



Appendix for test report



1 Appendix_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	33.26	28.86	38.5	PASS
		MCH	33.25	28.97	38.5	PASS
		HCH	33.22	28.84	38.5	PASS
	GSM/TM2	LCH	26.39	22.04	38.5	PASS
		MCH	26.38	22.02	38.5	PASS
		HCH	26.34	21.95	38.5	PASS

Test Band	Test Mode	Test Channel	Conducted Power [dBm]	EIRP [dBm]	Limit [dBm]	Verdict
GSM1900	GSM/TM1	LCH	30.11	32.07	33	PASS
		MCH	29.89	31.59	33	PASS
		HCH	30.09	32.12	33	PASS
	GSM/TM2	LCH	25.63	27.60	33	PASS
		MCH	25.57	27.30	33	PASS



Test Band	Test Mode	Test Channel	Conducted Power [dBm]	EIRP [dBm]	Limit [dBm]	Verdict
		HCH	25.58	27.64	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	0.23	13	PASS
		MCH	0.24	13	PASS
		HCH	0.2	13	PASS
	GSM/TM2	LCH	3.27	13	PASS
		MCH	3.26	13	PASS
		HCH	3.07	13	PASS

3Appendix_C: Modulation Characteristics

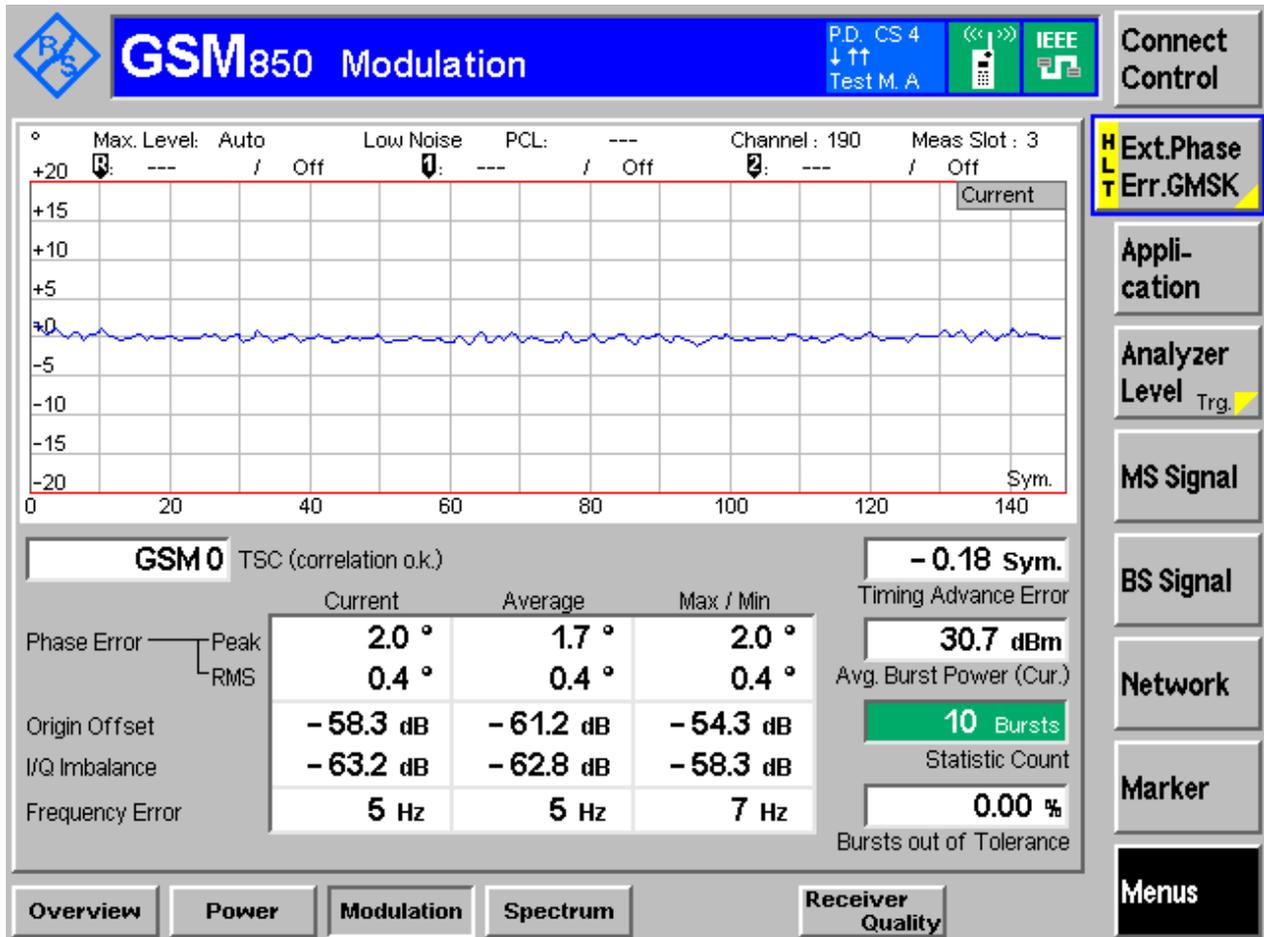
Part I - Test Plots

3.1 For GSM

3.1.1 Test Band = GSM850

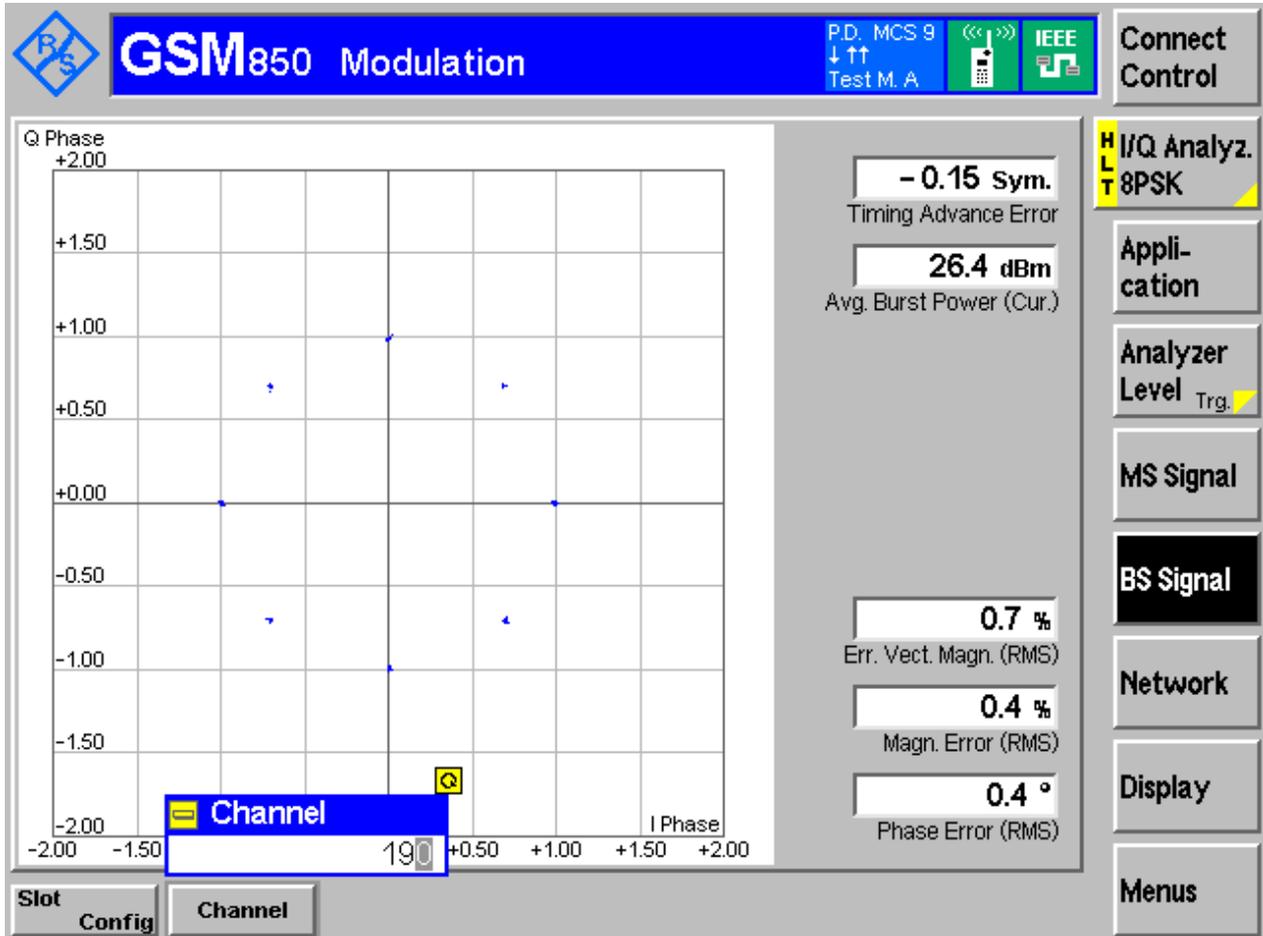
3.1.1.1 Test Mode = GSM/TM1

3.1.1.1.1 Test Channel = MCH



3.1.1.2 Test Mode = GSM/TM2

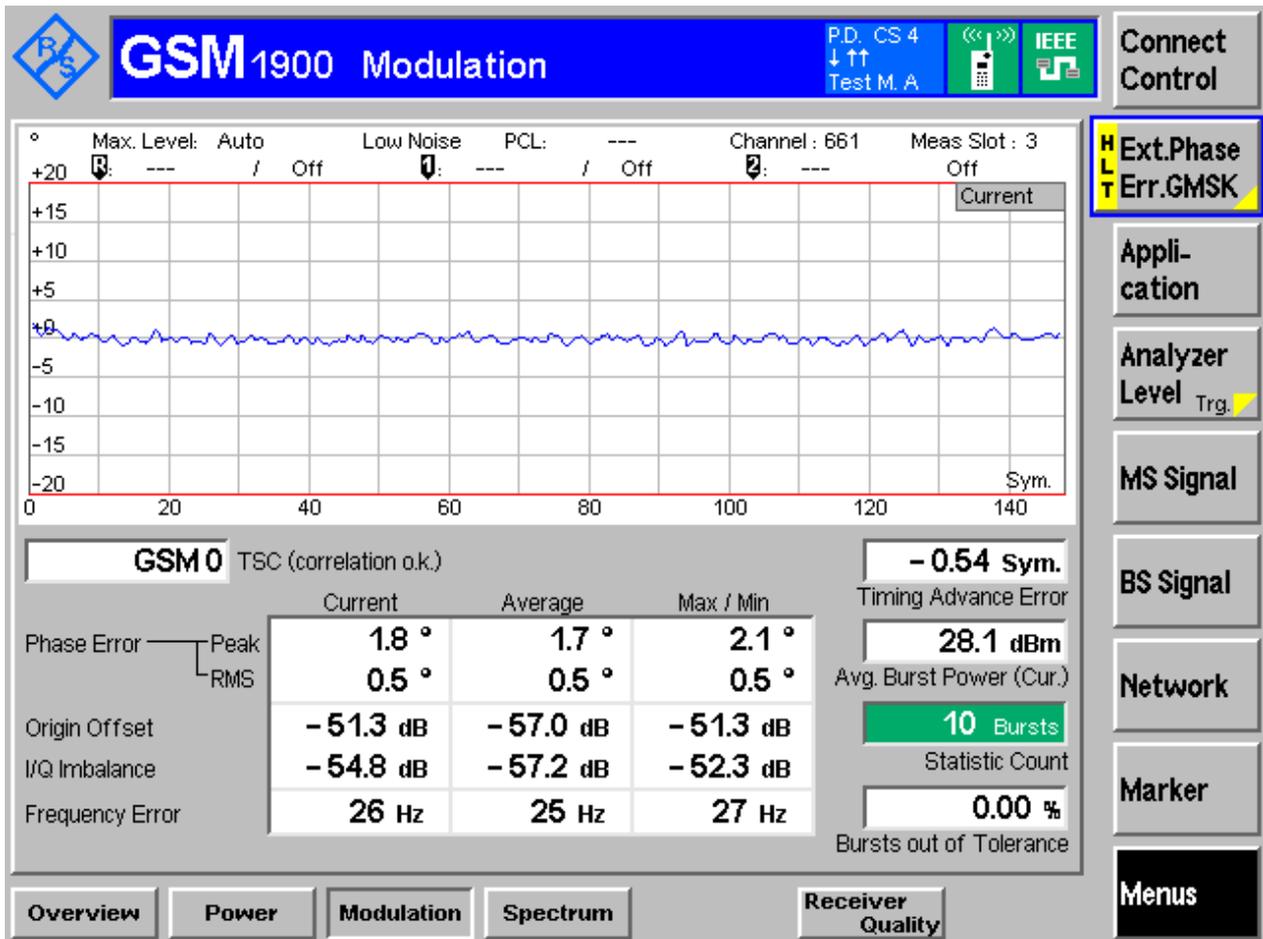
3.1.1.2.1 Test Channel = MCH



3.1.2 Test Band = GSM1900

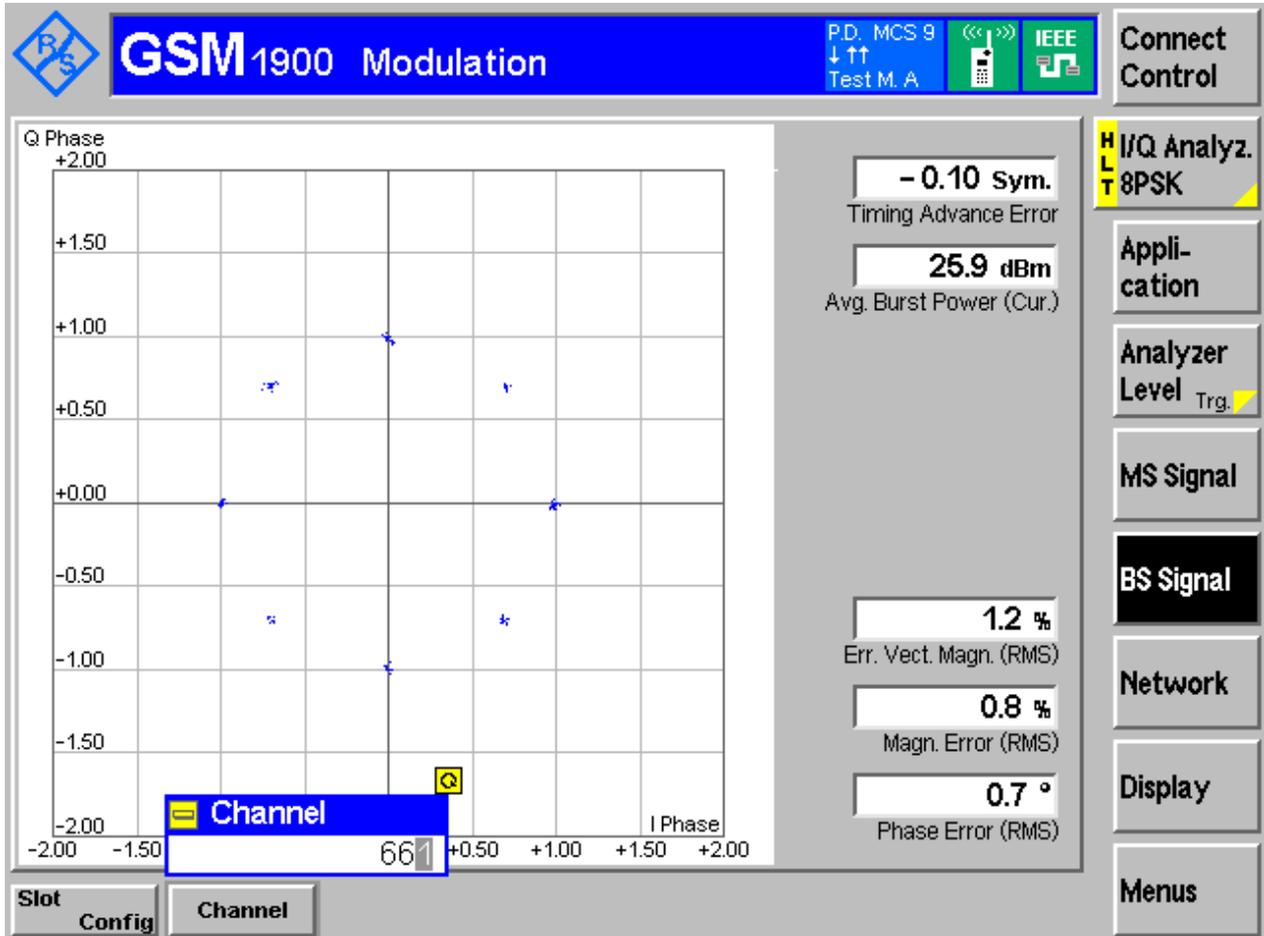
3.1.2.1 Test Mode = GSM/TM1

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	246.26	322.84	Pass
		MCH	245.78	316.32	Pass
		HCH	242.95	315.59	Pass
	GSM/TM2	LCH	242.94	313.33	Pass
		MCH	249.56	315.02	Pass
		HCH	248.44	308.93	Pass
GSM1900	GSM/TM1	LCH	246.53	316.17	Pass
		MCH	249.86	313.50	Pass
		HCH	245.79	315.53	Pass
	GSM/TM2	LCH	249.27	312.97	Pass
		MCH	240.38	312.03	Pass
		HCH	240.56	302.78	Pass



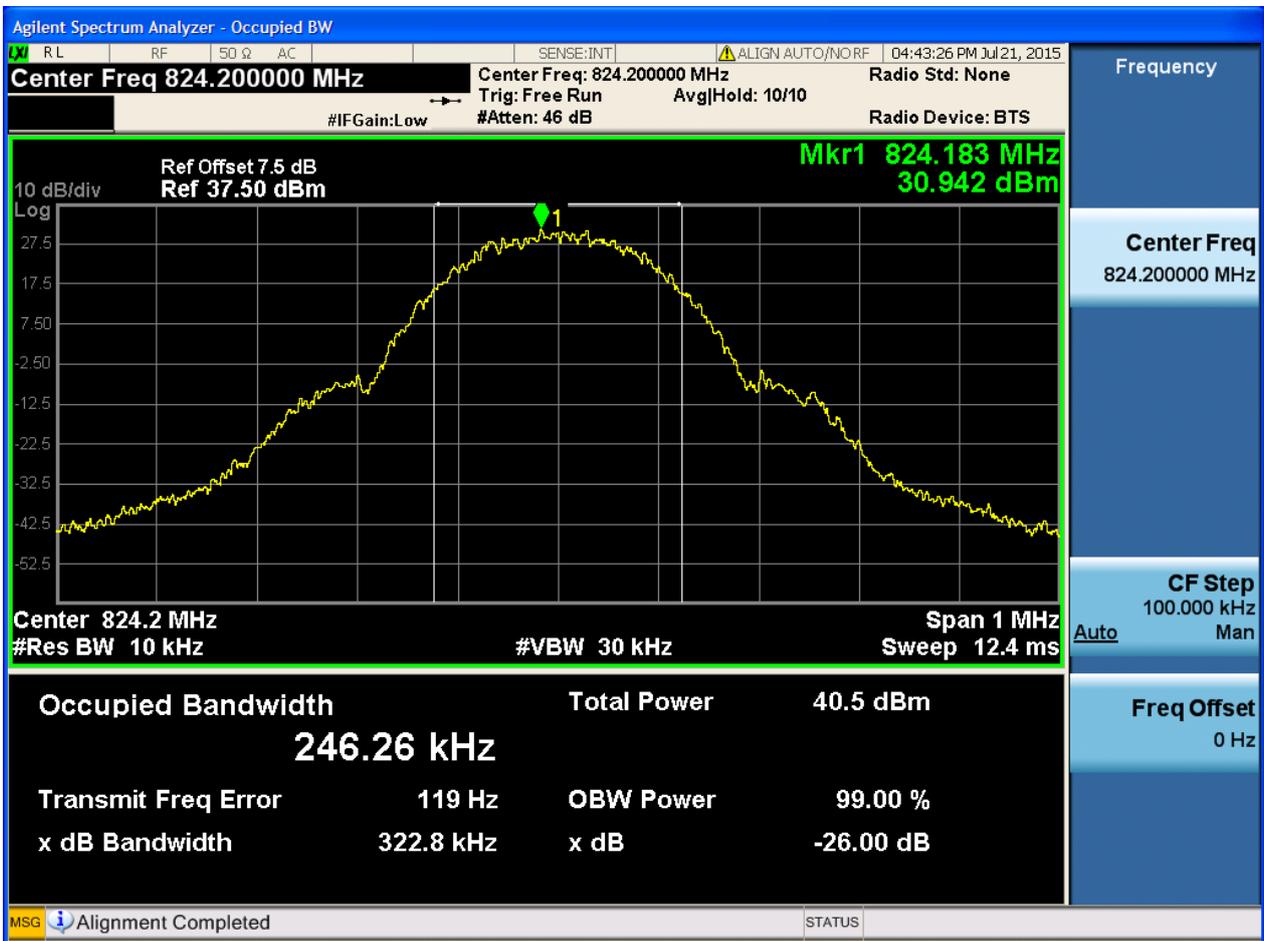
Part II - Test Plots

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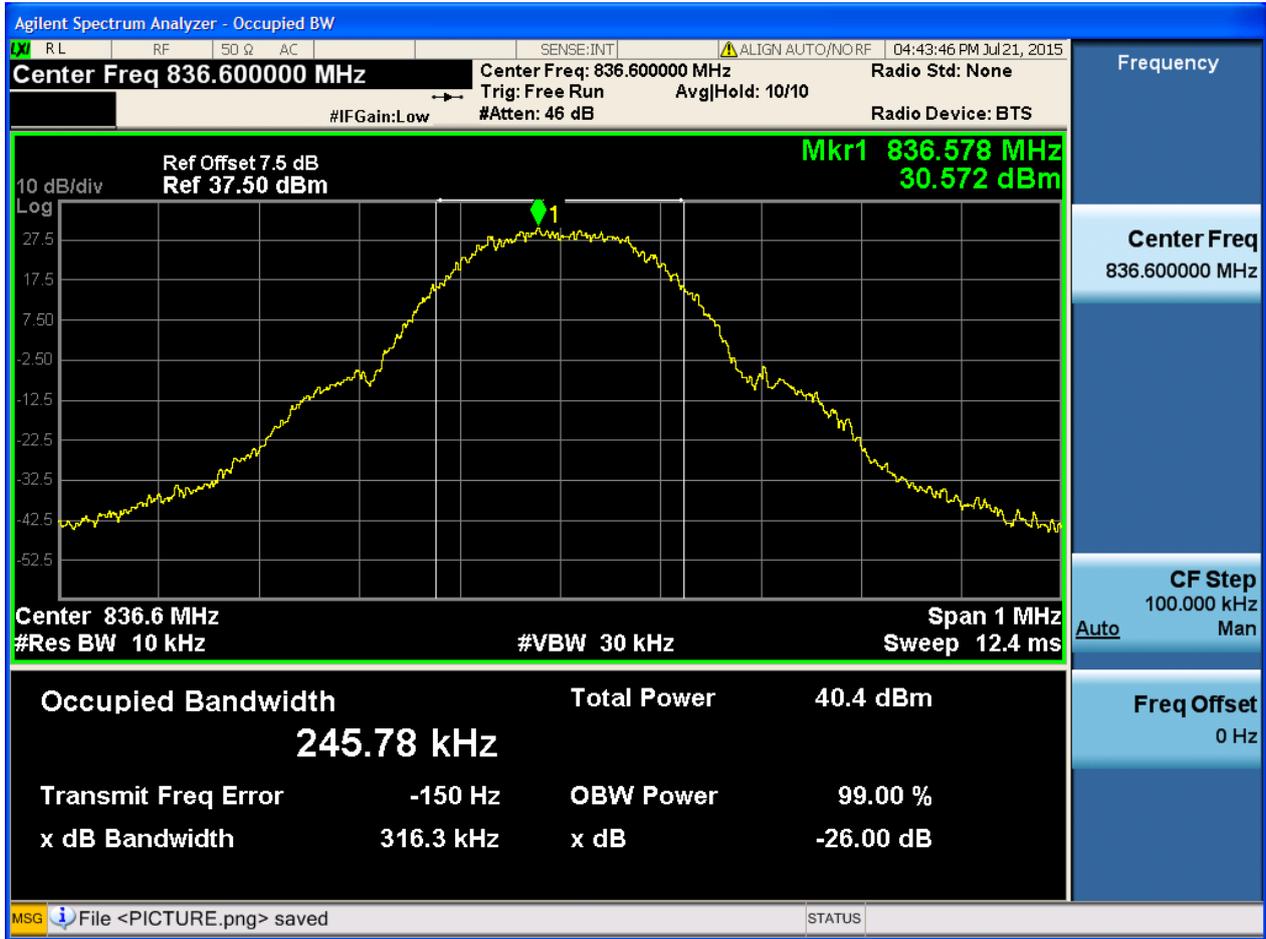
4.1.1.1 Test Mode = GSM/TM1

4.1.1.1.1 Test Channel = LCH



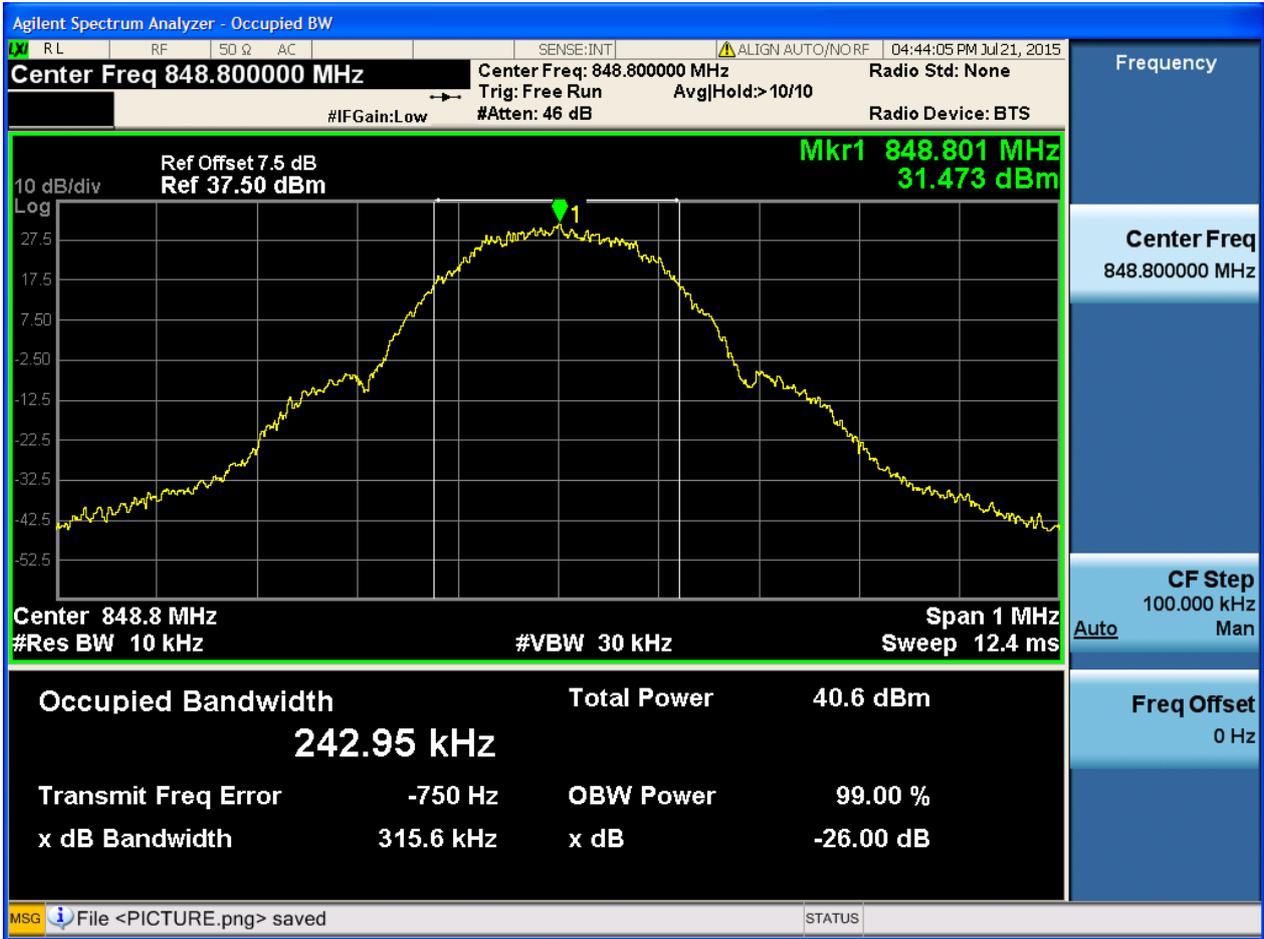


4.1.1.1.2 Test Channel = MCH





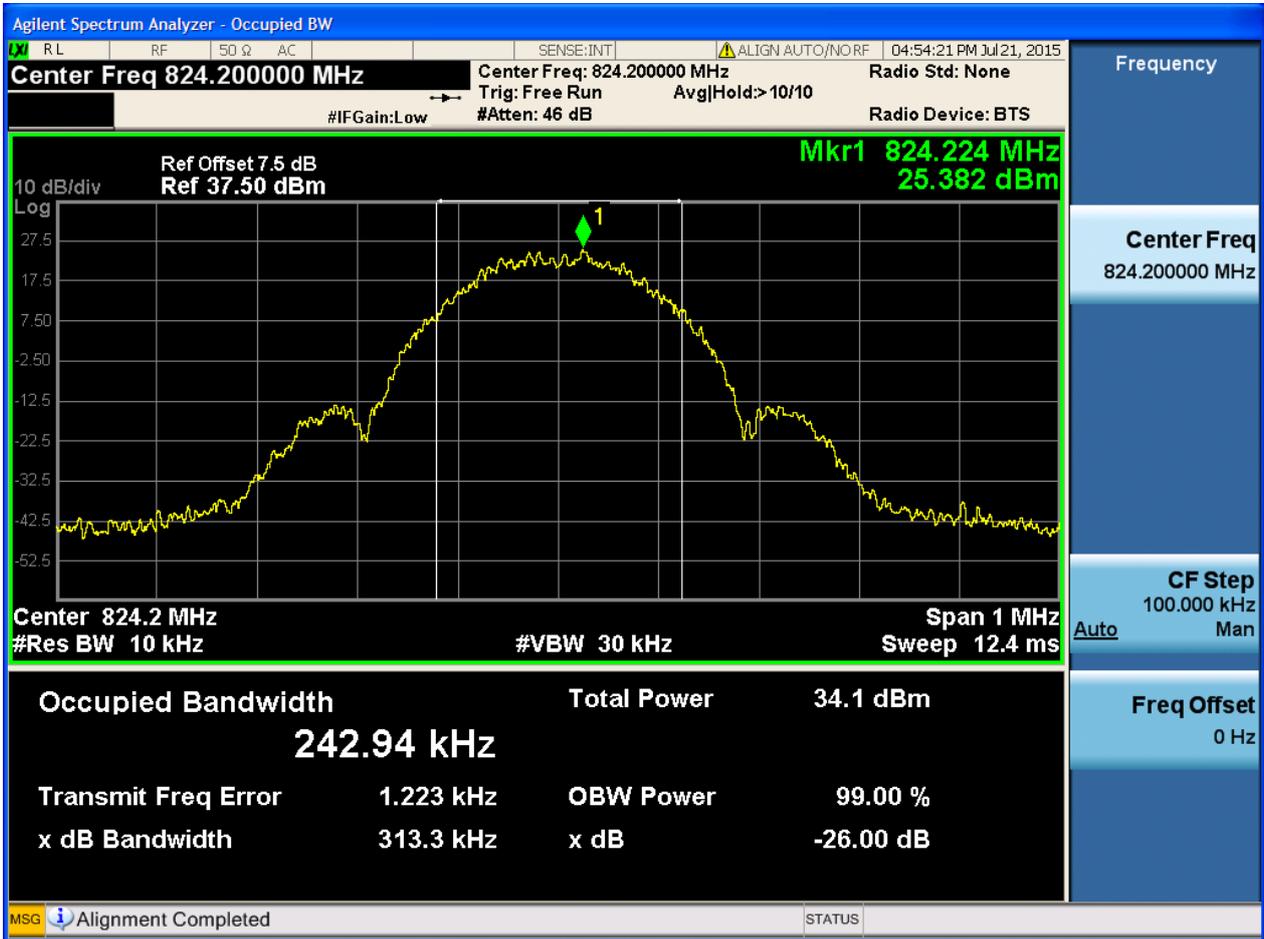
4.1.1.1.3 Test Channel = HCH





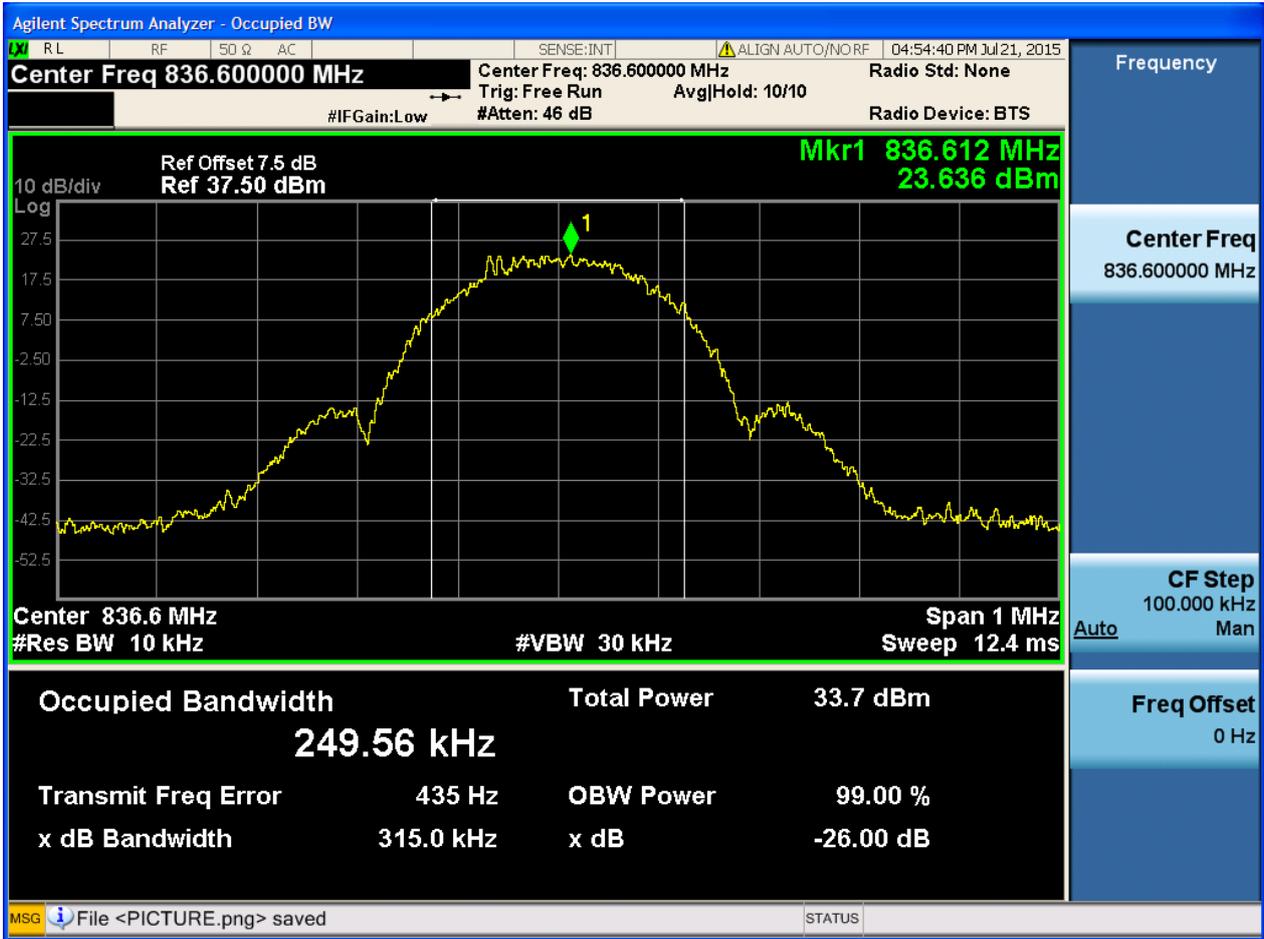
4.1.1.2 Test Mode = GSM/TM2

4.1.1.2.1 Test Channel = LCH



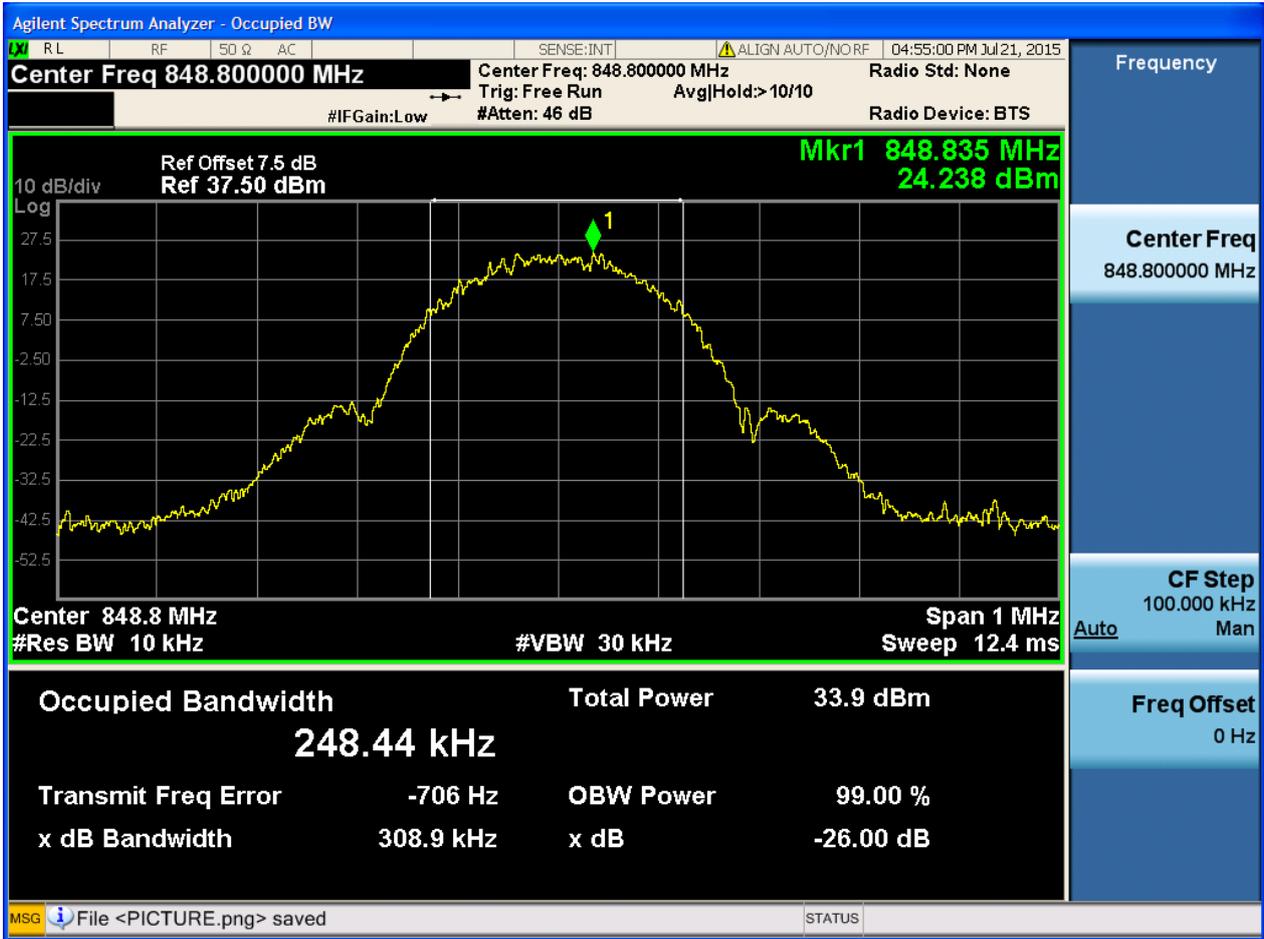


4.1.1.2.2 Test Channel = MCH





4.1.1.2.3 Test Channel = HCH





4.1.2 Test Band = GSM1900

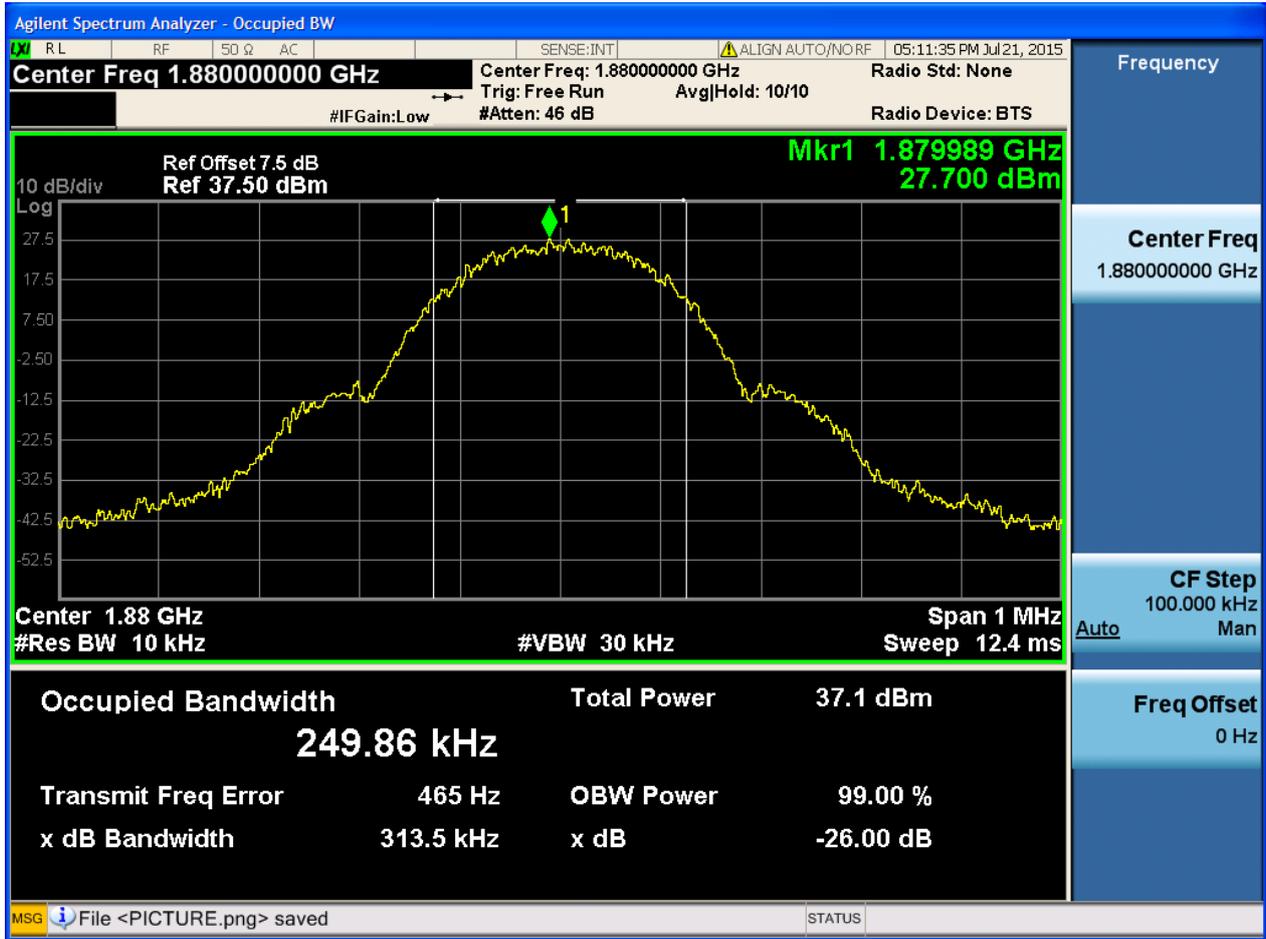
4.1.2.1 Test Mode = GSM/TM1

4.1.2.1.1 Test Channel = LCH



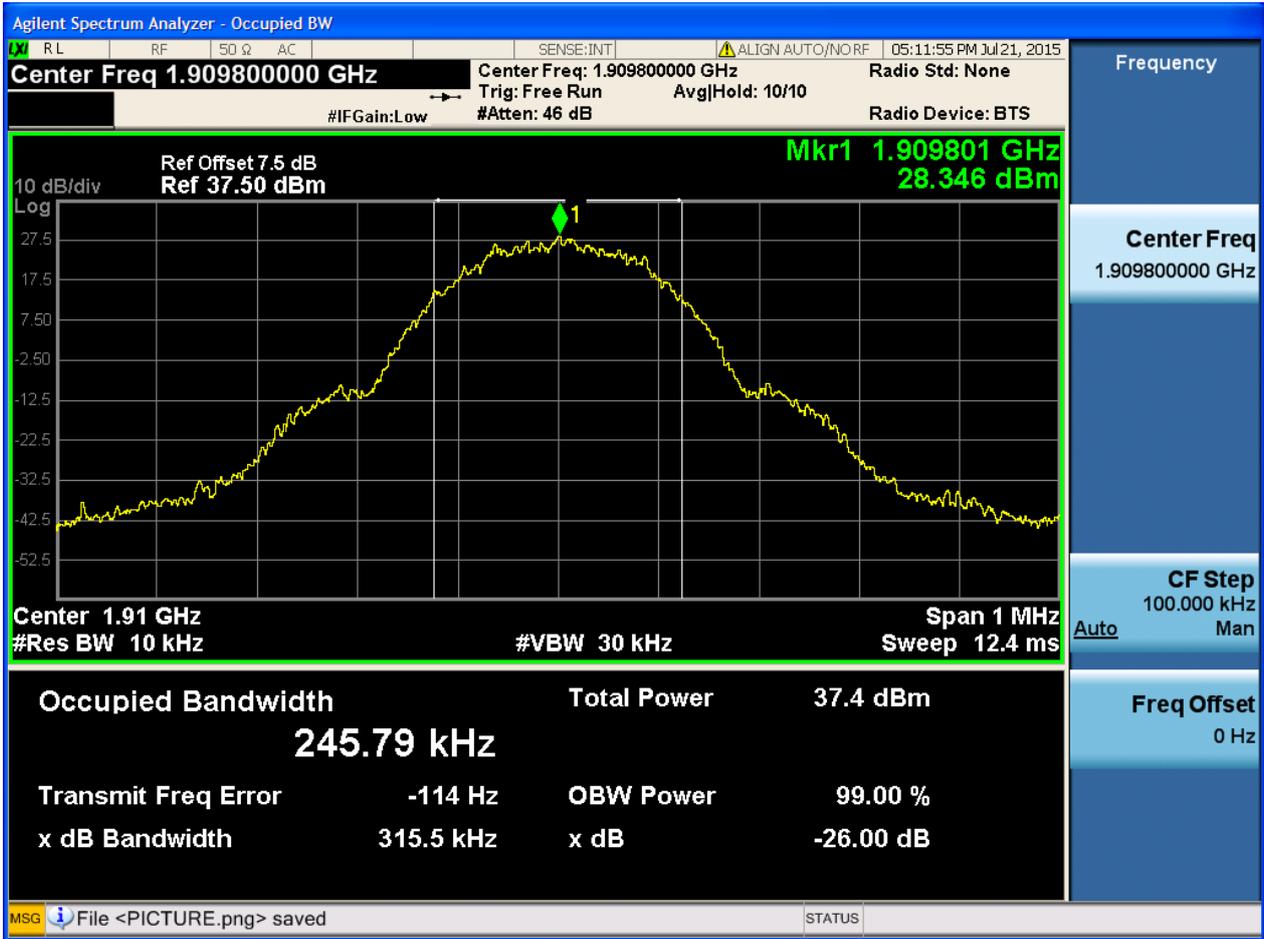


4.1.2.1.2 Test Channel = MCH





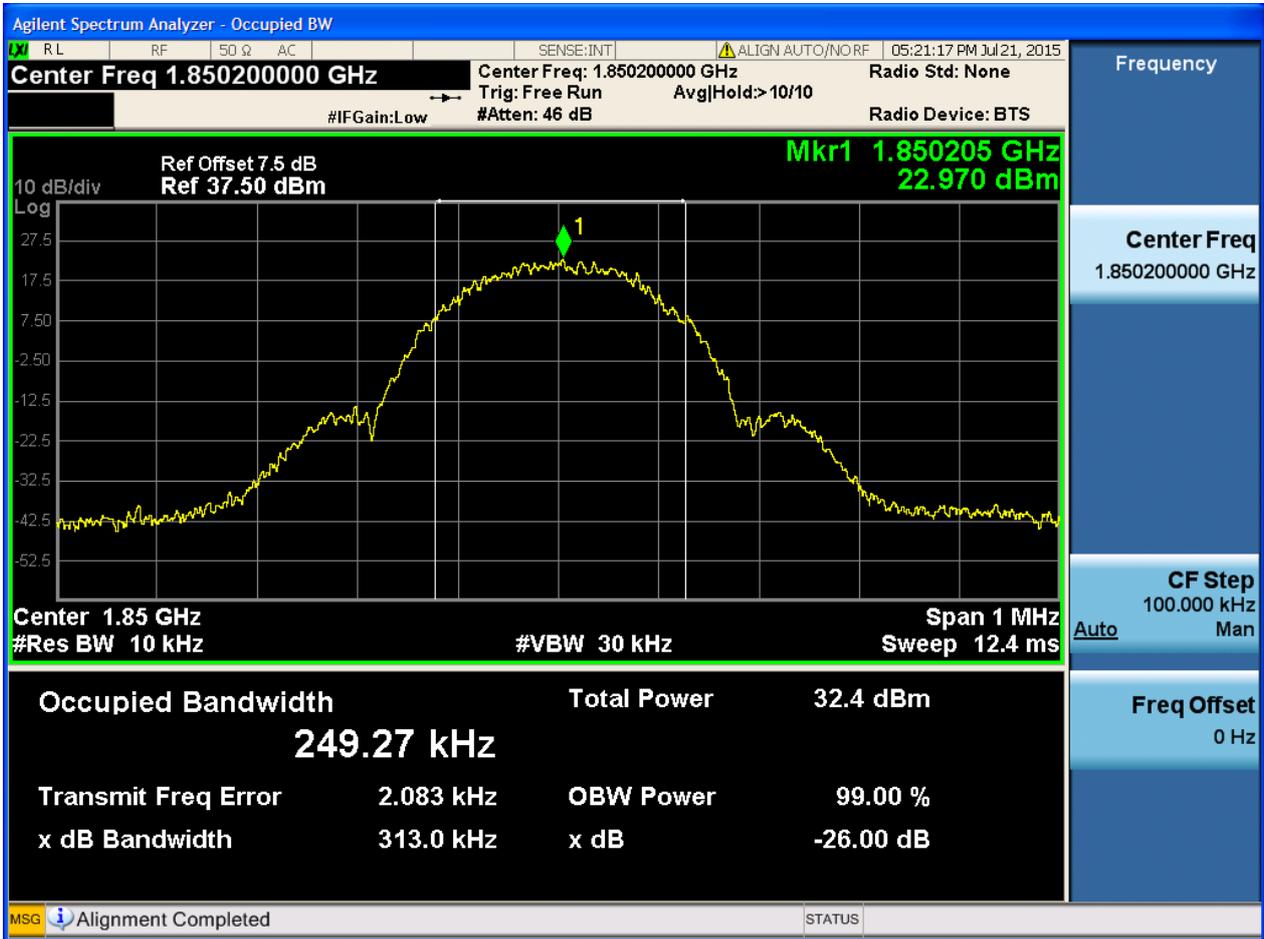
4.1.2.1.3 Test Channel = HCH





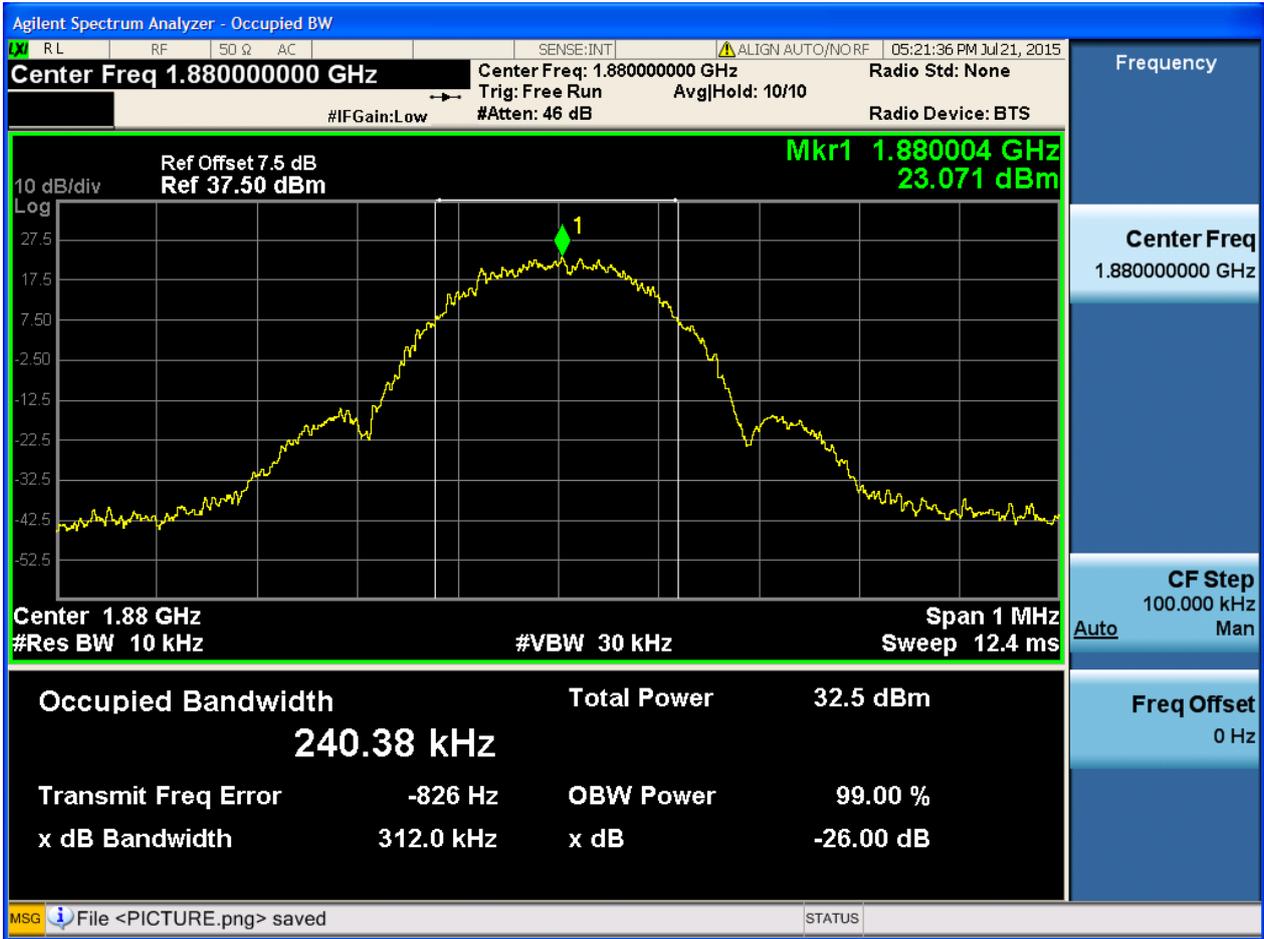
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4.1.2.2.1 Test Channel = LCH



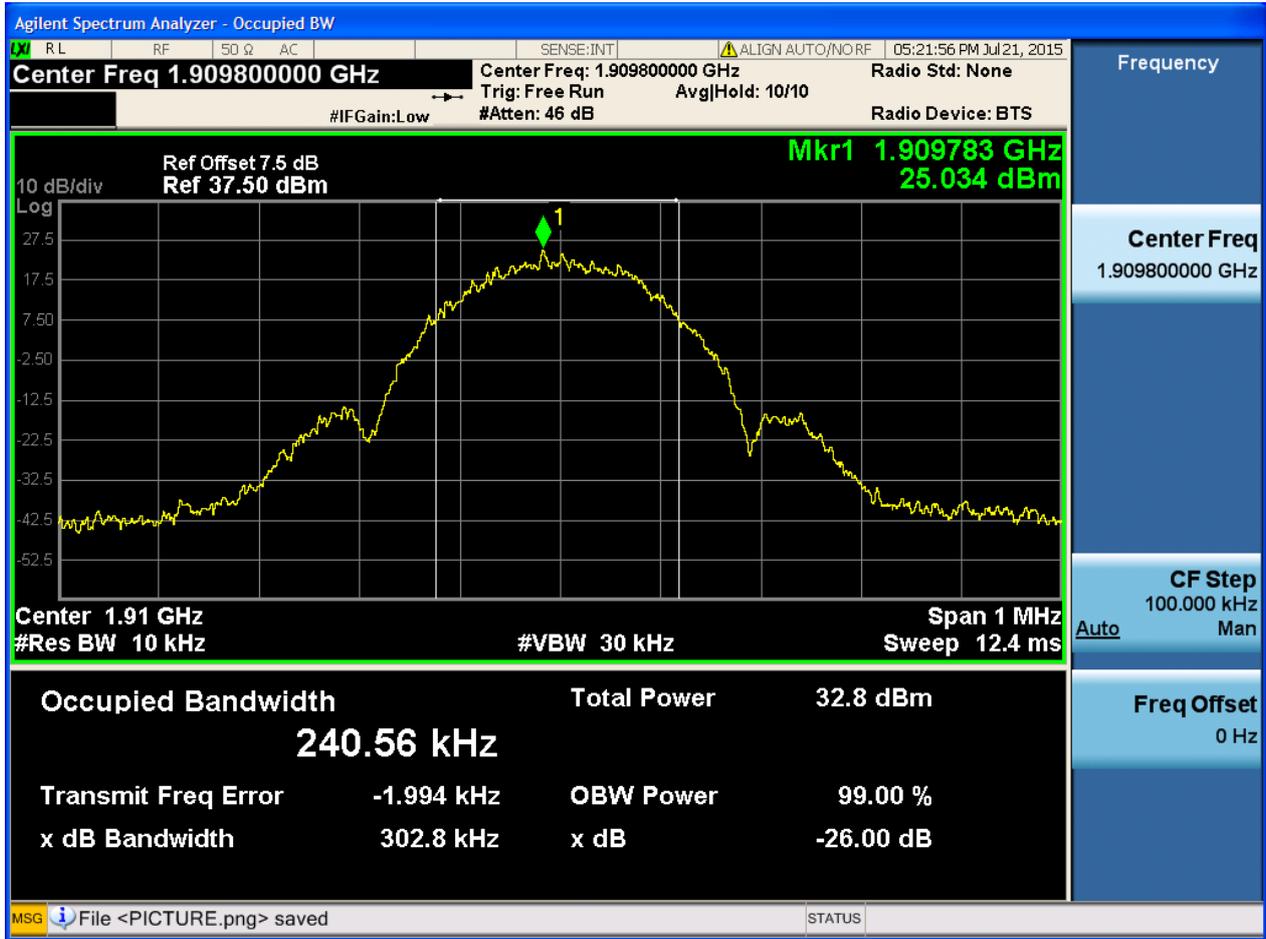


4.1.2.2.2 Test Channel = MCH





4.1.2.2.3 Test Channel = HCH





5Appendix_E: Band Edges Compliance

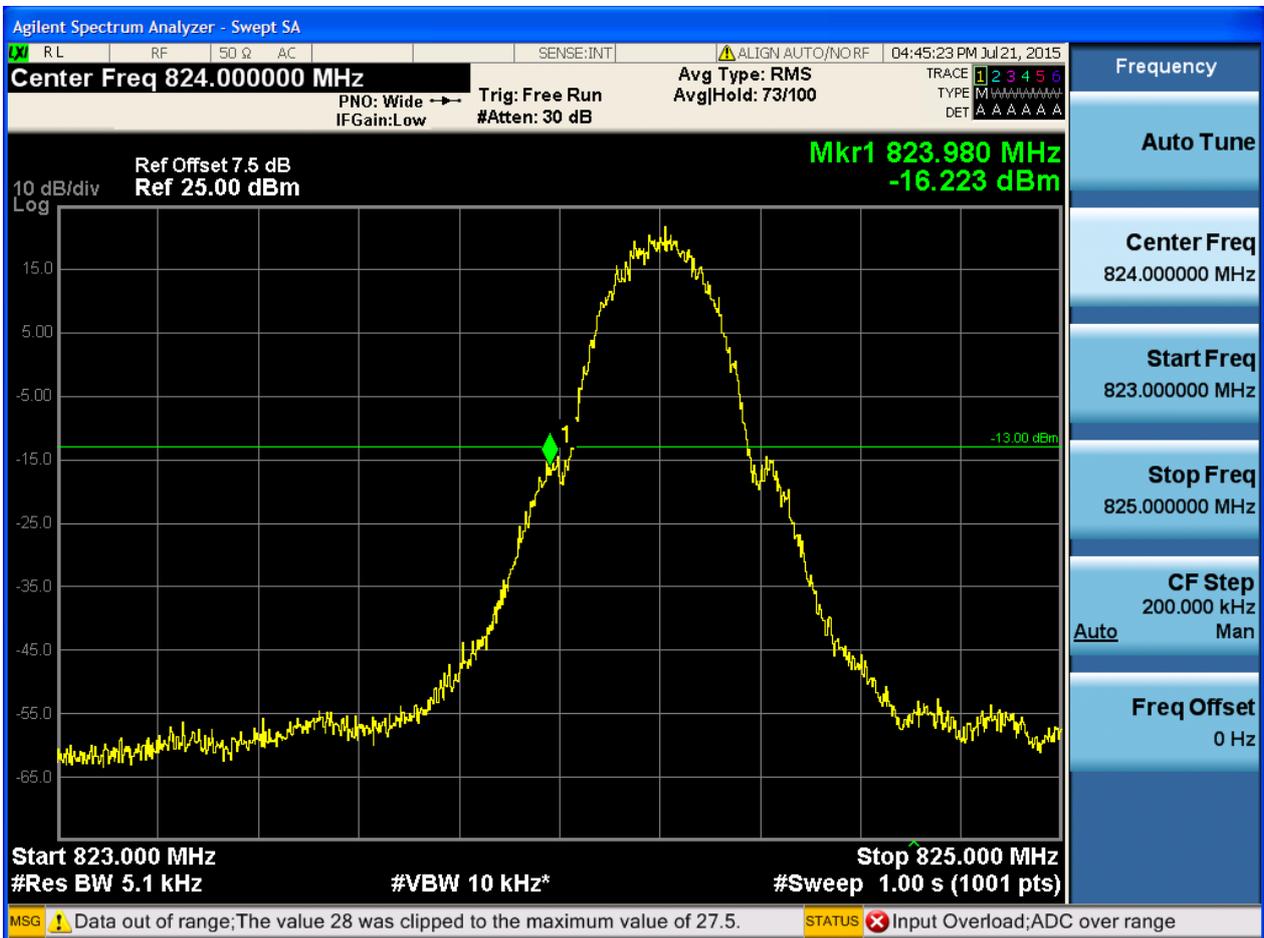
Part I - Test Plots

5.1 For GSM

5.1.1 Test Band = GSM850

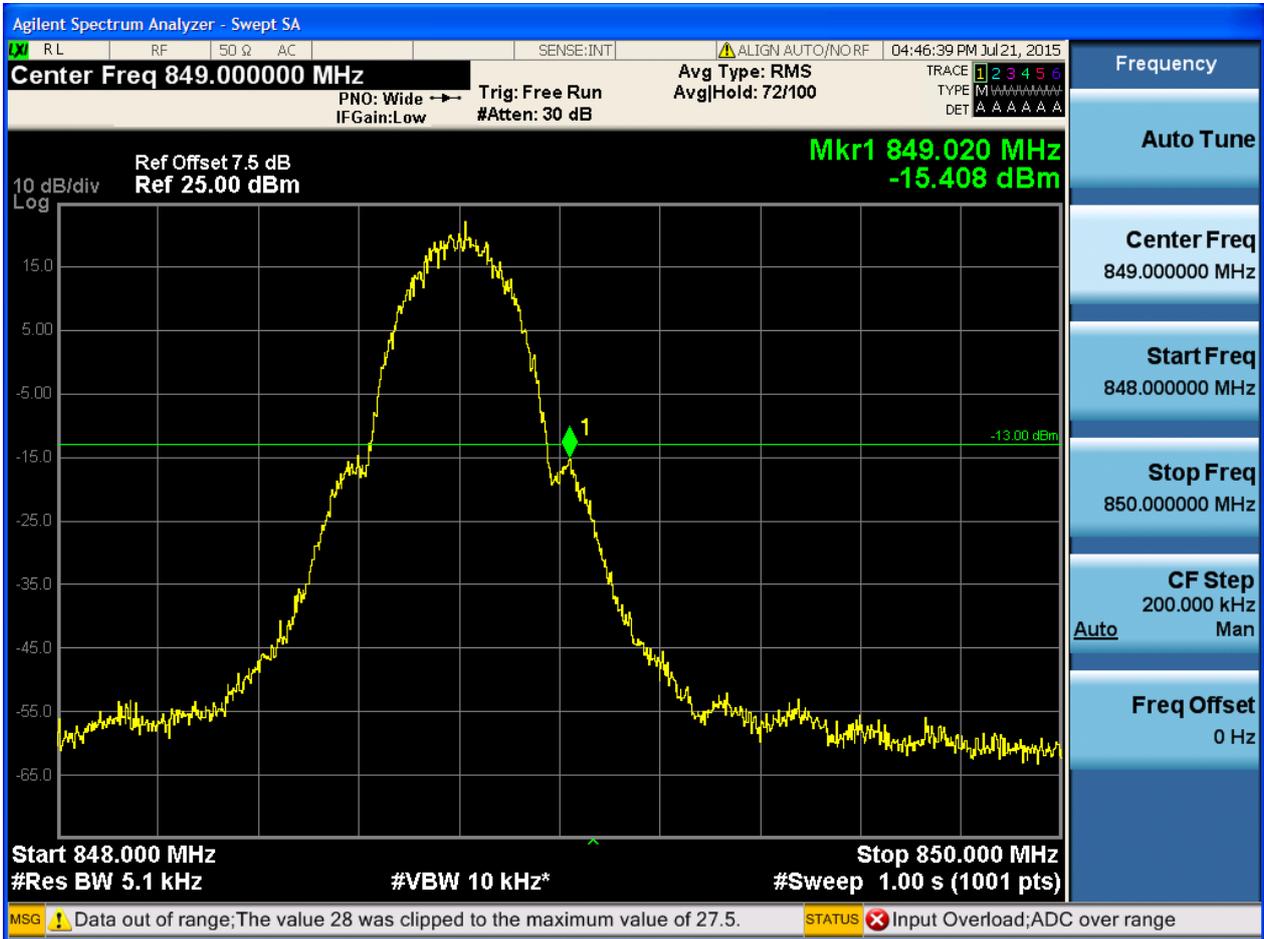
5.1.1.1 Test Mode = GSM/TM1

5.1.1.1.1 Test Channel = LCH





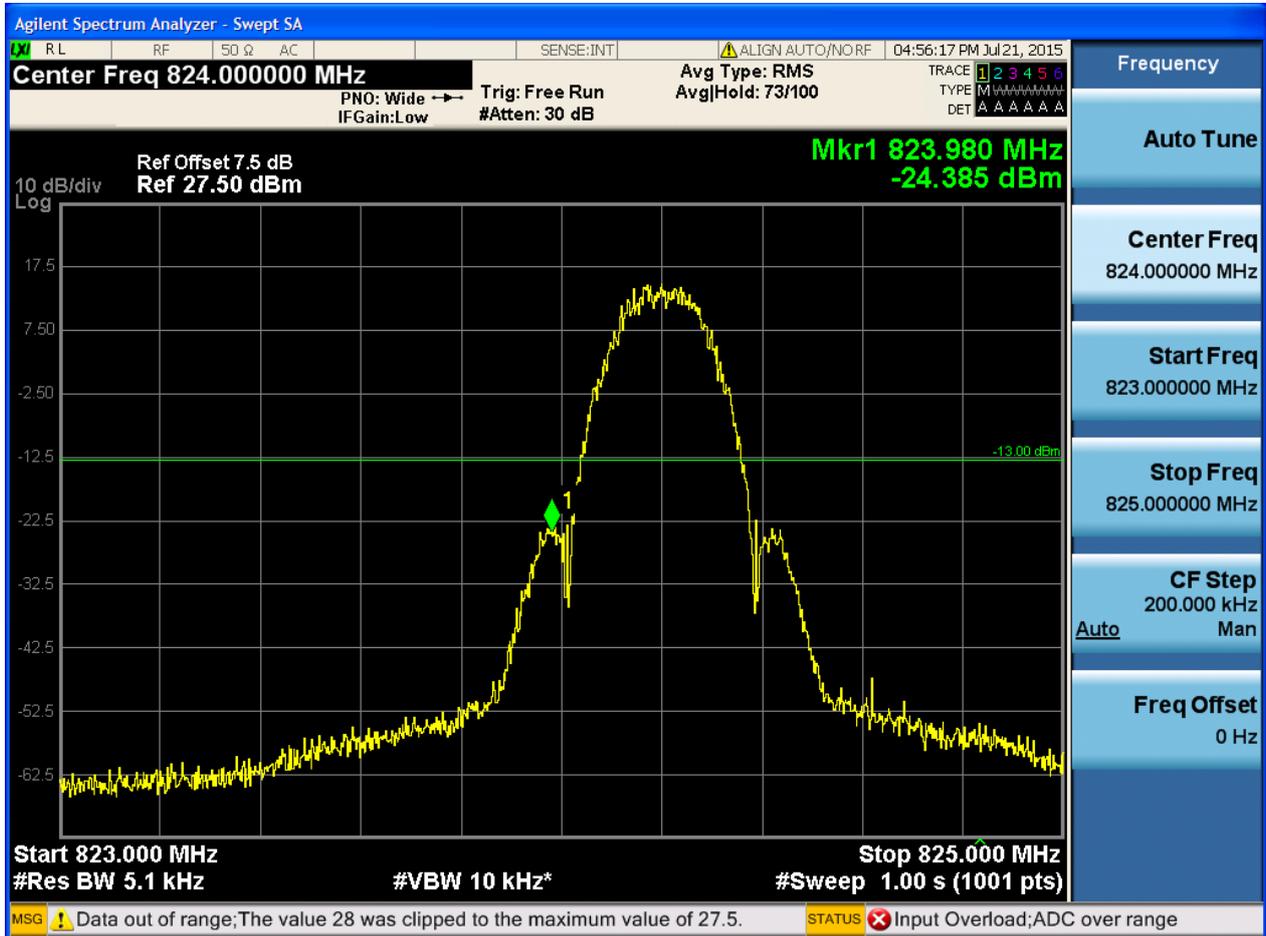
5.1.1.1.2 Test Channel = HCH



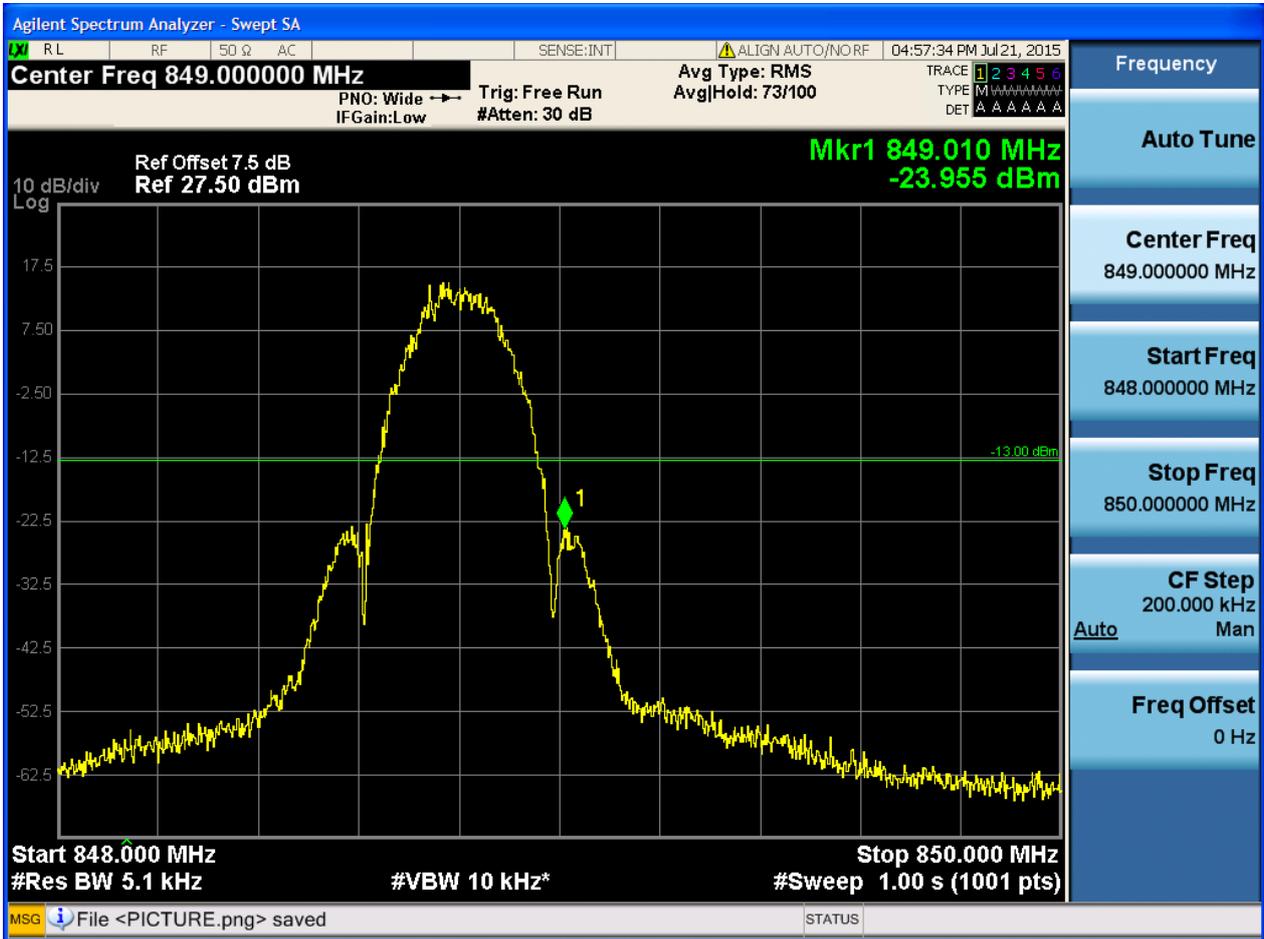


5.1.1.2 Test Mode = GSM/TM2

5.1.1.2.1 Test Channel = LCH



5.1.1.2.2 Test Channel = HCH

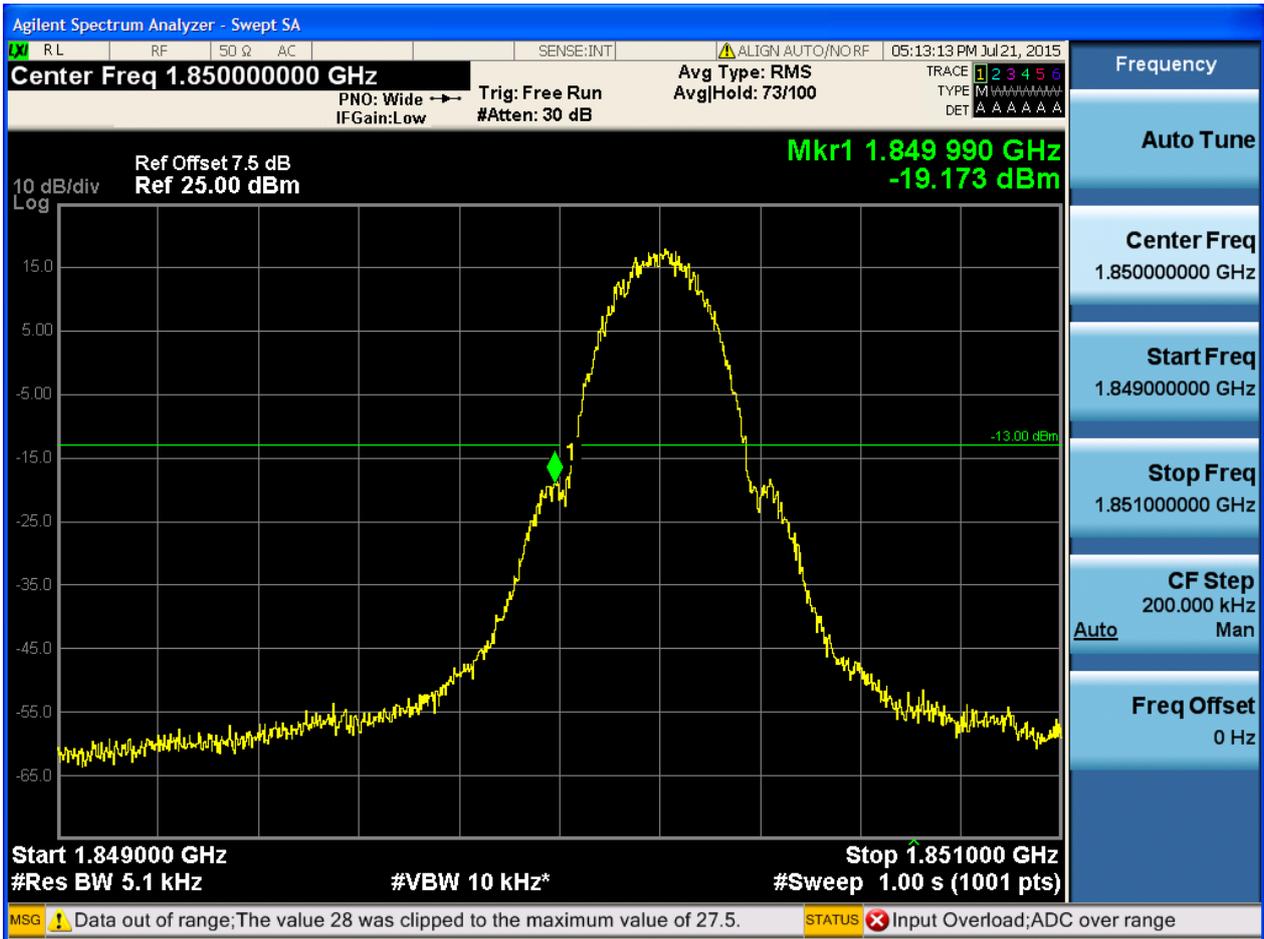




5.1.2 Test Band = GSM1900

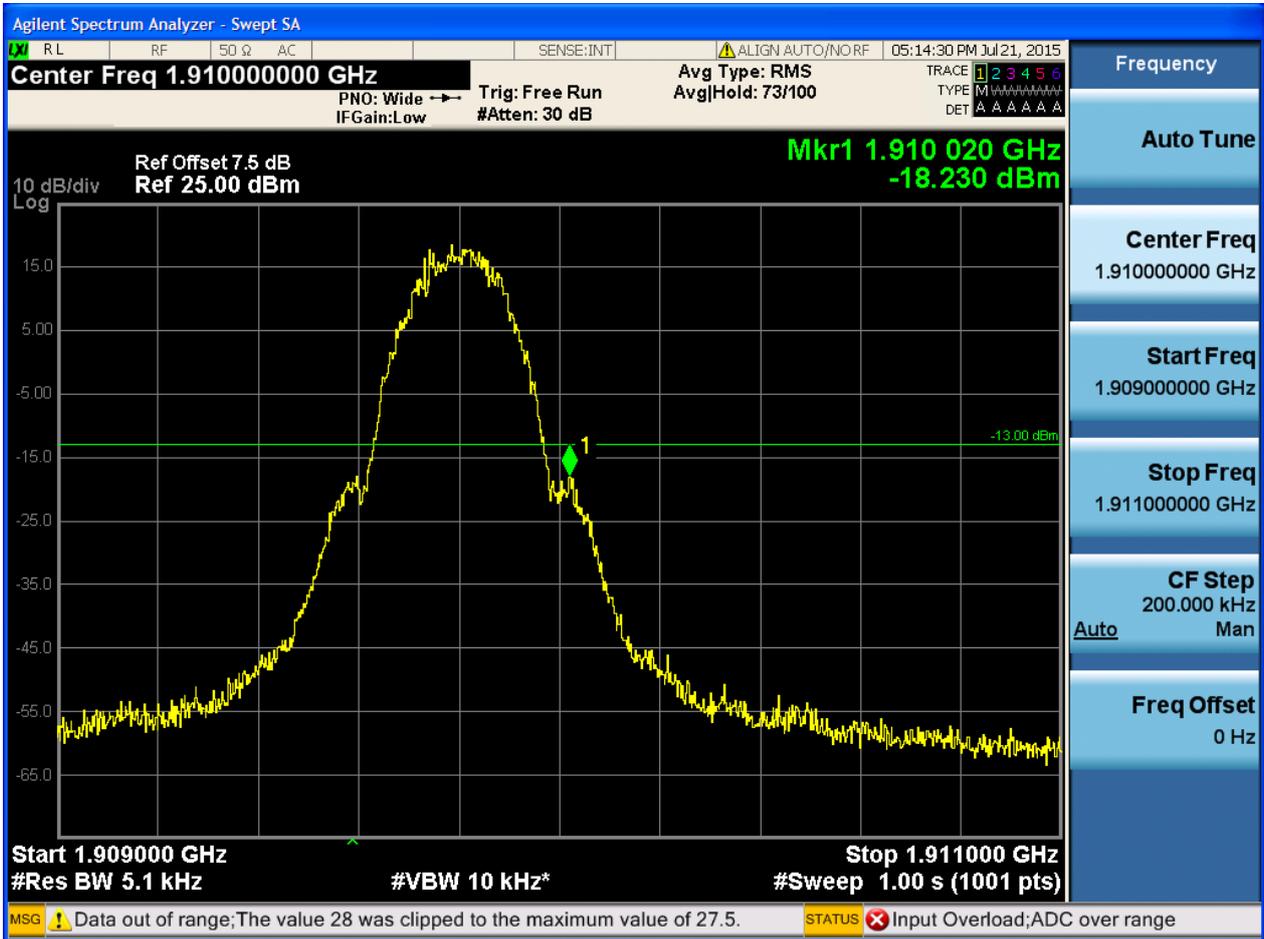
5.1.2.1 Test Mode = GSM/TM1

5.1.2.1.1 Test Channel = LCH



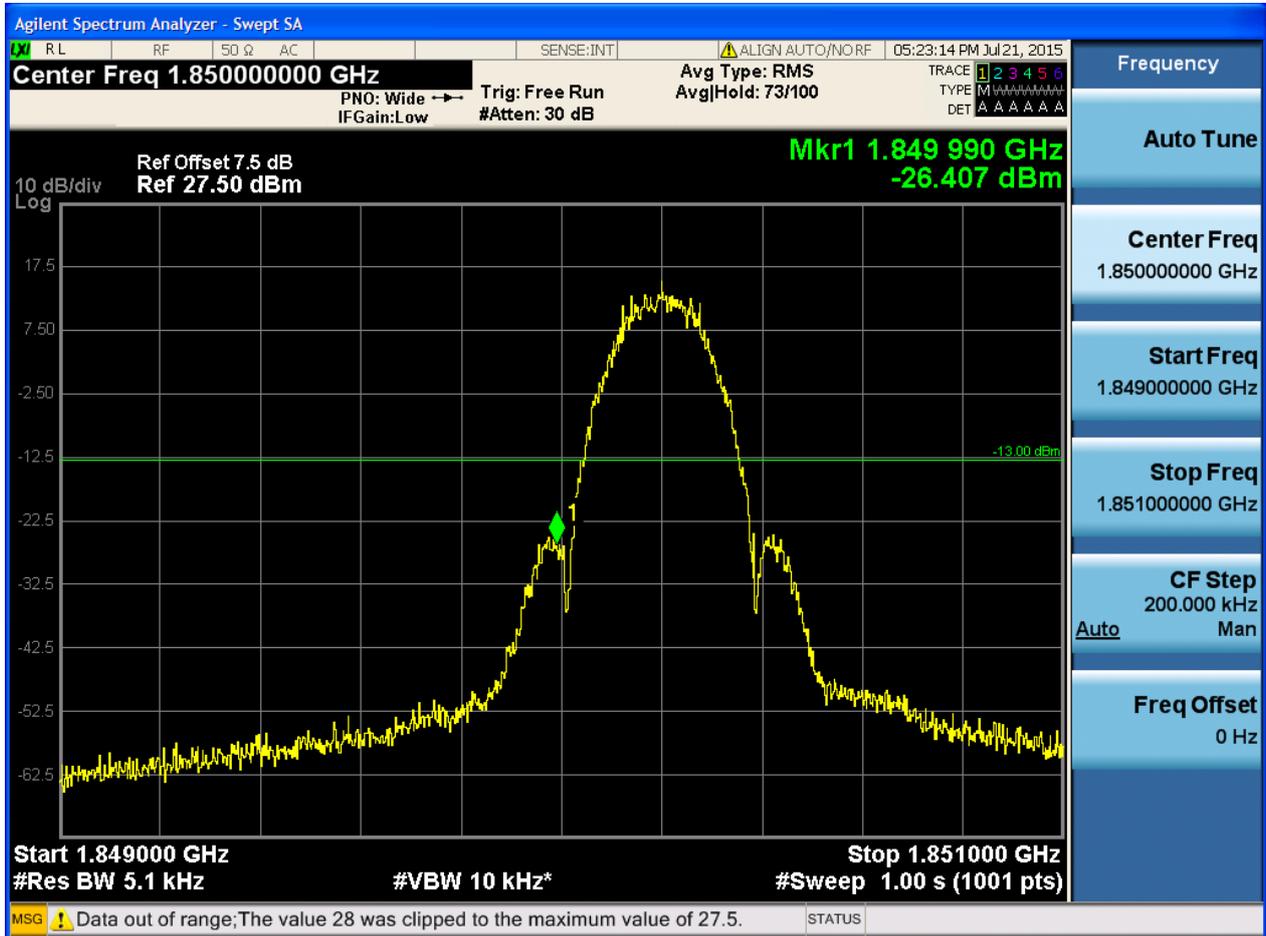


5.1.2.1.2 Test Channel = HCH

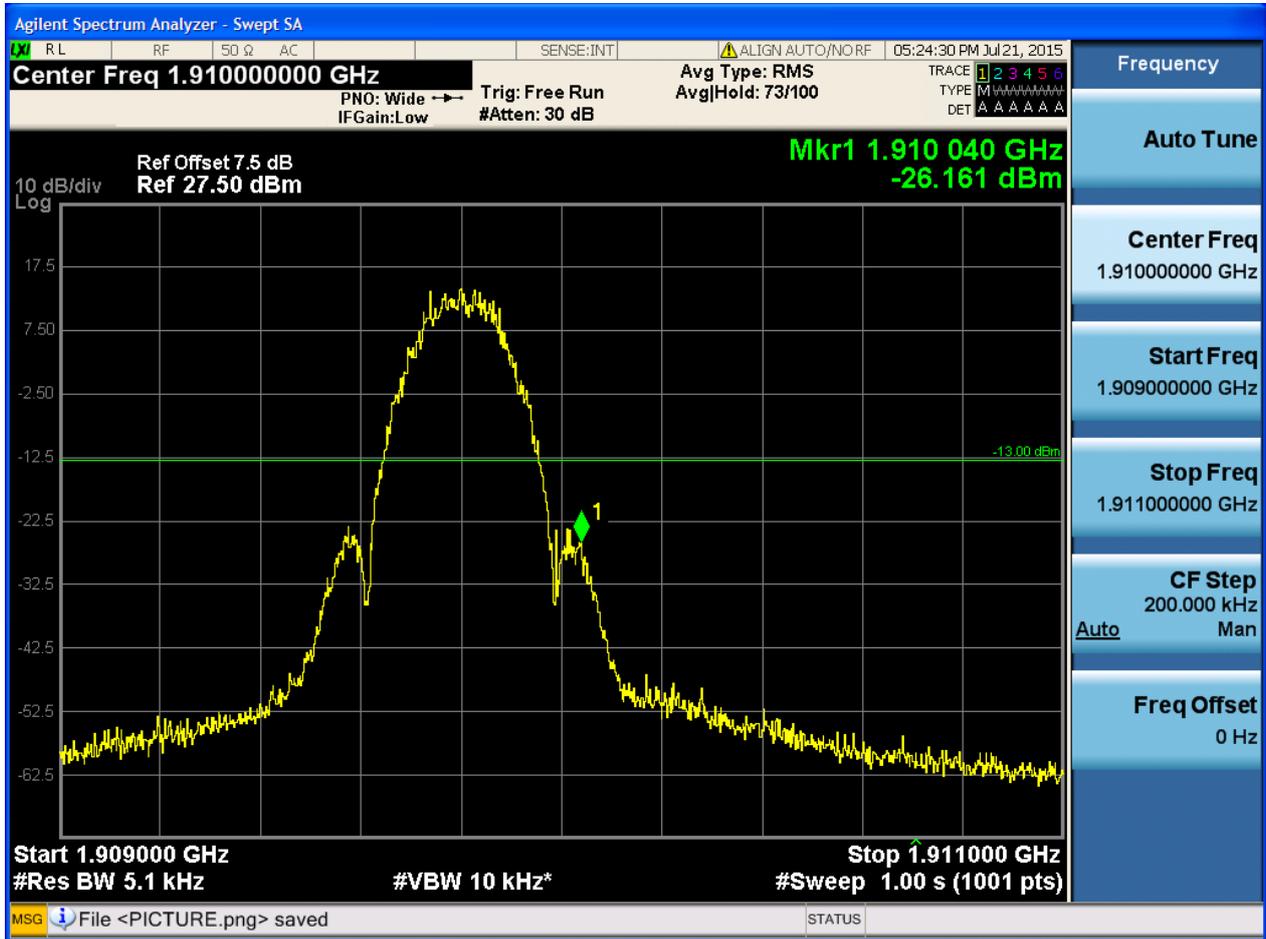


5.1.2.2 Test Mode = GSM/TM2

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.

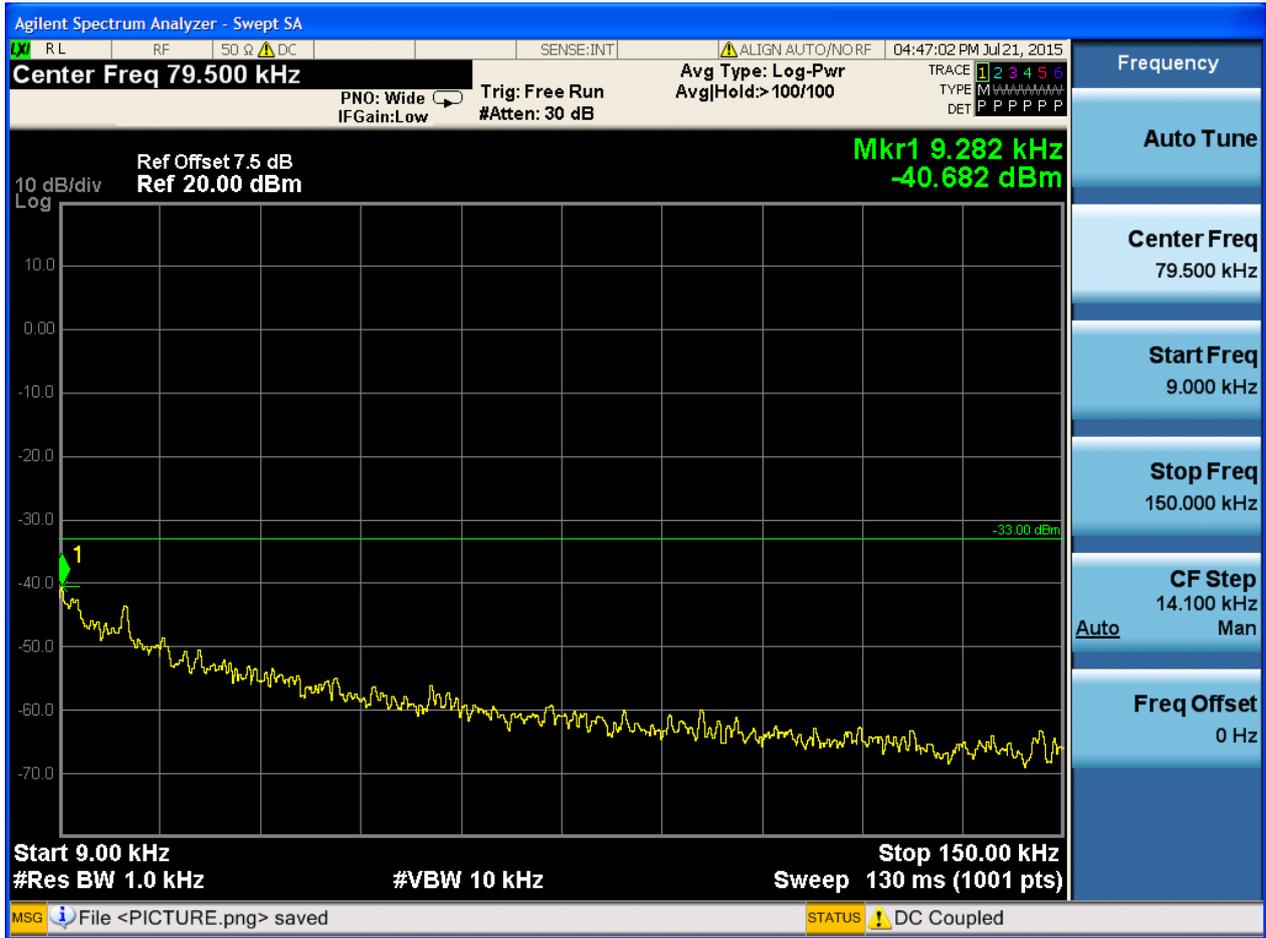
Part I - Test Plots

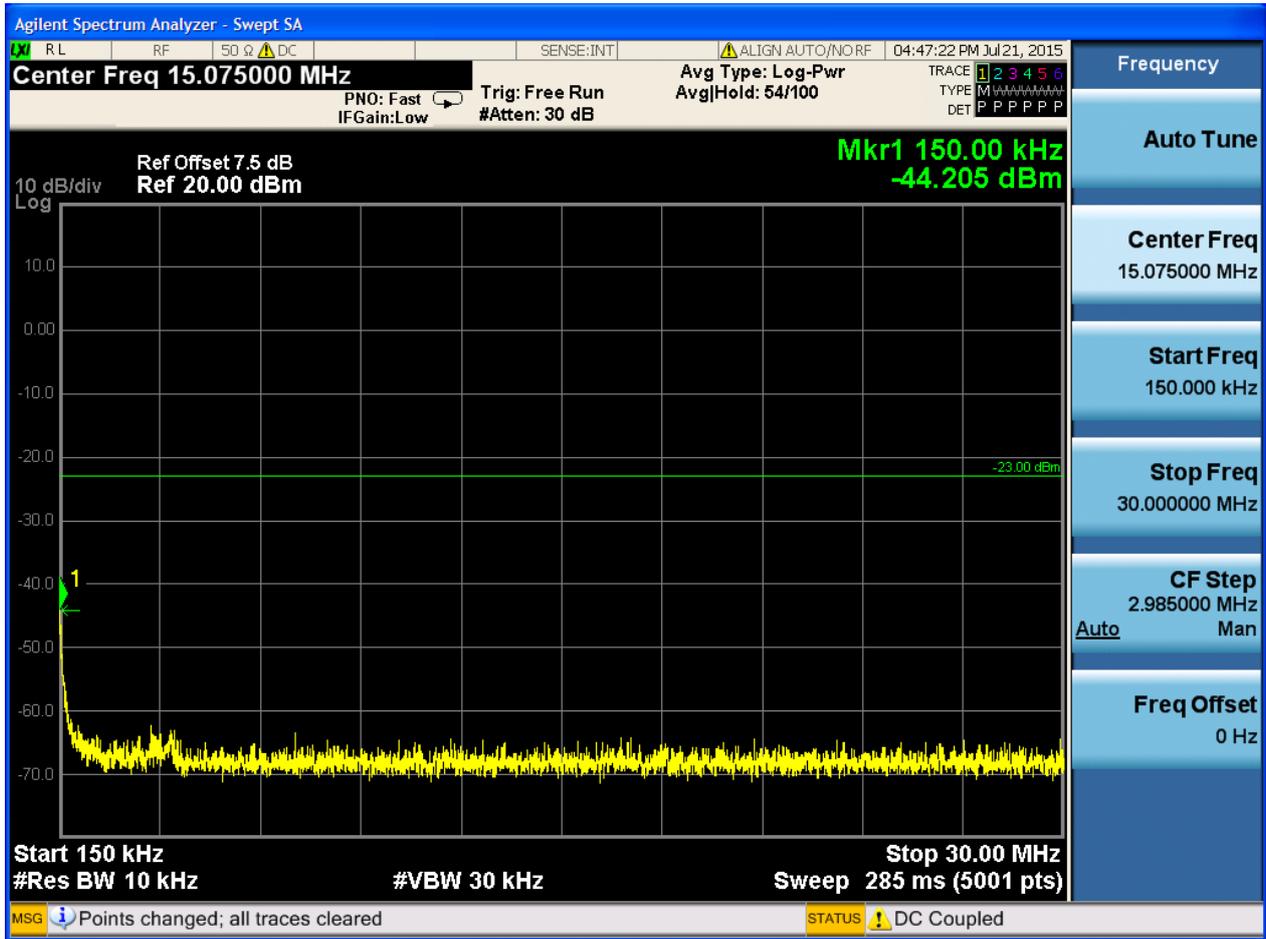
6.1 For GSM

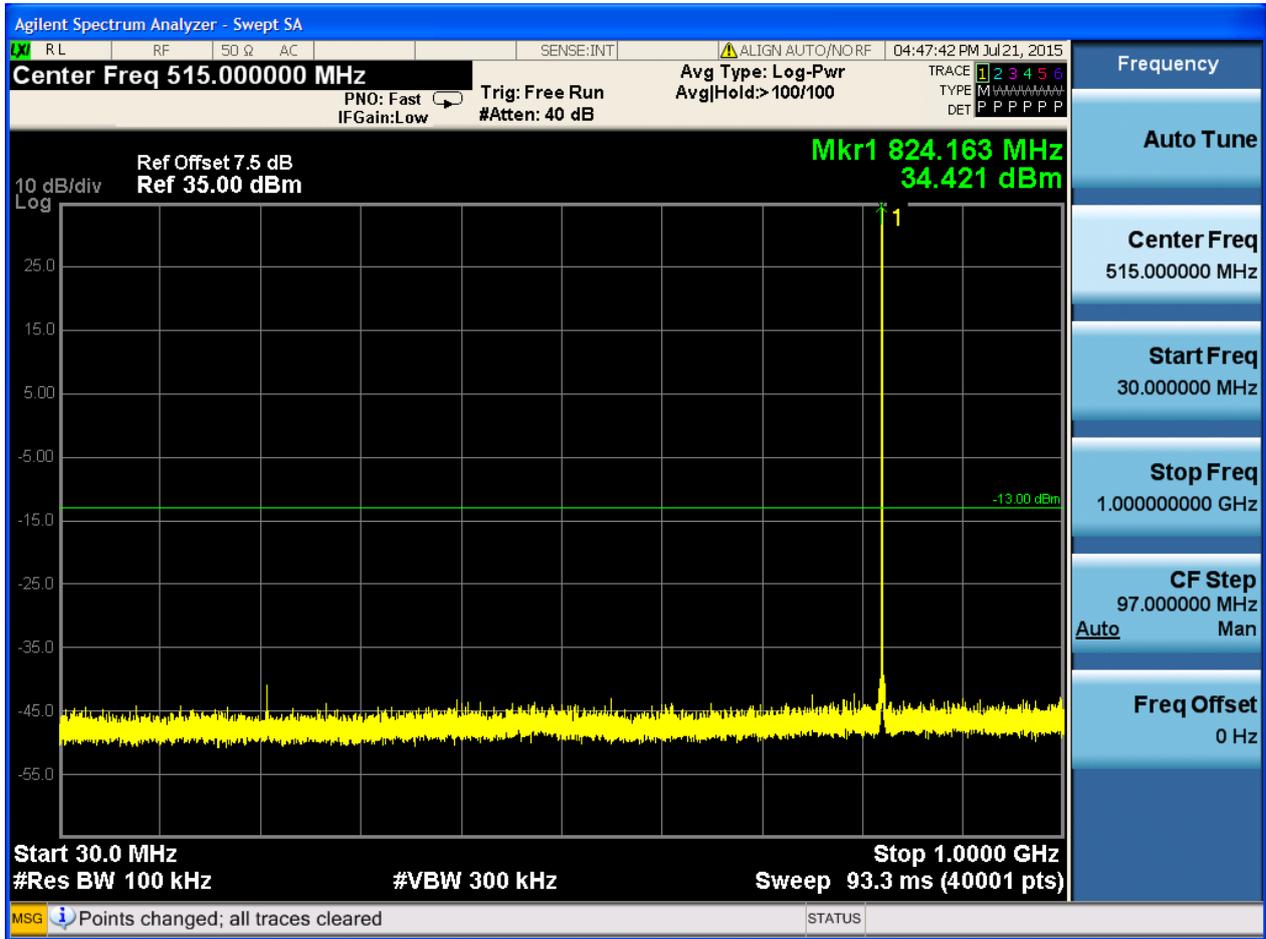
6.1.1 Test Band = GSM850

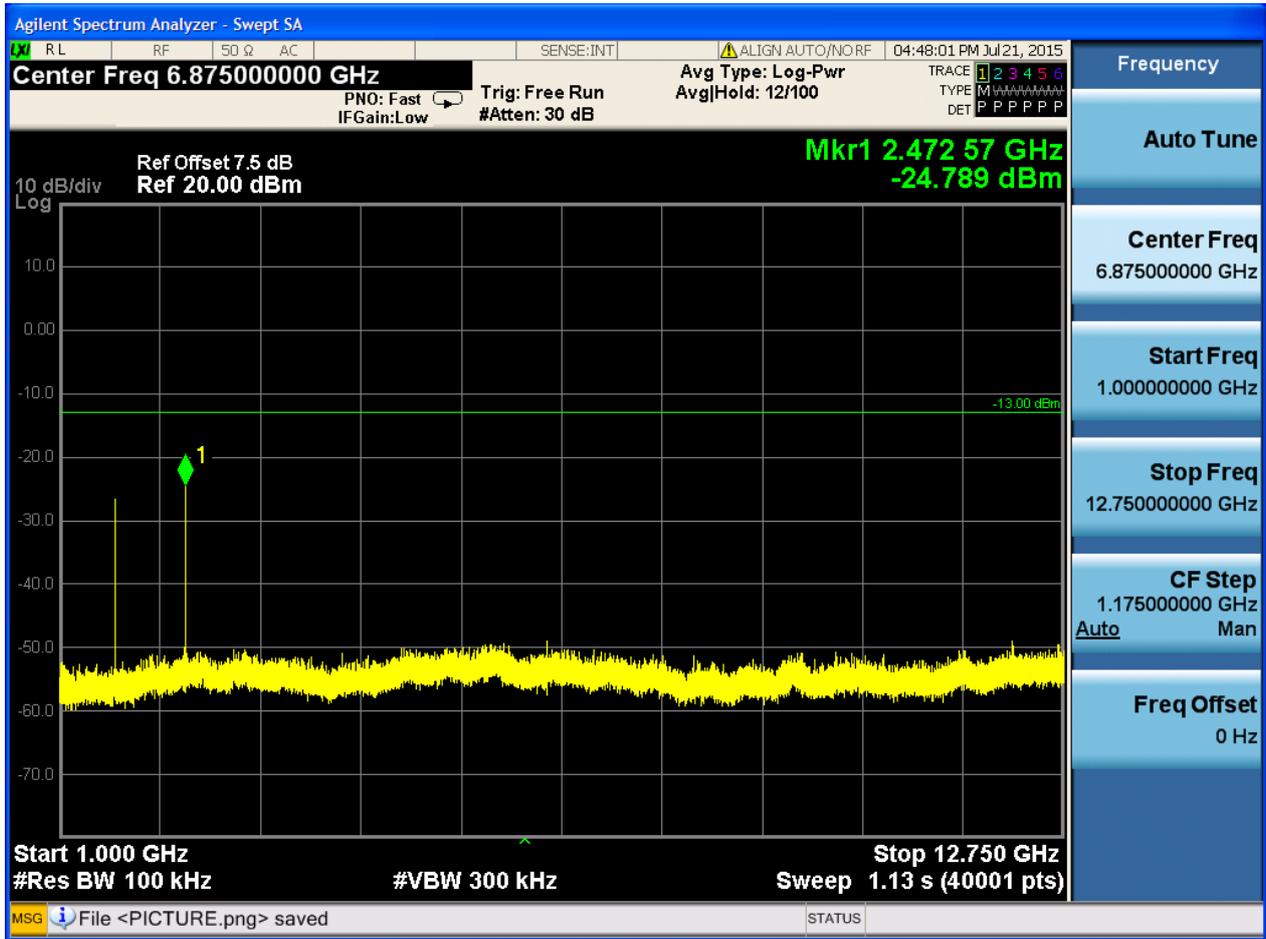
6.1.1.1 Test Mode = GSM/TM1

6.1.1.1.1 Test Channel = LCH

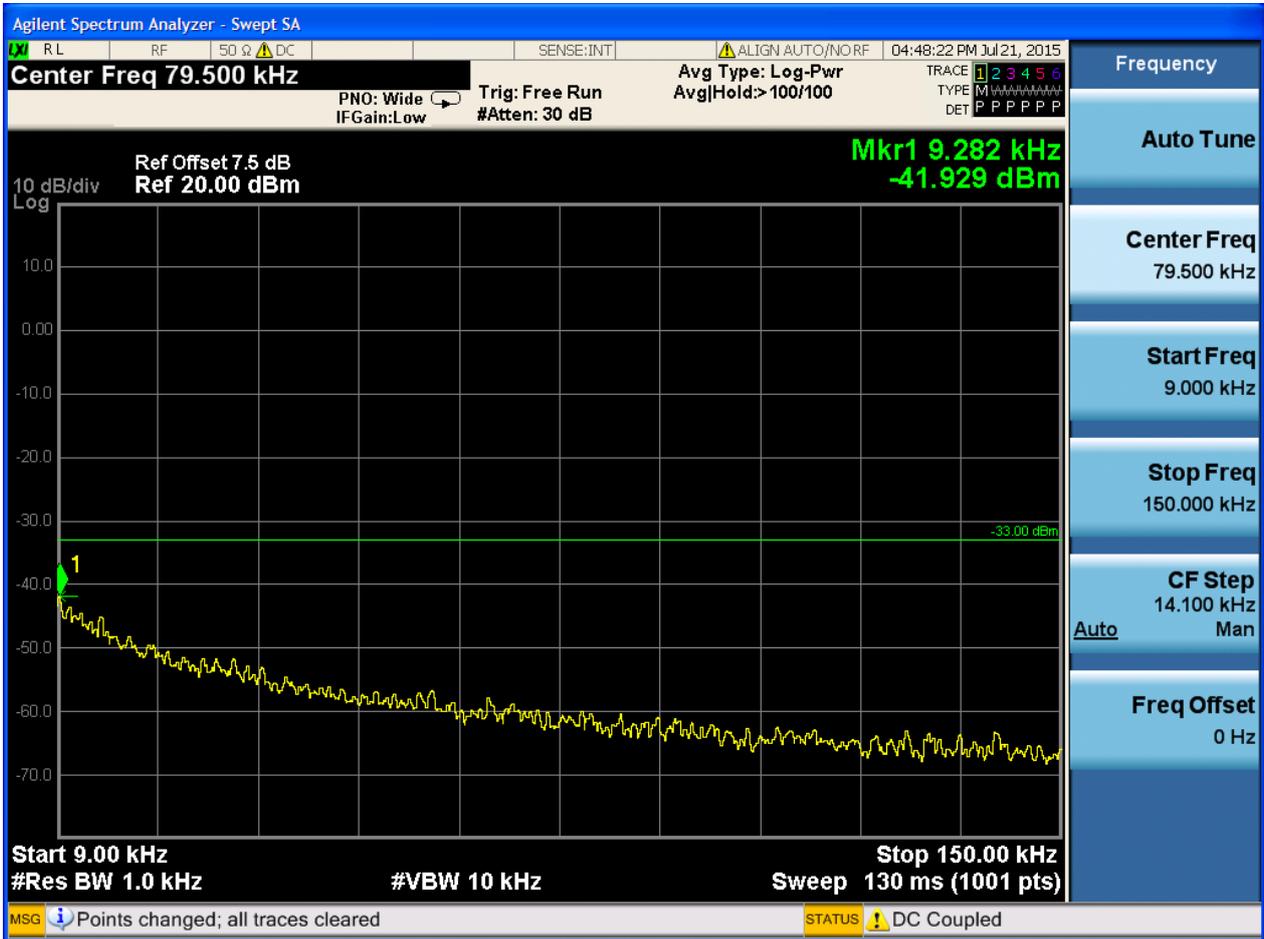


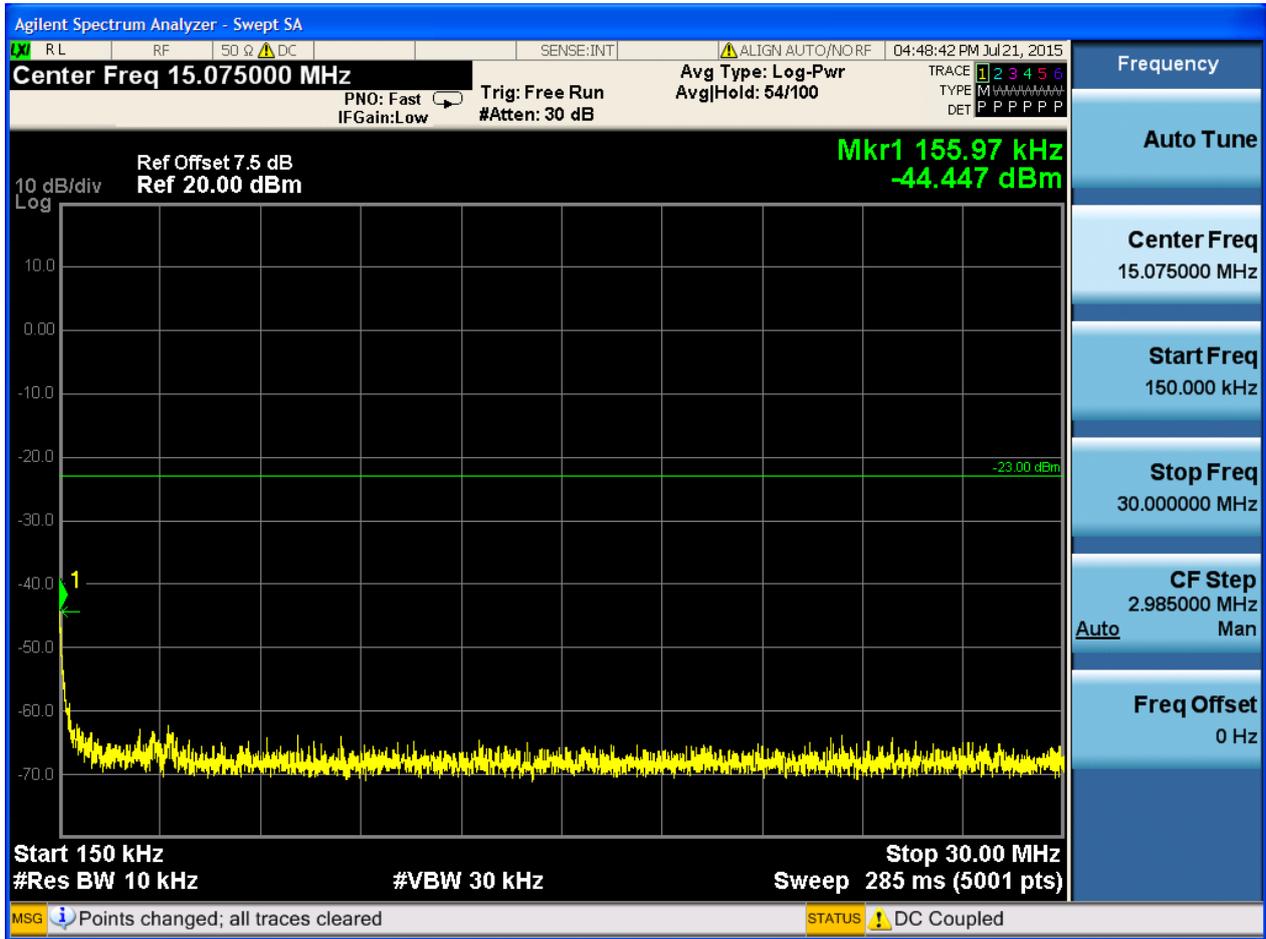


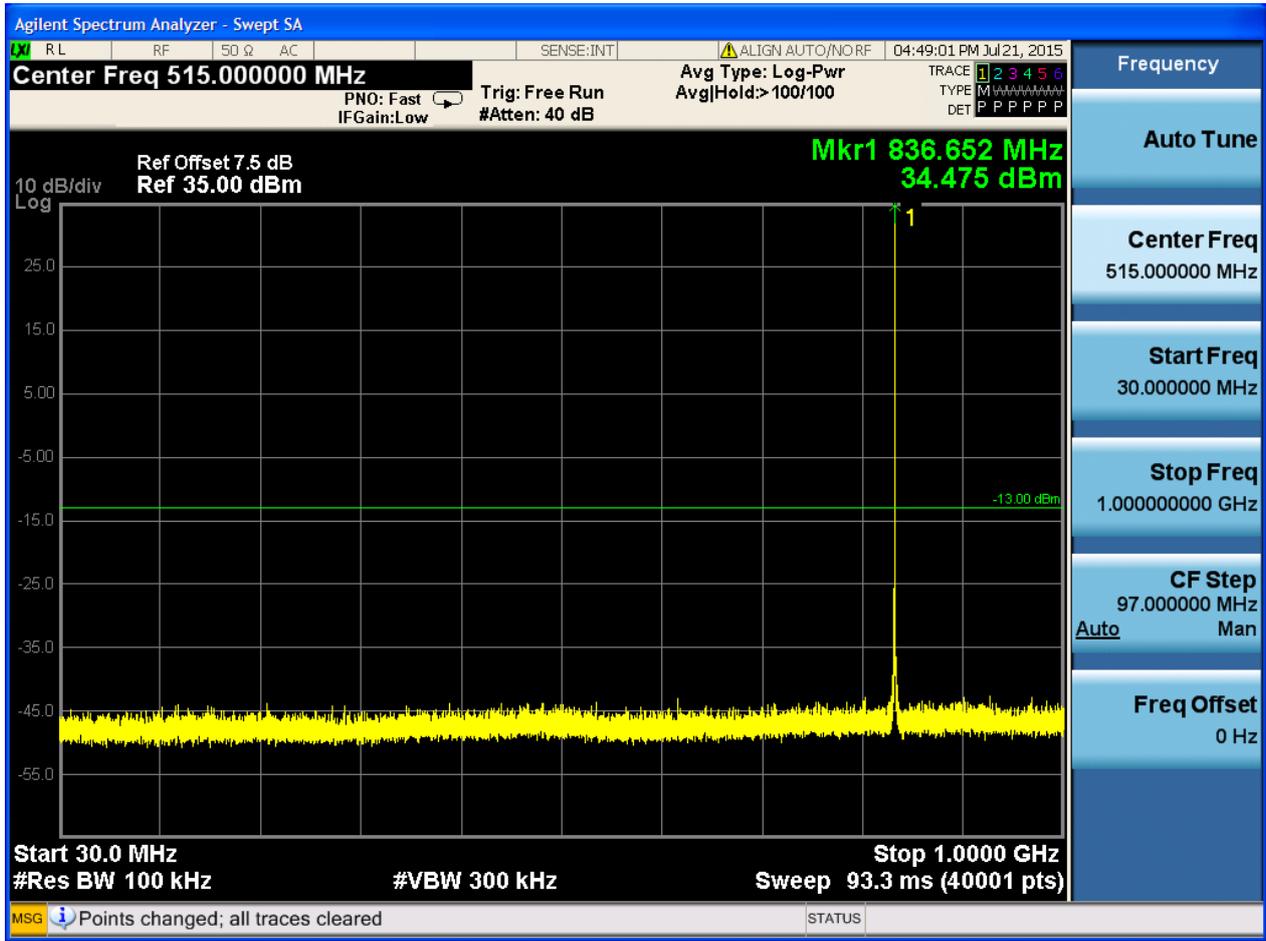


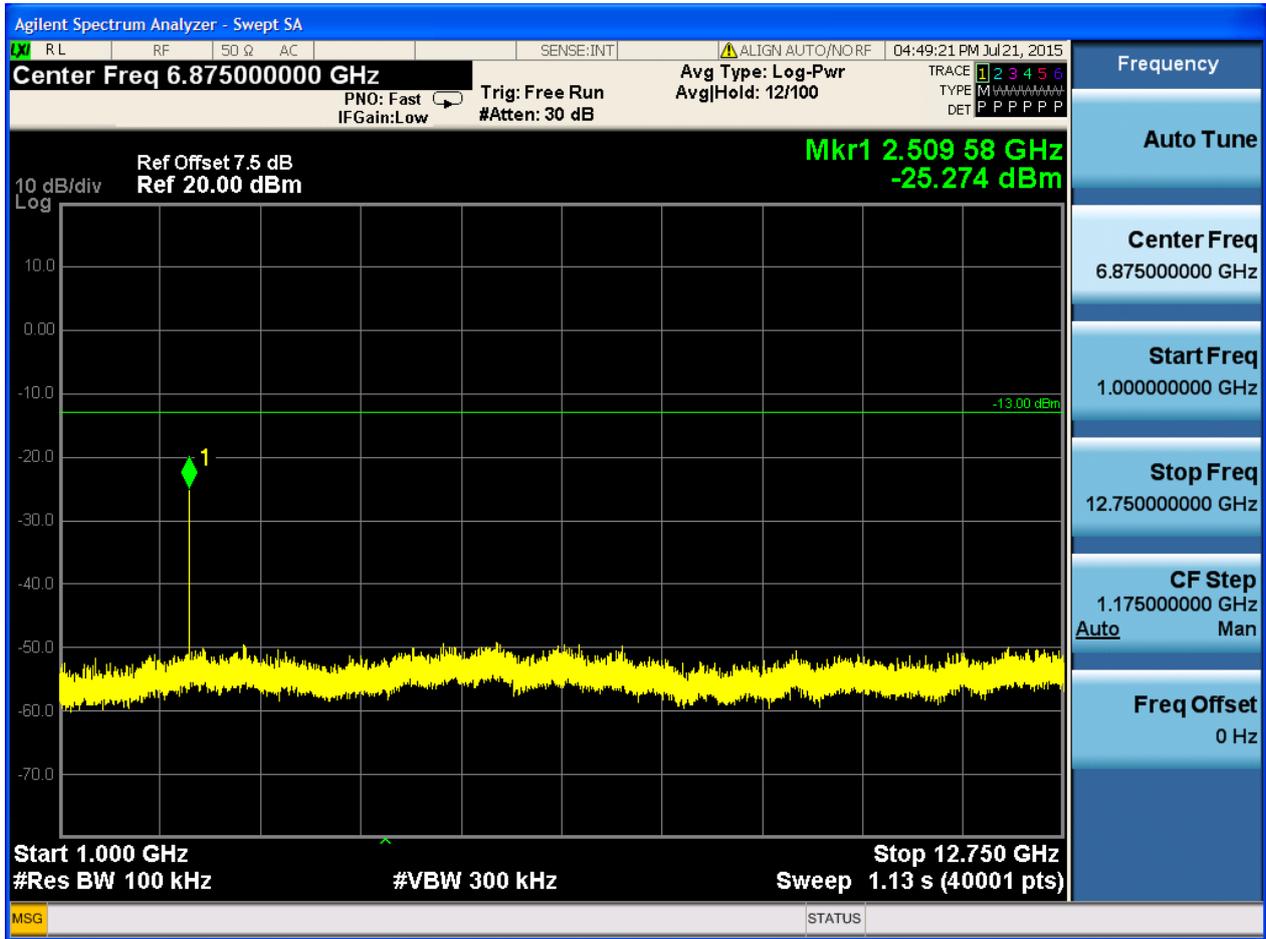


6.1.1.1.2 Test Channel = MCH



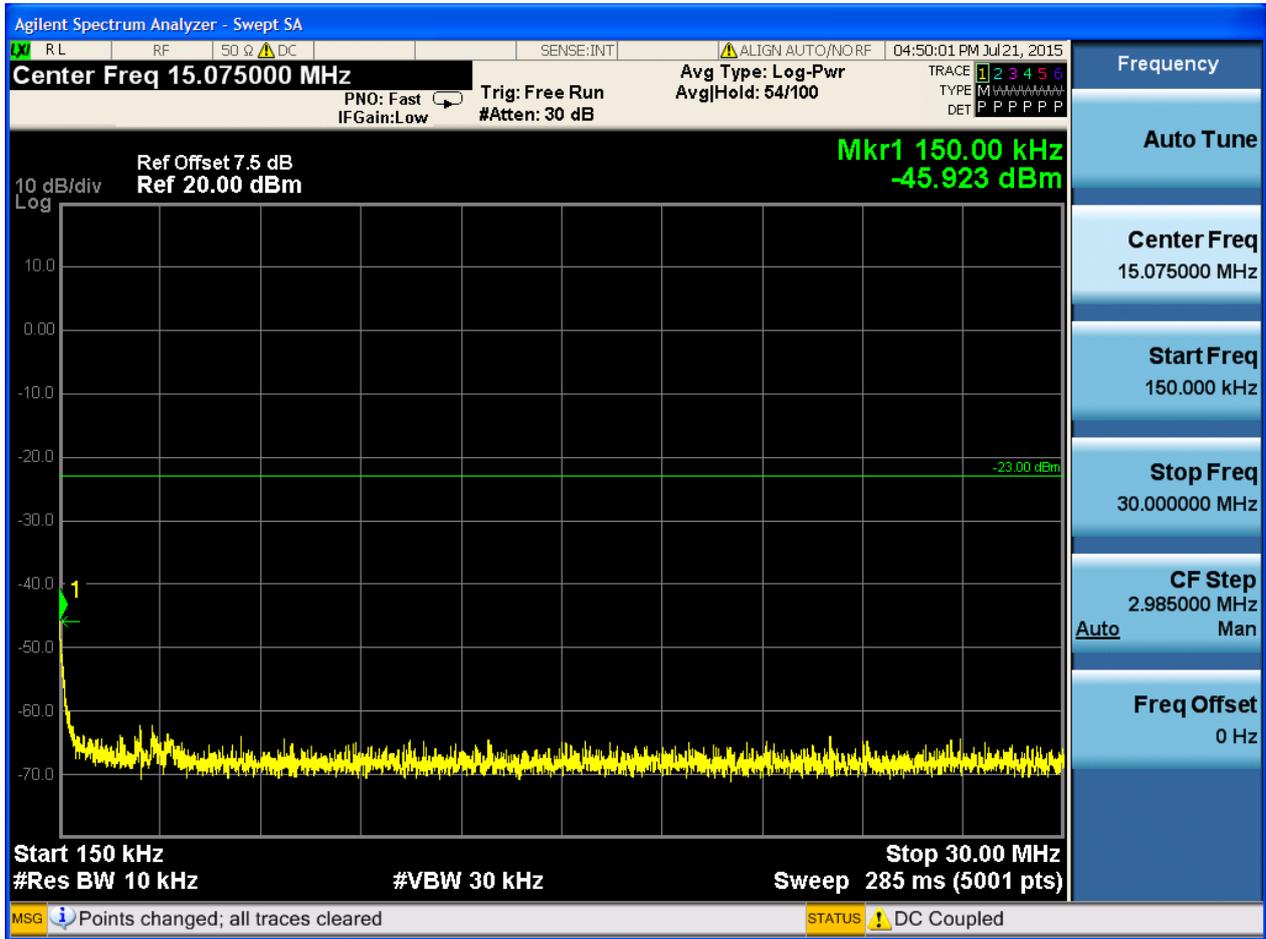


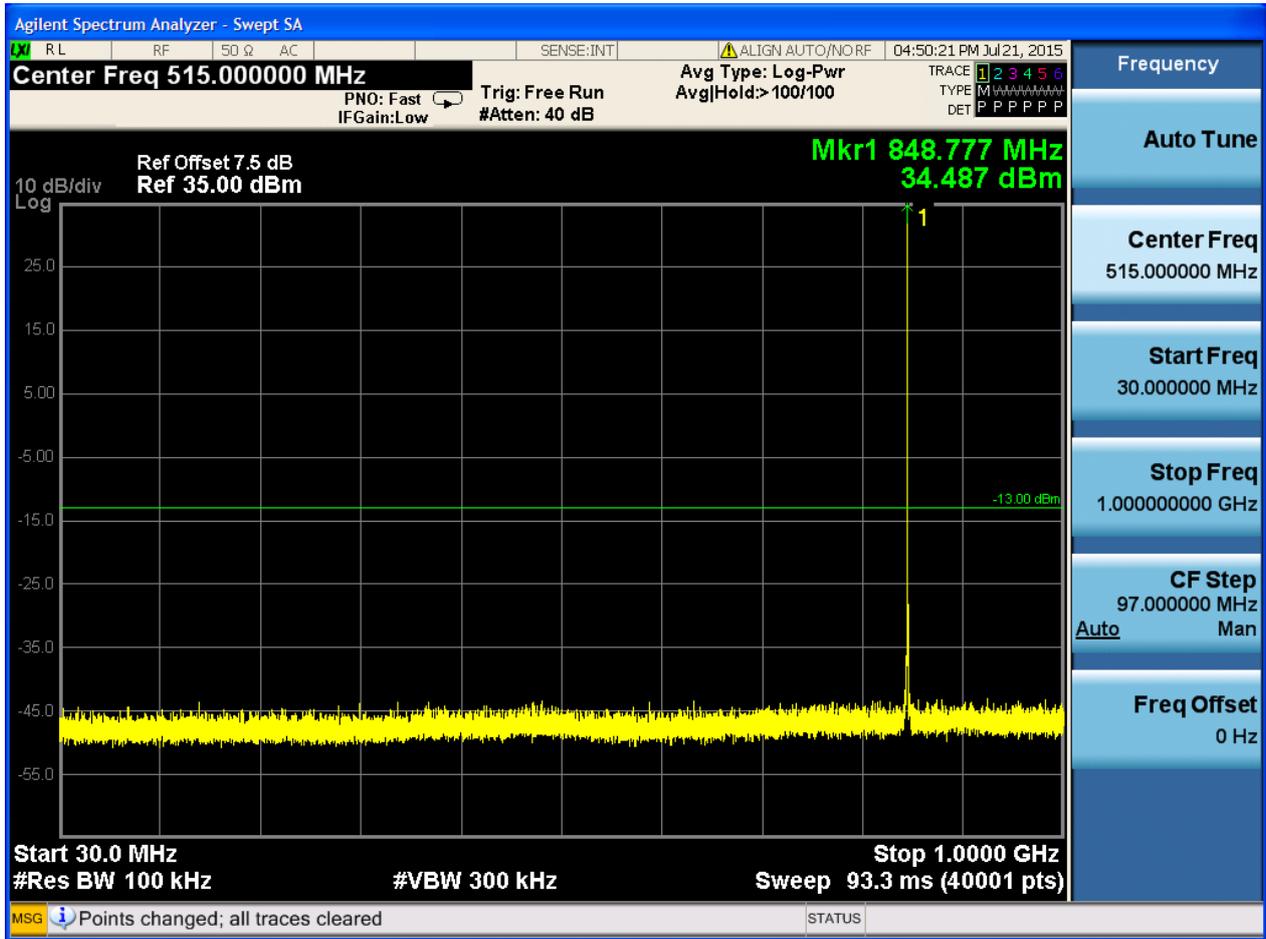


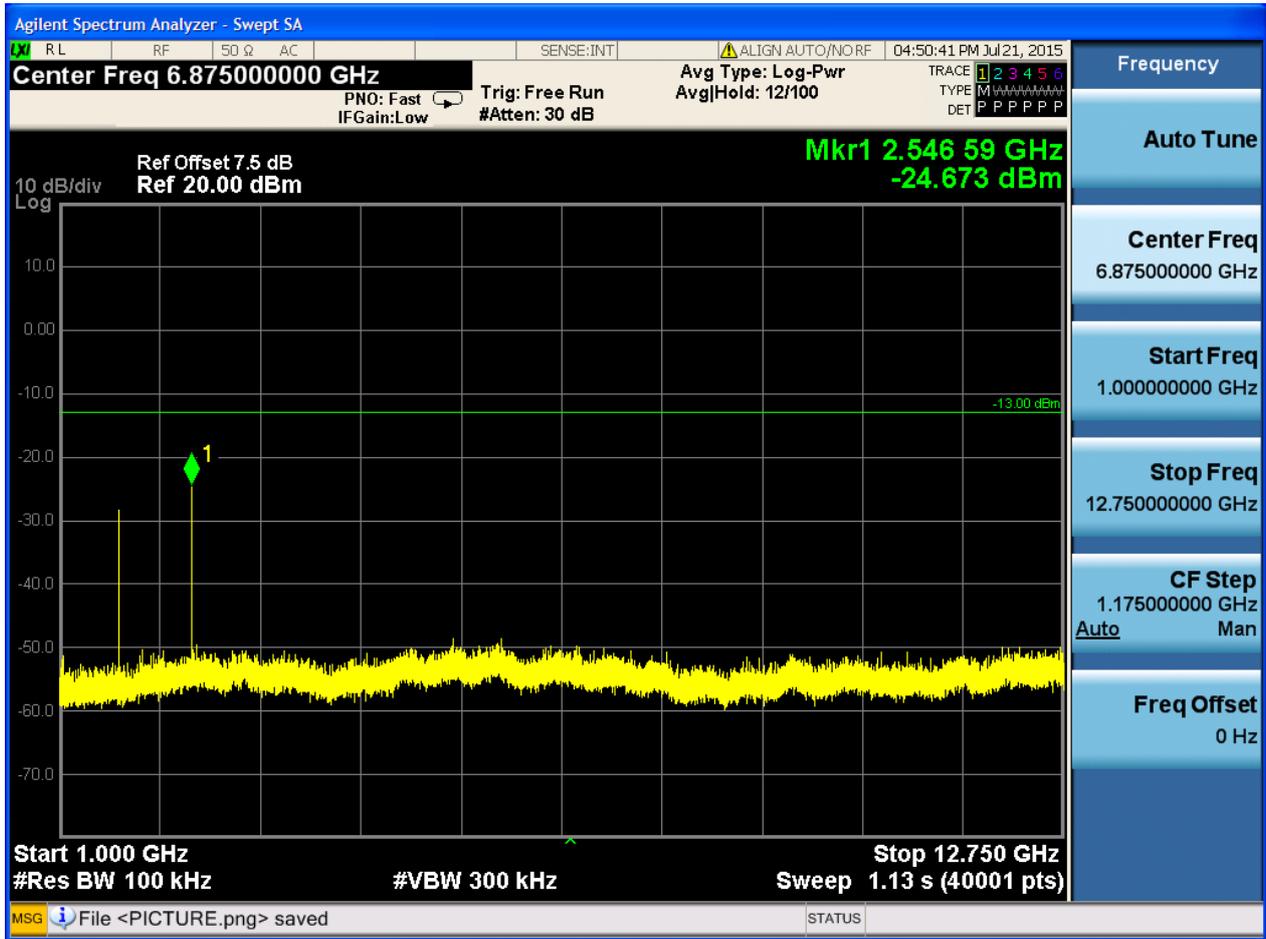


6.1.1.1.3 Test Channel = HCH



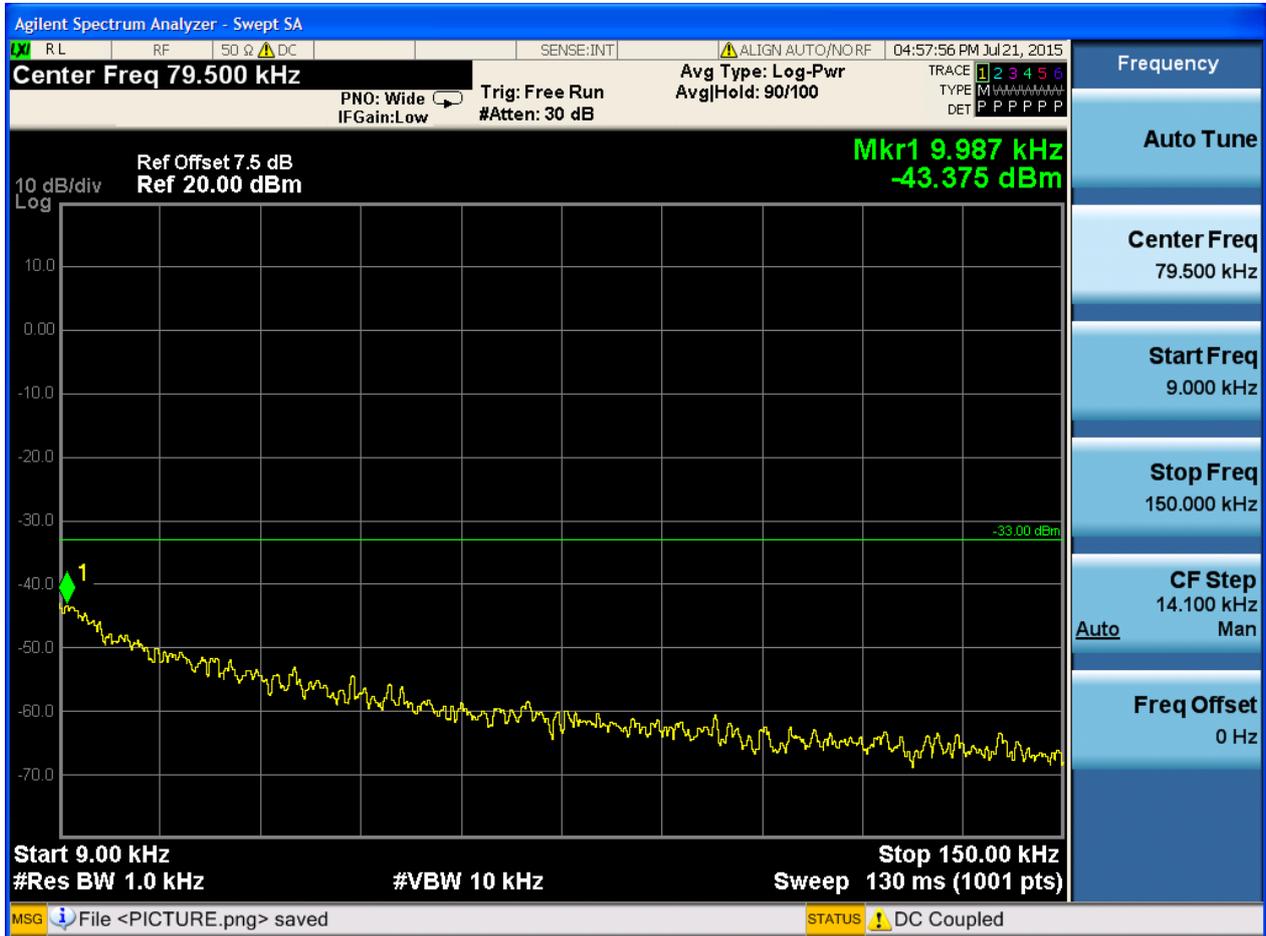


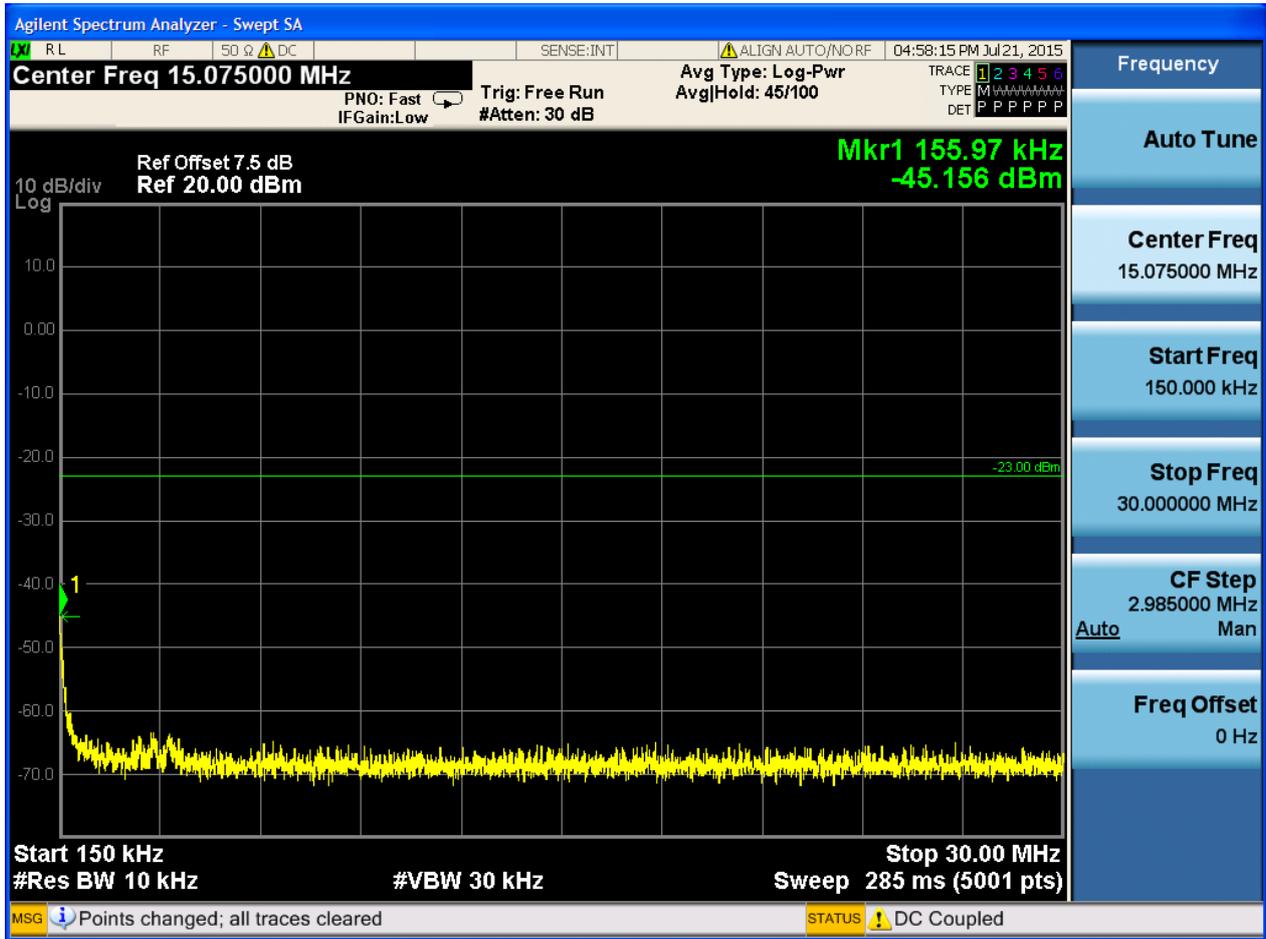


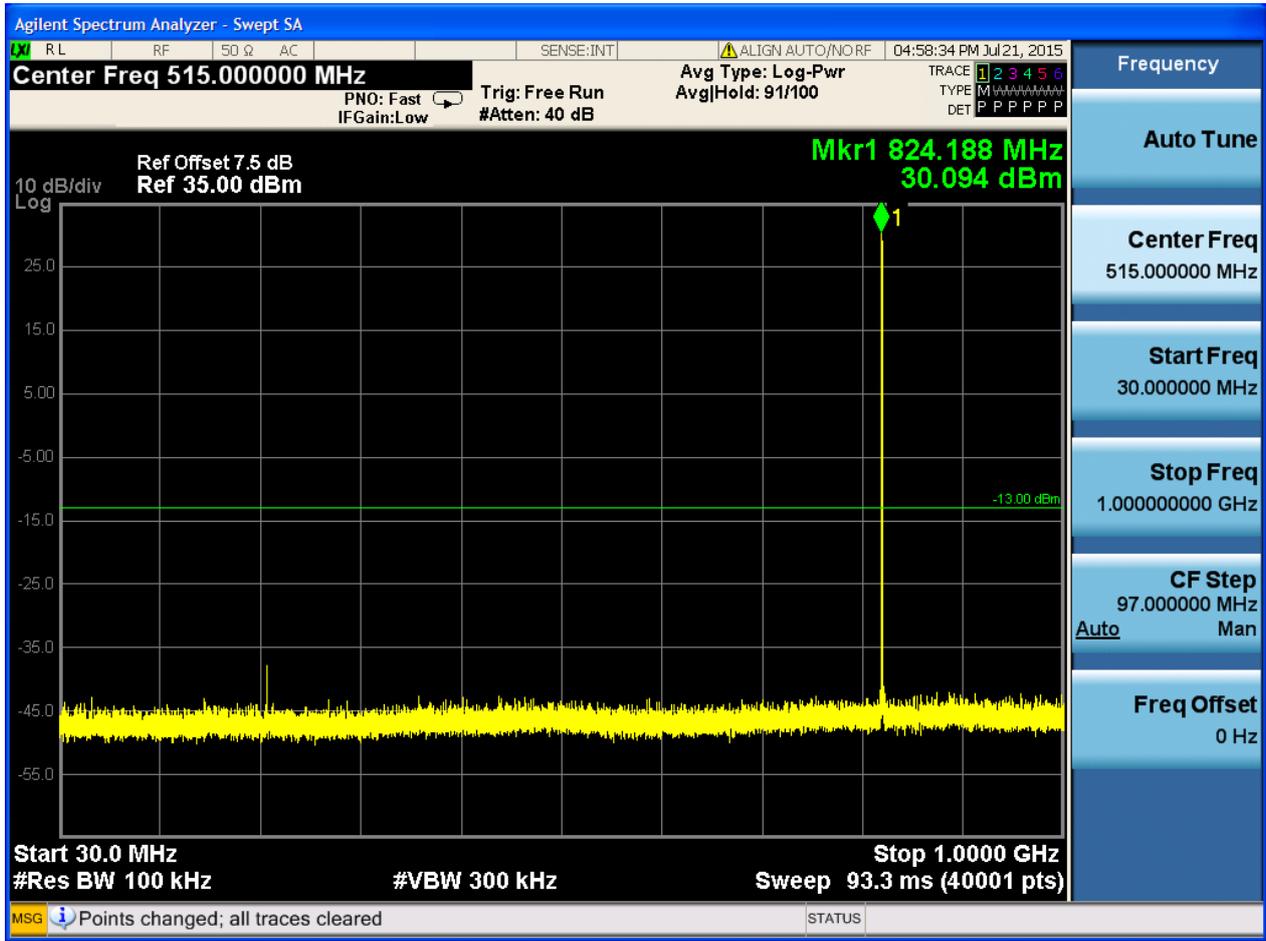


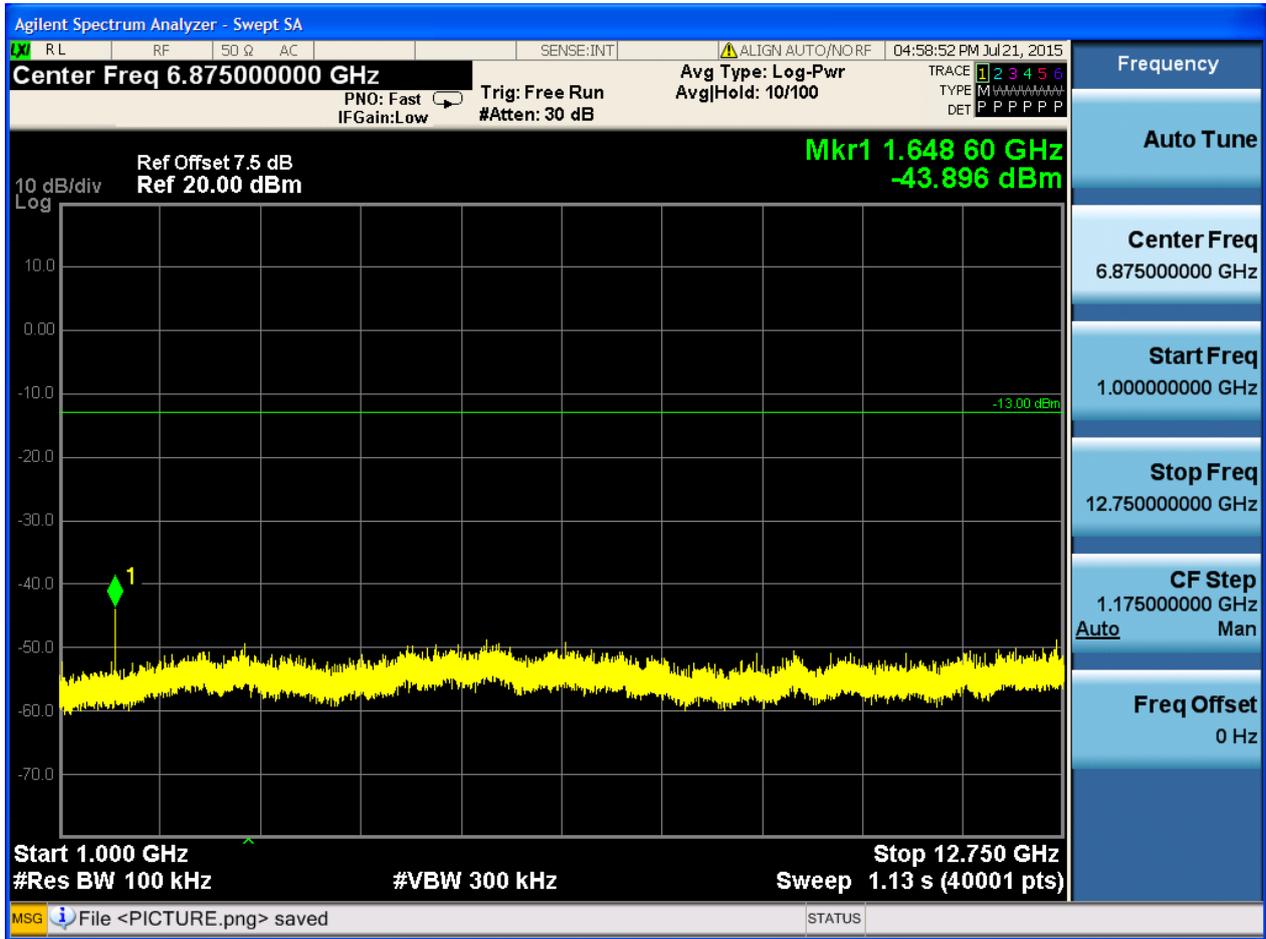
6.1.1.2 Test Mode = GSM/TM2

6.1.1.2.1 Test Channel = LCH

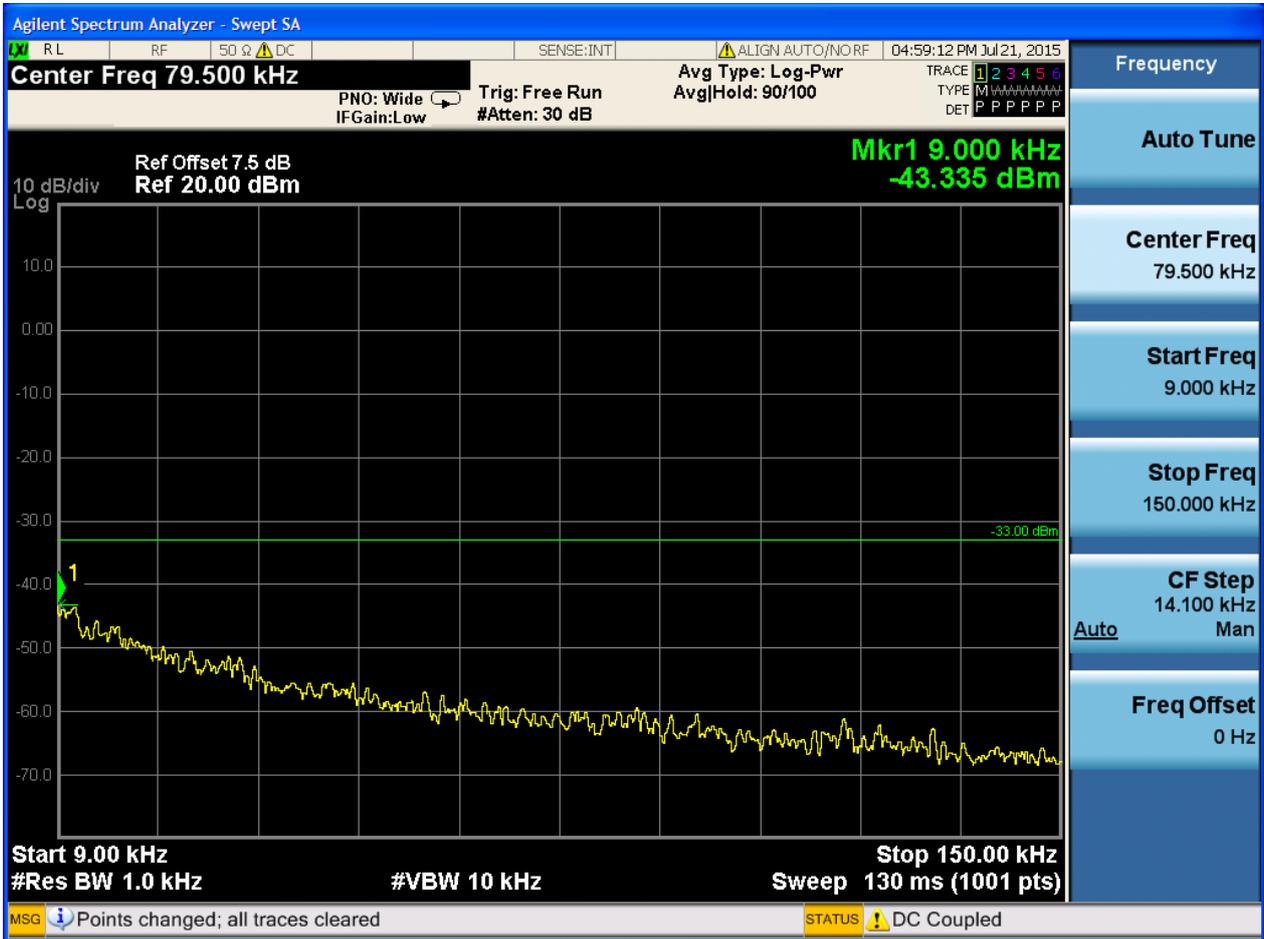


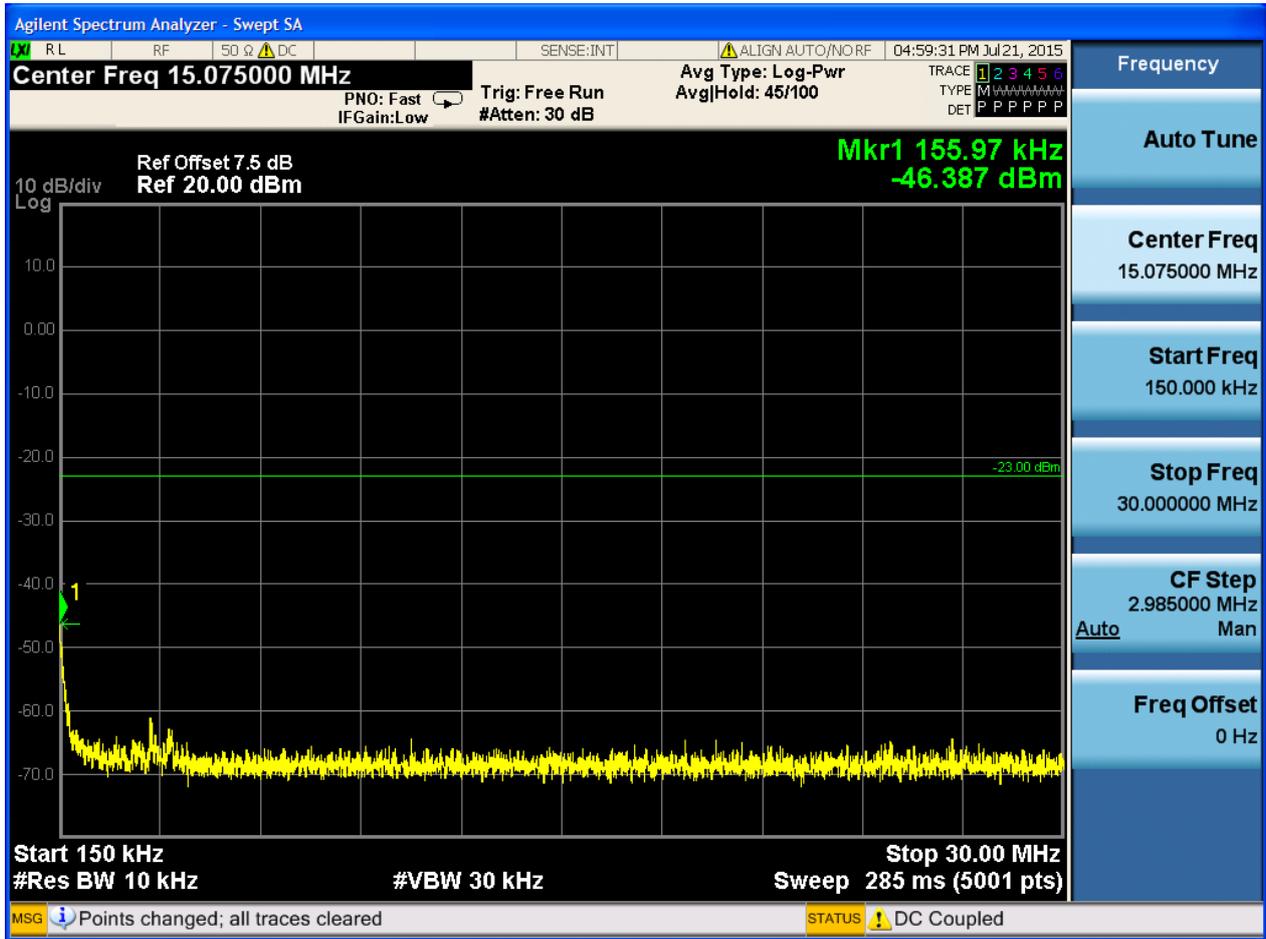


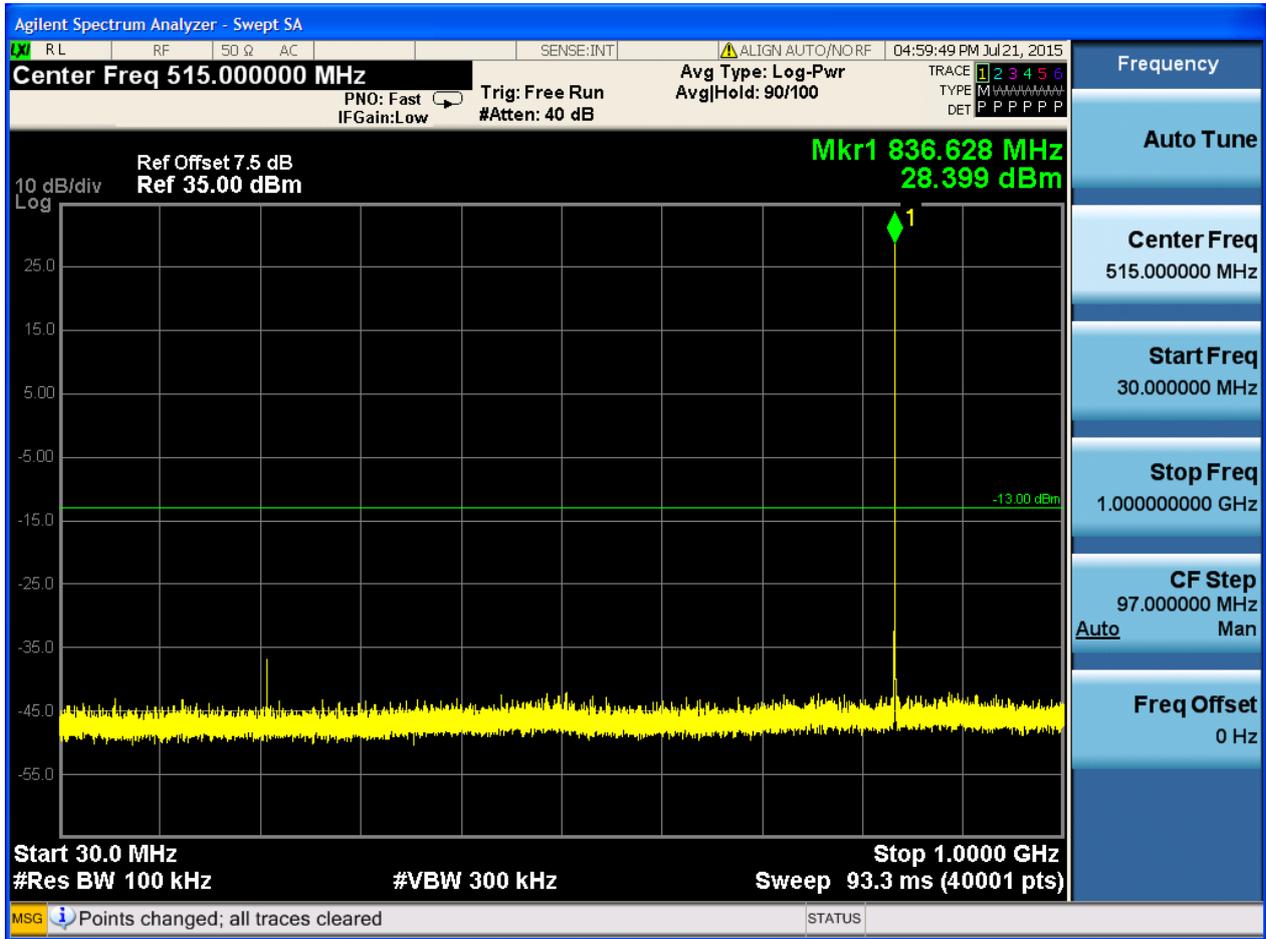


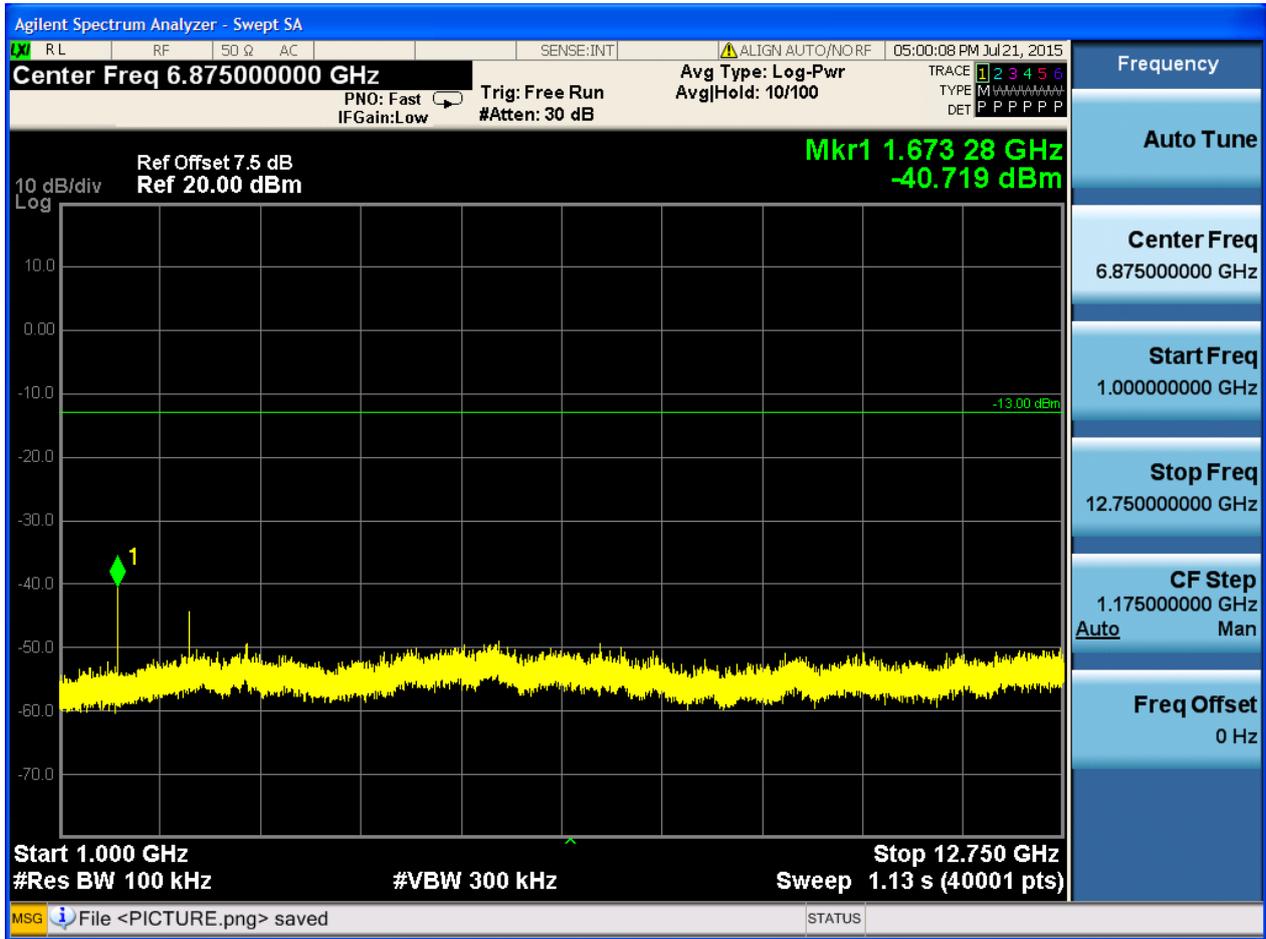


6.1.1.2.2 Test Channel = MCH





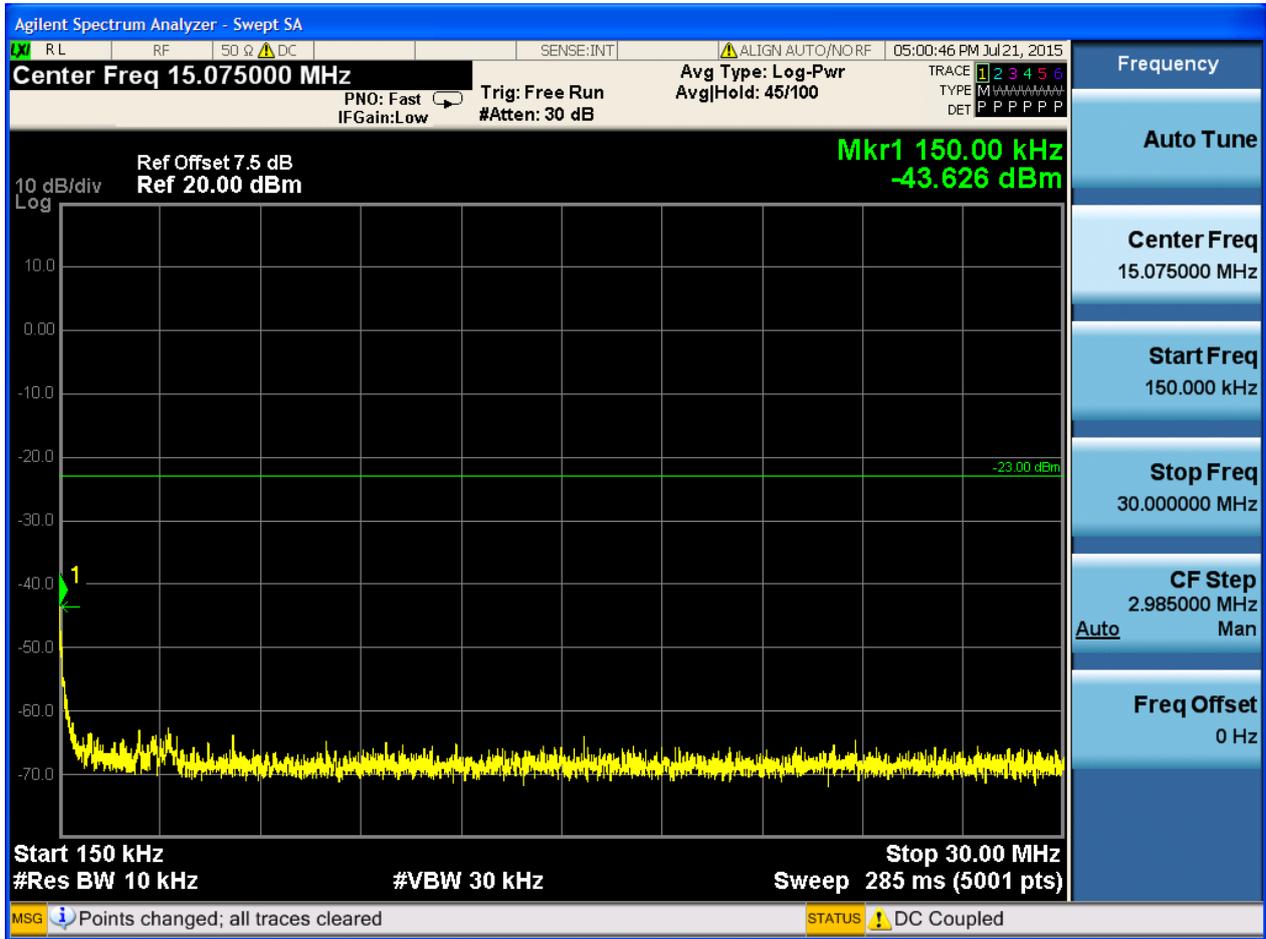


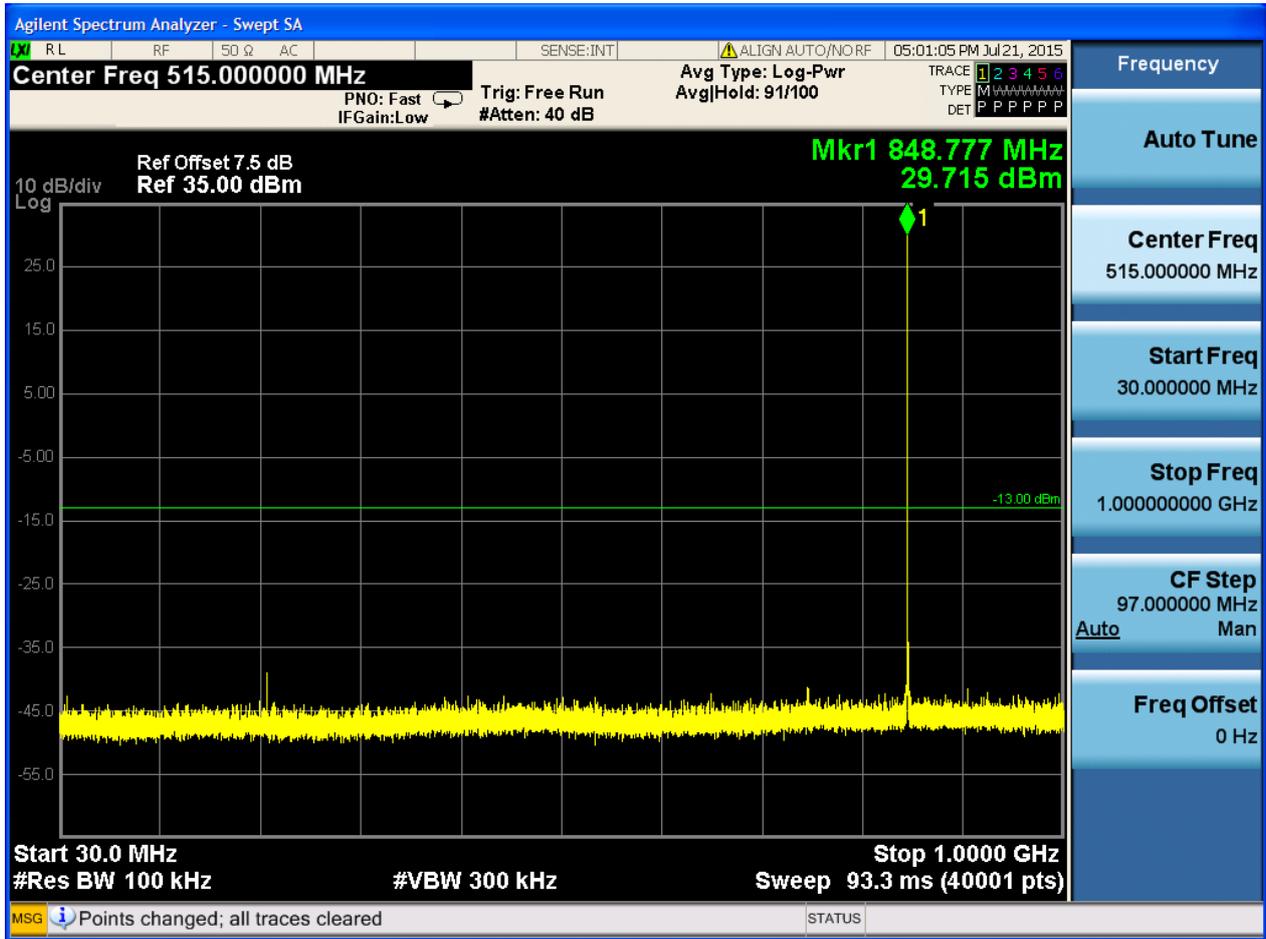


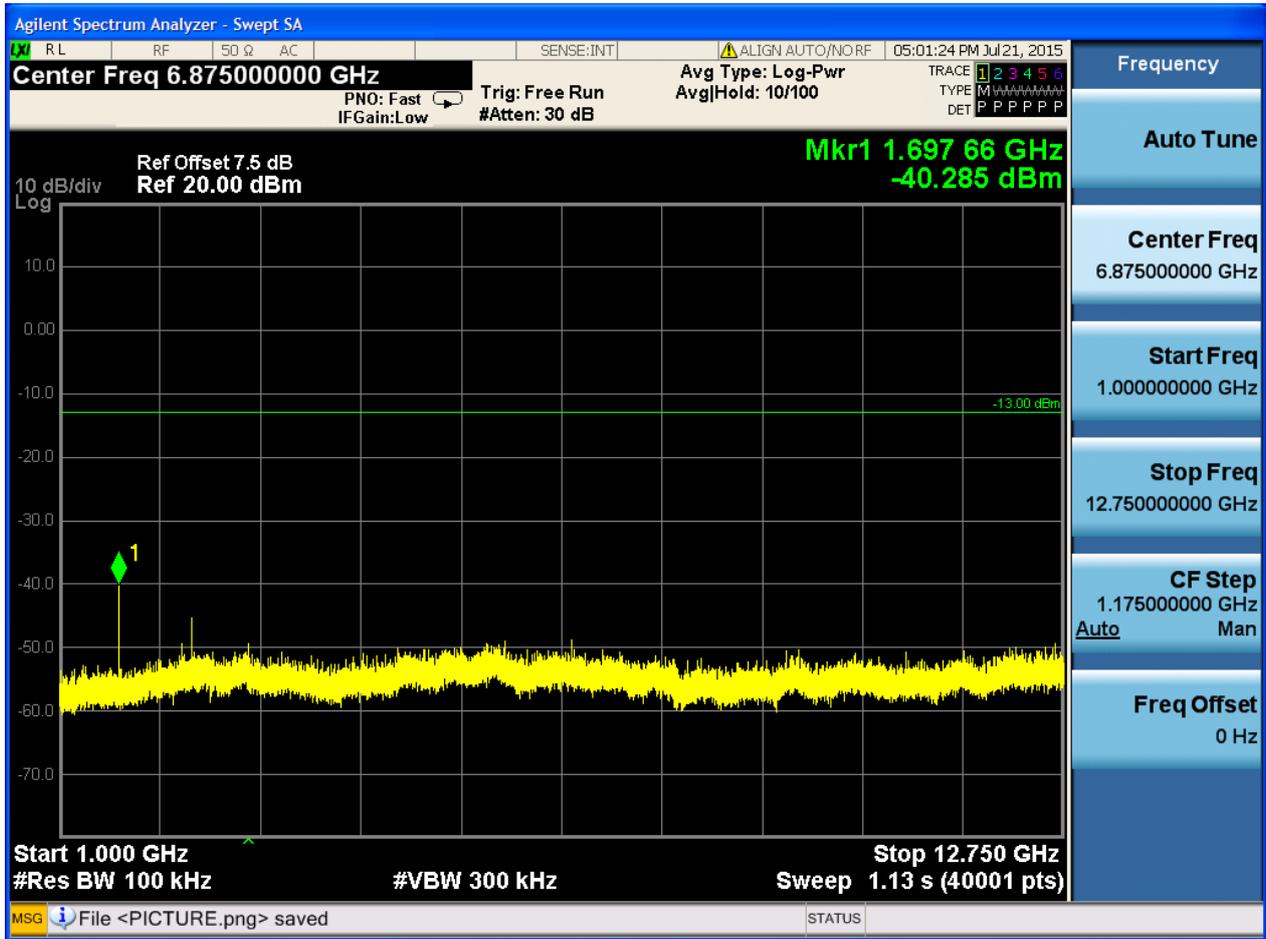


6.1.1.2.3 Test Channel = HCH









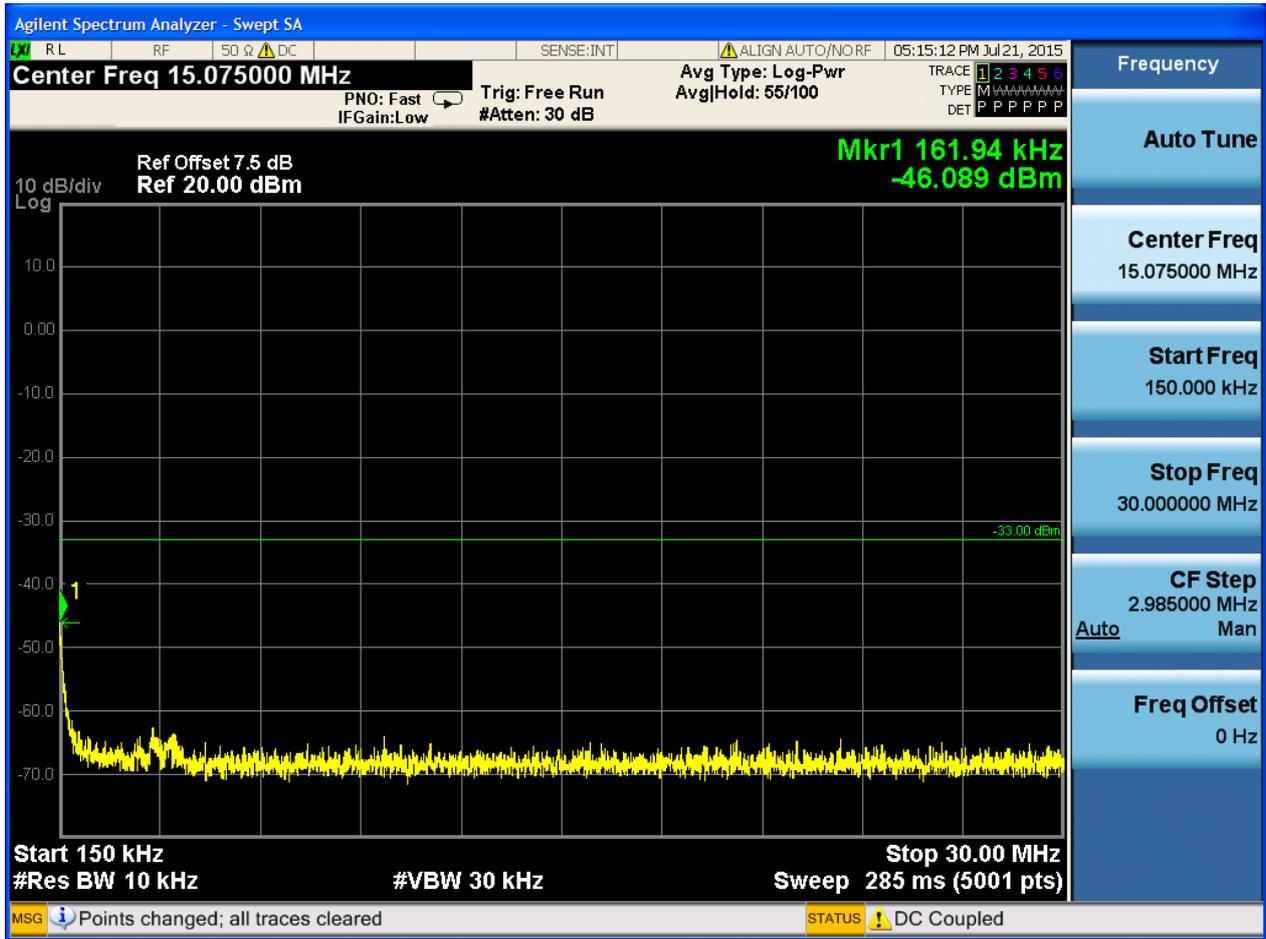


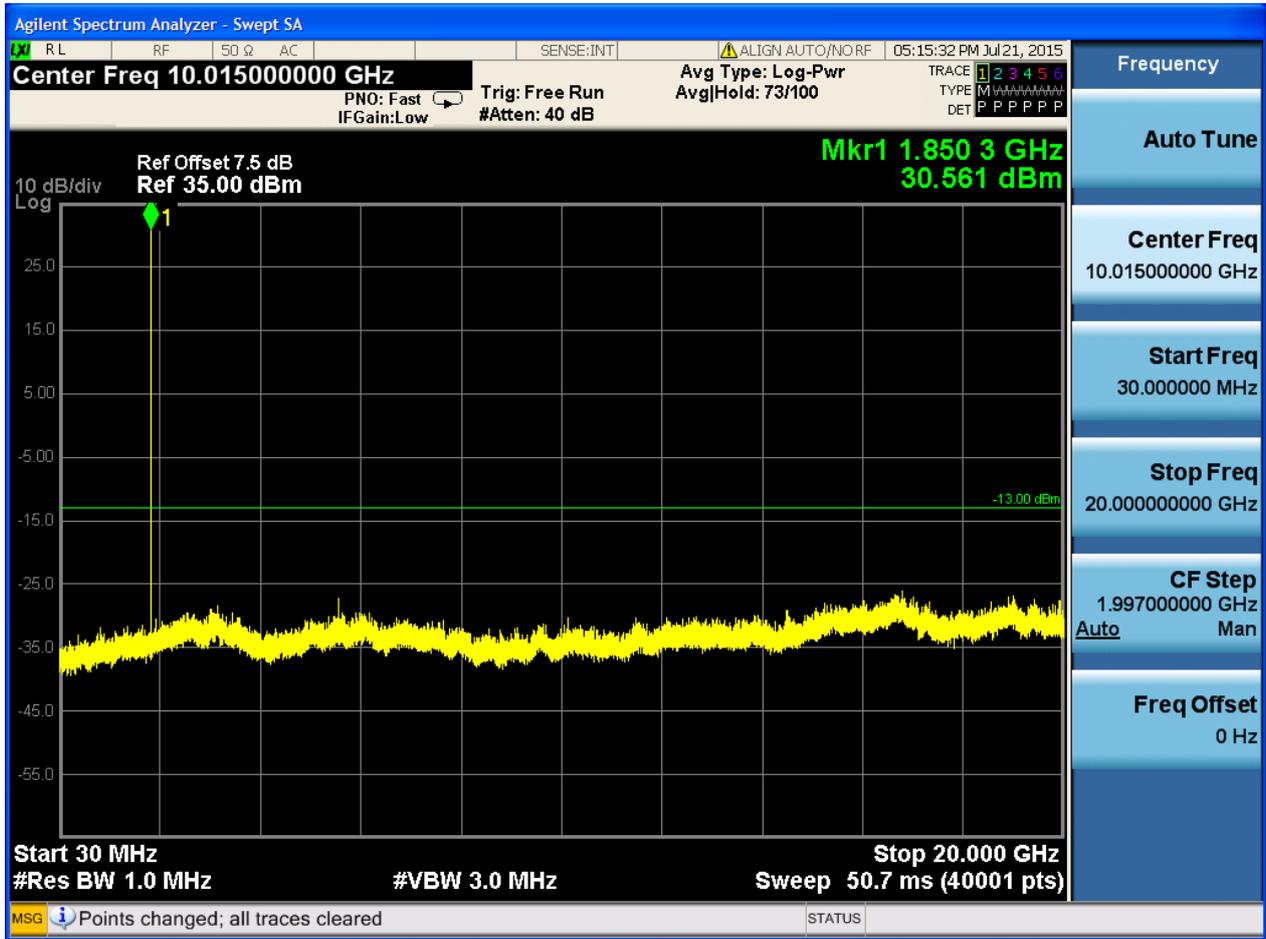
6.1.2 Test Band = GSM1900

6.1.2.1 Test Mode = GSM/TM1

6.1.2.1.1 Test Channel = LCH

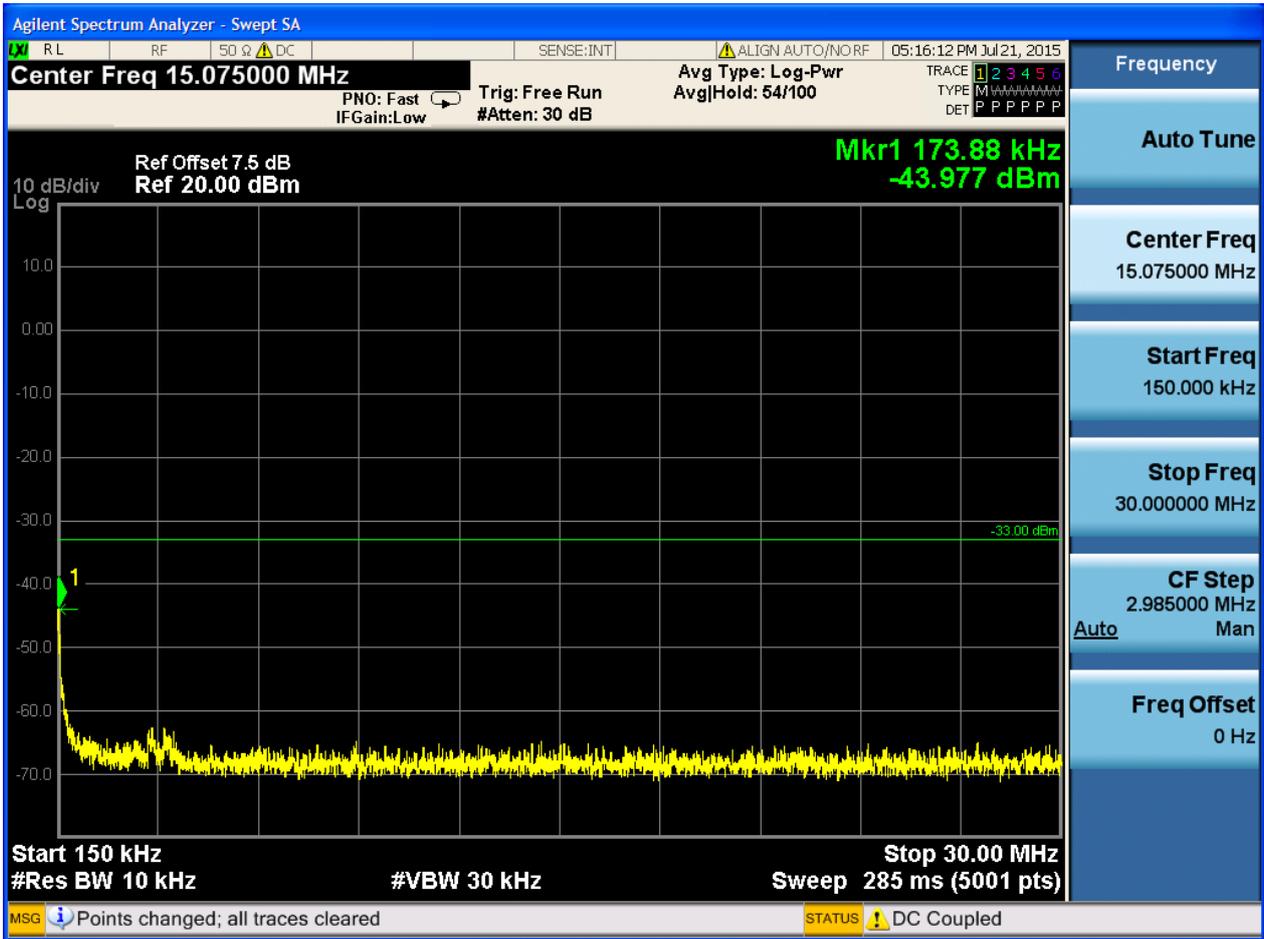


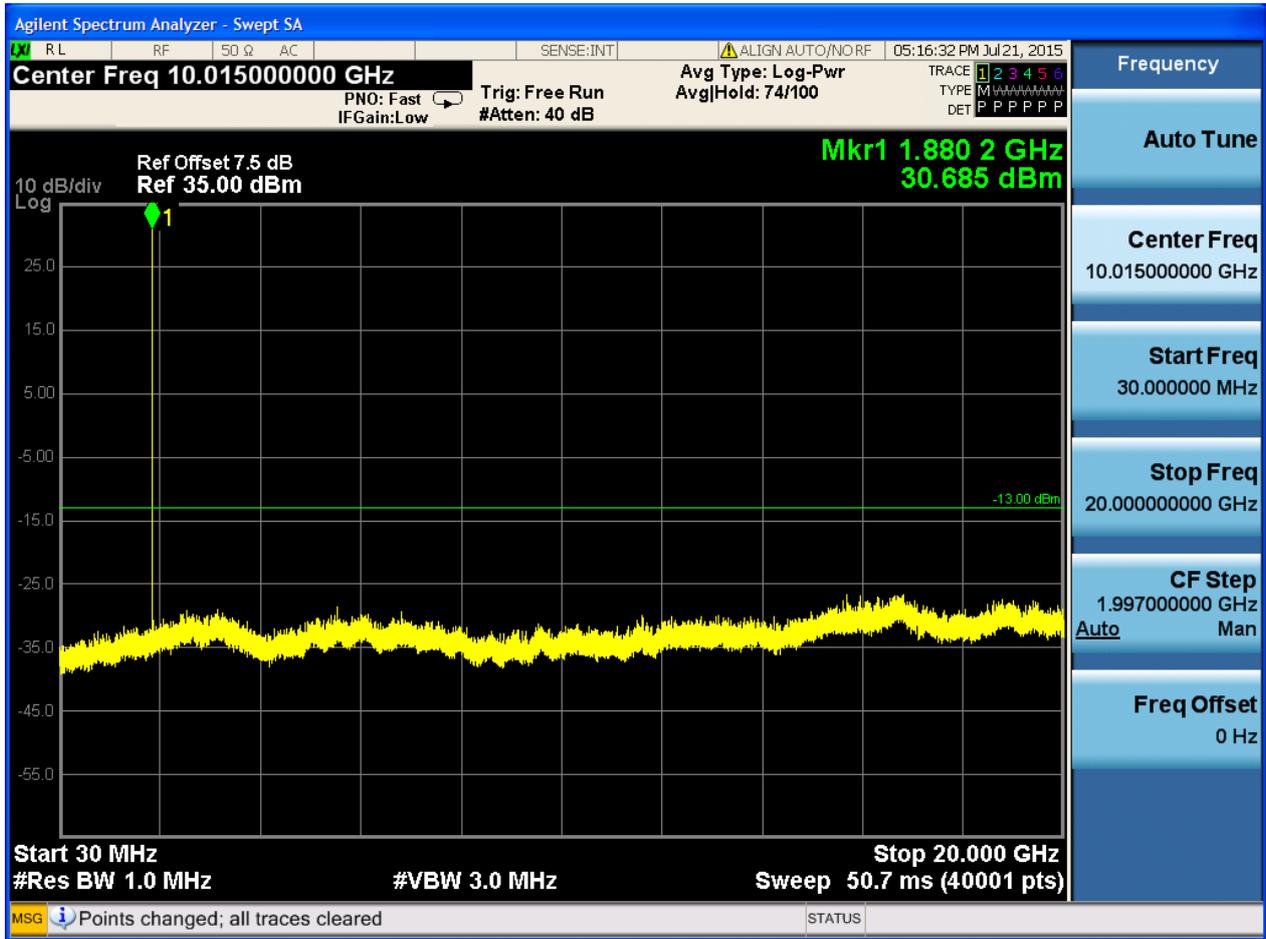




6.1.2.1.2 Test Channel = MCH



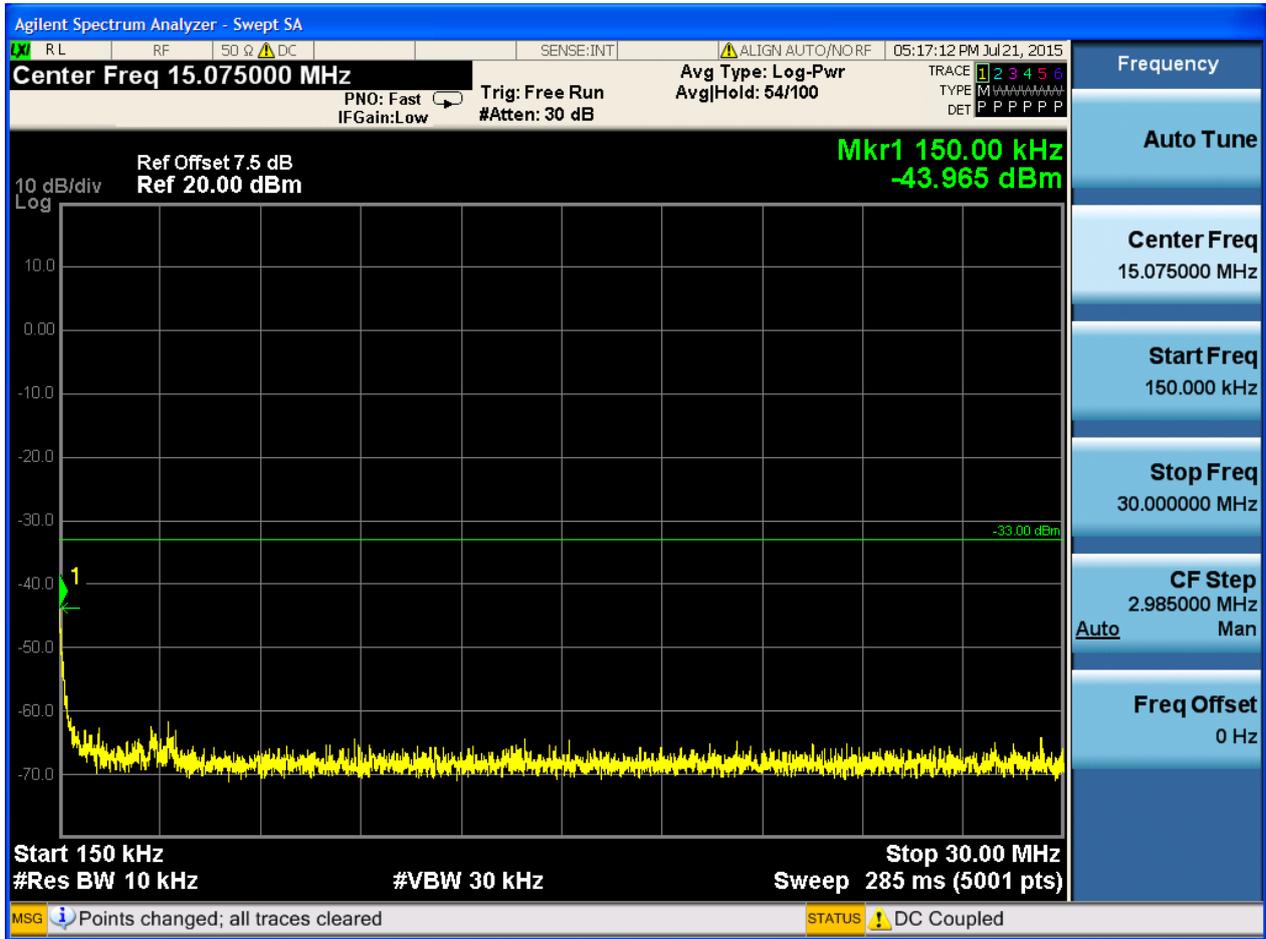


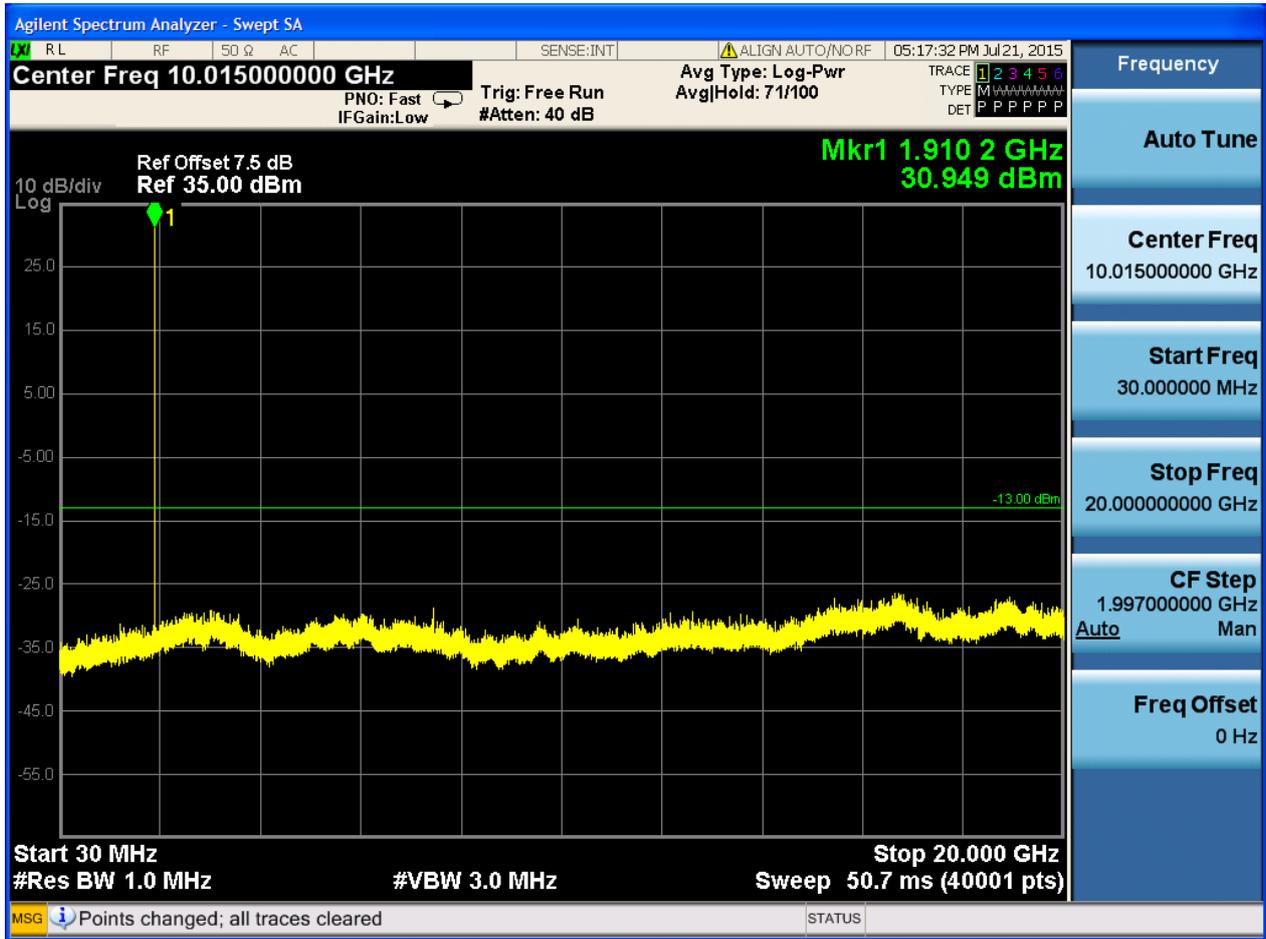




6.1.2.1.3 Test Channel = HCH



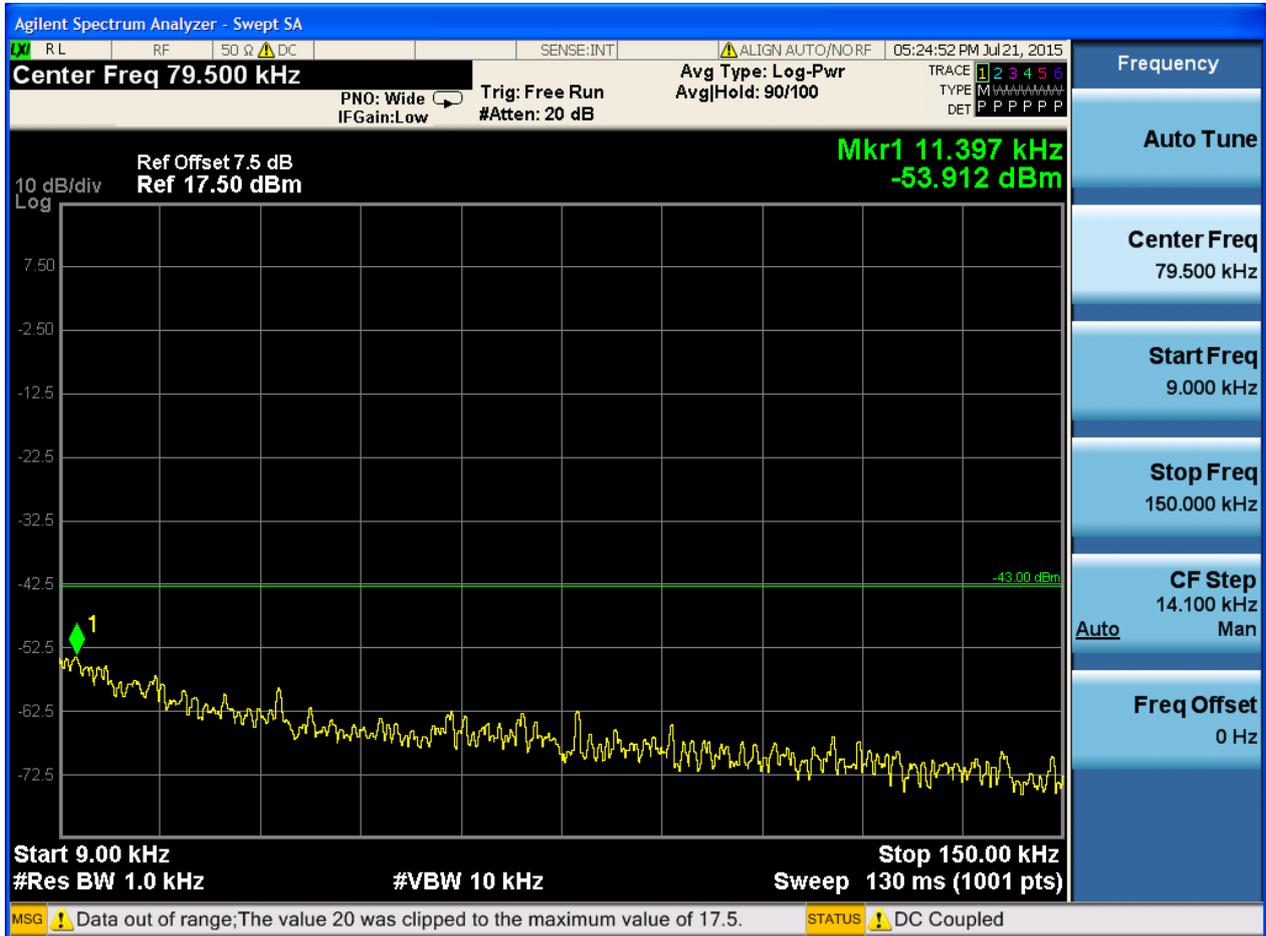


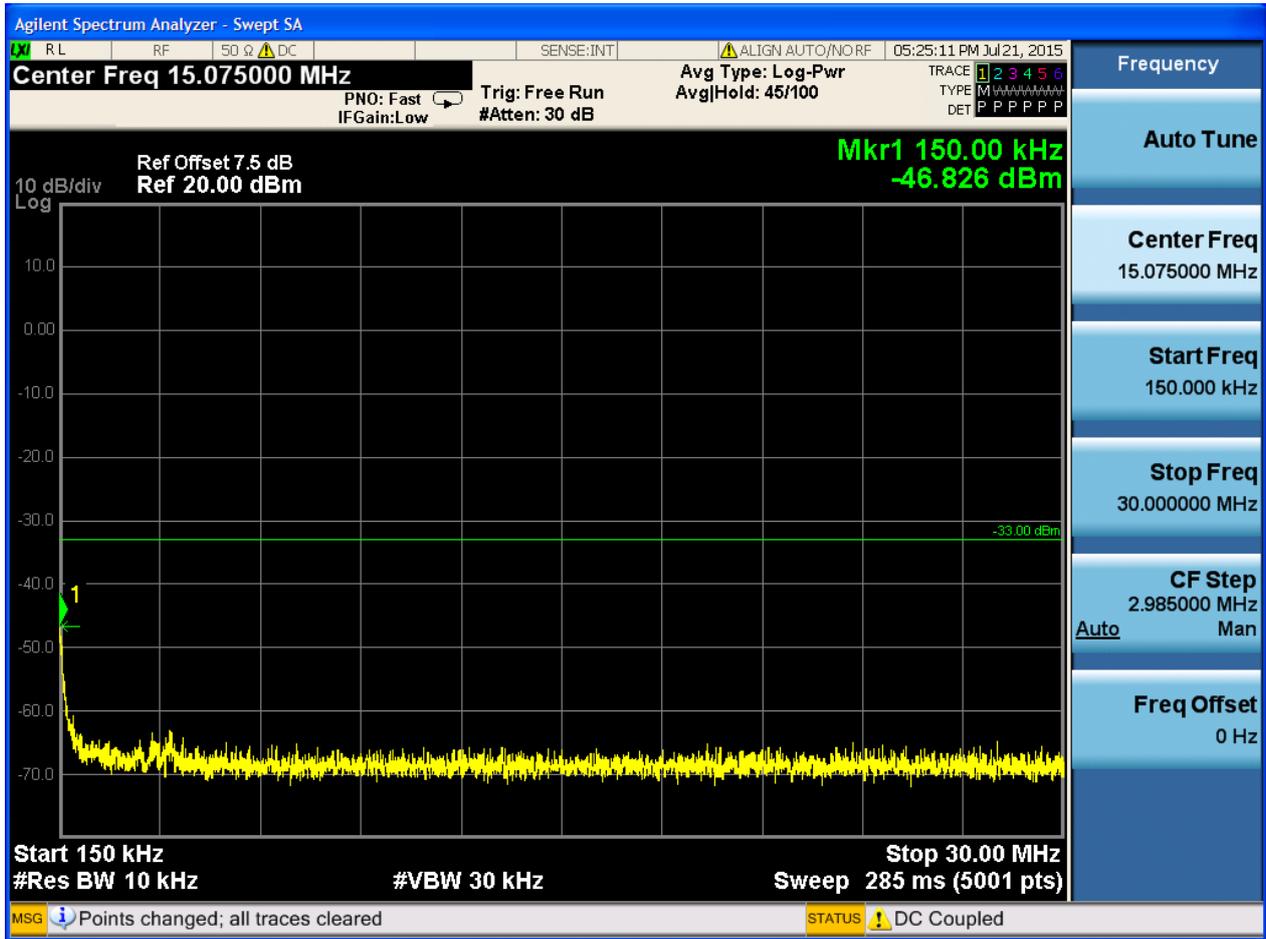


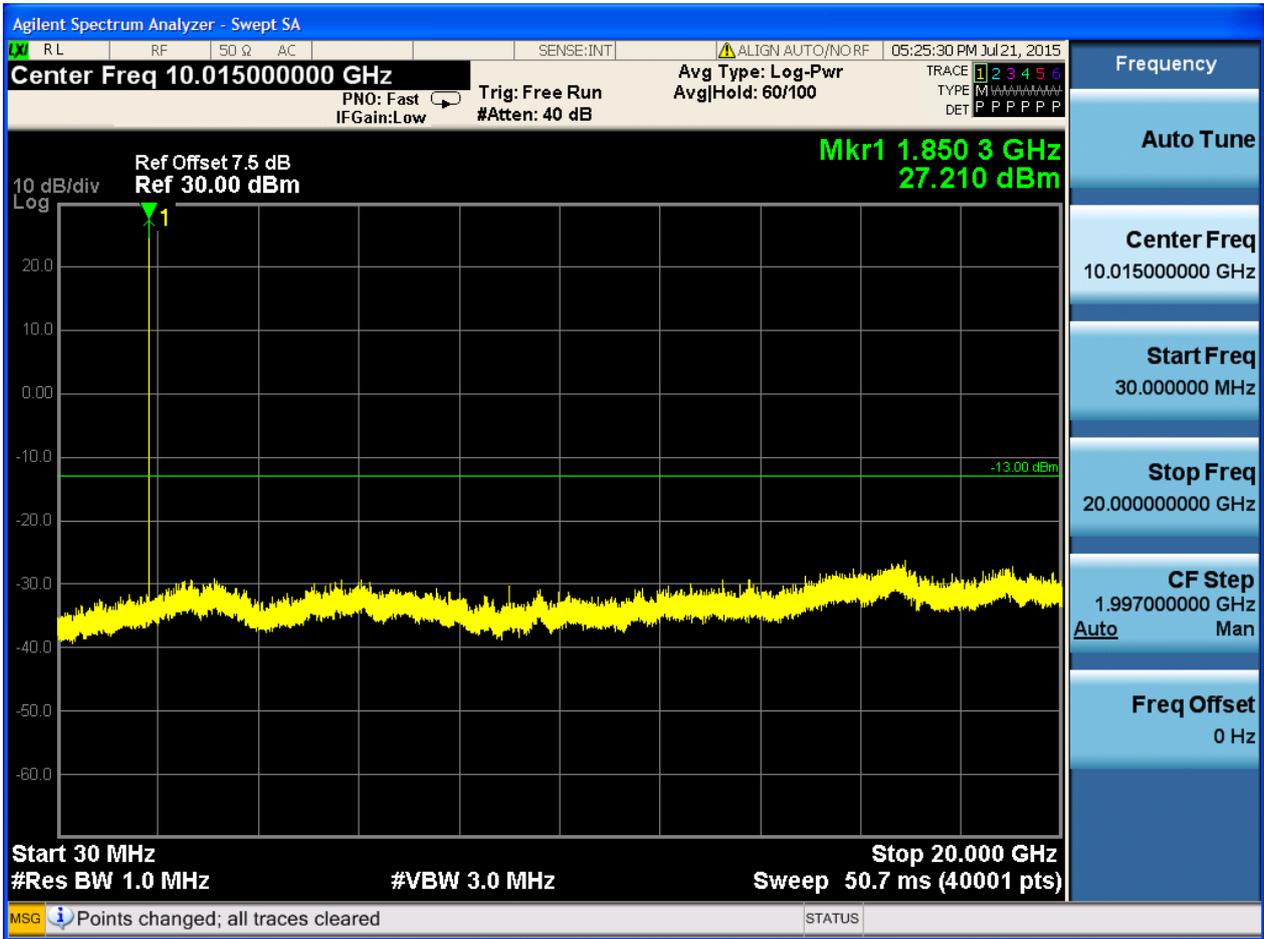


6.1.2.2 Test Mode = GSM/TM2

6.1.2.2.1 Test Channel = LCH

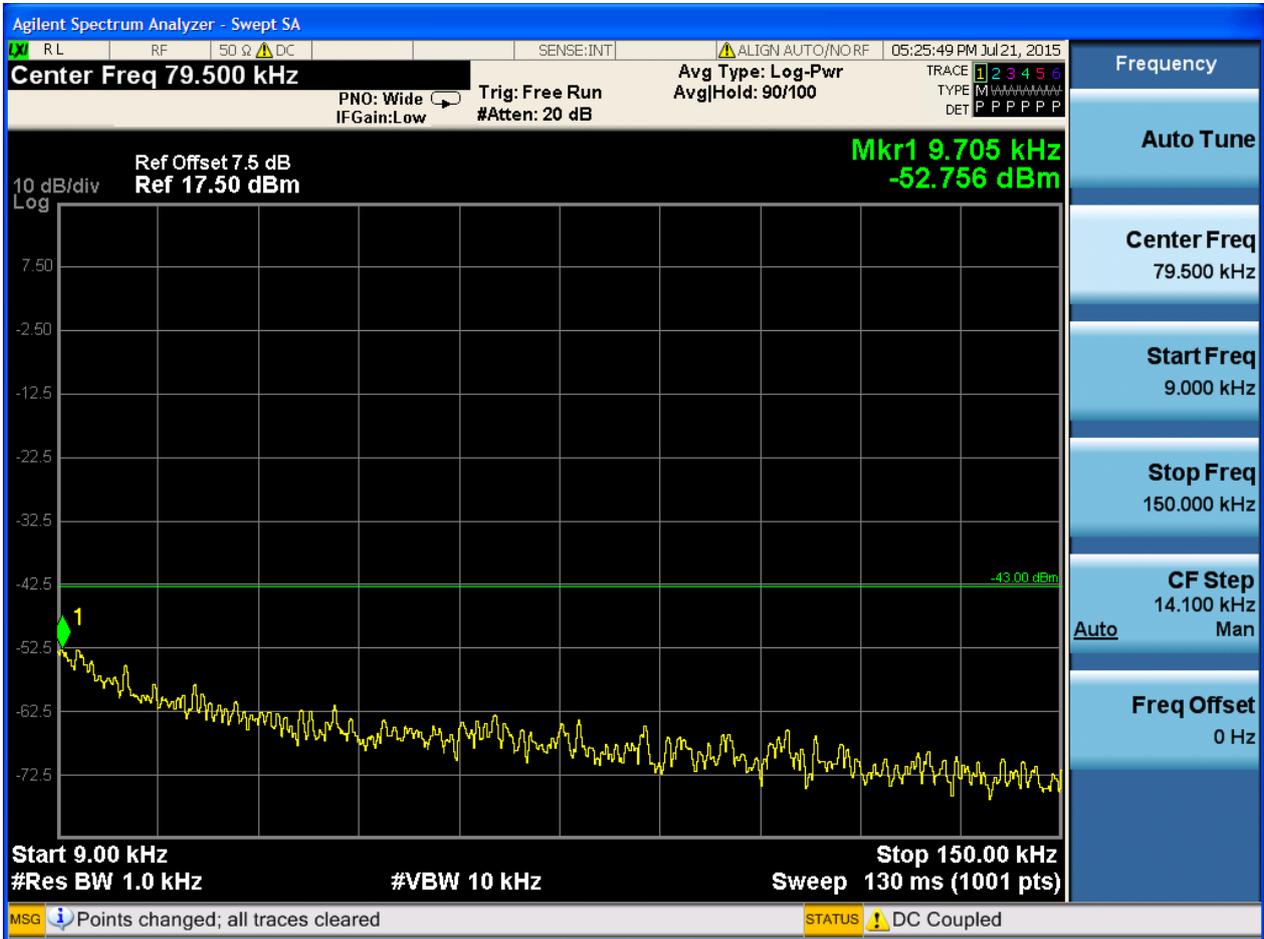


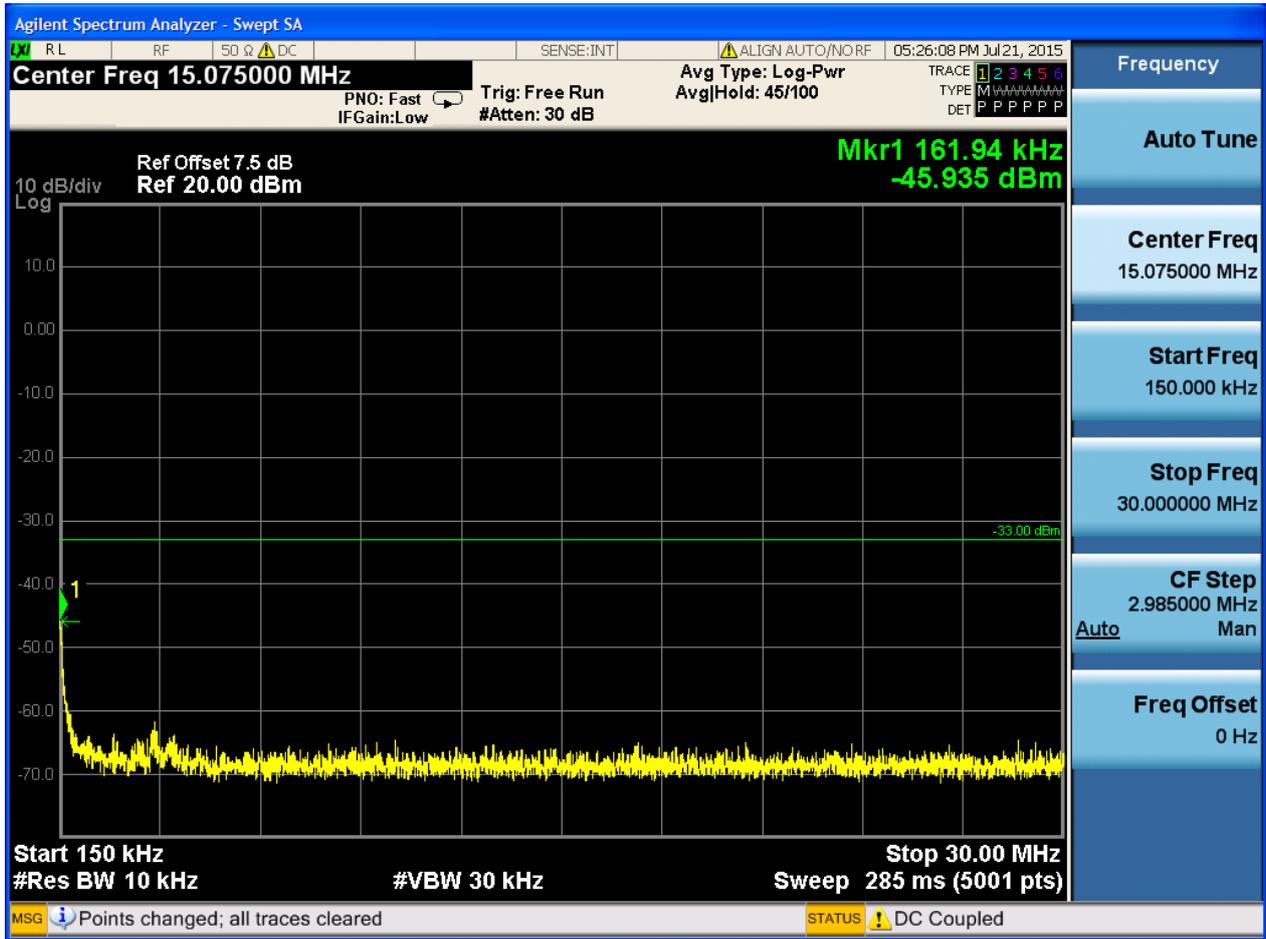


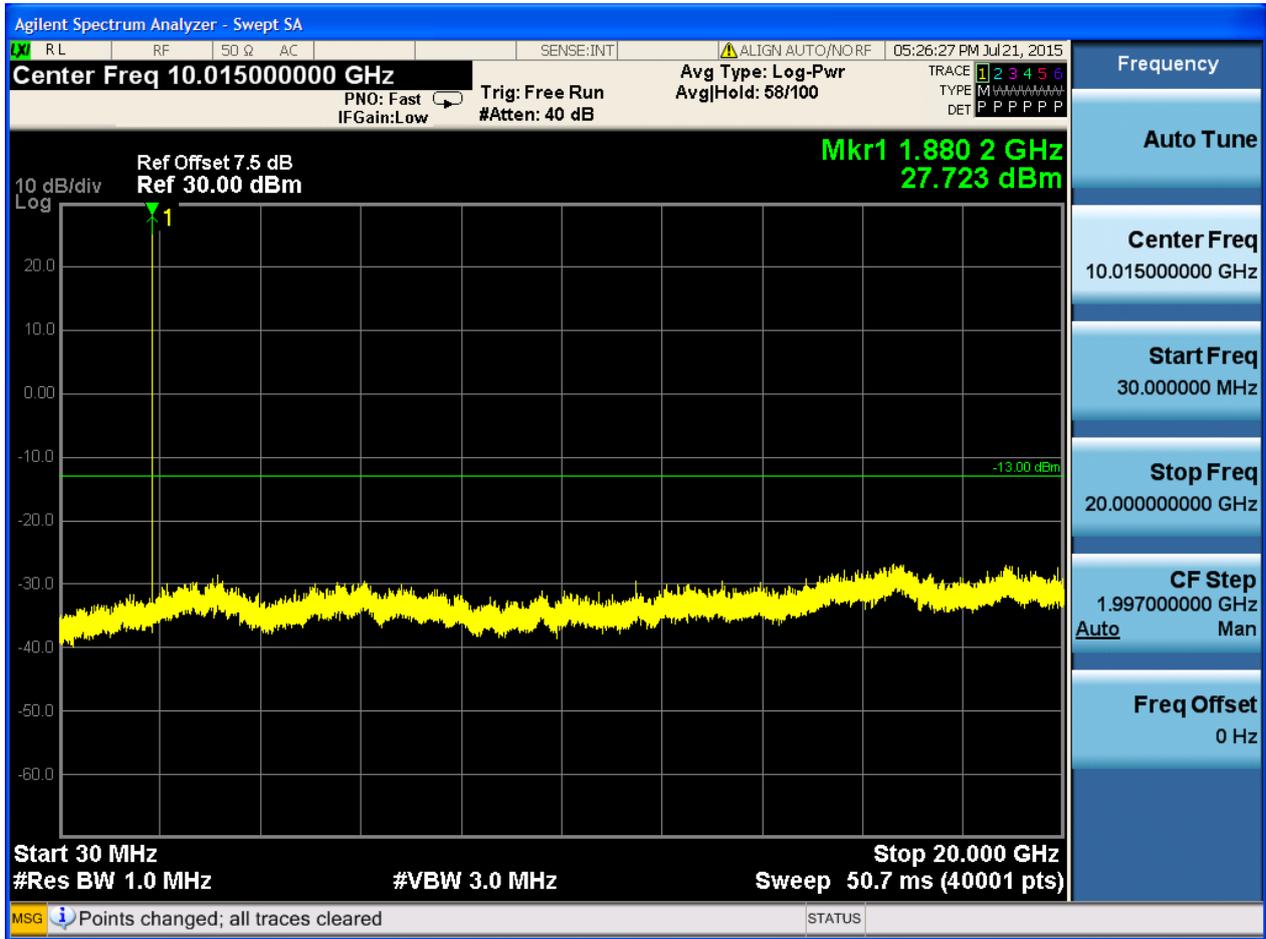




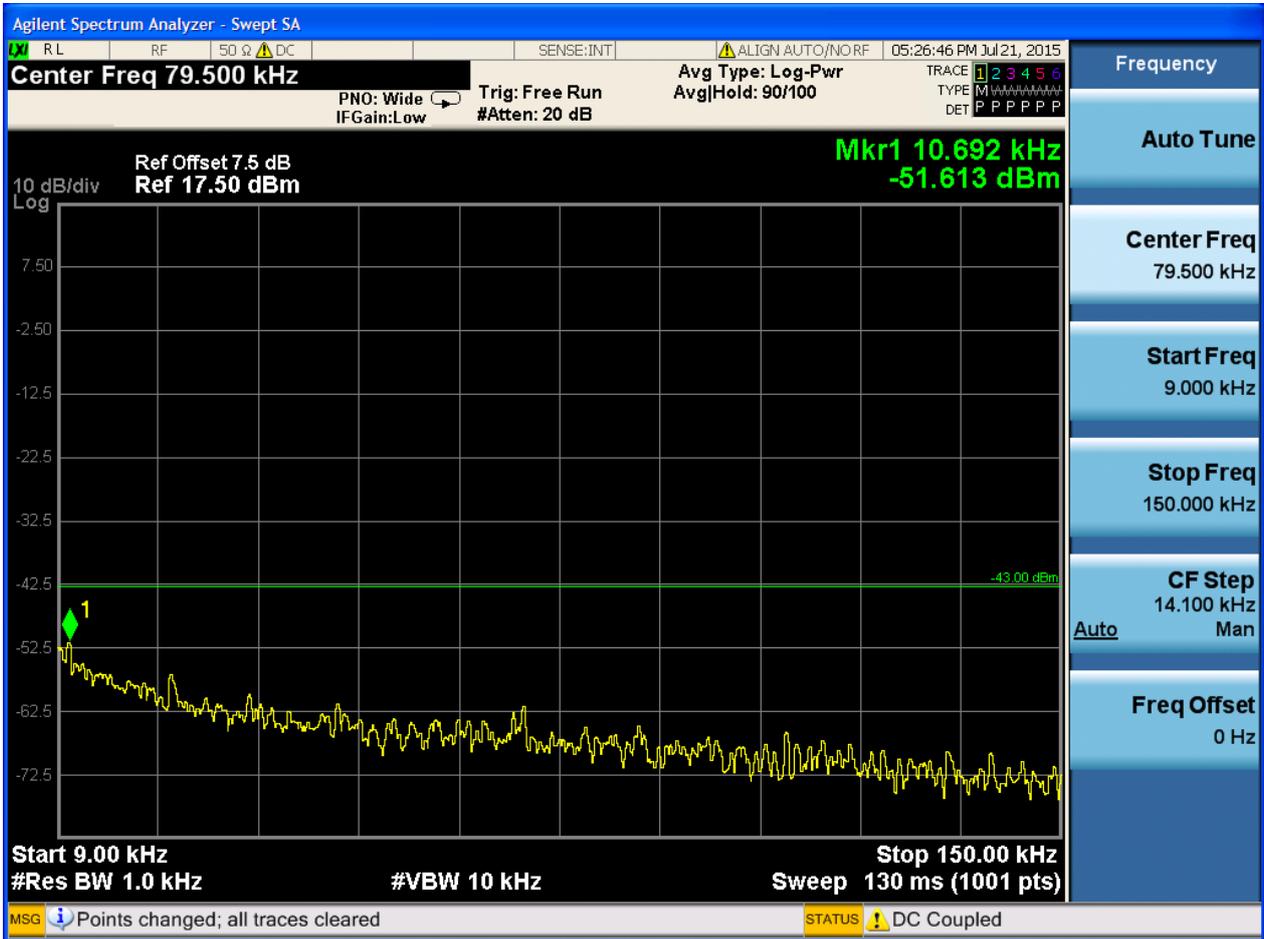
6.1.2.2.2 Test Channel = MCH

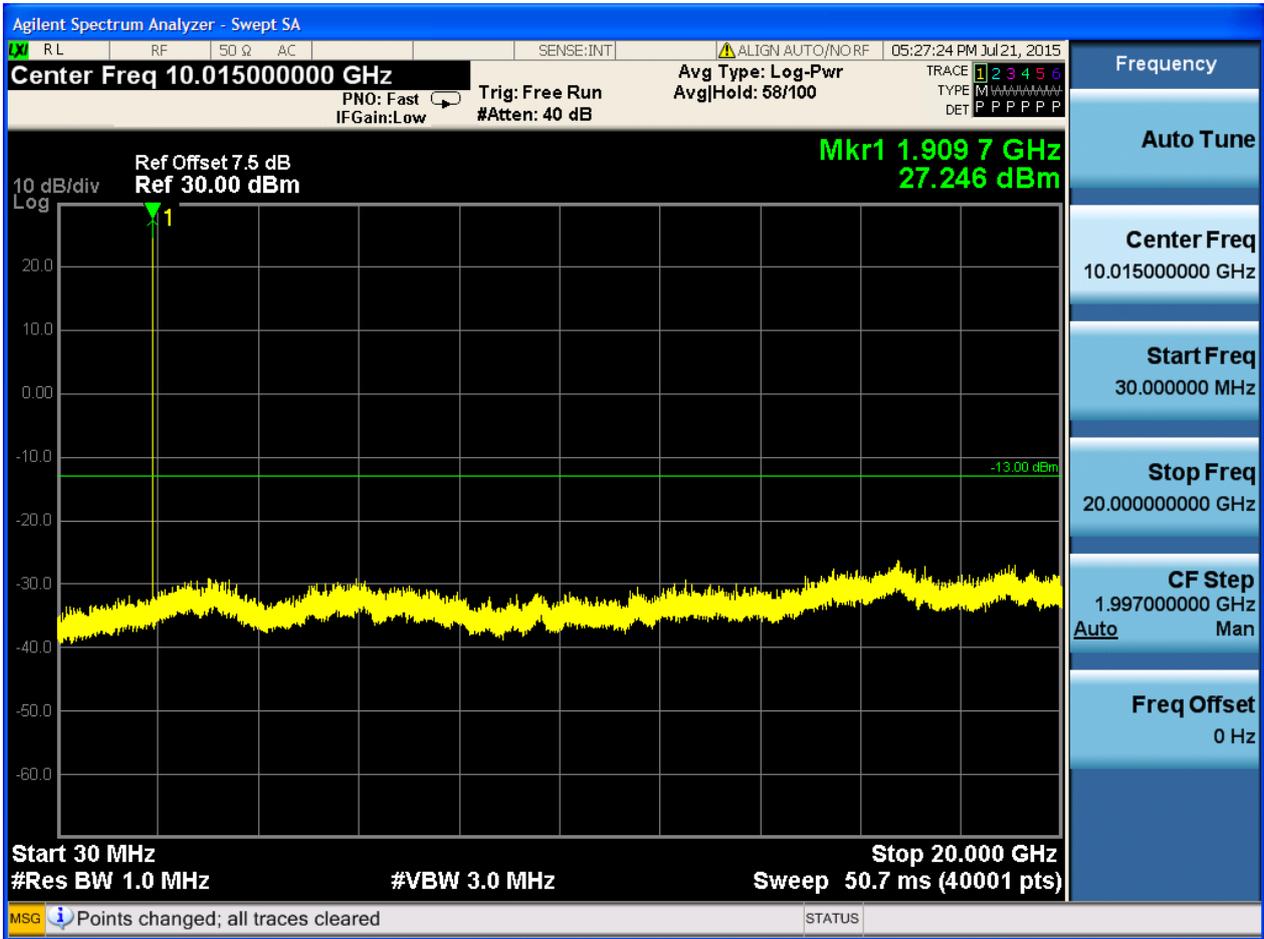






6.1.2.2.3 Test Channel = HCH





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

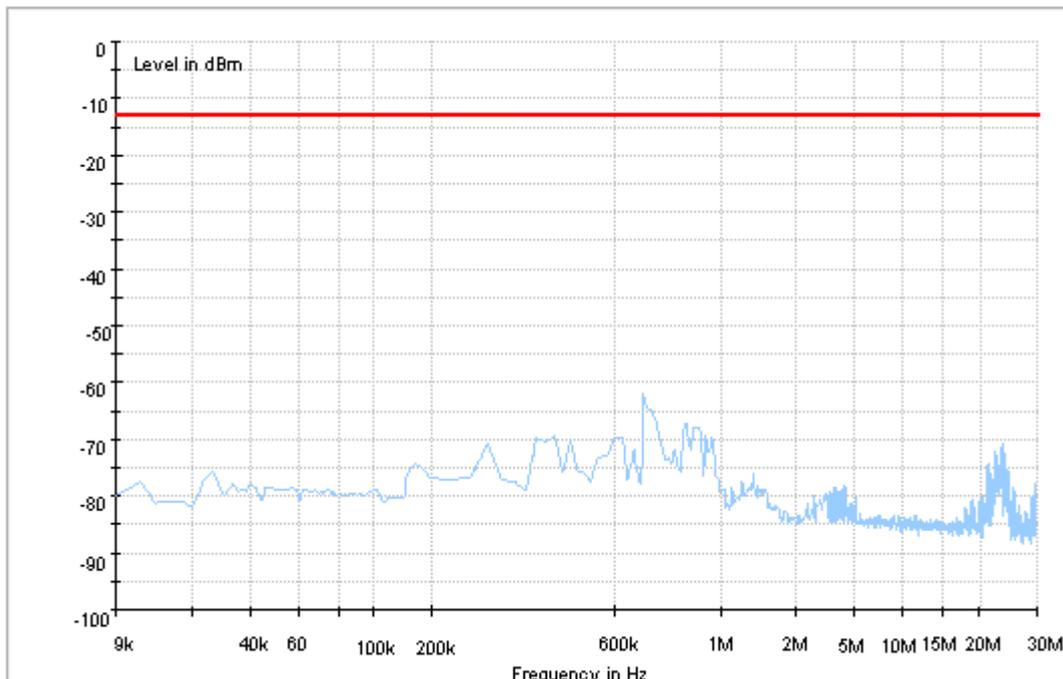
Above 1GHz, RBW = 1 MHz, VBW = 3 MHz. Detector: PK

We tested all modes, but the data presented below is the worst case.

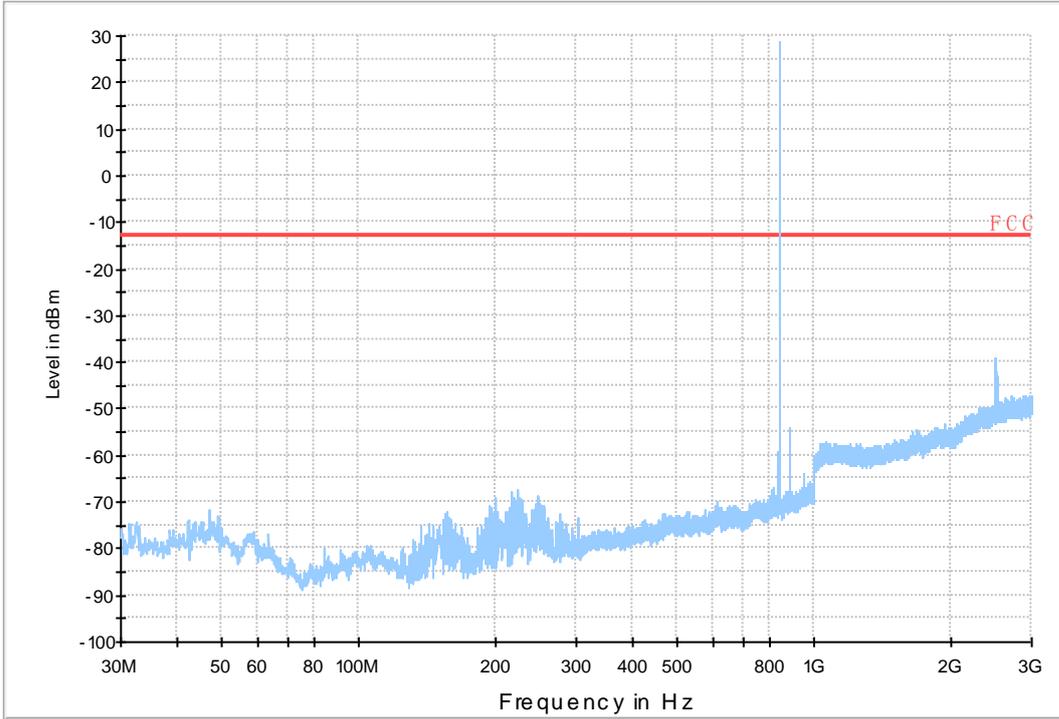
Part I - Test Plots

7.1 For GSM

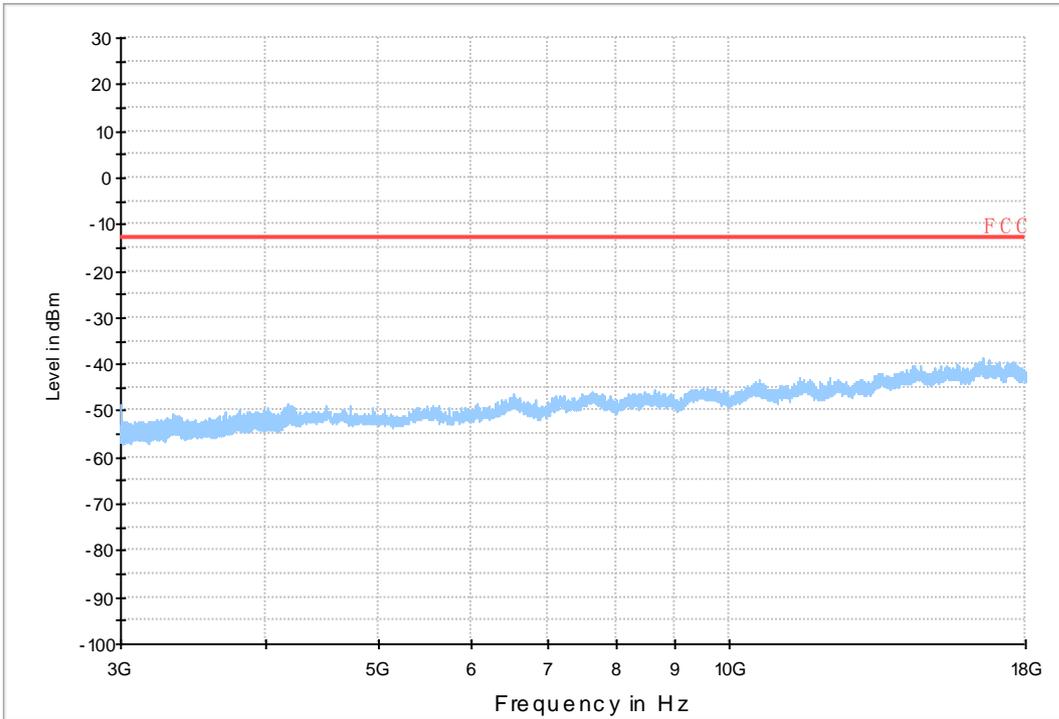
7.1.1 Test Band = GSM850



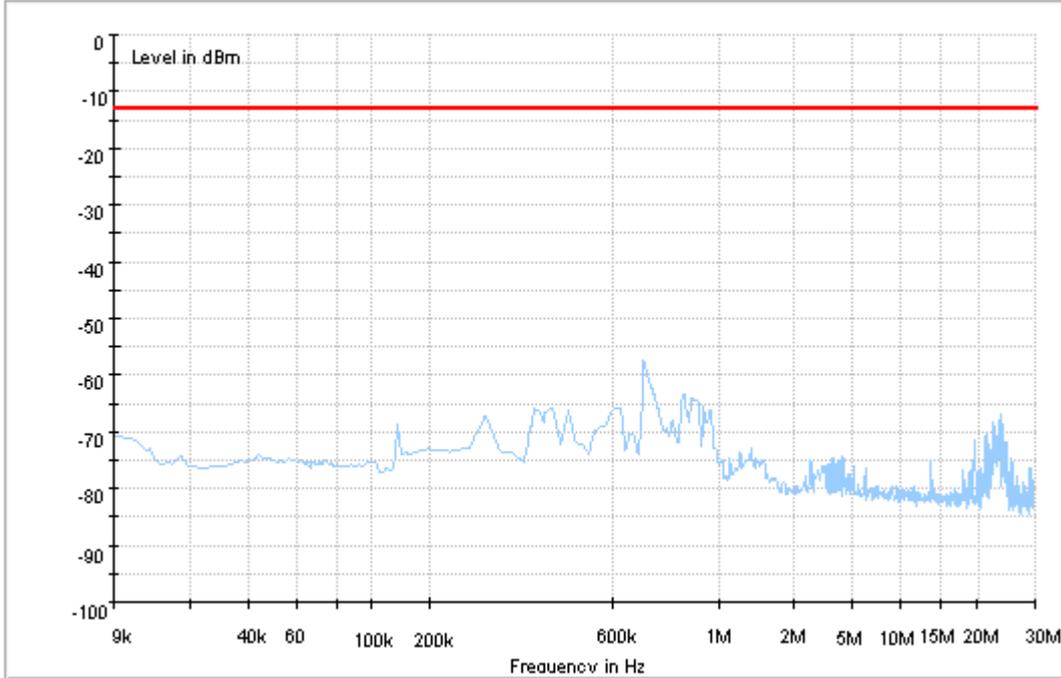
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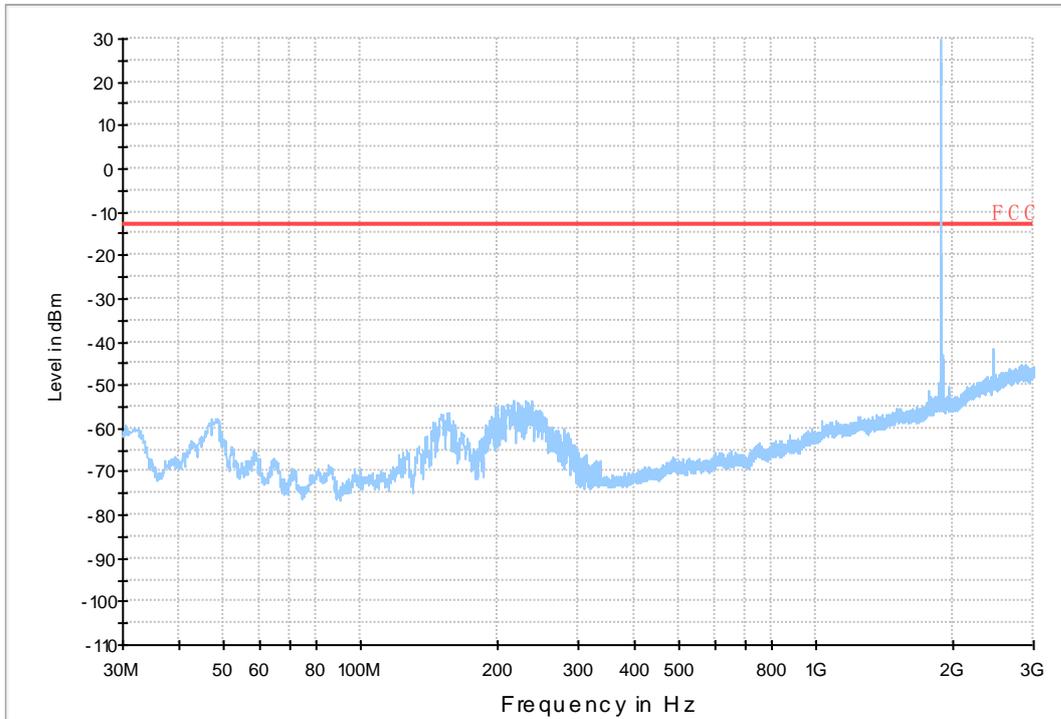
Copy of FCC PART22 GSM850_H



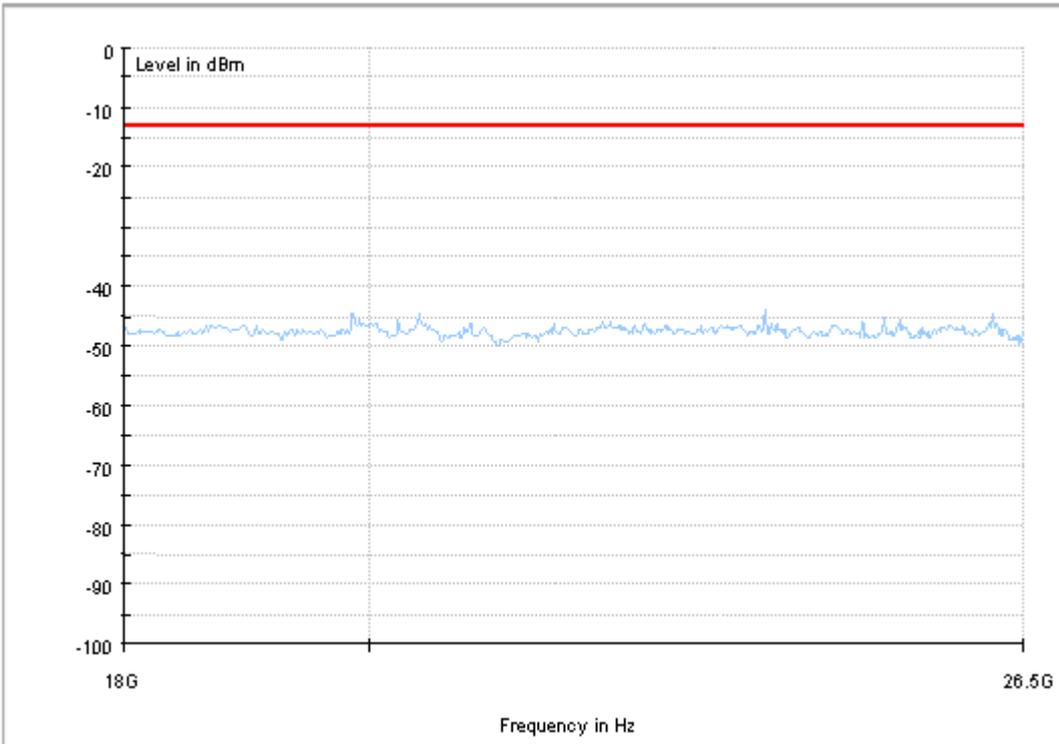
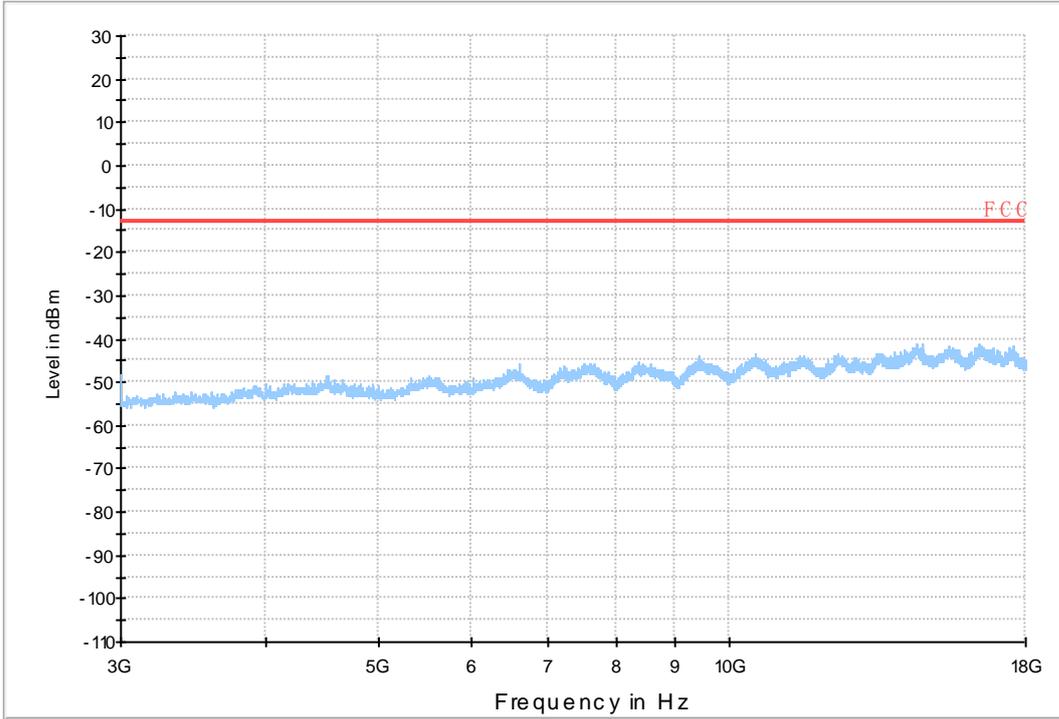
7.1.2 Test Band = GSM1900



Copy of FCC PART24 GSM 1900_L



Copy of FCC PART24 GSM 1900_H



8Appendix_H: Frequency Stability

8.1 For GSM

8.1.1 Frequency 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	10.46	0.01269	PASS
				VN	6.72	0.00815	PASS
				VH	7.62	0.00925	PASS
		MCH	TN	VL	4.39	0.00525	PASS
				VN	4.52	0.0054	PASS
				VH	5.81	0.00694	PASS
		HCH	TN	VL	-3.68	-0.00434	PASS
				VN	7.68	0.00905	PASS
				VH	7.23	0.00852	PASS
	GSM/TM2	LCH	TN	VL	11.33	0.01375	PASS
				VN	5.13	0.00622	PASS
				VH	5.81	0.00705	PASS
		MCH	TN	VL	7.55	0.00902	PASS
				VN	7.46	0.00892	PASS
				VH	6.88	0.00822	PASS
		HCH	TN	VL	6.65	0.00783	PASS
				VN	8.49	0.01	PASS
				VH	6.75	0.00795	PASS
GSM1900	GSM/TM1	LCH	TN	VL	5.23	0.00283	PASS
				VN	3.94	0.00213	PASS
				VH	2.45	0.00132	PASS
		MCH	TN	VL	11.82	0.00629	PASS
				VN	9.36	0.00498	PASS
				VH	10.27	0.00546	PASS
		HCH	TN	VL	-2.65	-0.00139	PASS
				VN	4.33	0.00227	PASS
				VH	20.15	0.01055	PASS
	GSM/TM2	LCH	TN	VL	12.24	0.00662	PASS
				VN	8.04	0.00435	PASS
				VH	11.82	0.00639	PASS
		MCH	TN	VL	13.17	0.00701	PASS
				VN	14.08	0.00749	PASS
				VH			

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				VH	11.66	0.0062	PASS
		HCH	TN	VL	2.71	0.00142	PASS
				VN	6.94	0.00363	PASS
				VH	6.52	0.00341	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	4.2	0.0051	PASS
				-20	8.2	0.00995	PASS
				-10	5.17	0.00627	PASS
				0	8.14	0.00988	PASS
				10	5.04	0.00612	PASS
				20	5.36	0.0065	PASS
				30	9.36	0.01136	PASS
				40	5.29	0.00642	PASS
		50	3.16	0.00383	PASS		
		MCH	VN	-30	4.52	0.0054	PASS
				-20	6.01	0.00718	PASS
				-10	12.01	0.01436	PASS
				0	7.75	0.00926	PASS
				10	11.36	0.01358	PASS
				20	5.23	0.00625	PASS
				30	6.52	0.00779	PASS
				40	3.03	0.00362	PASS
		50	4.2	0.00502	PASS		
		HCH	VN	-30	8.27	0.00974	PASS
				-20	8.52	0.01004	PASS
				-10	7.62	0.00898	PASS
				0	9.75	0.01149	PASS
				10	3.87	0.00456	PASS
				20	2.71	0.00319	PASS
	30			9.75	0.01149	PASS	
	40			6.52	0.00768	PASS	
	50	7.62	0.00898	PASS			
	GSM/TM2	LCH	VN	-30	8.78	0.01065	PASS
				-20	10.94	0.01327	PASS
				-10	10.27	0.01246	PASS
				0	8.3	0.01007	PASS



Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict		
				10	9.36	0.01136	PASS		
				20	4.55	0.00552	PASS		
				30	9.59	0.01164	PASS		
				40	8.88	0.01077	PASS		
				50	10.82	0.01313	PASS		
		MCH	VN	-30	6.39	0.00764	PASS		
				-20	5.23	0.00625	PASS		
				-10	6.07	0.00726	PASS		
				0	4.84	0.00579	PASS		
				10	5.94	0.0071	PASS		
				20	7.1	0.00849	PASS		
				30	7.3	0.00873	PASS		
				40	6.97	0.00833	PASS		
				50	4.39	0.00525	PASS		
				HCH	VN	-30	7.14	0.00841	PASS
		-20	9.04			0.01065	PASS		
		-10	8.1			0.00954	PASS		
		0	9.85			0.0116	PASS		
		10	10.94			0.01289	PASS		
		20	7.65			0.00901	PASS		
		30	10.17			0.01198	PASS		
		40	8.65			0.01019	PASS		
		50	7.39	0.00871	PASS				
		GSM1900	GSM/TM1	LCH	VN	-30	3.75	0.00203	PASS
						-20	7.49	0.00405	PASS
						-10	2.26	0.00122	PASS
						0	7.17	0.00388	PASS
10	1.1					0.00059	PASS		
20	-1.1					-0.00059	PASS		
30	7.75					0.00419	PASS		
40	1.36					0.00074	PASS		
50	2.91					0.00157	PASS		
MCH	VN			-30	8.33	0.00443	PASS		
				-20	5.29	0.00281	PASS		
				-10	5.49	0.00292	PASS		
				0	7.23	0.00385	PASS		
				10	8.14	0.00433	PASS		
				20	6.07	0.00323	PASS		
				30	9.04	0.00481	PASS		
				40	9.04	0.00481	PASS		



Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
		HCH	VN	50	5.17	0.00275	PASS
				-30	3.42	0.00179	PASS
				-20	3.36	0.00176	PASS
				-10	15.11	0.00791	PASS
				0	-0.19	-0.0001	PASS
				10	15.5	0.00812	PASS
				20	-1.81	-0.00095	PASS
				30	0.26	0.00014	PASS
				40	-1.68	-0.00088	PASS
				50	-6.78	-0.00355	PASS
	GSM/TM2	LCH	VN	-30	14.21	0.00768	PASS
				-20	4.97	0.00269	PASS
				-10	7.52	0.00406	PASS
				0	3.58	0.00193	PASS
				10	3.68	0.00199	PASS
				20	3.49	0.00189	PASS
				30	6.68	0.00361	PASS
				40	10.01	0.00541	PASS
				50	3.16	0.00171	PASS
				MCH	VN	-30	15.69
		-20	13.4			0.00713	PASS
		-10	13.27			0.00706	PASS
		0	14.08			0.00749	PASS
		10	15.27			0.00812	PASS
		20	15.63			0.00831	PASS
		30	11.33			0.00603	PASS
		40	14.33			0.00762	PASS
		50	13.5			0.00718	PASS
		HCH	VN			-30	6.42
				-20	7.14	0.00374	PASS
				-10	8.59	0.0045	PASS
				0	6.04	0.00316	PASS
				10	2.68	0.0014	PASS
				20	1.26	0.00066	PASS
				30	6.49	0.0034	PASS
				40	2.65	0.00139	PASS
50	2.23	0.00117	PASS				

END