

# Frequency Mixer

# MBA-9MH

## 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=+8dBm (dB)		
		@LO (dBm)					@LO (dBm)					@LO (dBm)		
		+10	+13	+16			+10	+13	+16			+10	+13	+16
530.0	560.0	12.28	10.20	10.24	530.0	560.0	11.99	9.54	15.52	530.0	560.0	0.90	1.12	0.54
630.0	660.0	9.95	9.61	9.48	630.0	660.0	7.72	11.65	14.46	630.0	660.0	1.97	1.15	0.86
730.0	760.0	9.20	8.50	8.23	730.0	760.0	12.17	20.53	18.32	730.0	760.0	2.02	1.74	1.50
830.0	860.0	8.12	7.49	7.21	830.0	860.0	15.65	19.74	19.70	830.0	860.0	2.68	2.49	2.19
930.0	960.0	7.96	7.06	6.64	930.0	960.0	13.25	19.07	26.01	930.0	960.0	2.59	2.70	2.55
1030.0	1060.0	7.57	6.72	6.45	1030.0	1060.0	10.92	13.75	15.55	1030.0	1060.0	2.78	2.83	2.56
1130.0	1160.0	7.57	7.09	6.89	1130.0	1160.0	14.15	17.18	19.23	1130.0	1160.0	2.80	2.51	2.23
1230.0	1260.0	7.72	7.41	7.27	1230.0	1260.0	14.24	16.25	18.14	1230.0	1260.0	2.69	2.32	2.02
1330.0	1360.0	7.88	7.66	7.58	1330.0	1360.0	13.49	15.41	16.44	1330.0	1360.0	2.64	2.20	1.83
1430.0	1460.0	8.20	7.98	7.89	1430.0	1460.0	12.78	14.76	16.32	1430.0	1460.0	2.51	2.08	1.71
1530.0	1560.0	8.30	8.18	8.11	1530.0	1560.0	12.94	14.70	15.81	1530.0	1560.0	2.21	1.72	1.37
1630.0	1660.0	8.33	8.36	8.35	1630.0	1660.0	14.96	16.28	17.56	1630.0	1660.0	1.95	1.45	1.19
1730.0	1760.0	7.60	7.57	7.60	1730.0	1760.0	14.87	15.16	15.76	1730.0	1760.0	2.08	1.78	1.54
1830.0	1860.0	7.50	7.39	7.37	1830.0	1860.0	17.45	17.22	17.35	1830.0	1860.0	1.45	1.22	1.08
1930.0	1960.0	7.92	7.79	7.76	1930.0	1960.0	16.68	17.28	17.58	1930.0	1960.0	1.91	1.63	1.45
2030.0	2060.0	7.68	7.61	7.60	2030.0	2060.0	15.90	16.45	16.88	2030.0	2060.0	1.66	1.49	1.34
2130.0	2160.0	7.30	7.15	7.12	2130.0	2160.0	15.85	16.36	16.70	2130.0	2160.0	1.79	1.61	1.48
2230.0	2260.0	7.39	7.33	7.35	2230.0	2260.0	16.61	17.49	18.03	2230.0	2260.0	1.80	1.61	1.49
2330.0	2360.0	7.83	7.70	7.68	2330.0	2360.0	17.12	17.95	18.51	2330.0	2360.0	1.57	1.39	1.24
2430.0	2460.0	7.40	7.35	7.40	2430.0	2460.0	16.70	18.11	18.76	2430.0	2460.0	1.80	1.57	1.40
2530.0	2560.0	7.79	7.79	7.87	2530.0	2560.0	12.01	14.26	16.24	2530.0	2560.0	1.39	1.11	0.94
2630.0	2660.0	8.63	8.37	8.26	2630.0	2660.0	17.41	15.67	14.08	2630.0	2660.0	0.62	0.53	0.48
2730.0	2760.0	8.03	7.82	7.74	2730.0	2760.0	12.06	12.66	12.69	2730.0	2760.0	1.10	0.92	0.78
2830.0	2860.0	7.72	7.57	7.55	2830.0	2860.0	13.44	13.71	13.85	2830.0	2860.0	1.28	0.95	0.75
2930.0	2960.0	7.75	7.56	7.53	2930.0	2960.0	11.92	12.57	12.98	2930.0	2960.0	1.75	1.40	1.12
3030.0	3060.0	7.29	7.04	7.00	3030.0	3060.0	11.34	12.11	12.67	3030.0	3060.0	2.49	2.08	1.75
3130.0	3160.0	6.90	6.71	6.69	3130.0	3160.0	11.19	12.06	12.58	3130.0	3160.0	2.69	2.23	1.89
3230.0	3260.0	6.40	6.29	6.30	3230.0	3260.0	12.68	13.38	13.57	3230.0	3260.0	2.77	2.38	2.08
3330.0	3360.0	6.19	6.08	6.09	3330.0	3360.0	13.14	13.88	14.28	3330.0	3360.0	2.86	2.51	2.25
3430.0	3460.0	6.11	6.02	6.03	3430.0	3460.0	13.57	14.14	14.11	3430.0	3460.0	2.84	2.57	2.34
3530.0	3560.0	6.25	6.18	6.27	3530.0	3560.0	12.76	12.44	10.43	3530.0	3560.0	2.95	2.74	2.57
3630.0	3660.0	6.69	6.95	8.03	3630.0	3660.0	12.23	11.83	14.31	3630.0	3660.0	2.64	2.36	1.70
3730.0	3760.0	7.68	8.14	9.71	3730.0	3760.0	15.01	15.67	11.40	3730.0	3760.0	1.99	1.73	1.32
3830.0	3860.0	7.68	7.38	8.37	3830.0	3860.0	15.80	12.73	12.26	3830.0	3860.0	2.01	2.23	1.70
3910.0	3940.0	7.16	6.95	7.04	3910.0	3940.0	14.62	15.09	10.83	3910.0	3940.0	2.06	2.09	2.19
4010.0	4040.0	7.16	6.98	6.98	4010.0	4040.0	13.08	13.37	10.45	4010.0	4040.0	2.53	2.43	2.42
4090.0	4120.0	6.99	6.89	6.94	4090.0	4120.0	14.27	14.68	12.57	4090.0	4120.0	2.30	2.14	2.06
4190.0	4220.0	7.23	7.13	7.17	4190.0	4220.0	13.83	15.21	15.08	4190.0	4220.0	1.96	1.70	1.59
4270.0	4300.0	7.67	7.59	7.65	4270.0	4300.0	14.49	16.29	16.64	4270.0	4300.0	1.73	1.38	1.25
4370.0	4400.0	8.23	8.17	8.28	4370.0	4400.0	15.41	16.84	16.95	4370.0	4400.0	1.70	1.30	1.22

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## Typical Performance Data

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=900MHz (dB)	IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=789.9MHz (dB)	IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=1010.1MHz (dB)
		@LO (dBm)			@LO (dBm)			@LO (dBm)
		+13			+13			+13
430.0	470.0	10.22	10.1	800.0	7.95	510.1	500.0	10.38
406.0	494.0	9.40	30.1	820.0	7.81	500.1	510.0	9.91
382.0	518.0	8.94	50.1	840.0	7.85	490.1	520.0	9.50
358.0	542.0	9.14	70.1	860.0	7.79	480.1	530.0	9.39
334.0	566.0	9.13	90.1	880.0	7.79	470.1	540.0	9.31
310.0	590.0	9.20	110.1	900.0	7.74	460.1	550.0	9.09
286.0	614.0	9.16	130.1	920.0	7.74	450.1	560.0	8.98
262.0	638.0	8.84	150.1	940.0	7.69	440.1	570.0	8.81
238.0	662.0	8.36	170.1	960.0	7.65	430.1	580.0	8.62
214.0	686.0	7.88	190.1	980.0	7.68	420.1	590.0	8.52
190.0	710.0	7.41	210.1	1000.0	7.88	410.1	600.0	8.45
166.0	734.0	7.12	230.1	1020.0	8.05	400.1	610.0	8.47
142.0	758.0	6.83	250.1	1040.0	7.91	390.1	620.0	8.54
118.0	782.0	6.80	270.1	1060.0	7.84	380.1	630.0	8.57
94.0	806.0	6.76	290.1	1080.0	7.69	370.1	640.0	8.47
70.0	830.0	6.78	310.1	1100.0	7.62	360.1	650.0	8.43
46.0	854.0	6.89	330.1	1120.0	7.69	350.1	660.0	8.28
22.0	878.0	7.02	350.1	1140.0	7.69	340.1	670.0	8.15
10.0	910.0	7.29	390.1	1180.0	7.78	320.1	690.0	7.94
65.6	965.6	7.12	410.1	1200.0	7.75	310.1	700.0	7.60
121.1	1021.1	7.10	450.1	1240.0	7.91	290.1	720.0	7.33
176.7	1076.7	6.78	470.1	1260.0	8.06	280.1	730.0	7.13
232.2	1132.2	6.82	510.1	1300.0	8.25	260.1	750.0	6.86
287.8	1187.8	7.05	530.1	1320.0	8.19	250.1	760.0	6.73
343.3	1243.3	7.25	570.1	1360.0	8.14	230.1	780.0	6.60
398.9	1298.9	7.41	590.1	1380.0	8.13	220.1	790.0	6.57
454.4	1354.4	7.39	630.1	1420.0	8.56	200.1	810.0	6.54
510.0	1410.0	7.61	650.1	1440.0	8.57	190.1	820.0	6.56
565.6	1465.6	7.70	690.1	1480.0	8.65	170.1	840.0	6.55
593.3	1493.3	7.76	710.1	1500.0	8.68	160.1	850.0	6.56
648.9	1548.9	7.69	750.1	1540.0	8.86	140.1	870.0	6.68
676.7	1576.7	7.86	770.1	1560.0	8.88	130.1	880.0	6.73
732.2	1632.2	8.06	810.1	1600.0	9.03	110.1	900.0	6.88
760.0	1660.0	8.04	830.1	1620.0	9.22	100.1	910.0	6.96
815.6	1715.6	8.57	870.1	1660.0	9.58	80.1	930.0	7.08
843.3	1743.3	8.74	890.1	1680.0	9.85	70.1	940.0	7.13
898.9	1798.9	9.30	930.1	1720.0	10.32	50.1	960.0	7.19
926.7	1826.7	9.58	950.1	1740.0	10.43	40.1	970.0	7.08
982.2	1882.2	10.18	990.1	1780.0	10.74	20.1	990.0	7.09
1010.0	1910.0	10.63	1010.1	1800.0	11.02	10.1	1000.0	7.08

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## Typical Performance Data

LO (MHz)	LO-RF ISOLATION (dB)			LO-IF ISOLATION (dB)		
	@LO (dBm)			@LO (dBm)		
	+10	+13	+16	+10	+13	+16
560.0	32.00	33.66	34.06	20.32	20.28	20.86
660.0	29.39	29.85	29.46	19.52	19.22	19.61
760.0	27.33	27.50	26.82	18.42	18.15	18.32
860.0	26.32	25.81	24.89	18.29	17.77	17.34
960.0	25.79	24.94	24.16	18.29	17.82	17.17
1060.0	25.98	24.73	23.86	18.04	17.96	17.63
1160.0	26.87	25.40	24.37	16.59	17.55	18.14
1260.0	28.09	26.34	25.23	14.82	16.41	17.90
1360.0	28.98	27.54	26.44	13.66	15.50	17.23
1460.0	29.11	28.08	27.53	12.83	14.55	16.18
1560.0	29.96	29.36	28.91	12.06	13.58	14.89
1660.0	30.51	30.32	30.21	11.50	12.87	13.86
1760.0	28.88	29.29	29.74	11.42	12.55	13.18
1860.0	30.58	31.31	31.61	11.51	12.34	12.73
1960.0	30.29	31.16	31.95	11.58	12.03	12.21
2060.0	32.19	32.75	33.25	12.17	12.08	11.86
2160.0	33.38	33.88	34.12	12.18	11.98	11.59
2260.0	38.07	38.12	37.76	12.77	11.94	11.50
2360.0	38.44	38.73	38.38	13.50	12.21	11.32
2460.0	38.24	39.42	39.39	13.85	12.47	11.37
2560.0	34.05	36.31	37.61	14.41	12.58	11.60
2660.0	32.27	35.17	37.63	14.85	13.03	11.98
2760.0	35.00	36.88	36.70	15.30	13.54	12.43
2860.0	33.09	34.95	34.47	15.27	14.07	12.88
2960.0	36.83	38.87	35.55	15.34	14.64	13.71
3060.0	37.09	38.84	34.32	15.68	15.22	15.00
3160.0	39.51	43.23	37.44	16.12	16.43	16.75
3260.0	43.64	35.06	31.60	15.83	16.98	18.00
3360.0	35.53	30.78	28.59	15.83	17.37	18.93
3460.0	29.93	27.17	25.37	15.93	17.62	19.04
3560.0	25.91	23.97	22.65	15.77	17.12	17.99
3660.0	22.77	21.50	20.64	14.78	15.43	15.68
3760.0	20.06	20.07	20.53	13.04	13.43	13.50
3860.0	19.93	19.47	18.36	12.57	13.34	13.95
3940.0	20.27	19.50	18.32	13.68	14.76	15.53
4040.0	23.23	22.16	20.83	15.54	16.76	17.66
4120.0	25.46	24.36	23.18	16.78	18.24	19.43
4220.0	27.95	26.55	25.29	18.38	19.74	20.94
4300.0	28.64	27.64	26.49	19.42	21.05	22.45
4400.0	30.48	28.86	27.23	21.51	23.89	26.48

RF (IN) (MHz)	LO (MHz)	RF-IF ISOLATION (dB)		
		@LO (dBm)		
		+10	+13	+16
530.0	560.0	26.36	19.64	16.56
630.0	660.0	18.70	15.86	14.55
730.0	760.0	16.81	15.04	14.09
830.0	860.0	17.35	15.91	15.10
930.0	960.0	18.18	17.32	16.96
1030.0	1060.0	19.86	19.57	19.38
1130.0	1160.0	20.93	21.09	21.15
1230.0	1260.0	22.15	22.67	22.97
1330.0	1360.0	23.19	24.04	24.59
1430.0	1460.0	23.16	24.06	24.55
1530.0	1560.0	23.73	24.30	24.58
1630.0	1660.0	24.61	24.74	24.78
1730.0	1760.0	24.64	24.98	25.19
1830.0	1860.0	24.09	24.28	24.39
1930.0	1960.0	24.08	24.08	24.02
2030.0	2060.0	24.65	24.71	24.68
2130.0	2160.0	24.63	24.70	24.82
2230.0	2260.0	24.14	24.14	24.17
2330.0	2360.0	24.29	24.30	24.35
2430.0	2460.0	24.71	24.78	24.81
2530.0	2560.0	24.21	24.28	24.32
2630.0	2660.0	24.07	24.16	24.25
2730.0	2760.0	25.42	25.43	25.36
2830.0	2860.0	25.25	25.29	25.28
2930.0	2960.0	26.59	26.42	26.19
3030.0	3060.0	27.64	27.13	26.91
3130.0	3160.0	28.22	27.58	27.13
3230.0	3260.0	29.08	28.23	27.69
3330.0	3360.0	29.57	28.52	27.89
3430.0	3460.0	28.51	27.71	27.13
3530.0	3560.0	25.81	25.22	24.68
3630.0	3660.0	21.88	21.15	20.63
3730.0	3760.0	18.29	18.04	18.20
3830.0	3860.0	16.10	16.53	16.62
3910.0	3940.0	16.09	16.46	16.88
4010.0	4040.0	16.78	16.81	16.95
4090.0	4120.0	17.65	17.37	17.17
4190.0	4220.0	17.42	16.70	16.16
4270.0	4300.0	16.76	15.60	14.87
4370.0	4400.0	18.08	16.31	15.29

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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=1000MHz (:1)		
		@LO (dBm)				@LO (dBm)				@LO (dBm)		
		+10	+13	+16		+10	+13	+16		+10	+13	+16
530.0	560.0	5.52	4.79	4.72	580.0	12.52	8.01	6.30	10.0	1.29	1.64	1.88
630.0	660.0	4.48	4.32	4.15	680.0	5.79	4.45	4.36	30.0	1.31	1.64	1.89
730.0	760.0	3.93	3.62	3.41	780.0	3.07	2.83	3.14	50.0	1.36	1.68	1.93
830.0	860.0	3.38	3.07	2.84	880.0	2.10	2.11	2.47	70.0	1.38	1.69	1.92
930.0	960.0	3.38	3.11	2.89	980.0	1.86	1.81	2.10	90.0	1.46	1.75	1.99
1030.0	1060.0	3.54	3.19	2.98	1080.0	1.99	1.78	1.97	110.0	1.51	1.76	1.98
1130.0	1160.0	3.82	3.61	3.47	1180.0	2.18	1.87	2.02	130.0	1.61	1.86	2.08
1230.0	1260.0	4.26	4.08	3.95	1280.0	2.20	1.95	2.17	150.0	1.69	1.90	2.10
1330.0	1360.0	4.56	4.38	4.26	1380.0	2.16	2.06	2.39	170.0	1.78	1.97	2.17
1430.0	1460.0	4.82	4.67	4.54	1480.0	2.18	2.21	2.60	190.0	1.88	2.03	2.21
1530.0	1560.0	4.57	4.54	4.51	1580.0	2.25	2.36	2.78	210.0	1.97	2.09	2.27
1630.0	1660.0	3.92	3.92	3.96	1680.0	2.07	2.30	2.80	230.0	2.09	2.19	2.36
1730.0	1760.0	3.70	3.45	3.31	1780.0	1.81	2.20	2.78	250.0	2.16	2.22	2.36
1830.0	1860.0	3.71	3.37	3.10	1880.0	1.66	2.14	2.74	270.0	2.27	2.32	2.46
1930.0	1960.0	3.79	3.60	3.48	1980.0	1.54	2.06	2.65	290.0	2.33	2.34	2.46
2030.0	2060.0	3.15	2.97	2.85	2080.0	1.50	2.01	2.57	310.0	2.44	2.43	2.55
2130.0	2160.0	2.83	2.57	2.37	2180.0	1.44	1.91	2.42	330.0	2.49	2.44	2.54
2230.0	2260.0	2.67	2.54	2.44	2280.0	1.52	1.85	2.28	350.0	2.57	2.49	2.59
2330.0	2360.0	2.97	2.84	2.73	2380.0	1.56	1.75	2.10	370.0	2.64	2.50	2.57
2430.0	2460.0	2.68	2.57	2.48	2480.0	1.65	1.64	1.90	390.0	2.69	2.52	2.58
2530.0	2560.0	2.63	2.55	2.50	2580.0	1.83	1.61	1.73	410.0	2.75	2.52	2.57
2630.0	2660.0	3.65	3.40	3.21	2680.0	1.94	1.54	1.55	430.0	2.79	2.53	2.55
2730.0	2760.0	3.86	3.59	3.39	2780.0	2.02	1.45	1.32	450.0	2.86	2.53	2.52
2830.0	2860.0	3.62	3.33	3.12	2880.0	2.15	1.42	1.14	470.0	2.91	2.52	2.49
2930.0	2960.0	3.94	3.65	3.45	2980.0	2.18	1.42	1.06	490.0	2.98	2.55	2.48
3030.0	3060.0	3.26	2.97	2.84	3080.0	2.14	1.47	1.30	510.0	3.00	2.51	2.41
3130.0	3160.0	2.67	2.39	2.27	3180.0	2.31	1.74	1.68	530.0	3.07	2.53	2.39
3230.0	3260.0	2.02	1.85	1.76	3280.0	2.10	1.79	1.93	550.0	3.09	2.50	2.32
3330.0	3360.0	1.71	1.54	1.46	3380.0	1.89	1.88	2.20	590.0	3.18	2.51	2.25
3430.0	3460.0	1.55	1.41	1.31	3480.0	1.77	2.00	2.42	610.0	3.21	2.51	2.22
3530.0	3560.0	1.54	1.43	1.33	3580.0	1.70	2.06	2.52	650.0	3.26	2.50	2.15
3630.0	3660.0	1.50	1.40	1.42	3680.0	1.59	1.95	2.32	670.0	3.28	2.51	2.14
3730.0	3760.0	1.47	1.34	1.39	3760.0	1.36	1.67	1.91	710.0	3.28	2.50	2.11
3830.0	3860.0	1.70	1.55	1.32	3860.0	1.33	1.63	1.96	730.0	3.27	2.50	2.10
3910.0	3940.0	1.92	1.74	1.52	3940.0	1.61	1.88	2.24	770.0	3.26	2.54	2.18
4010.0	4040.0	2.46	2.26	2.04	4040.0	1.87	2.06	2.39	790.0	3.26	2.57	2.24
4090.0	4120.0	2.46	2.28	2.12	4120.0	2.03	2.08	2.36	830.0	3.18	2.63	2.38
4190.0	4220.0	2.47	2.26	2.12	4220.0	2.38	2.14	2.23	850.0	3.15	2.69	2.50
4270.0	4300.0	2.67	2.46	2.31	4300.0	2.62	2.11	2.03	890.0	3.15	2.88	2.80
4370.0	4400.0	2.89	2.68	2.56	4400.0	2.84	2.04	1.74	910.0	3.18	3.03	3.01

## Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	+10	34	1	41	19	40	16	44	37	46
1	-	10	+0	19	34	40	37	24	33	44	40	44
2	76	47	45	51	49	63	48	59	50	45	47	52
3	>90	67	69	50	51	57	69	>76	58	54	55	59
4	>90	>76	>76	>76	73	73	>76	>76	>76	>76	68	74
5	>90	>76	>76	>76	>76	>76	>76	>76	>76	>76	>76	>76
6	>90	>76	>76	>76	>76	>76	>76	>76	>76	>76	>76	>76
7	>90	>76	>76	>76	>76	>76	>76	>76	>76	>76	>76	>76
8	>90	>76	>76	>76	>76	>76	>76	>76	>76	>76	>76	>76
9	>90	>76	>76	>76	>76	>76	>76	>76	>76	>76	>76	>76
10	>90	>76	>76	>76	>76	>76	>76	>76	>76	>76	>76	>76
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

### LO HARMONICS ORDER

Test conditions: RF IN: 900 MHz; -7.00 dBm.  
 LO IN: 930 MHz; +13.00 dBm  
 IF OUT: 30 MHz; -14.28 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	+0	39	11	51	29	48	31	66	41	53
1	-	9	+0	25	35	54	36	36	54	47	44	50
2	56	36	35	46	37	57	43	63	65	49	45	53
3	88	43	48	37	39	36	55	57	60	44	54	54
4	>90	57	53	72	45	49	58	65	56	67	60	60
5	>90	47	68	66	61	48	44	56	64	74	53	59
6	>90	63	53	71	73	64	51	58	63	69	77	66
7	>90	72	60	54	81	74	67	61	54	63	>86	78
8	>90	83	78	69	63	74	78	69	59	63	72	84
9	>90	78	83	75	71	72	78	79	76	70	71	68
10	>90	77	77	82	82	75	79	>86	>86	80	69	68
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

### LO HARMONICS ORDER

Test conditions: RF IN: 900 MHz; 3.00 dBm.  
 LO IN: 930 MHz; +13.00 dBm  
 IF OUT: 30 MHz; -4.38 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.