



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	31.83	28.21	38.5	PASS
		MCH	31.98	28.35	38.5	PASS
		HCH	32.04	28.57	38.5	PASS
	GSM/TM2	LCH	26.66	23.28	38.5	PASS
		MCH	26.65	23.21	38.5	PASS
		HCH	26.64	23.17	38.5	PASS



Test Band	Test Mode	Test Channel	Conducted Power [dBm]	EIRP [dBm]	Limit [dBm]	Verdict
GSM1900	GSM/TM1	LCH	29.18	27.78	33	PASS
		MCH	29.25	27.83	33	PASS
		HCH	29.11	27.74	33	PASS
	GSM/TM2	LCH	25.52	24.13	33	PASS
		MCH	25.52	24.08	33	PASS
		HCH	25.56	24.16	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	0.14	13	PASS
		MCH	0.11	13	PASS
		HCH	0.13	13	PASS
	GSM/TM2	LCH	3.15	13	PASS
		MCH	3.11	13	PASS
		HCH	3.15	13	PASS
GSM1900	GSM/TM1	LCH	0.14	13	PASS
		MCH	0.12	13	PASS
		HCH	0.13	13	PASS
	GSM/TM2	LCH	3.1	13	PASS
		MCH	3.1	13	PASS
		HCH	3.27	13	PASS

3Appendix_C: Modulation Characteristics

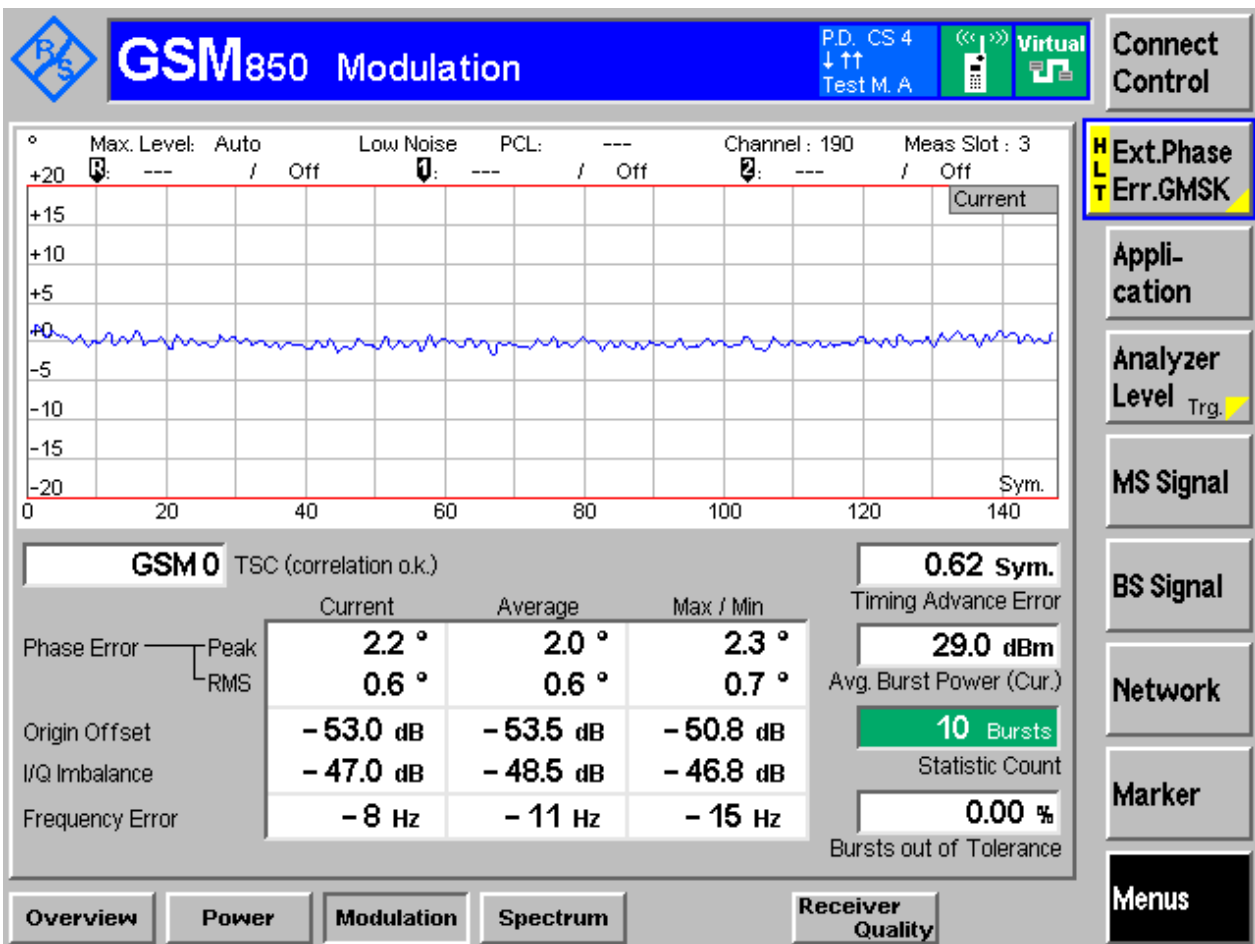
Part I - Test Plots

3.1 For GSM

3.1.1 Test Band = GSM850

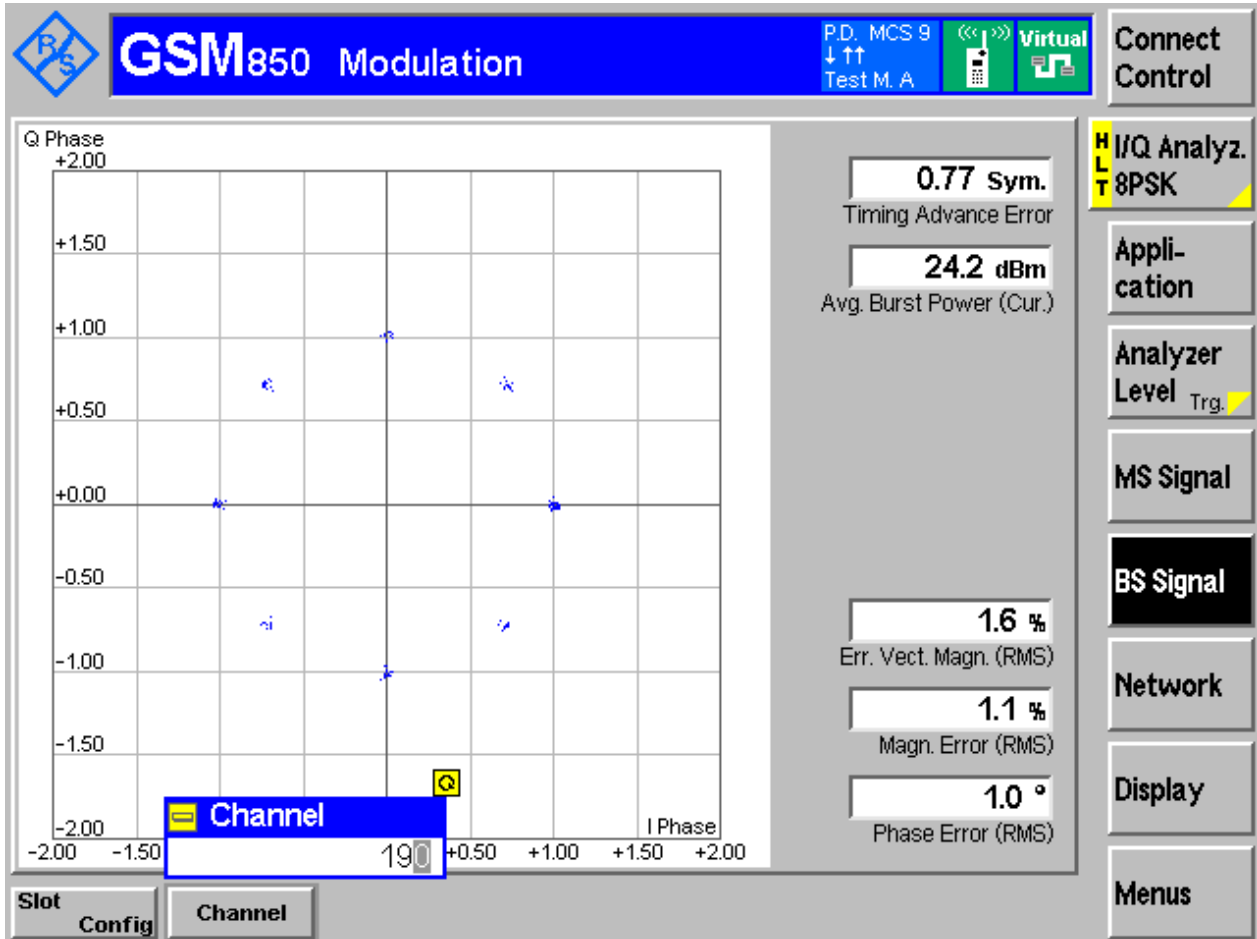
3.1.1.1 Test Mode = GSM/TM1

3.1.1.1.1 Test Channel = MCH



3.1.1.2 Test Mode = GSM/TM2

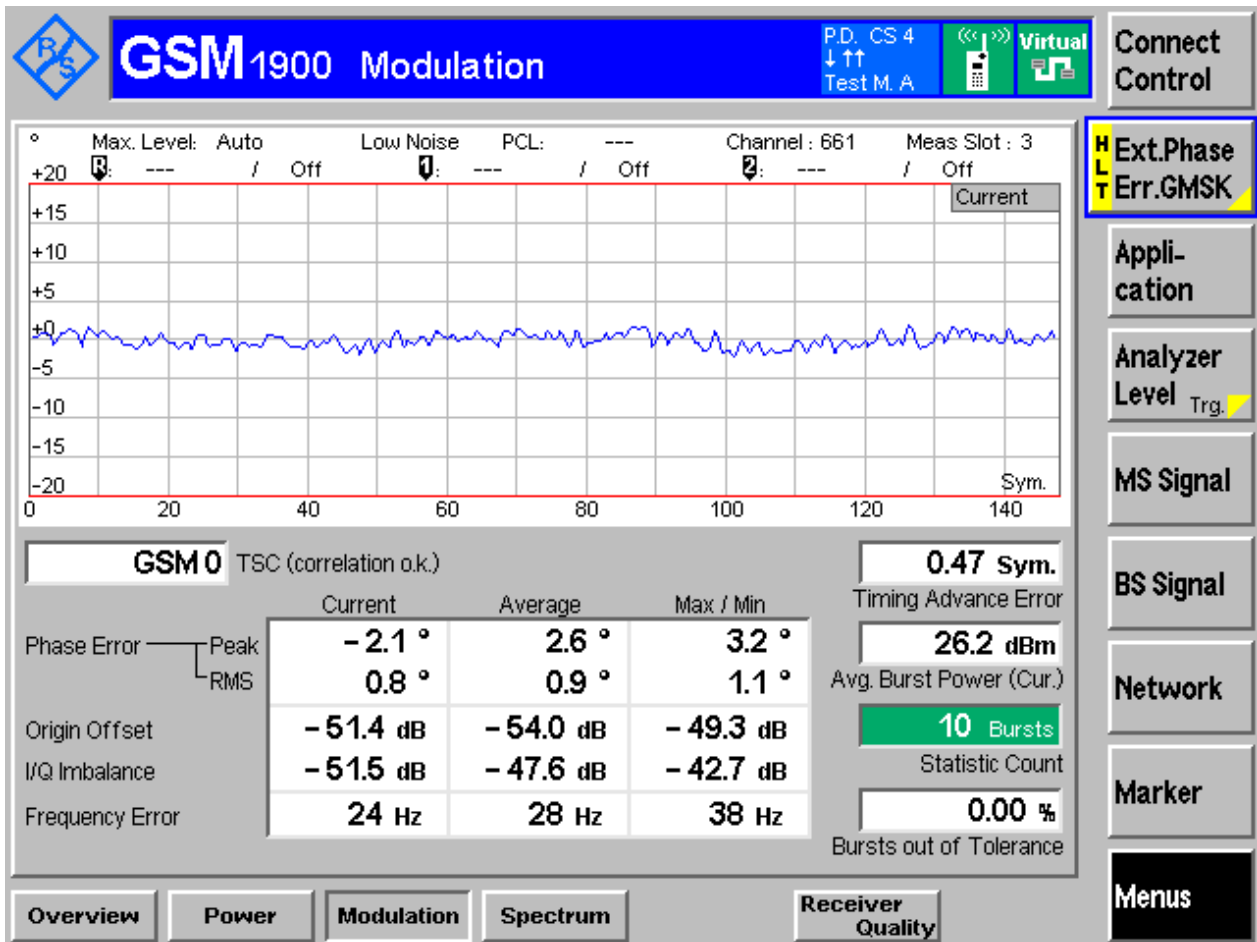
3.1.1.2.1 Test Channel = MCH



3.1.2 Test Band = GSM1900

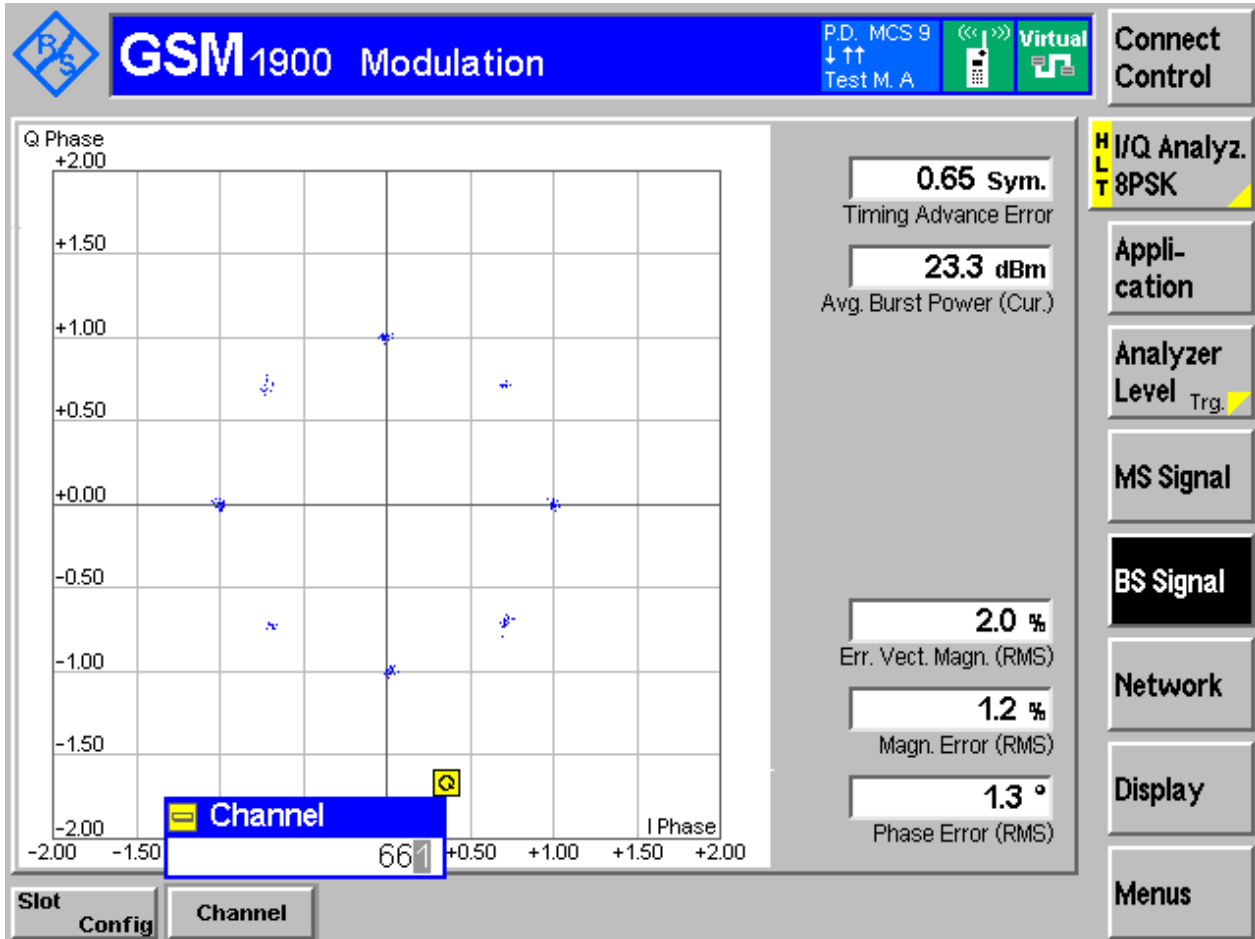
3.1.2.1 Test Mode = GSM/TM1

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	246.65	312.86	Pass
		MCH	242.53	316.50	Pass
		HCH	246.50	321.30	Pass
	GSM/TM2	LCH	246.17	314.99	Pass
		MCH	246.93	317.27	Pass
		HCH	251.73	324.54	Pass
GSM1900	GSM/TM1	LCH	243.16	308.29	Pass
		MCH	245.51	315.53	Pass
		HCH	243.40	317.27	Pass
	GSM/TM2	LCH	240.77	311.72	Pass
		MCH	243.46	310.00	Pass
		HCH	246.31	312.68	Pass

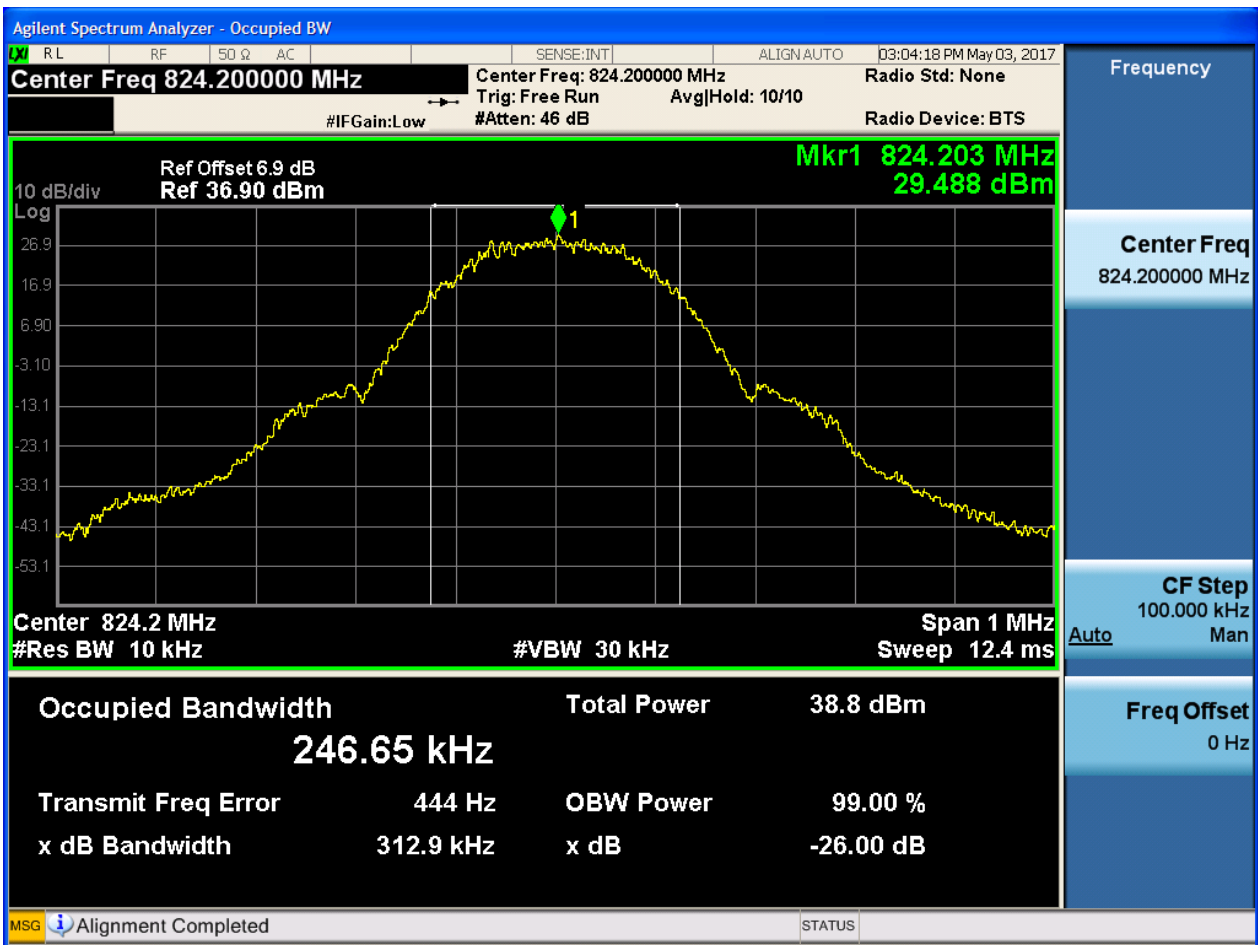
Part II - Test Plots

4.1 For GSM

4.1.1 Test Band = GSM850

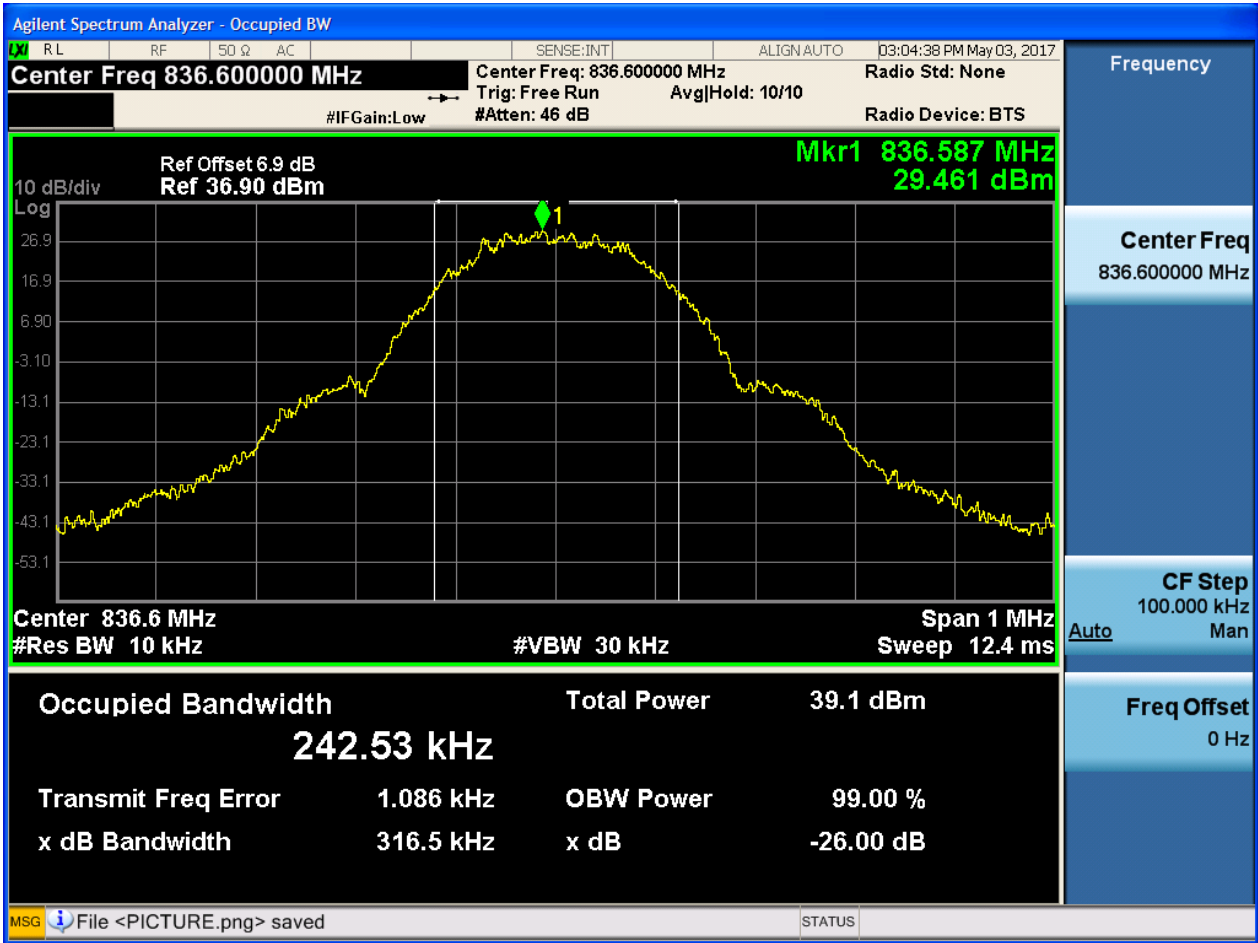
4.1.1.1 Test Mode = GSM/TM1

4.1.1.1.1 Test Channel = LCH



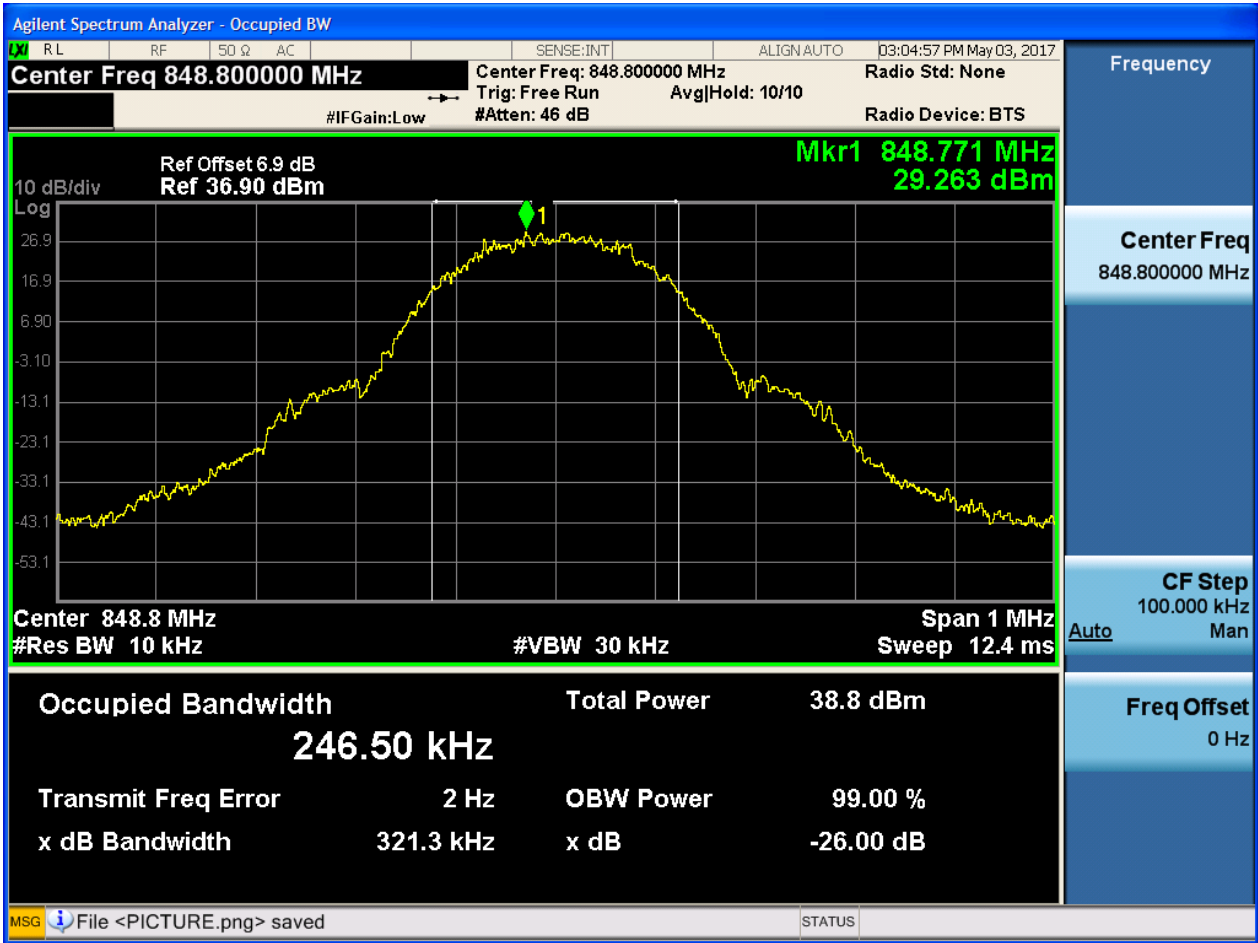


4.1.1.1.2 Test Channel = MCH





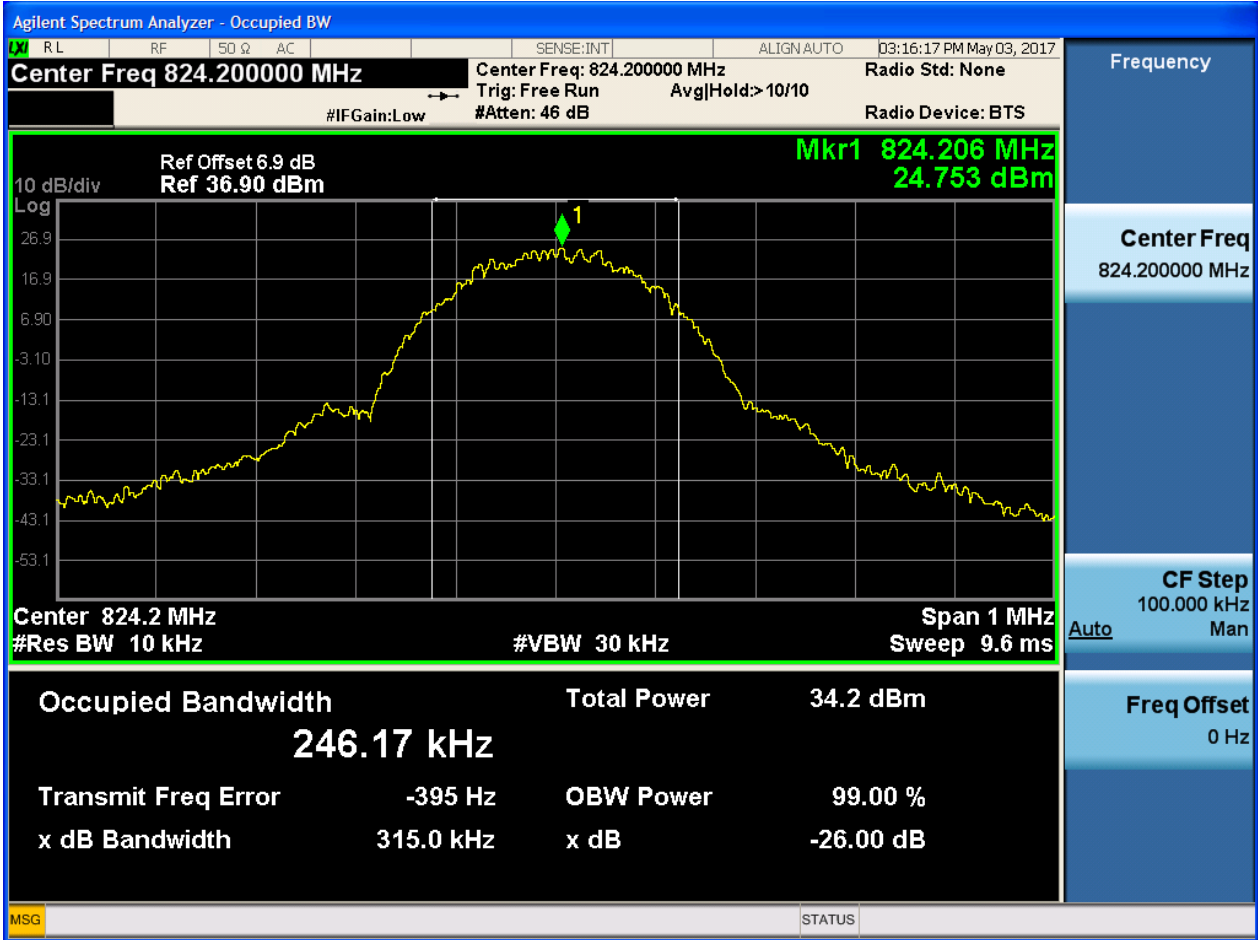
4.1.1.1.3 Test Channel = HCH





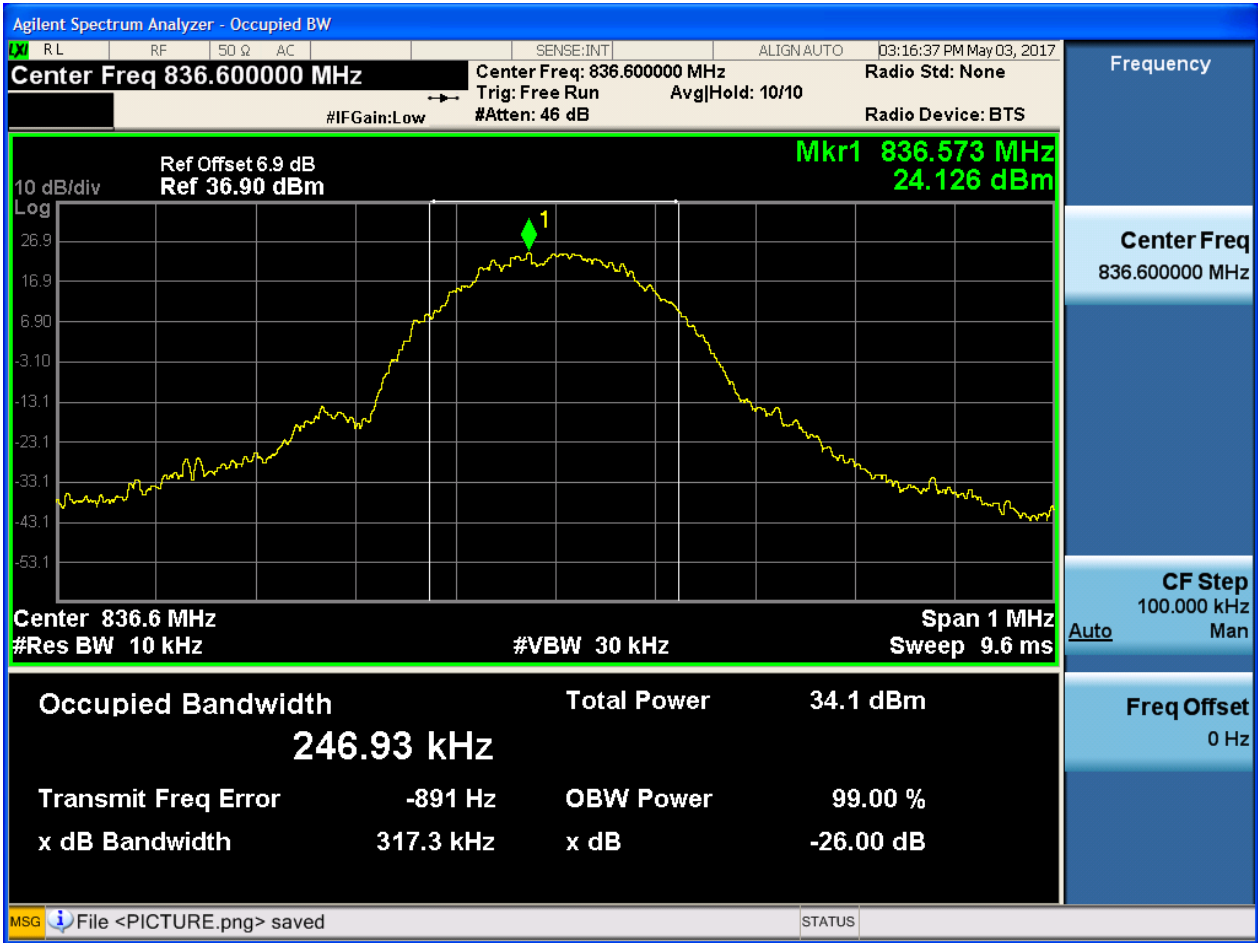
4.1.1.2 Test Mode = GSM/TM2

4.1.1.2.1 Test Channel = LCH



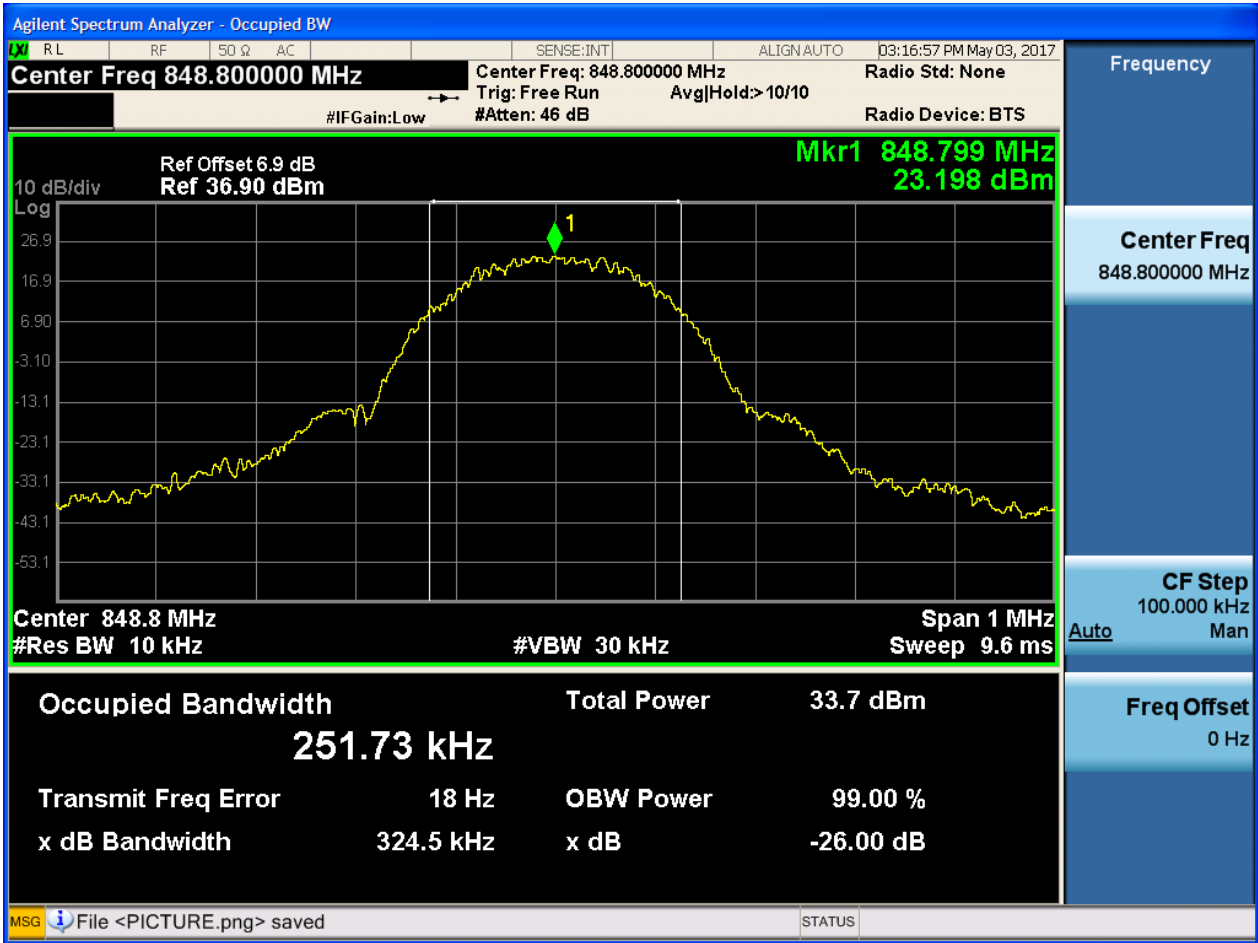


4.1.1.2.2 Test Channel = MCH





4.1.1.2.3 Test Channel = HCH

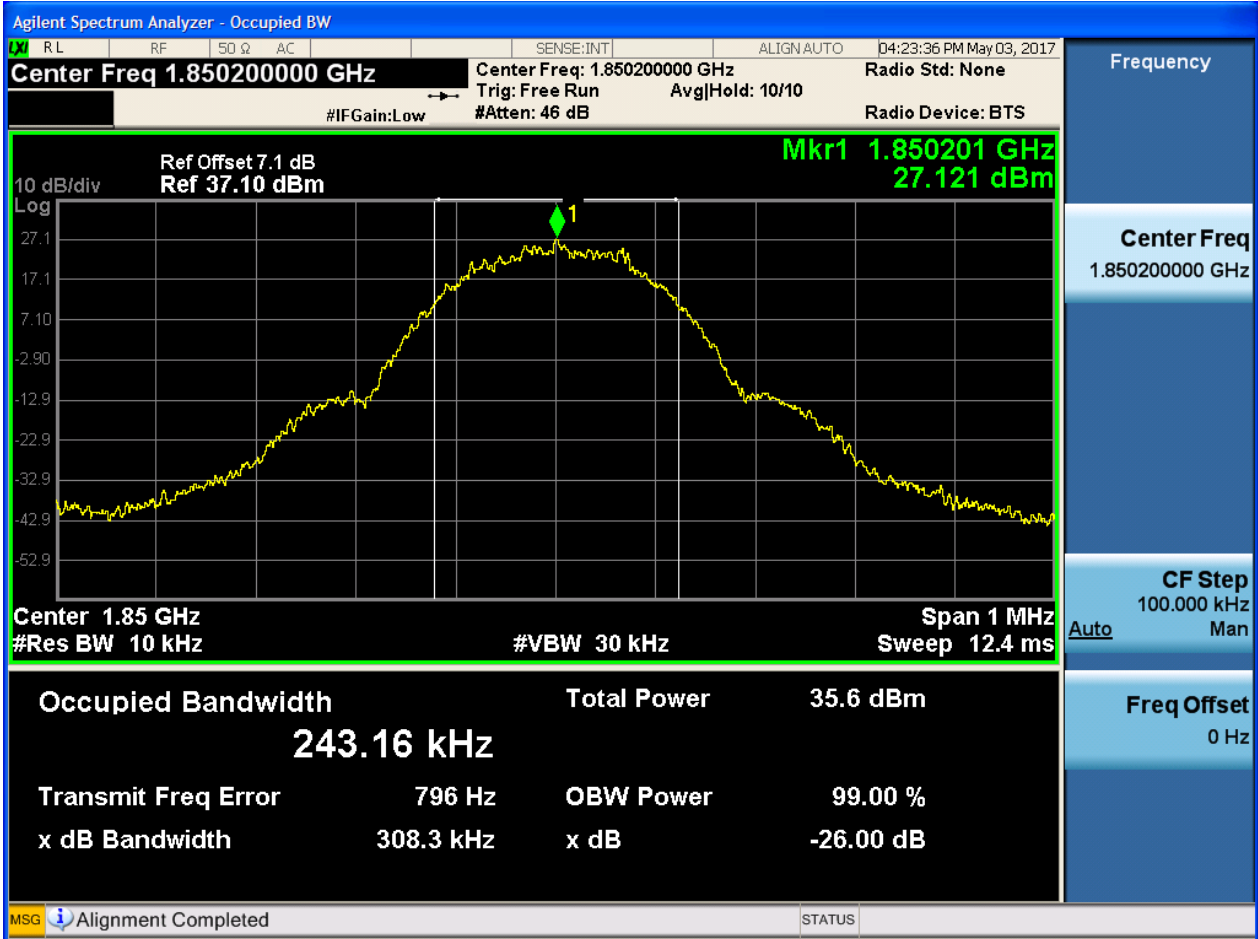




4.1.2 Test Band = GSM1900

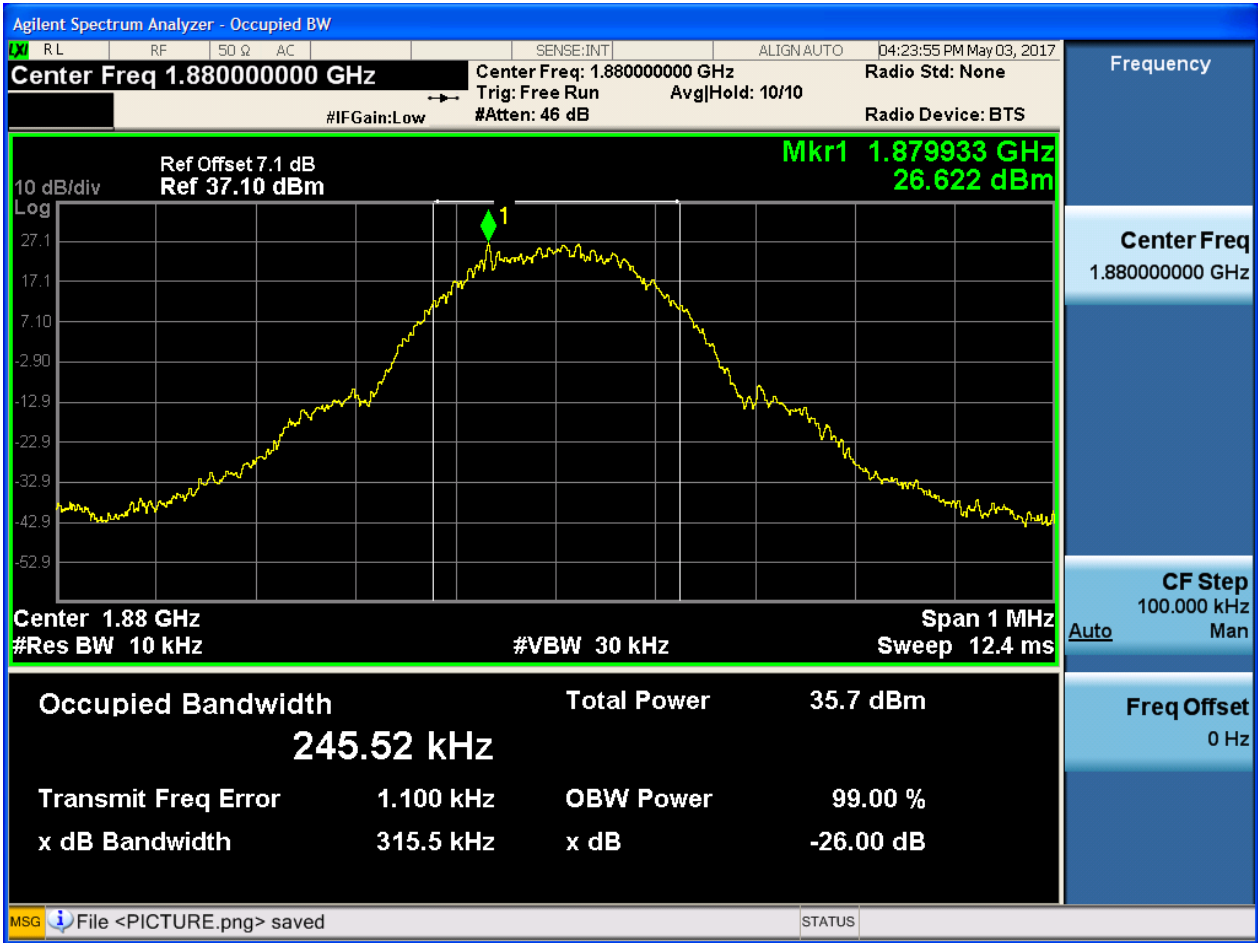
4.1.2.1 Test Mode = GSM/TM1

4.1.2.1.1 Test Channel = LCH



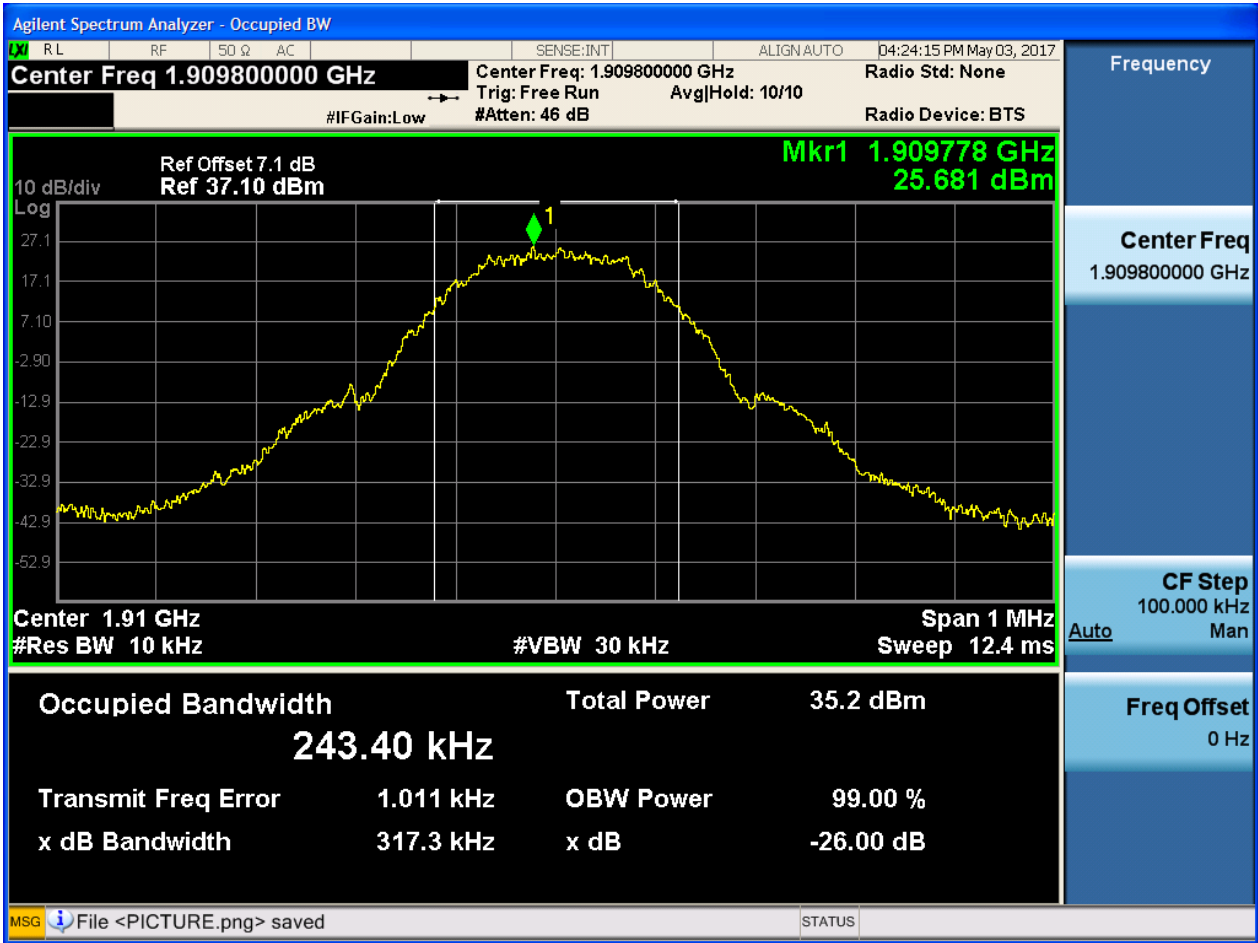


4.1.2.1.2 Test Channel = MCH





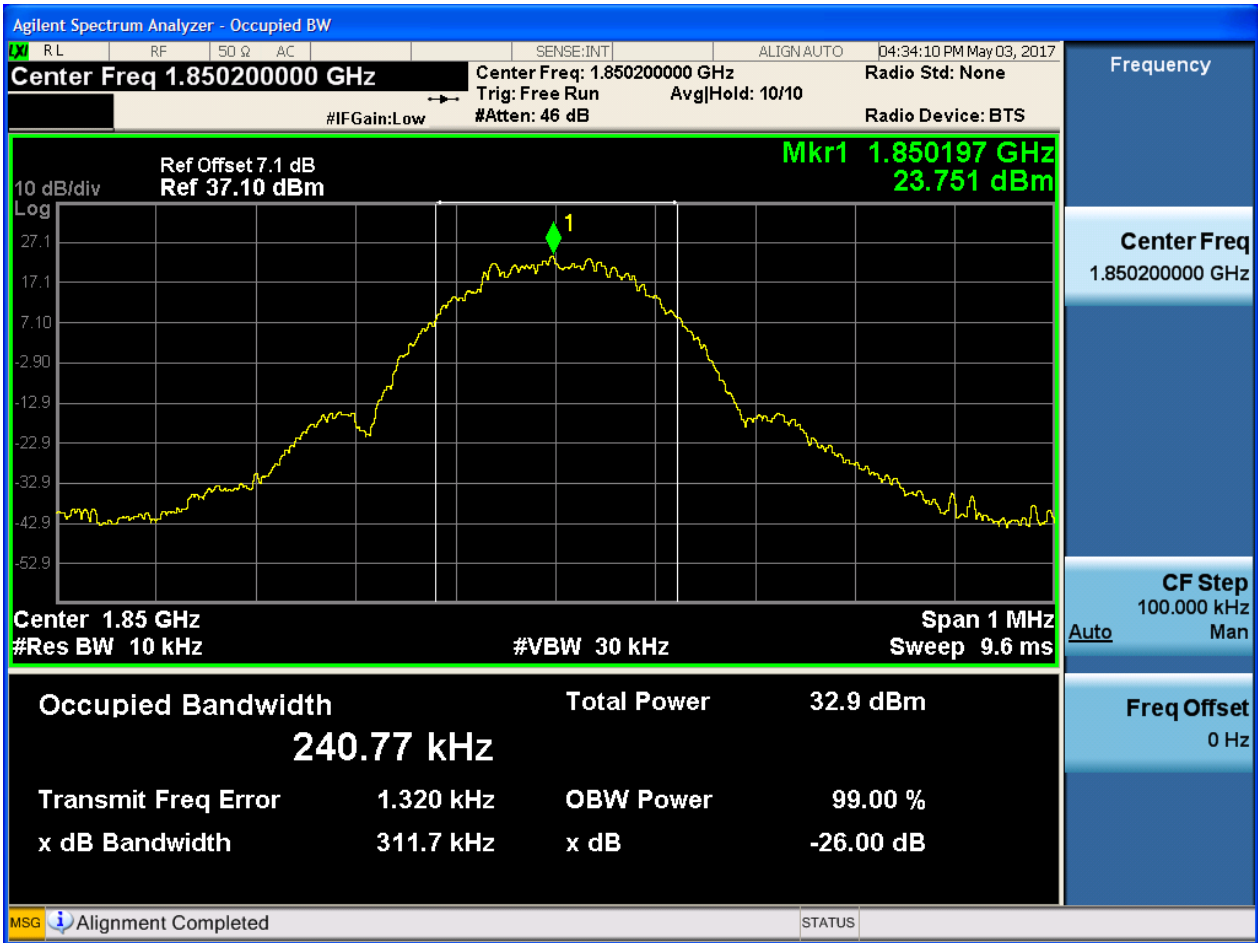
4.1.2.1.3 Test Channel = HCH





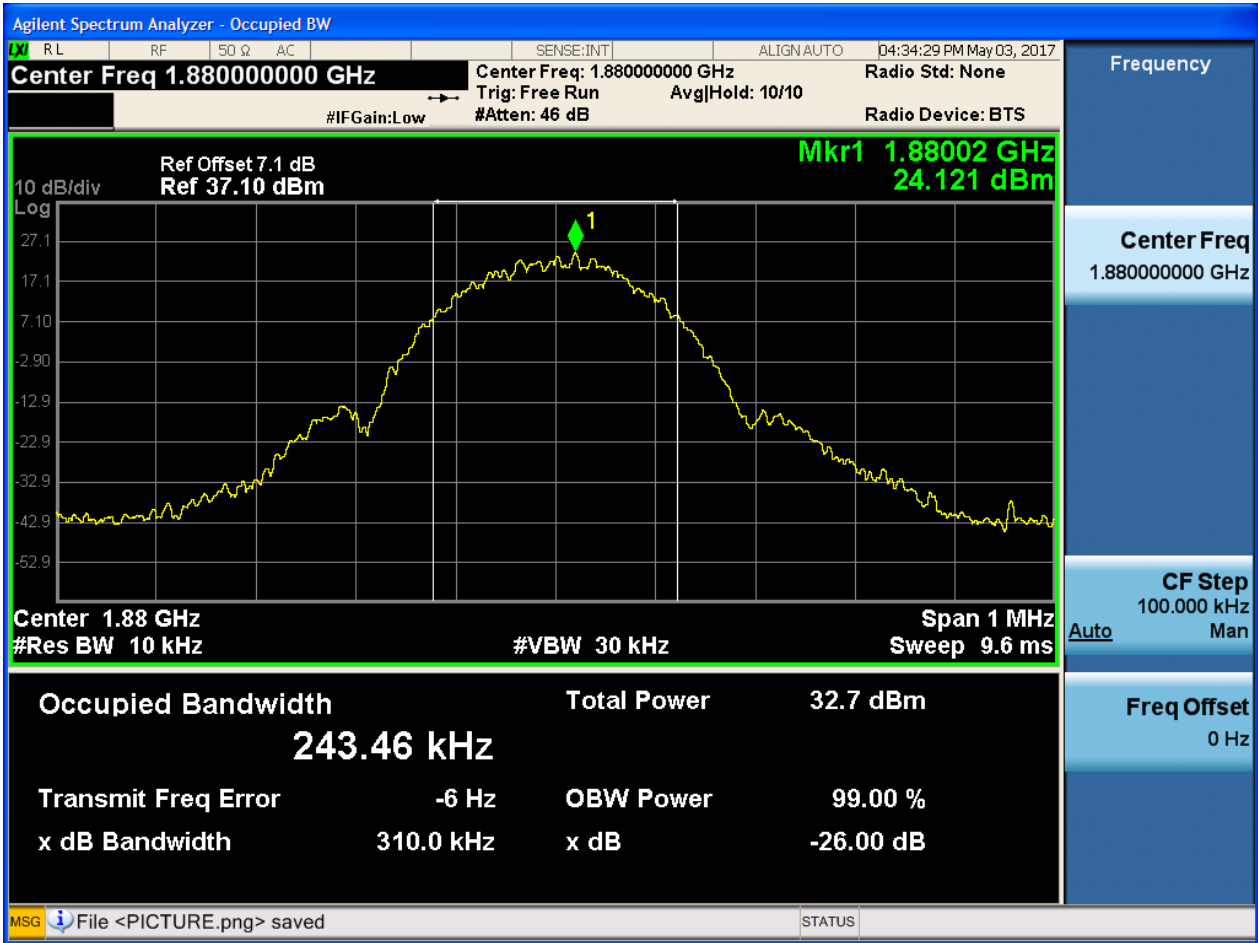
4.1.2.2 Test Mode = GSM/TM2

4.1.2.2.1 Test Channel = LCH



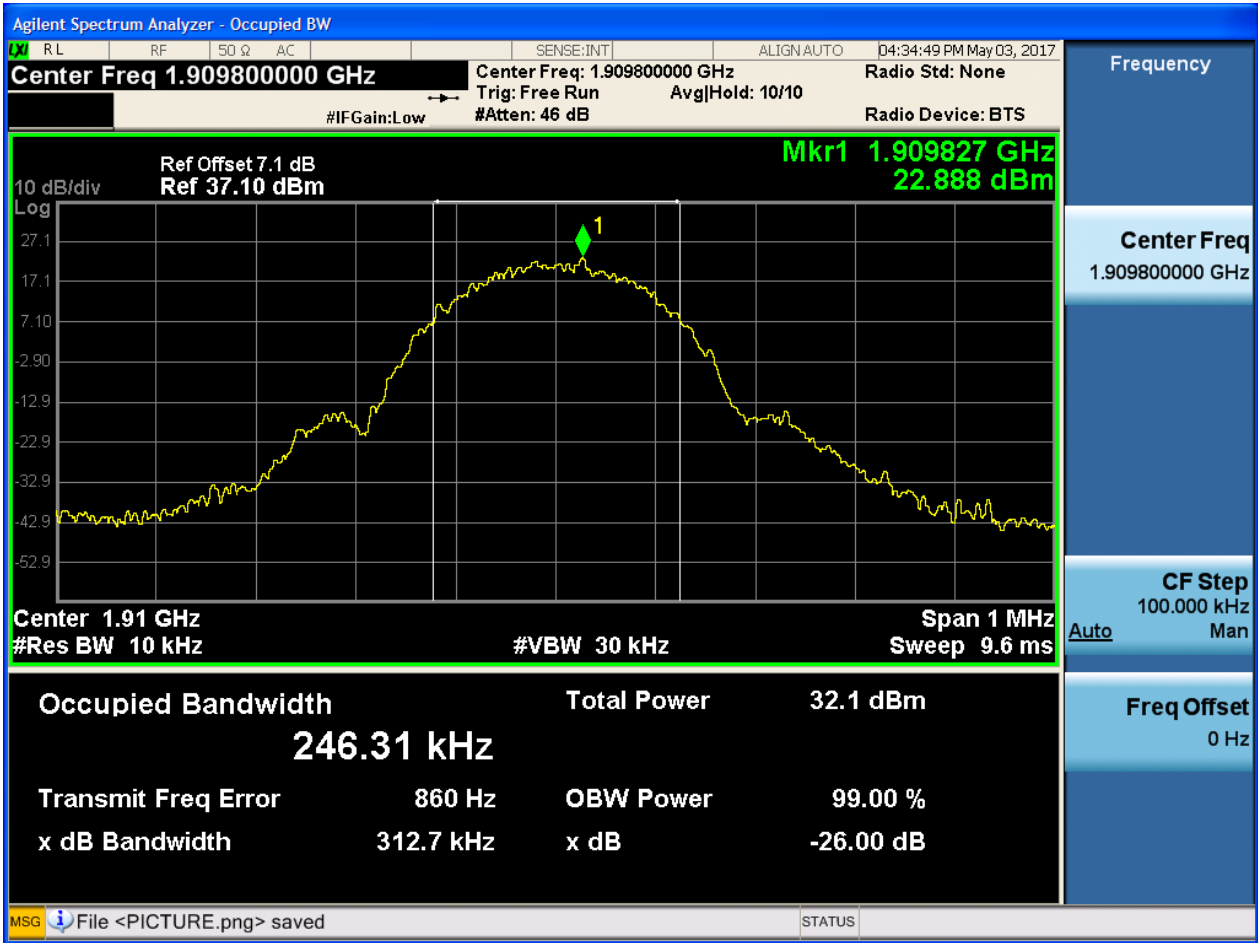


4.1.2.2.2 Test Channel = MCH





4.1.2.2.3 Test Channel = HCH





5Appendix_E: Band Edges Compliance

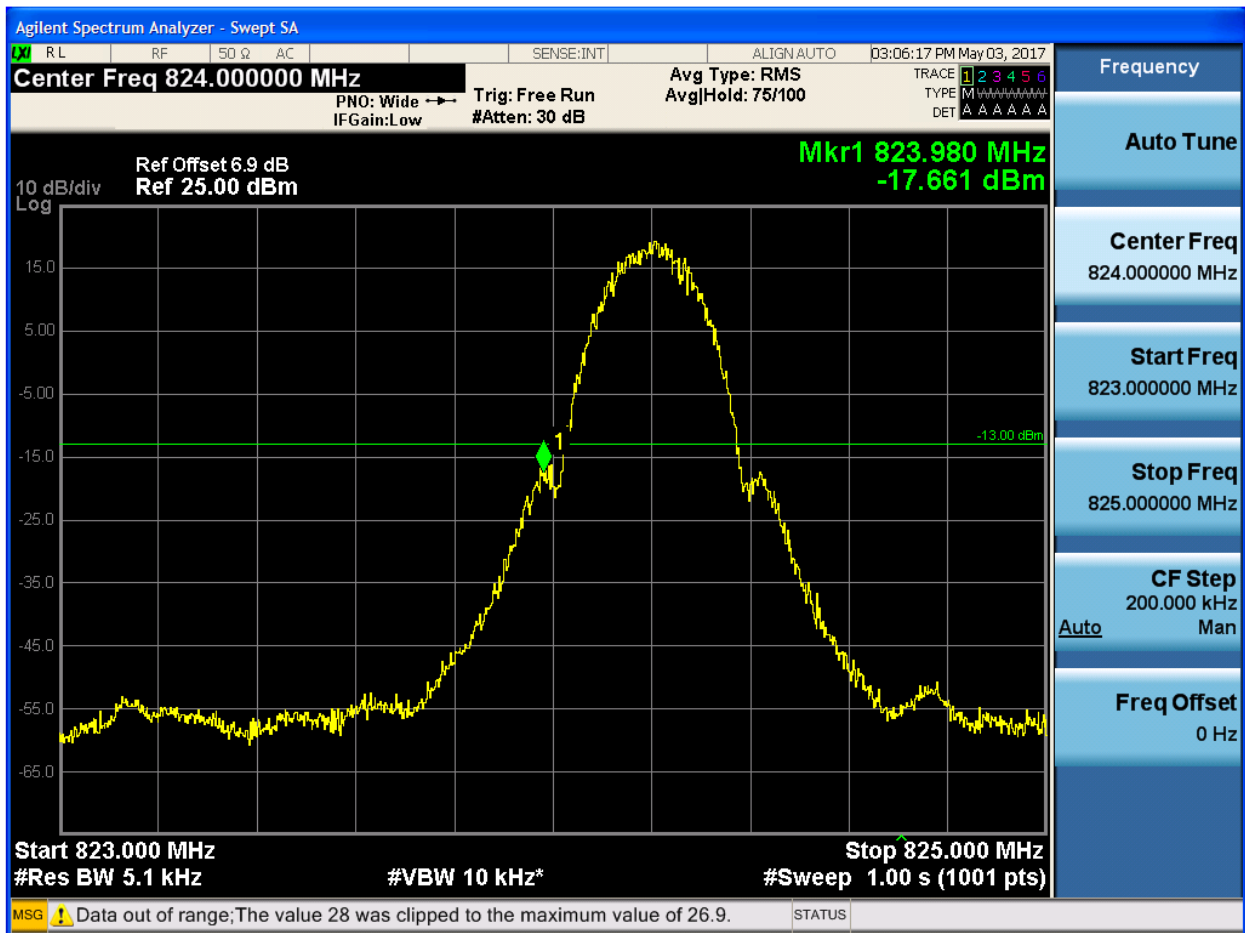
Part I - Test Plots

5.1 For GSM

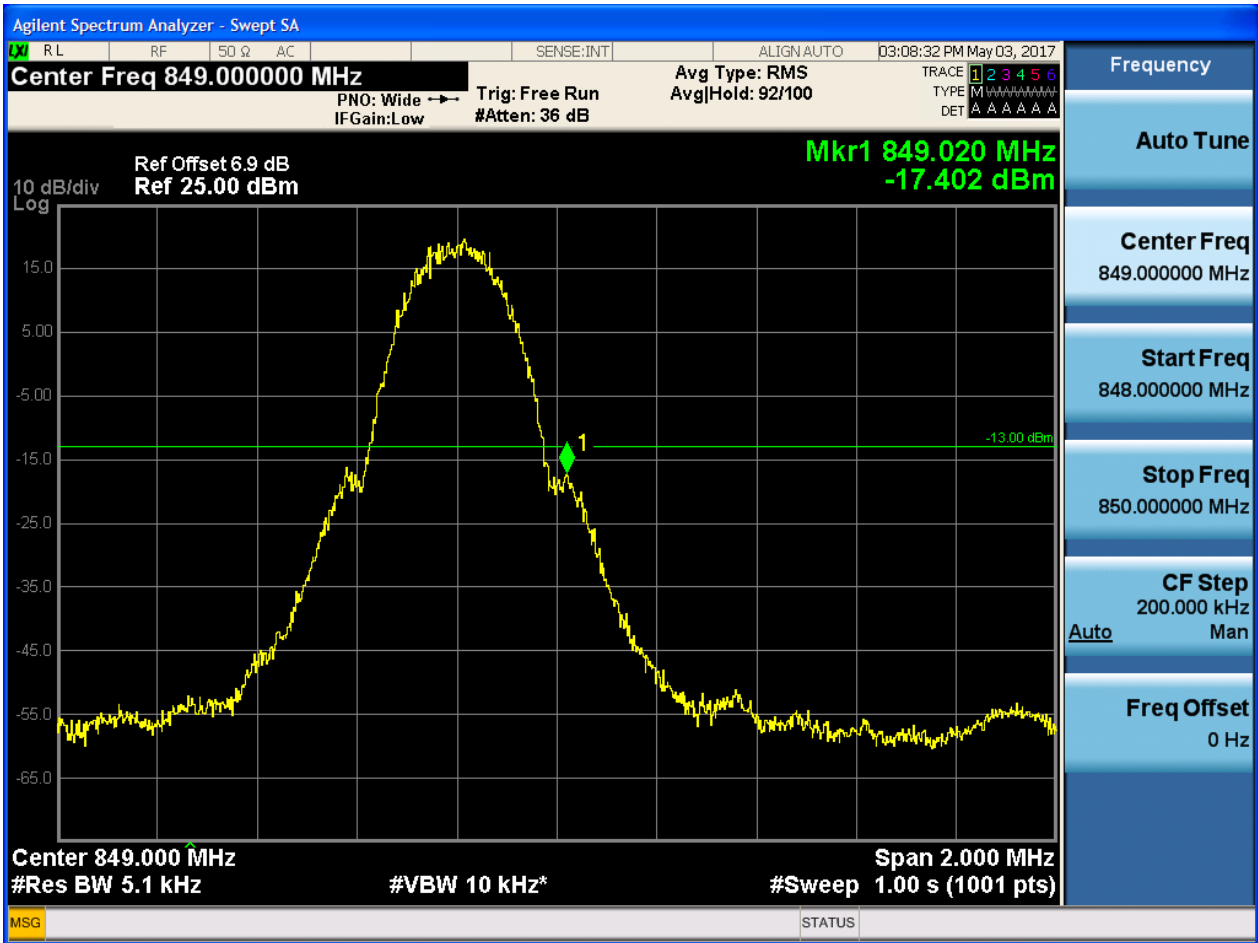
5.1.1 Test Band = GSM850

5.1.1.1 Test Mode = GSM/TM1

5.1.1.1.1 Test Channel = LCH

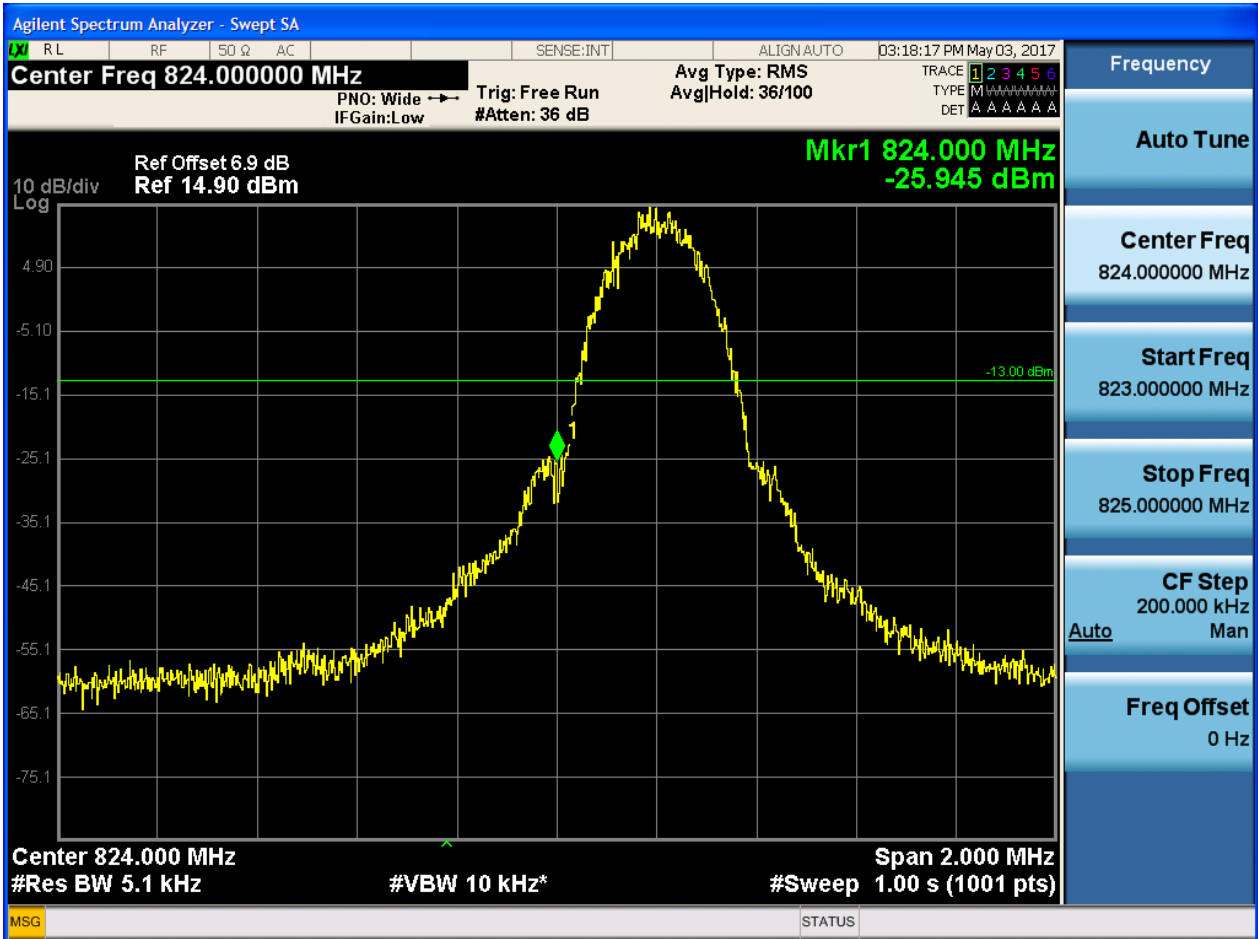


5.1.1.1.2 Test Channel = HCH

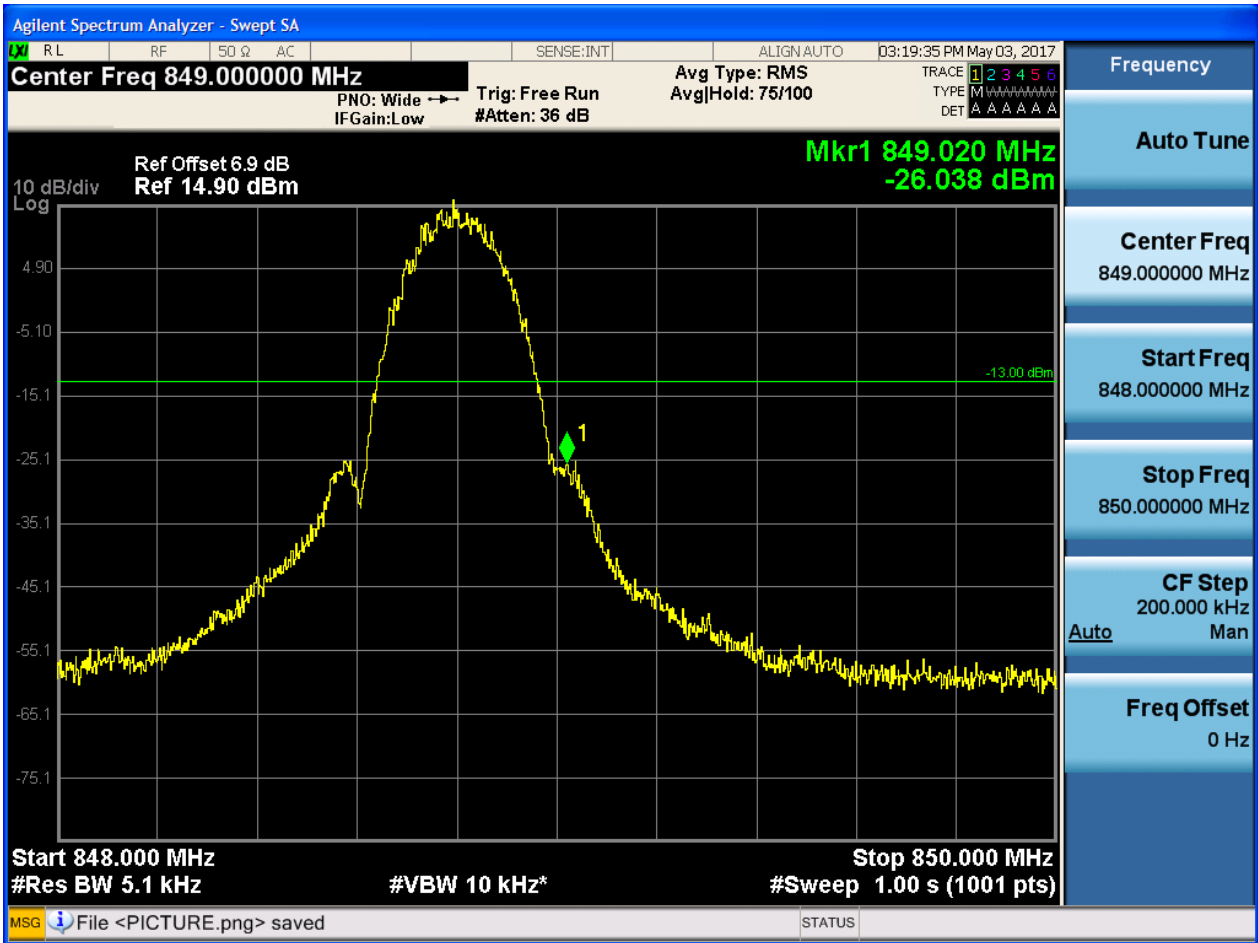


5.1.1.2 Test Mode = GSM/TM2

5.1.1.2.1 Test Channel = LCH



5.1.1.2.2 Test Channel = HCH

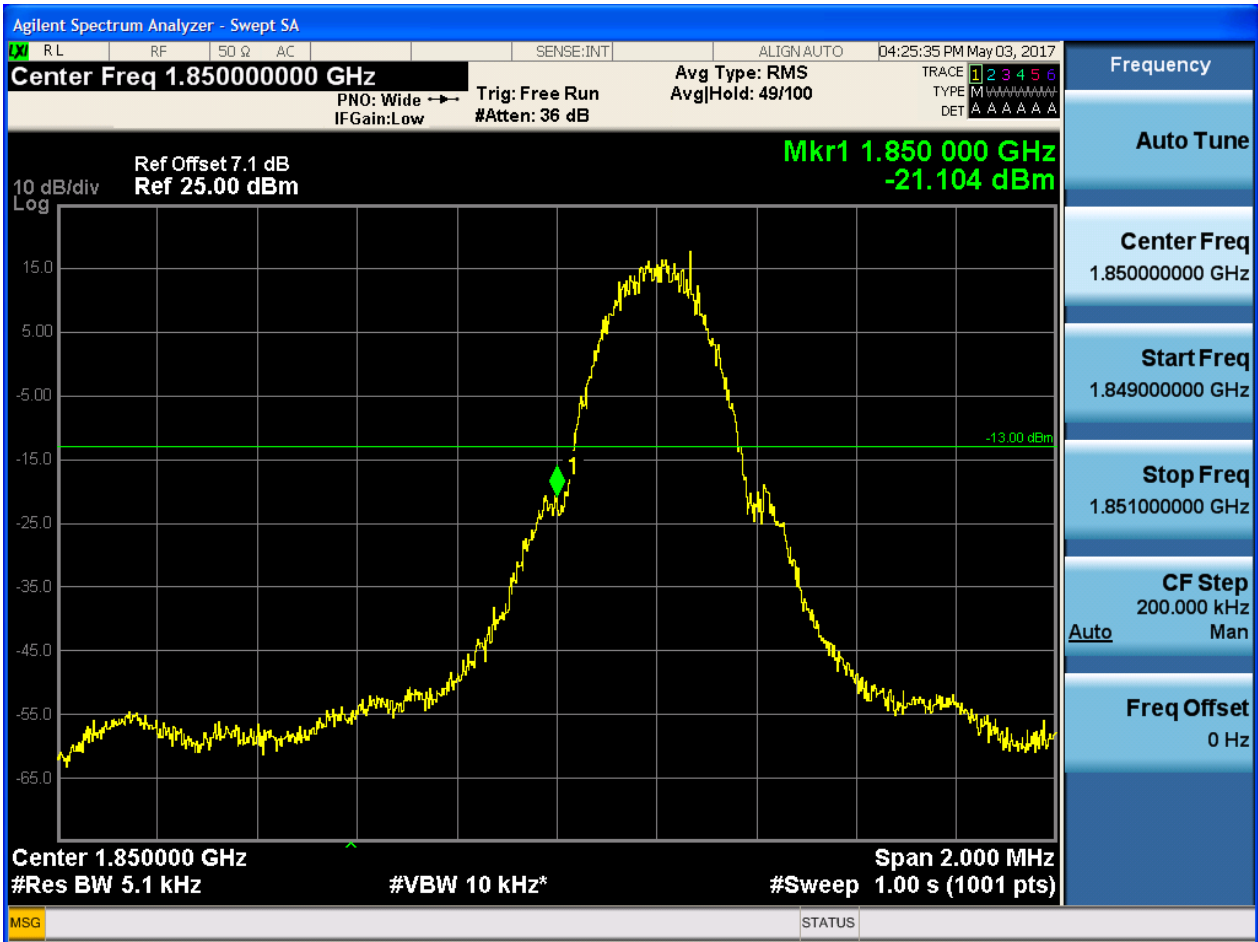




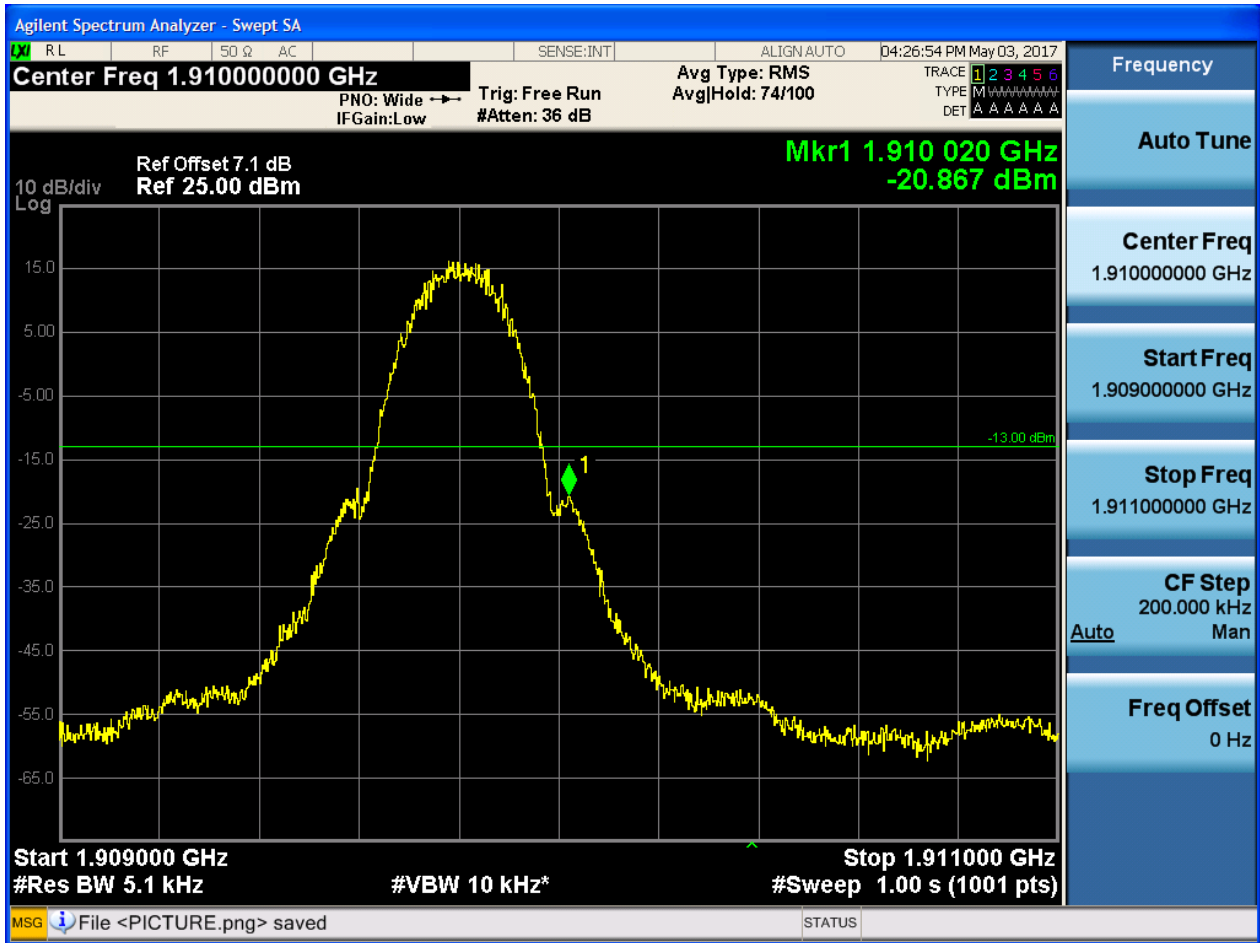
5.1.2 Test Band = GSM1900

5.1.2.1 Test Mode = GSM/TM1

5.1.2.1.1 Test Channel = LCH

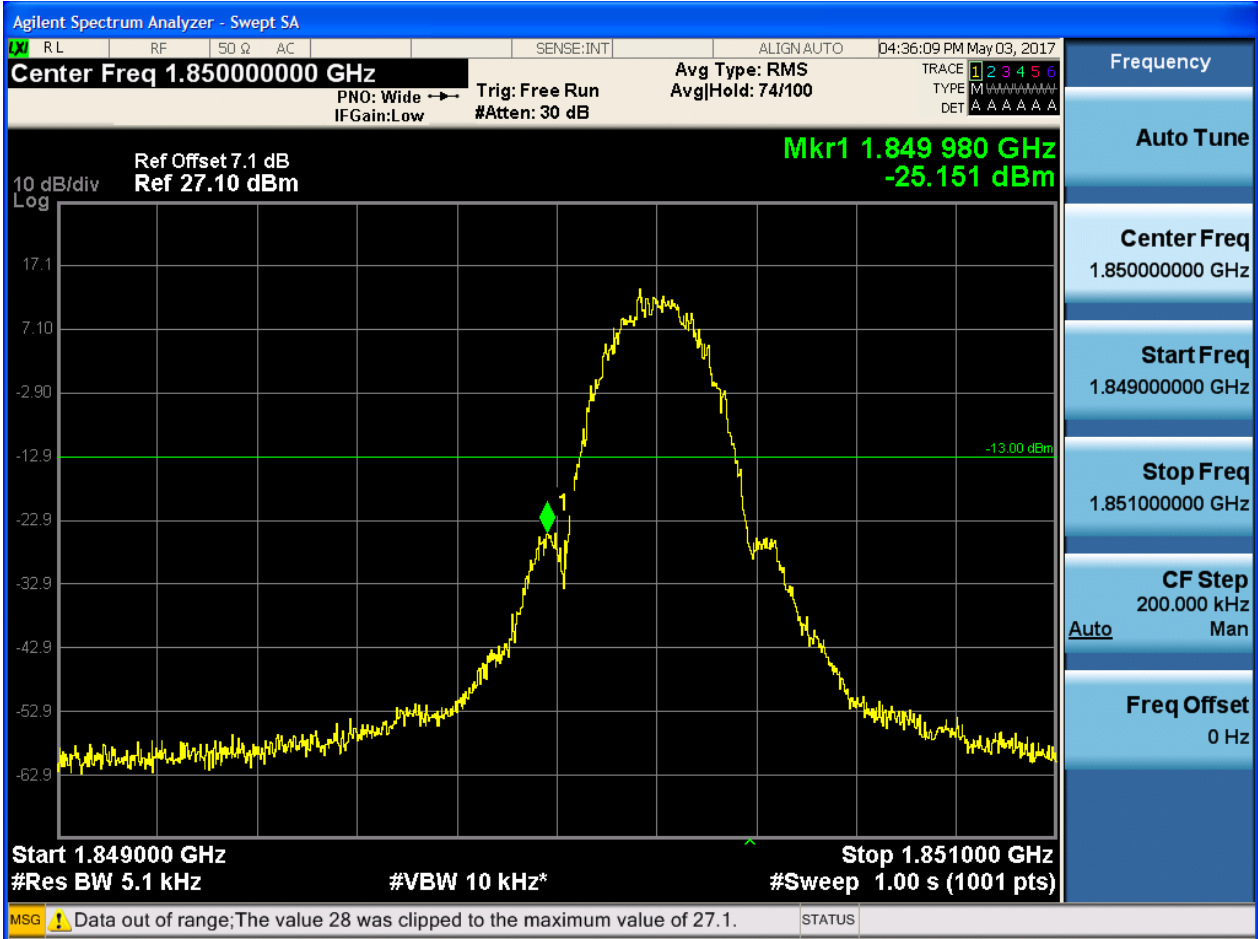


5.1.2.1.2 Test Channel = HCH

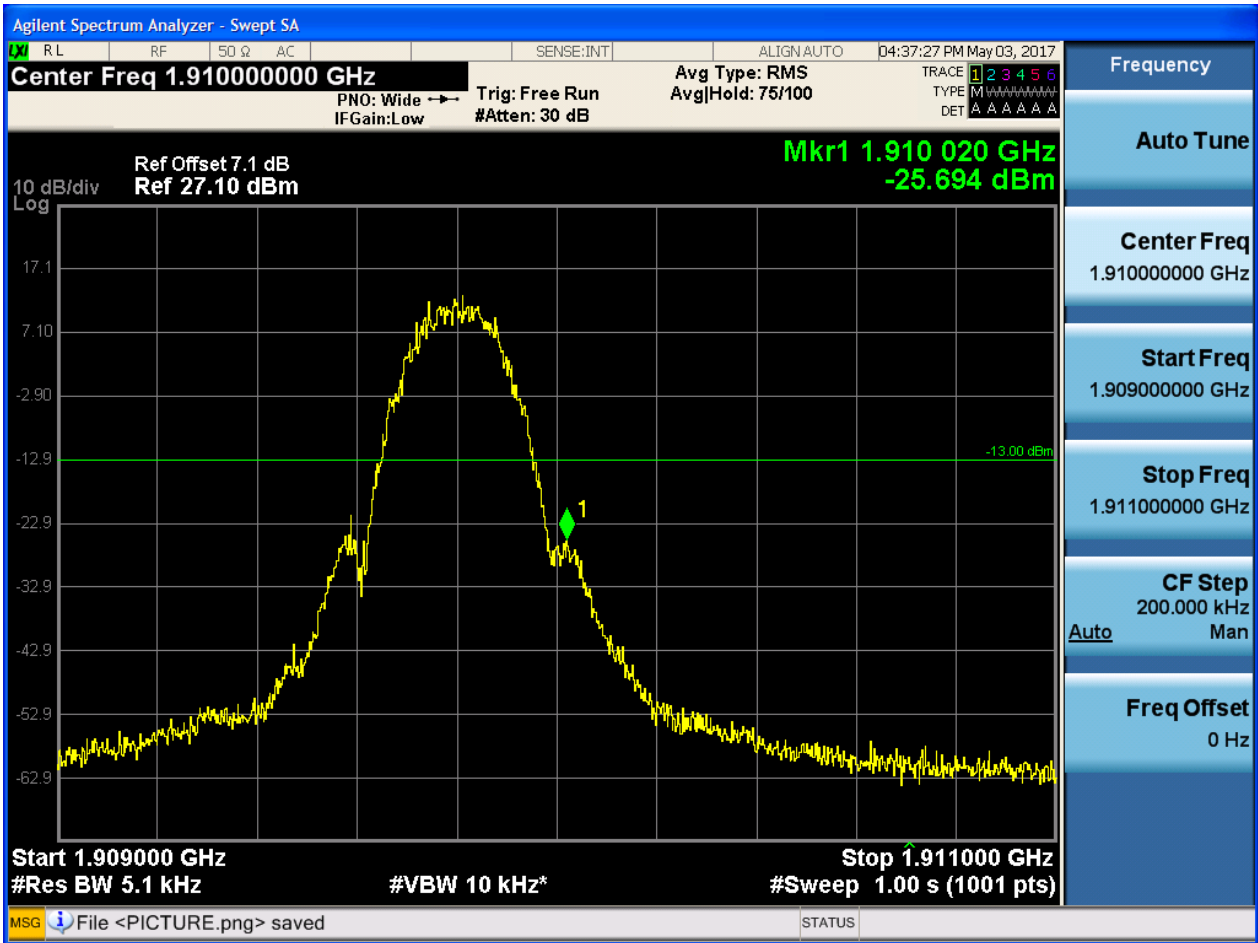


5.1.2.2 Test Mode = GSM/TM2

5.1.2.2.1 Test Channel = LCH



5.1.2.2.2 Test Channel = HCH





6 Appendix_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.

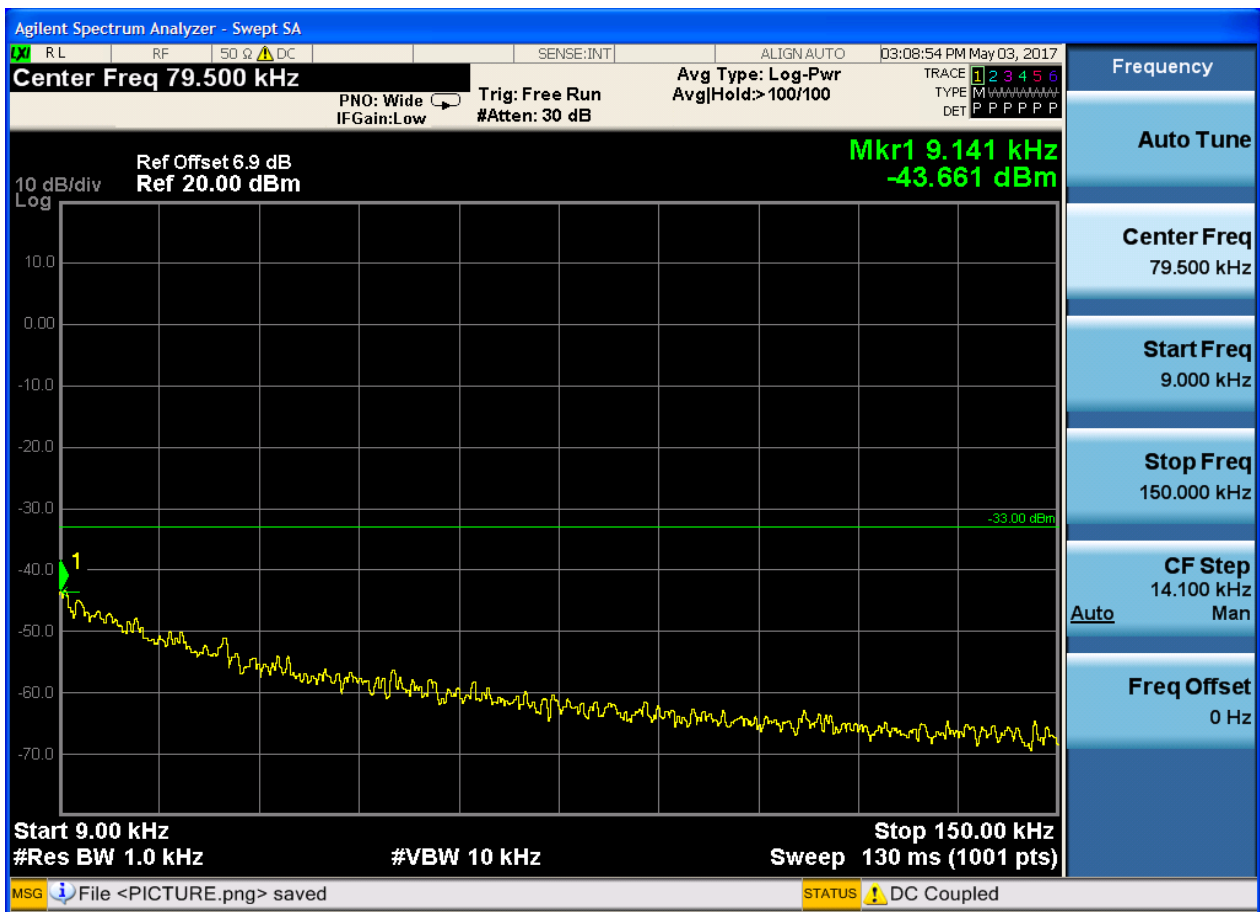
Part I - Test Plots

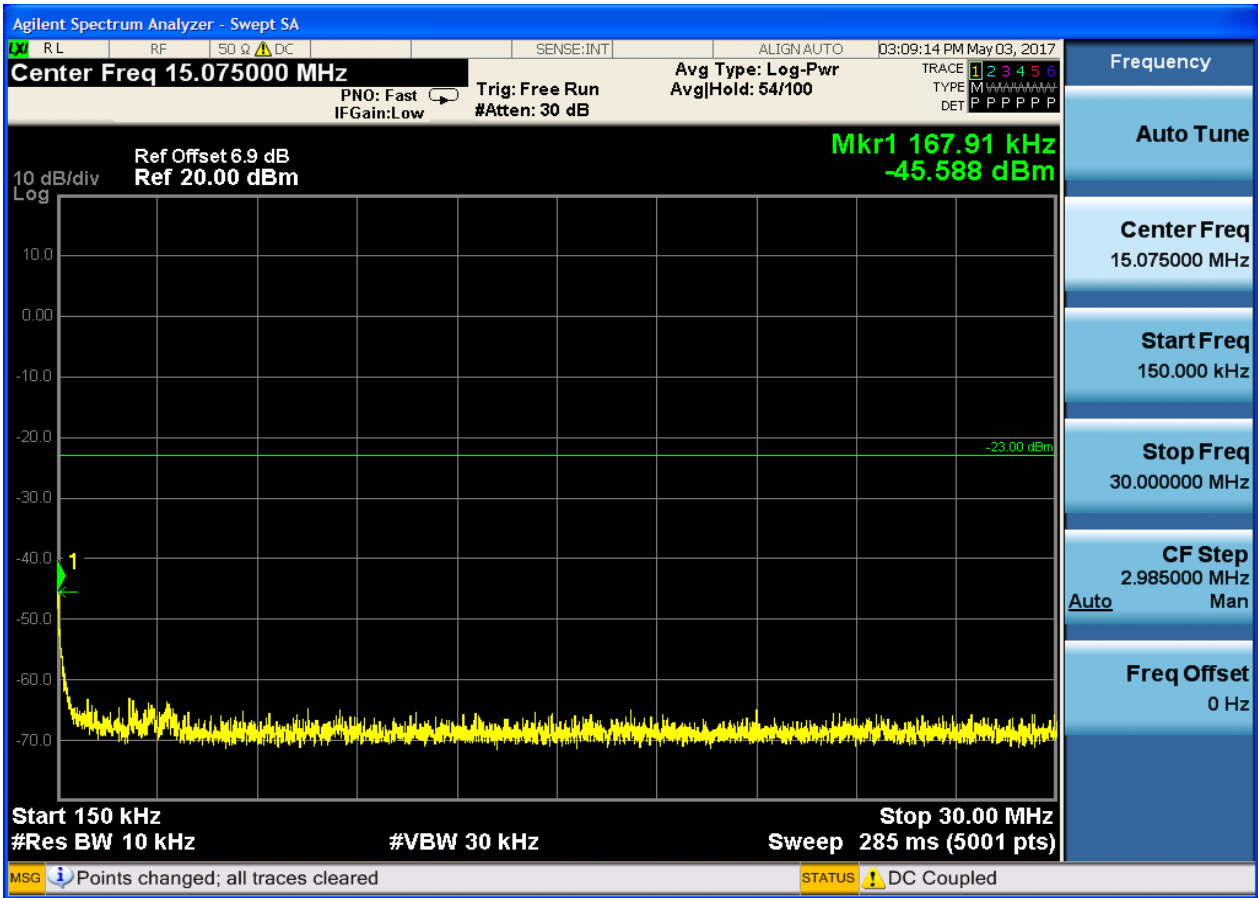
6.1 For GSM

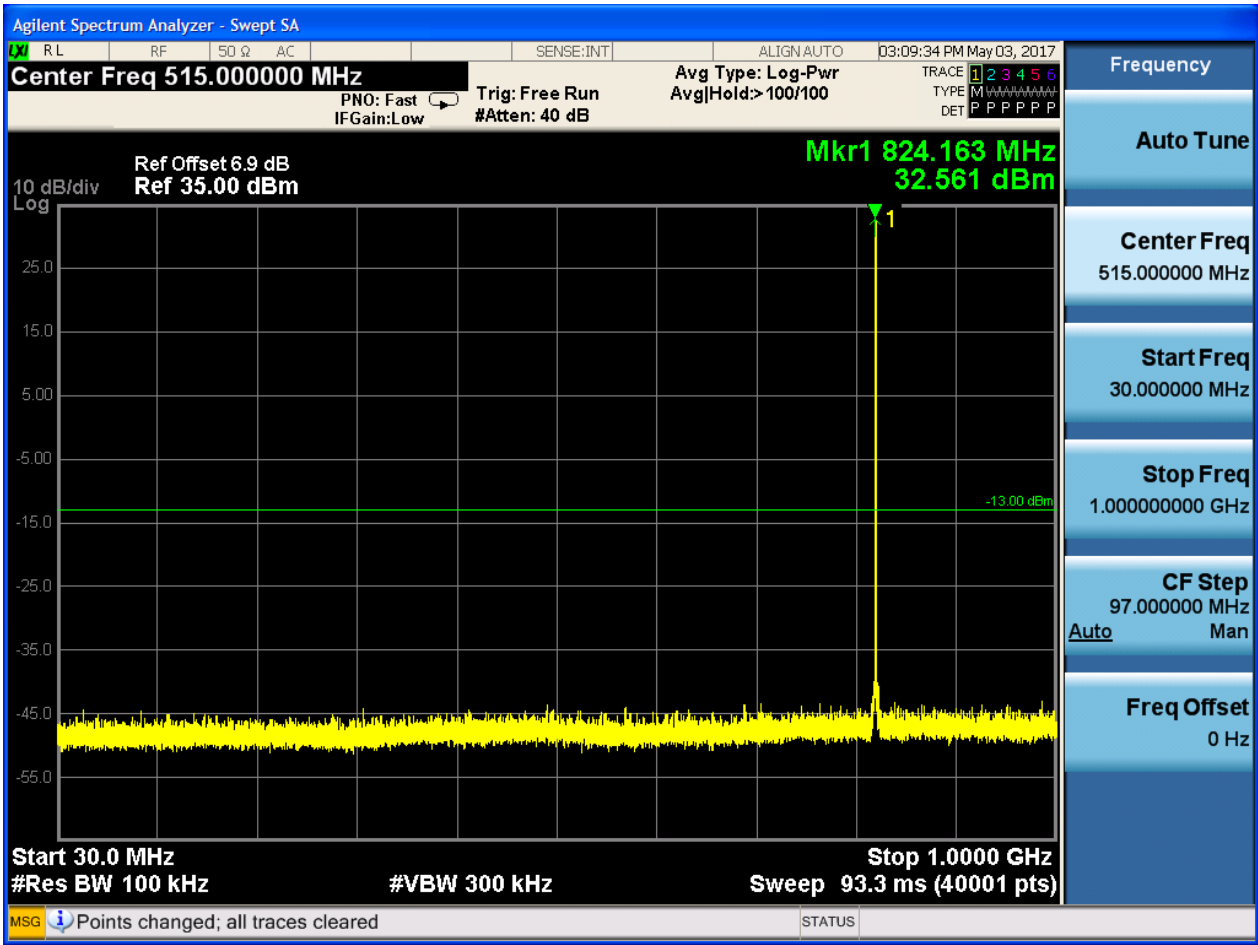
6.1.1 Test Band = GSM850

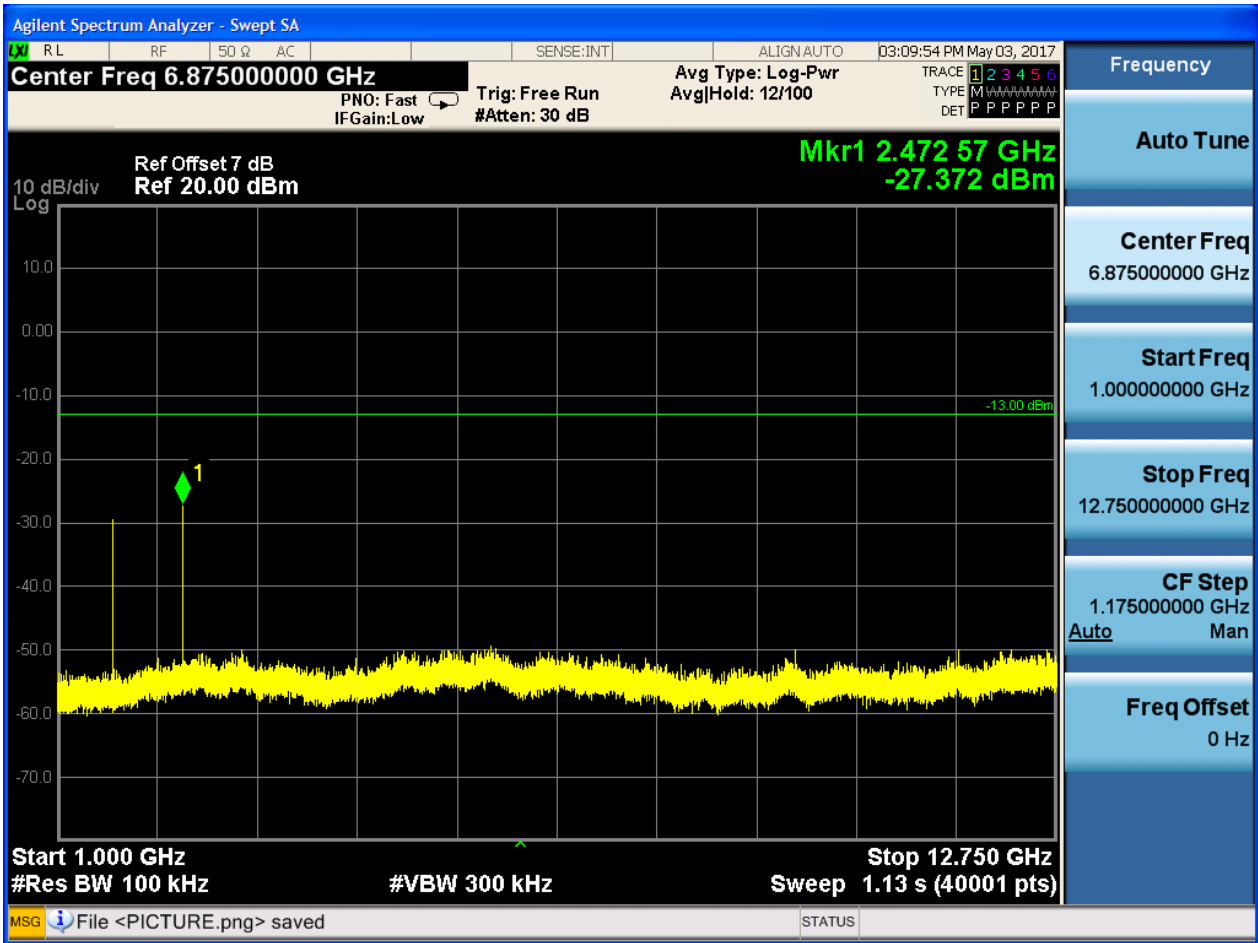
6.1.1.1 Test Mode = GSM/TM1

6.1.1.1.1 Test Channel = LCH

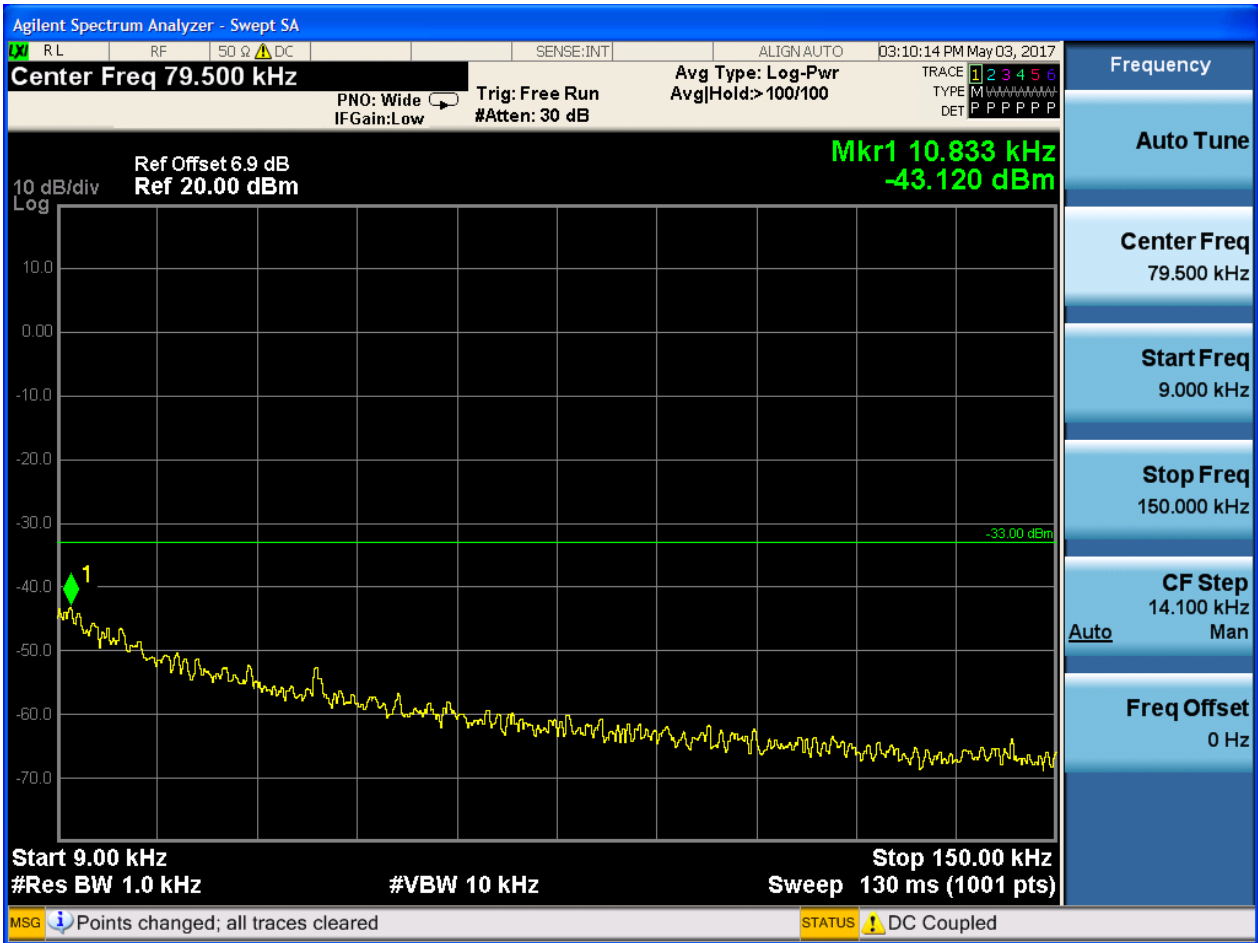


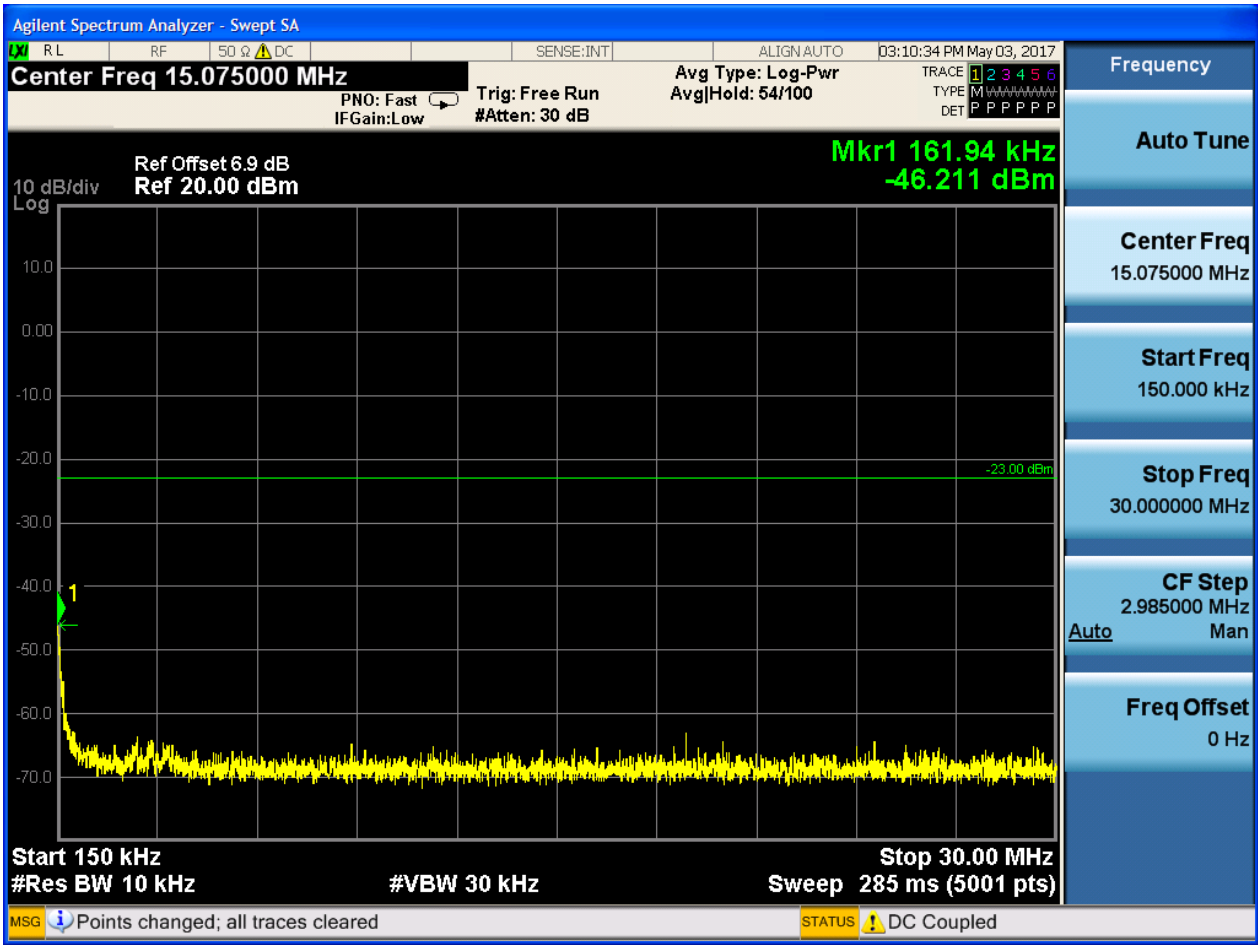


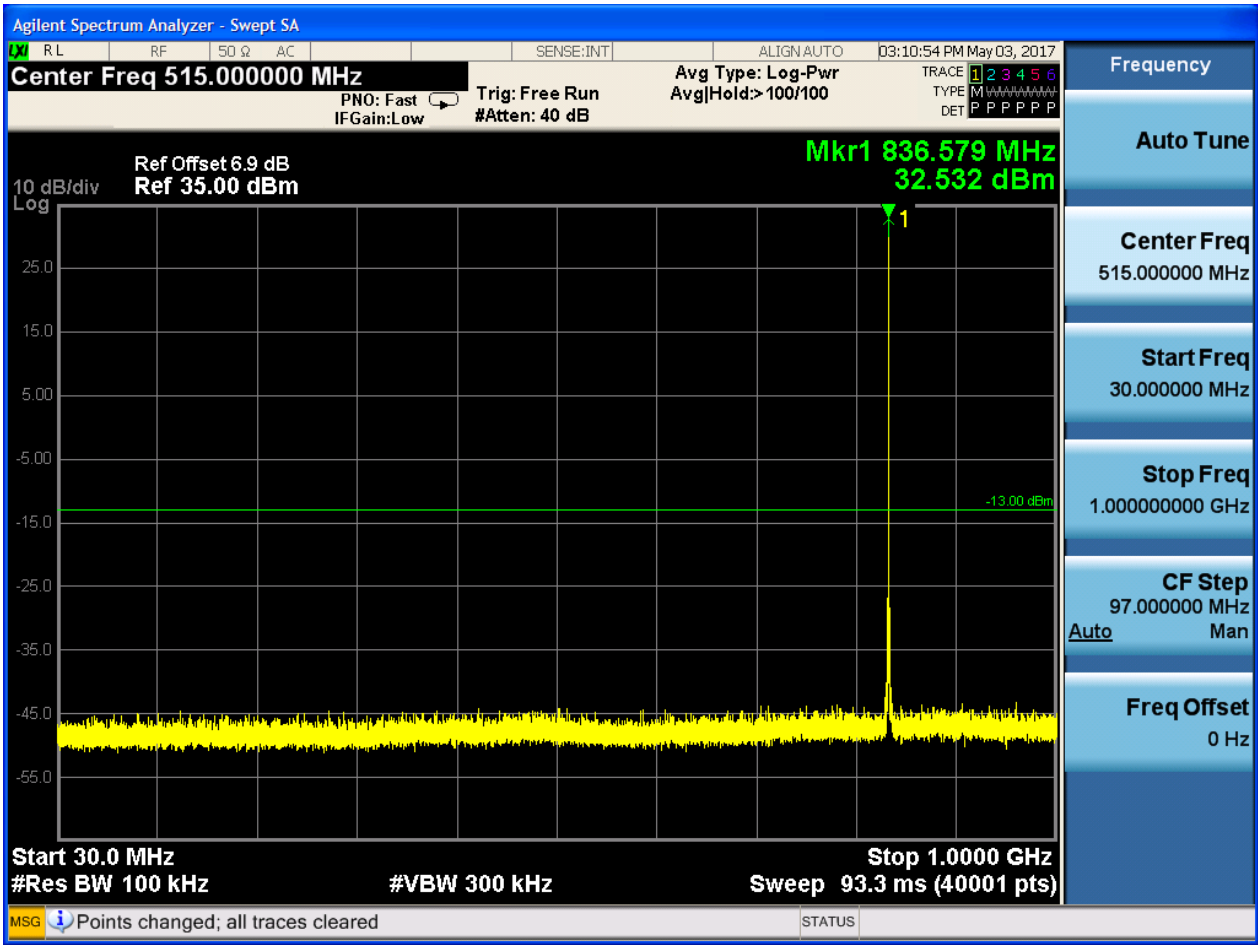


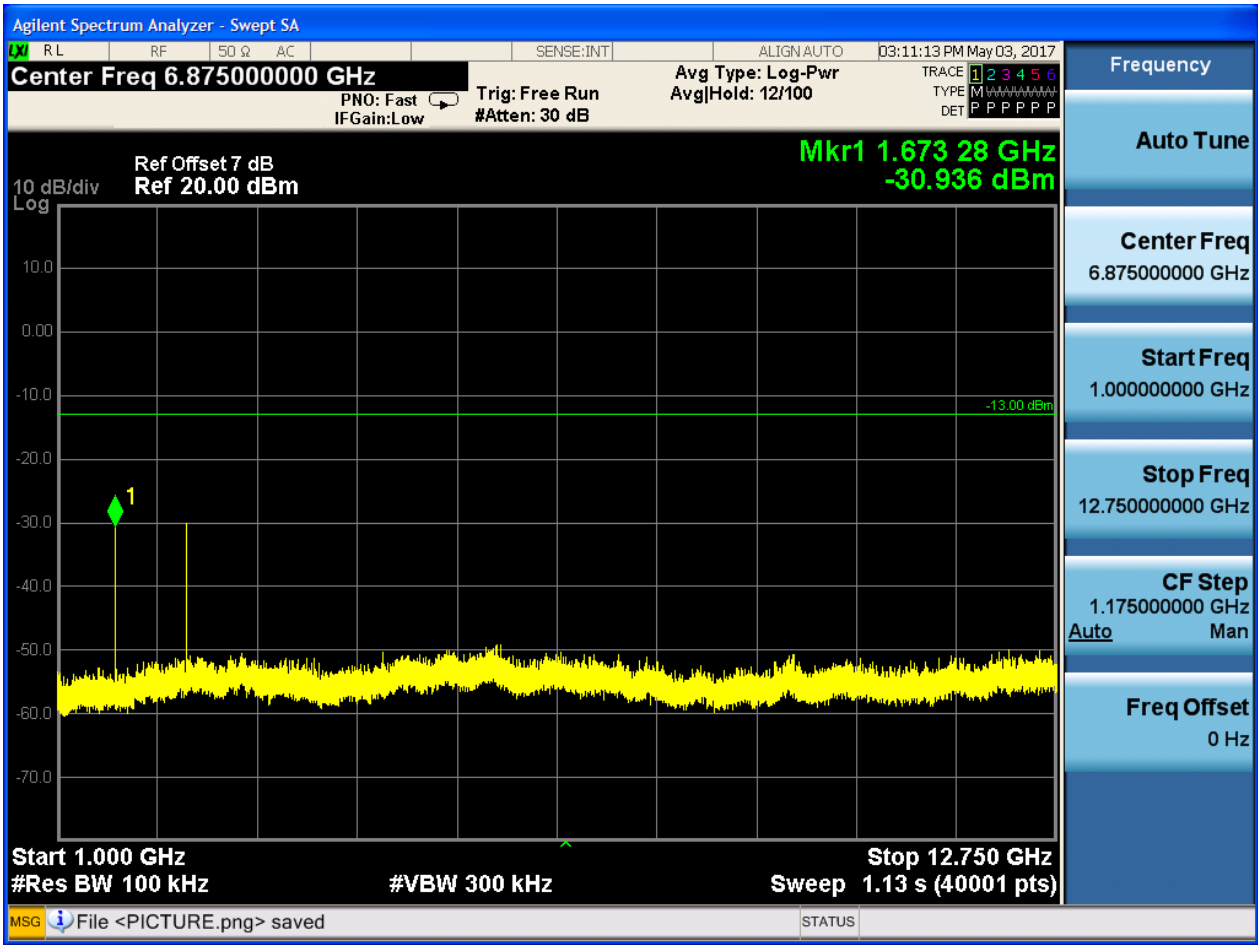


6.1.1.1.2 Test Channel = MCH

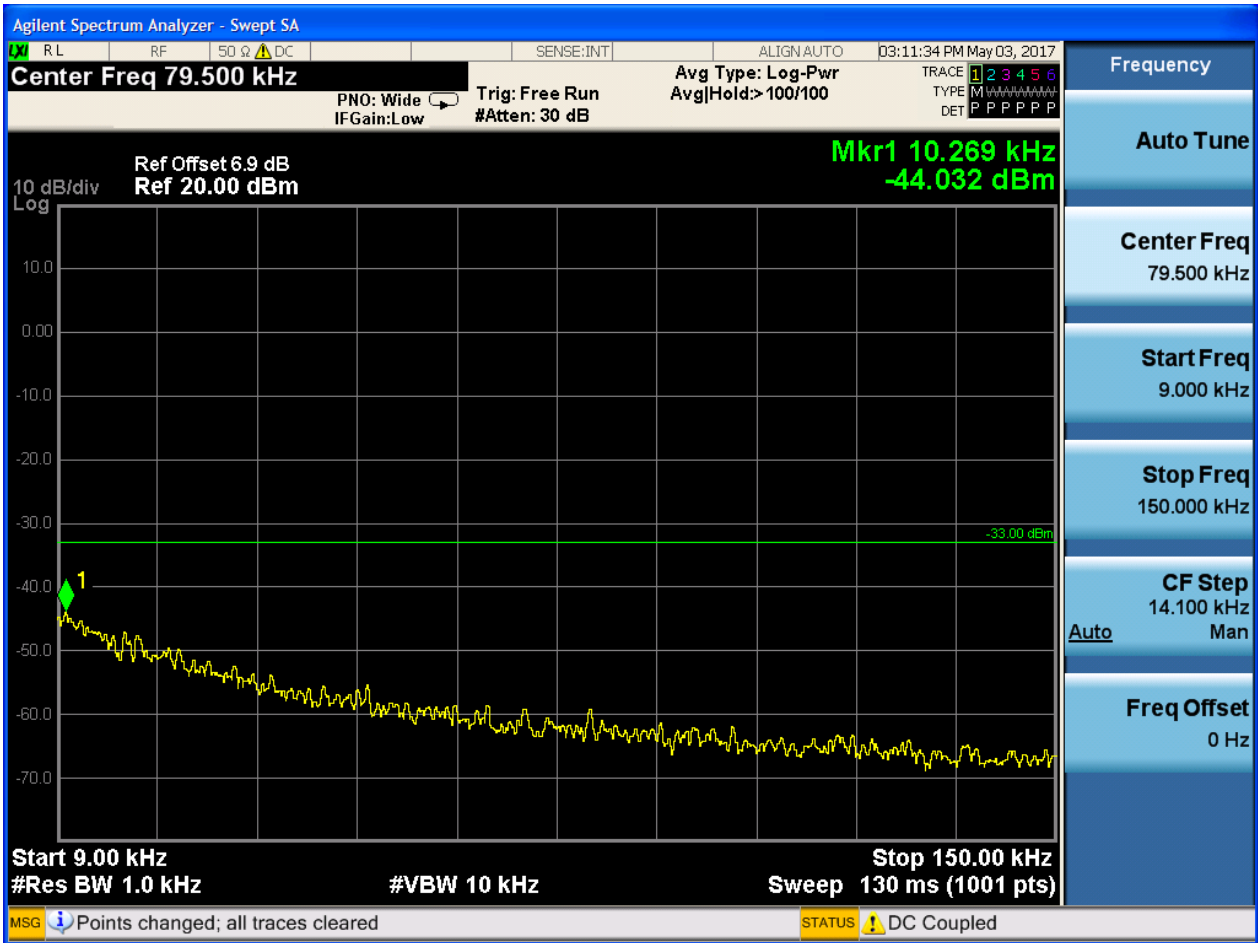


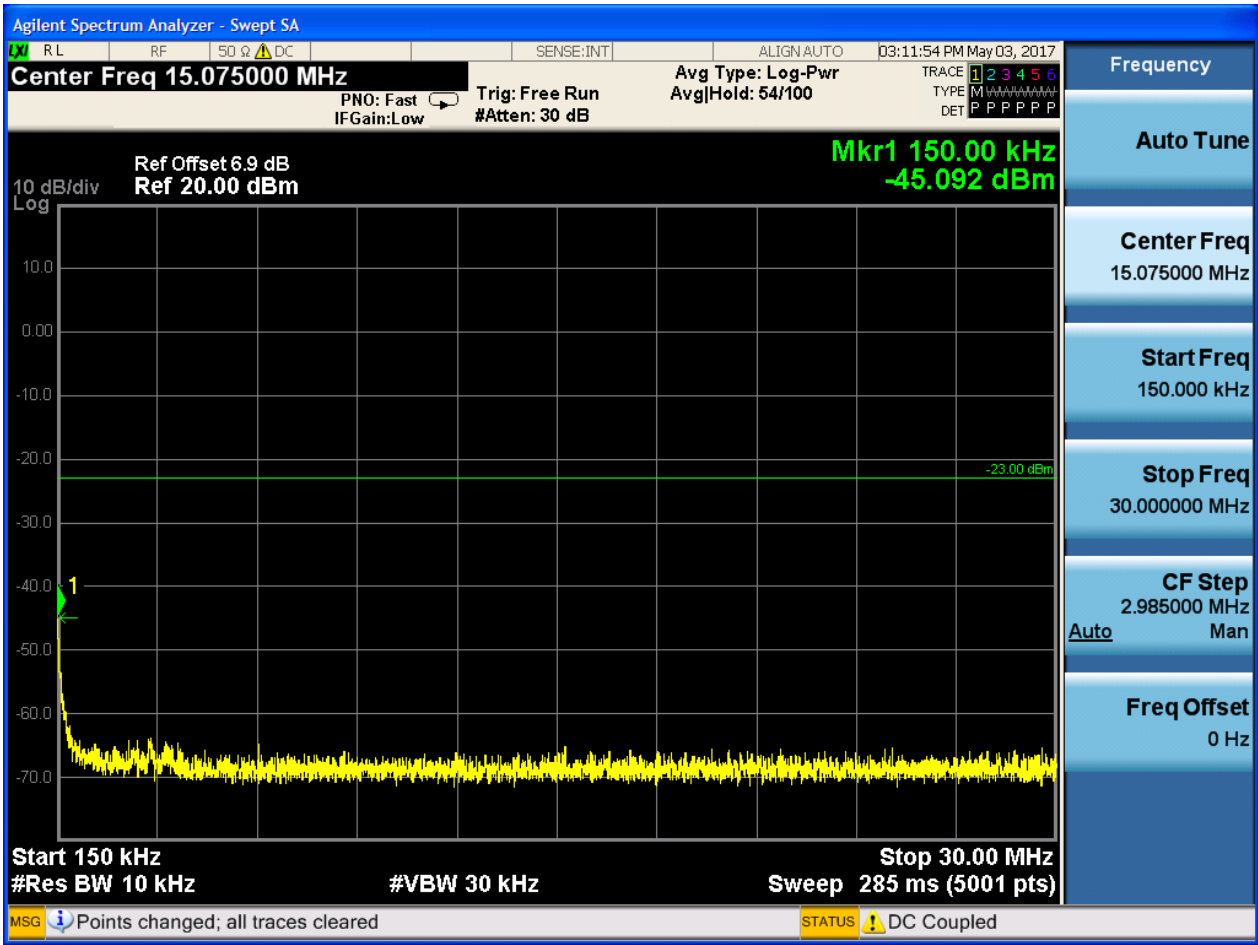


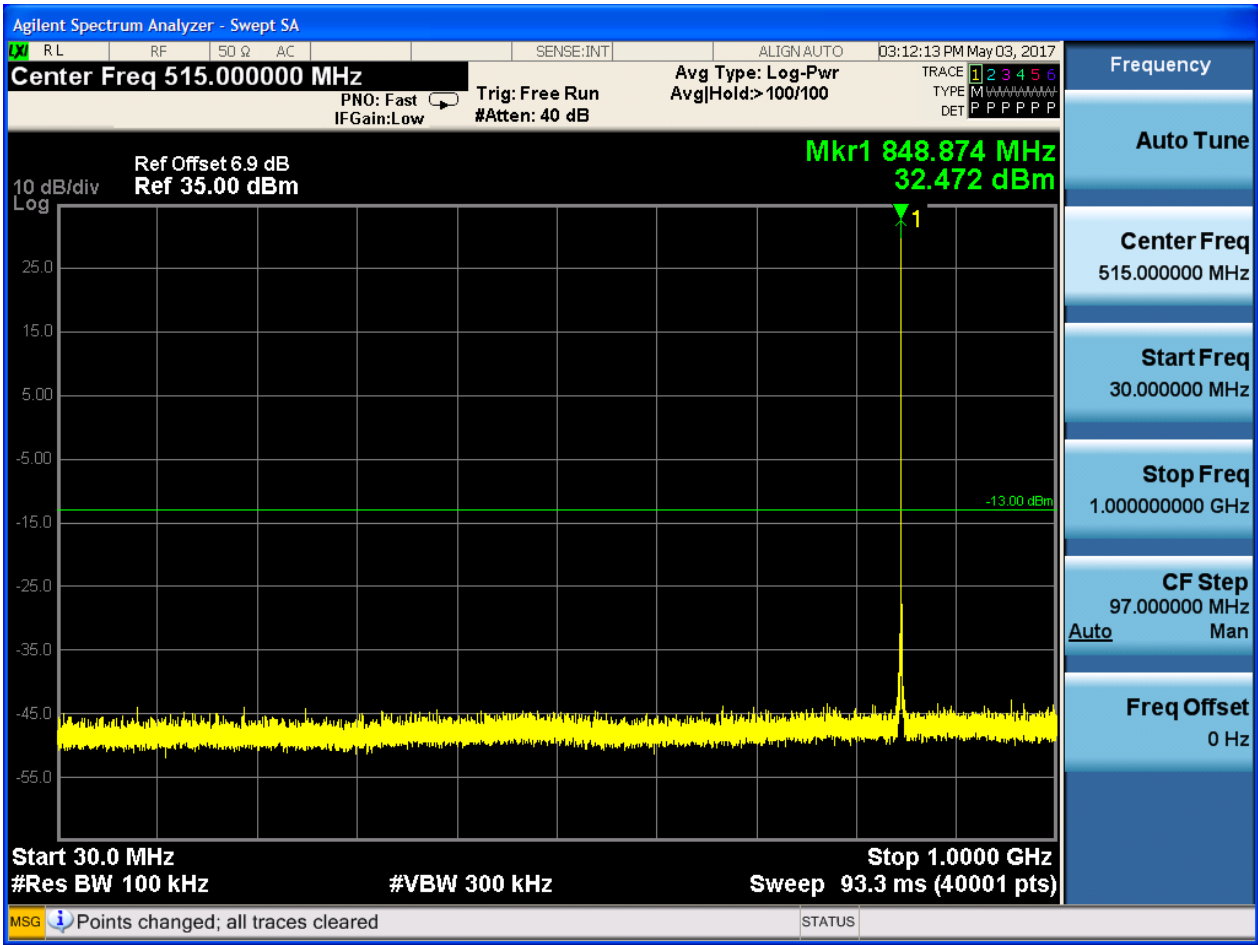


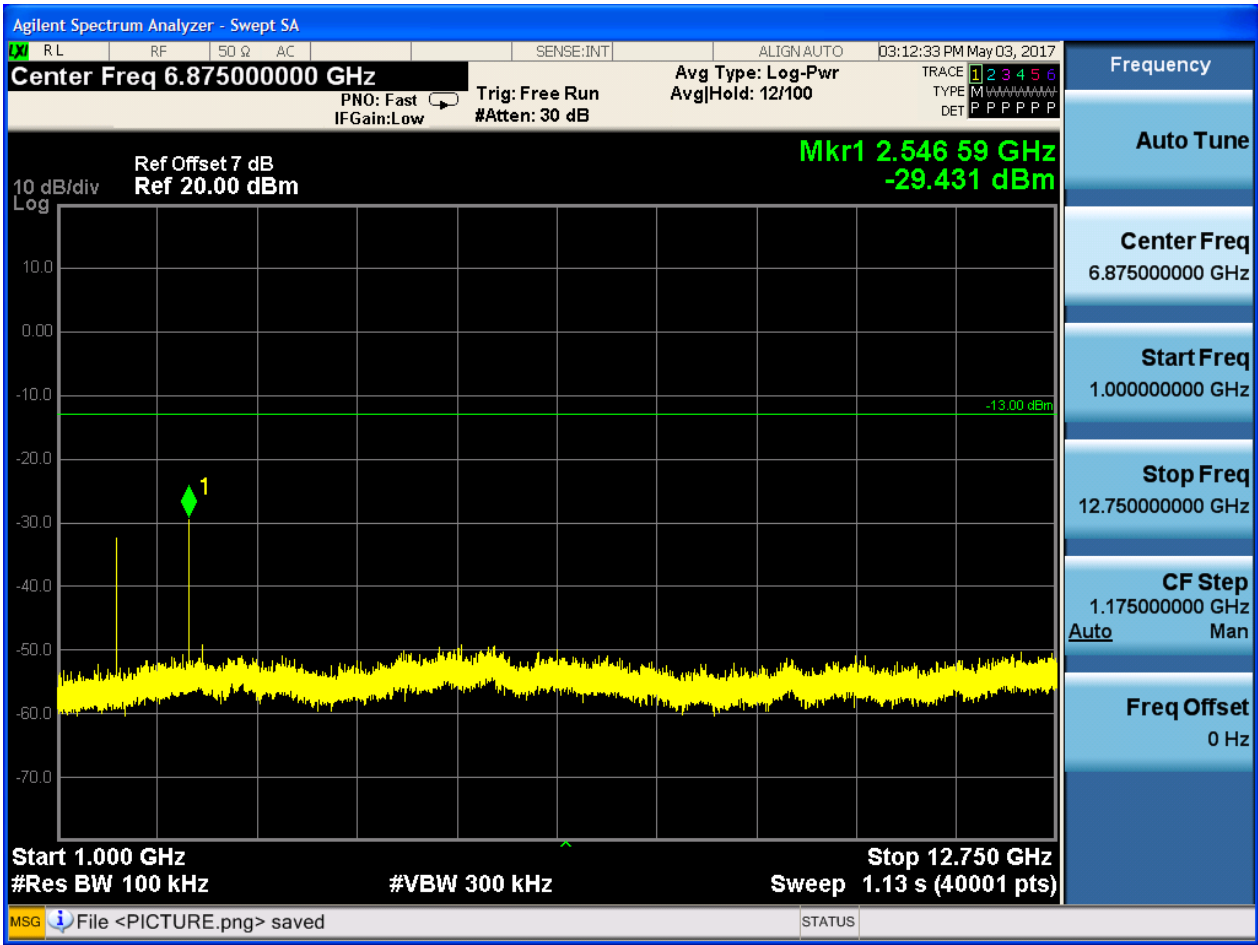


6.1.1.1.3 Test Channel = HCH





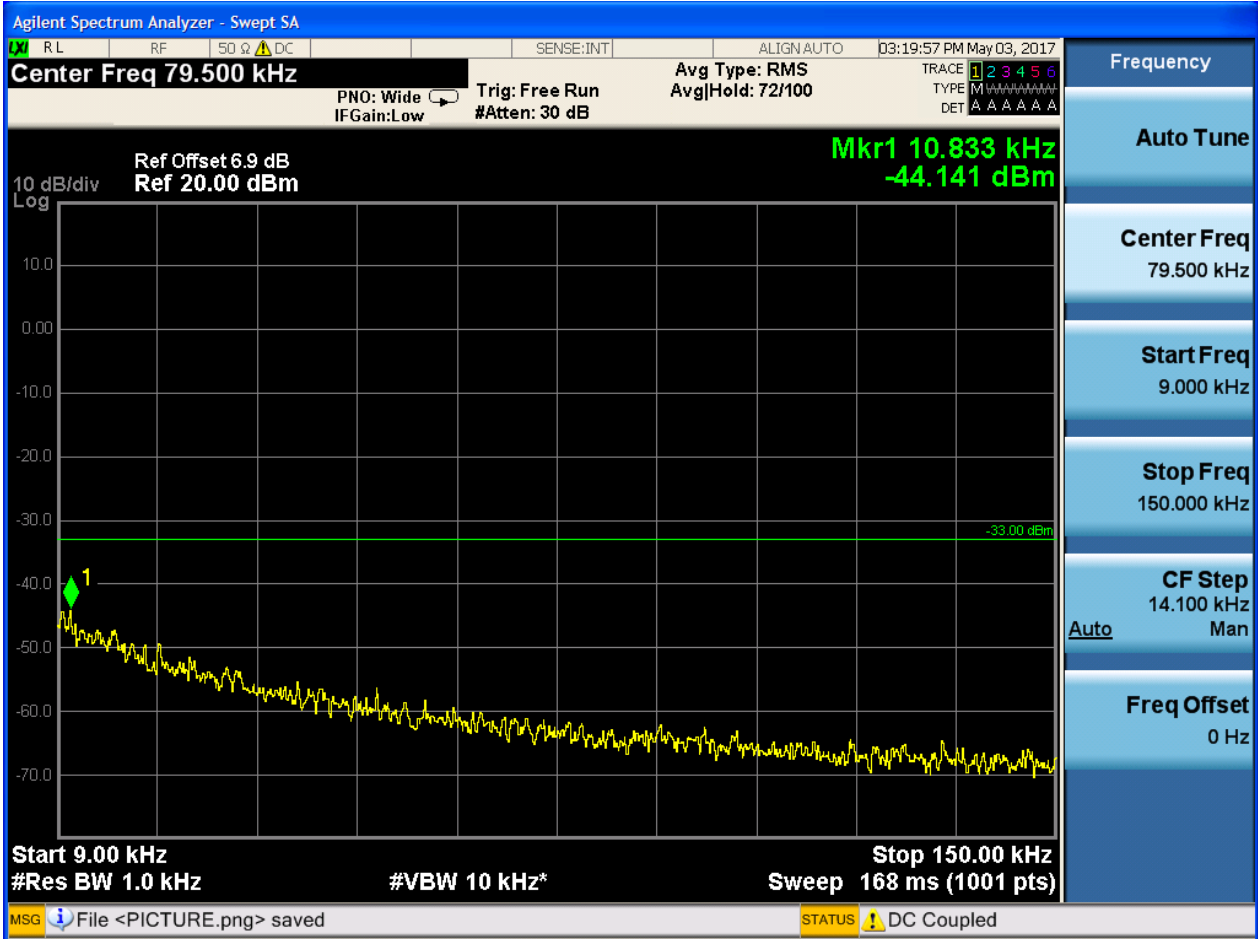


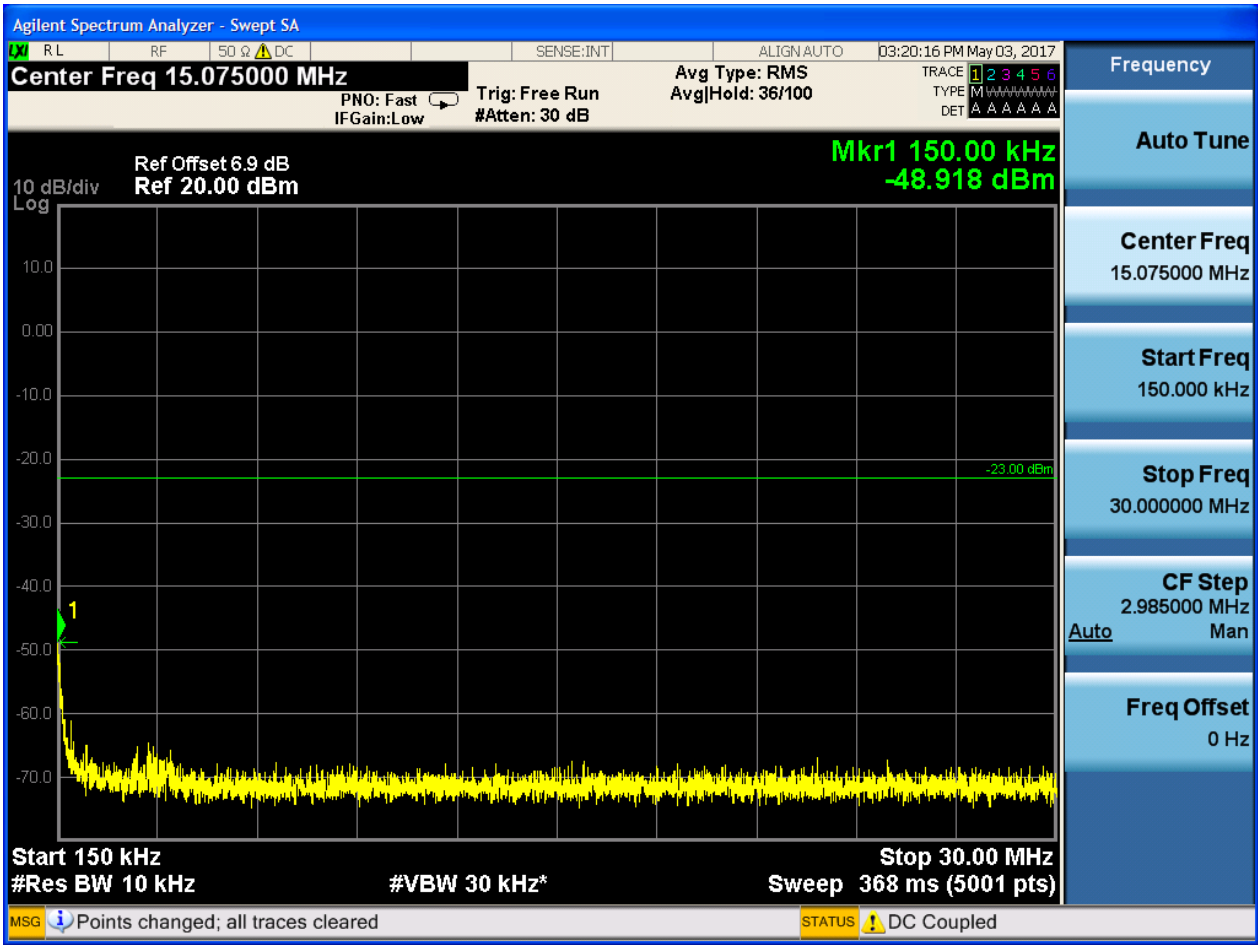


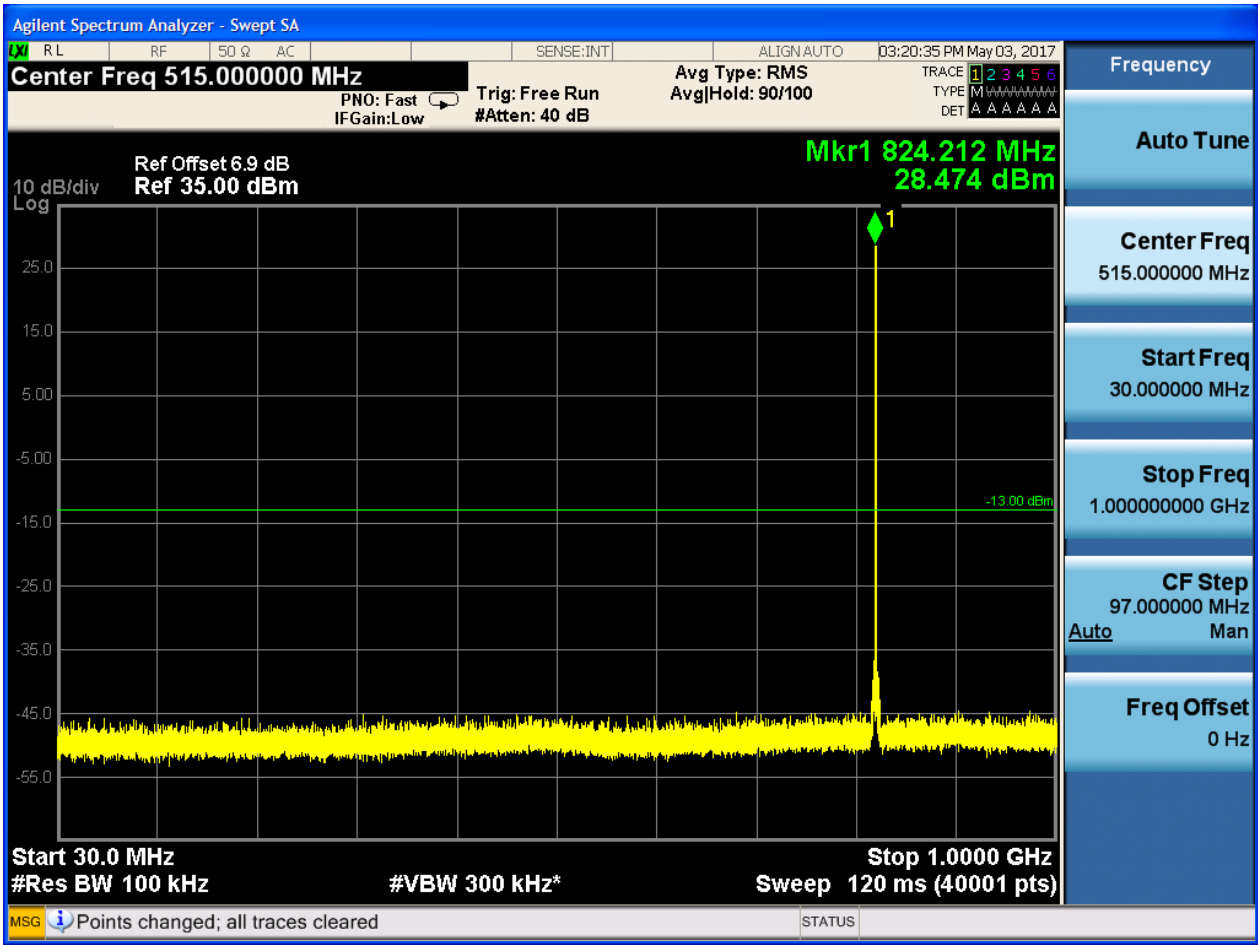


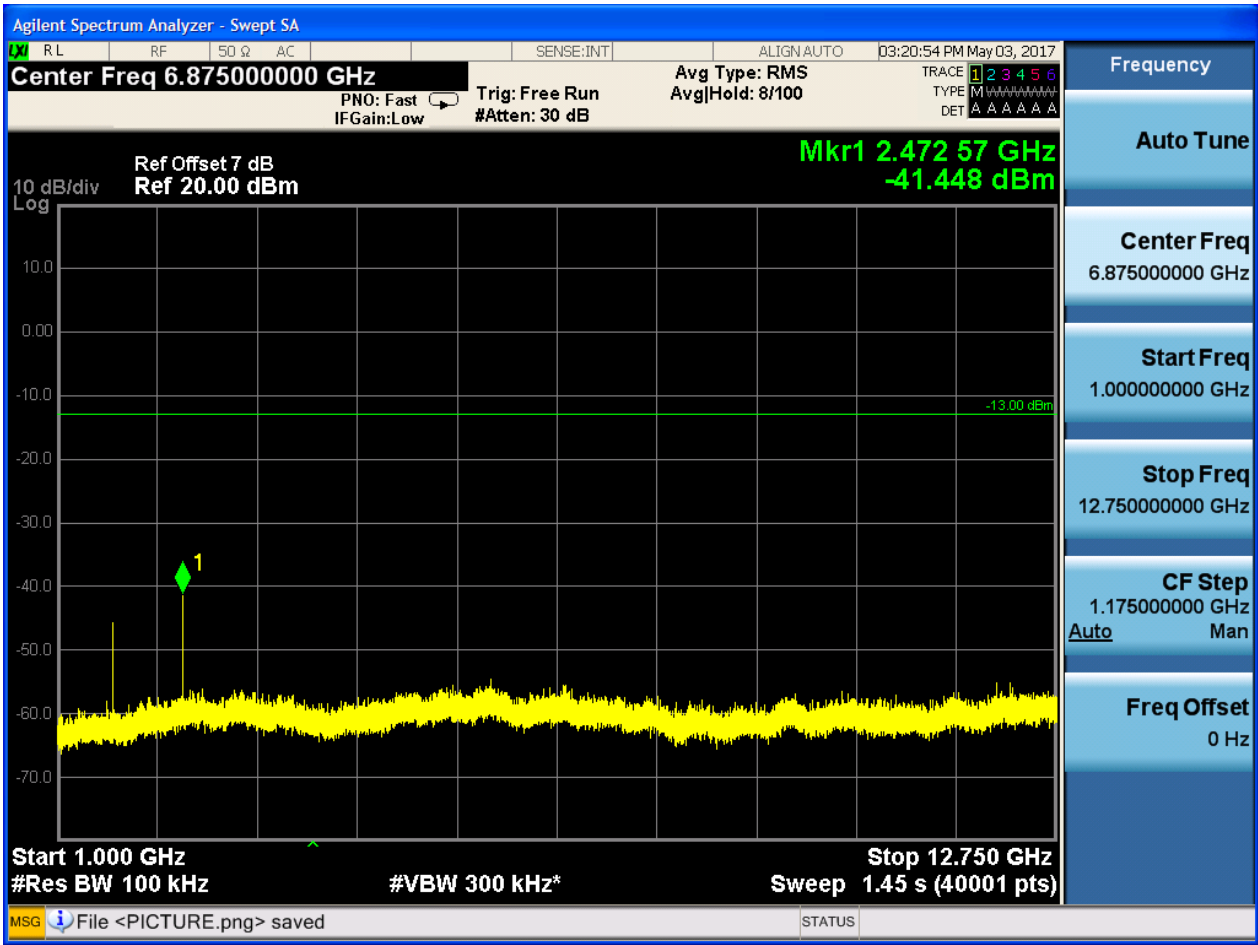
6.1.1.2 Test Mode = GSM/TM2

6.1.1.2.1 Test Channel = LCH

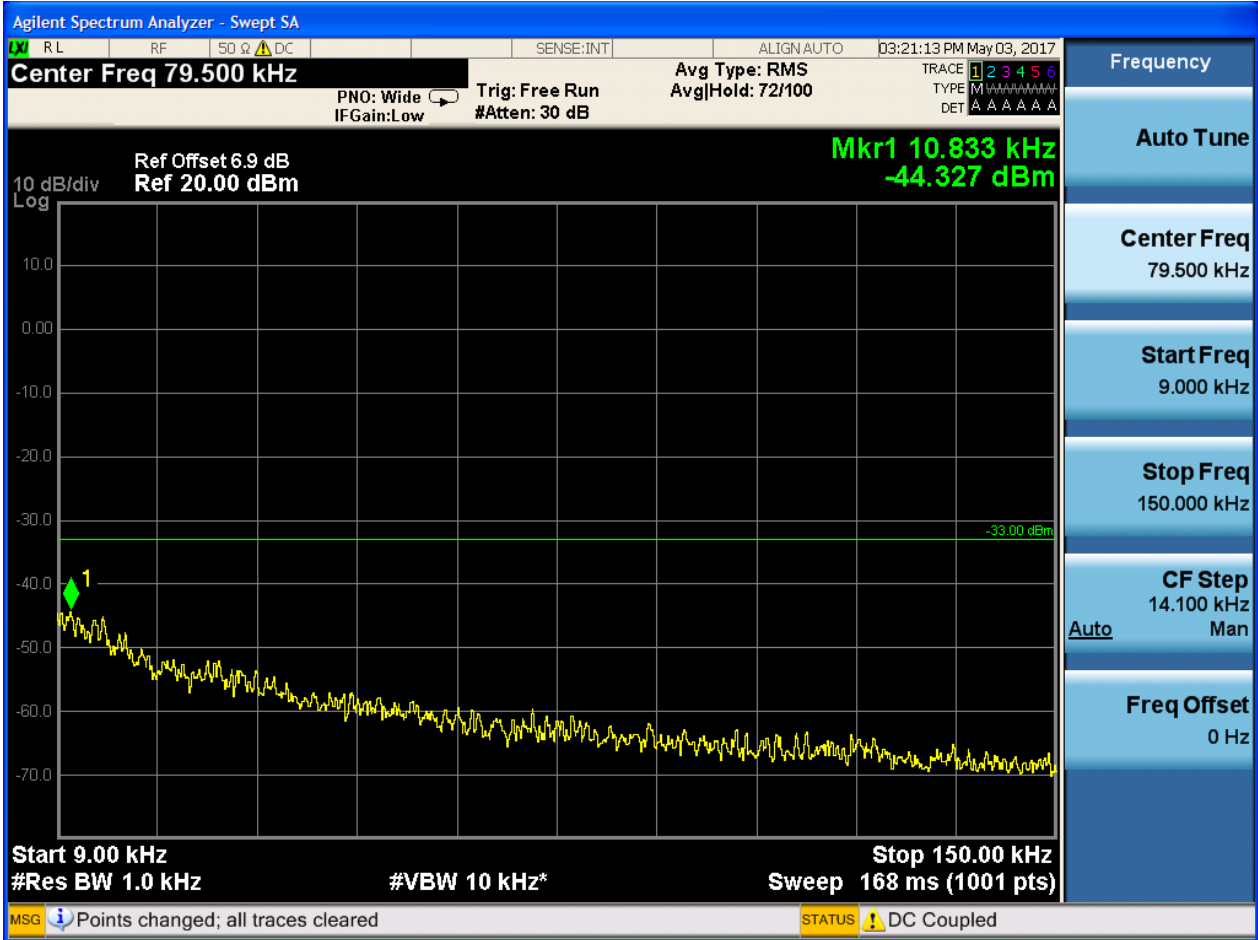


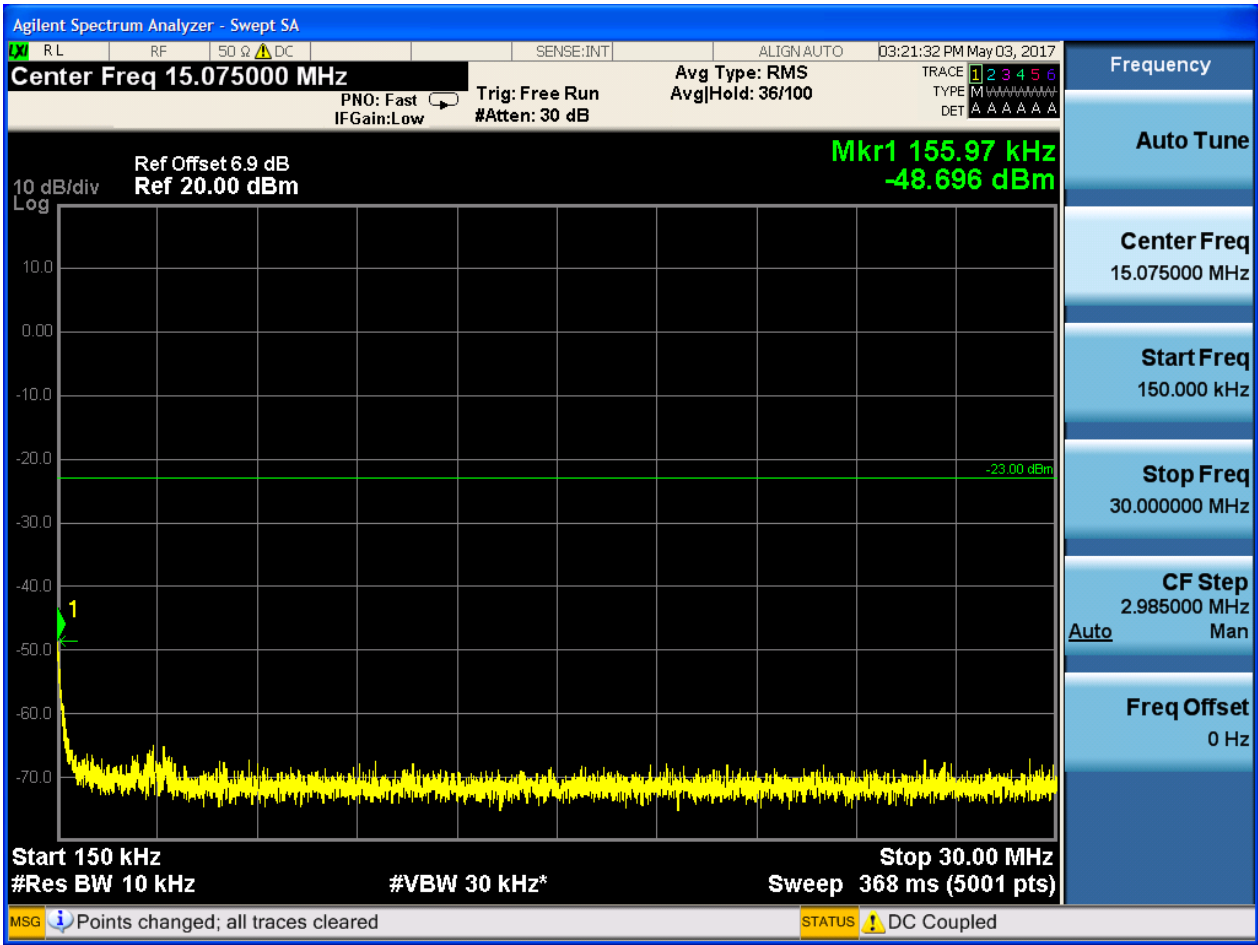


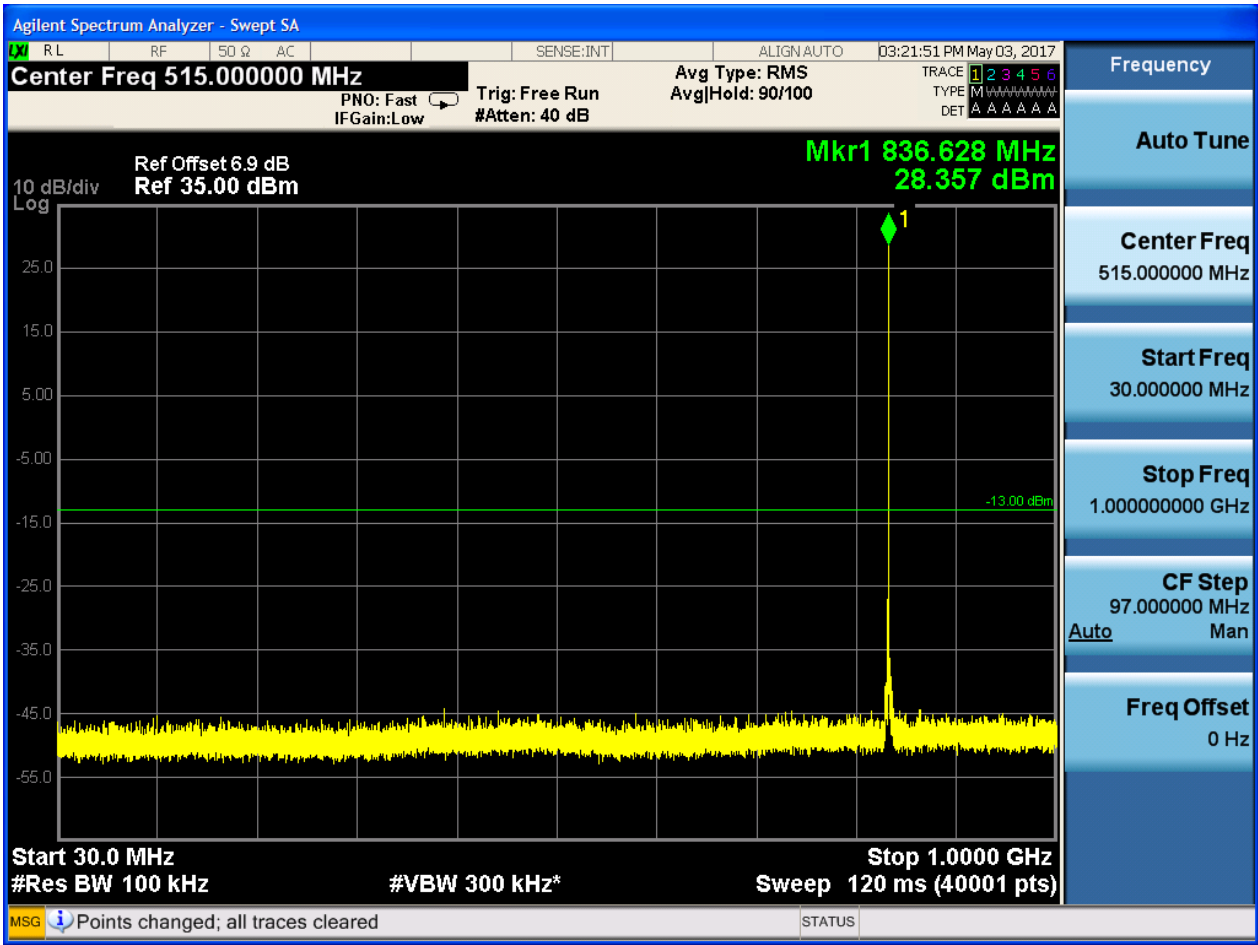


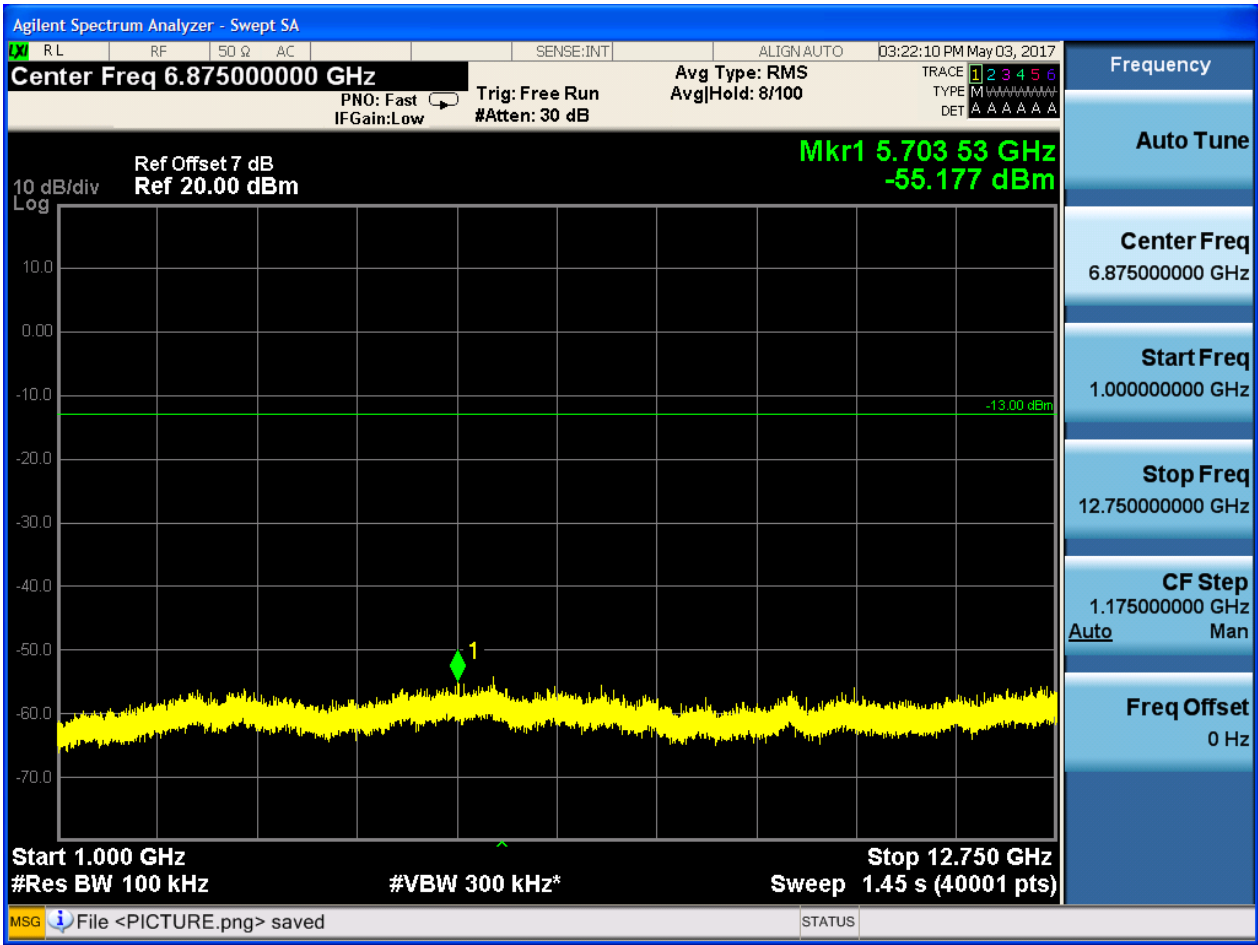


6.1.1.2.2 Test Channel = MCH

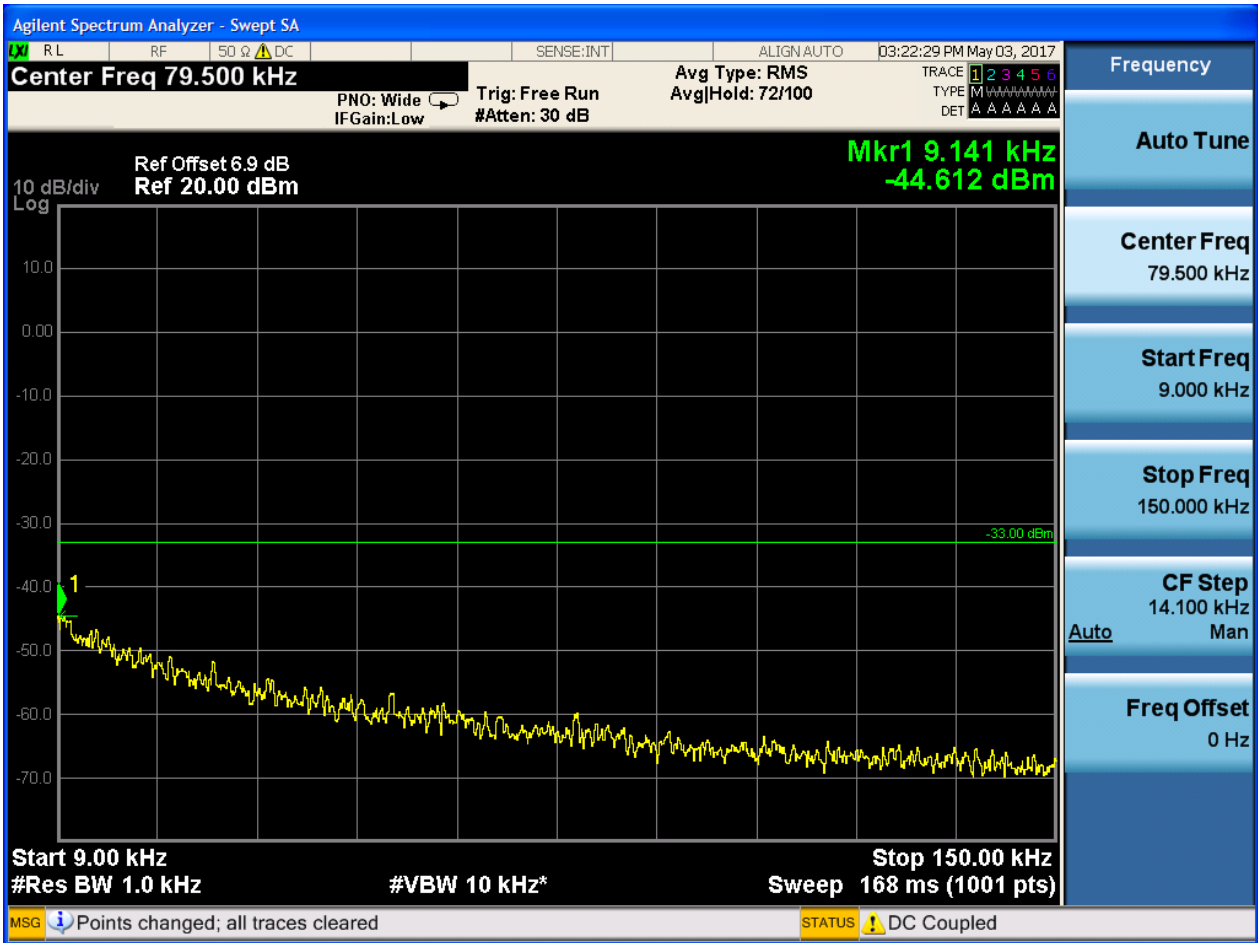


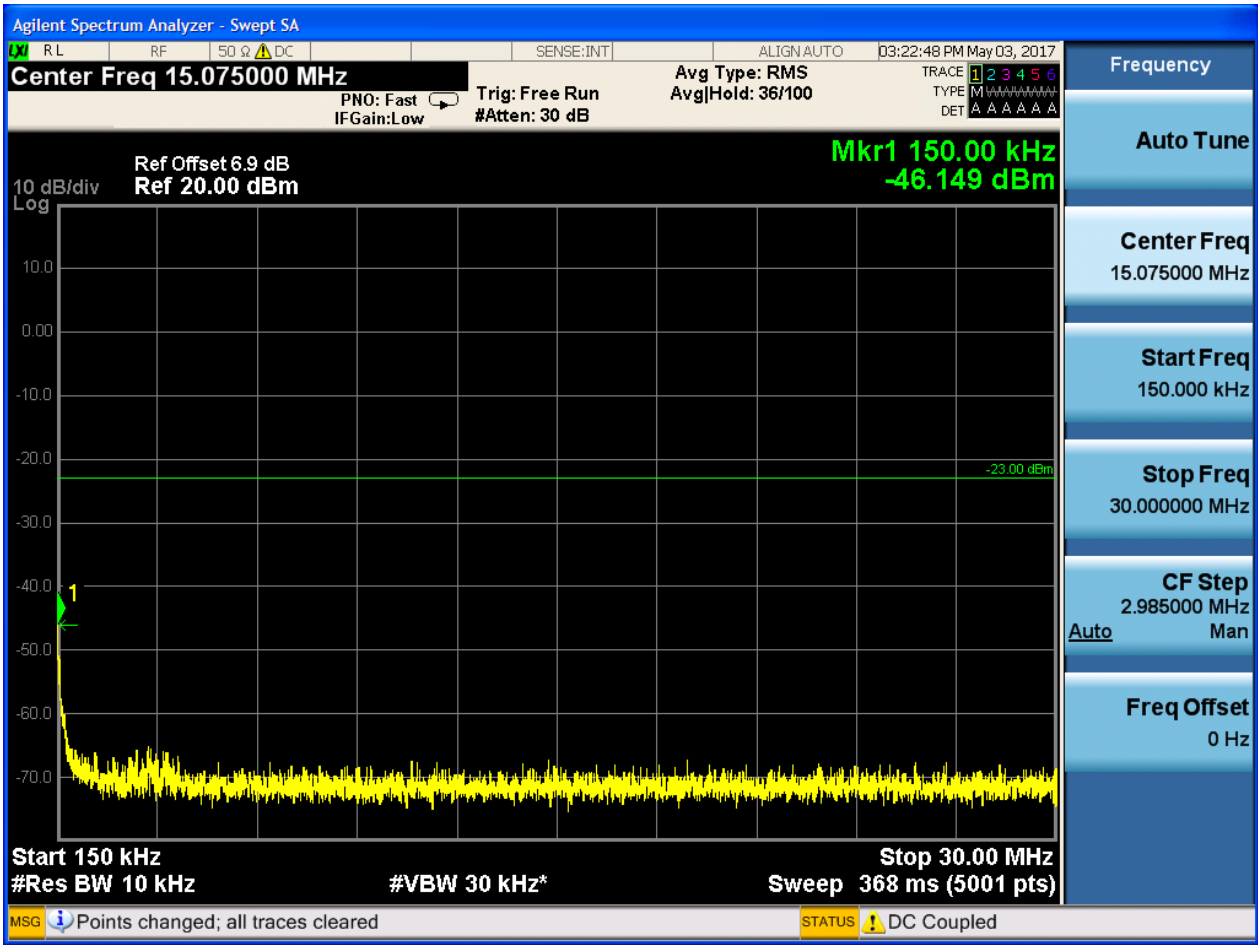


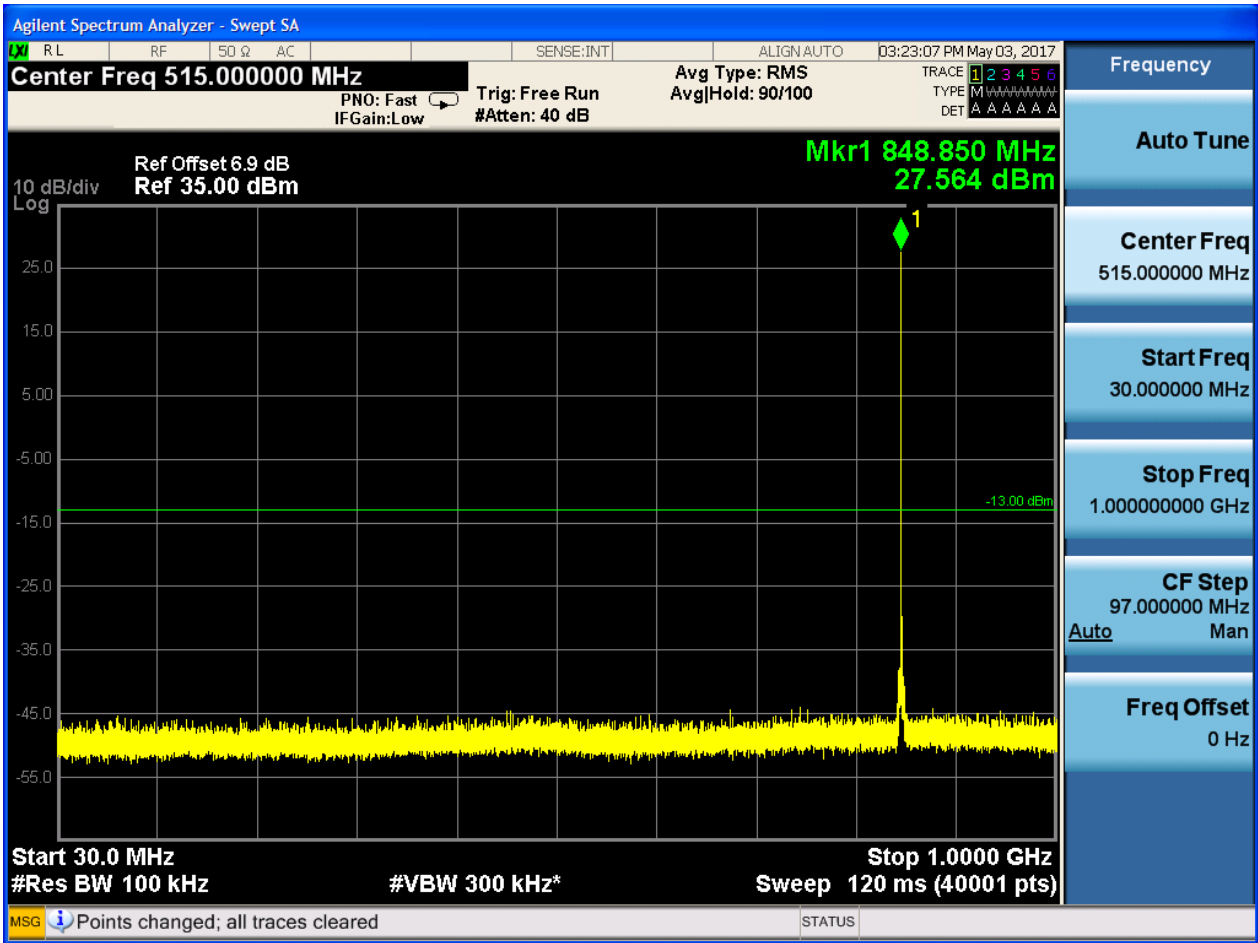


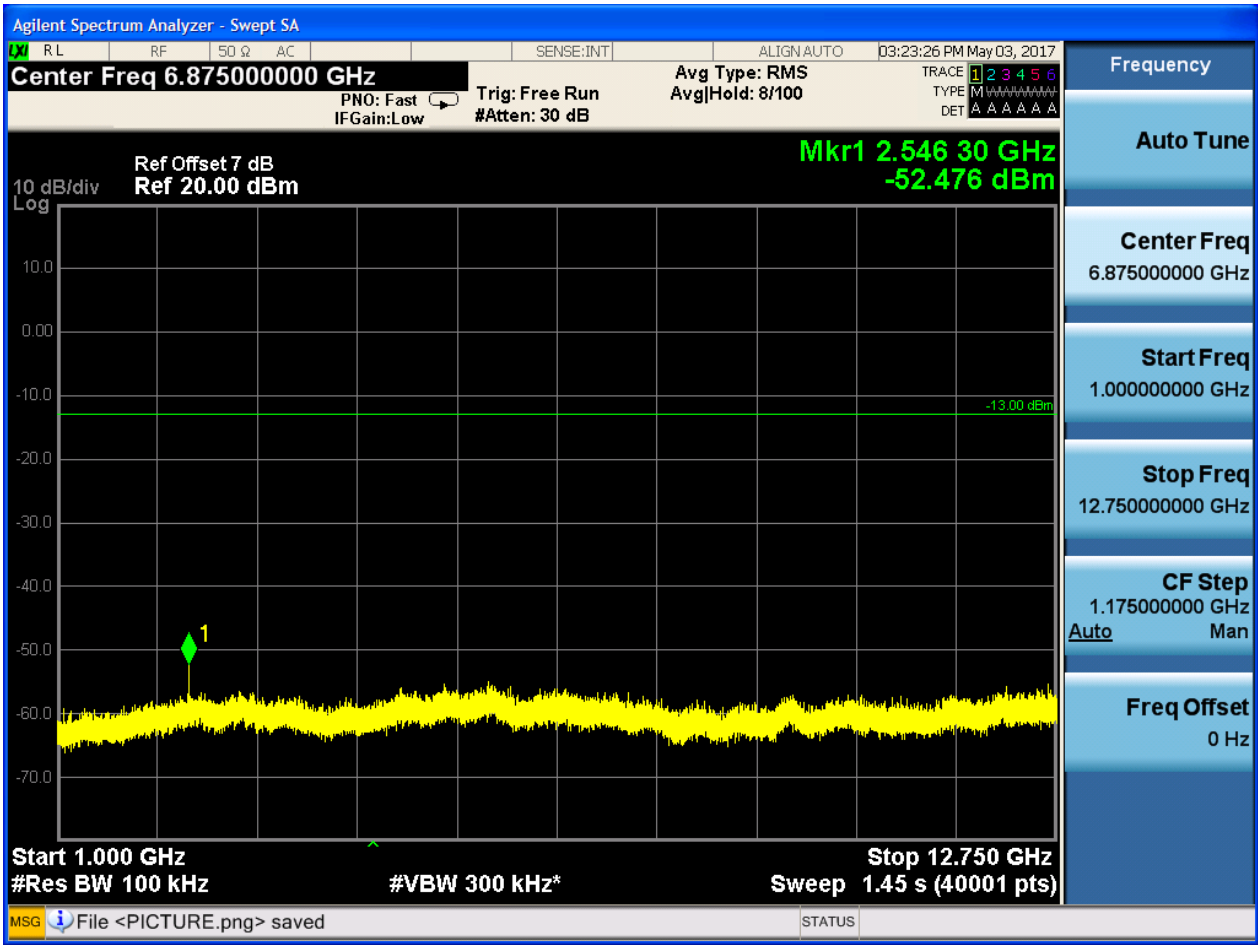


6.1.1.2.3 Test Channel = HCH







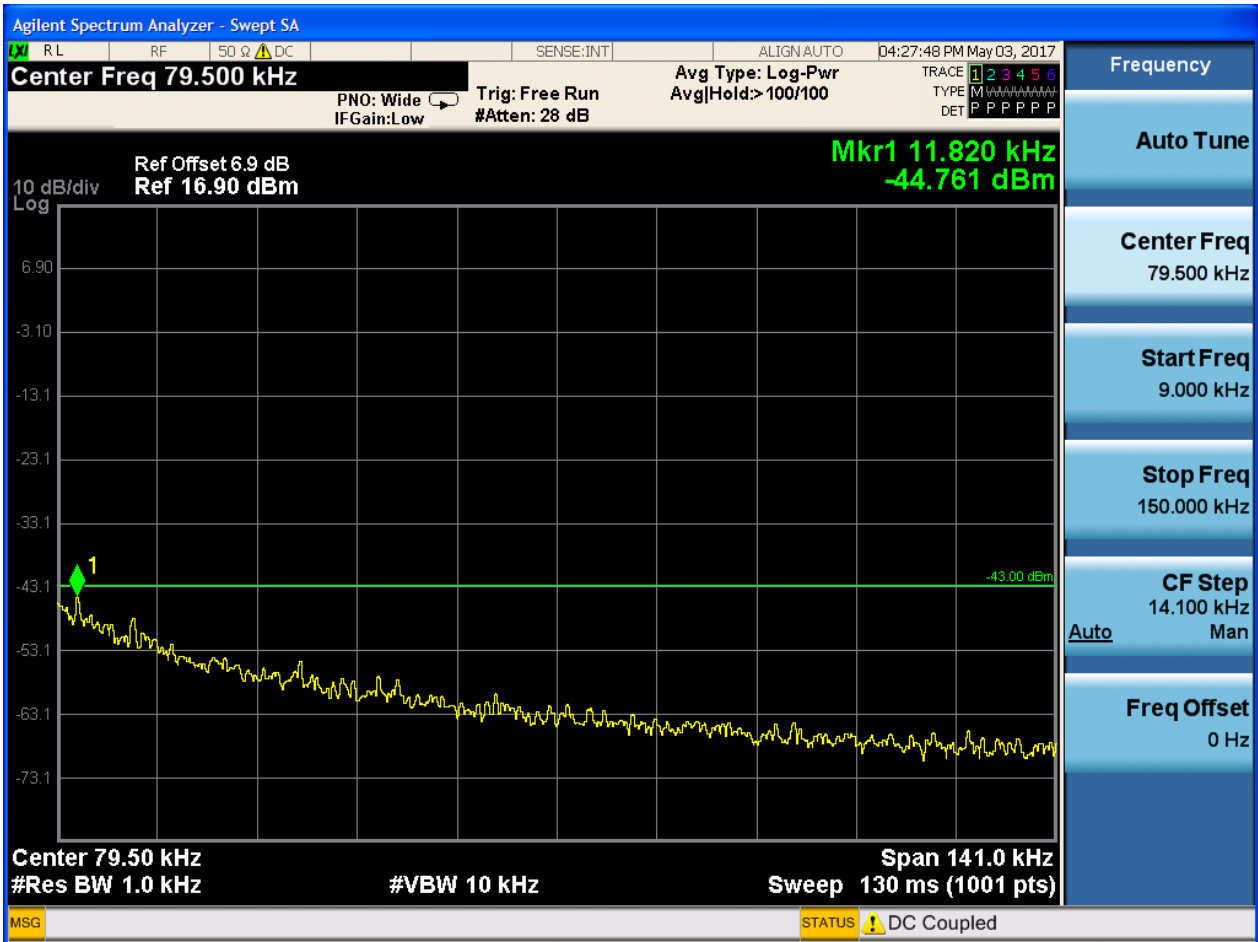


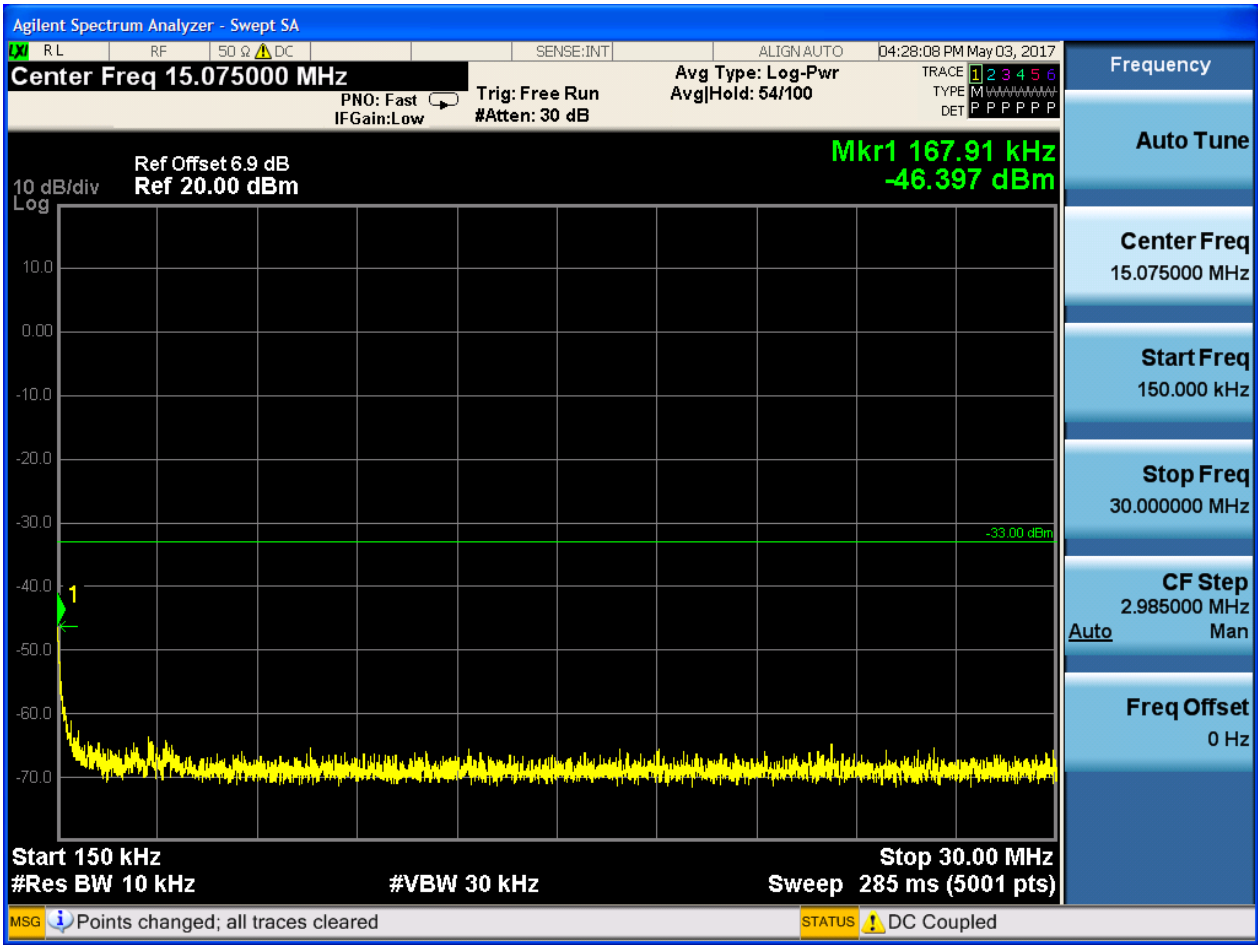


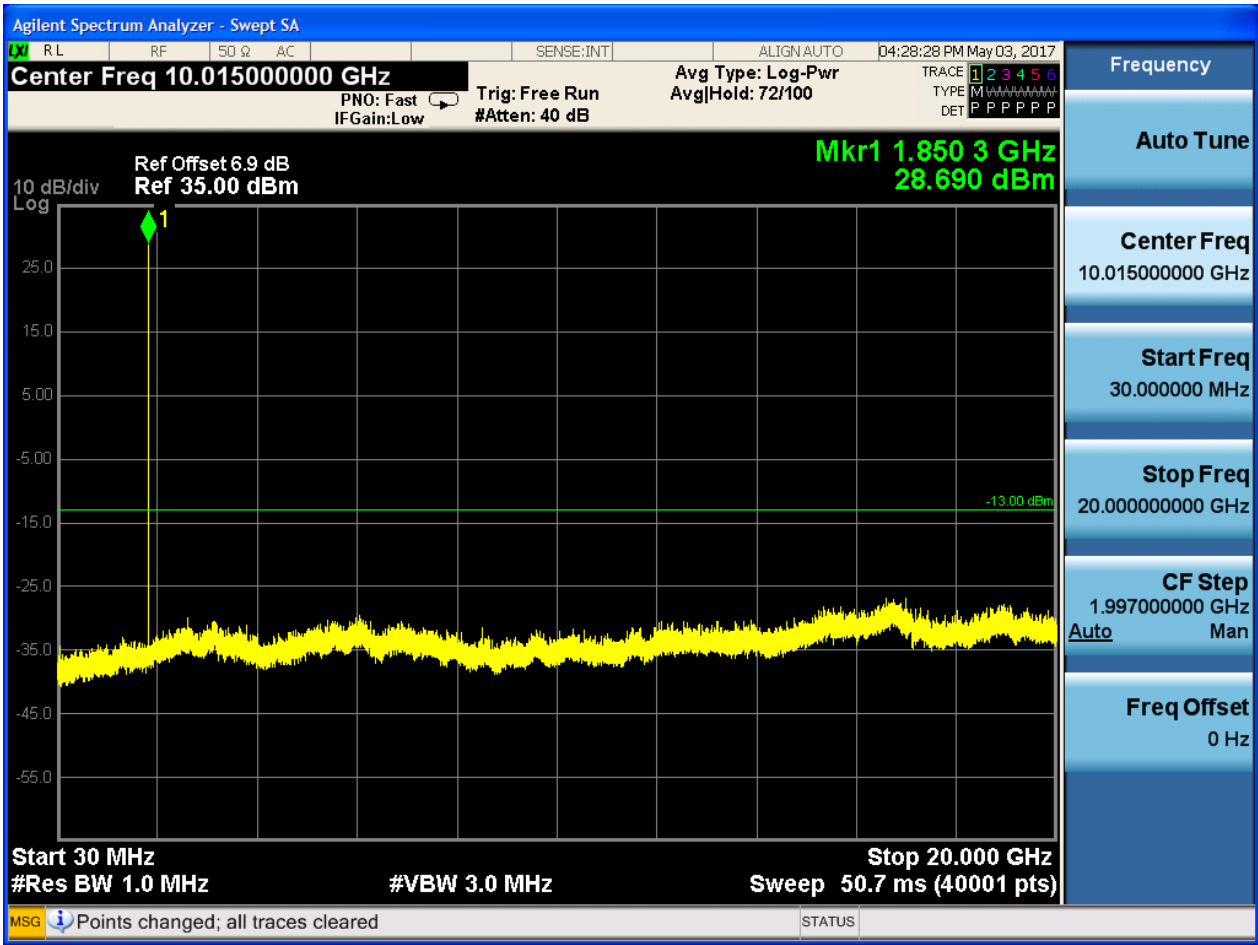
6.1.2 Test Band = GSM1900

6.1.2.1 Test Mode = GSM/TM1

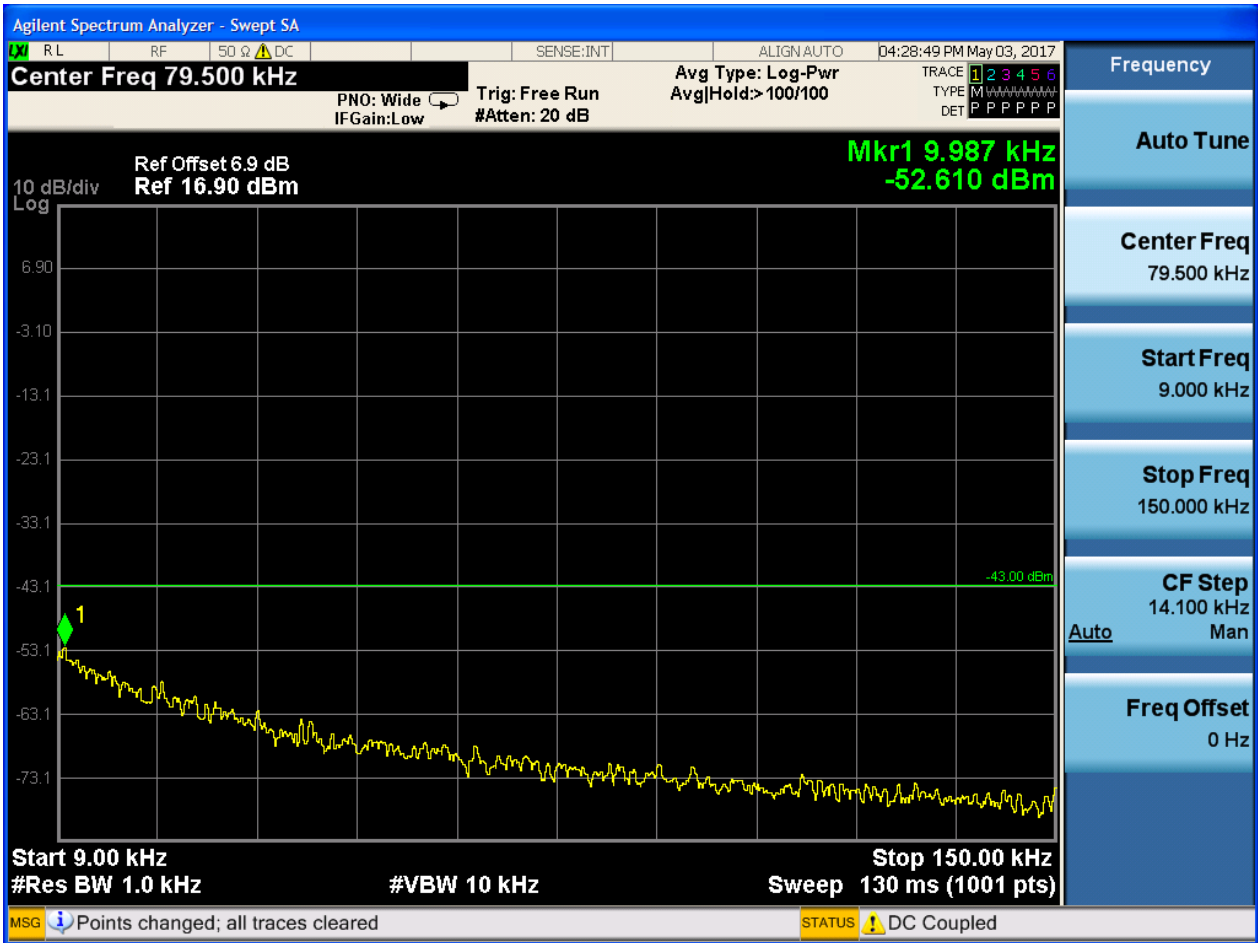
6.1.2.1.1 Test Channel = LCH

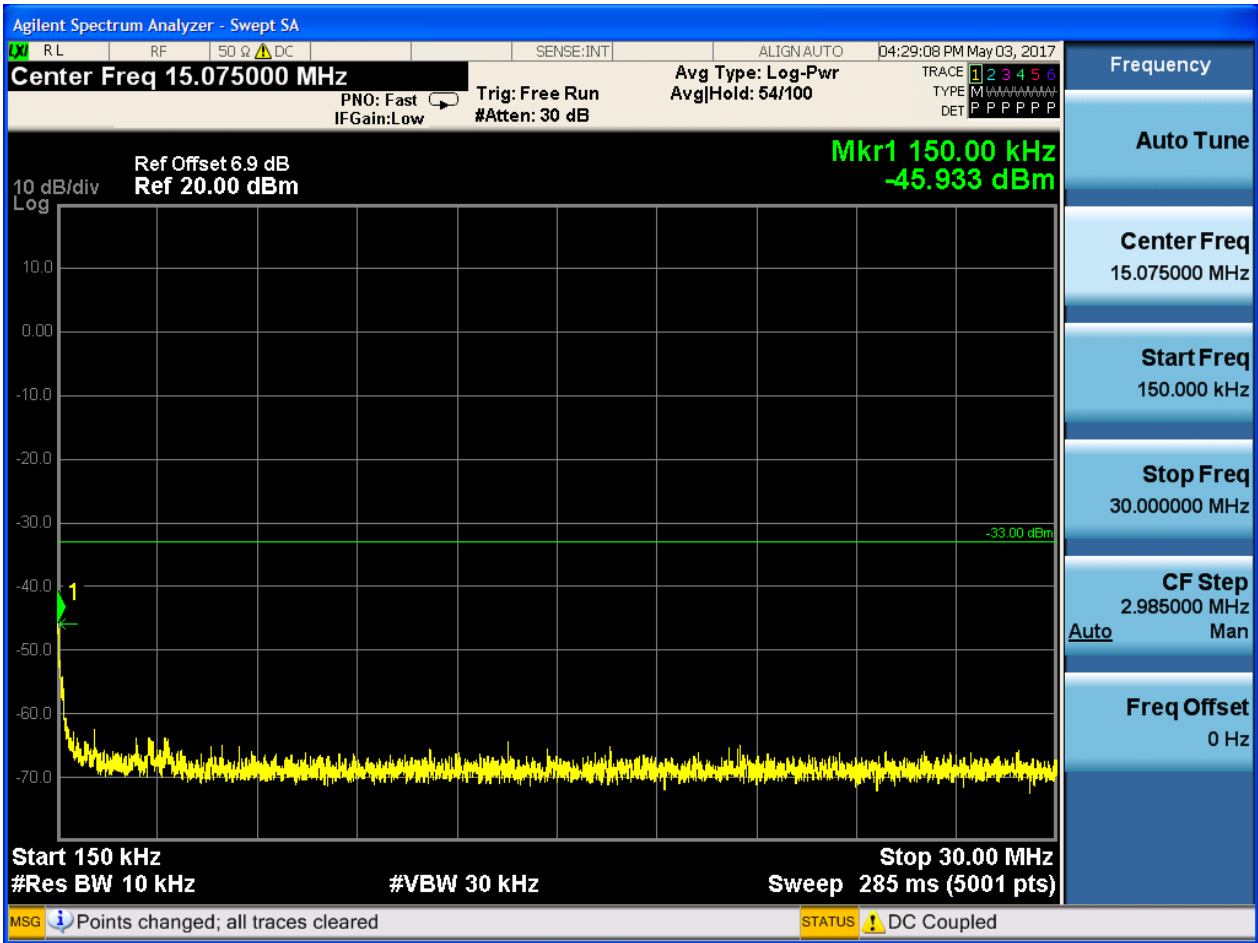


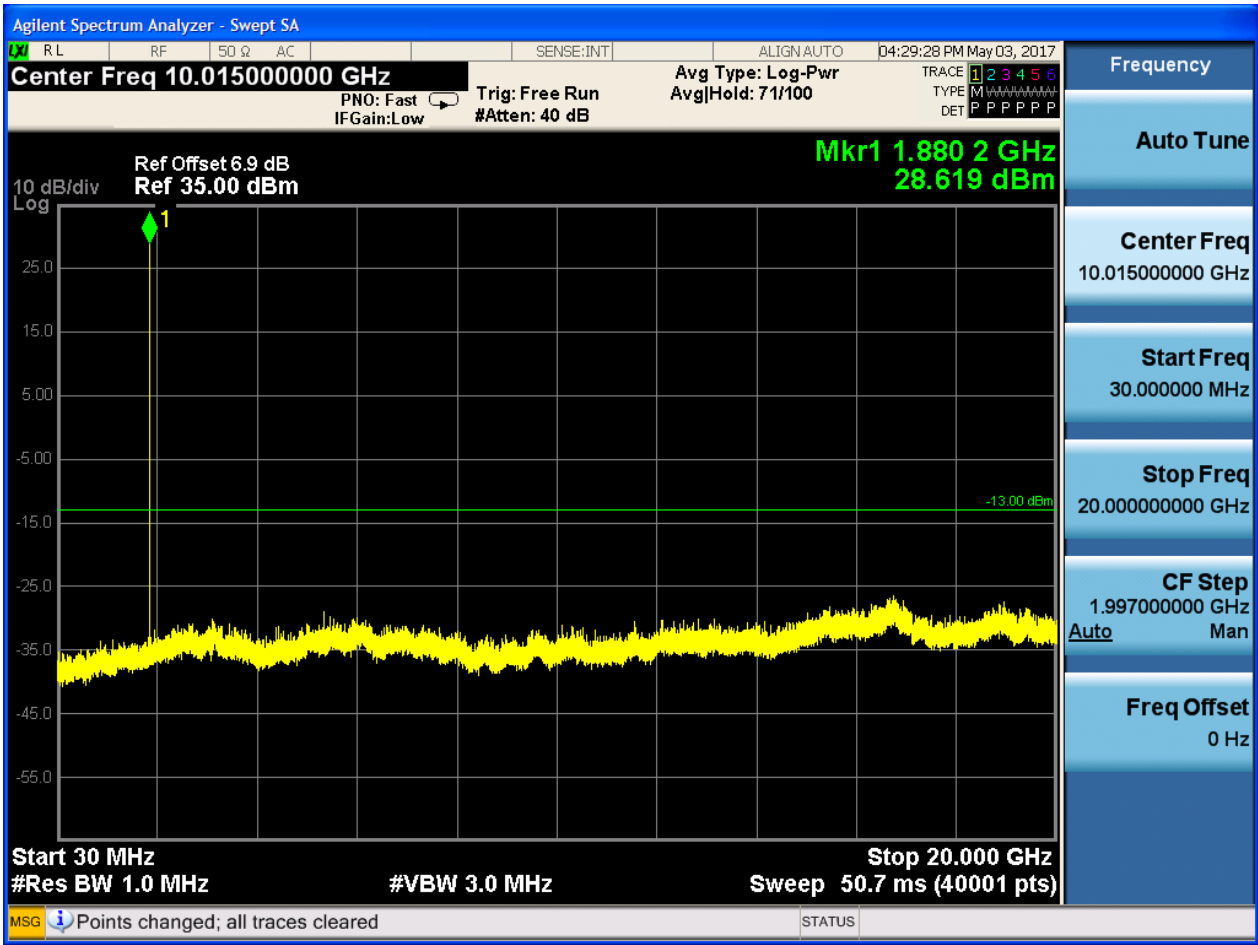




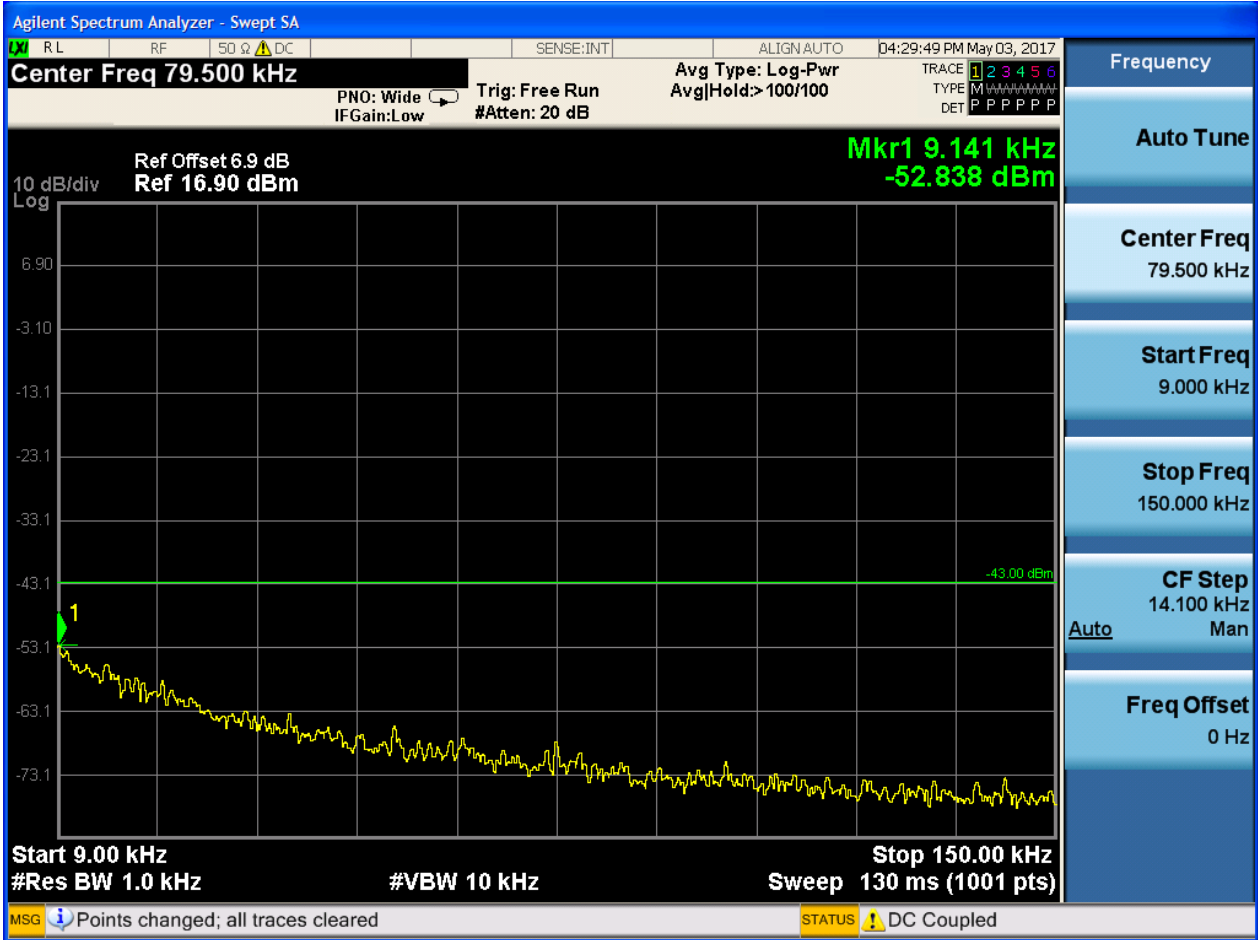
6.1.2.1.2 Test Channel = MCH

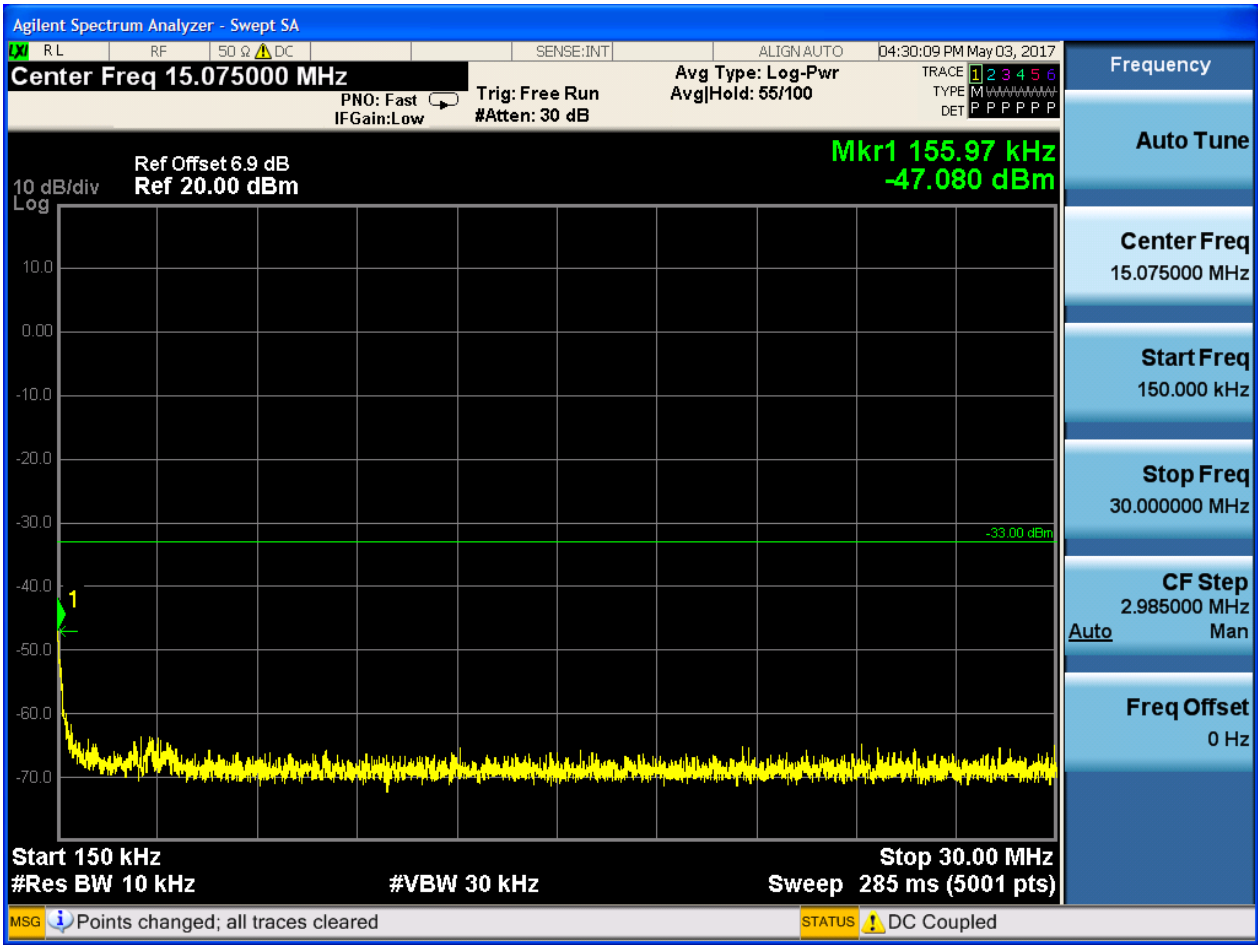


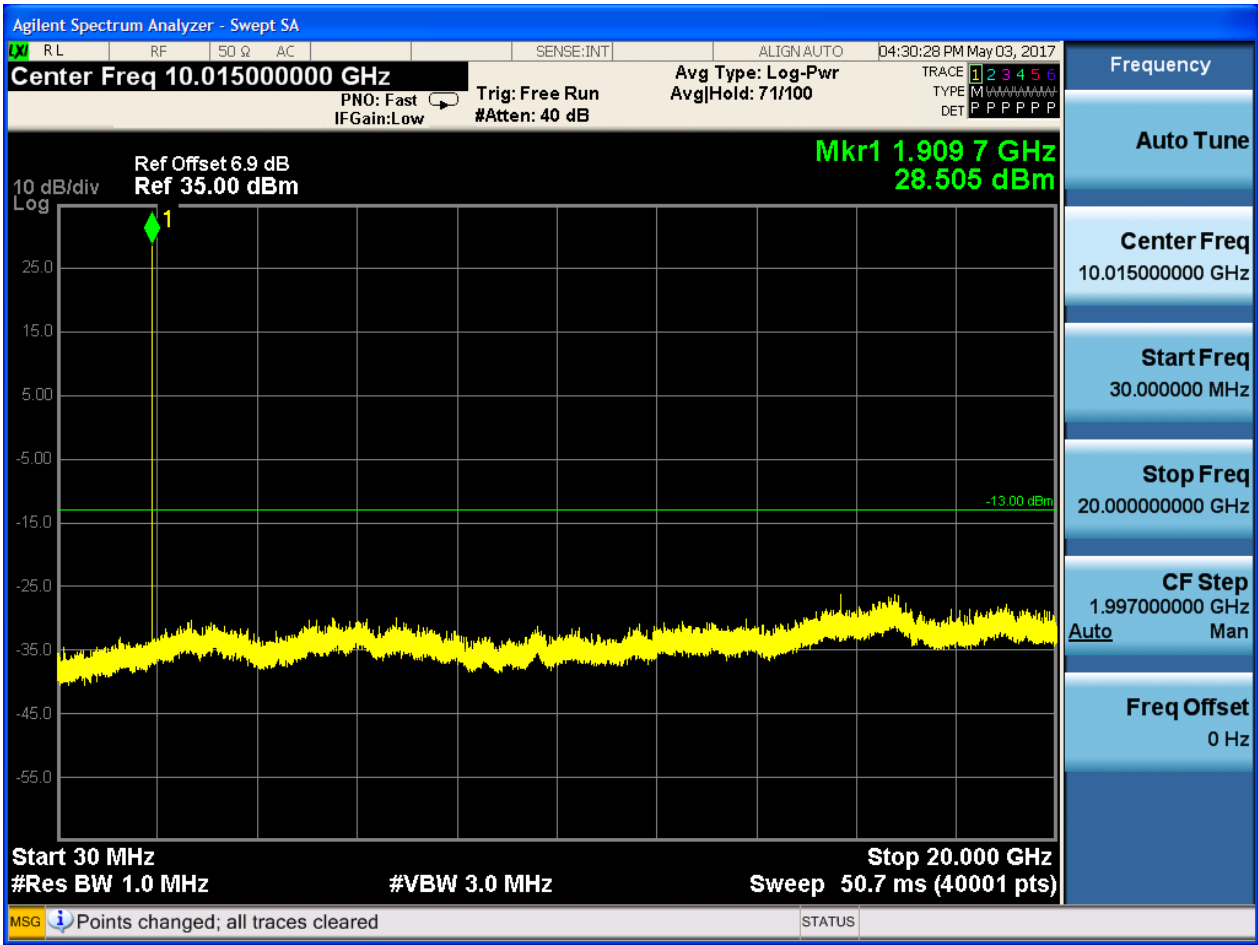




6.1.2.1.3 Test Channel = HCH

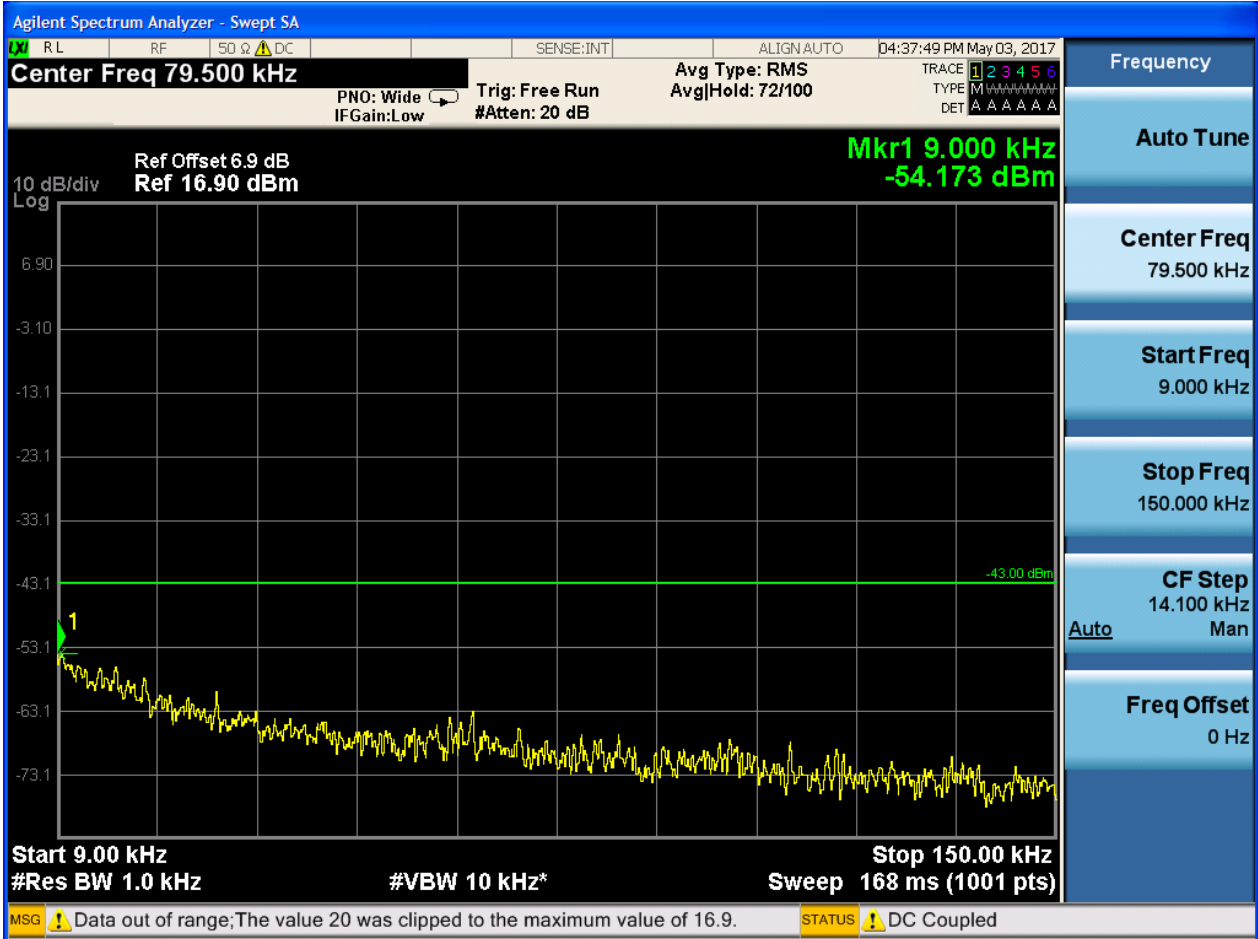


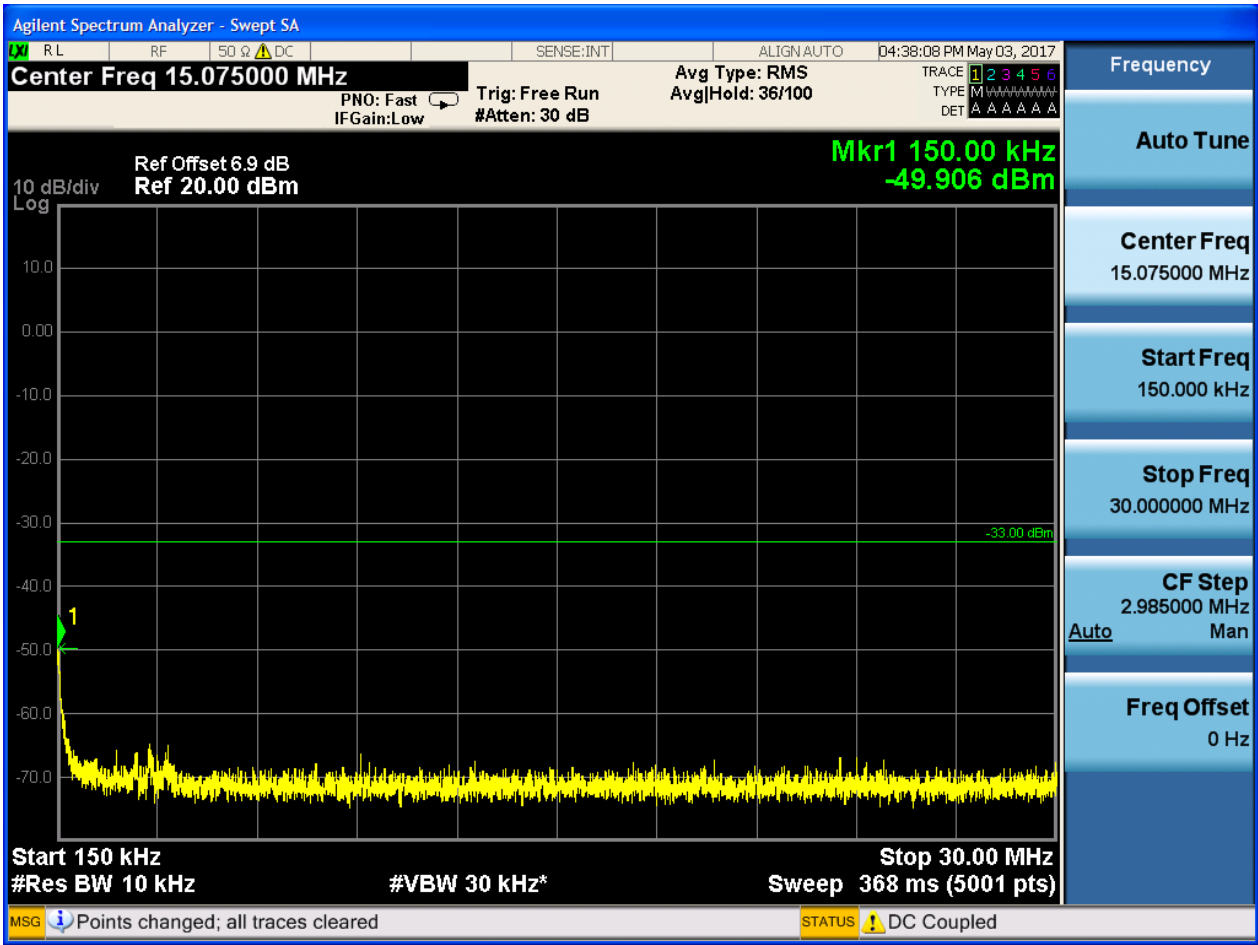


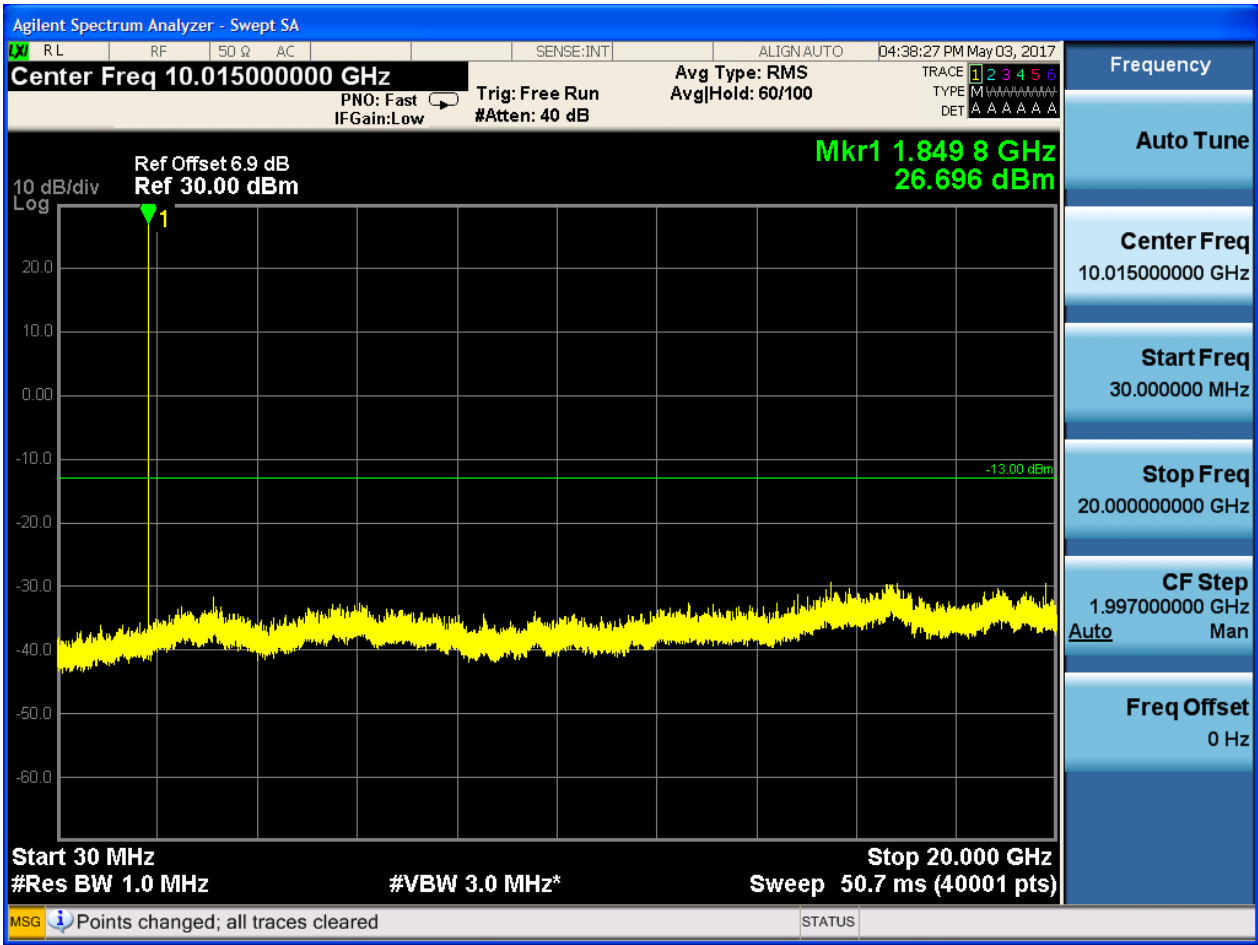


6.1.2.2 Test Mode = GSM/TM2

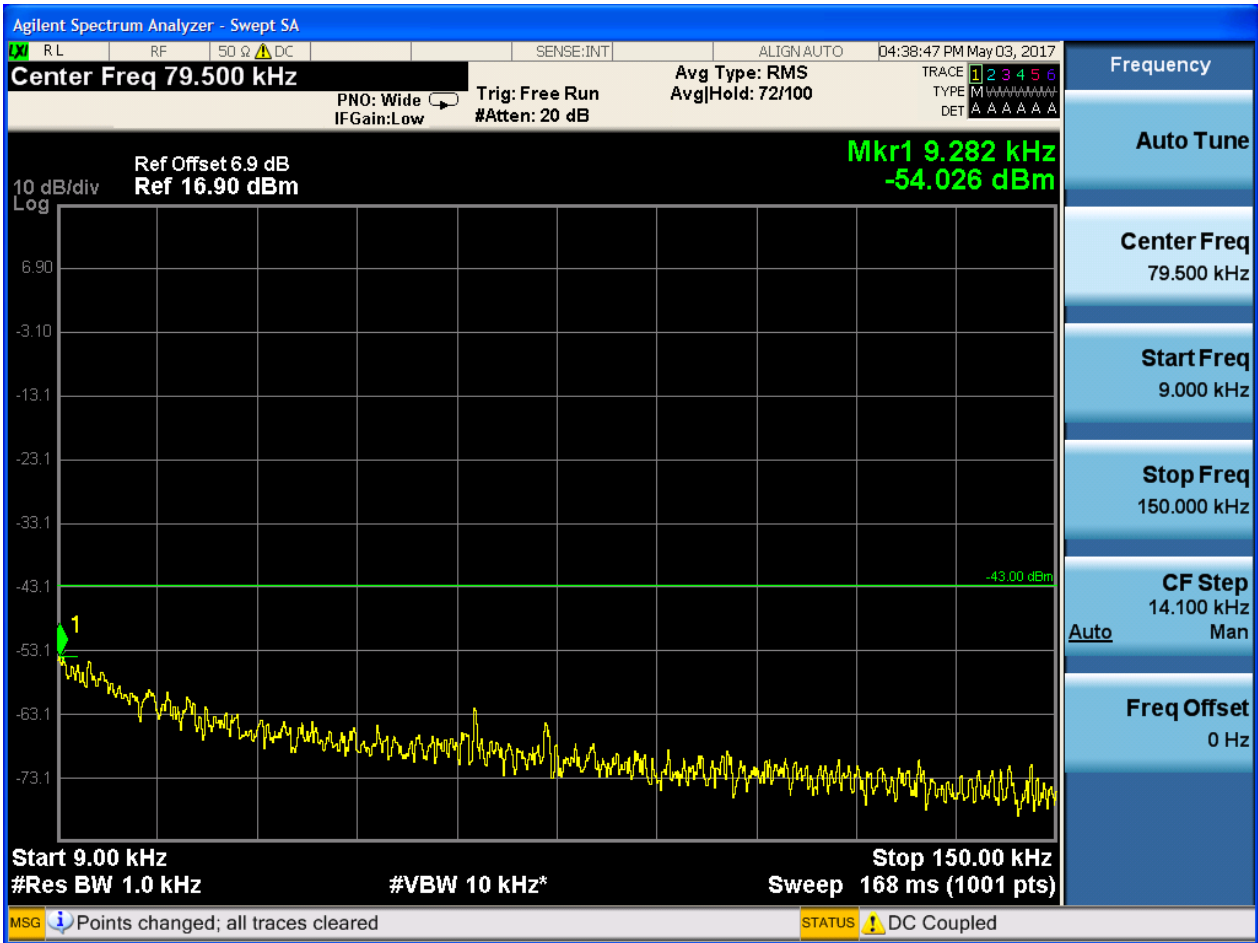
6.1.2.2.1 Test Channel = LCH

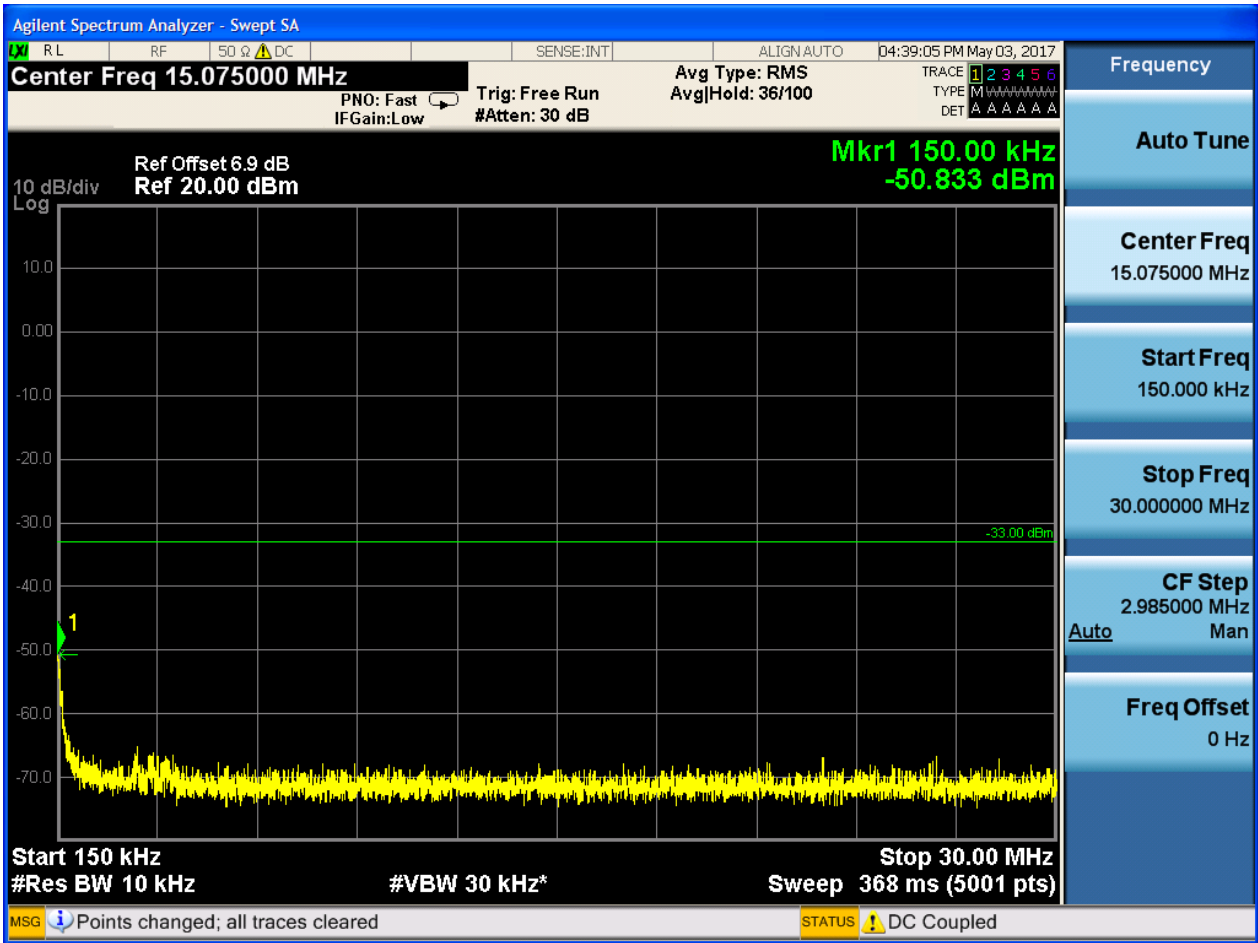


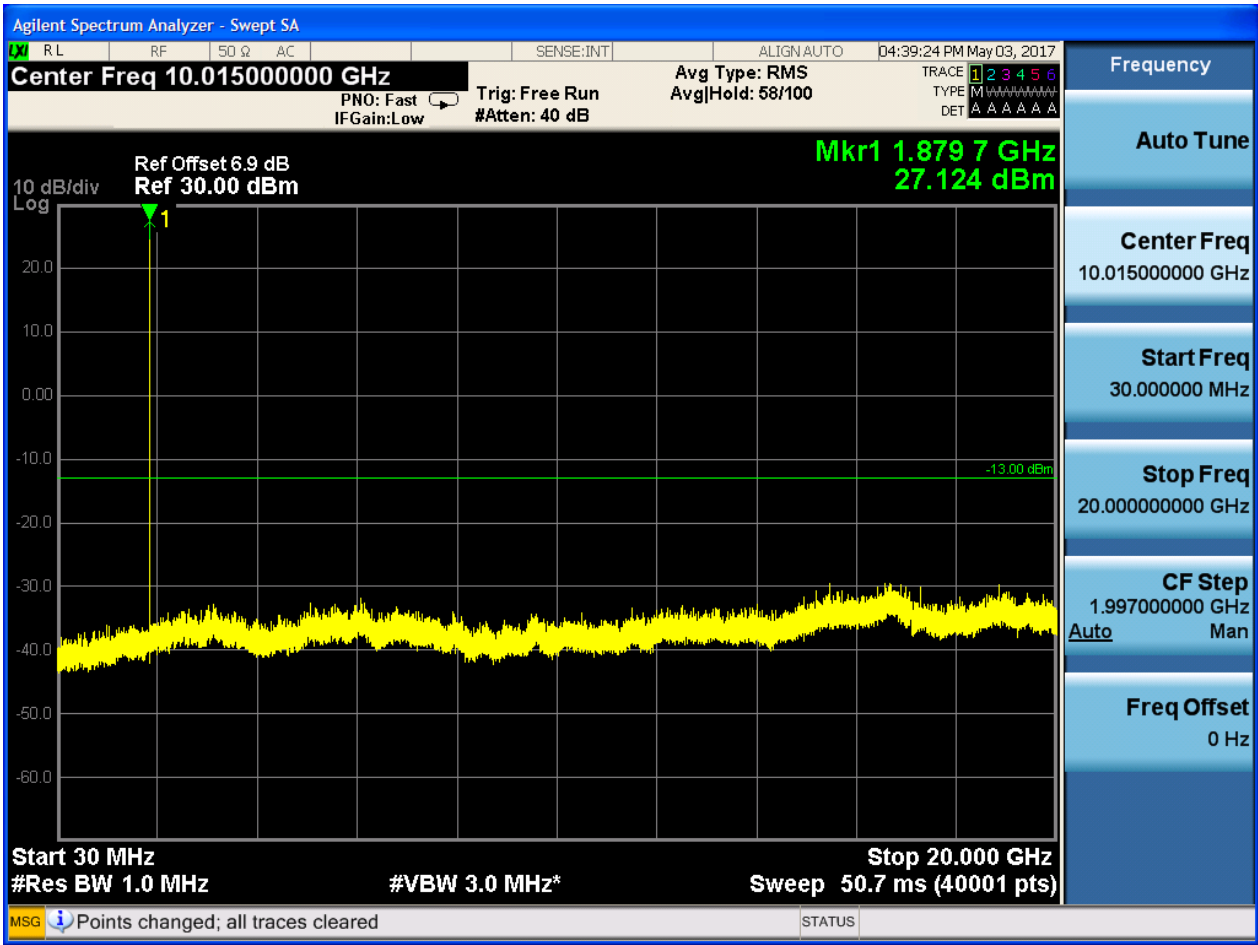




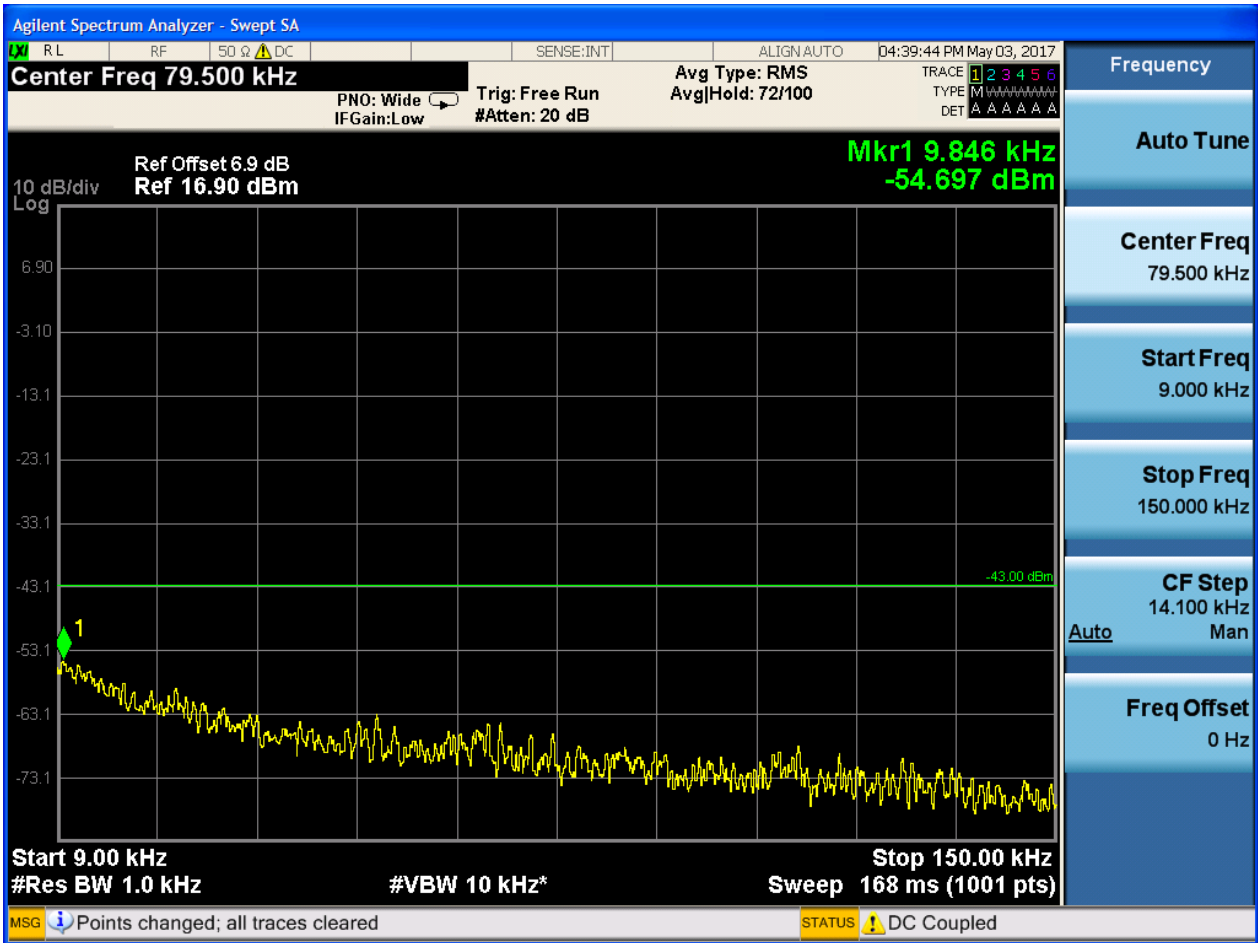
6.1.2.2.2 Test Channel = MCH

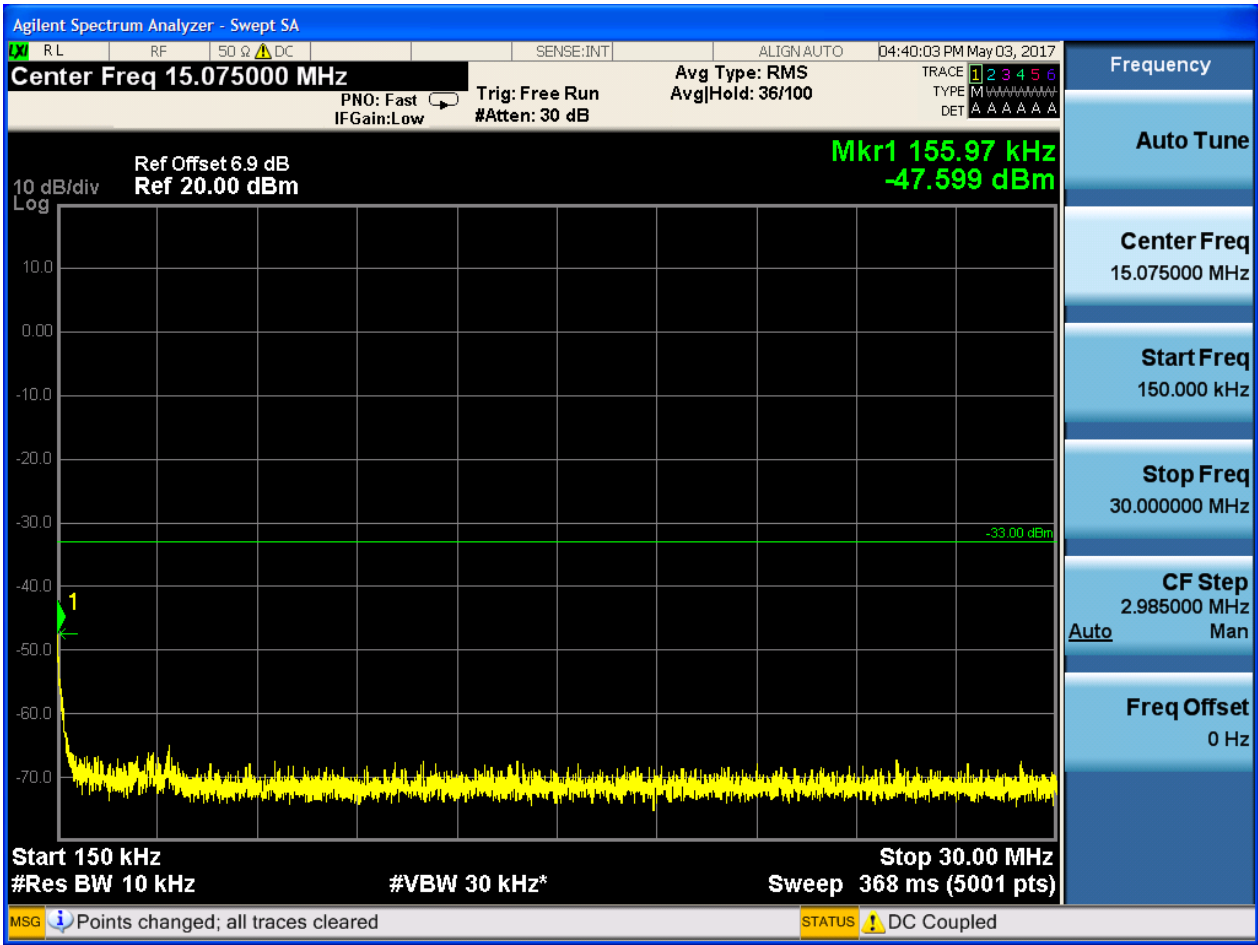


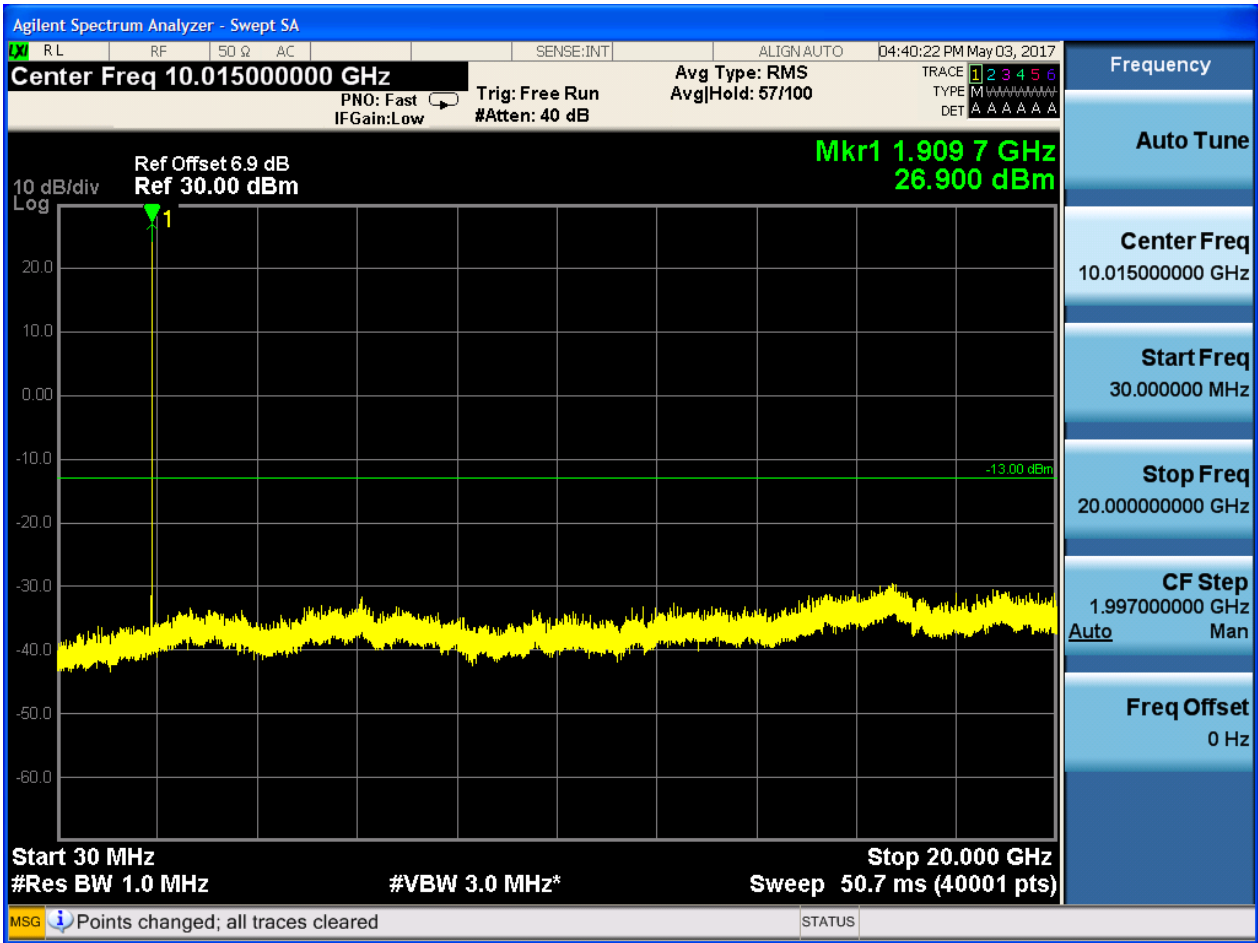




6.1.2.2.3 Test Channel = HCH







7Appendix_G: Field Strength of Spurious Radiation

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

9kHz~150kHz, 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

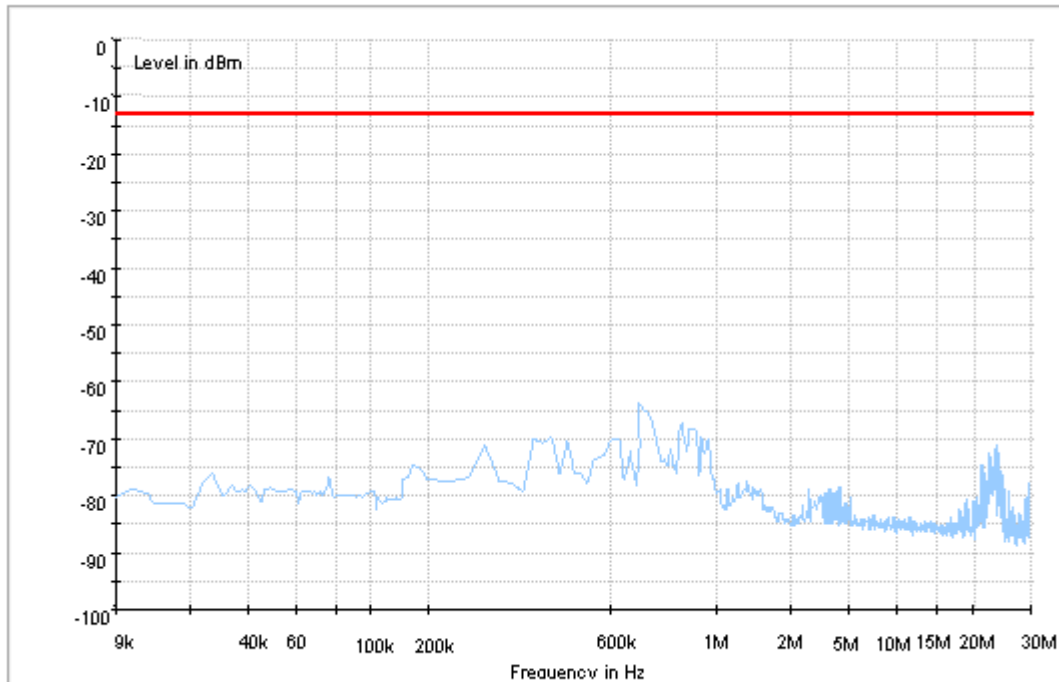
Above 1GHz, RBW = 1 MHz, VBW = 3 MHz. Detector: PK

Part I - Test Plots

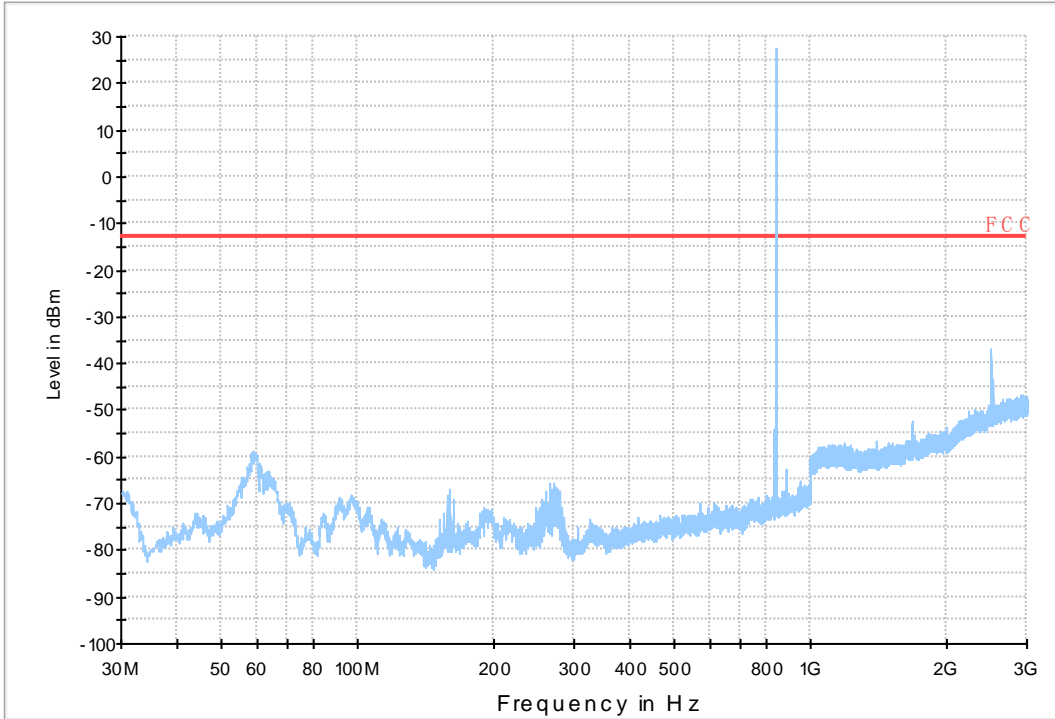
7.1 For GSM

7.1.1 Test Band = GSM850_ANT1

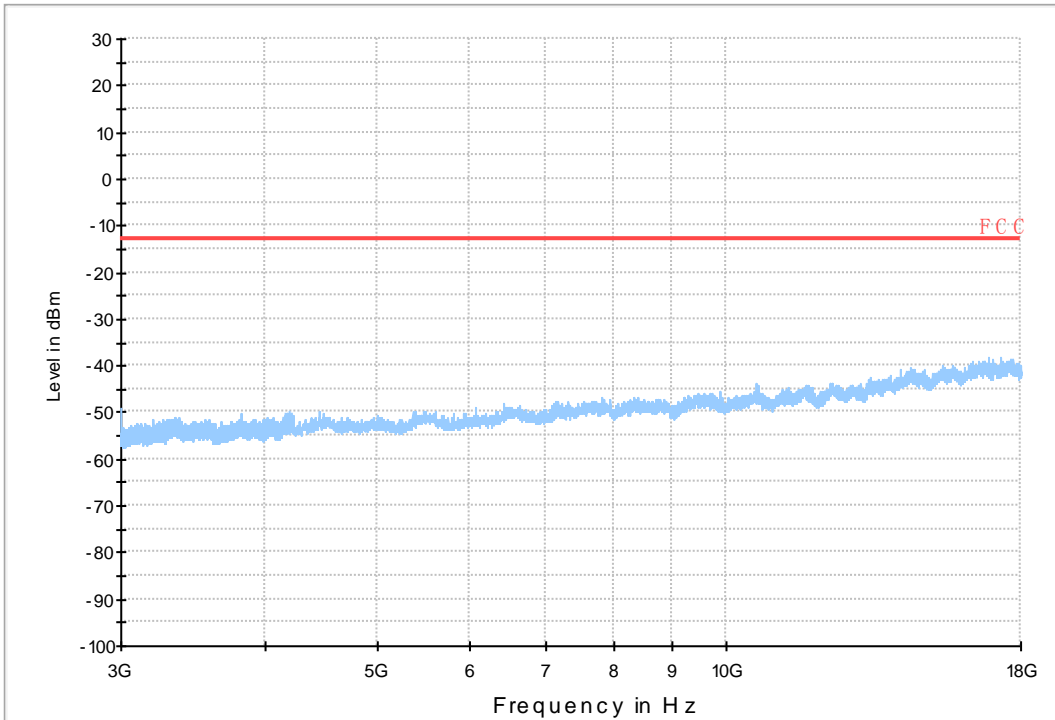
7.1.1.1 Test Mode = GSM/TM1



Copy of FCC PART22 GSM850_L

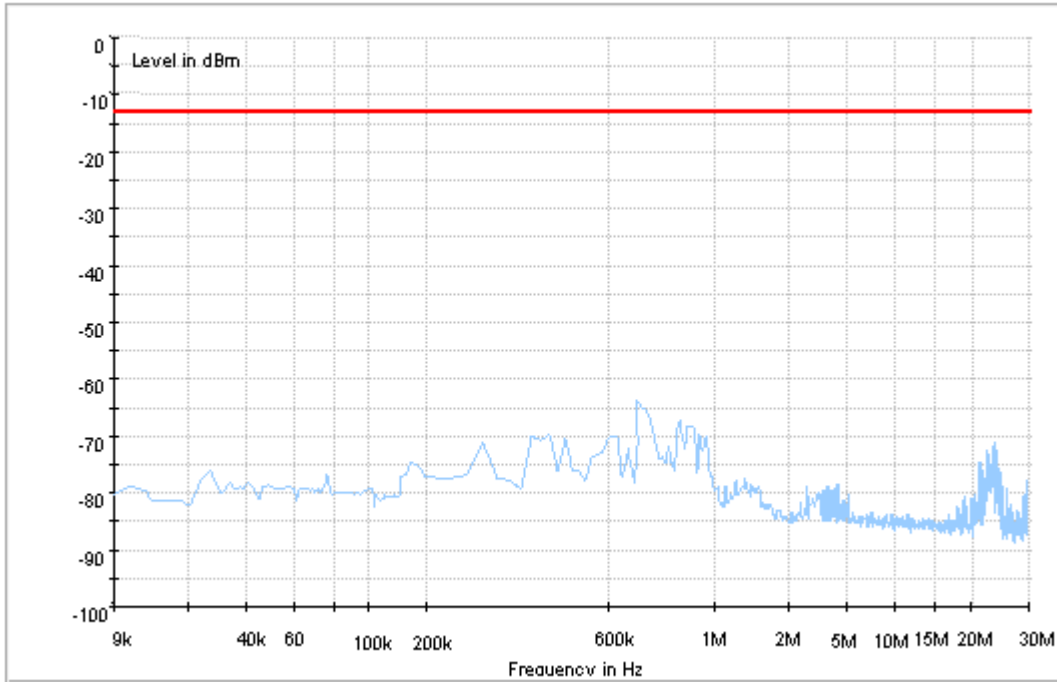


Copy of FCC PART22 GSM850_H

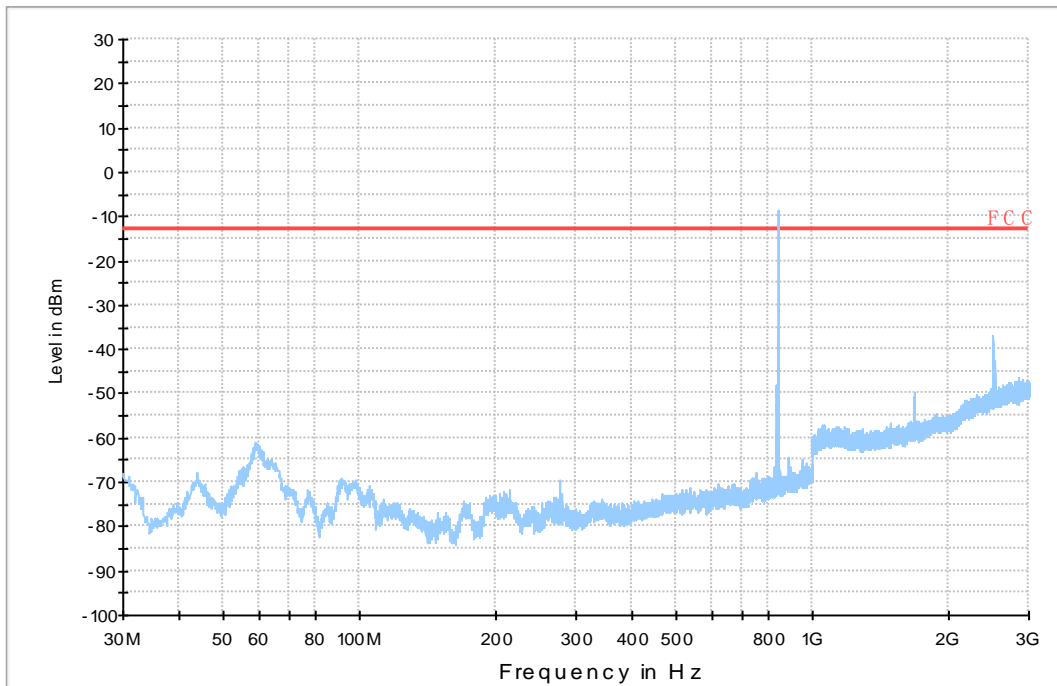


7.1.2 Test Band = GSM850_ANT2

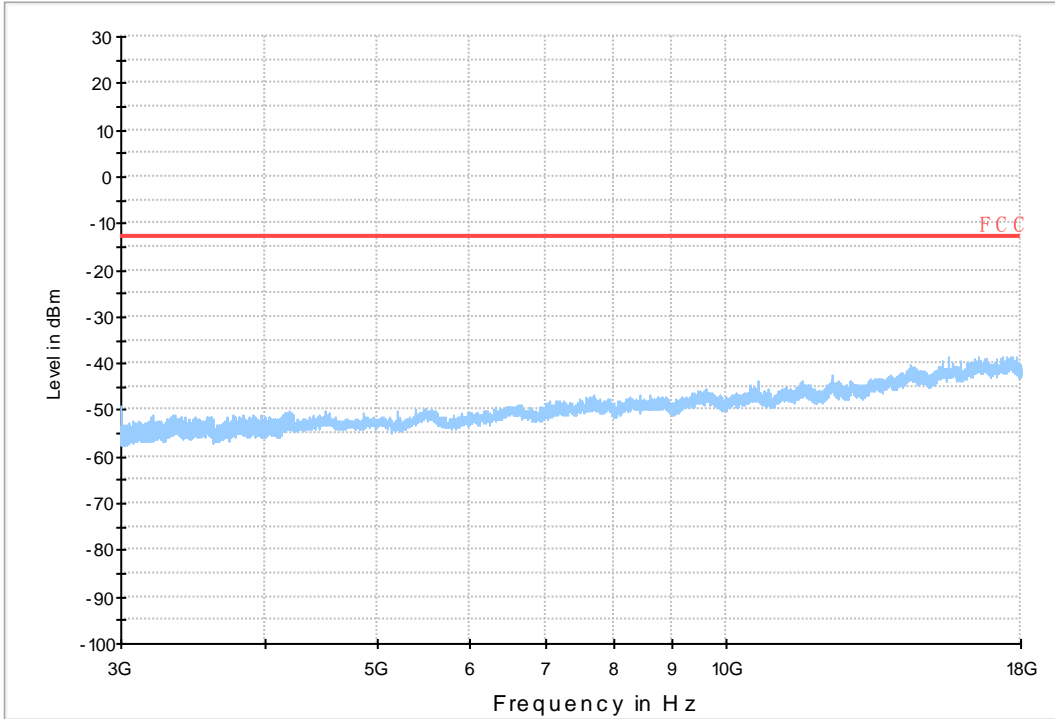
7.1.2.1 Test Mode = GSM/TM1



Copy of FCC PART22 GSM850_L

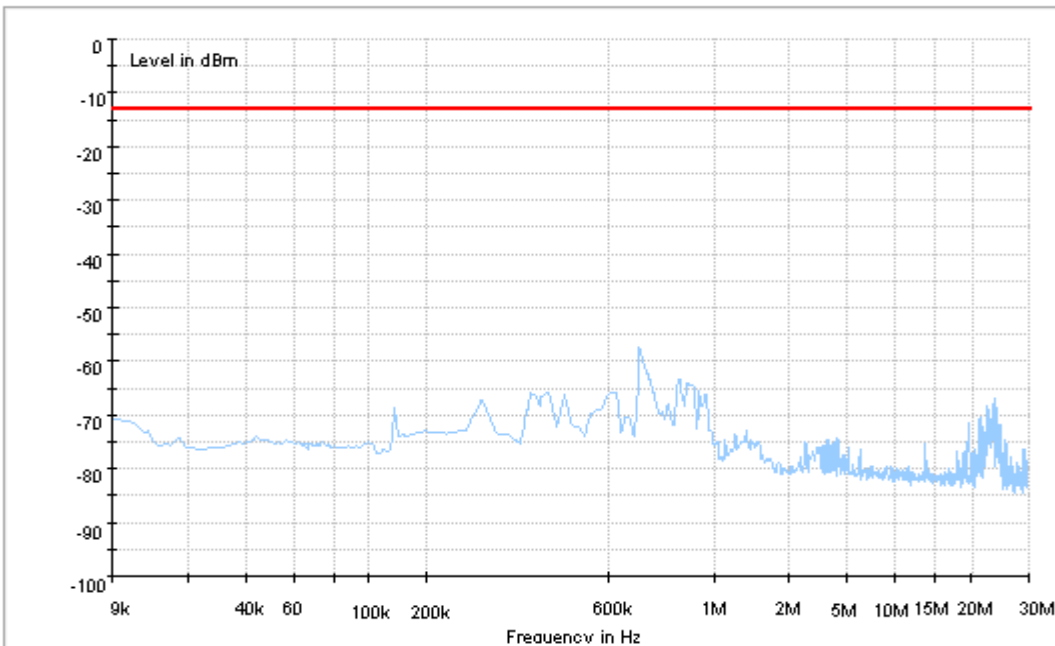


Copy of FCC PART22 GSM850_H

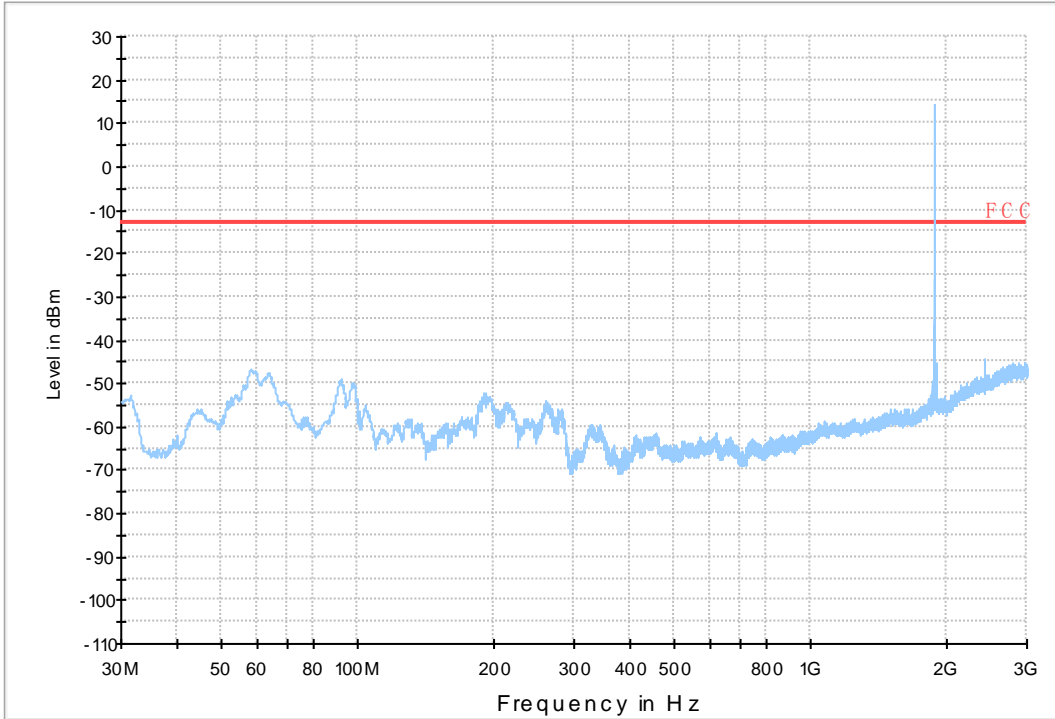


7.1.3 Test Band = GSM1900_ANT1

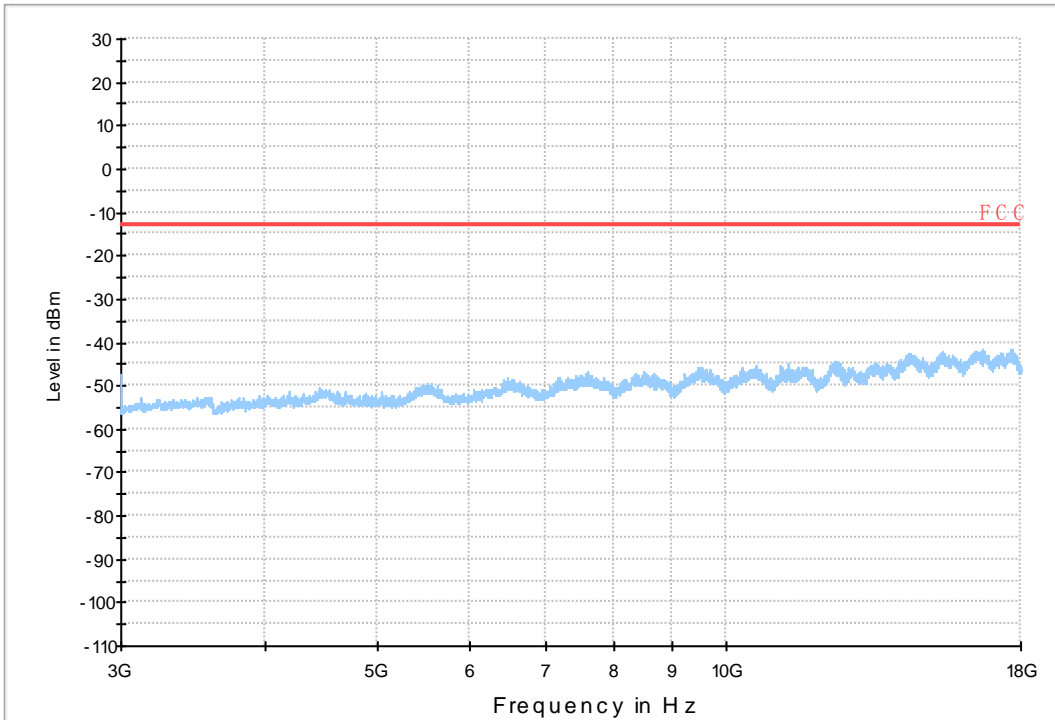
7.1.3.1 Test Mode = GSM/TM1

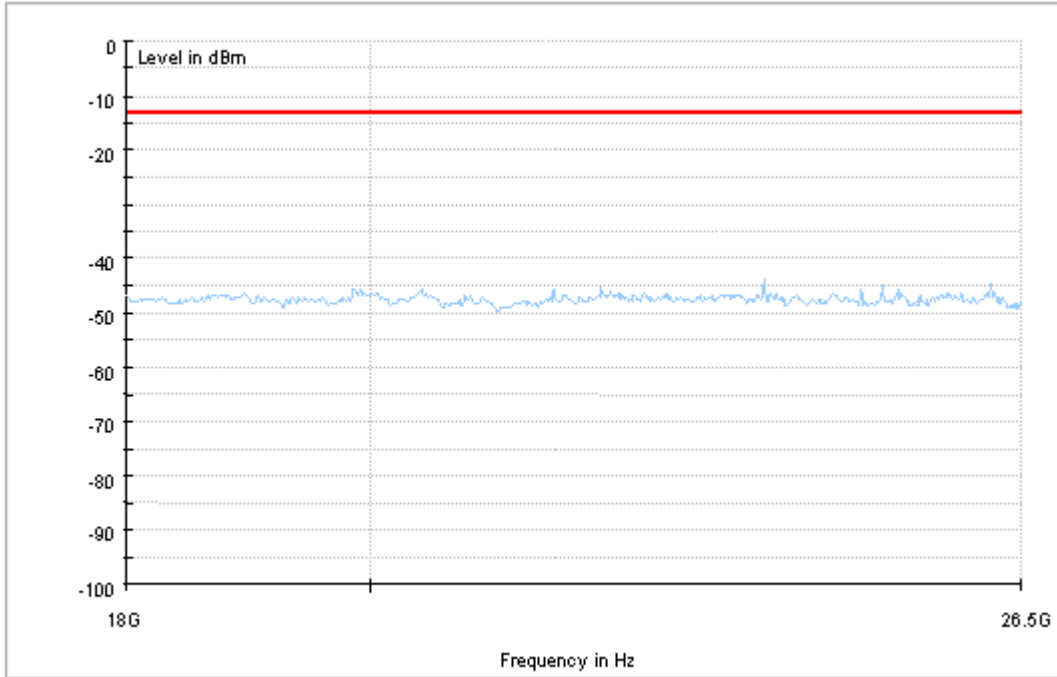


Copy of FCC PART24 GSM1900_L



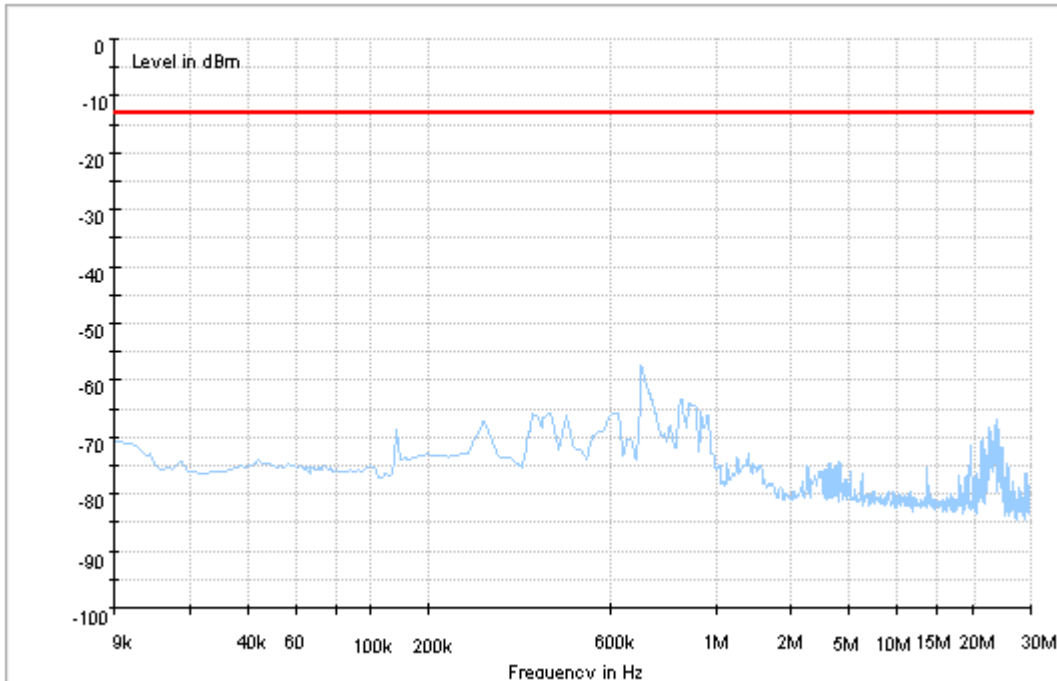
Copy of FCC PART24 GSM1900_H



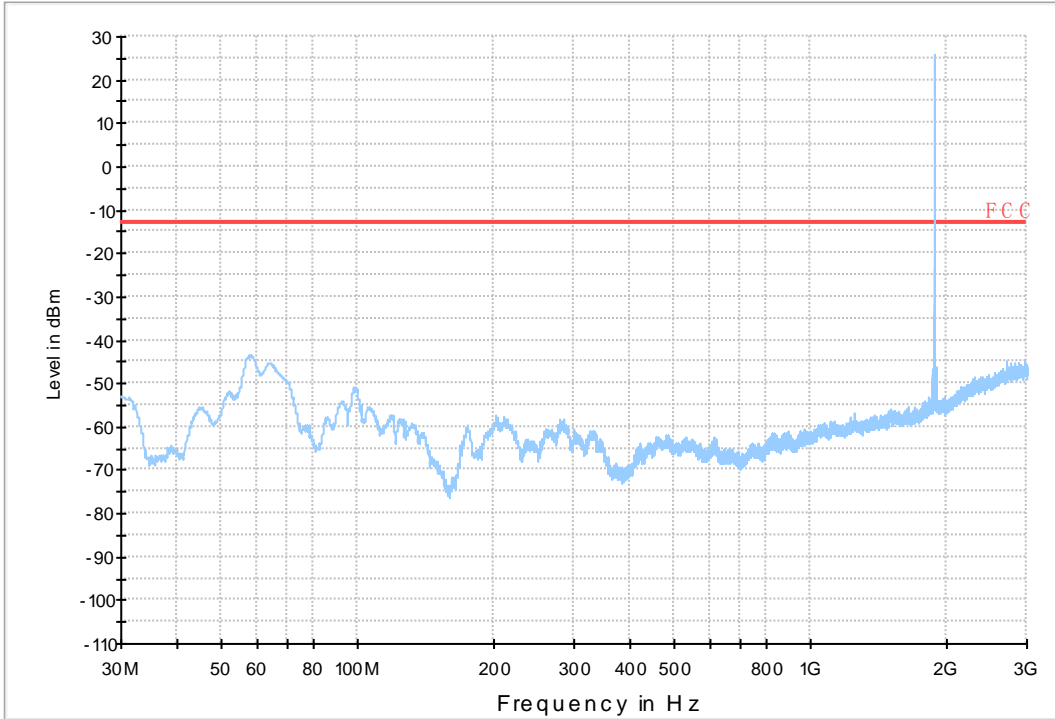


7.1.4 Test Band = GSM1900_ANT2

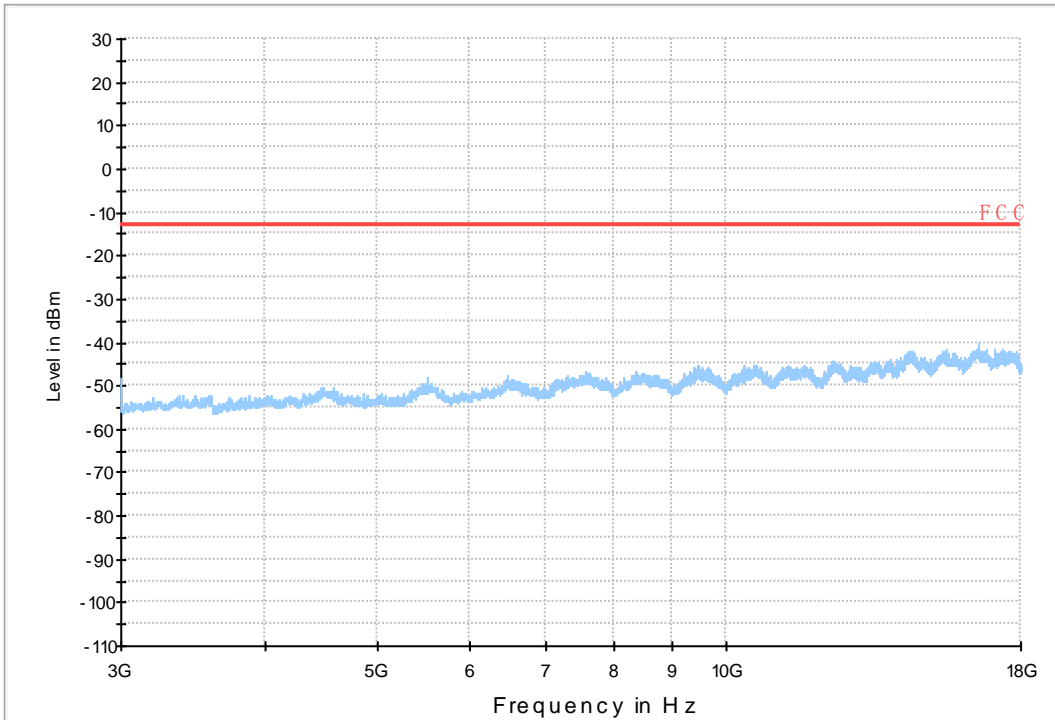
7.1.4.1 Test Mode = GSM/TM1

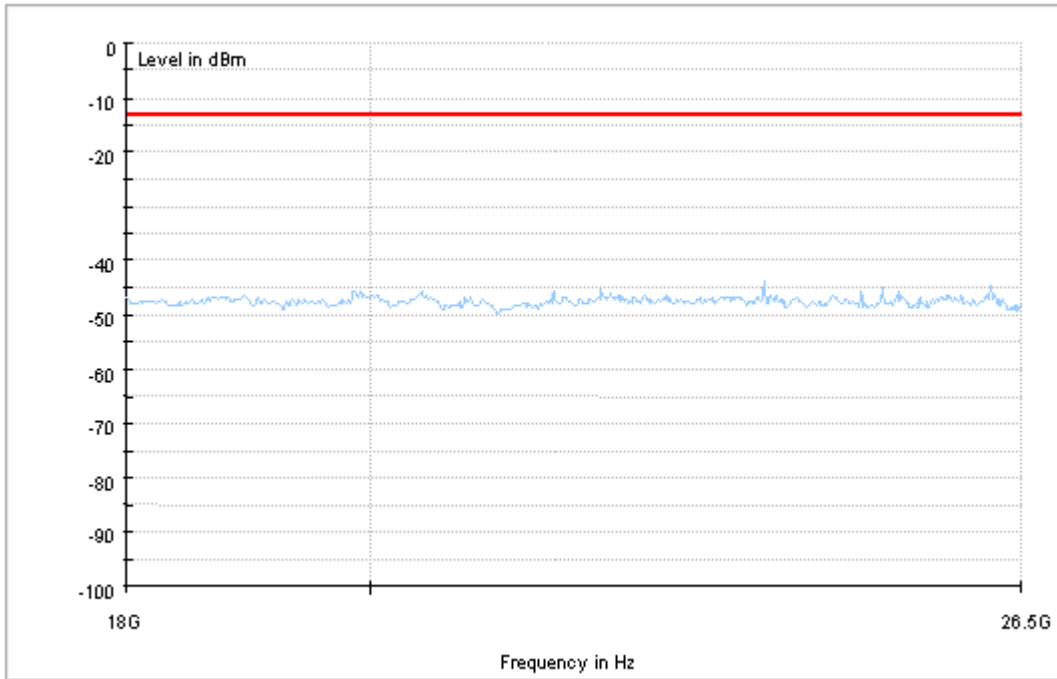


Copy of FCC PART24 GSM1900_L



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	-15.50	-0.01881	PASS
				VN	-14.92	-0.0181	PASS
				VH	-15.43	-0.01872	PASS
		MCH	TN	VL	-8.78	-0.01049	PASS
				VN	-12.01	-0.01436	PASS
				VH	-14.72	-0.0176	PASS
		HCH	TN	VL	-9.10	-0.01072	PASS
				VN	-12.79	-0.01507	PASS
				VH	-12.40	-0.01461	PASS
	GSM/TM2	LCH	TN	VL	-12.82	-0.01555	PASS
				VN	-16.40	-0.0199	PASS
				VH	-18.34	-0.02225	PASS
		MCH	TN	VL	-14.75	-0.01763	PASS
				VN	-10.04	-0.012	PASS
				VH	-14.59	-0.01744	PASS
HCH	TN	VL	-22.99	-0.02709	PASS		
		VN	-11.98	-0.01411	PASS		
		VH	-18.18	-0.02142	PASS		
GSM1900	GSM/TM1	LCH	TN	VL	41.00	0.02216	PASS
				VN	48.82	0.02639	PASS
				VH	35.32	0.01909	PASS
		MCH	TN	VL	33.71	0.01793	PASS
				VN	16.85	0.00896	PASS
				VH	31.70	0.01686	PASS
		HCH	TN	VL	36.94	0.01934	PASS
				VN	33.90	0.01775	PASS
				VH	30.99	0.01623	PASS
	GSM/TM2	LCH	TN	VL	22.44	0.01213	PASS
				VN	20.15	0.01089	PASS
				VH	22.79	0.01232	PASS

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
		MCH	TN	VL	10.56	0.00562	PASS
				VN	22.89	0.01218	PASS
				VH	20.53	0.01092	PASS
		HCH	TN	VL	14.75	0.00772	PASS
				VN	35.22	0.01844	PASS
				VH	26.96	0.01412	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	-14.21	-0.01724	PASS
				-20	-14.27	-0.01731	PASS
				-10	-14.08	-0.01708	PASS
				0	-17.63	-0.02139	PASS
				10	-14.98	-0.01818	PASS
				20	-11.43	-0.01387	PASS
				30	-11.88	-0.01441	PASS
				40	-9.30	-0.01128	PASS
		MCH	VN	-30	-13.30	-0.0159	PASS
				-20	-13.95	-0.01667	PASS
				-10	-10.98	-0.01312	PASS
				0	-14.40	-0.01721	PASS
				10	-16.98	-0.0203	PASS
				20	-15.50	-0.01853	PASS
				30	-11.82	-0.01413	PASS
				40	-14.08	-0.01683	PASS
		HCH	VN	-30	-8.78	-0.01034	PASS
				-20	-10.01	-0.01179	PASS
				-10	-14.53	-0.01712	PASS
				0	-11.11	-0.01309	PASS
				10	-12.20	-0.01437	PASS
				20	-12.66	-0.01492	PASS
				30	-9.30	-0.01096	PASS
				40	-8.78	-0.01034	PASS



Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
	GSM/TM2	LCH	VN	50	-13.88	-0.01635	PASS
				-30	-16.66	-0.02021	PASS
				-20	-14.46	-0.01754	PASS
				-10	-17.76	-0.02155	PASS
				0	-9.40	-0.0114	PASS
				10	-17.21	-0.02088	PASS
				20	-13.14	-0.01594	PASS
				30	-18.18	-0.02206	PASS
		40	-12.40	-0.01504	PASS		
		50	-11.85	-0.01438	PASS		
		MCH	VN	-30	-17.14	-0.02049	PASS
				-20	-10.65	-0.01273	PASS
				-10	-12.91	-0.01543	PASS
				0	-10.82	-0.01293	PASS
				10	-10.56	-0.01262	PASS
				20	-19.66	-0.0235	PASS
				30	-9.46	-0.01131	PASS
				40	-12.56	-0.01501	PASS
		50	-13.72	-0.0164	PASS		
		HCH	VN	-30	-21.70	-0.02557	PASS
				-20	-13.30	-0.01567	PASS
				-10	-10.59	-0.01248	PASS
				0	-12.20	-0.01437	PASS
				10	-12.46	-0.01468	PASS
				20	-11.82	-0.01393	PASS
				30	-16.89	-0.0199	PASS
				40	-8.88	-0.01046	PASS
		50	-9.81	-0.01156	PASS		
GSM1900	GSM/TM1	LCH	VN	-30	40.16	0.02171	PASS
				-20	36.16	0.01954	PASS
				-10	36.48	0.01972	PASS
				0	43.13	0.02331	PASS
				10	29.64	0.01602	PASS
				20	42.36	0.02289	PASS
				30	37.39	0.02021	PASS
				40	37.45	0.02024	PASS
		50	38.81	0.02098	PASS		
		MCH	VN	-30	26.67	0.01419	PASS
				-20	23.37	0.01243	PASS
				-10	25.38	0.0135	PASS



Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict						
				0	31.45	0.01673	PASS						
				10	22.86	0.01216	PASS						
				20	28.93	0.01539	PASS						
				30	39.32	0.02091	PASS						
				40	26.02	0.01384	PASS						
				50	40.62	0.02161	PASS						
		HCH	VN			-30	32.74	0.01714	PASS				
						-20	34.35	0.01799	PASS				
						-10	41.78	0.02188	PASS				
						0	25.18	0.01318	PASS				
						10	40.62	0.02127	PASS				
						20	40.03	0.02096	PASS				
						30	35.39	0.01853	PASS				
						40	32.22	0.01687	PASS				
						50	25.96	0.01359	PASS				
						GSM/TM2		LCH	VN	-30	27.12	0.01466	PASS
										-20	42.68	0.02307	PASS
										-10	20.37	0.01101	PASS
	0	36.81	0.0199	PASS									
	10	34.71	0.01876	PASS									
	20	29.06	0.01571	PASS									
	30	25.34	0.0137	PASS									
	40	20.53	0.0111	PASS									
	50	19.24	0.0104	PASS									
	MCH	VN			-30			21.70	0.01154	PASS			
					-20			16.18	0.00861	PASS			
					-10			23.28	0.01238	PASS			
					0			38.29	0.02037	PASS			
					10			27.86	0.01482	PASS			
					20			14.04	0.00747	PASS			
					30			21.02	0.01118	PASS			
					40			30.38	0.01616	PASS			
					50			25.47	0.01355	PASS			
	HCH	VN			-30	35.64	0.01866	PASS					
					-20	25.76	0.01349	PASS					
					-10	16.79	0.00879	PASS					
0					29.38	0.01538	PASS						
10					19.63	0.01028	PASS						
20					26.31	0.01378	PASS						
30					40.13	0.02101	PASS						



Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				40	26.22	0.01373	PASS
				50	28.28	0.01481	PASS

END