083.8	11.70	12.52	13.97	1053.8	1083.8	0.80	0.63	0.53
1053.8	1083.8	7.76	7.45	7.20	1114.1	1144.1	12.49	13.92	15.43	1114.1	1144.1	0.70	0.53	0.46
1114.1	1144.1	7.59	7.30	7.10	1194.3	1224.3	13.93	15.38	15.75	1194.3	1224.3	0.64	0.41	0.35
1194.3	1224.3	7.44	7.14	7.00	1254.6	1284.6	15.99	16.94	18.22	1254.6	1284.6	0.60	0.37	0.32
1254.6	1284.6	7.47	7.09	6.95	1334.8	1364.8	23.04	20.03	25.40	1334.8	1364.8	0.53	0.36	0.29
1334.8	1364.8	7.51	7.08	6.93	1395.1	1425.1	15.92	21.87	21.92	1395.1	1425.1	0.48	0.34	0.29
1395.1	1425.1	7.62	7.07	6.87	1475.4	1505.4	17.41	17.38	20.49	1475.4	1505.4	0.47	0.33	0.26
1475.4	1505.4	7.75	7.23	6.95	1535.6	1565.6	15.35	19.12	20.76	1535.6	1565.6	0.41	0.29	0.25
1535.6	1565.6	7.96	7.43	7.12	1615.9	1645.9	13.11	16.44	22.79	1615.9	1645.9	0.31	0.29	0.27
1615.9	1645.9	8.33	7.68	7.28	1676.1	1706.1	14.08	15.43	19.49	1676.1	1706.1	0.37	0.29	0.29
1676.1	1706.1	8.52	7.85	7.41	1756.4	1786.4	13.76	17.93	19.56	1756.4	1786.4	0.36	0.33	0.34
1756.4	1786.4	8.81	8.02	7.53	1816.6	1846.6	14.19	15.79	17.14	1816.6	1846.6	0.49	0.44	0.42
1816.6	1846.6	8.76	7.99	7.50	1896.9	1926.9	13.16	14.05	14.57	1896.9	1926.9	0.81	0.69	0.55
1896.9	1926.9	8.43	7.79	7.39	1957.1	1987.1	13.02	14.53	14.41	1957.1	1987.1	0.97	0.76	0.61
1957.1	1987.1	8.16	7.57	7.29	2037.4	2067.4	11.83	13.19	13.85	2037.4	2067.4	1.03	0.75	0.58
2037.4	2067.4	7.96	7.50	7.23	2097.6	2127.6	12.24	13.81	16.22	2097.6	2127.6	0.97	0.73	0.58
2097.6	2127.6	7.97	7.54	7.25	2177.9	2207.9	13.33	14.31	15.40	2177.9	2207.9	0.78	0.56	0.41
2238.1	2268.1	8.13	7.85	7.65	2238.1	2268.1	12.38	13.26	14.29	2238.1	2268.1	0.67	0.47	0.37
2318.4	2348.4	8.30	7.99	7.78	2318.4	2348.4	13.36	14.57	16.54	2318.4	2348.4	0.58	0.36	0.27
2378.6	2408.6	8.55	8.21	8.00	2378.6	2408.6	12.96	13.90	15.83	2378.6	2408.6	0.48	0.31	0.24
2458.9	2488.9	8.84	8.53	8.32	2458.9	2488.9	13.83	14.29	15.14	2458.9	2488.9	0.42	0.26	0.21
2519.1	2549.1	9.01	8.73	8.51	2519.1	2549.1	21.96	15.53	15.91	2519.1	2549.1	0.42	0.22	0.17
2599.4	2629.4	9.36	9.07	8.83	2599.4	2629.4	26.67	17.54	17.19	2599.4	2629.4	0.38	0.21	0.15
2659.6	2689.6	9.62	9.30	9.04	2659.6	2689.6	17.41	23.67	17.76	2659.6	2689.6	0.29	0.19	0.14
2739.9	2769.9	10.02	9.74	9.56	2739.9	2769.9	16.65	17.97	23.43	2739.9	2769.9	0.32	0.18	0.11
2800.1	2830.1	10.31	9.95	9.71	2800.1	2830.1	19.49	22.02	24.73	2800.1	2830.1	0.21	0.16	0.14



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Typical Performance Data

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=1000.1MHz (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)=2000.1MHz (dB)
		@LO (dBm)			@LO (dBm)			@LO (dBm)
		+10			+10			+10
600.0	400.1	8.41	10.0	20.1	6.34	600.0	1400.1	8.47
584.9	415.2	8.43	25.1	35.2	6.29	584.9	1415.2	8.47
569.7	430.4	8.42	40.3	50.4	6.26	569.7	1430.4	8.50
554.6	445.5	8.44	55.4	65.5	6.18	554.6	1445.5	8.47
539.5	460.6	8.46	70.5	80.6	6.18	539.5	1460.6	8.48
524.4	475.7	8.42	85.6	95.7	6.12	524.4	1475.7	8.44
509.2	490.9	8.46	100.8	110.9	6.06	509.2	1490.9	8.44
494.1	506.0	8.30	115.9	126.0	6.04	494.1	1506.0	8.37
479.0	521.1	8.41	131.0	141.1	5.99	479.0	1521.1	8.38
463.8	536.3	8.44	146.2	156.3	6.04	463.8	1536.3	8.38
448.7	551.4	8.46	161.3	171.4	6.01	448.7	1551.4	8.35
433.6	566.5	8.42	176.4	186.5	6.02	433.6	1566.5	8.31
418.5	581.6	8.40	191.5	201.6	5.98	418.5	1581.6	8.24
403.3	596.8	8.42	206.7	216.8	5.99	403.3	1596.8	8.26
388.2	611.9	8.40	221.8	231.9	5.97	388.2	1611.9	8.23
373.1	627.0	8.38	236.9	247.0	5.96	373.1	1627.0	8.22
357.9	642.2	8.28	252.1	262.2	6.02	357.9	1642.2	8.12
342.8	657.3	8.29	267.2	277.3	5.98	342.8	1657.3	8.12
327.7	672.4	8.19	282.3	292.4	6.02	327.7	1672.4	8.02
312.6	687.5	8.16	297.4	307.5	5.96	312.6	1687.5	7.97
297.4	702.7	8.05	312.6	322.7	6.02	297.4	1702.7	7.90
282.3	717.8	8.03	327.7	337.8	5.98	282.3	1717.8	7.87
267.2	732.9	7.92	342.8	352.9	6.02	267.2	1732.9	7.82
252.1	748.0	7.84	357.9	368.0	6.02	252.1	1748.0	7.72
236.9	763.2	7.75	373.1	383.2	6.05	236.9	1763.2	7.65
221.8	778.3	7.66	388.2	398.3	6.06	221.8	1778.3	7.53
206.7	793.4	7.61	403.3	413.4	6.04	206.7	1793.4	7.51
191.5	808.6	7.54	418.5	428.6	6.12	191.5	1808.6	7.44
176.4	823.7	7.52	433.6	443.7	6.09	176.4	1823.7	7.45
161.3	838.8	7.46	448.7	458.8	6.17	161.3	1838.8	7.35
146.2	853.9	7.44	463.8	473.9	6.14	146.2	1853.9	7.32
131.0	869.1	7.40	479.0	489.1	6.21	131.0	1869.1	7.26
115.9	884.2	7.40	494.1	504.2	6.18	115.9	1884.2	7.27
100.8	899.3	7.44	509.2	519.3	6.26	100.8	1899.3	7.26
85.6	914.5	7.44	524.4	534.5	6.28	85.6	1914.5	7.25
70.5	929.6	7.52	539.5	549.6	6.32	70.5	1929.6	7.25
55.4	944.7	7.50	554.6	564.7	6.40	55.4	1944.7	7.28
40.3	959.8	7.62	569.7	579.8	6.41	40.3	1959.8	7.38
25.1	975.0	7.66	584.9	595.0	6.48	25.1	1975.0	7.48
10.0	990.1	7.70	600.0	610.1	6.47	10.0	1990.1	7.58



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Typical Performance Data

LO (MHz)	LO-RF ISOLATION (dB)			LO-IF ISOLATION (dB)		
	@LO (dBm)			@LO (dBm)		
	+7	+10	+13	+7	+10	+13
5.0	66.46	71.57	74.37	62.26	64.17	65.17
10.0	66.09	68.83	71.33	66.49	67.23	67.03
90.4	56.18	56.94	57.02	53.35	52.93	51.81
170.7	53.90	54.31	54.53	49.06	47.84	46.88
251.0	51.91	52.19	52.35	45.76	44.40	43.31
331.3	50.45	50.75	50.59	42.59	41.44	40.34
411.5	49.24	49.27	49.10	39.84	39.01	38.03
491.8	49.21	48.91	48.57	38.13	37.16	36.20
552.0	48.33	48.14	47.76	36.68	36.19	35.31
632.3	47.05	46.45	46.00	34.79	34.53	33.96
692.5	46.09	45.58	45.07	33.51	33.01	32.51
772.8	45.47	45.08	45.17	31.95	31.56	30.91
833.0	45.10	44.69	44.21	30.89	30.77	30.19
913.3	44.88	43.43	43.19	29.63	29.28	29.08
973.6	44.14	42.86	41.94	28.66	28.25	27.97
1053.8	42.75	41.98	41.13	27.46	27.14	26.70
1114.1	41.80	40.71	40.79	26.45	26.18	25.91
1194.3	41.31	39.45	38.82	24.82	24.73	24.53
1254.6	41.27	38.91	37.61	23.66	23.63	23.46
1334.8	40.53	37.96	36.44	22.14	22.03	21.77
1395.1	40.05	37.46	35.92	21.25	20.95	20.55
1475.4	37.80	35.45	34.16	20.94	20.61	20.35
1535.6	36.94	34.79	33.52	22.35	21.98	21.84
1615.9	36.62	35.60	34.33	25.97	25.91	25.93
1676.1	36.79	36.21	35.11	29.51	29.67	29.78
1756.4	37.76	37.22	36.93	35.35	35.50	35.80
1816.6	38.12	37.58	36.99	40.14	39.84	39.65
1896.9	37.56	37.03	36.15	40.27	39.68	38.80
1957.1	37.06	36.47	35.73	37.08	36.93	36.54
2037.4	36.53	37.19	37.19	33.52	34.02	34.29
2097.6	35.54	35.78	36.05	31.85	32.43	32.83
2238.1	35.19	34.61	35.33	29.25	30.31	31.44
2318.4	35.30	34.23	34.42	28.35	29.84	31.31
2378.6	36.32	35.04	34.71	27.60	29.27	31.04
2458.9	37.05	36.64	36.47	27.01	28.51	30.51
2519.1	36.51	36.34	36.45	26.86	28.40	30.03
2599.4	36.70	36.04	35.93	26.57	28.59	30.72
2659.6	37.56	36.42	35.43	26.46	28.51	30.86
2739.9	37.91	37.76	37.31	26.85	28.71	30.98
2800.1	38.25	37.75	37.20	27.30	29.11	31.35

RF (IN) (MHz)	LO (MHz)	RF-IF ISOLATION (dB)		
		@LO (dBm)		
		+7	+10	+13
10.1	40.1	15.12	15.55	15.75
90.4	120.4	19.53	19.81	19.94
170.7	200.7	20.37	20.54	20.73
251.0	281.0	20.92	21.23	21.48
331.3	361.3	21.50	21.88	22.18
411.5	441.5	22.23	22.64	22.85
491.8	521.8	23.35	23.70	23.82
552.0	582.0	24.44	24.59	24.62
632.3	662.3	25.40	25.42	25.44
692.5	722.5	26.15	25.93	25.95
772.8	802.8	28.27	27.75	27.40
833.0	863.0	30.02	29.94	29.66
913.3	943.3	33.16	33.37	33.65
973.6	1003.6	35.92	35.91	36.11
1053.8	1083.8	37.31	37.80	38.11
1114.1	1144.1	34.60	34.26	34.37
1194.3	1224.3	30.97	29.85	29.39
1254.6	1284.6	29.09	27.88	27.26
1334.8	1364.8	27.41	26.30	25.61
1395.1	1425.1	25.95	25.06	24.46
1475.4	1505.4	24.53	23.98	23.47
1535.6	1565.6	24.09	23.90	23.68
1615.9	1645.9	23.93	23.96	24.03
1676.1	1706.1	23.90	24.02	24.24
1756.4	1786.4	23.78	24.17	24.40
1816.6	1846.6	24.06	24.62	24.97
1896.9	1926.9	25.06	25.61	26.01
1957.1	1987.1	25.77	26.26	26.42
2037.4	2067.4	26.14	26.11	25.90
2097.6	2127.6	25.55	25.16	24.67
2177.9	2207.9	24.34	23.56	22.85
2238.1	2268.1	23.48	22.79	22.17
2318.4	2348.4	21.82	21.04	20.50
2378.6	2408.6	20.93	20.06	19.52
2458.9	2488.9	19.80	19.13	18.64
2519.1	2549.1	19.16	18.53	18.13
2599.4	2629.4	18.51	17.90	17.58
2659.6	2689.6	18.02	17.56	17.17
2739.9	2769.9	17.70	17.33	17.12
2800.1	2830.1	17.47	17.11	16.99

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Typical Performance Data

RF (IN) (MHz)	LO (MHz)	RF VSWR (:1)		
		@LO (dBm)		
		+7	+10	+13
5.0	35.0	2.26	2.22	2.14
10.0	40.0	1.86	1.78	1.69
90.4	120.4	1.13	1.04	1.05
170.7	200.7	1.23	1.15	1.11
251.0	281.0	1.41	1.33	1.28
331.3	361.3	1.69	1.59	1.52
411.5	441.5	2.02	1.89	1.81
491.8	521.8	2.41	2.22	2.10
552.0	582.0	2.77	2.50	2.34
632.3	662.3	3.23	2.93	2.73
692.5	722.5	3.64	3.33	3.14
772.8	802.8	3.86	3.63	3.47
833.0	863.0	3.87	3.70	3.56
913.3	943.3	3.76	3.62	3.51
973.6	1003.6	3.60	3.49	3.41
1053.8	1083.8	3.31	3.22	3.15
1114.1	1144.1	3.10	2.99	2.90
1194.3	1224.3	2.84	2.66	2.57
1254.6	1284.6	2.70	2.45	2.33
1334.8	1364.8	2.51	2.22	2.07
1395.1	1425.1	2.42	2.09	1.92
1475.4	1505.4	2.35	2.04	1.85
1535.6	1565.6	2.33	2.04	1.87
1615.9	1645.9	2.35	2.09	1.90
1676.1	1706.1	2.36	2.14	1.98
1756.4	1786.4	2.39	2.17	2.03
1816.6	1846.6	2.31	2.11	1.97
1896.9	1926.9	2.03	1.85	1.72
1957.1	1987.1	1.77	1.64	1.53
2037.4	2067.4	1.44	1.34	1.27
2097.6	2127.6	1.25	1.14	1.08
2238.1	2268.1	1.06	1.14	1.21
2318.4	2348.4	1.21	1.33	1.41
2378.6	2408.6	1.31	1.45	1.54
2458.9	2488.9	1.47	1.62	1.74
2519.1	2549.1	1.56	1.73	1.87
2599.4	2629.4	1.70	1.85	1.99
2659.6	2689.6	1.82	1.98	2.12
2739.9	2769.9	1.98	2.14	2.27
2800.1	2830.1	2.15	2.30	2.43

LO (MHz)	LO VSWR (:1)		
	@LO (dBm)		
	+7	+10	+13
5.0	2.07	2.66	3.61
10.0	1.63	2.35	3.36
90.4	1.56	2.29	3.24
170.7	1.60	2.32	3.26
251.0	1.66	2.38	3.31
331.3	1.70	2.41	3.34
411.5	1.72	2.38	3.28
491.8	1.75	2.36	3.21
552.0	1.75	2.30	3.10
632.3	1.71	2.23	3.00
692.5	1.72	2.21	2.97
772.8	1.78	2.17	2.86
833.0	1.84	2.15	2.78
913.3	1.92	2.13	2.69
973.6	1.96	2.09	2.60
1053.8	2.03	2.01	2.44
1114.1	2.10	1.97	2.33
1194.3	2.16	1.91	2.20
1254.6	2.18	1.87	2.10
1334.8	2.18	1.80	1.97
1395.1	2.16	1.74	1.86
1475.4	2.08	1.62	1.71
1535.6	1.99	1.51	1.57
1615.9	1.92	1.37	1.42
1676.1	1.89	1.26	1.34
1756.4	1.81	1.15	1.28
1816.6	1.73	1.11	1.28
1896.9	1.67	1.13	1.35
1957.1	1.65	1.16	1.43
2037.4	1.58	1.22	1.55
2097.6	1.48	1.26	1.62
2238.1	1.33	1.38	1.84
2318.4	1.26	1.48	1.99
2378.6	1.22	1.54	2.05
2458.9	1.24	1.64	2.17
2519.1	1.28	1.73	2.30
2599.4	1.37	1.87	2.46
2659.6	1.42	1.93	2.51
2739.9	1.52	2.05	2.66
2800.1	1.61	2.17	2.80

IF (OUT) (MHz)	IF VSWR @LO=2000.1MHz (:1)		
	@LO (dBm)		
	+7	+10	+13
10.0	1.82	1.81	1.84
25.1	1.33	1.44	1.54
40.3	1.34	1.46	1.54
55.4	1.33	1.45	1.53
70.5	1.31	1.42	1.51
85.6	1.27	1.40	1.48
100.8	1.25	1.37	1.45
115.9	1.27	1.39	1.47
131.0	1.31	1.42	1.52
146.2	1.33	1.44	1.53
161.3	1.31	1.43	1.51
176.4	1.29	1.43	1.50
191.5	1.31	1.45	1.53
206.7	1.35	1.48	1.55
221.8	1.38	1.49	1.57
236.9	1.38	1.50	1.58
252.1	1.38	1.51	1.60
267.2	1.38	1.52	1.61
282.3	1.38	1.52	1.60
297.4	1.39	1.53	1.60
312.6	1.42	1.56	1.63
327.7	1.46	1.61	1.69
342.8	1.47	1.62	1.71
357.9	1.45	1.59	1.68
373.1	1.41	1.56	1.66
388.2	1.42	1.57	1.68
403.3	1.45	1.61	1.70
418.5	1.46	1.61	1.71
433.6	1.46	1.62	1.73
448.7	1.46	1.63	1.75
463.8	1.46	1.64	1.76
479.0	1.45	1.62	1.73
494.1	1.43	1.60	1.70
509.2	1.44	1.61	1.72
524.4	1.47	1.65	1.77
539.5	1.49	1.67	1.79
554.6	1.48	1.65	1.78
569.7	1.46	1.64	1.77
584.9	1.48	1.66	1.79
600.0	1.50	1.68	1.80

Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	9	30	34	44	26	50	51	52	62	51
1	-	28	+0	33	24	33	32	40	57	45	61	58
2	85	68	50	54	42	64	47	61	44	69	61	77
3	>100	54	53	50	37	50	47	65	49	56	65	57
4	>100	80	64	74	64	87	58	75	61	70	57	75
5	>100	76	69	72	74	63	51	61	60	62	60	68
6	>100	88	88	92	71	89	74	78	69	89	70	82
7	>100	81	85	>92	76	73	82	71	61	71	68	72
8	>100	>92	91	>92	90	>92	81	>92	77	86	76	>92
9	>100	89	>92	91	>92	>92	87	87	>92	80	73	81
10	>100	>92	>92	>92	>92	>92	>92	>92	86	>92	83	>92
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions: RF IN: 1000.1 MHz; 0.00 dBm.
 LO IN: 1030.01 MHz; +10.00 dBm
 IF OUT: 29.91 MHz; -7.52 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	+1	20	26	32	14	40	35	42	48	40
1	-	29	+0	34	25	33	30	37	48	37	46	42
2	100	67	56	66	51	70	59	65	49	67	64	72
3	>100	70	68	66	52	66	61	71	61	71	79	66
4	>100	>82	73	>82	71	>82	72	>82	75	>82	75	>82
5	>100	>82	>82	>82	>82	>82	80	>82	>82	>82	>82	>82
6	>100	>82	>82	>82	>82	>82	>82	>82	>82	>82	>82	>82
7	>100	>82	>82	>82	>82	>82	>82	>82	>82	>82	>82	>82
8	>100	>82	>82	>82	>82	>82	>82	>82	>82	>82	>82	>82
9	>100	>82	>82	>82	>82	>82	>82	>82	>82	>82	>82	>82
10	>100	>82	>82	>82	>82	>82	>82	>82	>82	>82	>82	>82
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions: RF IN: 1000.1 MHz; -10.00 dBm.
 LO IN: 1030.01 MHz; +10.00 dBm
 IF OUT: 29.91 MHz; -17.54 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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