



Appendix for test report

1Appendix_A: Effective (Isotropic) Radiated Power Output Data

Part I - Test Results

Test Band	Test Mode	Test Channel	Measured[dBm]	EIRP [dBm]	Limit [dBm]	Verdict
GSM1900	GSM/TM1	LCH	29.28	28.28	33	PASS
		MCH	29.3	28.3	33	PASS
		HCH	29.5	28.5	33	PASS
	GSM/TM2	LCH	25.3	24.3	33	PASS
		MCH	25.35	24.35	33	PASS
		HCH	25.25	24.25	33	PASS
Test Band	Test Mode	Test Channel	Measured[dBm]	ERP [dBm]	Limit [dBm]	Verdict
GSM850	GSM/TM1	LCH	32.45	26.1	38.5	PASS
		MCH	32.39	26.04	38.5	PASS
		HCH	32.27	25.92	38.5	PASS
	GSM/TM2	LCH	26.02	19.67	38.5	PASS
		MCH	25.84	19.49	38.5	PASS
		HCH	25.9	19.55	38.5	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	0.14	13	PASS
		MCH	0.13	13	PASS
		HCH	0.15	13	PASS
	GSM/TM2	LCH	3.08	13	PASS
		MCH	3.34	13	PASS
		HCH	3.23	13	PASS
GSM850	GSM/TM1	LCH	0.15	13	PASS
		MCH	0.13	13	PASS
		HCH	0.14	13	PASS
	GSM/TM2	LCH	3.08	13	PASS
		MCH	3.34	13	PASS
		HCH	3.23	13	PASS

3Appendix_C: Modulation Characteristics

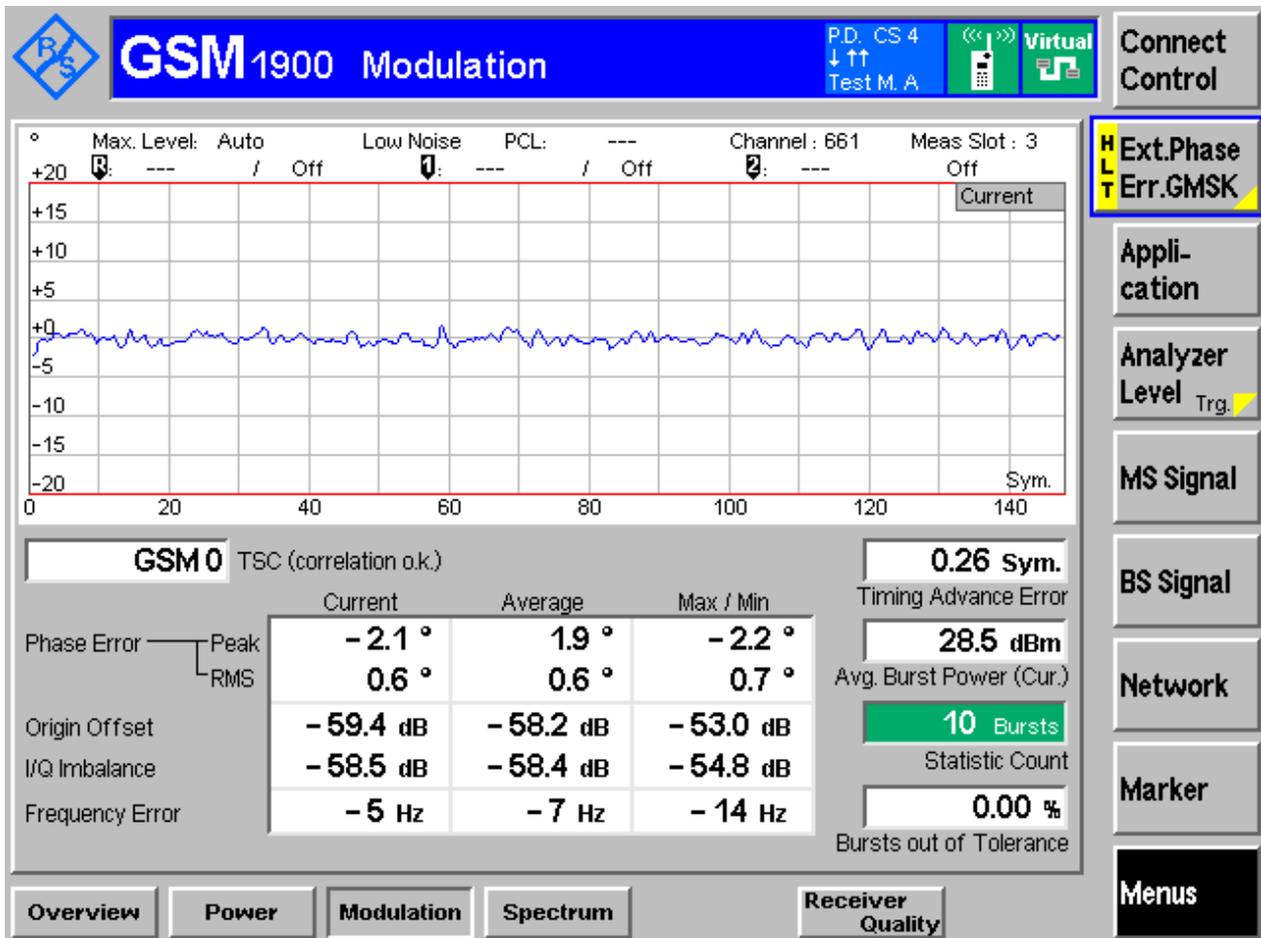
Part I - Test Plots

3.1 For GSM

3.1.2 Test Band = GSM1900

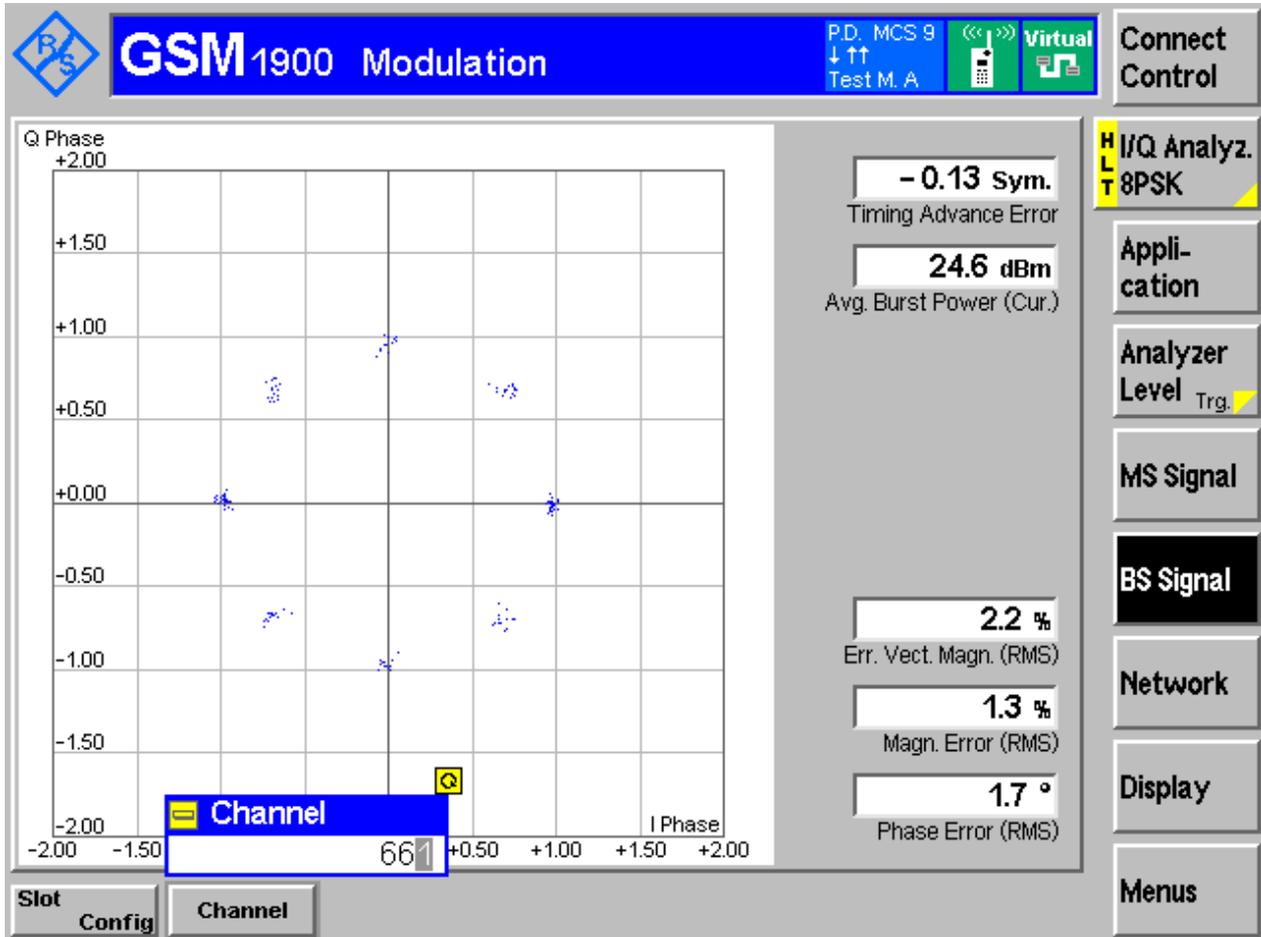
3.1.2.1 Test Mode = GSM/TM1

3.1.2.1.1 Test Channel = MCH



3.1.1.1 Test Mode = GSM/TM2

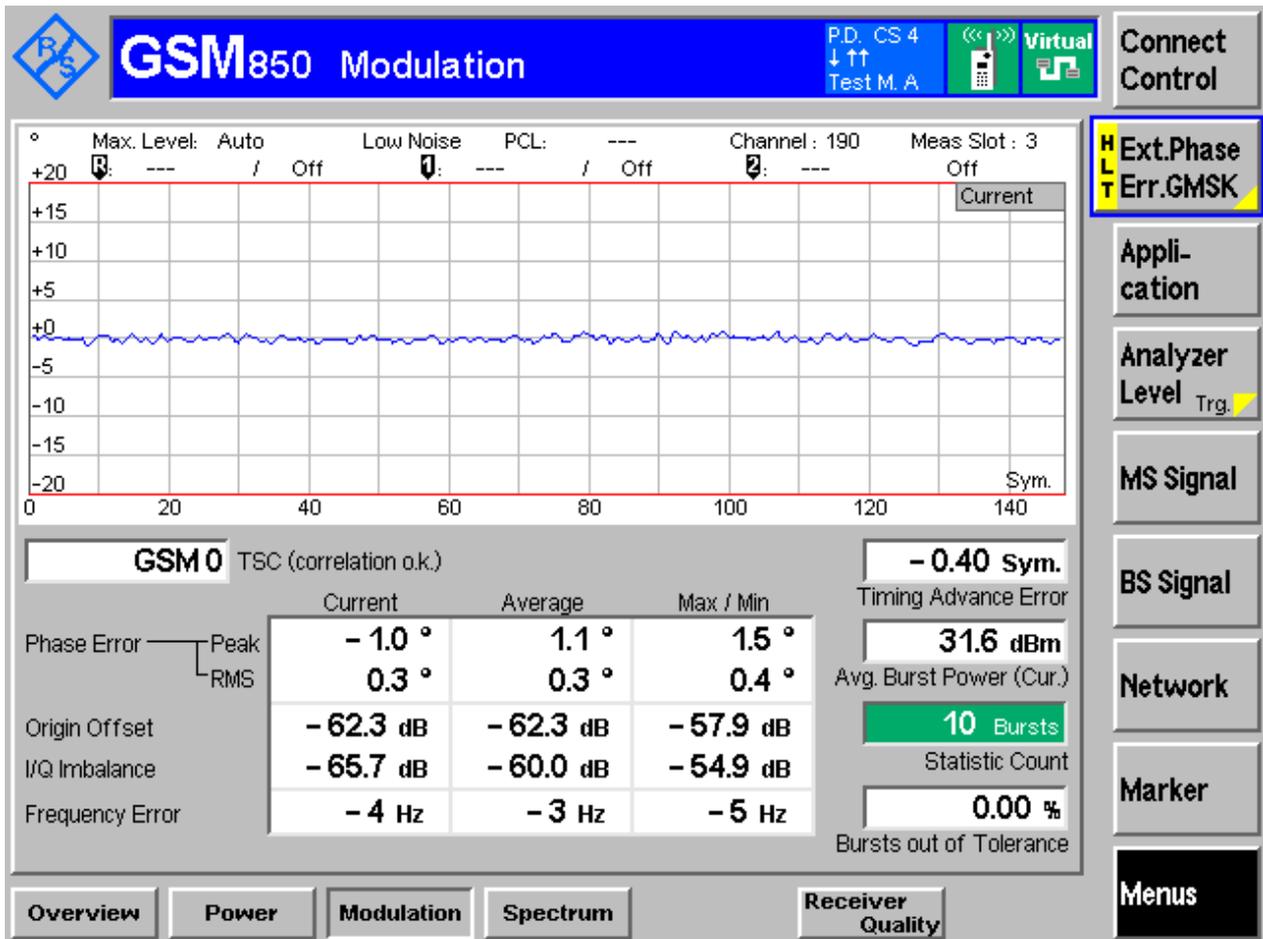
3.1.1.1.1 Test Channel = MCH



3.1.3 Test Band = GSM850

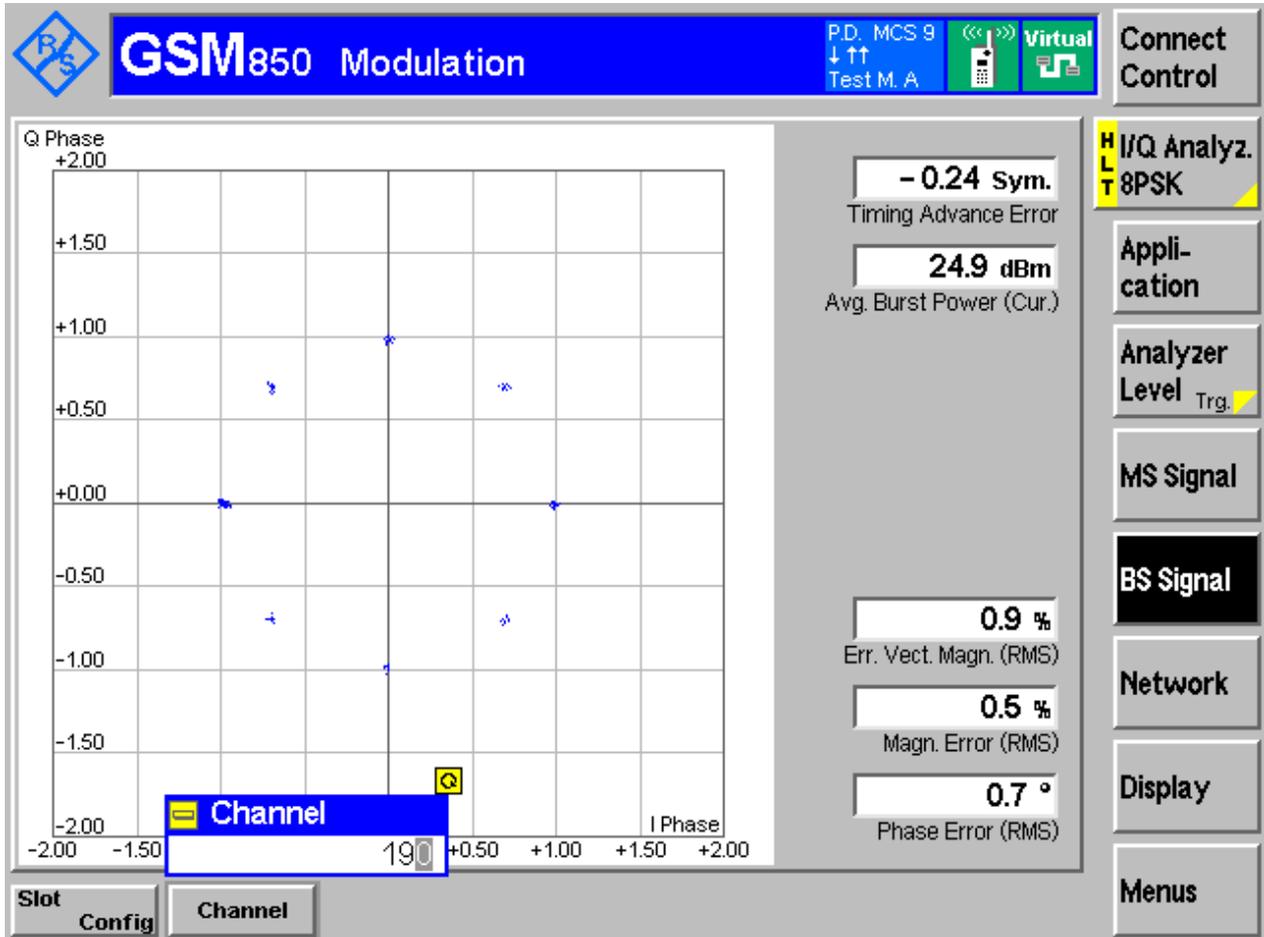
3.1.3.1 Test Mode = GSM/TM1

3.1.3.1.1 Test Channel = MCH



3.1.1.2 Test Mode = GSM/TM2

3.1.1.2.1 Test Channel = MCH



4Appendix_D: Bandwidth

Part I - Test Results

Test Band	Test Mode	Test Channel	Occupied Bandwidth [kHz]	Emission Bandwidth [kHz]	Verdict
GSM1900	GSM/TM1	LCH	244.01	315.18	Pass
		MCH	244.31	313.12	Pass
		HCH	249.61	319.68	Pass
	GSM/TM2	LCH	241.70	306.48	Pass
		MCH	246.58	320.76	Pass
		HCH	245.50	316.31	Pass
GSM850	GSM/TM1	LCH	244.65	317.43	Pass
		MCH	244.28	313.73	Pass
		HCH	246.62	306.41	Pass
	GSM/TM2	LCH	250.49	320.38	Pass
		MCH	251.47	323.27	Pass
		HCH	252.59	320.43	Pass



Part II - Test Plots

4.1 For GSM

4.1.1 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





4.1.1.2 Test Mode = GSM/TM2

4.1.1.2.1 Test Channel = LCH



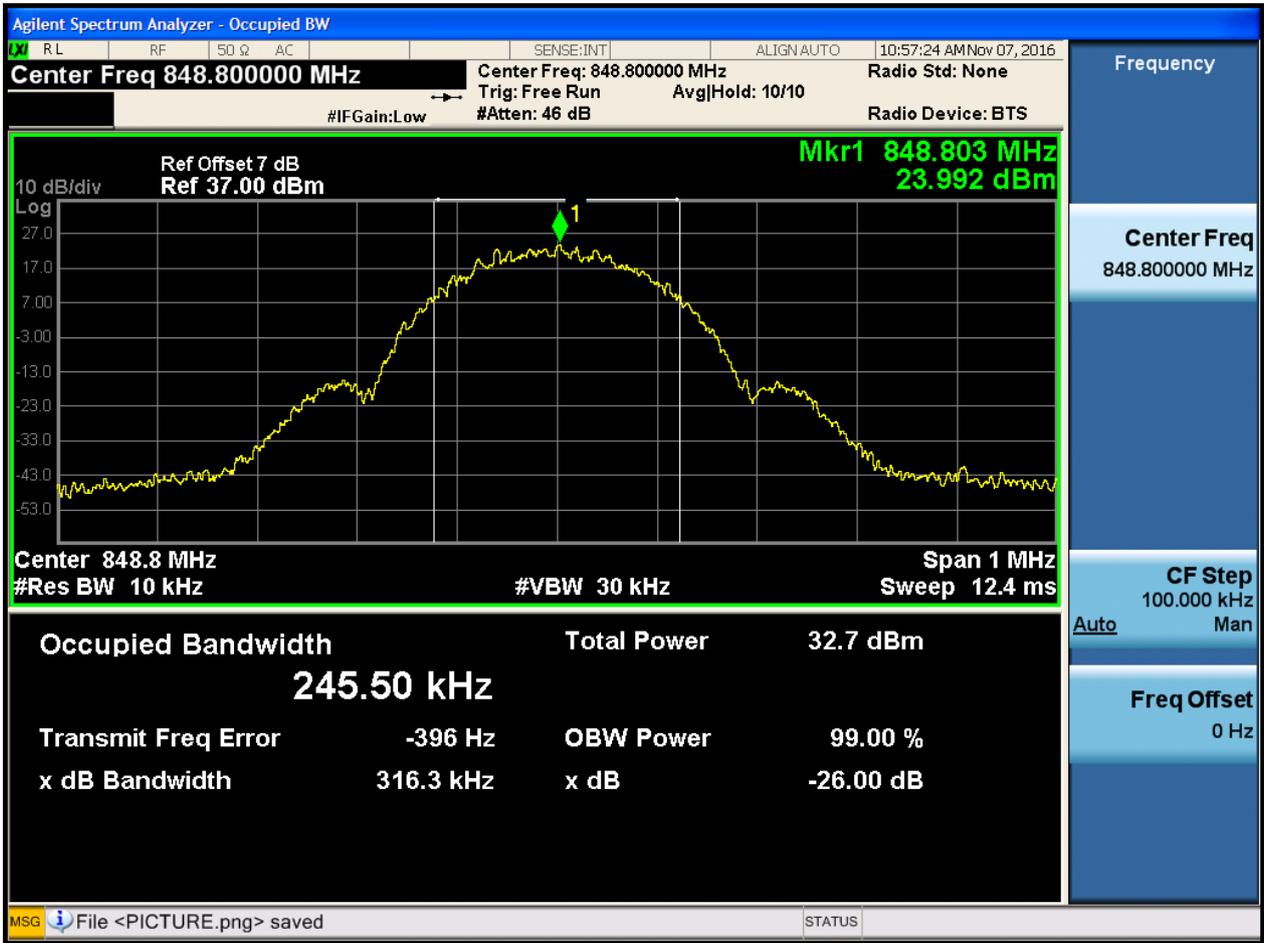


4.1.1.2.2 Test Channel = MCH





4.1.1.2.3 Test Channel = HCH

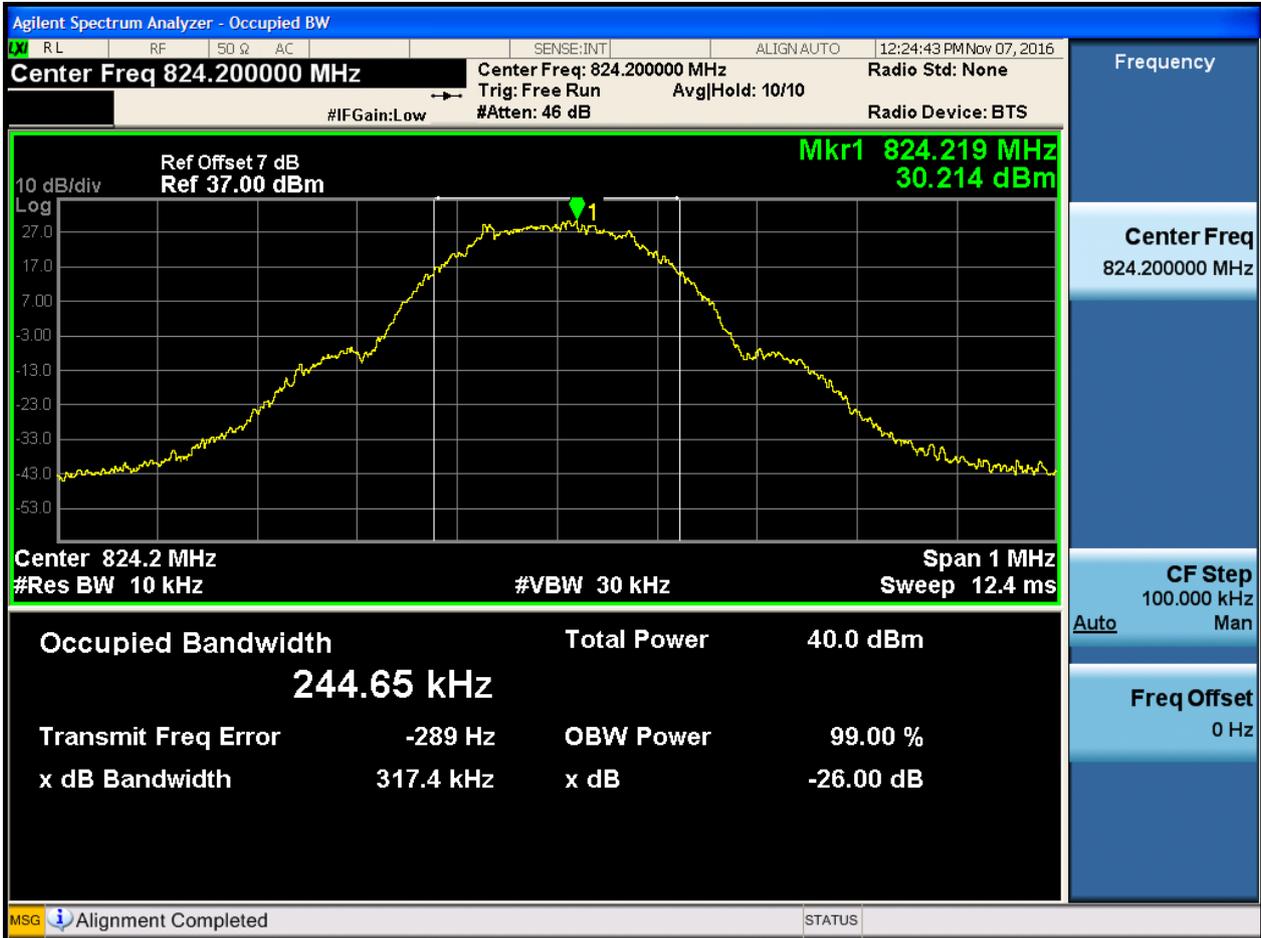




4.1.3 Test Band = GSM850

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





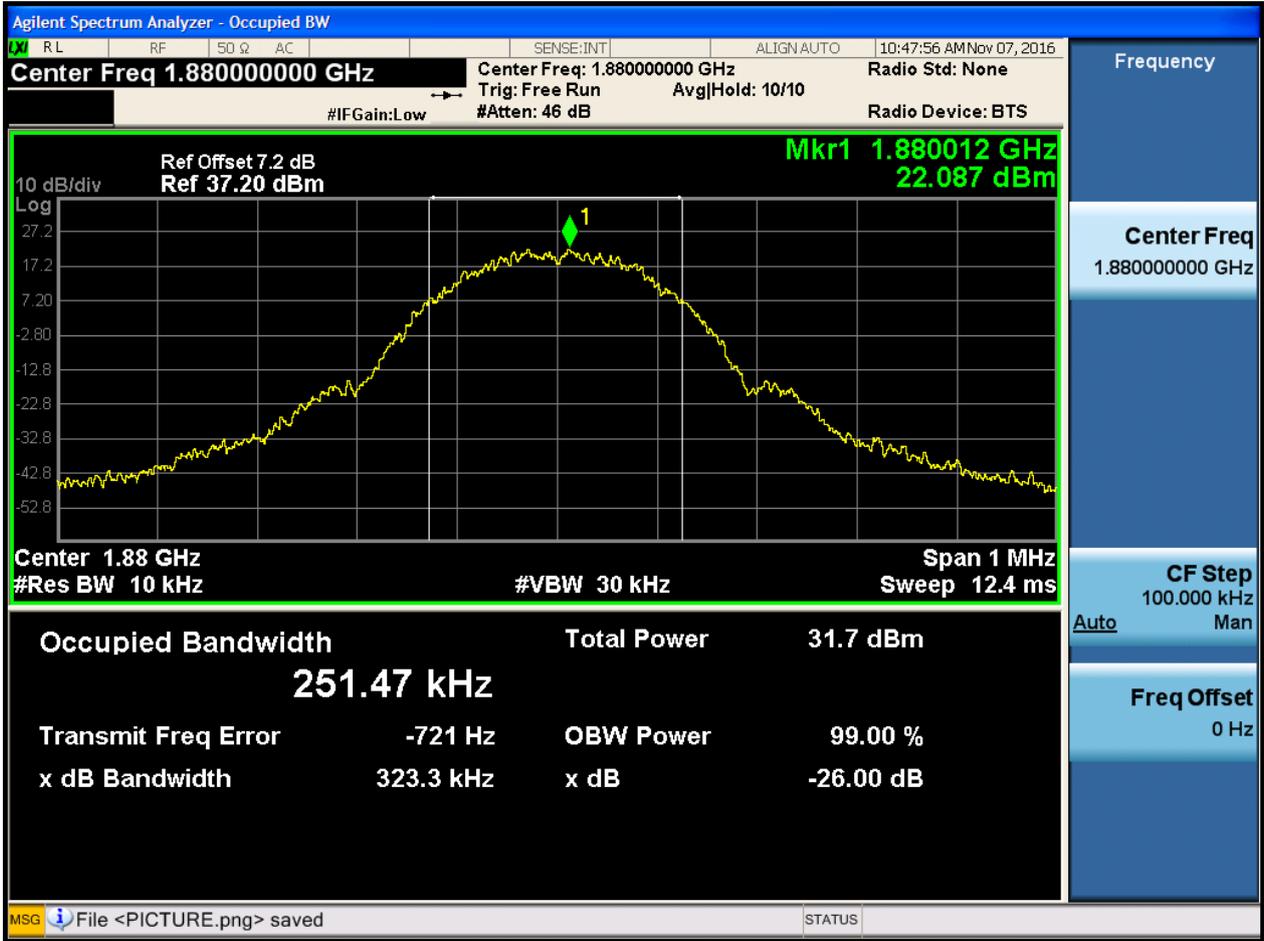
4.1.1.1 Test Mode = GSM/TM2

4.1.1.1.1 Test Channel = LCH





4.1.1.1.2 Test Channel = MCH





4.1.1.1.3 Test Channel = HCH



5Appendix_E: Band Edges Compliance

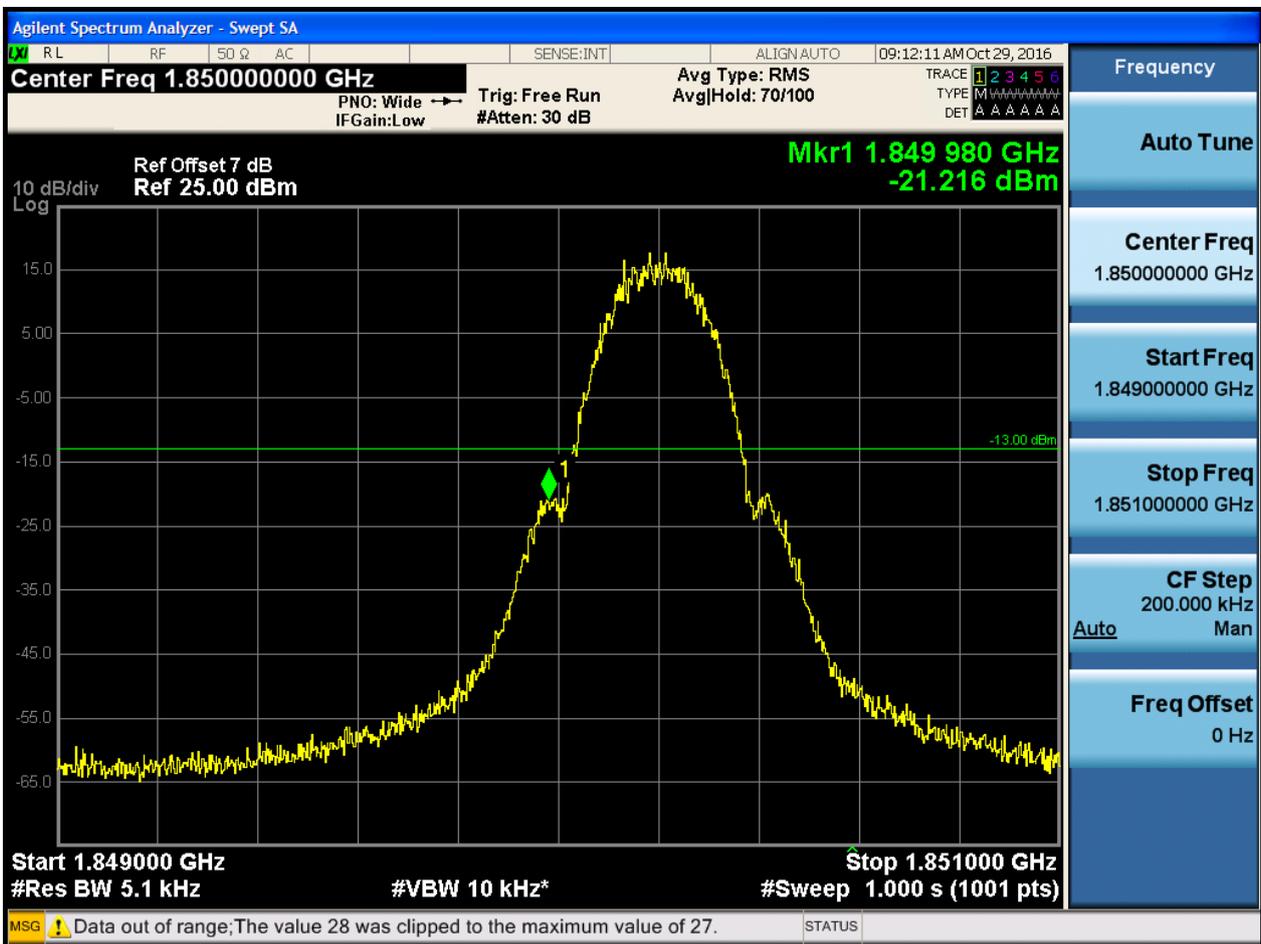
Part I - Test Plots

5.1 For GSM

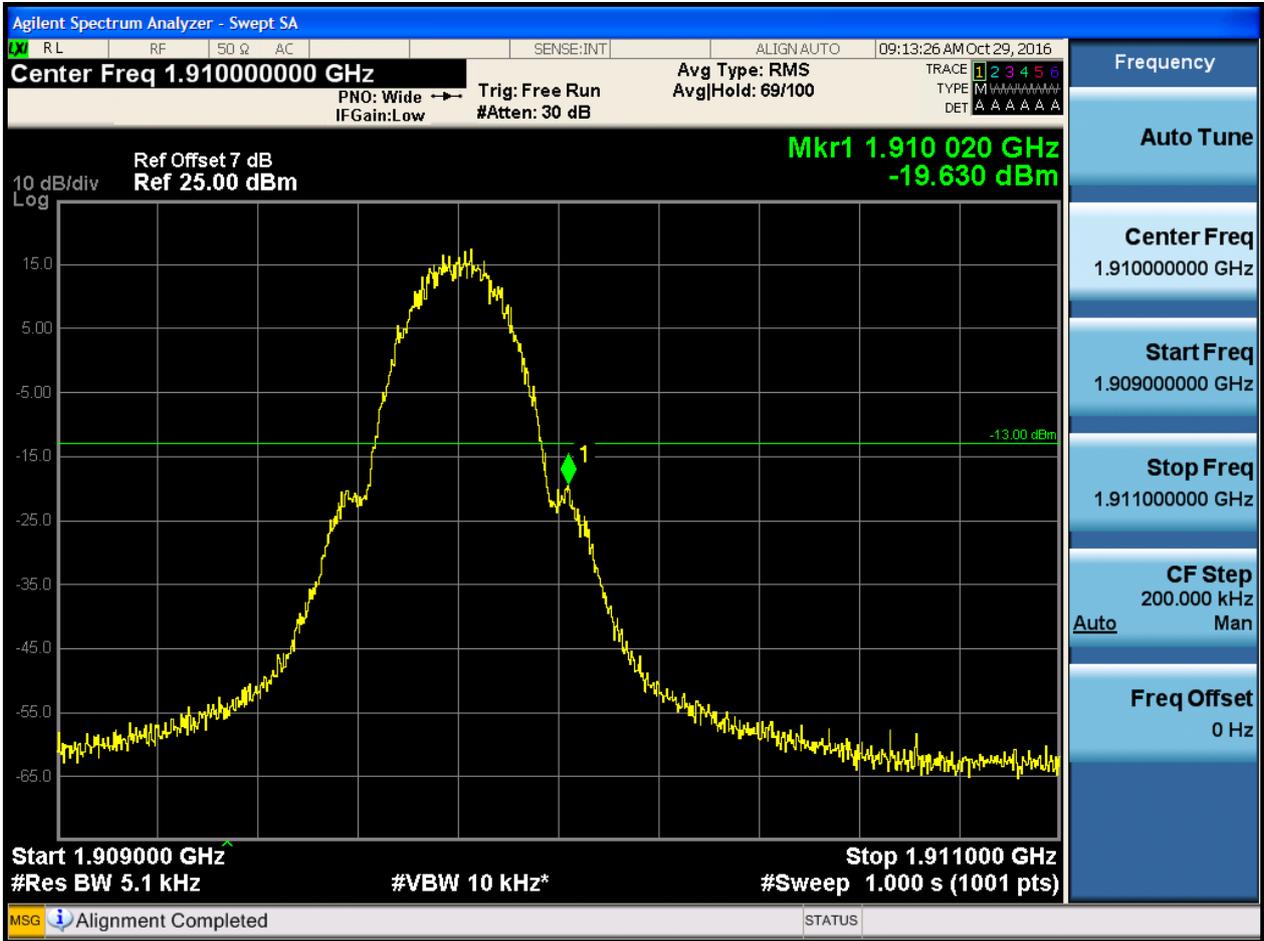
5.1.1 Test Band = GSM1900

5.1.1.1 Test Mode = GSM/TM1

5.1.1.1.1 Test Channel = LCH



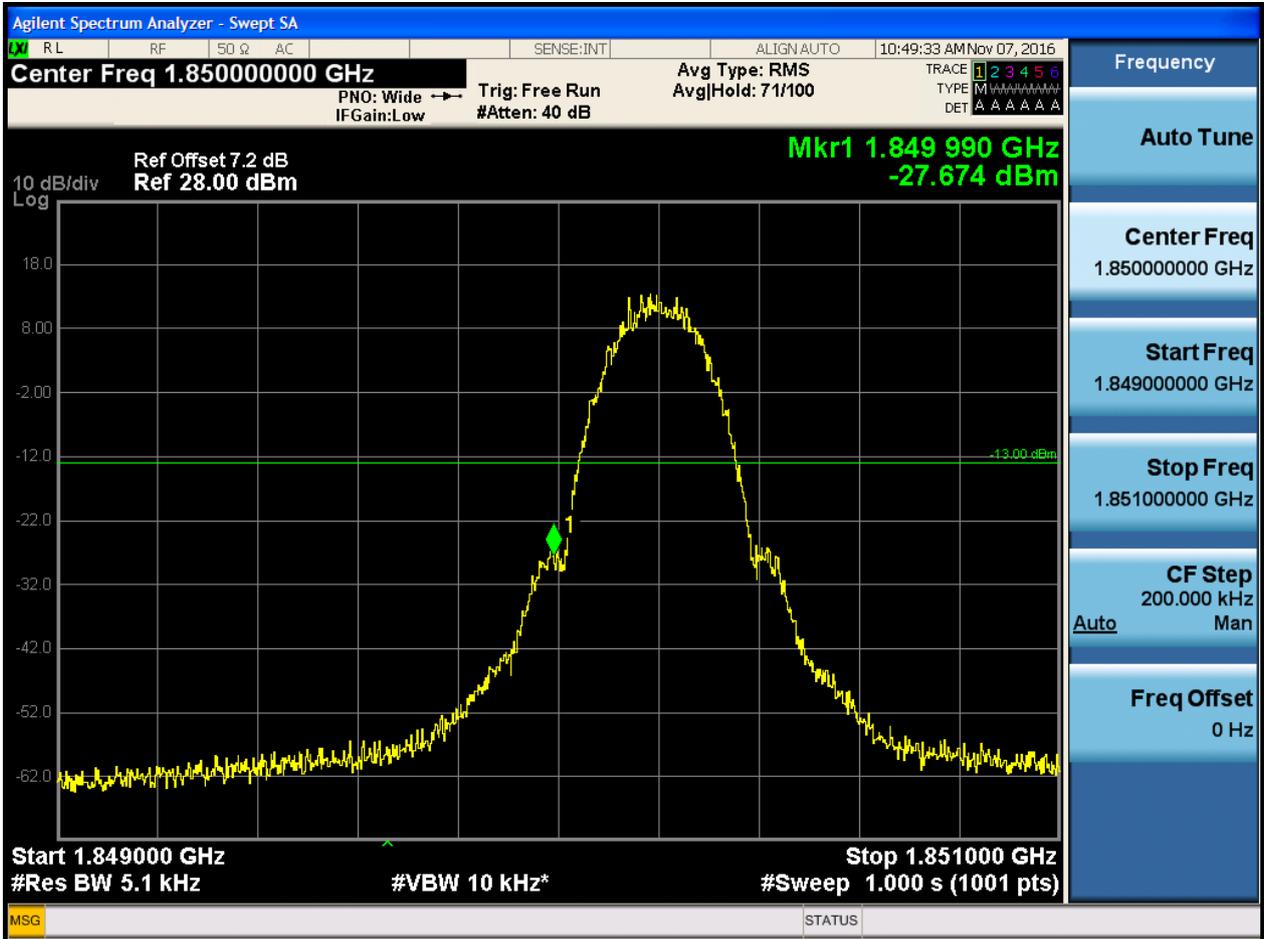
5.1.1.1.2 Test Channel = HCH





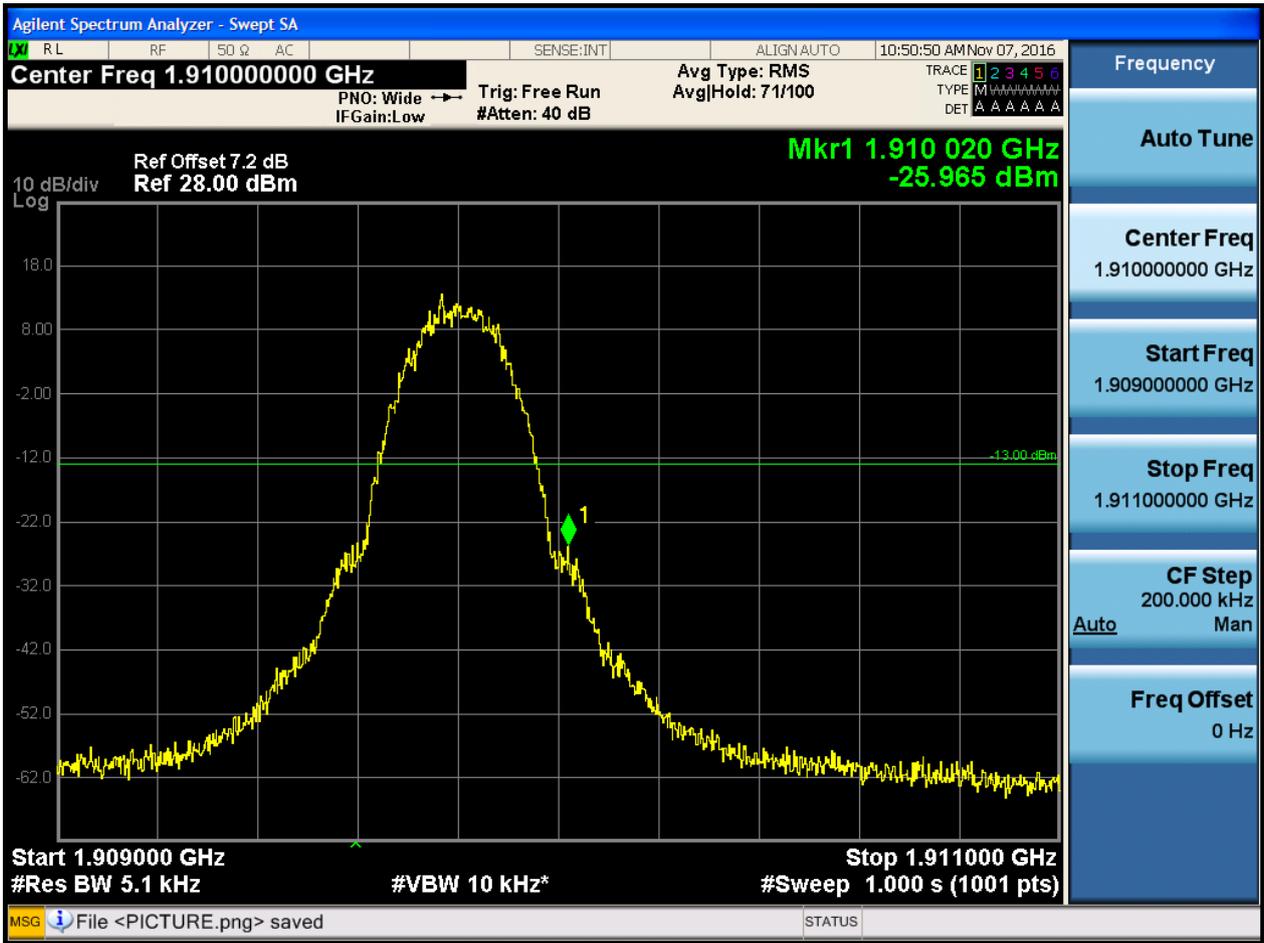
5.1.1.2 Test Mode = GSM/TM2

5.1.1.2.1 Test Channel = LCH





5.1.1.2.2 Test Channel = HCH

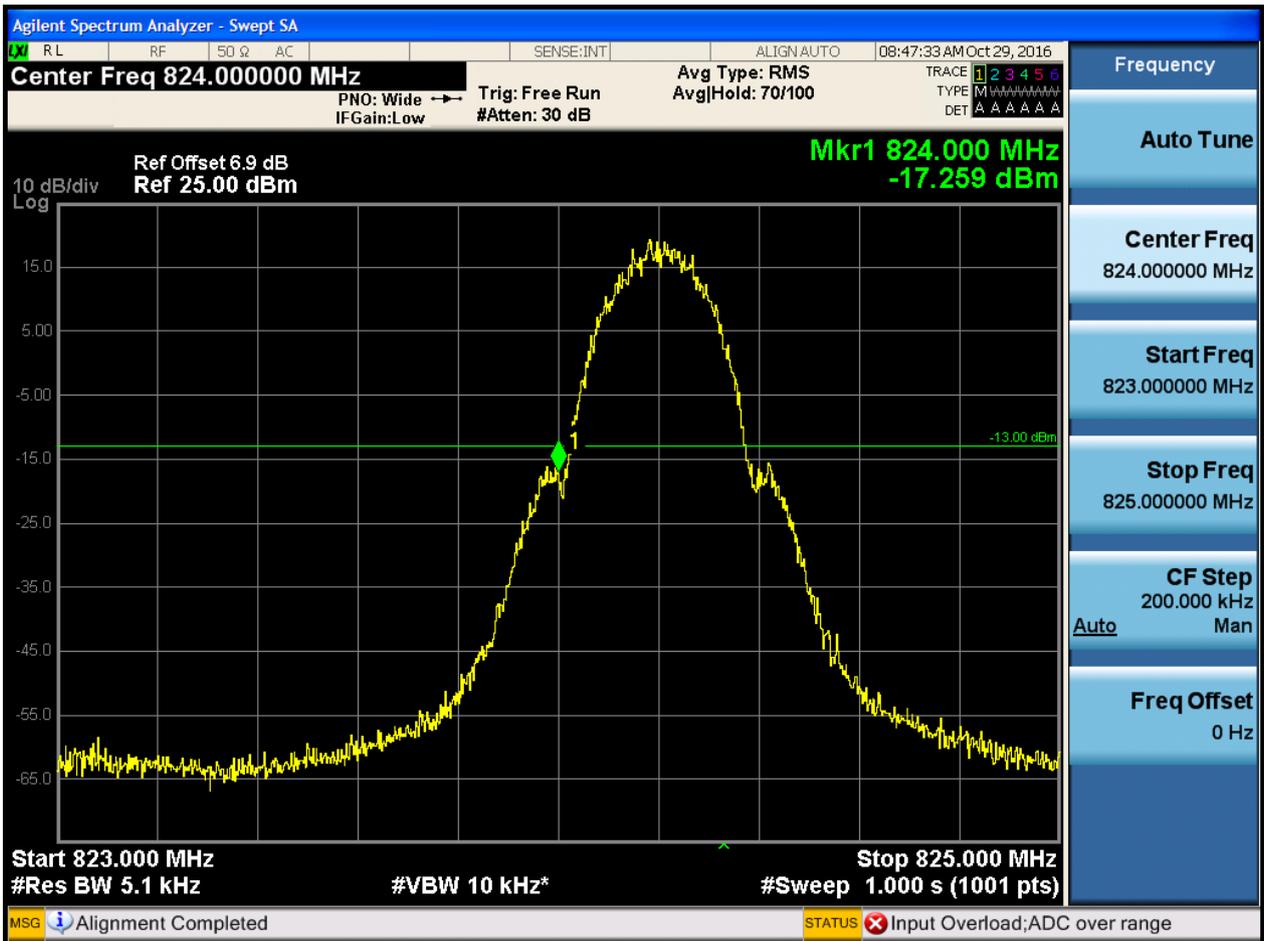




5.1.2 Test Band = GSM850

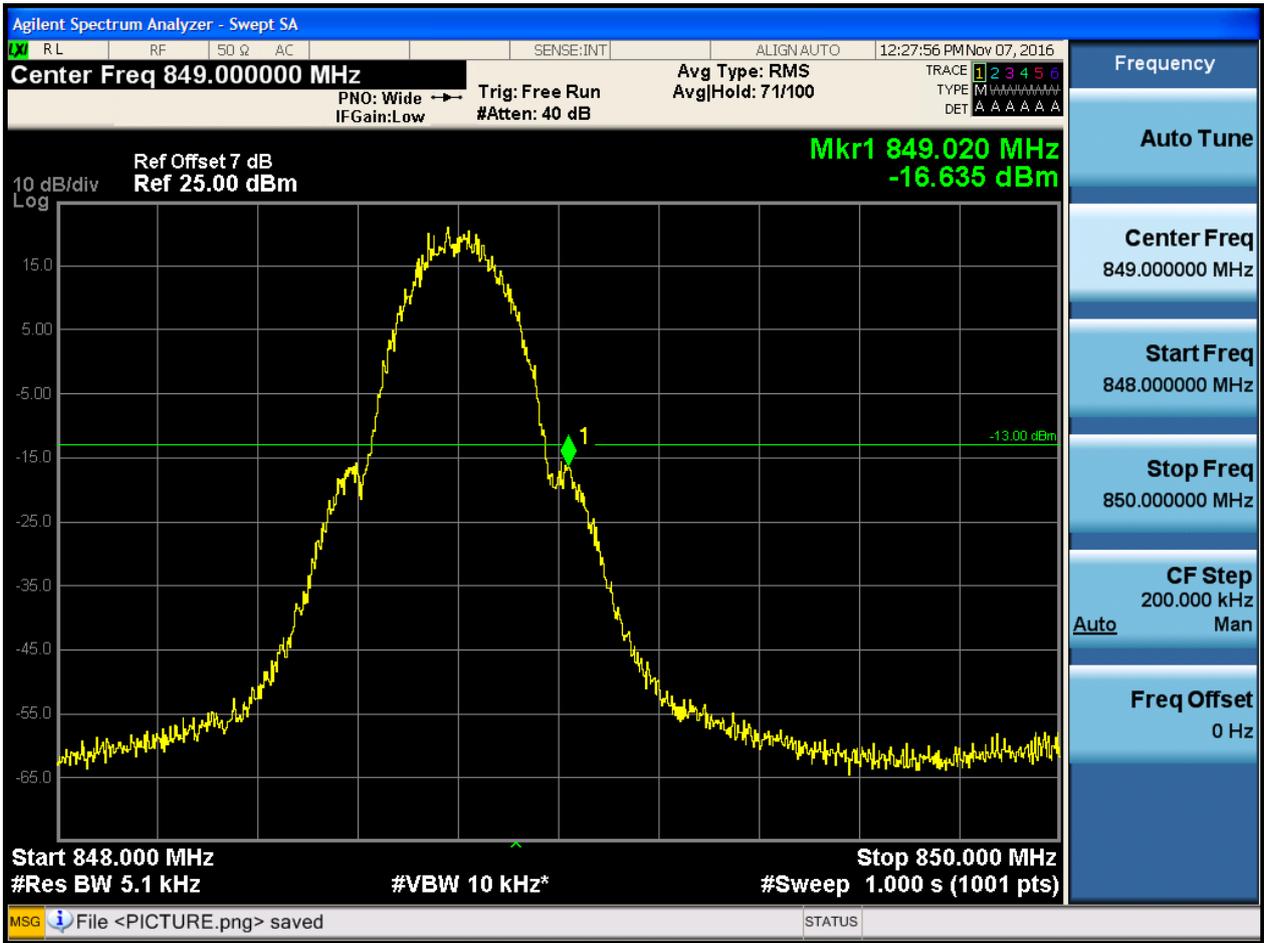
5.1.2.1 Test Mode = GSM/TM1

5.1.2.1.1 Test Channel = LCH





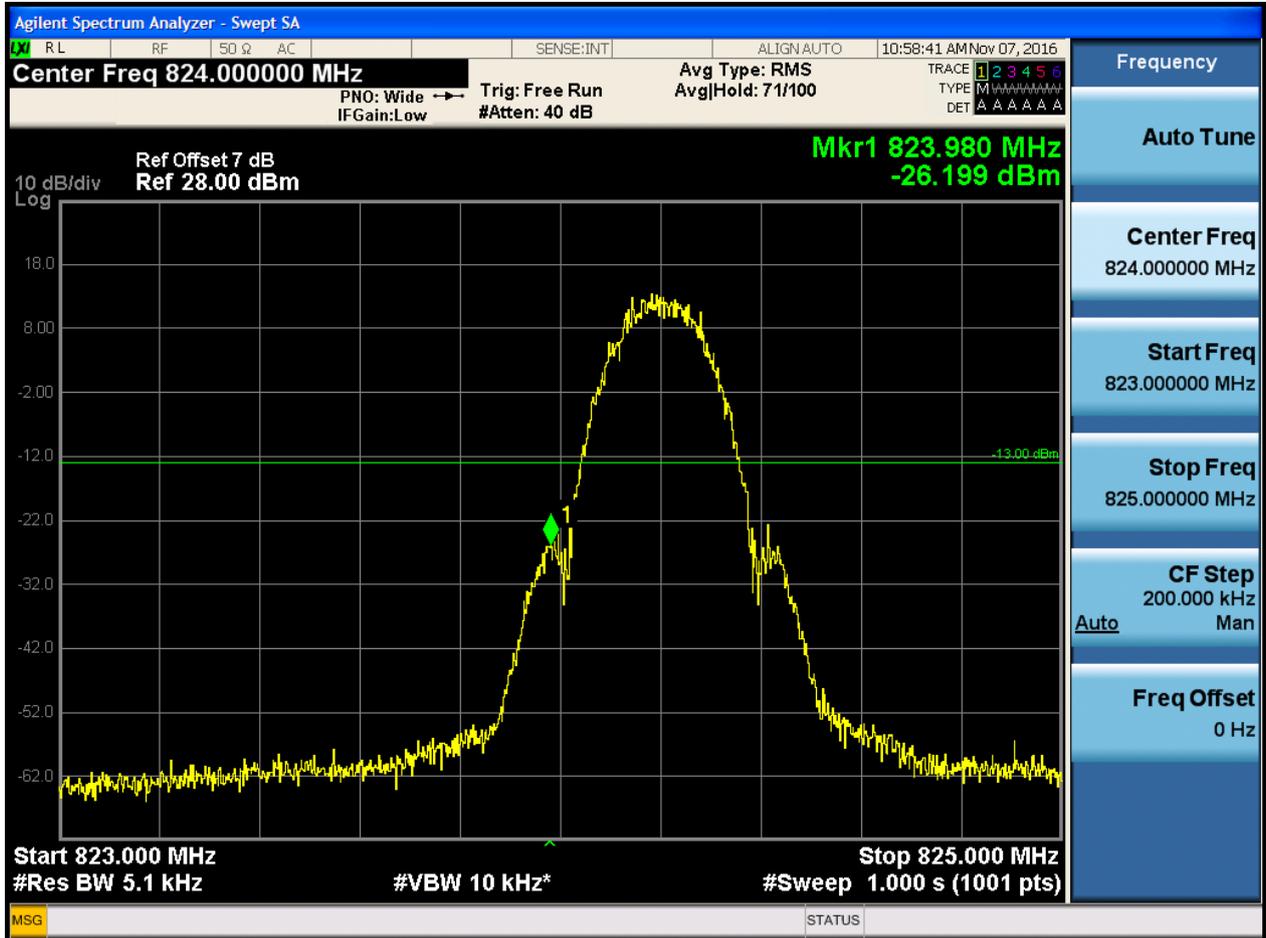
5.1.2.1.1 Test Channel = HCH



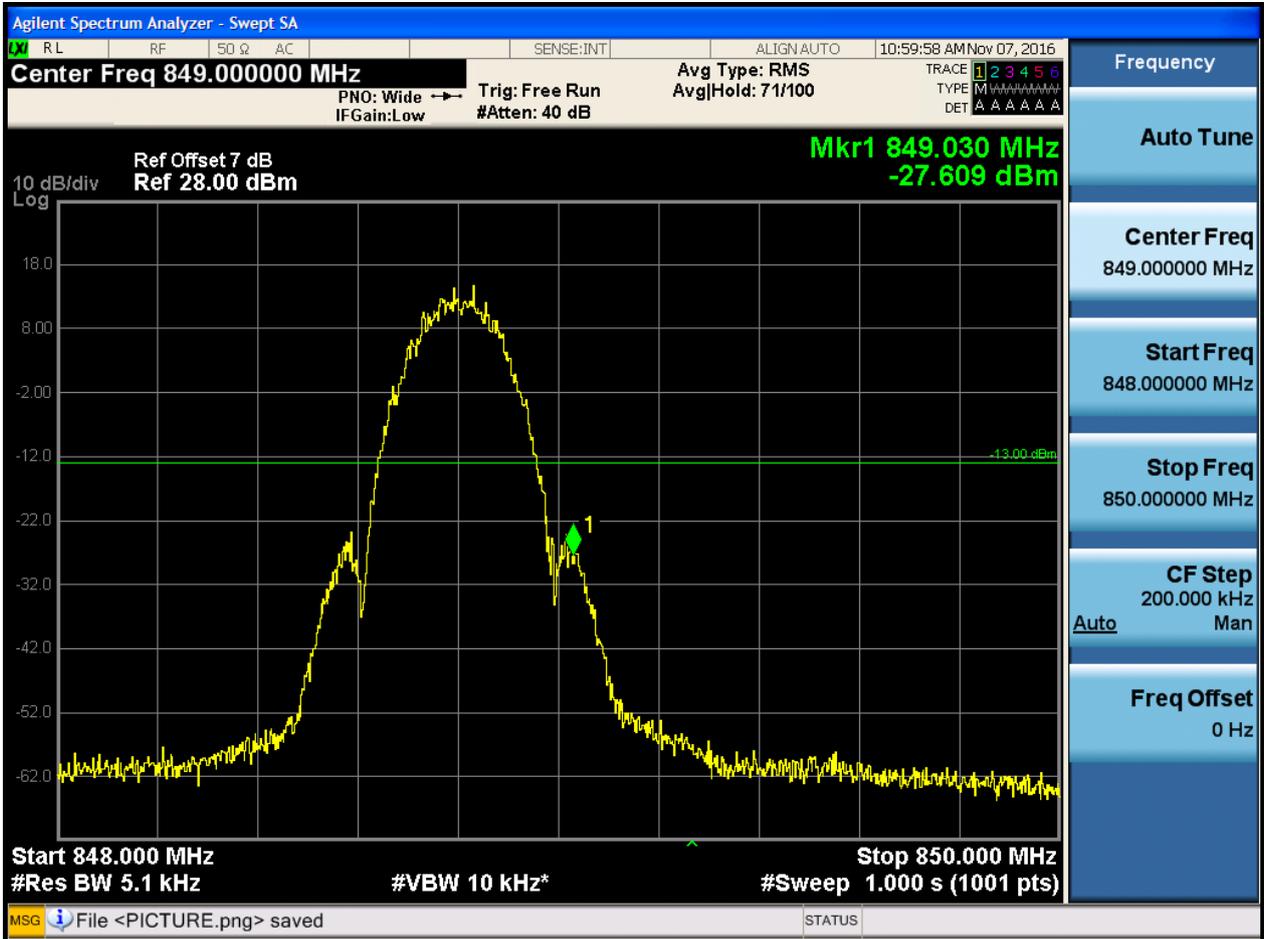


5.1.3.1 Test Mode = GSM/TM2

5.1.3.1.1 Test Channel = LCH



5.1.3.1.2 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

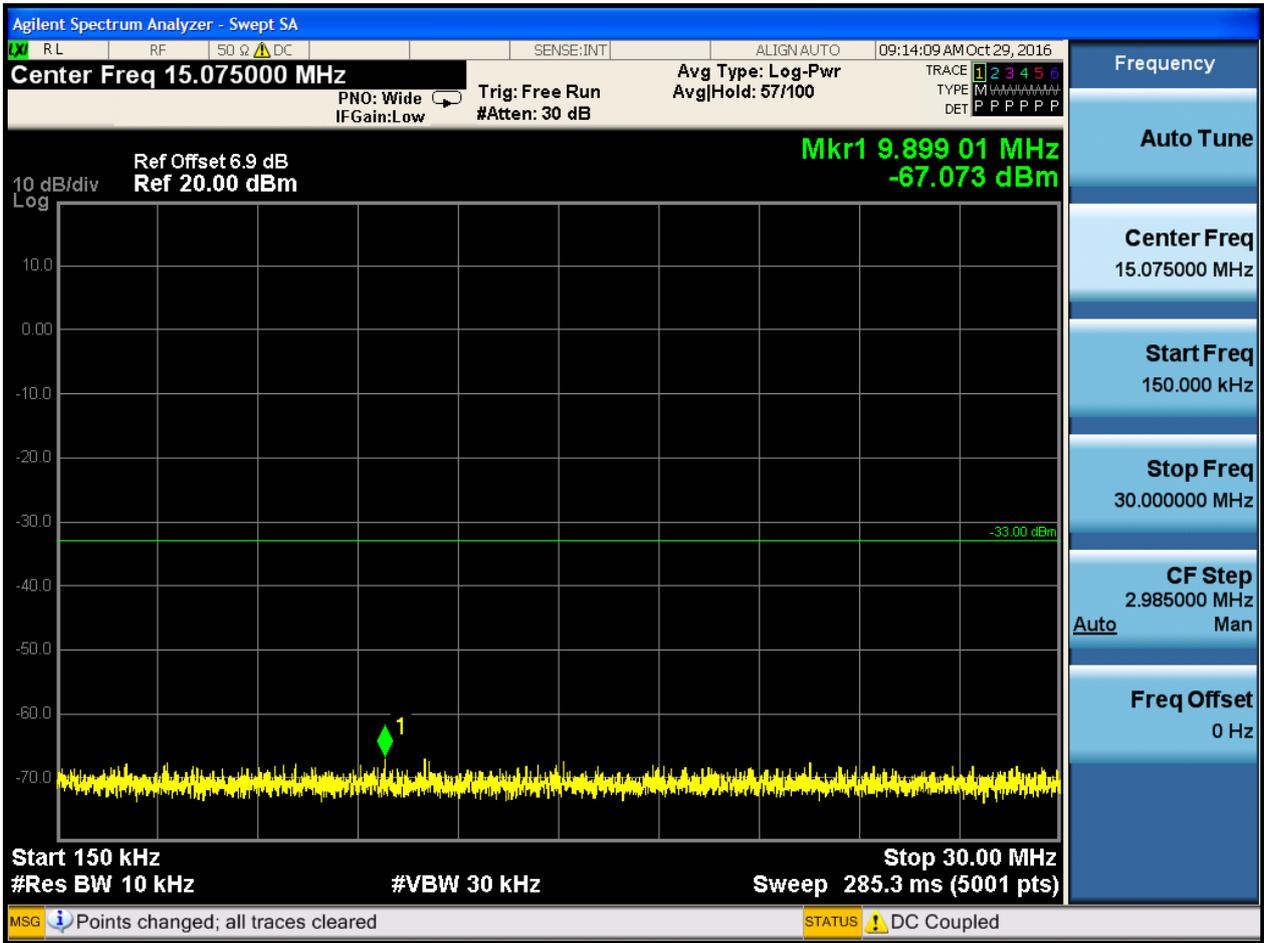
6.1 For GSM

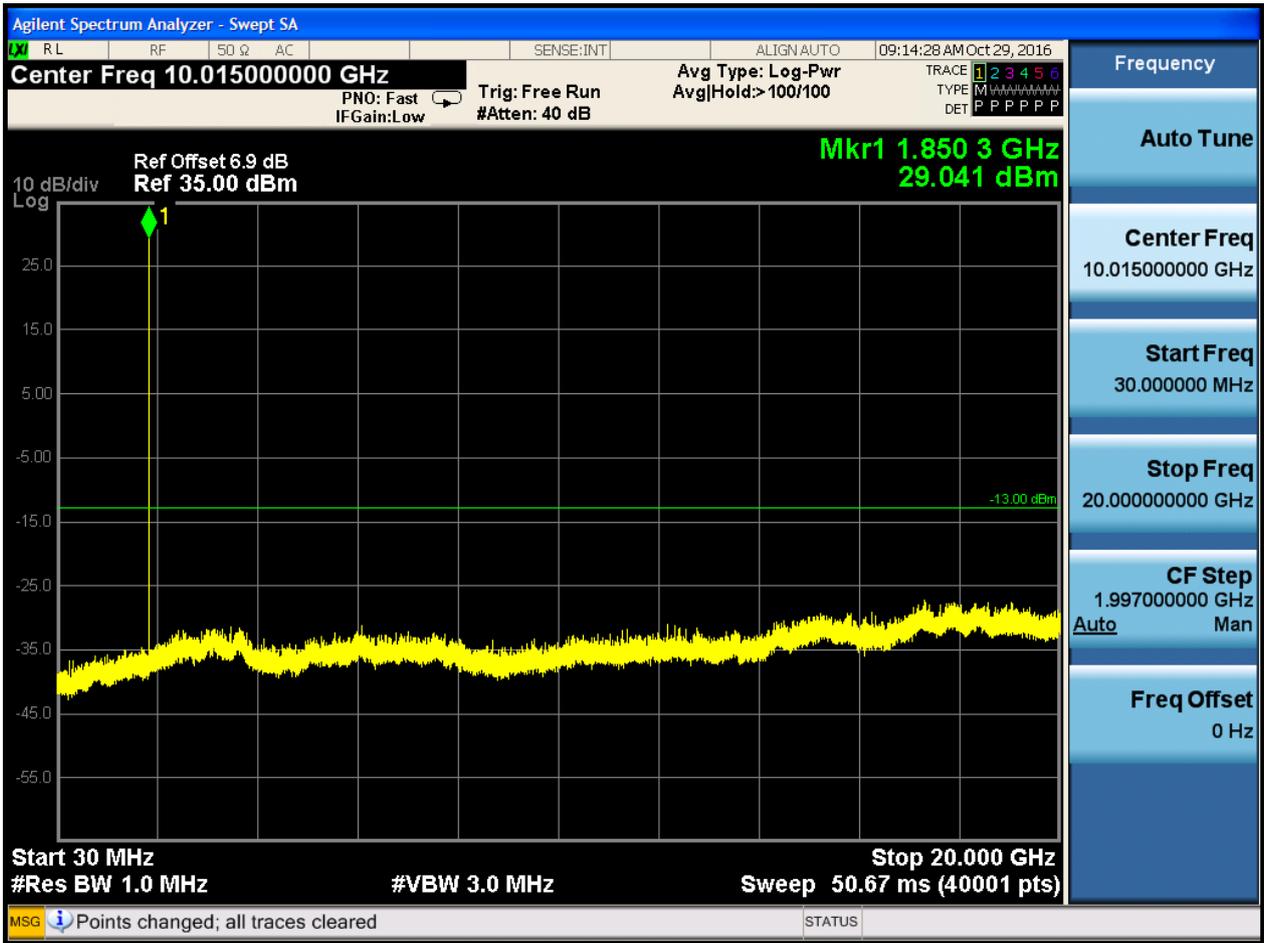
6.1.1 Test Band = GSM1900

6.1.2.1 Test Mode = GSM/TM1

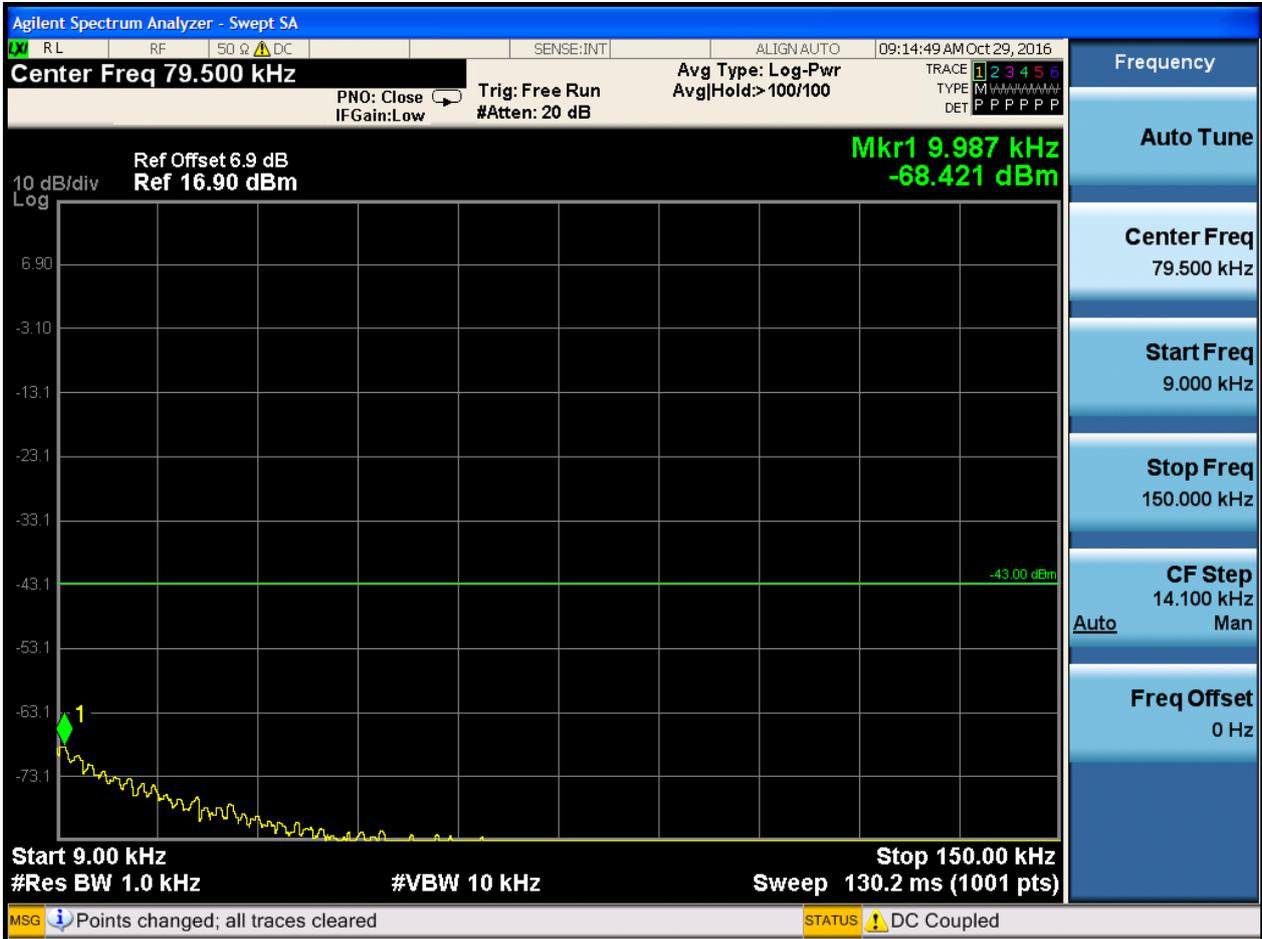
6.1.2.1.1 Test Channel = LCH

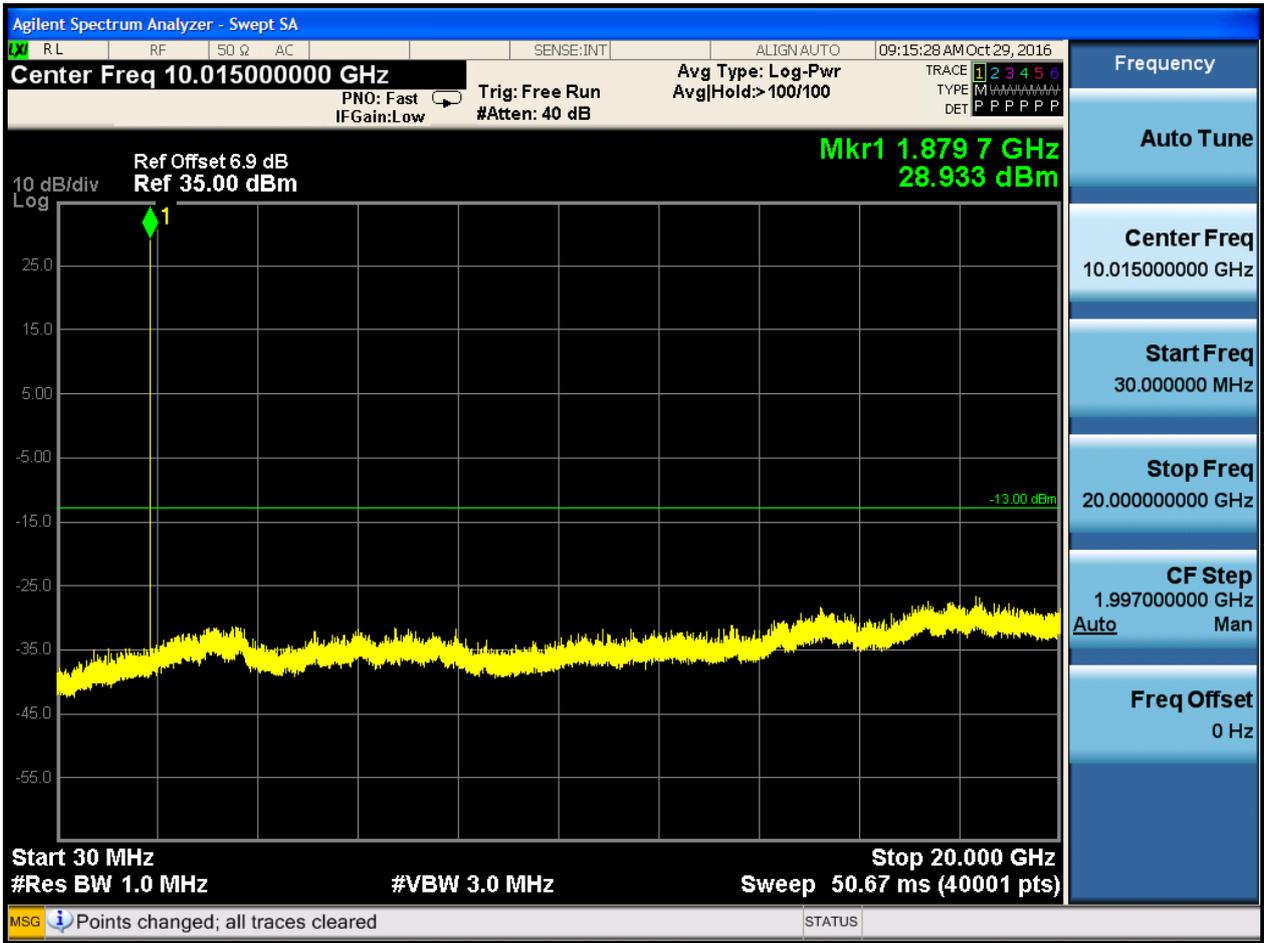






6.1.2.1.2 Test Channel = MCH

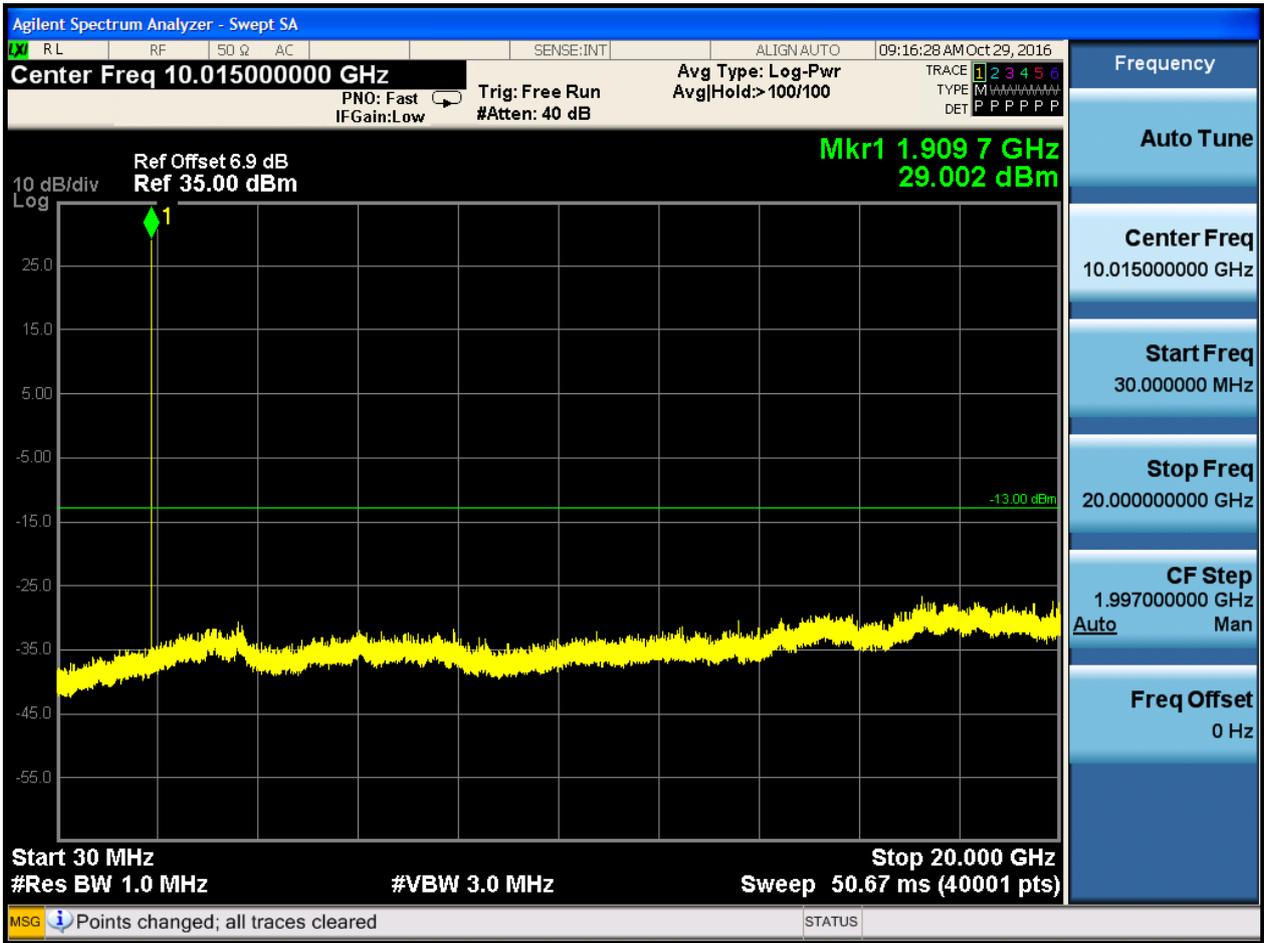






6.1.2.1.3 Test Channel = HCH

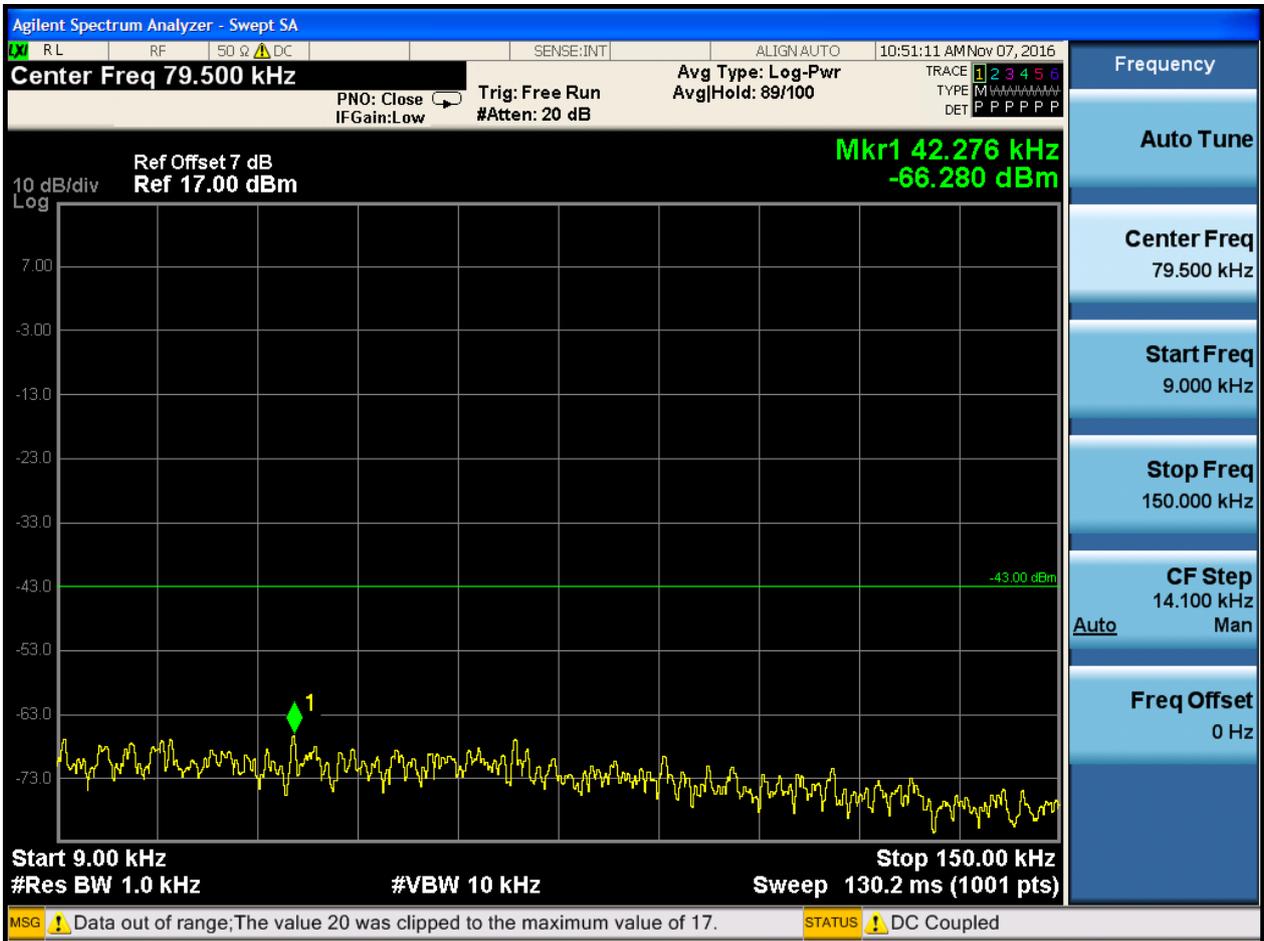


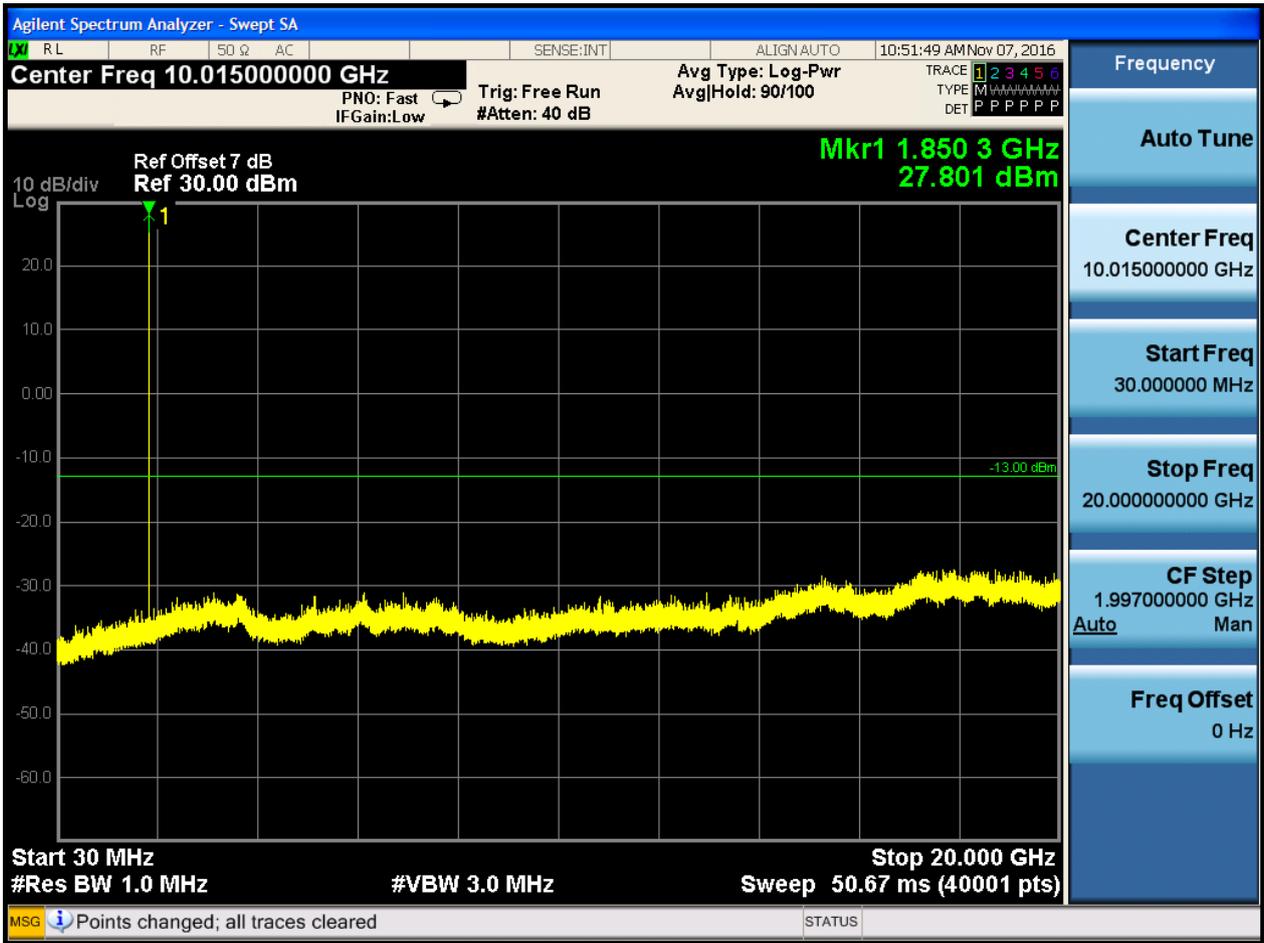




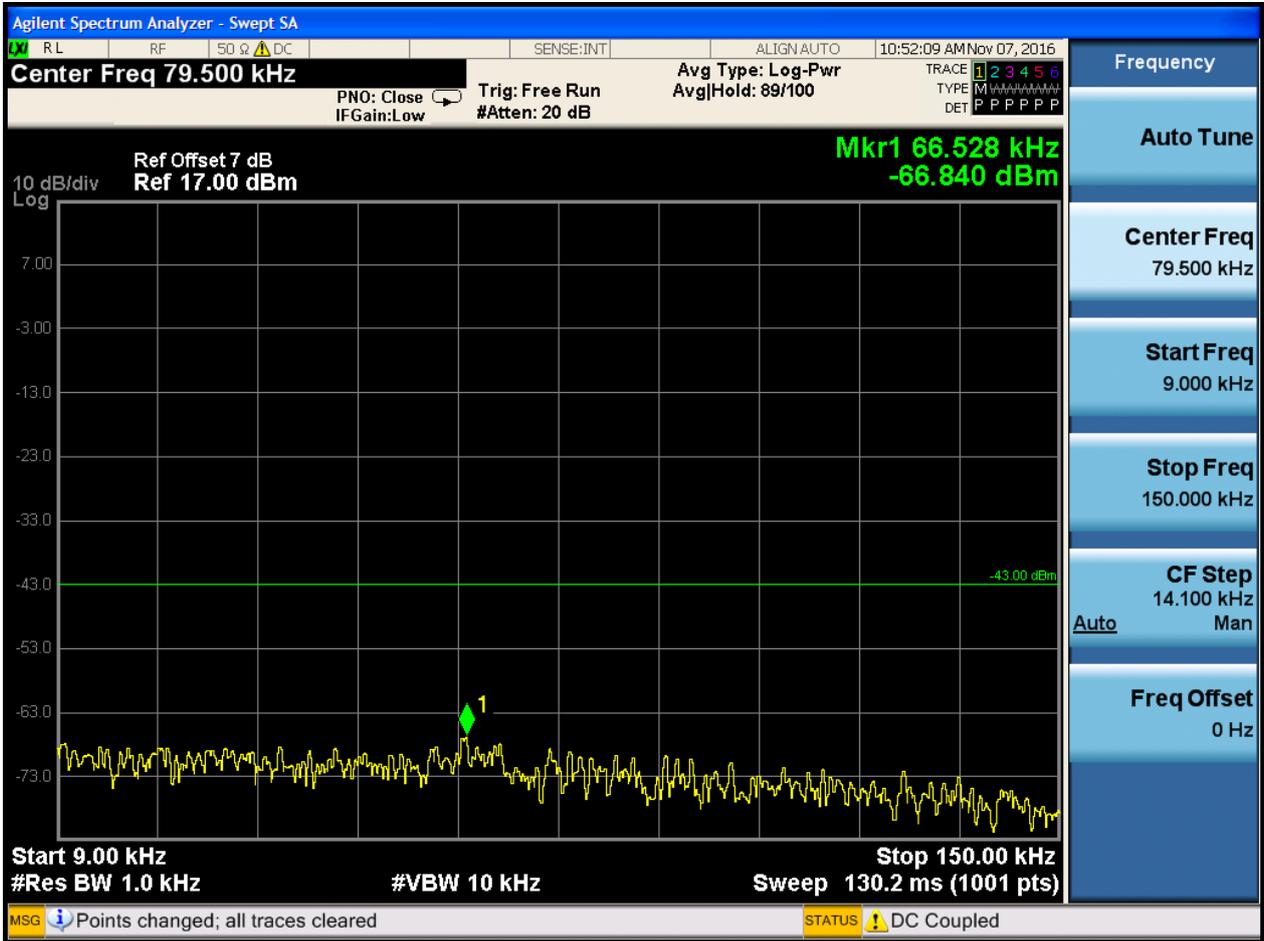
6.1.1.1 Test Mode = GSM/TM2

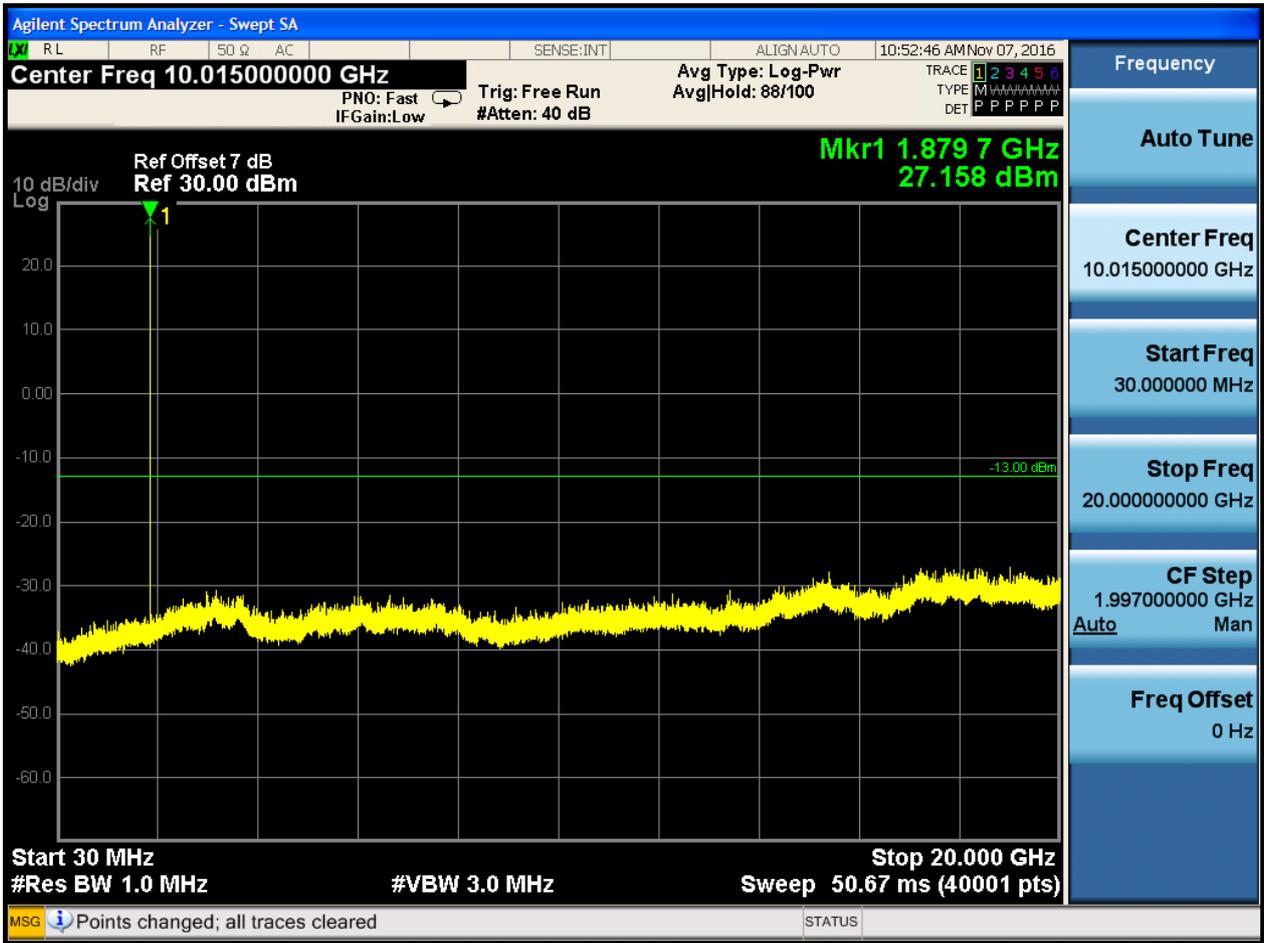
6.1.1.1.1 Test Channel = LCH



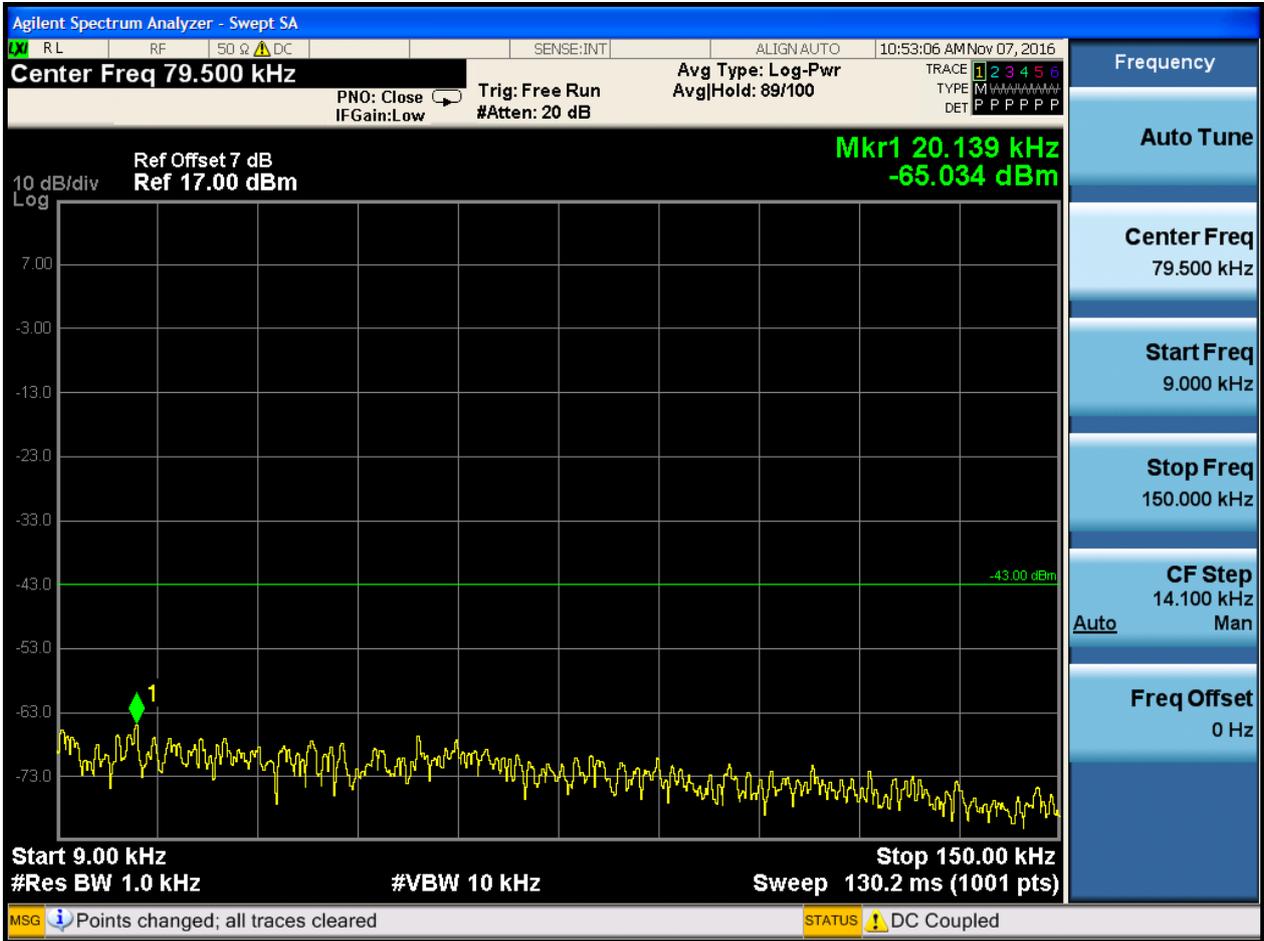


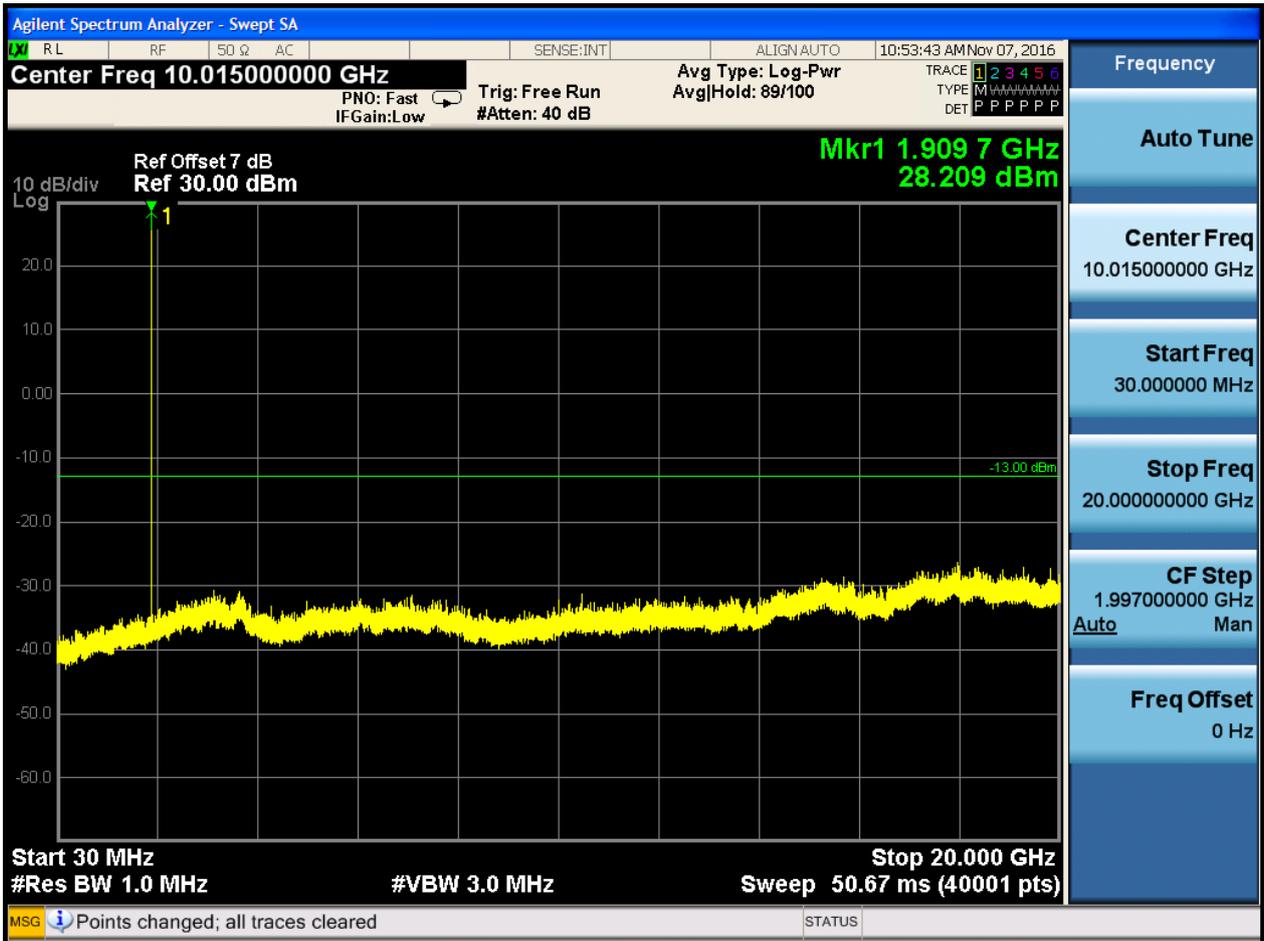
6.1.1.1.2 Test Channel = MCH





6.1.1.1.3 Test Channel = HCH



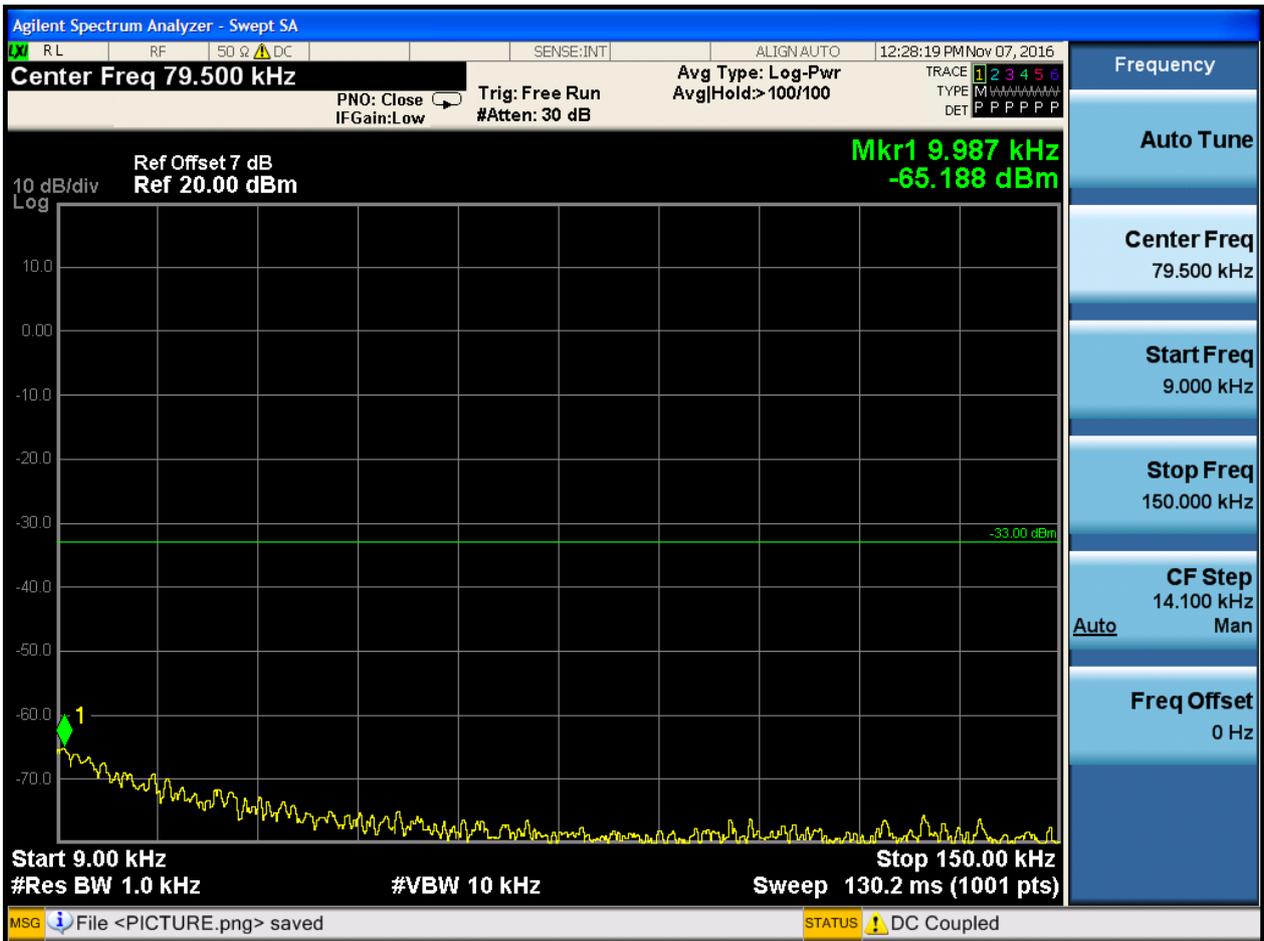


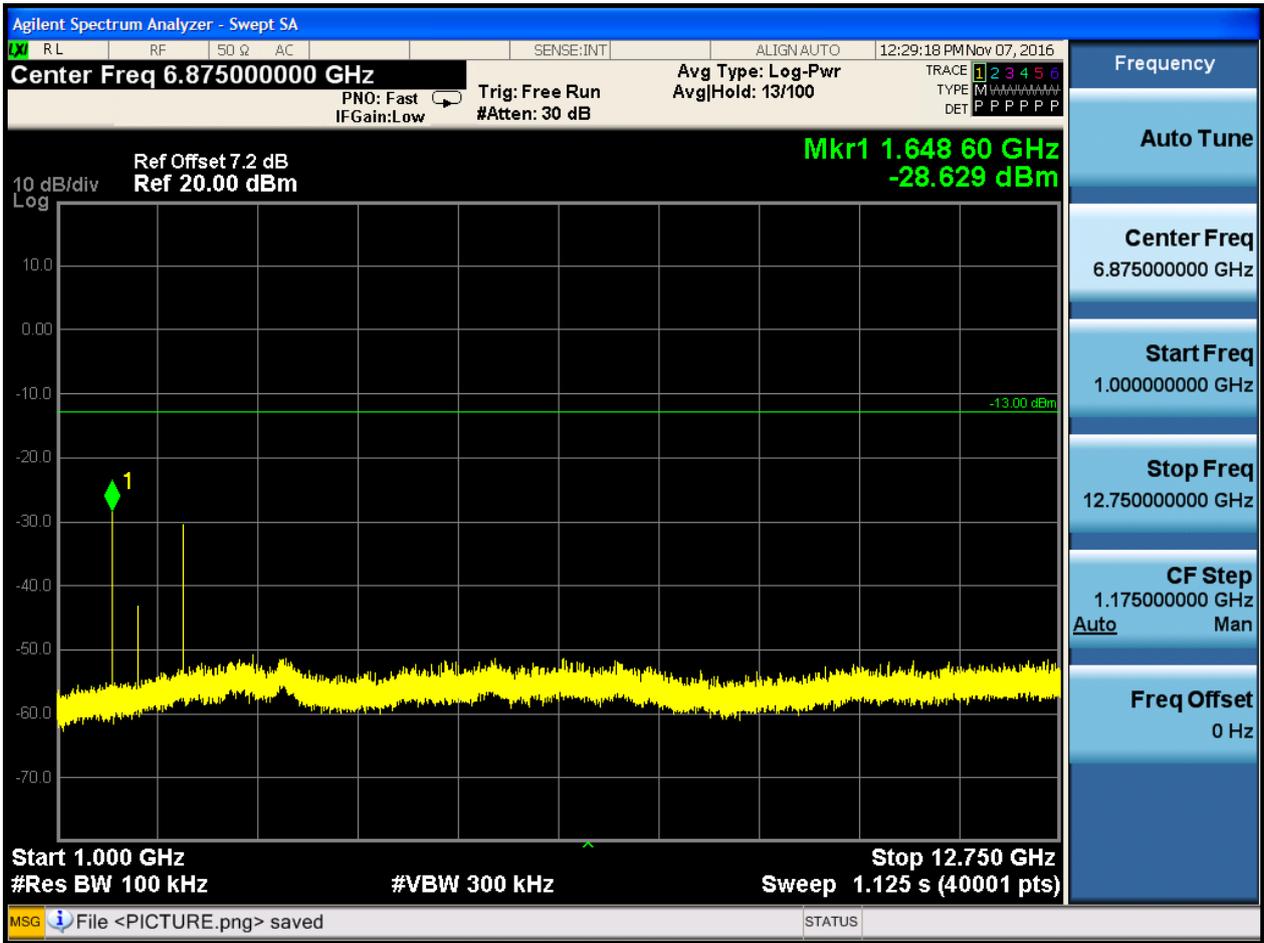


6.1.3 Test Band = GSM850

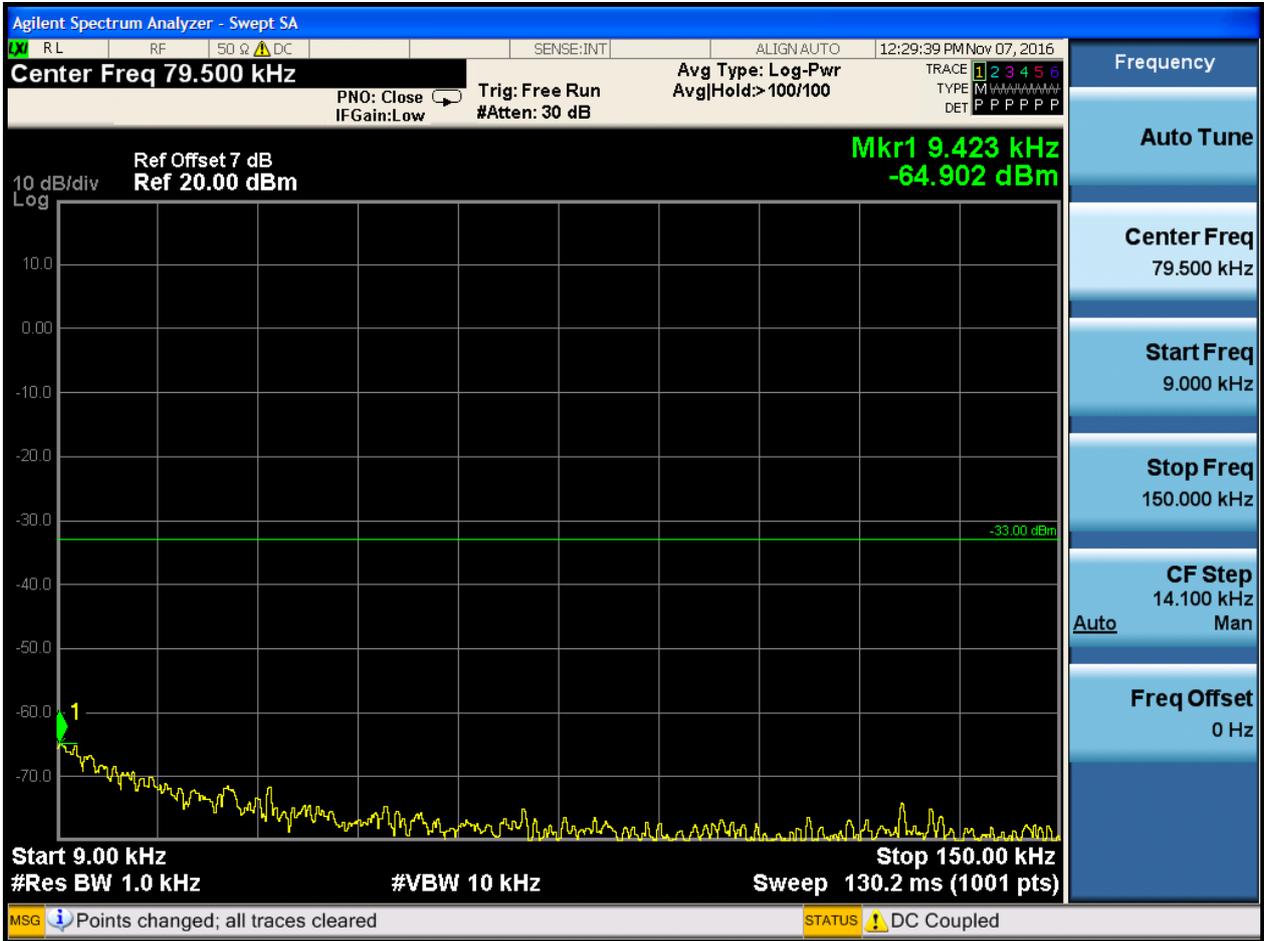
6.1.3.1 Test Mode = GSM/TM1

6.1.3.1.1 Test Channel = LCH

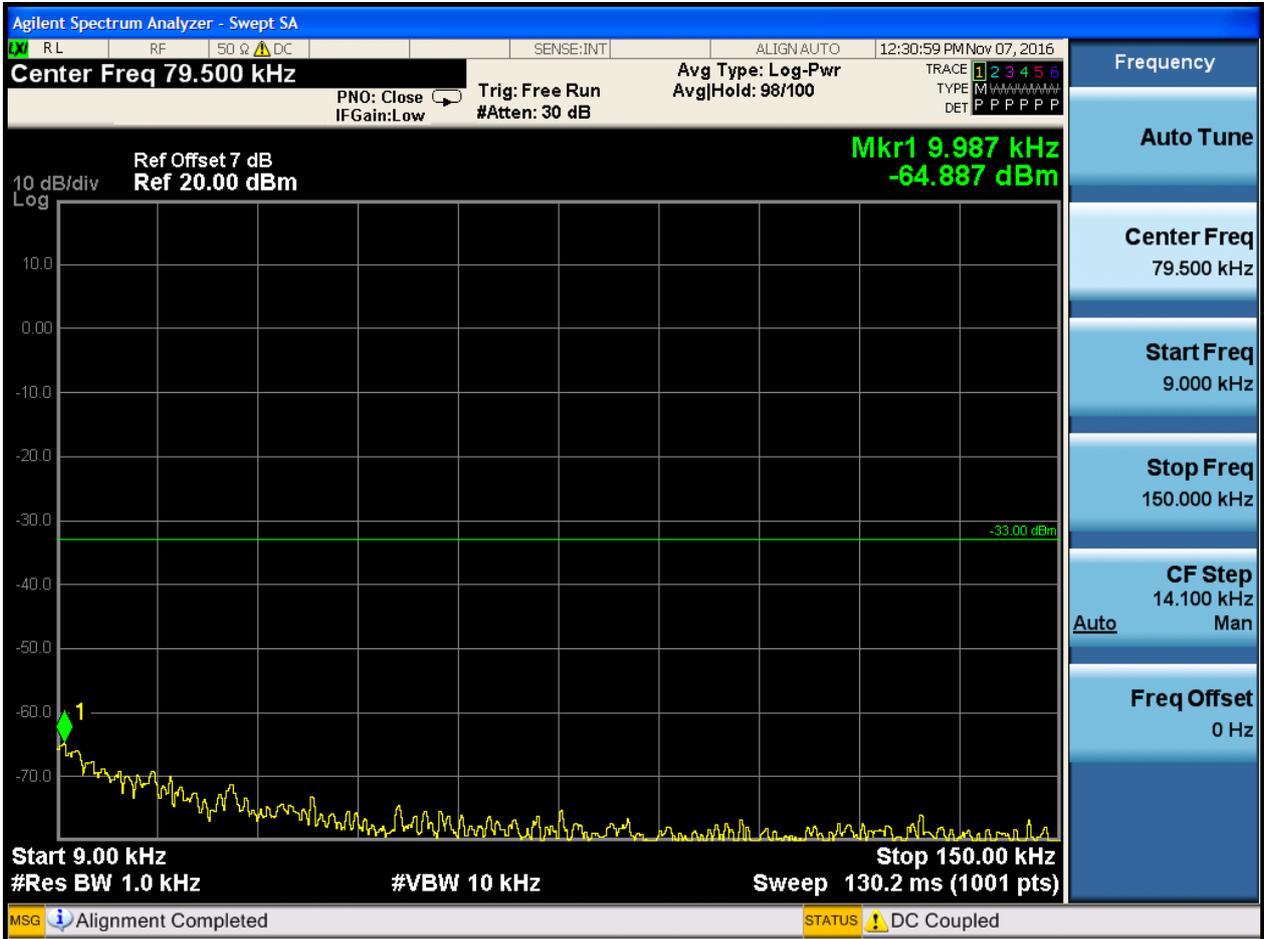


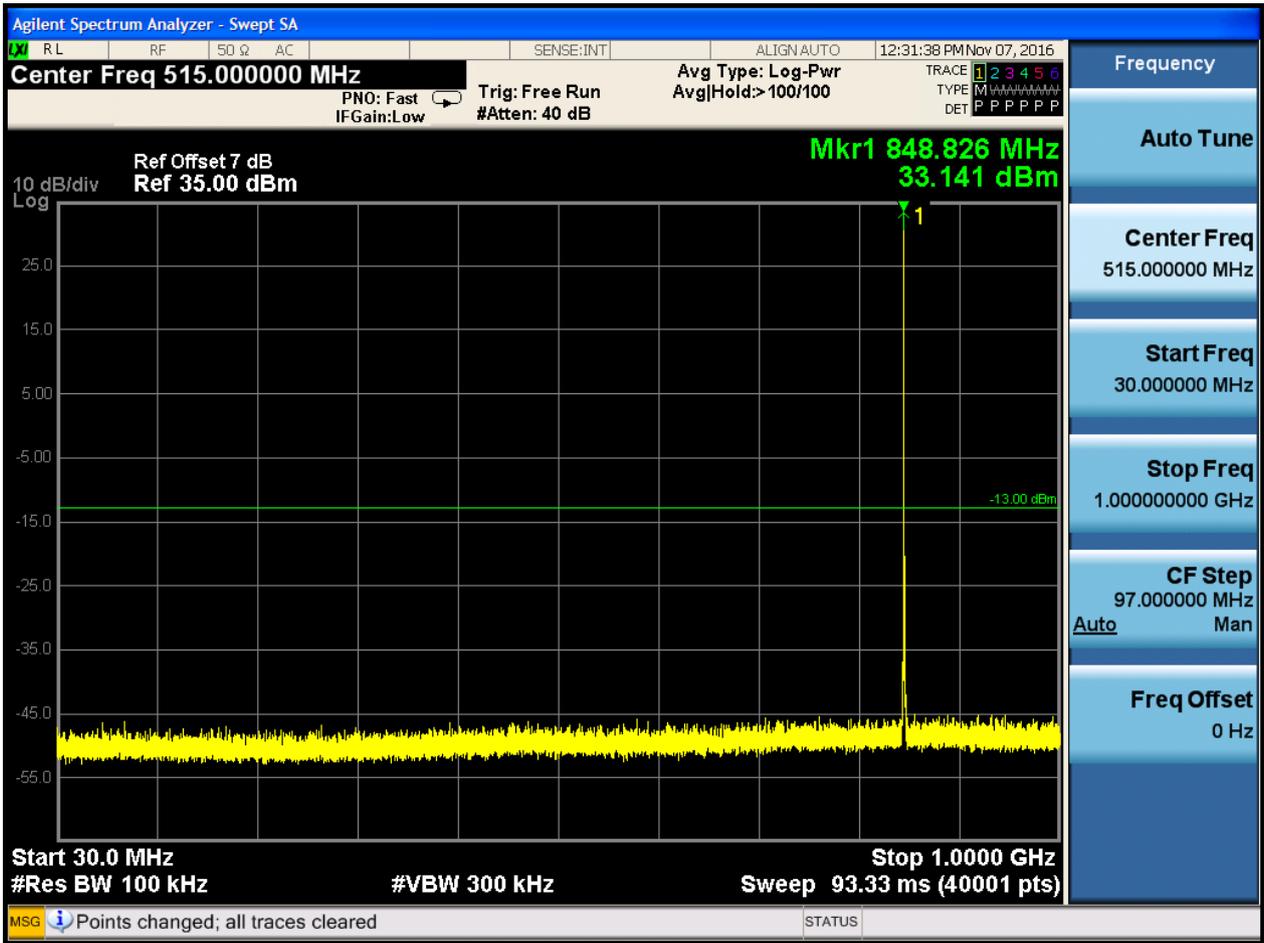


6.1.3.1.2 Test Channel = MCH



6.1.3.1.3 Test Channel = HCH

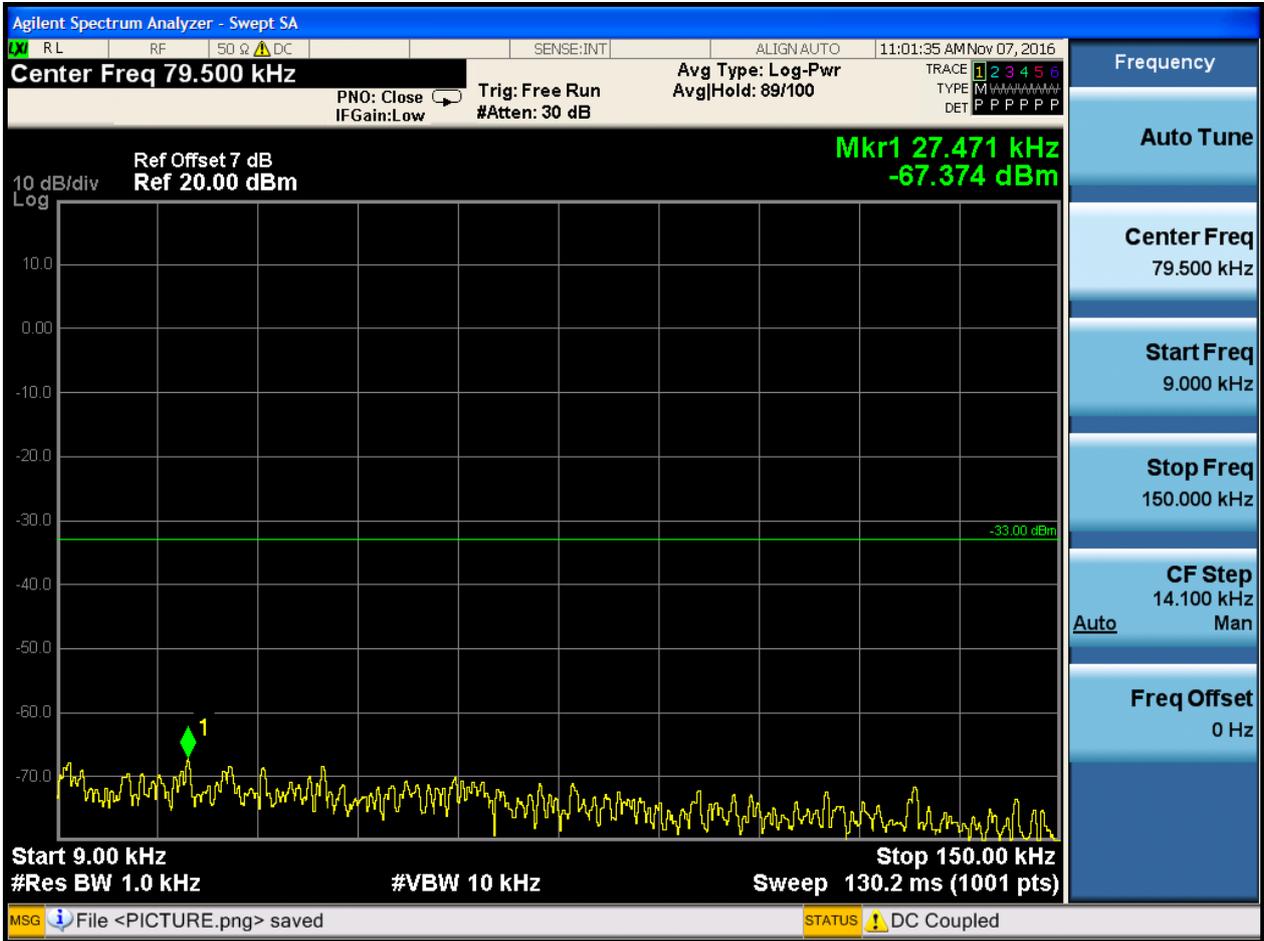


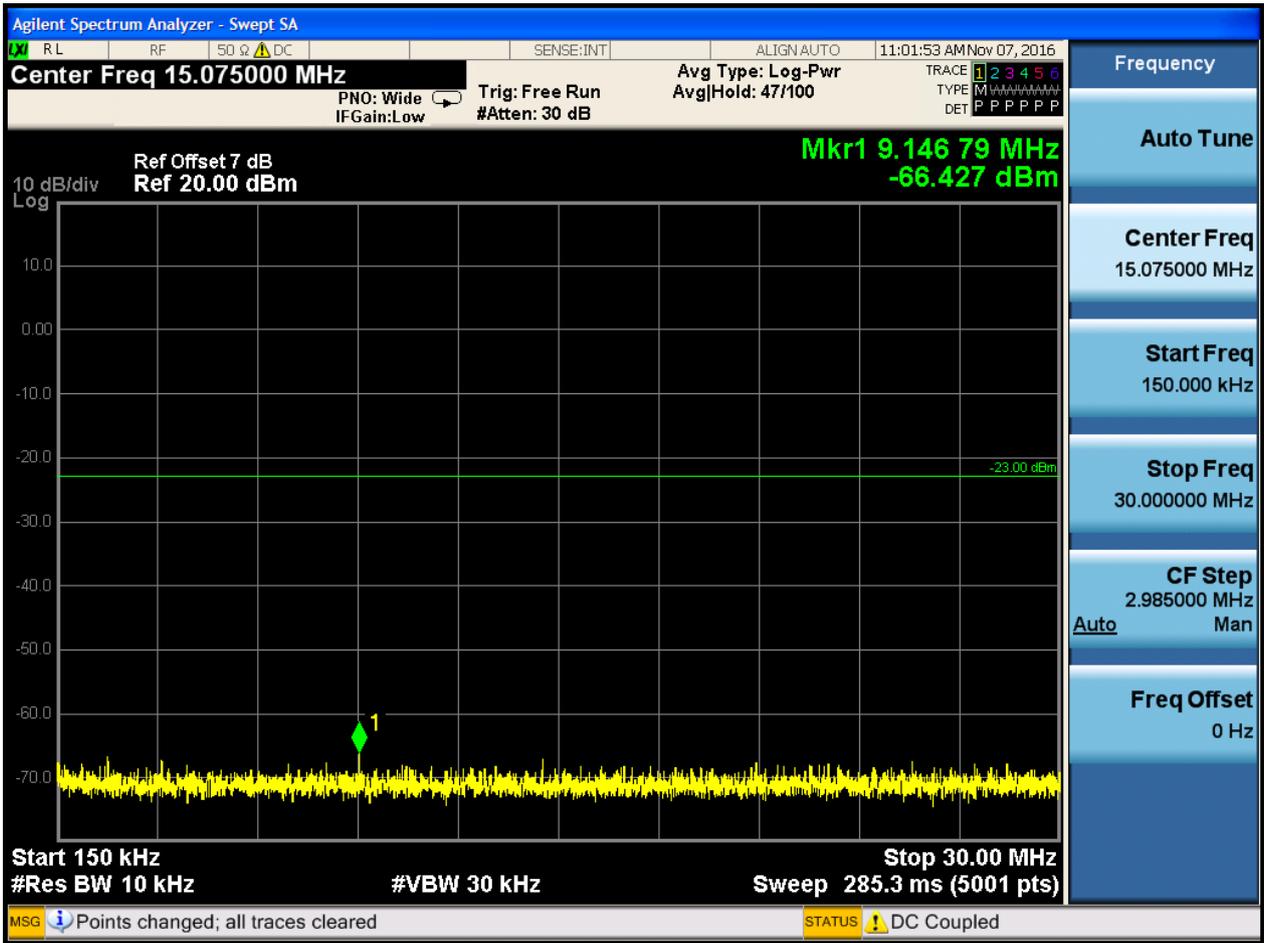


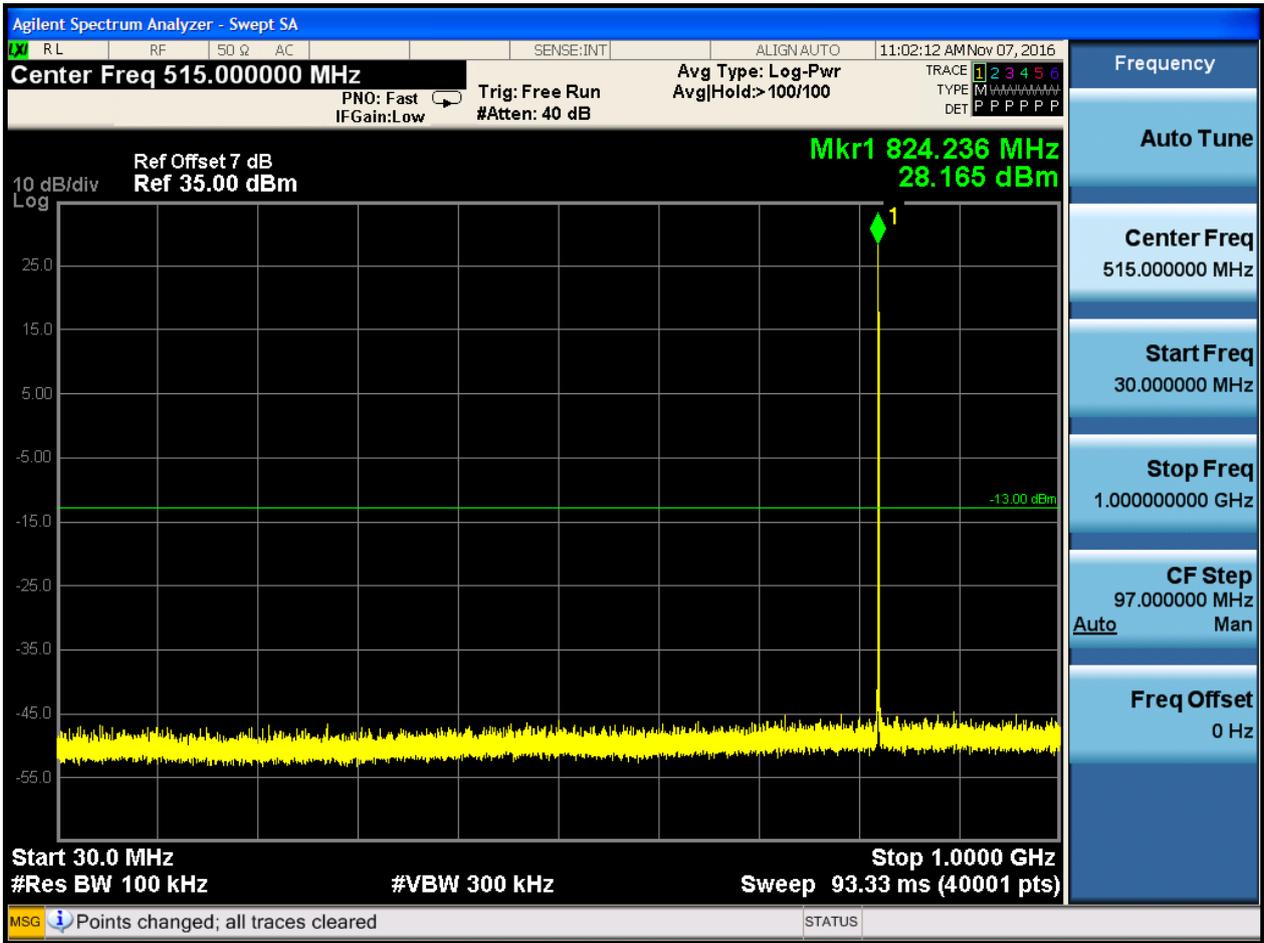


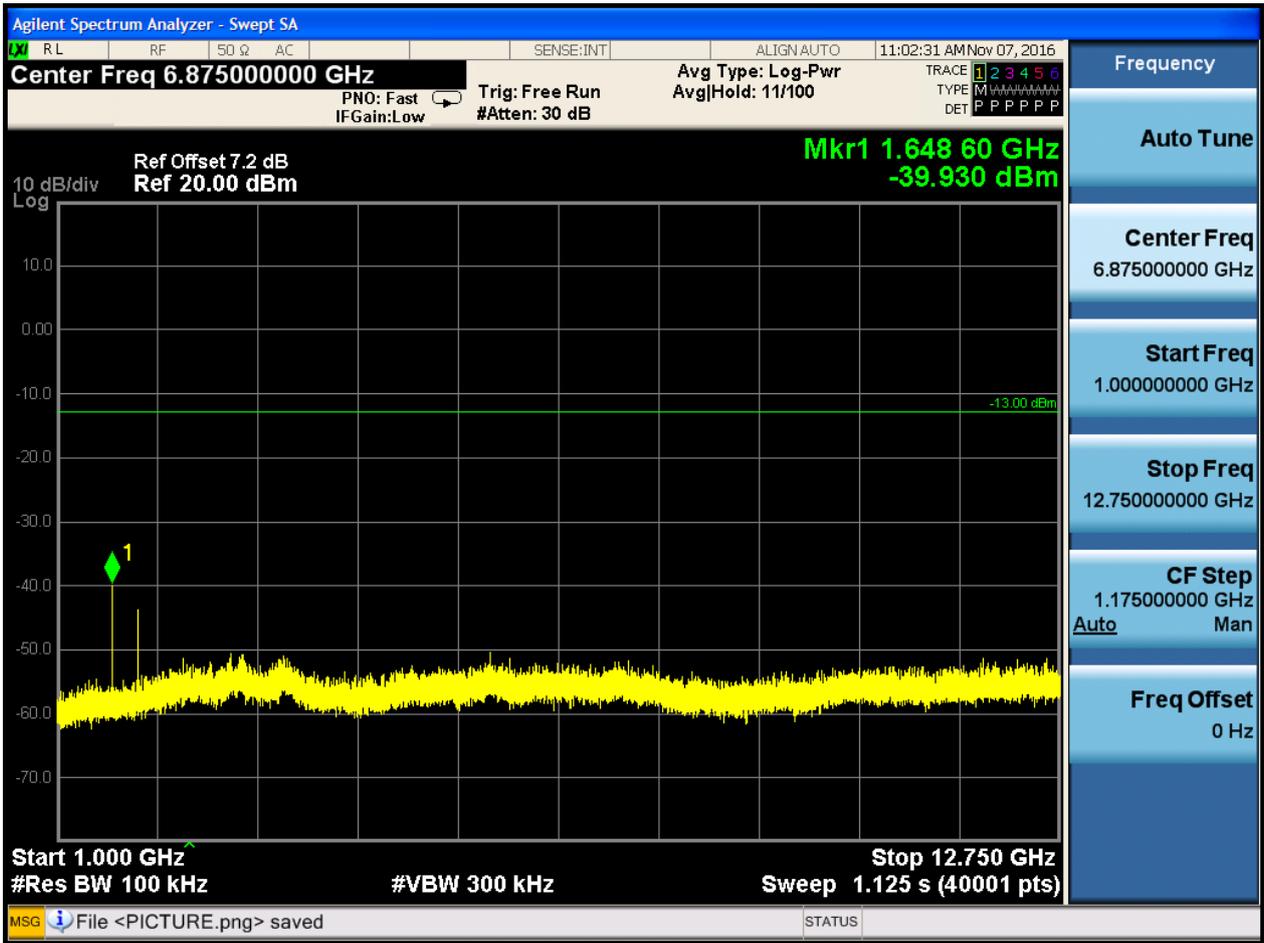
6.1.1.2 Test Mode = GSM/TM2

6.1.1.2.1 Test Channel = LCH



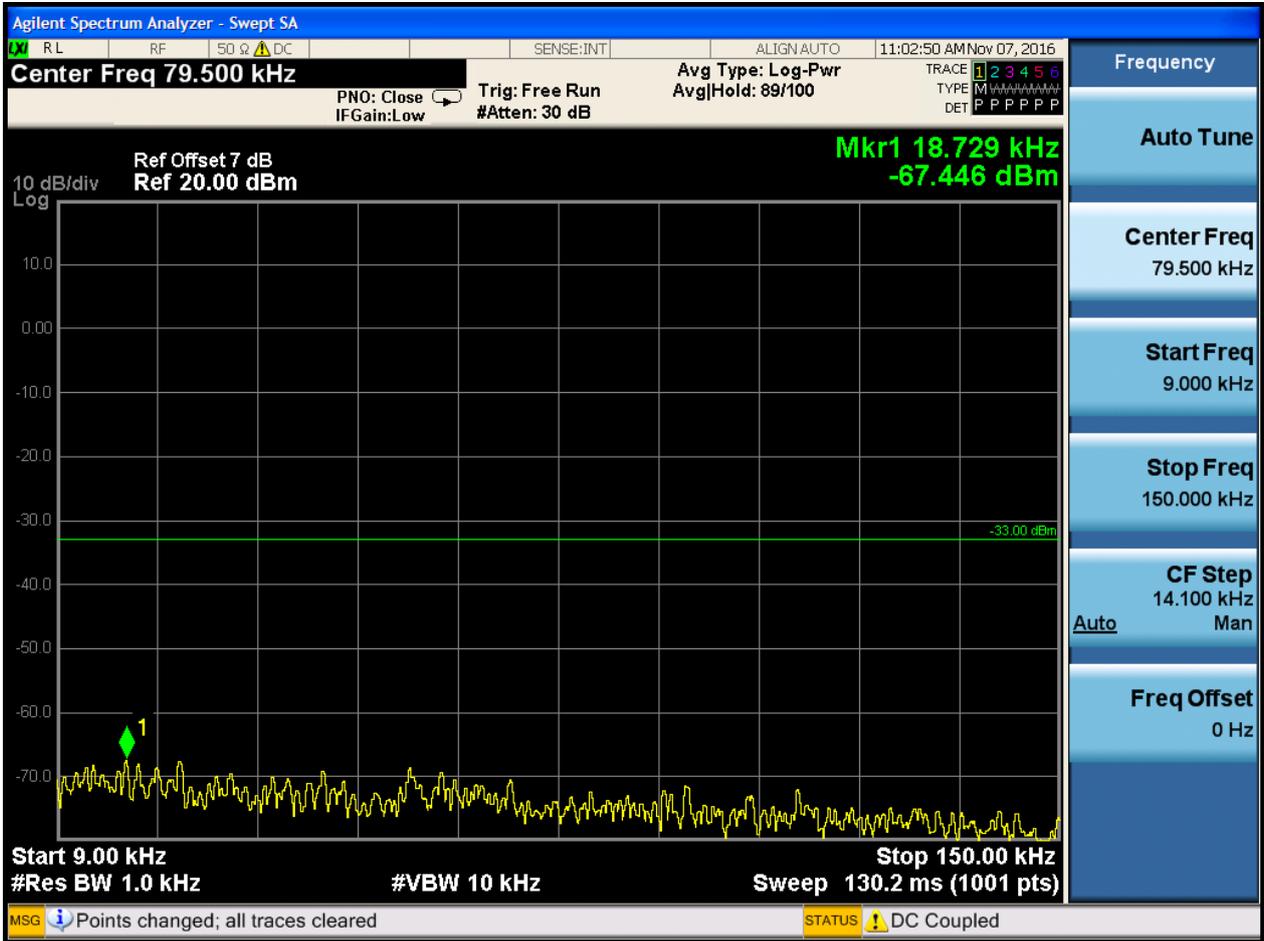


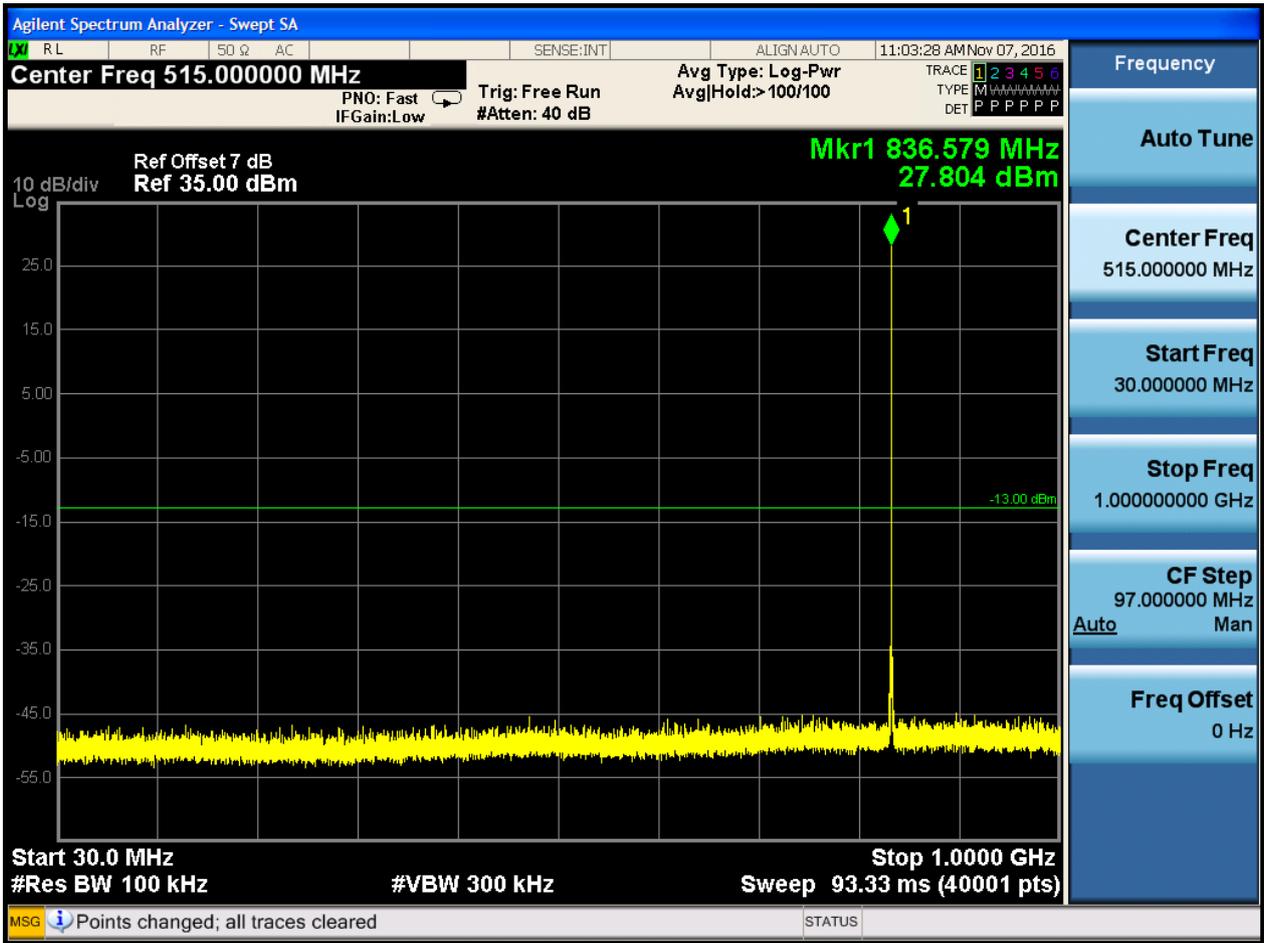




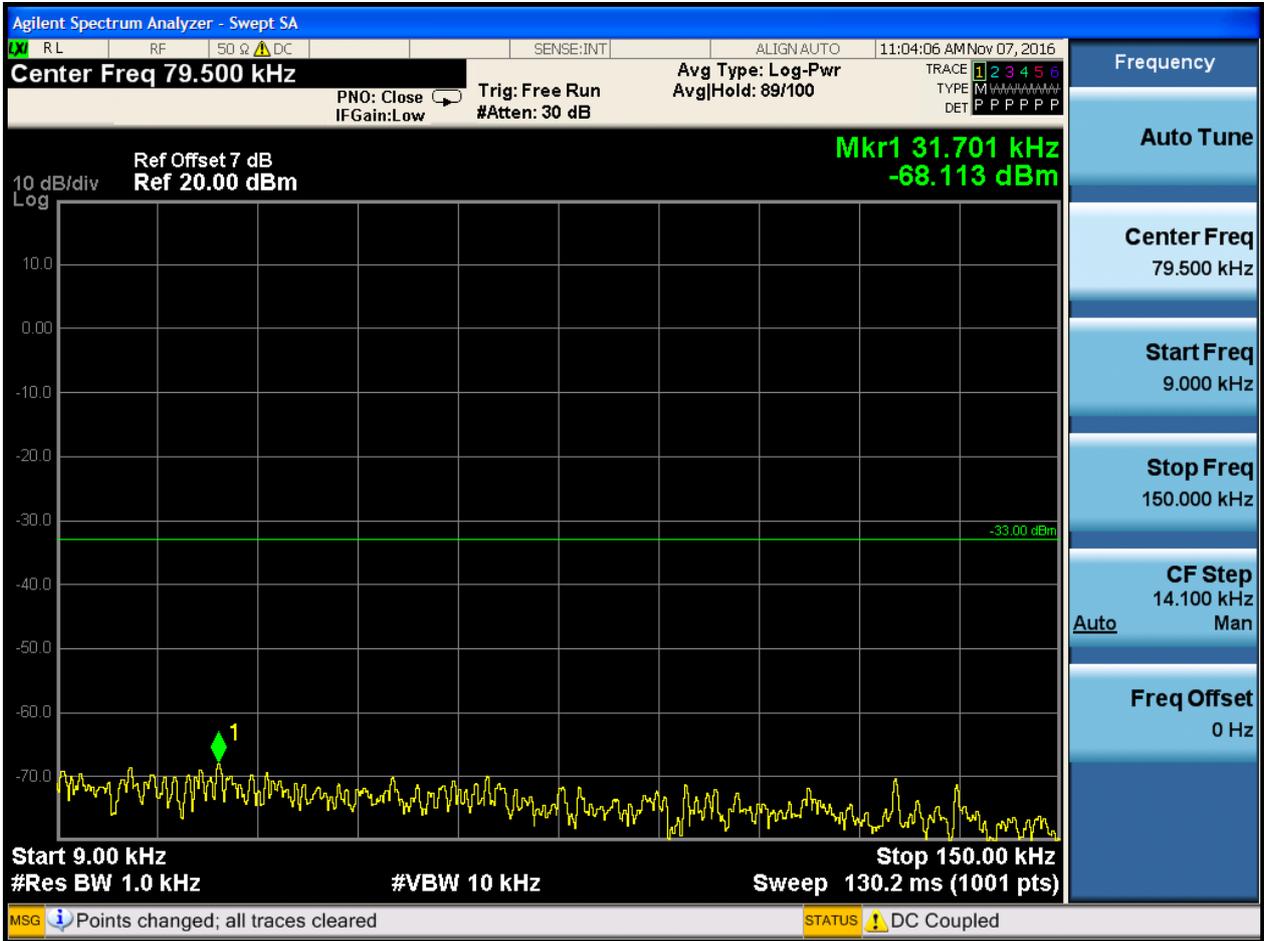


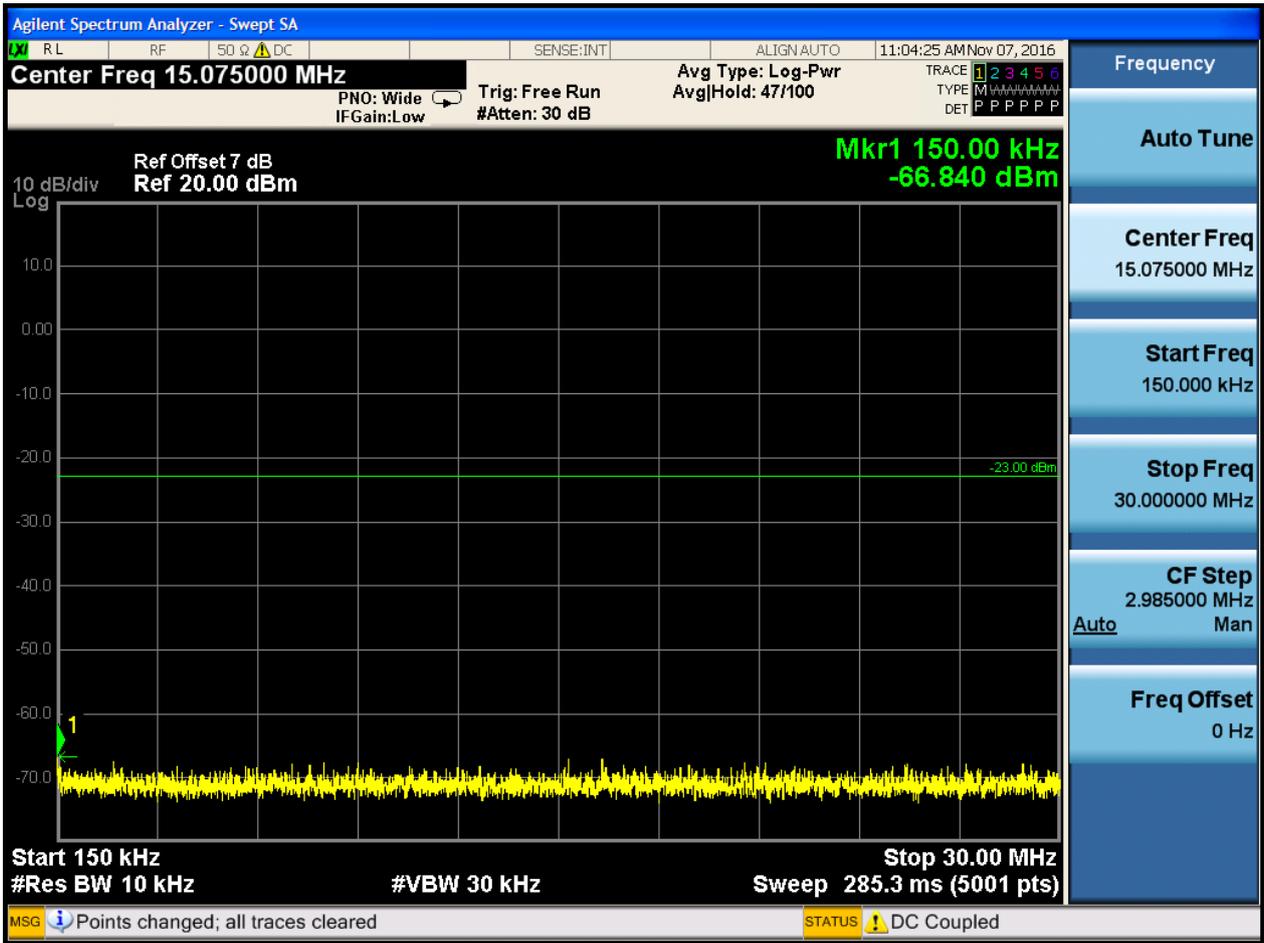
6.1.1.2.2 Test Channel = MCH

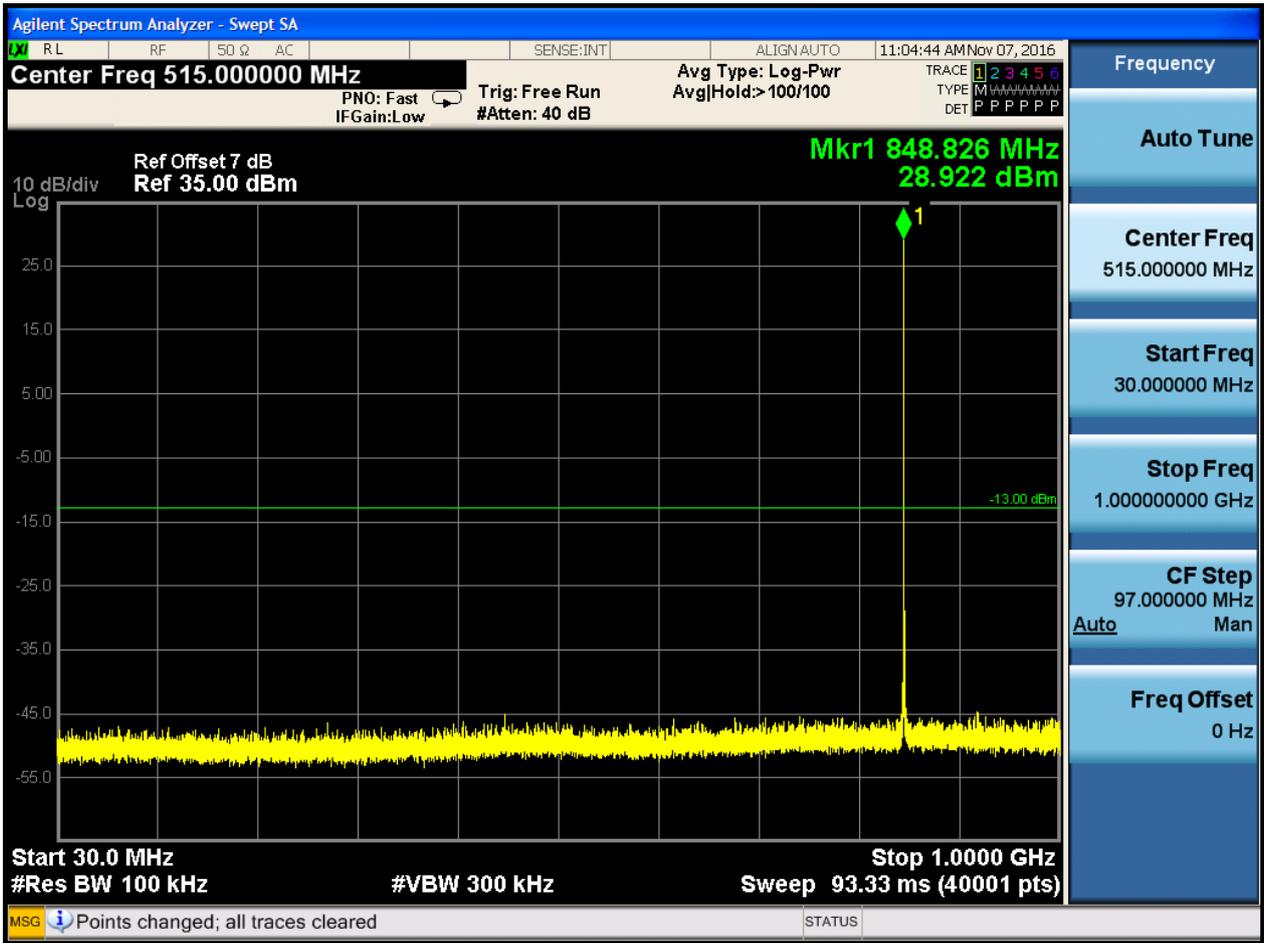


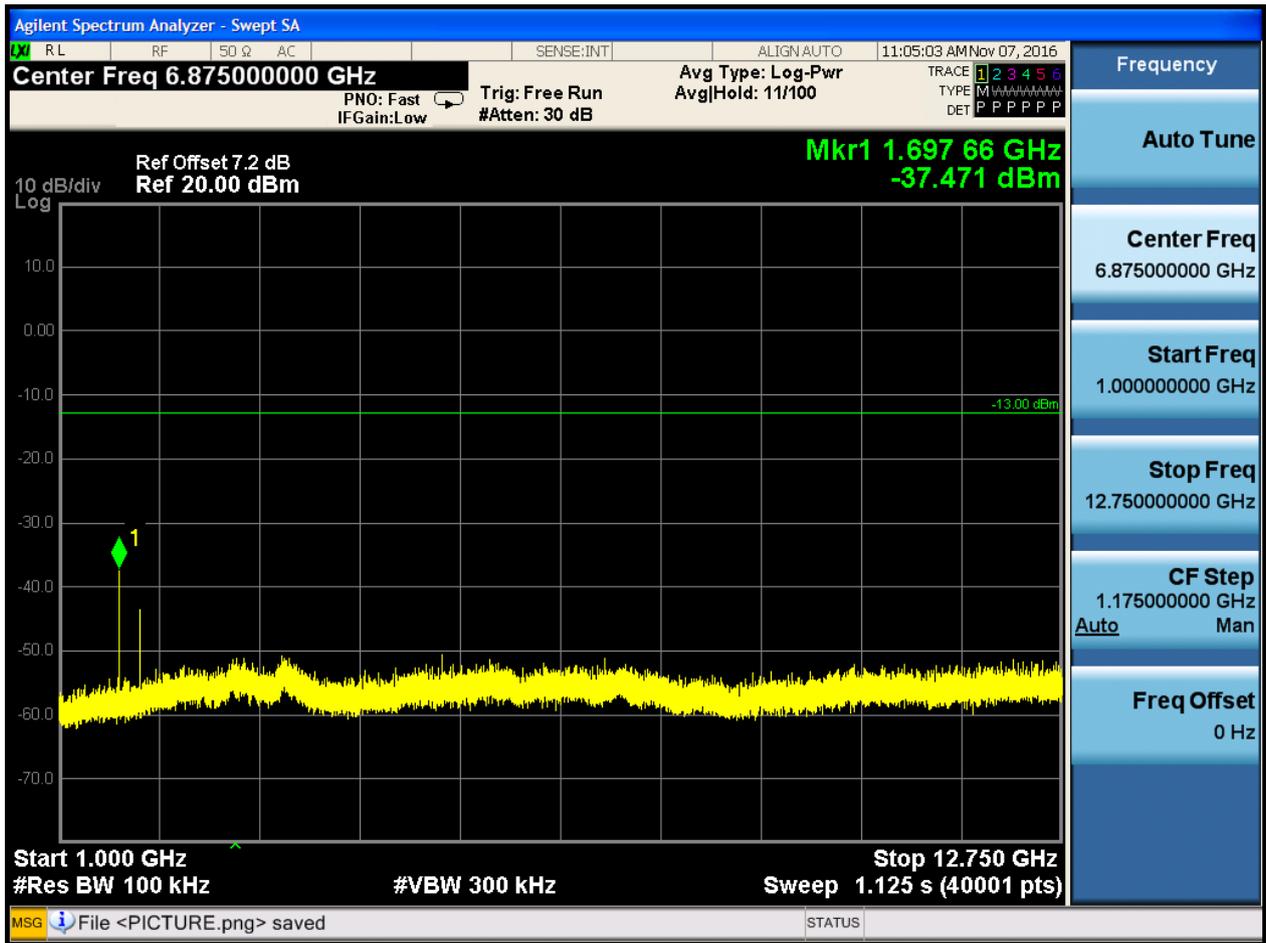


6.1.1.2.3 Test Channel = HCH









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

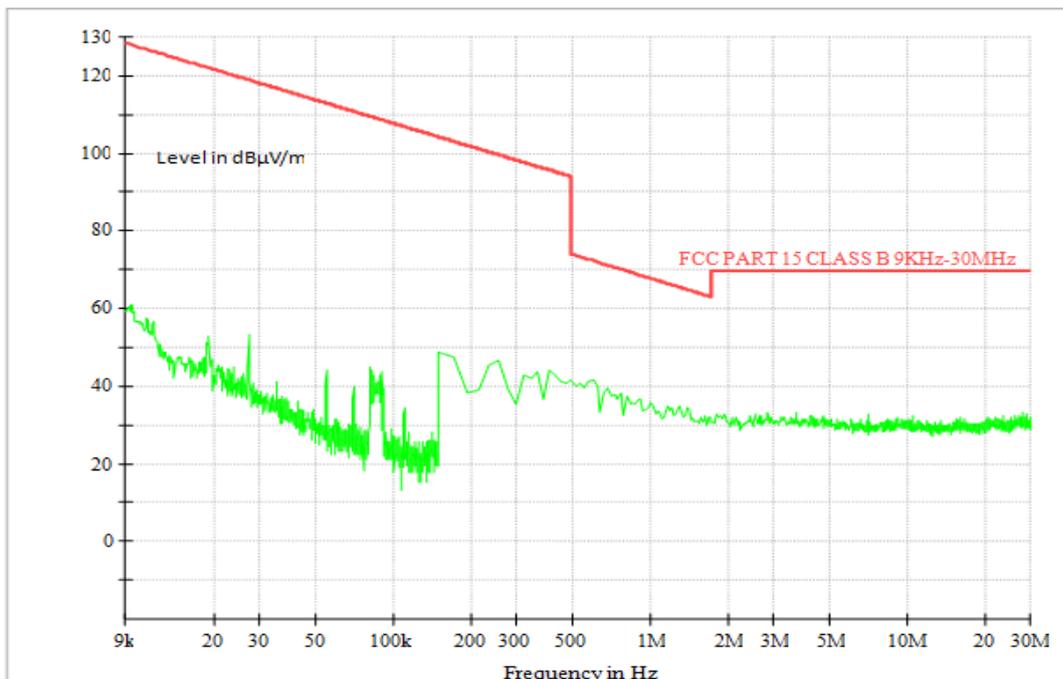
Above 1GHz, RBW = 1 MHz, VBW = 3 MHz. Detector: PK

Part I - Test Plots

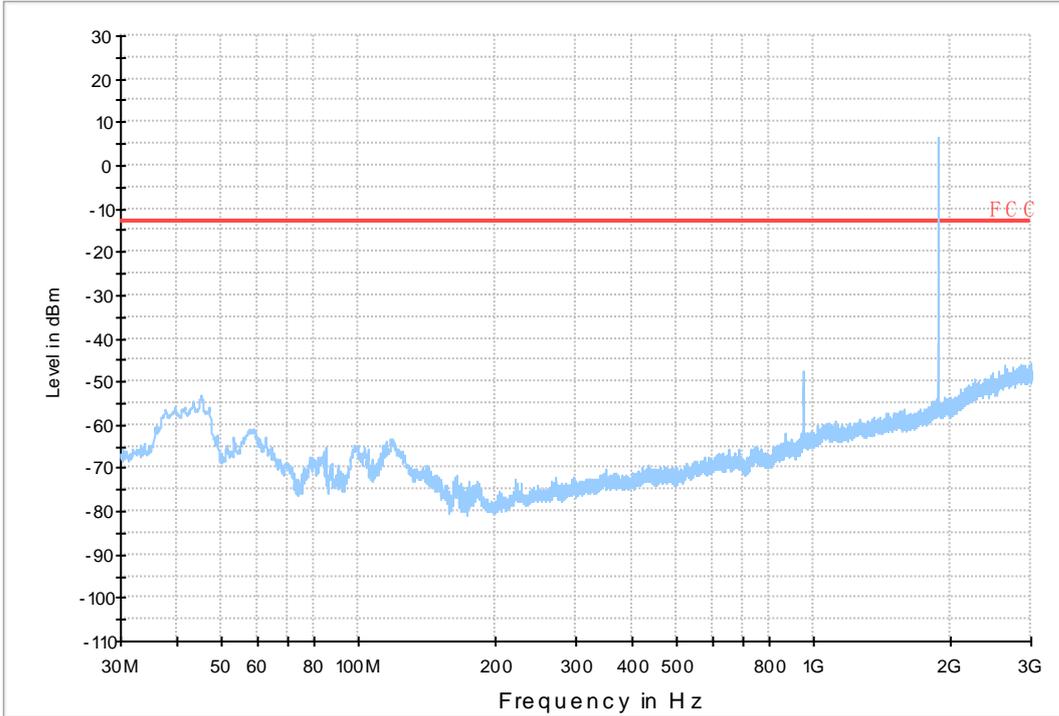
7.1 For GSM

7.1.2 Test Band = GSM1900

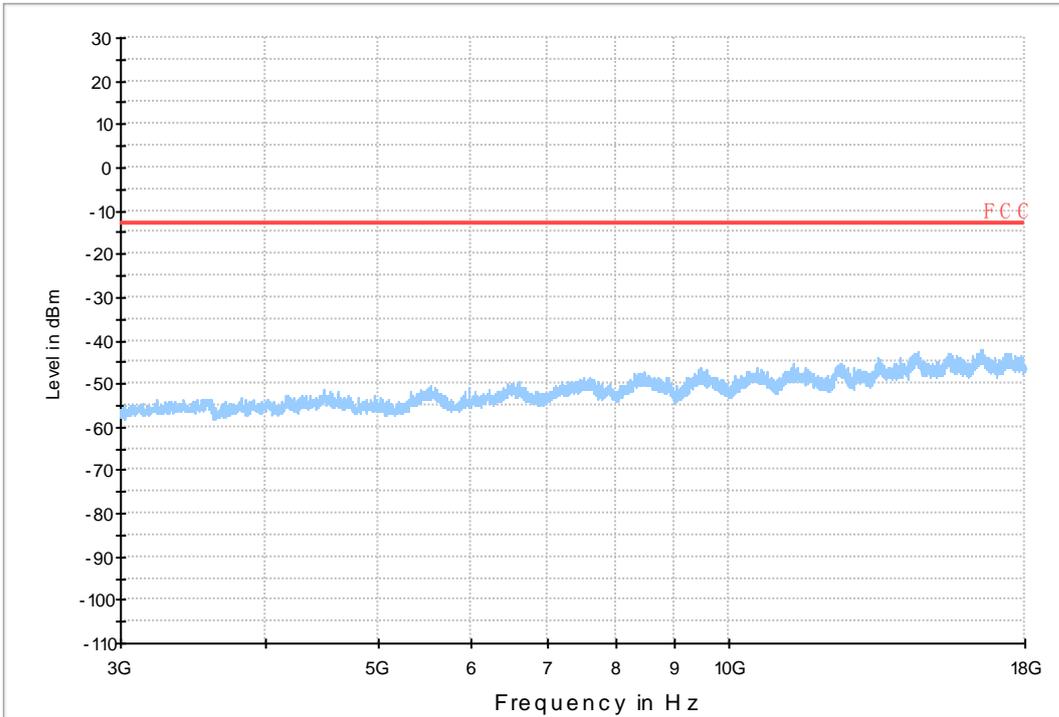
7.1.2.1 Test Mode = GSM/TM1

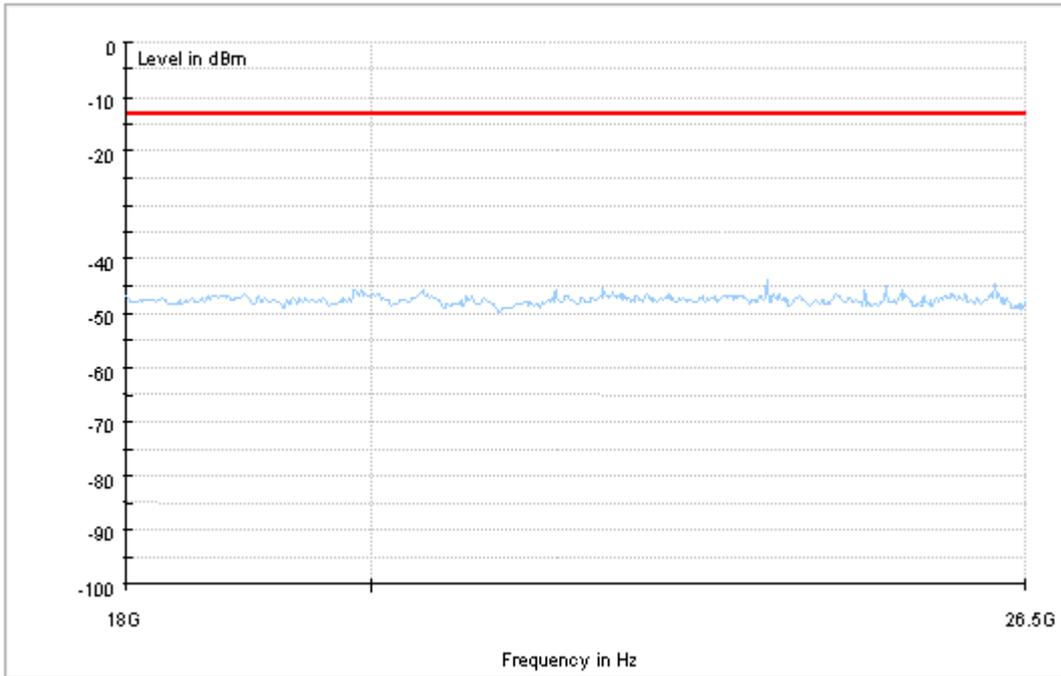


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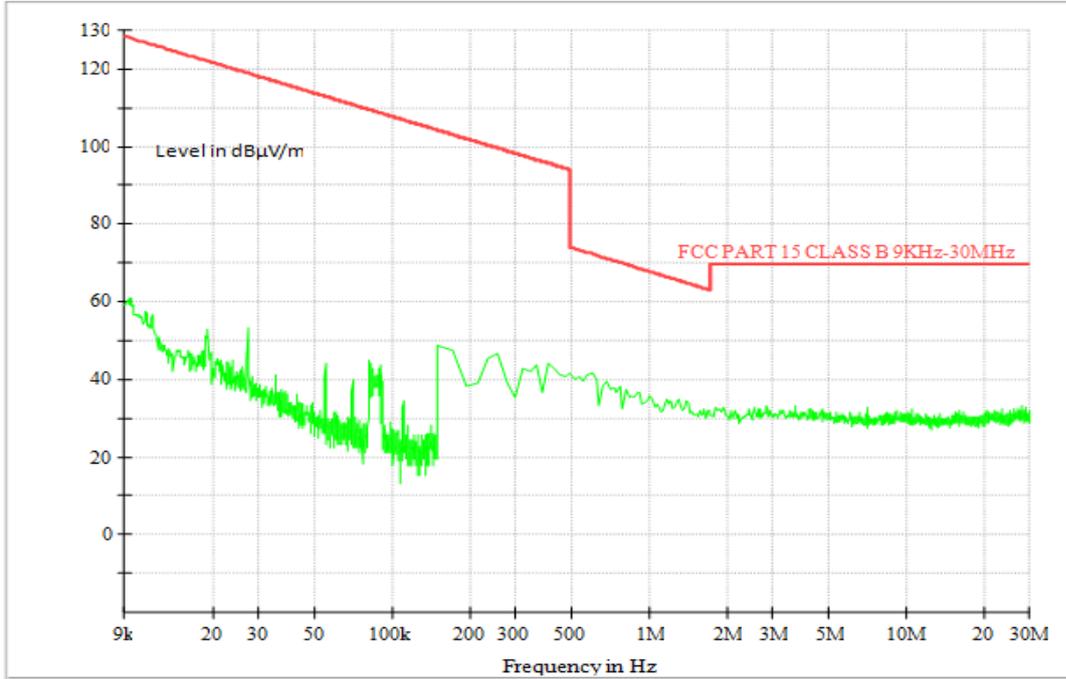
Copy of FCC PART24 GSM1900_H



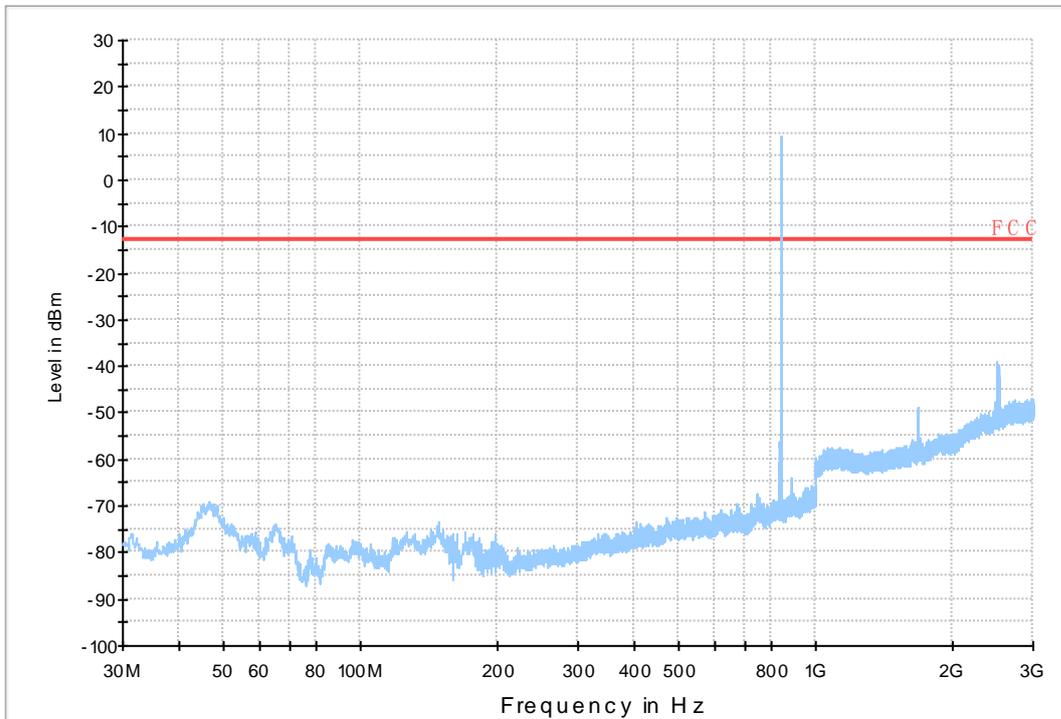


7.1.3 Test Band = GSM850

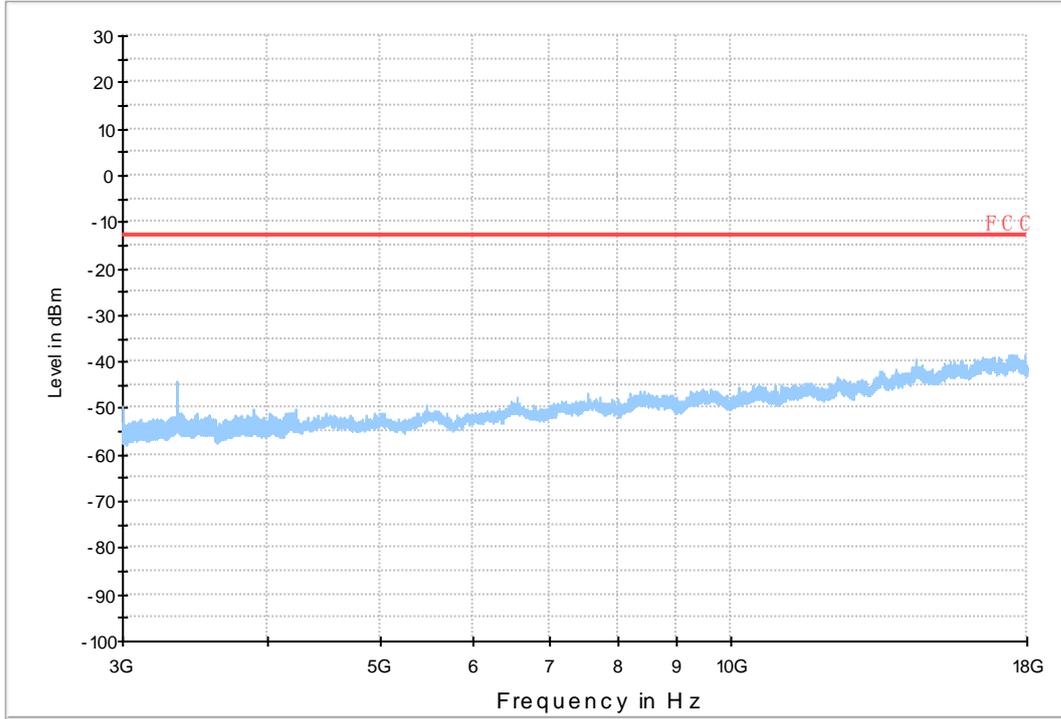
7.1.3.1 Test Mode = GSM/TM1



Copy of FCC PART22 GSM850_L



Copy of FCC PART22 GSM850_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
GSM1900	GSM/TM1	LCH	TN	VL	-8.01	-0.00433	PASS
				VN	-0.52	-0.00028	PASS
				VH	2.00	0.00108	PASS
		MCH	TN	VL	-5.81	-0.00309	PASS
				VN	-1.68	-0.00089	PASS
				VH	-0.84	-0.00045	PASS
		HCH	TN	VL	-0.13	-0.00007	PASS
				VN	1.23	0.00064	PASS
				VH	-0.48	-0.00025	PASS
	GSM/TM2	LCH	TN	VL	2.91	0.00157	PASS
				VN	-3.68	-0.00199	PASS
				VH	-6.84	-0.0037	PASS
		MCH	TN	VL	-4.88	-0.0026	PASS
				VN	2.20	0.00117	PASS
				VH	3.97	0.00211	PASS
HCH	TN	VL	-0.45	-0.00024	PASS		
		VN	-5.52	-0.00289	PASS		
		VH	-0.48	-0.00025	PASS		
GSM850	GSM/TM1	LCH	TN	VL	-2.45	-0.00297	PASS
				VN	-6.84	-0.0083	PASS
				VH	-4.46	-0.00541	PASS
		MCH	TN	VL	-7.36	-0.0088	PASS
				VN	-3.42	-0.00409	PASS
				VH	-8.07	-0.00965	PASS
		HCH	TN	VL	-0.58	-0.00068	PASS
				VN	-4.71	-0.00555	PASS
				VH	-0.97	-0.00051	PASS
	GSM/TM2	LCH	TN	VL	-1.94	-0.00235	PASS
				VN	0.61	0.00074	PASS
				VH	-0.87	-0.00106	PASS
MCH	TN	VL	3.00	0.00359	PASS		

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				VN	0.61	0.00073	PASS
				VH	1.90	0.00227	PASS
		HCH	TN	VL	-2.94	-0.00346	PASS
				VN	5.36	0.00631	PASS
				VH	2.78	0.00328	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
GSM1900	GSM/TM1	LCH	VN	-30	-1.10	-0.00059	PASS
				-20	1.03	0.00056	PASS
				-10	-7.55	-0.00408	PASS
				0	-9.94	-0.00537	PASS
				10	1.74	0.00094	PASS
				20	-11.43	-0.00618	PASS
				30	-7.17	-0.00388	PASS
				40	1.23	0.00066	PASS
		50	-4.91	-0.00265	PASS		
		MCH	VN	-30	-0.97	-0.00052	PASS
				-20	-1.10	-0.00059	PASS
				-10	0.45	0.00024	PASS
				0	-0.71	-0.00038	PASS
				10	-6.26	-0.00333	PASS
				20	-2.58	-0.00137	PASS
				30	-1.81	-0.00096	PASS
				40	-1.49	-0.00079	PASS
		50	0.65	0.00035	PASS		
		HCH	VN	-30	-1.55	-0.00081	PASS
				-20	1.10	0.00058	PASS
				-10	0.84	0.00044	PASS
				0	6.01	0.00315	PASS
				10	-1.49	-0.00078	PASS
				20	-2.84	-0.00149	PASS
	30			-8.46	-0.00443	PASS	
	40			-3.68	-0.00193	PASS	
	50	0.97	0.00051	PASS			
	GSM/TM2	LCH	VN	-30	-8.75	-0.00473	PASS
				-20	1.19	0.00064	PASS
				-10	-5.68	-0.00307	PASS
				0	4.13	0.00223	PASS



Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict		
				10	-11.56	-0.00625	PASS		
				20	3.03	0.00164	PASS		
				30	-7.97	-0.00431	PASS		
				40	3.13	0.00169	PASS		
				50	-8.65	-0.00468	PASS		
		MCH	VN			-30	0.36	0.00019	PASS
						-20	-0.65	-0.00035	PASS
						-10	-3.07	-0.00163	PASS
						0	1.52	0.00081	PASS
						10	-3.03	-0.00161	PASS
						20	-1.94	-0.00103	PASS
						30	0.55	0.00029	PASS
						40	0.29	0.00015	PASS
						50	1.71	0.00091	PASS
						HCH	VN		
		-20	0.94	0.00049	PASS				
		-10	-0.26	-0.00014	PASS				
		0	-1.16	-0.00061	PASS				
		10	-9.46	-0.00495	PASS				
		20	4.58	0.0024	PASS				
		30	1.65	0.00086	PASS				
		40	-0.68	-0.00036	PASS				
		50	3.10	0.00162	PASS				
		GSM850	GSM/TM1	LCH	VN	-30	-9.56	-0.0116	PASS
-20	-10.85					-0.01316	PASS		
-10	-6.59					-0.008	PASS		
0	-6.59					-0.008	PASS		
10	-4.78					-0.0058	PASS		
20	-6.59					-0.008	PASS		
30	-10.59					-0.01285	PASS		
40	-6.65					-0.00807	PASS		
50	-5.17					-0.00627	PASS		
MCH	VN							-30	-3.55
				-20	-2.65			-0.00317	PASS
				-10	-6.72			-0.00803	PASS
				0	-5.04			-0.00602	PASS
				10	-6.01			-0.00718	PASS
				20	-7.10			-0.00849	PASS
				30	-7.17			-0.00857	PASS
				40	-0.26			-0.00031	PASS
				50	-2.71			-0.00324	PASS



Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict	
		HCH	VN	-30	-4.97	-0.00586	PASS	
				-20	-4.78	-0.00563	PASS	
				-10	-11.82	-0.01393	PASS	
				0	1.55	0.00183	PASS	
				10	-3.23	-0.00381	PASS	
				20	-5.42	-0.00639	PASS	
				30	0.19	0.00022	PASS	
				40	-6.01	-0.00708	PASS	
				50	0.97	0.00051	PASS	
		GSM/TM2	LCH	VN	-30	-5.55	-0.00673	PASS
					-20	1.23	0.00149	PASS
					-10	0.61	0.00074	PASS
					0	-1.42	-0.00172	PASS
					10	2.71	0.00329	PASS
					20	-0.16	-0.00019	PASS
					30	-1.29	-0.00157	PASS
					40	0.03	0.00004	PASS
					50	-3.29	-0.00399	PASS
	MCH		VN	-30	2.49	0.00298	PASS	
				-20	3.71	0.00443	PASS	
				-10	5.91	0.00706	PASS	
				0	3.36	0.00402	PASS	
				10	2.45	0.00293	PASS	
				20	5.07	0.00606	PASS	
				30	-2.52	-0.00301	PASS	
				40	-1.10	-0.00131	PASS	
				50	6.55	0.00783	PASS	
	HCH	VN	-30	-6.01	-0.00708	PASS		
			-20	-0.39	-0.00046	PASS		
			-10	2.65	0.00312	PASS		
			0	1.84	0.00217	PASS		
			10	-2.39	-0.00282	PASS		
			20	-4.16	-0.0049	PASS		
			30	-4.62	-0.00544	PASS		
			40	-2.84	-0.00335	PASS		
			50	0.10	0.00012	PASS		

END