



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	32.5	28.21	38.5	PASS
		MCH	32.72	28.43	38.5	PASS
		HCH	32.61	28.32	38.5	PASS
	GSM/TM2	LCH	25.36	21.07	38.5	PASS
		MCH	25.32	21.03	38.5	PASS
		HCH	25.46	21.17	38.5	PASS
Test Band	Test Mode	Test Channel	Measured[dBm]	EIRP[dBm]	Limit [dBm]	Verdict
GSM1900	GSM/TM1	LCH	30.32	28.97	33	PASS
		MCH	30.23	28.88	33	PASS
		HCH	30.06	28.71	33	PASS
	GSM/TM2	LCH	26.12	24.77	33	PASS
		MCH	26.12	24.77	33	PASS
		HCH	26.14	24.79	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	0.46	13	PASS
		MCH	0.47	13	PASS
		HCH	0.48	13	PASS
	GSM/TM2	LCH	3.27	13	PASS
		MCH	3.29	13	PASS
		HCH	3.2	13	PASS
GSM1900	GSM/TM1	LCH	0.18	13	PASS
		MCH	0.17	13	PASS
		HCH	0.17	13	PASS
	GSM/TM2	LCH	3.03	13	PASS
		MCH	3.19	13	PASS
		HCH	3.15	13	PASS

3Appendix_C: Modulation Characteristics

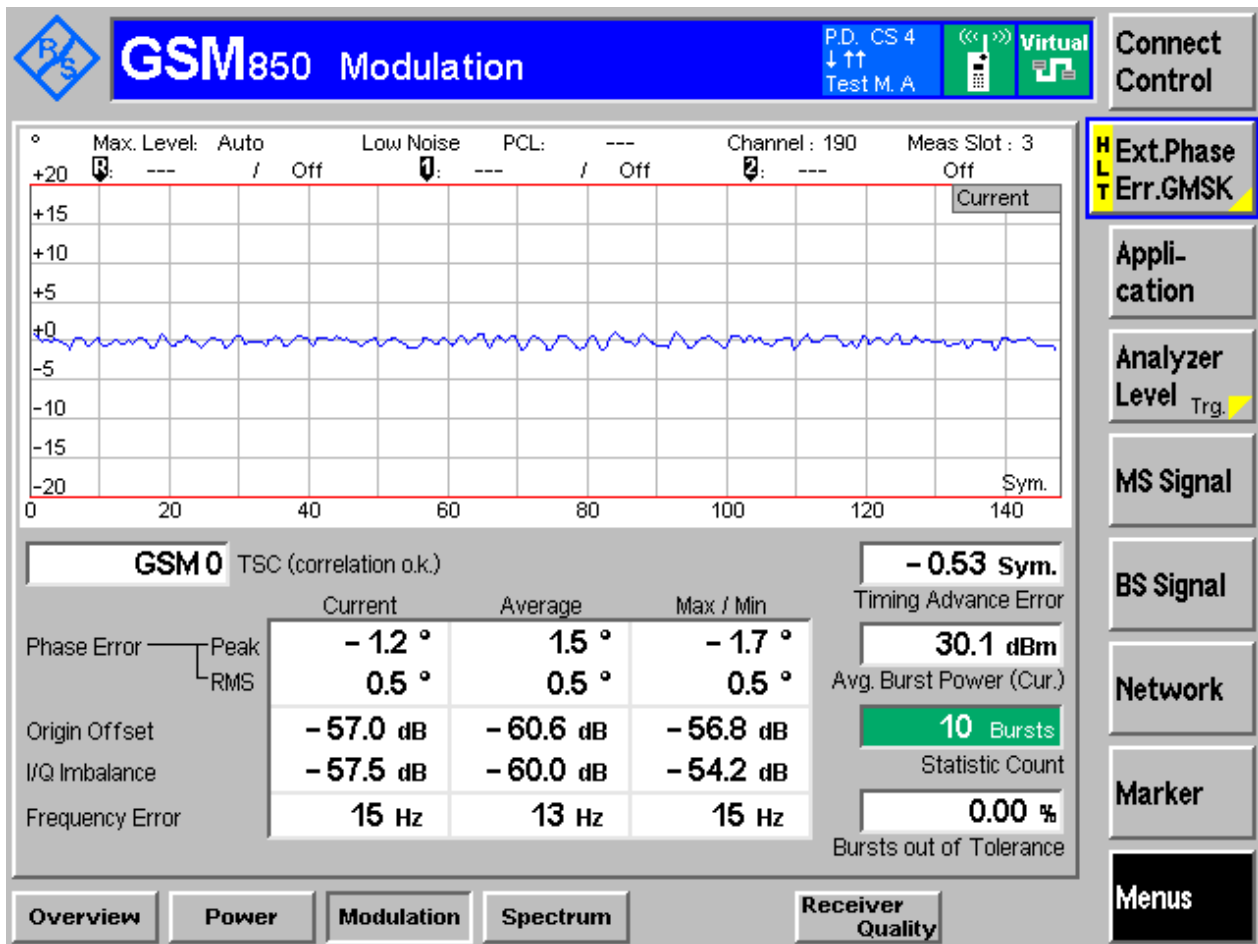
Part I - Test Plots

3.1 For GSM

3.1.1 Test Band = GSM850

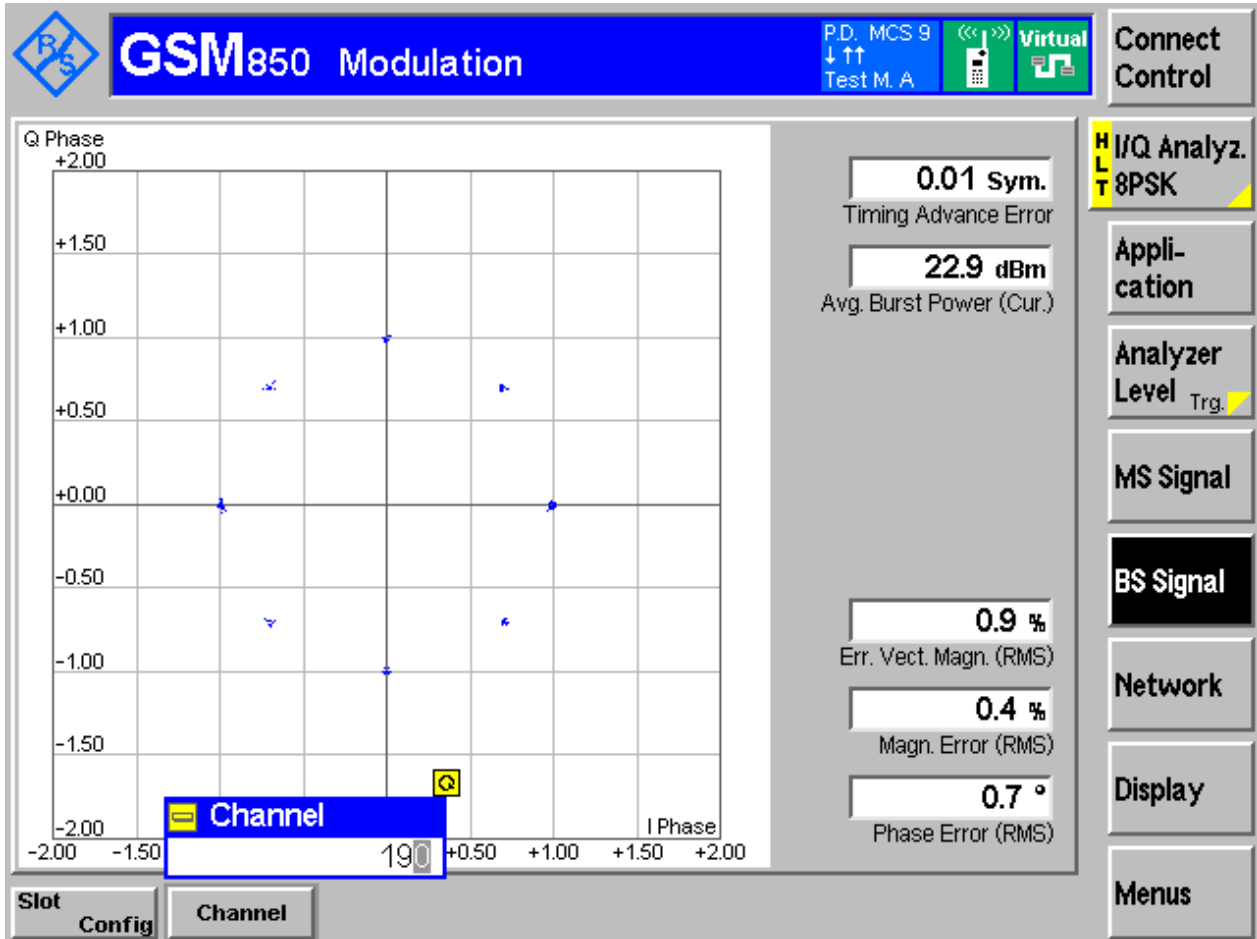
3.1.1.1 Test Mode = GSM/TM1

3.1.1.1.1 Test Channel = MCH



3.1.1.2 Test Mode = GSM/TM2

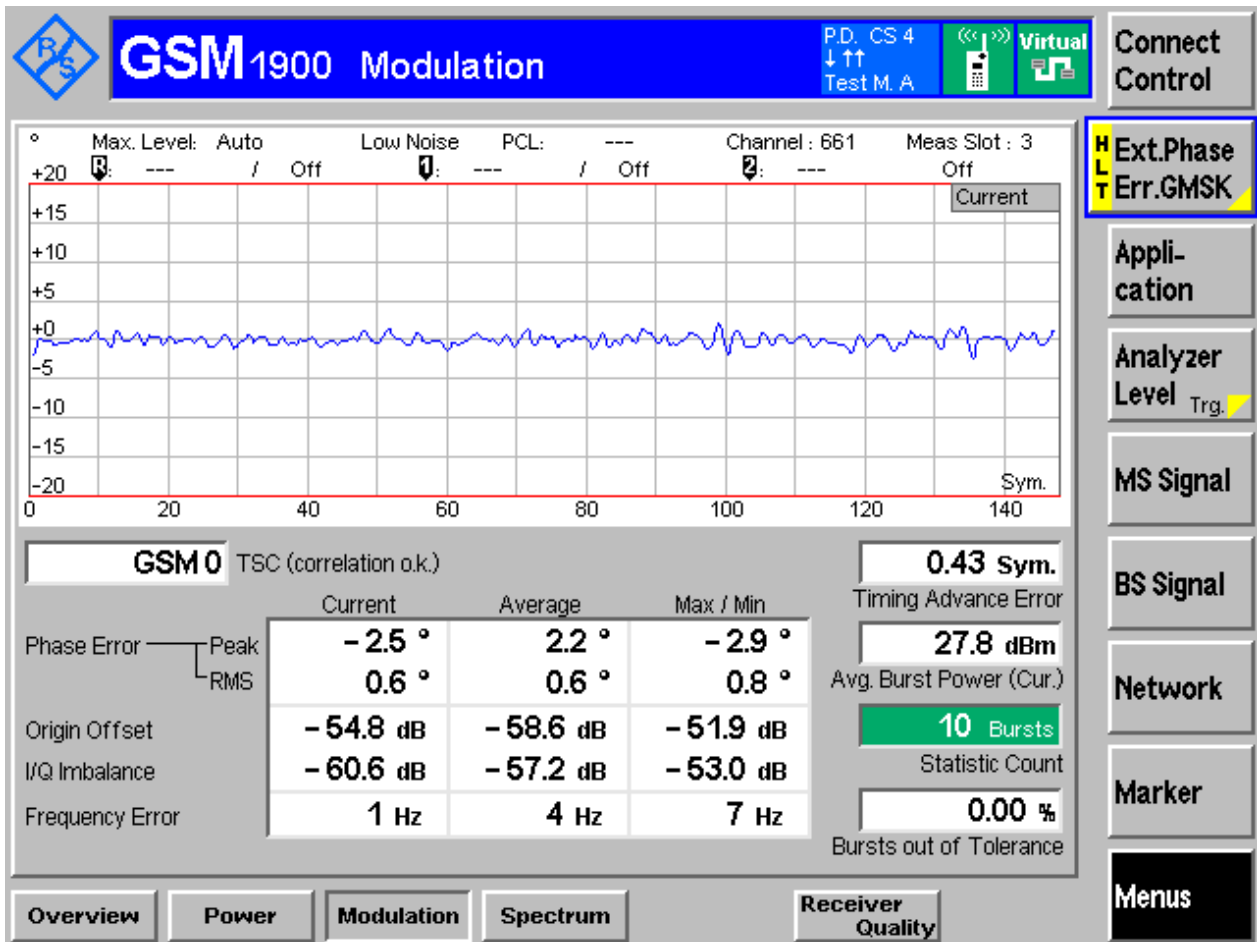
3.1.1.2.1 Test Channel = MCH



3.1.2 Test Band = GSM1900

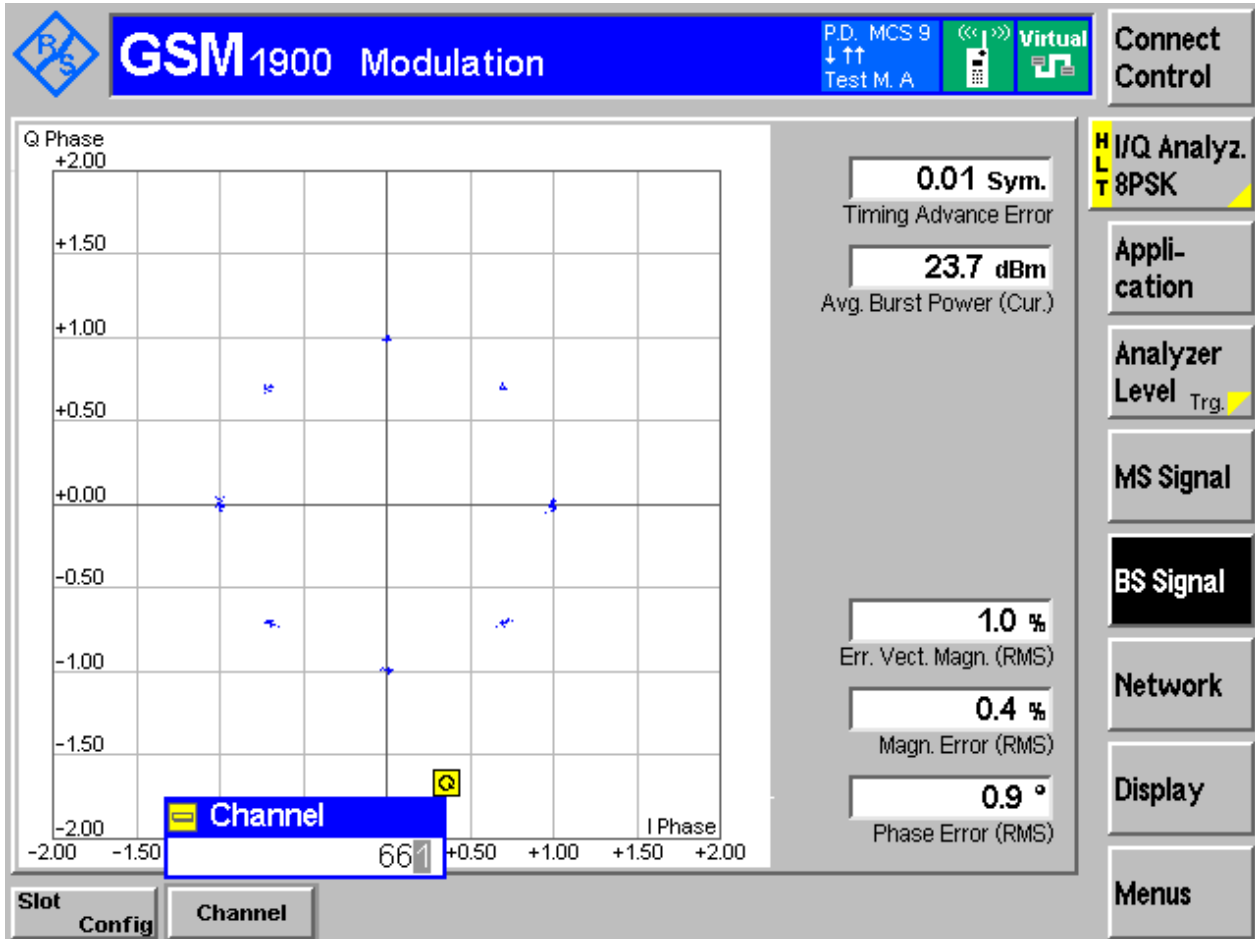
3.1.2.1 Test Mode = GSM/TM1

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	245.12	316.24	Pass
		MCH	243.86	315.03	Pass
		HCH	241.63	313.88	Pass
	GSM/TM2	LCH	248.68	312.02	Pass
		MCH	245.23	318.00	Pass
		HCH	241.28	309.49	Pass
GSM1900	GSM/TM1	LCH	246.35	318.04	Pass
		MCH	245.71	317.41	Pass
		HCH	249.00	316.89	Pass
	GSM/TM2	LCH	243.57	318.78	Pass
		MCH	246.89	316.48	Pass
		HCH	245.48	320.01	Pass



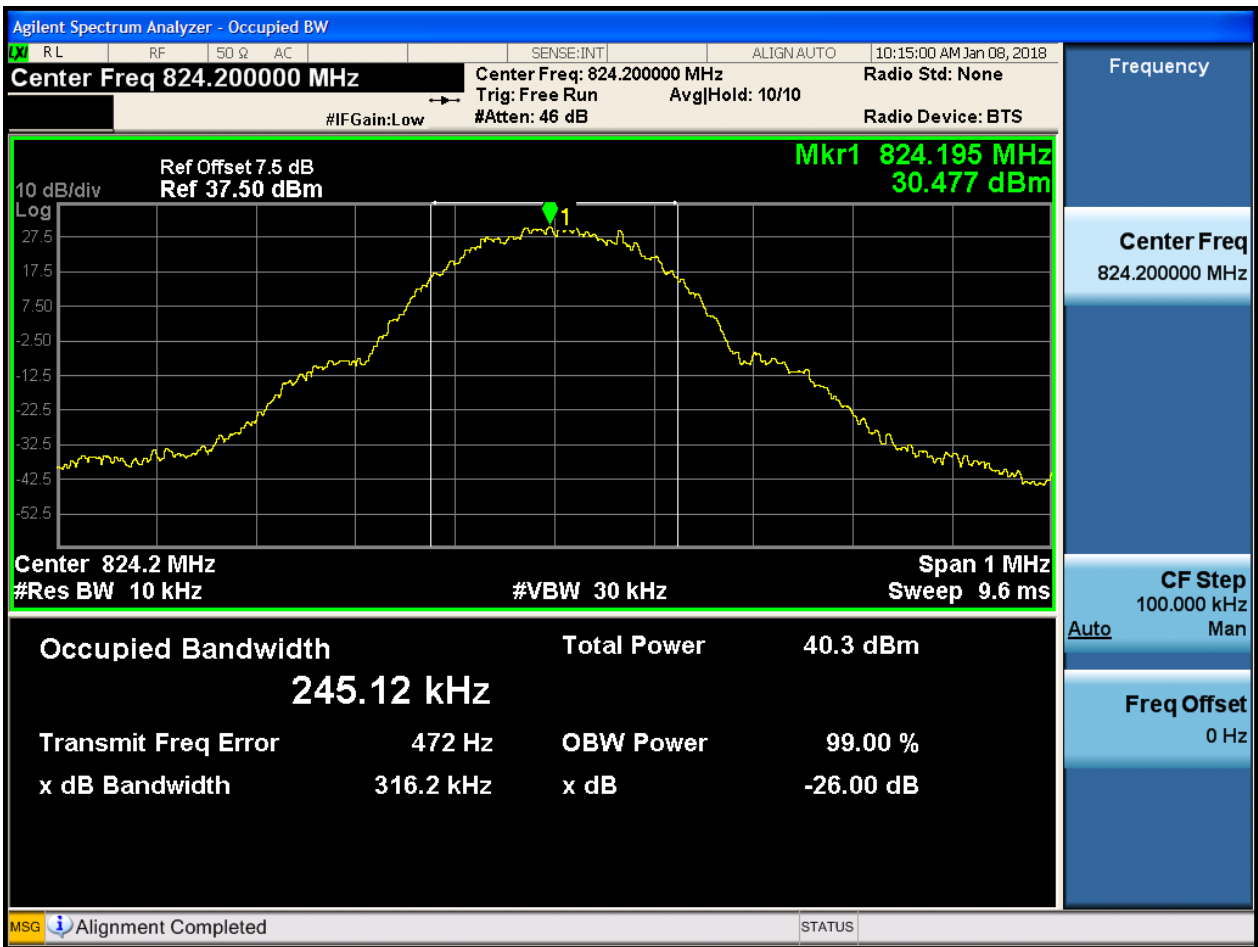
Part II - Test Plots

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



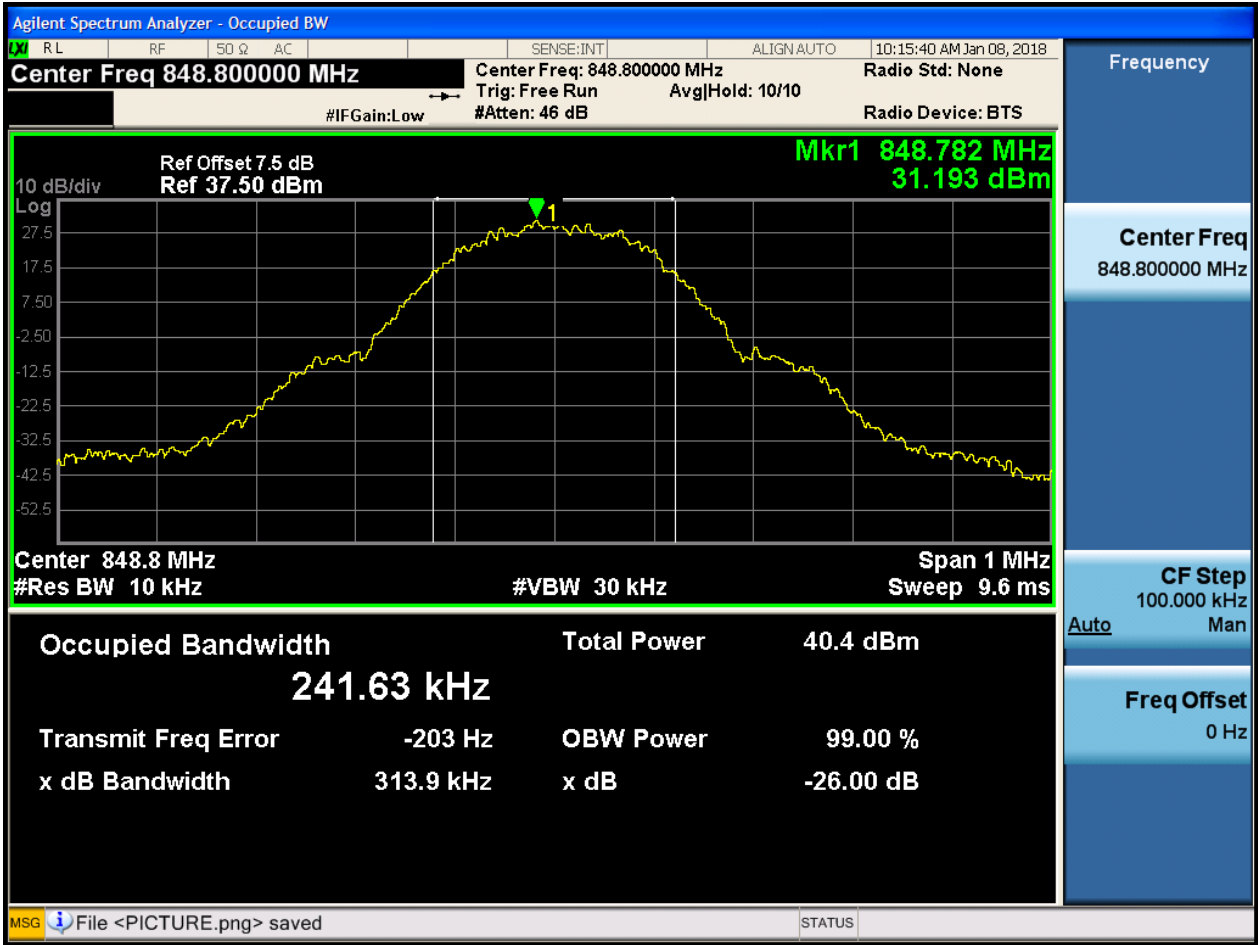


4.1.1.1.2 Test Channel = MCH





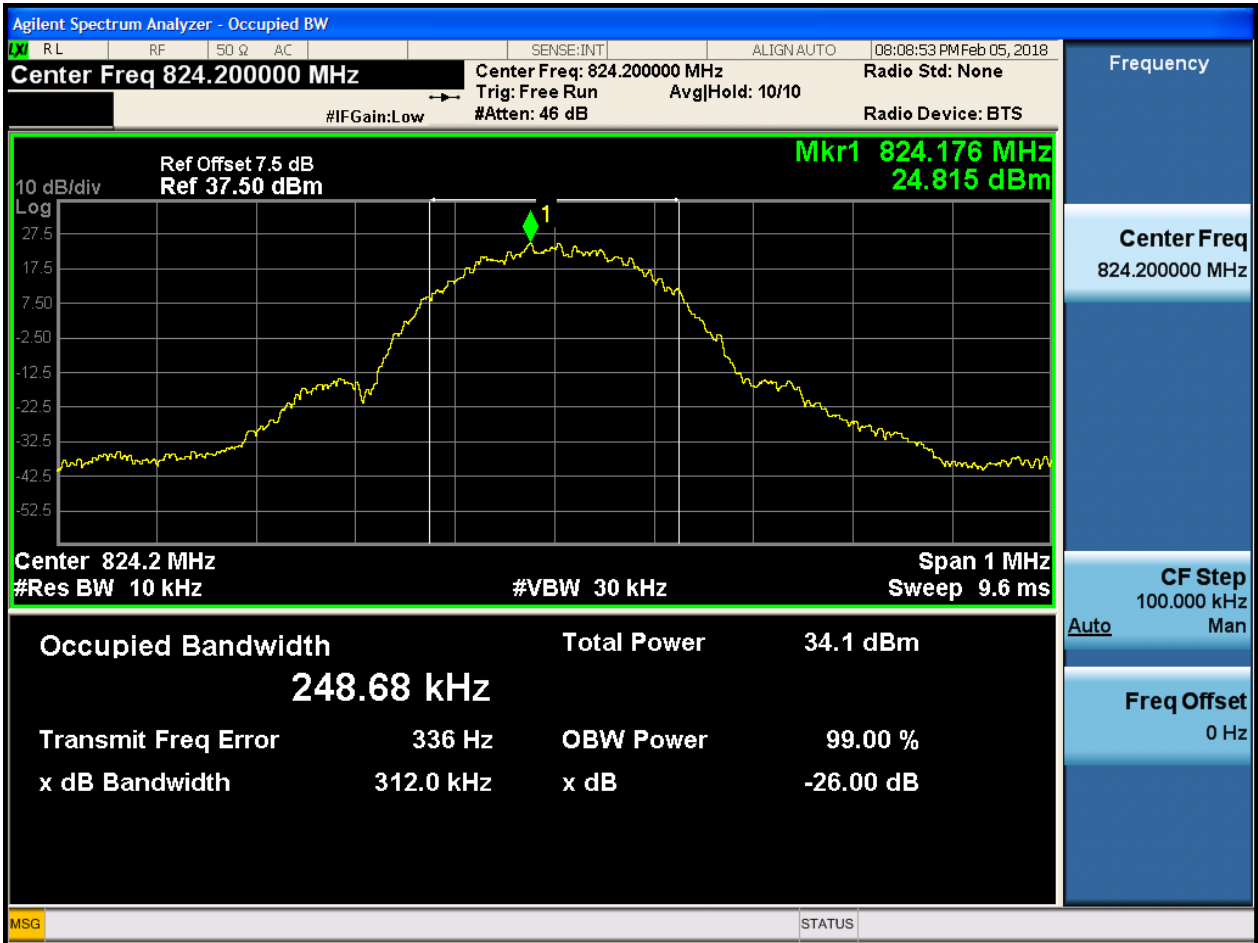
4.1.1.1.3 Test Channel = HCH





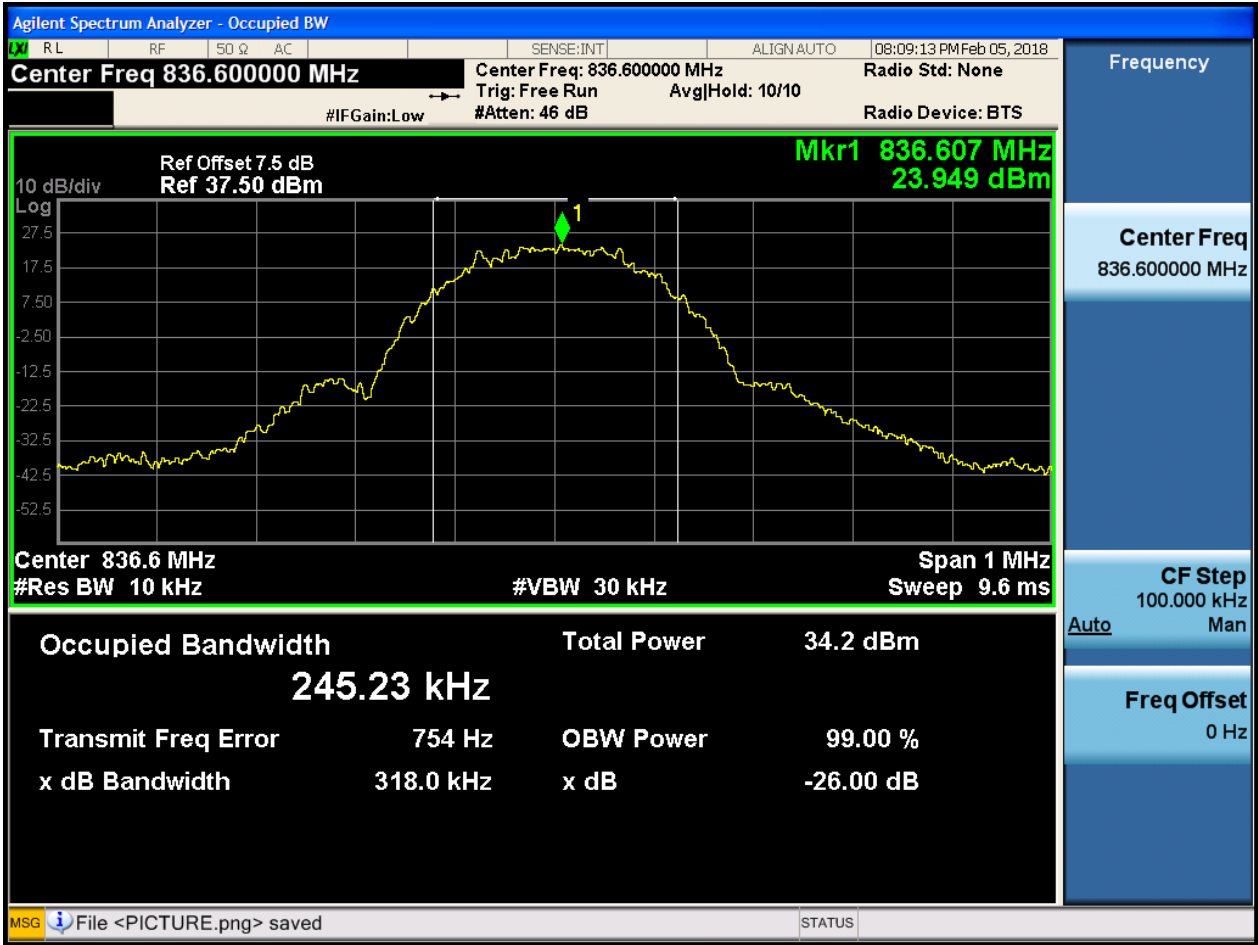
4.1.1.2 Test Mode = GSM/TM2

4.1.1.2.1 Test Channel = LCH



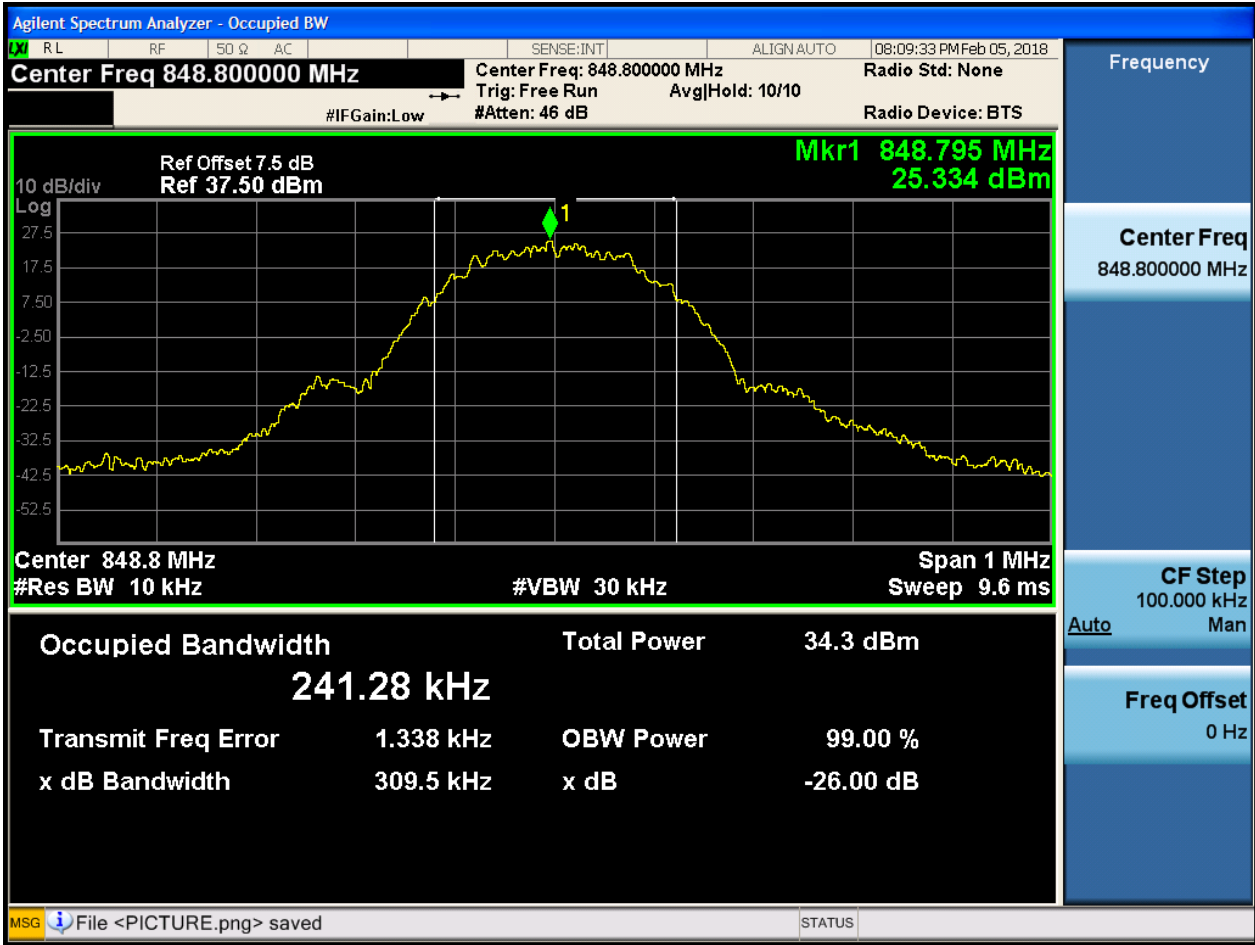


4.1.1.2.2 Test Channel = MCH





4.1.1.2.3 Test Channel = HCH

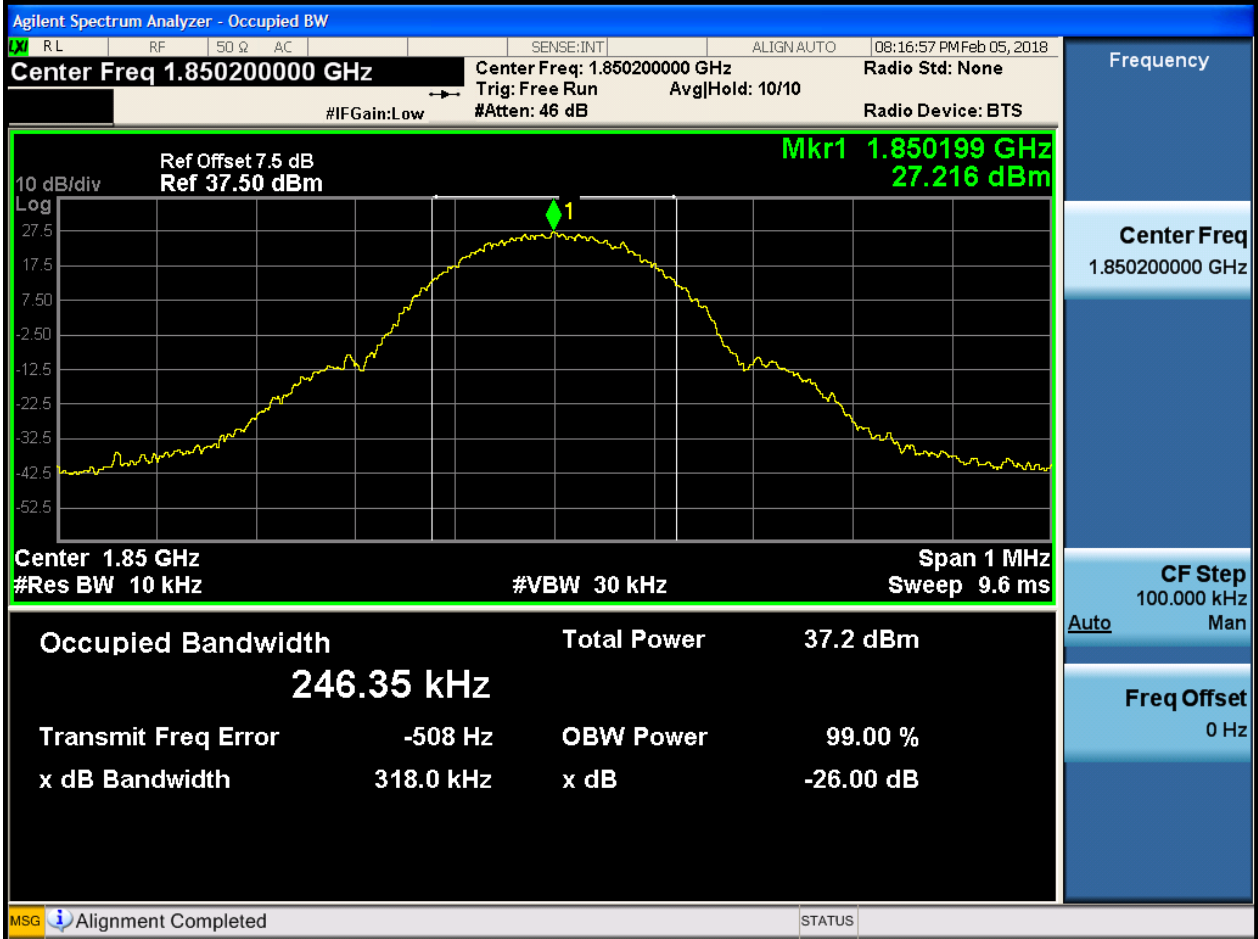




4.1.2 Test Band = GSM1900

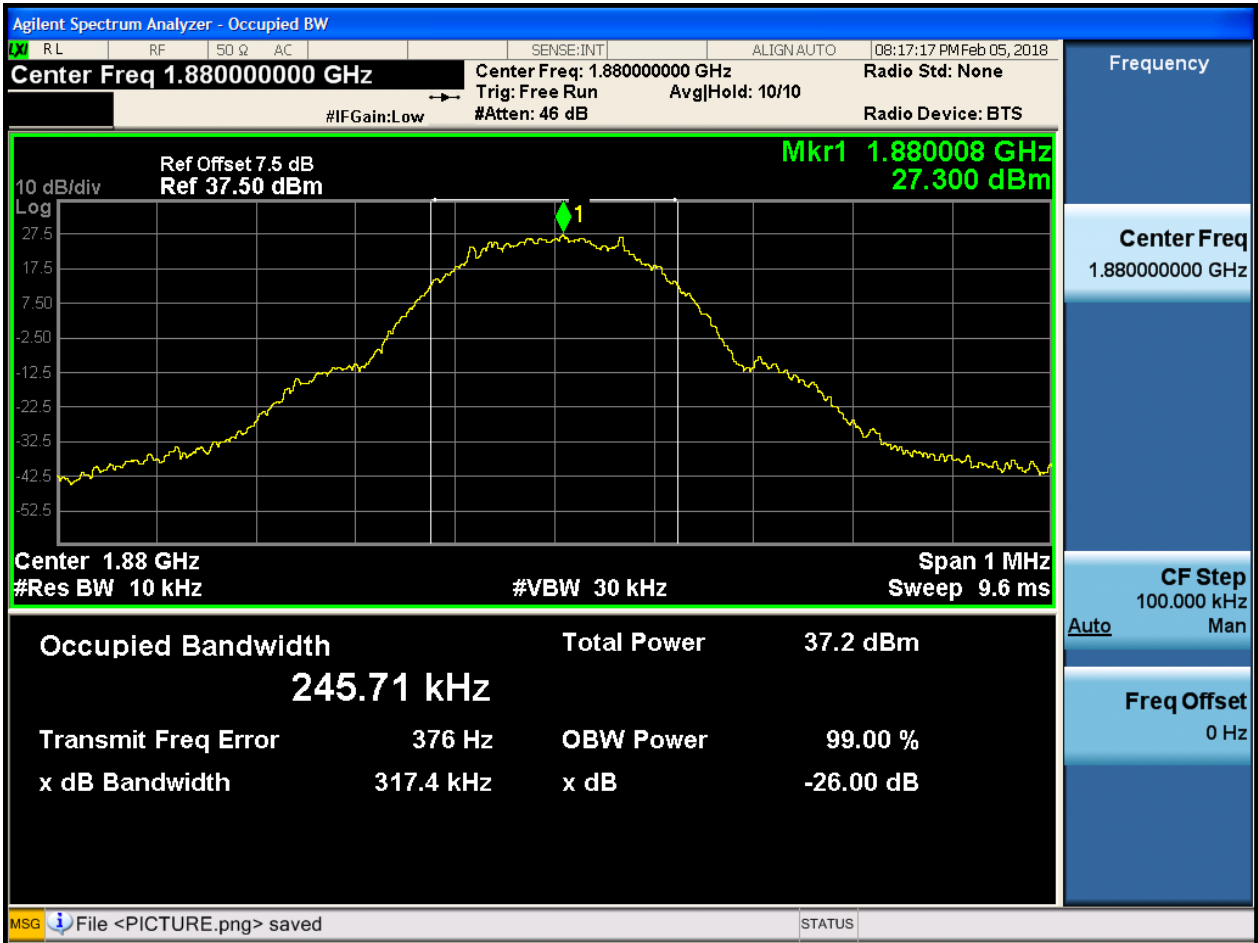
4.1.2.1 Test Mode = GSM/TM1

4.1.2.1.1 Test Channel = LCH



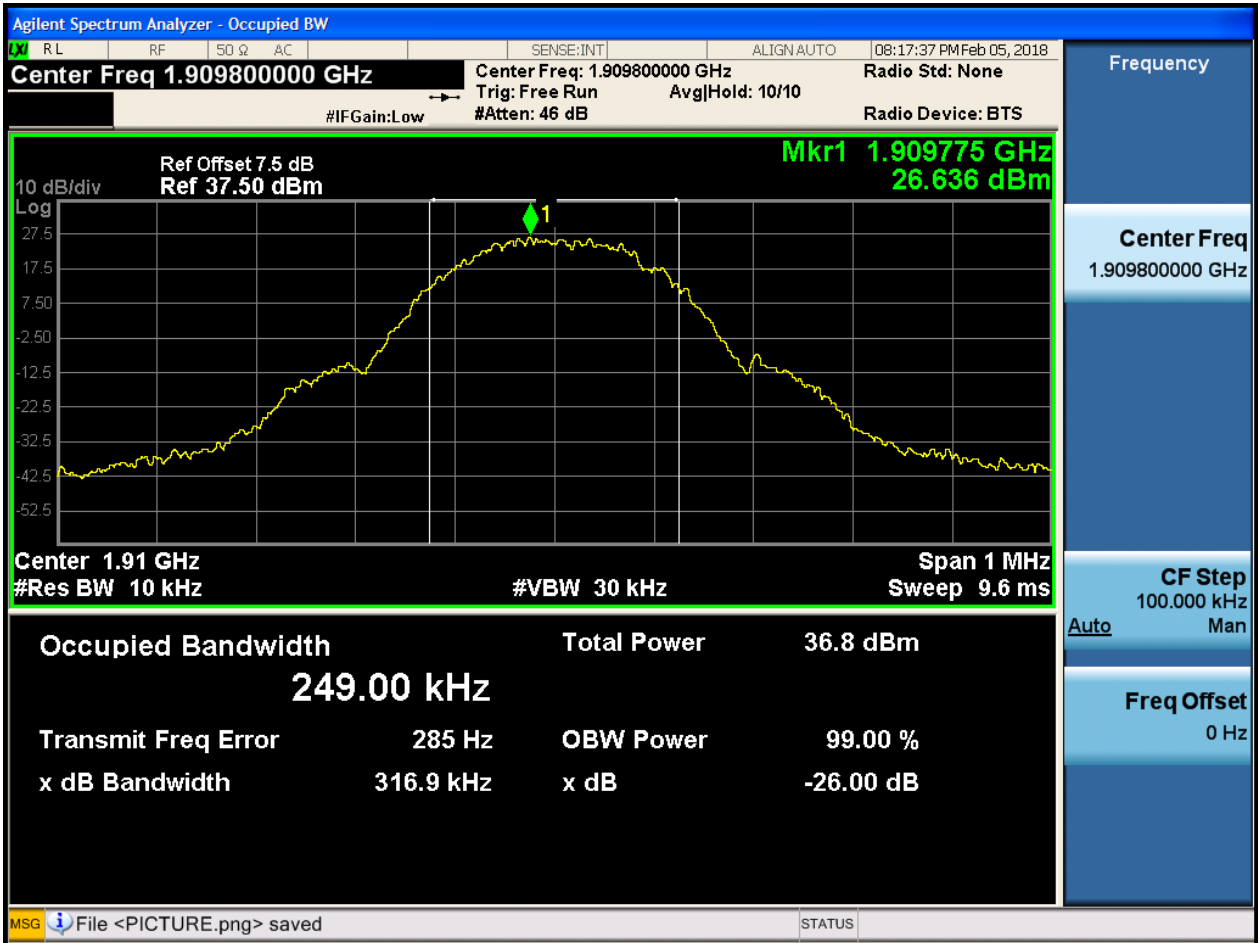


4.1.2.1.2 Test Channel = MCH





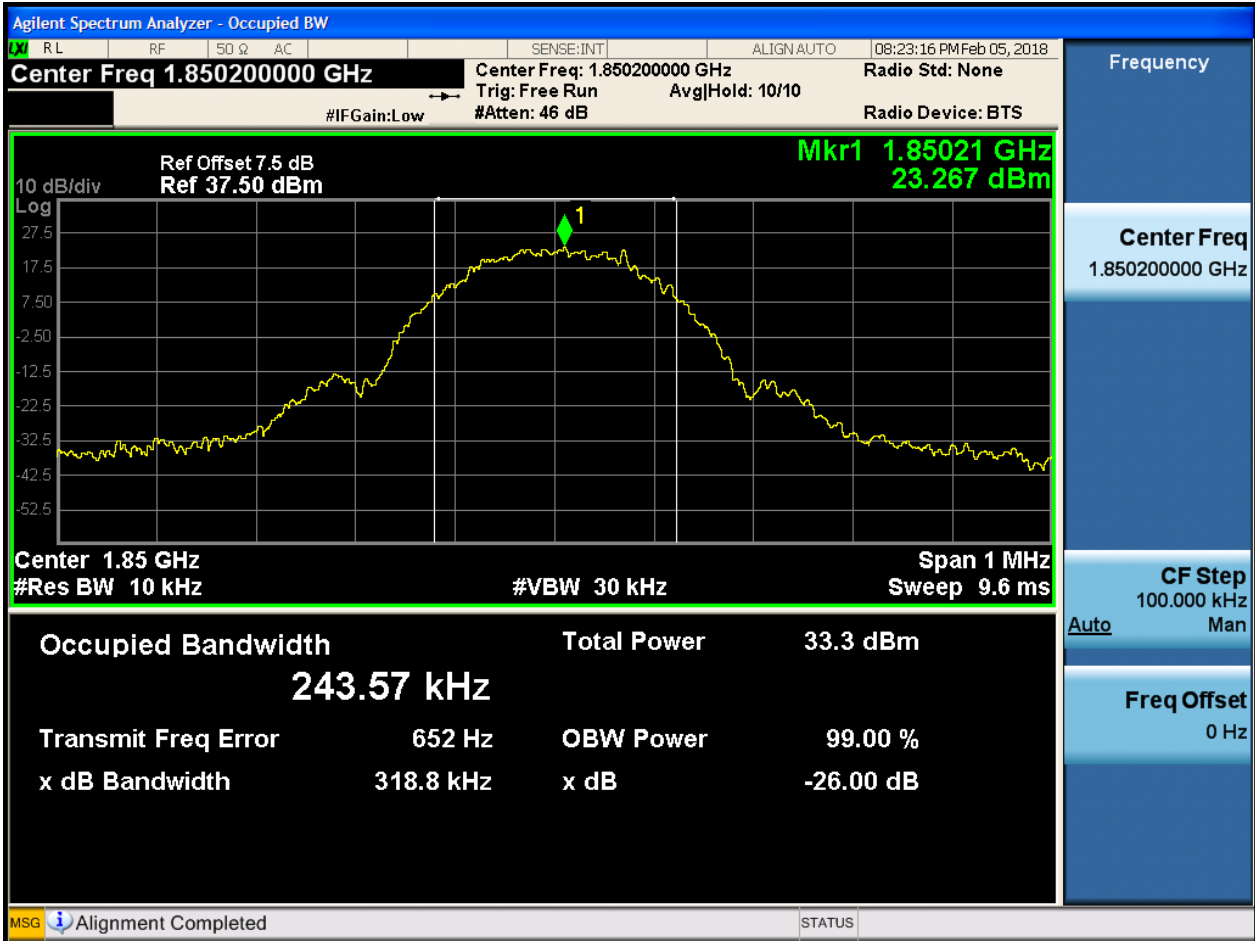
4.1.2.1.3 Test Channel = HCH



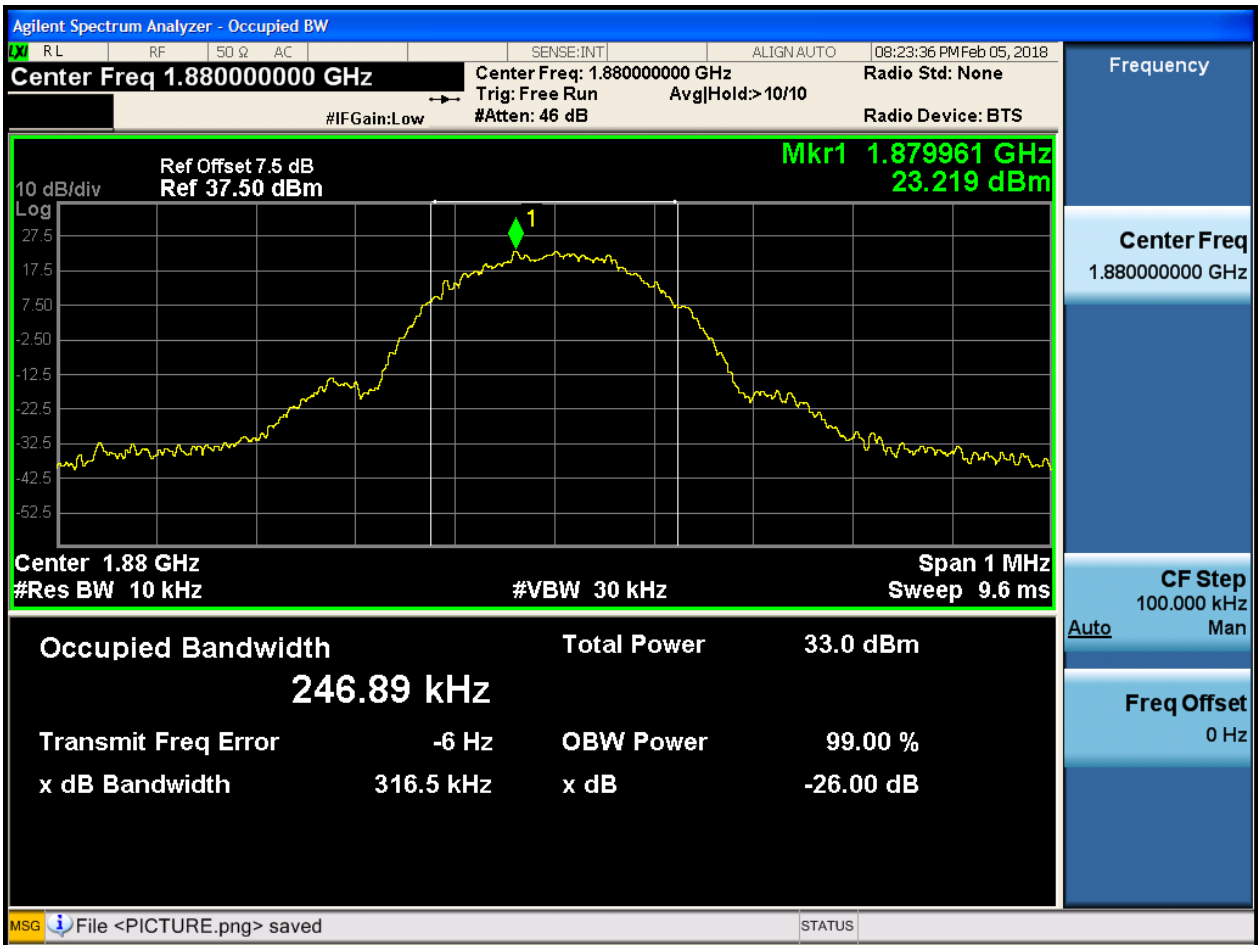


4.1.2.2 Test Mode = GSM/TM2

4.1.2.2.1 Test Channel = LCH

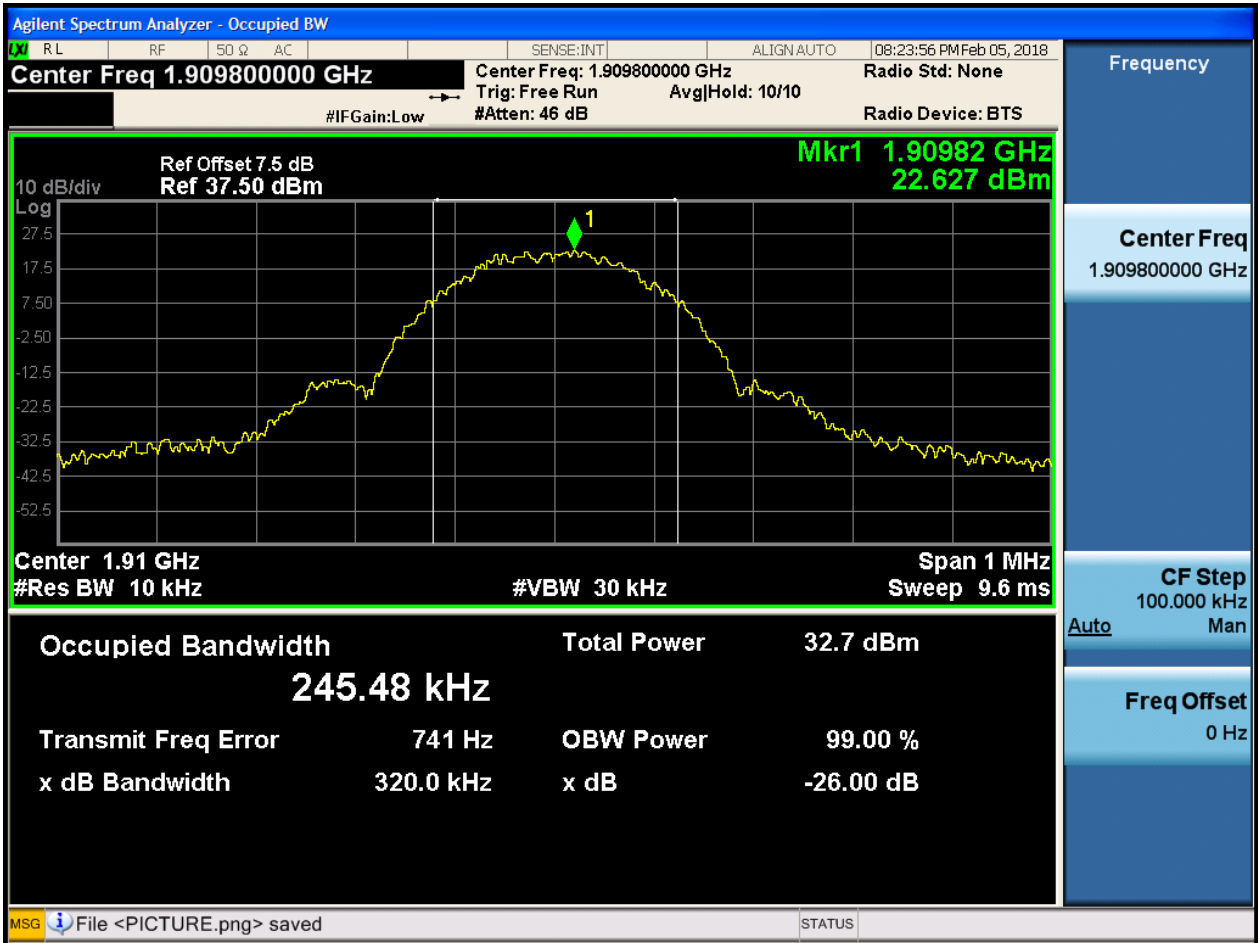


4.1.2.2.2 Test Channel = MCH





4.1.2.2.3 Test Channel = HCH





5Appendix_E: Band Edges Compliance

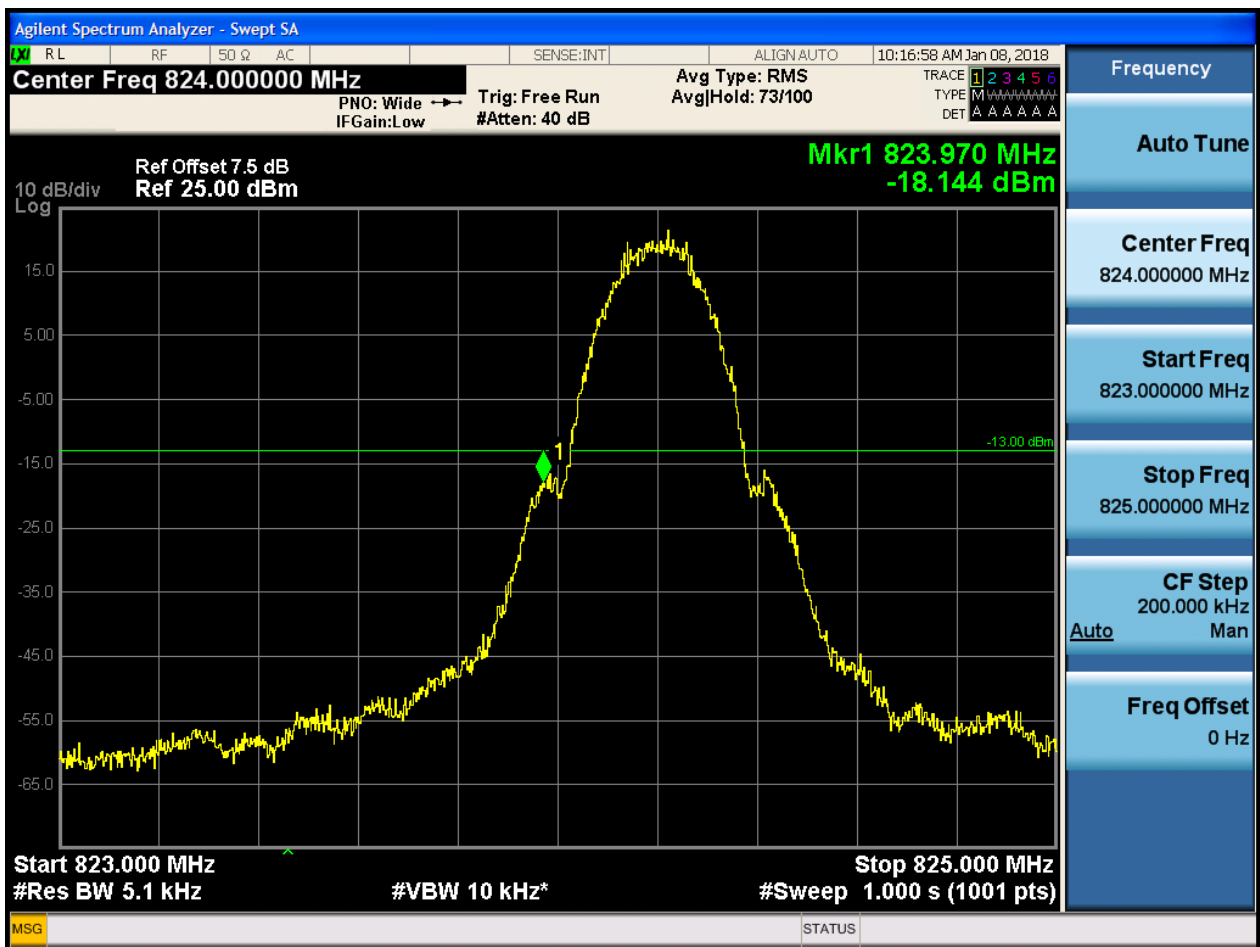
Part I - Test Plots

5.1 For GSM

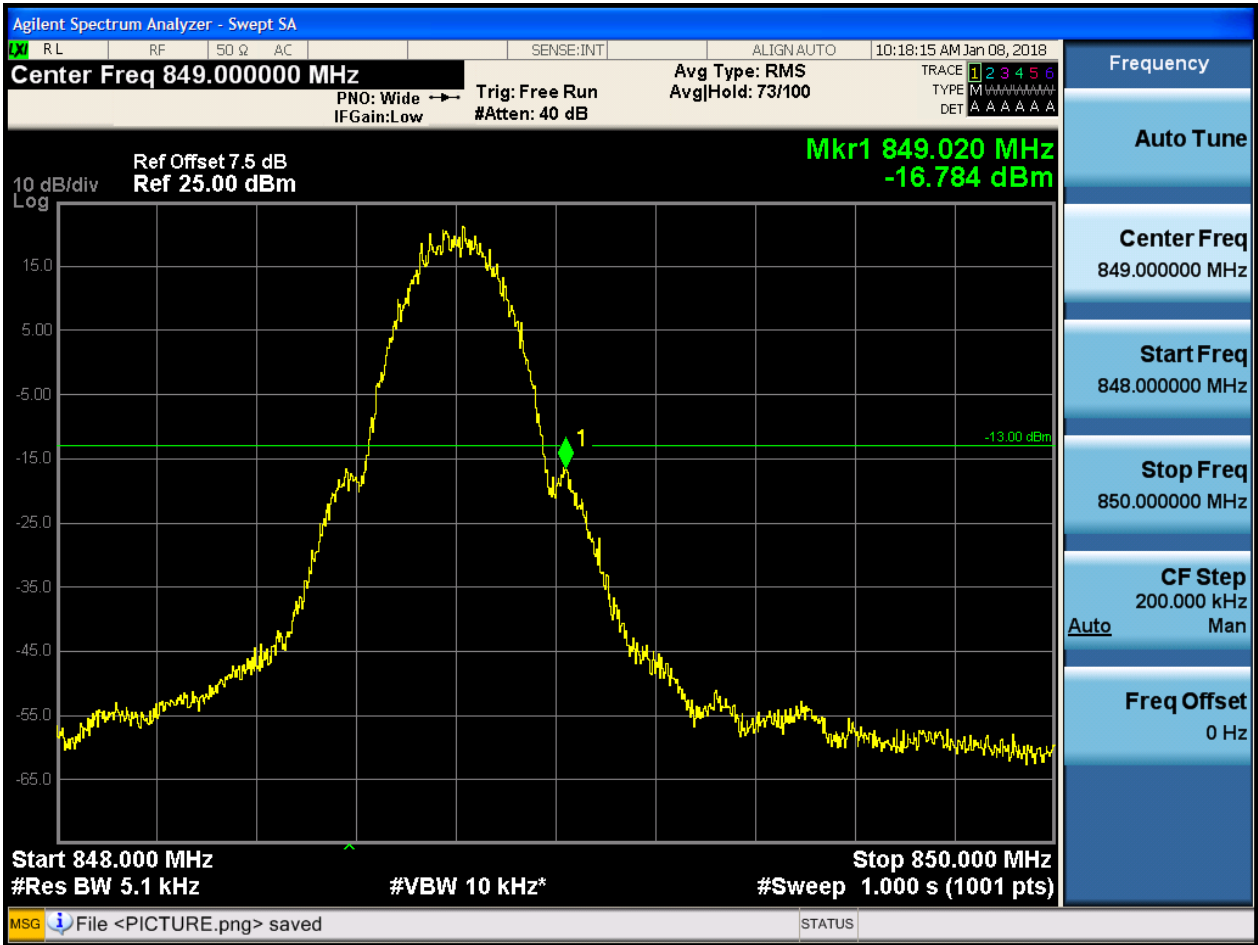
5.1.1 Test Band = GSM850

5.1.1.1 Test Mode = GSM/TM1

5.1.1.1.1 Test Channel = LCH



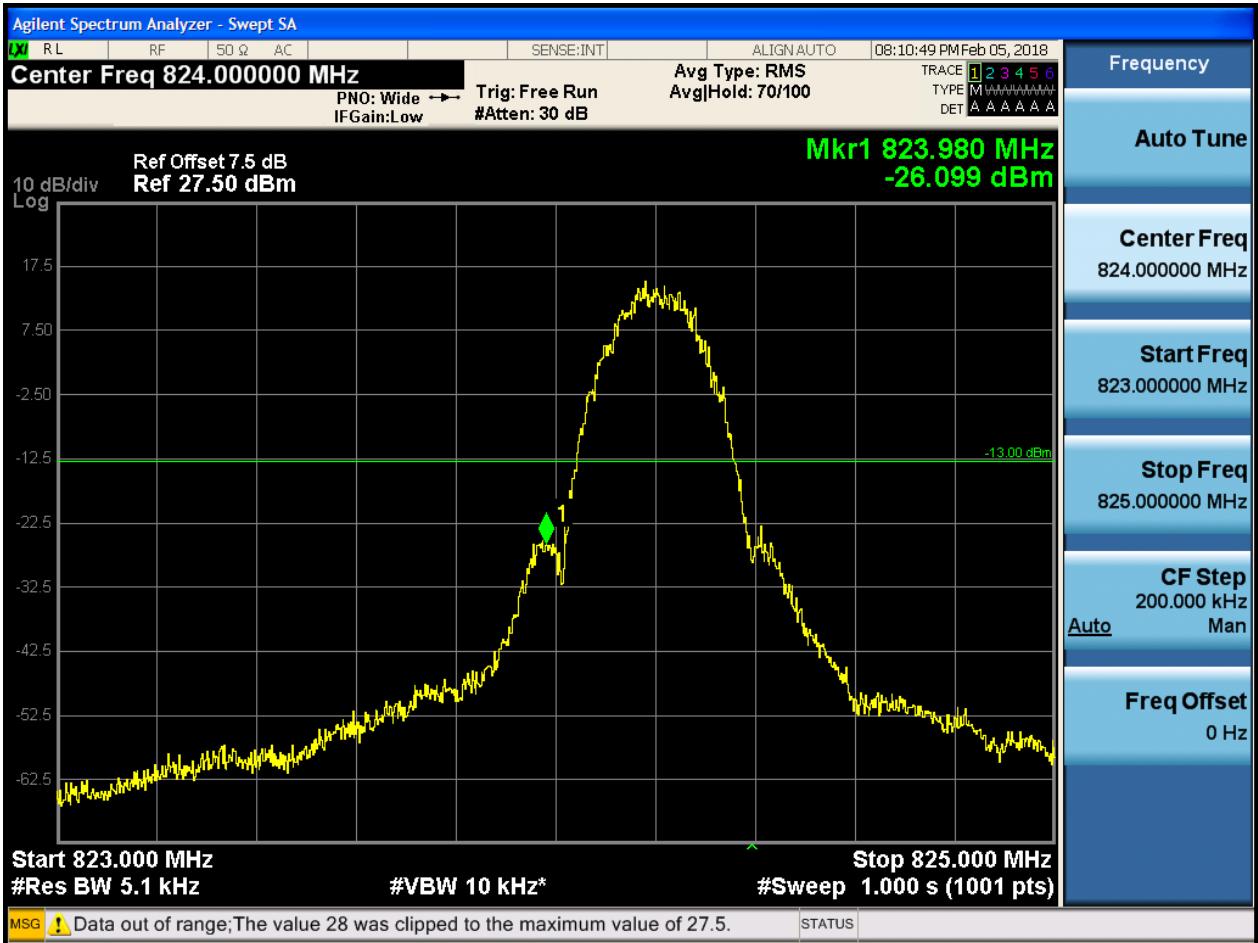
5.1.1.1.2 Test Channel = HCH



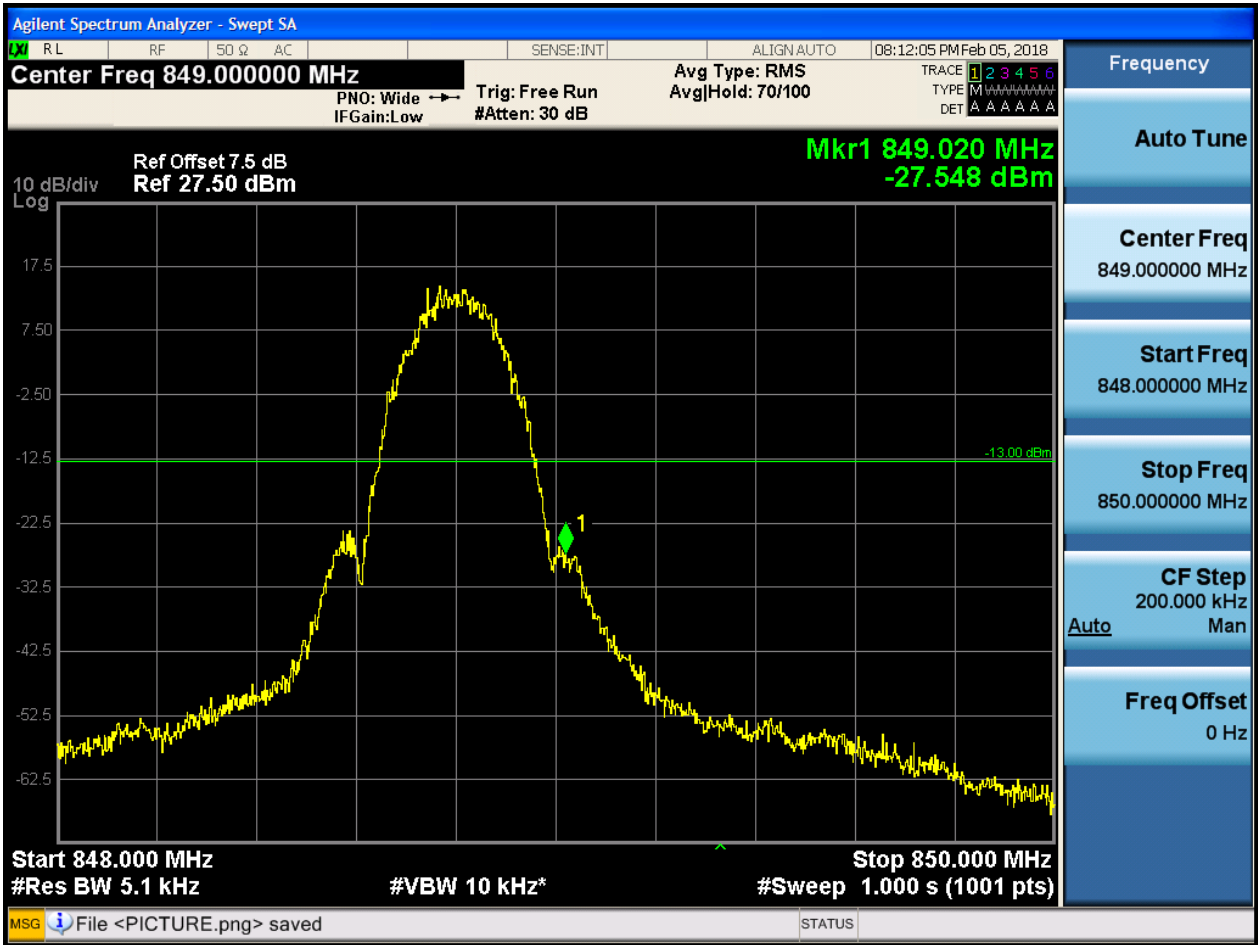


5.1.1.2 Test Mode = GSM/TM2

5.1.1.2.1 Test Channel = LCH



5.1.1.2.2 Test Channel = HCH

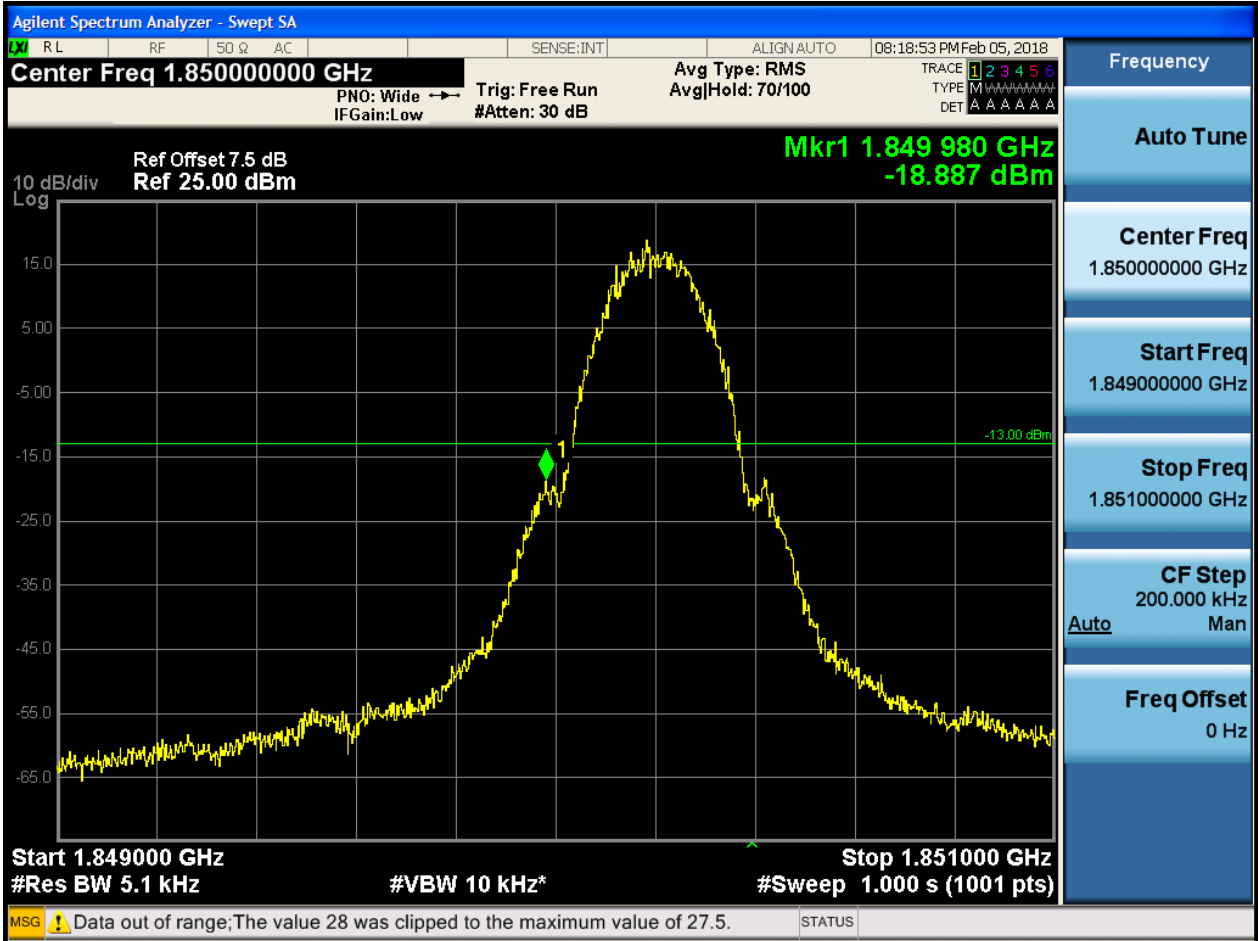




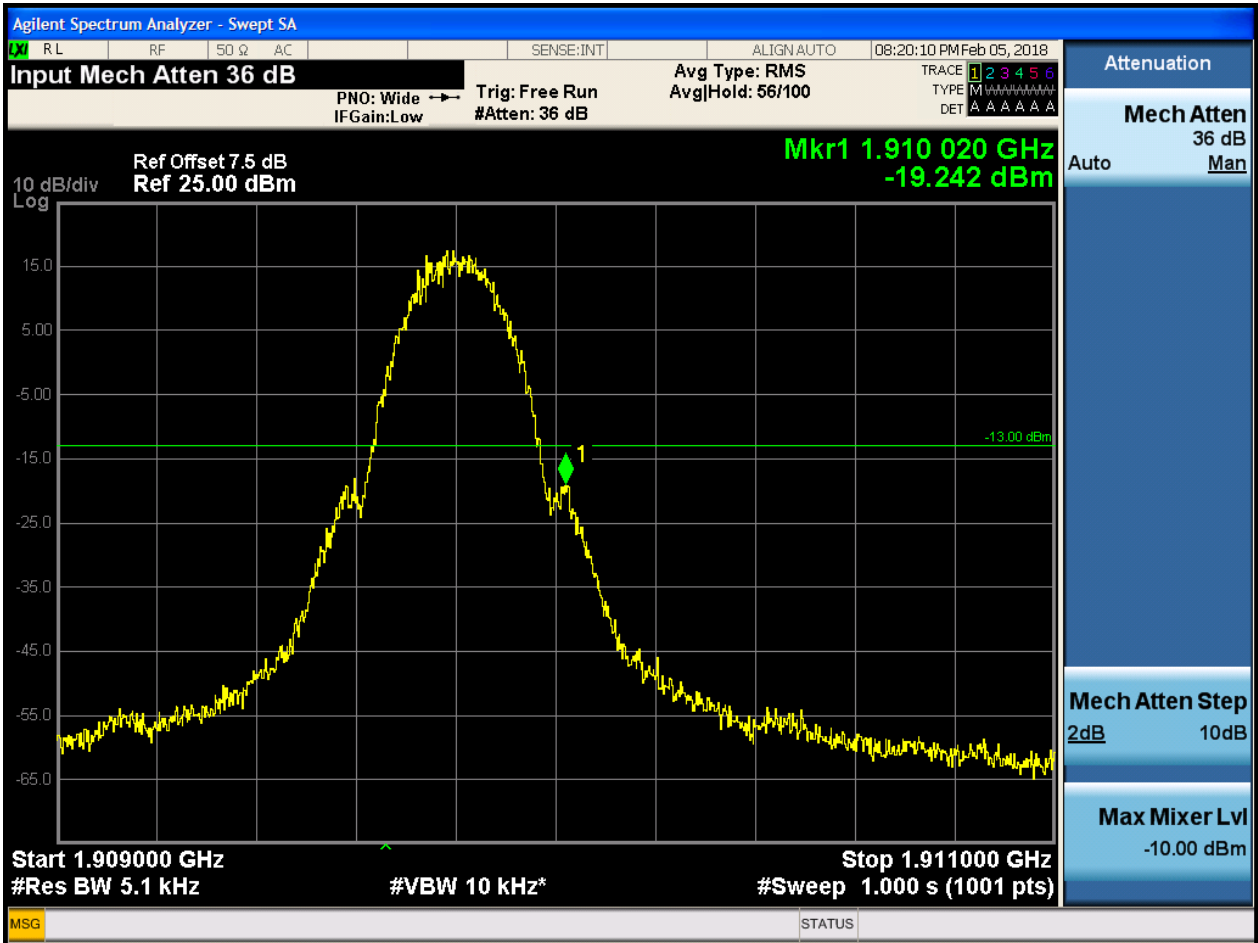
5.1.2 Test Band = GSM1900

5.1.2.1 Test Mode = GSM/TM1

5.1.2.1.1 Test Channel = LCH



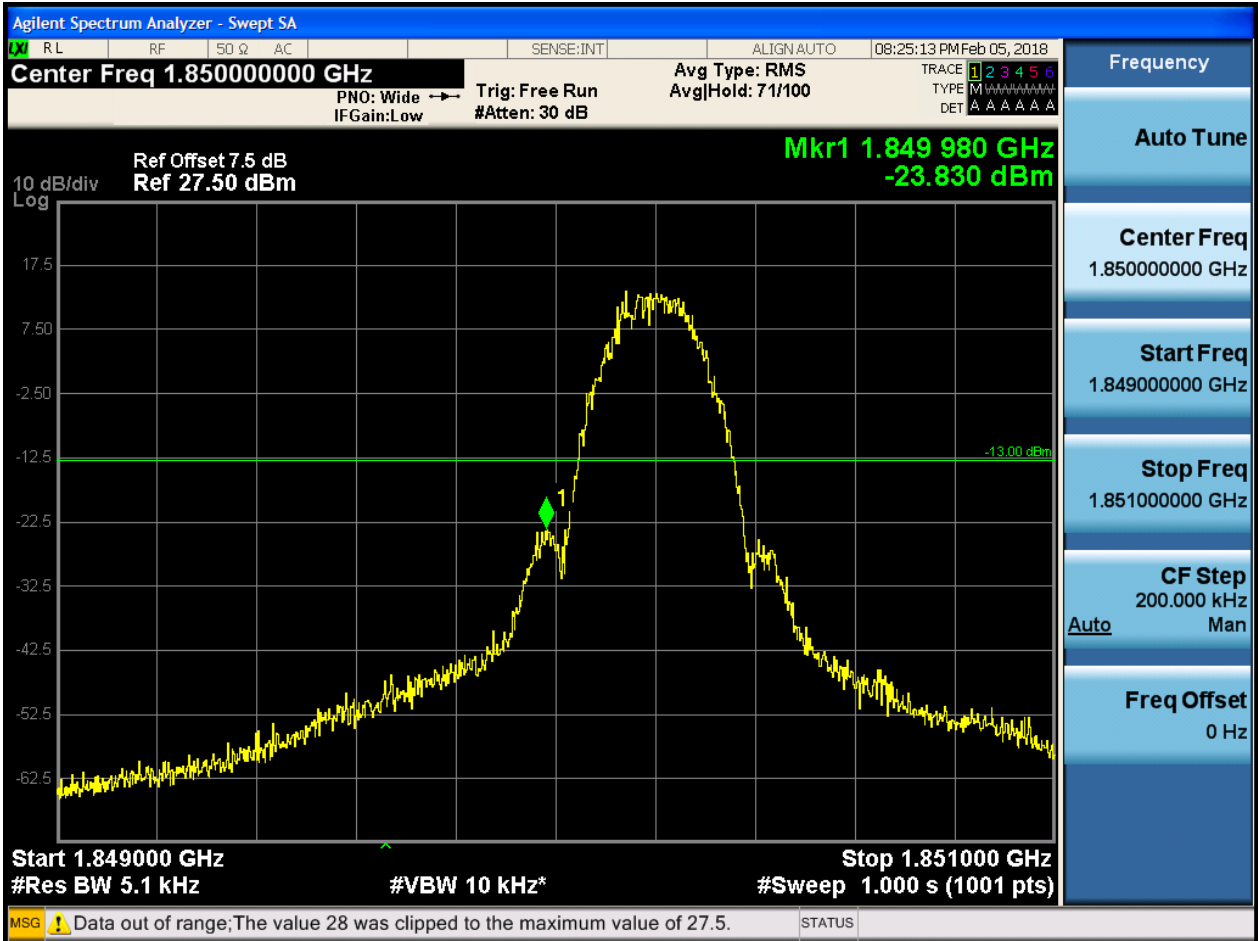
5.1.2.1.2 Test Channel = HCH



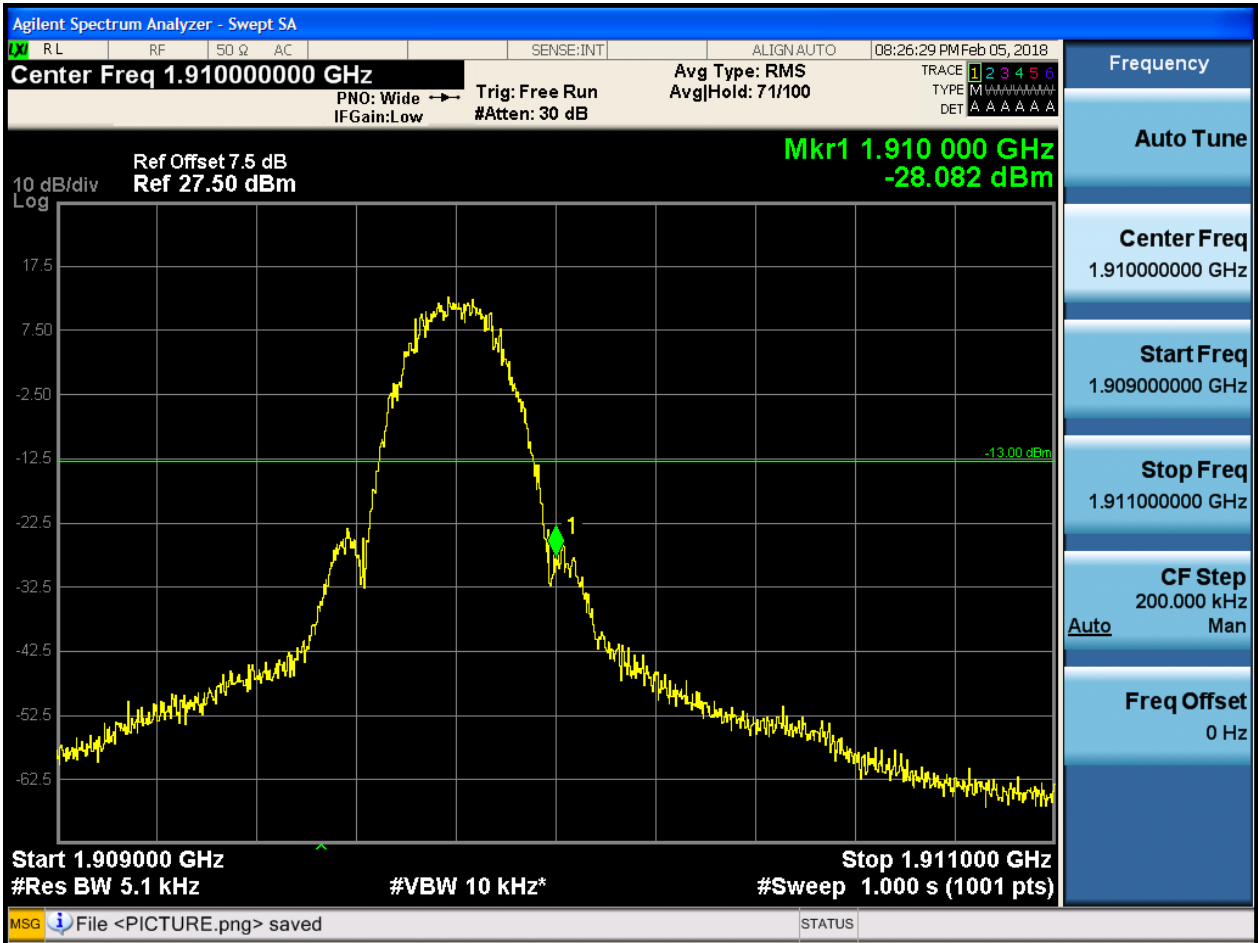


5.1.2.2 Test Mode = GSM/TM2

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.

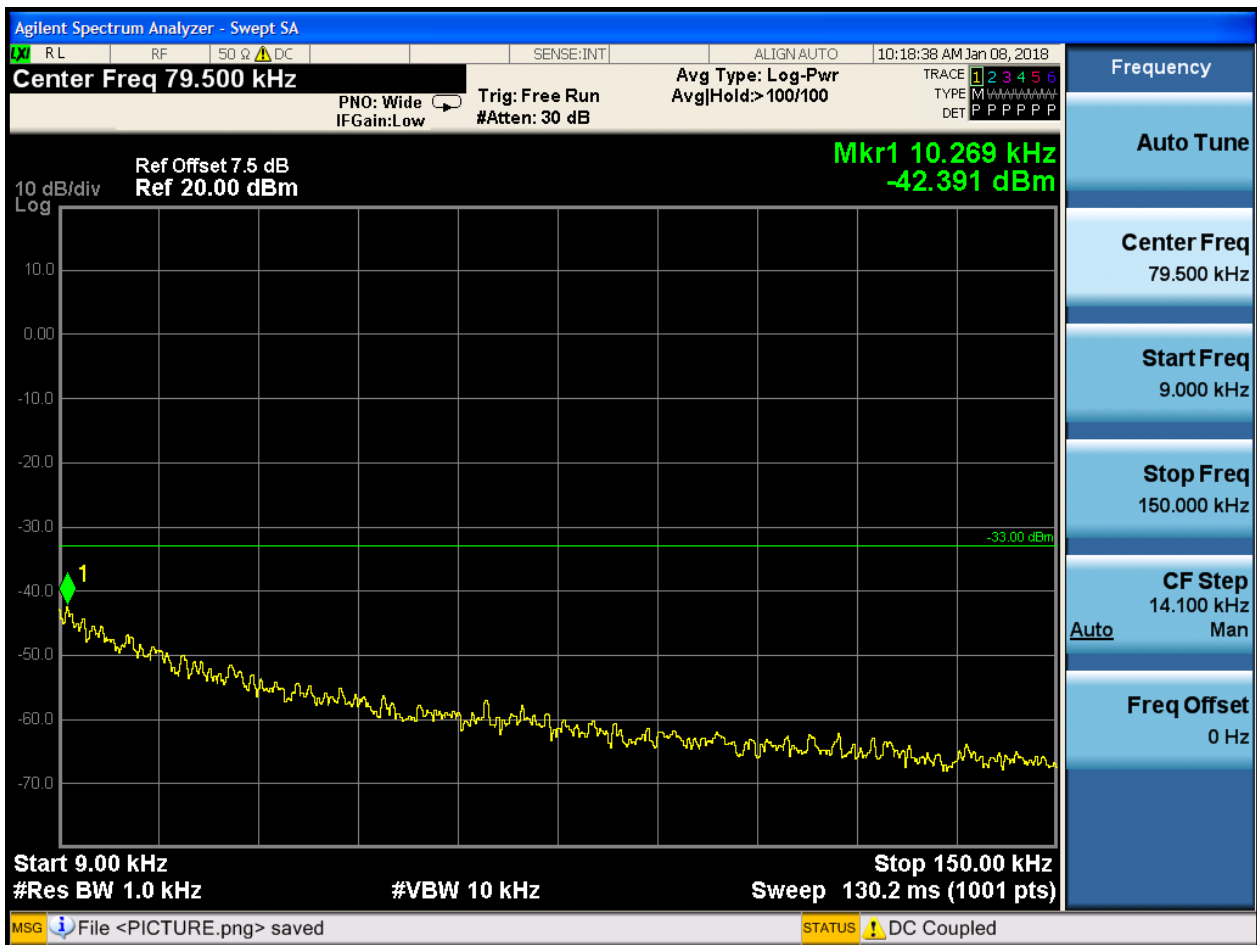
Part I - Test Plots

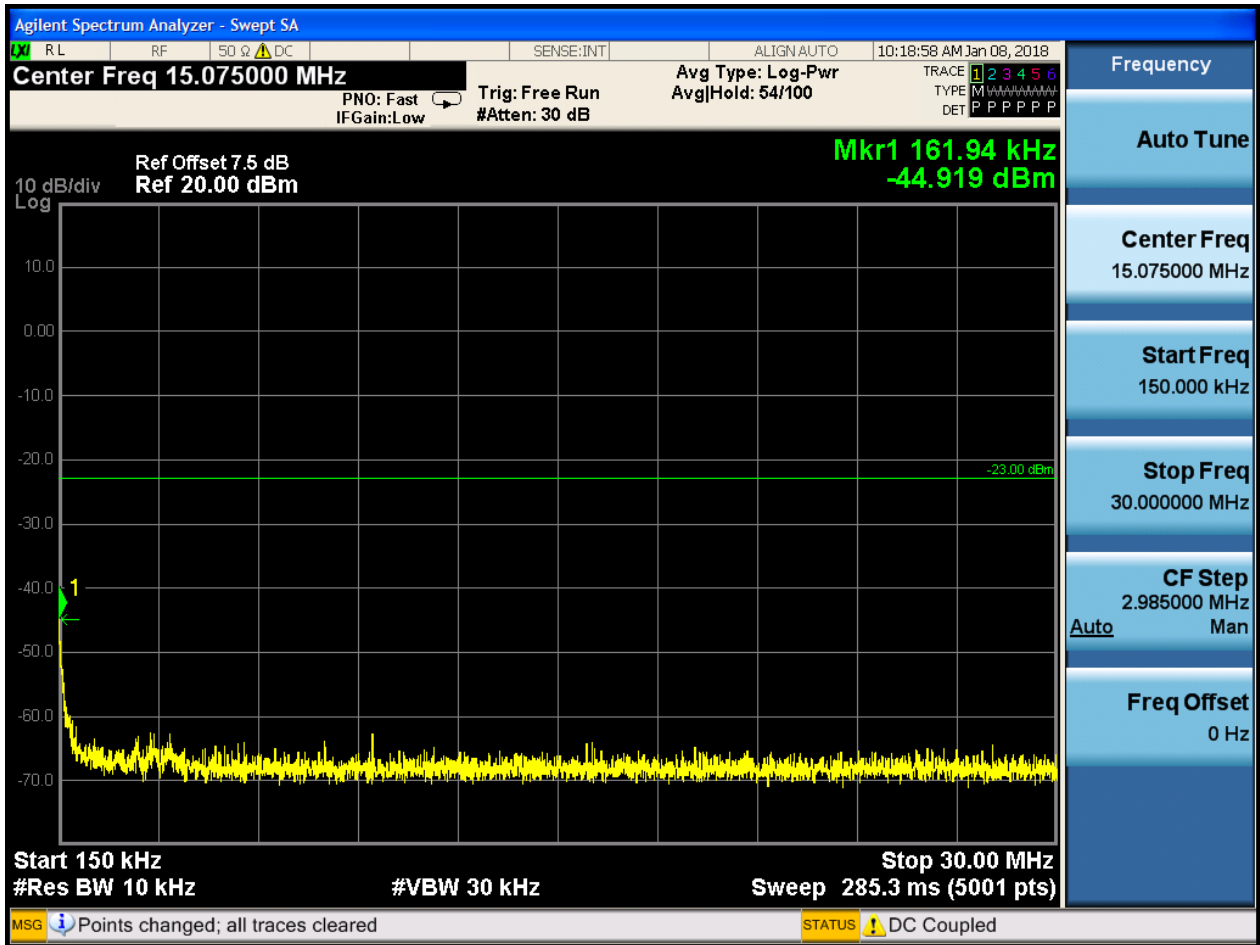
6.1 For GSM

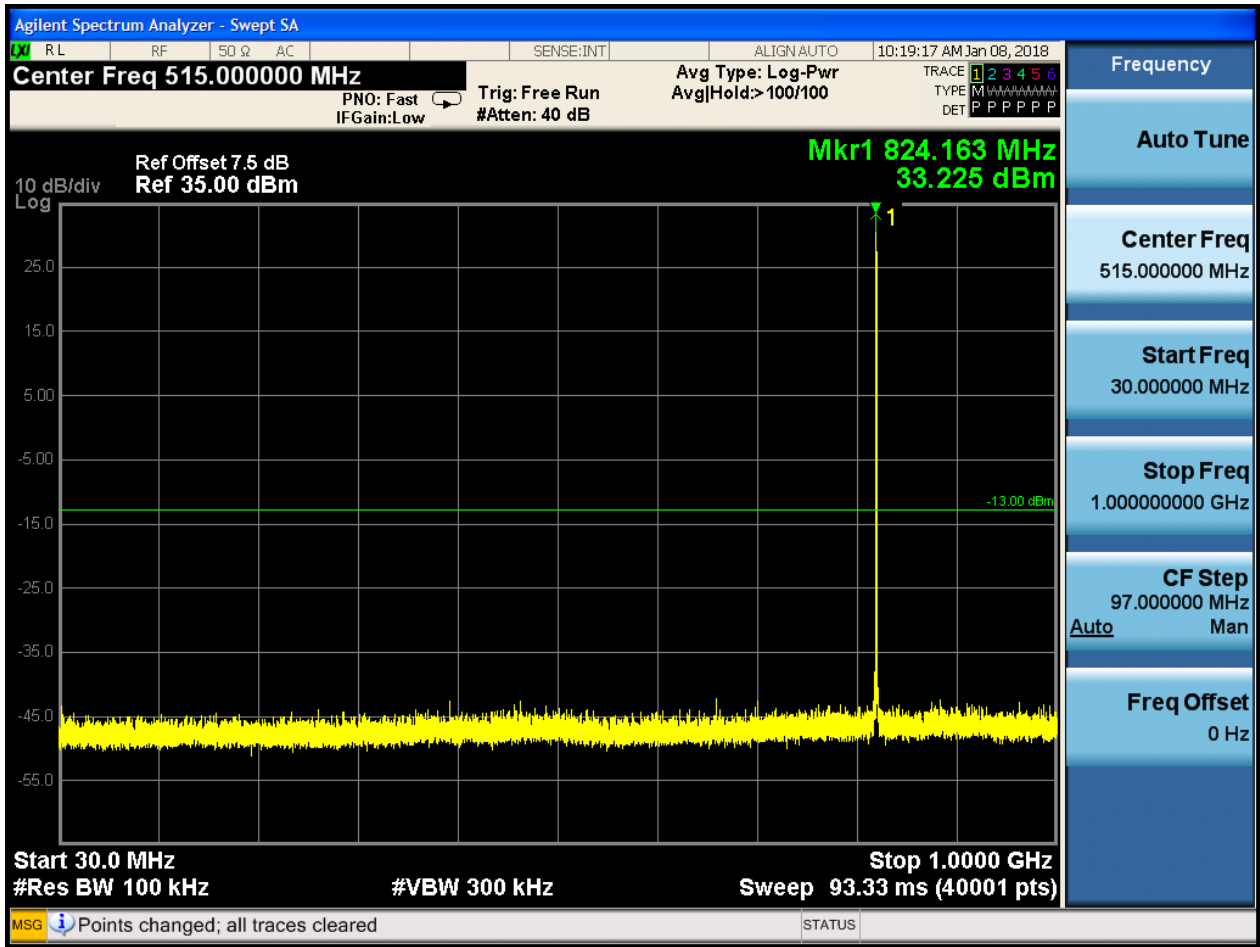
6.1.1 Test Band = GSM850

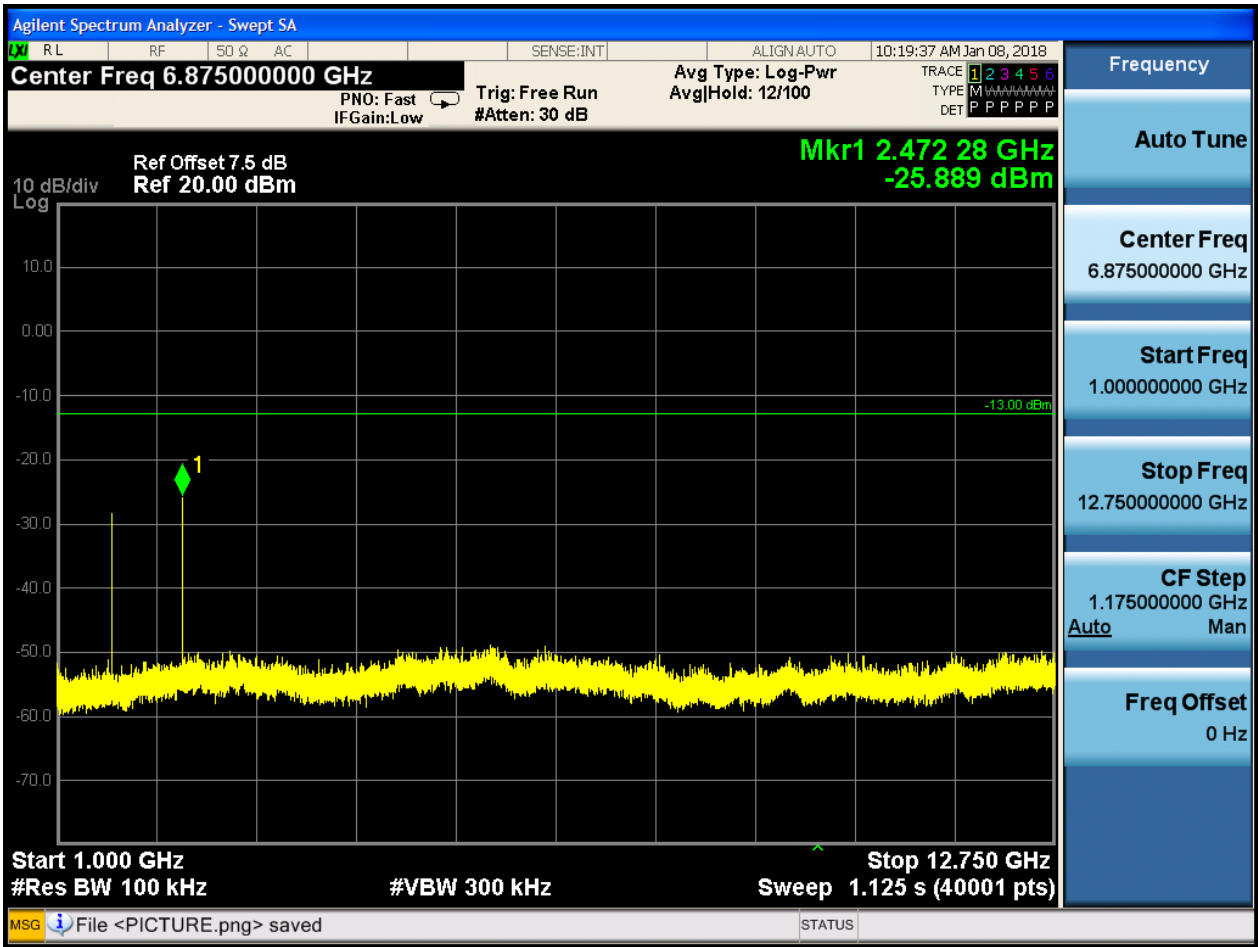
6.1.1.1 Test Mode = GSM/TM1

6.1.1.1.1 Test Channel = LCH



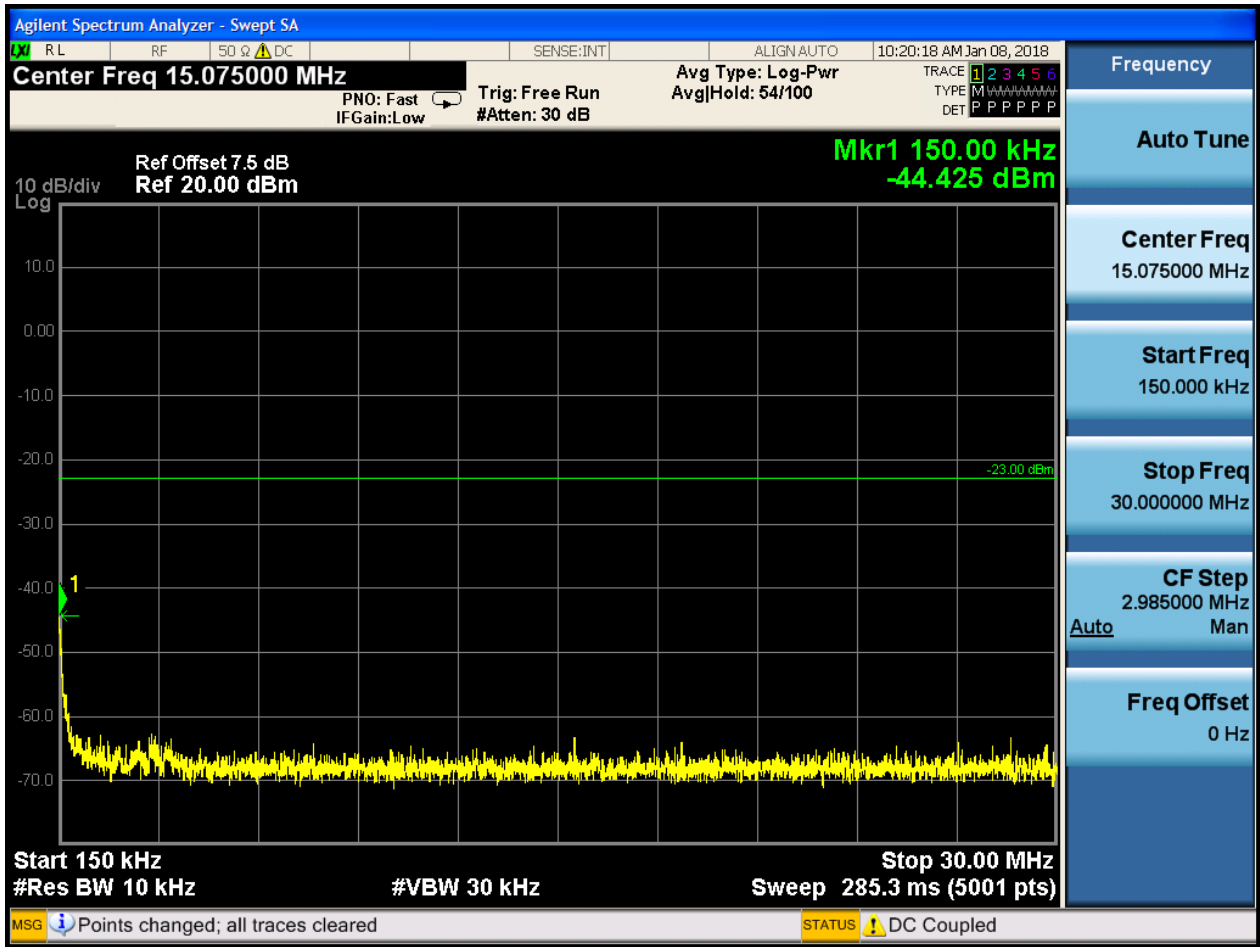


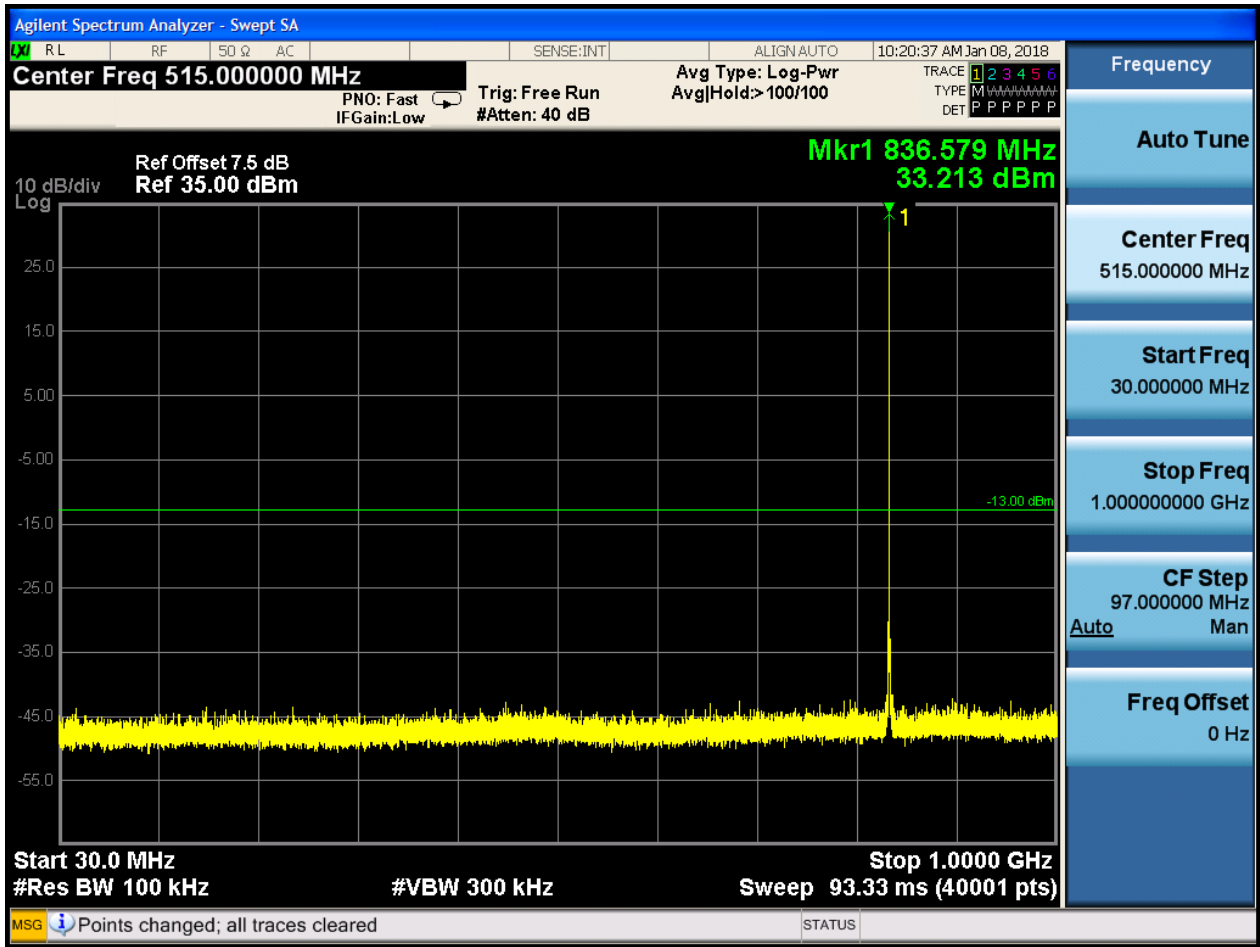


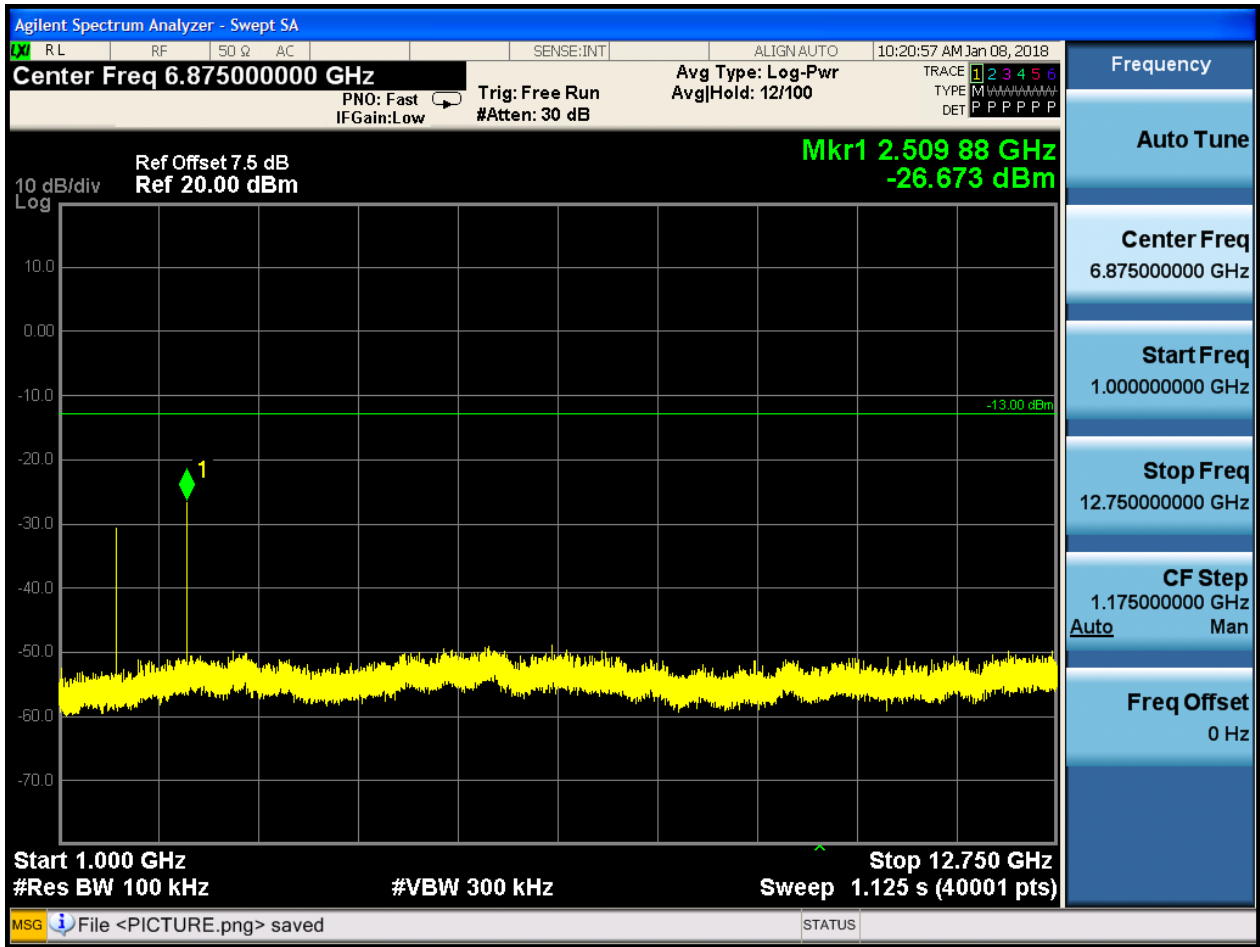


6.1.1.1.2 Test Channel = MCH

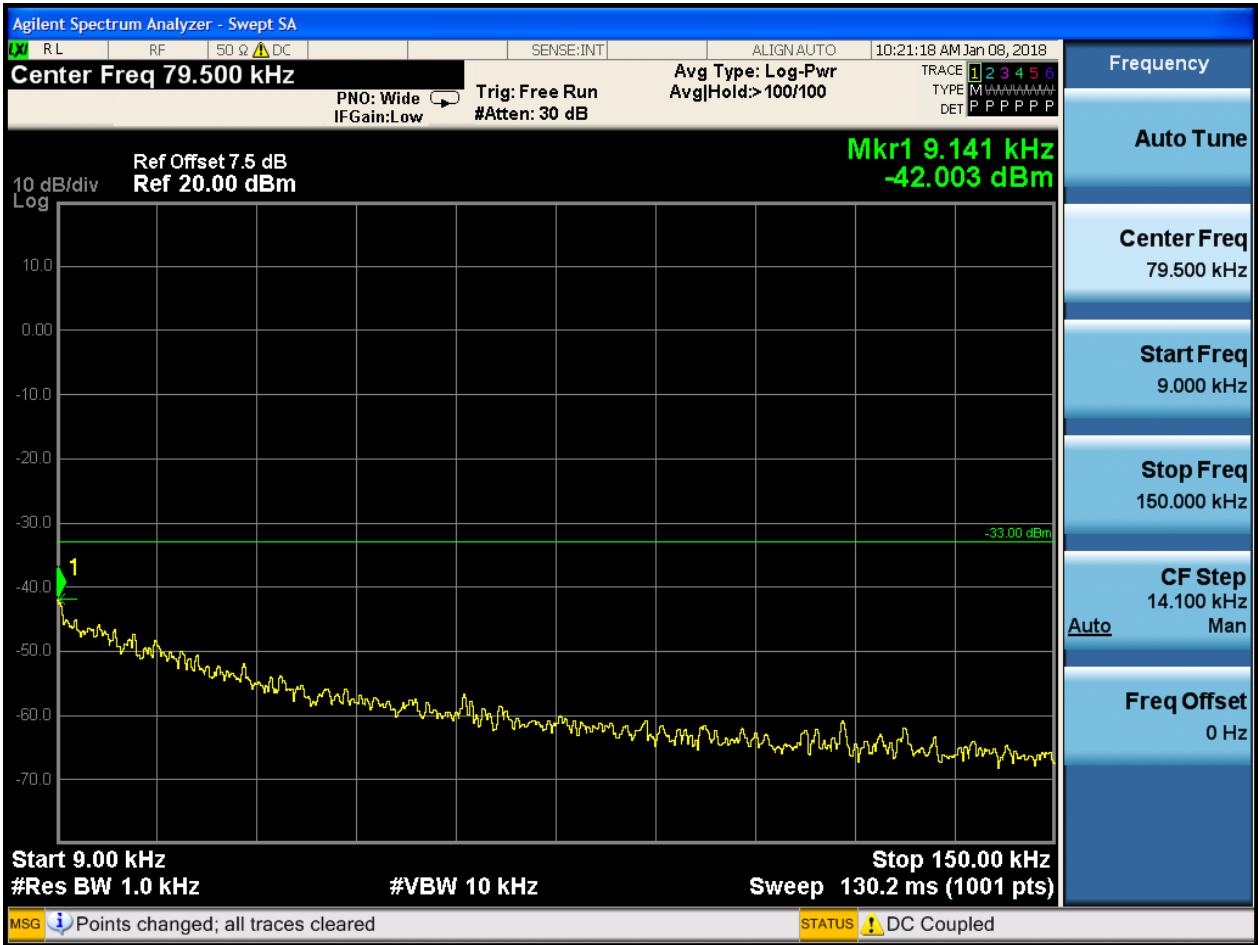


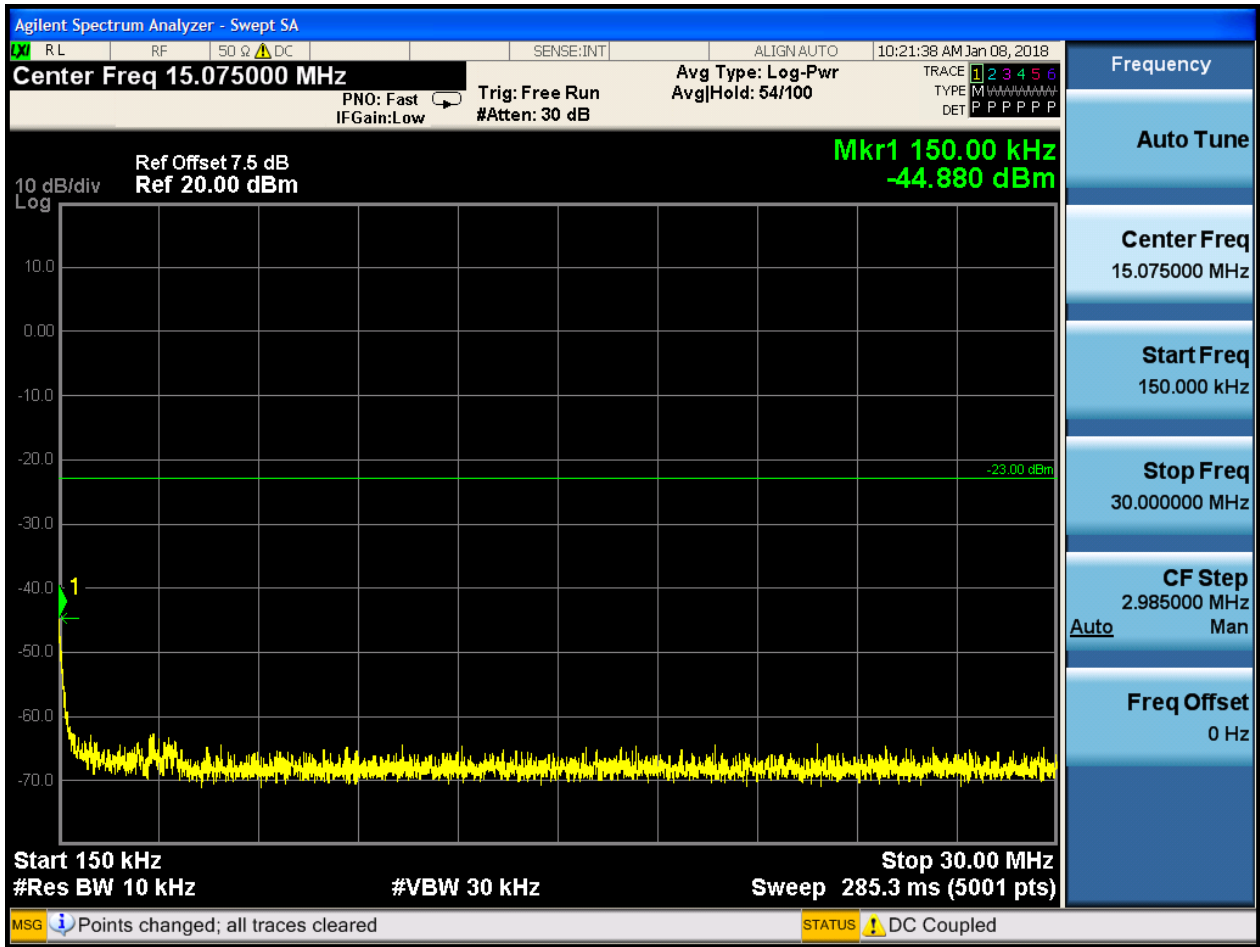


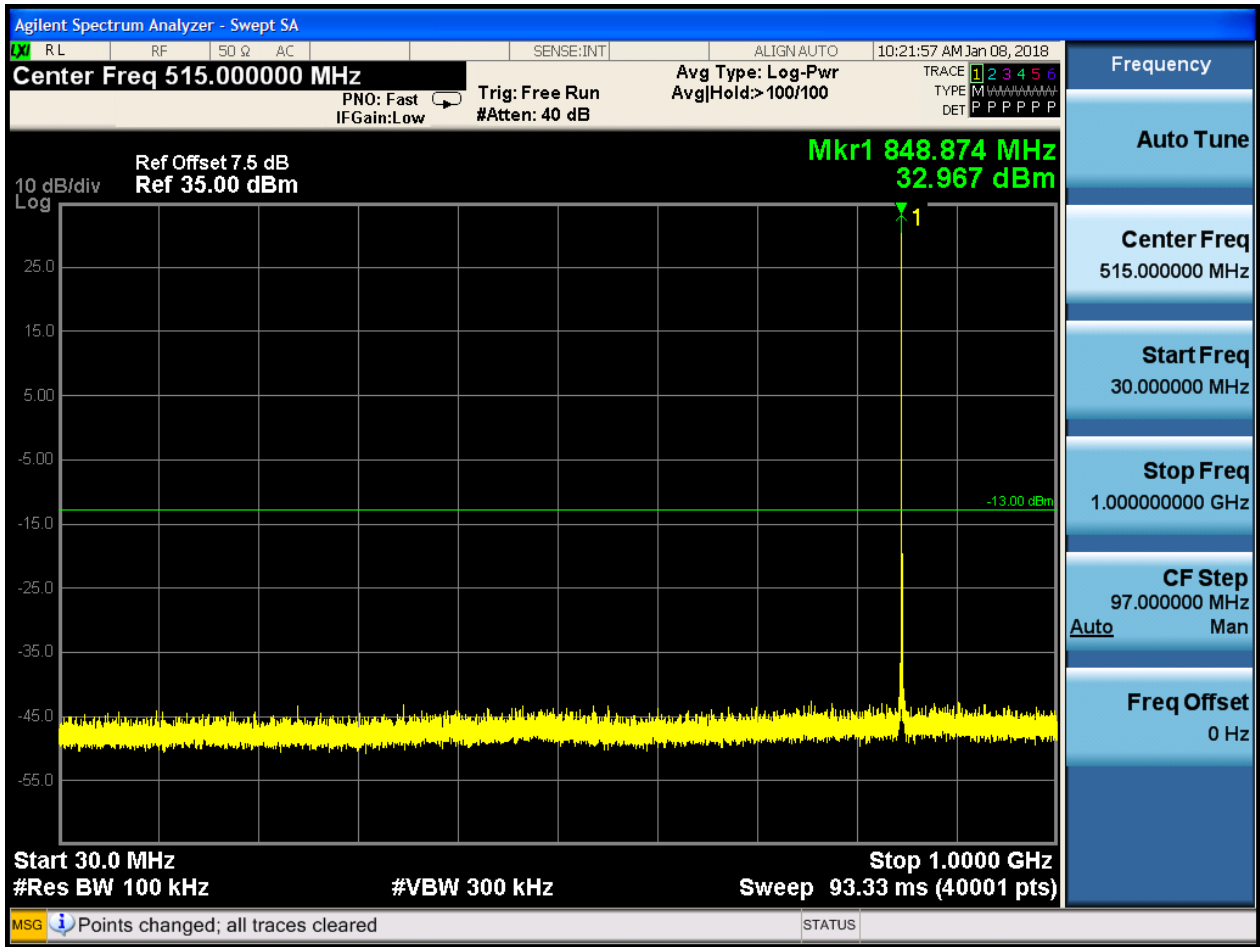


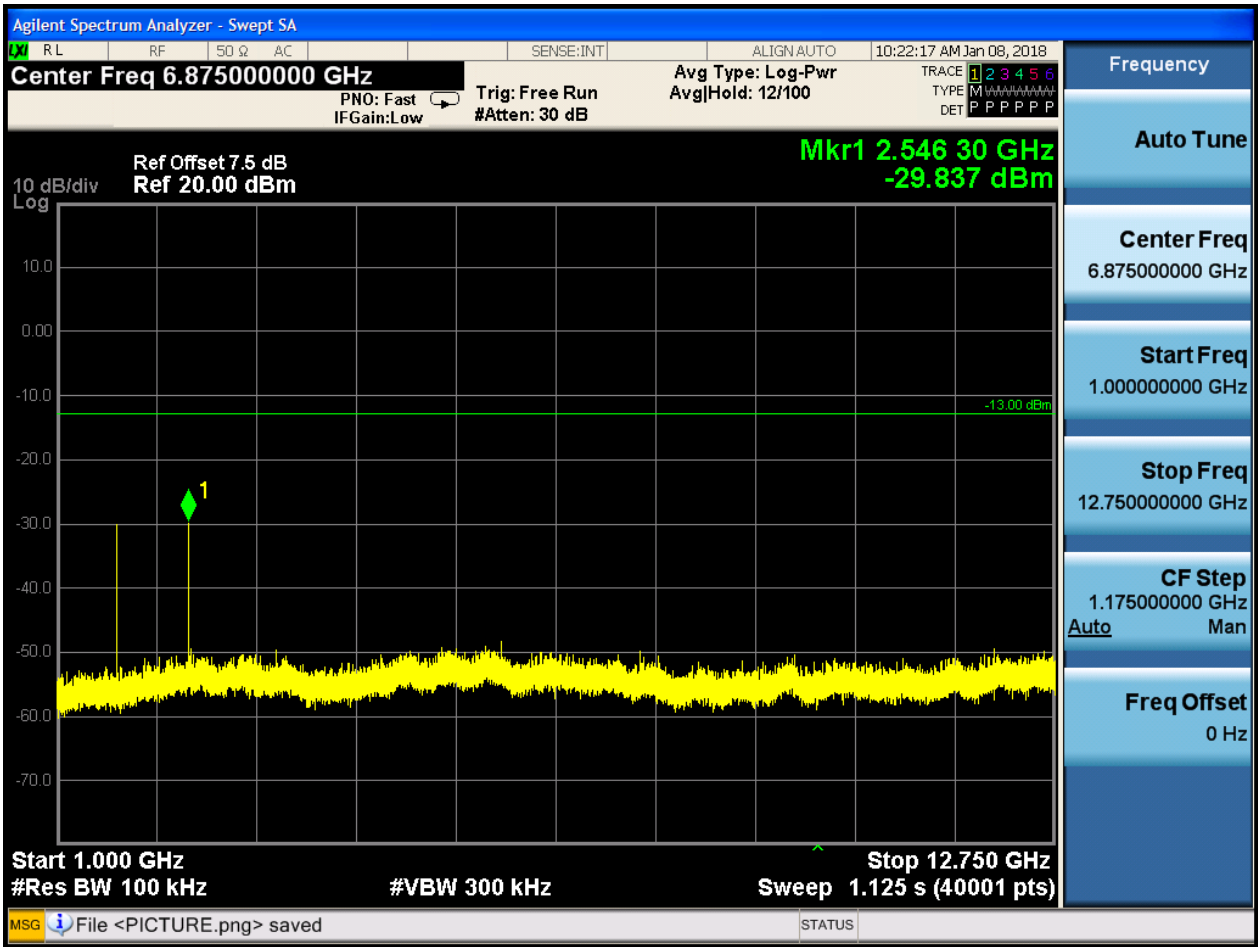


6.1.1.1.3 Test Channel = HCH





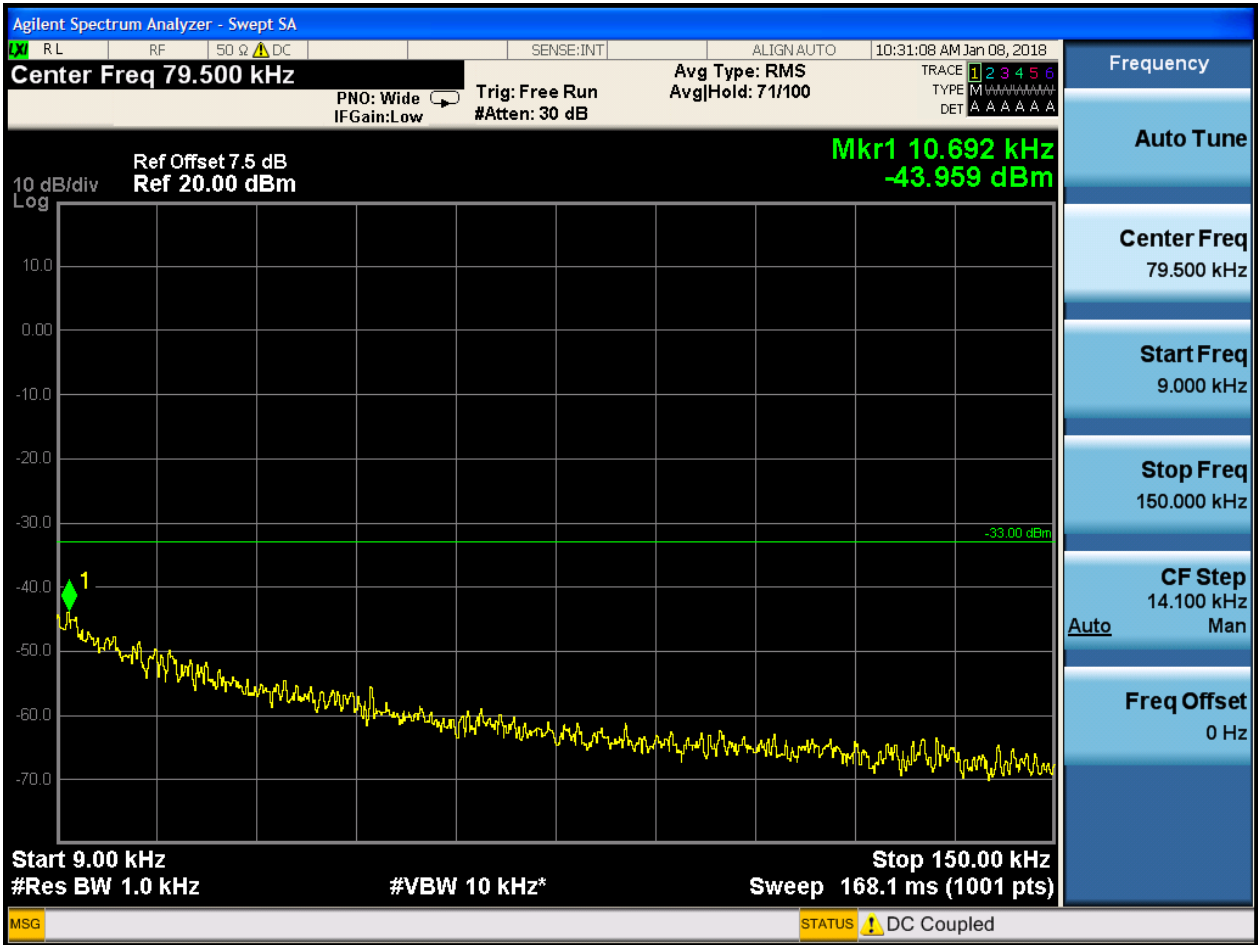


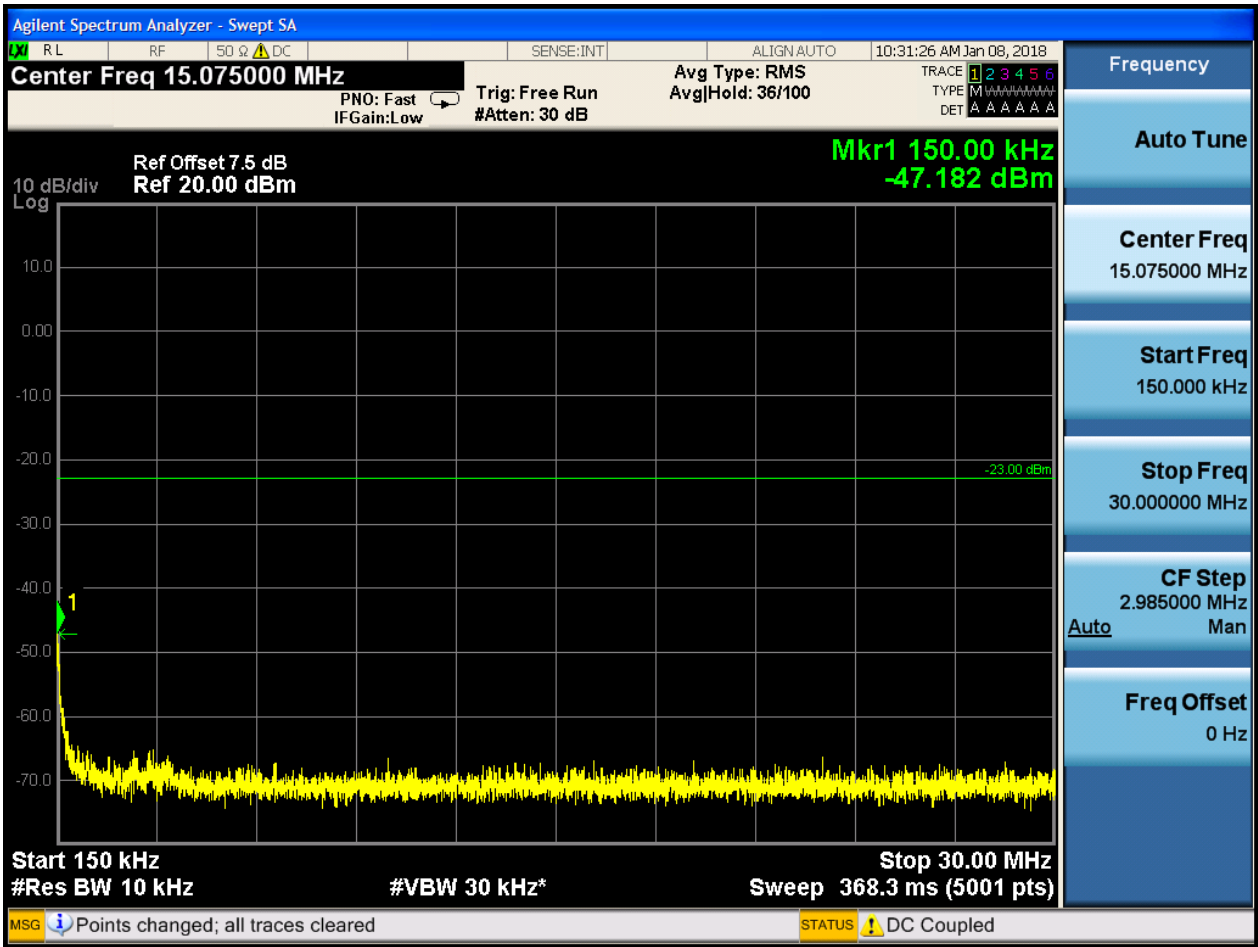


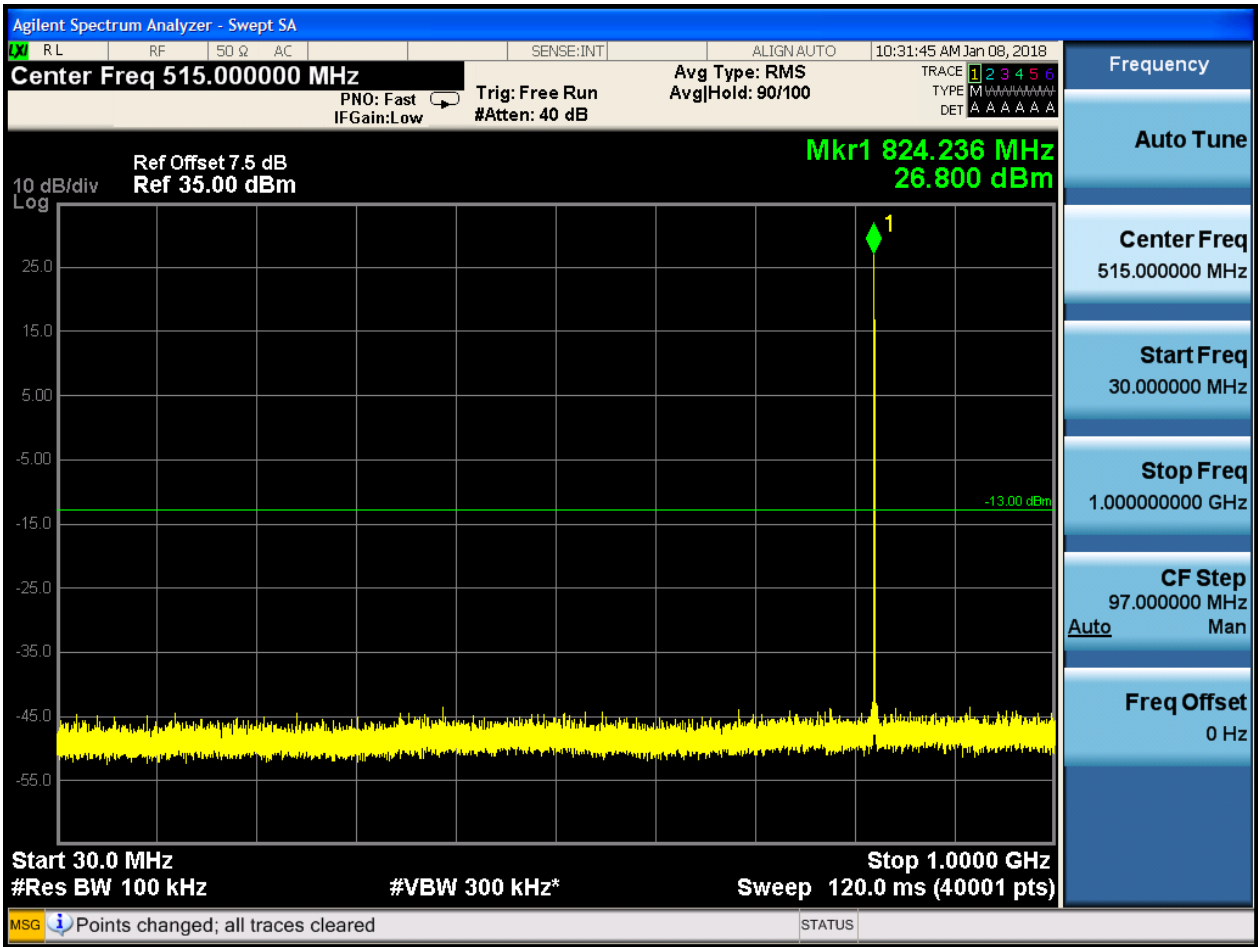


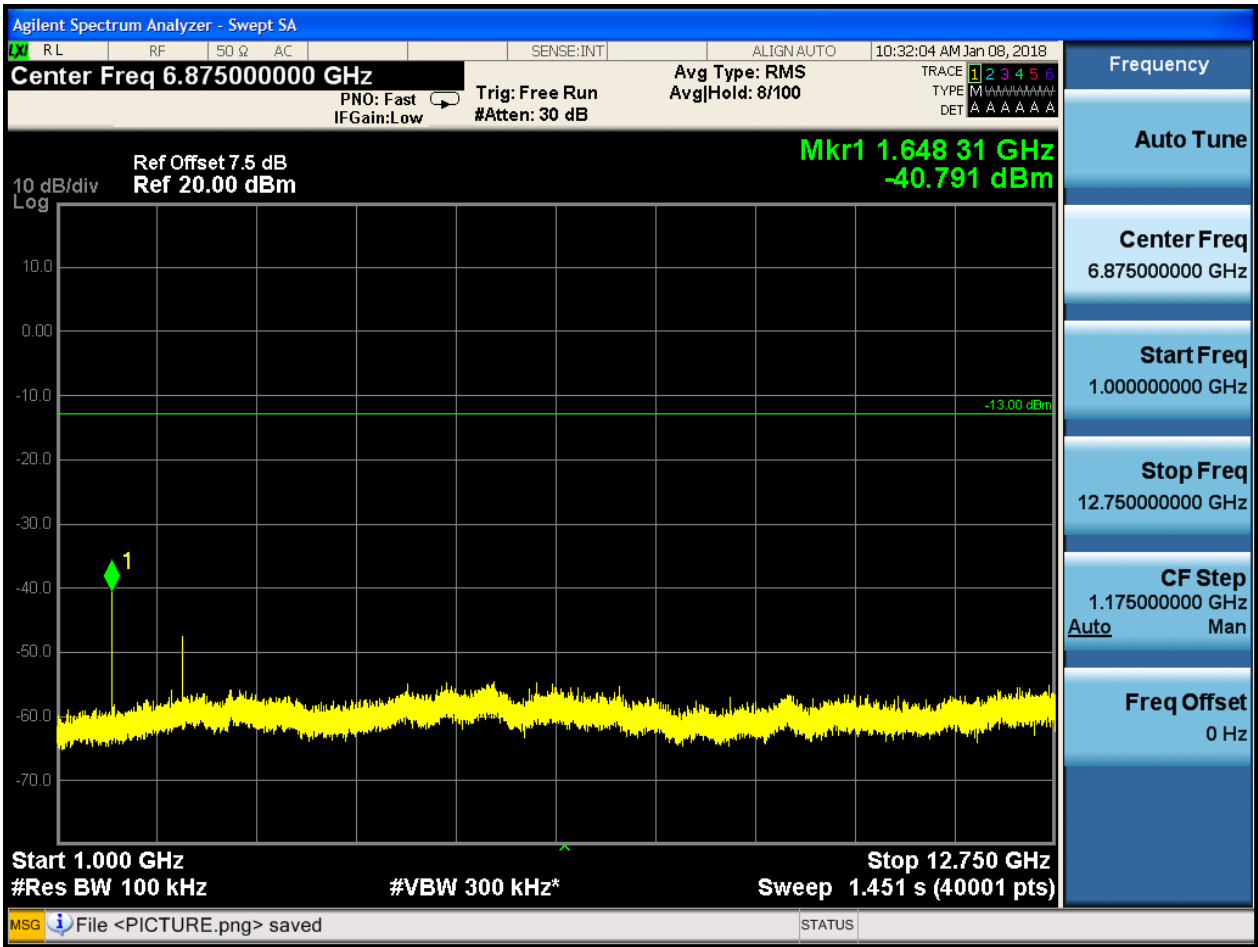
6.1.1.2 Test Mode = GSM/TM2

6.1.1.2.1 Test Channel = LCH



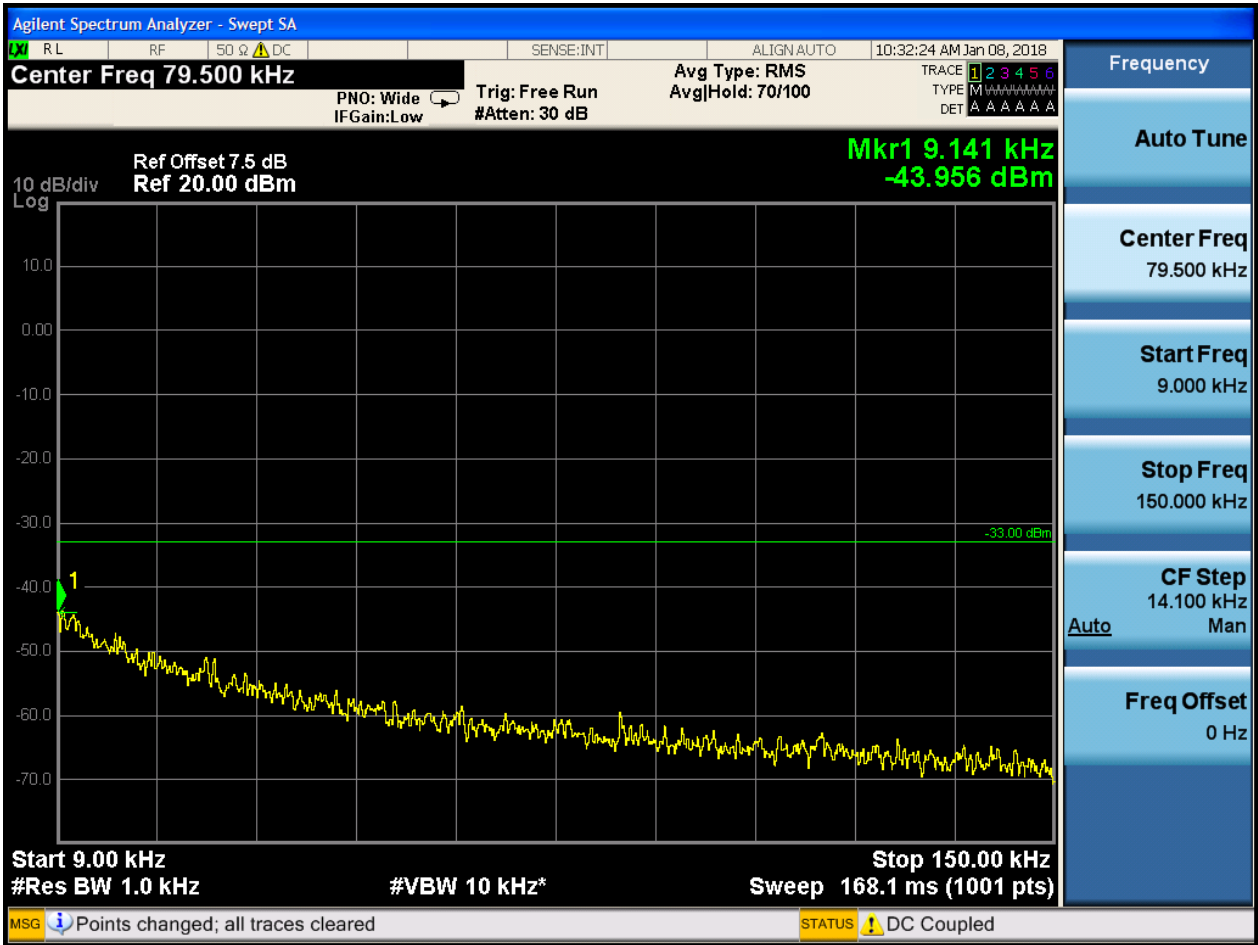


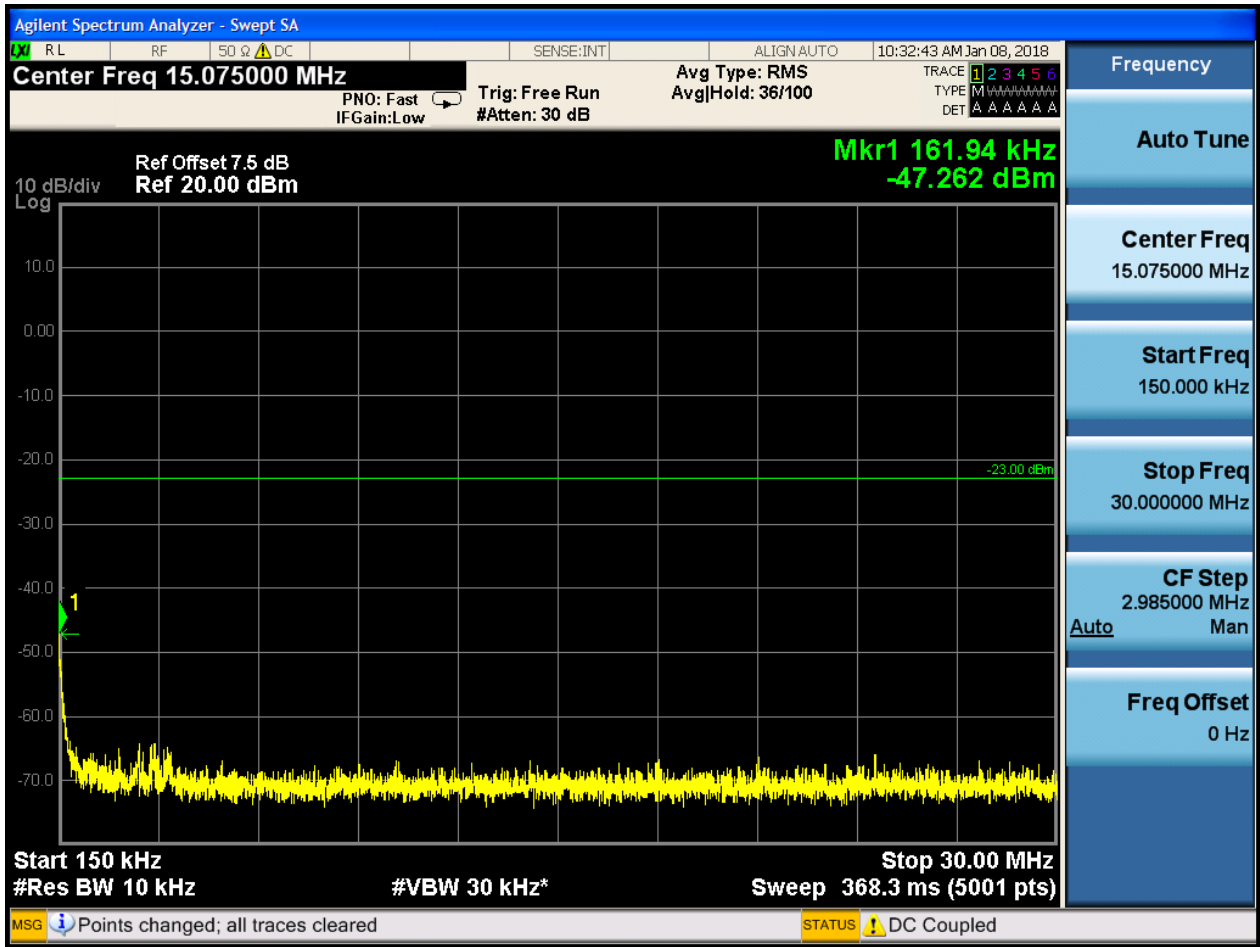


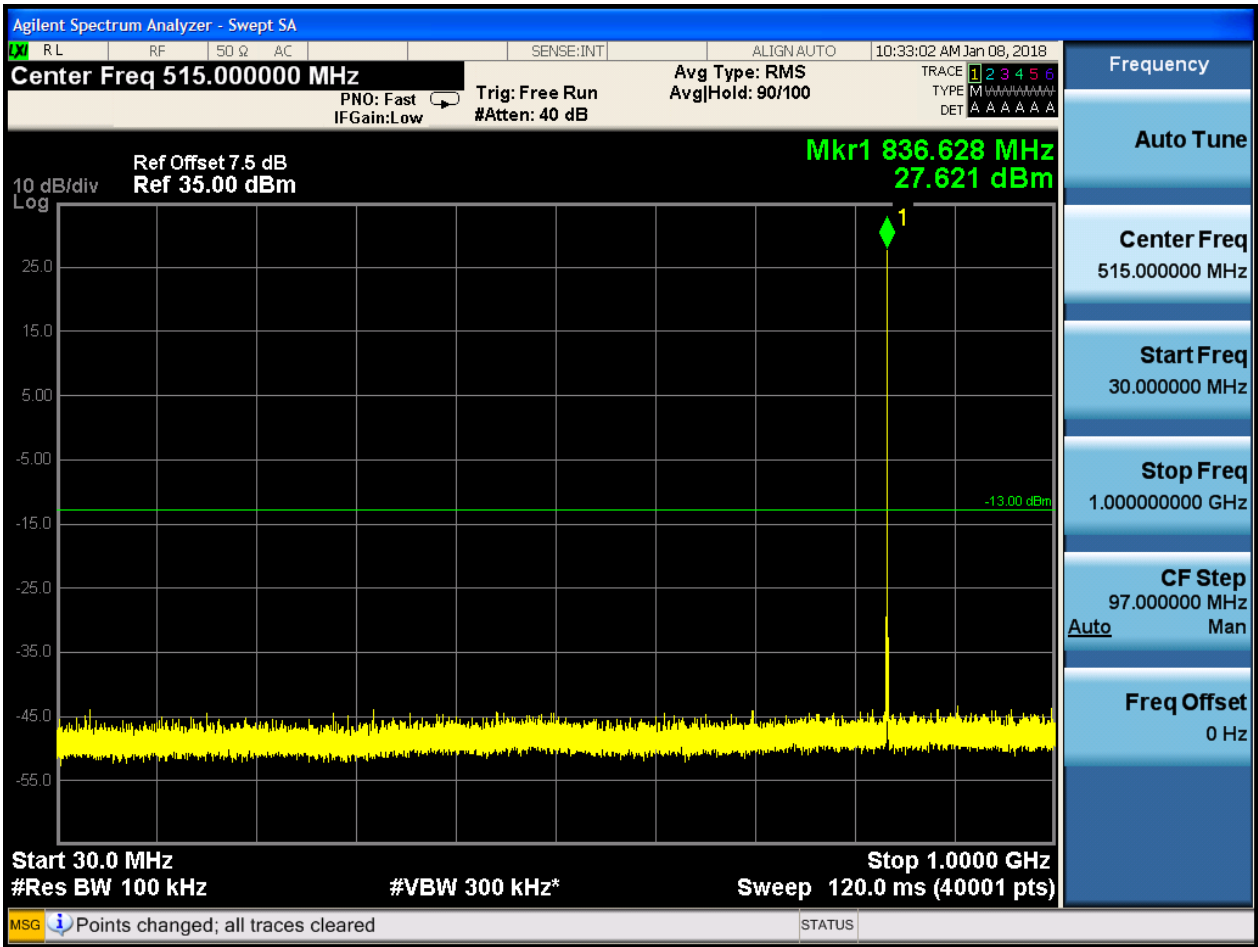


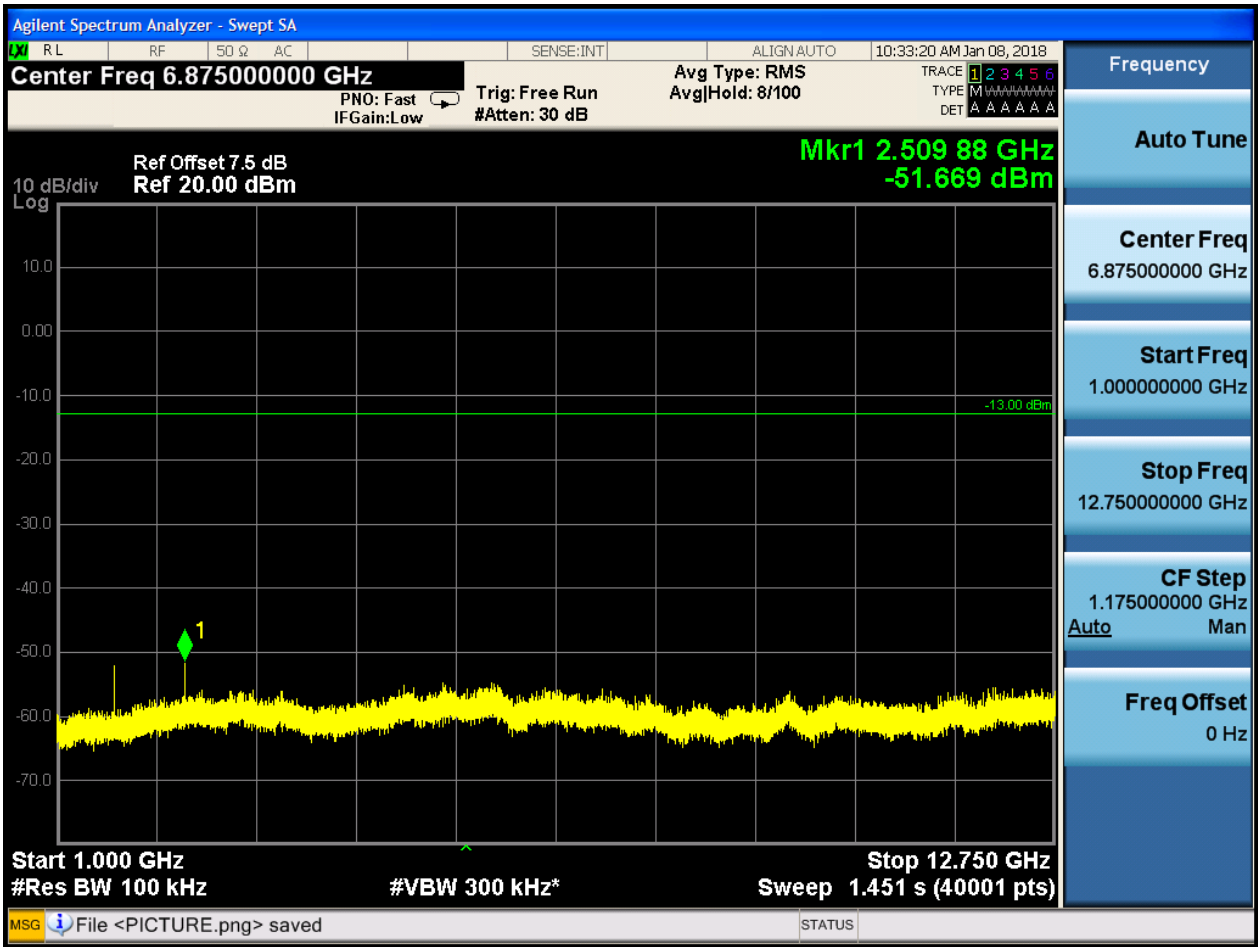


6.1.1.2.2 Test Channel = MCH



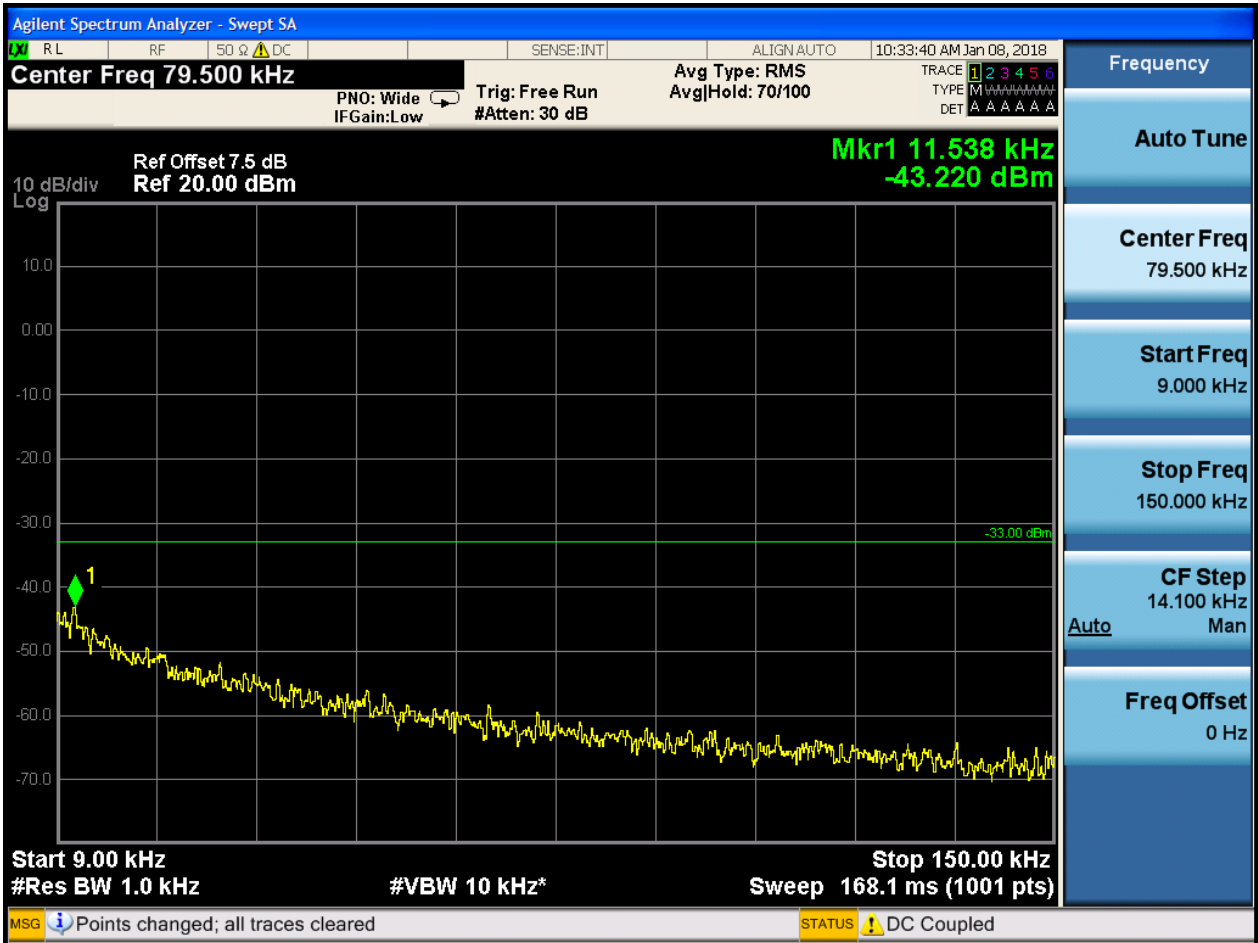


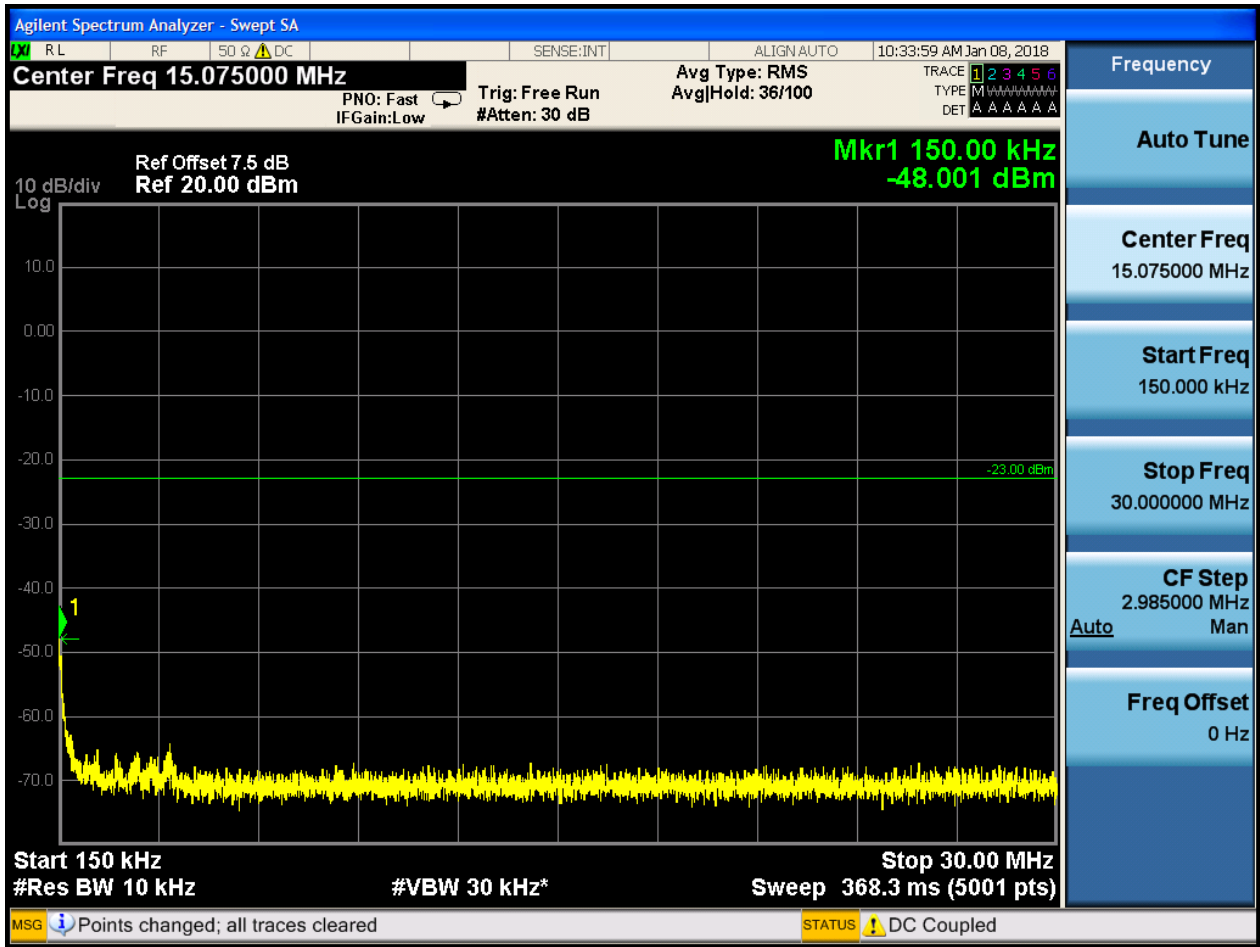


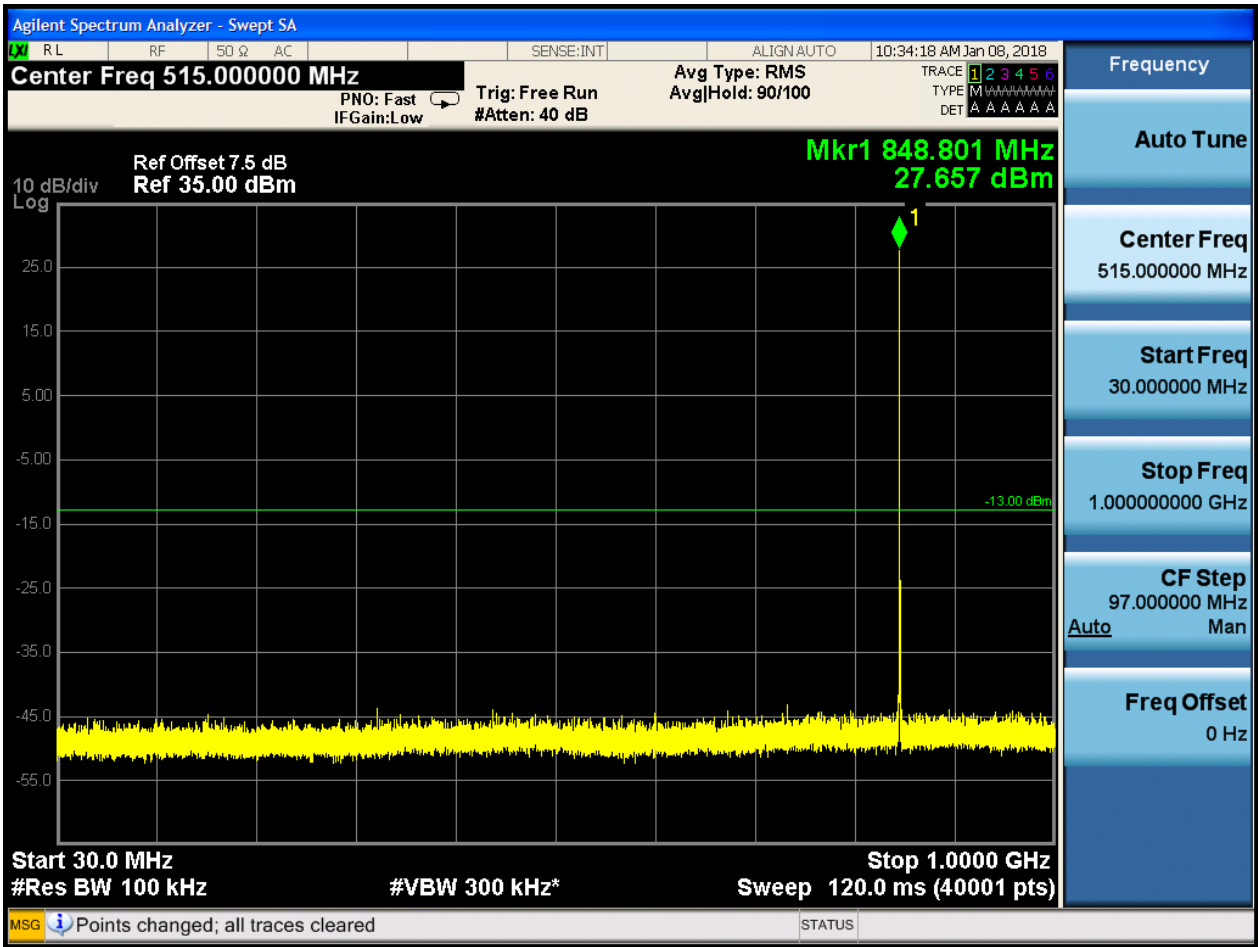


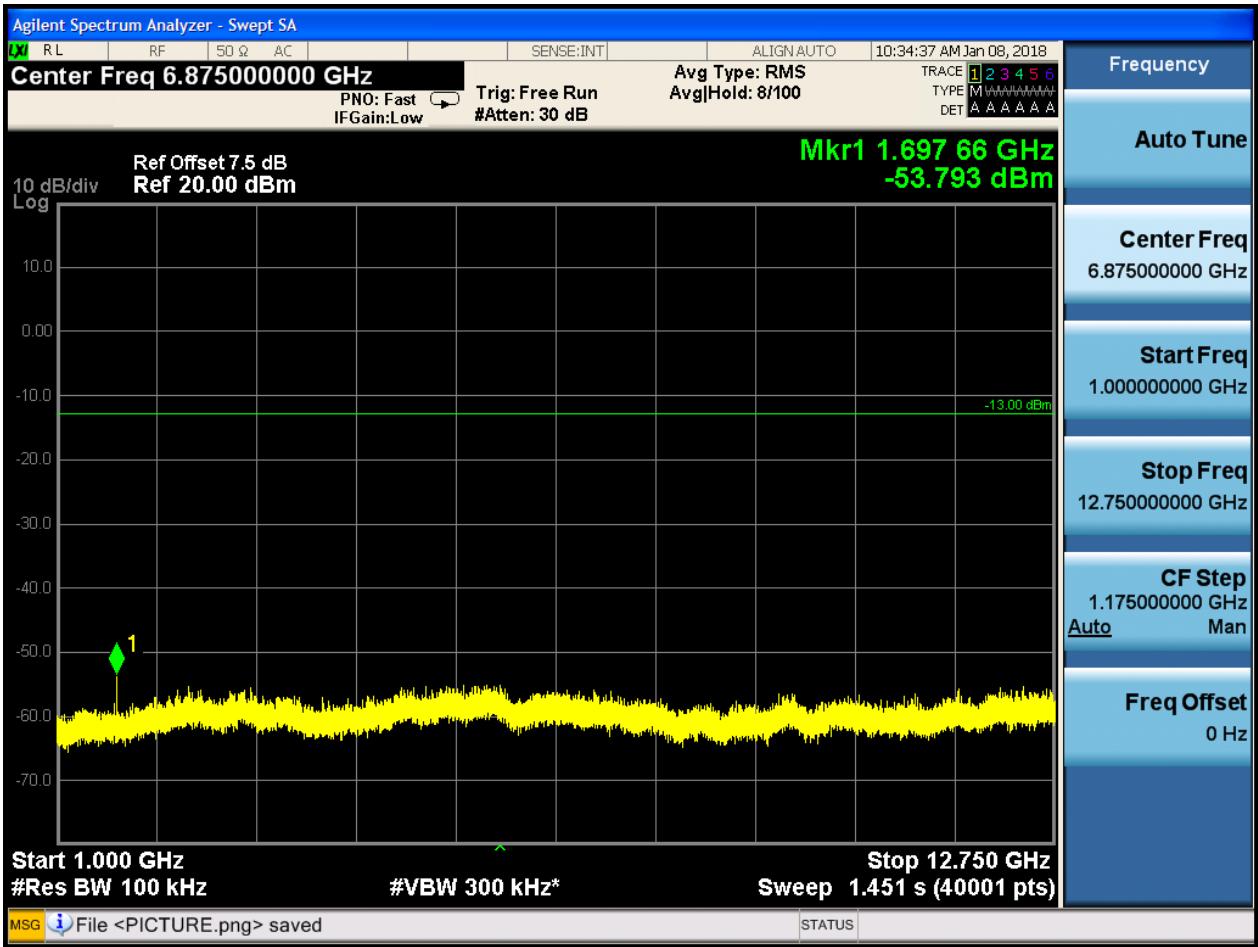


6.1.1.2.3 Test Channel = HCH









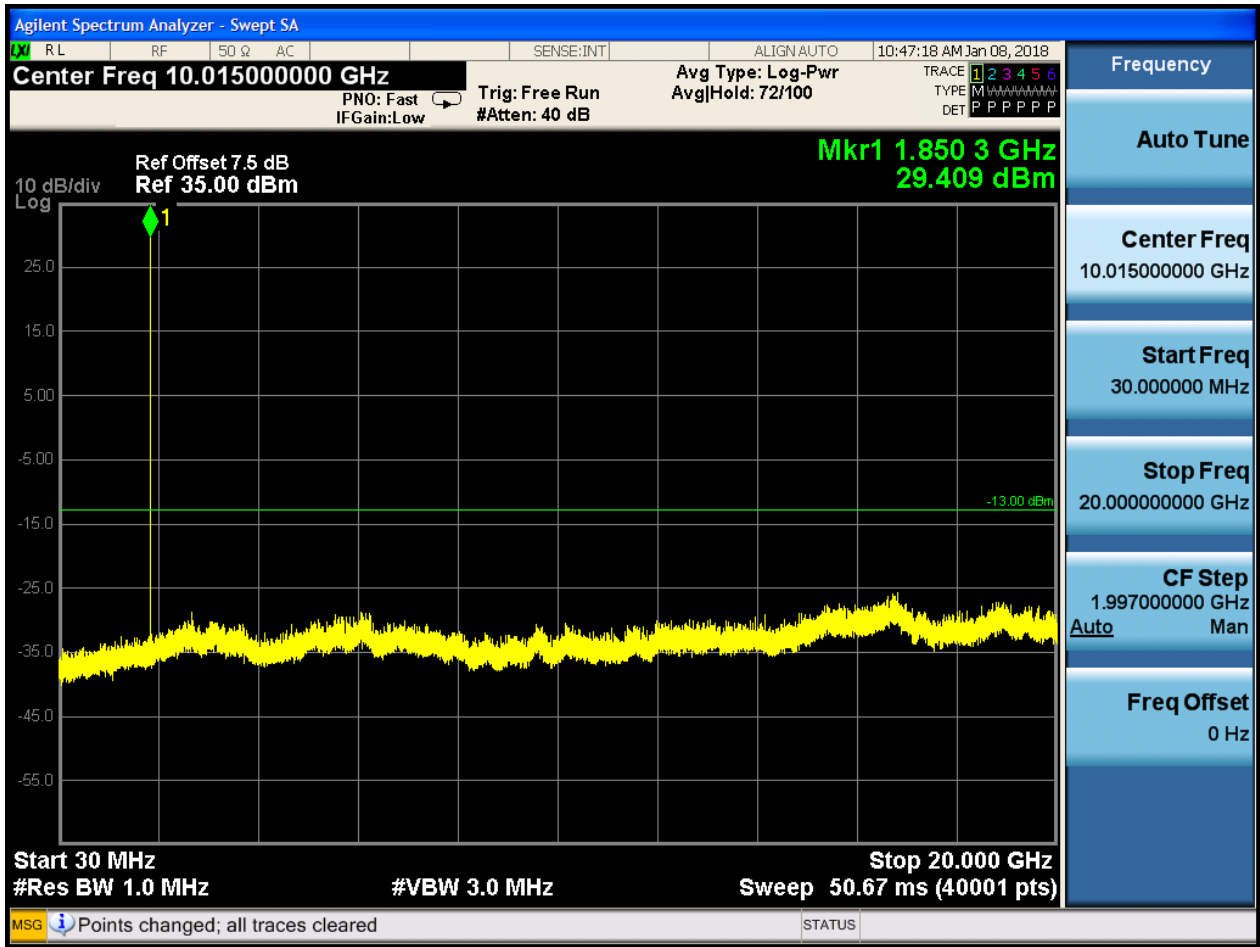


6.1.2 Test Band = GSM1900

6.1.2.1 Test Mode = GSM/TM1

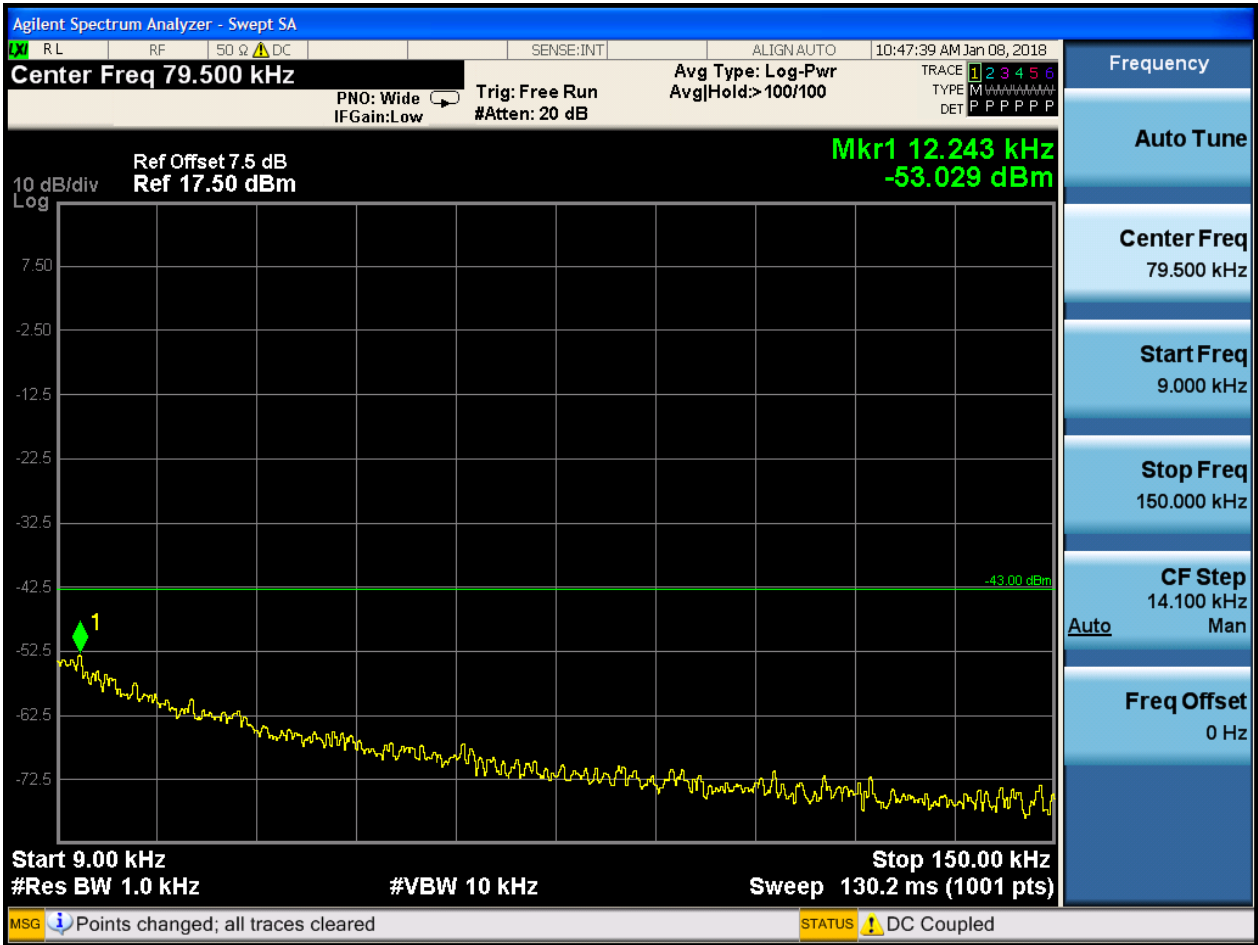
6.1.2.1.1 Test Channel = LCH

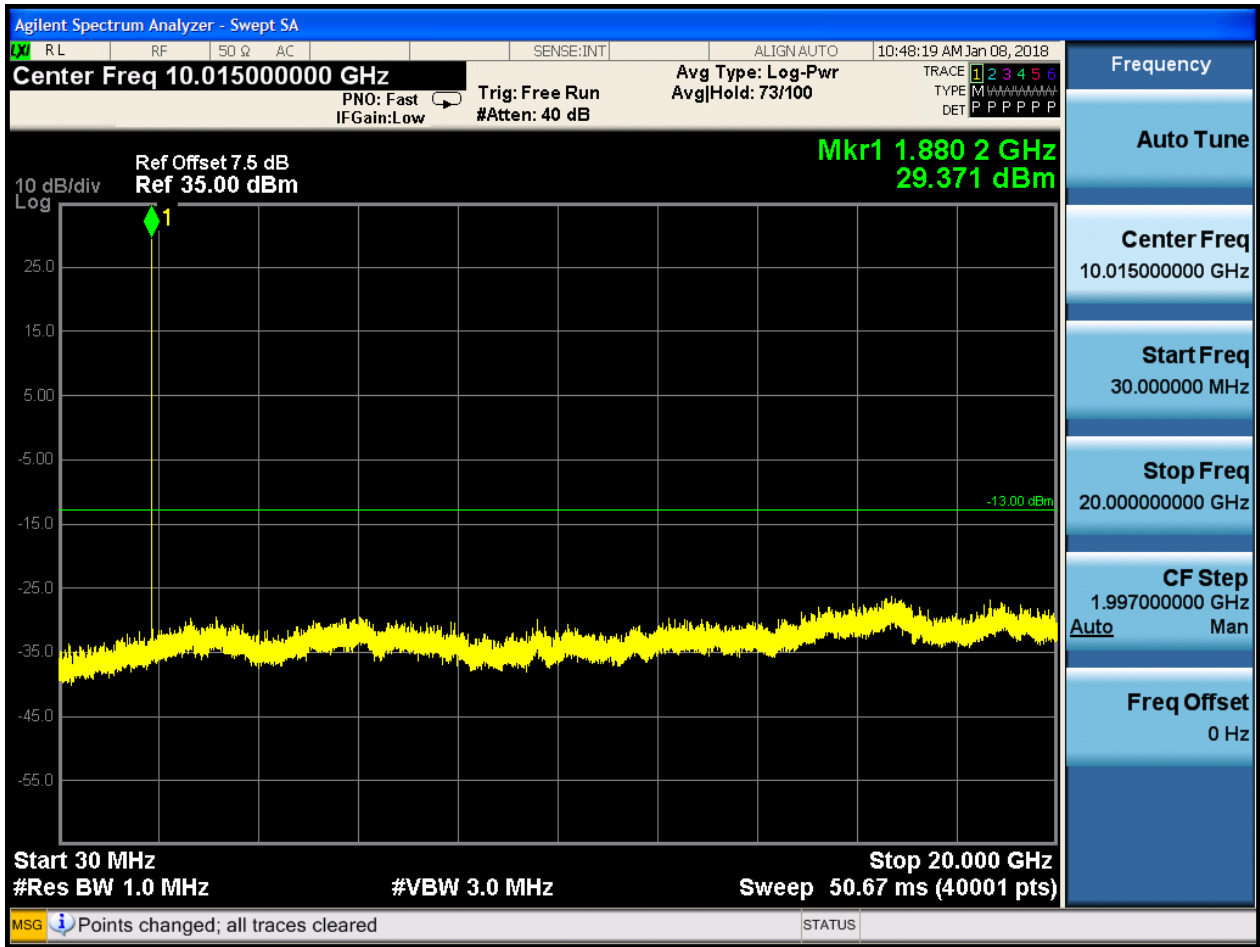






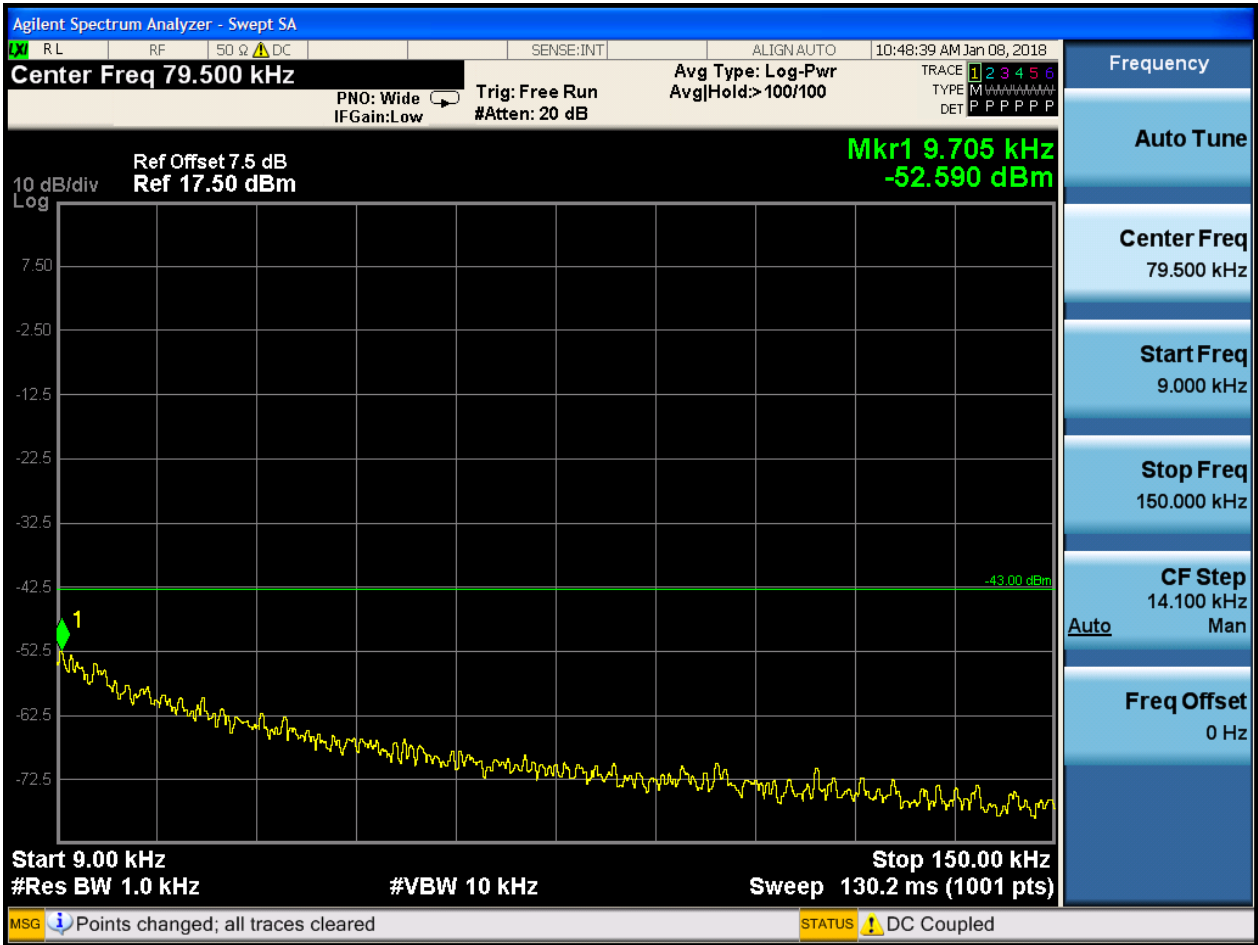
6.1.2.1.2 Test Channel = MCH

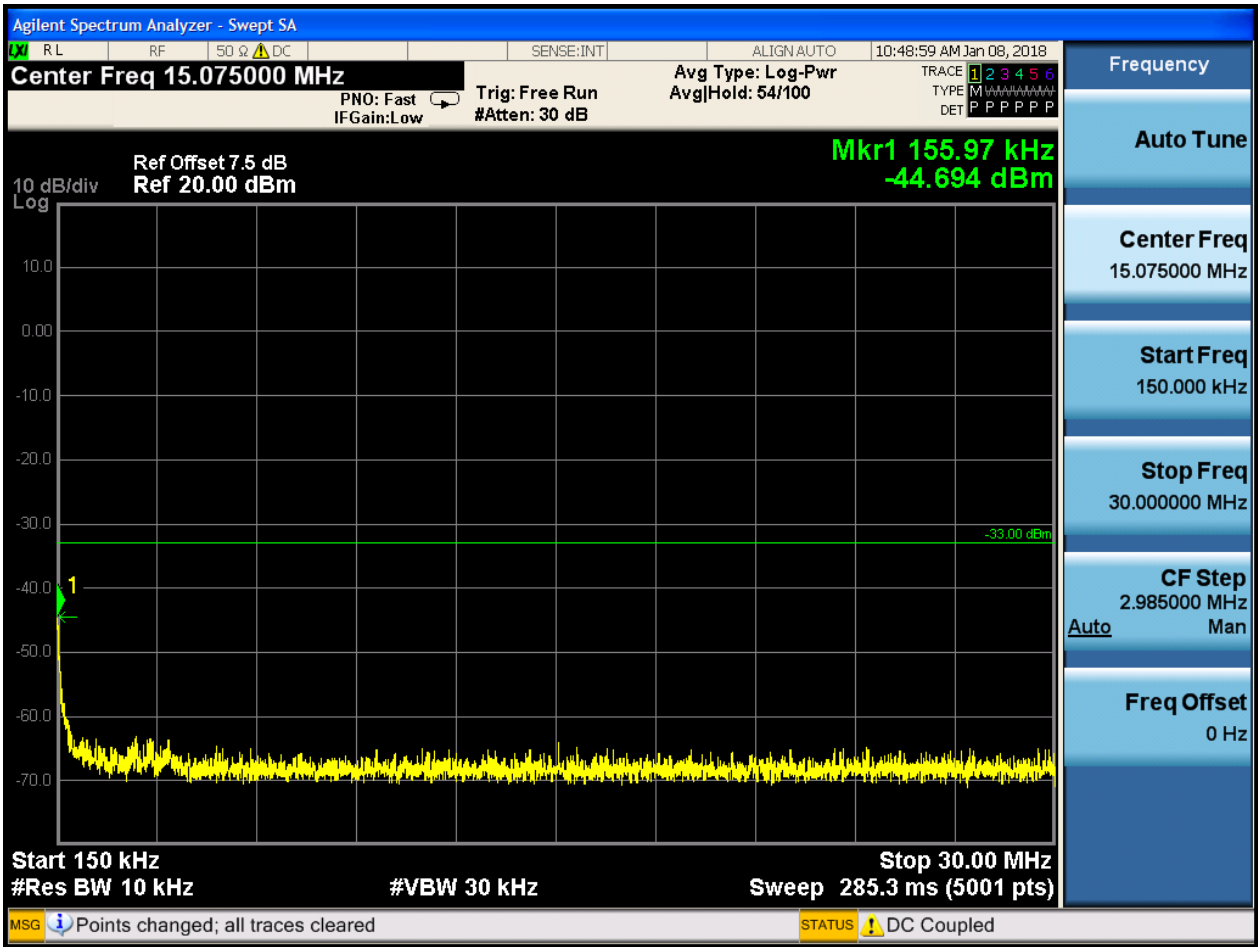


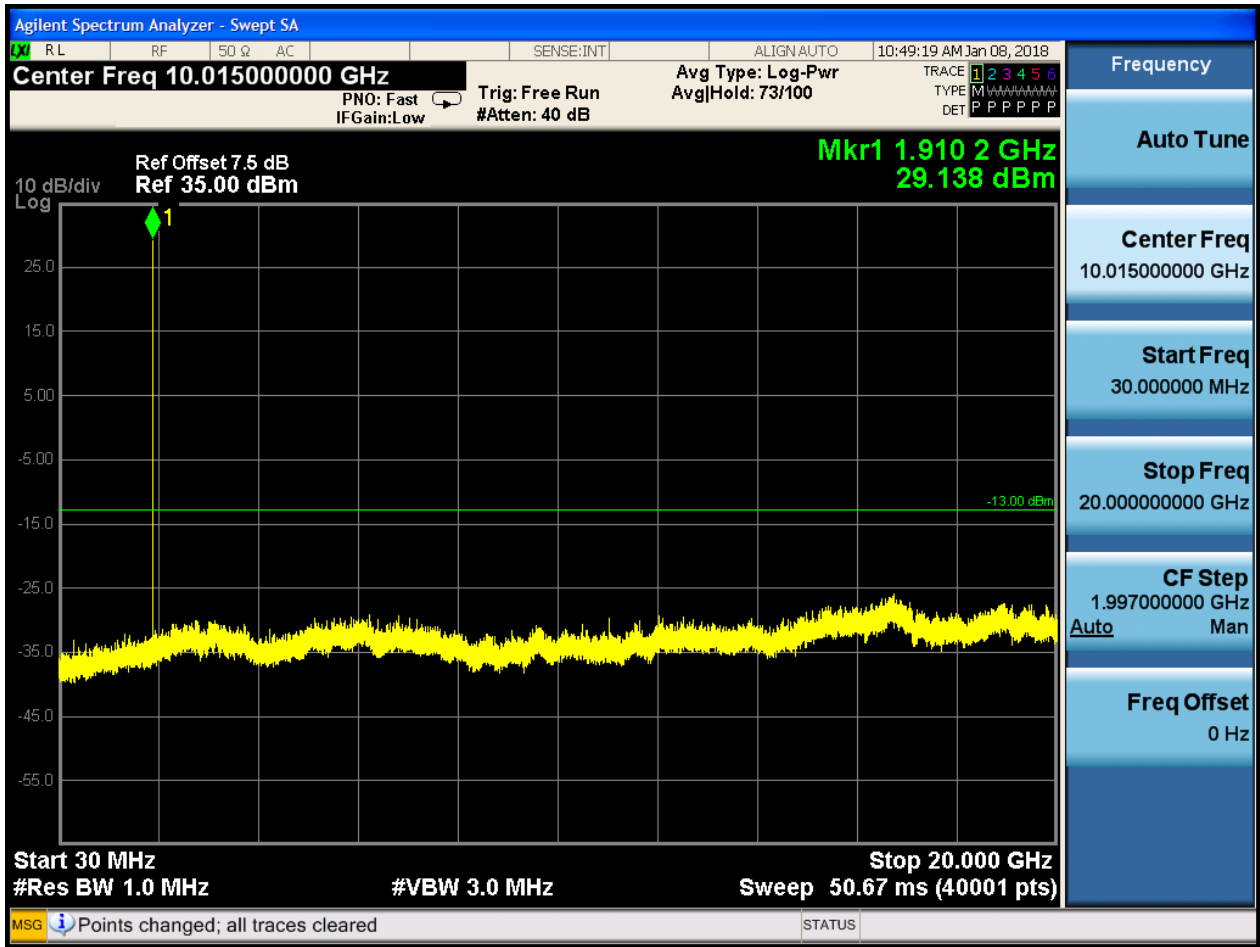


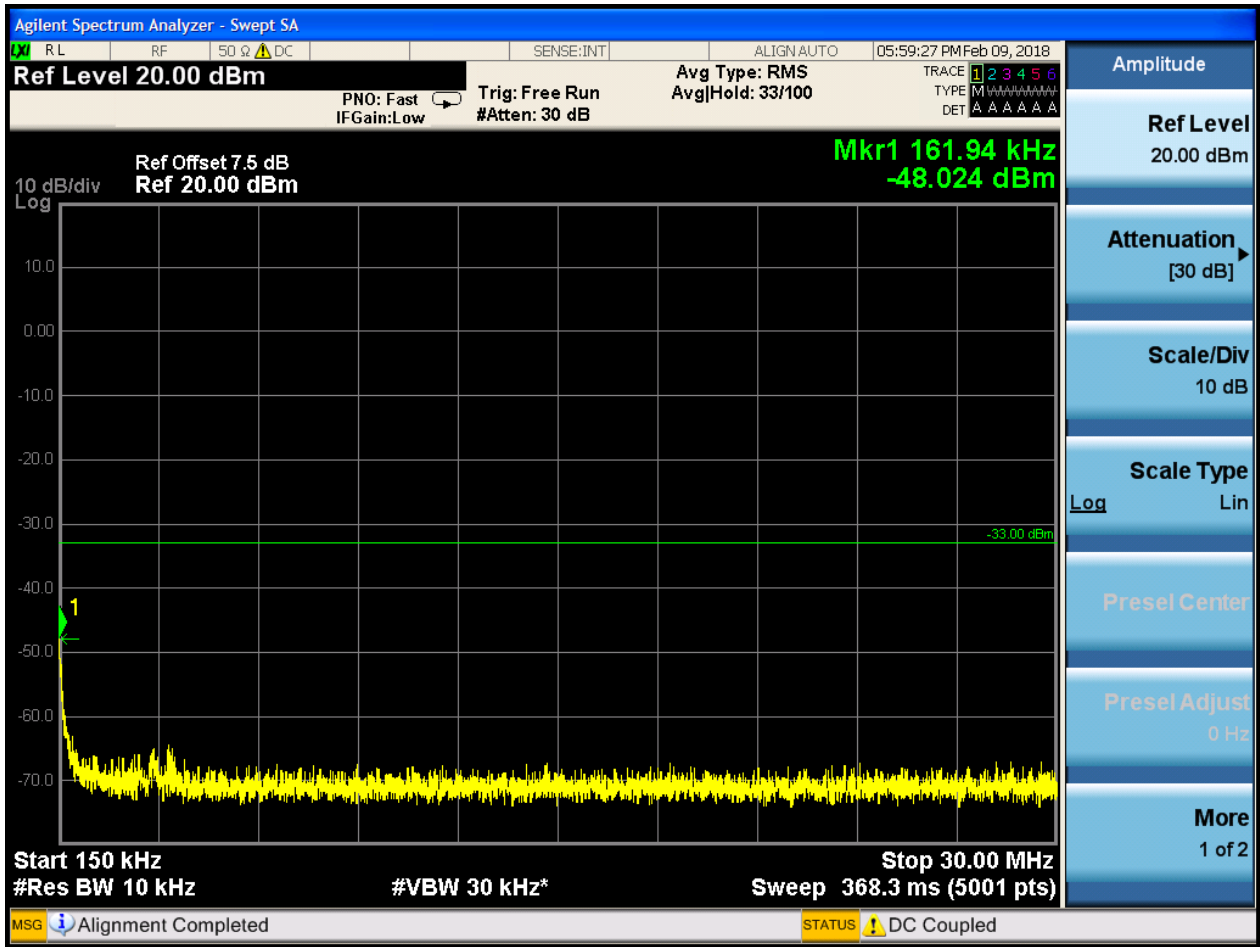


6.1.2.1.3 Test Channel = HCH



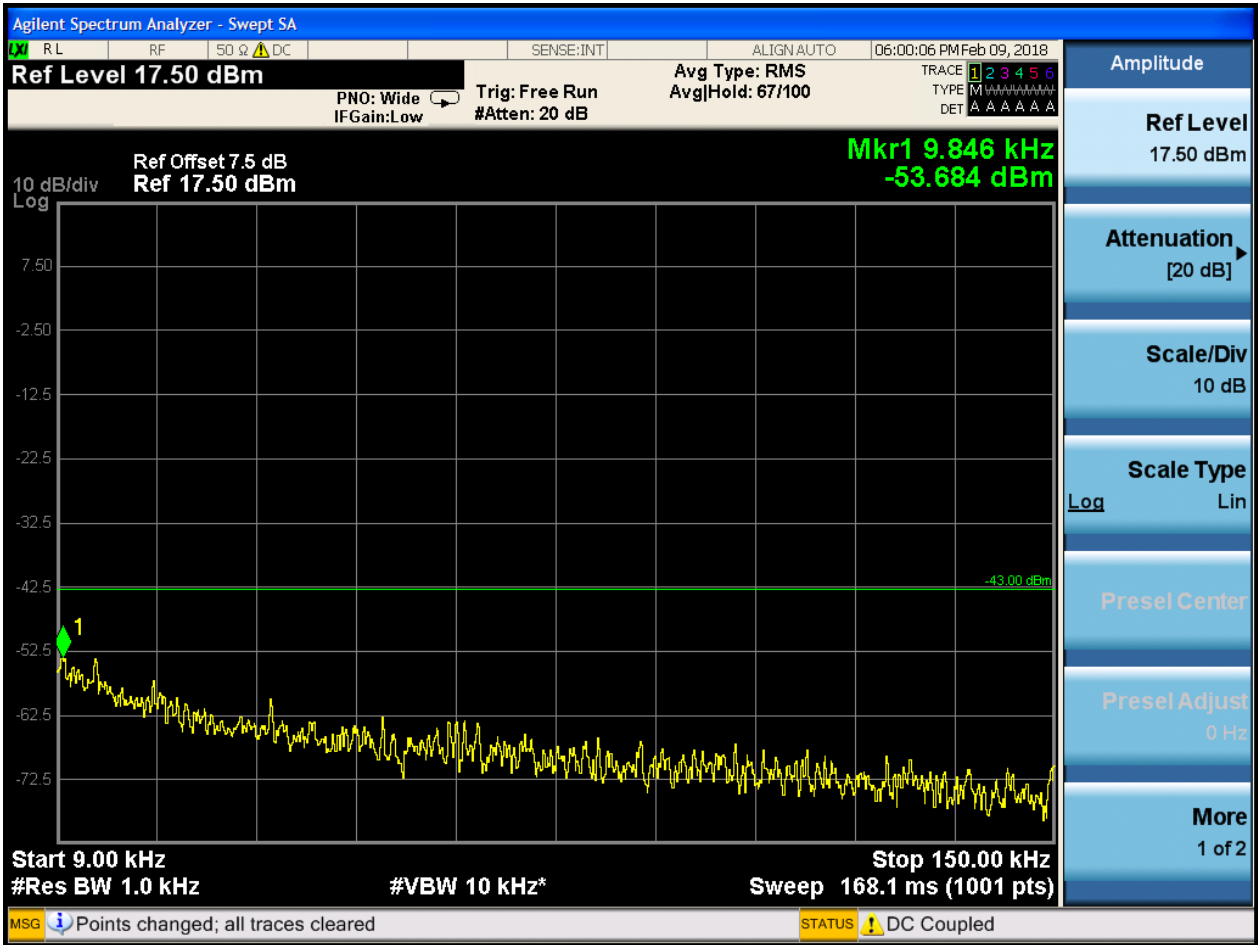




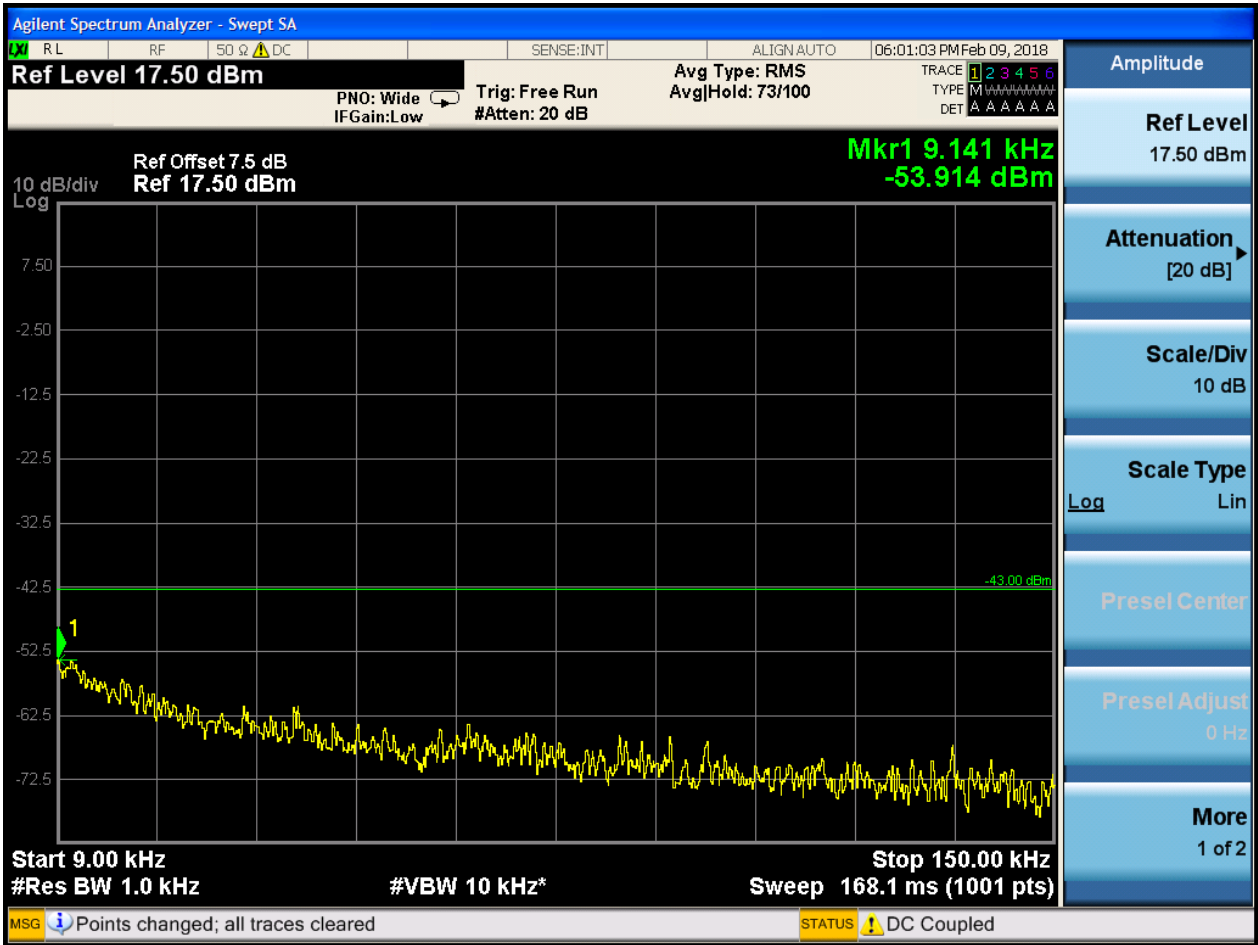


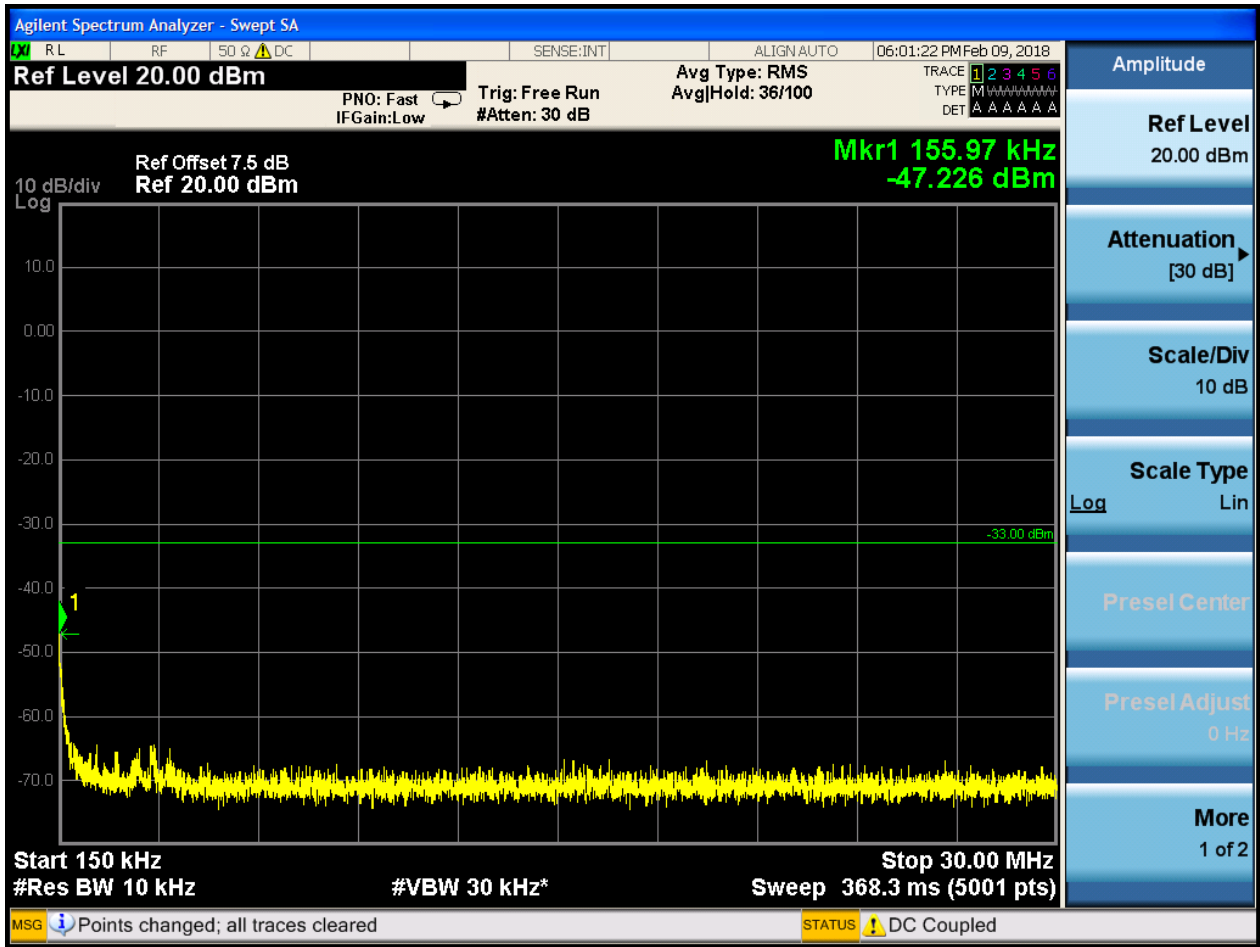


6.1.2.2.2 Test Channel = MCH



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.

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

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

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

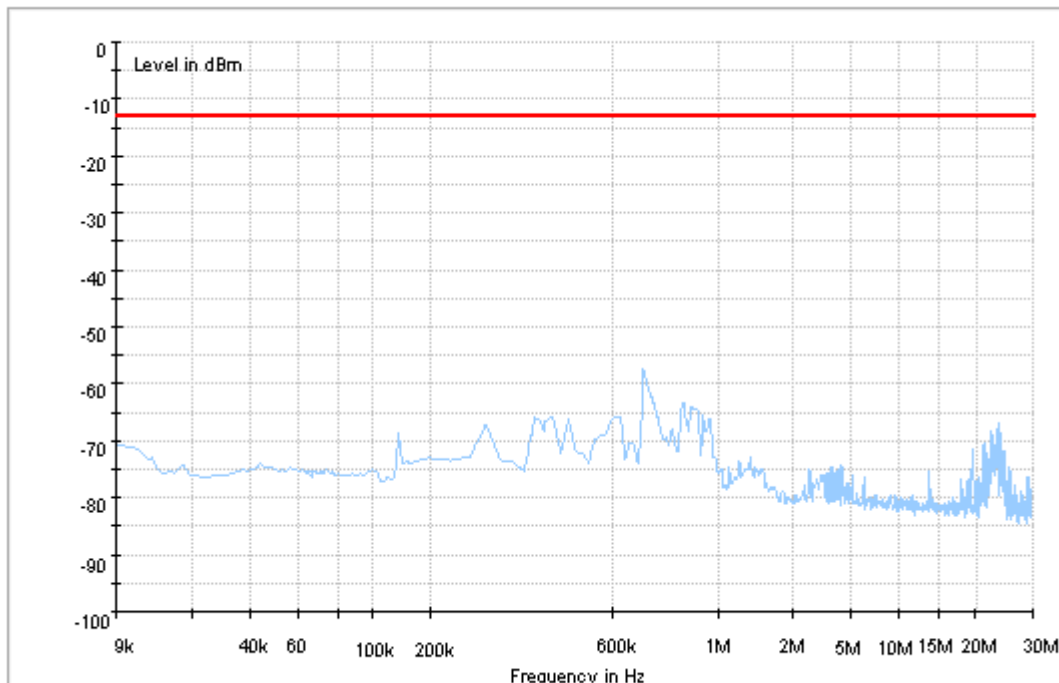
Above 1GHz, RBW = 1 MHz, VBW = 3 MHz. Detector: PK

Part I - Test Plots

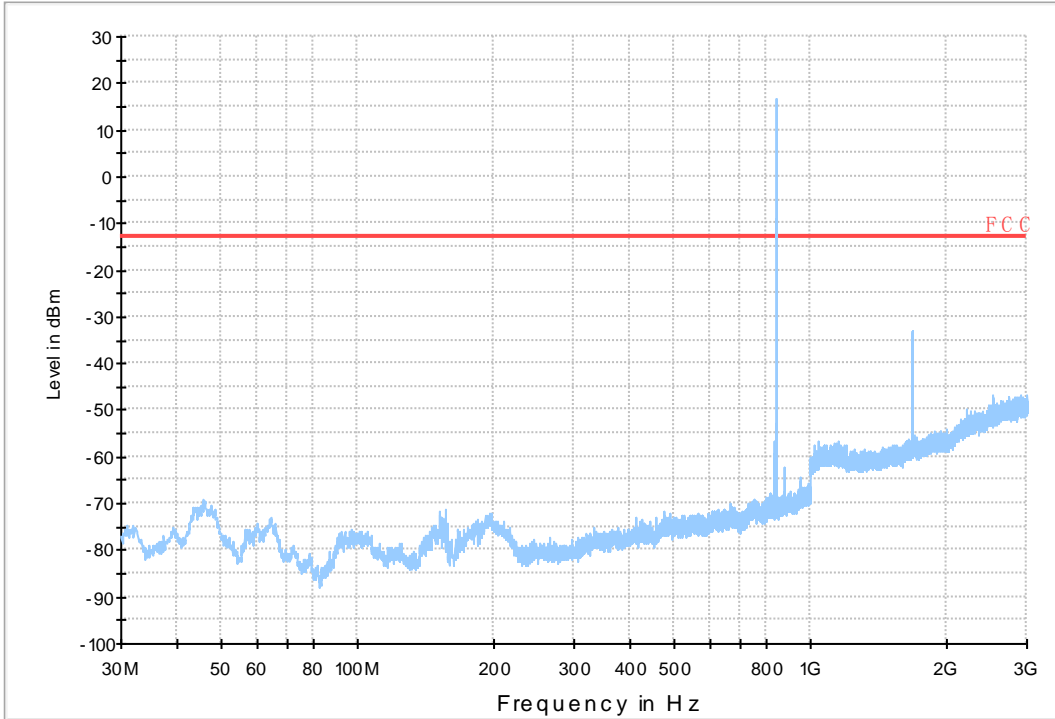
7.1 For GSM

7.1.1 Test Band = GSM850

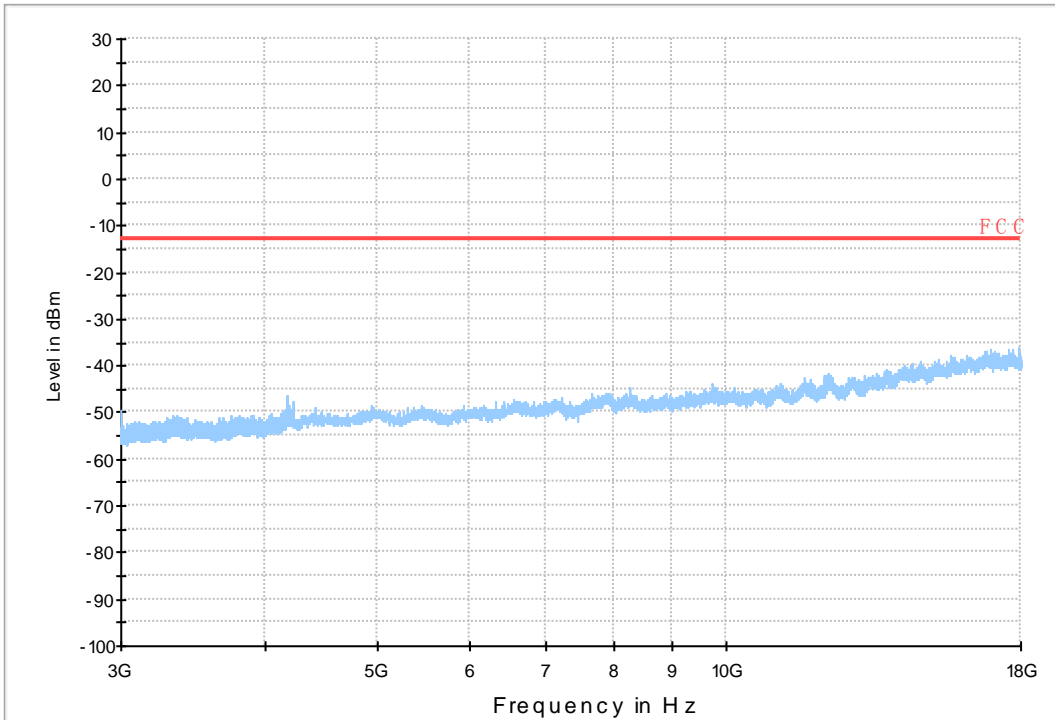
7.1.1.1 Test Mode = GSM/TM1



Copy of FCC PART22 GSM850_L

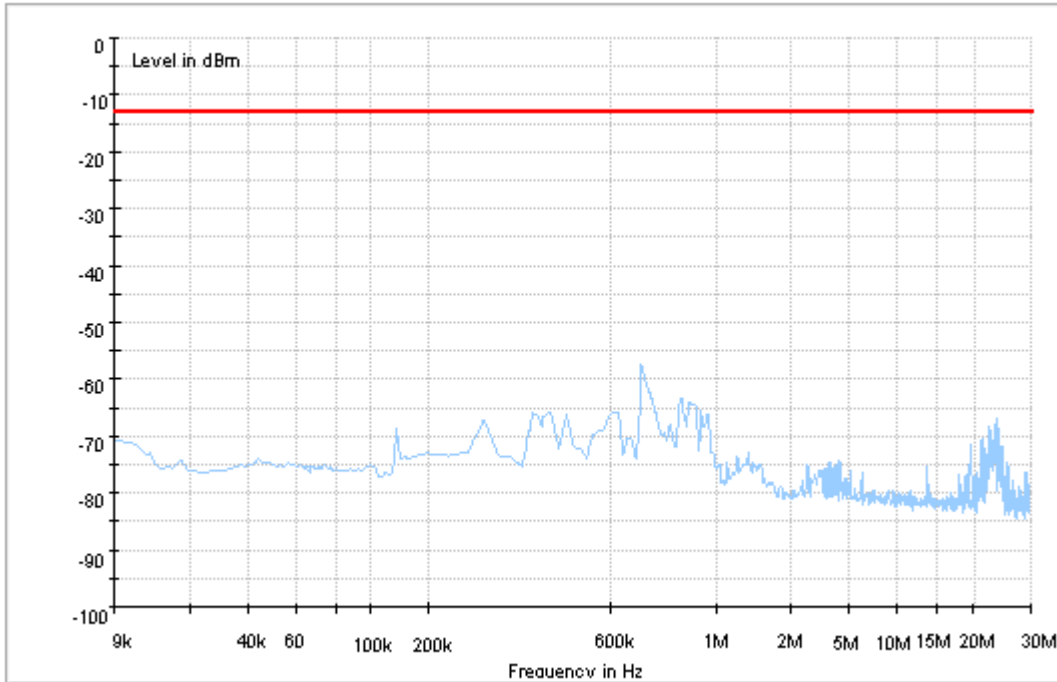


Copy of FCC PART22 GSM850_H

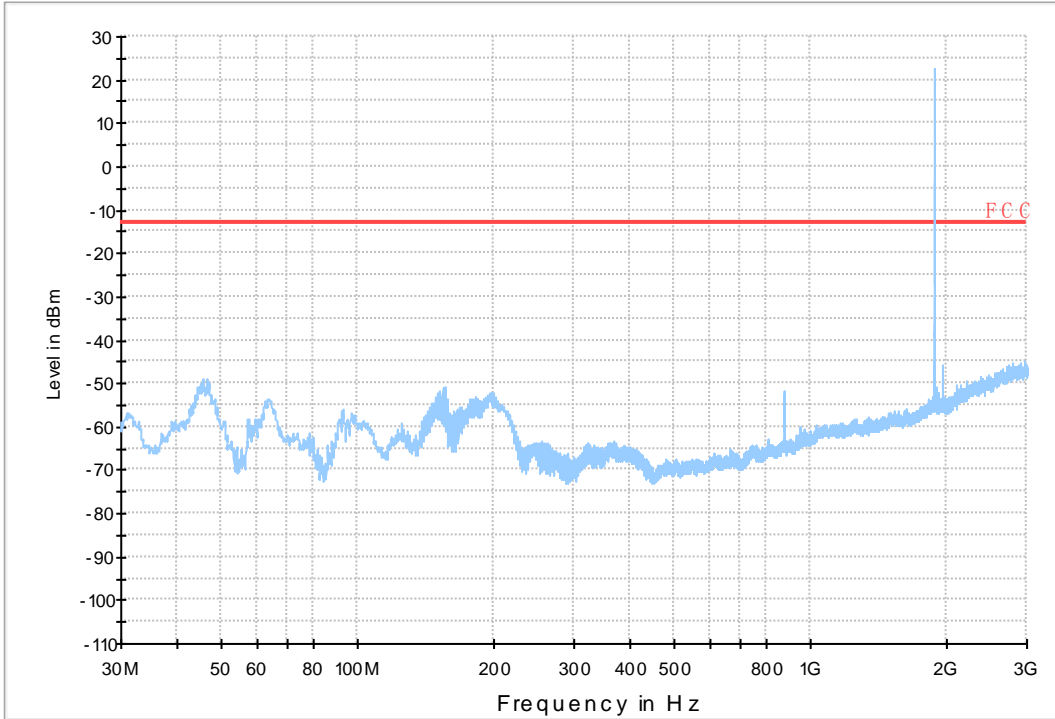


7.1.2 Test Band = GSM1900

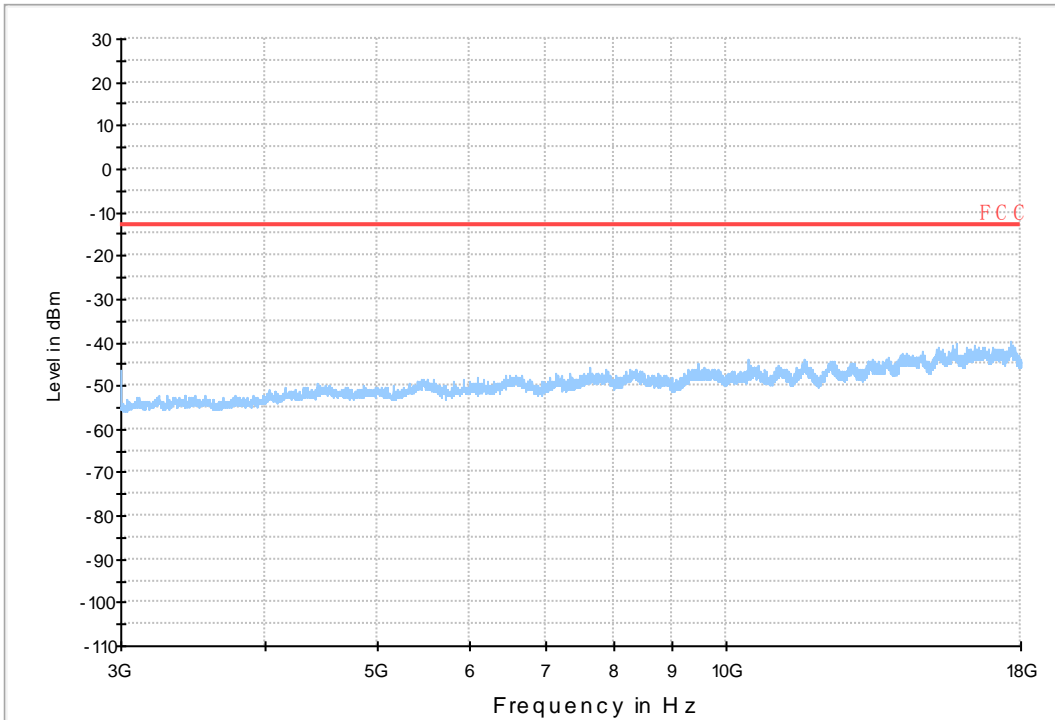
7.1.2.1 Test Mode = GSM/TM1

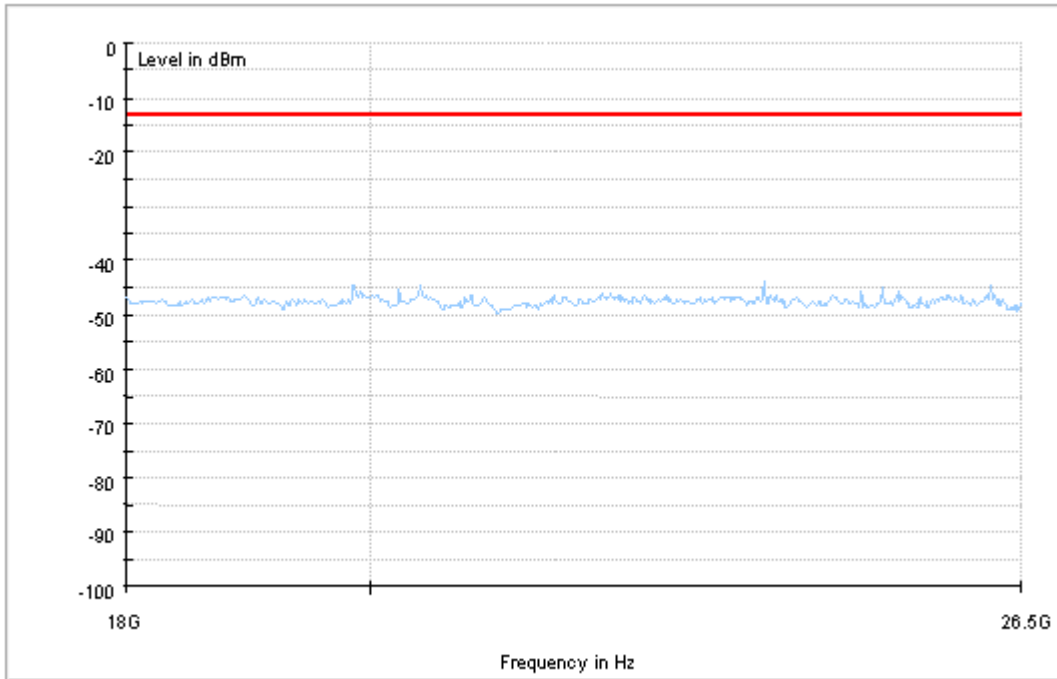


Copy of FCC PART24 GSM1900_L



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	16.85	0.02044	PASS
				VN	14.01	0.017	PASS
				VH	11.04	0.01339	PASS
		MCH	TN	VL	9.69	0.01158	PASS
				VN	11.88	0.0142	PASS
				VH	10.98	0.01312	PASS
		HCH	TN	VL	14.92	0.01758	PASS
				VN	9.49	0.01118	PASS
				VH	11.04	0.01301	PASS
	GSM/TM2	LCH	TN	VL	10.98	0.01332	PASS
				VN	15.82	0.01919	PASS
				VH	13.3	0.01614	PASS
		MCH	TN	VL	16.24	0.01941	PASS
				VN	14.63	0.01749	PASS
				VH	14.53	0.01737	PASS
		HCH	TN	VL	12.95	0.01526	PASS
				VN	13.46	0.01586	PASS
				VH	12.95	0.01526	PASS
GSM1900	GSM/TM1	LCH	TN	VL	8.85	0.00478	PASS
				VN	11.43	0.00618	PASS
				VH	2.97	0.00161	PASS
		MCH	TN	VL	10.27	0.00546	PASS
				VN	7.75	0.00412	PASS
				VH	7.23	0.00385	PASS
		HCH	TN	VL	11.62	0.00608	PASS
				VN	9.62	0.00504	PASS
				VH	1.68	0.00088	PASS
	GSM/TM2	LCH	TN	VL	10.75	0.00581	PASS
				VN	11.14	0.00602	PASS
				VH	16.5	0.00892	PASS
		MCH	TN	VL	11.82	0.00629	PASS
				VN	11.82	0.00629	PASS
				VH	13.24	0.00704	PASS
		HCH	TN	VL	13.53	0.00708	PASS



Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				VN	14.21	0.00744	PASS
				VH	11.07	0.0058	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	15.17	0.01841	PASS
				-20	13.04	0.01582	PASS
				-10	13.04	0.01582	PASS
				0	13.24	0.01606	PASS
				10	11.11	0.01348	PASS
				20	6.91	0.00838	PASS
				30	7.68	0.00932	PASS
				40	10.98	0.01332	PASS
				50	10.53	0.01278	PASS
		MCH	VN	-30	9.36	0.01119	PASS
				-20	10.78	0.01289	PASS
				-10	12.72	0.0152	PASS
				0	11.69	0.01397	PASS
				10	12.01	0.01436	PASS
				20	9.43	0.01127	PASS
	HCH	VN	-30	10.65	0.01255	PASS	
			-20	13.37	0.01575	PASS	
			-10	8.33	0.00981	PASS	
			0	7.94	0.00935	PASS	
			10	10.4	0.01225	PASS	
			20	10.65	0.01255	PASS	
			30	10.78	0.0127	PASS	
			40	11.62	0.01369	PASS	
			50	13.56	0.01598	PASS	
	GSM/TM2	LCH	VN	-30	11.49	0.01394	PASS
				-20	11.62	0.0141	PASS
				-10	15.01	0.01821	PASS
				0	13.3	0.01614	PASS
				10	16.3	0.01978	PASS
				20	16.66	0.02021	PASS



Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict																																																																																										
				30	10.49	0.01273	PASS																																																																																										
				40	14.17	0.01719	PASS																																																																																										
				50	15.14	0.01837	PASS																																																																																										
		MCH	VN			-30	17.53	0.02095	PASS																																																																																								
						-20	13.79	0.01648	PASS																																																																																								
						-10	12.88	0.0154	PASS																																																																																								
						0	15.34	0.01834	PASS																																																																																								
						10	14.46	0.01728	PASS																																																																																								
						20	15.08	0.01803	PASS																																																																																								
						30	12.49	0.01493	PASS																																																																																								
						40	13.37	0.01598	PASS																																																																																								
						50	12.85	0.01536	PASS																																																																																								
						HCH	VN			-30	17.34	0.02043	PASS																																																																																				
										-20	17.37	0.02046	PASS																																																																																				
		-10	16.27	0.01917	PASS																																																																																												
		0	16.4	0.01932	PASS																																																																																												
		10	13.33	0.0157	PASS																																																																																												
		20	13.88	0.01635	PASS																																																																																												
		30	14.33	0.01688	PASS																																																																																												
		40	14.85	0.0175	PASS																																																																																												
		GSM1900	GSM/TM1	LCH	VN					-30	5.1	0.00276	PASS	-20	6.52	0.00352	PASS	-10	2.52	0.00136	PASS	0	7.23	0.00391	PASS	10	7.94	0.00429	PASS	20	4.07	0.0022	PASS	30	3.75	0.00203	PASS	40	3.49	0.00189	PASS	50	1.68	0.00091	PASS	MCH	VN							-30	4.97	0.00264	PASS	-20	7.88	0.00419	PASS	-10	10.4	0.00553	PASS	0	13.24	0.00704	PASS	10	7.55	0.00402	PASS	20	6.13	0.00326	PASS	30	5.42	0.00288	PASS	40	5.88	0.00313	PASS	50	7.04	0.00374	PASS	HCH	VN			-30	4.13	0.00216	PASS
										-30	5.1	0.00276	PASS																																																																																				
										-20	6.52	0.00352	PASS																																																																																				
										-10	2.52	0.00136	PASS																																																																																				
0	7.23									0.00391	PASS																																																																																						
10	7.94									0.00429	PASS																																																																																						
20	4.07									0.0022	PASS																																																																																						
30	3.75									0.00203	PASS																																																																																						
40	3.49									0.00189	PASS																																																																																						
50	1.68									0.00091	PASS																																																																																						
MCH	VN															-30	4.97	0.00264	PASS	-20	7.88	0.00419	PASS	-10	10.4	0.00553	PASS	0	13.24	0.00704	PASS	10	7.55	0.00402	PASS	20	6.13	0.00326	PASS	30	5.42	0.00288	PASS	40	5.88	0.00313	PASS	50	7.04	0.00374	PASS	HCH	VN			-30	4.13	0.00216	PASS																																						
				-30	4.97	0.00264	PASS																																																																																										
				-20	7.88	0.00419	PASS																																																																																										
				-10	10.4	0.00553	PASS																																																																																										
				0	13.24	0.00704	PASS																																																																																										
				10	7.55	0.00402	PASS																																																																																										
				20	6.13	0.00326	PASS																																																																																										
				30	5.42	0.00288	PASS																																																																																										
40	5.88			0.00313	PASS																																																																																												
50	7.04			0.00374	PASS																																																																																												
HCH	VN					-30	4.13	0.00216	PASS																																																																																								



Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				-20	-0.9	-0.00047	PASS
				-10	3.49	0.00183	PASS
				0	2.39	0.00125	PASS
				10	2.32	0.00121	PASS
				20	2.91	0.00152	PASS
				30	6.2	0.00325	PASS
				40	5.04	0.00264	PASS
				50	4.46	0.00234	PASS
	GSM/TM2	LCH	VN	-30	5.71	0.00309	PASS
				-20	8.72	0.00471	PASS
				-10	15.21	0.00822	PASS
				0	7.39	0.00399	PASS
				10	8.2	0.00443	PASS
				20	6.36	0.00344	PASS
				30	4.88	0.00264	PASS
				40	7.2	0.00389	PASS
				50	-0.32	-0.00017	PASS
				MCH	VN	-30	10.17
		-20	18.69			0.00994	PASS
		-10	15.01			0.00798	PASS
		0	11.95			0.00636	PASS
		10	11.33			0.00603	PASS
		20	15.27			0.00812	PASS
		30	11.4			0.00606	PASS
		40	15.24			0.00811	PASS
		50	4.39			0.00234	PASS
		HCH	VN			-30	13.14
				-20	9.07	0.00475	PASS
	-10			14.43	0.00756	PASS	
	0			10.75	0.00563	PASS	
10	15.01			0.00786	PASS		
20	12.85			0.00673	PASS		
30	7.3			0.00382	PASS		
40	7.33			0.00384	PASS		
50	7.72	0.00404	PASS				

END