



Appendix for test report



1 Appendix_A: Effective (Isotropic) Radiated Power Output Data

Part I - Test Results

Test Band	Test Mode	Test Channel	Measured[dBm]	EIP[dBm]	Limit [dBm]	Verdict
GSM850	GSM/TM1	LCH	33.65	25.52	38.5	PASS
		MCH	33.77	25.59	38.5	PASS
		HCH	33.42	25.97	38.5	PASS
	GSM/TM2	LCH	27.15	21.29	38.5	PASS
		MCH	27.1	21.38	38.5	PASS
		HCH	27.11	21.35	38.5	PASS

Test Band	Test Mode	Test Channel	Measured[dBm]	EIRP[dBm]	Limit [dBm]	Verdict
GSM1900	GSM/TM1	LCH	30.37	30.27	33	PASS
		MCH	30.44	30.34	33	PASS
		HCH	30.82	30.72	33	PASS
	GSM/TM2	LCH	26.14	26.04	33	PASS
		MCH	26.23	26.13	33	PASS
		HCH	26.2	26.1	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	0.17	13	PASS
		MCH	0.21	13	PASS
		HCH	0.21	13	PASS
	GSM/TM2	LCH	3.25	13	PASS
		MCH	3.21	13	PASS
		HCH	3.32	13	PASS

3Appendix_C: Modulation Characteristics

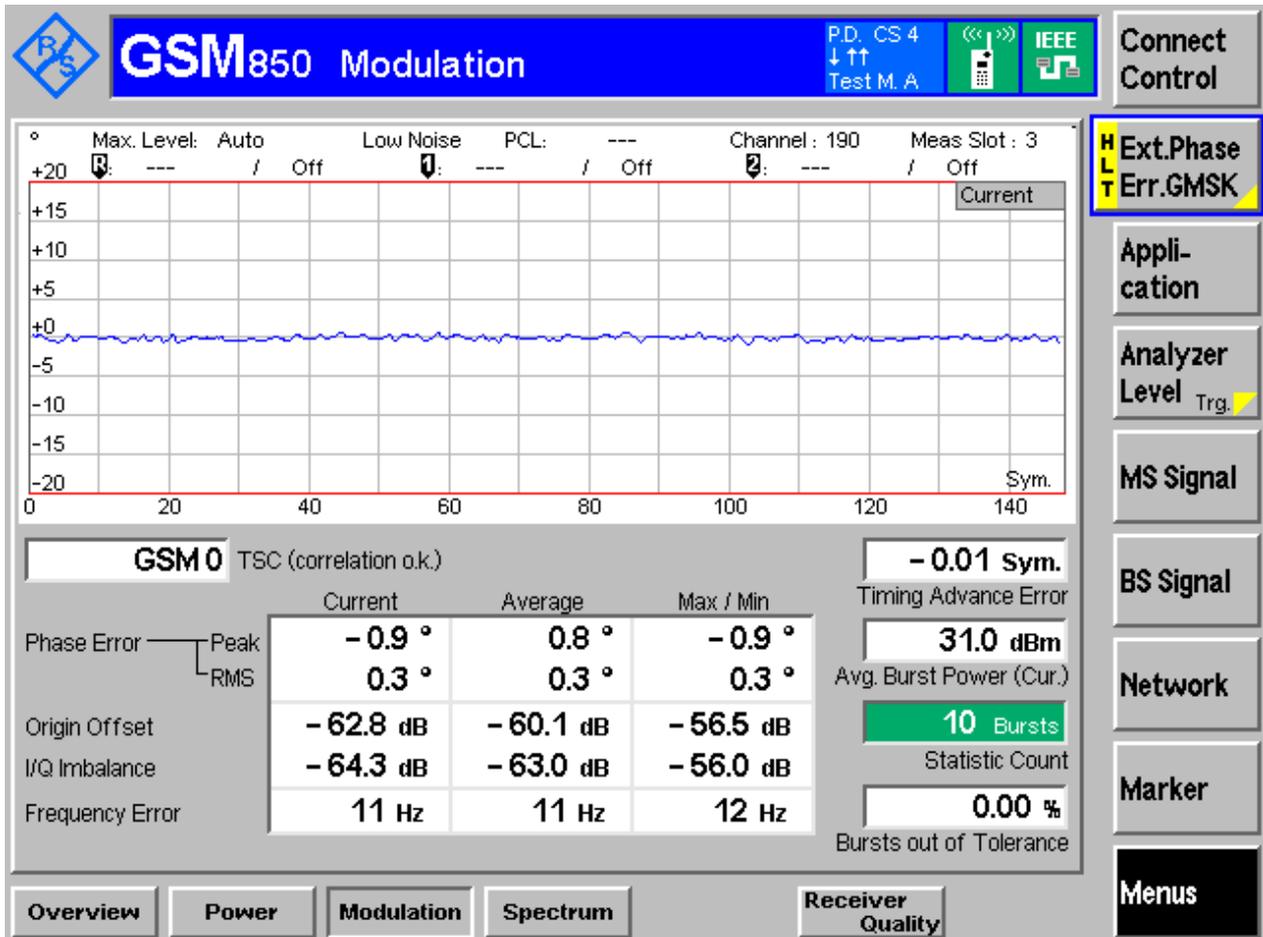
Part I - Test Plots

3.1 For GSM

3.1.1 Test Band = GSM850

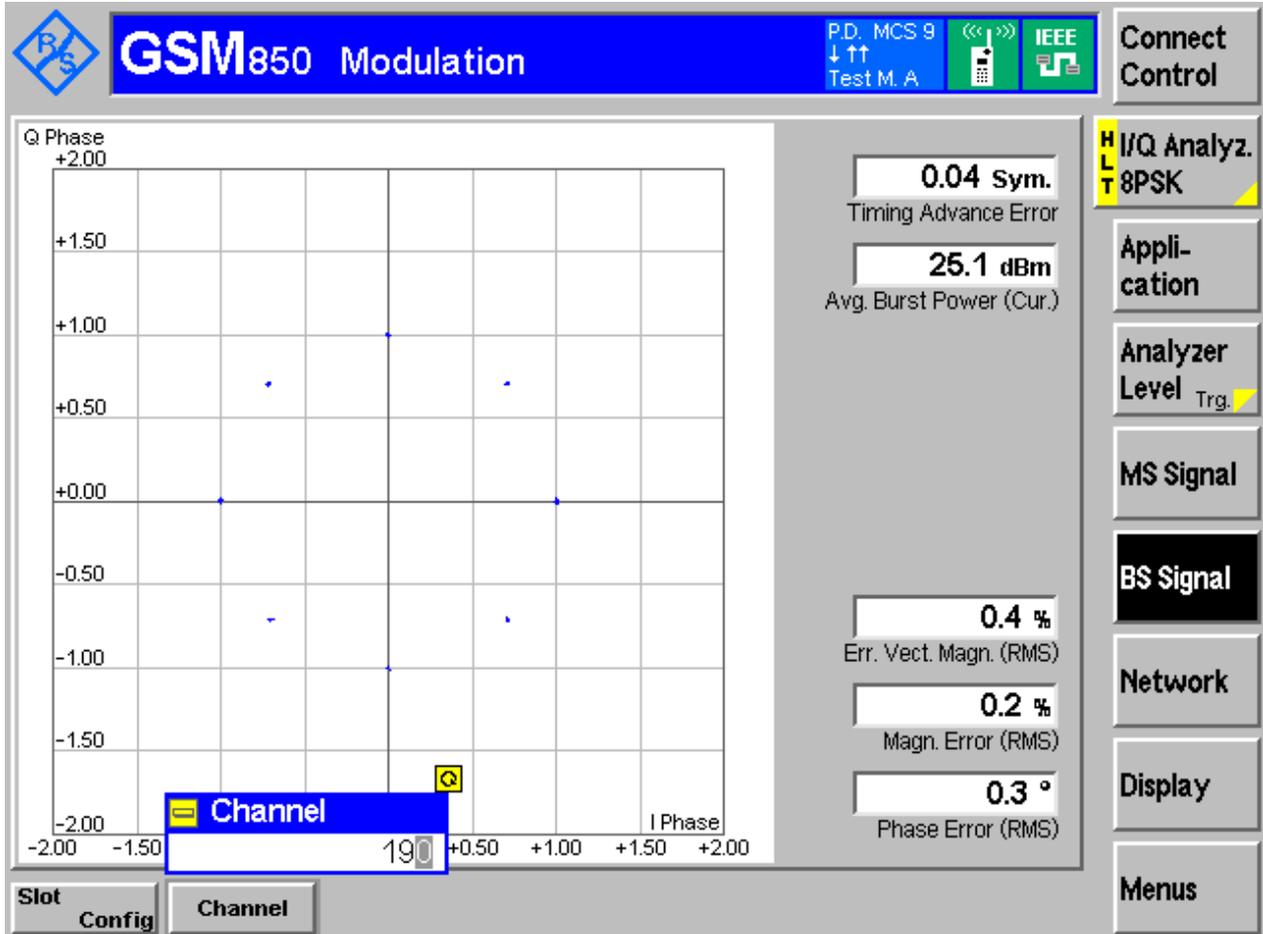
3.1.1.1 Test Mode = GSM/TM1

3.1.1.1.1 Test Channel = MCH



3.1.1.2 Test Mode = GSM/TM2

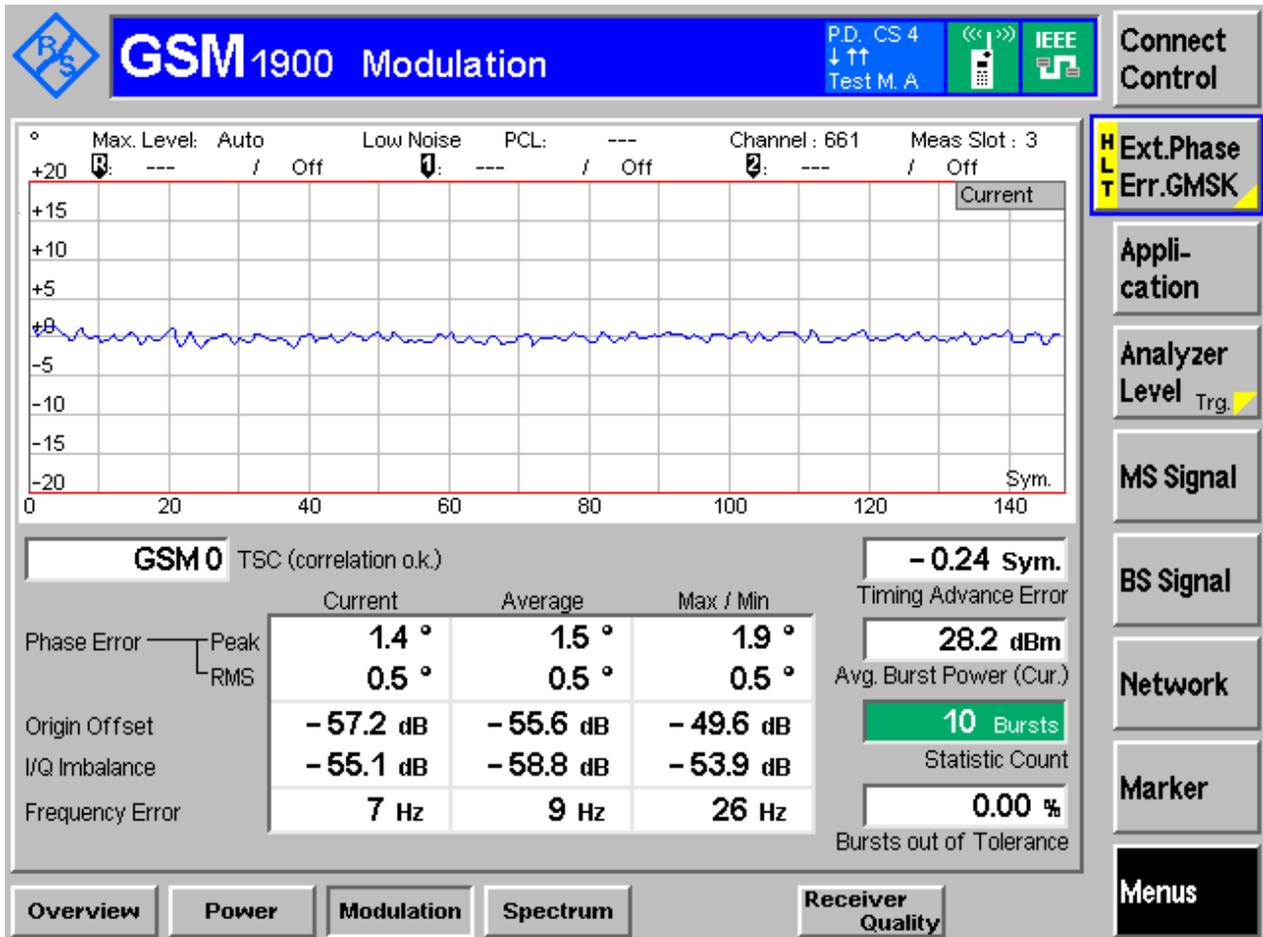
3.1.1.2.1 Test Channel = MCH



3.1.2 Test Band = GSM1900

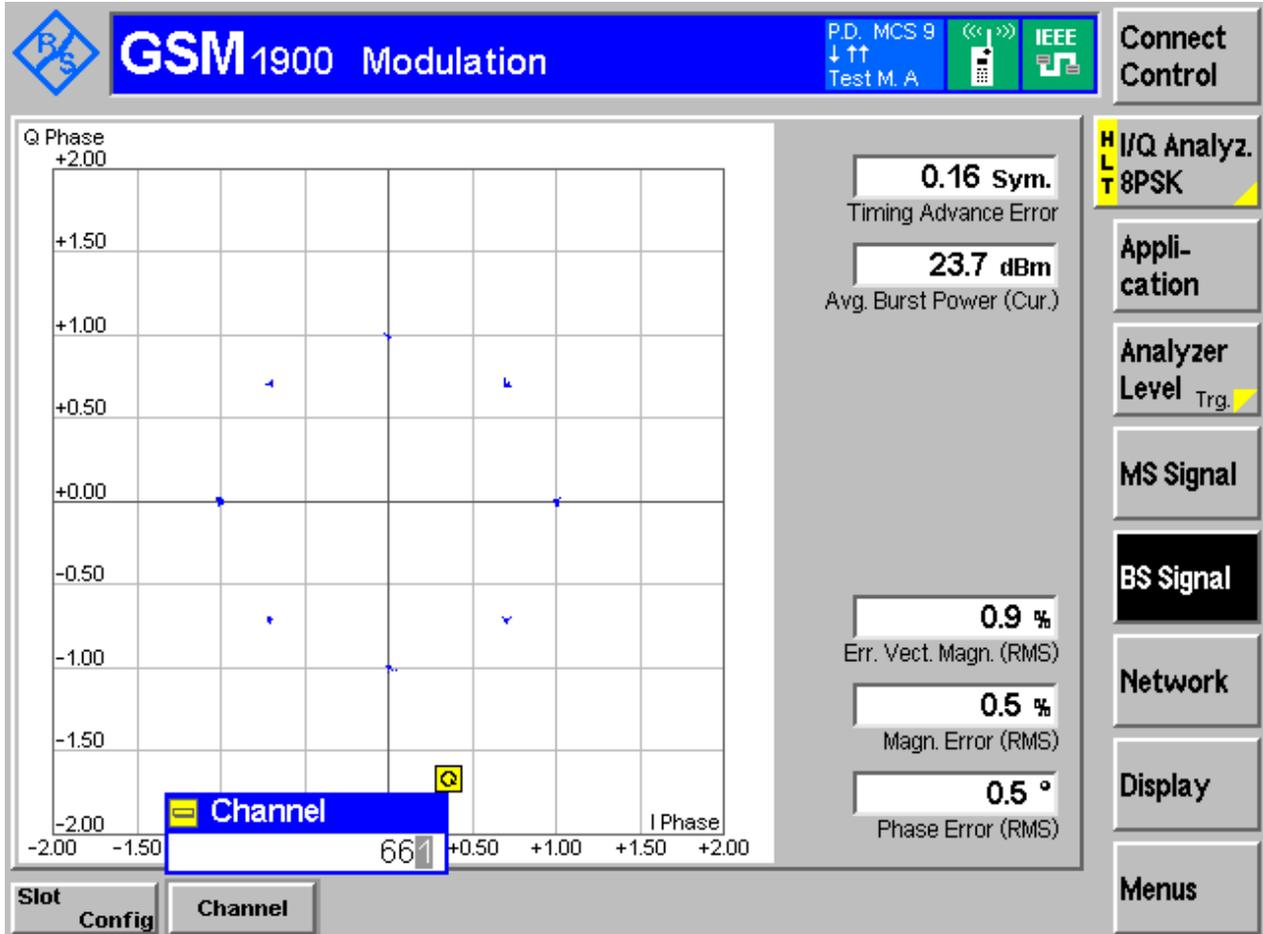
3.1.2.1 Test Mode = GSM/TM1

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	244.20	315.27	Pass
		MCH	243.90	316.32	Pass
		HCH	245.07	320.99	Pass
	GSM/TM2	LCH	244.55	314.31	Pass
		MCH	240.82	310.67	Pass
		HCH	241.43	308.79	Pass
GSM1900	GSM/TM1	LCH	245.24	317.92	Pass
		MCH	243.58	315.77	Pass
		HCH	243.72	313.96	Pass
	GSM/TM2	LCH	248.64	316.23	Pass
		MCH	239.77	310.24	Pass
		HCH	237.69	305.66	Pass

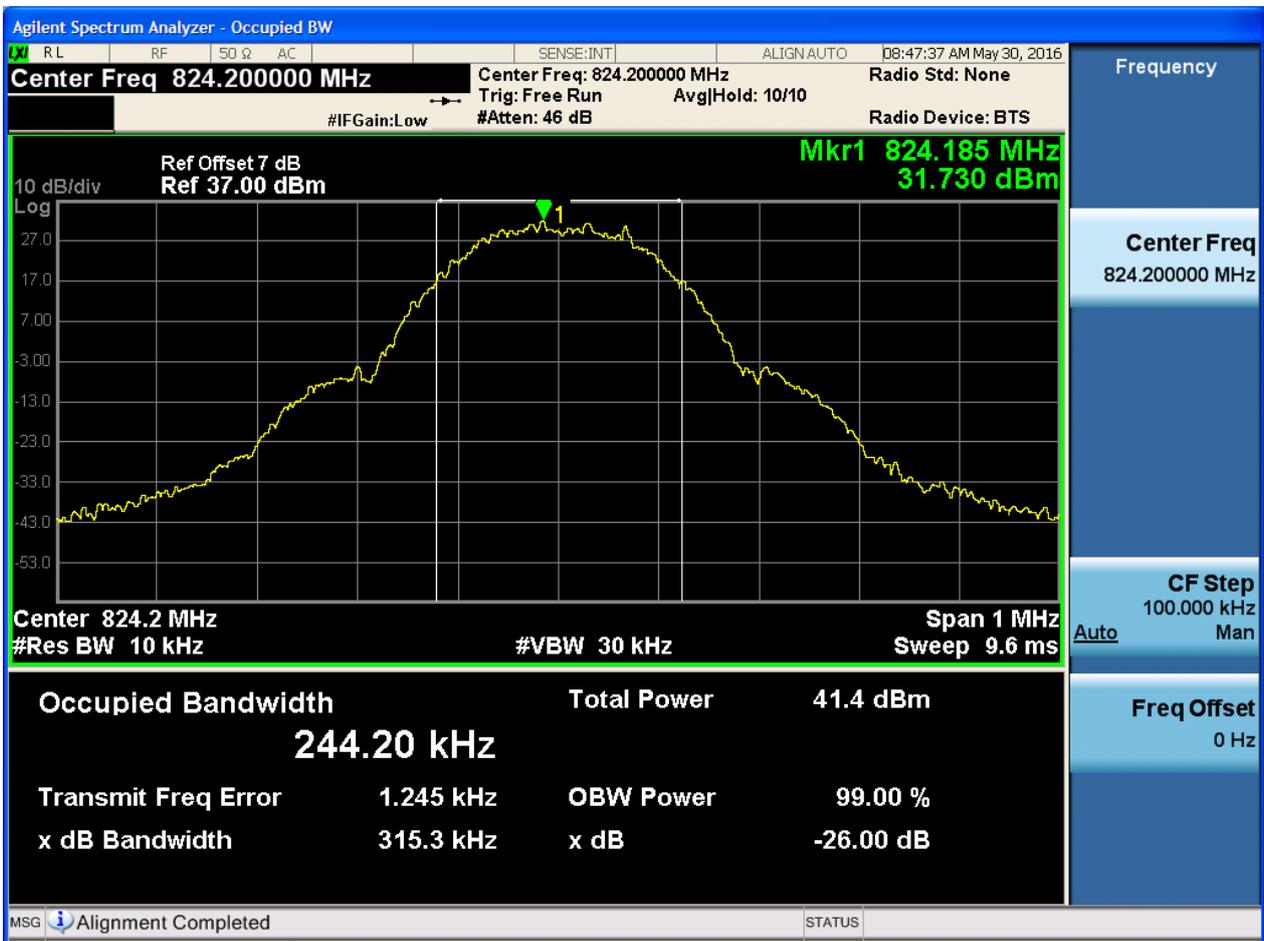
Part II - Test Plots

4.1 For GSM

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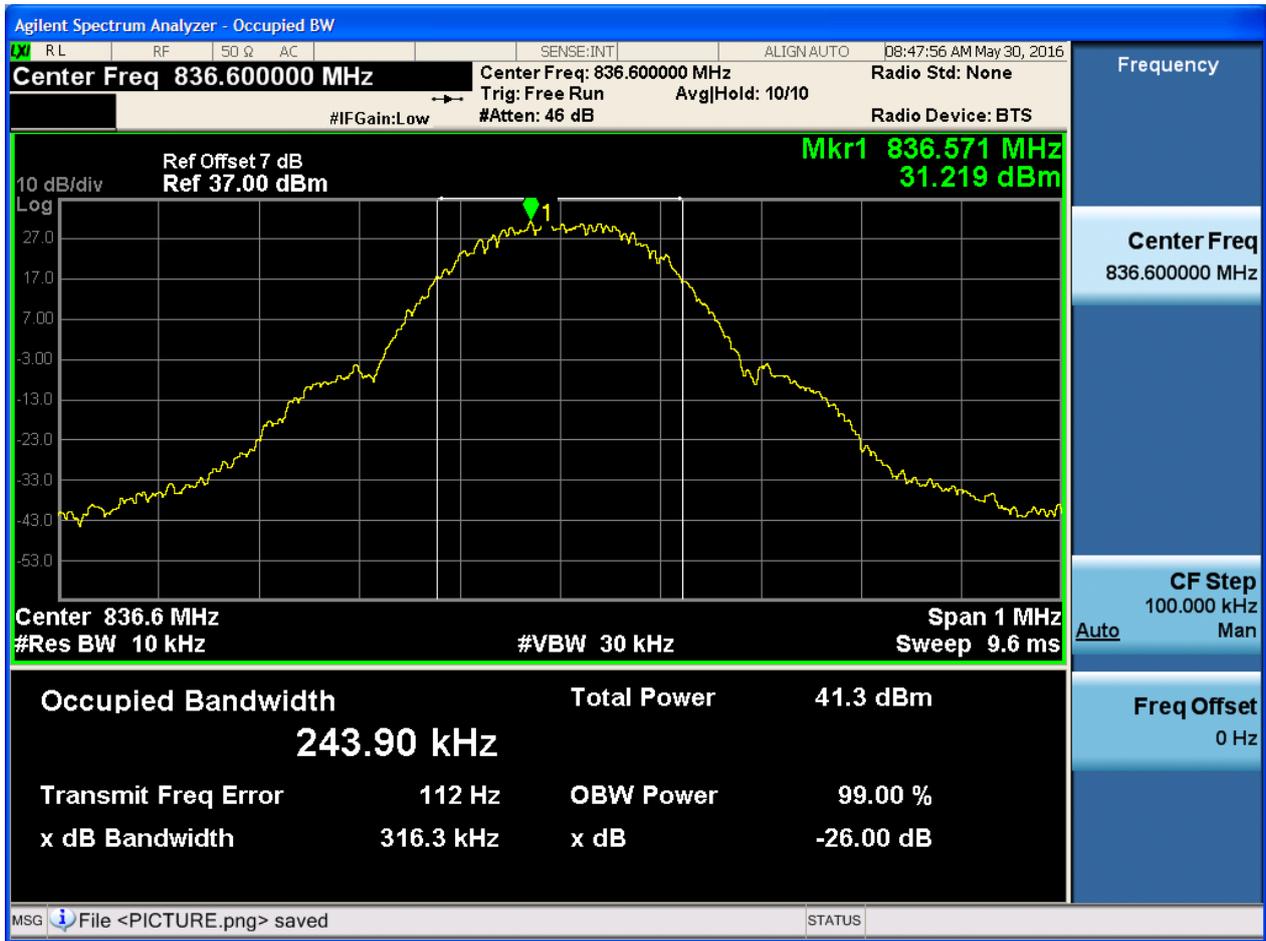
4.1.1.1 Test Mode = GSM/TM1

4.1.1.1.1 Test Channel = LCH

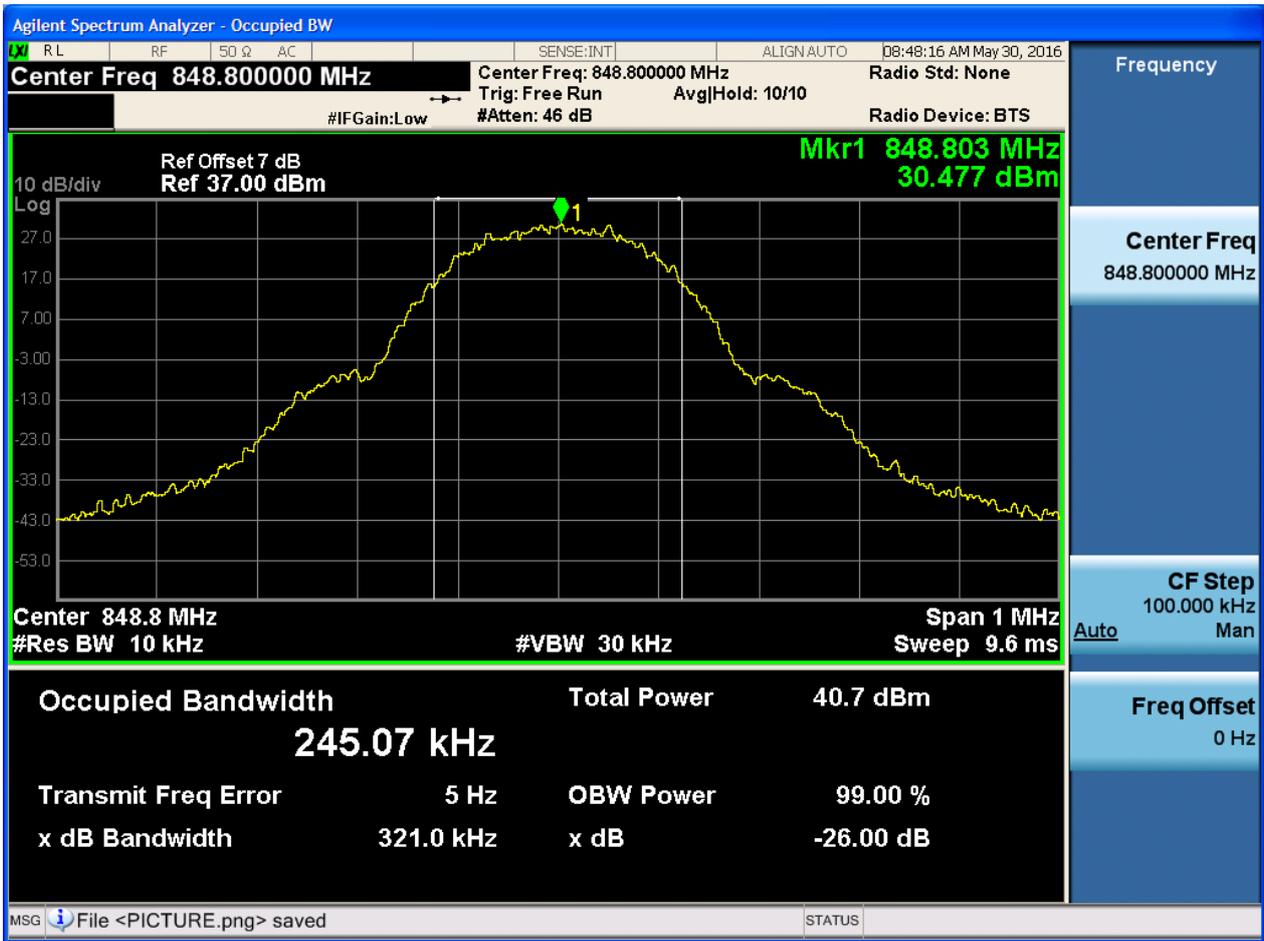




4.1.1.1.2 Test Channel = MCH



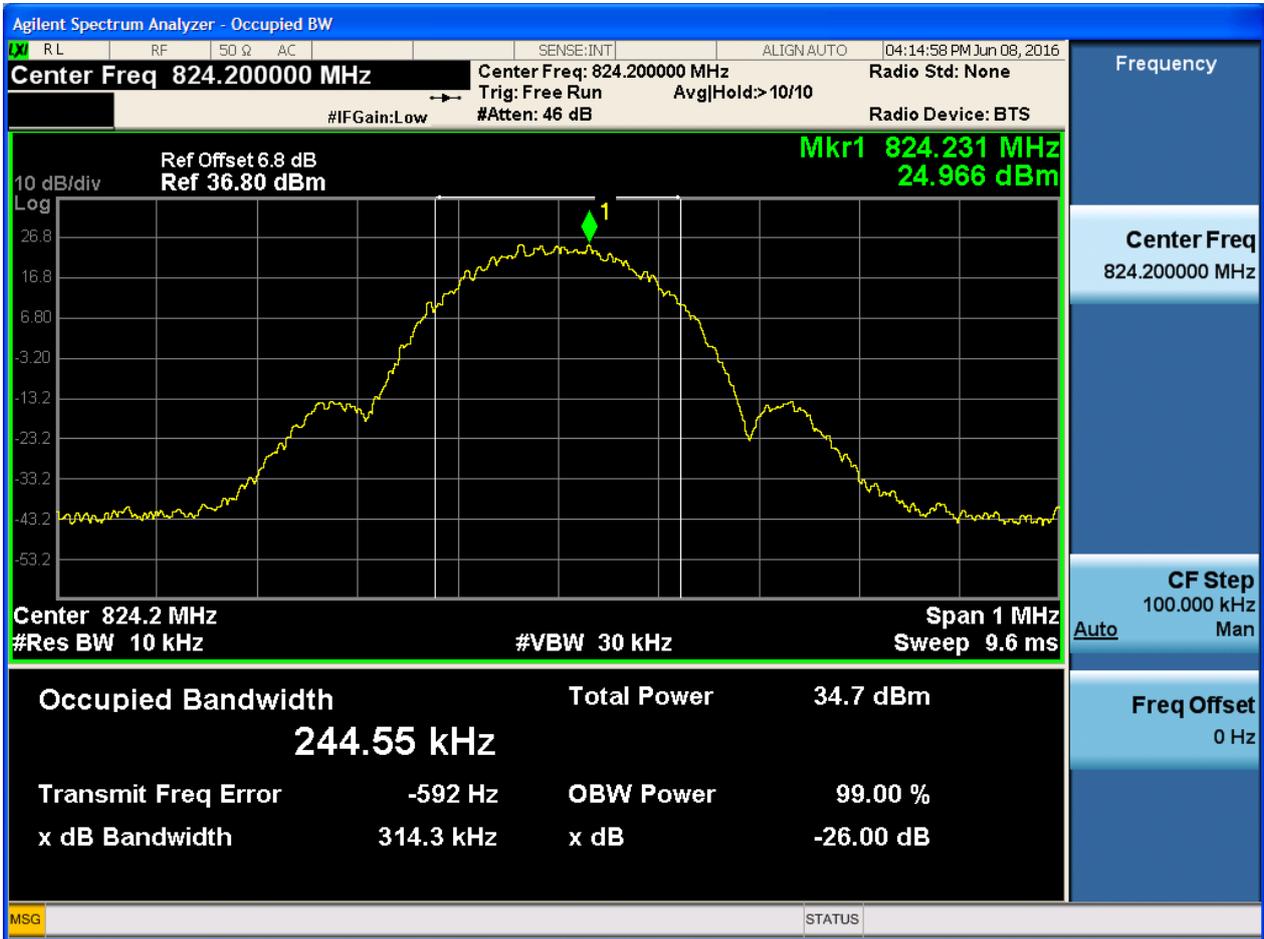
4.1.1.1.3 Test Channel = HCH





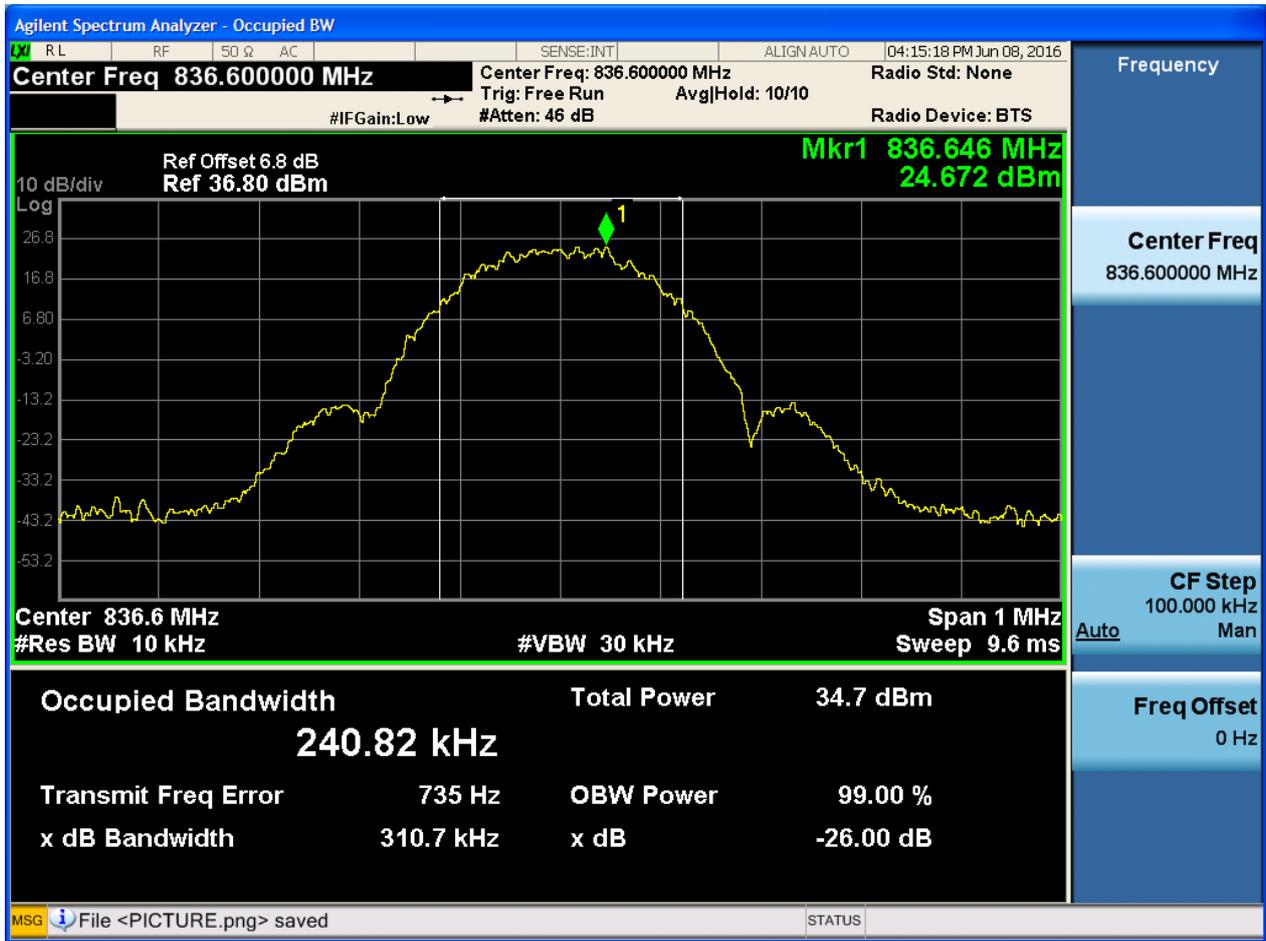
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4.1.1.2.1 Test Channel = LCH



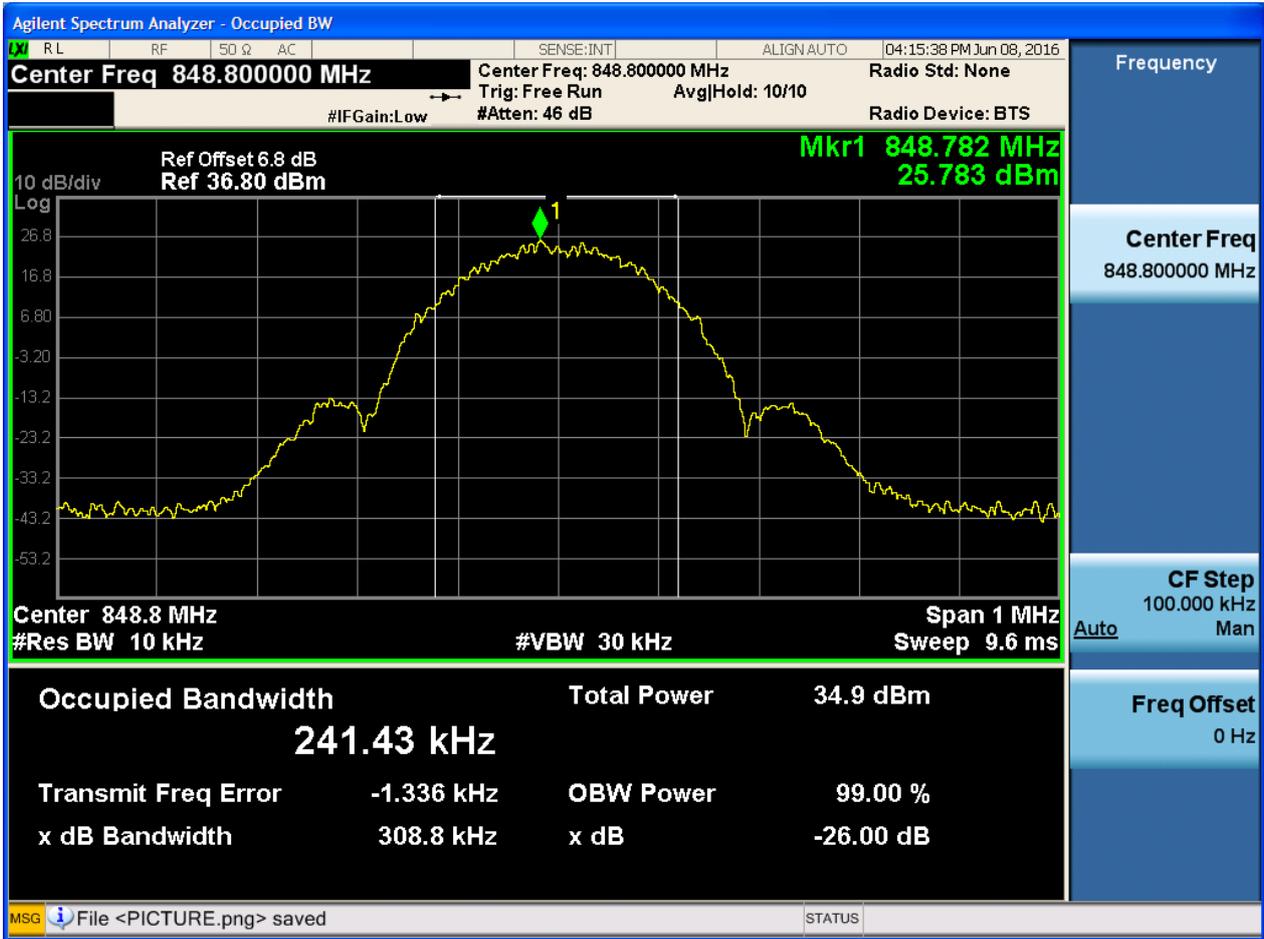


4.1.1.2.2 Test Channel = MCH





4.1.1.2.3 Test Channel = HCH





4.1.2 Test Band = GSM1900

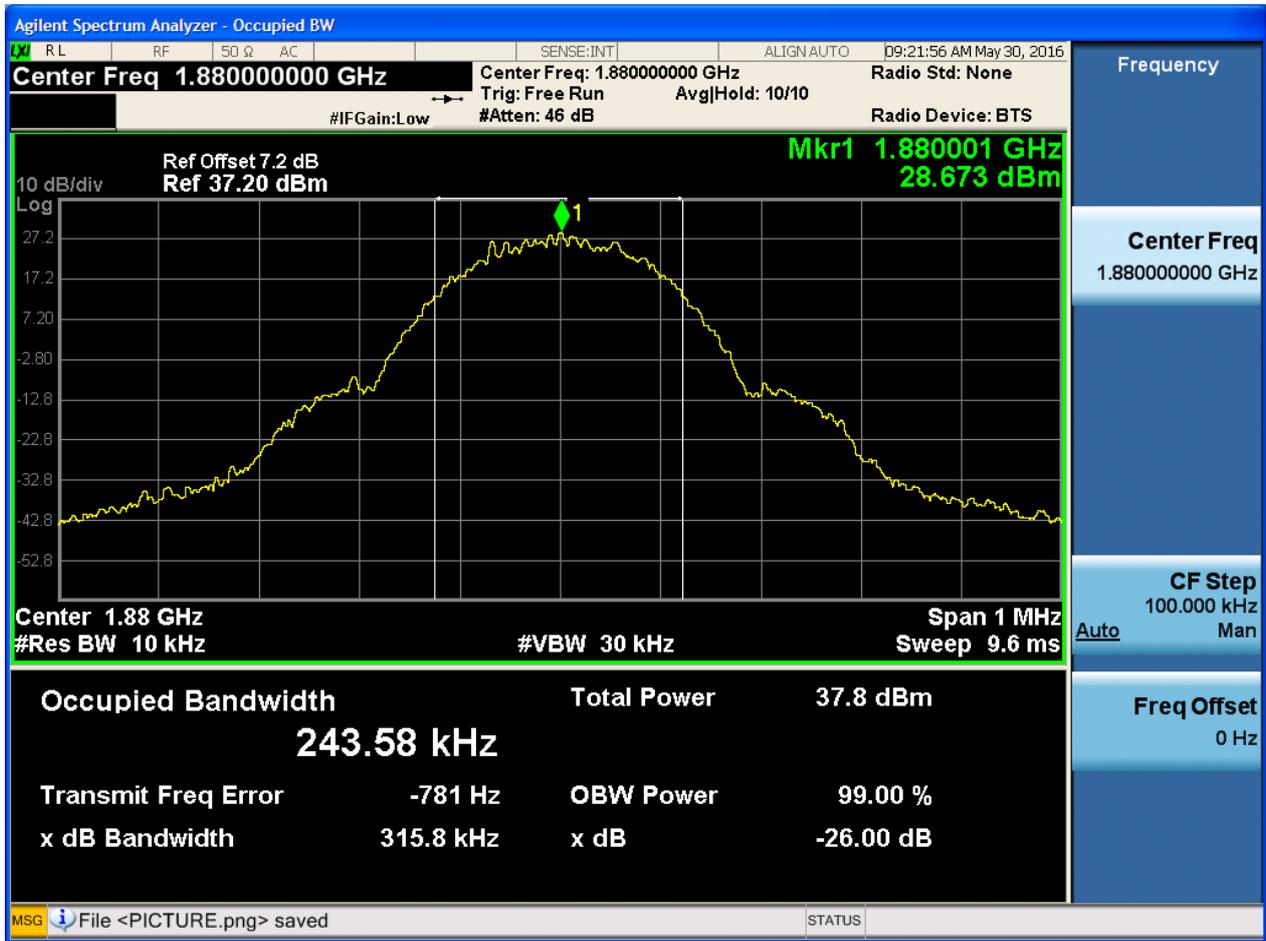
4.1.2.1 Test Mode = GSM/TM1

4.1.2.1.1 Test Channel = LCH



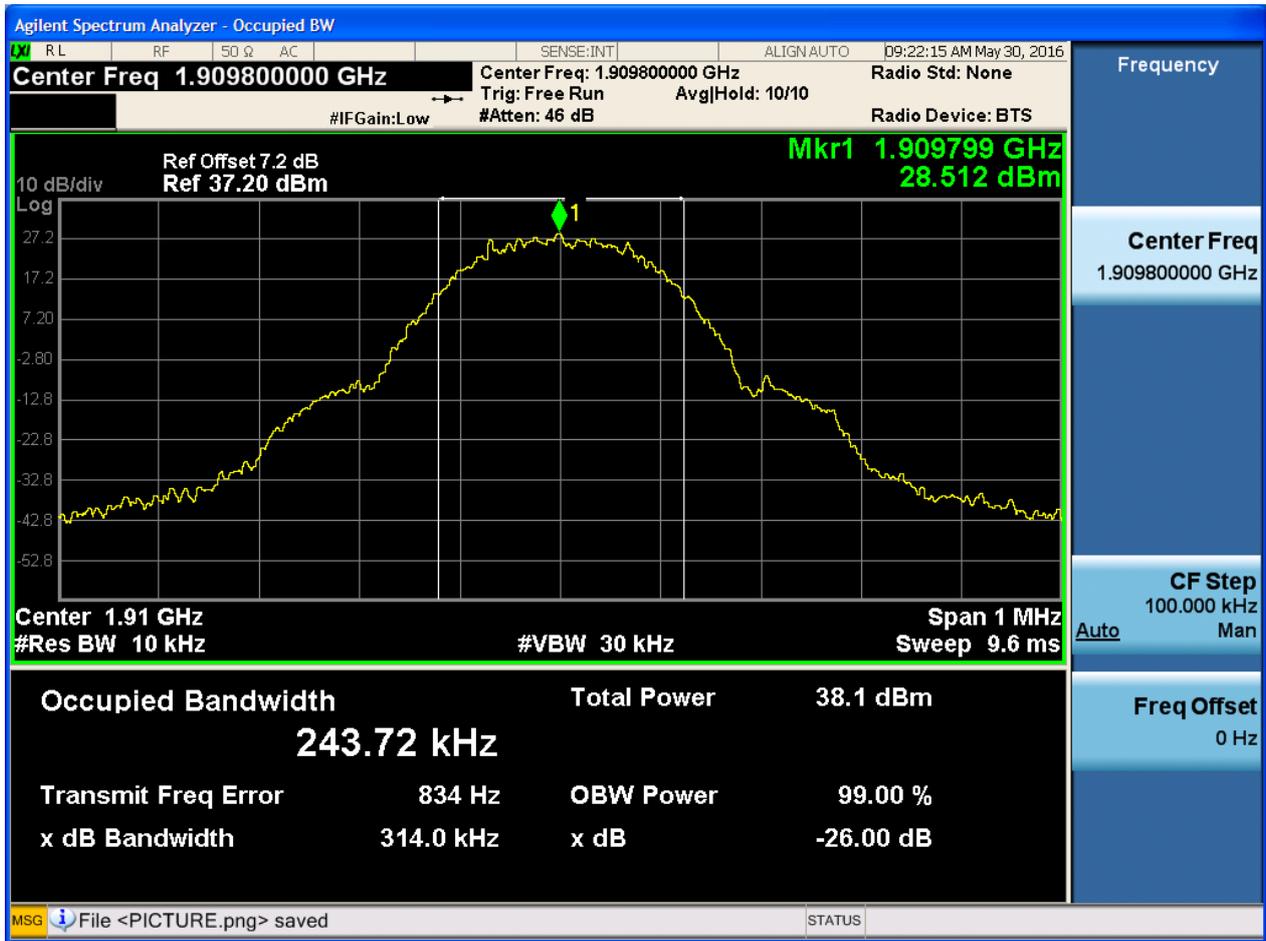


4.1.2.1.2 Test Channel = MCH





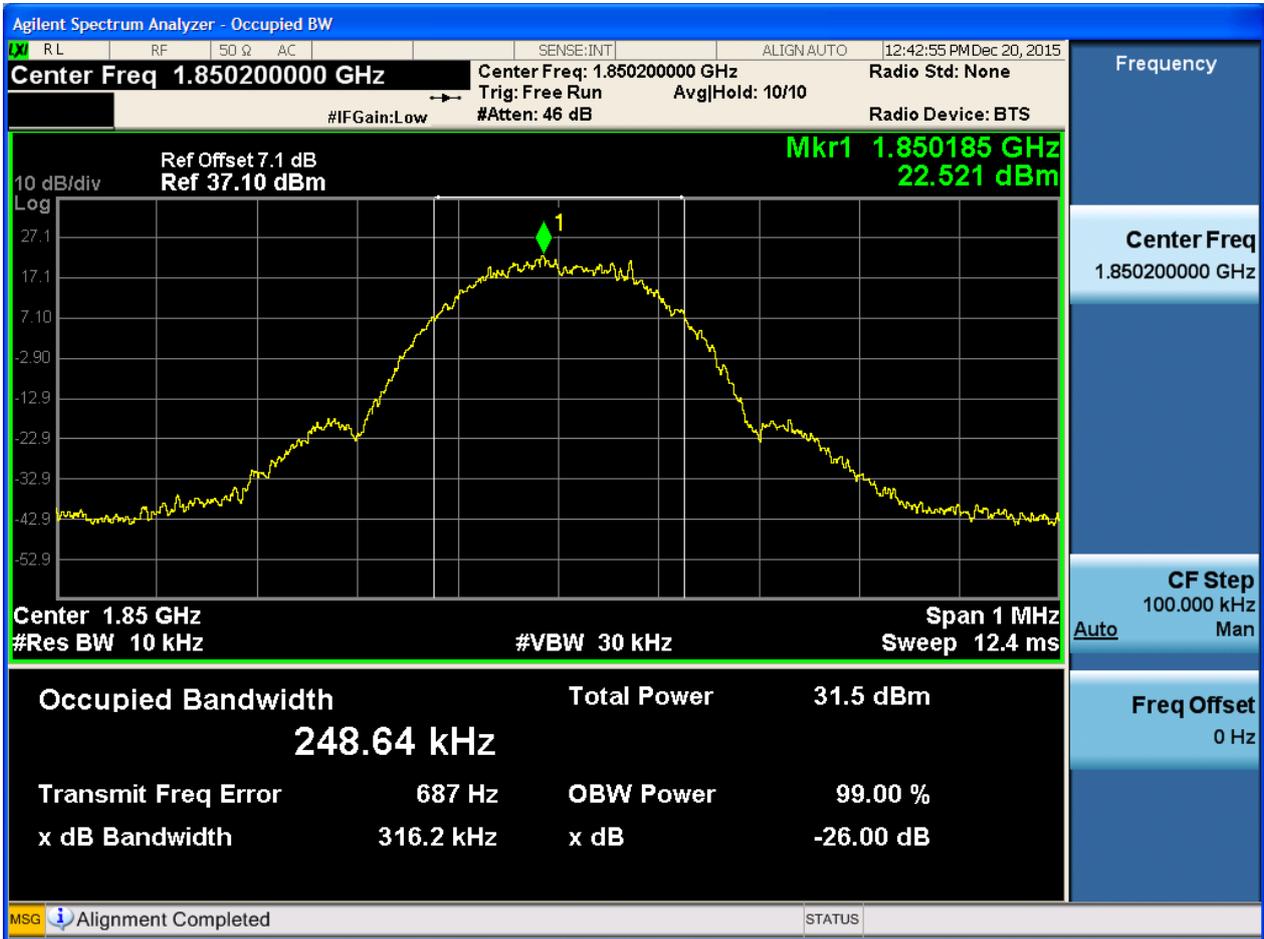
4.1.2.1.3 Test Channel = HCH



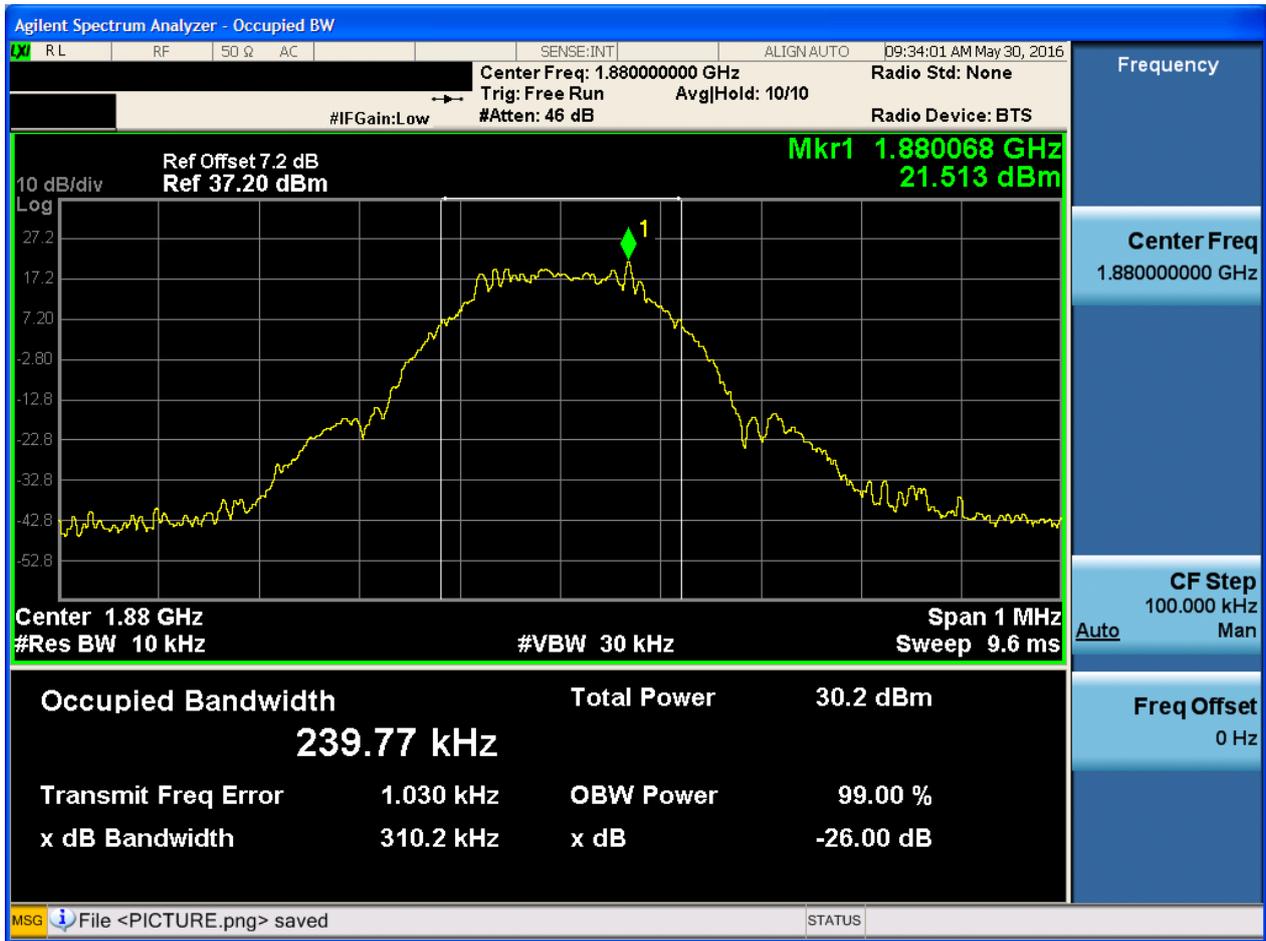


4.1.2.2 Test Mode = GSM/TM2

4.1.2.2.1 Test Channel = LCH

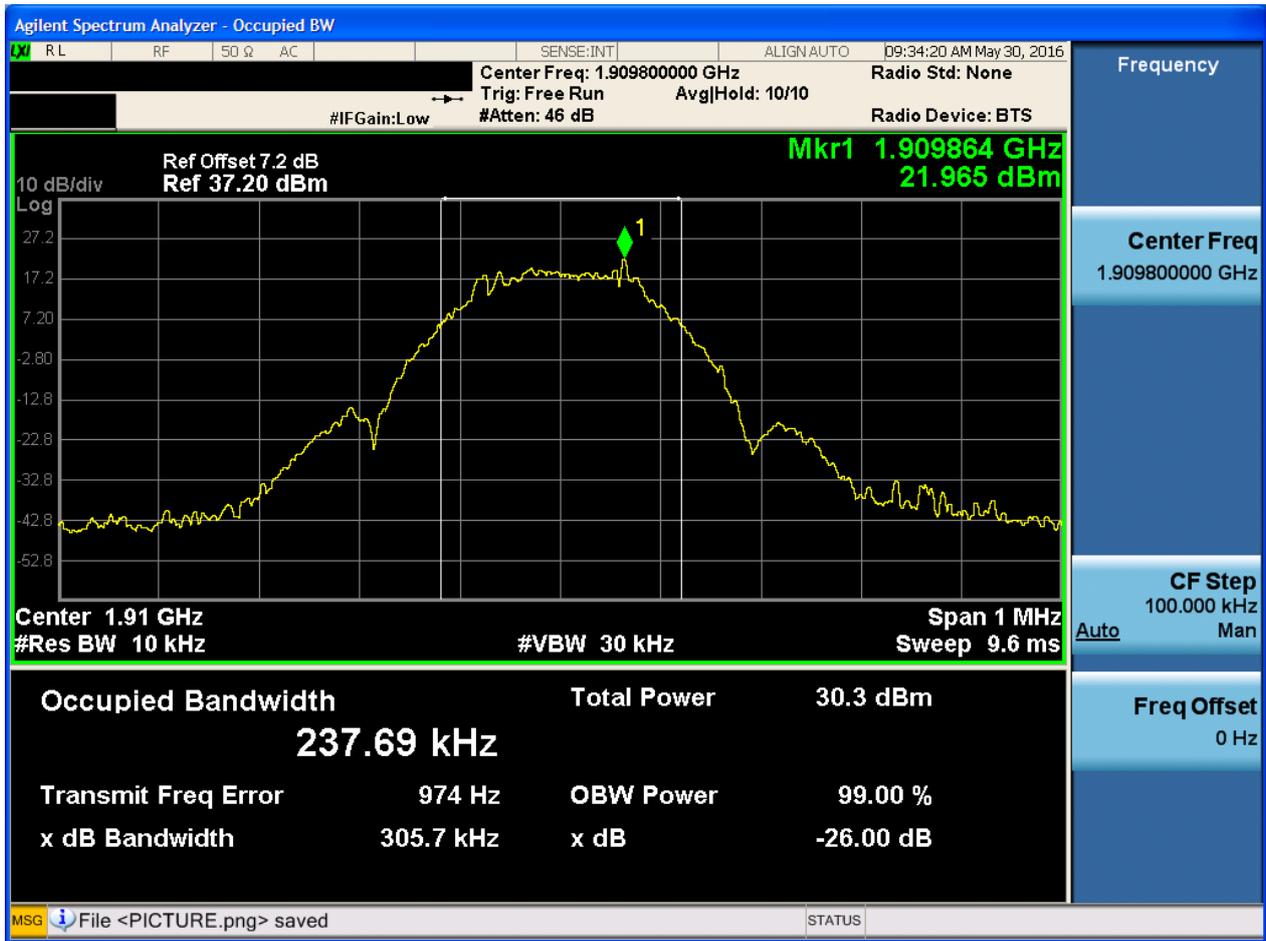


4.1.2.2.2 Test Channel = MCH





4.1.2.2.3 Test Channel = HCH





5Appendix_E: Band Edges Compliance

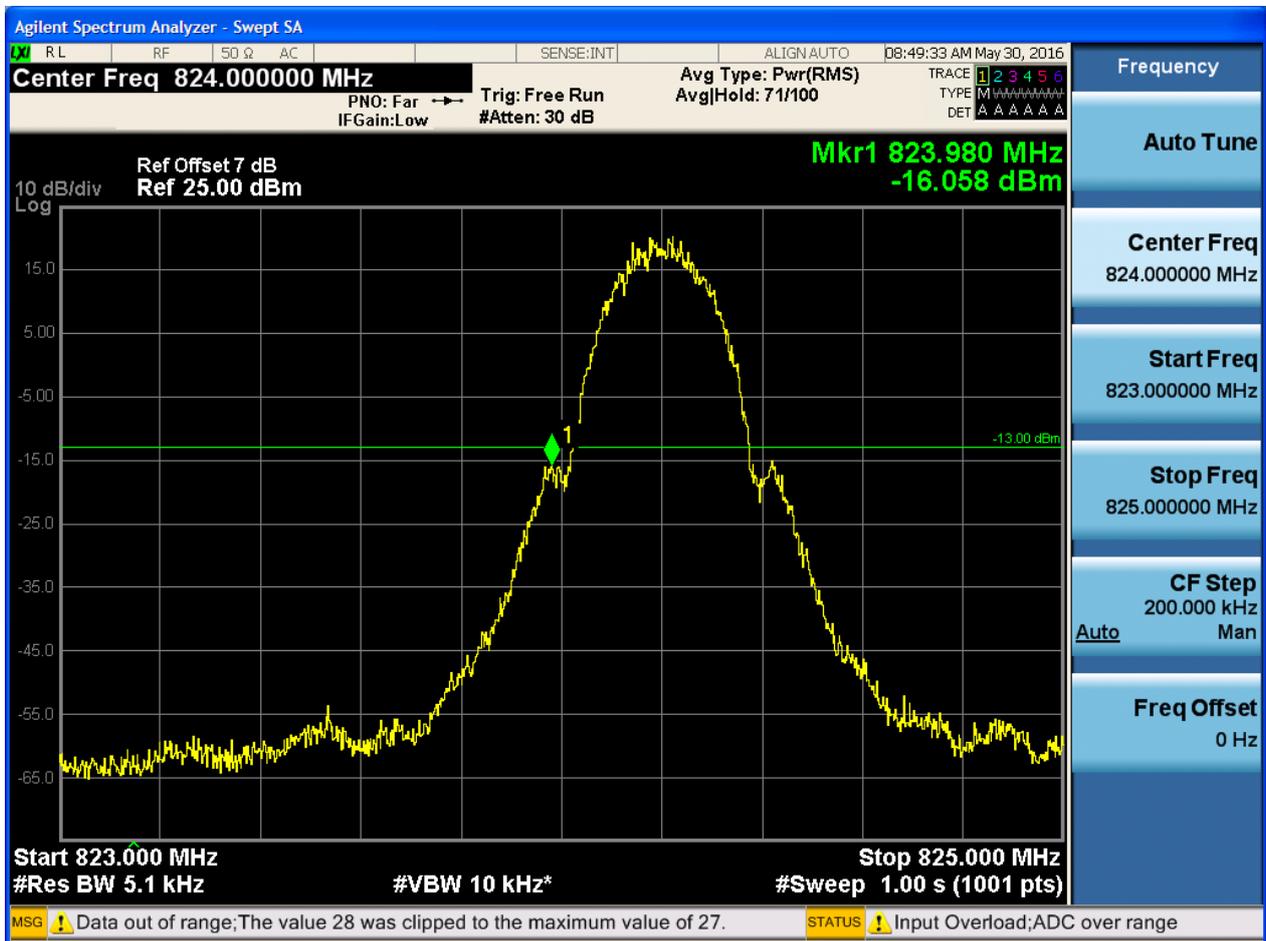
Part I - Test Plots

5.1 For GSM

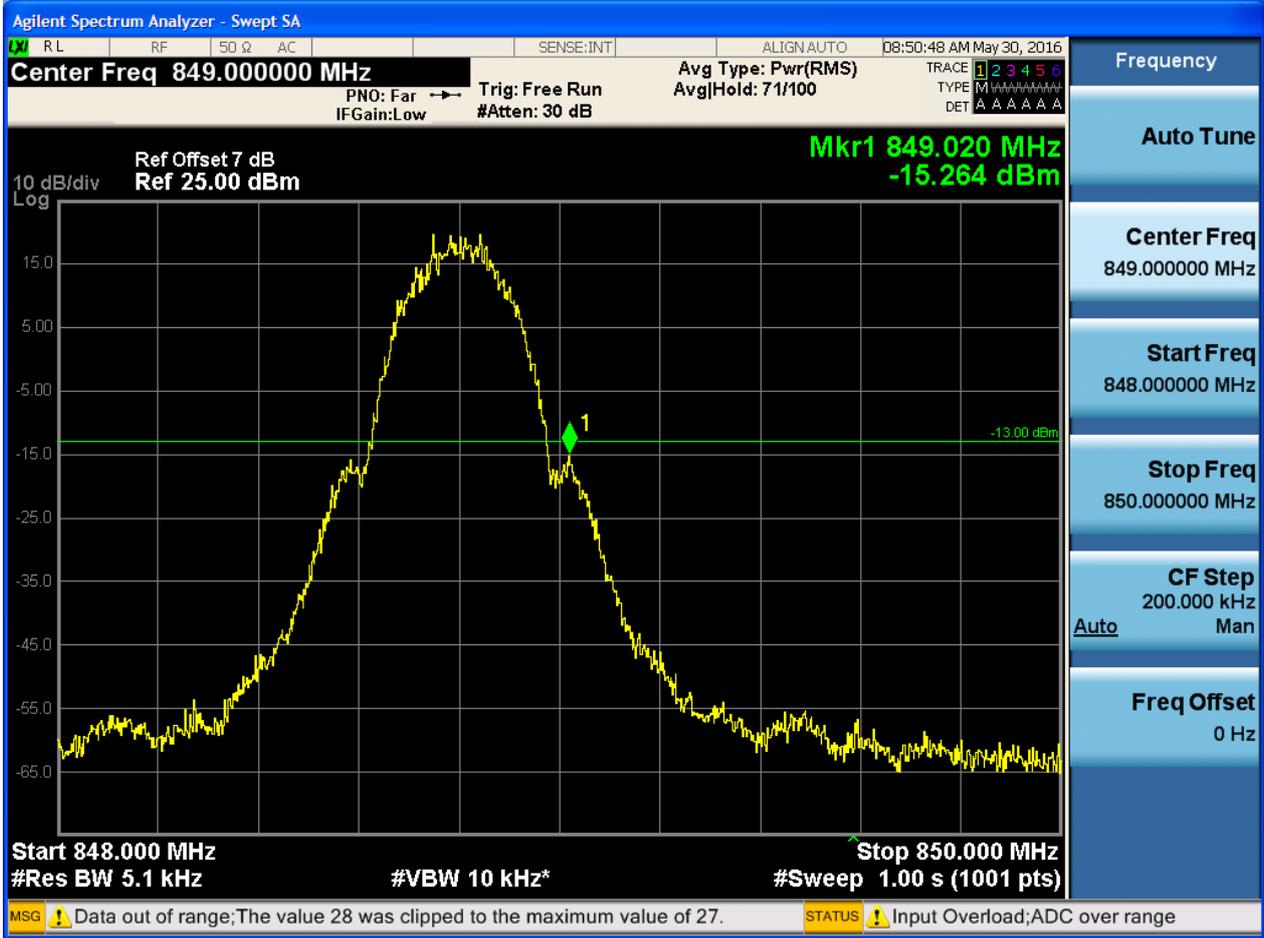
5.1.1 Test Band = GSM850

5.1.1.1 Test Mode = GSM/TM1

5.1.1.1.1 Test Channel = LCH



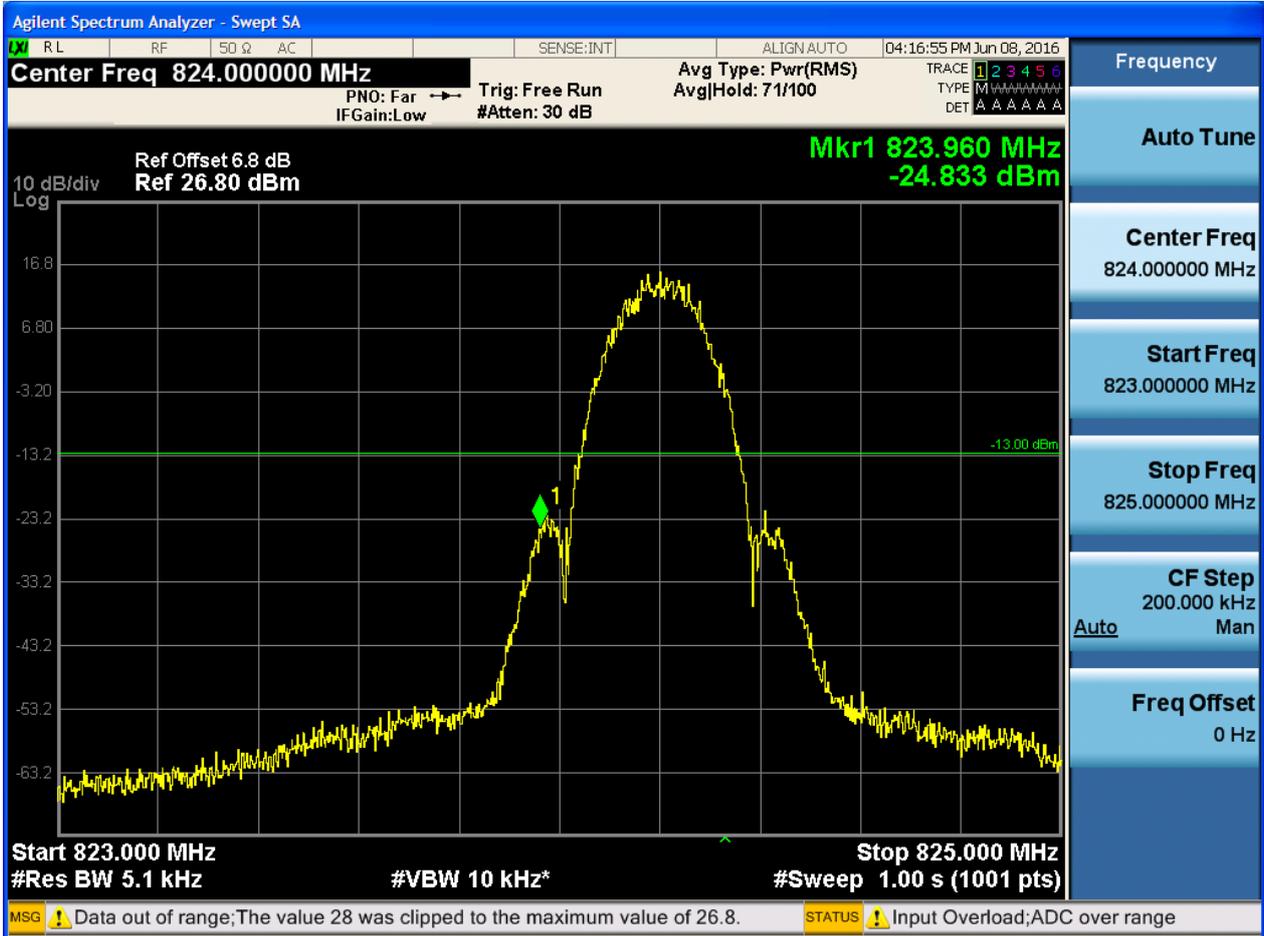
5.1.1.1.2 Test Channel = HCH



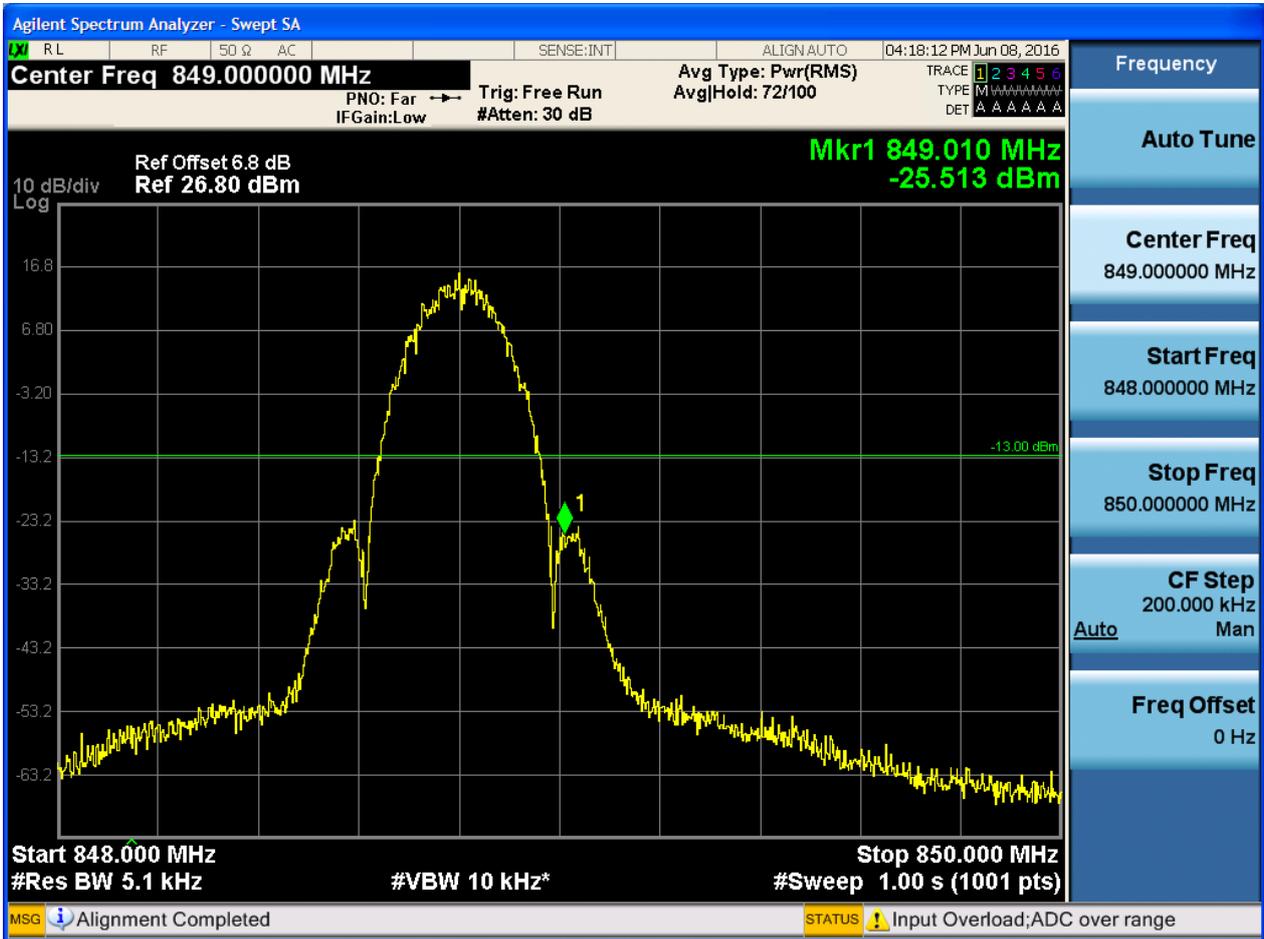


5.1.1.2 Test Mode = GSM/TM2

5.1.1.2.1 Test Channel = LCH



5.1.1.2.2 Test Channel = HCH

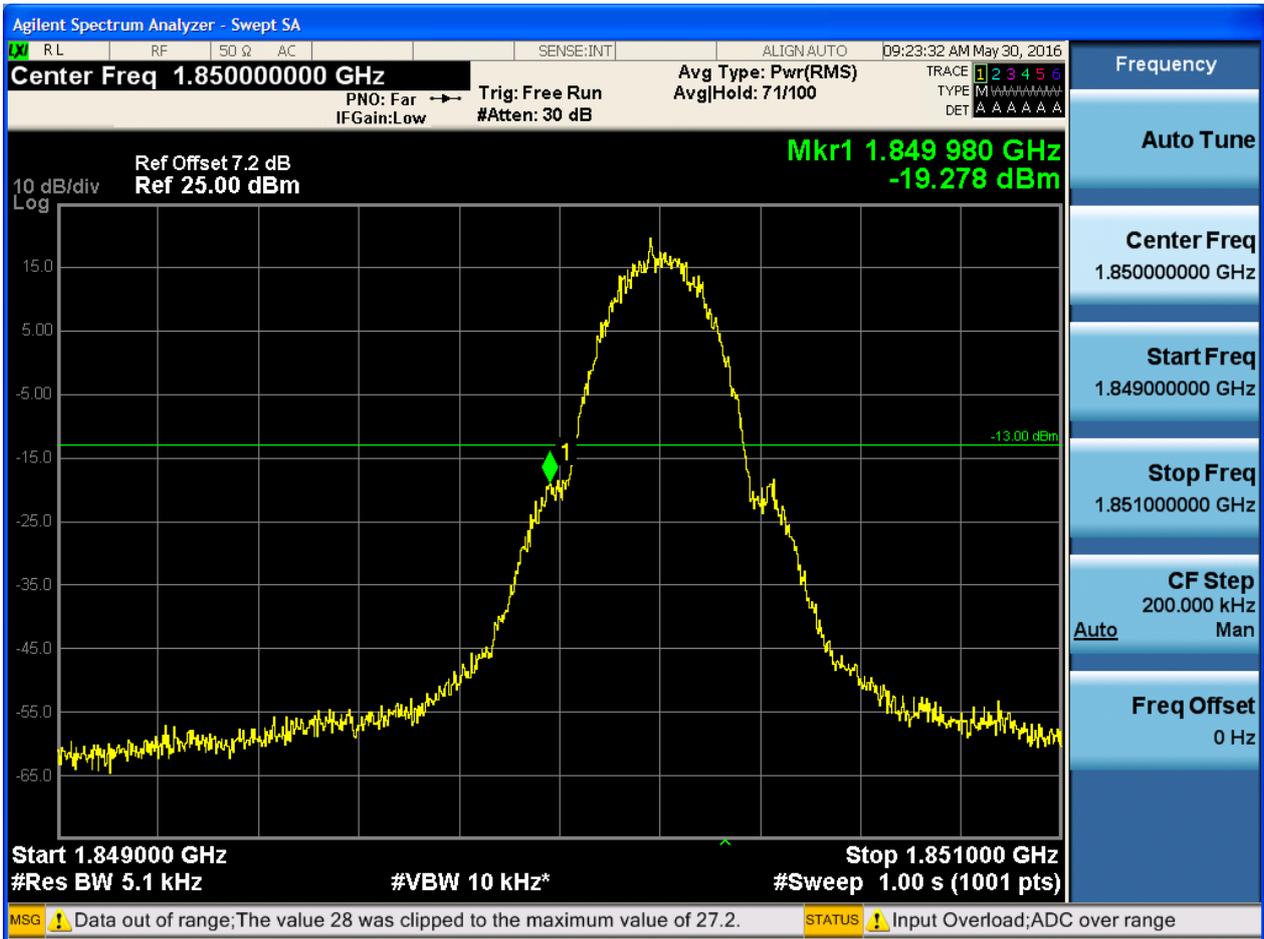




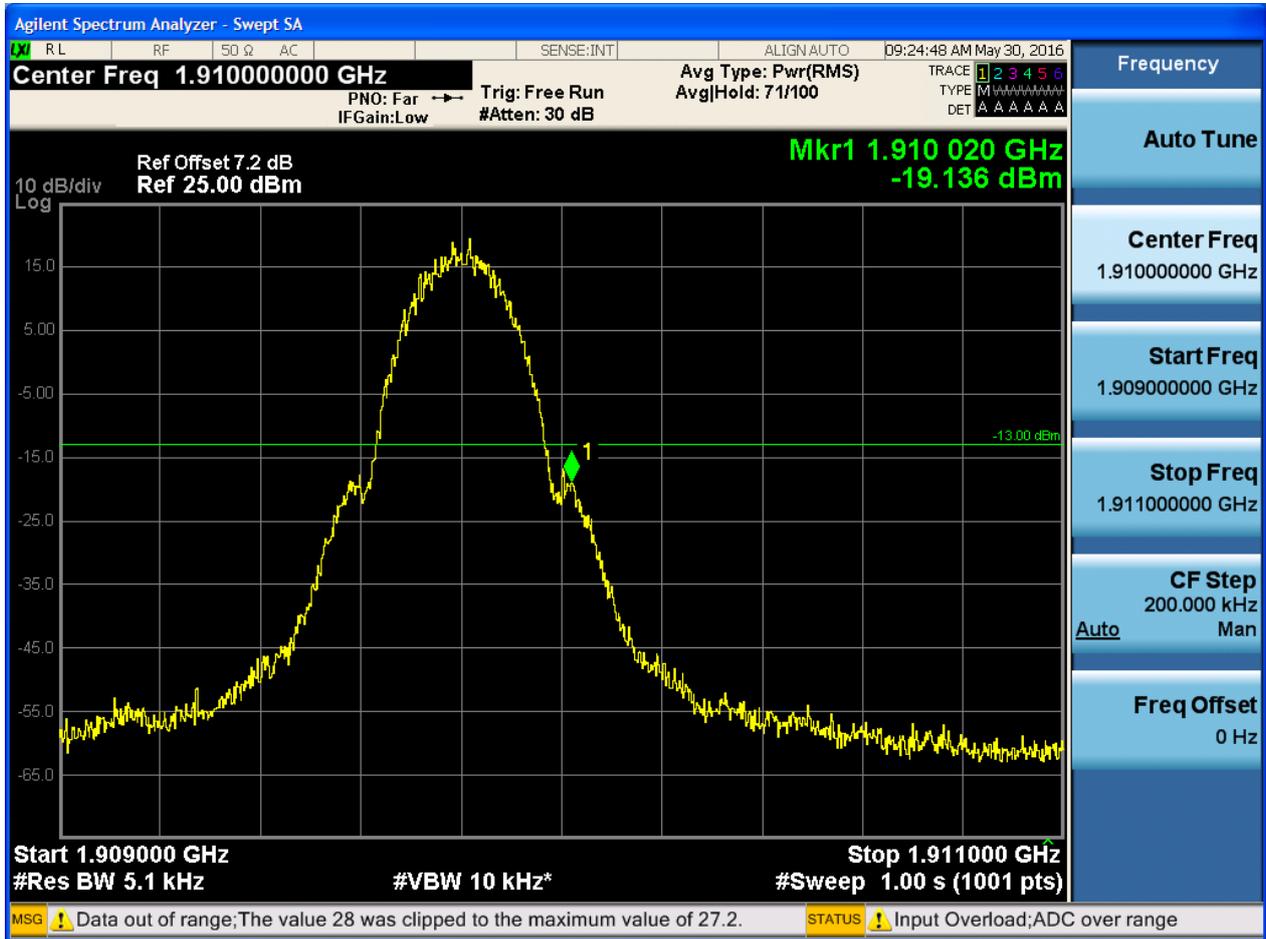
5.1.2 Test Band = GSM1900

5.1.2.1 Test Mode = GSM/TM1

5.1.2.1.1 Test Channel = LCH



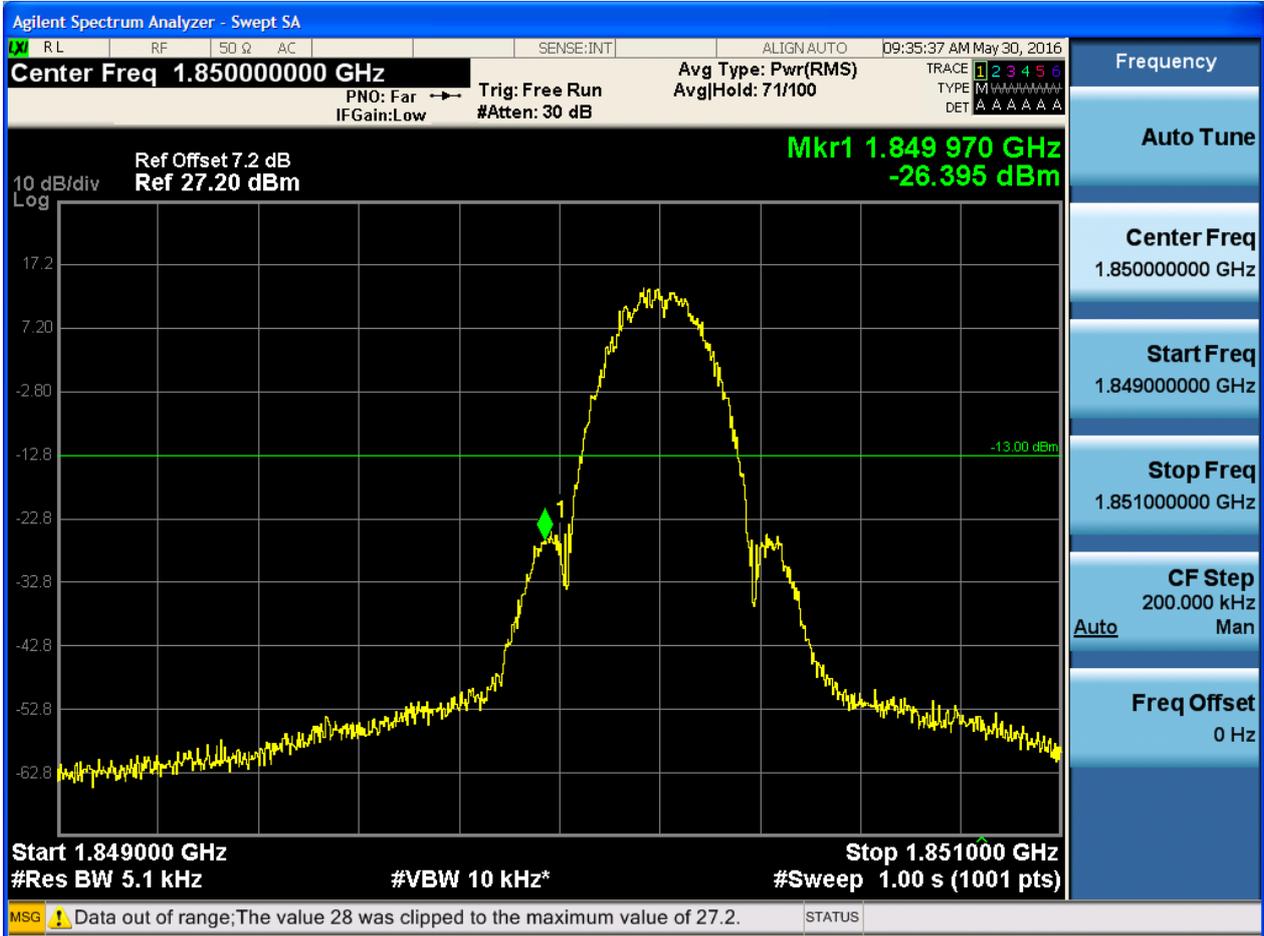
5.1.2.1.2 Test Channel = HCH



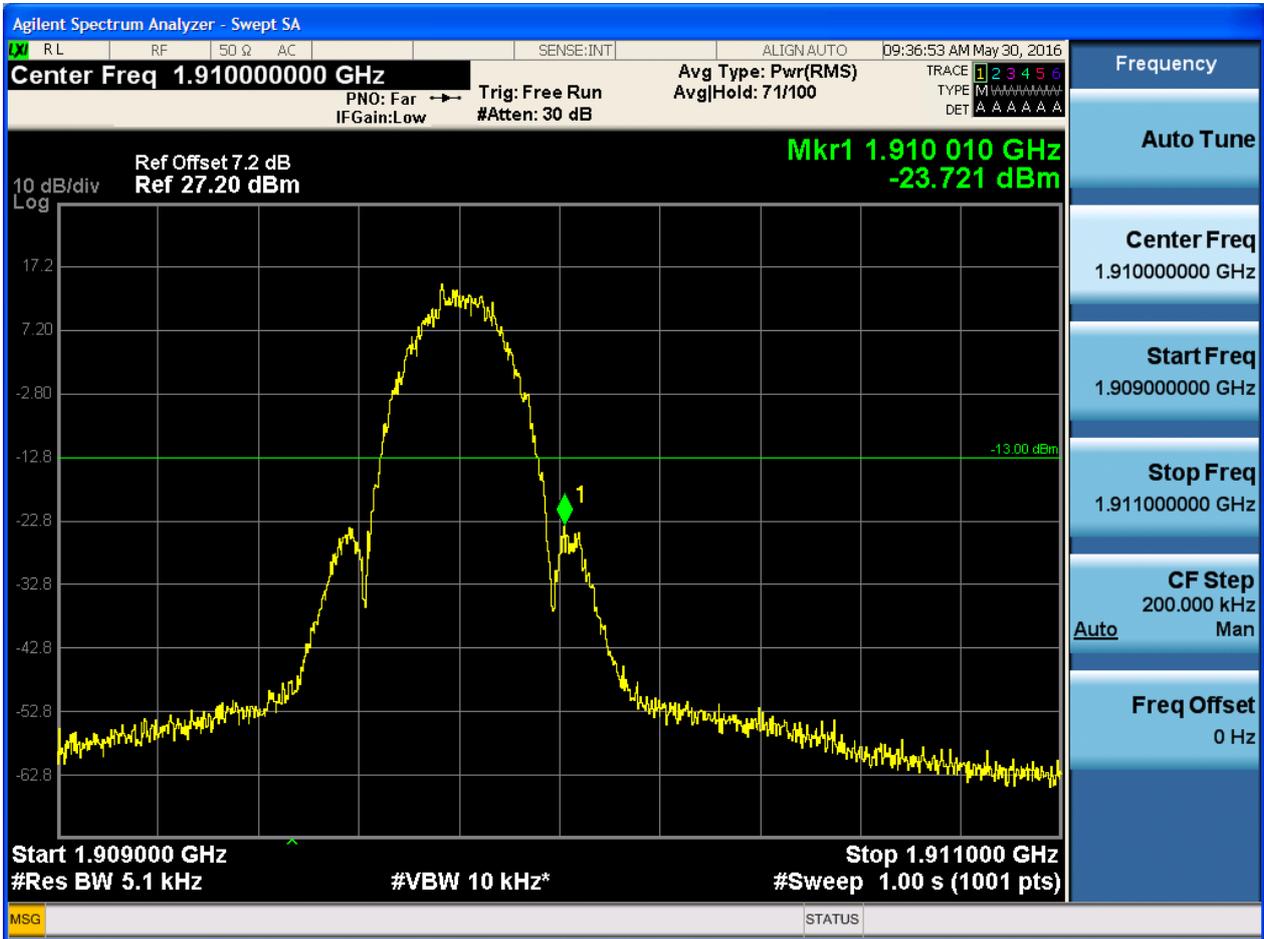


5.1.2.2 Test Mode = GSM/TM2

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.

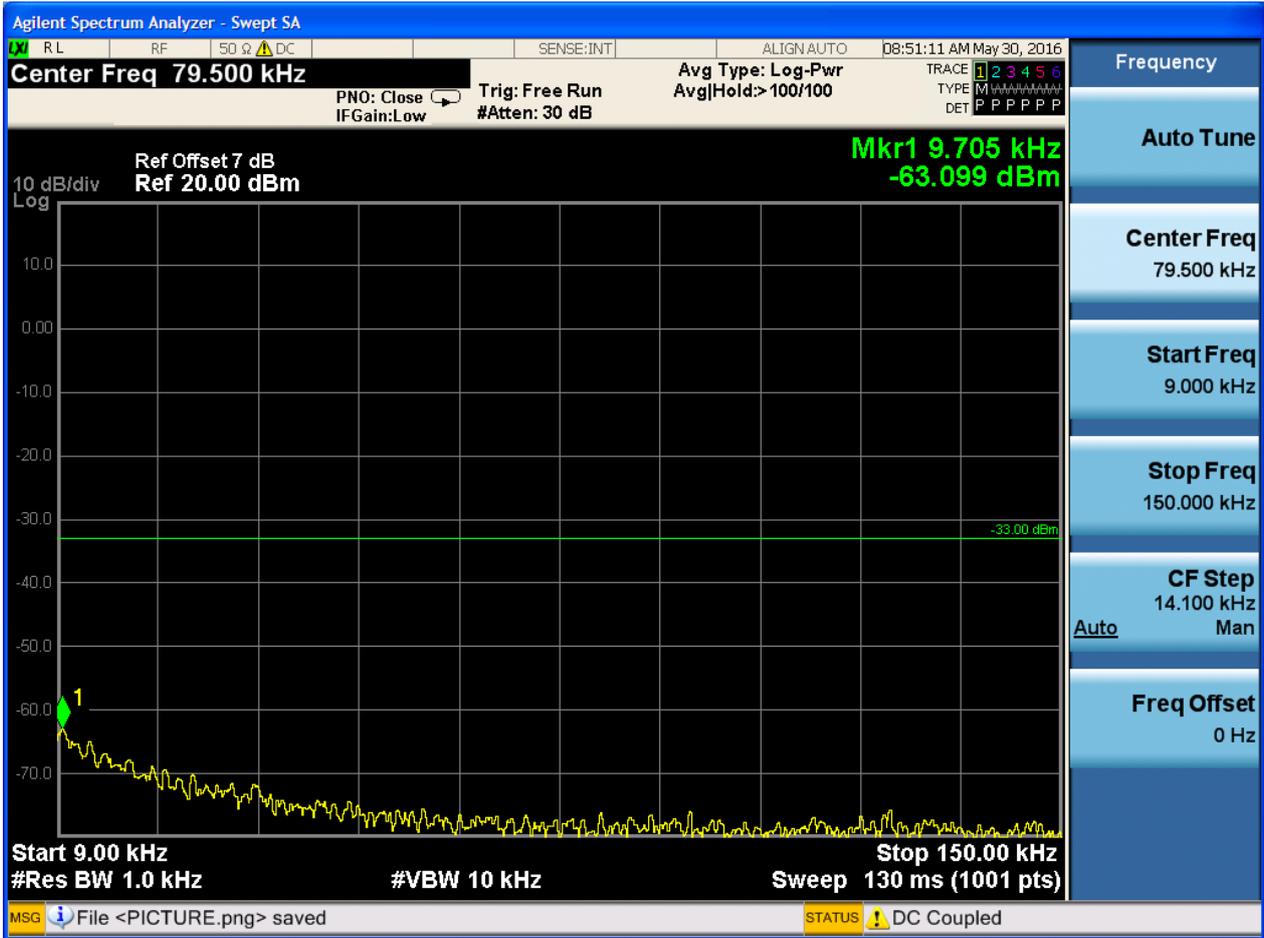
Part I - Test Plots

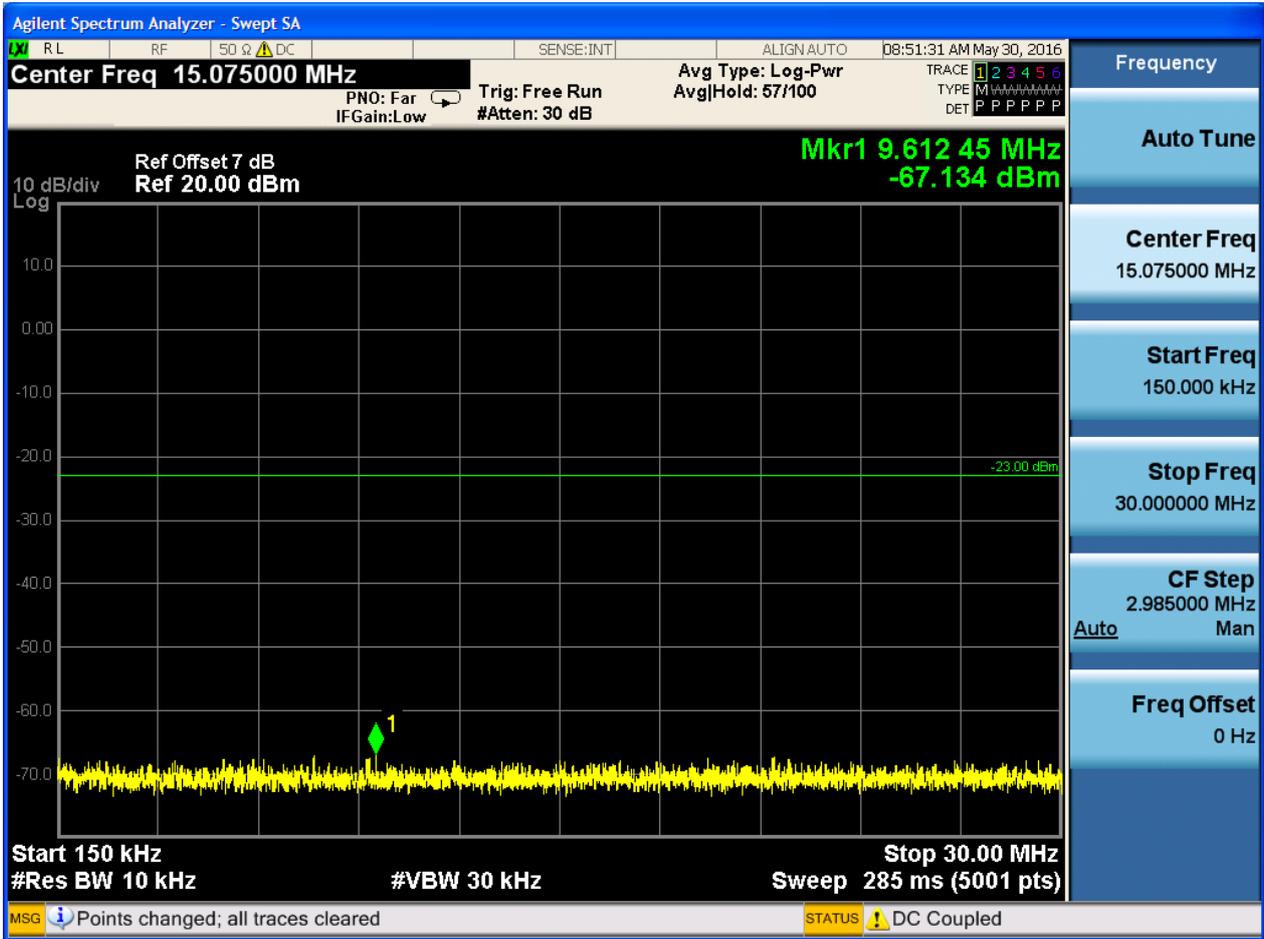
6.1 For GSM

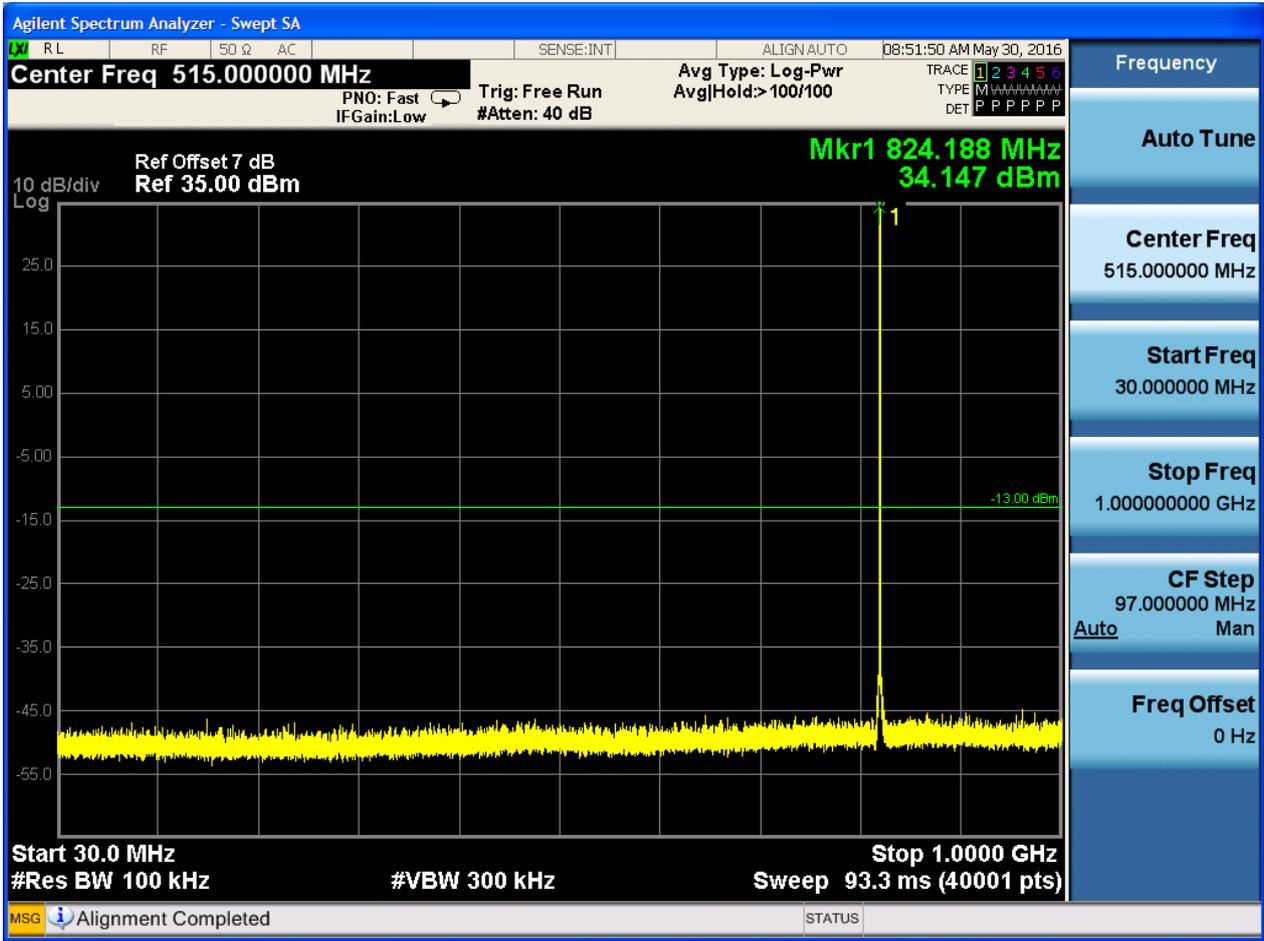
6.1.1 Test Band = GSM850

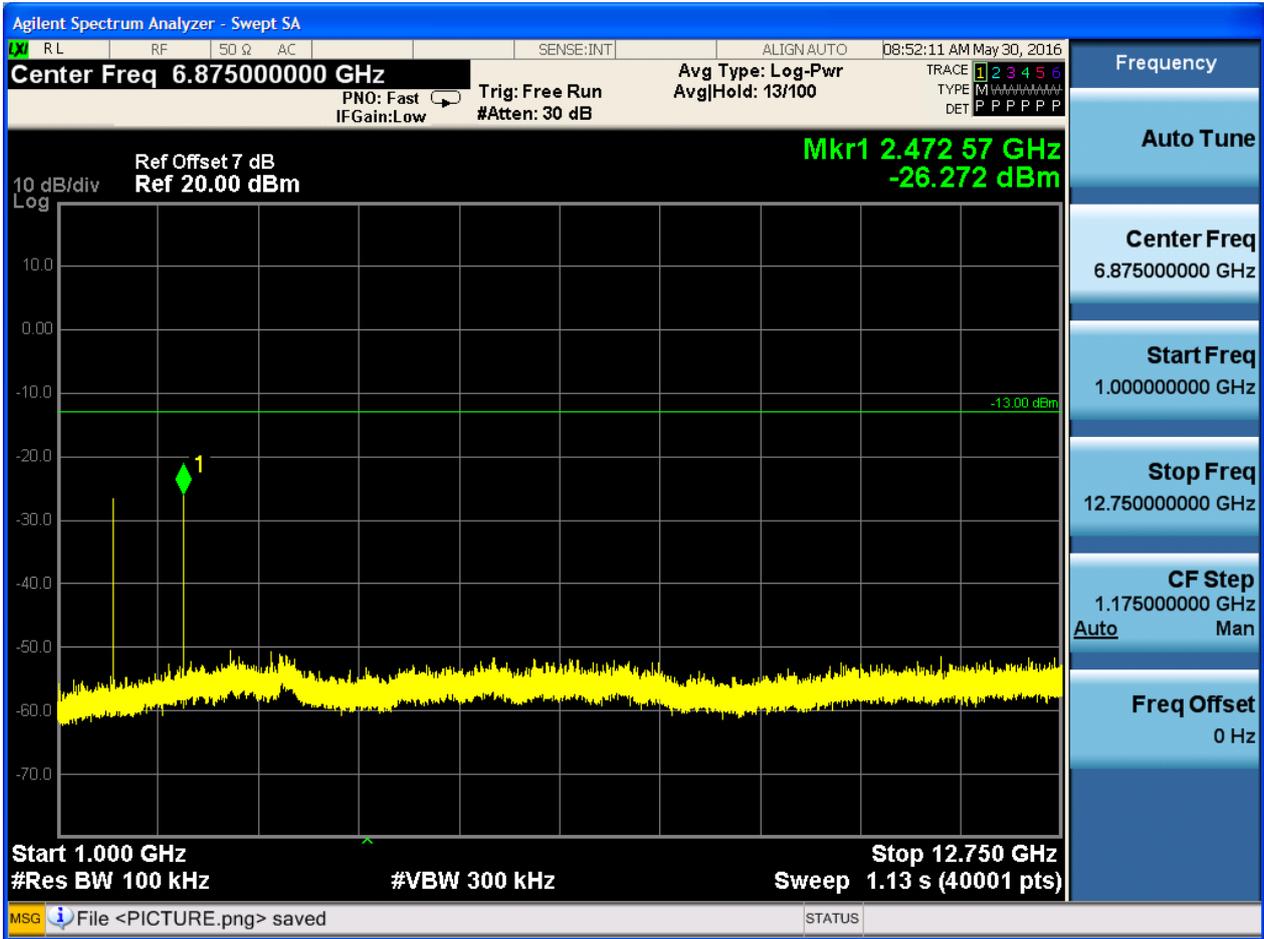
6.1.1.1 Test Mode = GSM/TM1

6.1.1.1.1 Test Channel = LCH



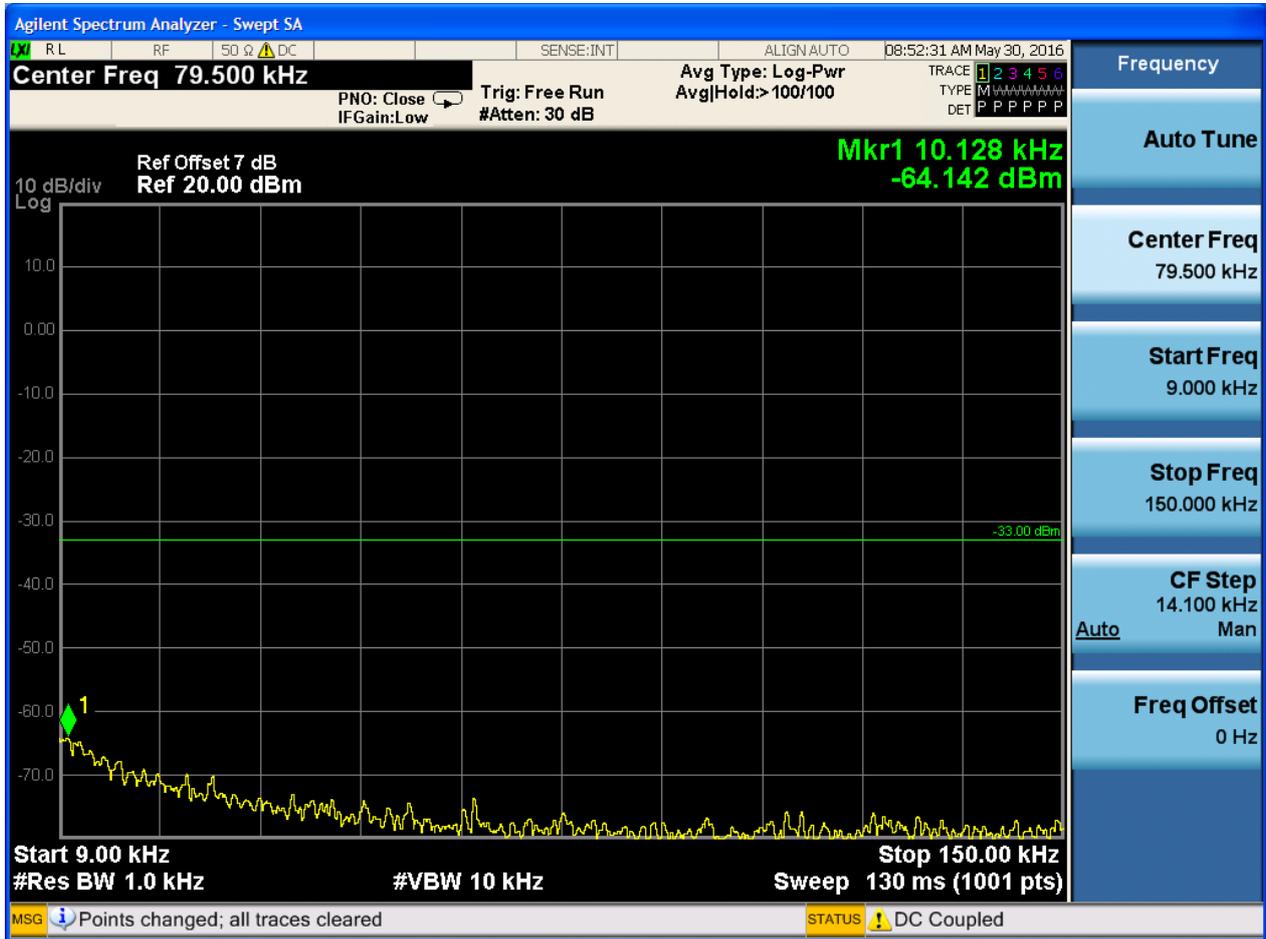


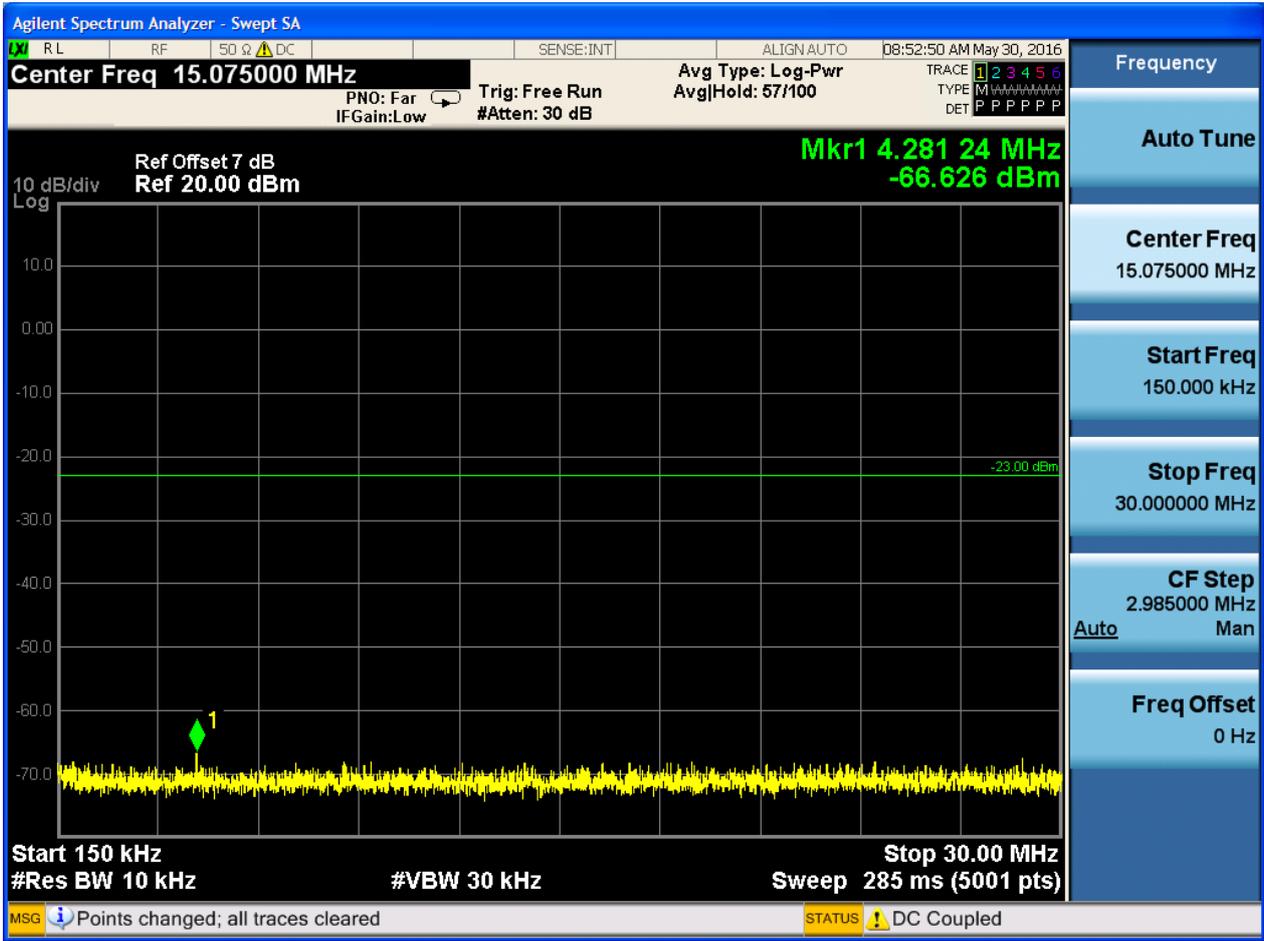


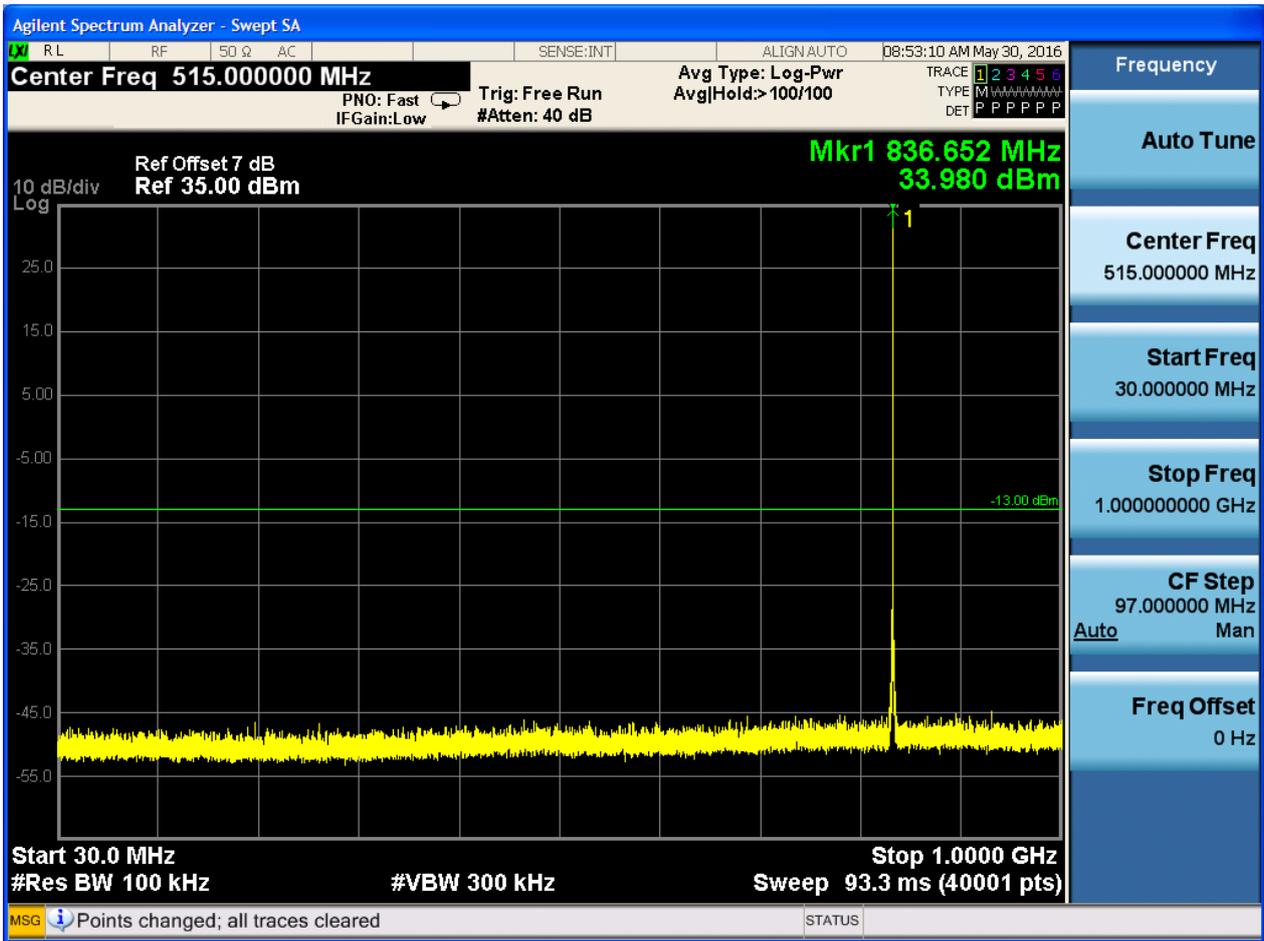


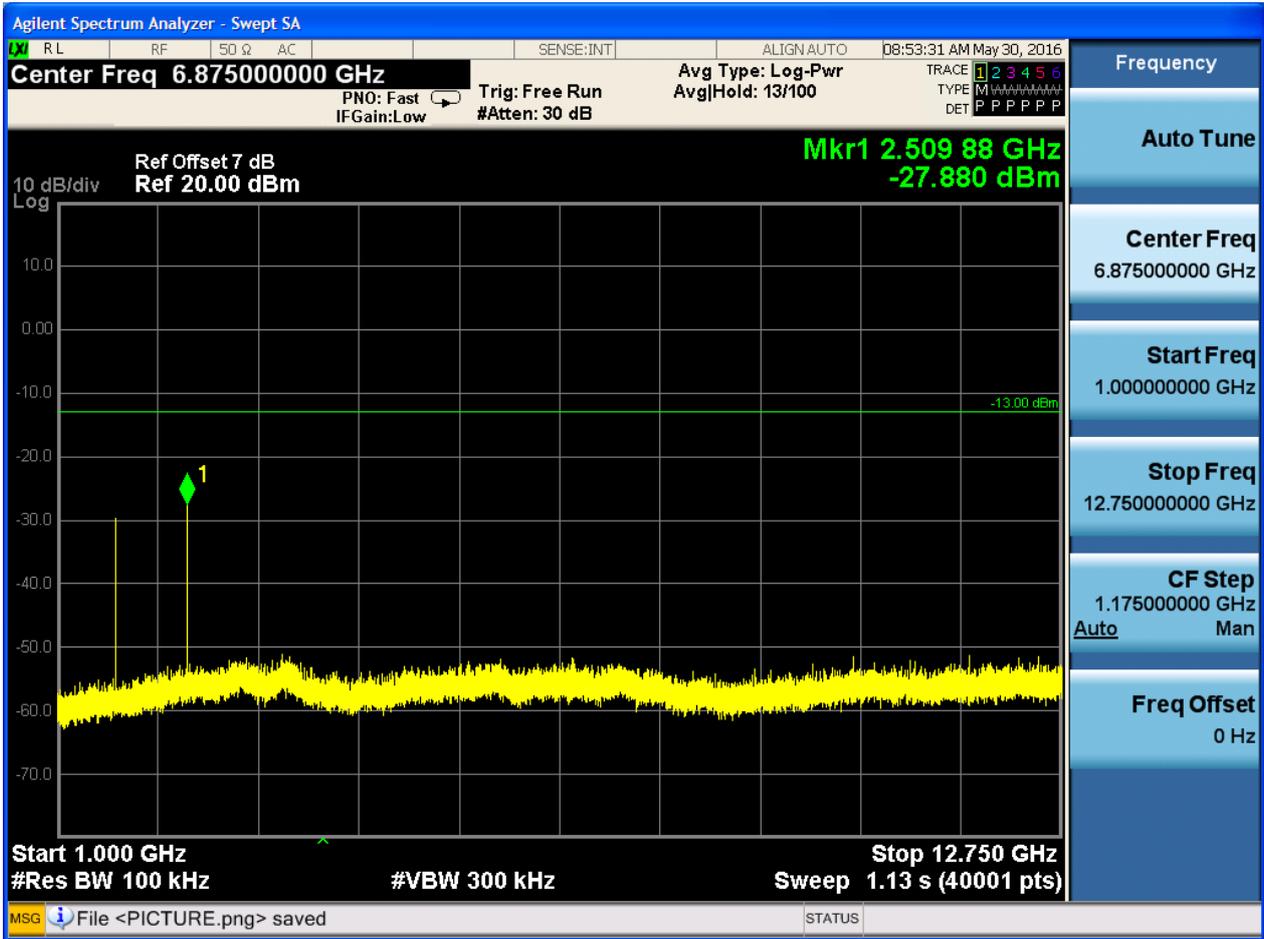


6.1.1.1.2 Test Channel = MCH



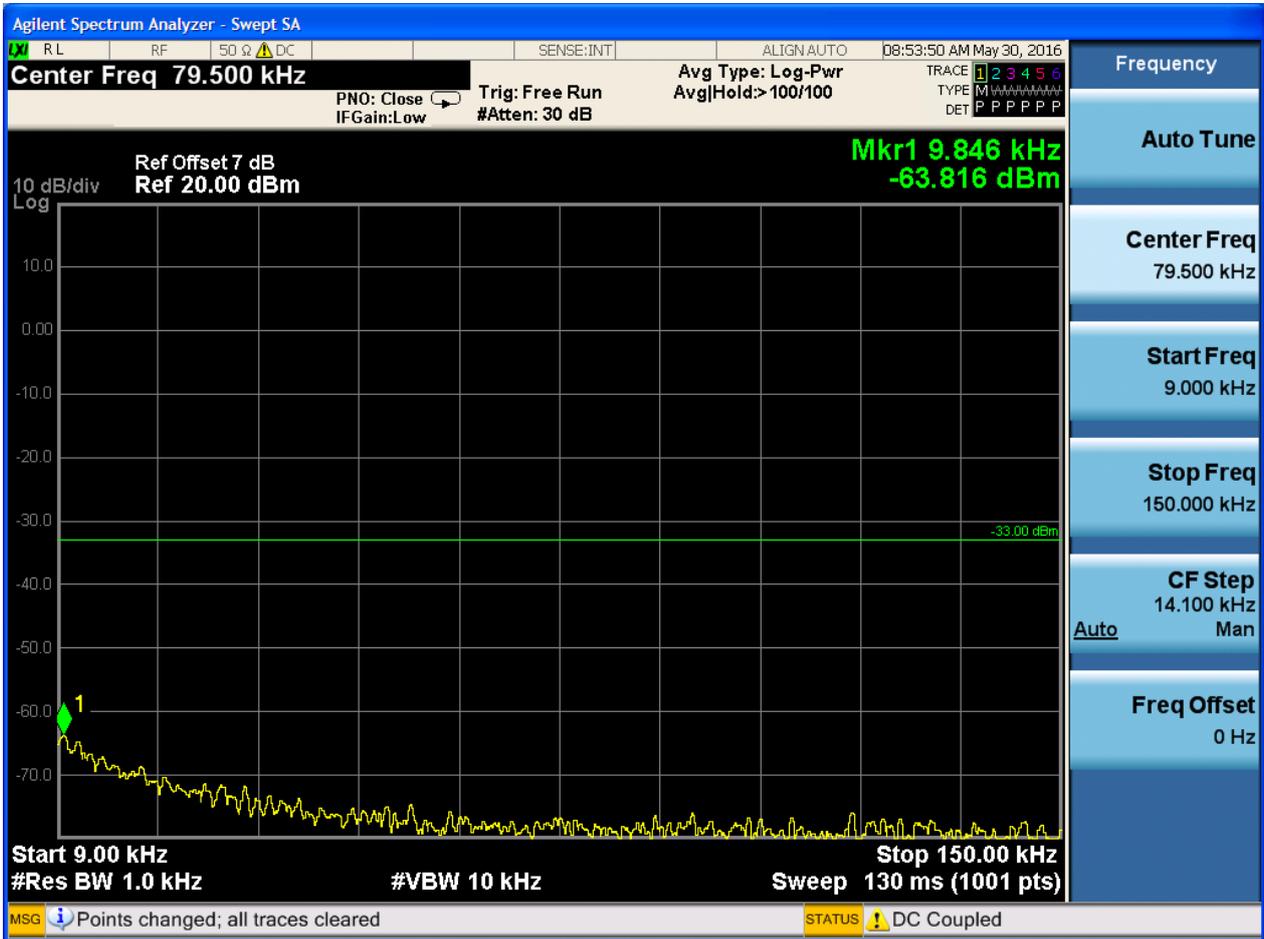


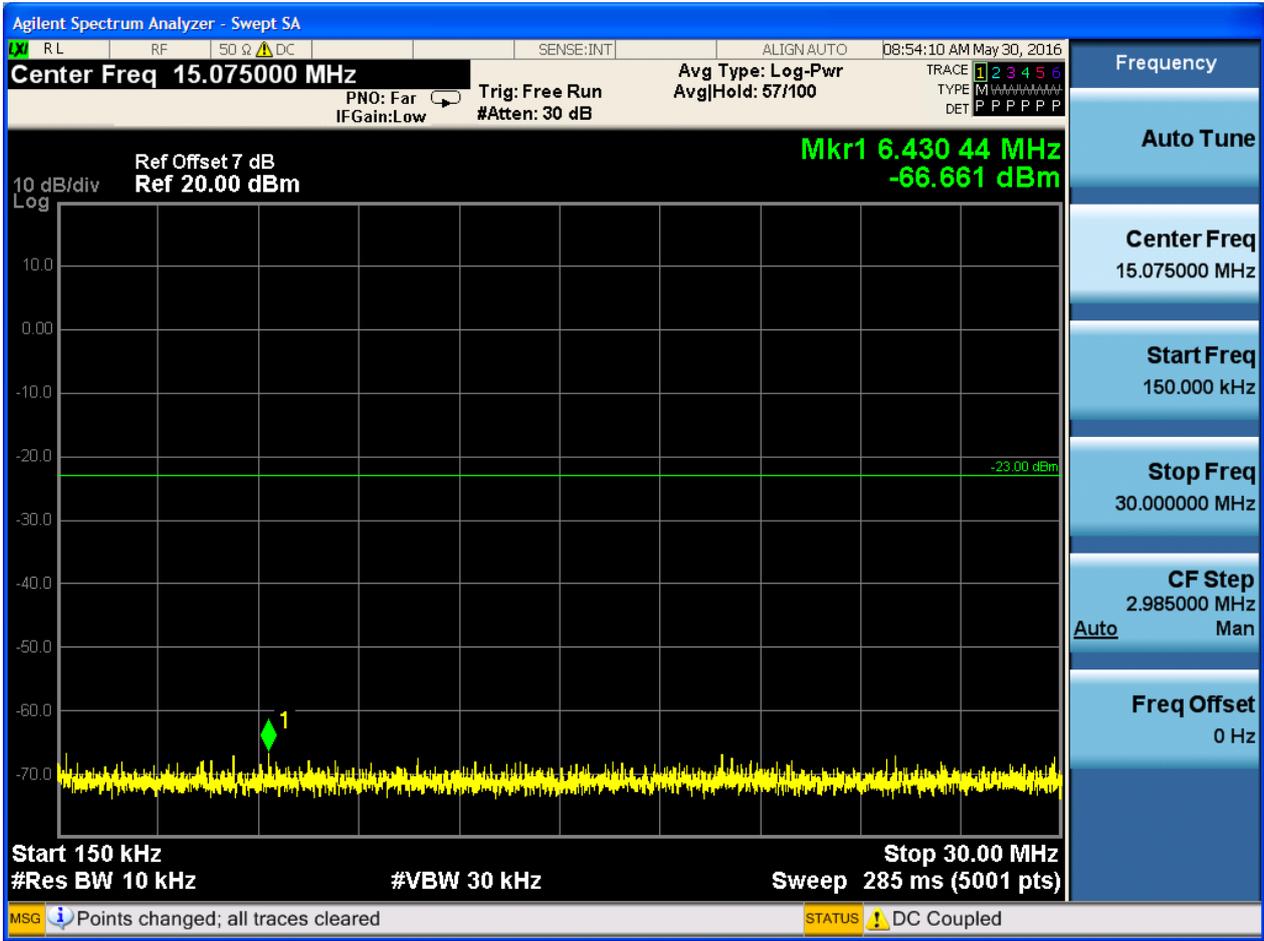


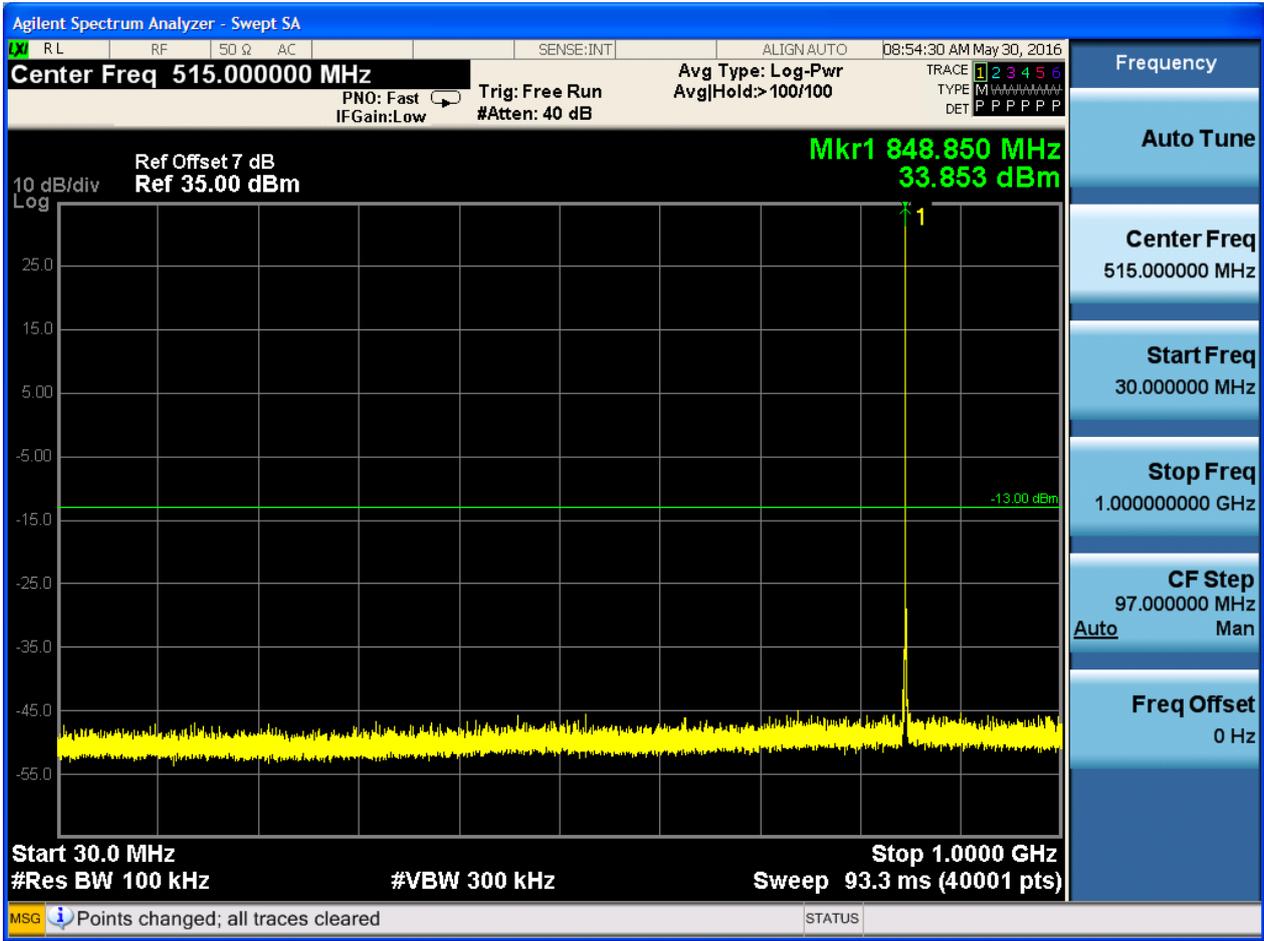


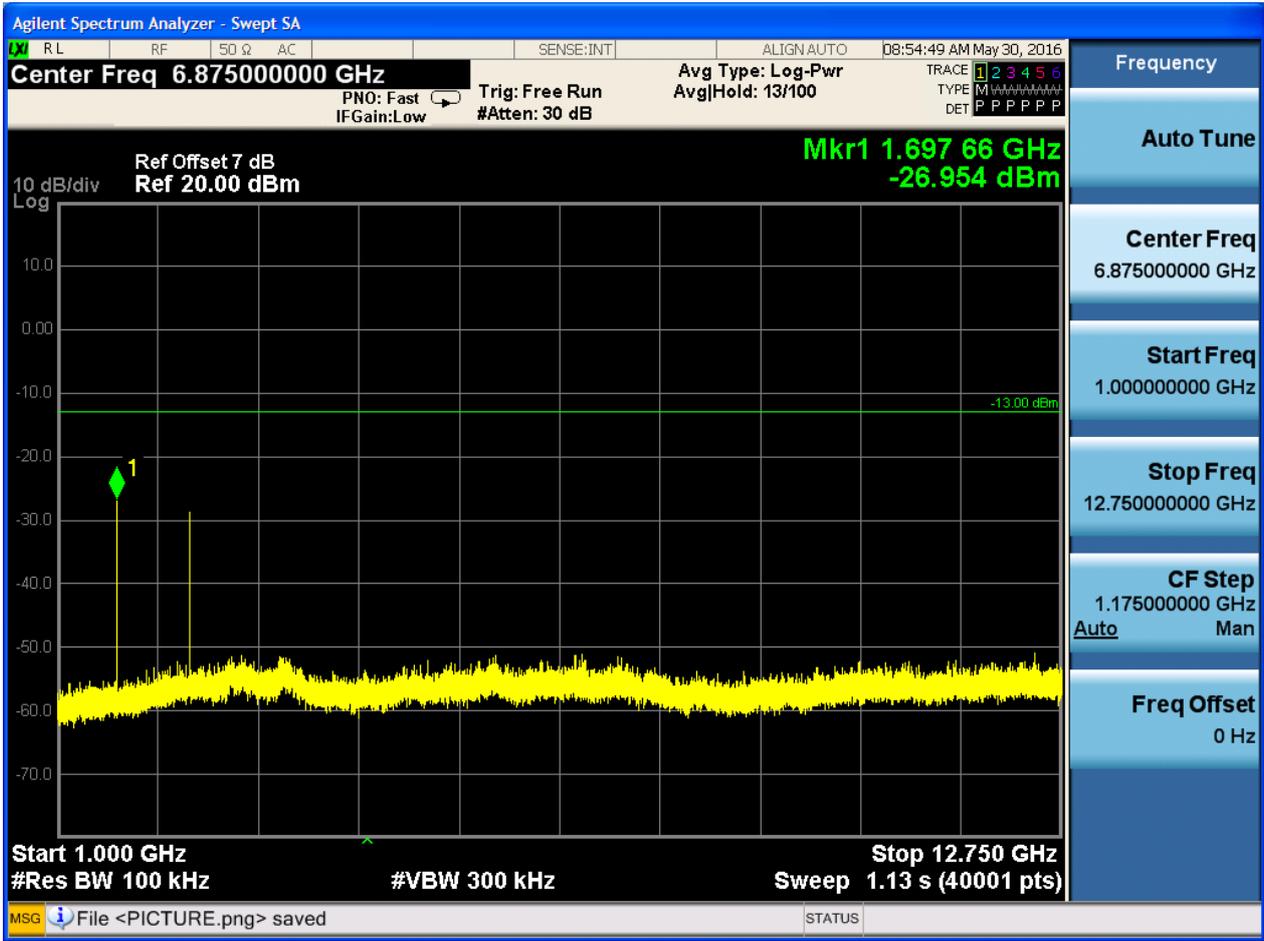


6.1.1.1.3 Test Channel = HCH



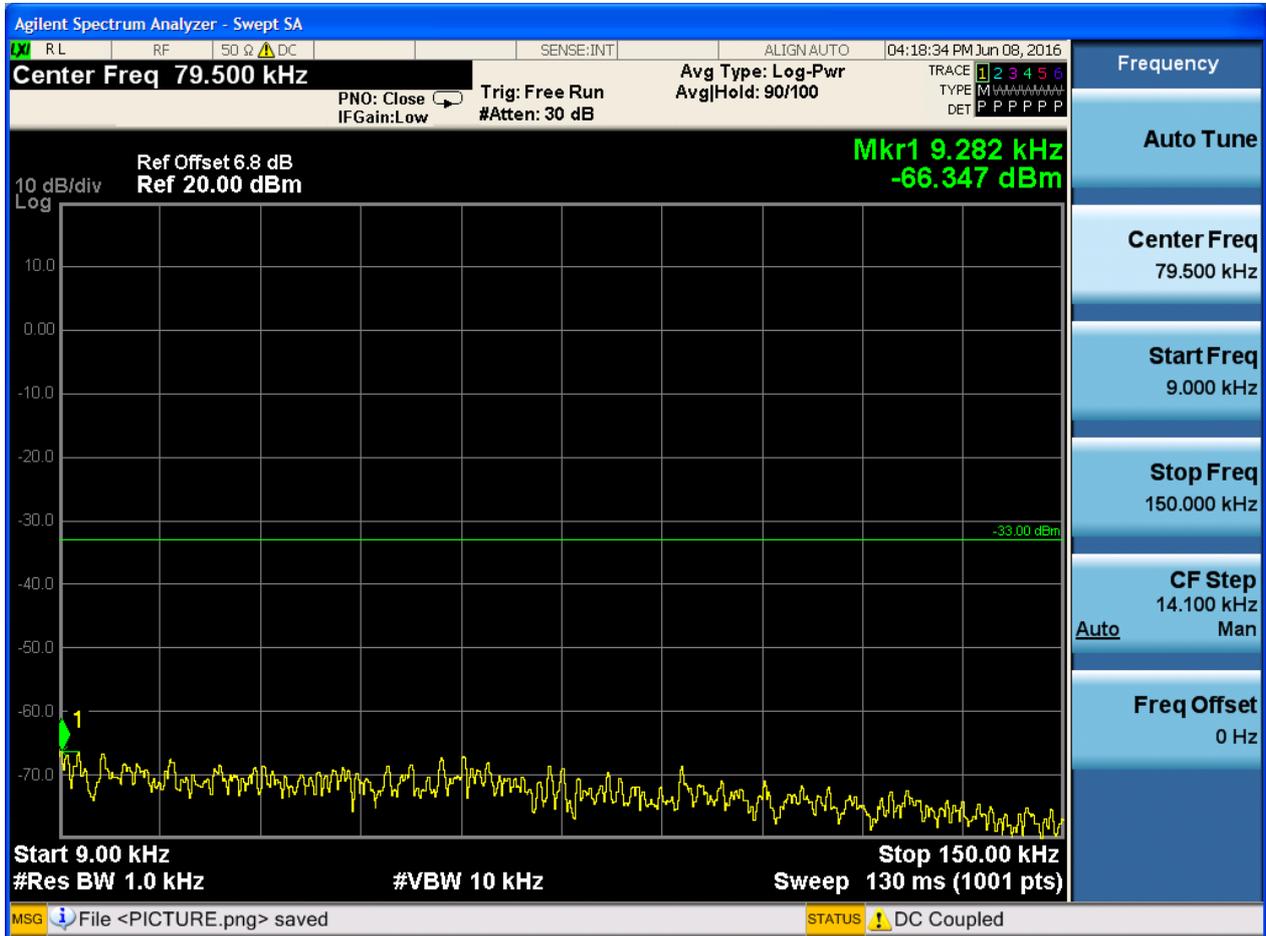


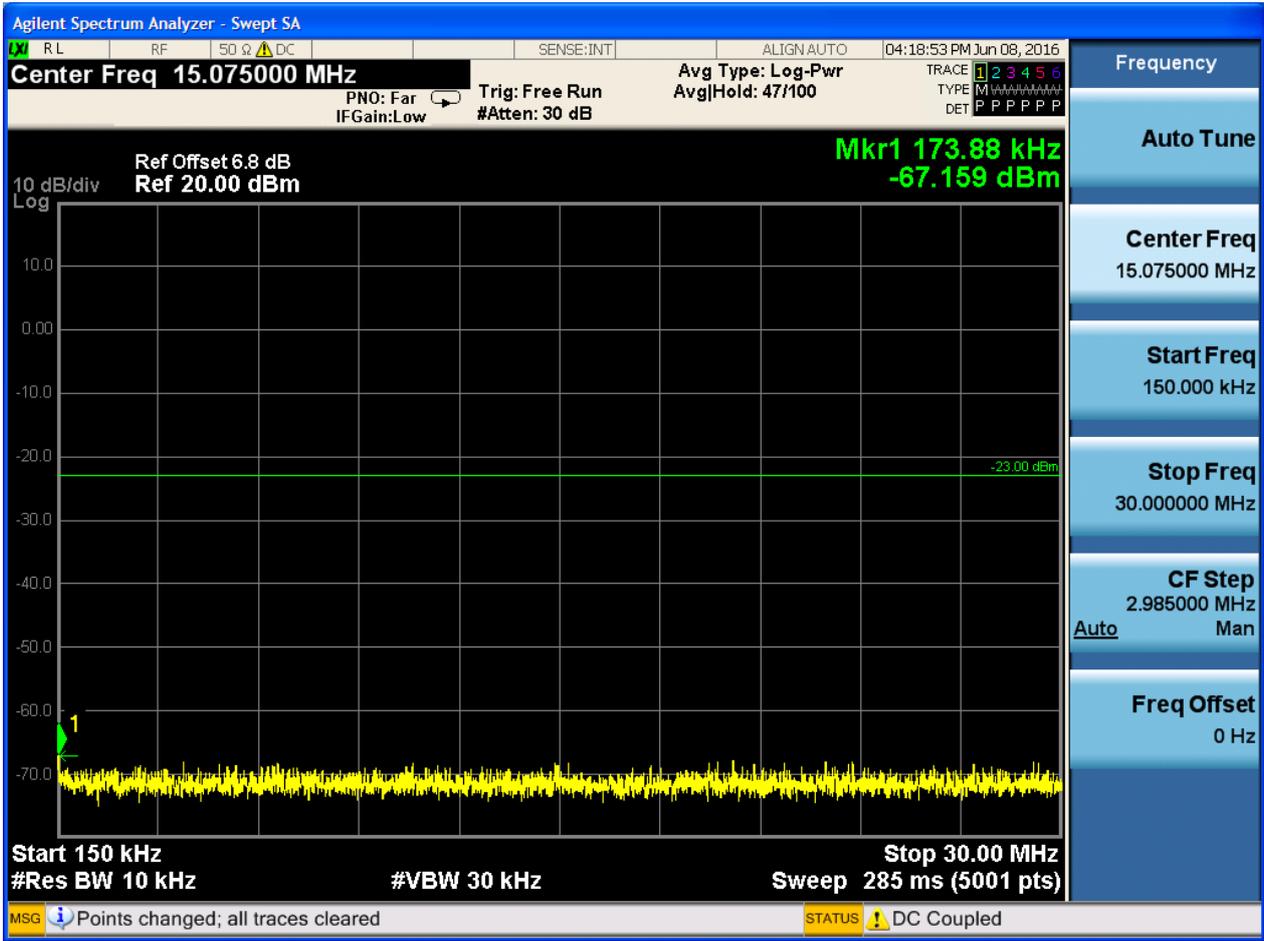


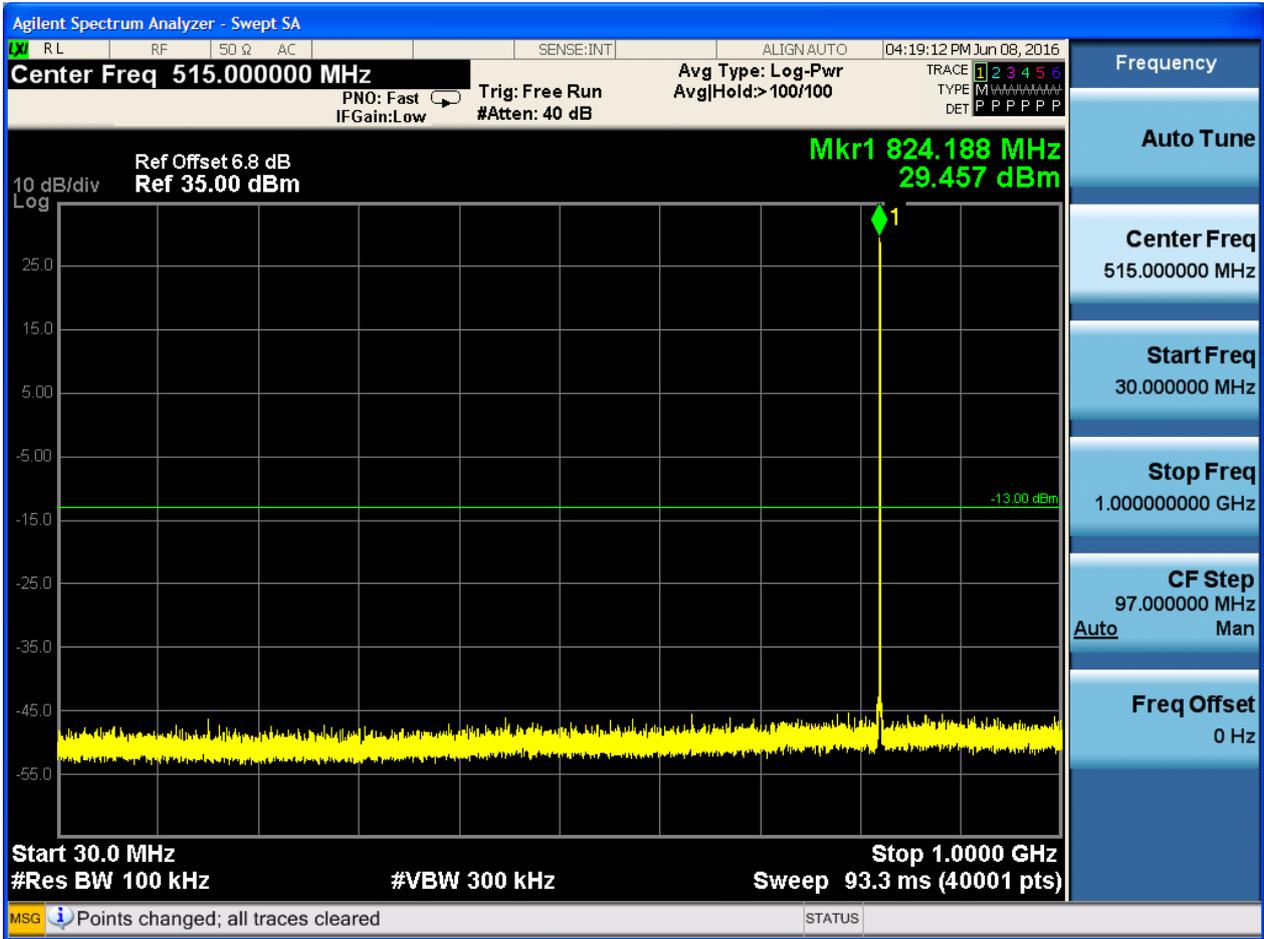


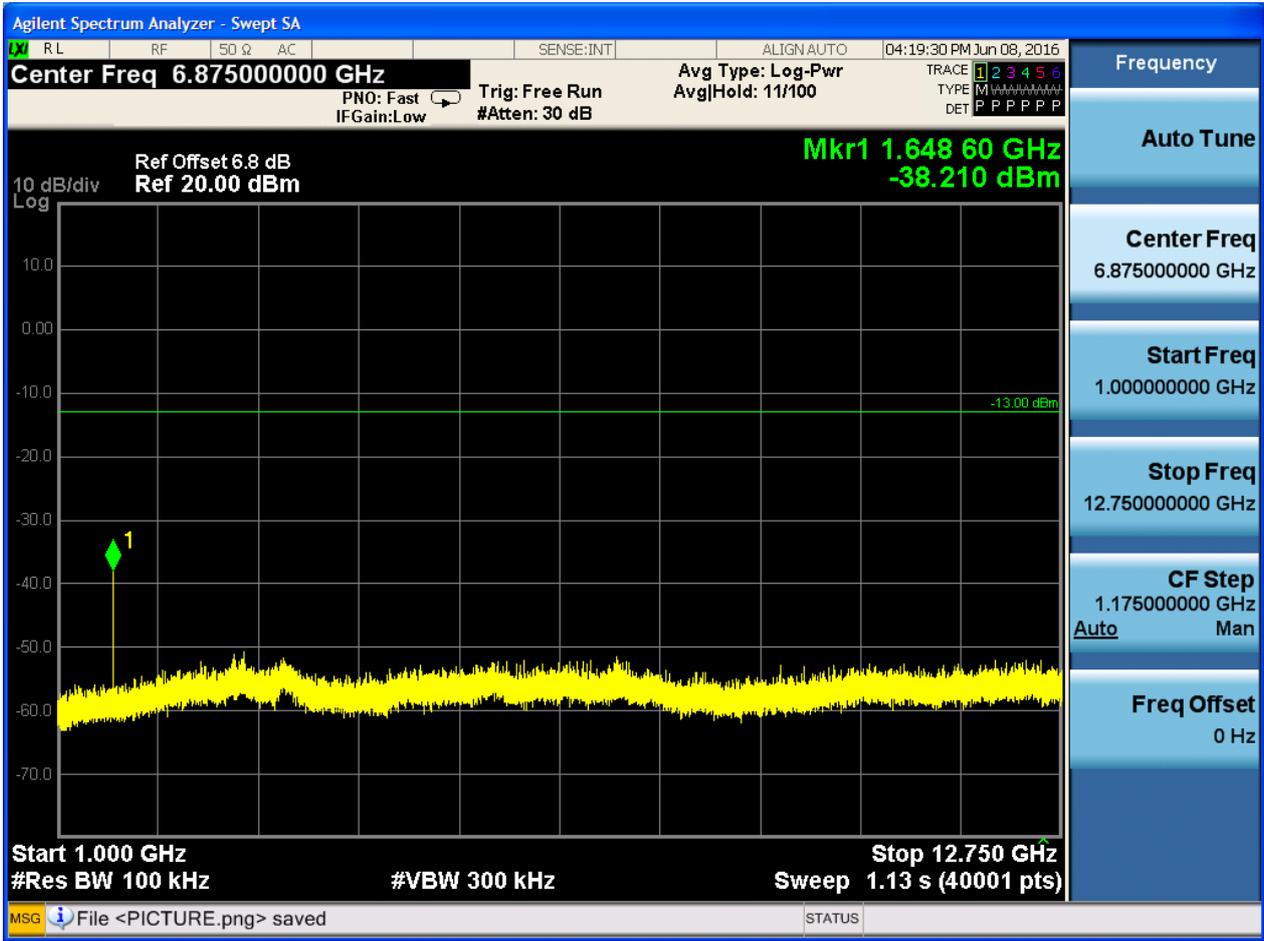
6.1.1.2 Test Mode = GSM/TM2

6.1.1.2.1 Test Channel = LCH



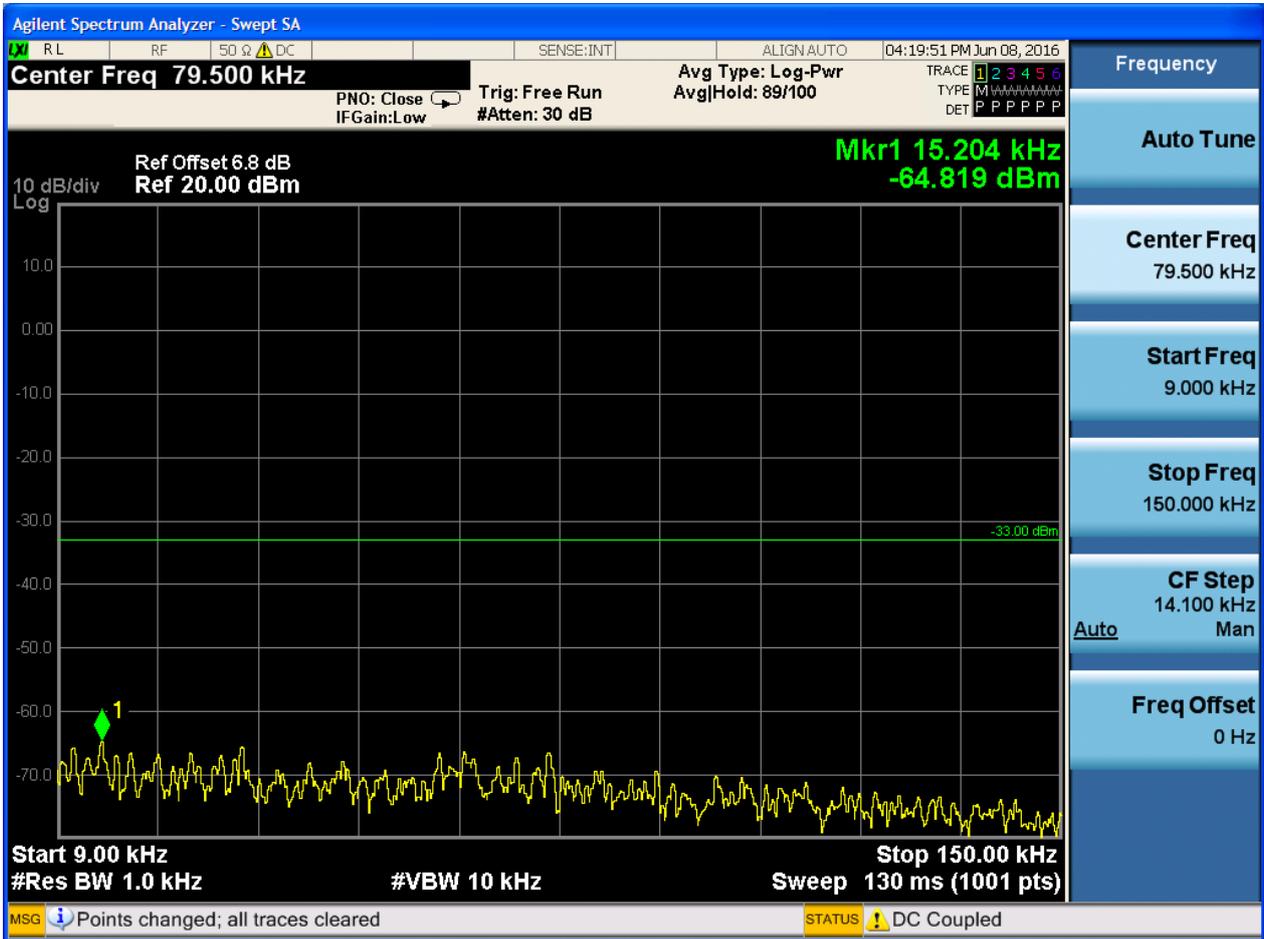


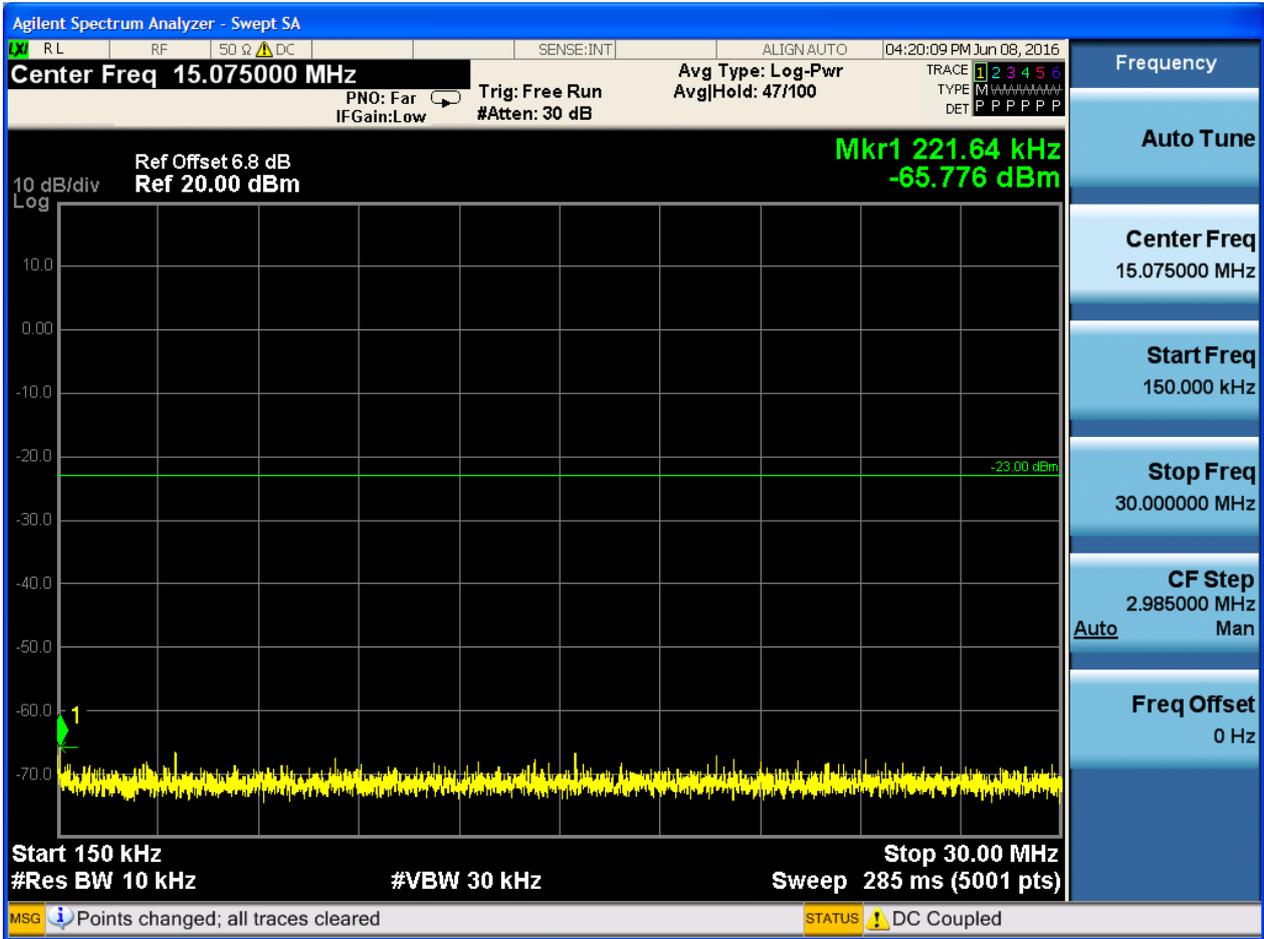


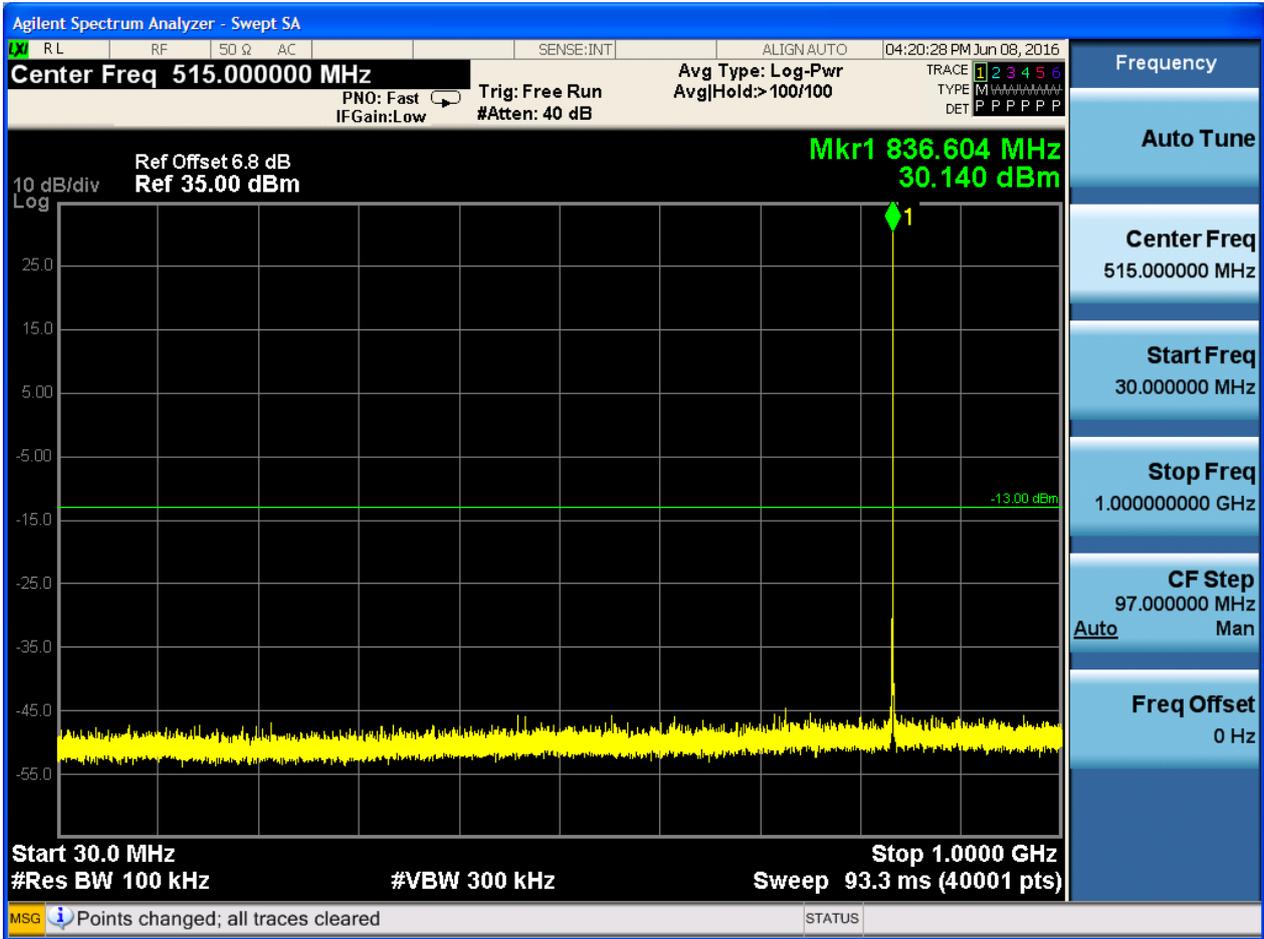




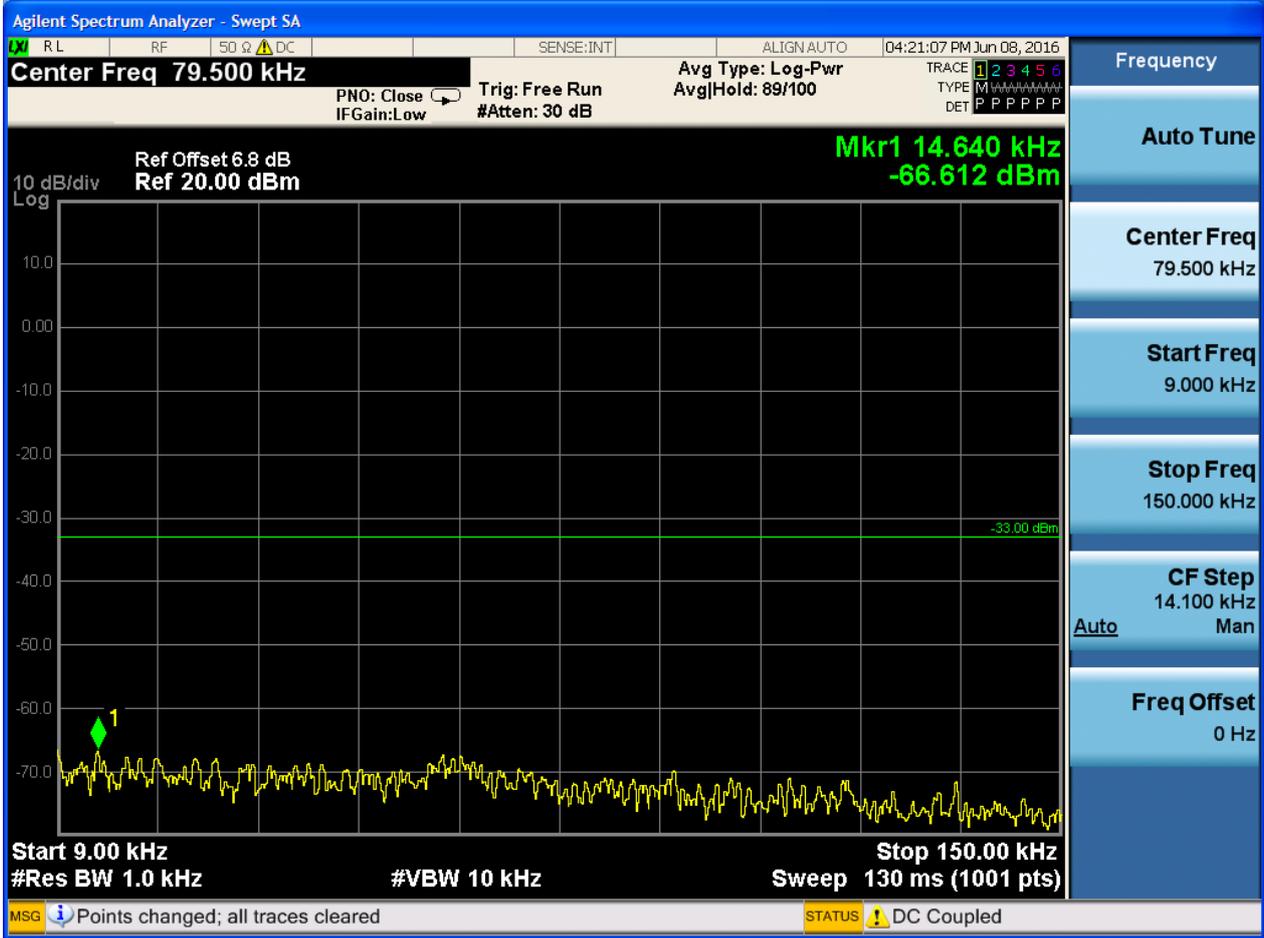
6.1.1.2.2 Test Channel = MCH

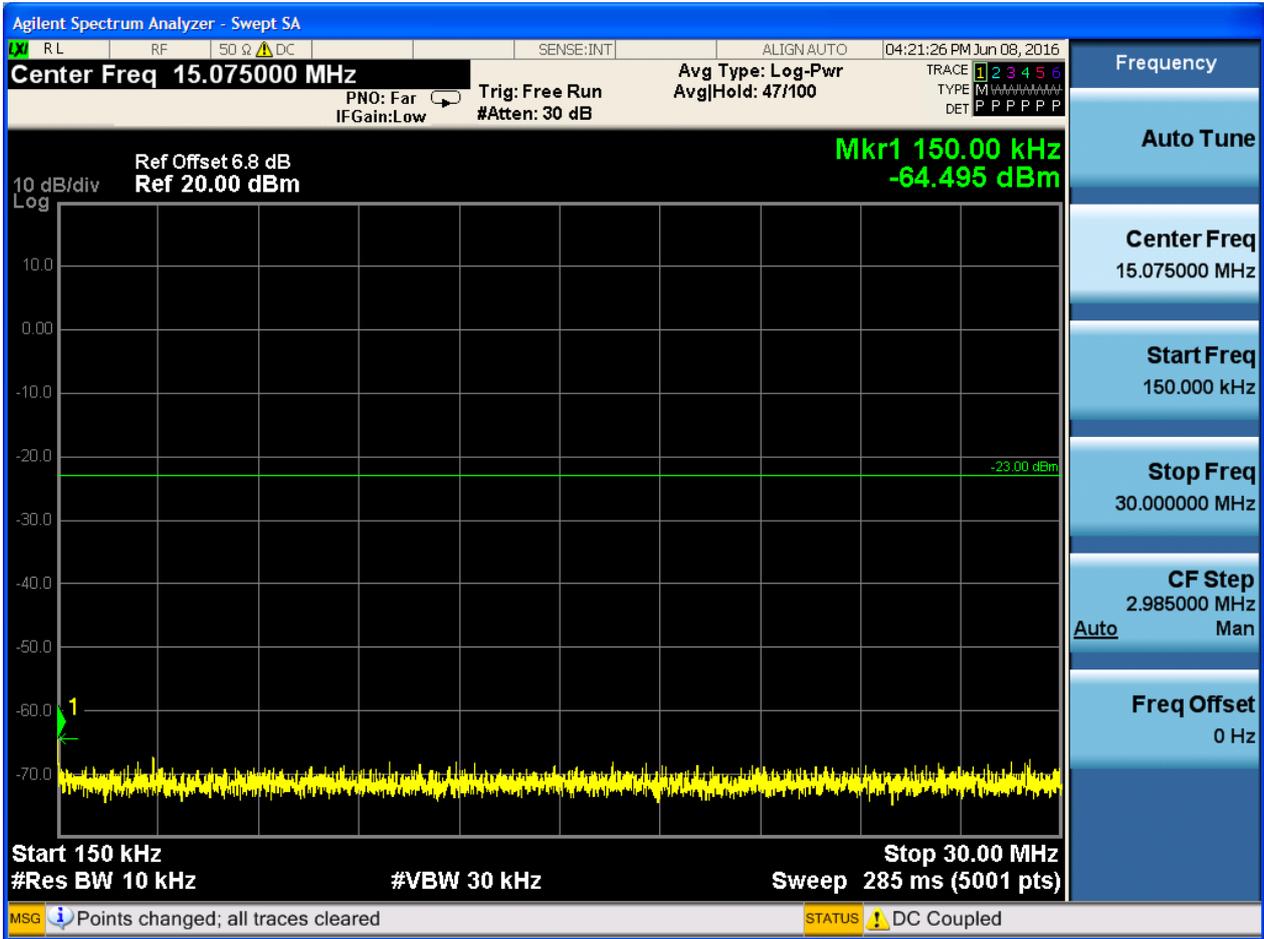


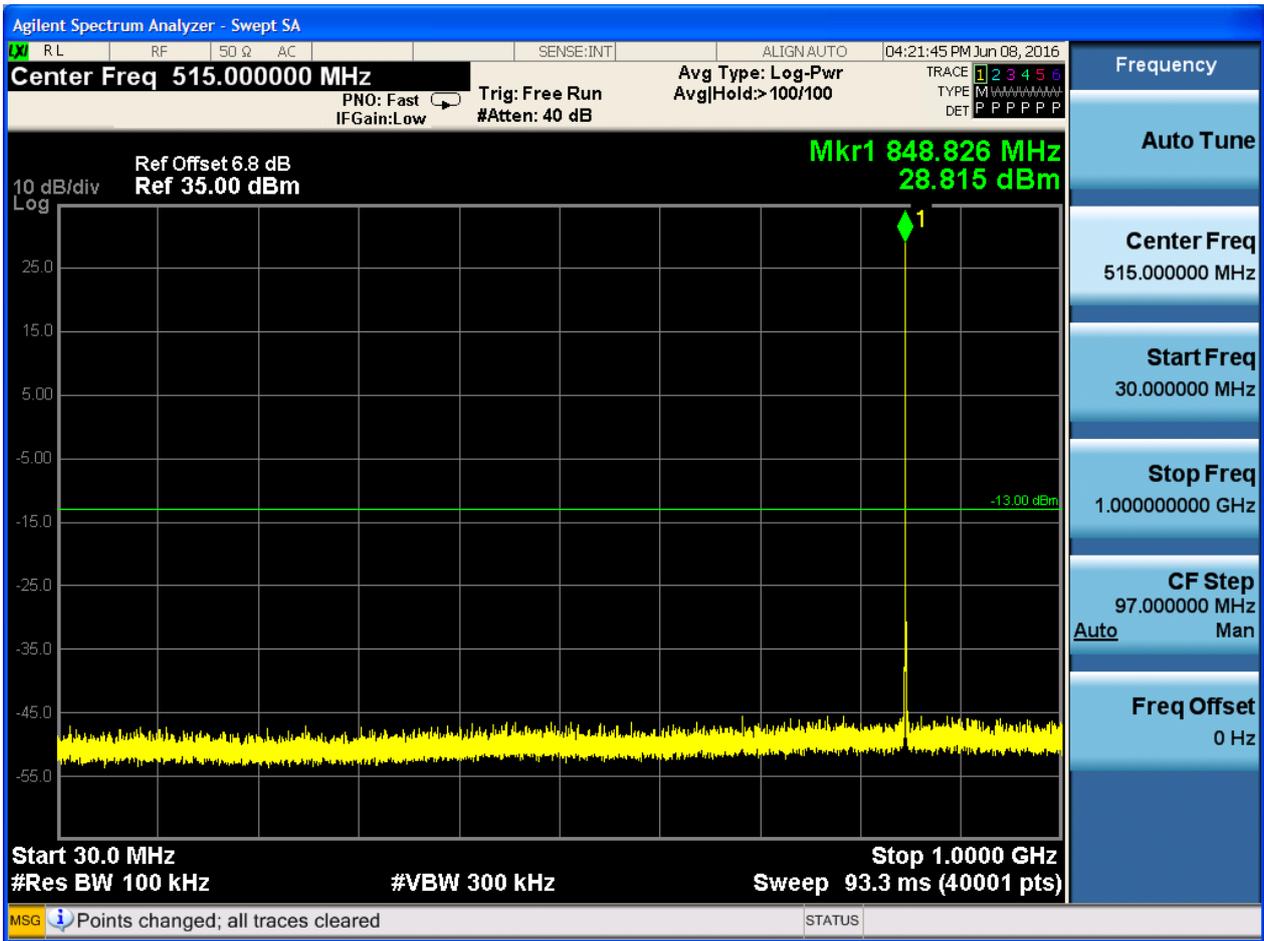


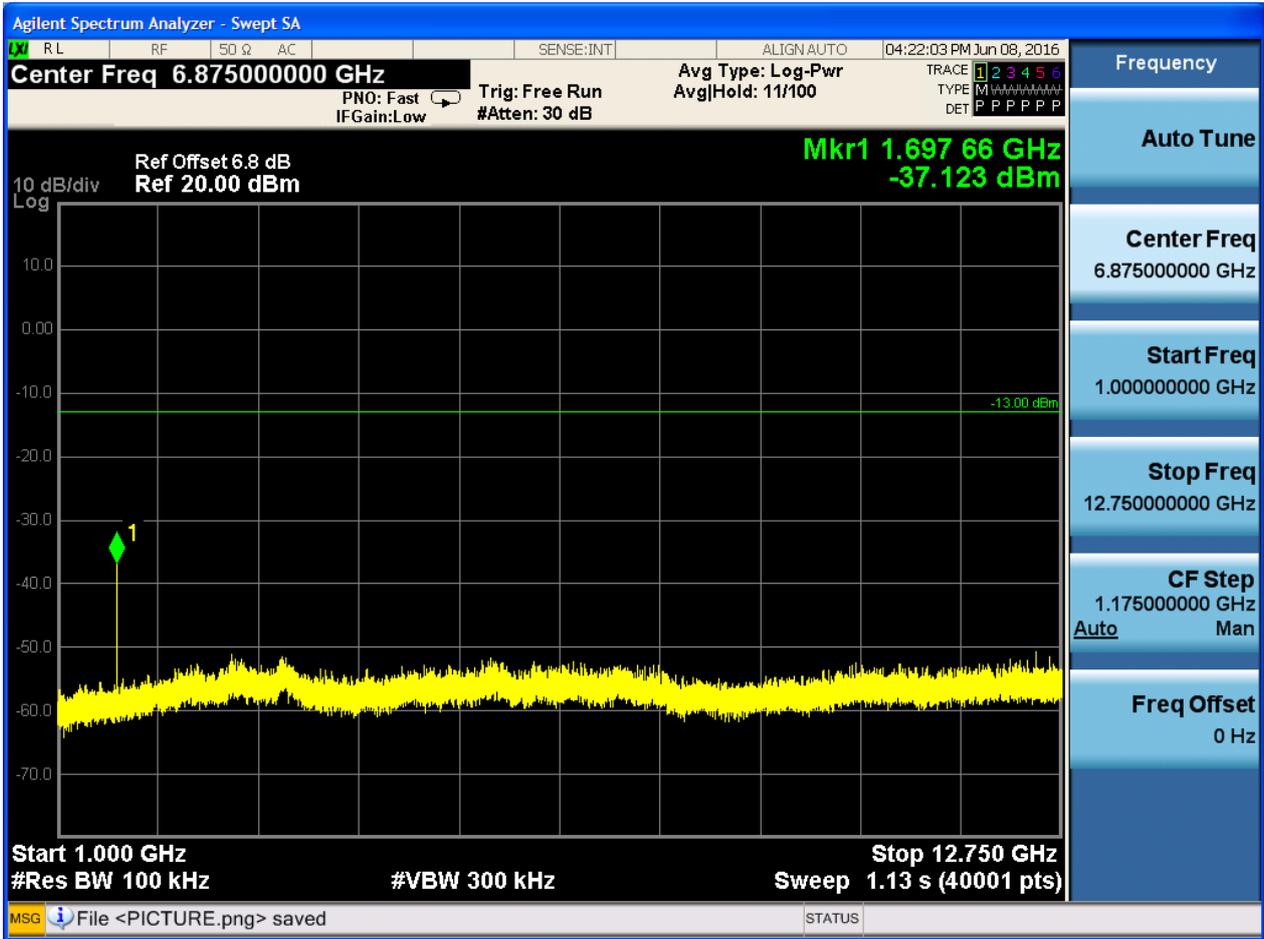


6.1.1.2.3 Test Channel = HCH









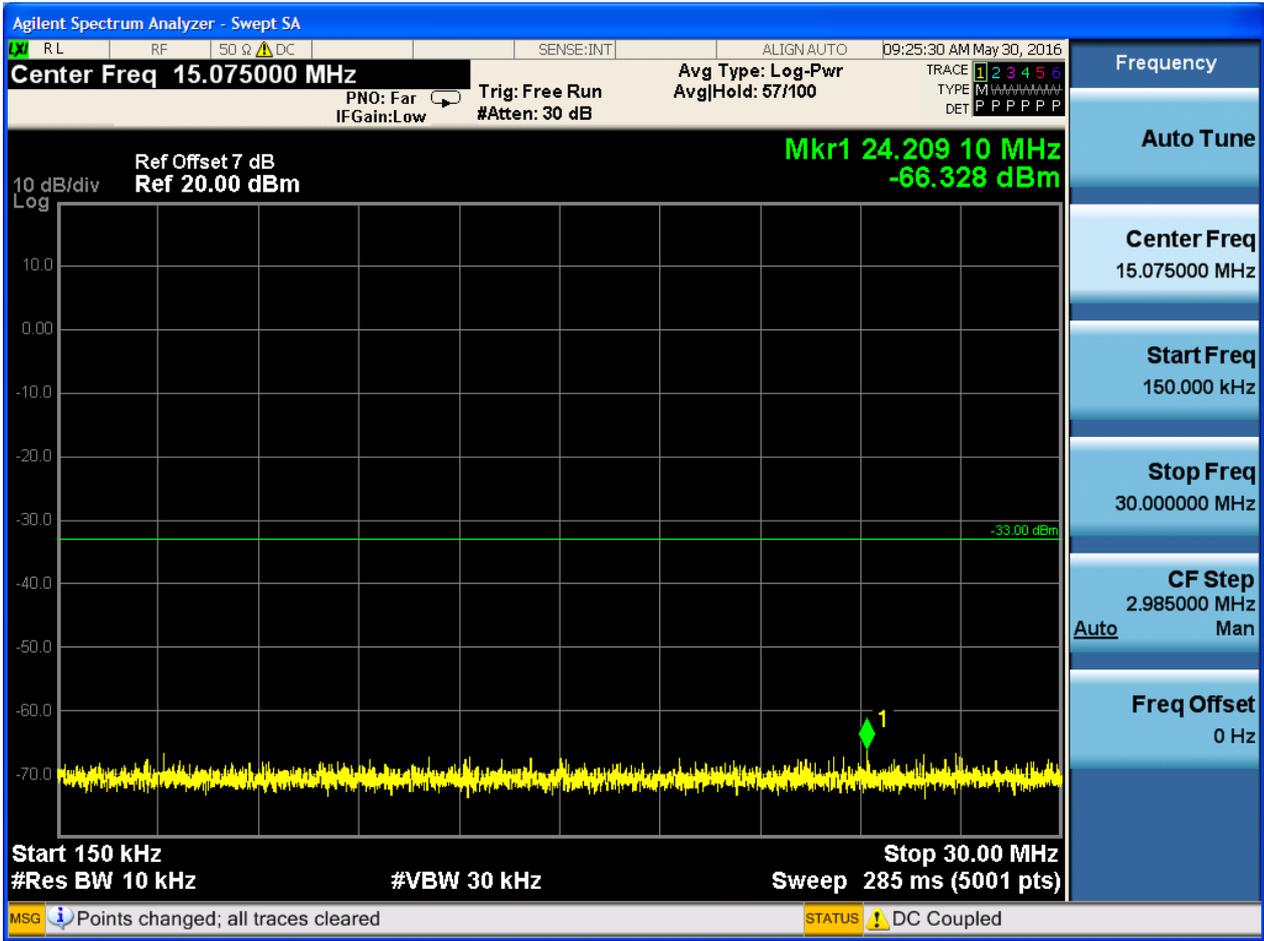


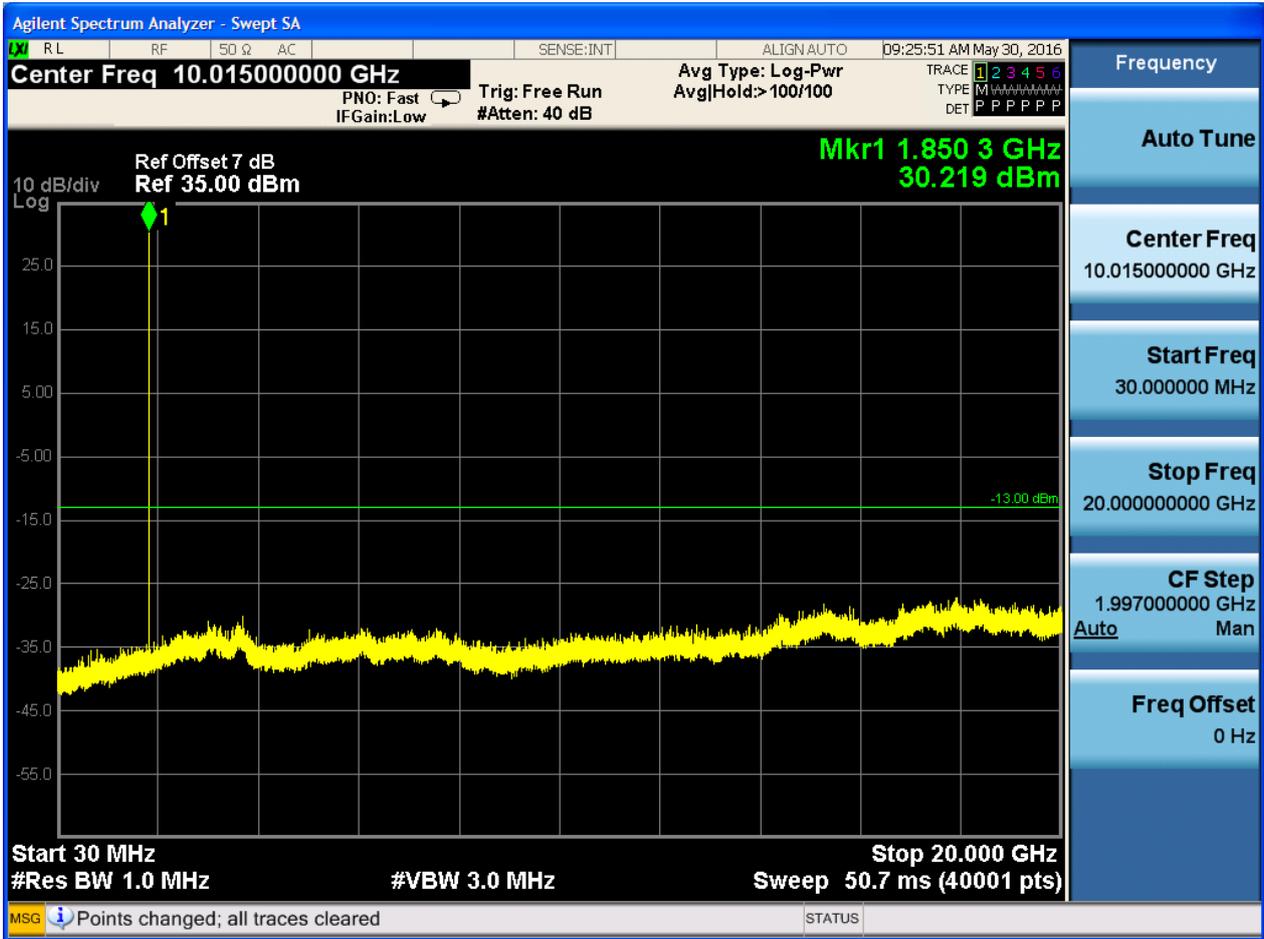
6.1.2 Test Band = GSM1900

6.1.2.1 Test Mode = GSM/TM1

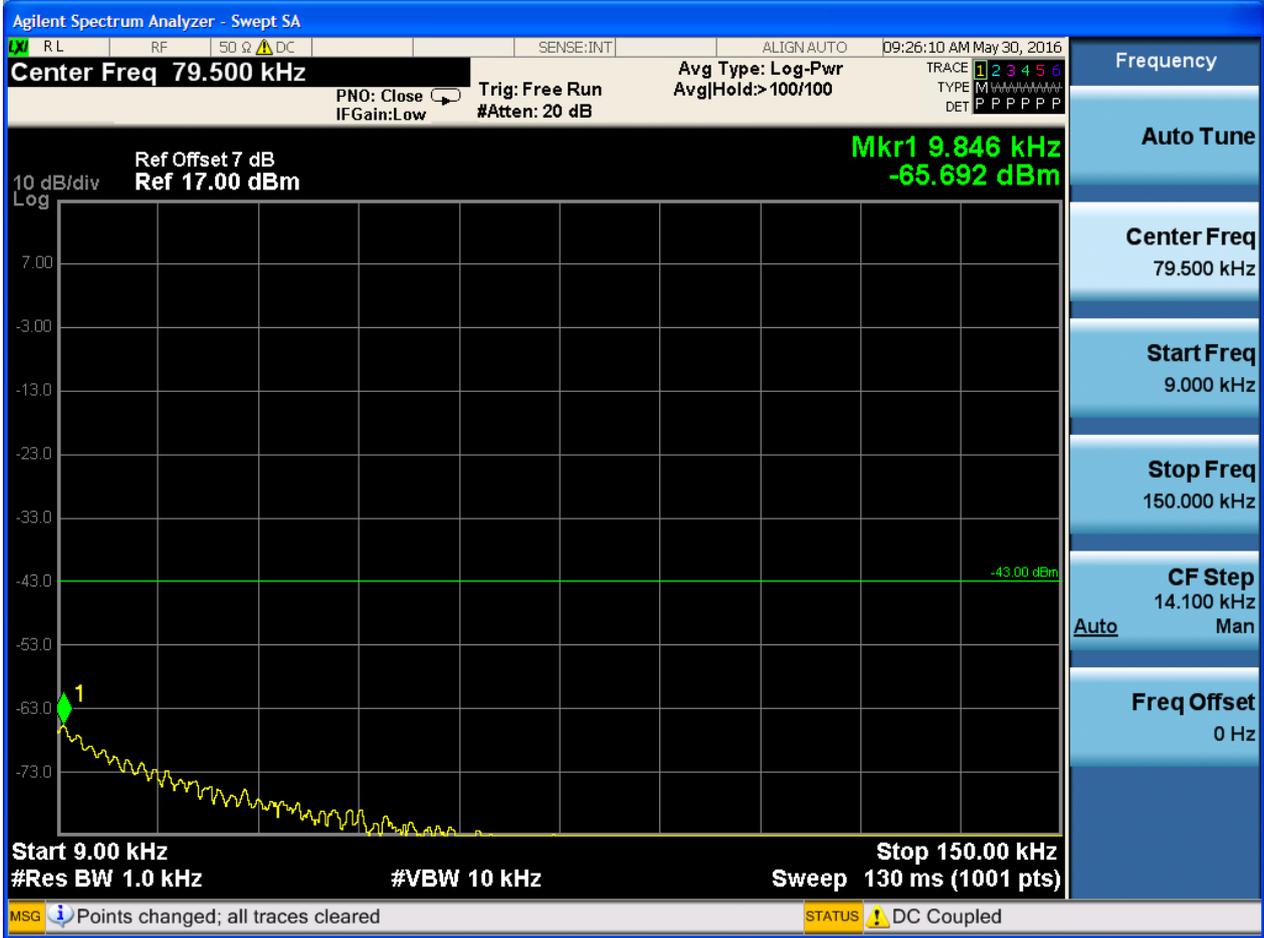
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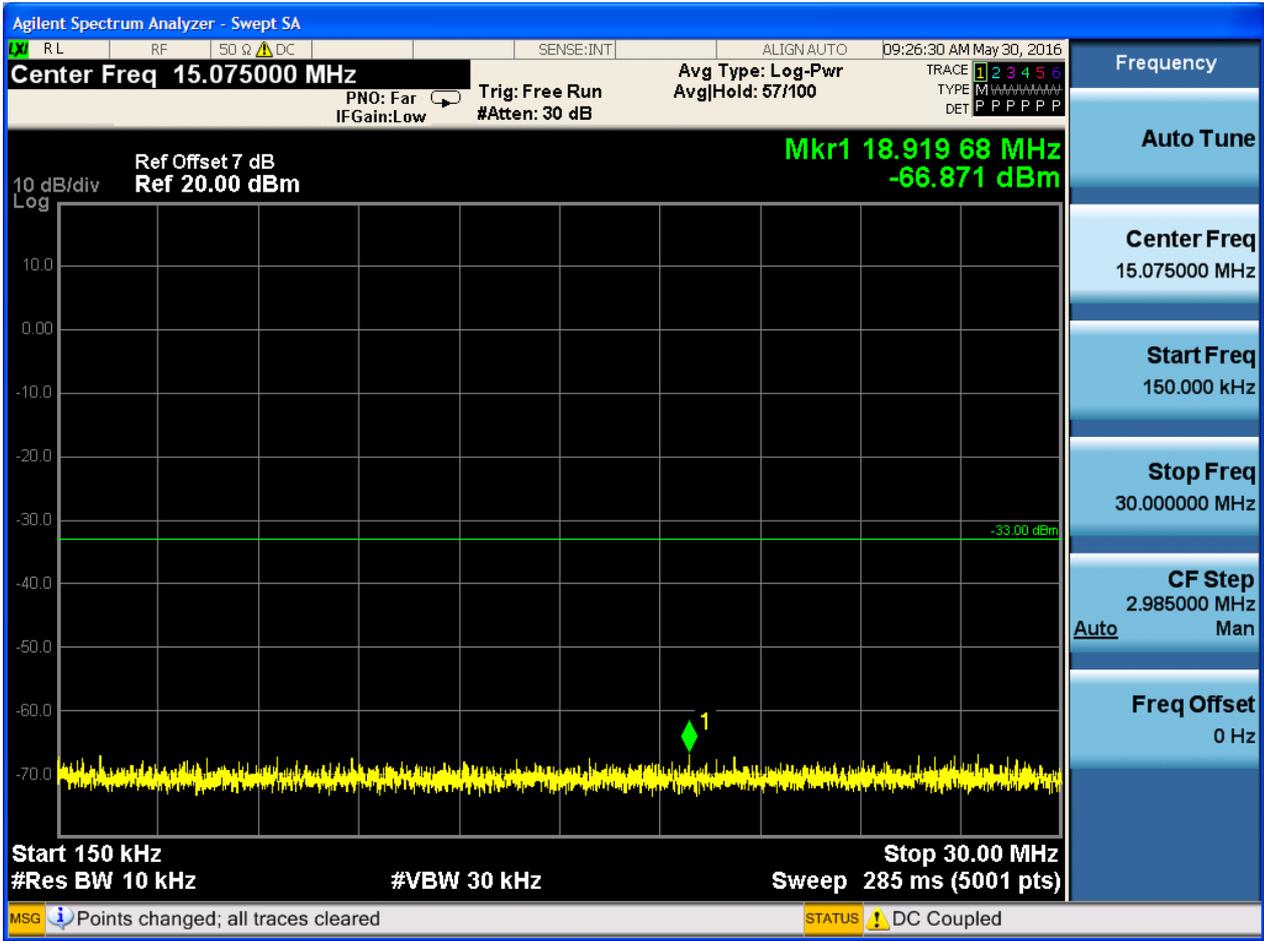






6.1.2.1.2 Test Channel = MCH



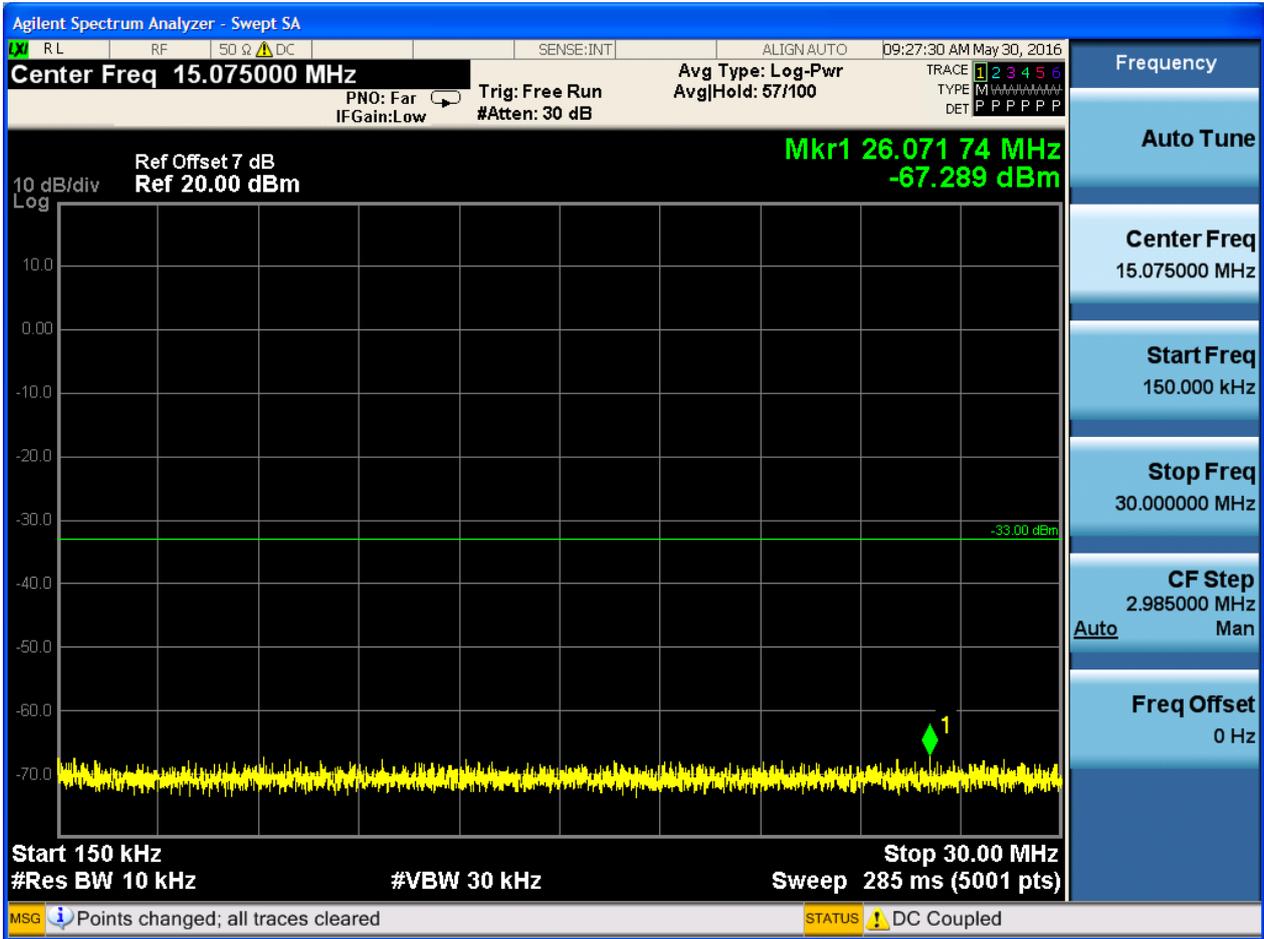


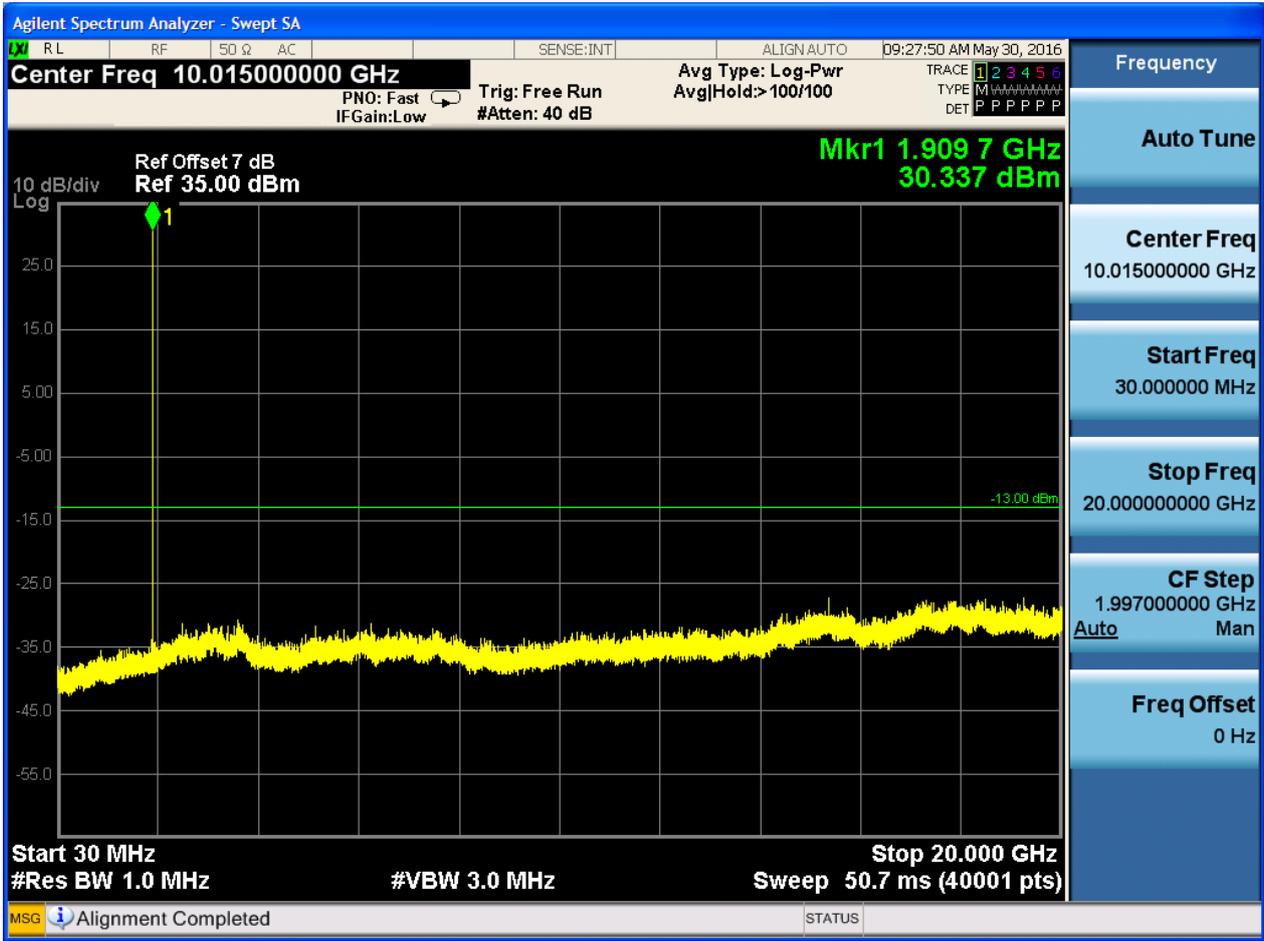




6.1.2.1.3 Test Channel = HCH



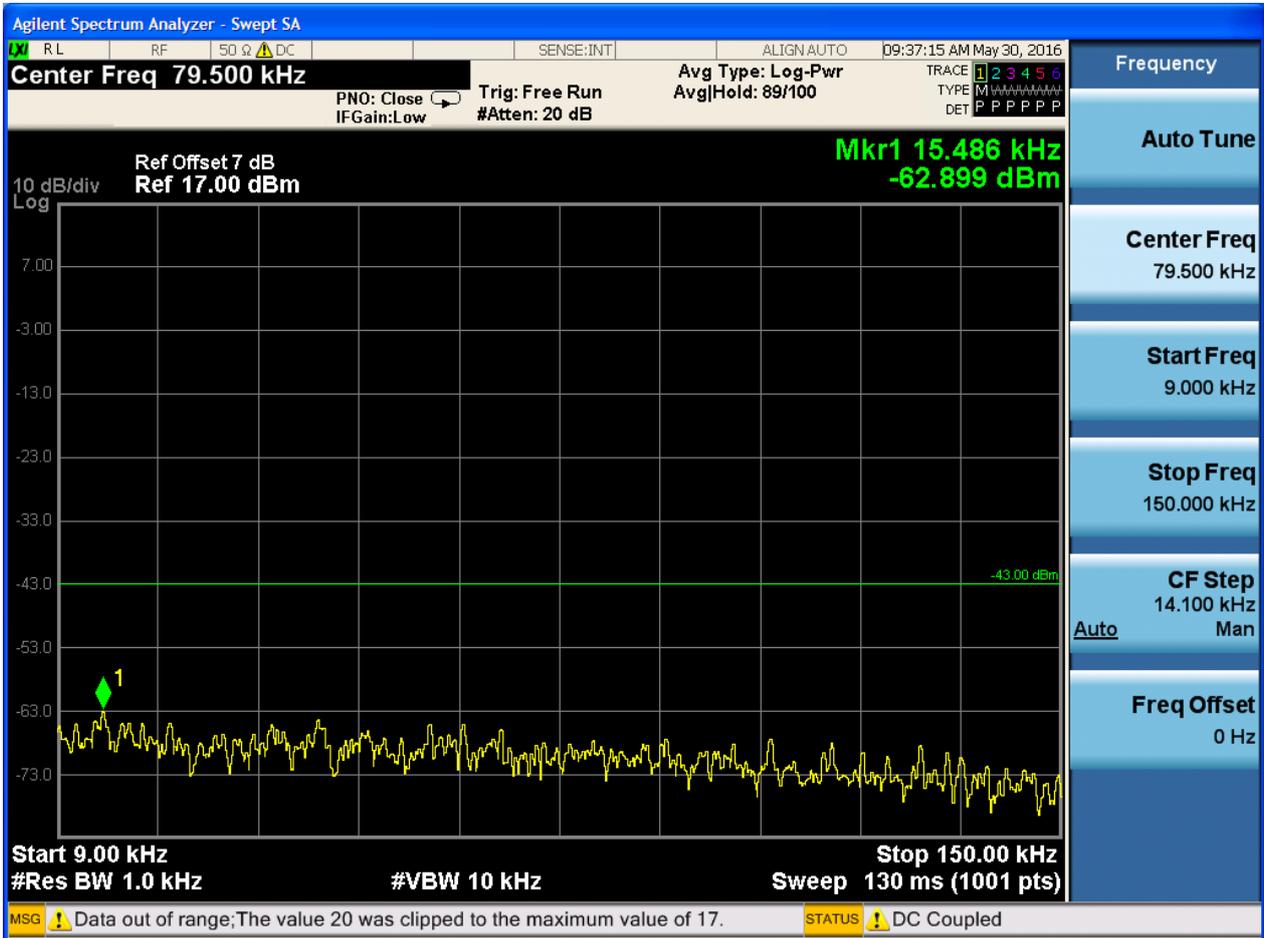


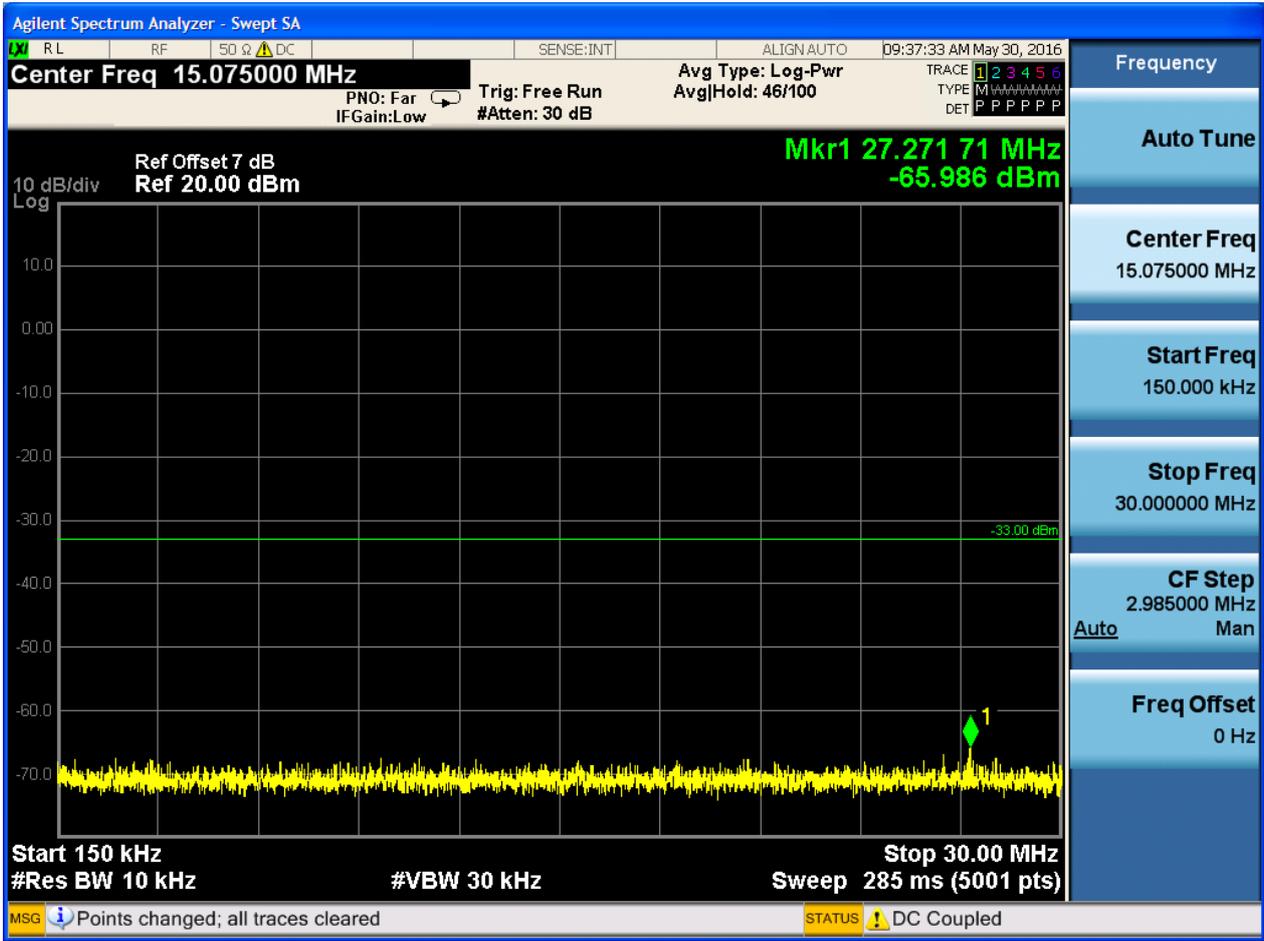


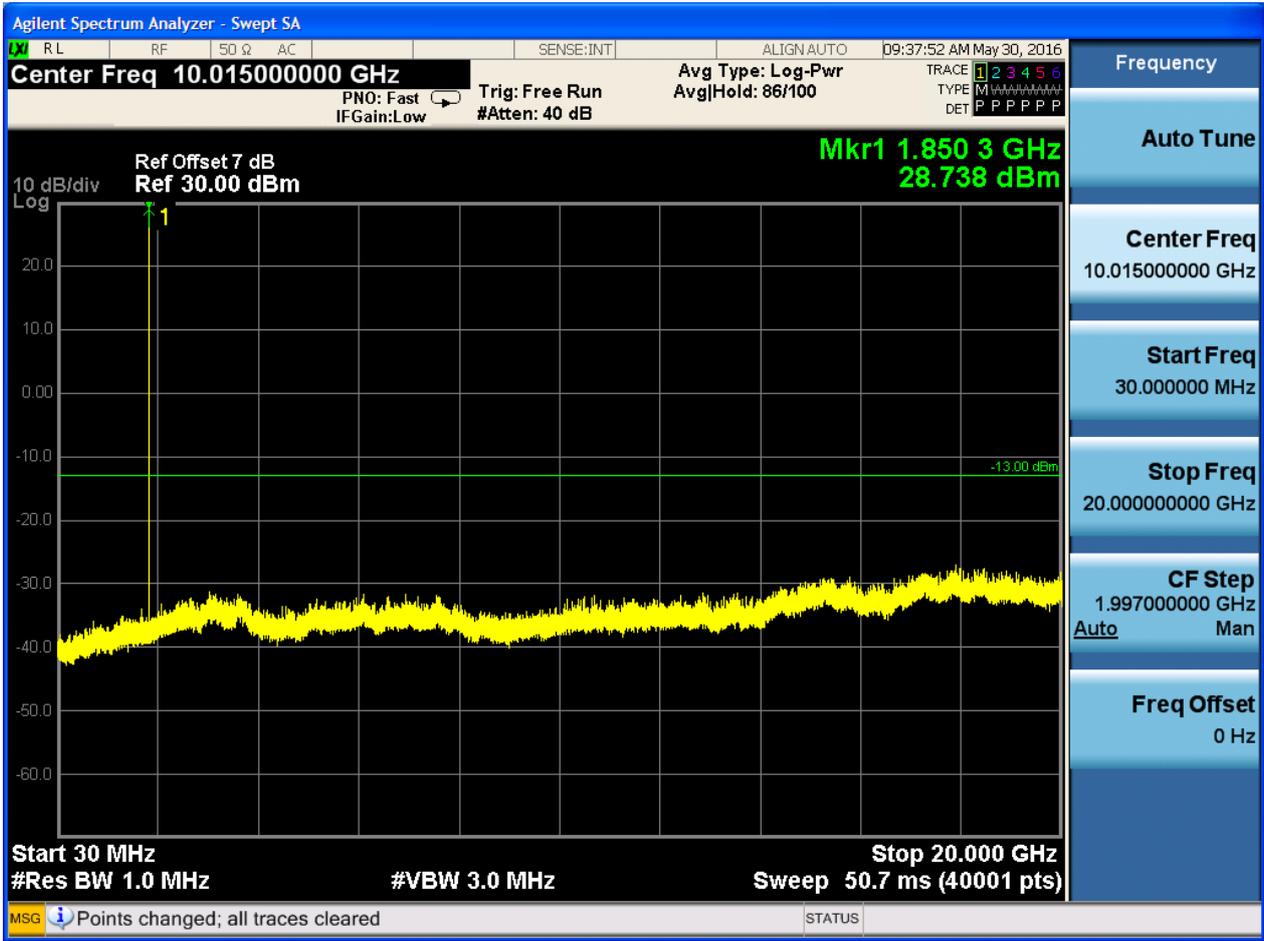


6.1.2.2 Test Mode = GSM/TM2

6.1.2.2.1 Test Channel = LCH

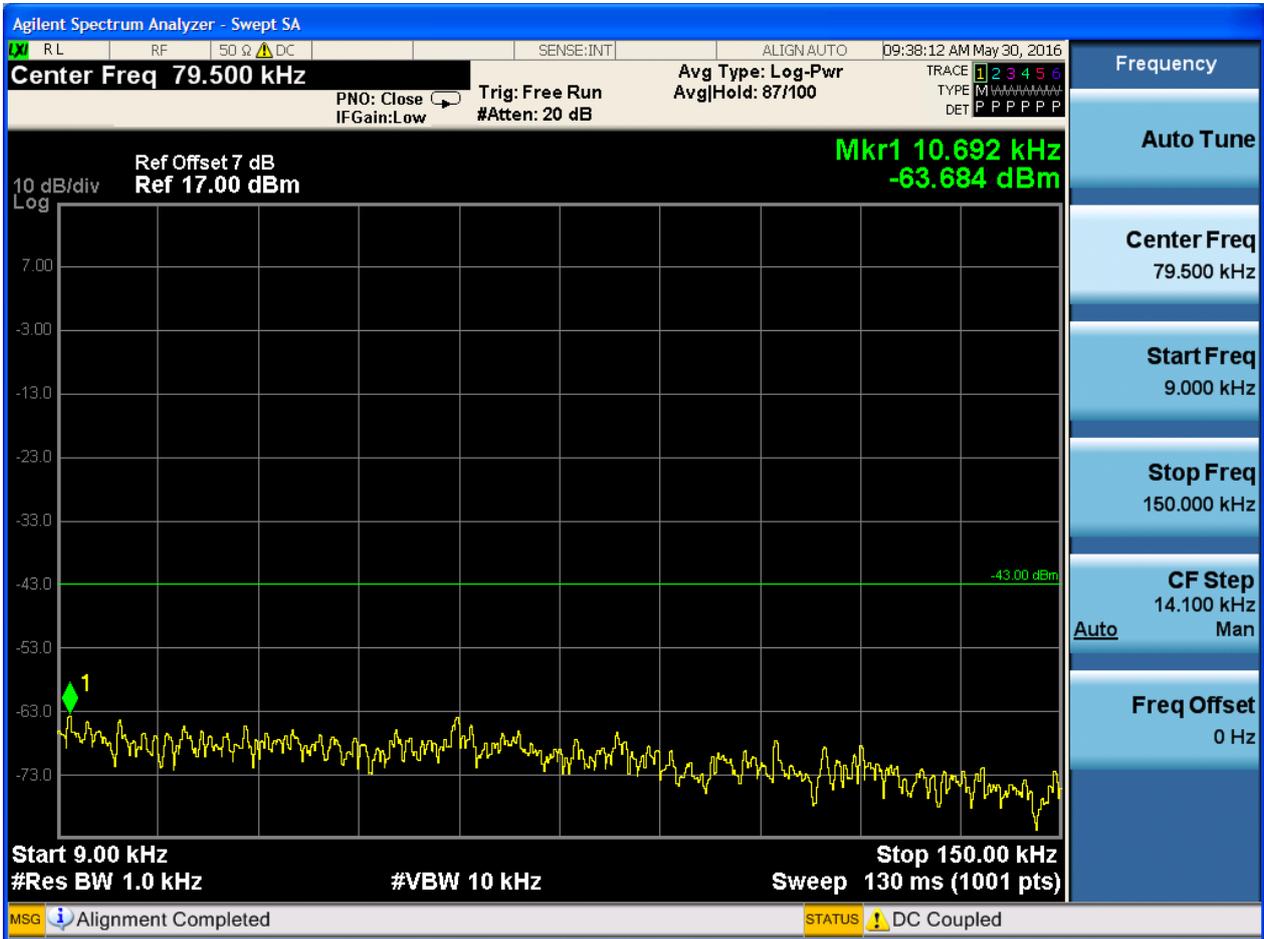


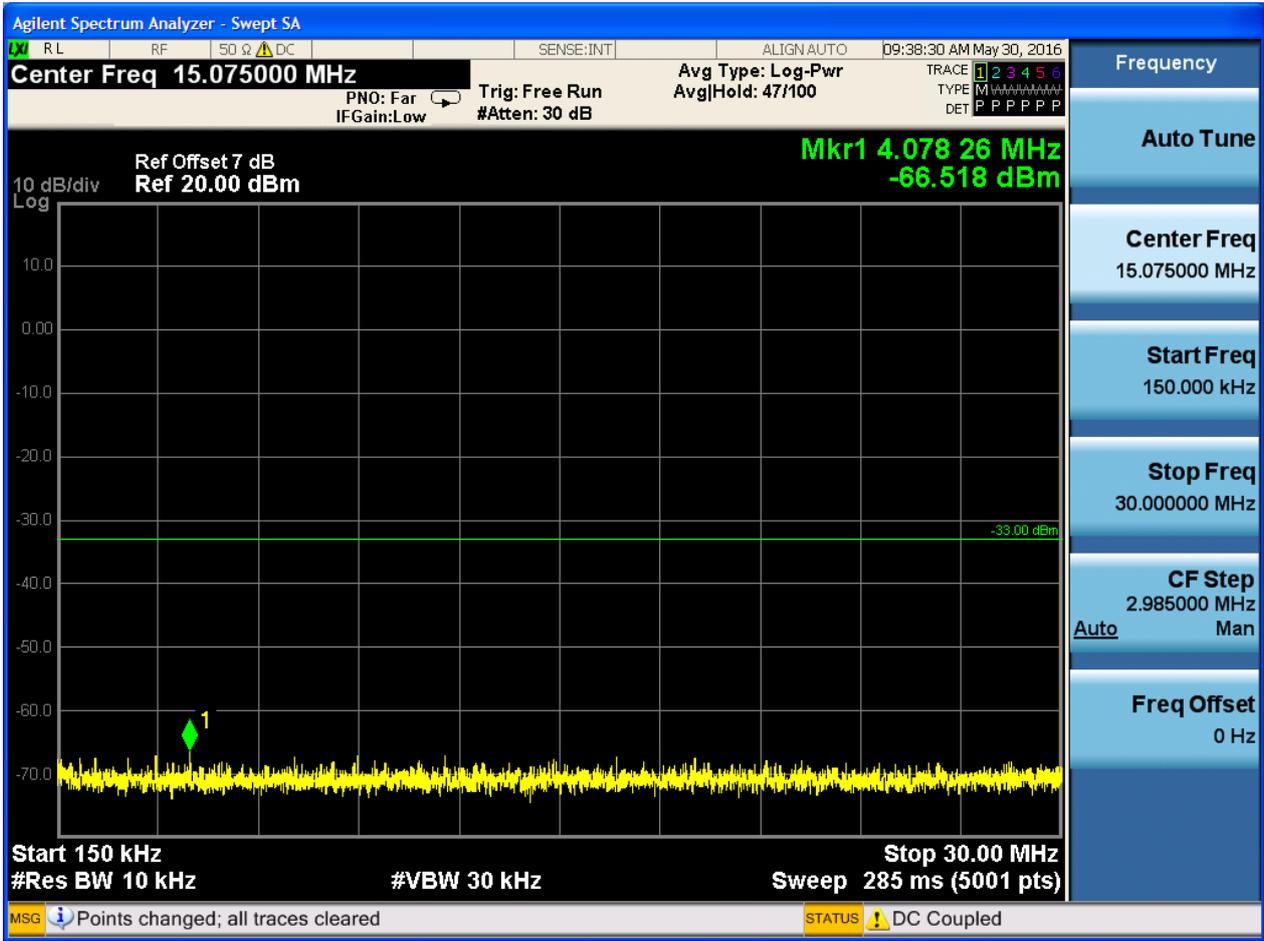


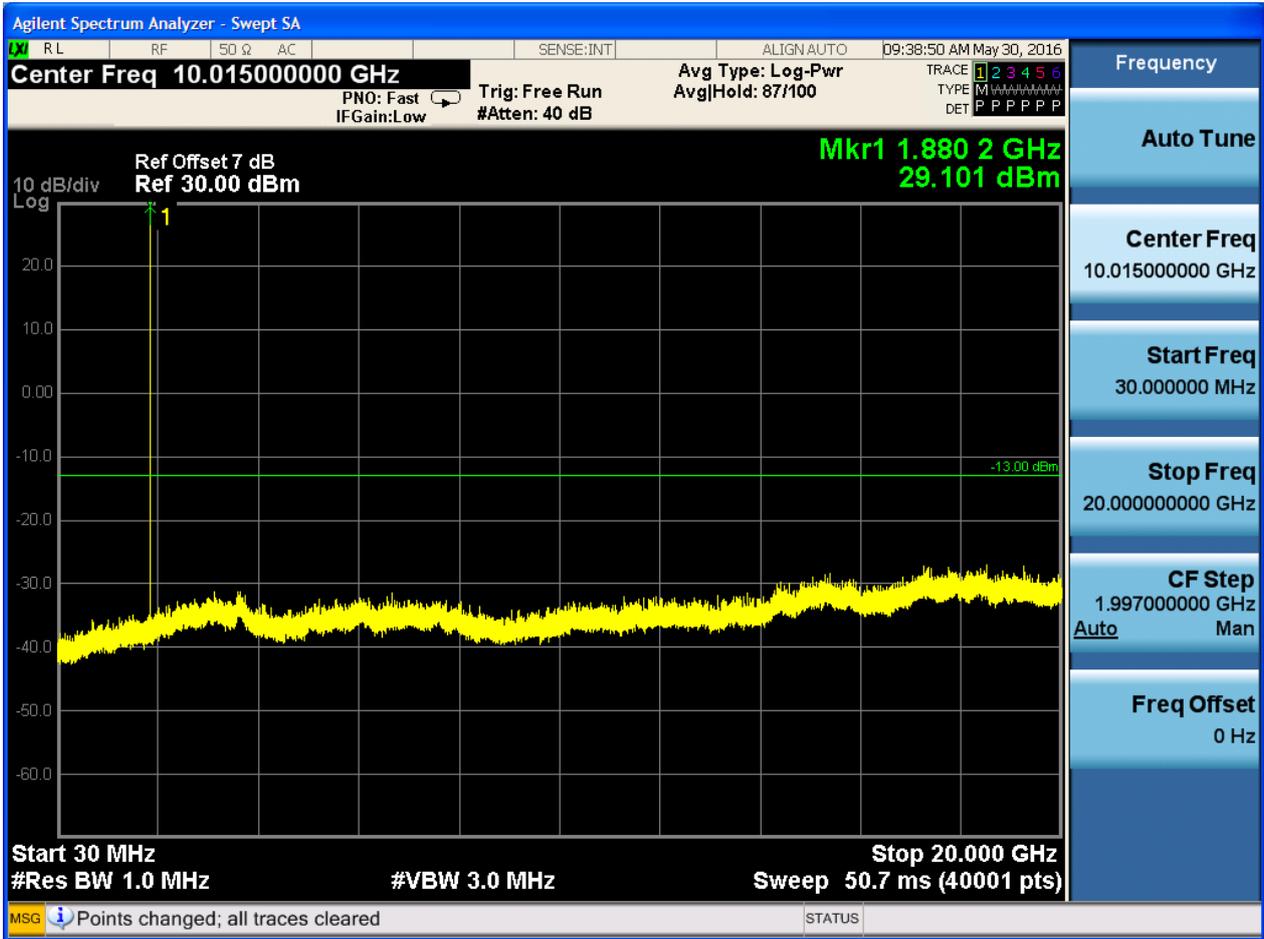




6.1.2.2.2 Test Channel = MCH

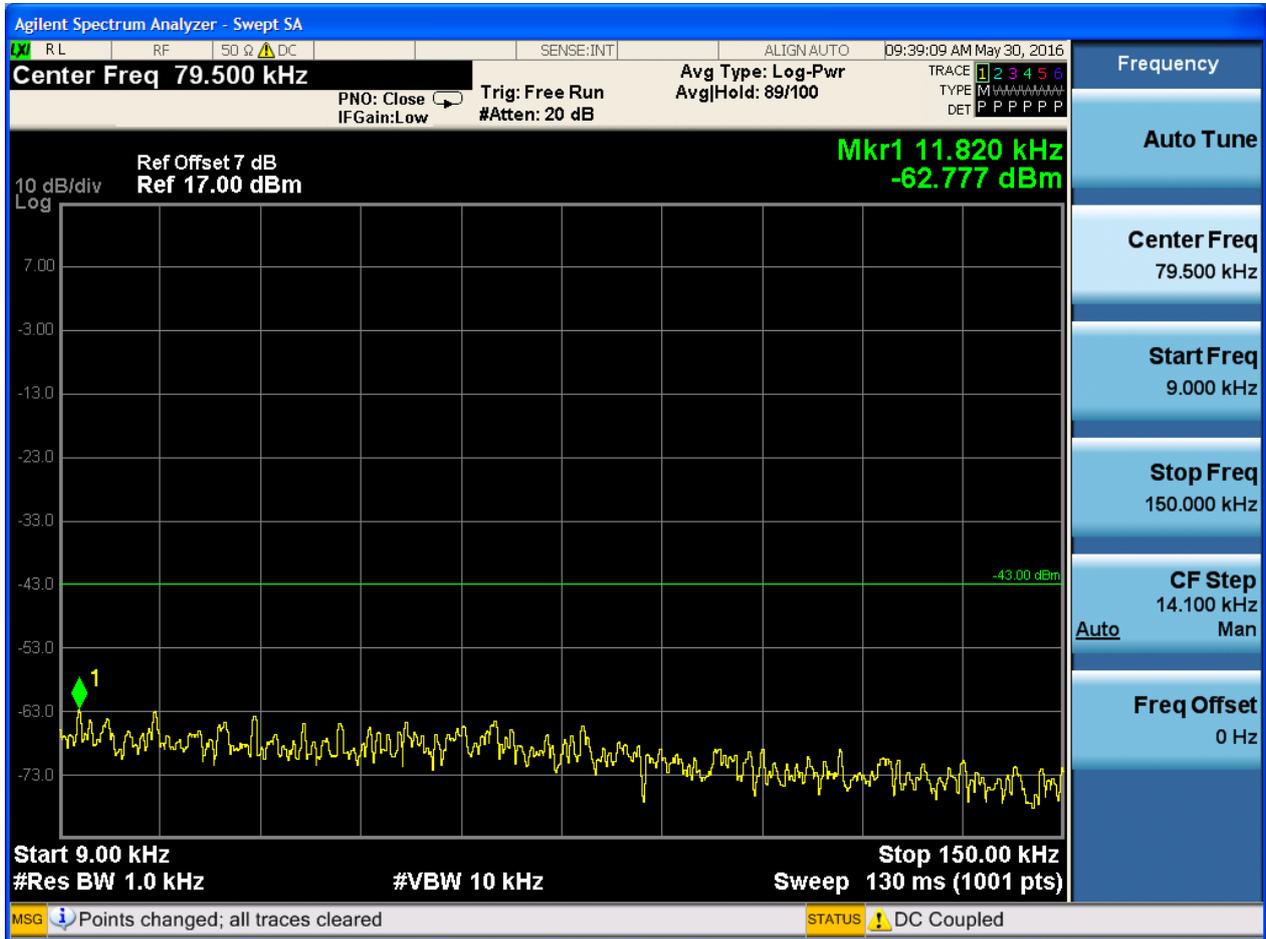


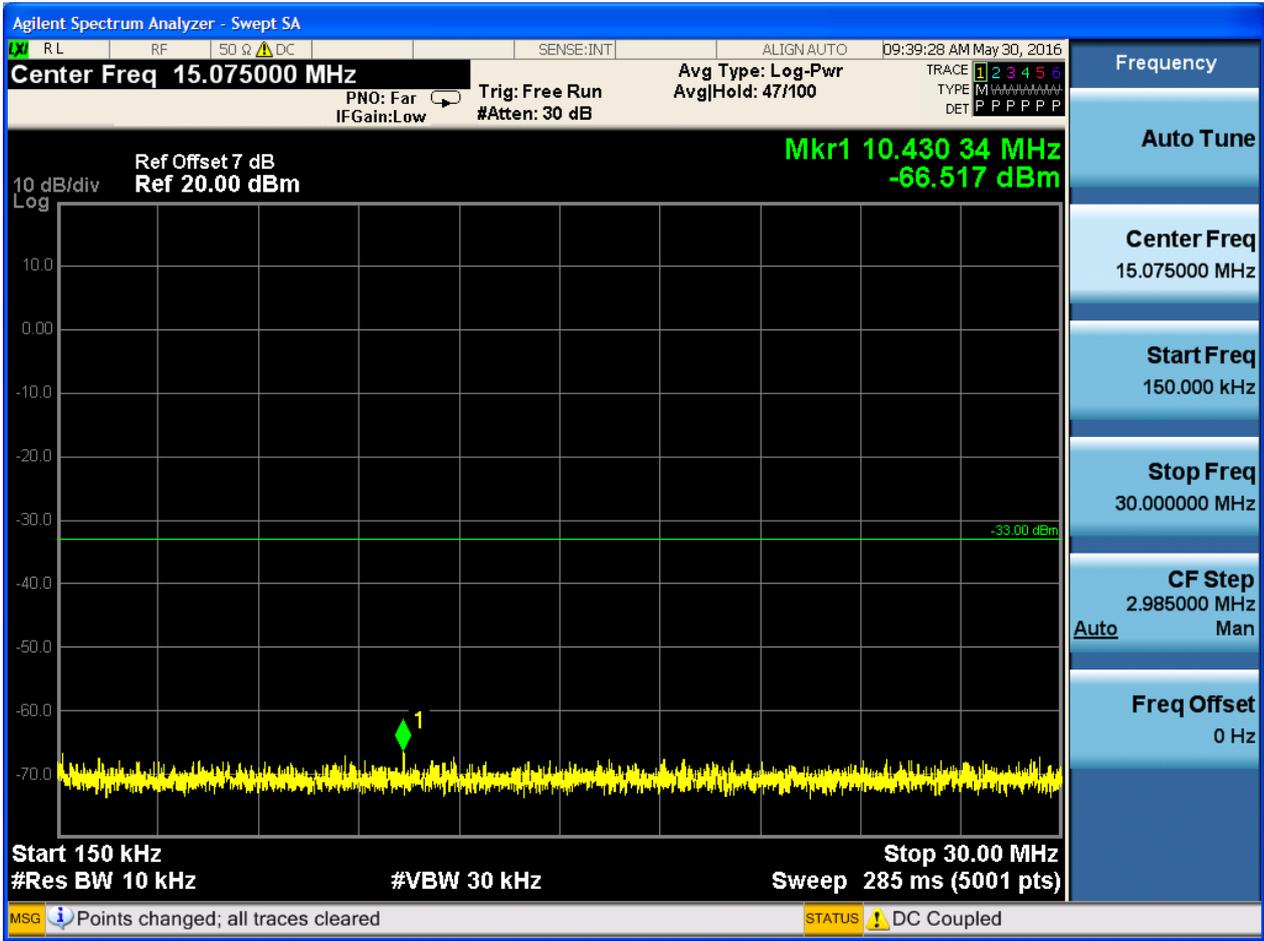






6.1.2.2.3 Test Channel = HCH







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

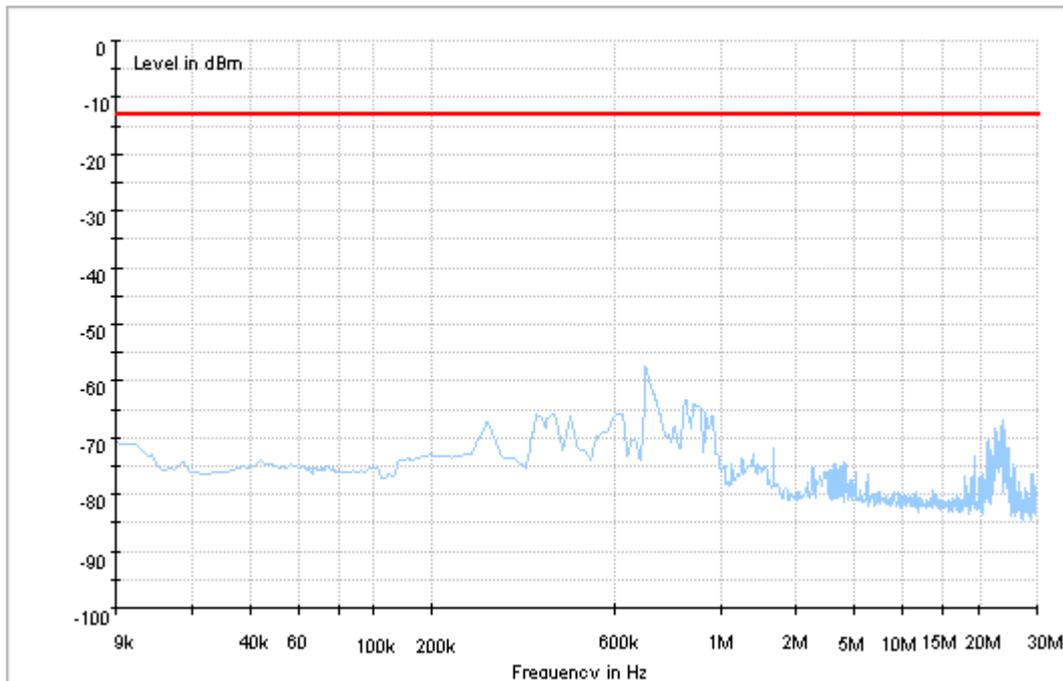
Above 1GHz, RBW = 1 MHz, VBW = 3 MHz. Detector: PK

Part I - Test Plots

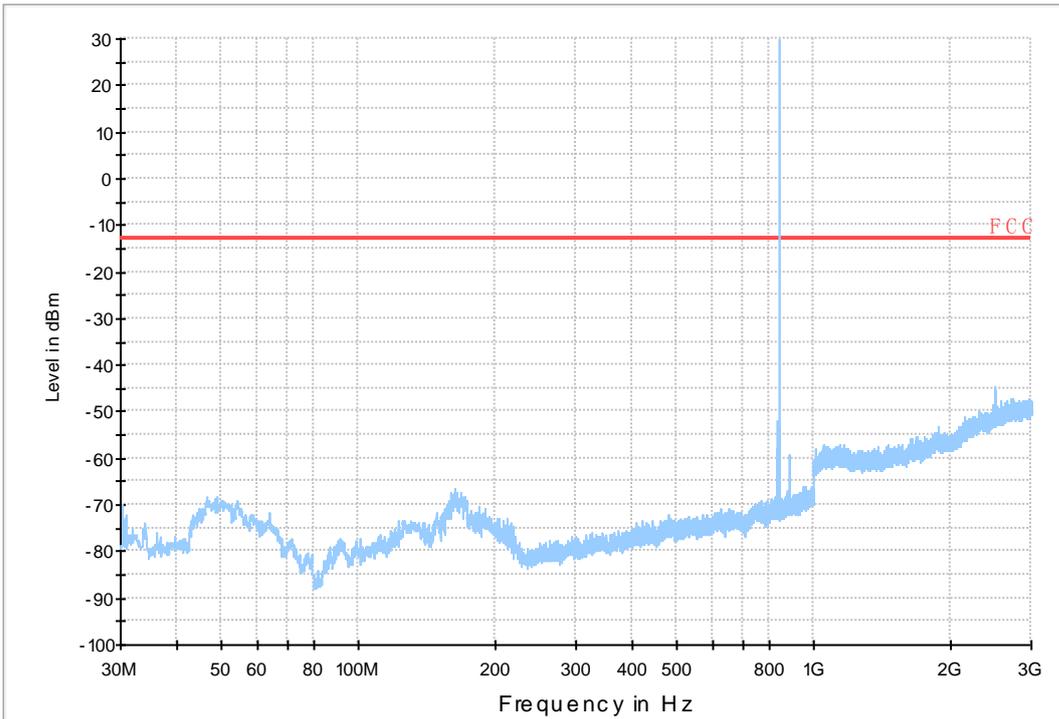
7.1 For GSM

7.1.1 Test Band = GSM850

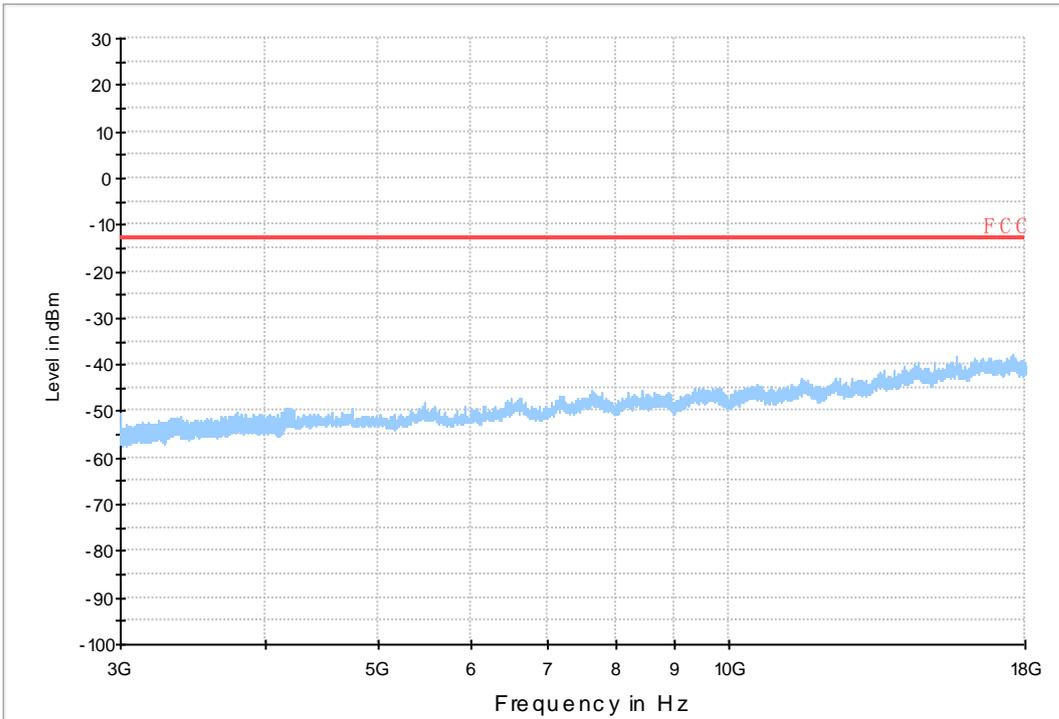
7.1.1.1 Test Mode = GSM/TM1



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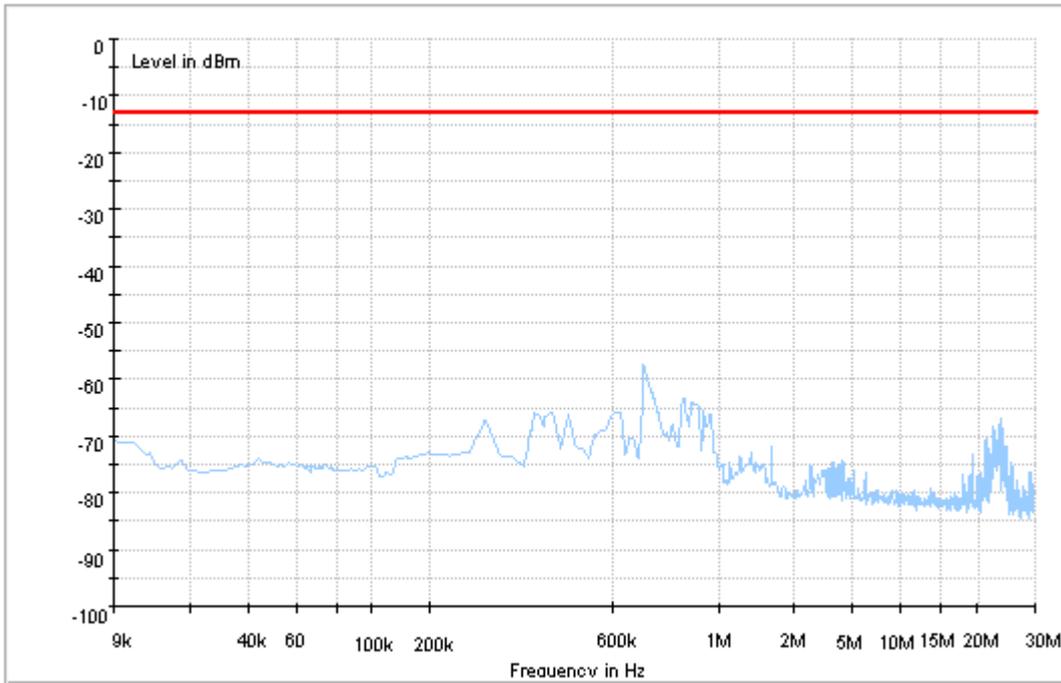


Copy of FCC PART22 GSM850_H

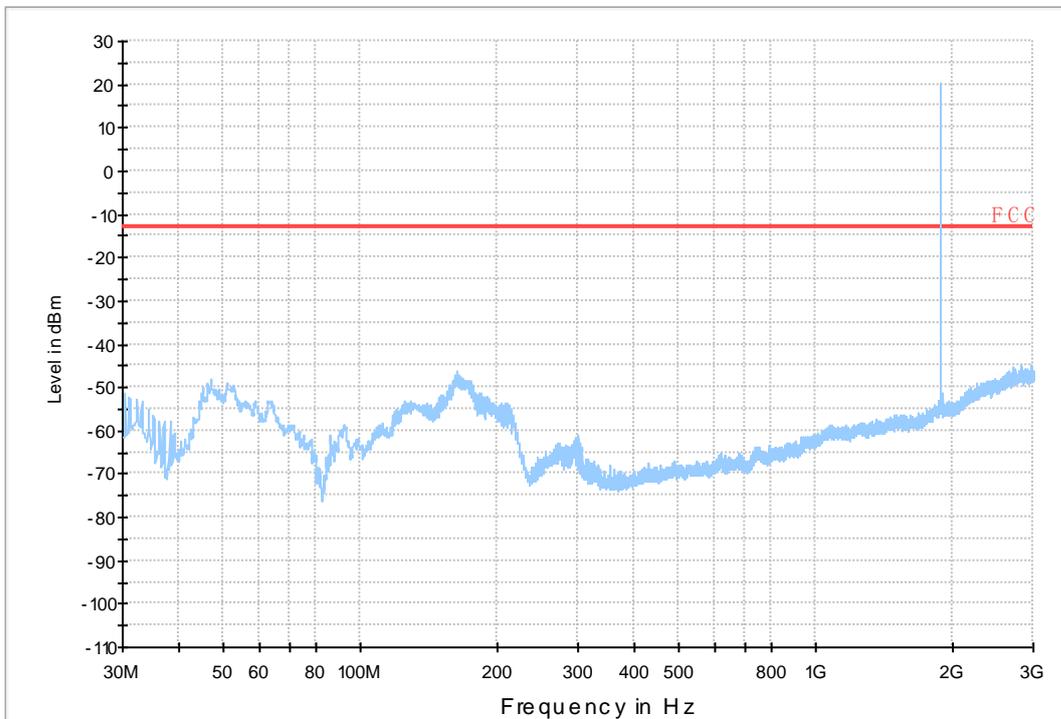


7.1.2 Test Band = GSM1900

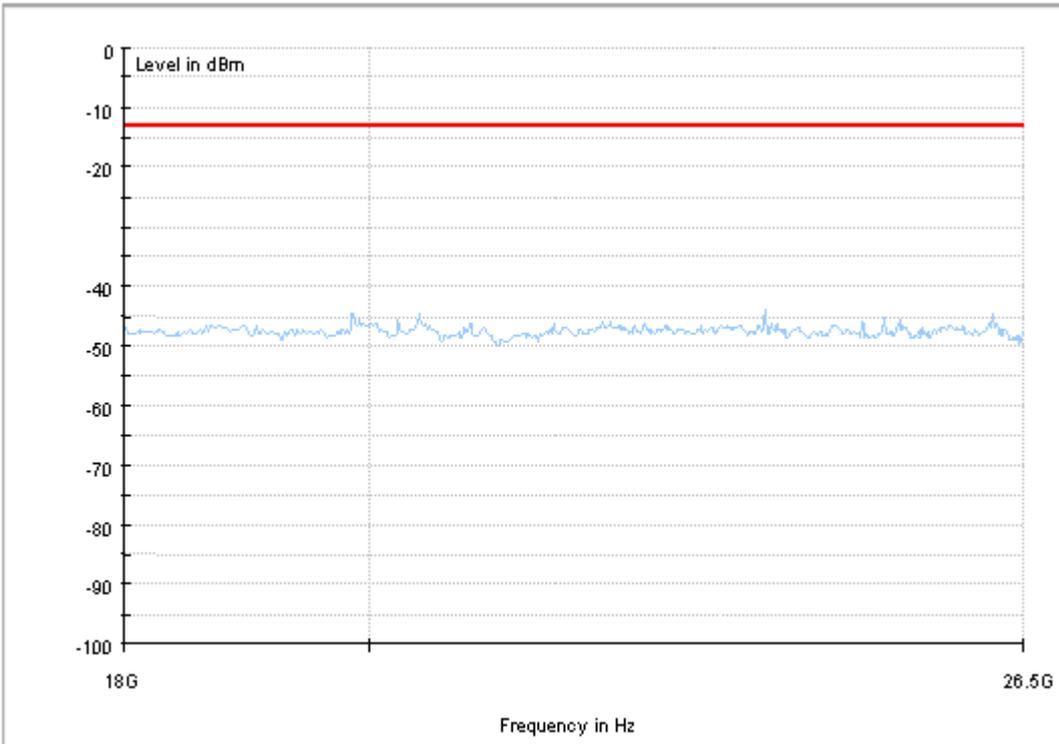
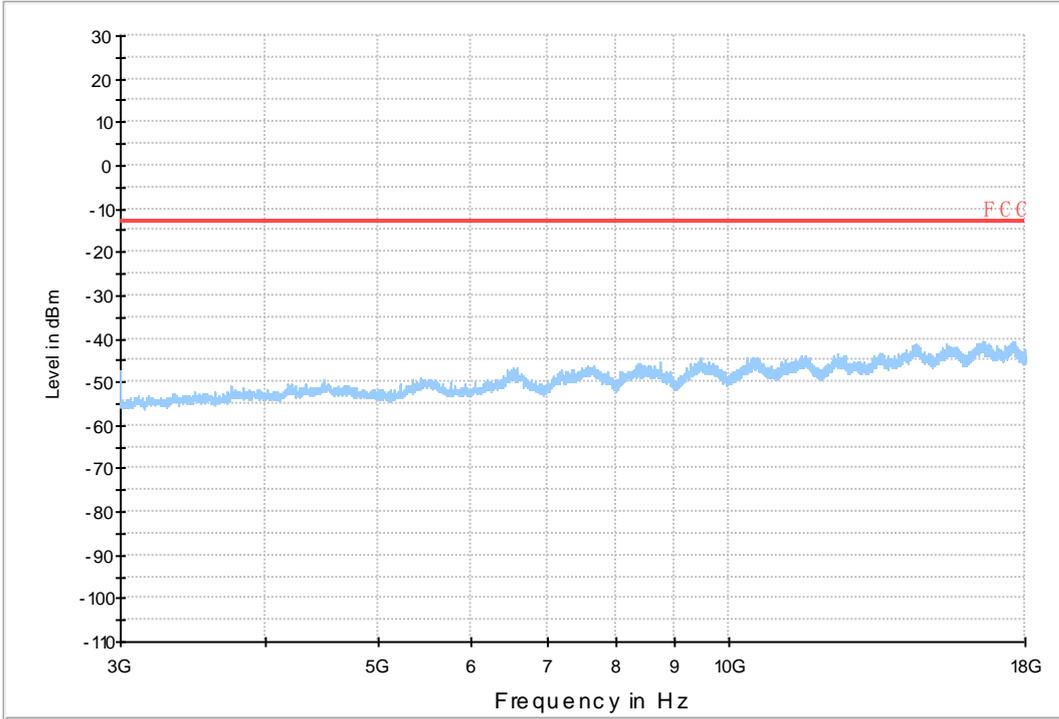
7.1.2.1 Test Mode = GSM/TM1



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	8.85	0.01074	PASS
				VN	10.20	0.01238	PASS
				VH	9.23	0.0112	PASS
		MCH	TN	VL	7.49	0.00895	PASS
				VN	7.62	0.00911	PASS
				VH	8.07	0.00965	PASS
		HCH	TN	VL	7.23	0.00852	PASS
				VN	9.30	0.01096	PASS
				VH	6.52	0.00768	PASS
	GSM/TM2	LCH	TN	VL	8.36	0.01014	PASS
				VN	14.53	0.01763	PASS
				VH	11.95	0.0145	PASS
		MCH	TN	VL	5.46	0.00653	PASS
				VN	8.39	0.01003	PASS
				VH	12.59	0.01505	PASS
HCH	TN	VL	3.87	0.00456	PASS		
		VN	15.30	0.01803	PASS		
		VH	14.40	0.01697	PASS		
GSM1900	GSM/TM1	LCH	TN	VL	10.27	0.00555	PASS
				VN	7.30	0.00395	PASS
				VH	5.62	0.00304	PASS
		MCH	TN	VL	15.17	0.00807	PASS
				VN	16.85	0.00896	PASS
				VH	10.07	0.00536	PASS
		HCH	TN	VL	1.16	0.00061	PASS
				VN	3.03	0.00159	PASS
				VH	-0.65	-0.00034	PASS
	GSM/TM2	LCH	TN	VL	9.17	0.00496	PASS
				VN	13.24	0.00716	PASS
				VH	14.95	0.00808	PASS

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
		MCH	TN	VL	0.13	0.00007	PASS
				VN	24.28	0.01291	PASS
				VH	19.89	0.01058	PASS
		HCH	TN	VL	5.71	0.00299	PASS
				VN	0.87	0.00046	PASS
				VH	2.52	0.00132	PASS
	GSM/TM2	LCH	TN	VL	9.20	0.01116	PASS
				VN	13.56	0.01645	PASS
				VH	16.92	0.02053	PASS
		MCH	TN	VL	16.43	0.01964	PASS
				VN	15.17	0.01813	PASS
				VH	14.46	0.01728	PASS
		HCH	TN	VL	12.46	0.01468	PASS
				VN	13.17	0.01552	PASS
				VH	11.62	0.01369	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	13.24	0.01606	PASS
				-20	9.17	0.01113	PASS
				-10	8.27	0.01003	PASS
				0	10.59	0.01285	PASS
				10	1.55	0.00188	PASS
				20	9.62	0.01167	PASS
				30	13.75	0.01668	PASS
				40	10.98	0.01332	PASS
				50	12.20	0.0148	PASS
		MCH	VN	-30	12.46	0.01489	PASS
				-20	6.97	0.00833	PASS
				-10	6.46	0.00772	PASS
				0	8.65	0.01034	PASS
				10	3.68	0.0044	PASS
				20	8.01	0.00957	PASS
				30	9.88	0.01181	PASS
				40	4.20	0.00502	PASS
				50	8.98	0.01073	PASS
		HCH	VN	-30	5.29	0.00623	PASS
				-20	6.33	0.00746	PASS

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict			
				-10	4.97	0.00586	PASS			
				0	7.68	0.00905	PASS			
				10	5.62	0.00662	PASS			
				20	7.23	0.00852	PASS			
				30	5.49	0.00647	PASS			
				40	3.03	0.00357	PASS			
				50	5.36	0.00631	PASS			
				GSM/TM2	LCH	VN	-30	12.79	0.01552	PASS
							-20	12.72	0.01543	PASS
							-10	11.88	0.01441	PASS
							0	11.56	0.01403	PASS
							10	11.56	0.01403	PASS
							20	11.62	0.0141	PASS
							30	15.27	0.01853	PASS
							40	13.37	0.01622	PASS
	50	11.17	0.01355				PASS			
	GSM/TM2	MCH	VN				-30	5.91	0.00706	PASS
							-20	13.98	0.01671	PASS
							-10	12.82	0.01532	PASS
							0	11.82	0.01413	PASS
							10	9.07	0.01084	PASS
							20	13.01	0.01555	PASS
				30	11.85	0.01416	PASS			
				40	7.72	0.00923	PASS			
				50	12.85	0.01536	PASS			
				GSM/TM2	HCH	VN	-30	12.46	0.01468	PASS
							-20	11.07	0.01304	PASS
							-10	3.55	0.00418	PASS
							0	5.59	0.00659	PASS
							10	5.13	0.00604	PASS
20							12.66	0.01492	PASS	
30	5.84	0.00688	PASS							
40	13.24	0.0156	PASS							
50	6.20	0.0073	PASS							
GSM1900	GSM/TM1	LCH	VN				-30	7.68	0.00415	PASS
							-20	6.39	0.00345	PASS
							-10	6.01	0.00325	PASS
							0	4.39	0.00237	PASS
							10	7.62	0.00412	PASS
							20	9.94	0.00537	PASS



Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict		
				30	9.04	0.00489	PASS		
				40	10.53	0.00569	PASS		
				50	8.33	0.0045	PASS		
		MCH	VN			-30	-8.14	-0.00433	PASS
						-20	10.91	0.0058	PASS
						-10	-3.94	-0.0021	PASS
						0	-6.78	-0.00361	PASS
						10	-5.23	-0.00278	PASS
						20	18.92	0.01006	PASS
						30	17.18	0.00914	PASS
						40	20.28	0.01079	PASS
						50	21.95	0.01168	PASS
						HCH	VN		
		-20	-6.07	-0.00318	PASS				
		-10	-2.20	-0.00115	PASS				
		0	4.58	0.0024	PASS				
		10	-0.52	-0.00027	PASS				
		20	5.29	0.00277	PASS				
		30	6.72	0.00352	PASS				
		40	-2.39	-0.00125	PASS				
		GSM/TM2	LCH	VN		-30	11.17	0.00604	PASS
	-20					10.98	0.00593	PASS	
	-10					16.11	0.00871	PASS	
	0					9.43	0.0051	PASS	
	10					11.46	0.00619	PASS	
	20					14.40	0.00778	PASS	
	30					18.95	0.01024	PASS	
	40					13.14	0.0071	PASS	
	50					13.08	0.00707	PASS	
	MCH					VN			-30
			-20	-0.61	-0.00032				PASS
			-10	23.18	0.01233				PASS
			0	19.24	0.01023				PASS
			10	22.21	0.01181				PASS
			20	26.15	0.01391				PASS
			30	30.45	0.0162				PASS
			40	-1.03	-0.00055				PASS
			50	18.63	0.00991				PASS
			HCH	VN					

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				-20	4.00	0.00209	PASS
				-10	7.14	0.00374	PASS
				0	3.55	0.00186	PASS
				10	2.07	0.00108	PASS
				20	7.04	0.00369	PASS
				30	8.43	0.00441	PASS
				40	8.85	0.00463	PASS
				50	10.65	0.00558	PASS
	GSM/TM2	LCH	VN	-30	14.11	0.01712	PASS
				-20	8.17	0.00991	PASS
				-10	6.39	0.00775	PASS
				0	14.14	0.01716	PASS
				10	14.85	0.01802	PASS
				20	16.01	0.01942	PASS
				30	15.76	0.01912	PASS
				40	3.87	0.0047	PASS
				50	7.43	0.00901	PASS
				MCH	VN	-30	15.37
		-20	14.82			0.01771	PASS
		-10	14.69			0.01756	PASS
		0	12.27			0.01467	PASS
		10	17.11			0.02045	PASS
		20	14.50			0.01733	PASS
		30	12.75			0.01524	PASS
		40	15.05			0.01799	PASS
		50	12.98			0.01552	PASS
		HCH	VN			-30	10.56
				-20	14.37	0.01693	PASS
				-10	13.37	0.01575	PASS
				0	12.72	0.01499	PASS
				10	12.69	0.01495	PASS
				20	11.20	0.0132	PASS
	30			12.14	0.0143	PASS	
40	13.37			0.01575	PASS		
50	10.69	0.01259	PASS				

END