

Frequency Mixer

RAY-6

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=+14.99dBm (dB)		
		@LO (dBm)					@LO (dBm)					@LO (dBm)		
		+20	+23	+26			+20	+23	+26			+20	+23	+26
0.0	10.0	6.00	6.00	5.98	10.1	40.1	34.73	29.55	28.12	10.1	40.1	1.07	0.62	0.28
0.1	10.1	4.80	4.76	4.73	16.0	46.0	34.71	29.28	28.04	16.0	46.0	1.14	0.70	0.31
0.2	10.2	4.59	4.58	4.53	21.9	51.9	30.92	27.93	27.34	21.9	51.9	1.16	0.75	0.34
1.0	11.0	4.54	4.60	4.66	27.8	57.8	28.68	27.03	27.17	27.8	57.8	1.18	0.75	0.32
2.0	12.0	4.74	4.76	4.83	33.7	63.7	27.21	26.45	27.12	33.7	63.7	1.16	0.73	0.32
5.0	15.0	4.74	4.78	4.85	39.6	69.6	25.79	25.48	26.55	39.6	69.6	1.09	0.70	0.33
8.6	18.6	4.84	4.82	4.92	45.5	75.5	25.67	25.76	26.98	45.5	75.5	1.12	0.76	0.37
10.0	20.0	4.78	4.82	4.85	51.4	81.4	24.14	24.58	26.15	51.4	81.4	1.06	0.75	0.40
16.0	46.0	5.37	5.34	5.35	57.3	87.3	25.14	25.26	26.52	57.3	87.3	0.94	0.65	0.36
21.9	51.9	5.39	5.36	5.36	63.2	93.2	24.94	24.86	26.58	63.2	93.2	0.91	0.63	0.32
27.8	57.8	5.45	5.43	5.43	69.1	99.1	23.40	24.01	26.44	69.1	99.1	0.91	0.61	0.31
39.6	69.6	5.45	5.45	5.50	75.0	105.0	23.71	24.45	27.52	75.0	105.0	0.91	0.58	0.29
45.5	75.5	5.44	5.42	5.47	80.9	110.9	23.65	24.35	28.49	80.9	110.9	0.95	0.61	0.27
51.4	81.4	5.48	5.42	5.44	86.8	116.8	23.09	24.00	29.16	86.8	116.8	1.07	0.65	0.32
57.3	87.3	5.56	5.49	5.50	92.7	122.7	21.52	22.84	27.53	92.7	122.7	1.22	0.75	0.35
63.2	93.2	5.56	5.49	5.50	98.6	128.6	20.19	21.87	24.91	98.6	128.6	1.41	0.84	0.40
75.0	105.0	5.68	5.66	5.70	104.5	134.5	18.64	21.10	23.83	104.5	134.5	1.54	0.94	0.48
80.9	110.9	5.72	5.72	5.77	110.4	140.4	17.90	20.21	23.88	110.4	140.4	1.70	1.07	0.53
86.8	116.8	5.72	5.72	5.78	116.3	146.3	18.19	20.61	25.53	116.3	146.3	1.77	1.16	0.62
92.7	122.7	5.78	5.76	5.81	122.2	152.2	18.69	21.27	24.90	122.2	152.2	1.81	1.23	0.70
98.6	128.6	5.86	5.83	5.89	128.0	158.0	18.97	22.21	24.97	128.0	158.0	1.81	1.26	0.72
110.4	140.4	5.99	5.89	5.90	133.9	163.9	19.43	23.72	25.84	133.9	163.9	1.82	1.28	0.73
122.2	152.2	6.04	5.89	5.81	139.8	169.8	20.01	24.80	26.57	139.8	169.8	1.78	1.26	0.73
128.0	158.0	6.06	5.87	5.76	145.7	175.7	22.13	27.22	29.17	145.7	175.7	1.68	1.19	0.72
133.9	163.9	6.07	5.86	5.75	151.6	181.6	25.02	23.00	24.92	151.6	181.6	1.56	1.10	0.70
145.7	175.7	6.19	6.02	5.94	157.5	187.5	23.05	21.03	21.66	157.5	187.5	1.47	1.05	0.67
151.6	181.6	6.23	6.10	6.06	163.4	193.4	21.73	20.08	20.72	163.4	193.4	1.47	1.08	0.65
157.5	187.5	6.26	6.19	6.20	169.3	199.3	21.14	20.09	22.71	169.3	199.3	1.63	1.19	0.62
163.4	193.4	6.30	6.26	6.31	175.2	205.2	20.87	20.86	24.88	175.2	205.2	1.73	1.22	0.66
169.3	199.3	6.33	6.32	6.43	181.1	211.1	20.79	21.98	25.03	181.1	211.1	1.81	1.25	0.72
181.1	211.1	6.58	6.64	6.87	187.0	217.0	21.29	23.41	24.87	187.0	217.0	1.82	1.21	0.79
187.0	217.0	6.84	6.94	7.24	192.9	222.9	21.65	23.57	24.06	192.9	222.9	1.74	1.10	0.89
192.9	222.9	7.12	7.28	7.64	198.8	228.8	21.62	22.64	23.04	198.8	228.8	1.68	1.04	0.91
198.8	228.8	7.35	7.56	7.94	204.7	234.7	21.56	22.16	22.85	204.7	234.7	1.71	1.13	0.82
210.6	240.6	7.72	7.89	8.18	210.6	240.6	21.11	21.51	22.84	210.6	240.6	1.73	1.20	0.80
216.5	246.5	8.04	8.18	8.45	216.5	246.5	20.87	21.57	24.29	216.5	246.5	1.71	1.25	0.88
222.4	252.4	8.48	8.55	8.78	222.4	252.4	20.98	21.84	25.15	222.4	252.4	1.65	1.30	0.98
228.3	258.3	8.96	8.98	9.17	228.3	258.3	21.53	22.08	23.93	228.3	258.3	1.58	1.33	1.05
234.2	264.2	9.45	9.44	9.66	234.2	264.2	22.57	22.48	23.80	234.2	264.2	1.50	1.27	1.06
240.1	270.1	9.96	9.93	10.17	240.1	270.1	22.95	22.50	23.42	240.1	270.1	1.37	1.20	1.04

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Frequency Mixer

RAY-6

Typical Performance Data

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=25.1MHz (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)=50.1MHz (dB)
		@LO (dBm)			@LO (dBm)			@LO (dBm)
		+23			+23			+23
0.5	24.6	5.16	0.5	10.6	5.10	0.5	49.6	5.28
0.9	24.2	5.08	1.5	11.6	5.00	1.5	48.6	5.15
1.2	23.9	5.05	2.5	12.6	4.98	2.5	47.6	5.13
1.6	23.5	5.05	3.5	13.6	4.98	3.5	46.6	5.14
2.0	23.1	5.05	4.6	14.7	5.00	4.6	45.5	5.14
2.4	22.7	5.03	5.6	15.7	5.00	5.6	44.5	5.14
2.7	22.4	5.04	6.6	16.7	5.01	6.6	43.5	5.14
3.1	22.0	5.03	7.6	17.7	5.01	7.6	42.5	5.13
3.5	21.6	5.03	8.6	18.7	5.01	8.6	41.5	5.12
3.8	21.3	5.03	9.6	19.7	5.03	9.6	40.5	5.14
4.2	20.9	5.03	10.6	20.7	5.04	10.6	39.5	5.13
4.6	20.5	5.03	11.6	21.7	5.04	11.6	38.5	5.13
5.0	20.1	5.03	12.7	22.8	5.05	12.7	37.4	5.15
5.3	19.8	5.03	13.7	23.8	5.05	13.7	36.4	5.16
5.7	19.4	5.03	14.7	24.8	5.04	14.7	35.4	5.16
6.1	19.0	5.03	15.7	25.8	5.06	15.7	34.4	5.16
6.4	18.7	5.03	16.7	26.8	5.07	16.7	33.4	5.16
6.8	18.3	5.03	17.7	27.8	5.07	17.7	32.4	5.16
7.2	17.9	5.03	18.7	28.8	5.07	18.7	31.4	5.16
7.6	17.5	5.03	19.7	29.8	5.08	19.7	30.4	5.17
7.9	17.2	5.04	20.8	30.9	5.08	20.8	29.3	5.17
8.3	16.8	5.04	21.8	31.9	5.09	21.8	28.3	5.18
8.7	16.4	5.04	22.8	32.9	5.09	22.8	27.3	5.16
9.1	16.0	5.04	23.8	33.9	5.08	23.8	26.3	5.13
9.4	15.7	5.03	24.8	34.9	5.08	24.8	25.3	5.14
9.8	15.3	5.03	25.8	35.9	5.10	25.8	24.3	5.11
10.2	14.9	5.03	26.8	36.9	5.09	26.8	23.3	5.18
10.5	14.6	5.01	27.8	37.9	5.09	27.8	22.3	5.20
10.9	14.2	5.00	28.9	39.0	5.10	28.9	21.2	5.21
11.3	13.8	4.98	29.9	40.0	5.09	29.9	20.2	5.22
11.7	13.4	4.98	30.9	41.0	5.09	30.9	19.2	5.23
12.0	13.1	4.96	31.9	42.0	5.09	31.9	18.2	5.25
12.4	12.7	5.04	32.9	43.0	5.08	32.9	17.2	5.25
12.8	12.3	5.00	33.9	44.0	5.08	33.9	16.2	5.25
13.1	12.0	4.97	34.9	45.0	5.07	34.9	15.2	5.25
13.5	11.6	4.99	35.9	46.0	5.07	35.9	14.2	5.25
13.9	11.2	5.00	37.0	47.1	5.08	37.0	13.1	5.24
14.3	10.8	5.03	38.0	48.1	5.09	38.0	12.1	5.25
14.6	10.5	5.05	39.0	49.1	5.08	39.0	11.1	5.27
15.0	10.1	5.05	40.0	50.1	5.08	40.0	10.1	5.28

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Typical Performance Data

LO (MHz)	LO-RF ISOLATION (dB)			LO-IF ISOLATION (dB)		
	@LO (dBm)			@LO (dBm)		
	+20	+23	+26	+20	+23	+26
0.0	60.88	56.94	56.57	57.28	56.32	56.05
0.1	59.08	55.89	53.94	56.52	52.80	50.68
0.2	60.44	56.55	53.59	57.32	52.97	50.17
1.0	61.74	57.41	53.98	58.45	53.59	50.84
2.0	62.28	58.18	54.57	59.79	54.59	51.44
5.0	58.99	57.29	54.86	57.30	54.20	52.27
8.6	50.26	50.26	49.44	48.24	46.35	44.99
10.0	46.67	45.31	44.07	46.40	44.58	42.73
51.4	53.73	53.41	55.83	41.68	41.41	40.96
57.3	52.23	52.06	52.93	41.25	40.80	39.93
63.2	53.53	53.20	52.95	40.55	39.87	38.74
69.1	52.09	51.85	51.99	39.95	38.96	37.63
75.0	50.60	50.44	51.35	39.26	38.08	36.62
80.9	48.66	48.49	50.63	38.08	37.13	35.67
86.8	45.80	45.63	48.13	36.85	36.03	34.75
92.7	43.47	43.37	45.17	36.03	34.84	33.59
98.6	42.21	42.13	43.10	35.31	33.82	32.66
104.5	41.44	41.34	41.06	34.47	32.96	31.88
110.4	40.68	40.68	38.97	34.22	32.43	31.29
122.2	39.01	38.97	34.83	33.59	31.26	30.48
128.0	38.48	38.44	34.01	32.94	30.51	29.69
133.9	38.71	38.65	35.98	31.95	29.45	28.21
139.8	39.22	39.21	40.35	30.29	28.07	26.63
145.7	39.31	39.26	41.20	28.54	26.33	24.92
151.6	39.08	39.13	38.09	27.17	24.86	23.39
157.5	38.00	38.06	35.37	25.59	23.27	21.90
163.4	36.84	36.89	33.72	24.10	21.91	20.62
169.3	35.84	35.88	32.60	22.64	20.60	19.43
175.2	34.63	34.68	31.59	21.32	19.49	18.40
181.1	33.54	33.57	30.61	20.43	18.64	17.52
187.0	32.89	32.91	29.93	19.87	18.11	16.89
192.9	32.48	32.52	29.84	19.65	17.83	16.61
198.8	32.01	32.04	29.96	19.54	17.71	16.61
204.7	31.33	31.35	29.90	19.32	17.55	16.53
210.6	30.49	30.53	29.42	19.09	17.31	16.28
216.5	29.29	29.36	28.06	18.77	16.96	15.93
222.4	27.89	27.93	26.20	18.24	16.46	15.45
228.3	26.53	26.58	24.36	17.51	15.88	14.81
234.2	25.08	25.13	22.64	16.58	15.13	14.04
240.1	23.73	23.77	21.16	15.72	14.39	13.30

RF (IN) (MHz)	LO (MHz)	RF-IF ISOLATION (dB)		
		@LO (dBm)		
		+20	+23	+26
10.1	40.1	27.26	26.71	24.64
16.0	46.0	25.34	25.06	23.47
21.9	51.9	24.20	24.02	23.10
27.8	57.8	23.48	23.52	23.09
33.7	63.7	22.99	23.16	23.28
39.6	69.6	22.26	22.74	23.20
45.5	75.5	21.66	22.14	22.57
51.4	81.4	21.03	21.50	21.84
57.3	87.3	20.74	20.96	21.17
63.2	93.2	21.33	21.49	21.59
69.1	99.1	22.58	22.83	22.90
75.0	105.0	24.00	24.42	24.41
80.9	110.9	24.58	25.45	25.98
86.8	116.8	23.01	24.20	25.71
92.7	122.7	21.02	22.01	24.06
98.6	128.6	19.39	20.28	22.46
104.5	134.5	17.89	18.61	20.02
110.4	140.4	16.67	17.27	17.92
116.3	146.3	15.97	16.57	17.02
122.2	152.2	15.63	16.16	16.55
128.0	158.0	15.16	15.68	16.22
133.9	163.9	14.79	15.26	15.82
139.8	169.8	14.61	14.99	15.47
145.7	175.7	14.68	15.02	15.50
151.6	181.6	14.92	15.30	15.72
157.5	187.5	14.89	15.25	15.63
163.4	193.4	14.57	14.86	15.12
169.3	199.3	14.22	14.27	13.94
175.2	205.2	13.83	13.56	12.72
181.1	211.1	13.39	12.72	11.70
187.0	217.0	12.70	11.89	11.02
192.9	222.9	11.80	11.06	10.44
198.8	228.8	11.03	10.47	10.05
204.7	234.7	10.38	9.96	9.61
210.6	240.6	9.75	9.44	9.15
216.5	246.5	9.26	9.01	8.80
222.4	252.4	8.81	8.64	8.47
228.3	258.3	8.30	8.16	8.05
234.2	264.2	7.89	7.79	7.66
240.1	270.1	7.49	7.43	7.23



Frequency Mixer

RAY-6

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	RF VSWR (:1)			LO (MHz)	LO VSWR (:1)			IF (OUT) (MHz)	IF VSWR @LO=50.1MHz (:1)		
		@LO (dBm)				@LO (dBm)				@LO (dBm)		
		+20	+23	+26		+20	+23	+26		+20	+23	+26
5.0	35.0	1.37	1.32	1.28	35.0	1.84	2.47	3.12	0.5	1.64	1.57	1.50
6.2	36.2	1.37	1.32	1.28	36.2	1.83	2.48	3.17	1.5	1.84	1.76	1.68
7.4	37.4	1.37	1.32	1.28	37.4	1.82	2.48	3.21	2.5	1.79	1.71	1.64
10.0	40.0	1.39	1.33	1.29	40.0	1.80	2.43	3.14	3.5	1.77	1.69	1.62
16.0	46.0	1.54	1.47	1.44	16.0	1.69	2.14	2.68	4.6	1.77	1.69	1.62
21.9	51.9	1.54	1.47	1.43	21.9	1.60	1.85	2.35	5.6	1.77	1.69	1.62
27.8	57.8	1.53	1.45	1.41	27.8	1.53	1.84	2.12	6.6	1.77	1.69	1.62
33.7	63.7	1.49	1.42	1.37	33.7	1.49	2.11	2.00	7.6	1.77	1.70	1.62
39.6	69.6	1.46	1.39	1.36	39.6	1.46	2.63	1.95	8.6	1.77	1.69	1.62
45.5	75.5	1.44	1.37	1.35	45.5	1.47	2.99	1.98	9.6	1.78	1.70	1.63
51.4	81.4	1.42	1.35	1.33	51.4	1.51	2.78	2.08	10.6	1.78	1.70	1.62
57.3	87.3	1.39	1.33	1.31	57.3	1.58	2.33	2.23	11.6	1.79	1.70	1.63
63.2	93.2	1.33	1.27	1.26	63.2	1.67	2.04	2.46	12.7	1.79	1.71	1.63
75.0	105.0	1.25	1.23	1.23	75.0	1.88	2.18	3.07	13.7	1.79	1.71	1.64
80.9	110.9	1.25	1.24	1.24	80.9	1.95	2.70	3.30	14.7	1.79	1.71	1.64
86.8	116.8	1.28	1.27	1.29	86.8	1.99	3.19	3.34	15.7	1.79	1.71	1.64
92.7	122.7	1.32	1.32	1.34	92.7	1.97	3.11	3.24	16.7	1.80	1.72	1.65
98.6	128.6	1.36	1.36	1.39	98.6	1.92	2.73	3.04	17.7	1.80	1.72	1.64
104.5	134.5	1.41	1.40	1.41	104.5	1.87	2.43	2.80	18.7	1.80	1.72	1.64
110.4	140.4	1.43	1.41	1.41	110.4	1.81	2.32	2.57	19.7	1.80	1.72	1.65
122.2	152.2	1.41	1.36	1.31	122.2	1.74	2.87	2.28	20.8	1.80	1.72	1.65
128.0	158.0	1.38	1.33	1.27	128.0	1.72	3.43	2.24	21.8	1.80	1.73	1.65
133.9	163.9	1.34	1.28	1.22	133.9	1.73	3.51	2.26	22.8	1.81	1.73	1.65
139.8	169.8	1.30	1.24	1.16	139.8	1.77	3.30	2.32	23.8	1.81	1.73	1.66
145.7	175.7	1.27	1.22	1.12	145.7	1.85	3.08	2.44	24.8	1.81	1.73	1.66
151.6	181.6	1.24	1.19	1.13	151.6	1.96	2.95	2.62	25.8	1.81	1.73	1.66
157.5	187.5	1.21	1.19	1.19	157.5	2.08	2.96	2.85	26.8	1.81	1.73	1.66
163.4	193.4	1.22	1.22	1.25	163.4	2.19	3.13	3.12	27.8	1.81	1.73	1.66
169.3	199.3	1.28	1.28	1.34	169.3	2.27	3.38	3.35	28.9	1.81	1.74	1.67
175.2	205.2	1.37	1.39	1.46	175.2	2.30	3.52	3.41	29.9	1.81	1.73	1.66
181.1	211.1	1.49	1.51	1.59	181.1	2.30	3.58	3.35	30.9	1.82	1.74	1.66
187.0	217.0	1.65	1.67	1.72	187.0	2.29	3.63	3.25	31.9	1.82	1.74	1.67
192.9	222.9	1.79	1.81	1.86	192.9	2.27	3.58	3.15	32.9	1.82	1.74	1.67
198.8	228.8	1.88	1.90	1.94	198.8	2.25	3.34	3.04	33.9	1.82	1.74	1.67
210.6	240.6	2.01	2.00	2.01	210.6	2.22	2.75	2.85	34.9	1.82	1.74	1.67
216.5	246.5	2.10	2.08	2.09	216.5	2.21	2.93	2.79	35.9	1.83	1.75	1.67
222.4	252.4	2.23	2.20	2.20	222.4	2.20	3.21	2.76	37.0	1.83	1.75	1.68
228.3	258.3	2.36	2.35	2.36	228.3	2.21	3.58	2.73	38.0	1.83	1.75	1.68
234.2	264.2	2.51	2.53	2.52	234.2	2.23	3.70	2.70	39.0	1.83	1.75	1.68
240.1	270.1	2.60	2.60	2.63	240.1	2.27	3.26	2.69	40.0	1.83	1.76	1.69

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Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	14	31	25	33	17	30	19	40	30	51
1	-	17	+0	27	10	31	16	42	21	37	31	48
2	87	65	57	69	61	69	63	70	50	62	51	69
3	106	60	68	64	70	67	69	61	64	62	59	65
4	>123	86	90	88	85	92	92	84	77	86	79	86
5	>123	78	76	82	71	83	69	88	69	87	70	82
6	>123	90	89	93	87	94	87	112	91	92	91	87
7	>122	91	82	90	82	89	77	88	77	97	78	95
8	>122	101	99	103	103	105	105	104	96	107	99	97
9	>122	95	87	95	87	96	88	97	84	95	85	101
10	>122	107	108	106	112	107	106	109	103	108	101	>119
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions: RF IN: 30.1 MHz; .01.00 dBm.
 LO IN: 40.01 MHz; +22.9.00 dBm
 IF OUT: 9.91 MHz; -5.29 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	24	42	34	47	28	42	32	51	43	67
1	-	18	+0	29	11	34	18	47	24	43	34	57
2	76	74	53	68	56	60	55	58	46	60	51	67
3	88	46	52	47	45	48	40	46	40	50	41	51
4	>123	74	76	95	71	87	71	72	67	77	57	70
5	>122	69	65	70	55	73	53	70	53	62	56	58
6	>123	89	74	85	75	83	81	86	76	79	78	79
7	>122	69	70	74	70	76	69	74	65	71	61	69
8	>123	85	82	84	87	86	82	92	82	85	91	89
9	>123	77	76	82	75	77	76	81	80	91	79	94
10	>123	94	89	94	93	93	95	109	91	103	88	88
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions: RF IN: 30.1 MHz; 9.98.00 dBm.
 LO IN: 40.01 MHz; +22.9.00 dBm
 IF OUT: 9.91 MHz; 4.68 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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