



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 [dBm]	Limit [dBm]	Verdict
GSM850	GSM/TM1	LCH	32.29	28.20	38.5	PASS
		MCH	32.28	27.97	38.5	PASS
		HCH	32.24	27.96	38.5	PASS
	GSM/TM2	LCH	26.2	21.84	38.5	PASS
		MCH	26.28	22.09	38.5	PASS
		HCH	26.24	22.12	38.5	PASS
Test Band	Test Mode	Test Channel	Measured[dBm]	EIRP [dBm]	Limit [dBm]	Verdict
GSM1900	GSM/TM1	LCH	29.84	28.52	33	PASS
		MCH	29.73	28.33	33	PASS
		HCH	29.63	28.32	33	PASS
	GSM/TM2	LCH	25.43	24.06	33	PASS
		MCH	25.48	24.24	33	PASS
		HCH	25.57	24.22	33	PASS



Note1:

a, For getting the ERP (Efficient Radiated Power) or EIRP (Efficient Isotropic Radiated Power) in substitution method, the following formula should be taken to calculate it,

$$\text{ERP [dBm]} = \text{SGP [dBm]} - \text{Cable Loss [dB]} + \text{Gain [dBd]}$$

$$\text{EIRP [dBm]} = \text{SGP [dBm]} - \text{Cable Loss [dB]} + \text{Gain [dBi]}$$

b, SGP = Signal Generator Level

Note2:

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

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
GSM850	GSM/TM1	LCH	0.13	13	PASS
		MCH	0.13	13	PASS
		HCH	0.13	13	PASS
	GSM/TM2	LCH	3.22	13	PASS
		MCH	2.97	13	PASS
		HCH	2.94	13	PASS
GSM1900	GSM/TM1	LCH	0.14	13	PASS
		MCH	0.12	13	PASS
		HCH	0.13	13	PASS
	GSM/TM2	LCH	2.87	13	PASS
		MCH	2.86	13	PASS
		HCH	2.66	13	PASS

3Appendix_C: Modulation Characteristics

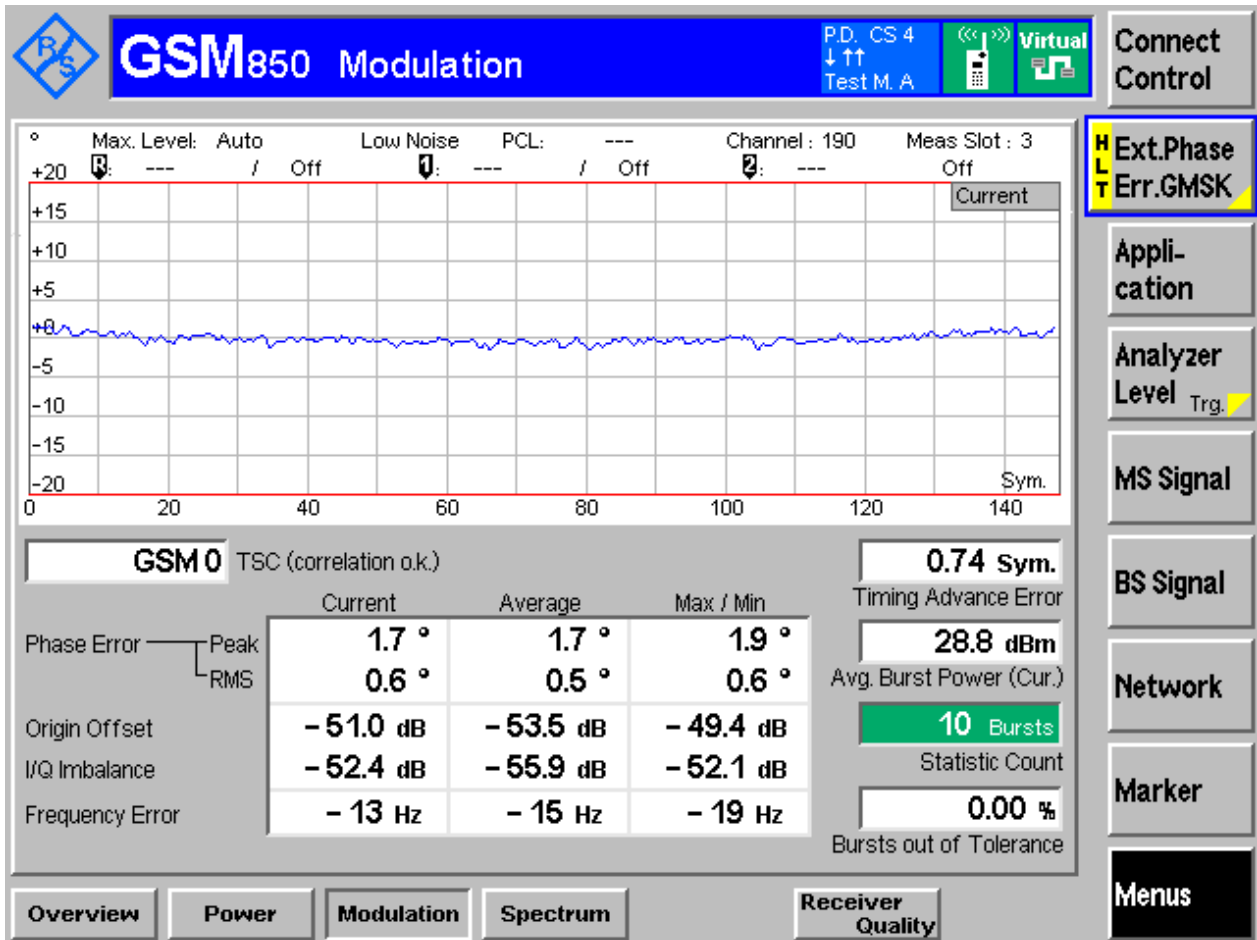
Part I - Test Plots

3.1 For GSM

3.1.1 Test Band = GSM850

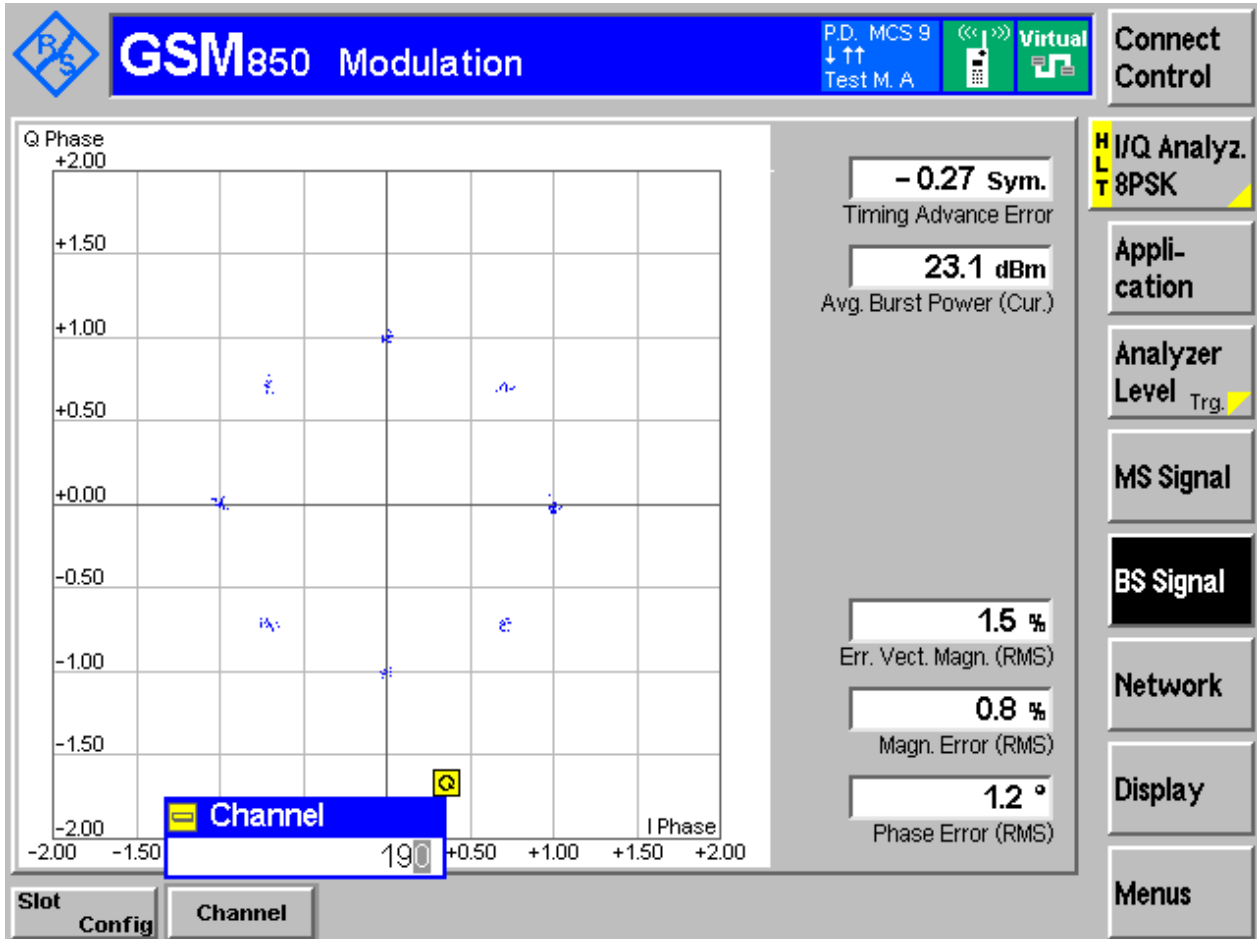
3.1.1.1 Test Mode = GSM/TM1

3.1.1.1.1 Test Channel = MCH



3.1.1.2 Test Mode = GSM/TM2

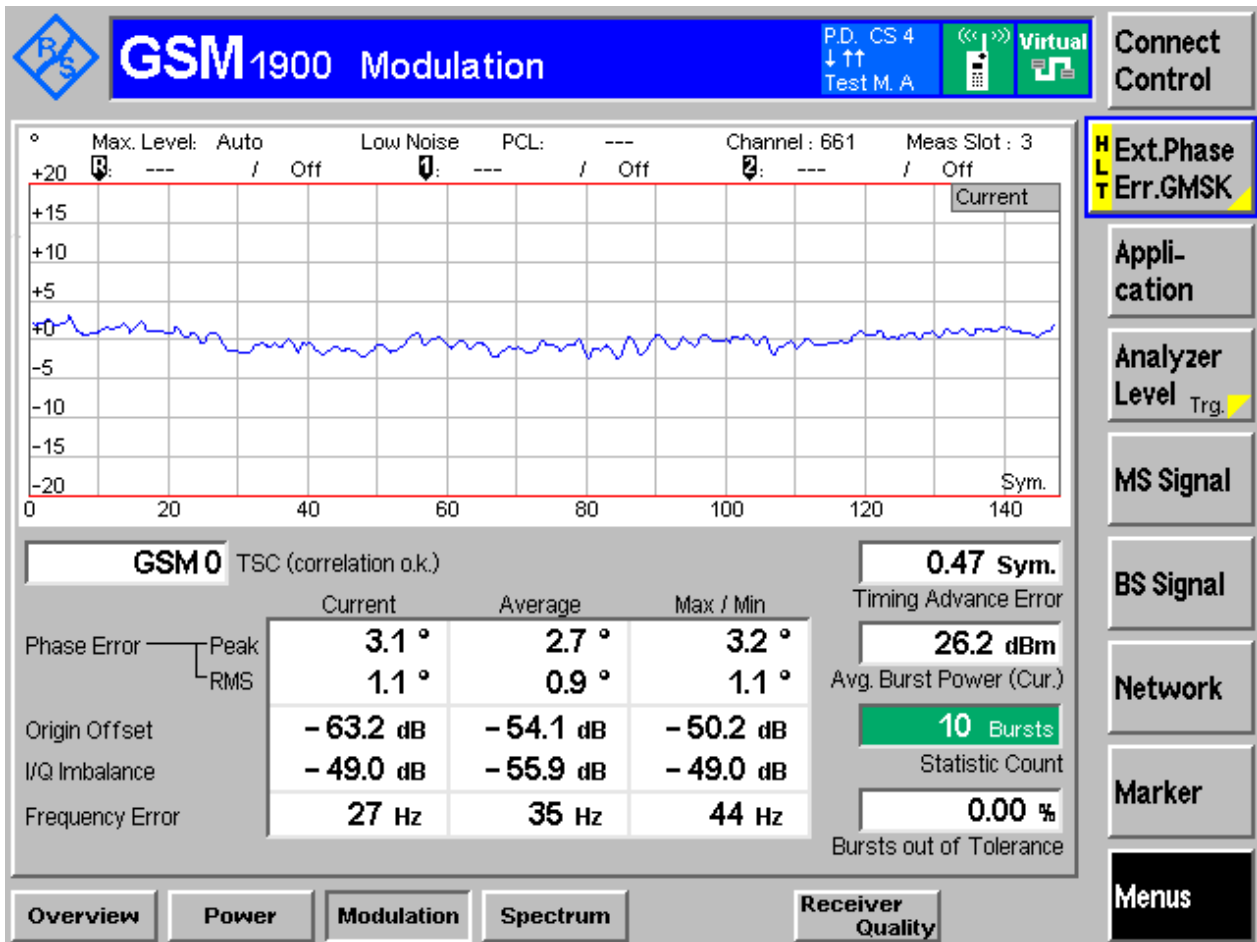
3.1.1.2.1 Test Channel = MCH



3.1.2 Test Band = GSM1900

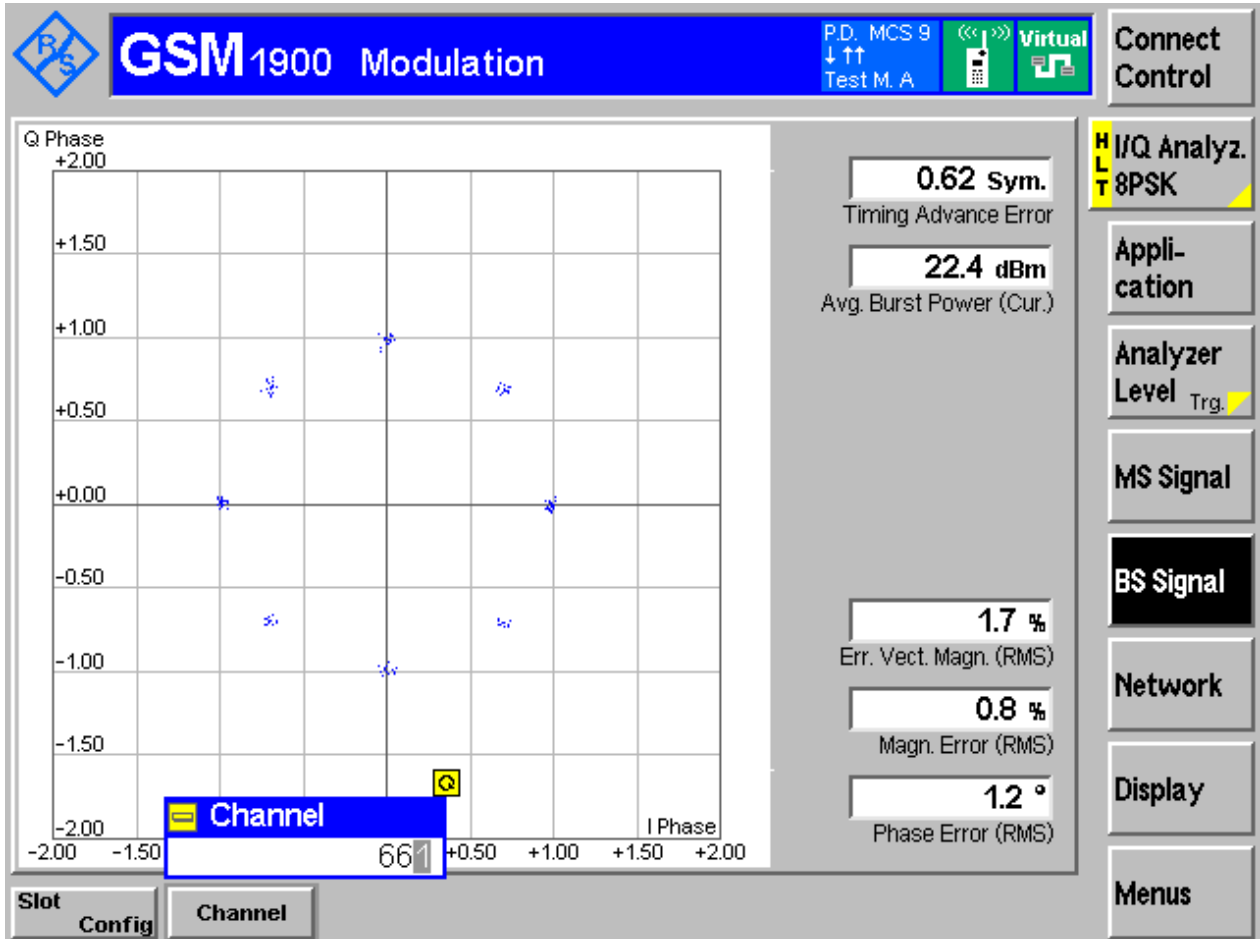
3.1.2.1 Test Mode = GSM/TM1

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	248.09	324.28	Pass
		MCH	244.88	321.66	Pass
		HCH	243.77	318.98	Pass
	GSM/TM2	LCH	254.96	319.46	Pass
		MCH	253.50	323.90	Pass
		HCH	248.57	311.65	Pass
GSM1900	GSM/TM1	LCH	242.60	318.03	Pass
		MCH	244.73	315.51	Pass
		HCH	242.72	321.69	Pass
	GSM/TM2	LCH	252.78	320.25	Pass
		MCH	251.45	327.25	Pass
		HCH	250.09	321.92	Pass



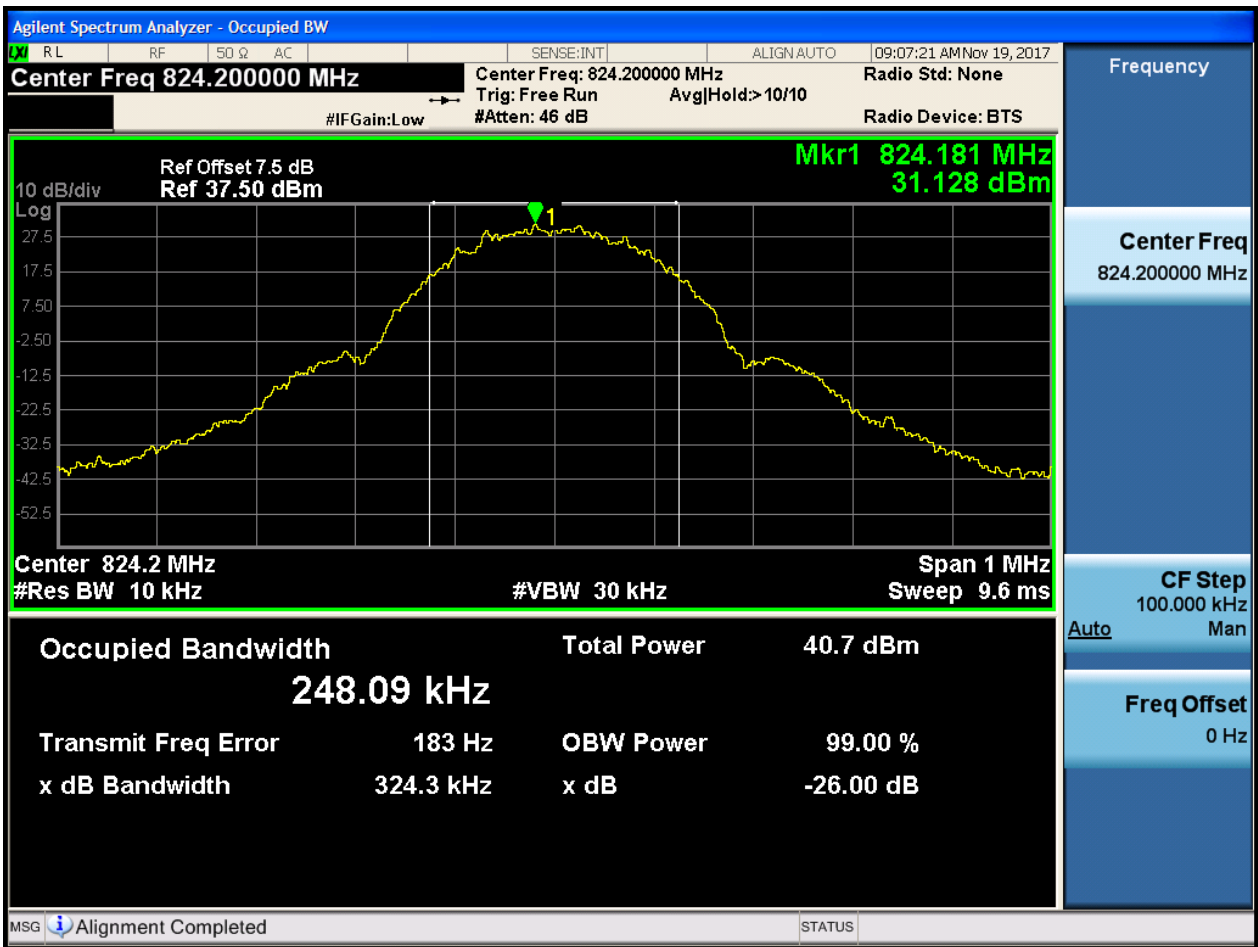
Part II - Test Plots

4.1 For GSM

4.1.1 Test Band = GSM850

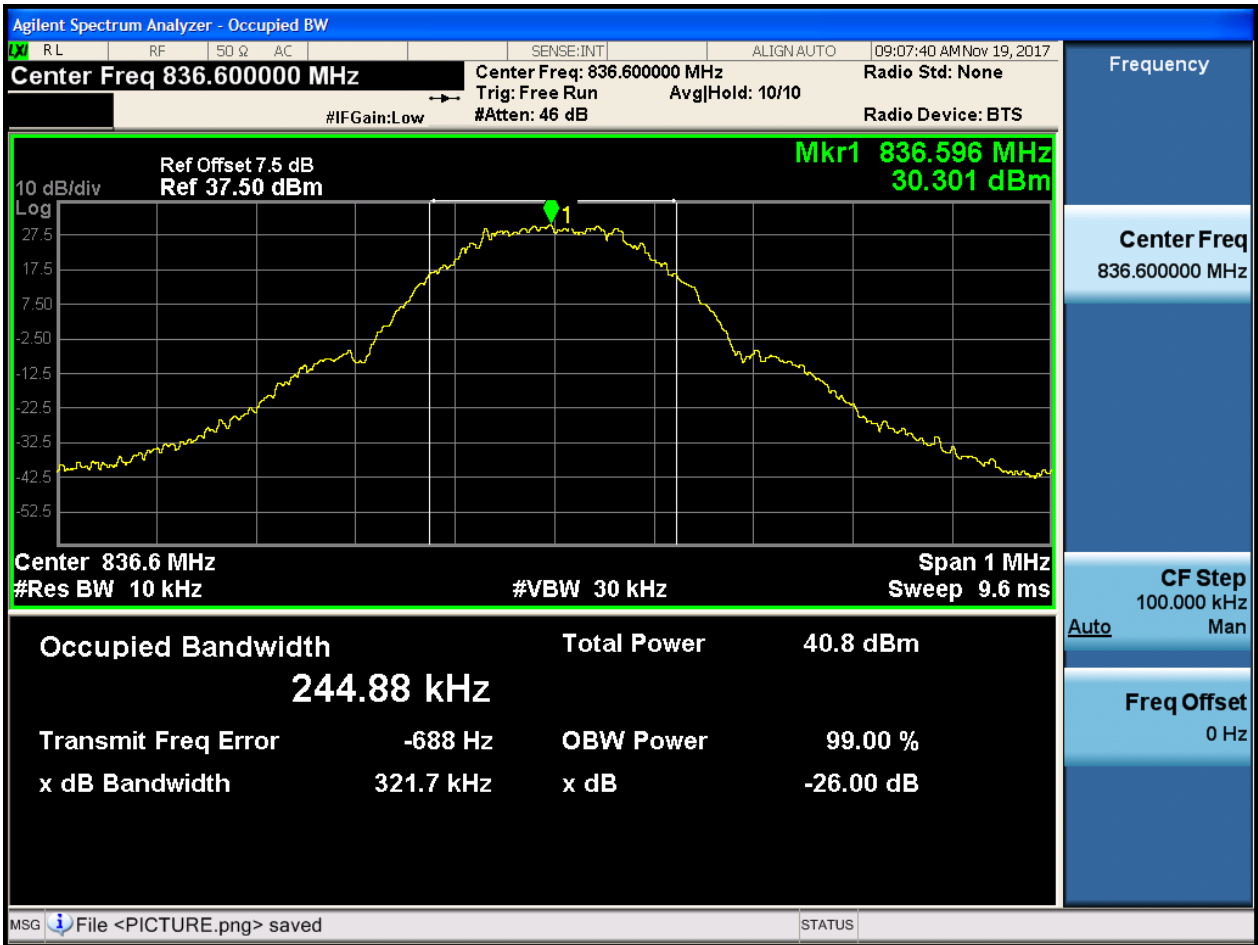
4.1.1.1 Test Mode = GSM/TM1

4.1.1.1.1 Test Channel = LCH



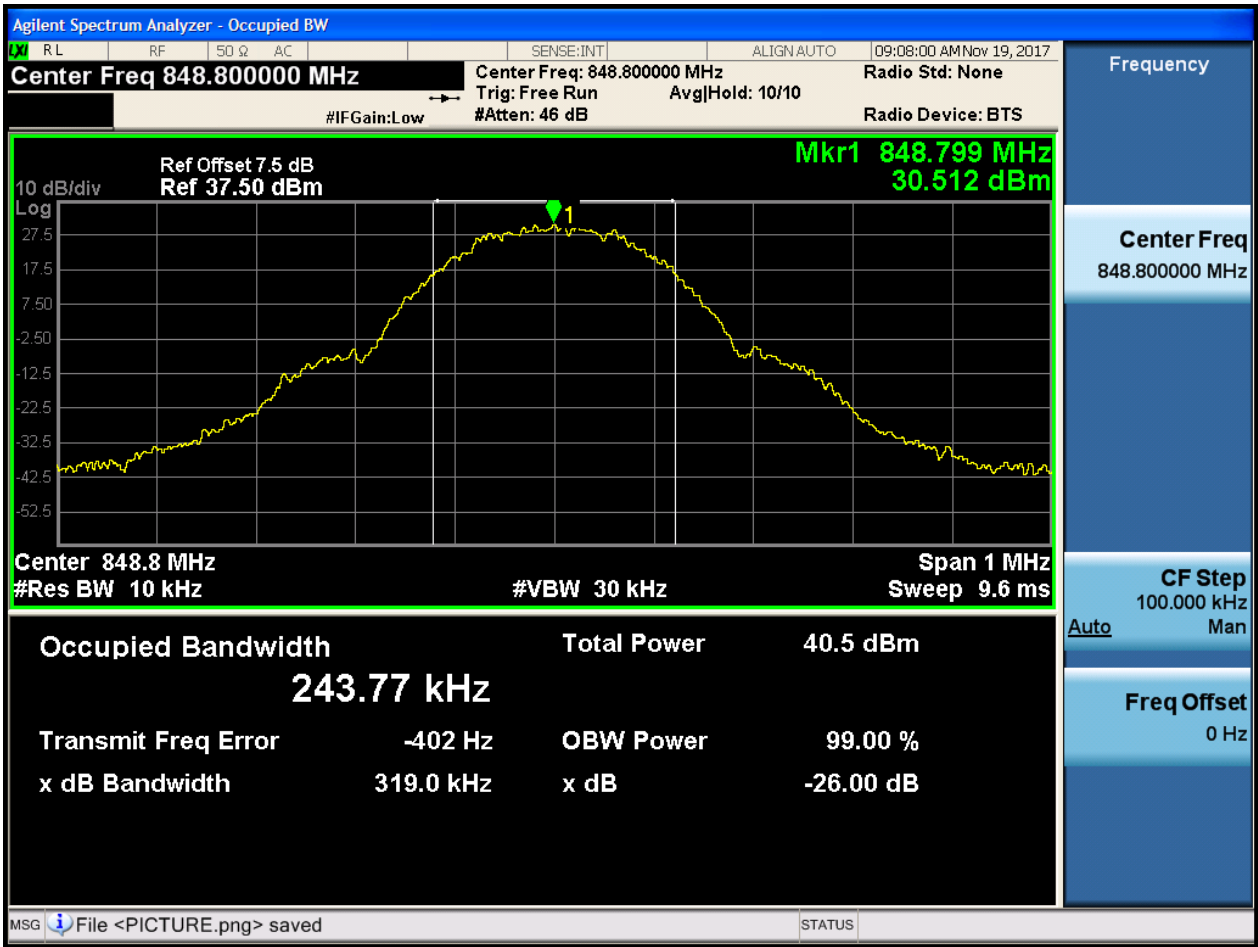


4.1.1.1.2 Test Channel = MCH





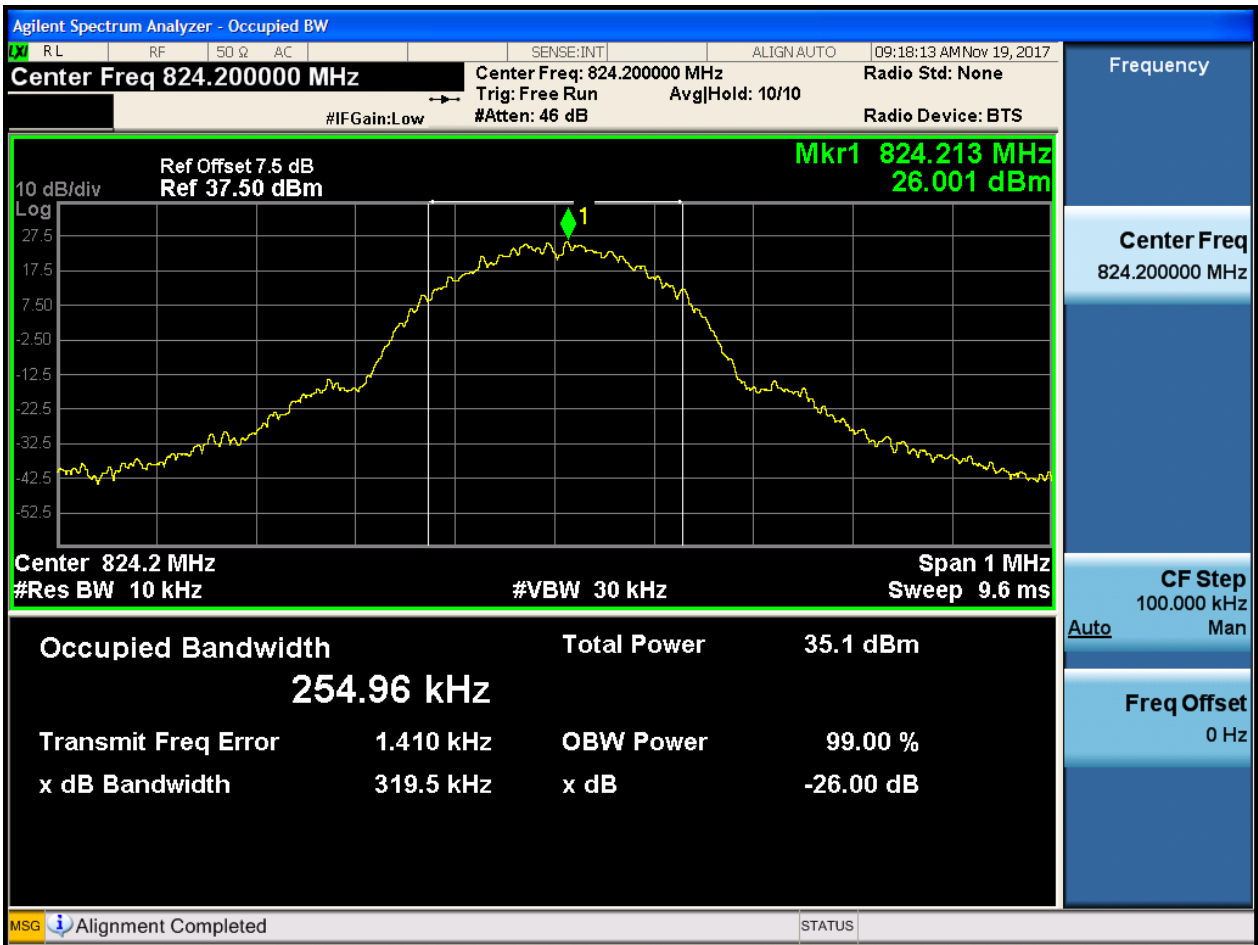
4.1.1.1.3 Test Channel = HCH





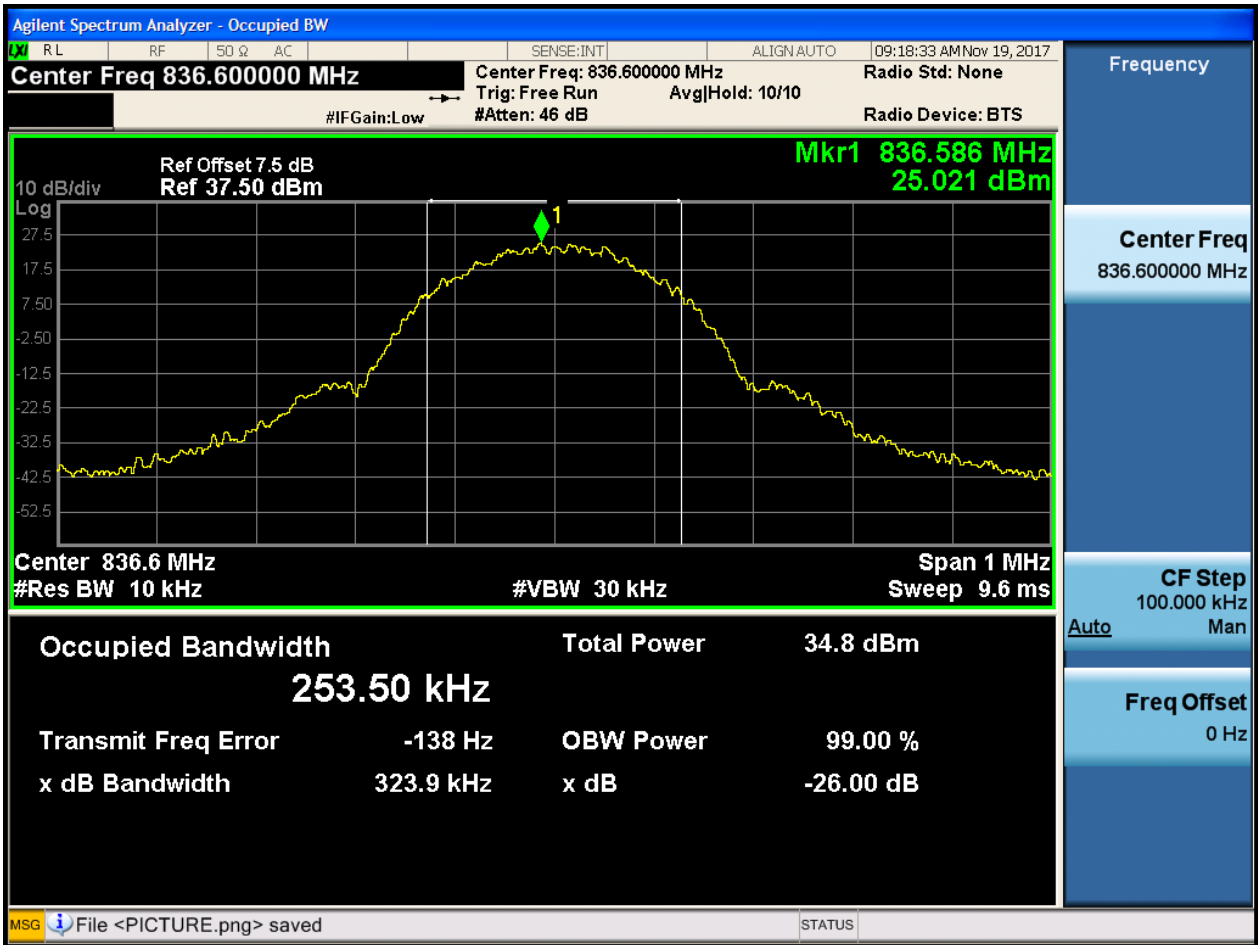
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4.1.1.2.1 Test Channel = LCH



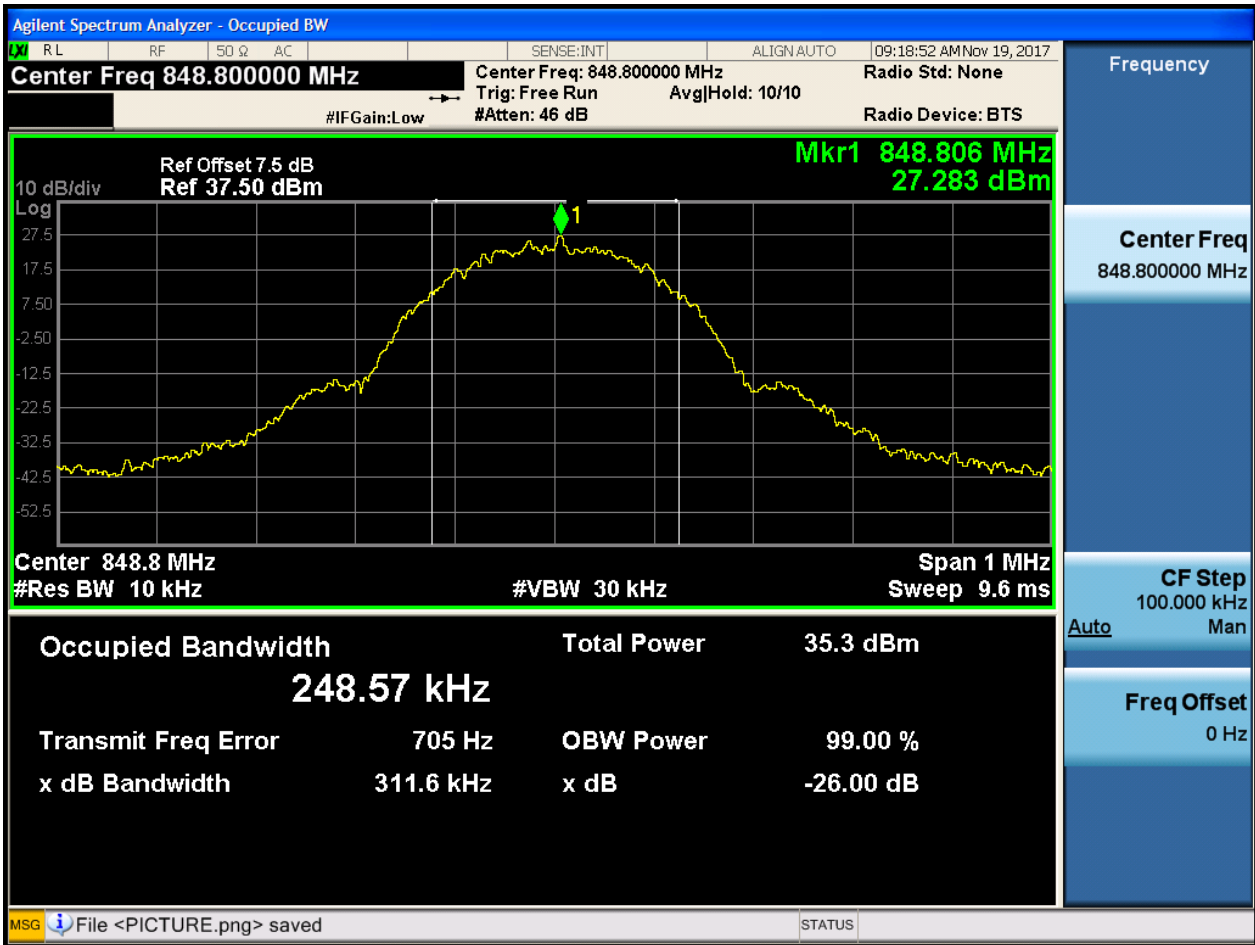


4.1.1.2.2 Test Channel = MCH





4.1.1.2.3 Test Channel = HCH

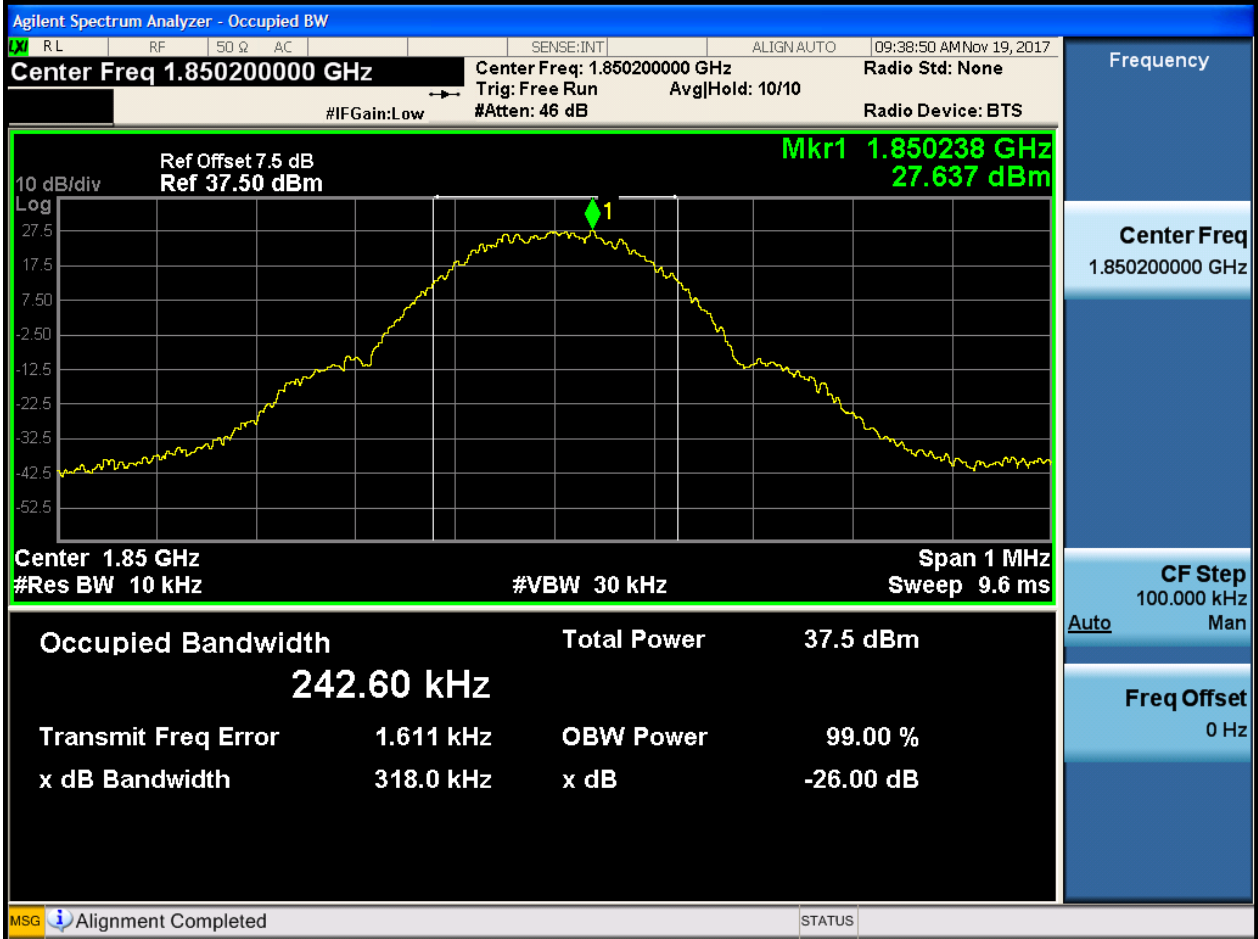




4.1.2 Test Band = GSM1900

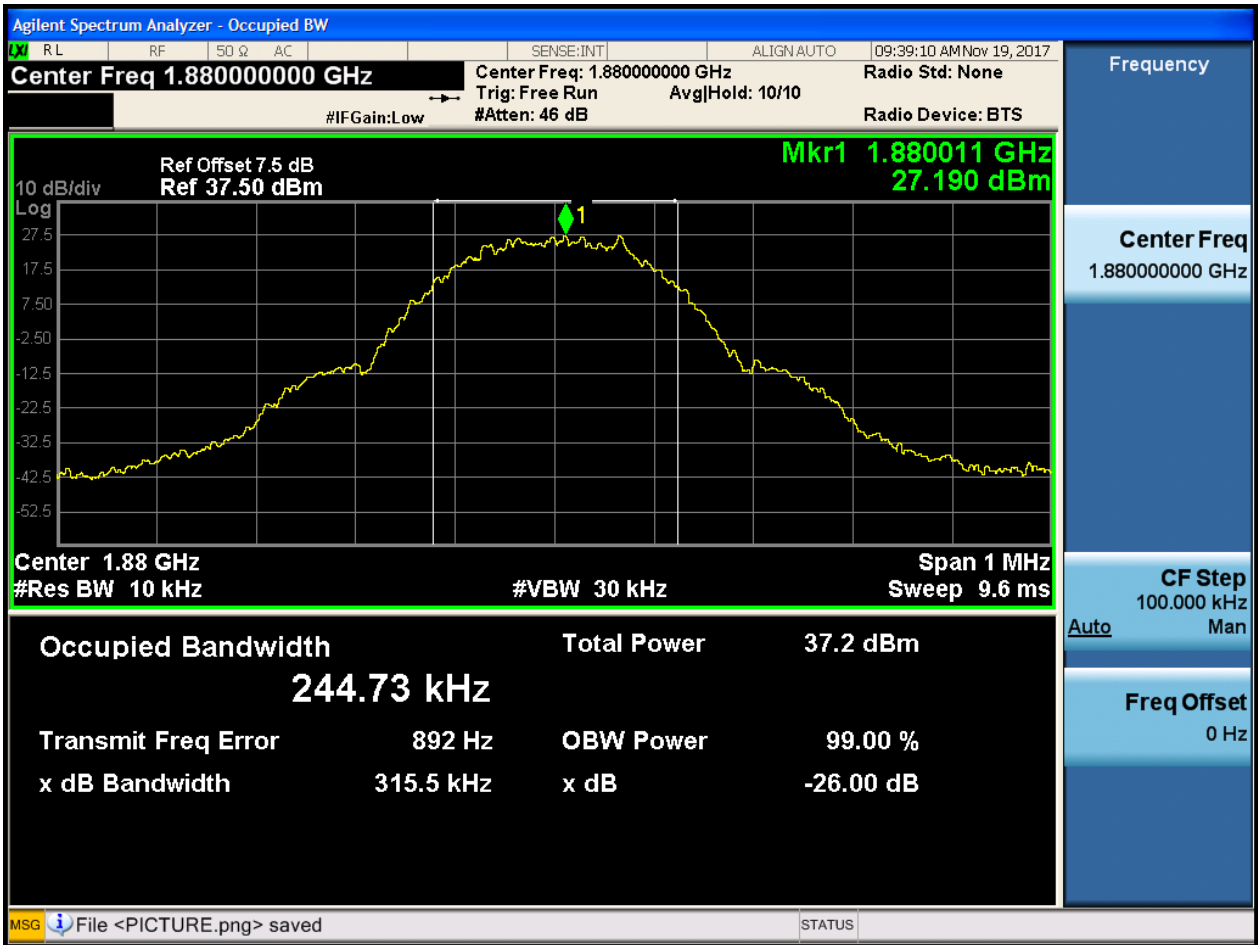
4.1.2.1 Test Mode = GSM/TM1

4.1.2.1.1 Test Channel = LCH



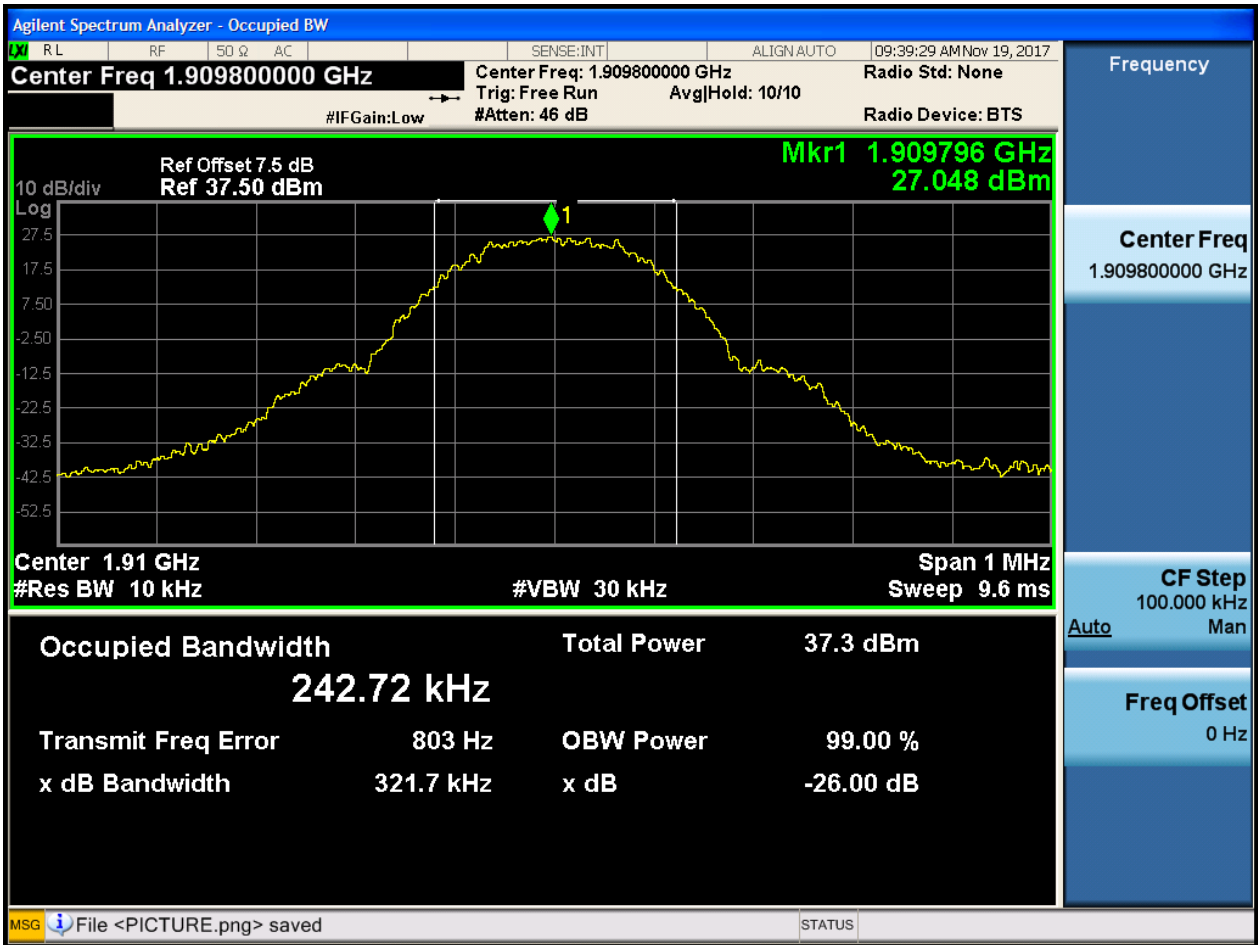


4.1.2.1.2 Test Channel = MCH





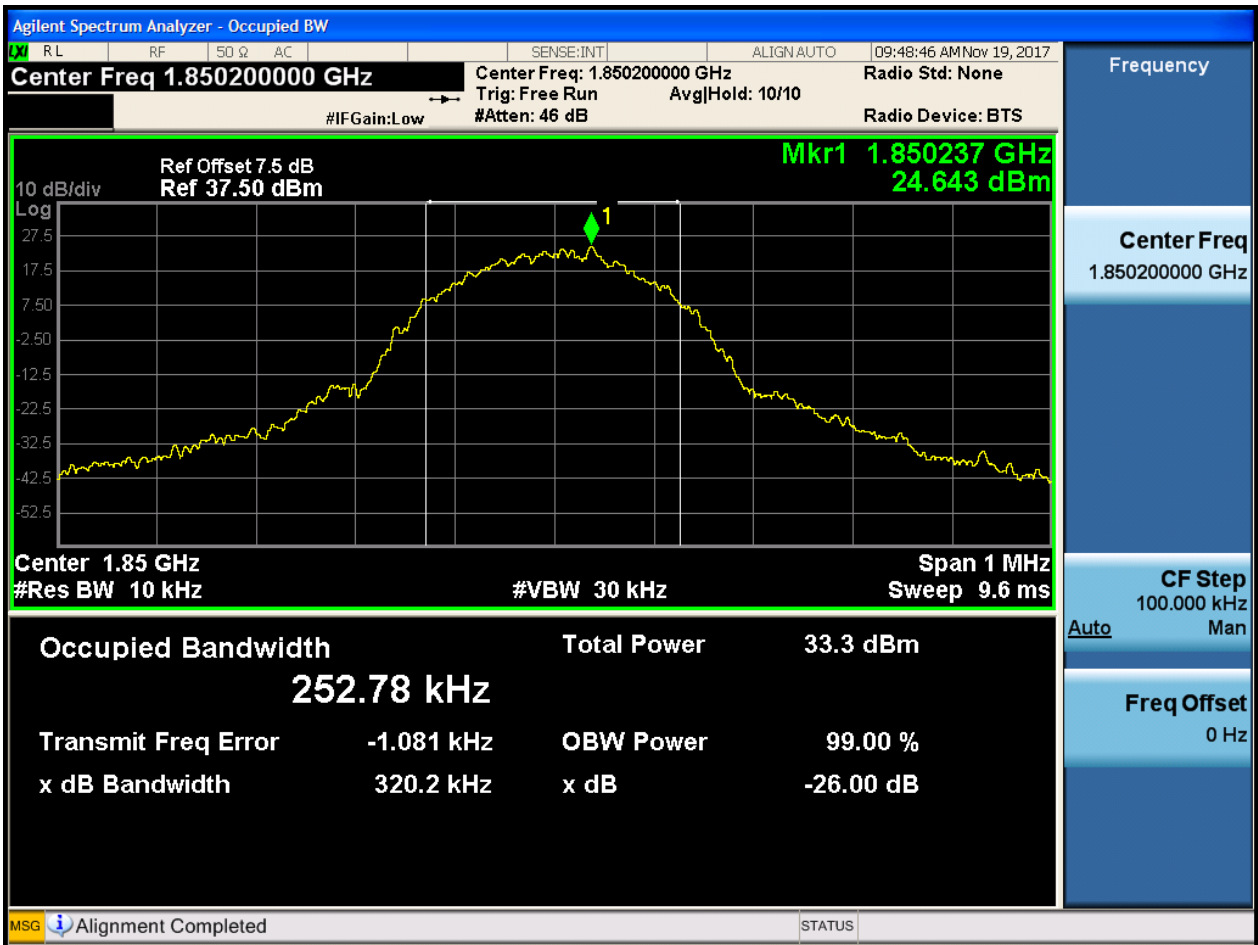
4.1.2.1.3 Test Channel = HCH





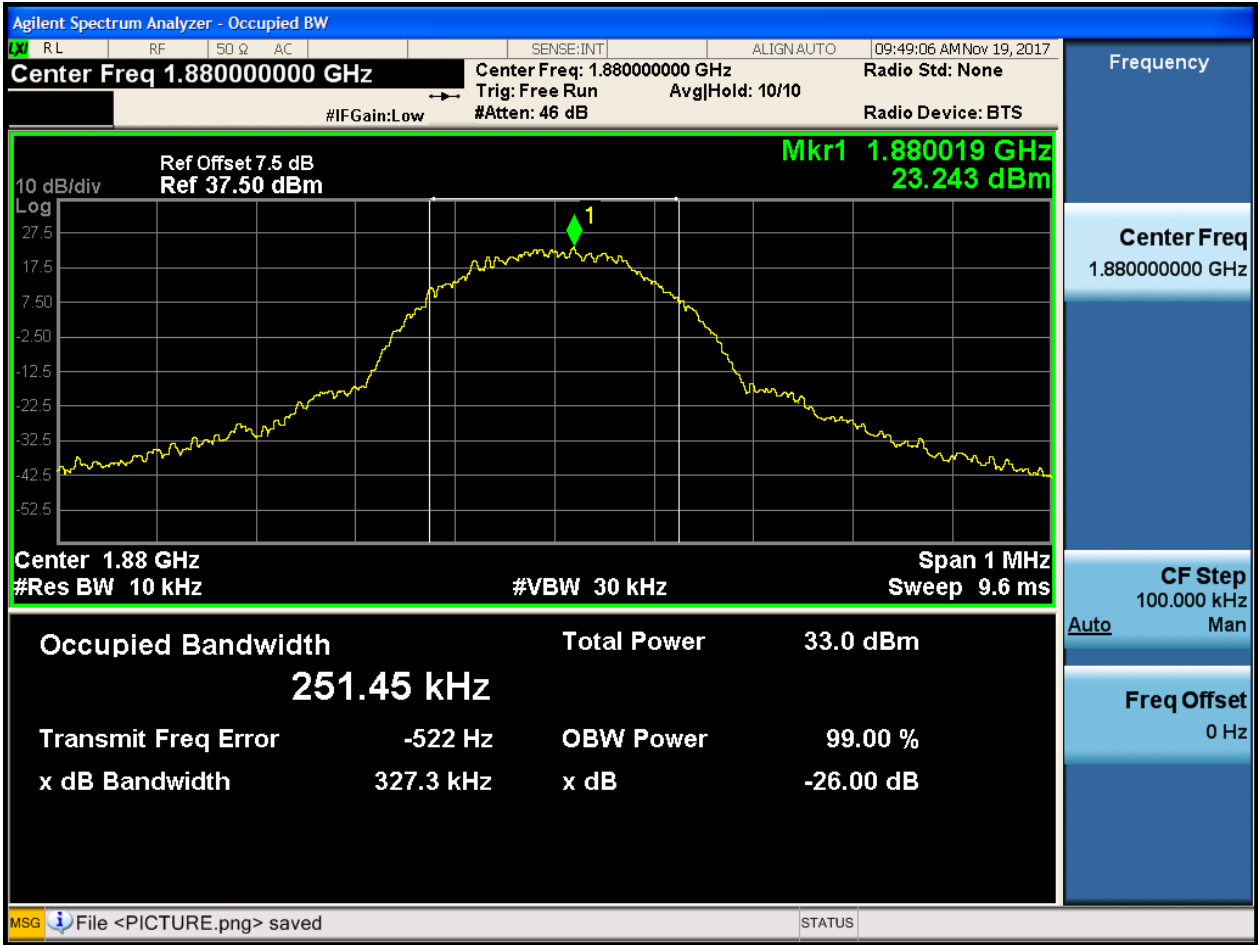
4.1.2.2 Test Mode = GSM/TM2

4.1.2.2.1 Test Channel = LCH



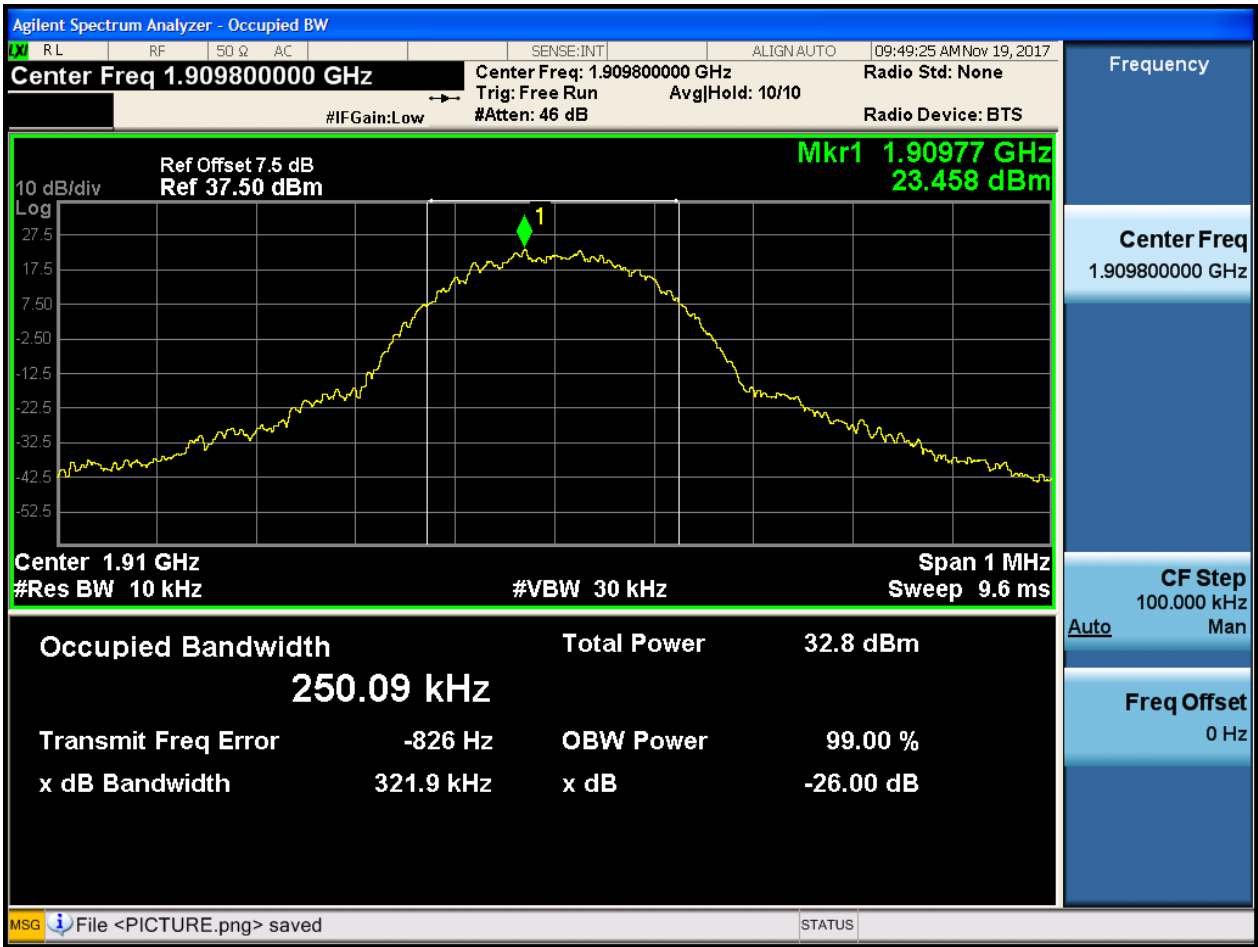


4.1.2.2.2 Test Channel = MCH





4.1.2.2.3 Test Channel = HCH





5Appendix_E: Band Edges Compliance

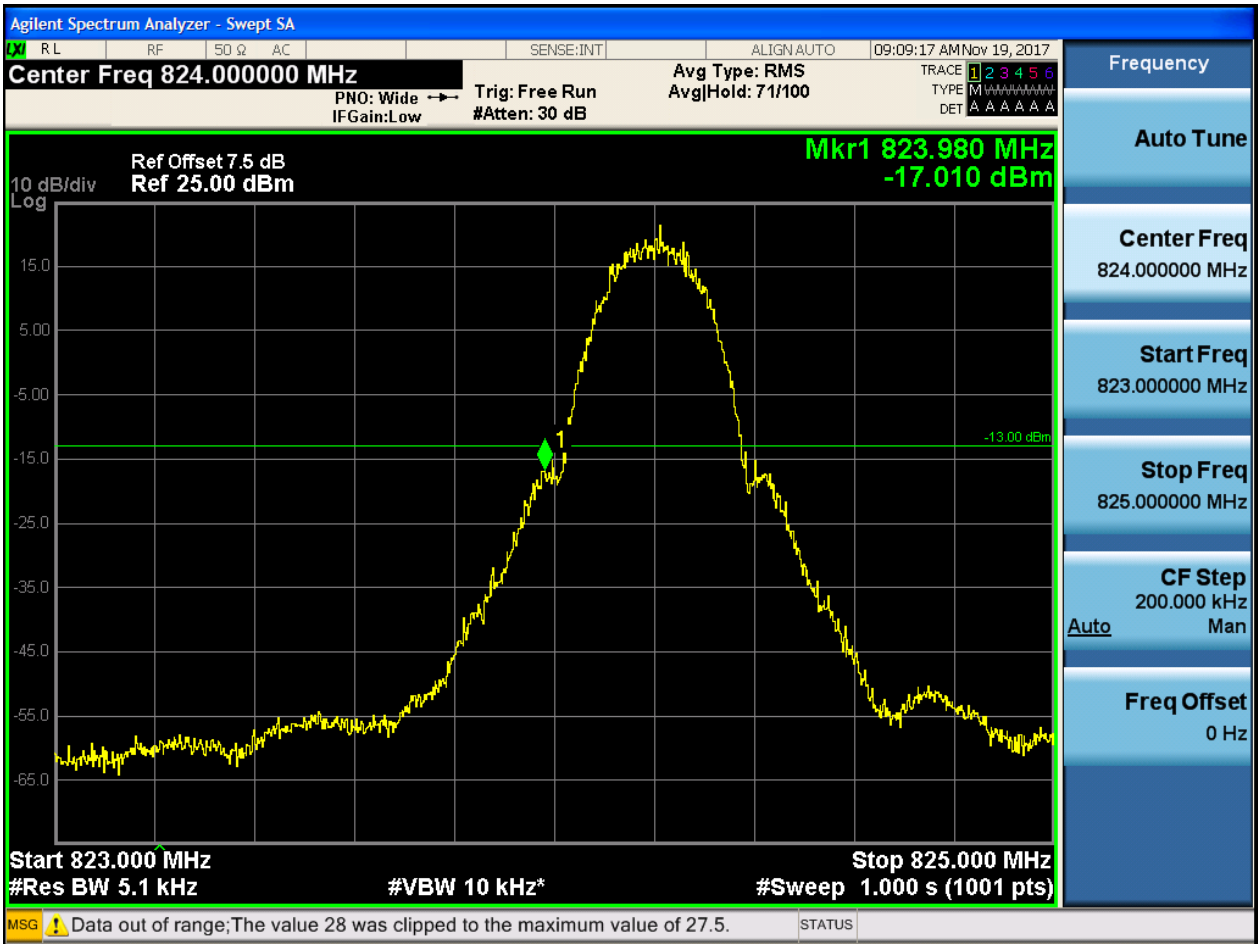
Part I - Test Plots

5.1 For GSM

5.1.1 Test Band = GSM850

5.1.1.1 Test Mode = GSM/TM1

5.1.1.1.1 Test Channel = LCH

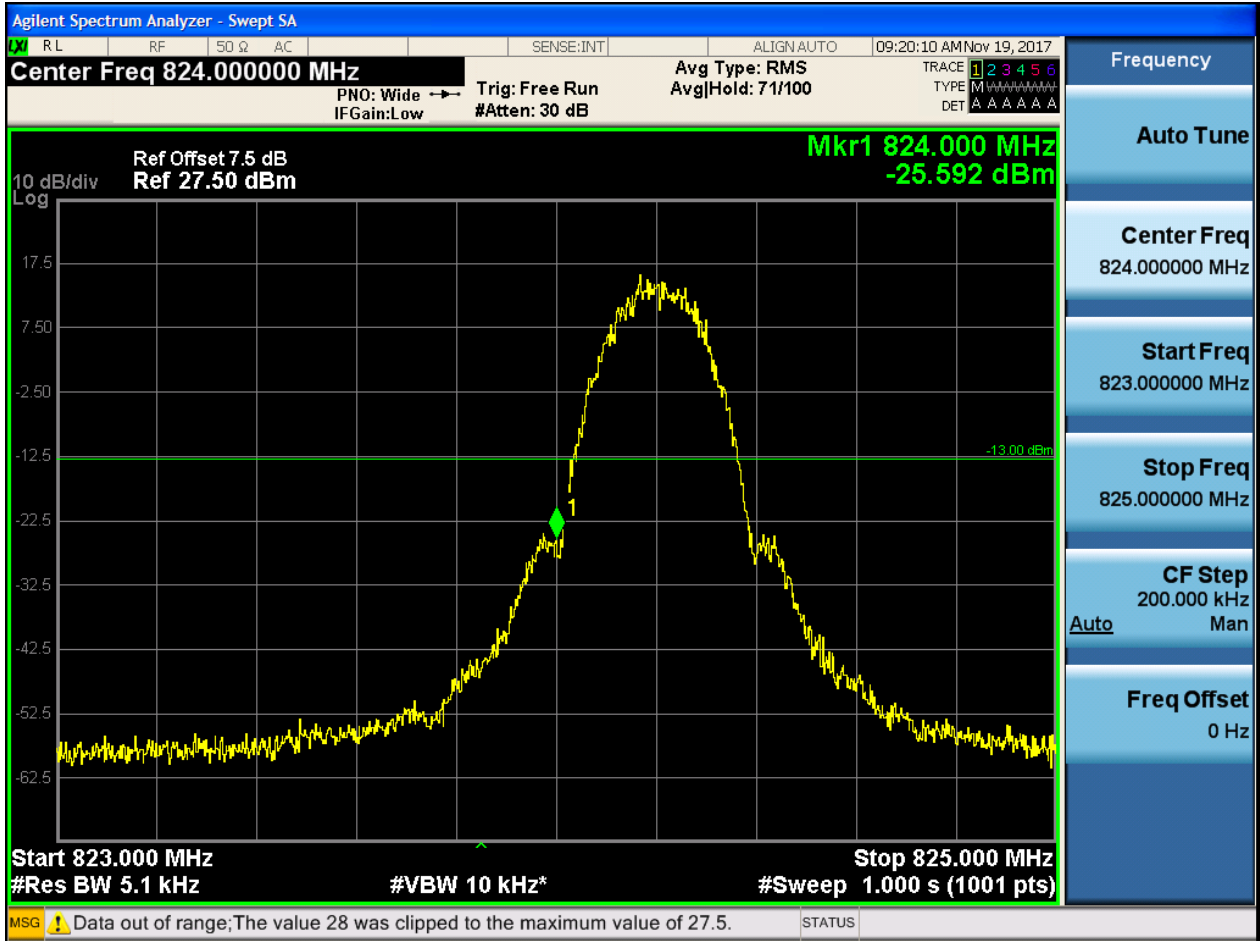


5.1.1.1.2 Test Channel = HCH

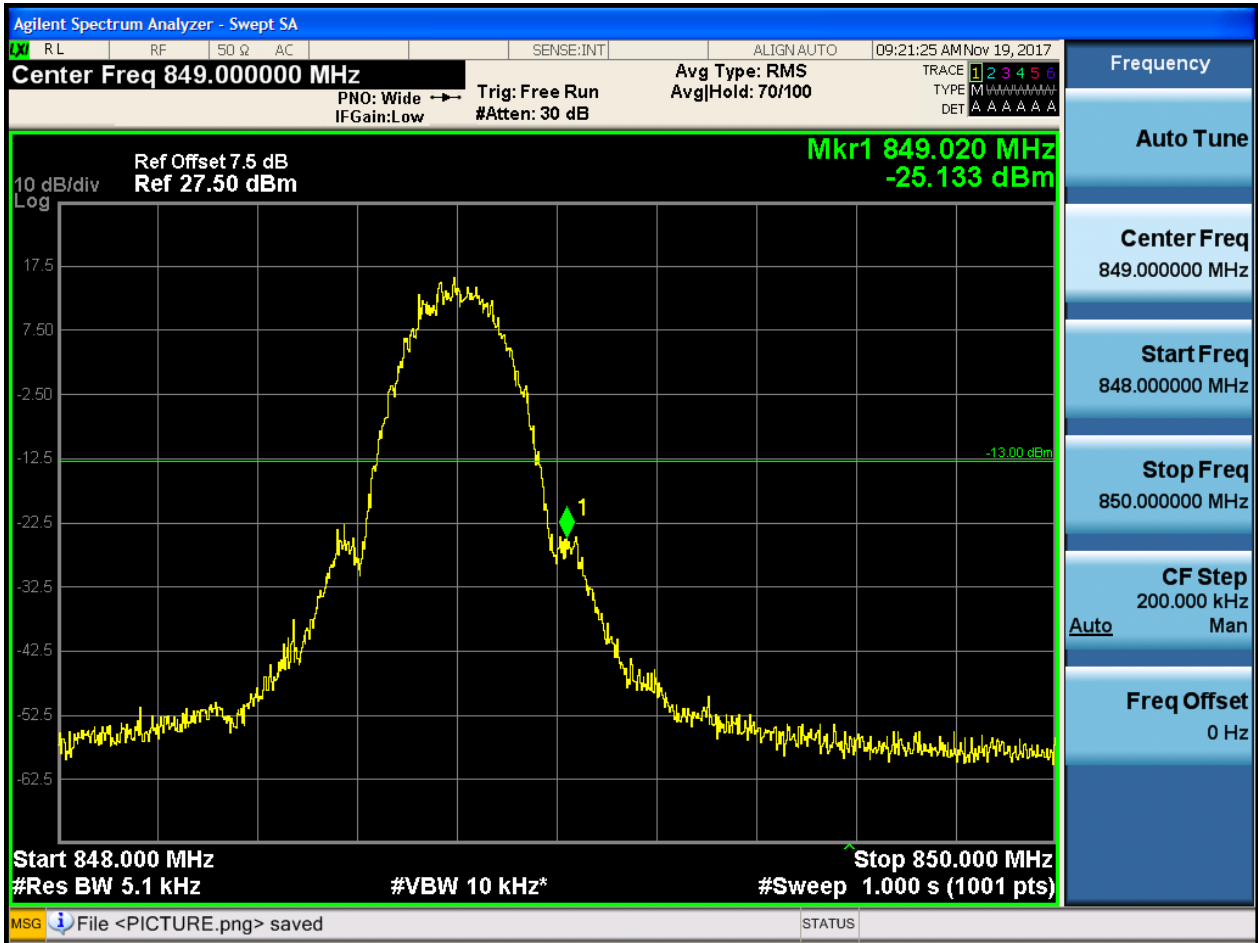


5.1.1.2 Test Mode = GSM/TM2

5.1.1.2.1 Test Channel = LCH



5.1.1.2.2 Test Channel = HCH

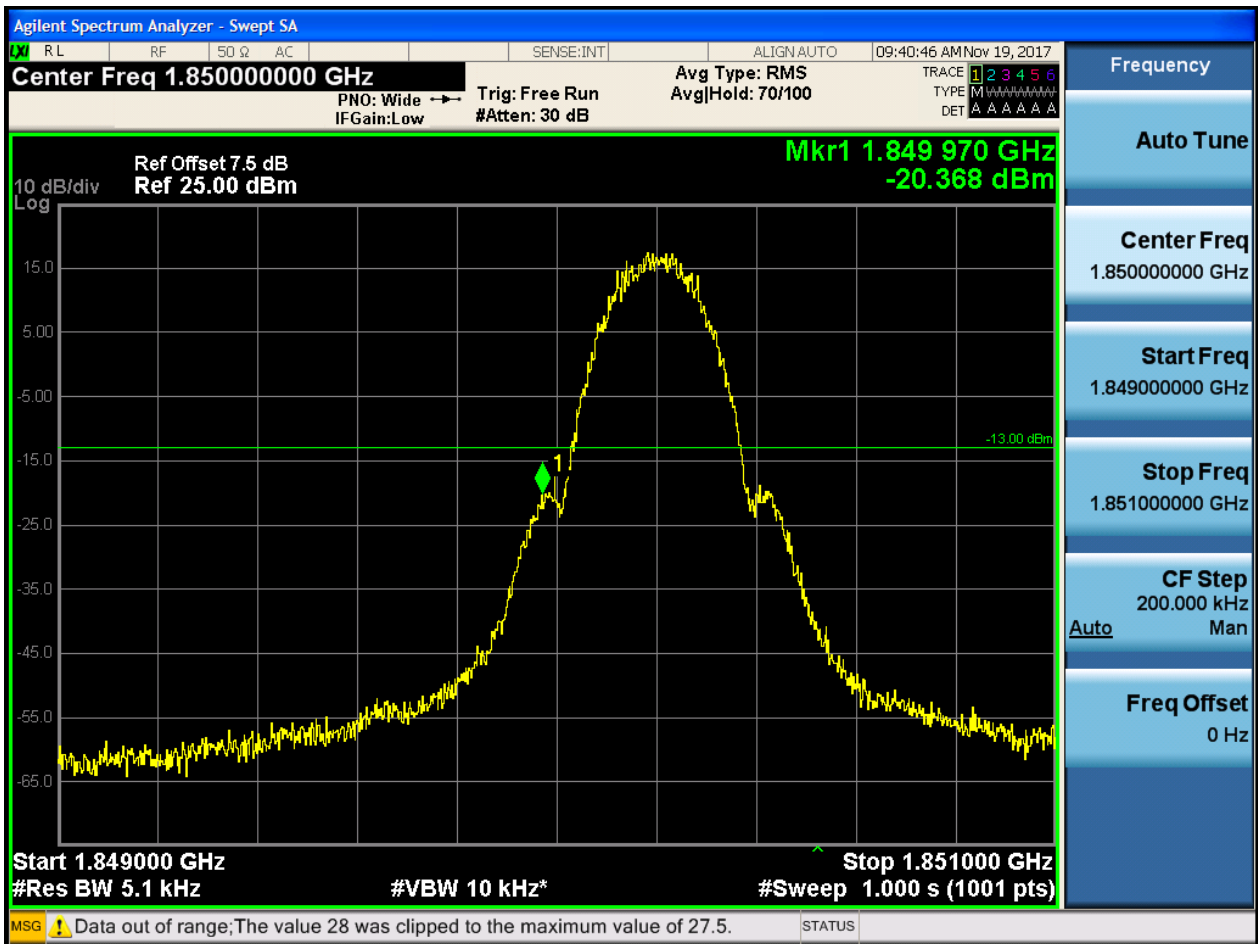




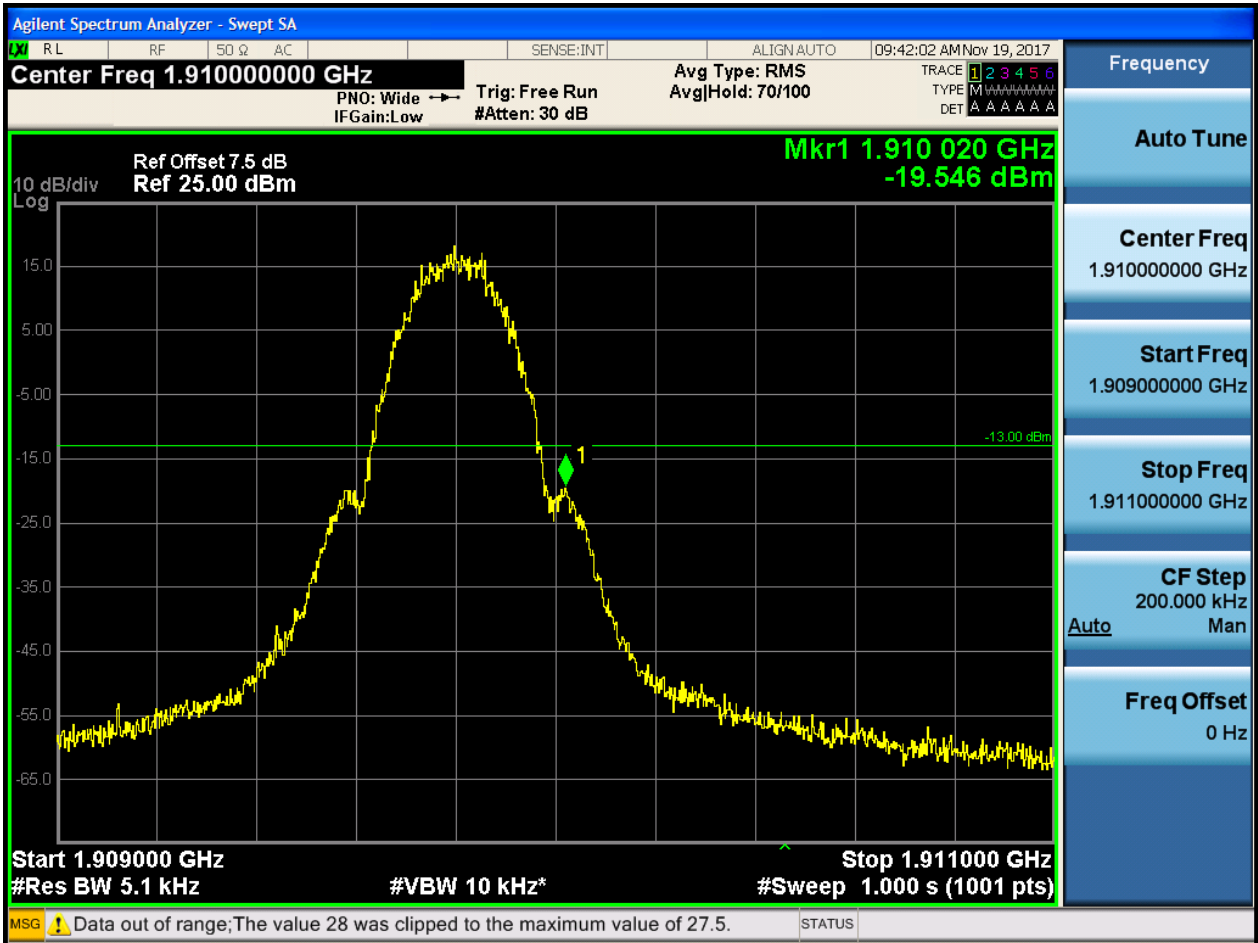
5.1.2 Test Band = GSM1900

5.1.2.1 Test Mode = GSM/TM1

5.1.2.1.1 Test Channel = LCH



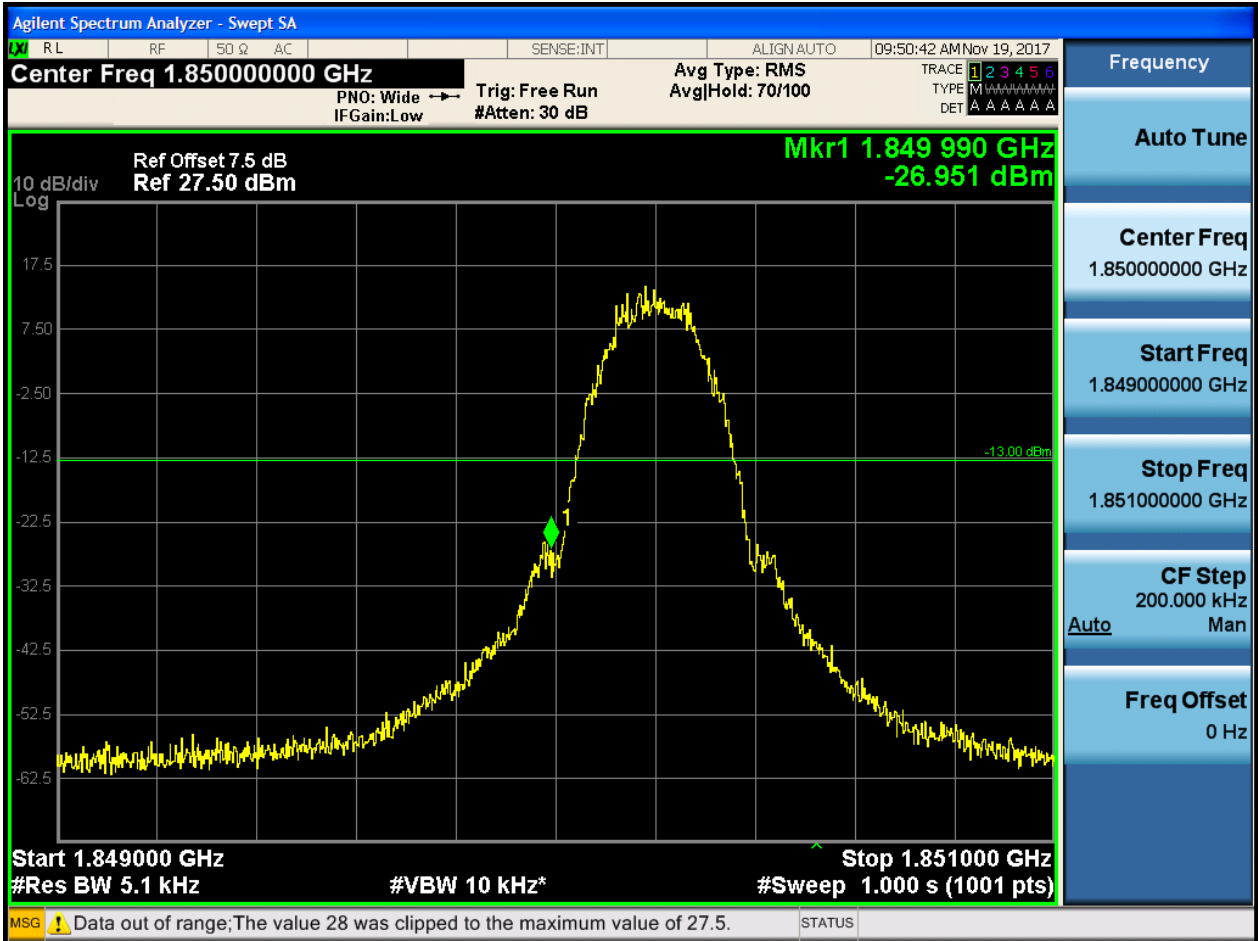
5.1.2.1.2 Test Channel = HCH



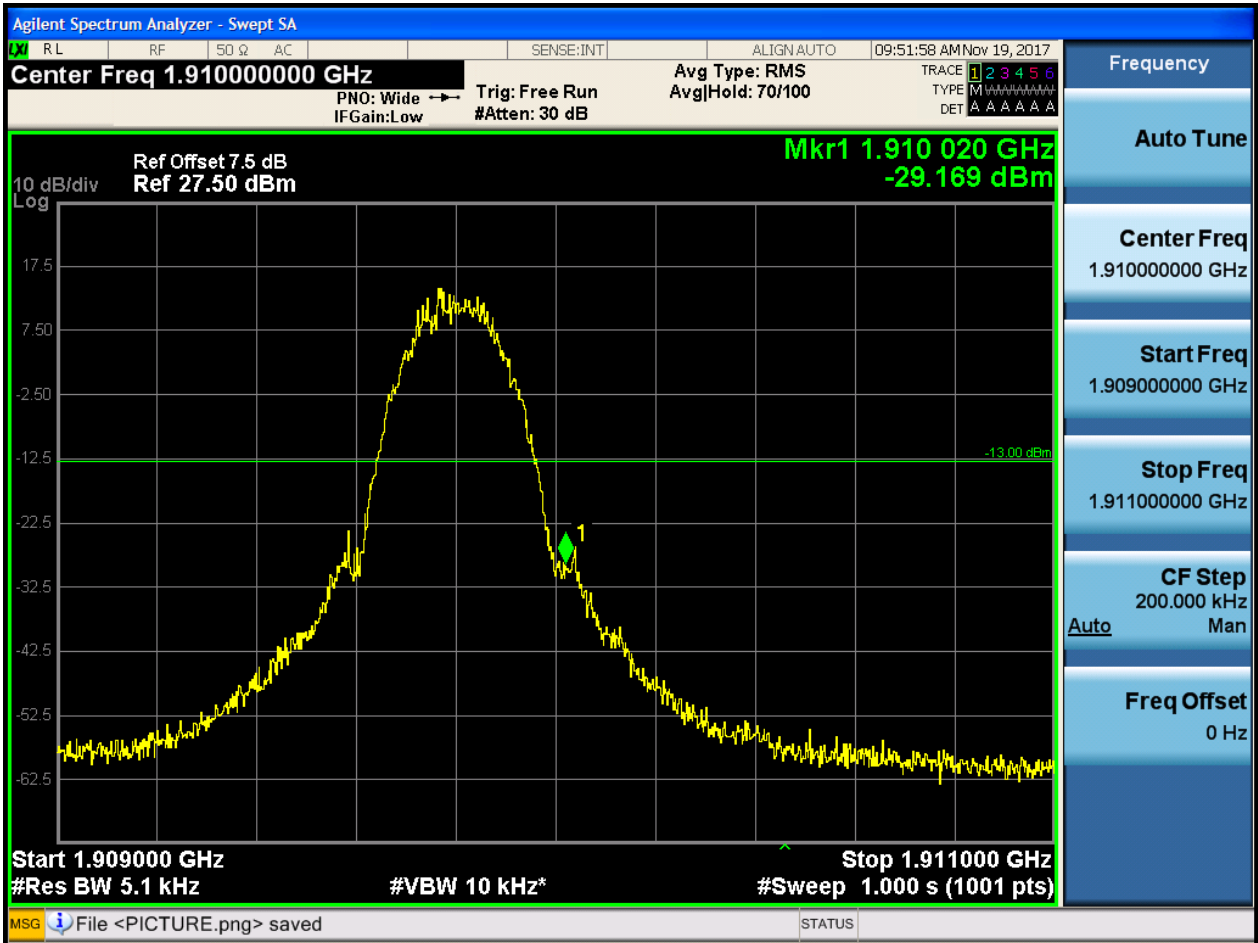


5.1.2.2 Test Mode = GSM/TM2

5.1.2.2.1 Test Channel = LCH



5.1.2.2.2 Test Channel = HCH



6Appendix_F: Spurious Emission at Antenna Terminal

NOTE: For the averaged unwanted emissions measurements, the measurement points in each sweep is greater than twice the Span/RBW in order to ensure bin-to-bin spacing of $< RBW/2$ so that narrowband signals are not lost between frequency bins. As to the present test item, the "Measurement Points = $k * (Span / RBW)$ " with k between 4 and 5, which results in an acceptable level error of less than 0.5 dB.

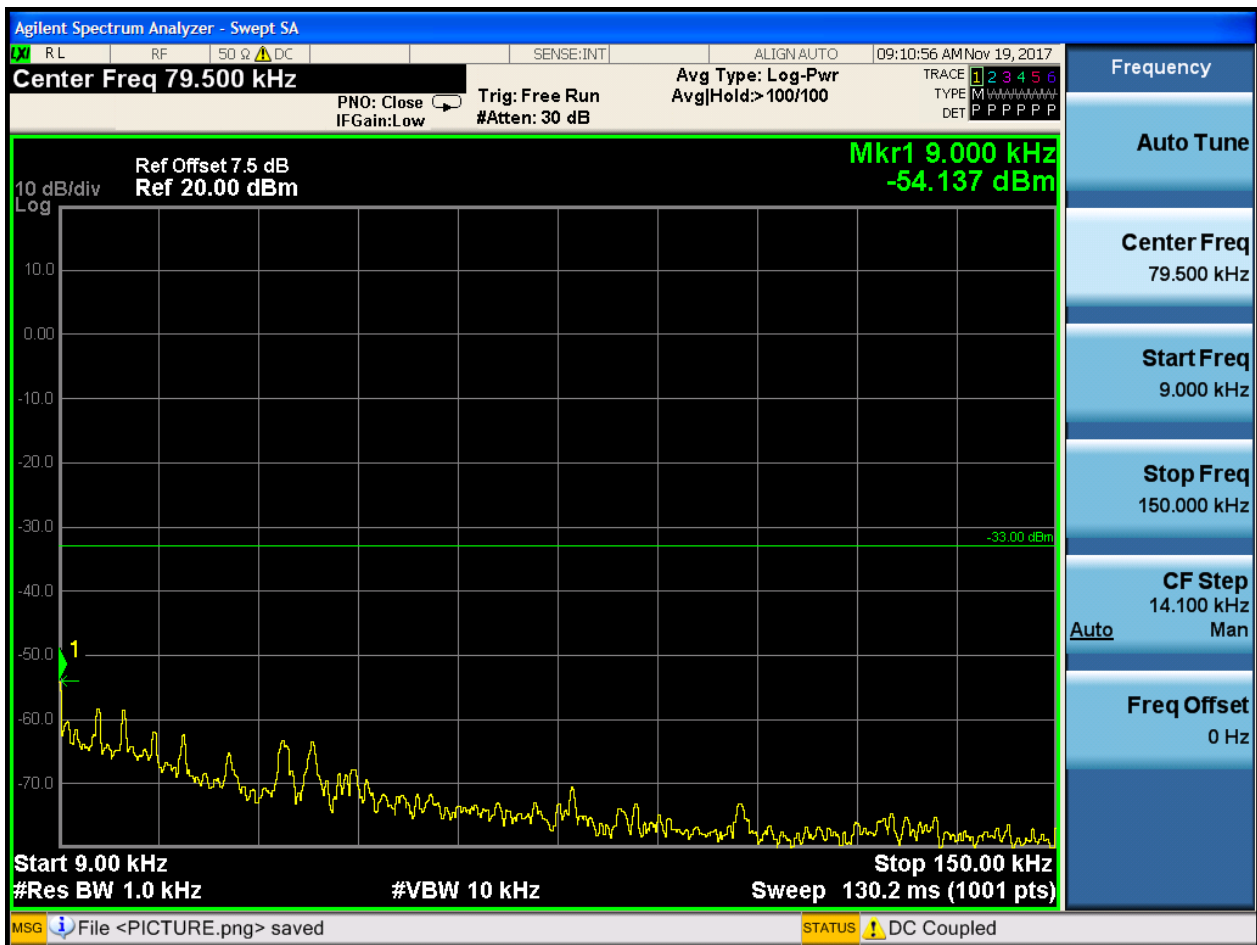
Part I - Test Plots

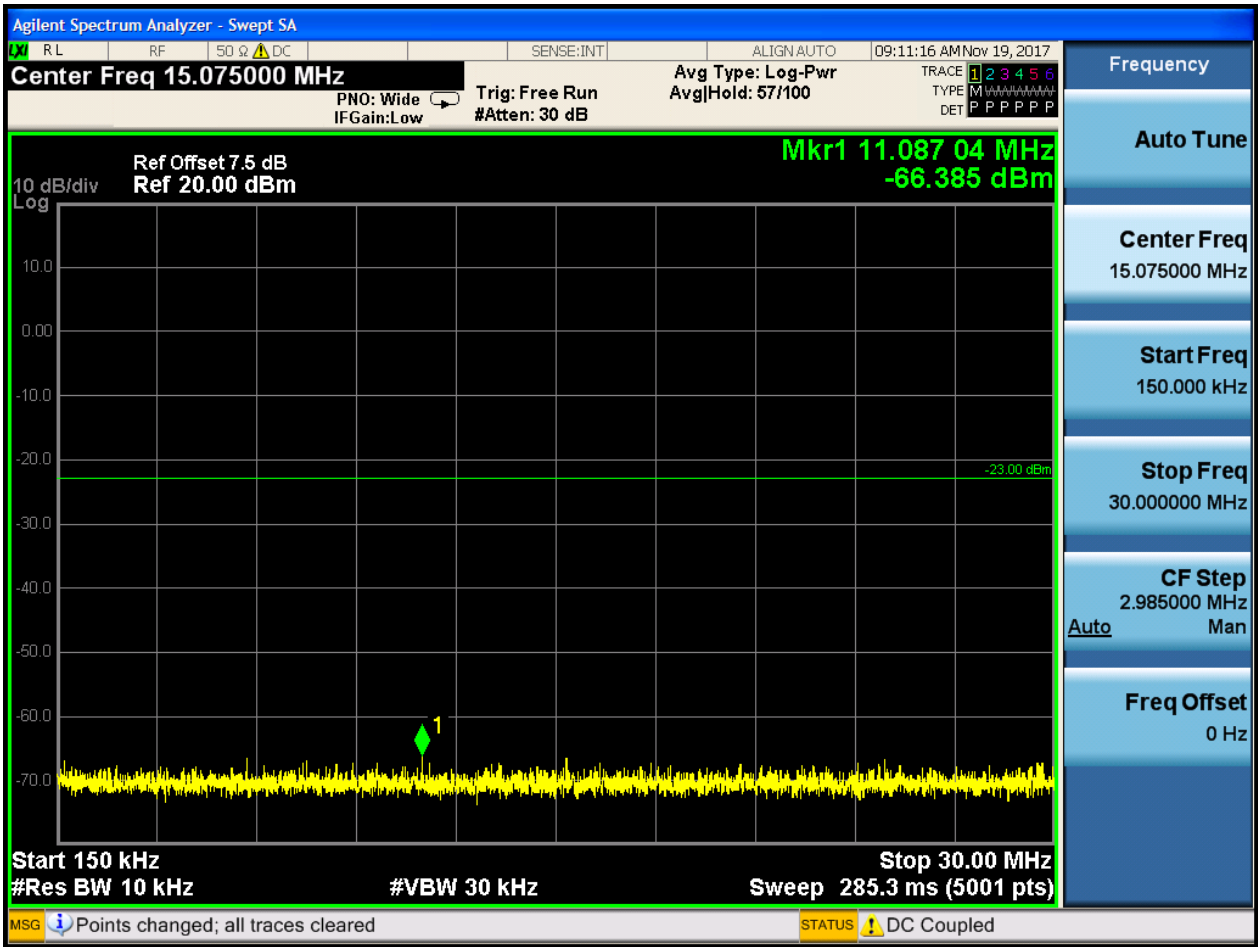
6.1 For GSM

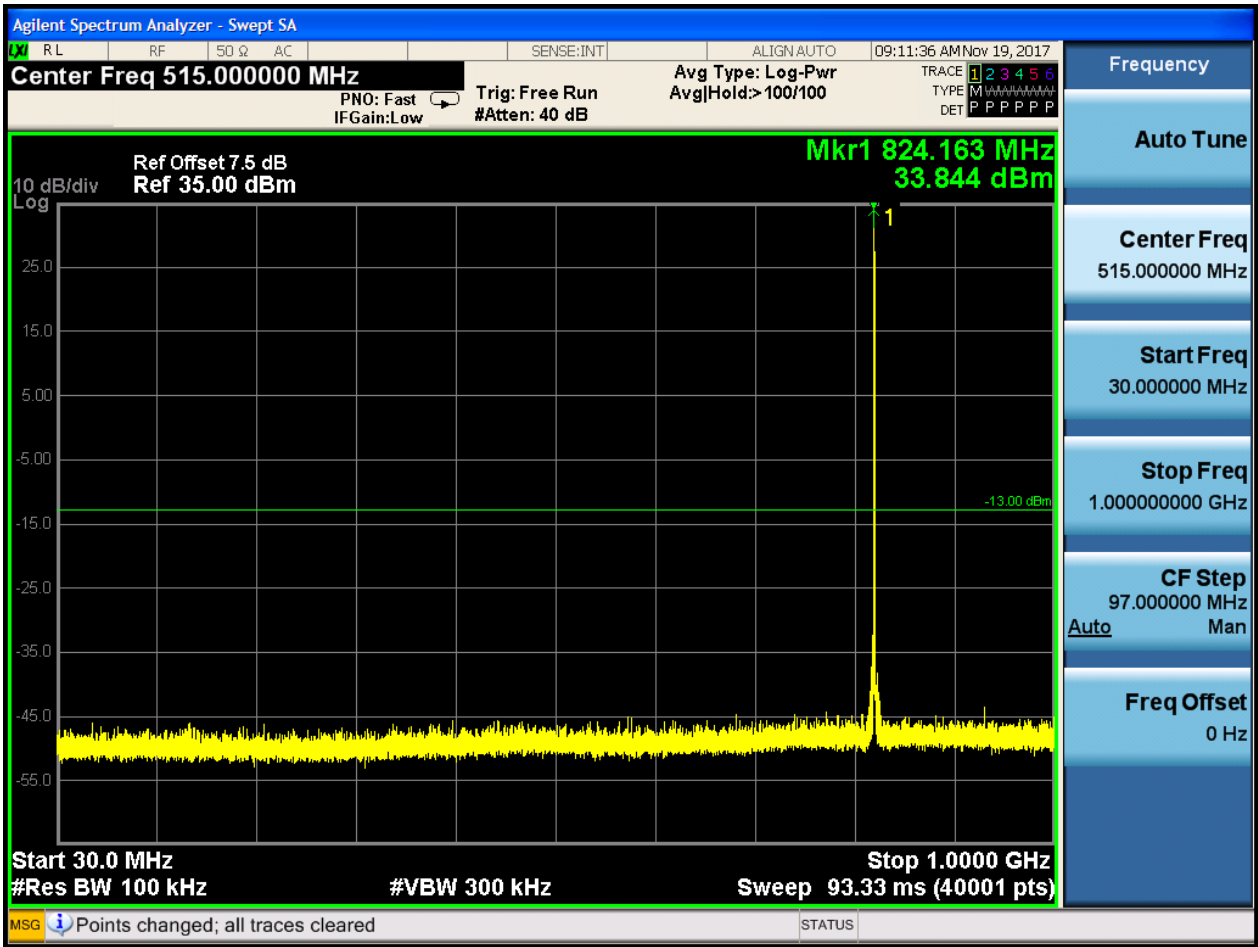
6.1.1 Test Band = GSM850

6.1.1.1 Test Mode = GSM/TM1

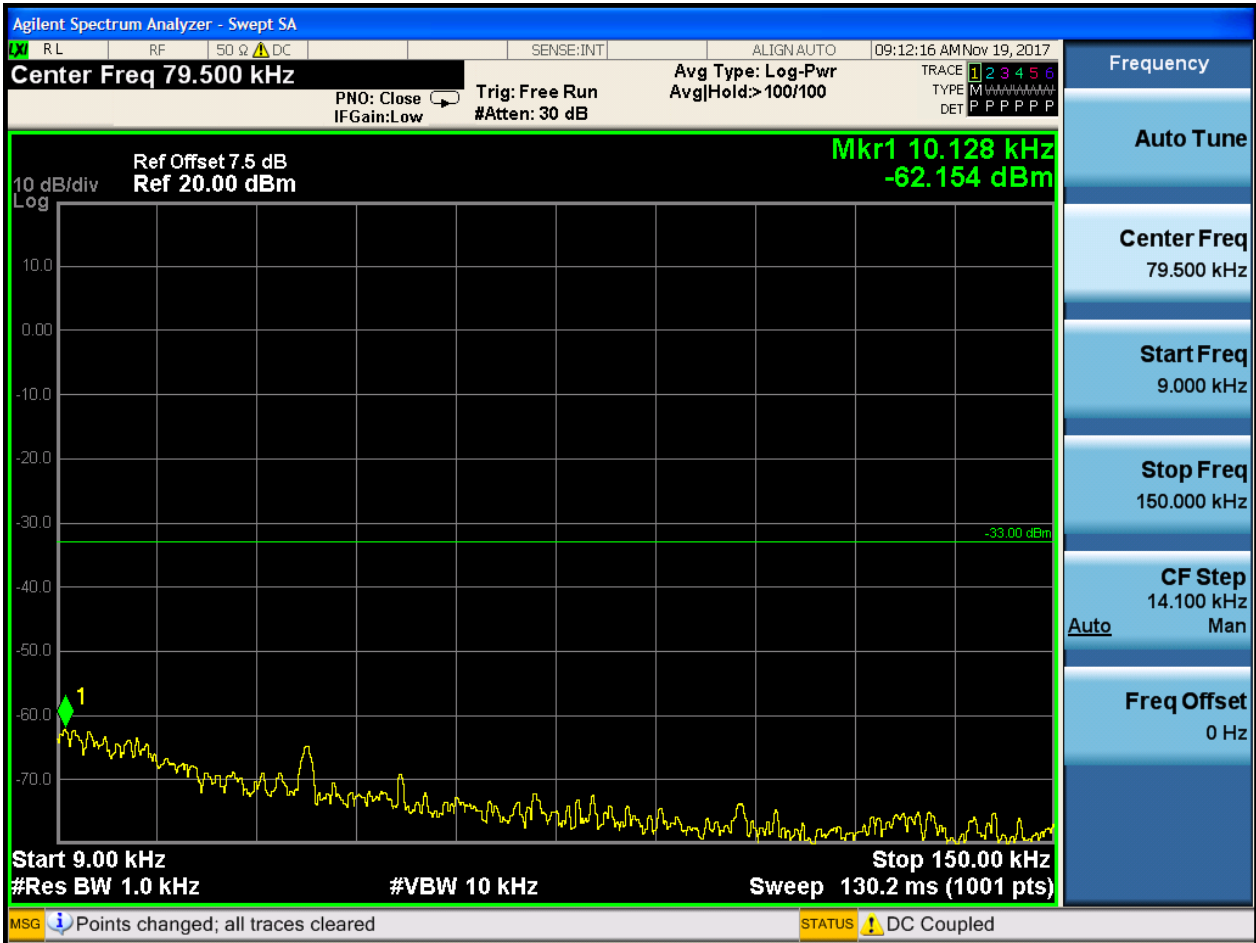
6.1.1.1.1 Test Channel = LCH

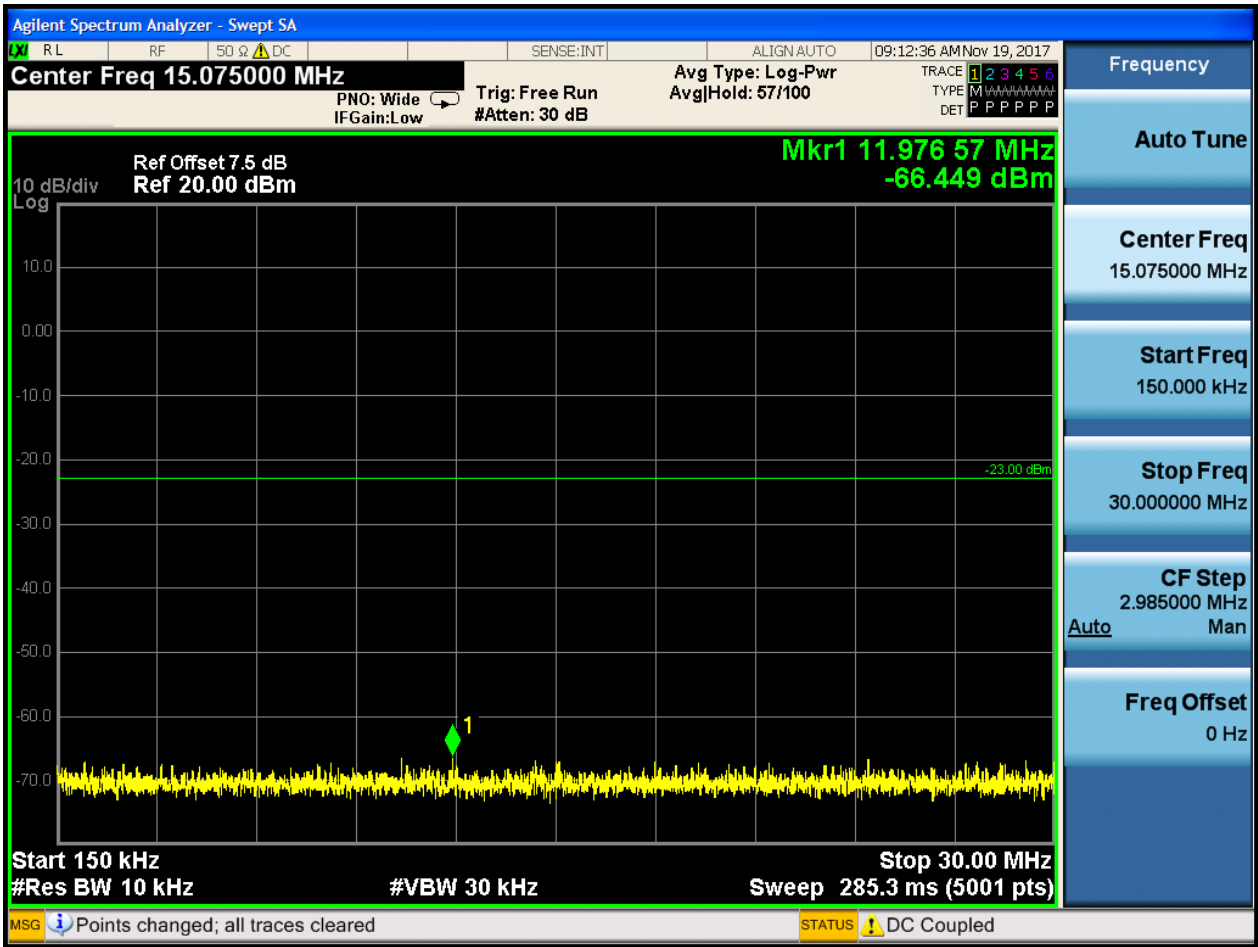


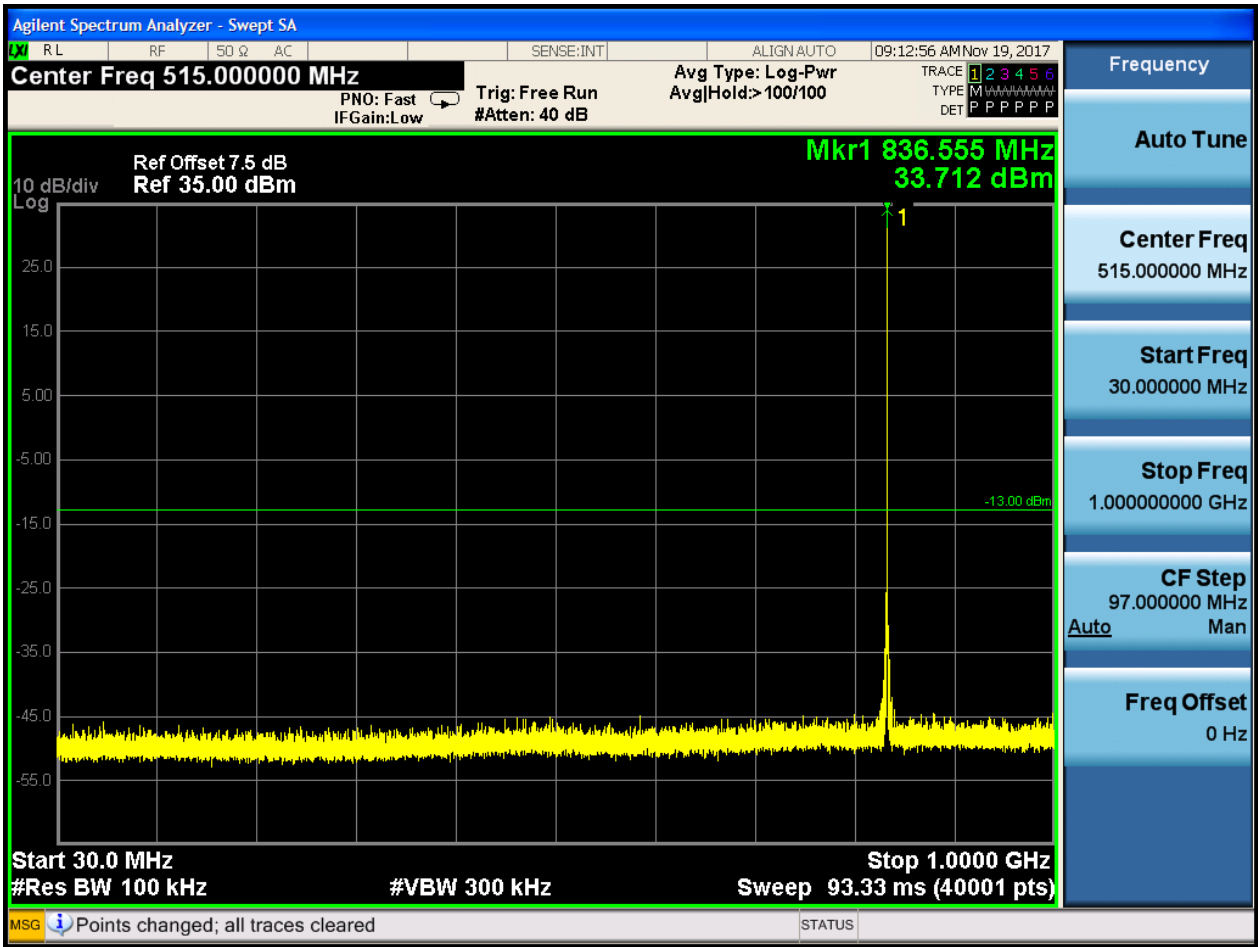




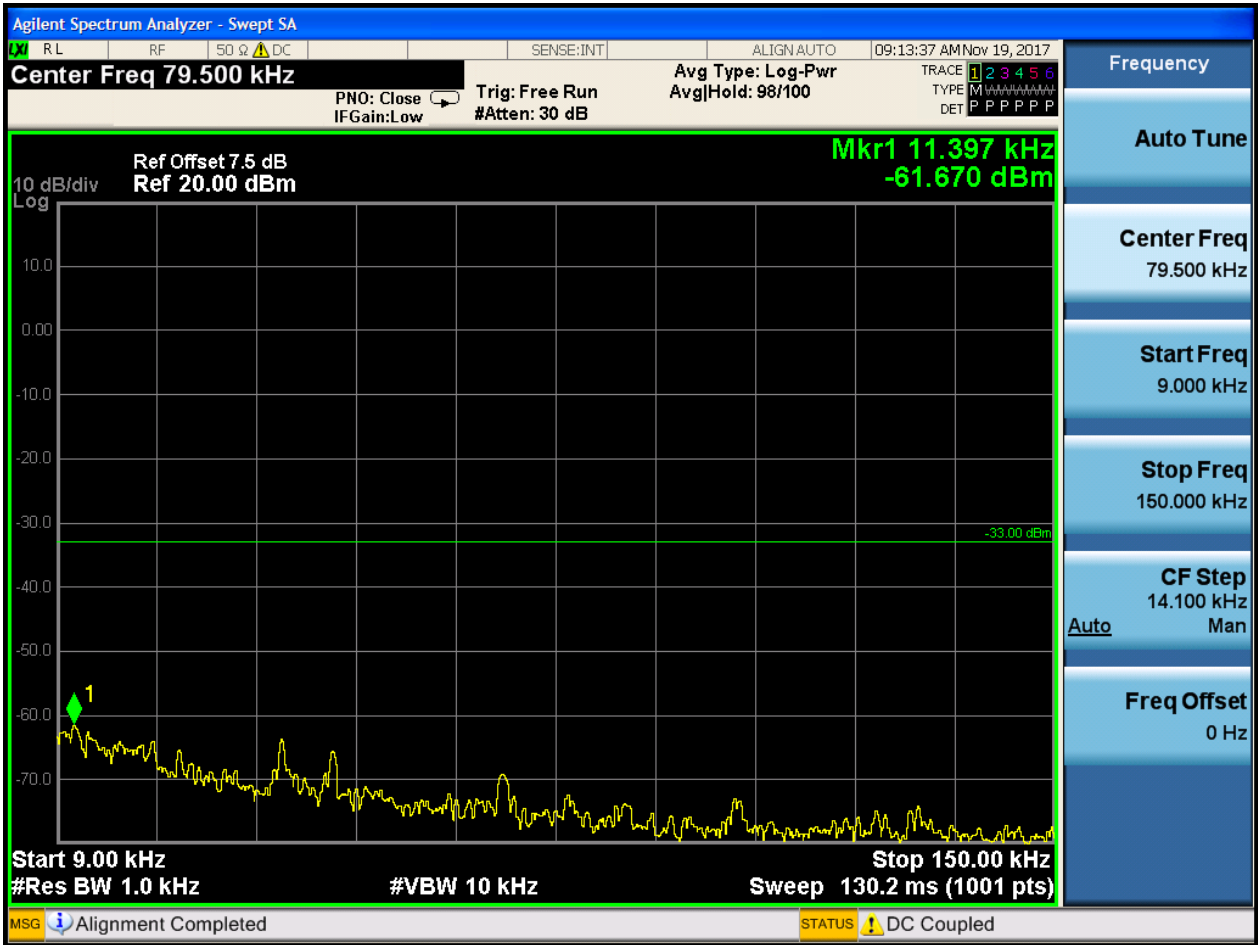
6.1.1.1.2 Test Channel = MCH

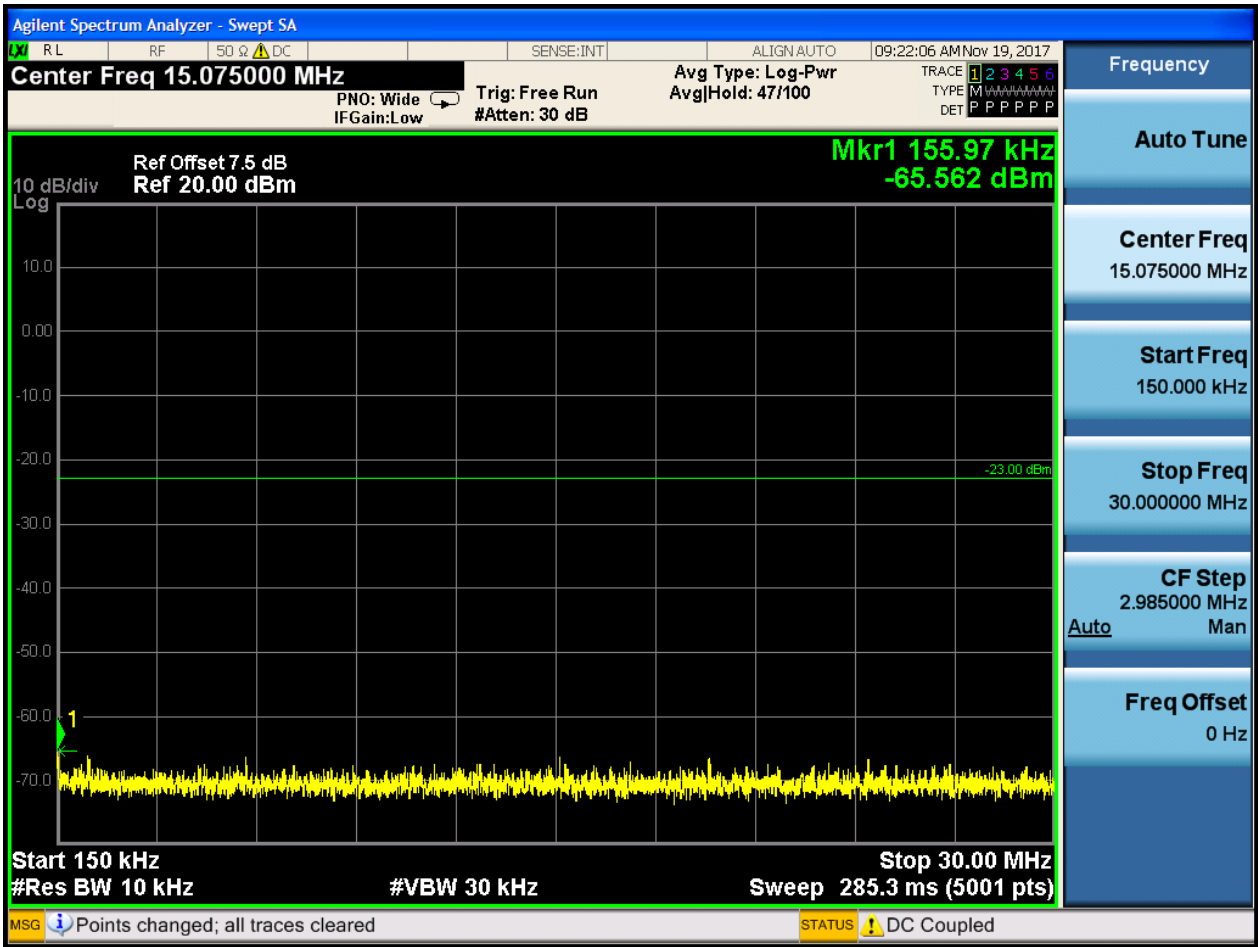


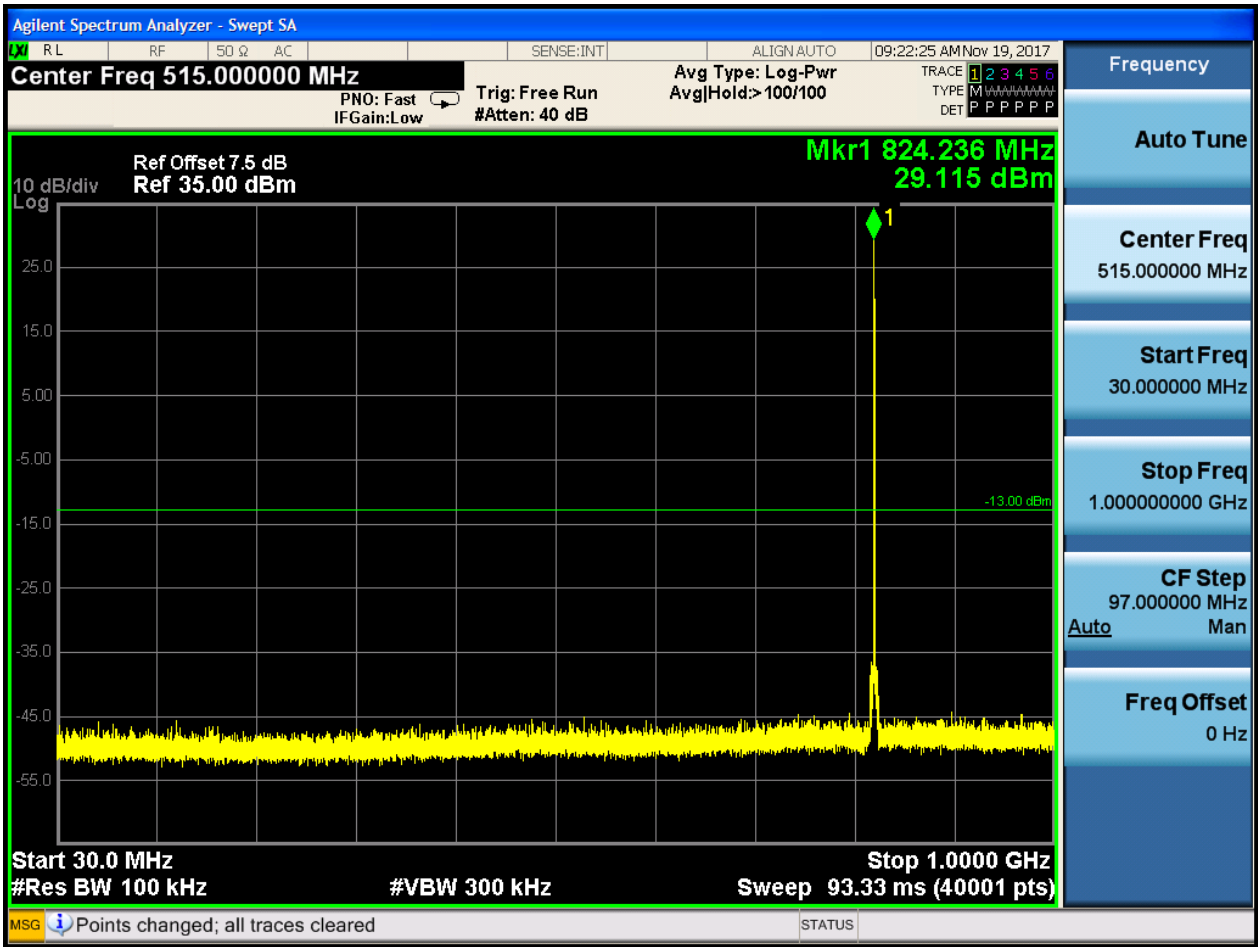




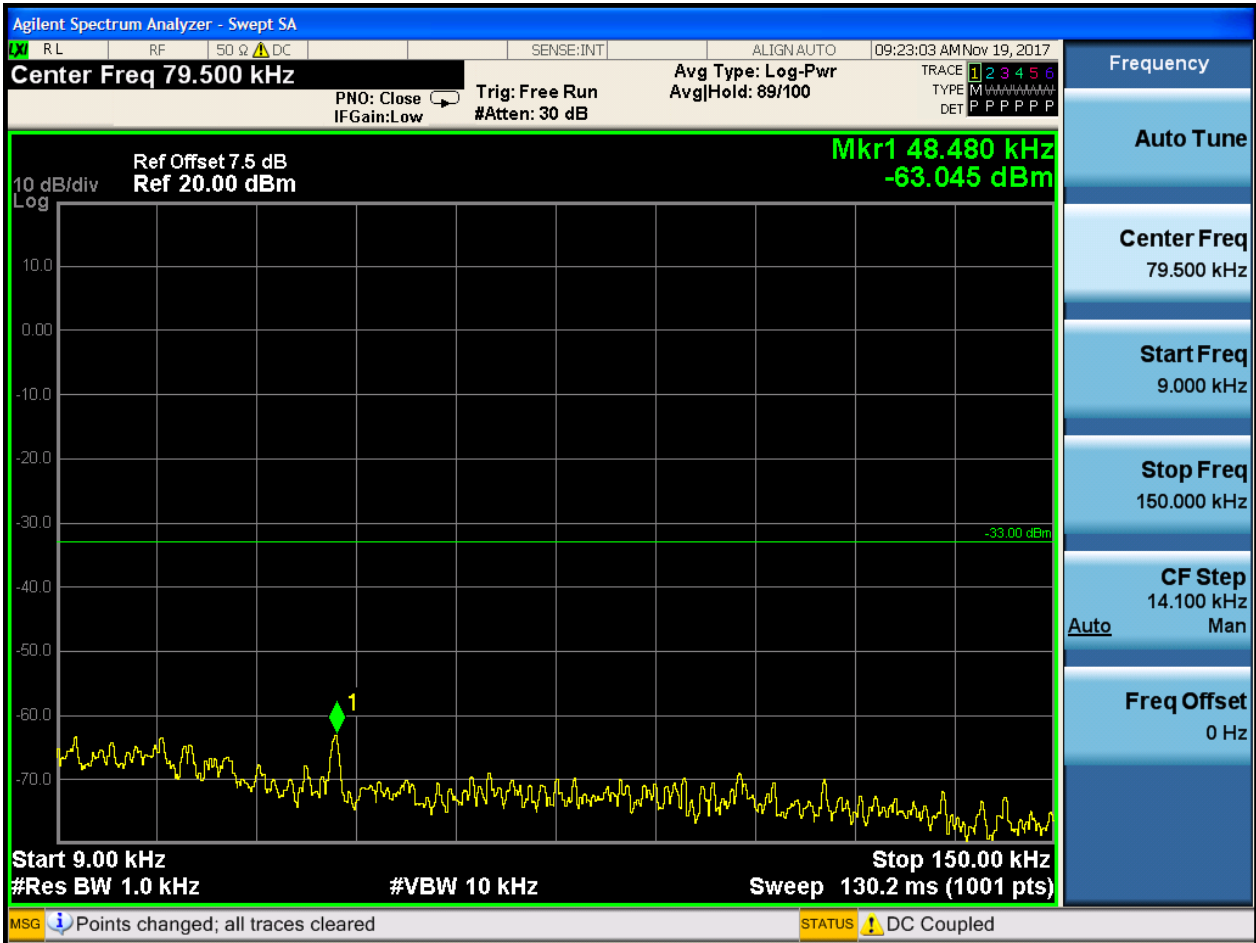
6.1.1.1.3 Test Channel = HCH

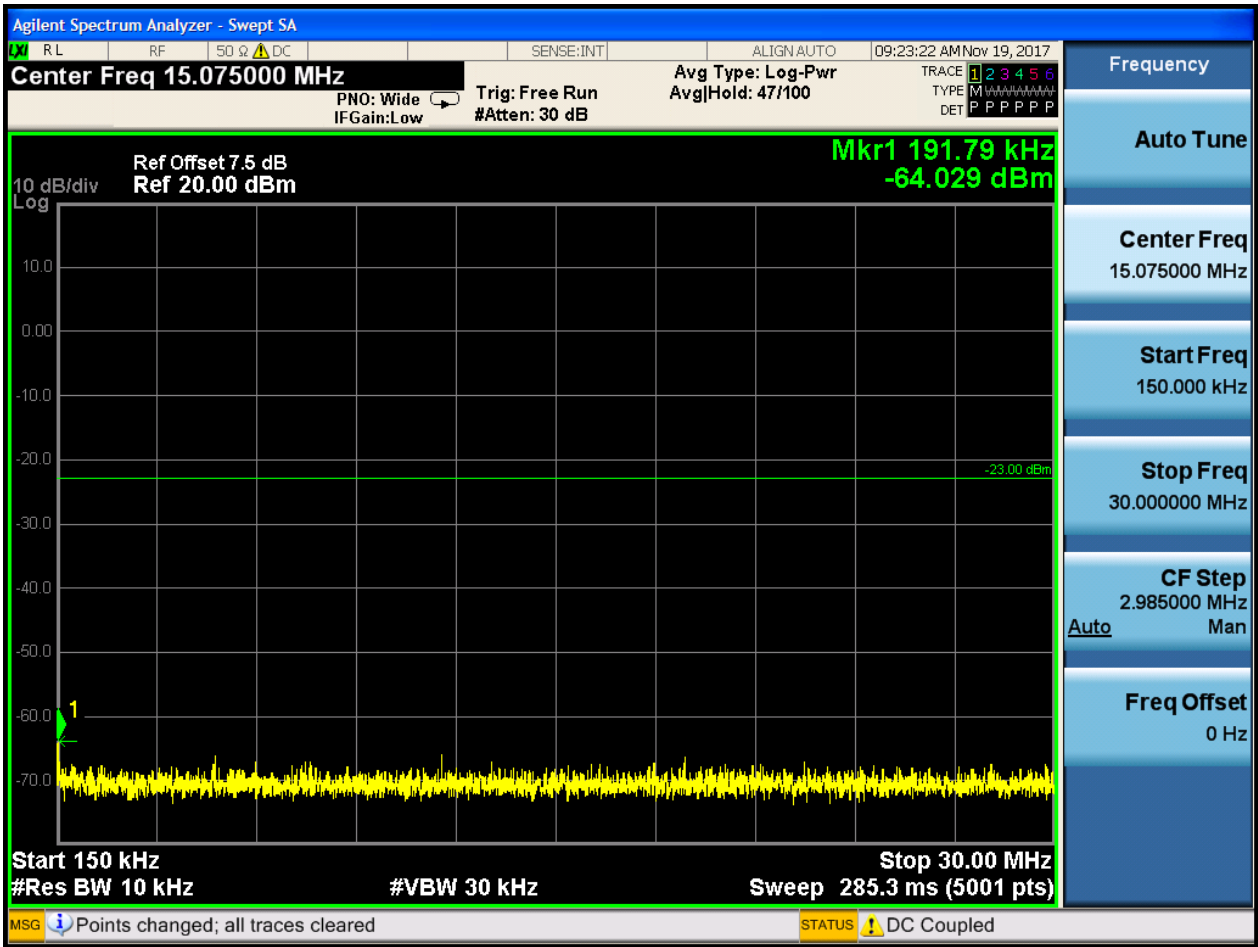






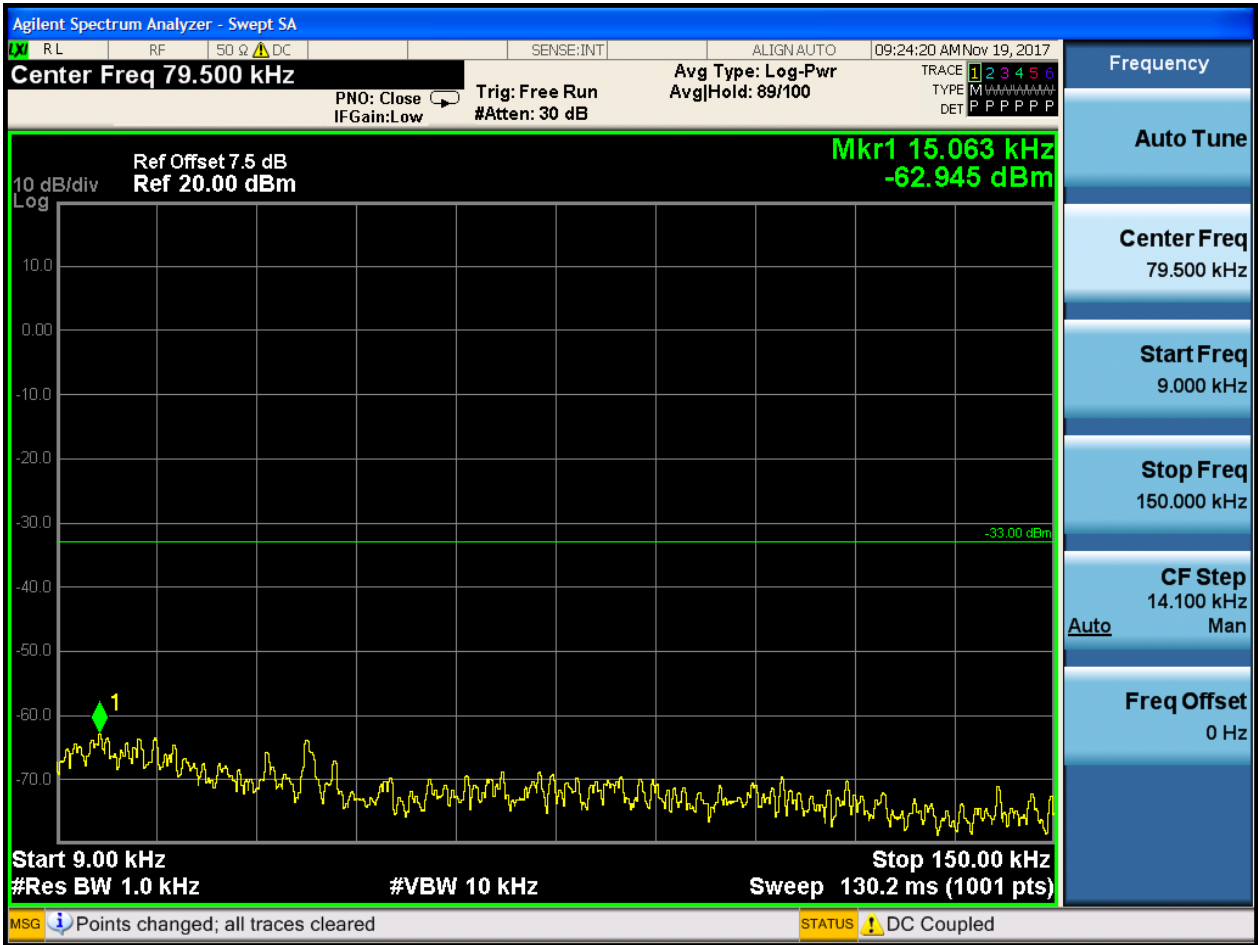
6.1.1.2.2 Test Channel = MCH

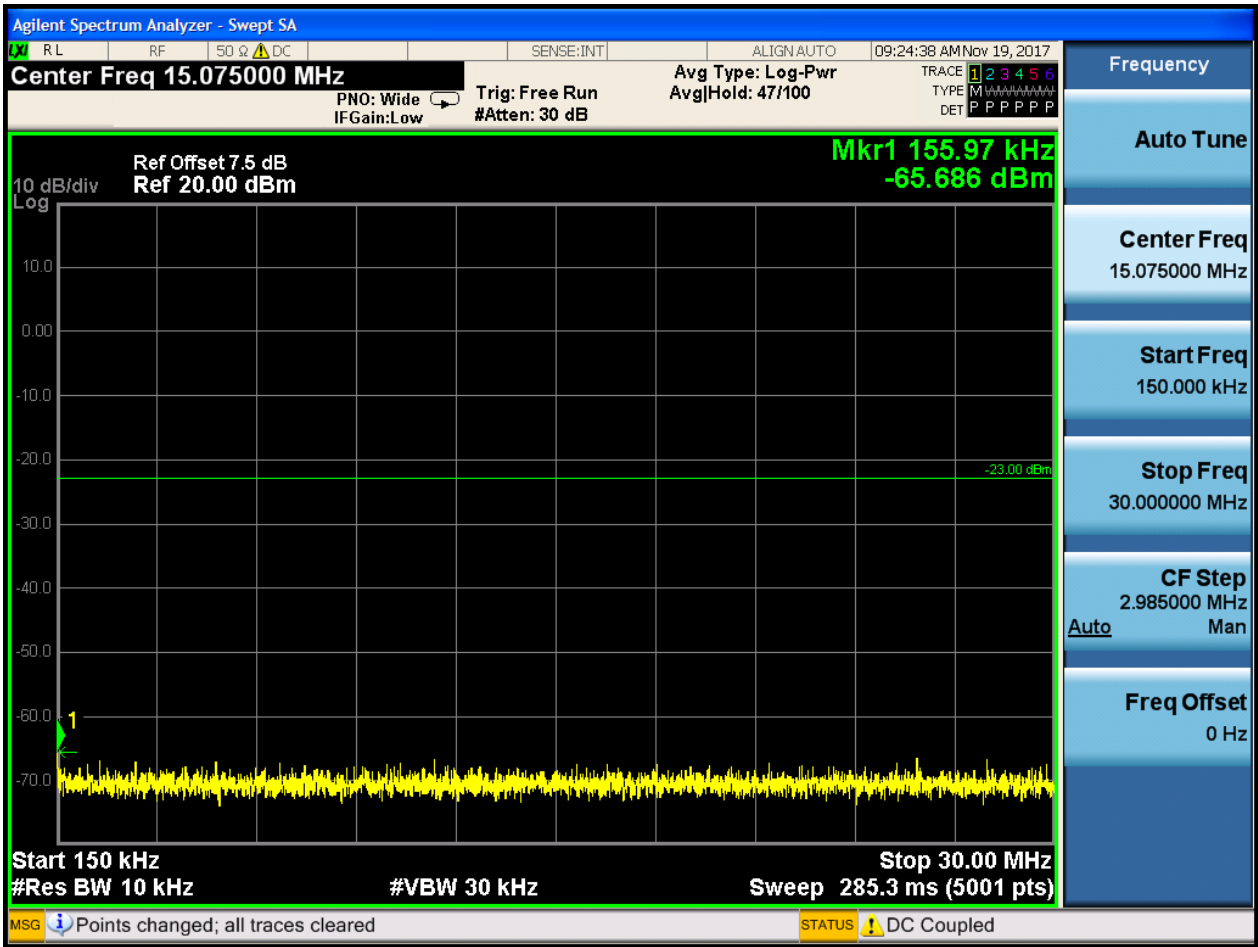






6.1.1.2.3 Test Channel = HCH



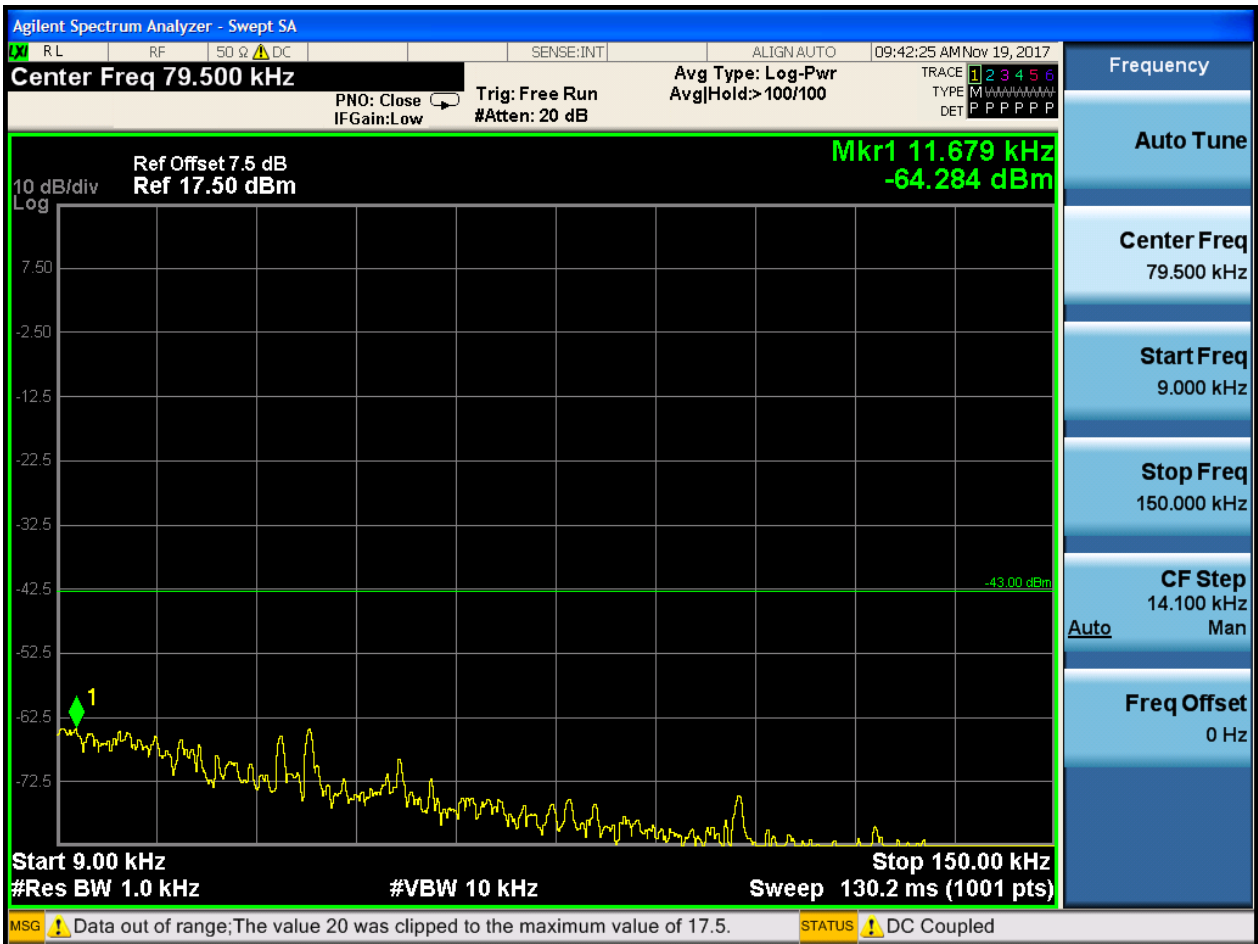


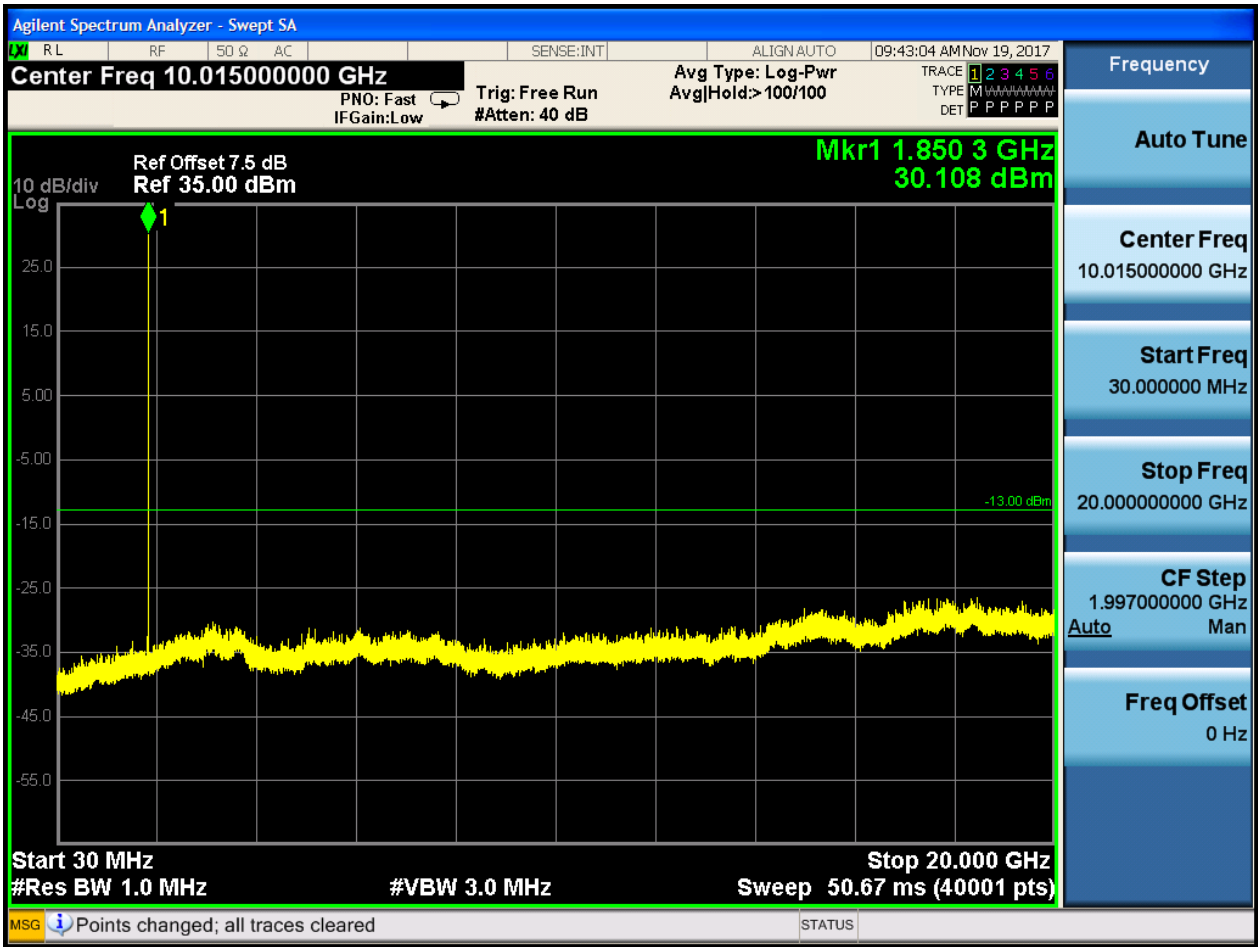


6.1.2 Test Band = GSM1900

6.1.2.1 Test Mode = GSM/TM1

6.1.2.1.1 Test Channel = LCH

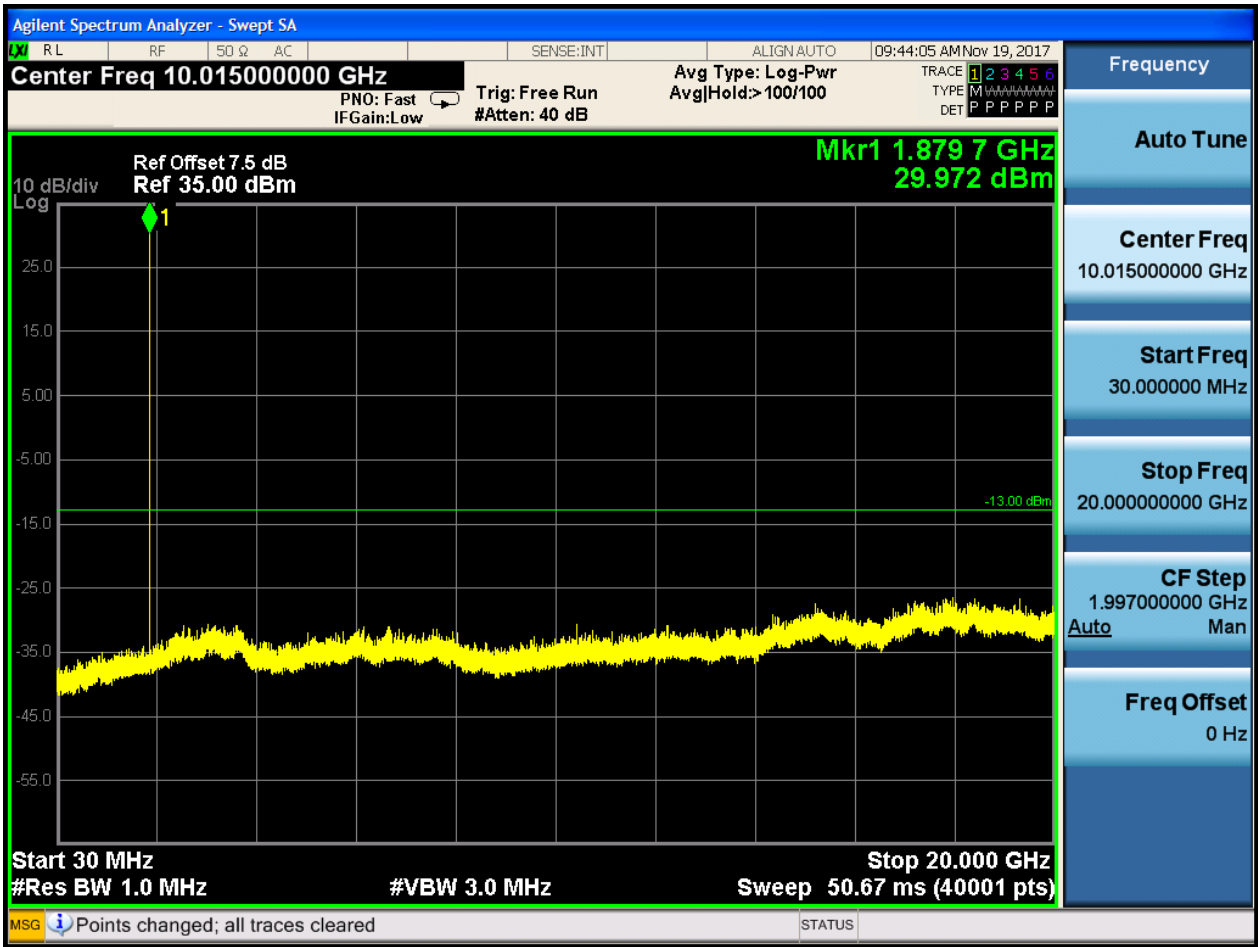




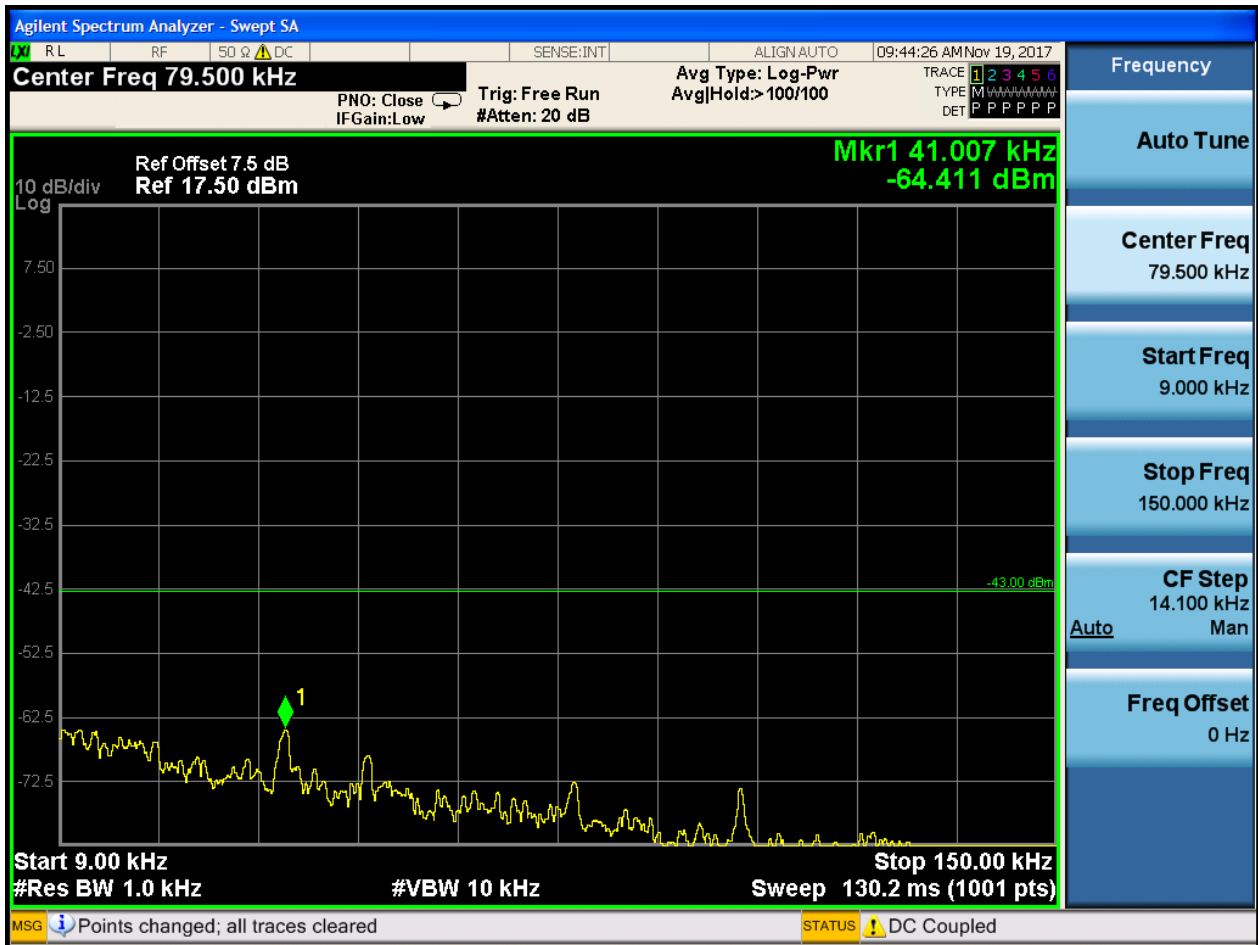


6.1.2.1.2 Test Channel = MCH





6.1.2.1.3 Test Channel = HCH

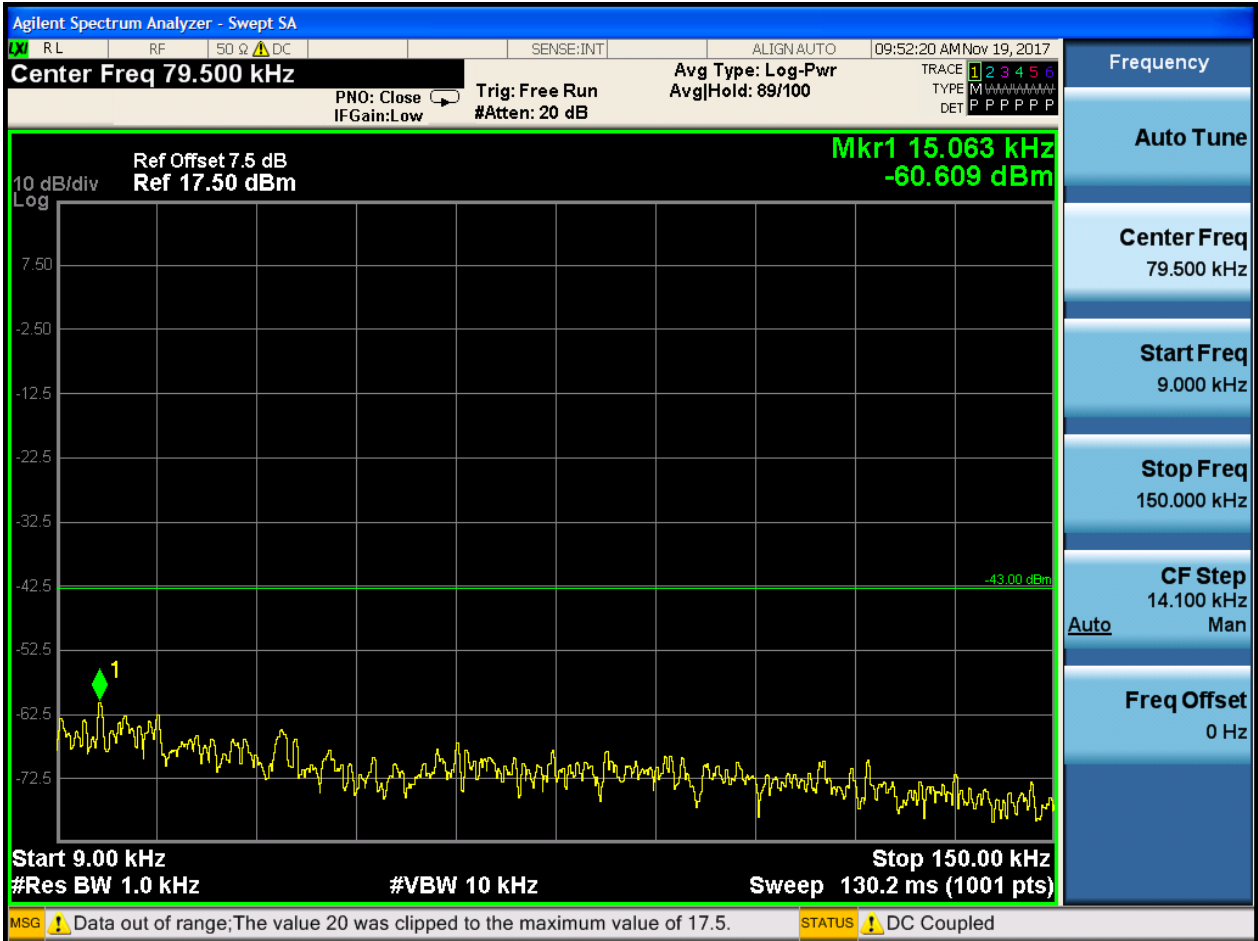


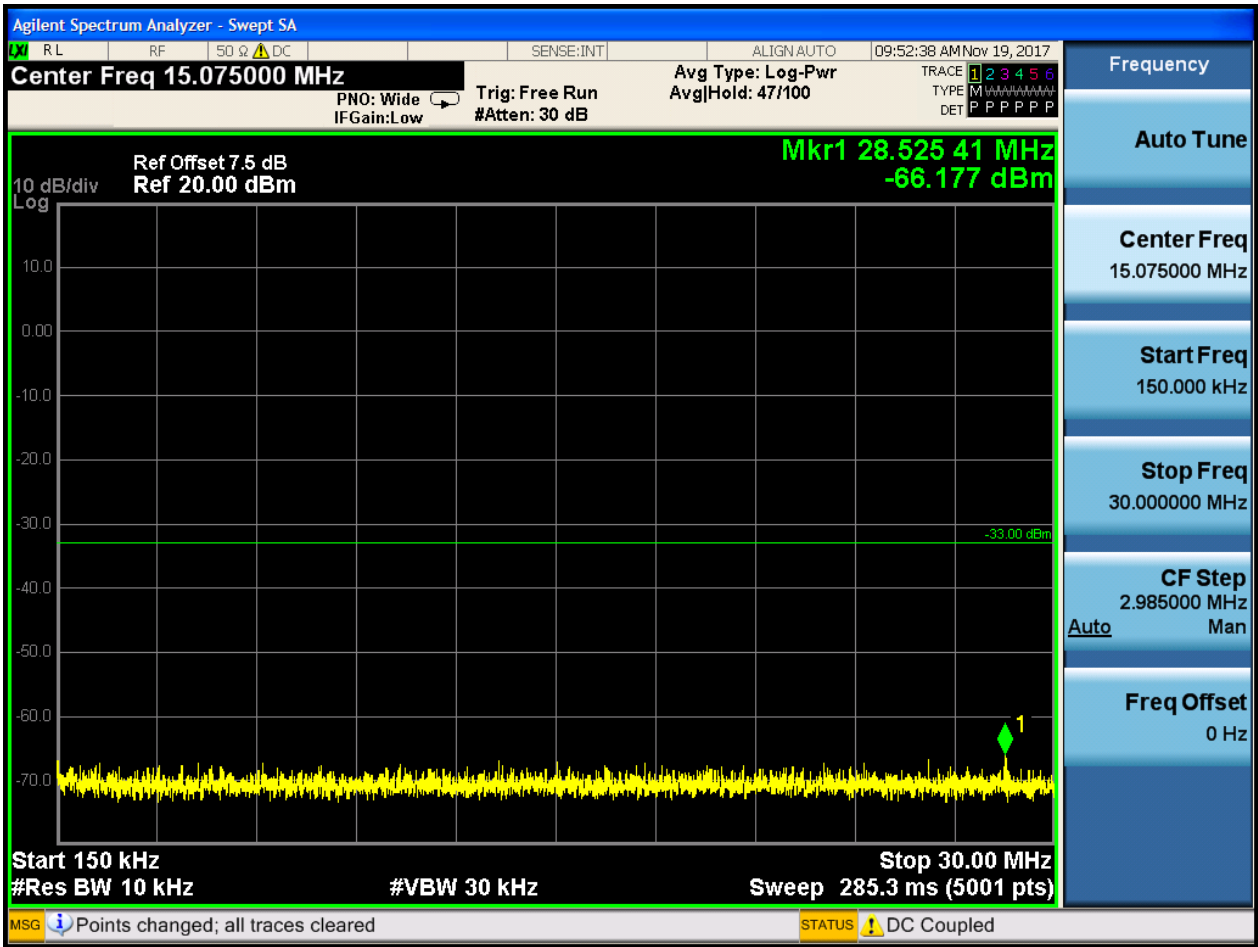




6.1.2.2 Test Mode = GSM/TM2

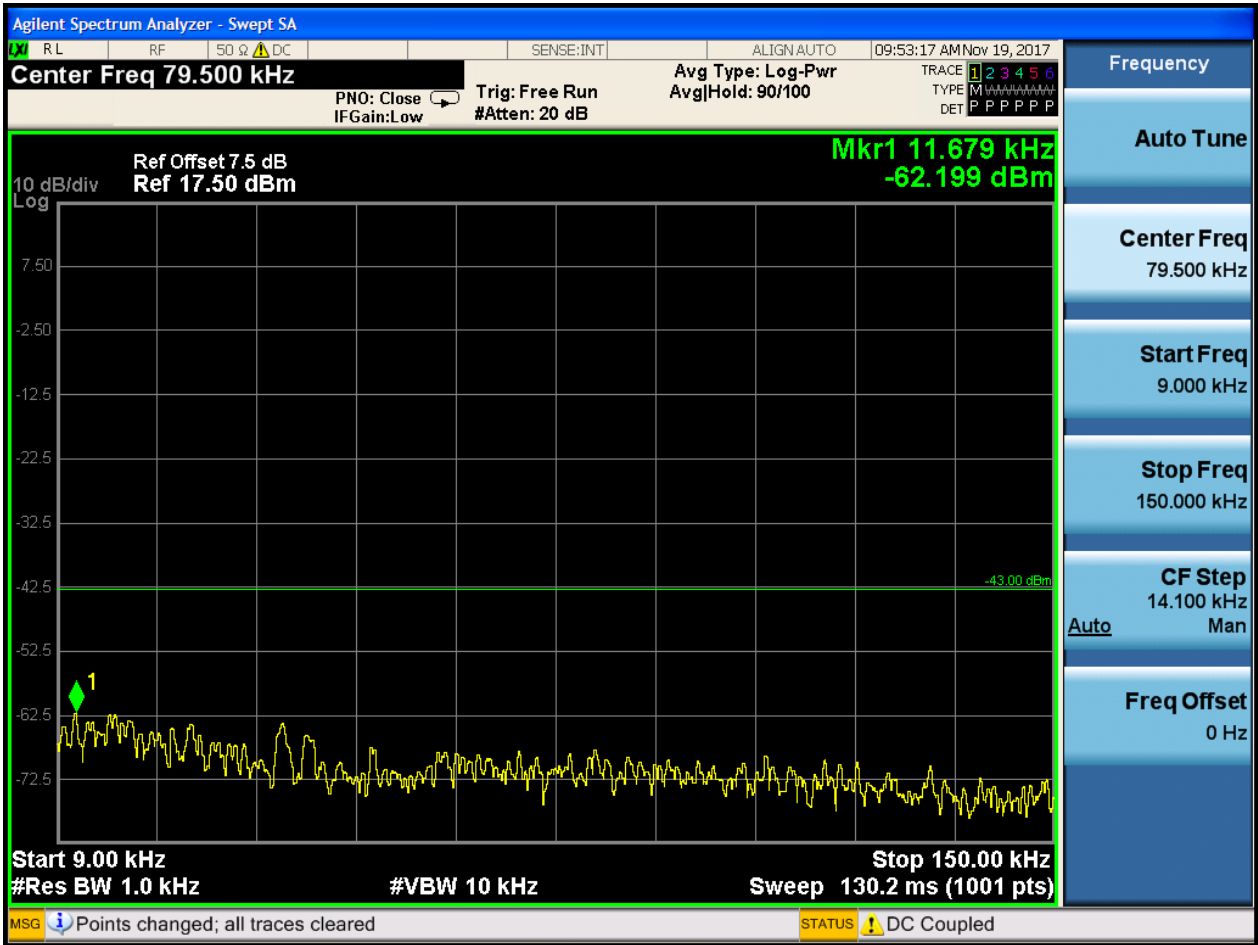
6.1.2.2.1 Test Channel = LCH







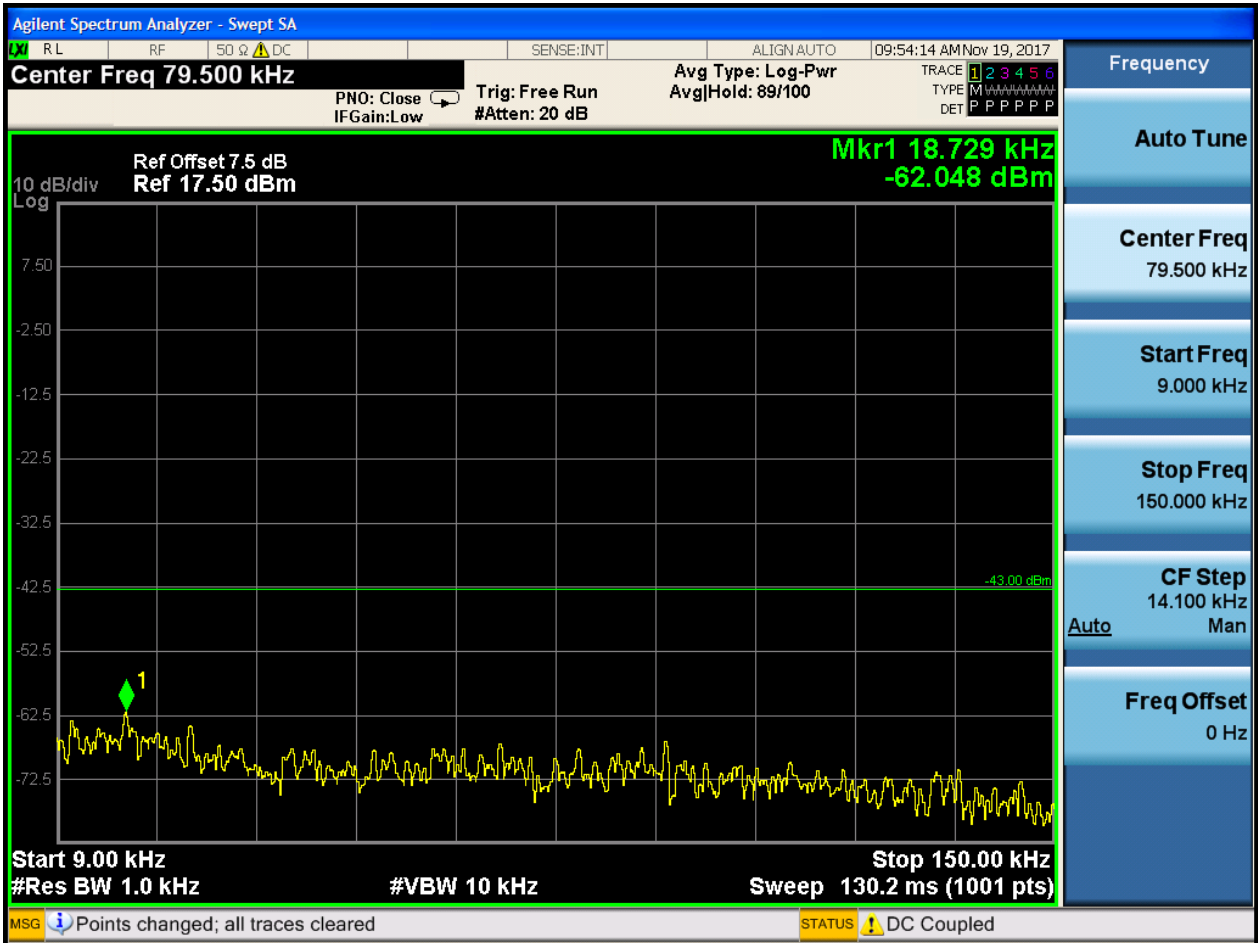
6.1.2.2.2 Test Channel = MCH

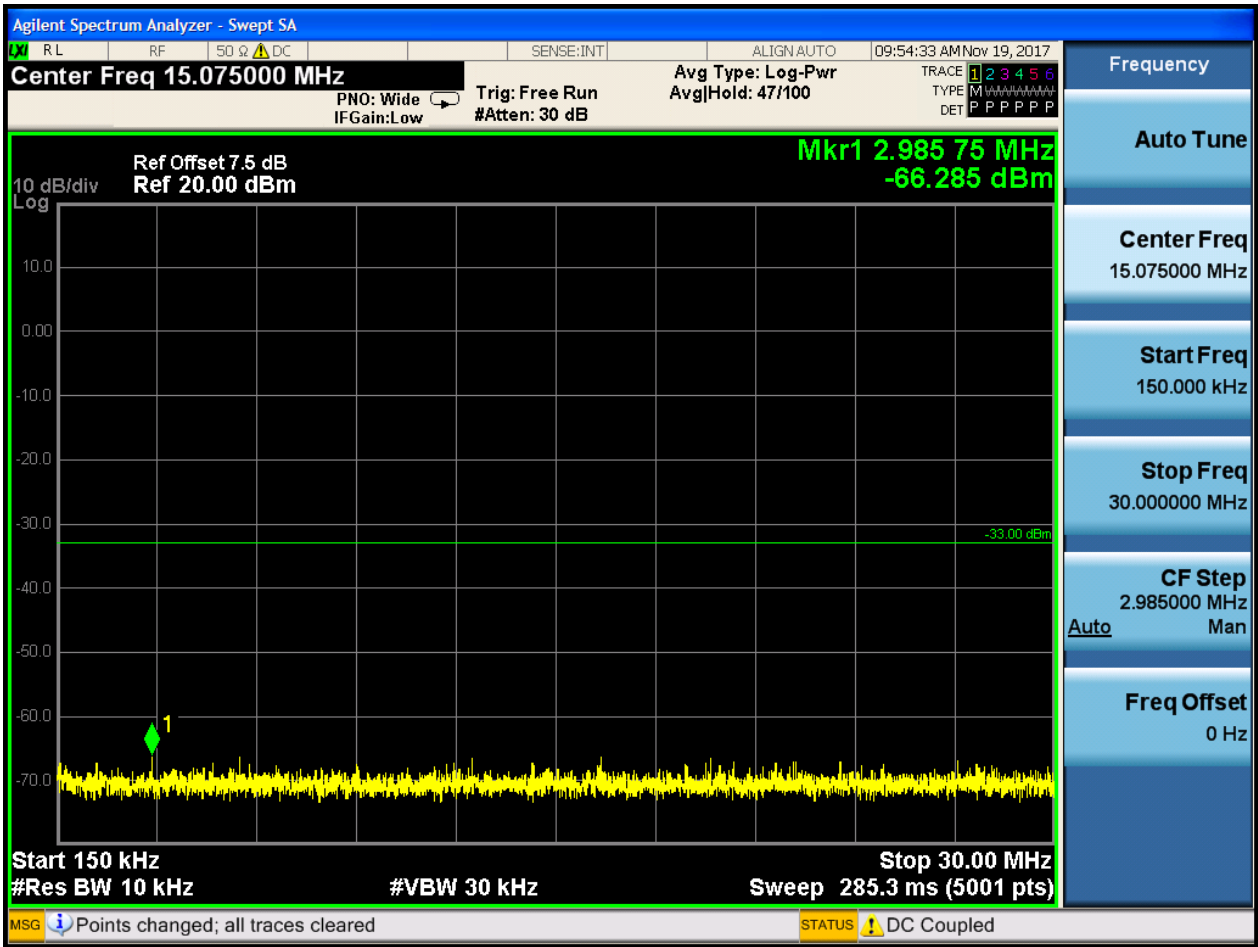


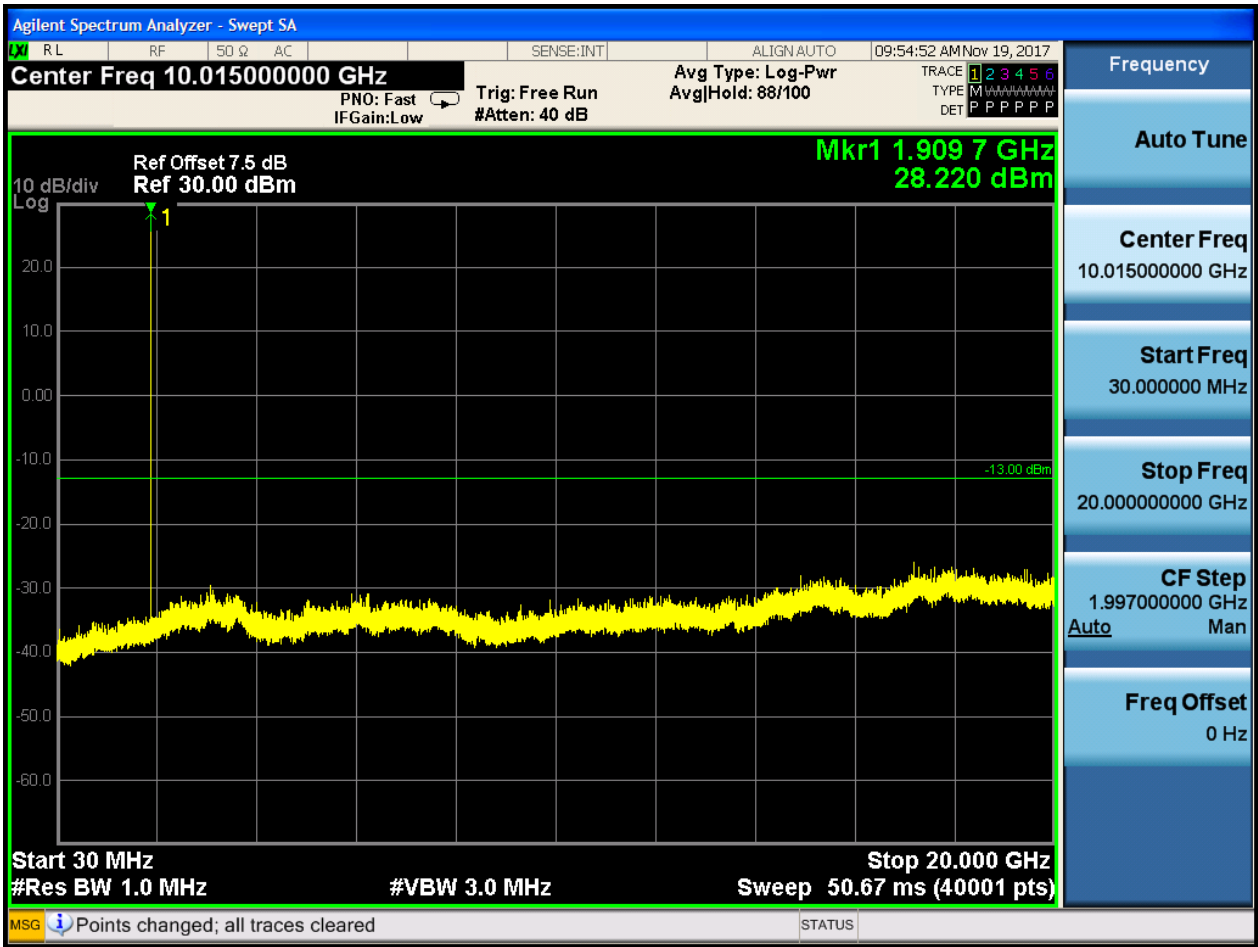




6.1.2.2.3 Test Channel = HCH







7Appendix_G: Field Strength of Spurious Radiation

Note: 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 = 30 kHz, Detector: PK

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

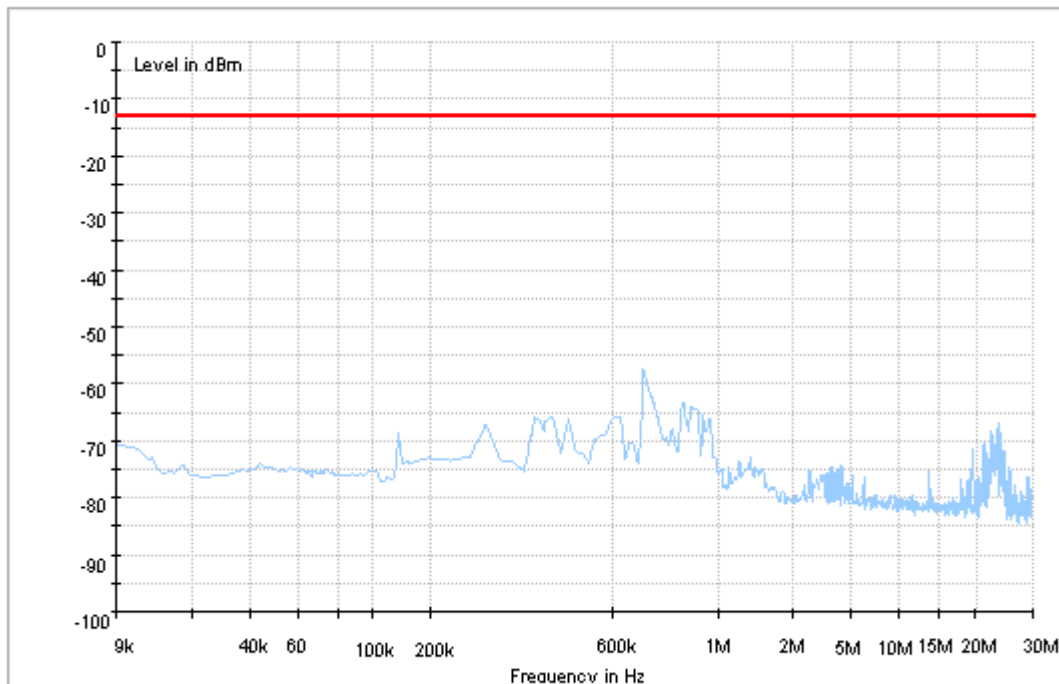
Above 1GHz, RBW = 1 MHz, VBW = 3 MHz. Detector: PK

Part I - Test Plots

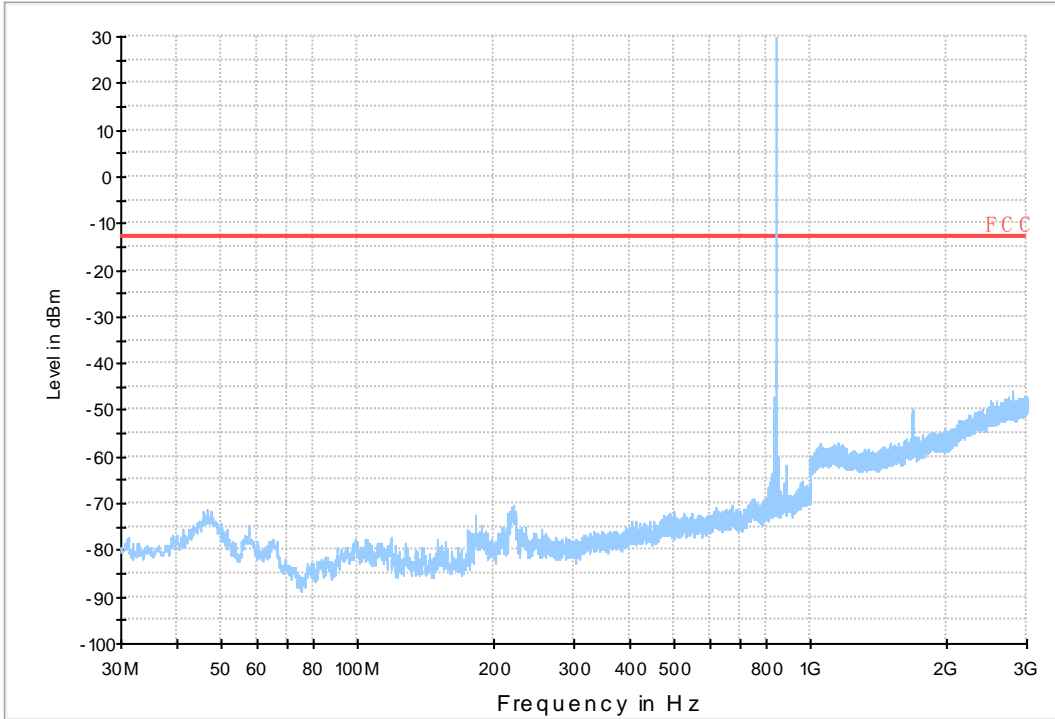
7.1 For GSM

7.1.1 Test Band = GSM850_ANT1

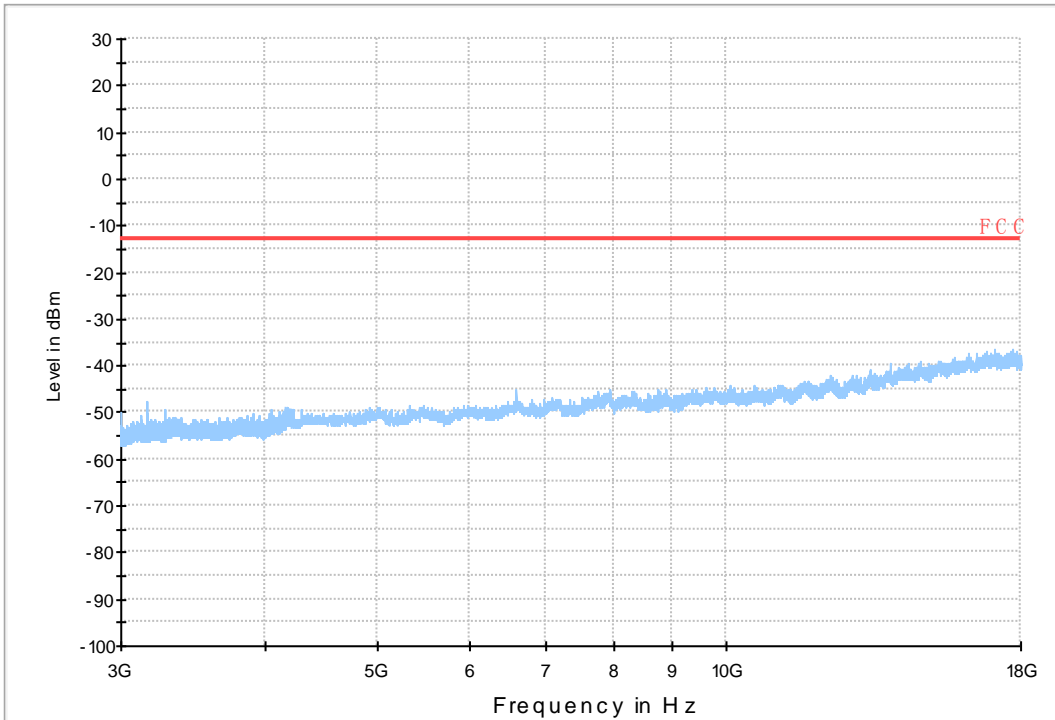
7.1.1.1 Test Mode = GSM/TM1



Copy of FCC PART22 GSM850_L

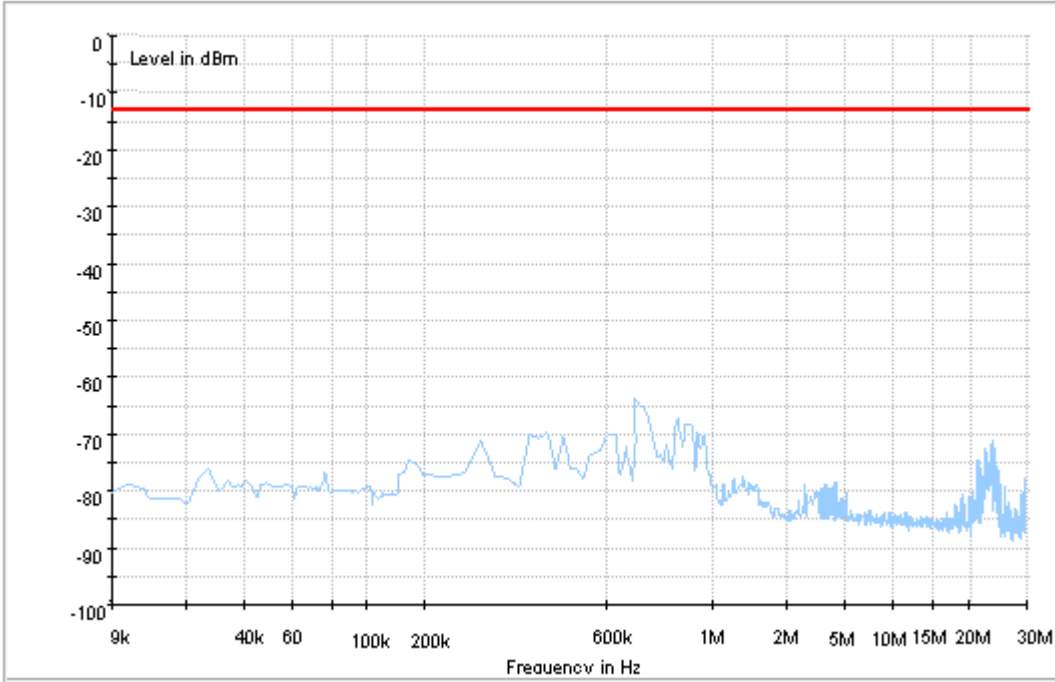


Copy of FCC PART22 GSM850_H

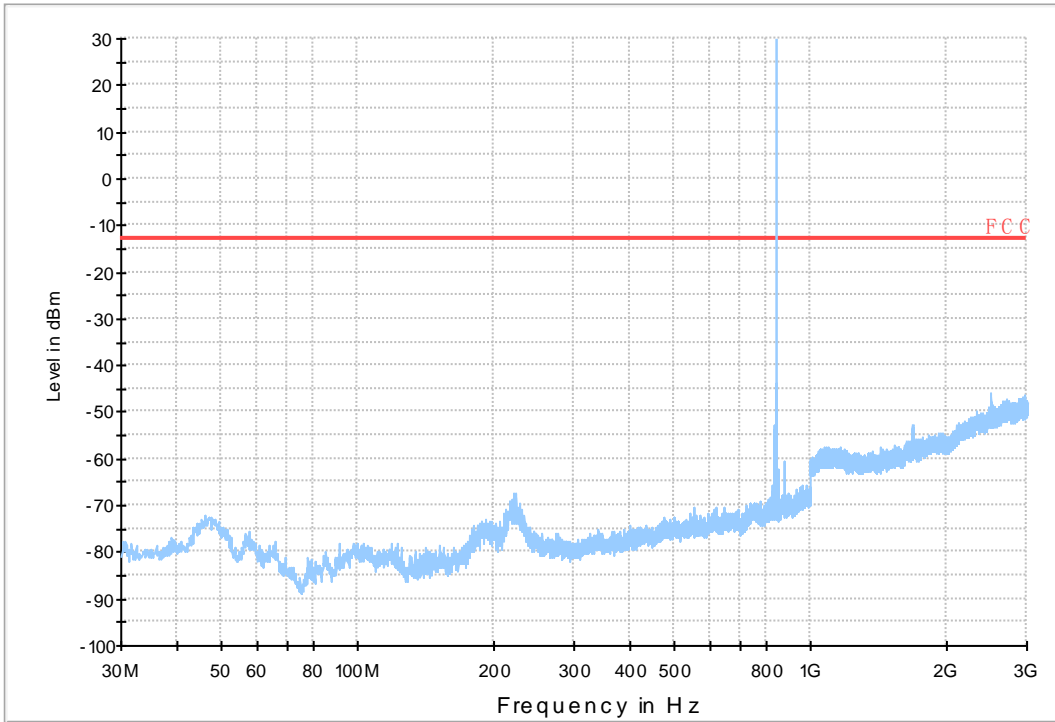


7.1.2 Test Band = GSM850_ANT2

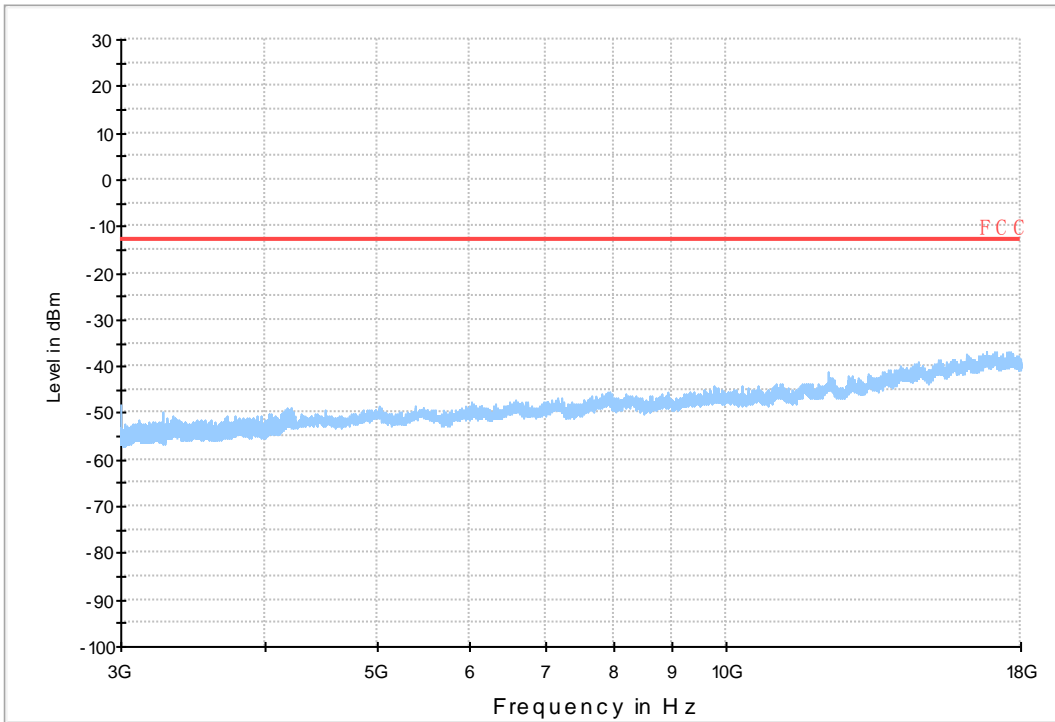
7.1.2.1 Test Mode = GSM/TM1



Copy of FCC PART22 GSM850_L

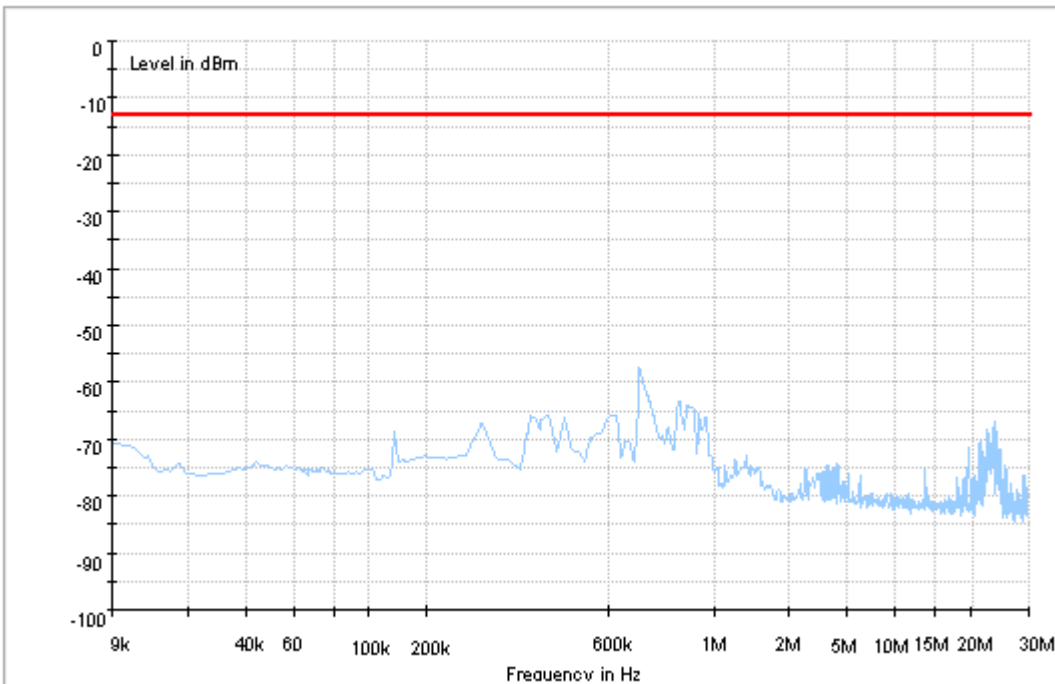


Copy of FCC PART22 GSM850_H

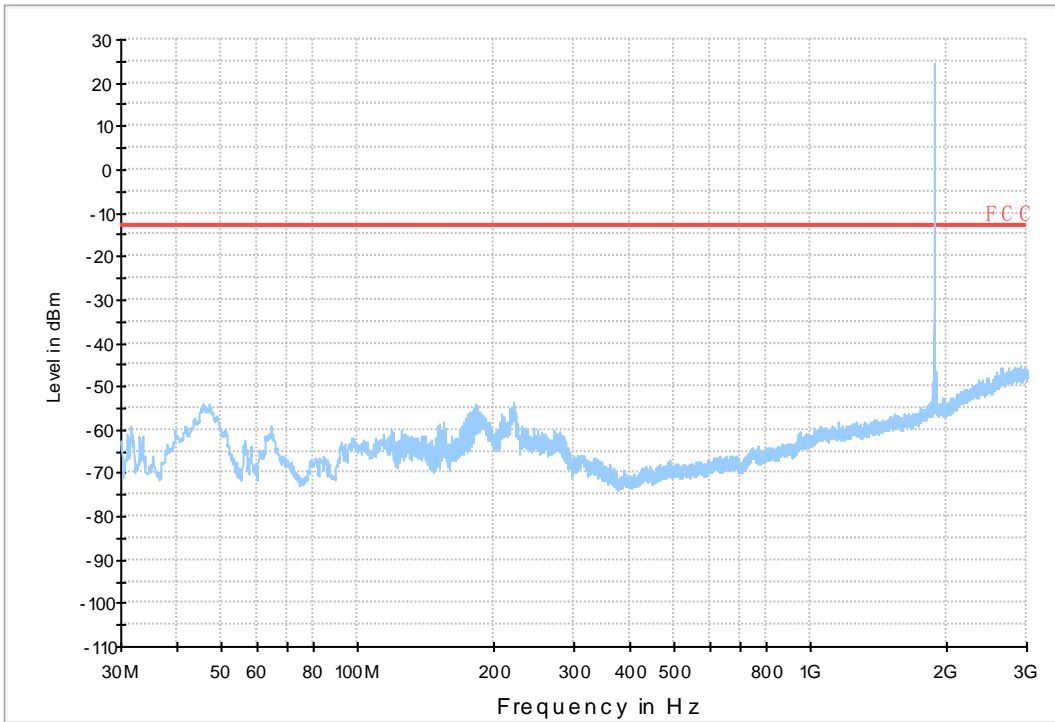


7.1.3 Test Band = GSM1900_ANT1

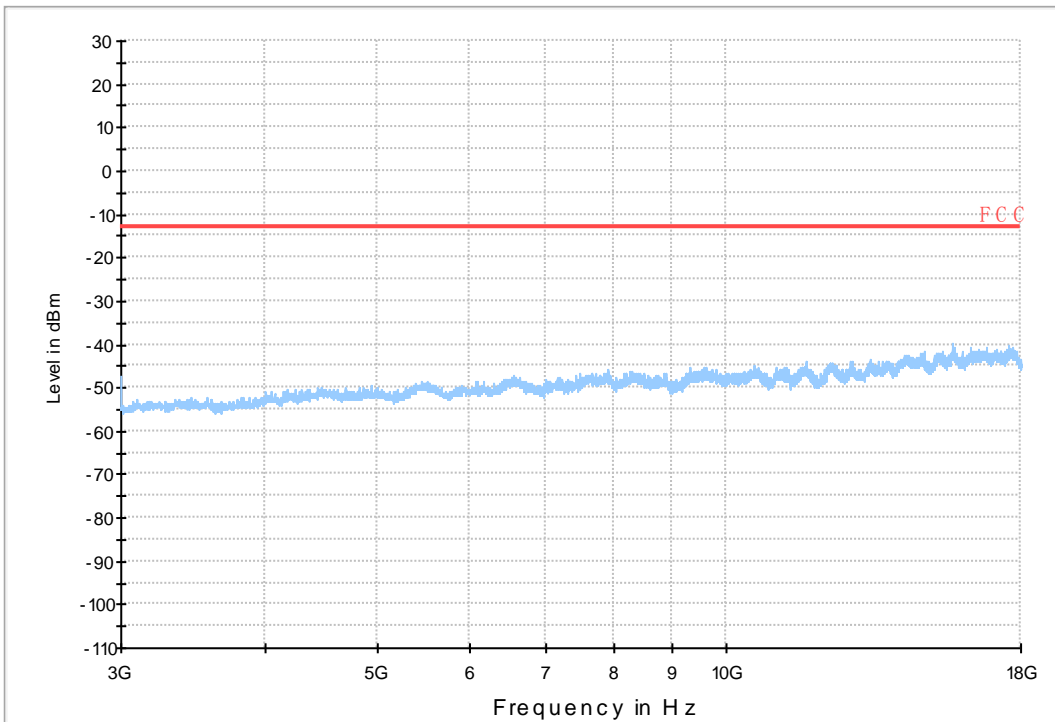
7.1.3.1 Test Mode = GSM/TM1

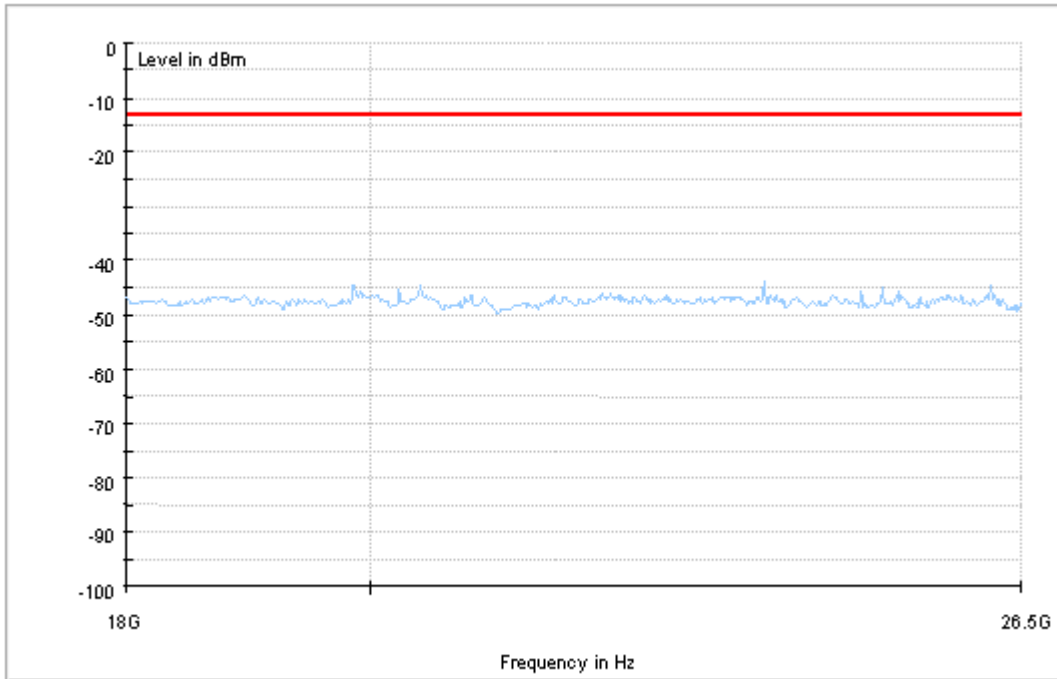


Copy of FCC PART24 GSM1900_L



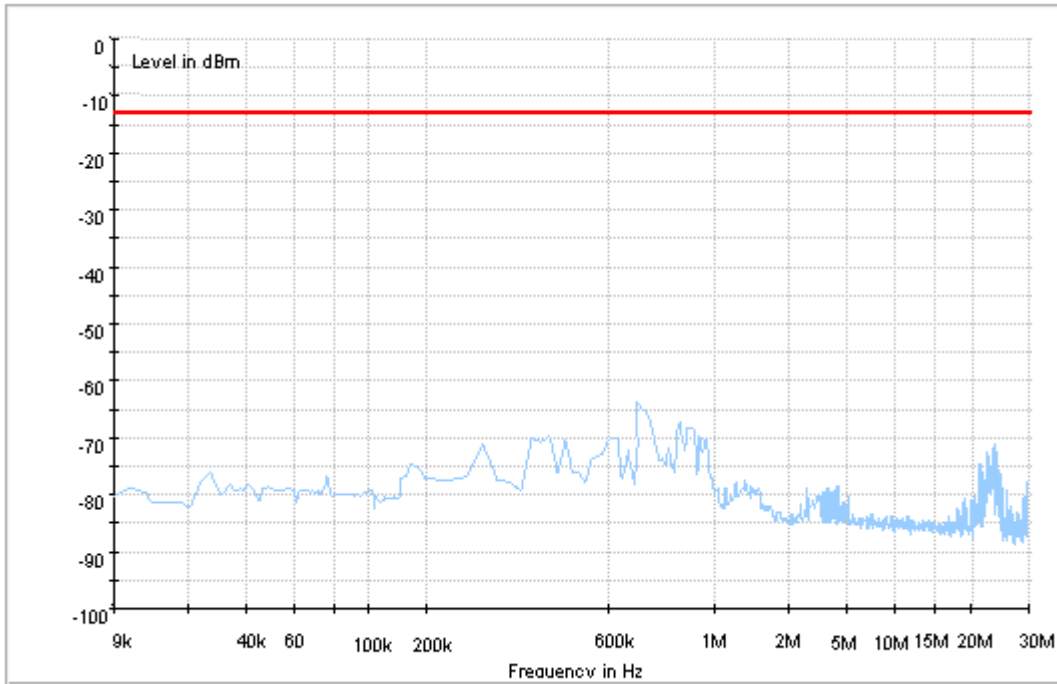
Copy of FCC PART24 GSM1900_H



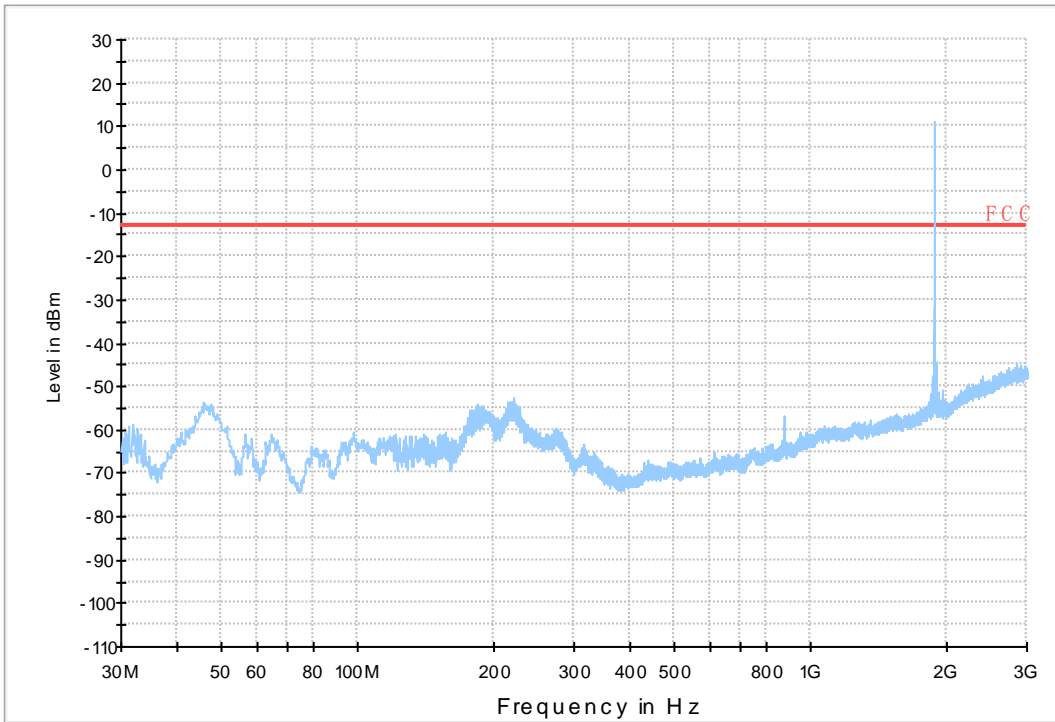


7.1.4 Test Band = GSM1900_ANT2

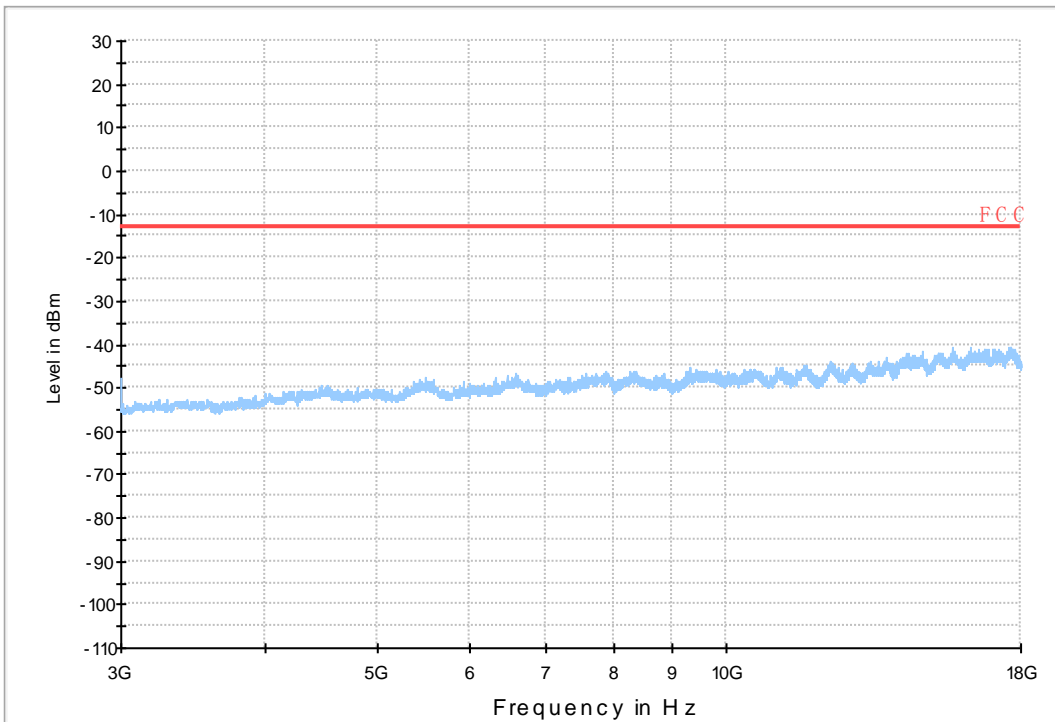
7.1.4.1 Test Mode = GSM/TM1

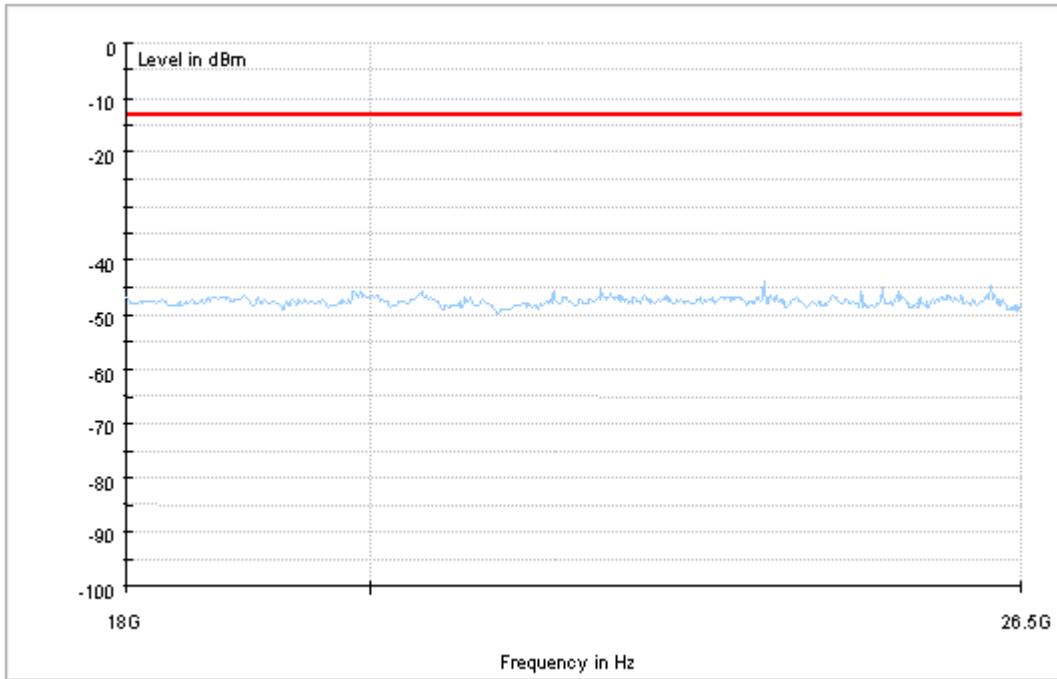


Copy of FCC PART24 GSM1900_L



Copy of FCC PART24 GSM1900_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
GSM850	GSM/TM1	LCH	TN	VL	-19.5	-0.02366	PASS
				VN	-19.11	-0.02319	PASS
				VH	-16.66	-0.02021	PASS
		MCH	TN	VL	-14.59	-0.01744	PASS
				VN	-10.33	-0.01235	PASS
				VH	-14.4	-0.01721	PASS
		HCH	TN	VL	-10.33	-0.01217	PASS
				VN	-15.63	-0.01841	PASS
				VH	-13.82	-0.01628	PASS
	GSM/TM2	LCH	TN	VL	-8.33	-0.01011	PASS
				VN	-12.2	-0.0148	PASS
				VH	-12.07	-0.01464	PASS
		MCH	TN	VL	-12.82	-0.01532	PASS
				VN	-11.88	-0.0142	PASS
				VH	-6.07	-0.00726	PASS
		HCH	TN	VL	-12.95	-0.01526	PASS
				VN	-8.33	-0.00981	PASS
				VH	-7.59	-0.00894	PASS
GSM1900	GSM/TM1	LCH	TN	VL	16.47	0.0089	PASS
				VN	12.2	0.00659	PASS
				VH	21.83	0.0118	PASS
		MCH	TN	VL	33.25	0.01769	PASS
				VN	20.6	0.01096	PASS
				VH	24.92	0.01326	PASS
		HCH	TN	VL	38.1	0.01995	PASS
				VN	27.96	0.01464	PASS
				VH	24.54	0.01285	PASS
	GSM/TM2	LCH	TN	VL	20.21	0.01092	PASS
				VN	11.46	0.00619	PASS
				VH	7.17	0.00388	PASS
		MCH	TN	VL	4.36	0.00232	PASS
				VN	4.81	0.00256	PASS
				VH			

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				VH	3.87	0.00206	PASS
		HCH	TN	VL	16.82	0.00881	PASS
				VN	33.45	0.01751	PASS
				VH	21.15	0.01107	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	-22.73	-0.02758	PASS
				-20	-17.05	-0.02069	PASS
				-10	-20.34	-0.02468	PASS
				0	-23.44	-0.02844	PASS
				10	-19.57	-0.02374	PASS
				20	-22.54	-0.02735	PASS
				30	-17.63	-0.02139	PASS
				40	-14.92	-0.0181	PASS
		50	-13.43	-0.01629	PASS		
		MCH	VN	-30	-10.4	-0.01243	PASS
				-20	-14.21	-0.01699	PASS
				-10	-14.4	-0.01721	PASS
				0	-12.14	-0.01451	PASS
				10	-14.85	-0.01775	PASS
				20	-14.79	-0.01768	PASS
				30	-11.17	-0.01335	PASS
				40	-13.82	-0.01652	PASS
		50	-15.37	-0.01837	PASS		
		HCH	VN	-30	-12.07	-0.01422	PASS
				-20	-14.59	-0.01719	PASS
				-10	-11.88	-0.014	PASS
				0	-10.2	-0.01202	PASS
				10	-14.85	-0.0175	PASS
				20	-8.65	-0.01019	PASS
	30			-12.27	-0.01446	PASS	
	40			-12.98	-0.01529	PASS	
	50	-12.85	-0.01514	PASS			
	GSM/TM2	LCH	VN	-30	-17.47	-0.0212	PASS
				-20	-11.78	-0.01429	PASS
				-10	-18.27	-0.02217	PASS
				0	-14.04	-0.01703	PASS

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict						
				10	-21.79	-0.02644	PASS						
				20	-17.56	-0.02131	PASS						
				30	-18.02	-0.02186	PASS						
				40	-16.76	-0.02033	PASS						
				50	-10.27	-0.01246	PASS						
		MCH	VN			-30	-11.33	-0.01354	PASS				
						-20	-9.17	-0.01096	PASS				
						-10	-18.56	-0.02219	PASS				
						0	-9.49	-0.01134	PASS				
						10	-7.39	-0.00883	PASS				
						20	-7.07	-0.00845	PASS				
						30	-13.62	-0.01628	PASS				
						40	-11.95	-0.01428	PASS				
						50	-15.46	-0.01848	PASS				
						HCH	VN			-30	-8.39	-0.00988	PASS
		-20	-9.36	-0.01103	PASS								
		-10	-10.49	-0.01236	PASS								
		0	-13.17	-0.01552	PASS								
		10	-10.75	-0.01266	PASS								
		20	-13.4	-0.01579	PASS								
		30	-2.39	-0.00282	PASS								
		40	-11.88	-0.014	PASS								
		50	-11.98	-0.01411	PASS								
		GSM1900	GSM/TM1	LCH	VN					-30	9.04	0.00489	PASS
-20	22.79									0.01232	PASS		
-10	16.98									0.00918	PASS		
0	20.99									0.01134	PASS		
10	26.22									0.01417	PASS		
20	12.33									0.00666	PASS		
30	17.82									0.00963	PASS		
40	6.01									0.00325	PASS		
50	21.63									0.01169	PASS		
MCH	VN									-30	28.09	0.01494	PASS
										-20	35.64	0.01896	PASS
										-10	35.39	0.01882	PASS
										0	30.22	0.01607	PASS
										10	33.32	0.01772	PASS
										20	22.54	0.01199	PASS
										30	36.35	0.01934	PASS
										40	47.65	0.02535	PASS



Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
		HCH	VN	50	20.79	0.01106	PASS
				-30	31.38	0.01643	PASS
				-20	24.86	0.01302	PASS
				-10	42.42	0.02221	PASS
				0	43.84	0.02296	PASS
				10	41.58	0.02177	PASS
				20	28.8	0.01508	PASS
				30	27.18	0.01423	PASS
				40	41.65	0.02181	PASS
				50	42.29	0.02214	PASS
	GSM/TM2	LCH	VN	-30	3.33	0.0018	PASS
				-20	10.85	0.00586	PASS
				-10	7.01	0.00379	PASS
				0	8.46	0.00457	PASS
				10	8.33	0.0045	PASS
				20	4.29	0.00232	PASS
				30	12.53	0.00677	PASS
				40	9.43	0.0051	PASS
				50	9.14	0.00494	PASS
				MCH	VN	-30	22.99
		-20	11.56			0.00615	PASS
		-10	12.69			0.00675	PASS
		0	22.7			0.01207	PASS
		10	19.63			0.01044	PASS
		20	18.21			0.00969	PASS
		30	14.24			0.00757	PASS
		40	14.3			0.00761	PASS
		50	28.31			0.01506	PASS
		HCH	VN			-30	18.5
				-20	28.41	0.01488	PASS
				-10	37.65	0.01971	PASS
				0	17.27	0.00904	PASS
				10	17.43	0.00913	PASS
				20	18.6	0.00974	PASS
				30	23.37	0.01224	PASS
				40	17.27	0.00904	PASS
50	14.33	0.0075	PASS				

END