

Frequency Mixer

SCM-5LH

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=0dBm (dB)		
		@LO (dBm)					@LO (dBm)					@LO (dBm)		
		+7	+10	+13			+7	+10	+13			+7	+10	+13
800.1	830.1	11.36	10.82	10.44	800.1	830.1	16.82	17.09	16.45	800.1	830.1	-0.02	-0.03	0.00
840.1	870.1	11.03	10.56	10.17	840.1	870.1	16.98	17.22	16.52	840.1	870.1	-0.04	-0.06	-0.02
880.1	910.1	10.58	10.14	9.78	880.1	910.1	16.32	17.00	16.41	880.1	910.1	-0.03	-0.07	-0.04
920.1	950.1	10.34	9.89	9.56	920.1	950.1	14.90	16.06	17.23	920.1	950.1	-0.01	-0.07	-0.06
960.1	990.1	9.88	9.31	8.98	960.1	990.1	13.18	15.49	16.67	960.1	990.1	0.05	-0.02	-0.02
1000.1	1030.1	9.51	8.88	8.53	1000.1	1030.1	11.55	14.49	15.62	1000.1	1030.1	0.15	0.04	0.02
1040.1	1070.1	9.08	8.43	8.05	1040.1	1070.1	9.59	12.98	14.91	1040.1	1070.1	0.22	0.09	0.07
1080.1	1110.1	8.89	8.13	7.75	1080.1	1110.1	9.16	11.15	13.10	1080.1	1110.1	0.21	0.18	0.19
1120.1	1150.1	8.62	7.78	7.38	1120.1	1150.1	10.86	9.45	11.84	1120.1	1150.1	0.15	0.26	0.33
1160.1	1190.1	8.38	7.58	7.14	1160.1	1190.1	10.96	9.47	10.33	1160.1	1190.1	0.15	0.31	0.46
1200.1	1230.1	7.96	7.20	6.79	1200.1	1230.1	10.23	8.68	8.82	1200.1	1230.1	0.19	0.40	0.59
1240.1	1270.1	7.73	7.00	6.60	1240.1	1270.1	9.72	7.82	7.53	1240.1	1270.1	0.20	0.47	0.71
1280.1	1310.1	7.50	6.79	6.40	1280.1	1310.1	9.12	7.06	6.33	1280.1	1310.1	0.28	0.59	0.88
1320.1	1350.1	7.41	6.64	6.24	1320.1	1350.1	9.16	7.32	4.93	1320.1	1350.1	0.25	0.65	1.01
1360.1	1390.1	7.43	6.63	6.22	1360.1	1390.1	8.59	7.33	3.68	1360.1	1390.1	0.20	0.66	1.05
1400.1	1430.1	7.00	6.27	6.10	1400.1	1430.1	7.64	5.93	2.68	1400.1	1430.1	0.40	0.84	1.02
1440.1	1470.1	6.95	6.36	6.21	1440.1	1470.1	6.76	4.67	2.90	1440.1	1470.1	0.49	0.82	0.94
1480.1	1510.1	6.65	6.25	6.33	1480.1	1510.1	5.22	2.86	7.80	1480.1	1510.1	0.70	0.88	0.82
1520.1	1550.1	6.70	6.44	6.35	1520.1	1550.1	4.19	1.92	5.34	1520.1	1550.1	0.71	0.76	0.84
1560.1	1590.1	6.52	6.43	6.14	1560.1	1590.1	3.48	2.20	3.55	1560.1	1590.1	0.92	0.84	1.13
1600.1	1630.1	6.52	6.49	5.67	1600.1	1630.1	3.21	7.36	3.51	1600.1	1630.1	0.92	0.81	1.51
1650.1	1680.1	6.45	6.32	5.54	1650.1	1680.1	4.19	7.98	6.19	1650.1	1680.1	1.13	1.00	1.43
1690.1	1720.1	6.49	6.16	5.40	1690.1	1720.1	6.02	7.55	8.06	1690.1	1720.1	1.05	0.99	1.30
1740.1	1770.1	6.61	6.13	5.59	1740.1	1770.1	6.68	8.98	7.73	1740.1	1770.1	1.11	0.99	1.06
1780.1	1810.1	6.64	6.21	5.71	1780.1	1810.1	7.49	10.42	8.15	1780.1	1810.1	1.13	0.83	0.91
1830.1	1860.1	6.59	6.06	6.00	1830.1	1860.1	8.57	8.08	9.21	1830.1	1860.1	1.49	0.89	0.75
1870.1	1900.1	6.48	6.07	6.13	1870.1	1900.1	7.82	7.58	12.48	1870.1	1900.1	1.50	0.79	0.58
1920.1	1950.1	6.70	6.33	6.41	1920.1	1950.1	8.26	8.23	10.37	1920.1	1950.1	1.72	0.90	0.45
1960.1	1990.1	6.80	6.48	6.57	1960.1	1990.1	8.56	7.28	10.84	1960.1	1990.1	1.65	0.83	0.39
2010.1	2040.1	7.02	6.58	6.74	2010.1	2040.1	5.53	5.50	9.76	2010.1	2040.1	2.22	1.20	0.57
2050.1	2080.1	7.35	6.79	6.89	2050.1	2080.1	5.08	5.41	8.07	2050.1	2080.1	2.11	1.17	0.57
2100.1	2130.1	7.72	7.08	7.17	2100.1	2130.1	5.08	3.85	8.03	2100.1	2130.1	2.62	1.48	0.74
2140.1	2170.1	8.18	7.57	7.54	2140.1	2170.1	5.45	4.43	9.11	2140.1	2170.1	2.58	1.37	0.70
2190.1	2220.1	8.41	8.10	8.08	2190.1	2220.1	3.81	4.76	7.49	2190.1	2220.1	3.49	1.78	0.92
2230.1	2260.1	8.87	8.63	8.49	2230.1	2260.1	3.68	5.91	7.60	2230.1	2260.1	3.35	1.63	0.87
2280.1	2310.1	8.89	8.87	8.92	2280.1	2310.1	2.51	5.05	5.60	2280.1	2310.1	4.04	2.05	1.05
2320.1	2350.1	9.48	9.42	9.33	2320.1	2350.1	2.25	5.33	6.00	2320.1	2350.1	4.14	2.10	1.12
2370.1	2400.1	9.33	9.34	9.47	2370.1	2400.1	1.16	3.61	5.31	2370.1	2400.1	4.66	2.54	1.34
2410.1	2440.1	10.41	10.53	10.55	2410.1	2440.1	0.90	3.97	6.00	2410.1	2440.1	4.68	2.35	1.17
2460.1	2490.1	10.20	10.90	11.46	2460.1	2490.1	0.42	2.88	8.76	2460.1	2490.1	5.38	2.59	1.14

Frequency Mixer

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Typical Performance Data

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=1525MHz (dB)	IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=1250.1MHz (dB)	IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=1800.1MHz (dB)
		@LO (dBm)			@LO (dBm)			@LO (dBm)
		+10			+10			+10
944.9	580.1	10.28	10.0	1260.1	7.00	1250.0	550.1	11.63
905.1	619.9	6.35	30.0	1280.1	7.05	1210.0	590.1	8.51
865.3	659.7	5.34	50.0	1300.1	7.19	1170.0	630.1	5.35
825.6	699.4	5.07	70.0	1320.1	7.24	1130.0	670.1	4.77
785.8	739.2	4.82	90.0	1340.1	7.30	1090.0	710.1	4.57
746.0	779.0	4.62	120.0	1370.1	7.63	1050.0	750.1	4.38
706.2	818.8	4.64	140.0	1390.1	7.78	1010.0	790.1	4.20
646.5	878.5	4.49	170.0	1420.1	8.04	970.0	830.1	4.12
606.7	918.3	4.44	190.0	1440.1	8.22	930.0	870.1	4.03
547.1	977.9	4.33	220.0	1470.1	8.52	910.0	890.1	4.05
507.3	1017.7	4.19	240.0	1490.1	8.75	870.0	930.1	3.94
447.6	1077.4	4.13	270.0	1520.1	8.99	850.0	950.1	3.94
407.8	1117.2	4.11	290.0	1540.1	8.98	810.0	990.1	3.93
348.2	1176.8	4.14	320.0	1570.1	8.99	790.0	1010.1	3.92
308.4	1216.6	4.24	340.0	1590.1	8.91	750.0	1050.1	3.82
248.7	1276.3	4.40	370.0	1620.1	8.51	730.0	1070.1	3.77
208.9	1316.1	4.66	390.0	1640.1	8.17	690.0	1110.1	3.78
149.2	1375.8	4.87	420.0	1670.1	8.15	670.0	1130.1	3.77
109.5	1415.5	5.07	440.0	1690.1	7.94	630.0	1170.1	3.75
49.8	1475.2	5.58	470.0	1720.1	7.69	610.0	1190.1	3.80
10.0	1515.0	6.12	490.0	1740.1	7.67	570.0	1230.1	3.84
50.2	1575.2	6.55	520.0	1770.1	7.74	550.0	1250.1	3.84
90.4	1615.4	6.67	540.0	1790.1	7.63	510.0	1290.1	3.92
150.8	1675.8	6.35	570.0	1820.1	7.68	490.0	1310.1	3.93
191.0	1716.0	6.07	590.0	1840.1	7.69	450.0	1350.1	3.97
251.3	1776.3	6.00	620.0	1870.1	7.82	430.0	1370.1	4.03
291.5	1816.5	5.80	640.0	1890.1	7.98	390.0	1410.1	4.21
351.8	1876.8	5.77	670.0	1920.1	7.91	370.0	1430.1	4.28
392.1	1917.1	5.59	690.0	1940.1	7.71	330.0	1470.1	4.57
452.4	1977.4	5.19	720.0	1970.1	7.89	310.0	1490.1	4.73
492.6	2017.6	5.04	740.0	1990.1	7.90	270.0	1530.1	5.09
552.9	2077.9	5.12	770.0	2020.1	7.71	250.0	1550.1	5.24
593.1	2118.1	5.29	790.0	2040.1	7.98	210.0	1590.1	5.89
653.5	2178.5	5.69	820.0	2070.1	8.06	190.0	1610.1	6.24
693.7	2218.7	6.01	840.0	2090.1	8.36	150.0	1650.1	6.48
754.0	2279.0	6.84	870.0	2120.1	8.75	130.0	1670.1	6.41
794.2	2319.2	7.57	890.0	2140.1	8.39	90.0	1710.1	6.23
854.6	2379.6	7.87	920.0	2170.1	9.24	70.0	1730.1	6.22
894.8	2419.8	8.87	940.0	2190.1	10.04	30.0	1770.1	6.21
955.1	2480.1	10.70	970.0	2220.1	9.96	10.0	1790.1	6.26

Frequency Mixer

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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
800.1	37.09	35.86	35.13	15.60	17.92	20.07
840.1	34.90	34.00	33.41	15.35	17.48	19.28
880.1	33.19	32.41	31.85	15.63	17.54	19.13
920.1	31.76	30.88	30.42	15.94	17.72	19.08
960.1	30.67	29.86	29.39	16.35	18.11	19.44
1000.1	29.67	29.03	28.44	16.65	19.03	20.37
1040.1	28.90	28.17	27.73	16.24	18.97	20.58
1080.1	28.01	27.42	27.06	16.15	18.73	20.68
1120.1	27.03	26.61	26.33	16.43	18.65	20.49
1160.1	26.28	26.00	25.86	16.76	18.65	20.29
1200.1	25.65	25.48	25.48	17.51	19.16	20.44
1240.1	25.10	25.17	25.16	17.97	19.34	20.21
1280.1	24.62	24.75	24.86	18.63	19.73	20.05
1320.1	24.06	24.32	24.51	19.10	19.87	19.78
1360.1	23.63	24.02	24.33	18.97	19.62	19.28
1400.1	23.44	23.94	24.42	18.97	19.48	18.56
1440.1	23.12	23.84	24.36	18.22	18.96	18.09
1480.1	23.24	24.13	24.51	17.44	18.20	17.21
1520.1	23.46	24.51	24.22	16.38	17.09	16.26
1560.1	23.55	24.88	24.54	15.38	16.15	14.99
1600.1	23.54	24.84	24.44	14.33	14.97	13.84
1650.1	23.65	24.72	24.49	12.91	13.40	12.52
1690.1	24.29	24.99	24.56	11.76	11.94	11.24
1740.1	24.27	24.78	24.36	10.84	10.82	10.36
1780.1	24.55	24.60	24.10	10.06	9.79	9.51
1830.1	24.51	24.23	23.61	9.75	8.97	8.88
1870.1	24.64	24.11	23.43	9.44	8.28	8.08
1920.1	23.99	23.76	23.07	10.15	8.40	7.75
1960.1	23.62	23.40	22.83	9.56	7.90	7.40
2010.1	22.95	22.66	21.96	9.79	8.08	7.18
2050.1	22.56	22.41	21.67	9.27	7.55	6.65
2100.1	21.71	21.47	20.76	9.01	7.46	6.47
2140.1	21.25	21.03	20.52	8.57	7.18	6.35
2190.1	20.57	20.35	19.72	8.22	6.82	5.96
2230.1	19.97	19.94	19.43	7.67	6.49	5.84
2280.1	19.27	19.30	18.79	7.06	5.96	5.19
2320.1	18.71	18.87	18.52	6.92	5.88	5.22
2370.1	18.19	18.49	18.20	6.33	5.41	4.78
2410.1	17.72	18.11	17.95	6.00	5.45	4.81
2460.1	17.07	17.55	17.60	5.31	4.68	4.38

RF (IN) (MHz)	LO (MHz)	RF-IF ISOLATION (dB)		
		@LO (dBm)		
		+7	+10	+13
800.1	830.1	20.11	19.62	18.83
840.1	870.1	19.30	18.82	18.35
880.1	910.1	18.01	17.54	17.25
920.1	950.1	17.05	16.68	16.42
960.1	990.1	16.31	15.89	15.63
1000.1	1030.1	15.69	15.12	14.88
1040.1	1070.1	15.35	14.93	14.53
1080.1	1110.1	14.95	14.71	14.35
1120.1	1150.1	14.40	14.27	14.07
1160.1	1190.1	14.19	14.09	14.02
1200.1	1230.1	13.88	13.75	13.65
1240.1	1270.1	13.77	13.80	13.65
1280.1	1310.1	13.72	13.81	13.78
1320.1	1350.1	13.63	13.70	13.92
1360.1	1390.1	13.78	13.85	14.36
1400.1	1430.1	14.04	14.29	14.98
1440.1	1470.1	14.37	14.72	15.66
1480.1	1510.1	15.05	15.39	15.93
1520.1	1550.1	16.08	16.31	15.31
1560.1	1590.1	17.33	17.73	15.22
1600.1	1630.1	18.41	18.34	15.50
1650.1	1680.1	20.03	18.78	15.30
1690.1	1720.1	21.53	18.56	15.13
1740.1	1770.1	22.44	18.75	15.76
1780.1	1810.1	21.37	18.37	15.63
1830.1	1860.1	19.22	18.52	15.72
1870.1	1900.1	17.23	17.11	14.94
1920.1	1950.1	16.20	15.94	14.72
1960.1	1990.1	15.63	15.11	13.50
2010.1	2040.1	15.14	14.62	12.77
2050.1	2080.1	14.39	13.74	11.96
2100.1	2130.1	13.65	13.04	11.08
2140.1	2170.1	13.20	12.33	10.51
2190.1	2220.1	13.21	12.09	10.41
2230.1	2260.1	12.84	11.52	10.05
2280.1	2310.1	12.71	11.44	10.20
2320.1	2350.1	12.44	11.30	10.10
2370.1	2400.1	12.20	11.13	10.29
2410.1	2440.1	11.51	10.75	10.23
2460.1	2490.1	11.47	10.82	11.07

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=1800.1MHz (:1)		
		@LO (dBm)				@LO (dBm)				@LO (dBm)		
		+7	+10	+13		+7	+10	+13		+7	+10	+13
800.1	830.1	12.71	11.93	11.31	830.1	3.75	4.57	5.79	10.1	2.97	2.32	1.82
840.1	870.1	10.56	9.96	9.48	870.1	3.26	4.12	5.30	50.1	3.11	2.41	1.87
880.1	910.1	10.07	9.53	9.04	910.1	3.01	3.95	5.10	90.1	3.05	2.39	1.88
920.1	950.1	8.95	8.47	8.12	950.1	2.86	3.79	4.93	130.1	3.03	2.39	1.89
960.1	990.1	7.90	7.38	7.05	990.1	2.73	3.65	4.77	170.1	2.85	2.29	1.86
1000.1	1030.1	7.50	6.94	6.58	1030.1	2.73	3.68	4.80	210.1	2.87	2.31	1.87
1040.1	1070.1	6.30	5.85	5.52	1070.1	2.75	3.67	4.78	250.1	2.75	2.29	1.91
1080.1	1110.1	6.13	5.58	5.25	1110.1	2.82	3.79	4.93	290.1	2.65	2.23	1.92
1120.1	1150.1	5.33	4.75	4.46	1150.1	2.91	3.91	5.09	330.1	2.46	2.15	1.93
1160.1	1190.1	5.02	4.46	4.09	1190.1	2.96	3.98	5.14	370.1	2.28	1.99	1.85
1200.1	1230.1	4.44	4.00	3.65	1230.1	3.15	4.25	5.49	410.1	2.23	1.98	1.89
1240.1	1270.1	3.85	3.48	3.20	1270.1	3.21	4.29	5.51	450.1	2.14	1.97	1.96
1280.1	1310.1	3.63	3.24	2.95	1310.1	3.42	4.56	5.85	490.1	2.06	1.97	2.05
1320.1	1350.1	3.13	2.78	2.49	1350.1	3.58	4.72	5.99	530.1	1.95	1.94	2.11
1360.1	1390.1	2.99	2.62	2.31	1390.1	3.71	4.86	6.13	570.1	1.87	1.85	2.07
1400.1	1430.1	2.48	2.19	1.99	1430.1	4.00	5.20	6.49	610.1	1.85	1.86	2.09
1440.1	1470.1	2.24	1.94	1.74	1470.1	4.08	5.25	6.51	650.1	1.80	1.84	2.13
1480.1	1510.1	1.94	1.68	1.59	1510.1	4.38	5.58	6.83	690.1	1.78	1.86	2.19
1520.1	1550.1	1.74	1.48	1.37	1550.1	4.48	5.58	6.71	730.1	1.71	1.83	2.26
1560.1	1590.1	1.61	1.31	1.36	1590.1	4.72	5.74	6.89	790.1	1.71	1.82	2.27
1600.1	1630.1	1.44	1.07	1.42	1630.1	4.89	5.79	6.68	830.1	1.69	1.82	2.36
1650.1	1680.1	1.37	1.11	1.48	1680.1	5.19	5.77	6.68	890.1	1.72	1.82	2.36
1690.1	1720.1	1.40	1.29	1.66	1720.1	5.42	5.74	6.51	930.1	1.72	1.82	2.42
1740.1	1770.1	1.57	1.39	1.67	1770.1	5.87	5.87	6.61	990.1	1.78	1.81	2.45
1780.1	1810.1	1.70	1.64	1.85	1810.1	6.07	5.85	6.53	1030.1	1.80	1.81	2.50
1830.1	1860.1	1.83	1.78	1.91	1860.1	6.37	5.97	6.32	1090.1	1.82	1.81	2.51
1870.1	1900.1	2.03	2.03	2.13	1900.1	6.53	6.15	6.44	1130.1	1.85	1.81	2.54
1920.1	1950.1	2.18	2.21	2.25	1950.1	7.20	6.30	6.17	1190.1	1.92	1.83	2.60
1960.1	1990.1	2.36	2.43	2.53	1990.1	7.47	6.53	6.30	1230.1	1.98	1.84	2.63
2010.1	2040.1	2.45	2.48	2.57	2040.1	7.60	6.39	5.97	1290.1	2.04	1.87	2.68
2050.1	2080.1	2.72	2.73	2.85	2080.1	7.76	6.58	6.11	1330.1	2.10	1.89	2.72
2100.1	2130.1	2.94	2.85	2.93	2130.1	7.56	6.35	5.72	1390.1	2.19	1.94	2.82
2140.1	2170.1	3.14	3.04	3.14	2170.1	7.53	6.56	5.95	1430.1	2.29	1.97	2.82
2190.1	2220.1	3.38	3.21	3.23	2220.1	7.22	6.13	5.51	1490.1	2.34	2.03	2.88
2230.1	2260.1	3.40	3.26	3.29	2260.1	7.20	6.21	5.66	1530.1	2.42	2.08	2.92
2280.1	2310.1	3.71	3.53	3.52	2310.1	6.86	5.75	5.20	1590.1	2.47	2.14	3.01
2320.1	2350.1	3.65	3.52	3.51	2350.1	6.76	5.70	5.00	1630.1	2.52	2.21	3.07
2370.1	2400.1	3.91	3.77	3.76	2400.1	6.17	5.17	4.86	1690.1	2.48	2.24	3.02
2410.1	2440.1	3.68	3.52	3.55	2440.1	5.83	5.03	4.70	1730.1	2.54	2.31	3.09
2460.1	2490.1	3.95	3.71	3.66	2490.1	5.41	5.09	4.48	1790.1	2.48	2.33	3.09

Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	+14	5	1	55	15	33	15	38	34	39
1	-	11	+0	22	22	39	49	48	39	56	49	61
2	86	53	26	35	27	46	46	65	49	53	39	61
3	>90	61	57	47	44	49	59	65	68	>69	61	66
4	>90	>69	>69	>69	57	62	59	>69	>69	>69	>69	>69
5	>90	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69
6	>90	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69
7	>90	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69
8	>90	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69
9	>90	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69
10	>90	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

Test conditions: RF IN: 1525 MHz; -15.00 dBm.
 LO IN: 1535 MHz; +10.00 dBm
 IF OUT: 10 MHz; -21.46 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	+6	16	11	55	26	50	31	50	46	54
1	-	10	+0	20	25	40	52	52	38	53	49	63
2	65	50	17	25	18	45	43	64	45	60	40	70
3	>90	50	42	37	33	41	41	58	59	61	55	61
4	>90	75	55	65	36	41	39	52	62	74	64	60
5	>90	75	>78	64	56	49	44	52	55	65	74	68
6	>90	67	71	>78	68	66	52	50	61	68	70	>78
7	>90	70	71	>78	>78	71	69	56	55	56	>78	72
8	>90	>78	74	>78	>78	>78	>78	72	63	57	68	76
9	>90	>78	>78	>78	>78	>78	>78	>78	>78	62	67	62
10	>90	>78	>78	>78	>78	>78	>78	>78	>78	>78	74	63
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions: RF IN: 1525 MHz; -5.00 dBm.
 LO IN: 1535 MHz; +10.00 dBm
 IF OUT: 10 MHz; -11.75 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.