



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	32.78	29.43	38.5	PASS
		MCH	32.95	29.6	38.5	PASS
		HCH	32.99	29.64	38.5	PASS
	GSM/TM2	LCH	26.97	23.62	38.5	PASS
		MCH	26.97	23.62	38.5	PASS
		HCH	27.04	23.69	38.5	PASS

Test Band	Test Mode	Test Channel	Conducted Power [dBm]	EIRP [dBm]	Limit [dBm]	Verdict
GSM1900	GSM/TM1	LCH	30.16	31.66	33	PASS
		MCH	29.76	31.26	33	PASS
		HCH	29.67	31.17	33	PASS
	GSM/TM2	LCH	25.89	27.39	33	PASS
		MCH	25.86	27.36	33	PASS



Test Band	Test Mode	Test Channel	Conducted Power [dBm]	EIRP [dBm]	Limit [dBm]	Verdict
		HCH	25.87	27.37	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:

$$\text{SET Span} = 1.5 * \text{OBW}$$

$$\text{SET RBW} = 1\% \text{ of the OBW, not to exceed 1MHz}$$

$$\text{SET VBW} \geq 3 * \text{RBW}$$

SET Sweep time=auto-couple.

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	0.16	13	PASS
		MCH	0.14	13	PASS
		HCH	0.15	13	PASS
	GSM/TM2	LCH	3.07	13	PASS
		MCH	2.99	13	PASS
		HCH	2.99	13	PASS



3Appendix_C: Modulation Characteristics

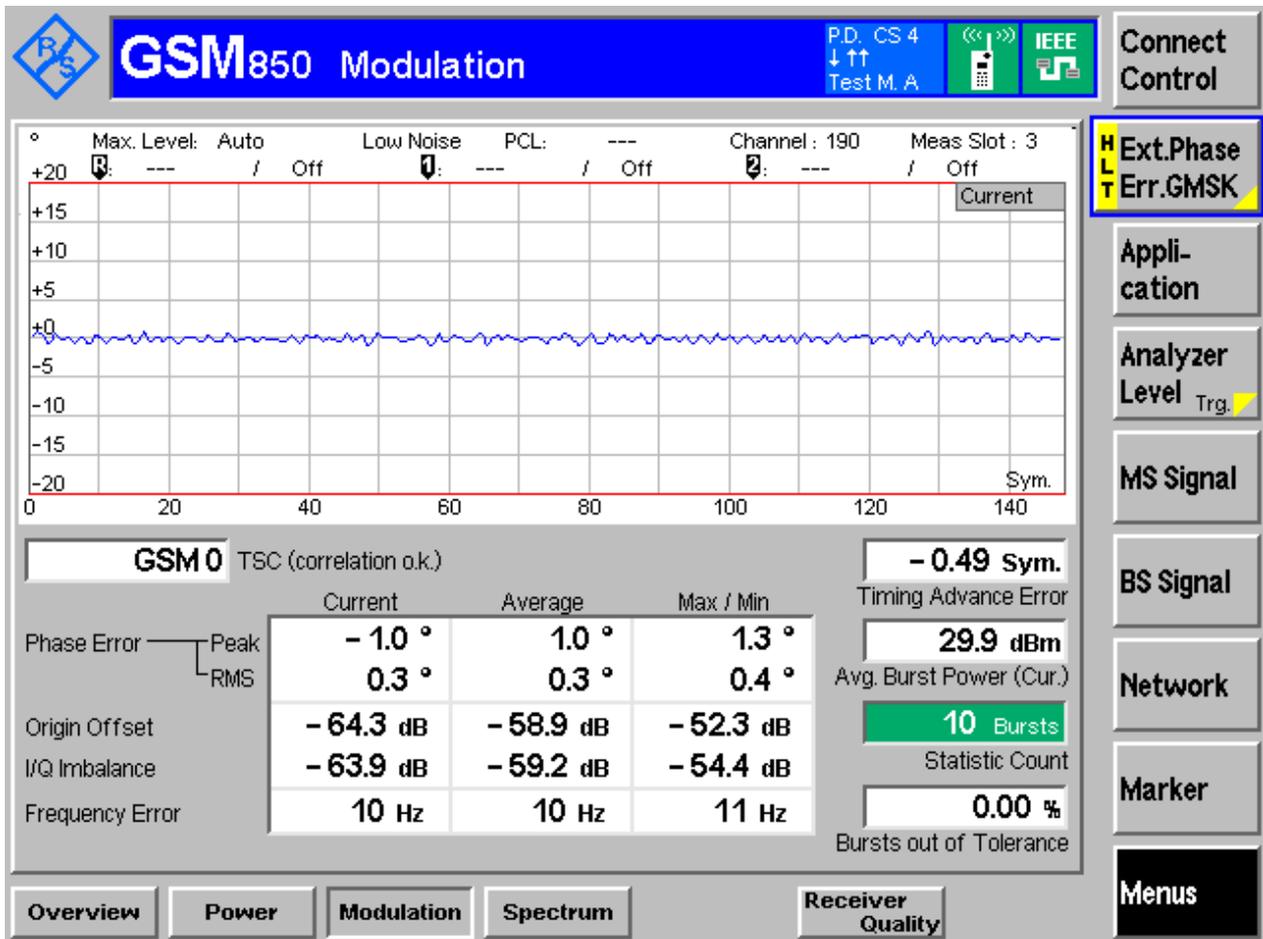
Part I - Test Plots

3.1 For GSM

3.1.1 Test Band = GSM850

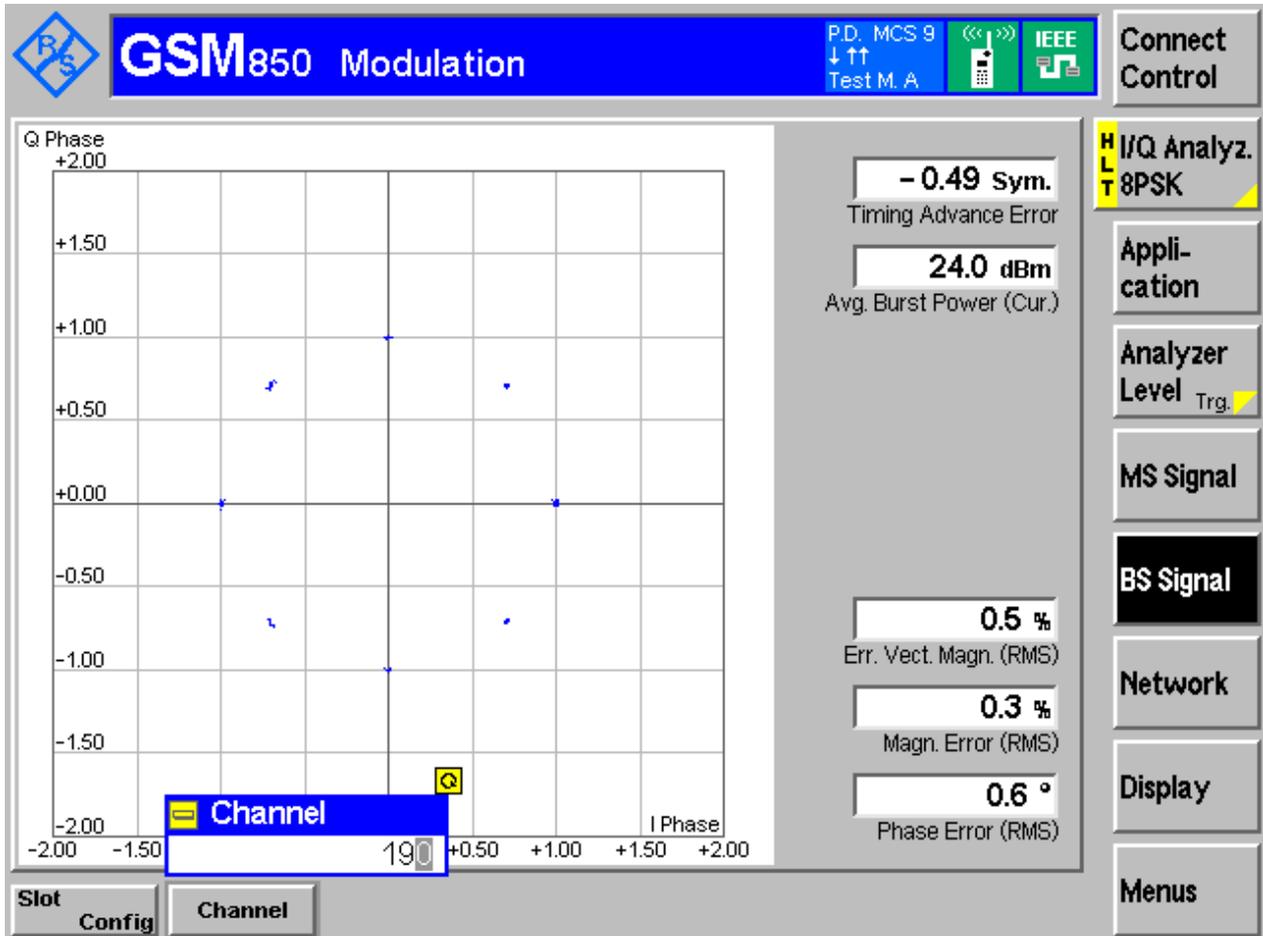
3.1.1.1 Test Mode = GSM/TM1

3.1.1.1.1 Test Channel = MCH



3.1.1.2 Test Mode = GSM/TM2

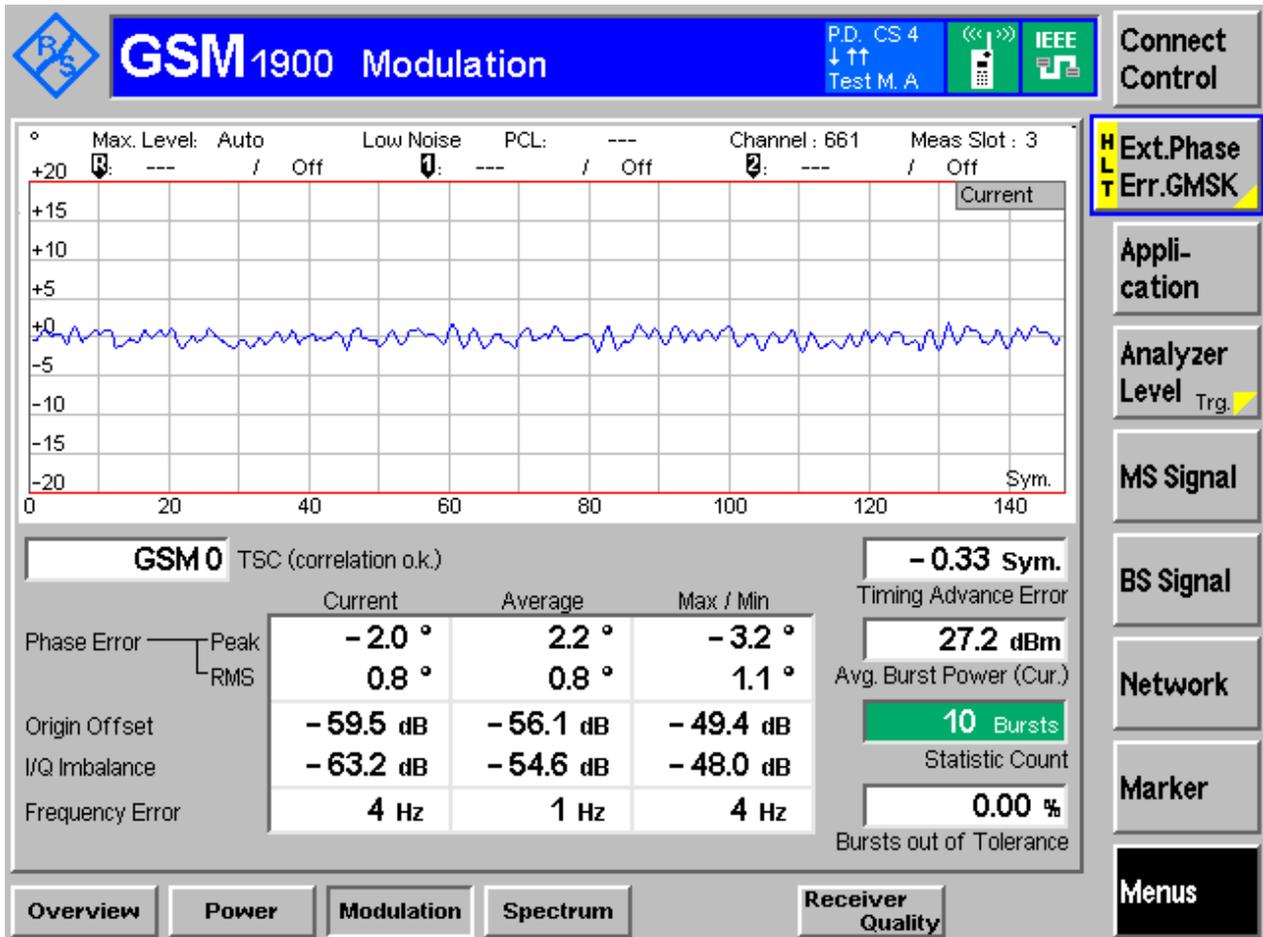
3.1.1.2.1 Test Channel = MCH



3.1.2 Test Band = GSM1900

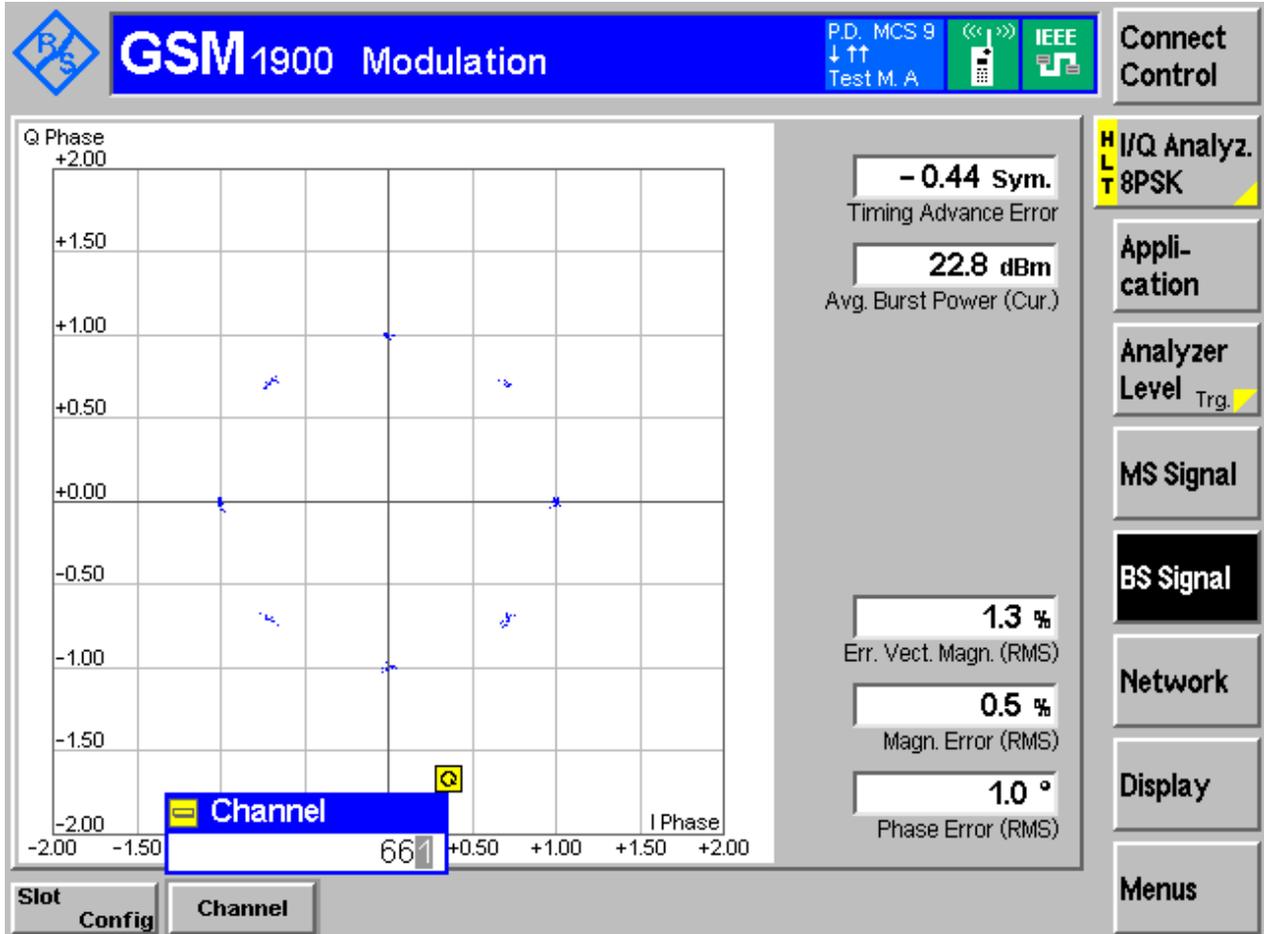
3.1.2.1 Test Mode = GSM/TM1

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	242.17	318.46	Pass
		MCH	241.35	315.96	Pass
		HCH	242.20	318.35	Pass
	GSM/TM2	LCH	247.76	309.93	Pass
		MCH	243.93	305.83	Pass
		HCH	243.96	308.24	Pass
GSM1900	GSM/TM1	LCH	243.42	317.98	Pass
		MCH	247.15	322.87	Pass
		HCH	244.07	310.26	Pass
	GSM/TM2	LCH	248.71	309.21	Pass
		MCH	250.91	303.83	Pass
		HCH	247.05	309.80	Pass



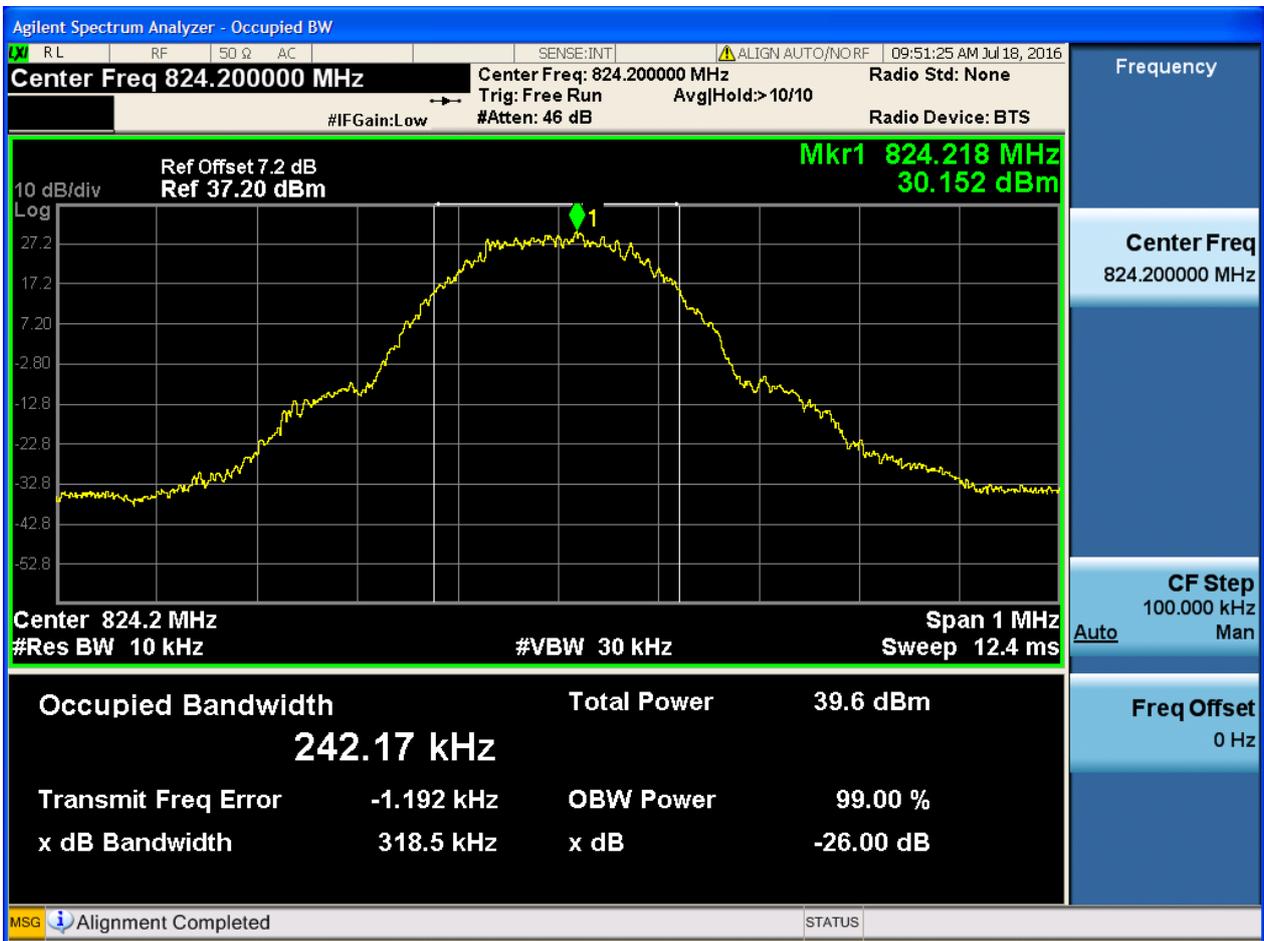
Part II - Test Plots

4.1 For GSM

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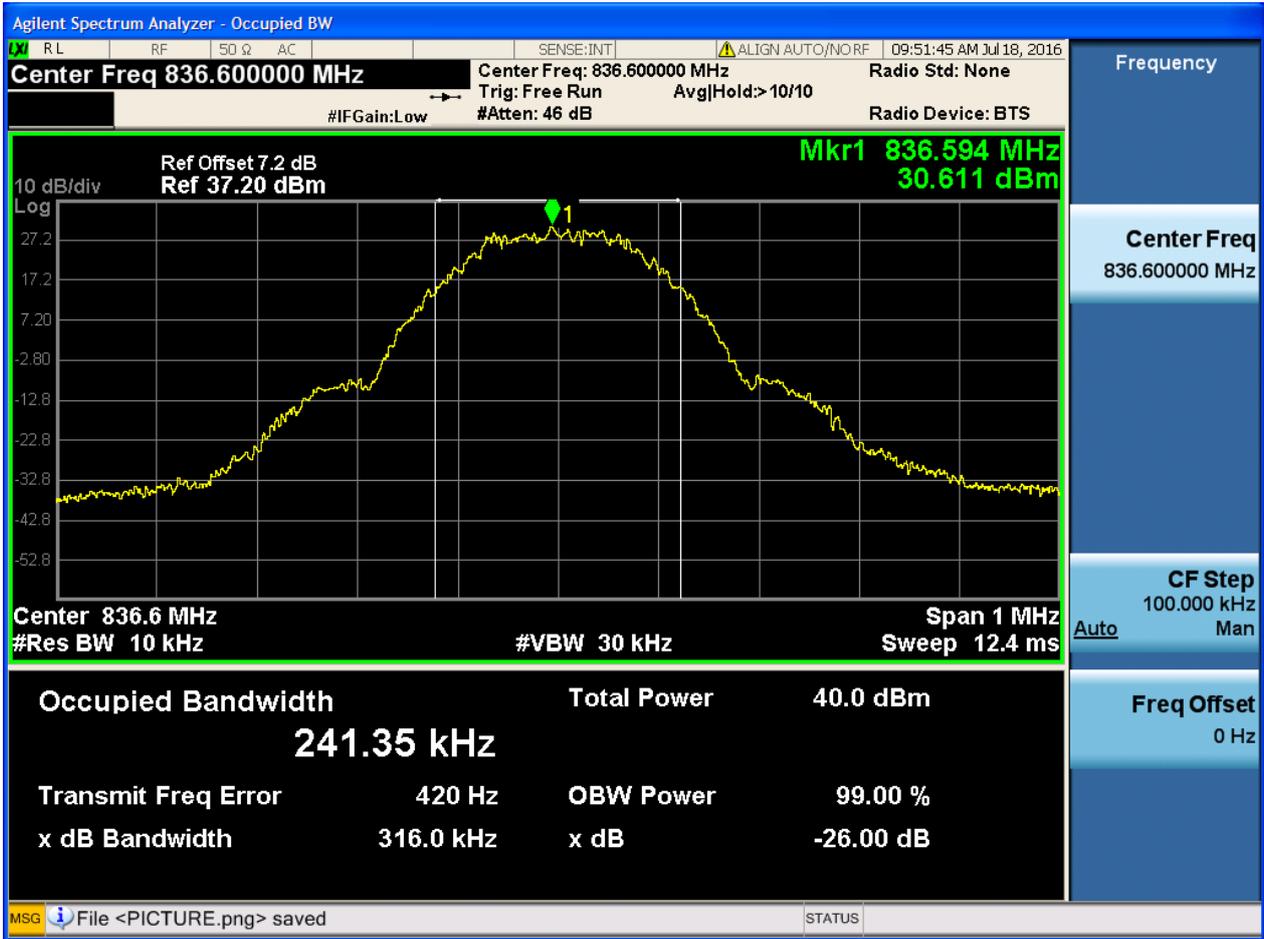
4.1.1.1 Test Mode = GSM/TM1

4.1.1.1.1 Test Channel = LCH



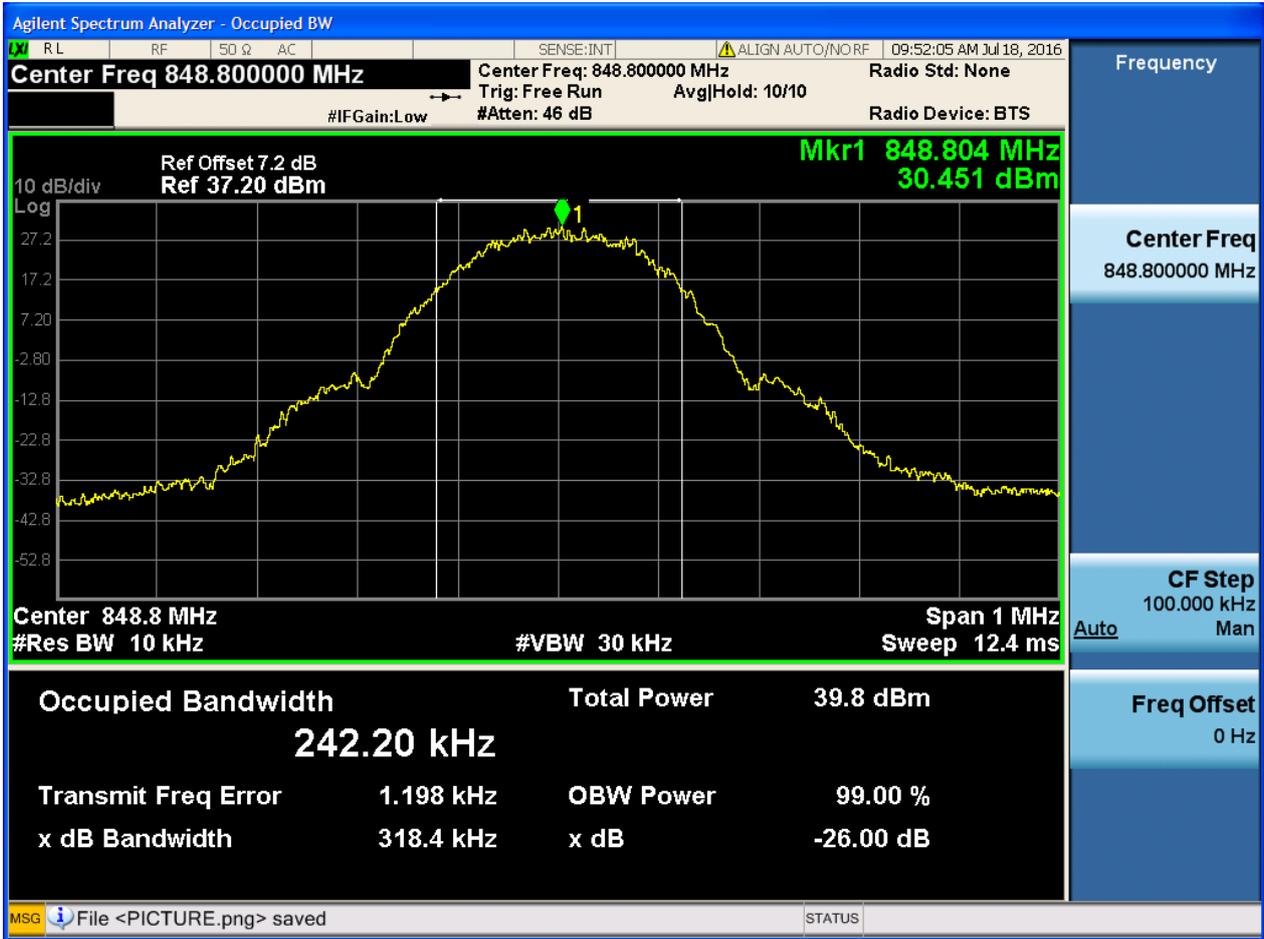


4.1.1.1.2 Test Channel = MCH





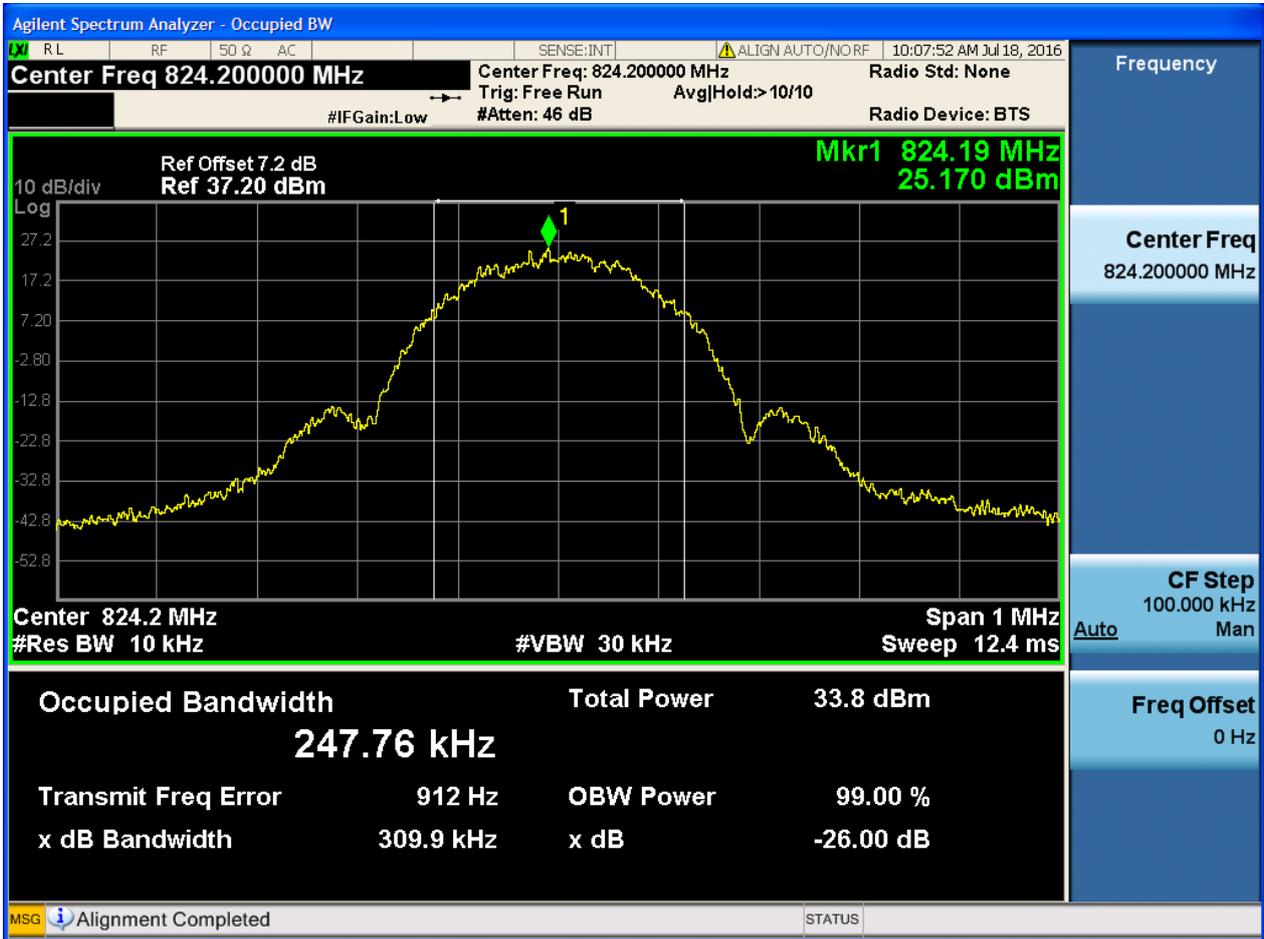
4.1.1.1.3 Test Channel = HCH





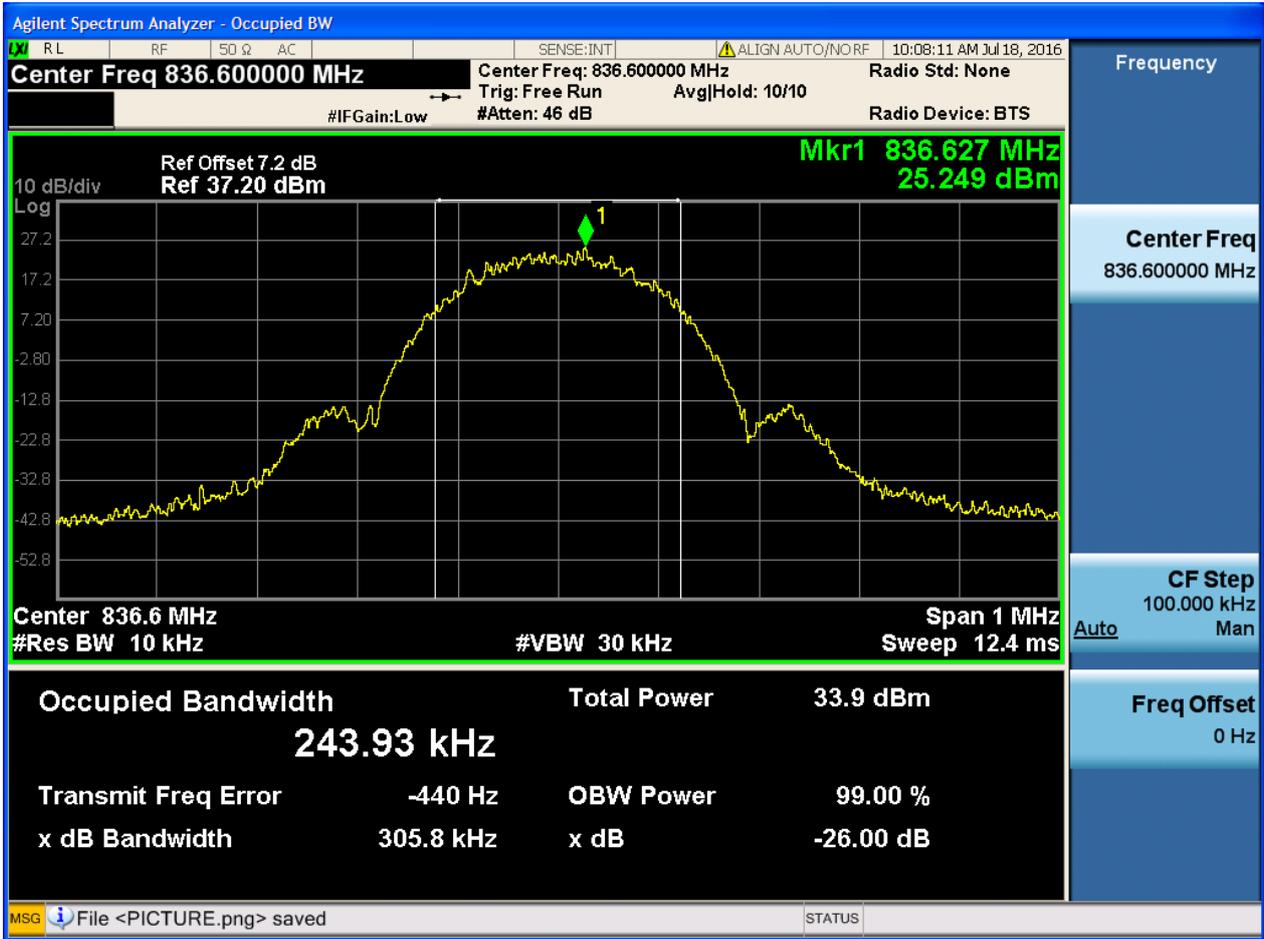
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4.1.1.2.1 Test Channel = LCH



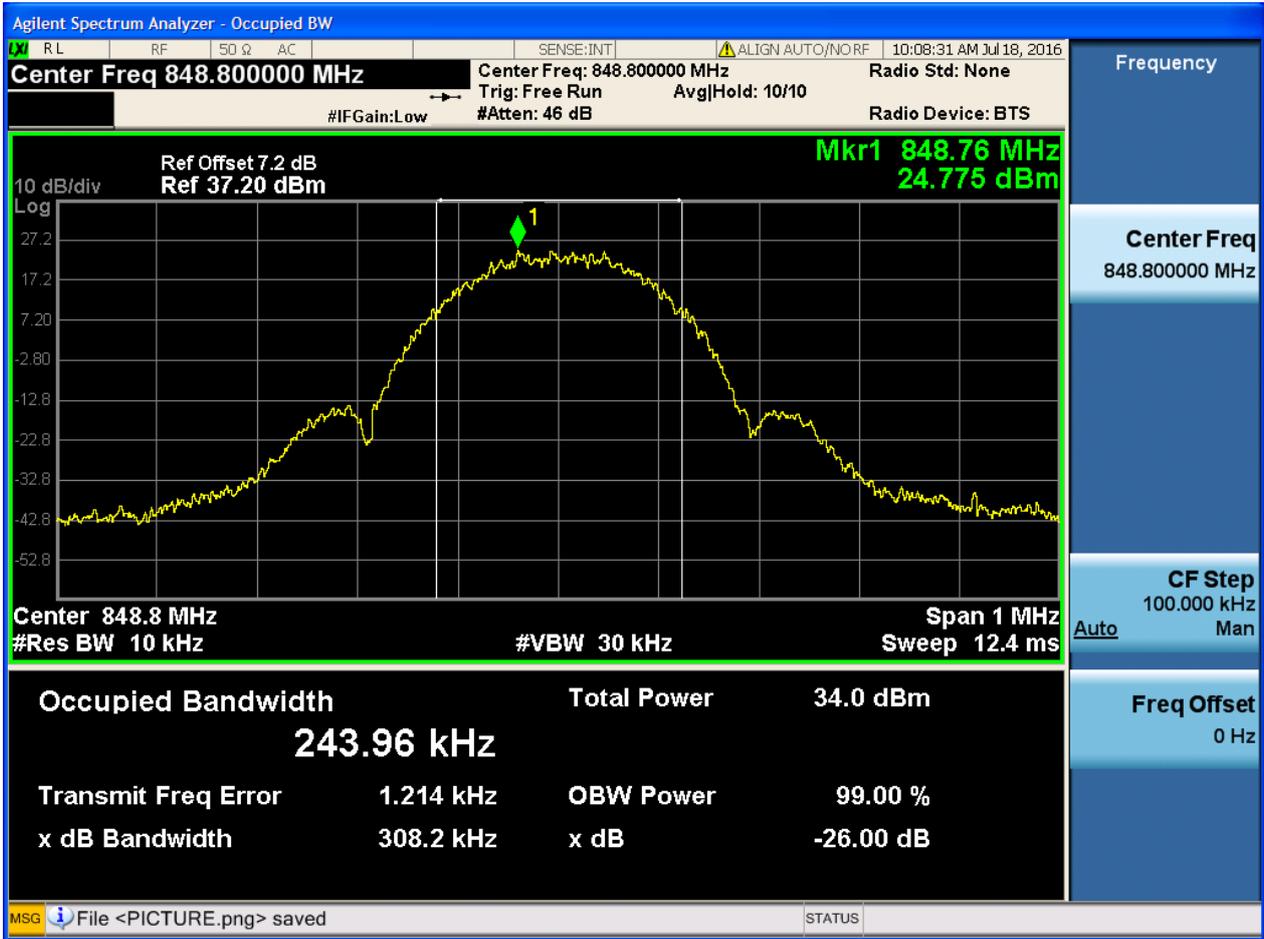


4.1.1.2.2 Test Channel = MCH





4.1.1.2.3 Test Channel = HCH





4.1.2 Test Band = GSM1900

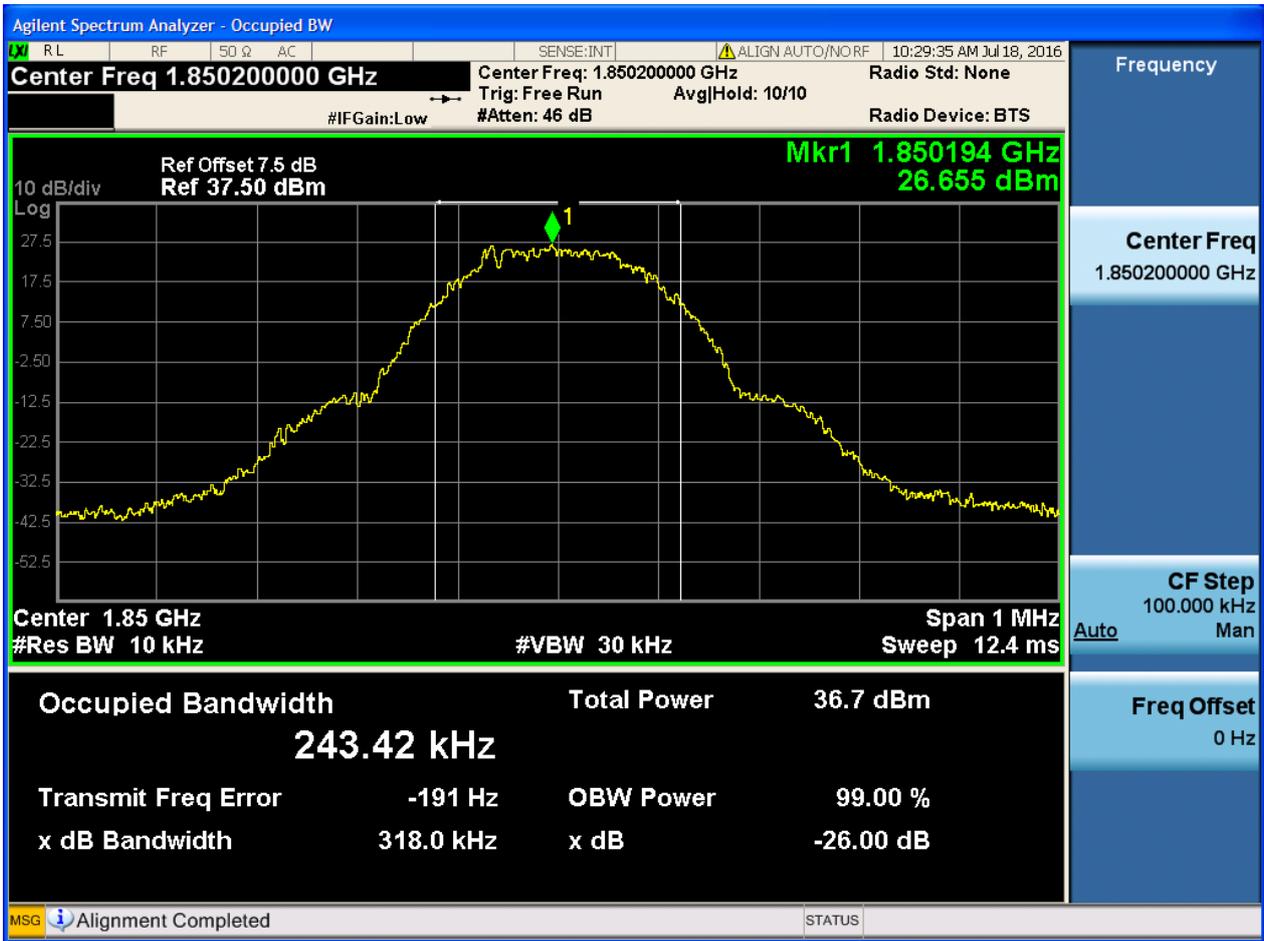
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4.1.2.1.1 Test Channel =

4.1.3 Test Band = GSM1900

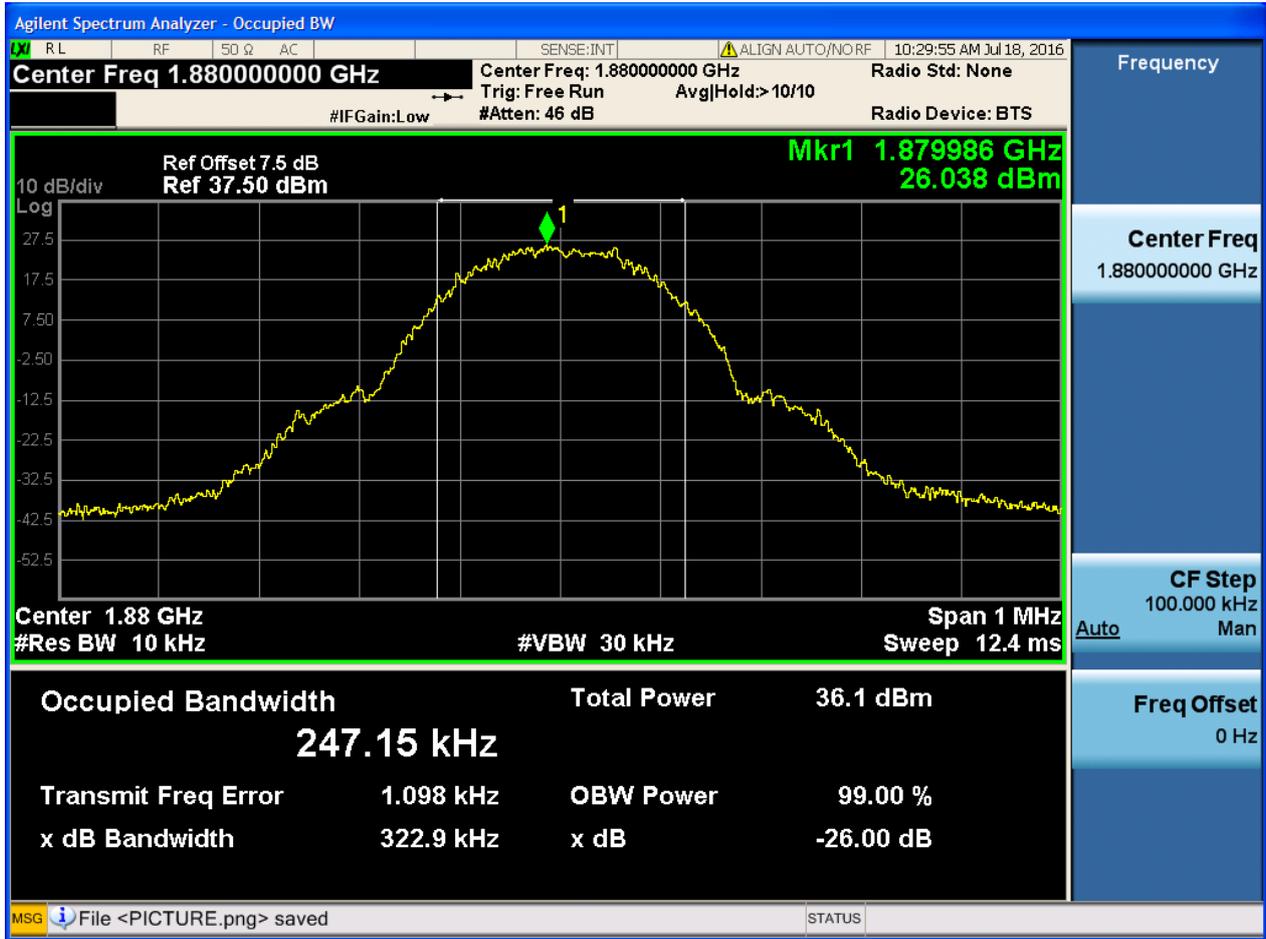
4.1.3.1 Test Mode = GSM/TM1

4.1.3.1.1 Test Channel = LCH





4.1.3.1.2 Test Channel = MCH





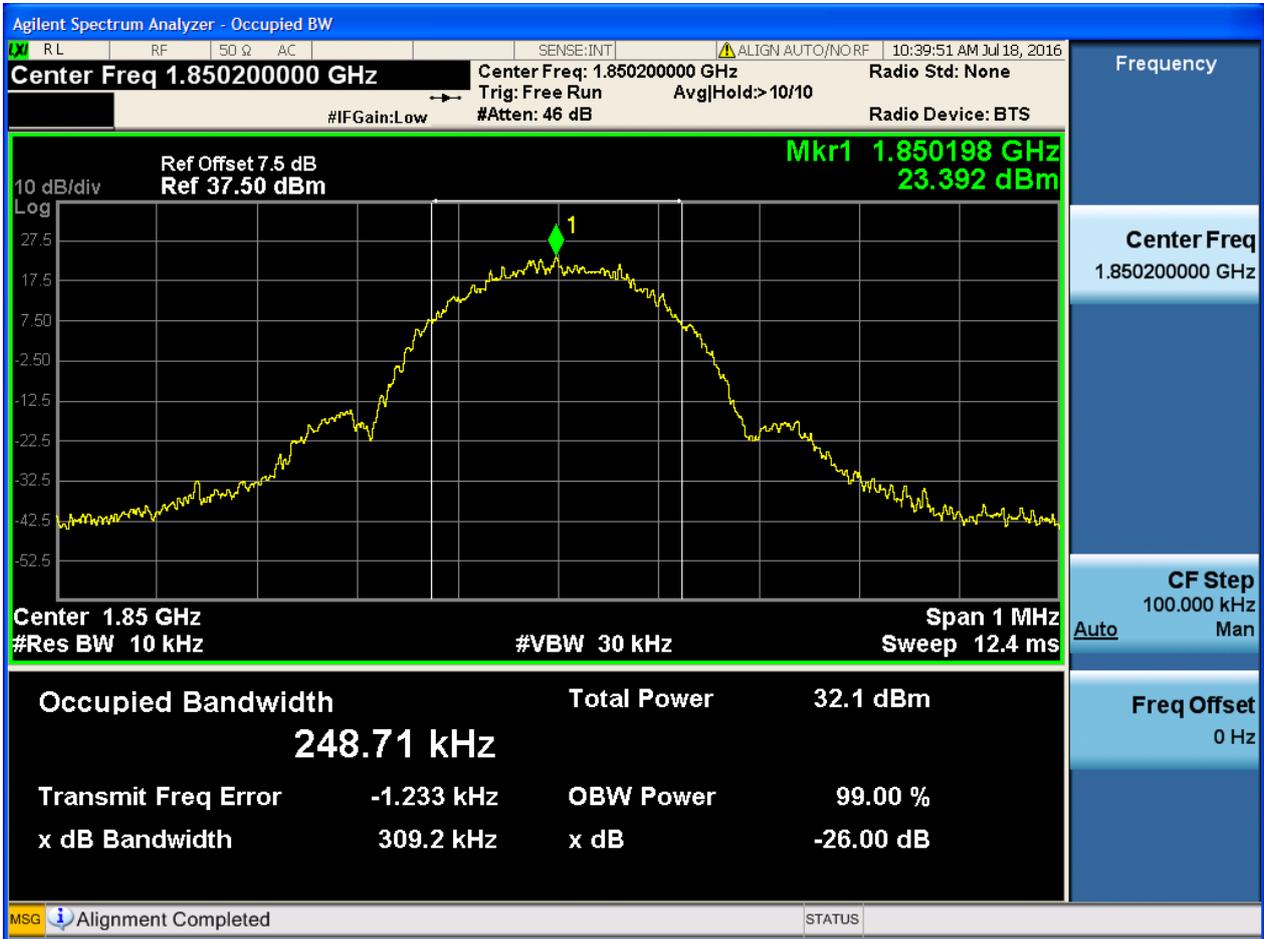
4.1.3.1.3 Test Channel = HCH





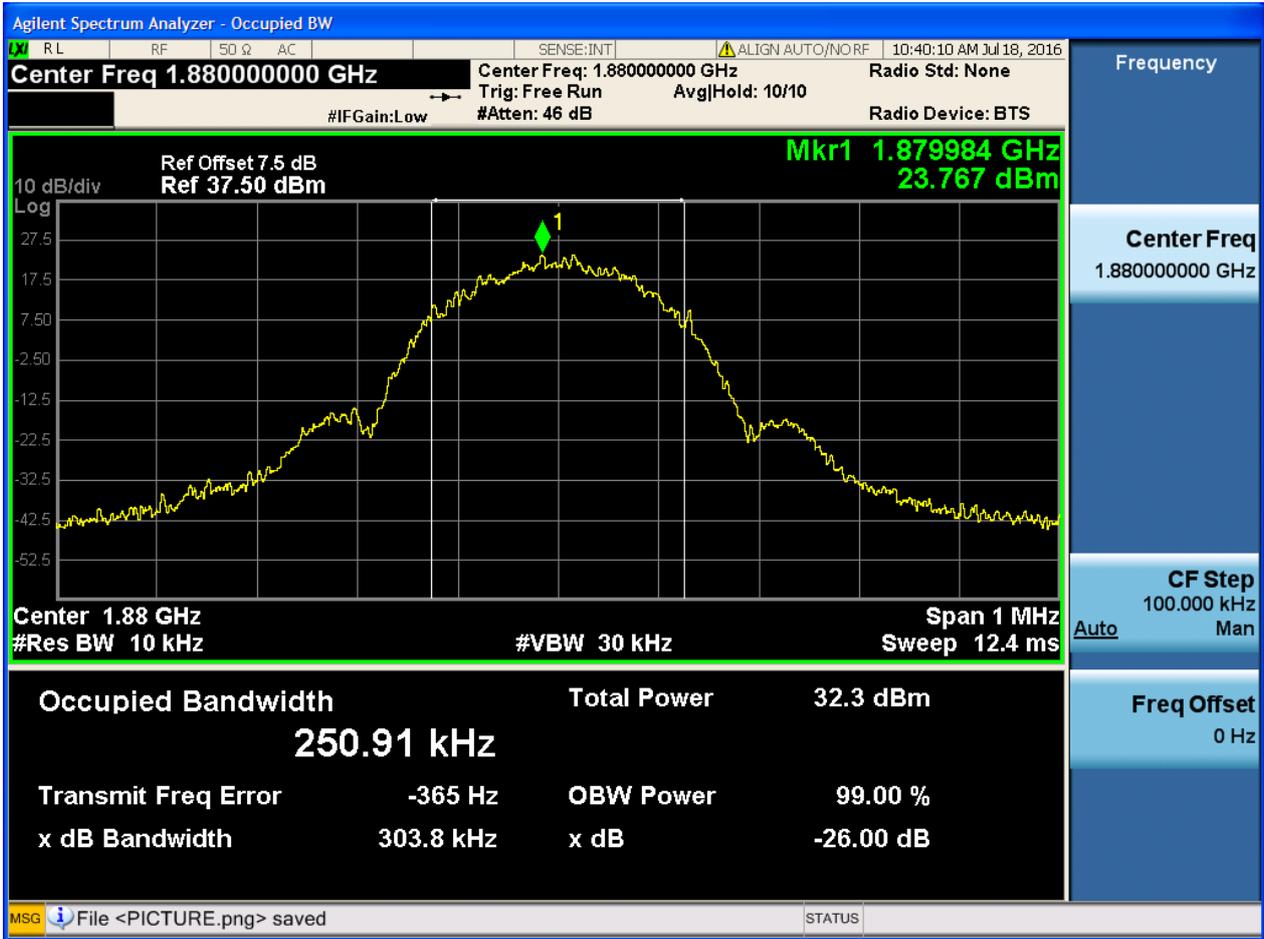
4.1.3.2 Test Mode = GSM/TM2

4.1.3.2.1 Test Channel = LCH



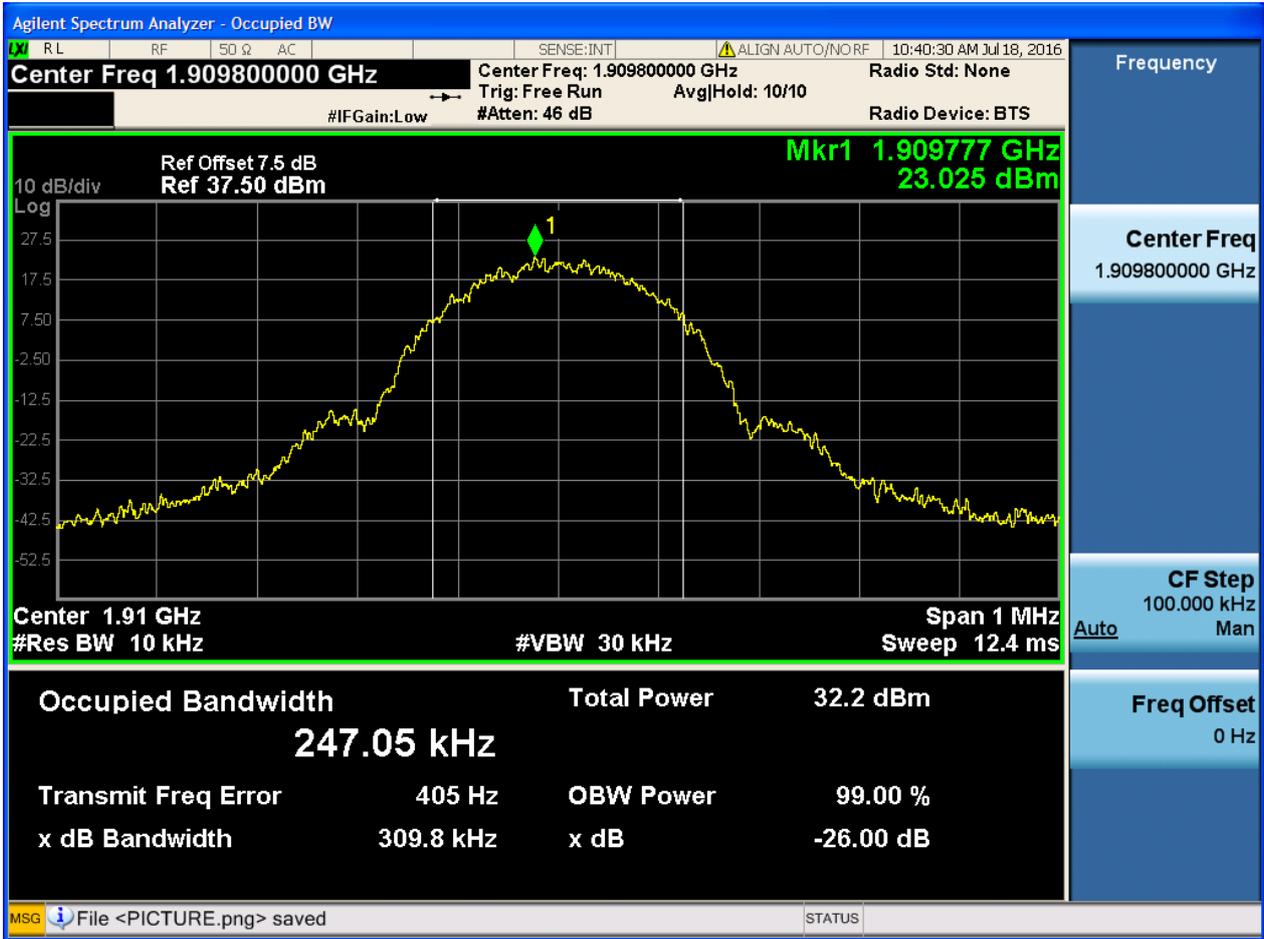


4.1.3.2.2 Test Channel = MCH





4.1.3.2.3 Test Channel = HCH





5Appendix_E: Band Edges Compliance

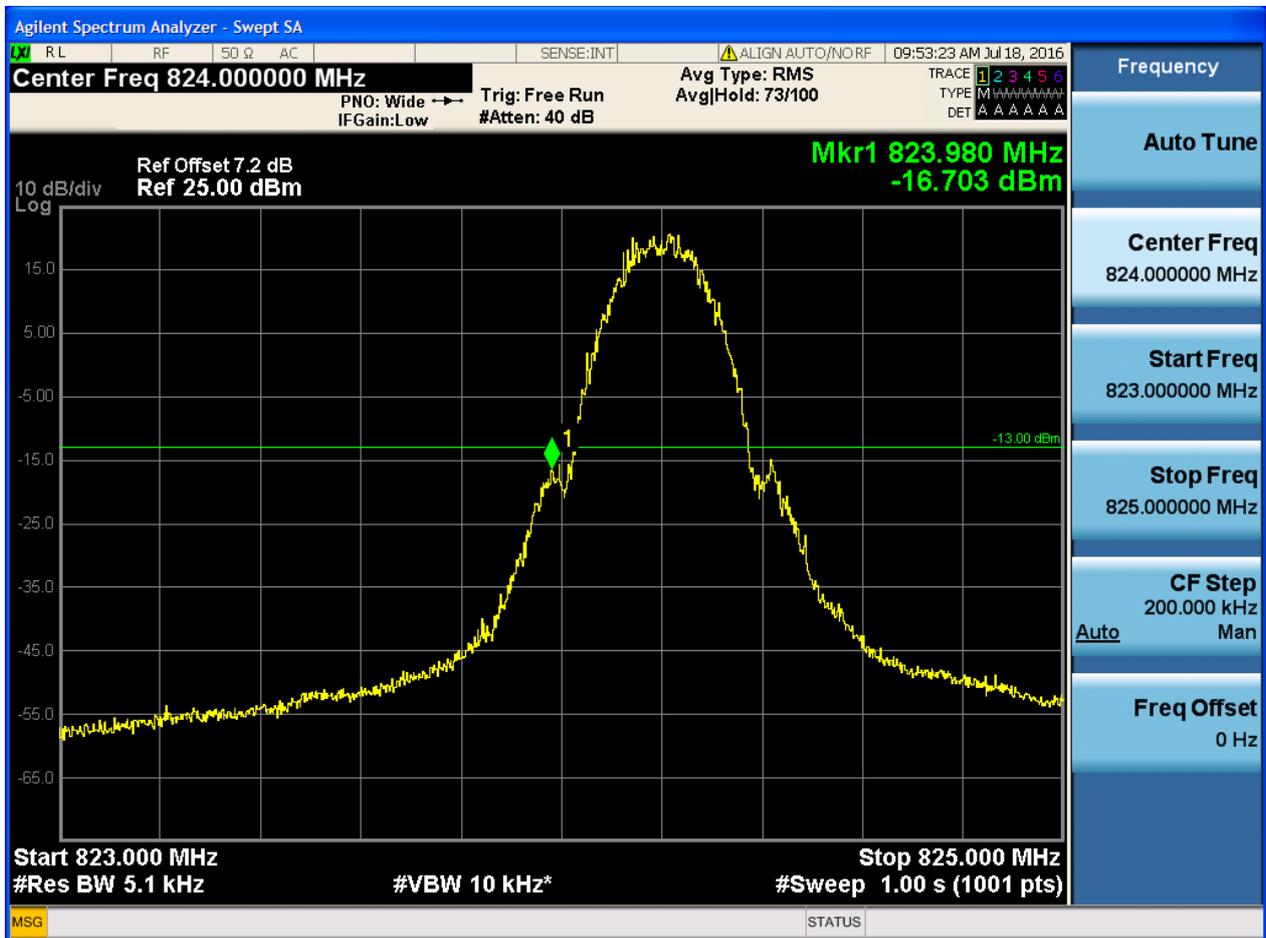
Part I - Test Plots

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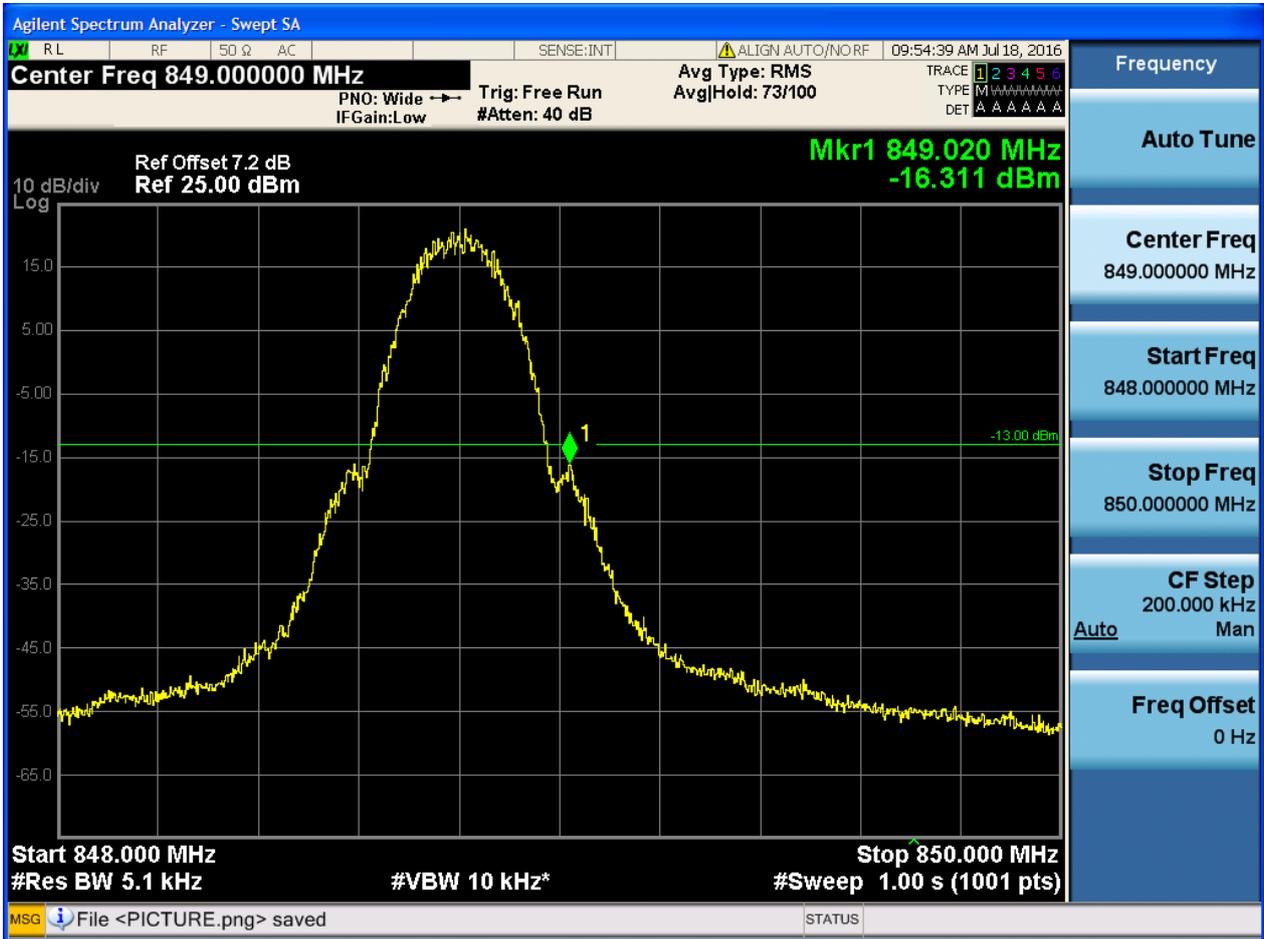
5.1.1 Test Band = GSM850

5.1.1.1 Test Mode = GSM/TM1

5.1.1.1.1 Test Channel = LCH



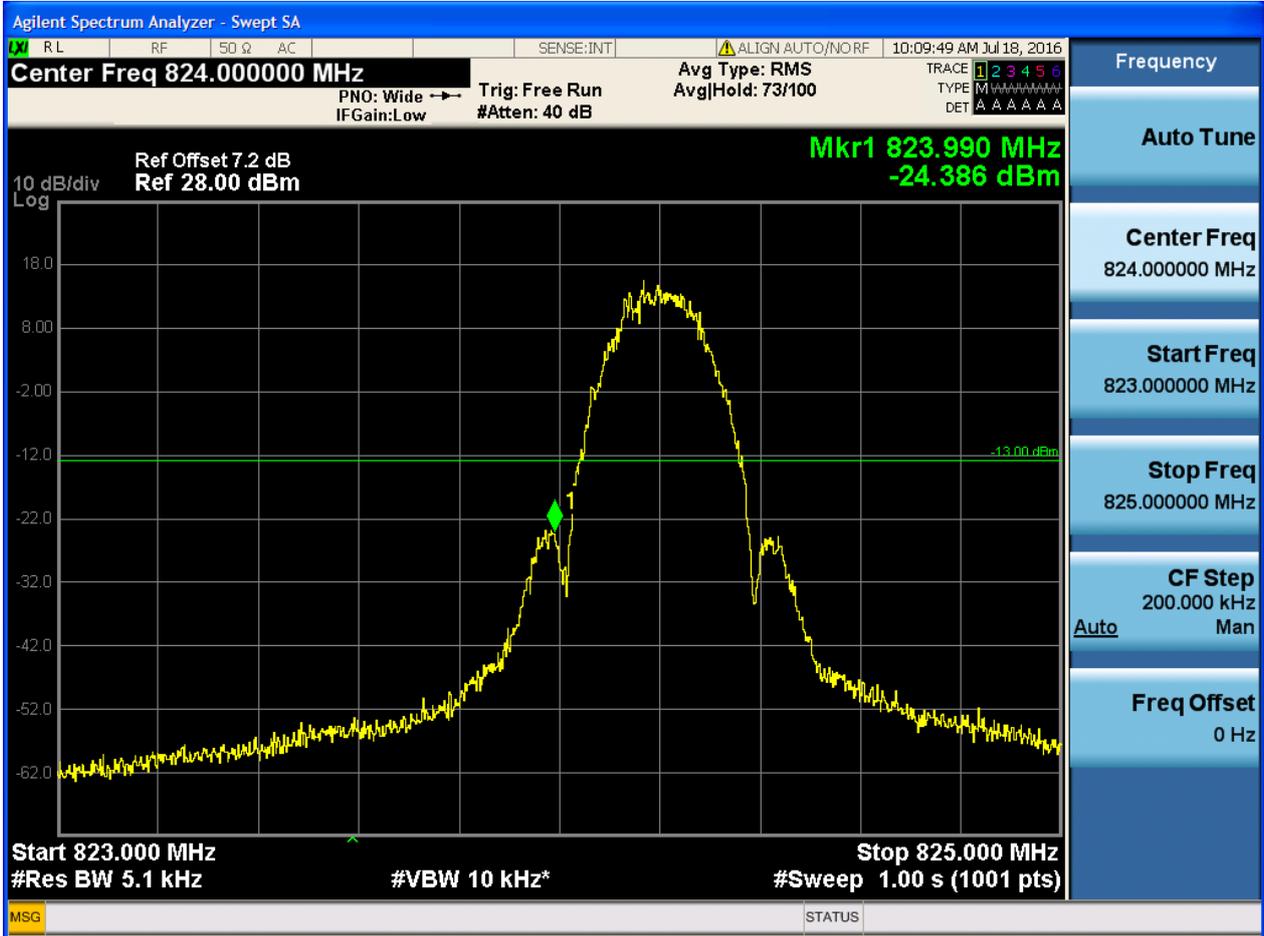
5.1.1.1.2 Test Channel = HCH



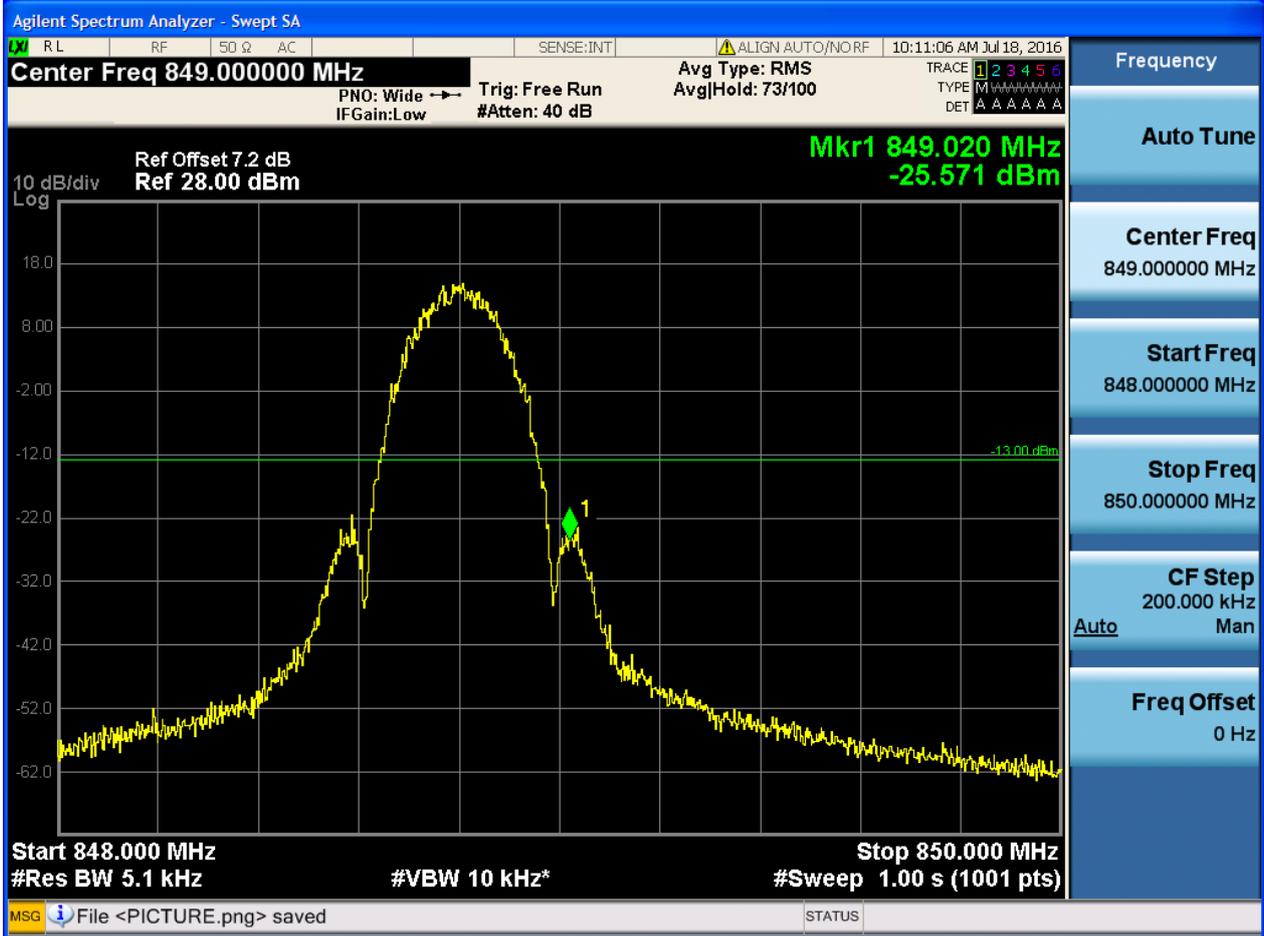


5.1.1.2 Test Mode = GSM/TM2

5.1.1.2.1 Test Channel = LCH



5.1.1.2.2 Test Channel = HCH

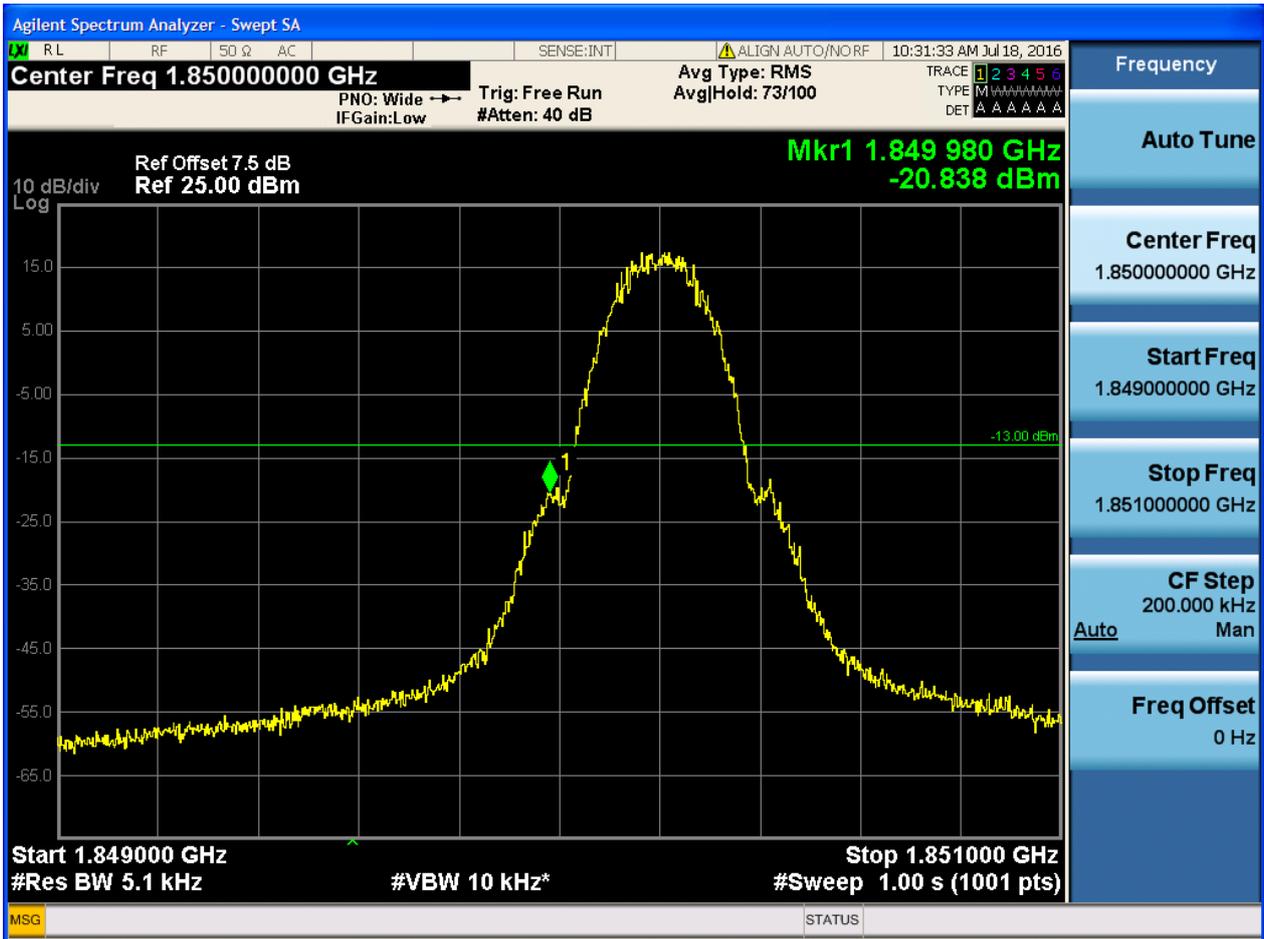




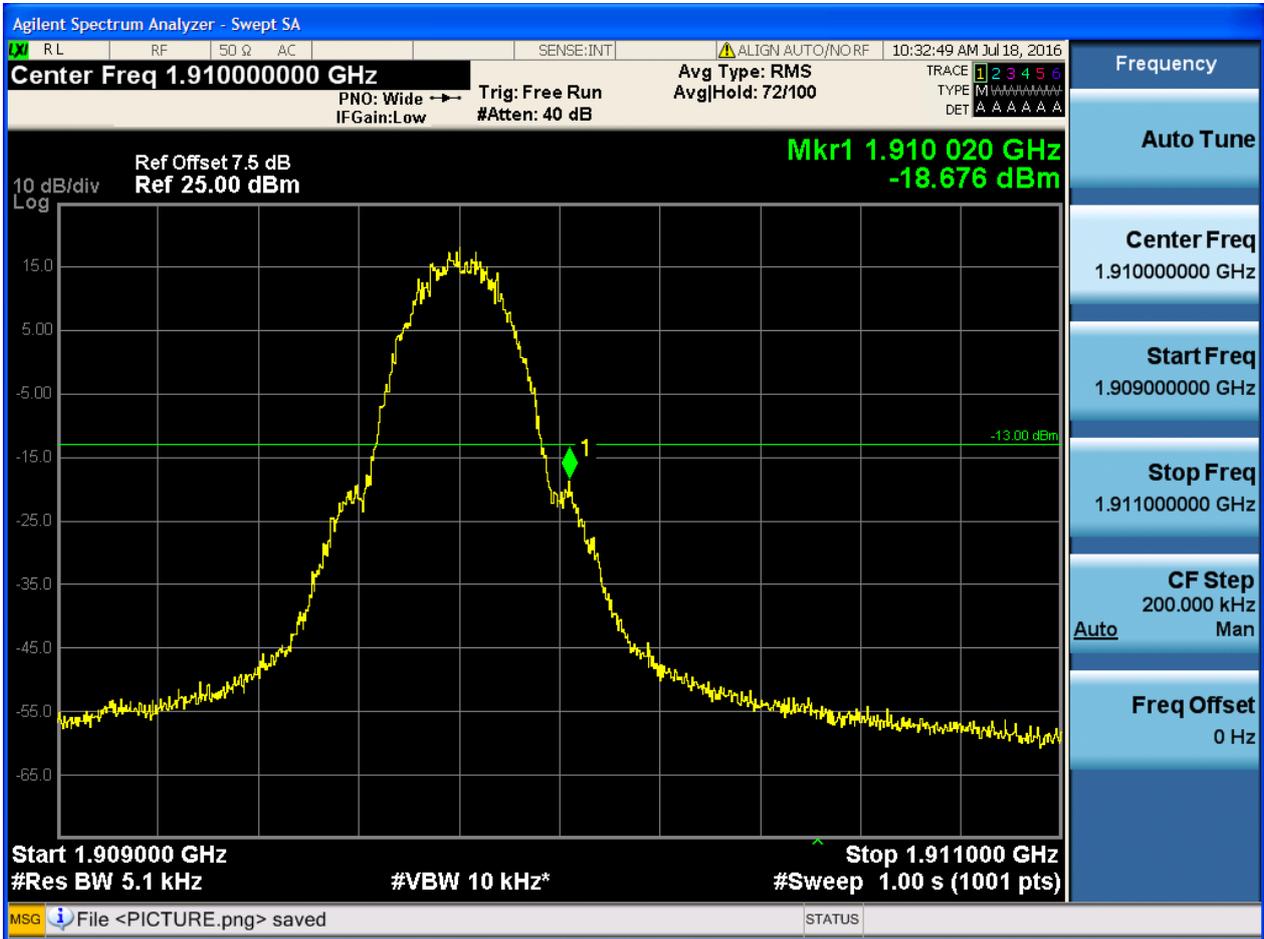
5.1.2 Test Band = GSM1900

5.1.2.1 Test Mode = GSM/TM1

5.1.2.1.1 Test Channel = LCH



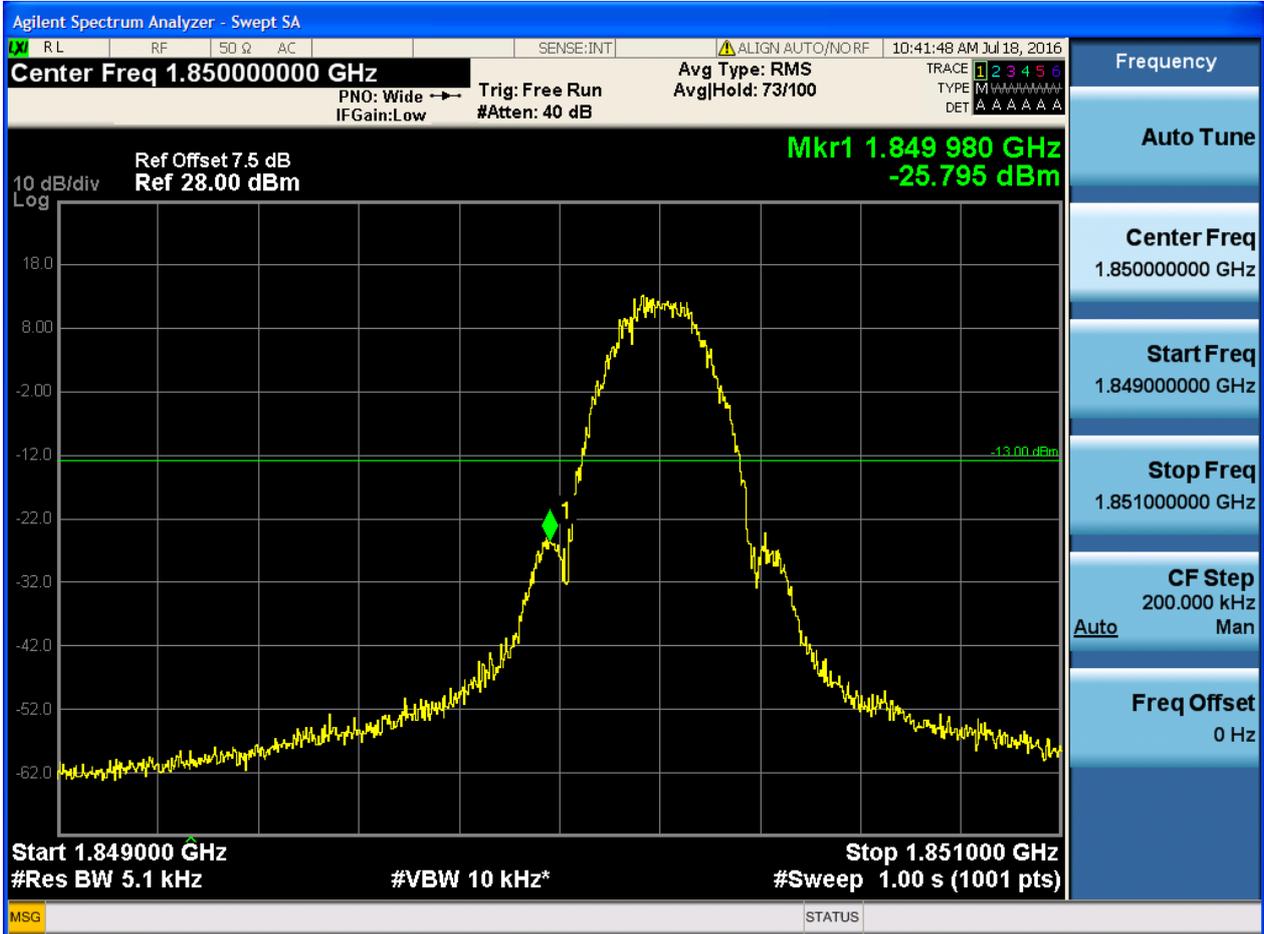
5.1.2.1.2 Test Channel = HCH



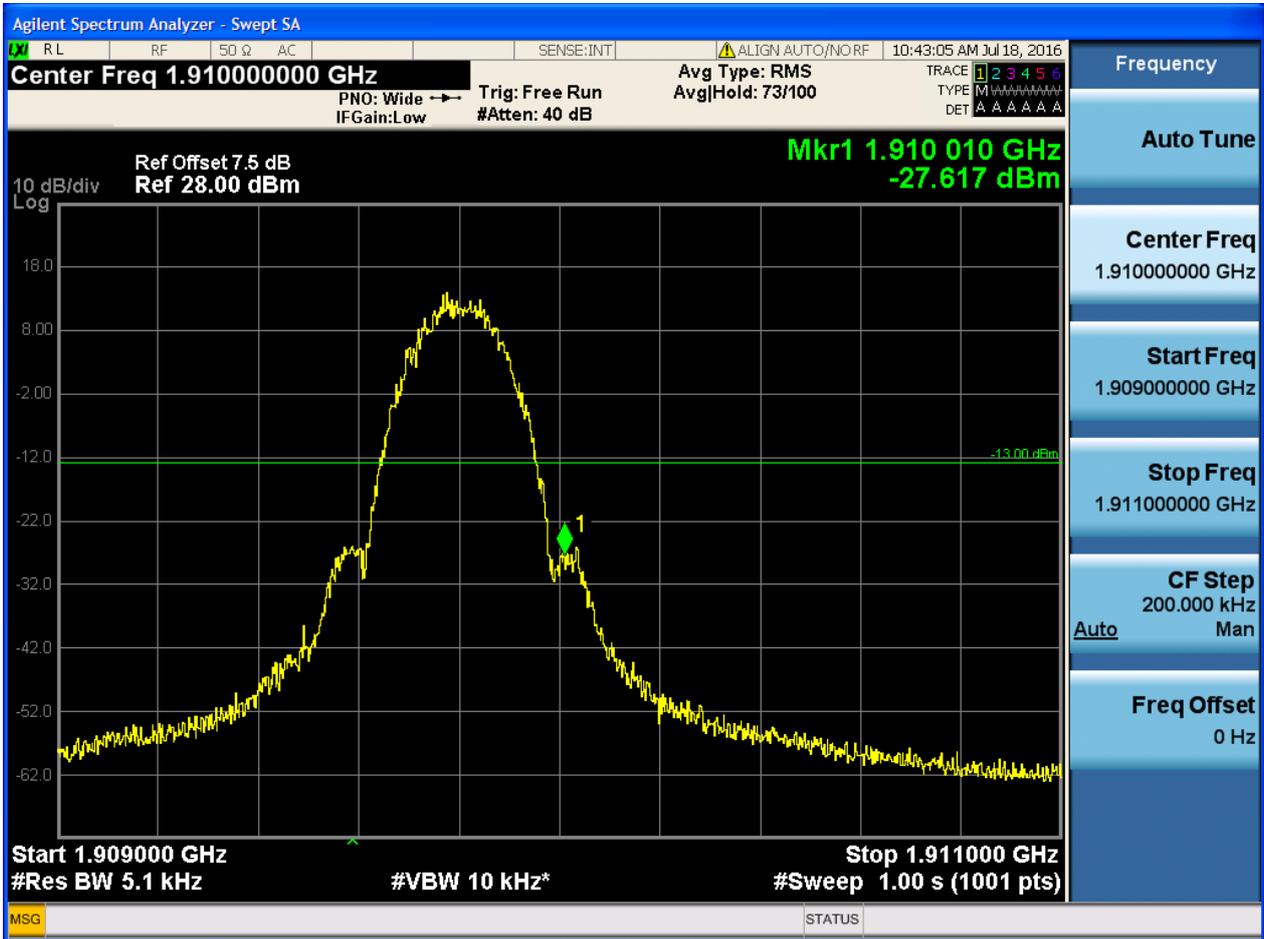


5.1.2.2 Test Mode = GSM/TM2

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.

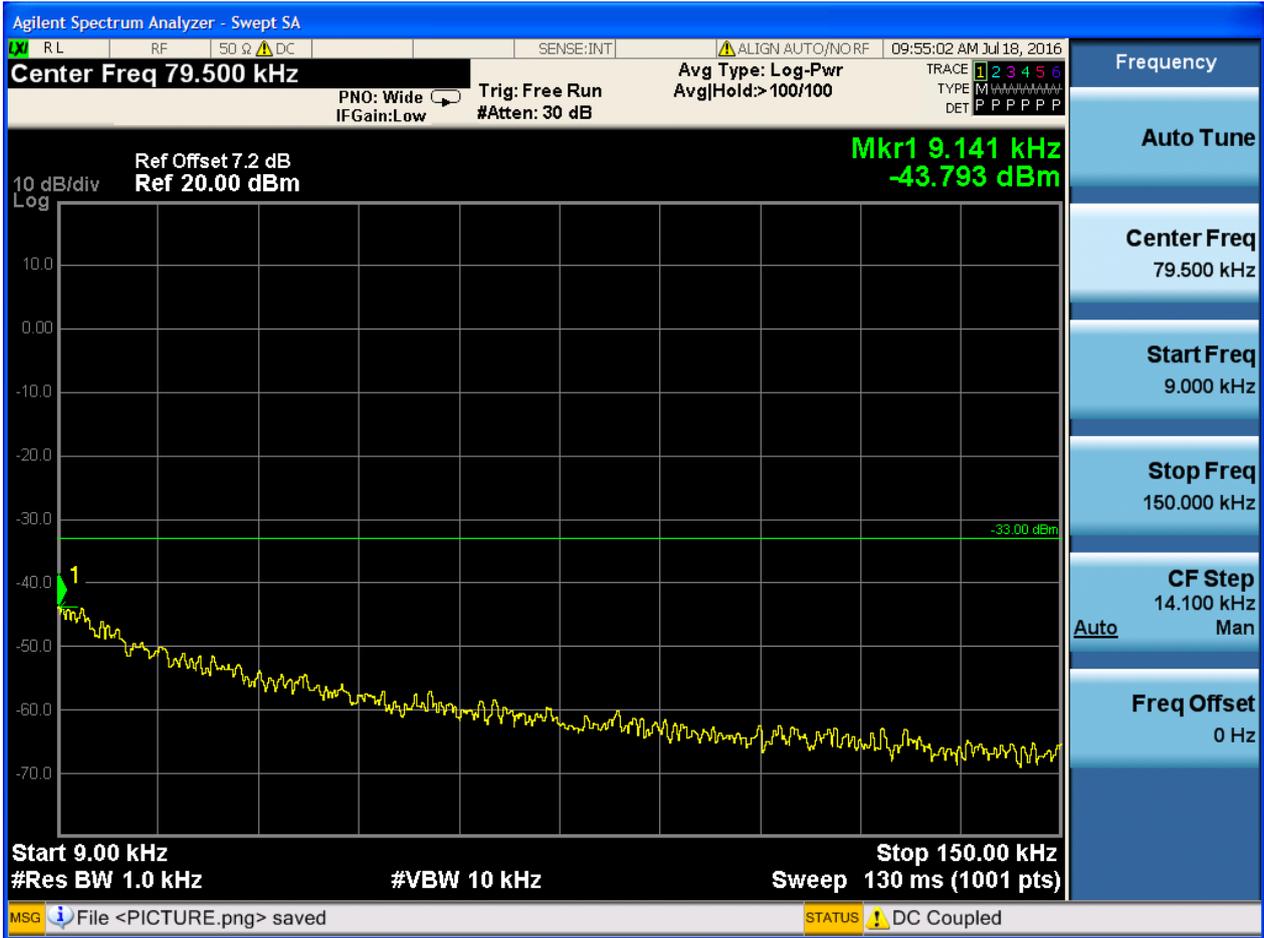
Part I - Test Plots

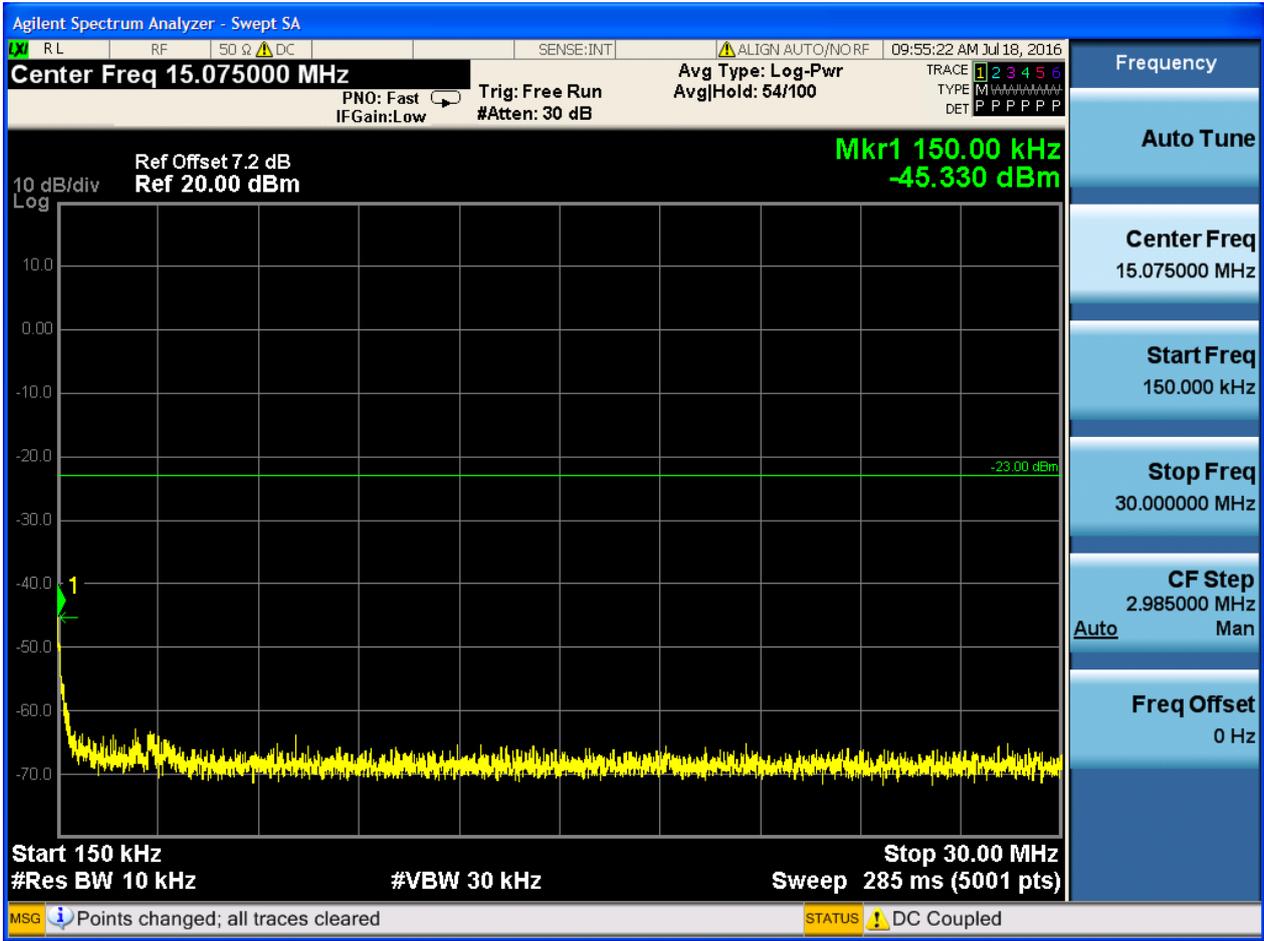
6.1 For GSM

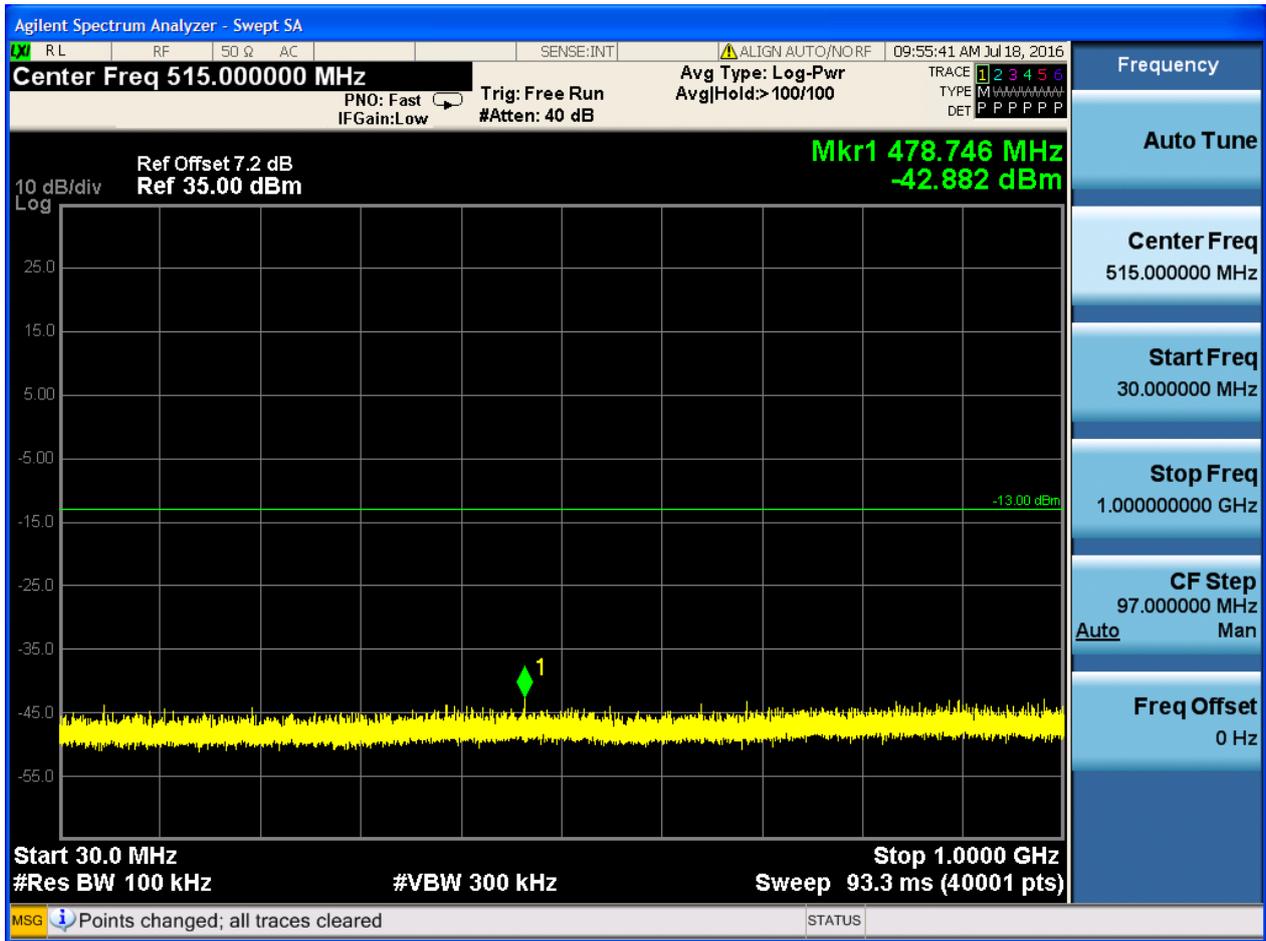
6.1.1 Test Band = GSM850

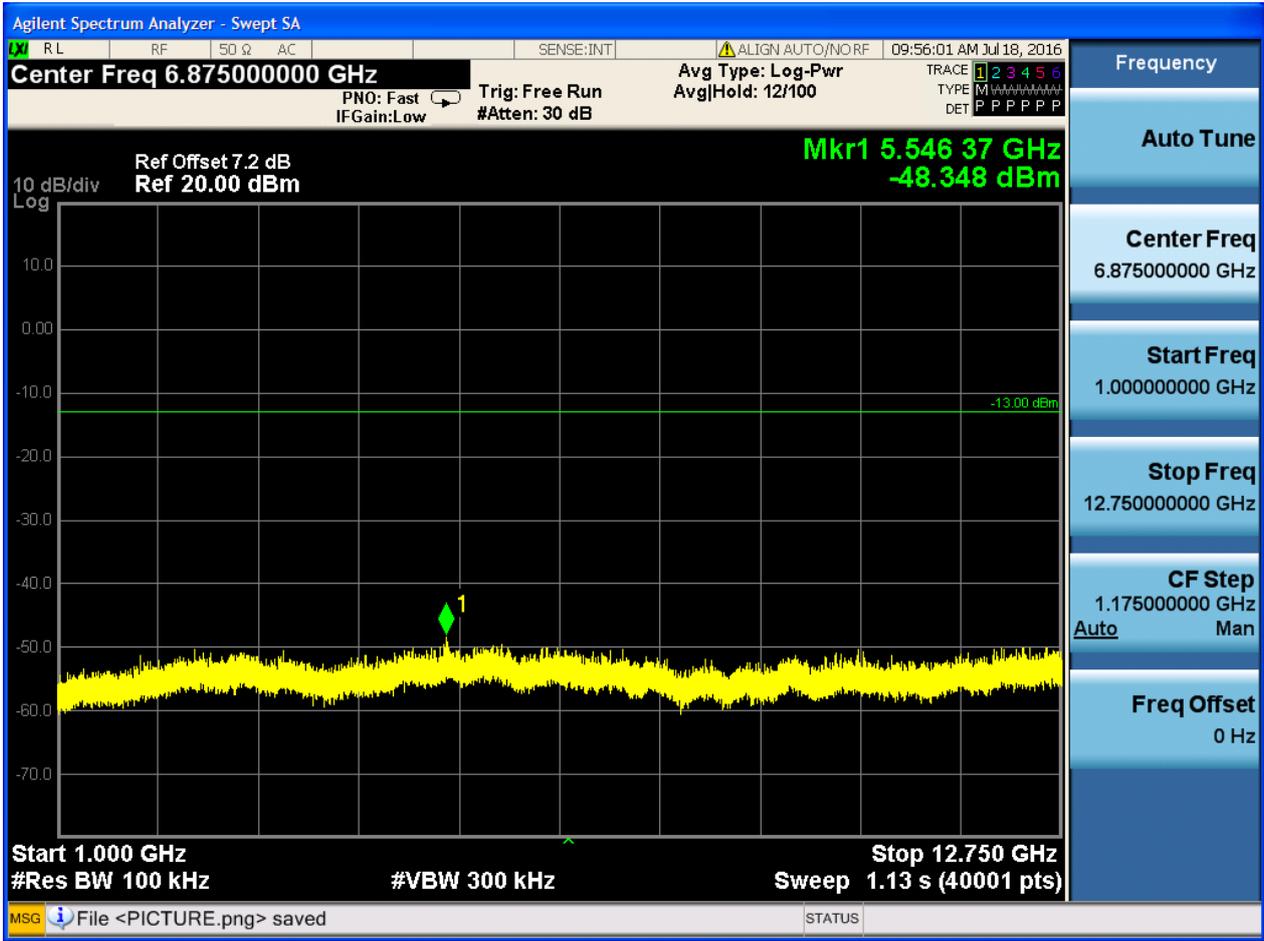
6.1.1.1 Test Mode = GSM/TM1

6.1.1.1.1 Test Channel = LCH

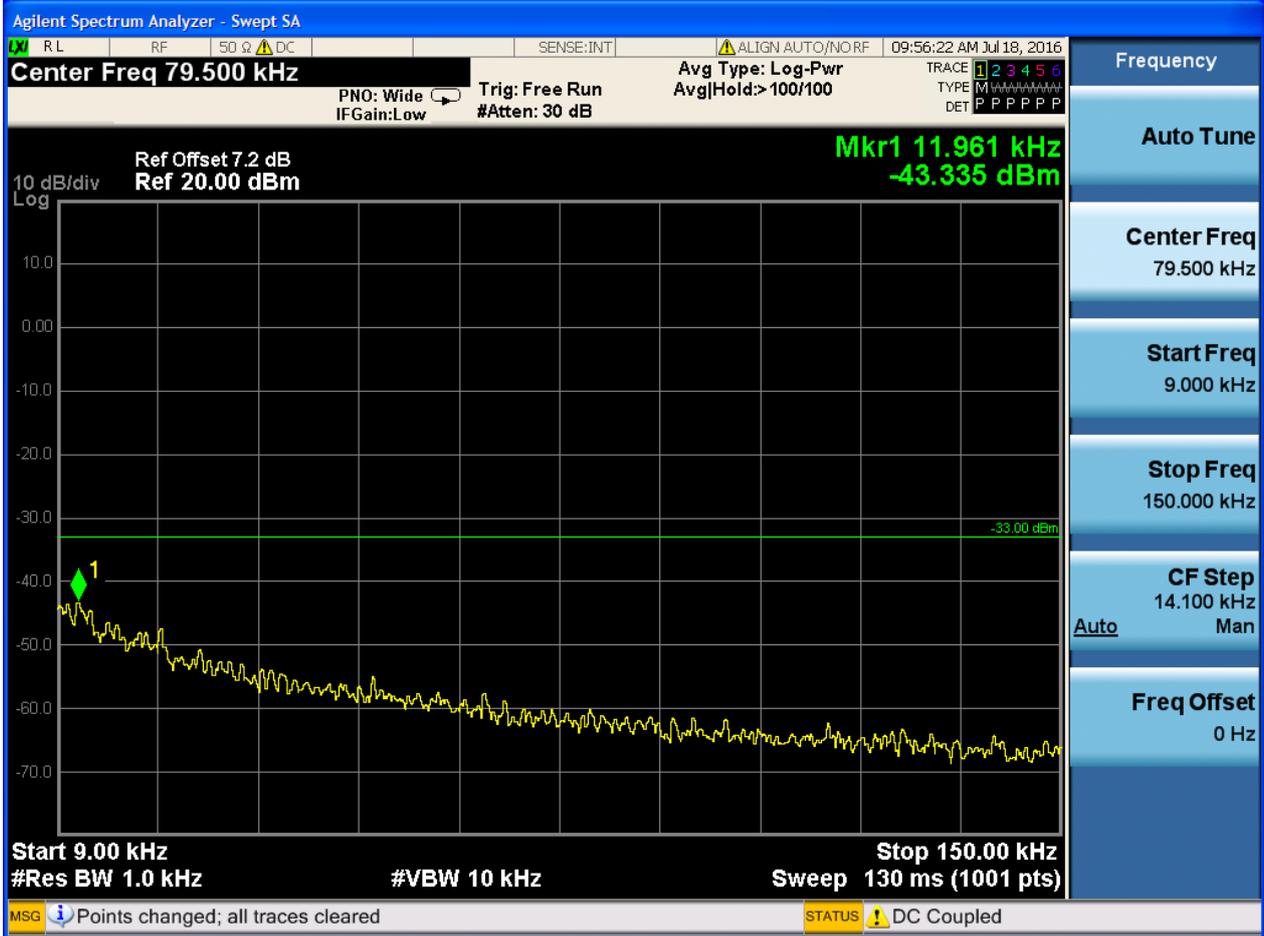


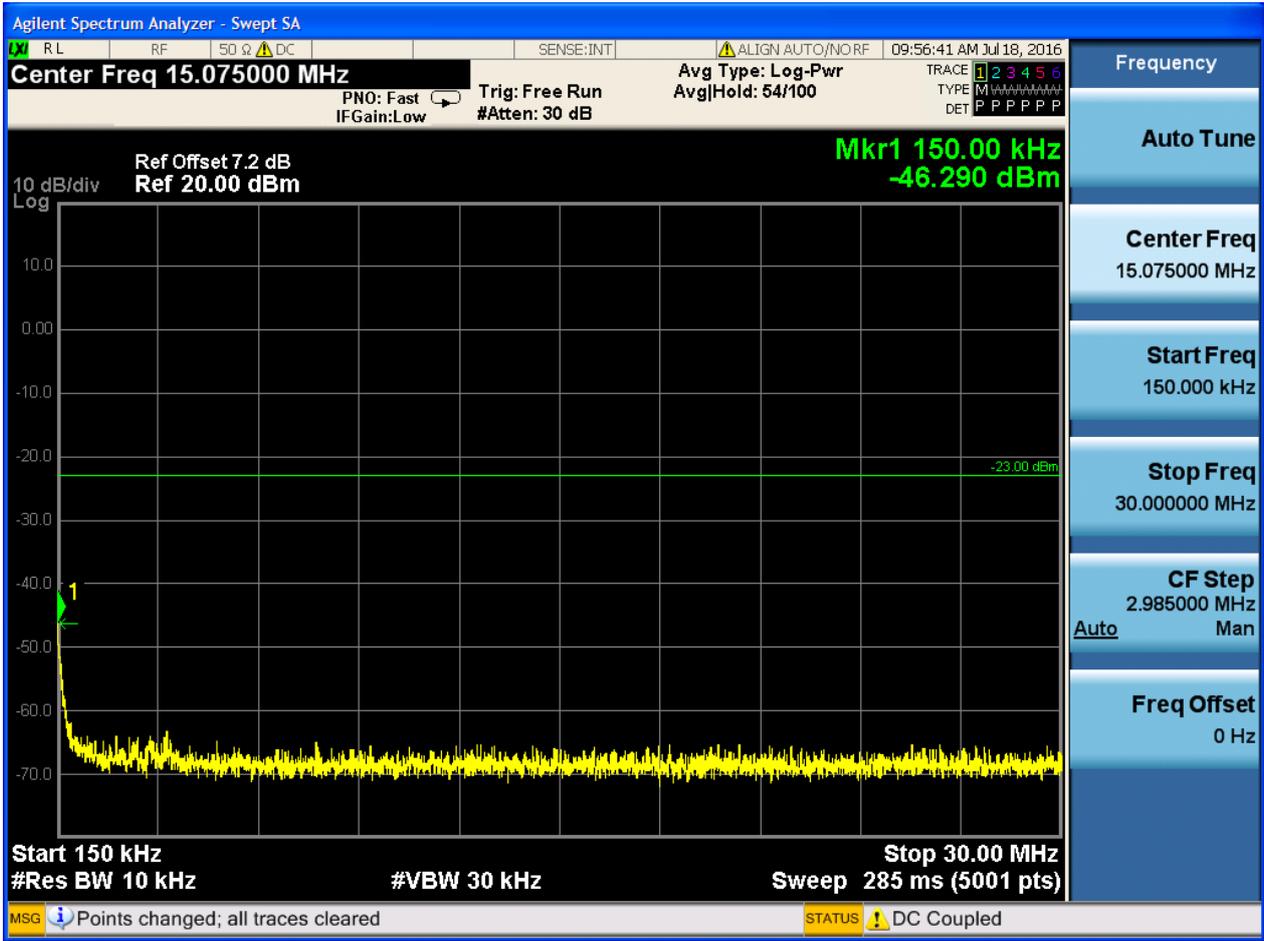


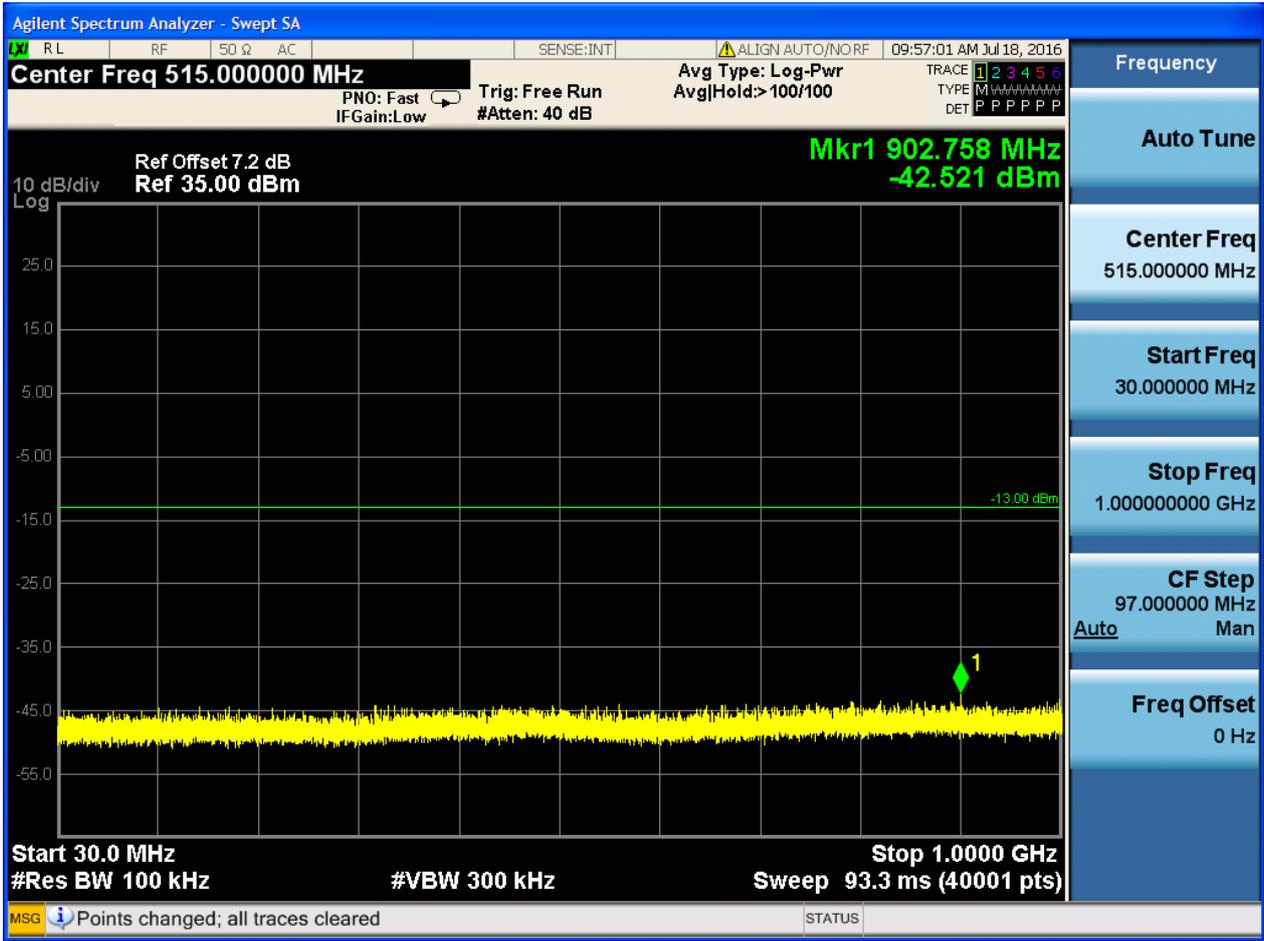


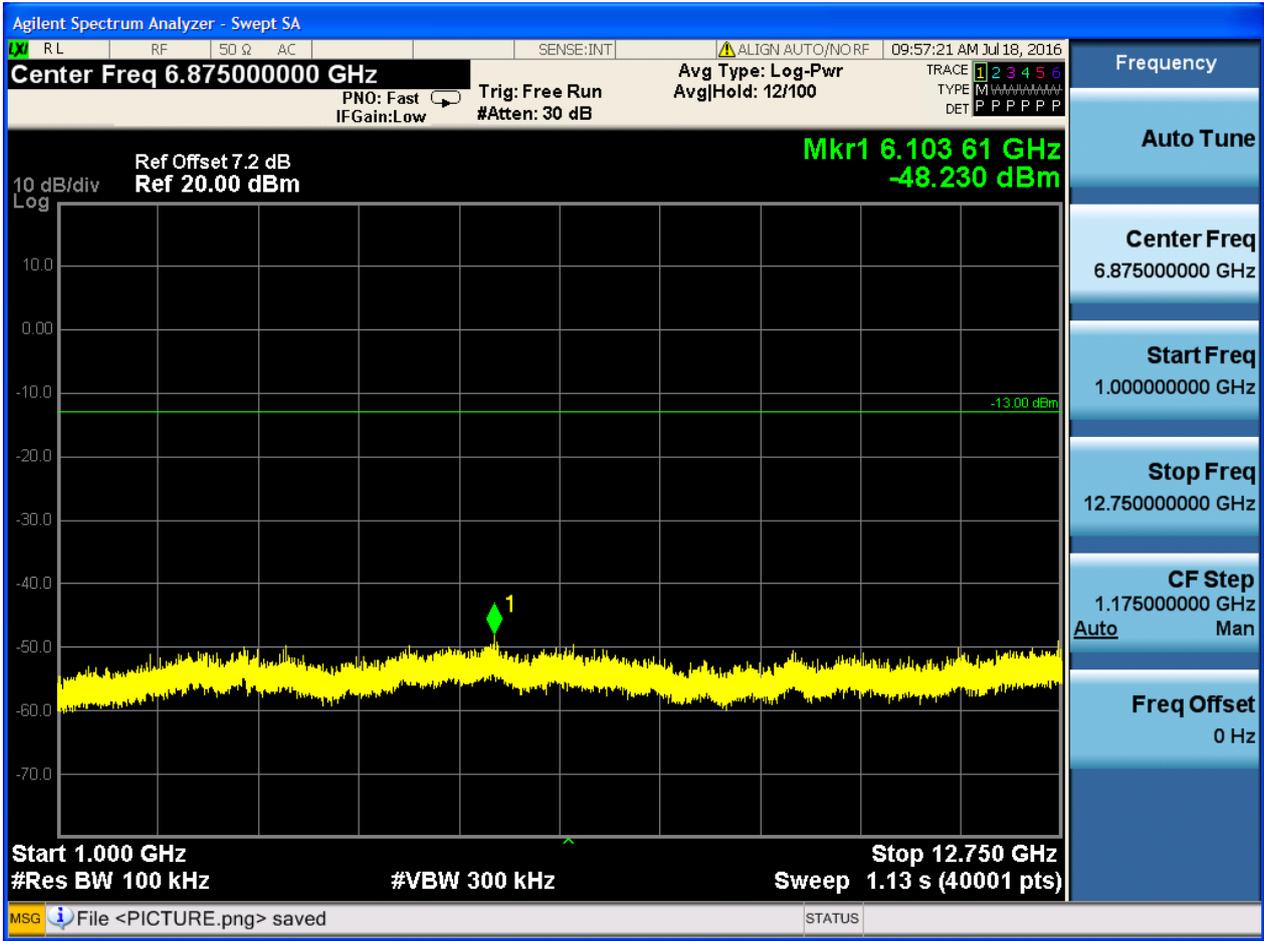


6.1.1.1.2 Test Channel = MCH

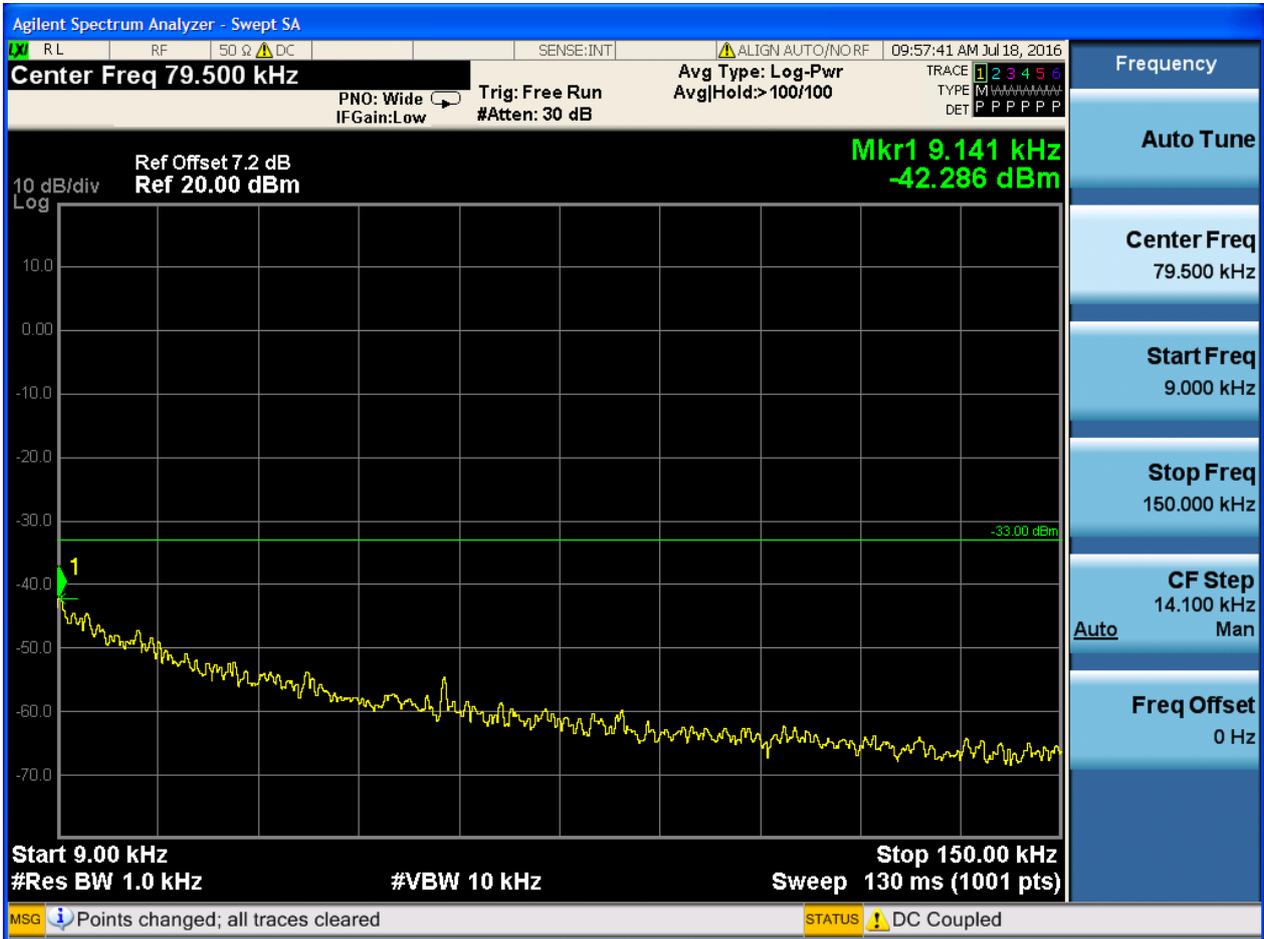


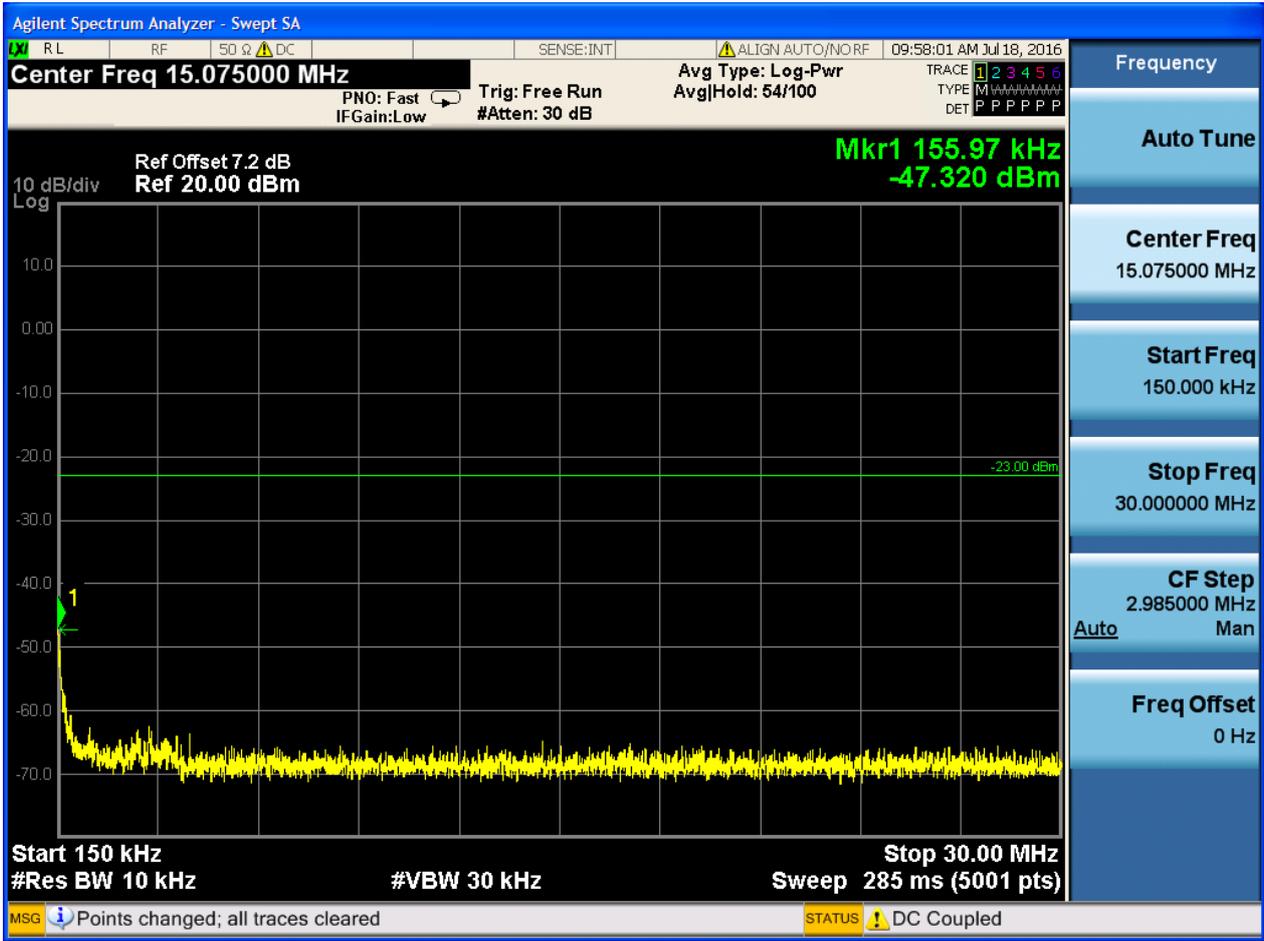


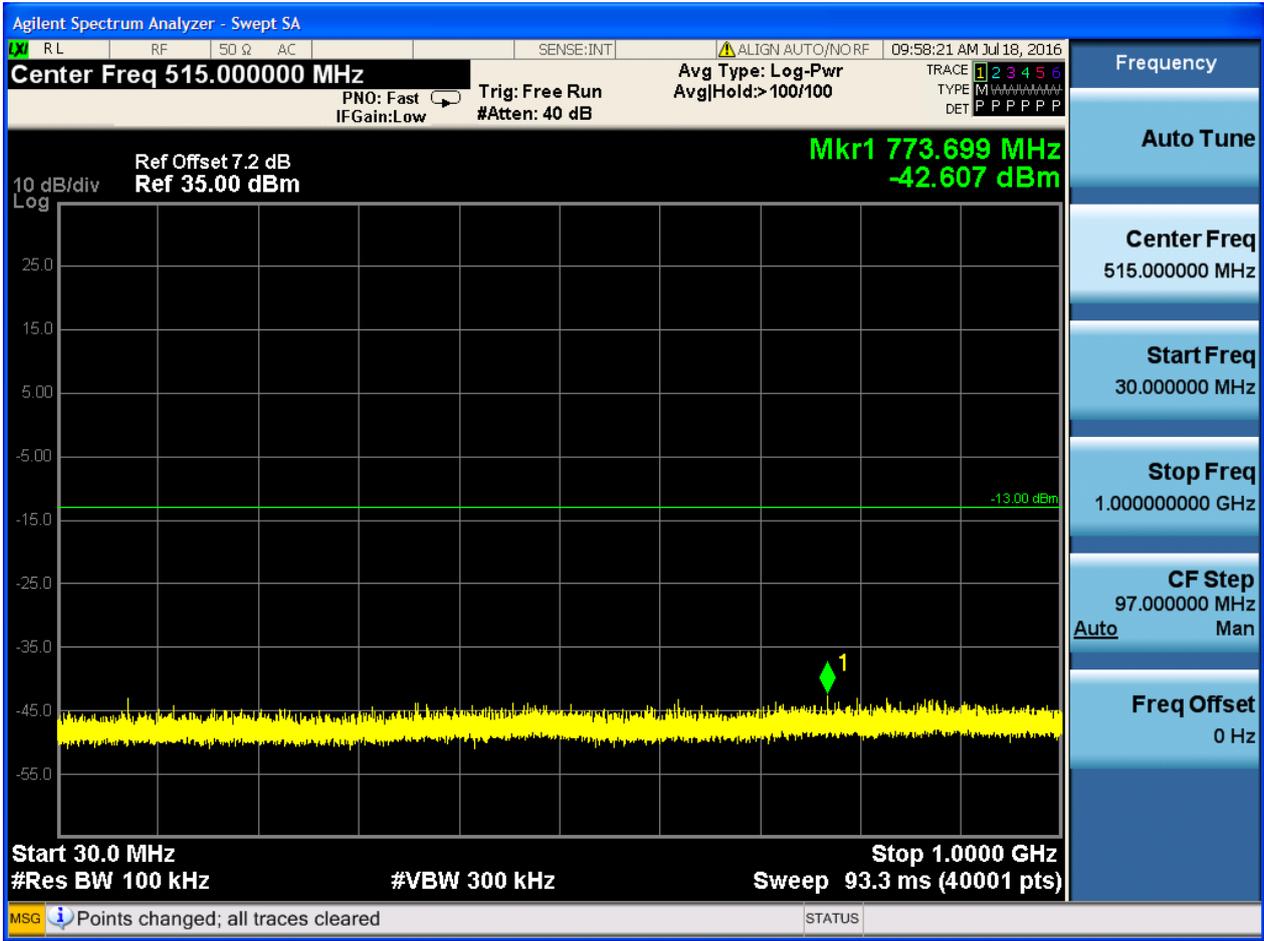


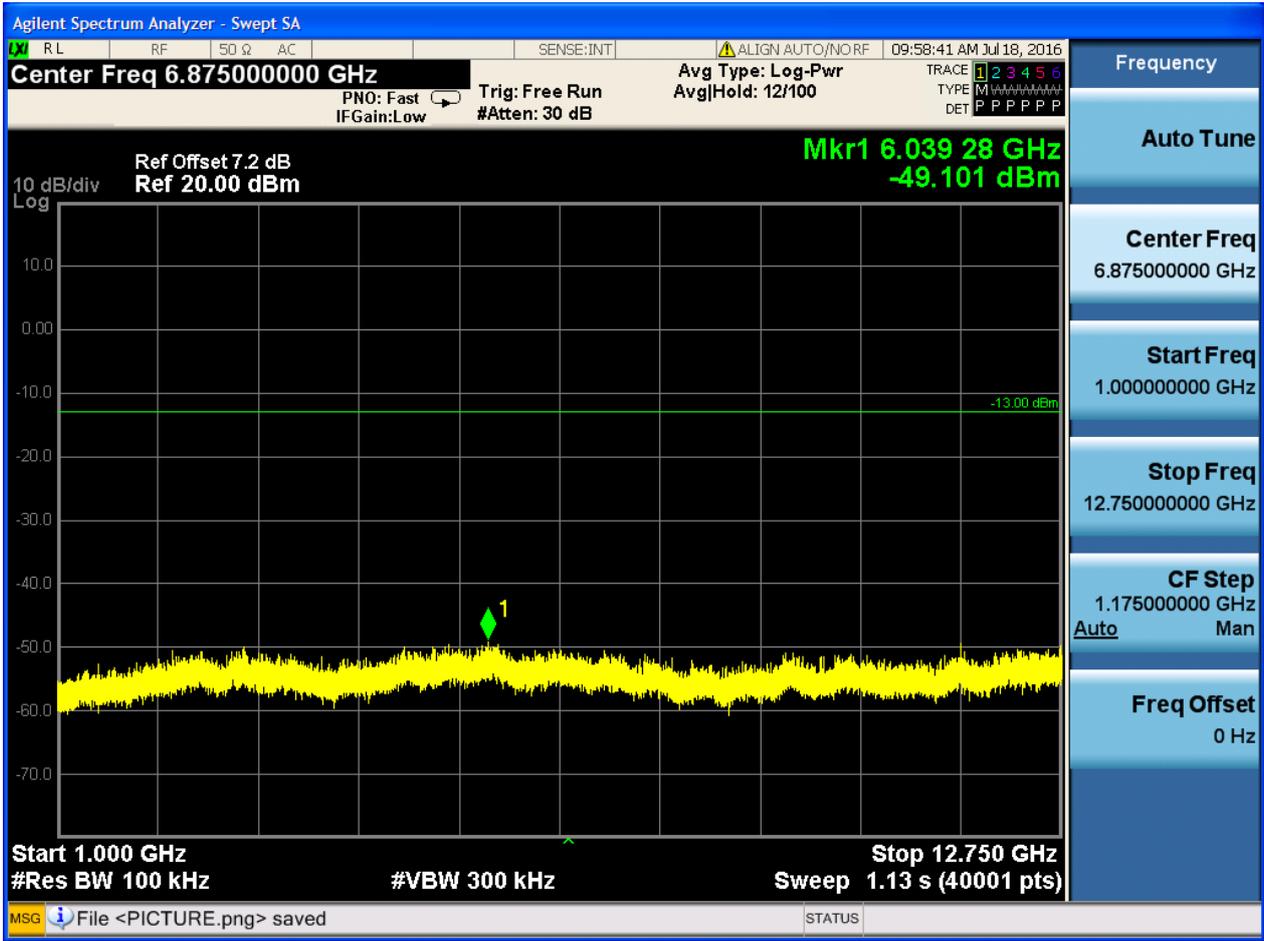


6.1.1.1.3 Test Channel = HCH





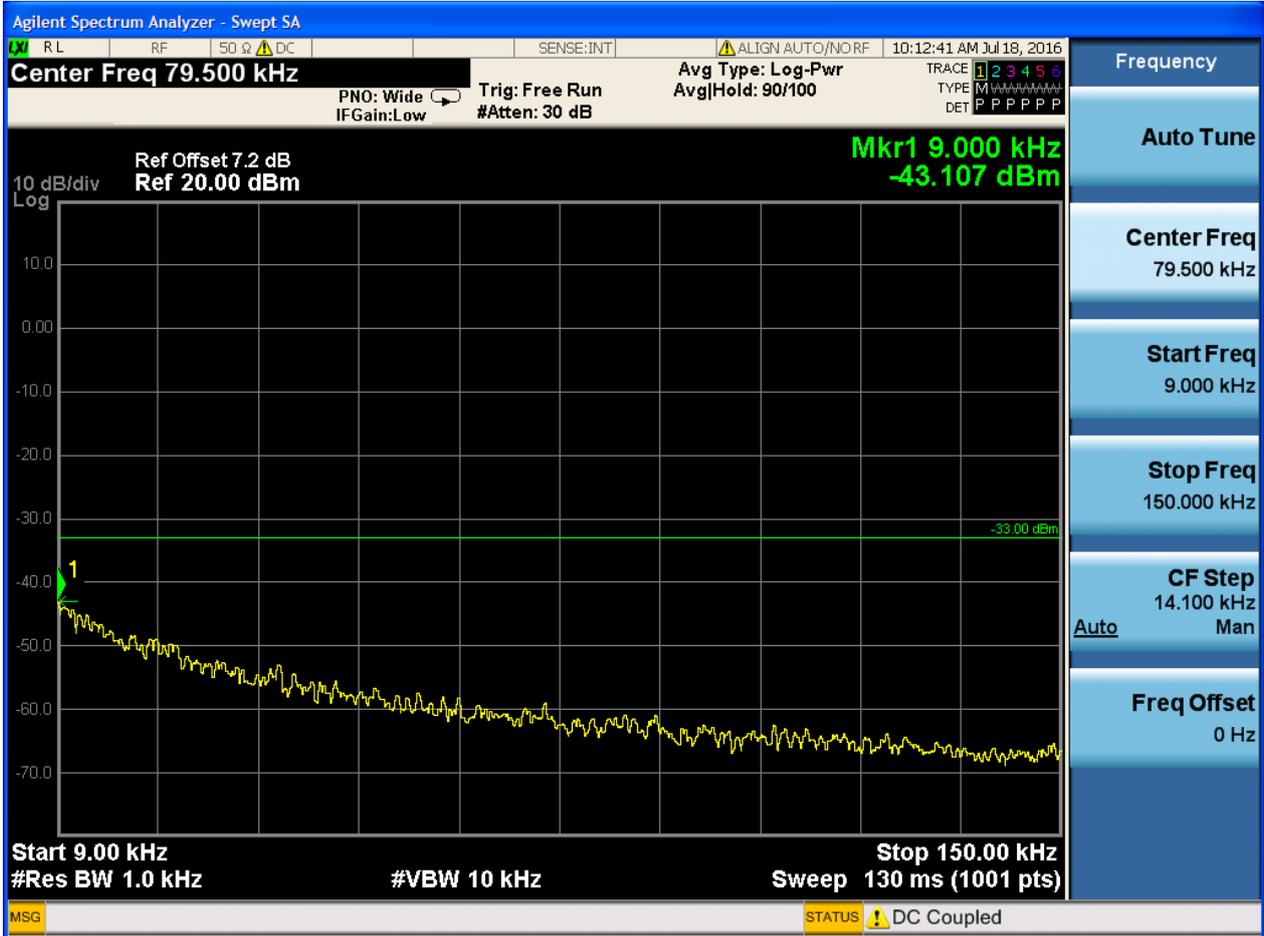


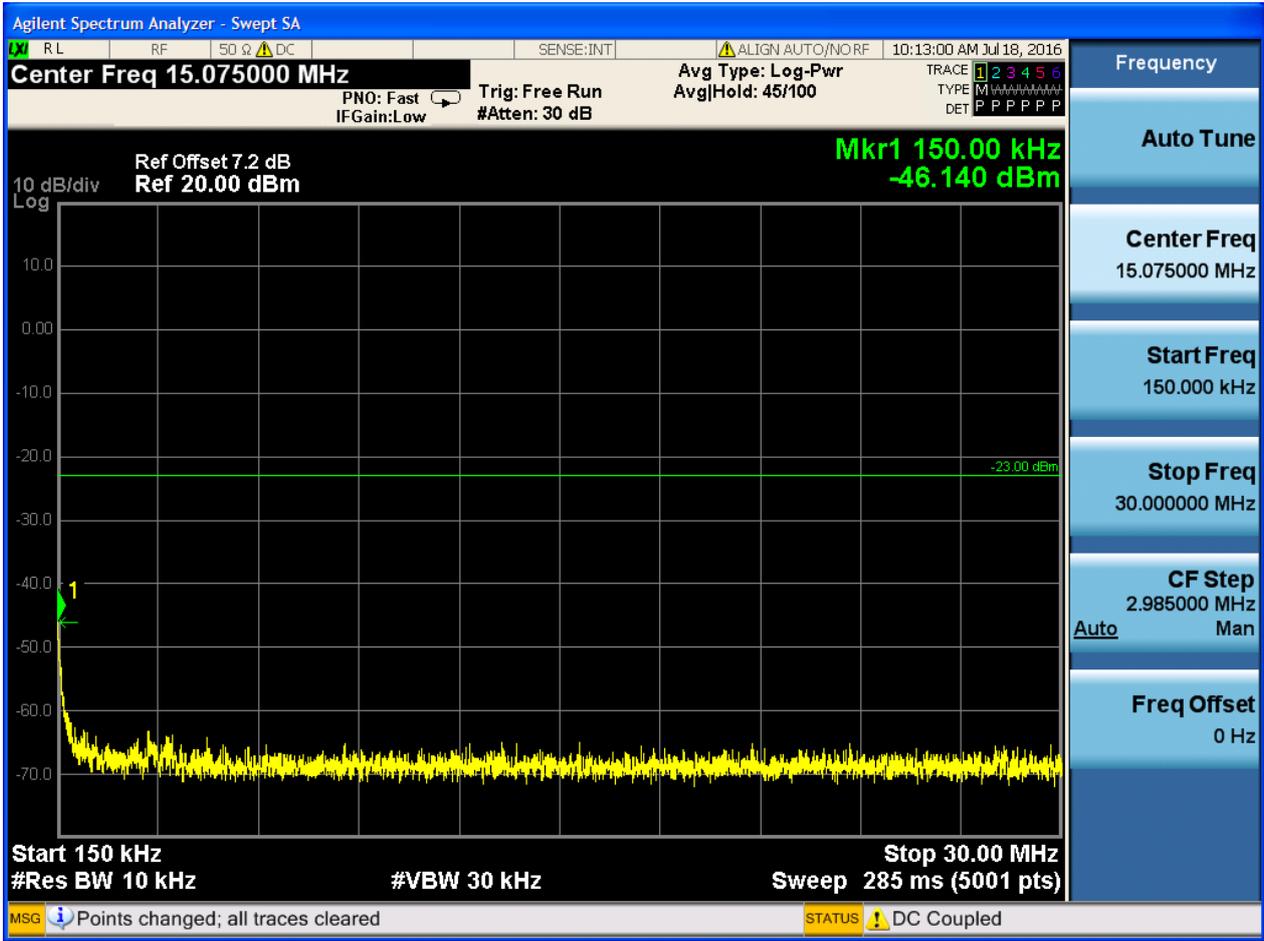


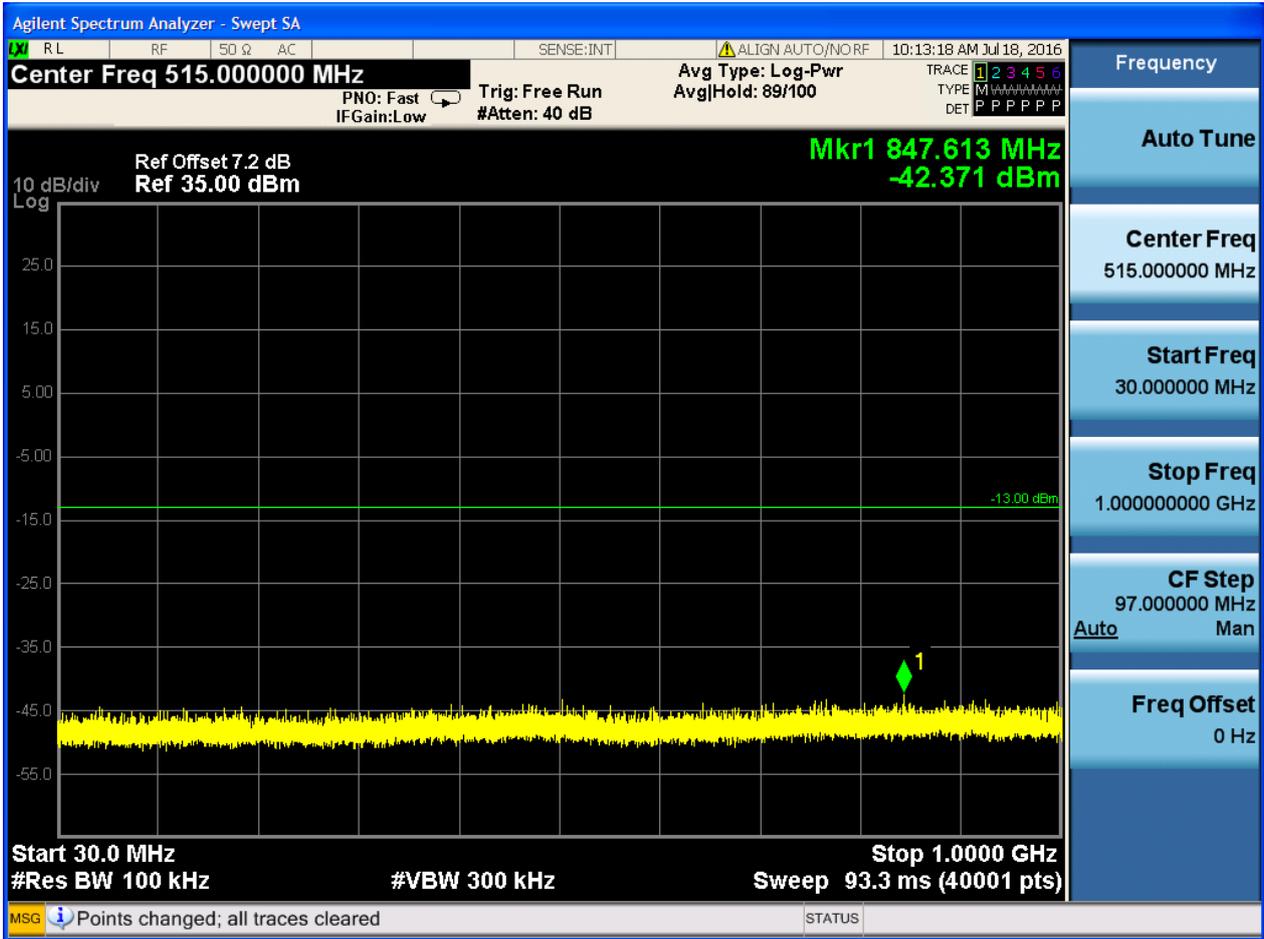


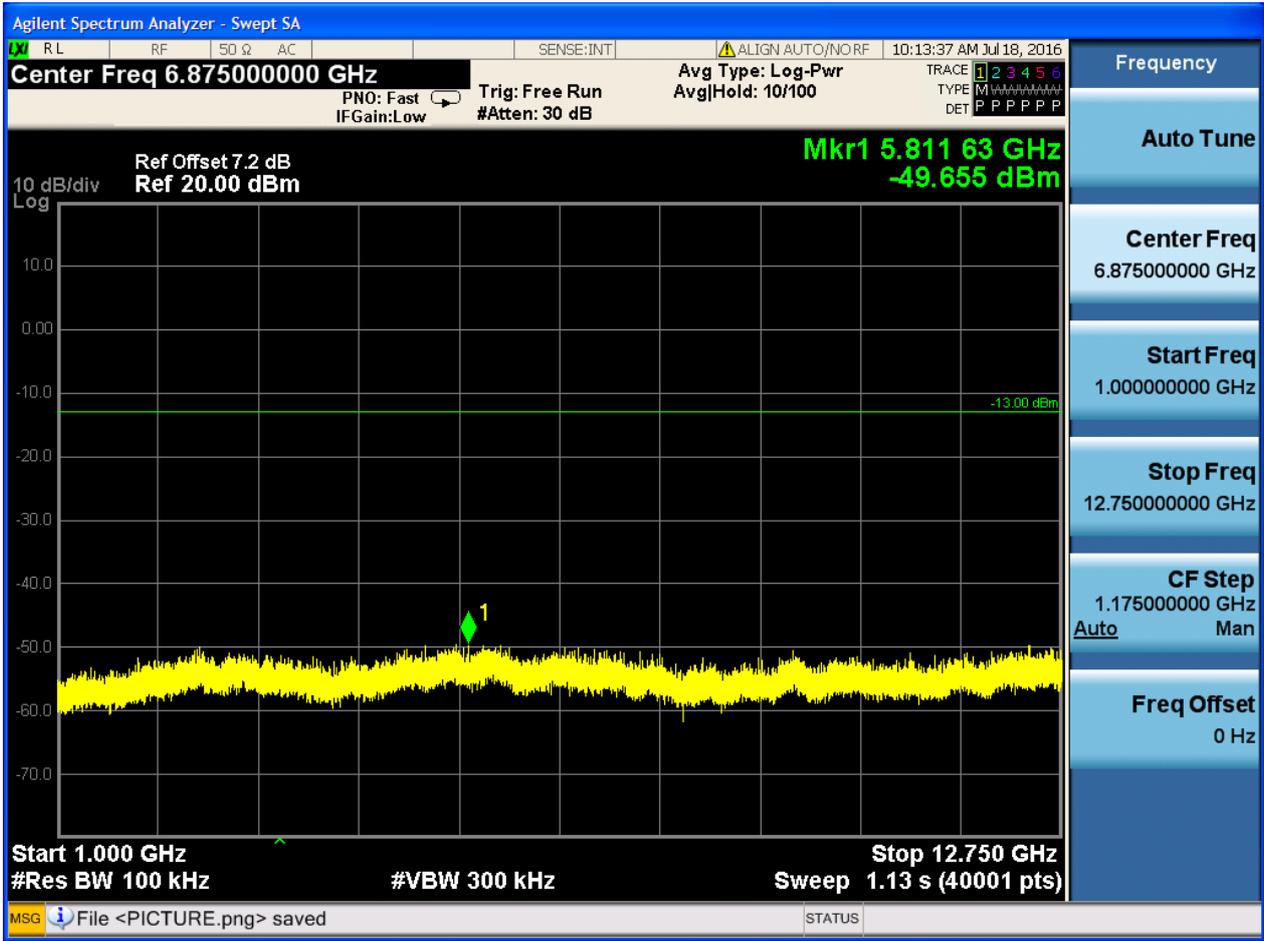
6.1.1.2 Test Mode = GSM/TM2

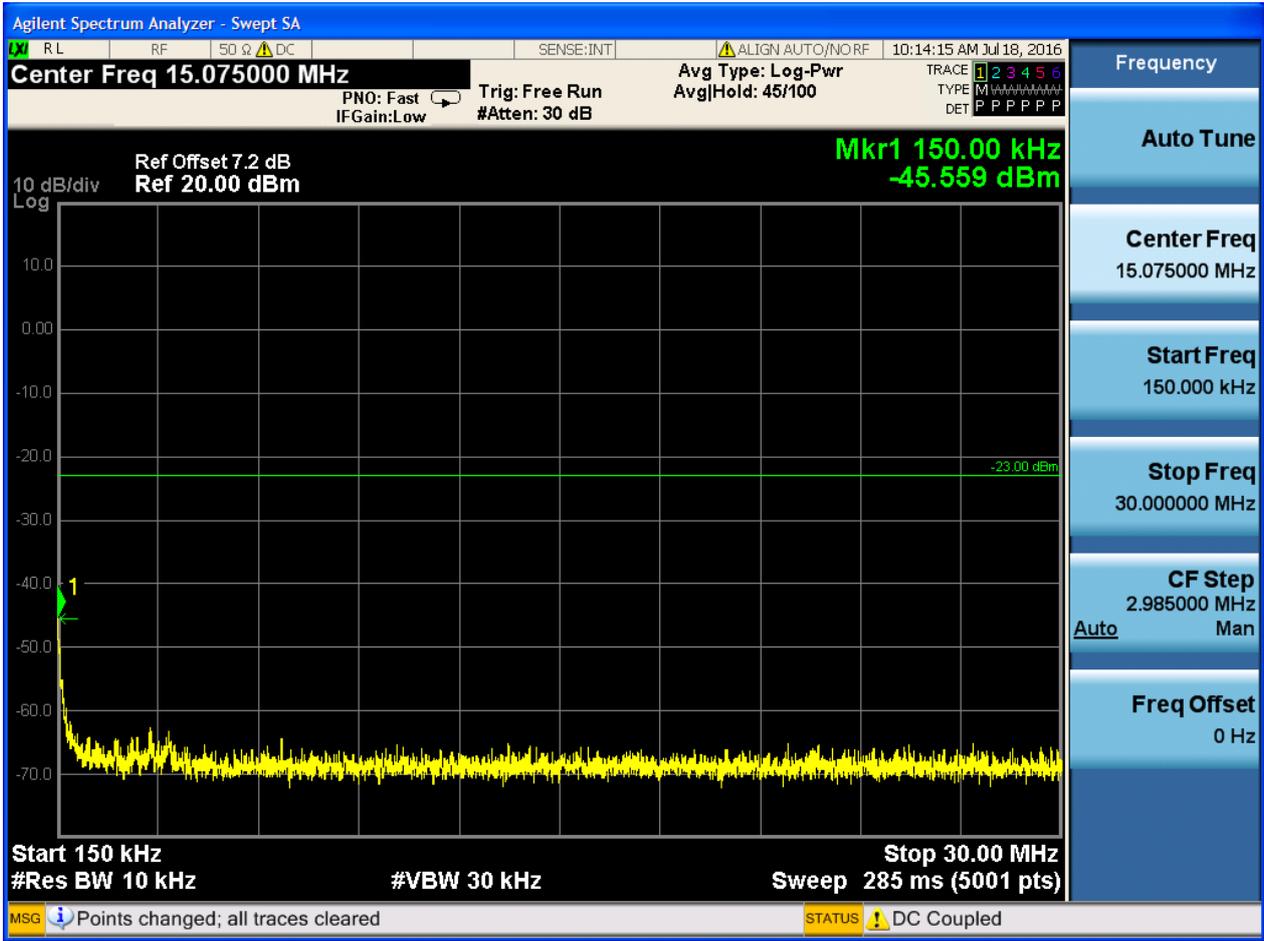
6.1.1.2.1 Test Channel = LCH

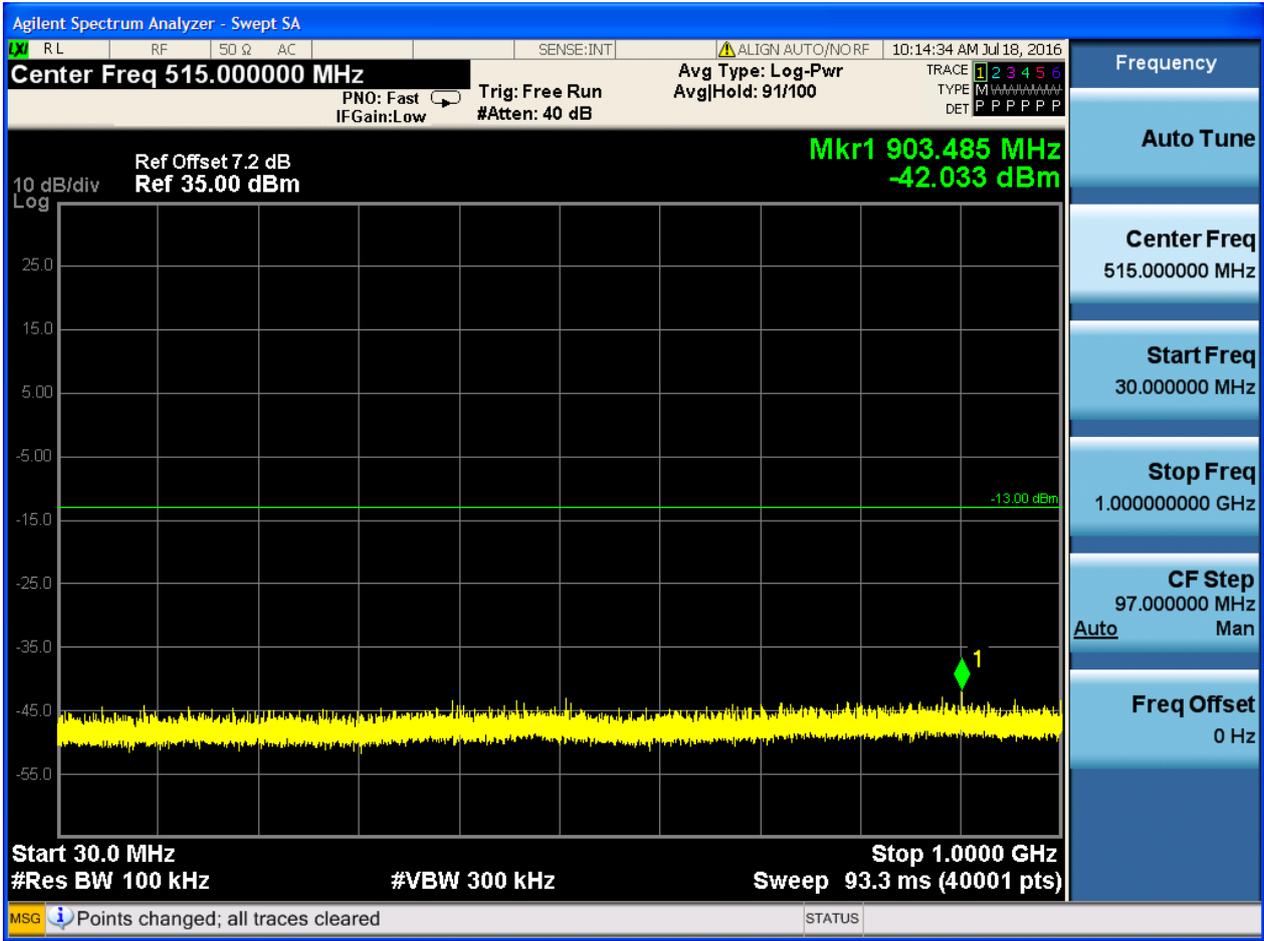


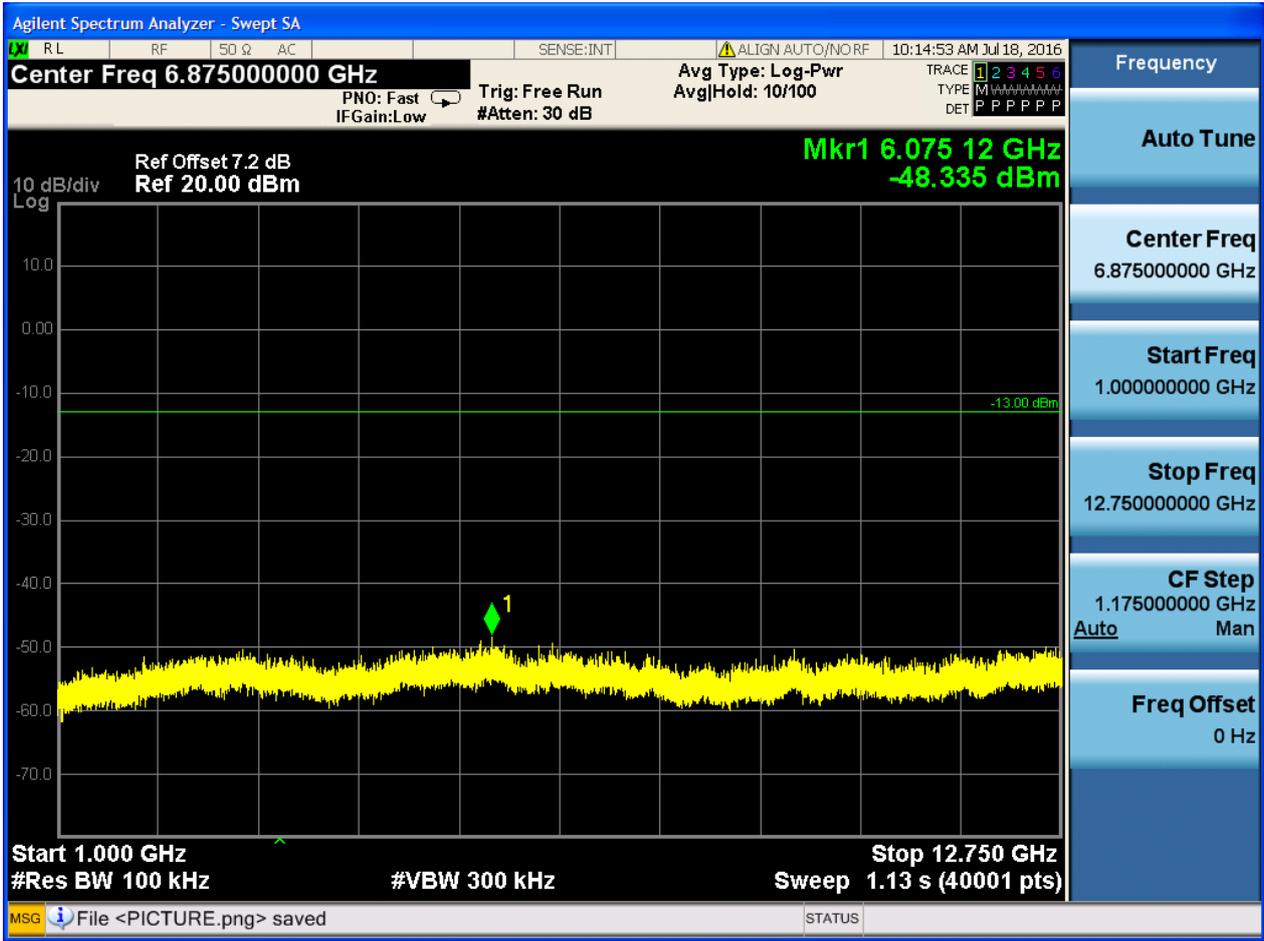




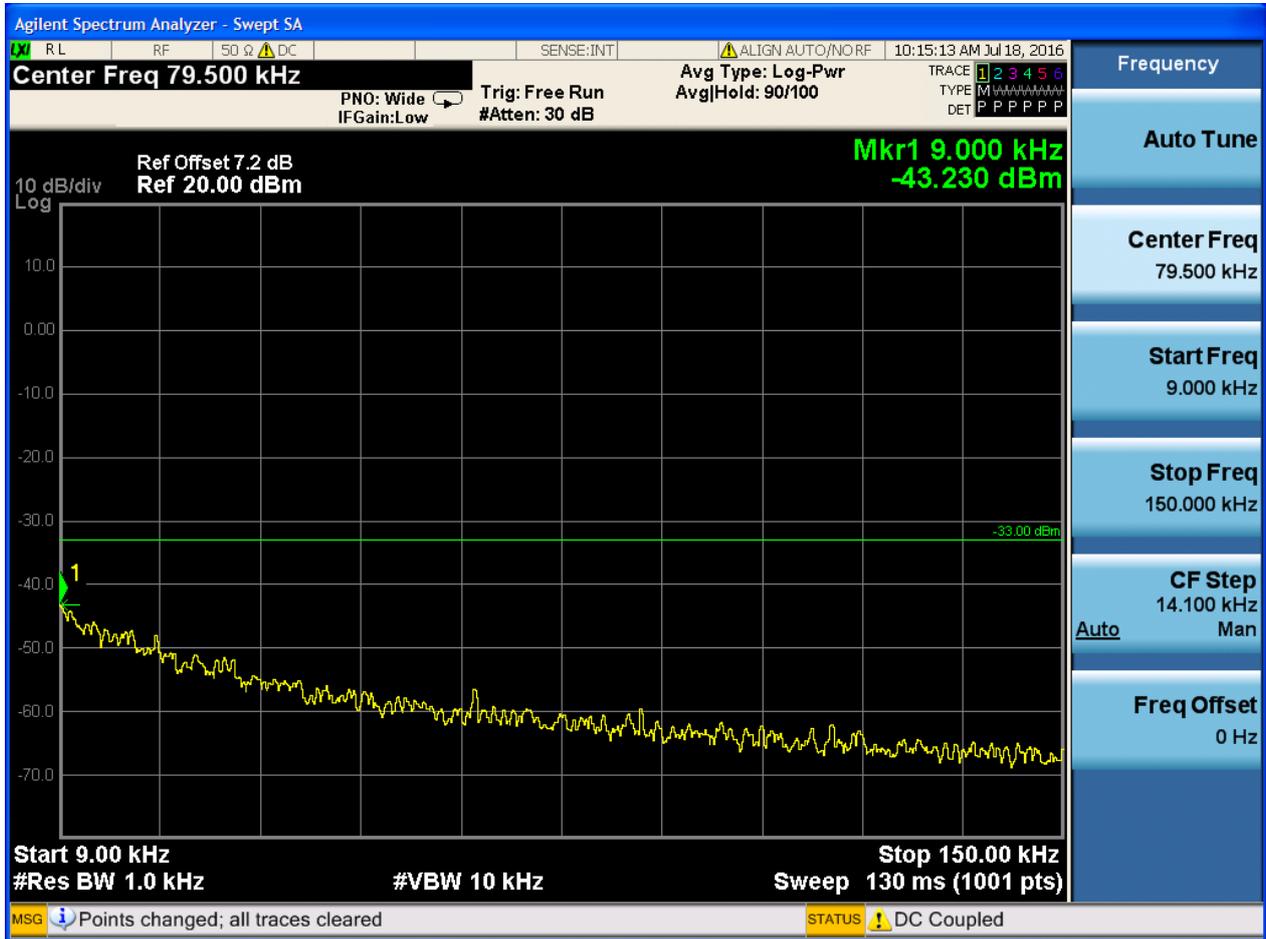


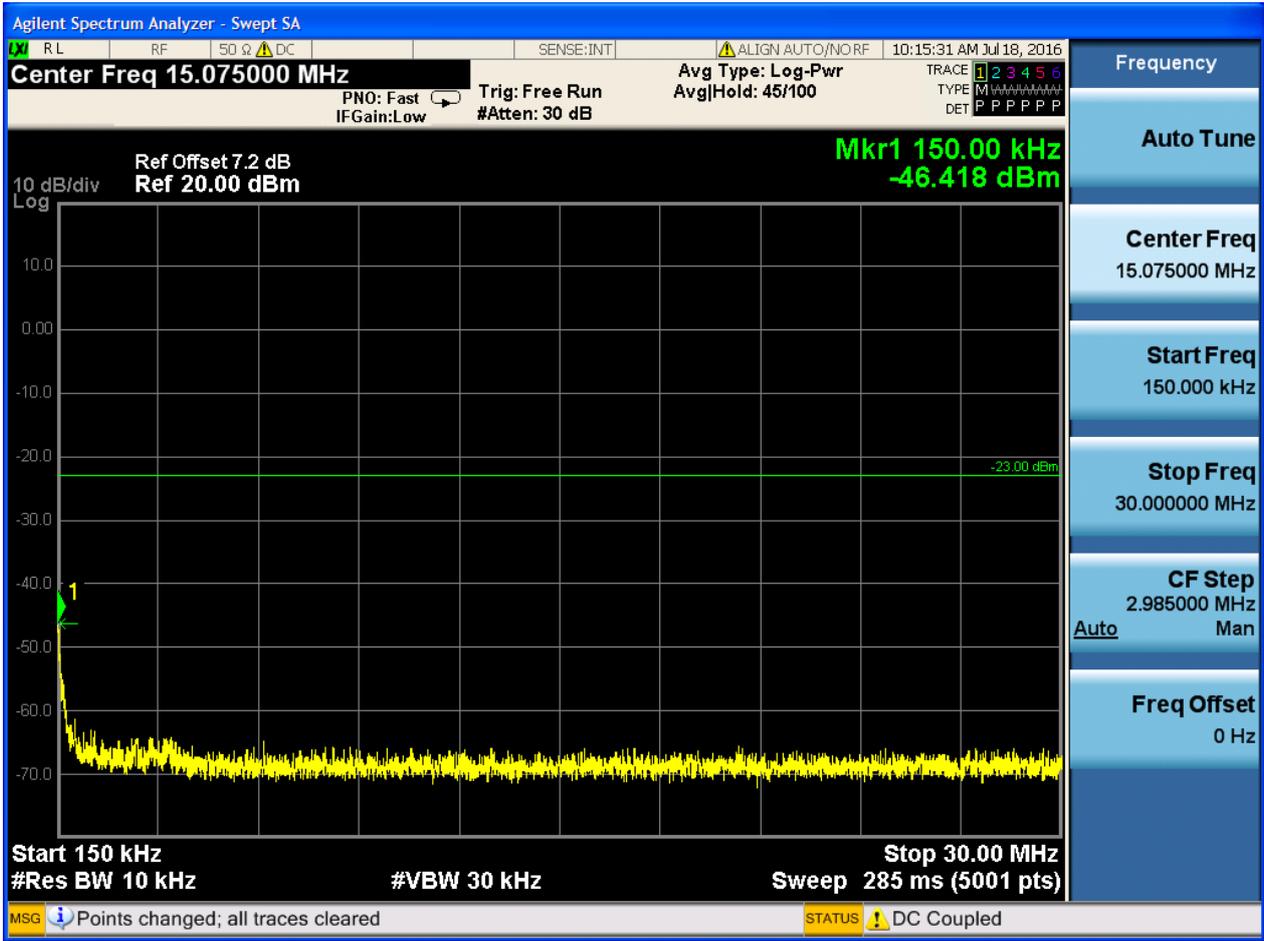


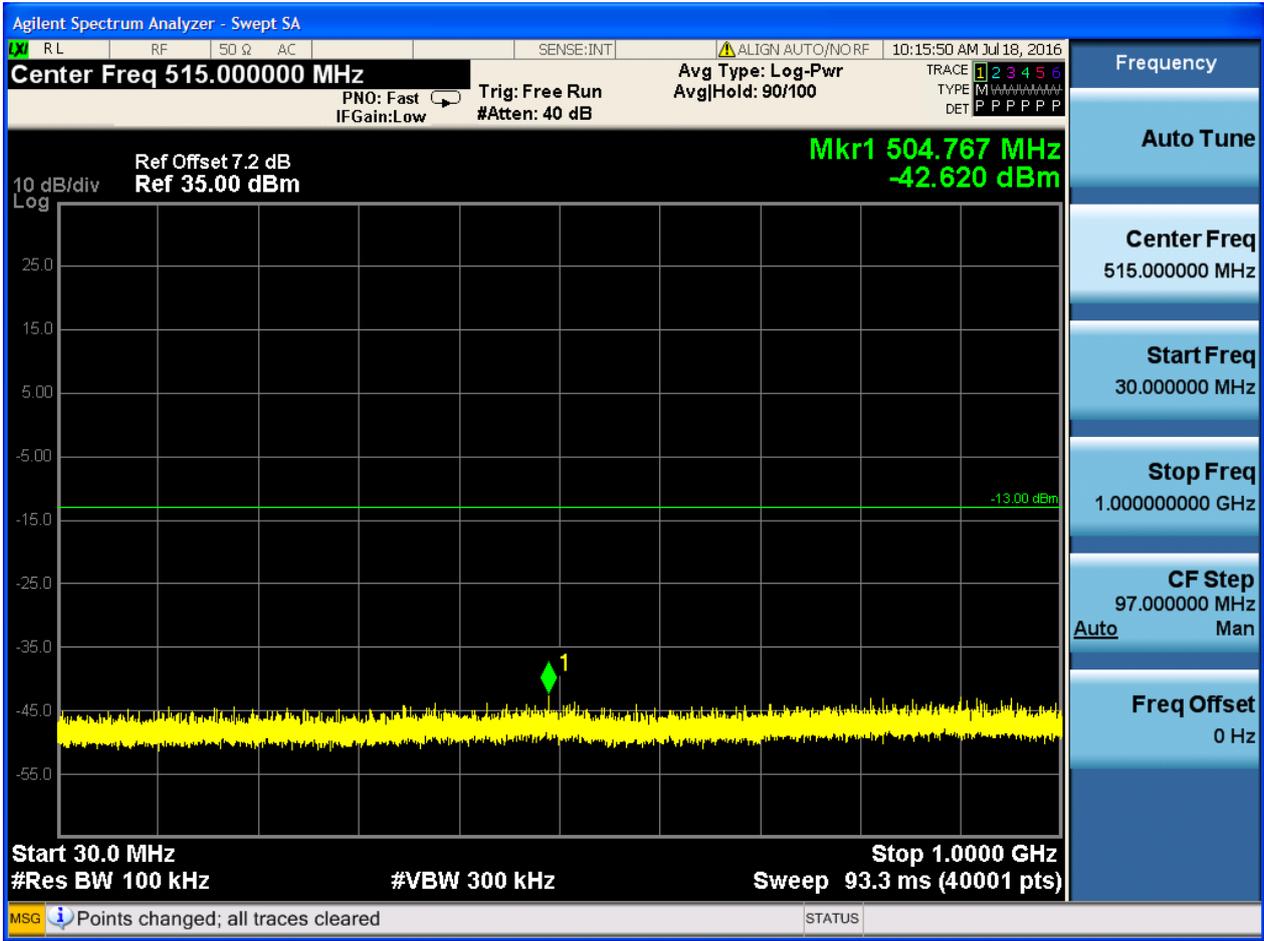


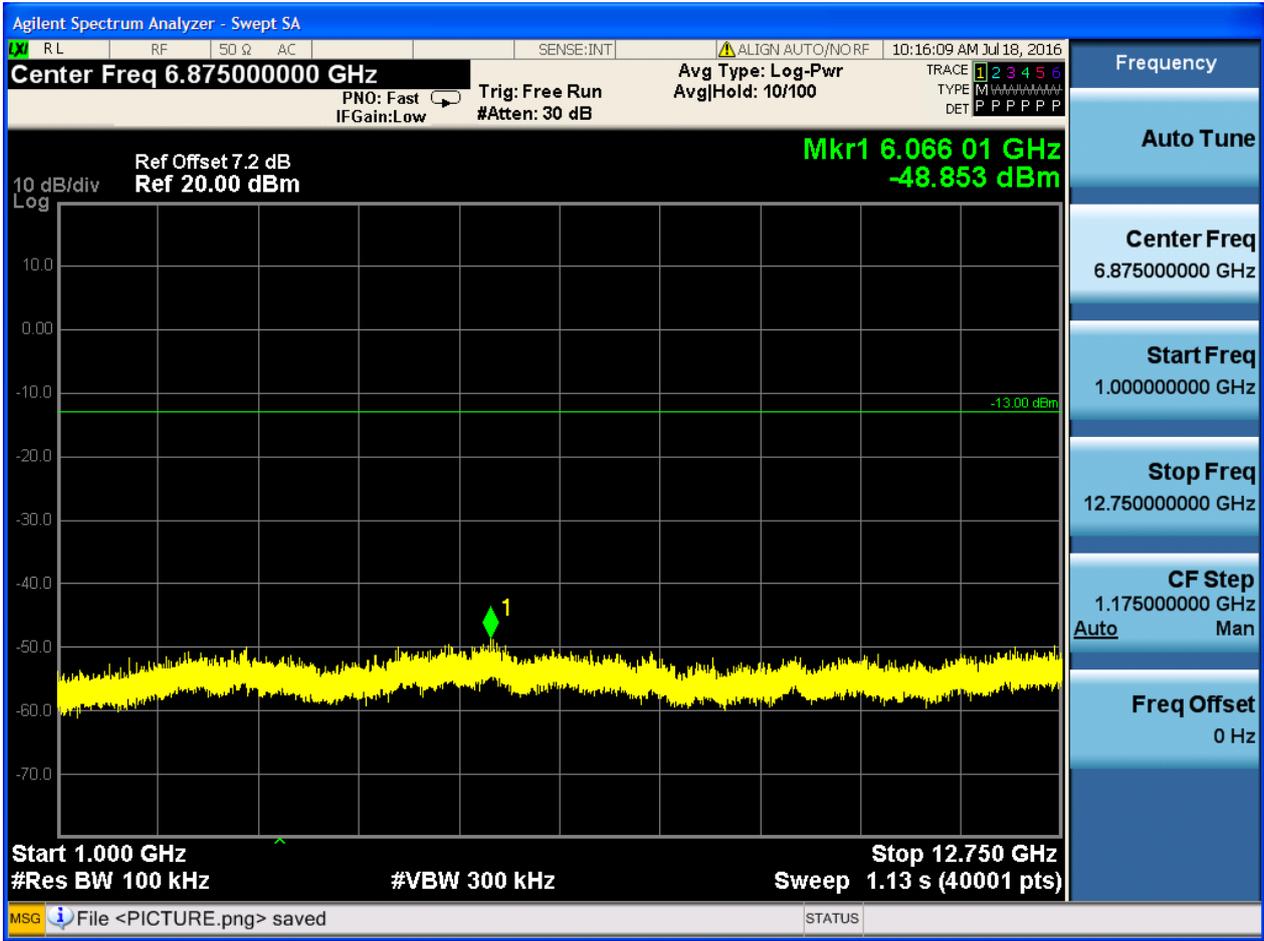


6.1.1.2.3 Test Channel = HCH









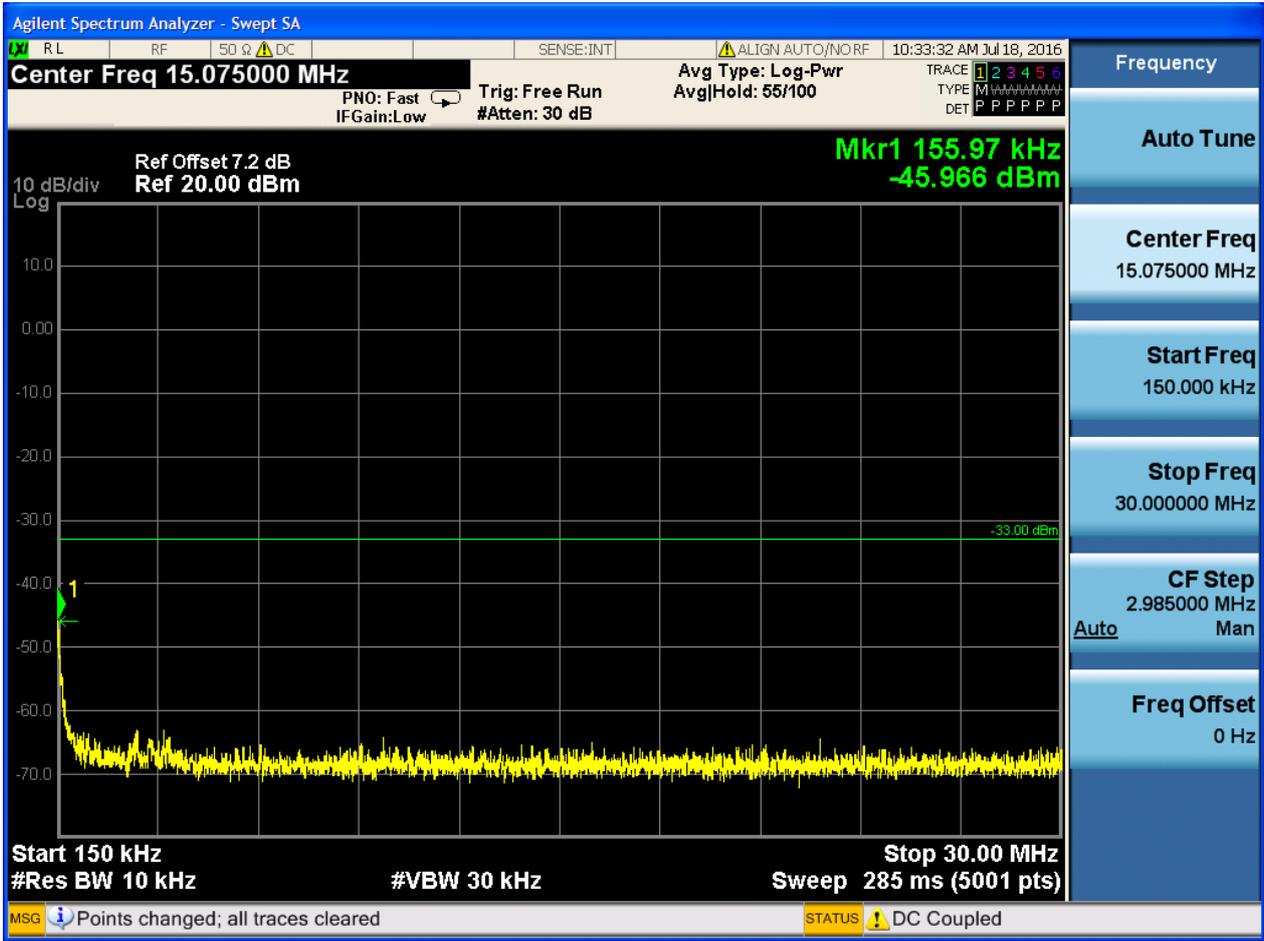


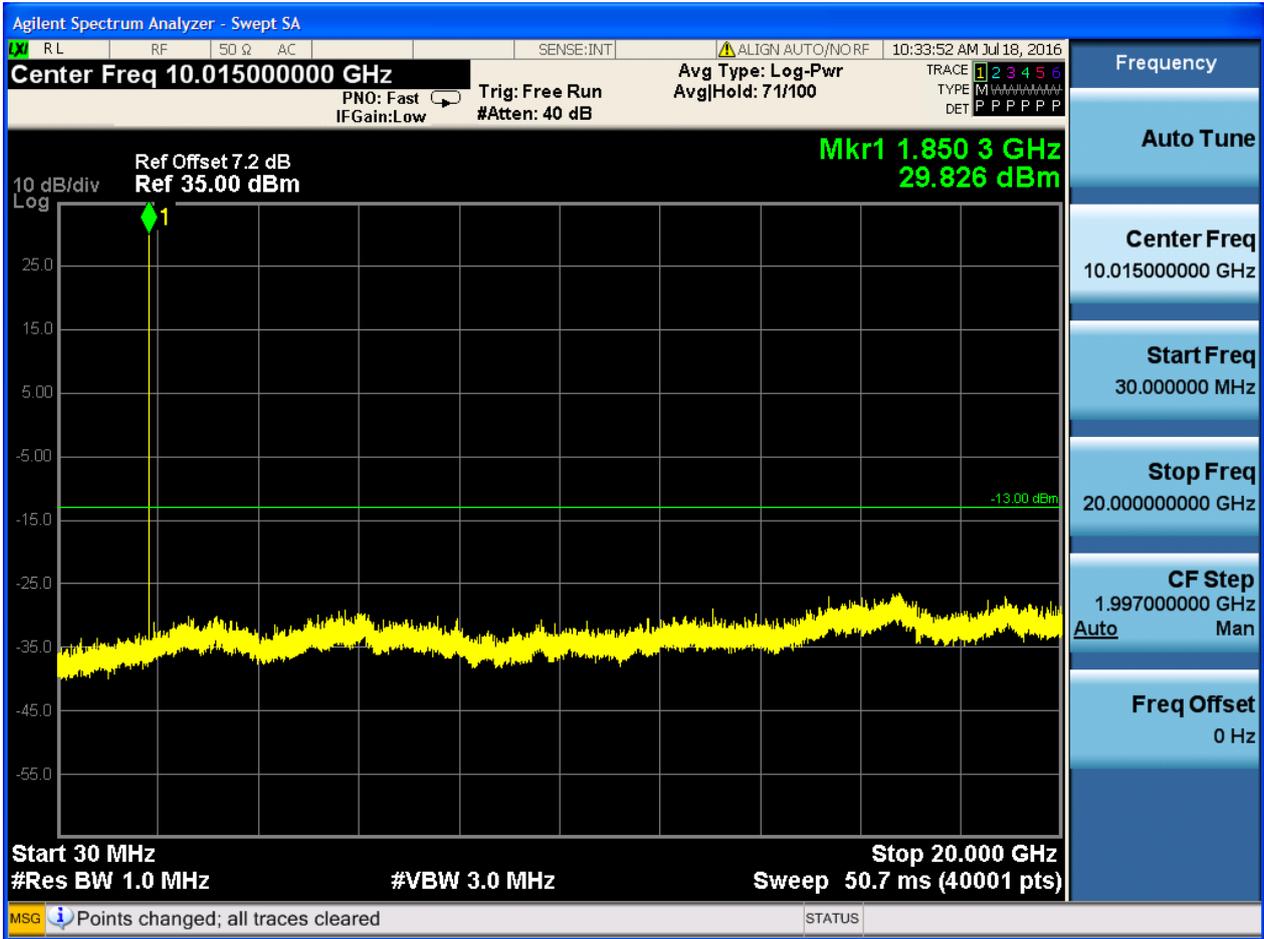
6.1.2 Test Band = GSM1900

6.1.2.1 Test Mode = GSM/TM1

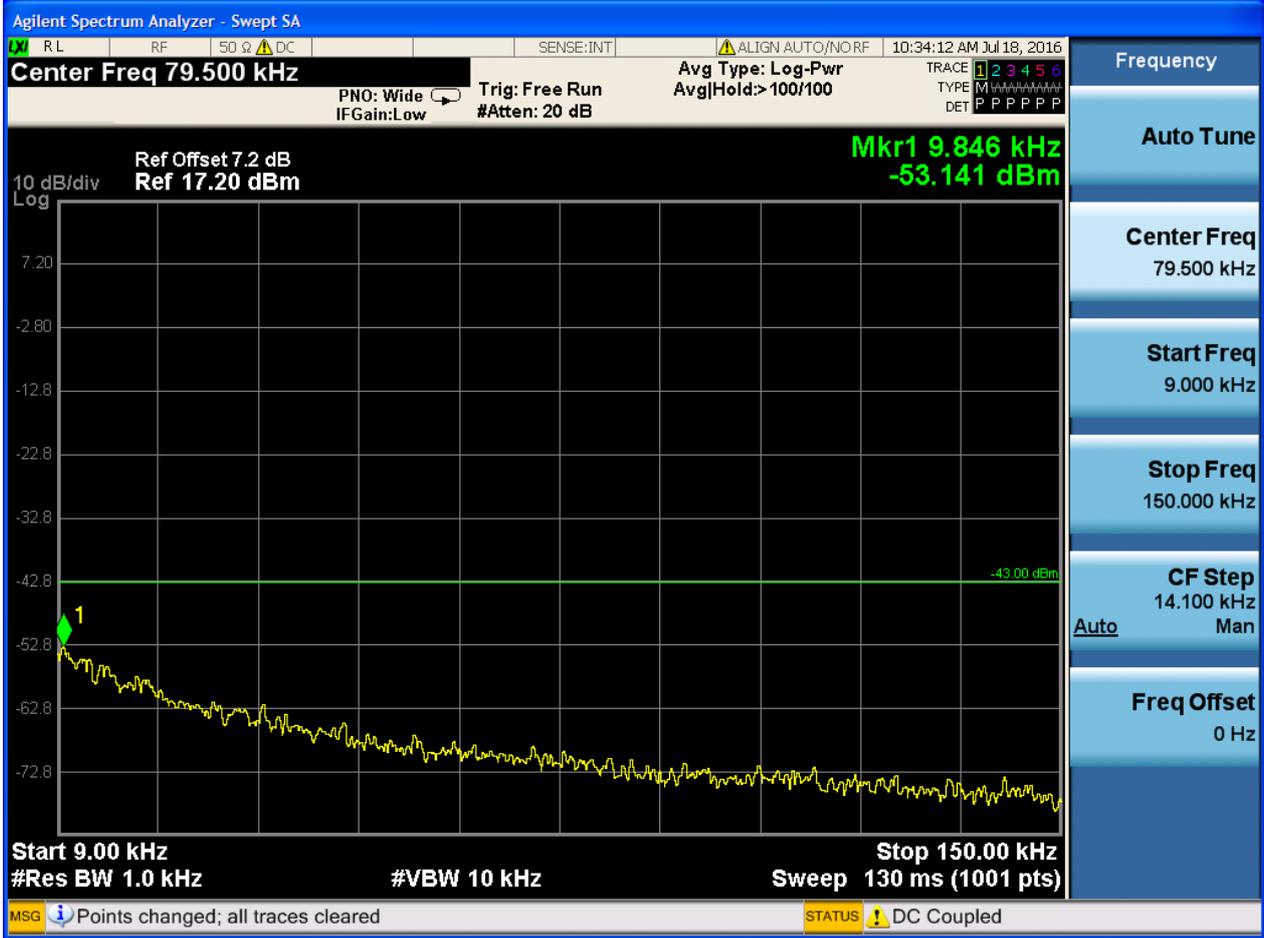
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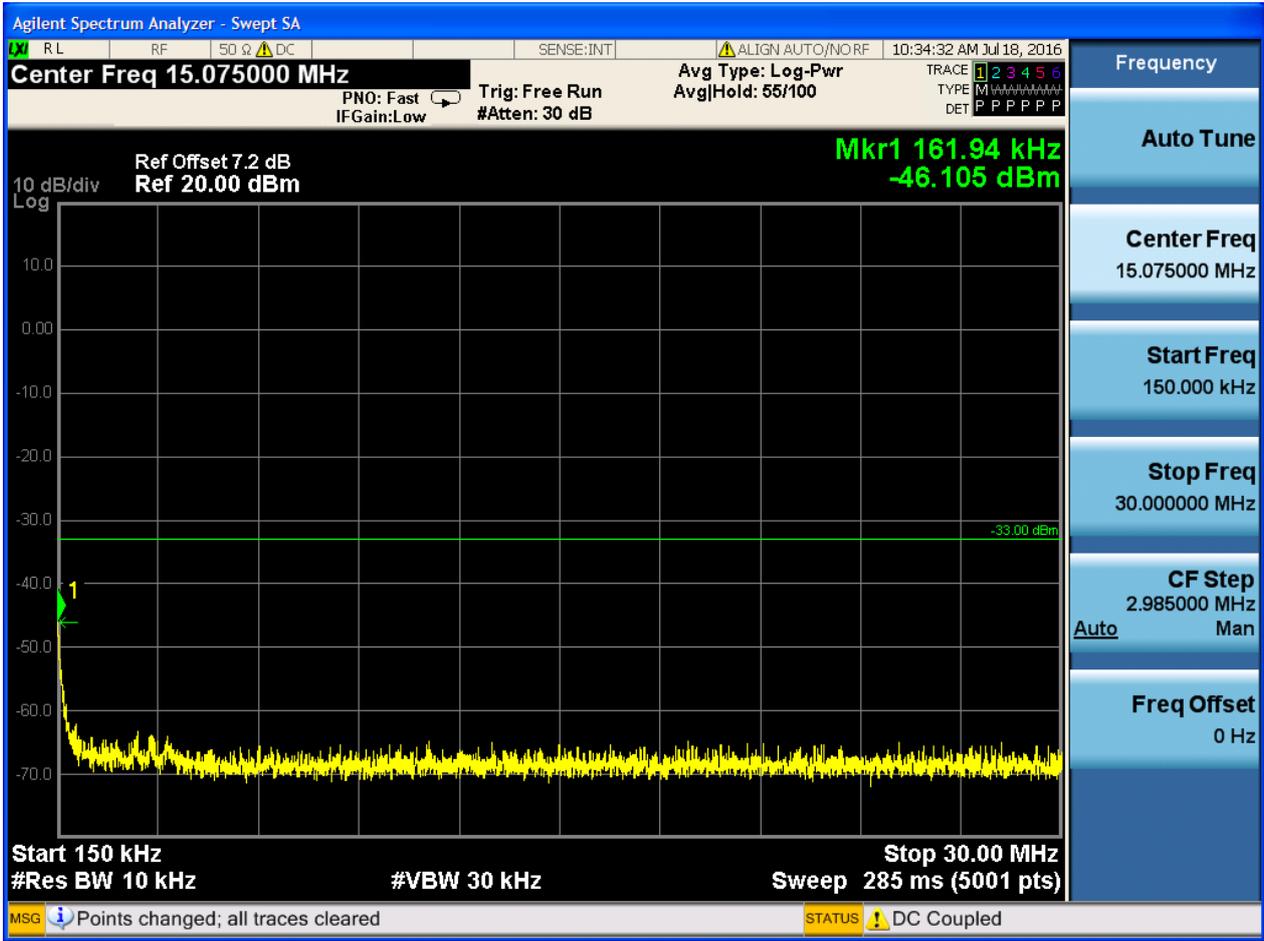




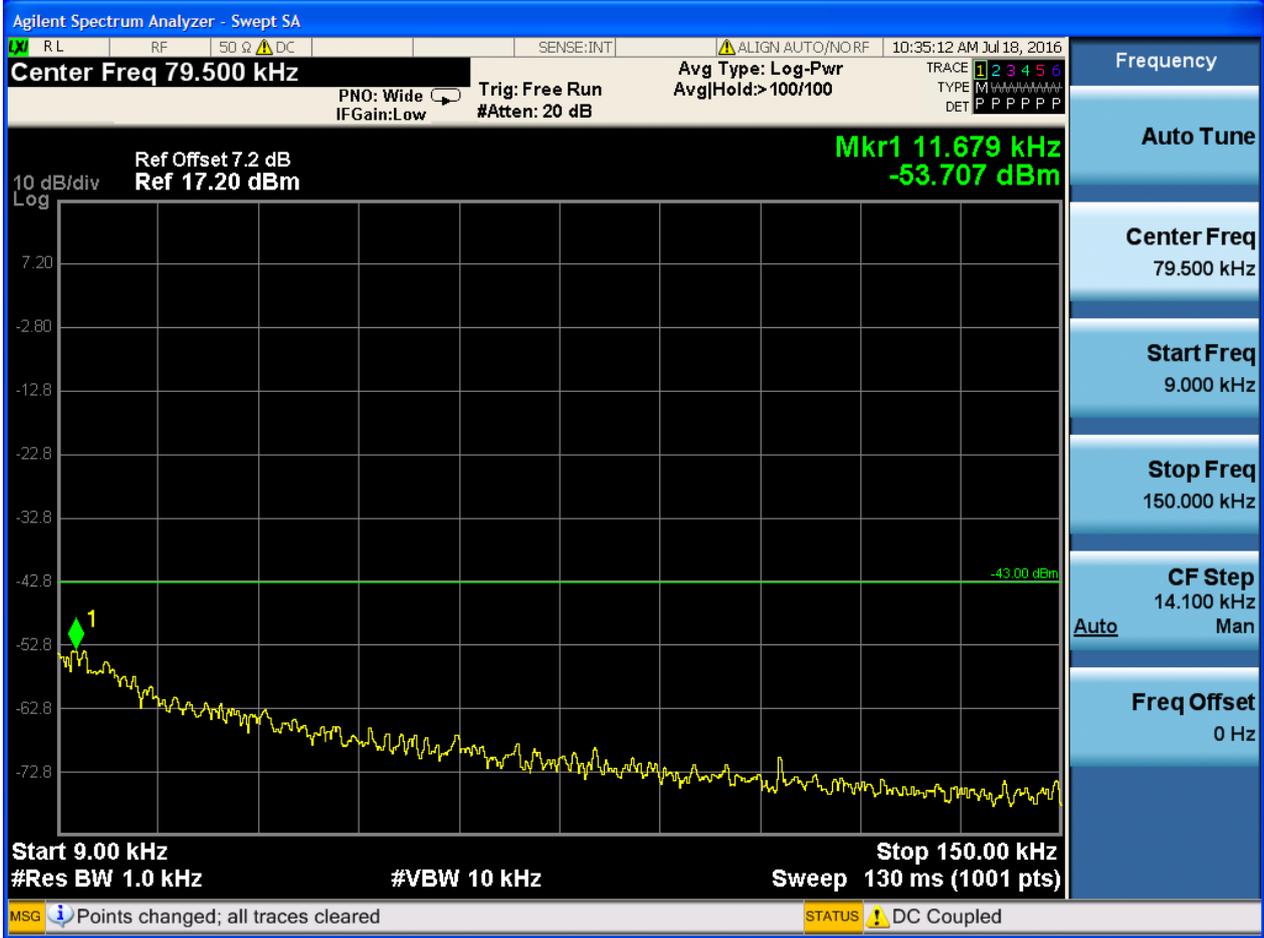


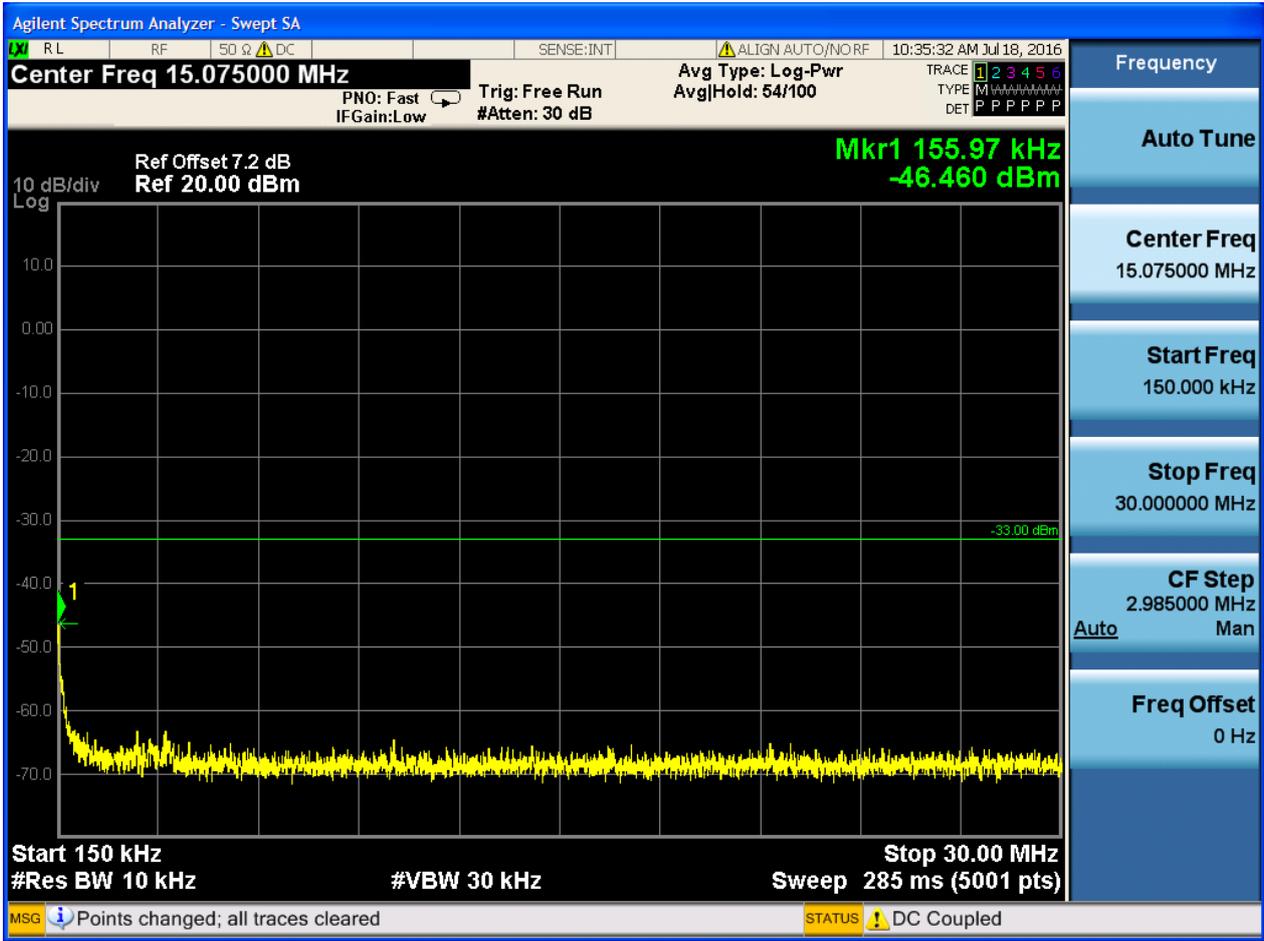
6.1.2.1.2 Test Channel = MCH

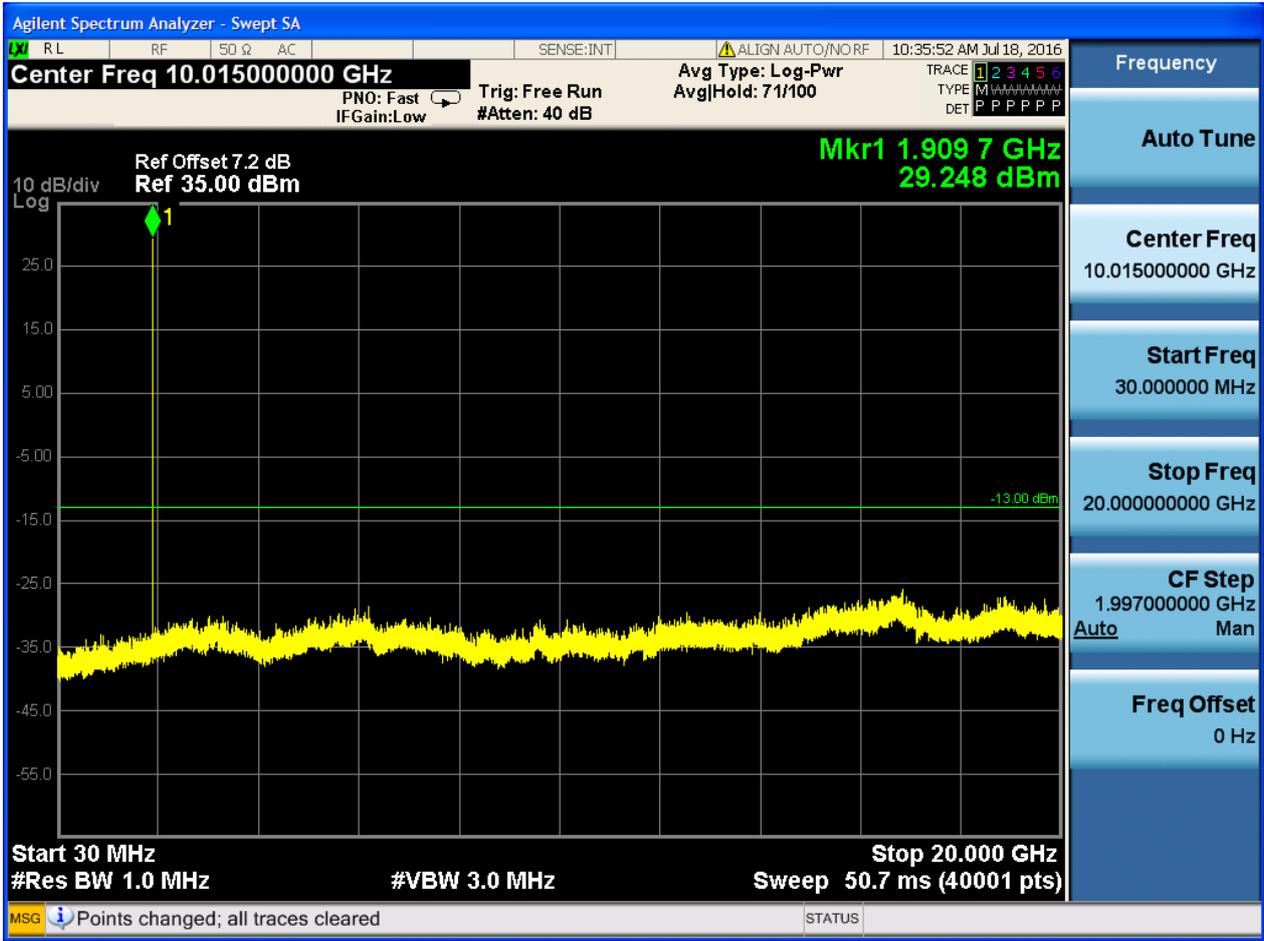




6.1.2.1.3 Test Channel = HCH

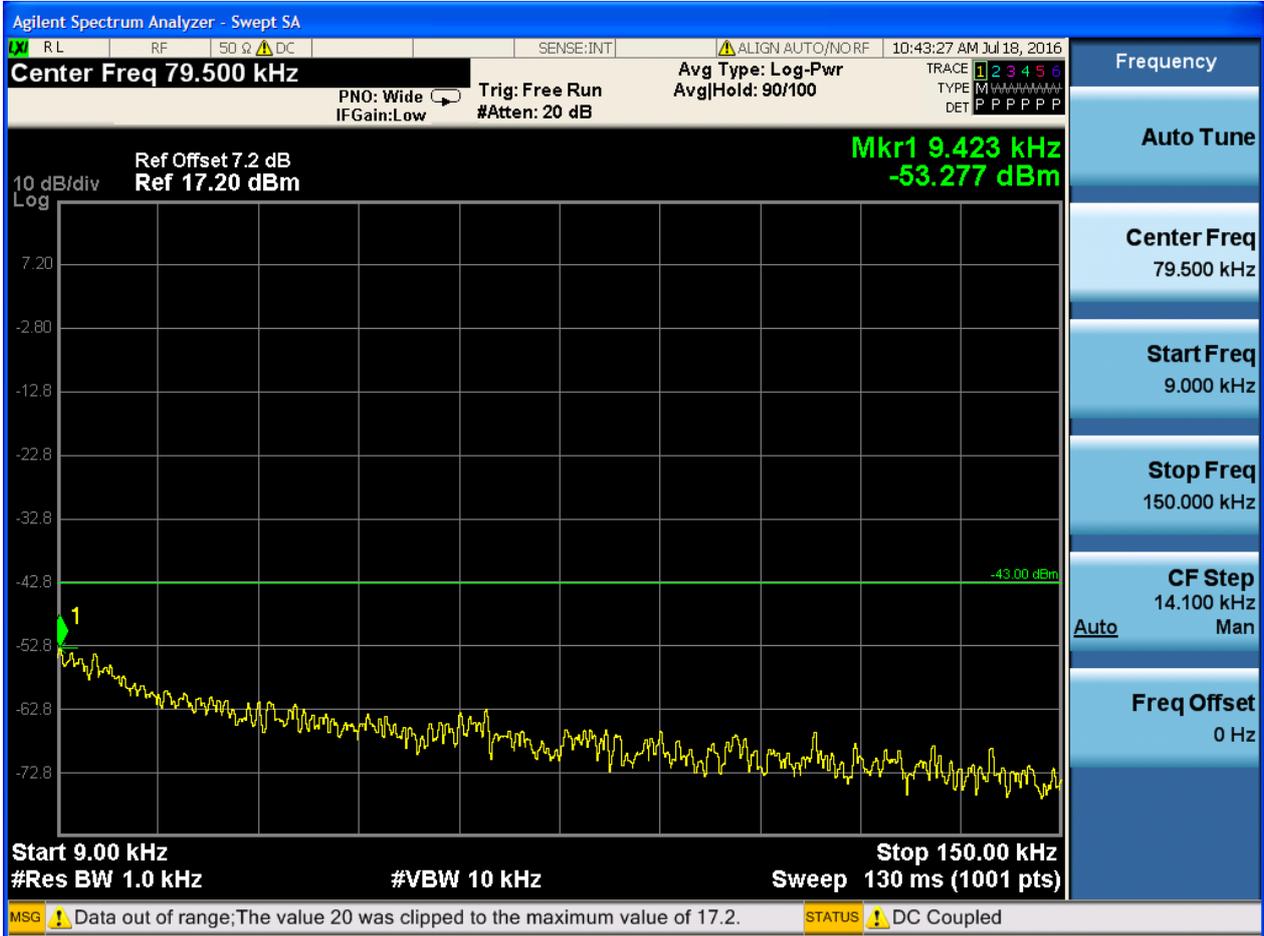


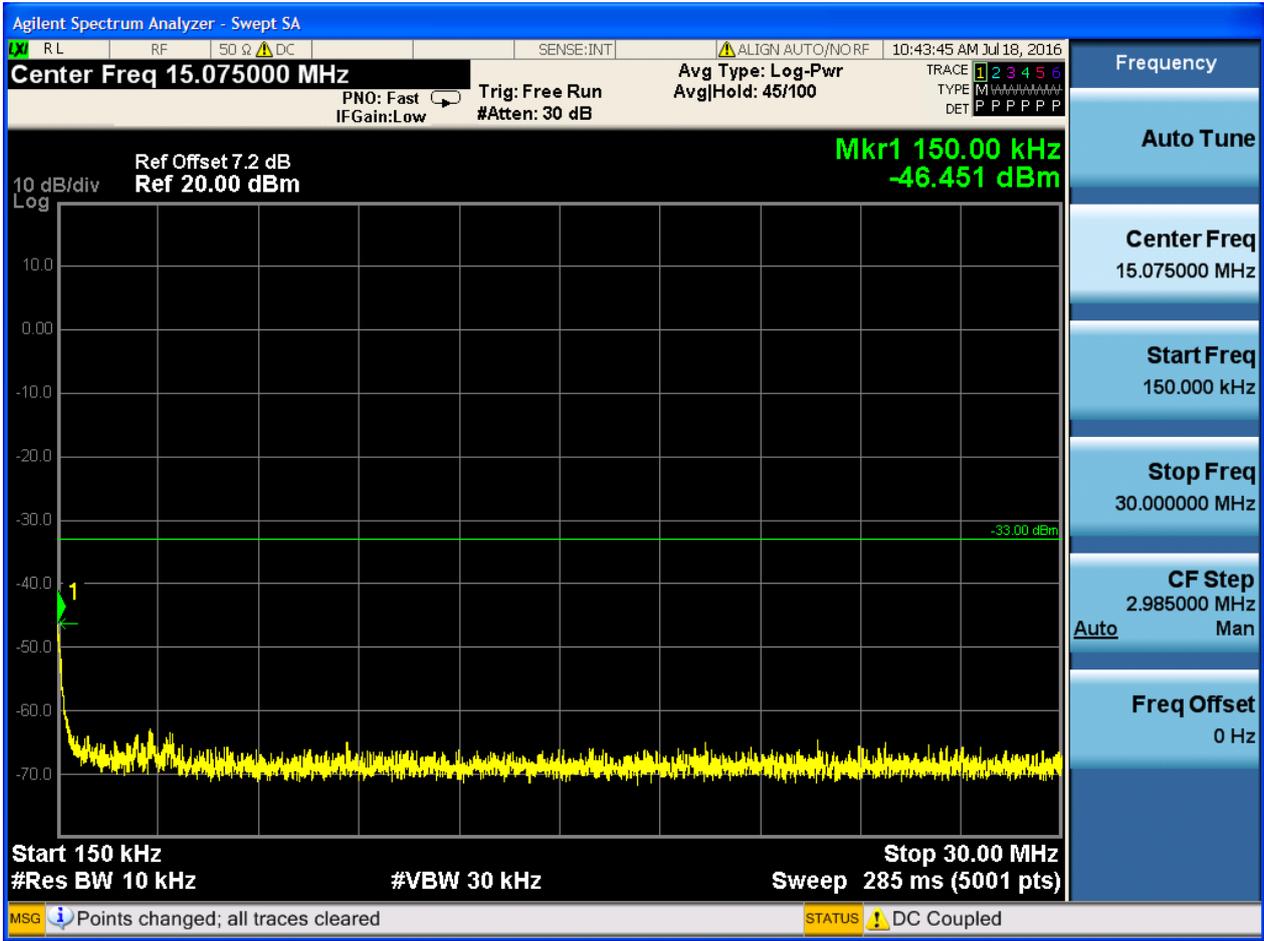


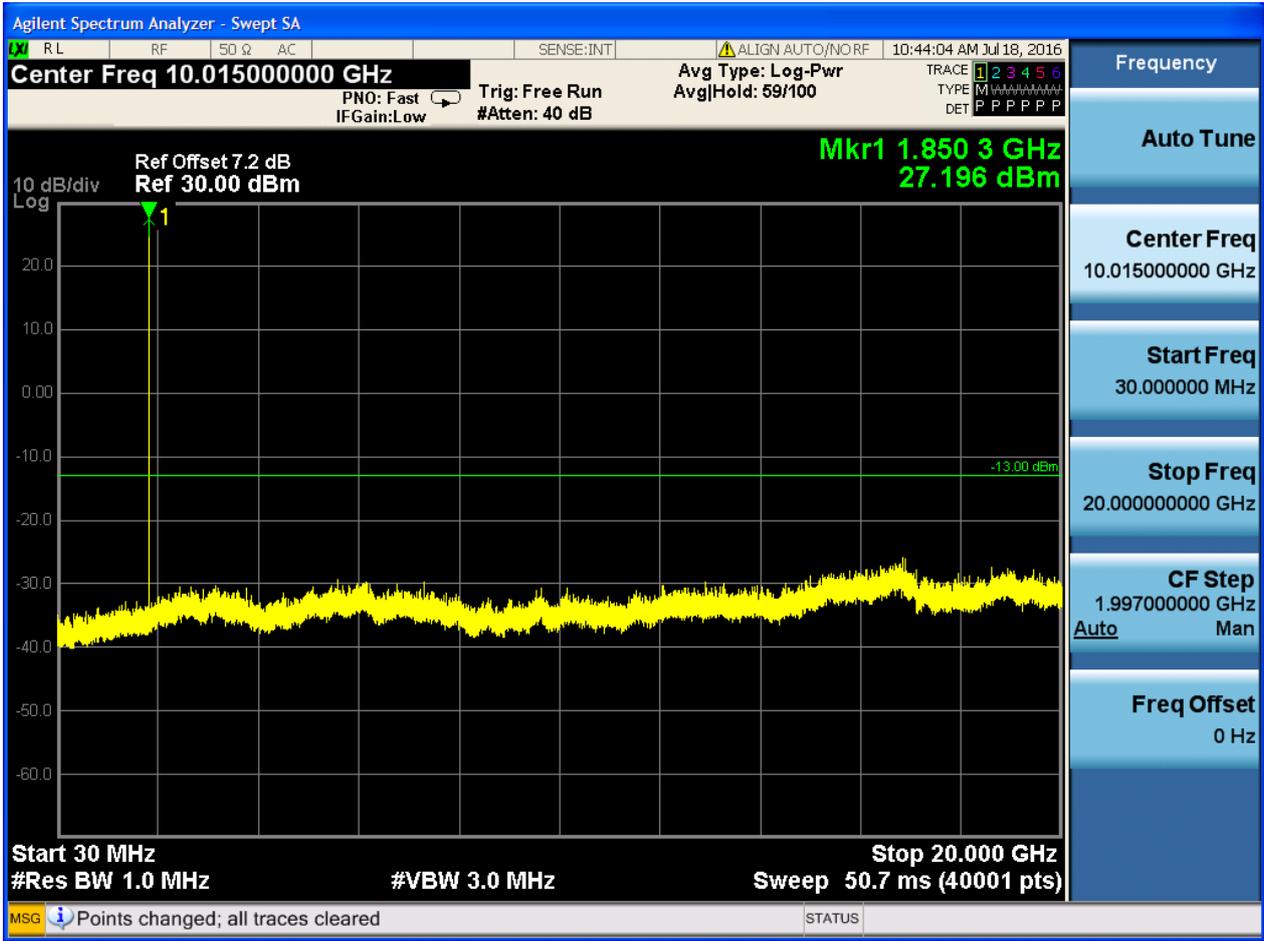


6.1.2.2 Test Mode = GSM/TM2

6.1.2.2.1 Test Channel = LCH

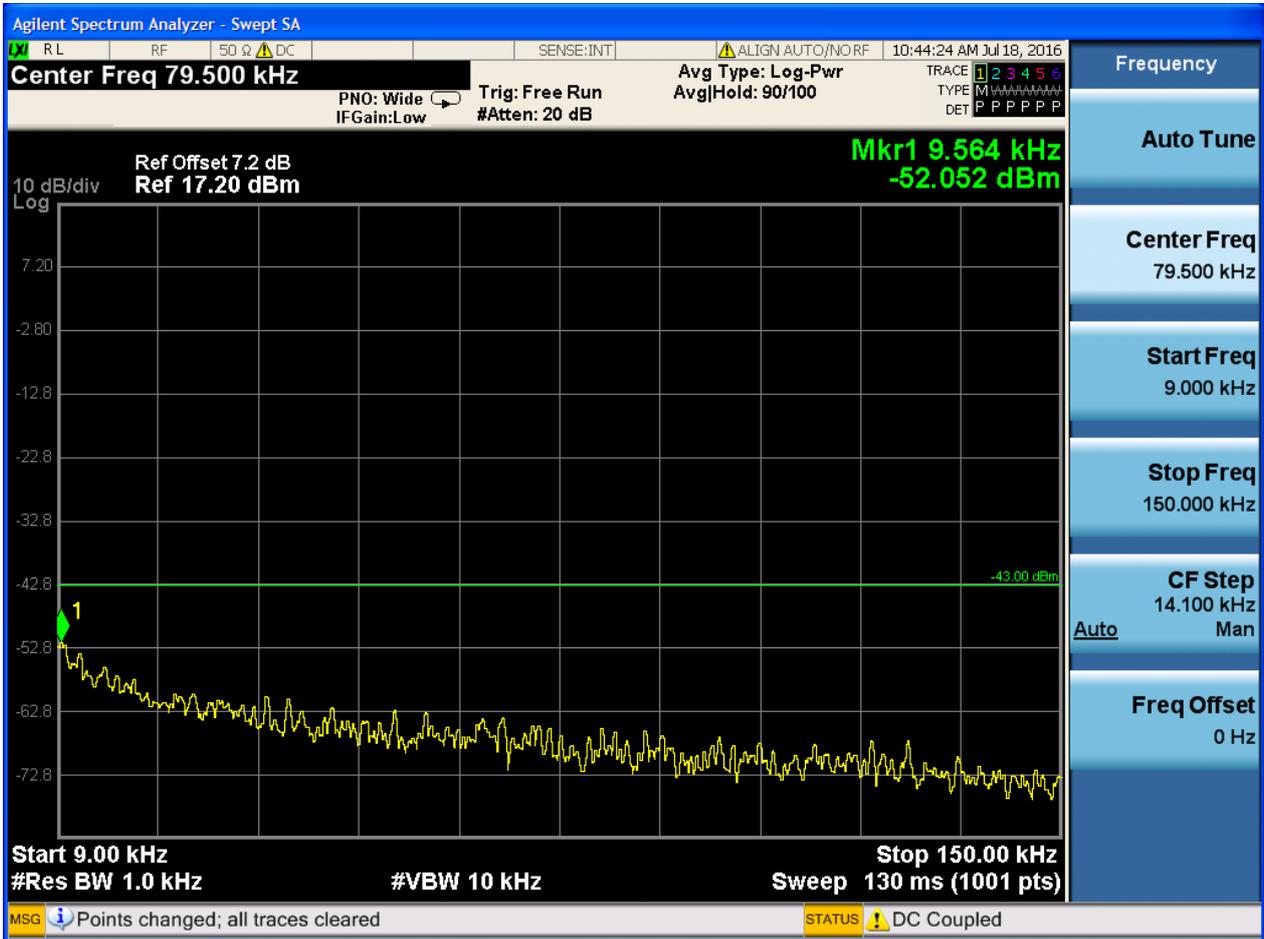


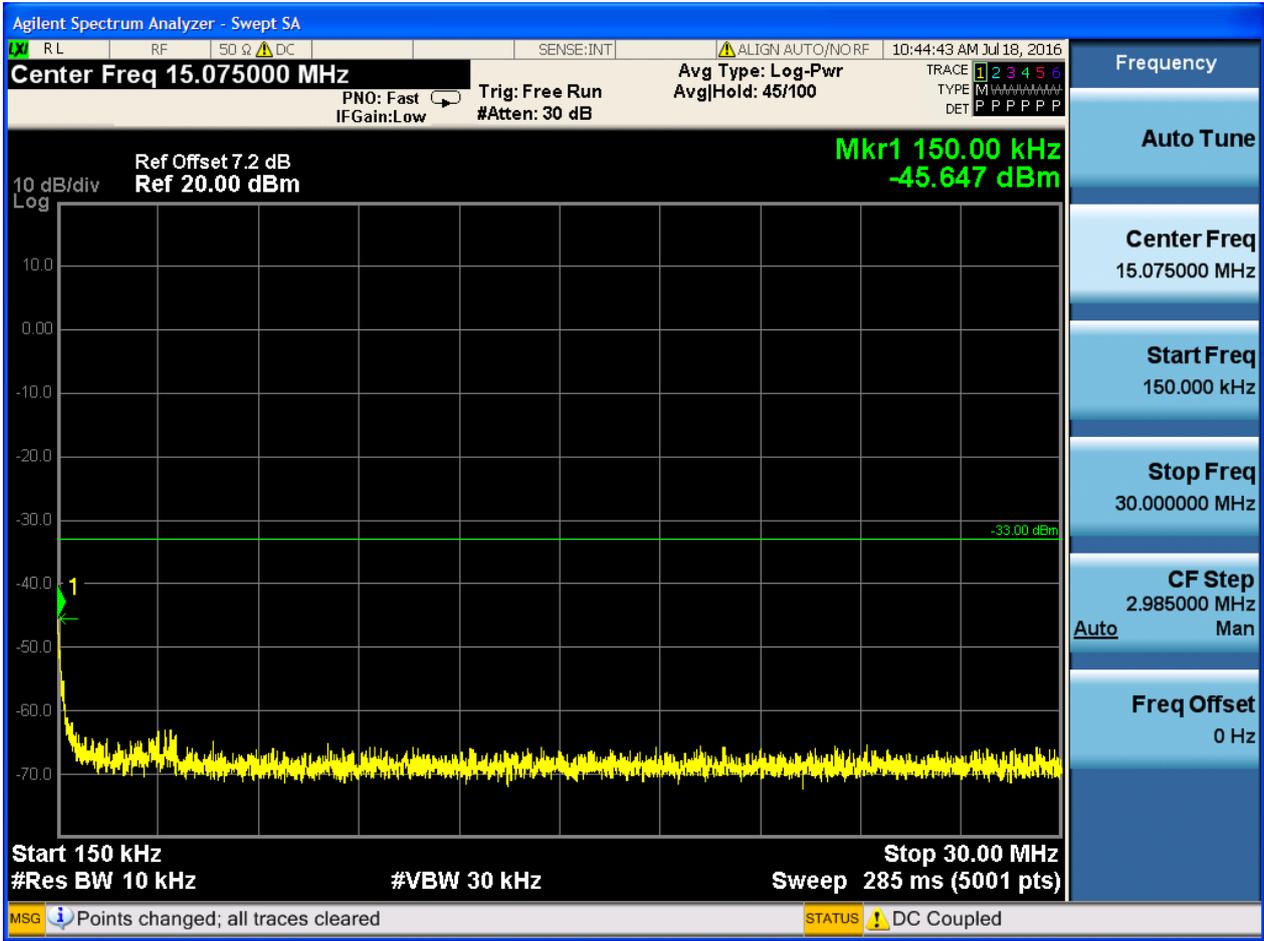


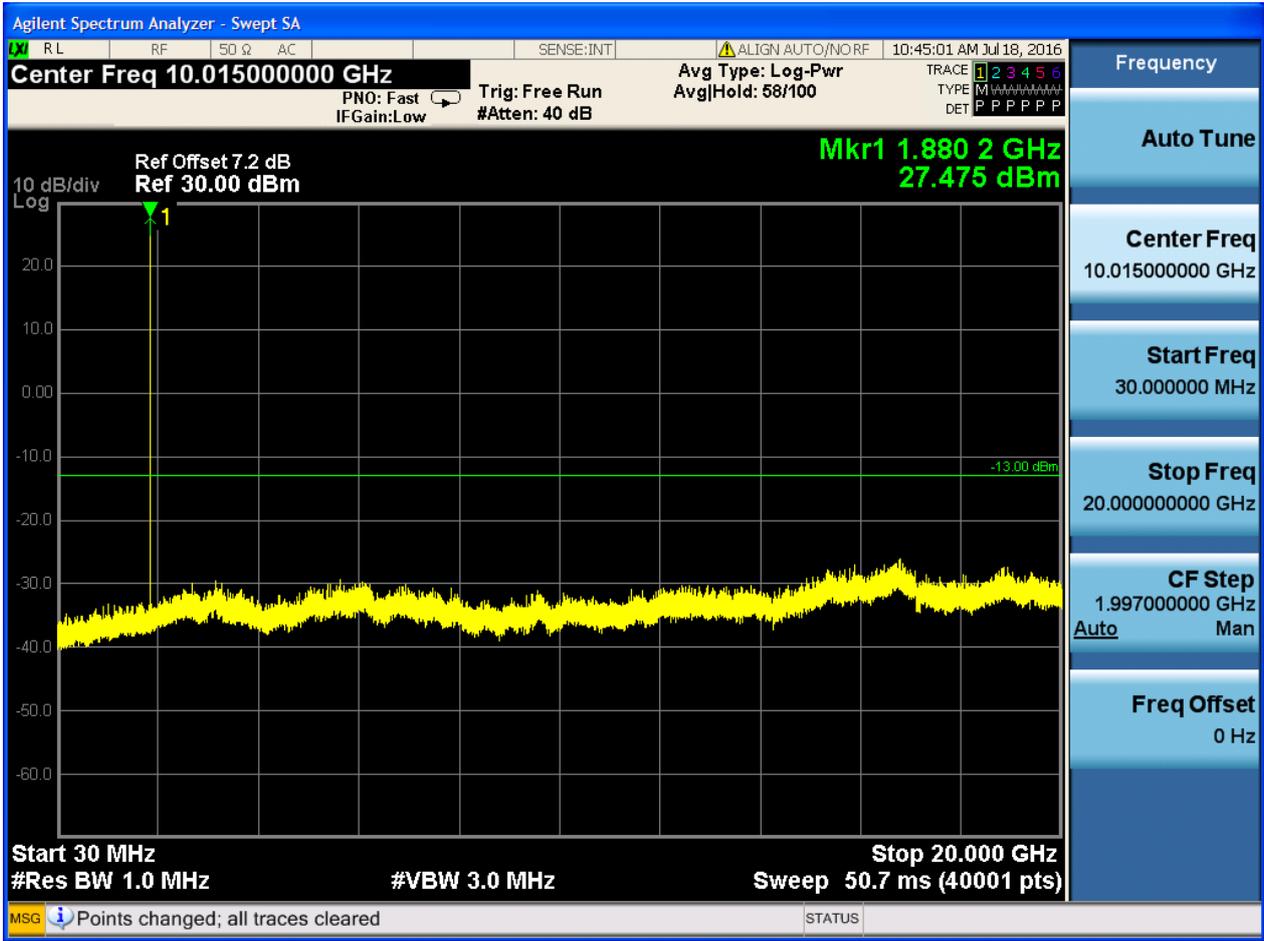




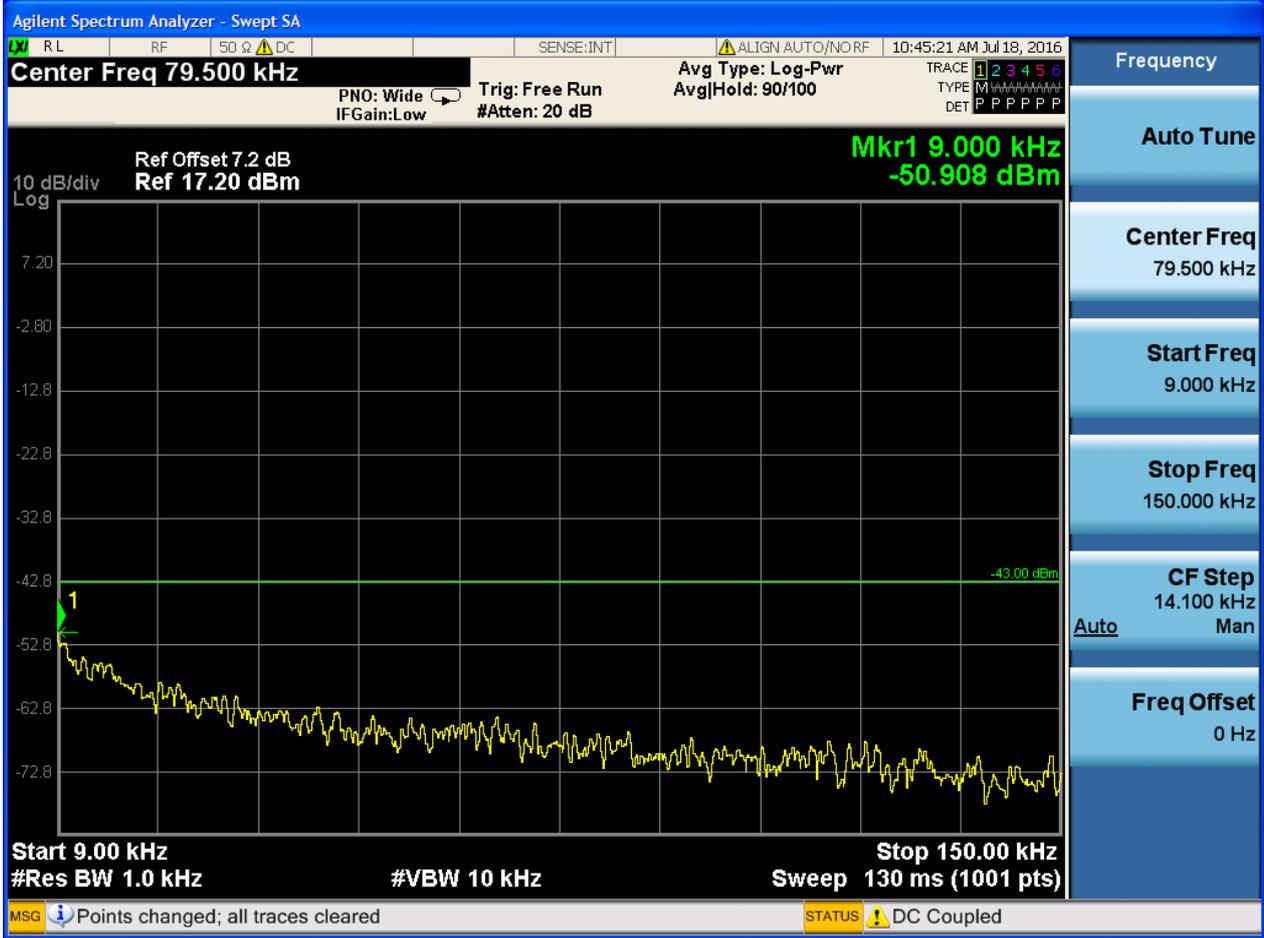
6.1.2.2.2 Test Channel = MCH

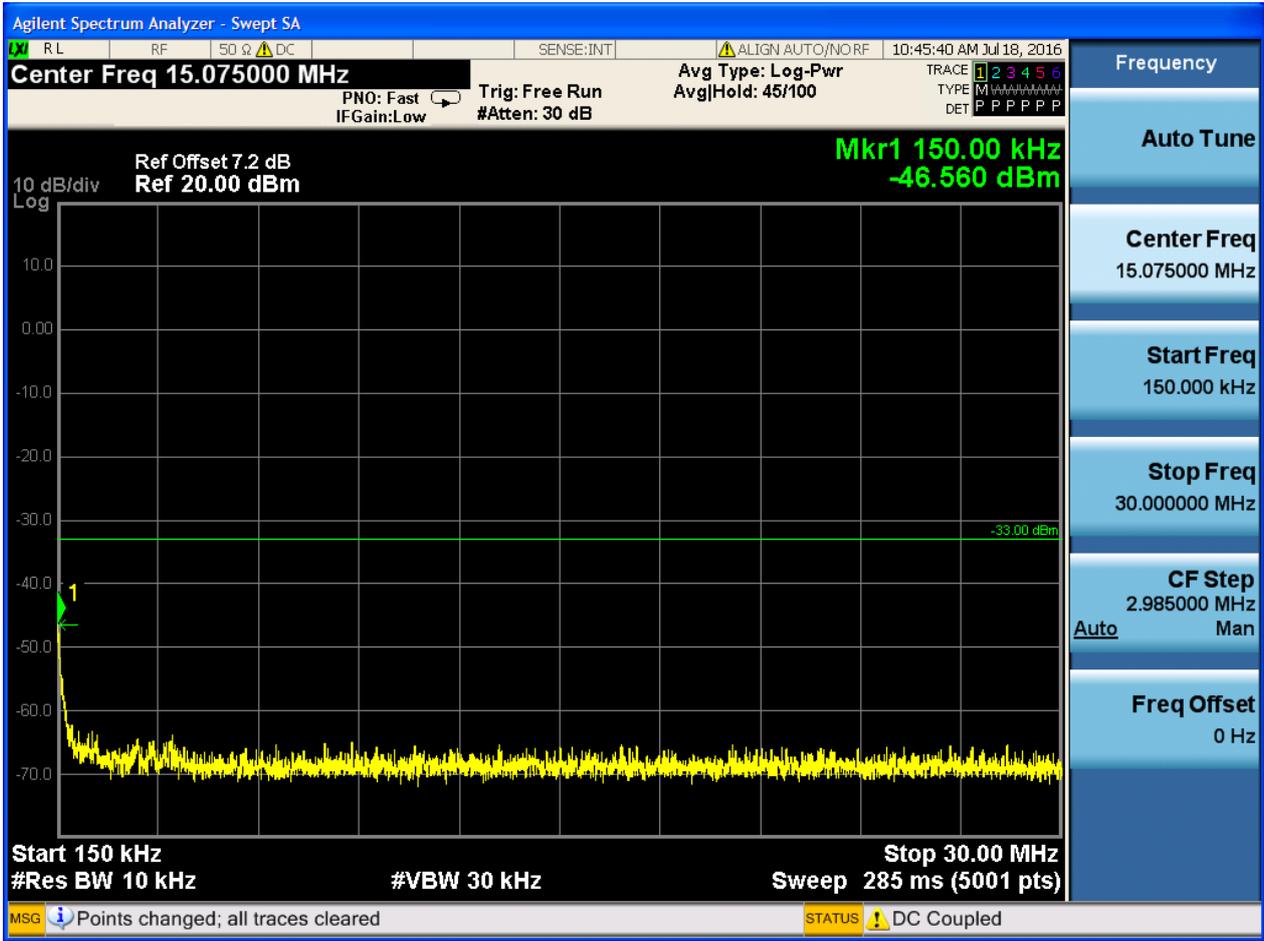


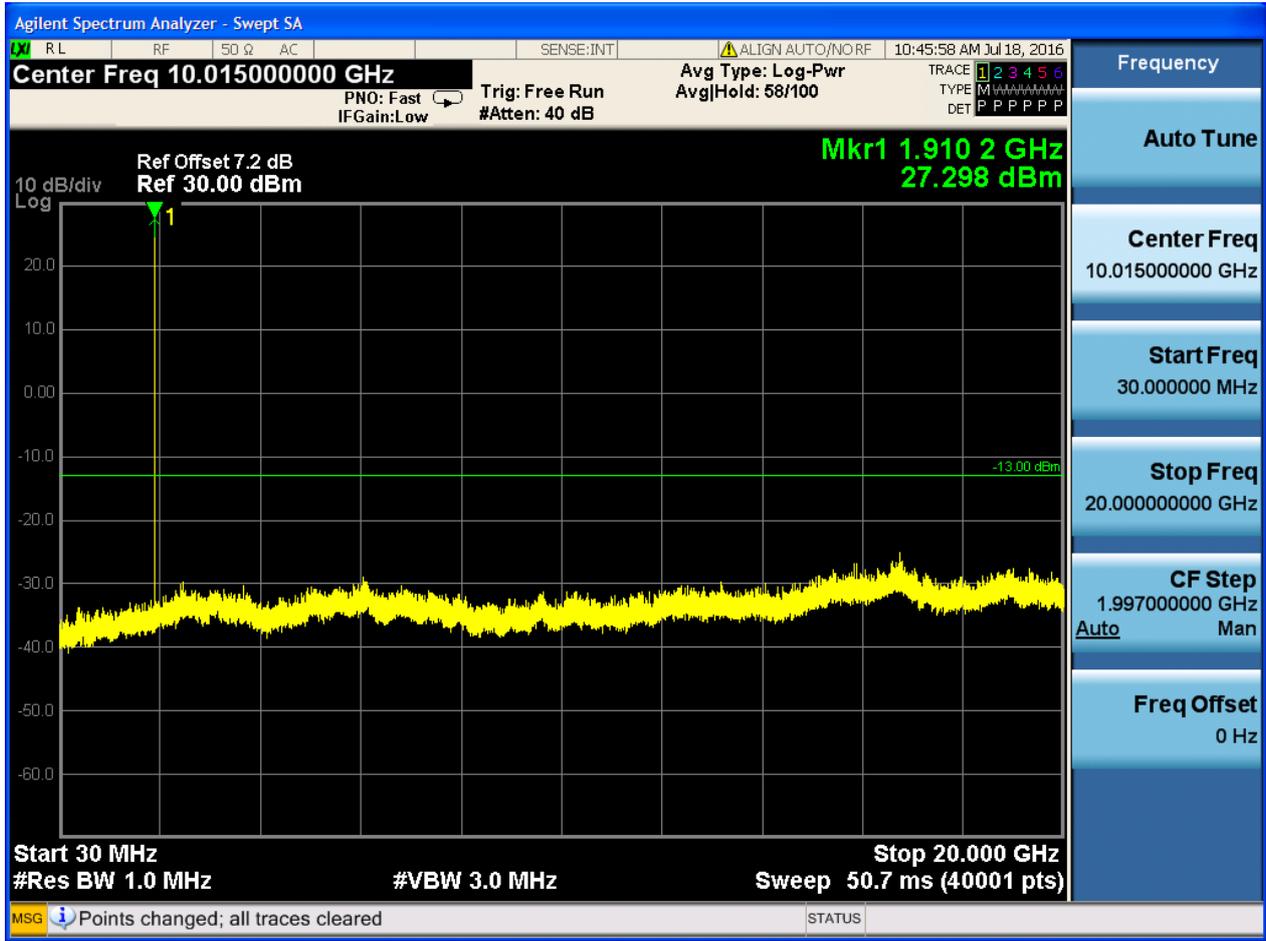




6.1.2.2.3 Test Channel = HCH







7Appendix_G: Field Strength of Spurious Radiation

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

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

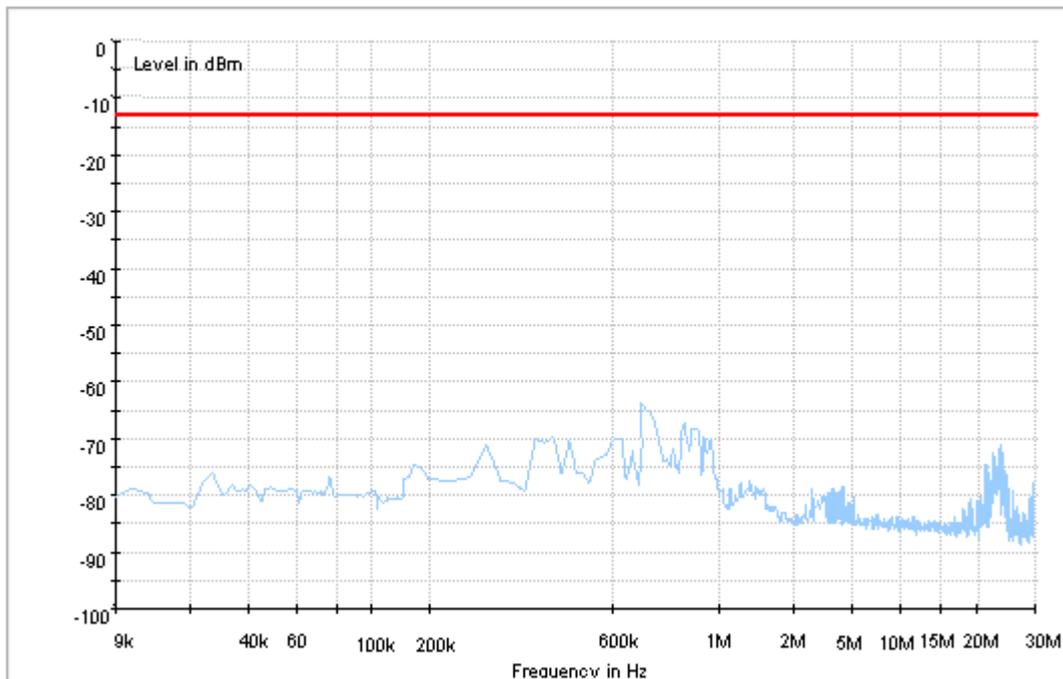
Above 1GHz, RBW = 1 MHz, VBW = 3 MHz. Detector: PK

Part I - Test Plots

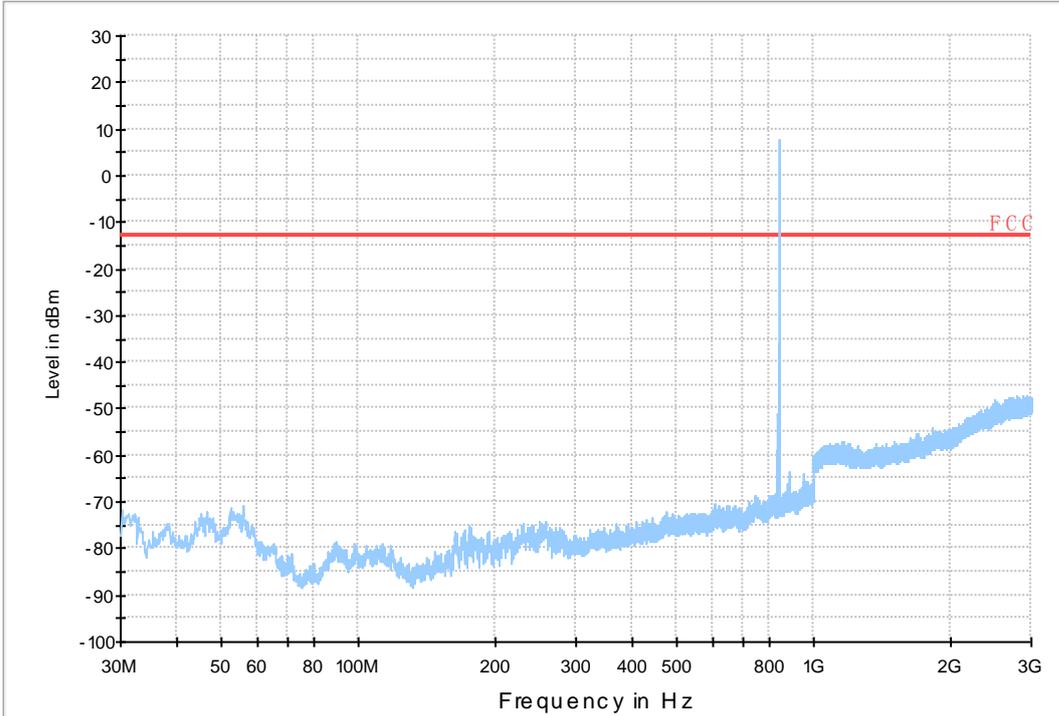
7.1 For GSM

7.1.1 Test Band = GSM850_Ant1

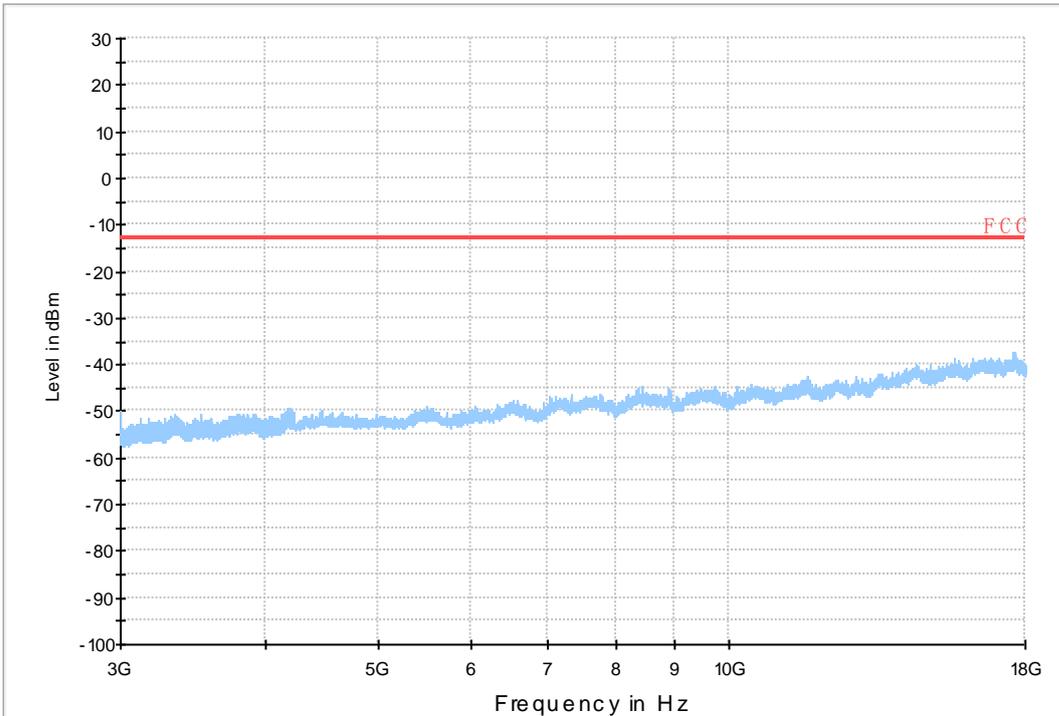
7.1.1.1 Test Mode = GSM/TM1



Copy of FCC PART22 GSM850_L

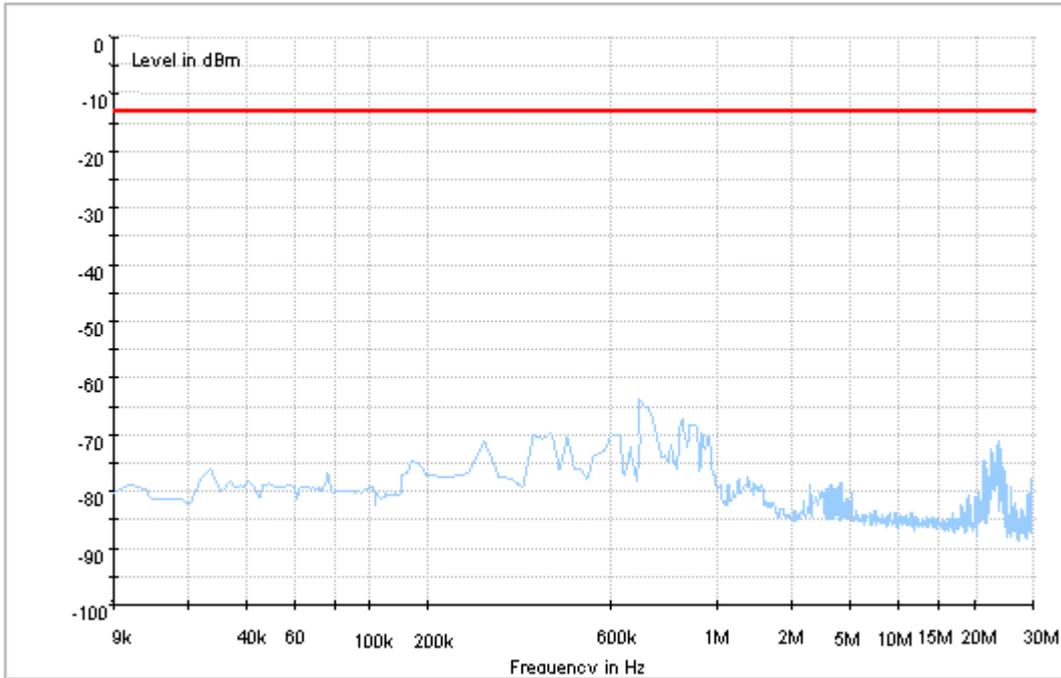


Copy of FCC PART22 GSM850_H

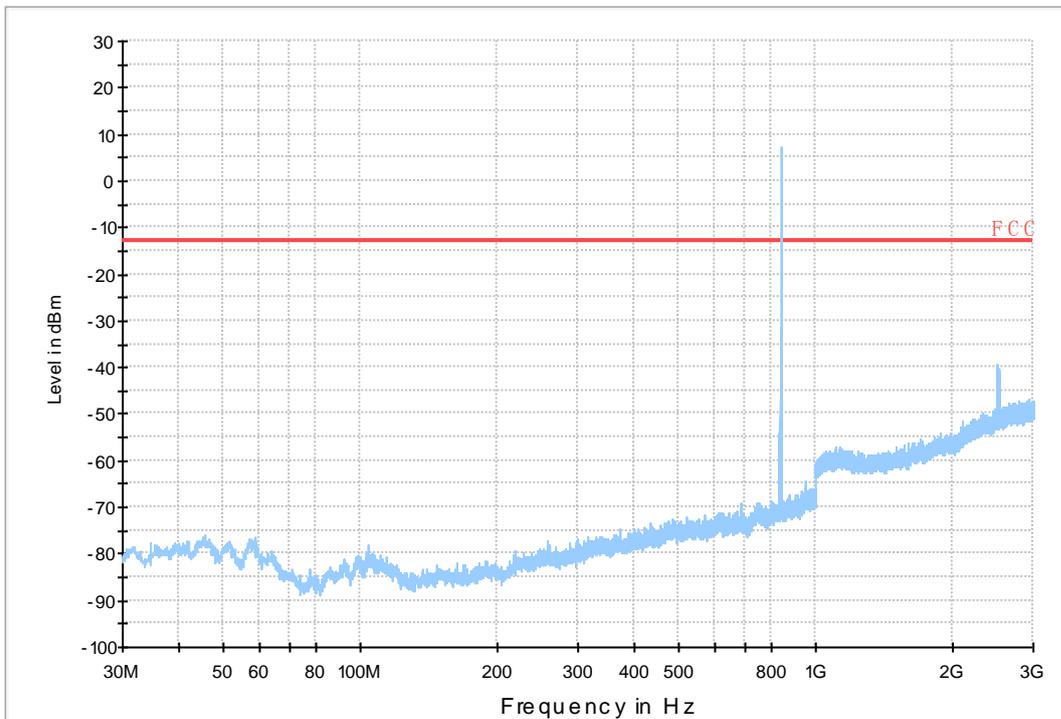


7.1.2 Test Band = GSM850_Ant2

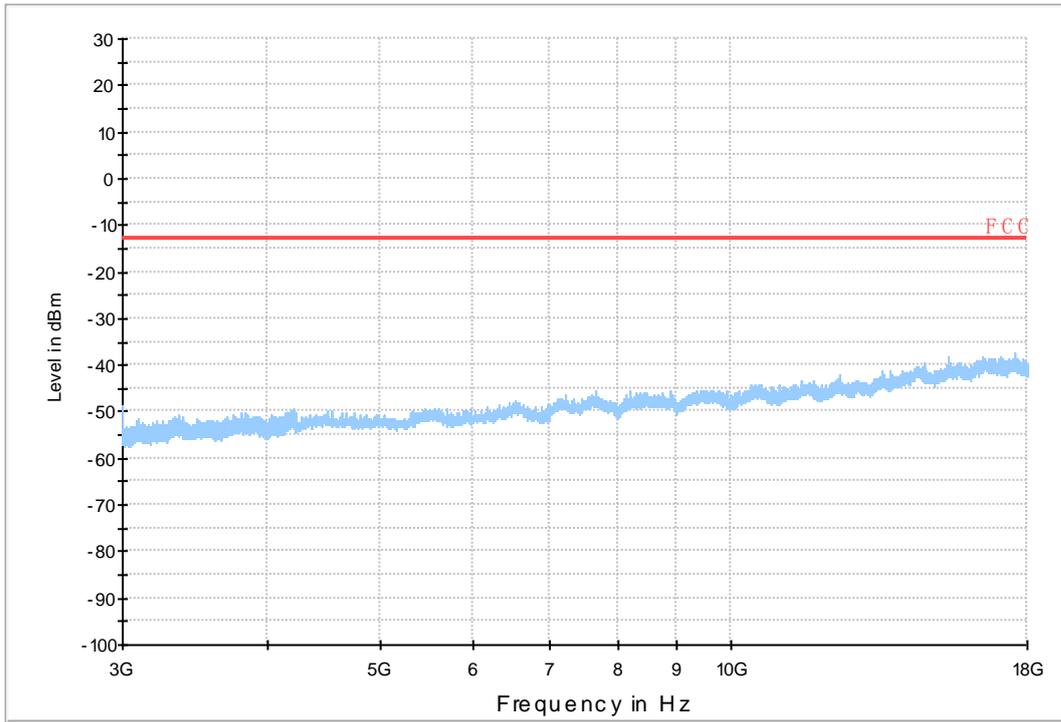
7.1.2.1 Test Mode = GSM/TM1



Copy of FCC PART22 GSM850_L

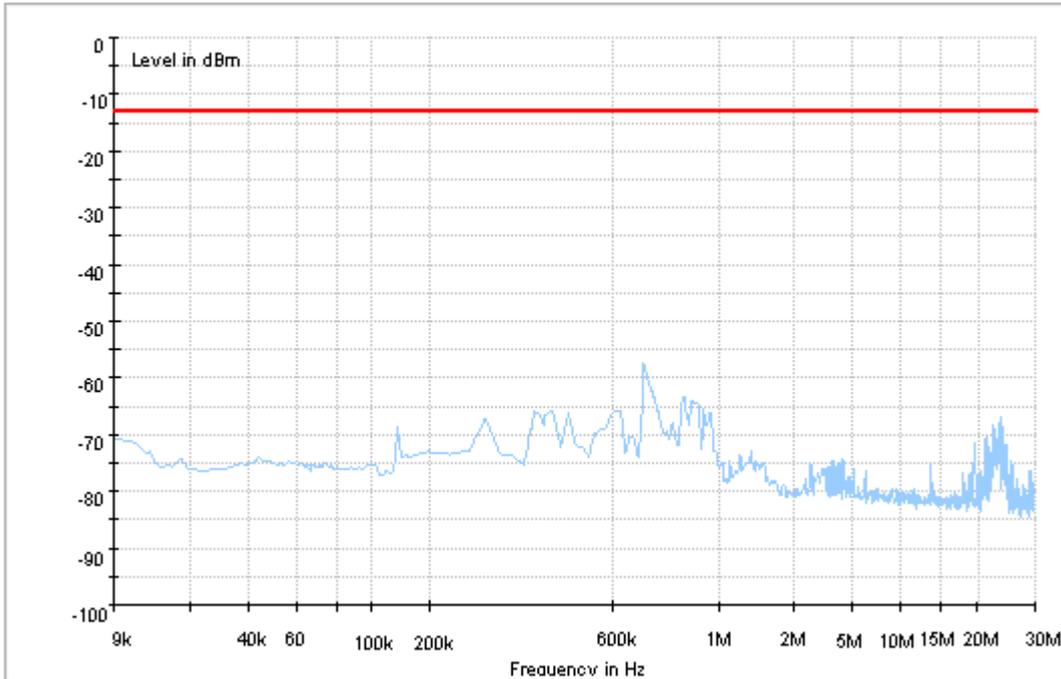


Copy of FCC PART22 GSM 850_H

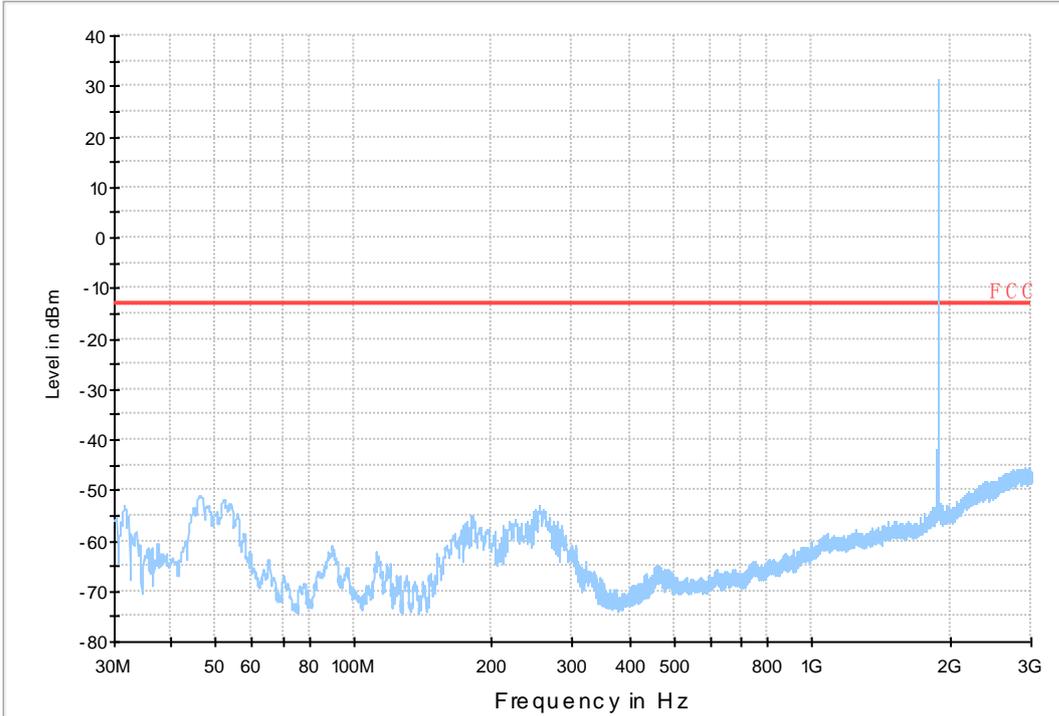


7.1.3 Test Band = GSM1900_Ant1

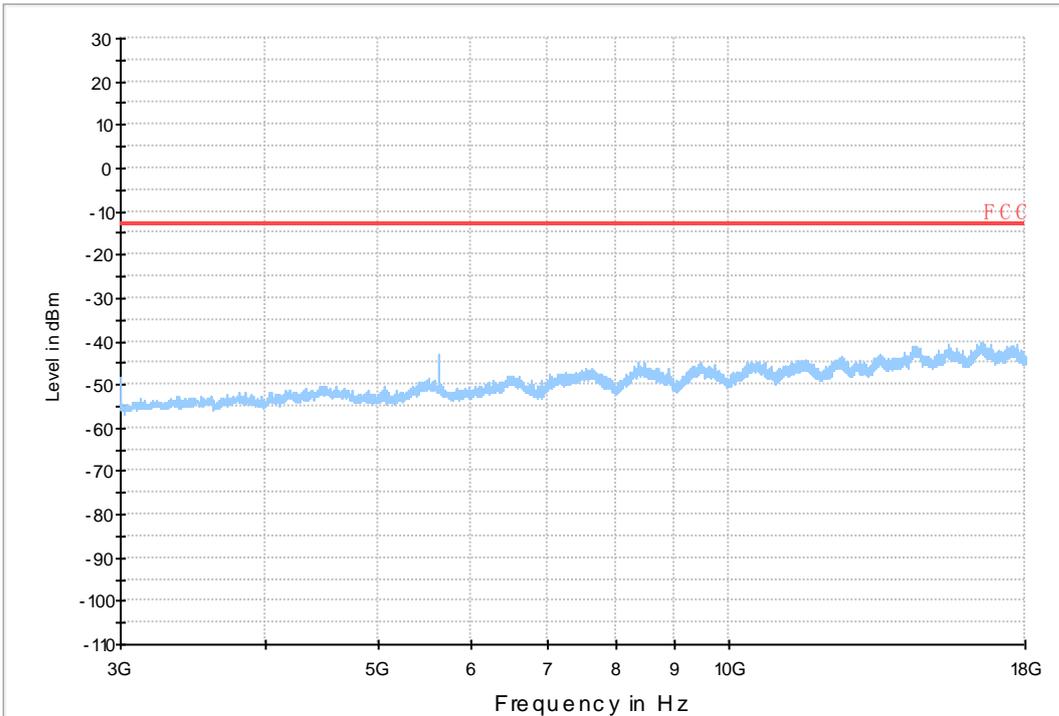
7.1.3.1 Test Mode = GSM/TM1

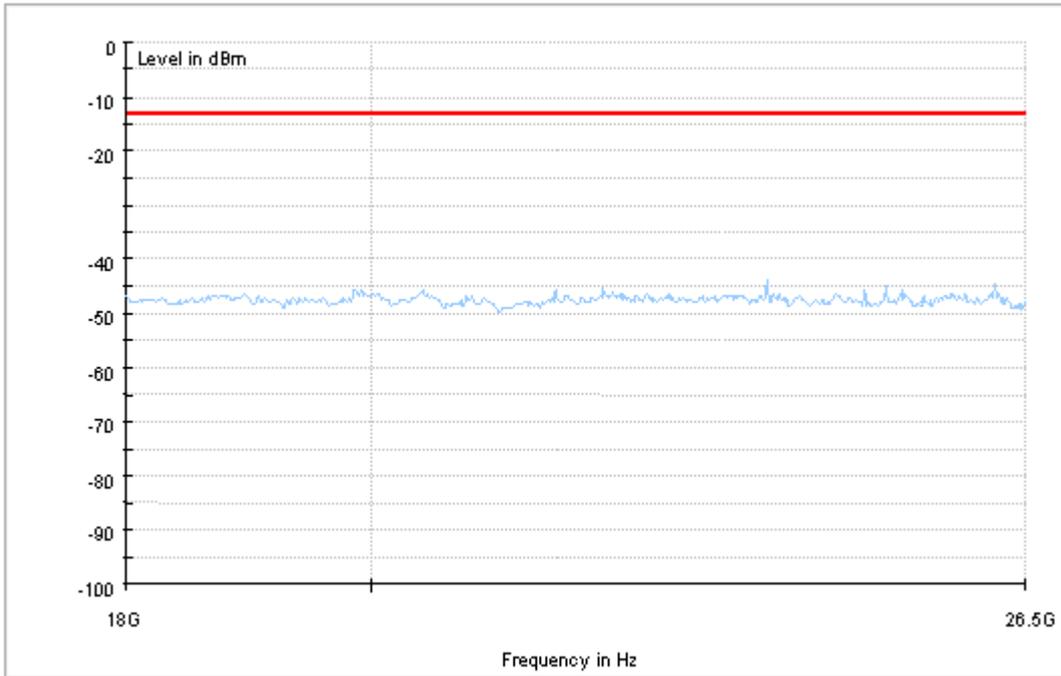


Copy of FCC PART24 GSM 1900_L



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	20.99	0.02547	PASS
				VN	10.46	0.01269	PASS
				VH	7.17	0.0087	PASS
		MCH	TN	VL	12.33	0.01474	PASS
				VN	3.75	0.00448	PASS
				VH	5.36	0.00641	PASS
		HCH	TN	VL	10.07	0.01186	PASS
				VN	10.98	0.01294	PASS
				VH	7.55	0.00889	PASS
	GSM/TM2	LCH	TN	VL	12.59	0.01528	PASS
				VN	11.62	0.0141	PASS
				VH	13.92	0.01689	PASS
		MCH	TN	VL	12.01	0.01436	PASS
				VN	7.30	0.00873	PASS
				VH	6.84	0.00818	PASS
		HCH	TN	VL	10.07	0.01186	PASS
				VN	12.01	0.01415	PASS
				VH	12.07	0.01422	PASS
GSM1900	GSM/TM1	LCH	TN	VL	0.13	0.00007	PASS
				VN	1.61	0.00087	PASS
				VH	-3.03	-0.00164	PASS
		MCH	TN	VL	-1.61	-0.00086	PASS
				VN	0.39	0.00021	PASS
				VH	1.10	0.00059	PASS
		HCH	TN	VL	2.78	0.00146	PASS
				VN	-3.75	-0.00196	PASS
				VH	3.16	0.00165	PASS
	GSM/TM2	LCH	TN	VL	5.52	0.00298	PASS
				VN	4.84	0.00262	PASS
				VH	4.94	0.00267	PASS
		MCH	TN	VL	-2.00	-0.00106	PASS



Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				VN	6.26	0.00333	PASS
				VH	4.07	0.00216	PASS
		HCH	TN	VL	4.04	0.00212	PASS
				VN	11.36	0.00595	PASS
				VH	6.46	0.00338	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	5.29	0.00642	PASS
				-20	6.65	0.00807	PASS
				-10	5.36	0.0065	PASS
				0	2.78	0.00337	PASS
				10	6.59	0.008	PASS
				20	12.79	0.01552	PASS
				30	5.04	0.00612	PASS
				40	10.01	0.01215	PASS
				50	10.98	0.01332	PASS
		MCH	VN	-30	9.94	0.01188	PASS
				-20	7.04	0.00842	PASS
				-10	6.39	0.00764	PASS
				0	1.16	0.00139	PASS
				10	9.81	0.01173	PASS
				20	3.81	0.00455	PASS
				30	6.78	0.0081	PASS
				40	7.49	0.00895	PASS
				50	10.20	0.01219	PASS
		HCH	VN	-30	13.04	0.01536	PASS
				-20	10.85	0.01278	PASS
				-10	7.68	0.00905	PASS
				0	2.32	0.00273	PASS
				10	7.23	0.00852	PASS
				20	6.59	0.00776	PASS
				30	12.01	0.01415	PASS
				40	6.07	0.00715	PASS
				50	5.81	0.00684	PASS
	GSM/TM2	LCH	VN	-30	13.92	0.01689	PASS
				-20	14.37	0.01744	PASS
				-10	11.75	0.01426	PASS



Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict						
				0	13.75	0.01668	PASS						
				10	11.07	0.01343	PASS						
				20	10.46	0.01269	PASS						
				30	13.79	0.01673	PASS						
				40	9.91	0.01202	PASS						
				50	12.24	0.01485	PASS						
		MCH	VN			-30	9.56	0.01143	PASS				
						-20	10.04	0.012	PASS				
						-10	10.07	0.01204	PASS				
						0	9.59	0.01146	PASS				
						10	9.78	0.01169	PASS				
						20	10.07	0.01204	PASS				
						30	10.75	0.01285	PASS				
						40	13.95	0.01667	PASS				
						50	12.53	0.01498	PASS				
		HCH	VN			-30	11.40	0.01343	PASS				
						-20	13.40	0.01579	PASS				
						-10	12.37	0.01457	PASS				
						0	12.20	0.01437	PASS				
						10	10.91	0.01285	PASS				
						20	9.49	0.01118	PASS				
						30	9.04	0.01065	PASS				
						40	10.30	0.01213	PASS				
		GSM1900	GSM/TM1	LCH	VN								
										-30	1.16	0.00063	PASS
										-20	2.78	0.0015	PASS
										-10	-3.10	-0.00168	PASS
0	0.00									0	PASS		
10	-3.75									-0.00203	PASS		
20	-2.65									-0.00143	PASS		
30	-3.94									-0.00213	PASS		
40	2.32									0.00125	PASS		
50	-4.33			-0.00234	PASS								
MCH	VN												
										-30	-5.55	-0.00295	PASS
										-20	-9.56	-0.00509	PASS
										-10	-11.36	-0.00604	PASS
										0	-4.71	-0.00251	PASS
										10	-3.03	-0.00161	PASS
										20	-7.62	-0.00405	PASS
										30	-4.39	-0.00234	PASS



Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				40	-3.29	-0.00175	PASS
				50	-3.23	-0.00172	PASS
		HCH	VN	-30	4.13	0.00216	PASS
				-20	2.84	0.00149	PASS
				-10	5.62	0.00294	PASS
				0	1.10	0.00058	PASS
				10	5.55	0.00291	PASS
				20	2.07	0.00108	PASS
				30	4.26	0.00223	PASS
				40	1.55	0.00081	PASS
				50	6.33	0.00331	PASS
				GSM/TM2	LCH	VN	-30
	-20	6.49	0.00351				PASS
	-10	9.81	0.0053				PASS
	0	11.11	0.006				PASS
	10	8.01	0.00433				PASS
	20	4.52	0.00244				PASS
	30	1.74	0.00094				PASS
	40	3.94	0.00213				PASS
	50	-0.68	-0.00037				PASS
	MCH	VN	-30				5.00
			-20		2.94	0.00156	PASS
			-10		3.13	0.00166	PASS
			0		5.88	0.00313	PASS
			10		-0.36	-0.00019	PASS
			20		9.20	0.00489	PASS
			30		1.68	0.00089	PASS
			40		-0.52	-0.00028	PASS
			50		-0.42	-0.00022	PASS
			HCH		VN	-30	-0.10
	-20	9.69				0.00507	PASS
	-10	10.23		0.00536		PASS	
0	5.00	0.00262		PASS			
10	8.88	0.00465		PASS			
20	9.23	0.00483		PASS			
30	-5.42	-0.00284		PASS			
40	7.17	0.00375		PASS			
			50	7.94	0.00416	PASS	

END