



Appendix for test report



1Appendix_A: Effective (Isotropic) Radiated Power Output Data

Part I - Test Results

Test Band	Test Mode	Test Channel	Measured[dBm]	ERP/EIRP [dBm]	Limit [dBm]	Verdict
GSM850	GSM/TM1	LCH	32.36	26.81	38.5	PASS
		MCH	32.31	26.76	38.5	PASS
		HCH	32.25	26.7	38.5	PASS
	GSM/TM2	LCH	25.53	19.98	38.5	PASS
		MCH	25.49	19.94	38.5	PASS
		HCH	25.43	19.88	38.5	PASS
GSM1900	GSM/TM1	LCH	29.78	31.88	33	PASS
		MCH	29.72	31.82	33	PASS
		HCH	29.56	31.66	33	PASS
	GSM/TM2	LCH	24.99	27.09	33	PASS
		MCH	24.97	27.07	33	PASS
		HCH	24.95	27.05	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
GSM850	GSM/TM1	LCH	0.24	13	PASS
		MCH	0.19	13	PASS
		HCH	0.19	13	PASS
	GSM/TM2	LCH	2.64	13	PASS
		MCH	2.62	13	PASS
		HCH	2.81	13	PASS
GSM1900	GSM/TM1	LCH	0.16	13	PASS
		MCH	0.15	13	PASS
		HCH	0.16	13	PASS
	GSM/TM2	LCH	2.68	13	PASS
		MCH	2.81	13	PASS
		HCH	2.8	13	PASS

3Appendix_C: Modulation Characteristics

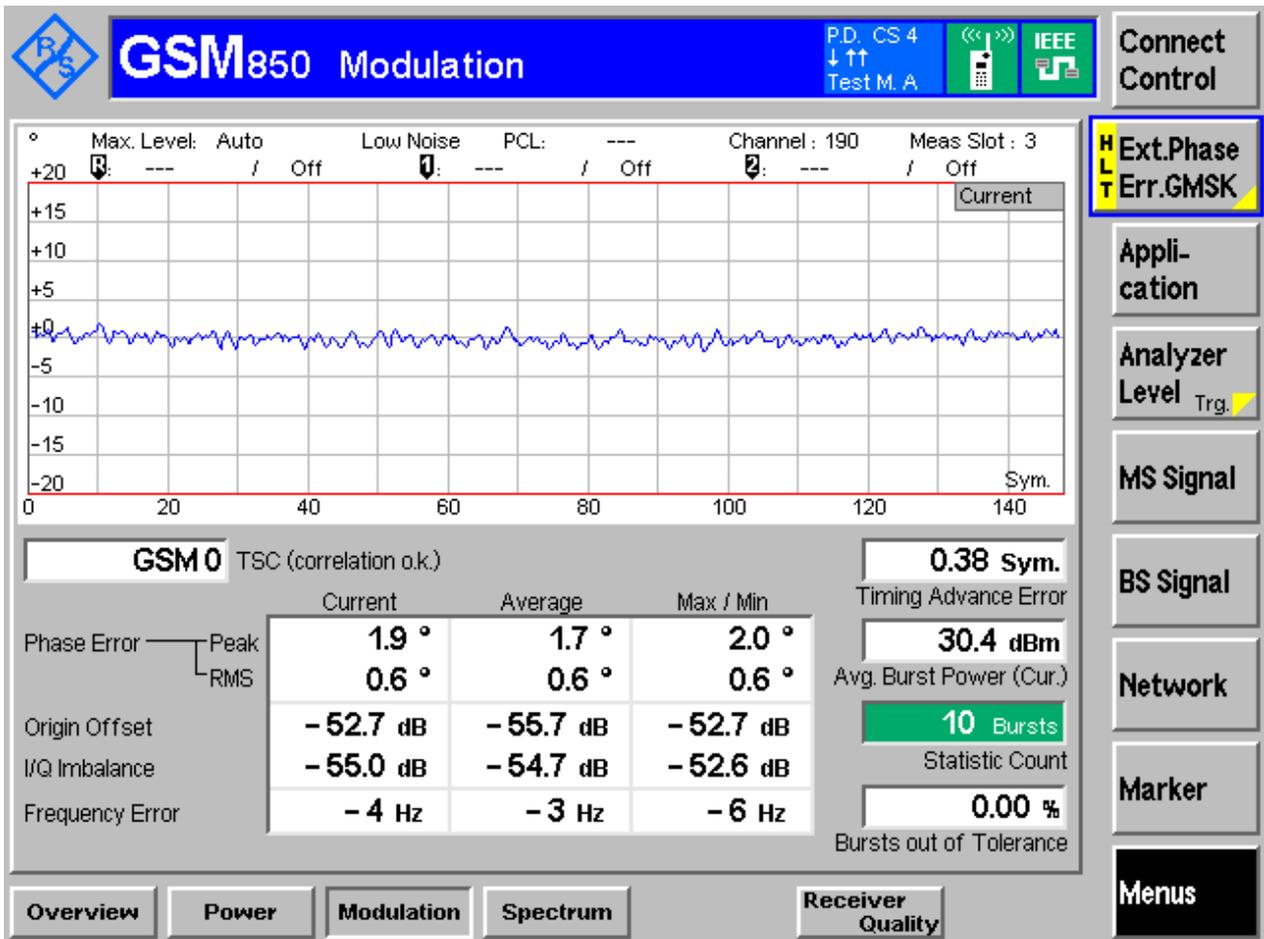
Part I - Test Plots

3.1 For GSM

3.1.1 Test Band = GSM850

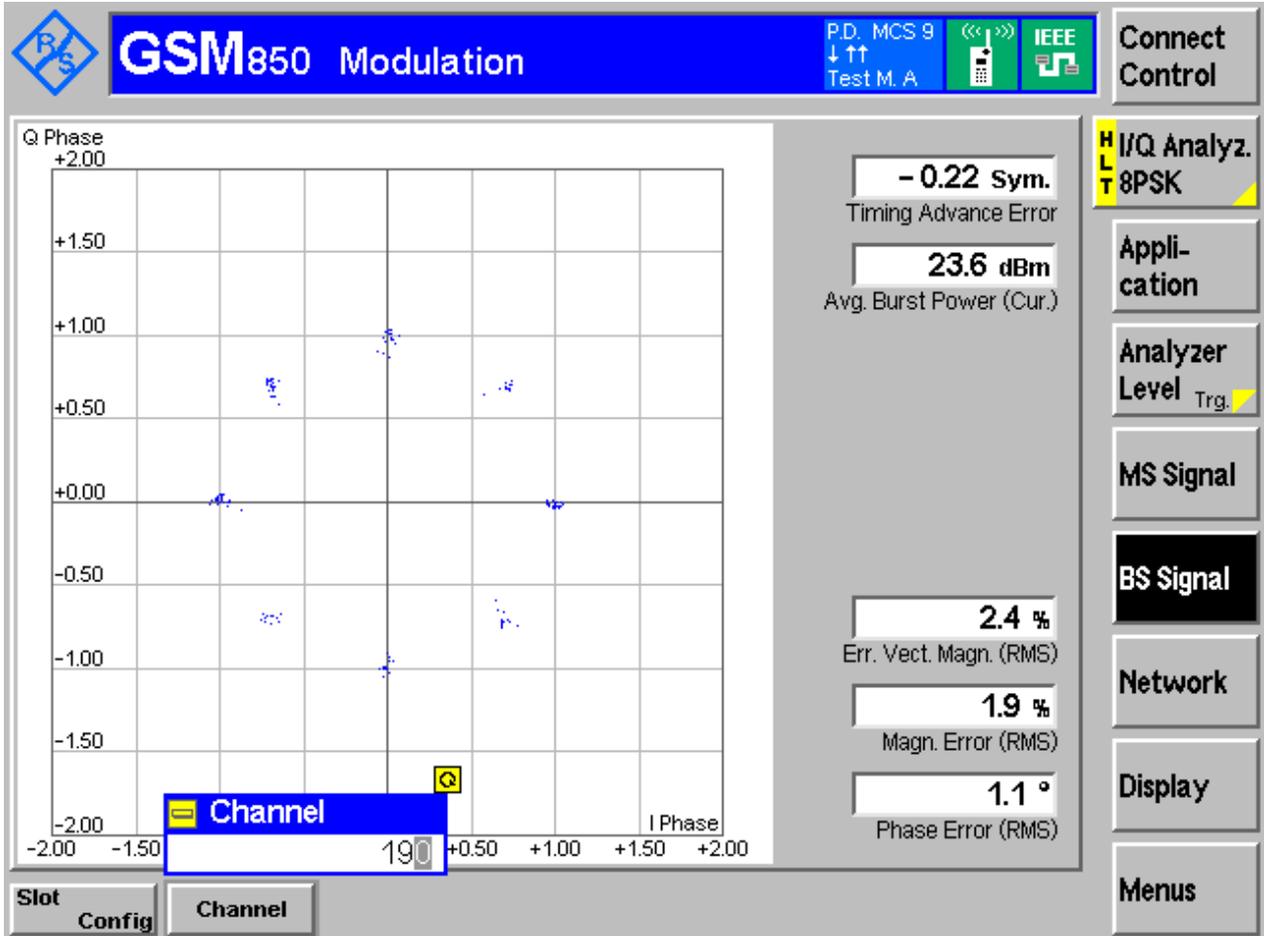
3.1.1.1 Test Mode = GSM/TM1

3.1.1.1.1 Test Channel = MCH



3.1.1.2 Test Mode = GSM/TM2

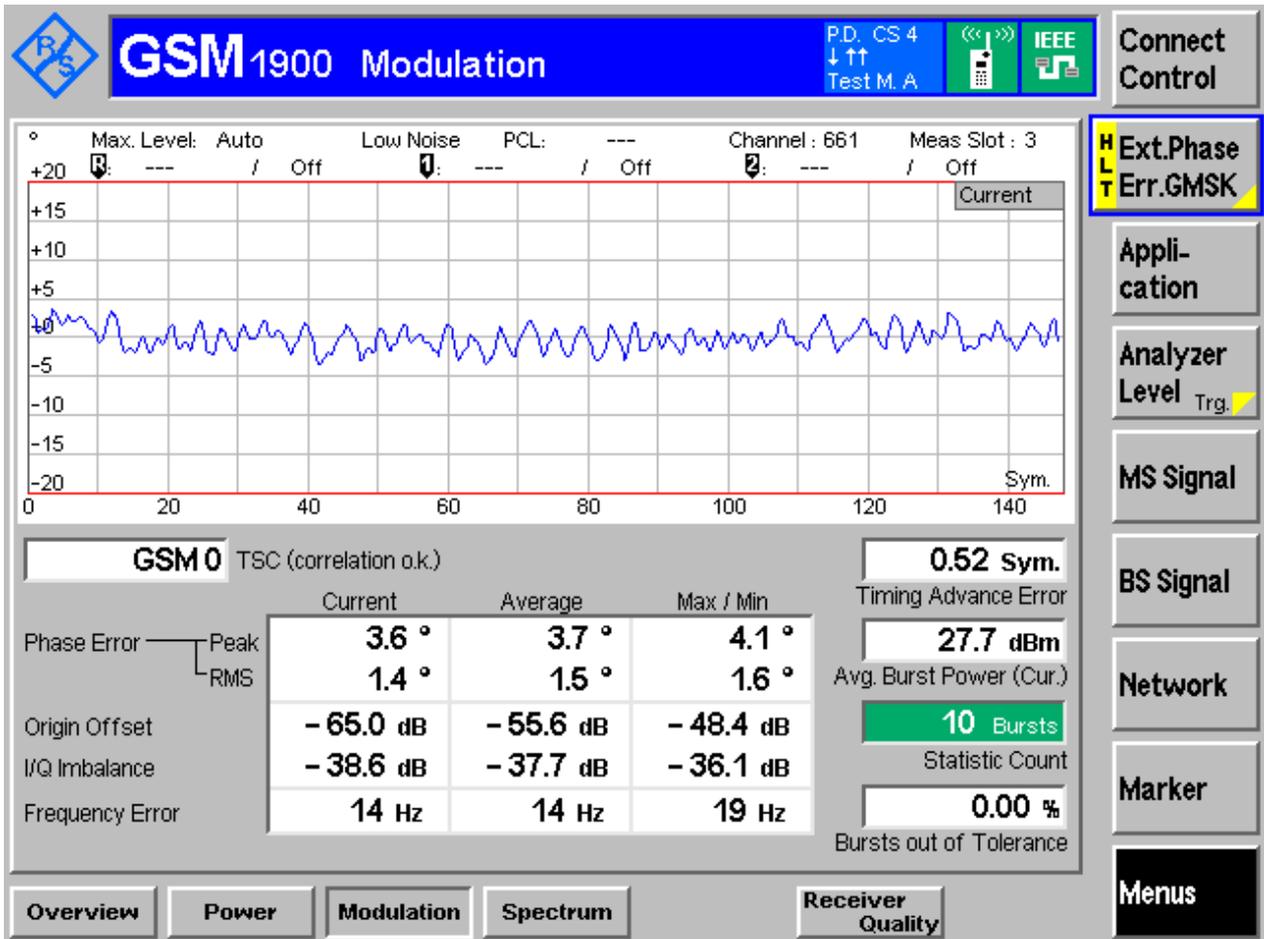
3.1.1.2.1 Test Channel = MCH



3.1.2 Test Band = GSM1900

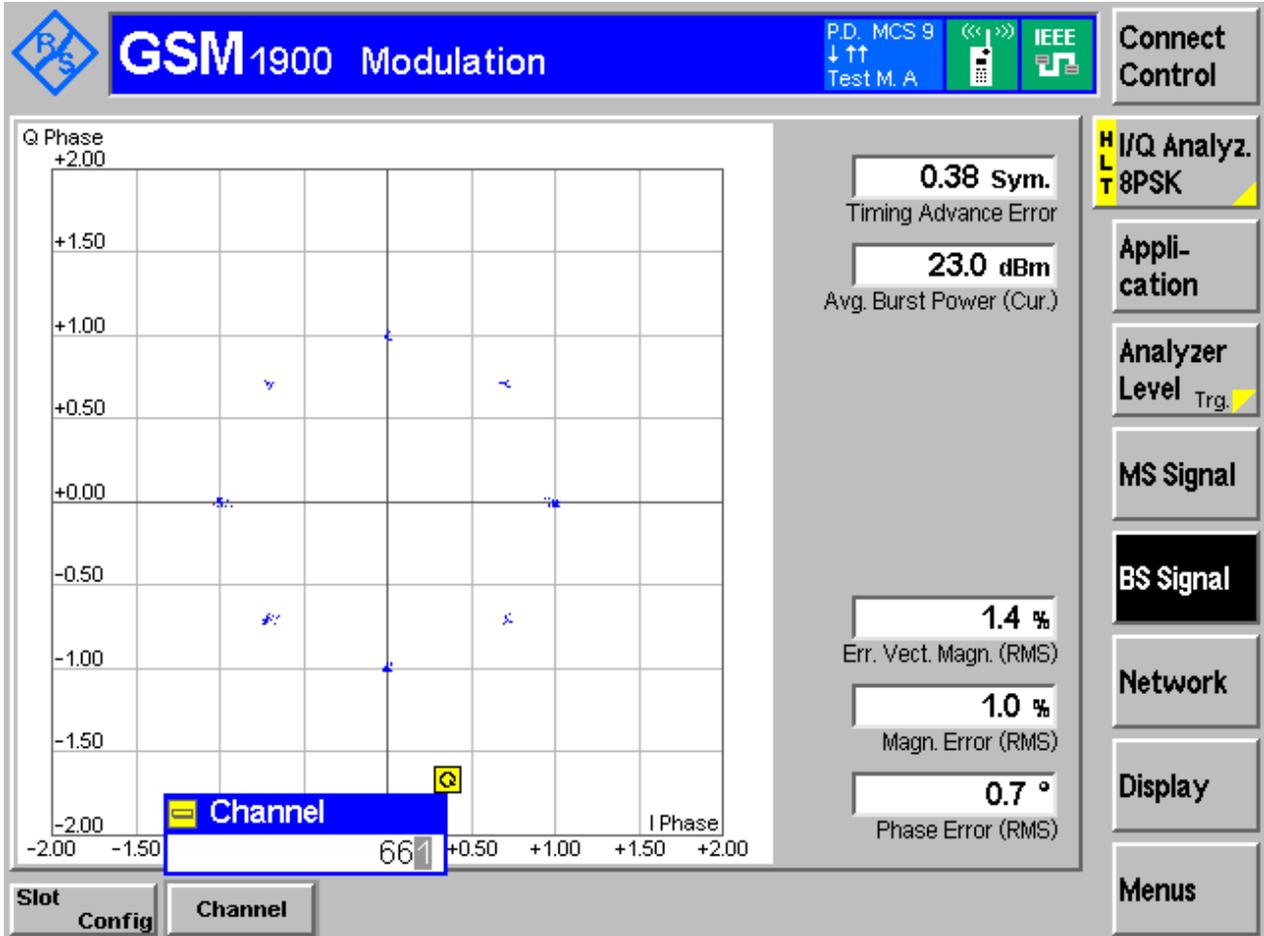
3.1.2.1 Test Mode = GSM/TM1

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	239.17	314.60	Pass
		MCH	245.14	312.22	Pass
		HCH	243.96	316.93	Pass
	GSM/TM2	LCH	249.39	319.60	Pass
		MCH	252.75	320.61	Pass
		HCH	251.08	317.81	Pass
GSM1900	GSM/TM1	LCH	241.57	319.51	Pass
		MCH	244.02	314.24	Pass
		HCH	242.49	315.06	Pass
	GSM/TM2	LCH	245.82	315.57	Pass
		MCH	246.81	309.47	Pass
		HCH	246.43	317.82	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



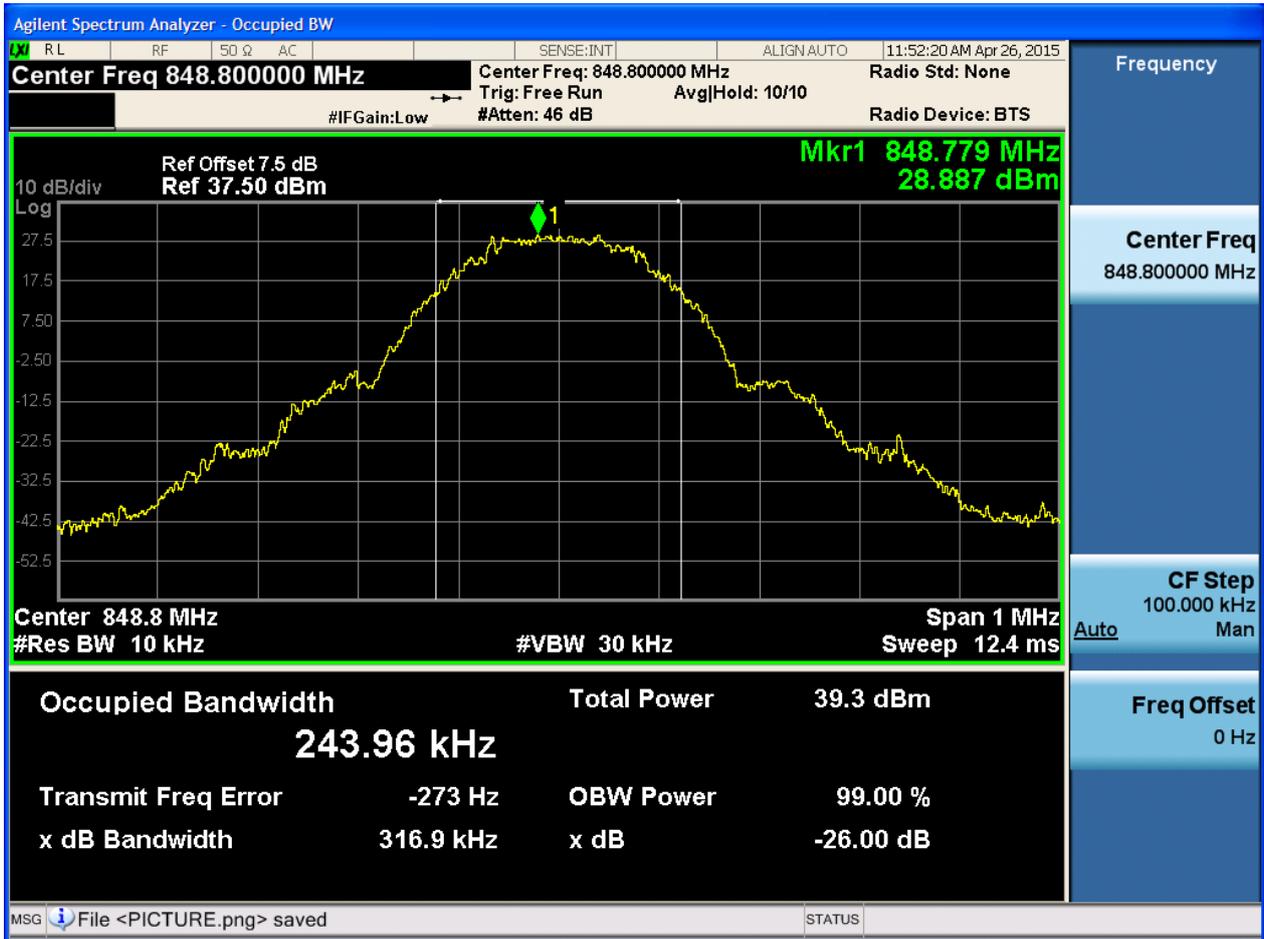


4.1.1.1.2 Test Channel = MCH





4.1.1.1.3 Test Channel = HCH



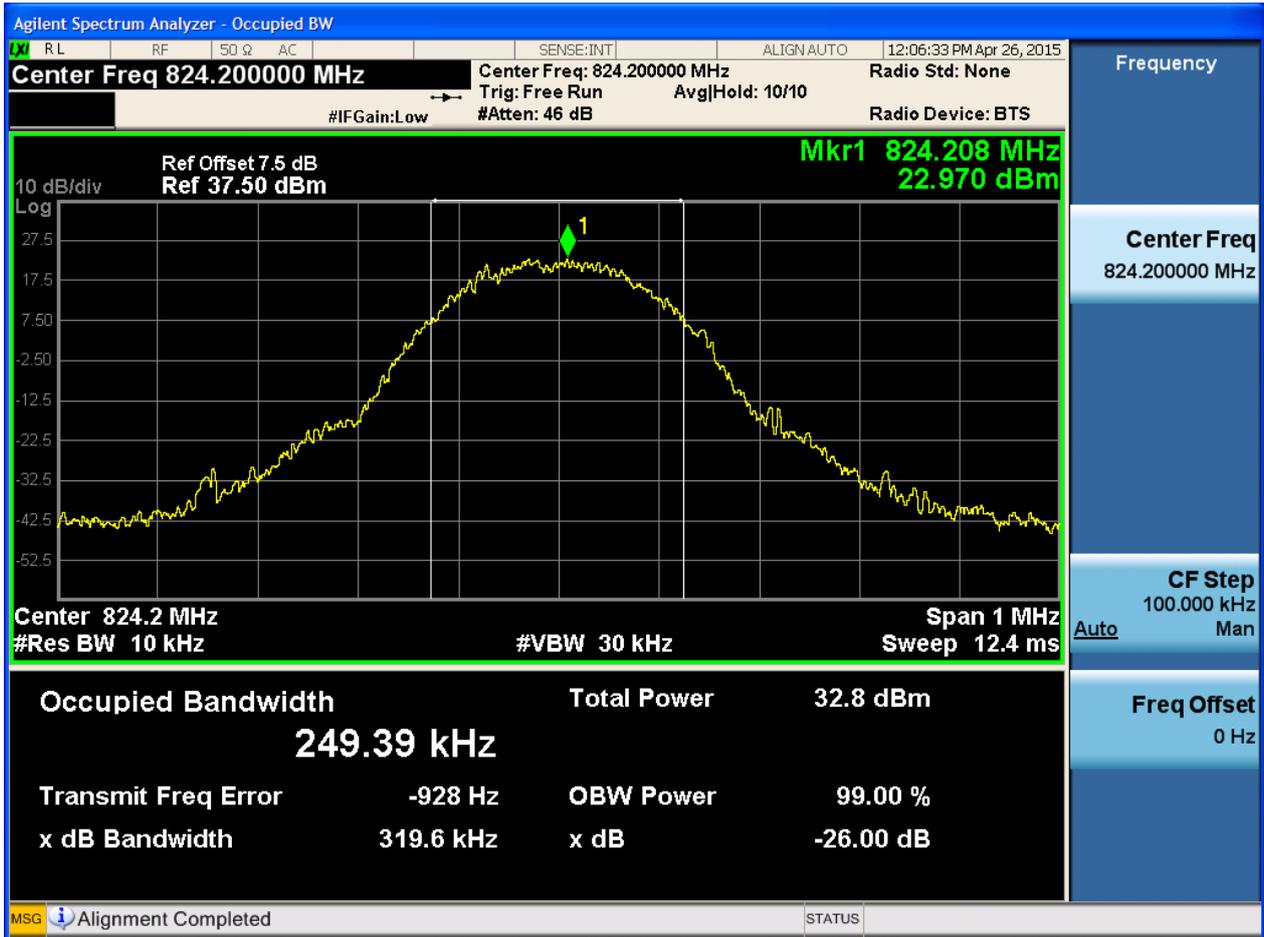


4.1.1.2 Test Mode = GSM/TM2

4.1.1.2.1 Test Channel =

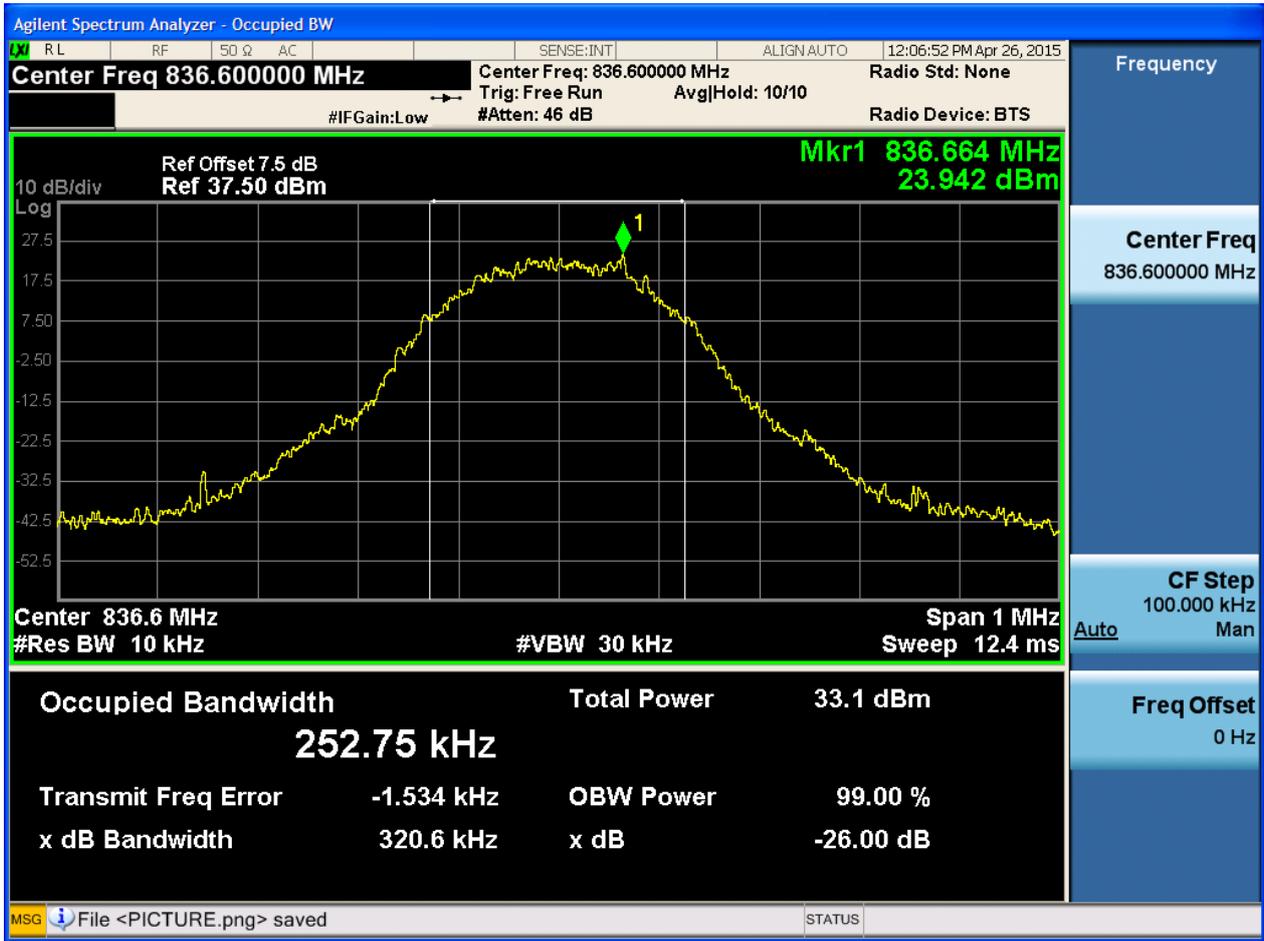
4.1.1.3 Test Mode = GSM/TM2

4.1.1.3.1 Test Channel = LCH





4.1.1.3.2 Test Channel = MCH





4.1.1.3.3 Test Channel = HCH

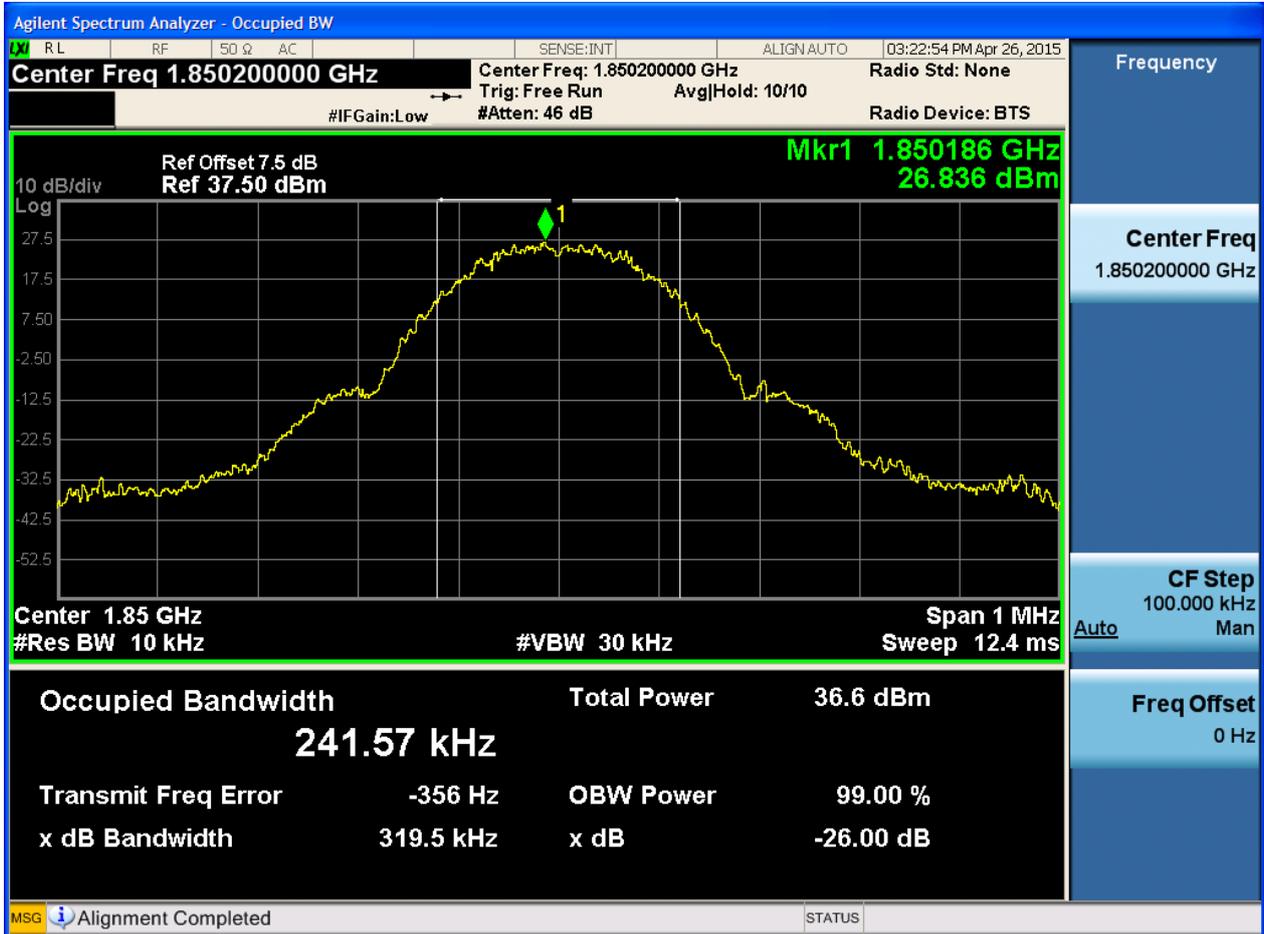




4.1.2 Test Band = GSM1900

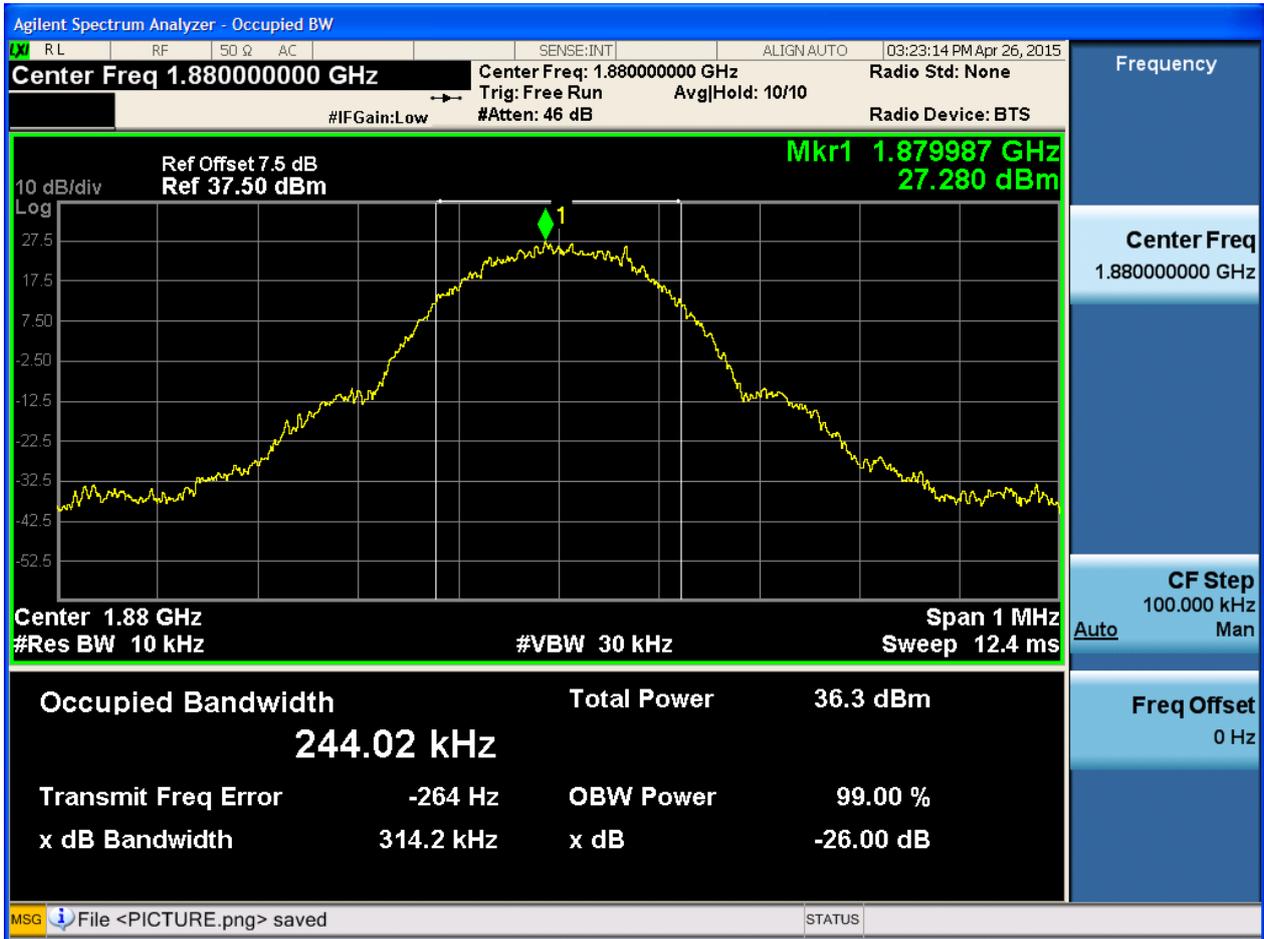
4.1.2.1 Test Mode = GSM/TM1

4.1.2.1.1 Test Channel = LCH



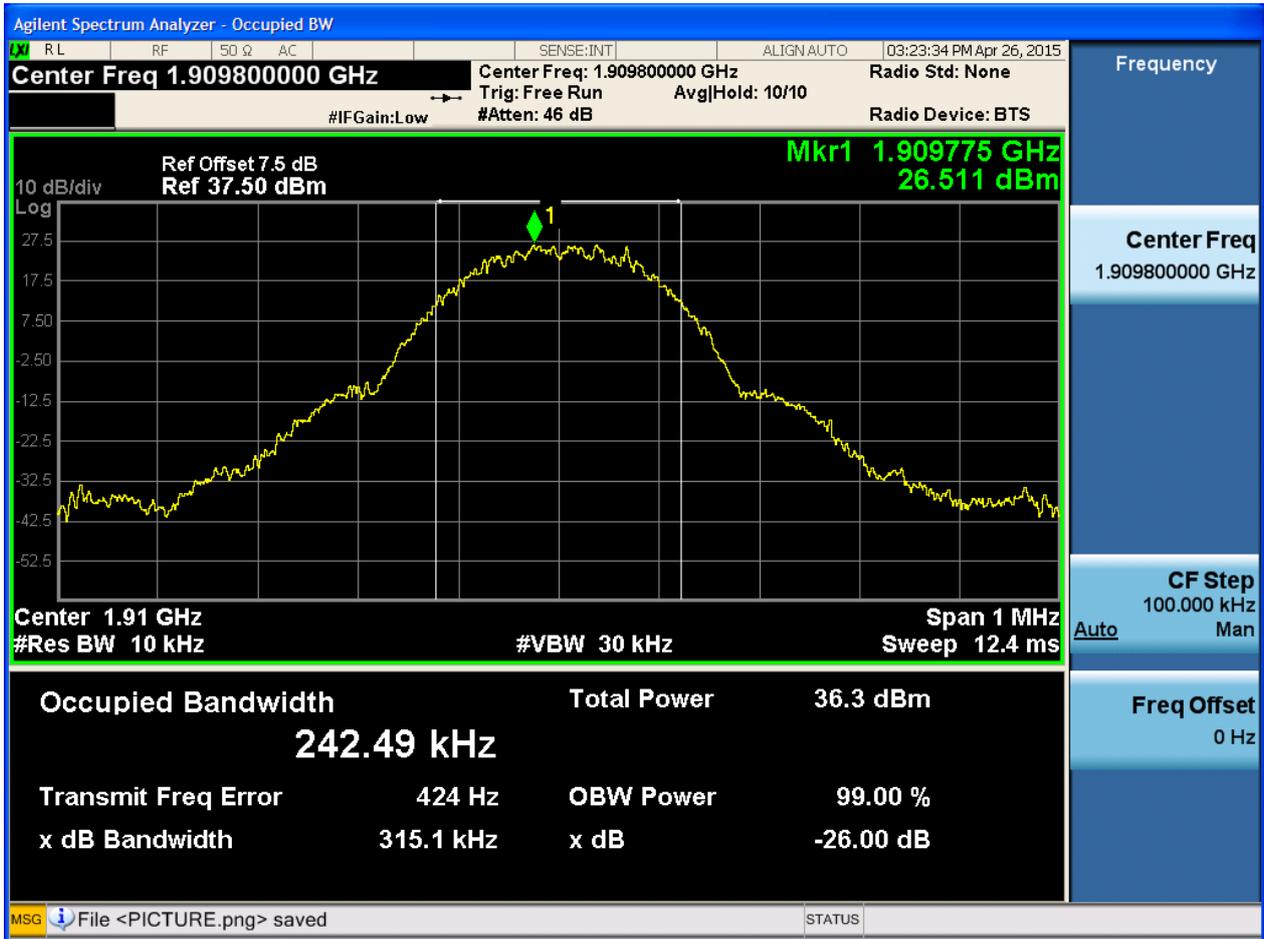


4.1.2.1.2 Test Channel = MCH





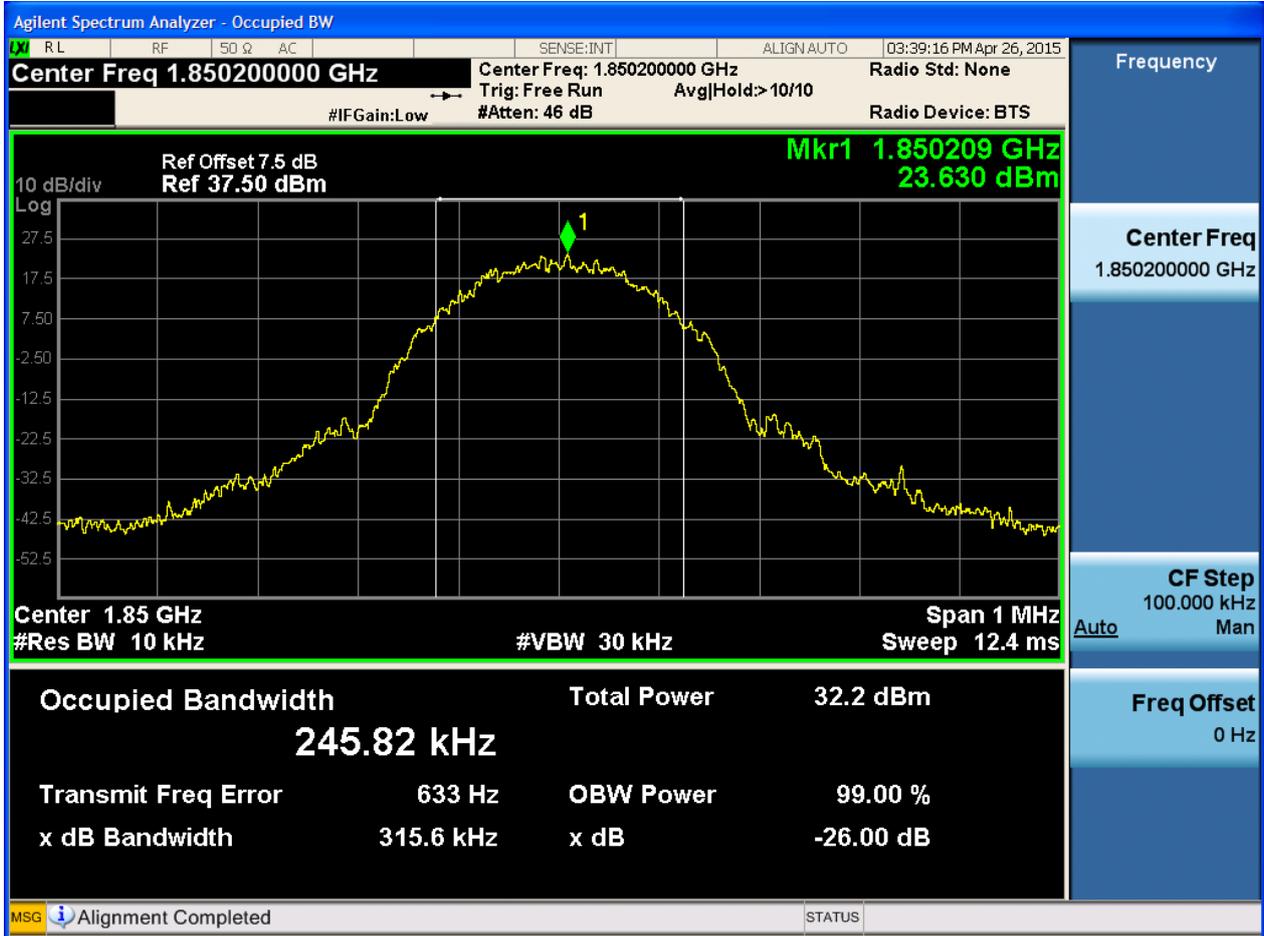
4.1.2.1.3 Test Channel = HCH





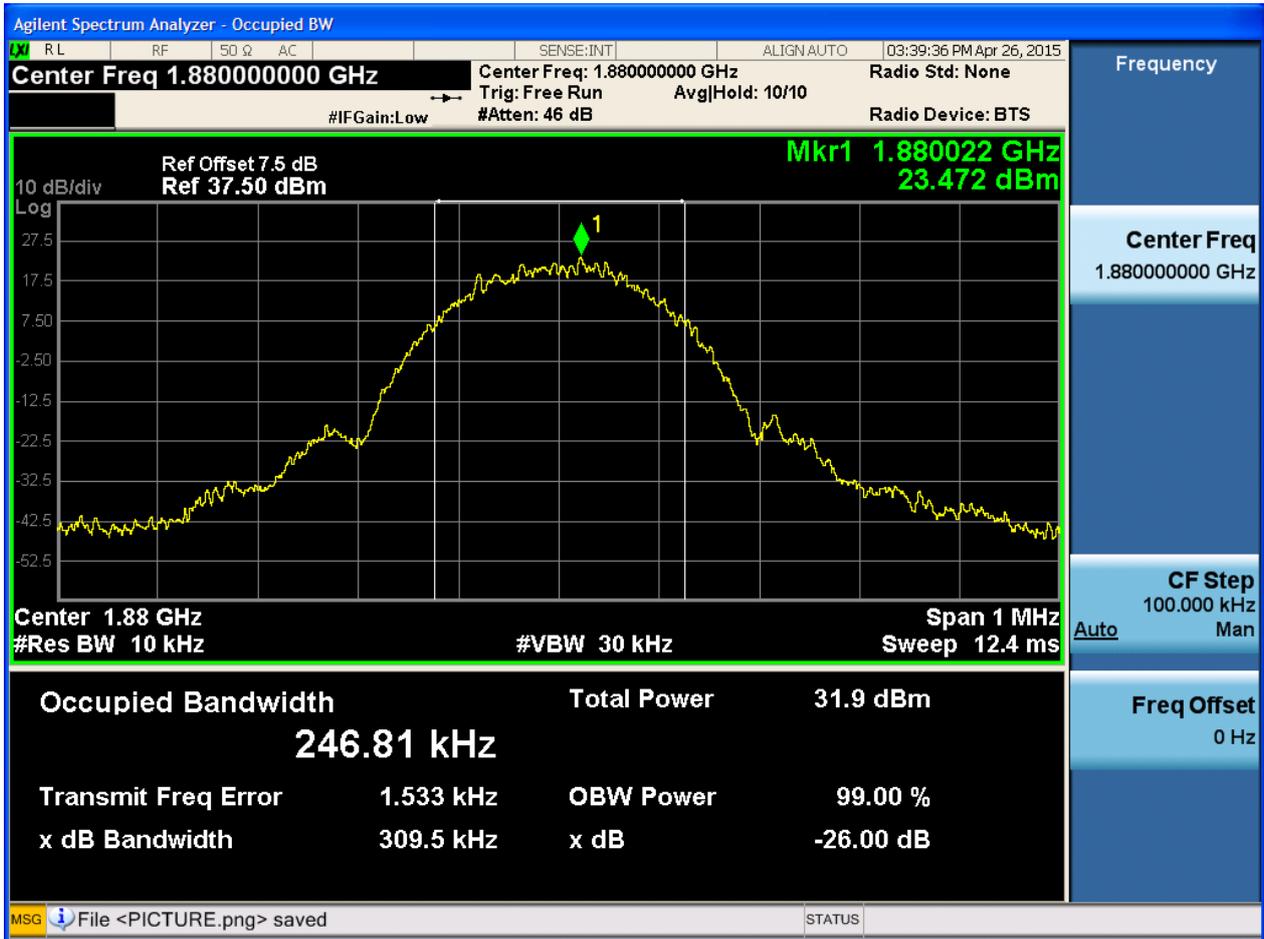
4.1.2.2 Test Mode = GSM/TM2

4.1.2.2.1 Test Channel = LCH



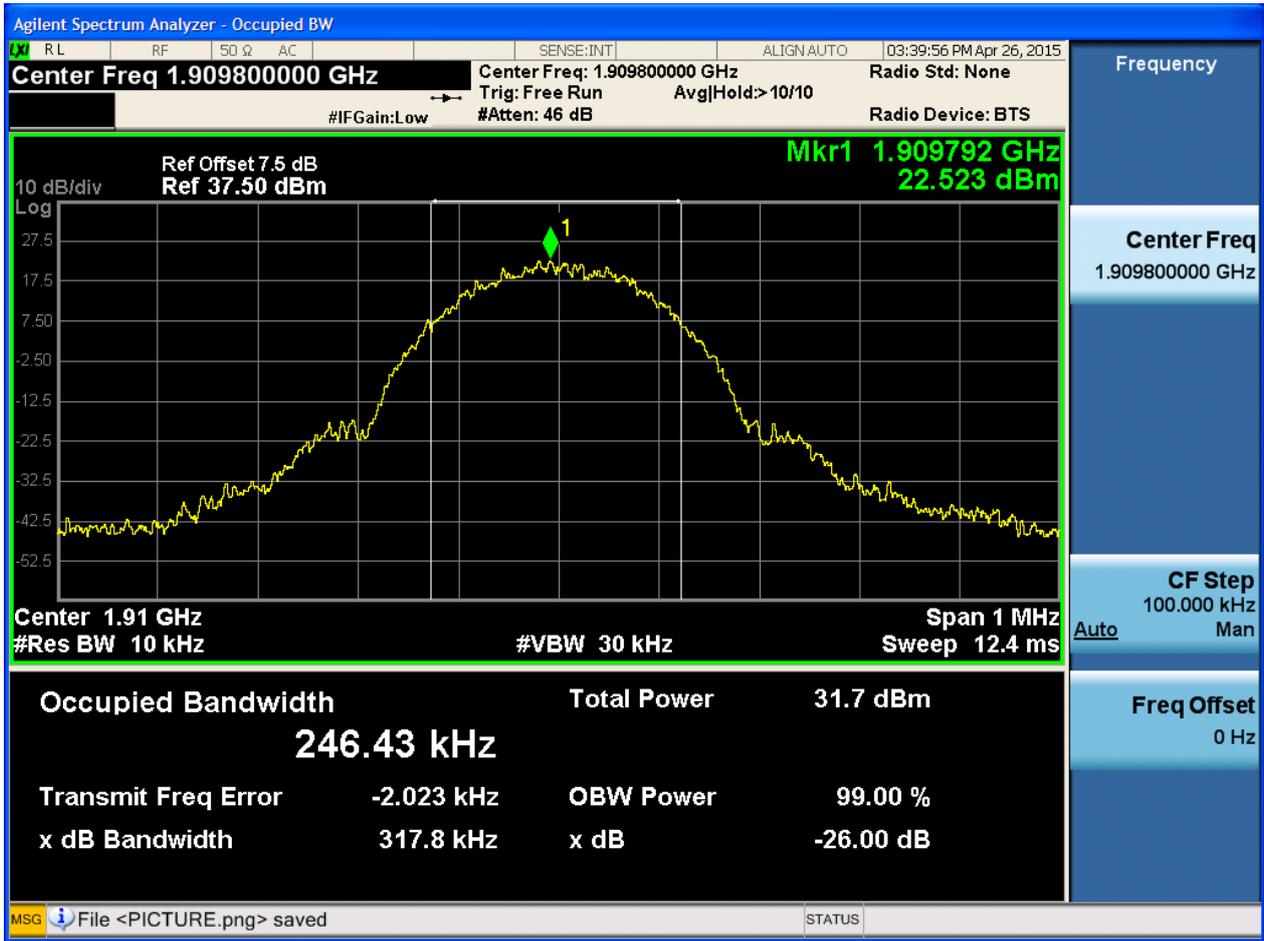


4.1.2.2.2 Test Channel = MCH



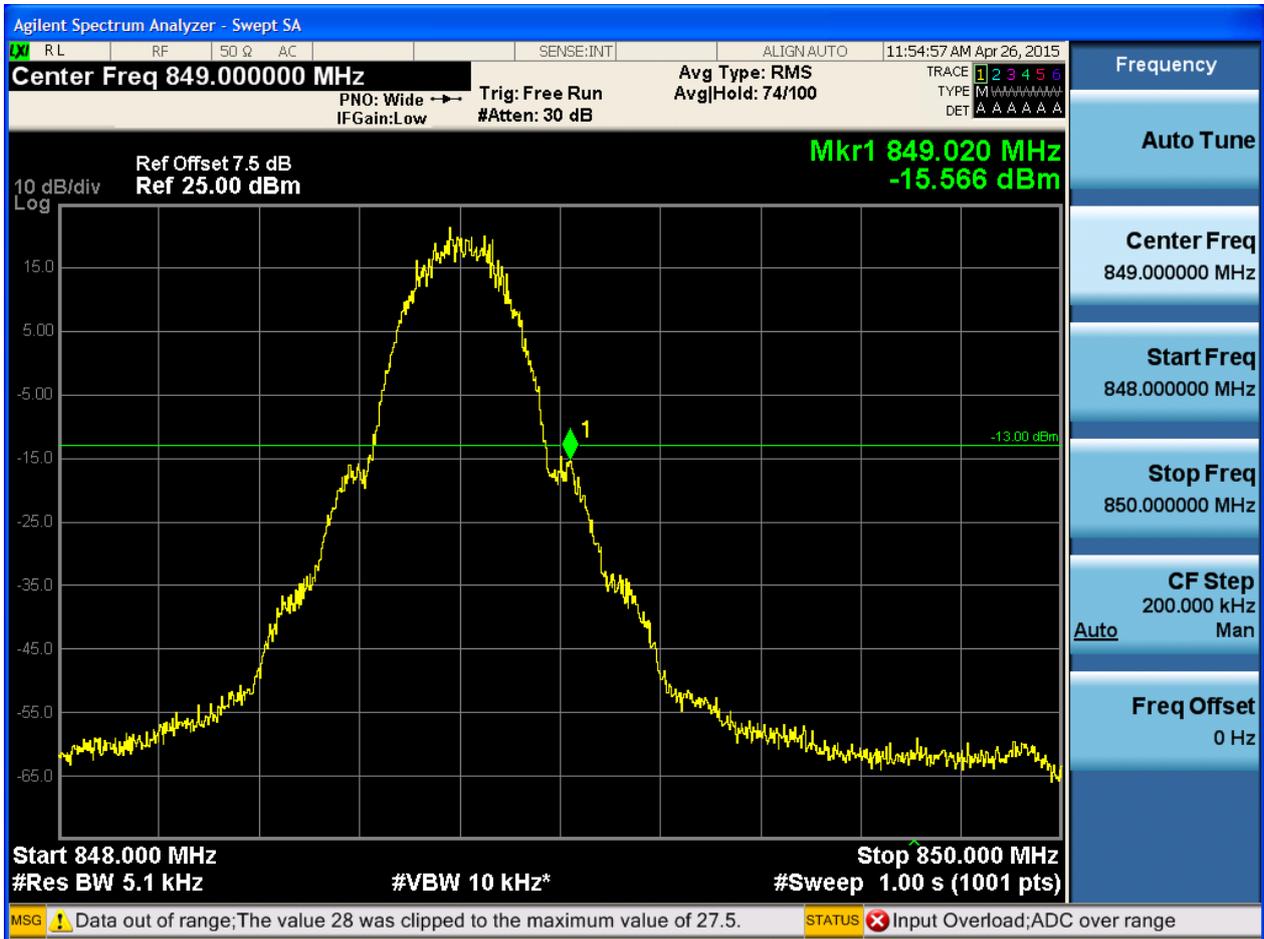


4.1.2.2.3 Test Channel = HCH





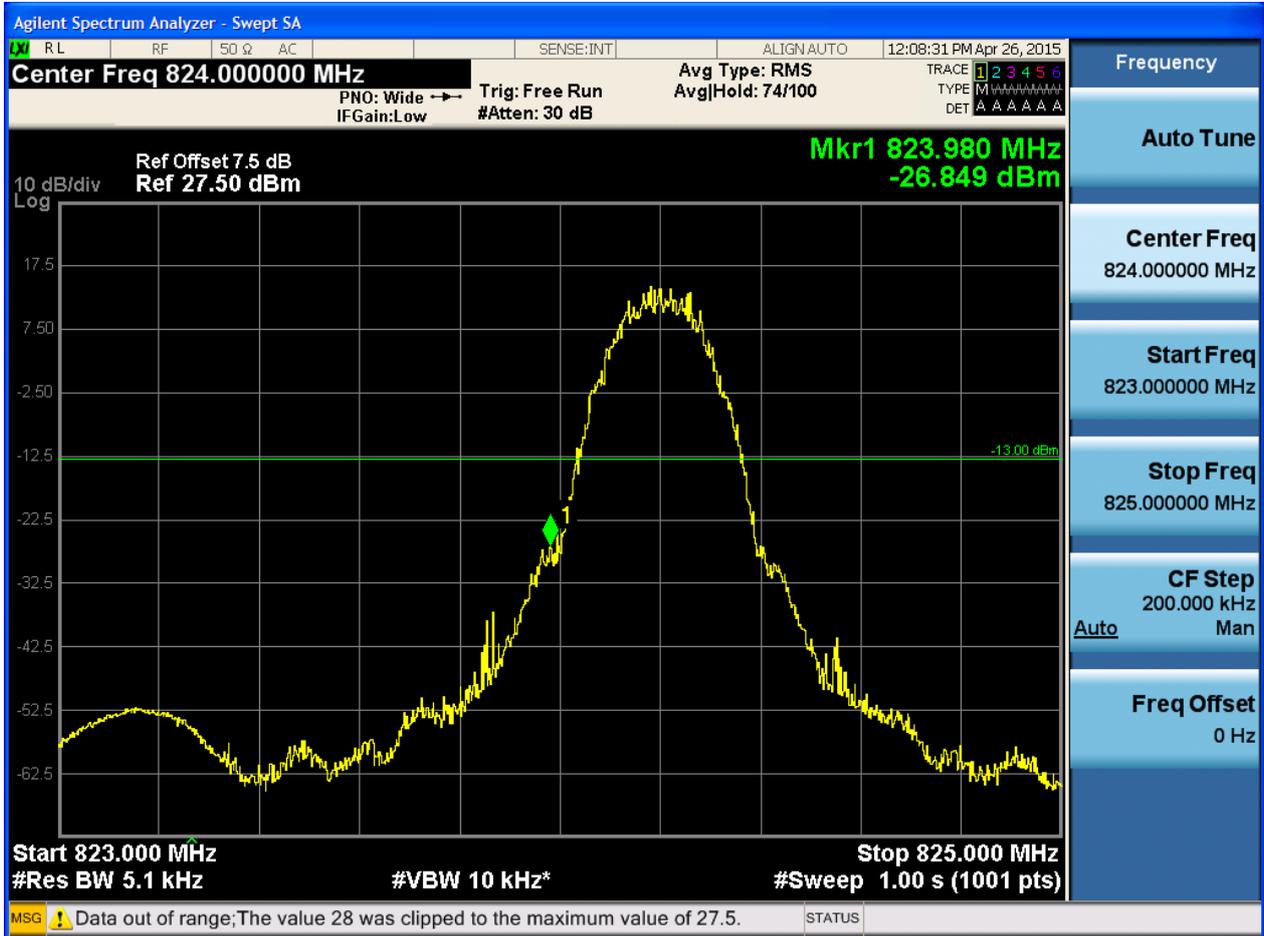
5.1.1.1.2 Test Channel = HCH





5.1.1.2 Test Mode = GSM/TM2

5.1.1.2.1 Test Channel = LCH



5.1.1.2.2 Test Channel = HCH

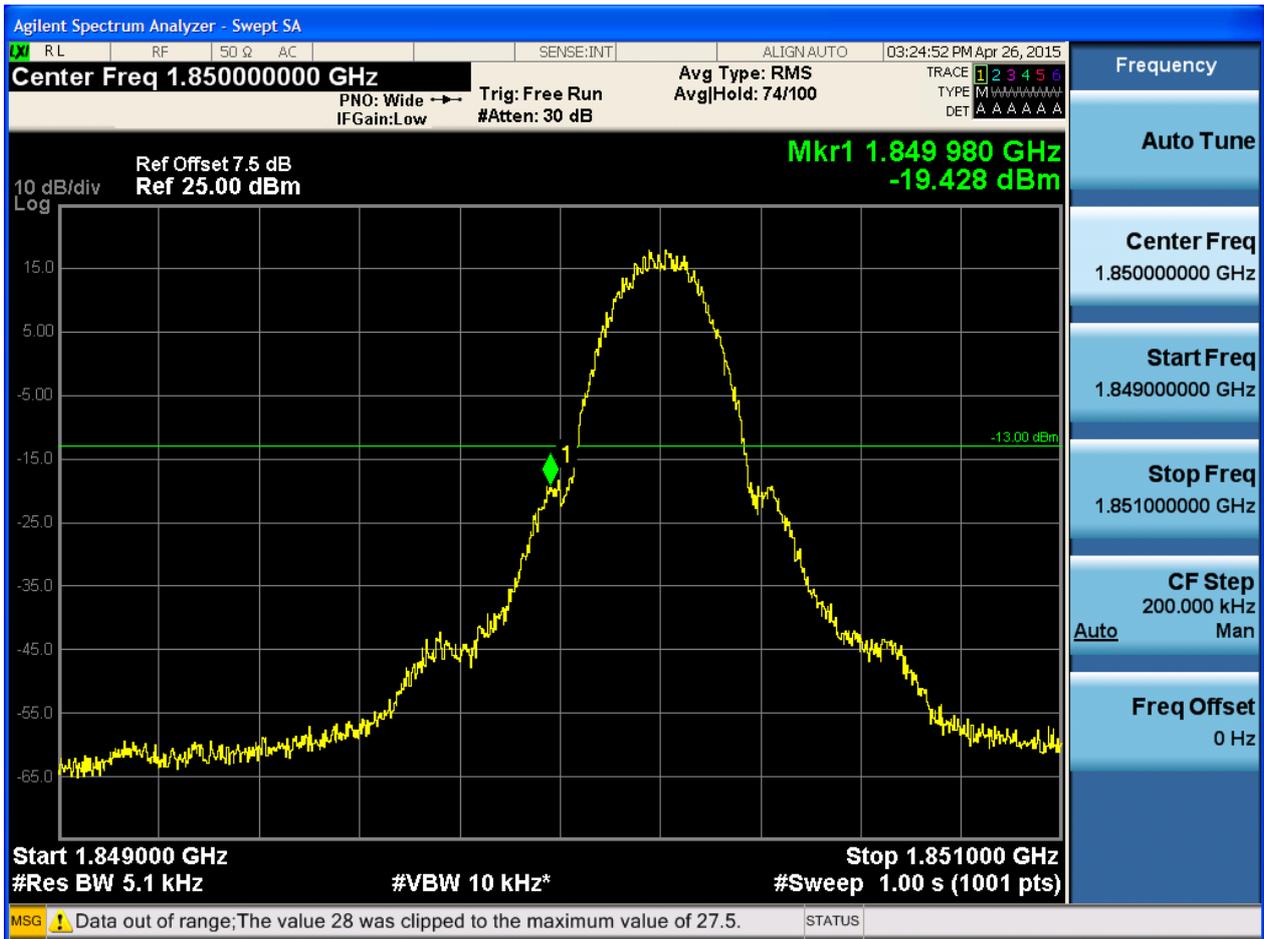




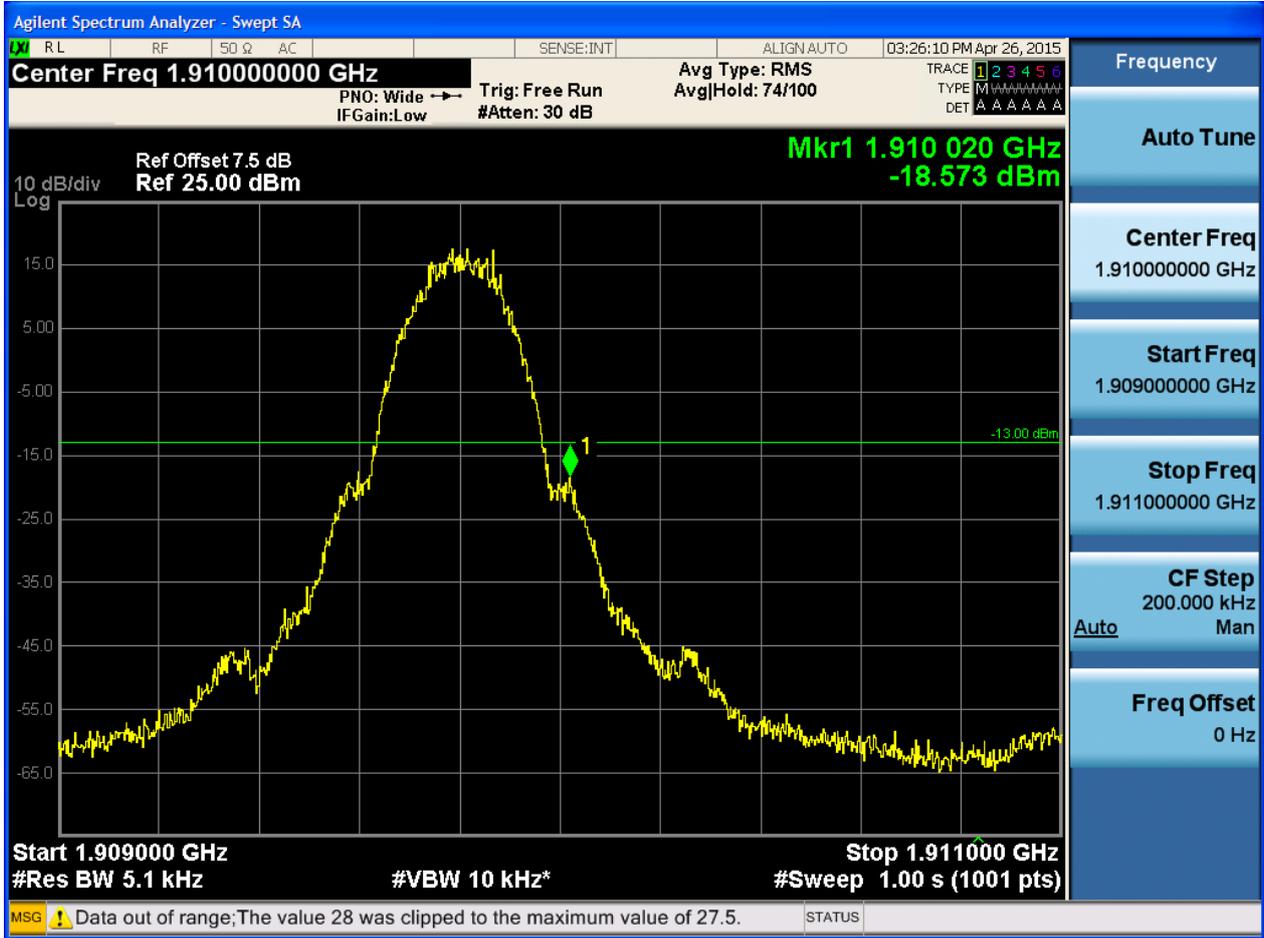
5.1.2 Test Band = GSM1900

5.1.2.1 Test Mode = GSM/TM1

5.1.2.1.1 Test Channel = LCH



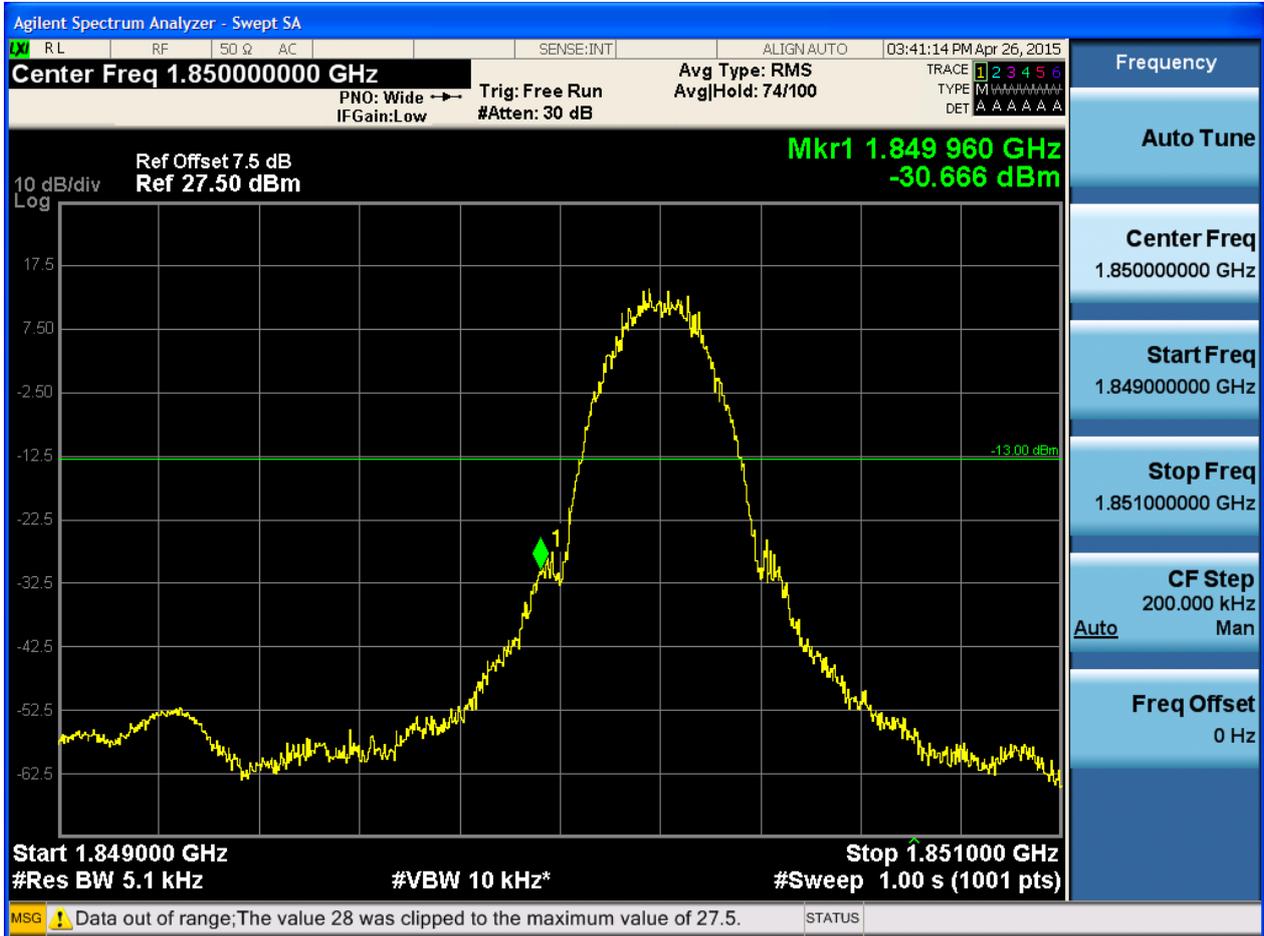
5.1.2.1.2 Test Channel = HCH





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

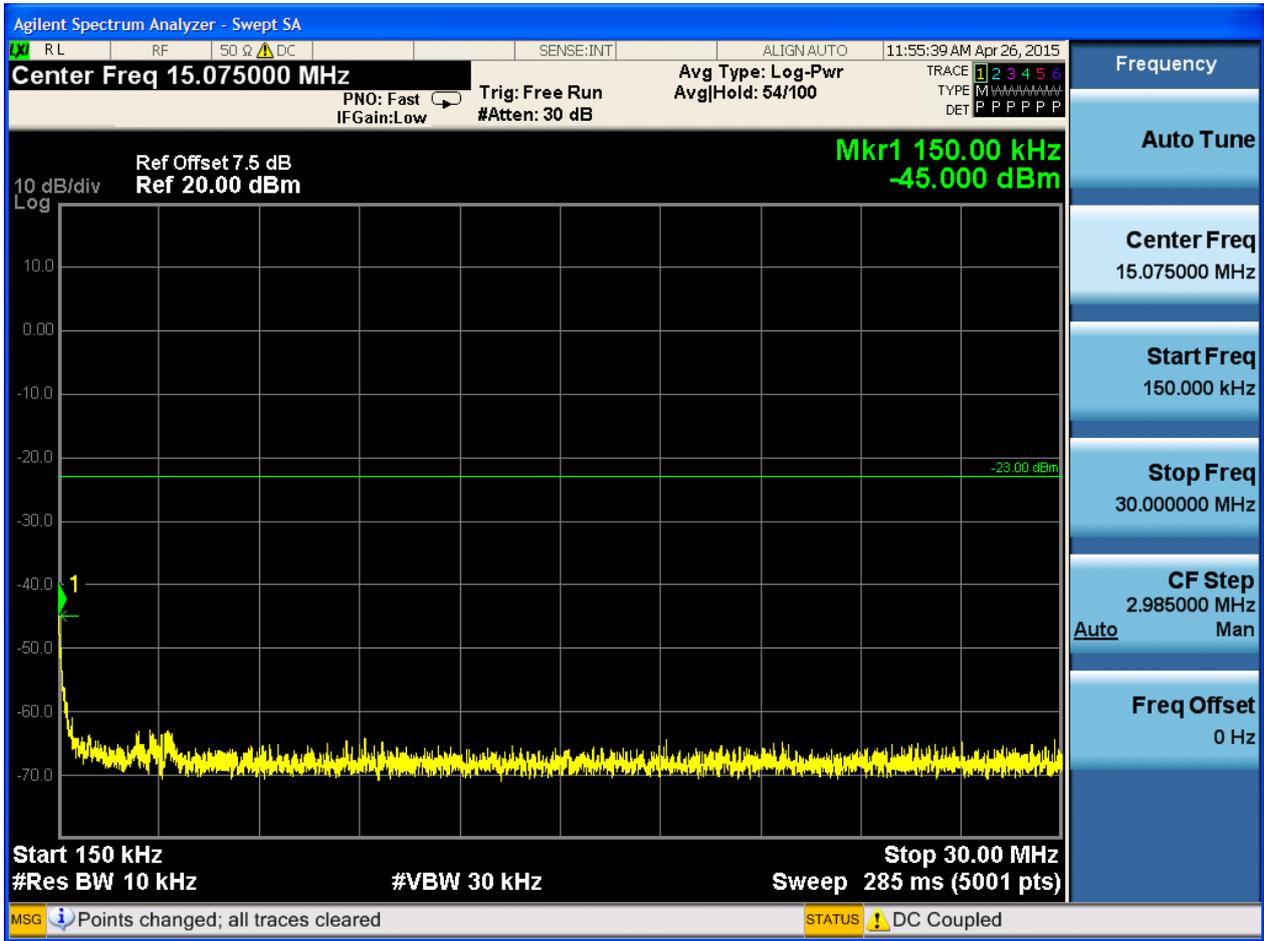
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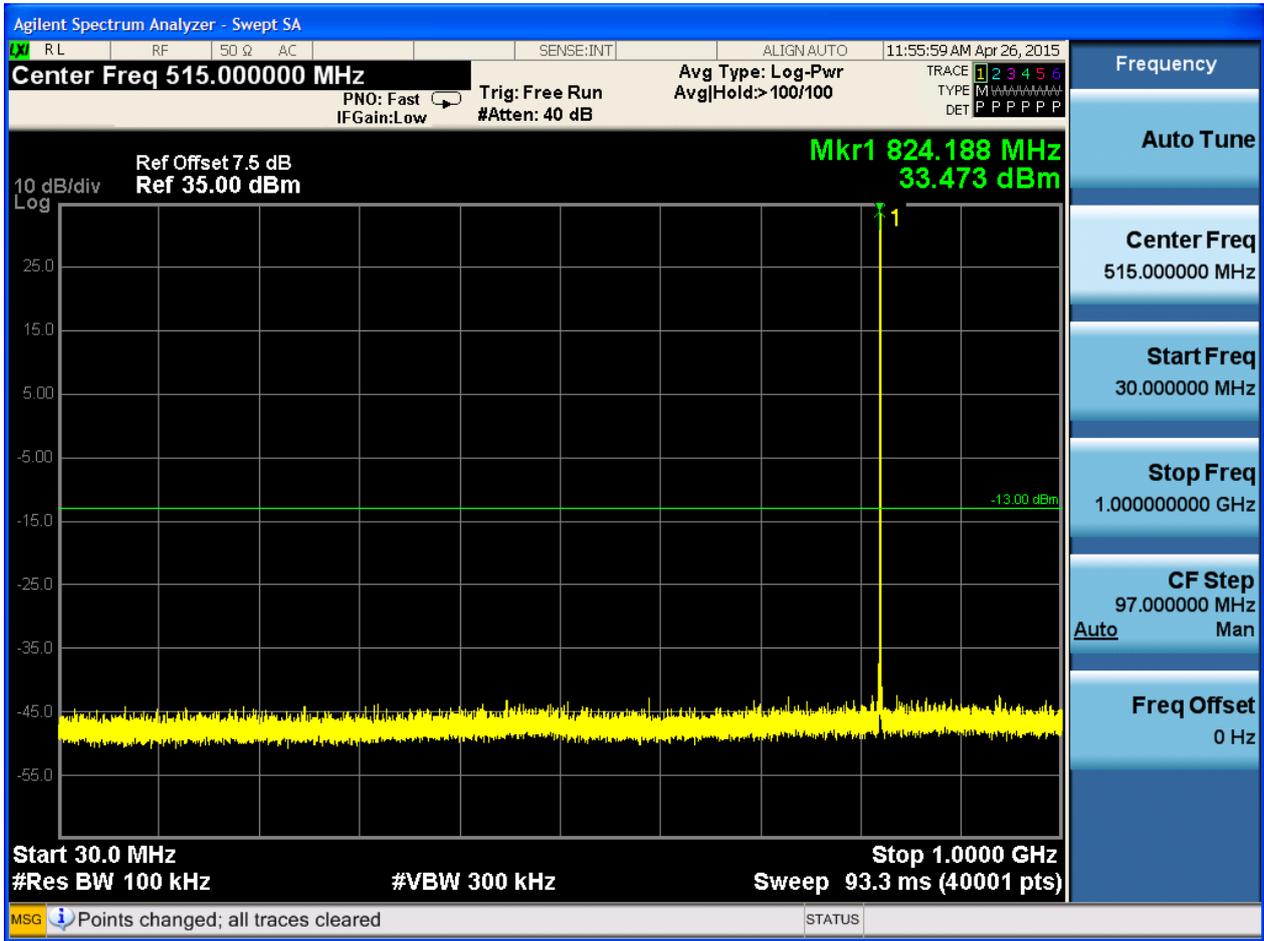
6.1.1 Test Band = GSM850

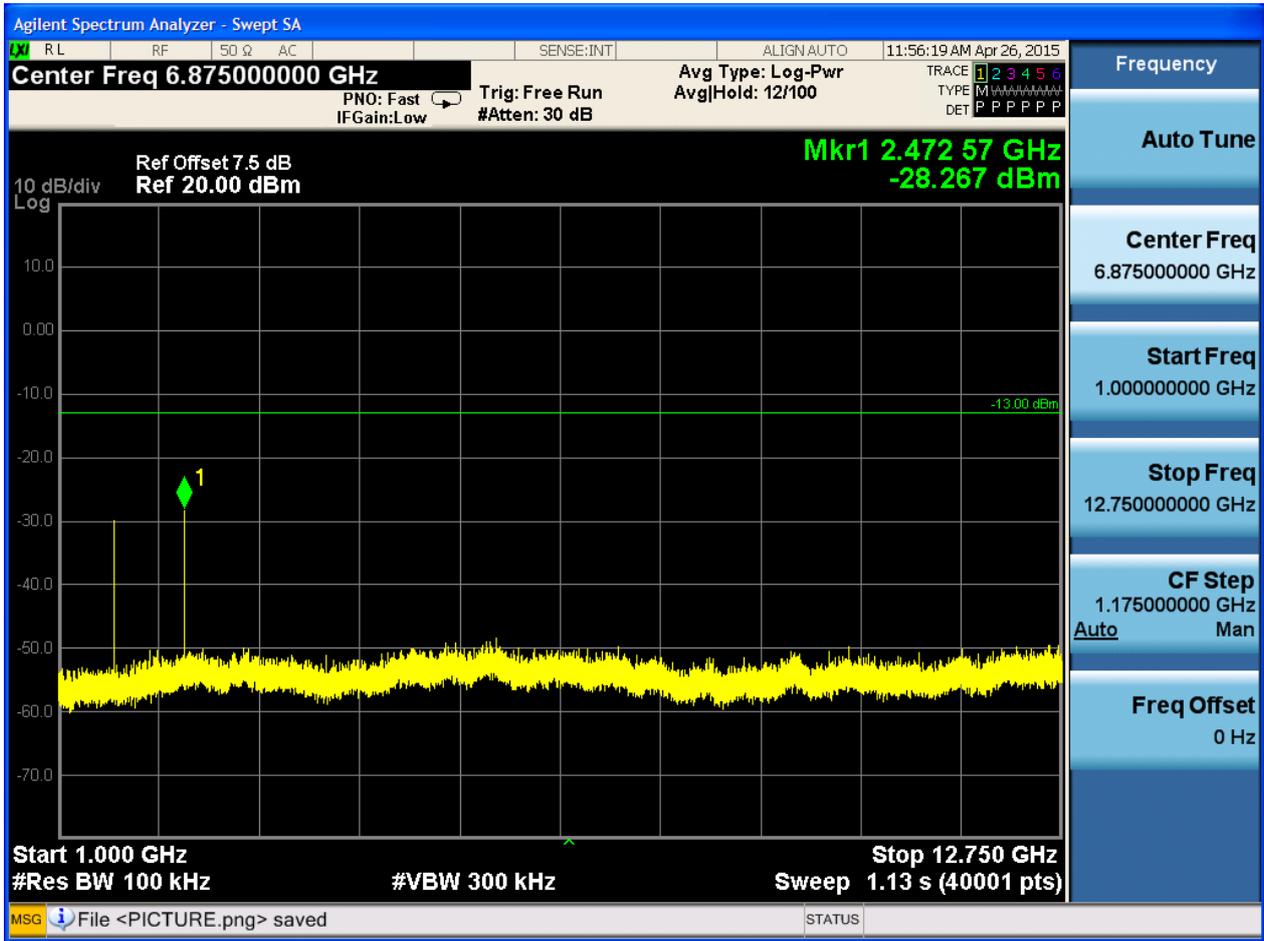
6.1.1.1 Test Mode = GSM/TM1

6.1.1.1.1 Test Channel = LCH



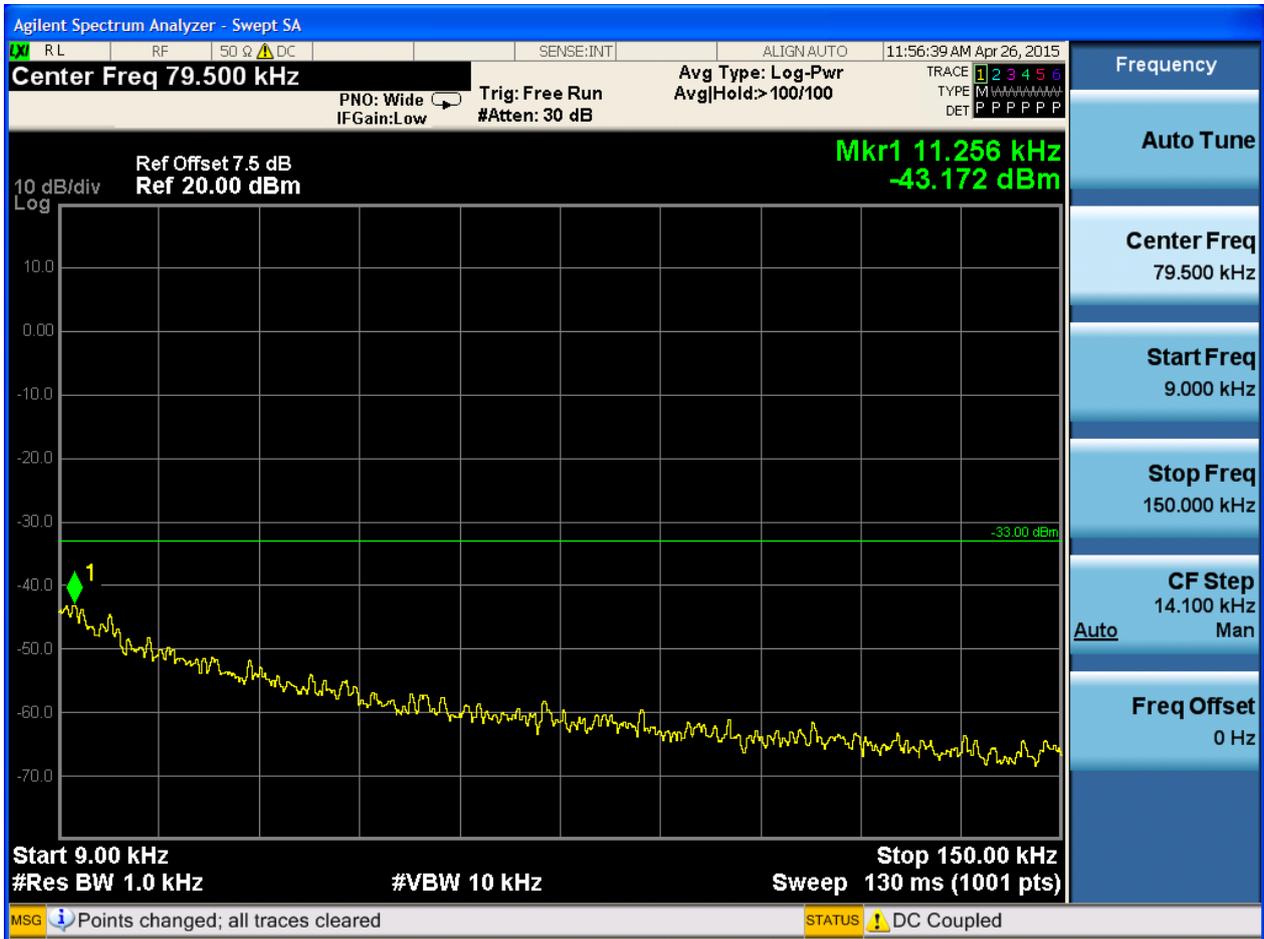


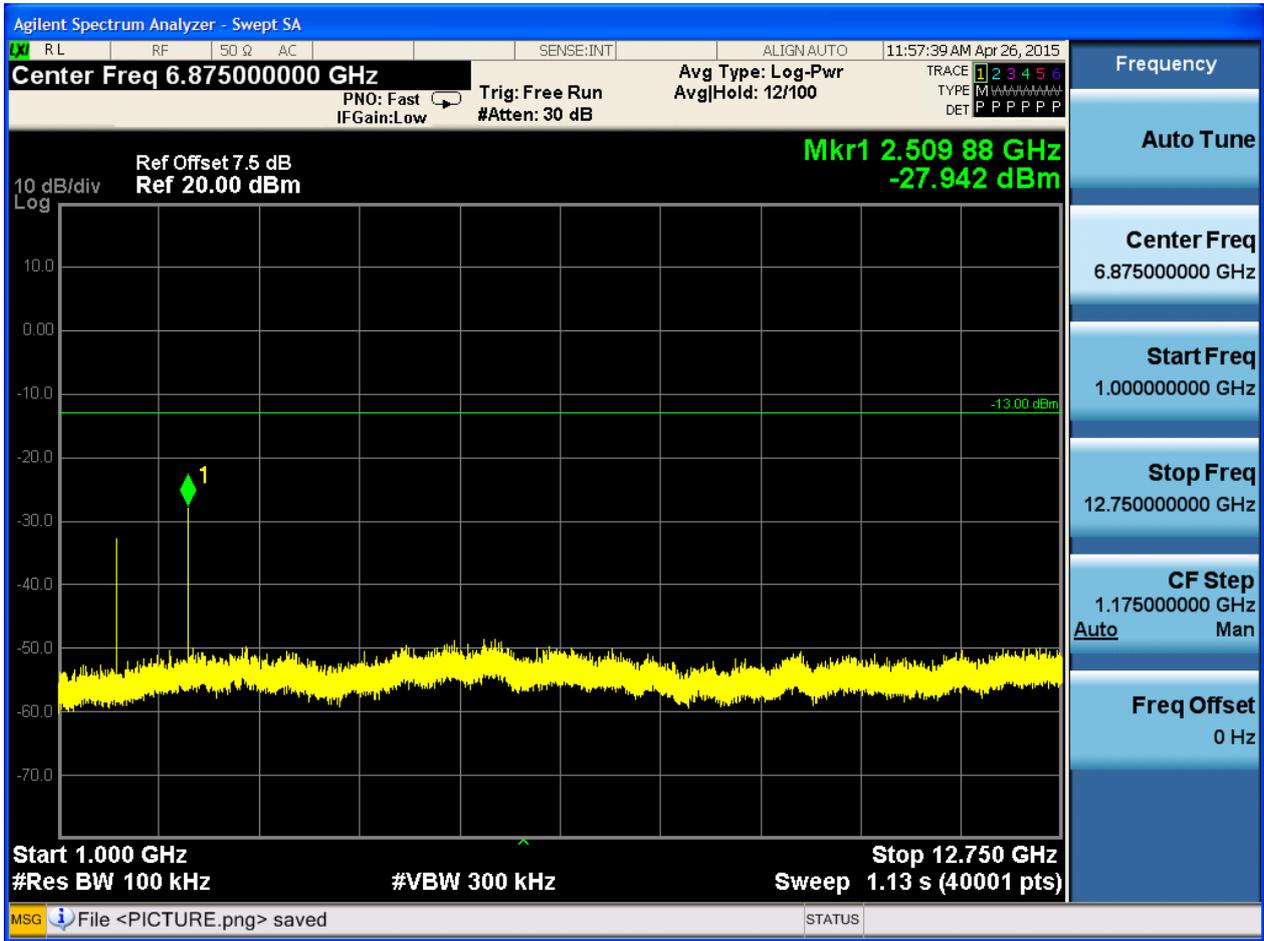






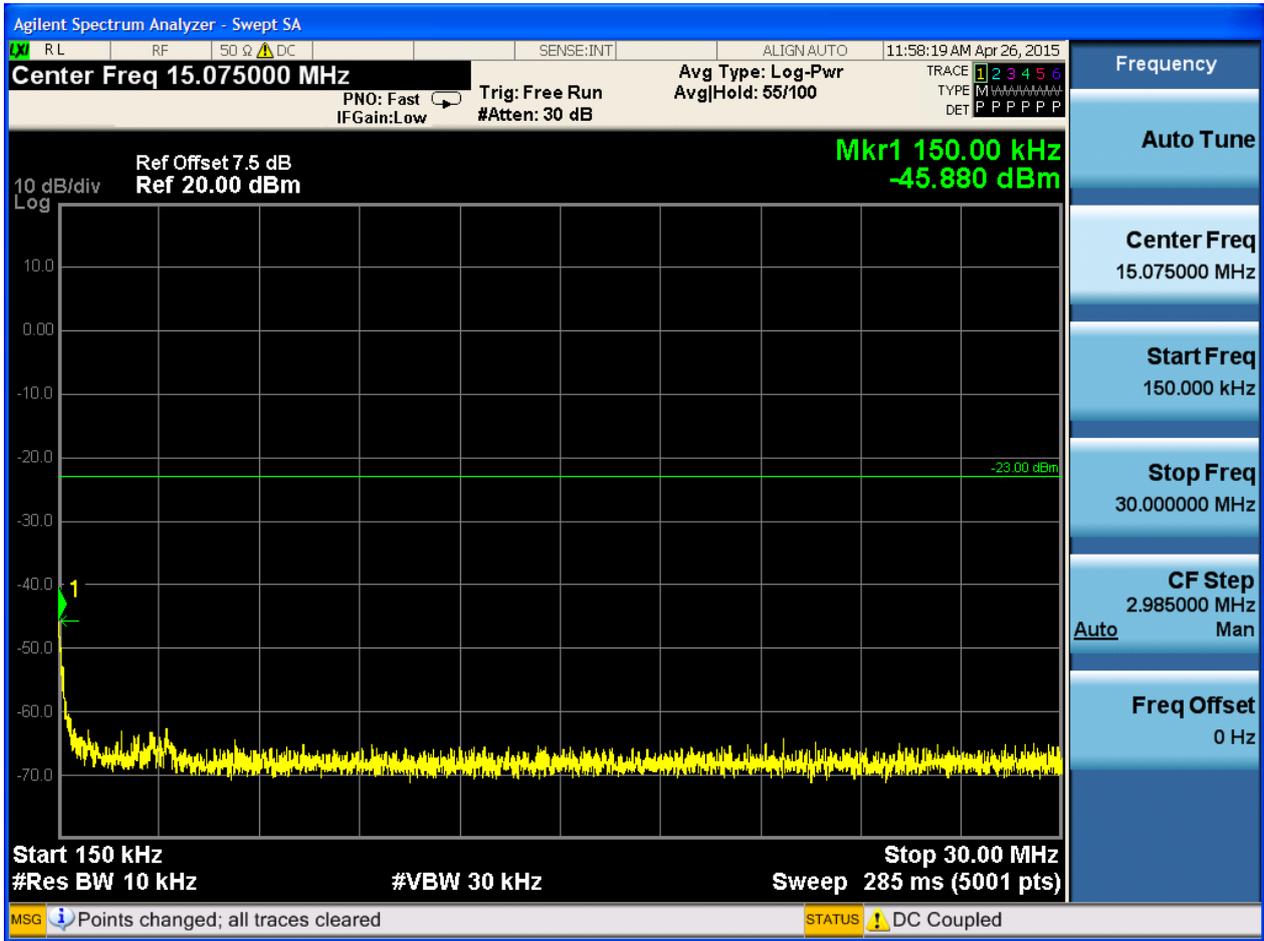
6.1.1.1.2 Test Channel = MCH

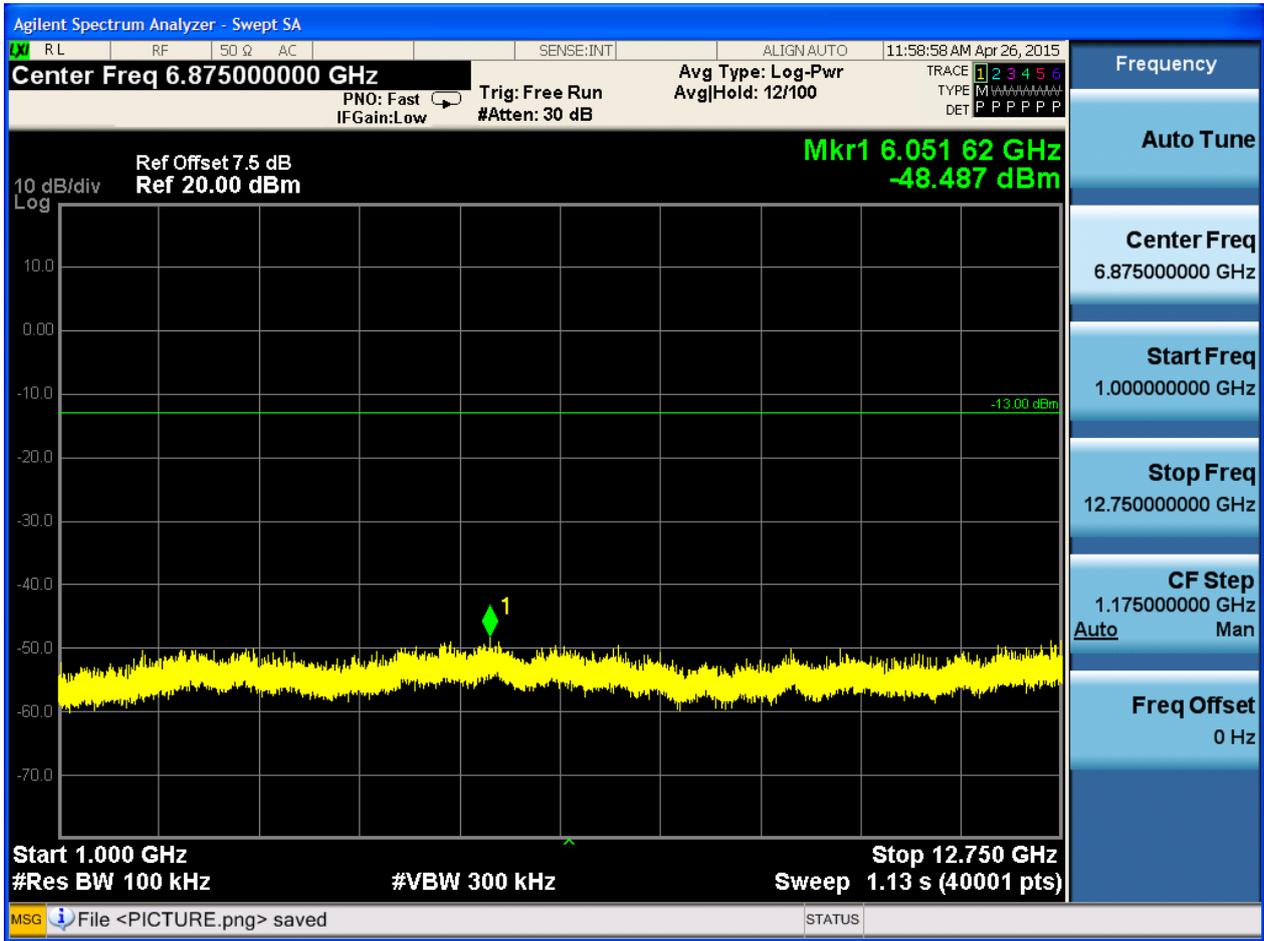




6.1.1.1.3 Test Channel = HCH

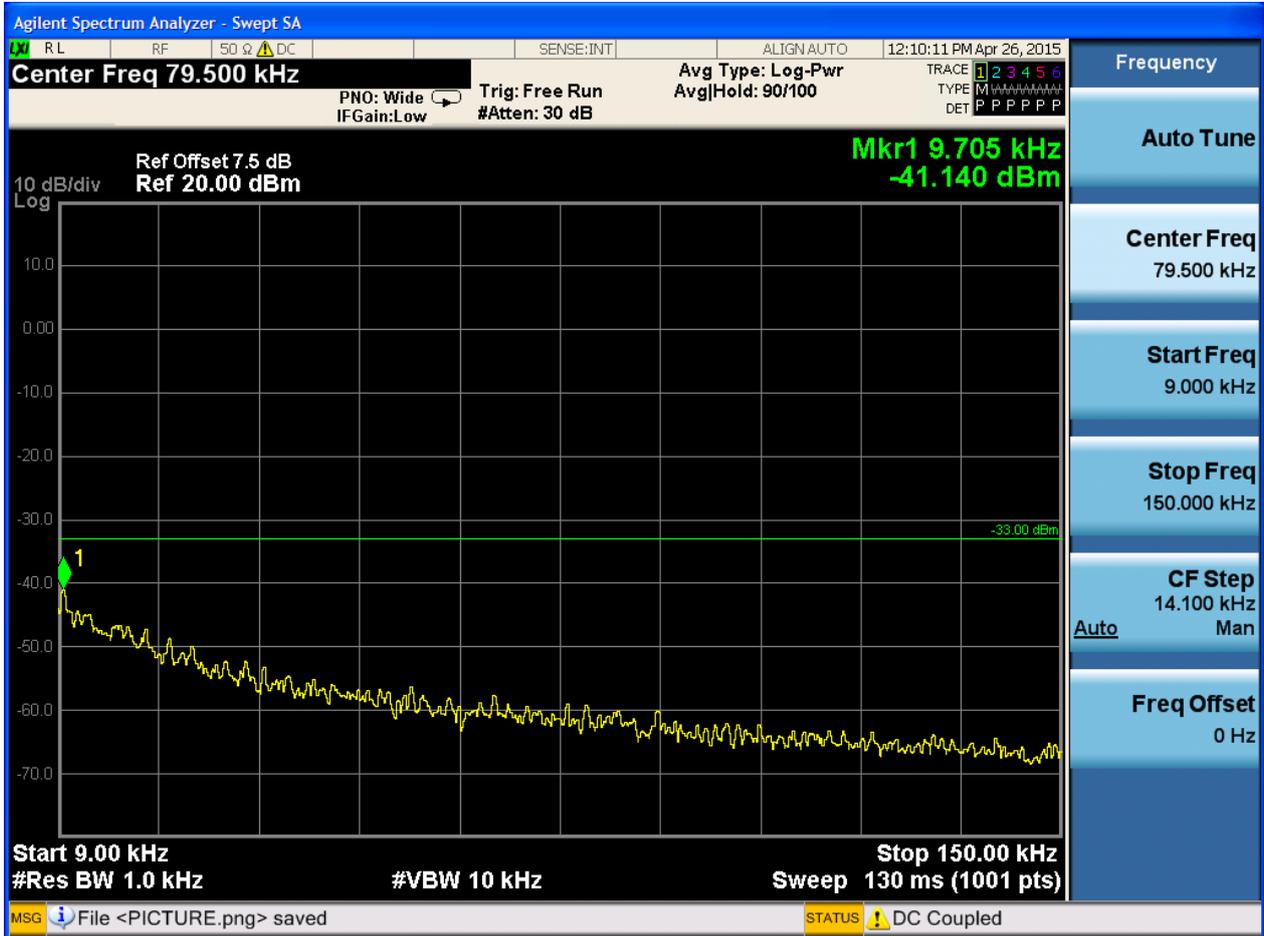


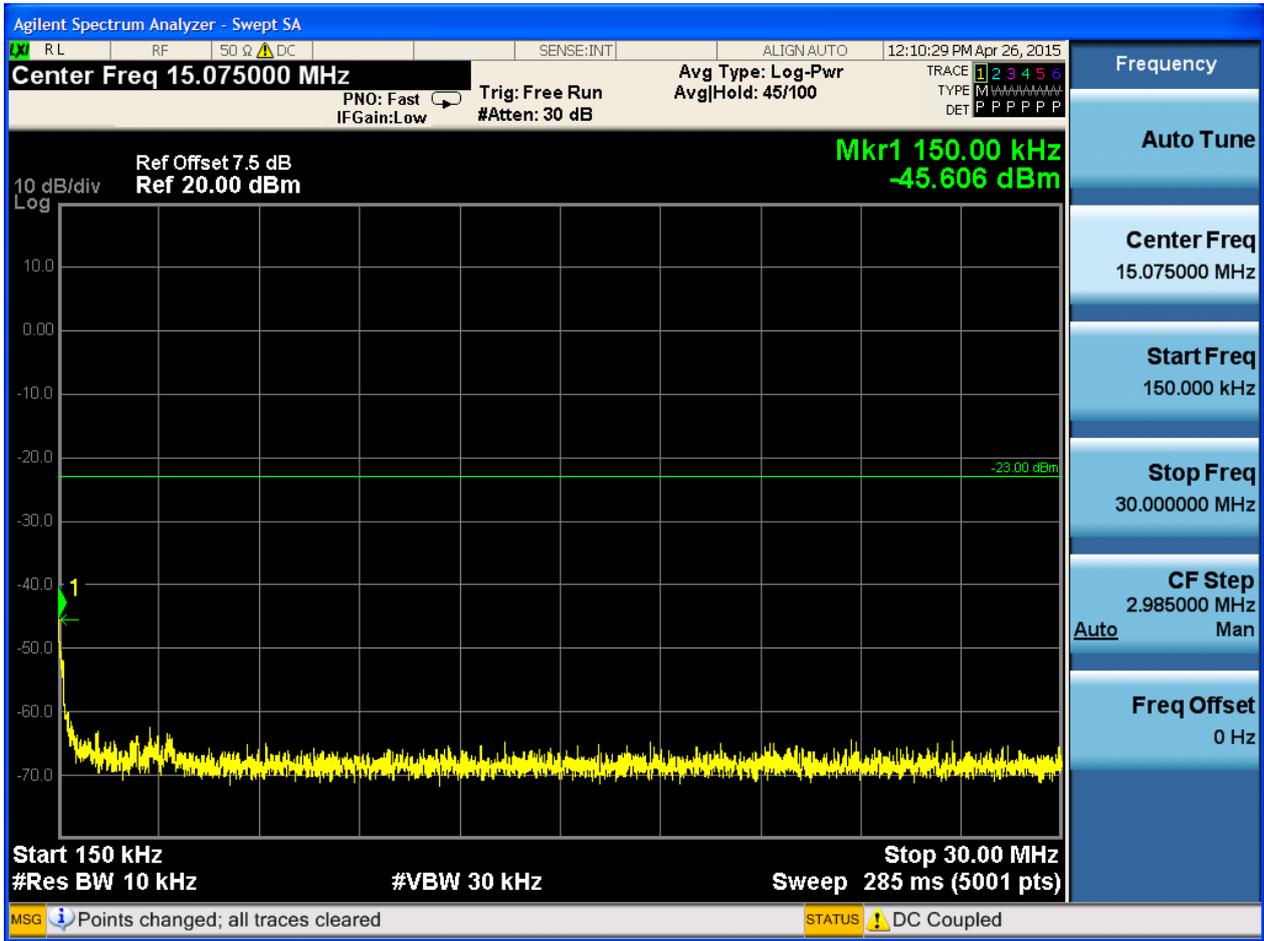


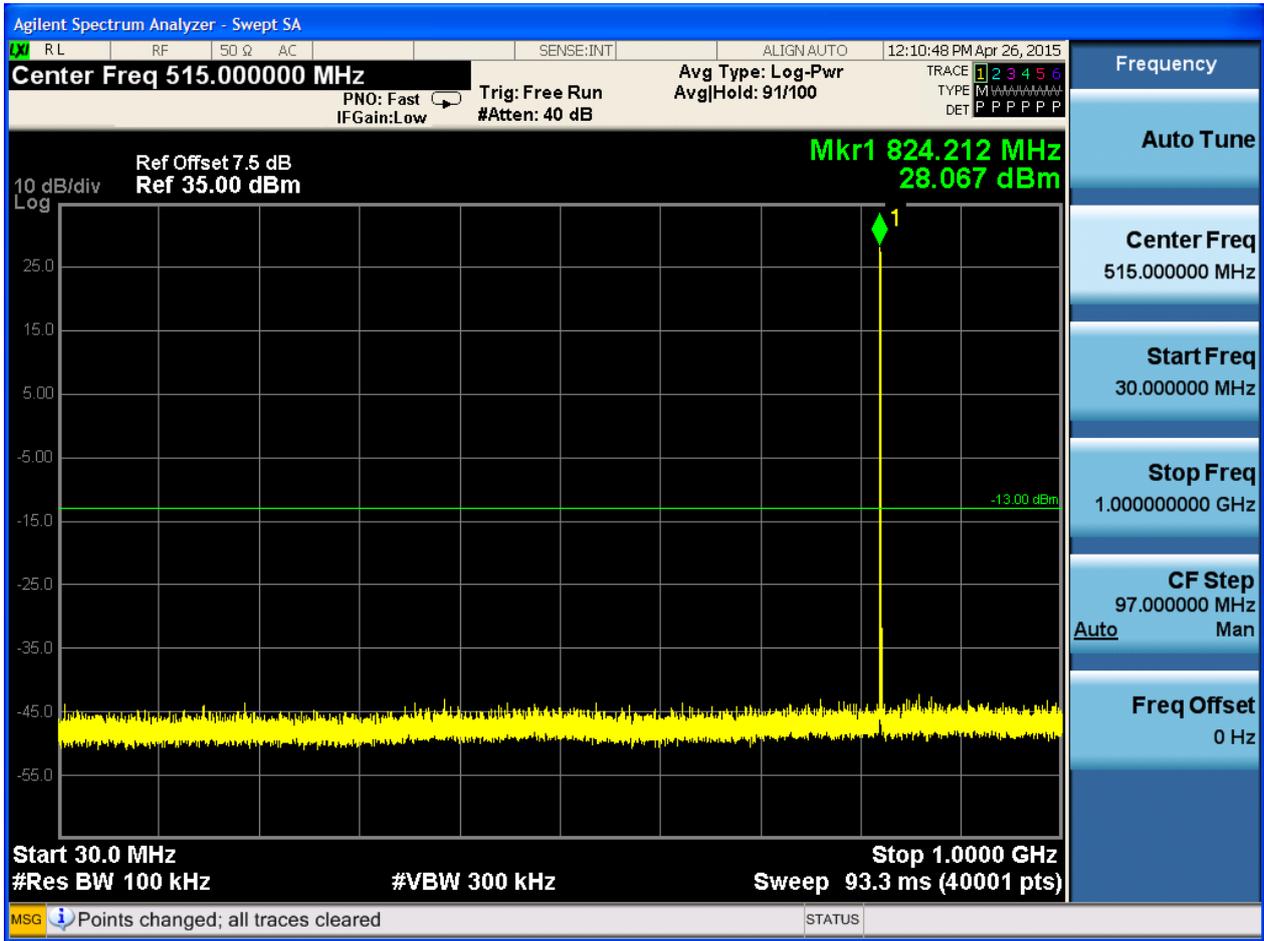


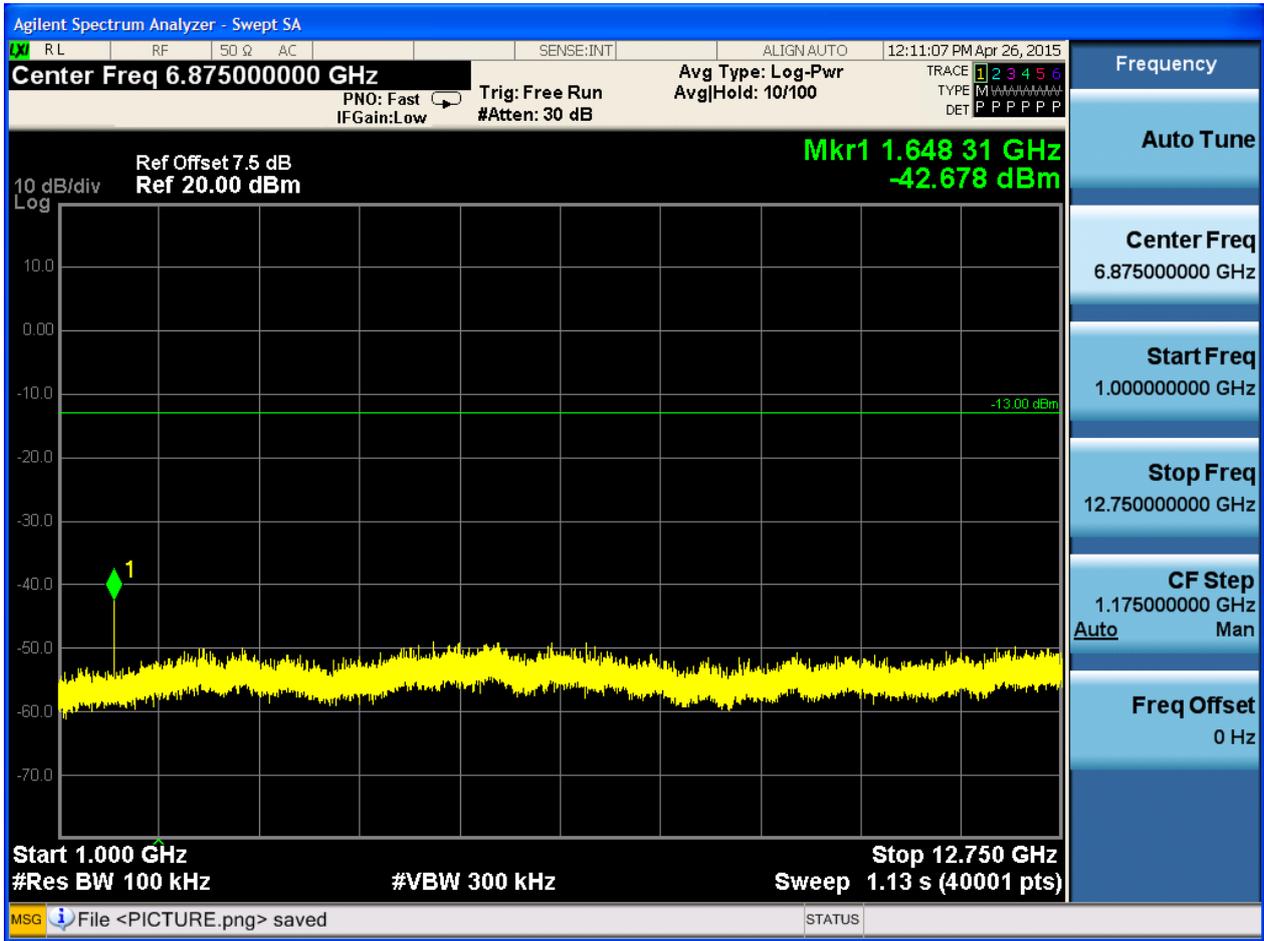
6.1.1.2 Test Mode = GSM/TM2

6.1.1.2.1 Test Channel = LCH

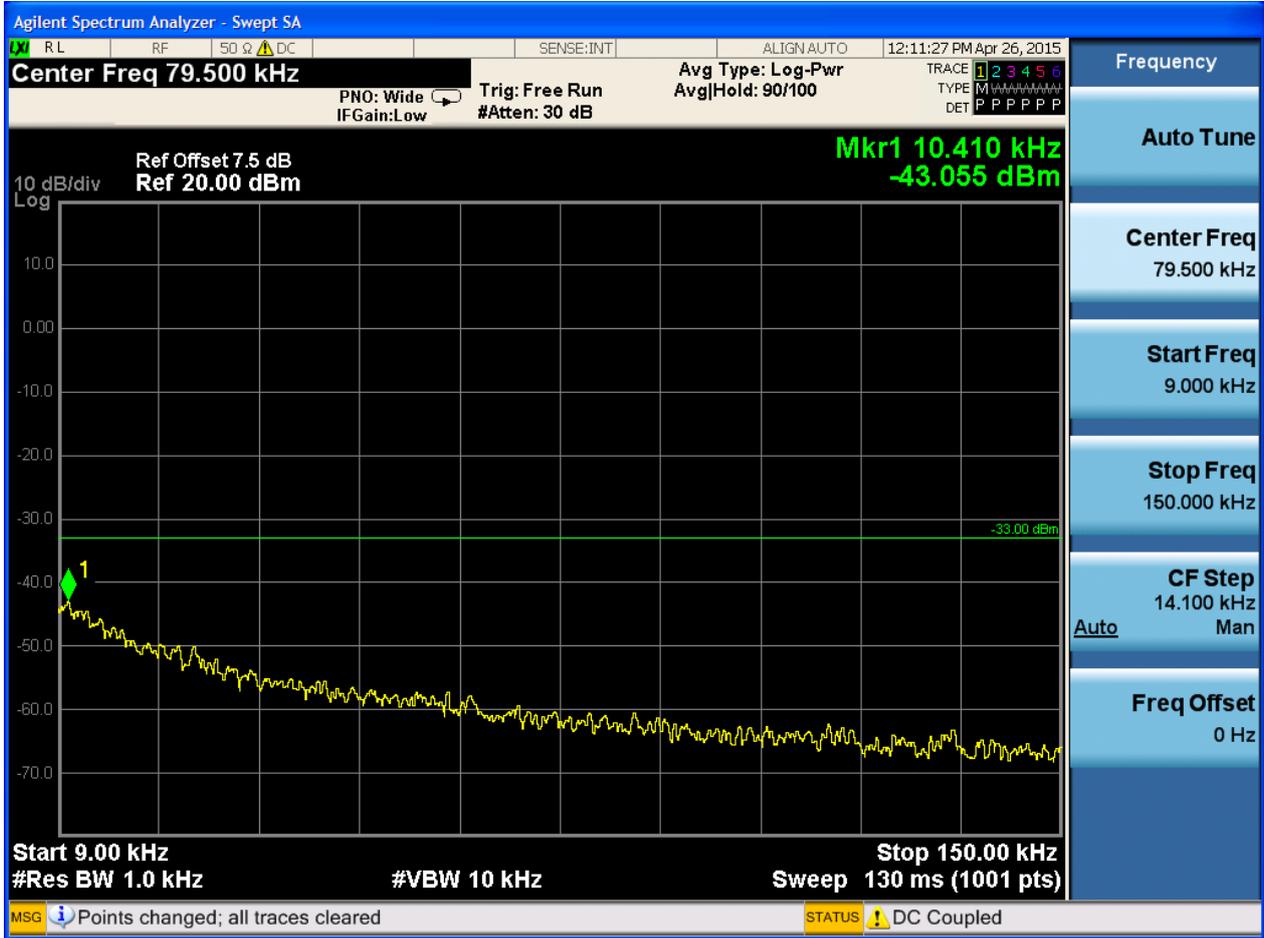


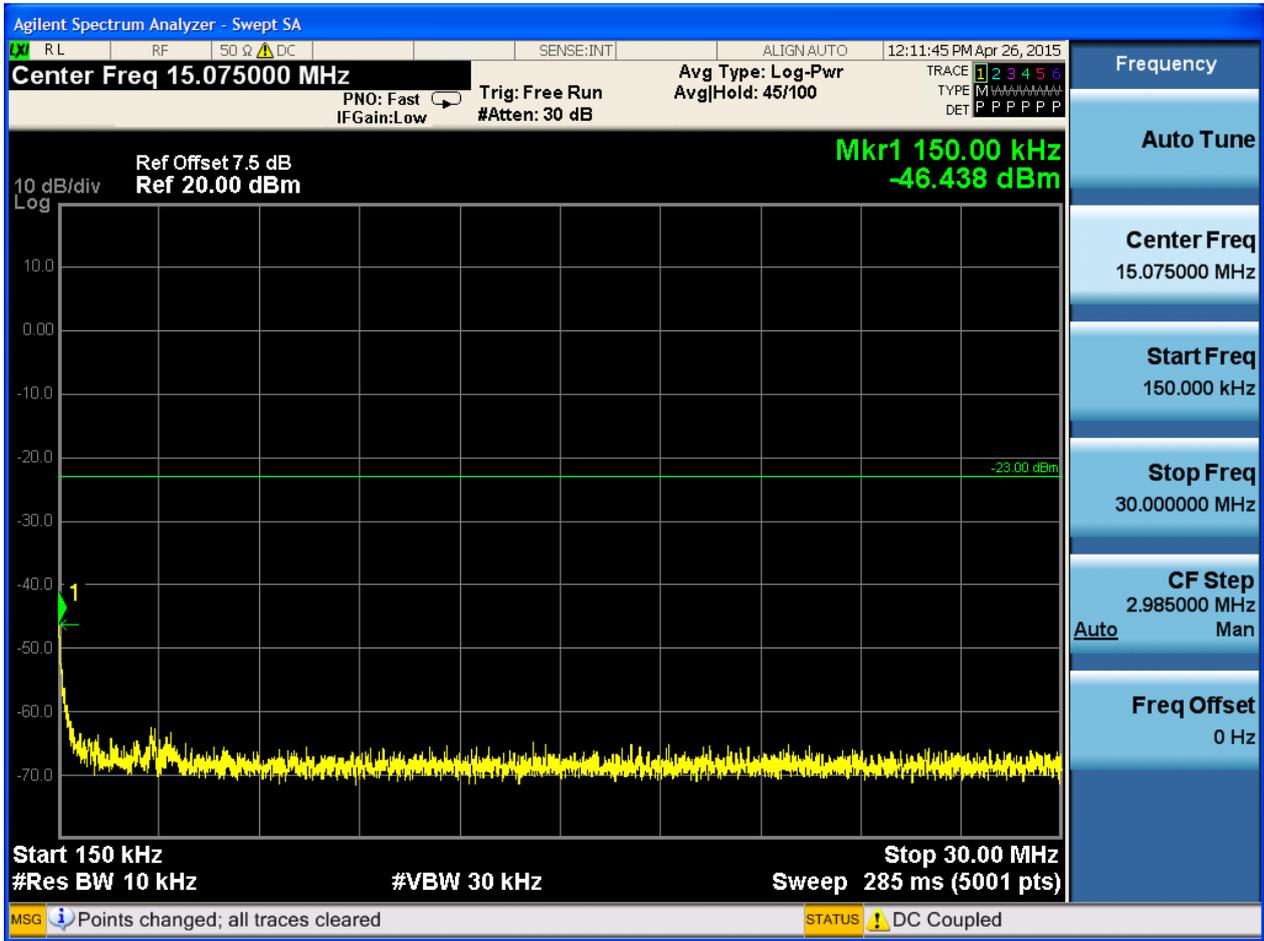


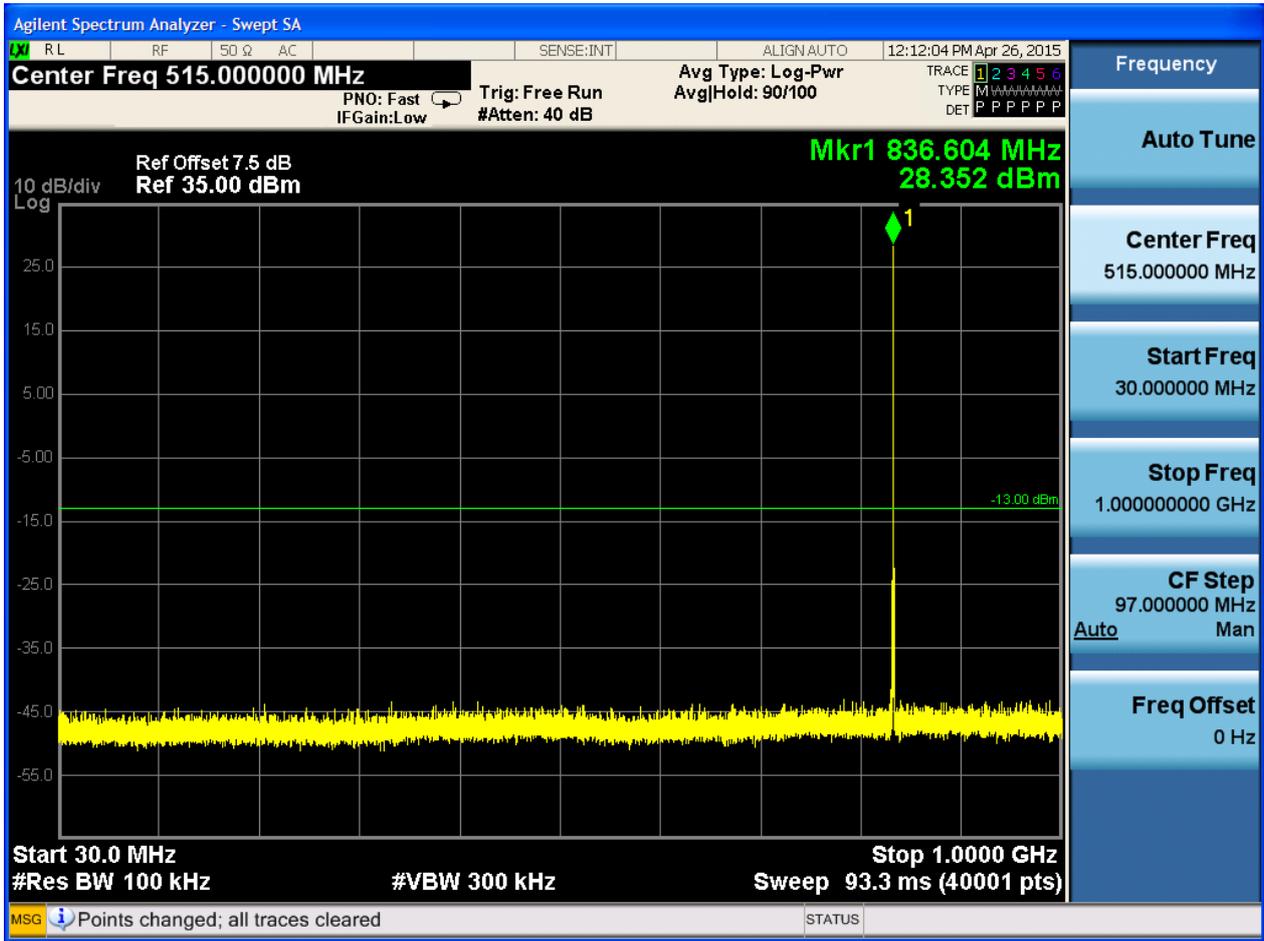


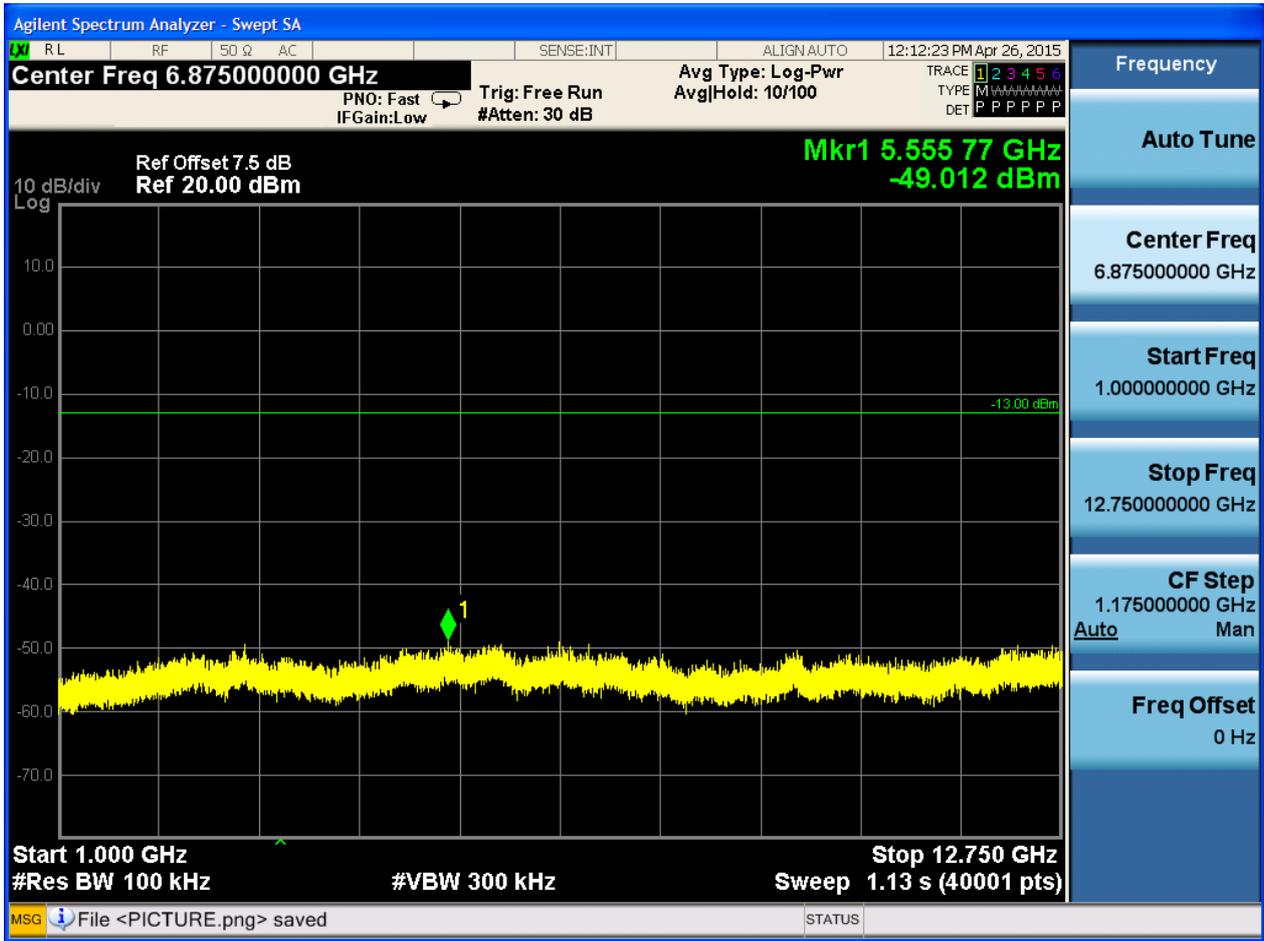


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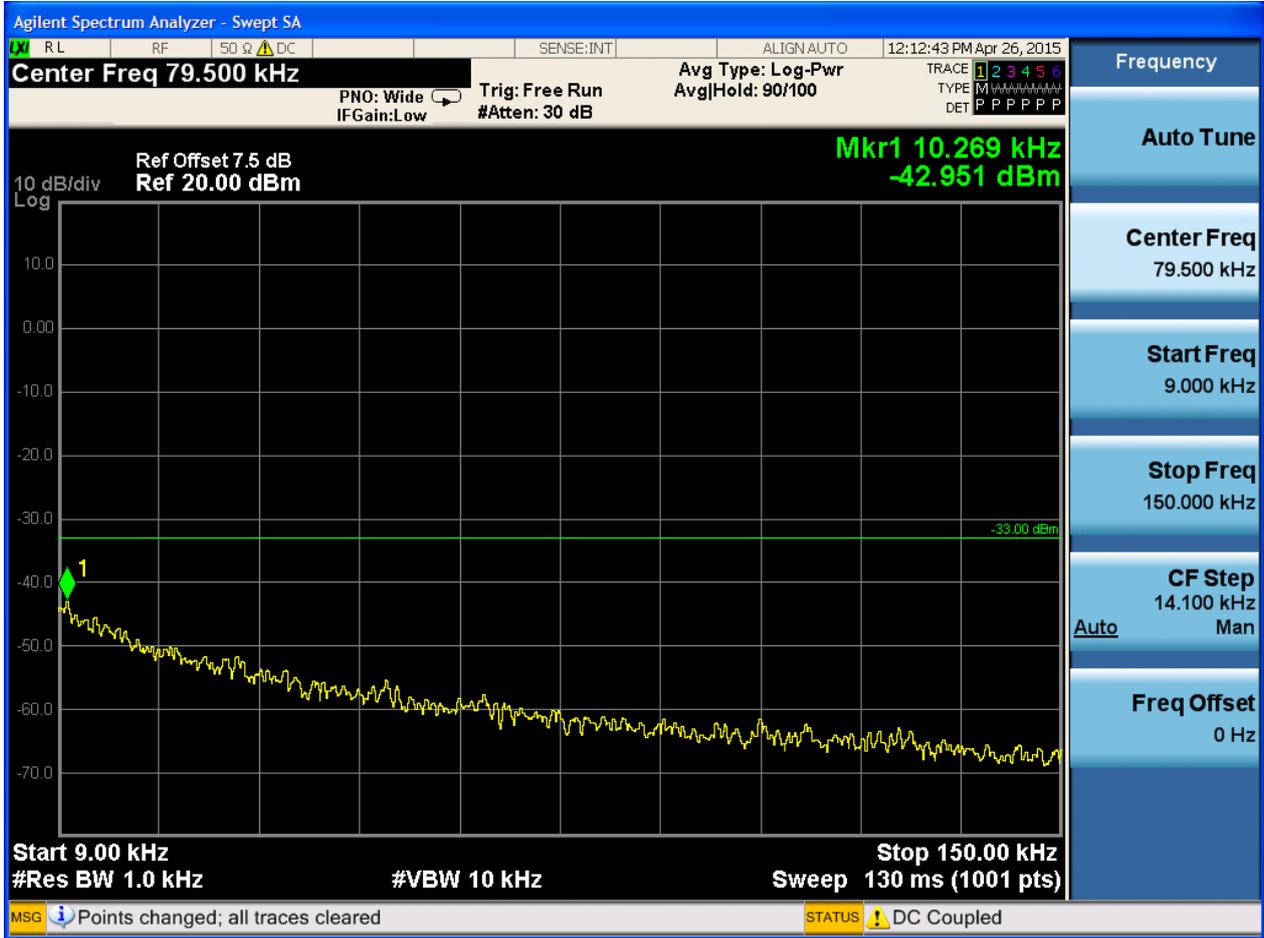


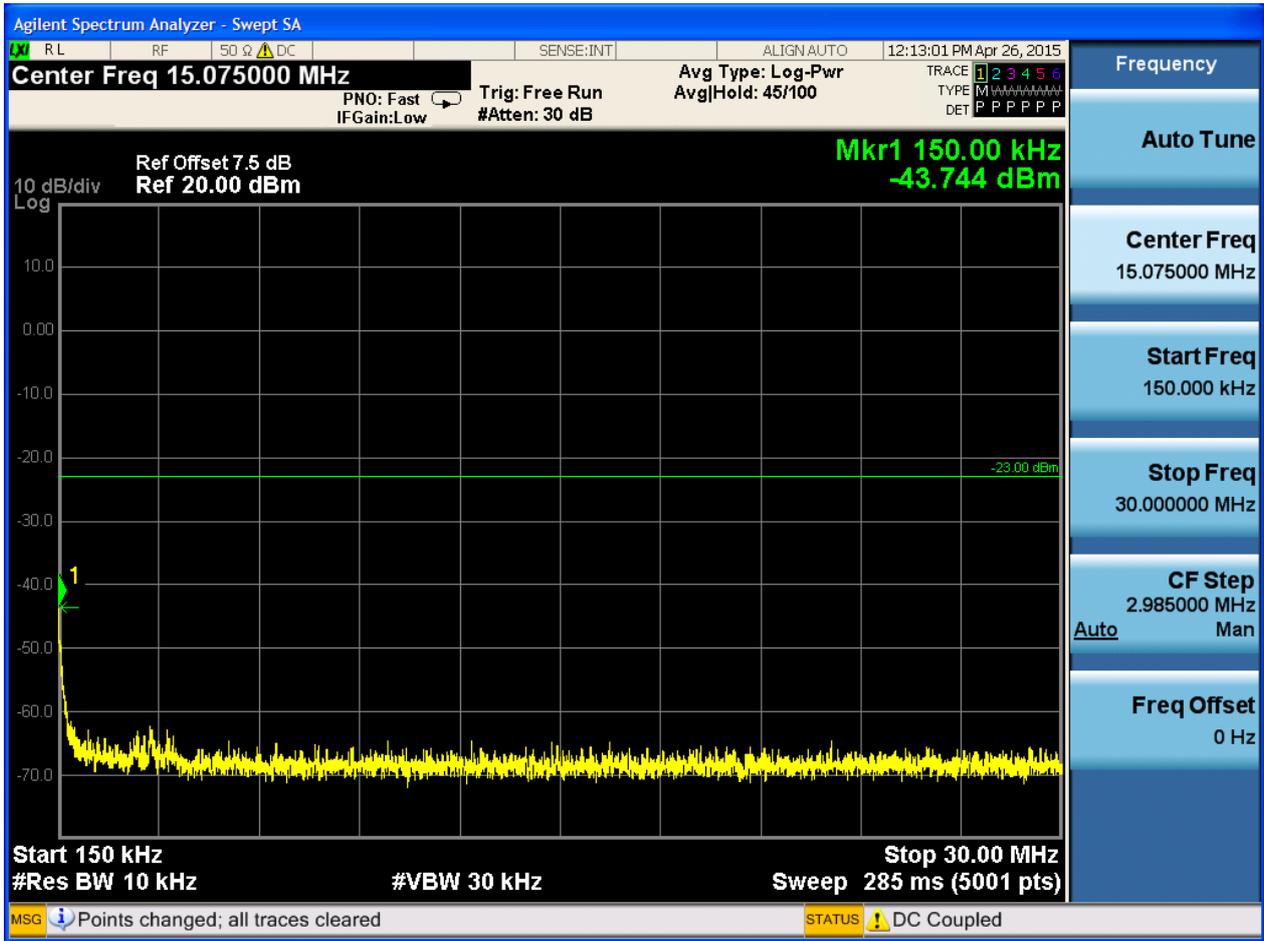


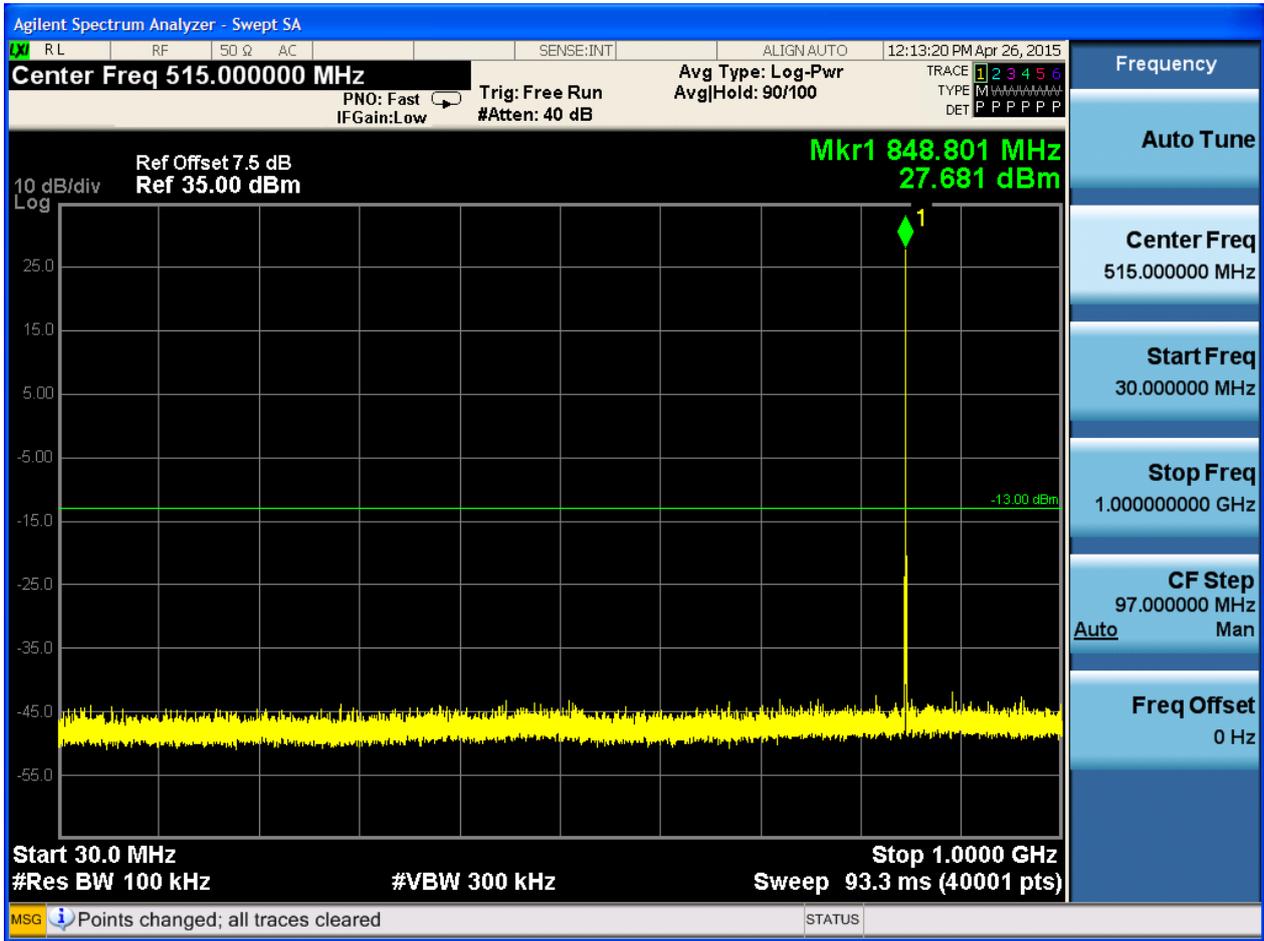


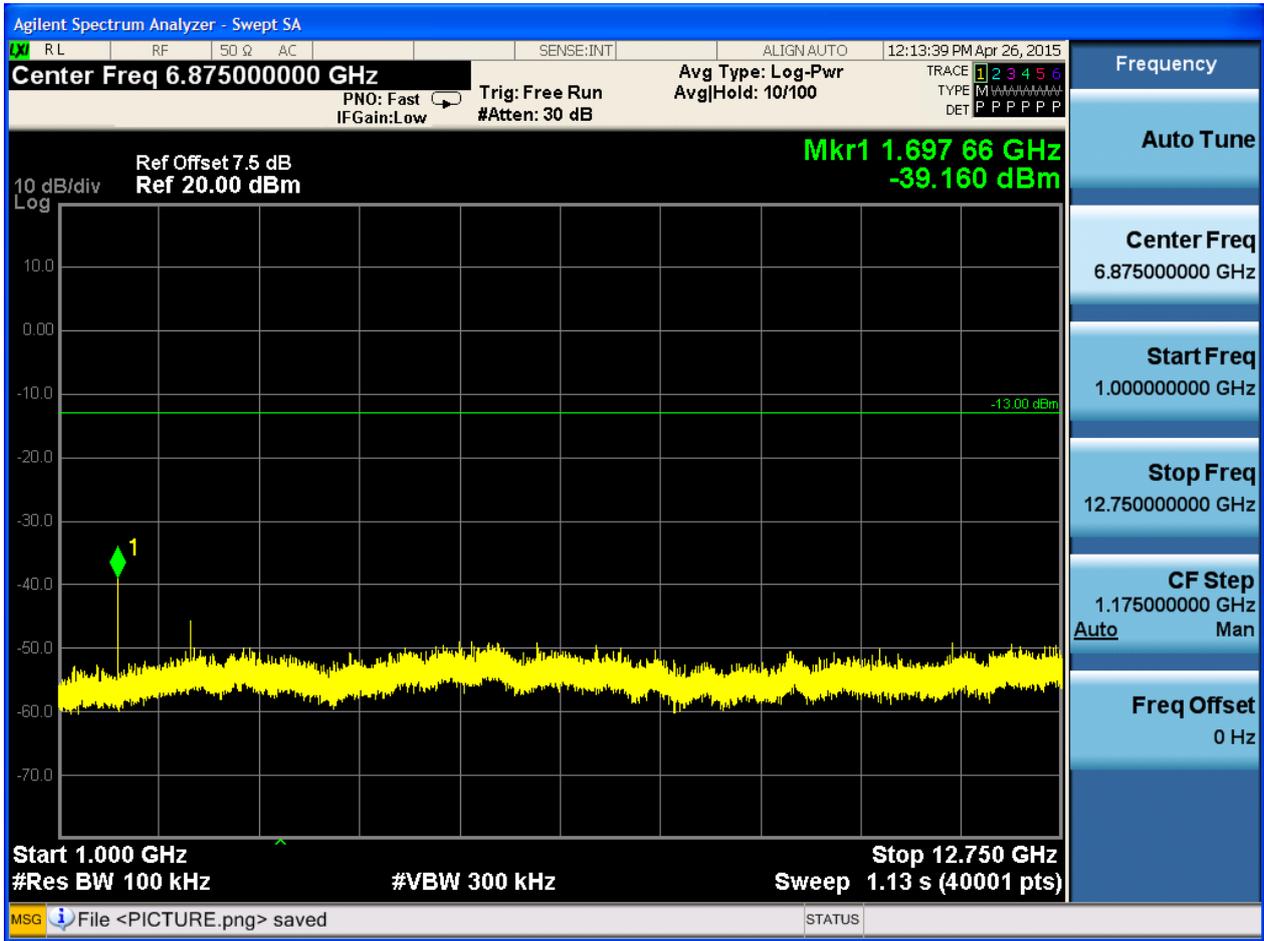


6.1.1.2.3 Test Channel = HCH









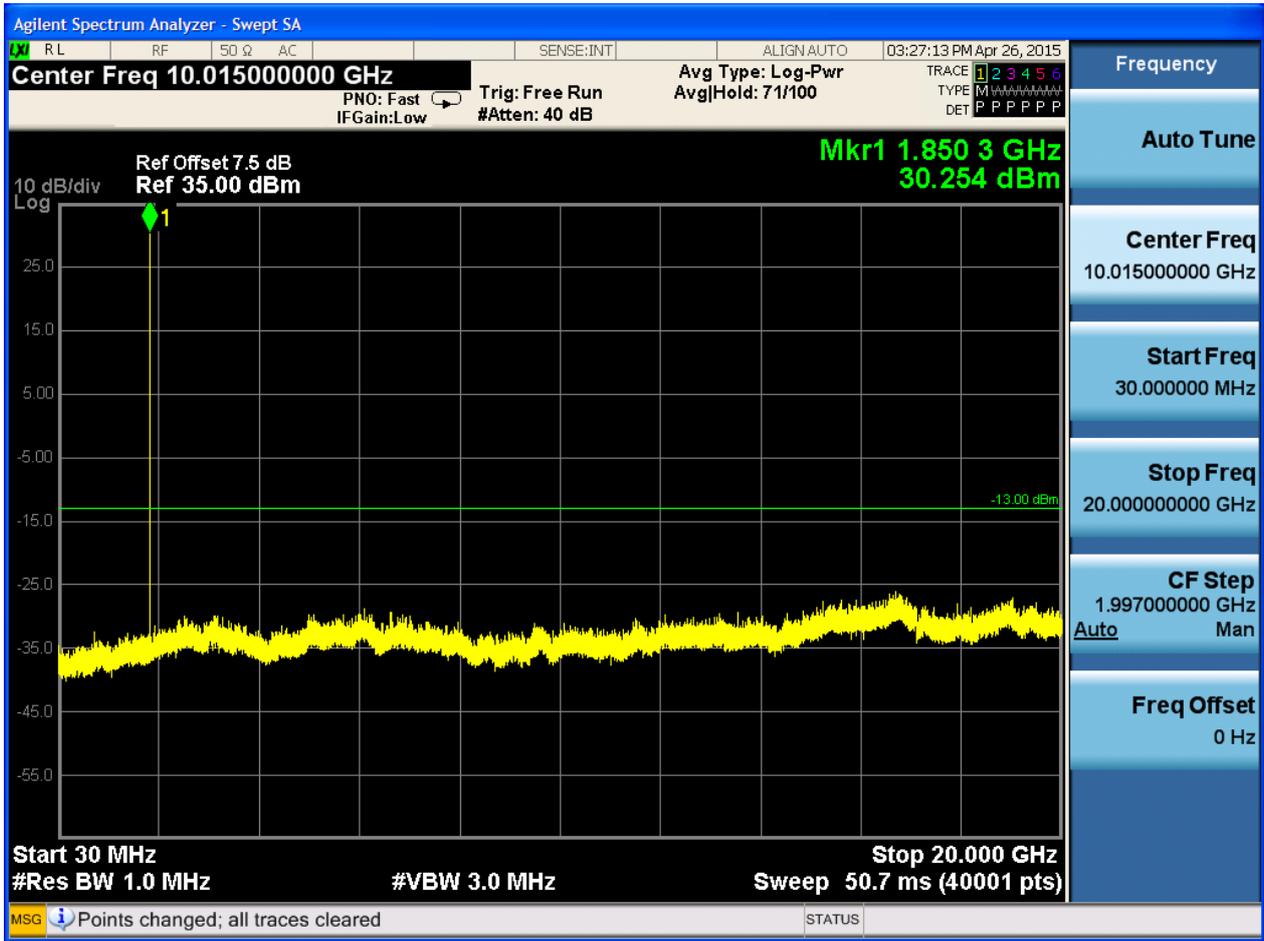


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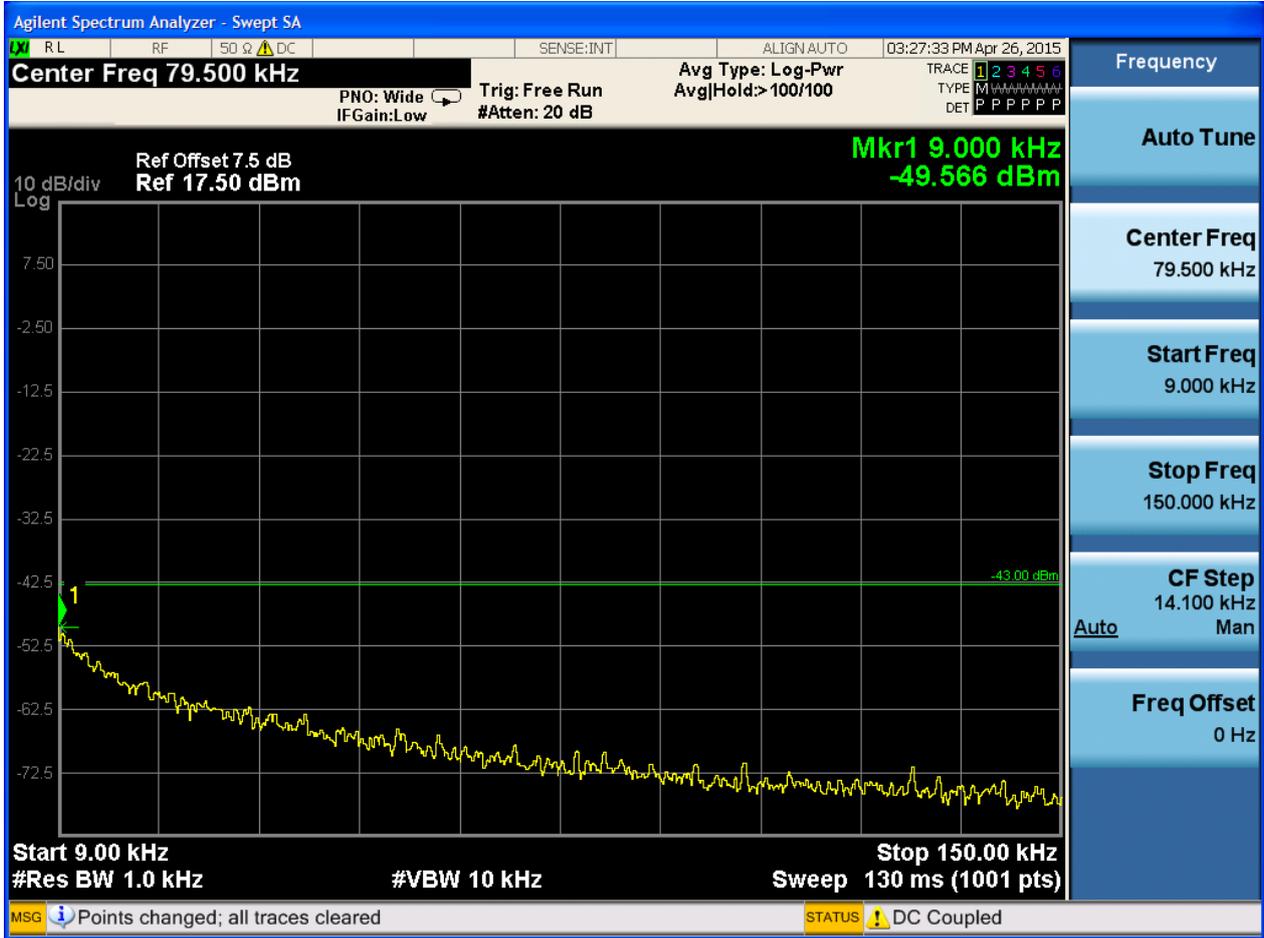
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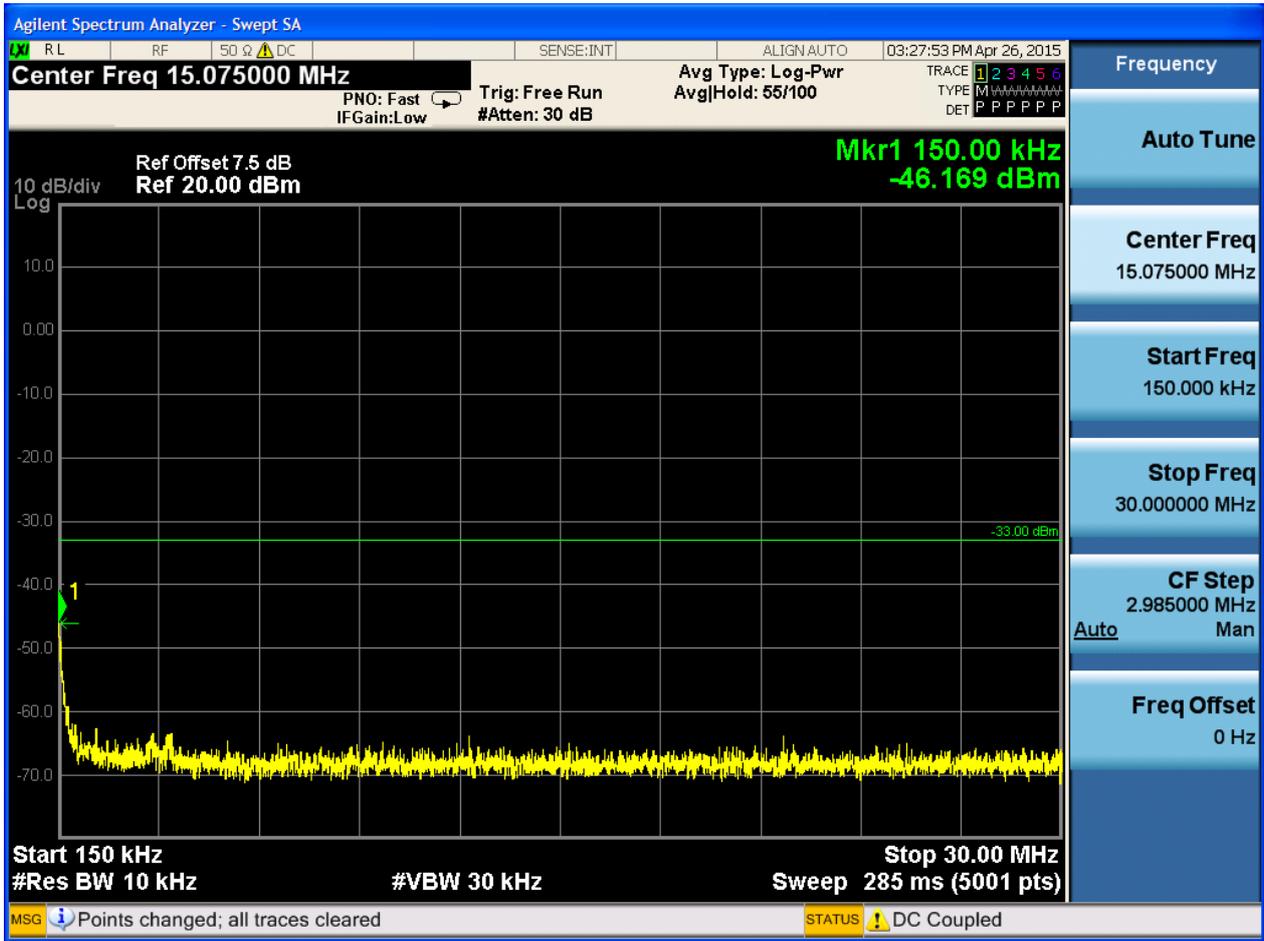
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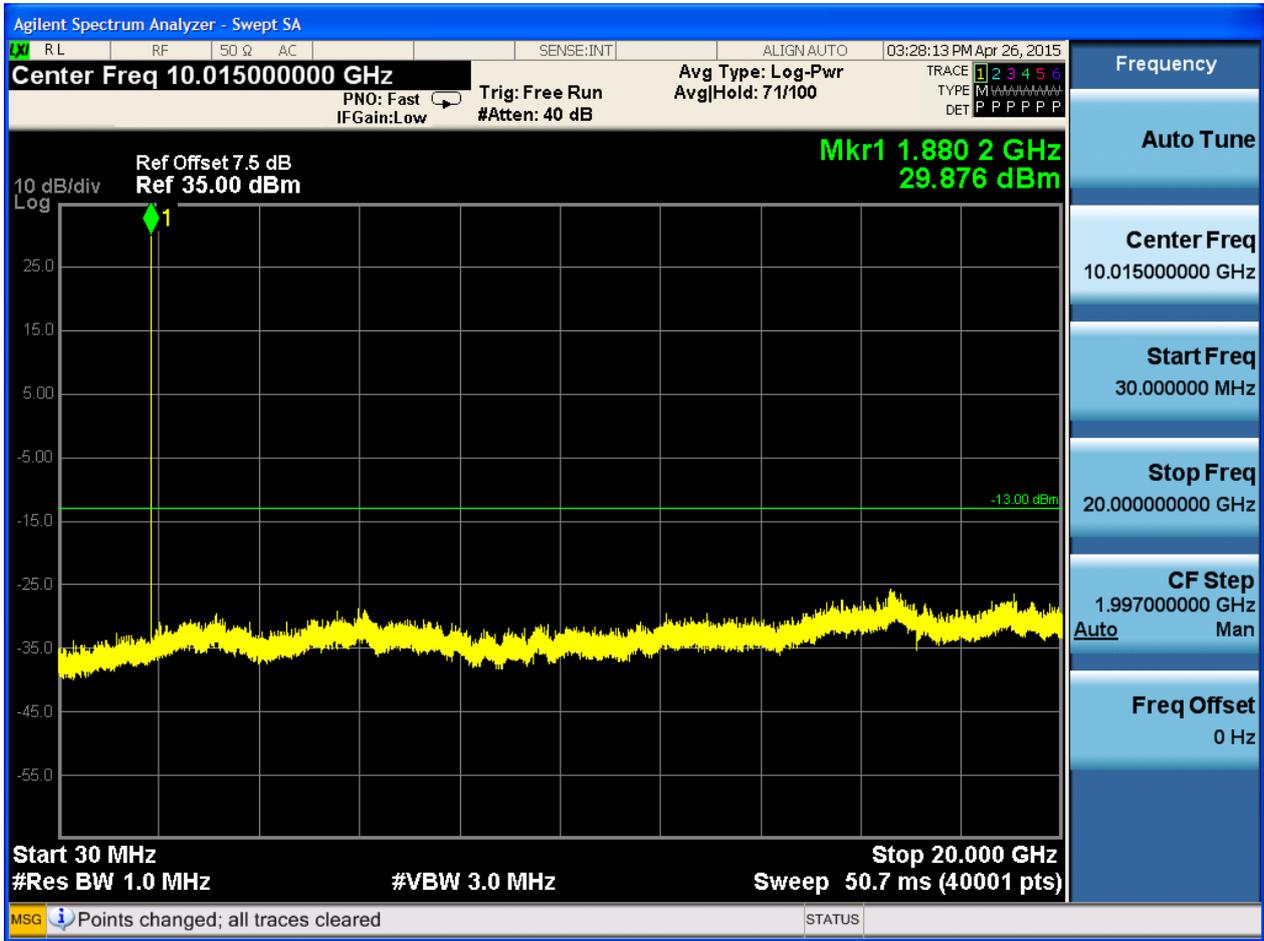




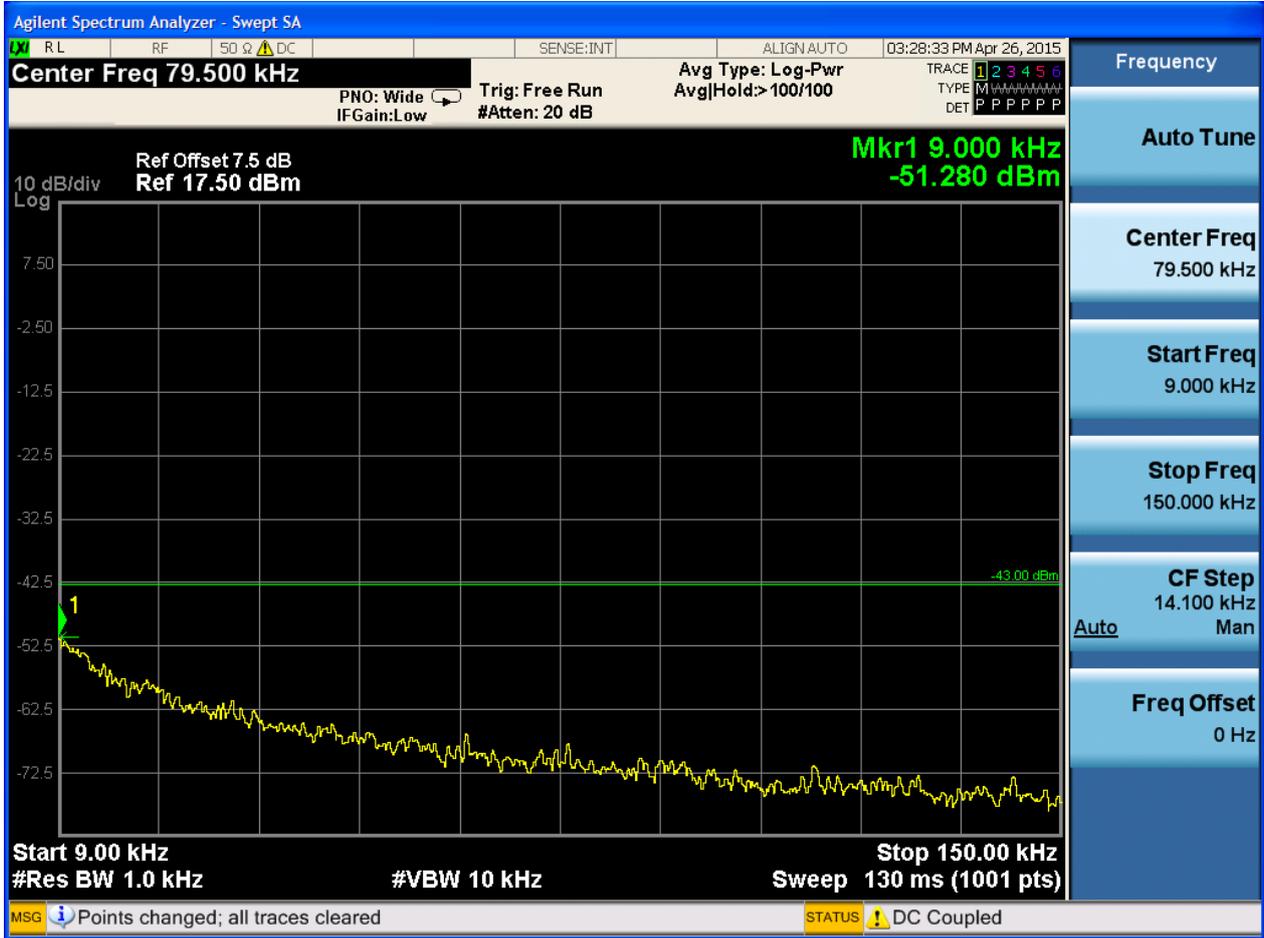
6.1.2.1.2 Test Channel = MCH

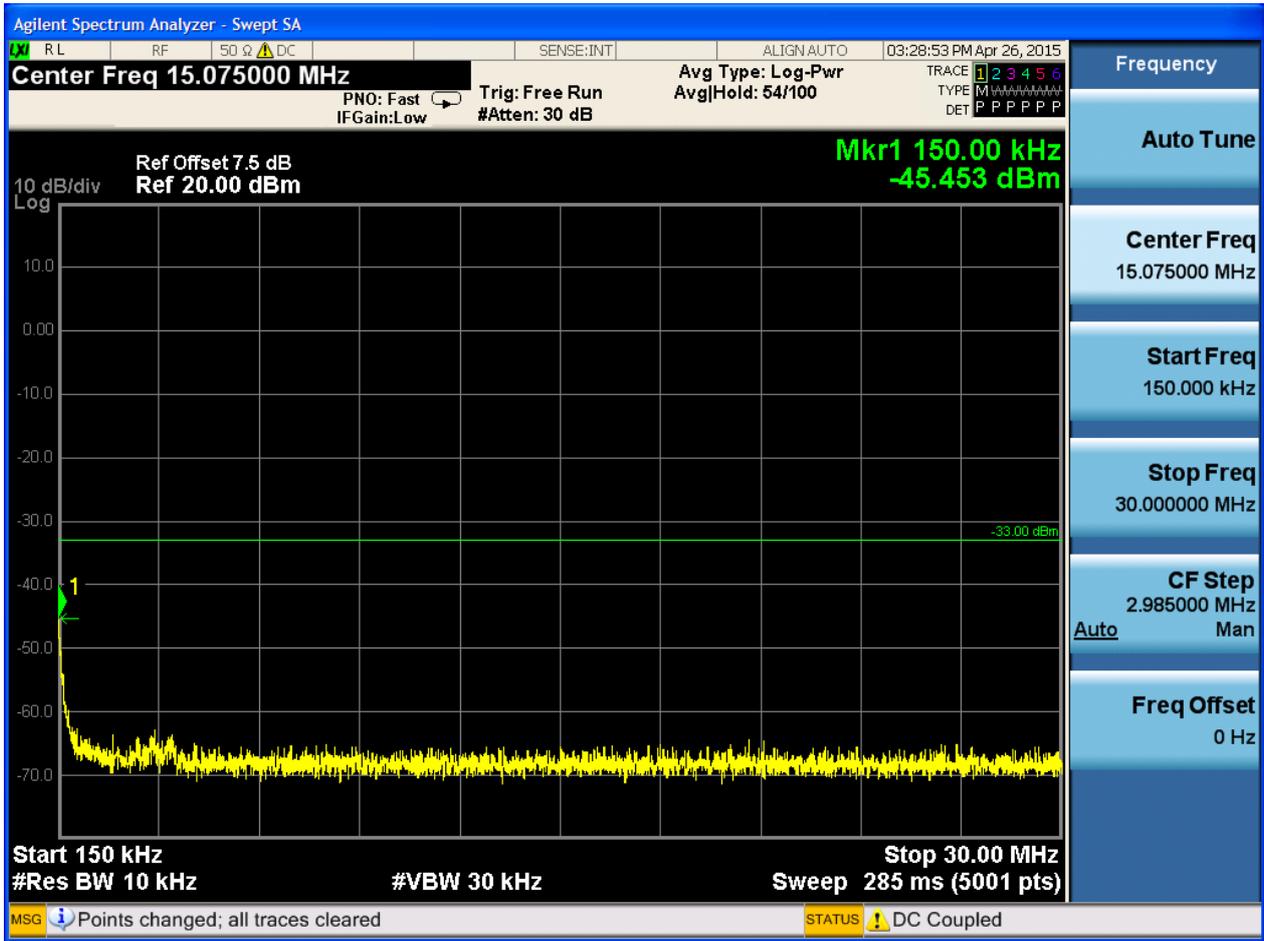


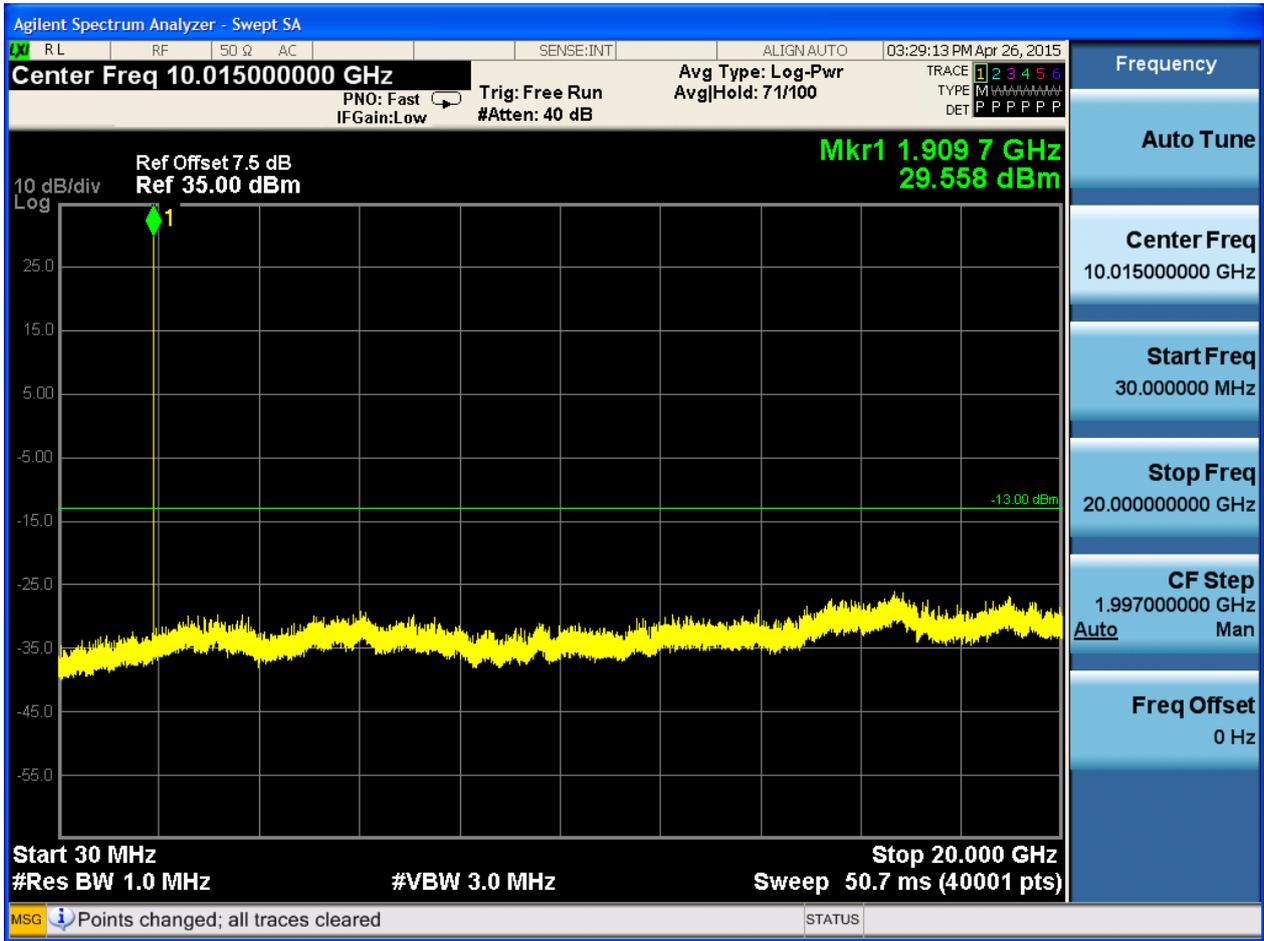




6.1.2.1.3 Test Channel = HCH

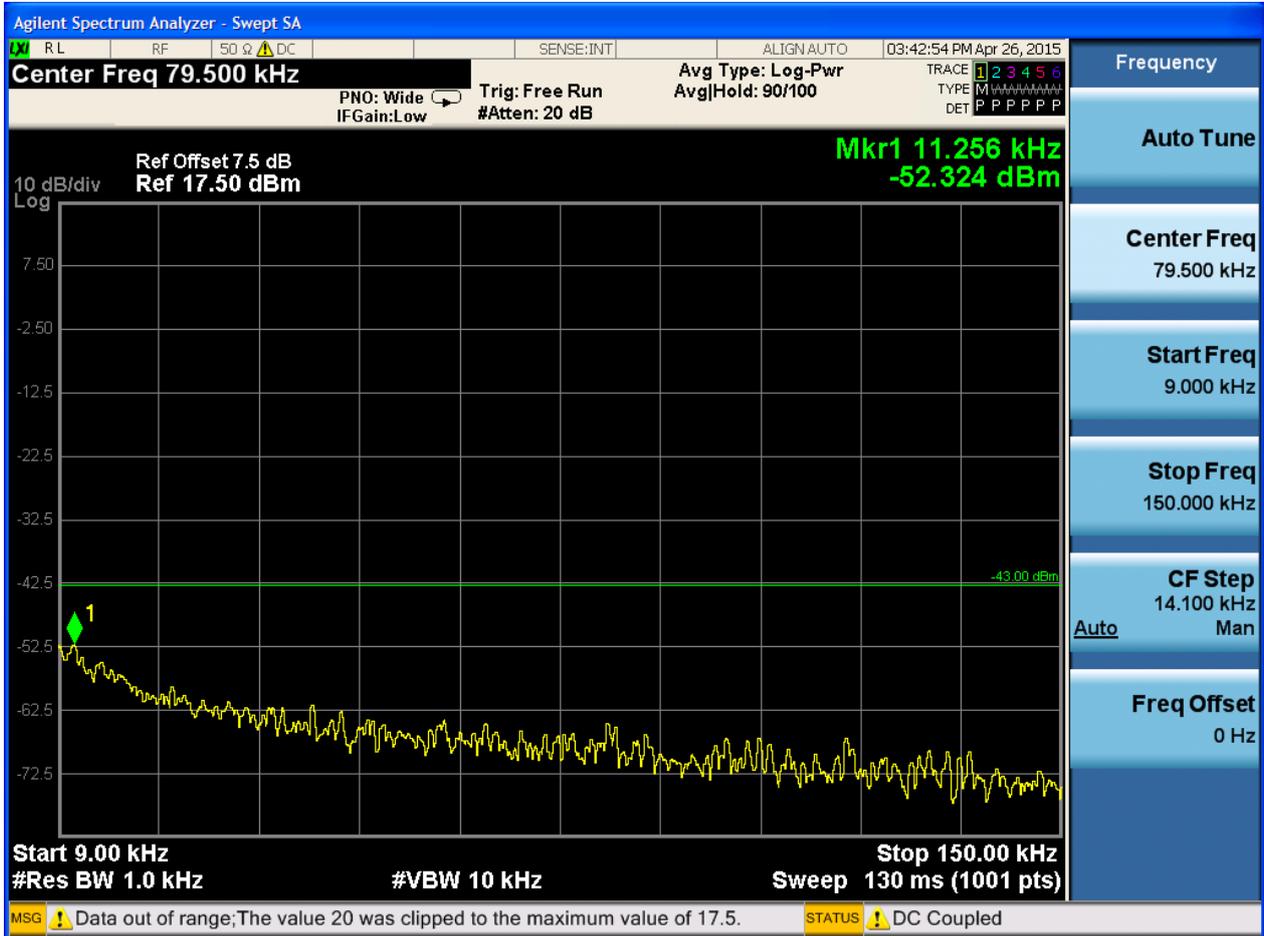


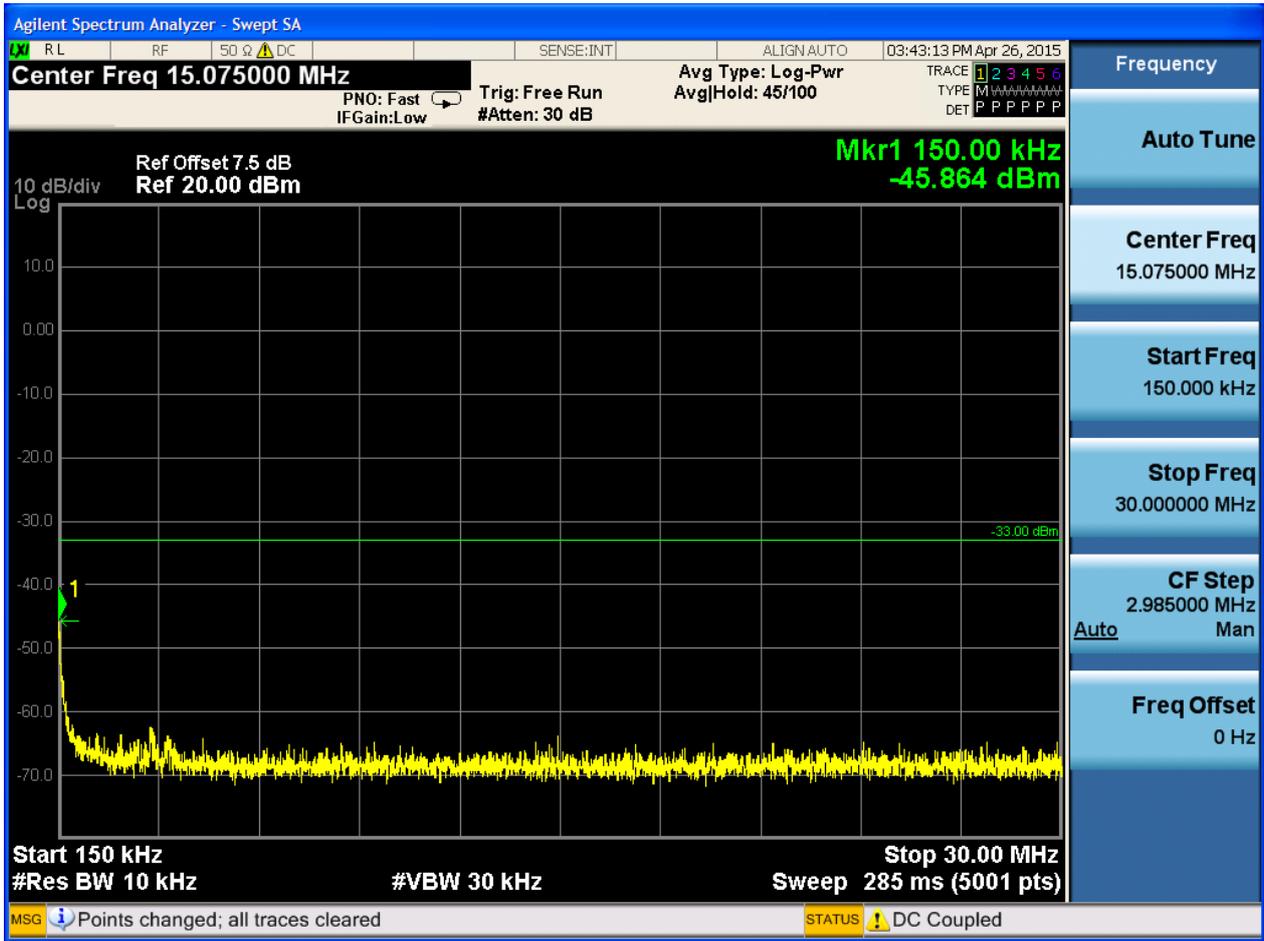


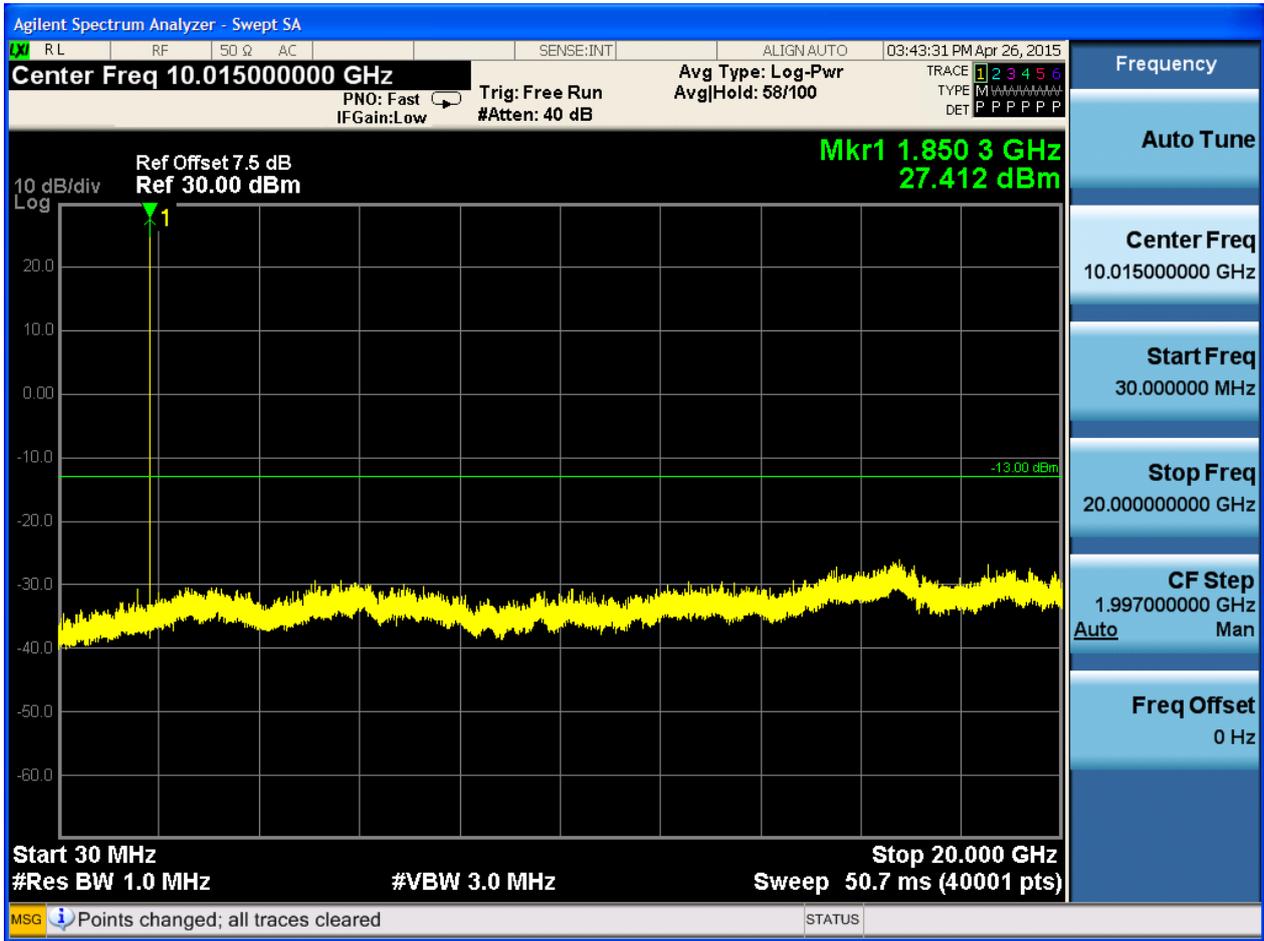


6.1.2.2 Test Mode = GSM/TM2

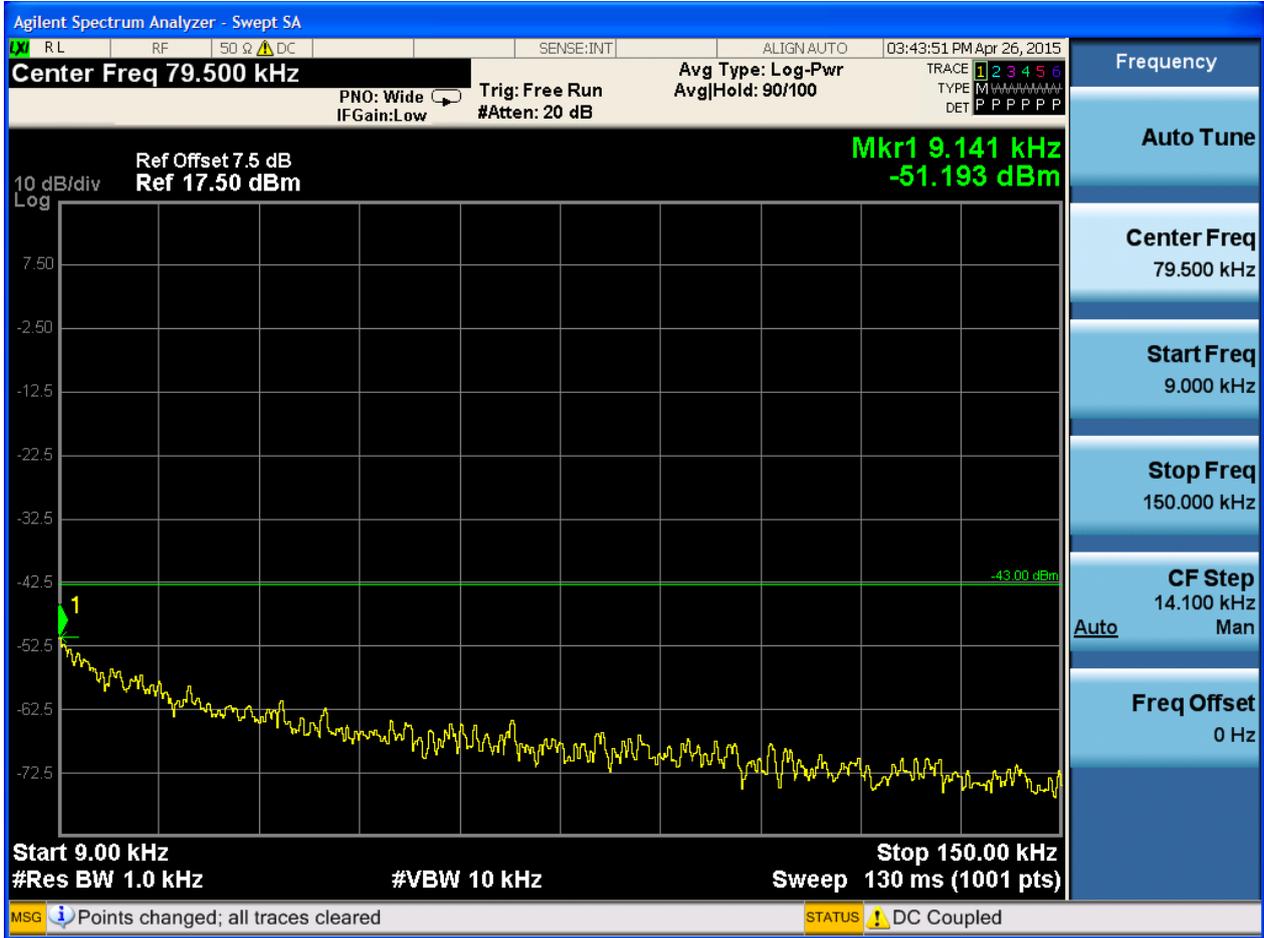
6.1.2.2.1 Test Channel = LCH

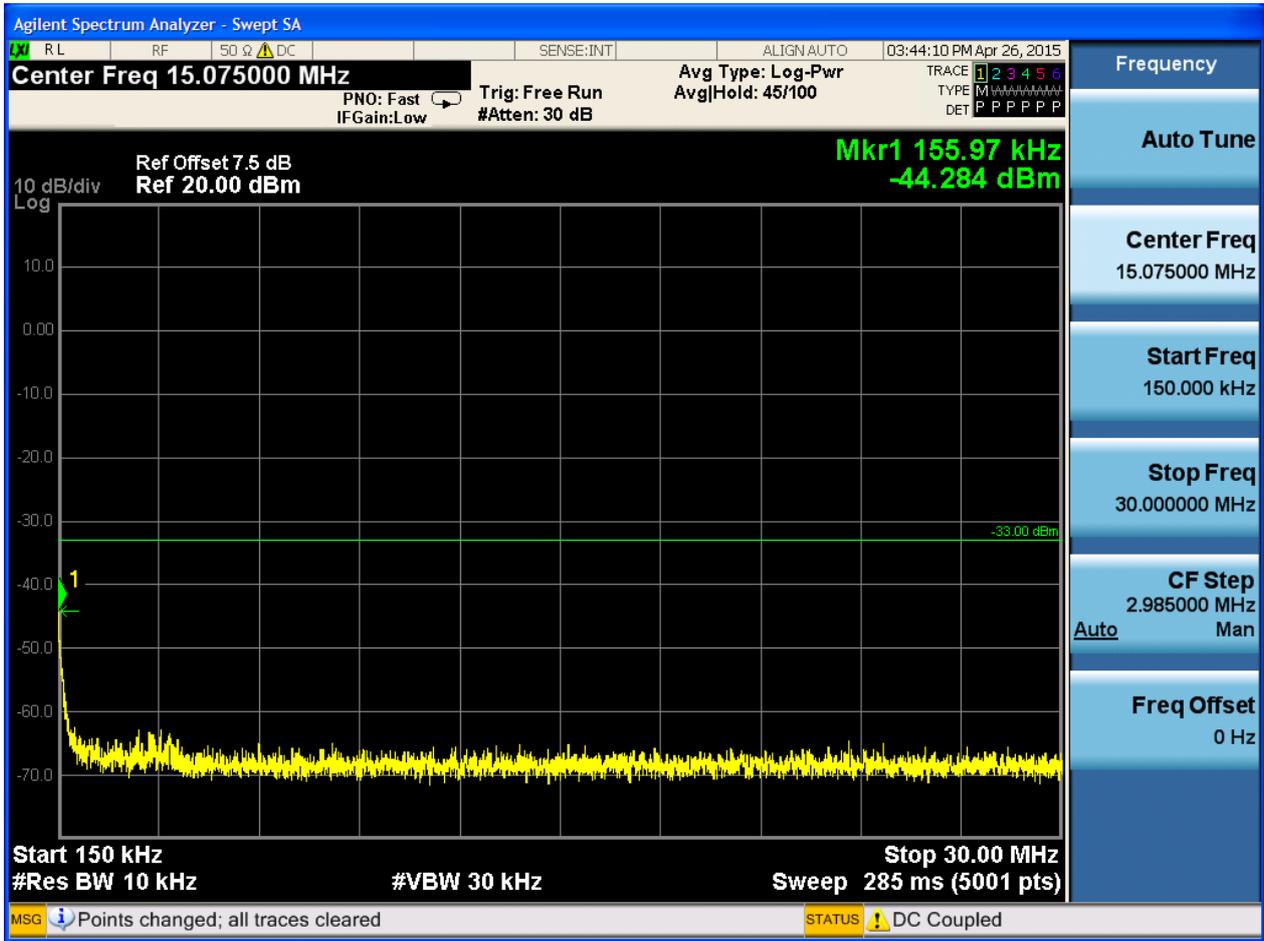


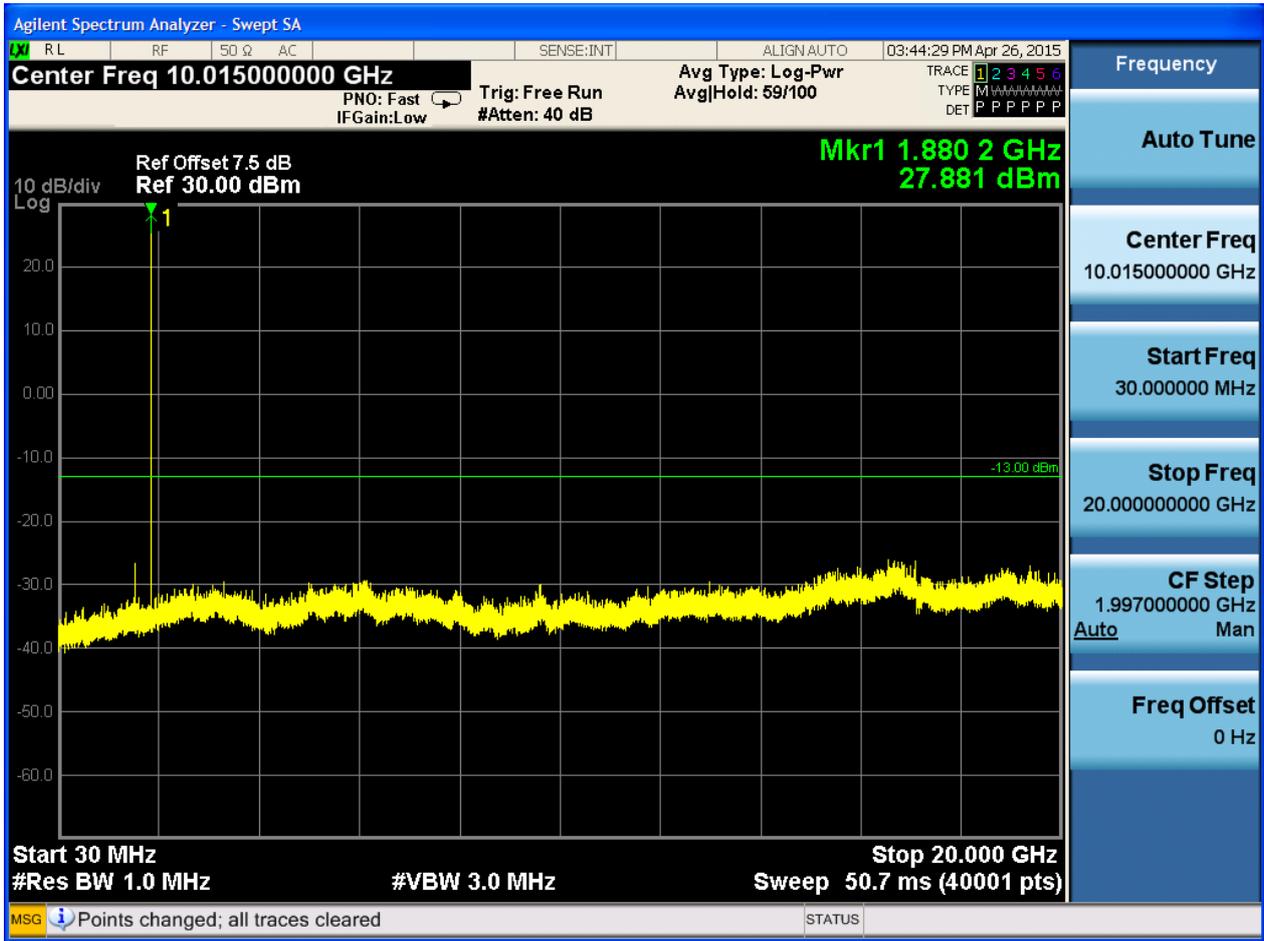




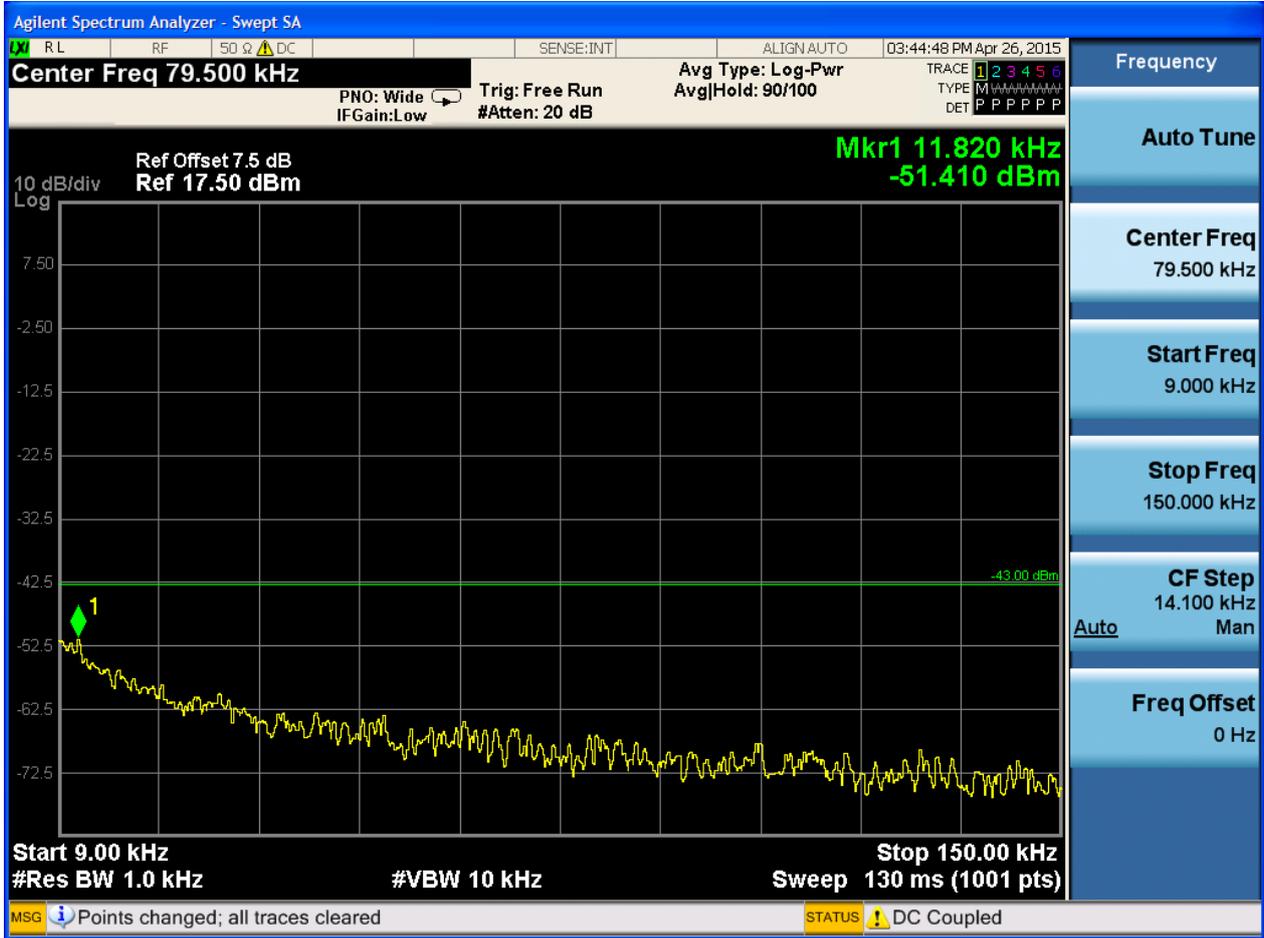
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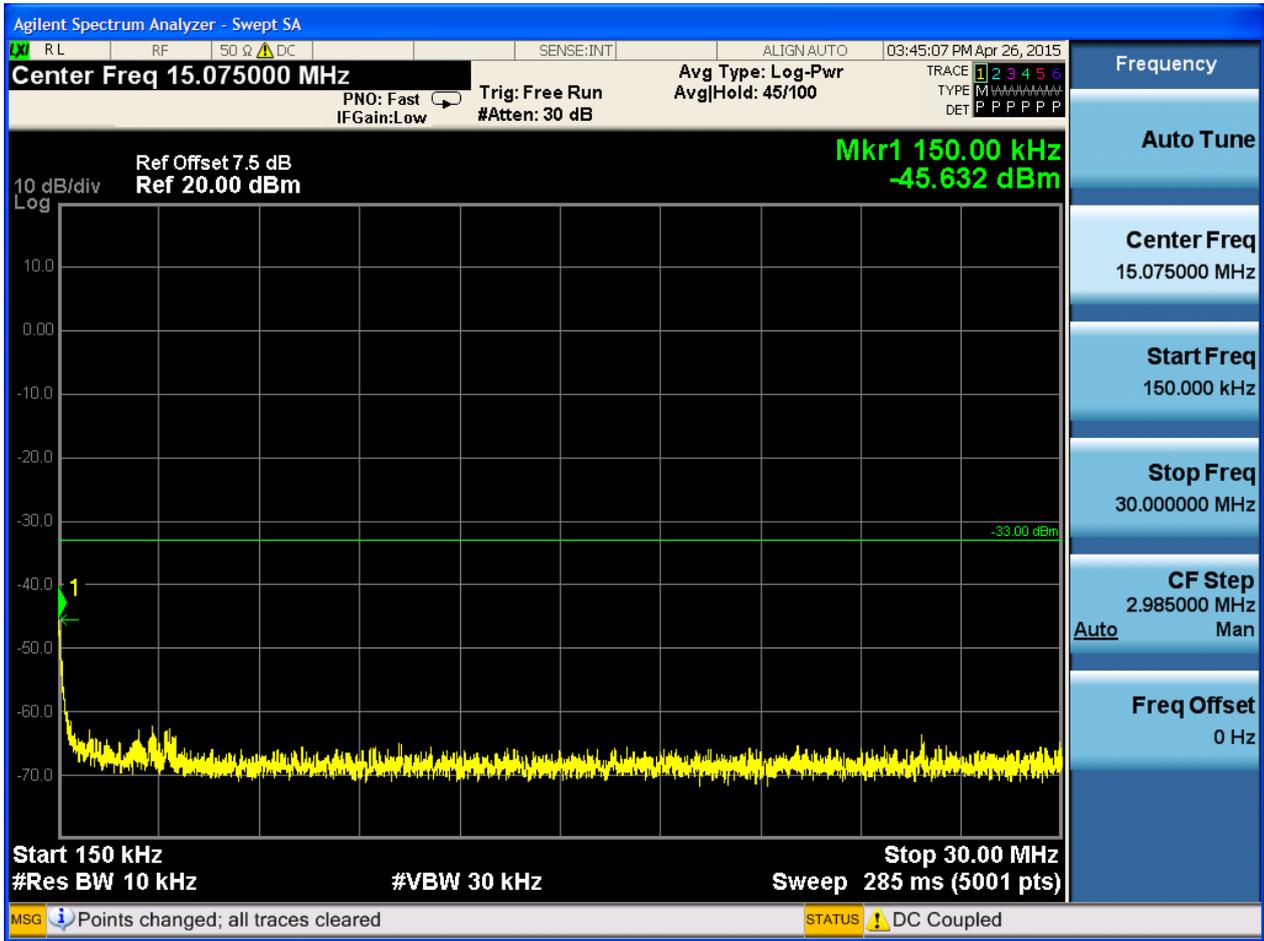


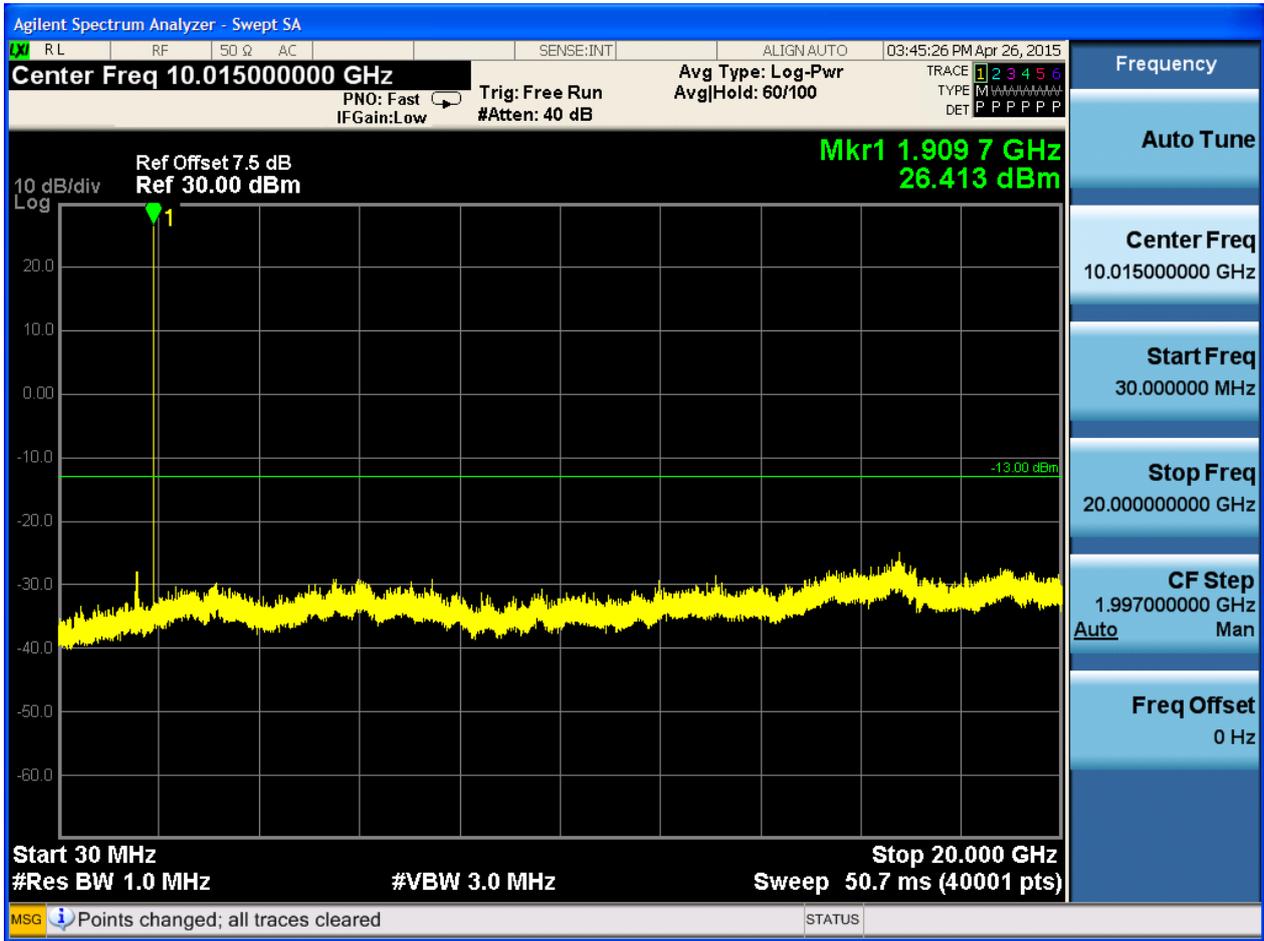




6.1.2.2.3 Test Channel = HCH







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

NOTE1: No peak found in the Test Range of “9 kHz to 30MHz”

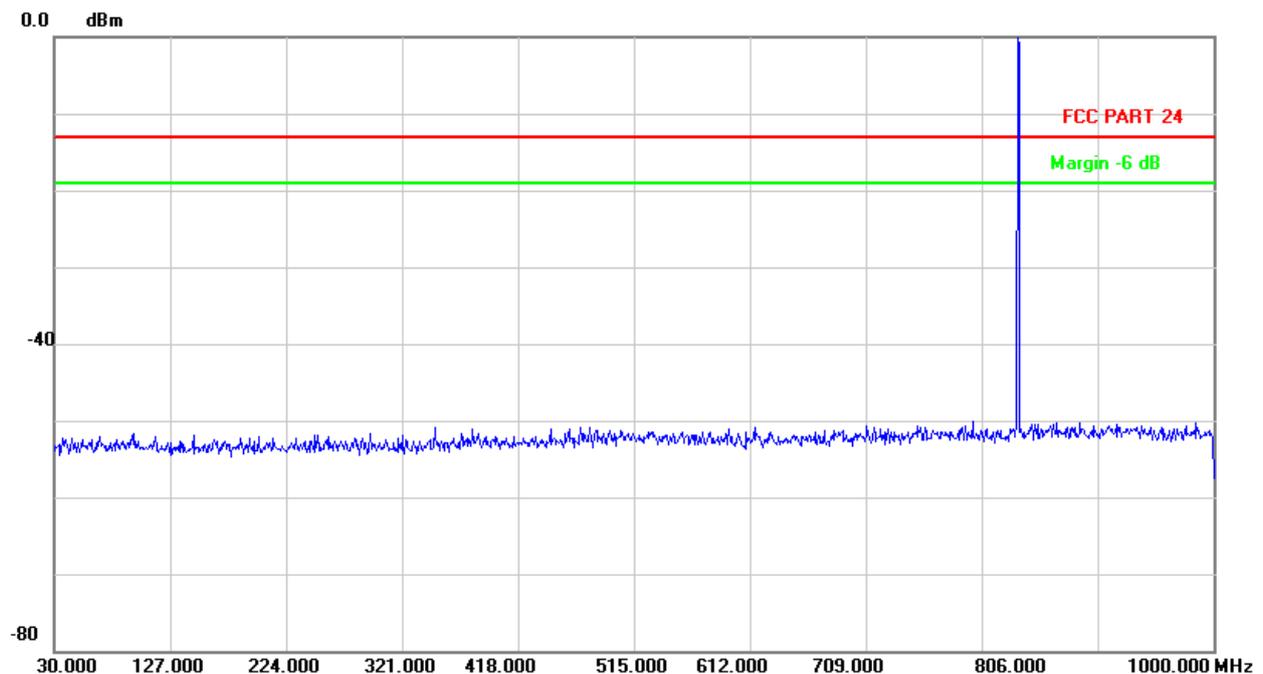
NOTE2: We tested all modes, but the data presented below is the worst case.

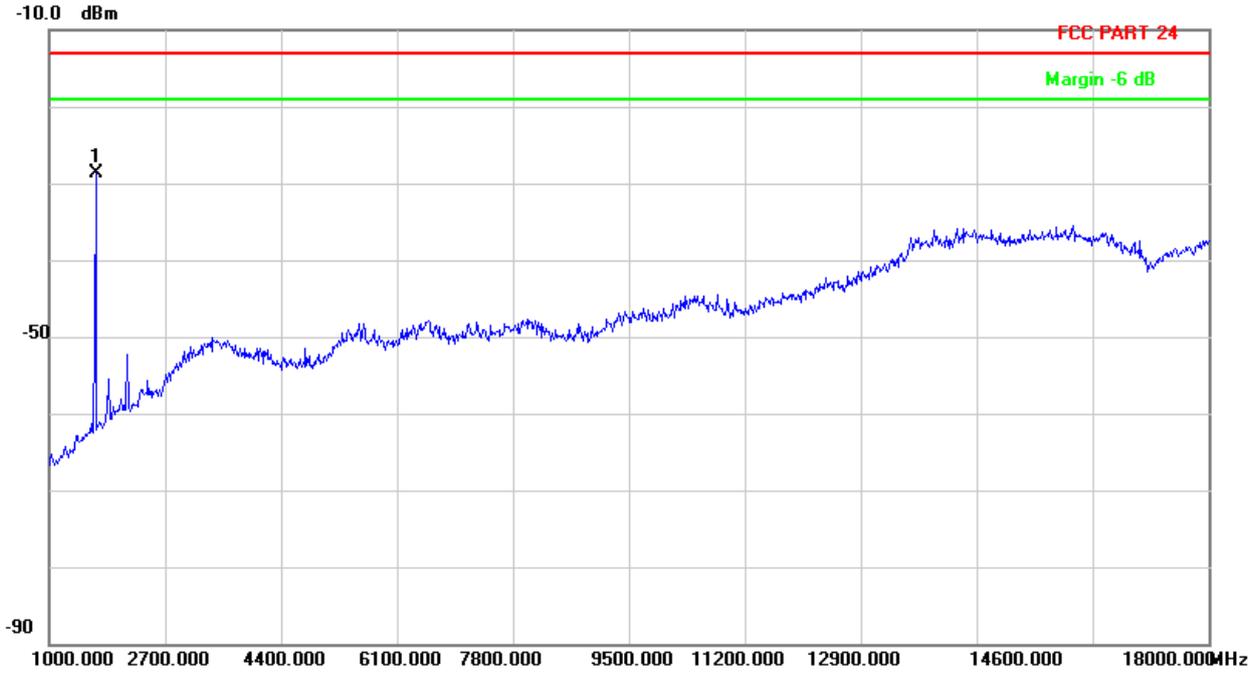
Part I - Test Plots

7.1 For GSM

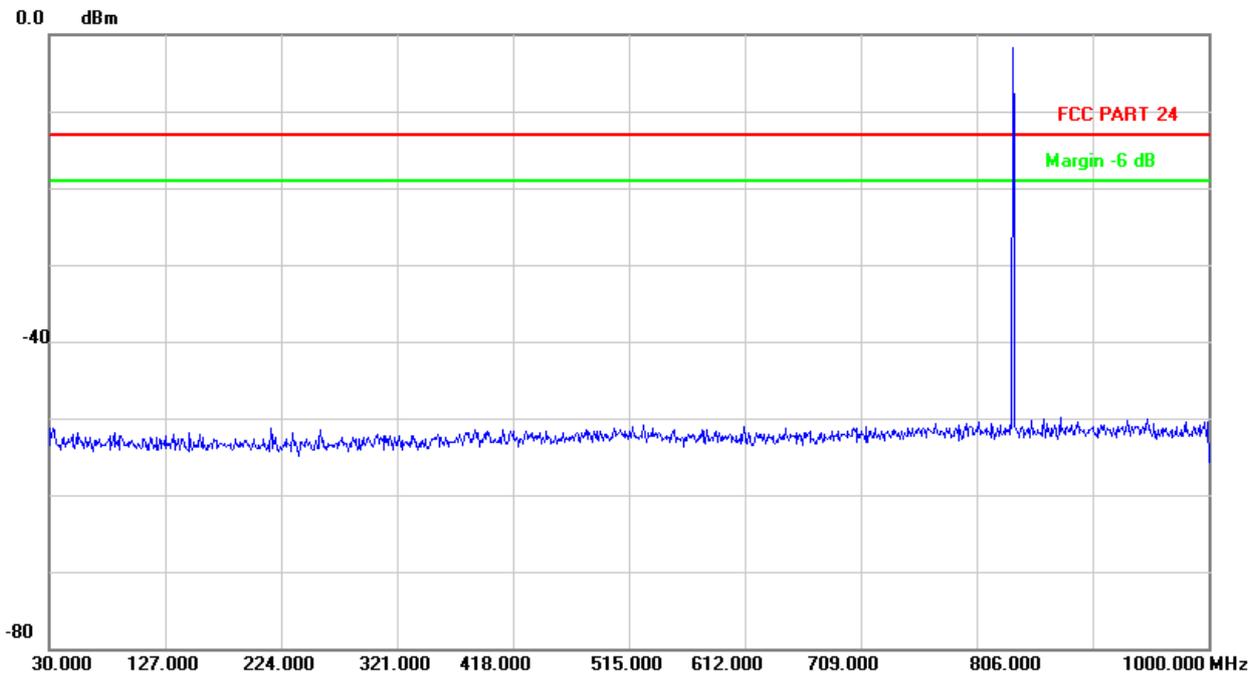
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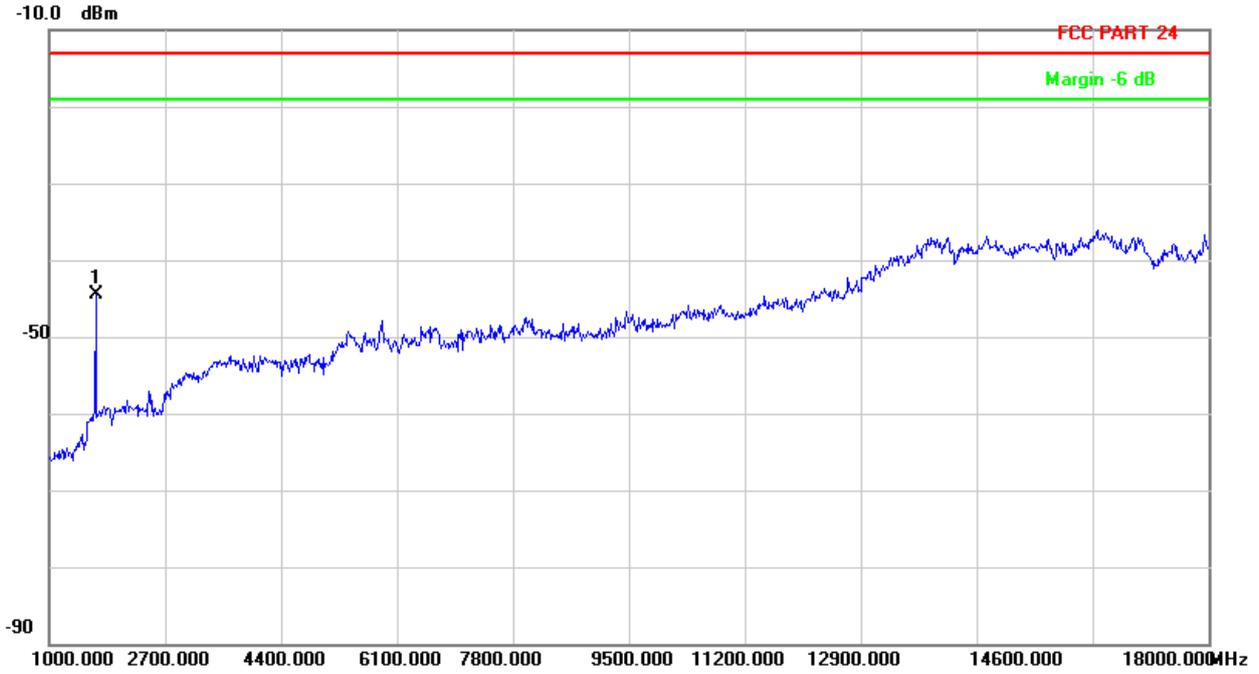
7.1.1.1 Test Mode = GSM/TM1





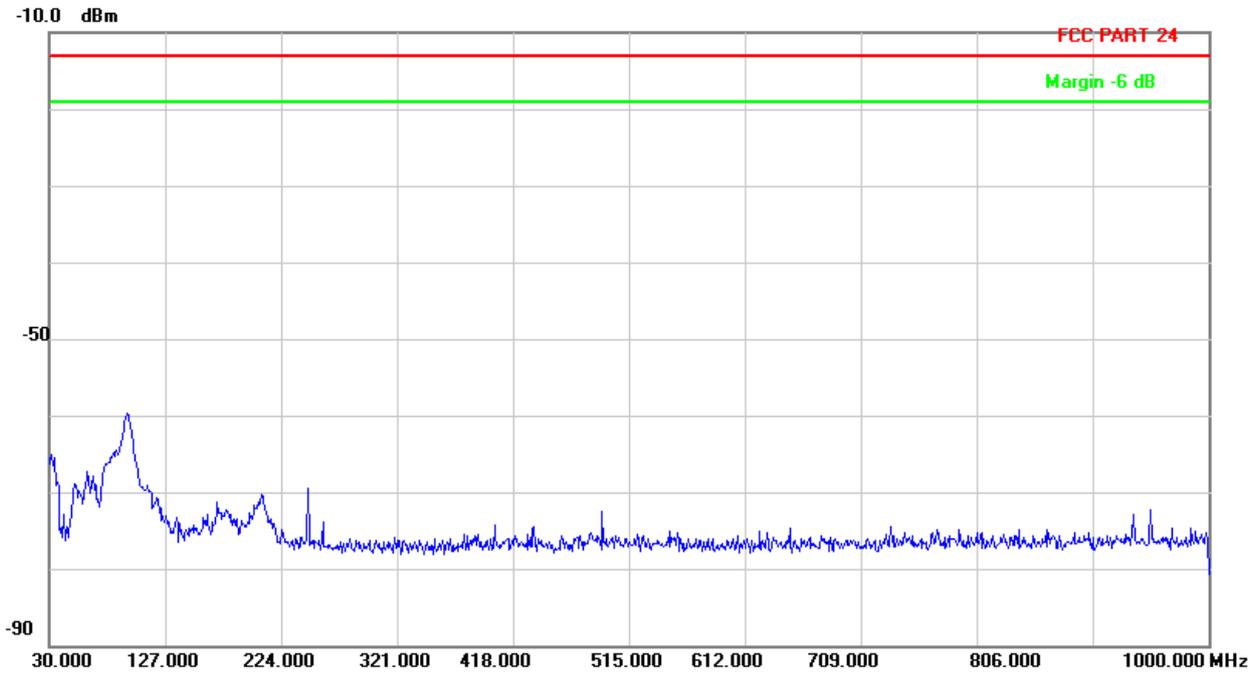
7.1.1.2 Test Mode = GSM/TM2

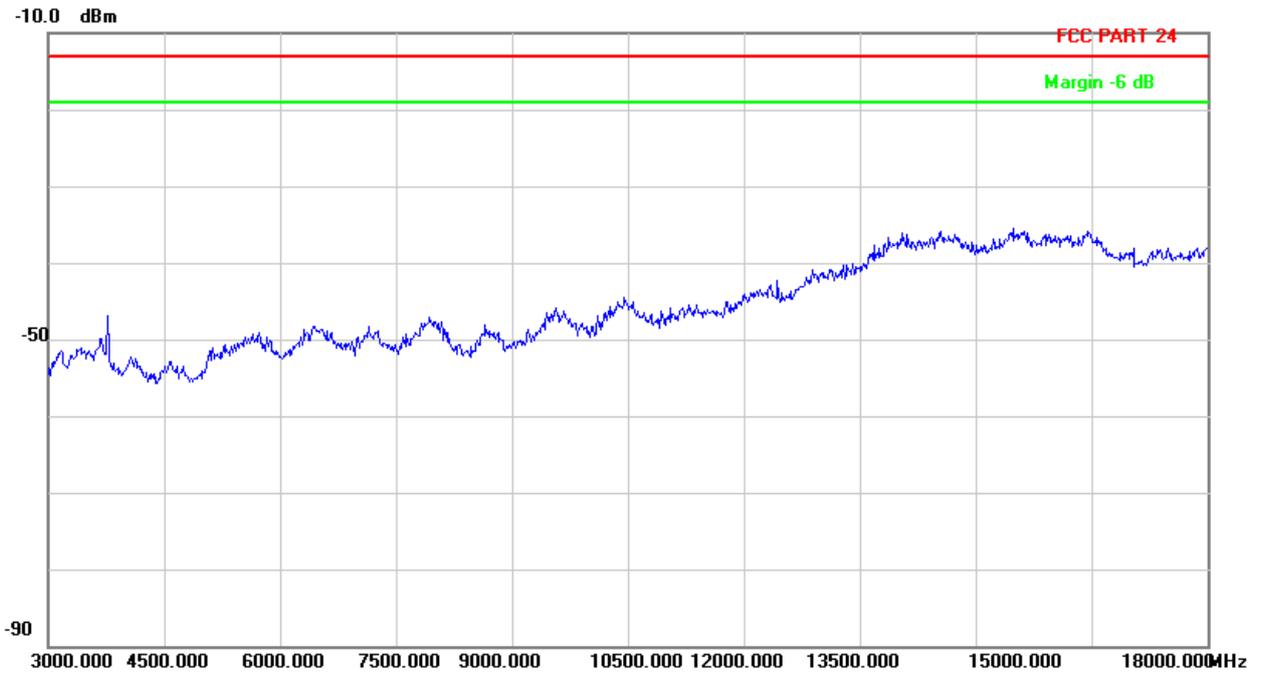
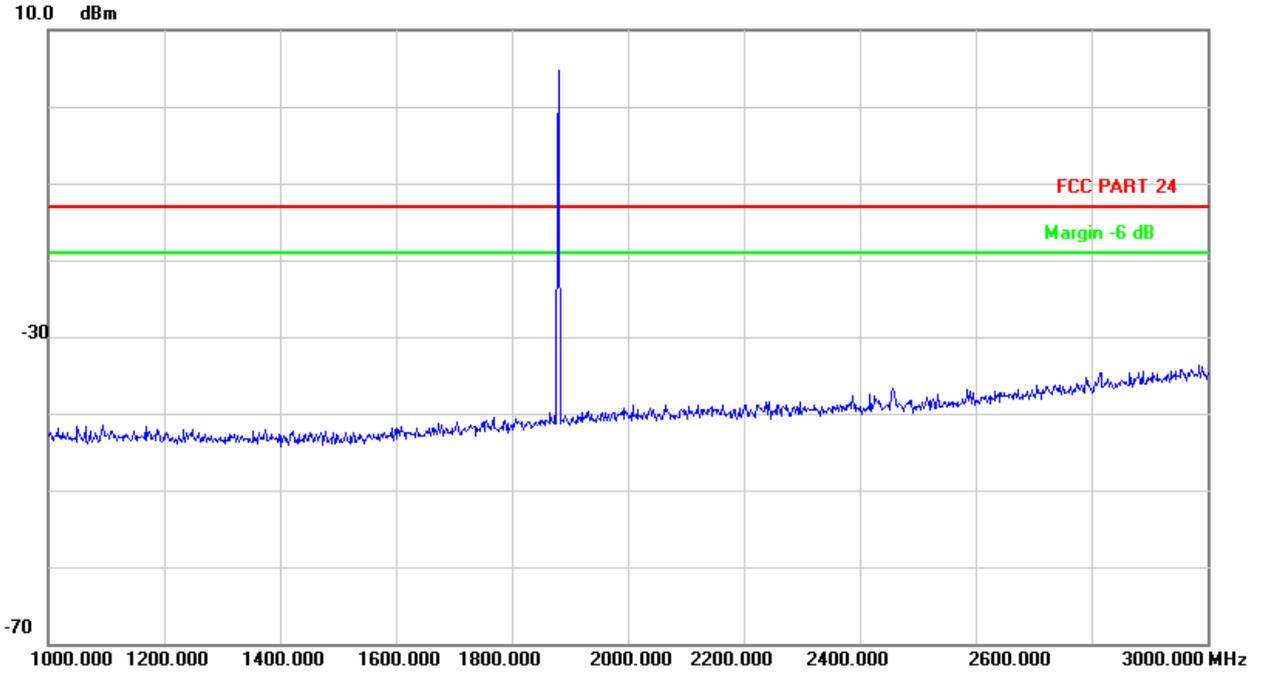


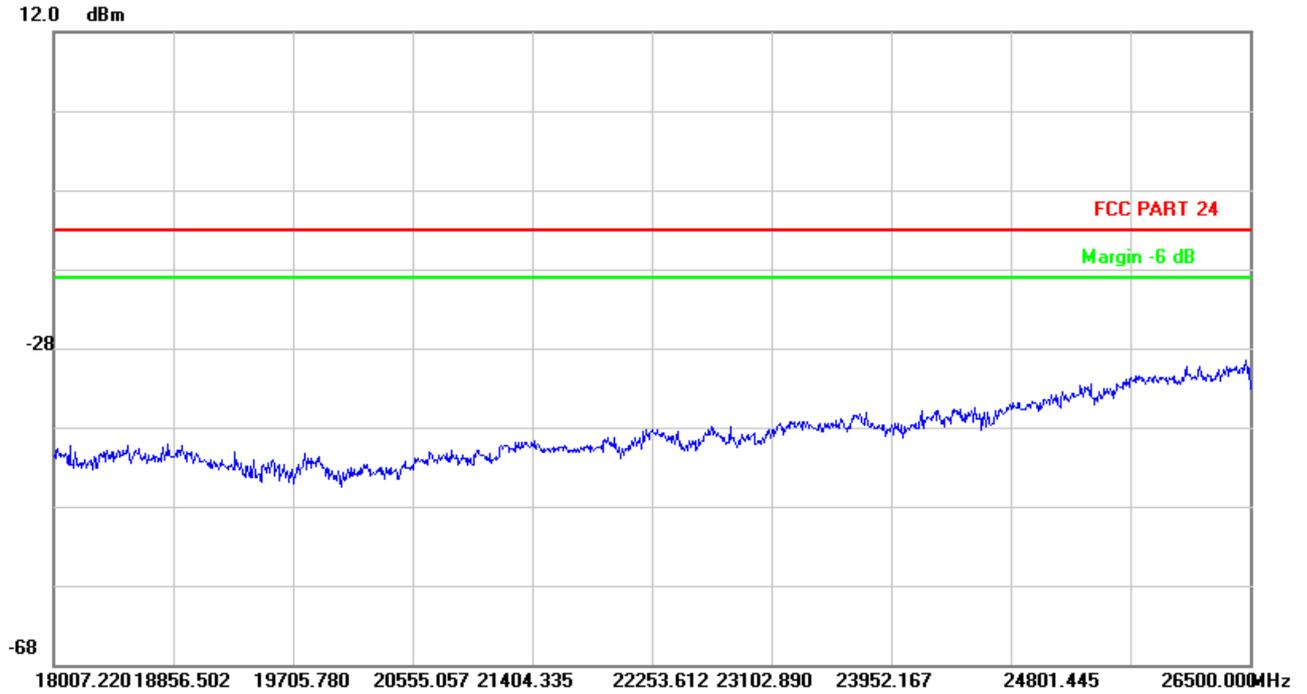


7.1.2 Test Band = GSM1900

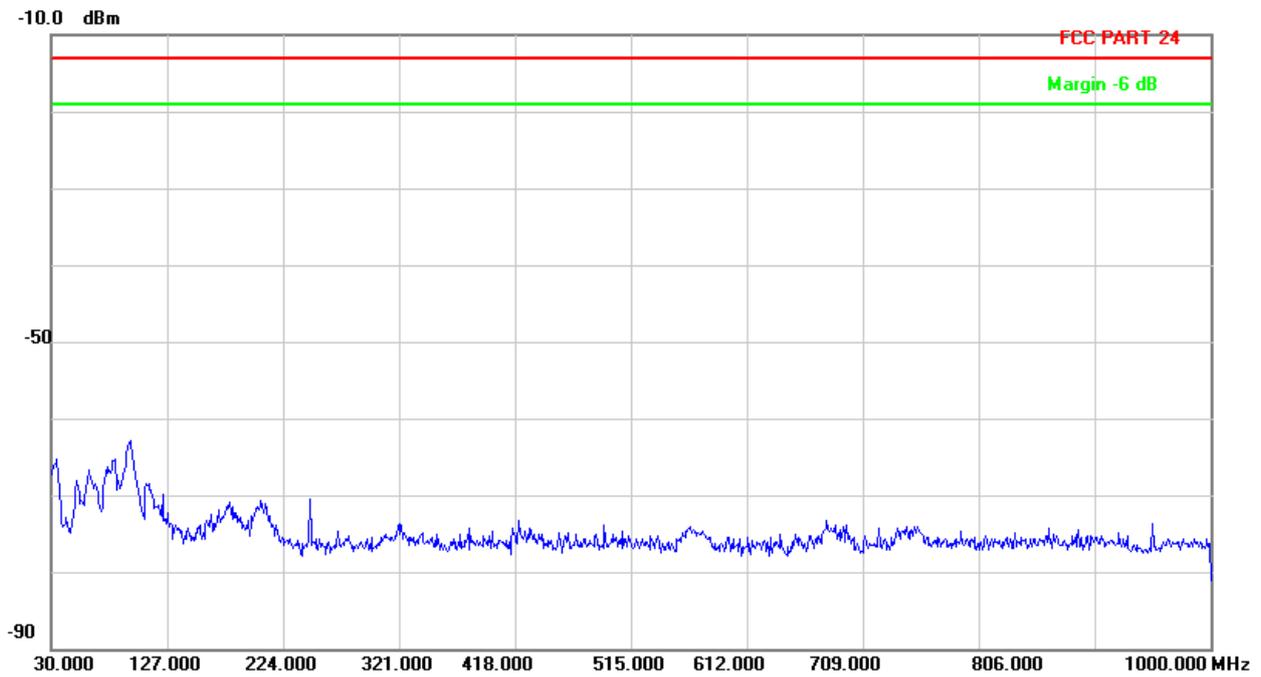
7.1.2.1 Test Mode = GSM/TM1

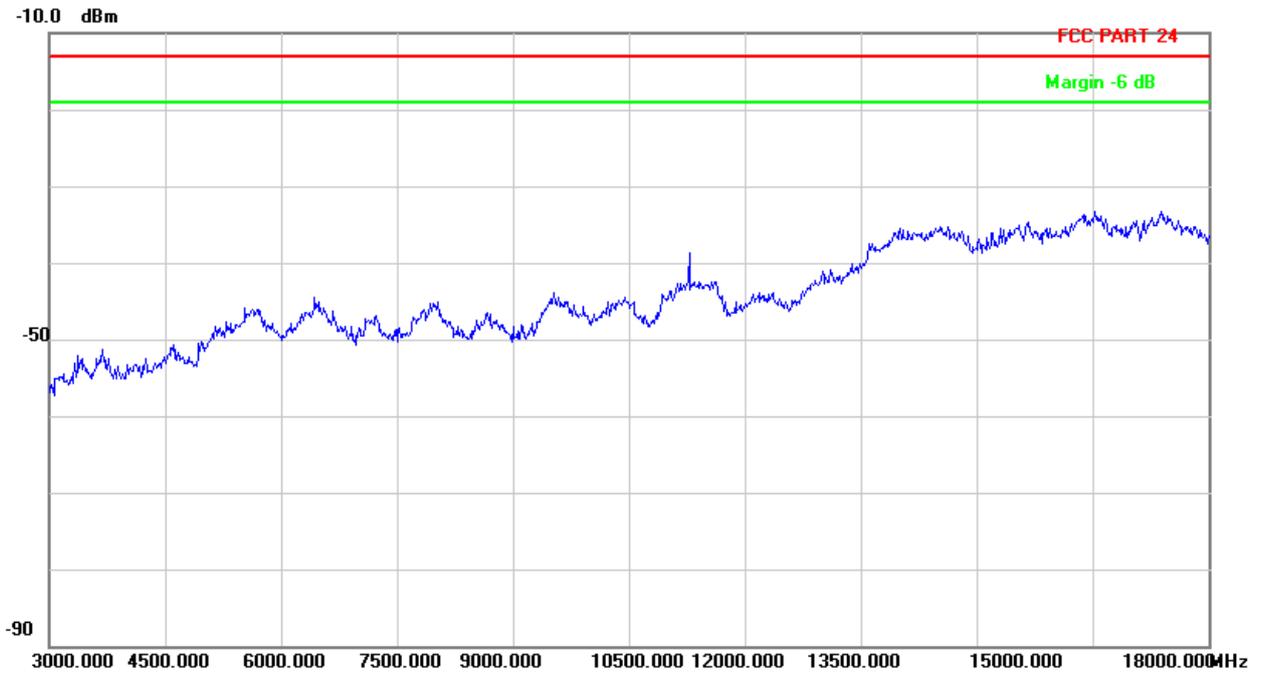
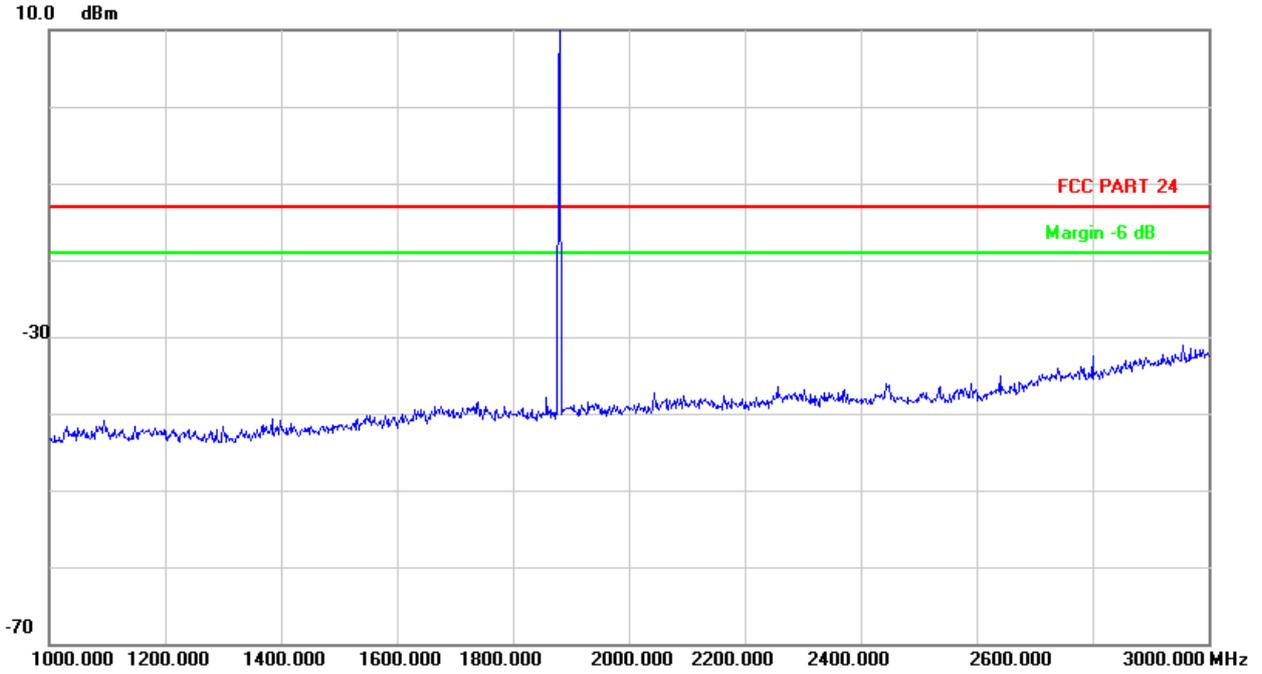


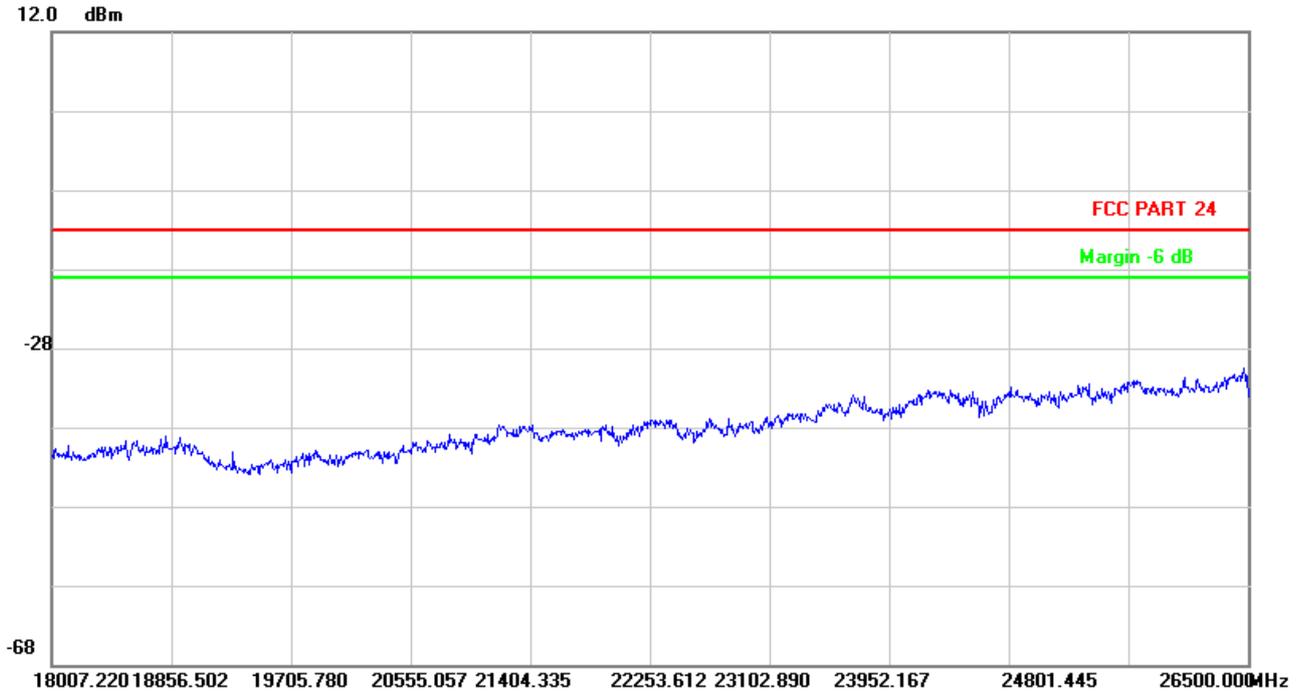




7.1.2.2 Test Mode = GSM/TM2









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	-5.42	-0.00658	PASS
				VN	-2.32	-0.00281	PASS
				VH	-9.69	-0.01176	PASS
		MCH	TN	VL	-4.46	-0.00533	PASS
				VN	-5.88	-0.00703	PASS
				VH	-8.91	-0.01065	PASS
		HCH	TN	VL	-5.94	-0.007	PASS
				VN	-1.1	-0.0013	PASS
				VH	-3.81	-0.00449	PASS
	GSM/TM2	LCH	TN	VL	-5.81	-0.00705	PASS
				VN	-8.62	-0.01046	PASS
				VH	-0.97	-0.00118	PASS
		MCH	TN	VL	-5.1	-0.0061	PASS
				VN	-9.27	-0.01108	PASS
				VH	-13.24	-0.01583	PASS
		HCH	TN	VL	-8.62	-0.01016	PASS
				VN	-4.84	-0.0057	PASS
				VH	-11.04	-0.01301	PASS
GSM1900	GSM/TM1	LCH	TN	VL	15.37	0.00831	PASS
				VN	17.11	0.00925	PASS
				VH	10.27	0.00555	PASS
		MCH	TN	VL	15.5	0.00824	PASS
				VN	23.83	0.01268	PASS
				VH	24.34	0.01295	PASS
		HCH	TN	VL	19.63	0.01028	PASS
				VN	19.95	0.01045	PASS
				VH	15.43	0.00808	PASS
	GSM/TM2	LCH	TN	VL	7.01	0.00379	PASS
				VN	2.84	0.00153	PASS
				VH	8.04	0.00435	PASS
		MCH	TN	VL	16.85	0.00896	PASS
				VN	13.72	0.0073	PASS
				VH	20.37	0.01084	PASS
		HCH	TN	VL	14.63	0.00766	PASS

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				VN	16.34	0.00856	PASS
				VH	12.46	0.00652	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	-1.94	-0.00235	PASS
				-20	-0.77	-0.00093	PASS
				-10	-4.84	-0.00587	PASS
				0	-4.52	-0.00548	PASS
				10	-6.01	-0.00729	PASS
				20	-4.46	-0.00541	PASS
				30	-4.26	-0.00517	PASS
				40	-1.81	-0.0022	PASS
		50	-5.94	-0.00721	PASS		
		MCH	VN	-30	-2.32	-0.00277	PASS
				-20	-5.75	-0.00687	PASS
				-10	-2.65	-0.00317	PASS
				0	-2.71	-0.00324	PASS
				10	-2.45	-0.00293	PASS
				20	-3.94	-0.00471	PASS
				30	-5.1	-0.0061	PASS
				40	-4.58	-0.00547	PASS
		50	-5.68	-0.00679	PASS		
		HCH	VN	-30	-4.07	-0.0048	PASS
				-20	-7.1	-0.00836	PASS
				-10	-8.07	-0.00951	PASS
				0	-5.81	-0.00684	PASS
				10	-5.17	-0.00609	PASS
				20	-4.65	-0.00548	PASS
	30			-5.42	-0.00639	PASS	
	40			-5.36	-0.00631	PASS	
	50	-5.55	-0.00654	PASS			
	GSM/TM2	LCH	VN	-30	-0.9	-0.00109	PASS
				-20	-3.62	-0.00439	PASS
				-10	-1.32	-0.0016	PASS
				0	-5.33	-0.00647	PASS
				10	-7.85	-0.00952	PASS
				20	-5.1	-0.00619	PASS



Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict						
				30	-3.42	-0.00415	PASS						
				40	-0.52	-0.00063	PASS						
				50	0.65	0.00079	PASS						
		MCH	VN			-30	-6.78	-0.0081	PASS				
						-20	-7.68	-0.00918	PASS				
						-10	-5.17	-0.00618	PASS				
						0	-6.13	-0.00733	PASS				
						10	-2.78	-0.00332	PASS				
						20	-2.26	-0.0027	PASS				
						30	-6.59	-0.00788	PASS				
						40	-2.84	-0.00339	PASS				
						50	-11.66	-0.01394	PASS				
						HCH	VN			-30	-14.24	-0.01678	PASS
										-20	-9.27	-0.01092	PASS
		-10	-5.81	-0.00684	PASS								
		0	-8.46	-0.00997	PASS								
		10	-5.78	-0.00681	PASS								
		20	-8.14	-0.00959	PASS								
		30	-5.07	-0.00597	PASS								
		40	-5.42	-0.00639	PASS								
		GSM1900	GSM/TM1	LCH	VN		-30	13.11	0.00709	PASS			
							-20	5.94	0.00321	PASS			
							-10	10.91	0.0059	PASS			
							0	8.14	0.0044	PASS			
10	5.36						0.0029	PASS					
20	7.04						0.0038	PASS					
30	9.17						0.00496	PASS					
40	7.81						0.00422	PASS					
50	7.43						0.00402	PASS					
MCH	VN					-30	14.53	0.00773	PASS				
						-20	23.44	0.01247	PASS				
						-10	18.79	0.00999	PASS				
						0	26.15	0.01391	PASS				
						10	19.82	0.01054	PASS				
						20	21.63	0.01151	PASS				
						30	20.15	0.01072	PASS				
						40	12.85	0.00684	PASS				
						50	23.5	0.0125	PASS				
HCH	VN					-30	18.98	0.00994	PASS				

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				-20	22.28	0.01167	PASS
				-10	14.92	0.00781	PASS
				0	15.37	0.00805	PASS
				10	11.69	0.00612	PASS
				20	17.5	0.00916	PASS
				30	15.69	0.00822	PASS
				40	20.66	0.01082	PASS
				50	16.4	0.00859	PASS
	GSM/TM2	LCH	VN	-30	8.04	0.00435	PASS
				-20	7.52	0.00406	PASS
				-10	8.46	0.00457	PASS
				0	1.07	0.00058	PASS
				10	5	0.0027	PASS
				20	8.36	0.00452	PASS
				30	7.17	0.00388	PASS
				40	4.91	0.00265	PASS
				50	13.75	0.00743	PASS
				MCH	VN	-30	17.69
		-20	22.63			0.01204	PASS
		-10	22.89			0.01218	PASS
		0	17.31			0.00921	PASS
		10	16.18			0.00861	PASS
		20	20.89			0.01111	PASS
		30	17.24			0.00917	PASS
		40	19.27			0.01025	PASS
		HCH	VN	-30	19.73	0.01033	PASS
				-20	12.37	0.00648	PASS
				-10	19.4	0.01016	PASS
				0	13.4	0.00702	PASS
				10	14.88	0.00779	PASS
				20	12.3	0.00644	PASS
				30	13.72	0.00718	PASS
40	13.01			0.00681	PASS		
			50	16.56	0.00867	PASS	

END