



Appendix for test report

1Appendix_A: Effective (Isotropic) Radiated Power Output Data

Part I - Test Results

Test Band	Test Mode	Test Channel	Conducted Power [dBm]	ERP [dBm]	Limit [dBm]	Verdict
GSM850	GSM/TM1	LCH	32.12	25.97	38.5	PASS
		MCH	32.11	25.96	38.5	PASS
		HCH	32.3	26.15	38.5	PASS
	GSM/TM2	LCH	26.55	20.4	38.5	PASS
		MCH	26.54	20.39	38.5	PASS
		HCH	26.53	20.38	38.5	PASS

Test Band	Test Mode	Test Channel	Conducted Power [dBm]	EIRP [dBm]	Limit [dBm]	Verdict
GSM1900	GSM/TM1	LCH	29.68	26.18	33	PASS
		MCH	29.55	26.05	33	PASS
		HCH	29.71	26.21	33	PASS
	GSM/TM2	LCH	25.52	22.02	33	PASS
		MCH	25.58	22.08	33	PASS



Test Band	Test Mode	Test Channel	Conducted Power [dBm]	EIRP [dBm]	Limit [dBm]	Verdict
		HCH	25.54	22.04	33	PASS

Note1:

a, For getting the ERP (Efficient Radiated Power) or EIRP (Efficient Isotropic Radiated Power) in substitution method, the following formula should be taken to calculate it,

$$\text{ERP [dBm]} = \text{SGP [dBm]} - \text{Cable Loss [dB]} + \text{Gain [dBd]}$$

$$\text{EIRP [dBm]} = \text{SGP [dBm]} - \text{Cable Loss [dB]} + \text{Gain [dBi]}$$

b, SGP=Signal Generator Level

Note2: RBW > emission bandwidth, VBW > 3 x RBW.

Detector: RMS

2Appendix_B: Peak-to-Average Ratio

Part I - Test Results

Test Band	Test Mode	Test Channel	Measured[dB]	Limit [dB]	Verdict
GSM1900	GSM/TM1	LCH	0.21	13	PASS
		MCH	0.2	13	PASS
		HCH	0.2	13	PASS
	GSM/TM2	LCH	3.17	13	PASS
		MCH	3.14	13	PASS
		HCH	3.18	13	PASS

3Appendix_C: Modulation Characteristics

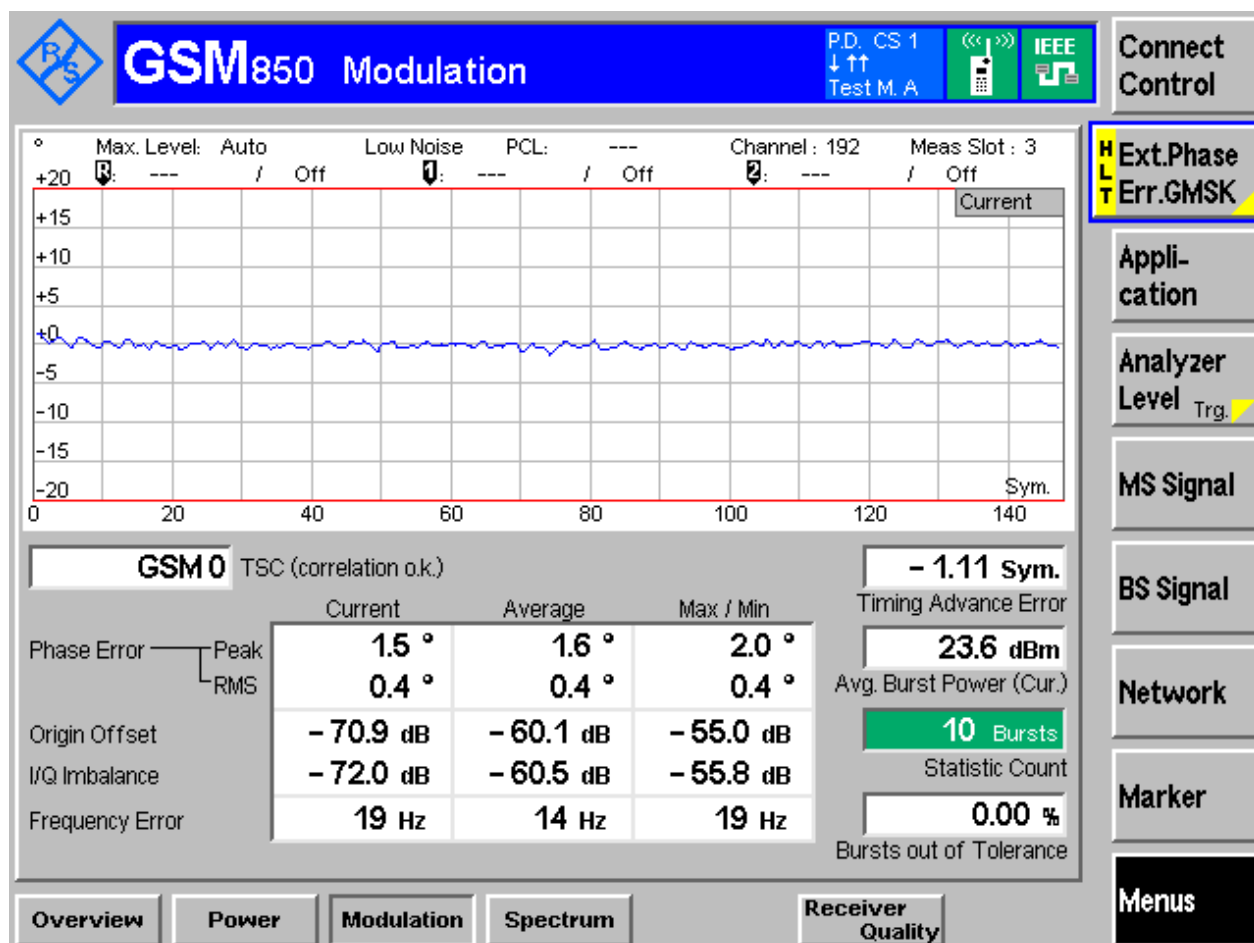
Part I - Test Plots

3.1 For GSM

3.1.1 Test Band = GSM850

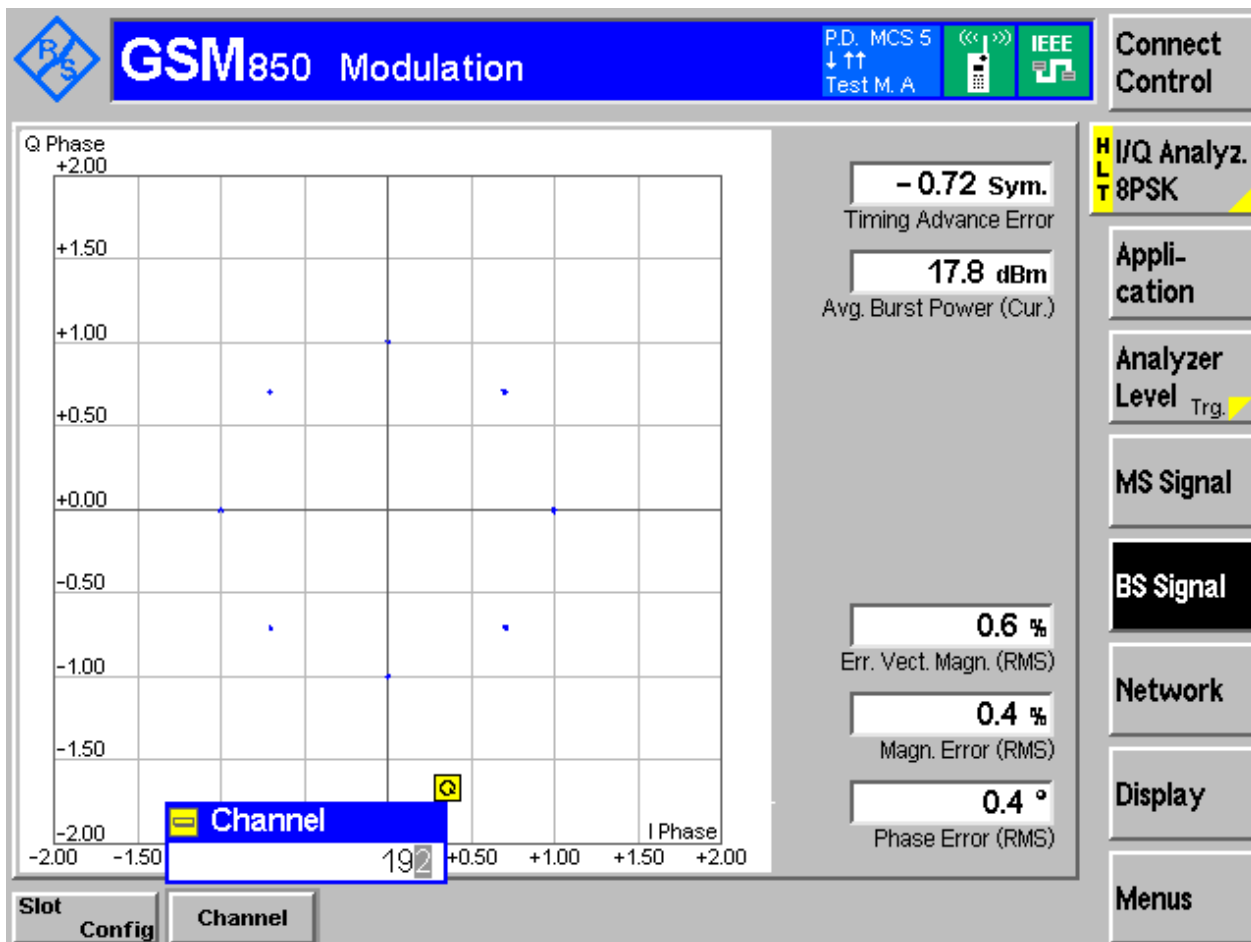
3.1.1.1 Test Mode = GSM/TM1

3.1.1.1.1 Test Channel = MCH



3.1.1.2 Test Mode = GSM/TM2

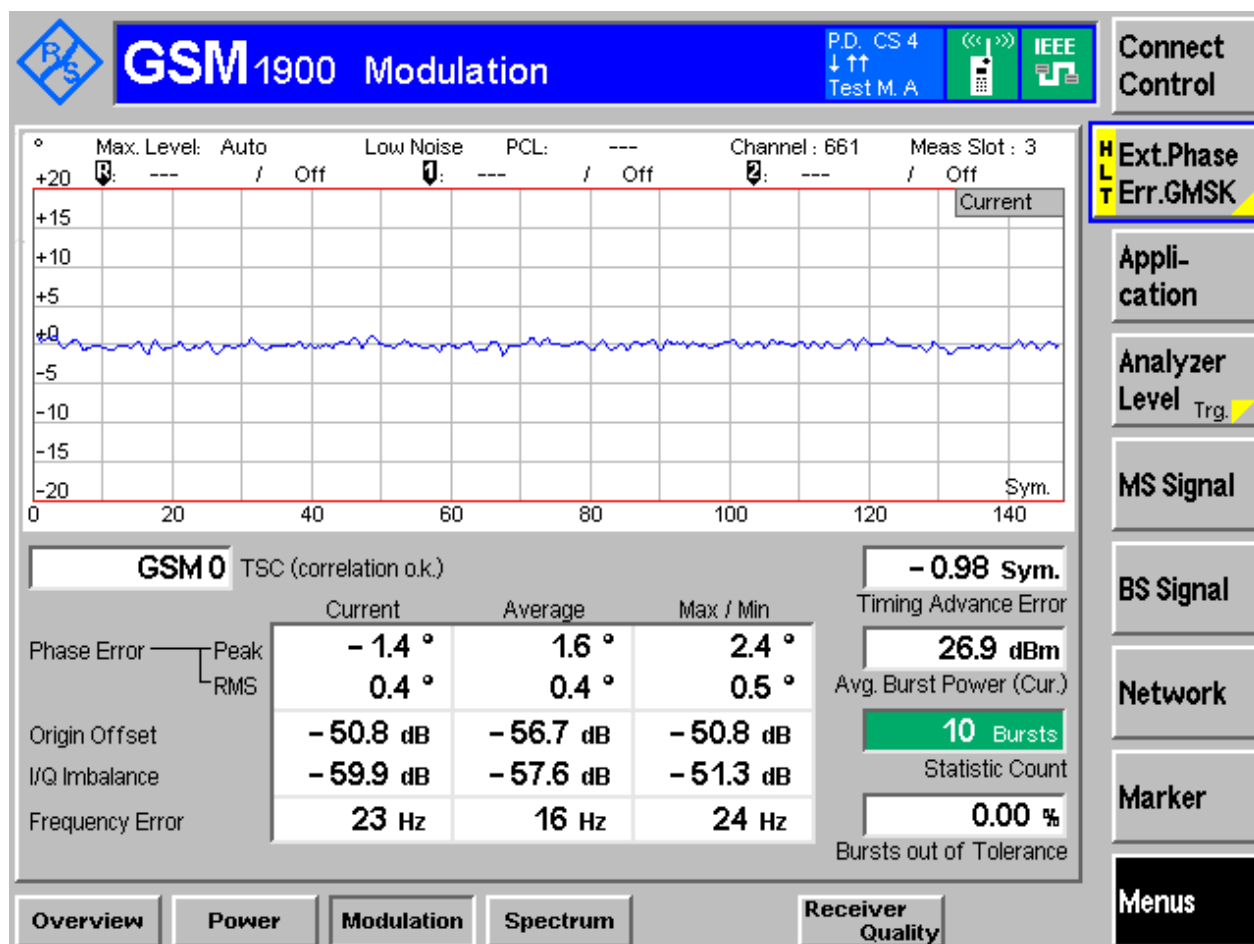
3.1.1.2.1 Test Channel = MCH



3.1.2 Test Band = GSM1900

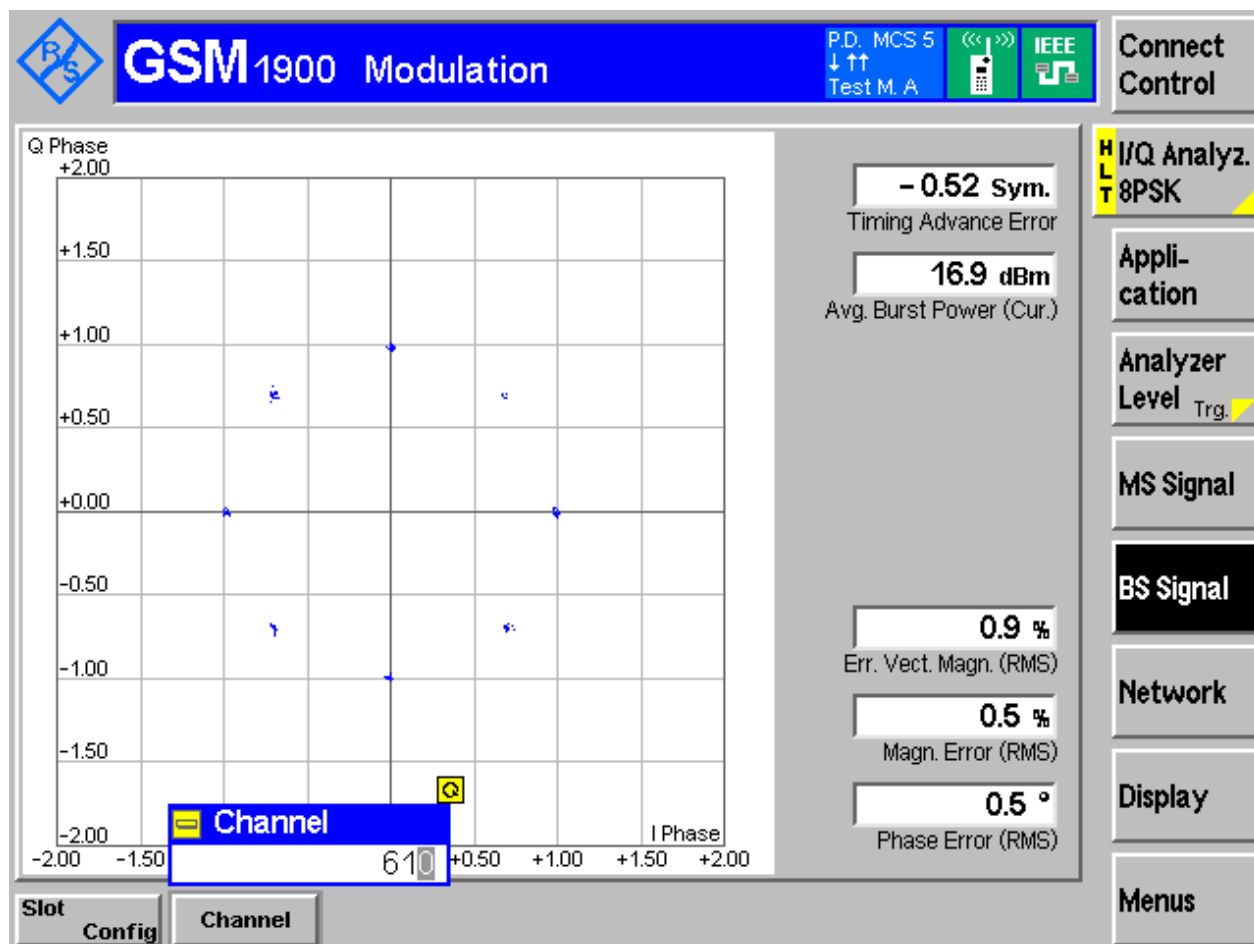
3.1.2.1 Test Mode = GSM/TM1

3.1.2.1.1 Test Channel = MCH



3.1.2.2 Test Mode = GSM/TM2

3.1.2.2.1 Test Channel = MCH



4Appendix_D: Bandwidth

Part I - Test Results

Test Band	Test Mode	Test Channel	Occupied Bandwidth [kHz]	Emission Bandwidth [kHz]	Verdict
GSM850	GSM/TM1	LCH	244.68	311.28	Pass
		MCH	243.90	312.47	Pass
		HCH	244.05	310.64	Pass
	GSM/TM2	LCH	244.00	321.58	Pass
		MCH	245.99	307.14	Pass
		HCH	234.07	299.23	Pass
GSM1900	GSM/TM1	LCH	244.59	320.60	Pass
		MCH	245.40	313.86	Pass
		HCH	247.42	312.99	Pass
	GSM/TM2	LCH	244.13	306.15	Pass
		MCH	242.32	305.61	Pass
		HCH	243.00	307.40	Pass

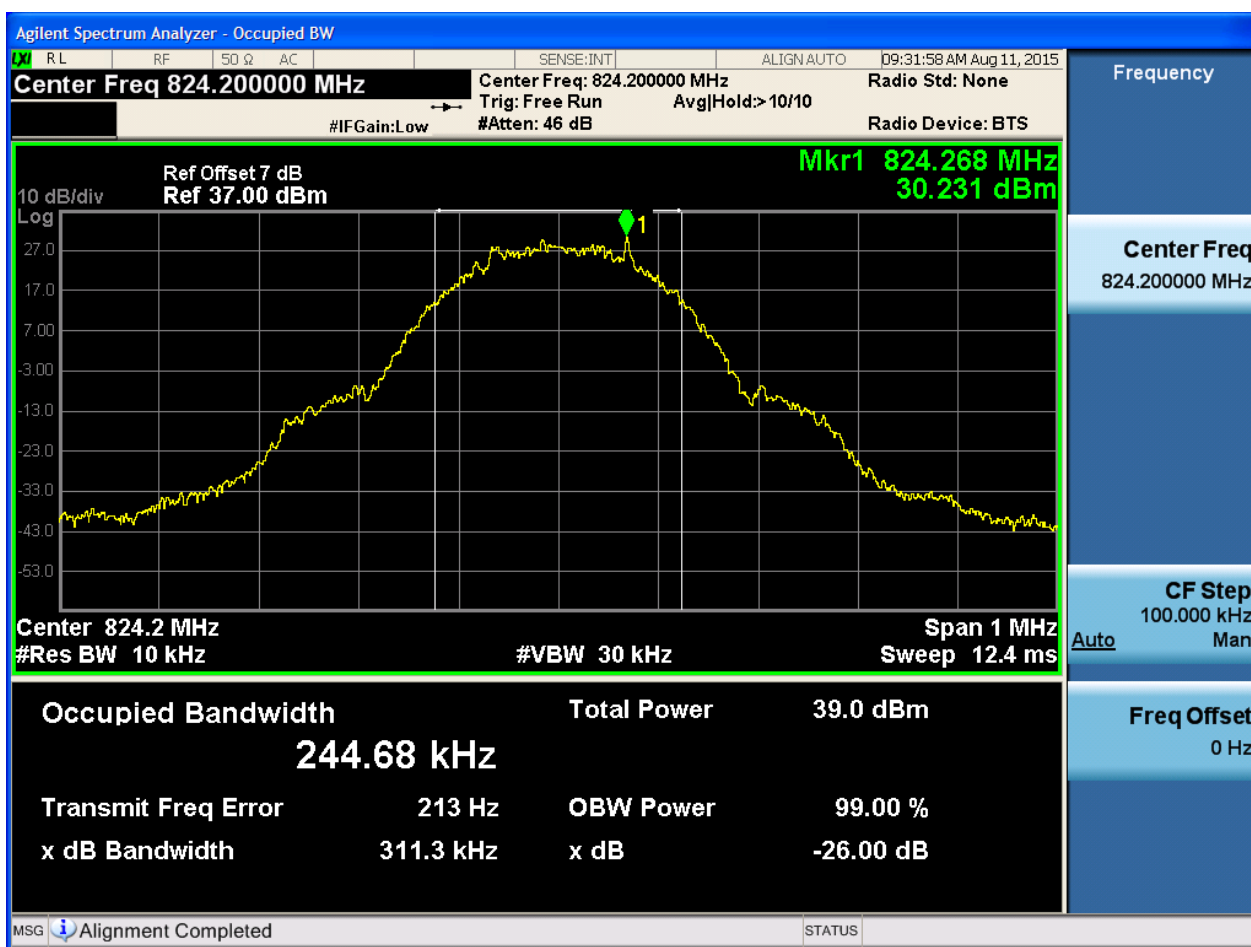
Part II - Test Plots

4.1 For GSM

4.1.1 Test Band = GSM850

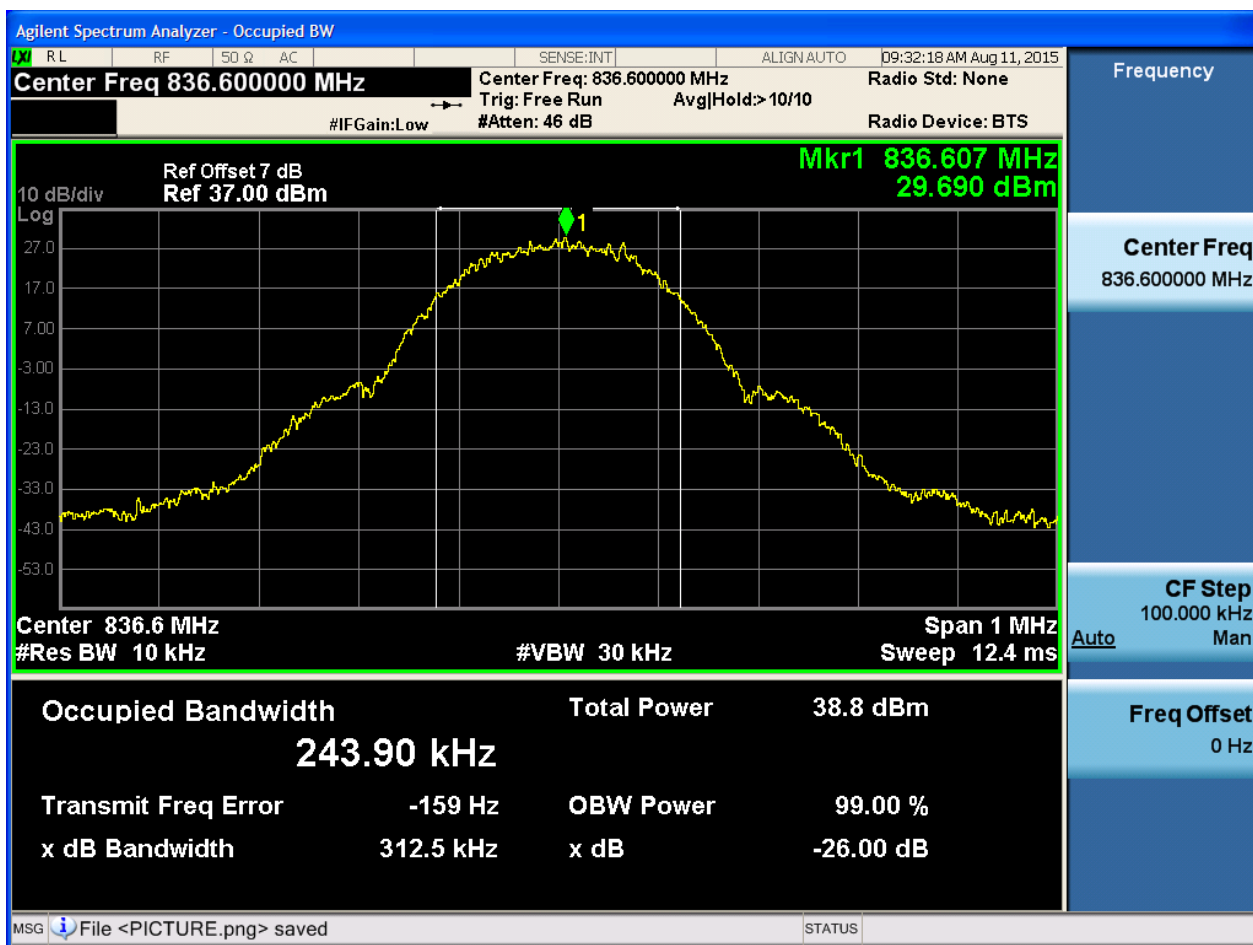
4.1.1.1 Test Mode = GSM/TM1

4.1.1.1.1 Test Channel = LCH



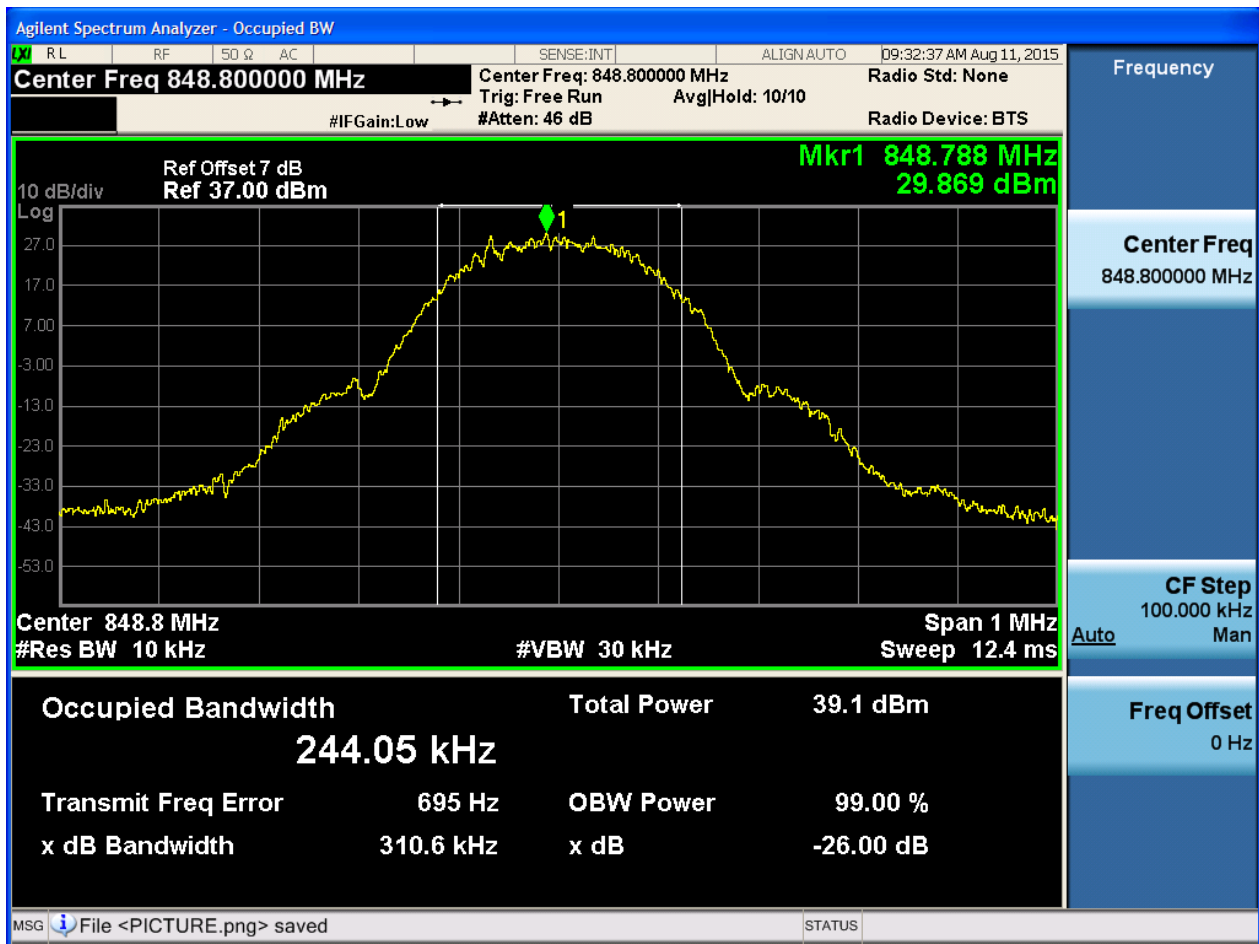


4.1.1.1.2 Test Channel = MCH



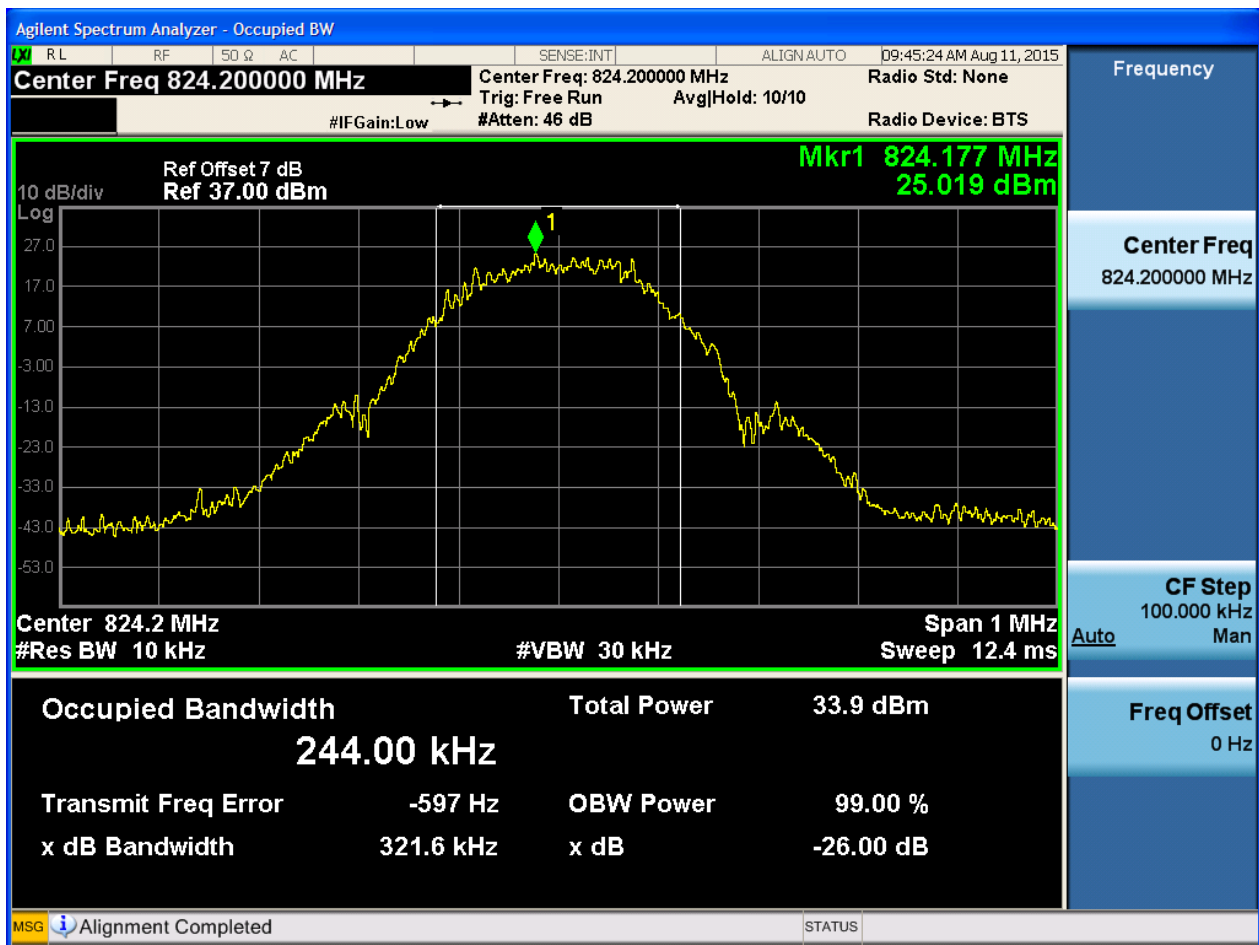


4.1.1.1.3 Test Channel = HCH



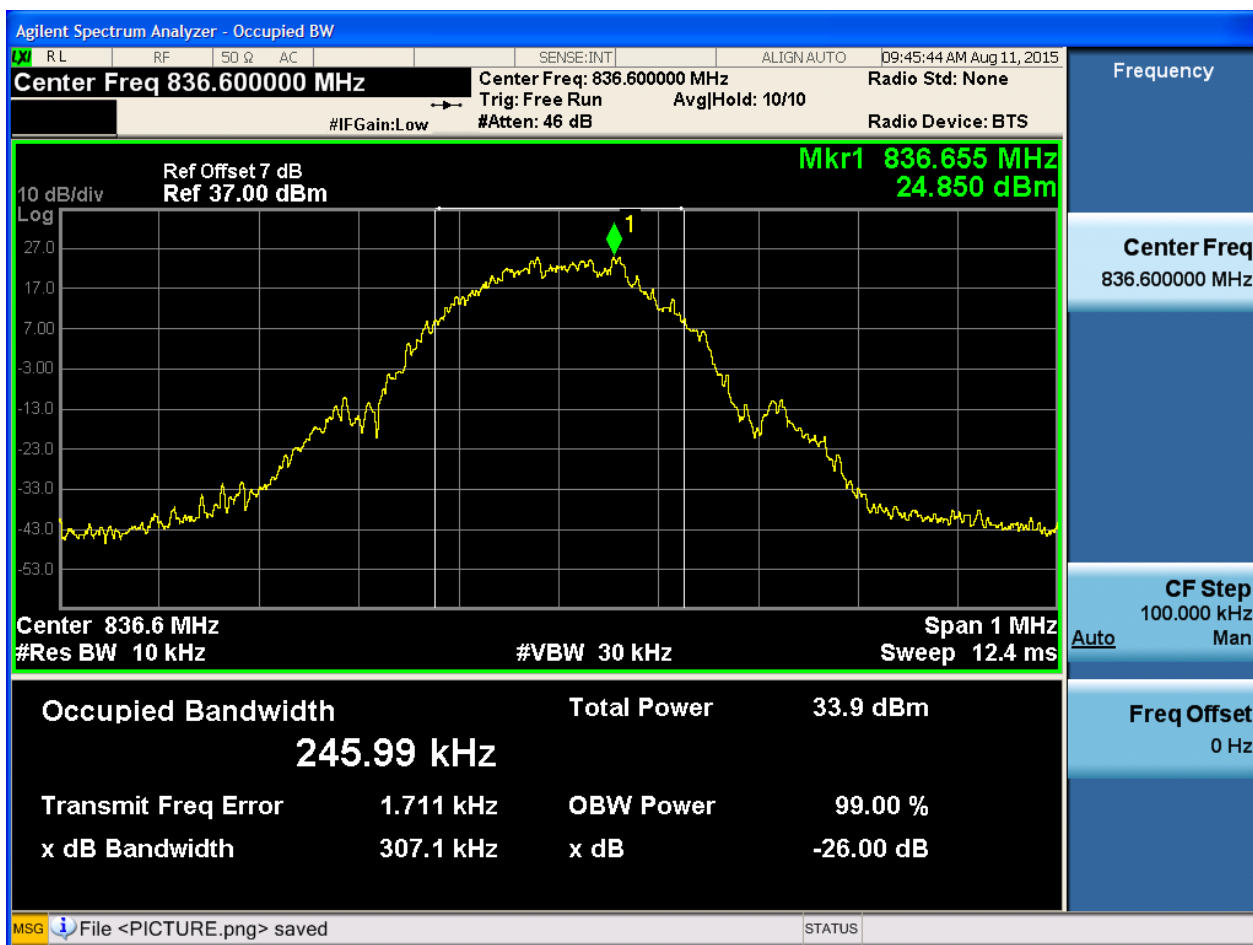
4.1.1.2 Test Mode = GSM/TM2

4.1.1.2.1 Test Channel = LCH



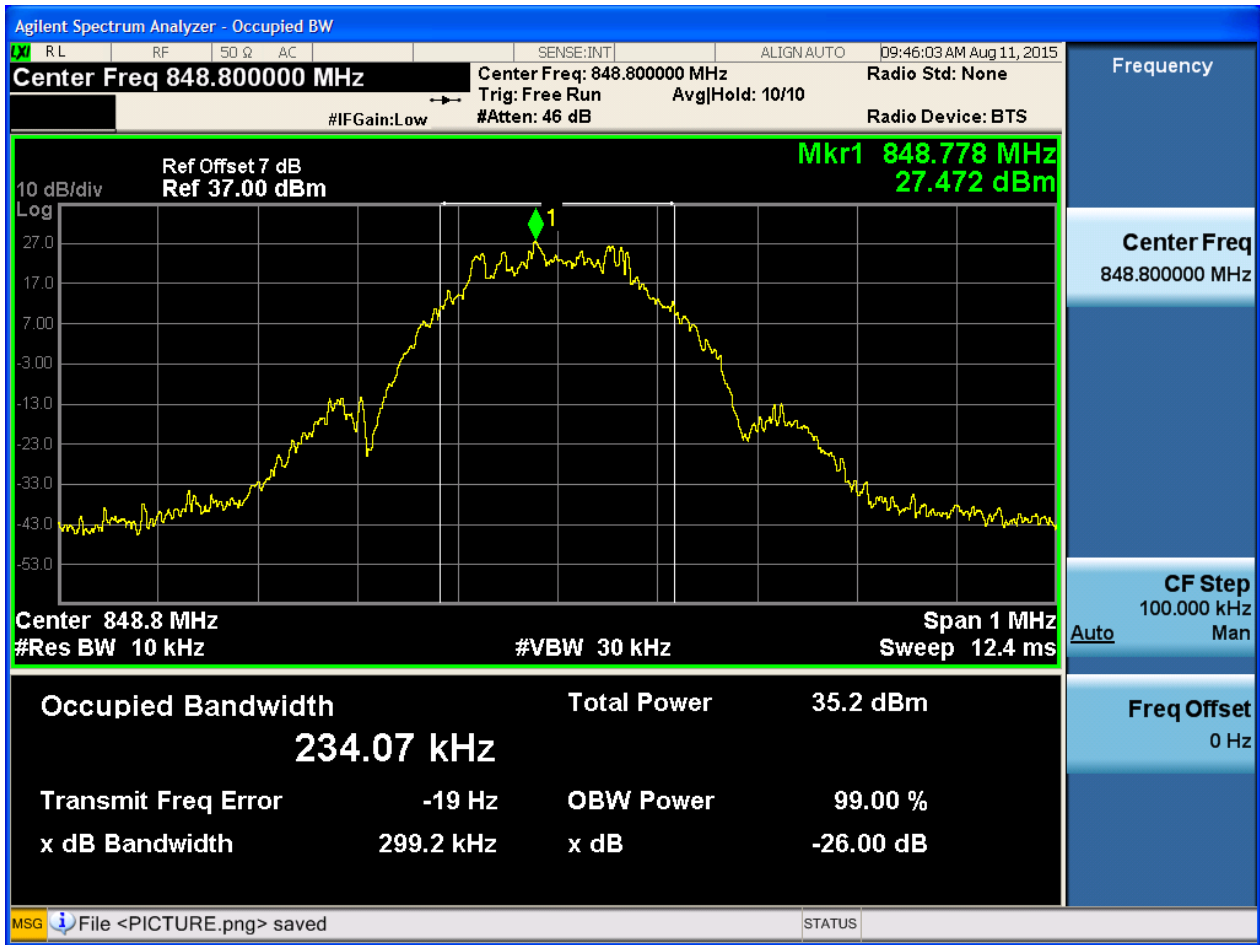


4.1.1.2.2 Test Channel = MCH





4.1.1.2.3 Test Channel = HCH

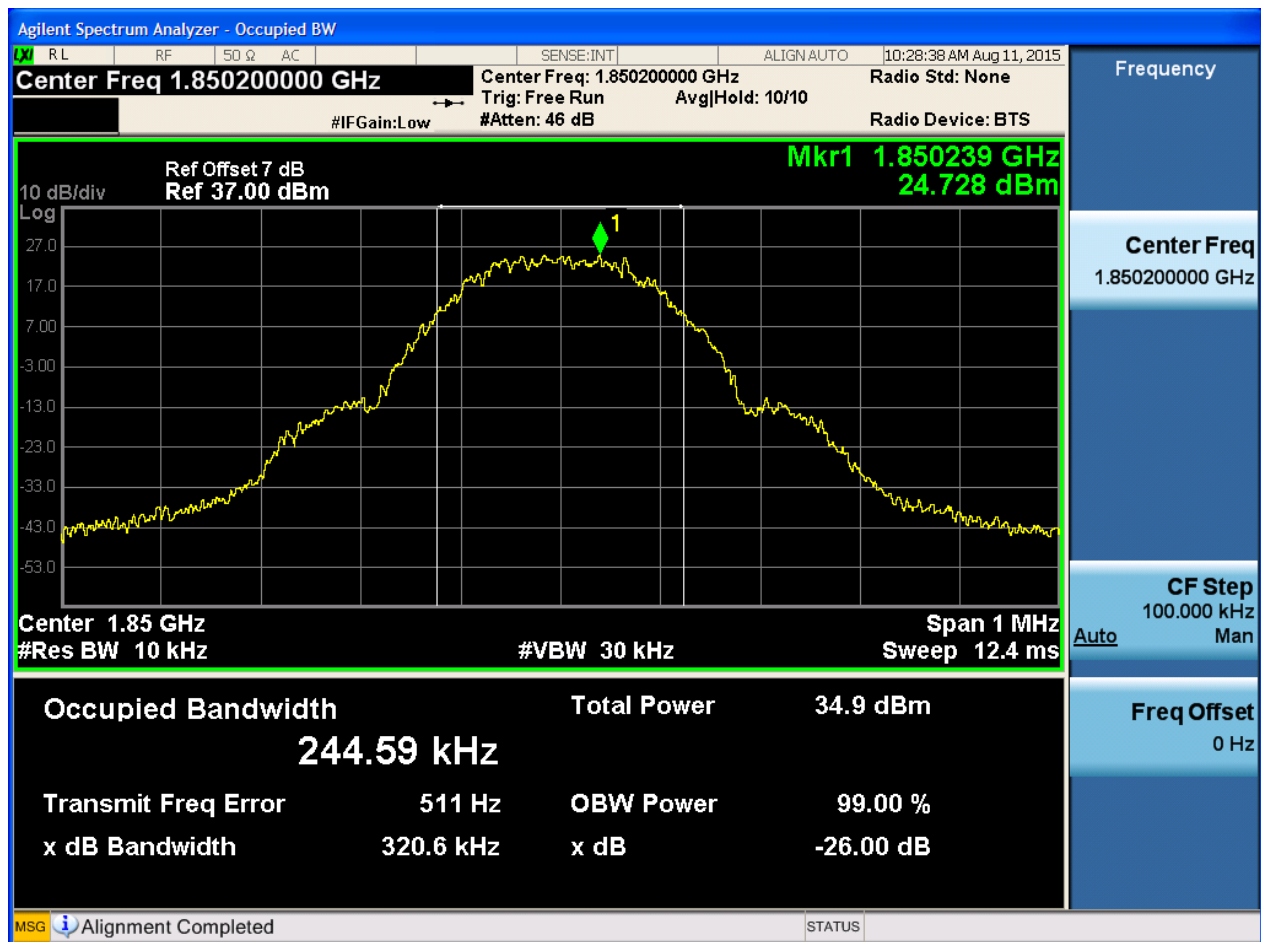




4.1.2 Test Band = GSM1900

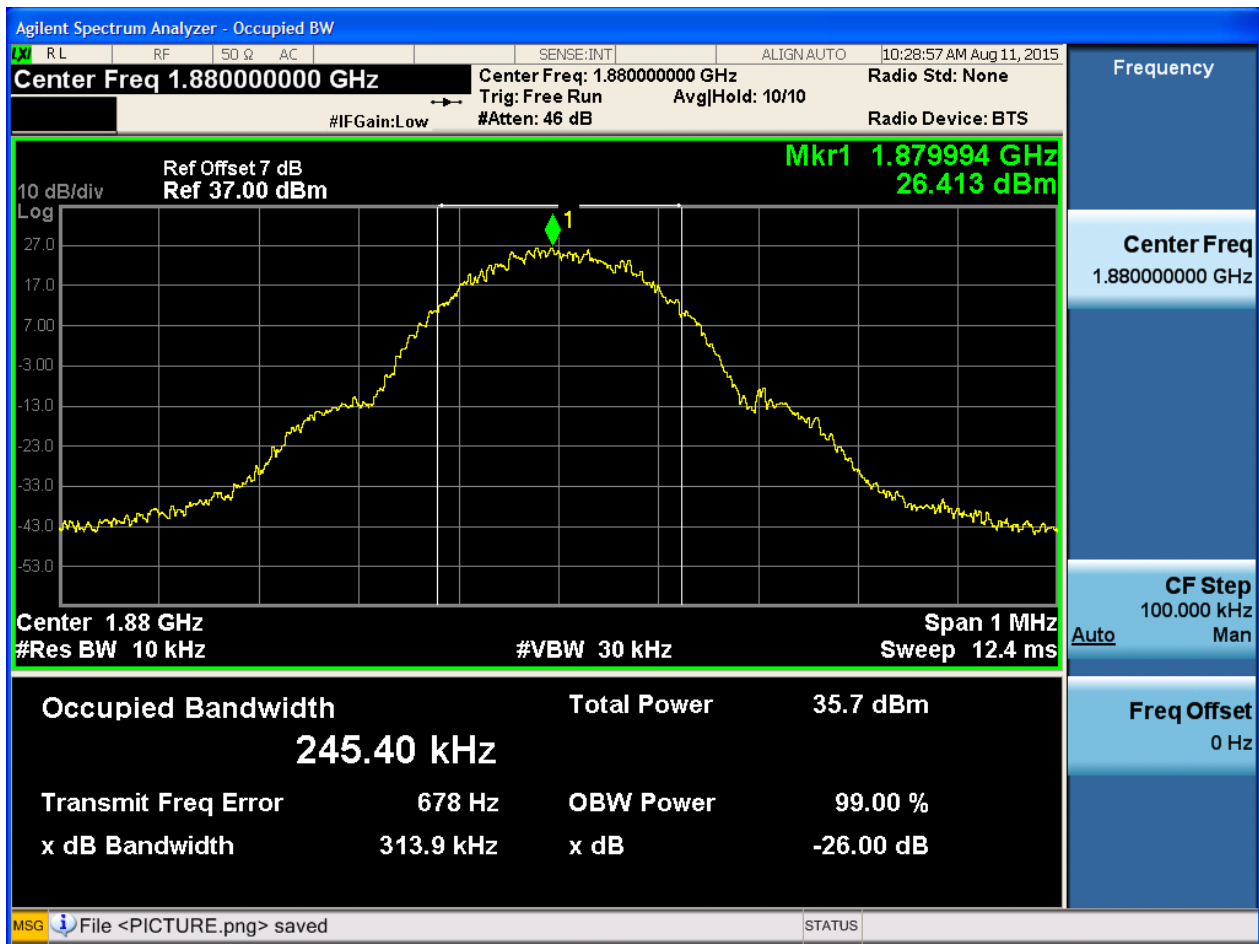
4.1.2.1 Test Mode = GSM/TM1

4.1.2.1.1 Test Channel = LCH





4.1.2.1.2 Test Channel = MCH





Agilent Spectrum Analyzer - Occupied BW

Center Freq 1.909800000 GHz

Center Freq: 1.909800000 GHz
Trig: Free Run
#Atten: 46 dB

Radio Std: None
Radio Device: BTS

#IFGain: Low

Frequency

Center Freq
1.909800000 GHz

CF Step
100.000 kHz
Man

Freq Offset
0 Hz

Ref Offset 7 dB
Ref 37.00 dBm

Mkr1 1.909794 GHz
26.203 dBm

10 dB/div
Log

Center 1.91 GHz
#Res BW 10 kHz

#VBW 30 kHz

Span 1 MHz
Sweep 12.4 ms

Occupied Bandwidth
247.42 kHz

Total Power
35.7 dBm

Transmit Freq Error
-529 Hz

OBW Power
99.00 %

x dB Bandwidth
313.0 kHz

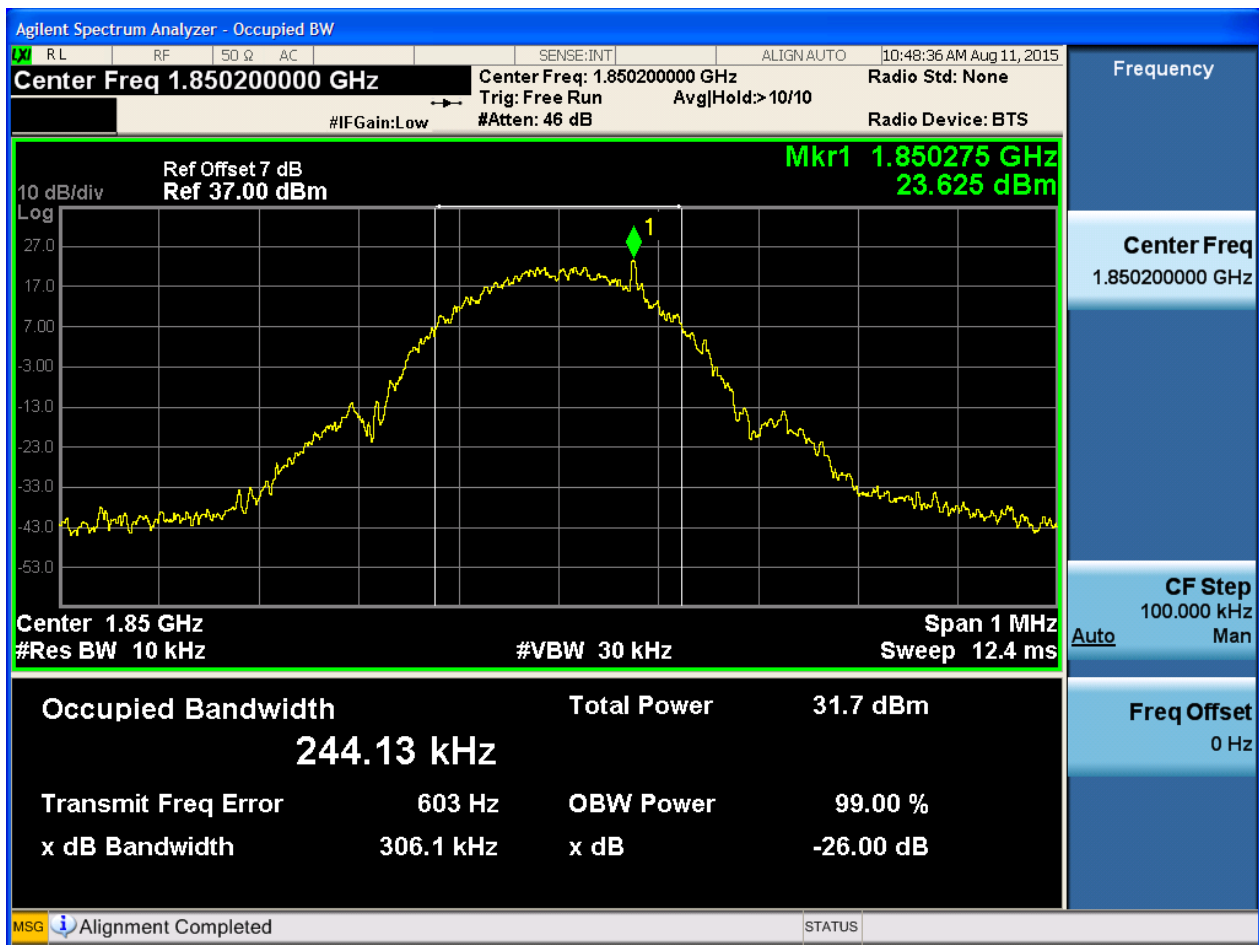
x dB
-26.00 dB

MSG File <PICTURE.png> saved

STATUS

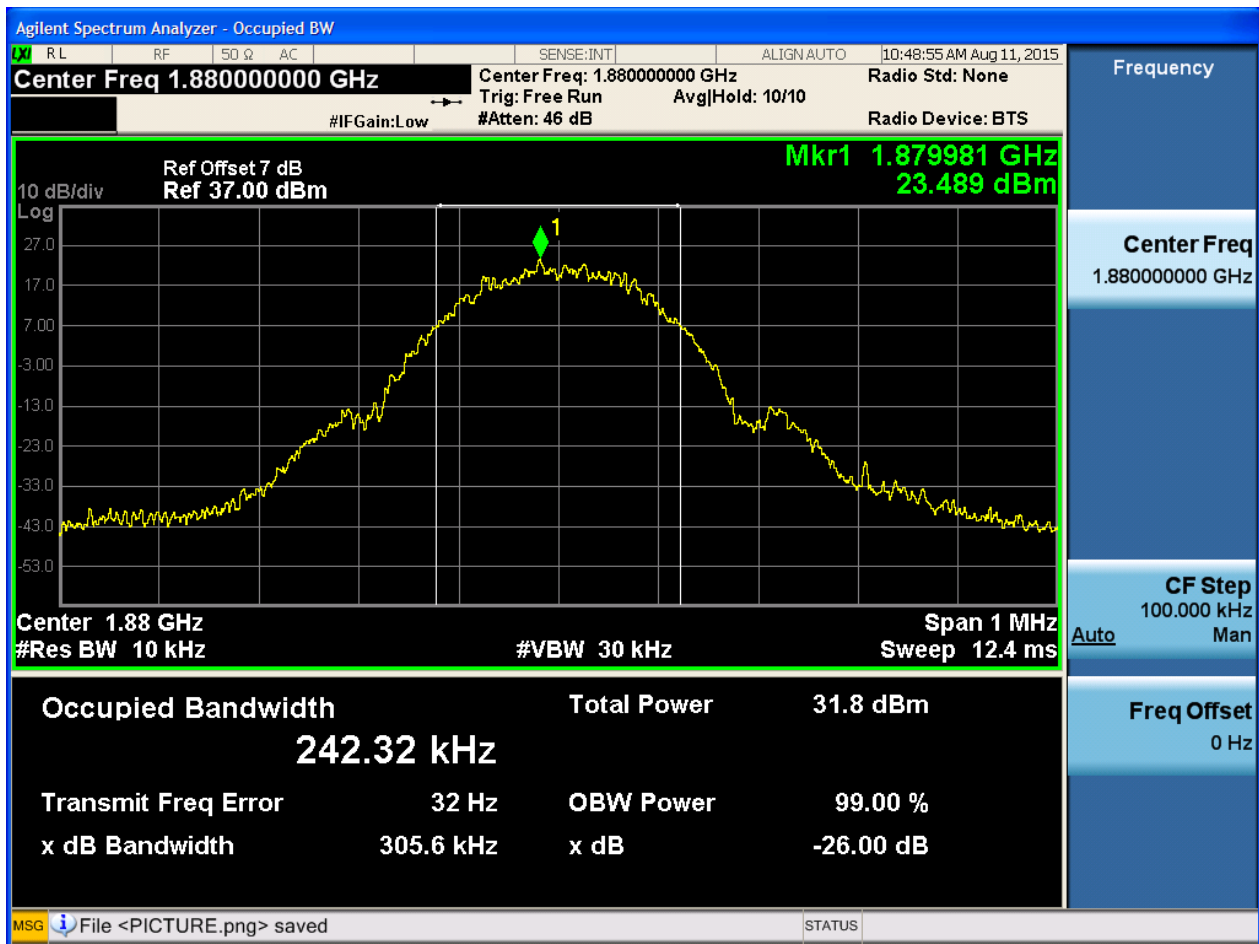
4.1.2.2 Test Mode = GSM/TM2

4.1.2.2.1 Test Channel = LCH



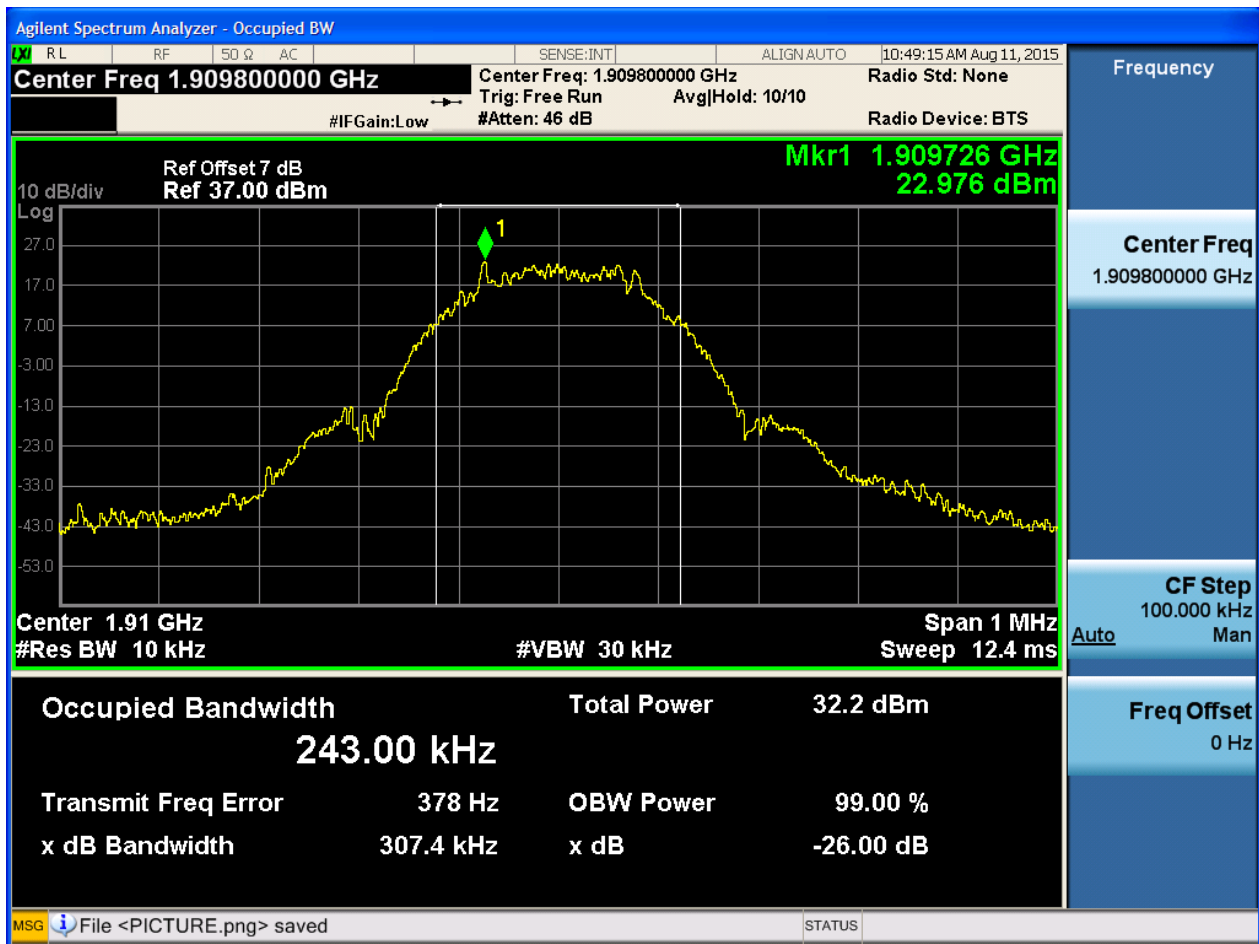


4.1.2.2.2 Test Channel = MCH





4.1.2.2.3 Test Channel = HCH





5Appendix_E: Band Edges Compliance

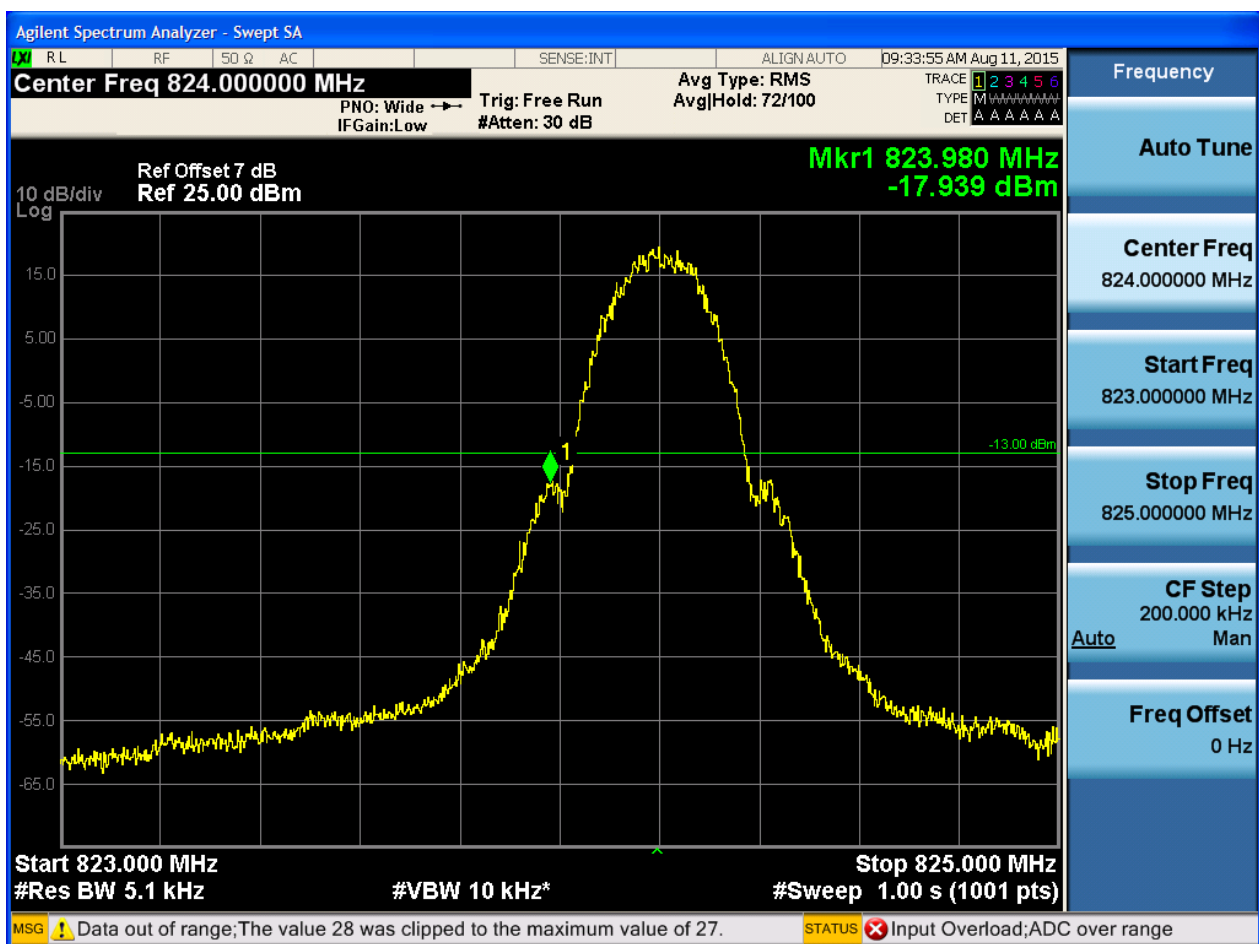
Part I - Test Plots

5.1 For GSM

5.1.1 Test Band = GSM850

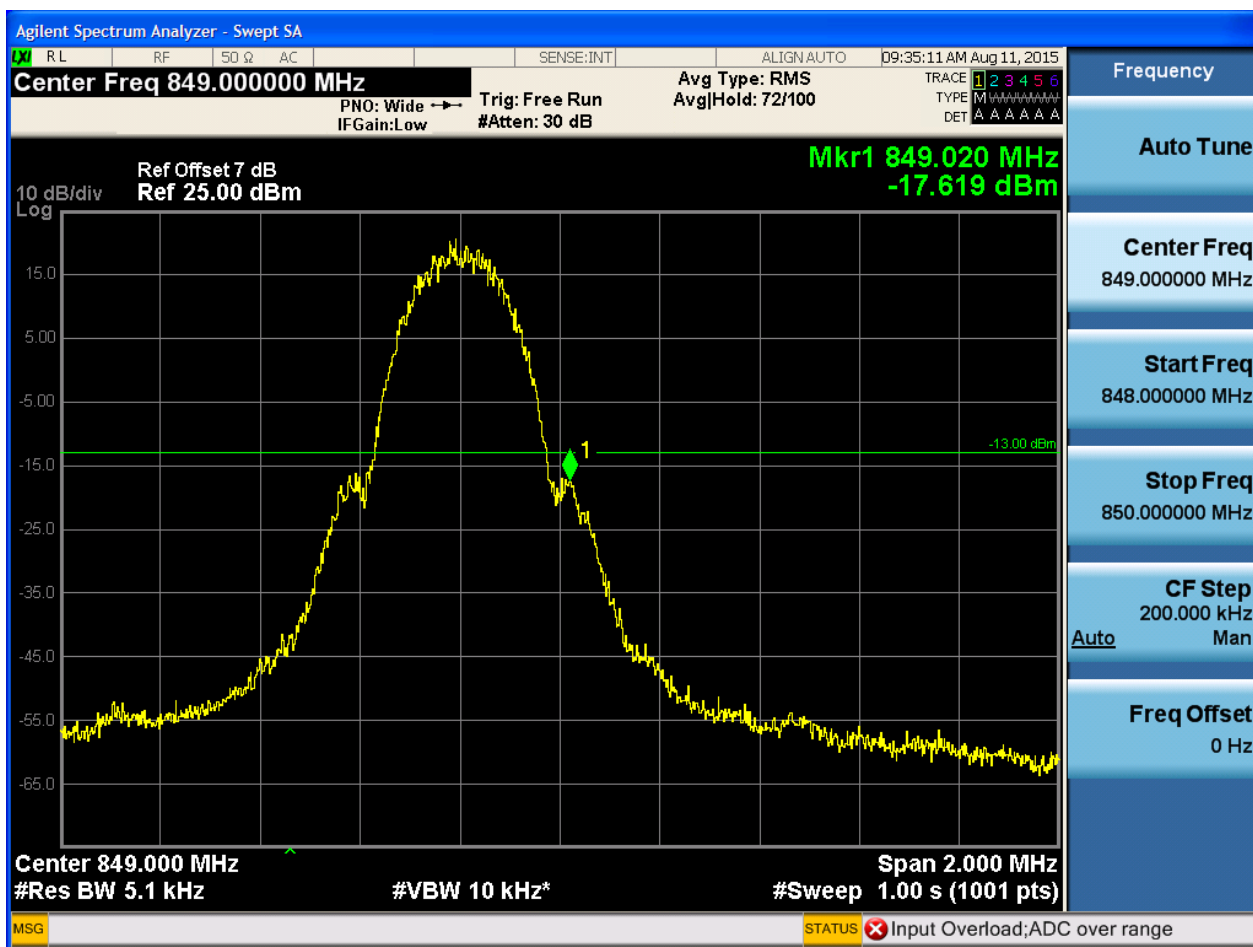
5.1.1.1 Test Mode = GSM/TM1

5.1.1.1.1 Test Channel = LCH



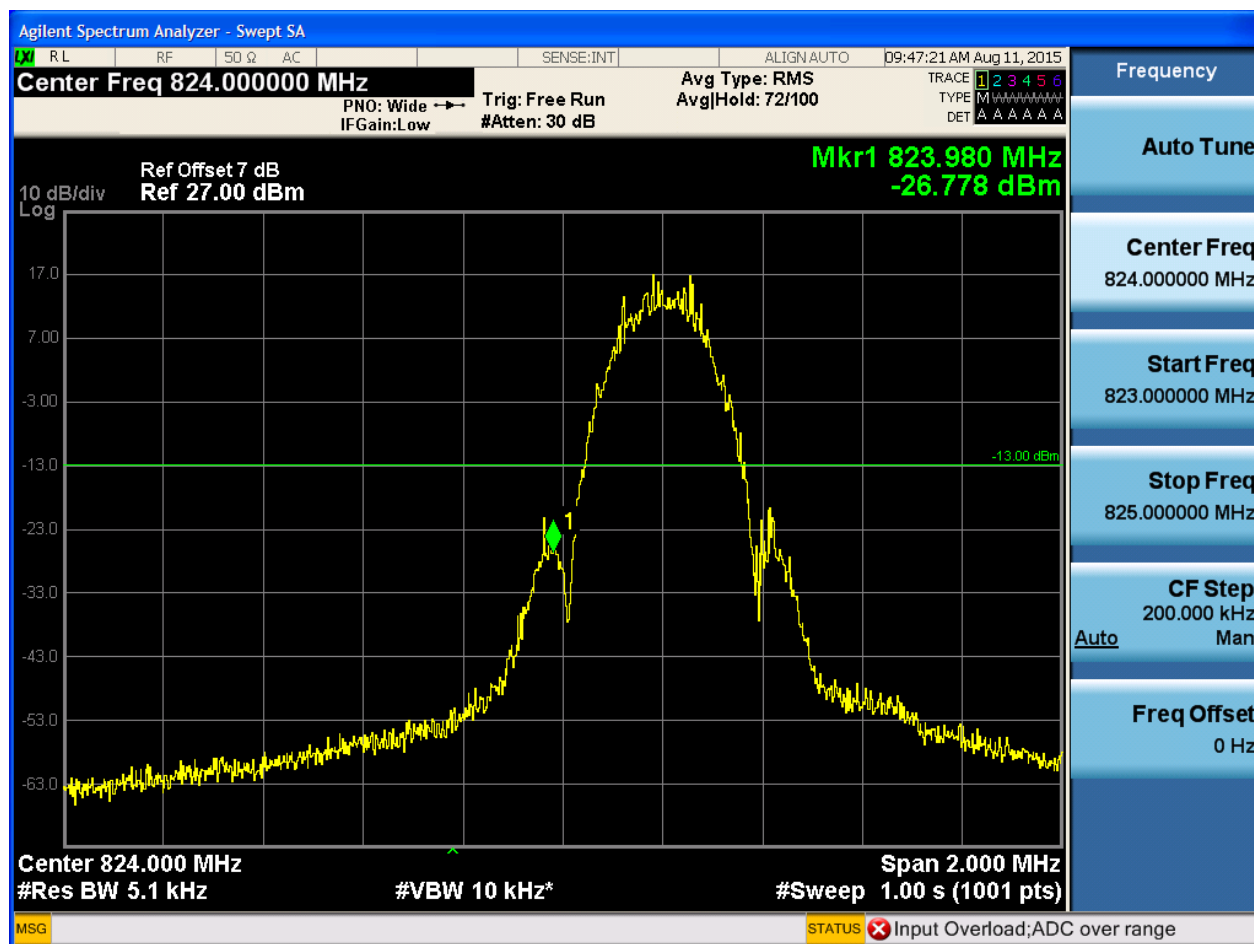


5.1.1.1.2 Test Channel = HCH

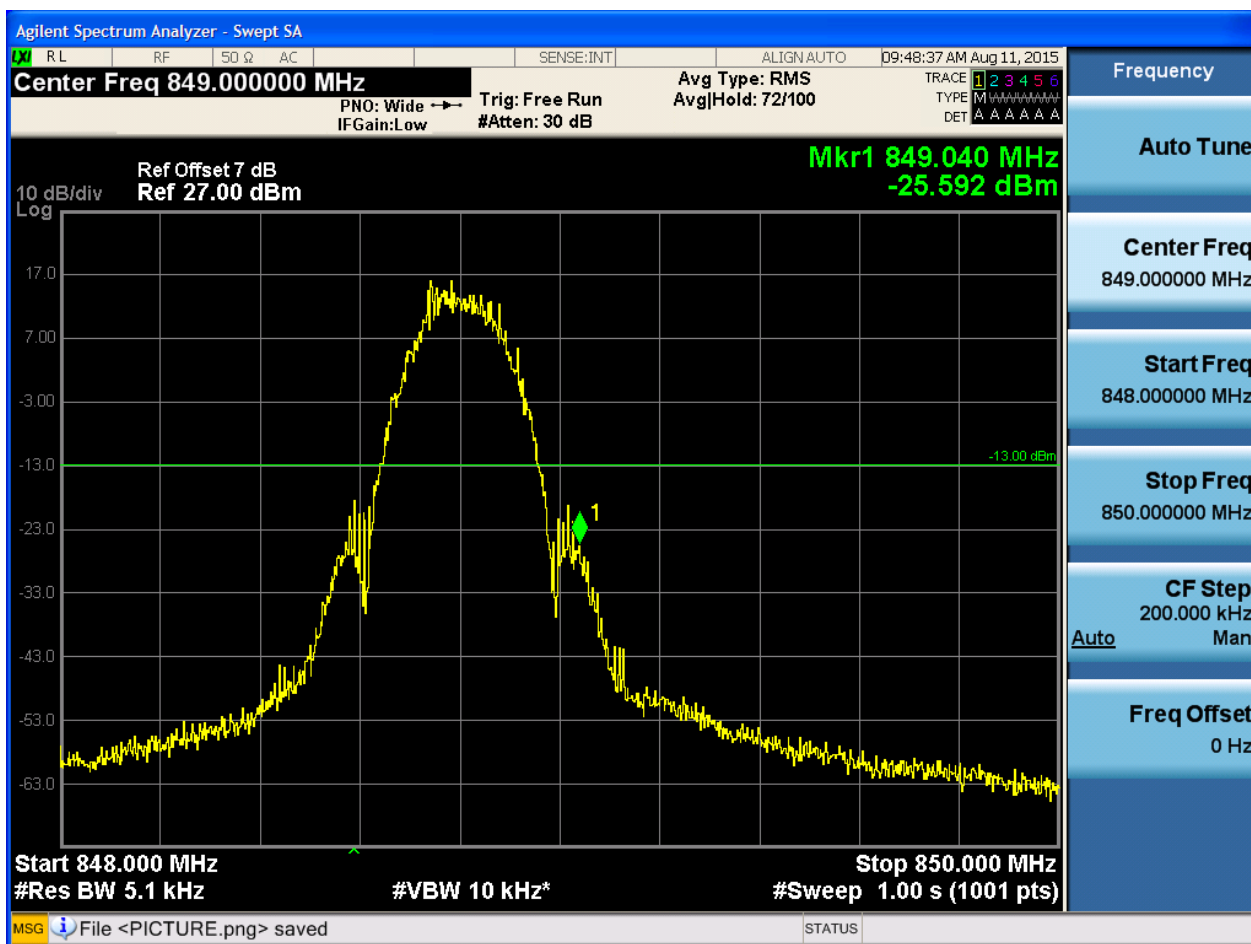


5.1.1.2 Test Mode = GSM/TM2

5.1.1.2.1 Test Channel = LCH



5.1.1.2.2 Test Channel = HCH

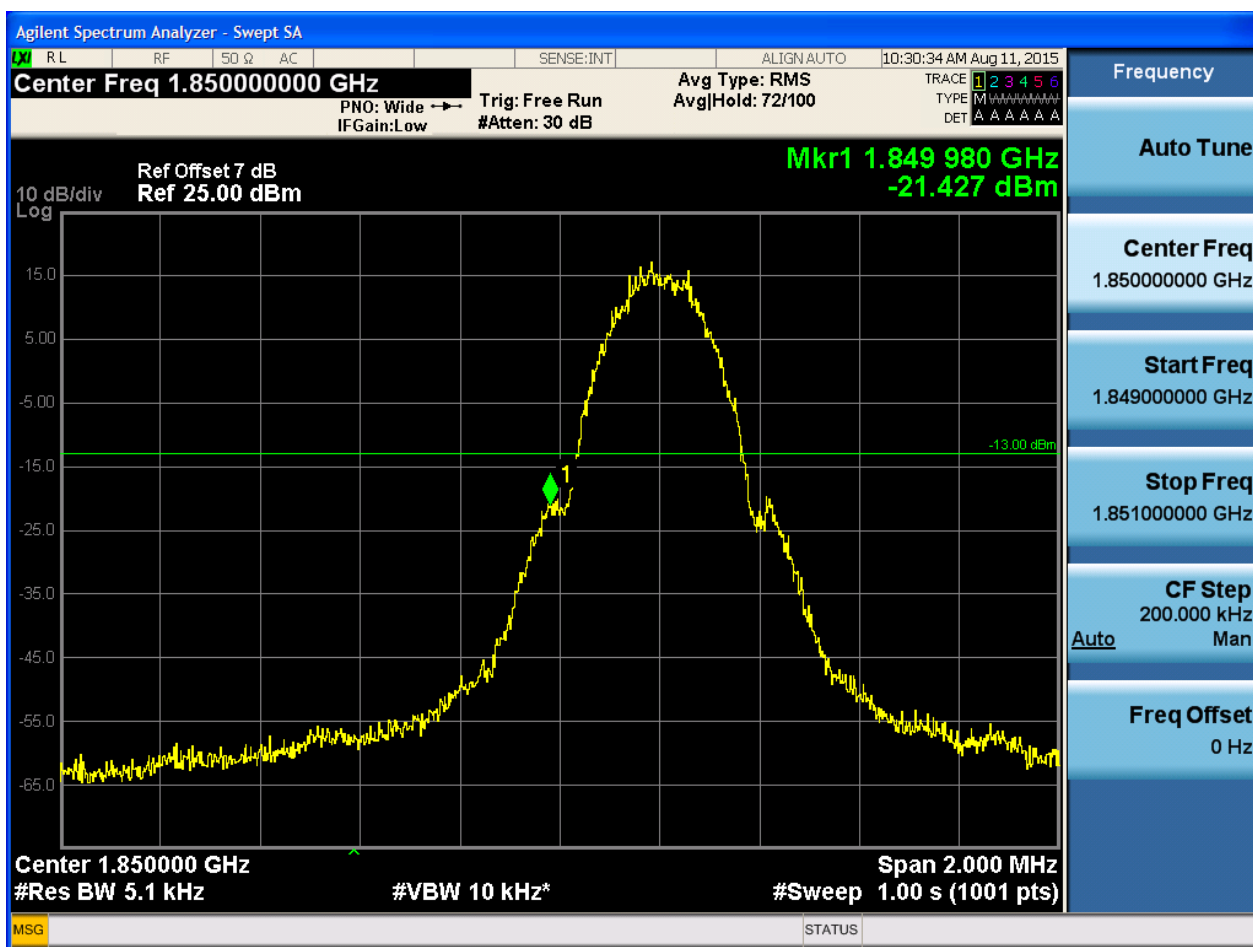




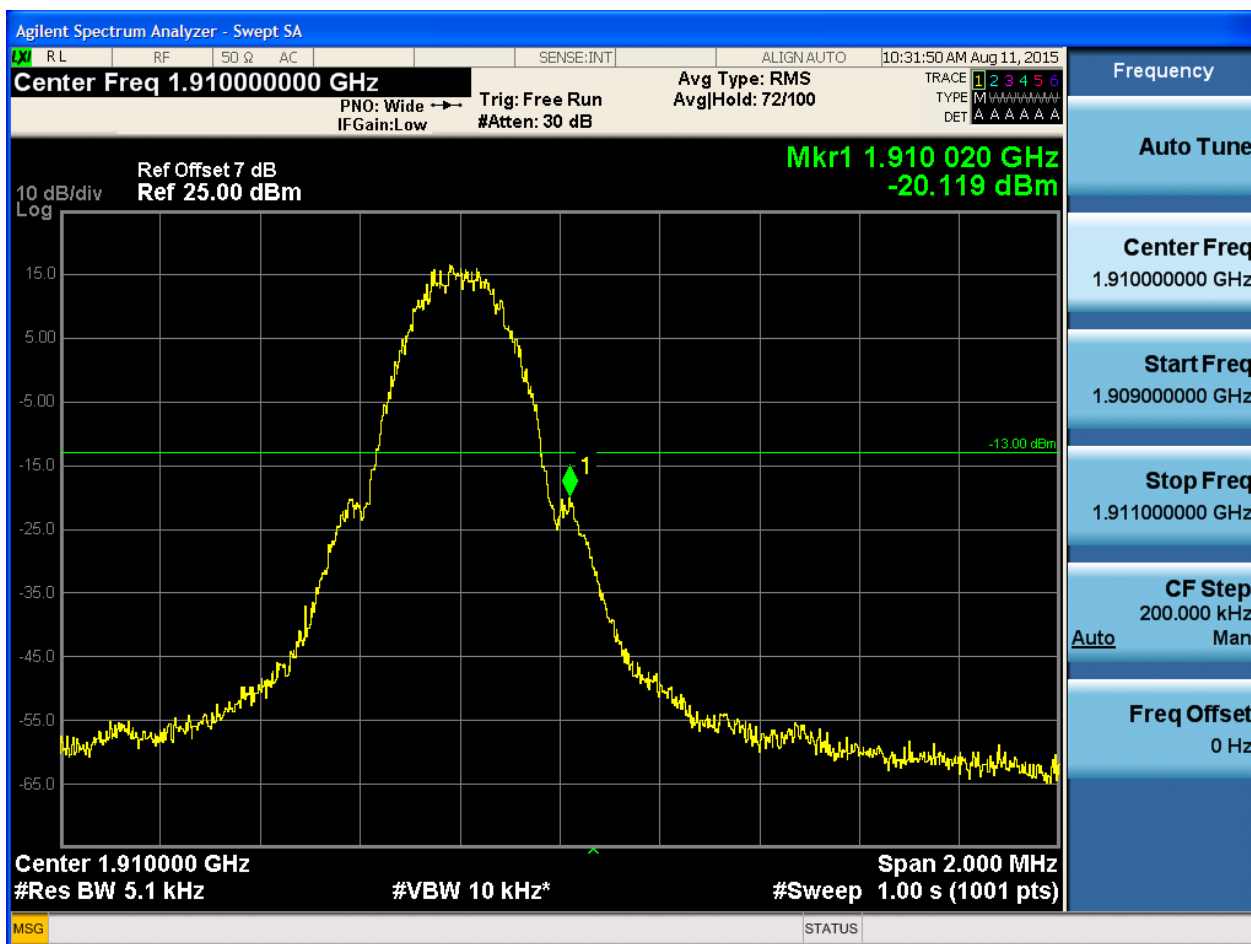
5.1.2 Test Band = GSM1900

5.1.2.1 Test Mode = GSM/TM1

5.1.2.1.1 Test Channel = LCH

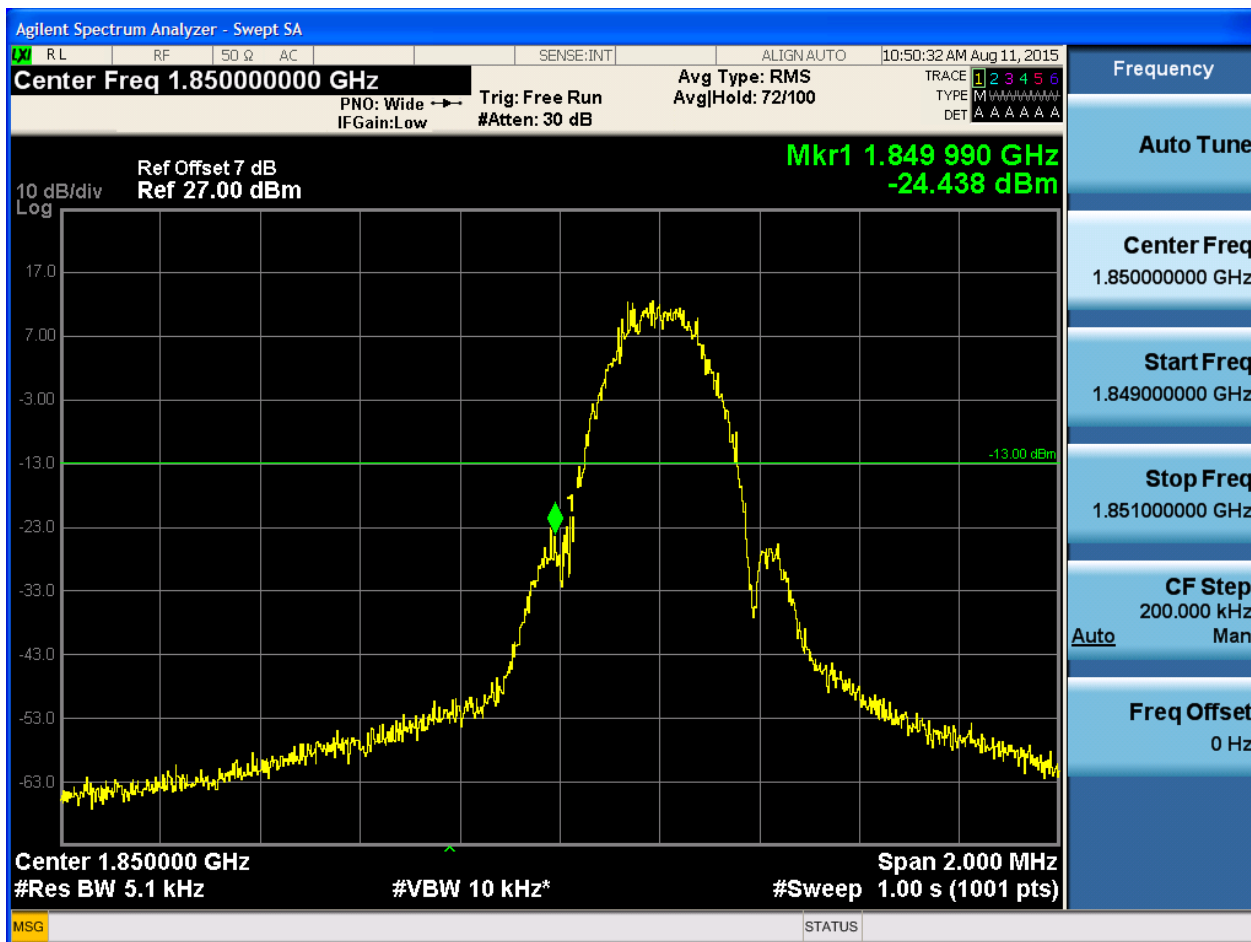


5.1.2.1.2 Test Channel = HCH

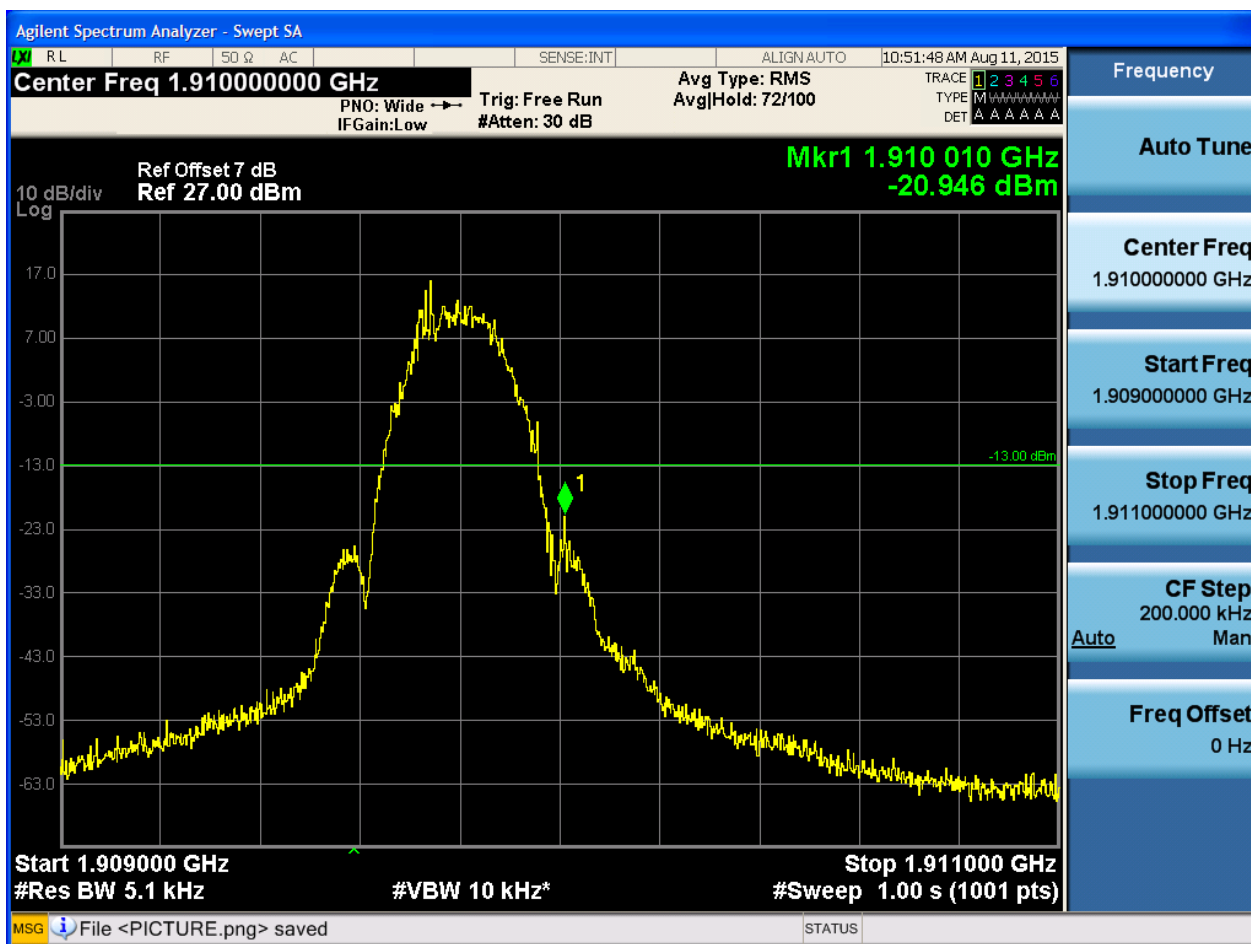


5.1.2.2 Test Mode = GSM/TM2

5.1.2.2.1 Test Channel = LCH



5.1.2.2.2 Test Channel = HCH



6Appendix_F: Spurious Emission at Antenna Terminal

NOTE: For the averaged unwanted emissions measurements, the measurement points in each sweep is greater than twice the Span/RBW in order to ensure bin-to-bin spacing of $< RBW/2$ so that narrowband signals are not lost between frequency bins. As to the present test item, the "Measurement Points = $k * (Span / RBW)$ " with k between 4 and 5, which results in an acceptable level error of less than 0.5 dB.

Part I - Test Plots

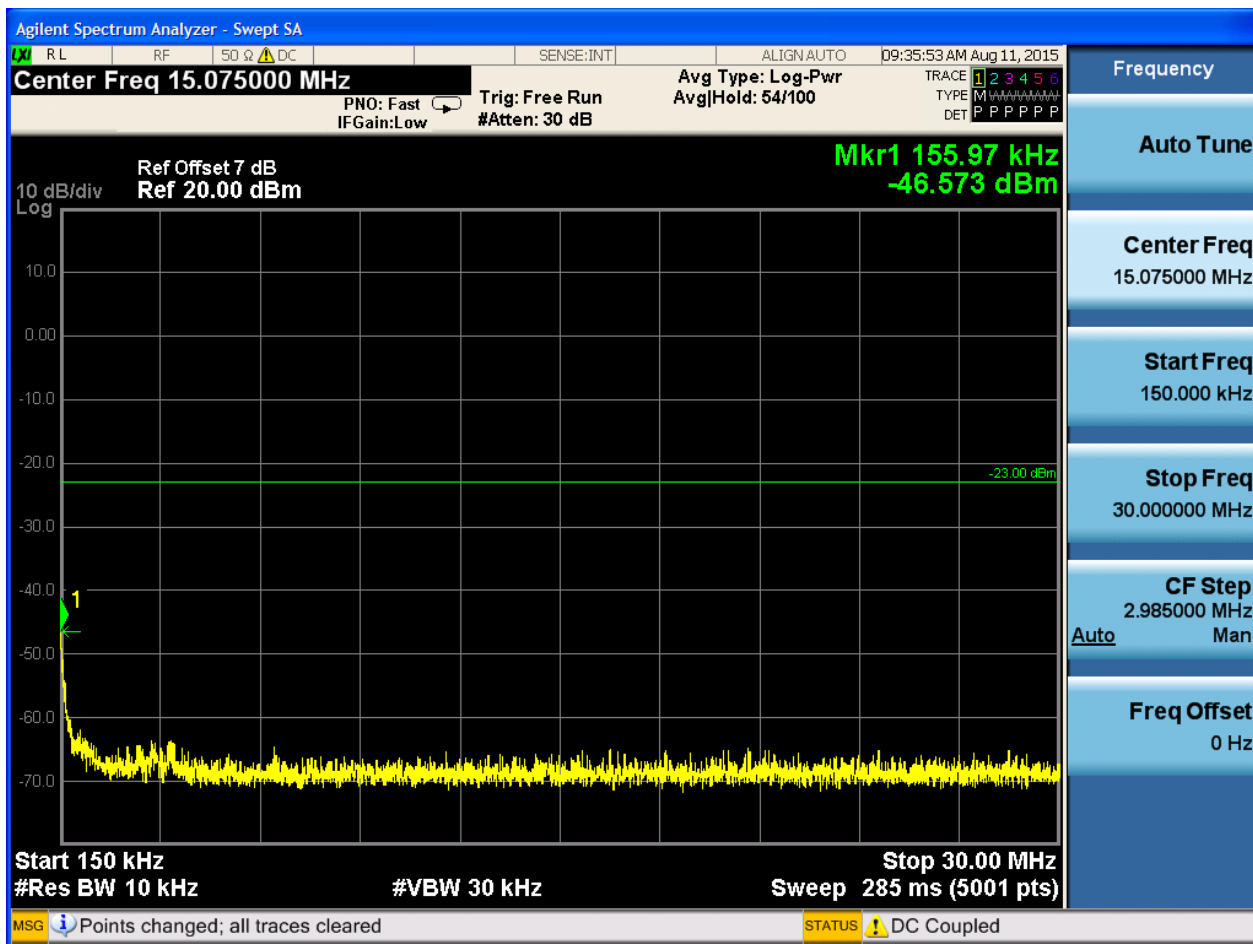
6.1 For GSM

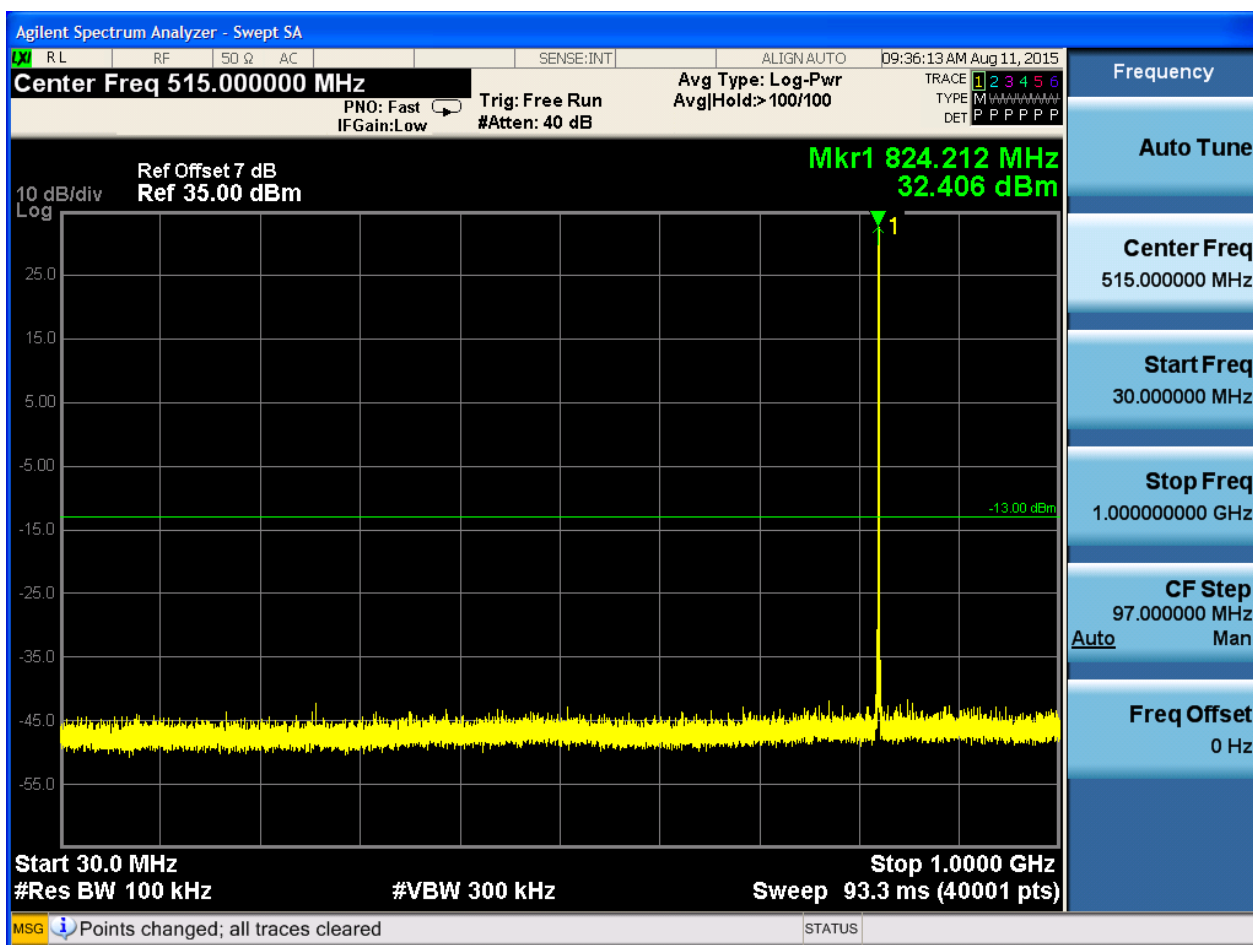
6.1.1 Test Band = GSM850

6.1.1.1 Test Mode = GSM/TM1

6.1.1.1.1 Test Channel = LCH

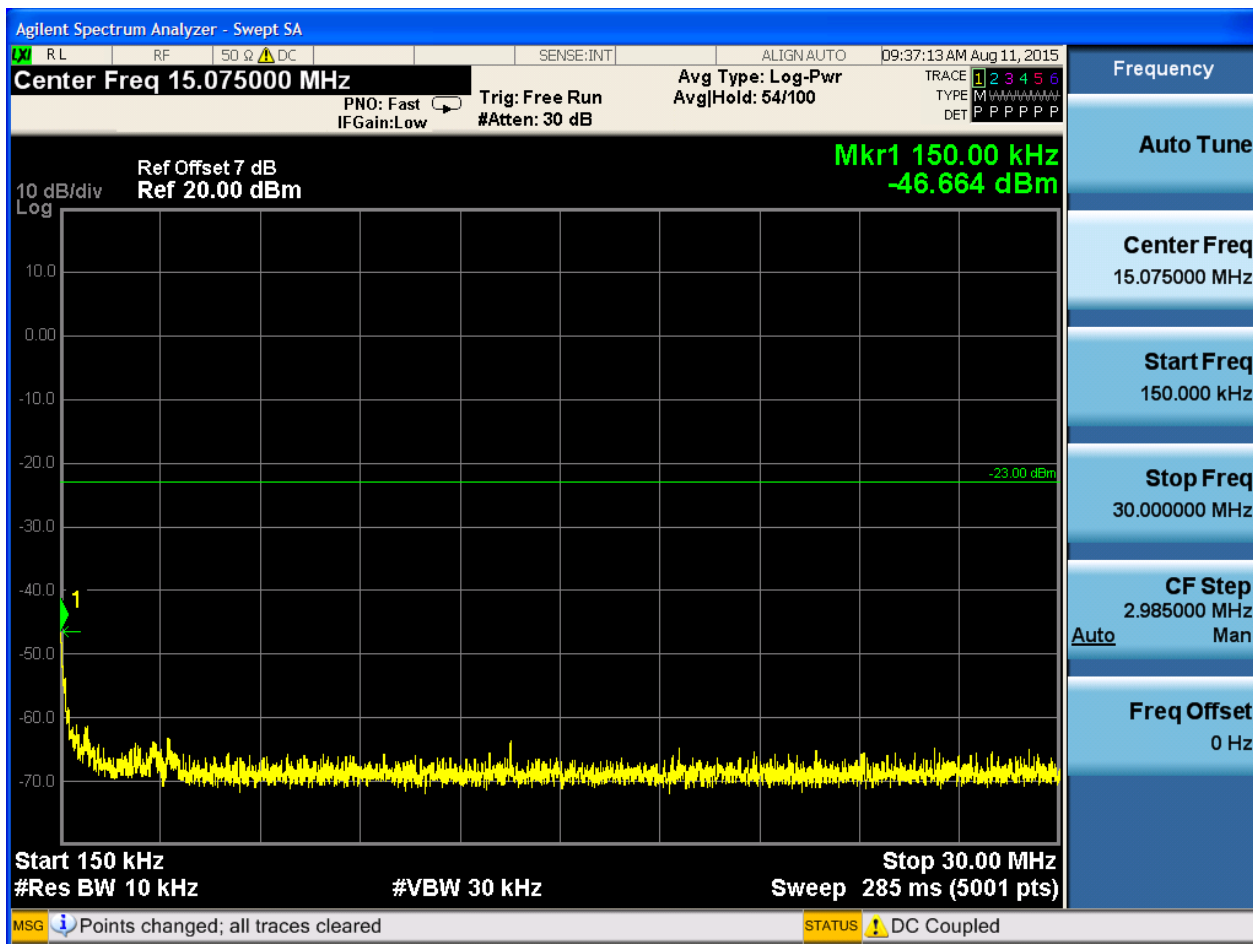


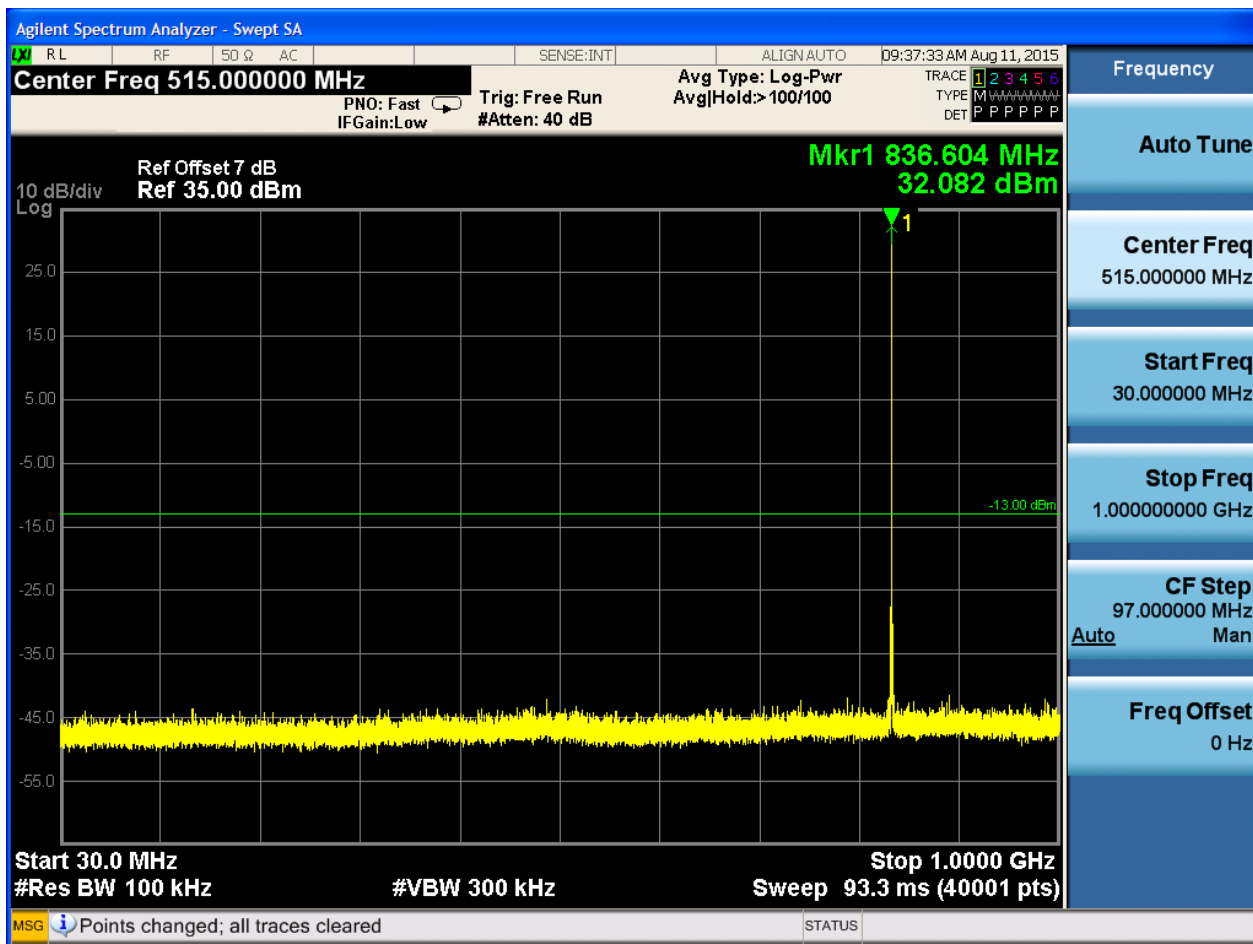


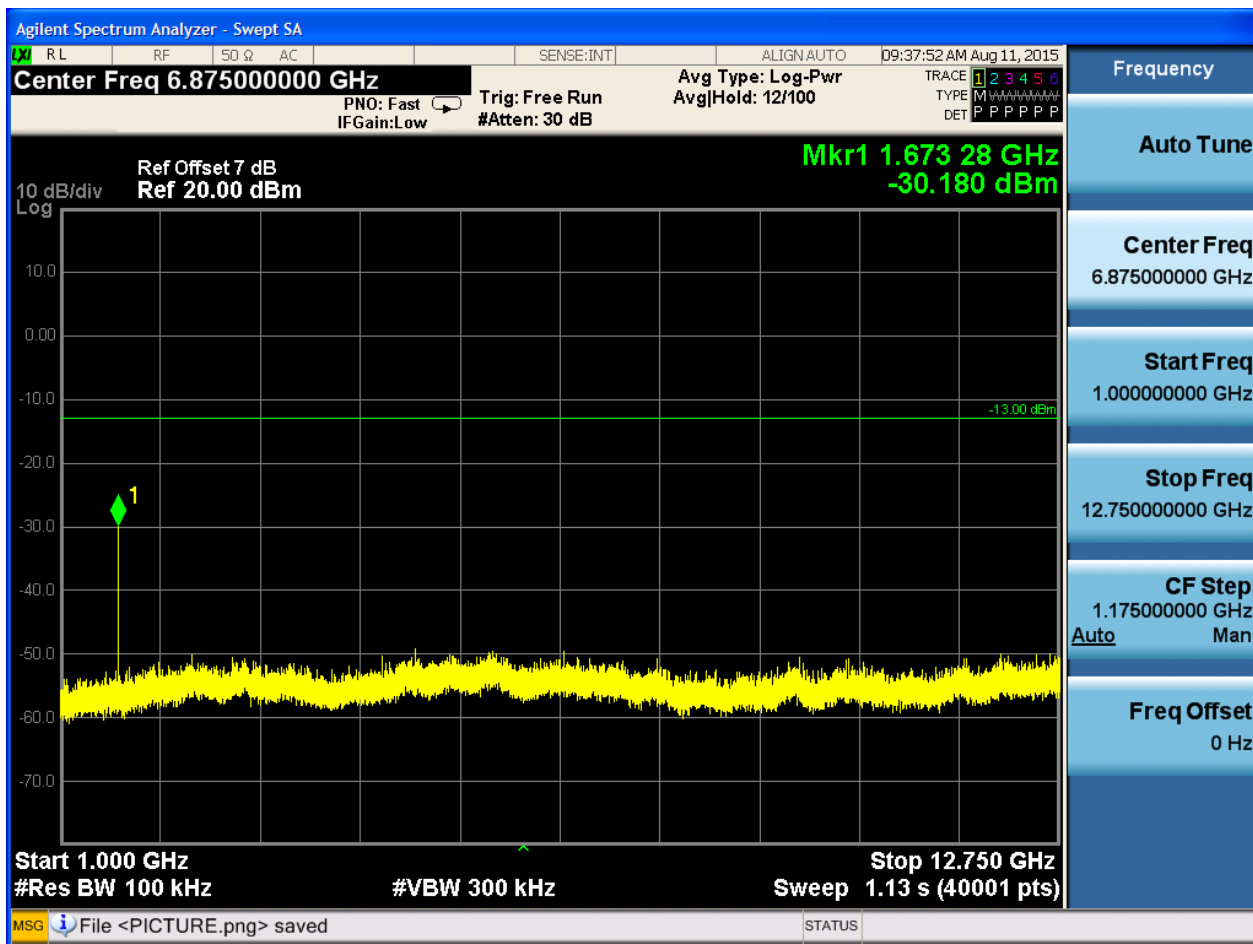


6.1.1.1.2 Test Channel = MCH



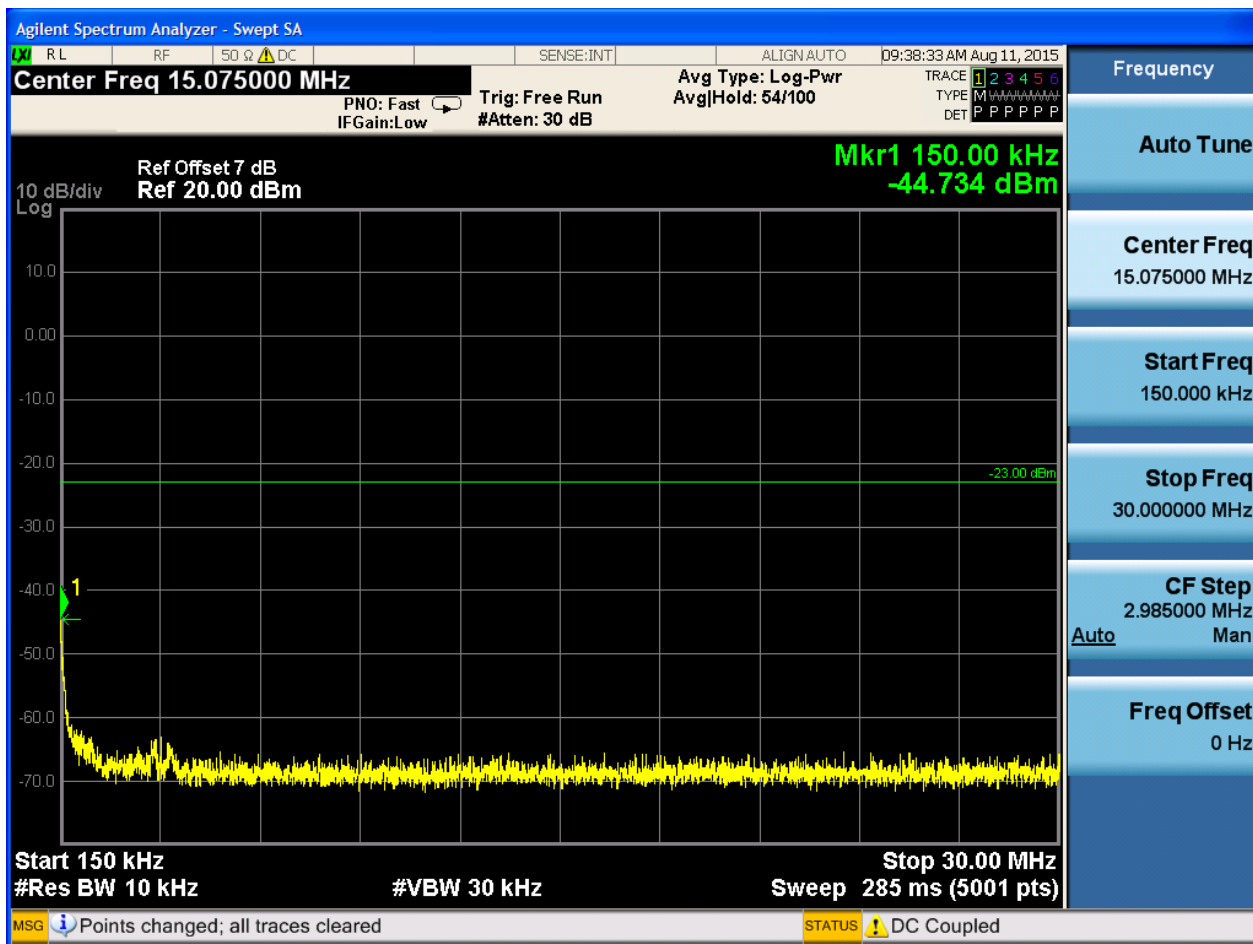


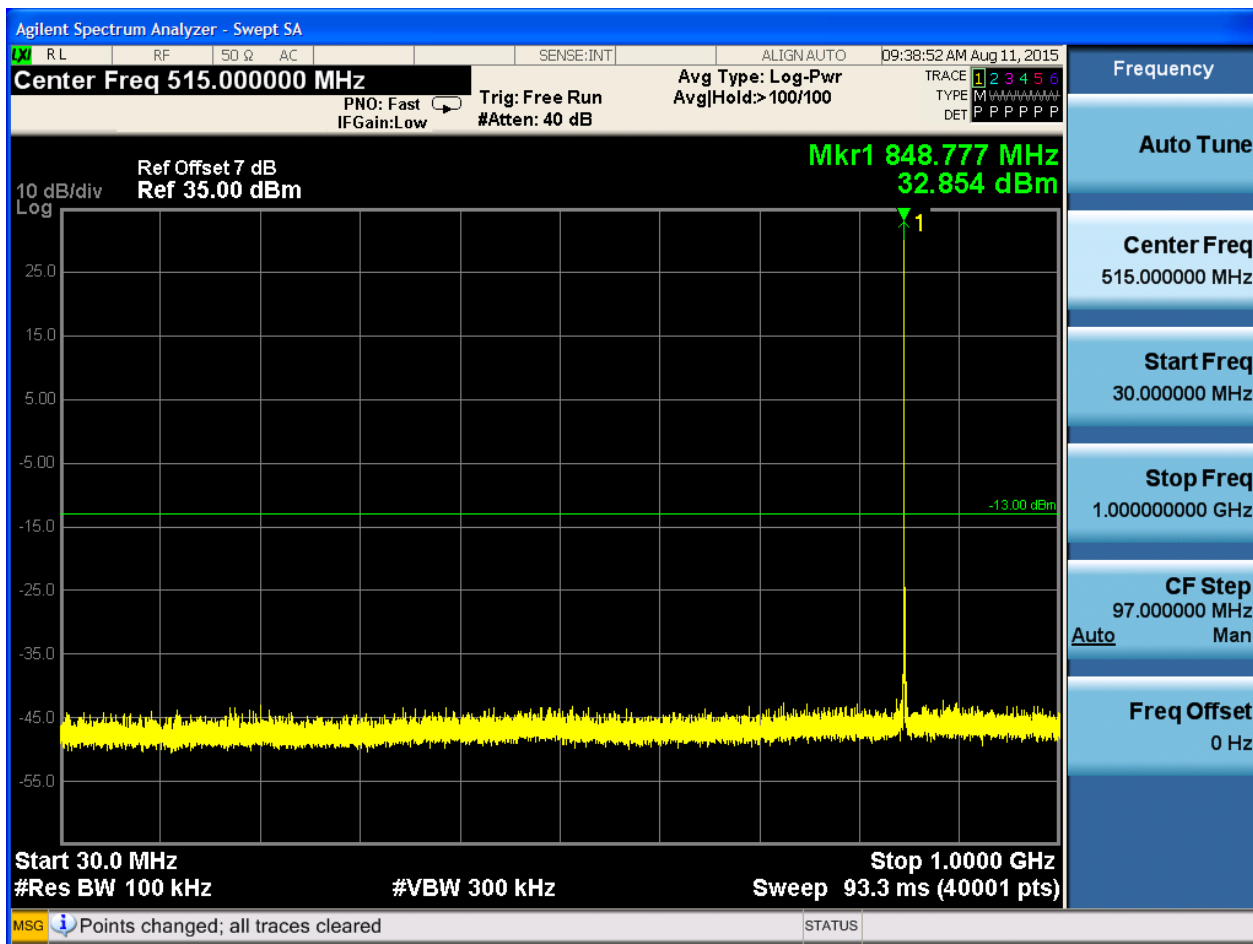


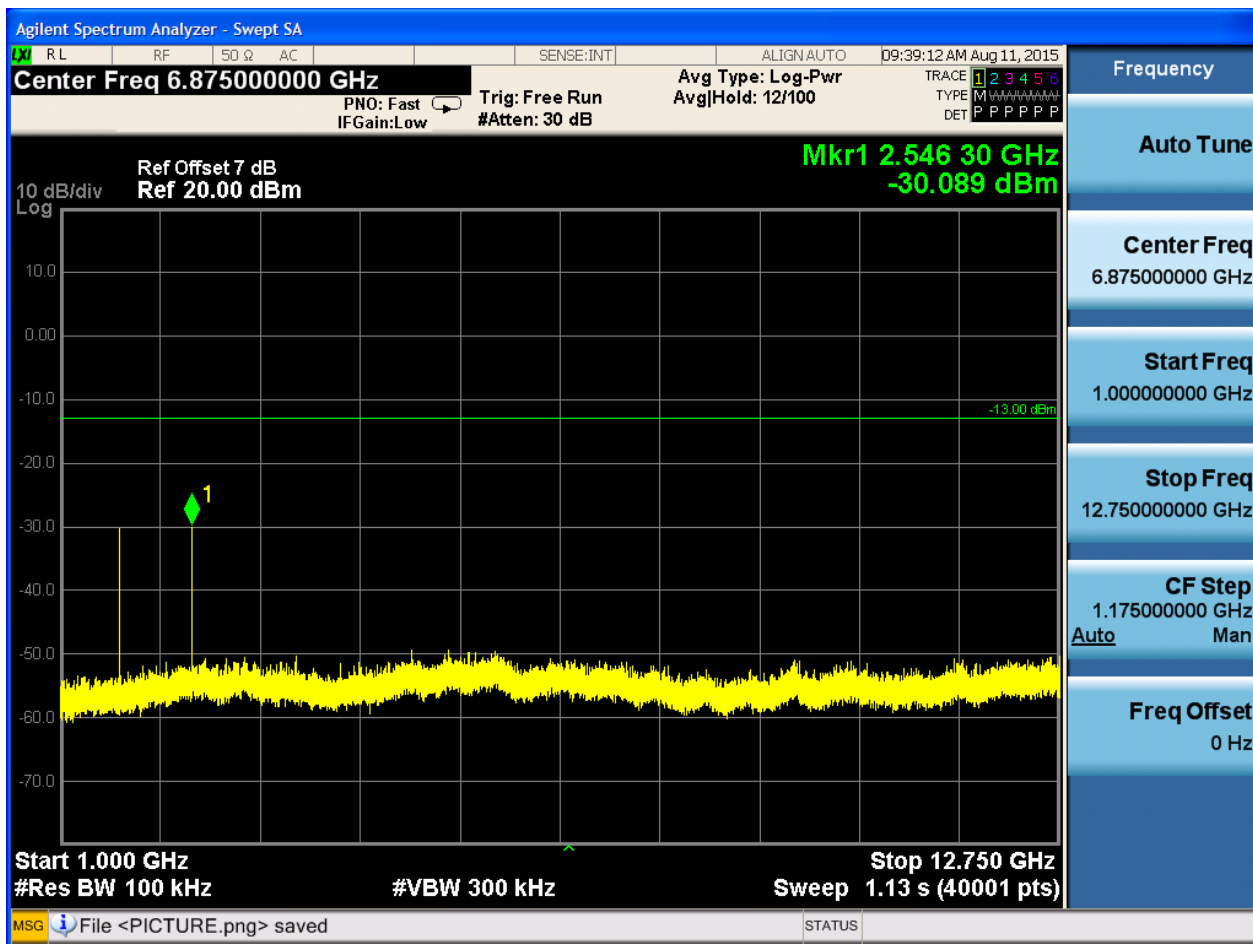


6.1.1.1.3 Test Channel = HCH





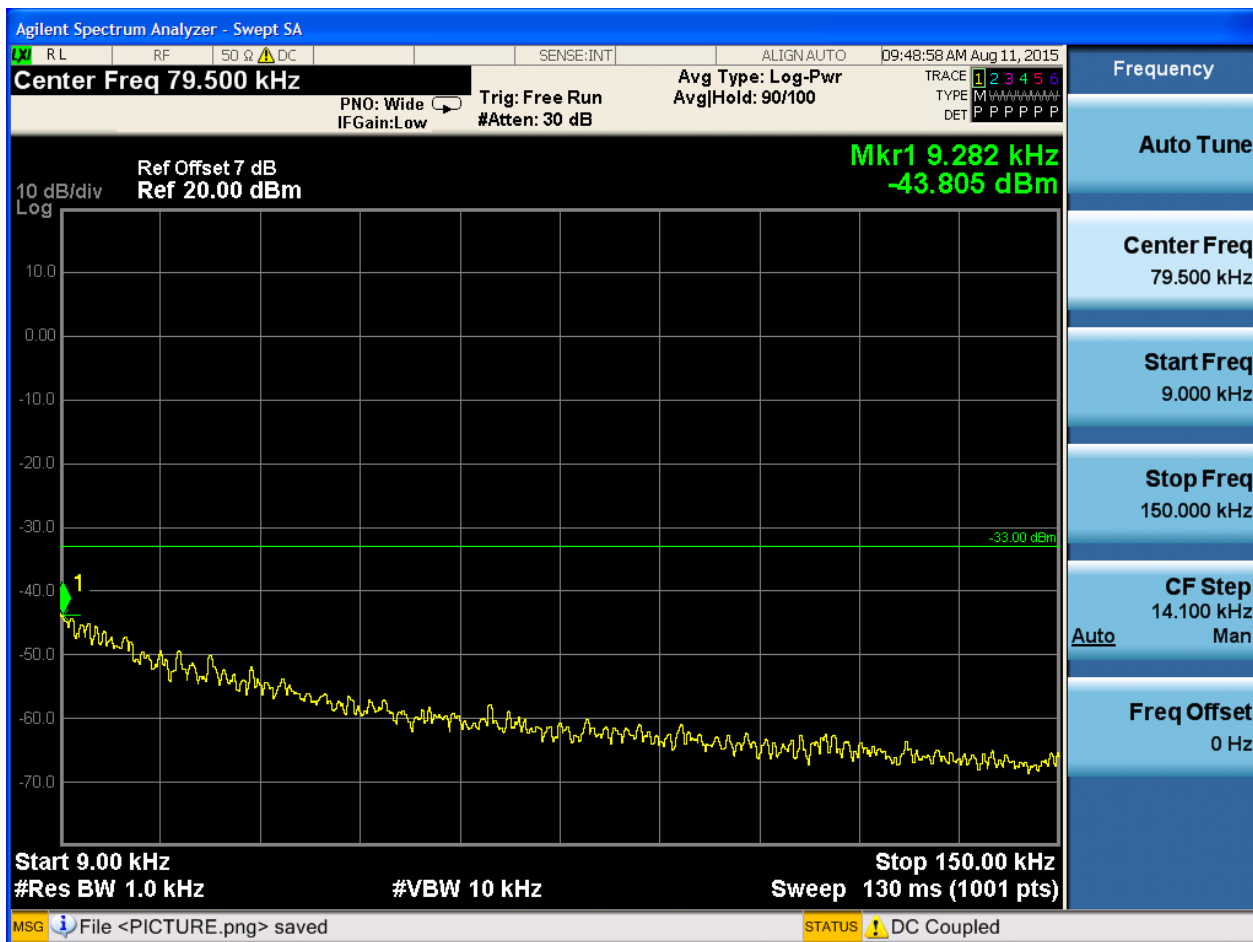


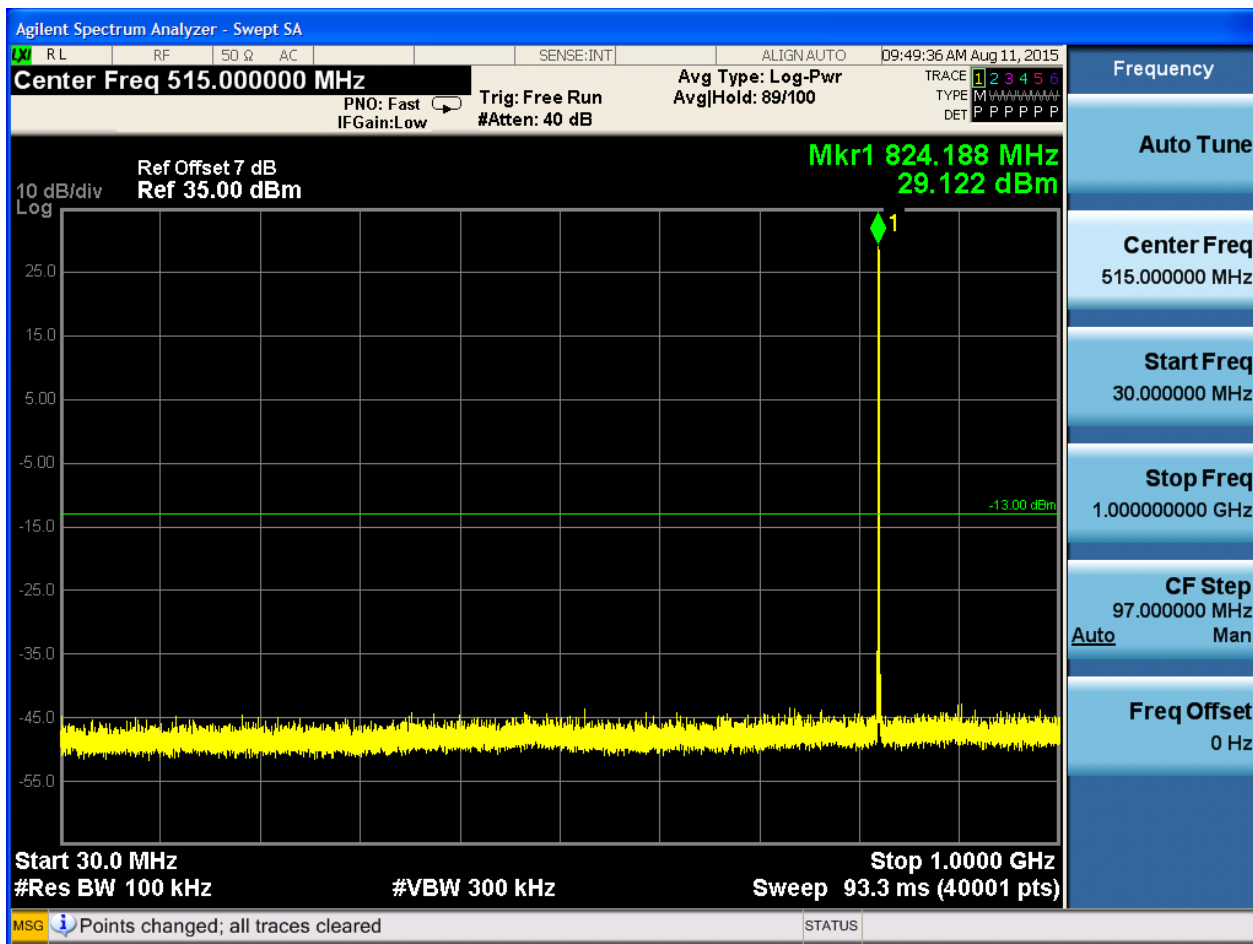


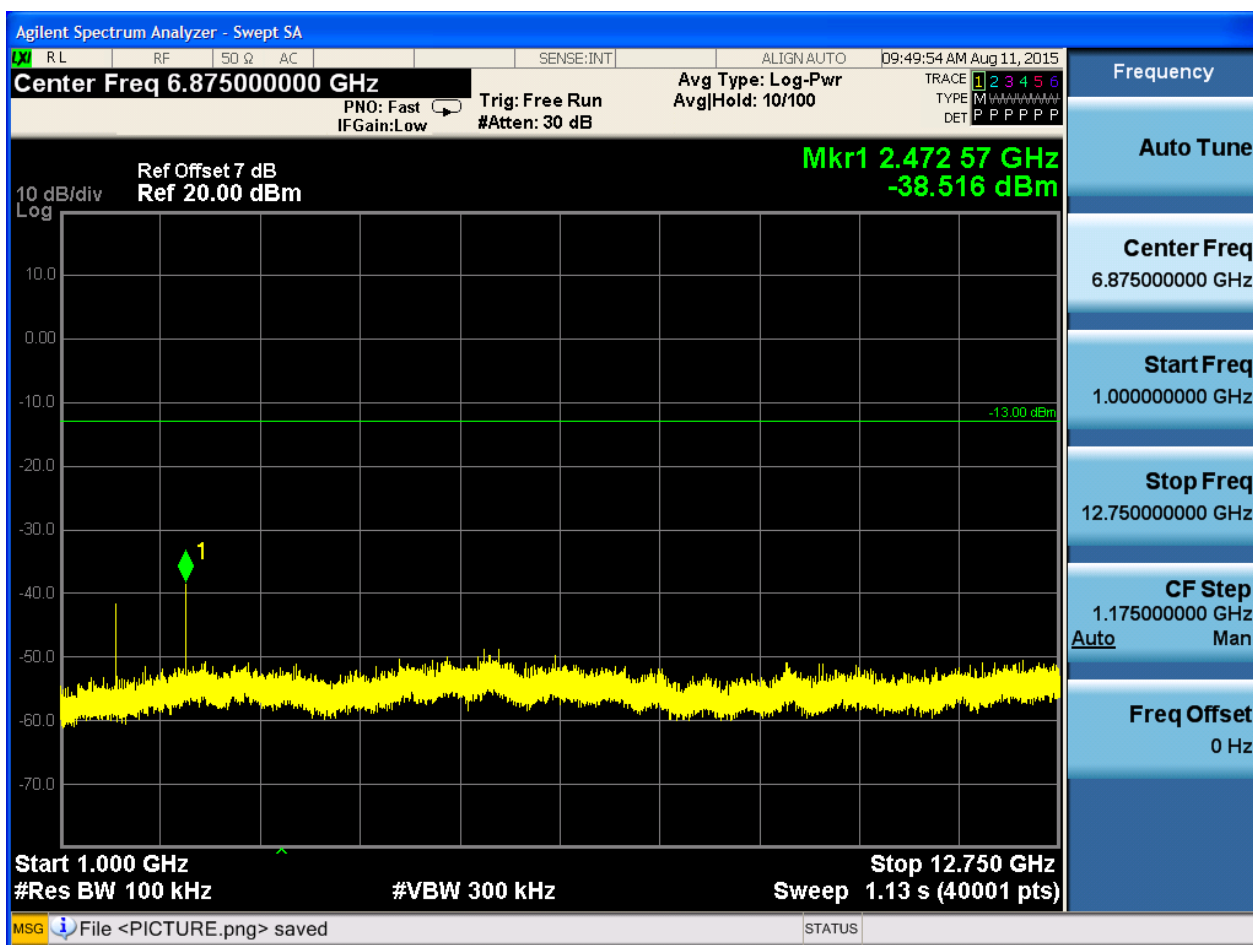


6.1.1.2 Test Mode = GSM/TM2

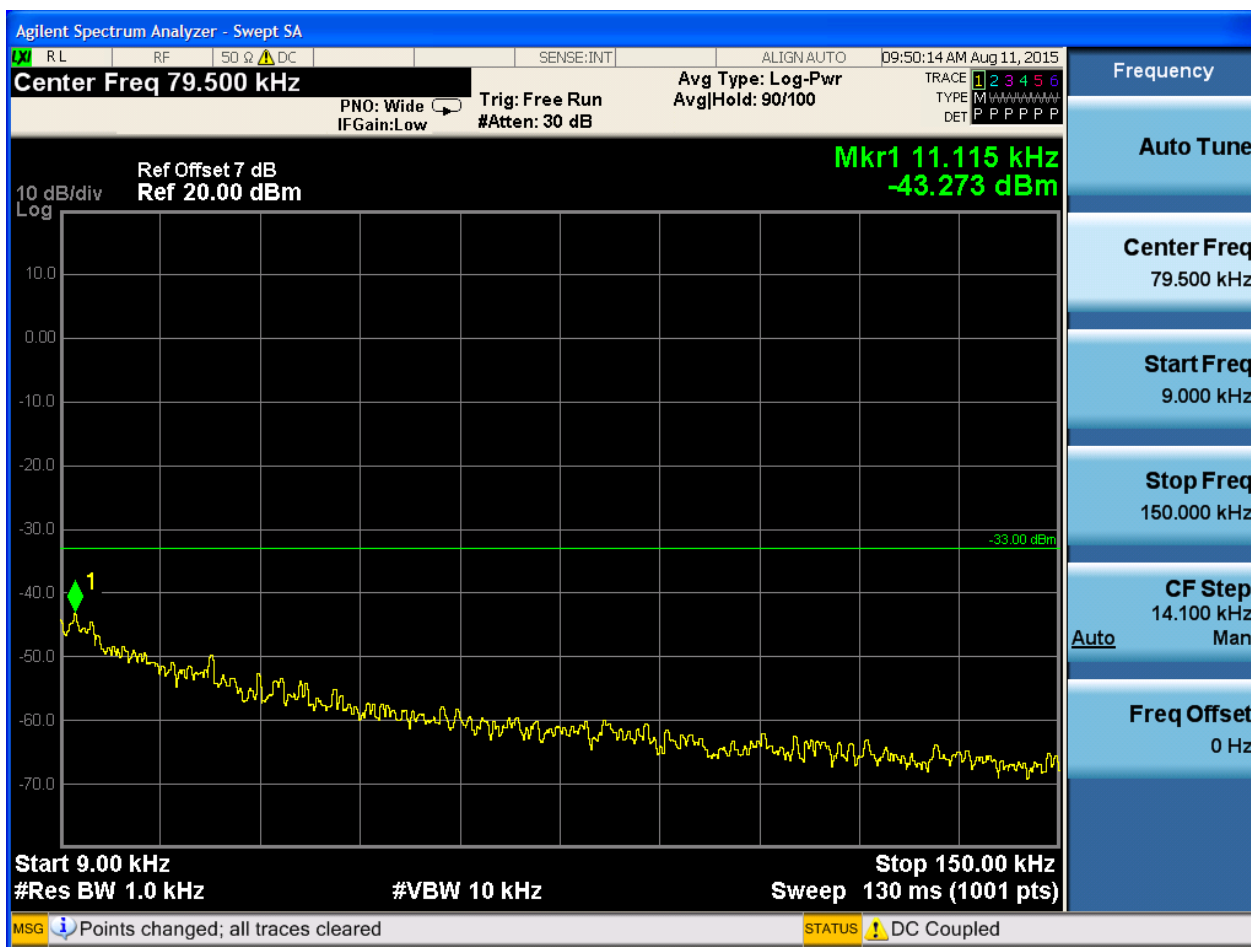
6.1.1.2.1 Test Channel = LCH

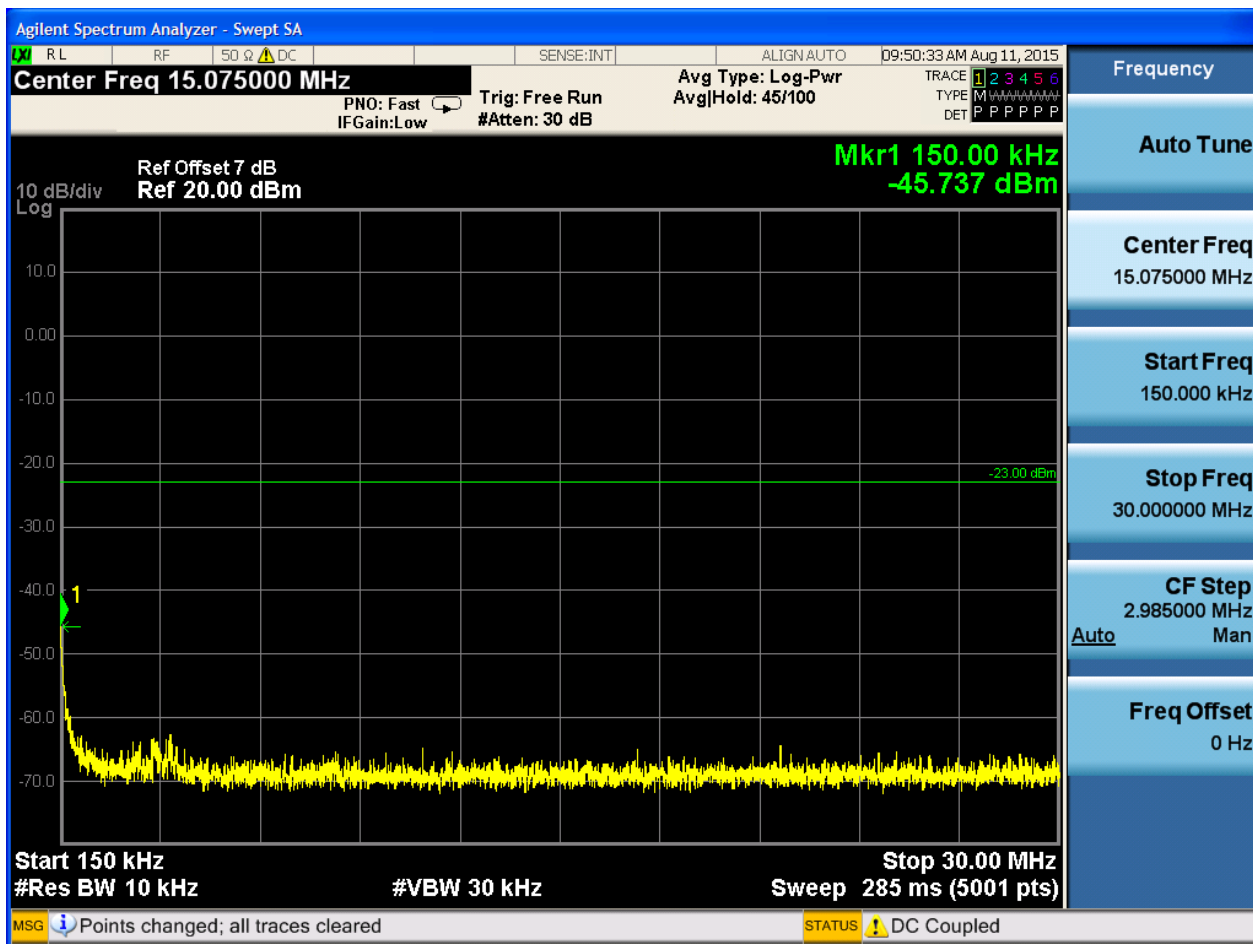


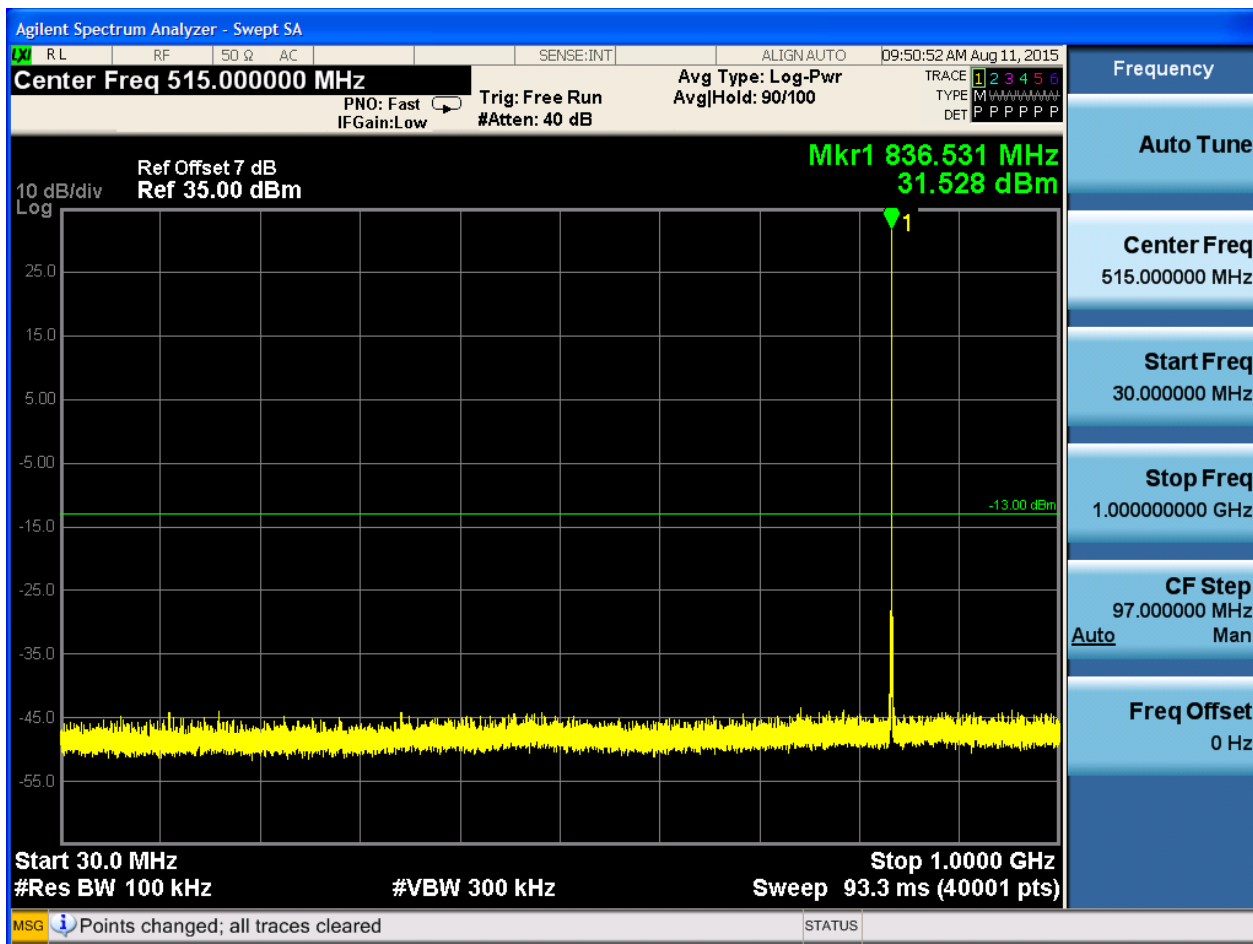


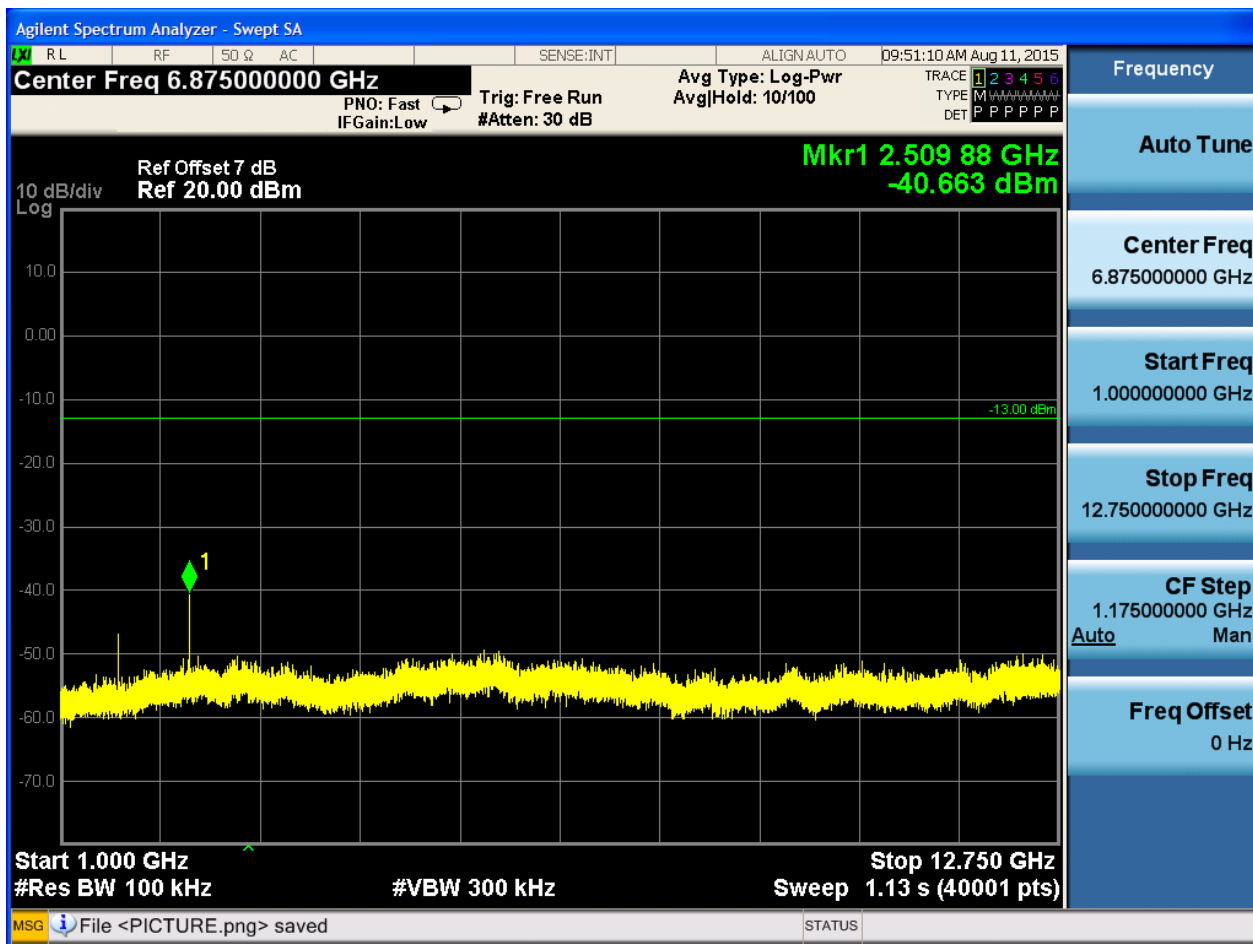


6.1.1.2.2 Test Channel = MCH

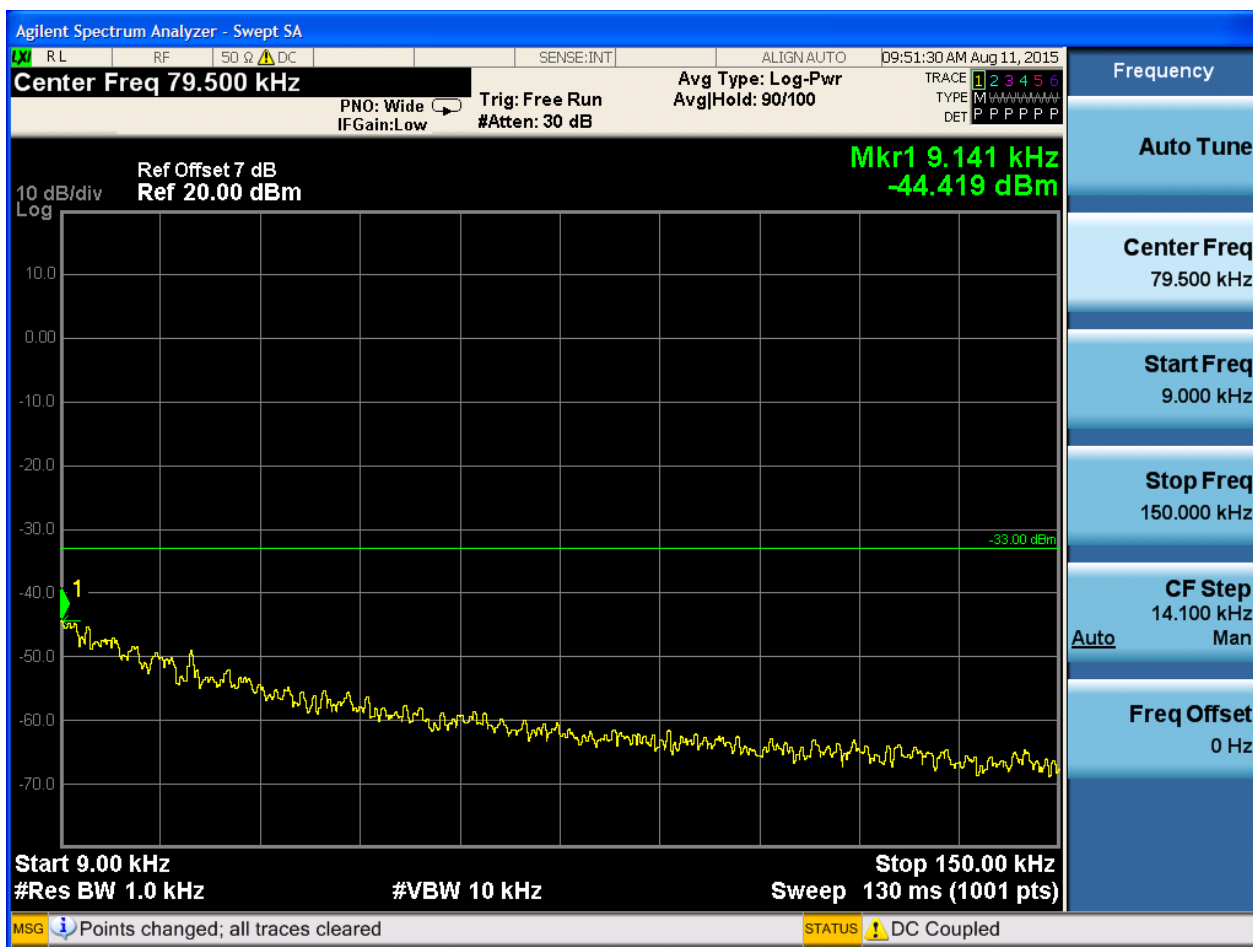


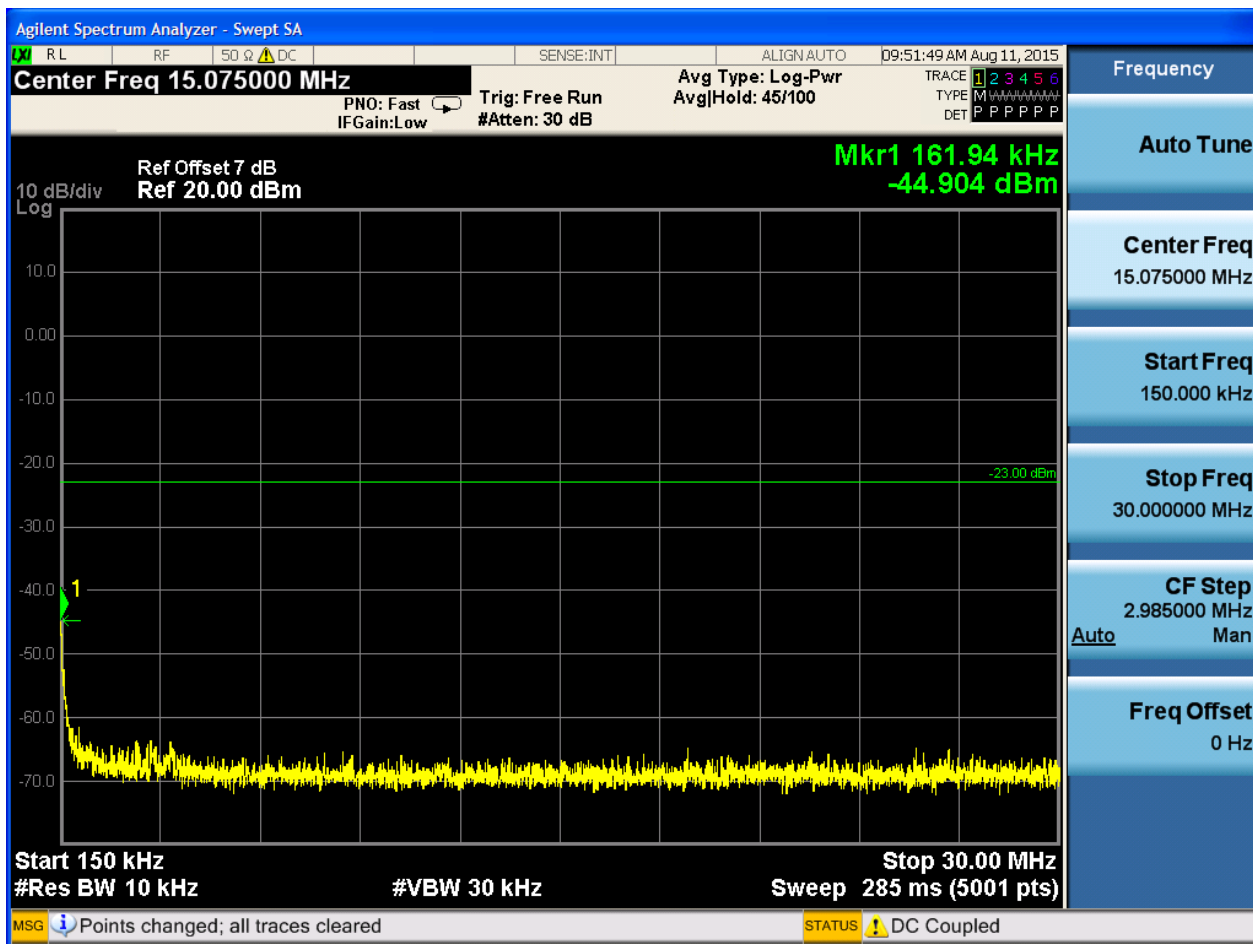


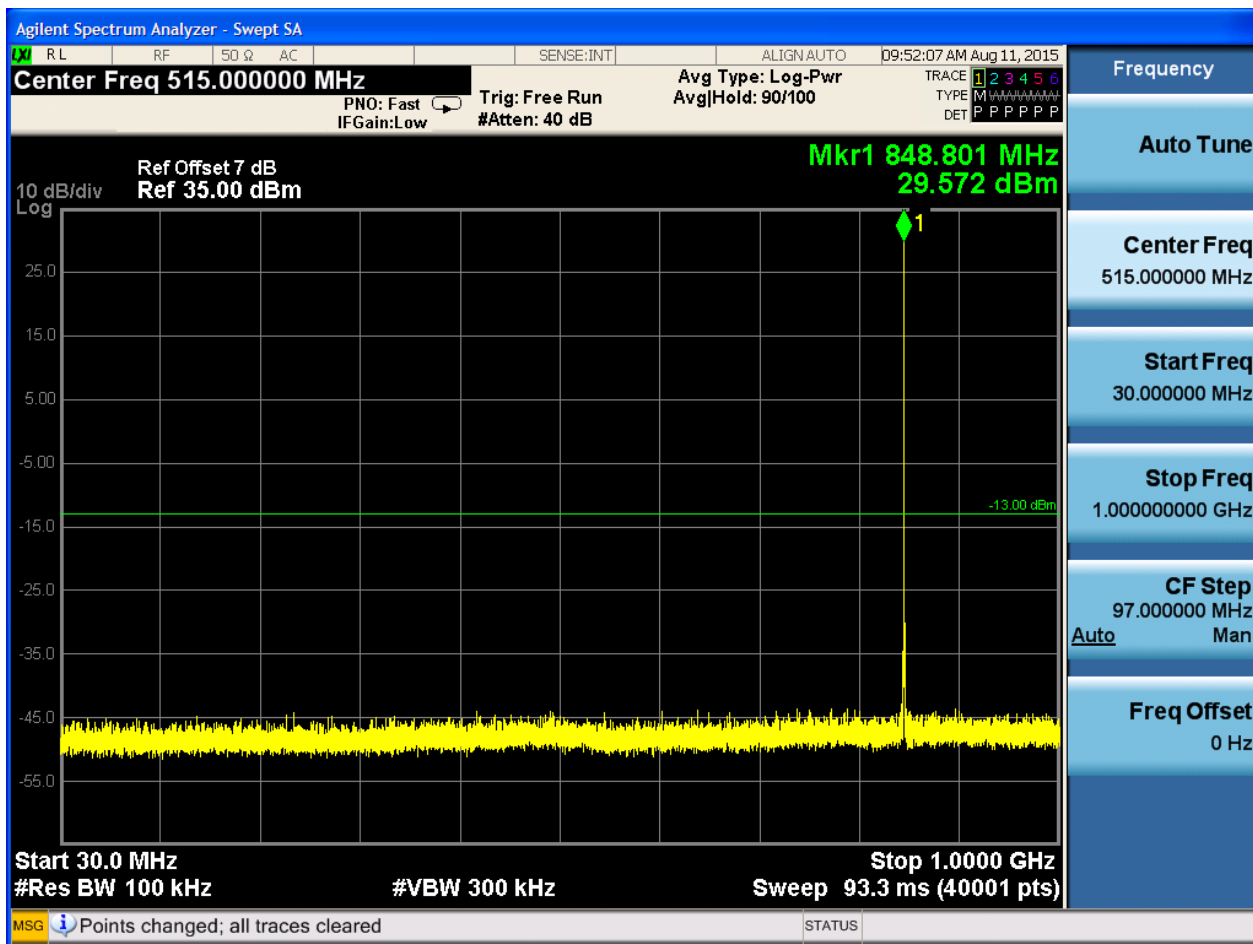


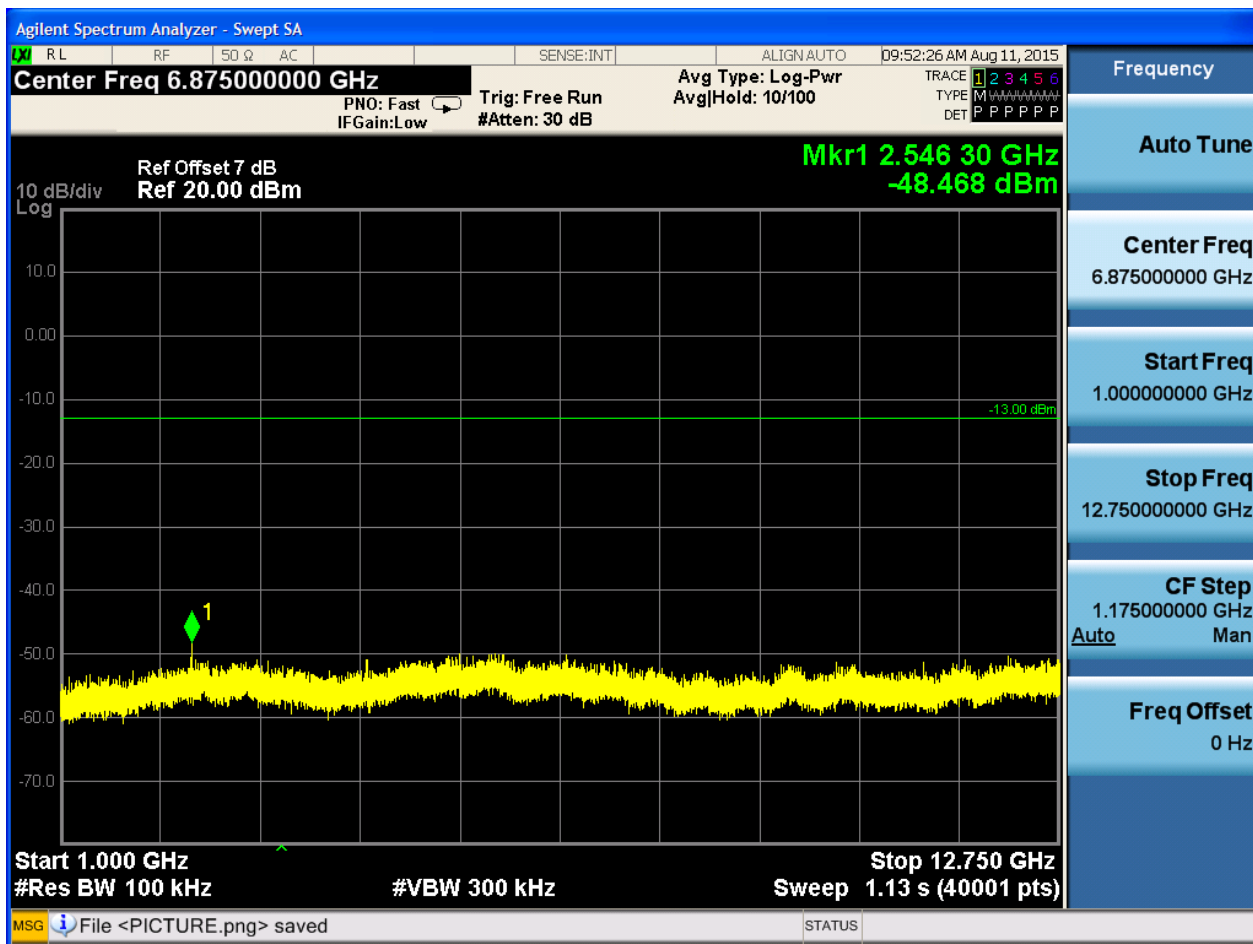


6.1.1.2.3 Test Channel = HCH





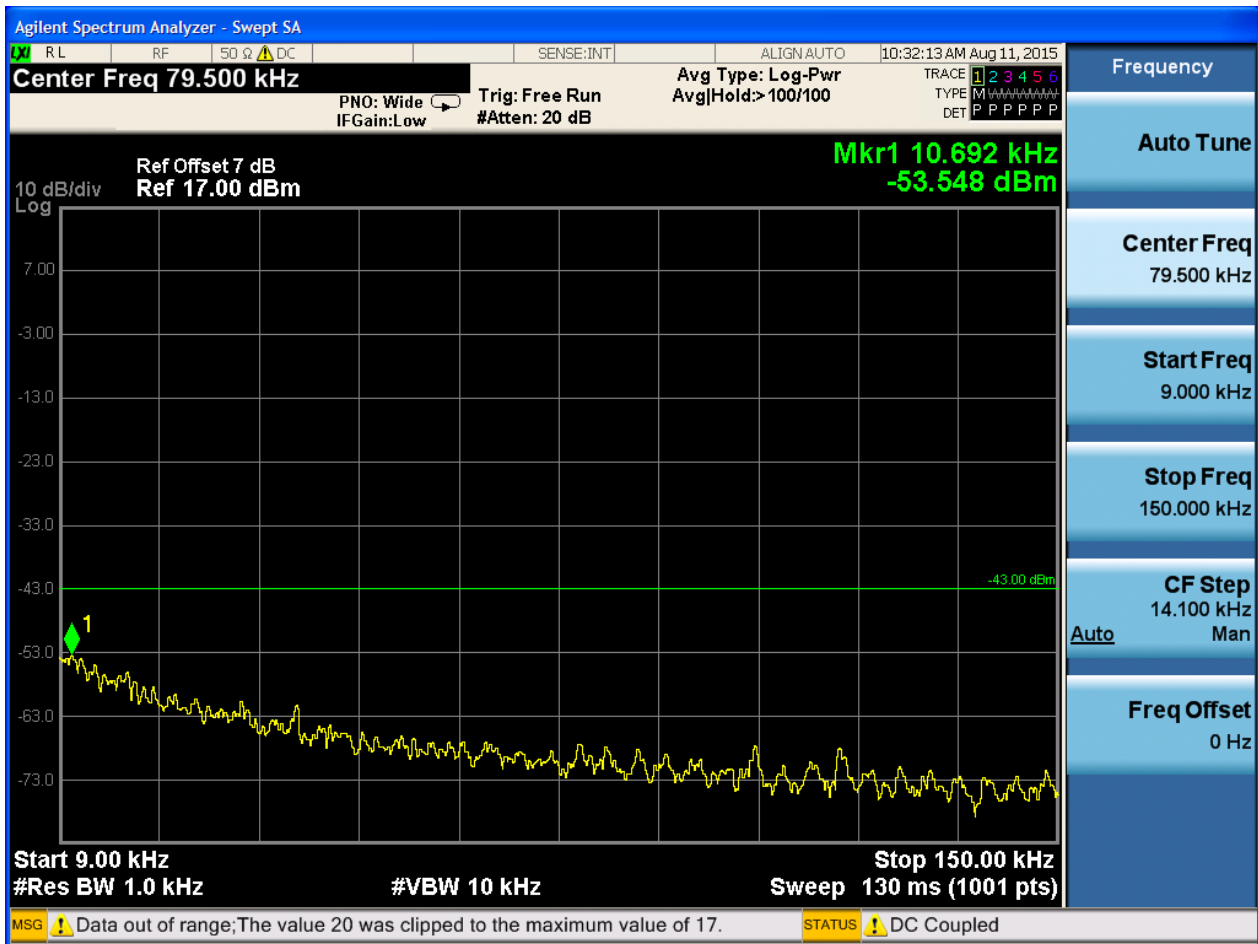


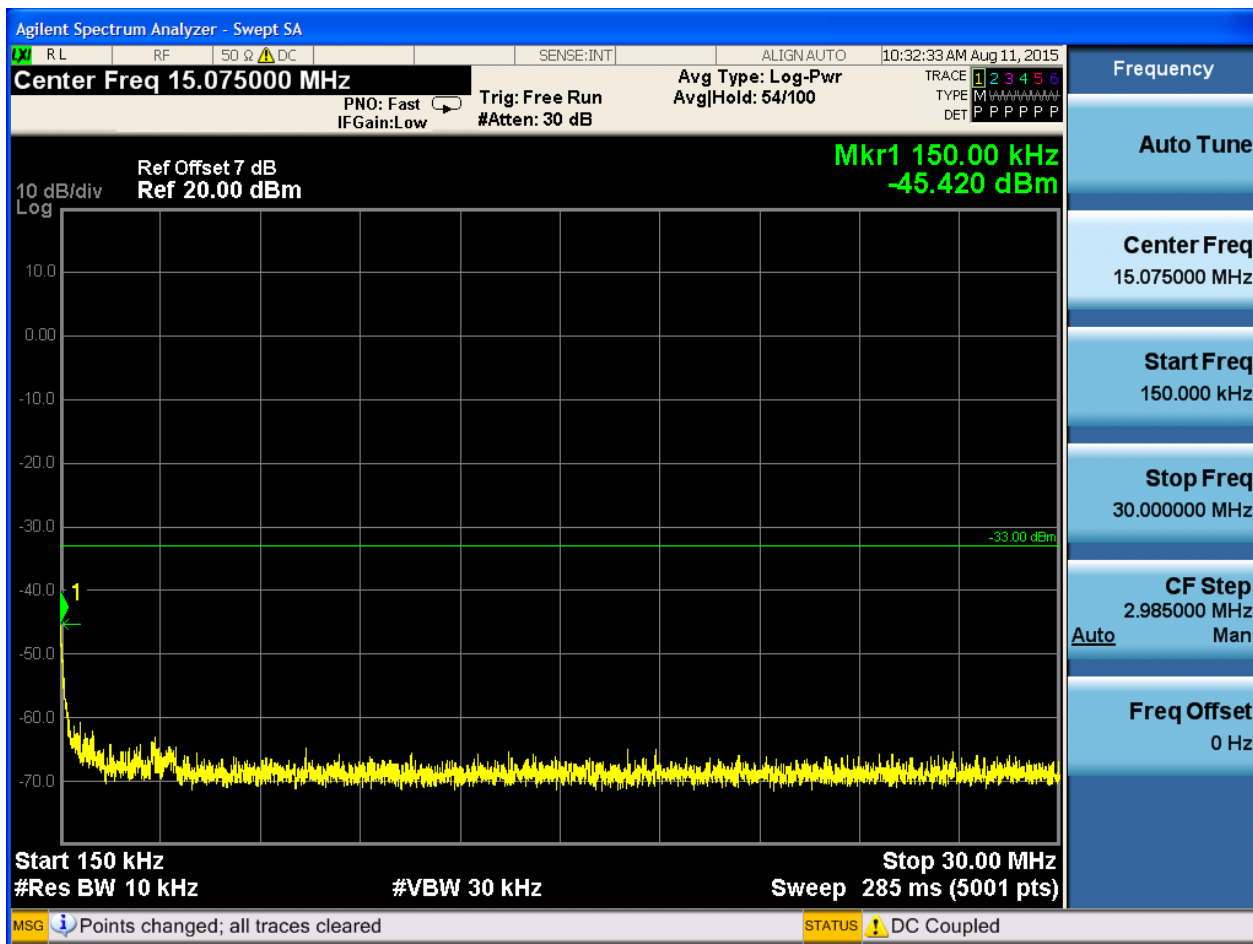


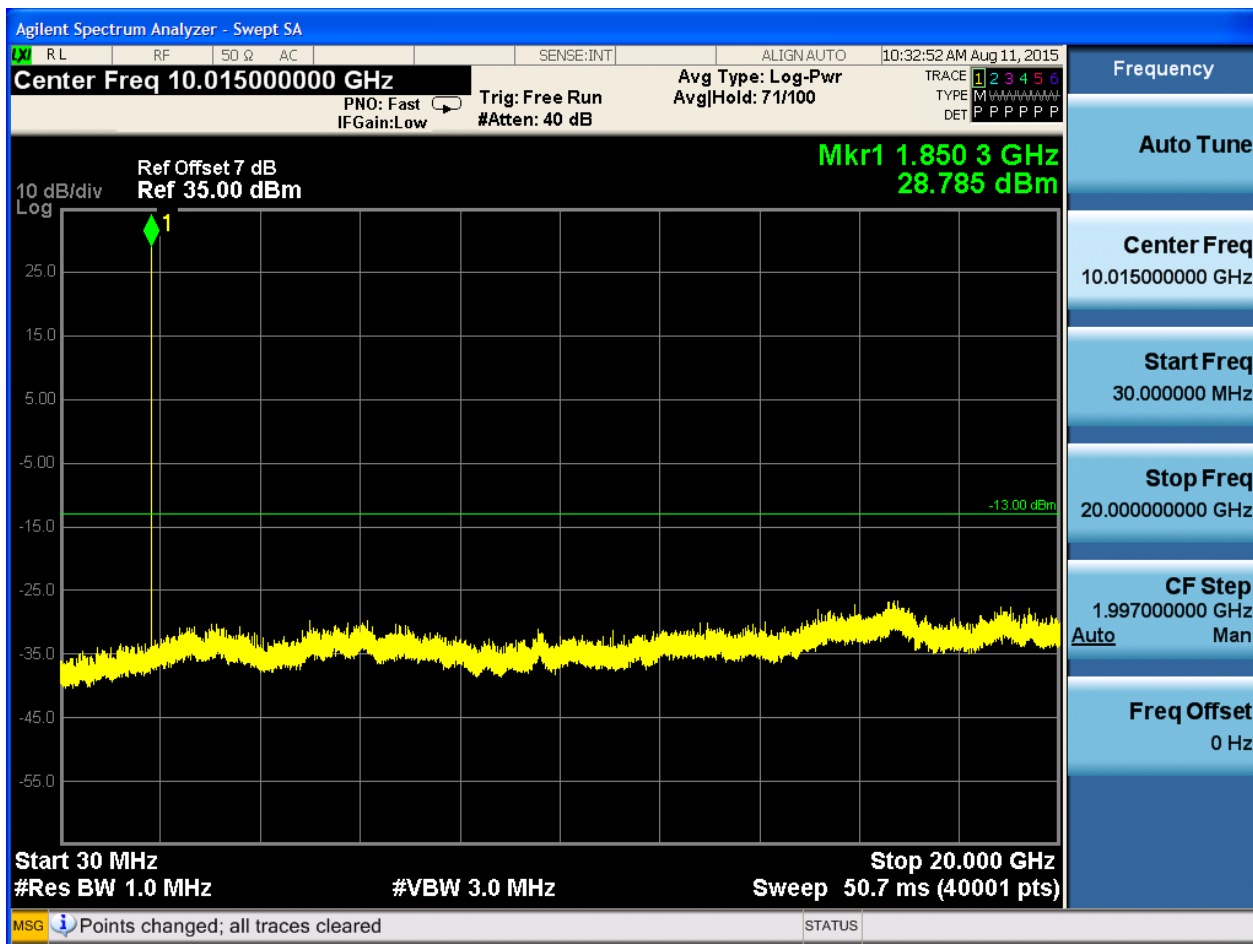
6.1.2 Test Band = GSM1900

6.1.2.1 Test Mode = GSM/TM1

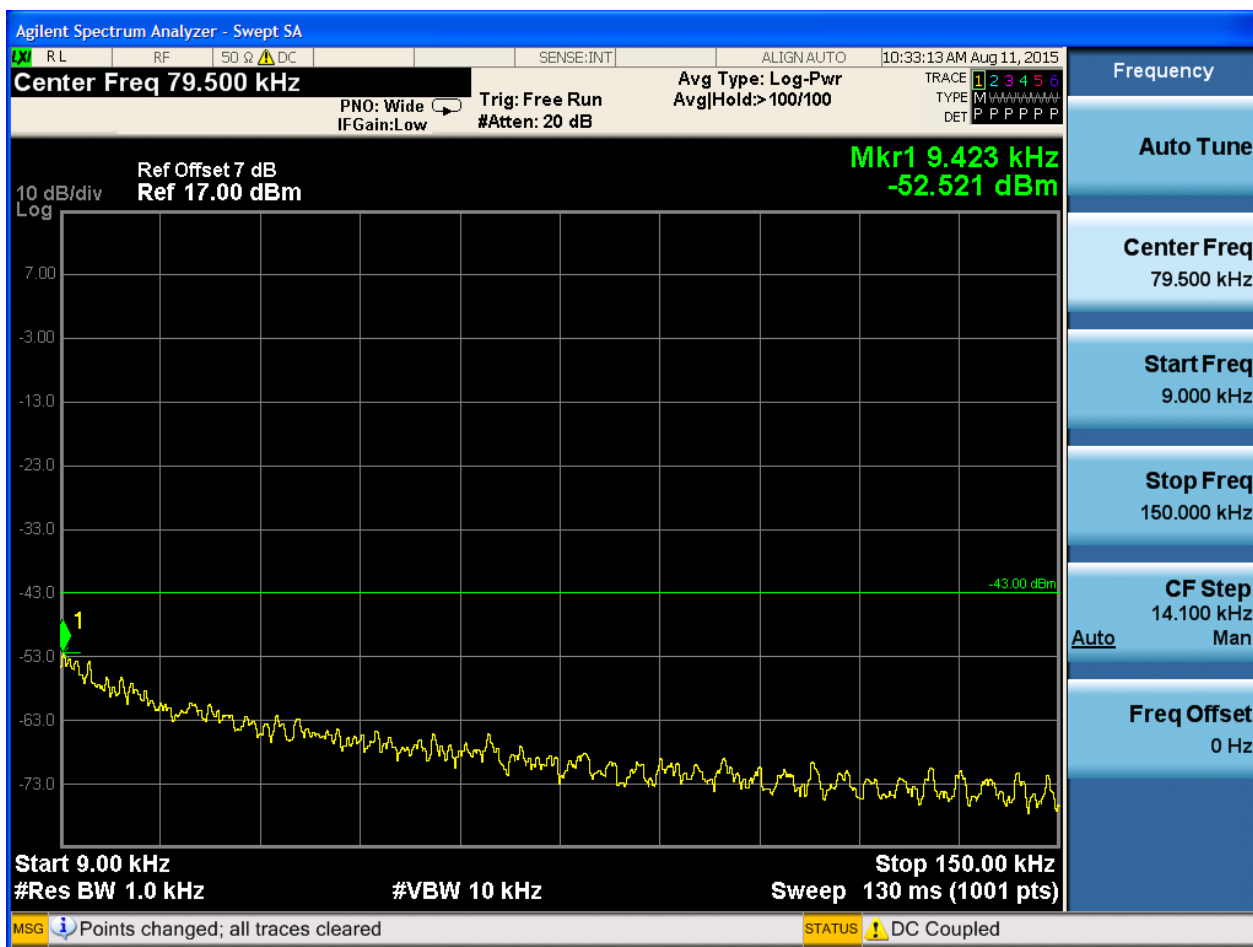
6.1.2.1.1 Test Channel = LCH

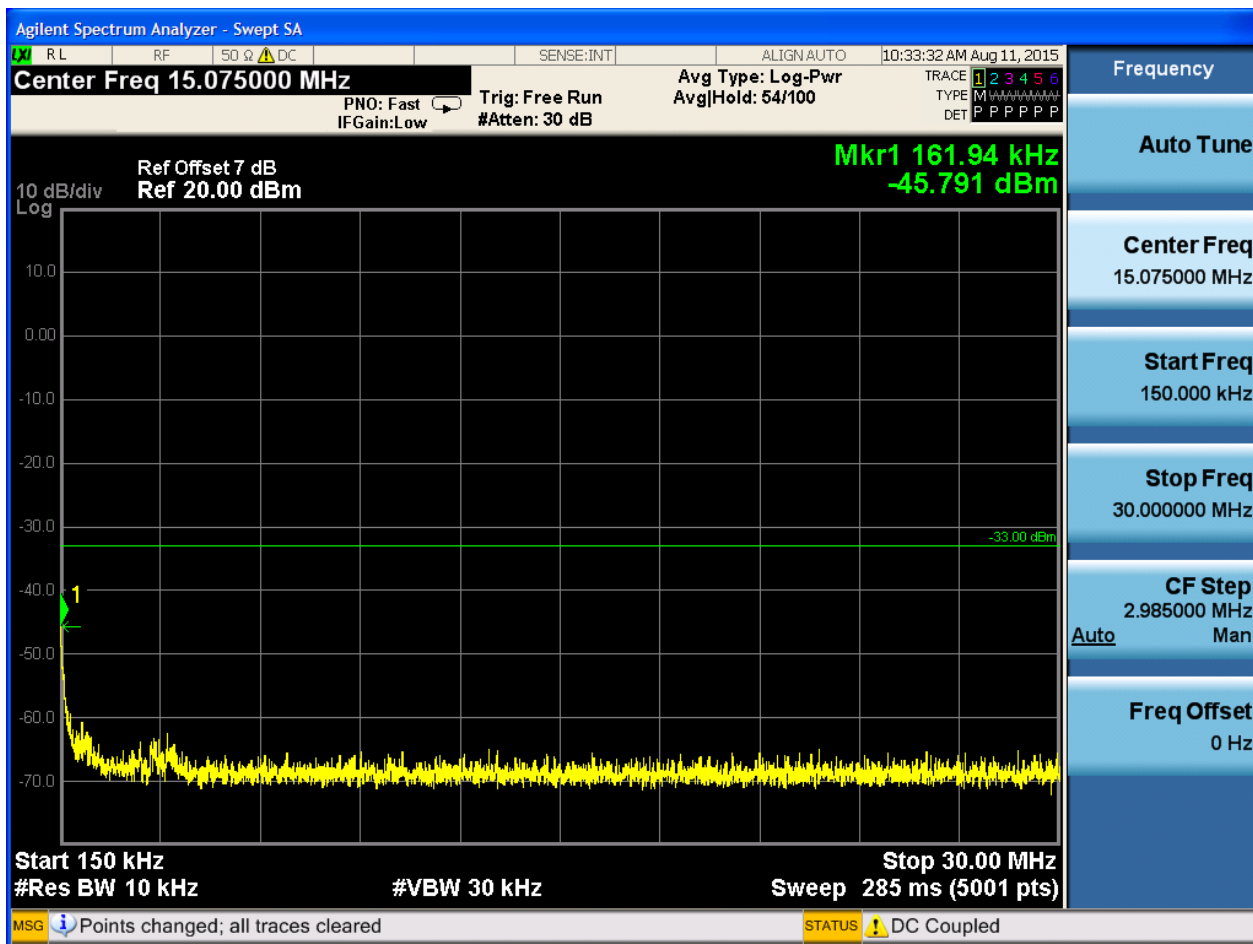


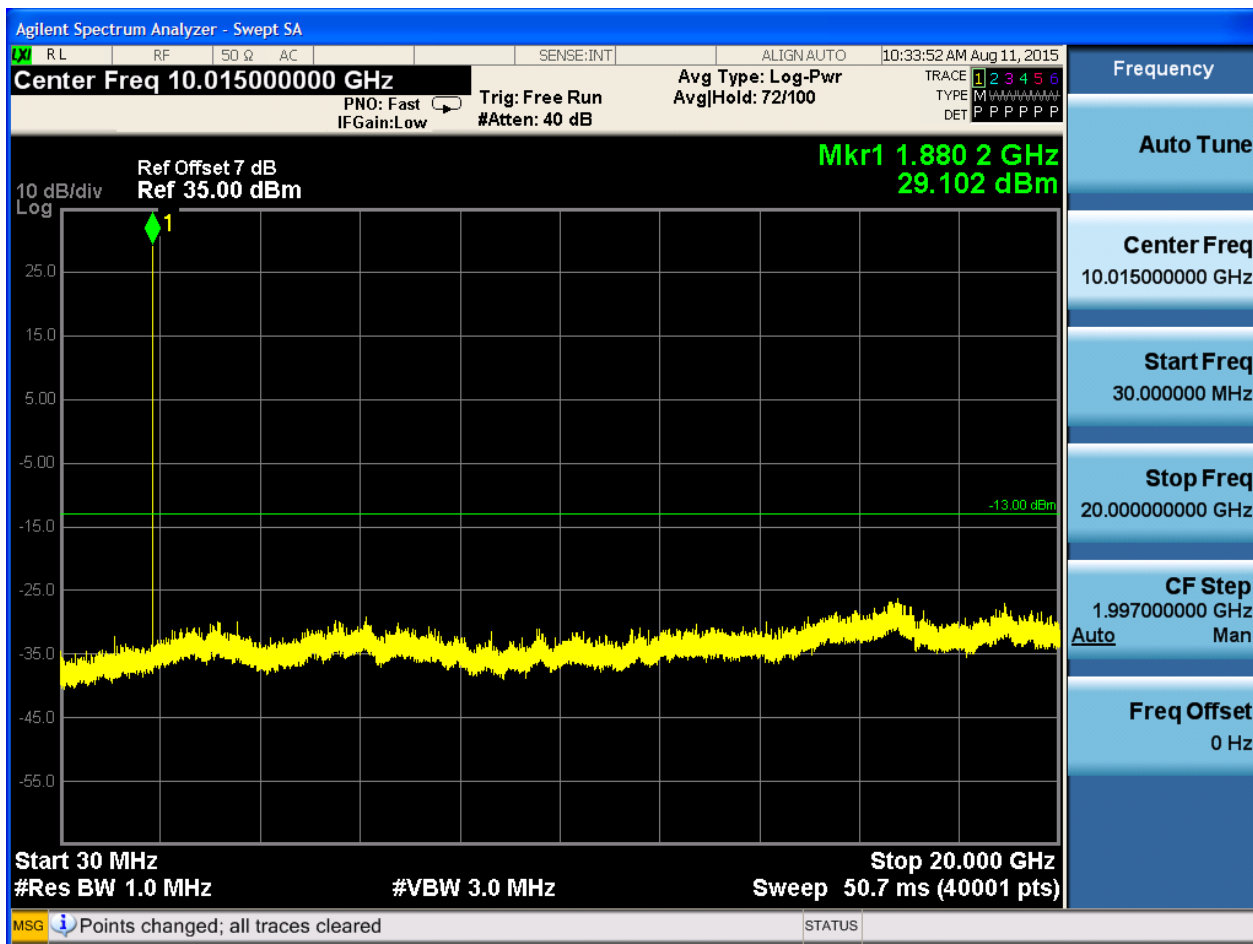




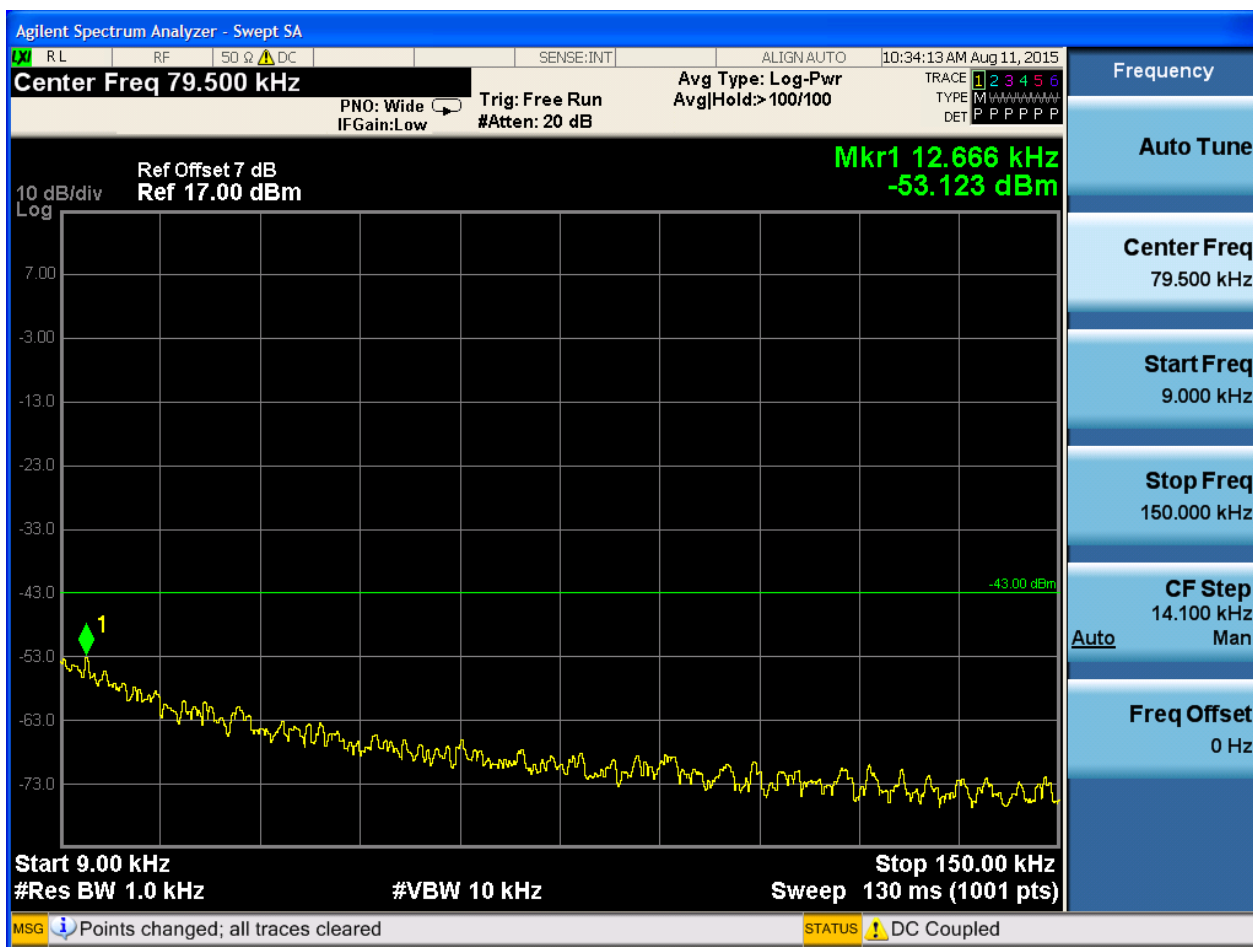
6.1.2.1.2 Test Channel = MCH

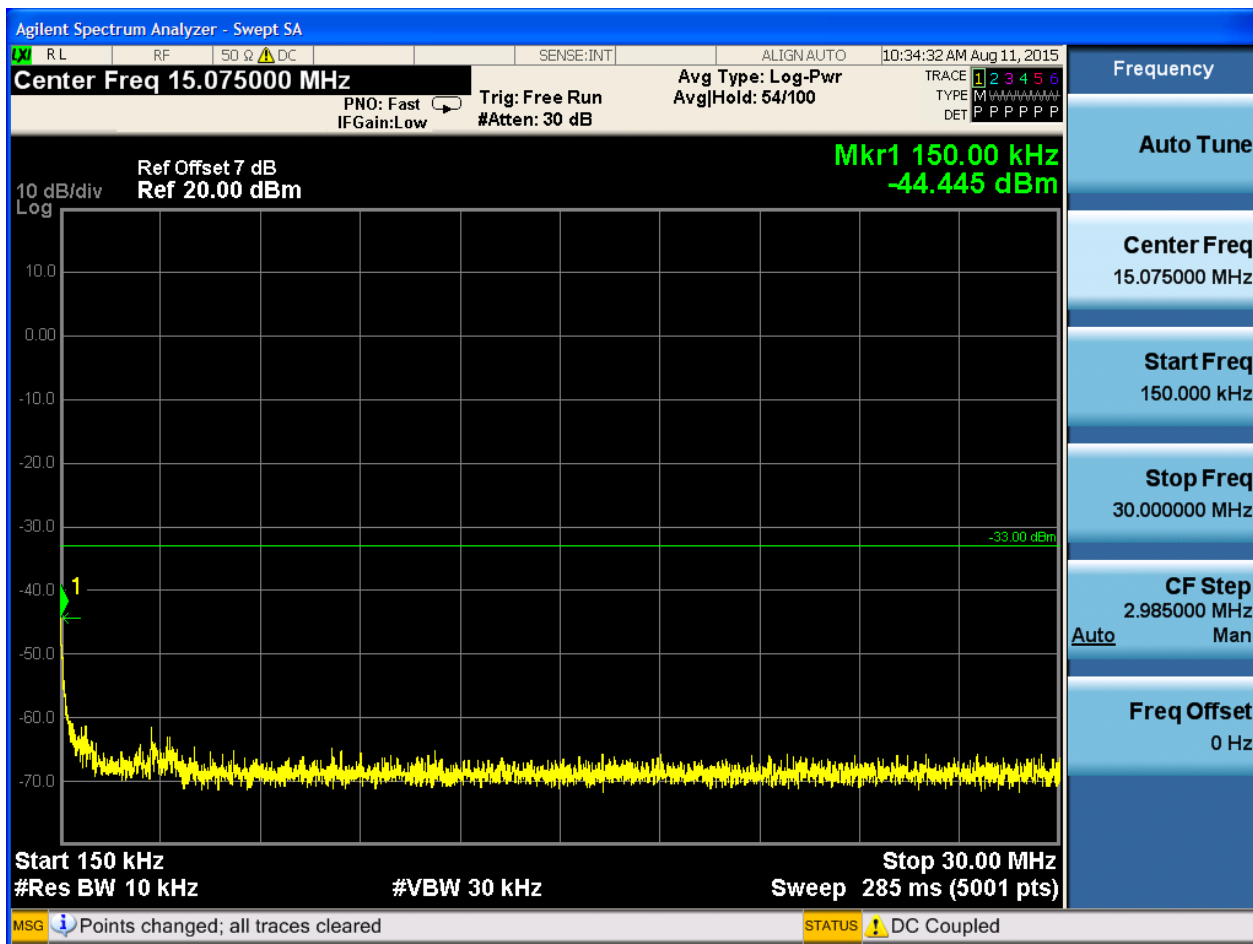


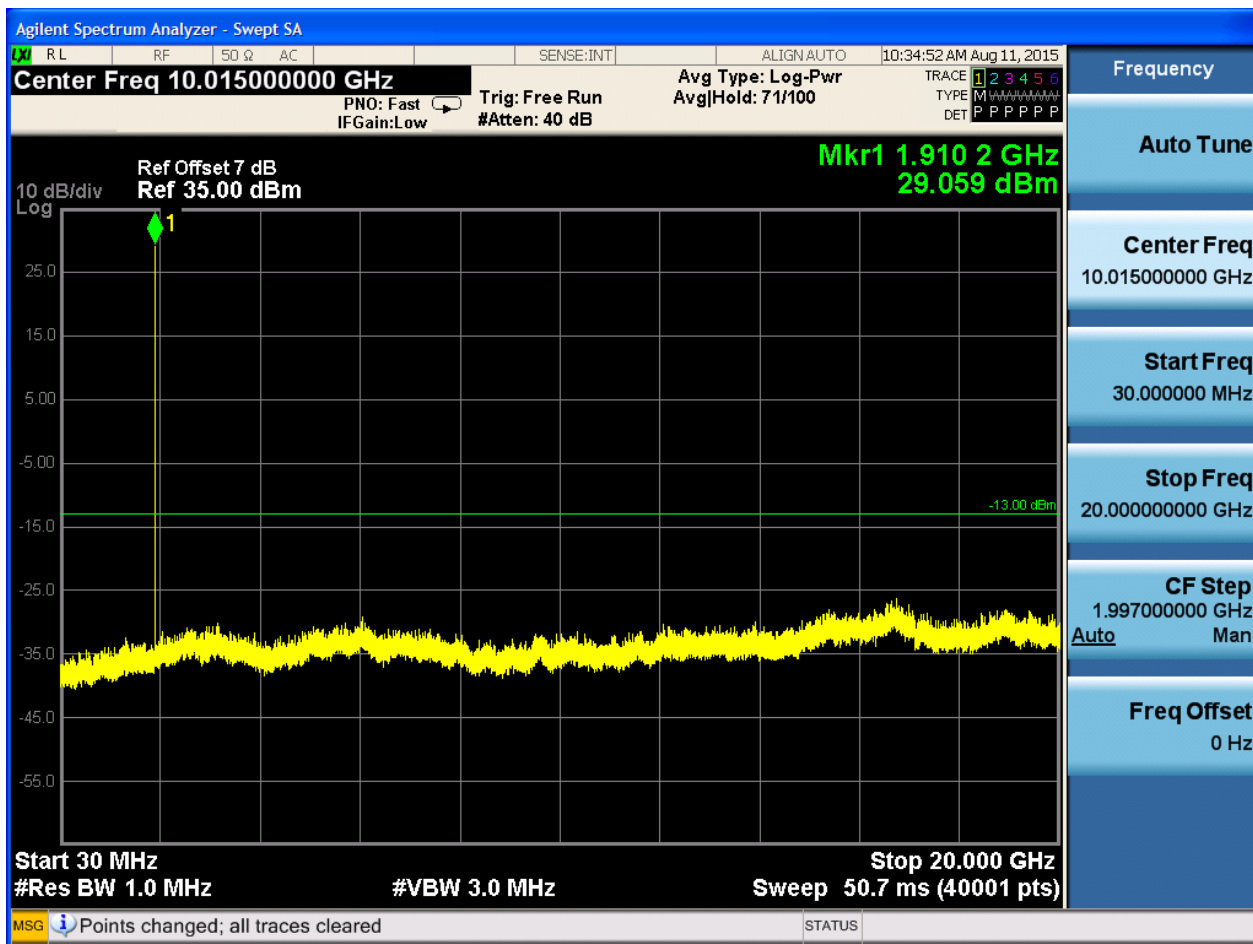




6.1.2.1.3 Test Channel = HCH

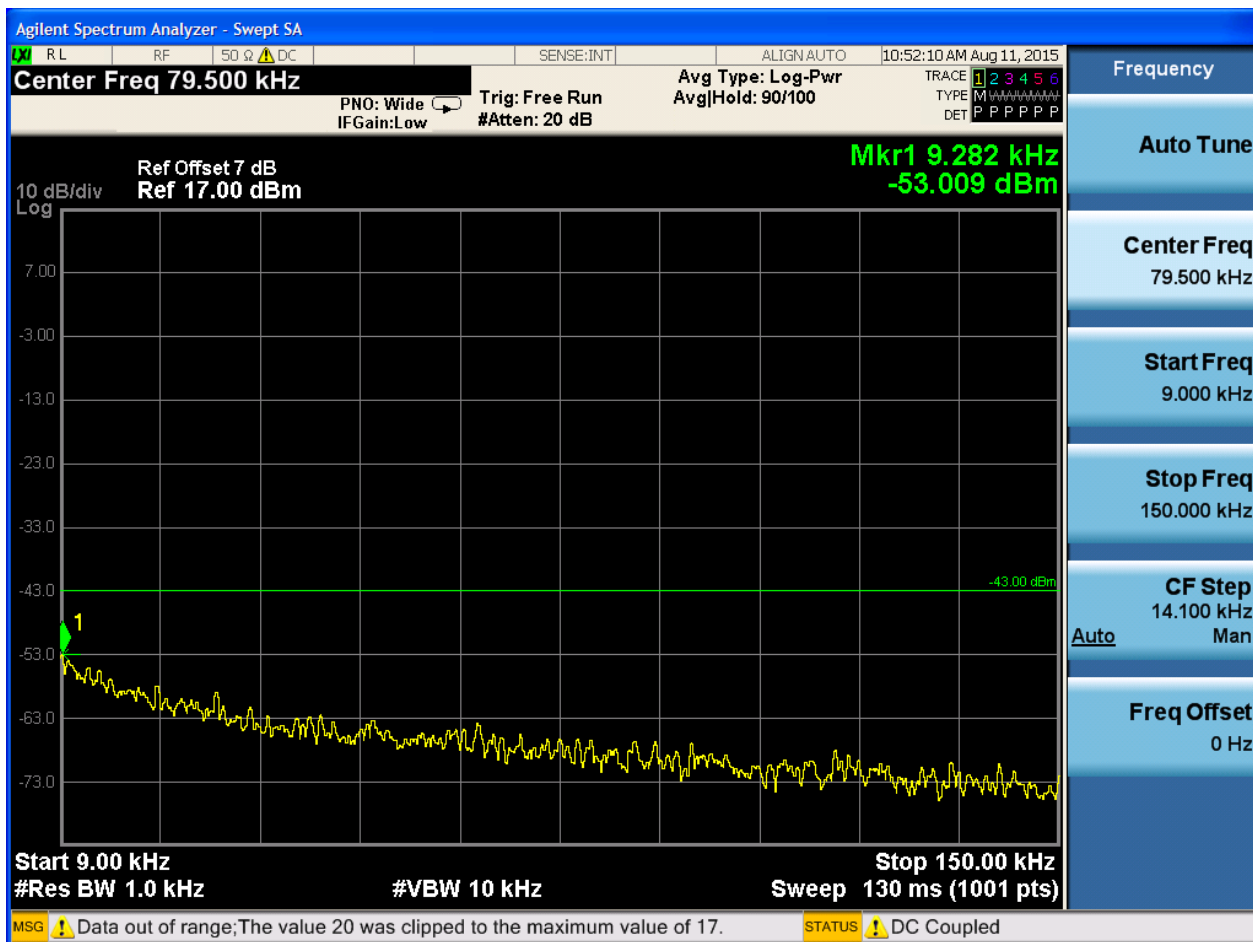


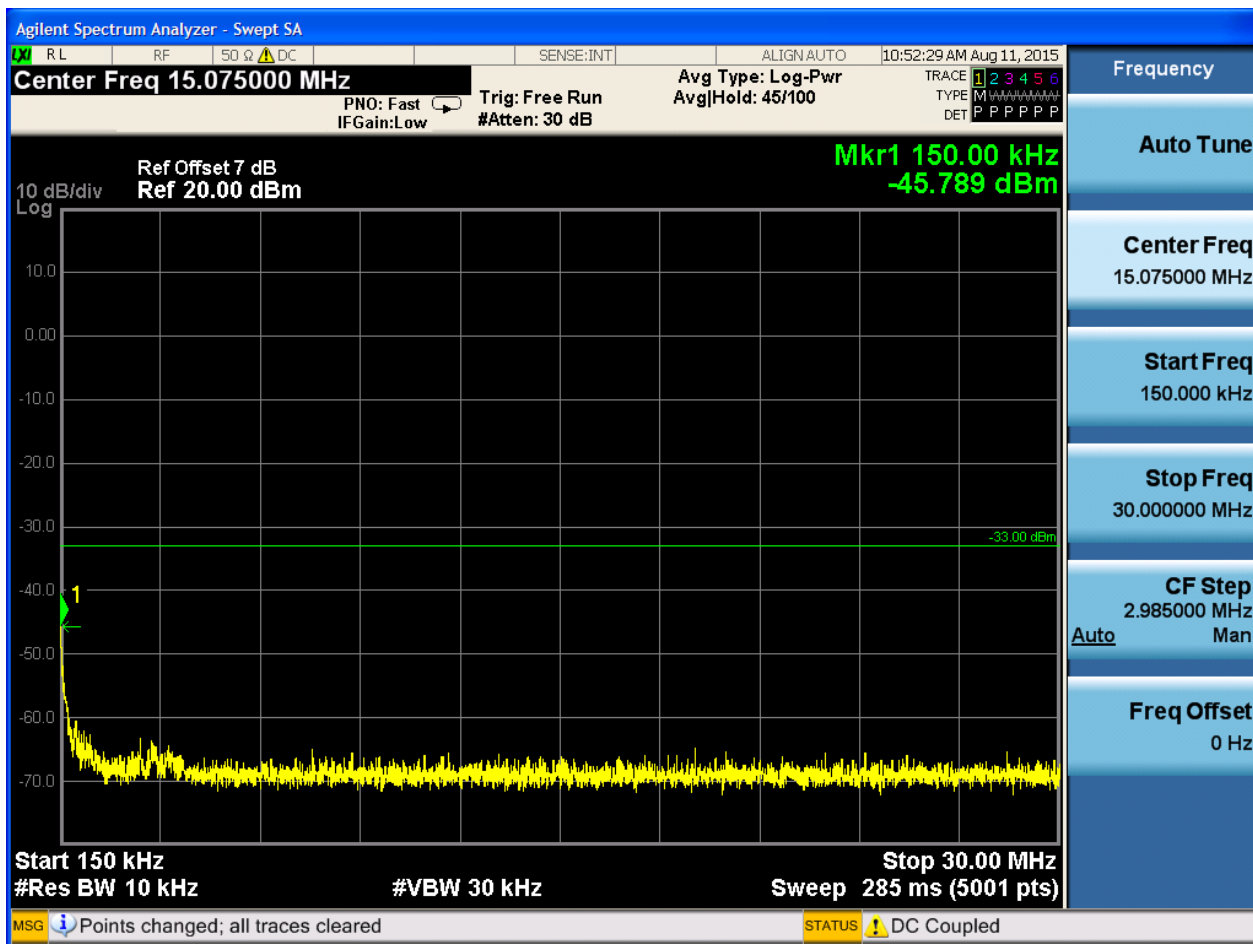


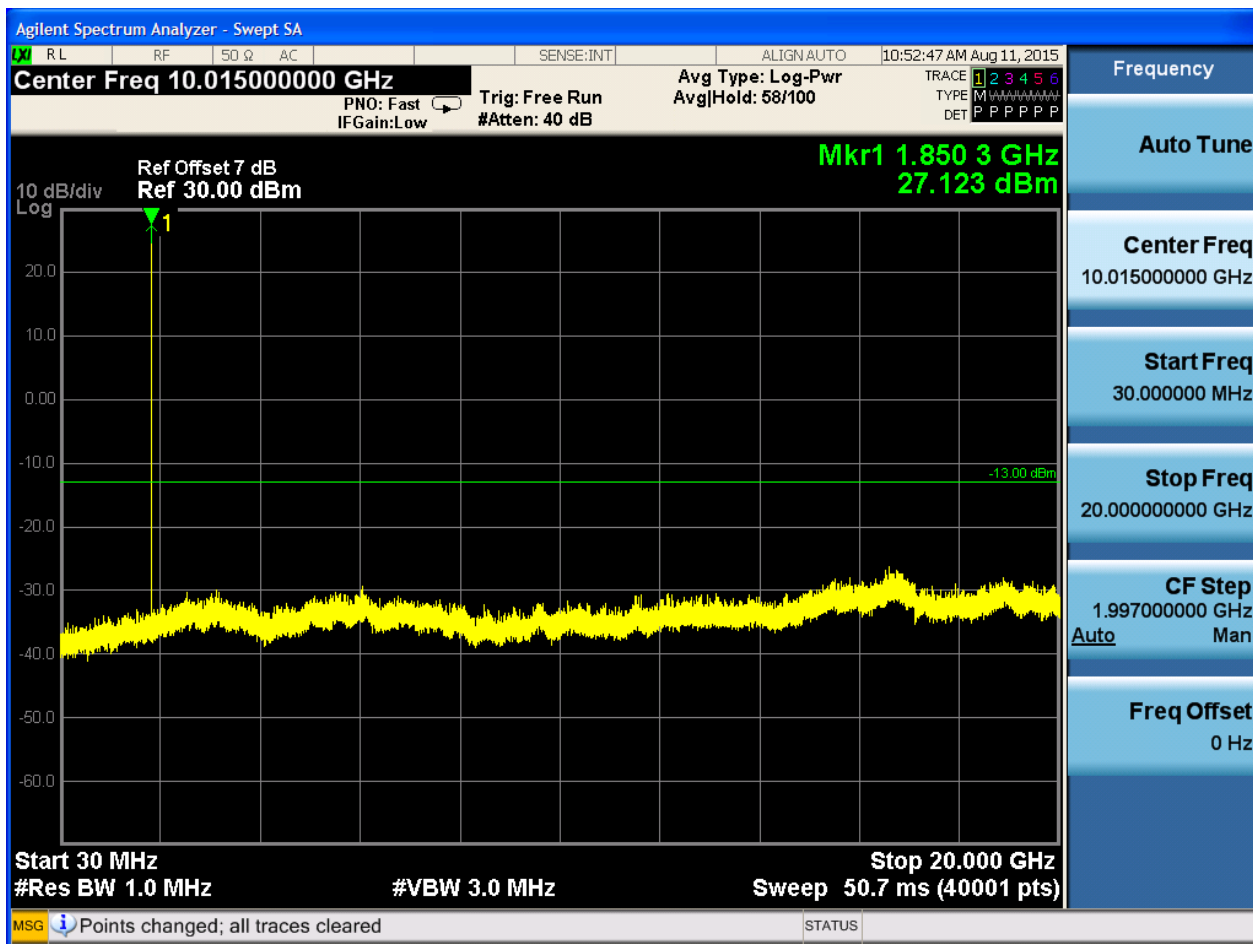


6.1.2.2 Test Mode = GSM/TM2

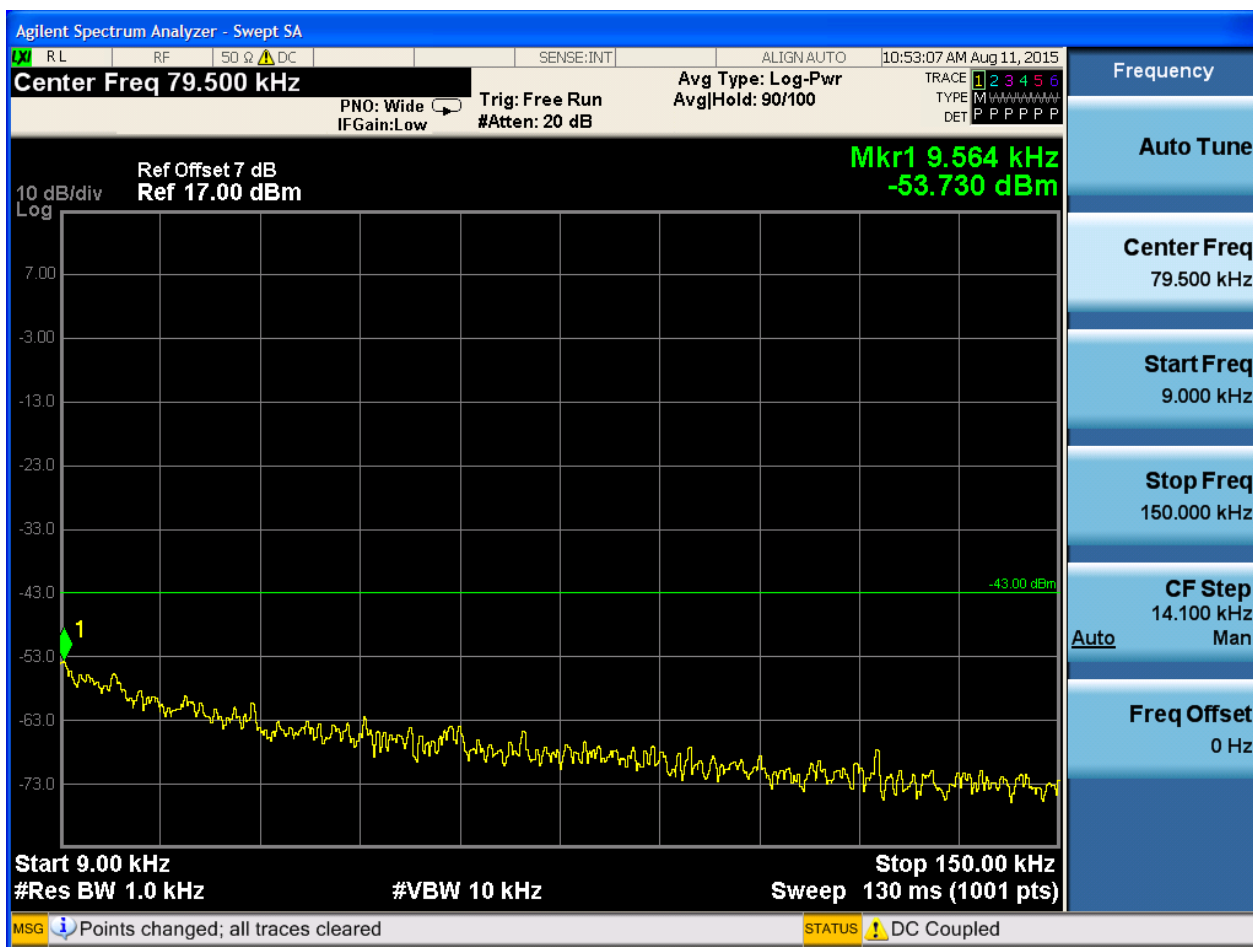
6.1.2.2.1 Test Channel = LCH

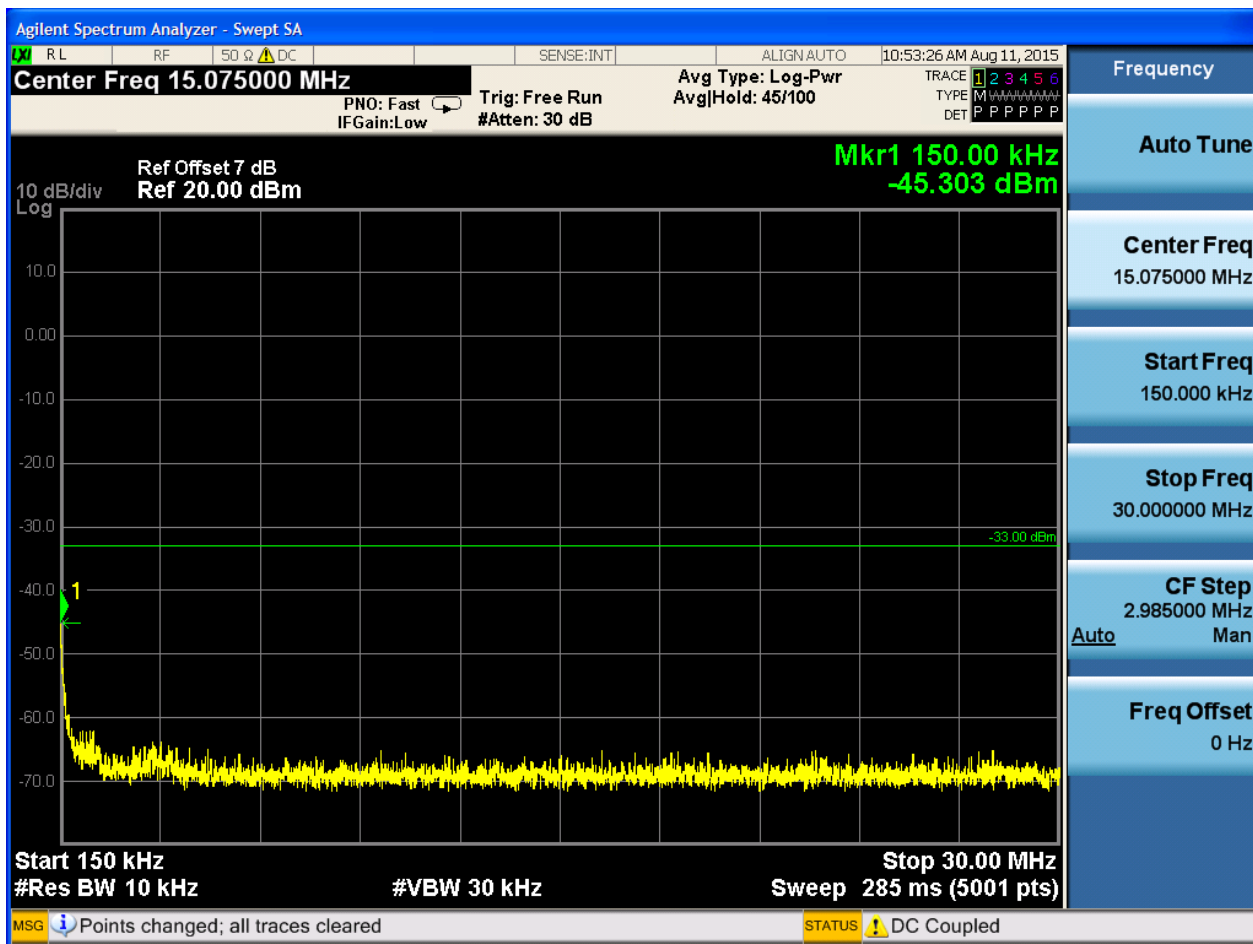


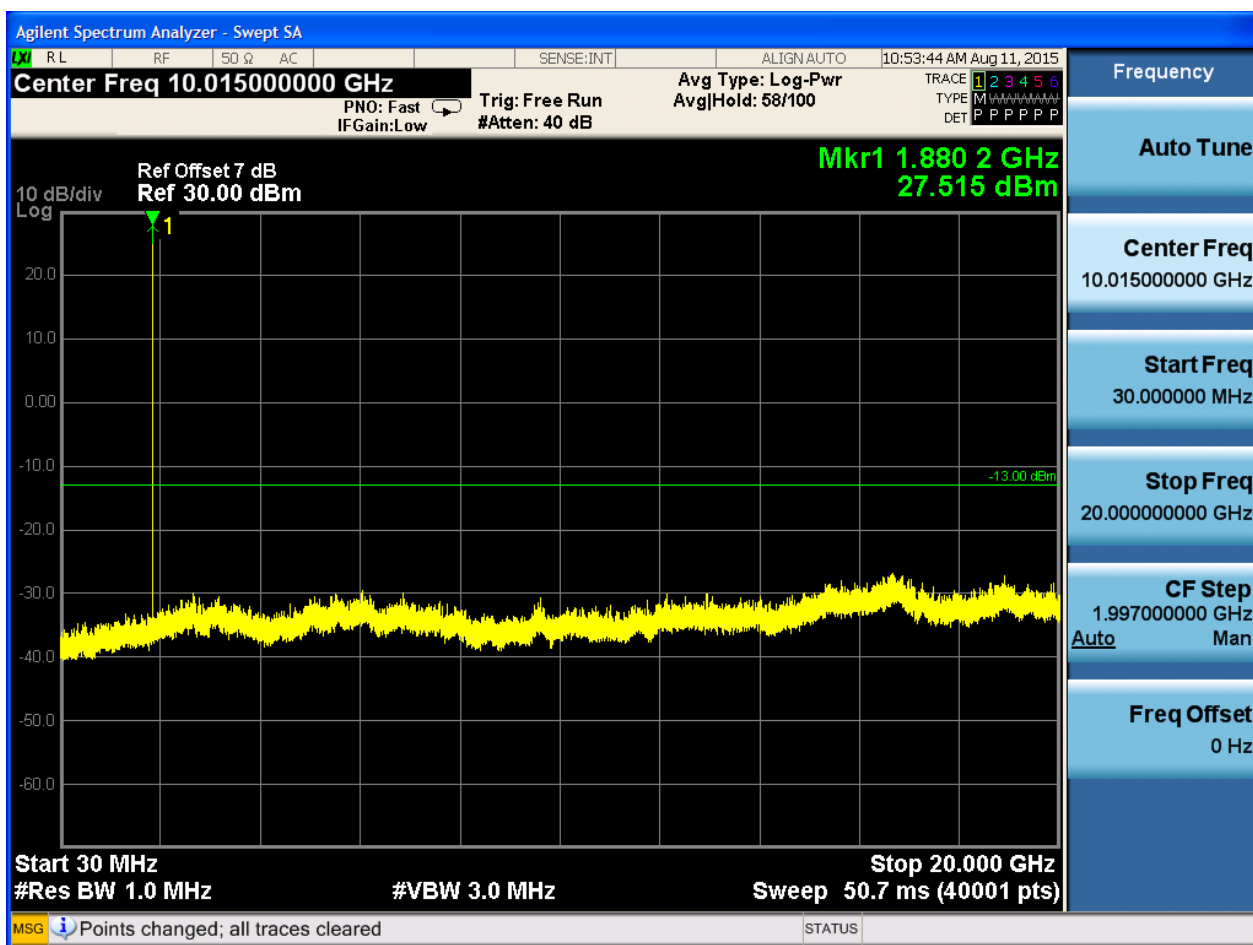




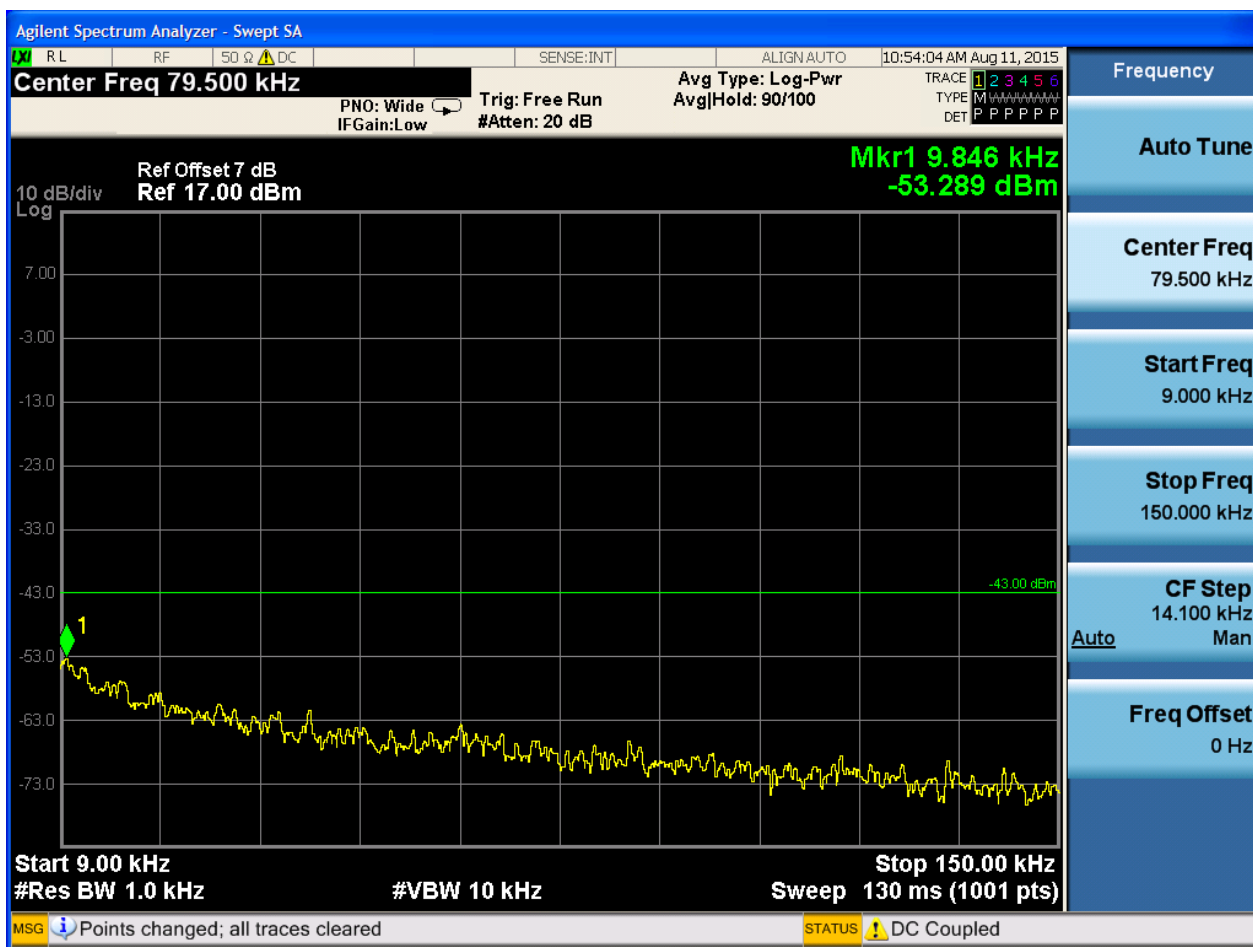
6.1.2.2.2 Test Channel = MCH

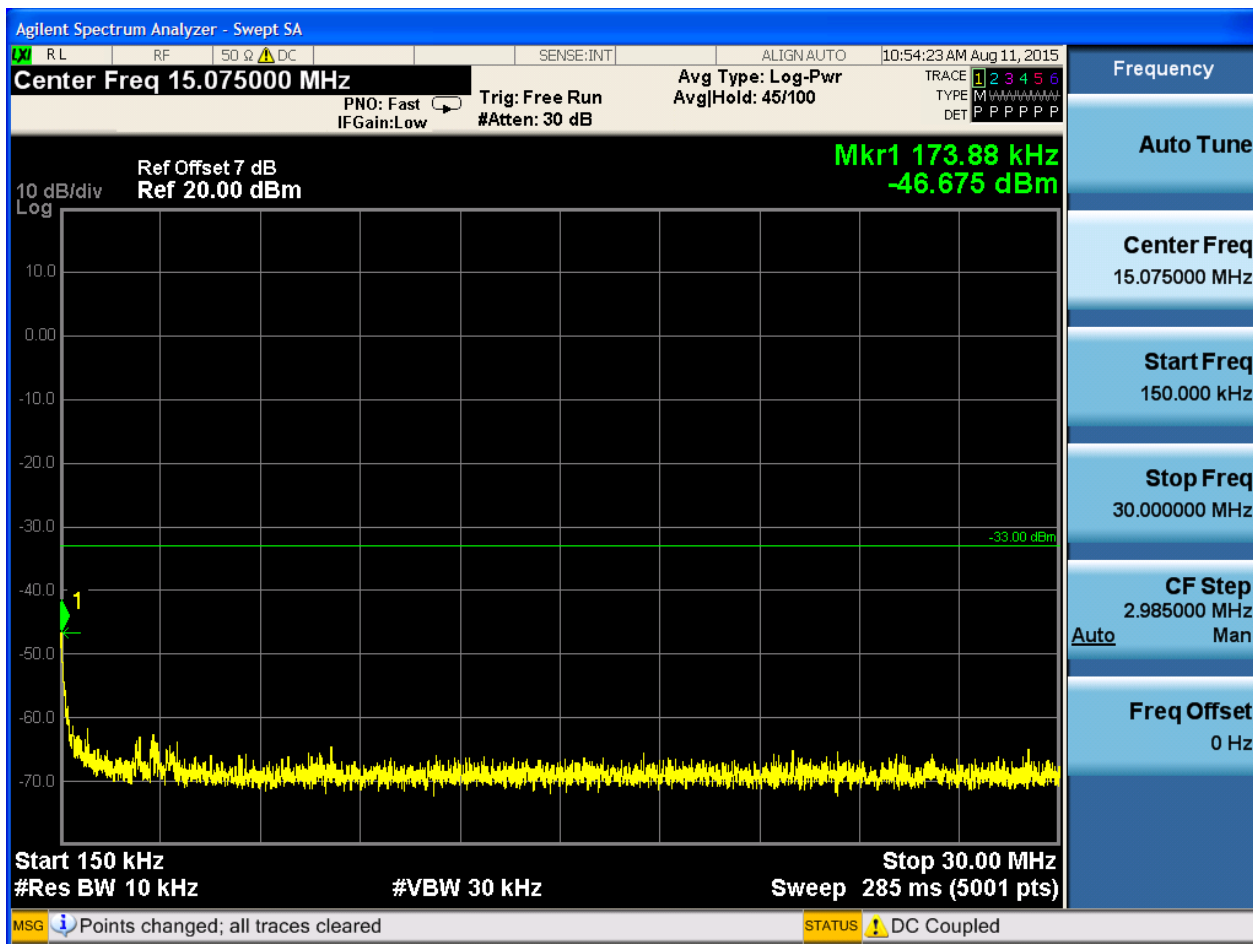


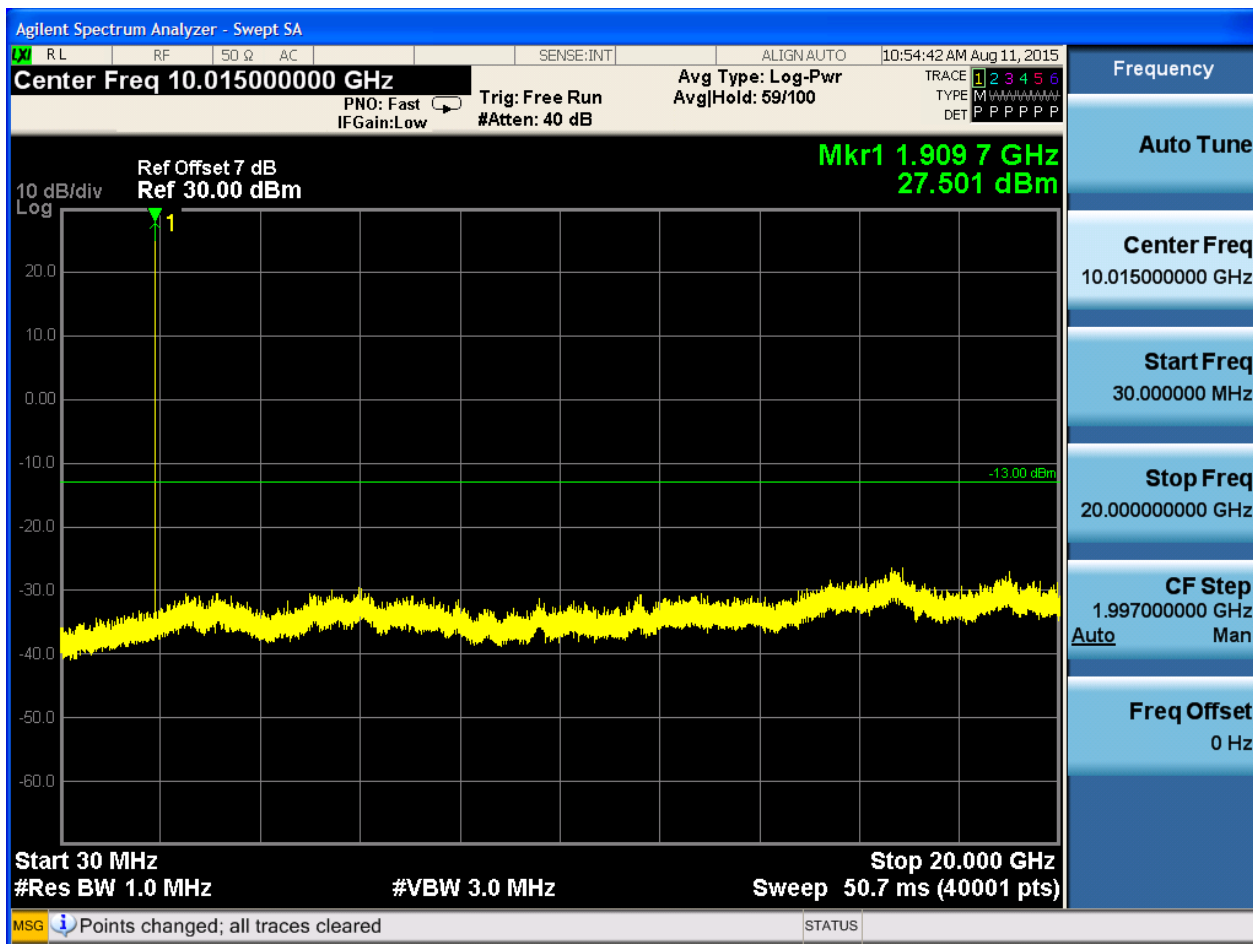




6.1.2.2.3 Test Channel = HCH







7Appendix_G: Field Strength of Spurious Radiation

Note:

9kHz~150kHz, VBW = 200Hz, VBW = 600 Hz, Detector: PK

150kHz~30MHz, VBW = 9kHz, VBW = 30k Hz, Detector: PK

30MHz~1GHz, RBW = 100 kHz, VBW = 300 kHz. Detector: PK

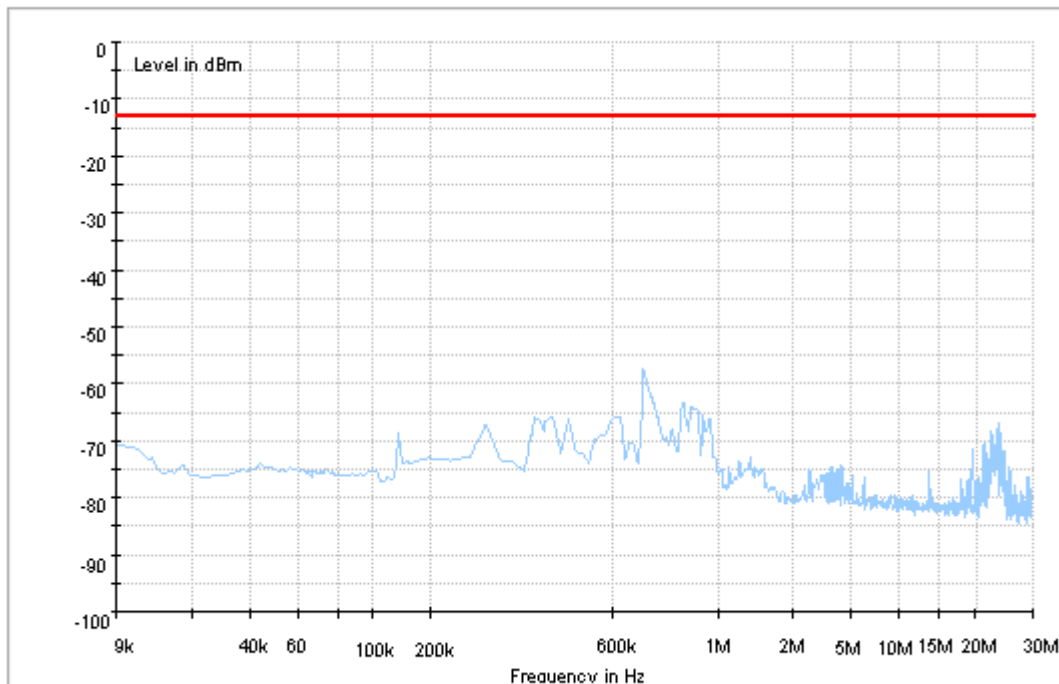
Above 1GHz, RBW = 1 MHz, VBW = 3 MHz. Detector: PK

Part I - Test Plots

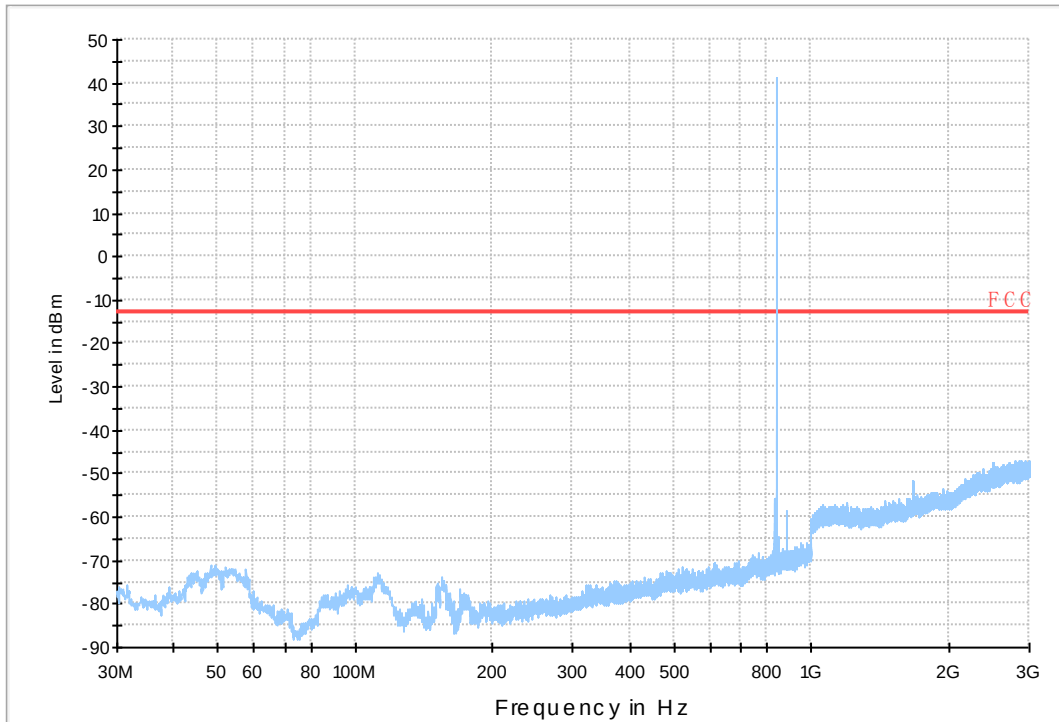
7.1 For GSM

7.1.1 Test Band = GSM850

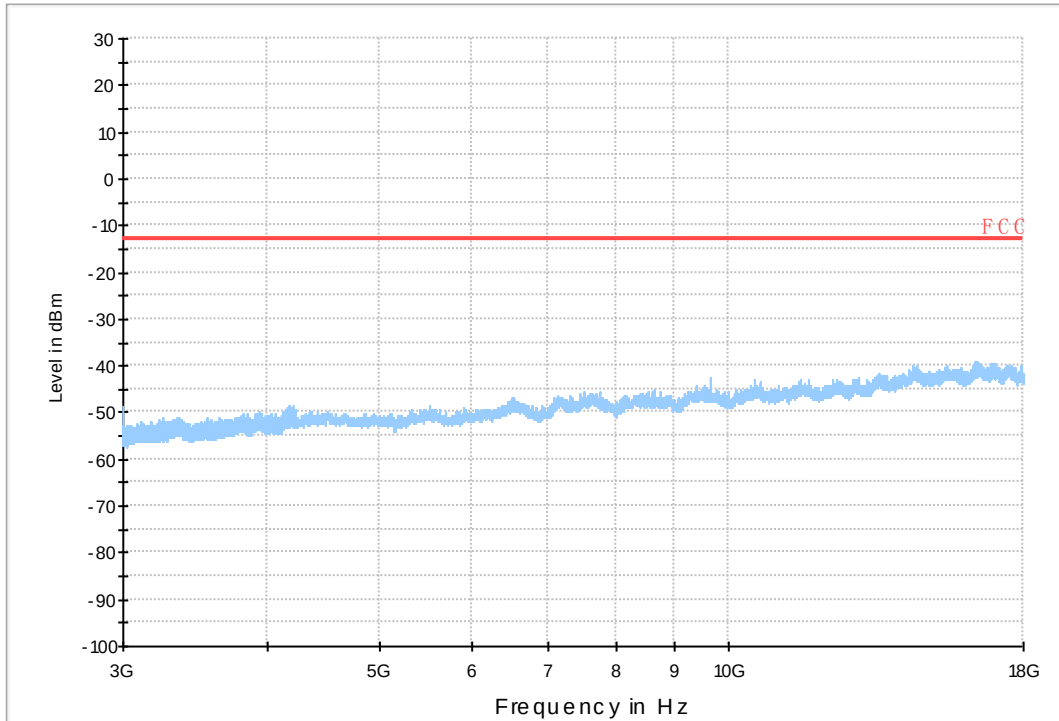
7.1.1.1 Test Mode = GSM/TM1



Copy of FCC PART22 GSM850_L

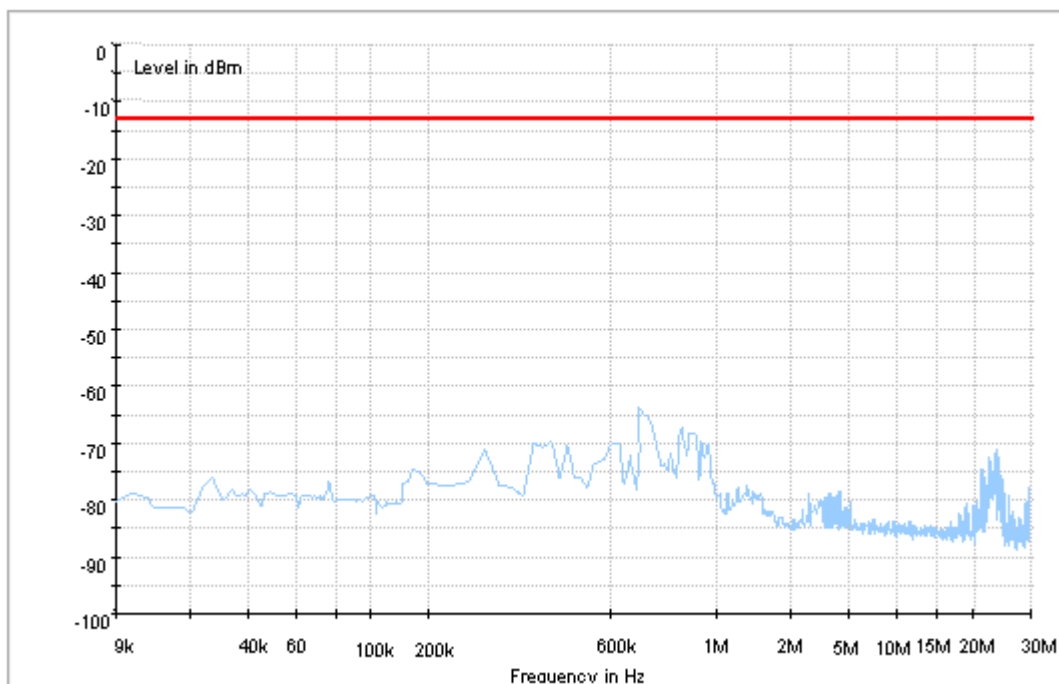


Copy of FCC PART22 GSM850_H

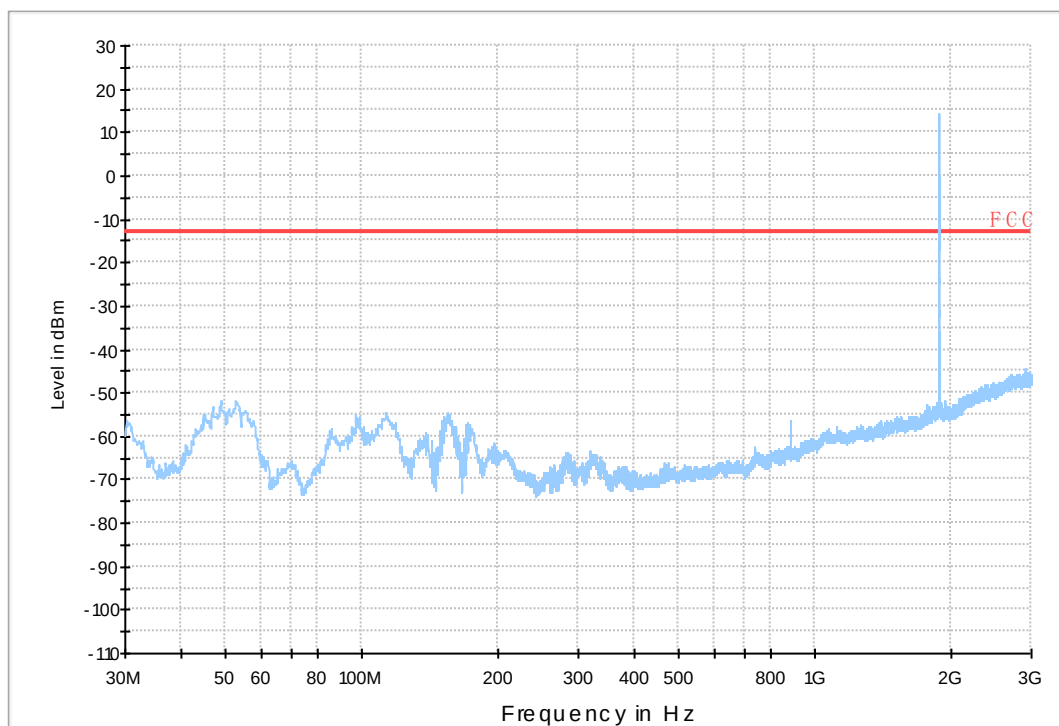


7.1.2 Test Band = GSM1900

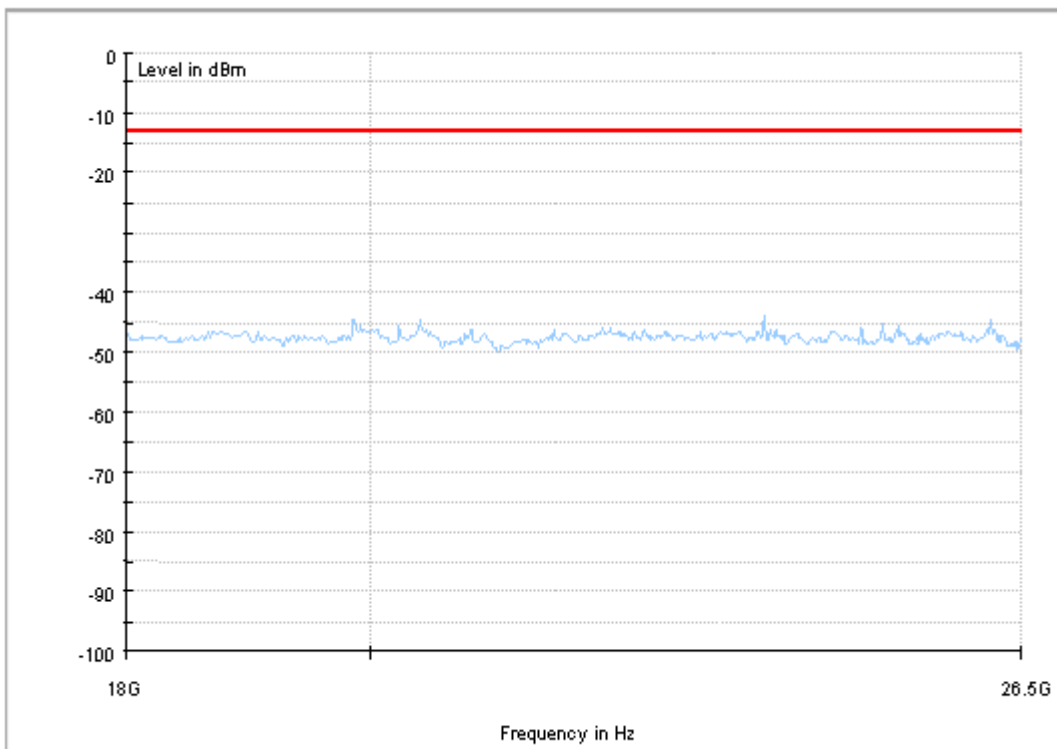
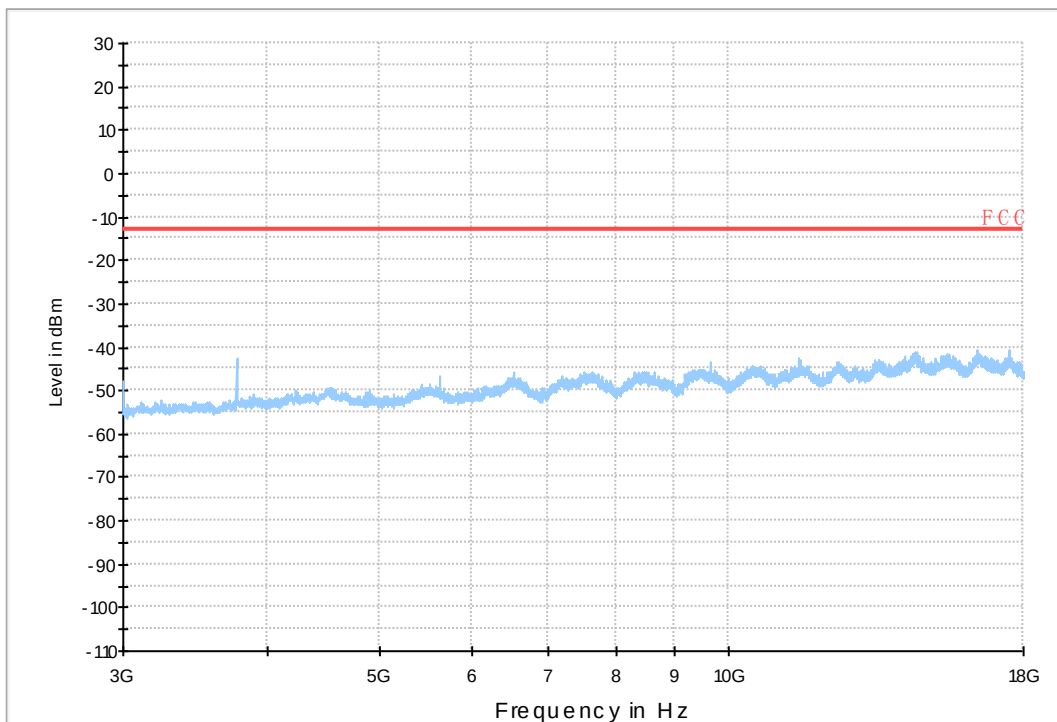
7.1.2.1 Test Mode = GSM/TM1



Copy of FCC PART 24 GSM 1900_L



Copy of FCC PART24 GSM 1900_H



8Appendix_H: Frequency Stability

8.1 For GSM

8.1.1Frequency Error vs. Voltage:

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
GSM850	GSM/TM1	LCH	TN	VL	9.04	0.01097	PASS
				VN	6.52	0.00791	PASS
				VH	10.53	0.01278	PASS
		MCH	TN	VL	11.95	0.01428	PASS
				VN	11.11	0.01328	PASS
				VH	11.82	0.01413	PASS
		HCH	TN	VL	9.36	0.01103	PASS
				VN	12.79	0.01507	PASS
				VH	9.56	0.01126	PASS
	GSM/TM2	LCH	TN	VL	15.56	0.01888	PASS
				VN	10.72	0.01301	PASS
				VH	12.66	0.01536	PASS
		MCH	TN	VL	13.11	0.01567	PASS
				VN	12.3	0.0147	PASS
				VH	9.52	0.01138	PASS
		HCH	TN	VL	6.65	0.00783	PASS
				VN	10.11	0.01191	PASS
				VH	9.33	0.01099	PASS
GSM1900	GSM/TM1	LCH	TN	VL	28.86	0.0156	PASS
				VN	33.38	0.01804	PASS
				VH	25.89	0.01399	PASS
		MCH	TN	VL	-3.75	-0.00199	PASS
				VN	16.79	0.00893	PASS
				VH	-7.81	-0.00415	PASS
		HCH	TN	VL	4.26	0.00223	PASS
				VN	-0.71	-0.00037	PASS
				VH	3.75	0.00196	PASS
	GSM/TM2	LCH	TN	VL	29.25	0.01581	PASS
				VN	30.12	0.01628	PASS
				VH	25.96	0.01403	PASS
		MCH	TN	VL	1.9	0.00101	PASS
				VN	1.81	0.00096	PASS

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
		HCH	TN	VH	5.23	0.00278	PASS
				VL	13.04	0.00683	PASS
				VN	6.94	0.00363	PASS
				VH	5.84	0.00306	PASS

8.1.2 Frequency Error vs. Temperature:

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
GSM850	GSM/TM1	LCH	VN	-30	8.01	0.00972	PASS
				-20	6.65	0.00807	PASS
				-10	7.81	0.00948	PASS
				0	5.81	0.00705	PASS
				10	8.27	0.01003	PASS
				20	6.2	0.00752	PASS
				30	4.39	0.00533	PASS
				40	7.43	0.00901	PASS
				50	6.33	0.00768	PASS
		MCH	VN	-30	8.2	0.0098	PASS
				-20	8.98	0.01073	PASS
				-10	8.91	0.01065	PASS
				0	8.98	0.01073	PASS
				10	10.59	0.01266	PASS
				20	9.17	0.01096	PASS
				30	11.3	0.01351	PASS
				40	8.46	0.01011	PASS
				50	7.68	0.00918	PASS
		HCH	VN	-30	9.23	0.01087	PASS
				-20	7.55	0.00889	PASS
				-10	11.56	0.01362	PASS
				0	10.78	0.0127	PASS
				10	12.85	0.01514	PASS
				20	11.88	0.014	PASS
				30	149.03	0.17558	PASS
				40	10.07	0.01186	PASS
				50	11.17	0.01316	PASS
	GSM/TM2	LCH	VN	-30	14.21	0.01724	PASS
				-20	11.46	0.0139	PASS
				-10	11.36	0.01378	PASS
				0	12.04	0.01461	PASS

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				10	14.01	0.017	PASS
				20	13.88	0.01684	PASS
				30	11.85	0.01438	PASS
				40	12.04	0.01461	PASS
				50	10.78	0.01308	PASS
		MCH	VN	-30	10.94	0.01308	PASS
				-20	11.59	0.01385	PASS
				-10	12.85	0.01536	PASS
				0	11.53	0.01378	PASS
				10	11.56	0.01382	PASS
				20	12.88	0.0154	PASS
				30	10.56	0.01262	PASS
				40	12.85	0.01536	PASS
				50	12.85	0.01536	PASS
		HCH	VN	-30	9.4	0.01107	PASS
				-20	6.49	0.00765	PASS
				-10	8.07	0.00951	PASS
				0	8.81	0.01038	PASS
				10	7.3	0.0086	PASS
				20	8.07	0.00951	PASS
				30	10.04	0.01183	PASS
				40	9.72	0.01145	PASS
				50	8.56	0.01008	PASS
GSM1900	GSM/TM1	LCH	VN	-30	2.58	0.00139	PASS
				-20	1.81	0.00098	PASS
				-10	7.1	0.00384	PASS
				0	9.49	0.00513	PASS
				10	26.15	0.01413	PASS
				20	28.15	0.01521	PASS
				30	3.23	0.00175	PASS
				40	29.44	0.01591	PASS
				50	5.55	0.003	PASS
		MCH	VN	-30	24.15	0.01285	PASS
				-20	5.88	0.00313	PASS
				-10	2.45	0.0013	PASS
				0	-1.23	-0.00065	PASS
				10	-0.52	-0.00028	PASS
				20	-1.55	-0.00082	PASS
				30	2.39	0.00127	PASS
				40	-4.58	-0.00244	PASS

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
		HCH	VN	50	-9.1	-0.00484	PASS
				-30	3.1	0.00162	PASS
				-20	4.13	0.00216	PASS
				-10	2.26	0.00118	PASS
				0	-2.32	-0.00121	PASS
				10	0.13	0.00007	PASS
				20	-1.36	-0.00071	PASS
				30	3.29	0.00172	PASS
				40	-5.88	-0.00308	PASS
				50	5.29	0.00277	PASS
	GSM/TM2	LCH	VN	-30	6.49	0.00351	PASS
				-20	24.96	0.01349	PASS
				-10	27.22	0.01471	PASS
				0	22.31	0.01206	PASS
				10	27.41	0.01481	PASS
				20	25.22	0.01363	PASS
				30	0.9	0.00049	PASS
				40	5.2	0.00281	PASS
				50	24.02	0.01298	PASS
		MCH	VN	-30	24.83	0.01321	PASS
				-20	0.74	0.00039	PASS
				-10	24.96	0.01328	PASS
				0	18.5	0.00984	PASS
				10	17.4	0.00926	PASS
				20	-1.23	-0.00065	PASS
				30	21.21	0.01128	PASS
				40	3	0.0016	PASS
				50	1.9	0.00101	PASS
		HCH	VN	-30	9.59	0.00502	PASS
				-20	11.49	0.00602	PASS
				-10	11.95	0.00626	PASS
				0	10.36	0.00542	PASS
				10	10.04	0.00526	PASS
				20	10.01	0.00524	PASS
				30	6.52	0.00341	PASS
				40	6.59	0.00345	PASS
				50	9.49	0.00497	PASS

END