

Frequency Mixer

TFM-15+

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=+5dBm (dB)		
		@LO (dBm)					@LO (dBm)					@LO (dBm)		
		+7	+10	+13			+7	+10	+13			+7	+10	+13
10.1	40.1	7.24	6.68	6.54	10.1	40.1	14.89	20.64	19.63	10.1	40.1	0.52	0.28	0.20
90.6	120.6	7.23	6.78	6.51	90.6	120.6	20.51	26.61	23.37	90.6	120.6	0.50	0.26	0.13
171.0	201.0	7.26	6.79	6.55	171.0	201.0	22.17	19.87	16.55	171.0	201.0	0.50	0.21	0.09
251.5	281.5	7.56	7.07	6.76	251.5	281.5	16.16	14.54	14.26	251.5	281.5	0.34	0.10	0.00
332.0	362.0	7.72	7.20	6.83	332.0	362.0	12.79	12.87	14.60	332.0	362.0	0.29	0.04	-0.01
412.4	442.4	7.90	7.31	6.87	412.4	442.4	12.02	12.98	16.12	412.4	442.4	0.21	0.03	0.01
492.9	522.9	8.13	7.40	6.86	492.9	522.9	11.57	13.51	17.95	492.9	522.9	0.15	0.05	0.07
573.4	603.4	8.13	7.32	6.83	573.4	603.4	11.79	15.30	20.39	573.4	603.4	0.15	0.12	0.10
653.8	683.8	8.38	7.45	6.92	653.8	683.8	11.92	15.96	21.11	653.8	683.8	0.14	0.15	0.13
734.3	764.3	8.43	7.48	6.95	734.3	764.3	12.93	17.31	20.52	734.3	764.3	0.21	0.21	0.14
814.8	844.8	8.51	7.54	7.00	814.8	844.8	14.46	18.41	19.11	814.8	844.8	0.34	0.30	0.20
915.4	945.4	8.45	7.46	6.99	915.4	945.4	15.99	18.58	19.07	915.4	945.4	0.45	0.40	0.28
995.8	1025.8	8.62	7.67	7.17	995.8	1025.8	14.99	17.46	18.28	995.8	1025.8	0.46	0.42	0.29
1096.4	1126.4	8.75	7.86	7.36	1096.4	1126.4	13.73	16.10	17.31	1096.4	1126.4	0.36	0.28	0.21
1176.9	1206.9	8.66	7.92	7.46	1176.9	1206.9	13.42	14.94	16.46	1176.9	1206.9	0.49	0.31	0.21
1277.5	1307.5	8.50	7.76	7.35	1277.5	1307.5	13.36	14.90	16.60	1277.5	1307.5	0.64	0.42	0.29
1357.9	1387.9	8.29	7.54	7.20	1357.9	1387.9	14.08	15.13	16.03	1357.9	1387.9	0.80	0.49	0.31
1458.5	1488.5	8.41	7.51	7.12	1458.5	1488.5	13.43	14.79	16.15	1458.5	1488.5	0.65	0.48	0.31
1539.0	1569.0	8.42	7.47	7.03	1539.0	1569.0	12.59	14.48	15.55	1539.0	1569.0	0.61	0.48	0.33
1639.6	1669.6	8.57	7.59	7.14	1639.6	1669.6	12.24	14.16	15.31	1639.6	1669.6	0.47	0.39	0.28
1720.0	1750.0	8.51	7.61	7.10	1720.0	1750.0	11.83	13.72	15.45	1720.0	1750.0	0.48	0.36	0.28
1820.6	1850.6	8.60	7.73	7.28	1820.6	1850.6	11.81	12.90	14.40	1820.6	1850.6	0.49	0.30	0.23
1901.1	1931.1	8.56	7.63	7.21	1901.1	1931.1	11.87	12.96	14.17	1901.1	1931.1	0.55	0.36	0.25
2001.7	2031.7	8.47	7.65	7.25	2001.7	2031.7	12.34	13.79	14.57	2001.7	2031.7	0.59	0.41	0.28
2082.1	2112.1	8.37	7.55	7.11	2082.1	2112.1	11.91	13.14	14.71	2082.1	2112.1	0.63	0.38	0.27
2182.7	2212.7	8.24	7.47	7.11	2182.7	2212.7	12.89	14.14	15.15	2182.7	2212.7	0.78	0.43	0.28
2263.2	2293.2	8.20	7.56	7.23	2263.2	2293.2	13.48	14.45	15.52	2263.2	2293.2	0.73	0.37	0.25
2363.8	2393.8	8.01	7.47	7.19	2363.8	2393.8	14.06	14.98	15.98	2363.8	2393.8	0.78	0.39	0.25
2444.3	2474.3	8.03	7.52	7.26	2444.3	2474.3	14.85	15.51	16.44	2444.3	2474.3	0.70	0.36	0.23
2544.8	2574.8	8.09	7.57	7.31	2544.8	2574.8	14.83	16.11	16.98	2544.8	2574.8	0.66	0.35	0.23
2625.3	2655.3	8.36	7.82	7.57	2625.3	2655.3	15.12	16.56	17.59	2625.3	2655.3	0.60	0.31	0.21
2725.9	2755.9	8.37	7.86	7.63	2725.9	2755.9	14.68	15.85	17.18	2725.9	2755.9	0.63	0.29	0.19
2806.4	2836.4	8.60	8.11	7.89	2806.4	2836.4	15.14	16.15	17.37	2806.4	2836.4	0.63	0.26	0.15
2906.9	2936.9	8.67	8.15	7.90	2906.9	2936.9	15.18	16.66	17.77	2906.9	2936.9	0.63	0.29	0.15
2987.4	3017.4	9.00	8.36	8.06	2987.4	3017.4	15.24	16.23	17.61	2987.4	3017.4	0.59	0.27	0.16
3088.0	3118.0	9.16	8.53	8.20	3088.0	3118.0	15.96	16.32	17.25	3088.0	3118.0	0.60	0.24	0.13
3168.5	3198.5	9.50	8.88	8.56	3168.5	3198.5	16.03	16.49	17.25	3168.5	3198.5	0.53	0.23	0.12
3269.0	3299.0	9.72	9.15	8.82	3269.0	3299.0	16.38	16.78	17.40	3269.0	3299.0	0.36	0.17	0.12
3349.5	3379.5	9.99	9.46	9.16	3349.5	3379.5	15.72	16.41	17.22	3349.5	3379.5	0.32	0.17	0.13
3450.1	3480.1	10.37	9.89	9.64	3450.1	3480.1	16.11	16.31	17.05	3450.1	3480.1	0.27	0.13	0.09



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Typical Performance Data

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=1510.1MHz (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)=3010.1MHz (dB)
		@LO (dBm)			@LO (dBm)			@LO (dBm)
		+10			+10			+10
1500.1	10.0	7.77	10.0	20.1	7.23	3000.1	10.0	10.61
1460.4	49.7	7.93	110.0	120.1	6.82	2919.8	90.3	10.32
1420.6	89.5	8.18	210.0	220.1	6.72	2839.6	170.5	9.91
1380.9	129.2	8.18	310.0	320.1	6.55	2759.3	250.8	9.78
1341.2	168.9	8.26	410.0	420.1	6.69	2679.0	331.1	9.63
1301.4	208.7	8.36	510.0	520.1	6.69	2598.8	411.3	9.41
1261.7	248.4	8.29	610.0	620.1	6.71	2518.5	491.6	9.26
1222.0	288.1	8.26	710.0	720.1	6.78	2438.2	571.9	9.13
1182.2	327.9	8.29	790.0	800.1	6.70	2358.0	652.1	9.04
1142.5	367.6	8.22	890.0	900.1	6.79	2277.7	732.4	8.89
1102.8	407.3	8.22	970.0	980.1	6.72	2197.4	812.7	8.72
1063.0	447.1	8.28	1070.0	1080.1	6.92	2117.1	893.0	8.55
1023.3	486.8	8.23	1150.0	1160.1	7.02	2036.9	973.2	8.41
983.6	526.5	8.17	1250.0	1260.1	7.14	1956.6	1053.5	8.31
943.8	566.3	8.20	1330.0	1340.1	7.34	1876.3	1133.8	8.14
904.1	606.0	8.08	1430.0	1440.1	7.57	1796.1	1214.0	8.09
864.4	645.7	7.97	1510.0	1520.1	7.75	1715.8	1294.3	7.94
824.6	685.5	7.98	1610.0	1620.1	7.95	1635.5	1374.6	7.85
784.9	725.2	8.03	1690.0	1700.1	7.81	1555.3	1454.8	7.74
745.2	764.9	7.87	1790.0	1800.1	8.11	1475.0	1535.1	7.60
705.4	804.7	7.89	1870.0	1880.1	8.19	1394.7	1615.4	7.53
665.7	844.4	7.88	1970.0	1980.1	8.38	1314.5	1695.6	7.43
626.0	884.1	7.75	2050.0	2060.1	8.58	1234.2	1775.9	7.46
586.2	923.9	7.70	2150.0	2160.1	8.74	1153.9	1856.2	7.42
546.5	963.6	7.73	2230.0	2240.1	9.09	1073.7	1936.4	7.49
506.8	1003.3	7.72	2330.0	2340.1	9.34	993.4	2016.7	7.53
467.0	1043.1	7.68	2410.0	2420.1	9.50	913.1	2097.0	7.51
427.3	1082.8	7.61	2510.0	2520.1	9.65	852.9	2157.2	7.51
387.6	1122.5	7.57	2590.0	2600.1	10.22	772.7	2237.4	7.52
347.8	1162.3	7.46	2690.0	2700.1	10.31	712.4	2297.7	7.50
308.1	1202.0	7.41	2770.0	2780.1	10.51	632.2	2377.9	7.52
268.4	1241.7	7.42	2870.0	2880.1	10.67	572.0	2438.1	7.57
228.6	1281.5	7.41	2950.0	2960.1	10.80	491.7	2518.4	7.67
188.9	1321.2	7.39	3050.0	3060.1	10.73	431.5	2578.6	7.75
149.2	1360.9	7.37	3130.0	3140.1	11.17	351.2	2658.9	7.80
129.3	1380.8	7.35	3230.0	3240.1	11.40	291.0	2719.1	7.83
89.6	1420.5	7.37	3310.0	3320.1	11.56	210.8	2799.3	7.93
69.7	1440.4	7.37	3410.0	3420.1	11.63	150.6	2859.5	7.97
30.0	1480.1	7.54	3490.0	3500.1	11.71	70.3	2939.8	8.18
10.1	1500.0	7.87	3590.0	3600.1	11.65	10.1	3000.0	8.71



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Typical Performance Data

LO (MHz)	LO-RF ISOLATION (dB)			LO-IF ISOLATION (dB)		
	@LO (dBm)			@LO (dBm)		
	+7	+10	+13	+7	+10	+13
40.1	40.47	45.32	49.67	30.30	33.93	37.26
120.6	50.14	56.77	62.59	32.67	36.69	40.64
201.0	55.07	55.28	55.89	34.12	38.30	41.27
281.5	49.34	50.34	51.33	35.15	38.82	39.36
362.0	45.26	46.72	48.13	37.34	39.03	37.27
442.4	43.36	44.99	46.62	40.43	38.78	35.63
522.9	41.03	42.62	44.26	42.21	37.13	33.97
603.4	39.59	41.23	43.00	44.02	35.75	32.95
683.8	38.63	40.05	41.43	44.06	35.04	31.77
764.3	38.14	39.37	40.50	42.56	34.29	30.85
844.8	37.75	38.64	39.34	40.35	33.94	30.50
945.4	37.83	38.21	38.57	37.00	32.76	29.85
1025.8	37.78	38.04	38.20	35.11	32.67	29.52
1126.4	38.30	38.24	38.08	32.96	31.93	29.25
1206.9	38.50	38.19	37.81	31.61	31.56	29.27
1307.5	38.65	37.65	37.06	30.22	30.95	29.33
1387.9	39.47	38.10	37.27	29.01	30.30	29.38
1488.5	39.78	38.42	36.83	27.69	29.60	29.39
1569.0	39.20	37.92	36.32	26.98	29.29	29.80
1669.6	38.43	37.19	35.44	26.23	28.85	30.24
1750.0	38.03	37.28	35.56	25.35	28.03	30.23
1850.6	35.33	35.16	33.94	28.67	30.89	32.57
1931.1	36.04	34.94	33.75	27.26	30.31	33.89
2031.7	35.82	35.17	33.64	27.11	30.34	34.94
2112.1	36.01	35.47	34.13	27.78	31.25	36.71
2212.7	36.09	35.14	33.99	29.21	33.94	41.23
2293.2	35.12	34.67	34.15	30.88	37.04	43.96
2393.8	33.36	33.25	32.82	34.40	42.51	38.46
2474.3	32.20	32.63	32.65	39.12	42.78	35.26
2574.8	31.26	31.82	32.07	45.85	36.67	32.02
2655.3	30.98	31.20	31.53	39.85	32.90	30.25
2755.9	31.14	31.28	31.44	34.42	30.11	28.31
2836.4	30.99	31.26	31.53	31.72	28.64	27.46
2936.9	31.30	31.75	31.97	29.25	27.55	26.69
3017.4	30.71	31.10	31.85	28.17	26.63	26.03
3118.0	29.37	30.01	30.64	26.56	25.67	25.55
3198.5	28.28	29.30	30.33	26.02	25.42	25.38
3299.0	27.89	28.89	29.88	24.91	24.67	24.92
3379.5	28.29	29.45	30.35	24.43	24.31	24.56
3480.1	28.84	30.61	32.02	23.91	24.01	24.49

RF (IN) (MHz)	LO (MHz)	RF-IF ISOLATION (dB)		
		@LO (dBm)		
		+7	+10	+13
10.1	40.1	21.21	20.69	20.91
90.6	120.6	23.70	23.93	23.59
171.0	201.0	24.68	24.68	24.63
251.5	281.5	25.10	25.02	25.14
332.0	362.0	25.58	25.79	25.84
412.4	442.4	26.31	26.37	26.55
492.9	522.9	26.71	26.79	26.79
573.4	603.4	27.26	27.48	27.35
653.8	683.8	27.91	27.89	27.76
734.3	764.3	28.34	27.74	27.37
814.8	844.8	29.06	28.37	27.84
915.4	945.4	29.16	28.12	27.65
995.8	1025.8	29.67	28.56	28.11
1096.4	1126.4	30.52	29.42	28.98
1176.9	1206.9	31.17	30.33	29.75
1277.5	1307.5	32.87	32.00	31.33
1357.9	1387.9	33.94	32.82	32.43
1458.5	1488.5	35.07	33.84	32.94
1539.0	1569.0	34.56	33.37	32.33
1639.6	1669.6	34.18	32.91	31.73
1720.0	1750.0	32.59	31.92	31.46
1820.6	1850.6	28.14	27.78	27.33
1901.1	1931.1	30.06	29.30	28.33
2001.7	2031.7	28.83	28.55	27.62
2082.1	2112.1	27.40	27.59	27.26
2182.7	2212.7	26.65	26.56	26.81
2263.2	2293.2	26.55	26.30	26.42
2363.8	2393.8	26.53	26.91	27.12
2444.3	2474.3	26.73	27.06	27.59
2544.8	2574.8	27.26	27.82	28.62
2625.3	2655.3	27.45	28.05	28.71
2725.9	2755.9	27.92	28.24	28.53
2806.4	2836.4	28.43	28.88	28.95
2906.9	2936.9	28.03	28.43	28.68
2987.4	3017.4	27.72	28.17	28.32
3088.0	3118.0	27.58	27.82	28.26
3168.5	3198.5	27.81	27.98	28.25
3269.0	3299.0	28.67	28.79	28.91
3349.5	3379.5	29.82	30.05	30.26
3450.1	3480.1	30.82	31.42	31.93



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Typical Performance Data

RF (IN) (MHz)	LO (MHz)	RF VSWR (:1)		
		@LO (dBm)		
		+7	+10	+13
10.1	40.1	1.43	1.34	1.37
90.6	120.6	1.22	1.09	1.05
171.0	201.0	1.26	1.12	1.03
251.5	281.5	1.35	1.20	1.11
332.0	362.0	1.42	1.27	1.18
412.4	442.4	1.51	1.36	1.27
492.9	522.9	1.65	1.48	1.37
573.4	603.4	1.72	1.55	1.45
653.8	683.8	1.86	1.67	1.55
734.3	764.3	1.98	1.78	1.64
814.8	844.8	2.15	1.93	1.79
915.4	945.4	2.21	1.97	1.83
995.8	1025.8	2.39	2.13	1.97
1096.4	1126.4	2.38	2.15	1.99
1176.9	1206.9	2.41	2.21	2.07
1277.5	1307.5	2.22	2.05	1.94
1357.9	1387.9	2.18	2.00	1.90
1458.5	1488.5	2.04	1.87	1.76
1539.0	1569.0	1.98	1.82	1.71
1639.6	1669.6	1.89	1.73	1.62
1720.0	1750.0	1.77	1.64	1.56
1820.6	1850.6	1.73	1.62	1.55
1901.1	1931.1	1.61	1.53	1.49
2001.7	2031.7	1.63	1.57	1.56
2082.1	2112.1	1.52	1.50	1.50
2182.7	2212.7	1.56	1.58	1.59
2263.2	2293.2	1.45	1.49	1.53
2363.8	2393.8	1.49	1.54	1.60
2444.3	2474.3	1.40	1.43	1.49
2544.8	2574.8	1.44	1.46	1.50
2625.3	2655.3	1.41	1.39	1.40
2725.9	2755.9	1.39	1.37	1.39
2806.4	2836.4	1.41	1.36	1.35
2906.9	2936.9	1.33	1.27	1.26
2987.4	3017.4	1.41	1.31	1.27
3088.0	3118.0	1.30	1.21	1.19
3168.5	3198.5	1.32	1.26	1.24
3269.0	3299.0	1.21	1.21	1.23
3349.5	3379.5	1.35	1.41	1.45
3450.1	3480.1	1.39	1.48	1.55

LO (MHz)	LO VSWR (:1)		
	@LO (dBm)		
	+7	+10	+13
40.1	1.13	1.68	2.44
120.6	1.08	1.60	2.28
201.0	1.17	1.55	2.17
281.5	1.25	1.55	2.13
362.0	1.30	1.54	2.09
442.4	1.40	1.55	2.07
522.9	1.45	1.51	1.99
603.4	1.56	1.49	1.92
683.8	1.62	1.46	1.83
764.3	1.71	1.46	1.76
844.8	1.78	1.43	1.68
945.4	1.92	1.44	1.58
1025.8	2.01	1.44	1.51
1126.4	2.09	1.43	1.41
1206.9	2.14	1.43	1.33
1307.5	2.19	1.41	1.24
1387.9	2.19	1.40	1.19
1488.5	2.15	1.37	1.15
1569.0	2.10	1.34	1.13
1669.6	2.01	1.29	1.13
1750.0	1.95	1.25	1.16
1850.6	1.82	1.18	1.22
1931.1	1.79	1.15	1.27
2031.7	1.71	1.13	1.31
2112.1	1.69	1.13	1.35
2212.7	1.65	1.12	1.37
2293.2	1.59	1.09	1.39
2393.8	1.53	1.06	1.40
2474.3	1.47	1.04	1.40
2574.8	1.43	1.04	1.41
2655.3	1.39	1.05	1.40
2755.9	1.36	1.06	1.41
2836.4	1.34	1.07	1.41
2936.9	1.31	1.09	1.41
3017.4	1.30	1.10	1.42
3118.0	1.27	1.13	1.45
3198.5	1.24	1.18	1.49
3299.0	1.20	1.24	1.56
3379.5	1.16	1.30	1.63
3480.1	1.14	1.40	1.74

IF (OUT) (MHz)	IF VSWR @LO=3000MHz (:1)		
	@LO (dBm)		
	+7	+10	+13
10.0	1.53	1.42	1.37
50.0	1.57	1.39	1.28
90.0	1.55	1.36	1.24
130.0	1.62	1.42	1.29
170.0	1.58	1.38	1.26
210.0	1.61	1.40	1.27
250.0	1.61	1.40	1.28
310.0	1.63	1.41	1.28
350.0	1.62	1.41	1.28
410.0	1.62	1.41	1.27
450.0	1.58	1.37	1.24
510.0	1.62	1.40	1.27
550.0	1.57	1.35	1.22
610.0	1.62	1.40	1.26
650.0	1.56	1.35	1.22
710.0	1.58	1.36	1.23
750.0	1.54	1.33	1.20
810.0	1.53	1.32	1.20
850.0	1.49	1.28	1.16
910.0	1.49	1.29	1.17
950.0	1.45	1.25	1.14
1010.0	1.43	1.24	1.14
1050.0	1.40	1.21	1.11
1110.0	1.35	1.17	1.10
1150.0	1.33	1.15	1.08
1210.0	1.28	1.13	1.11
1250.0	1.25	1.11	1.10
1310.0	1.23	1.13	1.14
1350.0	1.22	1.13	1.16
1410.0	1.16	1.15	1.21
1450.0	1.16	1.17	1.24
1510.0	1.17	1.25	1.34
1550.0	1.18	1.28	1.39
1610.0	1.24	1.36	1.46
1650.0	1.26	1.40	1.51
1710.0	1.32	1.47	1.59
1750.0	1.36	1.51	1.63
1810.0	1.48	1.65	1.78
1850.0	1.43	1.60	1.73
1910.0	1.55	1.72	1.85

Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	+3	28	10	29	10	28	21	38	25	35
1	-	25	+0	42	17	54	20	36	43	35	37	41
2	83	65	55	66	64	68	>68	59	51	>68	54	60
3	>90	>68	>68	>68	66	>68	>68	>68	68	>68	>68	>68
4	>90	>68	>68	>68	>68	>68	>68	>68	>68	>68	>68	>68
5	>90	>68	>68	>68	>68	>68	>68	>68	>68	>68	>68	>68
6	>90	>68	>68	>68	>68	>68	>68	>68	>68	>68	>68	>68
7	>90	>68	>68	>68	>68	>68	>68	>68	>68	>68	>68	>68
8	>90	>68	>68	>68	>68	>68	>68	>68	>68	>68	>68	>68
9	>90	>68	>68	>68	>68	>68	>68	>68	>68	>68	>68	>68
10	>90	>68	>68	>68	>68	>68	>68	>68	>68	>68	>68	>68
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions: RF IN: 1500 MHz; -14.00 dBm.
 LO IN: 1530 MHz; +10.00 dBm
 IF OUT: 30 MHz; -21.89 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	8	39	20	38	21	38	33	59	39	48
1	-	25	+0	43	17	50	20	39	42	38	38	45
2	64	56	46	61	55	60	68	54	42	65	47	53
3	>90	72	52	62	47	60	58	66	50	56	72	56
4	>90	73	76	>78	71	70	>78	>78	77	67	66	>78
5	>90	>78	75	>78	>78	78	71	>78	>78	>78	70	73
6	>90	>78	>78	>78	>78	>78	>78	>78	>78	>78	>78	>78
7	>90	>78	>78	>78	>78	>78	>78	>78	>78	>78	>78	>78
8	>90	>78	>78	>78	>78	>78	>78	>78	>78	>78	>78	>78
9	>90	>78	>78	>78	>78	>78	>78	>78	>78	>78	>78	>78
10	>90	>78	>78	>78	>78	>78	>78	>78	>78	>78	>78	>78
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions: RF IN: 1500 MHz; -4.00 dBm.
 LO IN: 1530 MHz; +10.00 dBm
 IF OUT: 30 MHz; -11.74 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.