



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/EIRP [dBm]	Limit [dBm]	Verdict
GSM850	GSM/TM1	LCH	32.27	27.12	38.5	PASS
		MCH	32.46	27.31	38.5	PASS
		HCH	32.6	27.45	38.5	PASS
	GSM/TM2	LCH	26.25	21.1	38.5	PASS
		MCH	26.36	21.21	38.5	PASS
		HCH	26.31	21.16	38.5	PASS
GSM1900	GSM/TM1	LCH	29.19	29.32	33	PASS
		MCH	29.24	29.37	33	PASS
		HCH	29.23	29.36	33	PASS
	GSM/TM2	LCH	25.03	25.16	33	PASS
		MCH	24.99	25.12	33	PASS
		HCH	25.05	25.18	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	0.13	13	PASS
		MCH	0.14	13	PASS
		HCH	0.15	13	PASS
	GSM/TM2	LCH	3.1	13	PASS
		MCH	3.1	13	PASS
		HCH	3.26	13	PASS

3Appendix_C: Modulation Characteristics

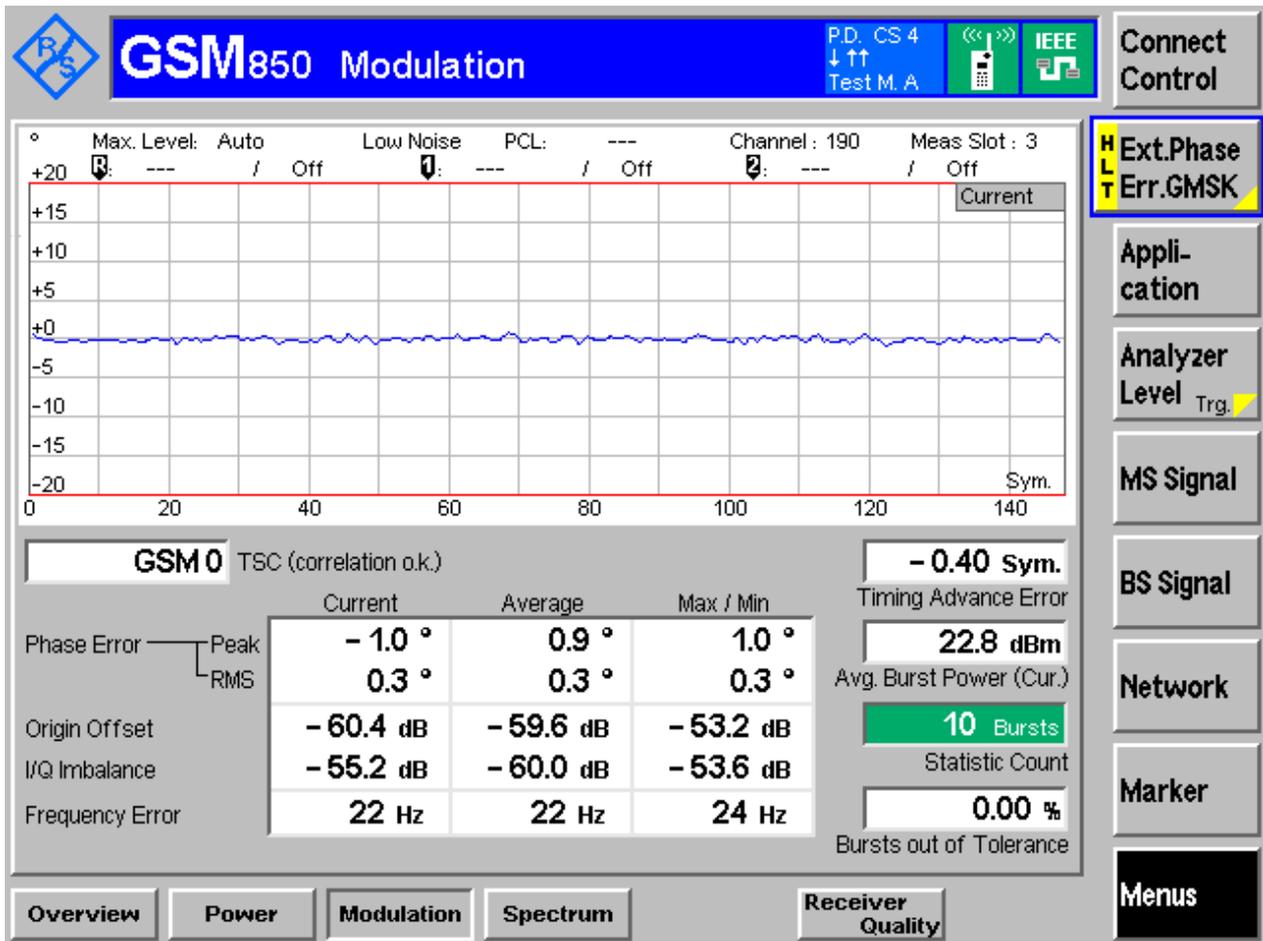
Part I - Test Plots

3.1 For GSM

3.1.1 Test Band = GSM850

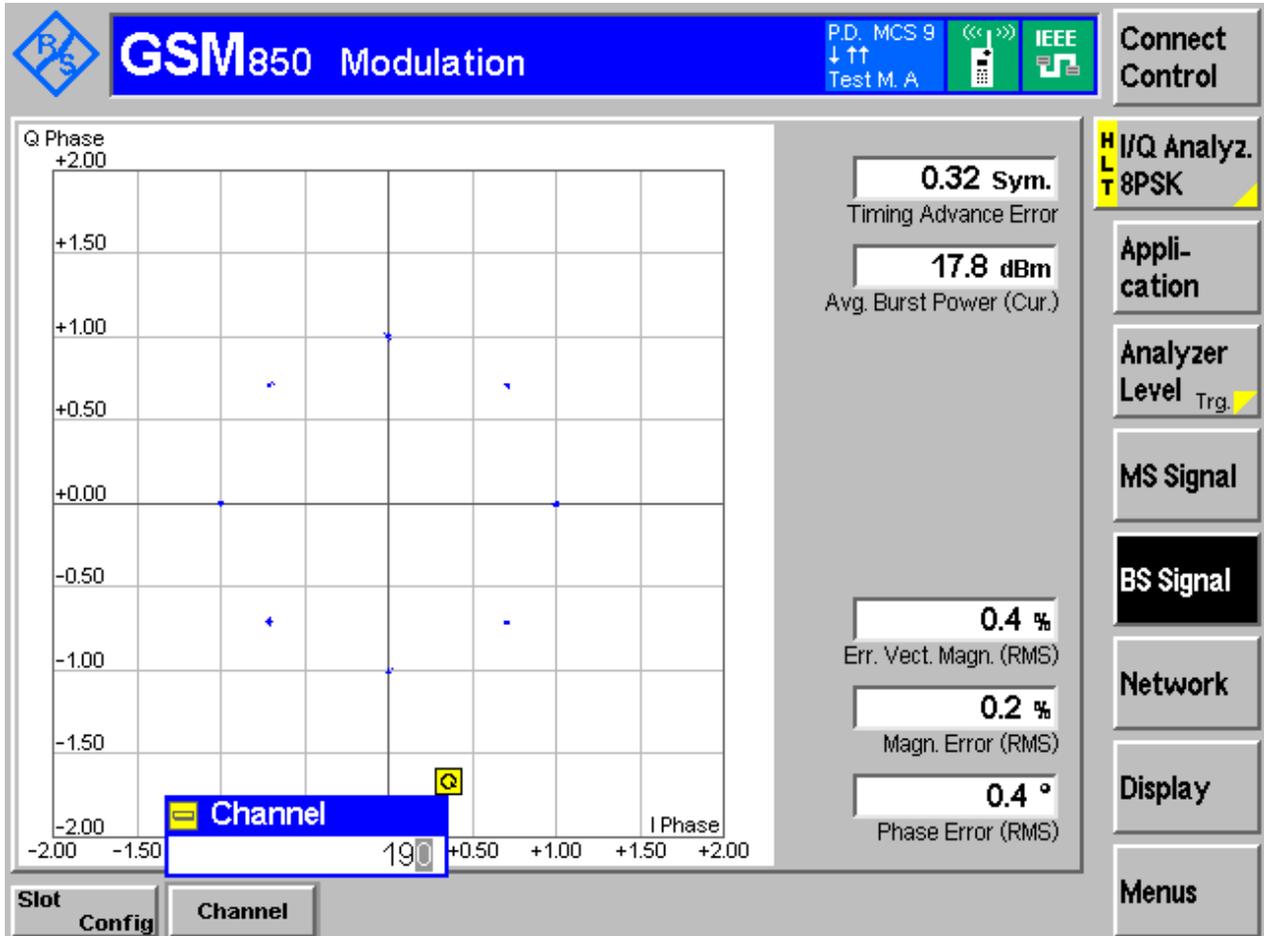
3.1.1.1 Test Mode = GSM/TM1

3.1.1.1.1 Test Channel = MCH



3.1.1.2 Test Mode = GSM/TM2

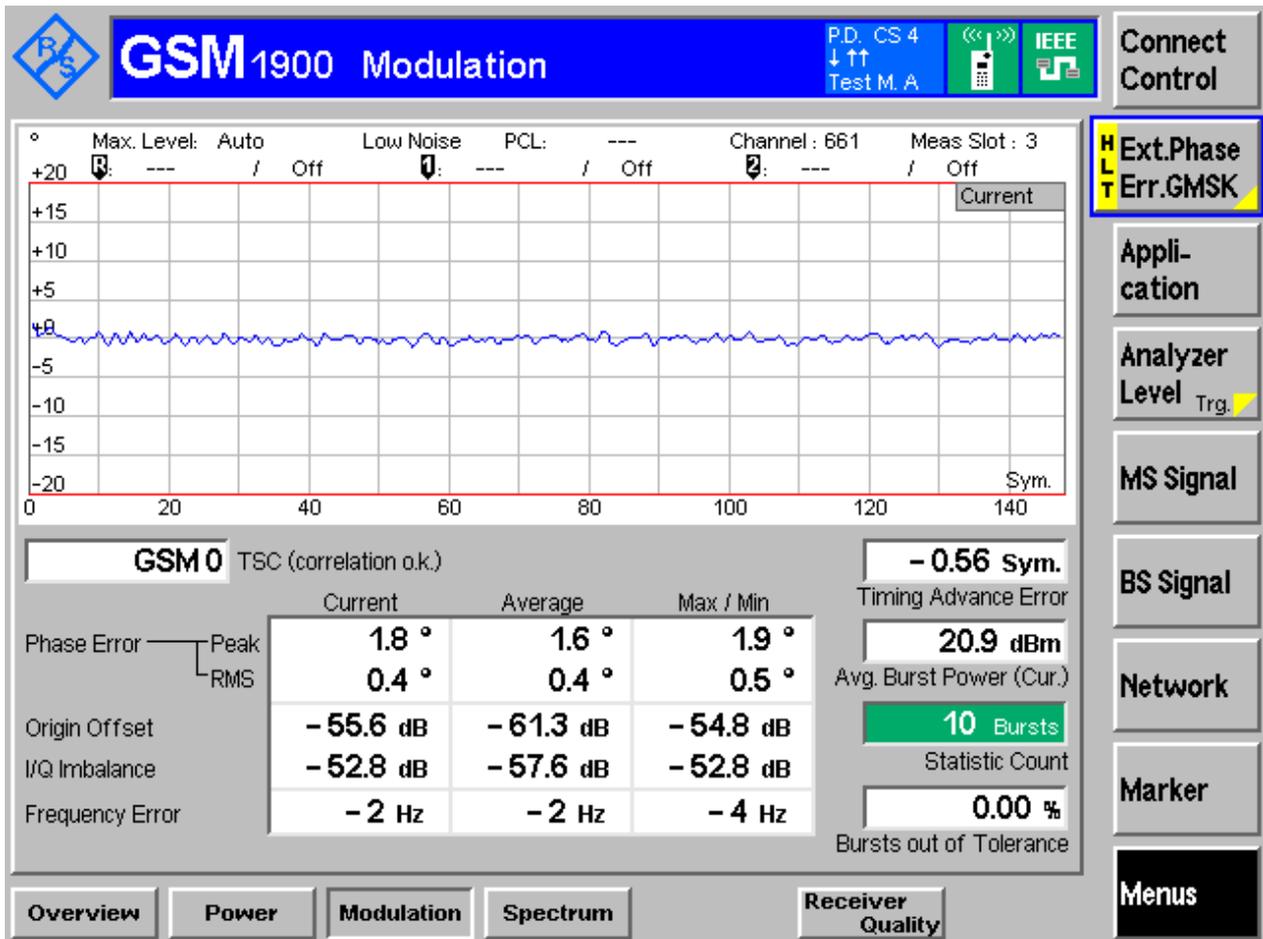
3.1.1.2.1 Test Channel = MCH



3.1.2 Test Band = GSM1900

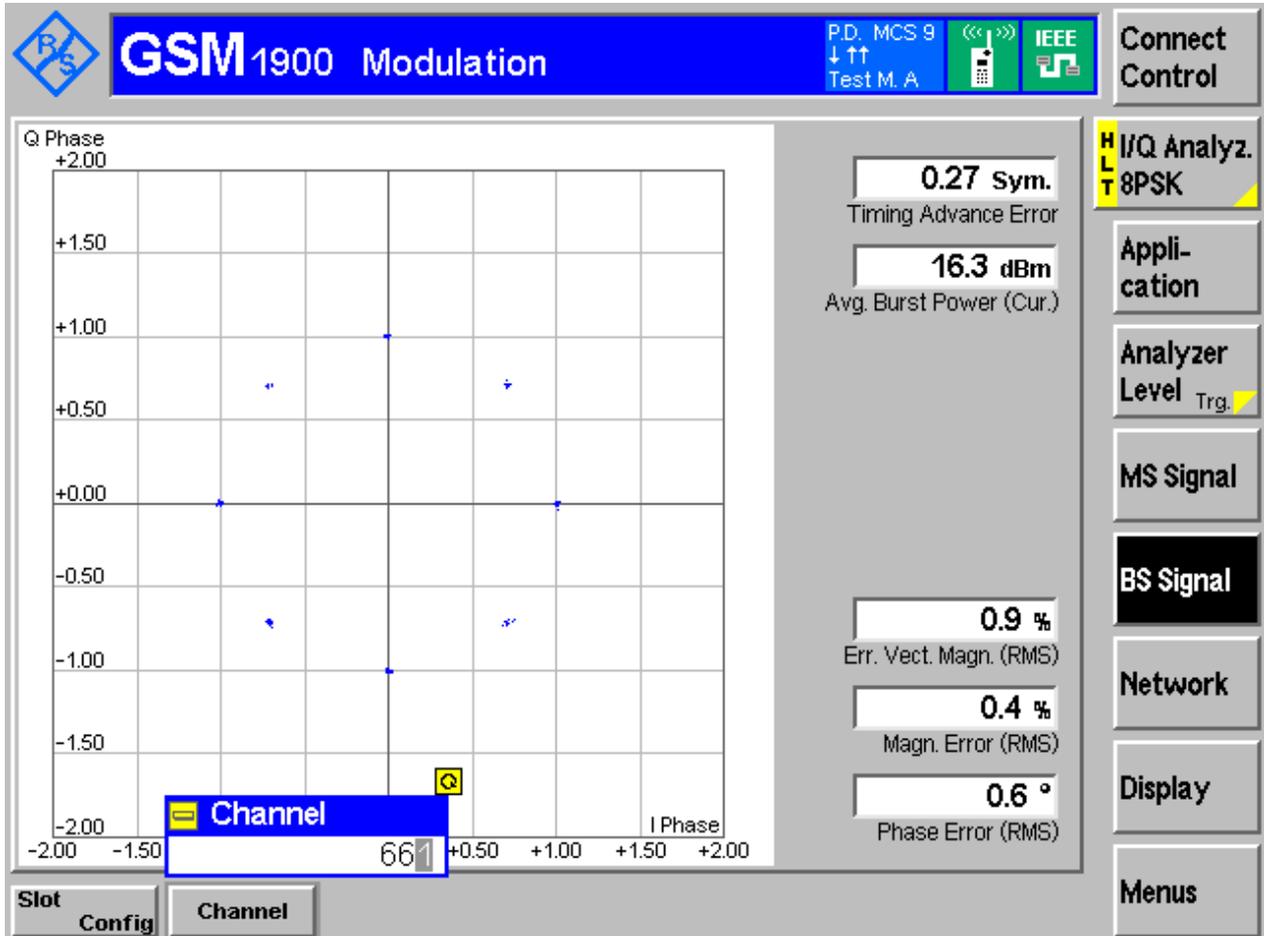
3.1.2.1 Test Mode = GSM/TM1

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	244.76	316.97	Pass
		MCH	242.11	316.96	Pass
		HCH	243.95	321.15	Pass
	GSM/TM2	LCH	250.47	325.27	Pass
		MCH	245.54	314.61	Pass
		HCH	234.32	299.23	Pass
GSM1900	GSM/TM1	LCH	246.72	319.17	Pass
		MCH	245.58	320.41	Pass
		HCH	243.13	315.65	Pass
	GSM/TM2	LCH	245.88	316.20	Pass
		MCH	245.11	319.87	Pass
		HCH	248.34	318.33	Pass



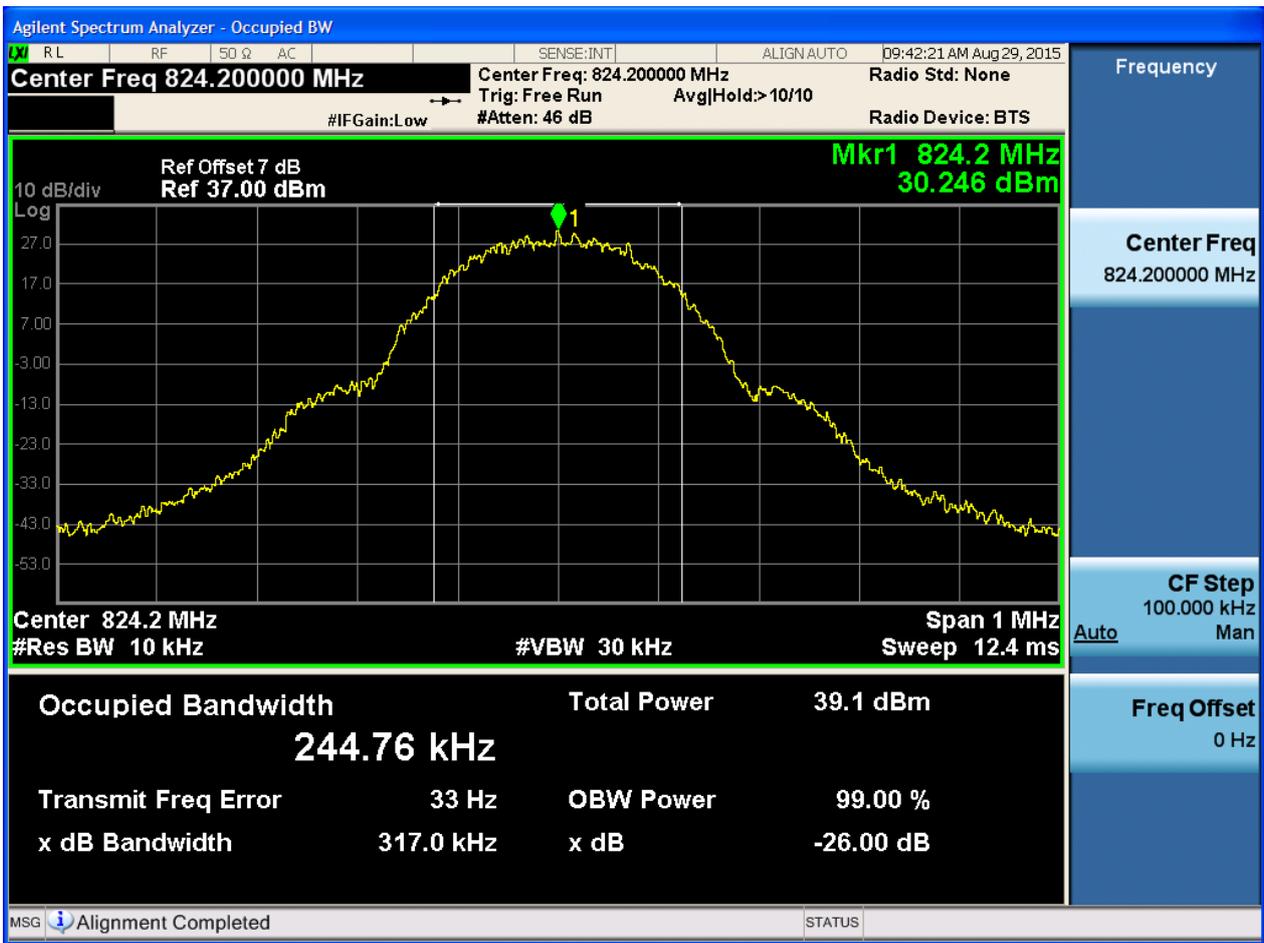
Part II - Test Plots

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



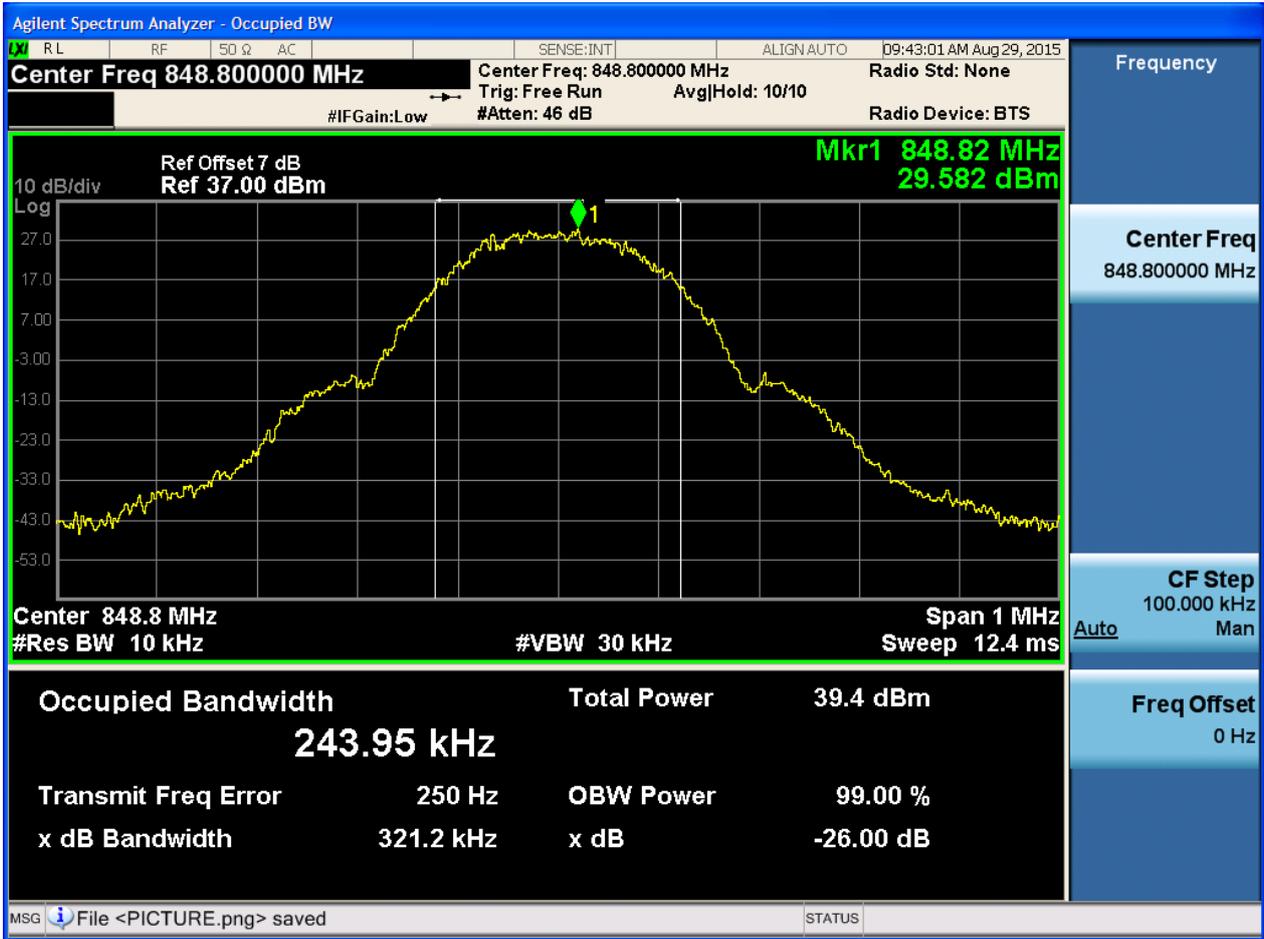


4.1.1.1.2 Test Channel = MCH





4.1.1.1.3 Test Channel = HCH





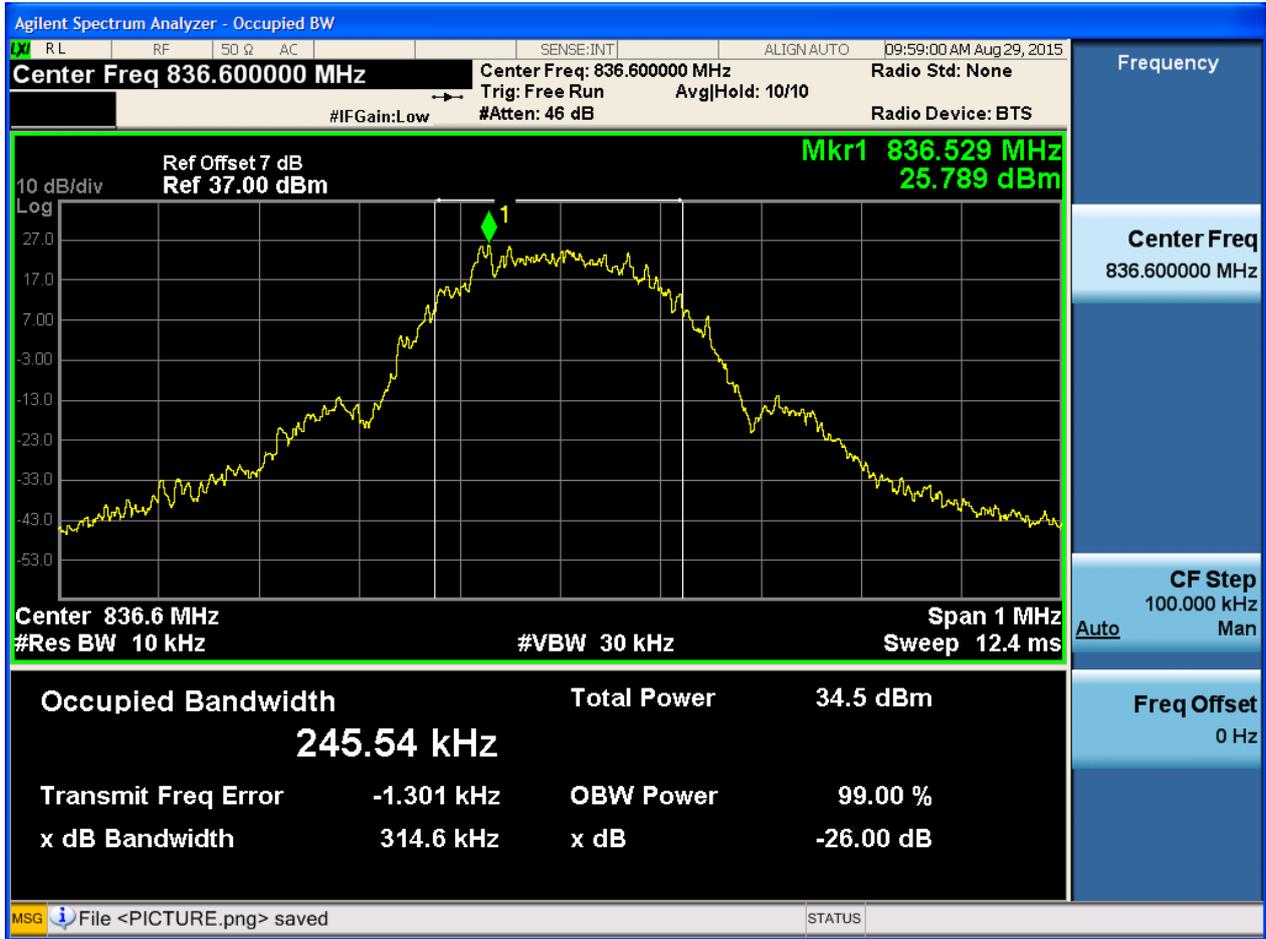
4.1.1.2 Test Mode = GSM/TM2

4.1.1.2.1 Test Channel = LCH



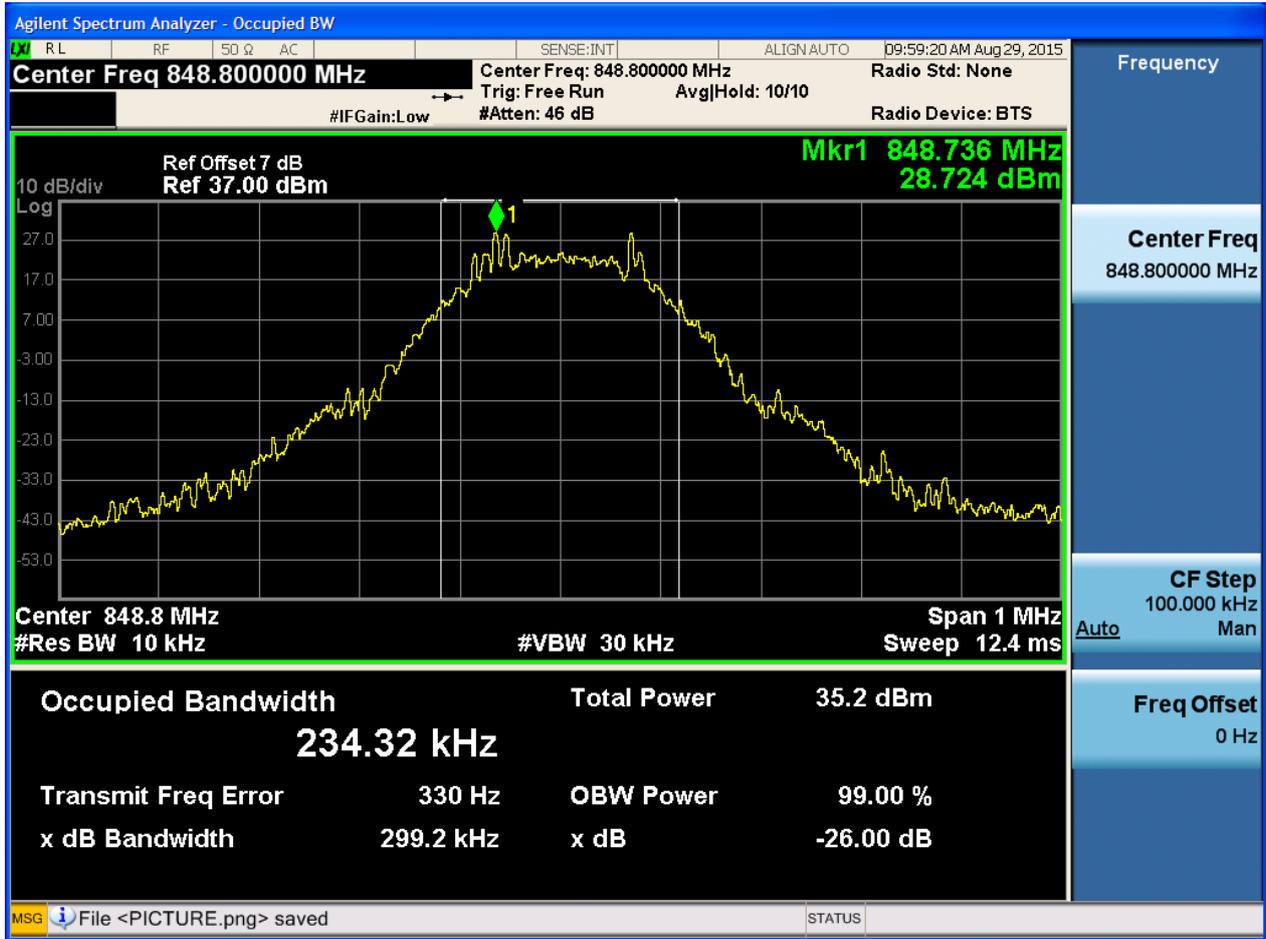


4.1.1.2.2 Test Channel = MCH





4.1.1.2.3 Test Channel = HCH

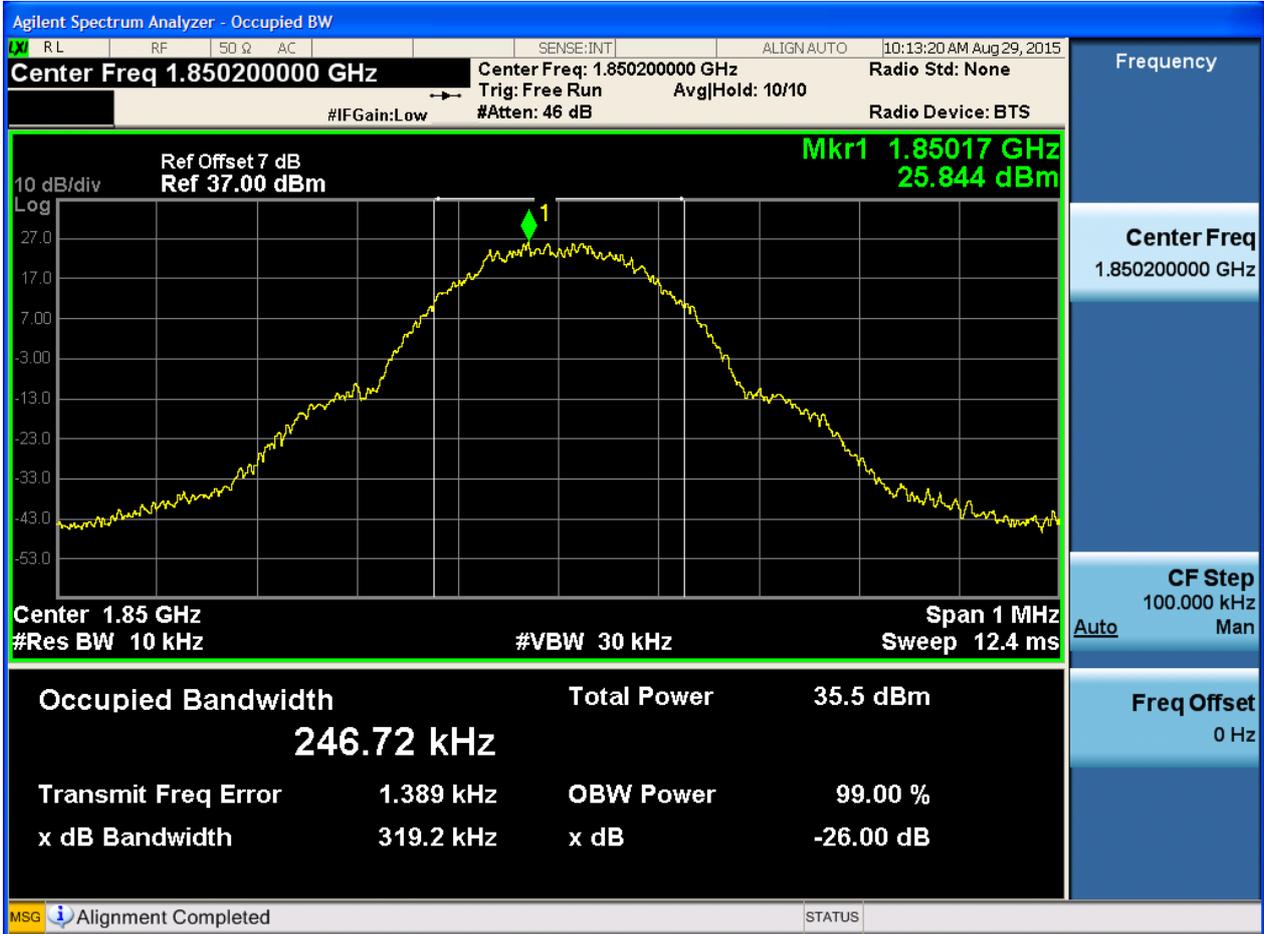




4.1.2 Test Band = GSM1900

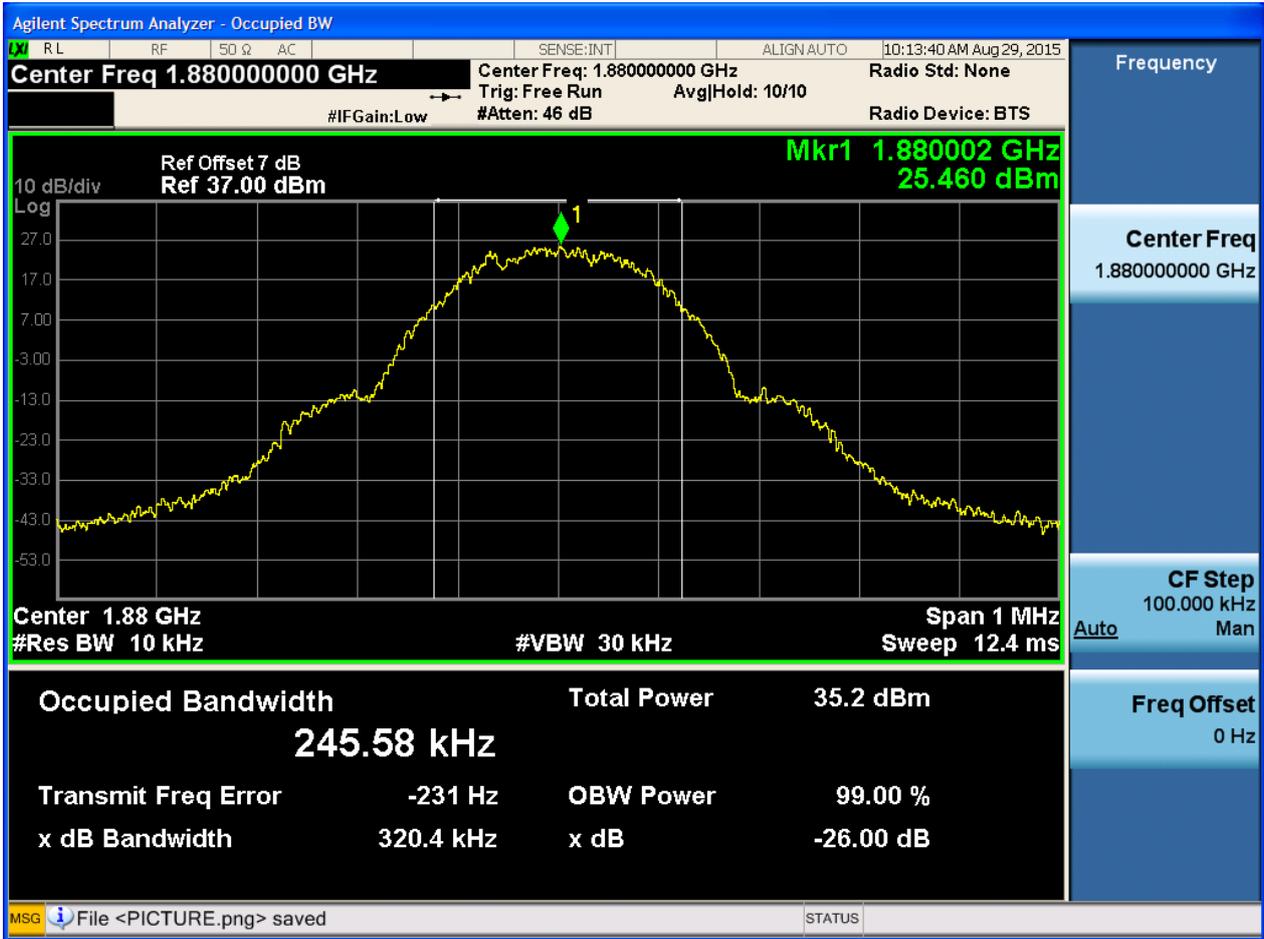
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4.1.2.1.1 Test Channel = LCH



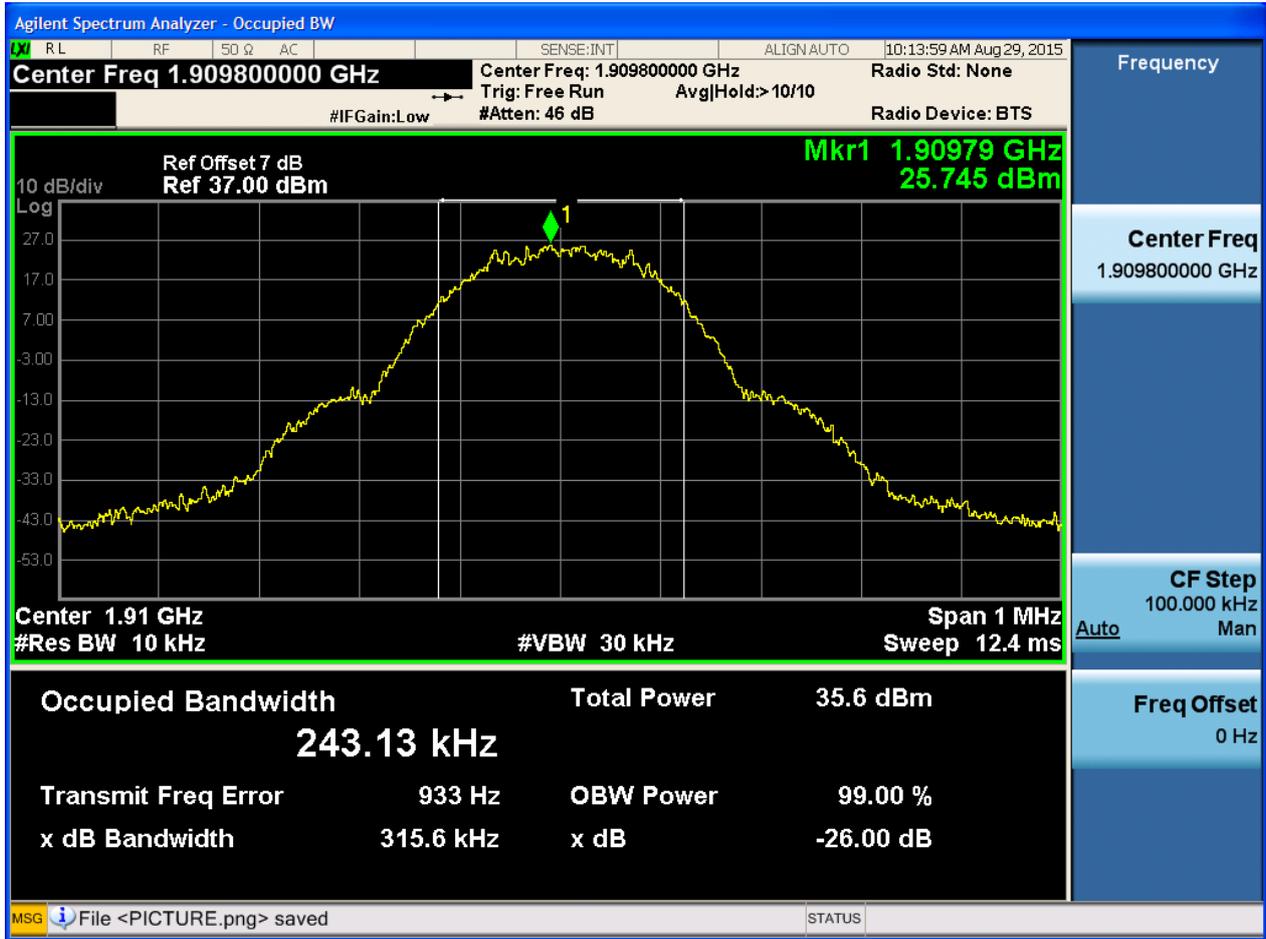


4.1.2.1.2 Test Channel = MCH





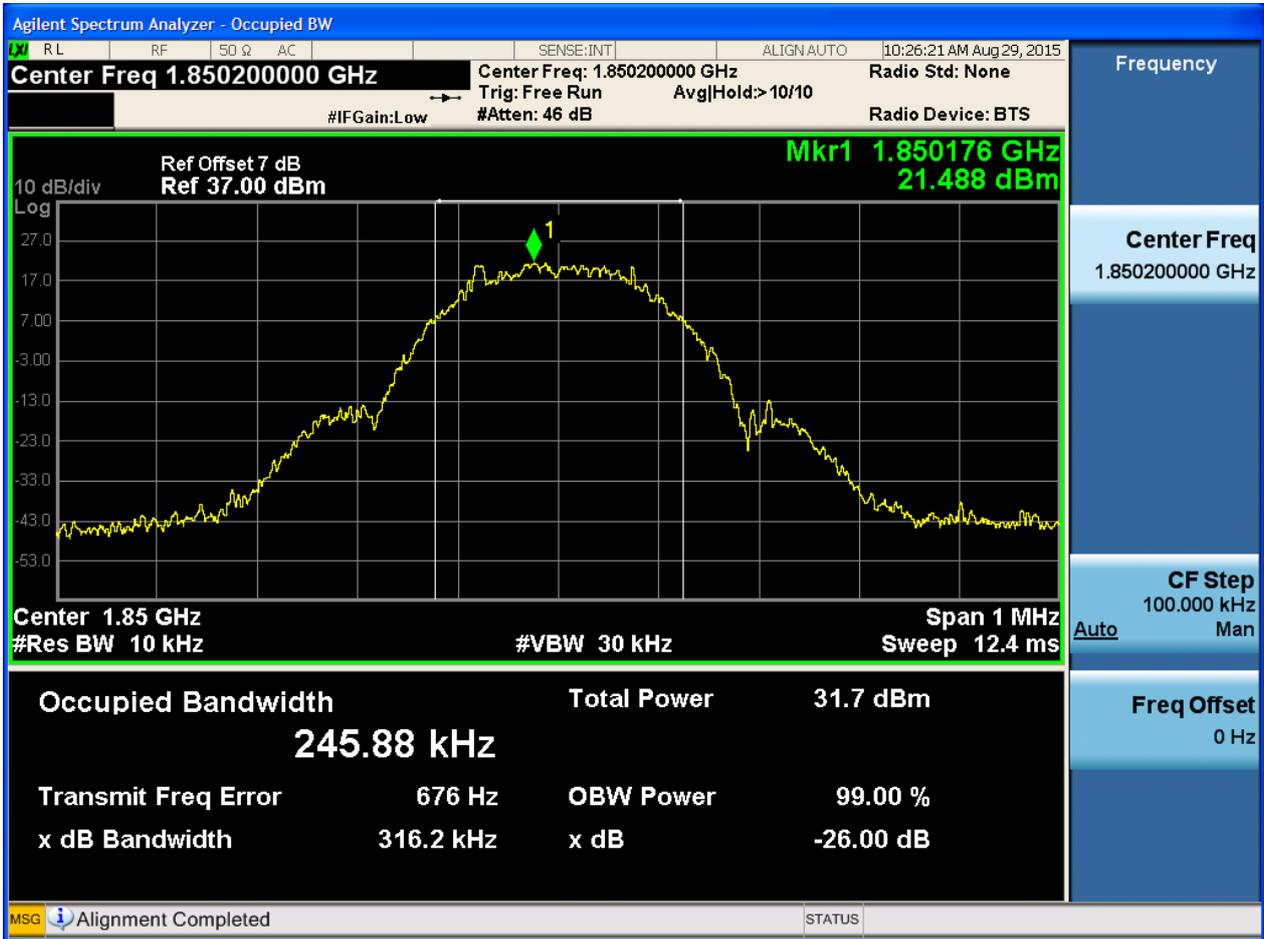
4.1.2.1.3 Test Channel = HCH





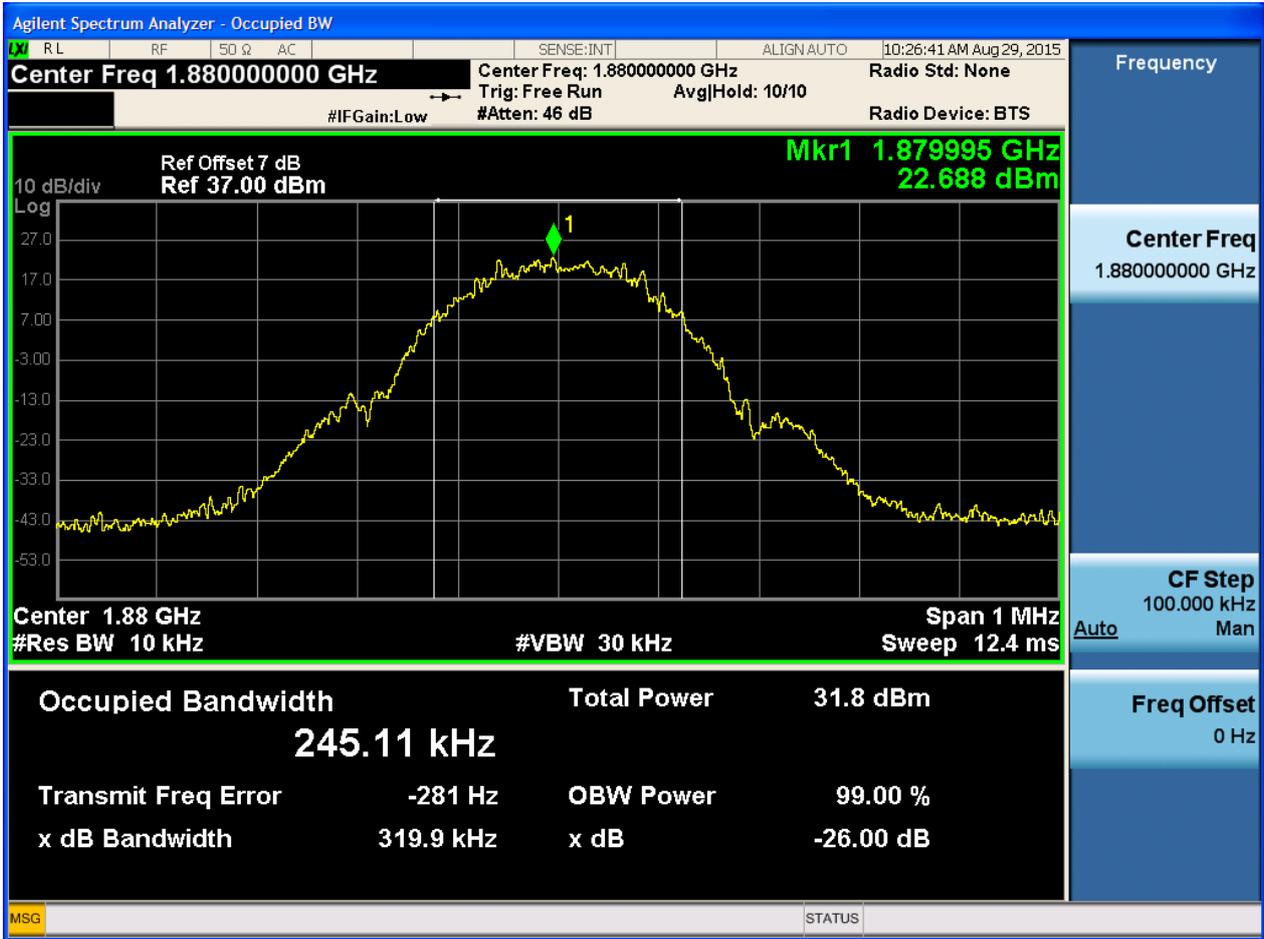
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4.1.2.2.1 Test Channel = LCH



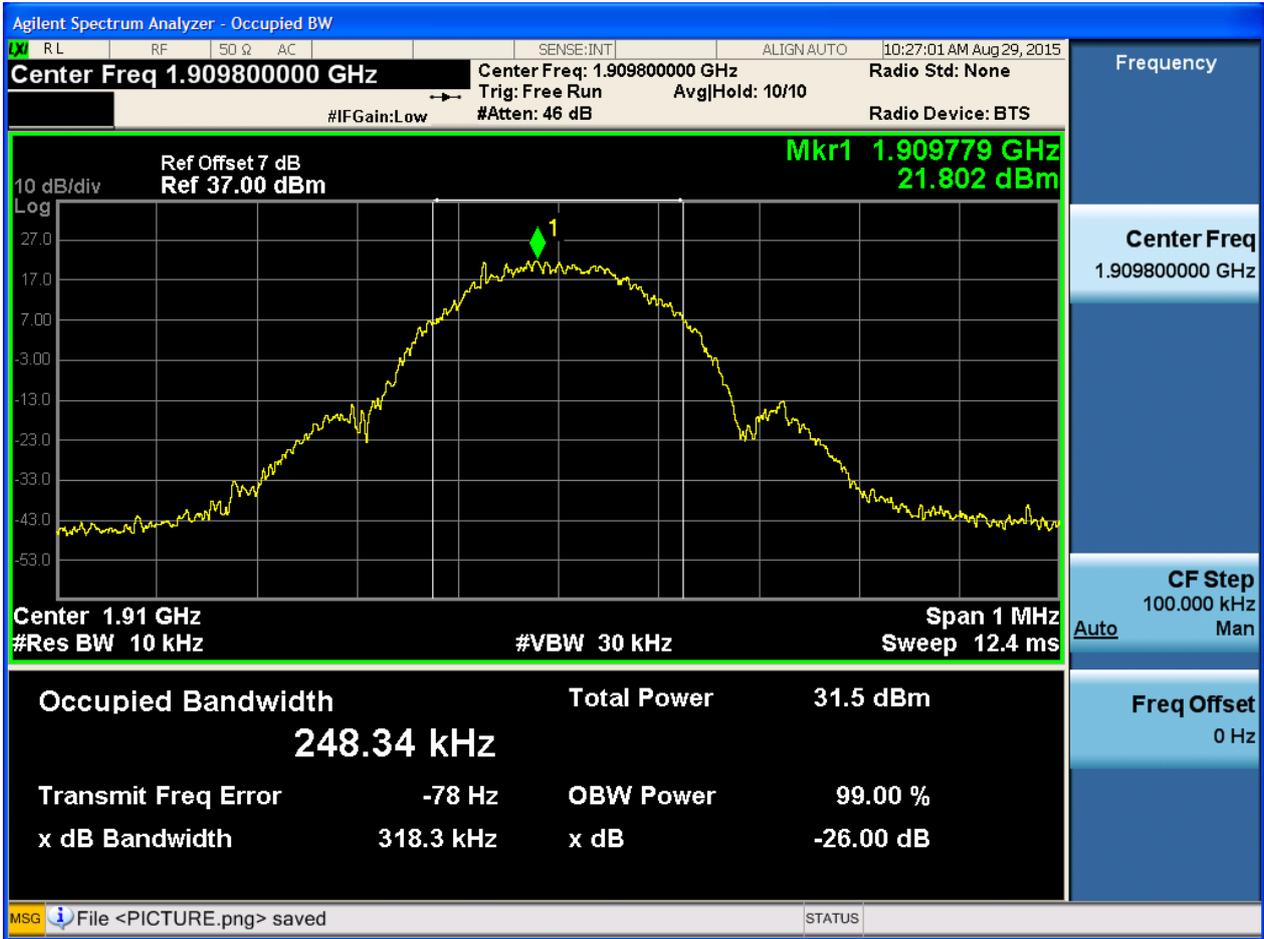


4.1.2.2.2 Test Channel = MCH





4.1.2.2.3 Test Channel = HCH





5Appendix_E: Band Edges Compliance

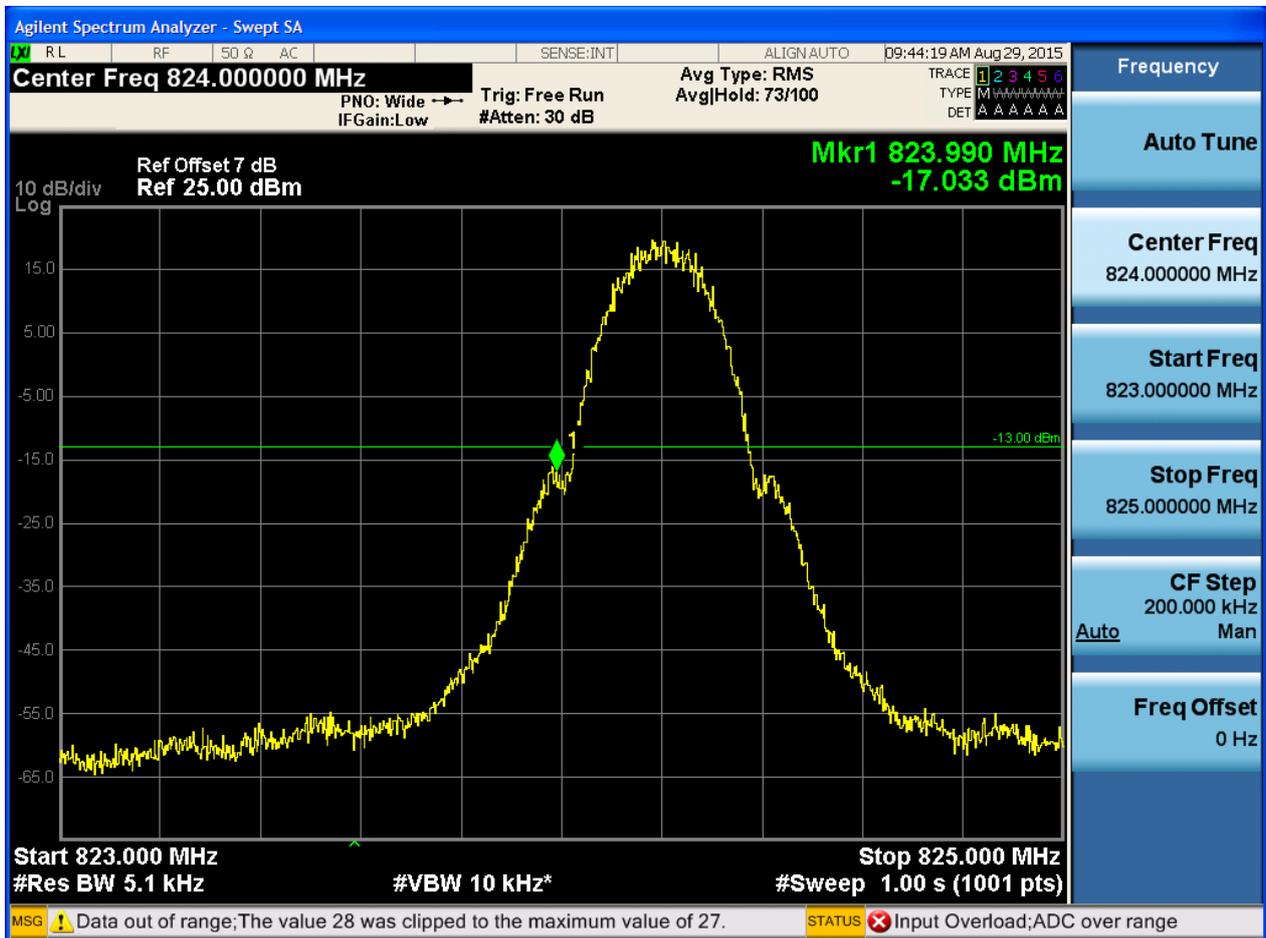
Part I - Test Plots

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5.1.1 Test Band = GSM850

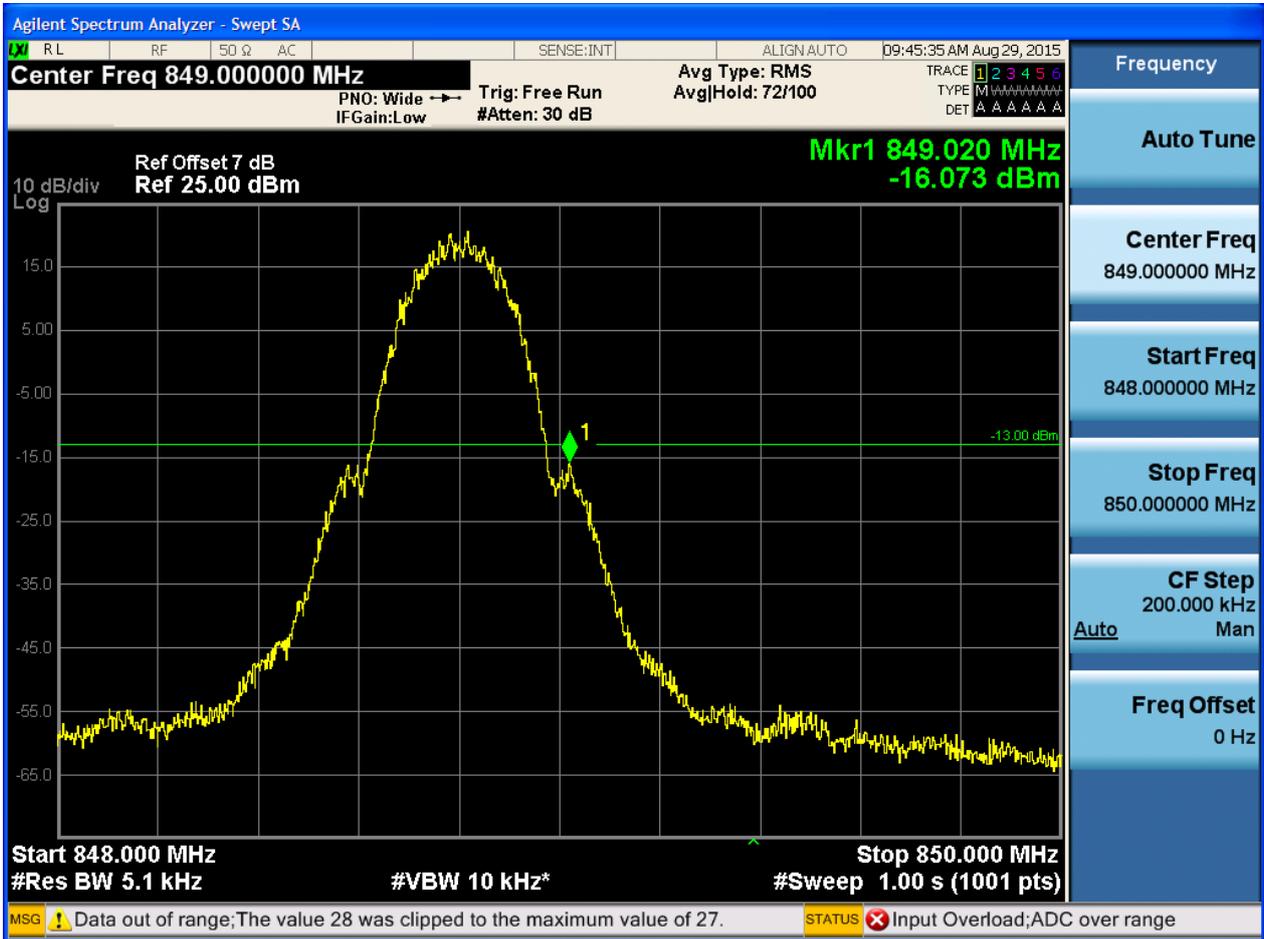
5.1.1.1 Test Mode = GSM/TM1

5.1.1.1.1 Test Channel = LCH





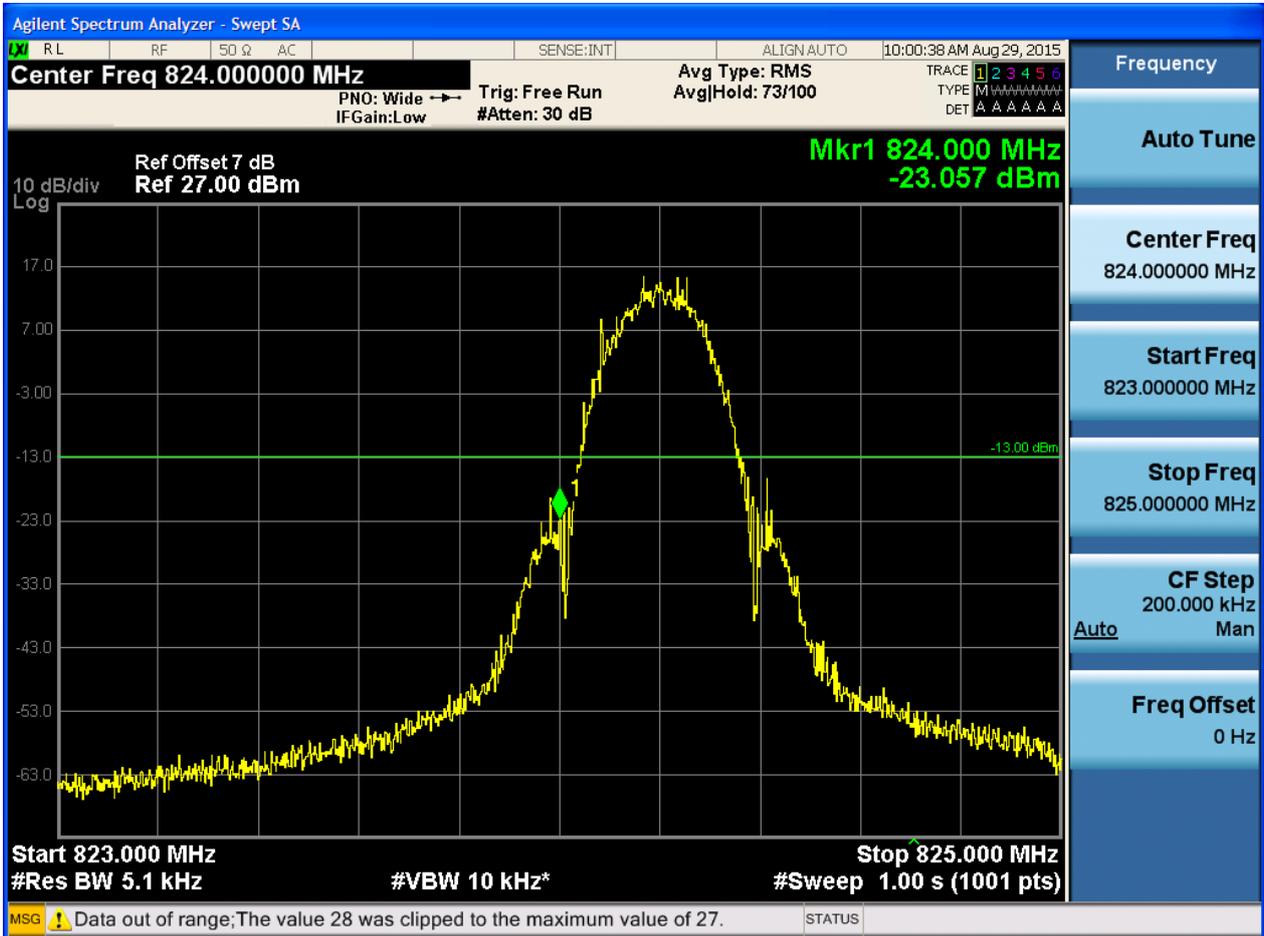
5.1.1.1.2 Test Channel = HCH



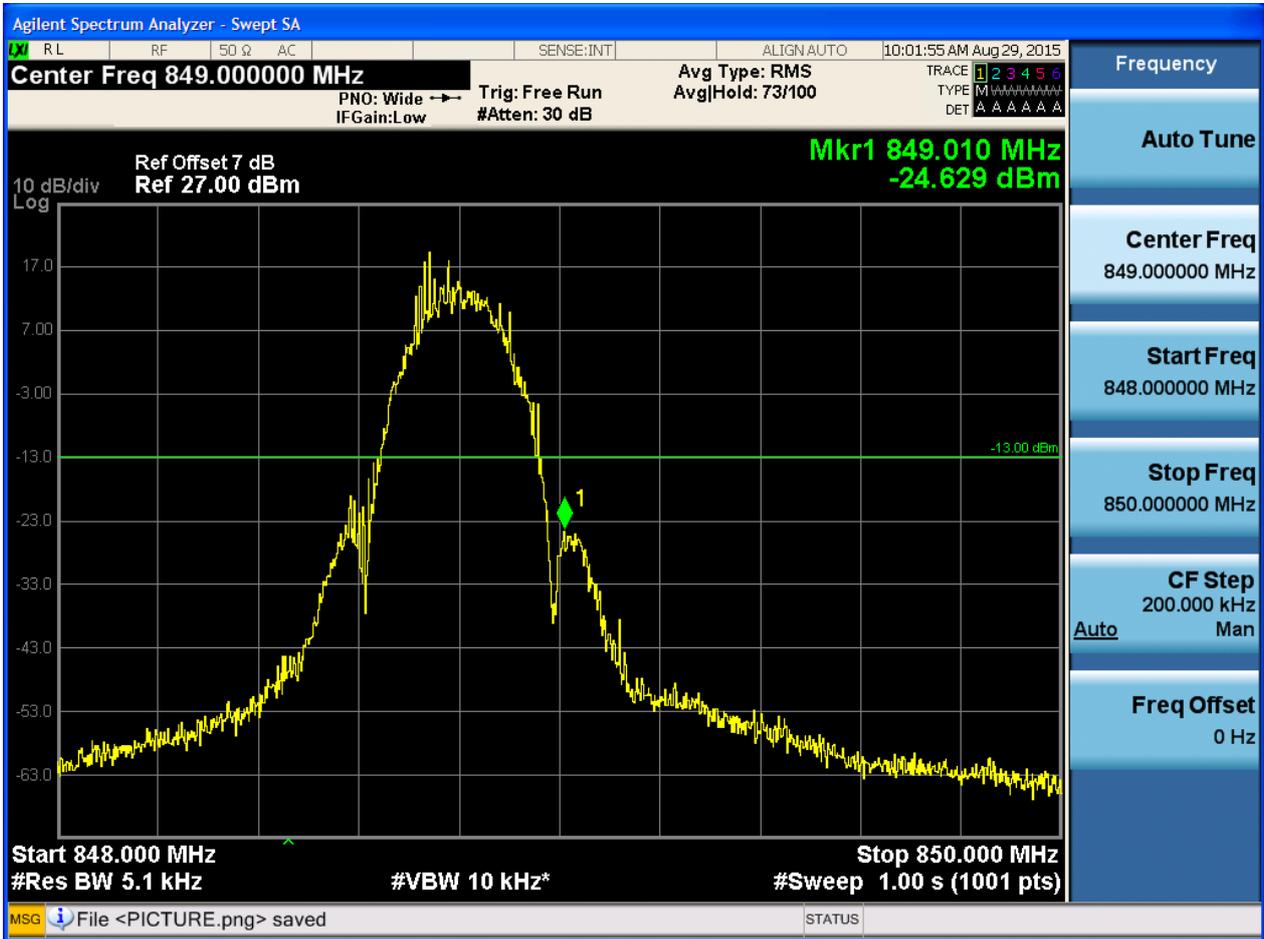


5.1.1.2 Test Mode = GSM/TM2

5.1.1.2.1 Test Channel = LCH



5.1.1.2.2 Test Channel = HCH

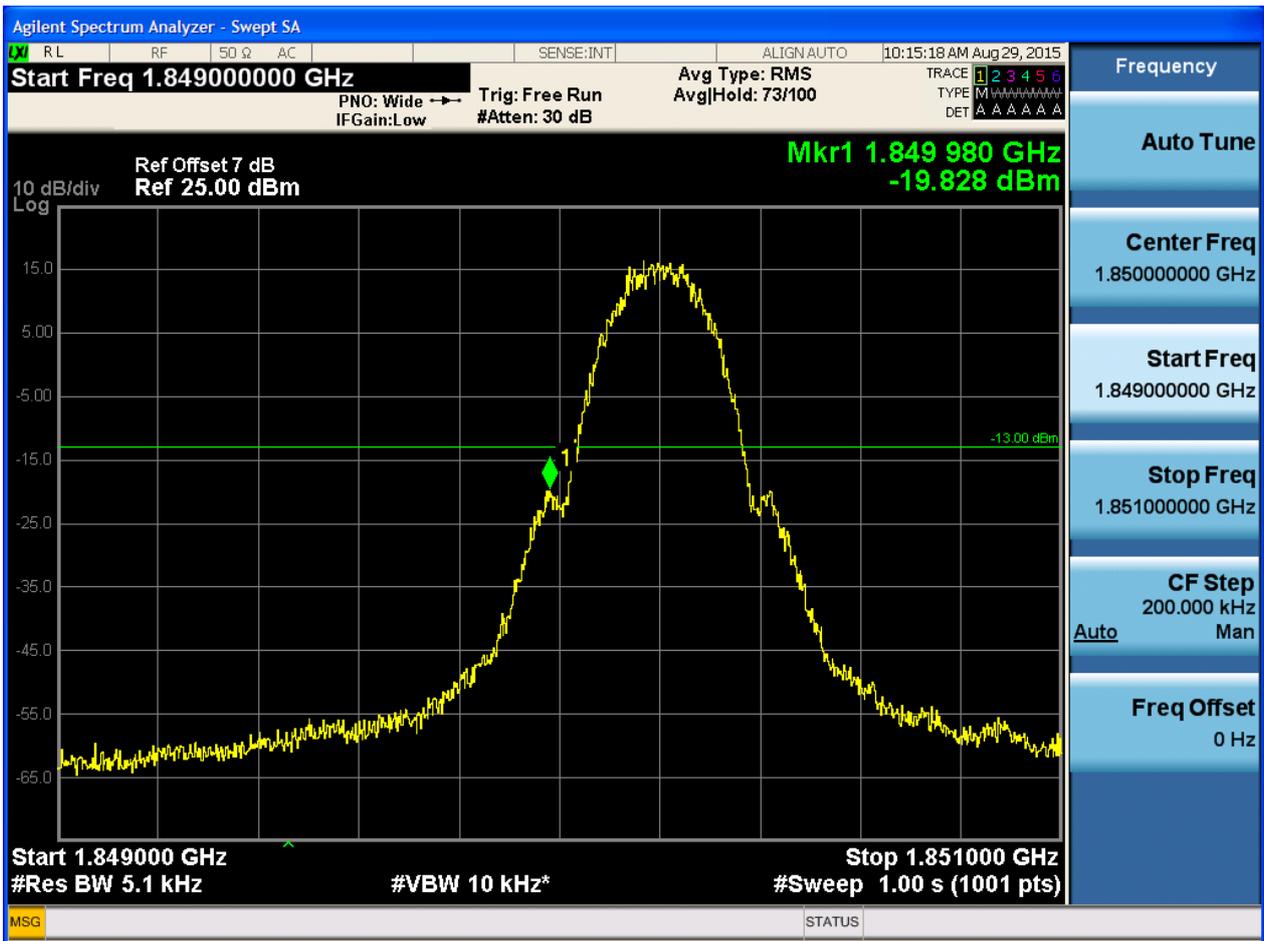




5.1.2 Test Band = GSM1900

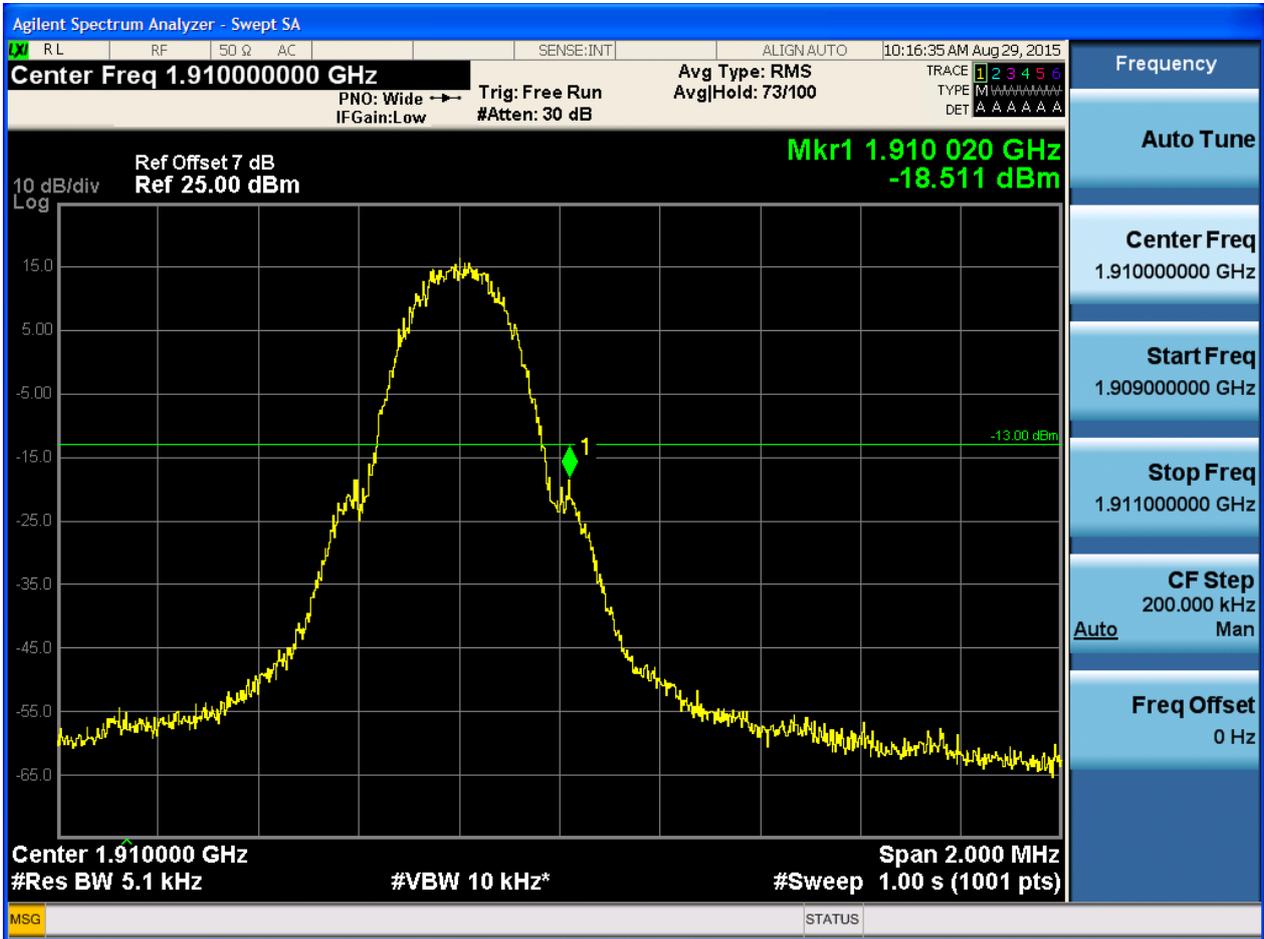
5.1.2.1 Test Mode = GSM/TM1

5.1.2.1.1 Test Channel = LCH





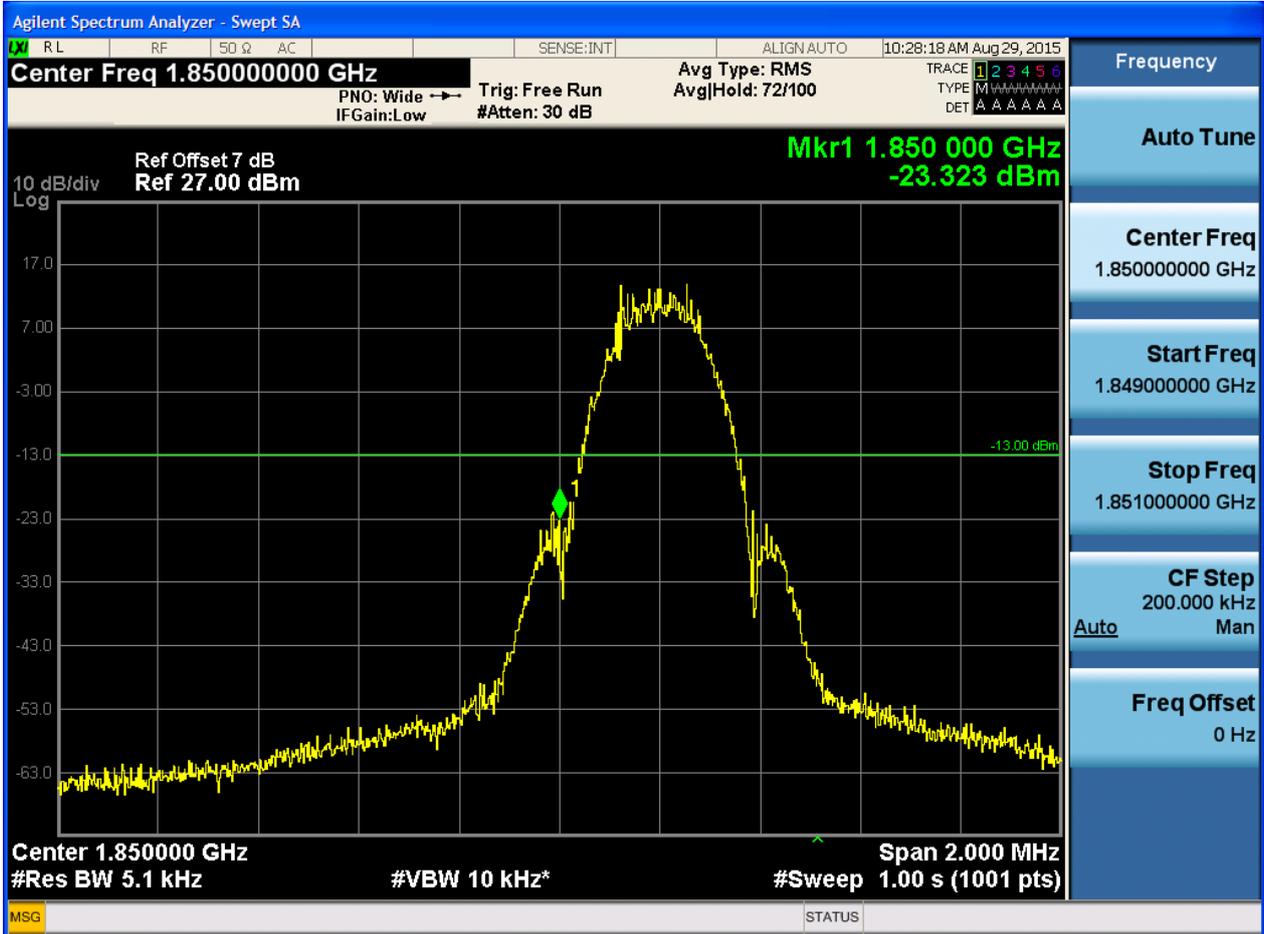
5.1.2.1.2 Test Channel = HCH





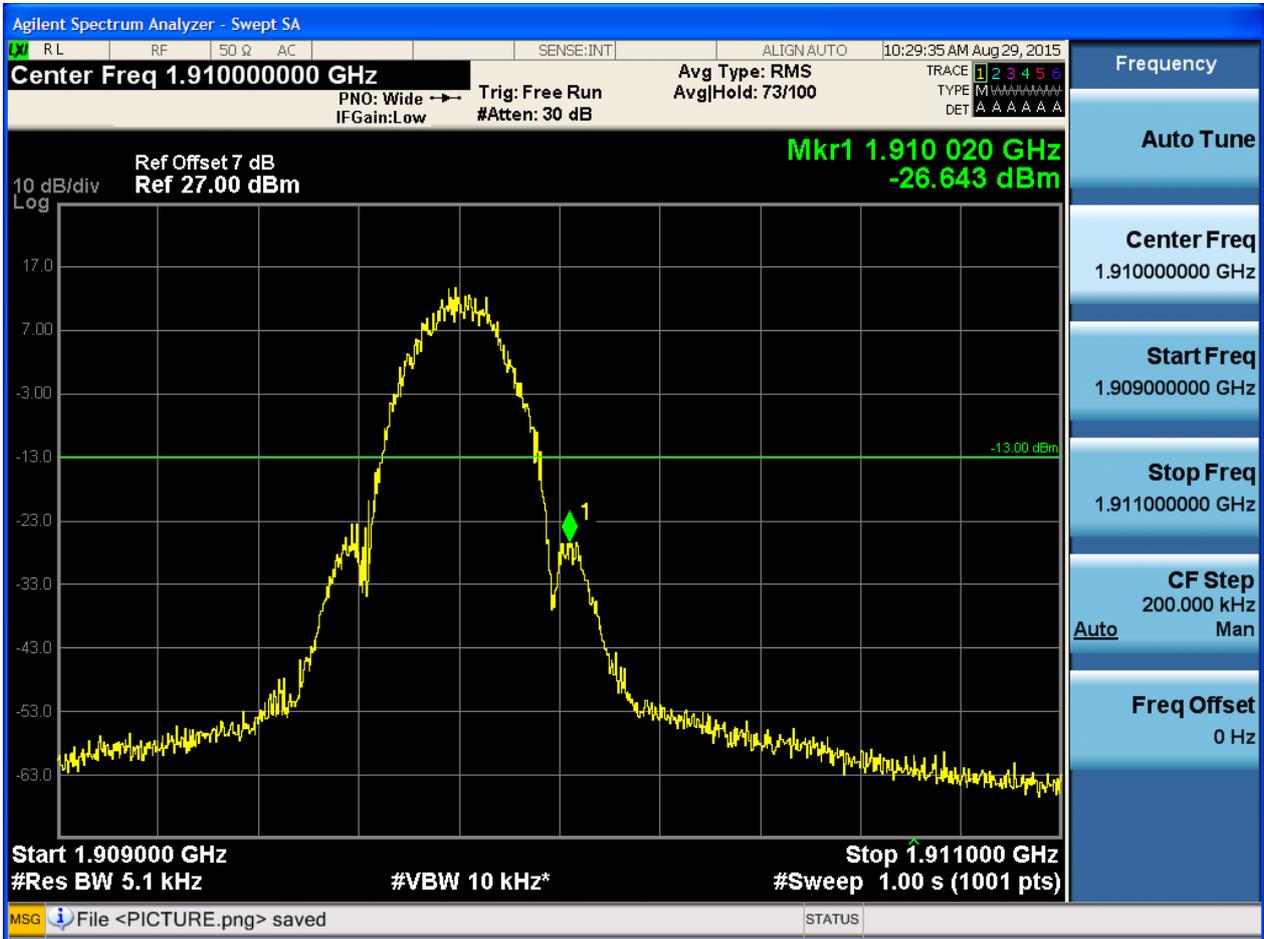
5.1.2.2 Test Mode = GSM/TM2

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.

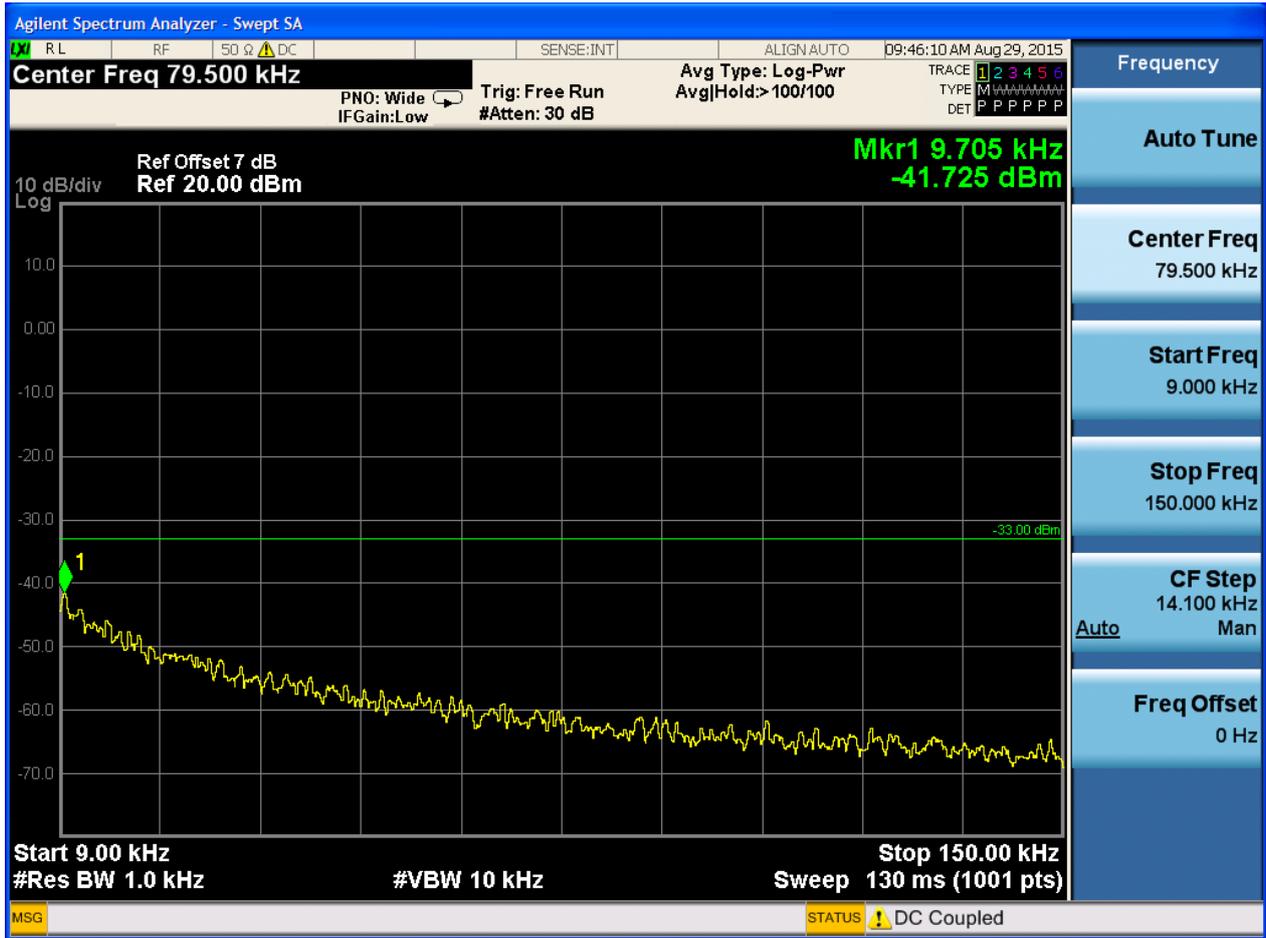
Part I - Test Plots

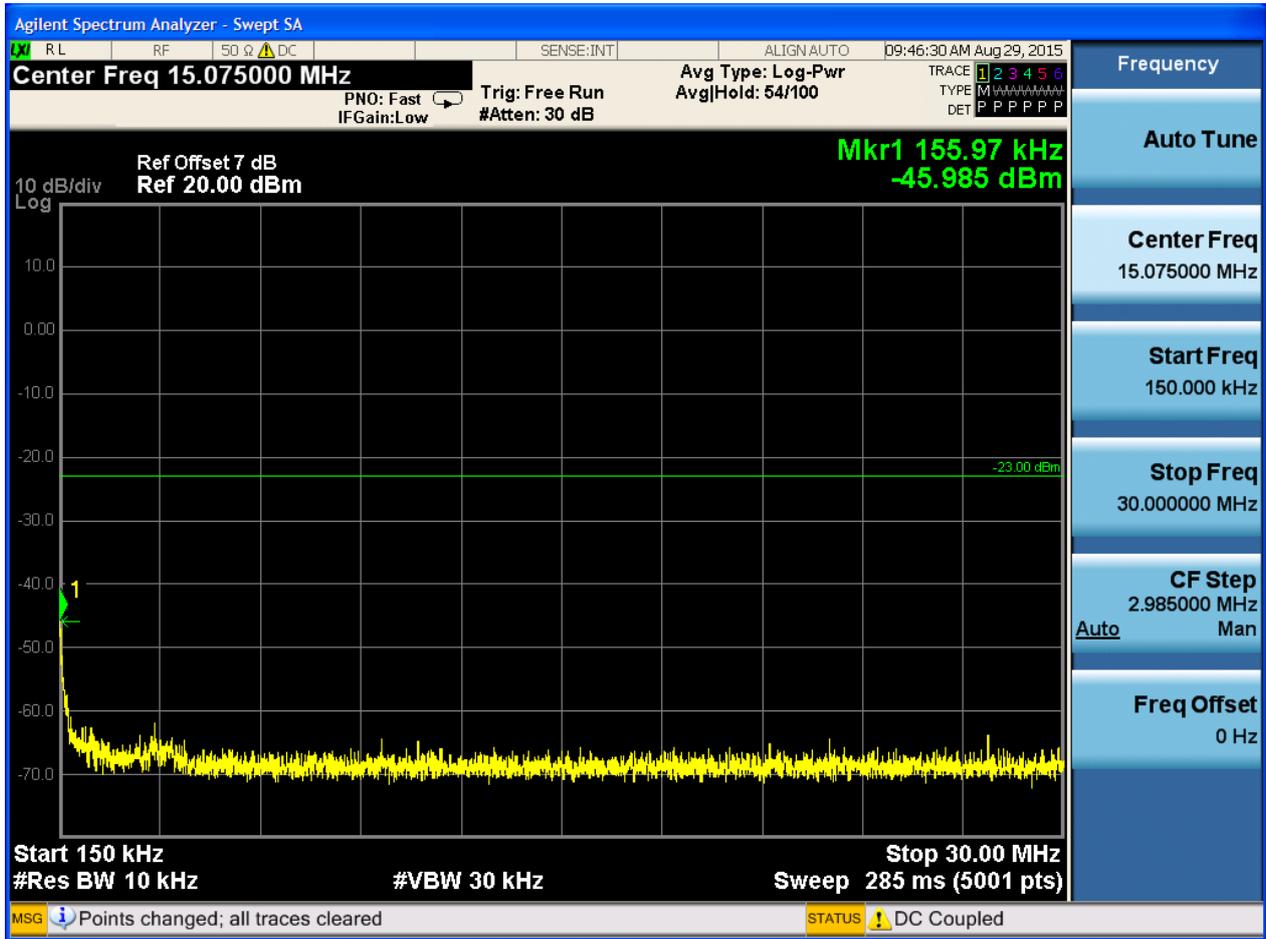
6.1 For GSM

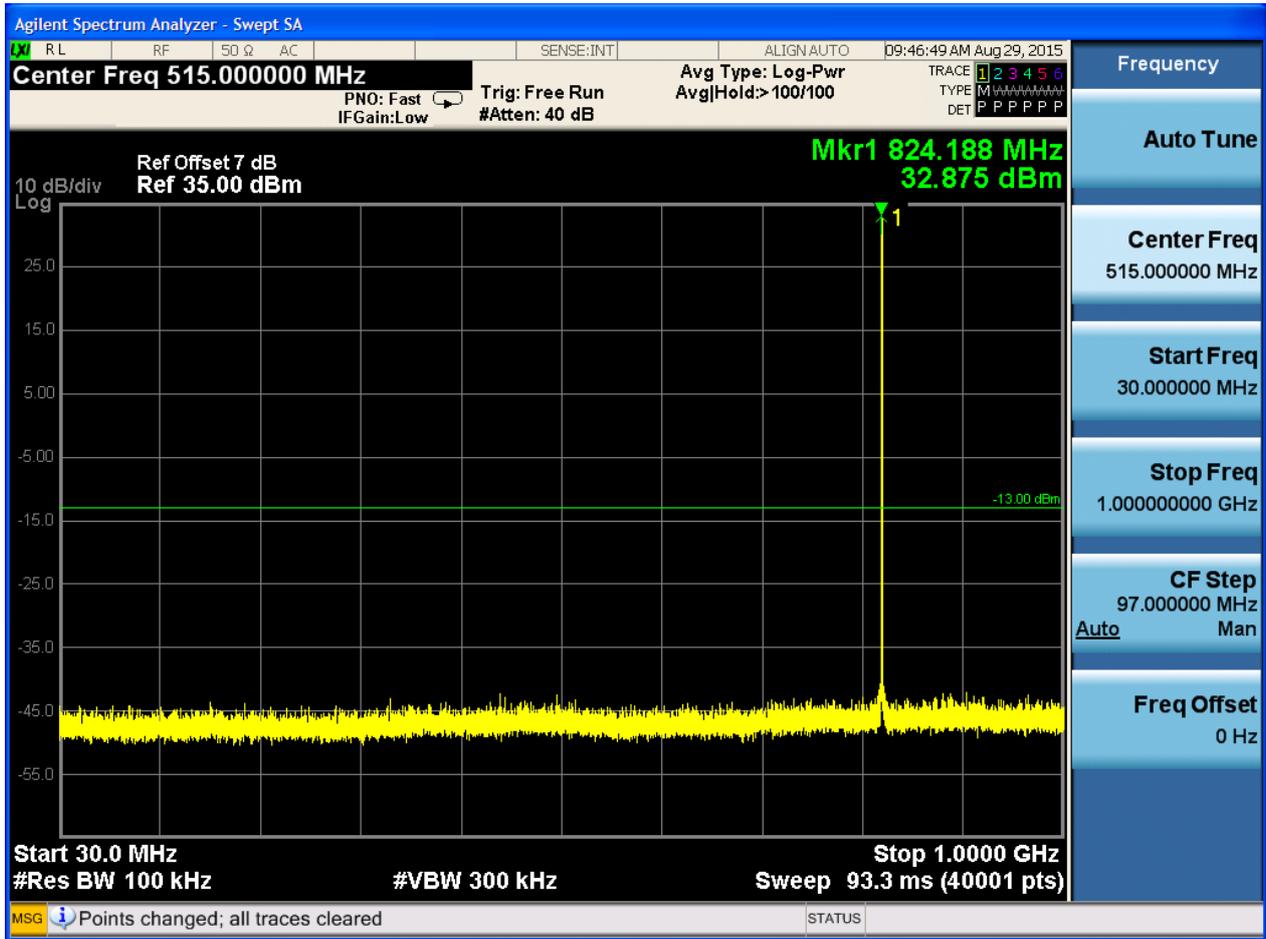
6.1.1 Test Band = GSM850

6.1.1.1 Test Mode = GSM/TM1

6.1.1.1.1 Test Channel = LCH

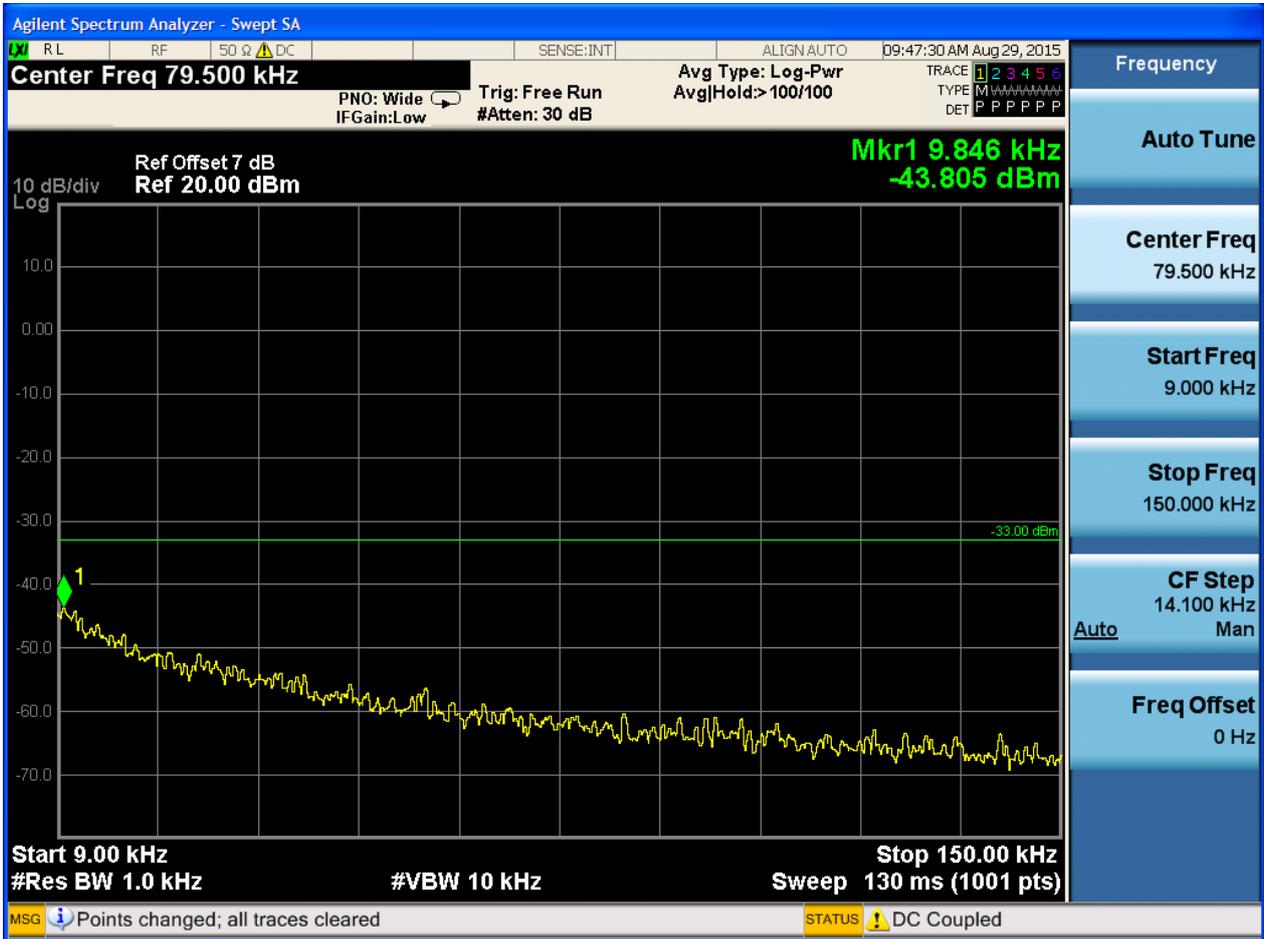


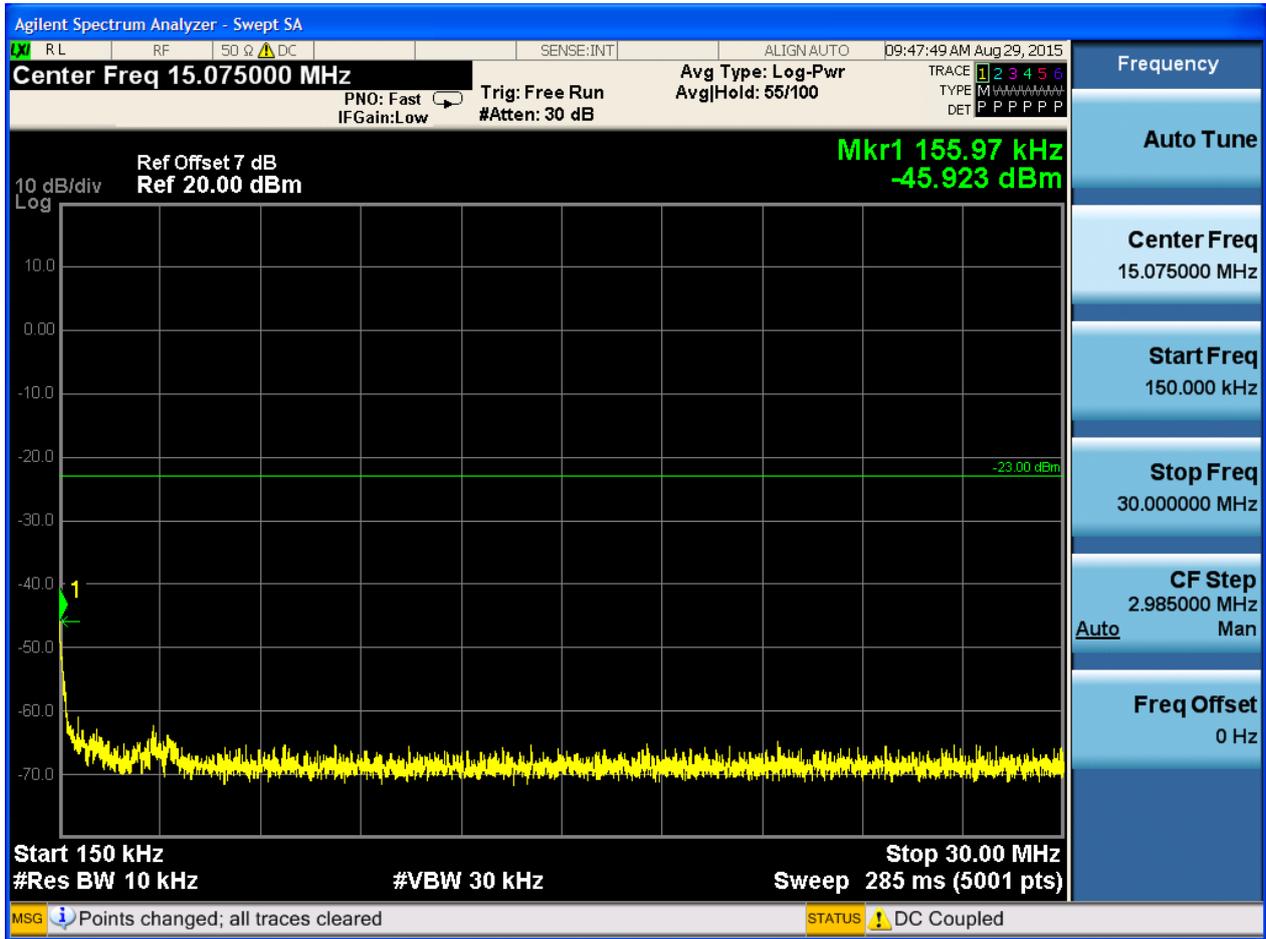


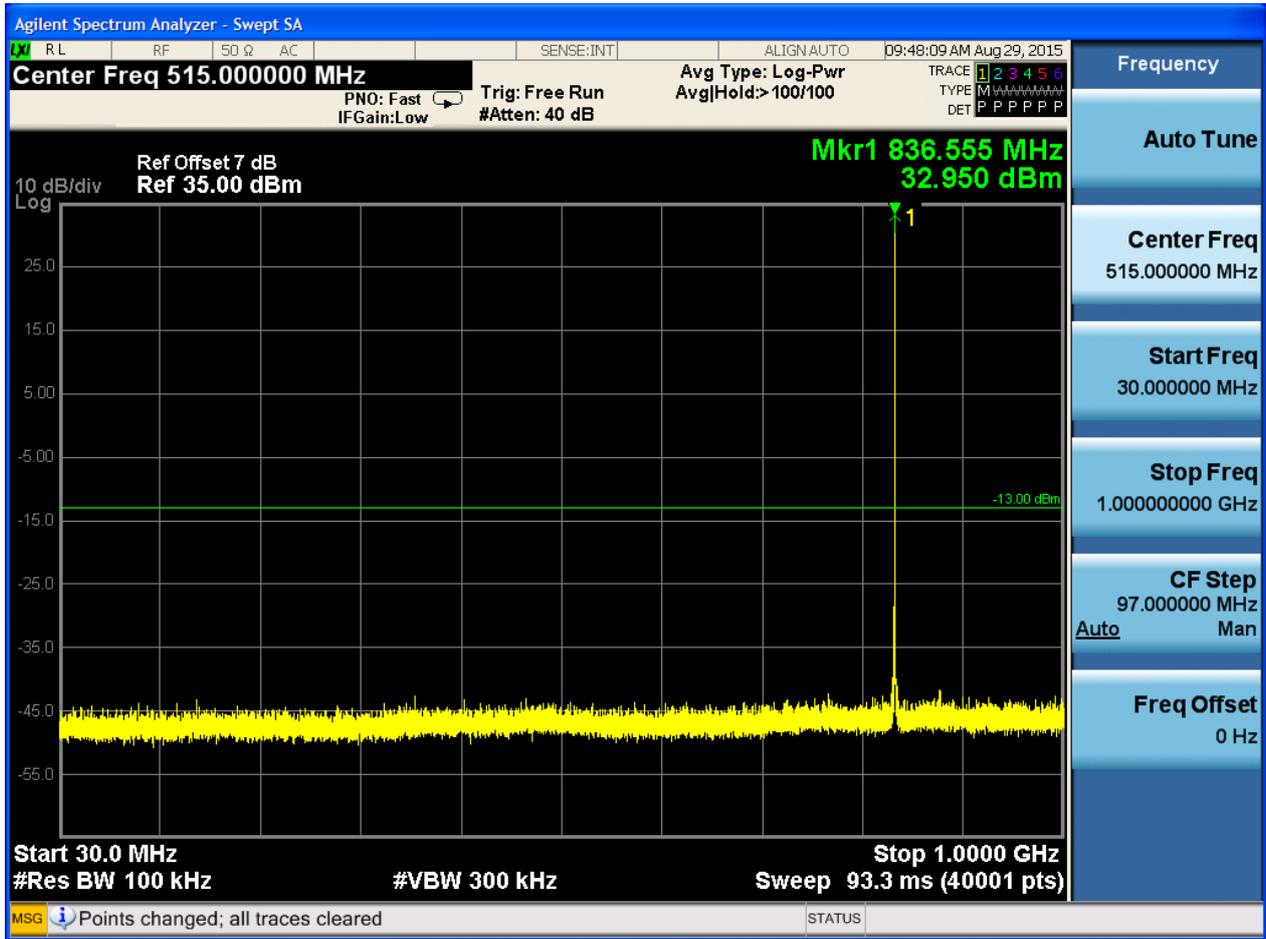


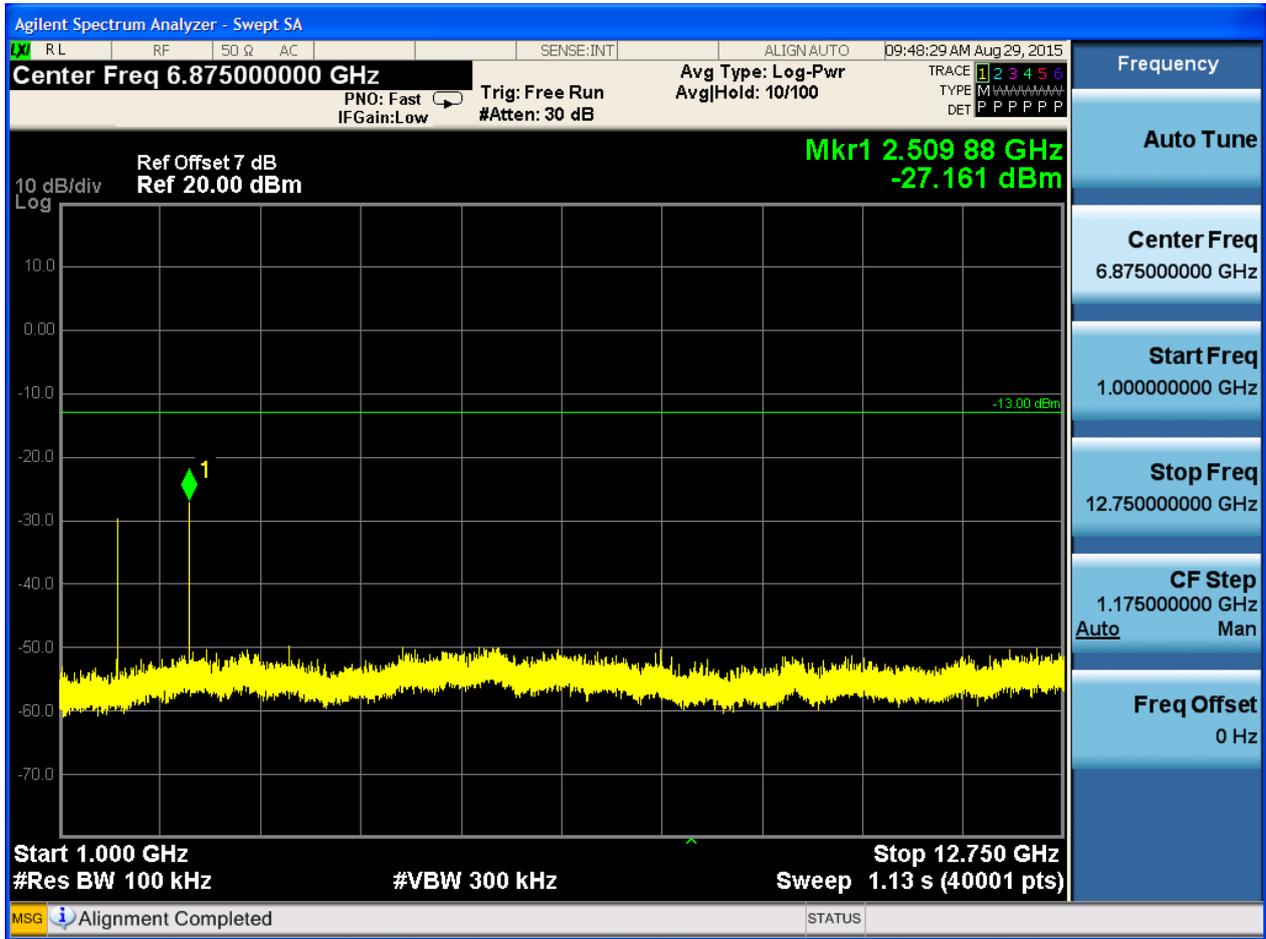


6.1.1.1.2 Test Channel = MCH



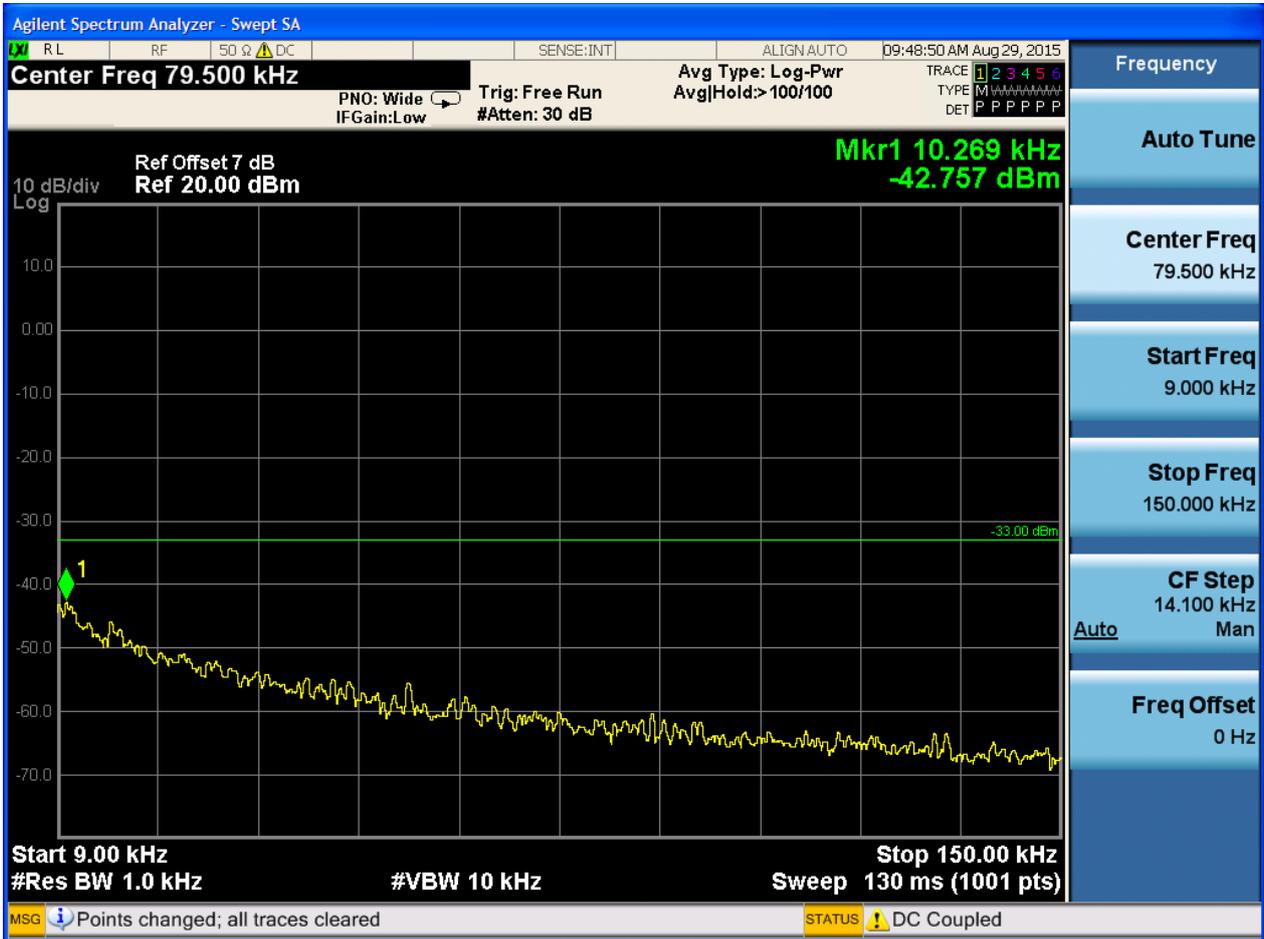


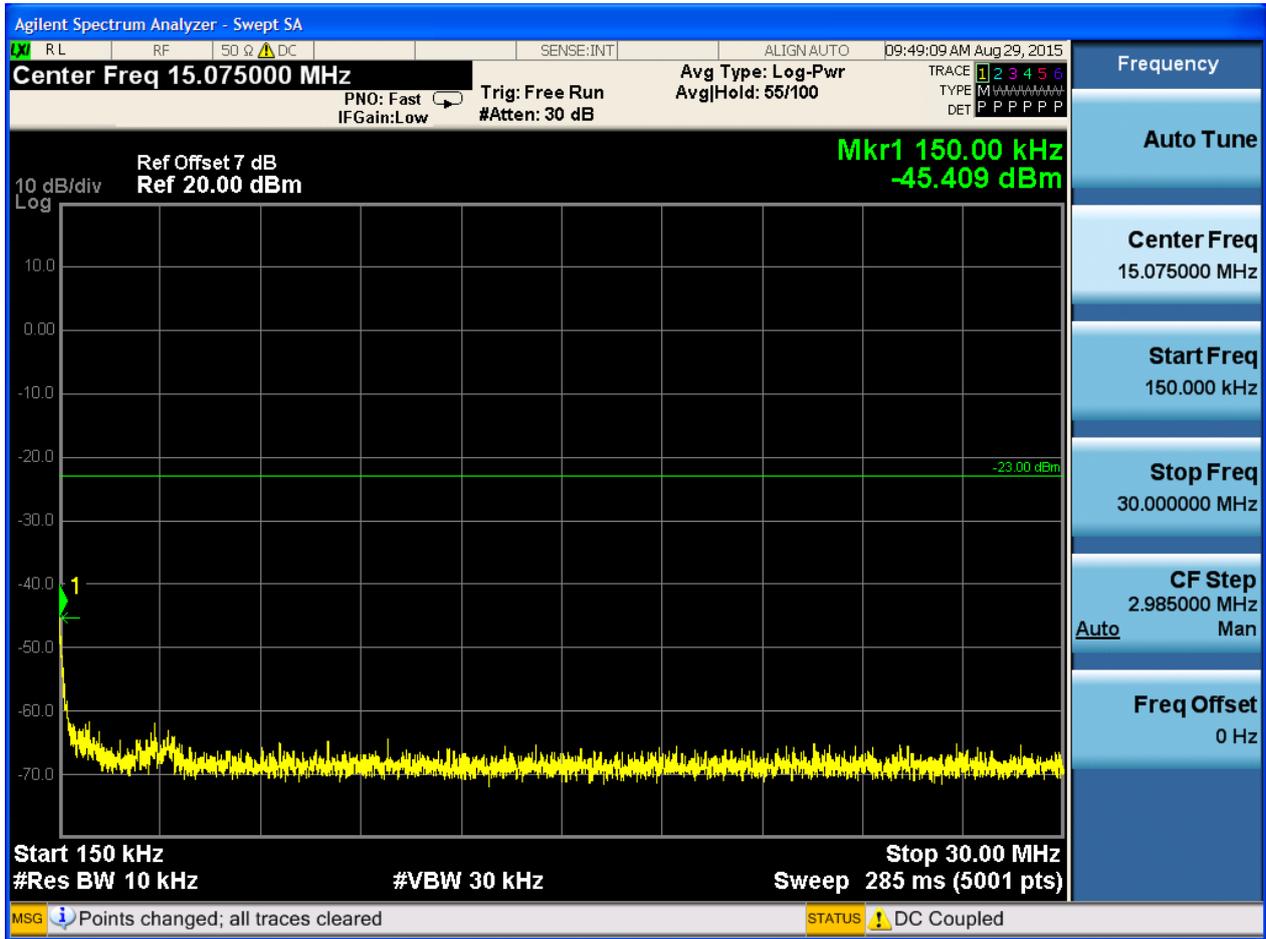


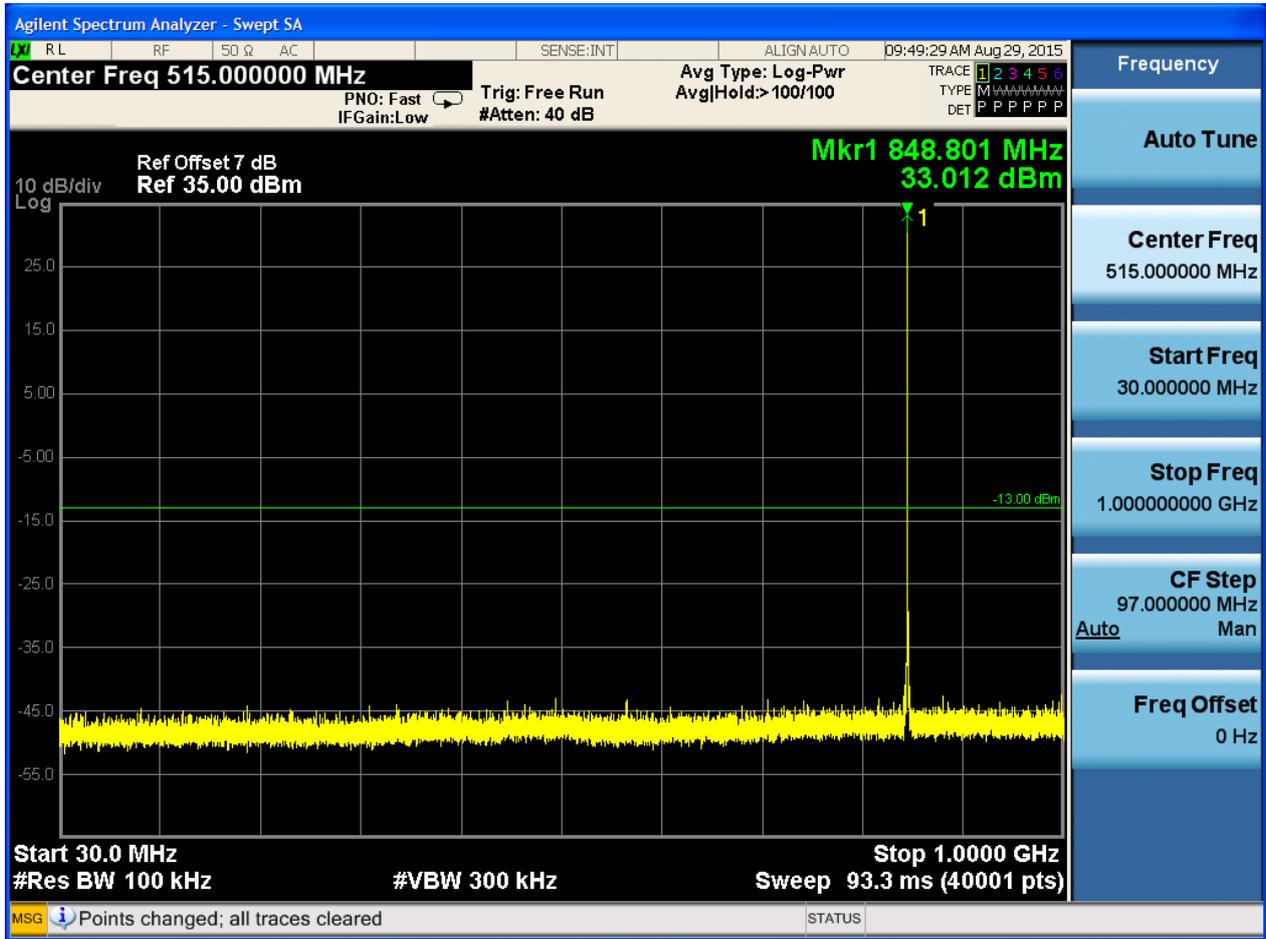


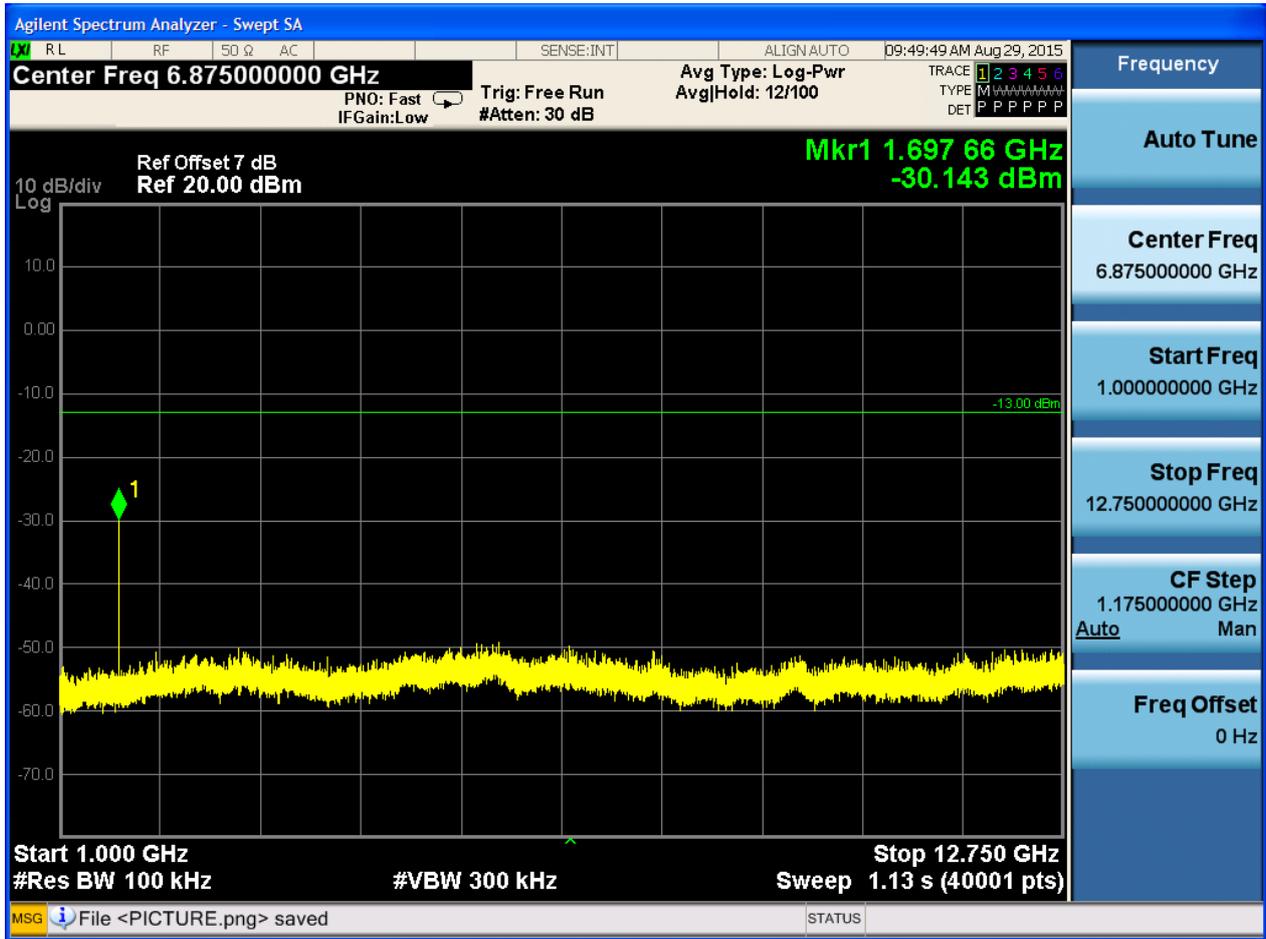


6.1.1.1.3 Test Channel = HCH





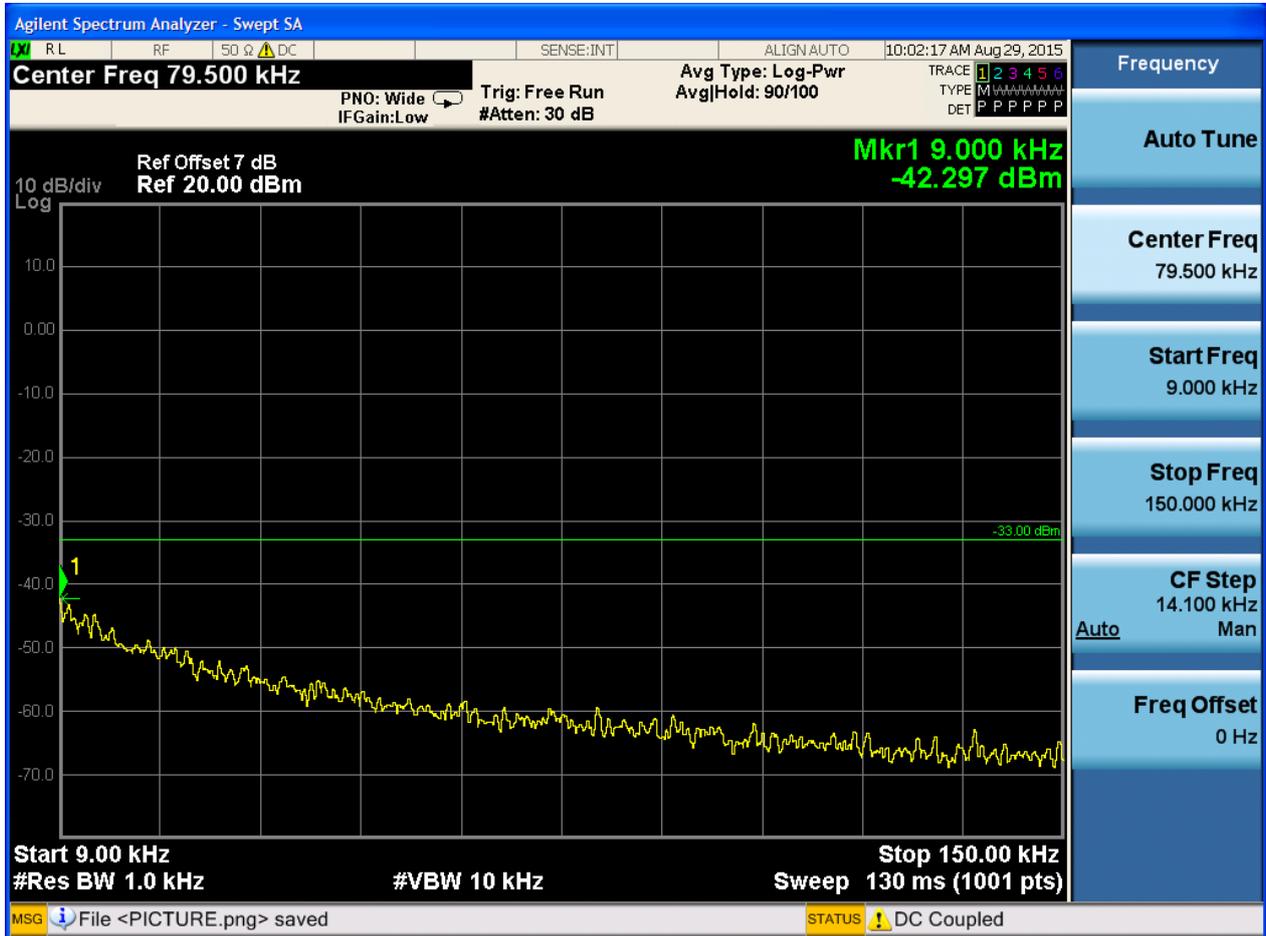


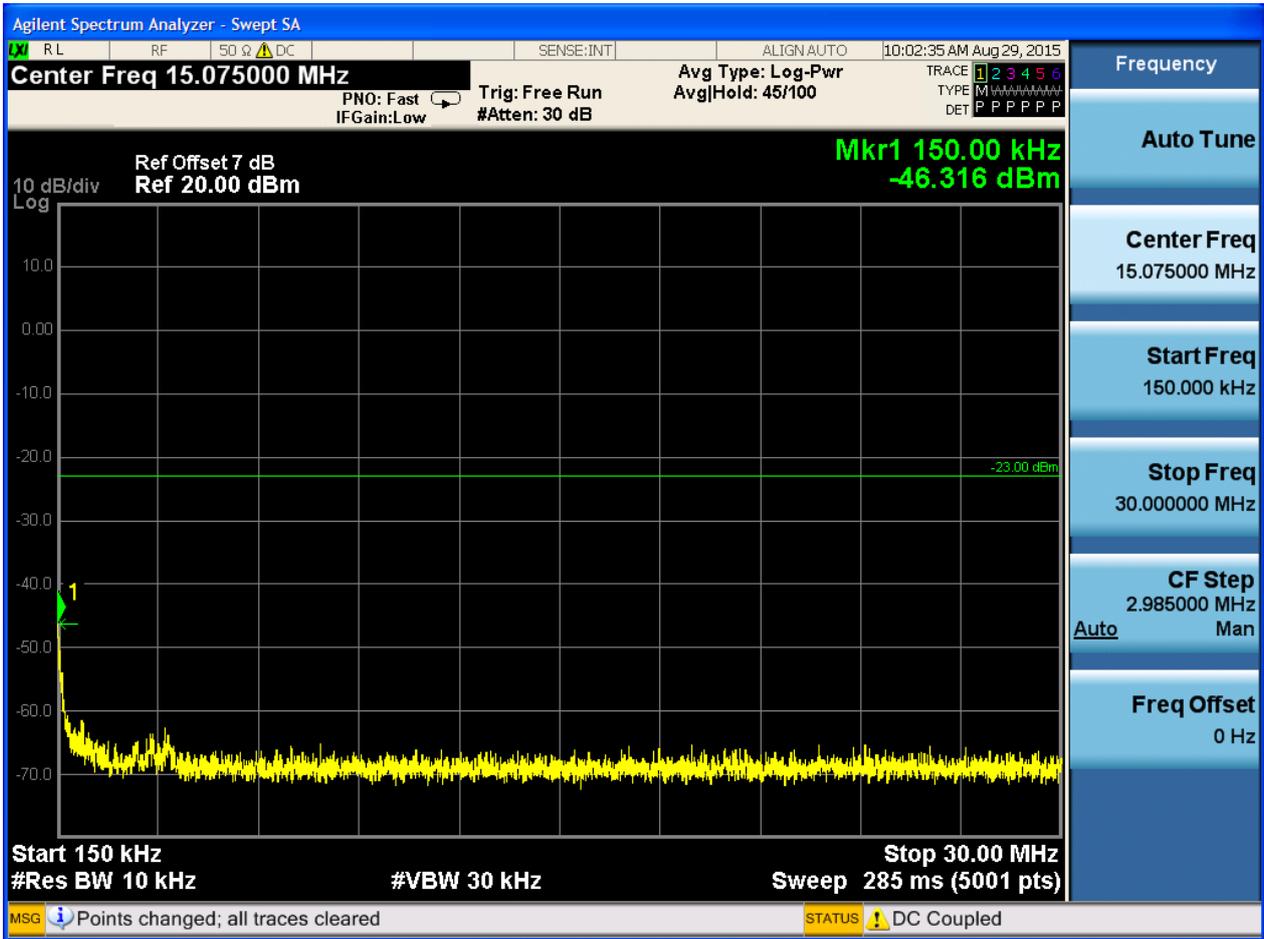


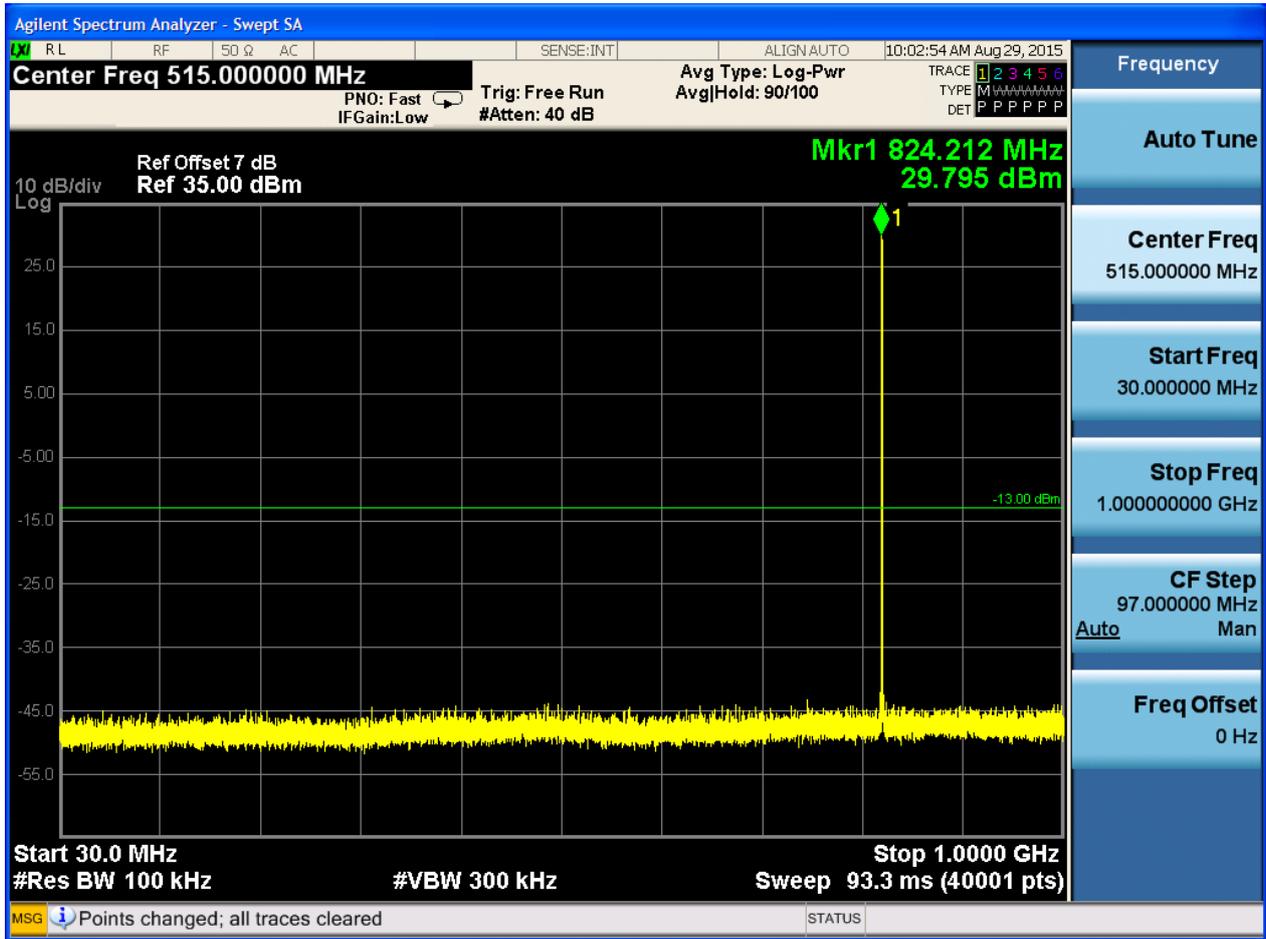


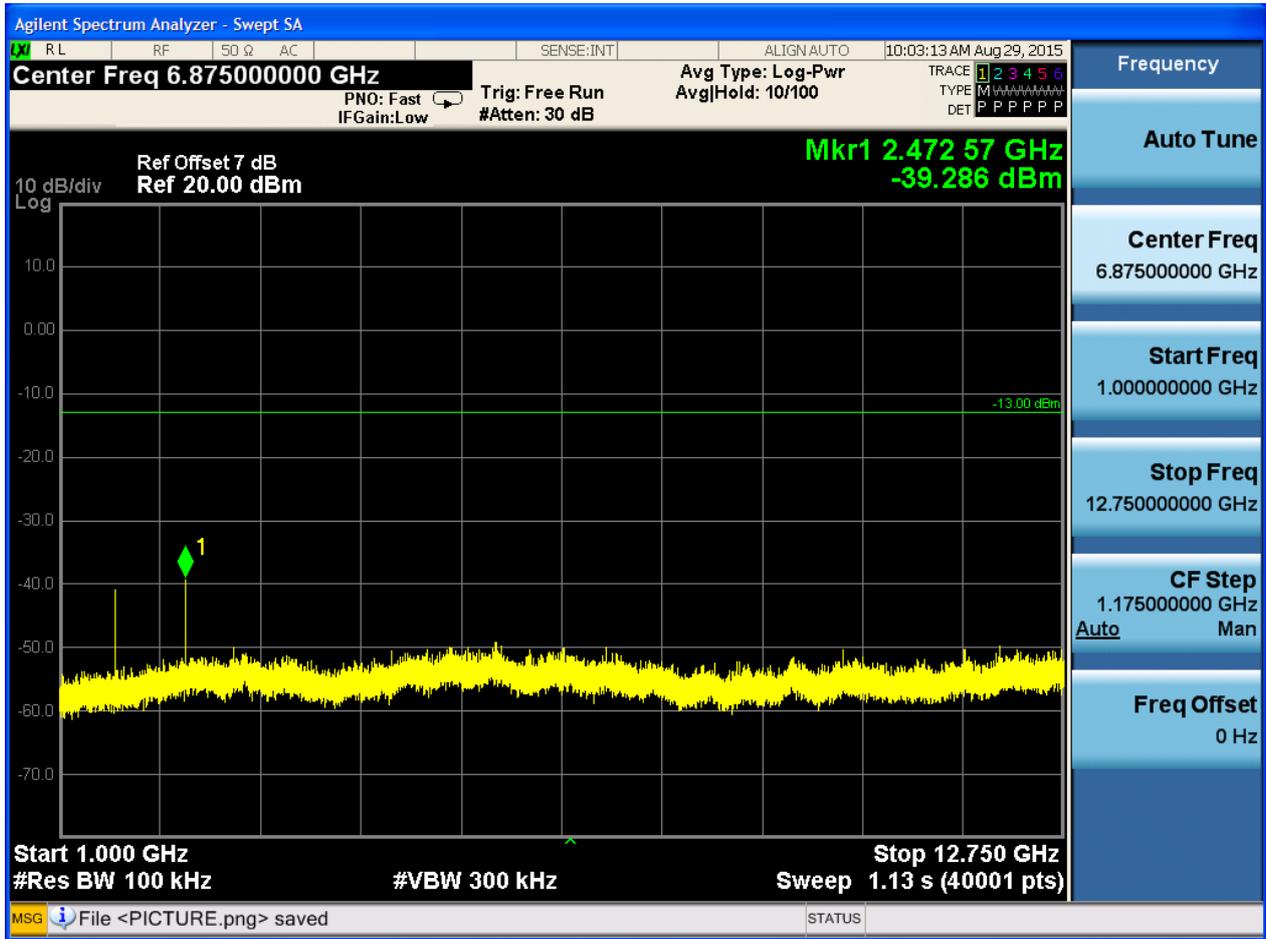
6.1.1.2 Test Mode = GSM/TM2

6.1.1.2.1 Test Channel = LCH

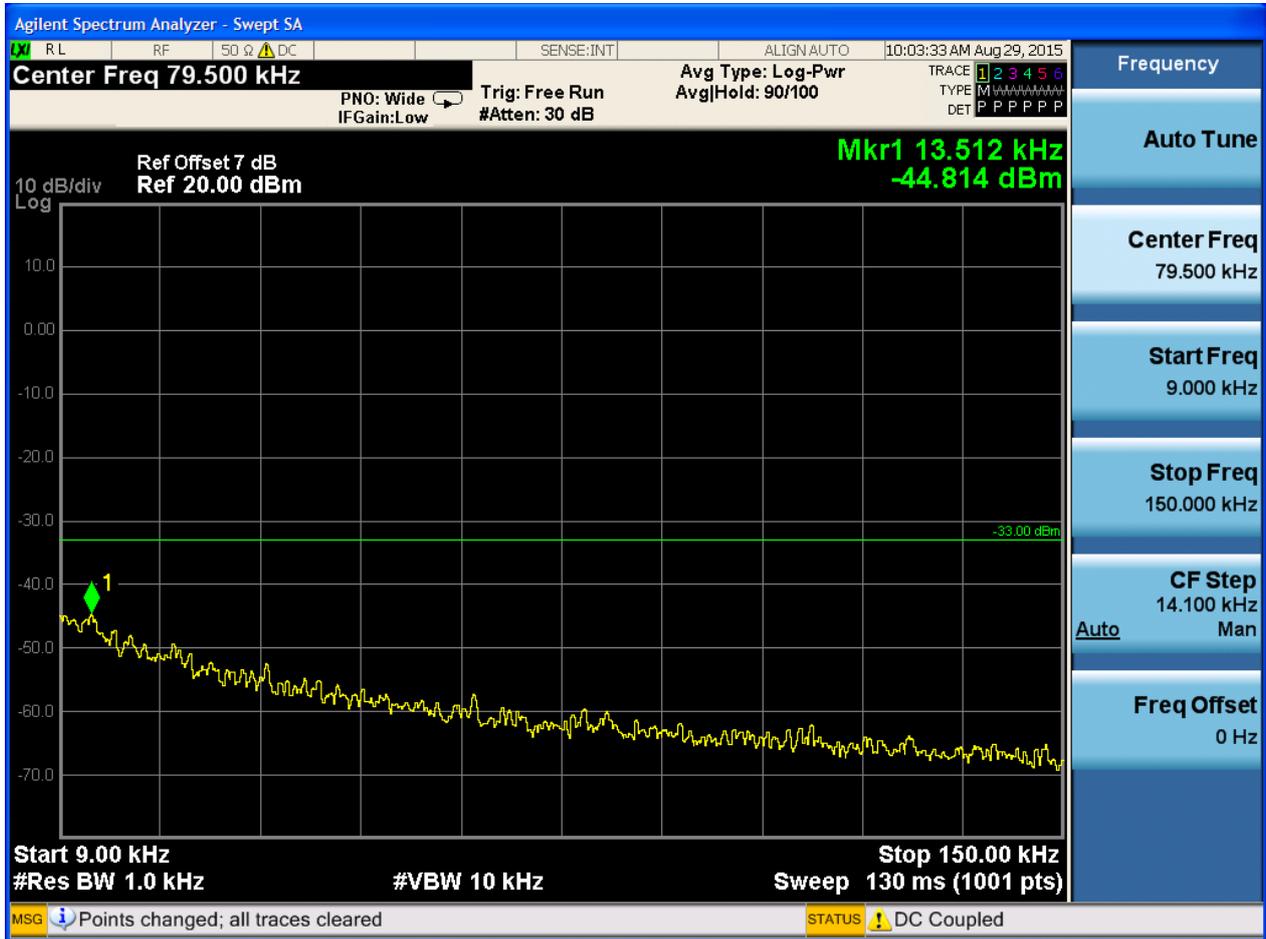


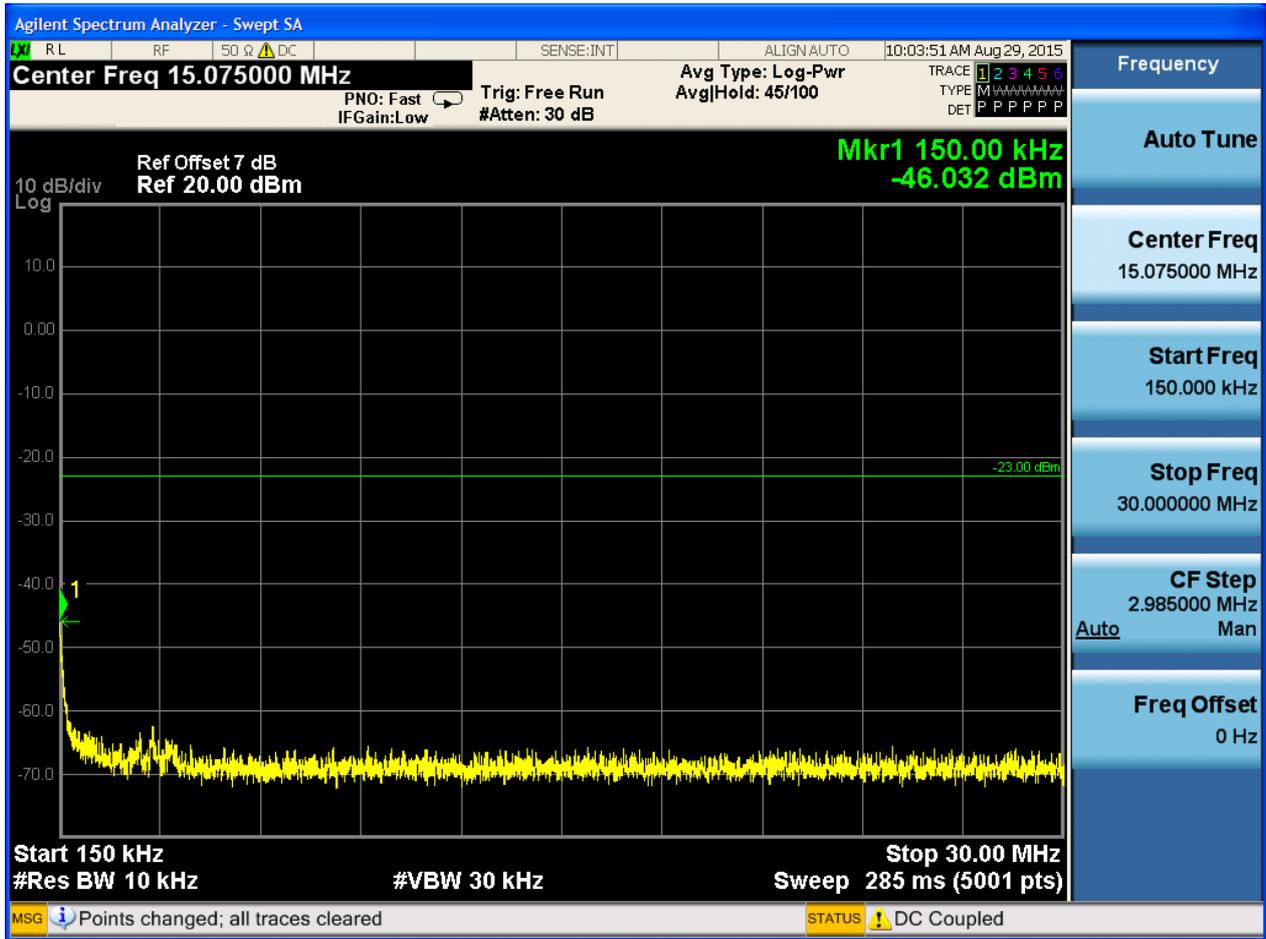


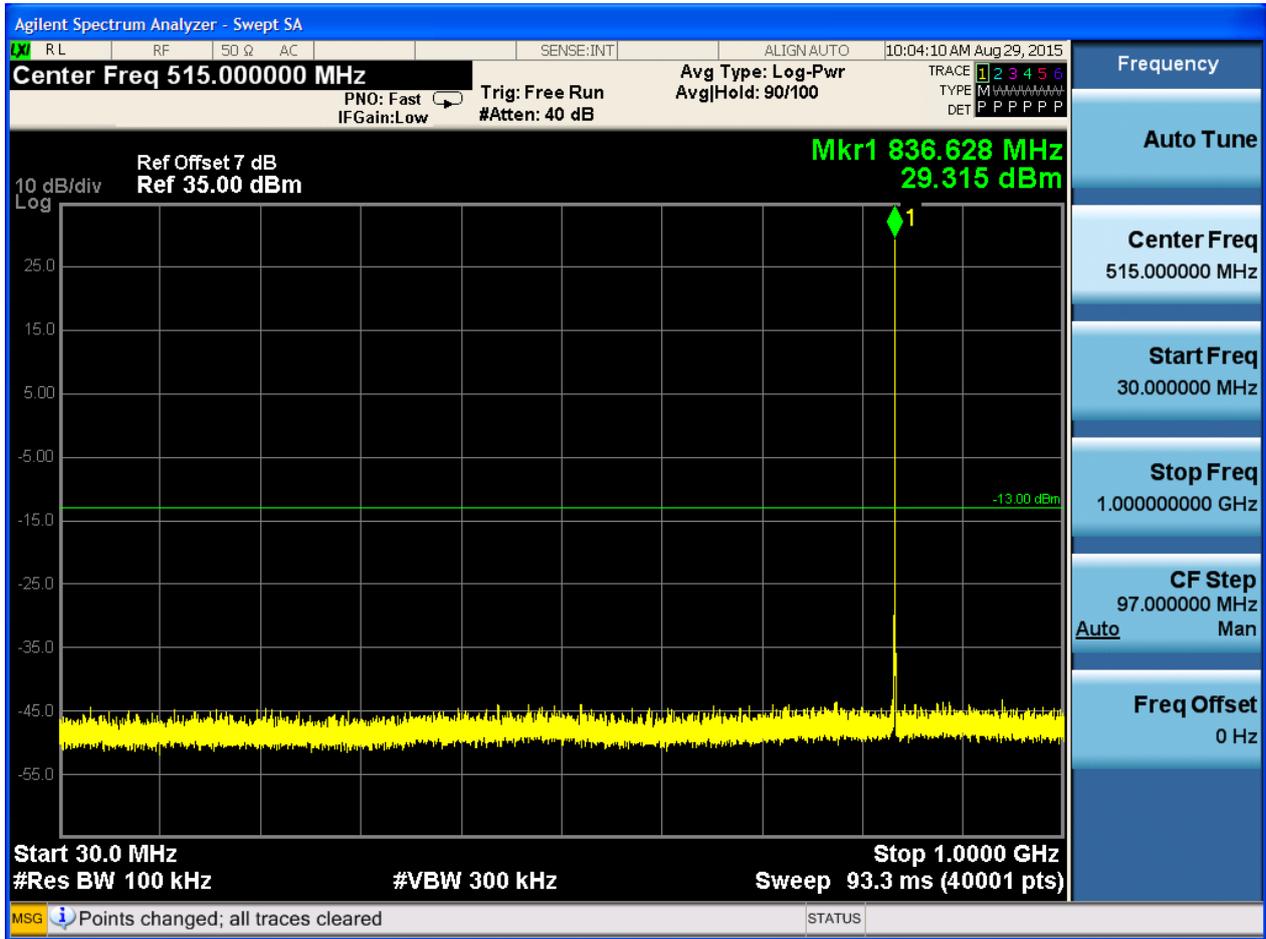


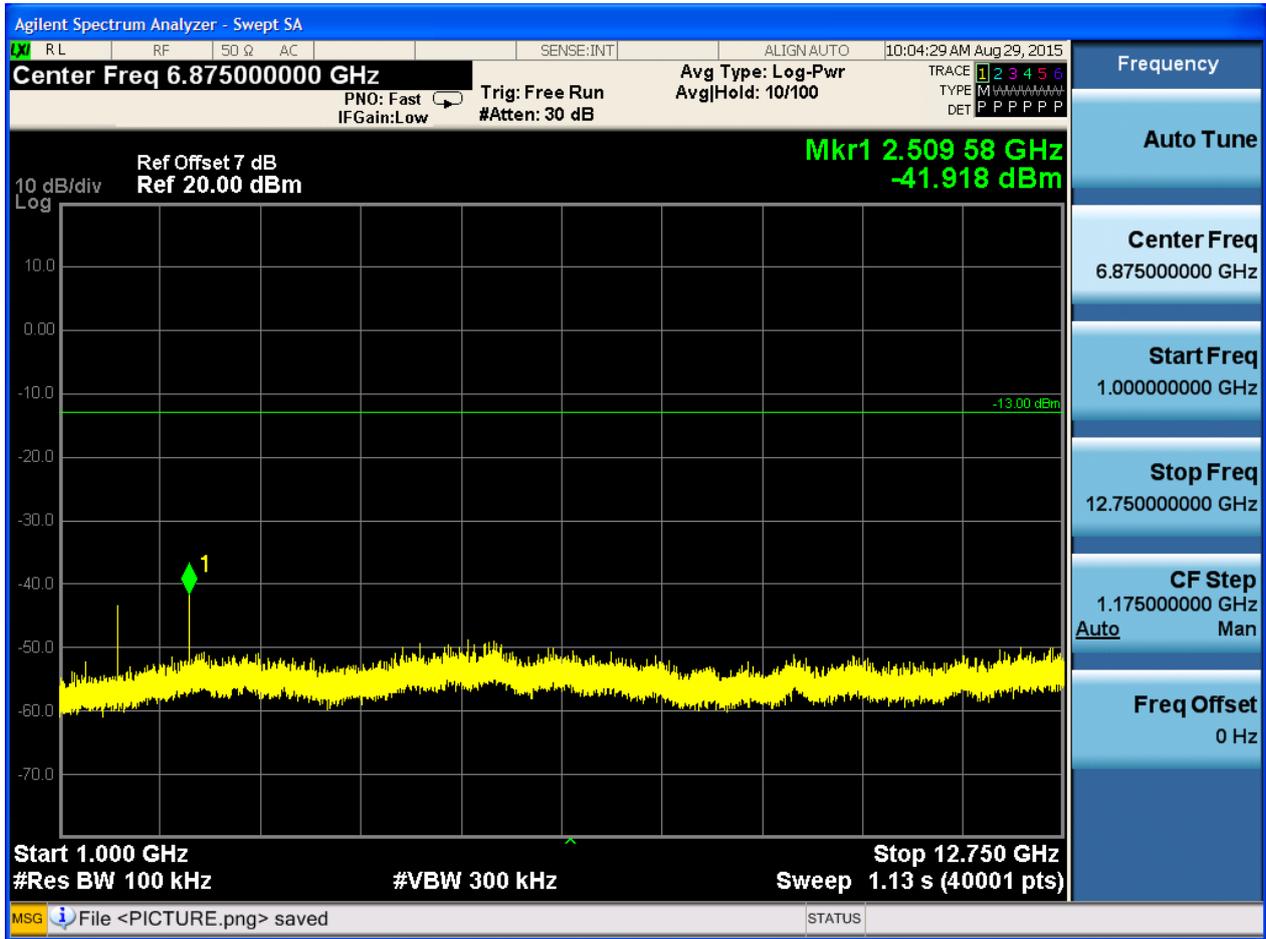


6.1.1.2.2 Test Channel = MCH





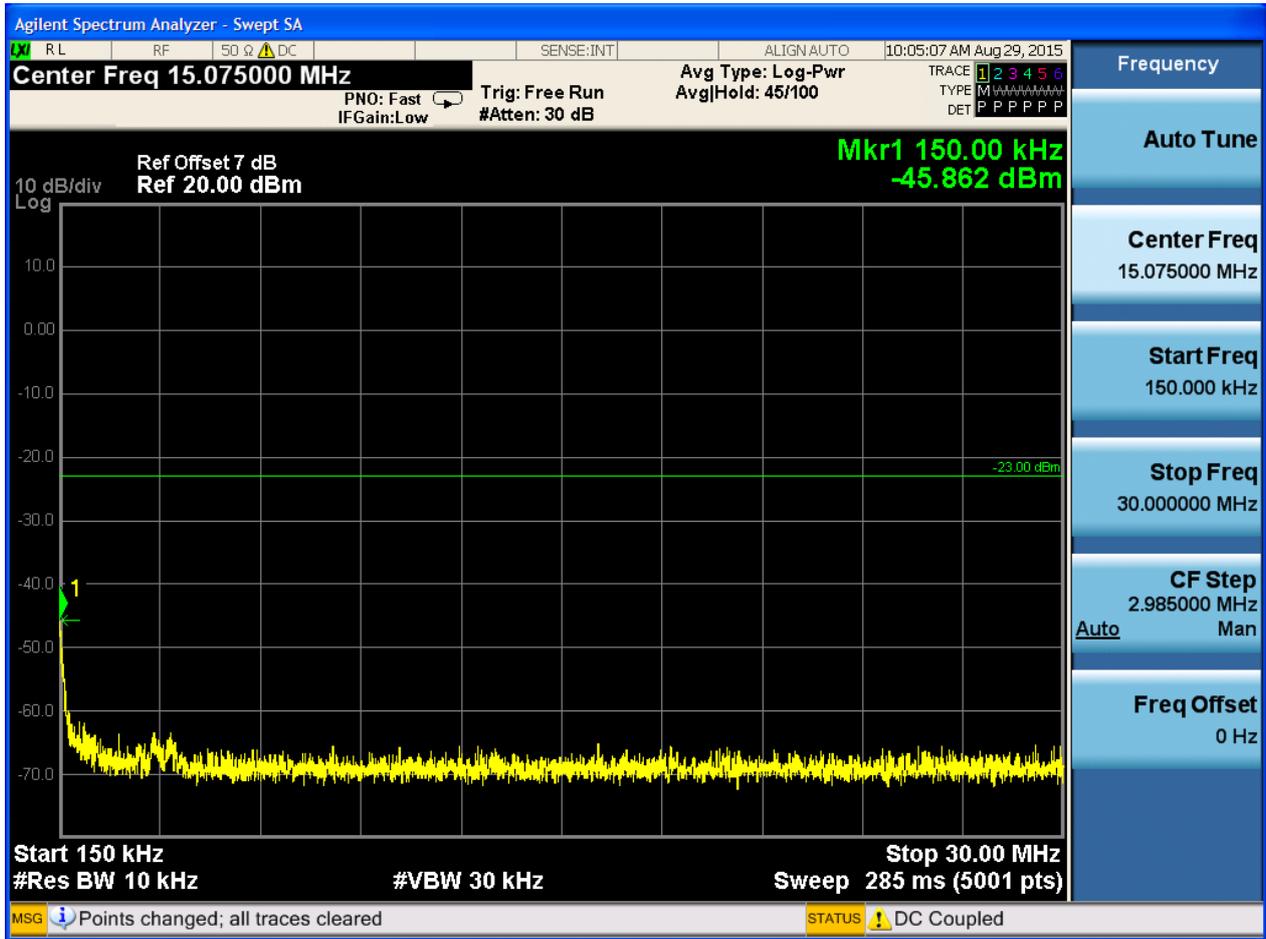


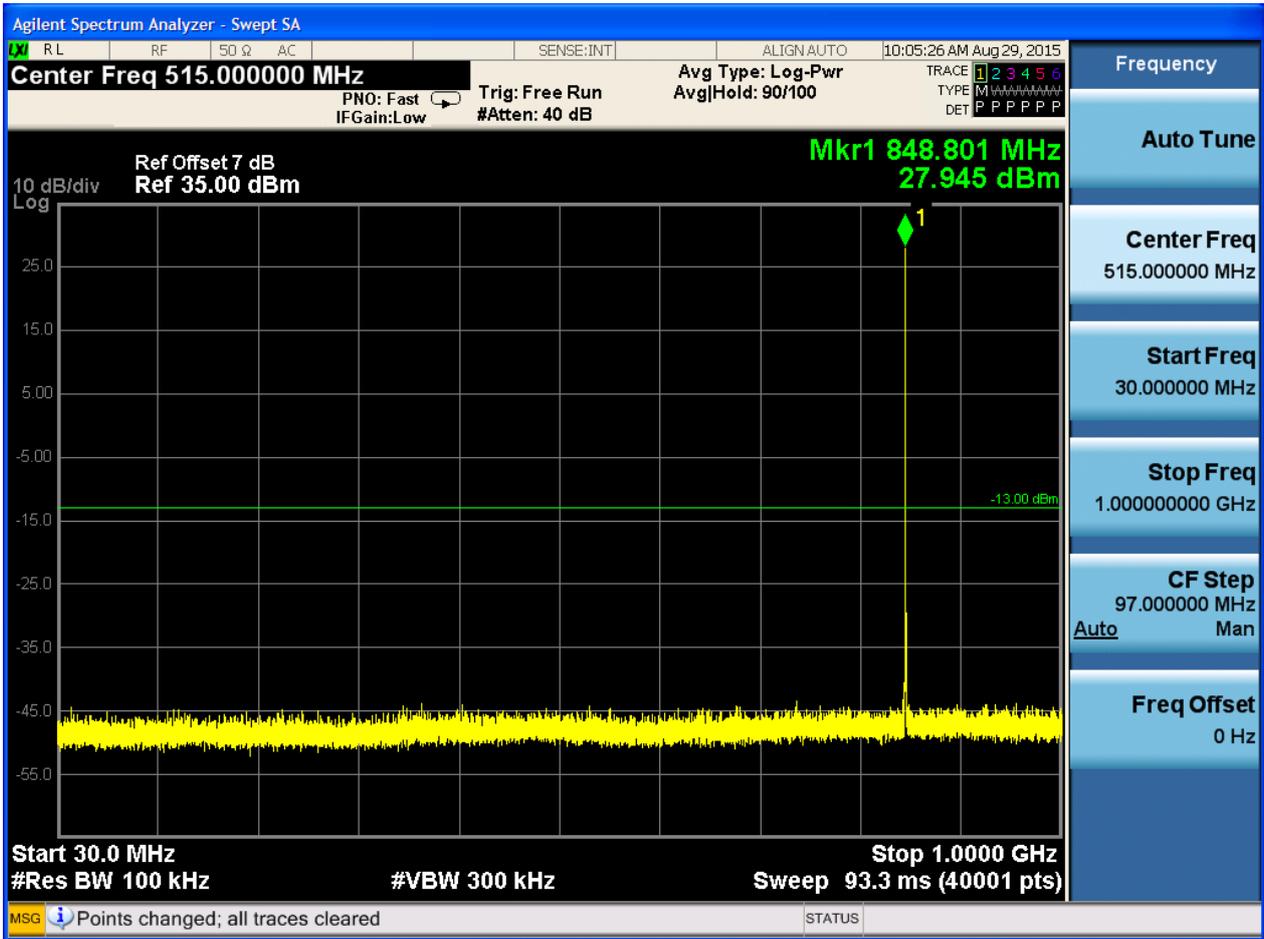




6.1.1.2.3 Test Channel = HCH





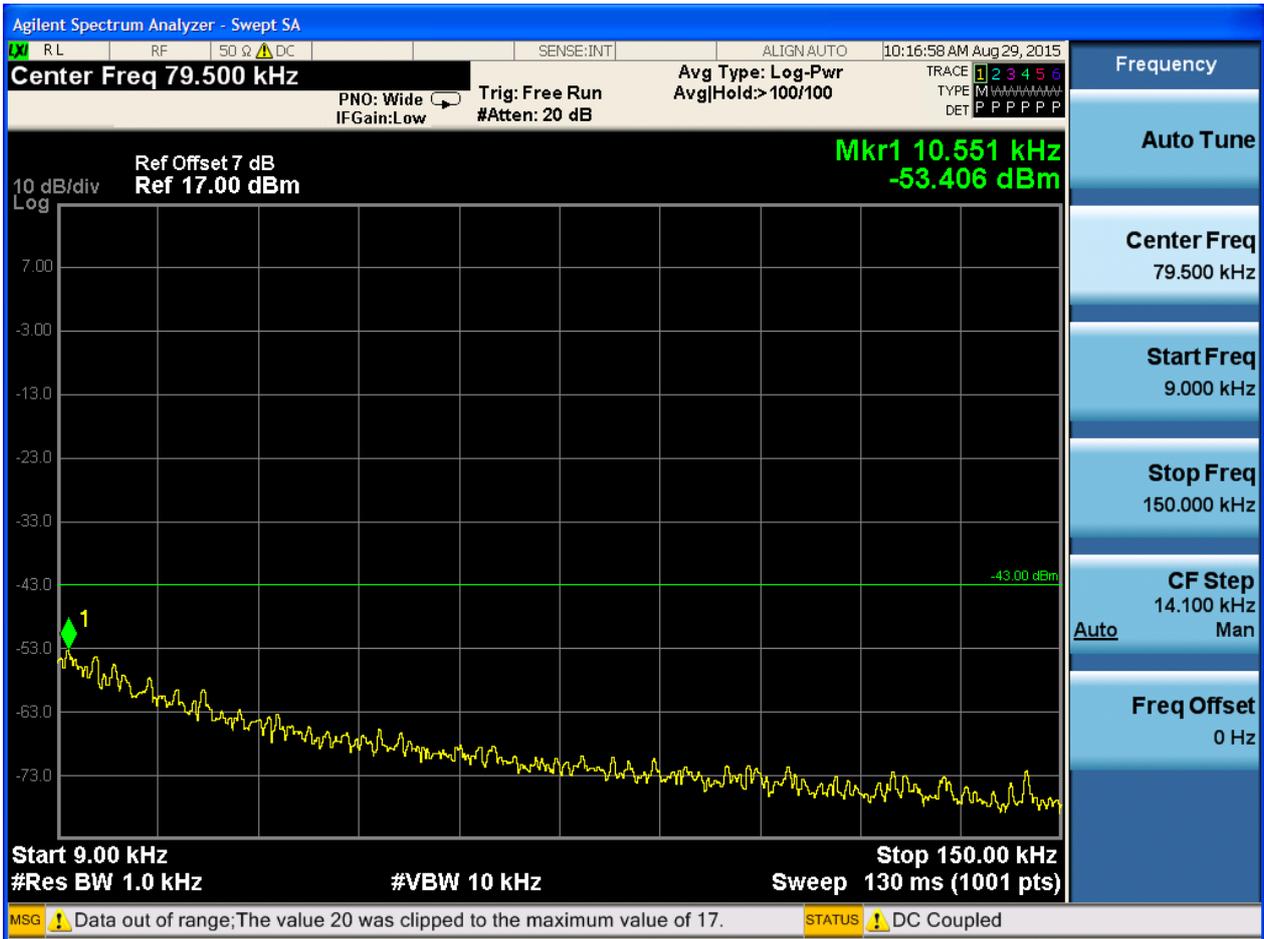


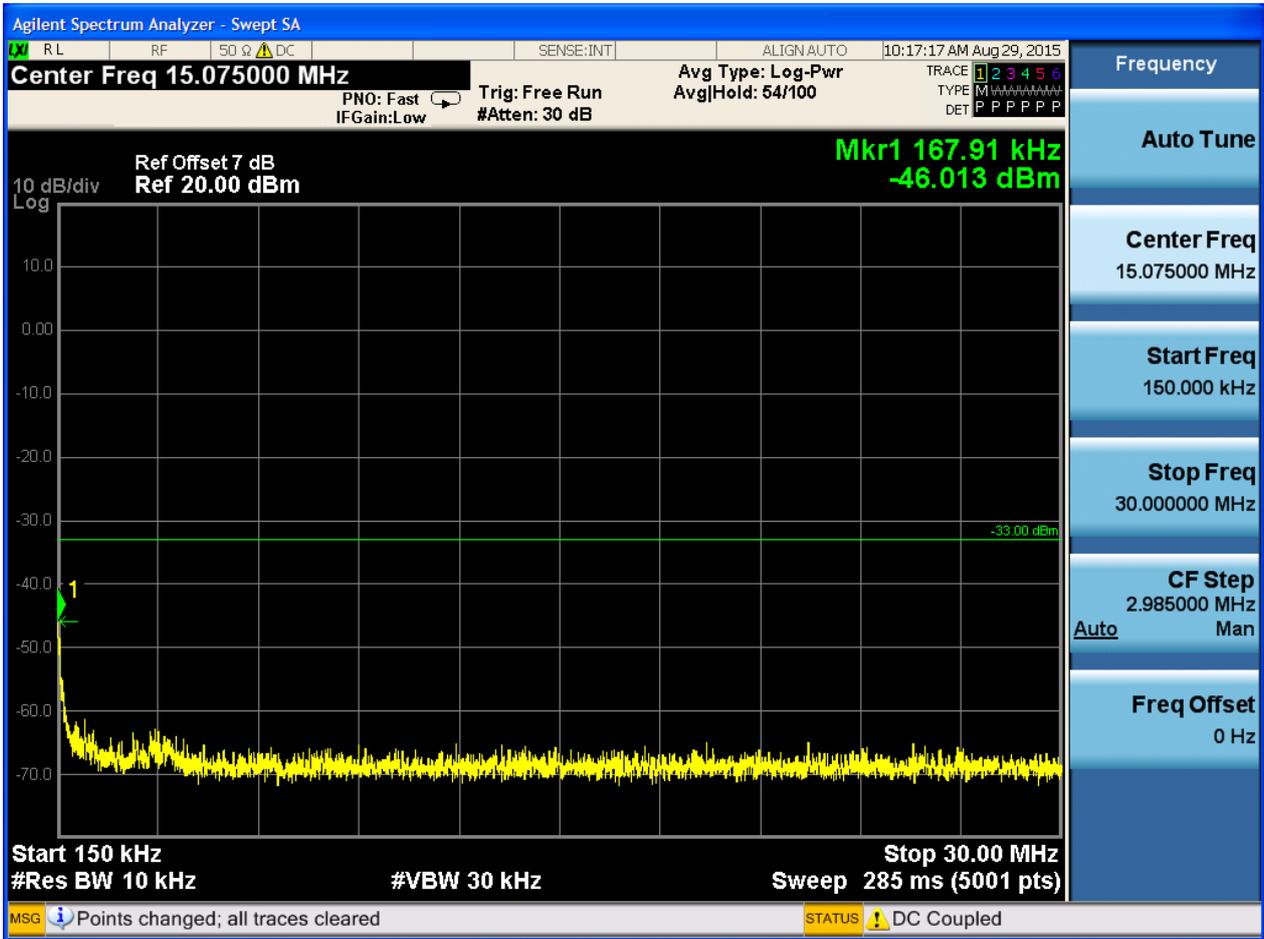


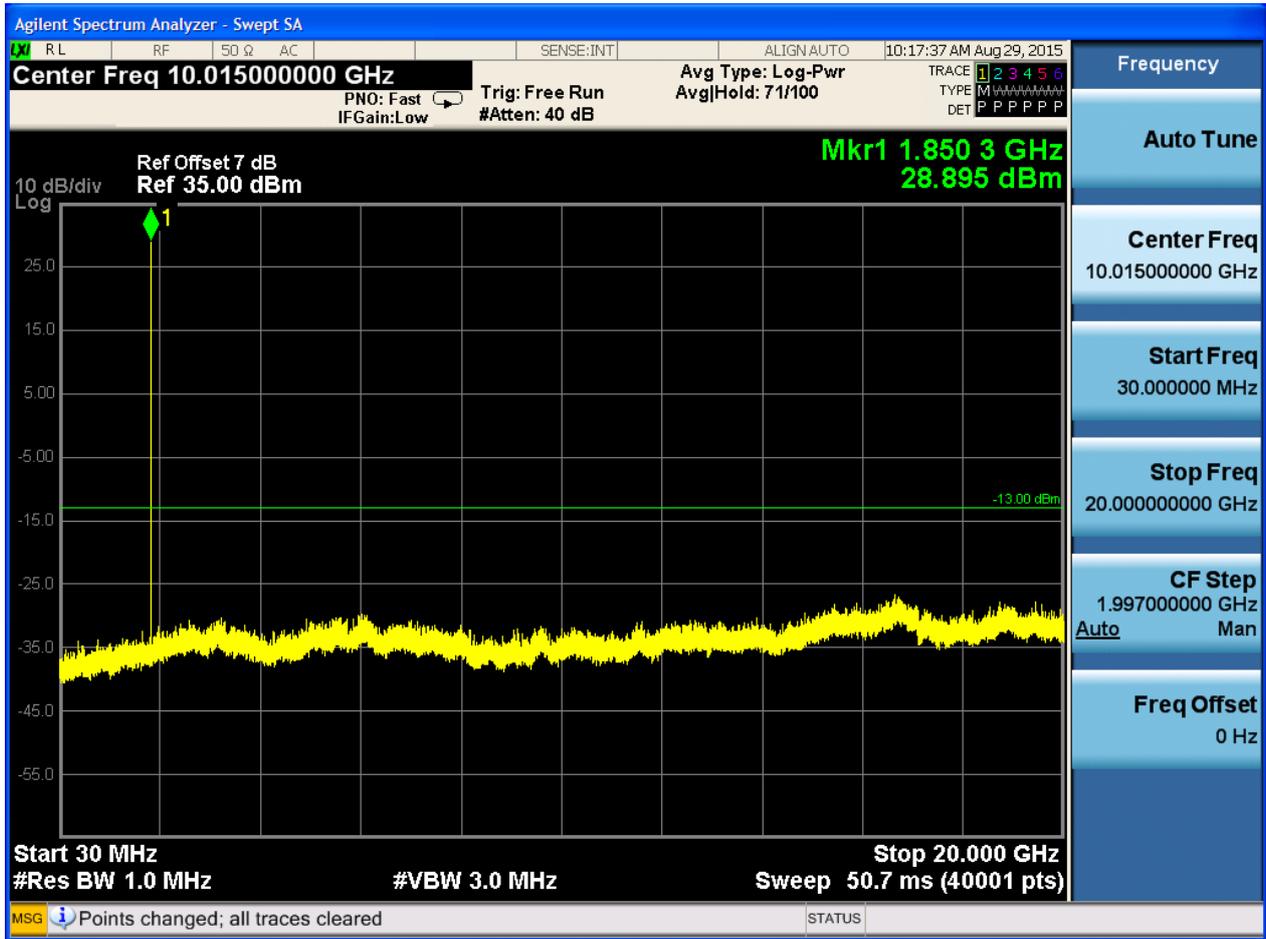
6.1.2 Test Band = GSM1900

6.1.2.1 Test Mode = GSM/TM1

6.1.2.1.1 Test Channel = LCH



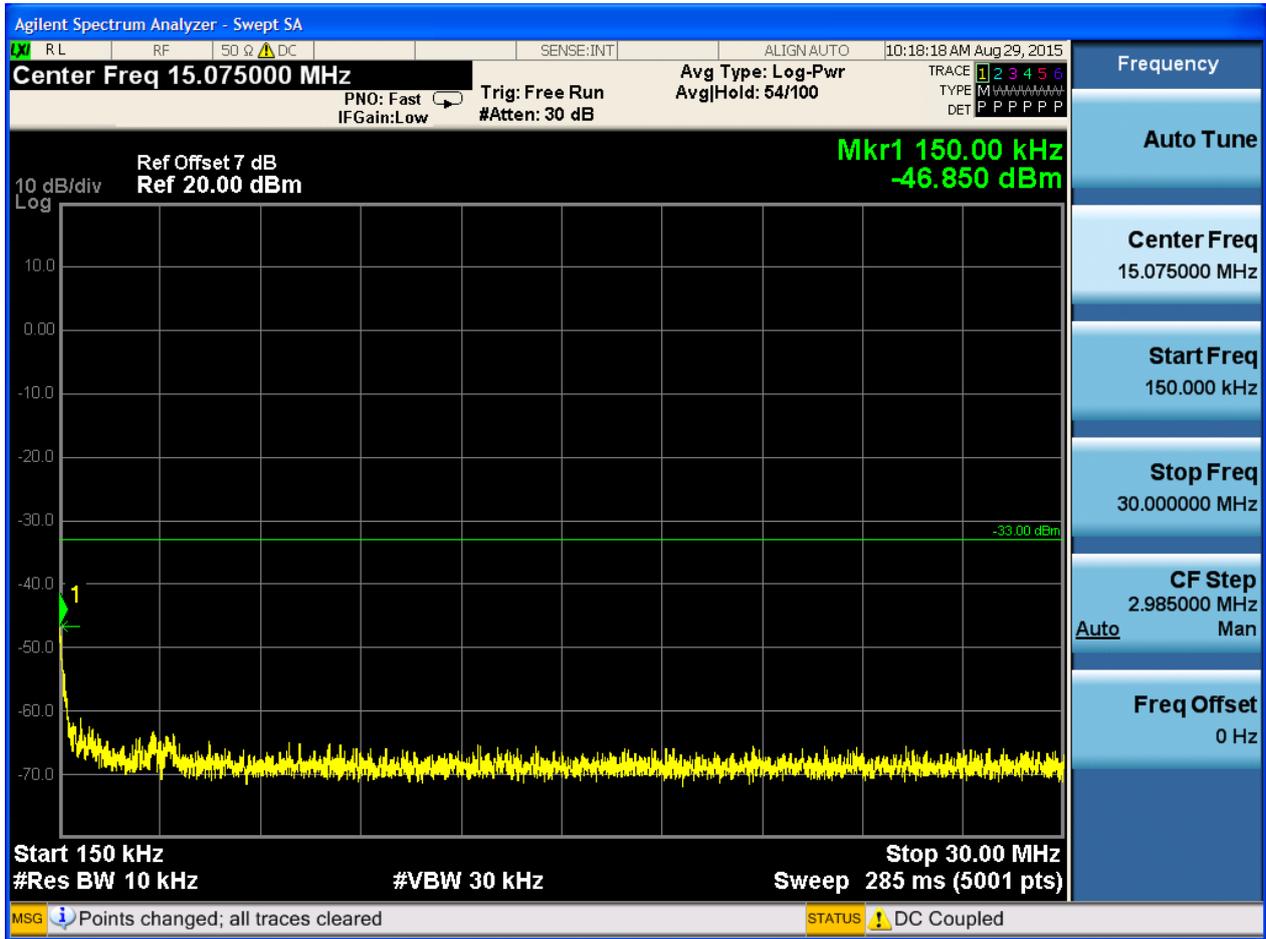


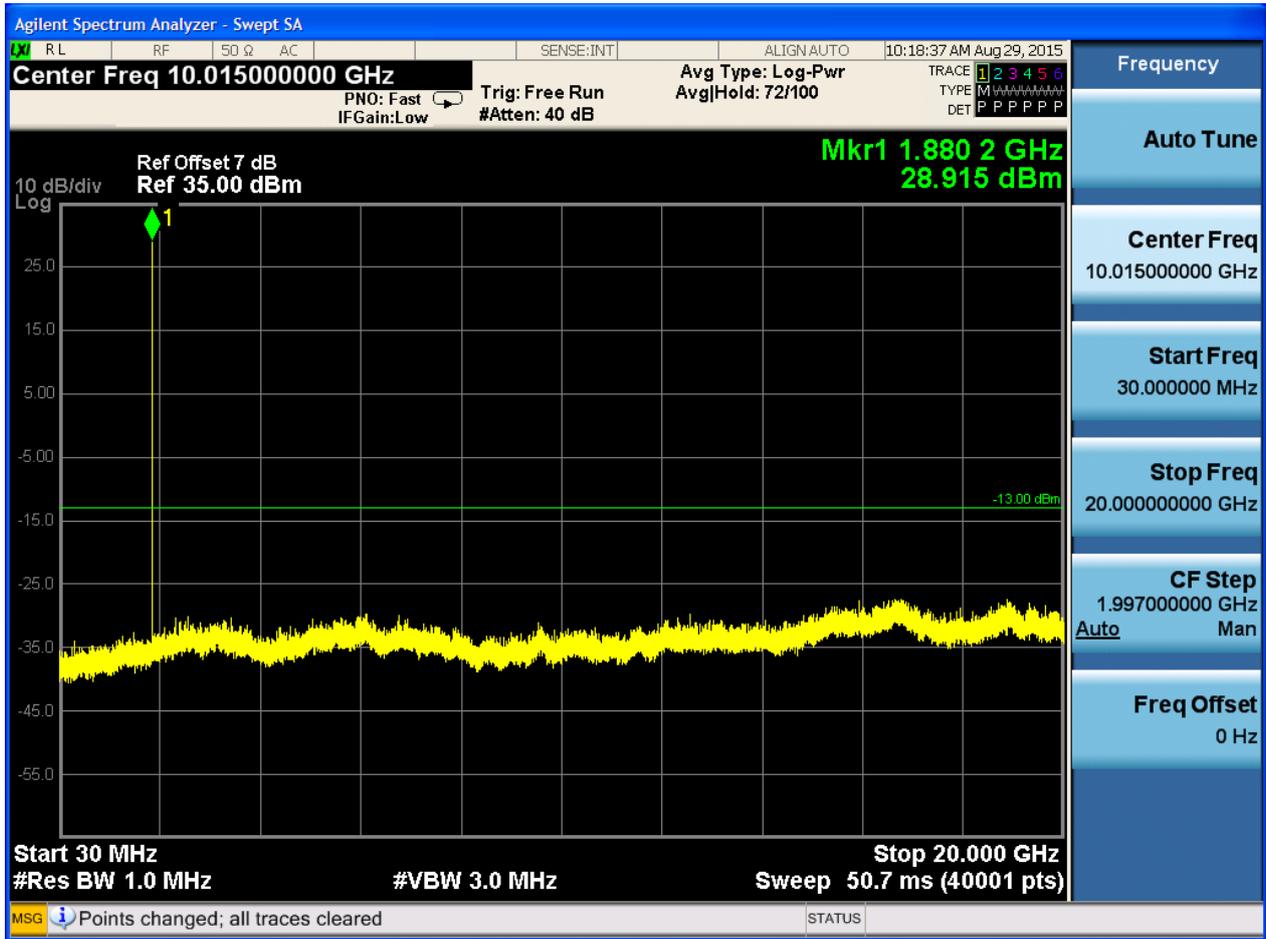




6.1.2.1.2 Test Channel = MCH

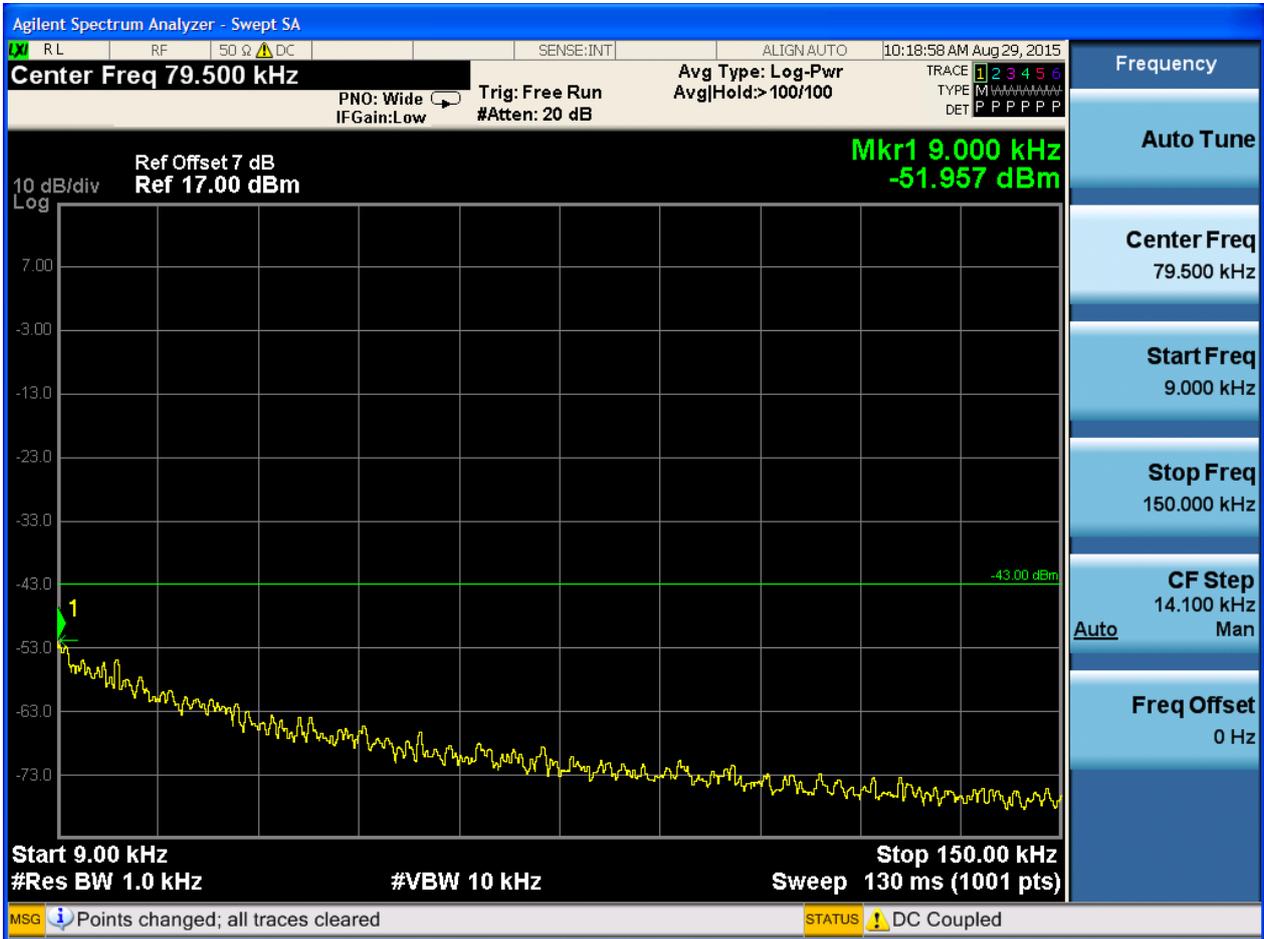


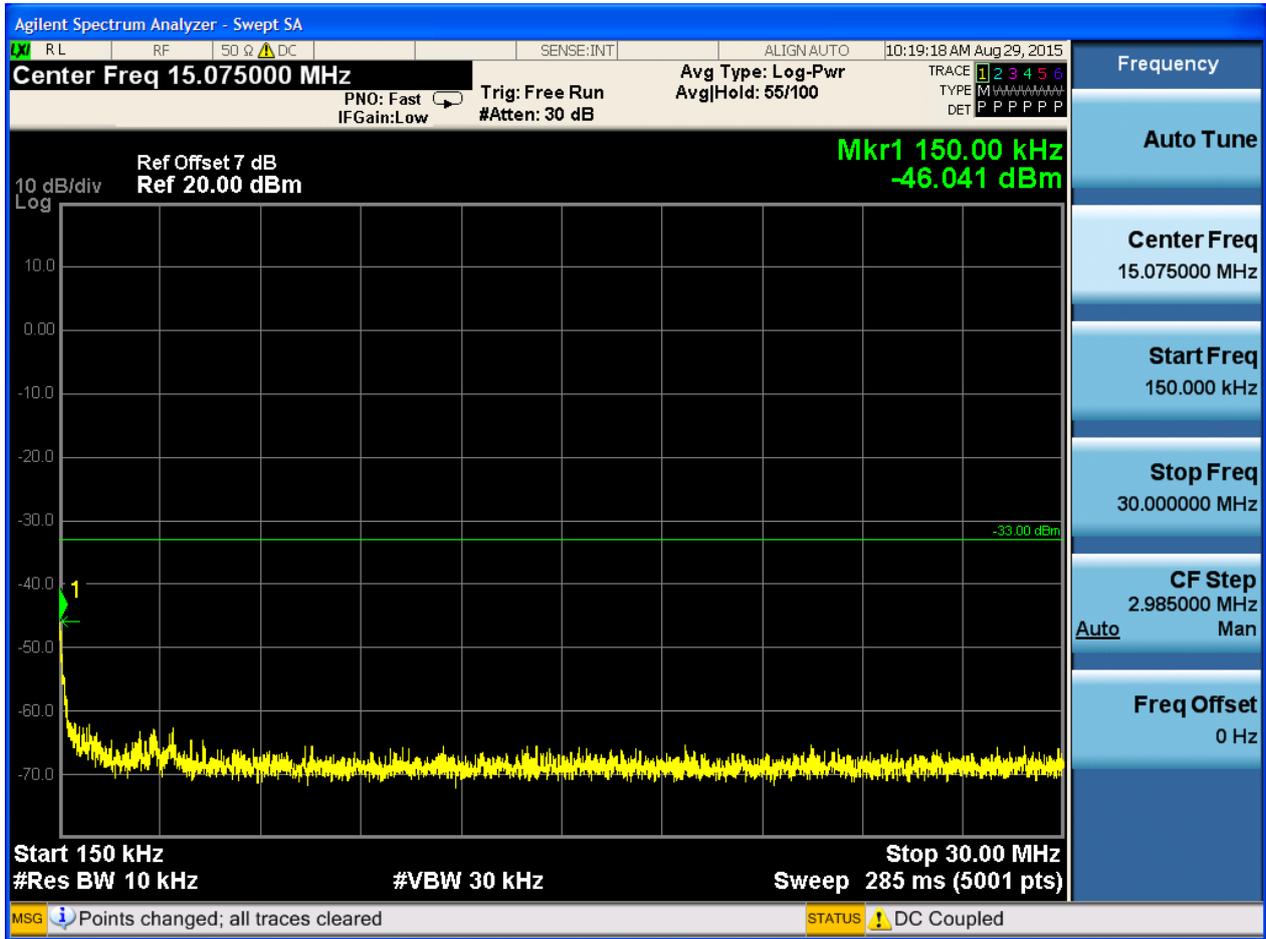


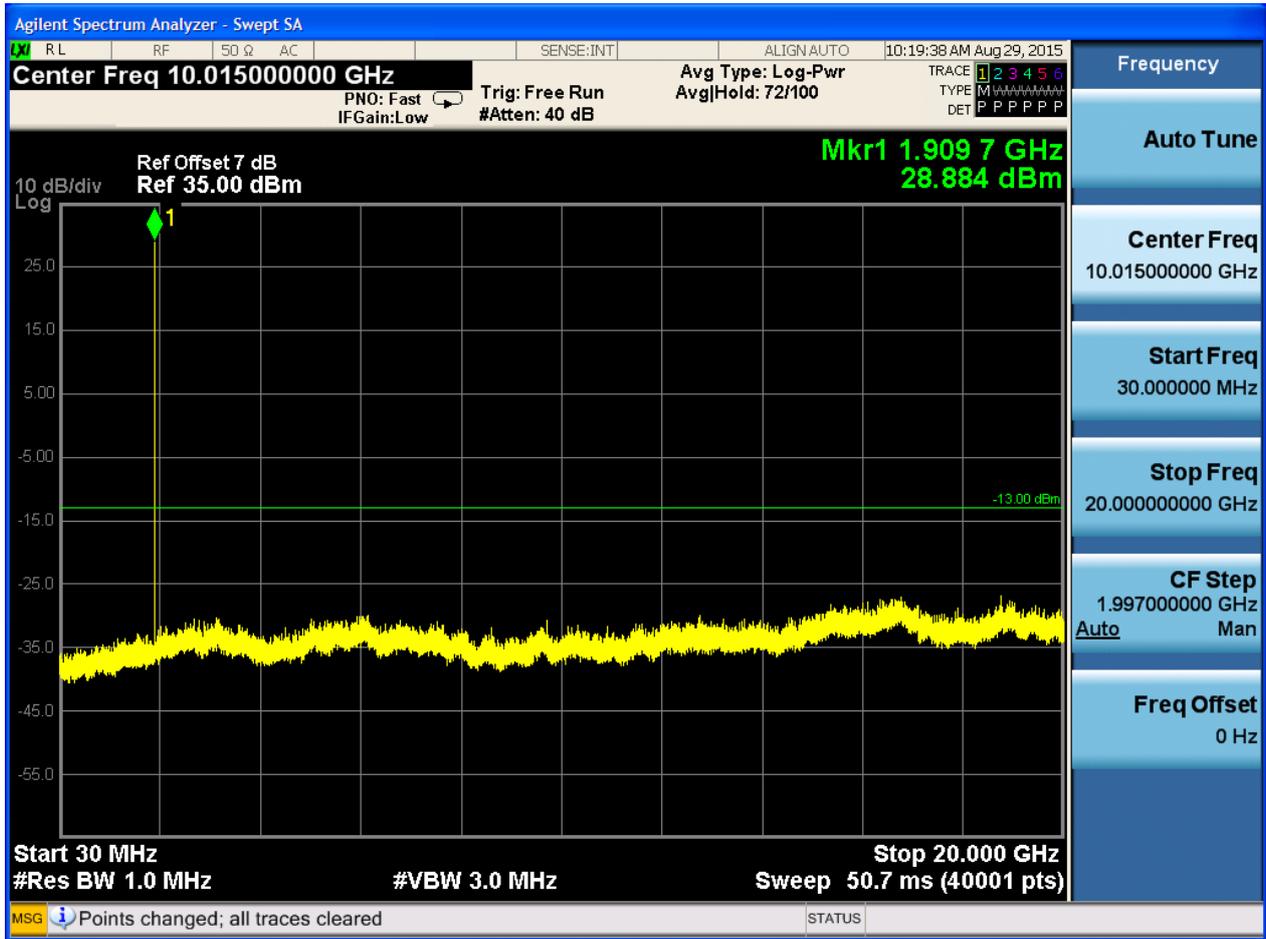




6.1.2.1.3 Test Channel = HCH



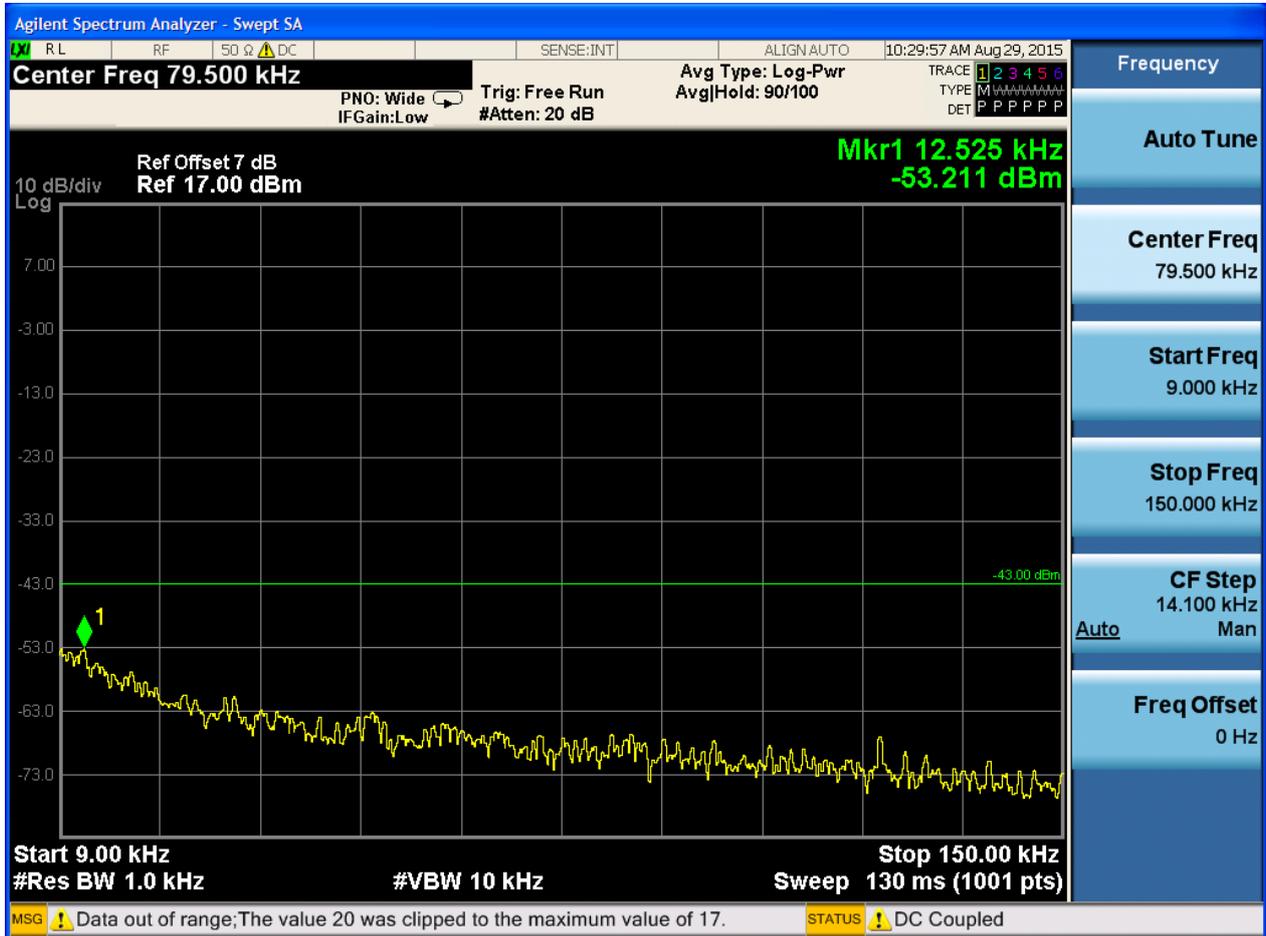


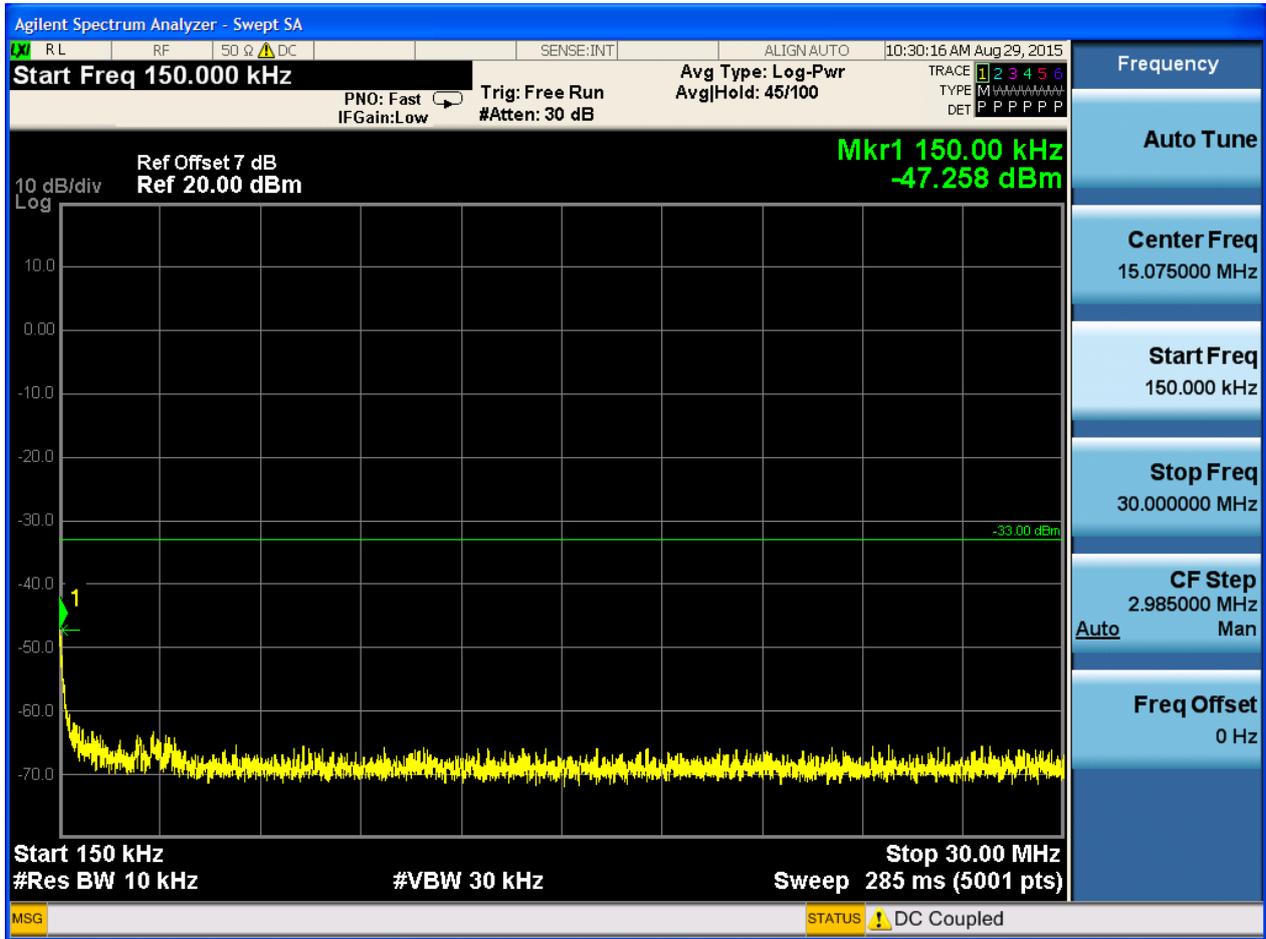


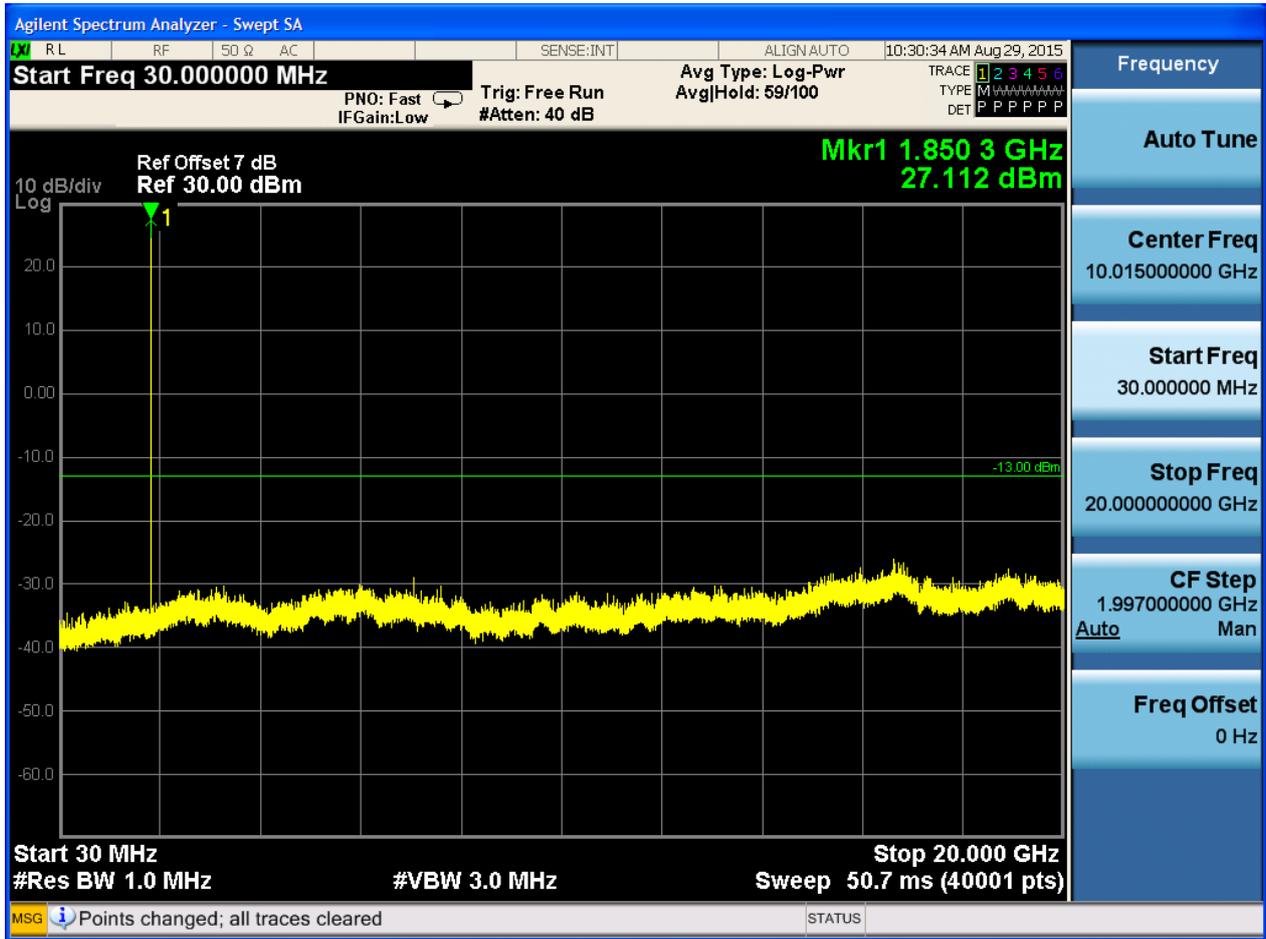


6.1.2.2 Test Mode = GSM/TM2

6.1.2.2.1 Test Channel = LCH

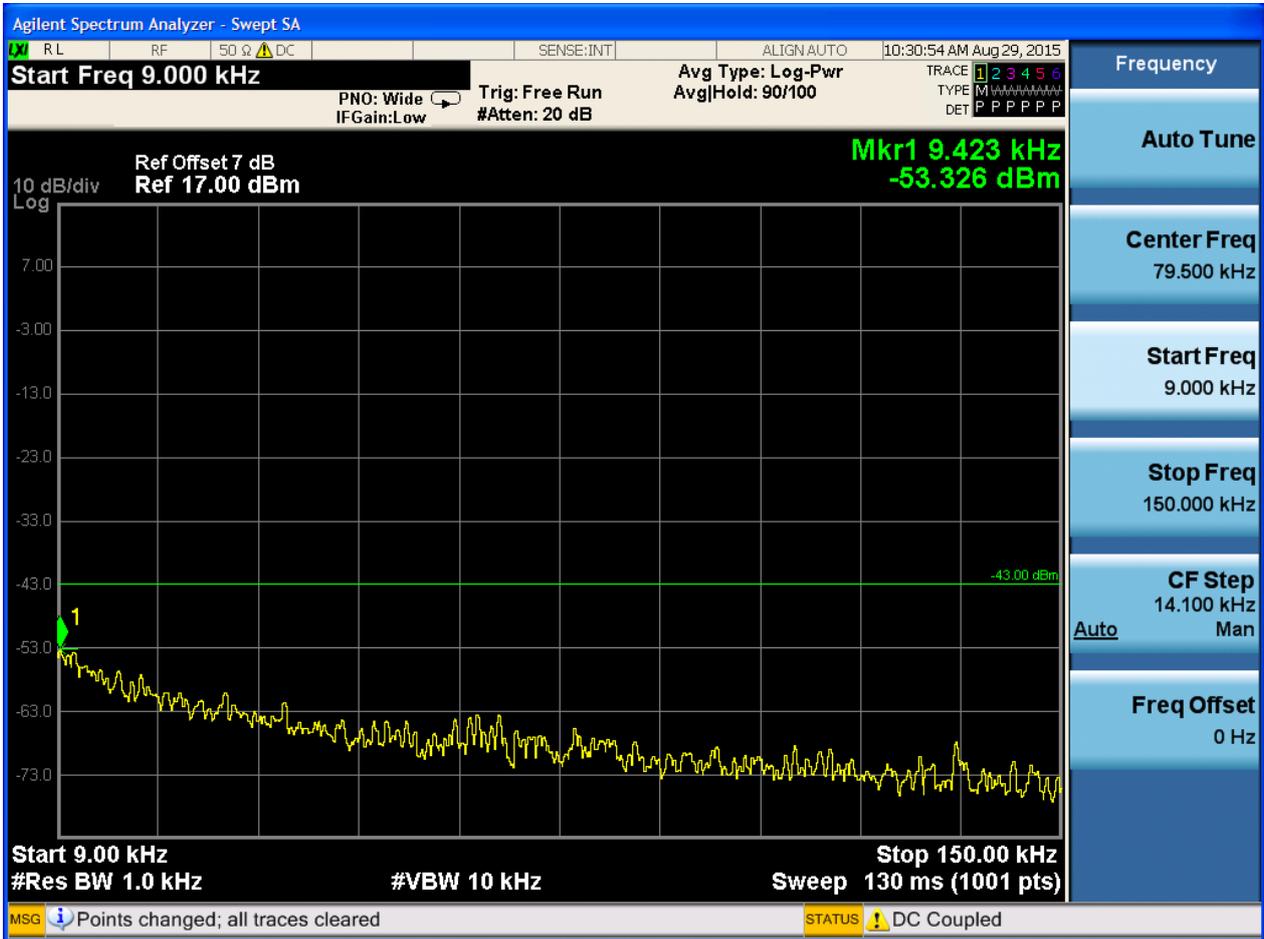


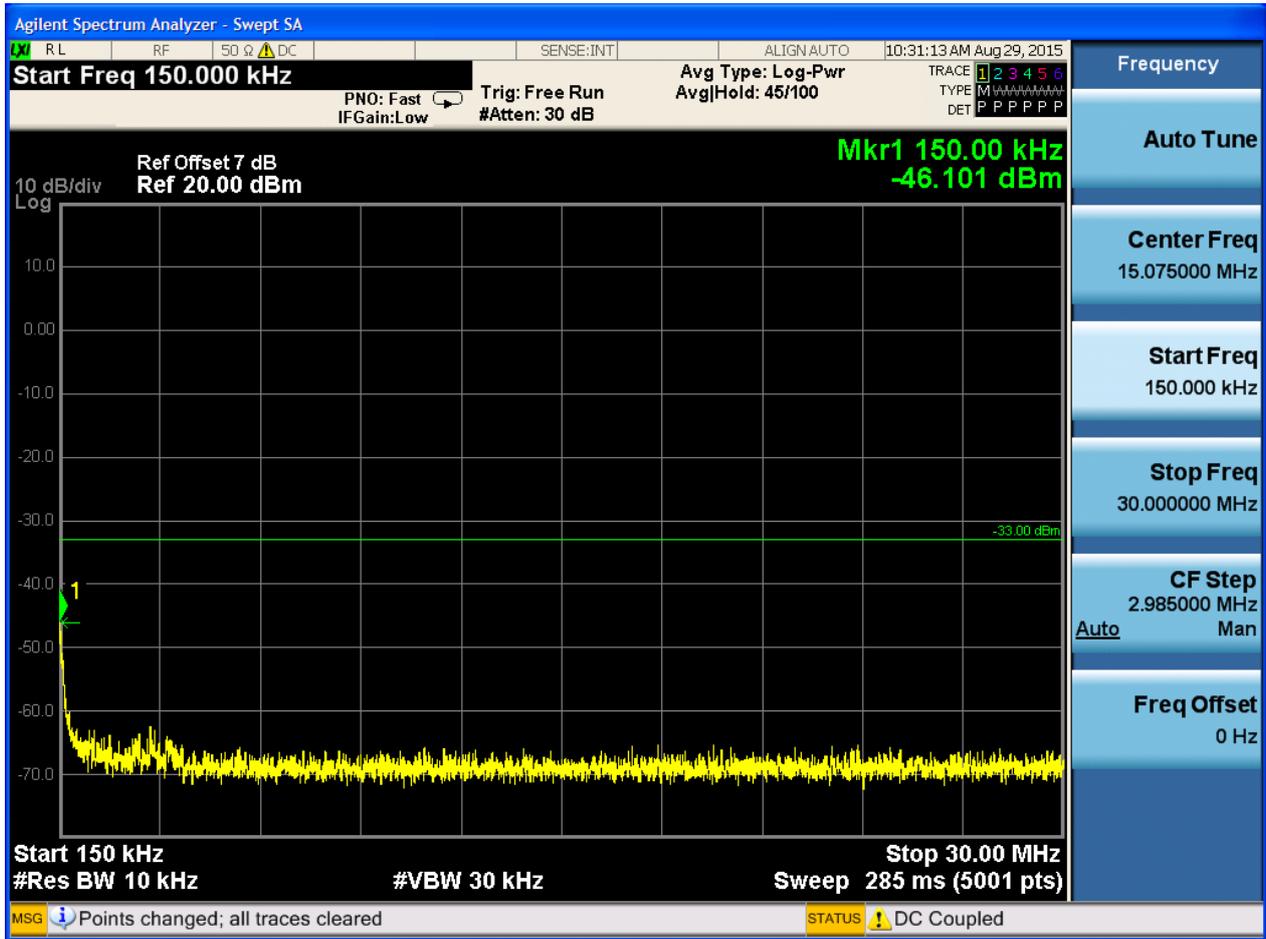


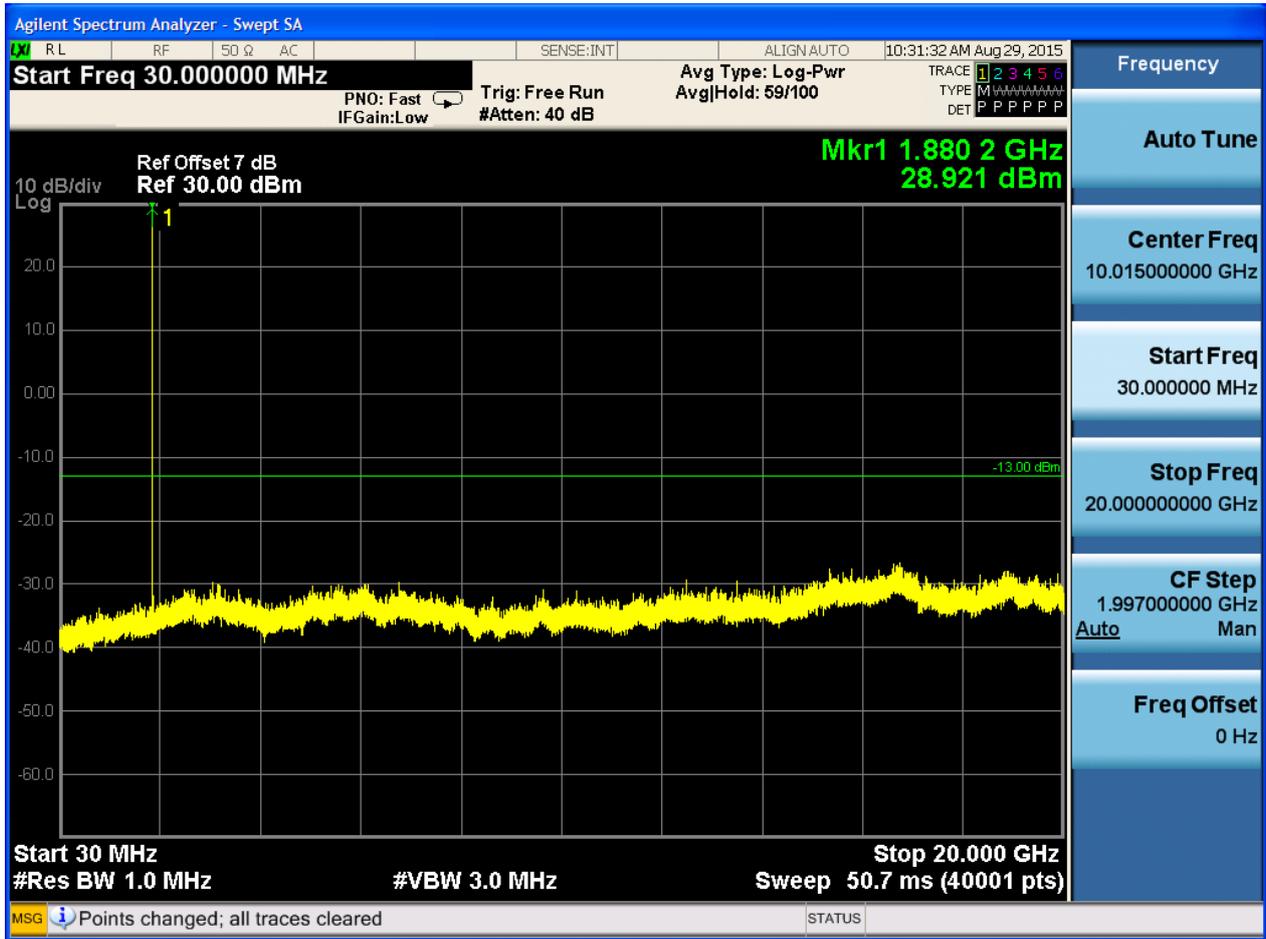




6.1.2.2.2 Test Channel = MCH

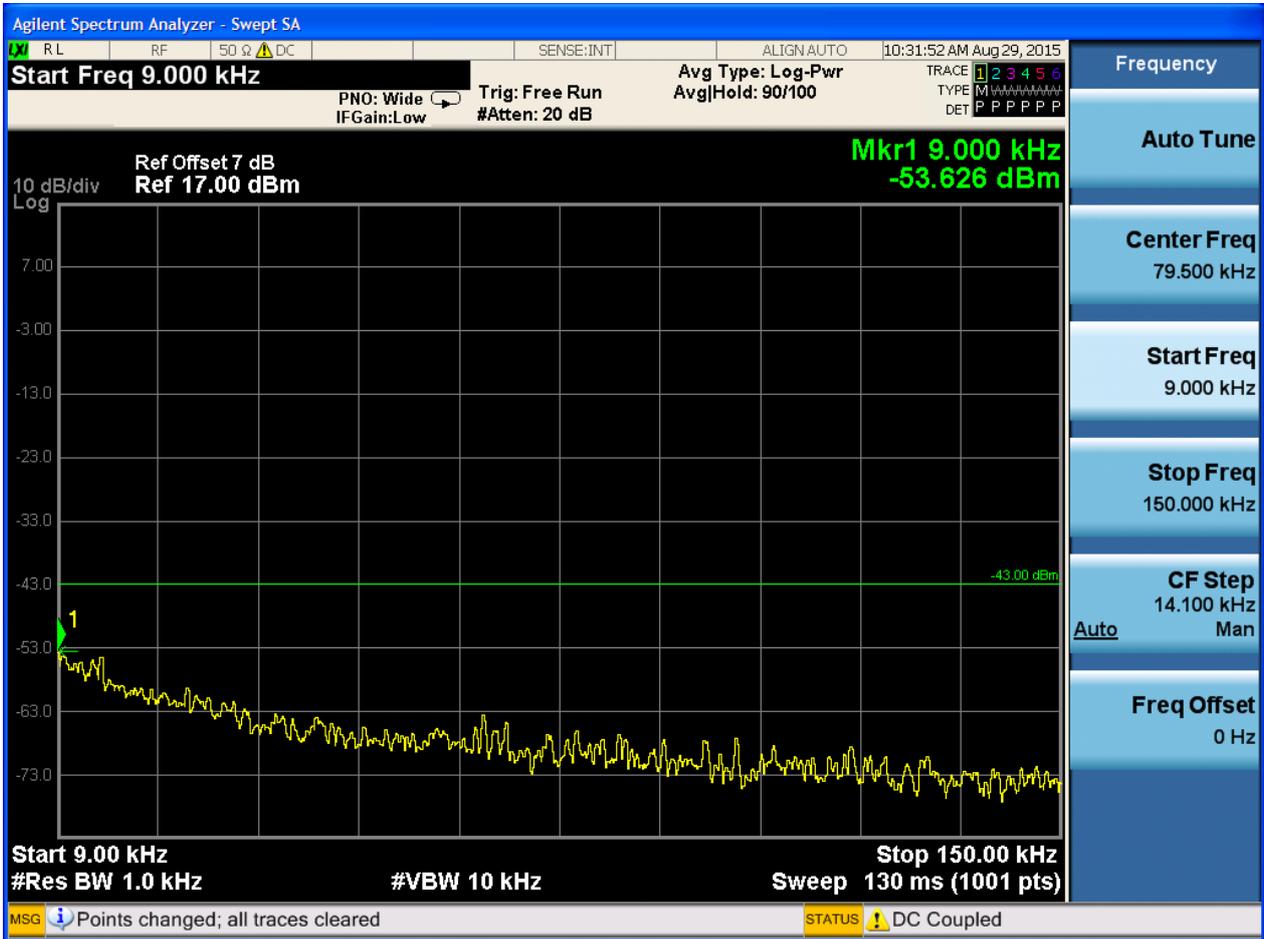


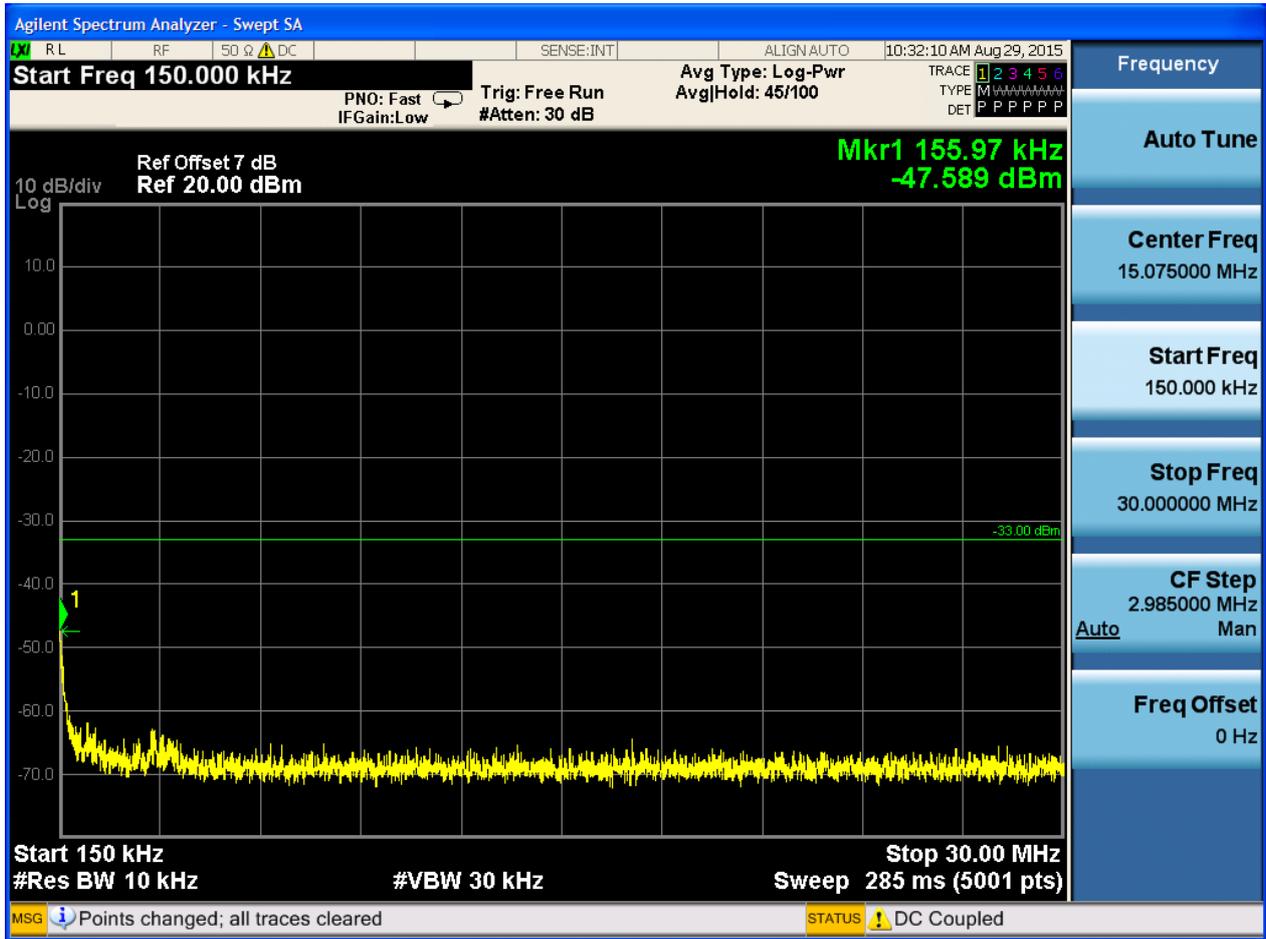


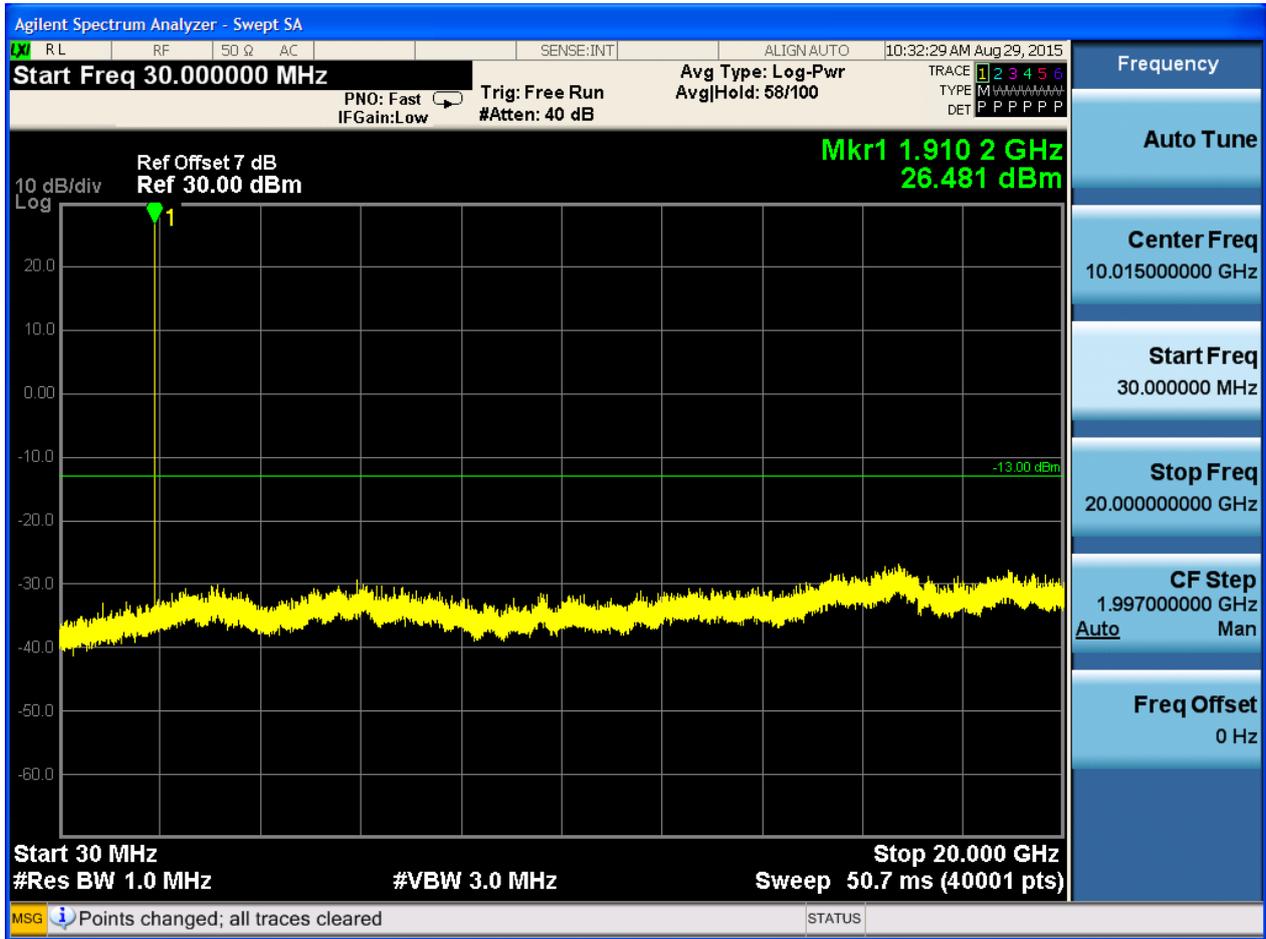




6.1.2.2.3 Test Channel = HCH







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

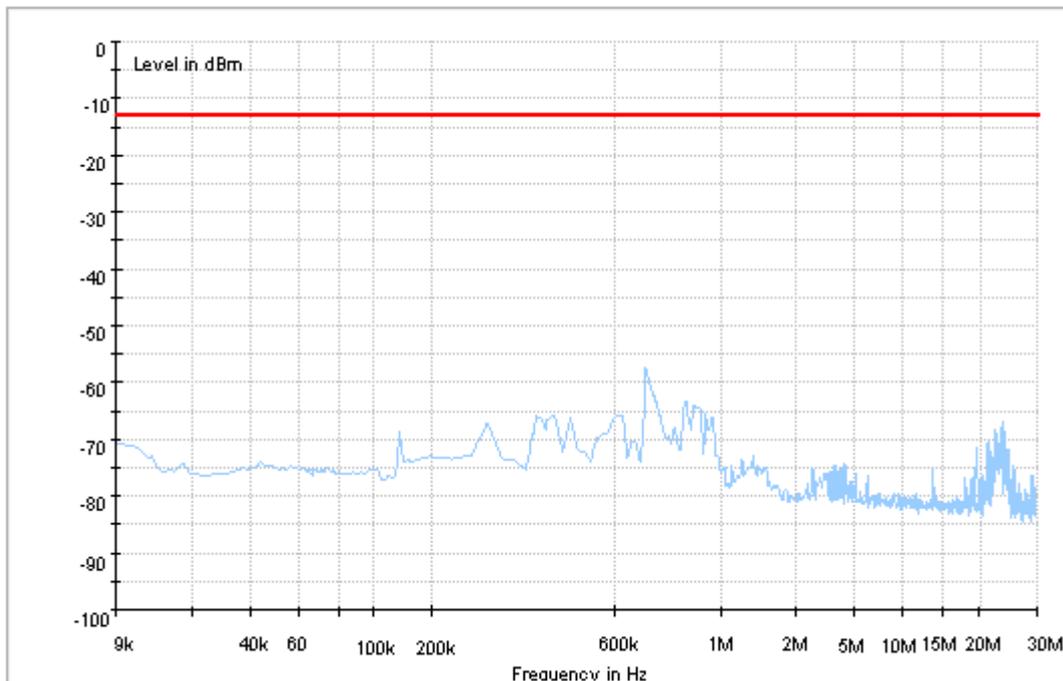
Above 1GHz, RBW = 1 MHz, VBW = 3 MHz. Detector: PK

Part I - Test Plots

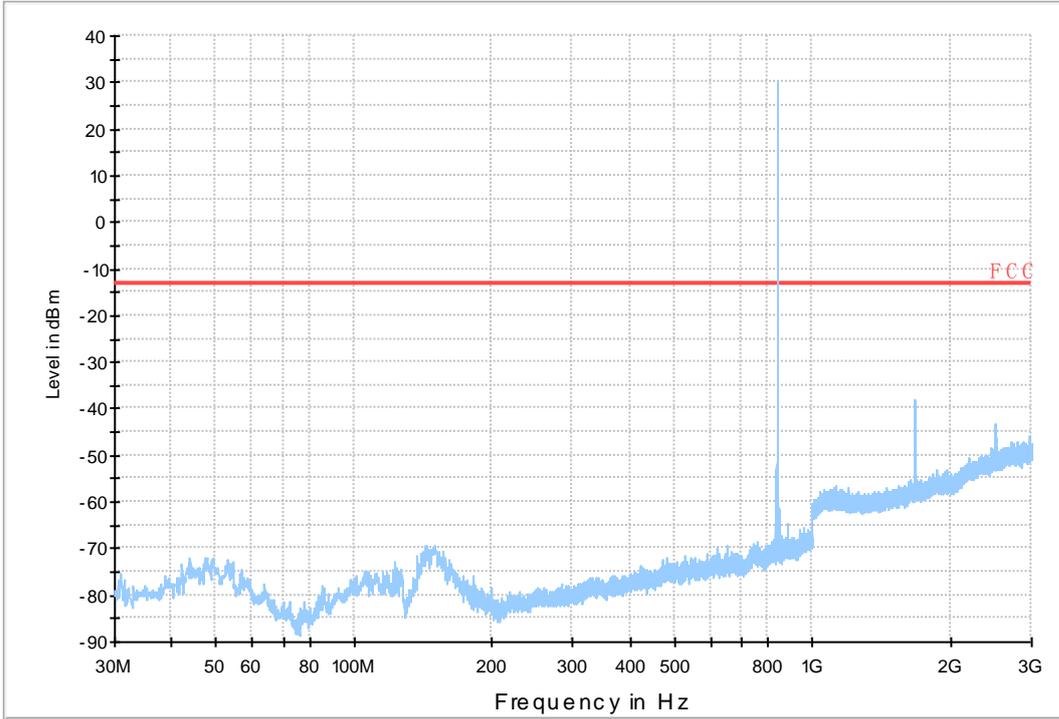
7.1 For GSM

7.1.1 Test Band = GSM850

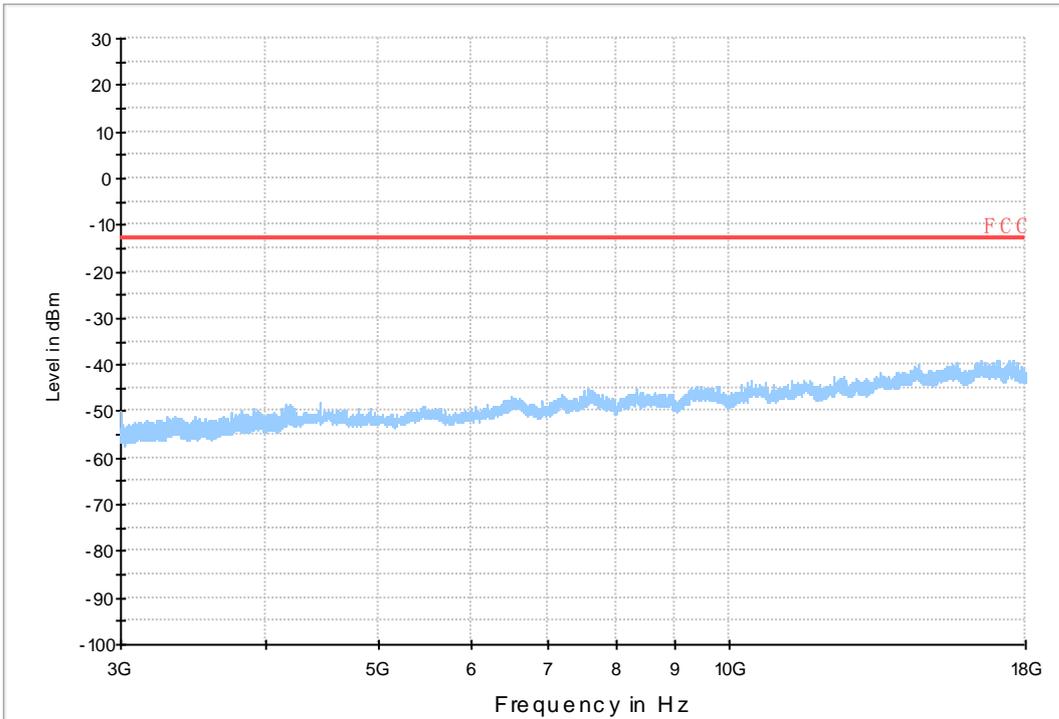
7.1.1.1 Test Mode = GSM/TM1



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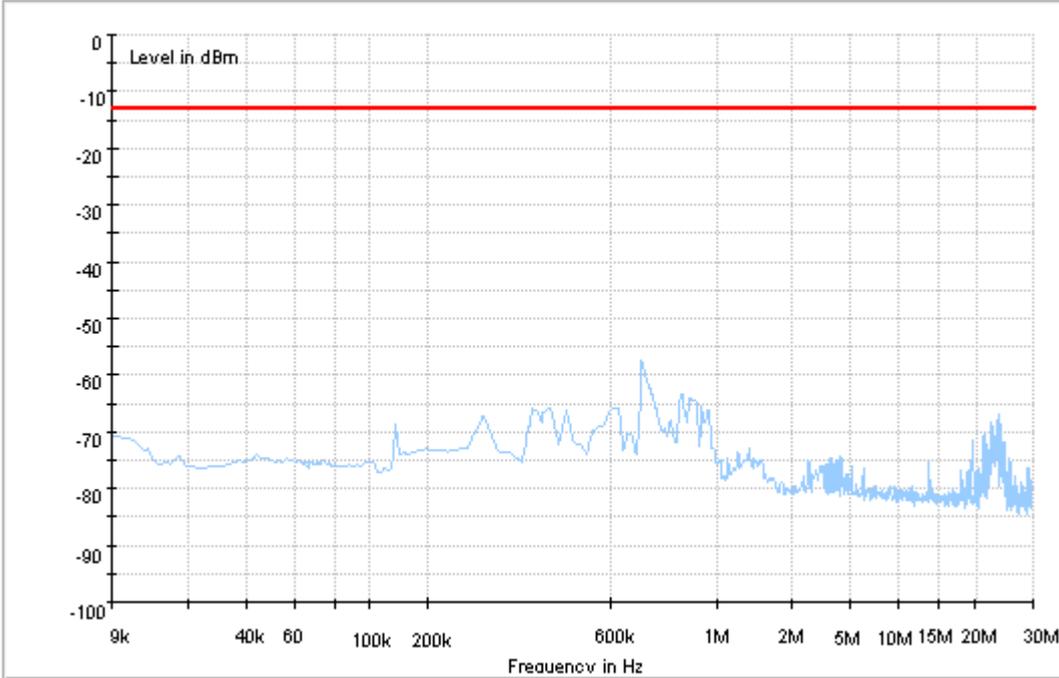


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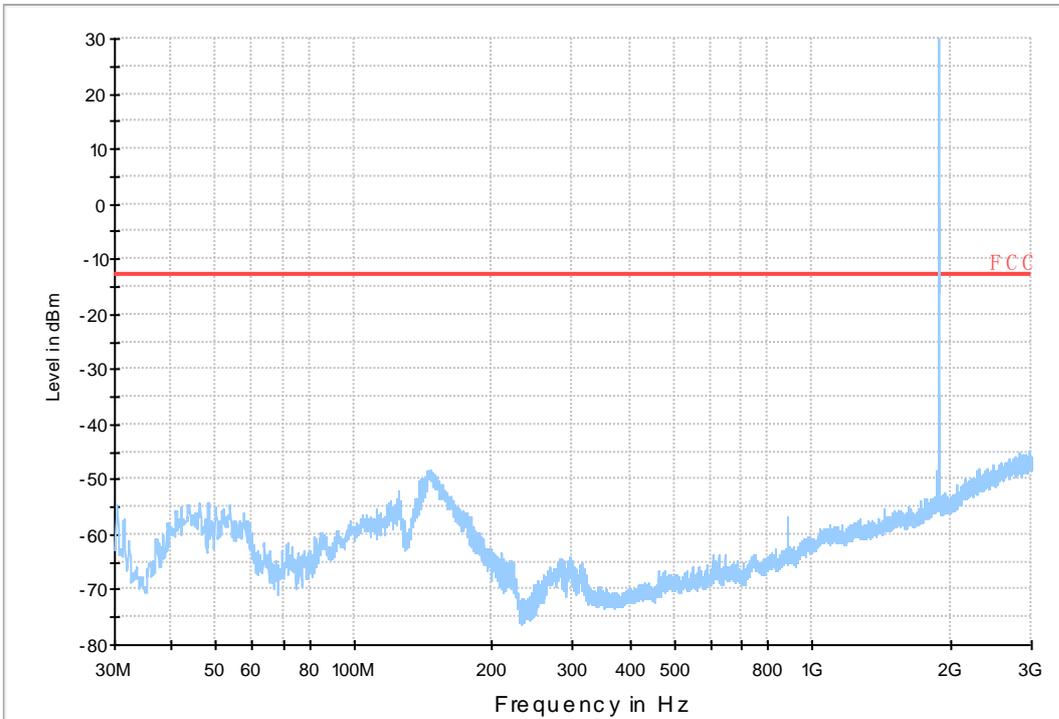


7.1.2 Test Band = GSM1900

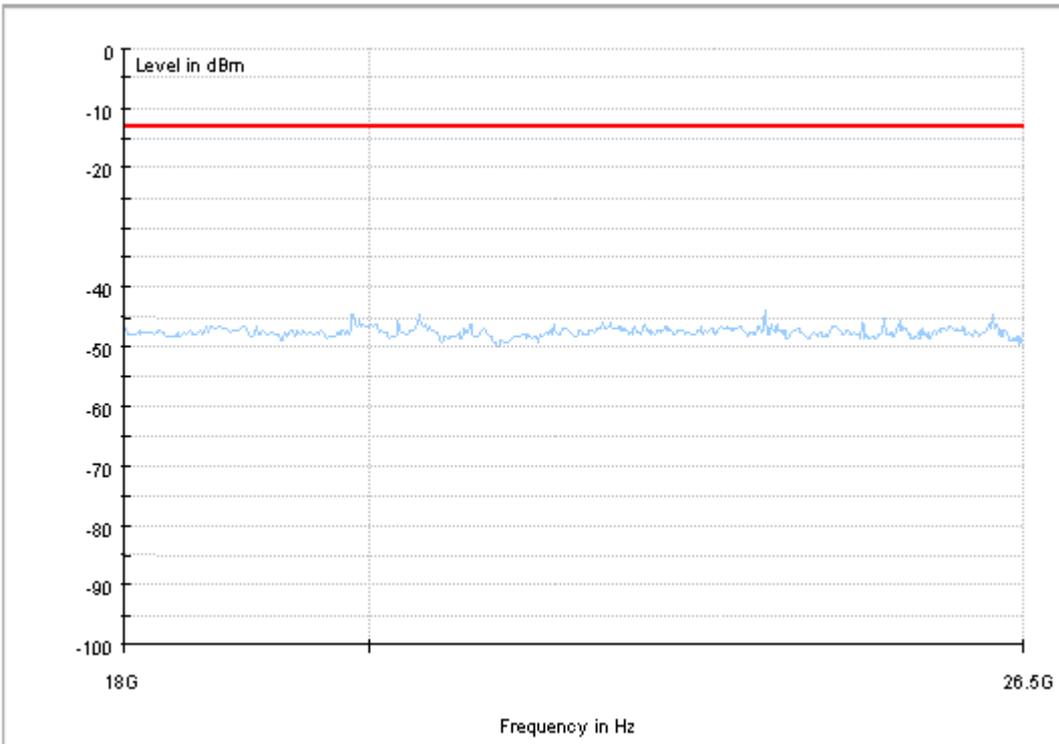
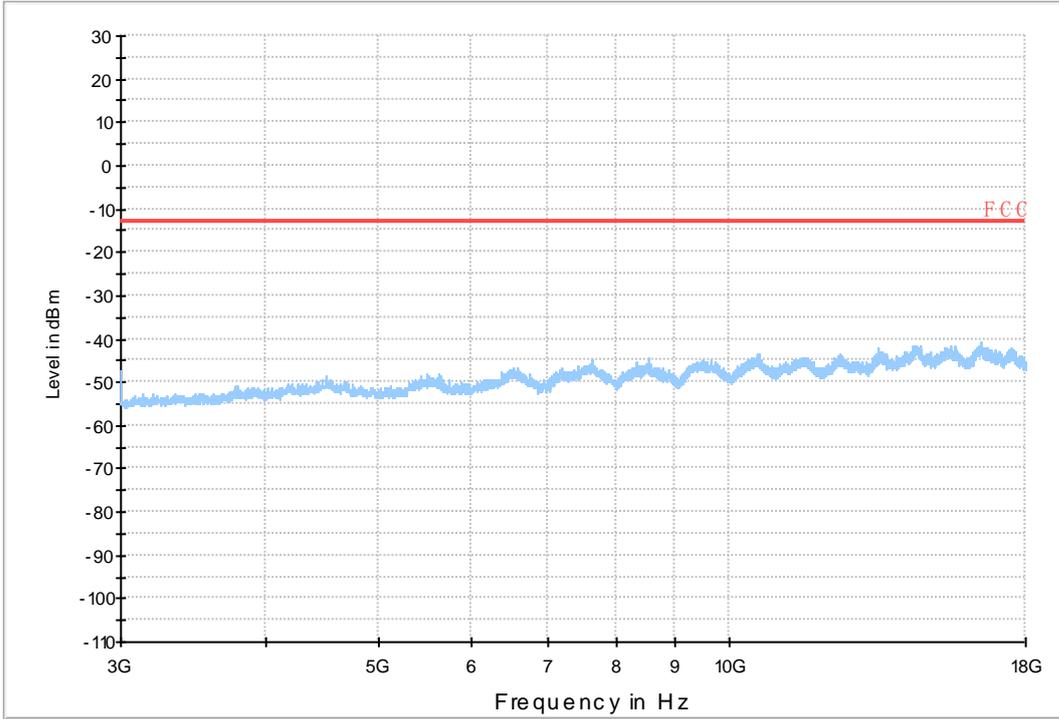
7.1.2.1 Test Mode = GSM/TM1



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	11.04	0.01339	PASS
				VN	6.26	0.0076	PASS
				VH	6.33	0.00768	PASS
		MCH	TN	VL	14.46	0.01728	PASS
				VN	24.99	0.02987	PASS
				VH	19.57	0.02339	PASS
		HCH	TN	VL	12.53	0.01476	PASS
				VN	13.95	0.01643	PASS
				VH	4.07	0.0048	PASS
	GSM/TM2	LCH	TN	VL	9.81	0.0119	PASS
				VN	9.43	0.01144	PASS
				VH	9.27	0.01125	PASS
		MCH	TN	VL	18.92	0.02262	PASS
				VN	15.24	0.01822	PASS
				VH	19.63	0.02346	PASS
HCH		TN	VL	9.98	0.01176	PASS	
			VN	10.91	0.01285	PASS	
			VH	10.07	0.01186	PASS	
GSM1900	GSM/TM1	LCH	TN	VL	12.91	0.00698	PASS
				VN	9.49	0.00513	PASS
				VH	13.37	0.00723	PASS
		MCH	TN	VL	-3.68	-0.00196	PASS
				VN	18.02	0.00959	PASS
				VH	-4.71	-0.00251	PASS
		HCH	TN	VL	9.69	0.00507	PASS
				VN	-3.03	-0.00159	PASS
				VH	-1.16	-0.00061	PASS
	GSM/TM2	LCH	TN	VL	14.46	0.00782	PASS
				VN	21.21	0.01146	PASS
				VH	18.56	0.01003	PASS



Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
		MCH	TN	VL	3.2	0.0017	PASS
				VN	3.58	0.0019	PASS
				VH	-0.55	-0.00029	PASS
		HCH	TN	VL	3.81	0.00199	PASS
				VN	2.55	0.00134	PASS
				VH	9.52	0.00498	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	9.43	0.01144	PASS
				-20	7.17	0.0087	PASS
				-10	11.43	0.01387	PASS
				0	9.62	0.01167	PASS
				10	10.27	0.01246	PASS
				20	9.17	0.01113	PASS
				30	8.46	0.01026	PASS
				40	2.07	0.00251	PASS
				50	8.14	0.00988	PASS
		MCH	VN	-30	11.11	0.01328	PASS
				-20	16.14	0.01929	PASS
				-10	9.49	0.01134	PASS
				0	26.35	0.0315	PASS
				10	23.31	0.02786	PASS
				20	17.31	0.02069	PASS
				30	21.57	0.02578	PASS
				40	9.43	0.01127	PASS
				50	19.31	0.02308	PASS
		HCH	VN	-30	7.81	0.0092	PASS
				-20	6.13	0.00722	PASS
				-10	6.13	0.00722	PASS
				0	6.33	0.00746	PASS
				10	15.17	0.01787	PASS
				20	12.53	0.01476	PASS
				30	1.61	0.0019	PASS
				40	8.2	0.00966	PASS
				50	8.46	0.00997	PASS
	GSM/TM2	LCH	VN	-30	6.55	0.00795	PASS
				-20	15.24	0.01849	PASS



Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict						
				-10	8.72	0.01058	PASS						
				0	10.72	0.01301	PASS						
				10	16.59	0.02013	PASS						
				20	6.42	0.00779	PASS						
				30	9.43	0.01144	PASS						
				40	6.13	0.00744	PASS						
				50	9.17	0.01113	PASS						
		MCH	VN			-30	26.05	0.03114	PASS				
						-20	12.53	0.01498	PASS				
						-10	20.18	0.02412	PASS				
						0	21.7	0.02594	PASS				
						10	25.02	0.02991	PASS				
						20	27.83	0.03327	PASS				
						30	24.02	0.02871	PASS				
						40	20.79	0.02485	PASS				
						50	22.57	0.02698	PASS				
		HCH	VN			-30	12.72	0.01499	PASS				
						-20	9.49	0.01118	PASS				
						-10	13.95	0.01643	PASS				
						0	12.27	0.01446	PASS				
						10	9.78	0.01152	PASS				
						20	12.72	0.01499	PASS				
						30	13.95	0.01643	PASS				
						40	10.43	0.01229	PASS				
						50	10.43	0.01229	PASS				
		GSM1900	GSM/TM1	LCH	VN								
										-30	13.11	0.00709	PASS
-20	13.37									0.00723	PASS		
-10	7.3									0.00395	PASS		
0	13.95									0.00754	PASS		
10	13.62									0.00736	PASS		
20	10.2									0.00551	PASS		
30	18.34									0.00991	PASS		
40	13.43									0.00726	PASS		
50	20.08			0.01085	PASS								
MCH	VN												
										-30	-1.03	-0.00055	PASS
										-20	16.08	0.00855	PASS
										-10	1.68	0.00089	PASS
										0	-8.78	-0.00467	PASS
										10	-0.9	-0.00048	PASS
20	-1.1			-0.00059	PASS								



Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict	
				30	-4	-0.00213	PASS	
				40	1.68	0.00089	PASS	
				50	-1.16	-0.00062	PASS	
		HCH	VN	-30	2.97	0.00156	PASS	
				-20	-2.26	-0.00118	PASS	
				-10	-1.23	-0.00064	PASS	
				0	0.9	0.00047	PASS	
				10	-2.13	-0.00112	PASS	
				20	-3.16	-0.00165	PASS	
				30	4.58	0.0024	PASS	
				40	-1.29	-0.00068	PASS	
				50	-2.39	-0.00125	PASS	
		GSM/TM2	LCH	VN	-30	19.21	0.01038	PASS
					-20	15.79	0.00853	PASS
					-10	15.43	0.00834	PASS
	0				11.82	0.00639	PASS	
	10				19.69	0.01064	PASS	
	20				19.08	0.01031	PASS	
	30				15.46	0.00836	PASS	
	40				22.15	0.01197	PASS	
	50				17.24	0.00932	PASS	
	MCH		VN	-30	-0.06	-0.00003	PASS	
				-20	3.52	0.00187	PASS	
				-10	1.42	0.00076	PASS	
				0	4.36	0.00232	PASS	
				10	2.97	0.00158	PASS	
				20	5.97	0.00318	PASS	
		30		1.16	0.00062	PASS		
		40		-1.19	-0.00063	PASS		
		50		1.19	0.00063	PASS		
	HCH	VN	-30	10.17	0.00533	PASS		
			-20	9.36	0.0049	PASS		
			-10	9.3	0.00487	PASS		
			0	5.13	0.00269	PASS		
			10	7.07	0.0037	PASS		
			20	8.17	0.00428	PASS		
			30	6.55	0.00343	PASS		
			40	9.98	0.00523	PASS		
			50	6.59	0.00345	PASS		