

Frequency Mixer

ASK-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
10.1	40.1	4.99	4.79	4.69	10.1	40.1	21.50	21.12	21.66	10.1	40.1	1.68	1.19	1.06
40.1	70.1	5.50	5.29	5.12	40.1	70.1	20.08	21.36	21.44	40.1	70.1	1.45	1.04	0.91
70.1	100.1	5.46	5.28	5.17	70.1	100.1	17.93	20.54	21.42	70.1	100.1	1.44	1.11	0.88
100.1	130.1	5.57	5.40	5.28	100.1	130.1	21.22	21.30	20.55	100.1	130.1	1.30	0.97	0.77
130.1	160.1	5.59	5.40	5.29	130.1	160.1	18.16	19.09	19.00	130.1	160.1	1.26	1.00	0.76
160.1	190.1	5.66	5.46	5.35	160.1	190.1	16.28	16.68	18.06	160.1	190.1	1.30	1.01	0.80
190.1	220.1	5.70	5.49	5.39	190.1	220.1	18.68	18.07	19.90	190.1	220.1	1.24	0.97	0.75
220.1	250.1	5.75	5.55	5.42	220.1	250.1	15.24	15.63	17.95	220.1	250.1	1.22	0.96	0.76
250.1	280.1	5.84	5.64	5.49	250.1	280.1	13.09	14.37	17.88	250.1	280.1	1.22	0.95	0.75
280.1	310.1	5.85	5.63	5.48	280.1	310.1	15.49	16.96	21.26	280.1	310.1	1.24	0.98	0.79
310.1	340.1	5.93	5.67	5.50	310.1	340.1	17.76	20.66	21.25	310.1	340.1	1.28	1.03	0.84
340.1	370.1	6.02	5.76	5.58	340.1	370.1	14.26	16.69	21.21	340.1	370.1	1.36	1.10	0.90
370.1	400.1	6.01	5.77	5.61	370.1	400.1	11.98	13.74	17.46	370.1	400.1	1.53	1.24	1.03
400.1	430.1	6.11	5.86	5.69	400.1	430.1	9.93	11.65	14.03	400.1	430.1	1.58	1.31	1.11
430.1	460.1	6.20	5.91	5.71	430.1	460.1	9.58	11.29	13.92	430.1	460.1	1.74	1.45	1.24
460.1	490.1	6.25	5.92	5.70	460.1	490.1	10.69	13.65	17.81	460.1	490.1	1.90	1.61	1.38
490.1	520.1	6.46	6.03	5.77	490.1	520.1	11.16	16.62	19.53	490.1	520.1	1.95	1.68	1.47
520.1	550.1	6.71	6.15	5.81	520.1	550.1	10.20	15.59	16.24	520.1	550.1	2.00	1.77	1.56
550.1	580.1	6.80	6.16	5.77	550.1	580.1	9.65	15.24	15.75	550.1	580.1	2.06	1.92	1.71
580.1	610.1	7.15	6.44	5.95	580.1	610.1	8.32	11.93	13.08	580.1	610.1	1.82	1.77	1.62
610.1	640.1	7.28	6.60	6.09	610.1	640.1	6.97	9.46	11.05	610.1	640.1	1.73	1.66	1.56
640.1	670.1	7.18	6.60	6.14	640.1	670.1	7.24	9.24	10.91	640.1	670.1	1.81	1.69	1.56
670.1	700.1	7.33	6.79	6.34	670.1	700.1	6.65	8.49	10.30	670.1	700.1	1.67	1.52	1.39
700.1	730.1	7.26	6.80	6.41	700.1	730.1	7.09	9.00	11.03	700.1	730.1	1.69	1.48	1.33
730.1	760.1	7.16	6.76	6.46	730.1	760.1	9.28	11.38	12.79	730.1	760.1	1.74	1.48	1.28
760.1	790.1	7.27	6.89	6.60	760.1	790.1	10.23	12.54	13.04	760.1	790.1	1.65	1.36	1.15
790.1	820.1	7.24	6.92	6.69	790.1	820.1	13.72	15.87	14.61	790.1	820.1	1.62	1.31	1.07
820.1	850.1	7.25	6.98	6.81	820.1	850.1	15.59	17.09	15.68	820.1	850.1	1.60	1.25	0.98
850.1	880.1	7.41	7.15	6.99	850.1	880.1	15.81	16.65	15.93	850.1	880.1	1.51	1.16	0.91
880.1	910.1	7.54	7.31	7.19	880.1	910.1	15.31	16.86	16.86	880.1	910.1	1.46	1.09	0.85
900.1	930.1	7.67	7.45	7.35	900.1	930.1	15.11	16.25	17.47	900.1	930.1	1.44	1.08	0.84
930.1	960.1	7.85	7.67	7.60	930.1	960.1	14.14	15.71	16.58	930.1	960.1	1.37	1.02	0.81
950.1	980.1	8.05	7.89	7.83	950.1	980.1	13.52	15.36	15.82	950.1	980.1	1.33	0.98	0.81
980.1	1010.1	8.35	8.21	8.18	980.1	1010.1	12.94	14.91	14.80	980.1	1010.1	1.26	0.92	0.77
1000.1	1030.1	8.60	8.50	8.50	1000.1	1030.1	12.10	13.87	14.39	1000.1	1030.1	1.19	0.85	0.73
1030.1	1060.1	9.02	8.94	8.92	1030.1	1060.1	11.19	12.56	13.79	1030.1	1060.1	1.10	0.76	0.68
1050.1	1080.1	9.31	9.26	9.26	1050.1	1080.1	11.34	12.49	13.89	1050.1	1080.1	0.99	0.67	0.63
1080.1	1110.1	9.79	9.73	9.70	1080.1	1110.1	11.37	12.80	14.56	1080.1	1110.1	0.90	0.61	0.62
1100.1	1130.1	10.13	10.07	10.06	1100.1	1130.1	11.82	13.81	15.37	1100.1	1130.1	0.82	0.56	0.59
1130.1	1160.1	10.64	10.53	10.53	1130.1	1160.1	13.34	15.03	15.61	1130.1	1160.1	0.76	0.54	0.56

REV. X2

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Frequency Mixer

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Typical Performance Data

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=300.1MHz (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)=600.1MHz (dB)
		@LO (dBm)			@LO (dBm)			@LO (dBm)
		+7			+7			+7
290.0	10.1	5.60	10.0	20.1	5.34	590.0	10.1	6.28
282.8	17.3	5.58	30.0	40.1	4.96	575.1	25.0	6.21
275.6	24.5	5.58	50.0	60.1	4.94	560.3	39.8	6.15
268.5	31.6	5.54	70.0	80.1	4.74	545.4	54.7	6.19
261.3	38.8	5.50	110.0	120.1	4.62	530.5	69.6	6.16
254.1	46.0	5.54	130.0	140.1	4.74	515.6	84.5	6.15
246.9	53.2	5.49	170.0	180.1	4.83	500.8	99.3	6.24
239.7	60.4	5.48	190.0	200.1	4.98	485.9	114.2	6.16
232.6	67.5	5.51	230.0	240.1	5.05	471.0	129.1	6.16
225.4	74.7	5.45	250.0	260.1	4.98	456.2	143.9	6.21
218.2	81.9	5.46	290.0	300.1	5.07	441.3	158.8	6.17
211.0	89.1	5.49	310.0	320.1	5.08	426.4	173.7	6.19
203.8	96.3	5.48	350.0	360.1	5.03	411.5	188.6	6.20
196.7	103.4	5.47	370.0	380.1	5.07	396.7	203.4	6.19
189.5	110.6	5.49	410.0	420.1	5.15	381.8	218.3	6.21
182.3	117.8	5.48	430.0	440.1	5.12	366.9	233.2	6.14
175.1	125.0	5.46	470.0	480.1	5.31	352.1	248.0	6.20
167.9	132.2	5.46	490.0	500.1	5.12	337.2	262.9	6.25
160.8	139.3	5.52	530.0	540.1	5.29	322.3	277.8	6.21
153.6	146.5	5.49	550.0	560.1	5.42	307.4	292.7	6.29
146.4	153.7	5.50	590.0	600.1	5.22	292.6	307.5	6.30
139.2	160.9	5.54	610.0	620.1	5.32	277.7	322.4	6.22
132.1	168.0	5.51	650.0	660.1	5.13	262.8	337.3	6.27
124.9	175.2	5.48	670.0	680.1	5.11	247.9	352.2	6.26
117.7	182.4	5.51	710.0	720.1	5.27	233.1	367.0	6.23
110.5	189.6	5.50	730.0	740.1	5.18	218.2	381.9	6.33
103.3	196.8	5.49	770.0	780.1	4.87	203.3	396.8	6.32
96.2	203.9	5.52	790.0	800.1	5.31	188.5	411.6	6.30
89.0	211.1	5.50	830.0	840.1	5.44	173.6	426.5	6.33
81.8	218.3	5.46	850.0	860.1	5.68	158.7	441.4	6.28
74.6	225.5	5.38	890.0	900.1	5.98	143.8	456.3	6.28
67.4	232.7	5.40	910.0	920.1	5.93	129.0	471.1	6.24
60.3	239.8	5.41	950.0	960.1	6.77	114.1	486.0	6.12
53.1	247.0	5.56	970.0	980.1	6.97	99.2	500.9	6.11
45.9	254.2	5.59	1010.0	1020.1	7.94	84.4	515.7	5.98
38.7	261.4	5.56	1030.0	1040.1	8.51	69.5	530.6	6.02
31.5	268.6	5.57	1070.0	1080.1	9.59	54.6	545.5	6.11
24.4	275.7	5.62	1090.0	1100.1	10.13	39.7	560.4	6.04
17.2	282.9	5.65	1130.0	1140.1	11.81	24.9	575.2	6.20
10.0	290.1	6.07	1150.0	1160.1	12.57	10.0	590.1	6.75

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Typical Performance Data

LO (MHz)	LO-RF ISOLATION (dB)			LO-IF ISOLATION (dB)			RF (IN) (MHz)	LO (MHz)	RF-IF ISOLATION (dB)		
	@LO (dBm)			@LO (dBm)					@LO (dBm)		
	+4	+7	+10	+4	+7	+10			+4	+7	+10
40.1	39.98	41.68	43.05	61.18	62.15	63.18	10.1	40.1	44.26	44.09	43.38
70.1	39.07	40.19	40.91	57.29	58.22	58.56	40.1	70.1	33.98	33.39	33.56
100.1	38.45	39.05	39.16	53.90	54.49	54.85	70.1	100.1	29.38	29.66	29.80
130.1	37.87	37.87	37.56	50.54	51.39	52.00	100.1	130.1	27.34	27.66	27.75
160.1	37.12	36.72	36.18	48.44	49.60	50.54	130.1	160.1	25.79	26.10	26.25
190.1	36.66	35.95	35.26	46.24	47.51	48.70	160.1	190.1	24.64	24.95	25.23
220.1	35.81	34.84	34.02	44.92	46.64	48.13	190.1	220.1	24.08	24.53	24.75
250.1	35.19	34.07	33.19	43.86	45.79	47.68	220.1	250.1	23.89	24.48	24.94
280.1	35.12	33.82	32.85	42.11	44.06	45.94	250.1	280.1	23.91	24.52	25.03
310.1	34.44	33.11	32.12	41.22	43.27	45.39	280.1	310.1	23.79	24.27	24.76
340.1	33.58	32.22	31.29	42.21	44.48	46.88	310.1	340.1	24.03	24.88	25.56
370.1	32.45	31.32	30.53	43.69	46.48	48.69	340.1	370.1	24.21	25.39	26.50
400.1	31.36	30.46	29.87	43.90	45.29	45.28	370.1	400.1	23.92	25.02	25.98
430.1	31.08	30.25	29.66	42.15	41.30	40.23	400.1	430.1	23.30	23.86	24.15
460.1	30.89	30.06	29.45	39.71	38.19	36.72	430.1	460.1	21.51	21.44	21.18
490.1	30.91	29.93	29.31	37.86	36.06	34.41	460.1	490.1	19.25	18.96	18.64
520.1	30.86	29.74	28.95	36.77	34.84	33.09	490.1	520.1	17.93	17.56	17.25
550.1	30.30	29.33	28.53	36.80	34.53	32.35	520.1	550.1	17.06	16.67	16.34
580.1	29.32	28.55	27.92	36.18	33.74	31.33	550.1	580.1	16.46	16.05	15.70
610.1	28.46	27.82	27.21	33.29	31.63	29.60	580.1	610.1	16.60	16.21	15.79
640.1	27.50	26.95	26.55	30.63	29.41	27.96	610.1	640.1	16.98	16.57	16.17
670.1	26.86	26.33	25.97	28.21	27.02	25.86	640.1	670.1	16.95	16.51	16.11
700.1	26.52	25.86	25.42	26.19	24.90	23.80	670.1	700.1	16.90	16.44	16.01
730.1	26.18	25.45	24.99	24.77	23.37	22.22	700.1	730.1	16.73	16.15	15.66
760.1	26.09	25.34	24.83	23.26	21.83	20.68	730.1	760.1	16.09	15.46	14.92
790.1	26.16	25.31	24.69	22.03	20.55	19.42	760.1	790.1	15.47	14.72	14.13
820.1	26.05	25.10	24.37	20.82	19.39	18.24	790.1	820.1	14.78	13.99	13.31
850.1	26.03	24.89	24.10	19.71	18.24	17.16	820.1	850.1	13.90	13.09	12.44
880.1	26.05	24.78	23.88	18.84	17.45	16.41	850.1	880.1	13.11	12.30	11.68
910.1	25.66	24.23	23.26	17.63	16.33	15.31	880.1	910.1	12.26	11.50	10.89
930.1	25.48	24.00	23.00	17.12	15.90	14.92	900.1	930.1	11.67	10.96	10.36
960.1	24.90	23.41	22.33	16.10	15.03	14.10	930.1	960.1	10.78	10.11	9.59
980.1	24.42	22.87	21.83	15.66	14.62	13.75	950.1	980.1	10.15	9.57	9.09
1010.1	23.44	22.05	20.99	14.74	13.89	13.01	980.1	1010.1	9.41	8.87	8.46
1030.1	22.58	21.33	20.37	14.26	13.50	12.72	1000.1	1030.1	8.78	8.33	7.96
1060.1	21.34	20.32	19.40	13.55	12.93	12.14	1030.1	1060.1	8.09	7.72	7.38
1080.1	20.61	19.73	18.91	13.32	12.76	12.05	1050.1	1080.1	7.56	7.19	6.93
1110.1	19.20	18.54	17.88	12.56	12.07	11.43	1080.1	1110.1	6.97	6.66	6.43
1130.1	18.40	17.89	17.30	12.28	11.85	11.24	1100.1	1130.1	6.58	6.30	6.08
1160.1	17.30	17.02	16.56	11.80	11.44	10.89	1130.1	1160.1	6.08	5.83	5.65

Frequency Mixer

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Typical Performance Data

RF (IN) (MHz)	LO (MHz)	RF VSWR (:1)			LO (MHz)	LO VSWR (:1)			IF (OUT) (MHz)	IF VSWR @LO=600.1MHz (:1)		
		@LO (dBm)				@LO (dBm)				@LO (dBm)		
		+4	+7	+10		+4	+7	+10		+4	+7	+10
10.1	40.1	1.25	1.25	1.05	40.1	1.91	2.89	4.27	10.1	1.80	1.51	1.33
40.1	70.1	1.18	1.09	1.05	70.1	1.83	2.69	3.82	20.1	1.85	1.56	1.37
70.1	100.1	1.12	1.05	1.01	100.1	1.76	2.54	3.55	40.1	1.83	1.54	1.35
100.1	130.1	1.16	1.08	1.03	130.1	1.81	2.62	3.67	50.1	1.81	1.53	1.34
130.1	160.1	1.12	1.05	1.01	160.1	1.81	2.61	3.61	70.1	1.86	1.57	1.37
160.1	190.1	1.13	1.06	1.03	190.1	1.79	2.54	3.48	80.1	1.85	1.56	1.38
190.1	220.1	1.14	1.07	1.02	220.1	1.82	2.59	3.54	100.1	1.81	1.53	1.34
220.1	250.1	1.12	1.05	1.01	250.1	1.86	2.63	3.58	110.1	1.86	1.57	1.38
250.1	280.1	1.13	1.07	1.03	280.1	1.87	2.62	3.54	130.1	1.87	1.58	1.39
280.1	310.1	1.14	1.08	1.03	310.1	1.90	2.65	3.57	140.1	1.84	1.55	1.37
310.1	340.1	1.13	1.06	1.01	340.1	1.95	2.70	3.62	160.1	1.88	1.60	1.41
340.1	370.1	1.12	1.05	1.02	370.1	1.98	2.72	3.63	170.1	1.88	1.60	1.41
370.1	400.1	1.13	1.06	1.01	400.1	2.02	2.78	3.70	190.1	1.84	1.56	1.38
400.1	430.1	1.13	1.07	1.02	430.1	2.07	2.82	3.74	200.1	1.87	1.59	1.41
430.1	460.1	1.17	1.11	1.06	460.1	2.10	2.84	3.75	220.1	1.91	1.64	1.45
460.1	490.1	1.23	1.16	1.12	490.1	2.17	2.91	3.82	230.1	1.88	1.61	1.43
490.1	520.1	1.30	1.23	1.18	520.1	2.25	2.99	3.90	250.1	1.91	1.64	1.45
520.1	550.1	1.41	1.33	1.28	550.1	2.30	3.03	3.93	260.1	1.94	1.66	1.48
550.1	580.1	1.54	1.44	1.38	580.1	2.37	3.12	4.02	280.1	1.85	1.59	1.42
580.1	610.1	1.66	1.55	1.47	610.1	2.46	3.23	4.15	290.1	1.88	1.62	1.44
610.1	640.1	1.77	1.67	1.59	640.1	2.48	3.25	4.15	310.1	1.94	1.68	1.51
640.1	670.1	1.85	1.76	1.68	670.1	2.50	3.26	4.16	320.1	1.90	1.65	1.48
670.1	700.1	1.90	1.82	1.75	700.1	2.55	3.32	4.23	340.1	1.92	1.66	1.49
700.1	730.1	1.96	1.89	1.84	730.1	2.58	3.33	4.23	350.1	1.95	1.70	1.53
730.1	760.1	1.97	1.92	1.88	760.1	2.57	3.30	4.16	370.1	1.84	1.61	1.46
760.1	790.1	1.97	1.93	1.90	790.1	2.61	3.33	4.18	380.1	1.85	1.61	1.46
790.1	820.1	2.03	2.00	1.98	820.1	2.66	3.35	4.20	400.1	1.93	1.69	1.54
820.1	850.1	2.04	2.02	2.00	850.1	2.67	3.33	4.14	410.1	1.89	1.66	1.52
850.1	880.1	2.09	2.06	2.04	880.1	2.70	3.34	4.12	430.1	1.85	1.64	1.49
880.1	910.1	2.16	2.13	2.10	910.1	2.78	3.38	4.14	440.1	1.90	1.68	1.53
900.1	930.1	2.24	2.20	2.17	930.1	2.83	3.41	4.13	460.1	1.80	1.60	1.48
930.1	960.1	2.28	2.24	2.21	960.1	2.86	3.38	4.05	470.1	1.76	1.57	1.44
950.1	980.1	2.33	2.29	2.25	980.1	2.90	3.40	4.02	490.1	1.84	1.64	1.51
980.1	1010.1	2.40	2.36	2.33	1010.1	3.00	3.45	4.02	500.1	1.81	1.62	1.50
1000.1	1030.1	2.46	2.42	2.39	1030.1	3.05	3.46	4.01	520.1	1.74	1.56	1.44
1030.1	1060.1	2.46	2.43	2.40	1060.1	3.05	3.40	3.88	530.1	1.78	1.59	1.47
1050.1	1080.1	2.47	2.45	2.43	1080.1	3.06	3.38	3.86	550.1	1.71	1.54	1.45
1080.1	1110.1	2.48	2.47	2.46	1110.1	3.09	3.39	3.79	560.1	1.65	1.48	1.39
1100.1	1130.1	2.48	2.48	2.48	1130.1	3.07	3.36	3.73	580.1	1.70	1.53	1.43
1130.1	1160.1	2.43	2.44	2.45	1160.1	2.99	3.27	3.59	590.1	1.70	1.54	1.44

REV. X2

ASK-1+

101012

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Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	17	9	14	34	19	29	27	36	34	45
1	-	19	+0	30	11	29	25	38	36	43	43	51
2	>90	57	60	59	64	55	56	61	59	68	62	60
3	>90	62	69	65	62	69	59	>70	>70	>70	70	>70
4	>90	>70	>70	>70	>70	>70	>70	>70	>70	>70	>70	>70
5	>90	>70	>70	>70	>70	>70	>70	>70	>70	>70	>70	>70
6	>90	>70	>70	>70	>70	>70	>70	>70	>70	>70	>70	>70
7	>90	>70	>70	>70	>70	>70	>70	>70	>70	>70	>70	>70
8	>90	>70	>70	>70	>70	>70	>70	>70	>70	>70	>70	>70
9	>90	>70	>70	>70	>70	>70	>70	>70	>70	>70	>70	>70
10	>90	>70	>70	>70	>70	>70	>70	>70	>70	>70	>70	>70
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions: RF IN: 300.1 MHz; -14.00 dBm.
 LO IN: 330.1 MHz; +7.00 dBm
 IF OUT: 30 MHz; -19.78 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	27	19	25	54	29	43	40	48	51	62
1	-	20	+0	29	12	33	27	44	37	49	49	55
2	73	46	47	54	50	47	46	64	57	55	55	62
3	>90	41	41	47	42	59	42	50	49	53	55	58
4	>90	66	63	55	77	53	77	55	64	67	64	66
5	>90	64	60	65	50	67	50	66	51	64	65	72
6	>90	79	>80	70	74	65	74	65	74	61	69	72
7	>90	>80	80	80	69	75	68	77	66	77	61	70
8	>90	>80	>80	>80	>80	77	>80	75	>80	76	>80	>80
9	>90	>80	>80	>80	>80	>80	76	>80	79	>80	79	>80
10	>90	>80	>80	>80	>80	>80	>80	79	>80	79	>80	78
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions: RF IN: 300.1 MHz; -4.00 dBm.
 LO IN: 330.1 MHz; +7.00 dBm
 IF OUT: 30 MHz; -9.78 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.