



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]	EIRP/ERP [dBm]	Limit [dBm]	Verdict
GSM1900	GSM/TM1	LCH	29.77	27.57	33	PASS
		MCH	29.66	27.46	33	PASS
		HCH	29.53	27.33	33	PASS
	GSM/TM2	LCH	25.57	23.37	33	PASS
		MCH	25.55	23.35	33	PASS
		HCH	25.52	23.32	33	PASS
GSM850	GSM/TM1	LCH	32.53	26.68	38.5	PASS
		MCH	32.5	26.65	38.5	PASS
		HCH	32.45	26.6	38.5	PASS
	GSM/TM2	LCH	26.62	20.77	38.5	PASS
		MCH	26.63	20.78	38.5	PASS
		HCH	26.58	20.73	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:

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

SET RBW = 1% 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	0.13	13	PASS
		MCH	0.13	13	PASS
		HCH	0.12	13	PASS
	GSM/TM2	LCH	2.83	13	PASS
		MCH	2.86	13	PASS
		HCH	2.86	13	PASS
GSM850	GSM/TM1	LCH	0.12	13	PASS
		MCH	0.12	13	PASS
		HCH	0.12	13	PASS
	GSM/TM2	LCH	3.13	13	PASS
		MCH	3.05	13	PASS
		HCH	3.12	13	PASS

3Appendix_C: Modulation Characteristics

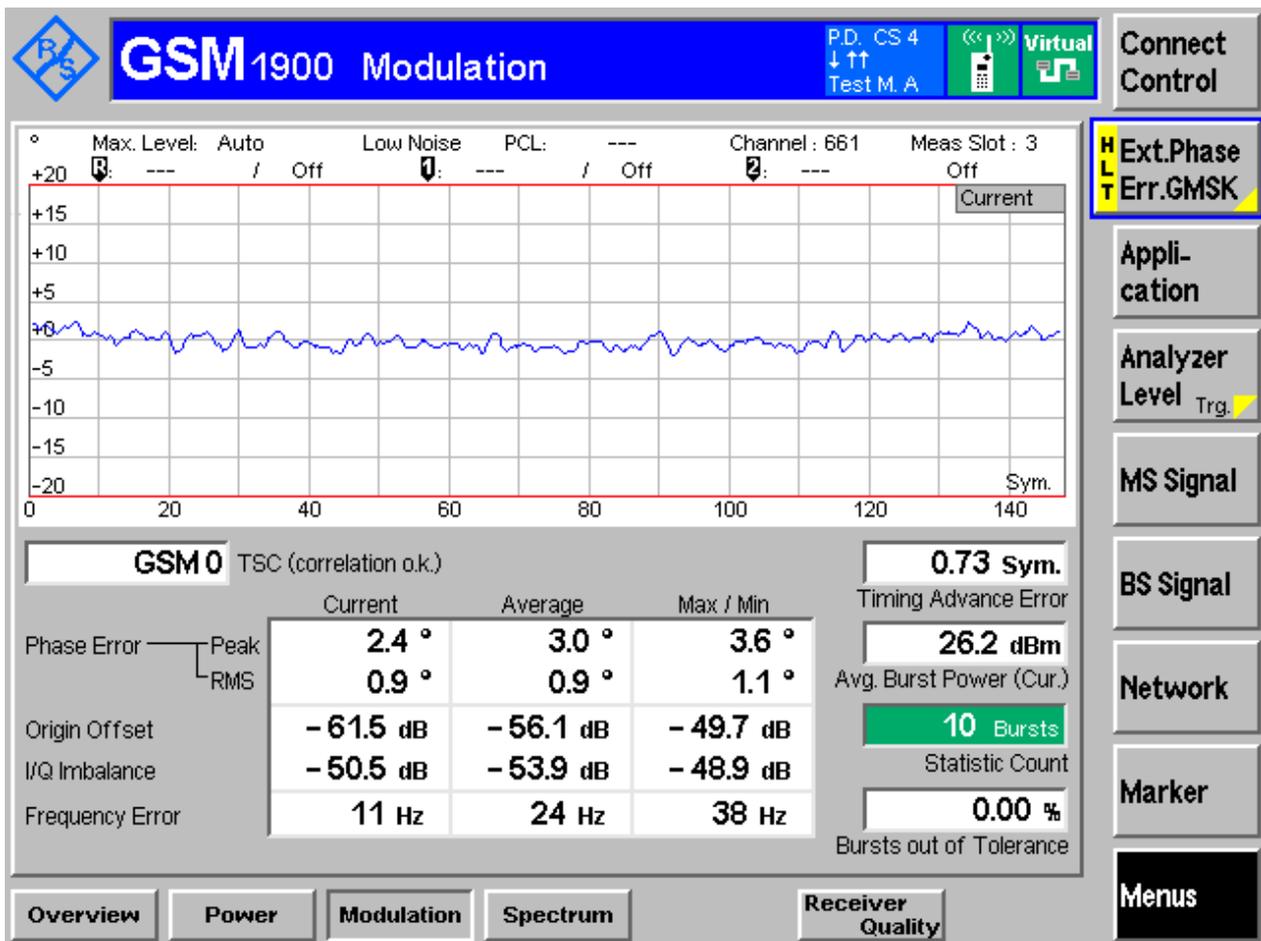
Part I - Test Plots

3.1 For GSM

3.1.1 Test Band = GSM1900

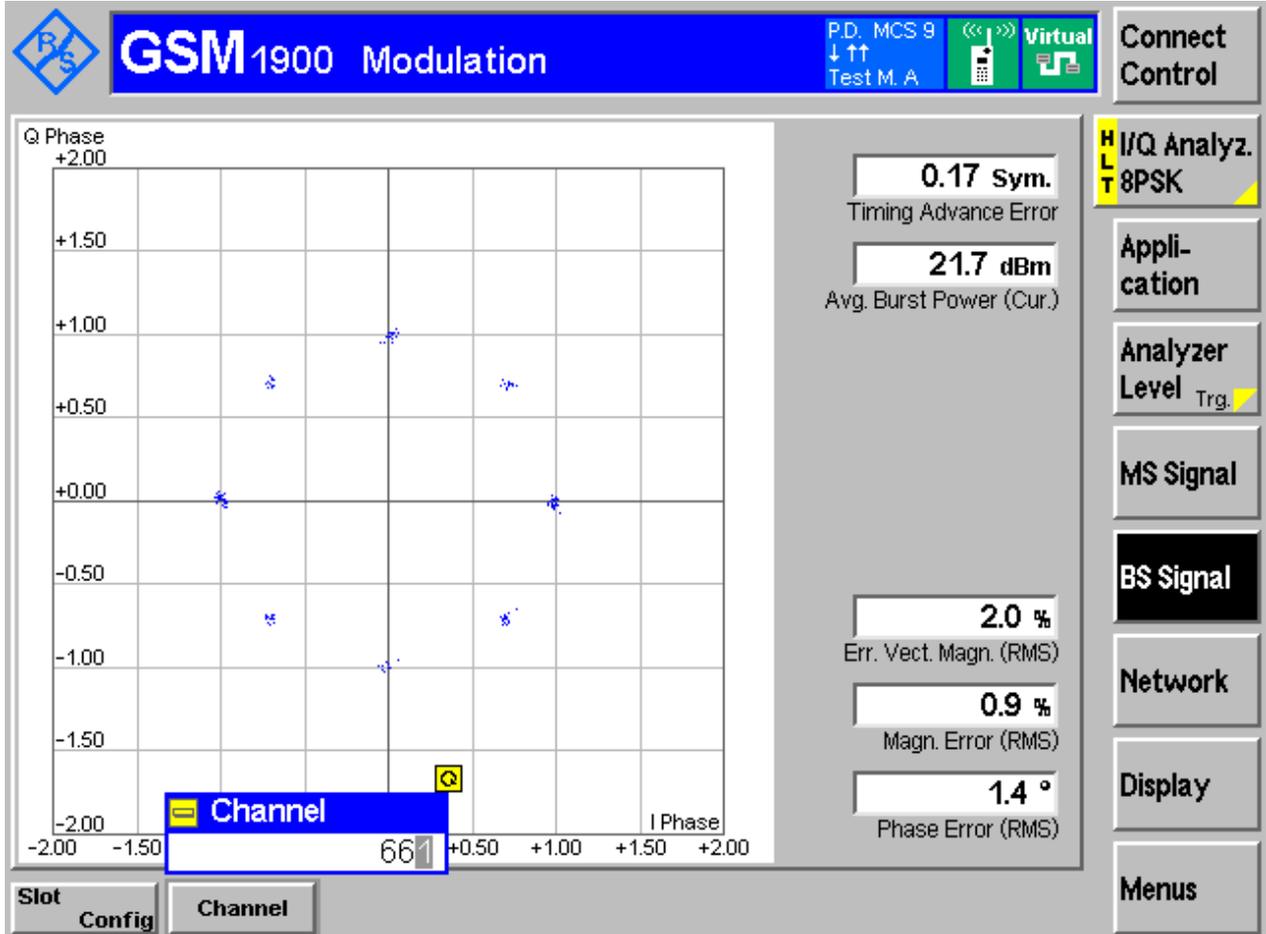
3.1.1.1 Test Mode = GSM/TM1

3.1.1.1.1 Test Channel = MCH



3.1.1.2 Test Mode = GSM/TM2

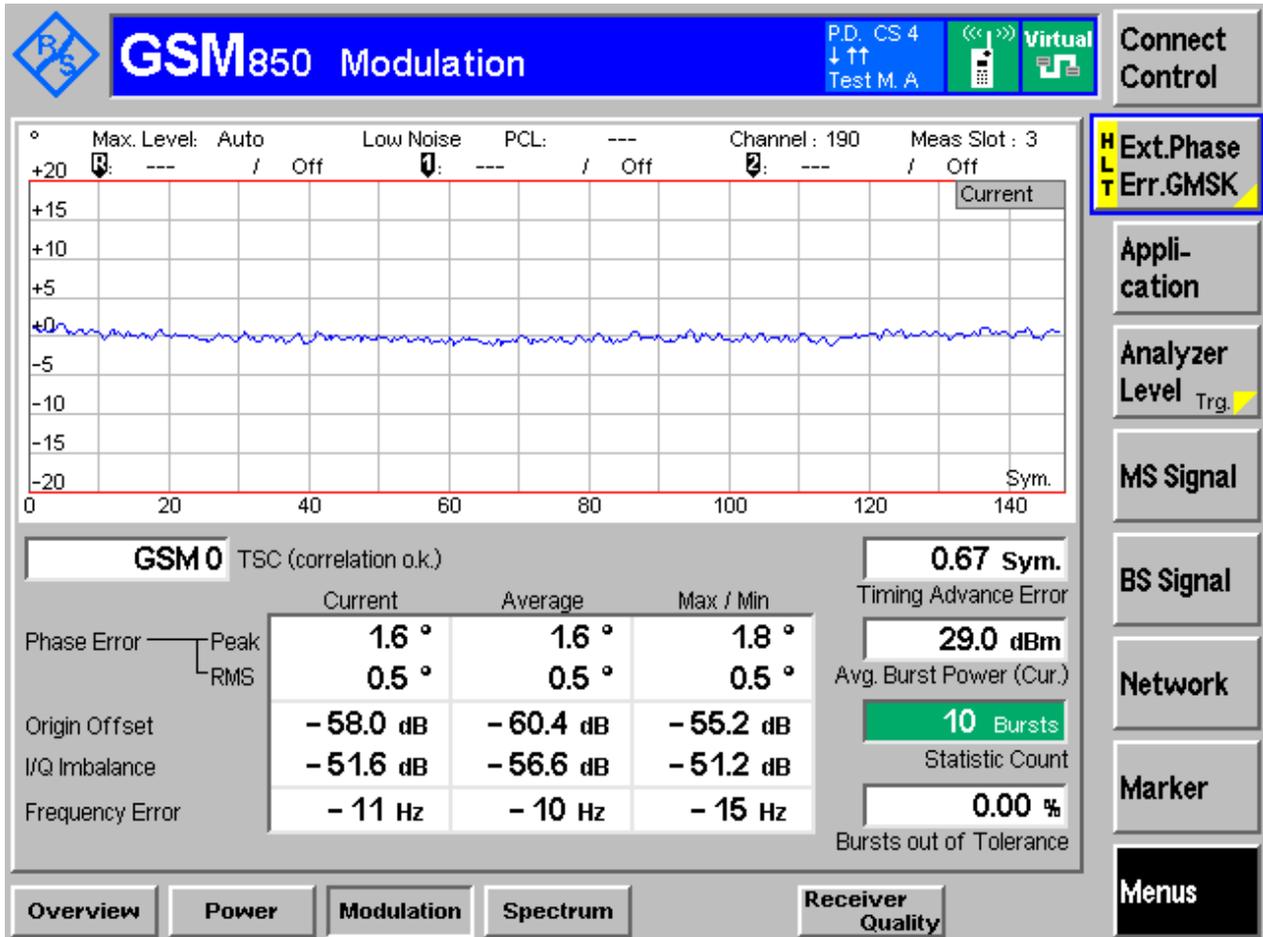
3.1.1.2.1 Test Channel = MCH



3.1.2 Test Band = GSM850

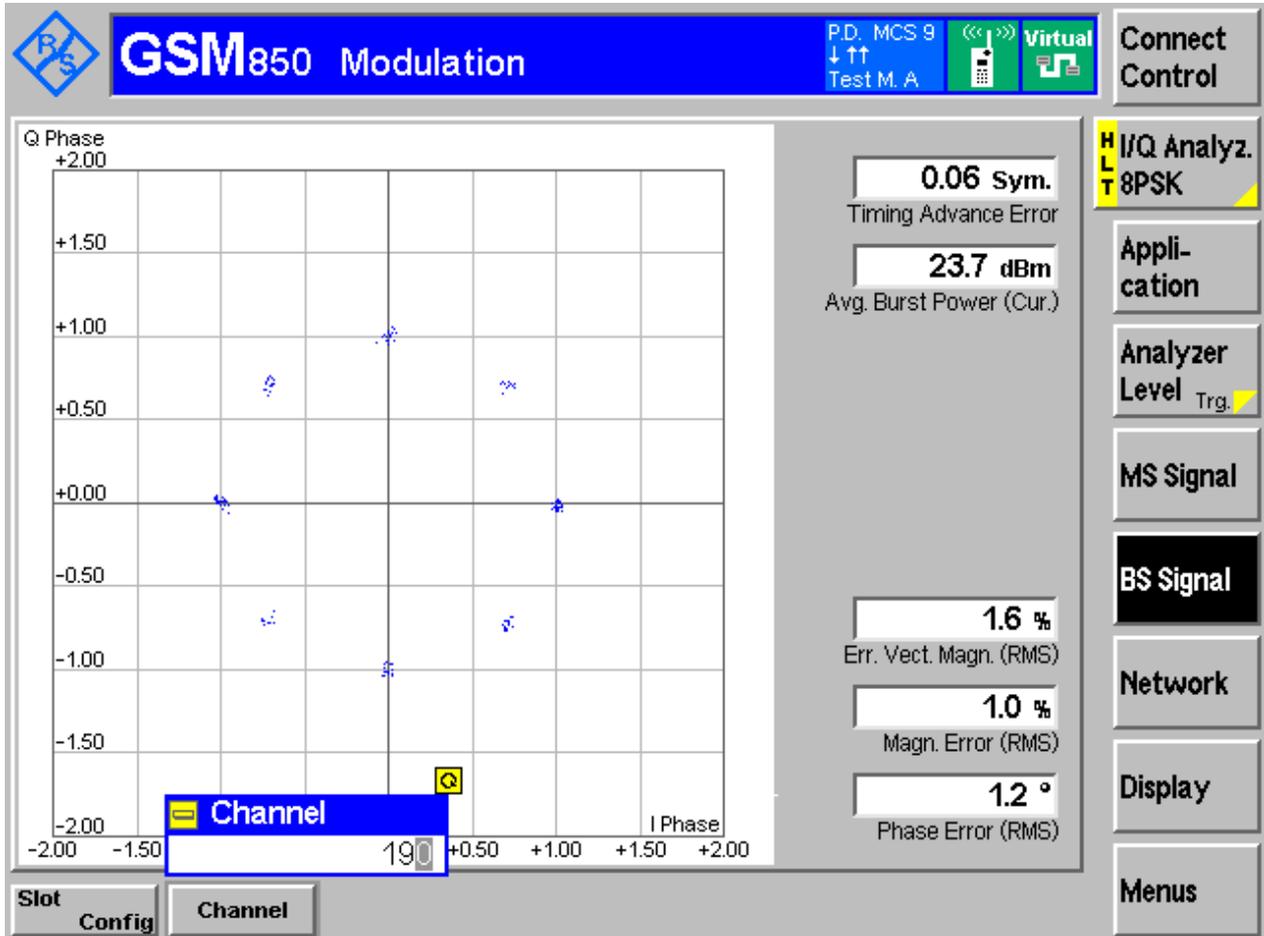
3.1.2.1 Test Mode = GSM/TM1

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
GSM1900	GSM/TM1	LCH	244.64	320.2	Pass
		MCH	246.34	323.6	Pass
		HCH	248.80	317.4	Pass
	GSM/TM2	LCH	249.32	322.7	Pass
		MCH	246.78	318.6	Pass
		HCH	251.45	315.5	Pass
GSM850	GSM/TM1	LCH	246.44	317	Pass
		MCH	245.09	314.4	Pass
		HCH	245.73	319.2	Pass
	GSM/TM2	LCH	247.98	319.3	Pass
		MCH	250.77	321	Pass
		HCH	249.58	317.7	Pass



Part II - Test Plots

4.1 For GSM

4.1.1 Test Band = GSM1900

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



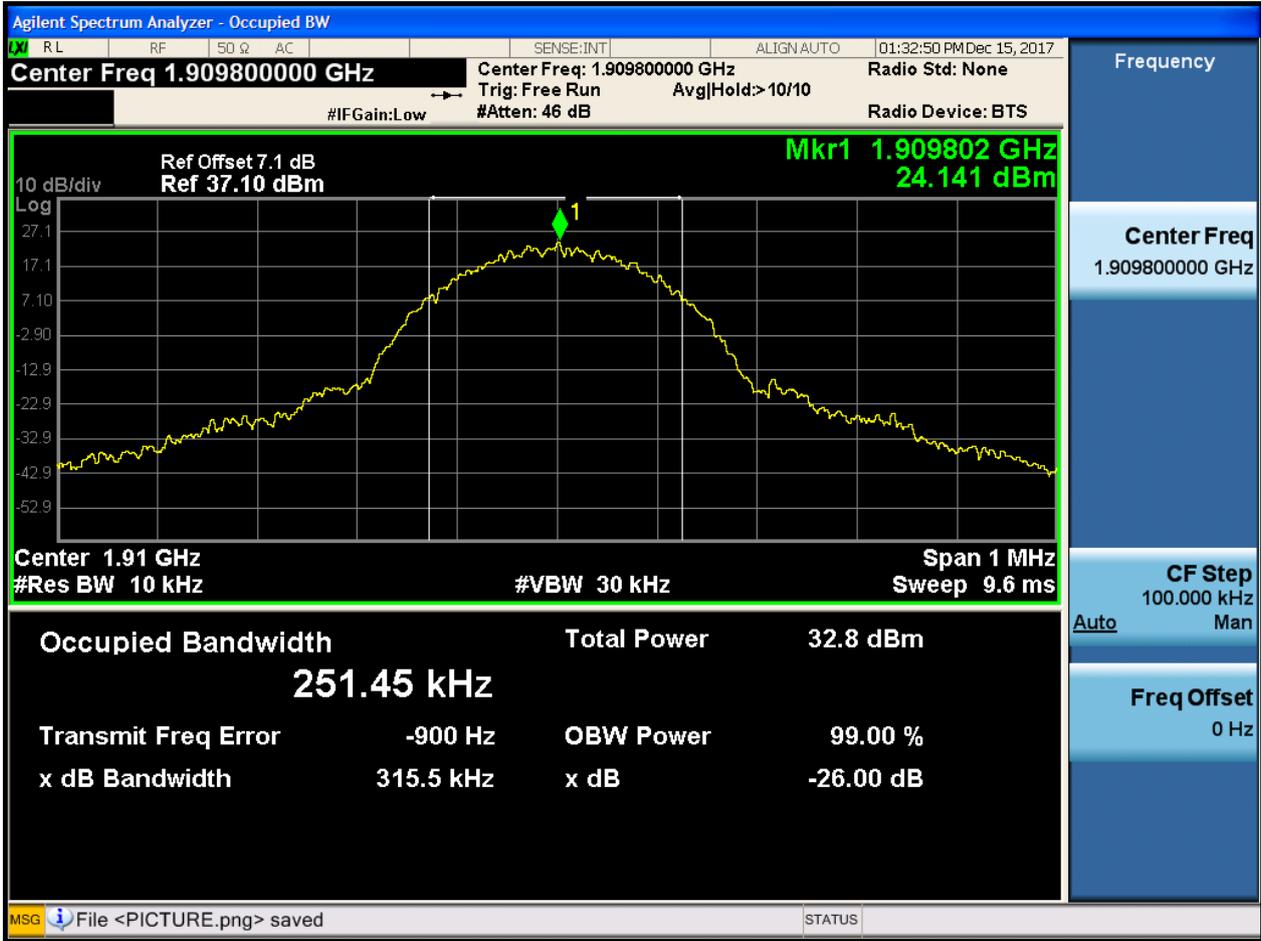


4.1.1.2.2 Test Channel = MCH





4.1.1.2.3 Test Channel = HCH





4.1.2 Test Band = GSM850

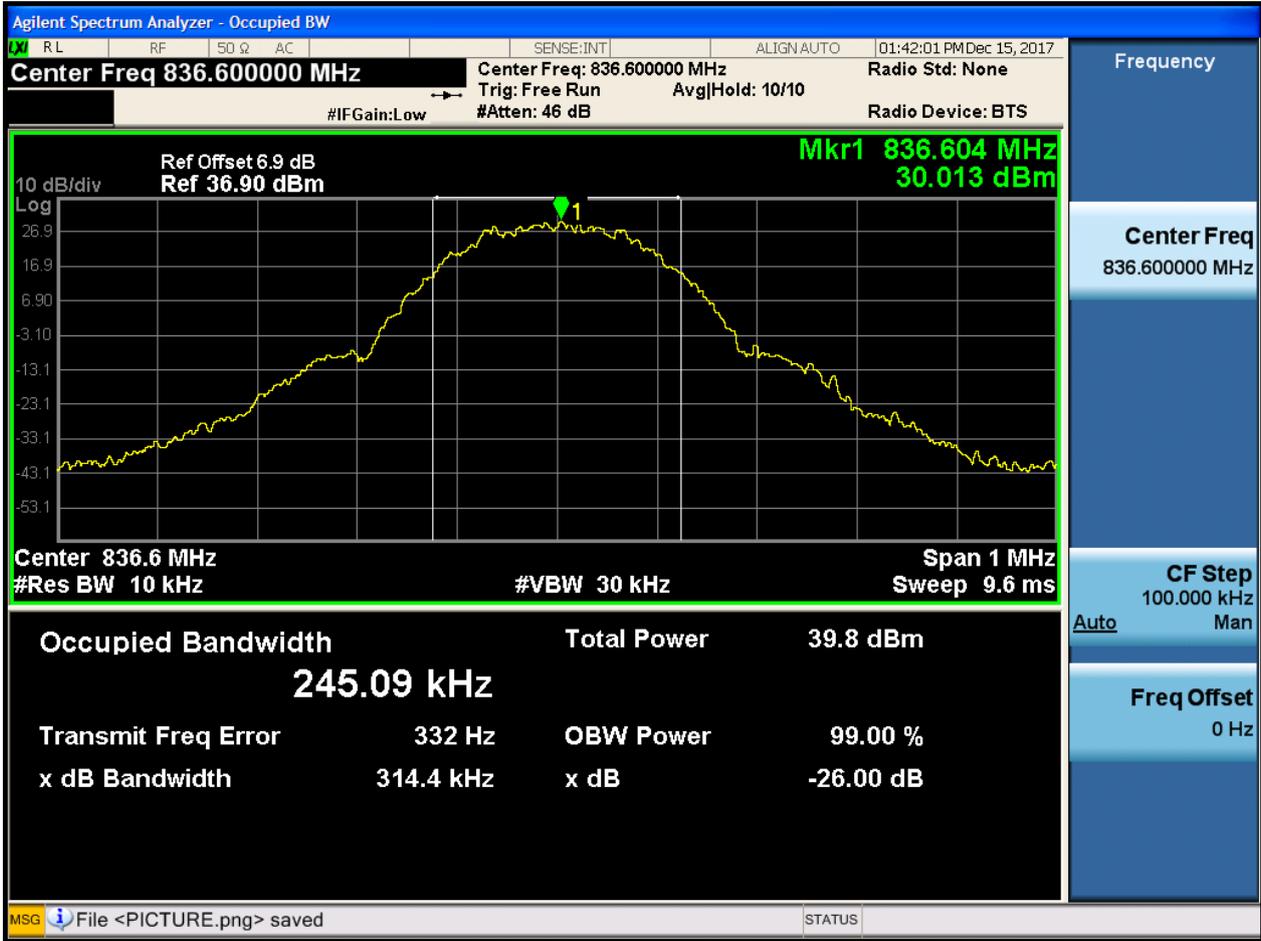
4.1.2.1 Test Mode = GSM/TM1

4.1.2.1.1 Test Channel = LCH





4.1.2.1.2 Test Channel = MCH





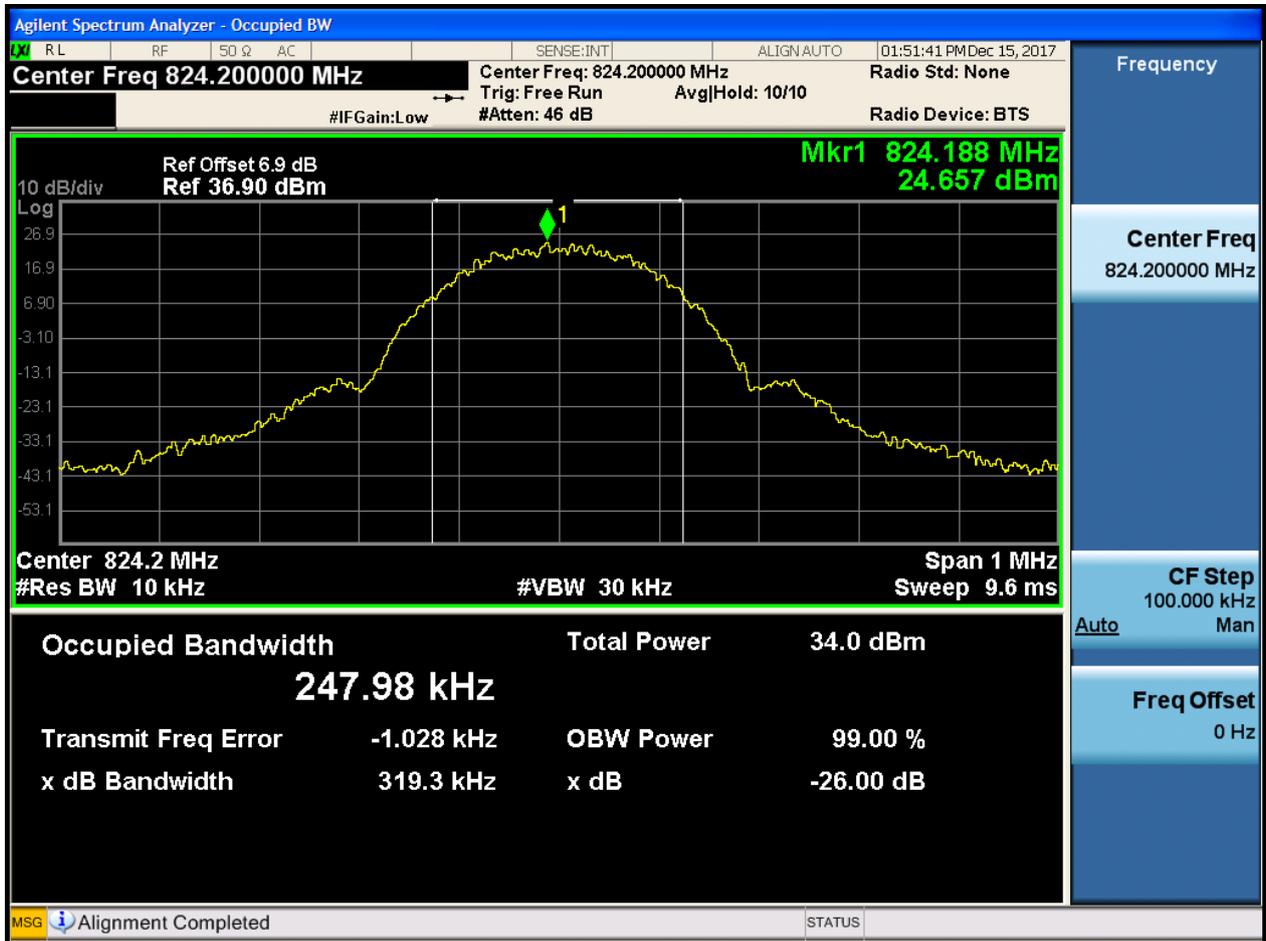
4.1.2.1.3 Test Channel = HCH





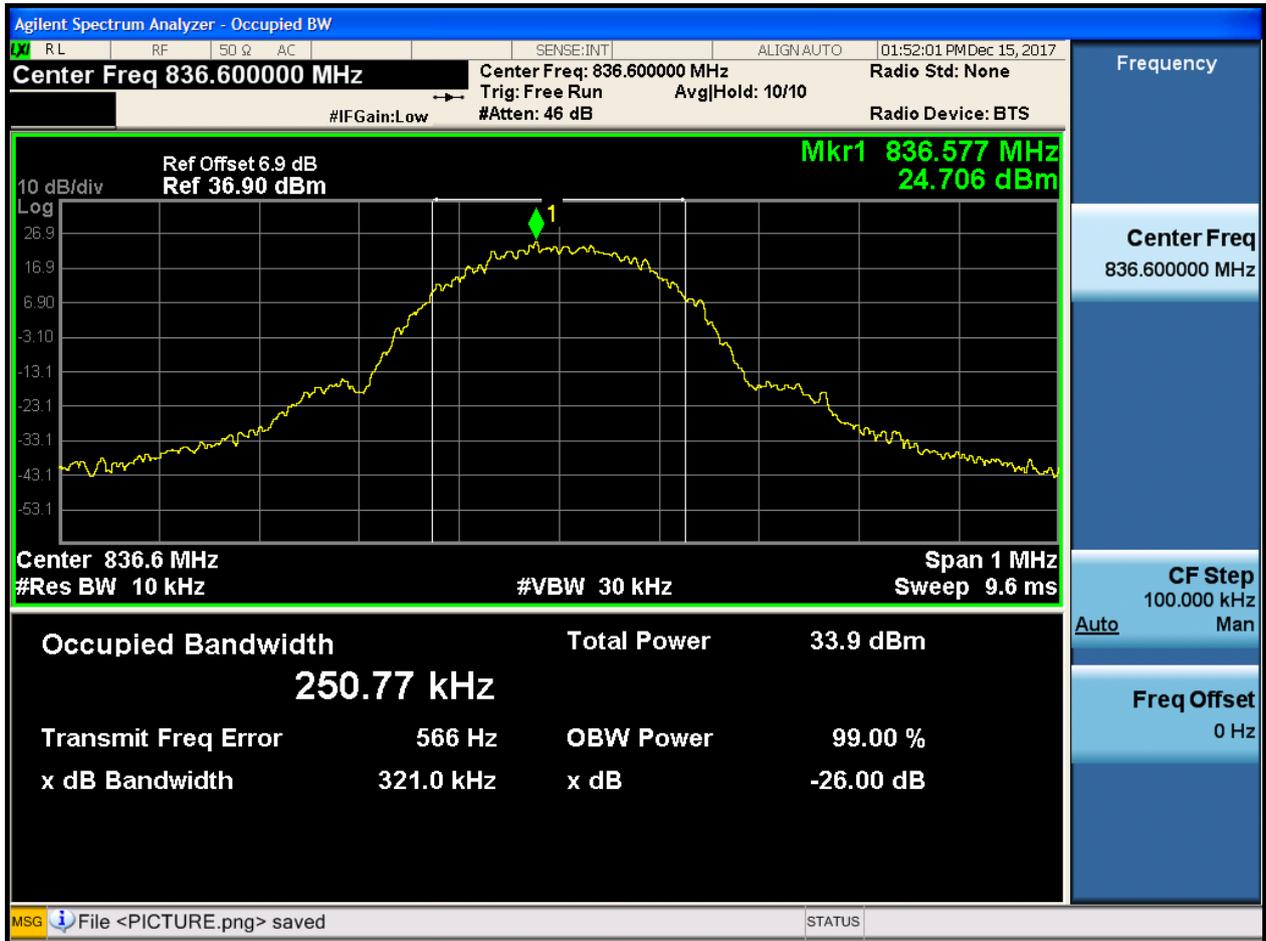
4.1.2.2 Test Mode = GSM/TM2

4.1.2.2.1 Test Channel = LCH



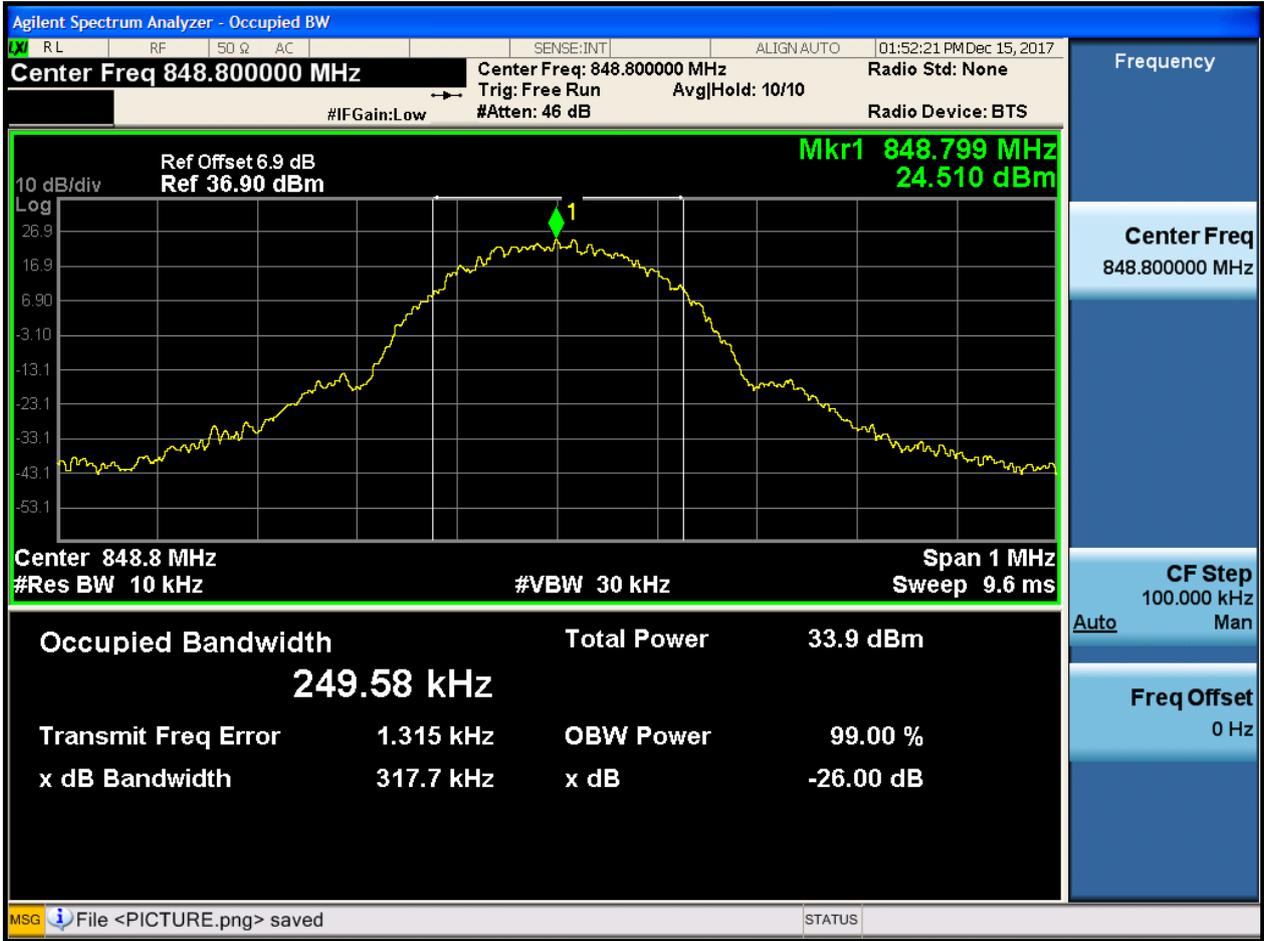


4.1.2.2.2 Test Channel = MCH





4.1.2.2.3 Test Channel = HCH





5Appendix_E: Band Edges Compliance

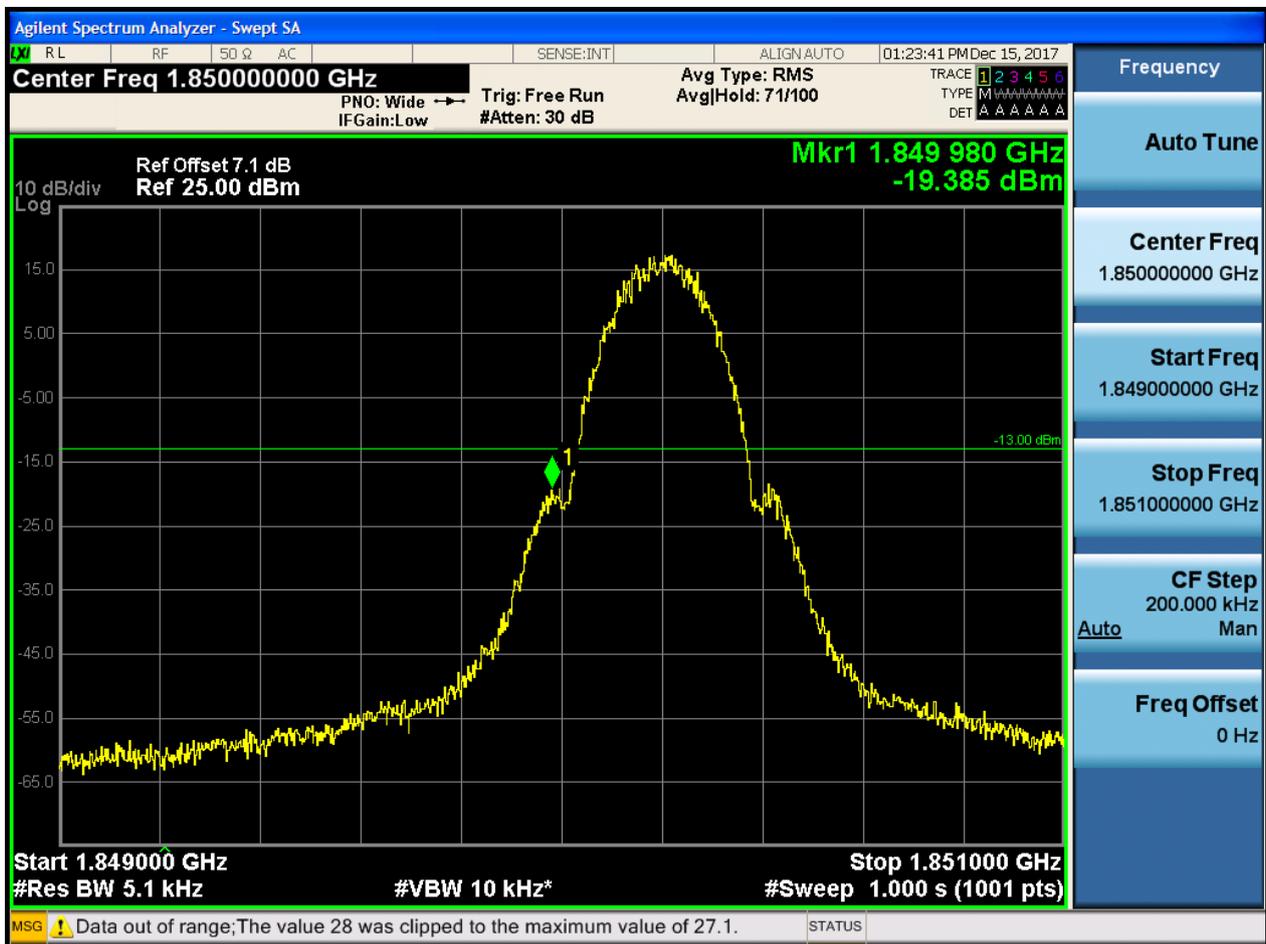
Part I - Test Plots

5.1 For GSM

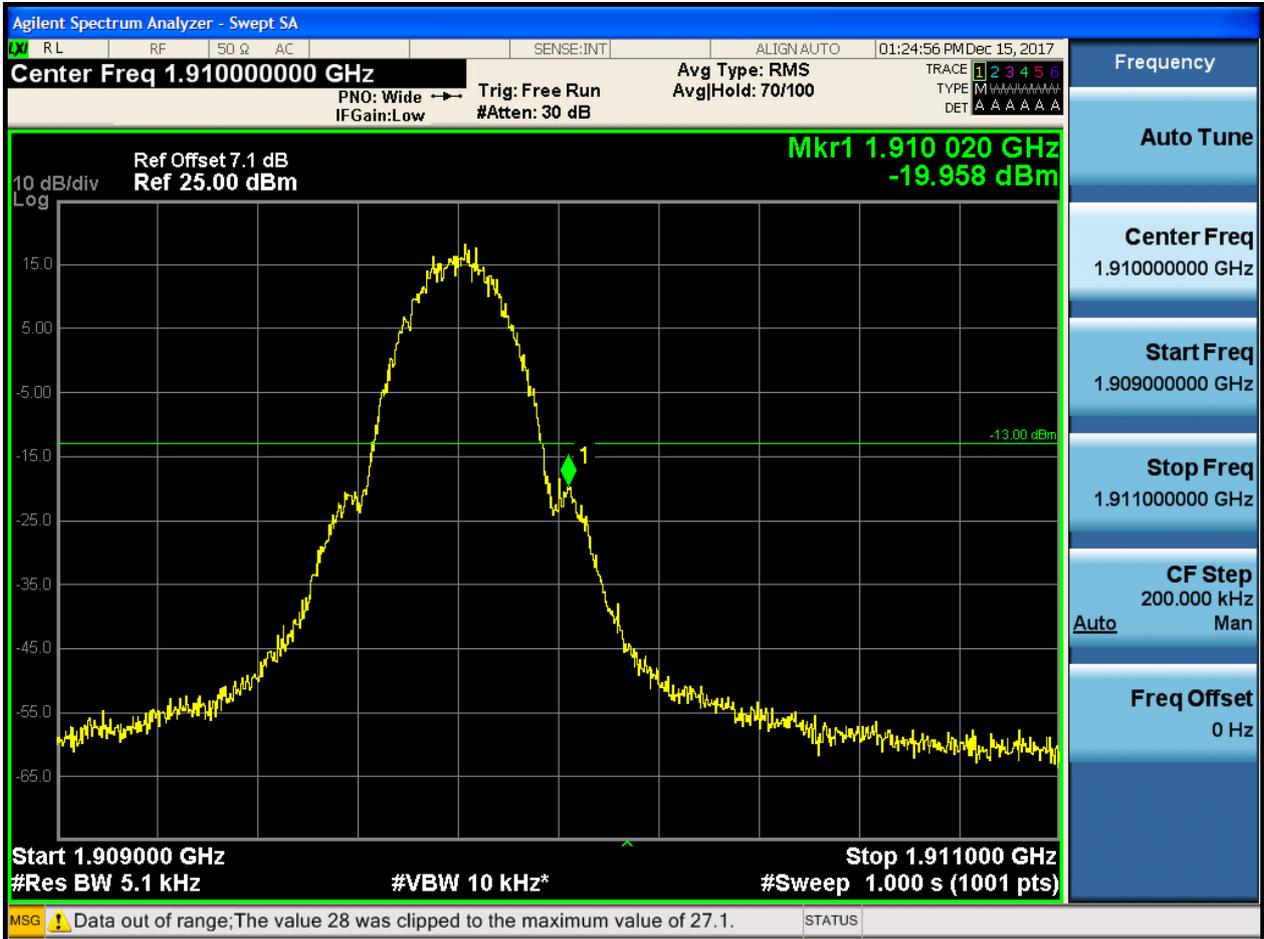
5.1.1 Test Band = GSM1900

5.1.1.1 Test Mode = GSM/TM1

5.1.1.1.1 Test Channel = LCH



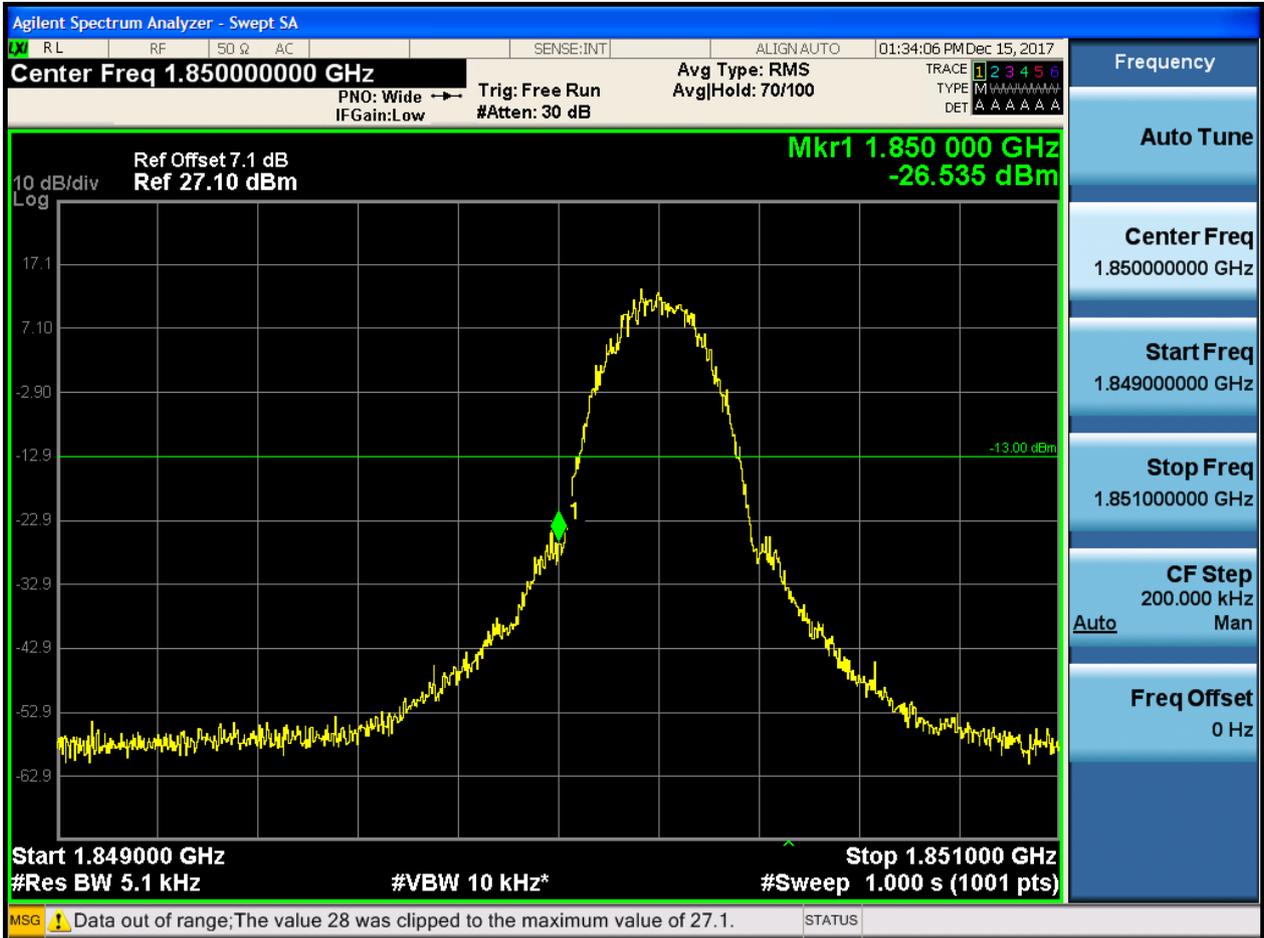
5.1.1.1.2 Test Channel = HCH



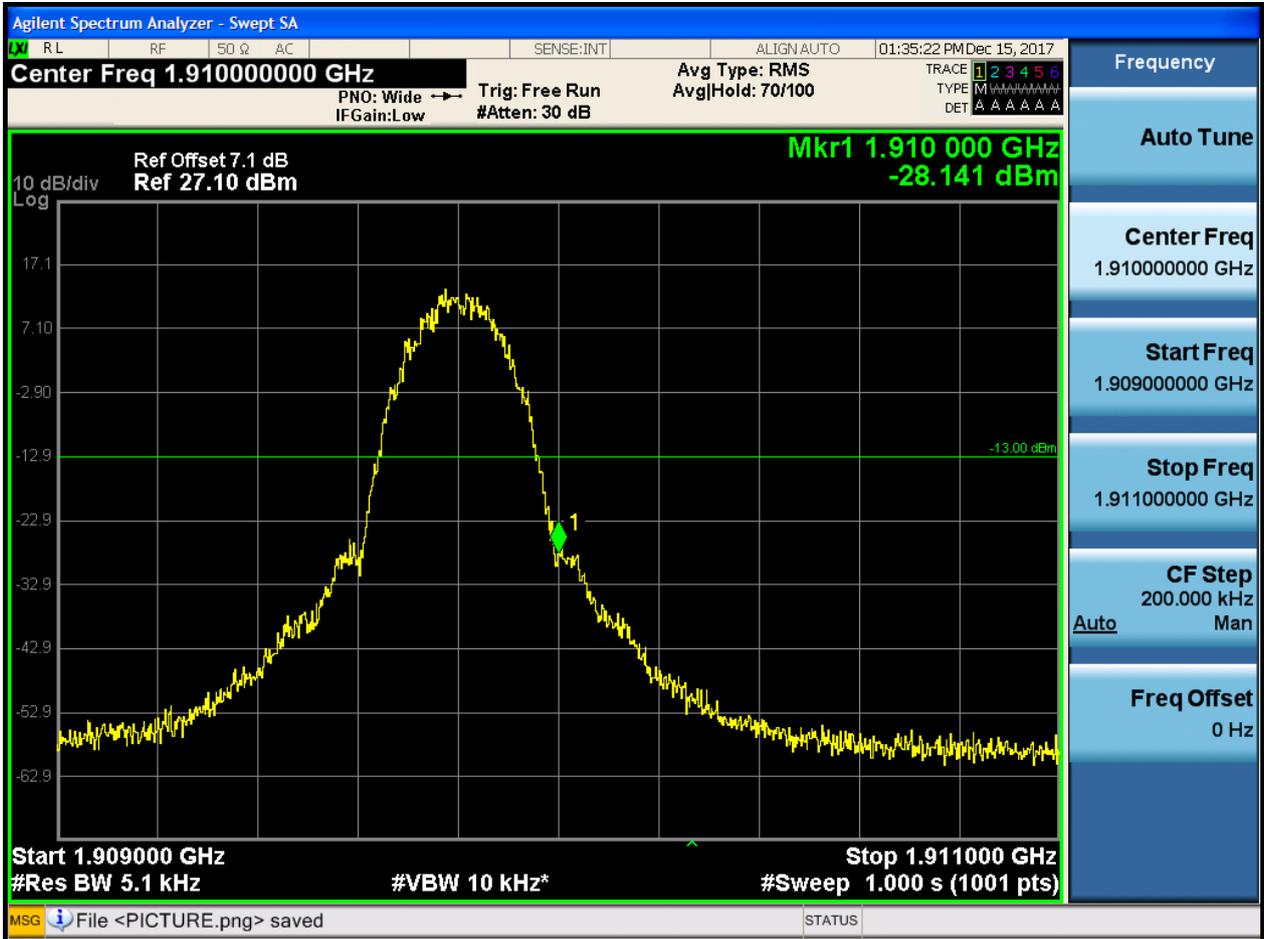


5.1.1.2 Test Mode = GSM/TM2

5.1.1.2.1 Test Channel = LCH



5.1.1.2.2 Test Channel = HCH

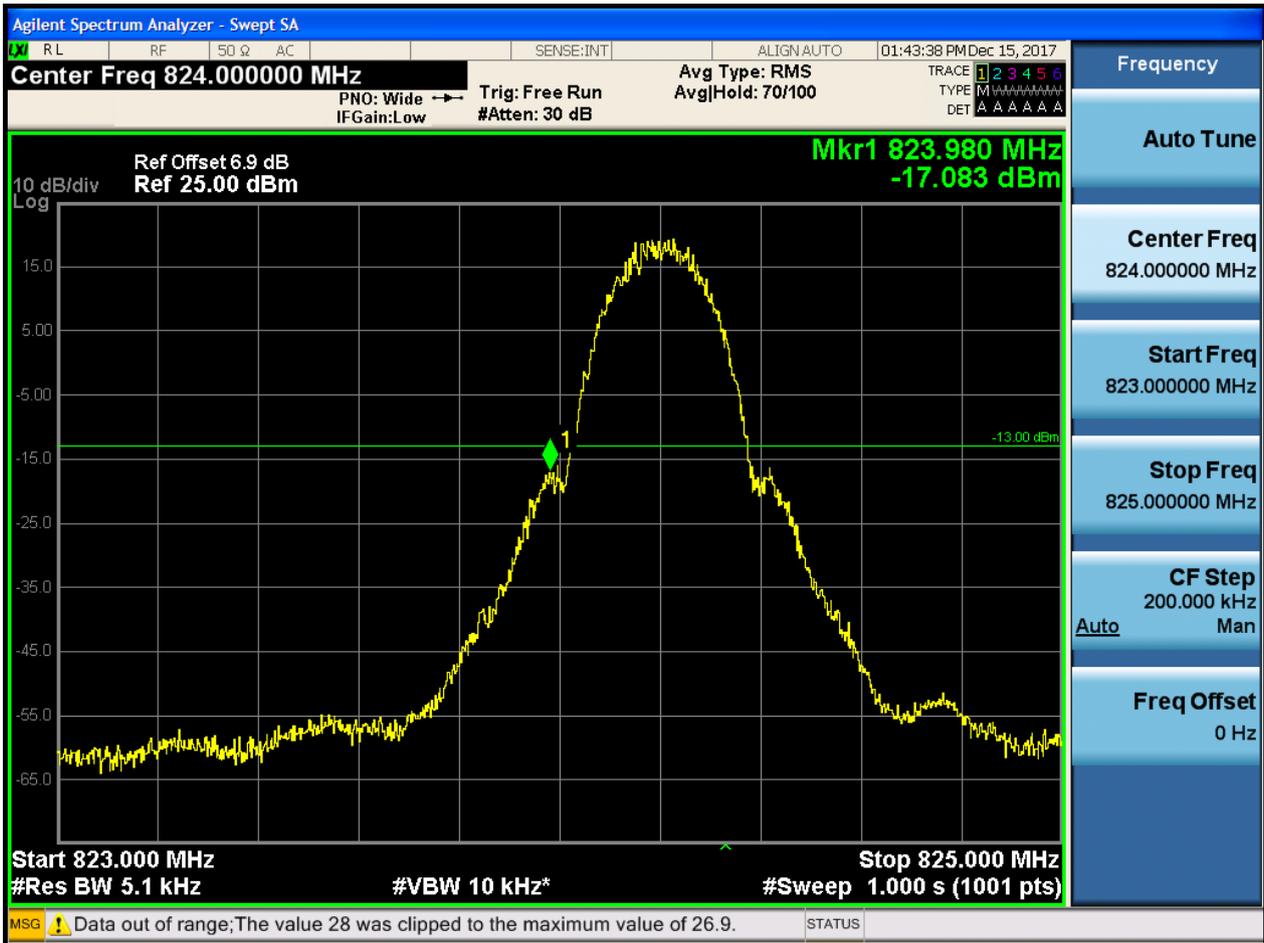




5.1.2 Test Band = GSM850

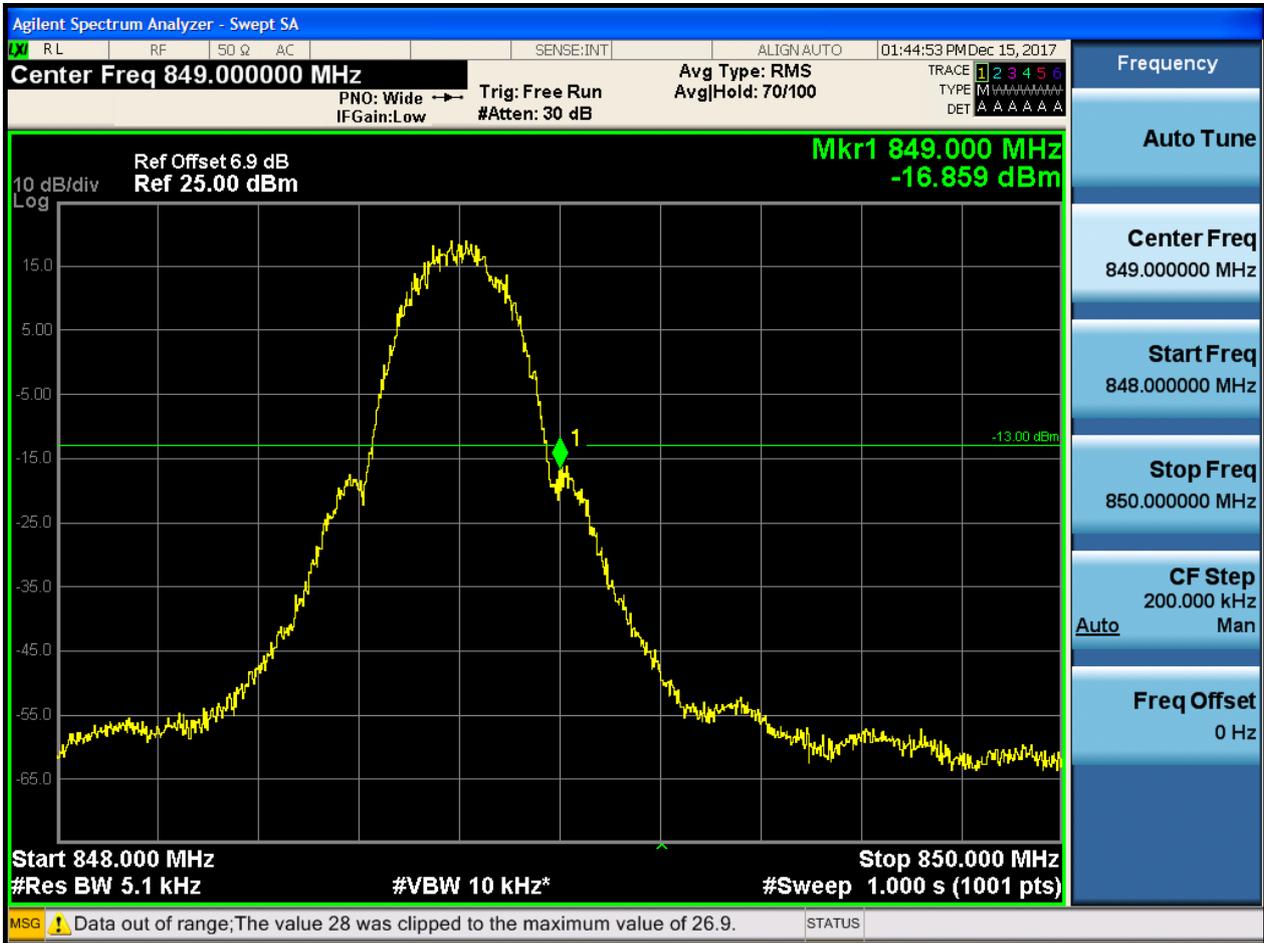
5.1.2.1 Test Mode = GSM/TM1

5.1.2.1.1 Test Channel = LCH



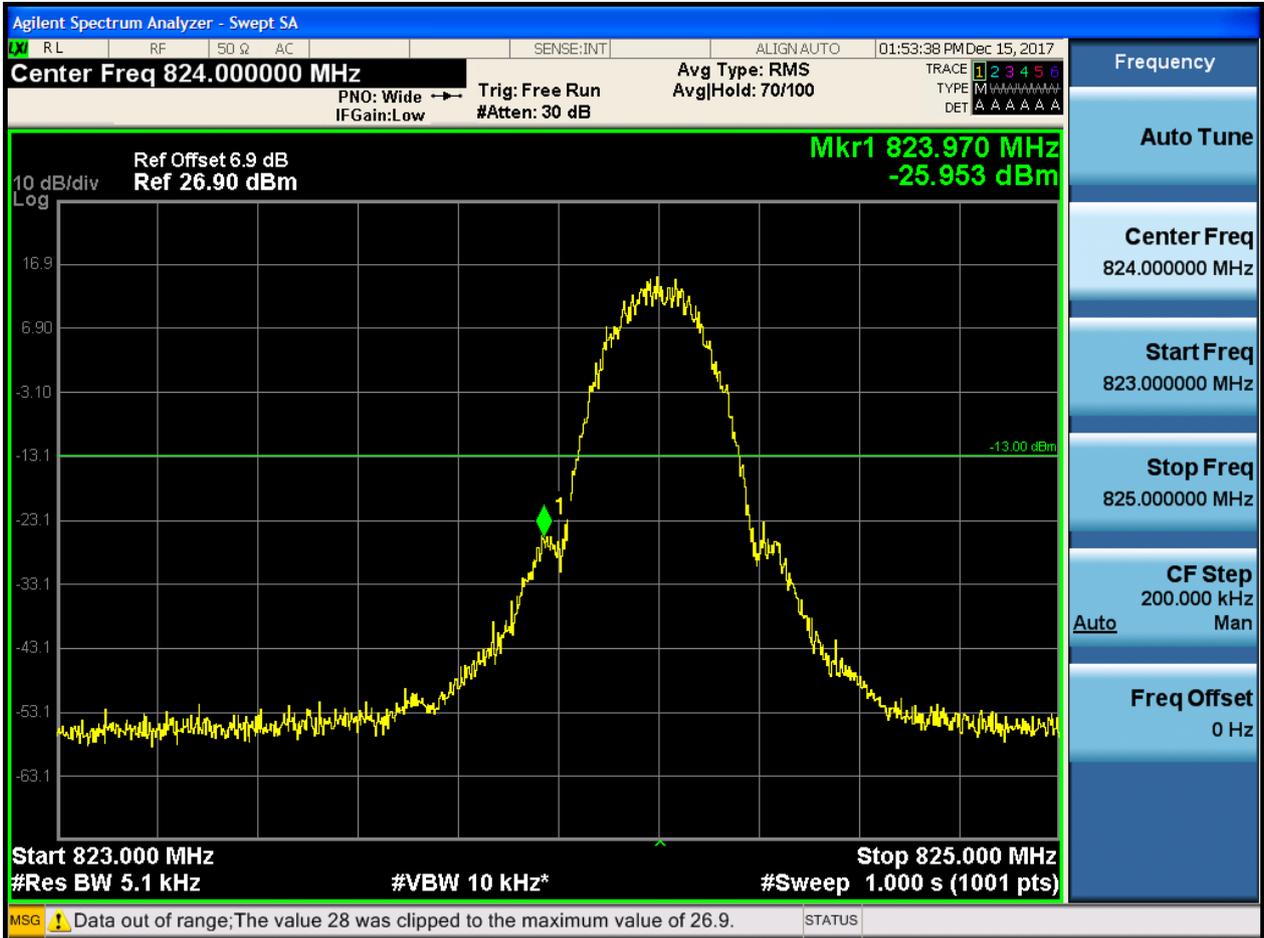


5.1.2.1.2 Test Channel = HCH



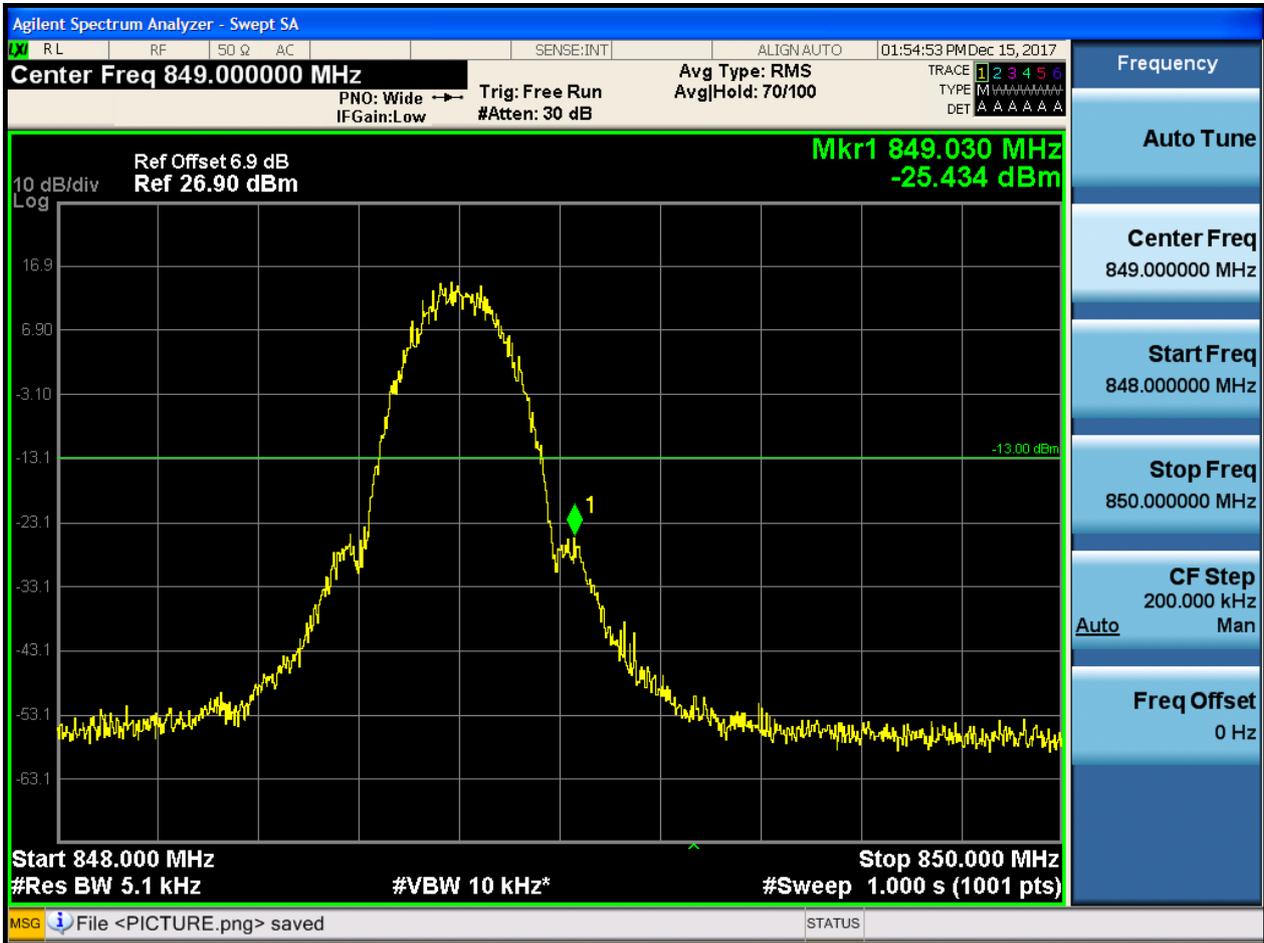
5.1.2.2 Test Mode = GSM/TM2

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 = GSM1900

6.1.1.1 Test Mode = GSM/TM1

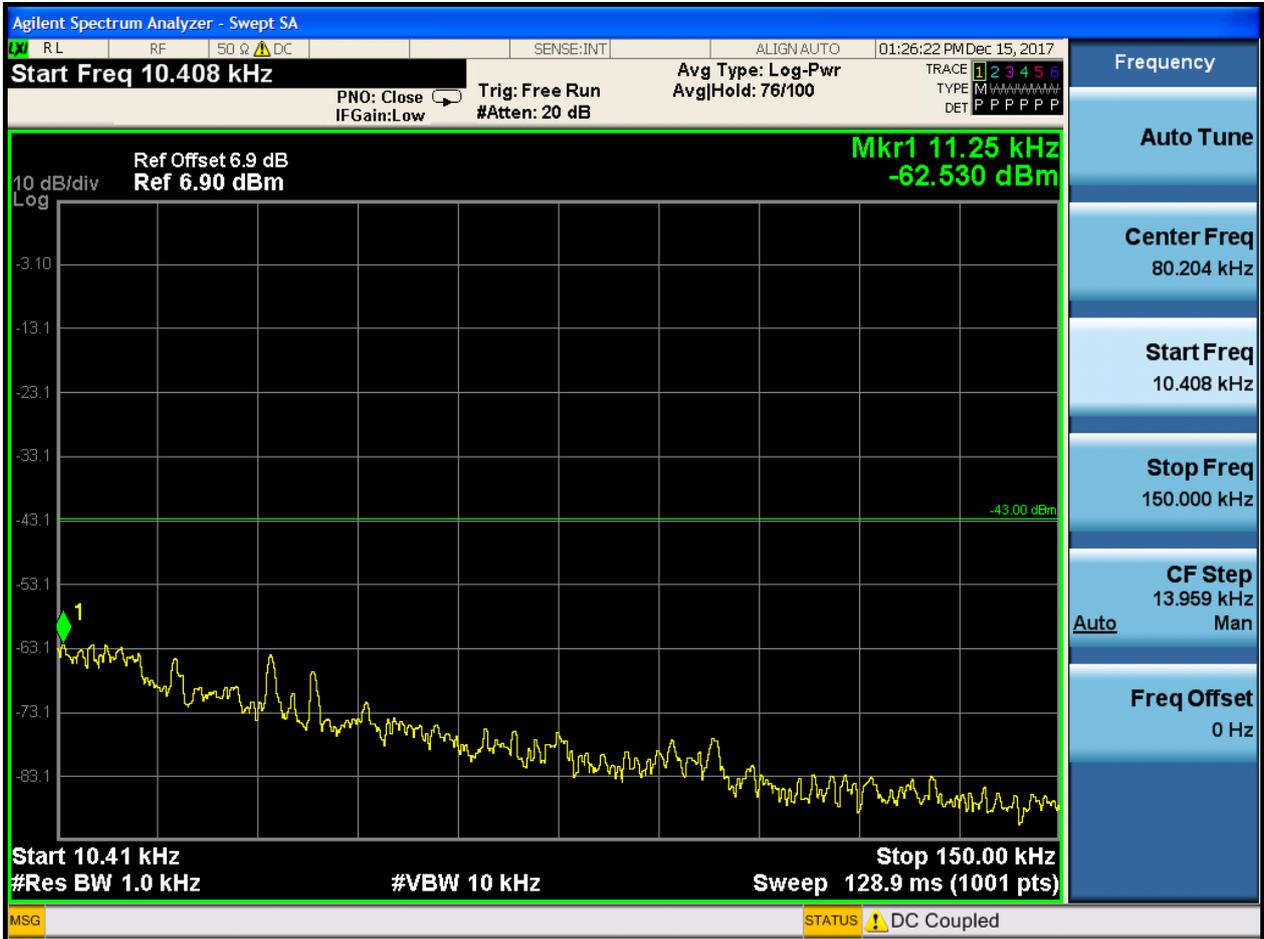
6.1.1.1.1 Test Channel = LCH







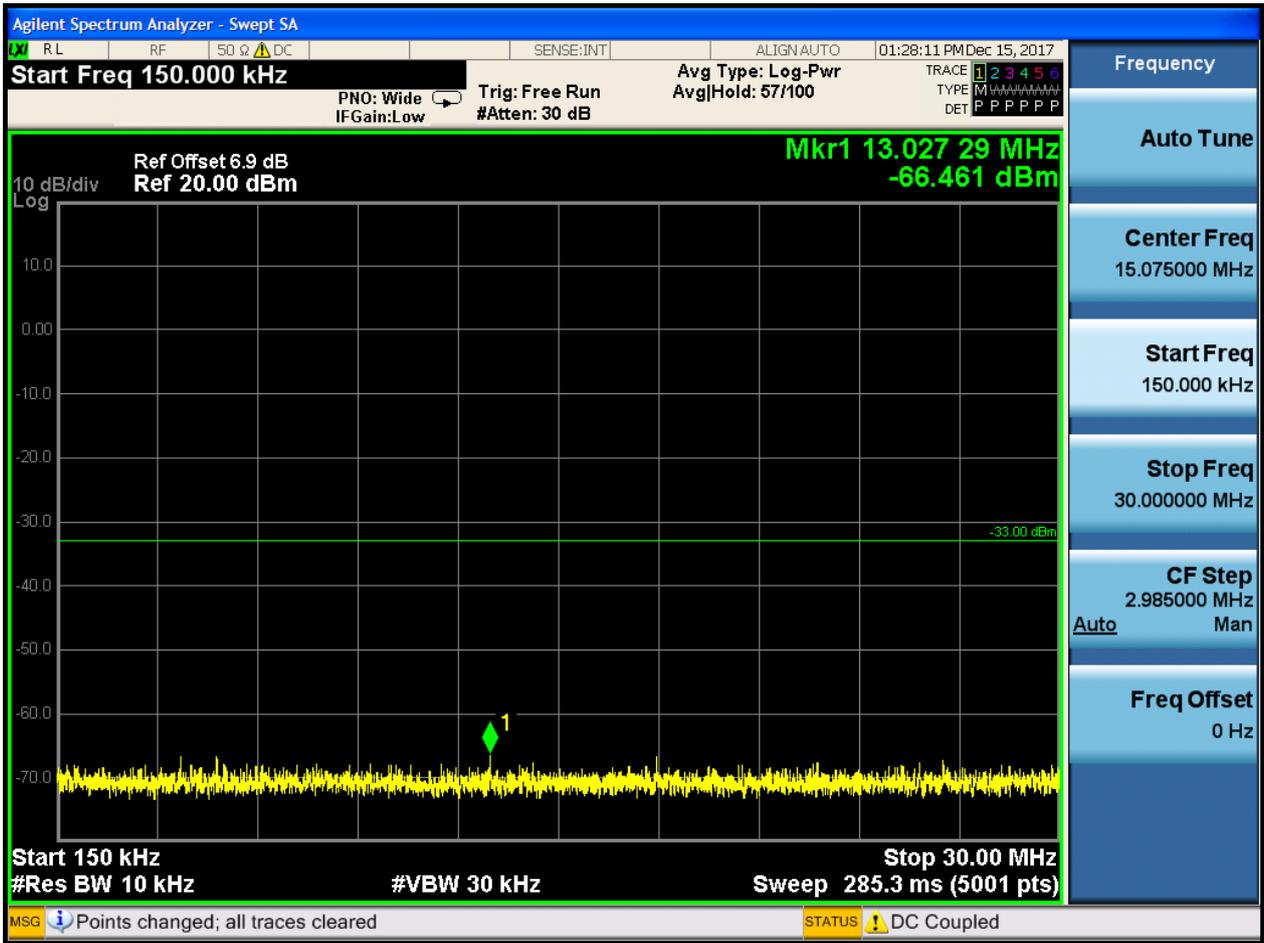
6.1.1.1.2 Test Channel = MCH

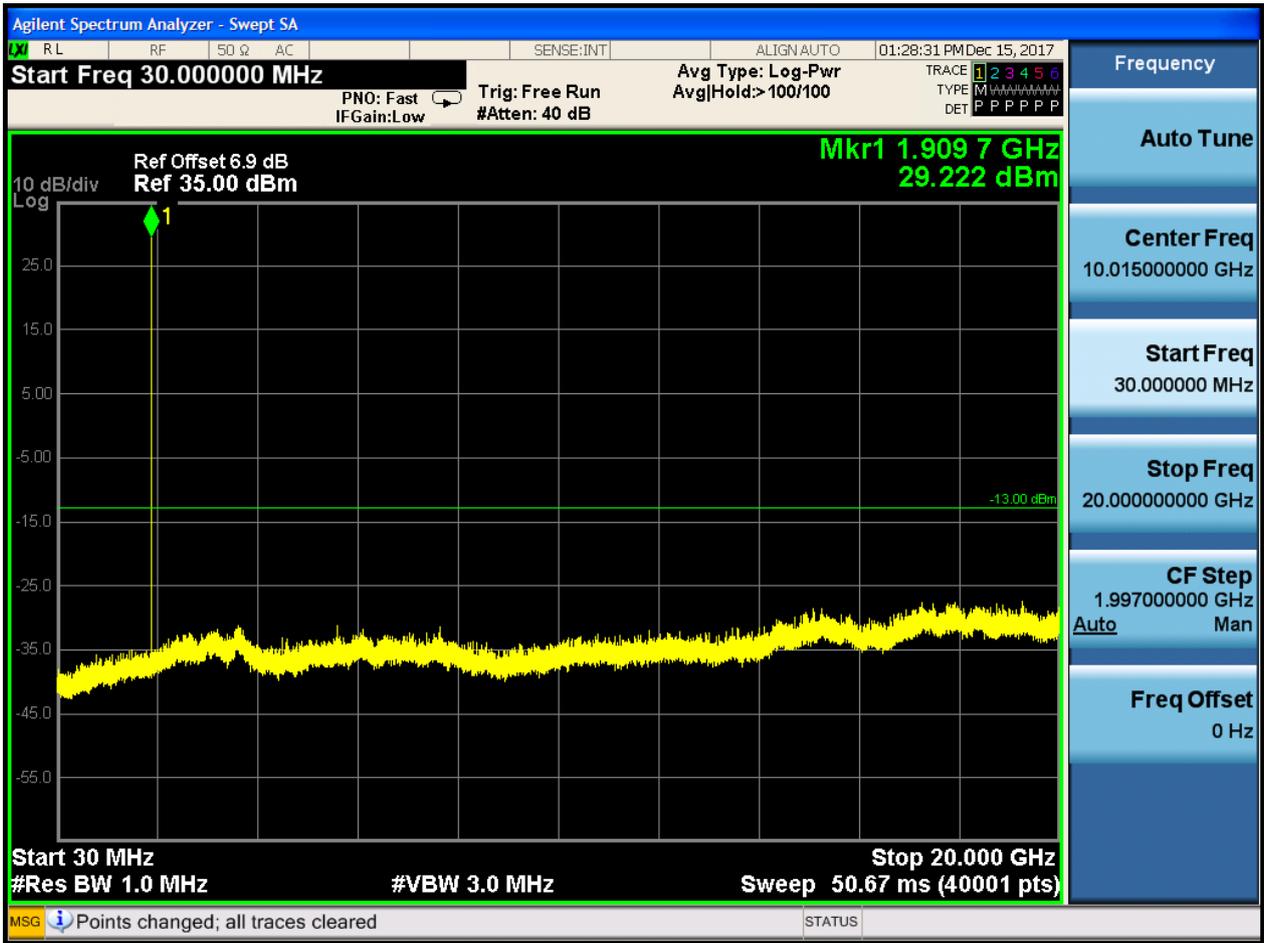




6.1.1.1.3 Test Channel = HCH



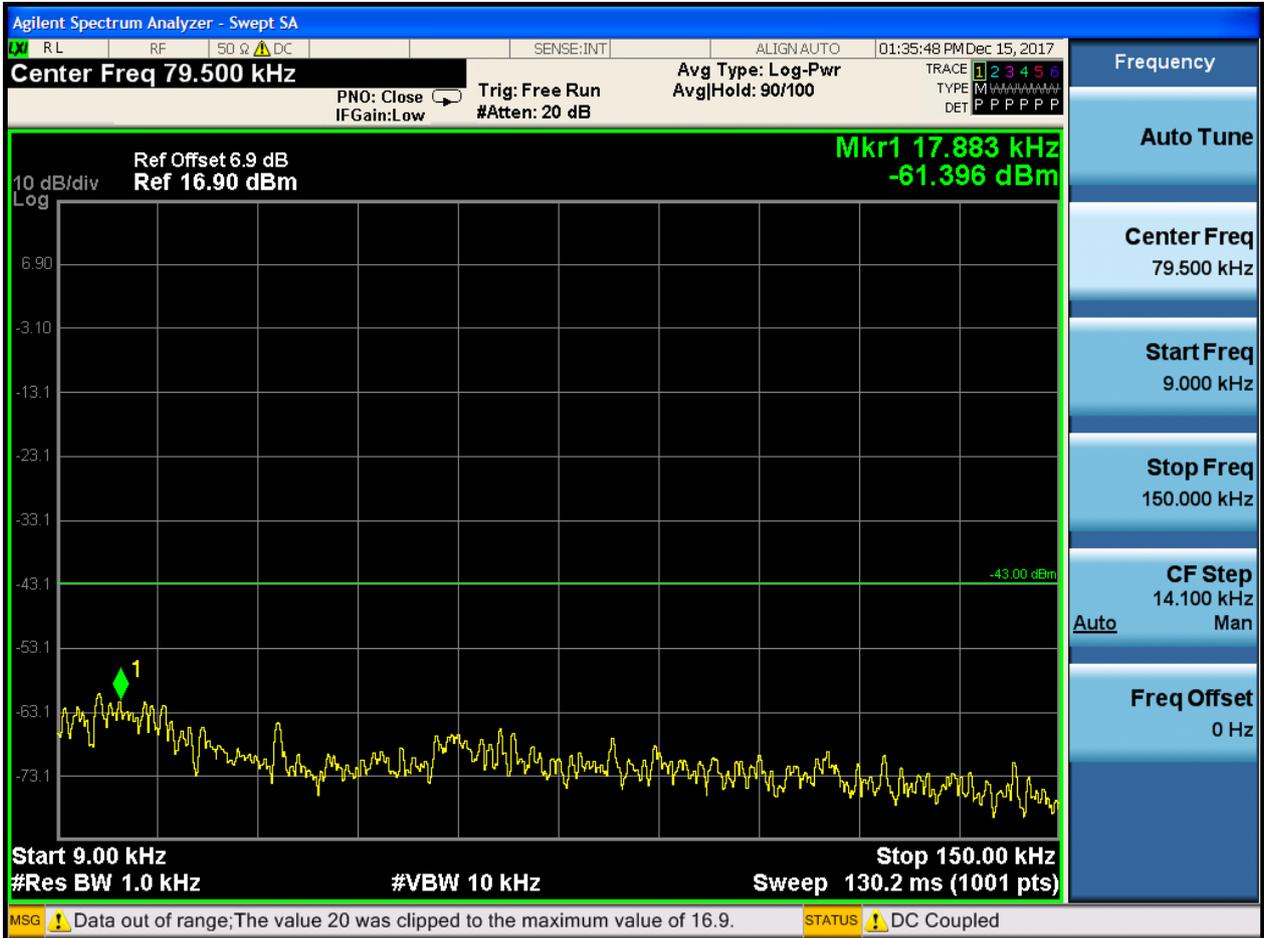






6.1.1.2 Test Mode = GSM/TM2

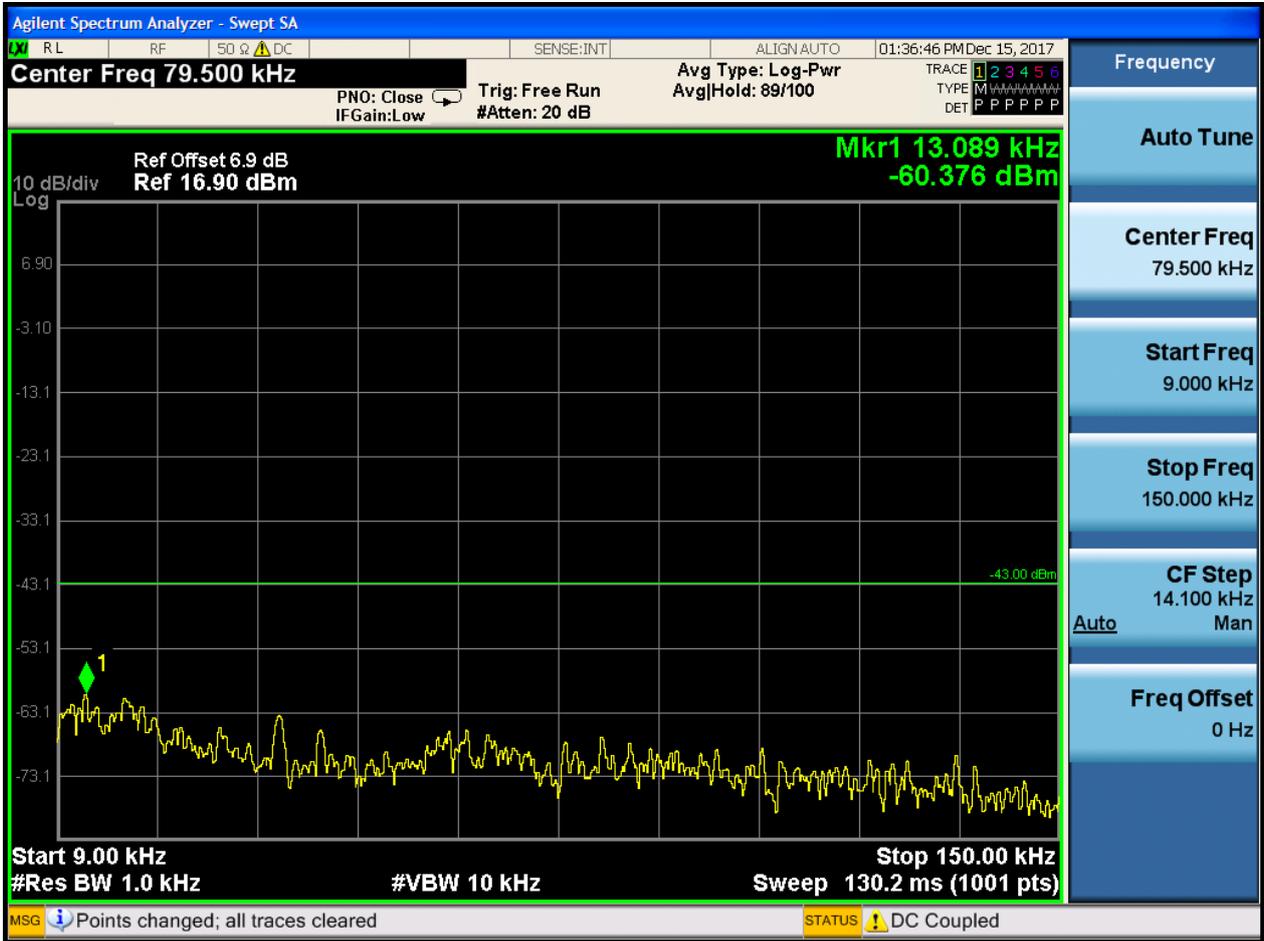
6.1.1.2.1 Test Channel = LCH







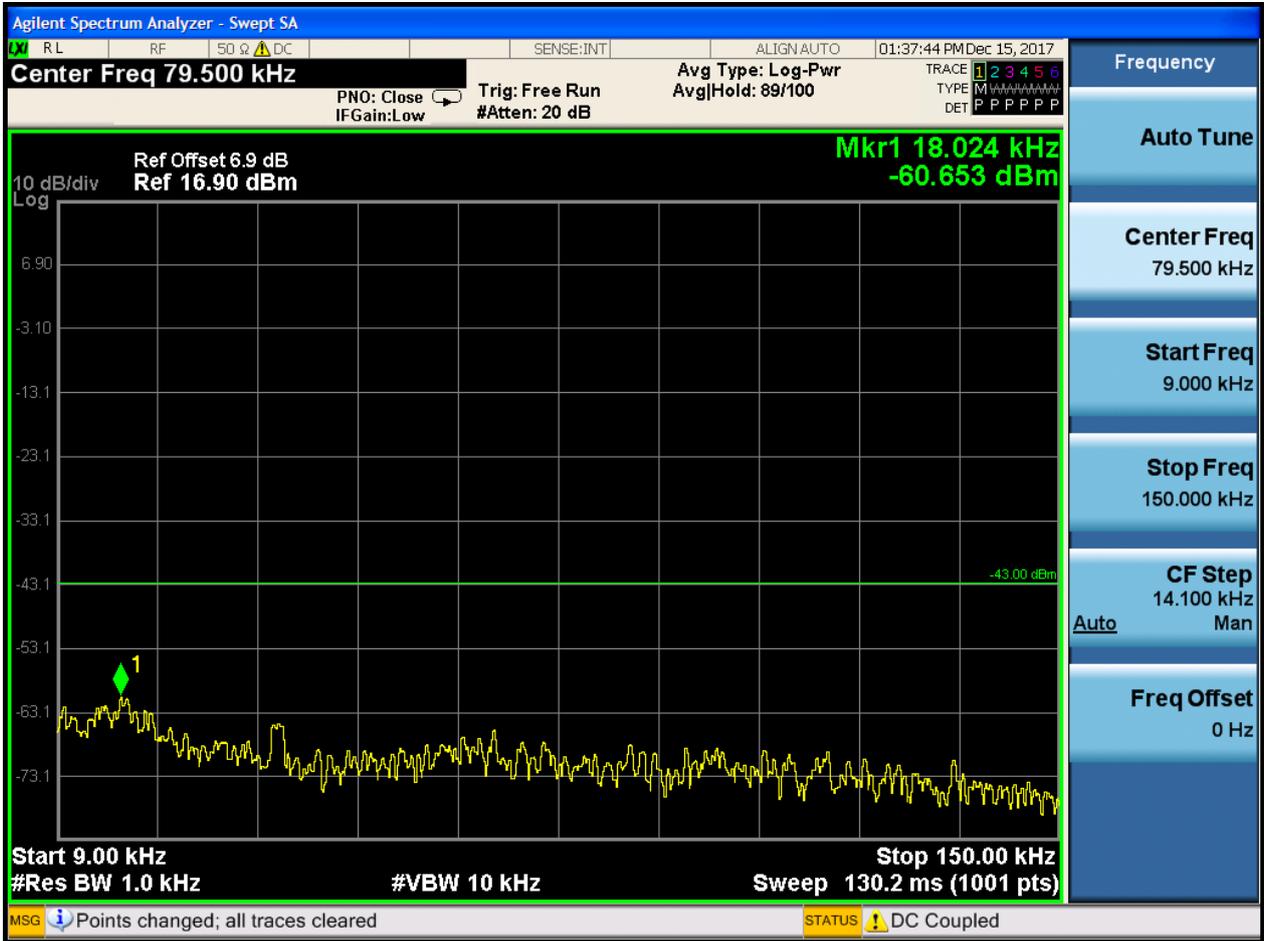
6.1.1.2.2 Test Channel = MCH

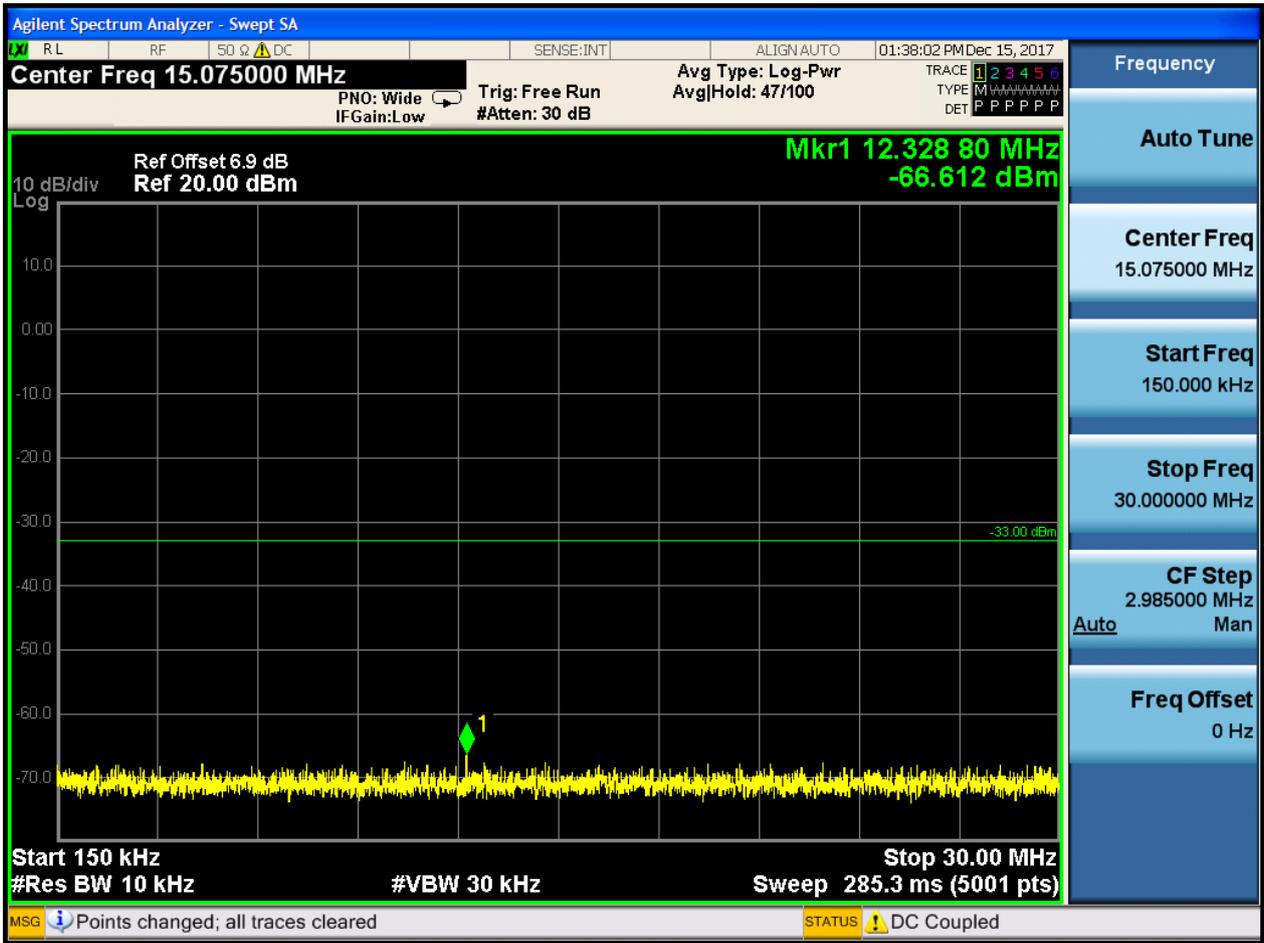






6.1.1.2.3 Test Channel = HCH





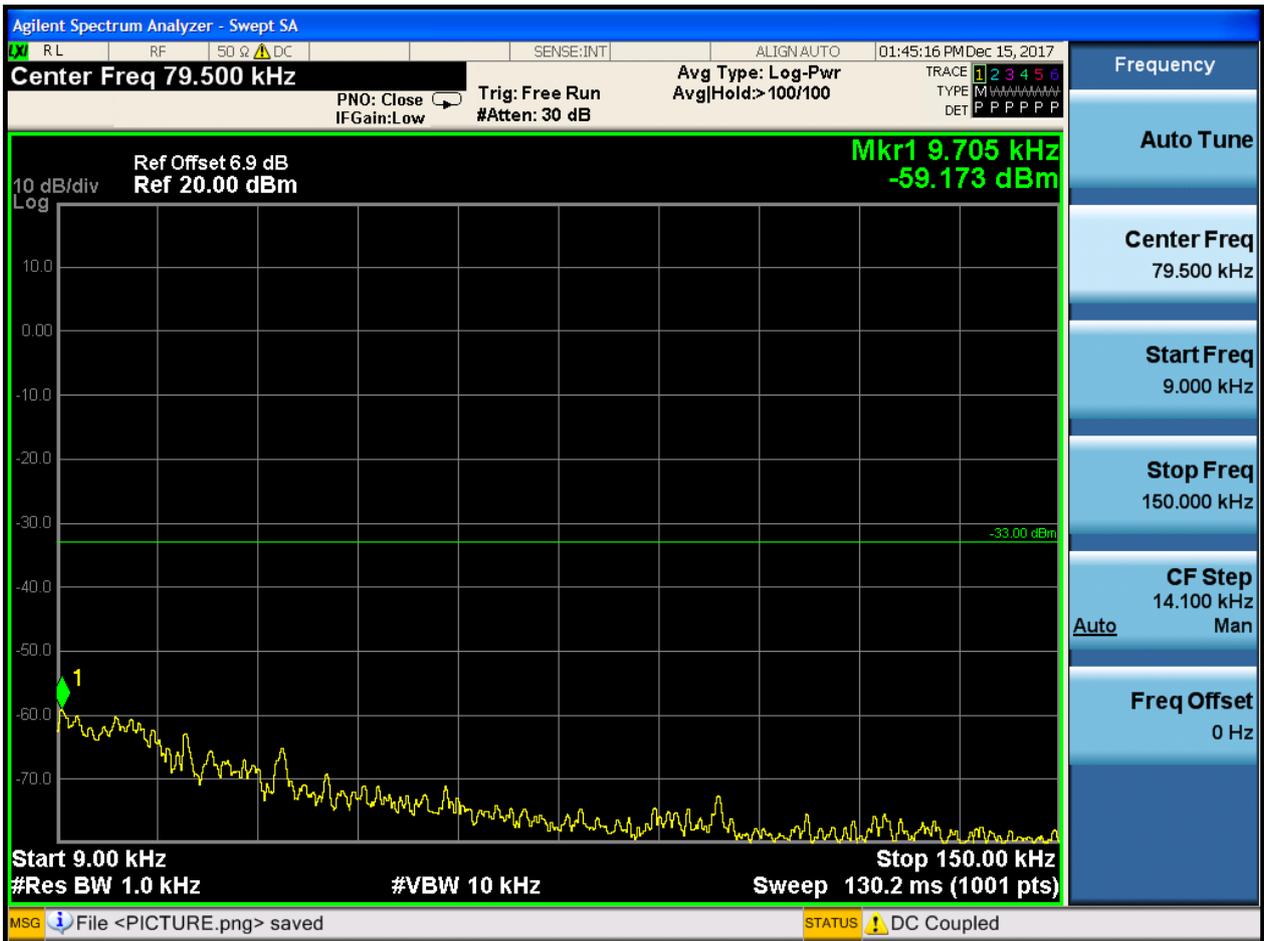


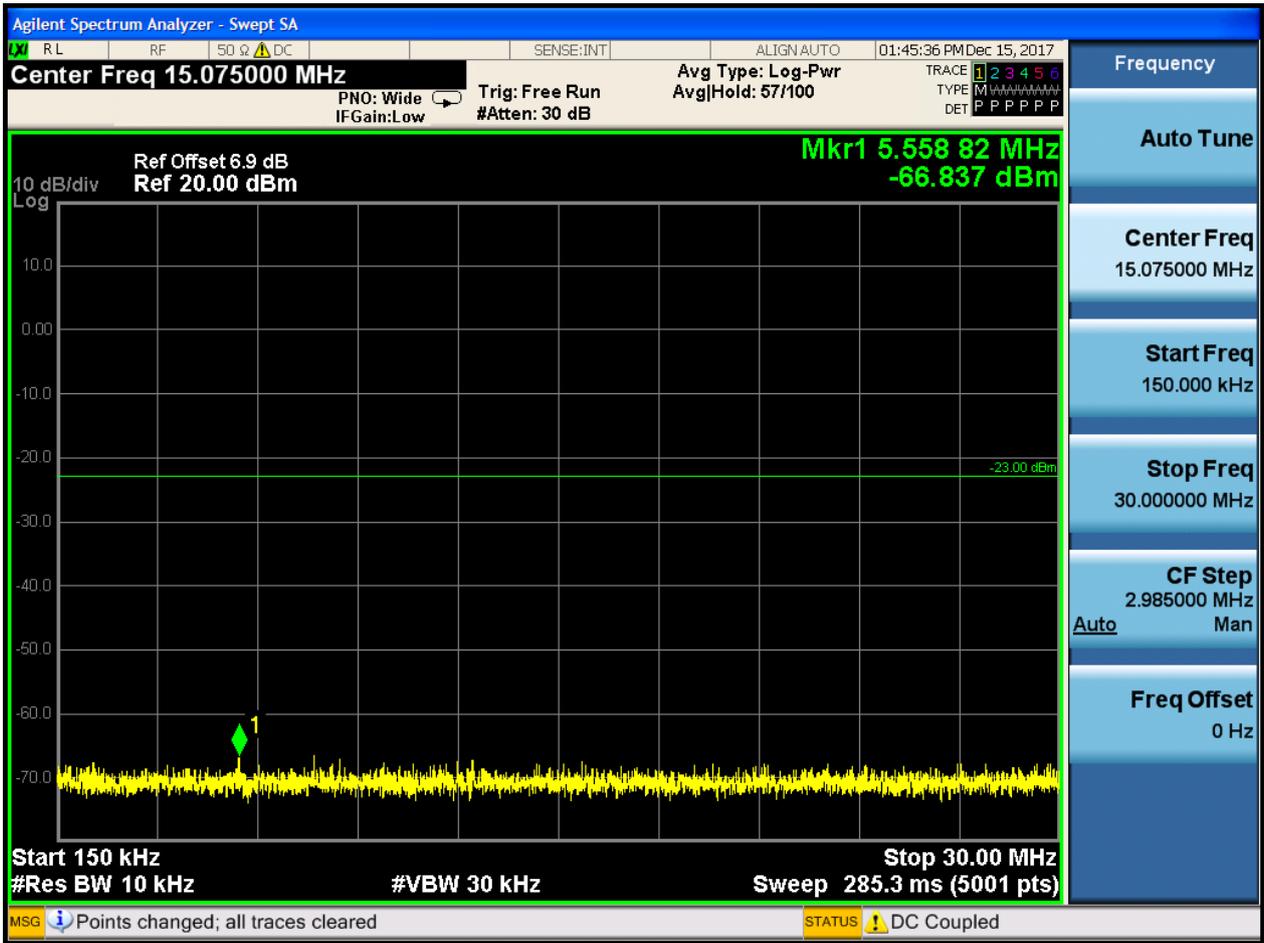


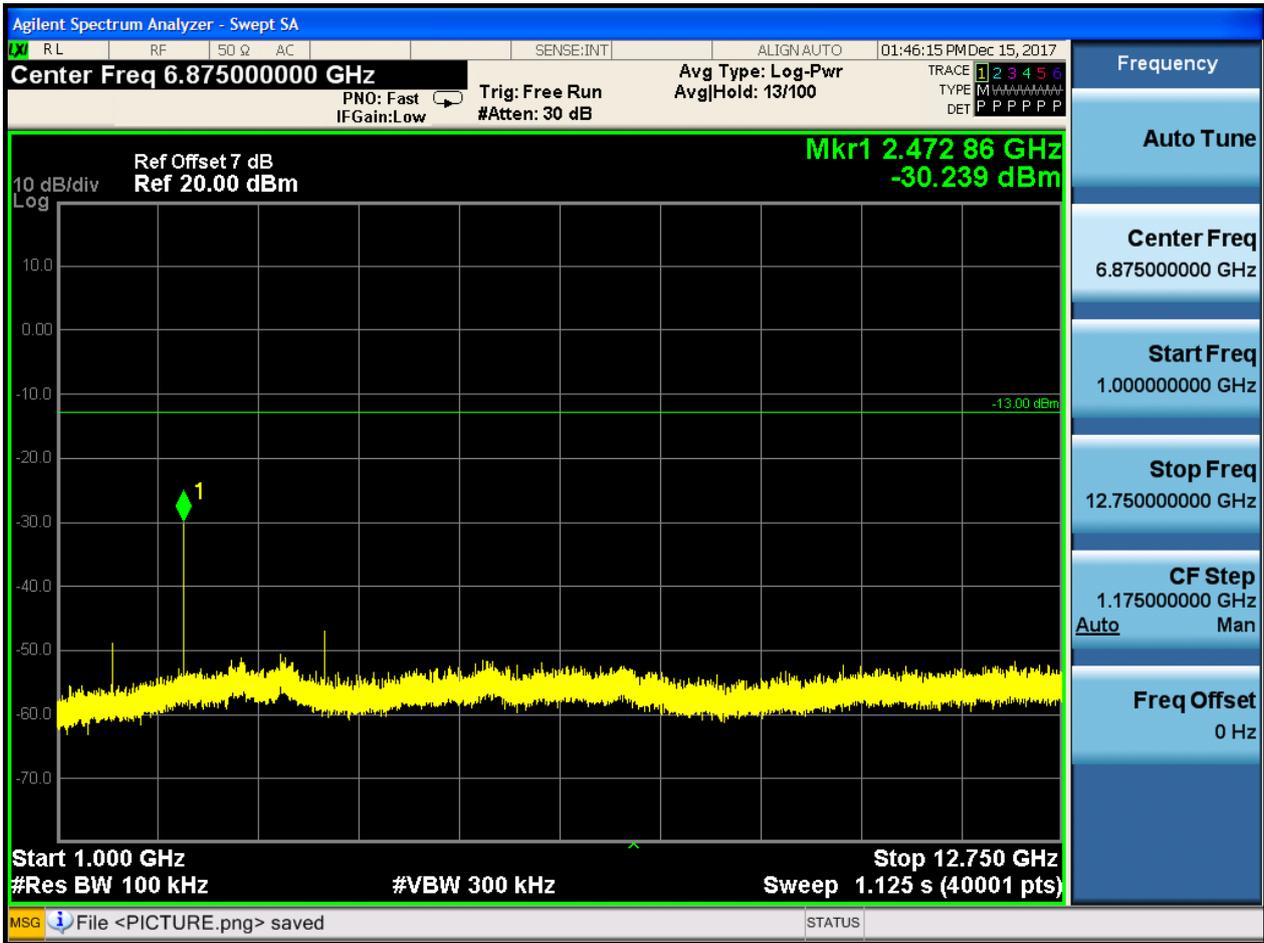
6.1.2 Test Band = GSM850

6.1.2.1 Test Mode = GSM/TM1

6.1.2.1.1 Test Channel = LCH





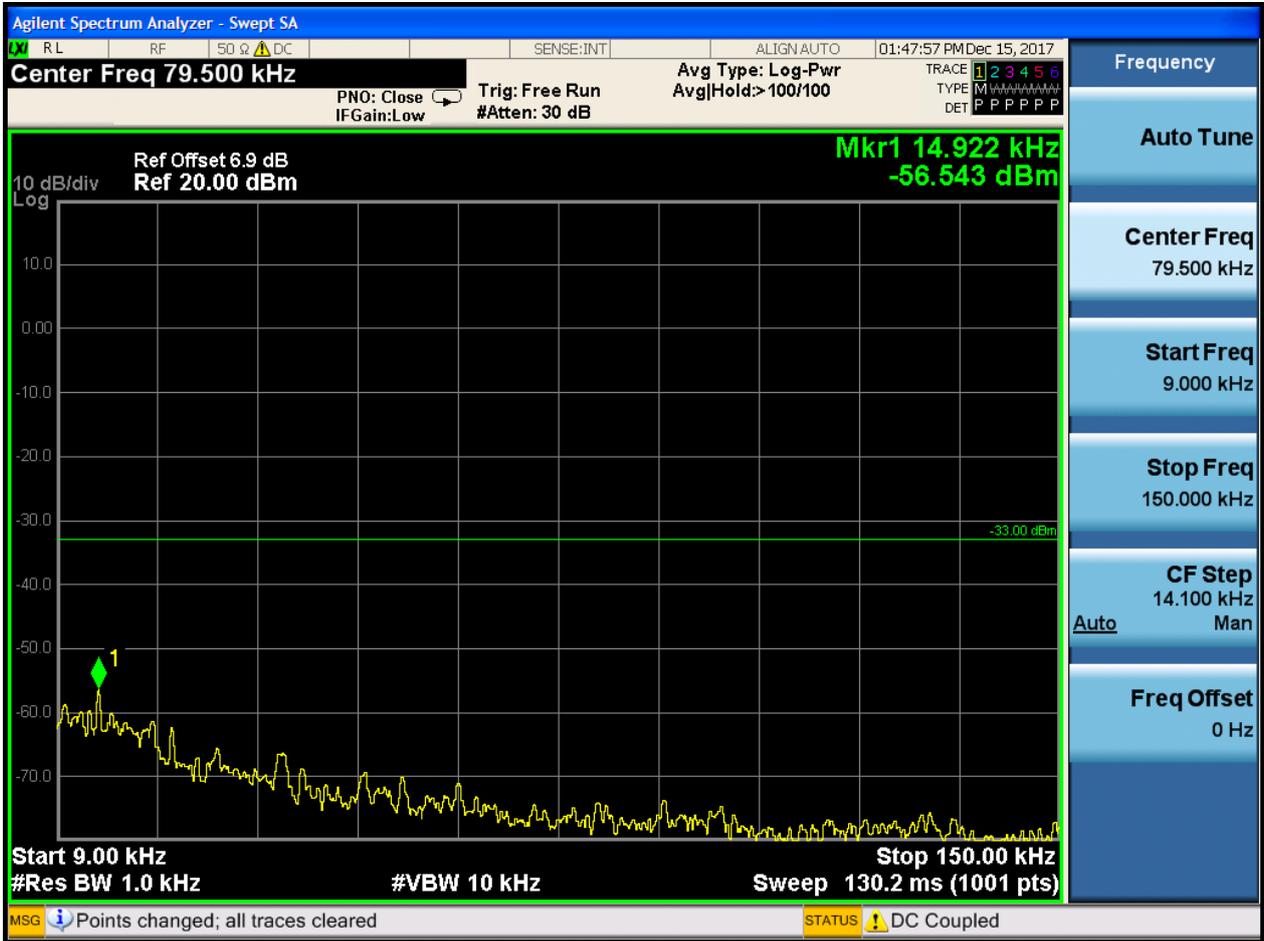


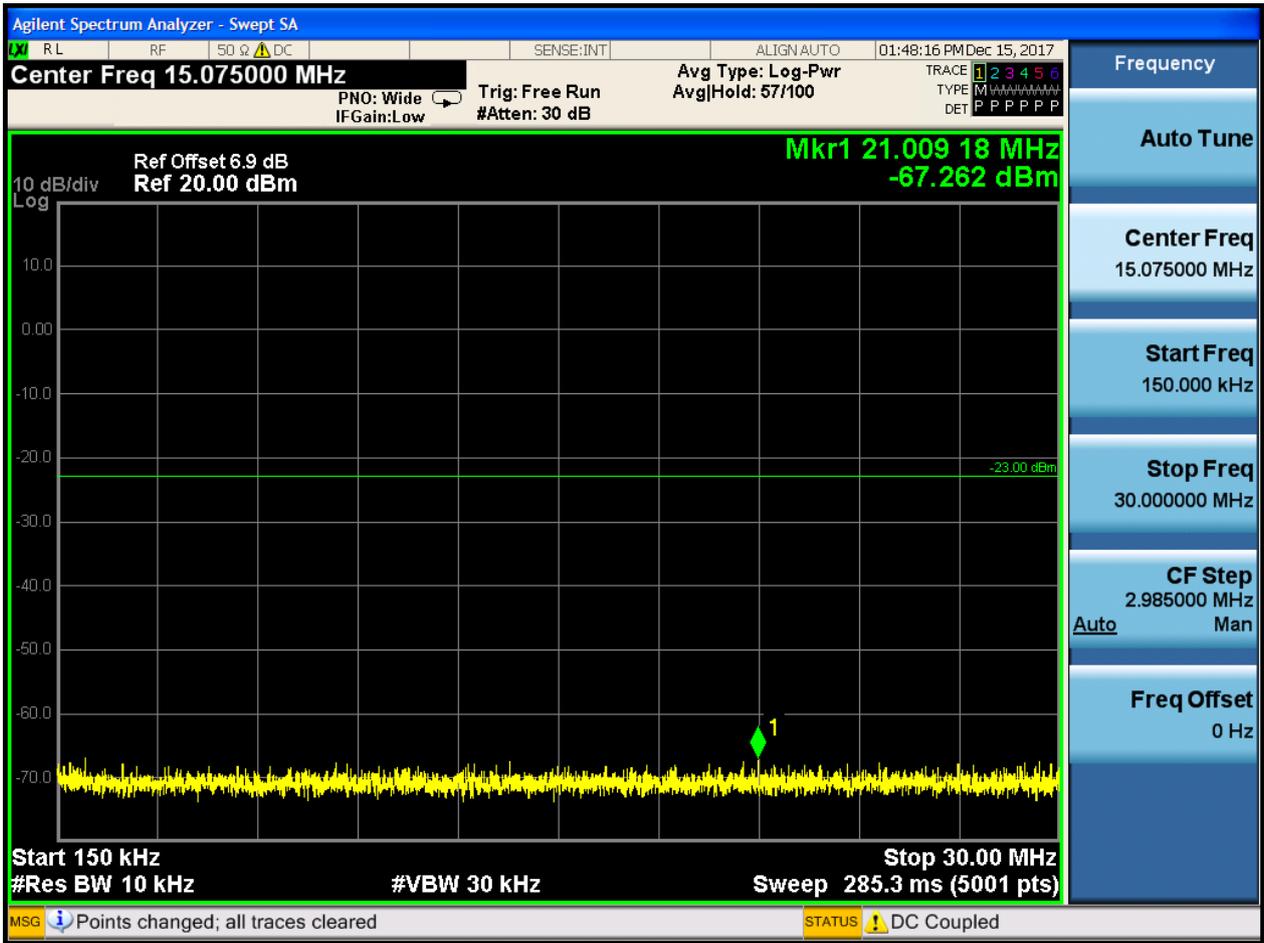


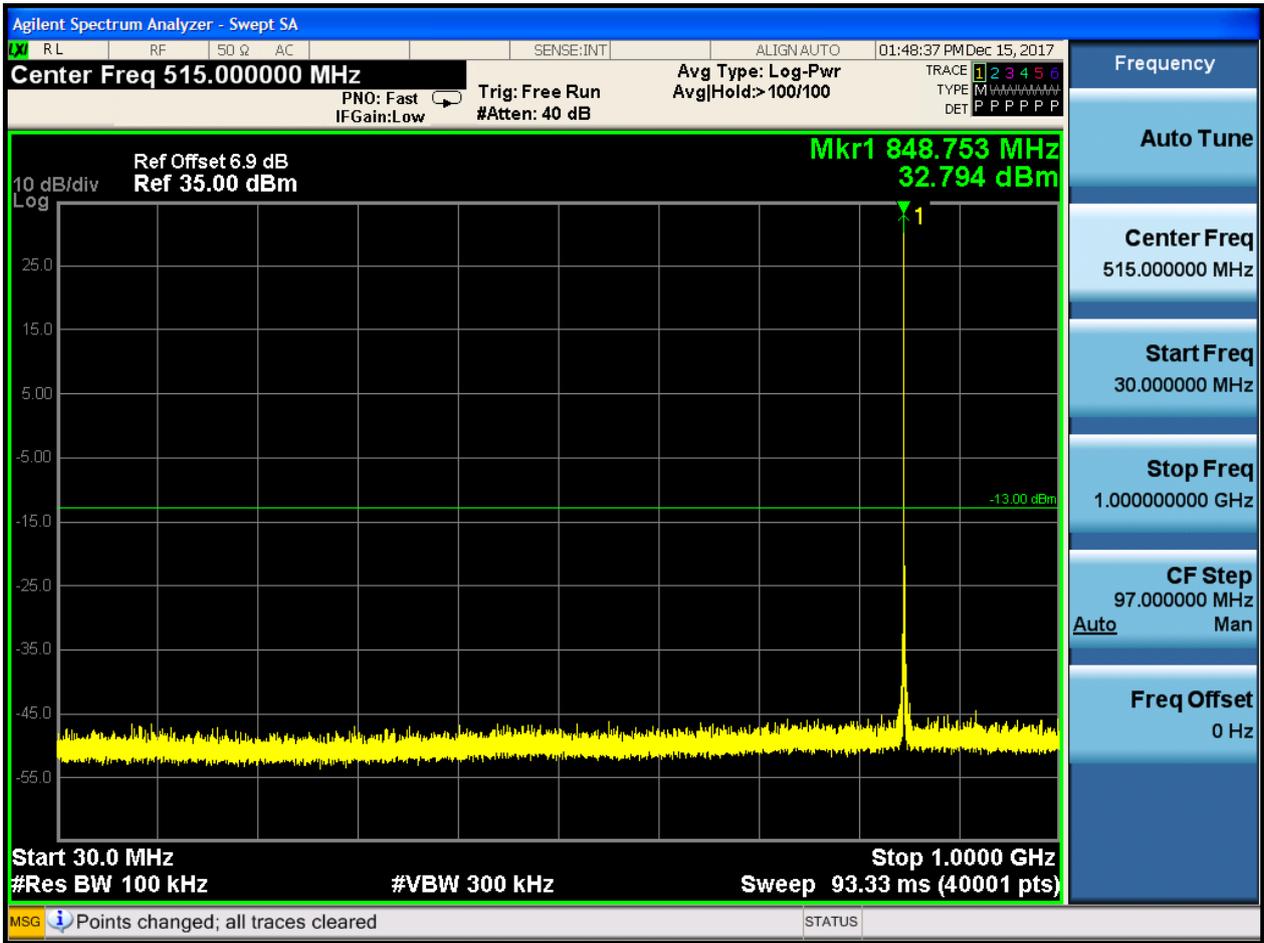
6.1.2.1.2 Test Channel = MCH

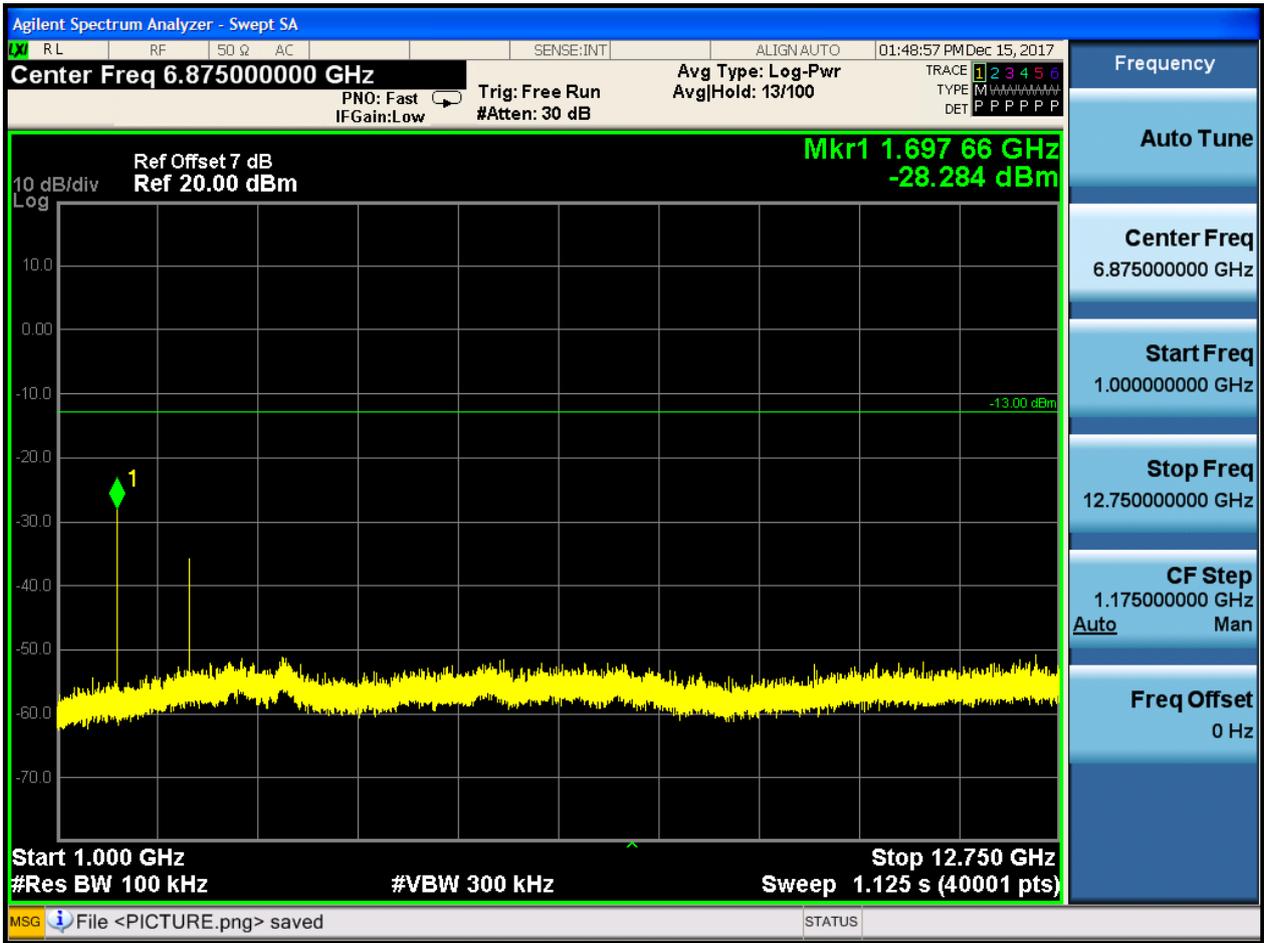


6.1.2.1.3 Test Channel = HCH





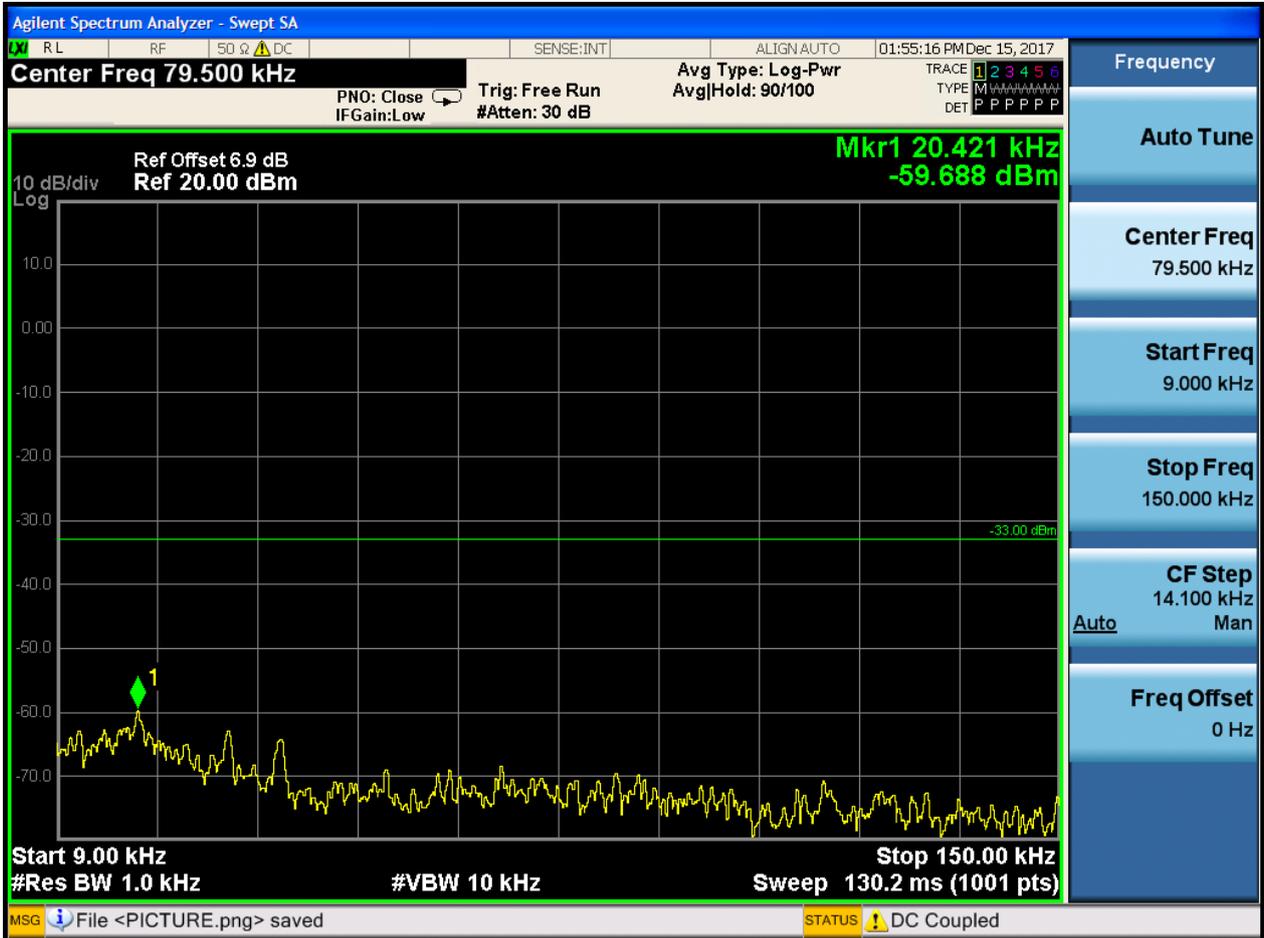






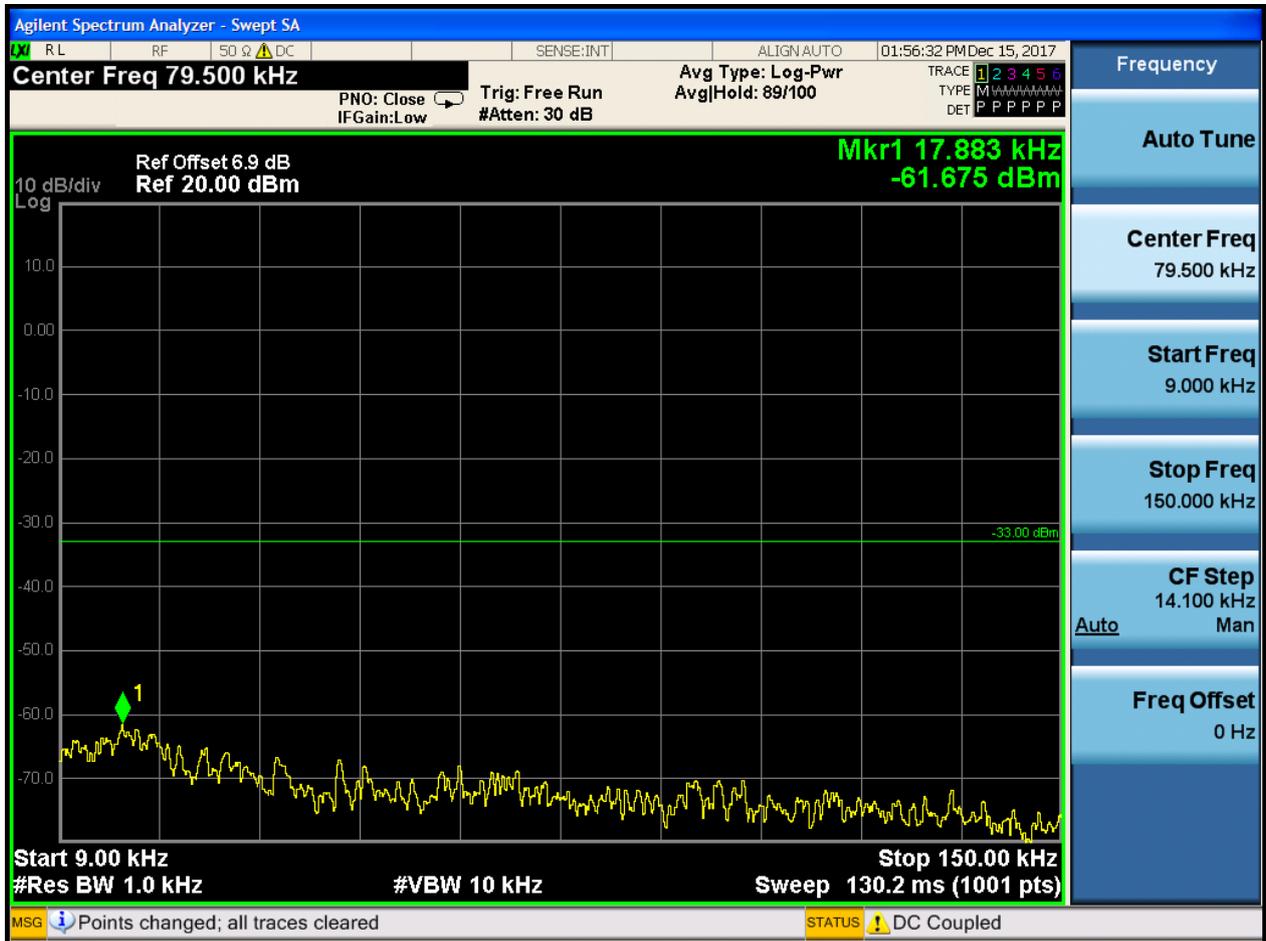
6.1.2.2 Test Mode = GSM/TM2

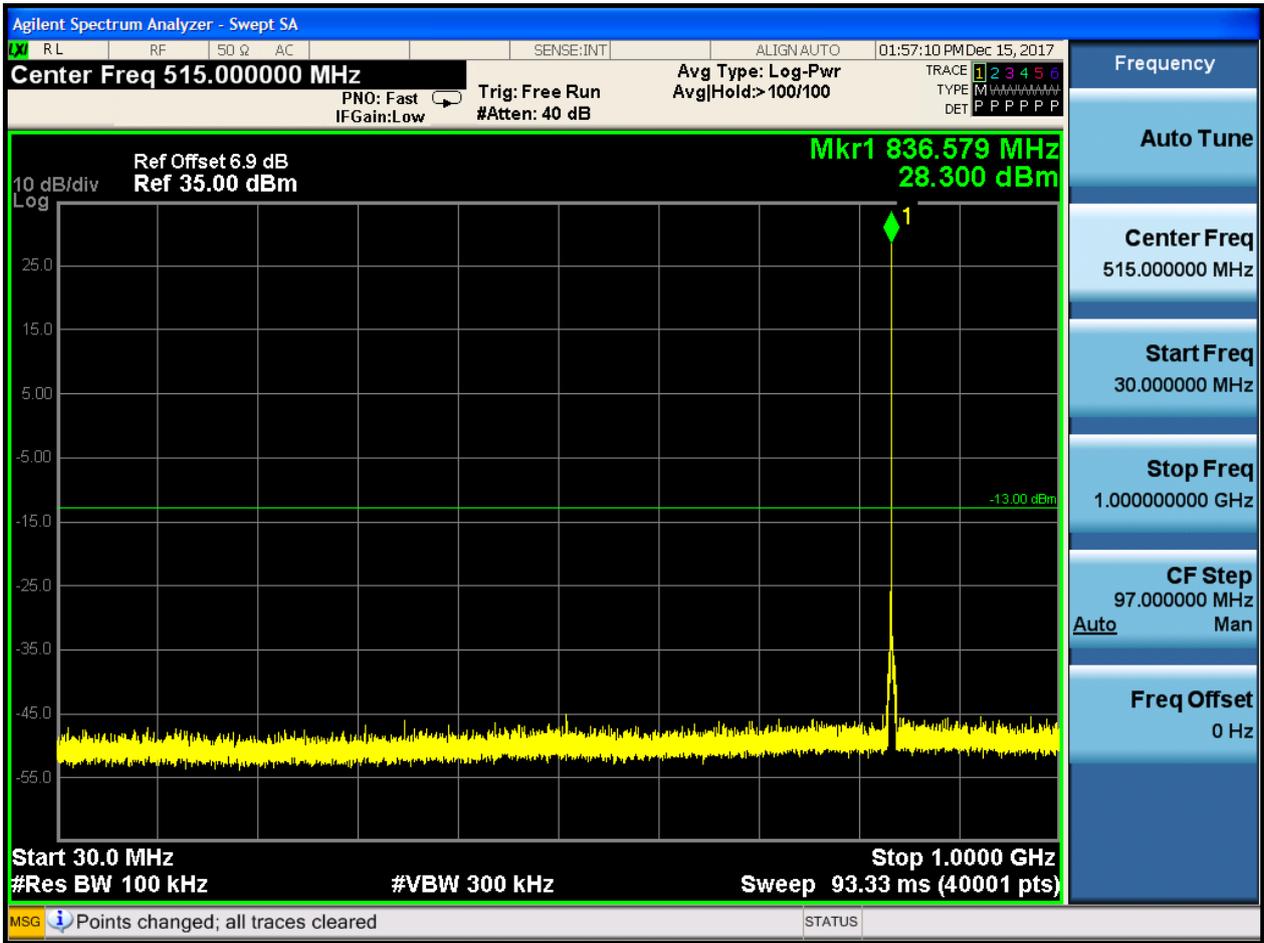
6.1.2.2.1 Test Channel = LCH





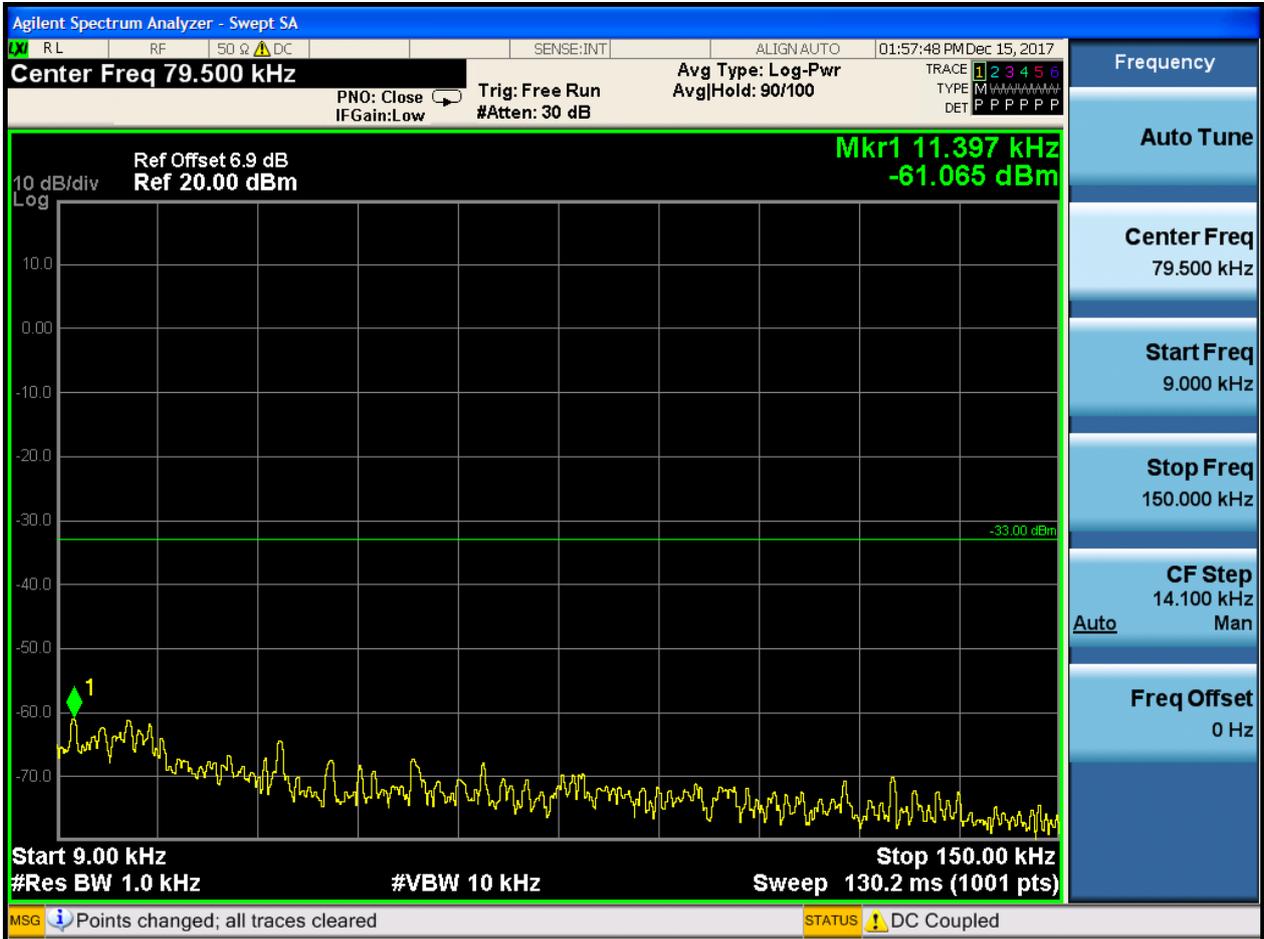
6.1.2.2.2 Test Channel = MCH







6.1.2.2.3 Test Channel = HCH



7Appendix_G: Field Strength of Spurious Radiation

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

9kHz~150kHz, RBW = 200Hz, VBW = 600 Hz, Detector: PK

150kHz~30MHz, RBW = 9kHz, VBW = 30k Hz, Detector: PK

30MHz~1GHz, RBW = 100 kHz, VBW = 300 kHz. Detector: PK

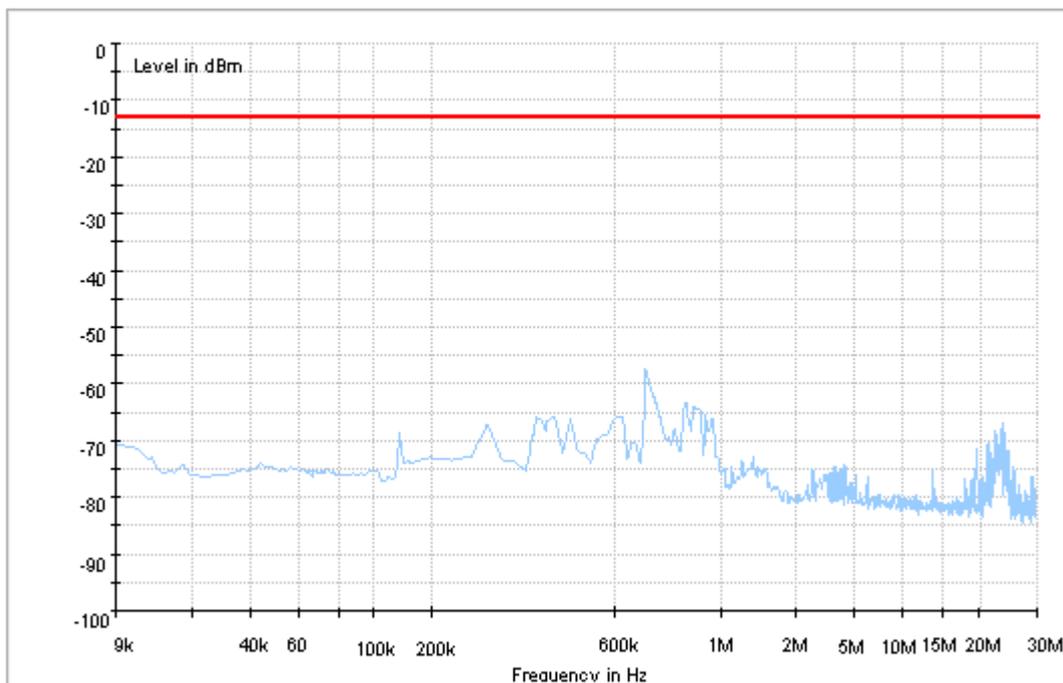
Above 1GHz, RBW = 1 MHz, VBW = 3 MHz. Detector: PK

Part I - Test Plots

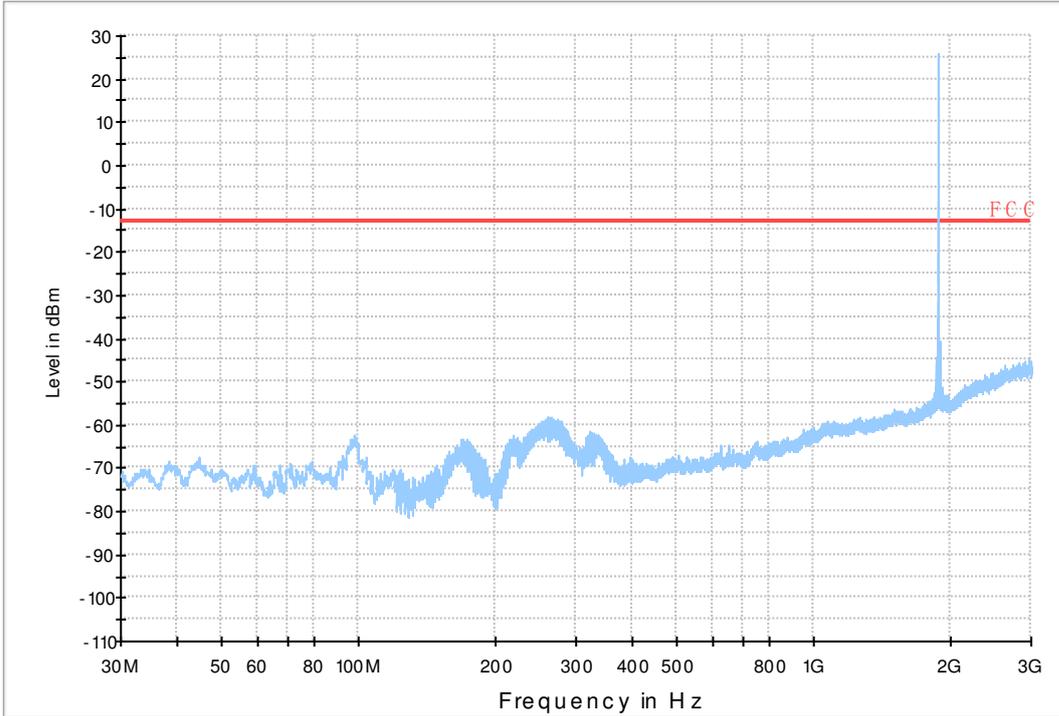
7.1 For GSM

7.1.1 Test Band = GSM1900_ANT1

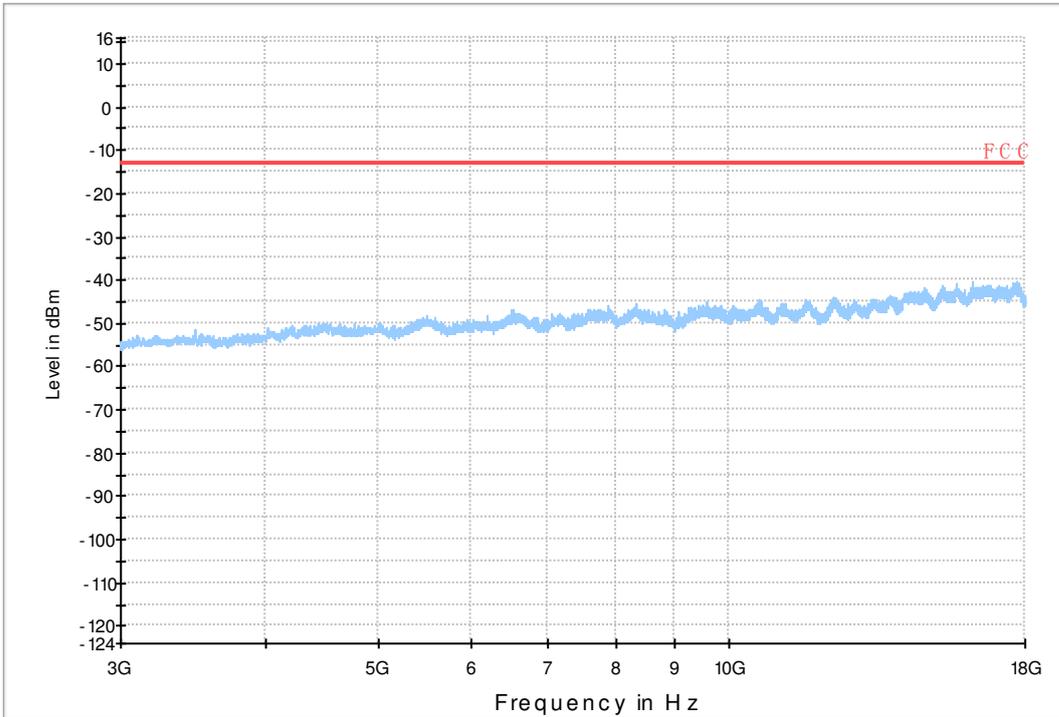
7.1.1.1 Test Mode = GSM/TM1

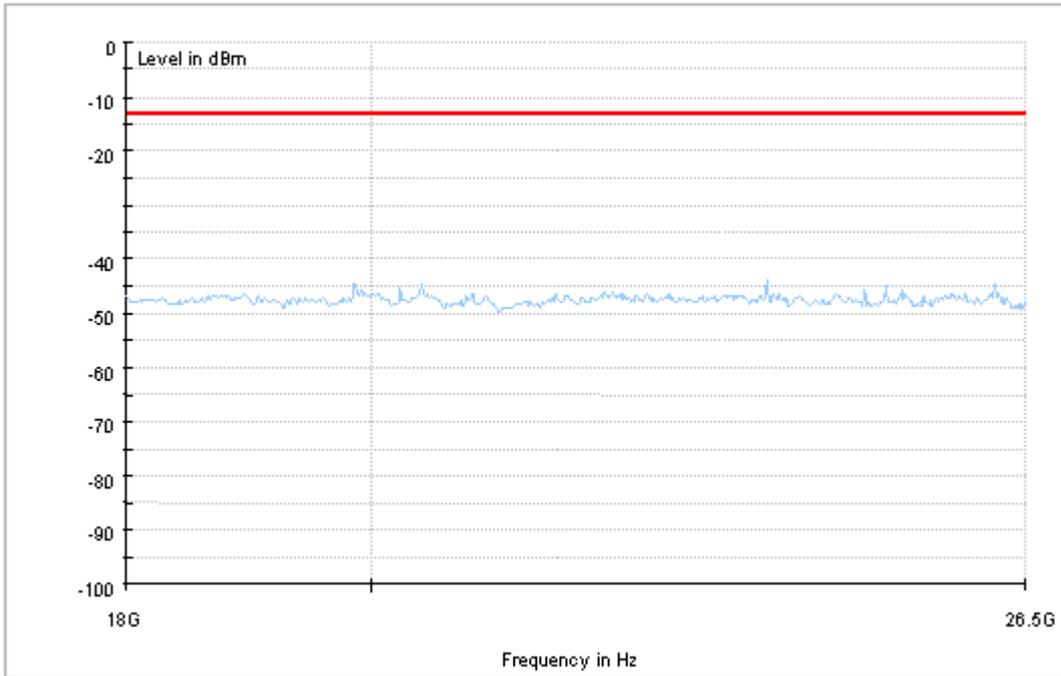


Copy of FCC PART24 GSM1900_L



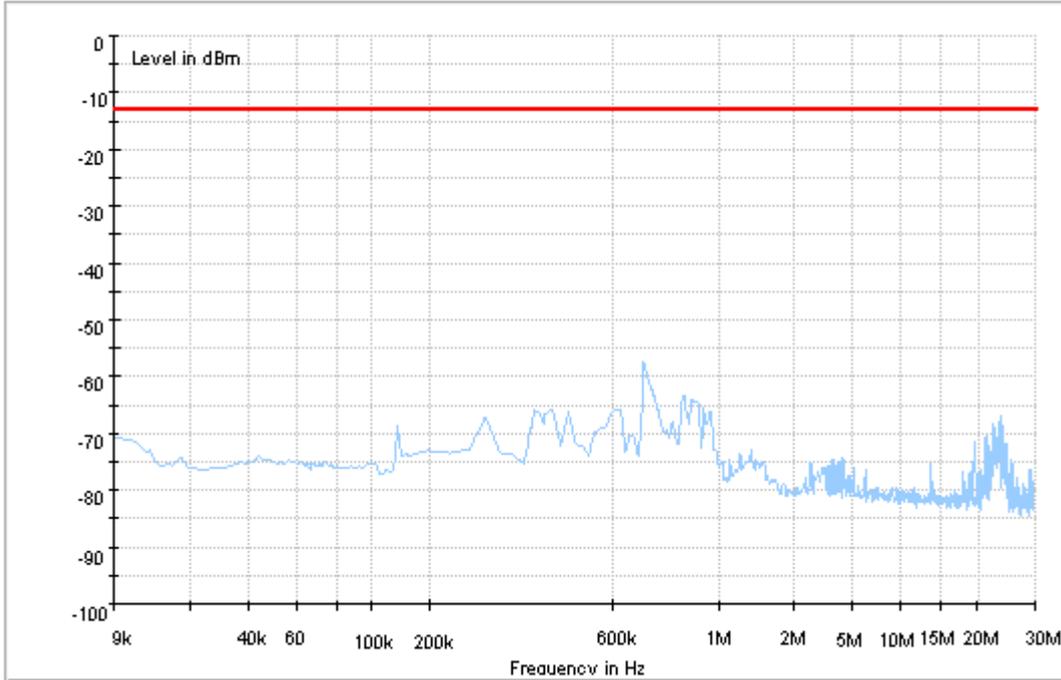
Copy of FCC PART24 GSM1900_H



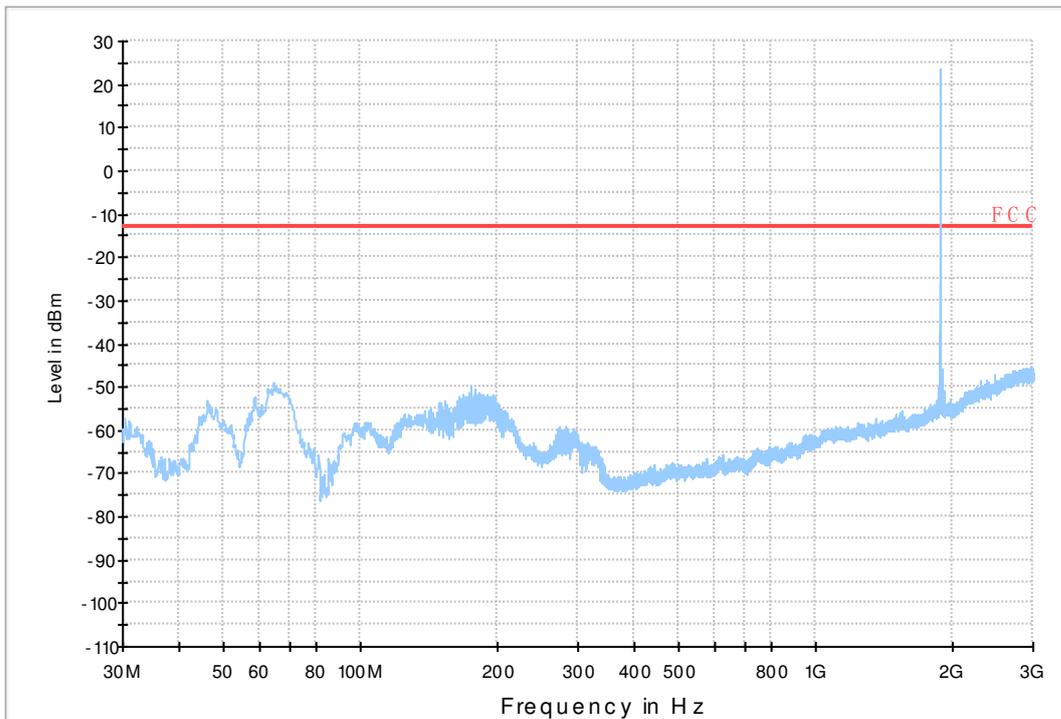


7.1.2 Test Band = GSM1900_ANT2

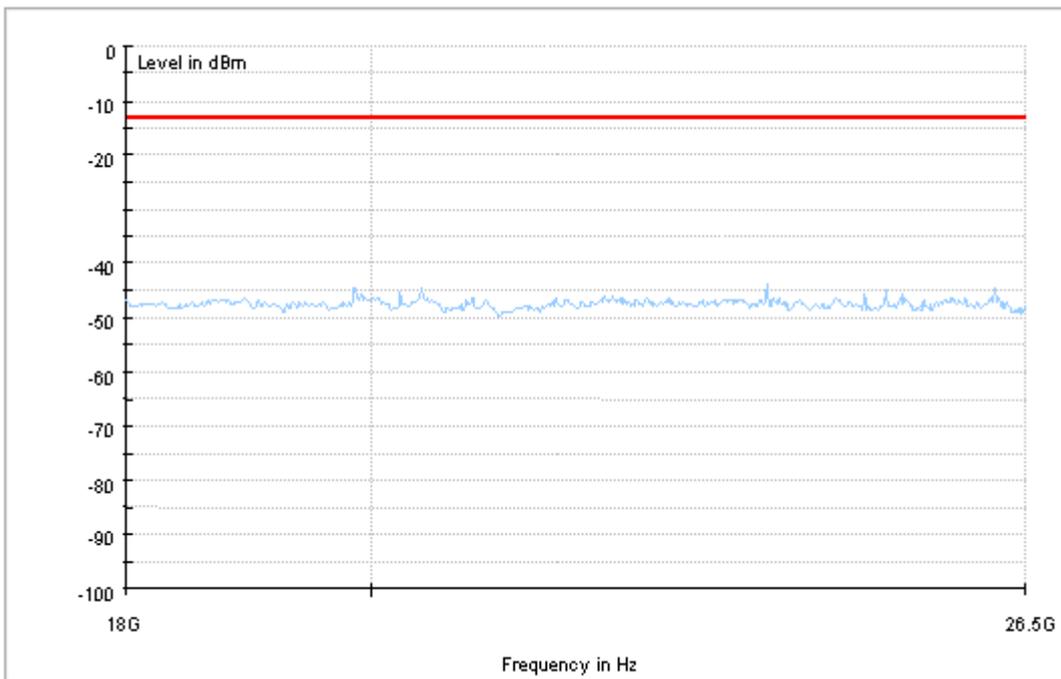
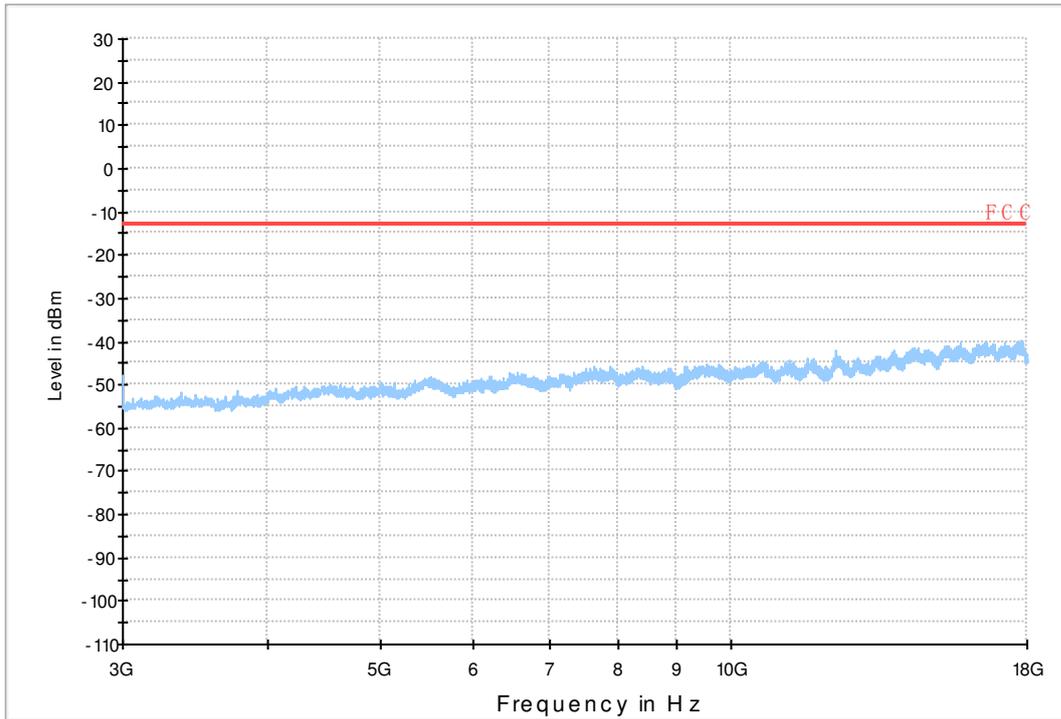
7.1.2.1 Test Mode = GSM/TM1



Copy of FCC PART24 GSM1900_L

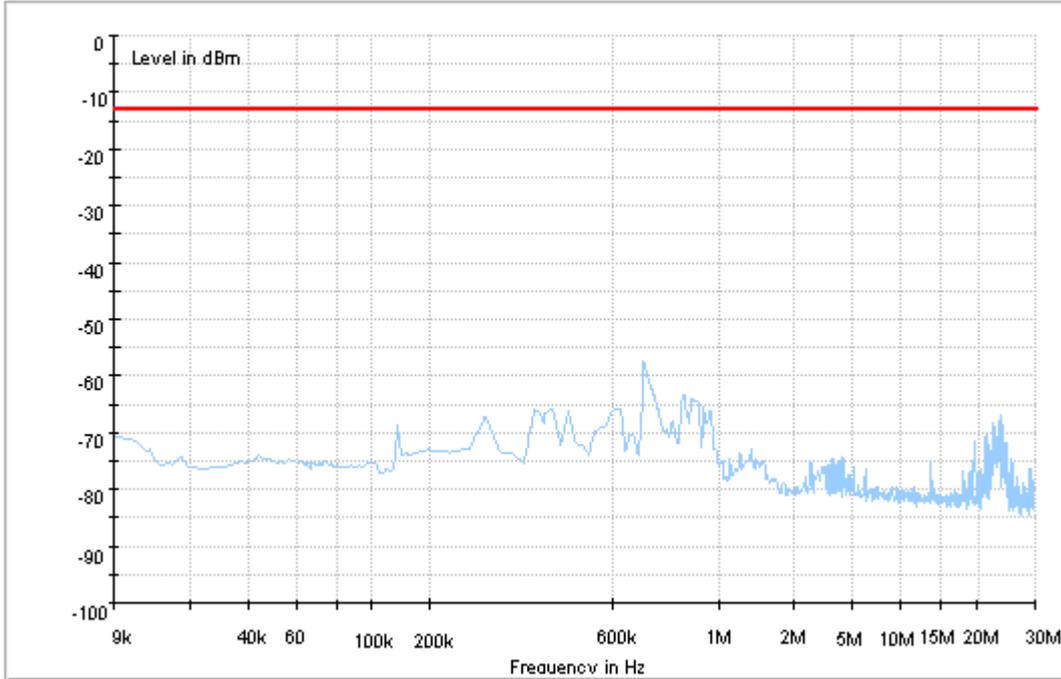


Copy of FCC PART24 GSM1900_H

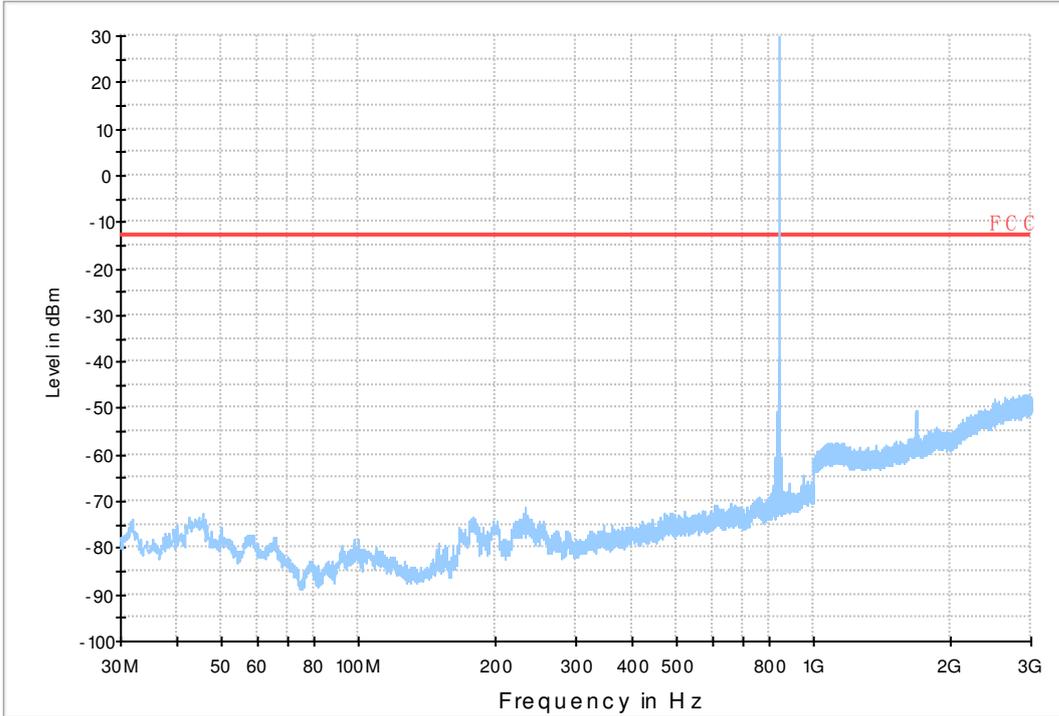


7.1.3 Test Band = GSM850_ANT1

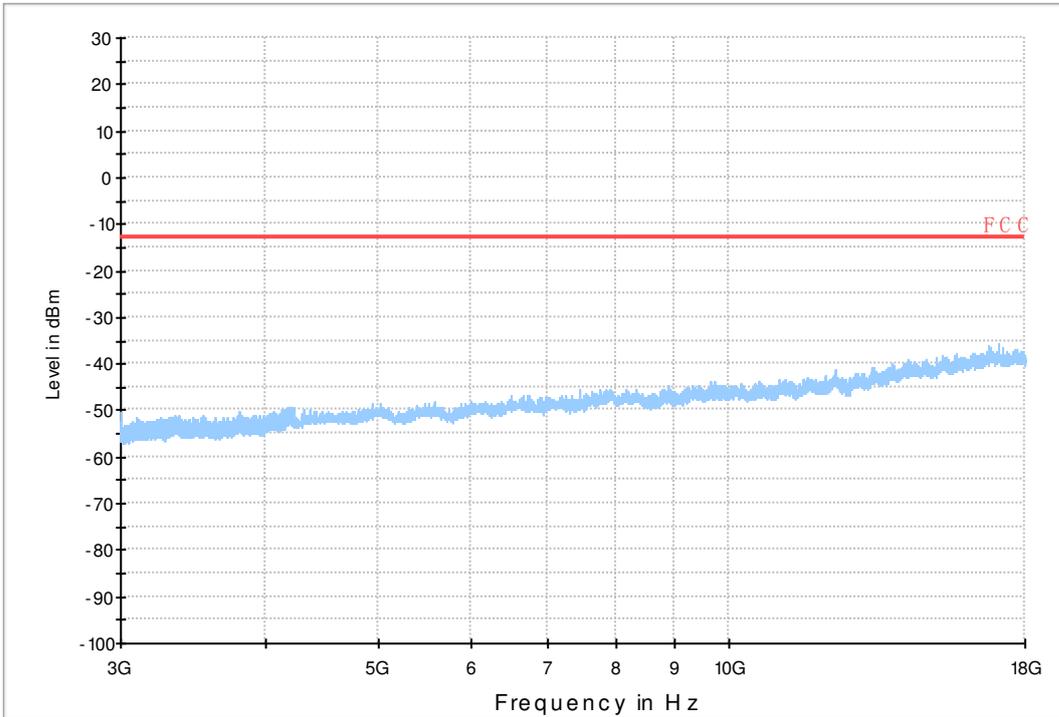
7.1.3.1 Test Mode = GSM/TM1



Copy of FCC PART22 GSM850_L

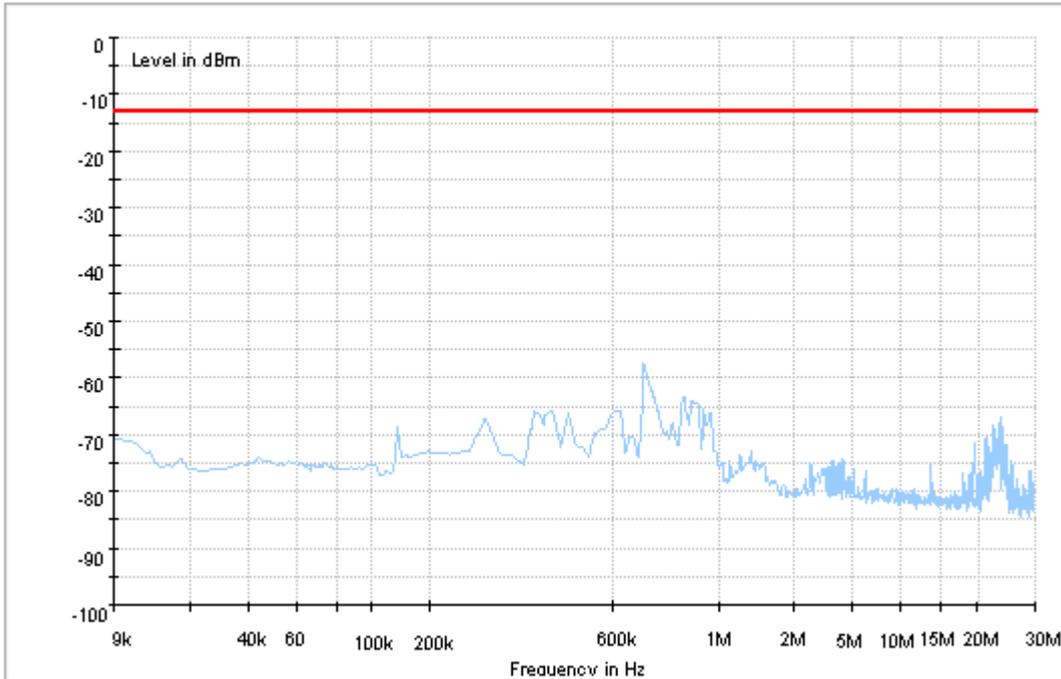


Copy of FCC PART22 GSM850_H

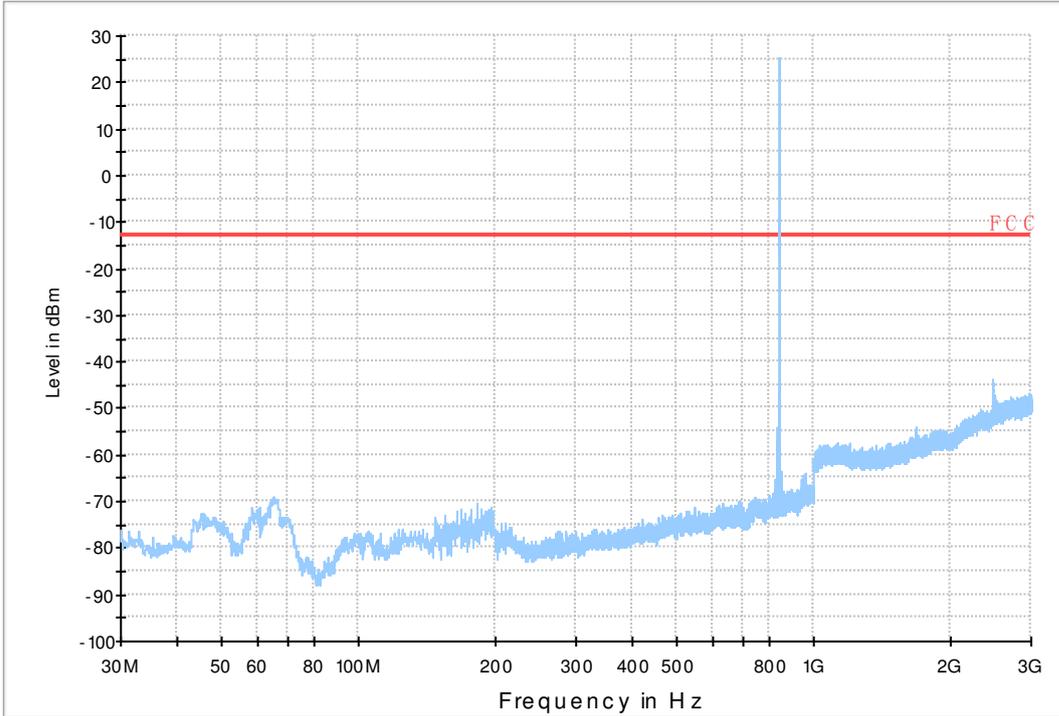


7.1.4 Test Band = GSM850_ANT2

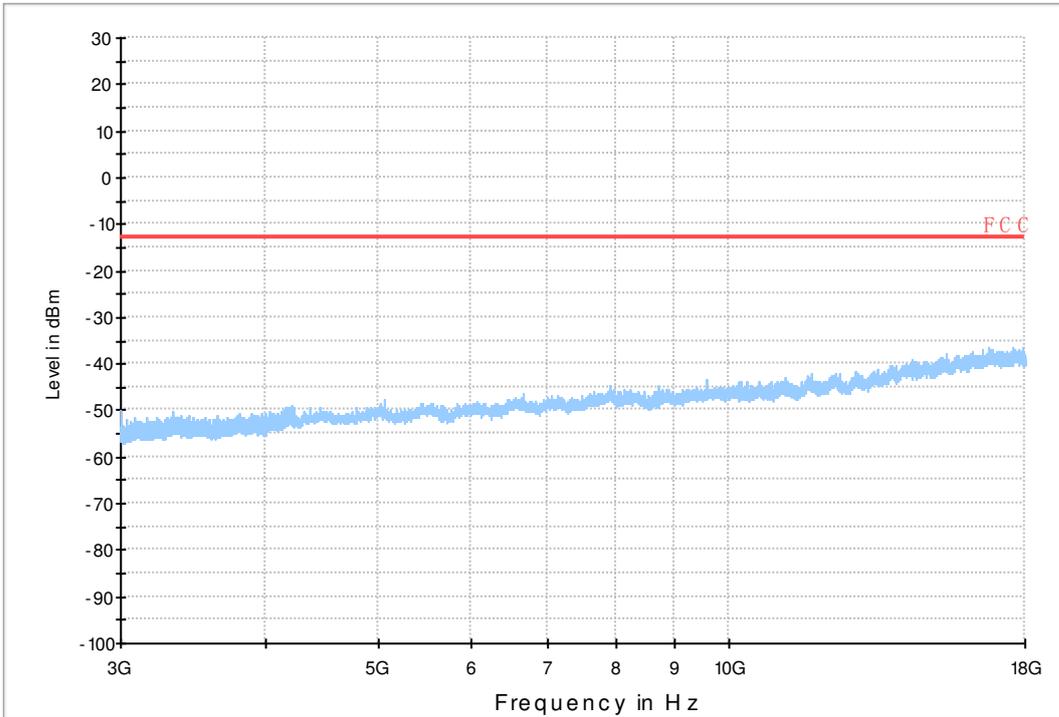
7.1.4.1 Test Mode = GSM/TM1



Copy of FCC PART22 GSM850_L



Copy of FCC PART22 GSM850_H



8Appendix_H: Frequency Stability

8.1 For GSM

8.1.1 Frequency 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	7.75	0.00419	PASS
				VN	0.26	0.00014	PASS
				VH	6.33	0.00342	PASS
		MCH	TN	VL	12.53	0.00666	PASS
				VN	17.56	0.00934	PASS
				VH	12.53	0.00666	PASS
		HCH	TN	VL	29.96	0.01569	PASS
				VN	11.49	0.00602	PASS
				VH	18.4	0.00963	PASS
	GSM/TM2	LCH	TN	VL	-14.11	-0.00763	PASS
				VN	13.04	0.00705	PASS
				VH	-8.33	-0.0045	PASS
		MCH	TN	VL	13.37	0.00711	PASS
				VN	10.01	0.00532	PASS
				VH	10.94	0.00582	PASS
		HCH	TN	VL	3.45	0.00181	PASS
				VN	12.75	0.00668	PASS
				VH	11.2	0.00586	PASS
GSM850	GSM/TM1	LCH	TN	VL	-15.43	-0.01872	PASS
				VN	-12.14	-0.01473	PASS
				VH	-14.92	-0.0181	PASS
		MCH	TN	VL	-11.75	-0.01404	PASS
				VN	-8.52	-0.01018	PASS
				VH	-10.59	-0.01266	PASS
	HCH	TN	VL	-11.17	-0.01316	PASS	
			VN	-10.98	-0.01294	PASS	
			VH	-12.01	-0.01415	PASS	
	GSM/TM2	LCH	TN	VL	-3.23	-0.00392	PASS
				VN	-4.62	-0.00561	PASS
				VH	-15.27	-0.01853	PASS

	MCH	TN	VL	-12.75	-0.01524	PASS
			VN	-10.01	-0.01197	PASS
			VH	-14.59	-0.01744	PASS
	HCH	TN	VL	-2.1	-0.00247	PASS
			VN	-6.84	-0.00806	PASS
			VH	-2.68	-0.00316	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	-5.1	-0.00276	PASS
				-20	12.2	0.00659	PASS
				-10	12.2	0.00659	PASS
				0	4.39	0.00237	PASS
				10	10.14	0.00548	PASS
				20	8.46	0.00457	PASS
				30	1.29	0.0007	PASS
				40	5.68	0.00307	PASS
				50	6.46	0.00349	PASS
		MCH	VN	-30	25.12	0.01336	PASS
				-20	25.31	0.01346	PASS
				-10	18.92	0.01006	PASS
				0	19.44	0.01034	PASS
				10	8.14	0.00433	PASS
				20	6.72	0.00357	PASS
				30	22.54	0.01199	PASS
				40	16.53	0.00879	PASS
				50	15.5	0.00824	PASS
		HCH	VN	-30	8.39	0.00439	PASS
				-20	11.17	0.00585	PASS
				-10	12.53	0.00656	PASS
				0	19.5	0.01021	PASS
				10	18.47	0.00967	PASS
				20	15.05	0.00788	PASS
				30	12.07	0.00632	PASS
				40	14.85	0.00778	PASS
				50	25.38	0.01329	PASS
	GSM/TM2	LCH	VN	-30	-19.37	-0.01047	PASS
				-20	1.97	0.00106	PASS

				-10	-9.01	-0.00487	PASS		
				0	0.16	0.00009	PASS		
				10	-4.46	-0.00241	PASS		
				20	2.74	0.00148	PASS		
				30	7.55	0.00408	PASS		
				40	-3.62	-0.00196	PASS		
				50	10.65	0.00576	PASS		
		MCH	VN	-30	11.36	0.00604	PASS		
				-20	2.29	0.00122	PASS		
				-10	9.81	0.00522	PASS		
				0	8.23	0.00438	PASS		
				10	8.59	0.00457	PASS		
				20	-0.84	-0.00045	PASS		
				30	-1.94	-0.00103	PASS		
		HCH	VN	40	3.39	0.0018	PASS		
				50	8.3	0.00441	PASS		
				-30	12.98	0.0068	PASS		
				-20	1.78	0.00093	PASS		
				-10	14.21	0.00744	PASS		
				0	6.97	0.00365	PASS		
				10	6.36	0.00333	PASS		
		GSM850	GSM/TM1	LCH	VN	20	4.16	0.00218	PASS
						30	10.14	0.00531	PASS
						40	4.91	0.00257	PASS
						50	11.59	0.00607	PASS
						-30	-22.79	-0.02765	PASS
						-20	-9.94	-0.01206	PASS
						-10	-11.3	-0.01371	PASS
MCH	VN			0	-7.36	-0.00893	PASS		
				10	-9.88	-0.01199	PASS		
				20	-7.81	-0.00948	PASS		
				30	-9.88	-0.01199	PASS		
				40	-12.4	-0.01504	PASS		
				50	-14.14	-0.01716	PASS		
				-30	-12.2	-0.01458	PASS		
-20	-10.4	-0.01243	PASS						
-10	-6.2	-0.00741	PASS						
0	-13.11	-0.01567	PASS						
10	-8.91	-0.01065	PASS						
20	-12.46	-0.01489	PASS						
30	-11.82	-0.01413	PASS						

		HCH	VN	40	-4.52	-0.0054	PASS
				50	-14.08	-0.01683	PASS
				-30	-12.79	-0.01507	PASS
				-20	-12.46	-0.01468	PASS
				-10	-8.2	-0.00966	PASS
				0	-12.46	-0.01468	PASS
				10	-16.14	-0.01902	PASS
				20	-8.91	-0.0105	PASS
				30	-8.52	-0.01004	PASS
				40	-14.72	-0.01734	PASS
	50	-13.69	-0.01613	PASS			
	GSM/TM2	LCH	VN	-30	-6.72	-0.00815	PASS
				-20	-1.36	-0.00165	PASS
				-10	-2.78	-0.00337	PASS
				0	-10.27	-0.01246	PASS
				10	-12.4	-0.01504	PASS
				20	-11.2	-0.01359	PASS
				30	-4.91	-0.00596	PASS
				40	-8.56	-0.01039	PASS
				50	-4.94	-0.00599	PASS
				MCH	VN	-30	-10.4
		-20	-3.16			-0.00378	PASS
		-10	-4.29			-0.00513	PASS
		0	-5.62			-0.00672	PASS
		10	-1.42			-0.0017	PASS
		20	-8.52			-0.01018	PASS
		30	-6.33			-0.00757	PASS
		40	-12.3			-0.0147	PASS
		50	-10.72			-0.01281	PASS
		HCH	VN			-30	-6.65
				-20	-10.88	-0.01282	PASS
	-10			-4.16	-0.0049	PASS	
	0			-6.65	-0.00783	PASS	
	10			-7.14	-0.00841	PASS	
	20			-11.24	-0.01324	PASS	
	30			-12.72	-0.01499	PASS	
	40			-6.49	-0.00765	PASS	
	50	-9.1	-0.01072	PASS			

END