



Appendix for test report

1 Appendix_A: Effective (Isotropic) Radiated Power Output Data

Part I - Test Results

Test Band	Test Mode	Test Channel	Conducted Power [dBm]	ERP [dBm]	Limit [dBm]	Verdict
GSM850	GSM/TM1	LCH	33.02	26.87	38.5	PASS
		MCH	33.17	27.02	38.5	PASS
		HCH	33.22	27.07	38.5	PASS
	GSM/TM2	LCH	26.01	19.86	38.5	PASS
		MCH	26.01	19.86	38.5	PASS
		HCH	25.98	19.83	38.5	PASS

Test Band	Test Mode	Test Channel	Conducted Power [dBm]	EIRP [dBm]	Limit [dBm]	Verdict
GSM1900	GSM/TM1	LCH	30.52	29.92	33	PASS
		MCH	30.36	29.76	33	PASS
		HCH	30.19	29.59	33	PASS
	GSM/TM2	LCH	25.51	24.91	33	PASS
		MCH	25.53	24.93	33	PASS
		HCH	25.49	24.89	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	0.36	13	PASS
		MCH	0.31	13	PASS
		HCH	0.27	13	PASS
	GSM/TM2	LCH	2.98	13	PASS
		MCH	3.03	13	PASS
		HCH	2.97	13	PASS
GSM1900	GSM/TM1	LCH	0.26	13	PASS
		MCH	0.23	13	PASS
		HCH	0.22	13	PASS
	GSM/TM2	LCH	2.99	13	PASS
		MCH	2.8	13	PASS
		HCH	2.87	13	PASS

3Appendix_C: Modulation Characteristics

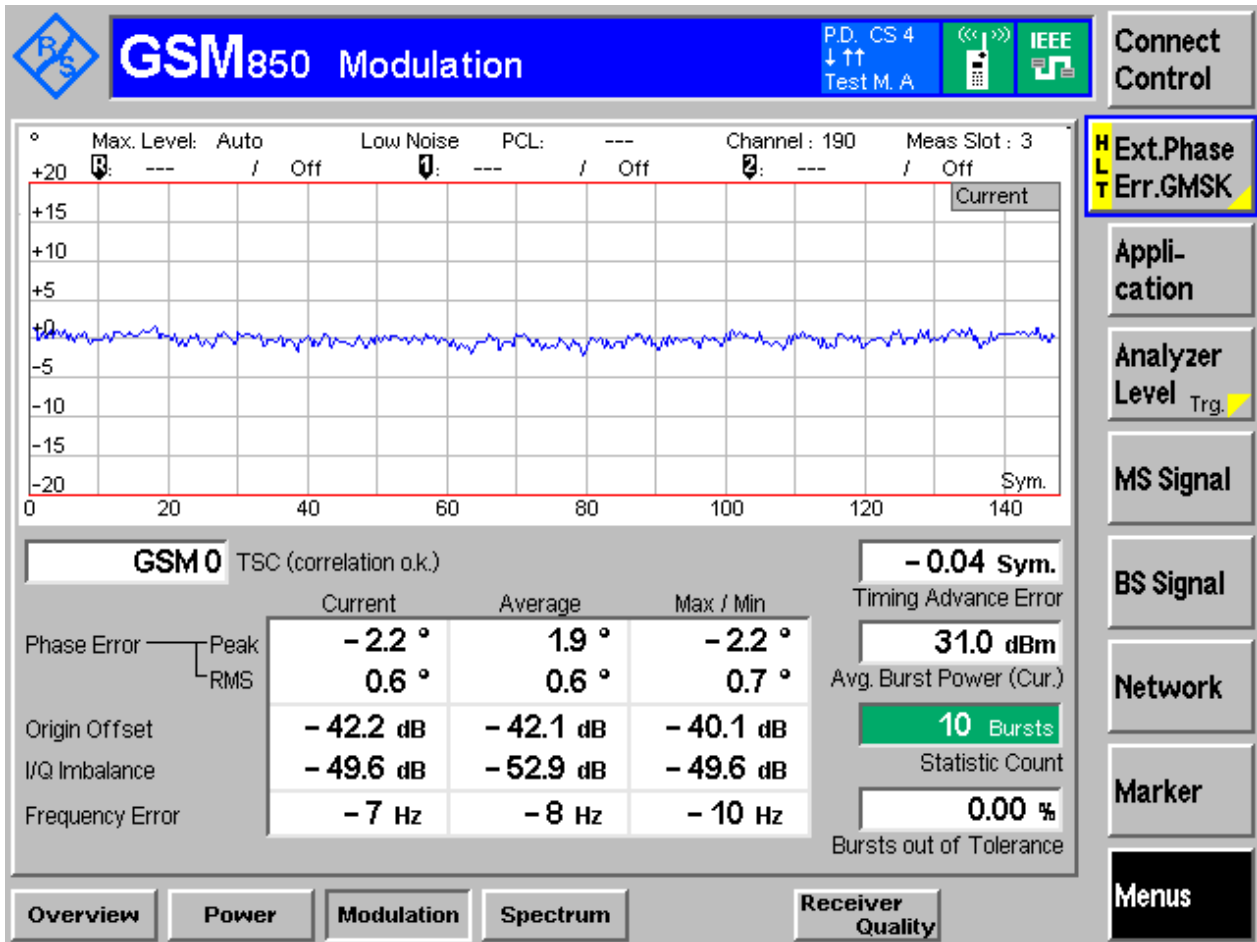
Part I - Test Plots

3.1 For GSM

3.1.1 Test Band = GSM850

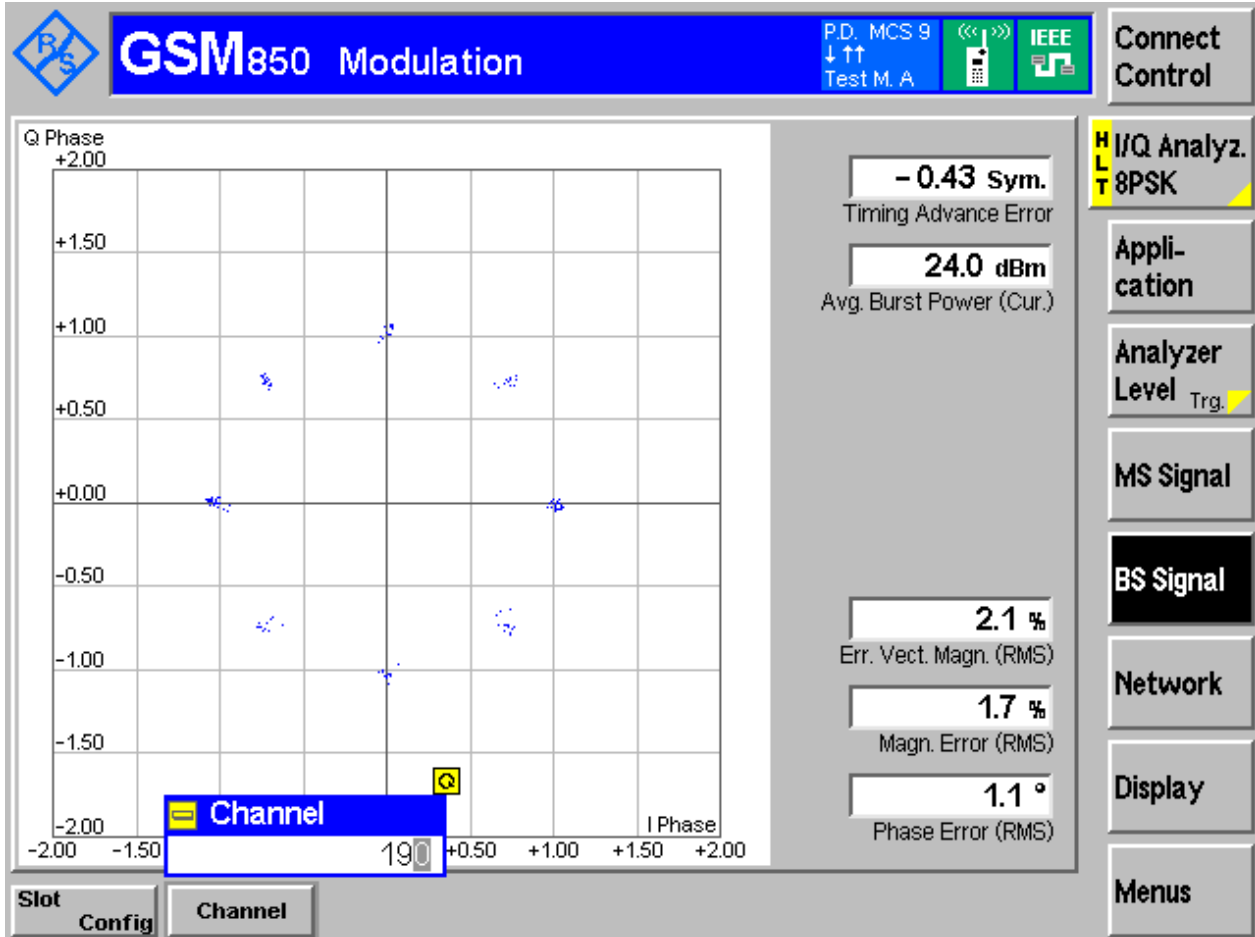
3.1.1.1 Test Mode = GSM/TM1

3.1.1.1.1 Test Channel = MCH



3.1.1.2 Test Mode = GSM/TM2

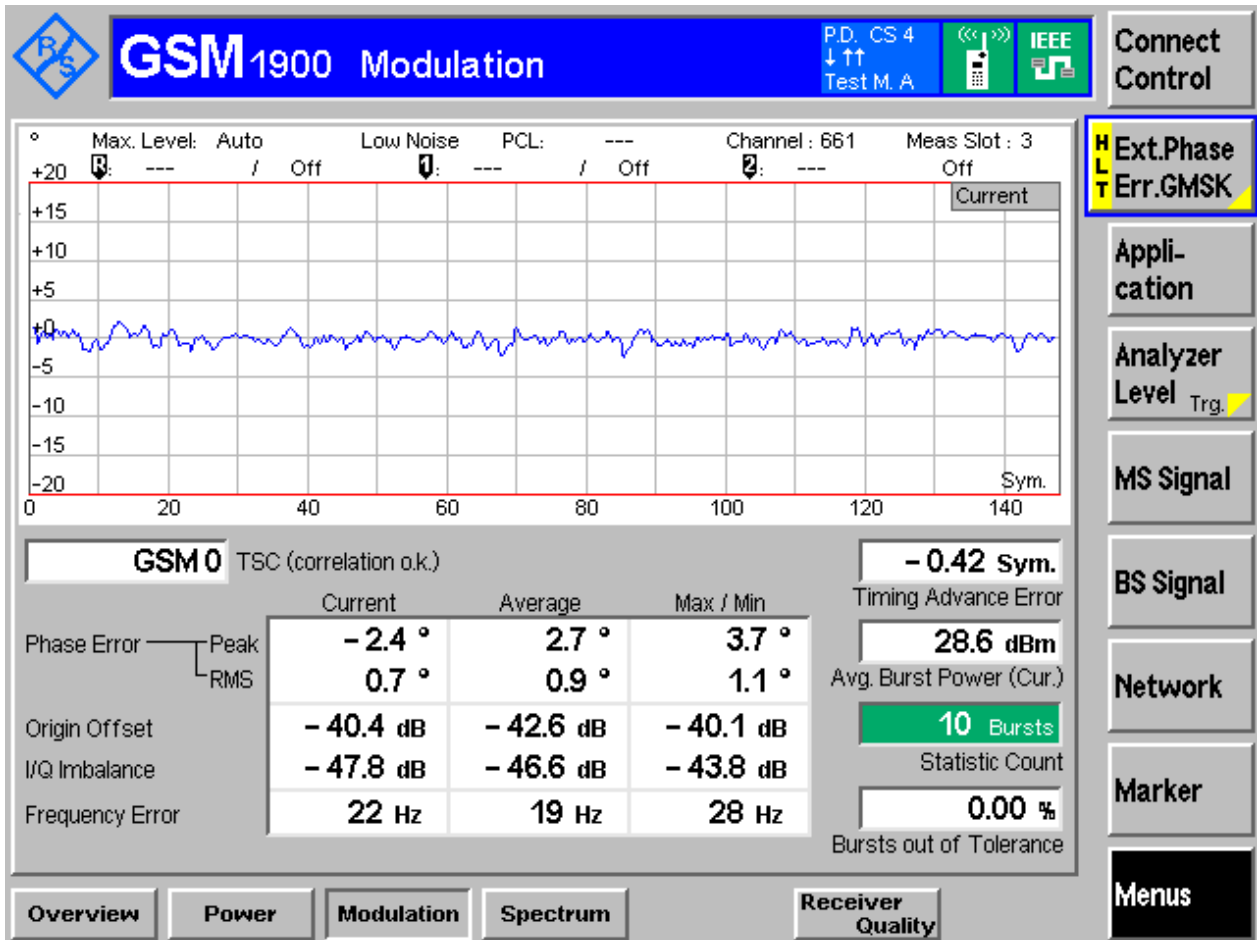
3.1.1.2.1 Test Channel = MCH



3.1.2 Test Band = GSM1900

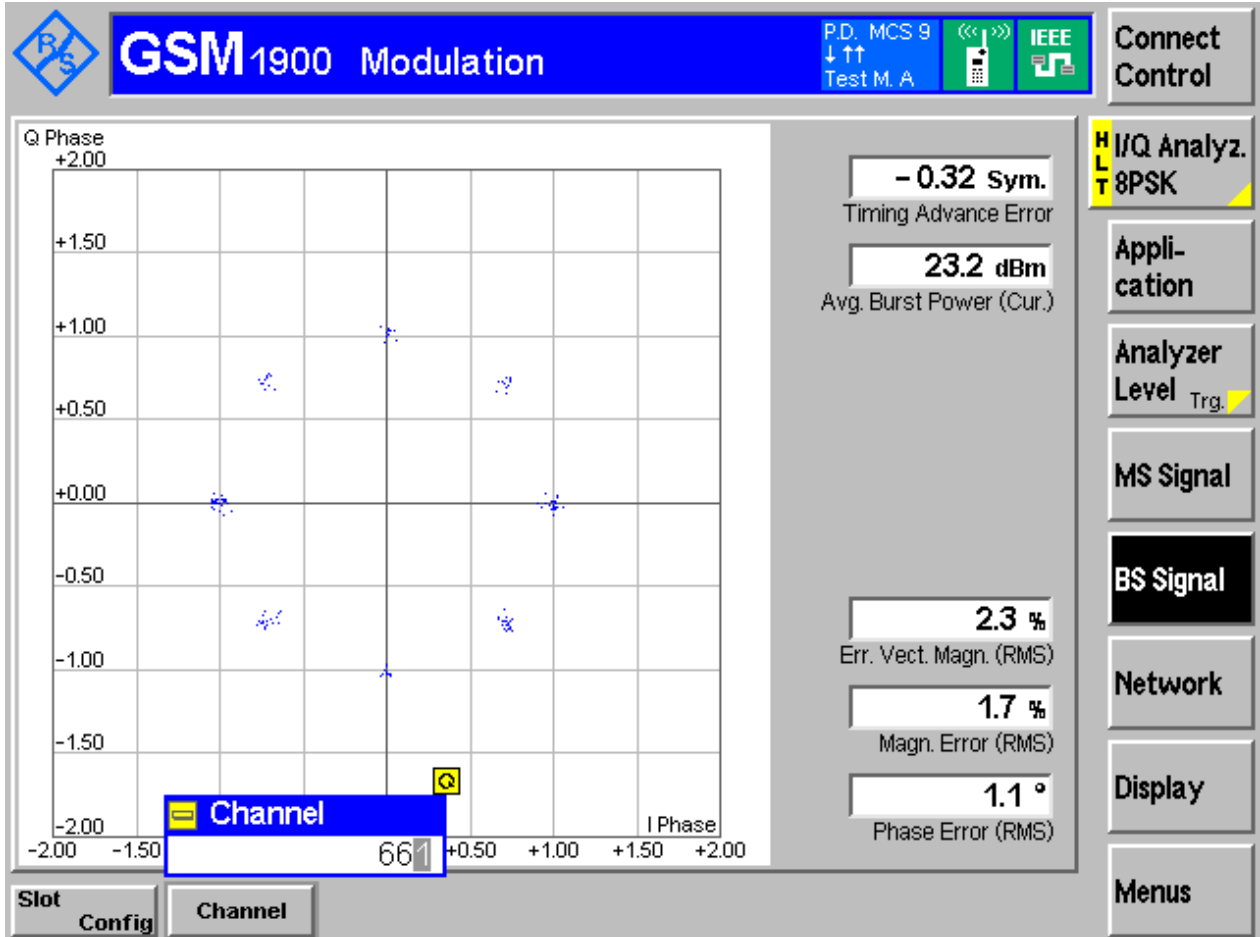
3.1.2.1 Test Mode = GSM/TM1

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	243.50	315.45	Pass
		MCH	245.51	314.75	Pass
		HCH	244.11	315.11	Pass
	GSM/TM2	LCH	248.55	317.19	Pass
		MCH	248.50	323.68	Pass
		HCH	254.70	326.00	Pass
GSM1900	GSM/TM1	LCH	246.48	318.42	Pass
		MCH	242.83	315.27	Pass
		HCH	243.12	311.66	Pass
	GSM/TM2	LCH	249.29	319.22	Pass
		MCH	246.16	319.10	Pass
		HCH	249.78	316.80	Pass



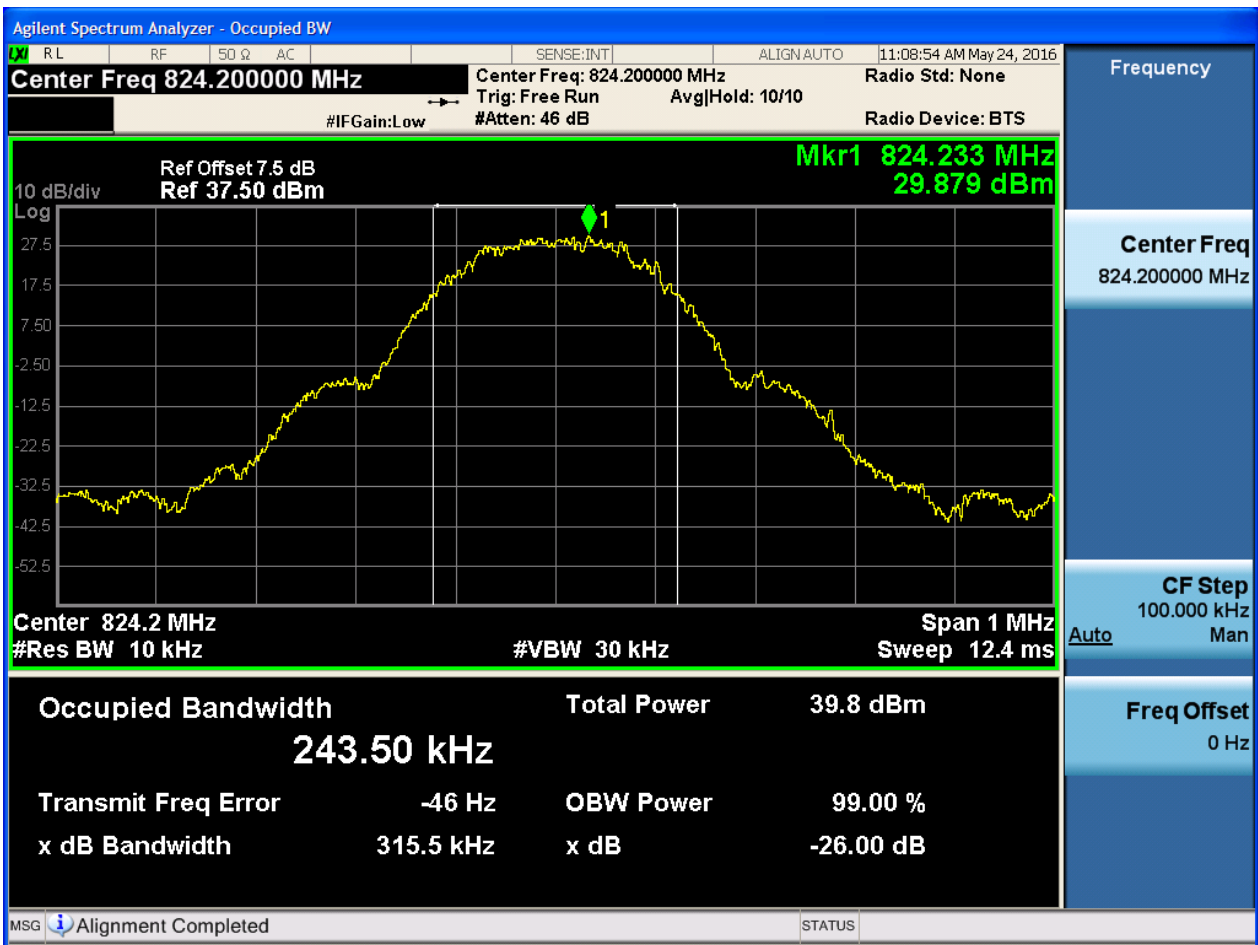
Part II - Test Plots

4.1 For GSM

4.1.1 Test Band = GSM850

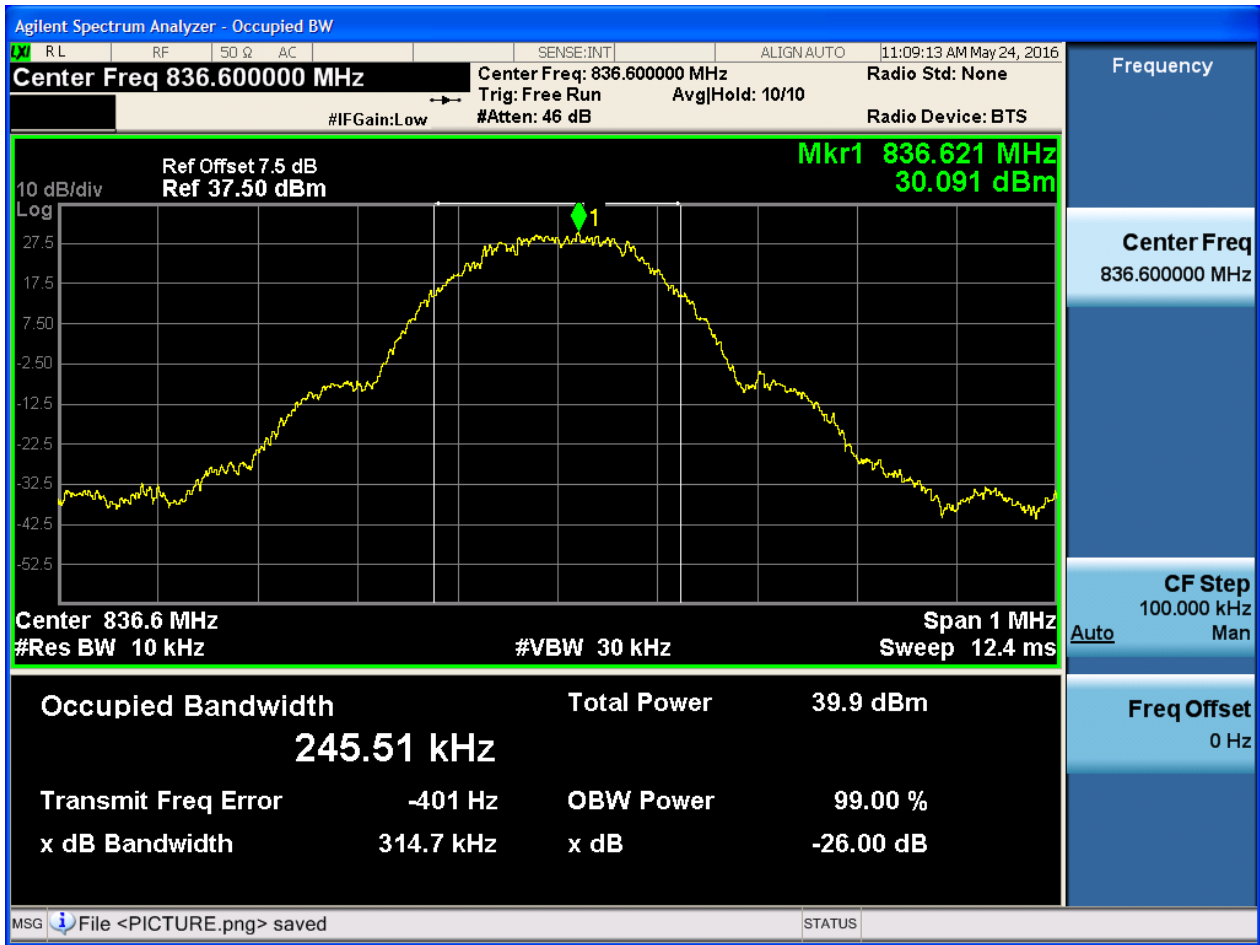
4.1.1.1 Test Mode = GSM/TM1

4.1.1.1.1 Test Channel = LCH



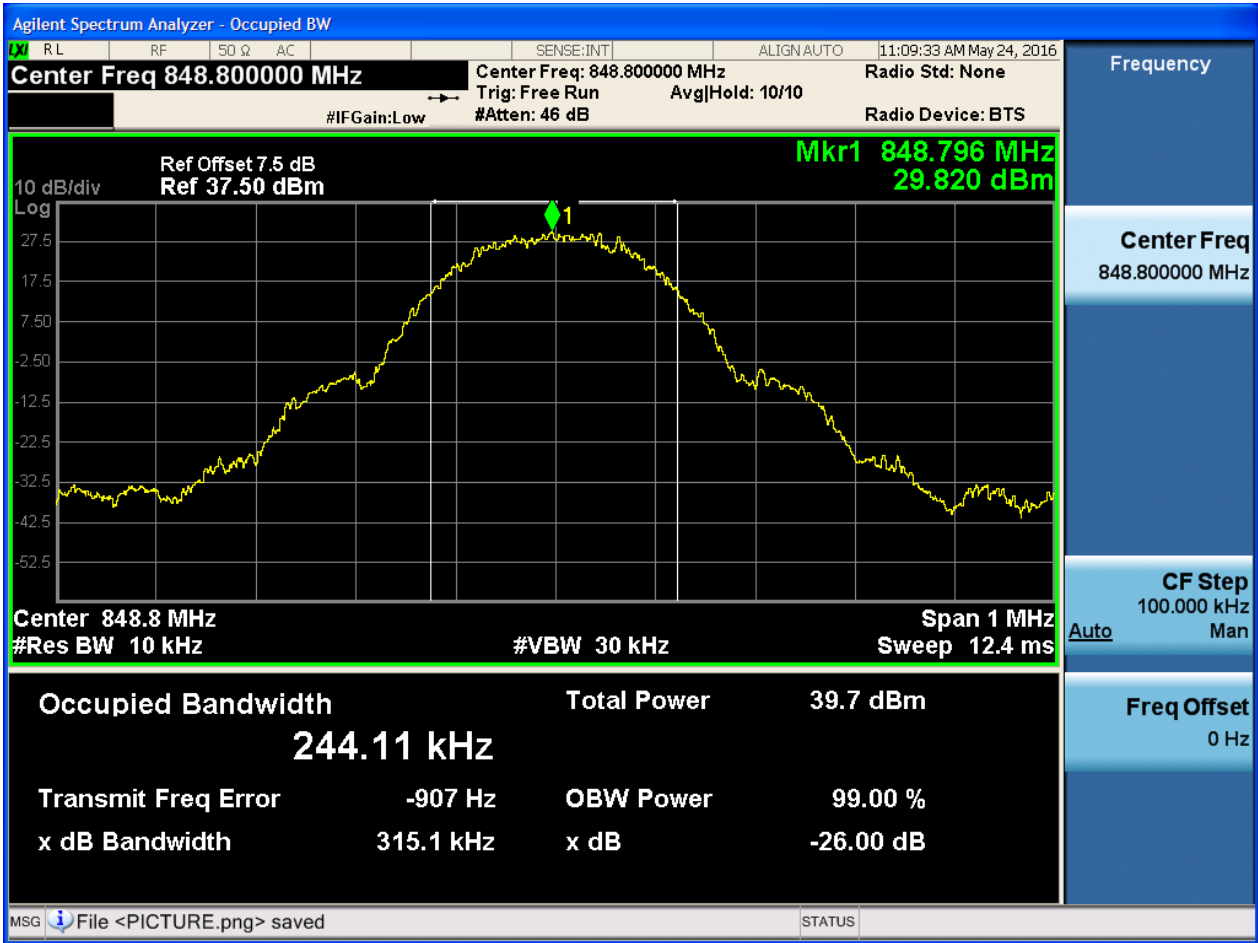


4.1.1.1.2 Test Channel = MCH





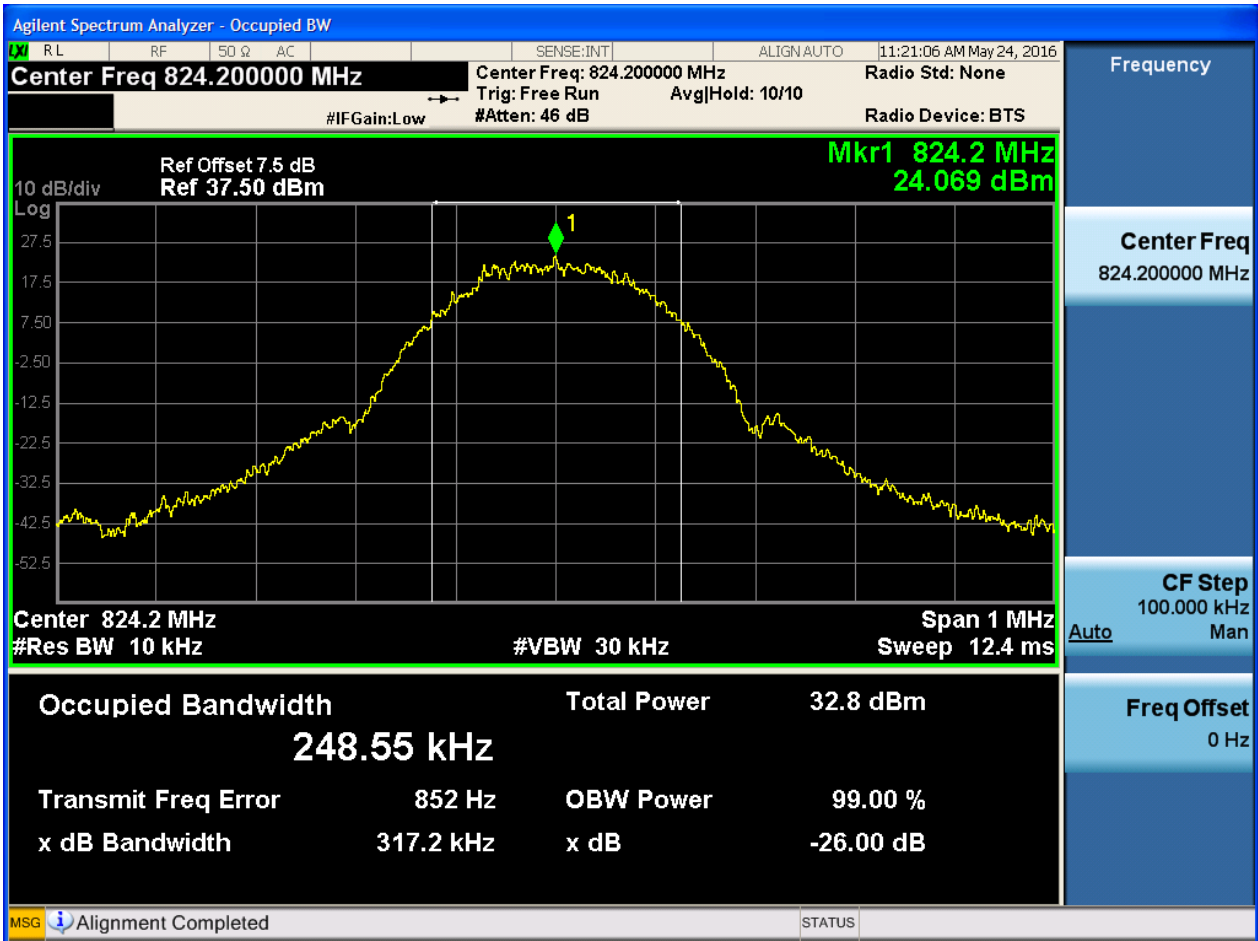
4.1.1.1.3 Test Channel = HCH





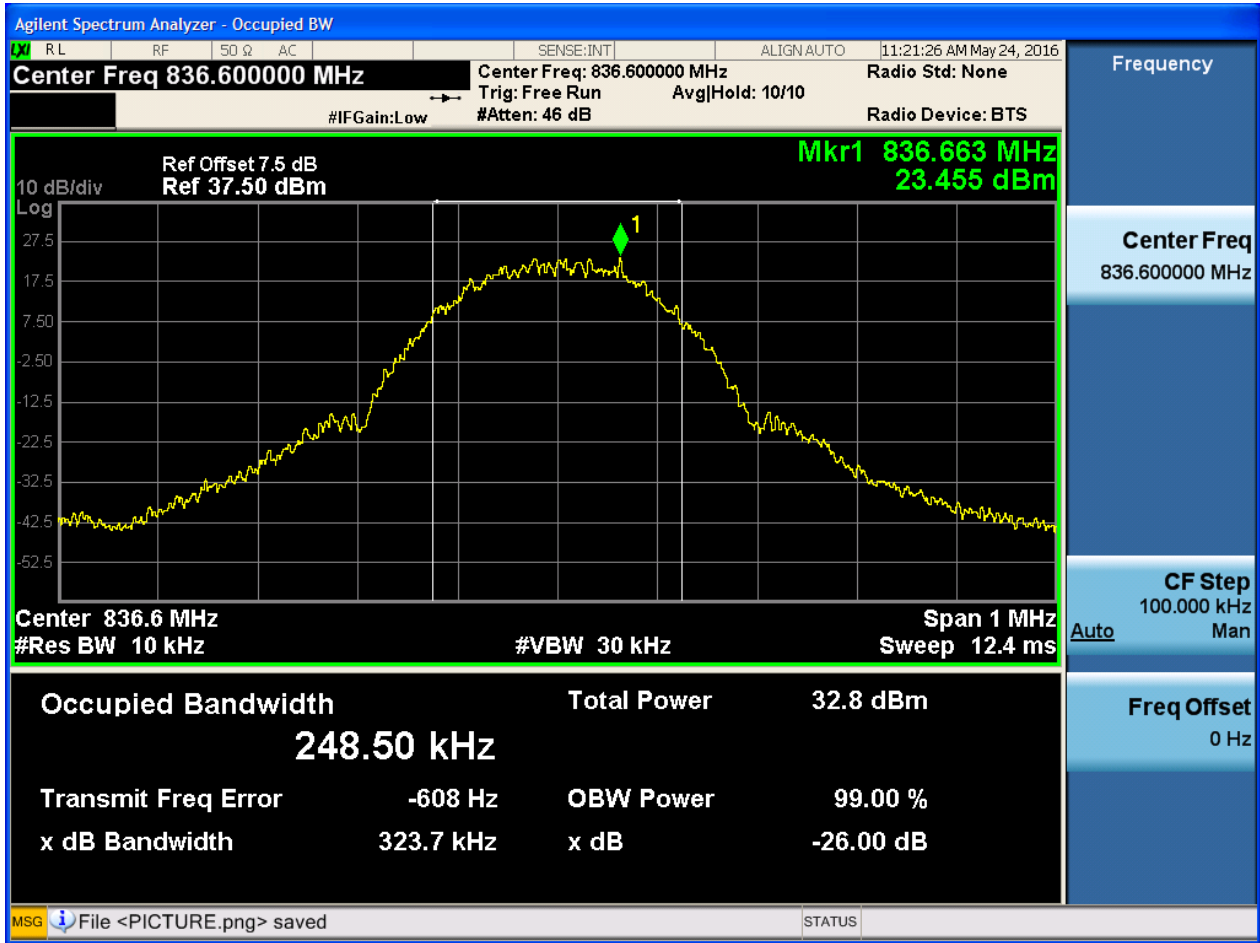
4.1.1.2 Test Mode = GSM/TM2

4.1.1.2.1 Test Channel = LCH



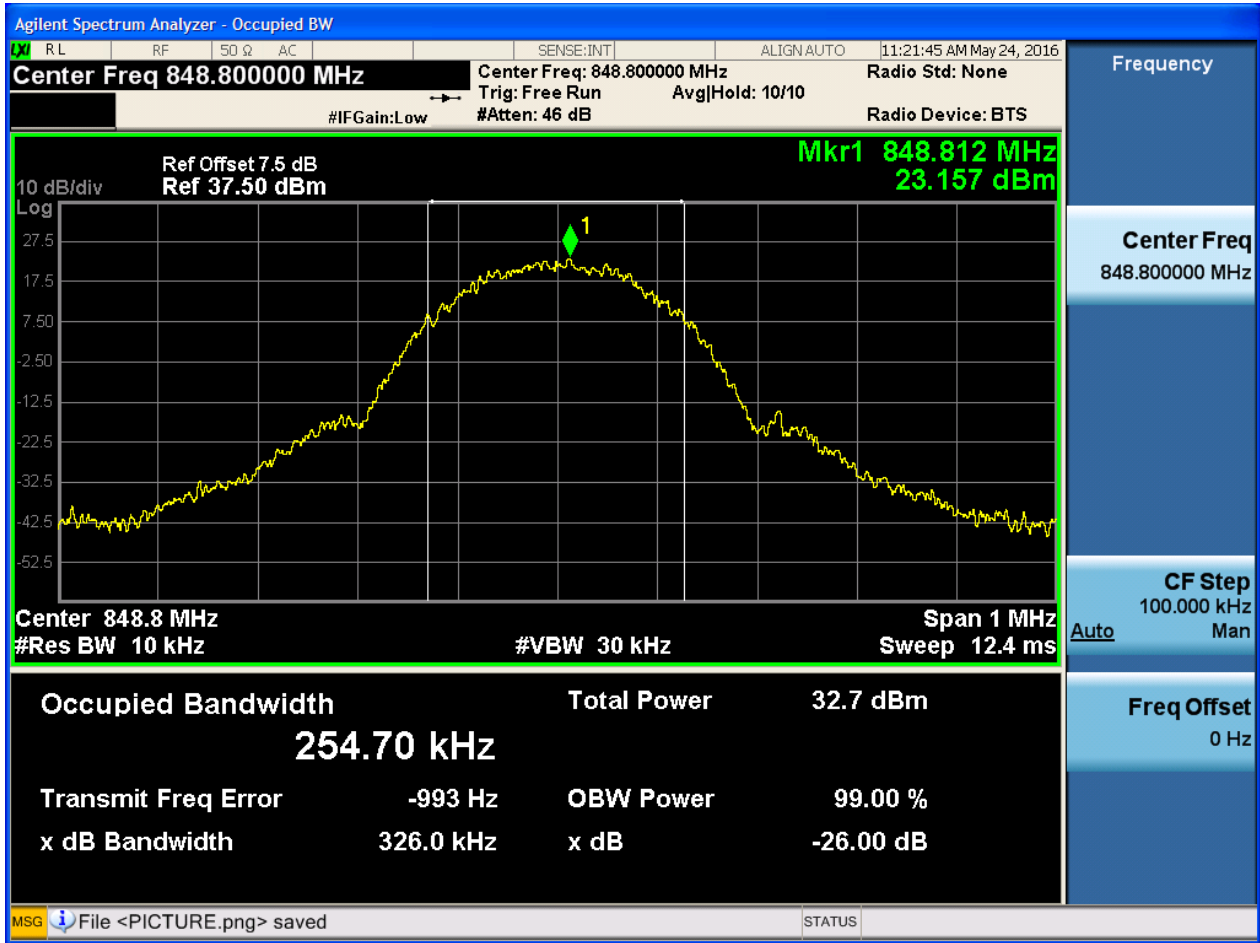


4.1.1.2.2 Test Channel = MCH





4.1.1.2.3 Test Channel = HCH

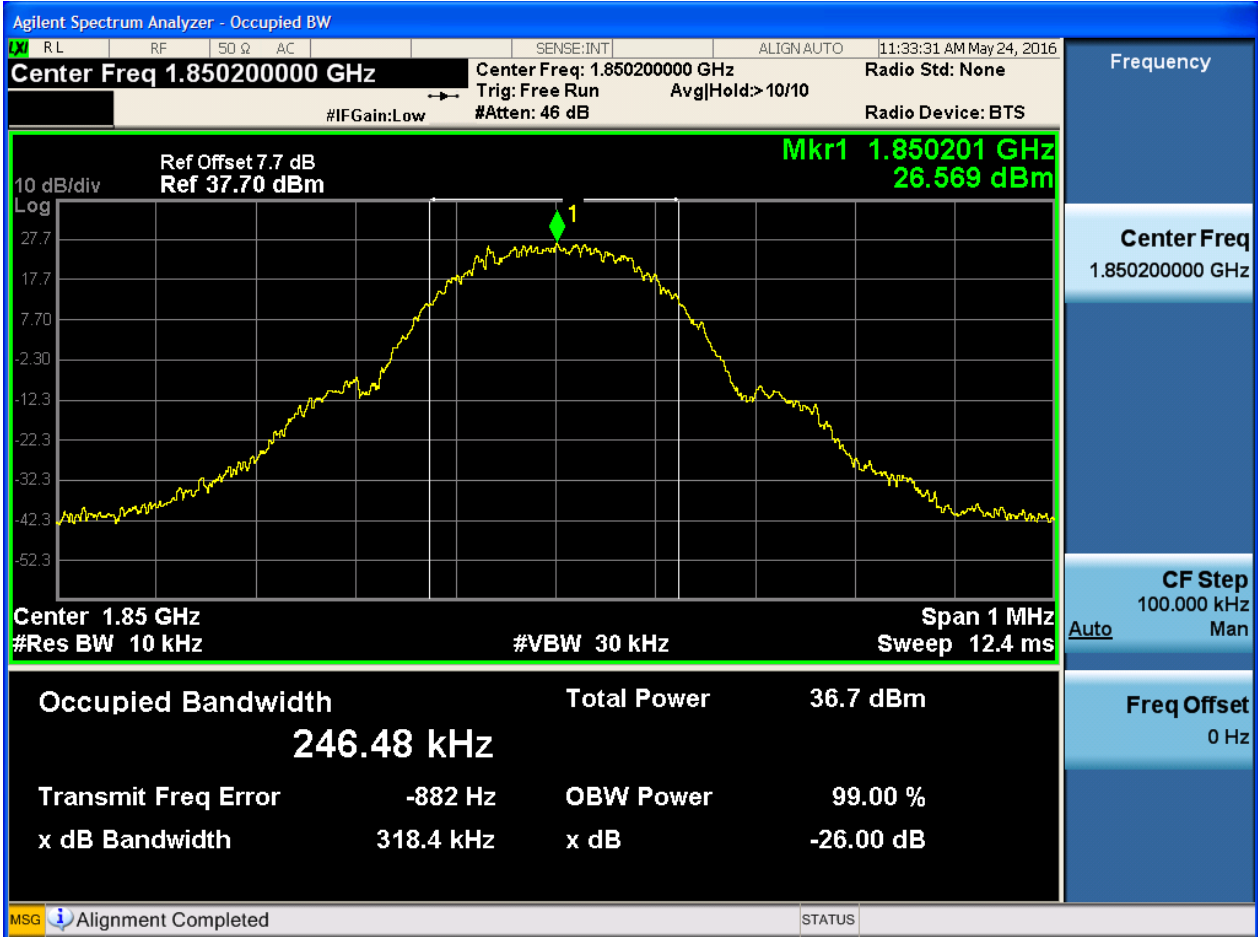




4.1.2 Test Band = GSM1900

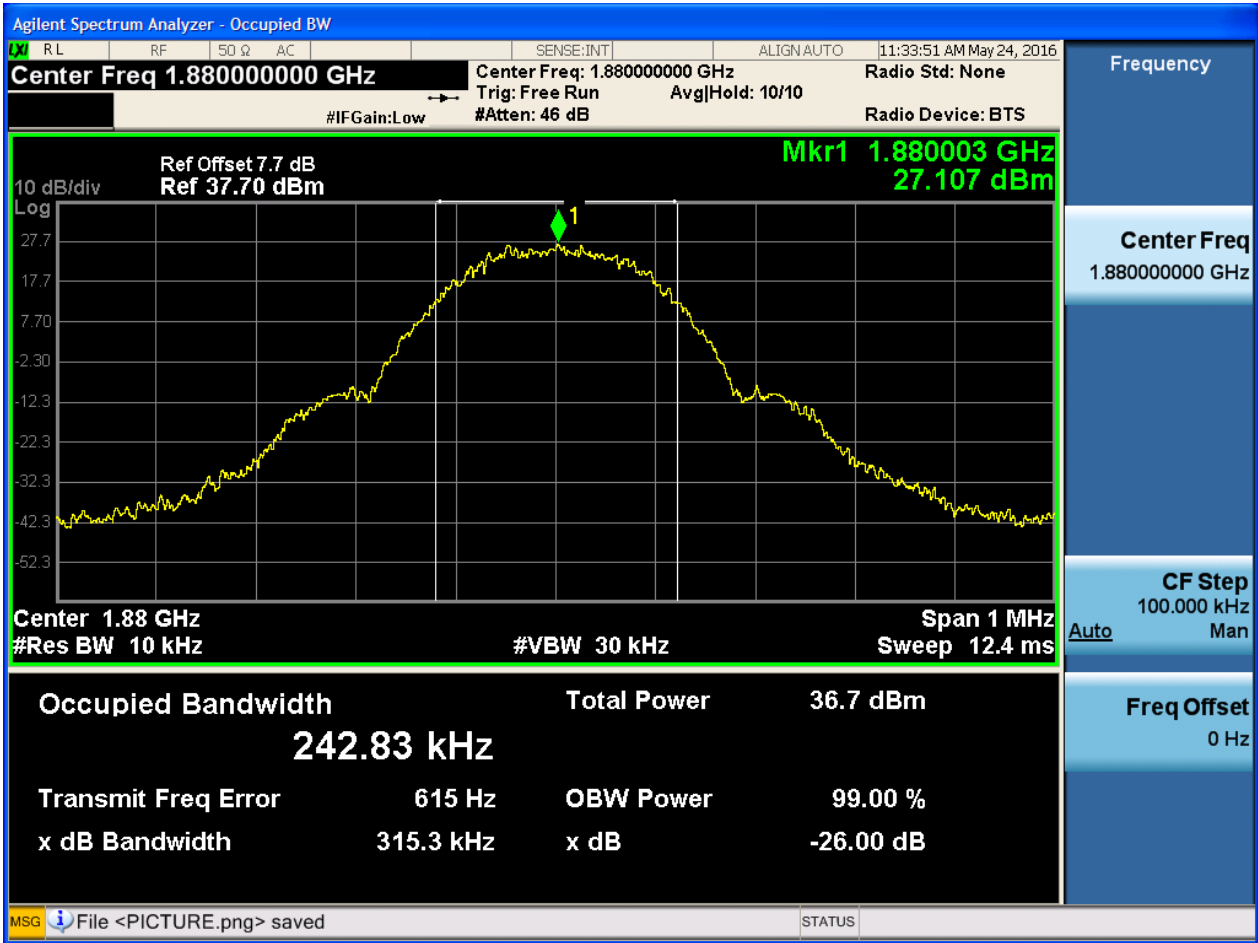
4.1.2.1 Test Mode = GSM/TM1

4.1.2.1.1 Test Channel = LCH



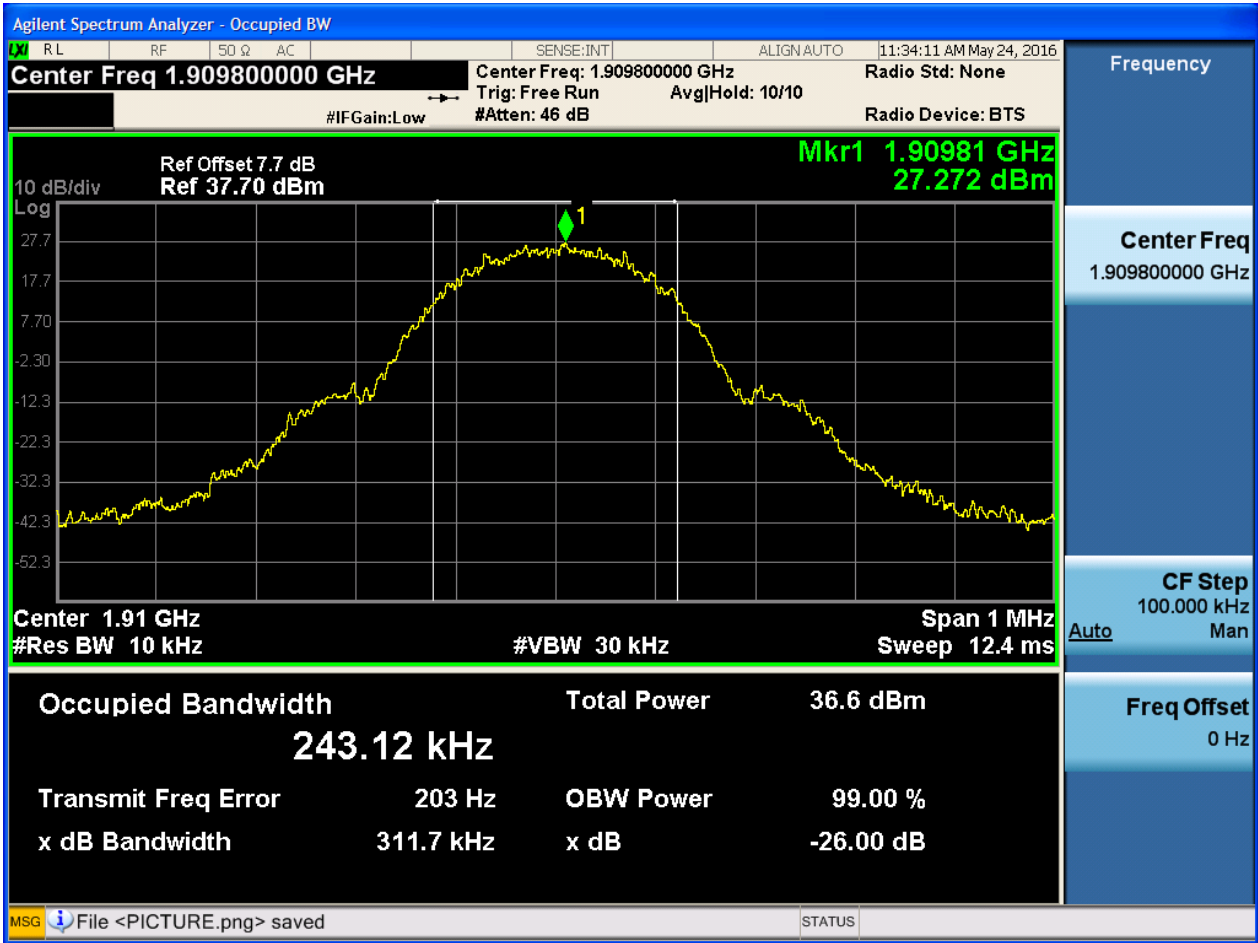


4.1.2.1.2 Test Channel = MCH





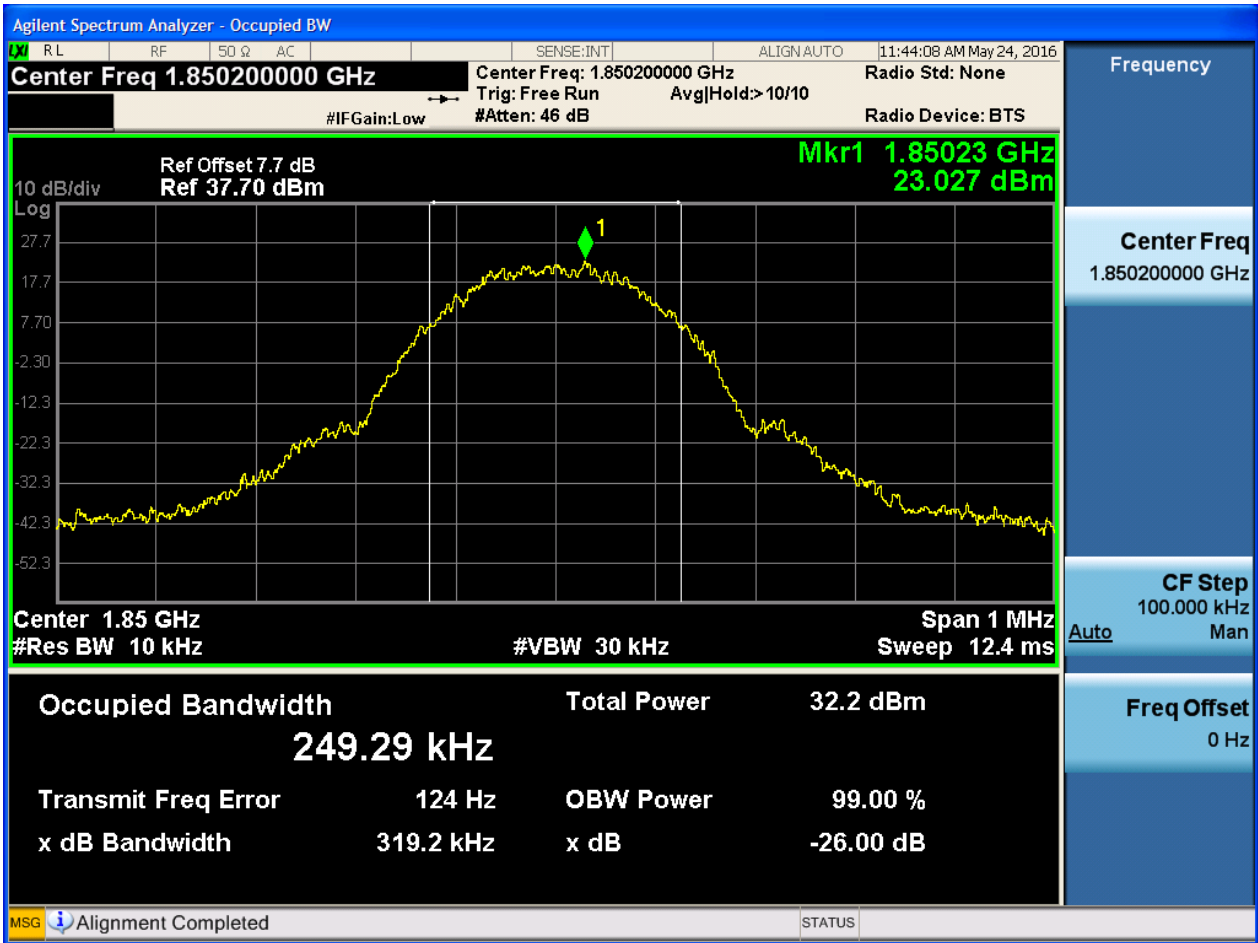
4.1.2.1.3 Test Channel = HCH





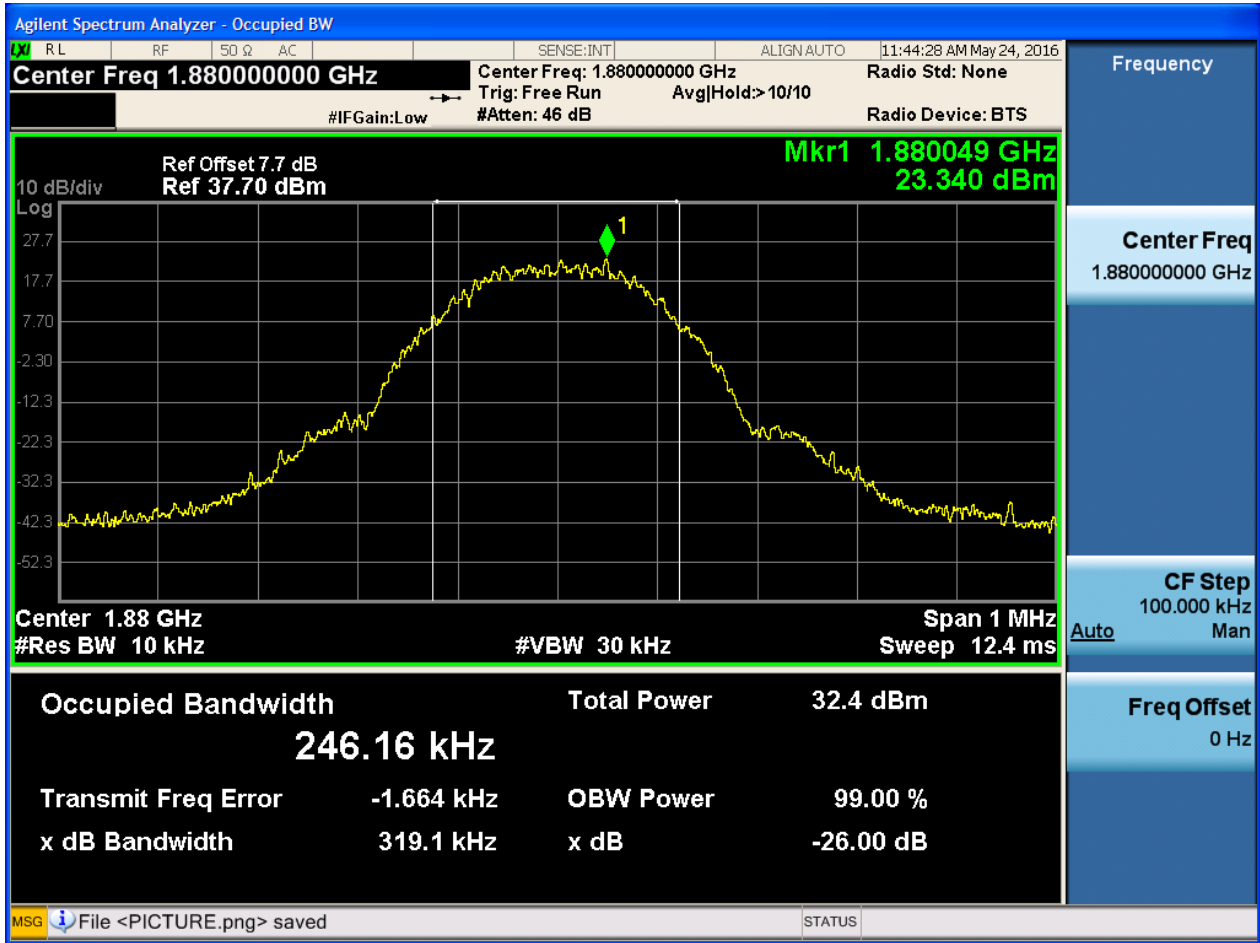
4.1.2.2 Test Mode = GSM/TM2

4.1.2.2.1 Test Channel = LCH



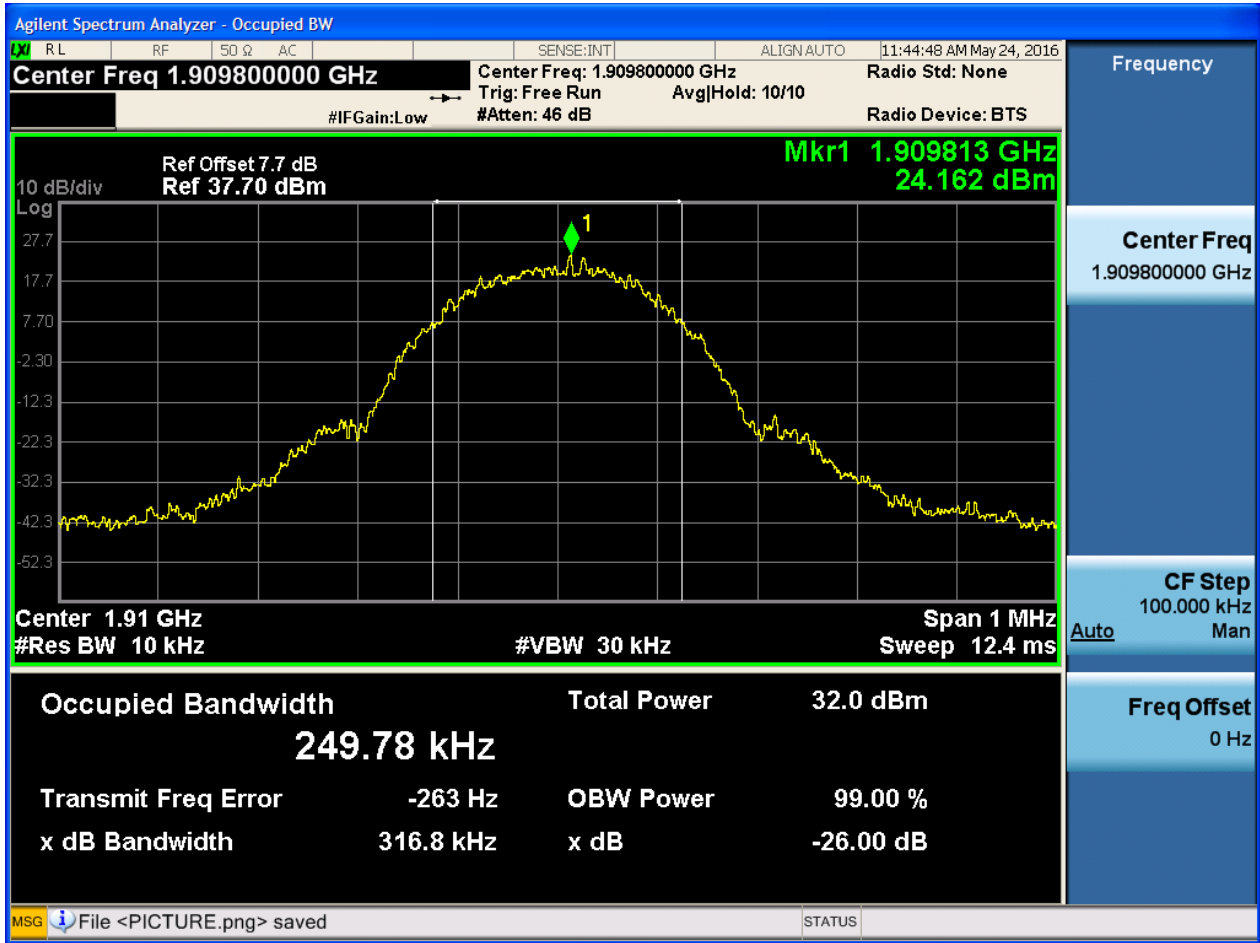


4.1.2.2.2 Test Channel = MCH





4.1.2.2.3 Test Channel = HCH





5Appendix_E: Band Edges Compliance

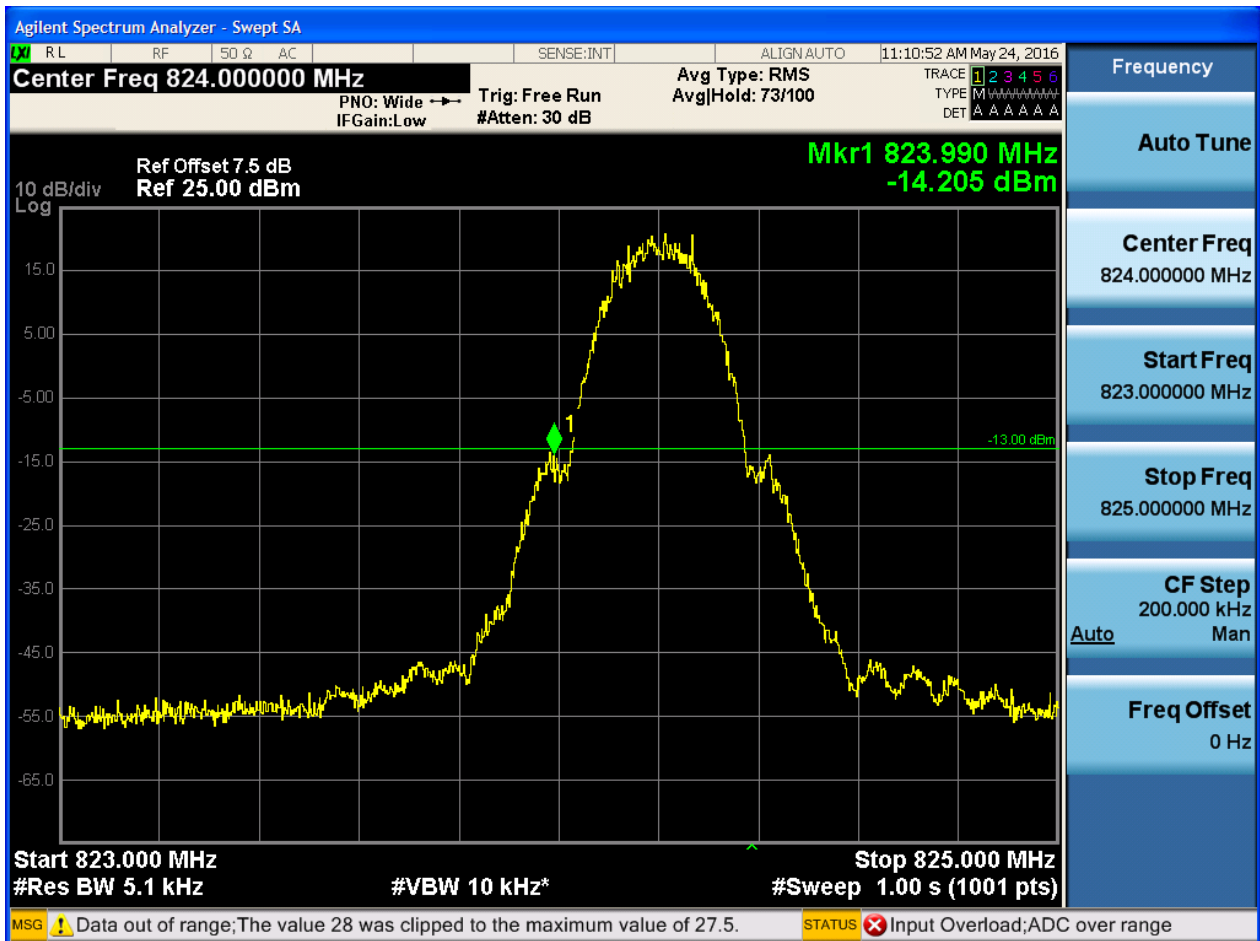
Part I - Test Plots

5.1 For GSM

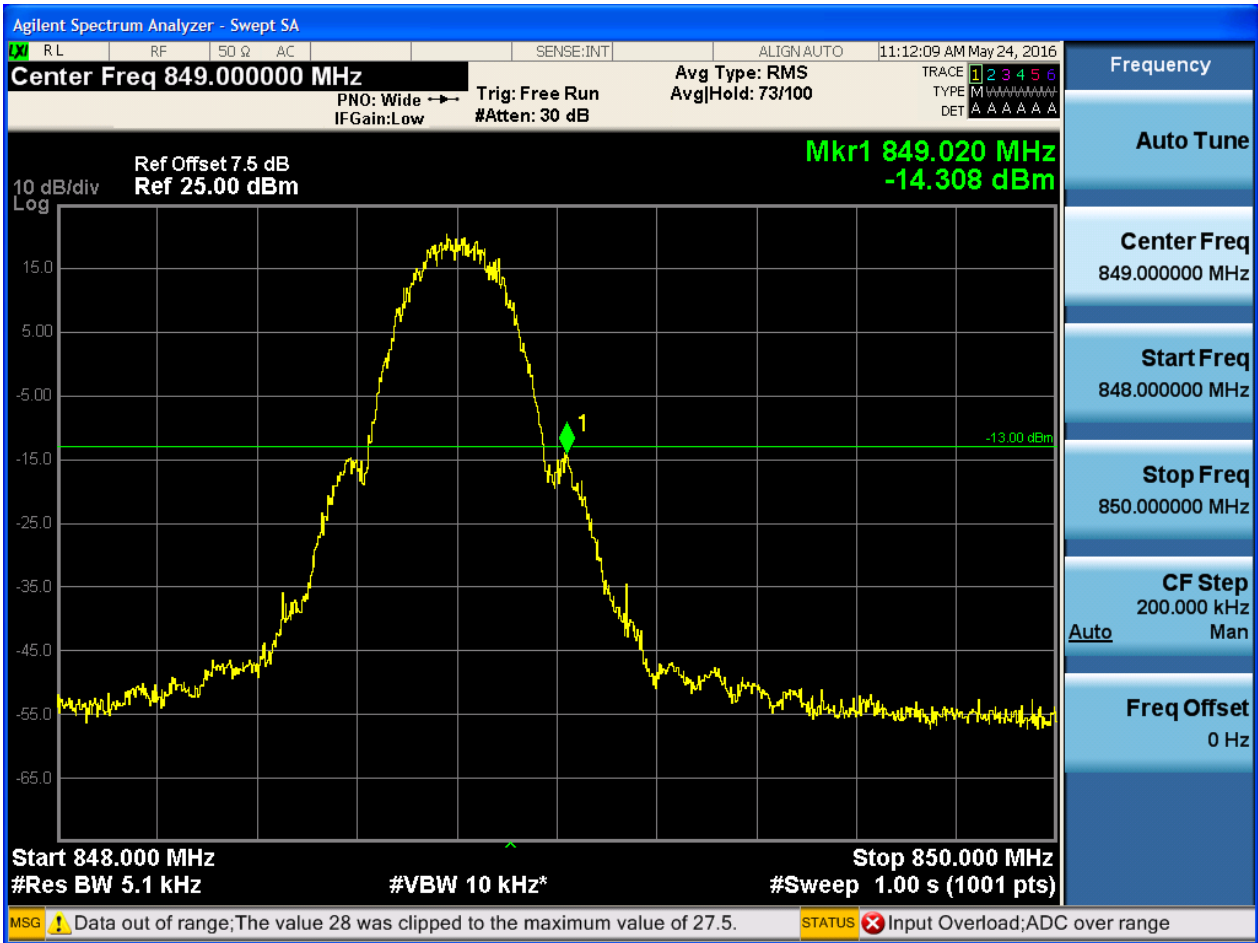
5.1.1 Test Band = GSM850

5.1.1.1 Test Mode = GSM/TM1

5.1.1.1.1 Test Channel = LCH

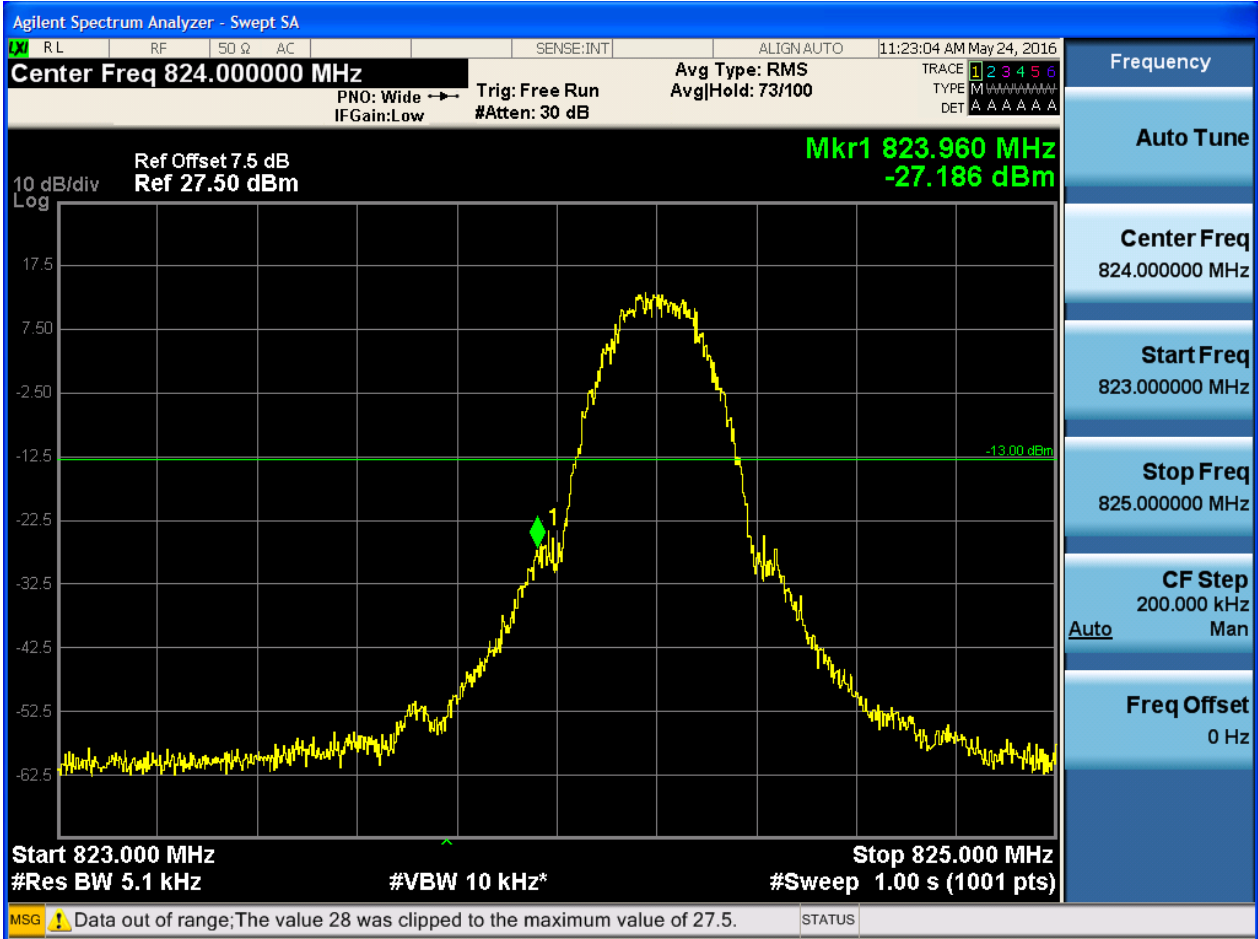


5.1.1.1.2 Test Channel = HCH

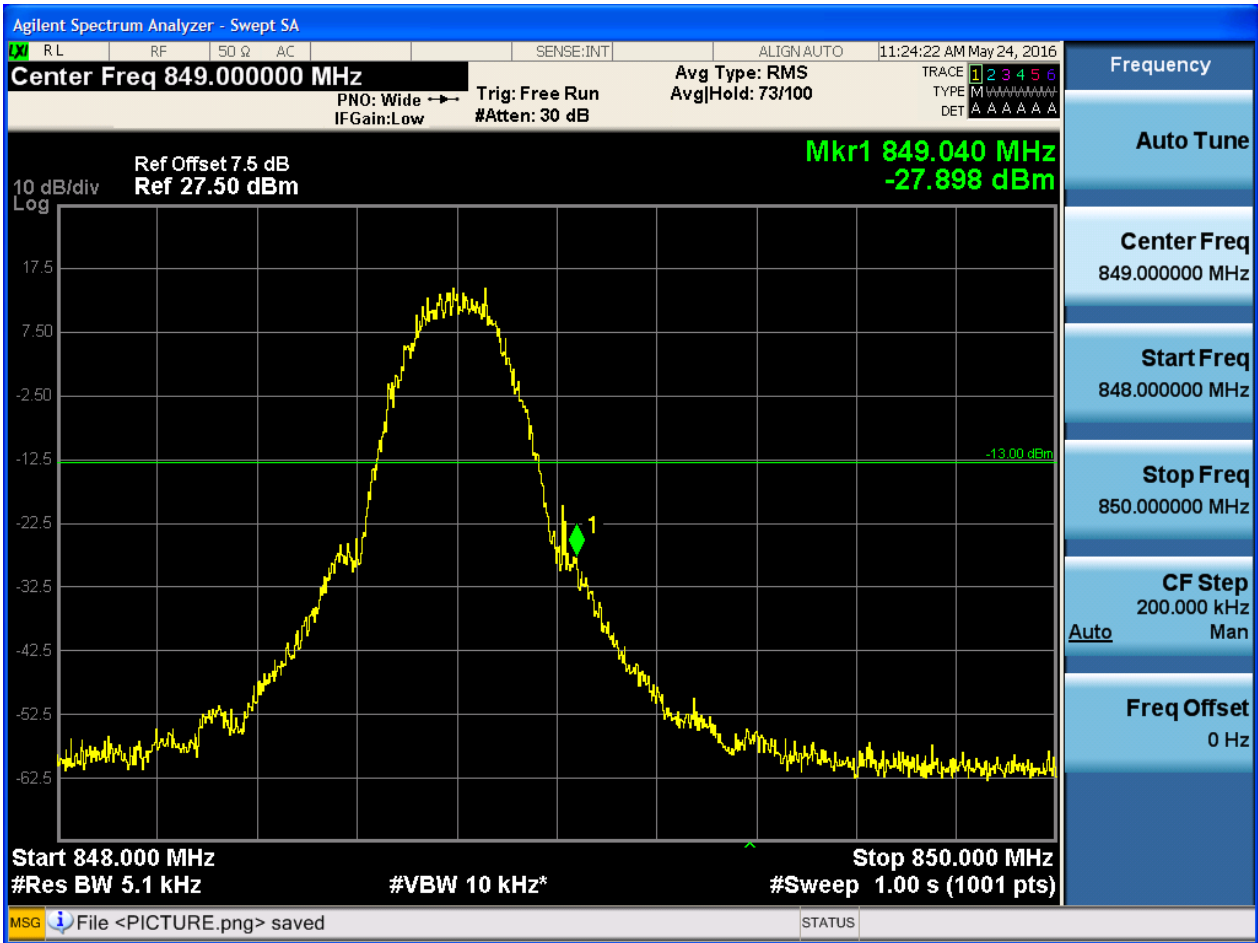


5.1.1.2 Test Mode = GSM/TM2

5.1.1.2.1 Test Channel = LCH



5.1.1.2.2 Test Channel = HCH

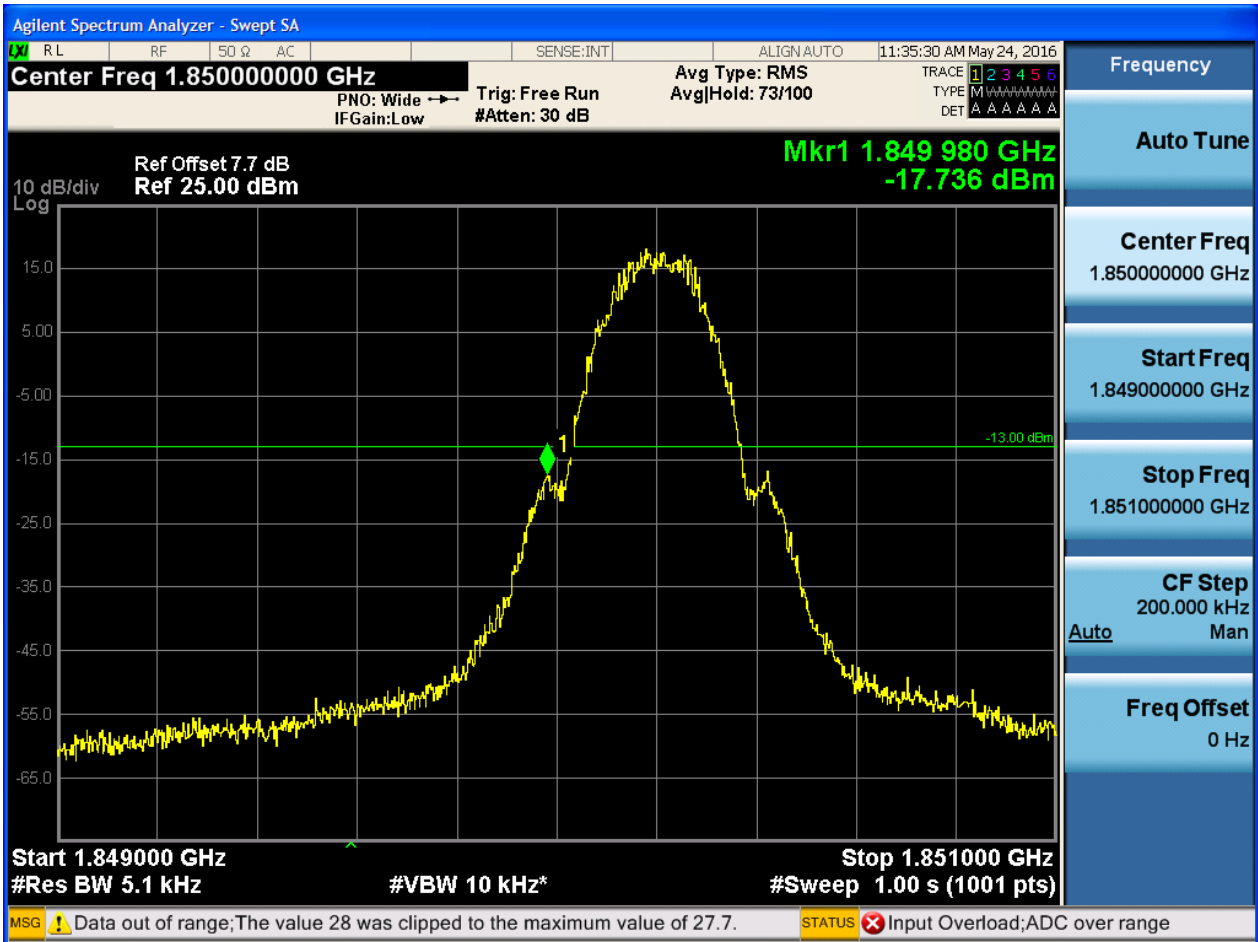




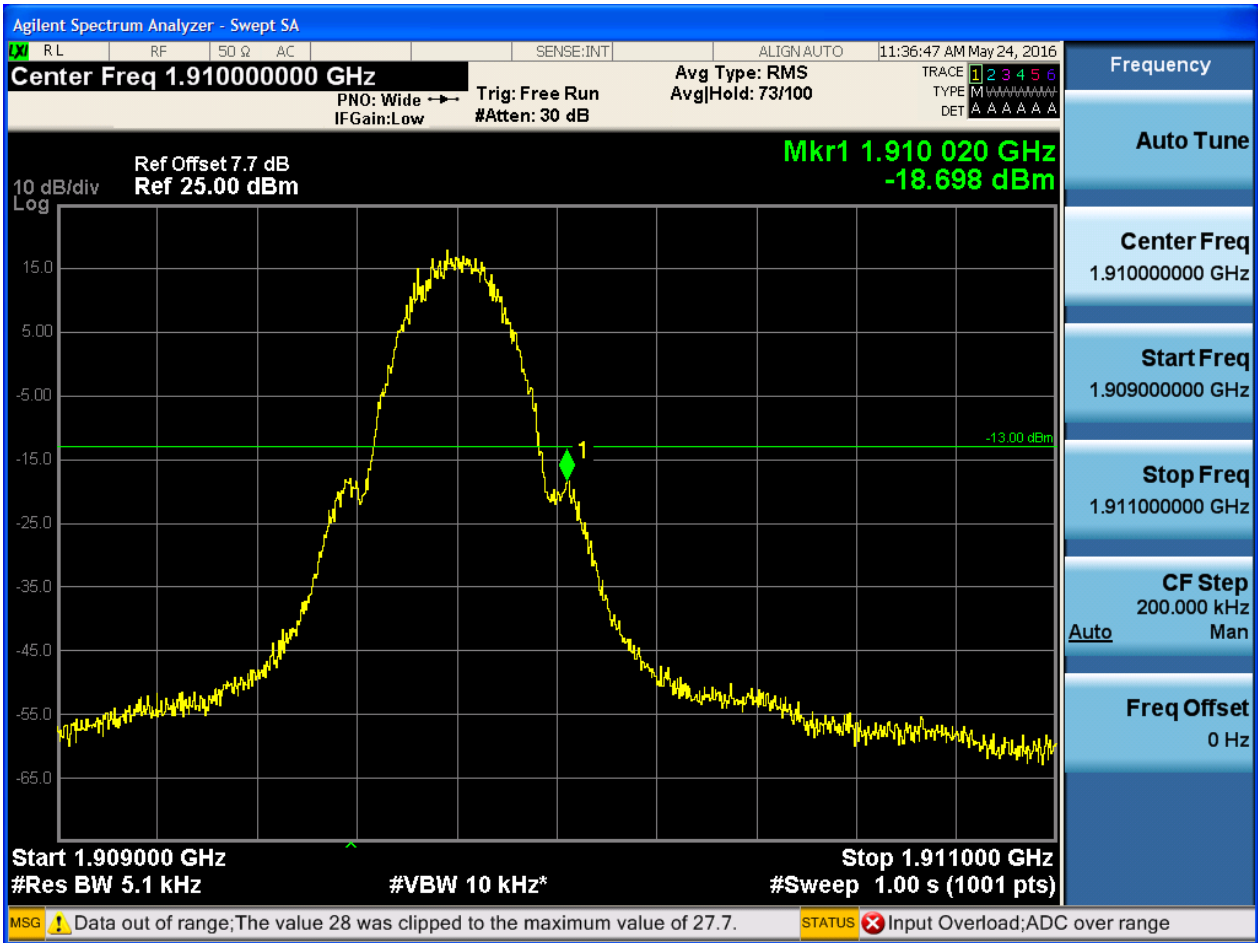
5.1.2 Test Band = GSM1900

5.1.2.1 Test Mode = GSM/TM1

5.1.2.1.1 Test Channel = LCH

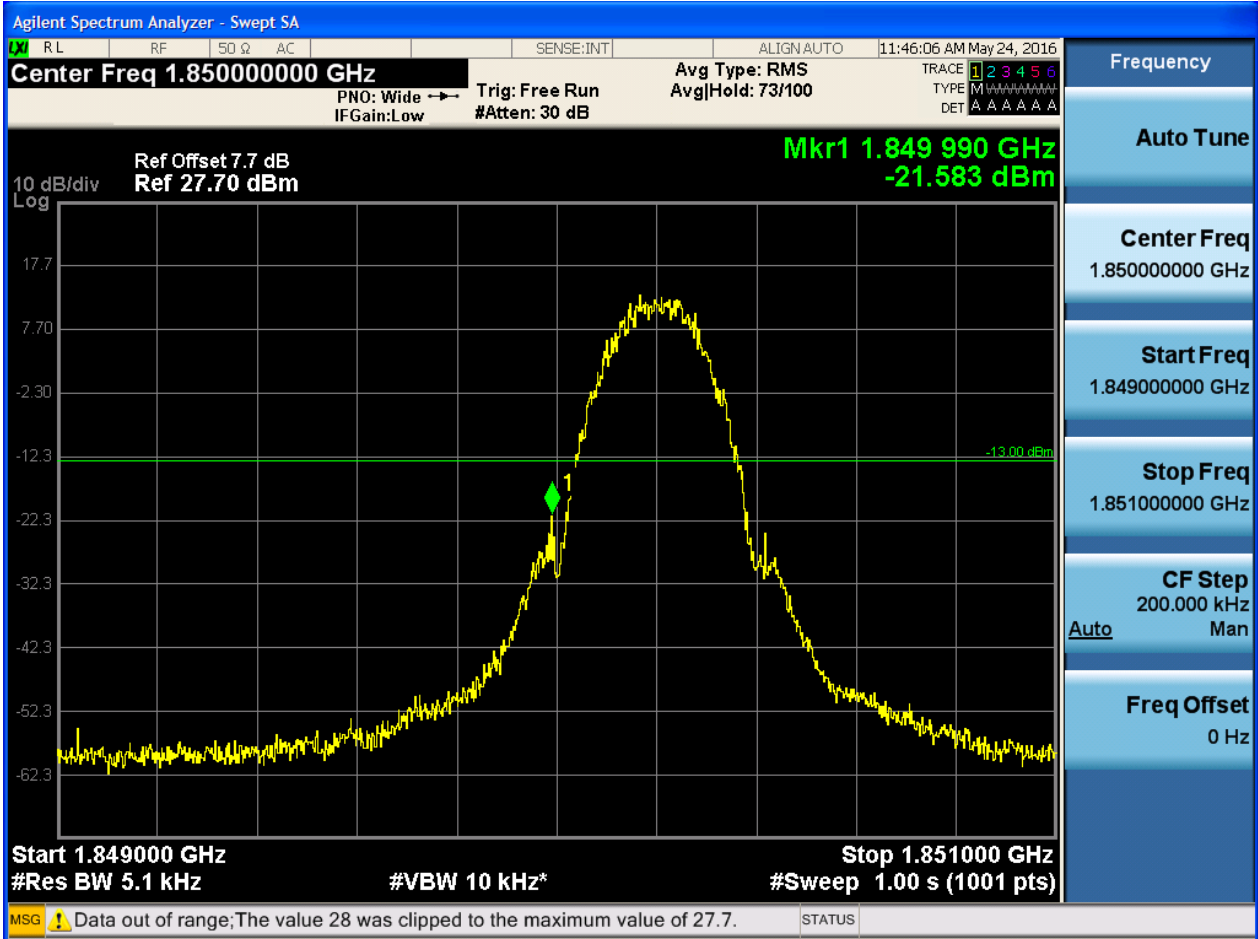


5.1.2.1.2 Test Channel = HCH

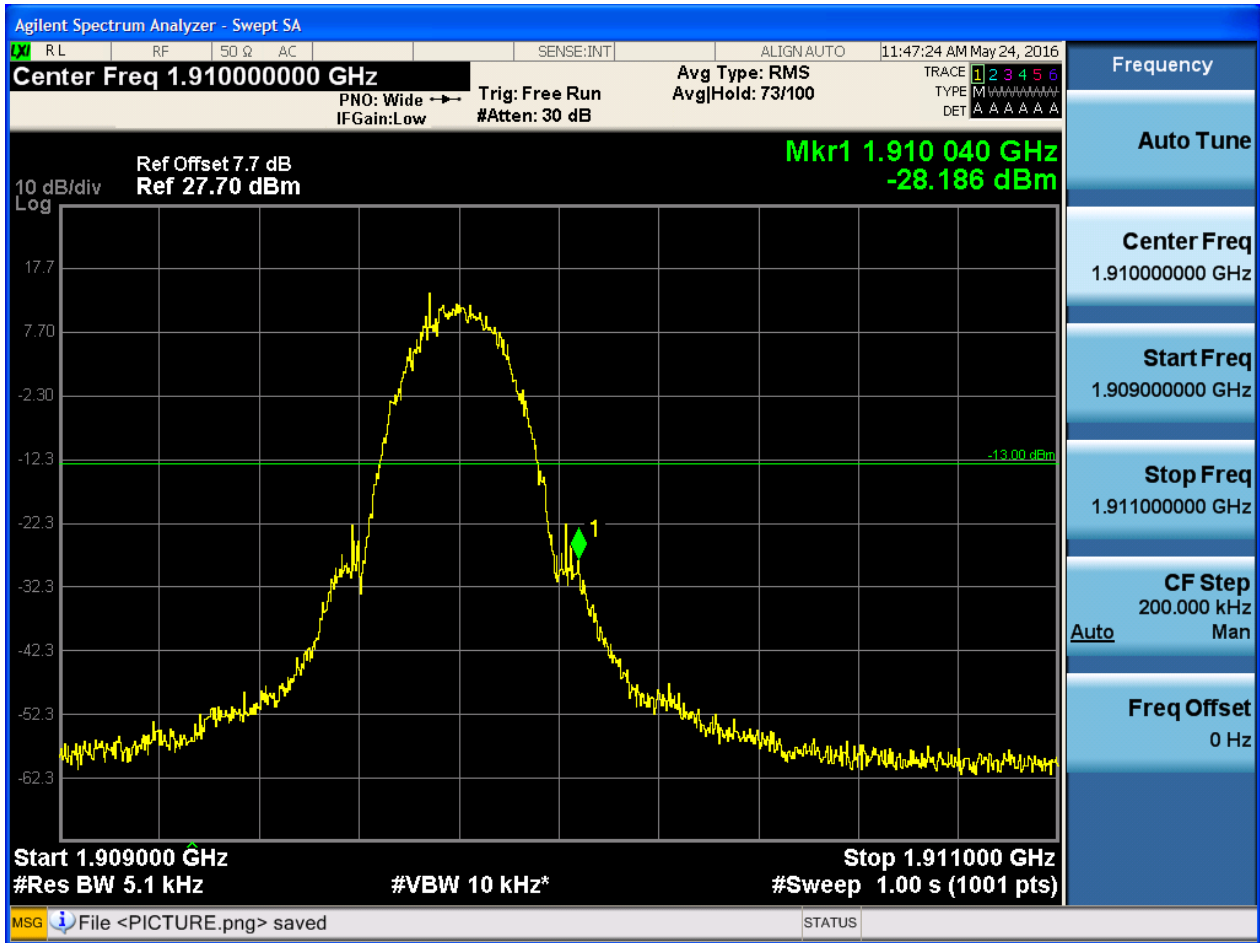


5.1.2.2 Test Mode = GSM/TM2

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.

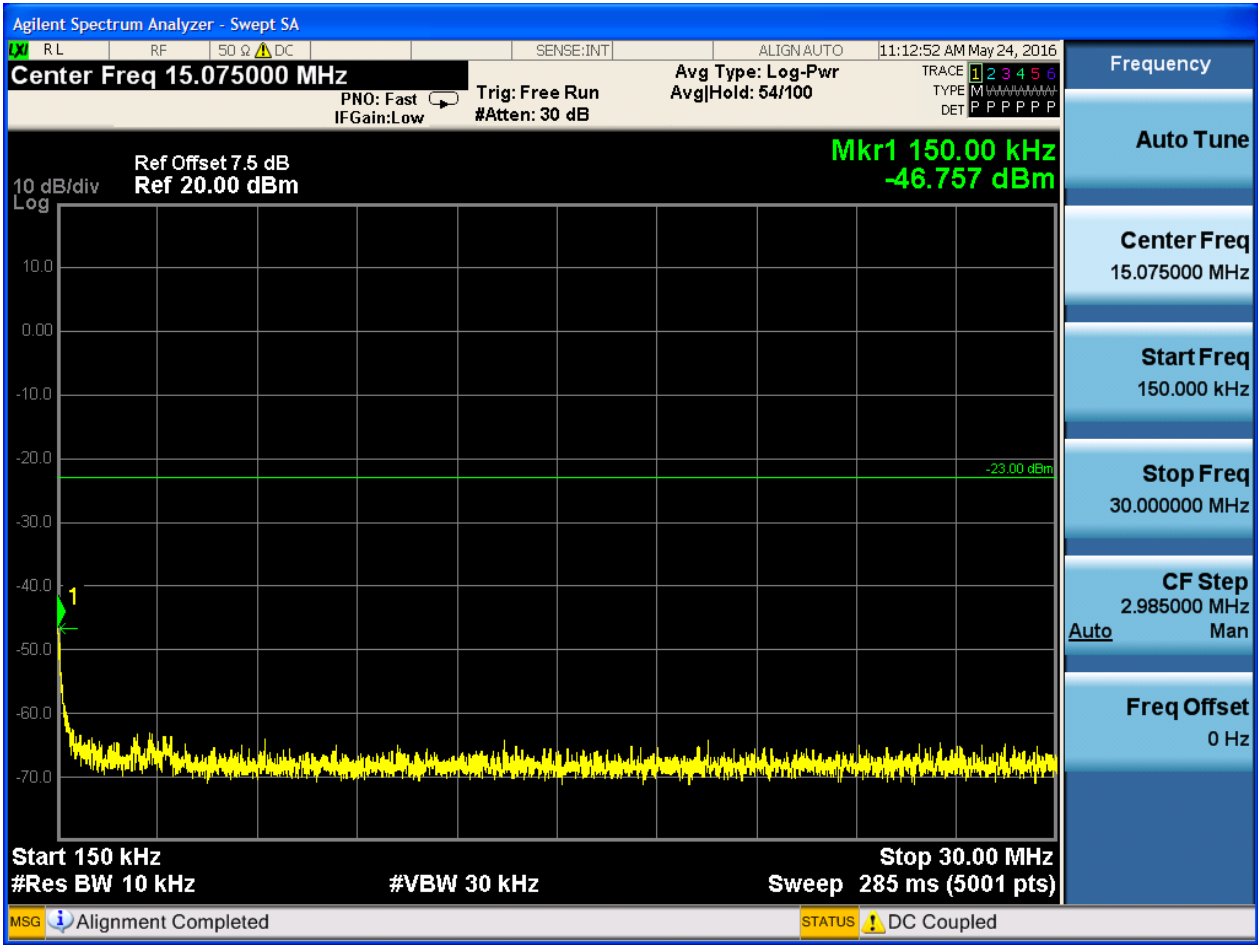
Part I - Test Plots

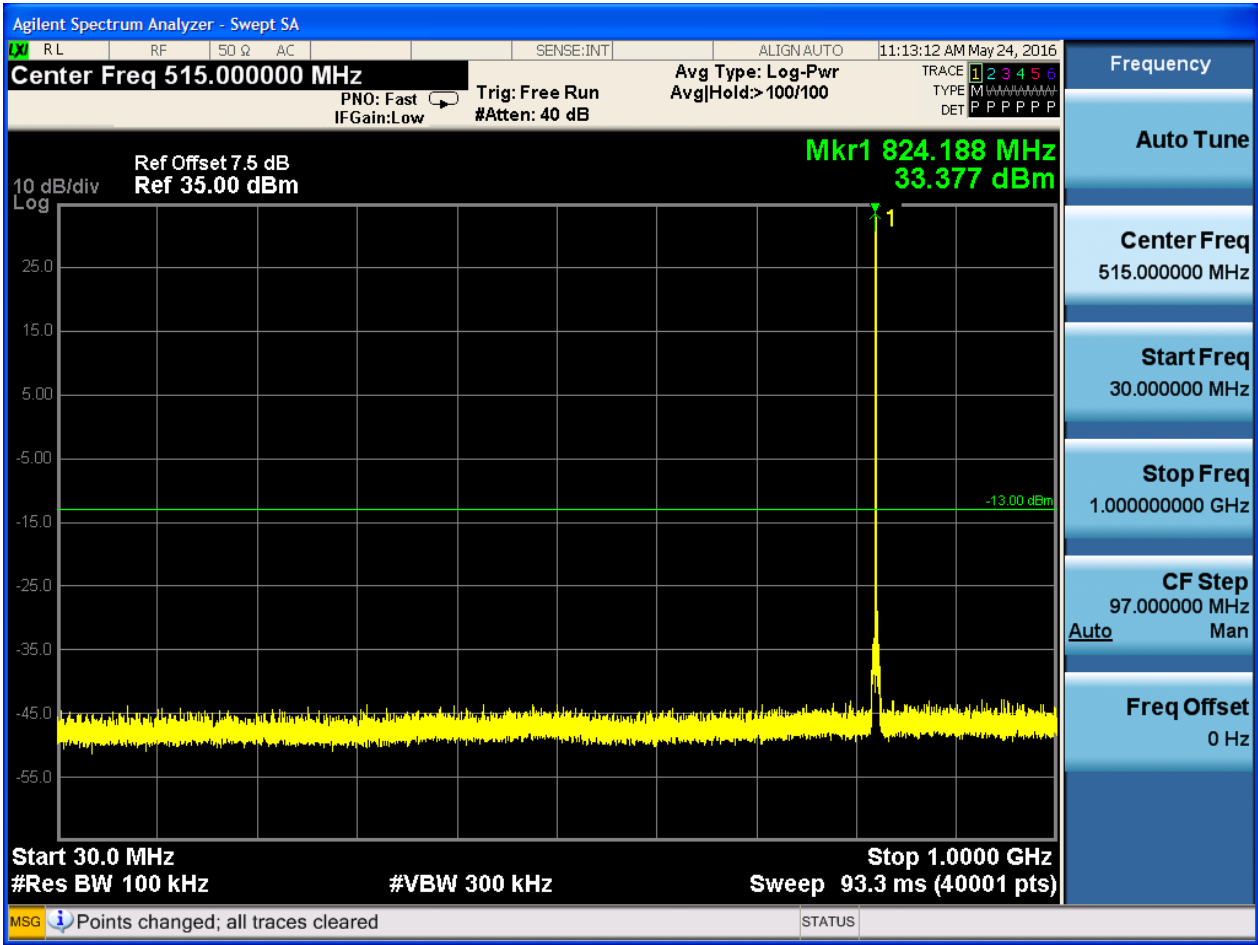
6.1 For GSM

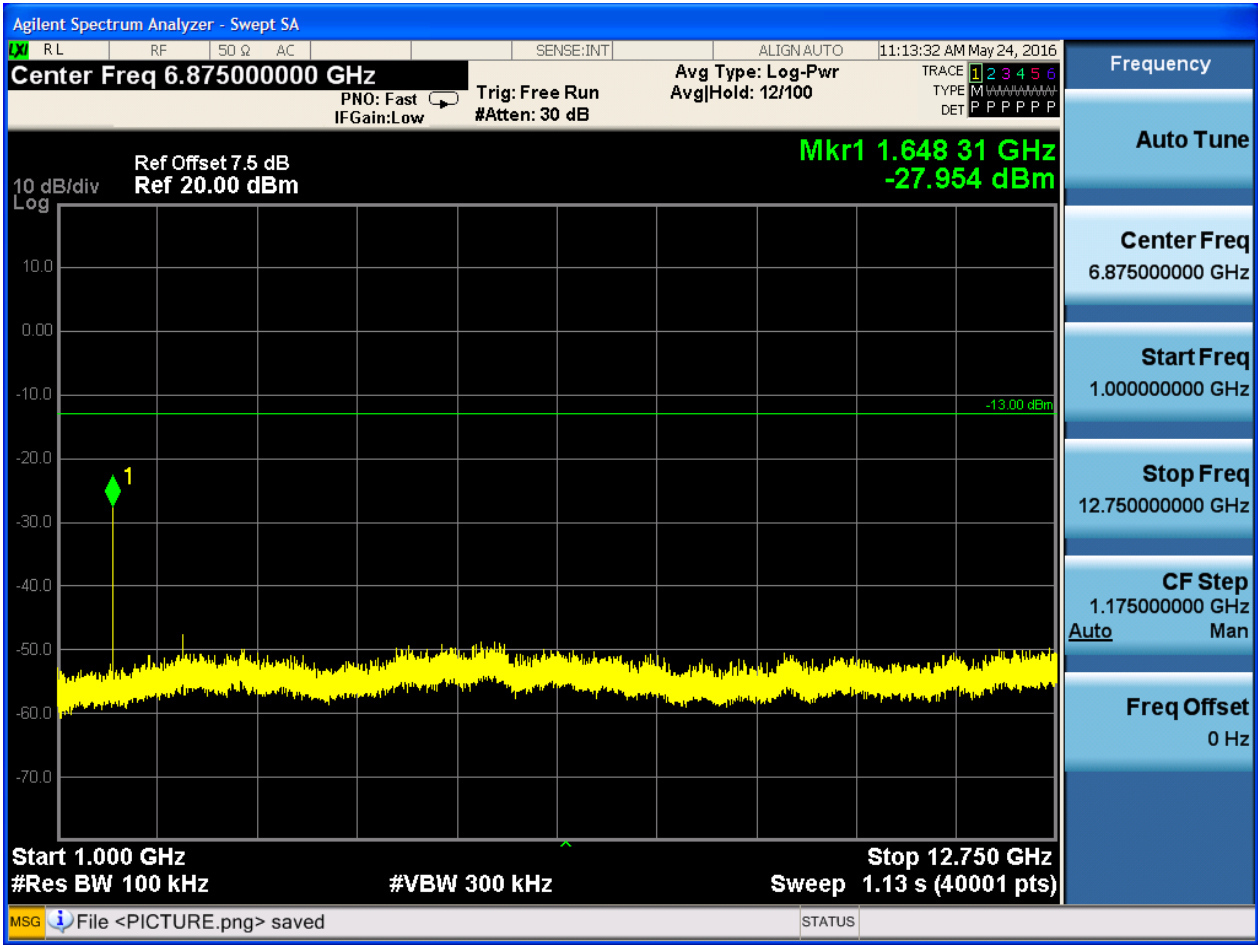
6.1.1 Test Band = GSM850

6.1.1.1 Test Mode = GSM/TM1

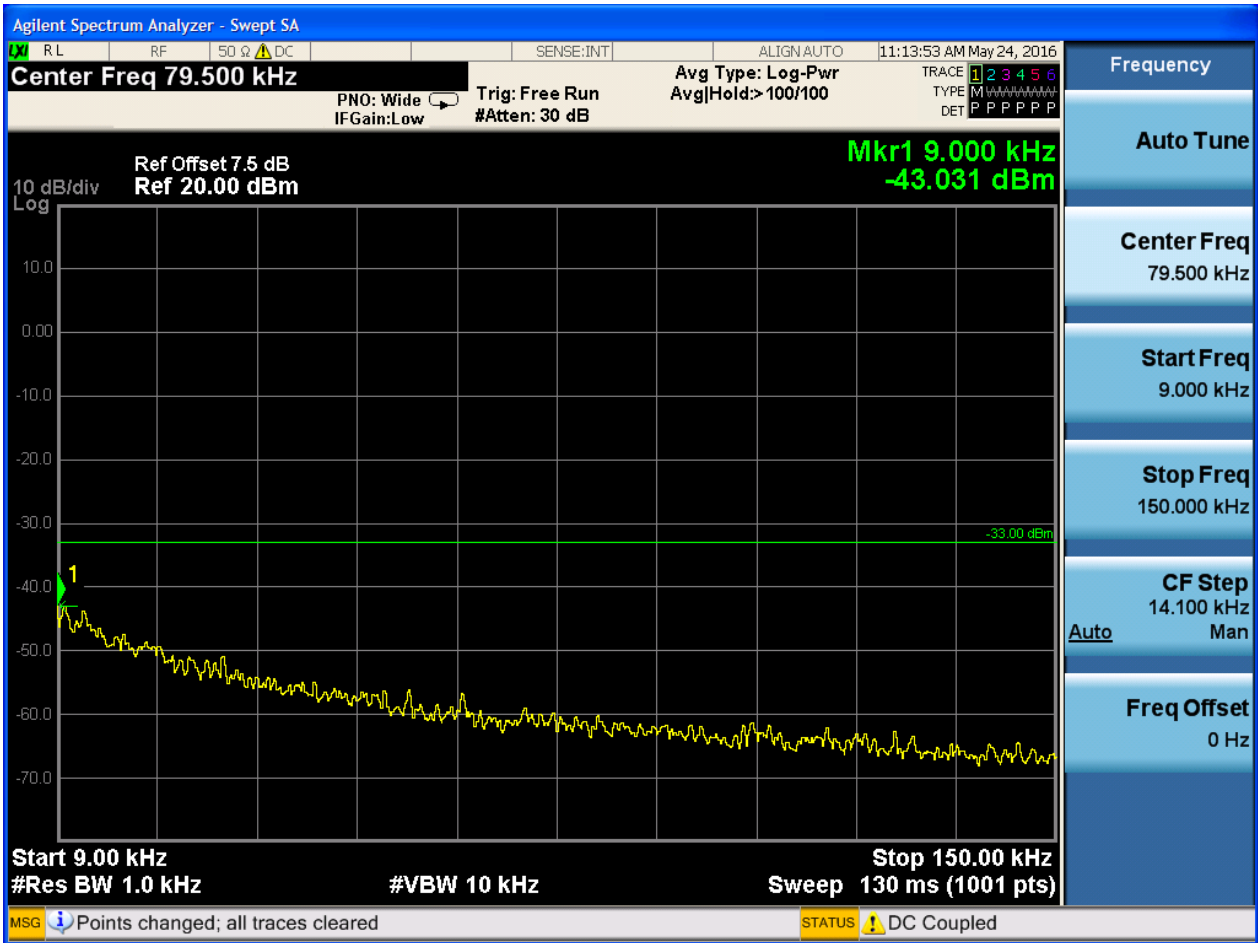
6.1.1.1.1 Test Channel = LCH

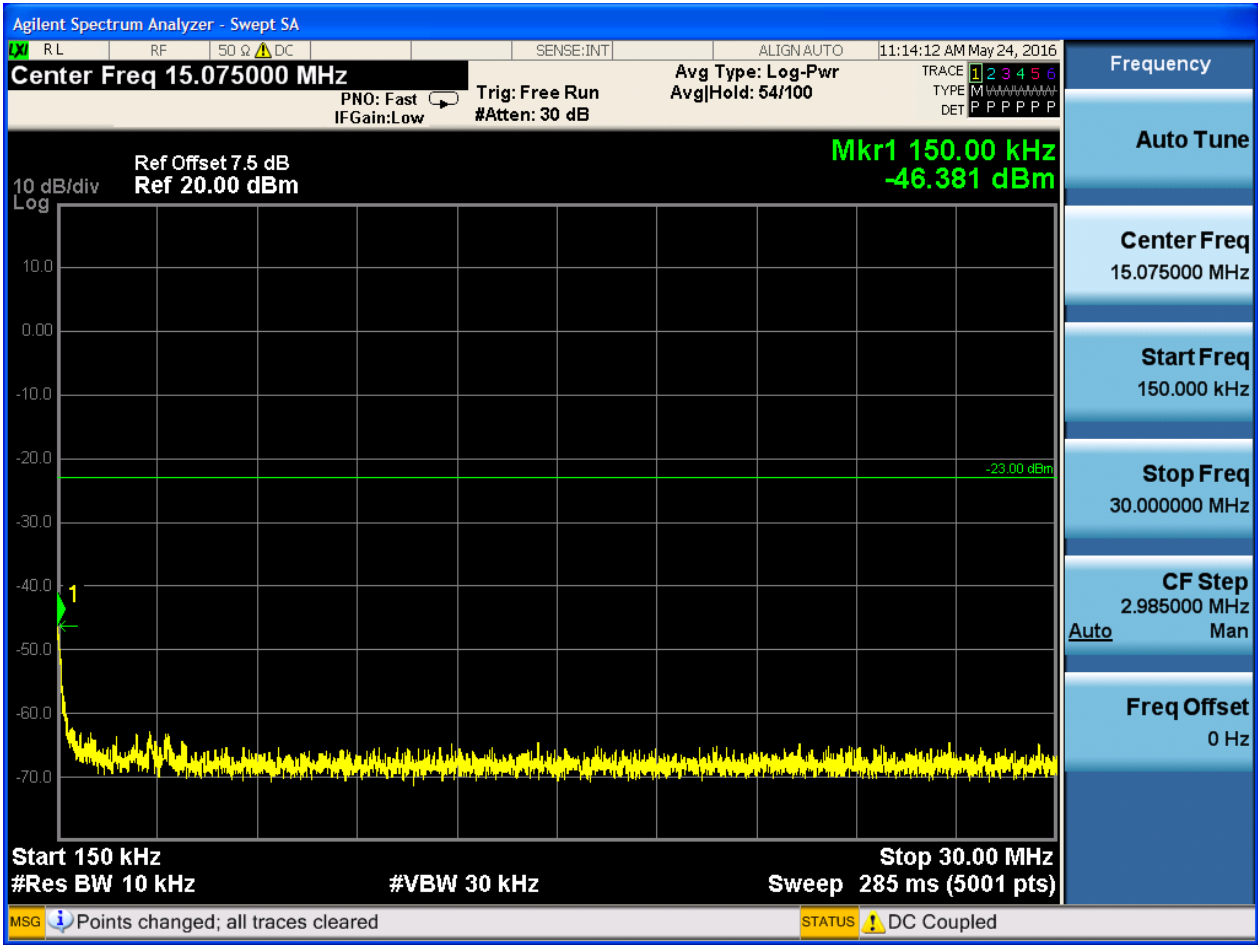


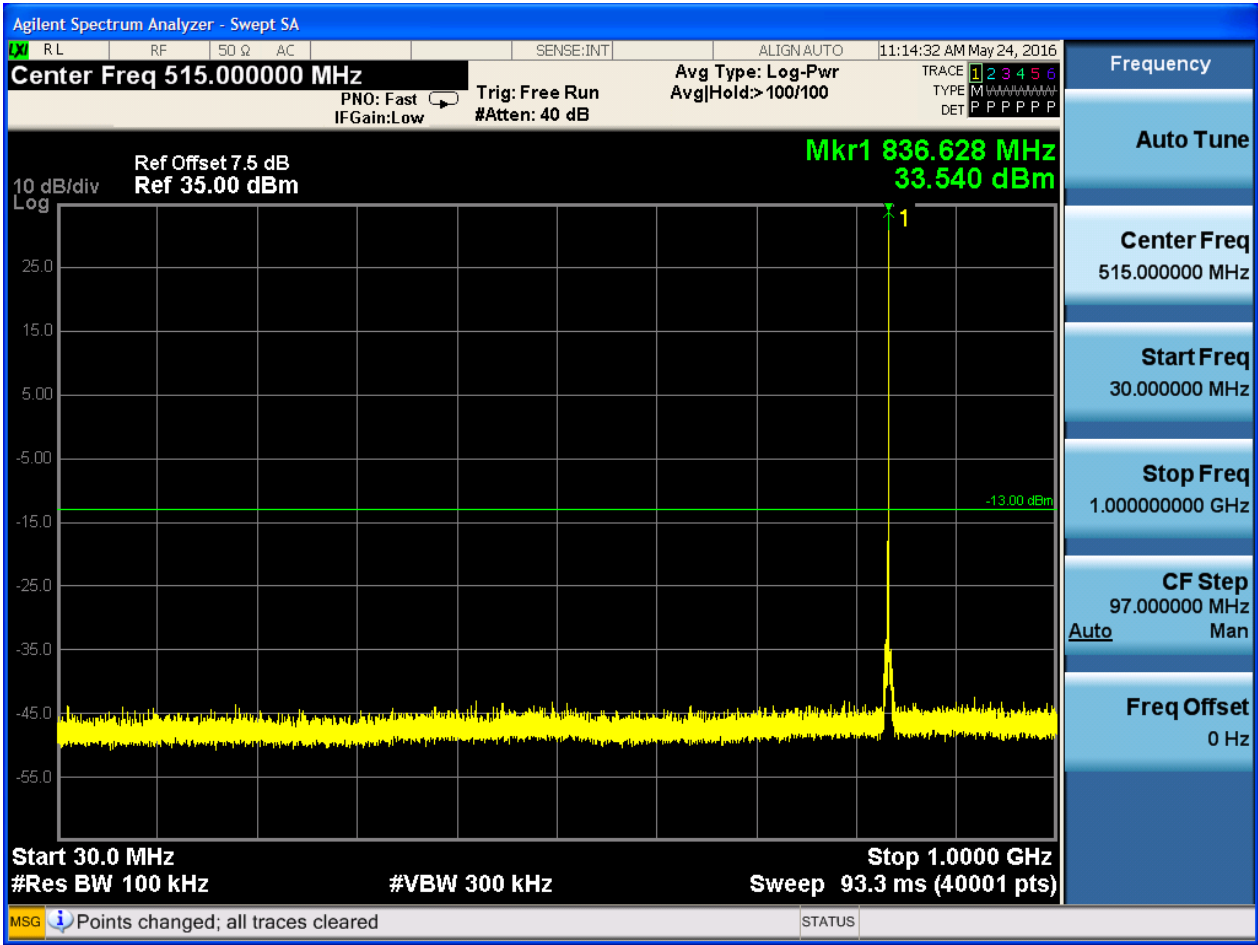


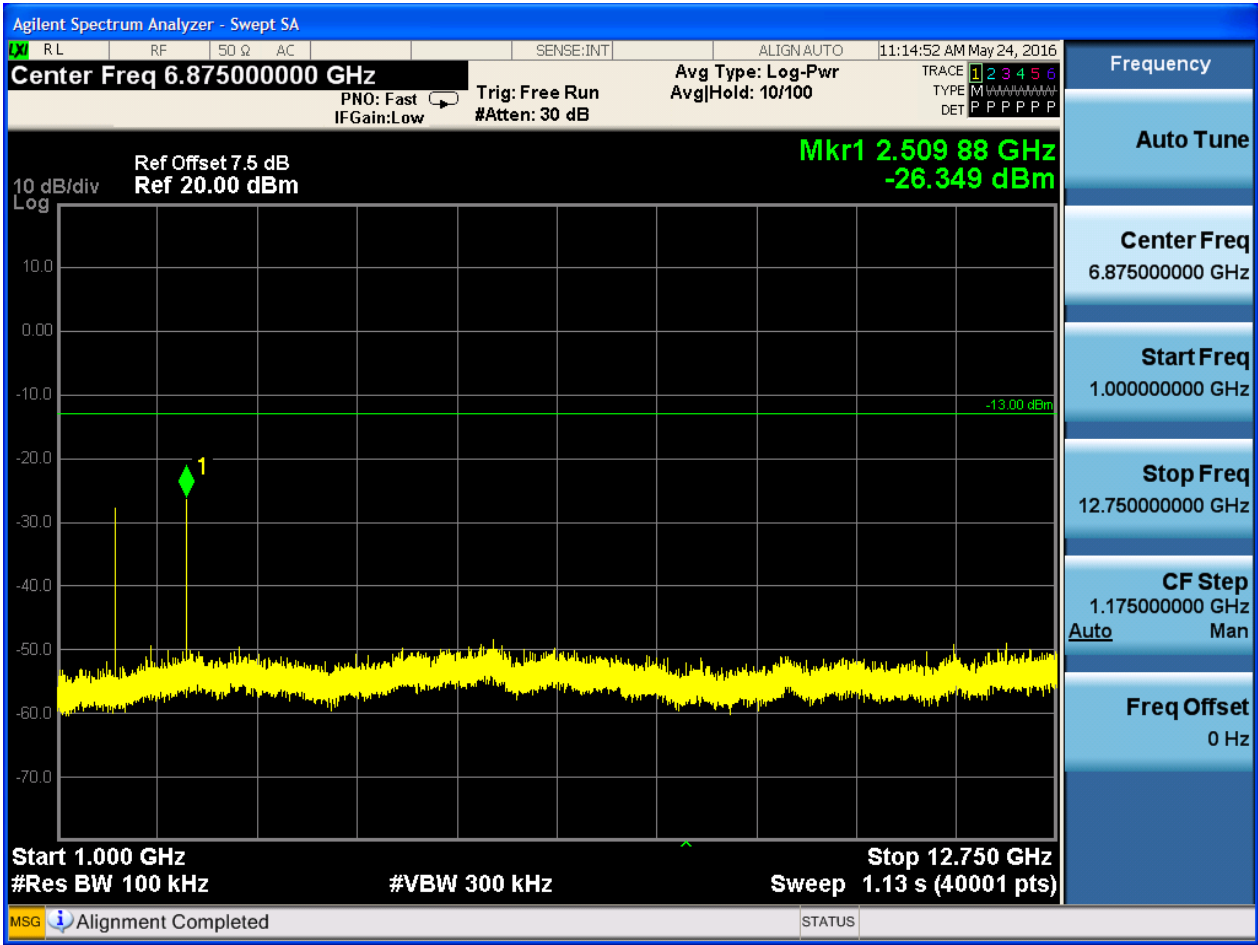


6.1.1.1.2 Test Channel = MCH

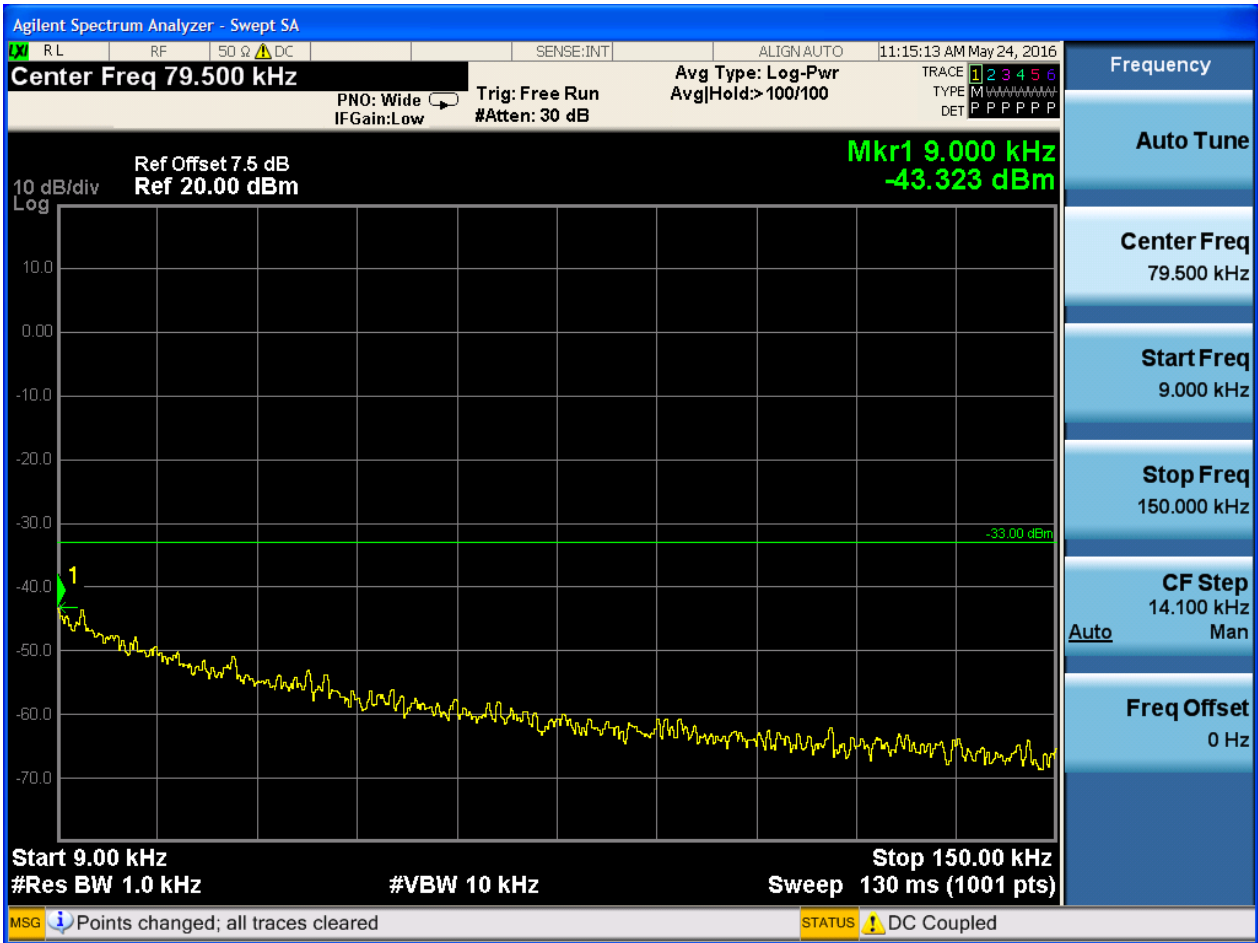


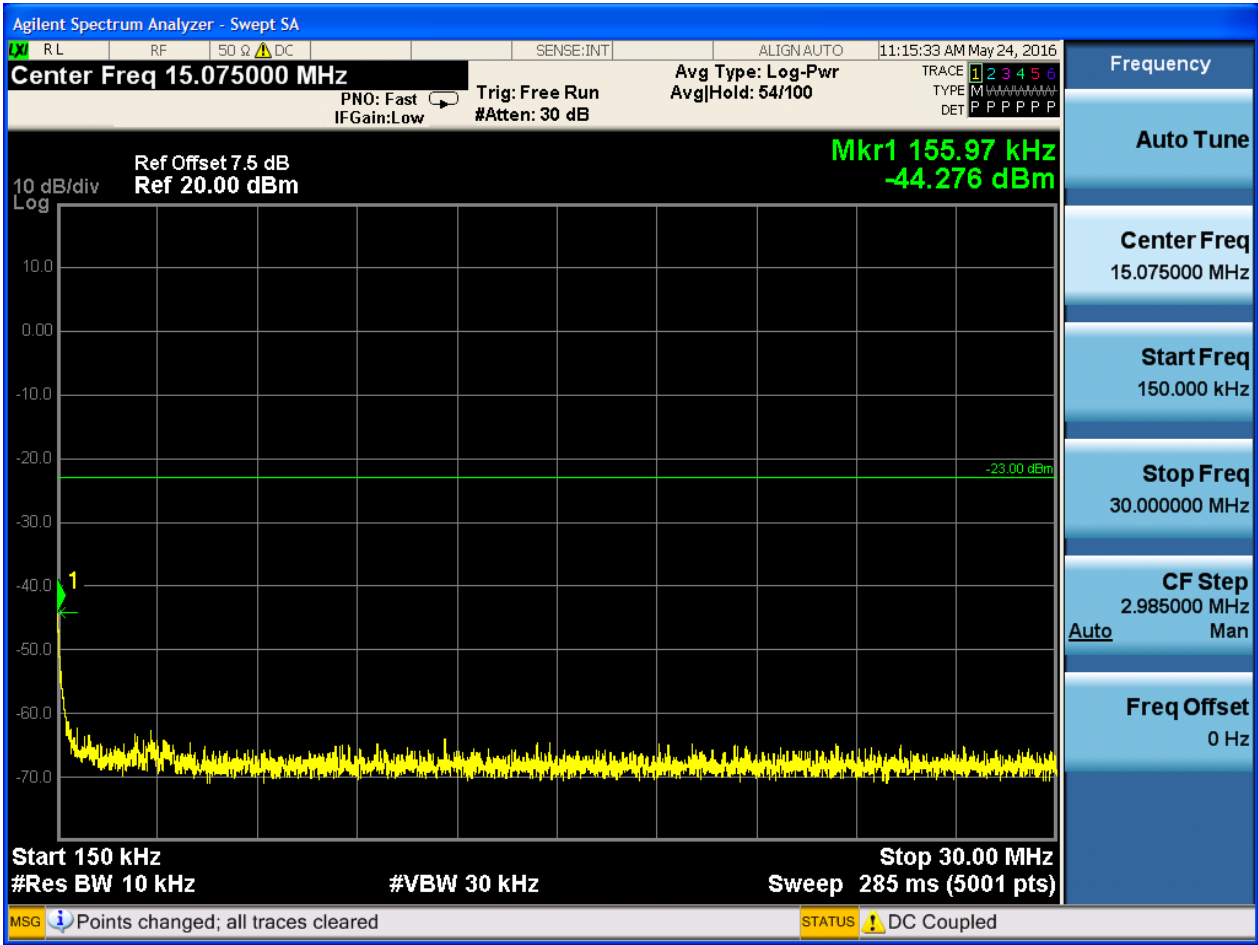


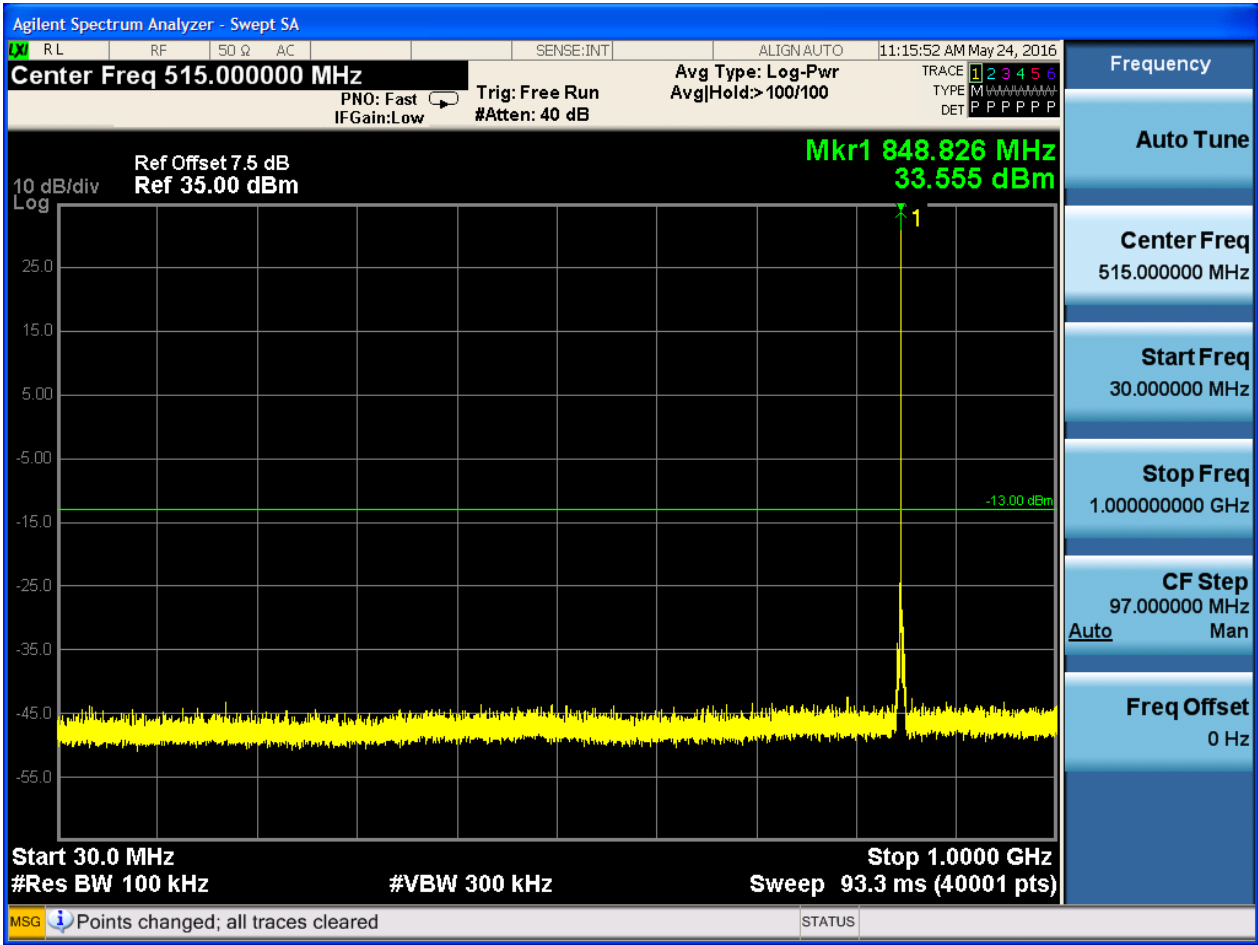


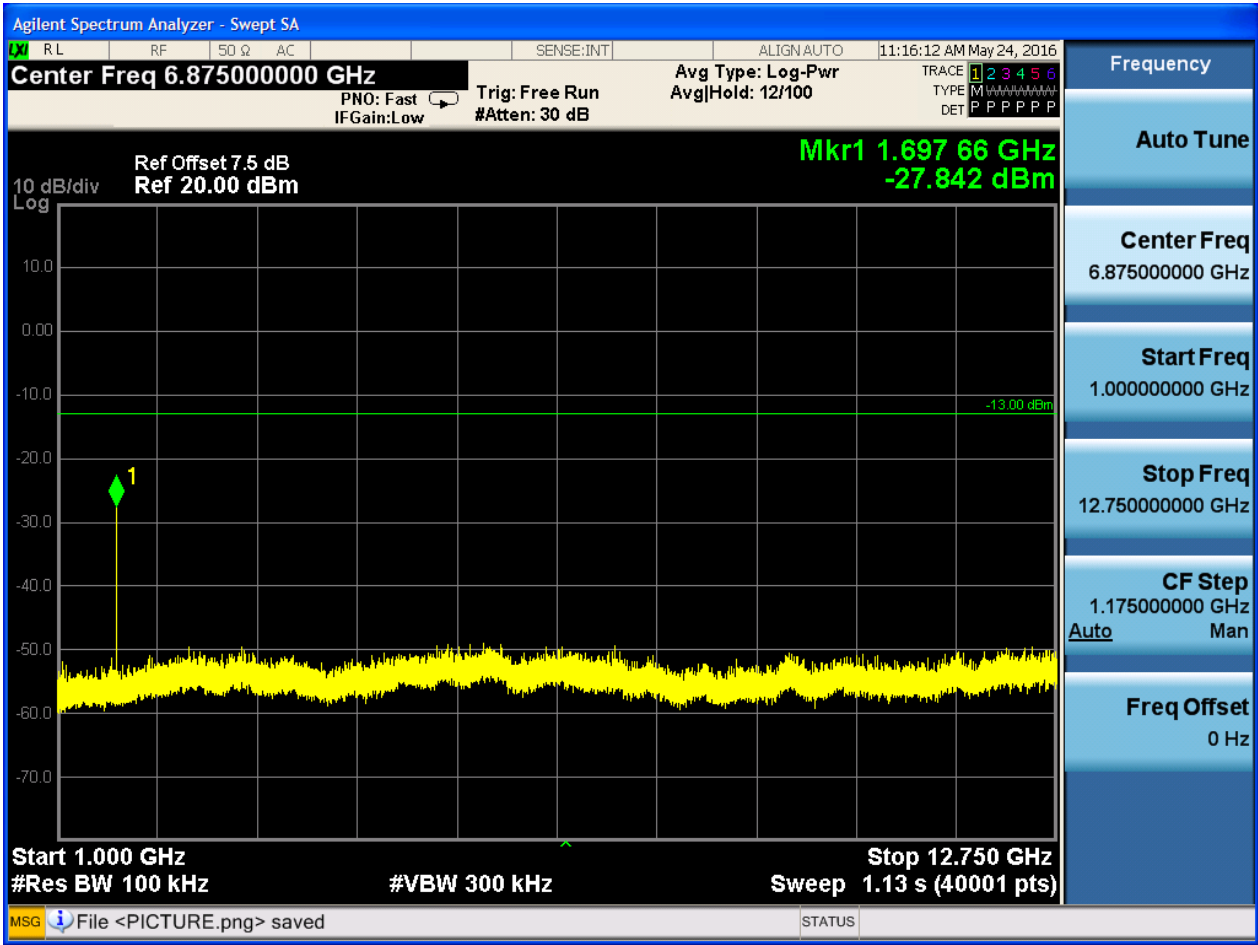


6.1.1.1.3 Test Channel = HCH





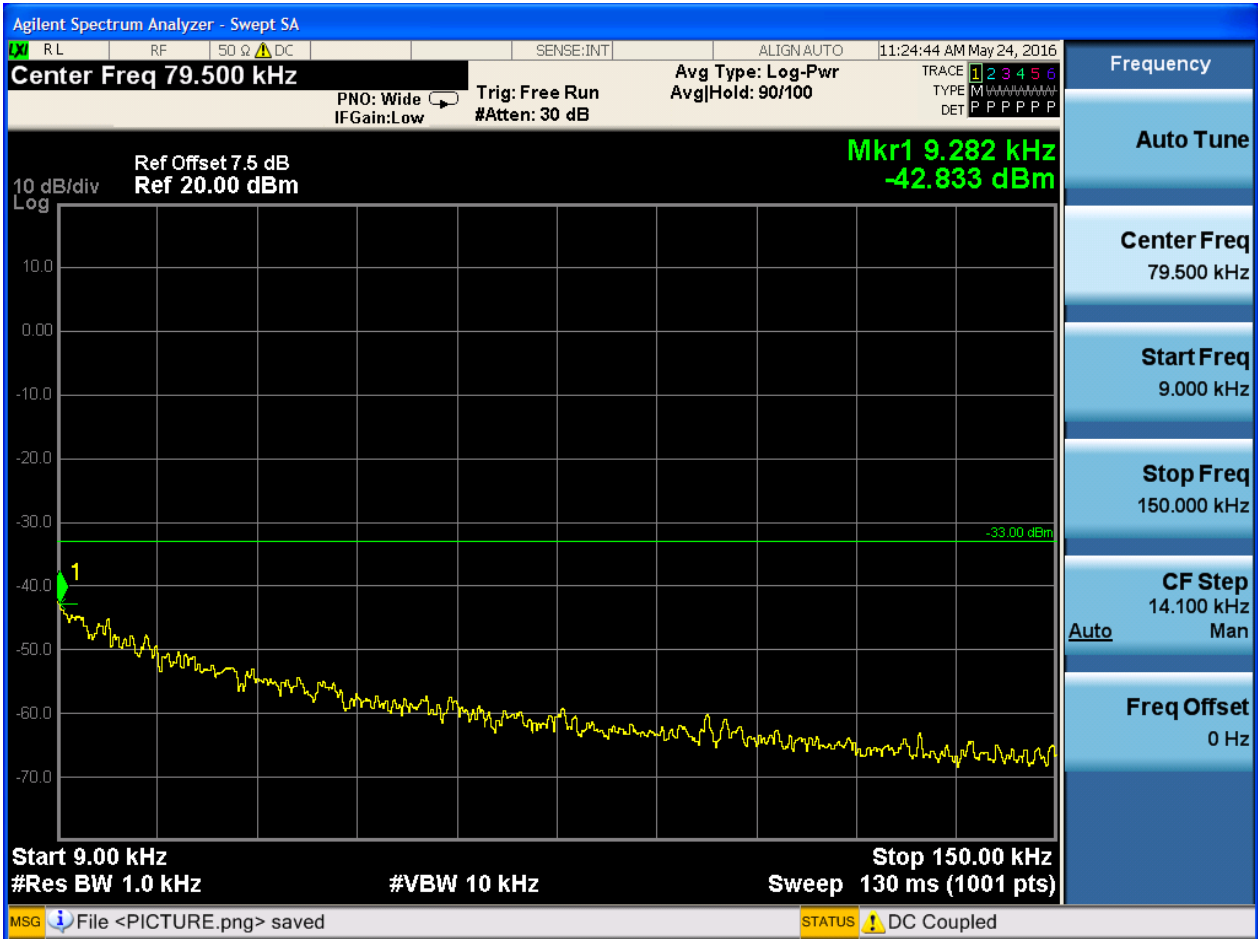


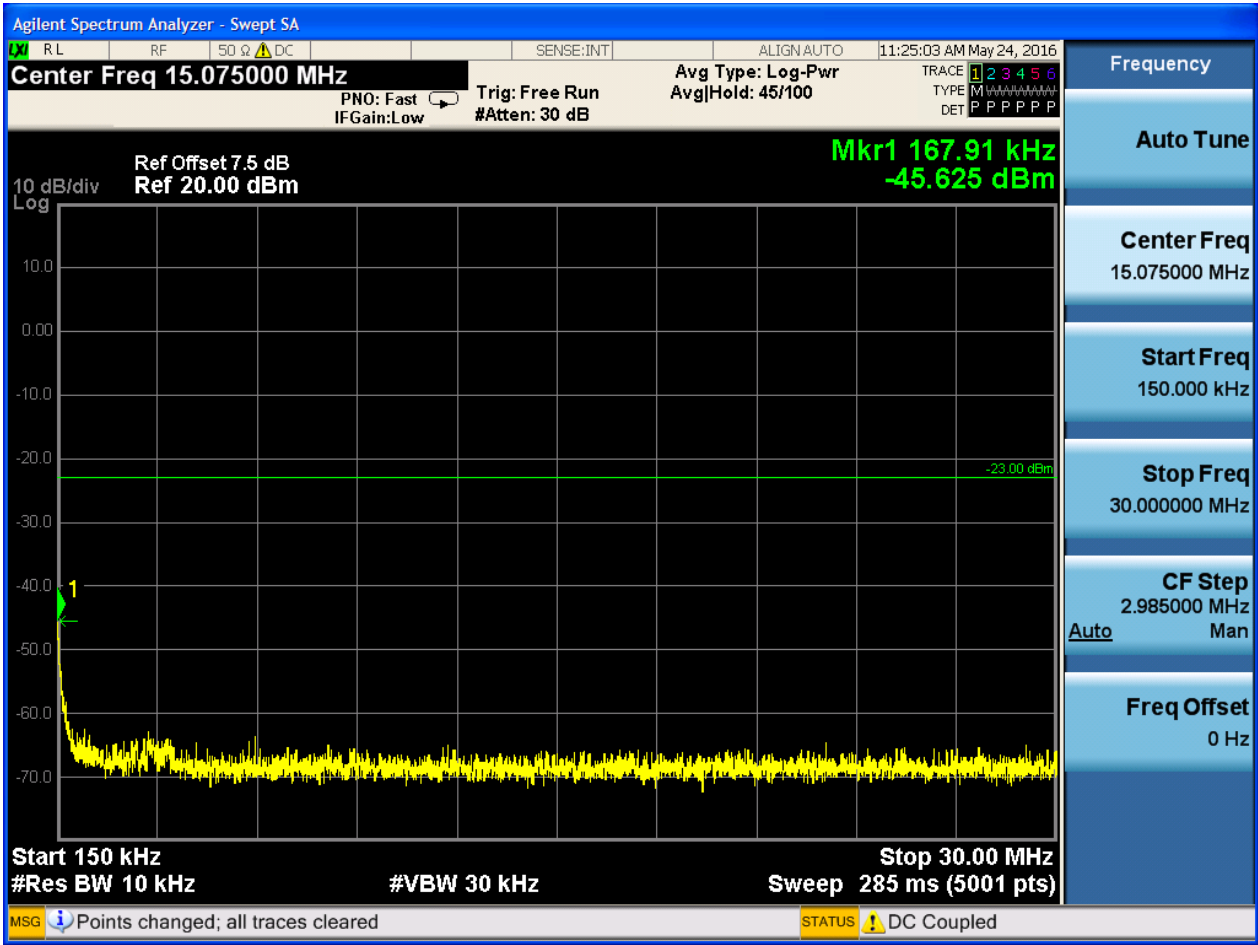


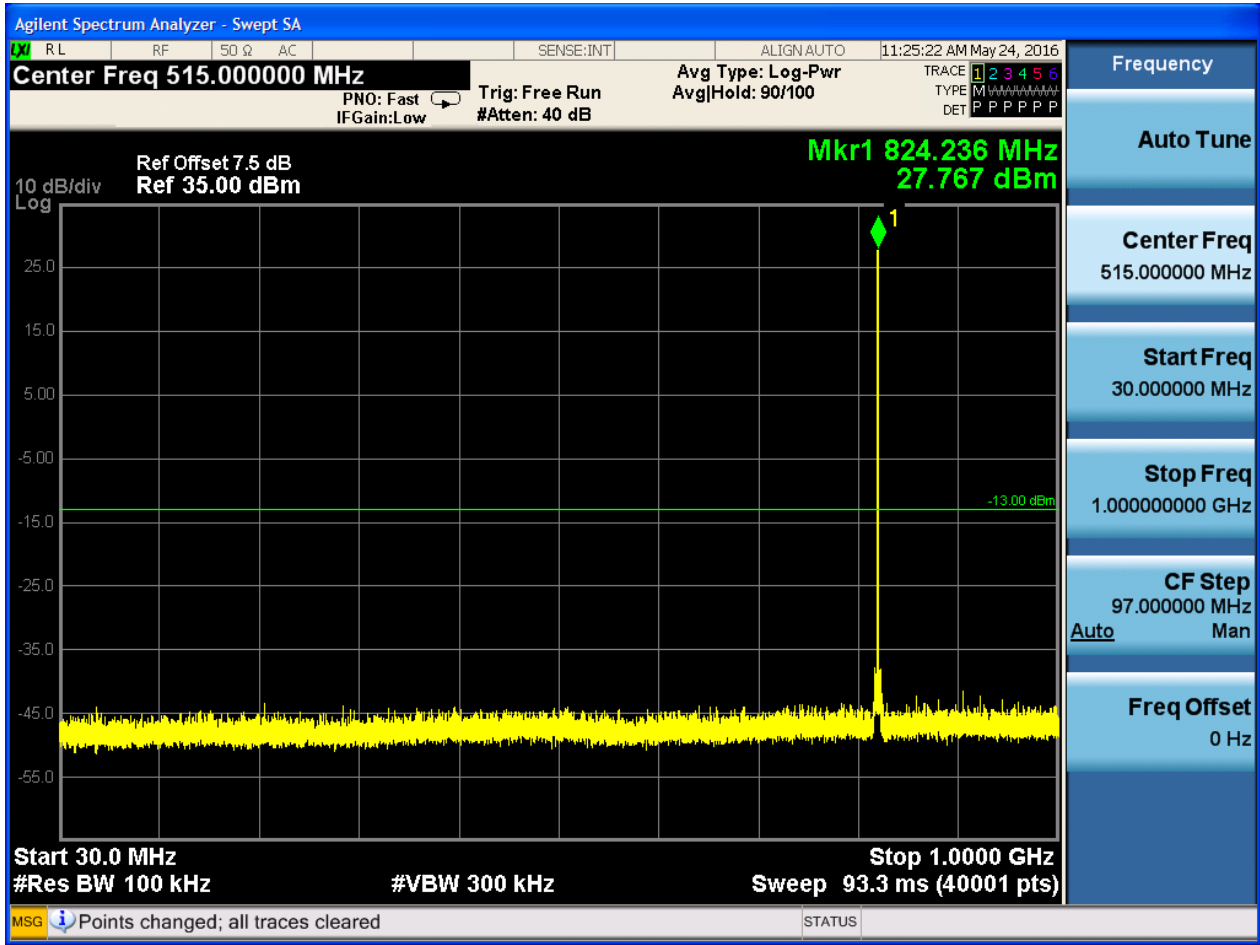


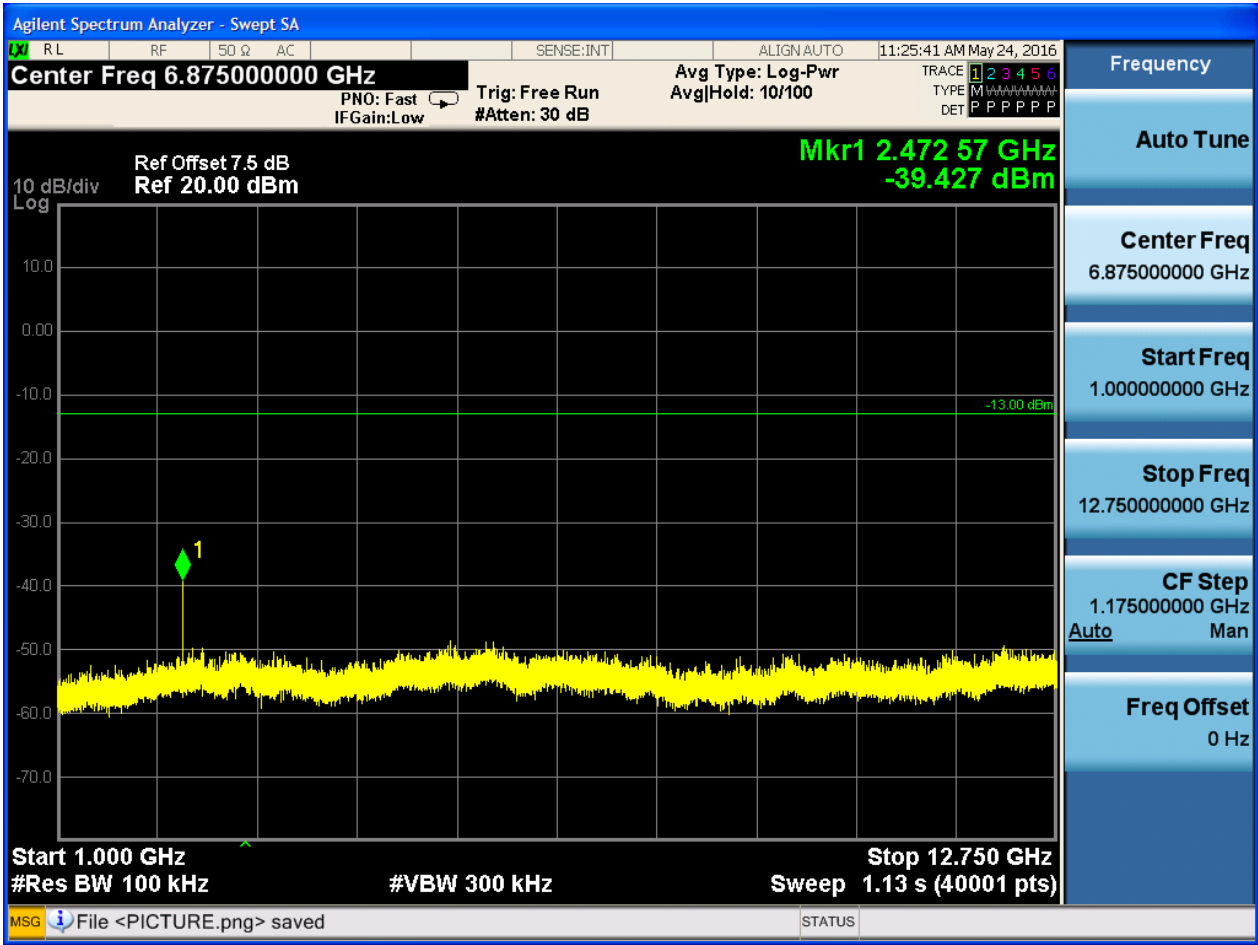
6.1.1.2 Test Mode = GSM/TM2

6.1.1.2.1 Test Channel = LCH

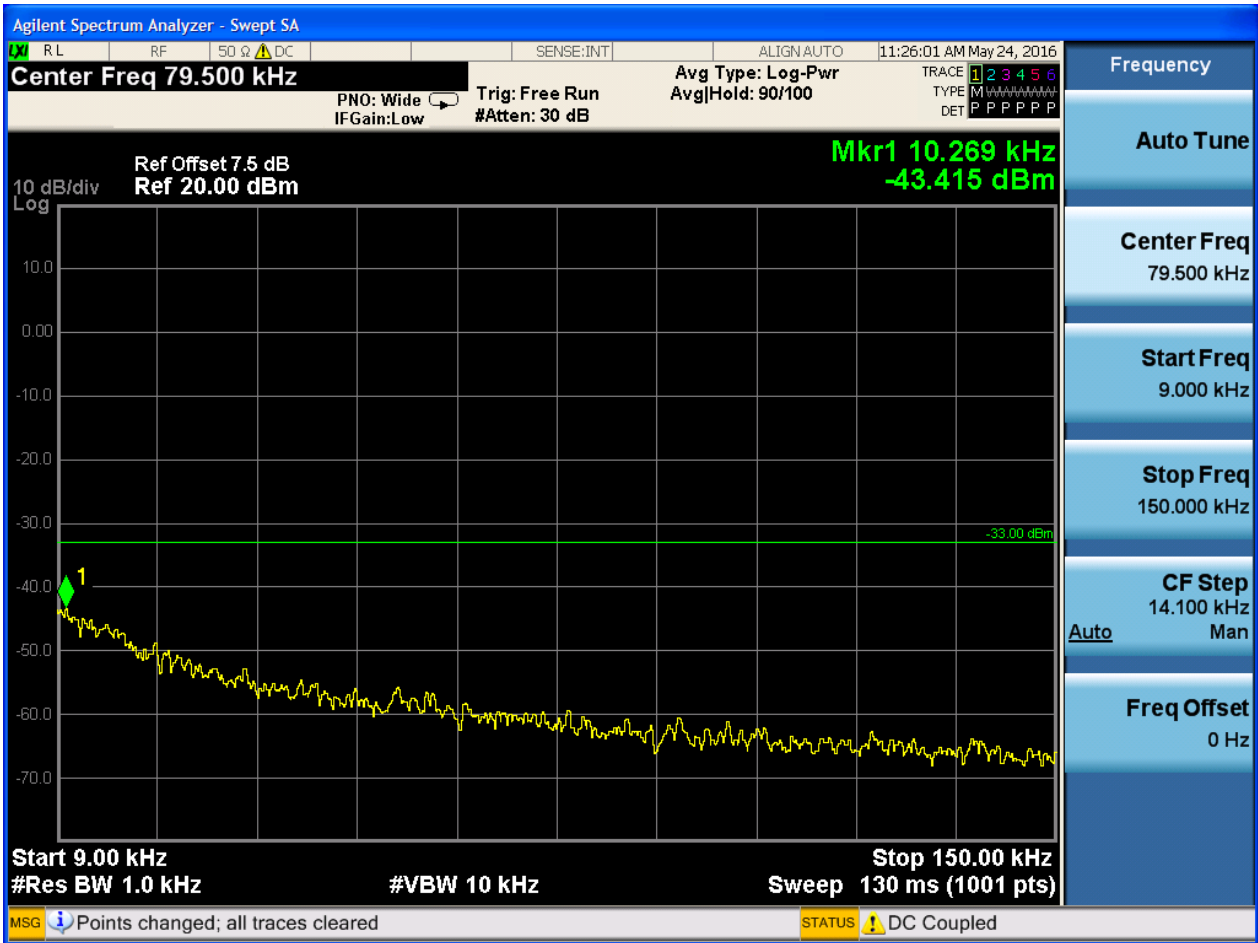


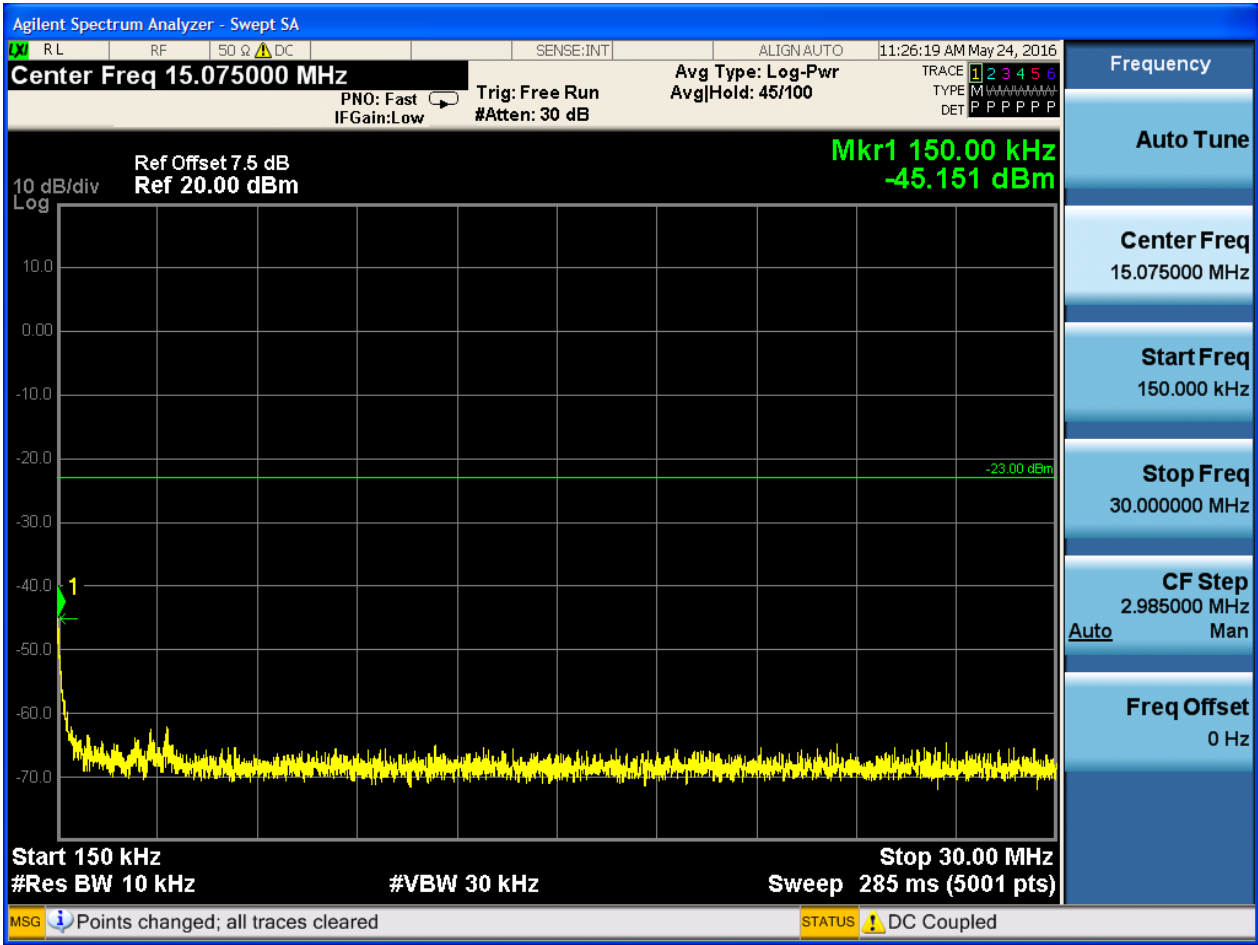


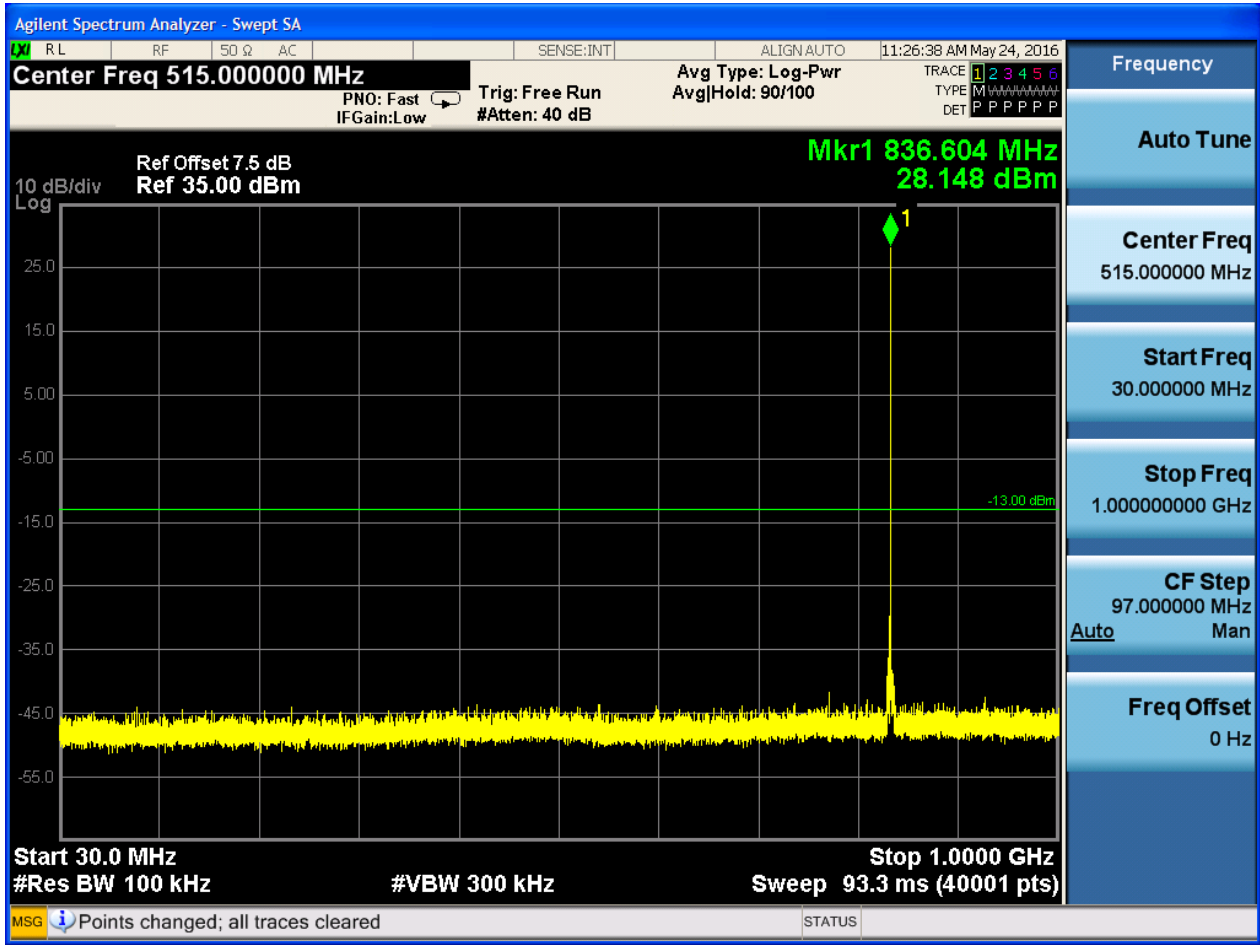


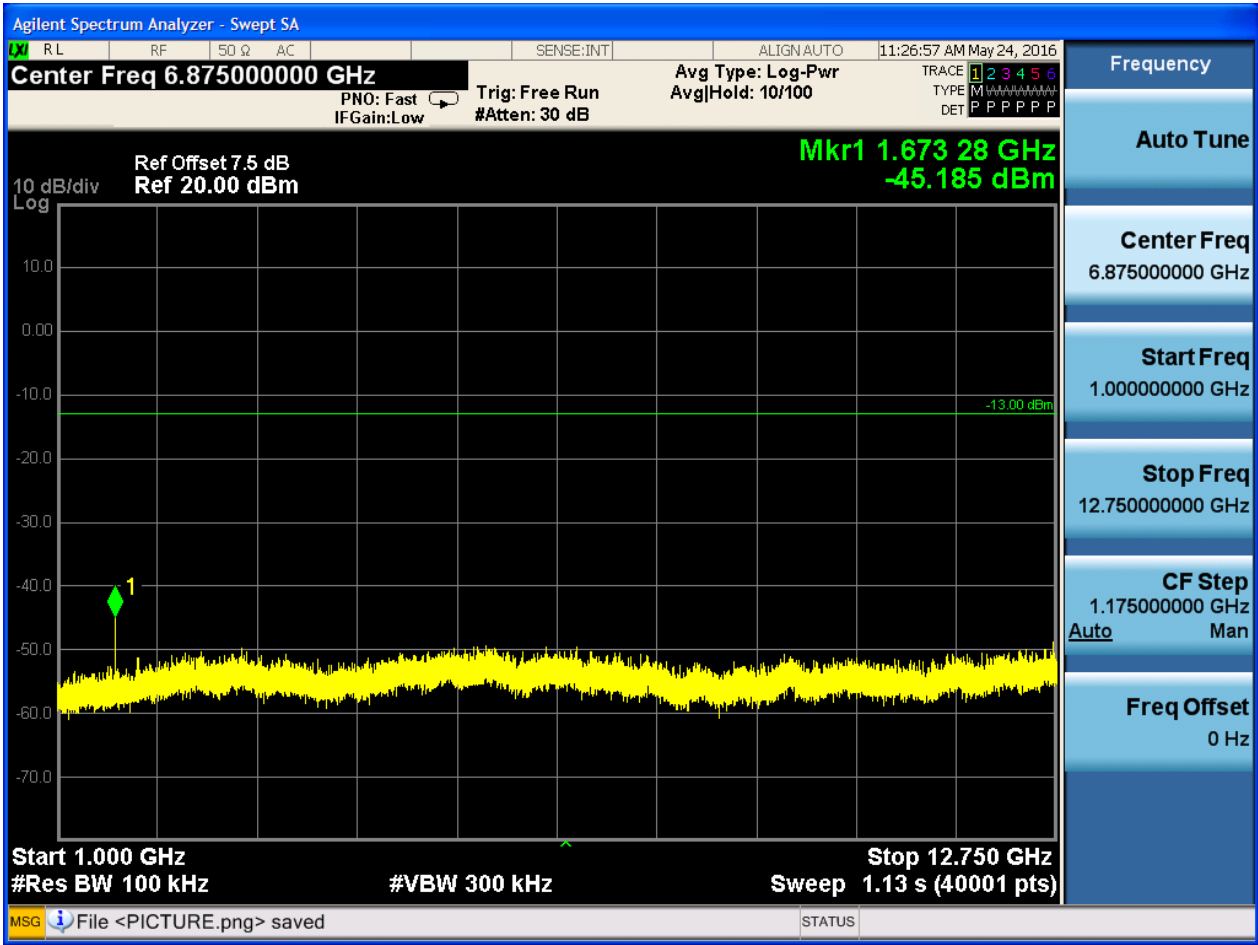


6.1.1.2.2 Test Channel = MCH



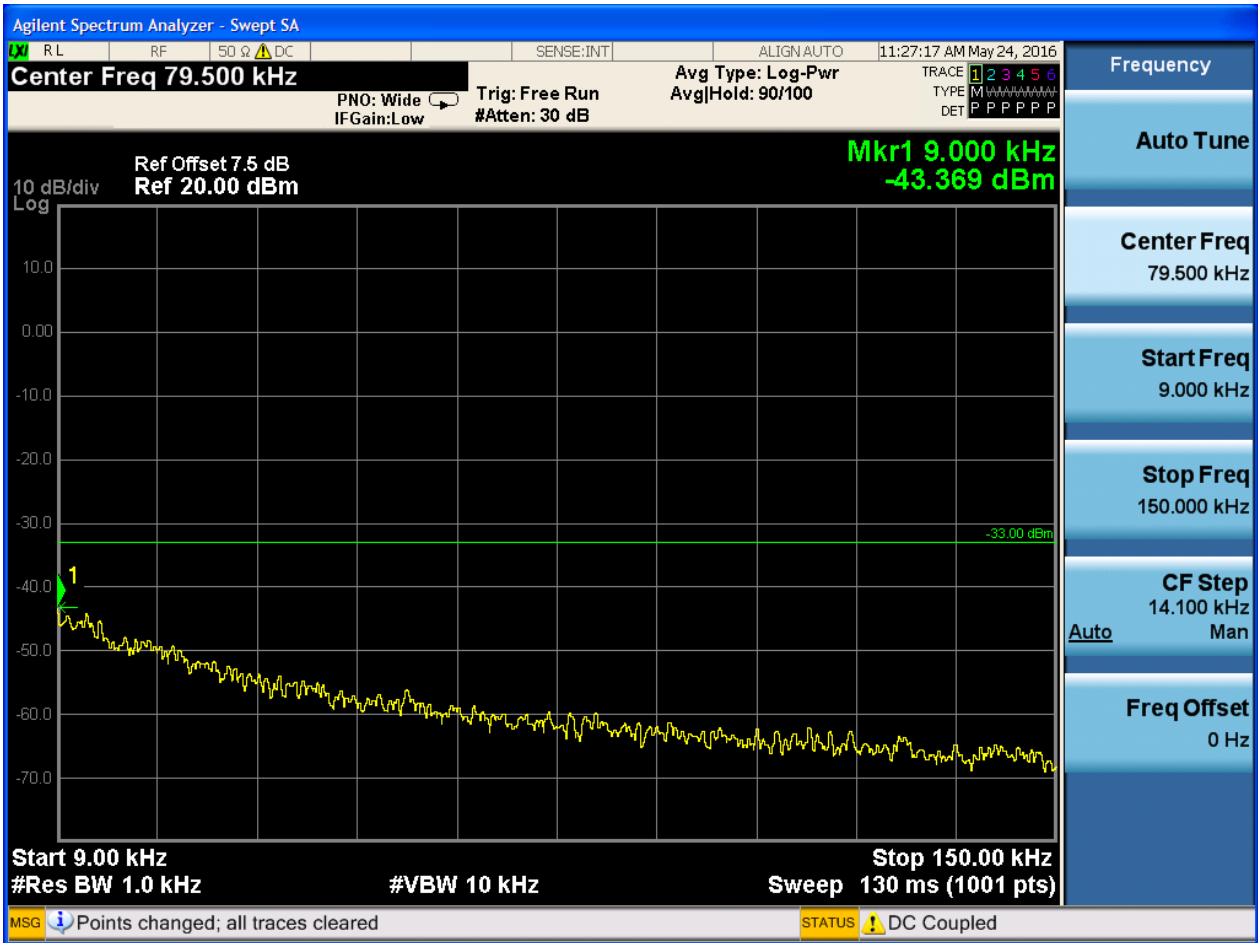


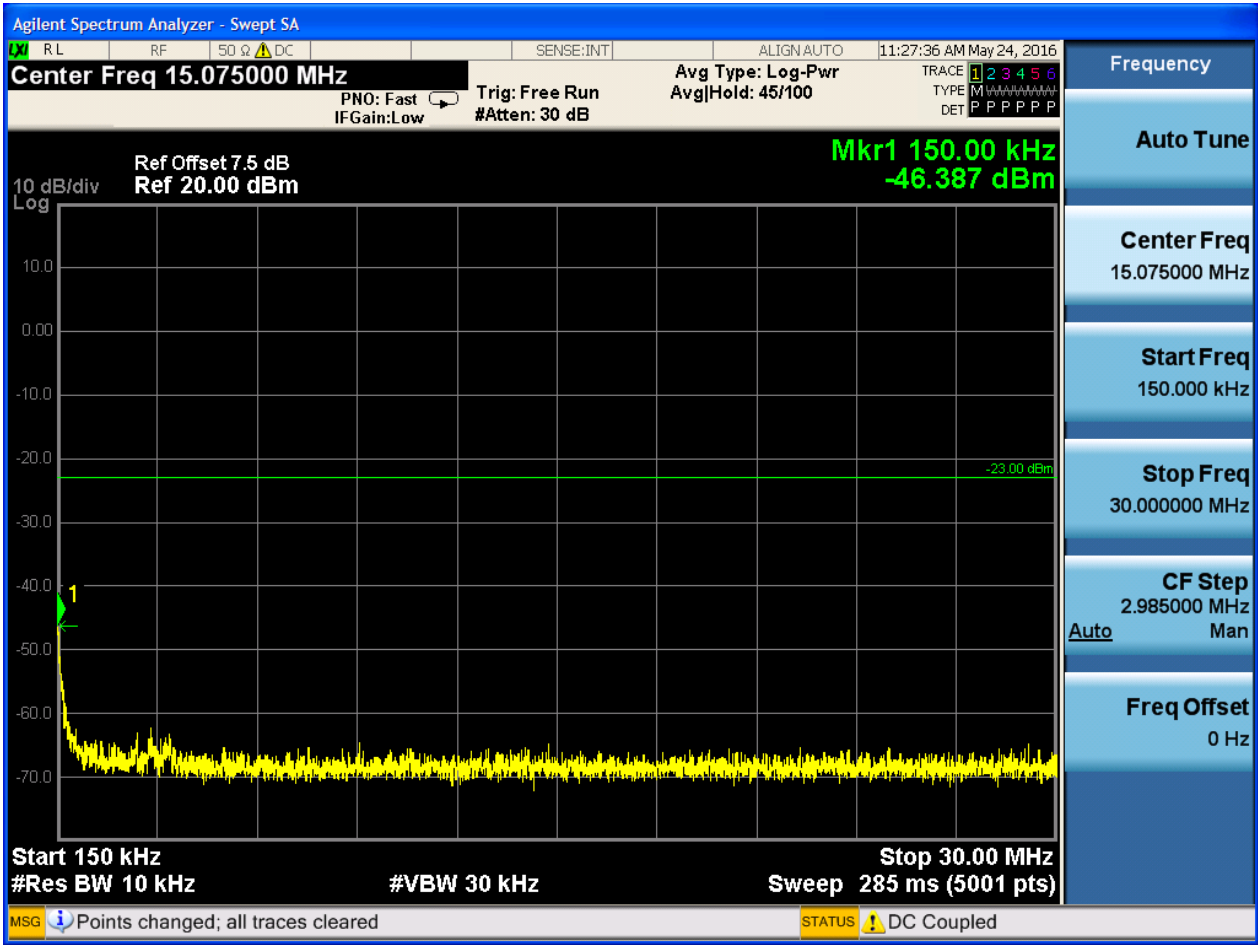


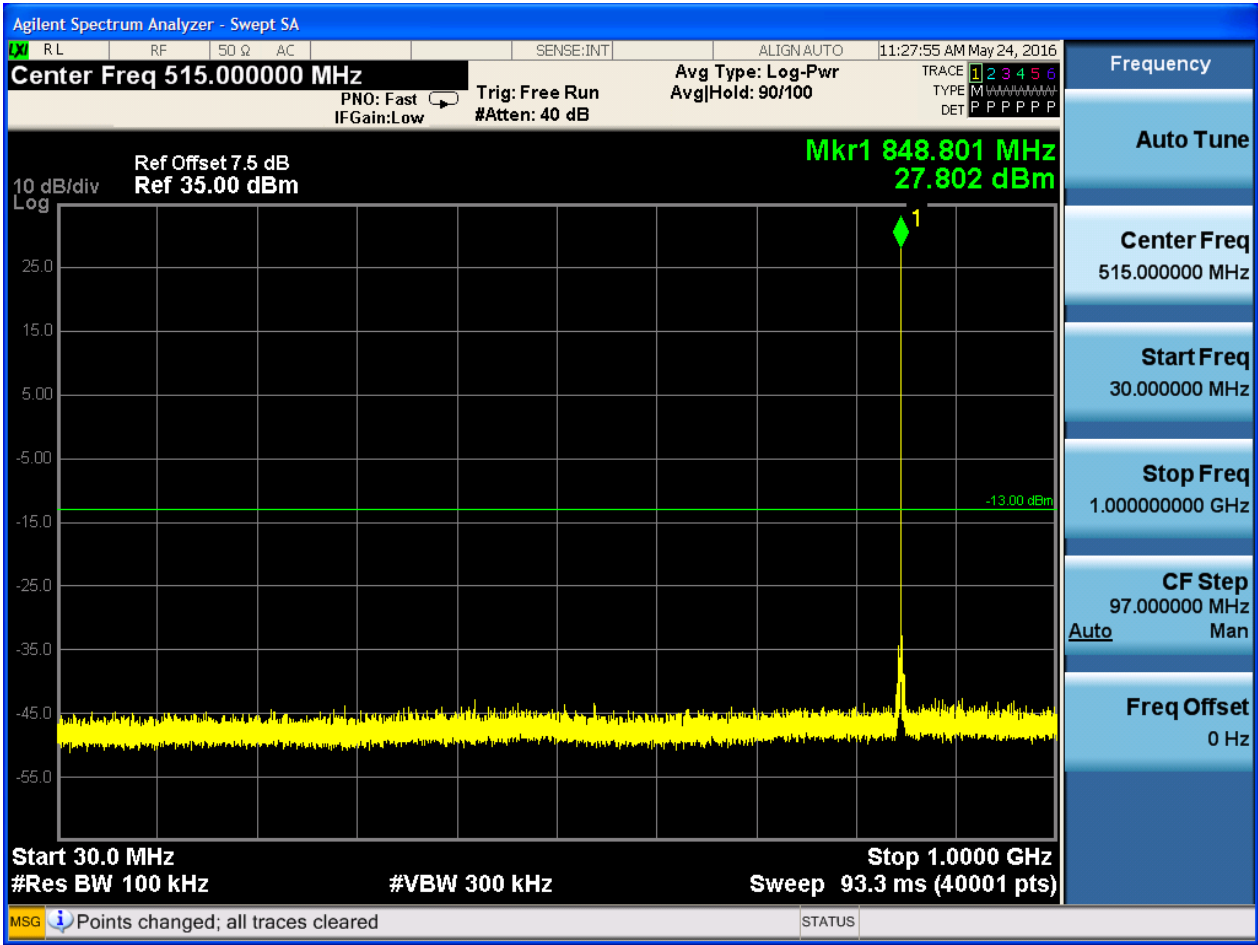


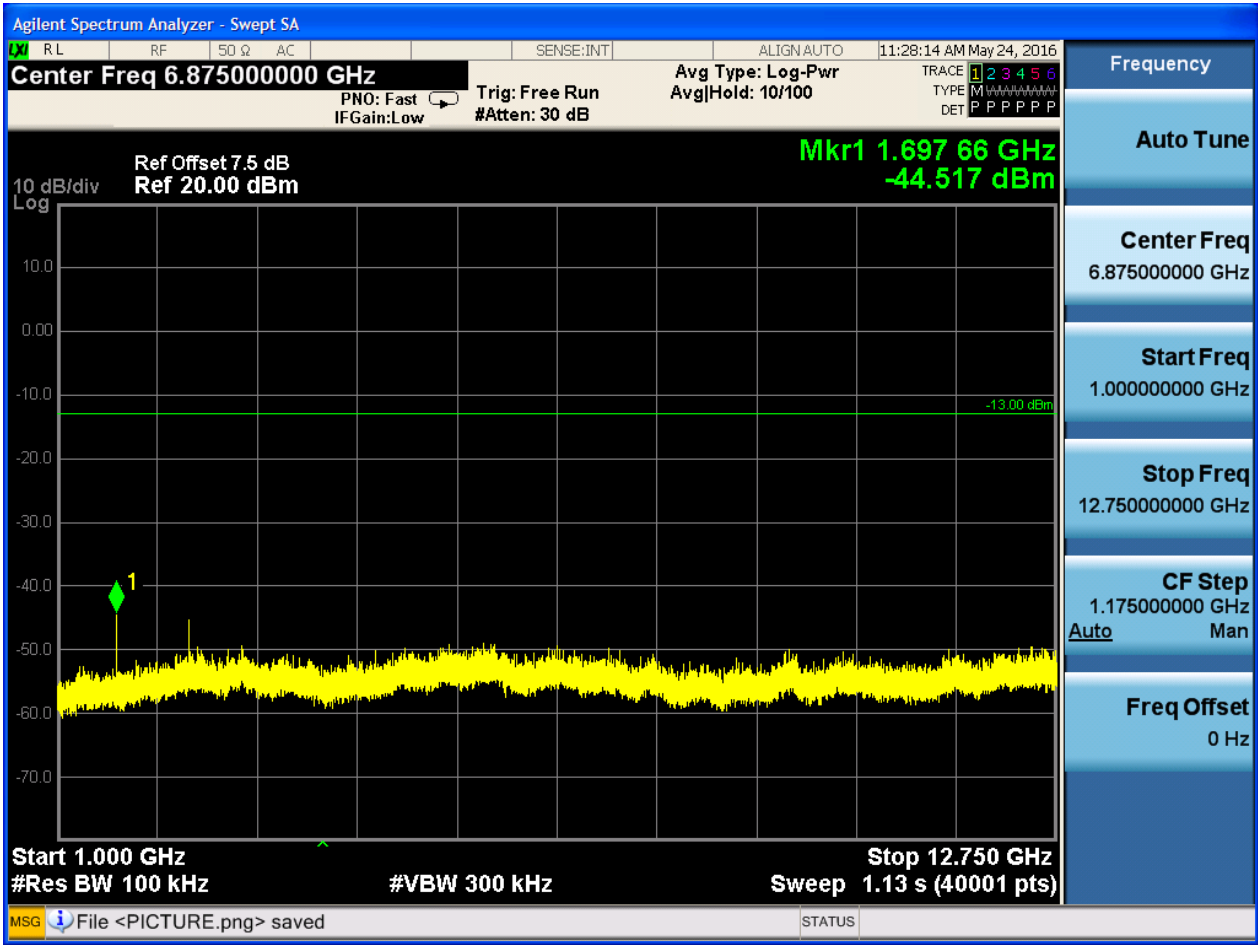


6.1.1.2.3 Test Channel = HCH







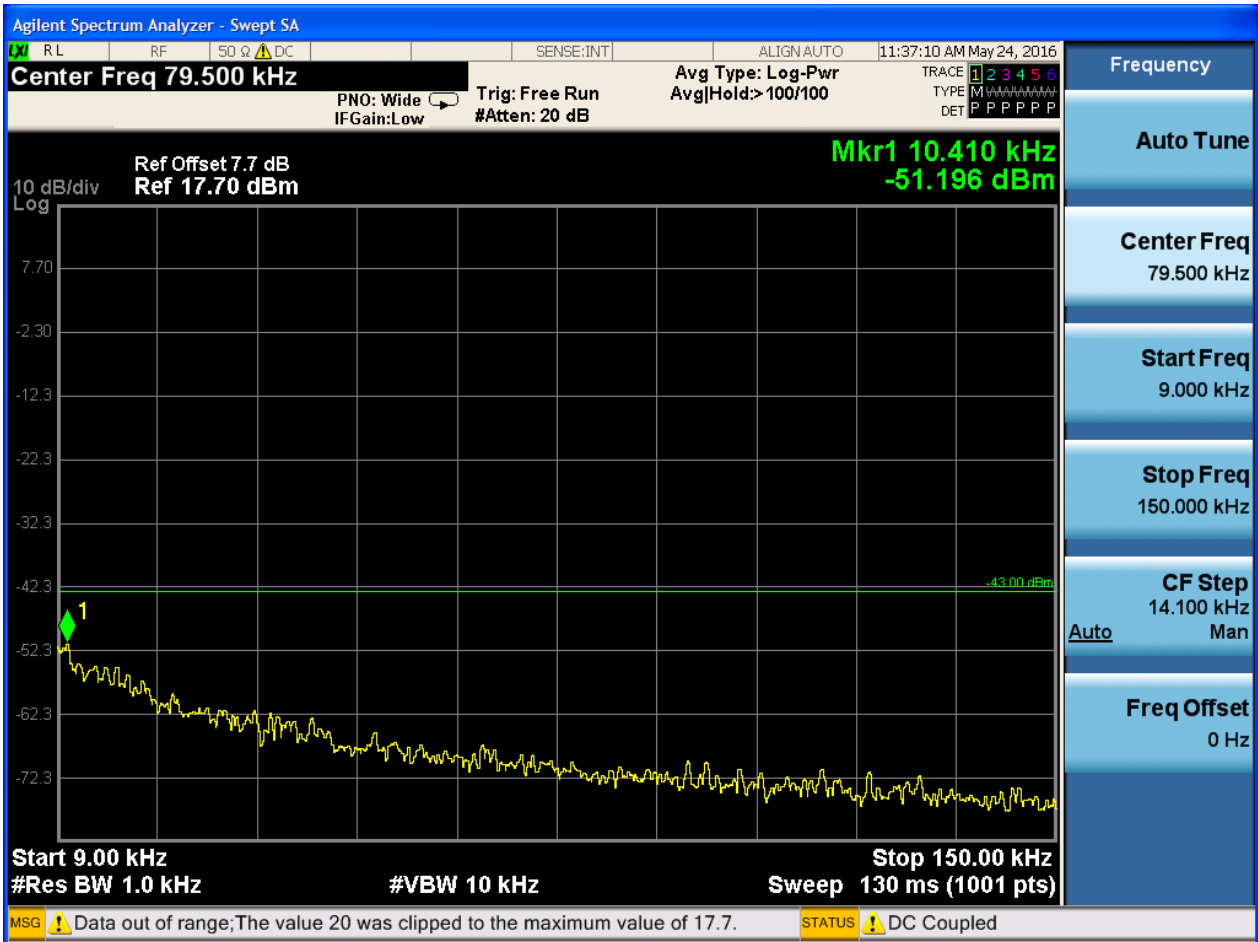


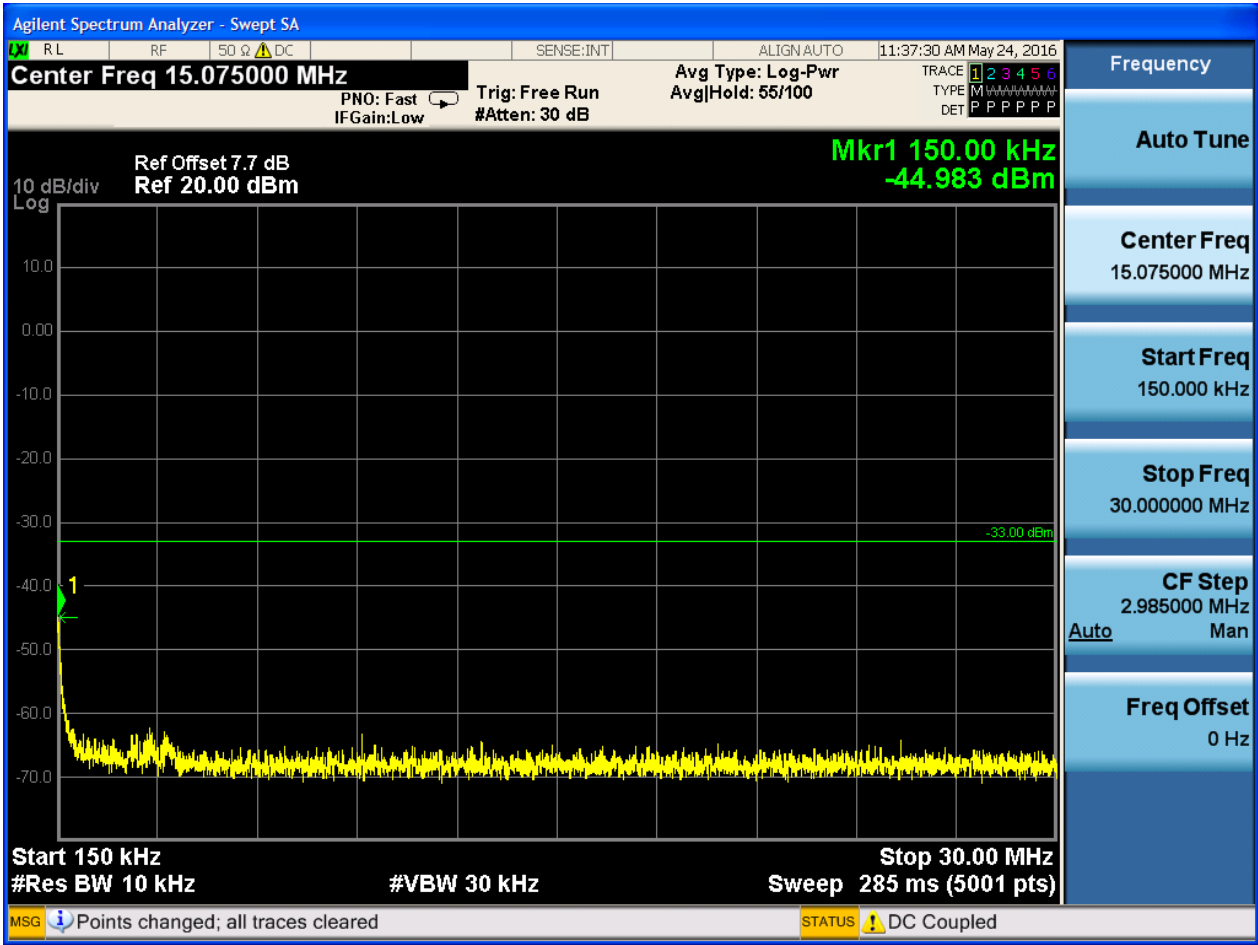


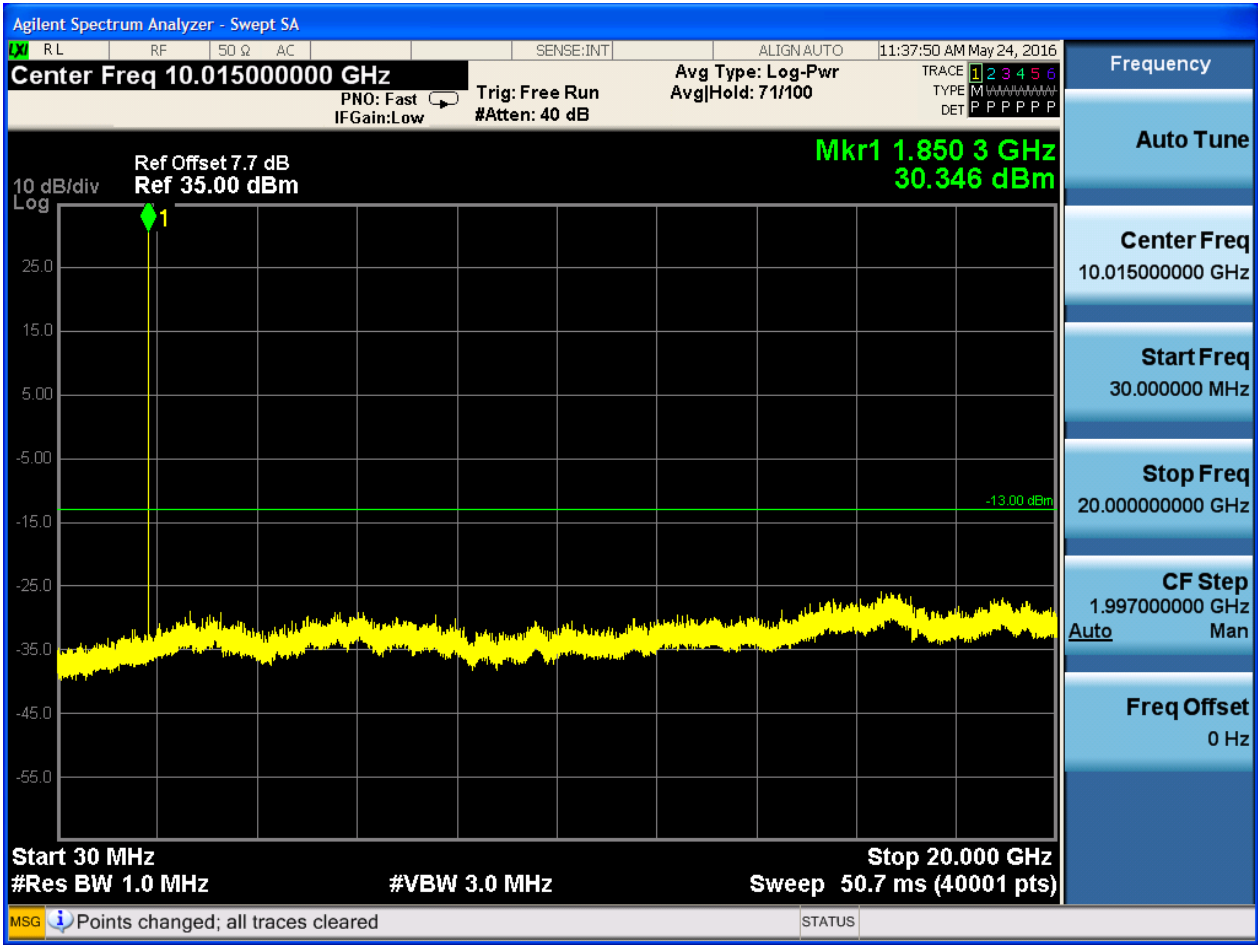
6.1.2 Test Band = GSM1900

6.1.2.1 Test Mode = GSM/TM1

6.1.2.1.1 Test Channel = LCH

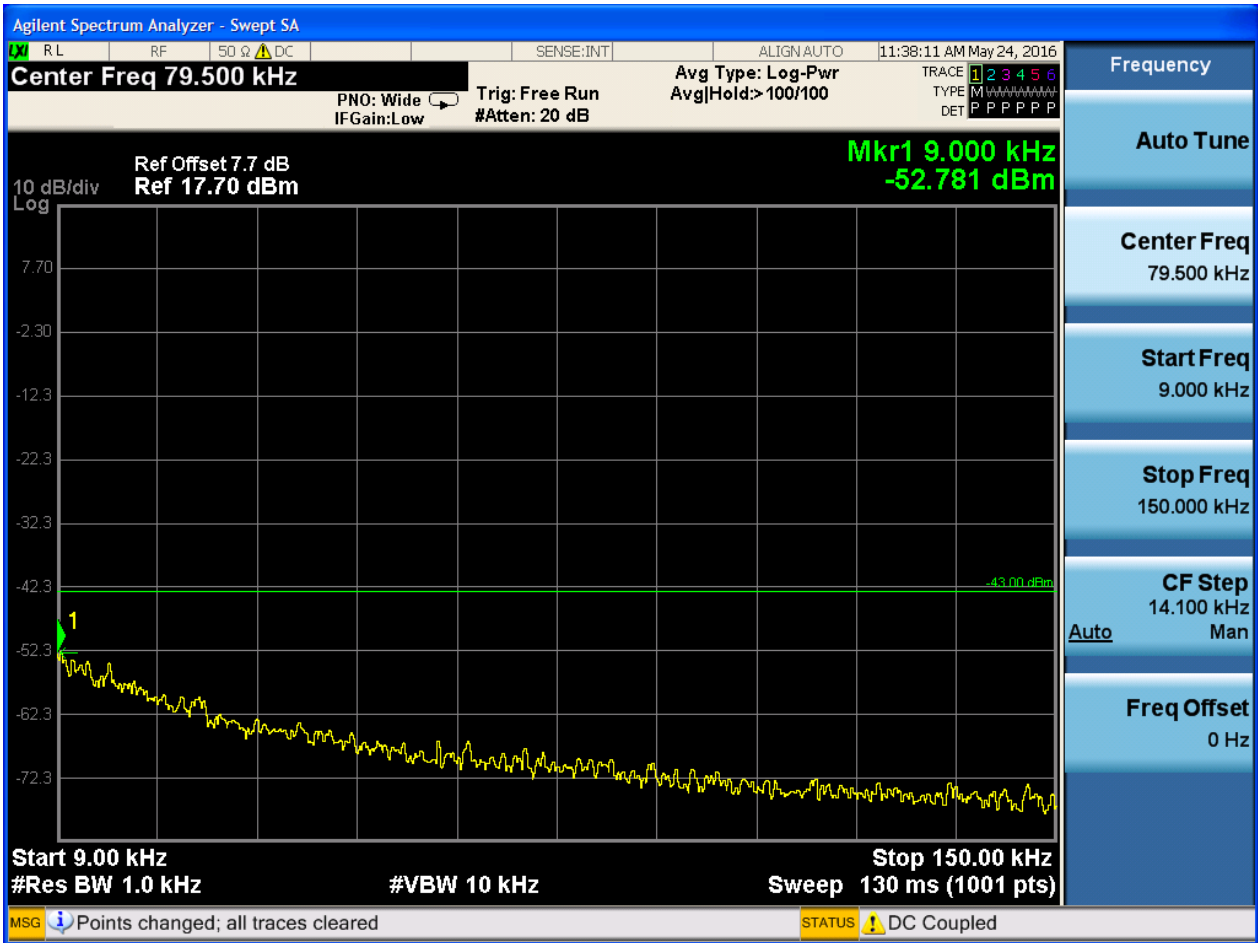


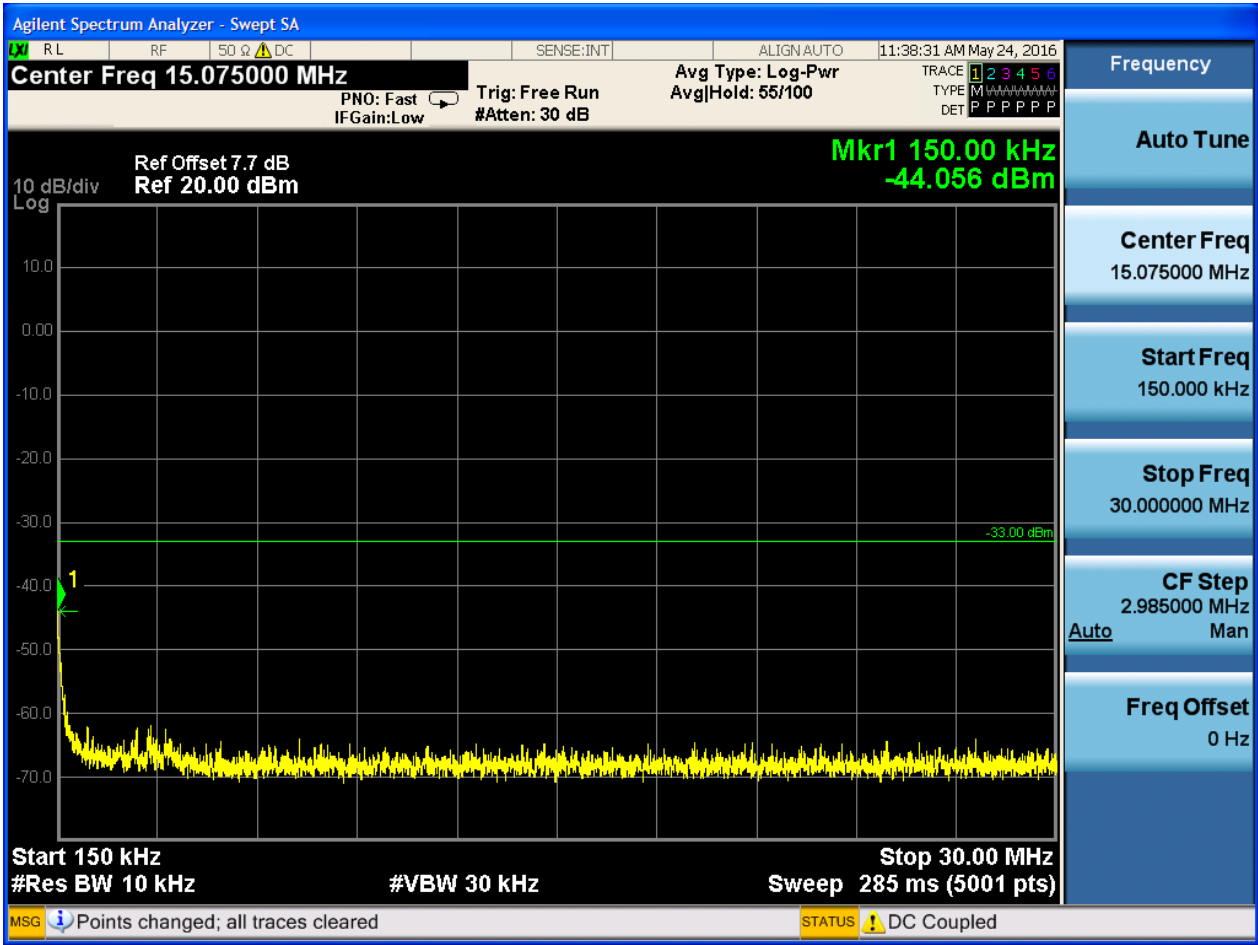


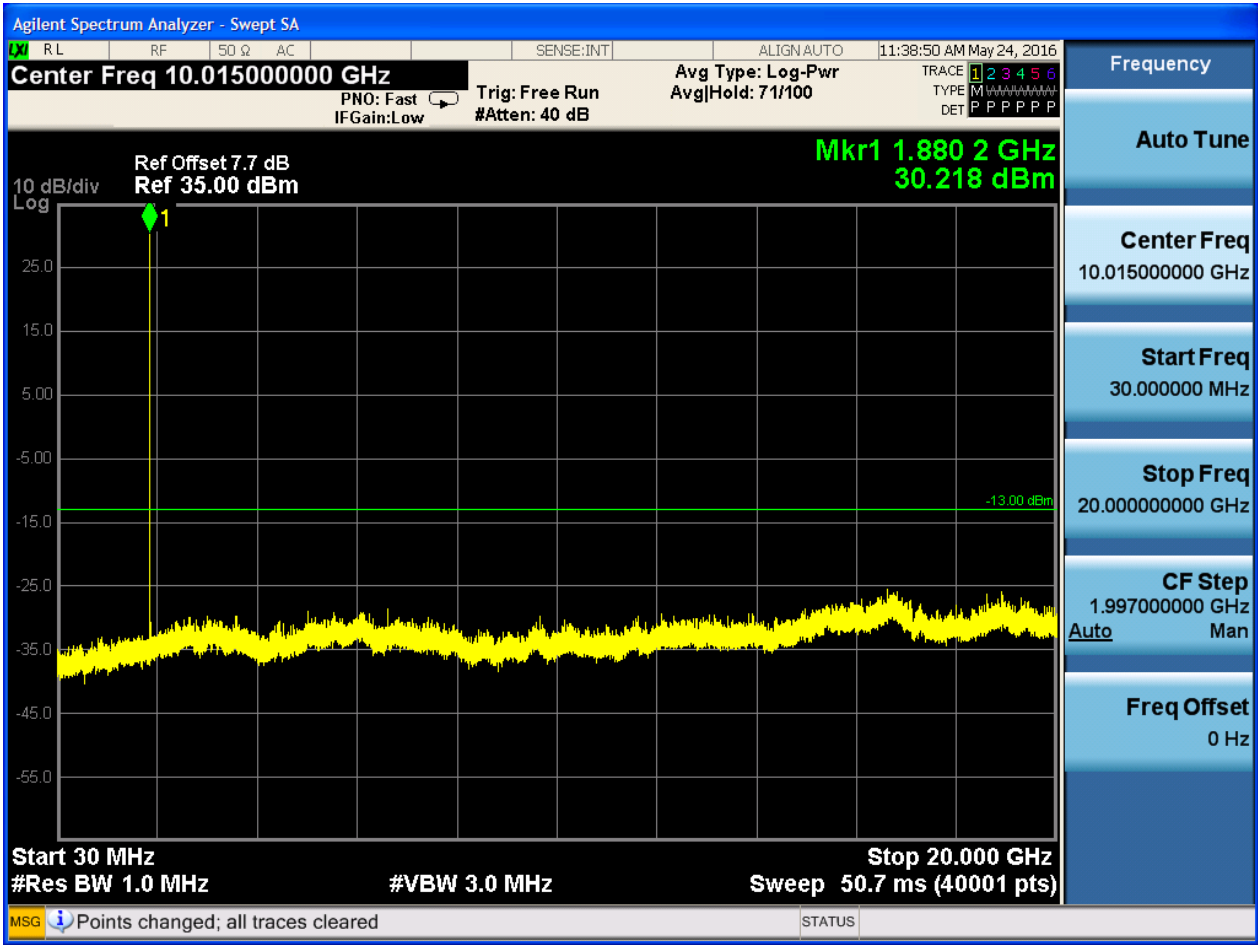




6.1.2.1.2 Test Channel = MCH

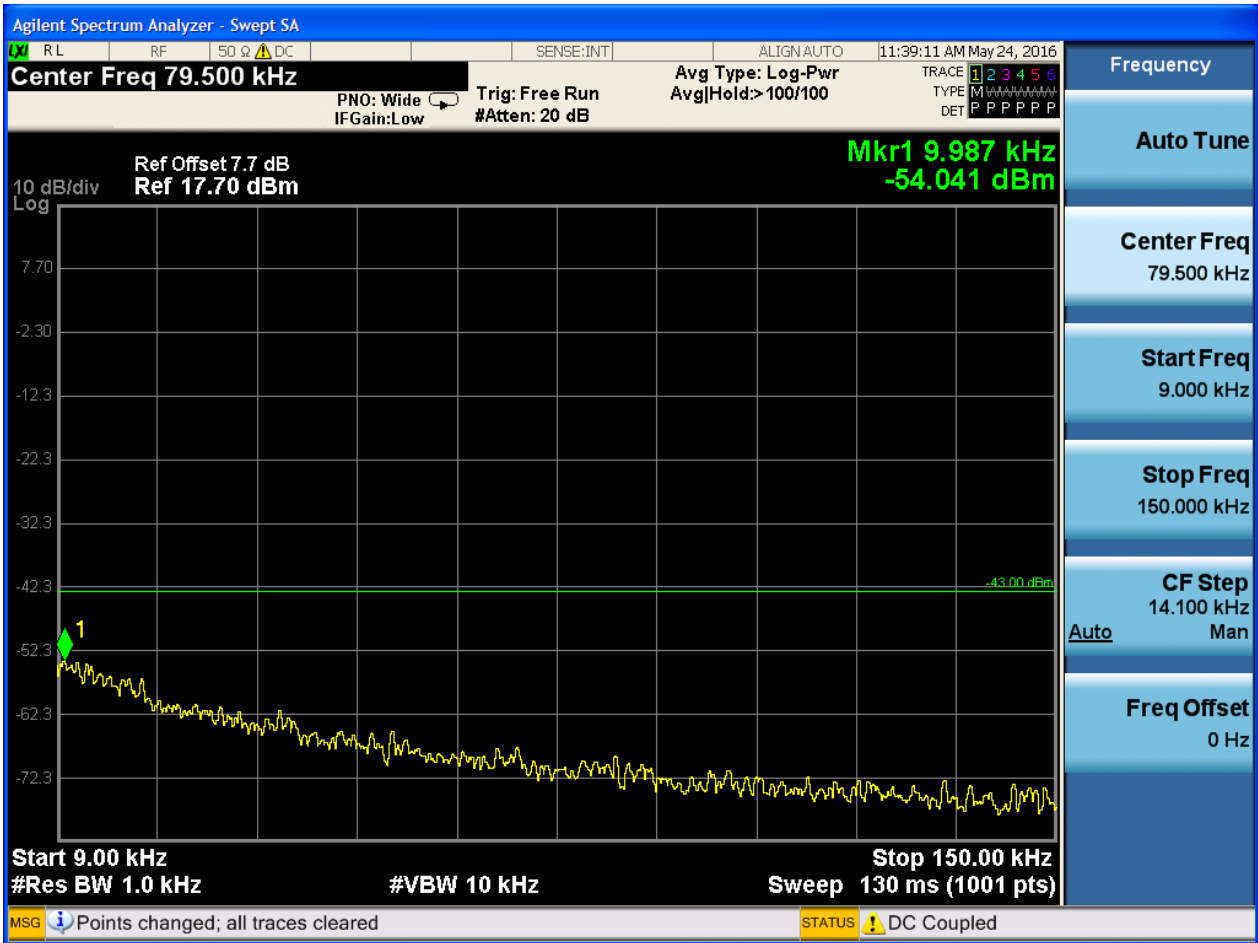


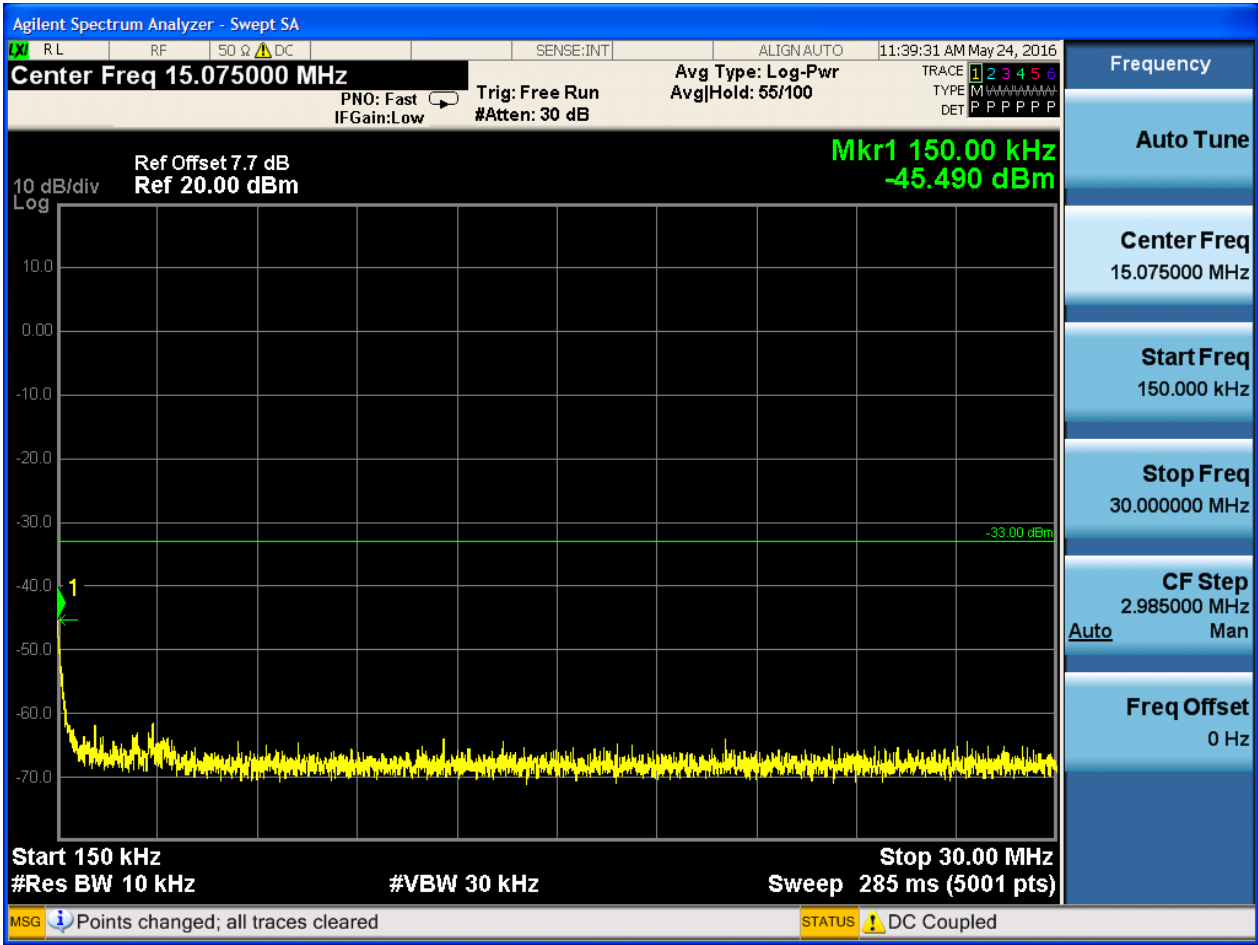


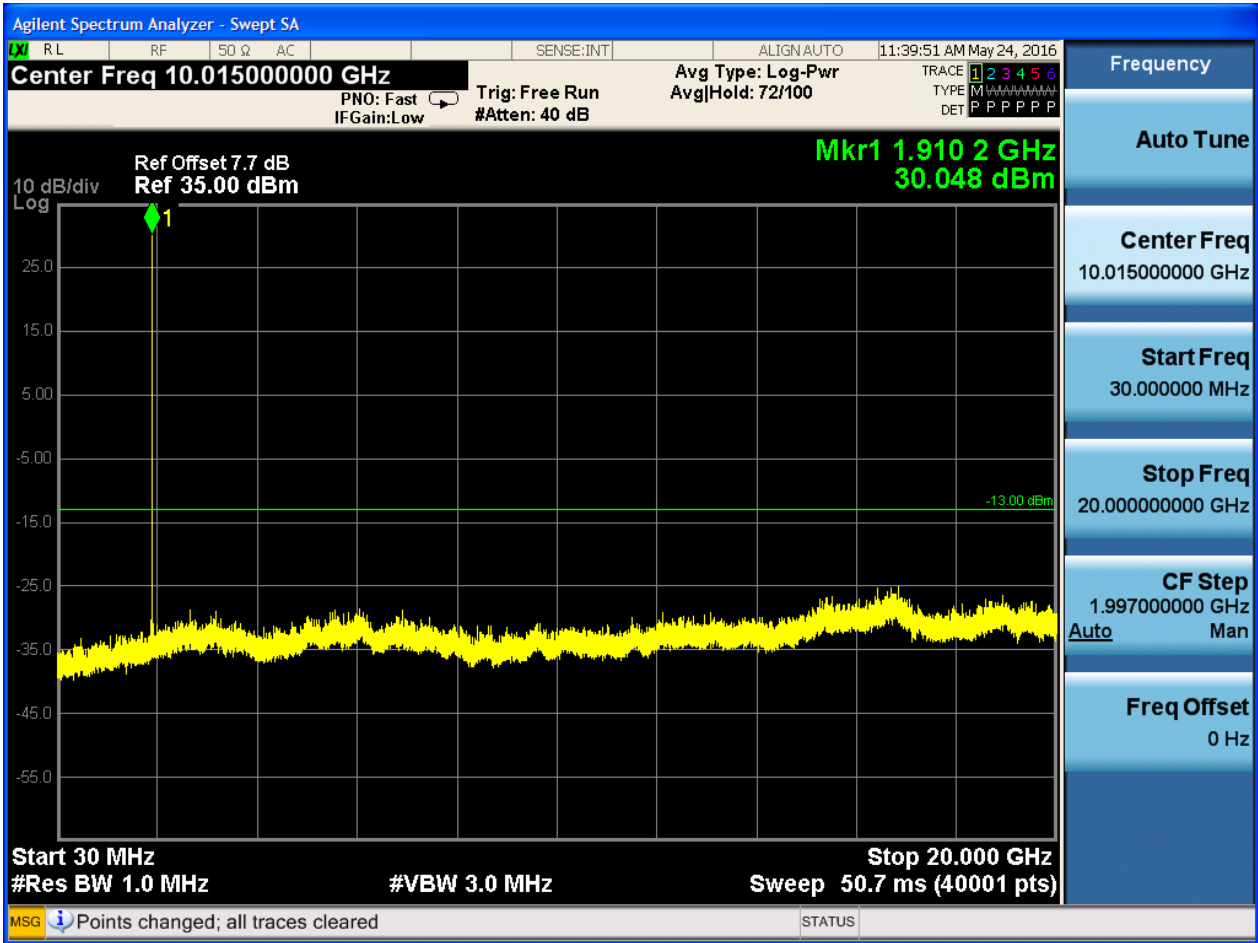




6.1.2.1.3 Test Channel = HCH

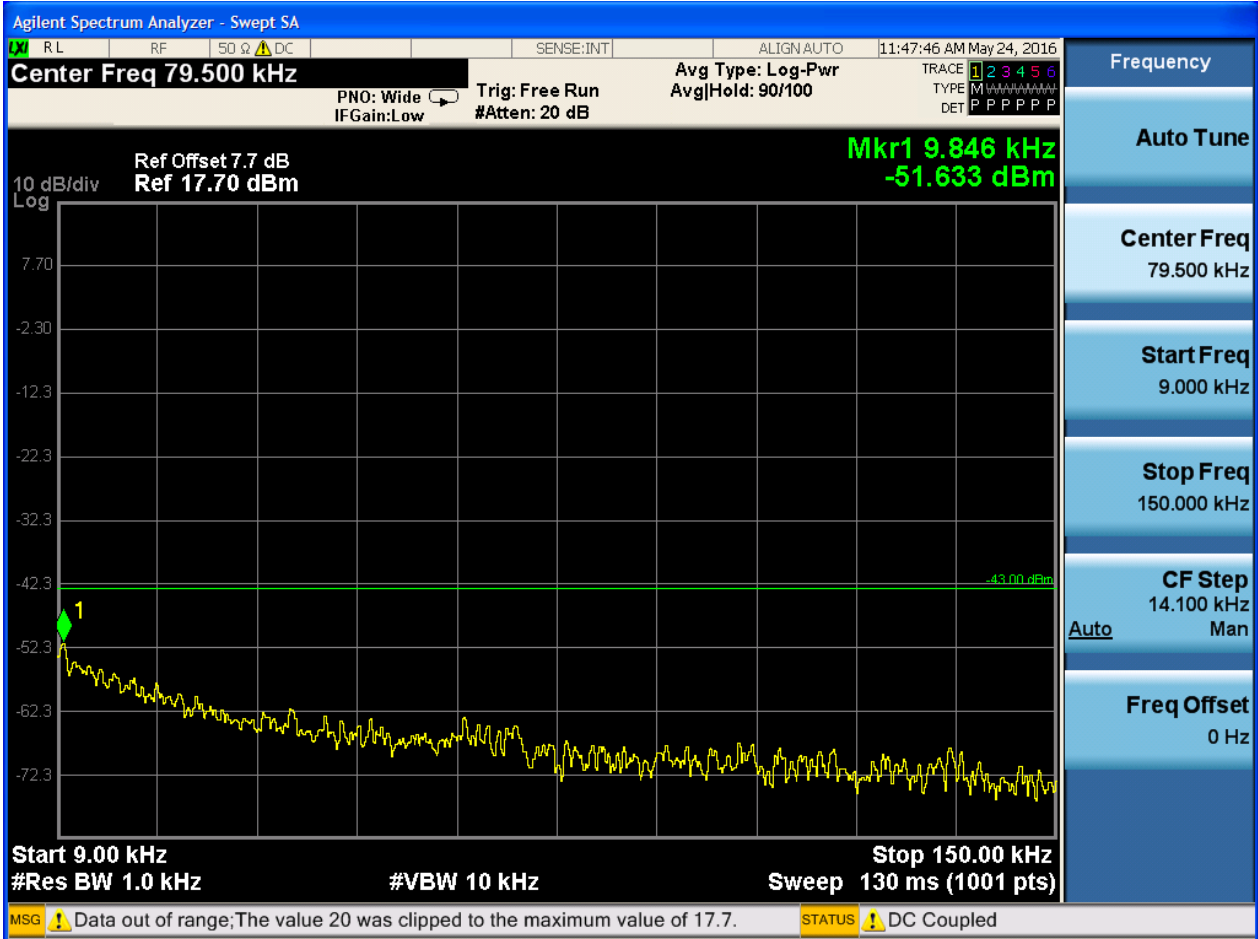


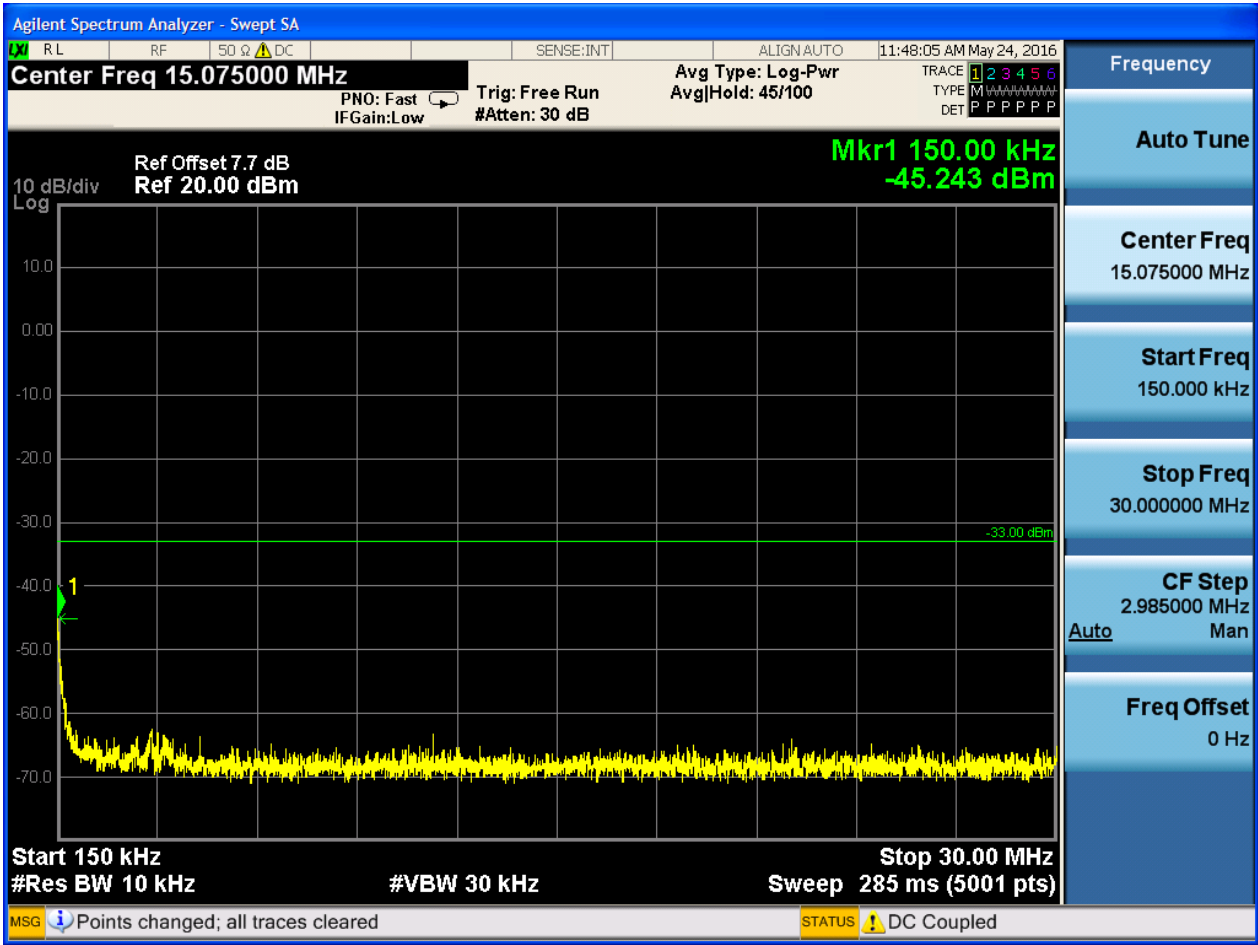


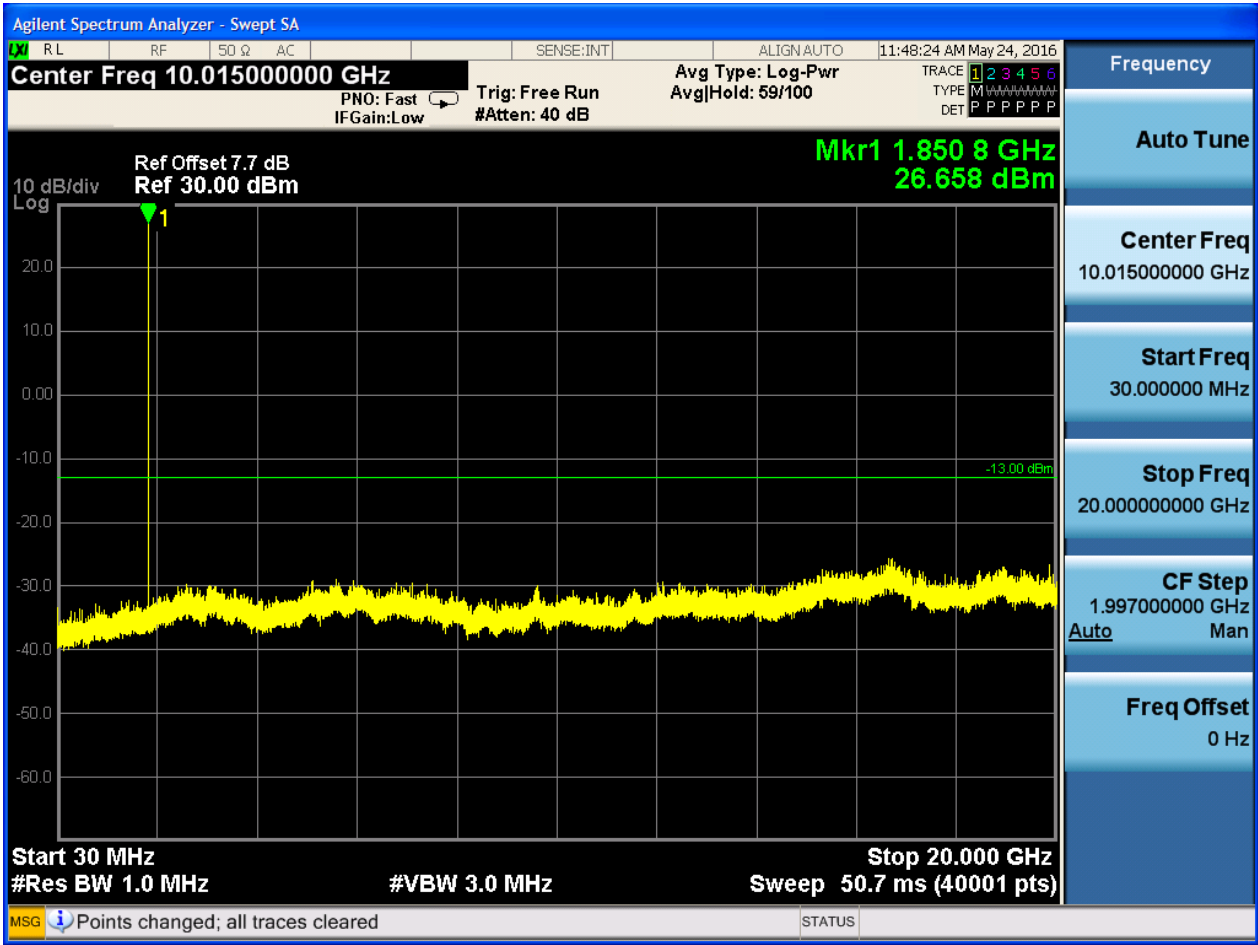


6.1.2.2 Test Mode = GSM/TM2

6.1.2.2.1 Test Channel = LCH

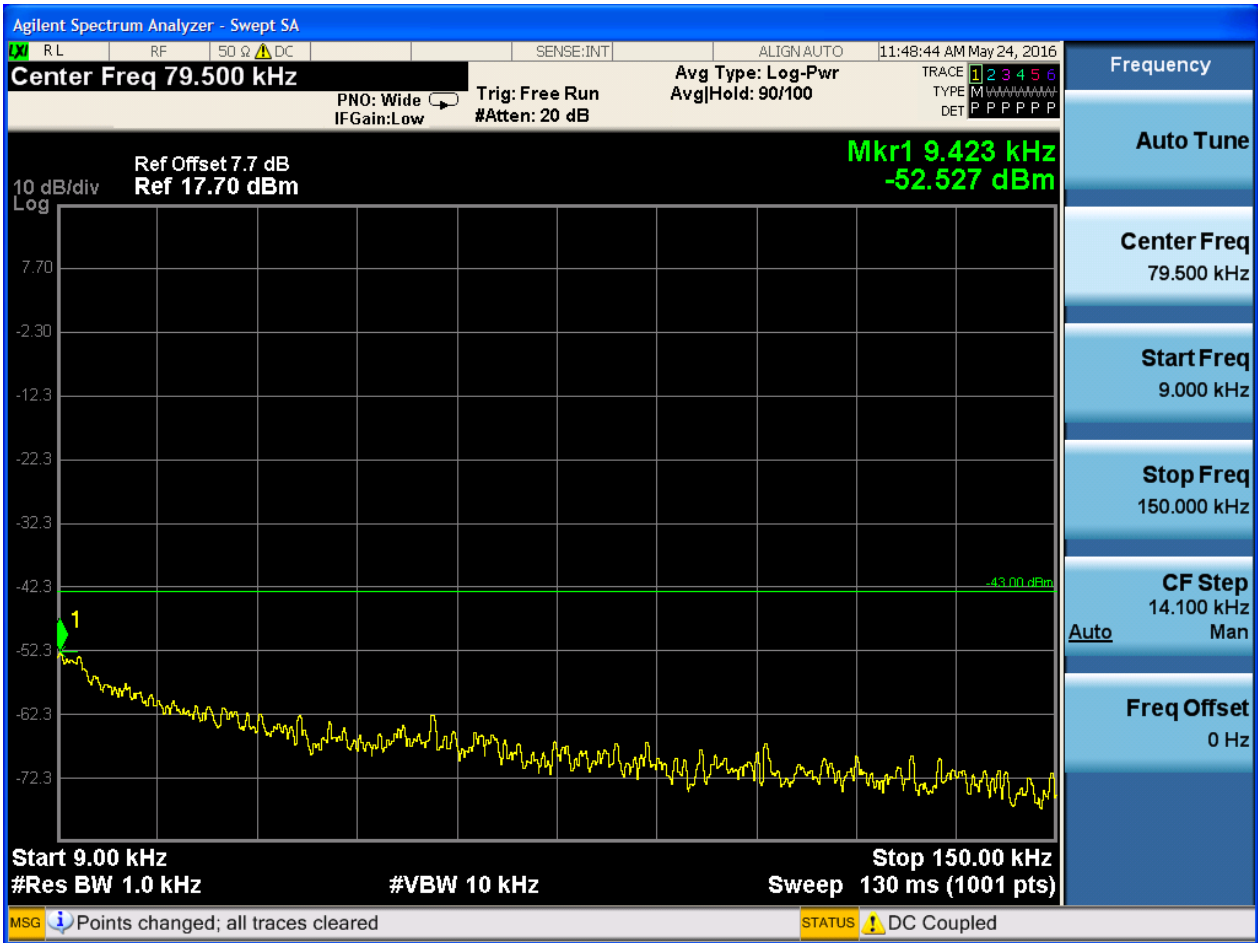


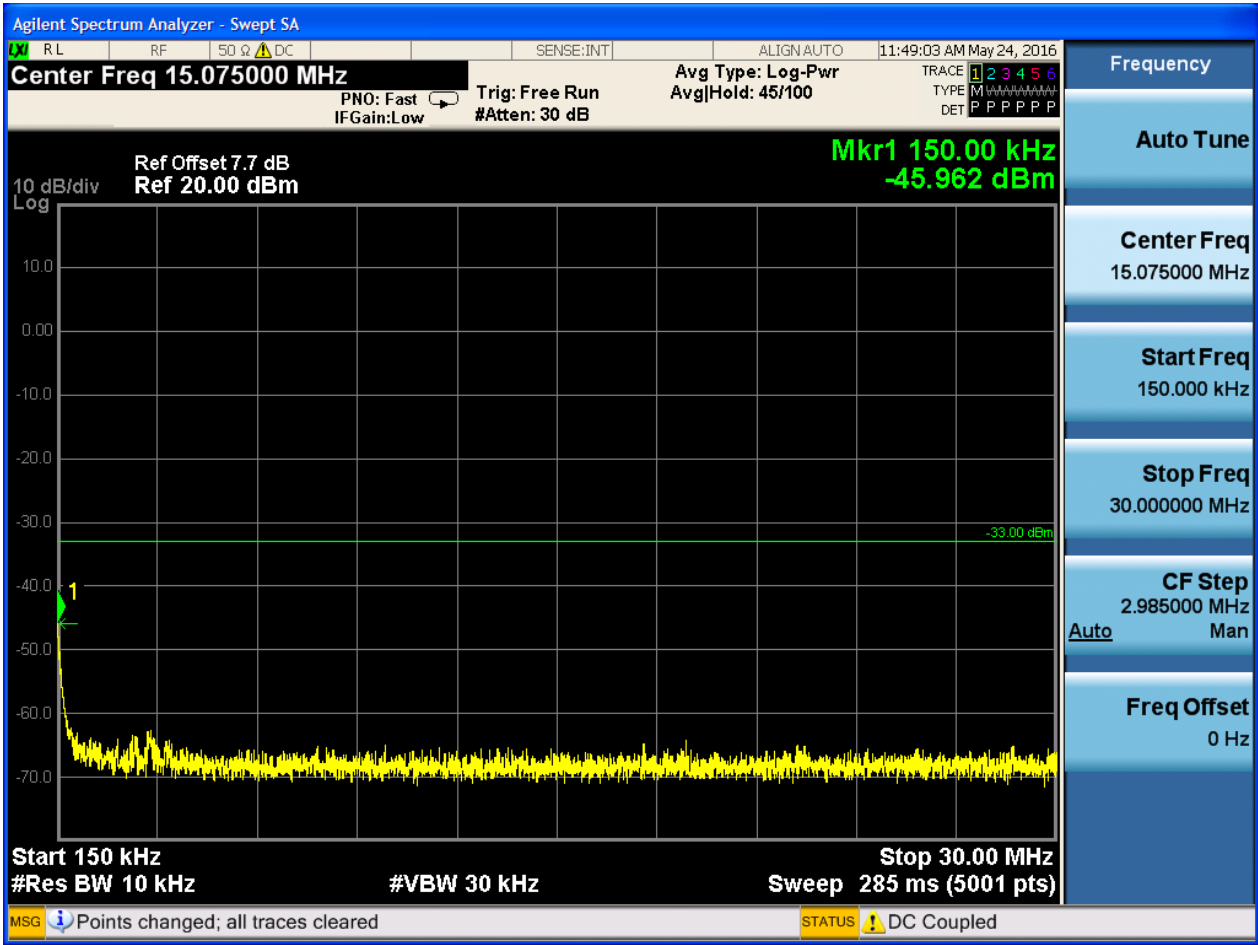


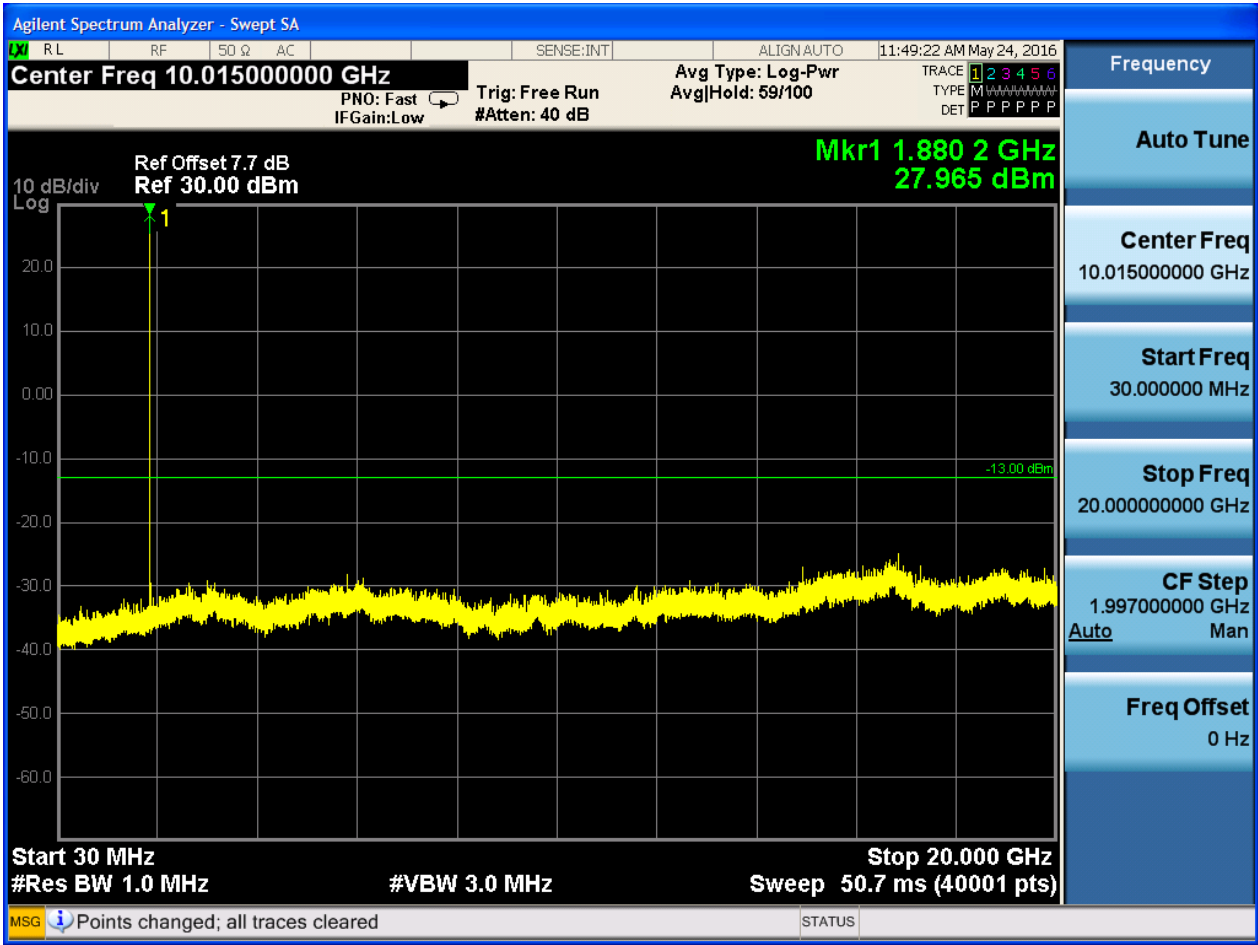




6.1.2.2.2 Test Channel = MCH

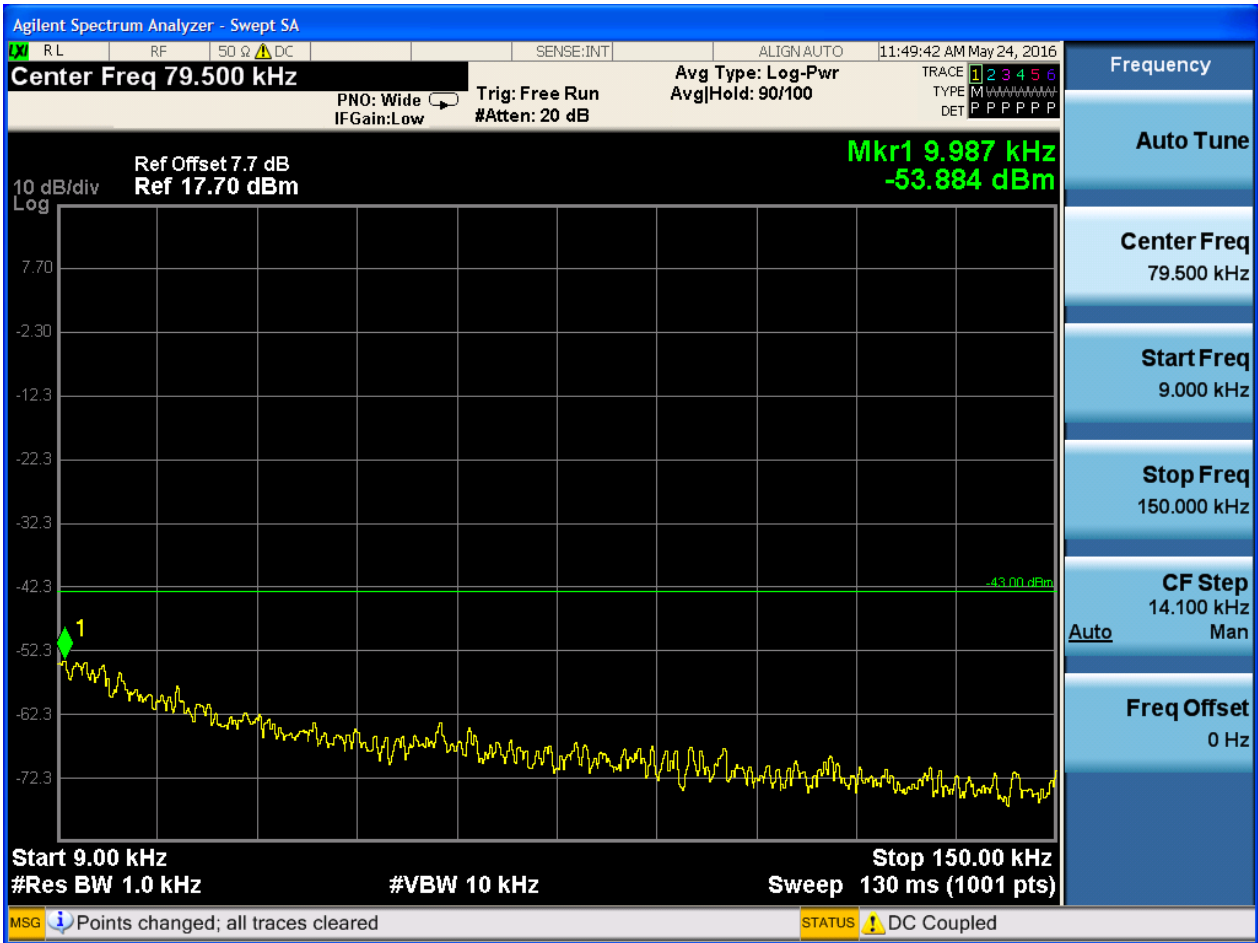


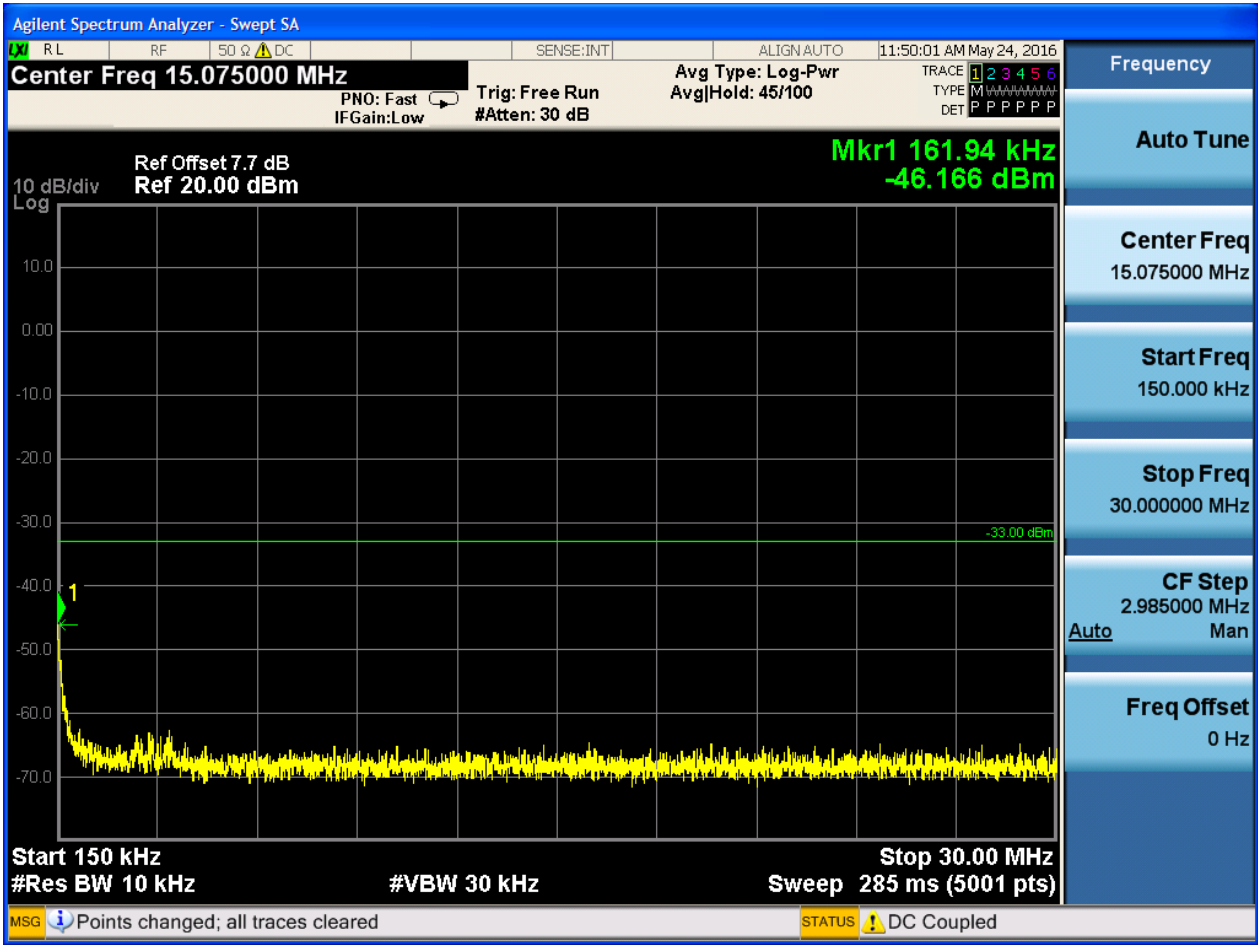


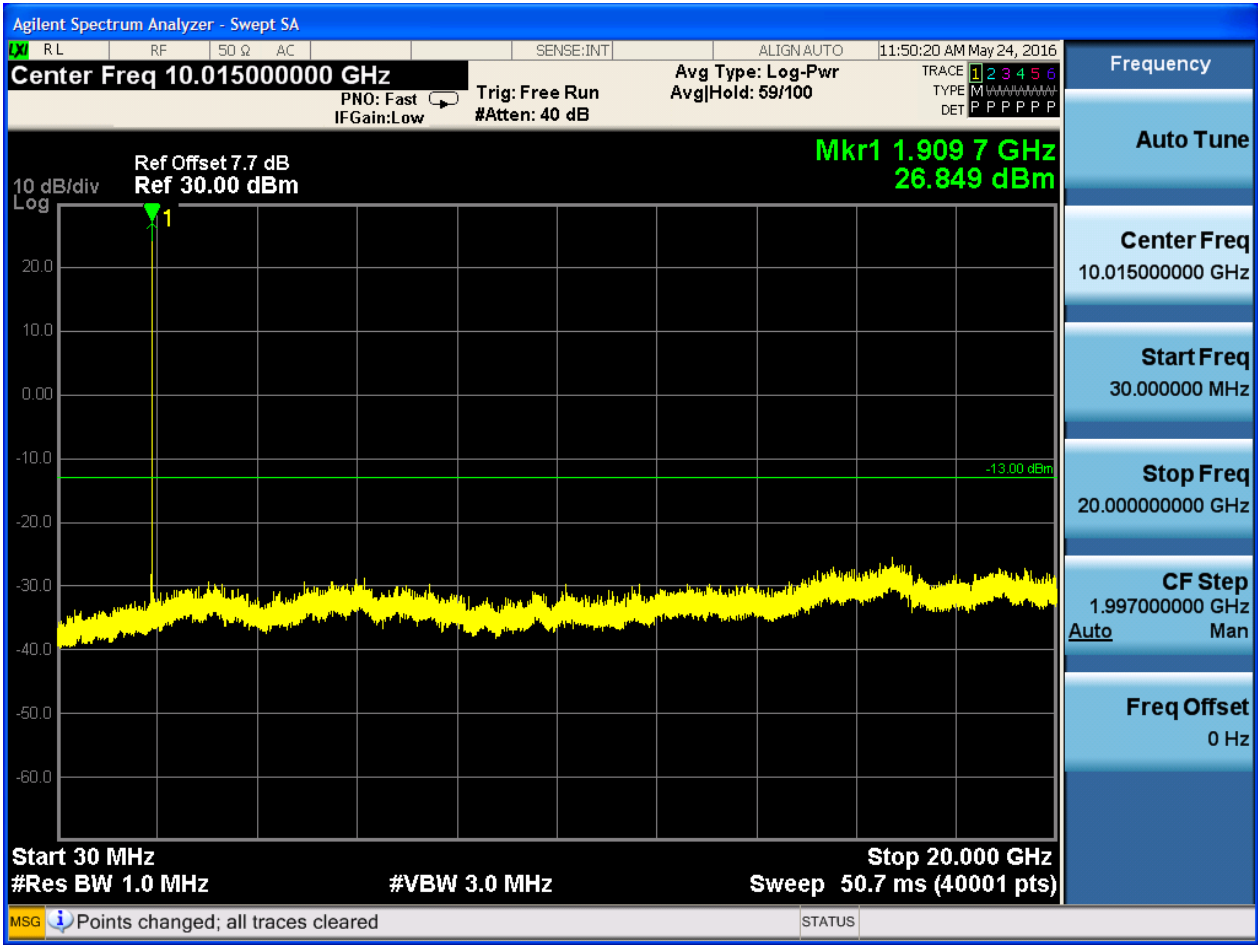




6.1.2.2.3 Test Channel = HCH







7 Appendix_G: Field Strength of Spurious Radiation

Note:

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

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

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

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

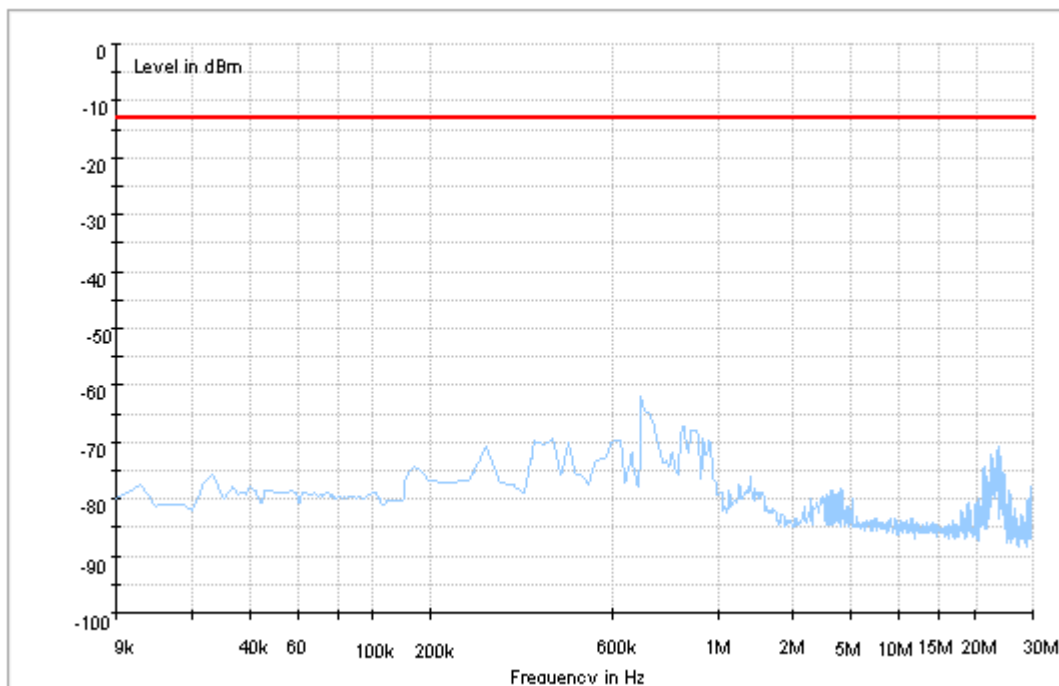
We tested all modes, but the data presented below is the worst case.

Part I - Test Plots

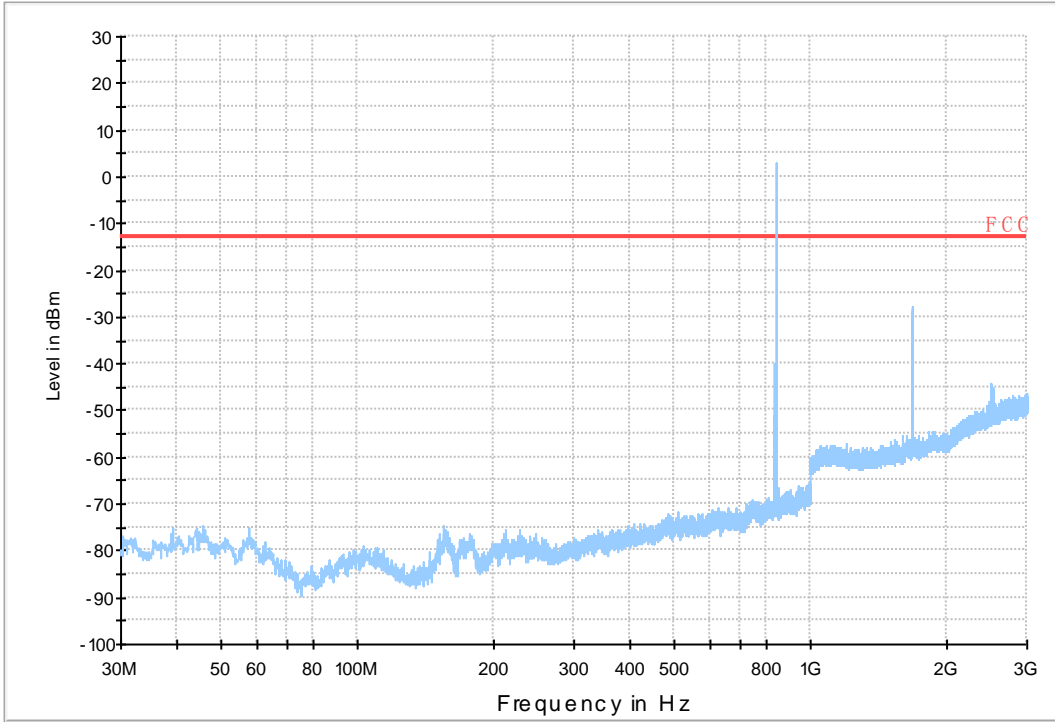
7.1 For GSM

7.1.1 Test Band = GSM850_Ant1

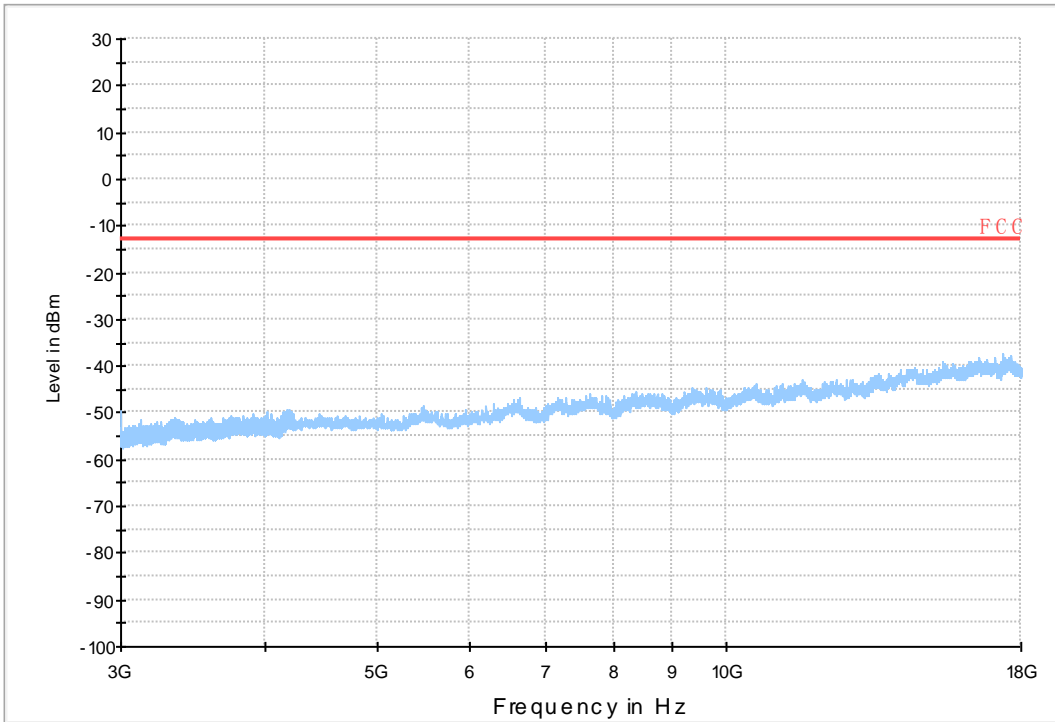
7.1.1.1 Test Mode = GSM/TM1



Copy of FCC PART22 GSM850_L

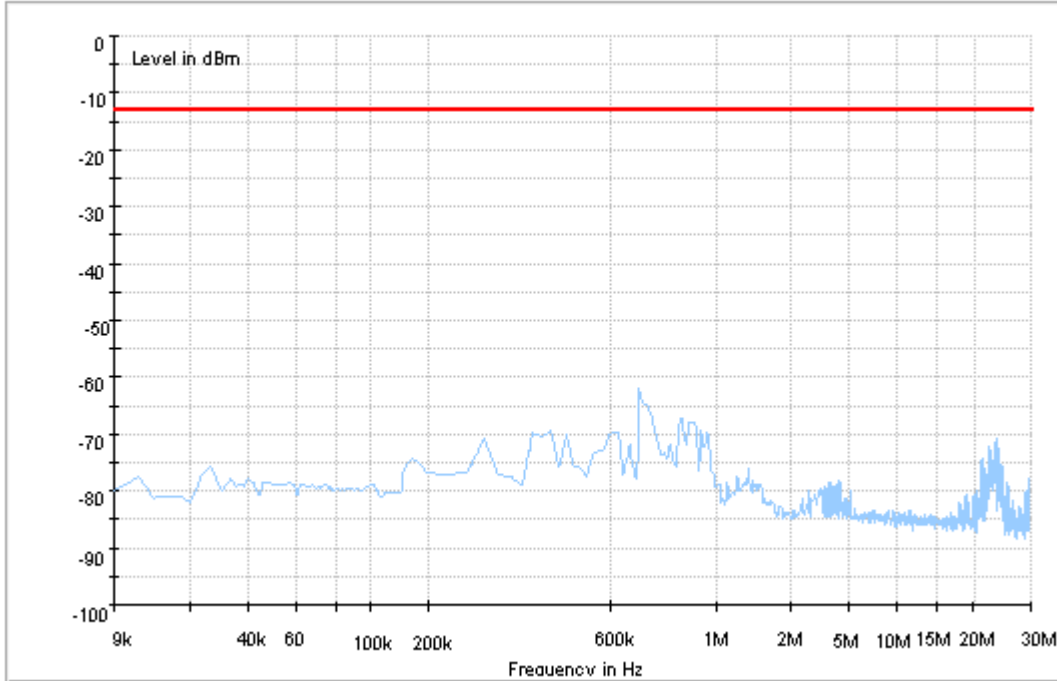


Copy of FCC PART22 GSM850_H

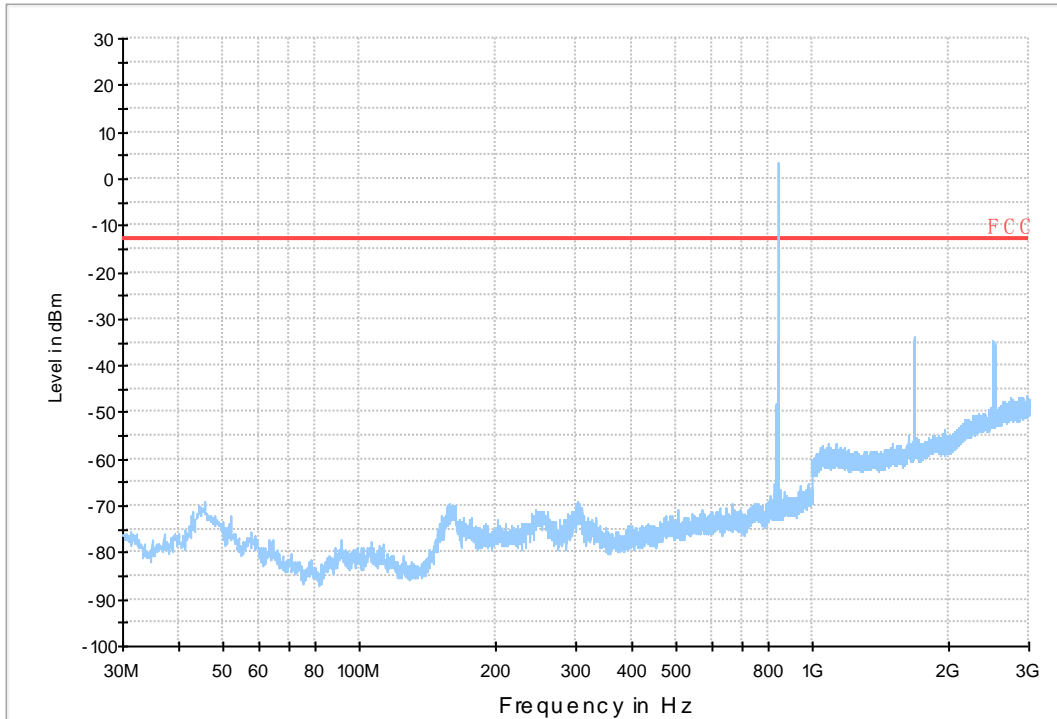


7.1.2 Test Band = GSM850_Ant2

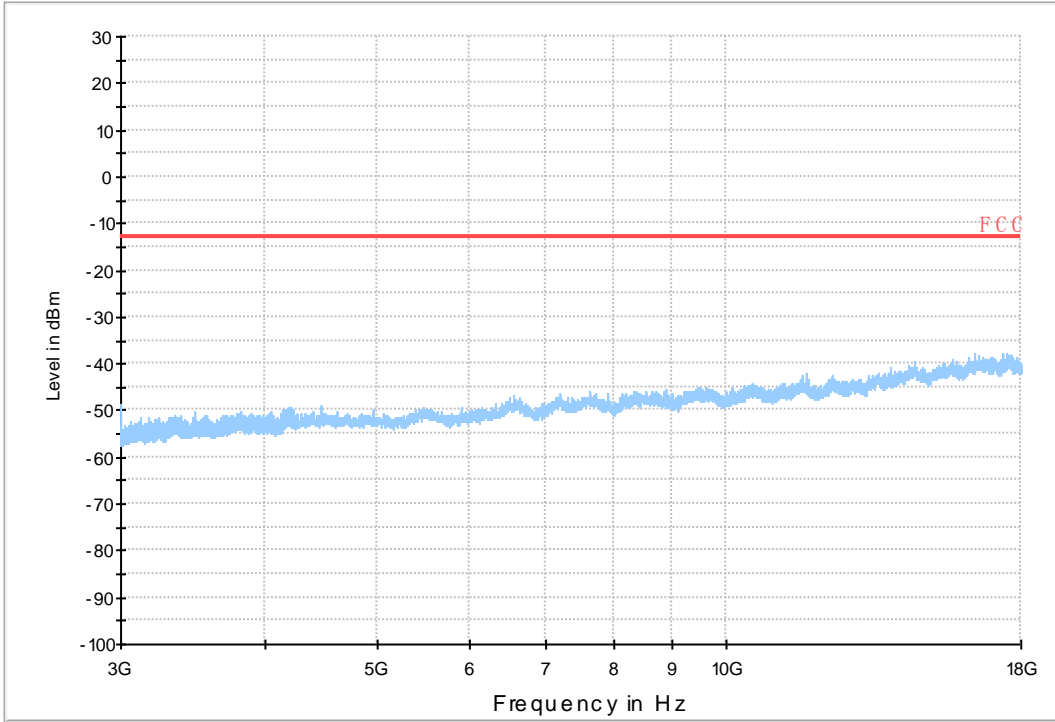
7.1.2.1 Test Mode = GSM/TM1



Copy of FCC PART22 GSM850_L

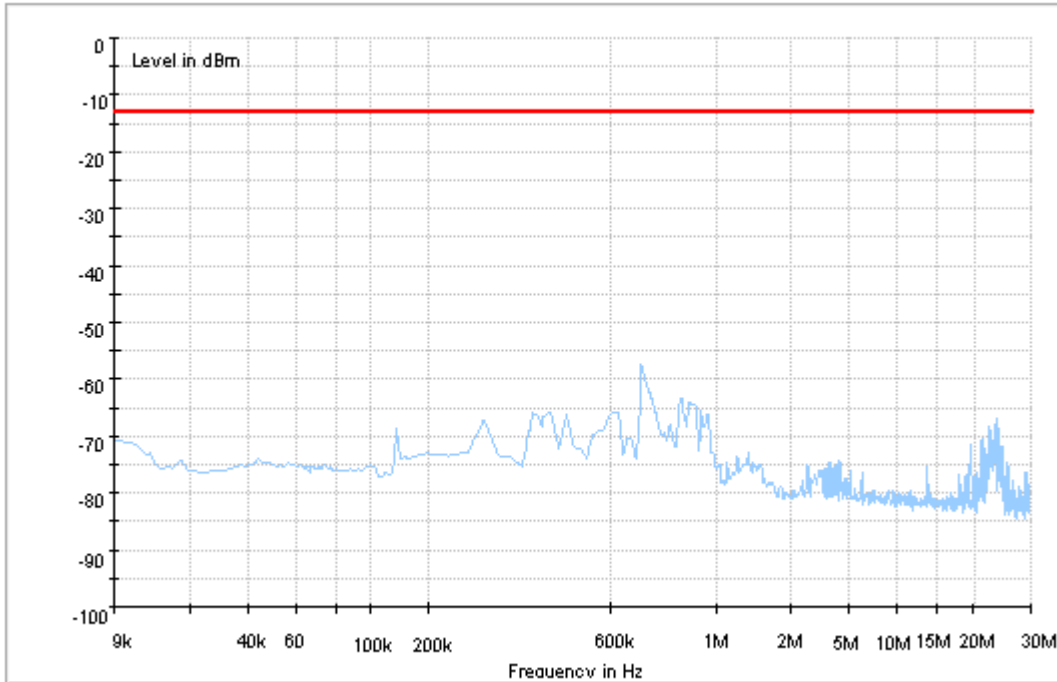


Copy of FCC PART22 GSM 850_H

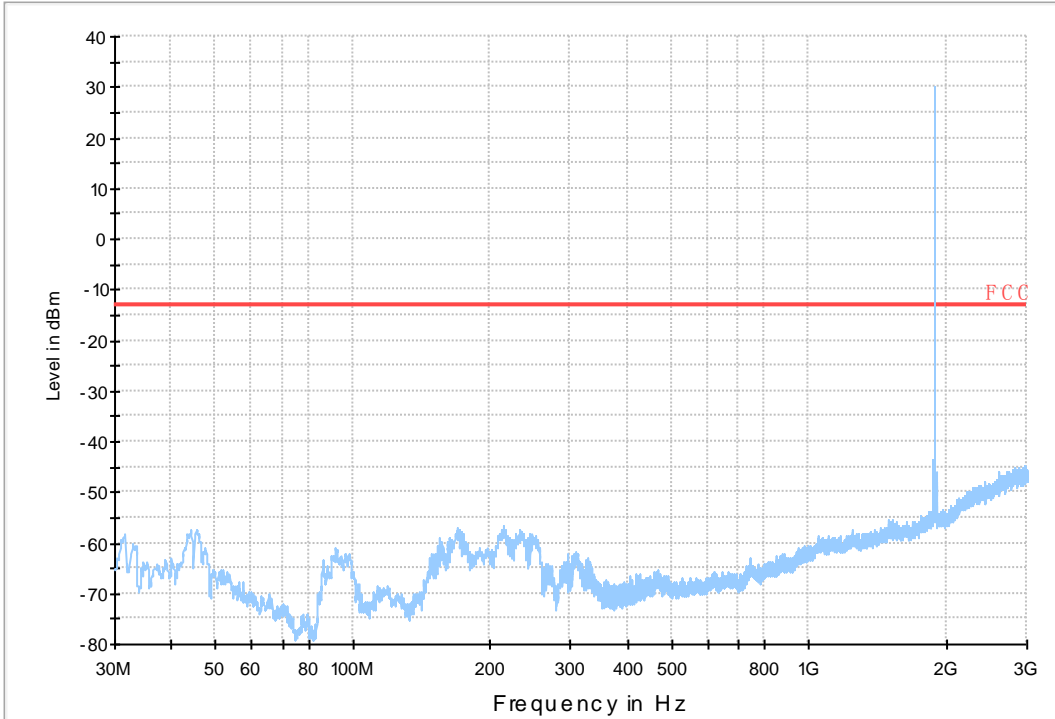


7.1.3 Test Band = GSM1900_Ant1

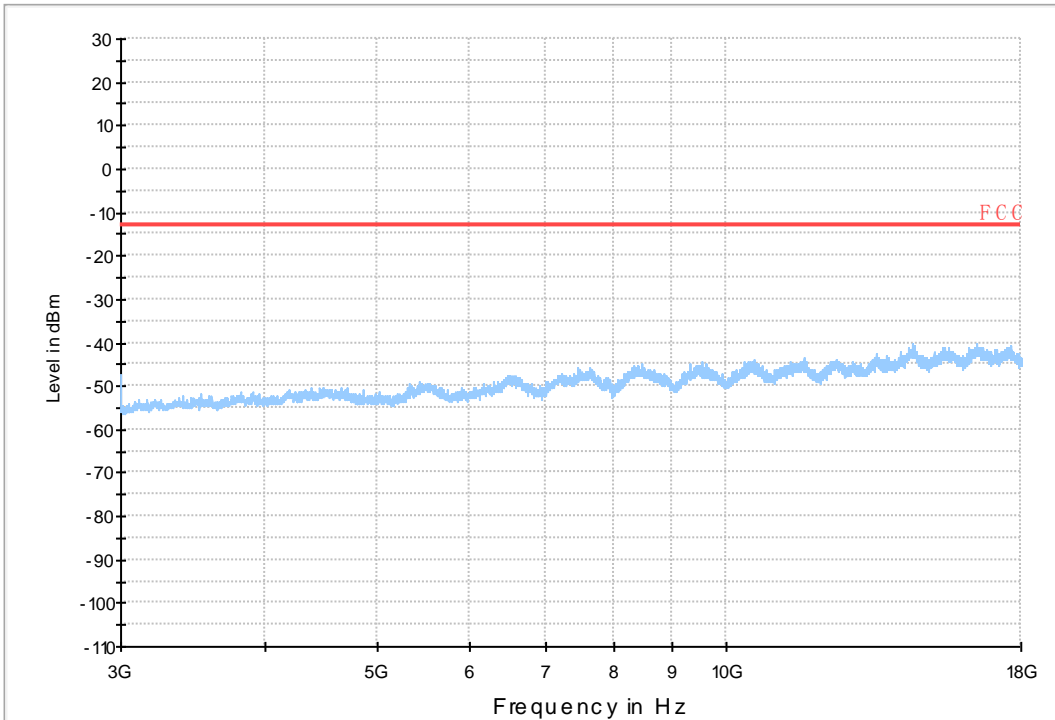
7.1.3.1 Test Mode = GSM/TM1

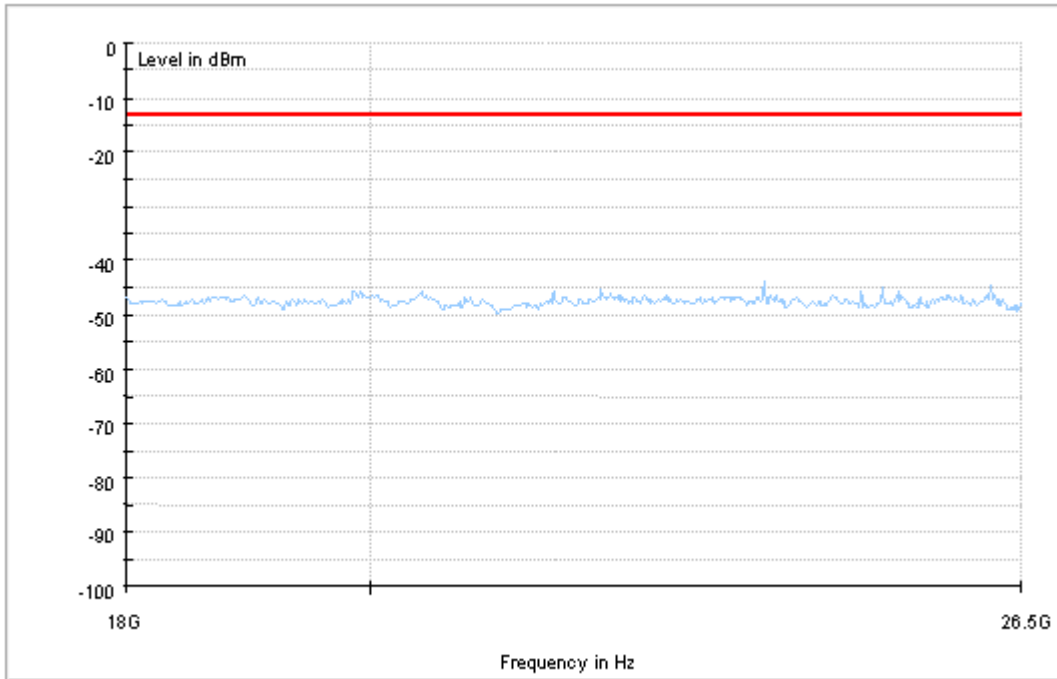


Copy of FCC PART24 GSM 1900_L



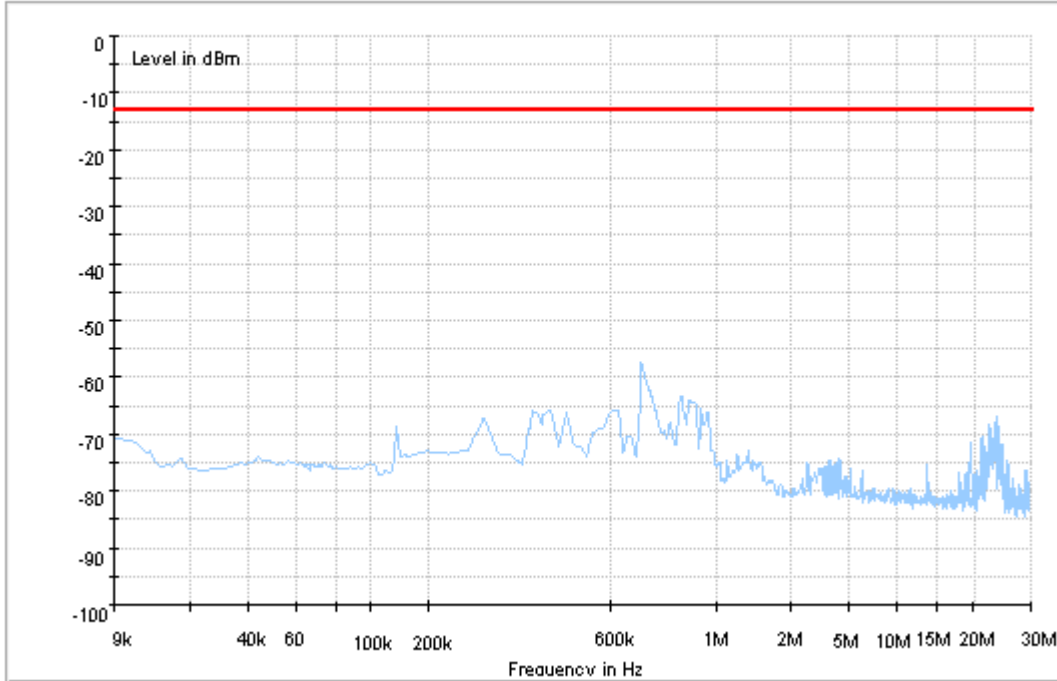
Copy of FCC PART24 GSM 1900_H



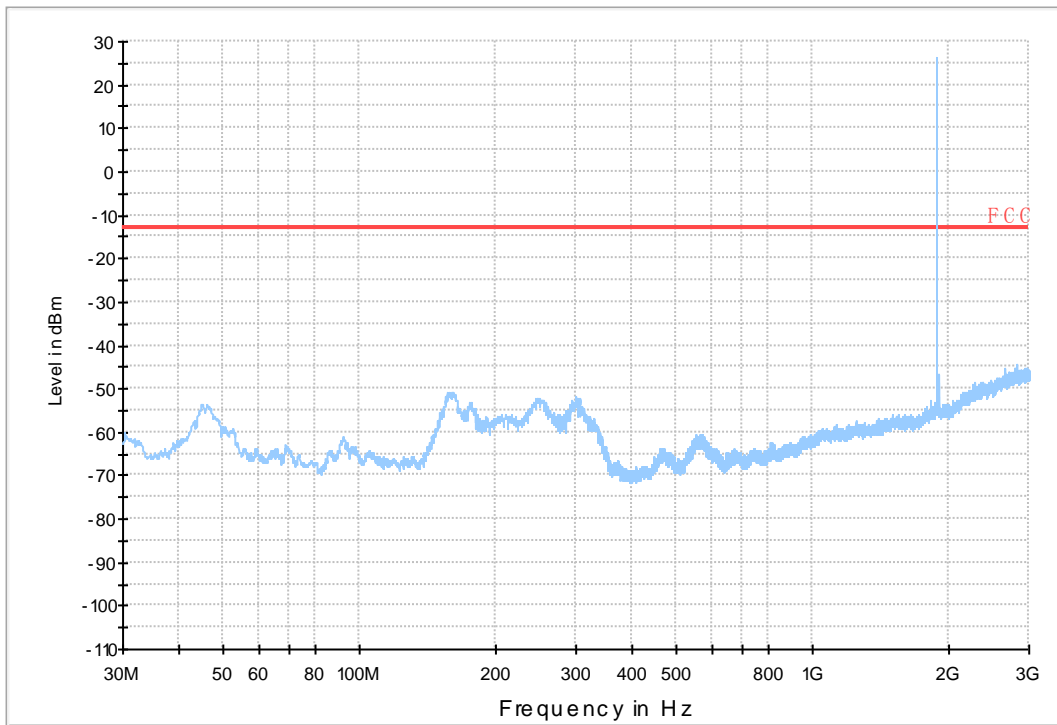


7.1.4 Test Band = GSM1900_Ant2

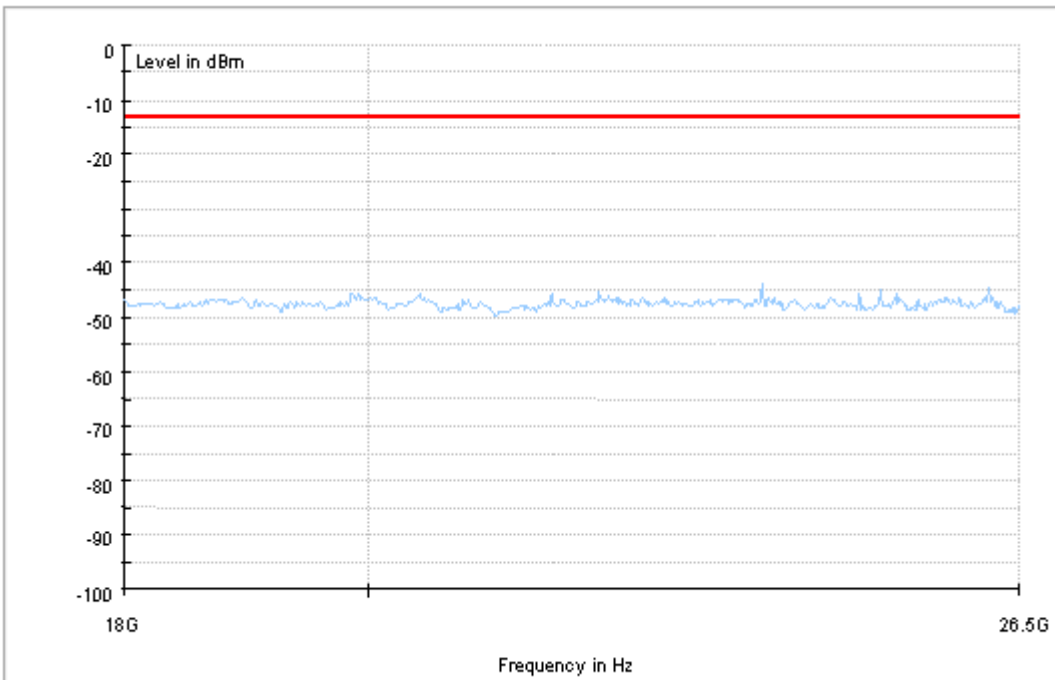
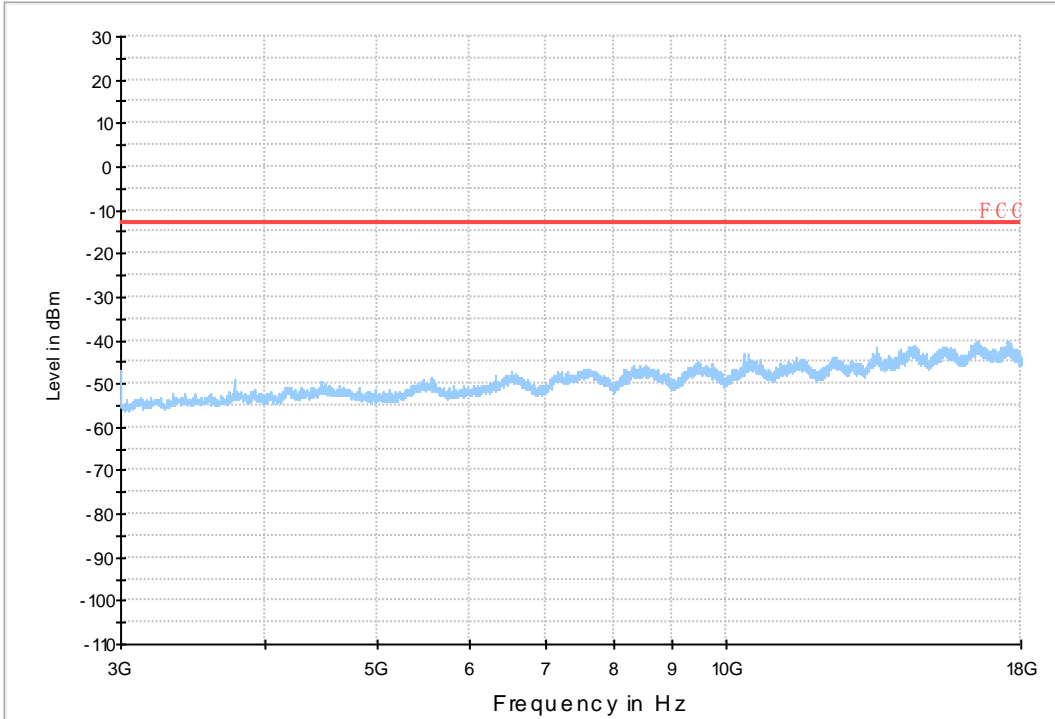
7.1.4.1 Test Mode = GSM/TM1



Copy of FCC PART24 GSM 1900_L



Copy of FCC PART24 GSM 1900_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	-4.97	-0.00603	PASS
				VN	-12.14	-0.01473	PASS
				VH	-5.17	-0.00627	PASS
		MCH	TN	VL	-11.24	-0.01344	PASS
				VN	-1.49	-0.00178	PASS
				VH	-7.17	-0.00857	PASS
		HCH	TN	VL	-14.46	-0.01704	PASS
				VN	-12.85	-0.01514	PASS
				VH	-1.87	-0.0022	PASS
	GSM/TM2	LCH	TN	VL	-12.69	-0.0154	PASS
				VN	-14.63	-0.01775	PASS
				VH	-9.62	-0.01167	PASS
		MCH	TN	VL	-12.04	-0.01439	PASS
				VN	-6.04	-0.00722	PASS
				VH	-16.08	-0.01922	PASS
		HCH	TN	VL	-18.44	-0.02172	PASS
				VN	-10.46	-0.01232	PASS
				VH	-9.72	-0.01145	PASS
GSM1900	GSM/TM1	LCH	TN	VL	12.46	0.00673	PASS
				VN	24.41	0.01319	PASS
				VH	19.95	0.01078	PASS
		MCH	TN	VL	14.33	0.00762	PASS
				VN	27.18	0.01446	PASS
				VH	16.72	0.00889	PASS
		HCH	TN	VL	20.4	0.01068	PASS
				VN	28.73	0.01504	PASS
				VH	26.15	0.01369	PASS
	GSM/TM2	LCH	TN	VL	10.27	0.00555	PASS
				VN	9.4	0.00508	PASS
				VH	7.94	0.00429	PASS
		MCH	TN	VL	7.07	0.00376	PASS
				VN	10.46	0.00556	PASS
				VH			

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				VH	11.72	0.00623	PASS
		HCH	TN	VL	0.68	0.00036	PASS
				VN	10.43	0.00546	PASS
				VH	3.36	0.00176	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	-6.59	-0.008	PASS
				-20	-12.33	-0.01496	PASS
				-10	-9.36	-0.01136	PASS
				0	-5.23	-0.00635	PASS
				10	-6.78	-0.00823	PASS
				20	-5.36	-0.0065	PASS
				30	-7.55	-0.00916	PASS
				40	-8.07	-0.00979	PASS
		50	-9.43	-0.01144	PASS		
		MCH	VN	-30	-7.88	-0.00942	PASS
				-20	-4.13	-0.00494	PASS
				-10	-6.52	-0.00779	PASS
				0	-9.56	-0.01143	PASS
				10	-7.36	-0.0088	PASS
				20	-3.87	-0.00463	PASS
				30	-4	-0.00478	PASS
				40	-10.46	-0.0125	PASS
		50	-9.75	-0.01165	PASS		
		HCH	VN	-30	-9.94	-0.01171	PASS
				-20	-11.24	-0.01324	PASS
				-10	-8.01	-0.00944	PASS
				0	-11.95	-0.01408	PASS
				10	-16.14	-0.01902	PASS
				20	-16.21	-0.0191	PASS
	30			-4.33	-0.0051	PASS	
	40			-6.46	-0.00761	PASS	
	50	-8.91	-0.0105	PASS			
	GSM/TM2	LCH	VN	-30	-19.05	-0.02311	PASS
				-20	-17.37	-0.02107	PASS
				-10	-9.94	-0.01206	PASS
				0	-20.21	-0.02452	PASS

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict		
				10	-12.72	-0.01543	PASS		
				20	-7.07	-0.00858	PASS		
				30	-12.62	-0.01531	PASS		
				40	-5.23	-0.00635	PASS		
				50	-7.62	-0.00925	PASS		
		MCH	VN	-30	-16.27	-0.01945	PASS		
				-20	-8.17	-0.00977	PASS		
				-10	-12.91	-0.01543	PASS		
				0	-11.17	-0.01335	PASS		
				10	-6.88	-0.00822	PASS		
				20	-11.07	-0.01323	PASS		
				30	-11.95	-0.01428	PASS		
				40	-12.37	-0.01479	PASS		
		HCH	VN	50	-15.69	-0.01875	PASS		
				-30	-13.88	-0.01635	PASS		
				-20	-17.85	-0.02103	PASS		
				-10	-16.59	-0.01955	PASS		
				0	-12.91	-0.01521	PASS		
				10	-6.94	-0.00818	PASS		
				20	-12.88	-0.01517	PASS		
				30	-10.65	-0.01255	PASS		
		GSM1900	GSM/TM1	LCH	VN	40	-14.33	-0.01688	PASS
						50	-15.27	-0.01799	PASS
						-30	22.6	0.01221	PASS
-20	16.59					0.00897	PASS		
-10	8.2					0.00443	PASS		
0	3.29					0.00178	PASS		
10	25.76					0.01392	PASS		
20	12.01					0.00649	PASS		
MCH	VN			30	16.08	0.00869	PASS		
				40	17.11	0.00925	PASS		
				50	14.53	0.00785	PASS		
				-30	13.3	0.00707	PASS		
				-20	9.23	0.00491	PASS		
				-10	13.69	0.00728	PASS		
				0	18.34	0.00976	PASS		
				10	25.38	0.0135	PASS		
20	19.18	0.0102	PASS						
30	9.56	0.00509	PASS						
40	6.97	0.00371	PASS						



Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
		HCH	VN	50	10.46	0.00556	PASS
				-30	23.31	0.01221	PASS
				-20	18.4	0.00963	PASS
				-10	16.59	0.00869	PASS
				0	31.77	0.01664	PASS
				10	11.82	0.00619	PASS
				20	26.8	0.01403	PASS
				30	34.42	0.01802	PASS
				40	29.77	0.01559	PASS
				50	31.38	0.01643	PASS
	GSM/TM2	LCH	VN	-30	19.18	0.01037	PASS
				-20	6.94	0.00375	PASS
				-10	7.88	0.00426	PASS
				0	6.91	0.00373	PASS
				10	7.91	0.00428	PASS
				20	-1.07	-0.00058	PASS
				30	-17.24	-0.00932	PASS
				40	4.33	0.00234	PASS
				50	-1.81	-0.00098	PASS
				MCH	VN	-30	-5.71
		-20	2.49			0.00132	PASS
		-10	5.84			0.00311	PASS
		0	20.24			0.01077	PASS
		10	15.79			0.0084	PASS
		20	4.46			0.00237	PASS
		30	8.07			0.00429	PASS
		40	-3.33			-0.00177	PASS
		50	7.26			0.00386	PASS
		HCH	VN			-30	12.14
				-20	18.14	0.0095	PASS
				-10	12.95	0.00678	PASS
				0	8.27	0.00433	PASS
				10	18.92	0.00991	PASS
				20	16.3	0.00853	PASS
				30	15.14	0.00793	PASS
				40	3.62	0.0019	PASS
				50	2.65	0.00139	PASS

END