

Frequency Mixer

HJK-ED13886/1

Typical Performance Data

RF (IN) (MHz)	LO (MHz)			
		@LO (dBm)		
		+15	+17	+19
10.0	80.1	7.50	7.40	7.33
21.0	91.1	7.38	7.27	7.21
43.0	113.1	7.35	7.26	7.20
54.0	124.1	7.15	7.05	6.99
76.0	146.1	7.18	7.11	7.07
98.0	168.1	7.13	7.06	7.01
109.0	179.1	6.90	6.83	6.78
136.0	206.1	6.90	6.85	6.82
136.0	206.1	6.90	6.85	6.82
146.0	216.1	6.99	6.95	6.92
156.0	226.1	6.83	6.78	6.77
161.0	231.1	6.64	6.58	6.58
174.0	244.1	6.54	6.50	6.52
184.0	254.1	6.66	6.64	6.68
194.0	264.1	6.82	6.80	6.85
214.0	284.1	6.70	6.66	6.67
224.0	294.1	6.58	6.53	6.52
244.0	314.1	6.80	6.75	6.71
264.0	334.1	6.90	6.84	6.79
274.0	344.1	6.80	6.72	6.66
294.0	364.1	6.90	6.81	6.74
304.0	374.1	7.16	7.07	6.99
324.0	394.1	7.27	7.14	7.04
344.0	414.1	7.28	7.13	7.01
354.0	424.1	7.37	7.23	7.11
374.0	444.1	7.58	7.42	7.28
394.0	464.1	7.65	7.45	7.28
404.0	474.1	7.73	7.51	7.34
424.0	494.1	8.00	7.75	7.56
434.0	504.1	8.12	7.86	7.65
454.0	524.1	8.11	7.82	7.61
474.0	544.1	8.27	7.96	7.74
484.0	554.1	8.44	8.12	7.88
504.0	574.1	8.62	8.25	7.97
514.0	584.1	8.69	8.29	7.99
534.0	604.1	8.97	8.54	8.22
554.0	624.1	9.12	8.67	8.34
564.0	634.1	9.09	8.64	8.30
584.0	654.1	9.28	8.81	8.46
604.0	674.1	9.59	9.07	8.69

RF (IN) (MHz)	LO (MHz)	IP-3 INPUT (dBm)		
		@LO (dBm)		
		+15	+17	+19
10.0	80.1	25.58	26.73	27.43
21.0	91.1	23.60	25.15	26.50
43.0	113.1	26.13	28.79	30.18
54.0	124.1	27.82	28.49	28.80
76.0	146.1	26.67	28.26	29.43
98.0	168.1	28.18	29.68	30.43
109.0	179.1	28.56	29.98	30.99
136.0	206.1	30.44	32.47	34.17
136.0	206.1	30.44	32.47	34.17
146.0	216.1	31.27	33.06	33.34
156.0	226.1	32.82	34.17	34.99
161.0	231.1	32.12	34.68	35.33
174.0	244.1	33.36	34.70	33.62
184.0	254.1	34.74	35.43	32.56
194.0	264.1	34.23	35.18	32.67
214.0	284.1	34.32	35.36	35.80
224.0	294.1	33.61	34.90	35.55
244.0	314.1	31.54	33.90	35.04
264.0	334.1	30.15	32.17	33.86
274.0	344.1	29.38	31.64	32.66
294.0	364.1	27.00	29.14	29.67
304.0	374.1	25.80	27.92	28.56
324.0	394.1	23.73	26.10	27.51
344.0	414.1	22.33	24.53	26.22
354.0	424.1	21.63	23.78	25.63
374.0	444.1	20.68	22.78	24.83
394.0	464.1	19.50	21.55	23.58
404.0	474.1	18.73	20.75	22.78
424.0	494.1	17.54	19.57	21.62
434.0	504.1	17.33	19.39	21.44
454.0	524.1	16.85	18.88	20.95
474.0	544.1	16.32	18.37	20.50
484.0	554.1	16.18	18.24	20.38
504.0	574.1	15.37	17.33	19.50
514.0	584.1	14.92	16.81	18.92
534.0	604.1	14.48	16.24	18.31
554.0	624.1	14.56	16.28	18.31
564.0	634.1	14.42	16.08	18.11
584.0	654.1	14.12	15.70	17.68
604.0	674.1	13.91	15.40	17.28

RF (IN) (MHz)	LO (MHz)	COMPRESSION @RF IN=+14dBm (dB)		
		@LO (dBm)		
		+15	+17	+19
10.0	80.1	0.32	0.18	0.11
21.0	91.1	0.35	0.18	0.10
43.0	113.1	0.43	0.30	0.23
54.0	124.1	0.35	0.25	0.20
76.0	146.1	0.32	0.23	0.17
98.0	168.1	0.30	0.21	0.14
109.0	179.1	0.29	0.20	0.14
136.0	206.1	0.19	0.14	0.10
136.0	206.1	0.19	0.14	0.10
146.0	216.1	0.16	0.11	0.08
156.0	226.1	0.12	0.09	0.07
161.0	231.1	0.10	0.07	0.07
174.0	244.1	0.09	0.07	0.07
184.0	254.1	0.10	0.08	0.08
194.0	264.1	0.09	0.07	0.08
214.0	284.1	0.09	0.07	0.07
224.0	294.1	0.10	0.08	0.06
244.0	314.1	0.17	0.12	0.09
264.0	334.1	0.23	0.15	0.10
274.0	344.1	0.28	0.18	0.12
294.0	364.1	0.48	0.30	0.19
304.0	374.1	0.59	0.38	0.24
324.0	394.1	0.90	0.56	0.36
344.0	414.1	1.24	0.76	0.48
354.0	424.1	1.44	0.90	0.56
374.0	444.1	1.79	1.10	0.67
394.0	464.1	2.37	1.47	0.89
404.0	474.1	2.71	1.73	1.07
424.0	494.1	3.35	2.26	1.42
434.0	504.1	3.51	2.40	1.51
454.0	524.1	3.76	2.64	1.70
474.0	544.1	4.05	2.90	1.91
484.0	554.1	4.19	3.02	1.99
504.0	574.1	4.70	3.53	2.42
514.0	584.1	4.99	3.82	2.68
534.0	604.1	5.27	4.13	2.99
554.0	624.1	5.27	4.14	3.00
564.0	634.1	5.38	4.27	3.14
584.0	654.1	5.52	4.42	3.30
604.0	674.1	5.70	4.63	3.52

Frequency Mixer

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Typical Performance Data

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=155.1MHz (dB)	IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=136.1MHz (dB)	IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=174.1MHz (dB)
		@LO (dBm)			@LO (dBm)			@LO (dBm)
		+17			+17			+17
145.1	10.0	10.50	10.9	147.0	7.16	164.1	10.0	10.37
135.1	20.0	9.08	25.9	162.0	7.11	159.1	15.0	9.46
120.1	35.0	8.36	40.9	177.0	7.07	154.1	20.0	8.96
110.1	45.0	8.05	60.9	197.0	6.95	149.1	25.0	8.62
95.1	60.0	7.74	75.9	212.0	6.87	144.1	30.0	8.38
80.1	75.0	7.55	90.9	227.0	6.90	139.1	35.0	8.17
70.1	85.0	7.36	110.9	247.0	6.91	129.1	45.0	7.93
55.1	100.0	7.34	125.9	262.0	6.87	124.1	50.0	7.78
45.1	110.0	7.30	140.9	277.0	6.90	119.1	55.0	7.67
38.1	117.0	7.27	160.9	297.0	6.88	114.1	60.0	7.60
35.1	120.0	7.25	175.9	312.0	6.89	109.1	65.0	7.54
33.1	122.0	7.24	190.9	327.0	6.89	104.1	70.0	7.47
30.1	125.0	7.21	210.9	347.0	6.91	94.1	80.0	7.36
27.1	128.0	7.18	225.9	362.0	6.94	89.1	85.0	7.32
25.1	130.0	7.16	245.9	382.0	6.99	84.1	90.0	7.24
22.1	133.0	7.14	260.9	397.0	7.01	79.1	95.0	7.21
20.1	135.0	7.12	275.9	412.0	7.03	74.1	100.0	7.17
17.1	138.0	7.09	295.9	432.0	7.08	64.1	110.0	7.17
14.1	141.0	7.07	310.9	447.0	7.11	60.1	114.0	7.14
12.1	143.0	7.08	325.9	462.0	7.17	58.1	116.0	7.13
11.0	166.0	7.01	345.9	482.0	7.23	56.1	118.0	7.11
41.0	196.0	6.90	360.9	497.0	7.26	54.1	120.0	7.11
81.0	236.0	6.80	375.9	512.0	7.28	52.1	122.0	7.09
111.0	266.0	6.73	395.9	532.0	7.29	48.1	126.0	7.07
151.0	306.0	6.79	410.9	547.0	7.33	46.1	128.0	7.07
191.0	346.0	6.91	425.9	562.0	7.39	44.1	130.0	7.06
221.0	376.0	6.97	445.9	582.0	7.54	42.1	132.0	7.06
261.0	416.0	7.07	460.9	597.0	7.58	40.1	134.0	7.05
301.0	456.0	7.09	480.9	617.0	7.63	36.1	138.0	7.03
331.0	486.0	7.30	495.9	632.0	7.67	34.1	140.0	7.01
371.0	526.0	7.41	510.9	647.0	7.68	32.1	142.0	6.99
411.0	566.0	7.42	530.9	667.0	7.83	30.1	144.0	6.95
441.0	596.0	7.66	543.9	680.0	7.93	28.1	146.0	6.93
481.0	636.0	7.73	558.9	695.0	8.04	26.1	148.0	6.90
511.0	666.0	7.83	578.9	715.0	8.09	22.1	152.0	6.86
551.0	706.0	8.17	593.9	730.0	8.15	20.1	154.0	6.84
580.0	735.0	8.24	608.9	745.0	8.22	18.1	156.0	6.83
595.0	750.0	8.31	628.9	765.0	8.35	16.1	158.0	6.83
615.0	770.0	8.44	643.9	780.0	8.49	14.1	160.0	6.81
635.0	790.0	8.65	663.9	800.0	8.60	10.1	164.0	6.75

Frequency Mixer

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Typical Performance Data

LO (MHz)	LO-RF ISOLATION (dB)			LO-IF ISOLATION (dB)		
	@LO (dBm)			@LO (dBm)		
	+15	+17	+19	+15	+17	+19
80.1	72.24	72.32	71.68	58.27	58.45	58.54
91.1	71.14	71.36	71.04	57.16	57.31	57.42
113.1	70.20	70.39	69.71	54.57	54.76	54.82
124.1	69.93	69.99	68.60	52.86	52.99	53.05
146.1	64.59	64.37	63.46	49.96	50.07	50.13
168.1	62.19	62.01	61.89	48.17	48.28	48.39
179.1	61.42	61.33	61.24	47.19	47.26	47.36
206.1	59.36	59.18	59.12	43.54	43.59	43.65
206.1	59.36	59.18	59.12	43.54	43.59	43.65
216.1	57.74	57.55	58.01	42.07	42.12	42.21
226.1	56.55	56.37	59.29	40.80	40.85	41.11
231.1	56.10	55.91	60.08	40.18	40.25	40.70
244.1	55.10	55.48	59.96	38.71	38.78	39.71
254.1	54.91	55.75	60.28	38.19	38.39	39.46
264.1	54.74	55.72	59.96	37.48	37.75	38.88
284.1	54.68	54.99	58.67	37.28	37.36	38.37
294.1	55.79	55.51	57.89	37.40	37.49	38.08
314.1	58.16	57.80	57.62	38.76	38.90	39.06
334.1	60.39	59.95	59.60	39.96	40.10	40.26
344.1	61.30	60.82	60.44	40.32	40.47	40.63
364.1	63.19	62.58	62.23	41.64	41.80	41.96
374.1	63.90	63.21	62.79	42.30	42.46	42.62
394.1	65.11	64.34	63.83	43.64	43.83	44.03
414.1	63.74	63.19	62.89	44.12	44.29	44.51
424.1	62.92	62.41	62.17	44.40	44.57	44.80
444.1	62.28	61.98	61.86	44.71	44.89	45.11
464.1	61.97	61.62	61.73	45.16	45.32	45.56
474.1	62.25	62.07	62.11	45.60	45.81	46.03
494.1	62.51	62.45	62.46	46.20	46.38	46.58
504.1	60.65	60.63	60.72	46.44	46.63	46.84
524.1	57.68	57.71	57.75	46.37	46.57	46.76
544.1	55.11	55.06	54.99	46.27	46.48	46.64
554.1	55.02	54.92	54.83	46.39	46.59	46.75
574.1	55.21	55.09	55.01	46.62	46.79	46.95
584.1	55.51	55.37	55.29	46.90	47.07	47.23
604.1	55.59	55.45	55.32	47.08	47.25	47.40
624.1	55.06	54.91	54.75	46.95	47.12	47.24
634.1	54.85	54.73	54.58	46.90	47.07	47.18
654.1	54.84	54.73	54.63	46.94	47.09	47.23
674.1	54.95	54.83	54.69	47.23	47.38	47.48

RF (IN) (MHz)	LO (MHz)	RF-IF ISOLATION (dB)		
		@LO (dBm)		
		+15	+17	+19
10.0	80.1	36.90	34.18	32.77
21.0	91.1	37.43	34.61	32.58
43.0	113.1	30.71	29.41	29.09
54.0	124.1	26.94	26.23	26.22
76.0	146.1	25.62	25.54	26.65
98.0	168.1	30.32	30.43	32.15
109.0	179.1	32.21	32.34	33.72
136.0	206.1	36.54	37.01	37.69
136.0	206.1	36.54	37.01	37.69
146.0	216.1	39.19	39.64	41.14
156.0	226.1	40.28	40.45	45.21
161.0	231.1	41.22	41.22	47.13
174.0	244.1	43.24	43.62	50.53
184.0	254.1	43.42	44.14	51.87
194.0	264.1	42.88	43.77	50.19
214.0	284.1	40.18	41.16	43.48
224.0	294.1	38.89	39.58	41.06
244.0	314.1	37.49	37.94	37.94
264.0	334.1	36.26	36.72	37.46
274.0	344.1	35.94	36.33	37.32
294.0	364.1	35.25	35.25	35.34
304.0	374.1	35.92	35.82	35.75
324.0	394.1	35.15	35.02	34.88
344.0	414.1	35.43	35.32	35.17
354.0	424.1	34.70	34.61	34.45
374.0	444.1	34.81	34.80	34.94
394.0	464.1	34.96	34.97	35.36
404.0	474.1	34.42	34.41	34.59
424.0	494.1	34.03	34.00	33.93
434.0	504.1	34.25	34.22	34.22
454.0	524.1	34.78	34.75	34.67
474.0	544.1	33.51	33.45	33.32
484.0	554.1	34.28	34.21	34.12
504.0	574.1	33.99	33.86	33.75
514.0	584.1	33.70	33.61	33.52
534.0	604.1	32.92	32.73	32.60
554.0	624.1	33.00	32.81	32.66
564.0	634.1	32.68	32.47	32.40
584.0	654.1	31.98	31.66	31.57
604.0	674.1	32.49	32.01	31.84



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IF/RF MICROWAVE COMPONENTS

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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=284.1MHz (:1)		
		@LO (dBm)				@LO (dBm)				@LO (dBm)		
		+15	+17	+19		+15	+17	+19		+15	+17	+19
10.0	80.1	2.11	2.18	2.26	80.1	3.91	3.89	3.85	10.0	1.18	1.19	1.21
21.0	91.1	2.10	2.17	2.26	91.1	3.90	3.89	3.85	20.0	1.10	1.11	1.13
43.0	113.1	1.95	2.02	2.10	113.1	3.84	3.83	3.80	30.0	1.10	1.12	1.14
54.0	124.1	1.98	2.06	2.15	124.1	3.82	3.80	3.77	40.0	1.13	1.15	1.17
76.0	146.1	2.00	2.07	2.15	146.1	3.75	3.73	3.68	50.0	1.14	1.16	1.18
98.0	168.1	1.99	2.06	2.13	168.1	3.71	3.69	3.66	60.0	1.15	1.17	1.19
109.0	179.1	2.00	2.07	2.14	179.1	3.68	3.67	3.65	70.0	1.14	1.15	1.17
136.0	206.1	1.98	2.05	2.10	206.1	3.42	3.42	3.41	80.0	1.10	1.11	1.13
136.0	206.1	1.98	2.05	2.10	206.1	3.42	3.42	3.41	90.0	1.10	1.11	1.13
146.0	216.1	2.03	2.09	2.14	216.1	3.24	3.24	3.19	100.0	1.16	1.17	1.19
156.0	226.1	2.06	2.11	2.20	226.1	3.01	3.00	2.79	110.0	1.17	1.19	1.21
161.0	231.1	2.06	2.11	2.22	231.1	2.86	2.85	2.57	120.0	1.15	1.16	1.19
174.0	244.1	2.01	2.07	2.19	244.1	2.39	2.34	2.11	130.0	1.13	1.15	1.17
184.0	254.1	2.01	2.07	2.18	254.1	1.98	1.92	1.83	140.0	1.15	1.16	1.18
194.0	264.1	2.02	2.08	2.18	264.1	1.60	1.57	1.61	150.0	1.16	1.18	1.20
214.0	284.1	1.99	2.04	2.12	284.1	1.31	1.33	1.48	160.0	1.19	1.21	1.23
224.0	294.1	1.94	1.98	2.04	294.1	1.49	1.49	1.57	170.0	1.22	1.24	1.26
244.0	314.1	1.90	1.94	1.99	314.1	1.92	1.93	1.93	180.0	1.19	1.21	1.24
264.0	334.1	1.85	1.90	1.94	334.1	2.26	2.27	2.27	190.0	1.15	1.17	1.19
274.0	344.1	1.81	1.85	1.90	344.1	2.40	2.40	2.40	200.0	1.19	1.20	1.23
294.0	364.1	1.79	1.84	1.88	364.1	2.60	2.60	2.59	210.0	1.24	1.26	1.29
304.0	374.1	1.78	1.83	1.87	374.1	2.68	2.68	2.68	220.0	1.25	1.27	1.30
324.0	394.1	1.75	1.79	1.83	394.1	2.81	2.81	2.80	230.0	1.24	1.26	1.28
344.0	414.1	1.80	1.83	1.86	414.1	2.91	2.91	2.91	240.0	1.24	1.26	1.29
354.0	424.1	1.80	1.83	1.86	424.1	2.95	2.95	2.95	250.0	1.24	1.26	1.28
374.0	444.1	1.81	1.83	1.86	444.1	3.01	3.00	3.00	260.0	1.25	1.27	1.30
394.0	464.1	1.88	1.89	1.91	464.1	3.05	3.05	3.04	270.0	1.31	1.33	1.36
404.0	474.1	1.89	1.91	1.93	474.1	3.07	3.07	3.06	280.0	1.36	1.38	1.42
424.0	494.1	1.92	1.94	1.95	494.1	3.11	3.11	3.11	290.0	1.29	1.31	1.34
434.0	504.1	1.97	1.98	1.99	504.1	3.13	3.13	3.12	300.0	1.27	1.29	1.32
454.0	524.1	2.03	2.03	2.04	524.1	3.16	3.16	3.16	310.0	1.31	1.33	1.36
474.0	544.1	2.08	2.08	2.08	544.1	3.19	3.19	3.19	320.0	1.36	1.38	1.41
484.0	554.1	2.13	2.12	2.13	554.1	3.20	3.20	3.20	330.0	1.37	1.39	1.43
504.0	574.1	2.19	2.19	2.19	574.1	3.22	3.22	3.22	340.0	1.38	1.40	1.44
514.0	584.1	2.21	2.21	2.20	584.1	3.23	3.23	3.24	350.0	1.38	1.40	1.44
534.0	604.1	2.30	2.29	2.28	604.1	3.24	3.25	3.26	360.0	1.36	1.38	1.42
554.0	624.1	2.36	2.35	2.34	624.1	3.26	3.27	3.28	370.0	1.38	1.40	1.44
564.0	634.1	2.39	2.37	2.36	634.1	3.28	3.28	3.29	380.0	1.46	1.48	1.52
584.0	654.1	2.47	2.45	2.44	654.1	3.31	3.32	3.33	390.0	1.49	1.51	1.55
604.0	674.1	2.52	2.51	2.49	674.1	3.32	3.33	3.35	405.0	1.43	1.46	1.49

Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	---	--	14.22	35.80	24.80	36.91	28.16	32.01	34.73	49.21	36.39	54.53
1	---	37.24	--	36.52	11.60	36.73	20.47	38.44	26.19	39.68	37.63	41.33
2	90.70	70.06	64.54	66.50	70.59	68.76	77.30	71.83	79.59	74.14	77.16	77.84
3	81.09	87.44	65.64	86.23	70.81	82.99	67.79	84.00	68.62	84.17	70.44	92.73
4	128.99	112.26	106.50	103.38	105.67	104.30	107.29	119.49	107.62	106.41	108.86	116.31
5	128.42	116.91	109.59	110.42	111.22	110.72	107.81	117.69	108.08	115.19	111.05	118.18
6	128.25	113.33	105.91	102.94	103.97	102.86	103.58	115.29	104.09	118.15	106.18	117.52
7	128.47	118.22	109.43	118.72	95.94	117.98	96.66	117.46	108.30	117.73	111.45	118.47
8	126.85	119.24	112.13	118.44	102.26	107.86	102.64	109.33	112.72	117.74	114.13	117.26
9	127.79	118.78	118.66	118.29	117.69	112.90	112.62	110.48	114.07	117.38	118.67	117.95
10	128.59	118.50	116.97	115.27	118.94	103.72	110.07	103.04	110.63	113.84	117.53	118.19
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions: RF IN: 155.00 MHz; 0 dBm.
LO IN: 265.00 MHz; +17.00 dBm
IF OUT: 110.00 MHz; -6.88 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	---	--	23.89	43.69	35.32	49.66	38.79	42.65	46.34	60.03	47.08	66.02
1	---	36.46	--	35.38	12.08	35.44	21.52	37.21	27.75	38.85	39.98	41.38
2	70.67	57.91	54.58	56.06	59.93	57.43	73.23	60.94	79.57	62.66	67.38	64.71
3	50.64	73.14	57.55	70.63	54.98	67.96	50.12	70.43	51.24	72.09	53.03	89.25
4	95.00	83.96	76.64	84.28	77.45	83.66	80.76	85.86	85.75	88.74	87.01	87.63
5	93.40	85.43	74.43	86.41	77.71	84.20	74.85	82.04	74.87	83.10	76.08	83.49
6	124.12	102.66	93.41	100.62	93.42	102.61	94.30	107.11	96.21	111.43	99.87	105.43
7	125.32	114.79	88.35	107.96	89.90	106.25	90.05	107.29	88.71	105.44	89.85	102.10
8	126.17	115.78	104.36	104.79	103.14	92.25	102.73	92.40	109.48	105.49	108.11	116.23
9	124.61	119.61	105.08	118.61	104.16	107.13	109.37	107.96	106.63	119.66	103.98	119.98
10	126.19	120.75	120.15	118.16	118.37	105.87	114.14	104.72	113.90	117.17	120.07	120.97
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions: RF IN: 155.00 MHz; 10 dBm.
LO IN: 265.00 MHz; +17.00 dBm
IF OUT: 110.00 MHz; 3.13 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 represents the Harmonics level of the RF Input Signal to the mixer