

# Frequency Mixer

# MACA-242H+

## 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=+10dBm (dB)		
		@LO (dBm)					@LO (dBm)					@LO (dBm)		
		-6	-3	0			-6	-3	0			-6	-3	0
290.1	260.1	19.52	13.34	10.53	290.1	260.1	7.43	17.77	19.80	290.1	260.1	-11.45	0.80	1.40
360.1	330.1	8.50	7.12	6.25	360.1	330.1	14.36	15.57	18.22	360.1	330.1	2.62	2.37	1.80
430.1	400.1	7.58	6.78	6.19	430.1	400.1	10.99	13.45	15.37	430.1	400.1	3.24	2.23	1.50
500.1	470.1	8.19	6.99	6.26	500.1	470.1	14.19	16.59	18.85	500.1	470.1	1.61	1.67	1.45
570.1	540.1	8.47	7.76	7.27	570.1	540.1	16.70	18.76	19.30	570.1	540.1	0.60	0.64	0.59
640.1	610.1	7.10	6.86	6.73	640.1	610.1	16.06	17.00	17.72	640.1	610.1	0.92	0.84	0.75
710.1	680.1	6.18	5.95	5.73	710.1	680.1	24.06	21.84	20.64	710.1	680.1	0.48	0.41	0.38
780.1	750.1	7.70	7.38	7.06	780.1	750.1	18.34	22.21	24.71	780.1	750.1	0.92	0.82	0.68
850.1	820.1	8.62	8.01	7.54	850.1	820.1	21.95	27.98	23.21	850.1	820.1	0.18	0.32	0.39
920.1	890.1	7.27	7.13	6.94	920.1	890.1	22.25	24.16	25.48	920.1	890.1	0.54	0.39	0.32
990.1	960.1	6.44	6.43	6.32	990.1	960.1	19.45	21.03	22.59	990.1	960.1	0.54	0.41	0.41
1060.1	1030.1	7.17	7.22	7.26	1060.1	1030.1	20.88	22.63	24.02	1060.1	1030.1	0.34	0.28	0.22
1130.1	1100.1	8.60	8.32	8.02	1130.1	1100.1	27.78	31.68	28.77	1130.1	1100.1	0.53	0.38	0.34
1200.1	1170.1	8.07	7.78	7.69	1200.1	1170.1	27.82	24.24	24.35	1200.1	1170.1	0.51	0.34	0.22
1280.1	1250.1	8.58	7.98	7.68	1280.1	1250.1	20.43	24.77	27.57	1280.1	1250.1	0.11	0.26	0.26
1350.1	1320.1	7.83	7.24	6.92	1350.1	1320.1	15.00	16.73	17.66	1350.1	1320.1	0.89	0.92	0.86
1430.1	1400.1	6.26	6.06	5.88	1430.1	1400.1	12.91	13.65	13.87	1430.1	1400.1	1.83	1.76	1.65
1500.1	1470.1	5.86	5.81	5.66	1500.1	1470.1	12.69	13.28	13.44	1500.1	1470.1	2.19	1.87	1.66
1580.1	1550.1	5.85	5.60	5.40	1580.1	1550.1	17.48	18.63	18.49	1580.1	1550.1	1.51	1.22	0.98
1650.1	1620.1	5.52	5.42	5.35	1650.1	1620.1	20.02	21.23	21.04	1650.1	1620.1	1.08	0.67	0.50
1730.1	1700.1	5.91	5.87	5.88	1730.1	1700.1	23.54	24.76	26.16	1730.1	1700.1	0.60	0.29	0.15
1800.1	1770.1	6.23	5.98	5.78	1800.1	1770.1	17.81	20.68	23.54	1800.1	1770.1	1.31	0.90	0.60
1880.1	1850.1	6.49	5.96	5.62	1880.1	1850.1	17.21	18.86	22.03	1880.1	1850.1	1.63	1.08	0.69
1950.1	1920.1	8.26	6.88	6.12	1950.1	1920.1	11.64	13.83	15.03	1950.1	1920.1	1.84	1.96	1.80
2030.1	2000.1	9.19	7.65	6.98	2030.1	2000.1	14.31	16.48	17.04	2030.1	2000.1	1.08	1.32	1.20
2100.1	2070.1	8.63	7.54	7.05	2100.1	2070.1	15.05	16.17	16.03	2100.1	2070.1	0.96	1.03	0.94
2180.1	2150.1	8.32	7.50	7.06	2180.1	2150.1	20.44	20.83	21.11	2180.1	2150.1	0.78	0.80	0.74
2250.1	2220.1	7.99	7.32	6.87	2250.1	2220.1	17.59	20.14	21.13	2250.1	2220.1	0.69	0.63	0.53
2330.1	2300.1	7.64	7.01	6.65	2330.1	2300.1	21.88	23.80	25.33	2330.1	2300.1	0.84	0.54	0.36
2400.1	2370.1	7.92	6.84	6.27	2400.1	2370.1	17.13	20.00	22.75	2400.1	2370.1	1.13	0.79	0.48
2480.1	2450.1	9.52	8.03	6.86	2480.1	2450.1	10.61	13.96	16.89	2480.1	2450.1	1.84	1.52	1.33
2550.1	2520.1	12.28	9.98	8.64	2550.1	2520.1	18.26	17.11	17.51	2550.1	2520.1	0.86	1.21	1.06
2630.1	2600.1	14.69	10.75	9.01	2630.1	2600.1	12.35	21.21	23.63	2630.1	2600.1	-2.07	0.25	0.59
2700.1	2670.1	13.64	10.97	9.38	2700.1	2670.1	13.79	21.63	21.46	2700.1	2670.1	-1.35	0.03	0.41
2780.1	2750.1	11.50	9.63	8.65	2780.1	2750.1	15.43	26.70	23.88	2780.1	2750.1	-0.33	0.31	0.36
2850.1	2820.1	11.38	9.43	8.24	2850.1	2820.1	13.89	20.08	24.00	2850.1	2820.1	-0.31	0.44	0.59
2930.1	2900.1	11.76	9.57	7.99	2930.1	2900.1	13.26	17.46	18.20	2930.1	2900.1	-0.38	0.47	0.70
3000.1	2970.1	12.01	10.16	8.53	3000.1	2970.1	15.40	16.82	17.49	3000.1	2970.1	0.25	0.36	0.49
3080.1	3050.1	12.10	10.86	9.14	3080.1	3050.1	14.59	16.36	17.35	3080.1	3050.1	1.90	1.08	1.07
3150.1	3120.1	12.83	12.71	11.20	3150.1	3120.1	12.42	16.09	17.59	3150.1	3120.1	3.13	1.52	1.40

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## Typical Performance Data

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=1575.1MHz (dB)
		@LO (dBm)
		-3
635.0	940.1	13.05
594.7	980.4	9.88
554.4	1020.7	8.83
514.0	1061.1	7.98
473.7	1101.4	7.41
433.4	1141.7	7.63
393.1	1182.0	7.16
352.7	1222.4	6.53
312.4	1262.7	6.03
272.1	1303.0	5.58
231.8	1343.3	5.39
211.6	1363.5	5.30
171.3	1403.8	5.08
151.1	1424.0	5.13
110.8	1464.3	5.31
90.6	1484.5	5.36
50.3	1524.8	5.59
30.2	1544.9	5.57
10.0	1585.1	5.59
30.5	1605.6	5.36
71.5	1646.6	5.30
91.9	1667.0	5.41
132.9	1708.0	5.61
153.4	1728.5	5.79
194.4	1769.5	6.14
214.8	1789.9	6.30
255.8	1830.9	6.73
276.3	1851.4	6.93
317.3	1892.4	7.44
337.7	1912.8	7.81
378.7	1953.8	8.48
399.2	1974.3	8.64
440.2	2015.3	9.18
460.6	2035.7	9.58
501.6	2076.7	9.23
522.1	2097.2	8.93
563.1	2138.2	8.56
583.5	2158.6	8.59
624.5	2199.6	10.73
645.0	2220.1	13.24

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=750.1MHz (dB)
		@LO (dBm)
		-3
10.0	760.1	6.68
30.0	780.1	6.97
50.0	800.1	7.59
70.0	820.1	7.97
90.0	840.1	8.26
110.0	860.1	8.34
130.0	880.1	8.48
150.0	900.1	8.42
170.0	920.1	8.40
190.0	940.1	8.28
210.0	960.1	8.01
230.0	980.1	7.58
250.0	1000.1	7.38
260.0	1010.1	7.21
280.0	1030.1	7.09
290.0	1040.1	7.07
310.0	1060.1	7.05
320.0	1070.1	7.13
340.0	1090.1	6.91
350.0	1100.1	6.75
370.0	1120.1	6.61
380.0	1130.1	6.66
400.0	1150.1	6.69
410.0	1160.1	6.82
430.0	1180.1	7.15
440.0	1190.1	7.21
460.0	1210.1	7.52
470.0	1220.1	7.67
490.0	1240.1	7.99
500.0	1250.1	8.13
520.0	1270.1	8.31
530.0	1280.1	8.29
550.0	1300.1	8.47
560.0	1310.1	8.61
580.0	1330.1	8.89
590.0	1340.1	9.18
610.0	1360.1	9.92
620.0	1370.1	10.56
640.0	1390.1	12.95
650.0	1400.1	14.56

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=2400.1001MHz (dB)
		@LO (dBm)
		-3
650.1	1750.0	14.38
630.1	1770.0	11.79
610.1	1790.0	10.29
590.1	1810.0	9.68
570.1	1830.0	9.57
550.1	1850.0	9.64
530.1	1870.0	9.69
510.1	1890.0	9.85
490.1	1910.0	10.02
470.1	1930.0	10.13
450.1	1950.0	10.10
430.1	1970.0	9.93
410.1	1990.0	9.84
400.1	2000.0	9.79
380.1	2020.0	9.74
370.1	2030.0	9.75
350.1	2050.0	9.66
340.1	2060.0	9.58
320.1	2080.0	9.47
310.1	2090.0	9.30
290.1	2110.0	9.16
280.1	2120.0	9.07
260.1	2140.0	8.81
250.1	2150.0	8.70
230.1	2170.0	8.46
220.1	2180.0	8.26
200.1	2200.0	7.98
190.1	2210.0	7.86
170.1	2230.0	7.60
160.1	2240.0	7.50
140.1	2260.0	7.31
130.1	2270.0	7.18
110.1	2290.0	7.00
100.1	2300.0	6.95
80.1	2320.0	6.81
70.1	2330.0	6.77
50.1	2350.0	6.83
40.1	2360.0	6.79
20.1	2380.0	6.89
10.1	2390.0	6.97

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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)		
	-6	-3	0	-6	-3	0			-6	-3	0
260.1	35.10	33.85	31.80	5.79	7.13	7.61	290.1	260.1	25.45	23.97	22.14
330.1	25.81	28.28	28.45	3.03	5.36	7.15	360.1	330.1	20.89	19.53	18.22
400.1	29.92	28.01	25.87	3.26	5.81	8.10	430.1	400.1	19.92	17.39	15.88
470.1	23.42	23.87	24.35	3.75	6.12	8.23	500.1	470.1	17.25	16.76	16.55
540.1	23.61	24.88	25.94	4.97	7.53	10.07	570.1	540.1	21.33	21.14	21.42
610.1	31.99	39.57	49.38	6.54	7.00	7.63	640.1	610.1	29.52	29.47	31.60
680.1	20.67	20.76	21.07	20.61	21.49	22.01	710.1	680.1	48.28	46.98	44.53
750.1	20.30	21.29	20.93	42.08	42.35	42.82	780.1	750.1	65.71	65.04	63.38
820.1	21.85	21.59	20.58	56.20	55.69	55.99	850.1	820.1	67.31	67.53	67.84
890.1	20.16	22.18	22.08	44.48	44.47	44.80	920.1	890.1	66.65	68.14	68.97
960.1	19.26	19.65	18.36	32.67	33.36	34.13	990.1	960.1	67.73	68.18	70.04
1030.1	21.45	22.94	20.56	39.98	41.59	43.09	1060.1	1030.1	70.51	71.06	69.98
1100.1	27.45	33.19	24.60	46.97	48.98	50.91	1130.1	1100.1	70.20	70.98	71.04
1170.1	23.73	39.27	26.36	52.00	54.05	56.21	1200.1	1170.1	72.07	71.50	72.70
1250.1	23.29	31.68	22.19	58.26	60.12	61.90	1280.1	1250.1	75.16	76.16	76.41
1320.1	19.60	22.48	23.84	75.60	79.77	82.53	1350.1	1320.1	84.01	84.24	87.71
1400.1	10.95	11.56	11.85	55.92	57.83	59.62	1430.1	1400.1	77.97	77.36	76.82
1470.1	14.73	16.30	17.40	47.28	50.43	53.45	1500.1	1470.1	74.30	75.07	78.37
1550.1	15.58	14.88	14.71	51.54	55.61	59.46	1580.1	1550.1	83.03	90.00	83.21
1620.1	13.52	13.22	13.40	51.46	55.98	60.21	1650.1	1620.1	87.40	86.89	81.22
1700.1	14.70	13.82	13.47	50.06	54.58	58.96	1730.1	1700.1	79.76	79.73	81.98
1770.1	16.50	16.88	17.72	51.90	55.14	59.12	1800.1	1770.1	77.14	76.89	76.93
1850.1	15.69	16.43	17.80	56.83	55.95	56.43	1880.1	1850.1	72.56	71.11	70.38
1920.1	15.39	15.62	16.15	63.84	59.88	57.37	1950.1	1920.1	71.07	69.00	68.82
2000.1	14.62	13.91	13.96	67.88	70.94	68.74	2030.1	2000.1	69.79	69.47	68.57
2070.1	13.79	13.46	12.68	67.68	73.61	78.26	2100.1	2070.1	68.02	66.98	67.88
2150.1	16.32	18.47	19.70	71.23	76.11	81.74	2180.1	2150.1	65.74	66.00	65.51
2220.1	14.17	14.85	15.27	70.09	74.38	80.33	2250.1	2220.1	66.10	66.20	66.13
2300.1	14.85	16.13	16.91	65.10	70.06	73.83	2330.1	2300.1	64.68	66.01	66.73
2370.1	14.95	17.26	18.52	62.44	65.49	68.43	2400.1	2370.1	65.70	66.88	67.05
2450.1	14.48	18.18	24.48	58.07	60.95	63.49	2480.1	2450.1	64.69	66.13	66.00
2520.1	13.02	20.20	23.84	54.94	59.88	63.64	2550.1	2520.1	64.41	64.44	64.49
2600.1	13.00	16.06	15.74	50.02	50.56	50.85	2630.1	2600.1	62.72	64.55	65.84
2670.1	12.11	10.00	8.48	48.43	47.42	47.07	2700.1	2670.1	70.45	67.76	67.81
2750.1	19.72	14.55	11.64	57.92	53.67	52.03	2780.1	2750.1	67.21	65.26	63.82
2820.1	20.91	17.43	14.06	62.27	56.52	54.65	2850.1	2820.1	63.60	62.20	61.38
2900.1	20.57	19.66	19.53	59.89	57.70	57.50	2930.1	2900.1	60.39	59.92	59.35
2970.1	21.96	20.26	20.06	56.99	57.46	58.47	3000.1	2970.1	57.90	57.92	57.73
3050.1	18.16	17.91	17.76	52.81	55.21	56.83	3080.1	3050.1	56.24	56.31	56.34
3120.1	16.20	17.85	18.10	50.98	54.05	56.07	3150.1	3120.1	55.18	55.15	54.93

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## Typical Performance Data

RF (IN) (MHz)	LO (MHz)	RF VSWR (:1)		
		@LO (dBm)		
		-6	-3	0
290.1	260.1	7.22	3.87	3.14
360.1	330.1	2.20	1.79	1.77
430.1	400.1	1.99	1.71	1.66
500.1	470.1	3.58	3.02	2.73
570.1	540.1	4.77	4.43	4.26
640.1	610.1	3.92	3.82	3.79
710.1	680.1	3.16	2.82	2.62
780.1	750.1	4.00	3.65	3.38
850.1	820.1	6.05	5.51	5.10
920.1	890.1	4.32	4.10	3.90
990.1	960.1	3.03	2.84	2.71
1060.1	1030.1	3.06	3.03	2.99
1130.1	1100.1	5.51	5.38	5.28
1200.1	1170.1	5.59	5.23	5.04
1280.1	1250.1	4.80	4.59	4.50
1350.1	1320.1	4.05	3.86	3.80
1430.1	1400.1	2.74	2.48	2.32
1500.1	1470.1	2.16	1.95	1.79
1580.1	1550.1	1.45	1.33	1.26
1650.1	1620.1	1.19	1.22	1.25
1730.1	1700.1	1.56	1.72	1.87
1800.1	1770.1	1.47	1.57	1.62
1880.1	1850.1	1.17	1.08	1.23
1950.1	1920.1	1.89	1.55	1.37
2030.1	2000.1	2.79	2.44	2.32
2100.1	2070.1	2.87	2.59	2.53
2180.1	2150.1	2.97	2.69	2.60
2250.1	2220.1	3.06	2.82	2.73
2330.1	2300.1	2.85	2.58	2.51
2400.1	2370.1	2.69	2.22	2.04
2480.1	2450.1	3.20	2.43	2.02
2550.1	2520.1	4.28	3.57	3.31
2630.1	2600.1	4.91	4.09	3.78
2700.1	2670.1	4.86	4.03	3.69
2780.1	2750.1	4.43	3.73	3.47
2850.1	2820.1	4.15	3.42	3.06
2930.1	2900.1	4.08	3.25	2.81
3000.1	2970.1	3.90	3.26	2.85
3080.1	3050.1	3.77	3.28	2.86
3150.1	3120.1	3.98	3.82	3.52

LO (MHz)	LO VSWR (:1)		
	@LO (dBm)		
	-6	-3	0
260.1	5.65	5.61	5.63
330.1	5.27	5.30	5.36
400.1	4.18	4.33	4.40
470.1	3.98	3.93	3.88
540.1	3.73	3.57	3.44
610.1	3.29	3.17	3.05
680.1	2.93	2.89	2.82
750.1	2.57	2.60	2.57
820.1	2.40	2.44	2.42
890.1	2.28	2.32	2.33
960.1	2.20	2.23	2.25
1030.1	2.00	2.02	2.04
1100.1	2.10	2.06	2.05
1170.1	2.07	2.03	2.02
1250.1	2.02	2.00	2.03
1320.1	1.99	2.04	2.11
1400.1	2.07	2.20	2.33
1470.1	2.26	2.46	2.68
1550.1	2.44	2.60	2.79
1620.1	2.60	2.70	2.82
1700.1	2.84	2.77	2.80
1770.1	2.95	2.80	2.73
1850.1	2.92	2.75	2.66
1920.1	2.75	2.60	2.53
2000.1	2.52	2.38	2.33
2070.1	2.18	2.10	2.12
2150.1	1.71	1.74	1.86
2220.1	1.38	1.49	1.67
2300.1	1.20	1.33	1.52
2370.1	1.36	1.36	1.46
2450.1	1.63	1.58	1.57
2520.1	1.77	1.72	1.73
2600.1	1.55	1.46	1.45
2670.1	1.54	1.46	1.45
2750.1	1.25	1.24	1.26
2820.1	1.14	1.12	1.14
2900.1	1.22	1.18	1.13
2970.1	1.37	1.32	1.25
3050.1	1.55	1.48	1.39
3120.1	1.61	1.57	1.47

IF (OUT) (MHz)	IF VSWR @LO=2400.1001MHz (:1)		
	@LO (dBm)		
	-6	-3	0
10.0	1.53	1.10	1.07
30.0	1.53	1.10	1.08
50.0	1.56	1.12	1.05
70.0	1.56	1.13	1.06
90.0	1.61	1.17	1.04
110.0	1.61	1.17	1.06
130.0	1.64	1.21	1.09
150.0	1.67	1.23	1.09
170.0	1.75	1.30	1.14
190.0	1.81	1.35	1.19
210.0	1.87	1.42	1.25
230.0	1.94	1.47	1.29
250.0	2.04	1.57	1.37
260.0	2.09	1.61	1.40
280.0	2.16	1.68	1.48
290.0	2.17	1.69	1.48
310.0	2.24	1.74	1.51
320.0	2.26	1.76	1.53
340.0	2.35	1.84	1.59
350.0	2.42	1.89	1.64
370.0	2.49	1.95	1.69
380.0	2.57	2.03	1.75
400.0	2.67	2.10	1.82
410.0	2.75	2.16	1.86
430.0	2.88	2.28	1.97
440.0	2.92	2.32	2.00
460.0	3.06	2.45	2.13
470.0	3.07	2.45	2.13
490.0	3.11	2.51	2.19
500.0	3.09	2.49	2.18
520.0	2.92	2.37	2.10
530.0	2.82	2.31	2.05
550.0	2.41	2.01	1.81
560.0	2.18	1.84	1.67
580.0	1.59	1.36	1.28
590.0	1.33	1.14	1.11
610.0	1.50	1.44	1.43
620.0	1.97	1.87	1.82
640.0	3.49	3.24	3.09
650.0	4.45	4.13	3.94

## Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	45	59	23	34	37	35	42	73	36	55
1	-	79	+0	77	65	66	40	66	40	64	60	52
2	67	>79	>79	48	>79	>79	64	68	68	74	70	>79
3	>90	>79	>79	>79	54	>79	>79	>79	78	>79	74	>79
4	>90	>79	>79	>79	>79	76	>79	>79	>79	>79	>79	>79
5	>90	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79
6	>90	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79
7	>90	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79
8	>90	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79
9	>90	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79
10	>90	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79	>79
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

### LO HARMONICS ORDER

Test conditions: RF IN: 1575.1 MHz; -5.00 dBm.  
 LO IN: 1545.1 MHz; +-3.00 dBm  
 IF OUT: 30 MHz; -10.5 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	57	70	35	47	54	47	56	77	51	66
1	-	79	+0	76	66	68	42	67	42	71	65	59
2	47	>89	86	37	75	>89	55	61	63	68	73	>89
3	87	84	>89	>89	33	>89	>89	80	63	83	64	84
4	>90	76	79	>89	>89	58	>89	>89	73	78	78	>89
5	>90	83	78	>89	>89	>89	52	>89	>89	>89	77	>89
6	>90	85	84	>89	>89	>89	>89	77	>89	>89	>89	>89
7	>90	>89	84	>89	88	>89	>89	>89	68	>89	>89	>89
8	>90	>89	>89	>89	>89	>89	>89	>89	>89	76	>89	>89
9	>90	>89	>89	>89	>89	>89	>89	>89	>89	>89	79	>89
10	>90	>89	>89	>89	>89	>89	>89	>89	>89	>89	>89	80
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

### LO HARMONICS ORDER

Test conditions: RF IN: 1575.1 MHz; 5.00 dBm.  
 LO IN: 1545.1 MHz; +-3.00 dBm  
 IF OUT: 30 MHz; -0.78 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.