



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	32.52	27.34	38.5	PASS
		MCH	32.63	27.49	38.5	PASS
		HCH	32.65	27.64	38.5	PASS
	GSM/TM2	LCH	26.19	21.09	38.5	PASS
		MCH	26.15	20.98	38.5	PASS
		HCH	26.12	21.14	38.5	PASS
Test Band	Test Mode	Test Channel	Measured[dBm]	EIRP[dBm]	Limit [dBm]	Verdict
GSM1900	GSM/TM1	LCH	30.58	28.35	33	PASS
		MCH	30.63	28.38	33	PASS
		HCH	30.5	28.41	33	PASS
	GSM/TM2	LCH	25.58	23.34	33	PASS
		MCH	25.52	23.20	33	PASS
		HCH	25.46	23.16	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:

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

$$\text{SET RBW} = 1\% \text{ of the OBW, not to exceed 1MHz}$$

$$\text{SET VBW} \geq 3 * \text{RBW}$$

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
GSM850	GSM/TM1	LCH	0.12	13	PASS
		MCH	0.13	13	PASS
		HCH	0.13	13	PASS
	GSM/TM2	LCH	3.11	13	PASS
		MCH	3.06	13	PASS
		HCH	3.01	13	PASS
GSM1900	GSM/TM1	LCH	0.12	13	PASS
		MCH	0.13	13	PASS
		HCH	0.12	13	PASS
	GSM/TM2	LCH	3.11	13	PASS
		MCH	3	13	PASS
		HCH	3.03	13	PASS

3Appendix_C: Modulation Characteristics

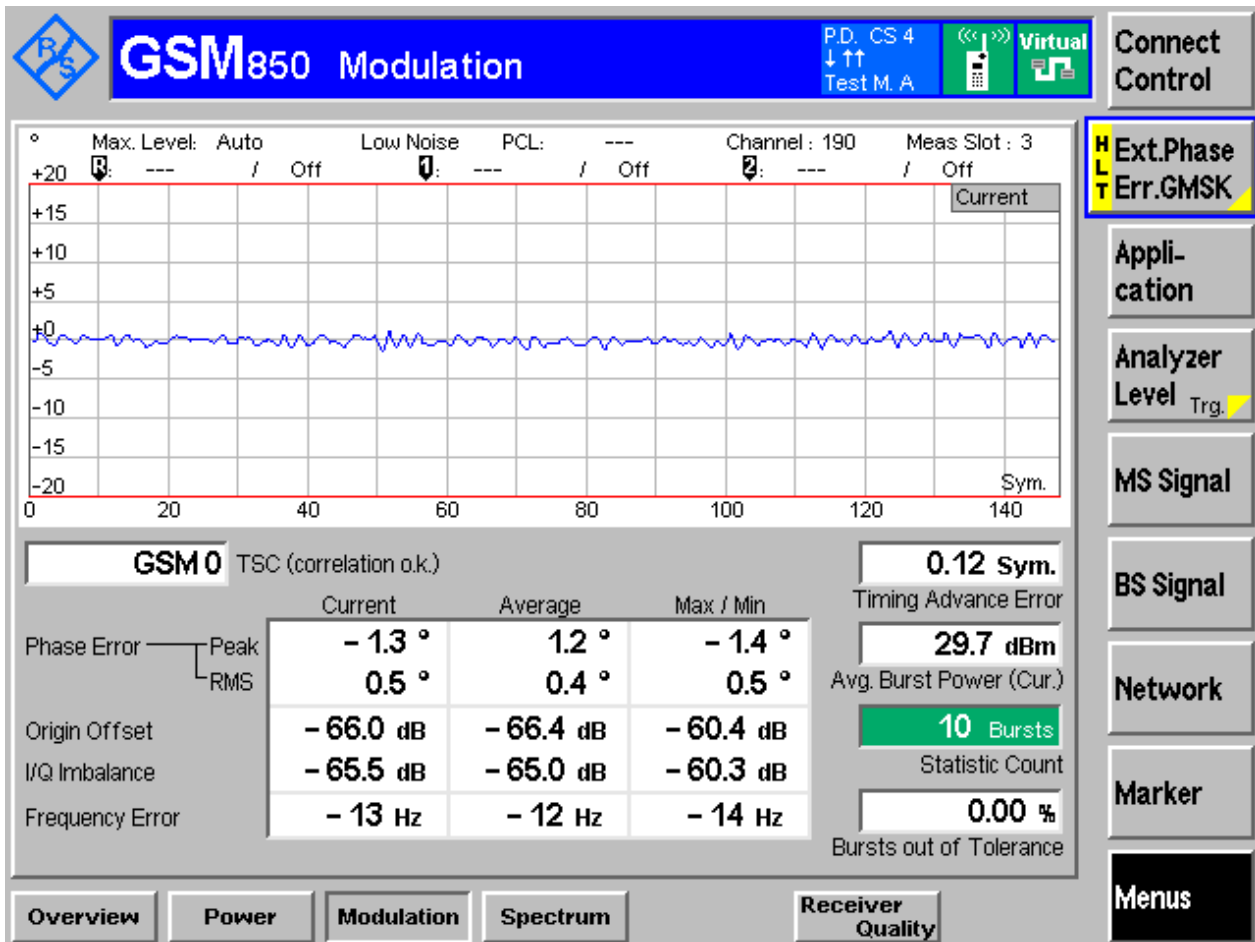
Part I - Test Plots

3.1 For GSM

3.1.1 Test Band = GSM850

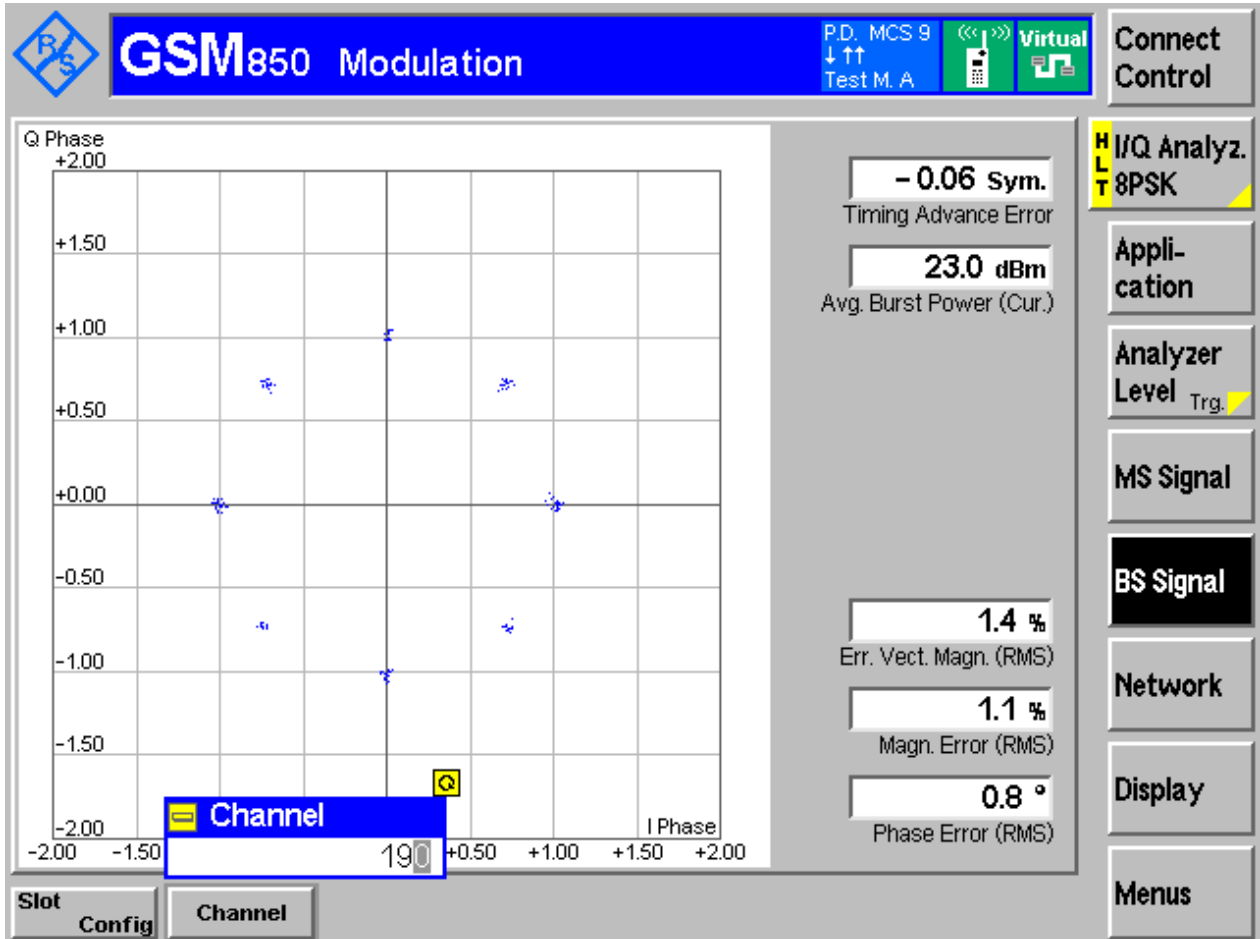
3.1.1.1 Test Mode = GSM/TM1

3.1.1.1.1 Test Channel = MCH



3.1.1.2 Test Mode = GSM/TM2

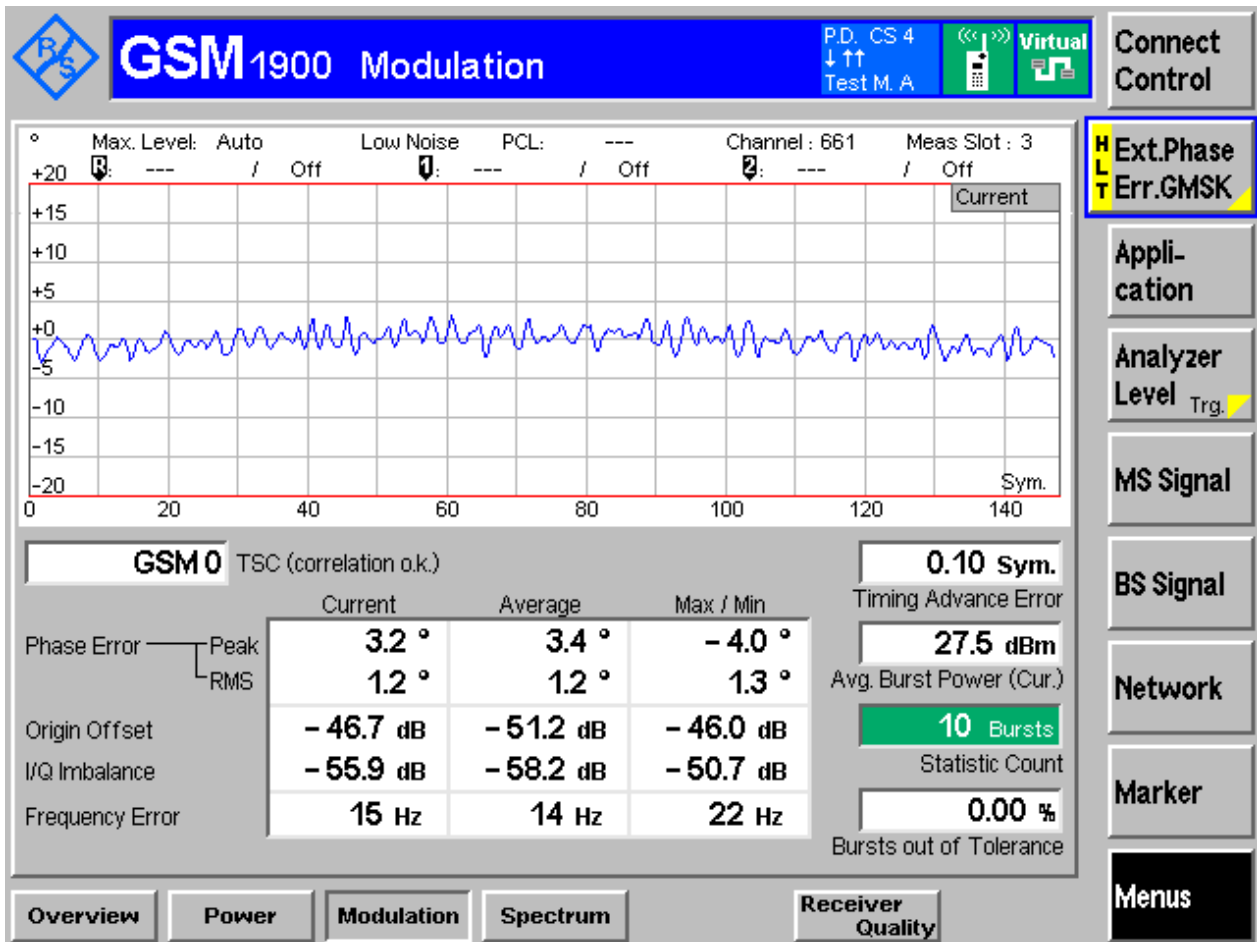
3.1.1.2.1 Test Channel = MCH



3.1.2 Test Band = GSM1900

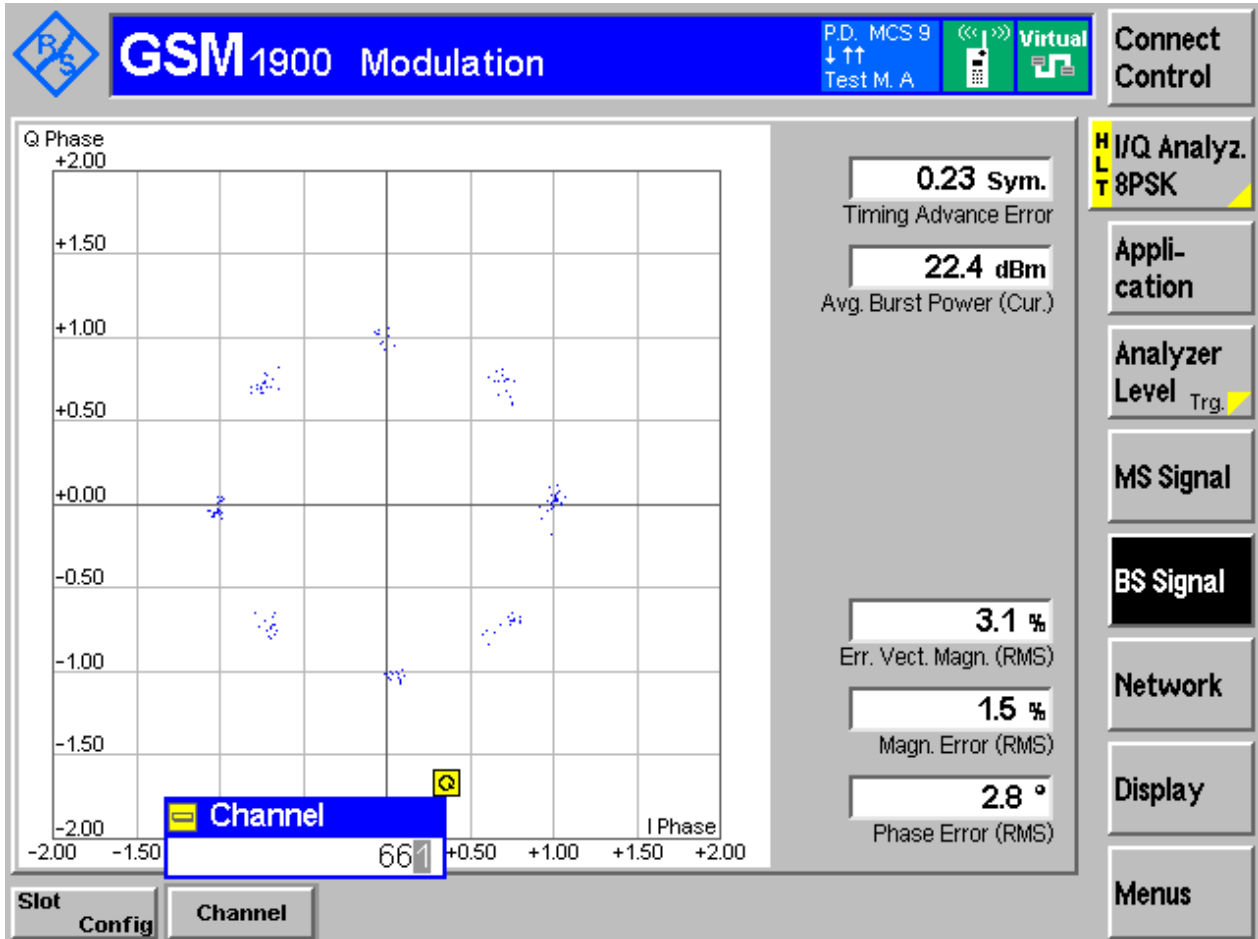
3.1.2.1 Test Mode = GSM/TM1

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	249.26	316.33	Pass
		MCH	245.70	323.33	Pass
		HCH	242.54	317.44	Pass
	GSM/TM2	LCH	246.51	315.97	Pass
		MCH	245.91	315.93	Pass
		HCH	250.66	314.52	Pass
GSM1900	GSM/TM1	LCH	245.02	316.46	Pass
		MCH	241.33	312.97	Pass
		HCH	240.31	320.21	Pass
	GSM/TM2	LCH	250.66	320.74	Pass
		MCH	249.90	319.79	Pass
		HCH	247.18	317.72	Pass

Part II - Test Plots

4.1 For GSM

4.1.1 Test Band = GSM850

4.1.1.1 Test Mode = GSM/TM1

4.1.1.1.1 Test Channel = LCH





4.1.1.1.2 Test Channel = MCH





4.1.1.1.3 Test Channel = HCH





4.1.1.2 Test Mode = GSM/TM2

4.1.1.2.1 Test Channel = LCH



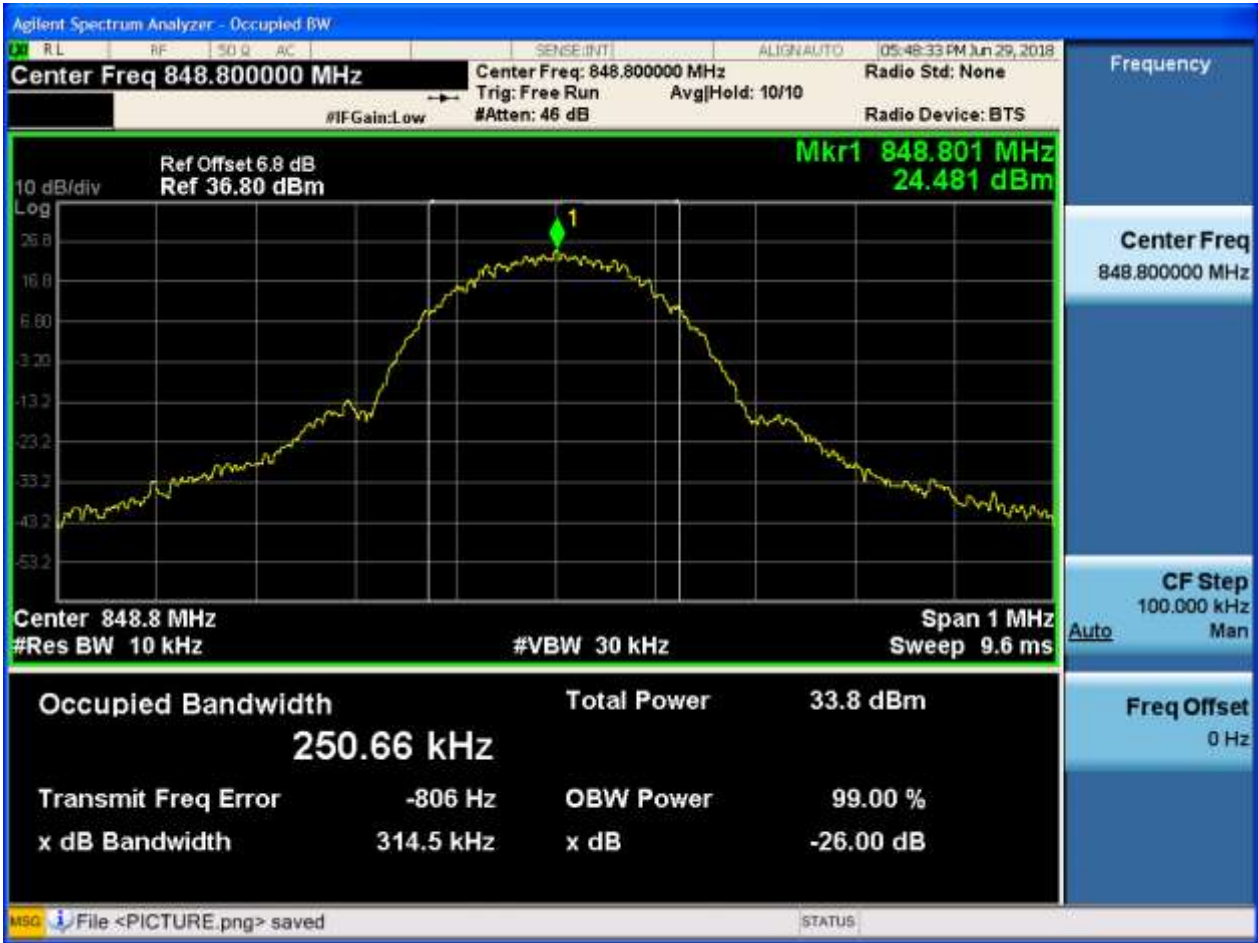


4.1.1.2.2 Test Channel = MCH





4.1.1.2.3 Test Channel = HCH





4.1.2 Test Band = GSM1900

4.1.2.1 Test Mode = GSM/TM1

4.1.2.1.1 Test Channel = LCH





4.1.2.1.2 Test Channel = MCH





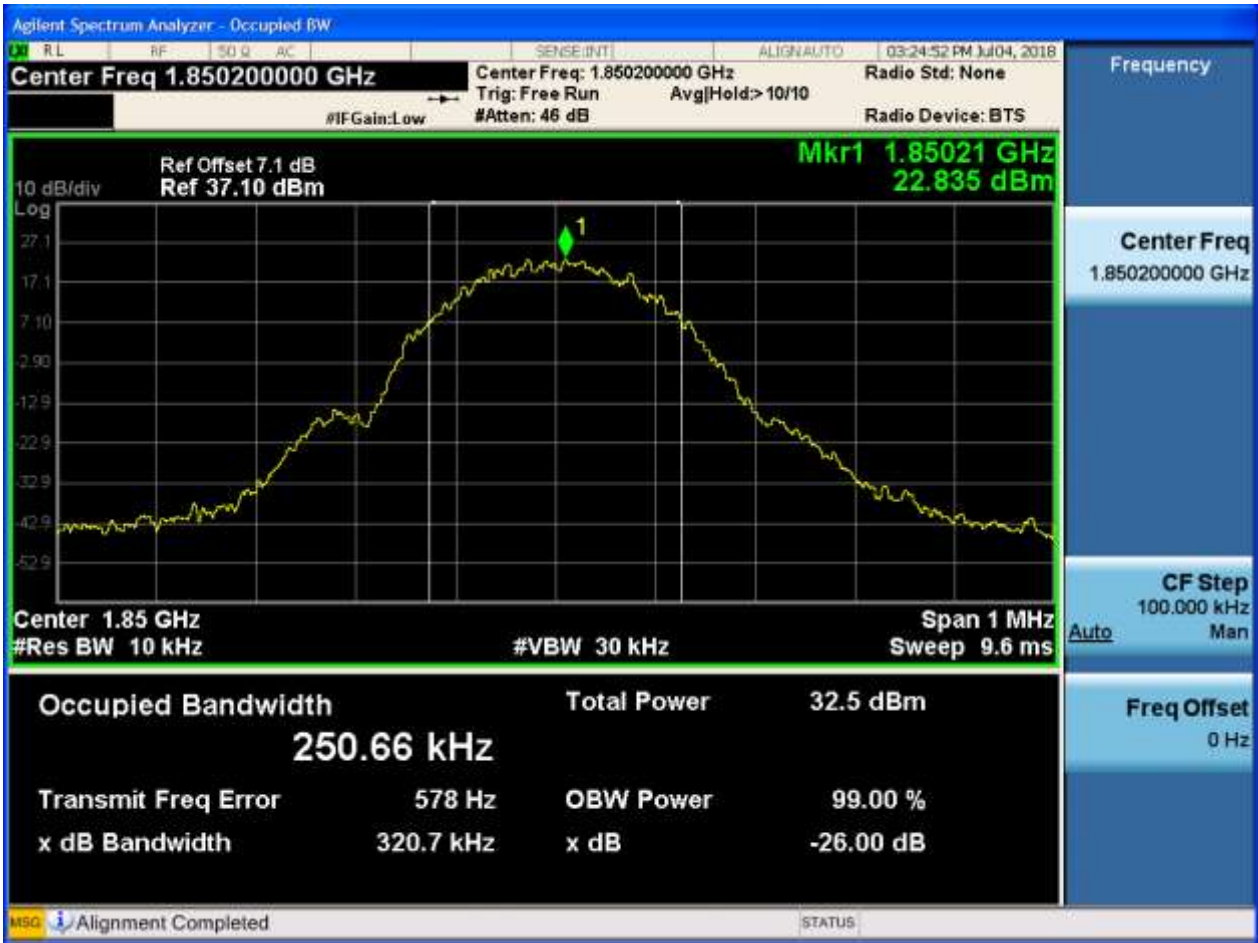
4.1.2.1.3 Test Channel = HCH





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

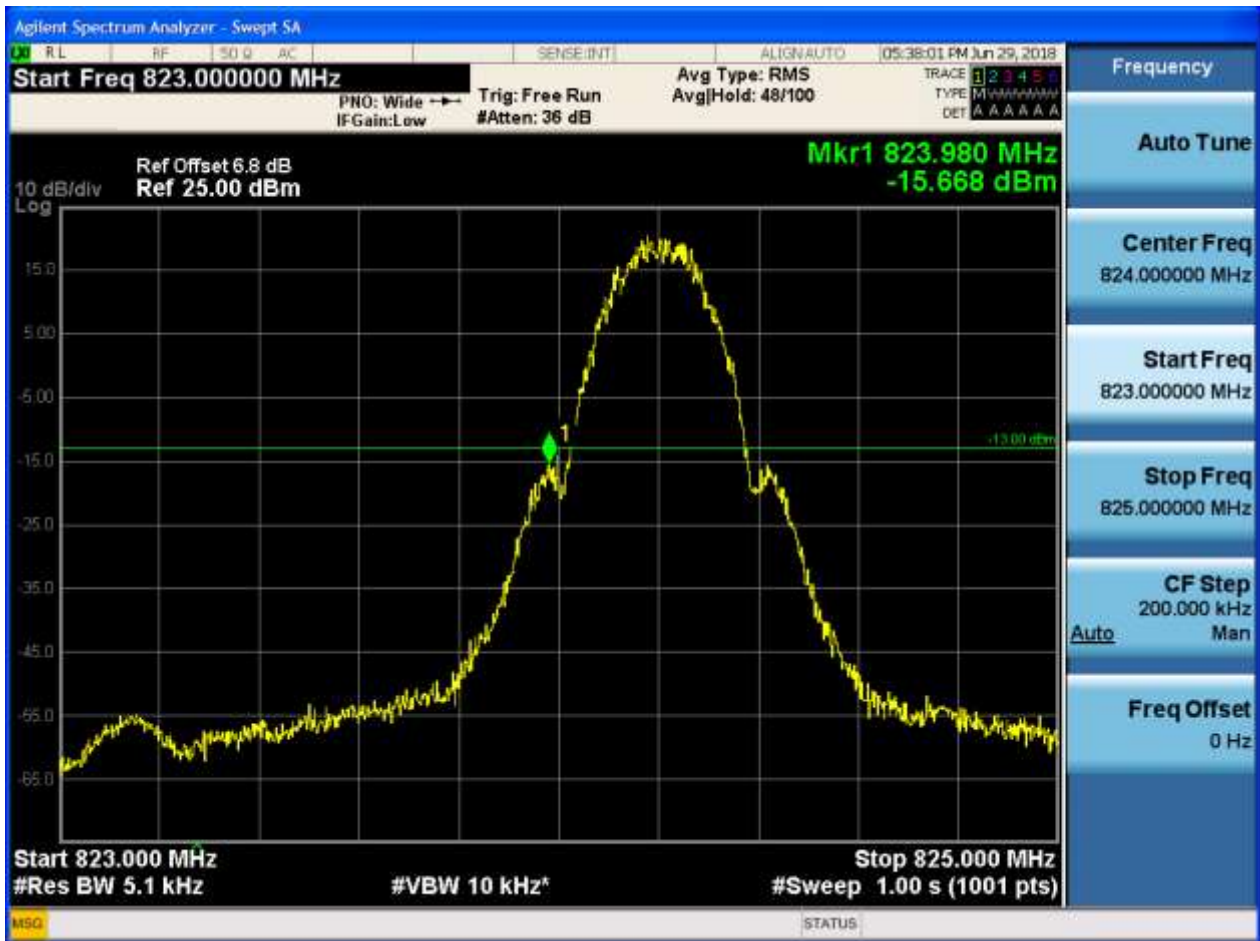
Part I - Test Plots

5.1 For GSM

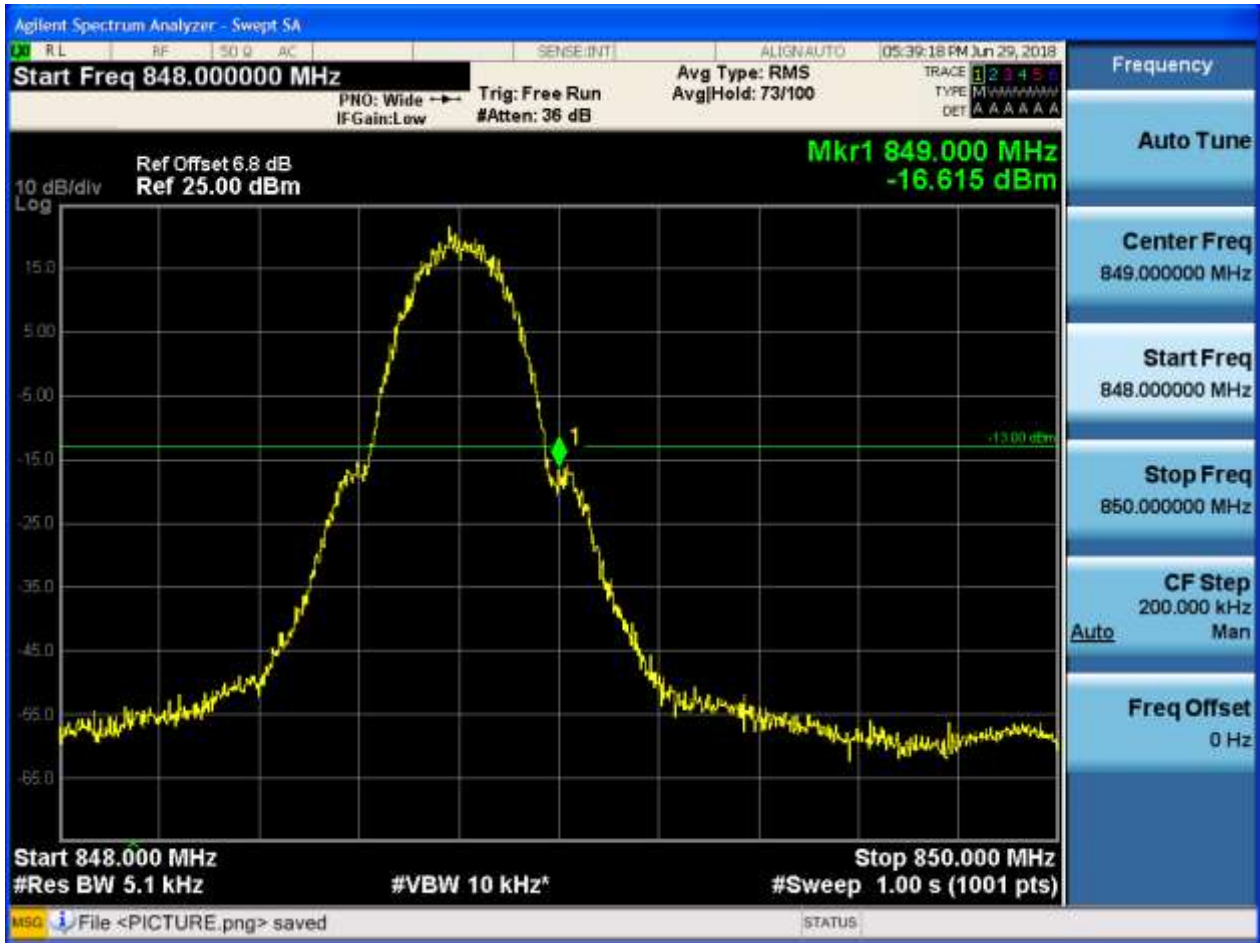
5.1.1 Test Band = GSM850

5.1.1.1 Test Mode = GSM/TM1

5.1.1.1.1 Test Channel = LCH

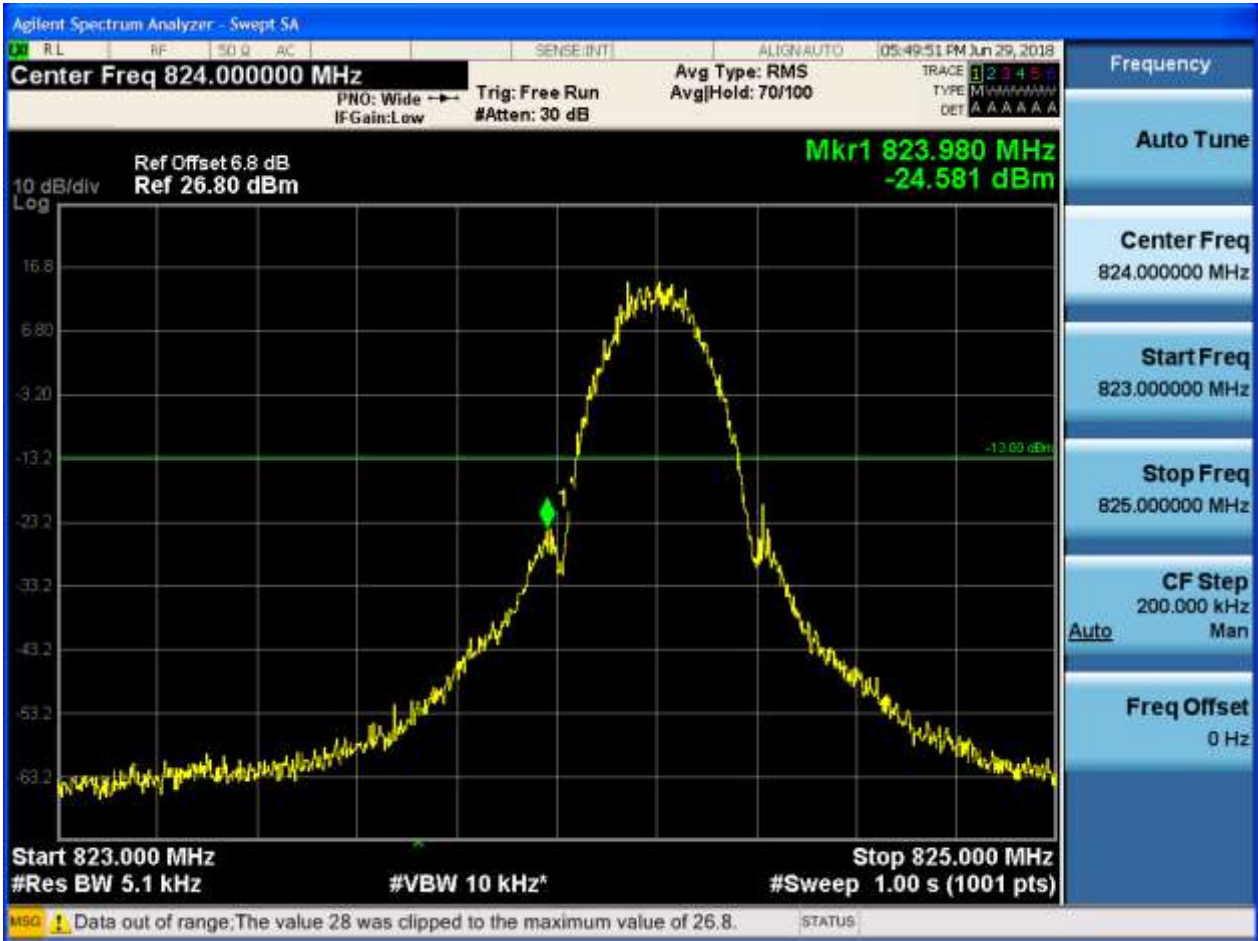


5.1.1.1.2 Test Channel = HCH

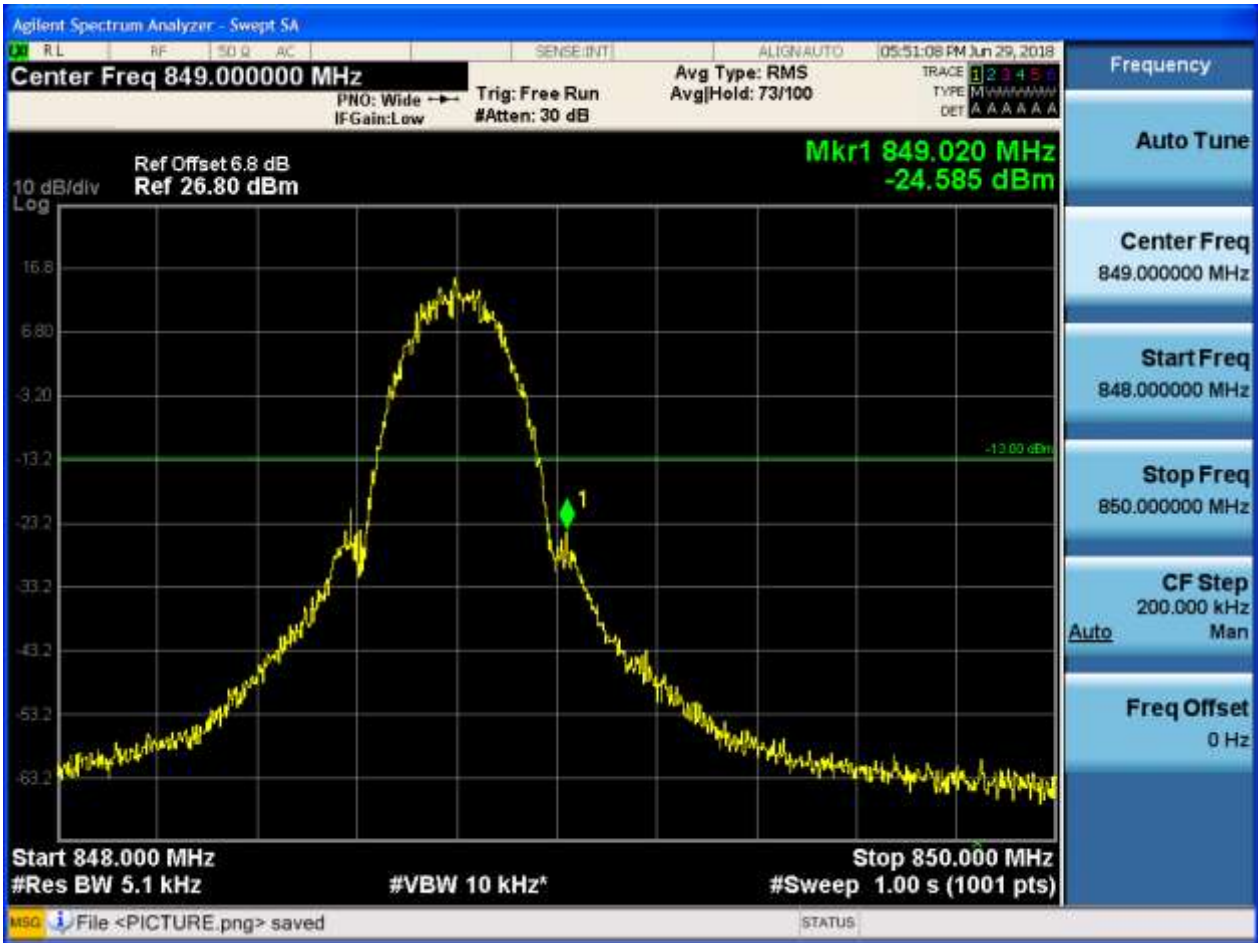


5.1.1.2 Test Mode = GSM/TM2

5.1.1.2.1 Test Channel = LCH



5.1.1.2.2 Test Channel = HCH

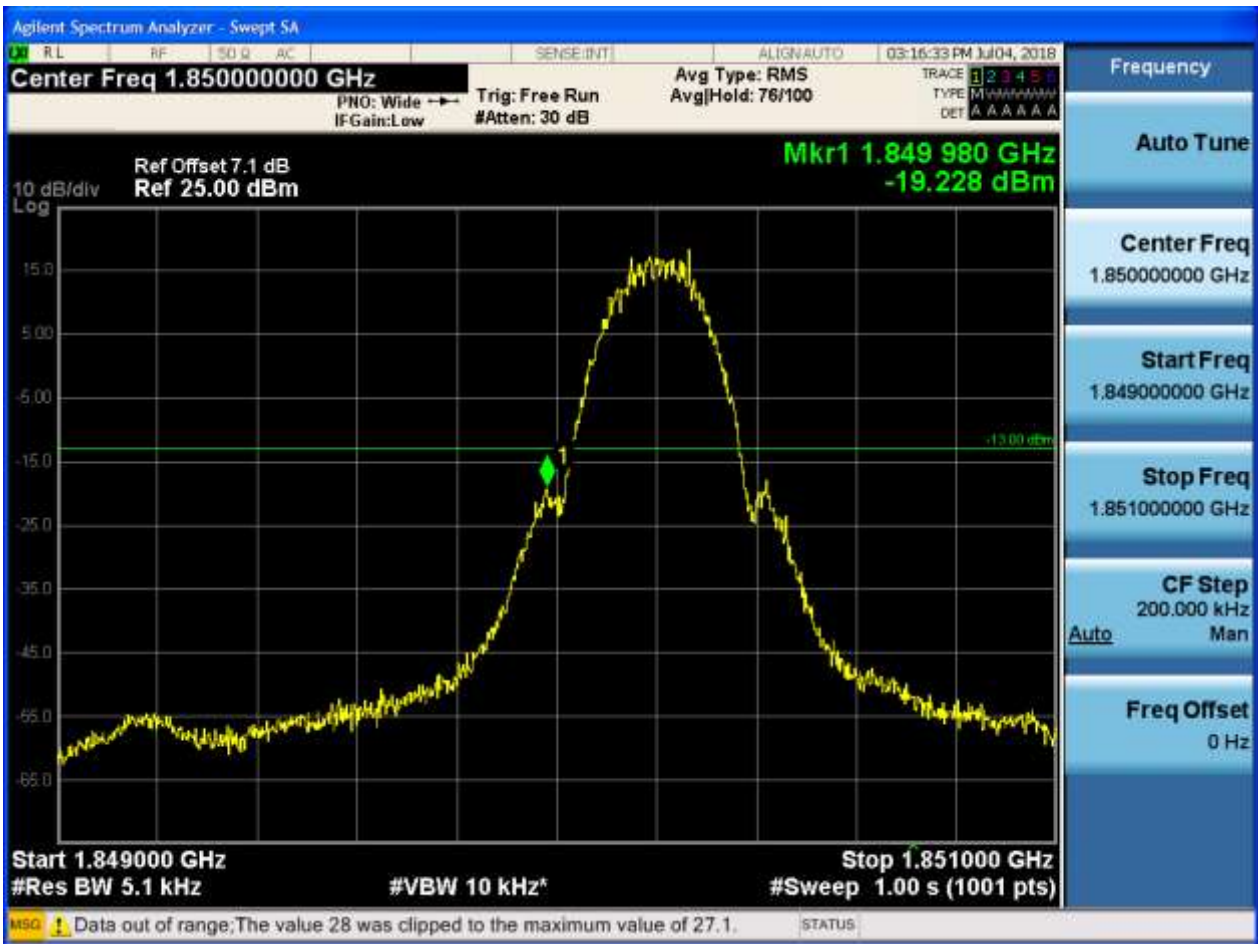




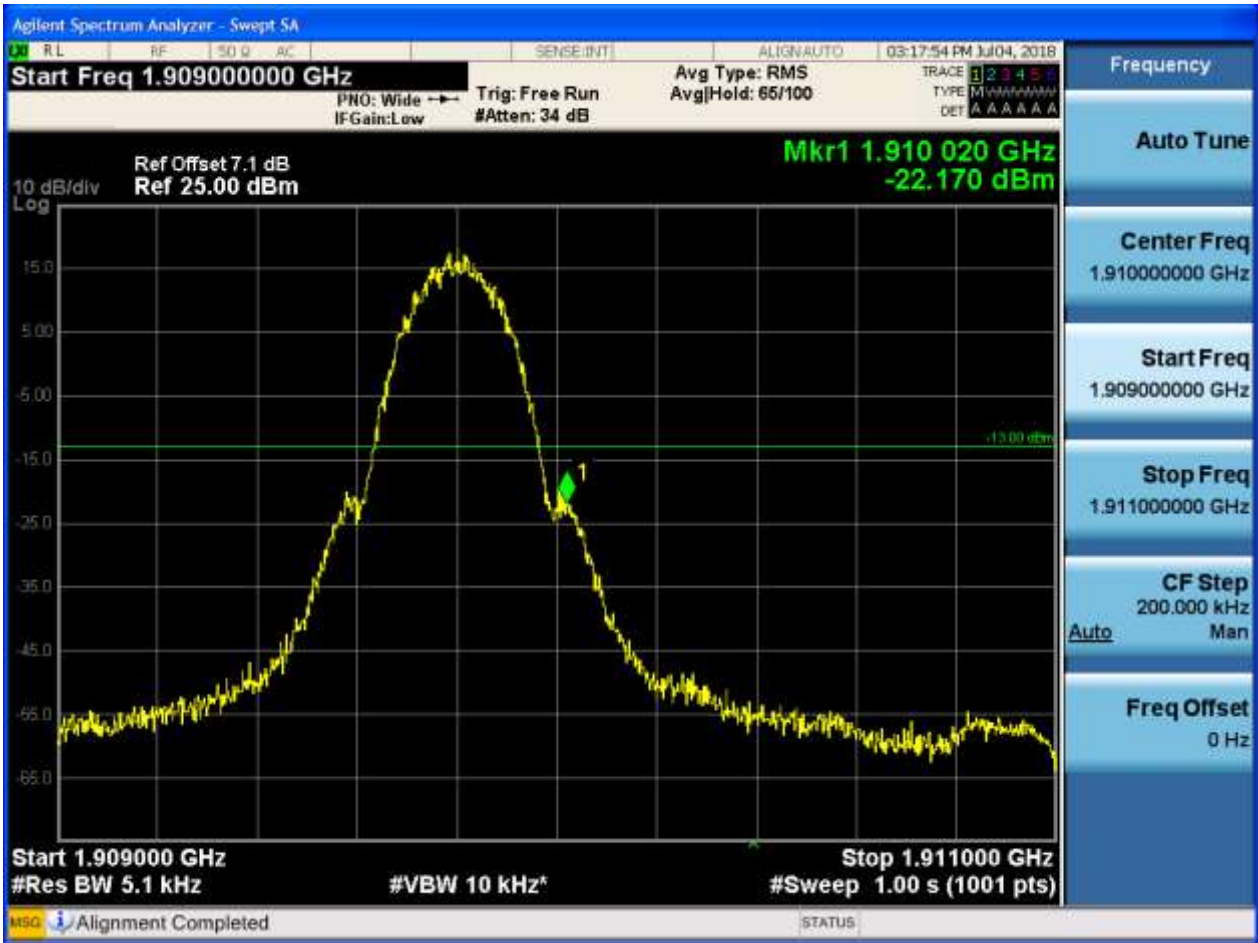
5.1.2 Test Band = GSM1900

5.1.2.1 Test Mode = GSM/TM1

5.1.2.1.1 Test Channel = LCH

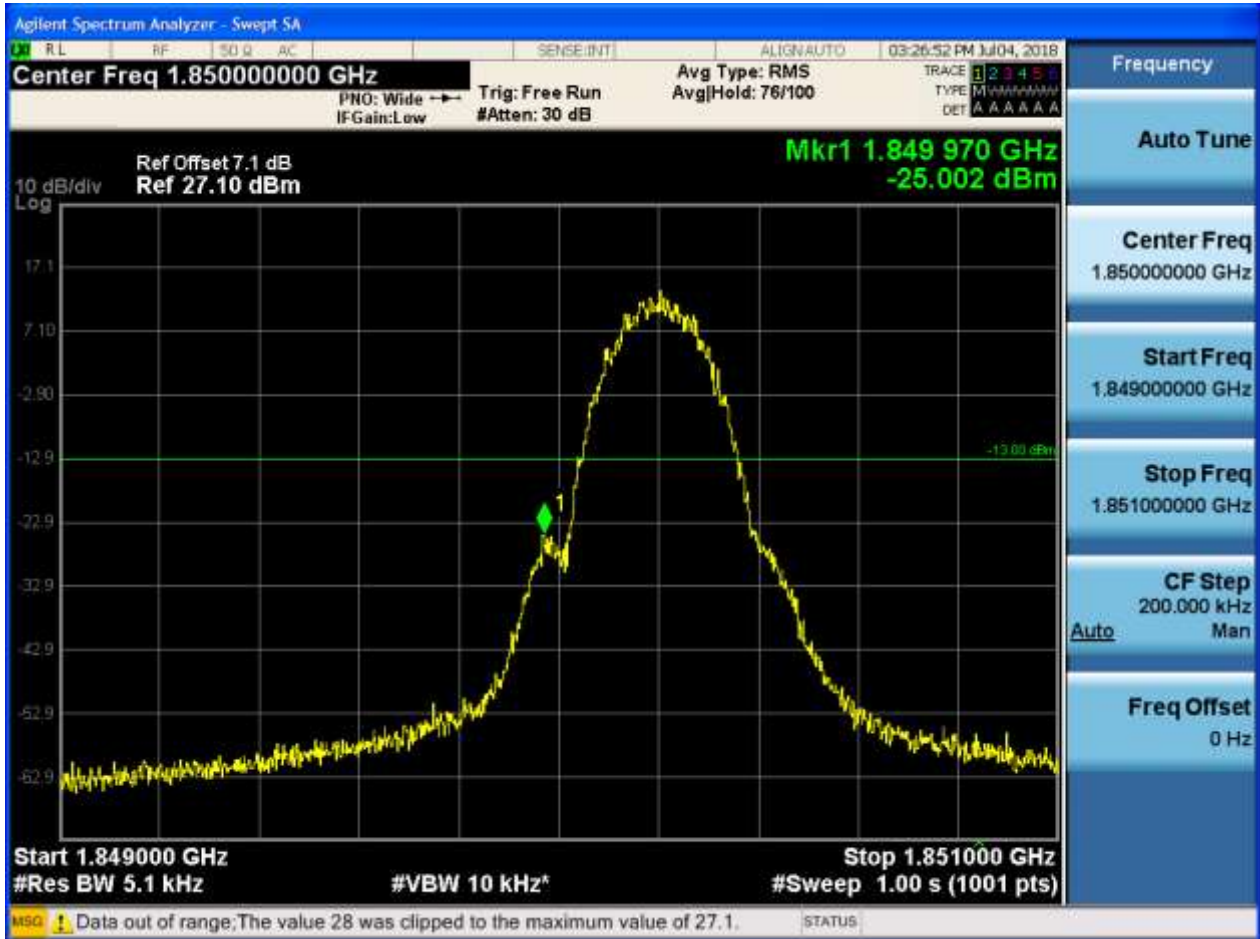


5.1.2.1.2 Test Channel = HCH

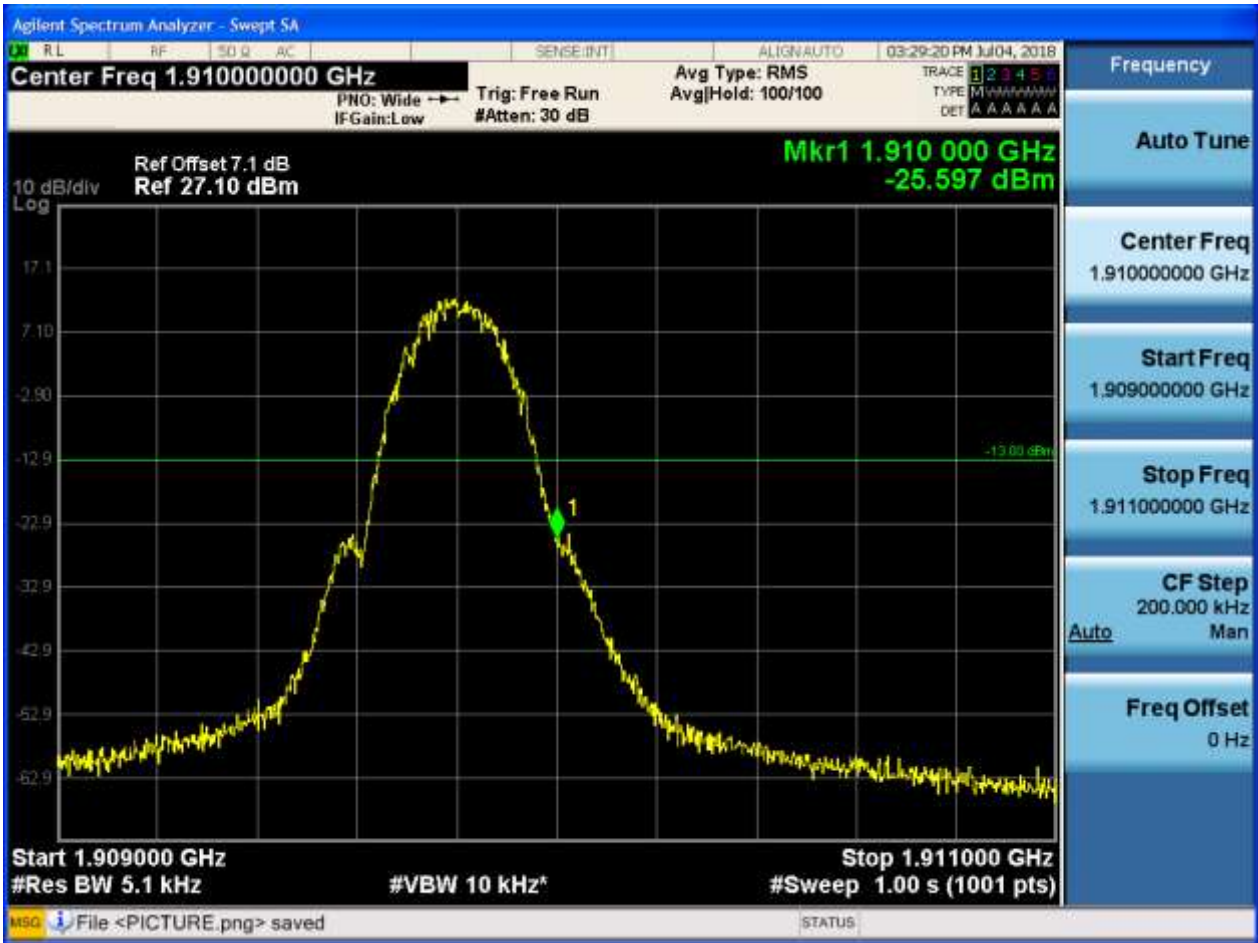


5.1.2.2 Test Mode = GSM/TM2

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

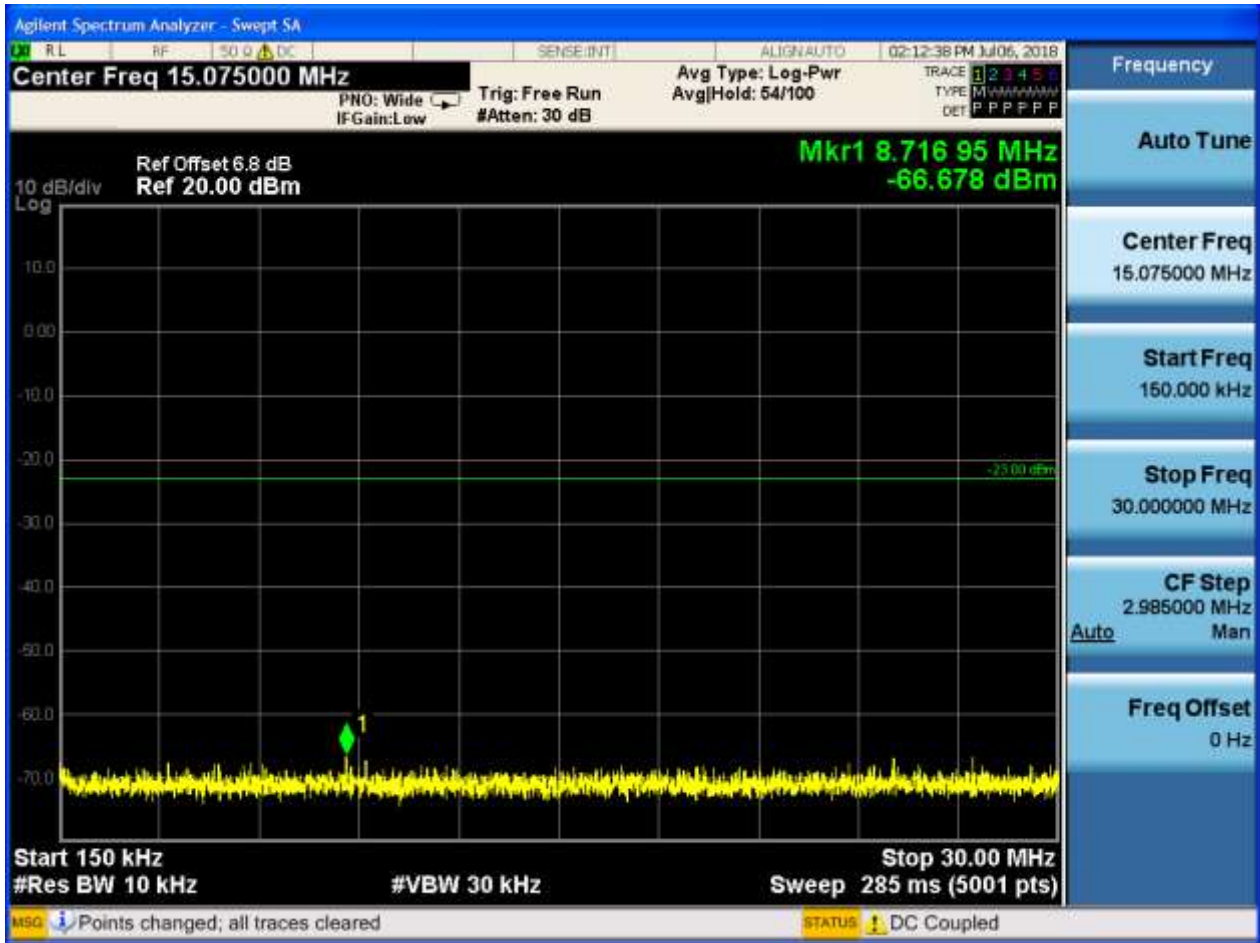
6.1 For GSM

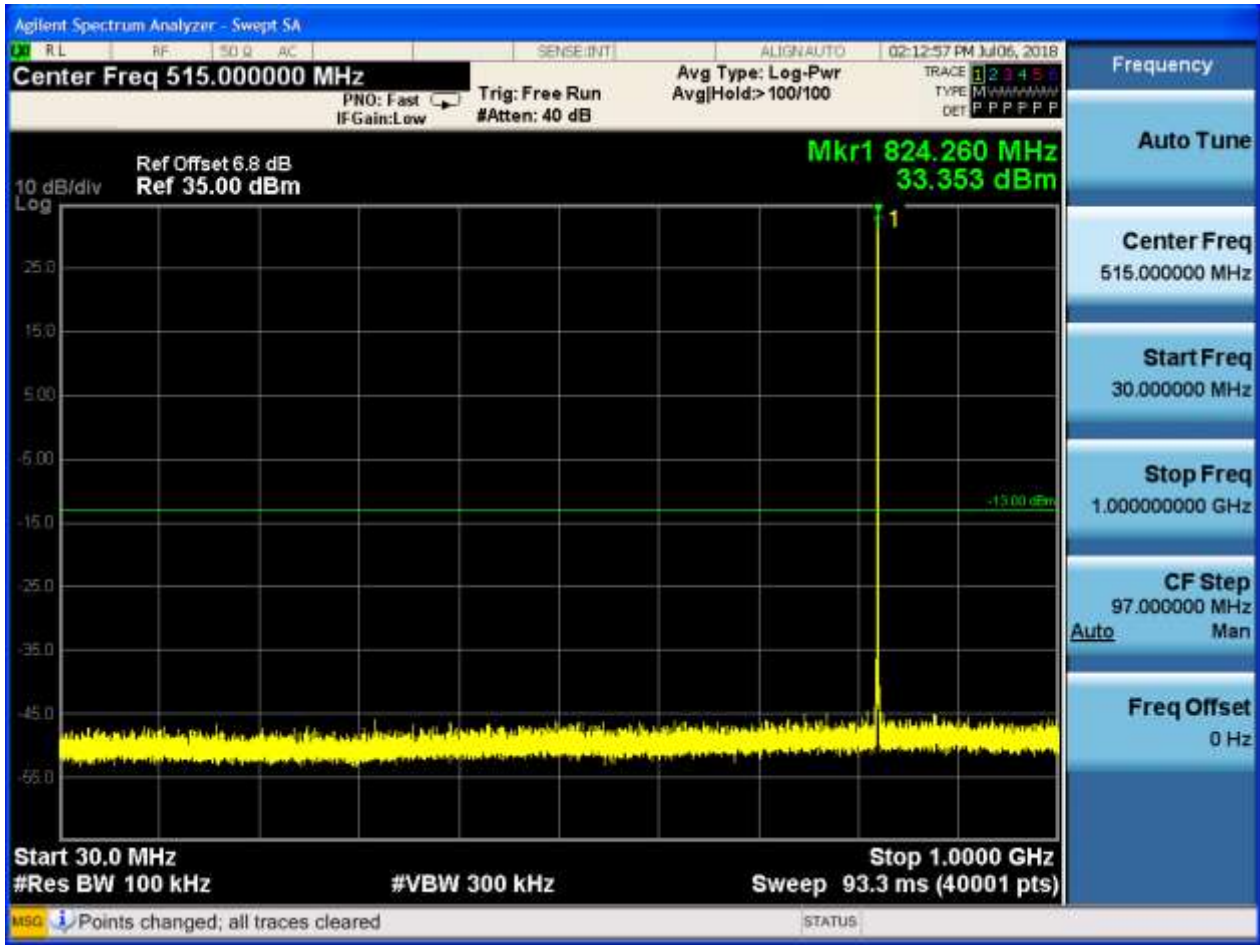
6.1.1 Test Band = GSM850

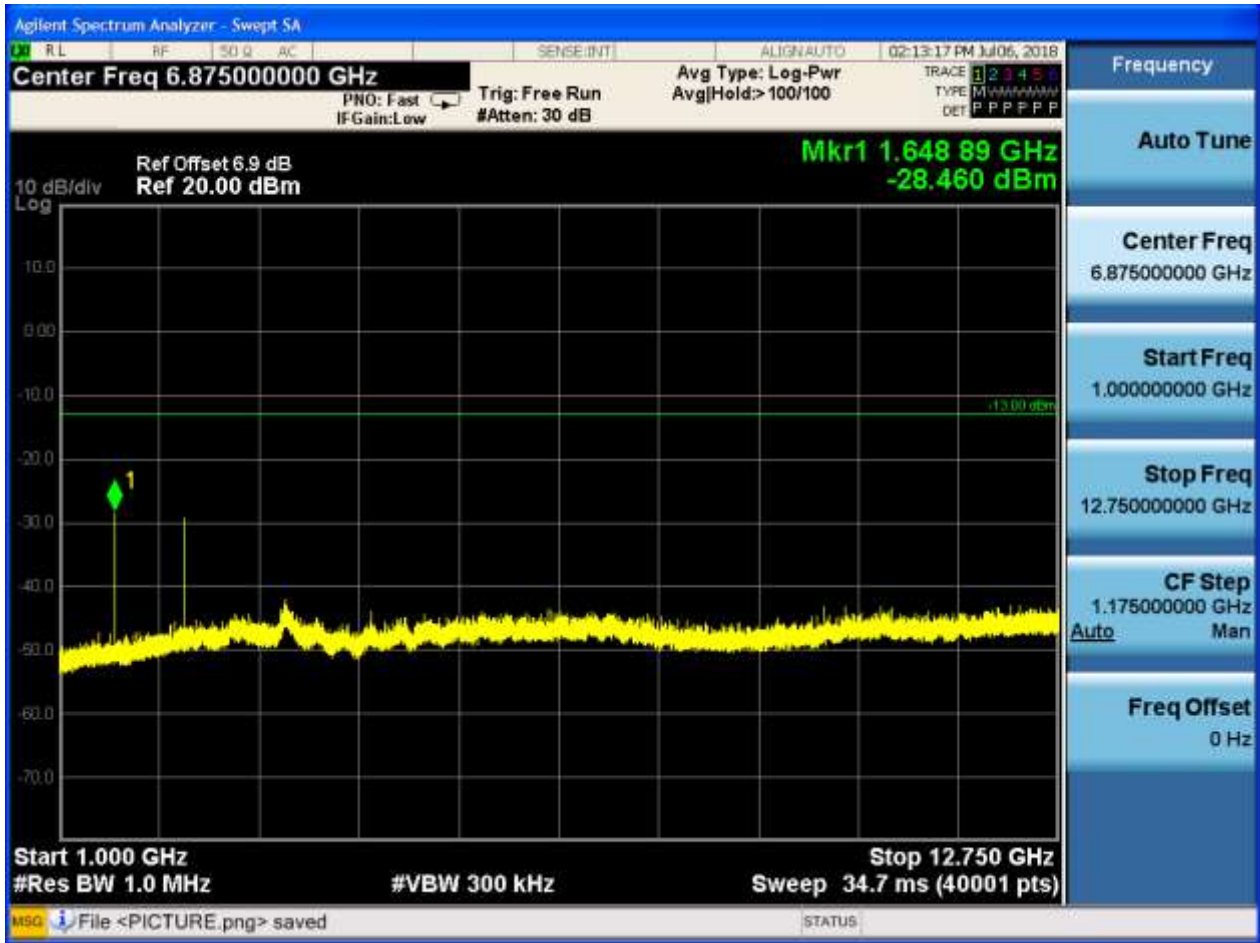
6.1.1.1 Test Mode = GSM/TM1

6.1.1.1.1 Test Channel = LCH



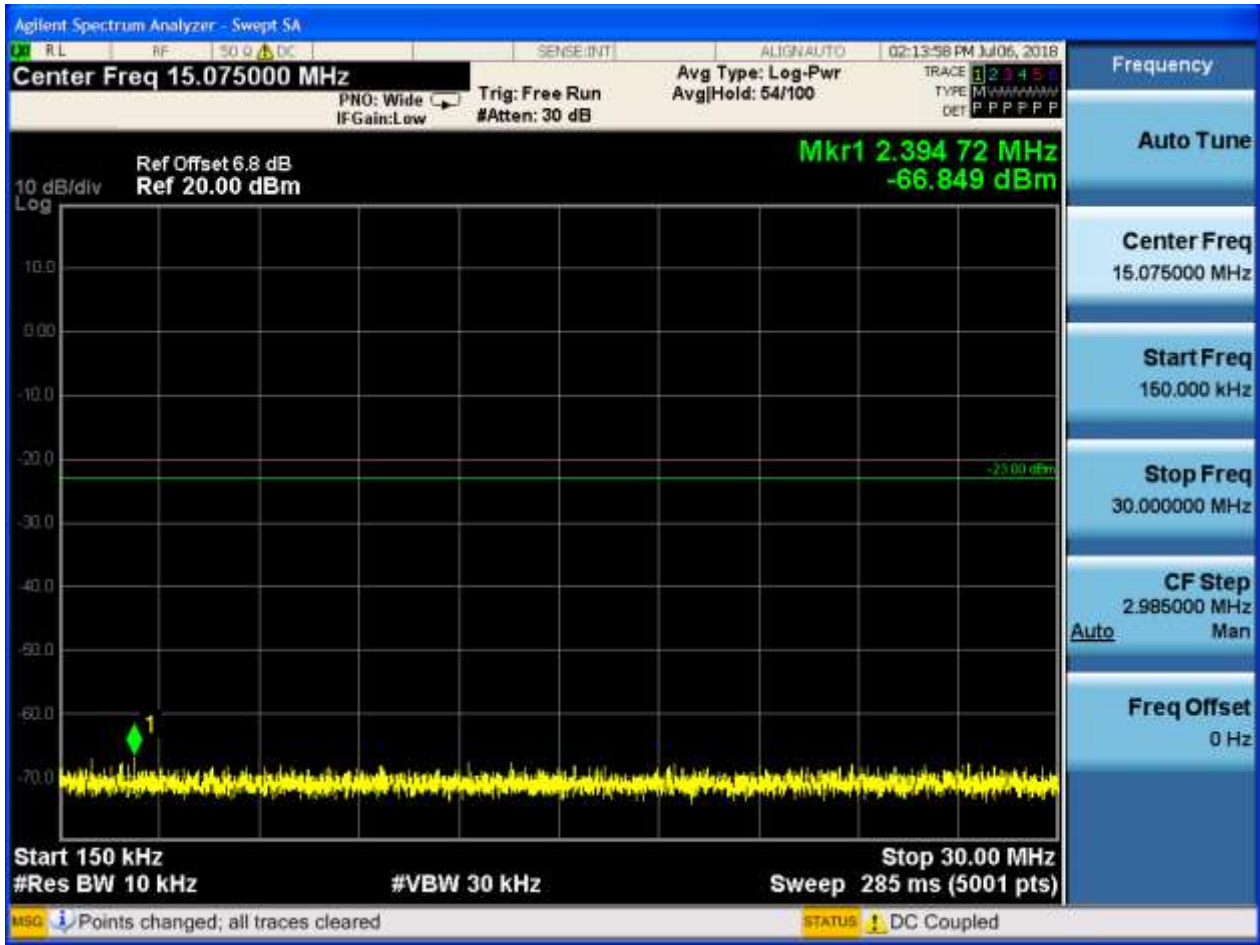


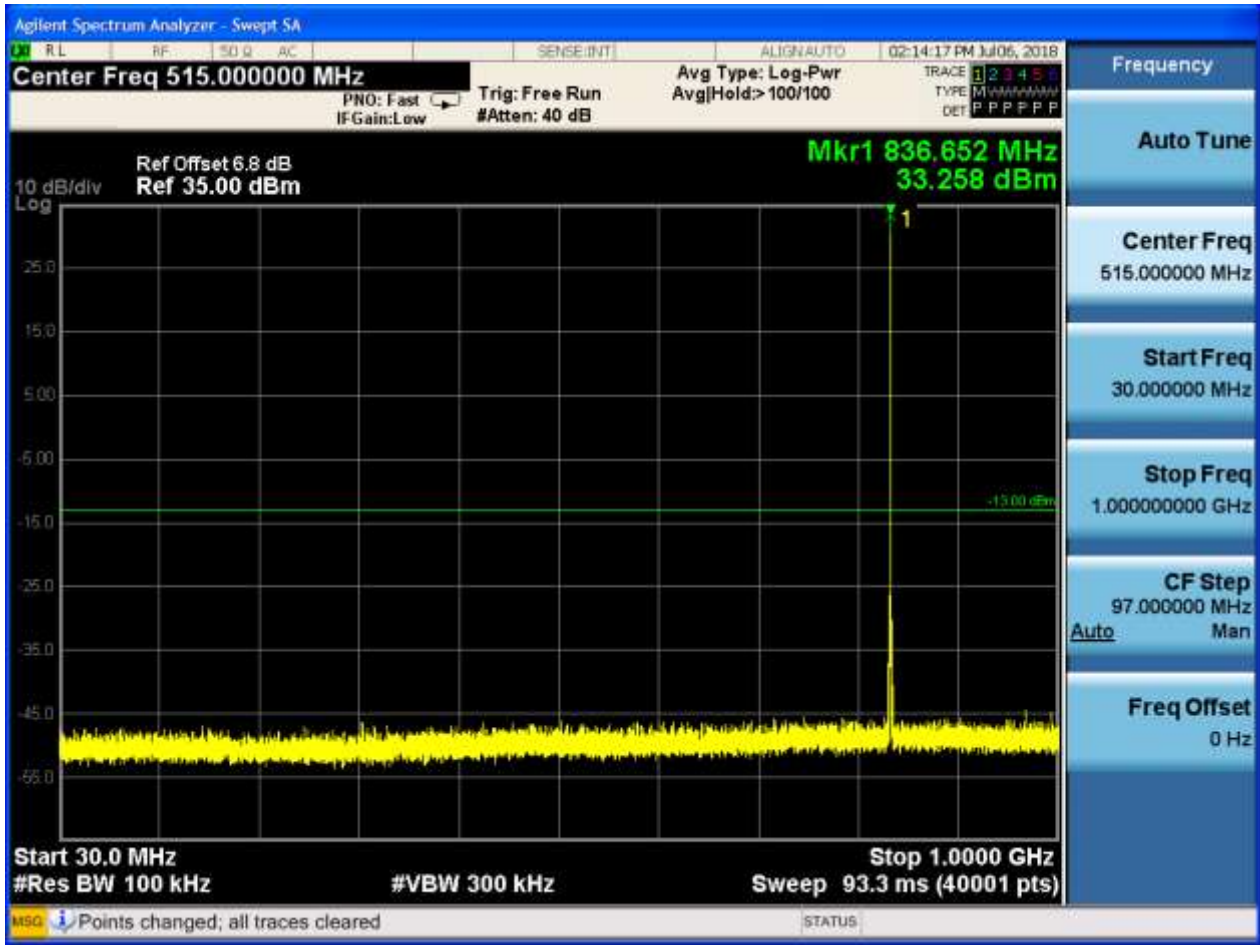




6.1.1.1.2 Test Channel = MCH



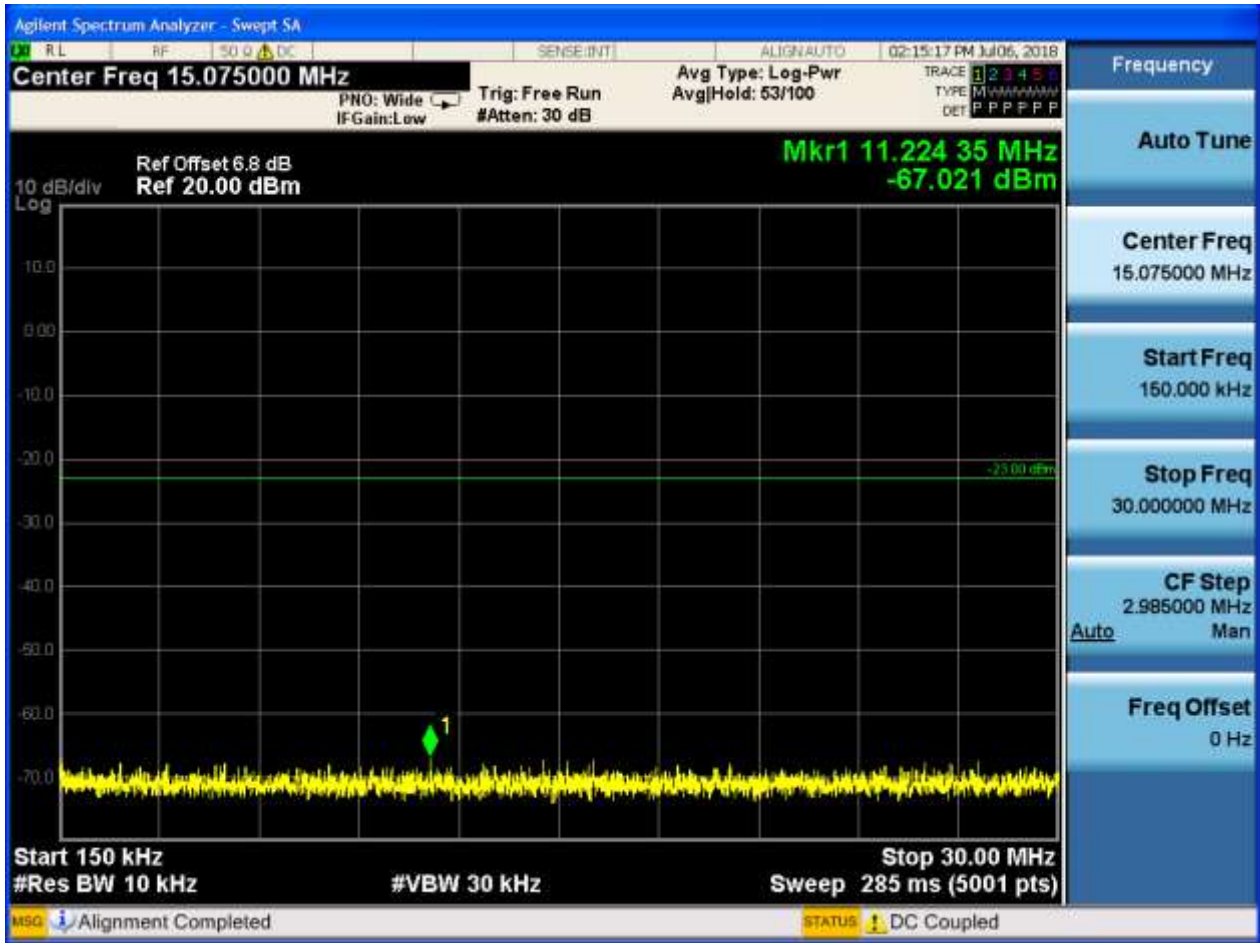


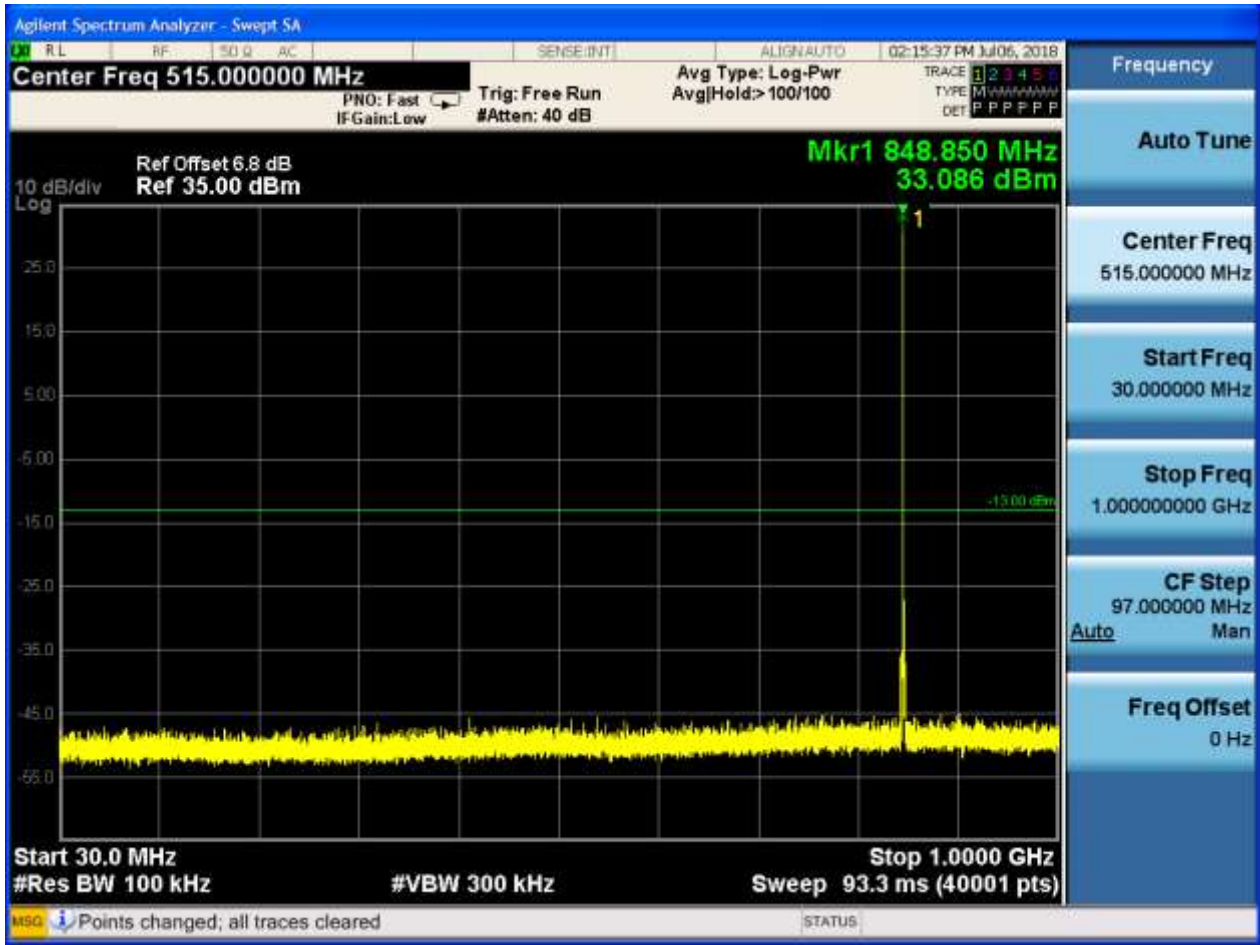


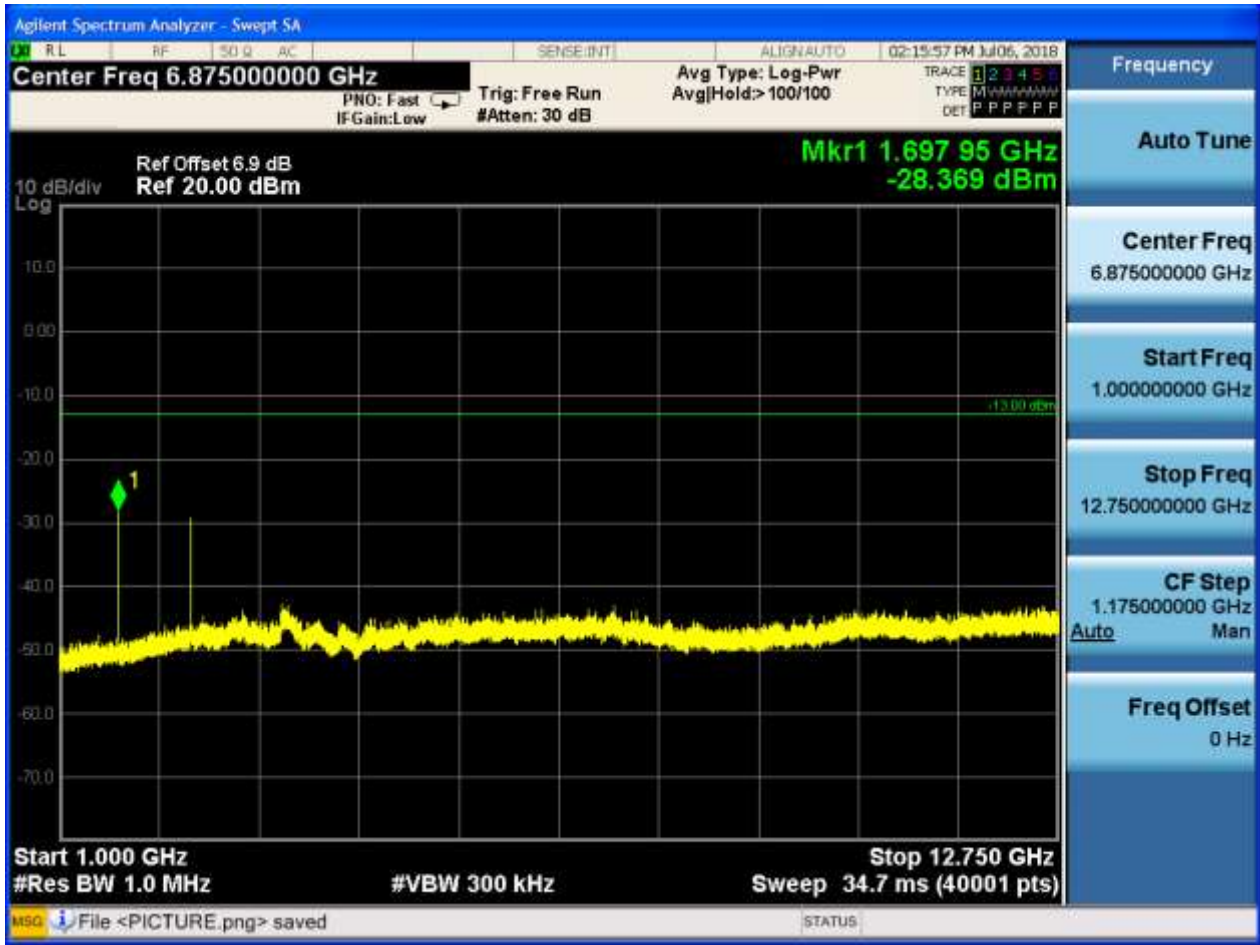


6.1.1.1.3 Test Channel = HCH





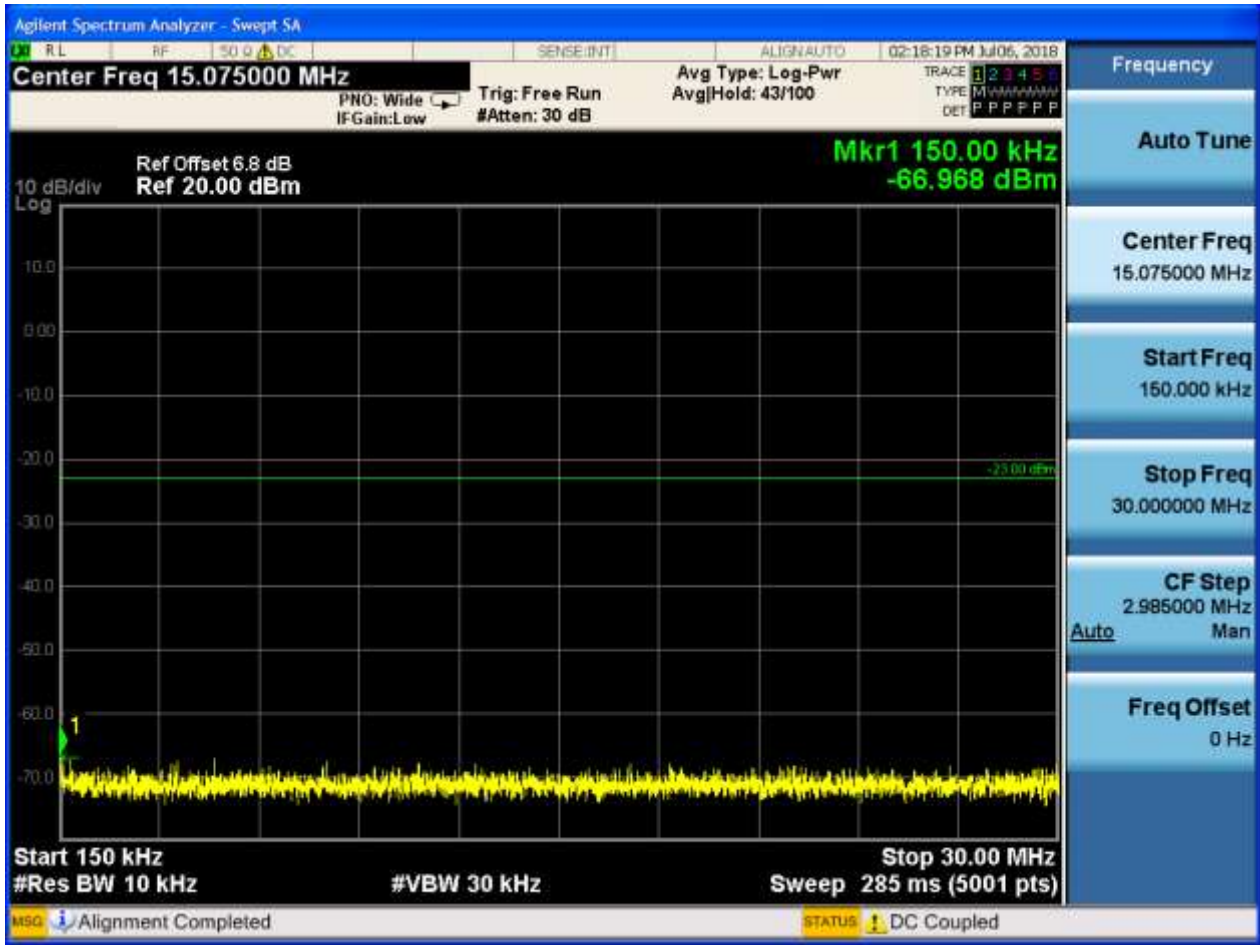


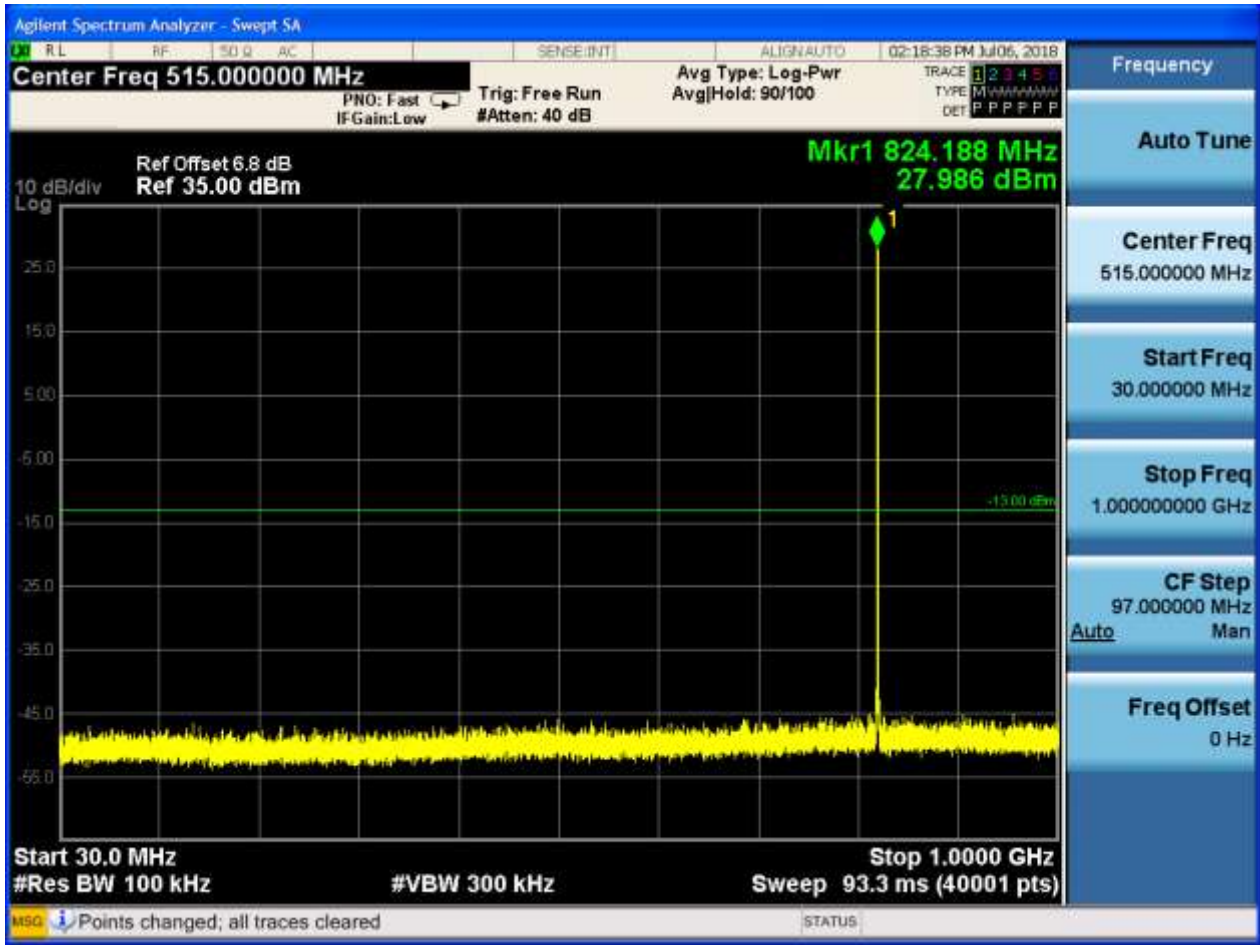


6.1.1.2 Test Mode = GSM/TM2

6.1.1.2.1 Test Channel = LCH

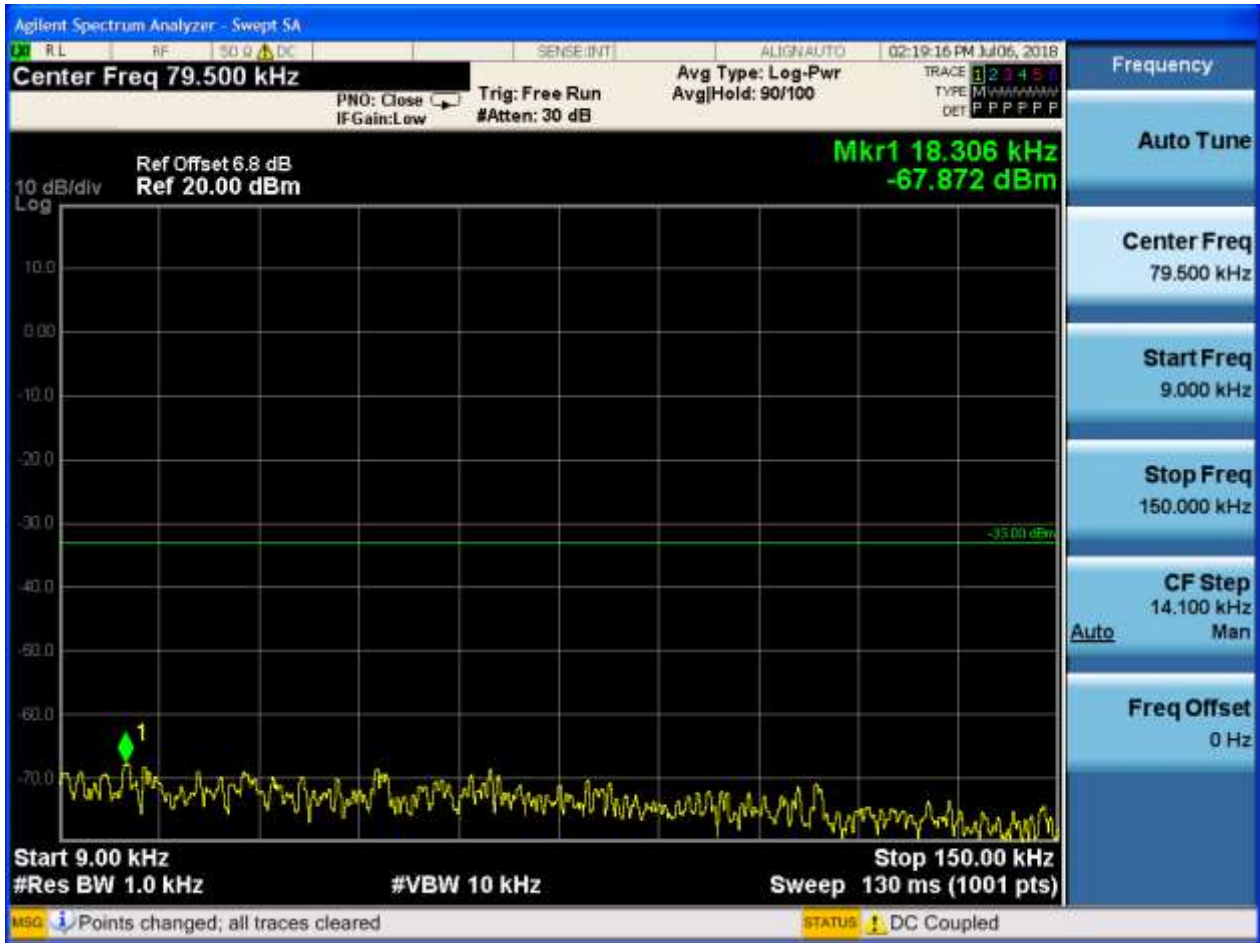


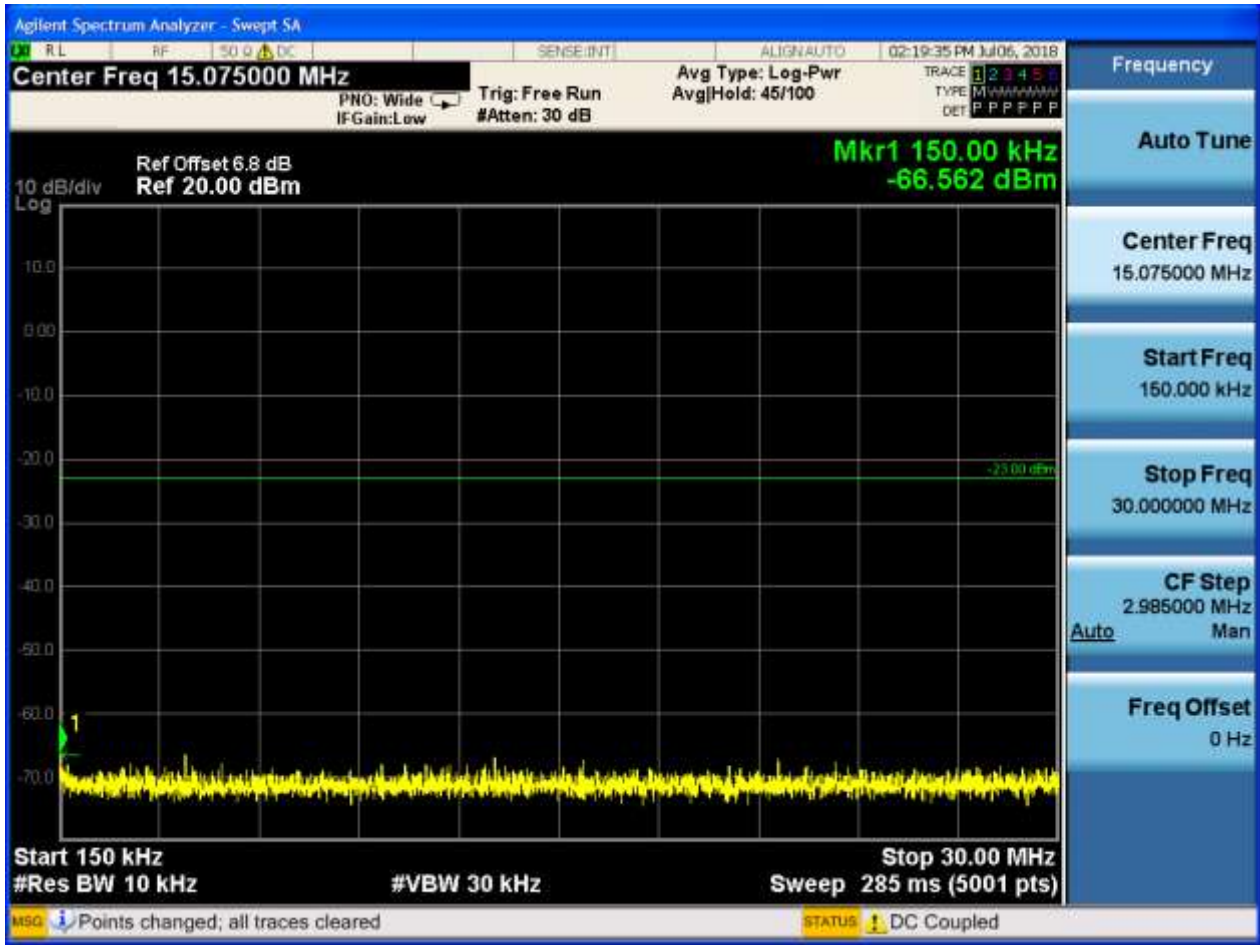


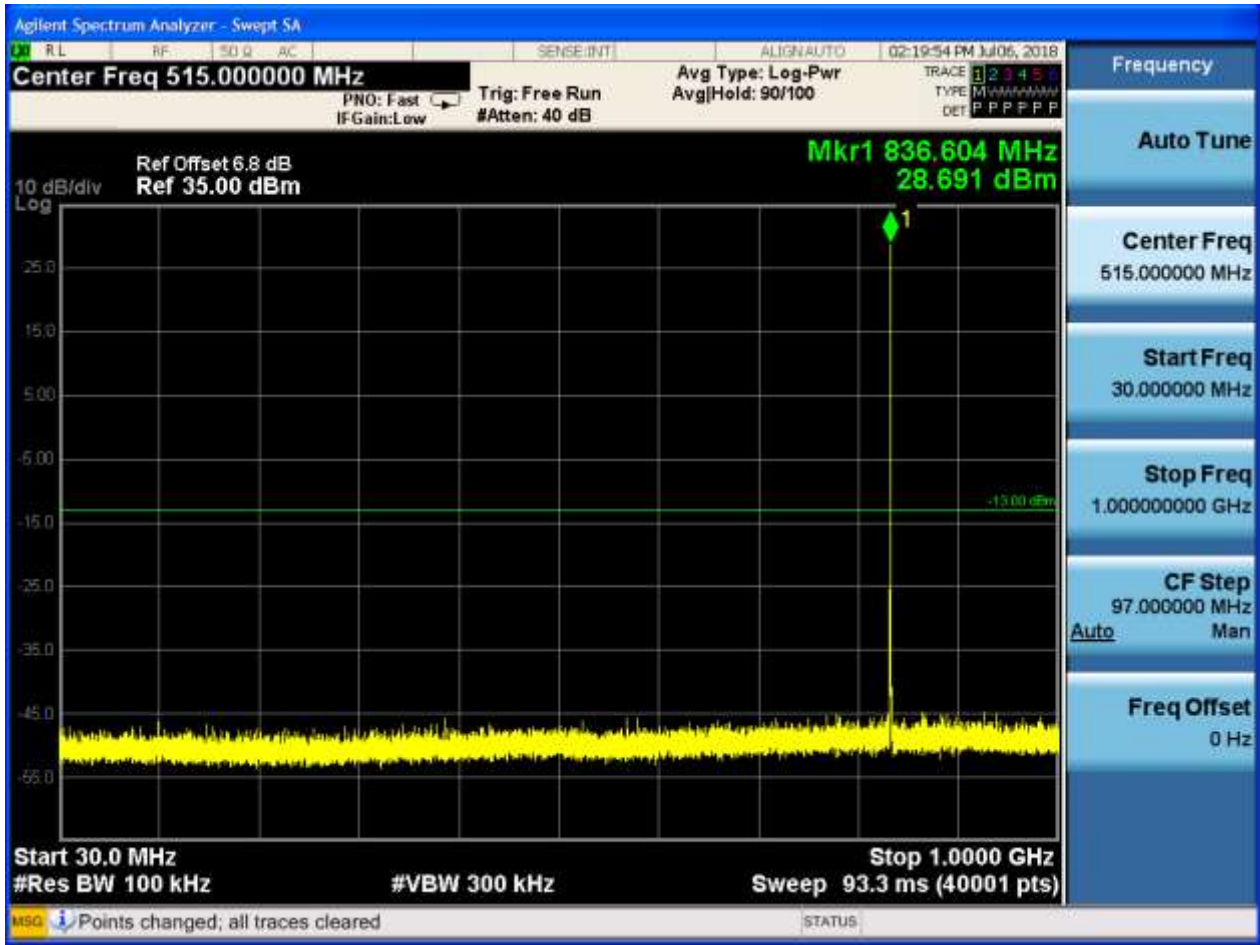


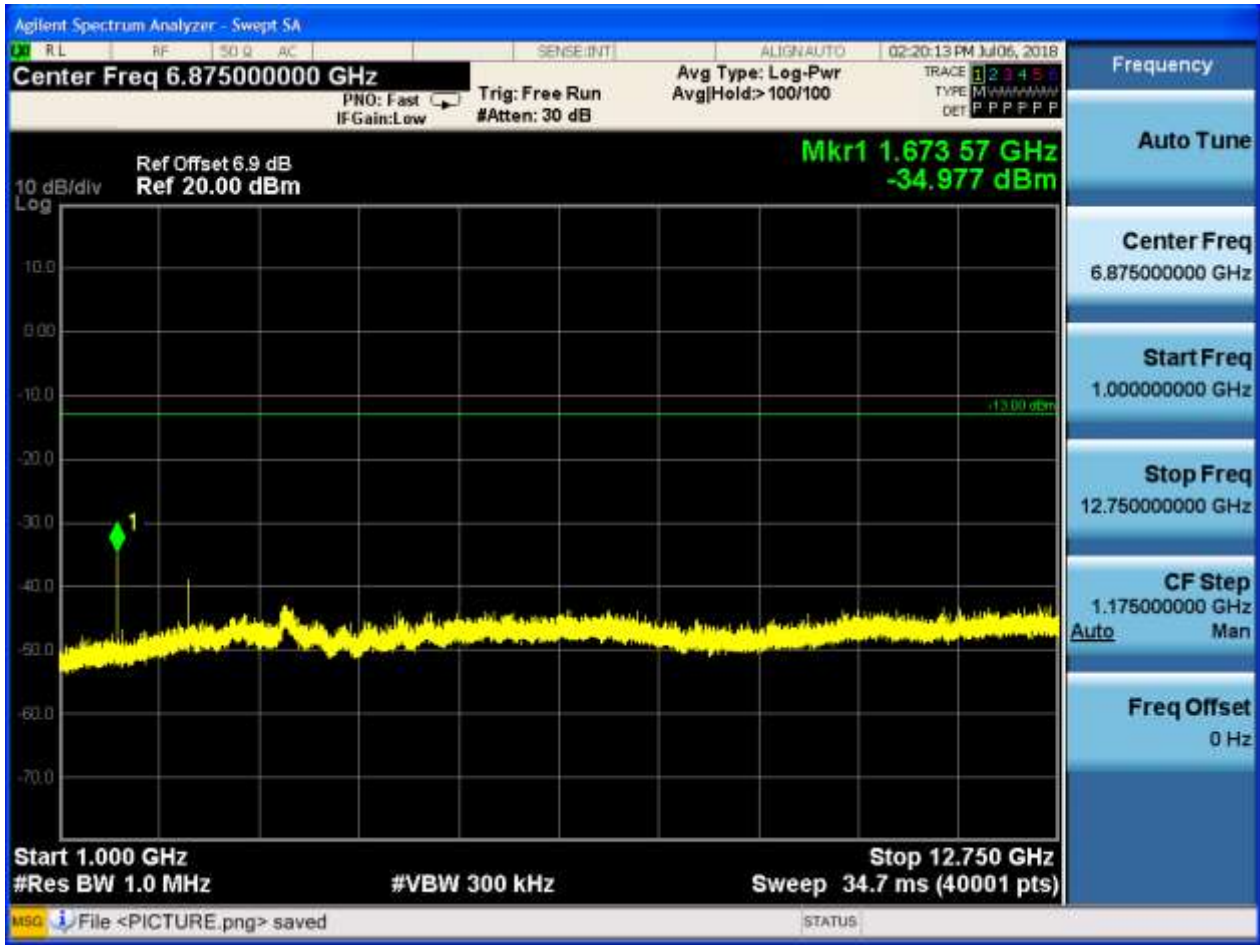


6.1.1.2.2 Test Channel = MCH



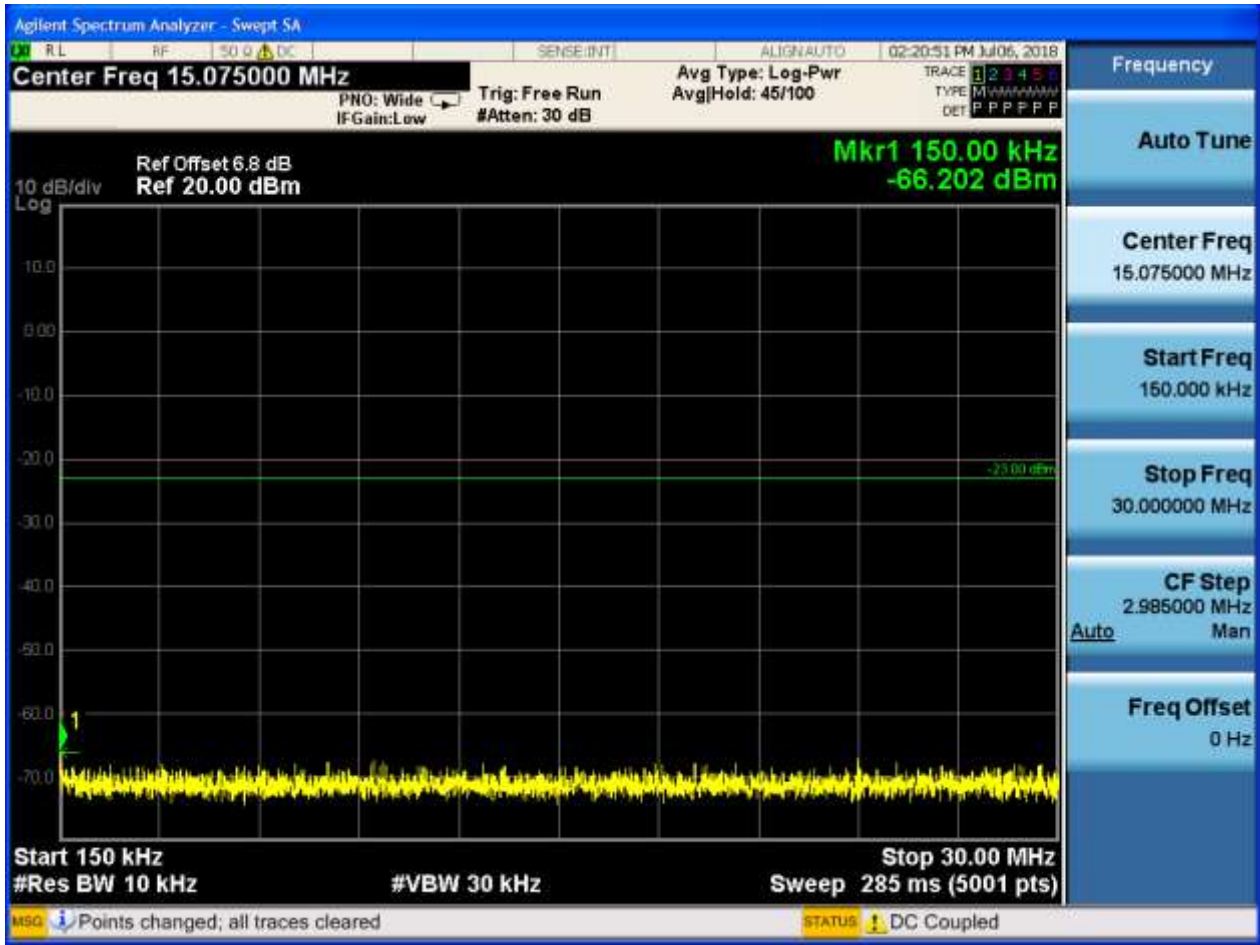


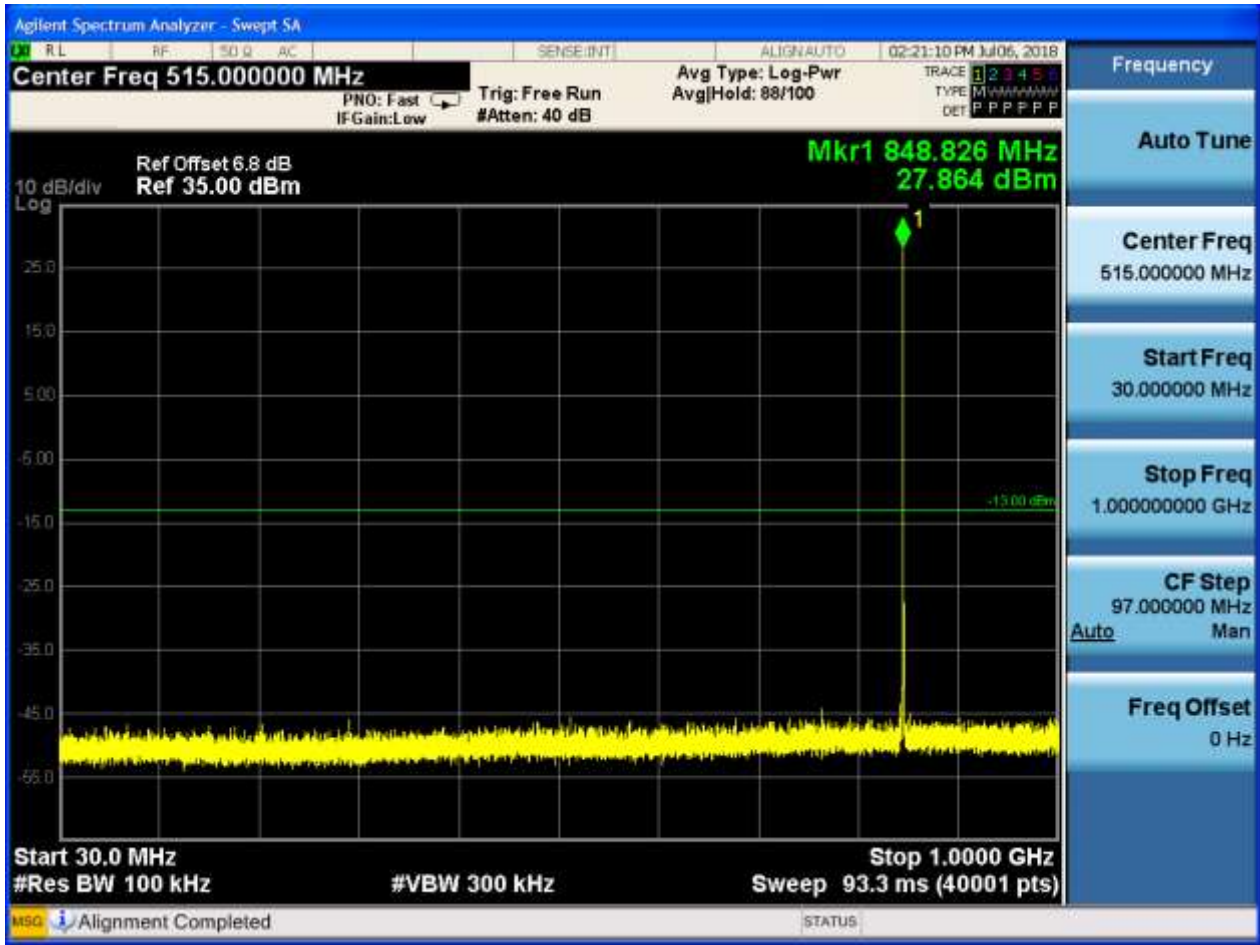




6.1.1.2.3 Test Channel = HCH









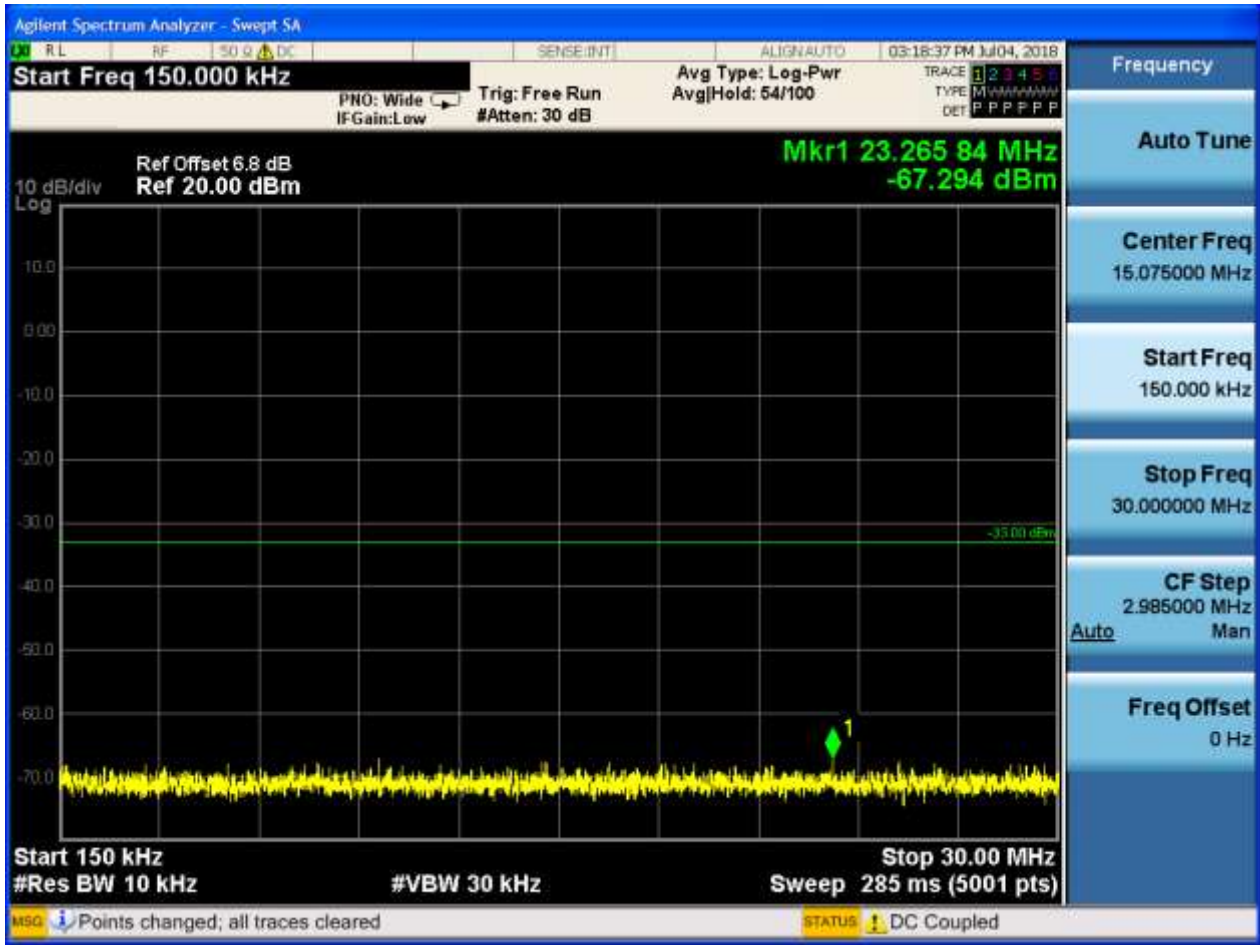


6.1.2 Test Band = GSM1900

6.1.2.1 Test Mode = GSM/TM1

6.1.2.1.1 Test Channel = LCH

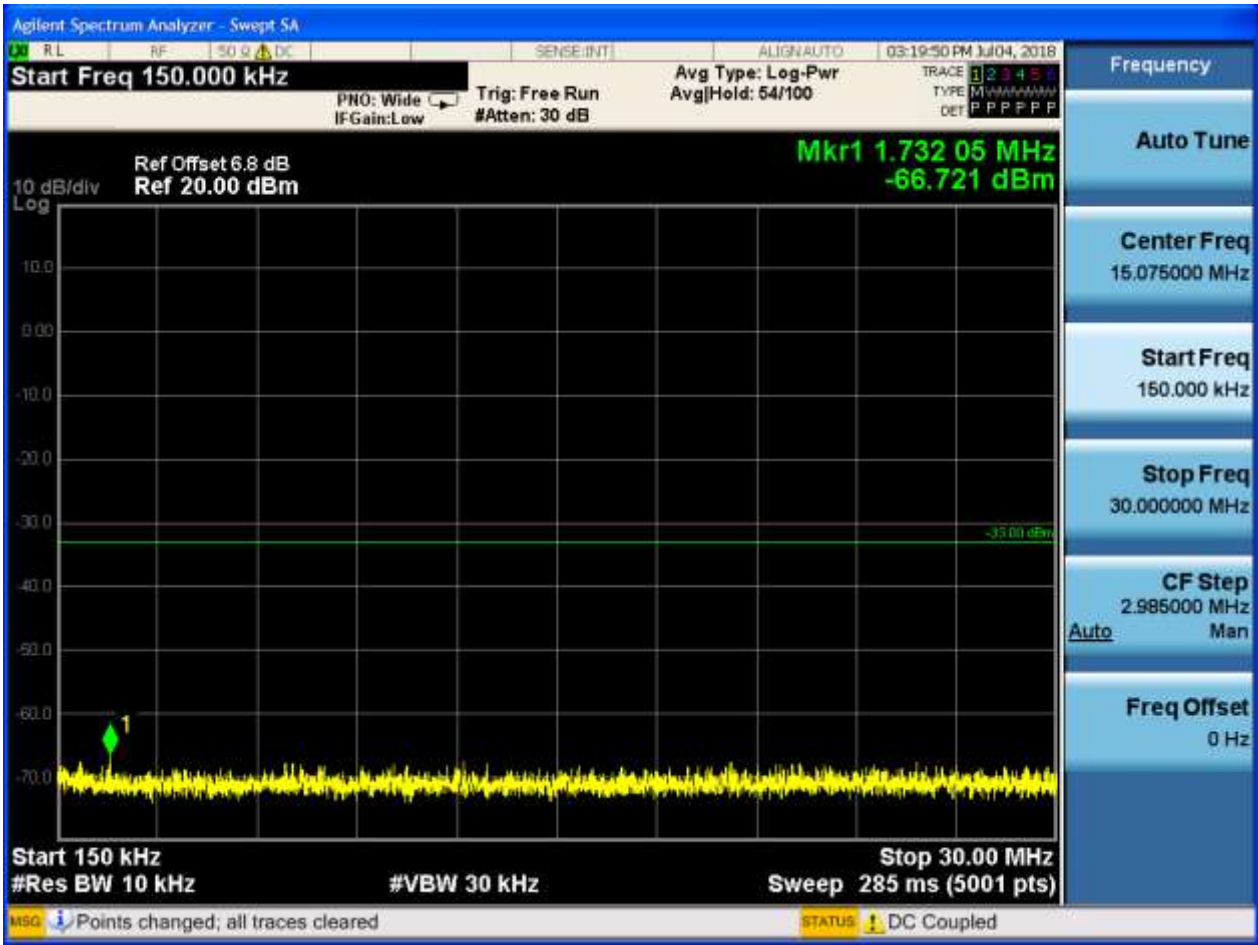






6.1.2.1.2 Test Channel = MCH

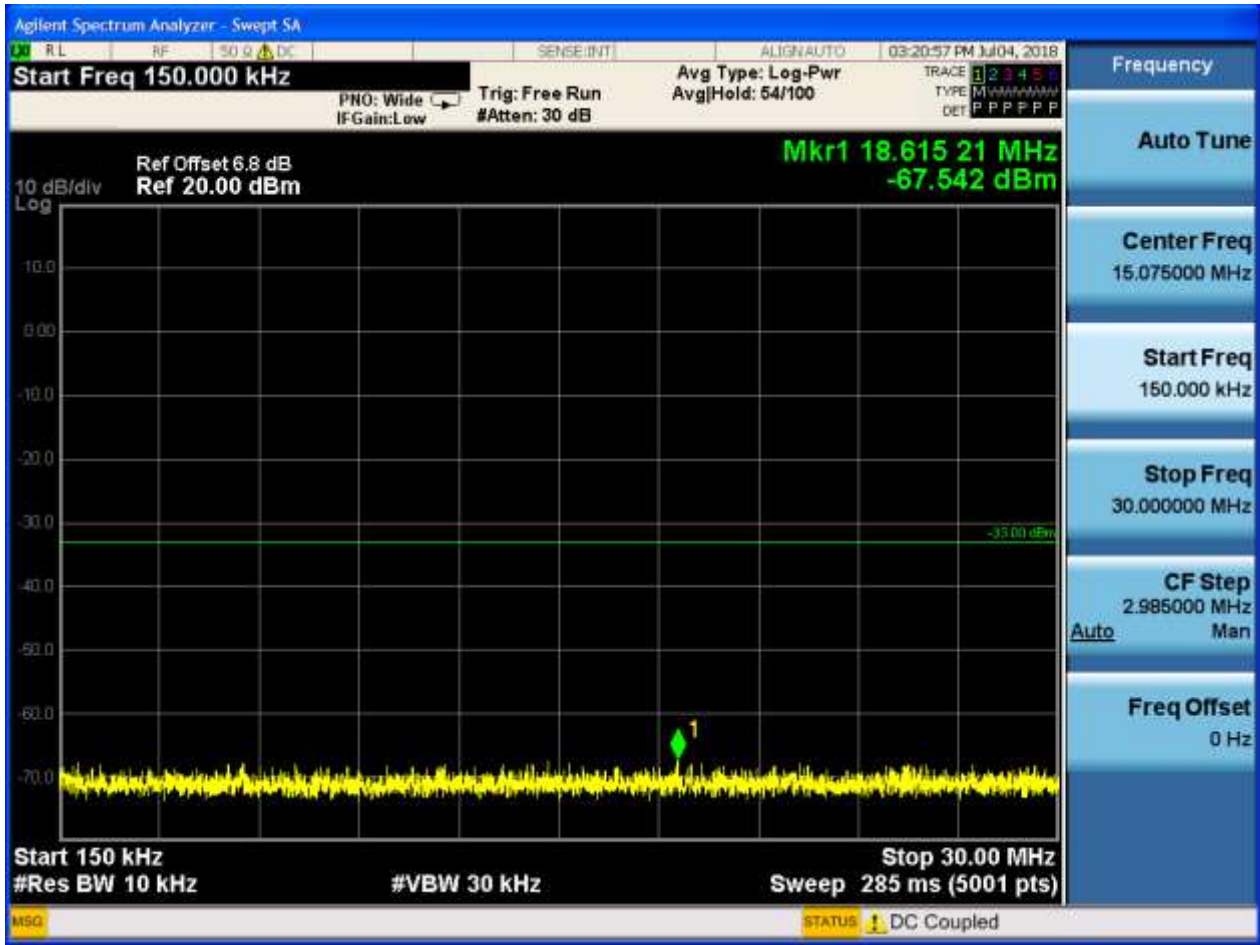






6.1.2.1.3 Test Channel = HCH

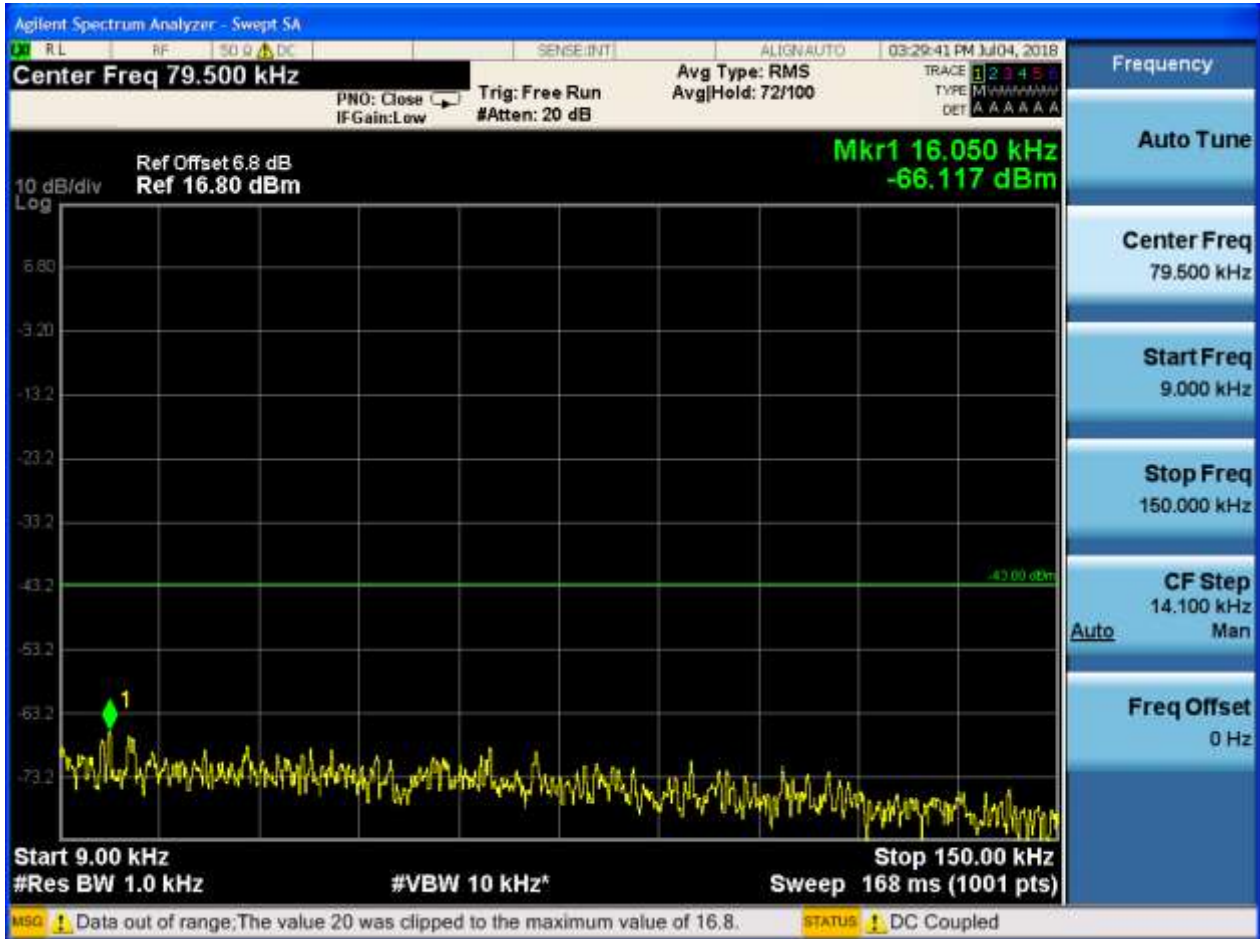


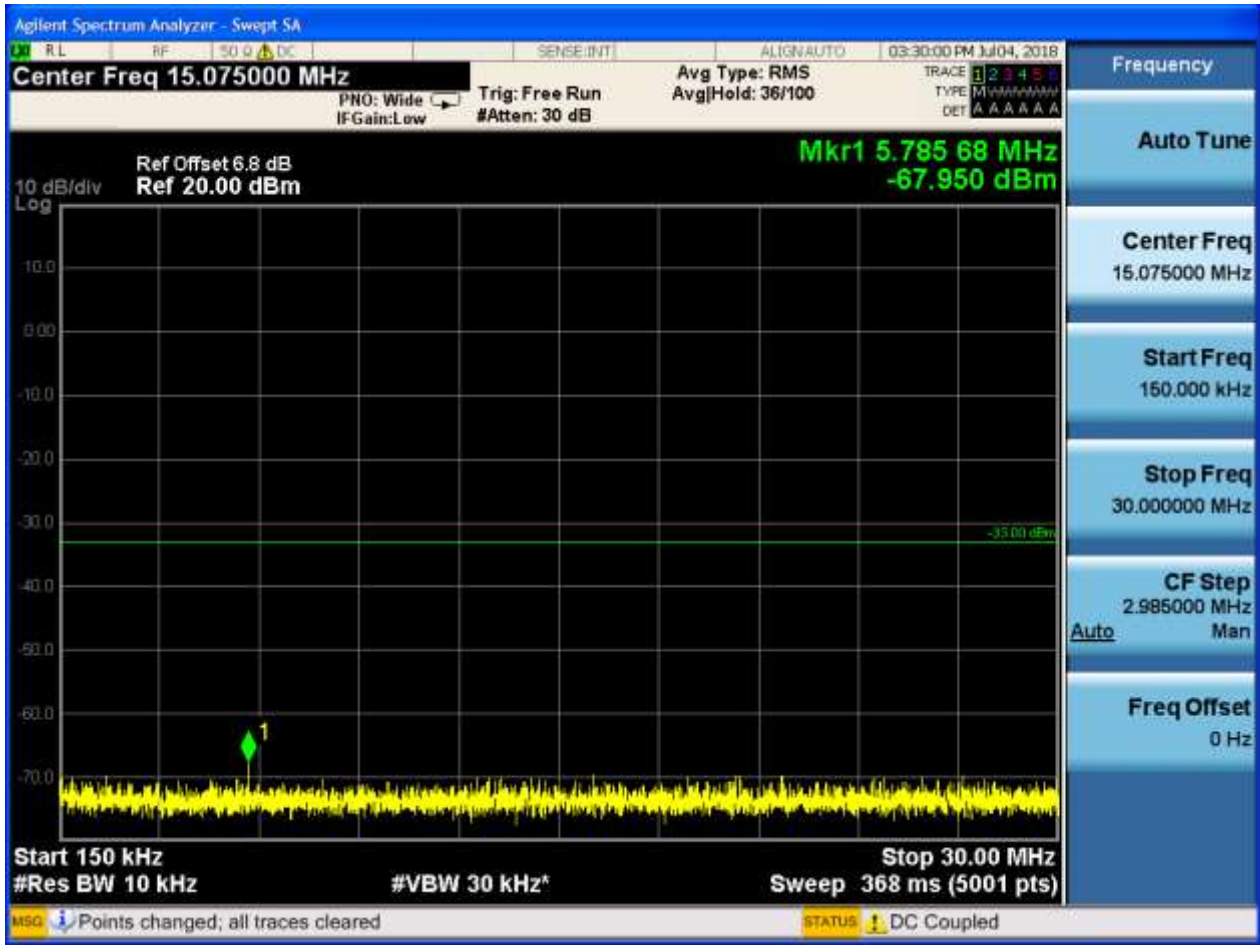


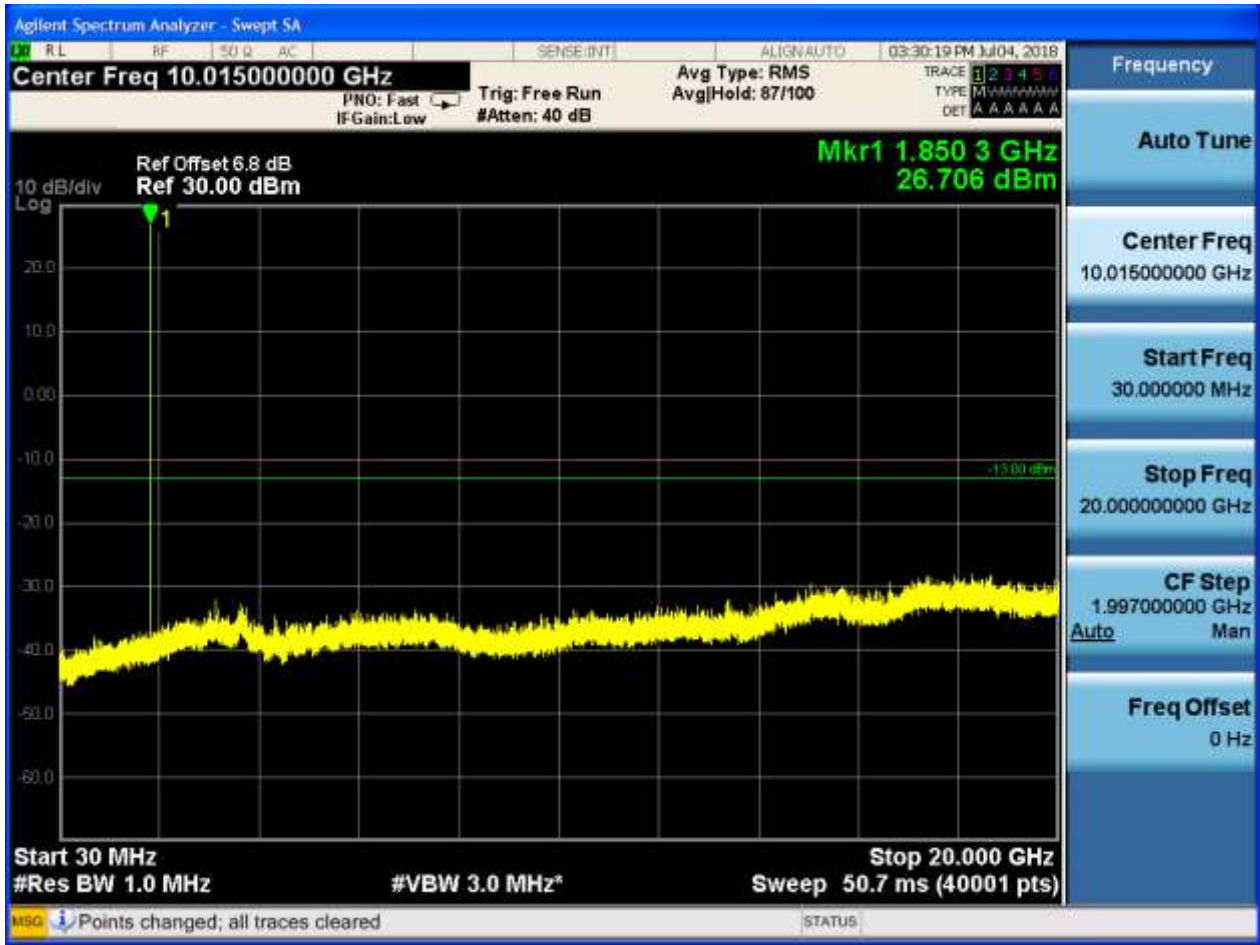


6.1.2.2 Test Mode = GSM/TM2

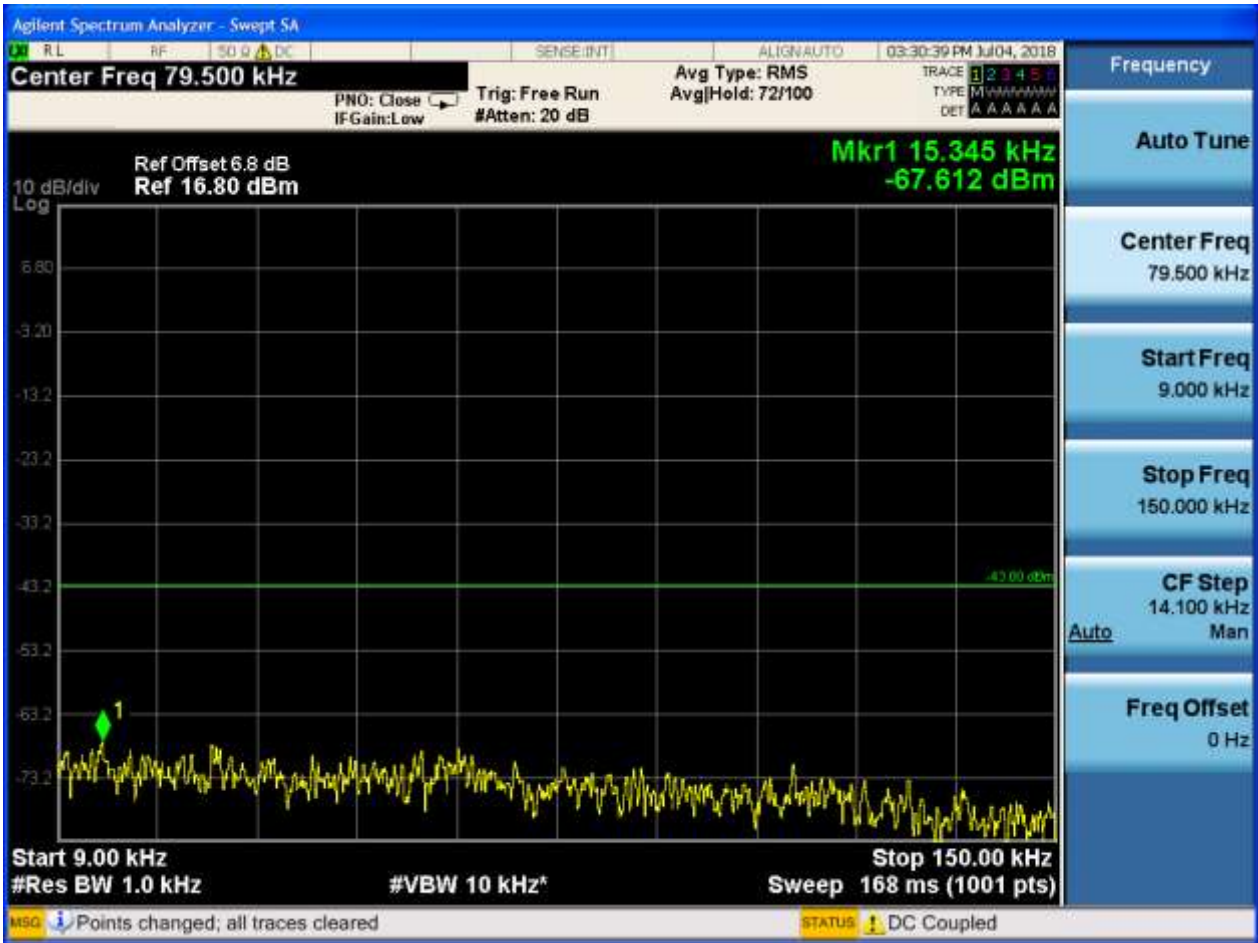
6.1.2.2.1 Test Channel = LCH

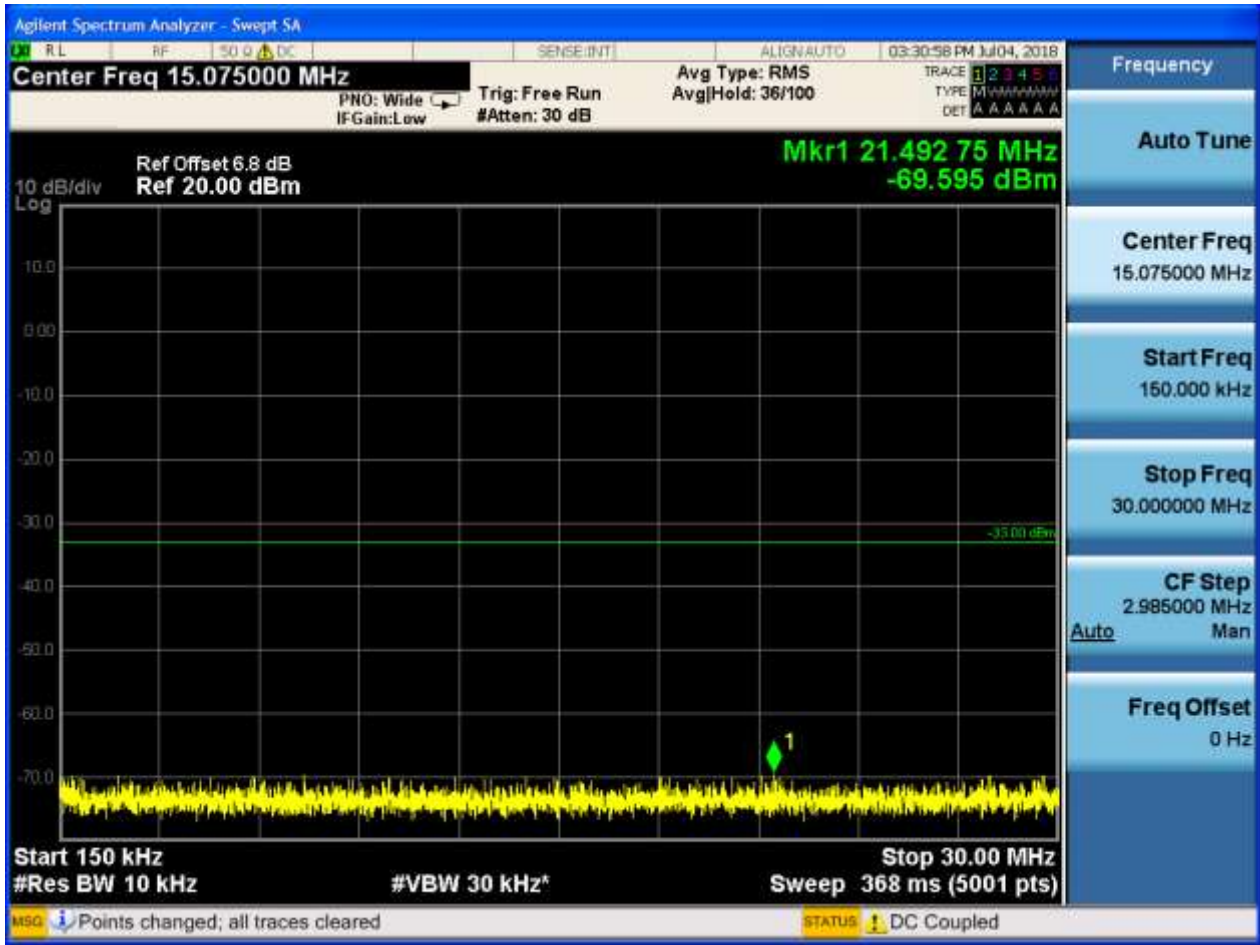


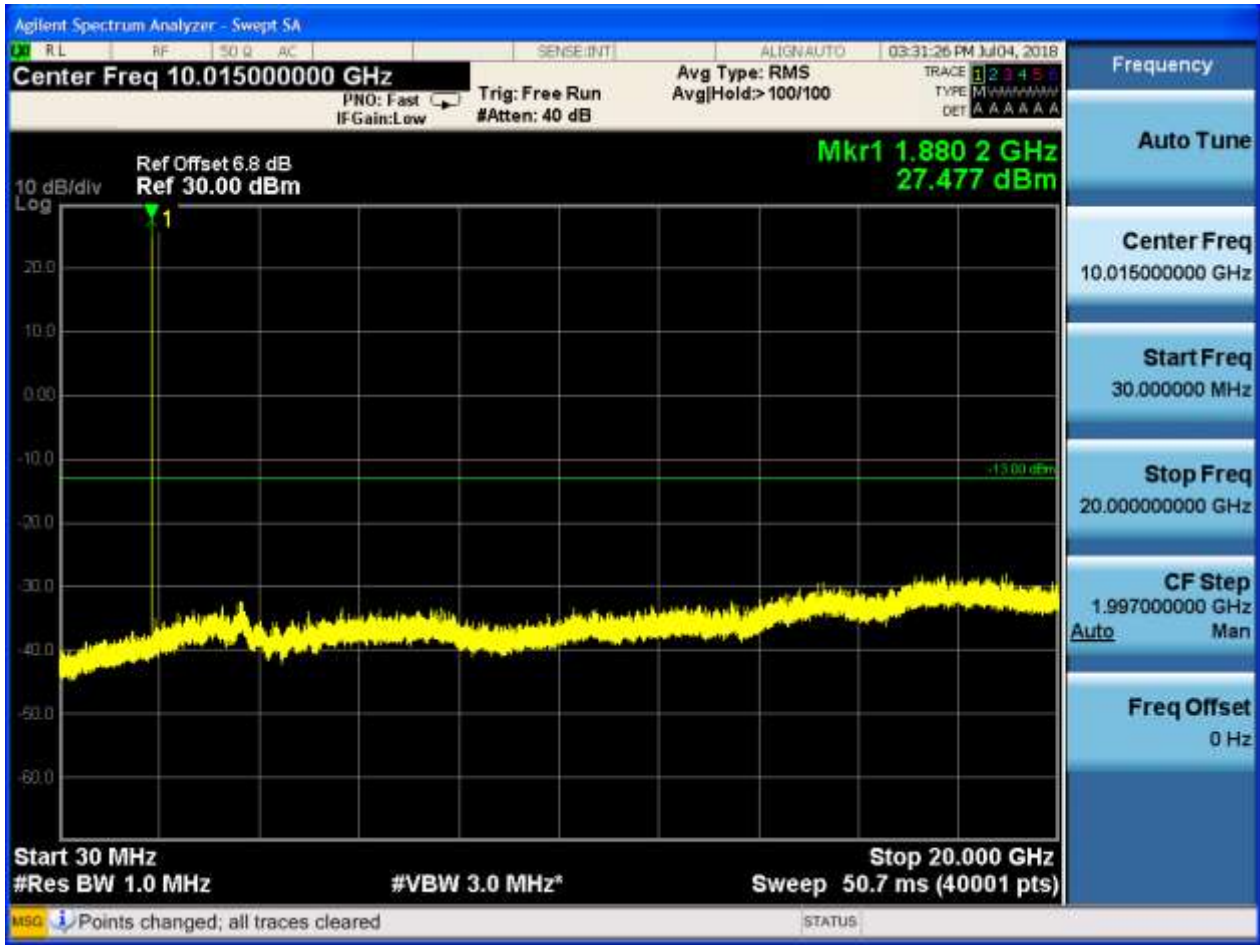




6.1.2.2.2 Test Channel = MCH

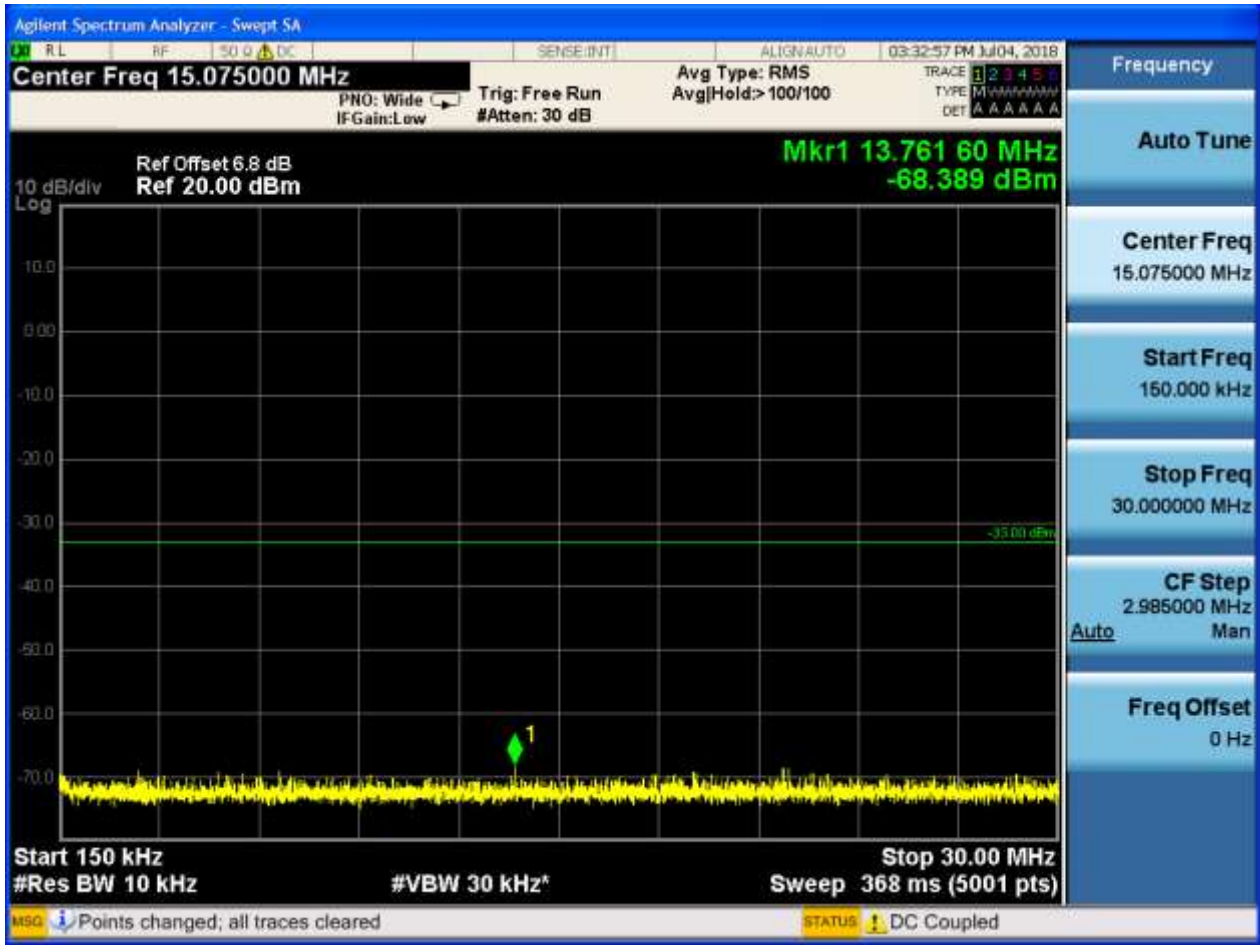






6.1.2.2.3 Test Channel = HCH









7Appendix_G: Field Strength of Spurious Radiation

Note: 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

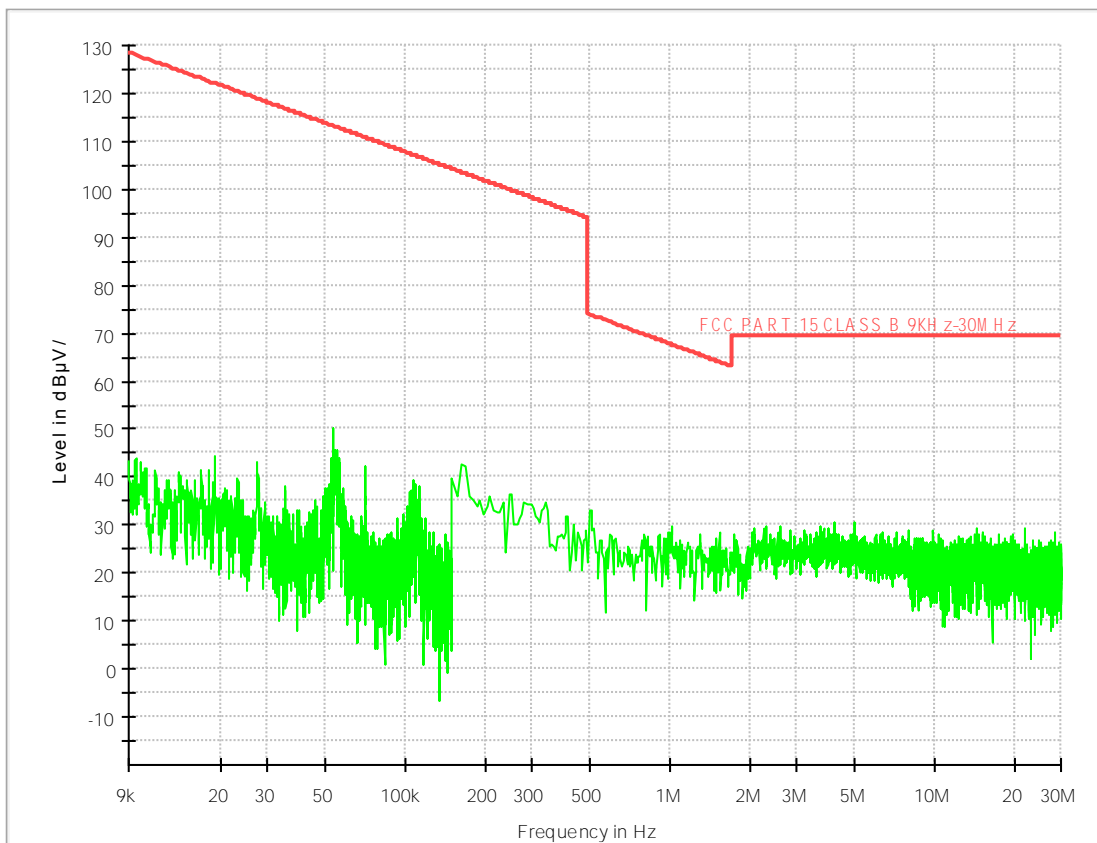


Part I - Test Plots

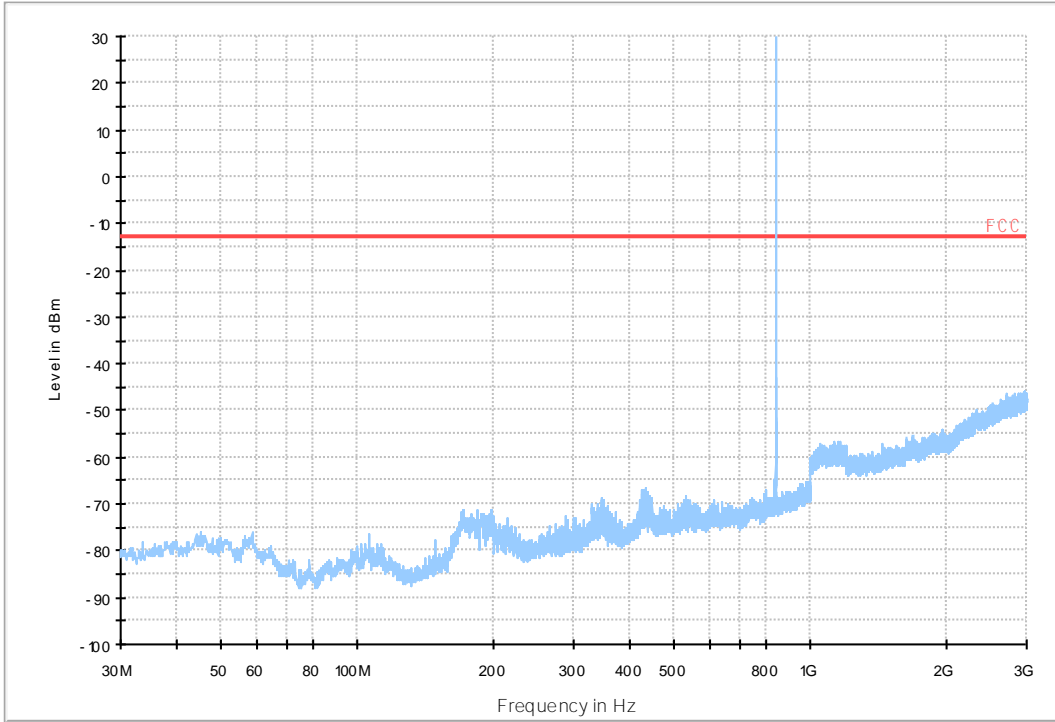
7.1 For GSM

7.1.1 Test Band = GSM850-Ant1

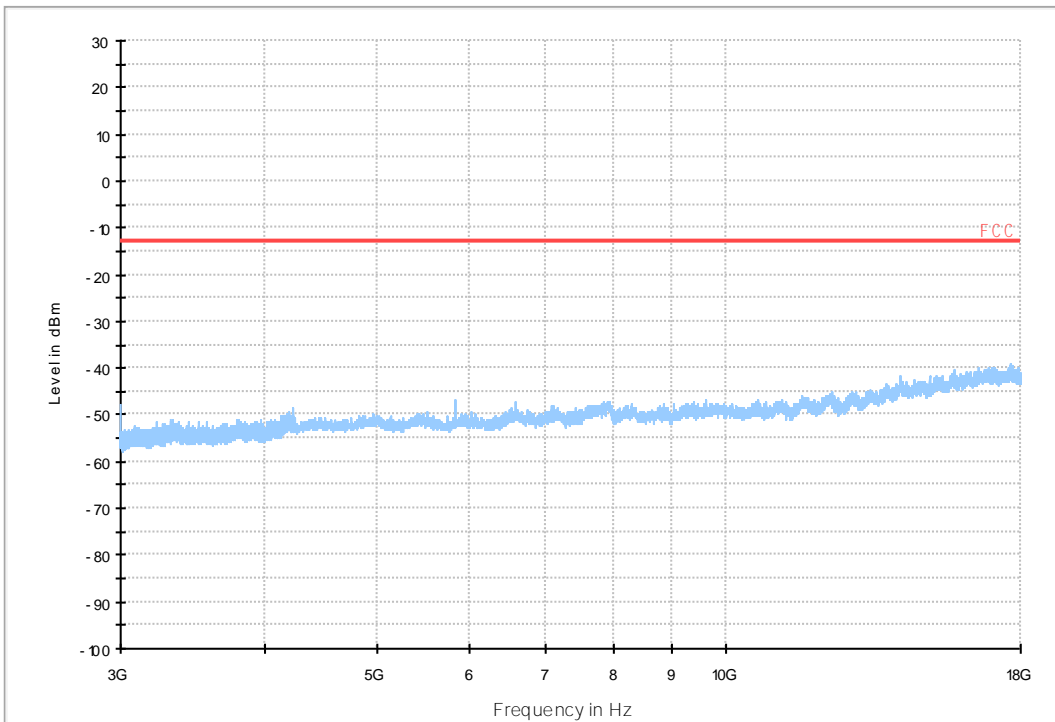
7.1.1.1 Test Mode = GSM/TM1



04 FCC PART 22 GSM850_L

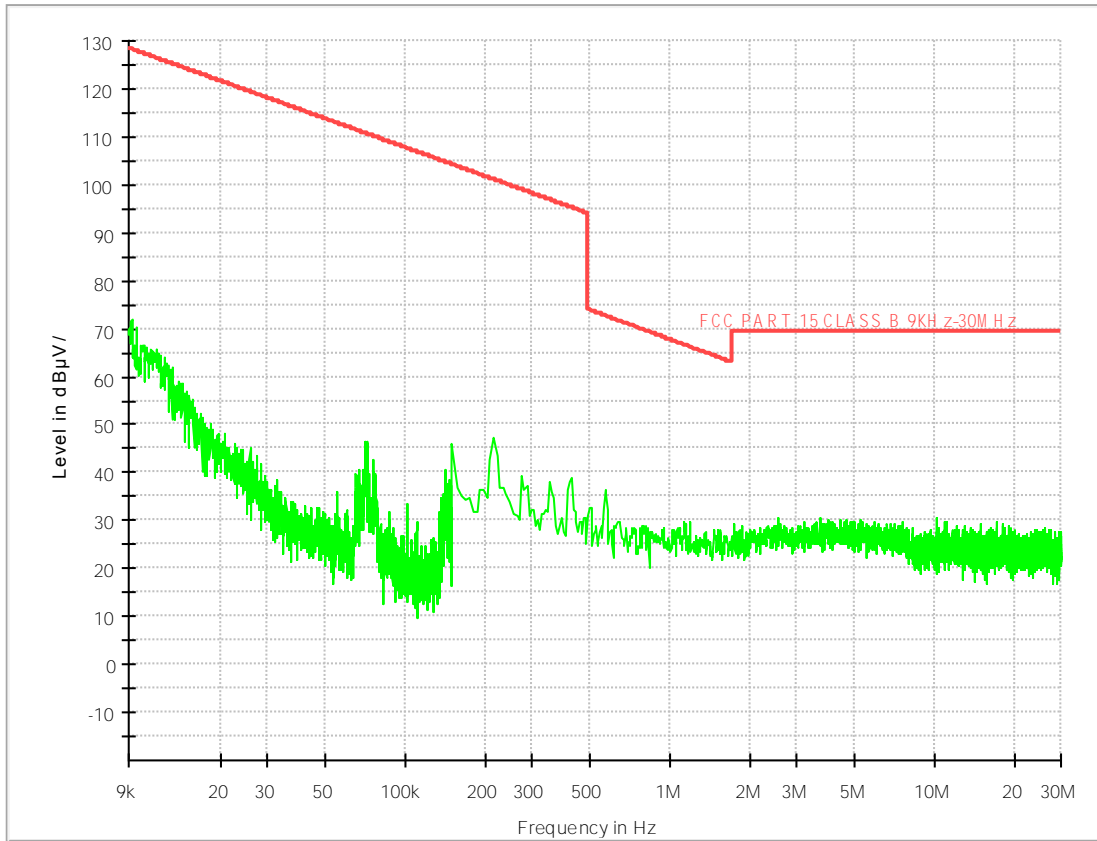


03 FCC PART 22 GSM850_H

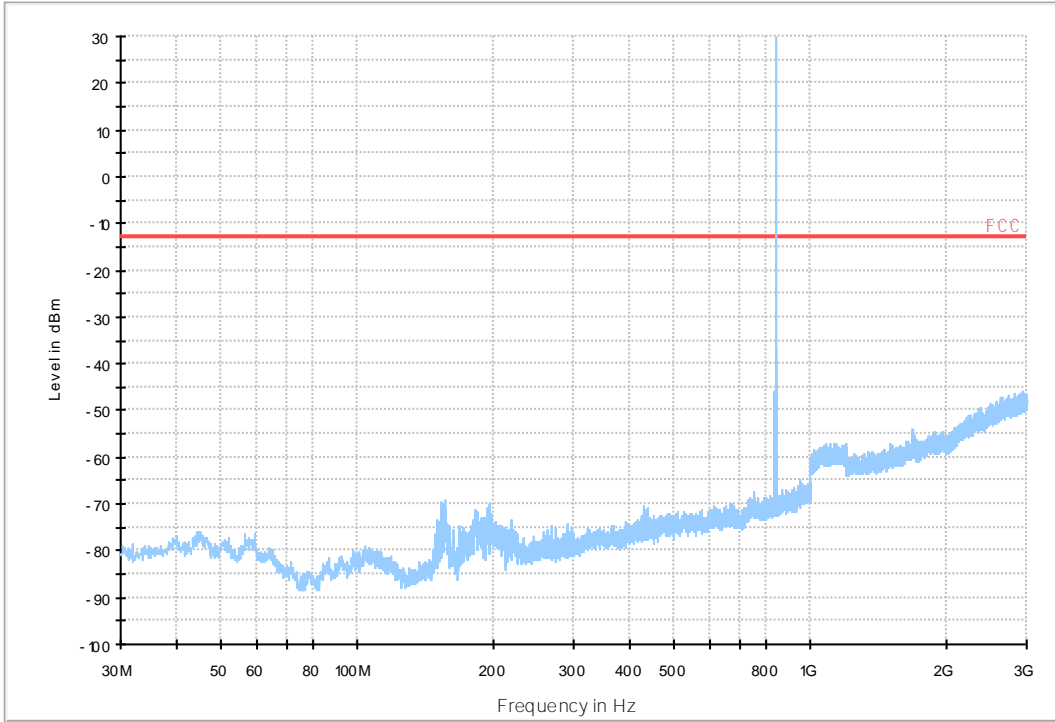


7.1.2 Test Band = GSM850-Ant2

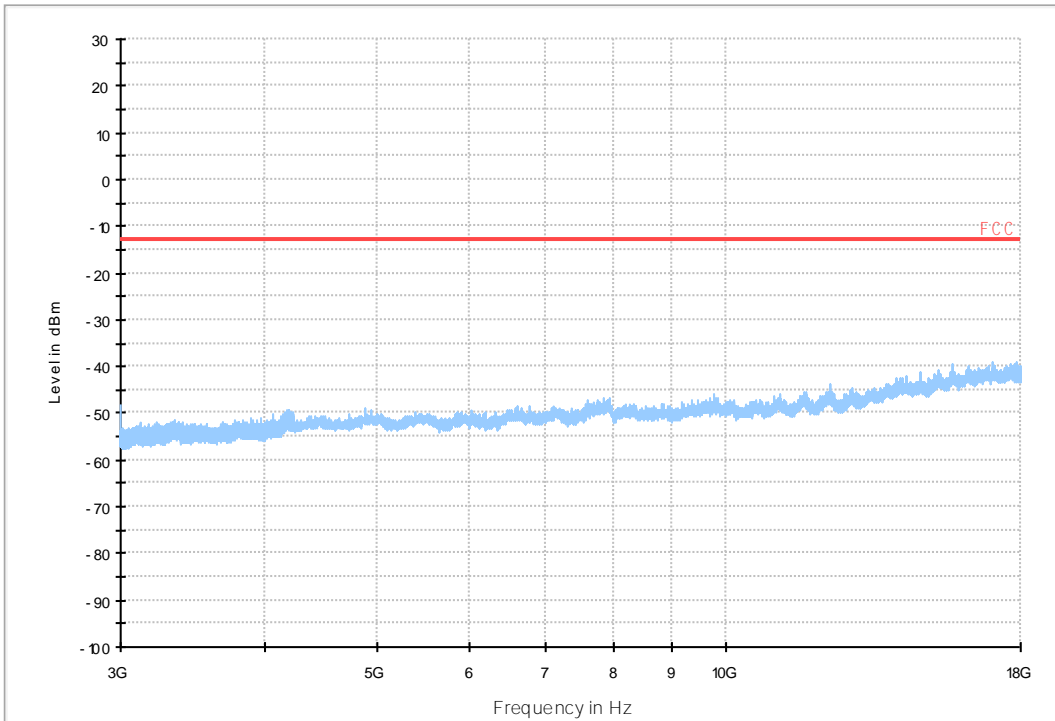
7.1.2.1 Test Mode = GSM/TM1



04 FCC PART 22 GSM850_L



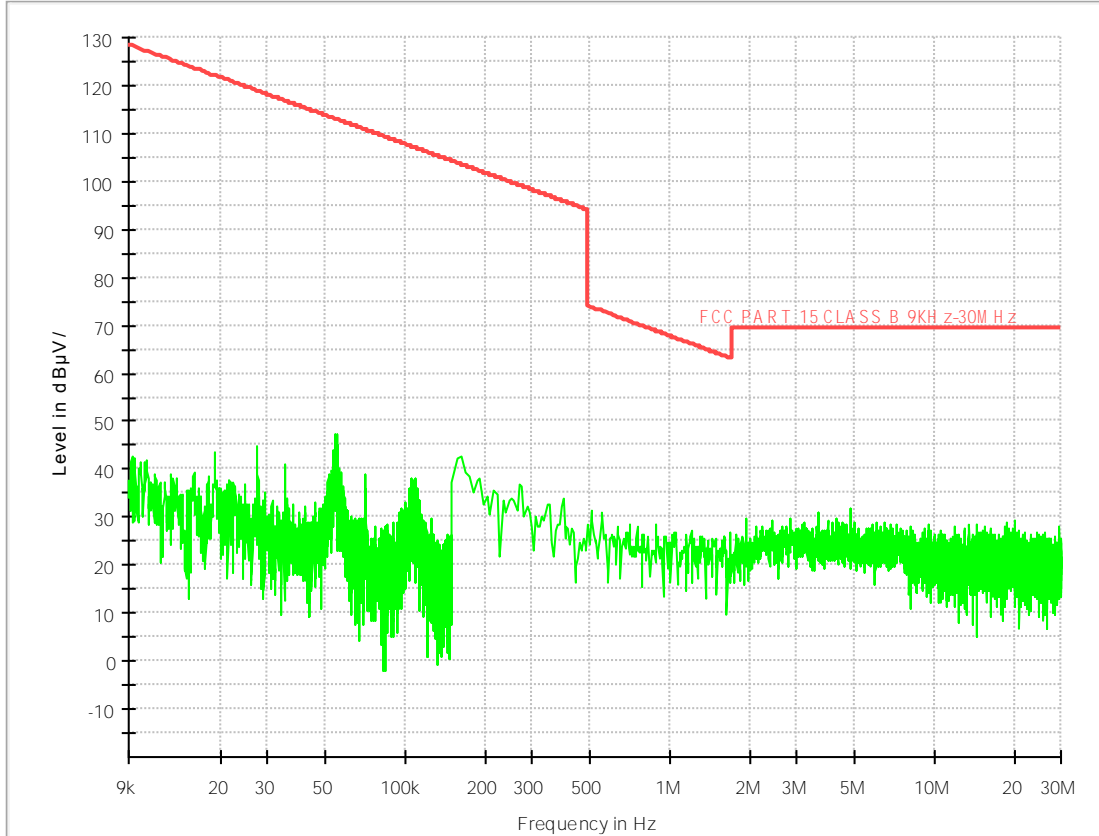
03 FCC PART 22 GSM850_H



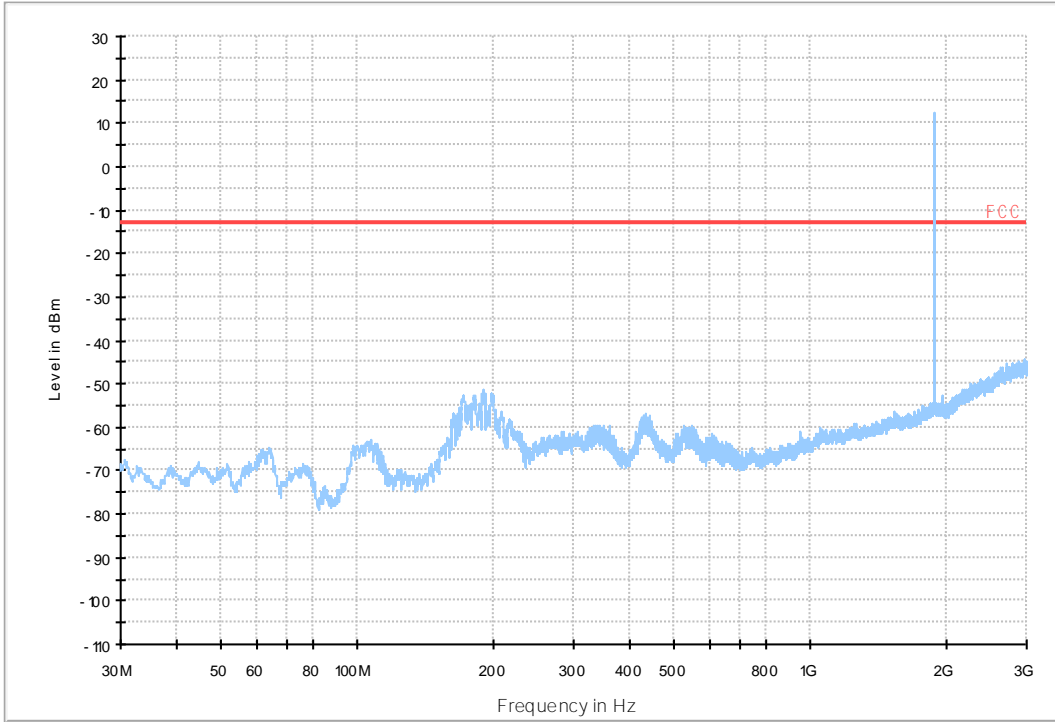


7.1.3 Test Band = GSM1900

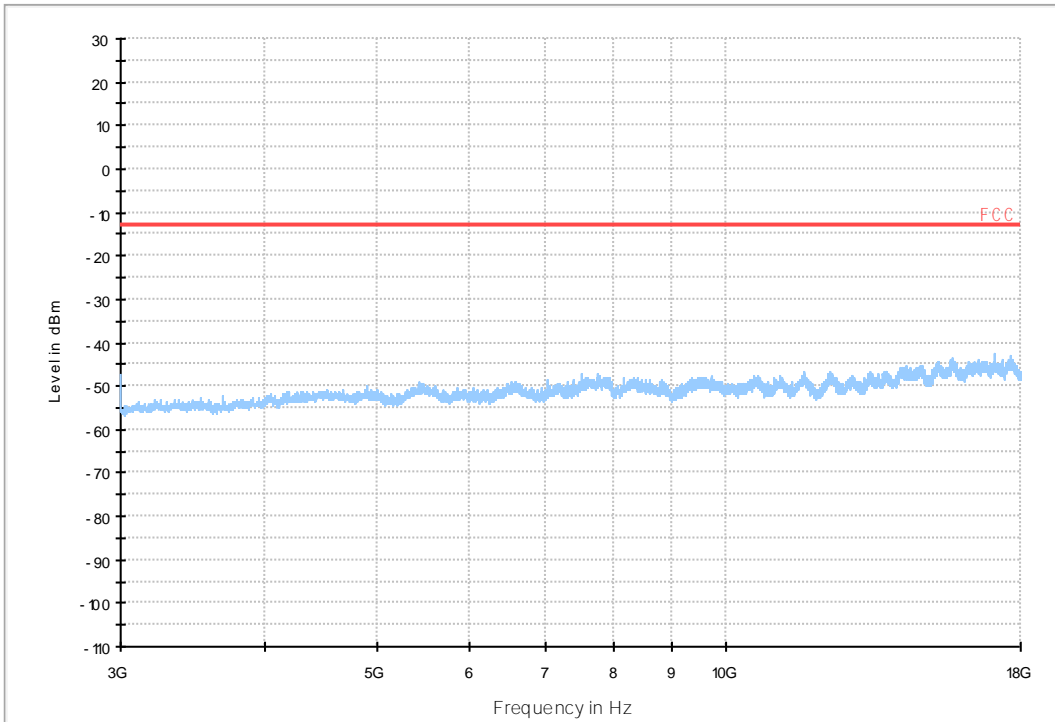
7.1.3.1 Test Mode = GSM/TM1



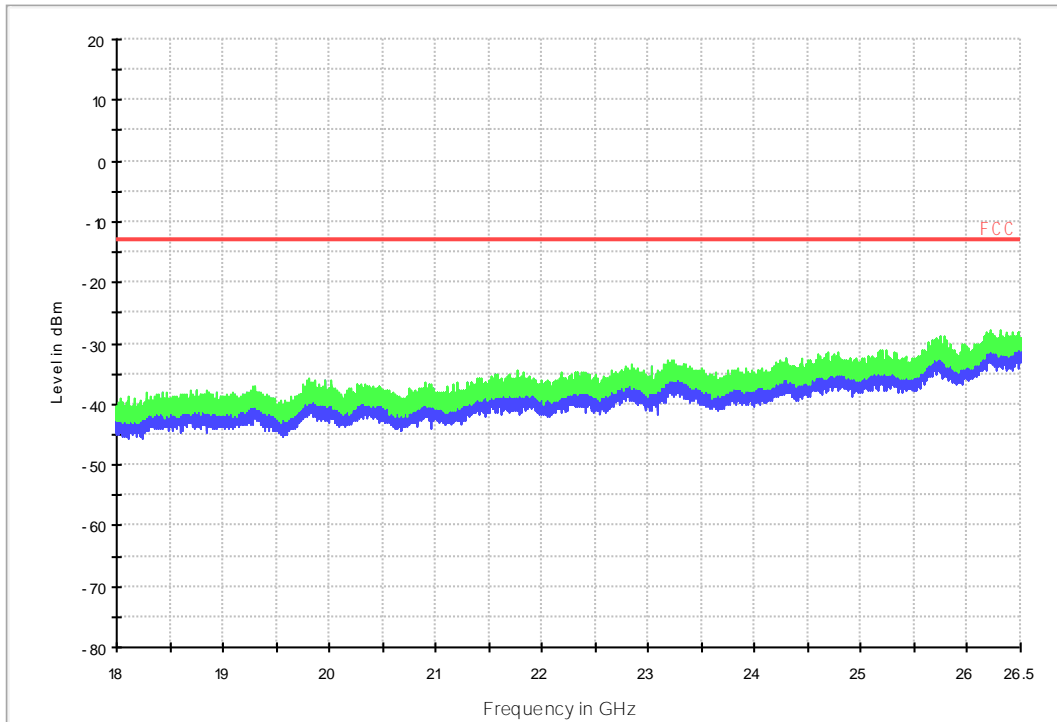
10 FCC PART 24 GSM1900_L



09 FCC PART 24 GSM1900_H

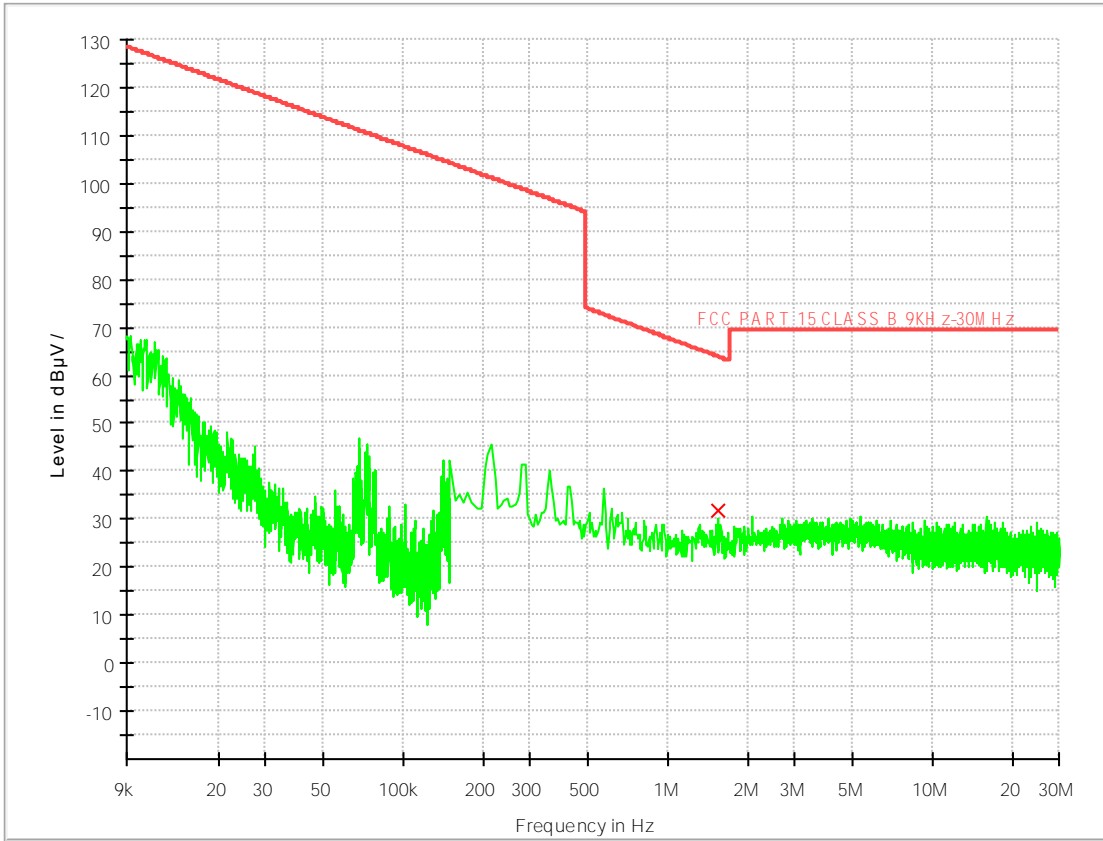


18G~26.5G RSE-TX-DIRECT OR ABOVE 1.5G PK

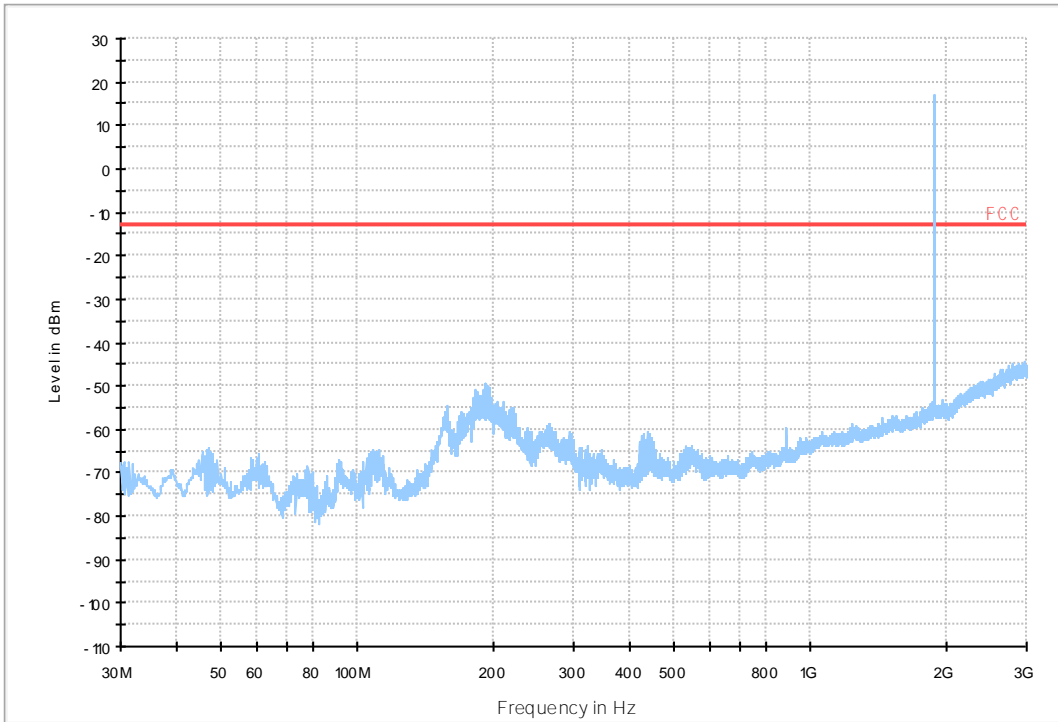


7.1.4 Test Band = GSM1900-Ant2

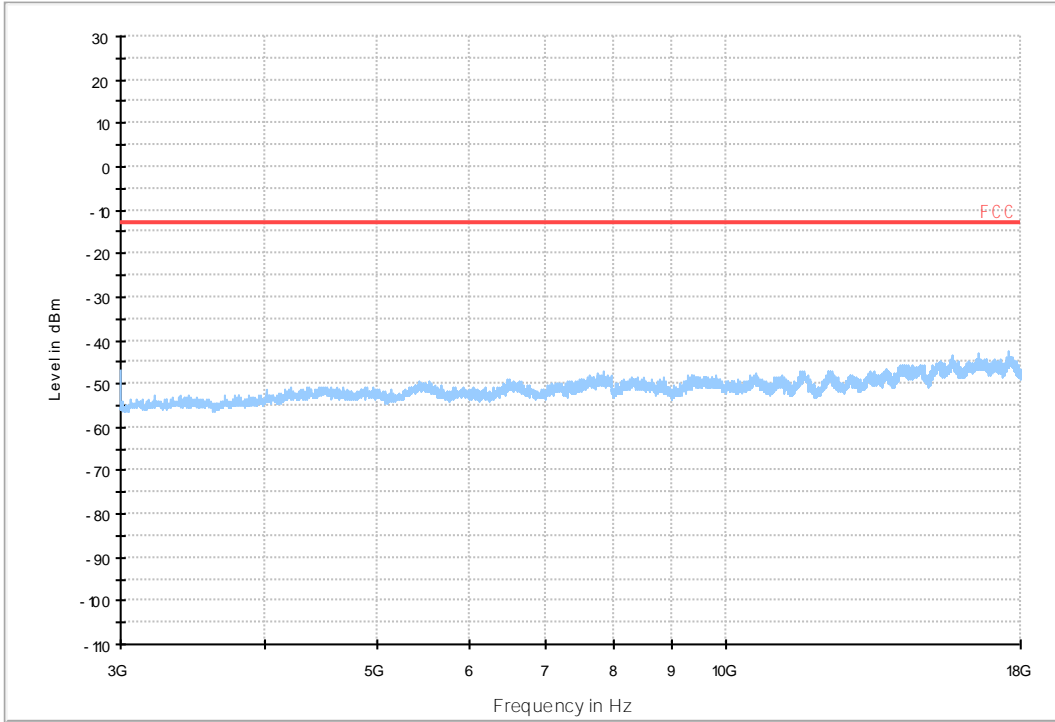
7.1.4.1 Test Mode = GSM/TM1



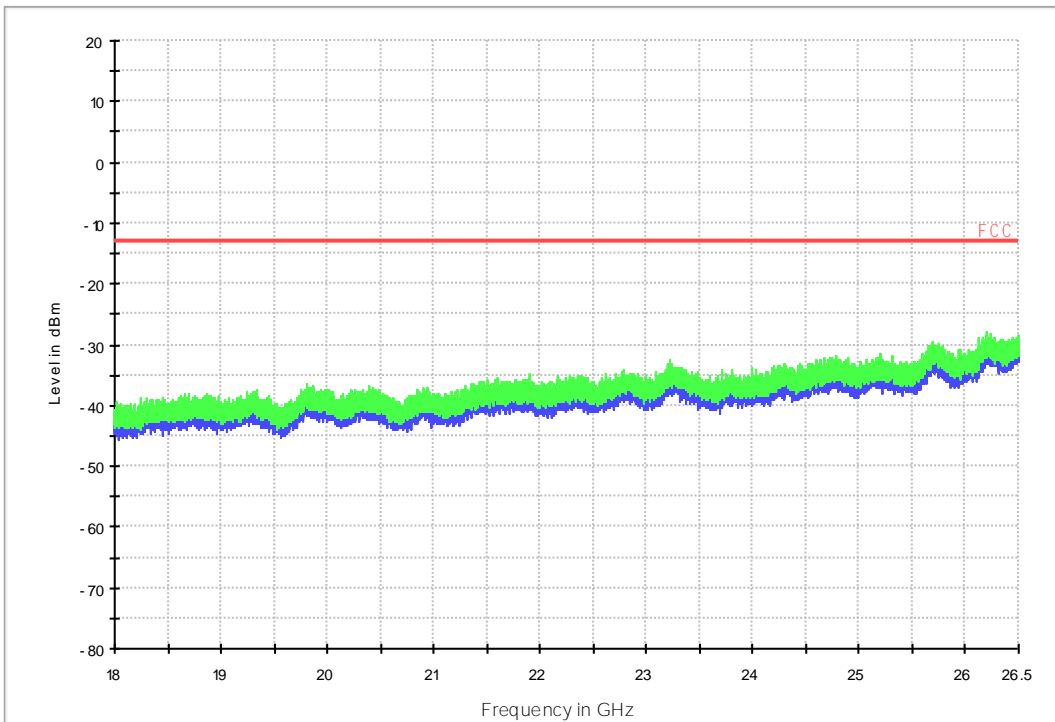
10 FCC PART 24 GSM1900_L



09 FCC PART 24 GSM1900_H



18G~26.5G RSE-TX-DIRECT OR ABOVE 1.5G PK





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	-11.17	-0.01355	PASS
				VN	-12.20	-0.0148	PASS
				VH	-15.69	-0.01904	PASS
		MCH	TN	VL	-15.76	-0.01884	PASS
				VN	-14.79	-0.01768	PASS
				VH	-13.30	-0.0159	PASS
		HCH	TN	VL	-10.14	-0.01195	PASS
				VN	-12.07	-0.01422	PASS
				VH	-10.65	-0.01255	PASS
	GSM/TM2	LCH	TN	VL	-5.78	-0.00701	PASS
				VN	-3.00	-0.00364	PASS
				VH	-4.65	-0.00564	PASS
		MCH	TN	VL	-6.49	-0.00776	PASS
				VN	-4.81	-0.00575	PASS
				VH	-7.23	-0.00864	PASS
		HCH	TN	VL	0.29	0.00034	PASS
				VN	-4.29	-0.00505	PASS
				VH	-3.62	-0.00426	PASS
GSM1900	GSM/TM1	LCH	TN	VL	6.39	0.00345	PASS
				VN	9.04	0.00489	PASS
				VH	13.43	0.00726	PASS
		MCH	TN	VL	19.24	0.01023	PASS
				VN	19.37	0.0103	PASS
				VH	14.79	0.00787	PASS
		HCH	TN	VL	16.08	0.00842	PASS
				VN	13.56	0.0071	PASS
				VH	14.98	0.00784	PASS
	GSM/TM2	LCH	TN	VL	25.57	0.01382	PASS
				VN	32.71	0.01768	PASS
				VH	27.64	0.01494	PASS
		MCH	TN	VL	34.26	0.01822	PASS
				VN	32.09	0.01707	PASS
				VH			



Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				VH	23.54	0.01252	PASS
		HCH	TN	VL	27.89	0.0146	PASS
				VN	37.03	0.01939	PASS
				VH	30.93	0.0162	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	-12.59	-0.01528	PASS
				-20	-13.95	-0.01693	PASS
				-10	-18.02	-0.02186	PASS
				0	-15.82	-0.01919	PASS
				10	-14.21	-0.01724	PASS
				20	-16.98	-0.0206	PASS
				30	-16.27	-0.01974	PASS
				40	-17.31	-0.021	PASS
		50	-13.95	-0.01693	PASS		
		MCH	VN	-30	-13.69	-0.01636	PASS
				-20	-15.24	-0.01822	PASS
				-10	-12.53	-0.01498	PASS
				0	-13.04	-0.01559	PASS
				10	-14.08	-0.01683	PASS
				20	-13.24	-0.01583	PASS
				30	-14.14	-0.0169	PASS
				40	-13.56	-0.01621	PASS
		50	-16.27	-0.01945	PASS		
		HCH	VN	-30	-12.79	-0.01507	PASS
				-20	-6.52	-0.00768	PASS
				-10	-11.75	-0.01384	PASS
				0	-10.01	-0.01179	PASS
				10	-8.20	-0.00966	PASS
				20	-10.27	-0.0121	PASS
	30			-7.04	-0.00829	PASS	
	40			-8.85	-0.01043	PASS	
	50	-8.33	-0.00981	PASS			
	GSM/TM2	LCH	VN	-30	-2.81	-0.00341	PASS
				-20	-4.33	-0.00525	PASS
				-10	-0.65	-0.00079	PASS
				0	-6.81	-0.00826	PASS



Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict						
				10	-1.29	-0.00157	PASS						
				20	-2.23	-0.00271	PASS						
				30	1.55	0.00188	PASS						
				40	-3.84	-0.00466	PASS						
				50	-5.04	-0.00612	PASS						
		MCH	VN			-30	-10.11	-0.01208	PASS				
						-20	-5.59	-0.00668	PASS				
						-10	-1.90	-0.00227	PASS				
						0	-4.04	-0.00483	PASS				
						10	-7.75	-0.00926	PASS				
						20	-3.45	-0.00412	PASS				
						30	-1.32	-0.00158	PASS				
						40	-6.78	-0.0081	PASS				
						50	-5.59	-0.00668	PASS				
						HCH	VN			-30	-2.13	-0.00251	PASS
		-20	0.90	0.00106	PASS								
		-10	-0.65	-0.00077	PASS								
		0	0.94	0.00111	PASS								
		10	0.39	0.00046	PASS								
		20	-6.23	-0.00734	PASS								
		30	0.48	0.00057	PASS								
		40	2.03	0.00239	PASS								
		50	-1.97	-0.00232	PASS								
		GSM1900	GSM/TM1	LCH	VN					-30	8.98	0.00485	PASS
										-20	11.24	0.00608	PASS
-10	14.53									0.00785	PASS		
0	11.24									0.00608	PASS		
10	6.13									0.00331	PASS		
20	8.07									0.00436	PASS		
30	8.78									0.00475	PASS		
40	6.97									0.00377	PASS		
50	10.14									0.00548	PASS		
MCH	VN									-30	14.85	0.0079	PASS
										-20	17.37	0.00924	PASS
										-10	10.46	0.00556	PASS
										0	17.24	0.00917	PASS
										10	13.43	0.00714	PASS
										20	20.79	0.01106	PASS
										30	12.46	0.00663	PASS
										40	18.14	0.00965	PASS



Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
		HCH	VN	50	10.72	0.0057	PASS
				-30	13.37	0.007	PASS
				-20	13.62	0.00713	PASS
				-10	10.65	0.00558	PASS
				0	14.59	0.00764	PASS
				10	13.04	0.00683	PASS
				20	9.94	0.0052	PASS
				30	11.17	0.00585	PASS
				40	6.78	0.00355	PASS
				50	8.27	0.00433	PASS
	GSM/TM2	LCH	VN	-30	25.12	0.01358	PASS
				-20	20.08	0.01085	PASS
				-10	22.70	0.01227	PASS
				0	35.16	0.019	PASS
				10	34.90	0.01886	PASS
				20	23.21	0.01254	PASS
				30	25.70	0.01389	PASS
				40	36.26	0.0196	PASS
				50	27.96	0.01511	PASS
				MCH	VN	-30	31.90
		-20	27.73			0.01475	PASS
		-10	32.93			0.01752	PASS
		0	34.22			0.0182	PASS
		10	27.09			0.01441	PASS
		20	28.38			0.0151	PASS
		30	33.19			0.01765	PASS
		40	26.54			0.01412	PASS
		50	28.93			0.01539	PASS
		HCH	VN			-30	37.39
				-20	33.22	0.01739	PASS
				-10	32.90	0.01723	PASS
				0	25.05	0.01312	PASS
				10	29.51	0.01545	PASS
				20	34.13	0.01787	PASS
				30	31.22	0.01635	PASS
				40	29.64	0.01552	PASS
				50	36.16	0.01893	PASS

END