

# Frequency Mixer

# SCM-1

## 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
1.0	31.0	6.58	6.20	6.00	10.1	40.1	17.20	16.57	26.49	10.1	40.1	1.56	1.23	0.96
2.0	32.0	6.53	6.16	5.97	29.9	59.9	21.93	19.53	22.48	29.9	59.9	1.43	1.19	0.89
5.0	35.0	5.48	5.16	5.00	49.7	79.7	17.74	21.95	24.06	49.7	79.7	1.45	1.13	0.88
10.0	40.0	5.72	5.46	5.30	69.4	99.4	20.19	24.52	20.76	69.4	99.4	1.42	1.08	0.85
29.9	59.9	5.70	5.35	5.24	89.2	119.2	16.06	23.84	19.89	89.2	119.2	1.28	1.09	0.80
49.7	79.7	5.69	5.42	5.29	109.0	139.0	23.09	20.18	17.98	109.0	139.0	1.33	0.99	0.75
69.4	99.4	5.63	5.45	5.29	128.8	158.8	21.75	19.22	19.01	128.8	158.8	1.27	1.03	0.77
89.2	119.2	5.67	5.42	5.32	148.5	178.5	22.77	20.61	20.12	148.5	178.5	1.28	0.97	0.75
109.0	139.0	5.65	5.43	5.32	168.3	198.3	20.59	20.23	19.02	168.3	198.3	1.26	0.96	0.74
128.8	158.8	5.70	5.43	5.35	188.1	218.1	17.88	17.08	17.35	188.1	218.1	1.25	0.92	0.72
148.5	178.5	5.69	5.45	5.35	207.9	237.9	15.95	17.58	19.00	207.9	237.9	1.23	0.95	0.72
188.1	218.1	5.74	5.52	5.41	227.7	257.7	16.36	15.56	16.35	227.7	257.7	1.25	0.95	0.76
207.9	237.9	5.71	5.51	5.40	247.4	277.4	13.90	12.99	14.54	247.4	277.4	1.15	0.88	0.68
227.7	257.7	5.78	5.56	5.46	267.2	297.2	14.42	15.63	18.83	267.2	297.2	1.21	0.94	0.75
247.4	277.4	5.80	5.59	5.46	287.0	317.0	14.49	16.34	24.65	287.0	317.0	1.21	0.95	0.75
267.2	297.2	5.87	5.63	5.49	306.8	336.8	15.29	14.43	16.86	306.8	336.8	1.18	0.93	0.73
287.0	317.0	5.88	5.65	5.48	326.5	356.5	15.68	14.77	17.58	326.5	356.5	1.26	0.96	0.75
306.8	336.8	5.98	5.74	5.60	346.3	376.3	17.53	17.91	20.54	346.3	376.3	1.36	1.05	0.82
326.5	356.5	6.03	5.79	5.65	366.1	396.1	16.32	25.40	20.84	366.1	396.1	1.42	1.12	0.88
346.3	376.3	6.02	5.76	5.66	385.9	415.9	10.89	15.77	21.75	385.9	415.9	1.47	1.15	0.91
366.1	396.1	6.16	5.89	5.68	405.7	435.7	9.12	10.79	14.75	405.7	435.7	1.56	1.30	1.05
385.9	415.9	6.15	5.89	5.72	425.4	455.4	8.25	9.04	12.36	425.4	455.4	1.64	1.32	1.07
405.7	435.7	6.24	5.97	5.80	445.2	475.2	7.51	8.05	9.44	445.2	475.2	1.81	1.46	1.21
445.2	475.2	6.43	6.21	6.03	465.0	495.0	7.13	7.79	8.86	465.0	495.0	1.94	1.57	1.28
465.0	495.0	6.50	6.21	6.07	484.8	514.8	7.29	8.49	9.79	484.8	514.8	2.05	1.65	1.37
484.8	514.8	6.51	6.28	6.08	504.5	534.5	7.29	9.16	11.77	504.5	534.5	2.20	1.81	1.53
504.5	534.5	6.63	6.32	6.13	524.3	554.3	8.10	11.69	16.75	524.3	554.3	2.21	1.81	1.52
524.3	554.3	6.62	6.29	6.07	544.1	574.1	8.86	14.08	22.59	544.1	574.1	2.44	2.02	1.70
544.1	574.1	6.73	6.29	6.10	583.7	613.7	7.98	19.40	17.77	583.7	613.7	2.34	2.05	1.66
583.7	613.7	7.07	6.43	6.16	603.4	633.4	6.26	13.86	16.63	603.4	633.4	2.33	2.11	1.76
603.4	633.4	7.26	6.58	6.18	643.0	673.0	5.33	9.10	15.05	643.0	673.0	2.12	1.99	1.78
643.0	673.0	7.79	7.01	6.43	662.8	692.8	5.62	8.78	14.77	662.8	692.8	1.97	1.86	1.67
662.8	692.8	7.84	7.11	6.50	702.3	732.3	6.15	8.50	12.32	702.3	732.3	1.79	1.68	1.54
702.3	732.3	8.32	7.56	6.93	722.1	752.1	5.88	8.15	10.61	722.1	752.1	1.56	1.47	1.38
722.1	752.1	8.71	8.00	7.38	761.7	791.7	5.50	6.77	8.82	761.7	791.7	1.45	1.35	1.29
781.4	811.4	9.54	8.91	8.28	781.4	811.4	5.39	6.24	8.02	781.4	811.4	1.23	1.06	1.04
821.0	851.0	9.94	9.41	8.91	821.0	851.0	5.56	5.46	6.24	821.0	851.0	1.18	1.02	0.96
840.8	870.8	10.25	9.63	9.09	840.8	870.8	5.38	5.41	6.10	840.8	870.8	1.11	0.97	0.91
880.3	910.3	10.69	10.12	9.56	880.3	910.3	6.41	6.45	7.56	880.3	910.3	1.02	0.89	0.91
900.1	930.1	10.72	10.22	9.73	900.1	930.1	7.38	7.27	8.91	900.1	930.1	0.95	0.86	0.91

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## Typical Performance Data

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=250.1MHz (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)=500.1MHz (dB)
		@LO (dBm)			@LO (dBm)			@LO (dBm)
		+7			+7			+7
240.0	10.1	5.58	10.0	20.1	5.30	490.0	10.1	6.22
234.1	16.0	5.58	22.3	32.4	5.13	477.7	22.4	6.14
228.2	21.9	5.51	34.6	44.7	5.12	465.4	34.7	6.08
222.3	27.8	5.50	46.9	57.0	5.17	453.1	47.0	6.09
216.4	33.7	5.48	59.2	69.3	5.15	440.8	59.3	6.14
210.5	39.6	5.47	71.5	81.6	5.16	428.5	71.6	6.09
204.6	45.5	5.48	83.8	93.9	5.16	416.2	83.9	6.05
198.7	51.4	5.45	96.2	106.3	5.16	403.8	96.3	6.04
192.8	57.3	5.43	108.5	118.6	5.16	391.5	108.6	6.01
186.9	63.2	5.41	120.8	130.9	5.16	379.2	120.9	6.05
181.0	69.1	5.44	133.1	143.2	5.16	366.9	133.2	6.07
175.1	75.0	5.45	145.4	155.5	5.20	354.6	145.5	6.04
169.2	80.9	5.44	157.7	167.8	5.26	342.3	157.8	6.06
163.3	86.8	5.42	170.0	180.1	5.22	330.0	170.1	6.06
157.4	92.7	5.42	182.3	192.4	5.25	317.7	182.4	6.05
151.5	98.6	5.43	194.6	204.7	5.24	305.4	194.7	6.09
145.6	104.5	5.45	206.9	217.0	5.25	293.1	207.0	6.06
139.7	110.4	5.46	219.2	229.3	5.28	280.8	219.3	6.06
133.8	116.3	5.44	231.5	241.6	5.28	268.5	231.6	6.10
127.9	122.2	5.41	243.8	253.9	5.30	256.2	243.9	6.11
122.1	128.0	5.42	256.2	266.3	5.34	243.8	256.3	6.17
116.2	133.9	5.44	268.5	278.6	5.29	231.5	268.6	6.16
110.3	139.8	5.47	280.8	290.9	5.34	219.2	280.9	6.12
104.4	145.7	5.47	293.1	303.2	5.35	206.9	293.2	6.17
98.5	151.6	5.45	305.4	315.5	5.35	194.6	305.5	6.16
92.6	157.5	5.46	317.7	327.8	5.42	182.3	317.8	6.14
86.7	163.4	5.46	330.0	340.1	5.44	170.0	330.1	6.18
80.8	169.3	5.48	342.3	352.4	5.46	157.7	342.4	6.19
74.9	175.2	5.48	354.6	364.7	5.49	145.4	354.7	6.17
69.0	181.1	5.47	366.9	377.0	5.51	133.1	367.0	6.17
63.1	187.0	5.46	379.2	389.3	5.52	120.8	379.3	6.15
57.2	192.9	5.47	391.5	401.6	5.53	108.5	391.6	6.14
51.3	198.8	5.49	403.8	413.9	5.48	96.2	403.9	6.18
45.4	204.7	5.51	416.2	426.3	5.59	83.8	416.3	6.16
39.5	210.6	5.53	428.5	438.6	5.59	71.5	428.6	6.23
33.6	216.5	5.53	440.8	450.9	5.55	59.2	440.9	6.27
27.7	222.4	5.52	453.1	463.2	5.50	46.9	453.2	6.24
21.8	228.3	5.55	465.4	475.5	5.46	34.6	465.5	6.30
15.9	234.2	5.57	477.7	487.8	5.42	22.3	477.8	6.35
10.0	240.1	5.66	490.0	500.1	5.38	10.0	490.1	6.41

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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
1.0	71.78	72.88	73.48	65.58	66.78	67.58
2.0	71.15	72.45	73.65	65.65	67.15	68.05
5.0	70.67	72.07	72.97	65.67	67.07	67.77
10.0	69.97	70.97	72.17	65.37	66.57	67.47
29.9	59.00	60.81	62.36	61.78	62.73	62.05
49.7	54.88	56.45	58.18	60.63	60.96	61.51
69.4	51.66	53.55	55.32	58.79	60.68	59.12
89.2	49.56	51.53	53.33	57.51	58.39	57.35
109.0	47.77	49.77	51.60	56.01	57.00	56.31
128.8	46.83	48.98	50.63	53.79	55.11	54.76
148.5	45.65	47.70	49.45	52.16	53.70	53.53
188.1	43.80	45.72	47.28	48.95	51.10	51.83
207.9	42.99	45.04	46.64	47.51	49.71	50.63
227.7	42.33	44.30	45.93	46.36	48.66	49.89
247.4	41.37	43.43	45.09	45.16	47.64	49.00
267.2	41.03	42.85	44.53	44.04	46.54	48.26
287.0	40.47	42.15	43.69	43.17	45.39	47.26
306.8	39.84	41.81	43.48	42.26	44.66	46.31
326.5	39.76	41.76	43.46	41.59	44.31	46.15
346.3	39.53	41.26	42.93	40.66	43.22	45.66
366.1	39.30	41.11	42.60	40.15	42.86	45.36
385.9	38.47	40.27	41.80	39.40	42.16	44.99
405.7	38.51	40.65	42.36	39.16	41.91	44.37
445.2	37.23	39.41	41.42	37.58	40.45	43.09
465.0	37.33	39.43	41.35	37.52	40.31	43.01
484.8	36.51	38.65	40.67	36.49	39.14	41.94
504.5	36.16	38.27	40.27	36.29	38.93	41.70
524.3	35.43	37.50	39.52	35.83	38.35	41.10
544.1	35.50	37.73	39.95	35.60	38.18	40.91
583.7	34.80	37.30	39.67	35.34	37.86	40.61
603.4	35.12	37.59	39.83	35.85	38.35	41.06
643.0	34.67	37.28	39.63	36.07	38.69	41.07
662.8	34.05	36.61	39.22	35.55	38.41	40.85
702.3	34.38	36.82	39.30	35.60	38.70	41.65
722.1	34.53	37.03	39.74	35.08	38.05	41.28
781.4	35.84	38.43	41.32	34.21	35.79	37.09
821.0	36.95	39.66	42.51	33.48	34.35	34.86
840.8	37.27	39.91	42.88	33.34	33.82	34.10
880.3	38.34	40.94	43.45	32.69	32.62	32.45
900.1	38.45	41.14	43.27	32.21	32.00	31.61

RF (IN) (MHz)	LO (MHz)	RF-IF ISOLATION (dB)		
		@LO (dBm)		
		+4	+7	+10
10.1	40.1	43.36	44.14	50.29
29.9	59.9	41.81	42.55	41.55
49.7	79.7	37.80	38.48	38.81
69.4	99.4	34.74	35.66	36.08
89.2	119.2	33.47	33.95	34.43
109.0	139.0	32.03	32.53	32.86
128.8	158.8	31.21	31.65	32.25
148.5	178.5	30.40	30.95	31.45
168.3	198.3	30.05	30.62	31.06
188.1	218.1	29.95	30.62	31.12
207.9	237.9	29.49	30.40	31.13
227.7	257.7	29.54	30.58	31.45
247.4	277.4	29.33	30.32	31.07
267.2	297.2	29.29	30.27	31.12
287.0	317.0	29.80	30.69	31.54
306.8	336.8	29.95	30.78	31.45
326.5	356.5	31.06	32.24	32.96
346.3	376.3	31.07	32.44	33.50
366.1	396.1	30.60	31.92	33.06
385.9	415.9	29.60	30.59	31.17
405.7	435.7	27.51	27.82	27.98
425.4	455.4	26.54	26.60	26.52
445.2	475.2	24.88	24.79	24.66
465.0	495.0	24.25	24.07	23.78
484.8	514.8	23.60	23.43	23.20
504.5	534.5	22.85	22.59	22.31
524.3	554.3	22.76	22.54	22.29
544.1	574.1	22.42	22.10	21.84
583.7	613.7	22.42	21.89	21.48
603.4	633.4	22.69	21.98	21.38
643.0	673.0	23.30	22.63	21.80
662.8	692.8	23.67	23.01	22.18
702.3	732.3	23.32	22.84	22.23
722.1	752.1	22.94	22.56	22.03
761.7	791.7	21.19	20.89	20.43
781.4	811.4	20.27	20.03	19.64
821.0	851.0	18.40	18.08	17.71
840.8	870.8	17.41	16.92	16.51
880.3	910.3	15.87	15.14	14.46
900.1	930.1	14.95	14.10	13.42



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## Typical Performance Data

RF (IN) (MHz)	LO (MHz)	RF VSWR (:1)		
		@LO (dBm)		
		+4	+7	+10
5.0	35.0	1.19	1.23	1.28
10.0	40.0	1.09	1.14	1.19
29.9	59.9	1.14	1.06	1.00
49.7	79.7	1.12	1.05	1.03
69.4	99.4	1.10	1.03	1.04
89.2	119.2	1.12	1.04	1.06
109.0	139.0	1.08	1.05	1.08
128.8	158.8	1.08	1.05	1.08
148.5	178.5	1.08	1.07	1.10
168.3	198.3	1.08	1.07	1.11
188.1	218.1	1.07	1.09	1.12
207.9	237.9	1.07	1.11	1.14
227.7	257.7	1.08	1.10	1.14
247.4	277.4	1.08	1.11	1.14
267.2	297.2	1.09	1.11	1.15
287.0	317.0	1.11	1.14	1.18
306.8	336.8	1.12	1.15	1.18
326.5	356.5	1.13	1.17	1.20
346.3	376.3	1.15	1.20	1.24
366.1	396.1	1.15	1.21	1.26
385.9	415.9	1.17	1.23	1.29
405.7	435.7	1.16	1.21	1.27
425.4	455.4	1.17	1.21	1.26
445.2	475.2	1.16	1.20	1.23
465.0	495.0	1.16	1.19	1.22
484.8	514.8	1.18	1.20	1.22
504.5	534.5	1.20	1.21	1.22
524.3	554.3	1.25	1.26	1.27
544.1	574.1	1.32	1.31	1.32
583.7	613.7	1.52	1.49	1.49
603.4	633.4	1.65	1.60	1.60
643.0	673.0	1.96	1.88	1.84
662.8	692.8	2.12	2.04	1.98
702.3	732.3	2.52	2.41	2.31
722.1	752.1	2.76	2.65	2.54
761.7	791.7	3.20	3.07	2.95
781.4	811.4	3.45	3.32	3.20
821.0	851.0	3.82	3.72	3.60
840.8	870.8	4.00	3.88	3.76
880.3	910.3	4.27	4.12	3.98
900.1	930.1	4.31	4.18	4.04

LO (MHz)	LO VSWR (:1)		
	@LO (dBm)		
	+4	+7	+10
5.0	1.65	2.68	4.16
10.0	1.60	2.55	4.01
29.9	1.94	2.82	3.87
49.7	1.96	2.81	3.91
69.4	1.88	2.65	3.62
89.2	1.89	2.72	3.72
109.0	1.86	2.63	3.61
128.8	1.94	2.75	3.76
148.5	1.94	2.74	3.73
168.3	1.90	2.65	3.58
188.1	1.95	2.74	3.67
207.9	1.94	2.71	3.65
227.7	2.04	2.84	3.81
247.4	2.01	2.78	3.70
267.2	2.05	2.81	3.72
287.0	2.07	2.77	3.63
306.8	2.07	2.81	3.70
326.5	2.15	2.91	3.79
346.3	2.17	2.89	3.76
366.1	2.28	3.06	3.93
385.9	2.19	2.87	3.70
405.7	2.27	2.98	3.80
425.4	2.34	3.05	3.89
445.2	2.34	3.05	3.87
465.0	2.48	3.20	4.02
484.8	2.39	3.07	3.86
504.5	2.51	3.20	4.01
524.3	2.50	3.16	3.94
544.1	2.59	3.25	4.01
583.7	2.66	3.25	3.97
603.4	2.82	3.43	4.15
643.0	2.98	3.65	4.35
662.8	2.90	3.52	4.23
702.3	3.05	3.67	4.37
722.1	3.08	3.69	4.42
761.7	3.17	3.75	4.45
781.4	3.29	3.87	4.57
821.0	3.39	3.97	4.66
840.8	3.45	3.95	4.61
880.3	3.52	4.00	4.62
900.1	3.50	3.90	4.51

IF (OUT) (MHz)	IF VSWR @LO=500.1MHz (:1)		
	@LO (dBm)		
	+4	+7	+10
5.0	1.53	1.39	1.29
10.0	1.51	1.39	1.29
22.6	2.01	1.84	1.68
35.1	1.93	1.75	1.61
47.7	1.84	1.66	1.53
60.3	1.83	1.66	1.53
72.8	1.88	1.71	1.57
85.4	1.93	1.76	1.63
97.9	1.97	1.81	1.67
110.5	2.00	1.83	1.69
123.1	2.01	1.83	1.70
135.6	1.98	1.81	1.67
148.2	1.93	1.77	1.65
160.8	1.92	1.77	1.65
173.3	1.96	1.81	1.69
185.9	2.03	1.88	1.75
198.5	2.08	1.92	1.80
211.0	2.09	1.94	1.81
223.6	2.05	1.90	1.79
236.2	2.01	1.87	1.75
248.7	2.01	1.87	1.76
261.3	2.05	1.91	1.80
273.8	2.10	1.96	1.86
286.4	2.12	1.99	1.88
299.0	2.09	1.96	1.86
311.5	2.06	1.94	1.84
324.1	2.05	1.93	1.83
336.7	2.06	1.94	1.85
349.2	2.08	1.96	1.87
361.8	2.07	1.97	1.88
374.4	2.07	1.96	1.88
386.9	2.08	1.97	1.89
399.5	2.11	2.00	1.91
412.1	2.12	2.00	1.92
424.6	2.08	1.97	1.89
437.2	2.04	1.93	1.86
449.7	2.03	1.93	1.86
462.3	2.07	1.96	1.88
474.9	2.11	2.00	1.92
487.4	2.11	2.01	1.94
500.0	2.22	2.29	2.34

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## Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	19	24	19	26	30	41	38	51	38	39
1	-	25	+0	34	11	40	16	38	35	66	49	39
2	>100	70	55	63	54	73	53	65	63	77	71	76
3	>100	67	61	67	61	75	56	72	64	>80	76	>80
4	>100	>80	>80	>80	>80	>80	>80	>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	79	>80	>80	>80
9	>100	>80	>80	>80	>80	>80	>80	>80	>80	66	>80	>80
10	>100	>80	>80	>80	>80	>80	>80	>80	>80	>80	68	>80
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

### LO HARMONICS ORDER

Test conditions: RF IN: 250.1 MHz; -14.00 dBm.  
 LO IN: 280.01 MHz; +7.00 dBm  
 IF OUT: 29.91 MHz; -19.78 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	29	36	30	40	41	54	50	65	50	54
1	-	26	+0	35	12	40	18	43	37	66	52	48
2	>100	51	49	59	49	54	51	54	70	67	63	70
3	>100	48	41	50	42	58	38	63	41	57	57	73
4	>100	62	70	64	64	63	61	67	58	70	70	81
5	>100	70	68	69	54	66	52	70	54	64	62	79
6	>100	86	80	76	90	78	86	77	81	73	77	76
7	>100	>90	75	90	73	84	75	88	68	>90	64	74
8	>100	>90	>90	88	>90	80	>90	84	>90	85	86	>90
9	>100	>90	>90	>90	82	>90	77	90	82	71	83	>90
10	>100	>90	>90	>90	>90	>90	>90	>90	>90	>90	83	>90
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

### LO HARMONICS ORDER

Test conditions: RF IN: 250.1 MHz; -4.00 dBm.  
 LO IN: 280.01 MHz; +7.00 dBm  
 IF OUT: 29.91 MHz; -9.68 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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