Frequency Mixer RAY-1+

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	CONVERSION LOSS IF FIXED @IF(OUT)=30MHz (dB) @LO (dBm)		
		+20	+23	+26
5.0	35.0	6.50	6.52	6.53
10.0	40.0	6.60	6.40	6.48
20.1	50.1	5.64	5.52	5.46
30.1	60.1	5.67	5.54	5.48
40.1	70.1	5.69	5.54	5.49
50.1	80.1	5.65	5.53	5.50
60.1	90.1	5.63	5.54	5.51
80.1	110.1	5.66	5.57	5.55
100.1	130.1	5.67	5.60	5.57
120.1	150.1	5.68	5.61	5.58
140.1	170.1	5.70	5.65	5.62
160.1	190.1	5.70	5.64	5.61
180.1	210.1	5.72	5.67	5.64
200.1	230.1	5.76	5.69	5.66
220.1	250.1	5.79	5.72	5.69
240.1	270.1	5.82	5.75	5.71
260.1	290.1	5.89	5.80	5.75
280.1	310.1	5.91	5.84	5.79
300.1	330.1	5.89	5.83	5.80
320.1	350.1	5.92	5.86	5.85
350.1	380.1	6.08	5.96	5.91
380.1	410.1	6.20	6.06	5.94
410.1	440.1	6.37	6.19	6.03
440.1	470.1	6.47	6.22	6.04
470.1	500.1	6.35	6.11	5.96
500.1	530.1	6.39	6.09	5.92
530.1	560.1	6.57	6.24	6.05
560.1	590.1	7.08	6.57	6.34
590.1	620.1	7.39	6.63	6.33
620.1	650.1	7.67	6.94	6.57
650.1	680.1	8.62	7.90	7.30
690.1	720.1	8.44	7.92	7.40
730.1	760.1	8.09	7.77	7.54
810.1	840.1	8.30	8.10	7.90
850.1	880.1	8.40	8.15	7.98
890.1	920.1	8.60	8.30	8.12
930.1	960.1	8.80	8.55	8.40
970.1	1000.1	9.46	9.11	8.86
1010.1	1040.1	10.51	10.05	9.69
1050.1	1080.1	11.85	11.28	10.69

RF (IN) (MHz)	LO (MHz)	IP3 INPUT (dBm) @LO (dBm)		
		+20	+23	+26
10.1	40.1	26.95	26.61	34.09
20.1	50.1	25.12	32.82	27.31
30.1	60.1	25.12	32.54	28.50
40.1	70.1	26.50	26.40	29.08
50.1	80.1	27.57	27.39	29.22
60.1	90.1	25.37	27.97	28.90
80.1	110.1	24.28	27.36	28.18
100.1	130.1	25.74	27.06	27.64
120.1	150.1	25.45	26.70	27.38
140.1	170.1	25.78	26.17	26.89
160.1	190.1	24.74	25.40	26.89
180.1	210.1	24.76	25.73	27.23
200.1	230.1	23.31	24.44	26.59
220.1	250.1	24.65	25.20	26.35
240.1	270.1	25.58	26.50	28.60
260.1	290.1	22.63	24.21	26.98
280.1	310.1	22.70	23.36	25.18
300.1	330.1	23.61	24.49	26.84
320.1	350.1	24.32	25.67	28.50
350.1	380.1	21.75	24.36	27.00
380.1	410.1	17.95	20.48	24.38
410.1	440.1	18.27	19.45	22.03
440.1	470.1	20.01	21.93	24.19
470.1	500.1	23.13	26.20	30.13
500.1	530.1	25.56	29.49	39.10
530.1	560.1	26.74	30.04	32.88
560.1	590.1	26.59	35.14	42.27
590.1	620.1	21.16	31.00	32.66
620.1	650.1	20.19	26.34	29.75
650.1	680.1	19.71	21.44	24.54
690.1	720.1	20.04	21.60	29.25
730.1	760.1	24.02	26.76	27.62
770.1	800.1	24.62	29.29	32.32
810.1	840.1	26.39	34.47	33.29
850.1	880.1	25.50	27.81	31.80
890.1	920.1	25.77	26.75	27.85
930.1	960.1	27.51	28.82	30.01
970.1	1000.1	24.81	26.81	29.82
1010.1	1040.1	20.78	23.04	22.24
1050.1	1080.1	17.98	22.47	19.95

RF (IN) (MHz)	LO (MHz)	COMPRESSION @RF IN=+15dBm (dB) @LO (dBm)		
		+20	+23	+26
10.1	40.1	0.45	0.30	0.16
20.1	50.1	0.51	0.34	0.19
30.1	60.1	0.55	0.38	0.21
40.1	70.1	0.53	0.35	0.17
50.1	80.1	0.49	0.29	0.12
60.1	90.1	0.42	0.22	0.08
80.1	110.1	0.39	0.19	0.06
100.1	130.1	0.41	0.21	0.08
120.1	150.1	0.41	0.24	0.13
140.1	170.1	0.38	0.24	0.13
160.1	190.1	0.34	0.22	0.12
180.1	210.1	0.28	0.16	0.07
200.1	230.1	0.29	0.19	0.10
220.1	250.1	0.32	0.22	0.15
240.1	270.1	0.35	0.24	0.15
260.1	290.1	0.36	0.26	0.16
280.1	310.1	0.37	0.26	0.14
300.1	330.1	0.51	0.34	0.18
320.1	350.1	0.72	0.48	0.31
350.1	380.1	0.96	0.69	0.44
380.1	410.1	1.08	0.81	0.51
410.1	440.1	1.18	0.93	0.63
440.1	470.1	1.33	1.17	0.91
470.1	500.1	1.22	1.05	0.81
500.1	530.1	1.27	1.08	0.88
530.1	560.1	1.44	1.22	1.01
560.1	590.1	1.29	1.14	0.93
590.1	620.1	0.98	1.11	0.90
620.1	650.1	0.74	0.93	0.77
650.1	680.1	0.43	0.67	0.75
690.1	720.1	0.39	0.56	0.61
730.1	760.1	0.71	0.73	0.54
770.1	800.1	0.68	0.62	0.35
810.1	840.1	0.61	0.51	0.38
850.1	880.1	0.68	0.61	0.51
890.1	920.1	0.59	0.44	0.40
930.1	960.1	0.58	0.33	0.49
970.1	1000.1	0.71	0.33	0.52
1010.1	1040.1	0.96	0.48	0.58
1050.1	1080.1	0.94	0.60	0.51

Typical Performance Data

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=250.1MHz (dB)
		@LO (dBm)
		+23
0.5	249.6	5.80
1.0	249.1	5.72
1.5	248.6	5.71
2.0	248.1	5.70
2.5	247.6	5.70
3.0	247.1	5.69
4.0	246.1	5.69
5.0	245.1	5.70
6.0	244.1	5.70
8.0	242.1	5.69
10.0	240.1	5.69
15.0	235.1	5.71
20.0	230.1	5.70
25.0	225.1	5.70
30.0	220.1	5.71
35.0	215.1	5.72
40.0	210.1	5.70
45.0	205.1	5.72
50.0	200.1	5.74
55.0	195.1	5.75
60.0	190.1	5.74
65.0	185.1	5.74
70.0	180.1	5.75
80.0	170.1	5.75
90.0	160.1	5.76
100.0	150.1	5.77
110.0	140.1	5.78
120.0	130.1	5.77
130.0	120.1	5.75
140.0	110.1	5.76
150.0	100.1	5.77
160.0	90.1	5.77
170.0	80.1	5.76
180.0	70.1	5.75
190.0	60.1	5.76
200.0	50.1	5.77
210.0	40.1	5.82
220.0	30.1	5.86
230.0	20.1	5.89
240.0	10.1	5.93

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=10.1MHz (dB)
		@LO (dBm)
		+23
0.5	10.6	5.58
0.8	10.9	5.53
1.0	11.1	5.51
2.0	12.1	5.49
3.0	13.1	5.49
4.0	14.1	5.50
5.0	15.1	5.50
6.0	16.1	5.50
8.0	18.1	5.50
10.0	20.1	5.51
15.0	25.1	5.52
20.0	30.1	5.53
25.0	35.1	5.55
30.0	40.1	5.55
35.0	45.1	5.55
40.0	50.1	5.52
45.0	55.1	5.50
50.0	60.1	5.54
70.0	80.1	5.52
90.0	100.1	5.53
110.0	120.1	5.55
130.0	140.1	5.58
150.0	160.1	5.57
170.0	180.1	5.60
190.0	200.1	5.61
210.0	220.1	5.60
230.0	240.1	5.66
250.0	260.1	5.66
270.0	280.1	5.70
290.0	300.1	5.72
310.0	320.1	5.72
330.0	340.1	5.74
350.0	360.1	5.72
370.0	380.1	5.75
390.0	400.1	5.76
410.0	420.1	5.71
430.0	440.1	5.77
450.0	460.1	5.74
470.0	480.1	5.73
490.0	500.1	5.70

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=500.1MHz (dB)
		@LO (dBm)
		+23
0.5	499.6	6.18
0.8	499.4	6.11
1.0	499.1	6.09
2.0	498.1	6.10
3.0	497.1	6.10
4.0	496.1	6.11
5.0	495.1	6.12
6.0	494.1	6.13
8.0	492.1	6.14
10.0	490.1	6.17
15.0	485.1	6.24
20.0	480.1	6.30
25.0	475.1	6.34
30.0	470.1	6.38
35.0	465.1	6.45
40.0	460.1	6.50
45.0	455.1	6.54
50.0	450.1	6.55
70.0	430.1	6.52
90.0	410.1	6.43
110.0	390.1	6.35
130.0	370.1	6.27
150.0	350.1	6.32
170.0	330.1	6.38
190.0	310.1	6.50
210.0	290.1	6.44
230.0	270.1	6.46
250.0	250.1	6.28
270.0	230.1	6.48
290.0	210.1	6.50
310.0	190.1	6.50
330.0	170.1	6.54
350.0	150.1	6.53
370.0	130.1	6.52
390.0	110.1	6.49
410.0	90.1	6.47
430.0	70.1	6.46
450.0	50.1	6.44
470.0	30.1	6.52
490.0	10.1	6.54

Typical Performance Data

LO (MHz)	LO-RF ISOLATION (dB) @LO (dBm)			LO-IF ISOLATION (dB) @LO (dBm)		
	+20	+23	+26	+20	+23	+26
5.0	61.85	57.02	53.70	79.05	82.02	86.00
10.0	60.36	56.72	53.82	79.25	82.32	86.00
20.1	77.12	77.40	83.55	66.09	65.11	58.40
30.1	74.00	74.22	80.80	64.92	64.16	58.60
40.1	72.01	72.07	77.47	62.98	63.52	57.90
50.1	70.45	70.64	73.52	61.98	59.85	57.43
60.1	68.79	68.97	71.28	59.17	57.44	56.61
80.1	68.19	68.21	66.55	53.20	55.19	54.72
100.1	67.07	67.10	64.58	51.25	53.50	52.90
120.1	67.22	66.90	63.35	49.41	51.65	51.59
140.1	64.03	63.79	65.62	48.02	50.41	50.91
160.1	63.29	62.98	62.21	47.35	49.27	49.80
180.1	63.35	63.07	60.17	45.58	47.31	47.55
200.1	61.19	61.02	59.61	44.67	45.95	45.44
220.1	65.32	64.97	58.86	43.99	44.71	43.79
240.1	63.07	62.94	59.87	41.67	43.06	43.29
260.1	64.10	63.71	56.72	41.90	42.66	42.35
280.1	78.04	73.63	54.92	39.60	40.51	40.54
300.1	60.08	59.64	56.39	39.81	40.04	38.83
320.1	57.09	56.78	63.96	37.74	37.70	36.68
350.1	54.22	54.18	47.00	35.85	35.62	35.21
380.1	58.13	58.41	51.64	35.15	34.52	34.13
410.1	53.94	54.28	61.42	34.03	33.27	31.50
440.1	50.54	52.13	44.08	32.65	31.90	30.41
470.1	52.89	54.13	43.32	30.71	29.70	29.32
500.1	45.57	47.79	47.95	27.77	26.97	26.65
530.1	44.93	45.56	41.03	25.36	24.34	23.90
560.1	47.31	42.72	40.94	25.18	24.01	24.09
590.1	44.69	42.71	43.58	25.51	23.80	23.26
620.1	41.70	37.43	37.50	24.24	21.79	20.91
650.1	44.77	37.30	37.51	23.07	20.26	19.24
690.1	43.92	37.72	38.76	24.11	21.93	20.87
730.1	39.42	33.93	31.55	20.43	18.30	17.81
810.1	35.55	31.20	29.24	17.16	15.58	16.02
850.1	32.71	28.09	26.93	13.34	12.22	13.04
890.1	32.87	28.57	28.24	13.87	12.89	14.14
930.1	31.94	27.43	25.86	13.58	12.66	13.92
970.1	29.40	25.38	24.12	11.23	10.24	11.65
1010.1	30.04	26.98	24.97	13.33	12.27	13.68
1050.1	27.79	25.26	23.14	11.85	10.84	12.30

RF (IN) (MHz)	LO (MHz)	RF-IF ISOLATION (dB) @LO (dBm)		
		+20	+23	+26
10.1	40.1	34.65	32.88	30.61
20.1	50.1	33.51	31.73	29.00
30.1	60.1	33.26	31.59	29.32
40.1	70.1	32.87	31.67	31.04
50.1	80.1	32.32	31.70	31.73
60.1	90.1	31.77	31.29	31.62
80.1	110.1	30.87	30.44	30.58
100.1	130.1	29.93	29.53	29.16
120.1	150.1	28.92	28.47	27.01
140.1	170.1	28.61	28.61	28.05
160.1	190.1	28.51	28.61	28.82
180.1	210.1	28.35	28.53	28.82
200.1	230.1	28.20	28.32	28.36
220.1	250.1	28.11	28.14	27.64
240.1	270.1	28.62	28.72	28.57
260.1	290.1	28.50	28.78	29.14
280.1	310.1	29.11	29.45	29.88
300.1	330.1	29.37	30.08	30.72
320.1	350.1	29.72	30.60	31.20
350.1	380.1	28.71	29.85	30.78
380.1	410.1	27.71	28.78	29.07
410.1	440.1	25.98	26.86	28.32
440.1	470.1	24.83	25.12	25.88
470.1	500.1	24.61	24.79	24.76
500.1	530.1	23.76	24.05	24.45
530.1	560.1	23.44	23.86	24.85
560.1	590.1	24.00	24.00	23.97
590.1	620.1	24.46	24.33	24.08
620.1	650.1	24.65	25.22	25.24
650.1	680.1	24.15	23.87	23.28
690.1	720.1	23.45	23.39	23.05
730.1	760.1	23.08	22.33	21.62
770.1	800.1	22.75	22.16	21.51
810.1	840.1	22.21	21.94	21.70
850.1	880.1	21.40	21.00	20.55
890.1	920.1	20.84	20.49	20.17
930.1	960.1	19.94	19.47	19.01
970.1	1000.1	19.53	19.31	19.08
1010.1	1040.1	17.84	17.61	17.13
1050.1	1080.1	17.43	17.54	17.49

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	RF VSWR (:1) @LO (dBm)		
		+20	+23	+26
5.0	35.0	1.26	1.29	1.34
10.0	40.0	1.12	1.14	1.19
20.1	50.1	1.16	1.07	1.02
30.1	60.1	1.16	1.07	1.01
40.1	70.1	1.16	1.05	1.01
50.1	80.1	1.11	1.04	1.02
60.1	90.1	1.09	1.04	1.04
80.1	110.1	1.10	1.05	1.05
100.1	130.1	1.09	1.06	1.06
120.1	150.1	1.10	1.07	1.07
140.1	170.1	1.10	1.08	1.08
160.1	190.1	1.09	1.08	1.09
180.1	210.1	1.09	1.08	1.09
200.1	230.1	1.09	1.08	1.09
220.1	250.1	1.09	1.08	1.09
240.1	270.1	1.09	1.08	1.10
260.1	290.1	1.08	1.08	1.09
280.1	310.1	1.06	1.06	1.08
300.1	330.1	1.05	1.07	1.09
320.1	350.1	1.04	1.06	1.08
350.1	380.1	1.03	1.00	1.02
380.1	410.1	1.09	1.06	1.04
410.1	440.1	1.18	1.15	1.12
440.1	470.1	1.26	1.23	1.21
470.1	500.1	1.33	1.30	1.28
500.1	530.1	1.48	1.44	1.40
530.1	560.1	1.51	1.47	1.44
560.1	590.1	1.76	1.70	1.66
590.1	620.1	1.80	1.72	1.69
620.1	650.1	2.01	1.93	1.89
650.1	680.1	2.24	2.15	2.10
690.1	720.1	2.31	2.28	2.22
730.1	760.1	2.62	2.61	2.57
810.1	840.1	3.67	3.59	3.51
850.1	880.1	4.07	3.95	3.89
890.1	920.1	4.87	4.69	4.54
930.1	960.1	5.95	5.70	5.56
970.1	1000.1	7.60	7.34	7.14
1010.1	1040.1	8.27	8.05	7.87
1050.1	1080.1	10.02	9.79	9.90

LO (MHz)	LO VSWR (:1) @LO (dBm)		
	+20	+23	+26
5.0	1.88	2.50	3.19
10.0	1.80	2.37	2.55
20.1	1.49	2.09	2.67
30.1	1.43	1.91	2.21
40.1	1.41	1.84	2.08
50.1	1.41	1.87	2.16
60.1	1.48	2.01	2.40
80.1	1.59	2.38	3.34
100.1	1.54	2.27	3.13
120.1	1.43	1.90	2.16
140.1	1.42	1.85	2.15
160.1	1.54	2.15	2.77
180.1	1.62	2.39	3.38
200.1	1.52	2.10	2.52
220.1	1.46	1.89	2.13
240.1	1.53	2.01	2.36
260.1	1.70	2.42	3.37
280.1	1.70	2.40	3.06
300.1	1.60	2.08	2.32
320.1	1.57	2.00	2.31
350.1	1.80	2.51	3.42
380.1	1.78	2.35	2.71
410.1	1.70	2.13	2.46
440.1	1.94	2.61	3.42
470.1	1.92	2.48	2.88
500.1	1.82	2.27	2.63
530.1	2.02	2.63	3.34
560.1	2.10	2.67	3.09
590.1	2.02	2.49	2.84
620.1	2.21	2.75	3.29
650.1	2.36	2.94	3.37
690.1	2.28	2.75	3.08
730.1	2.48	3.04	3.53
810.1	2.42	2.86	3.25
850.1	2.82	3.47	4.01
890.1	2.33	2.69	2.97
930.1	2.95	3.56	4.01
970.1	2.47	2.81	3.01
1010.1	2.92	3.33	3.55
1050.1	2.89	3.31	3.67

IF (OUT) (MHz)	IF VSWR @LO=500.1MHz (:1) @LO (dBm)		
	+20	+23	+26
0.5	1.32	1.31	1.33
0.8	1.22	1.13	1.11
1.0	1.29	1.16	1.09
2.0	1.39	1.25	1.16
3.0	1.38	1.24	1.15
4.0	1.36	1.22	1.13
5.0	1.34	1.20	1.12
6.0	1.32	1.19	1.11
8.0	1.31	1.17	1.09
10.0	1.30	1.17	1.09
15.0	1.30	1.17	1.09
20.0	1.31	1.17	1.09
25.0	1.31	1.18	1.09
30.0	1.32	1.18	1.10
35.0	1.33	1.19	1.10
40.0	1.33	1.19	1.11
45.0	1.34	1.20	1.12
50.0	1.35	1.20	1.12
70.0	1.37	1.23	1.15
90.0	1.38	1.24	1.17
110.0	1.40	1.27	1.19
130.0	1.43	1.29	1.22
150.0	1.45	1.31	1.24
170.0	1.48	1.34	1.27
190.0	1.50	1.36	1.29
210.0	1.52	1.38	1.30
230.0	1.55	1.40	1.32
250.0	1.57	1.42	1.33
270.0	1.60	1.44	1.35
290.0	1.61	1.45	1.36
310.0	1.62	1.46	1.36
330.0	1.64	1.47	1.36
350.0	1.66	1.48	1.37
370.0	1.66	1.48	1.37
390.0	1.66	1.48	1.36
410.0	1.66	1.48	1.36
430.0	1.66	1.47	1.35
450.0	1.67	1.48	1.35
470.0	1.67	1.48	1.35
490.0	1.65	1.46	1.33

Harmonics Tables

RF HARMONICS ORDER	(-dBm)	(-dBc)										
0	-	-	12	27	14	30	17	38	25	32	25	38
1	-	27	+0	32	11	36	23	41	29	47	41	47
2	98	70	49	66	49	66	51	66	62	74	62	74
3	109	76	60	79	60	82	60	78	68	86	69	85
4	>123	95	87	98	85	95	85	94	86	100	94	103
5	>122	112	99	103	95	102	94	103	94	103	103	111
6	>124	>123	115	>118	105	116	105	114	104	113	108	120
7	>123	>124	>122	>124	>121	118	>122	>121	>122	>120	>123	>123
8	>123	>122	>122	>125	>122	>123	117	>122	119	>122	118	>124
9	>123	>121	>123	>123	>124	>122	>123	>123	>120	>123	>121	>122
10	>123	>122	>121	>123	>124	>123	>123	>123	>122	>122	>122	>121
RF CAL		0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions: **RF IN: 250.1 MHz; .02.00 dBm.**
LO IN: 280.01 MHz; +23.00 dBm
IF OUT: 29.91 MHz; -5.65 dBm

RF HARMONICS ORDER	(-dBm)	(-dBc)										
0	-	-	21	36	26	41	28	50	37	43	37	50
1	-	27	+0	32	11	37	24	43	30	48	40	51
2	85	68	43	66	43	64	44	59	56	65	53	60
3	98	59	48	66	46	67	45	60	54	63	62	72
4	118	81	63	85	62	77	61	73	63	80	74	82
5	>122	75	66	72	61	73	59	72	57	70	62	73
6	>123	88	84	82	86	80	77	82	74	90	76	91
7	>124	91	83	88	74	99	74	100	77	103	86	98
8	123	115	93	106	91	94	84	89	87	89	90	91
9	>124	108	101	106	95	114	84	97	81	95	81	98
10	123	108	109	111	109	110	104	105	95	112	94	106
RF CAL		0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions: **RF IN: 250.1 MHz; 10.00 dBm.**
LO IN: 280.01 MHz; +23.00 dBm
IF OUT: 29.91 MHz; 4.37 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.