



Appendix for test report

1 Appendix_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	31.68	27.53	38.5	PASS
		MCH	31.82	27.67	38.5	PASS
		HCH	31.89	27.74	38.5	PASS
	GSM/TM2	LCH	26.34	22.19	38.5	PASS
		MCH	26.34	22.19	38.5	PASS
		HCH	26.31	22.16	38.5	PASS

Test Band	Test Mode	Test Channel	Measured[dBm]	EIRP[dBm]	Limit [dBm]	Verdict
GSM1900	GSM/TM1	LCH	29.74	27.64	33	PASS
		MCH	29.83	27.73	33	PASS
		HCH	29.8	27.7	33	PASS
	GSM/TM2	LCH	25.61	23.51	33	PASS
		MCH	25.55	23.45	33	PASS
		HCH	25.55	23.45	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	0.12	13	PASS
		MCH	0.13	13	PASS
		HCH	0.13	13	PASS
	GSM/TM2	LCH	2.93	13	PASS
		MCH	3.07	13	PASS
		HCH	3.08	13	PASS
GSM1900	GSM/TM1	LCH	0.13	13	PASS
		MCH	0.14	13	PASS
		HCH	0.14	13	PASS
	GSM/TM2	LCH	2.94	13	PASS
		MCH	2.86	13	PASS
		HCH	2.89	13	PASS

3Appendix_C: Modulation Characteristics

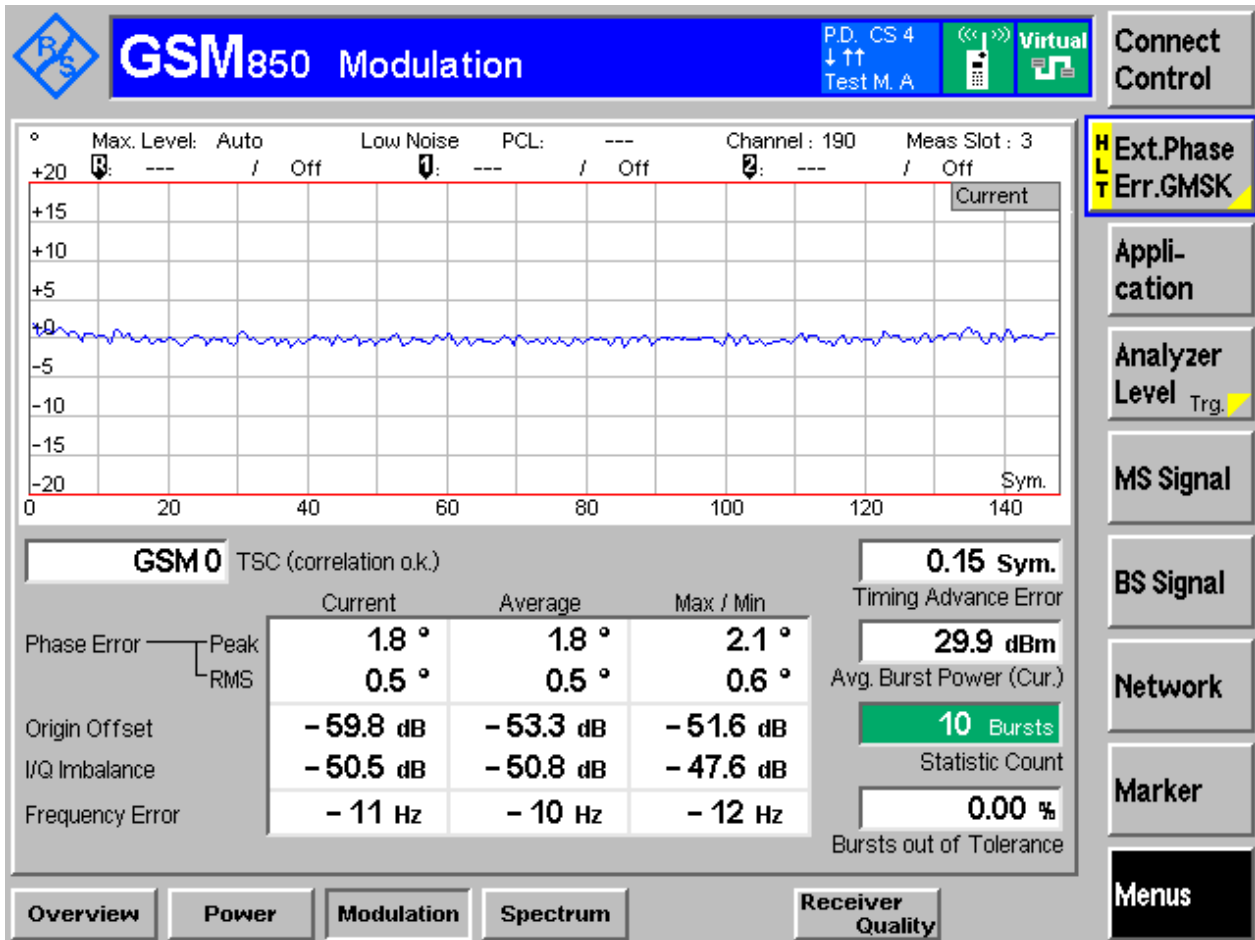
Part I - Test Plots

3.1 For GSM

3.1.1 Test Band = GSM850

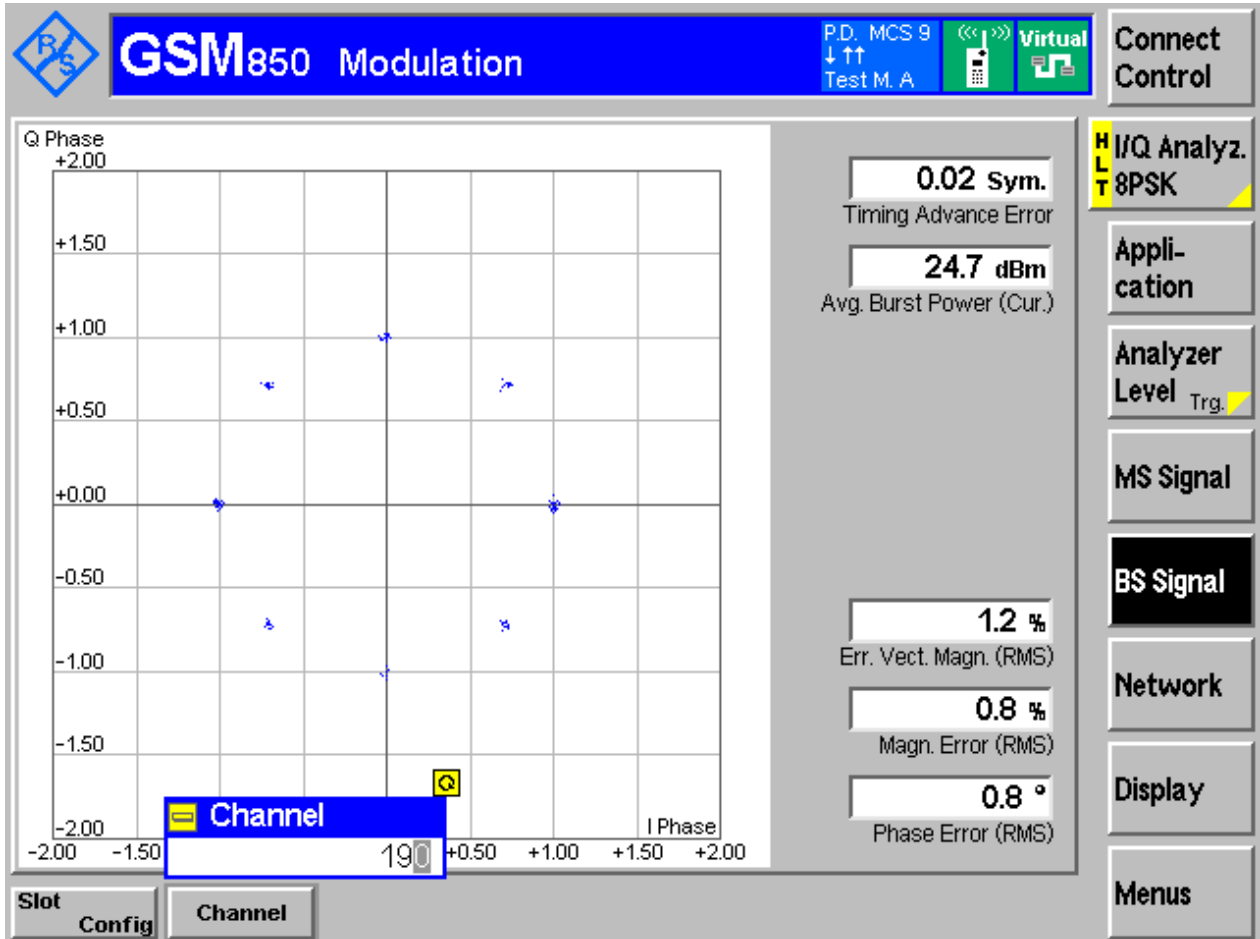
3.1.1.1 Test Mode = GSM/TM1

3.1.1.1.1 Test Channel = MCH



3.1.1.2 Test Mode = GSM/TM2

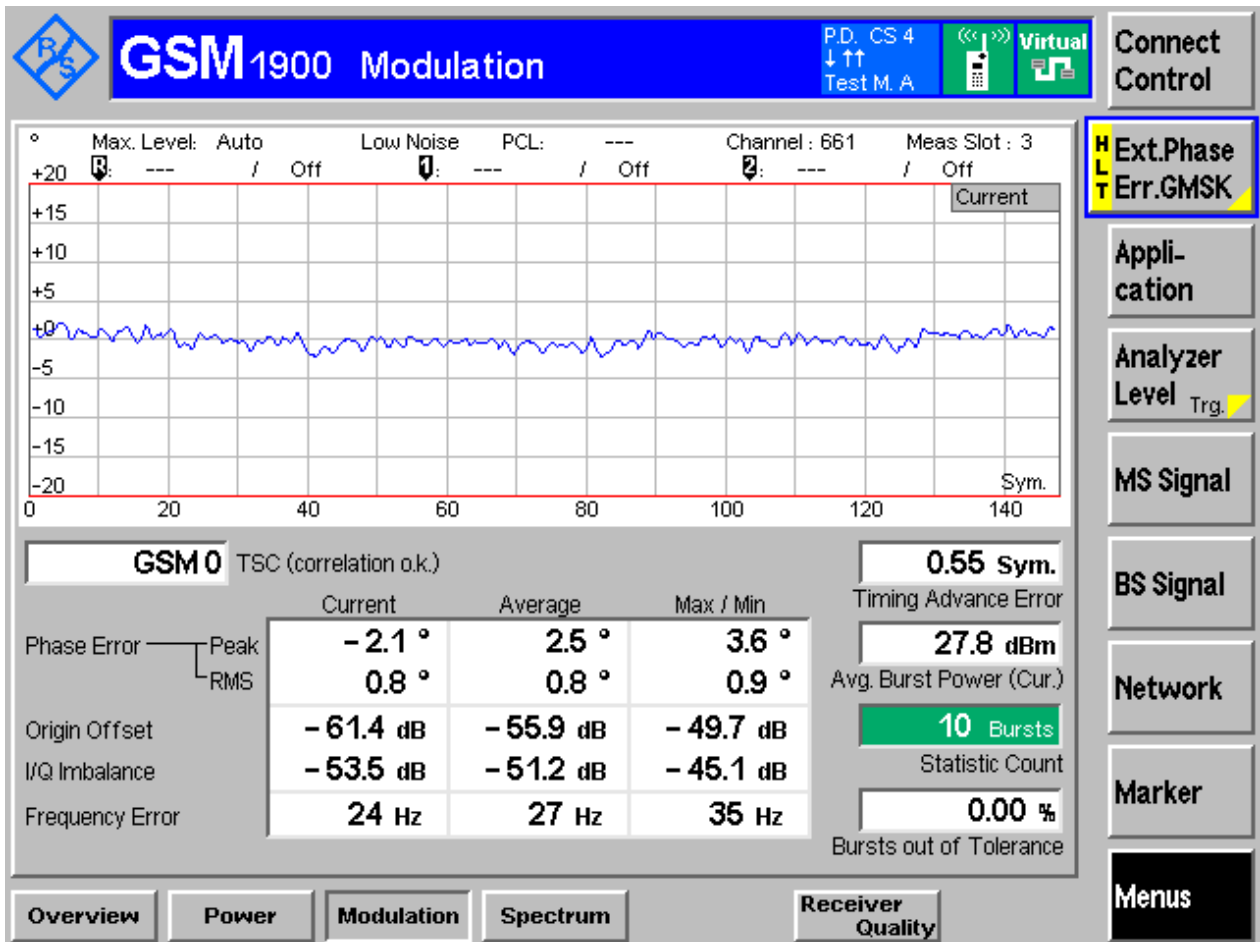
3.1.1.2.1 Test Channel = MCH



3.1.2 Test Band = GSM1900

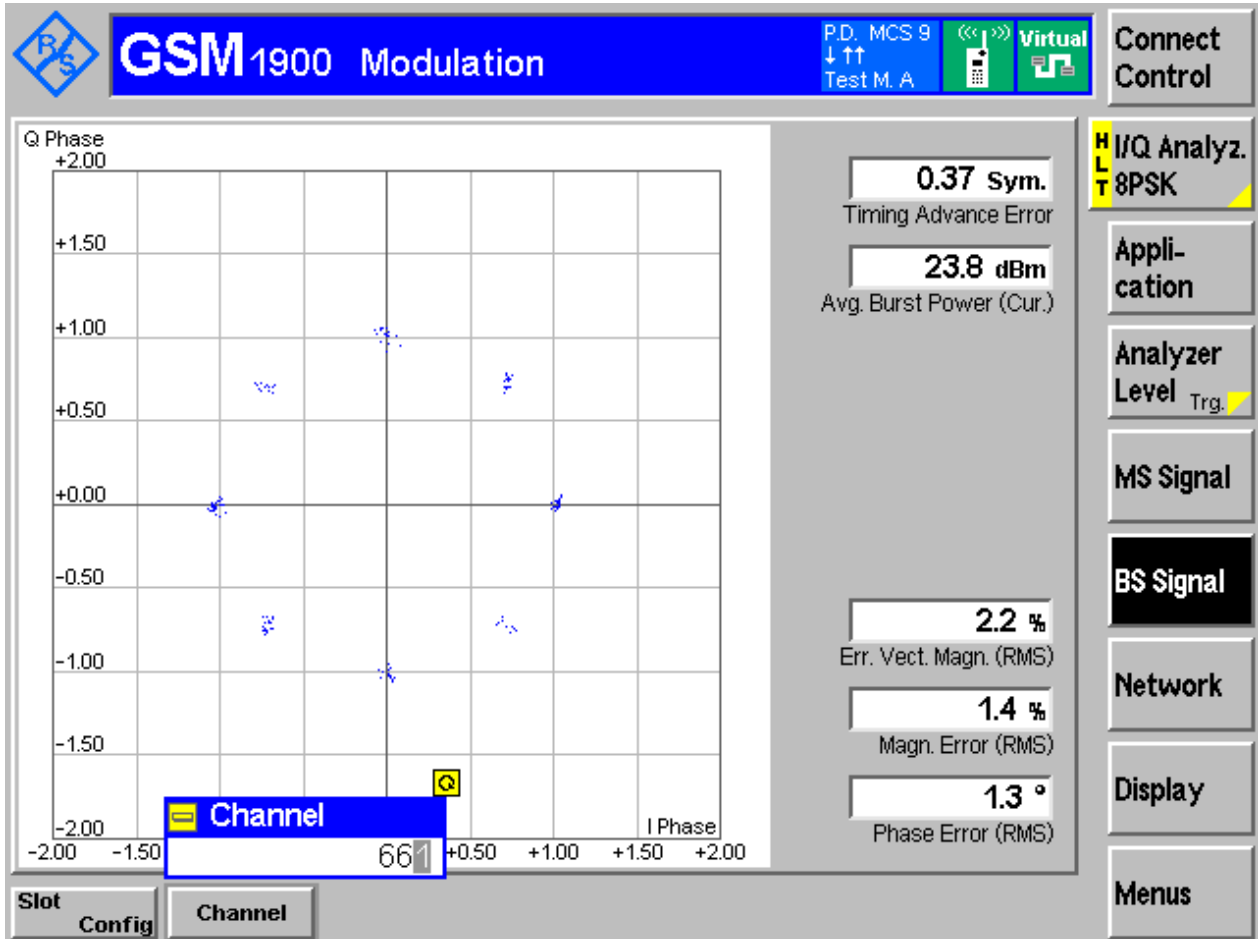
3.1.2.1 Test Mode = GSM/TM1

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	247.39	320.1	Pass
		MCH	248.24	323.0	Pass
		HCH	244.14	312.8	Pass
	GSM/TM2	LCH	246.05	317.8	Pass
		MCH	251.39	318.7	Pass
		HCH	248.55	320.6	Pass
GSM1900	GSM/TM1	LCH	249.85	318.3	Pass
		MCH	246.63	315.9	Pass
		HCH	245.11	316.3	Pass
	GSM/TM2	LCH	243.35	313.8	Pass
		MCH	244.86	313.2	Pass
		HCH	247.16	316.1	Pass



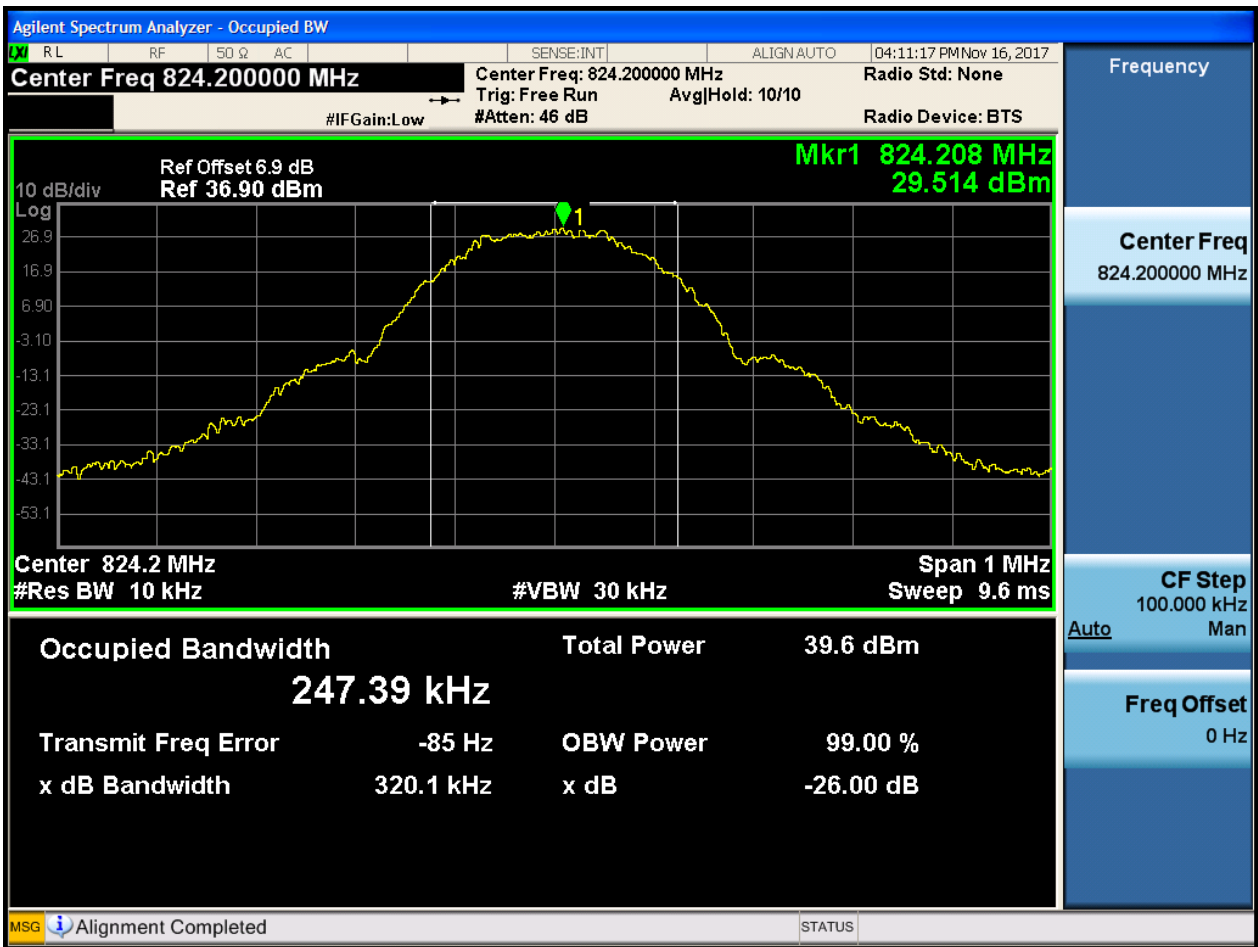
Part II - Test Plots

4.1 For GSM

4.1.1 Test Band = GSM850

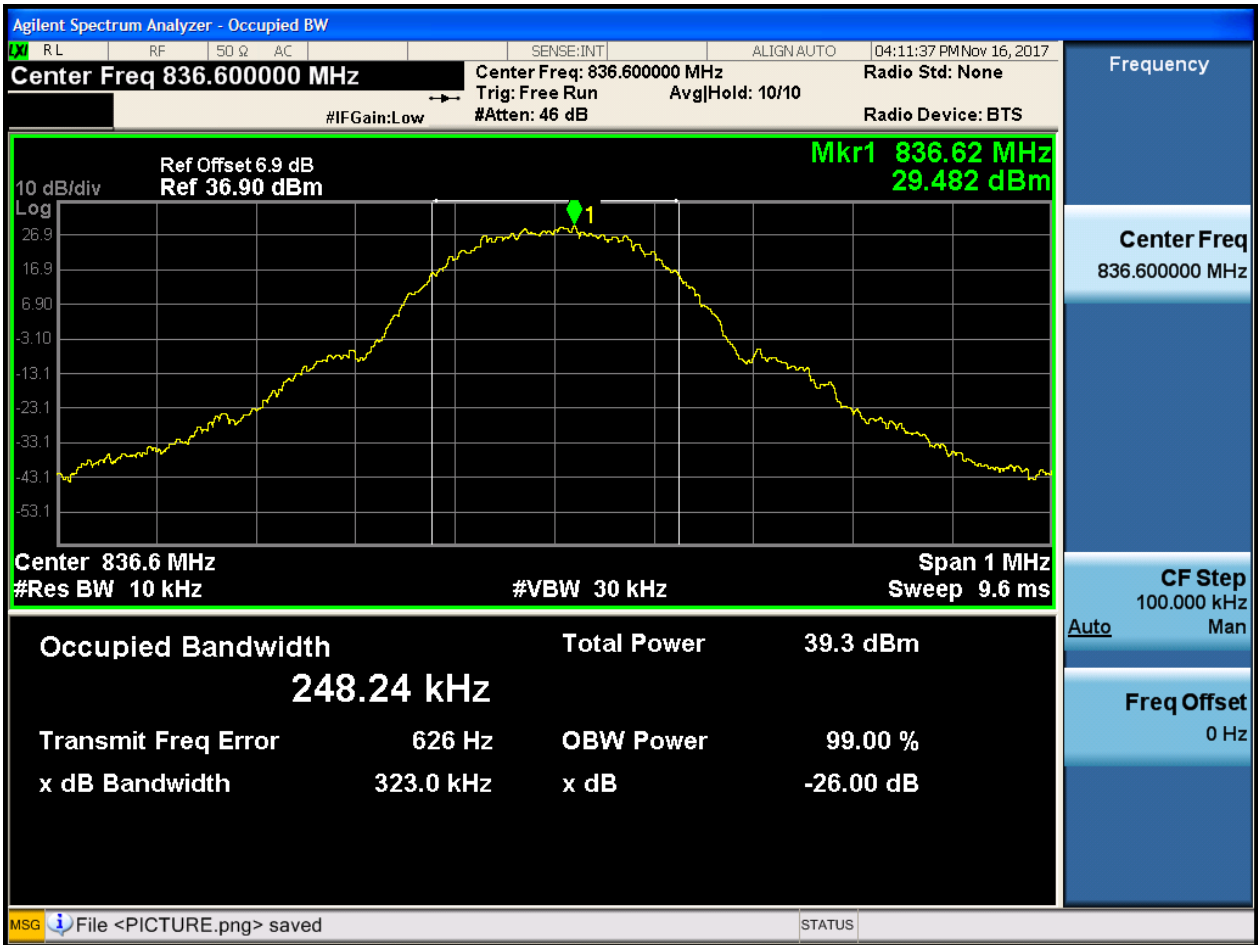
4.1.1.1 Test Mode = GSM/TM1

4.1.1.1.1 Test Channel = LCH



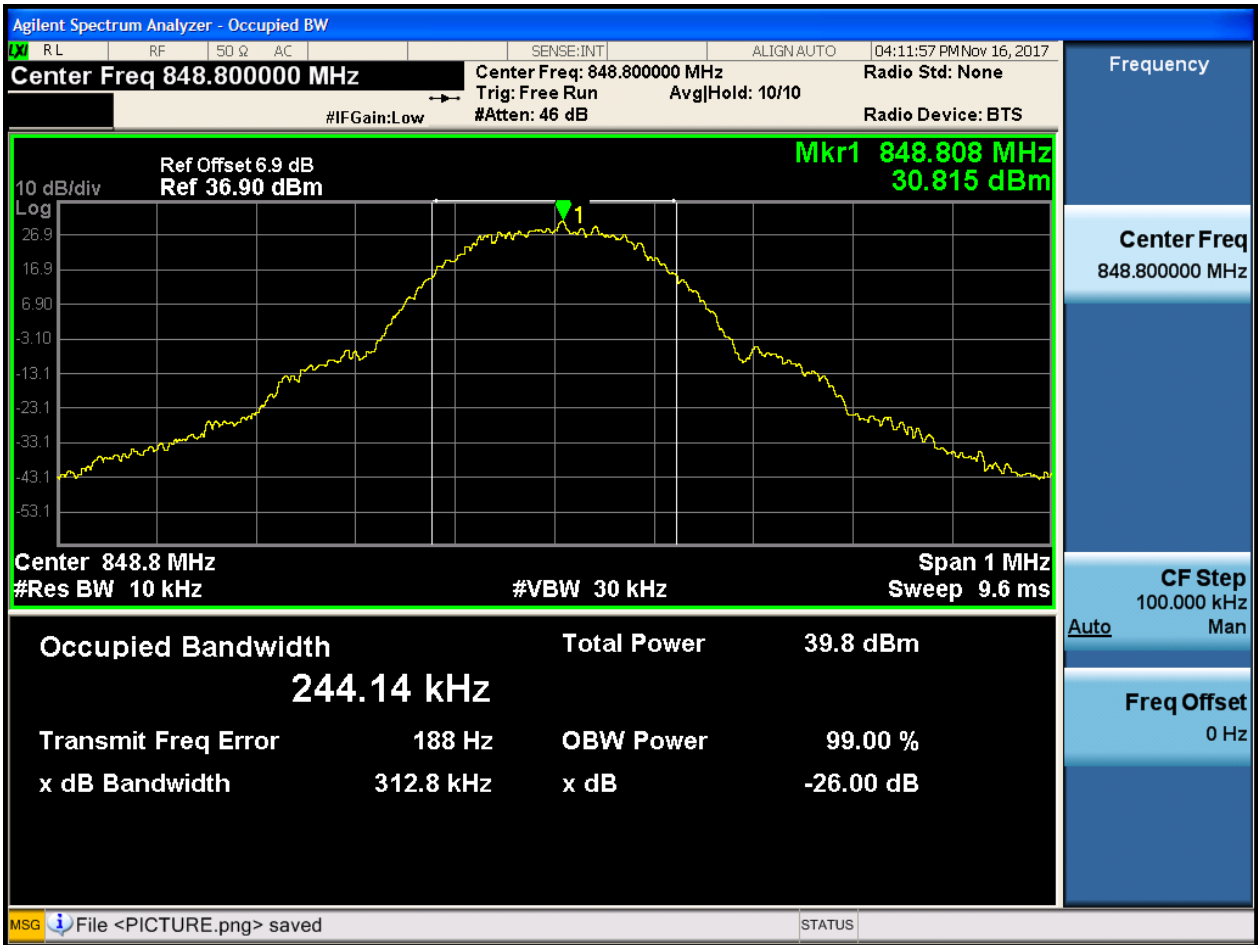


4.1.1.1.2 Test Channel = MCH





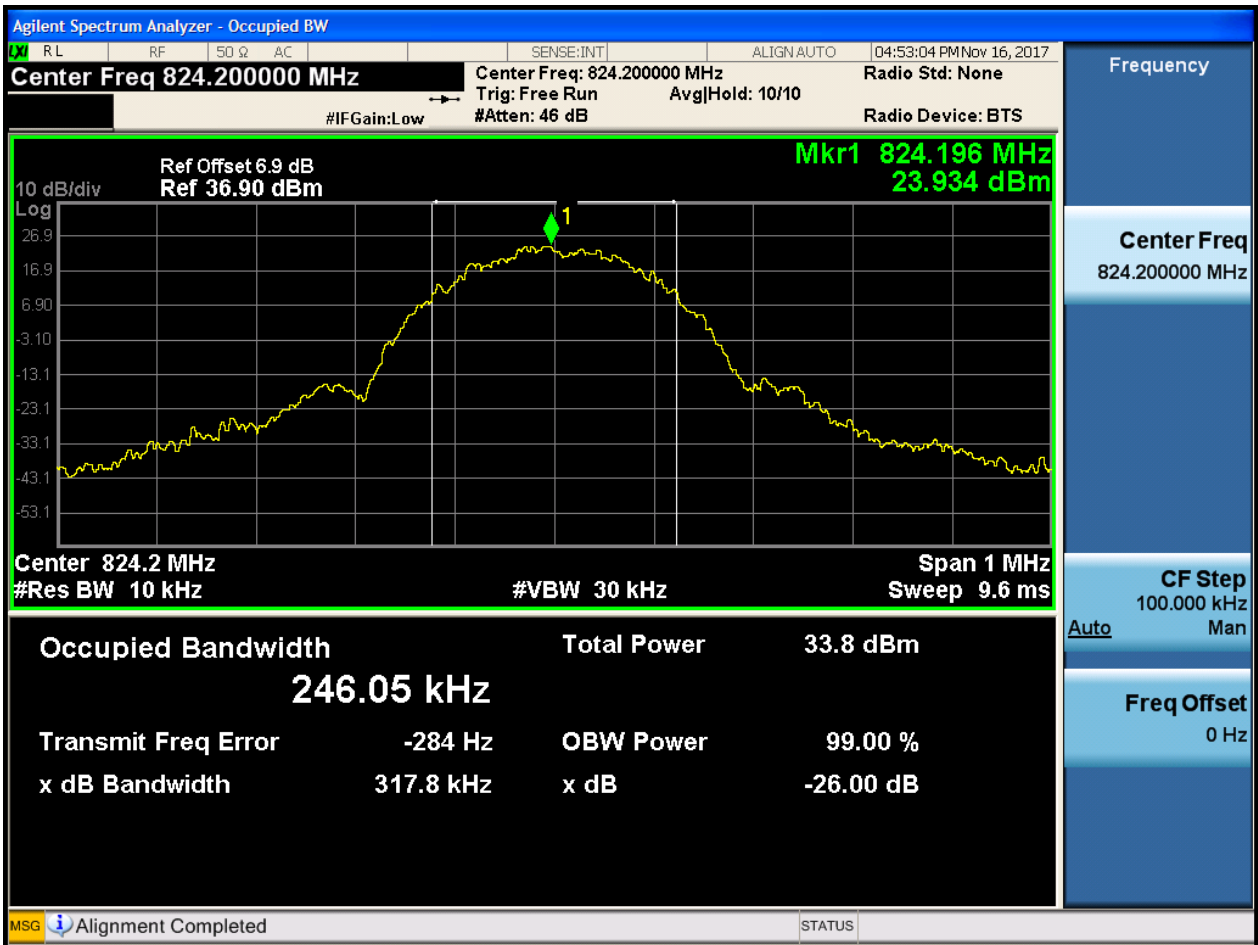
4.1.1.1.3 Test Channel = HCH





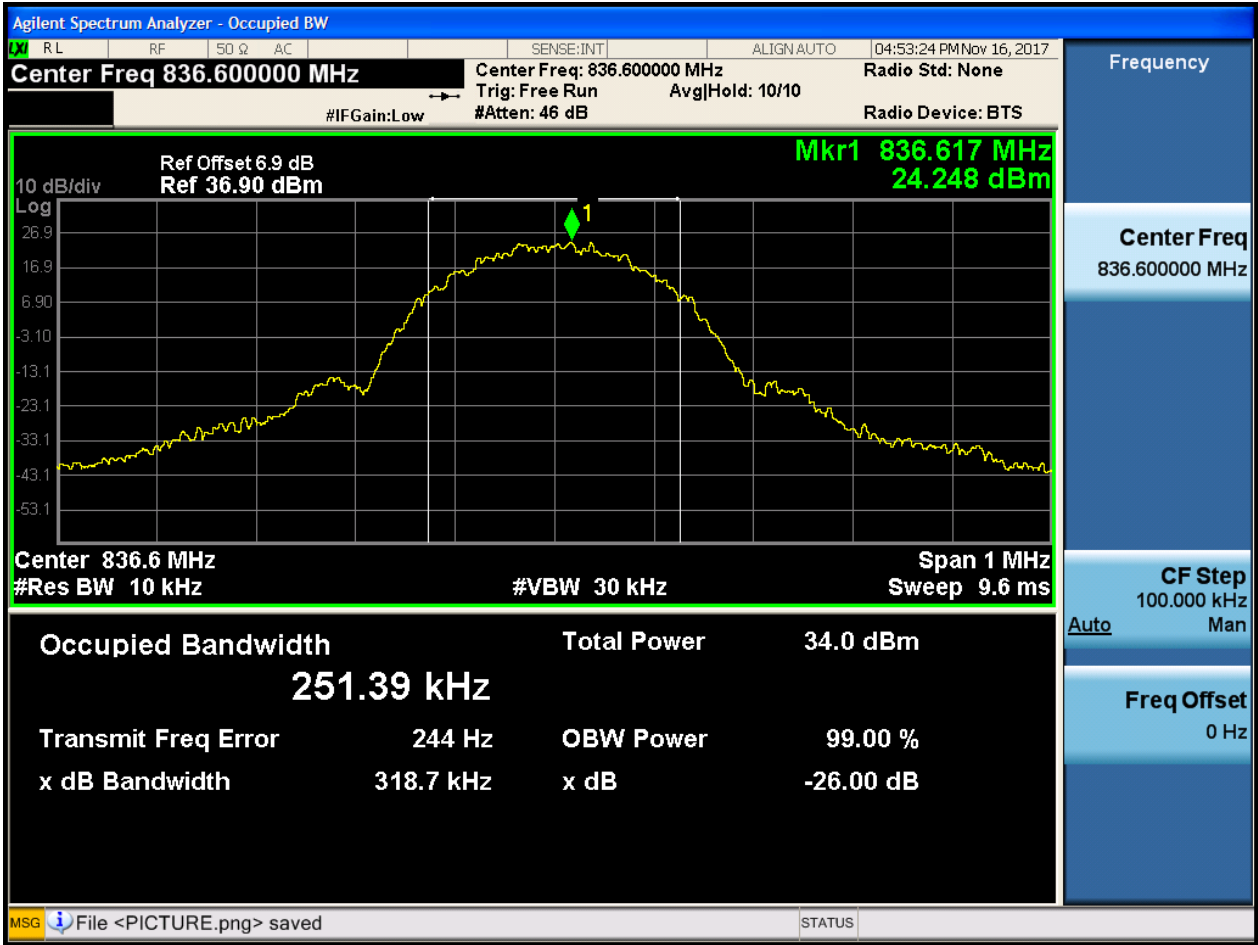
4.1.1.2 Test Mode = GSM/TM2

4.1.1.2.1 Test Channel = LCH



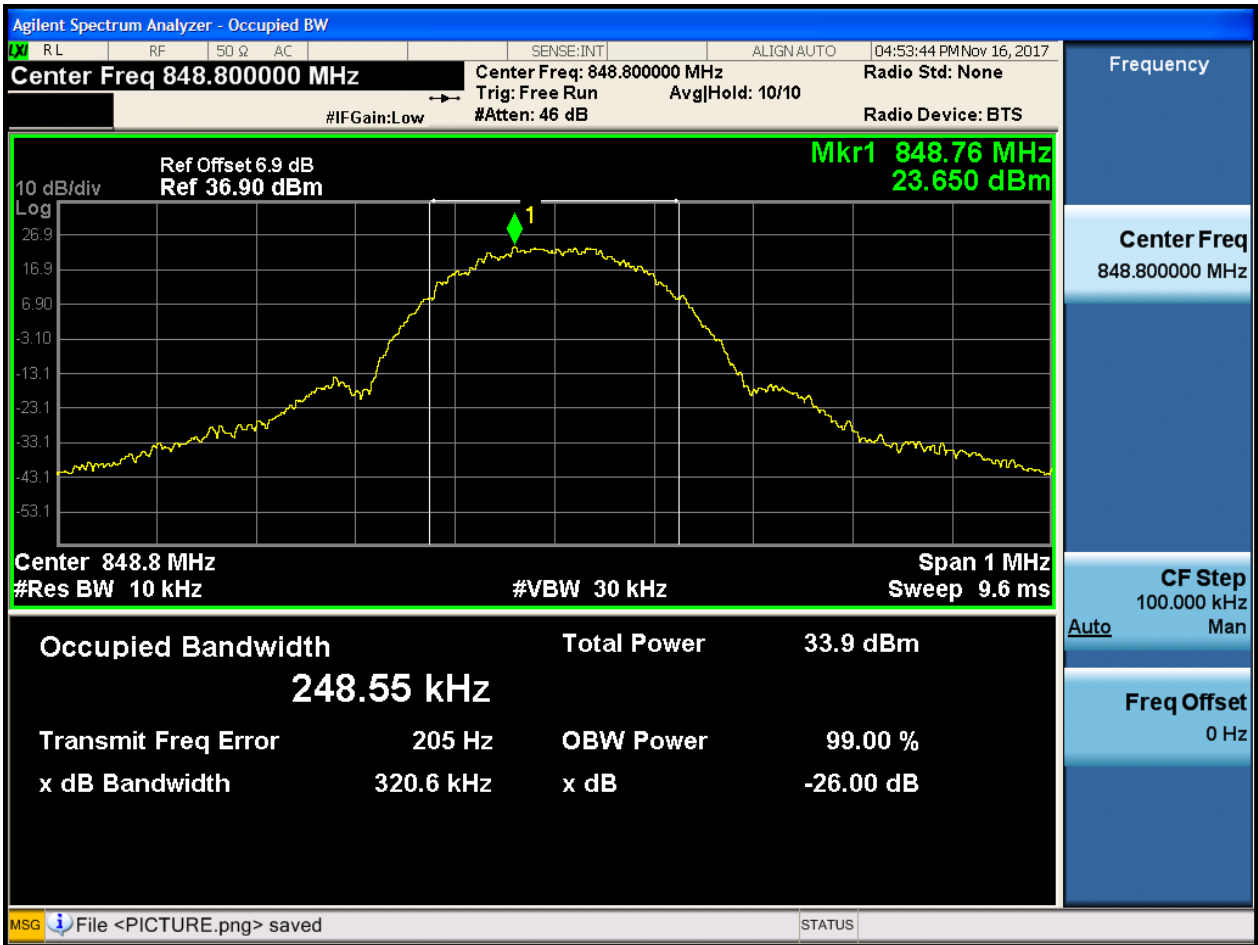


4.1.1.2.2 Test Channel = MCH





4.1.1.2.3 Test Channel = HCH

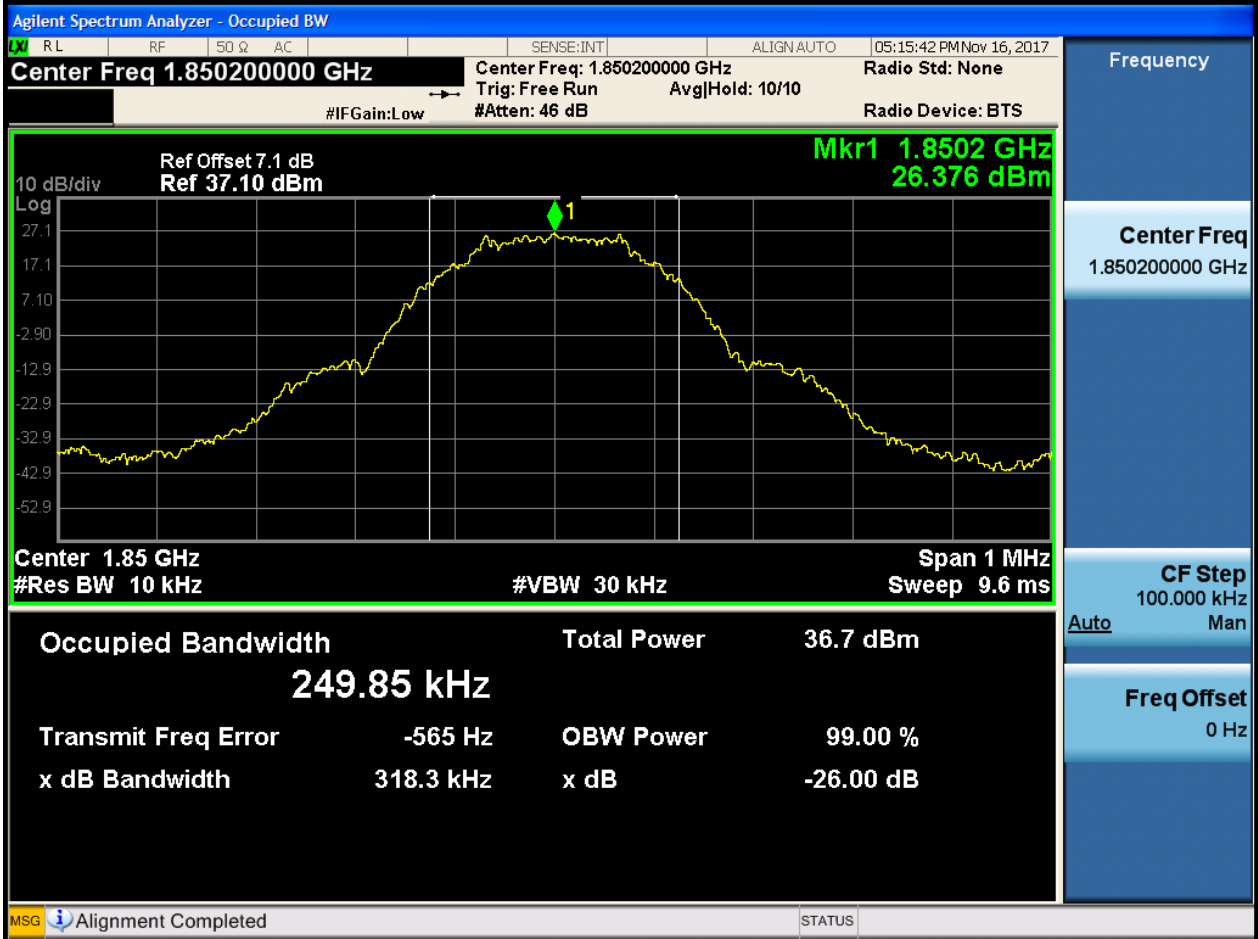




4.1.2 Test Band = GSM1900

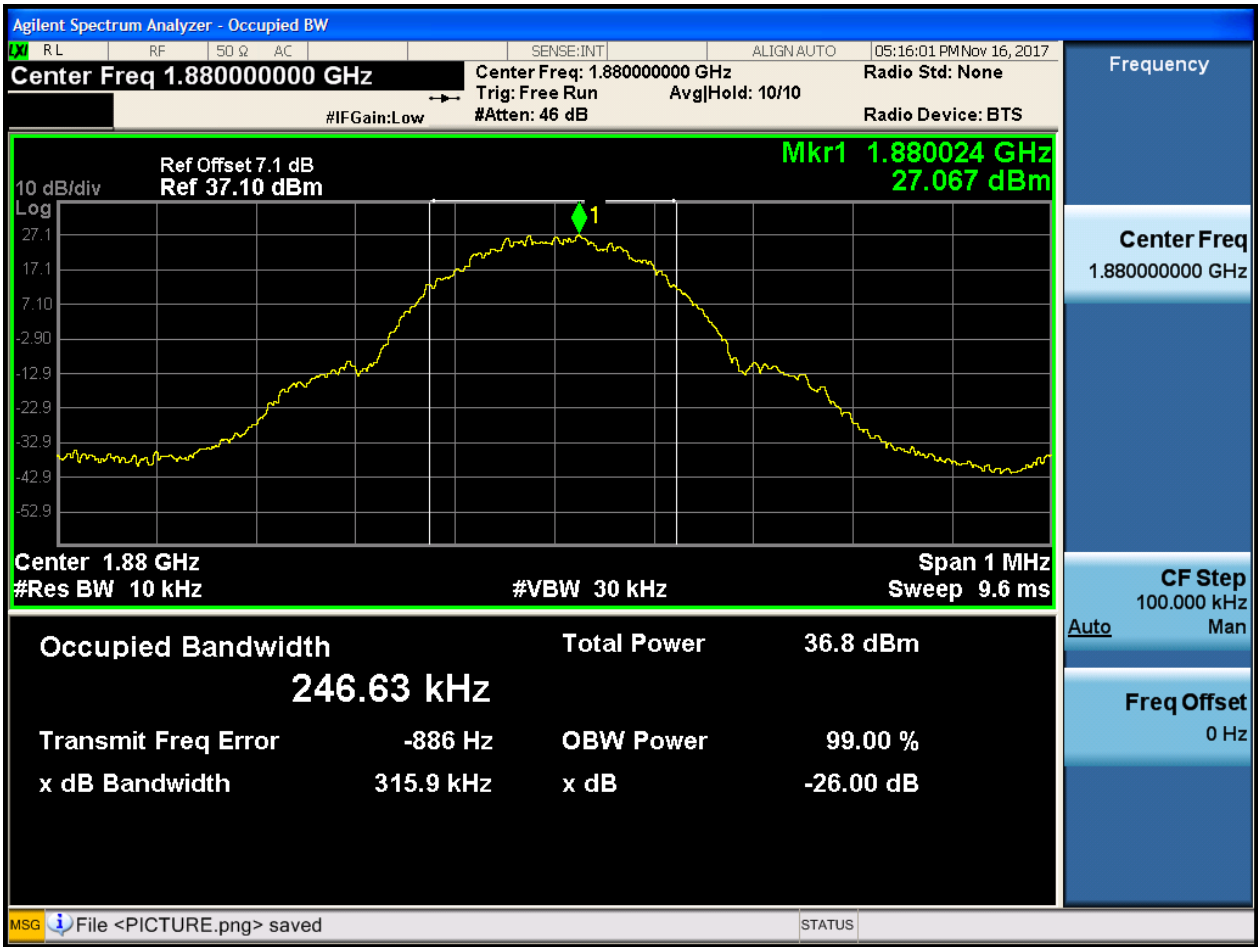
4.1.2.1 Test Mode = GSM/TM1

4.1.2.1.1 Test Channel = LCH



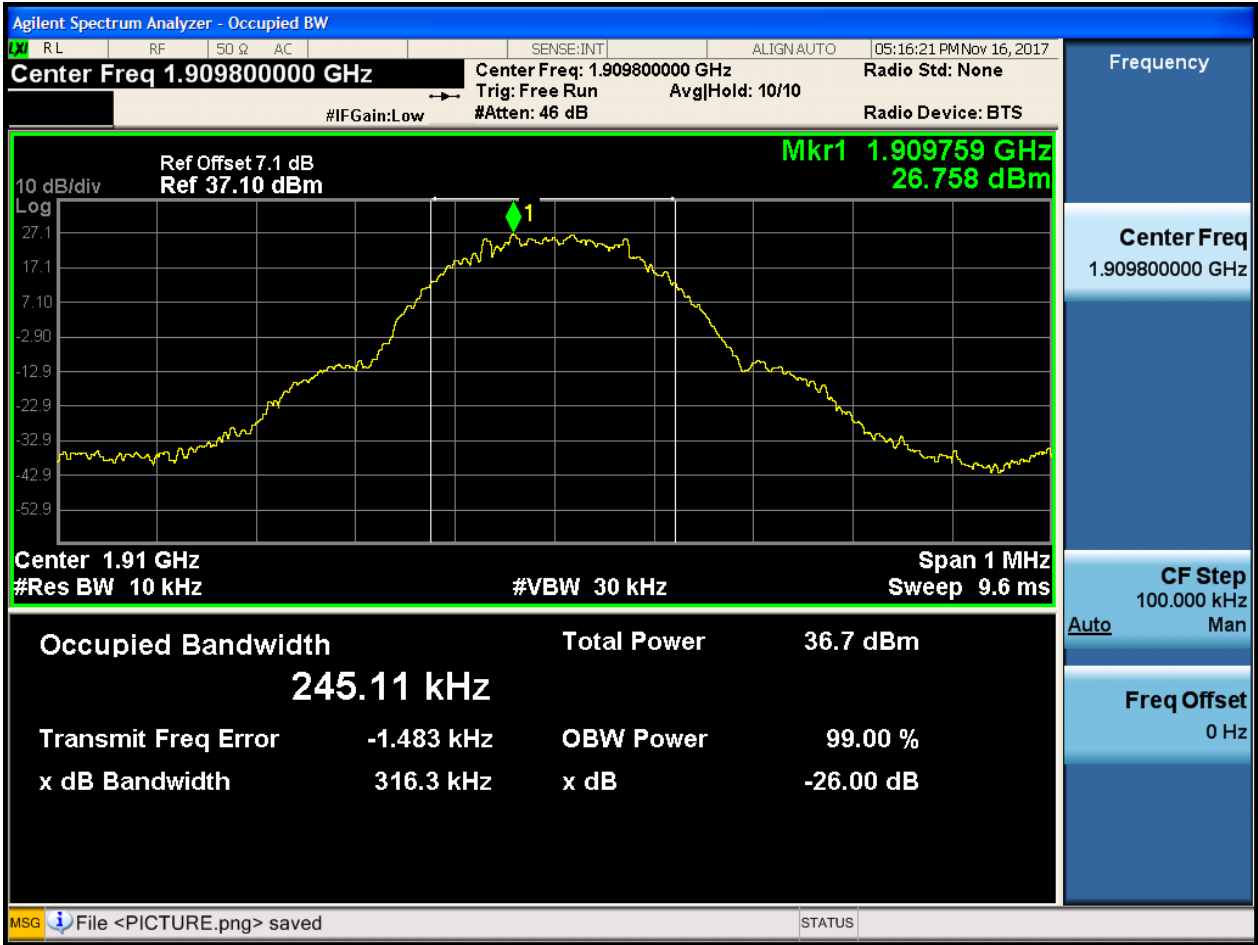


4.1.2.1.2 Test Channel = MCH





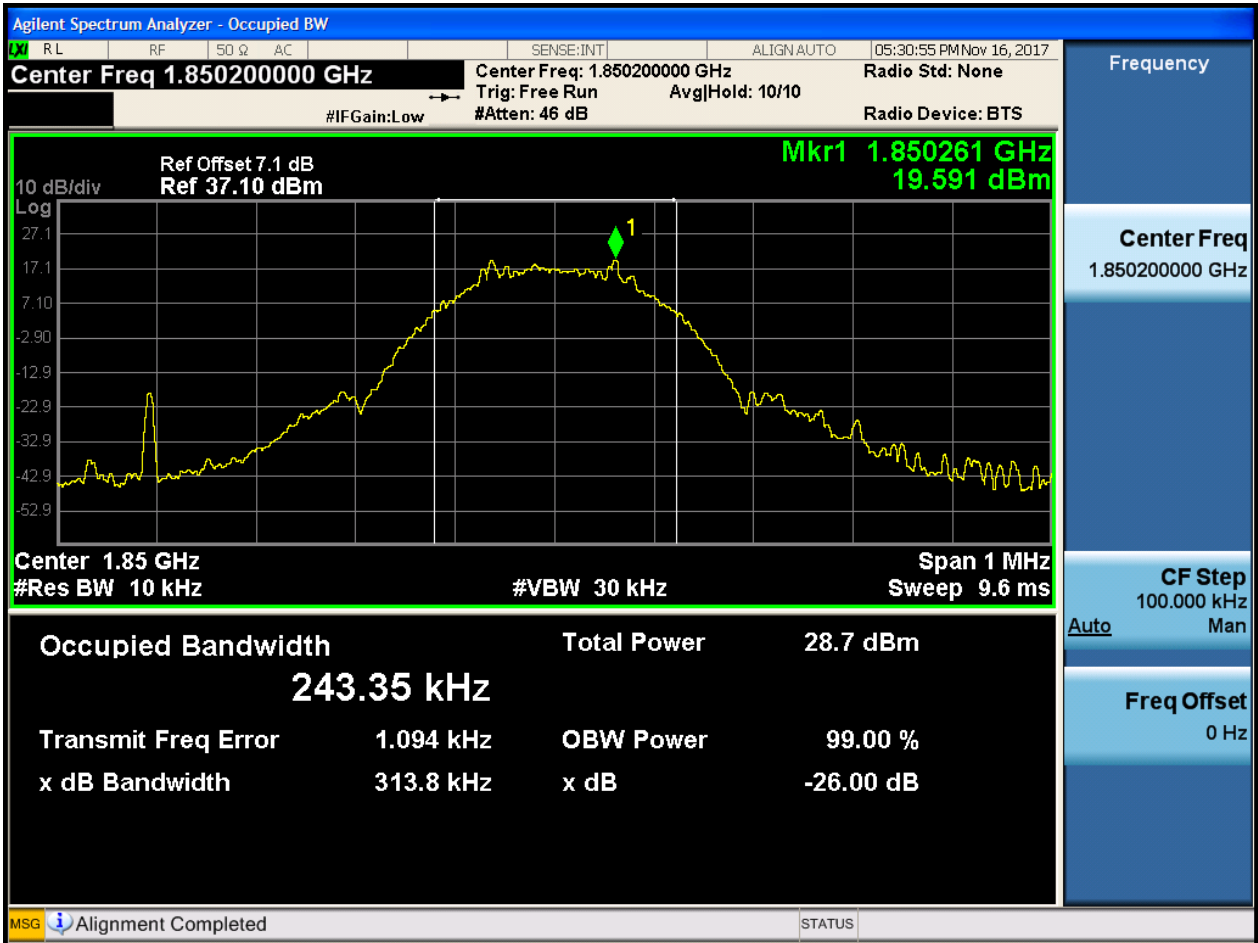
4.1.2.1.3 Test Channel = HCH





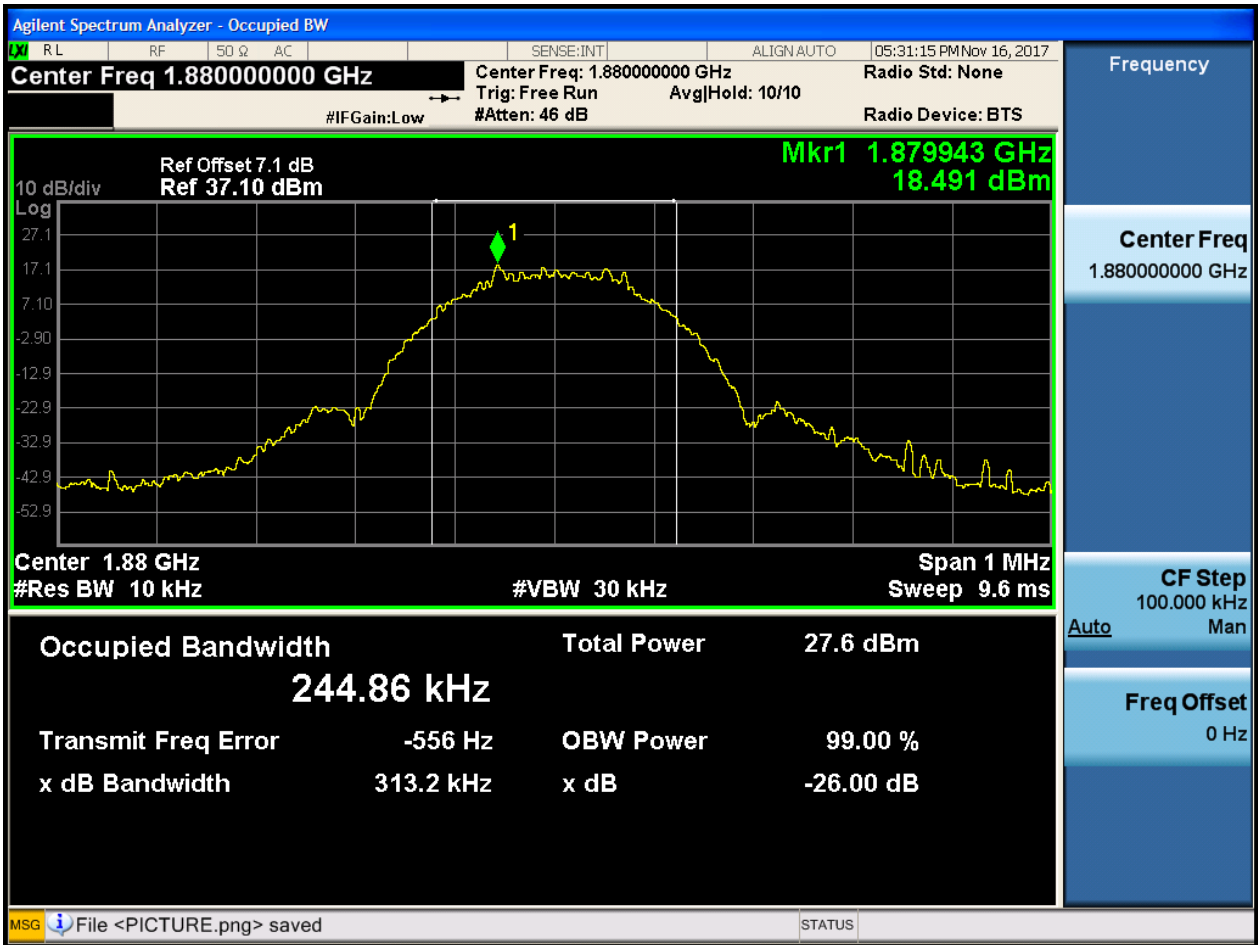
4.1.2.2 Test Mode = GSM/TM2

4.1.2.2.1 Test Channel = LCH



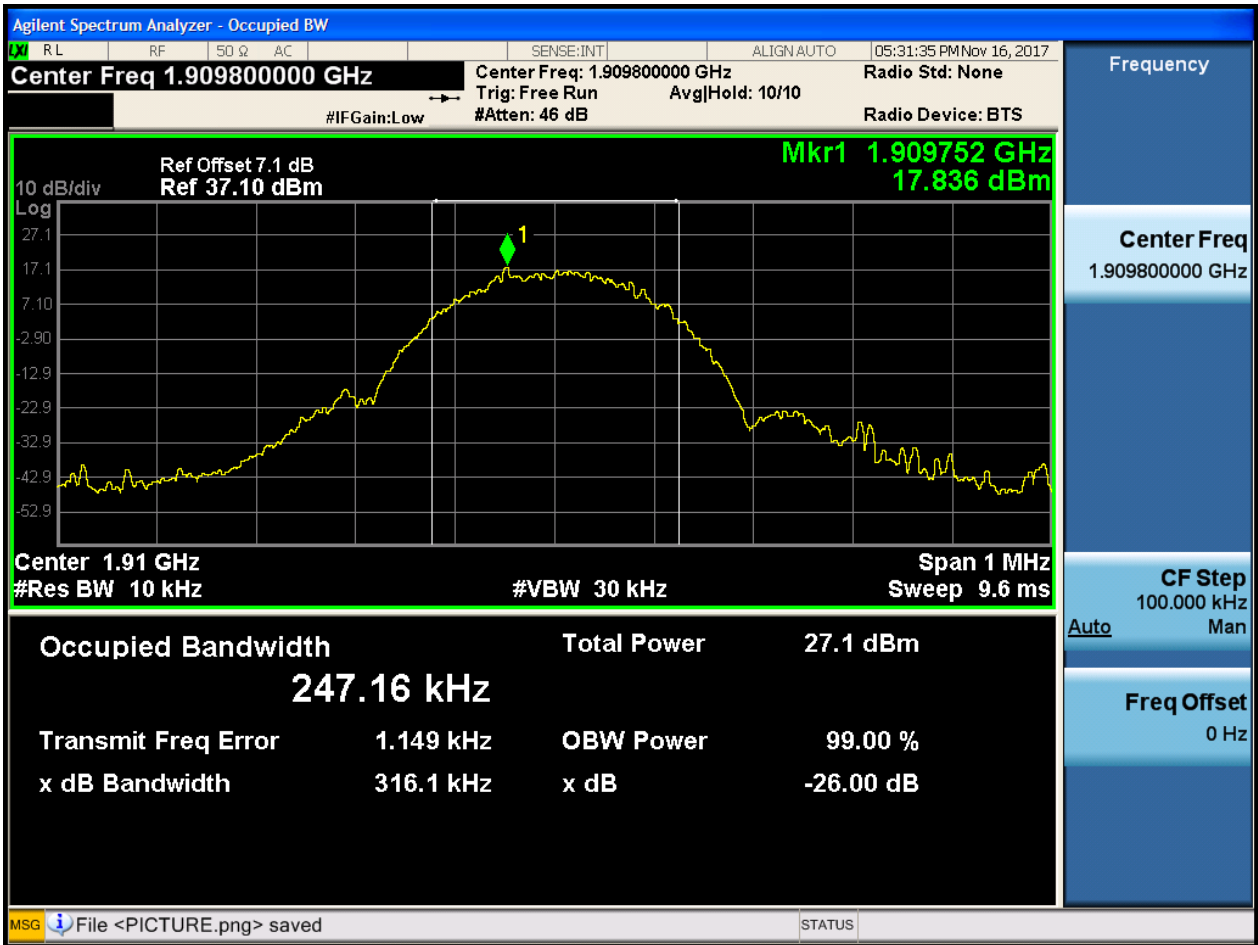


4.1.2.2.2 Test Channel = MCH





4.1.2.2.3 Test Channel = HCH



5Appendix_E: Band Edges Compliance

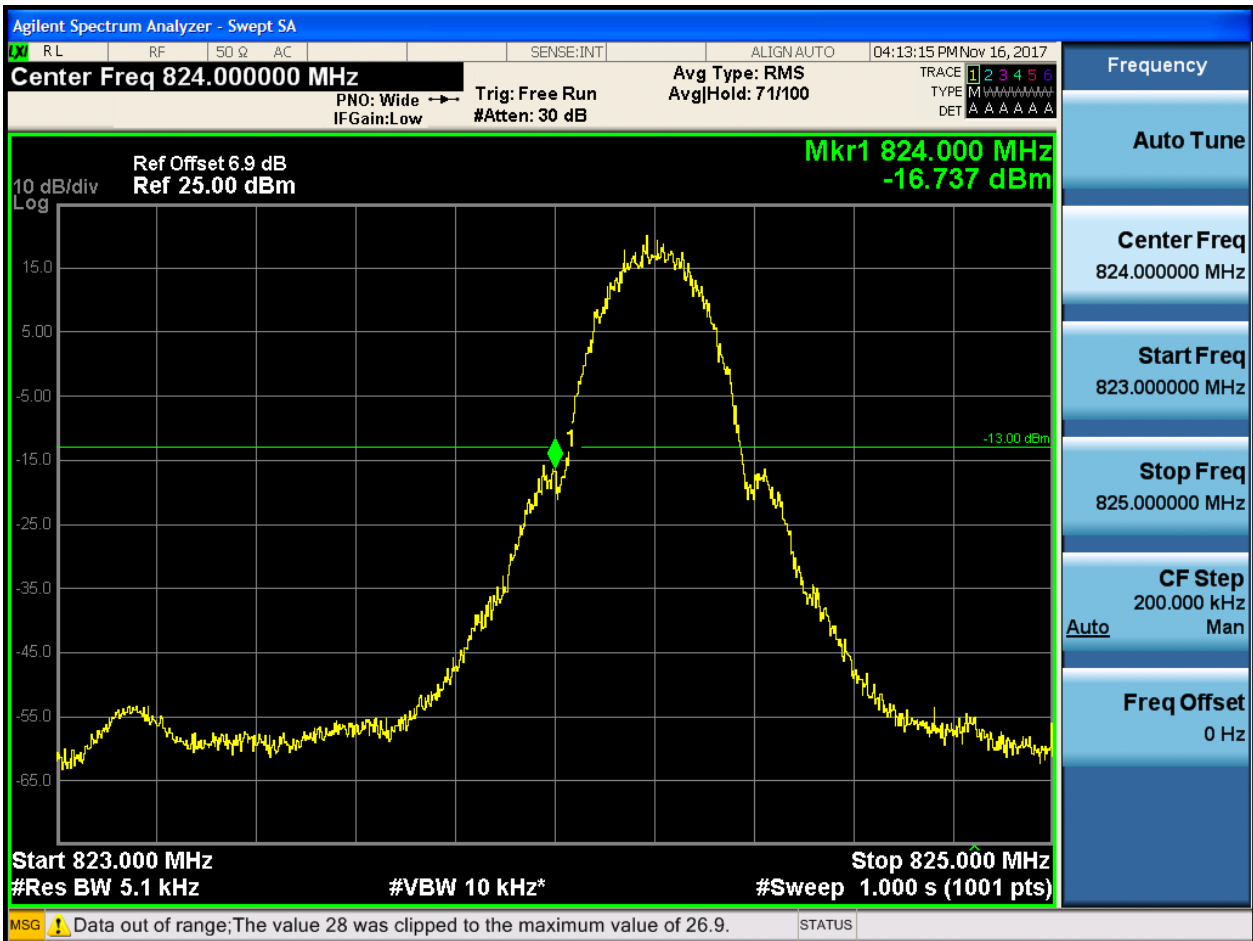
Part I - Test Plots

5.1 For GSM

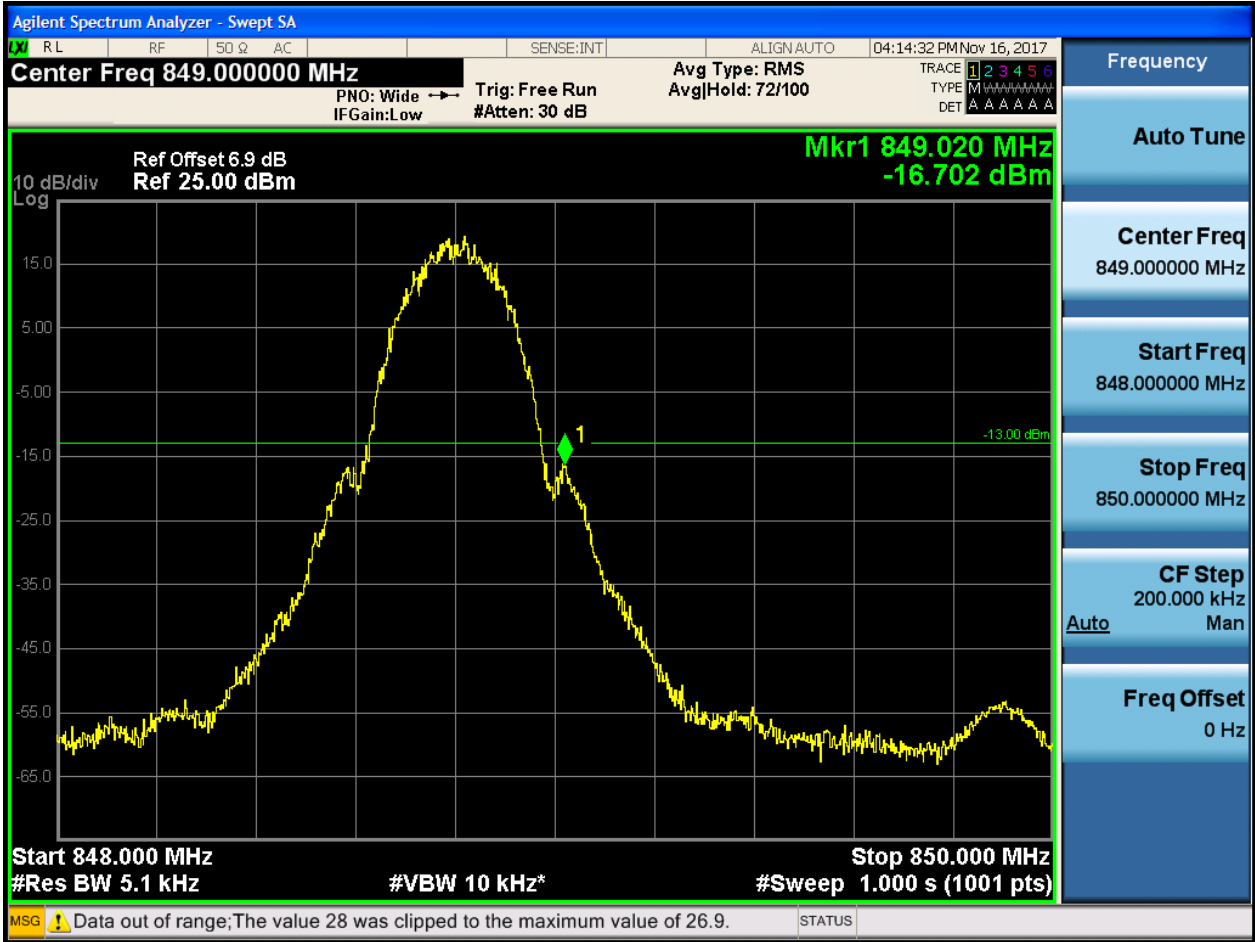
5.1.1 Test Band = GSM850

5.1.1.1 Test Mode = GSM/TM1

5.1.1.1.1 Test Channel = LCH

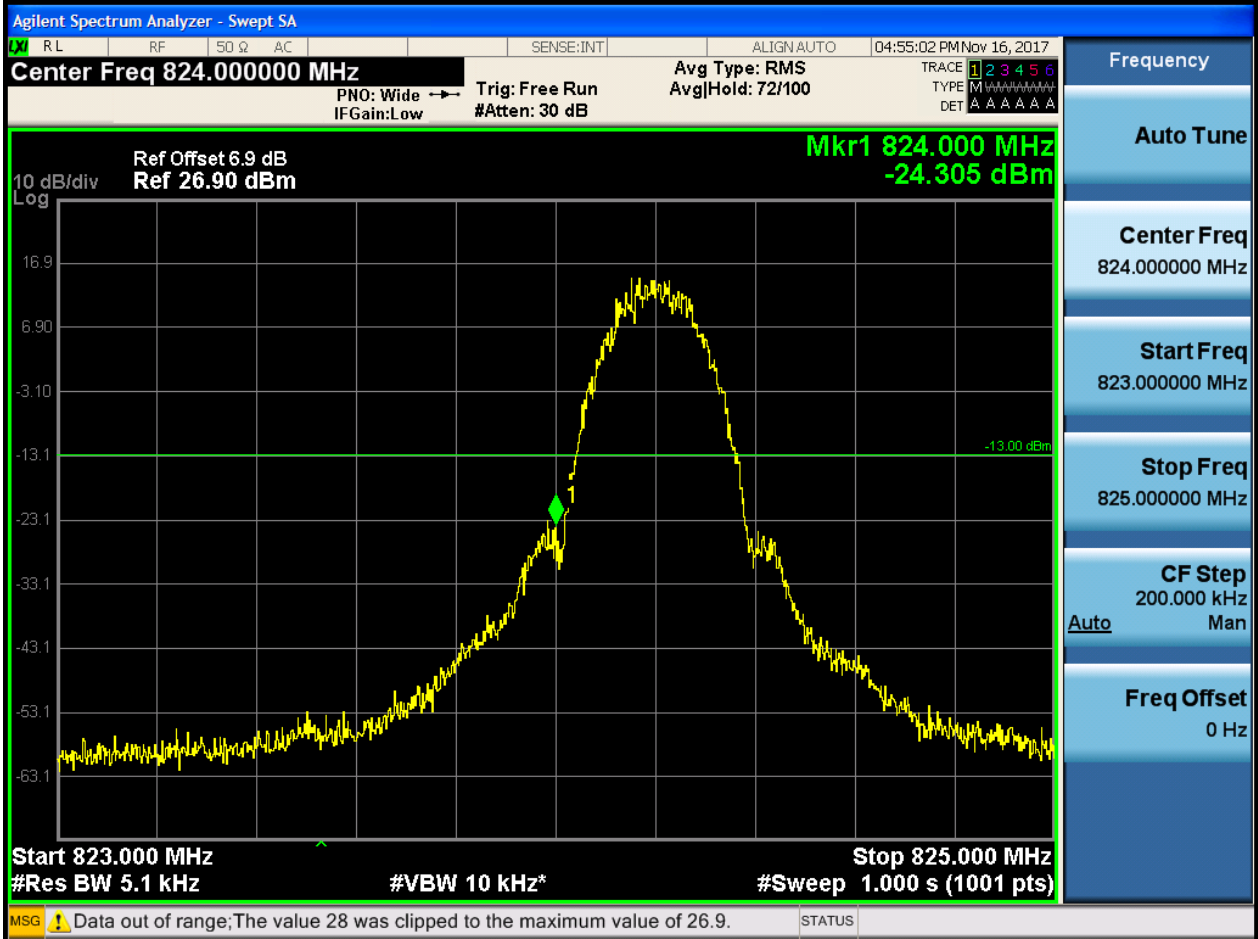


5.1.1.1.2 Test Channel = HCH

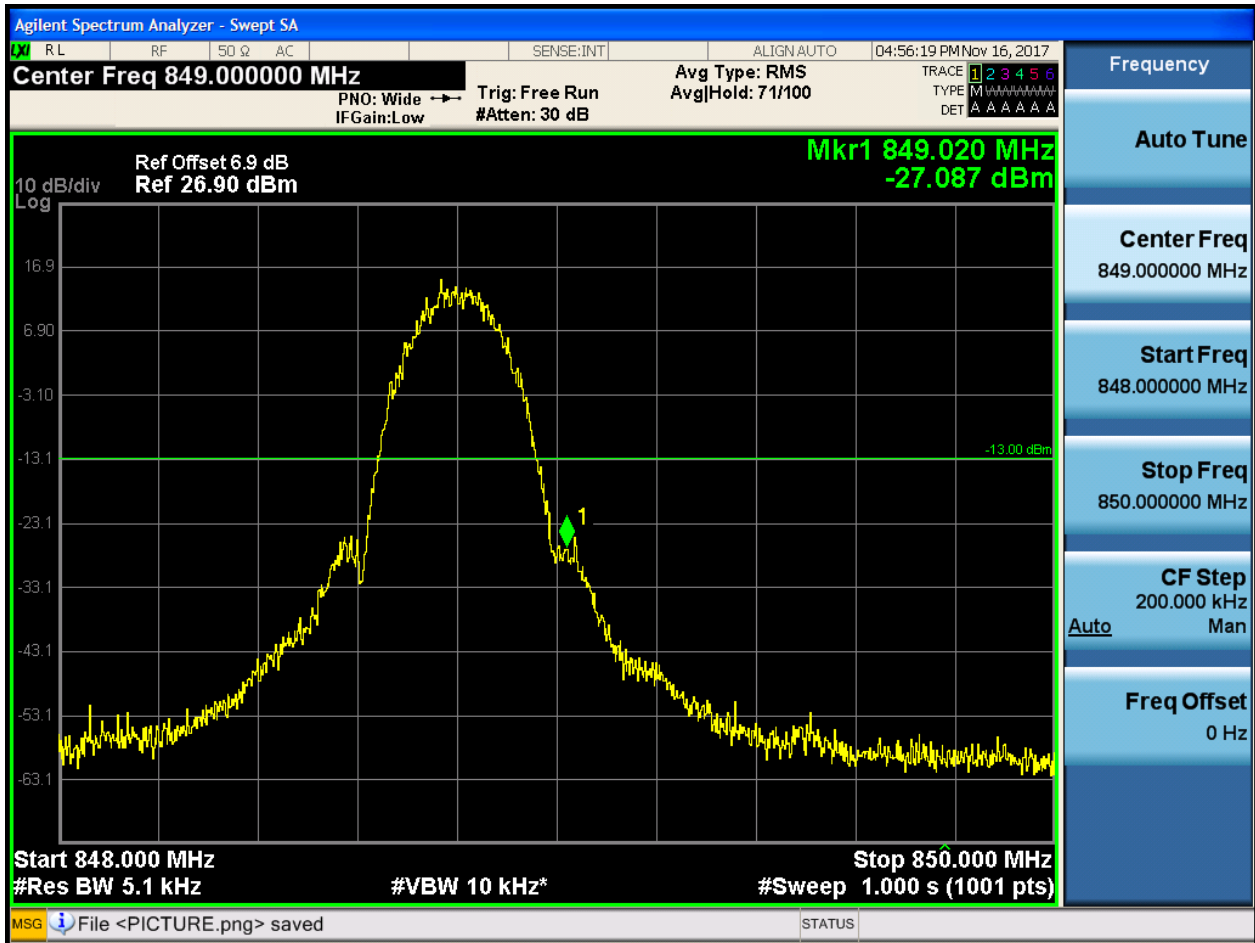


5.1.1.2 Test Mode = GSM/TM2

5.1.1.2.1 Test Channel = LCH



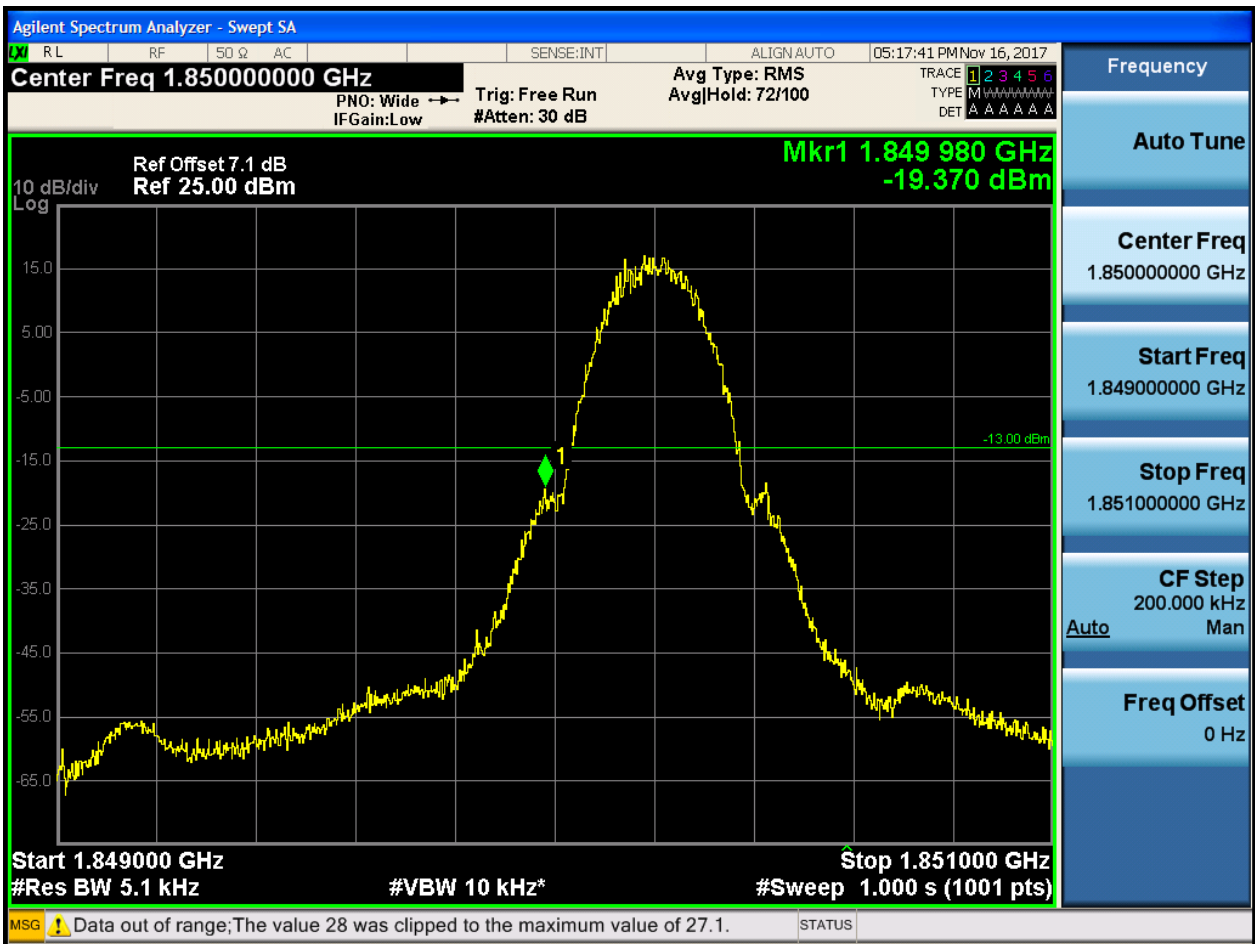
5.1.1.2.2 Test Channel = HCH



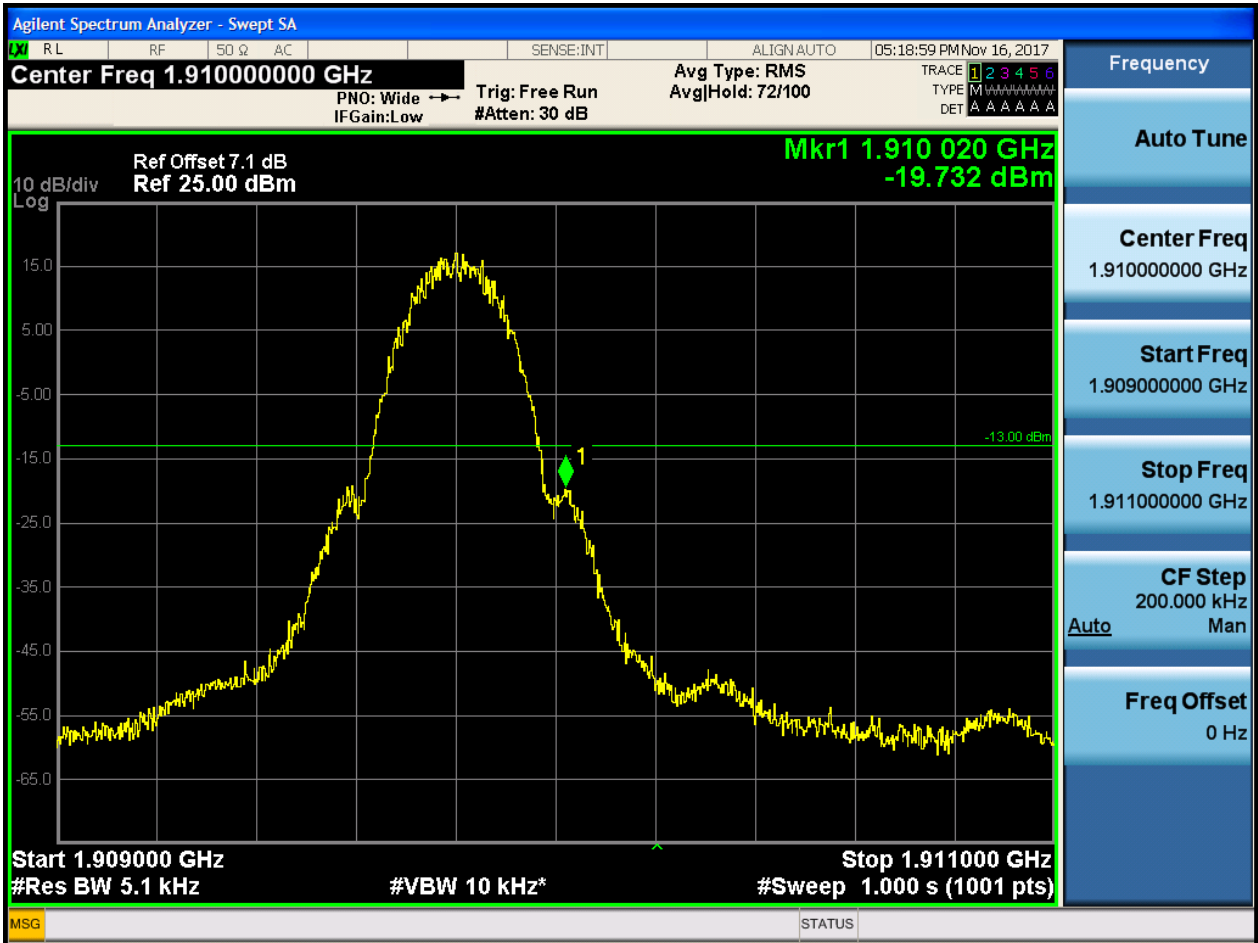
5.1.2 Test Band = GSM1900

5.1.2.1 Test Mode = GSM/TM1

5.1.2.1.1 Test Channel = LCH

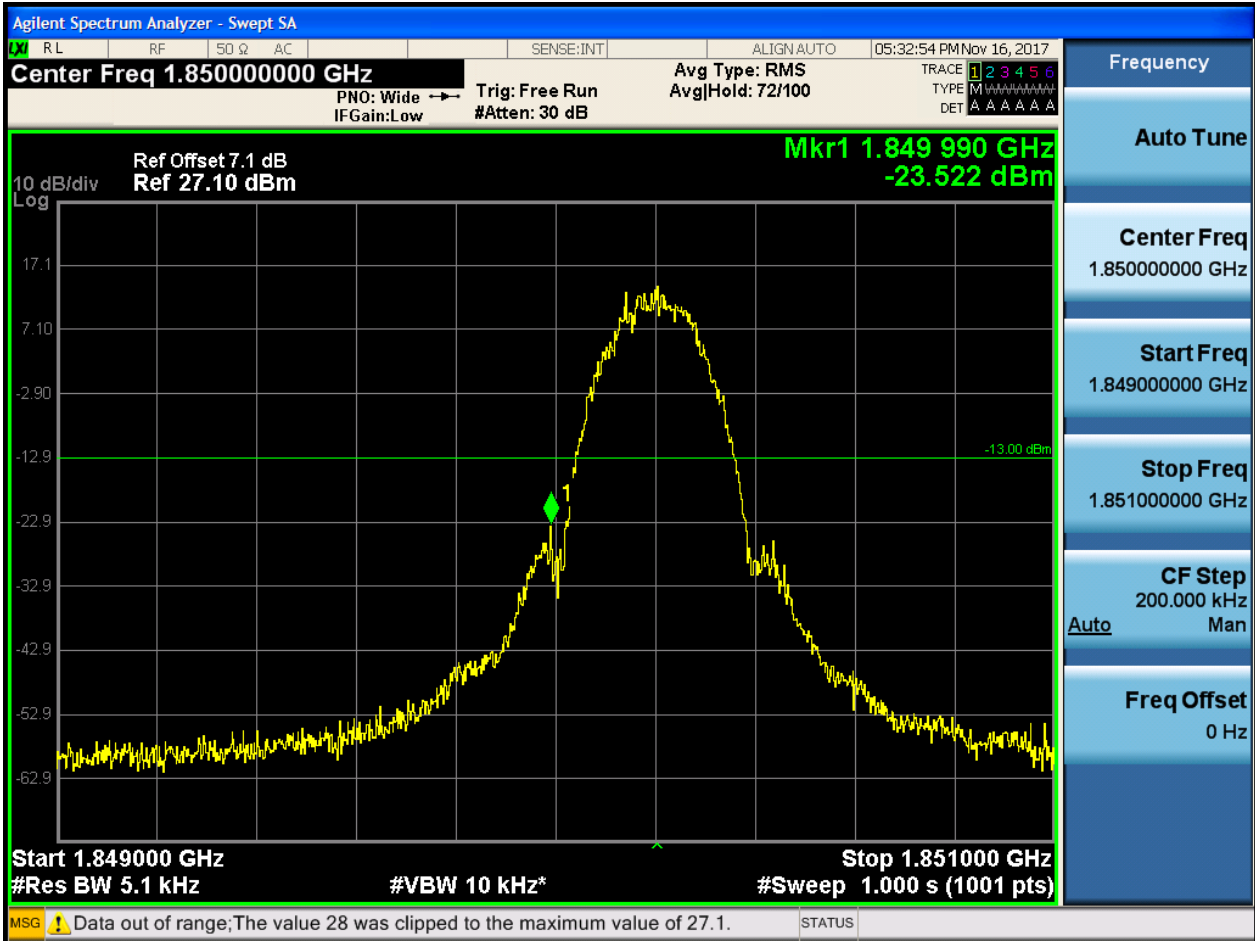


5.1.2.1.2 Test Channel = HCH

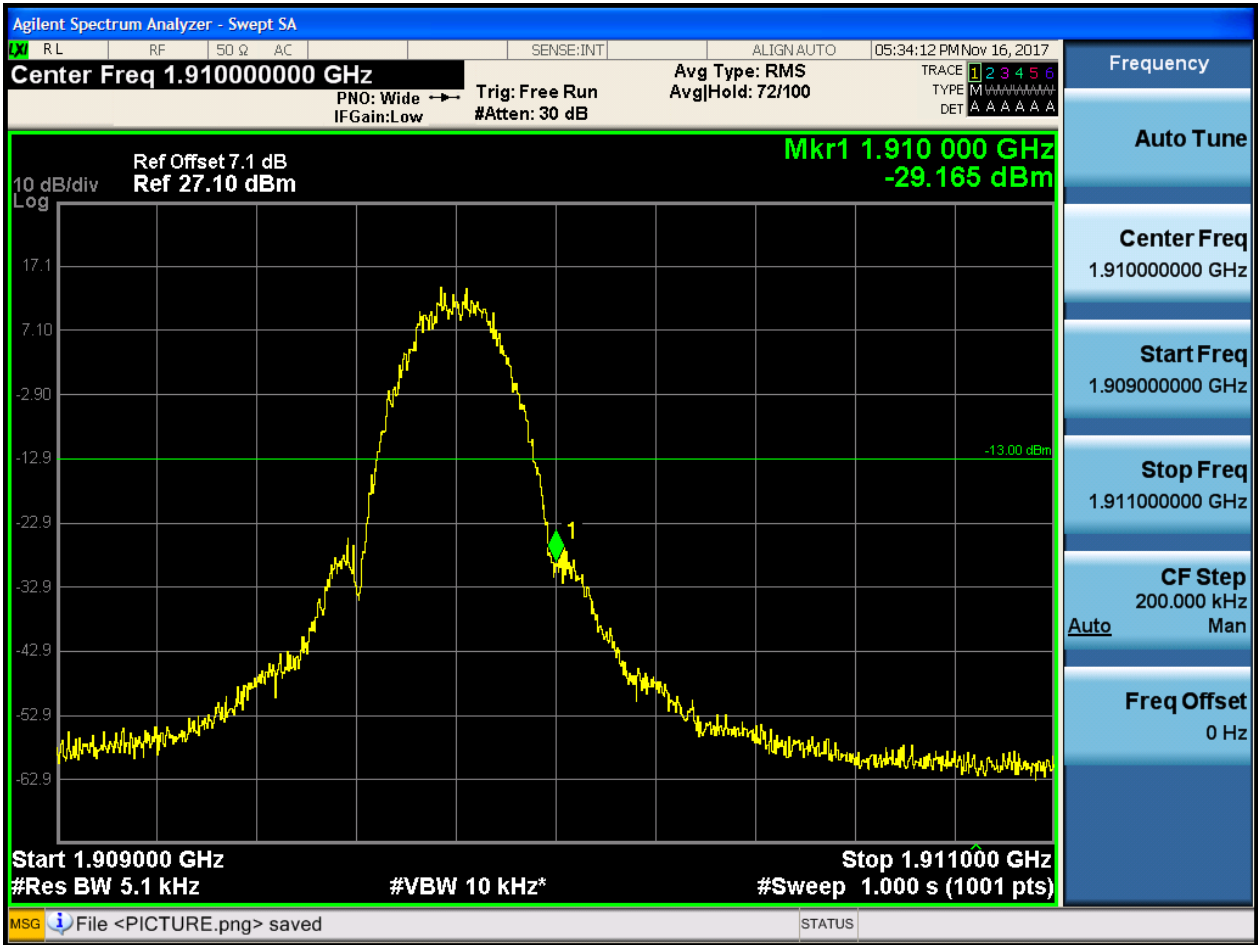


5.1.2.2 Test Mode = GSM/TM2

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.

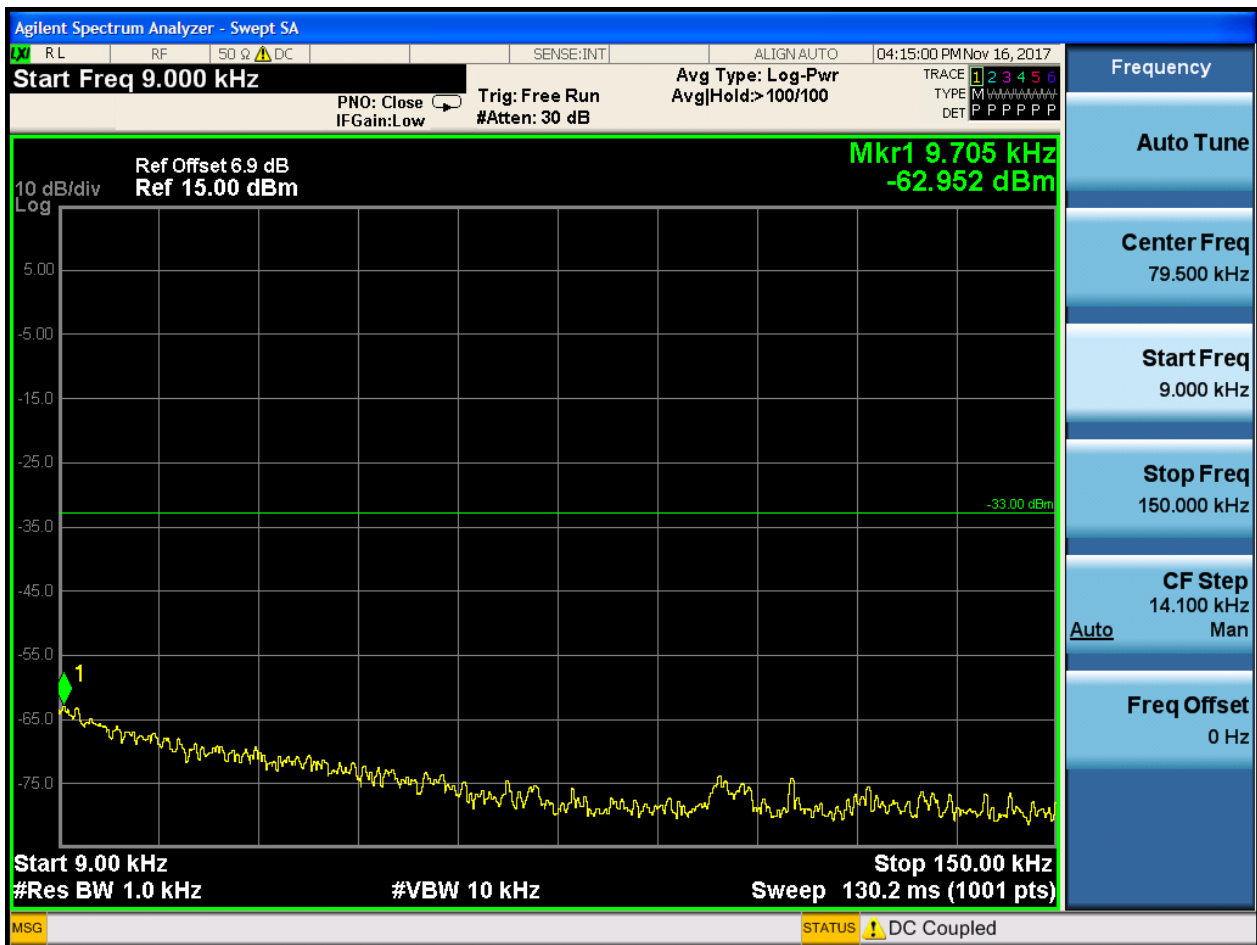
Part I - Test Plots

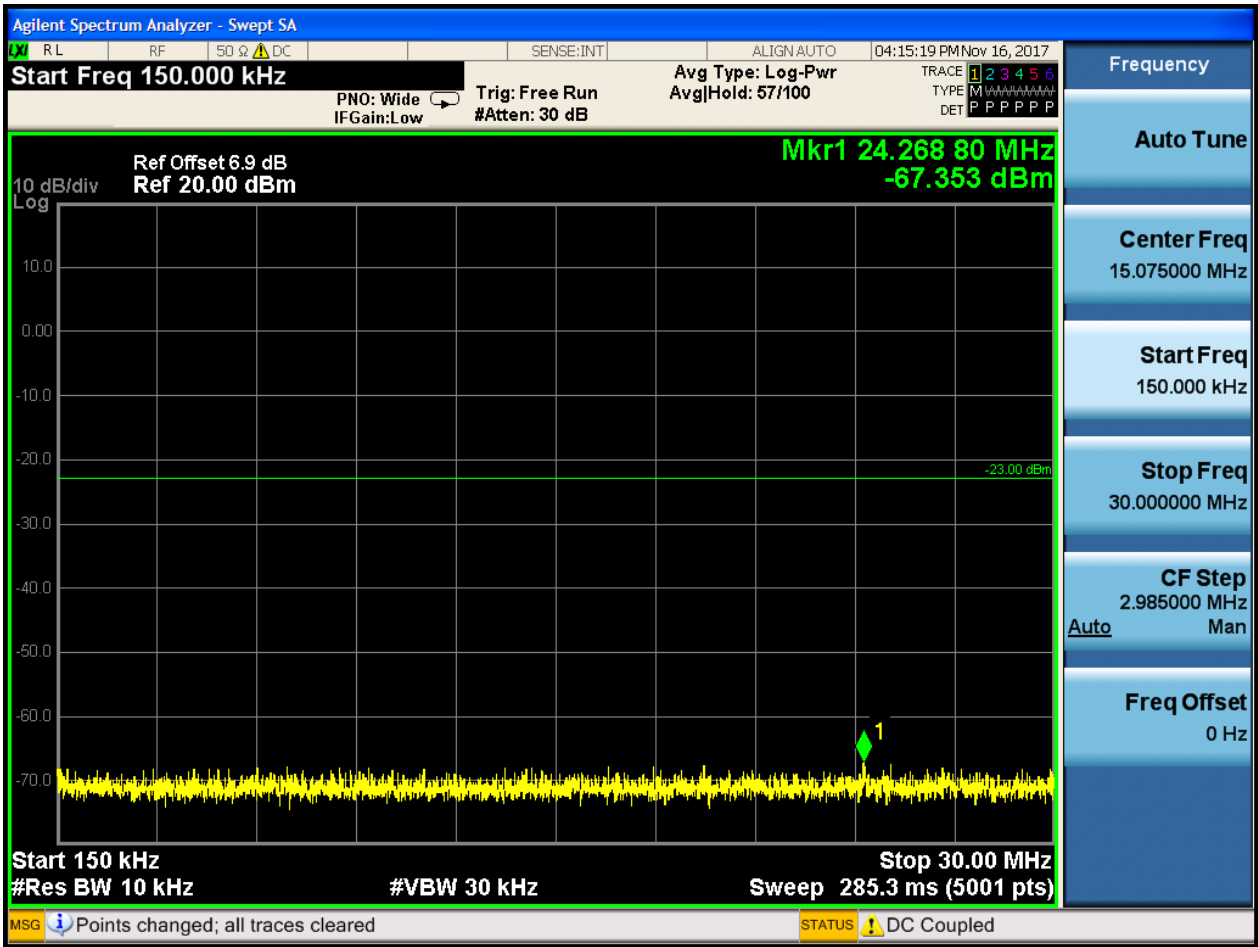
6.1 For GSM

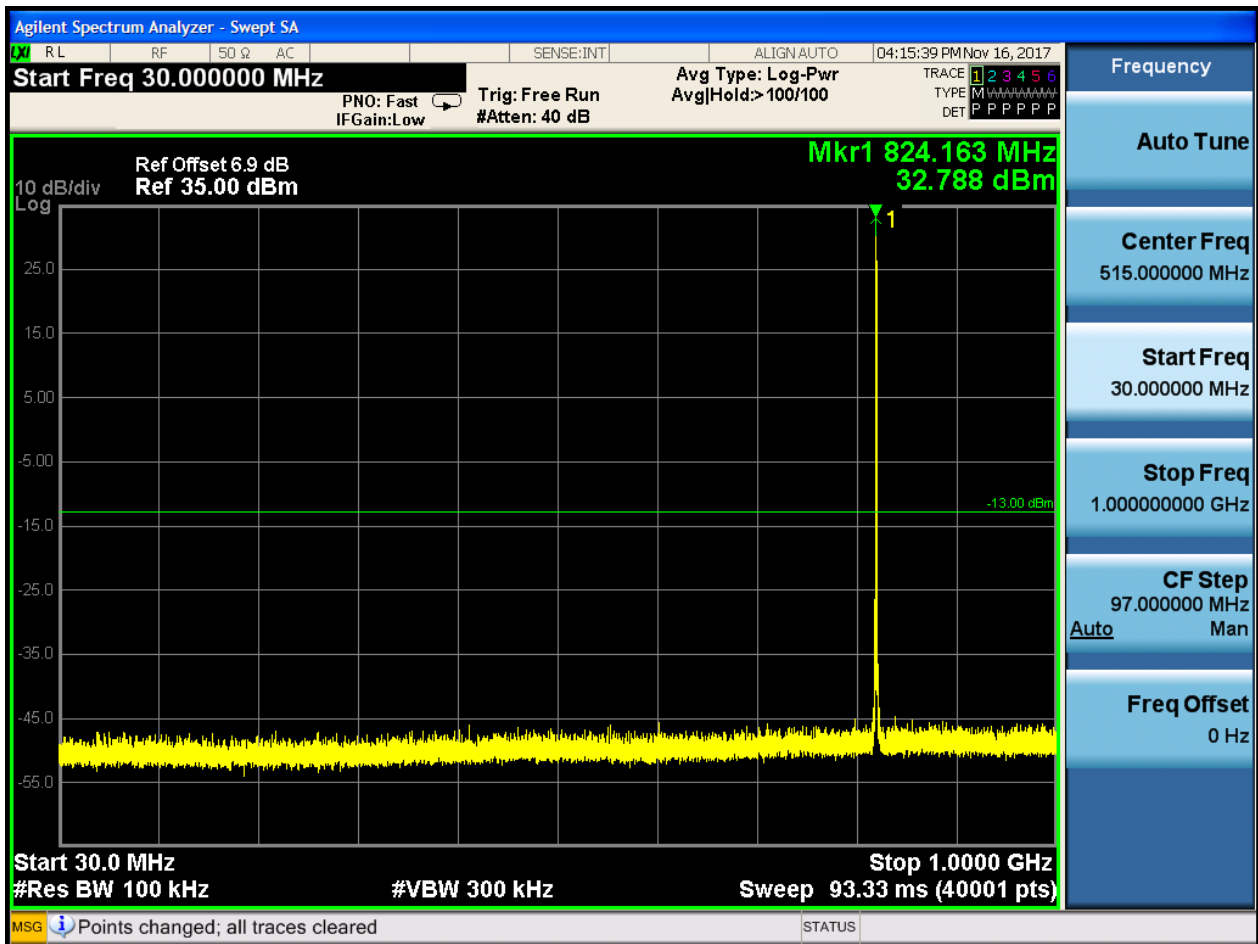
6.1.1 Test Band = GSM850

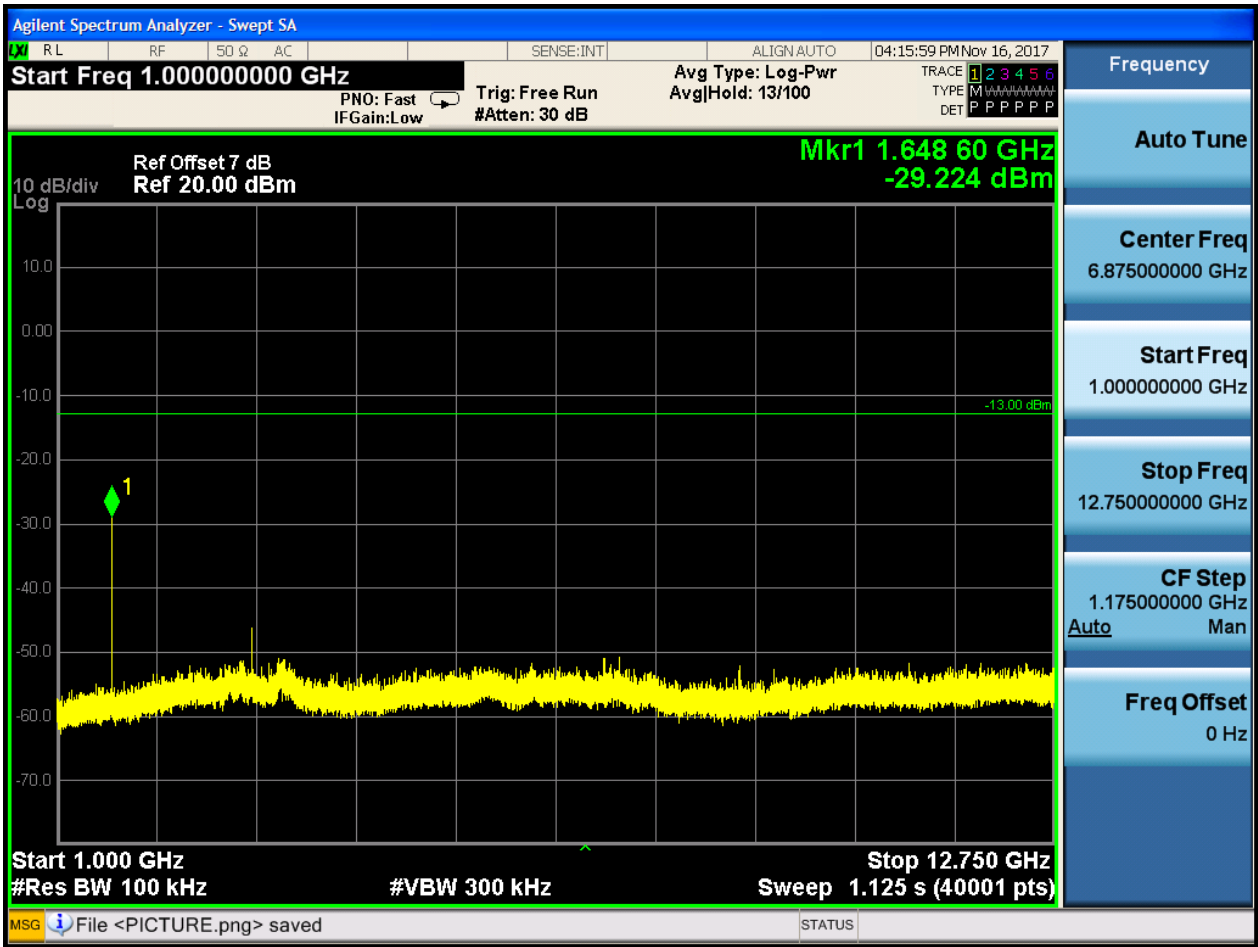
6.1.1.1 Test Mode = GSM/TM1

6.1.1.1.1 Test Channel = LCH

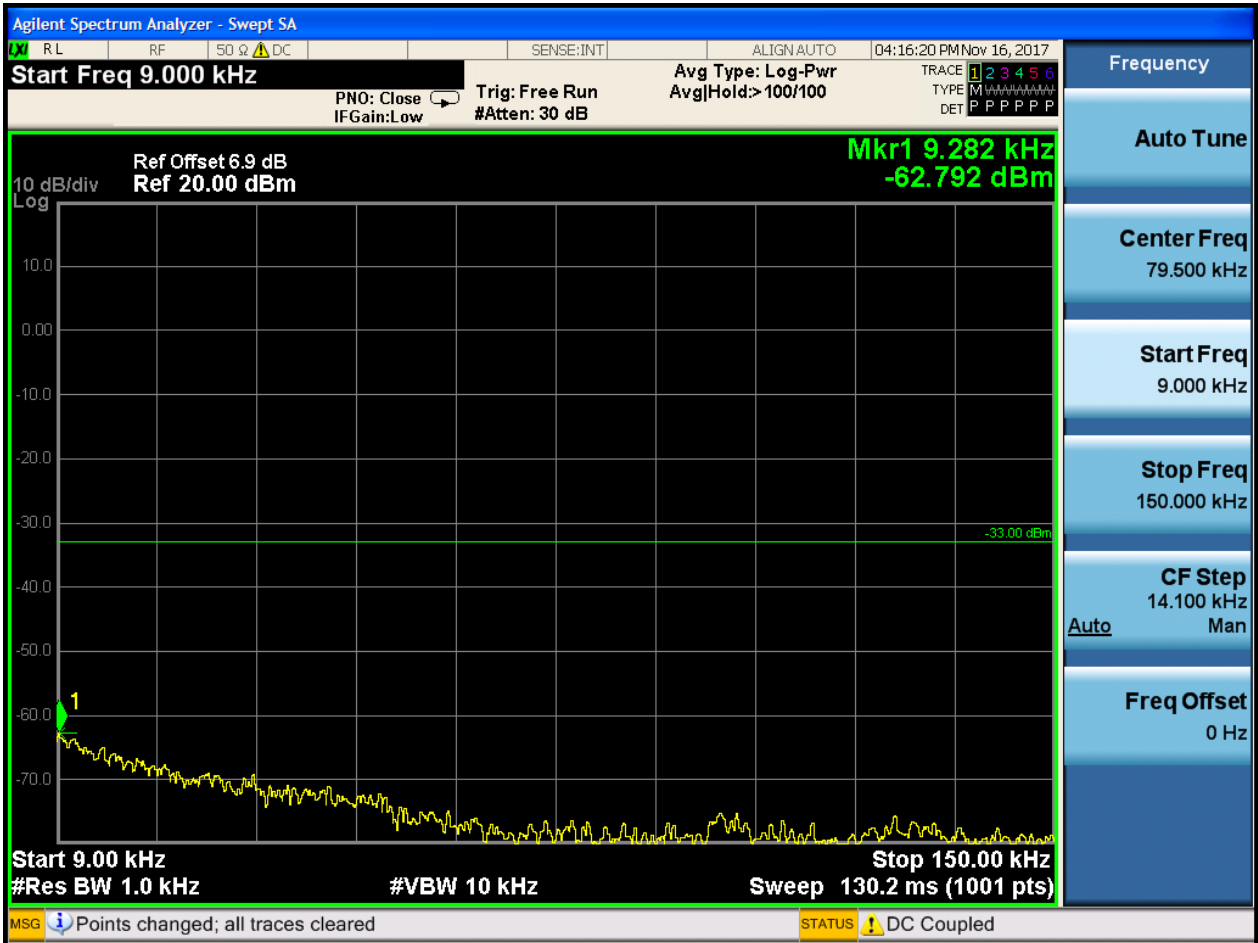


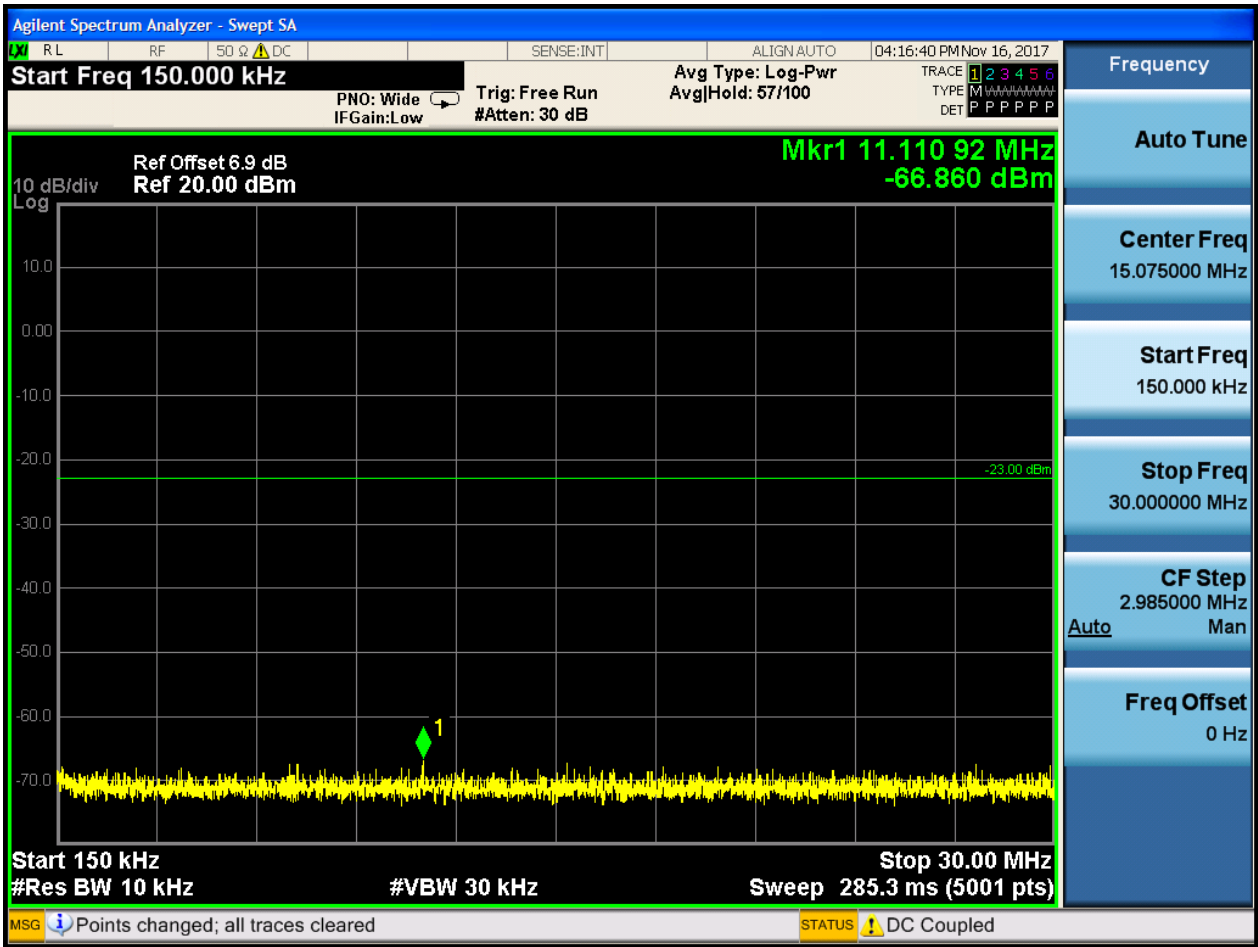


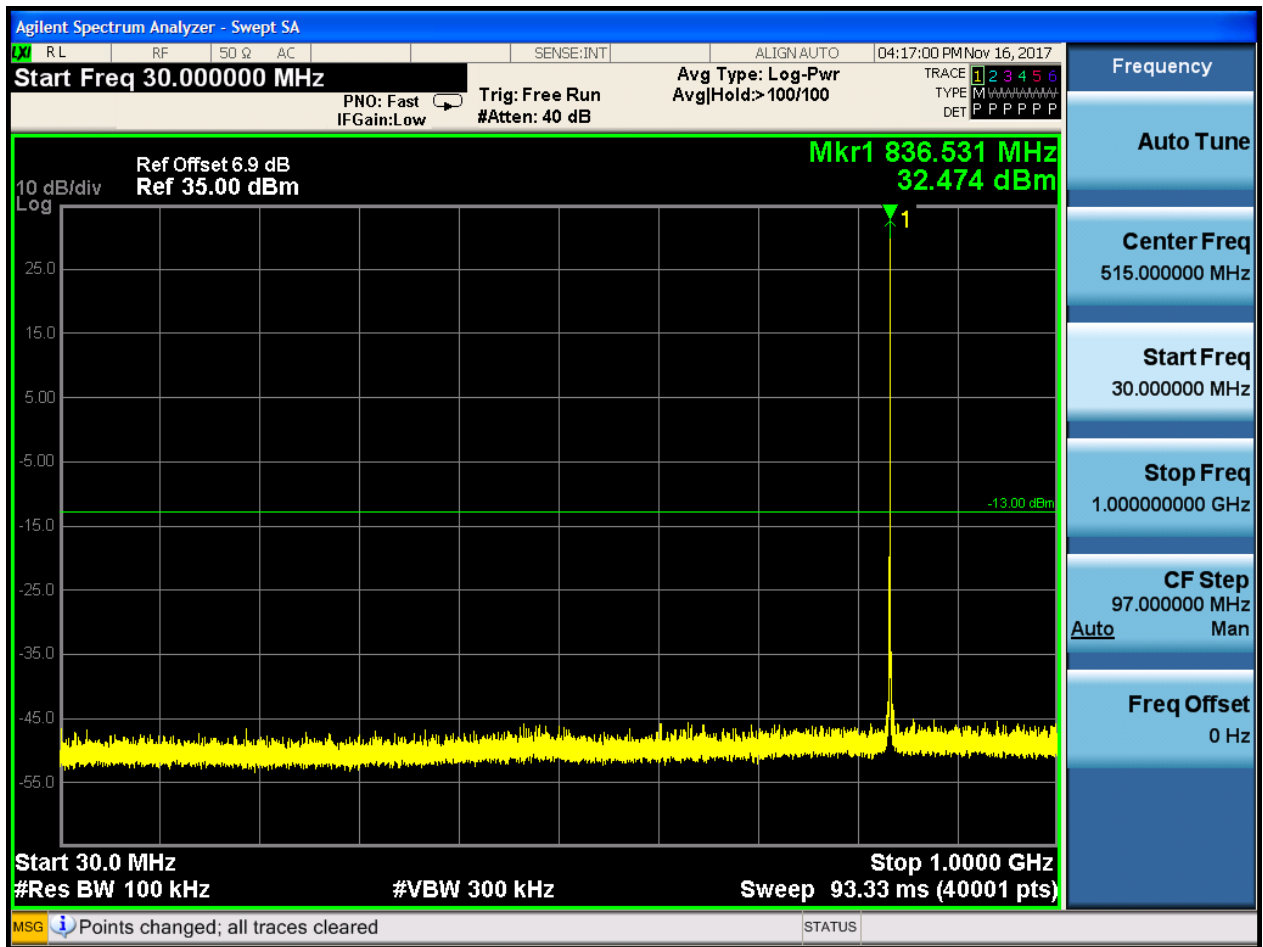


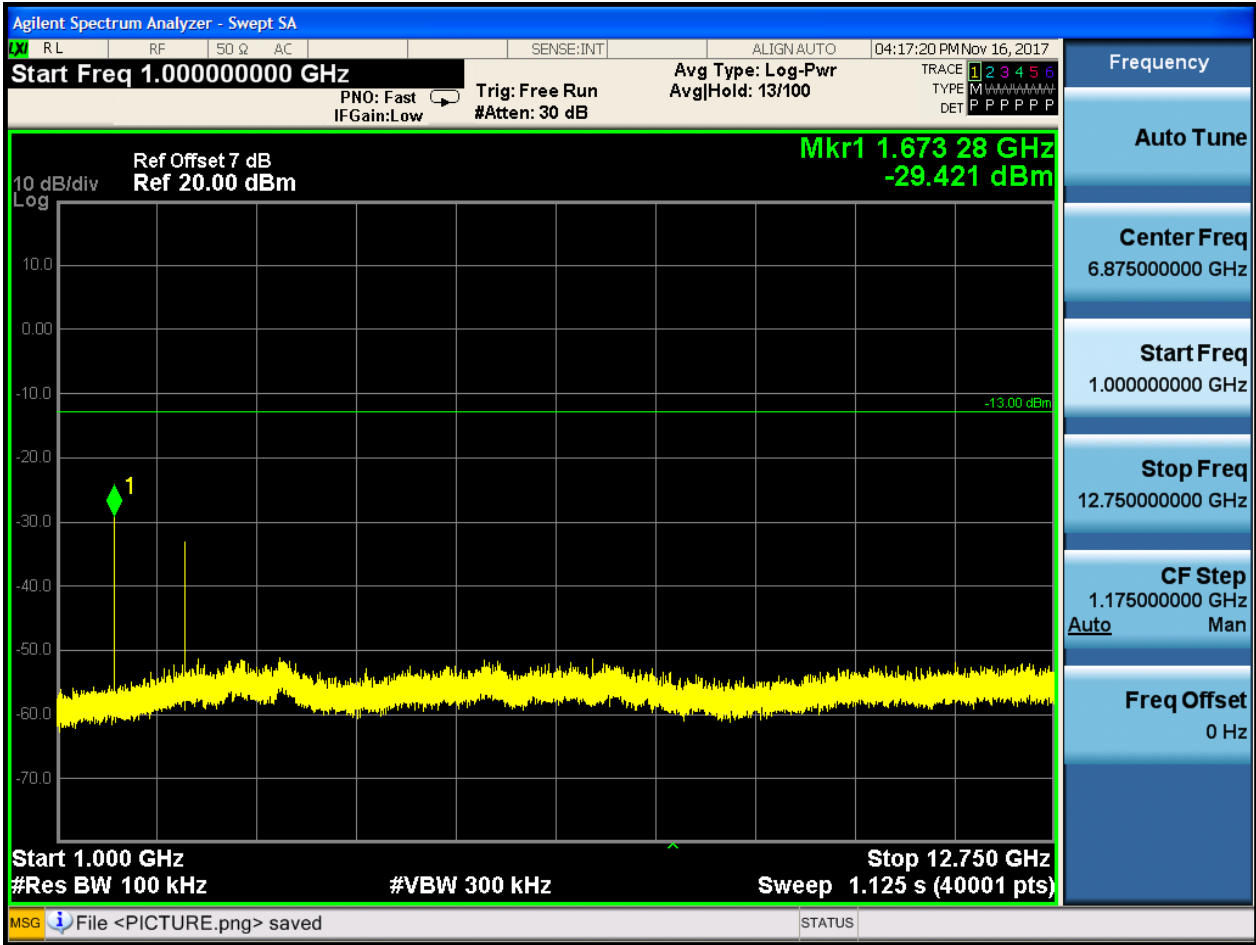


6.1.1.1.2 Test Channel = MCH

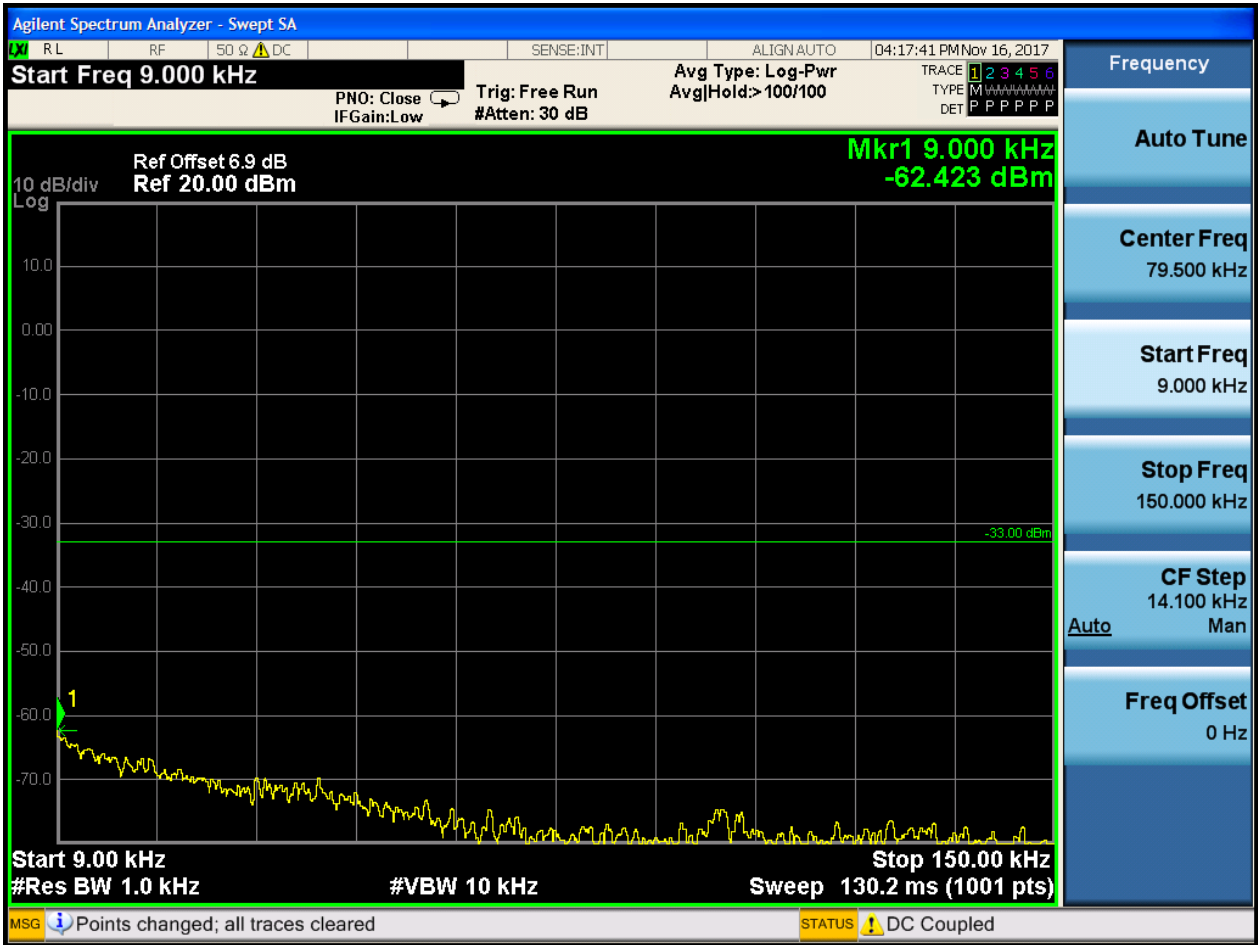


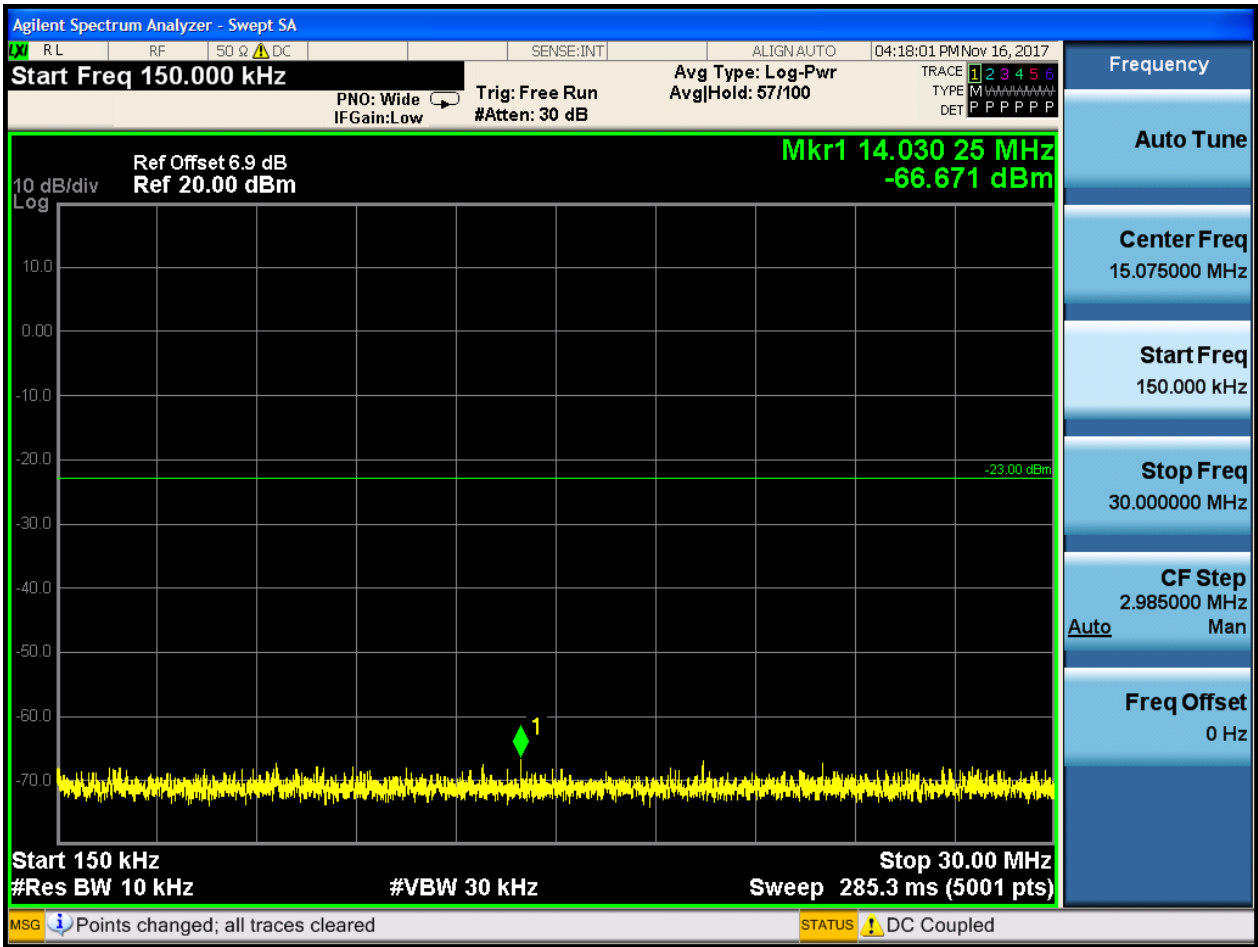


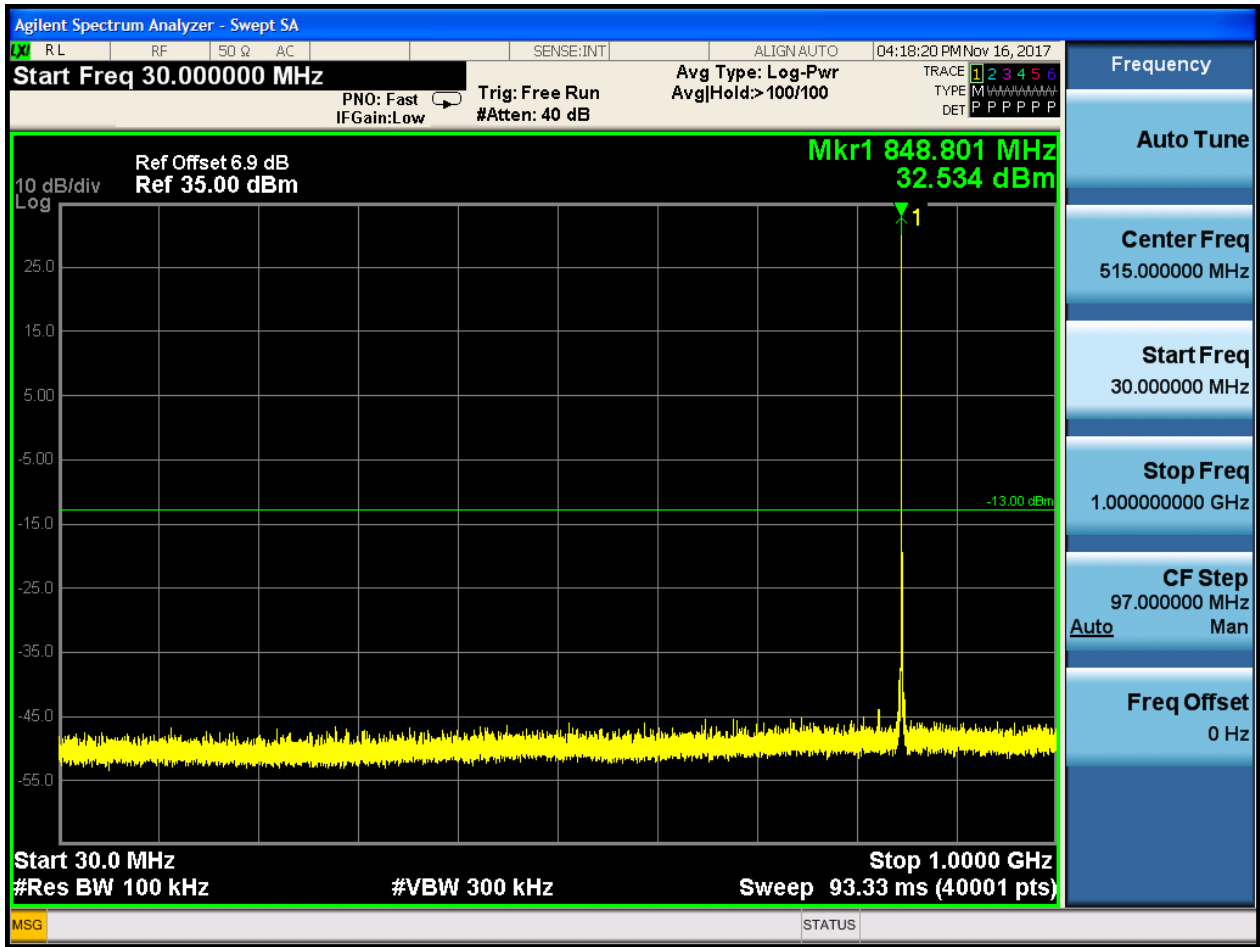




6.1.1.1.3 Test Channel = HCH

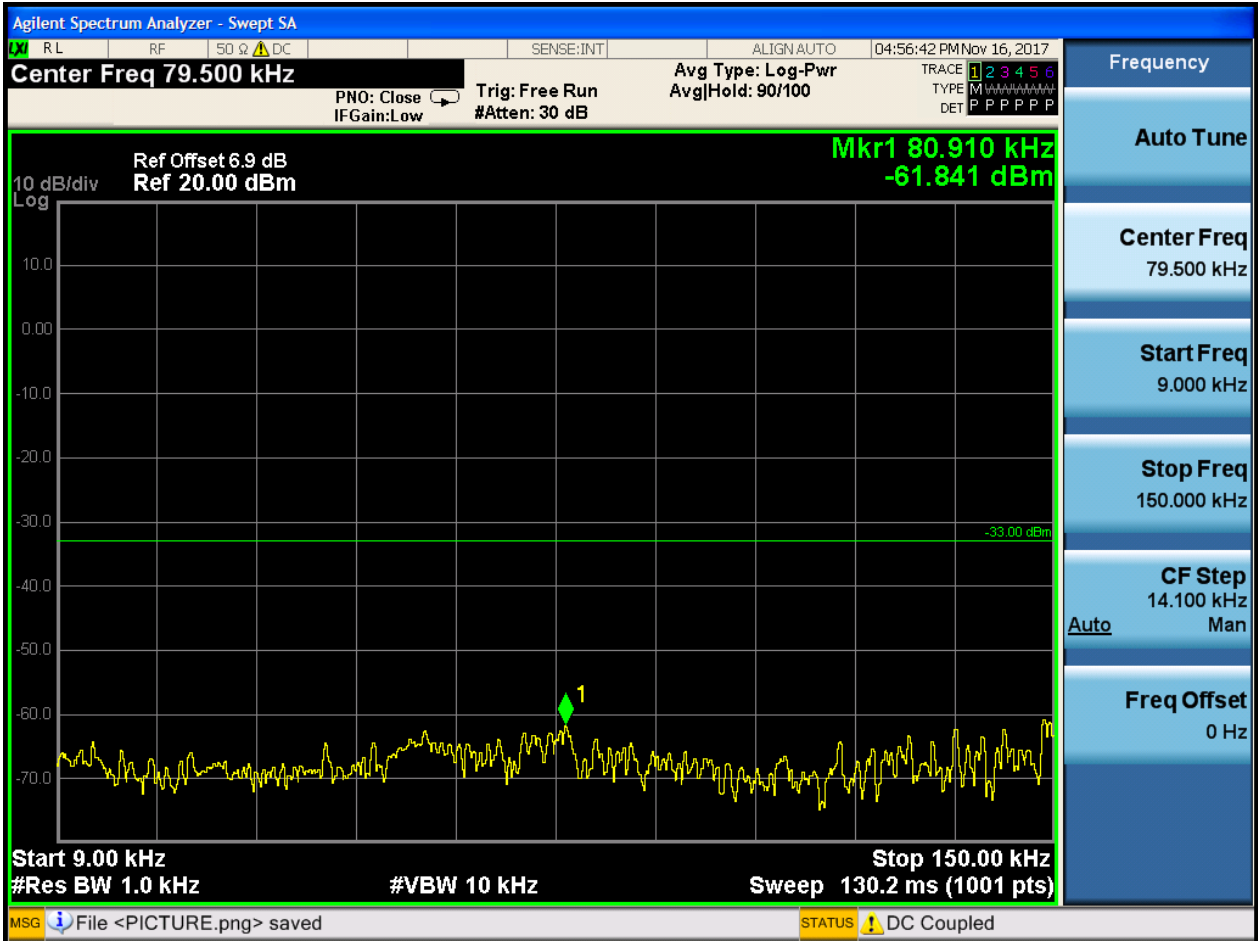


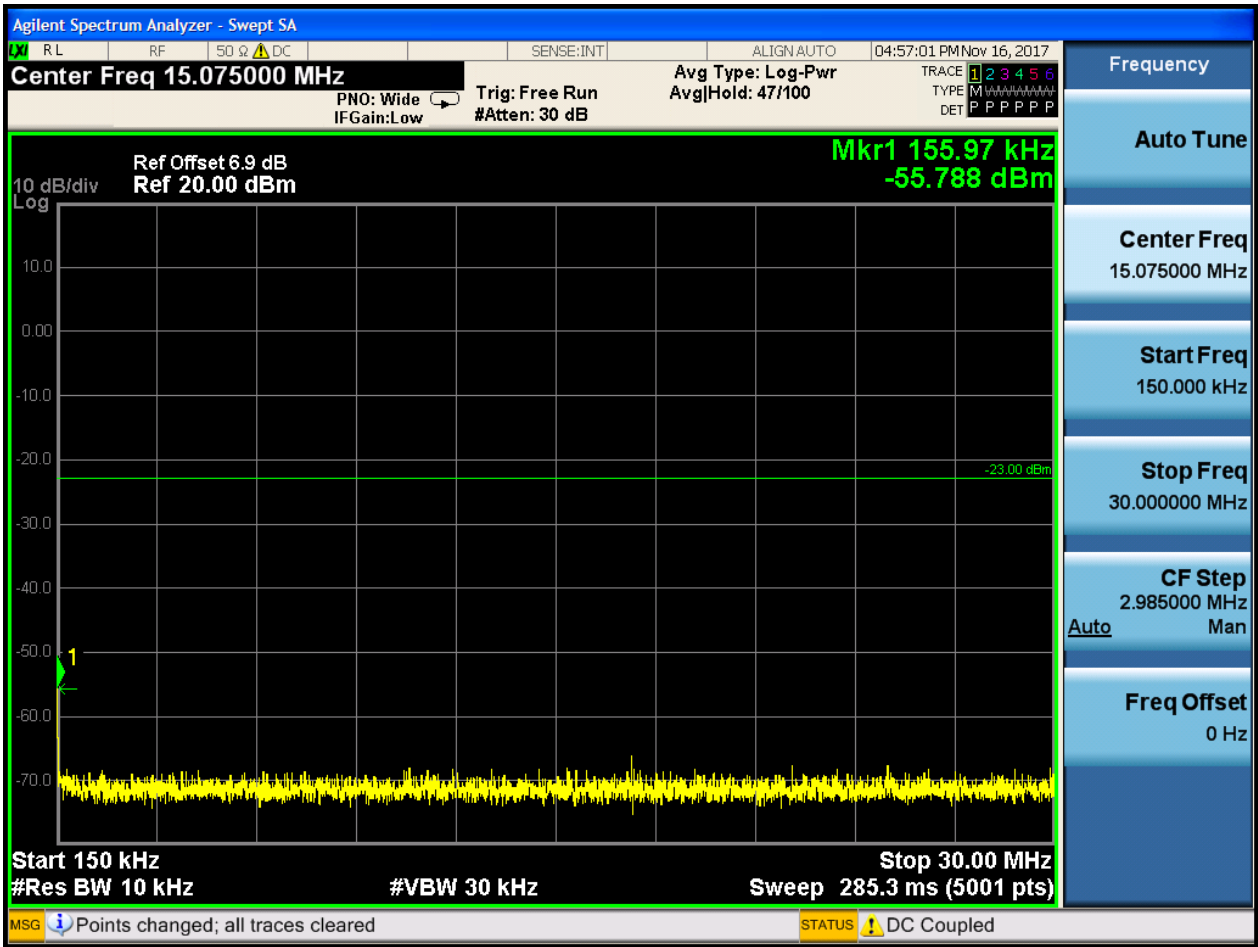




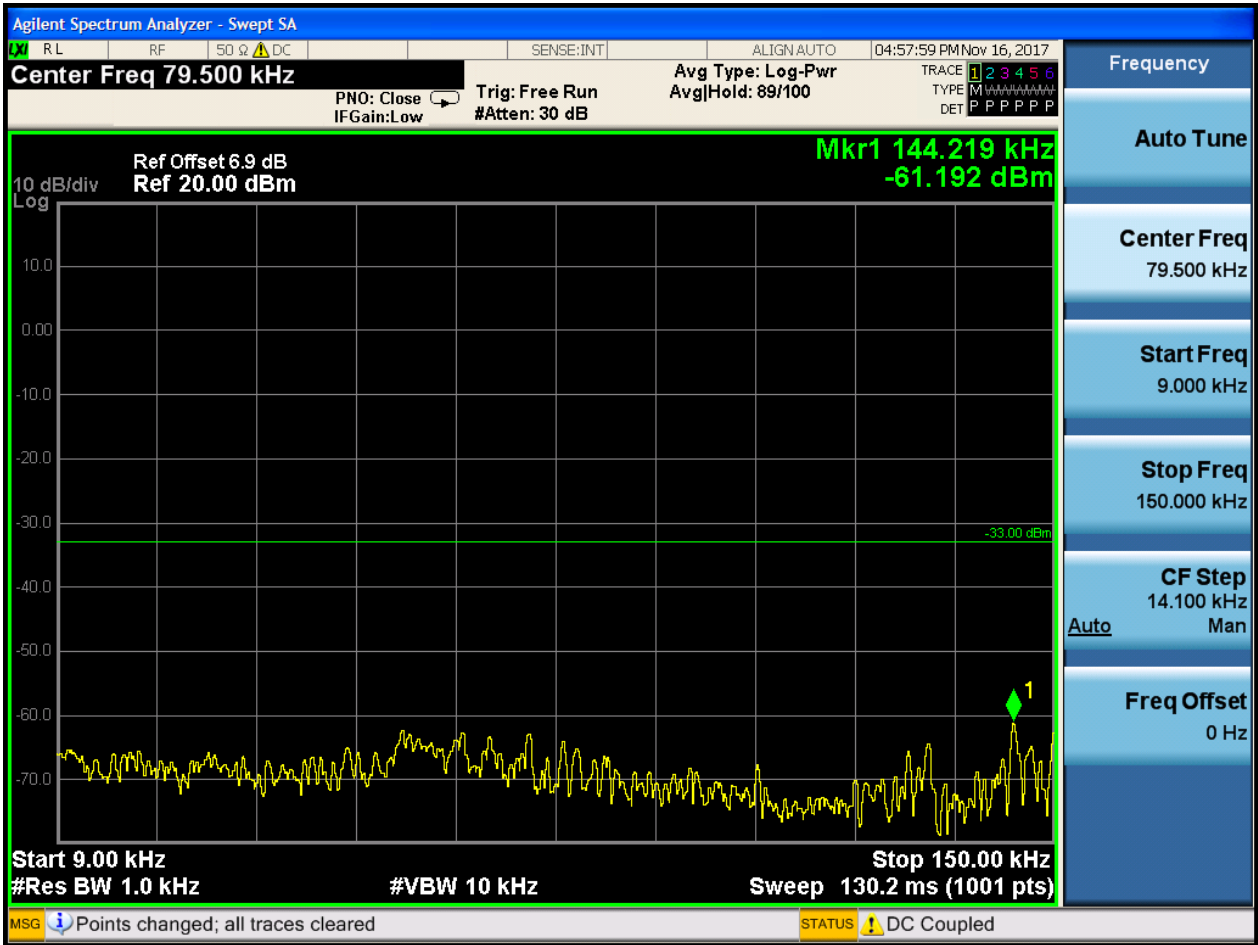
6.1.1.2 Test Mode = GSM/TM2

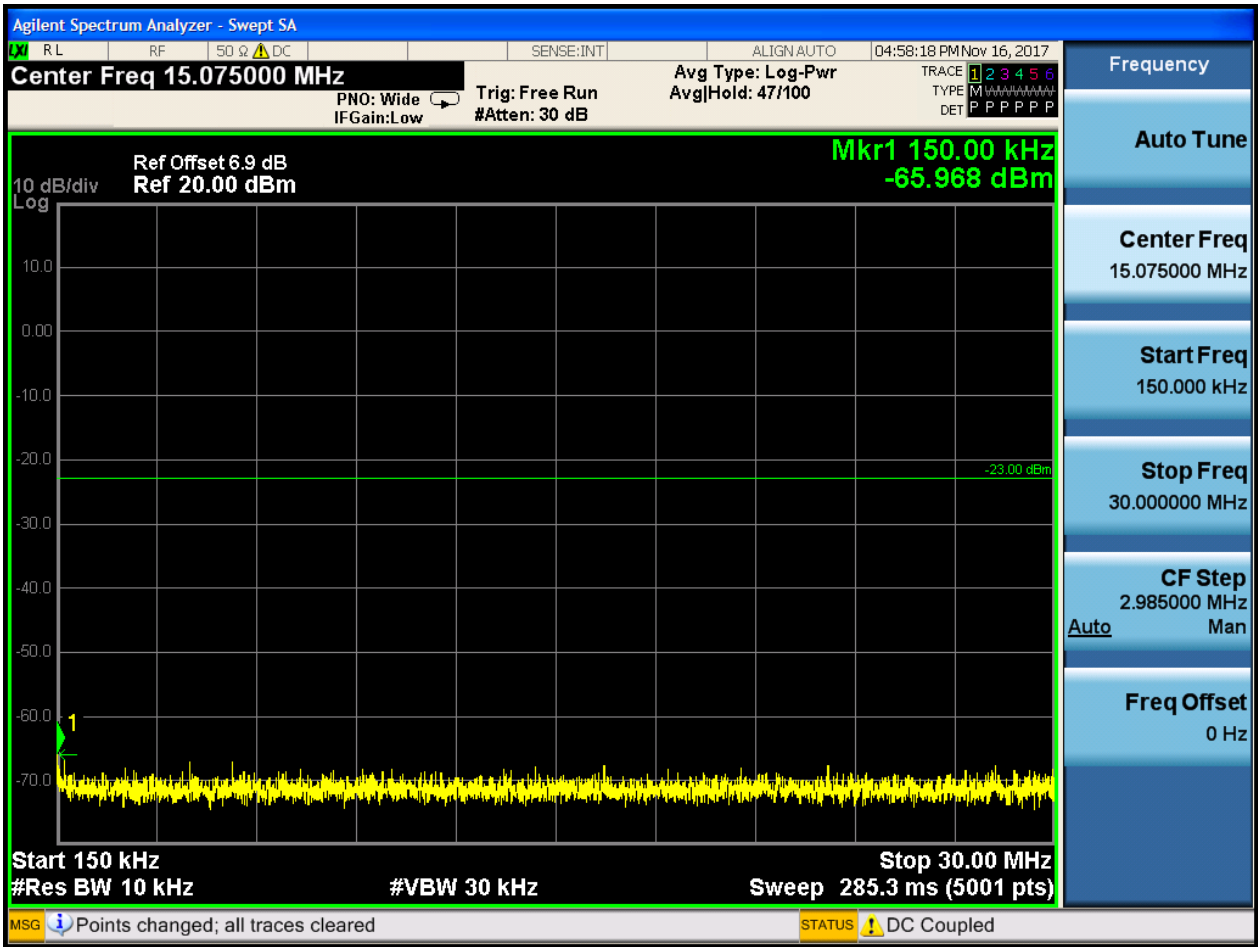
6.1.1.2.1 Test Channel = LCH

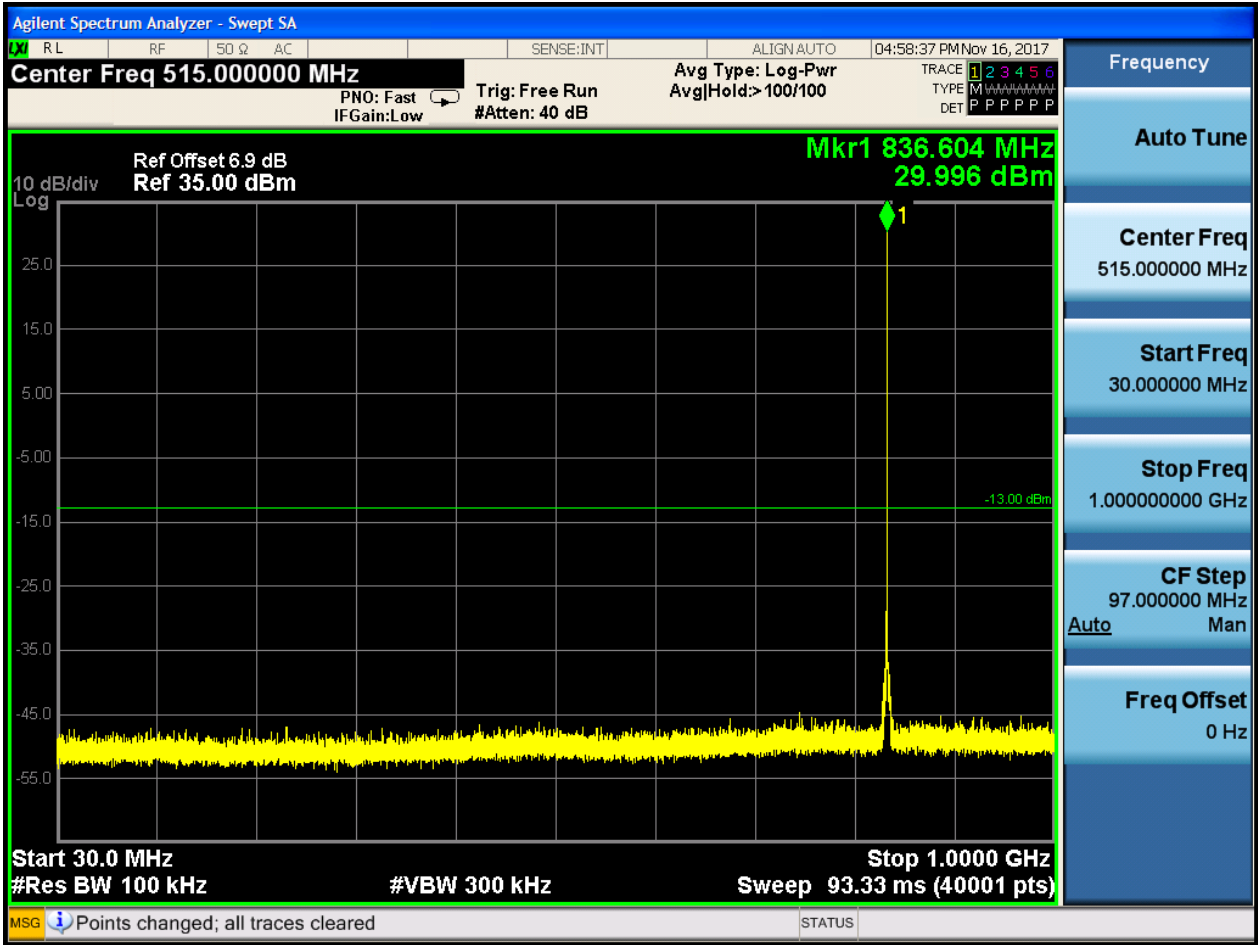


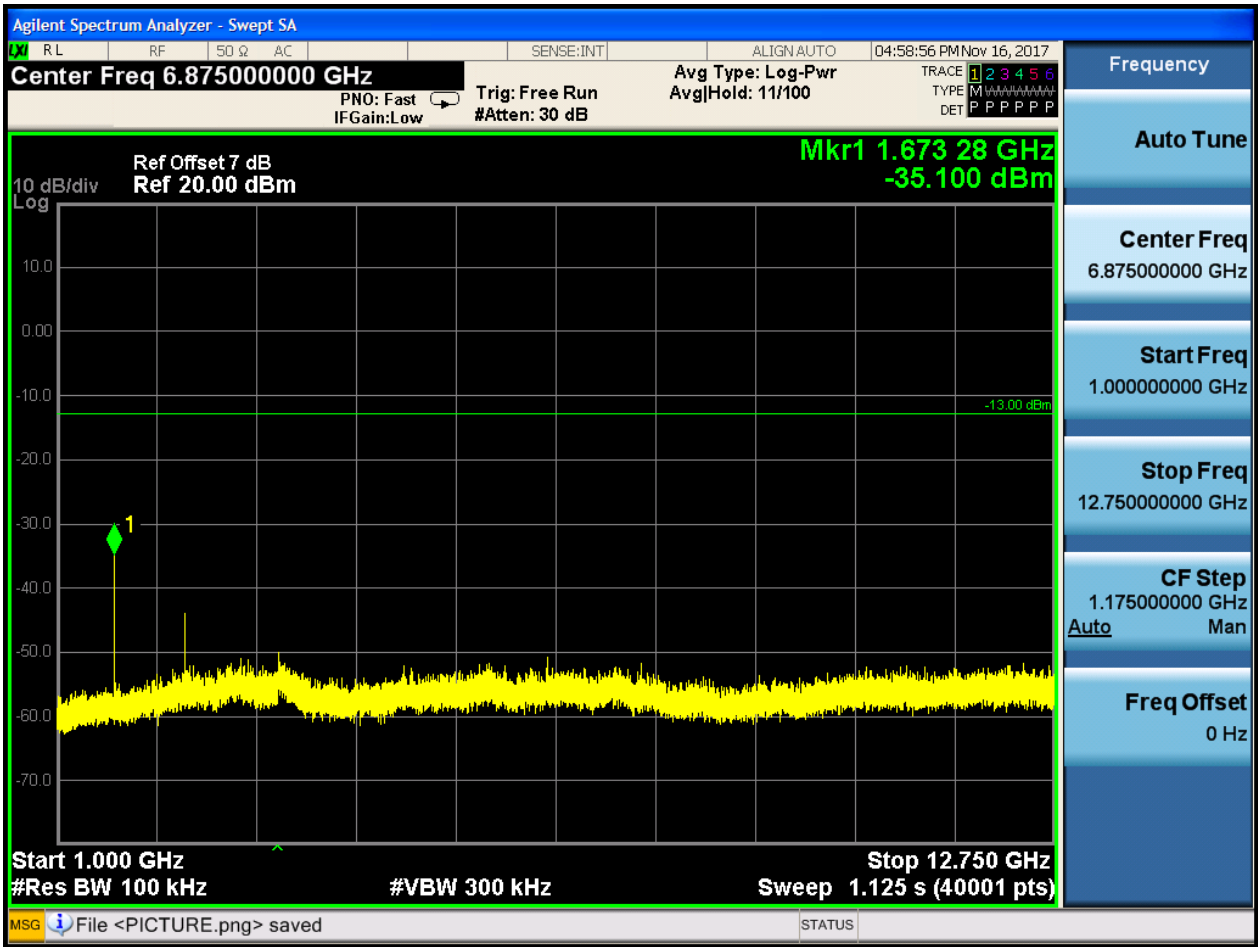


6.1.1.2.2 Test Channel = MCH



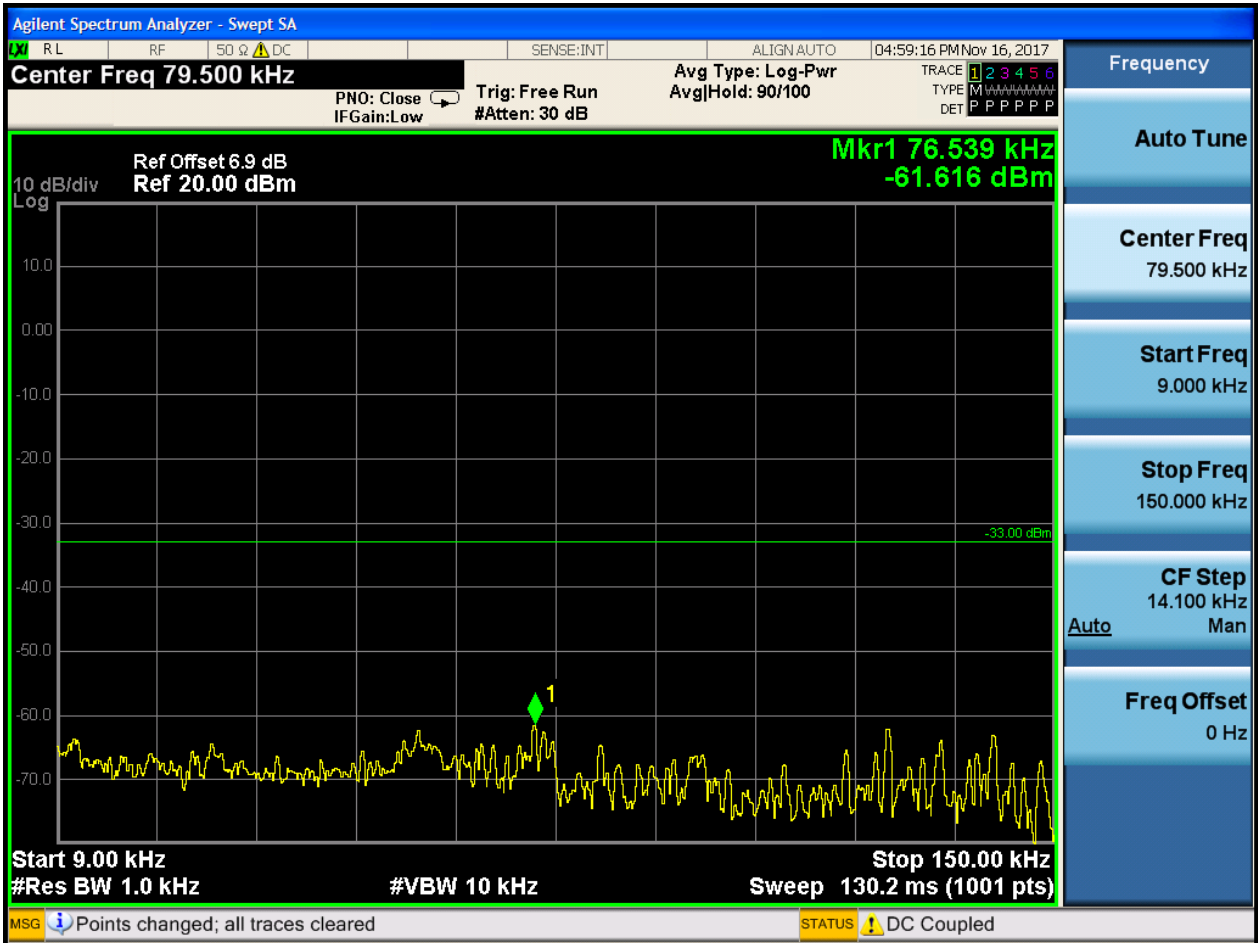


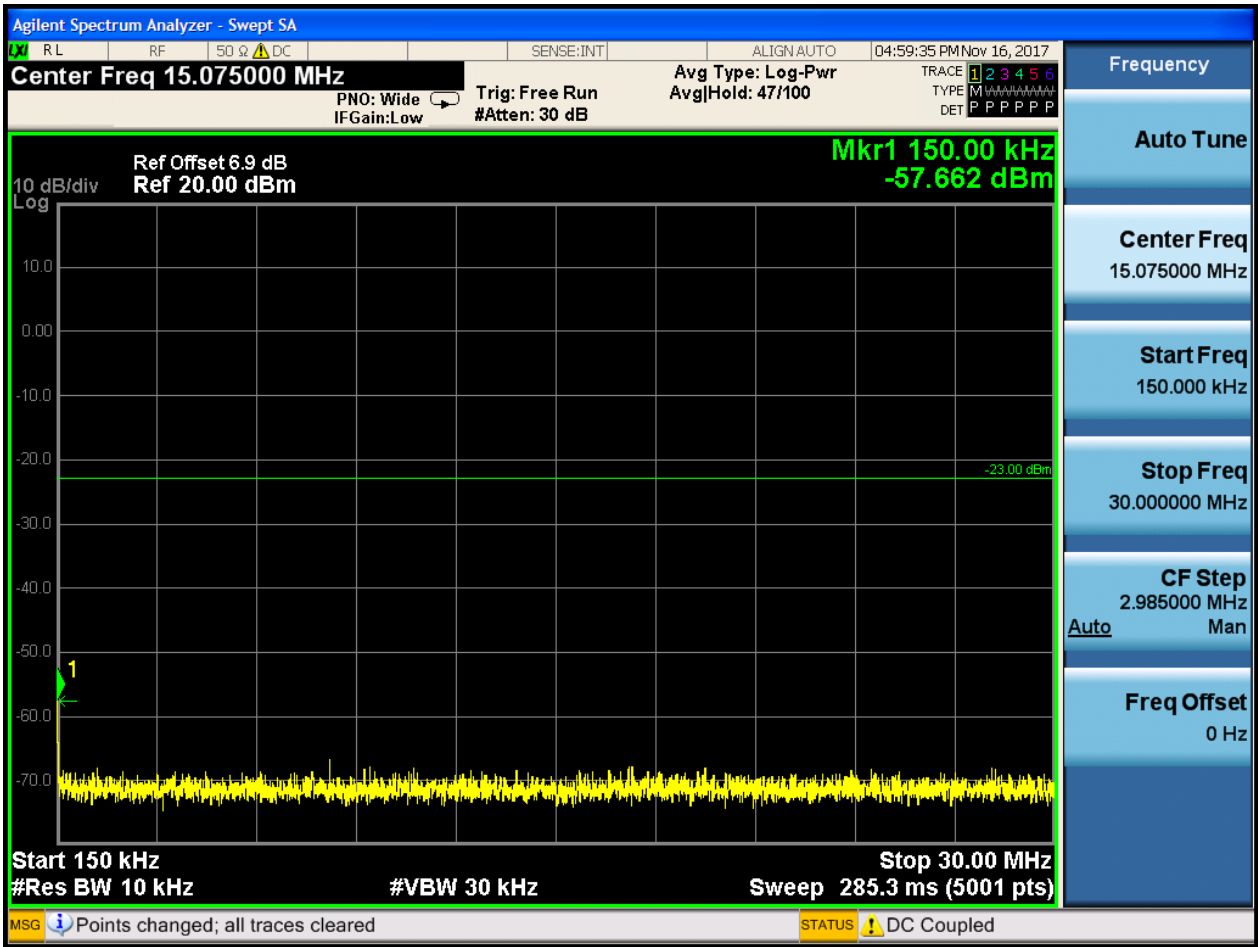


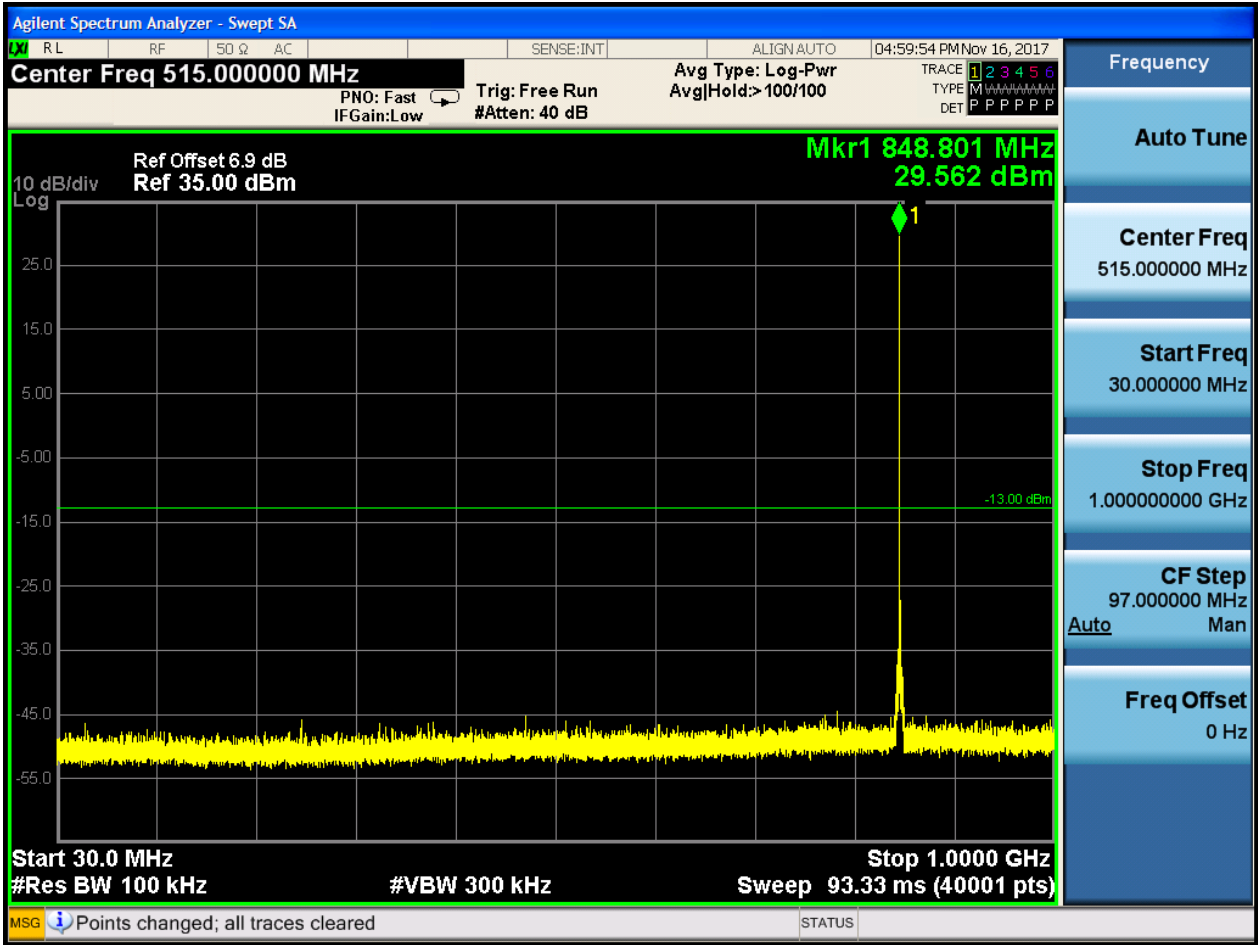


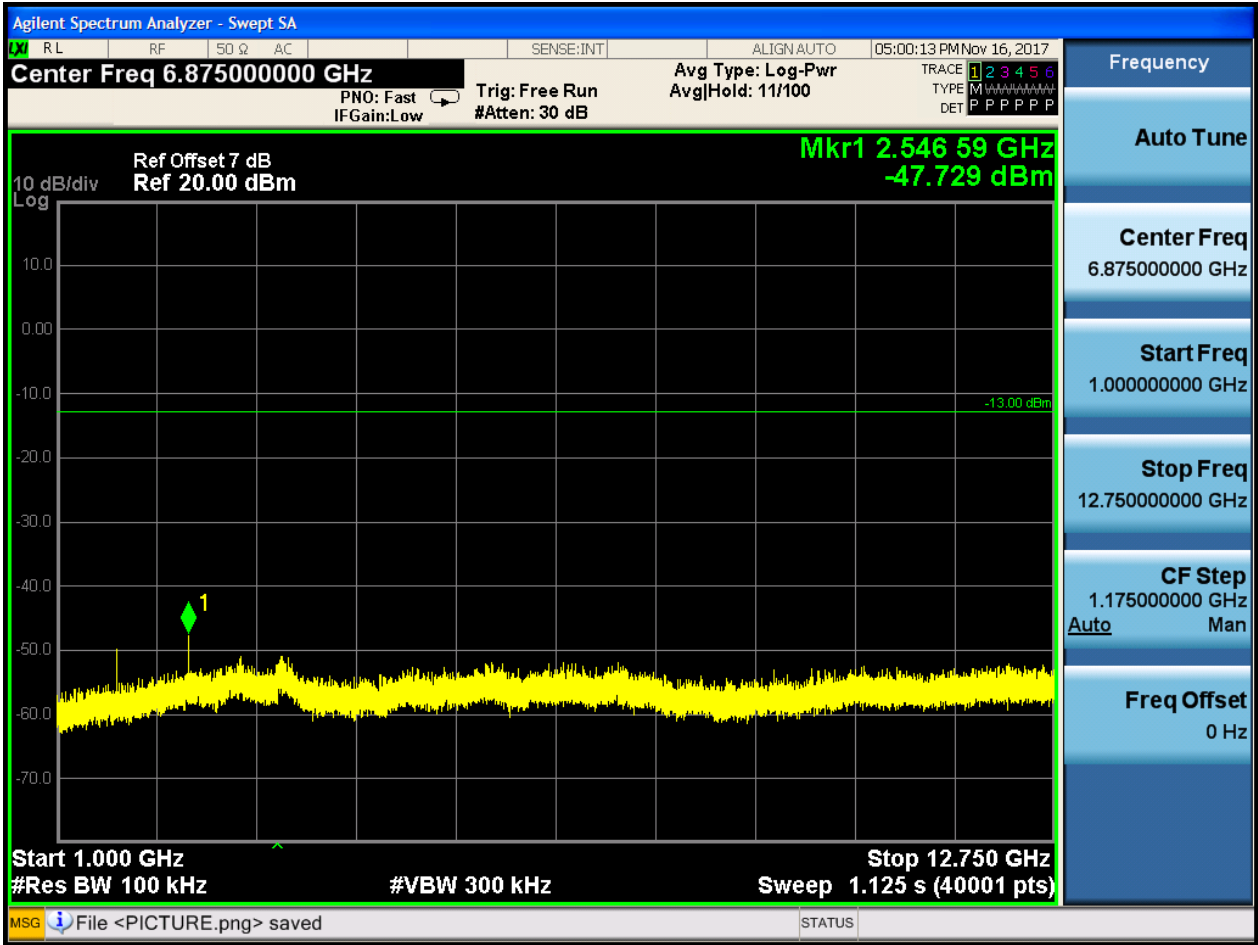


6.1.1.2.3 Test Channel = HCH









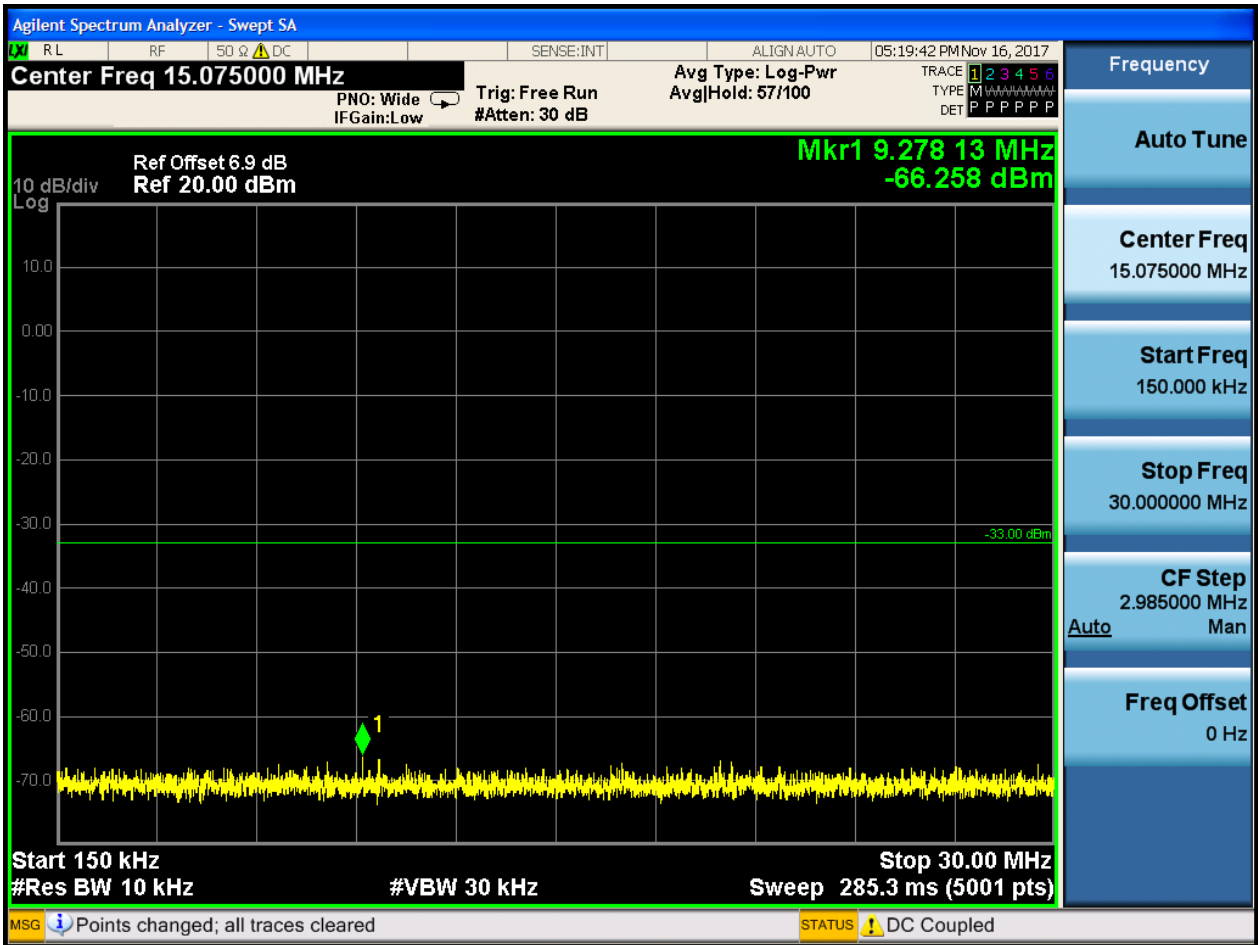


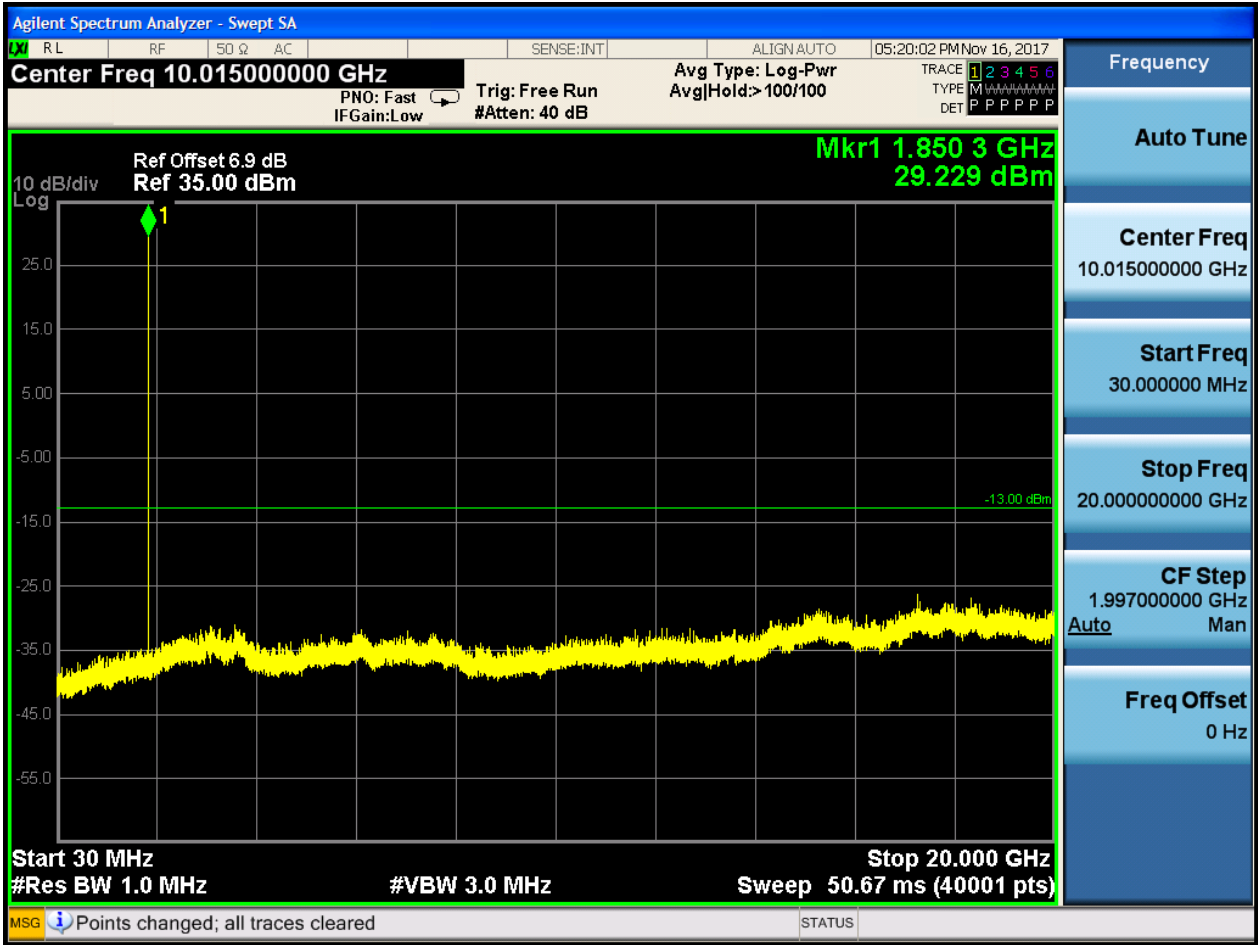
6.1.2 Test Band = GSM1900

6.1.2.1 Test Mode = GSM/TM1

6.1.2.1.1 Test Channel = LCH

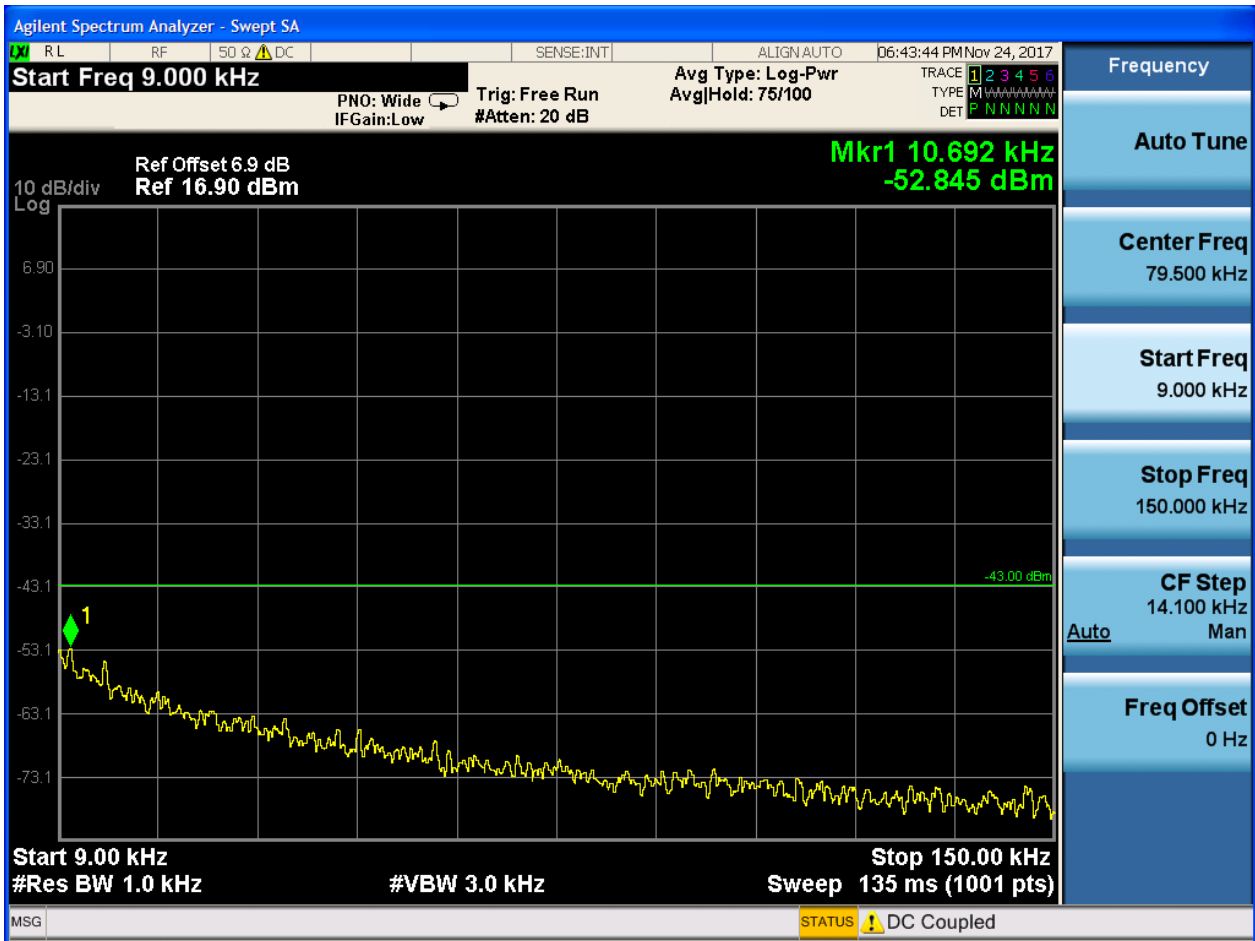


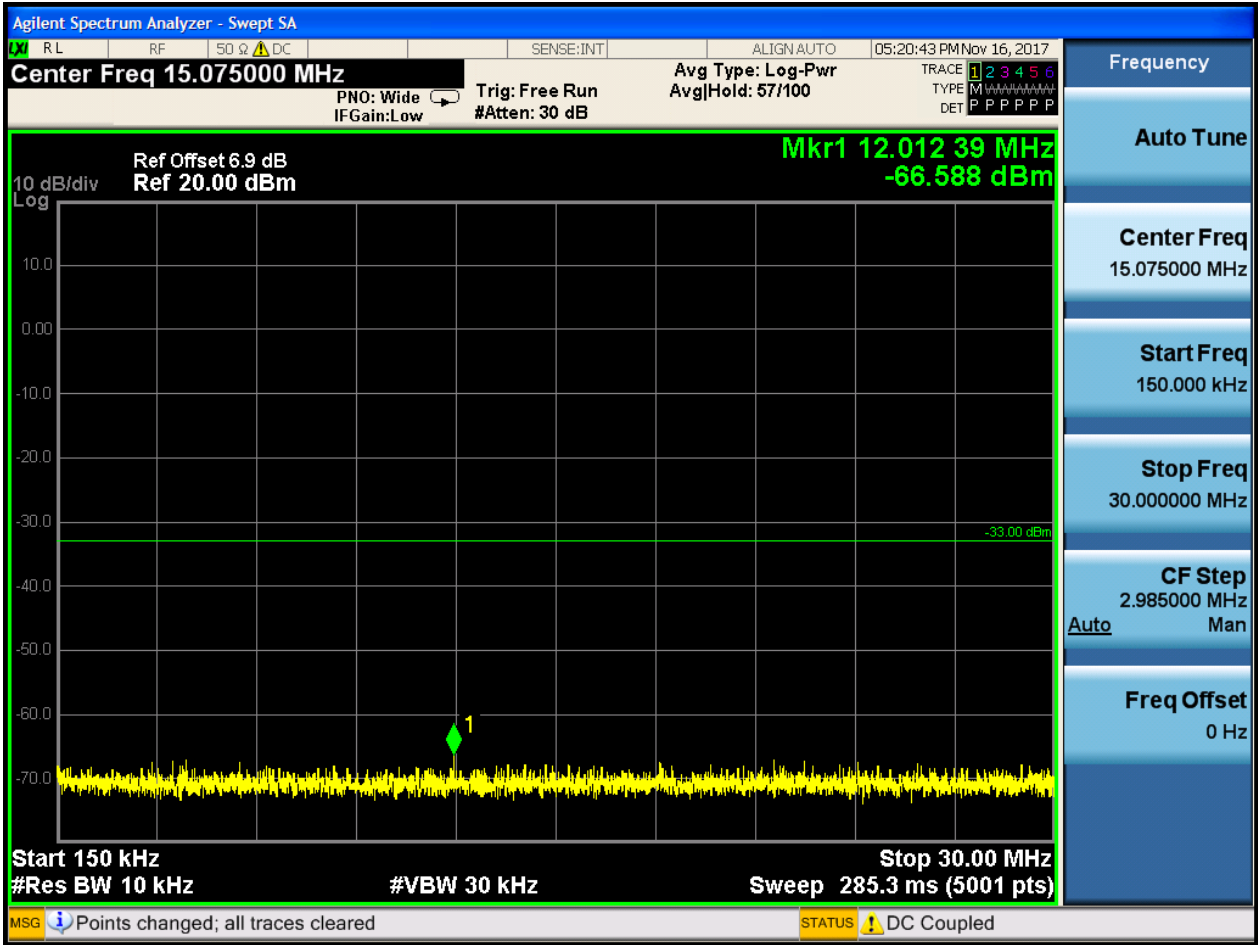






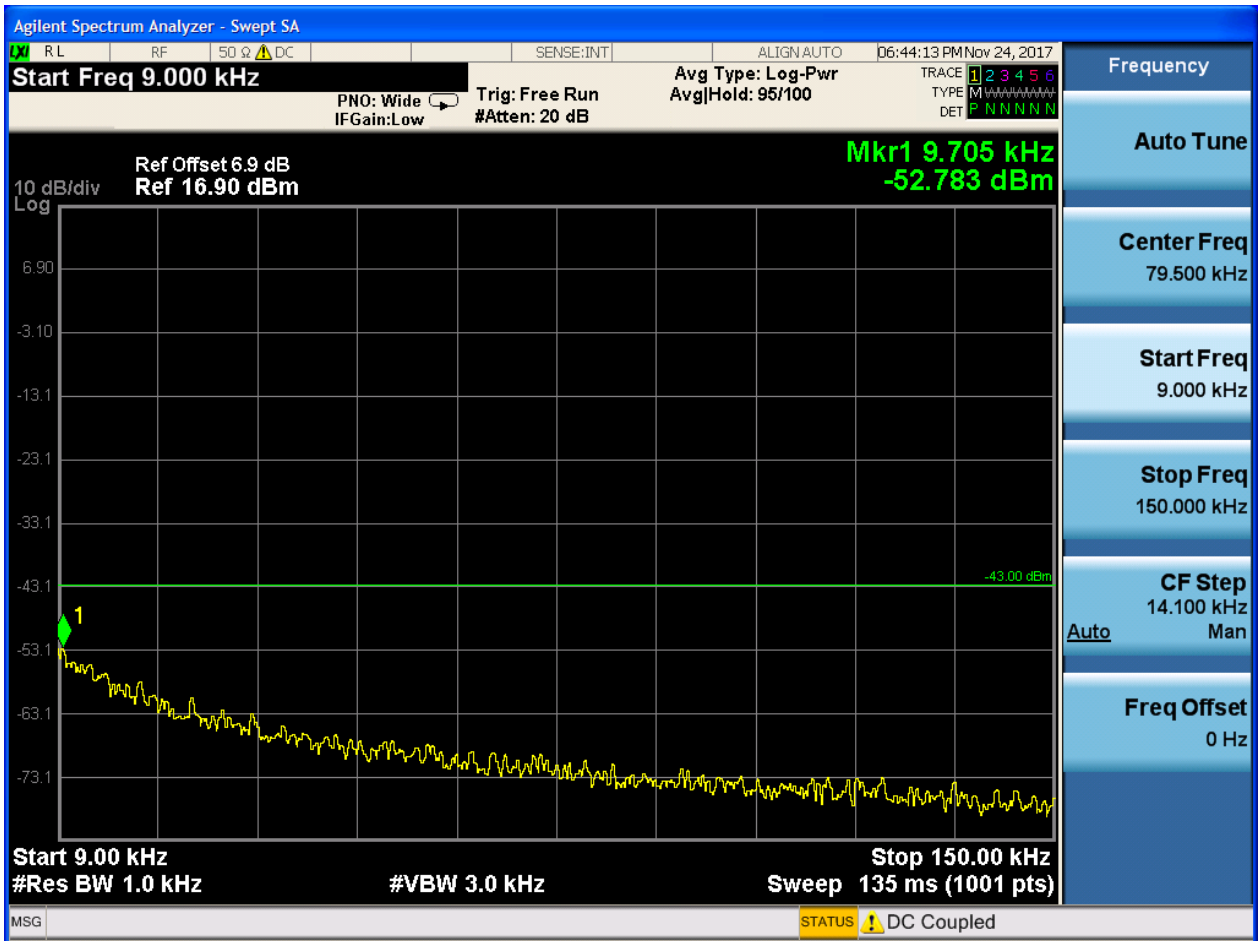
6.1.2.1.2 Test Channel = MCH

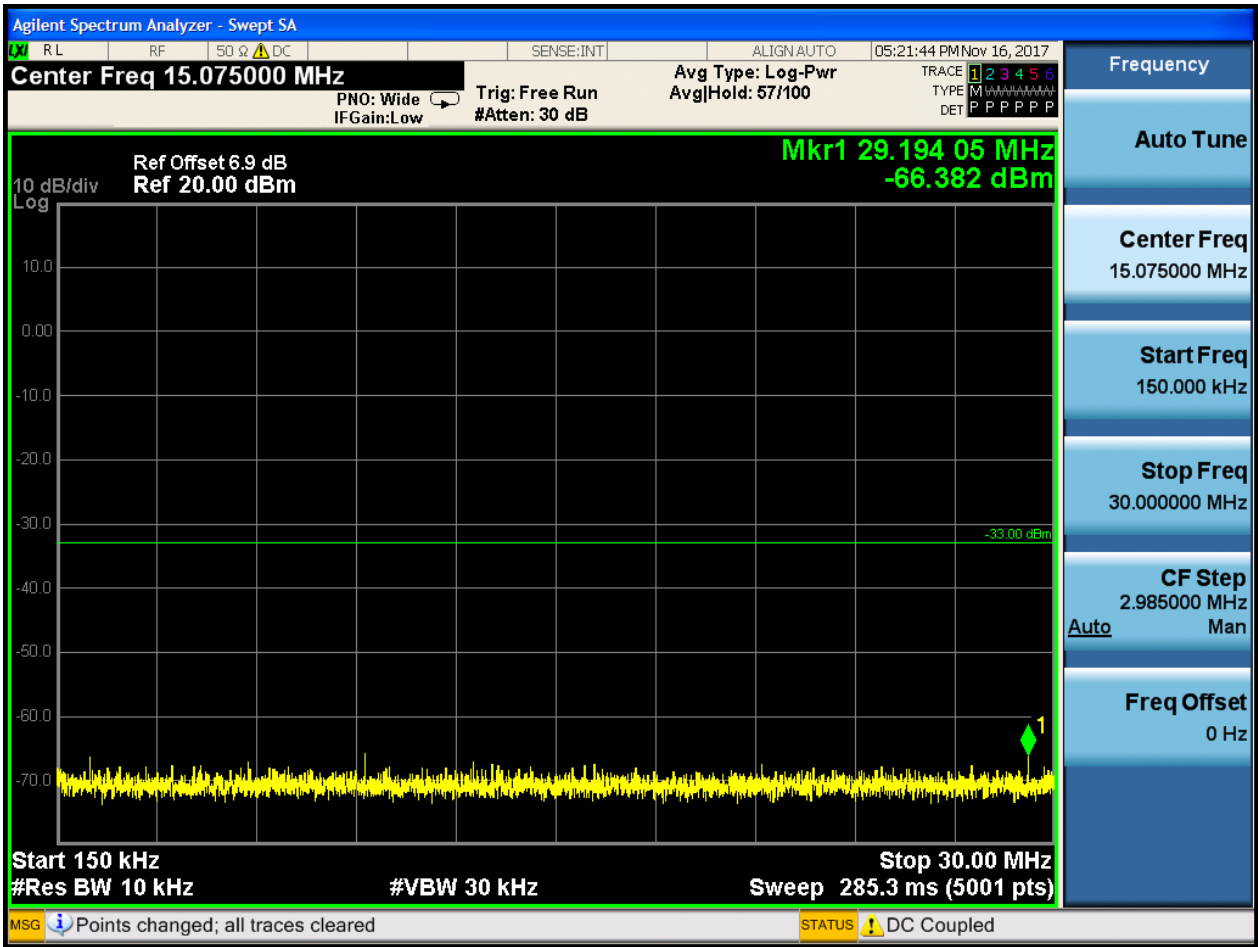


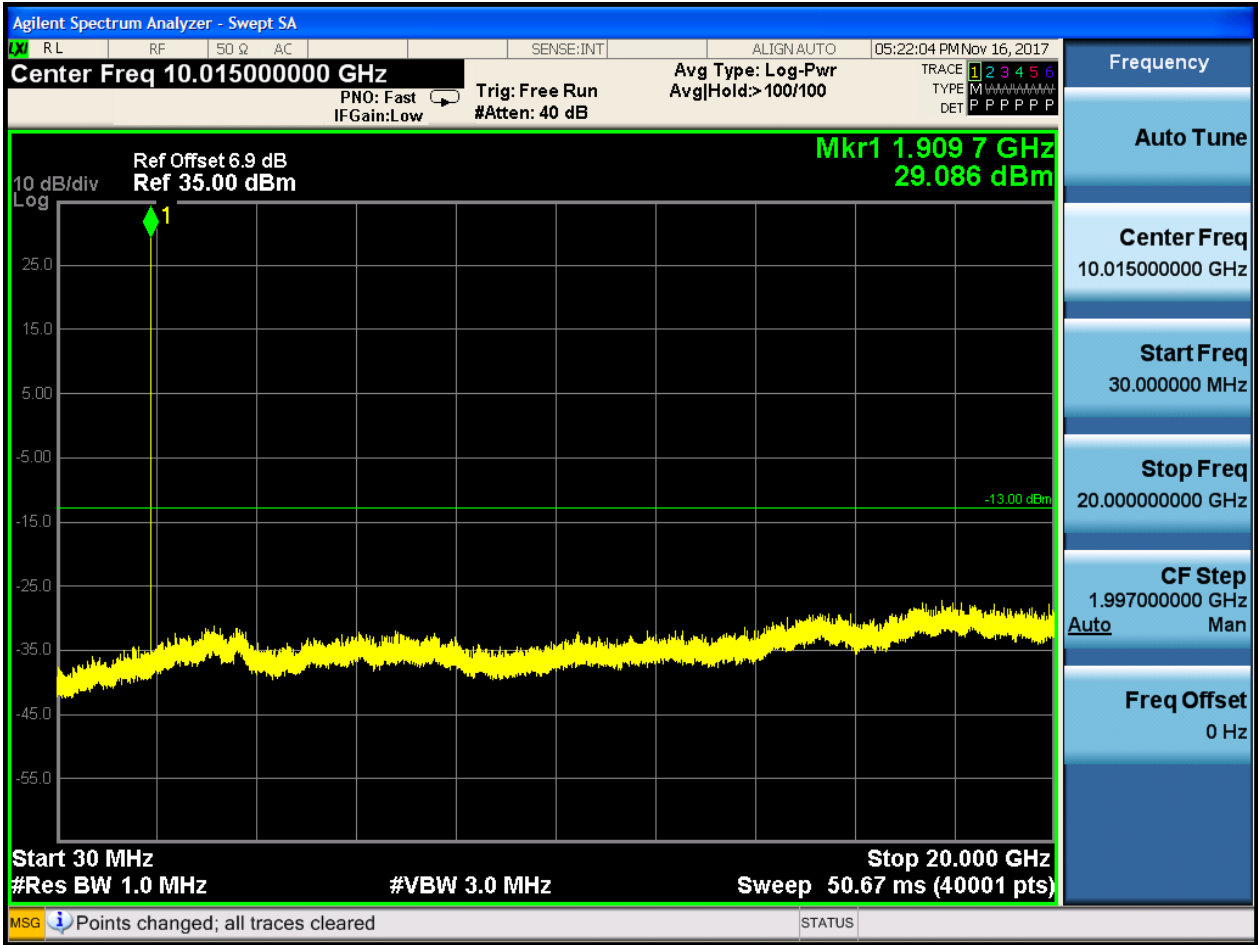




6.1.2.1.3 Test Channel = HCH

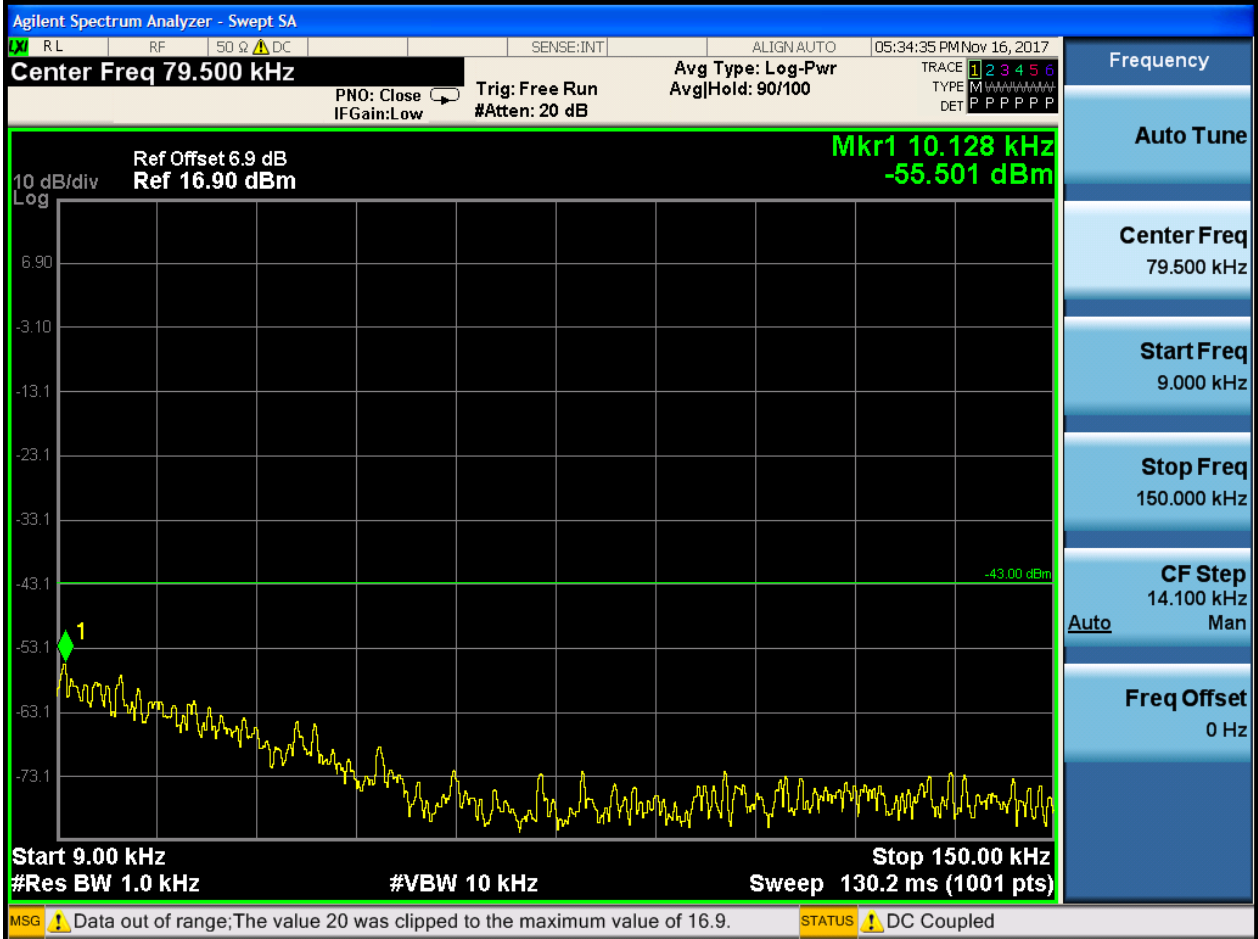


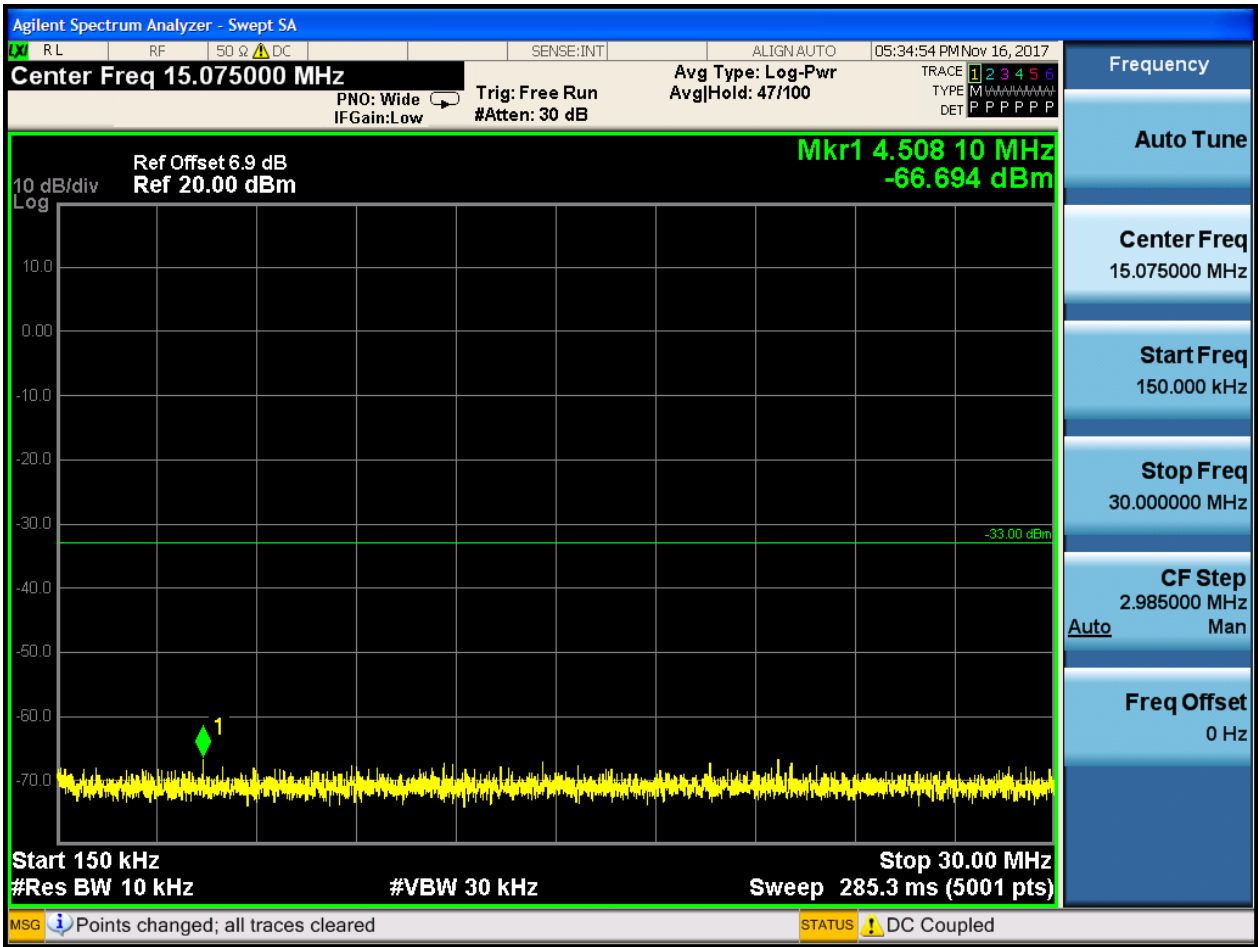


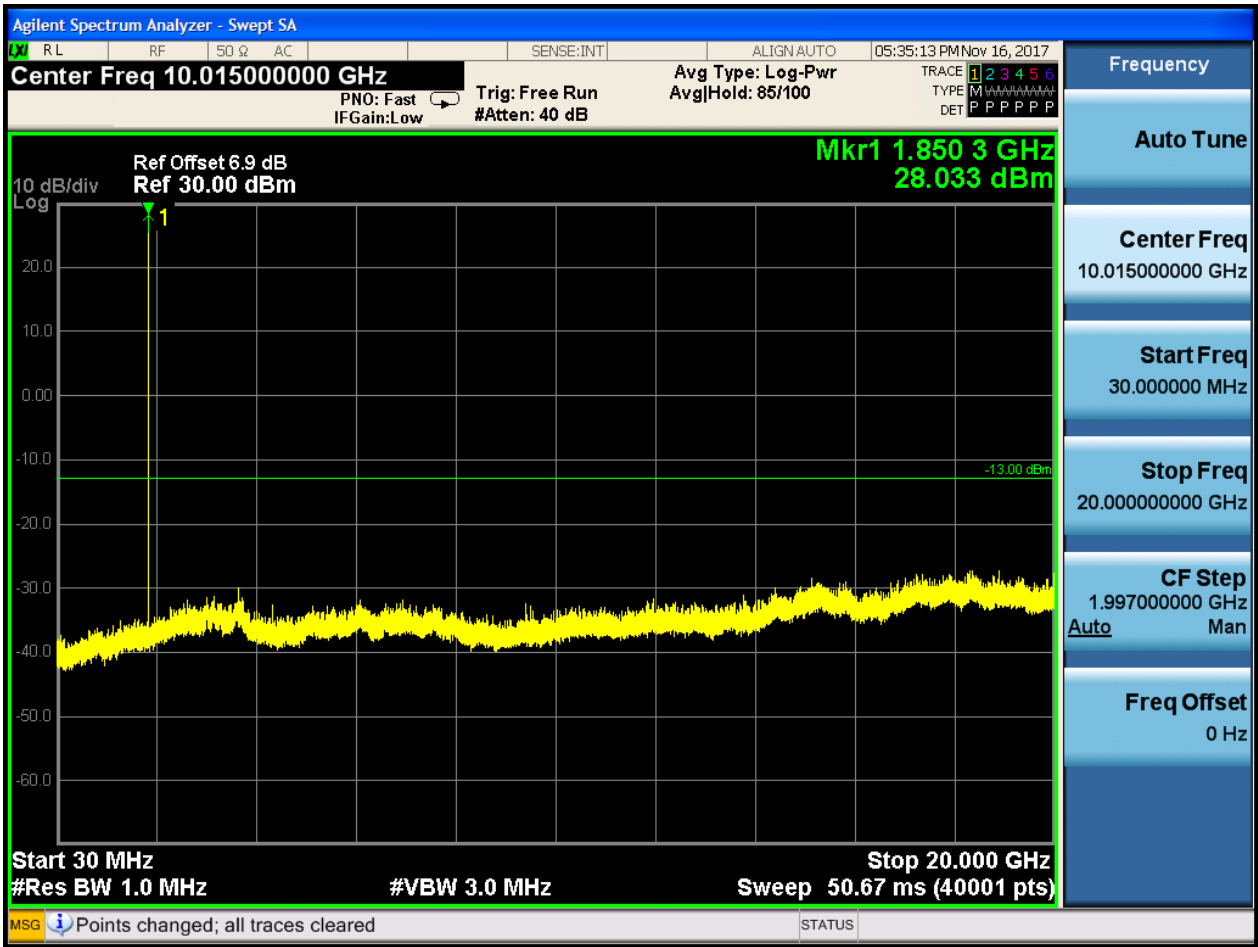


6.1.2.2 Test Mode = GSM/TM2

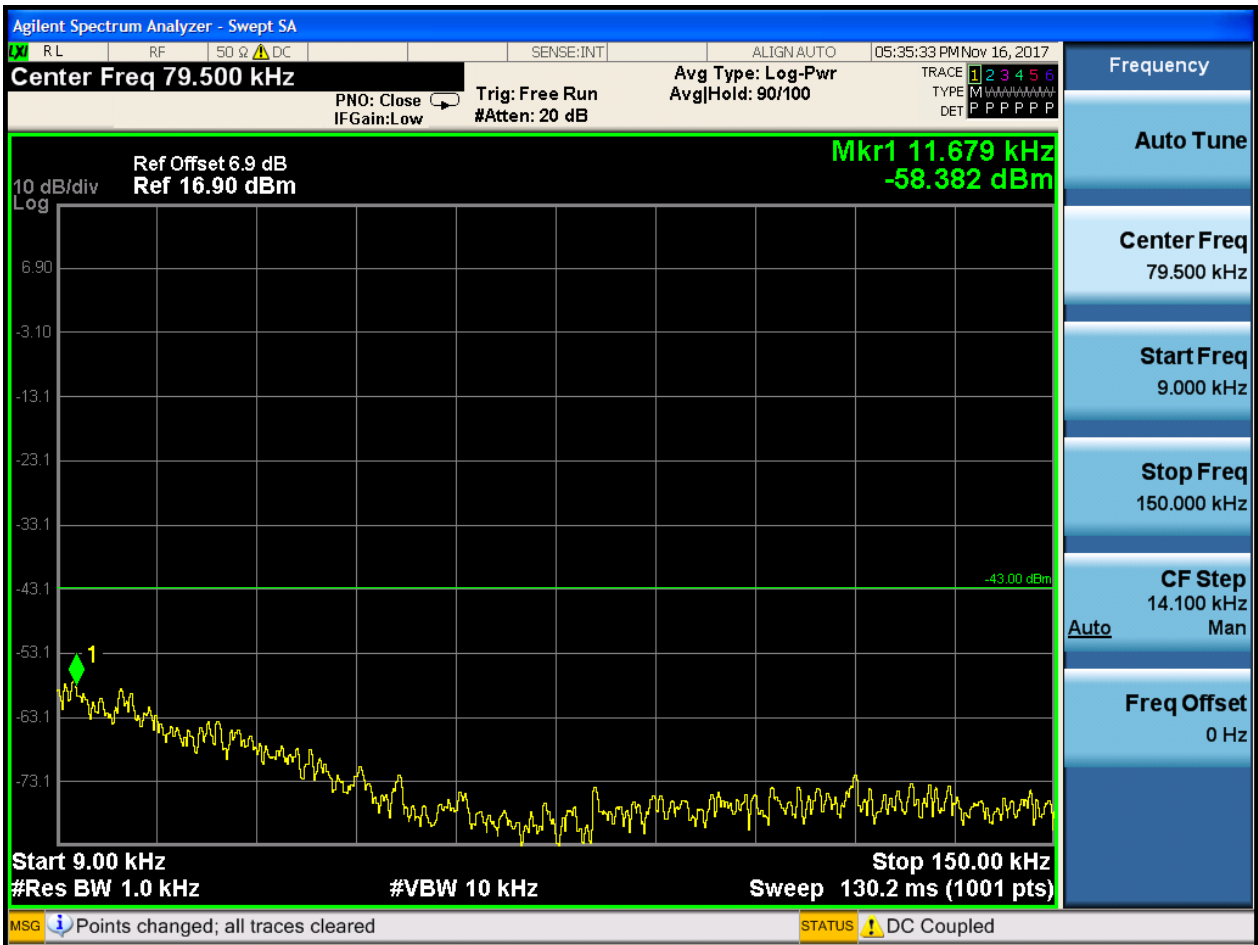
6.1.2.2.1 Test Channel = LCH

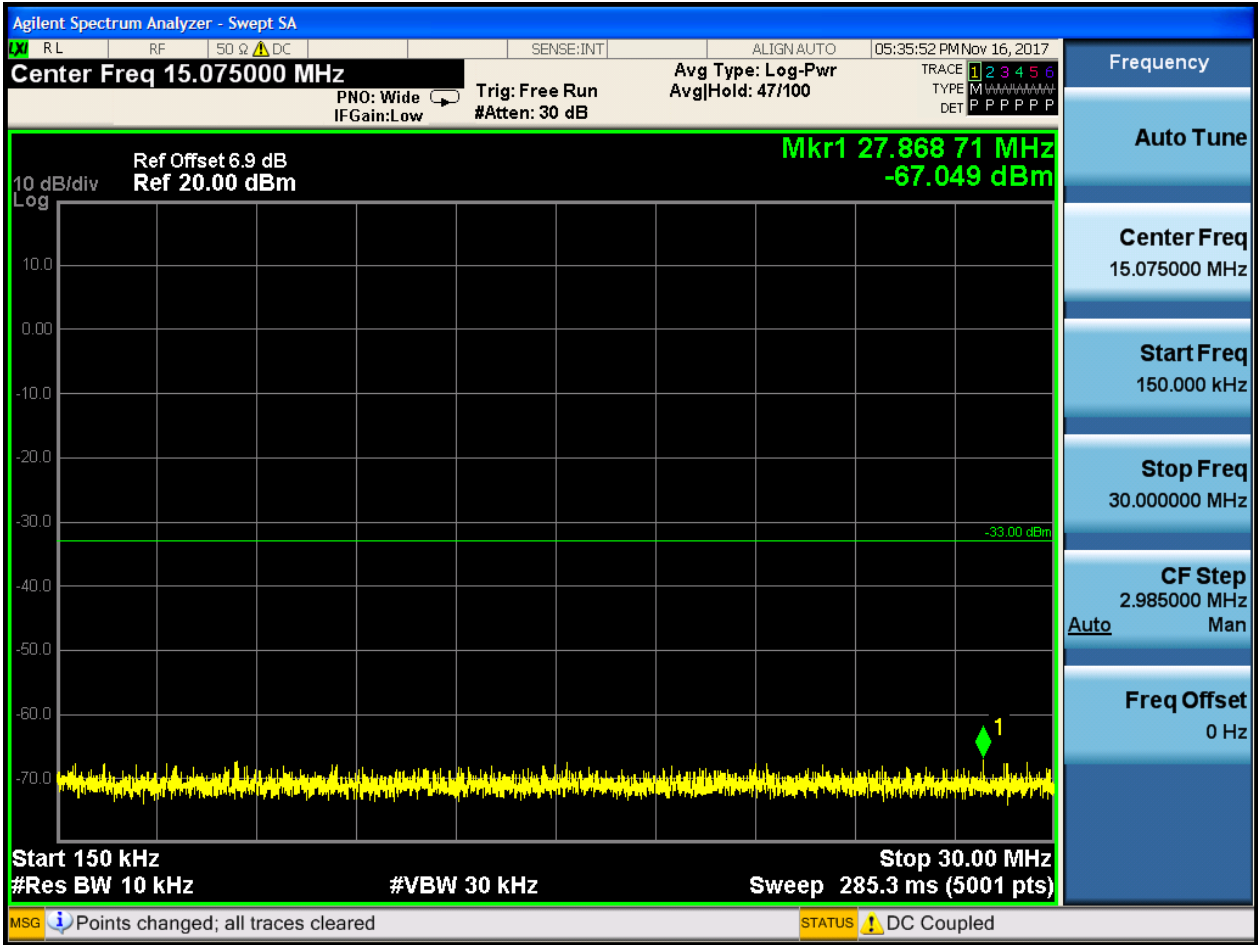






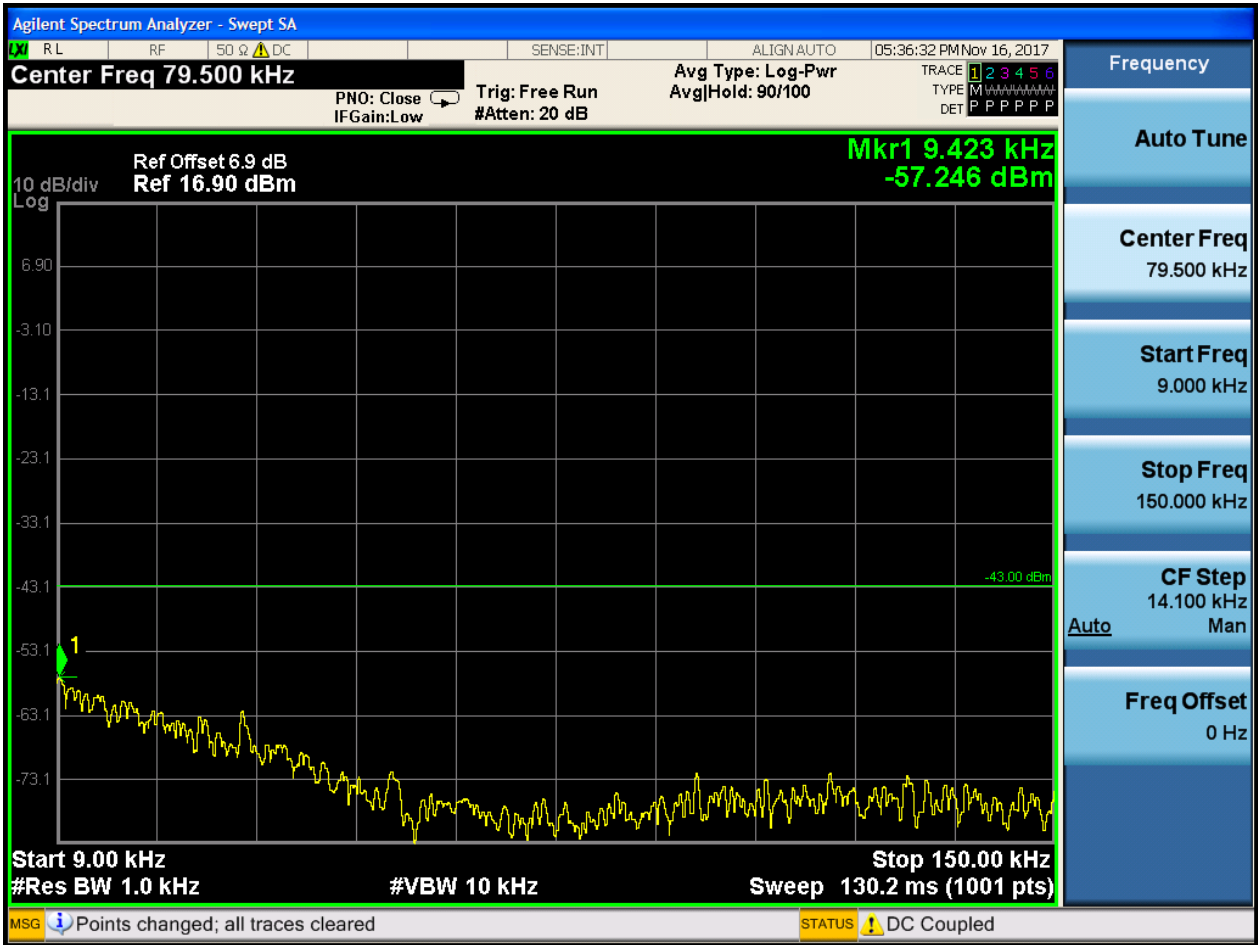
6.1.2.2.2 Test Channel = MCH

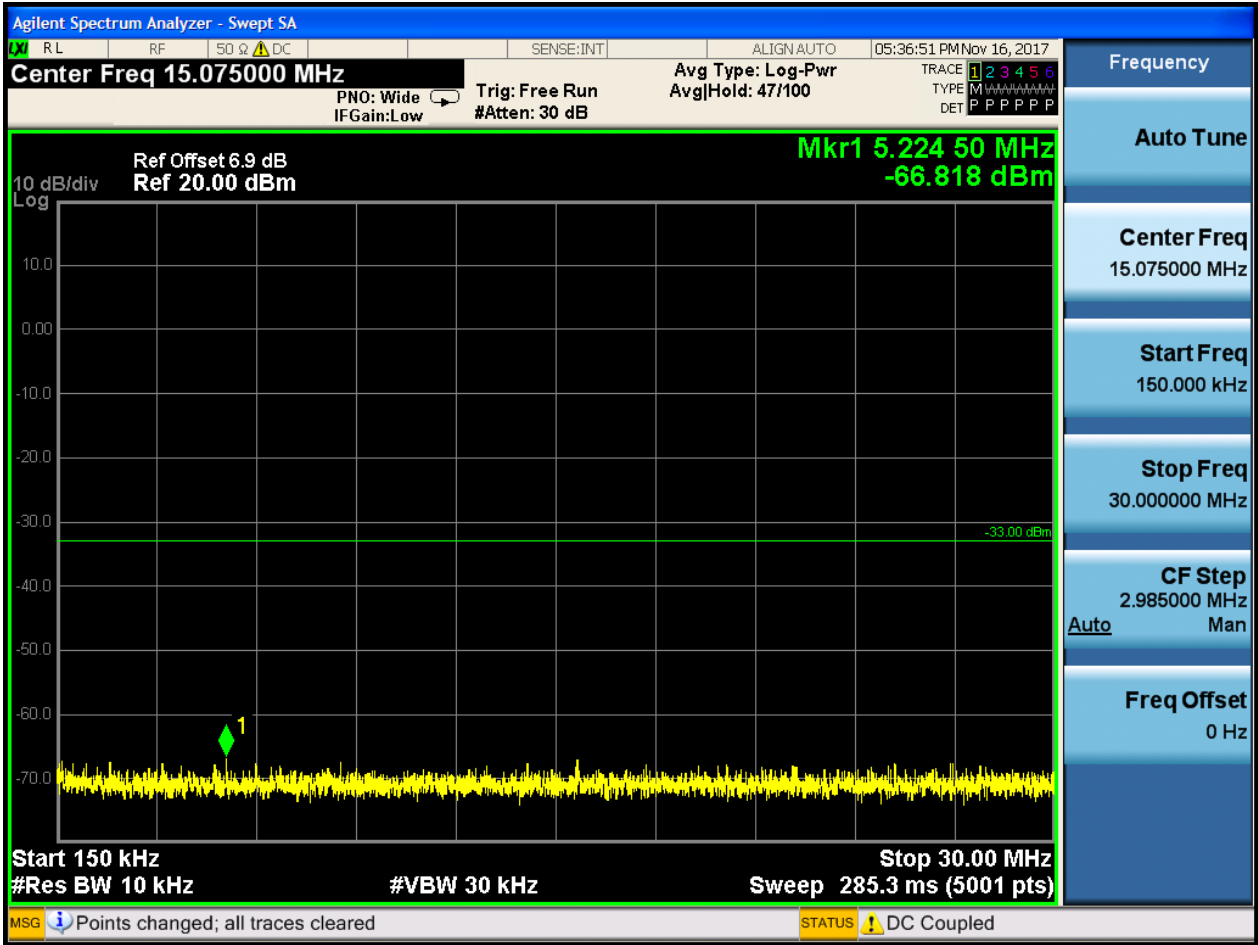






6.1.2.2.3 Test Channel = HCH







7Appendix_G: Field Strength of Spurious Radiation

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

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

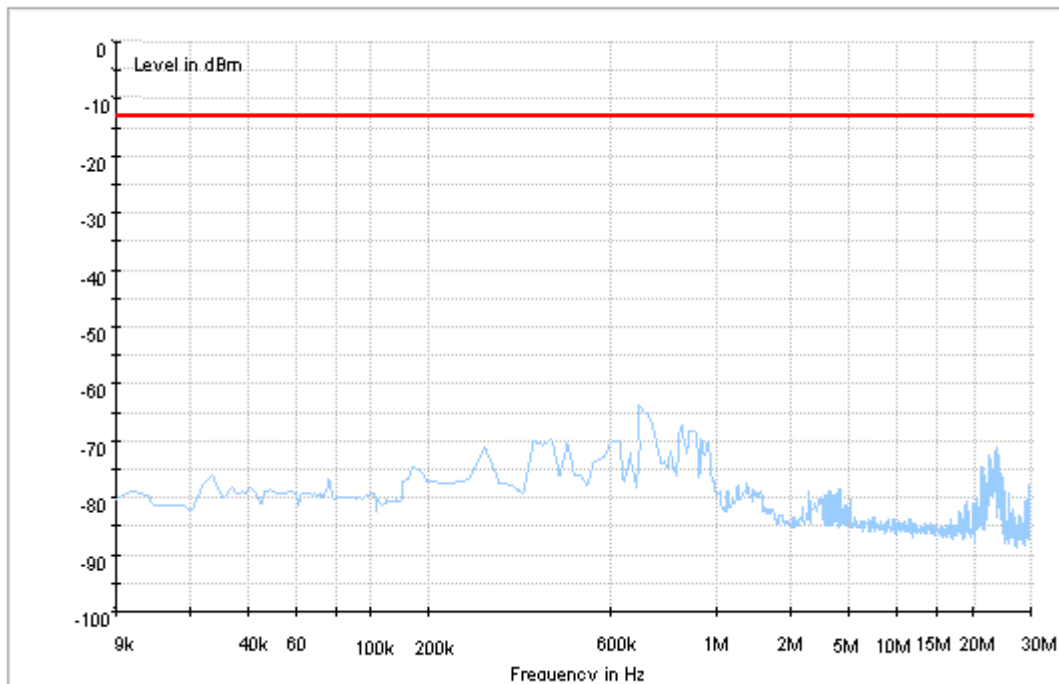
Above 1GHz, RBW = 1 MHz, VBW = 3 MHz. Detector: PK

Part I - Test Plots

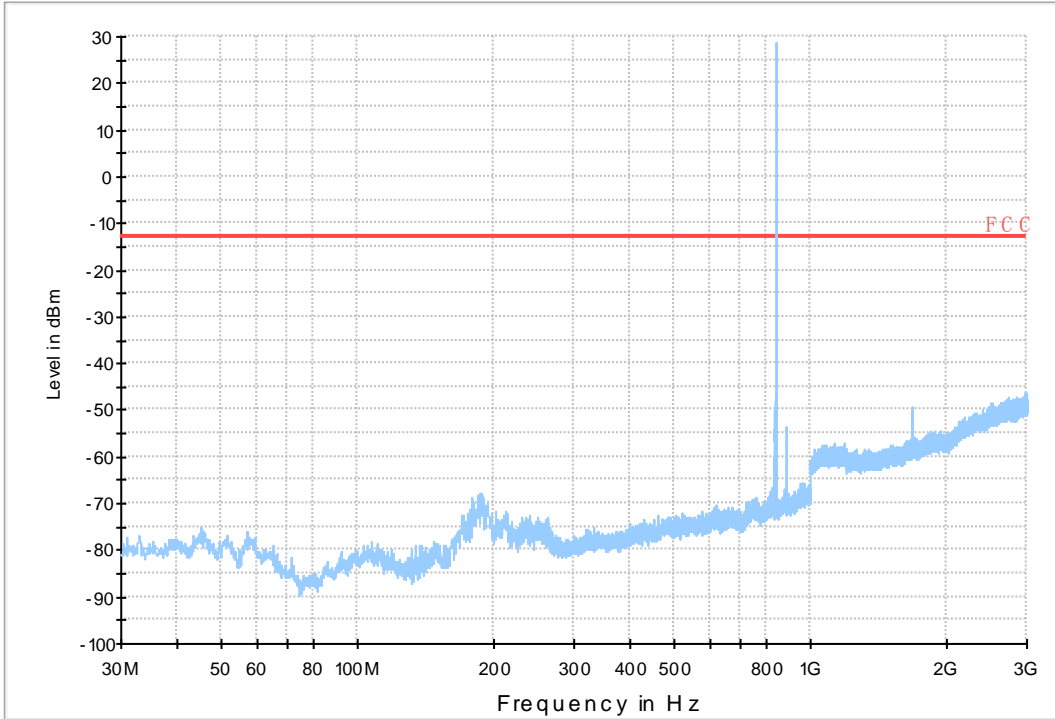
7.1 For GSM

7.1.1 Test Band = GSM850_ANT1

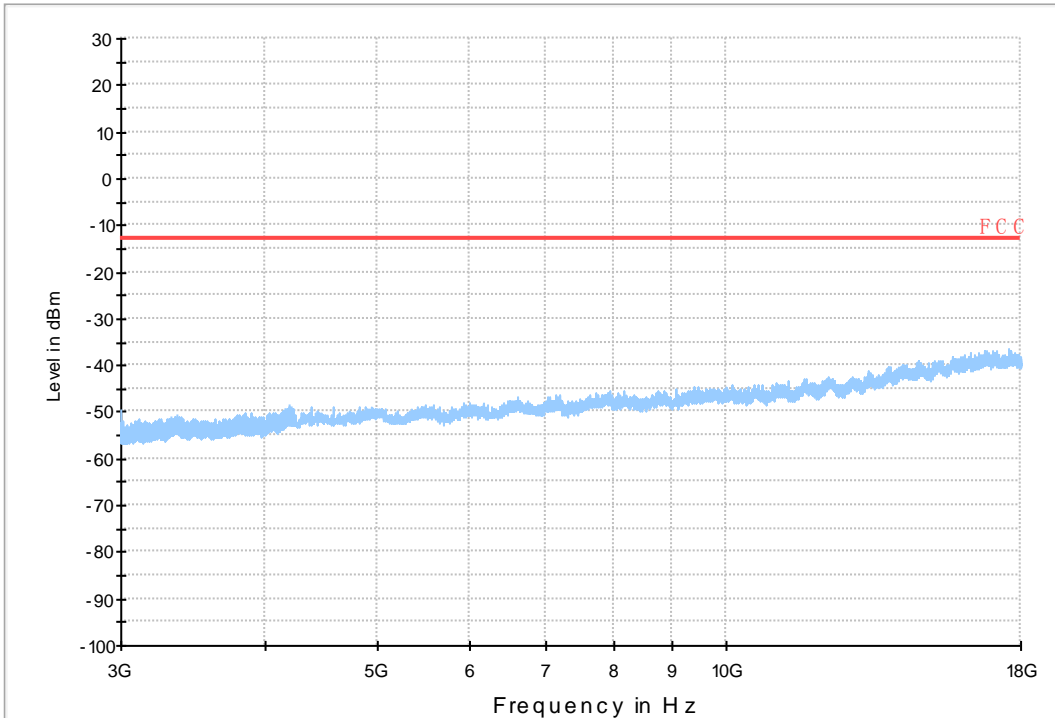
7.1.1.1 Test Mode = GSM/TM1



Copy of FCC PART22 GSM850_L

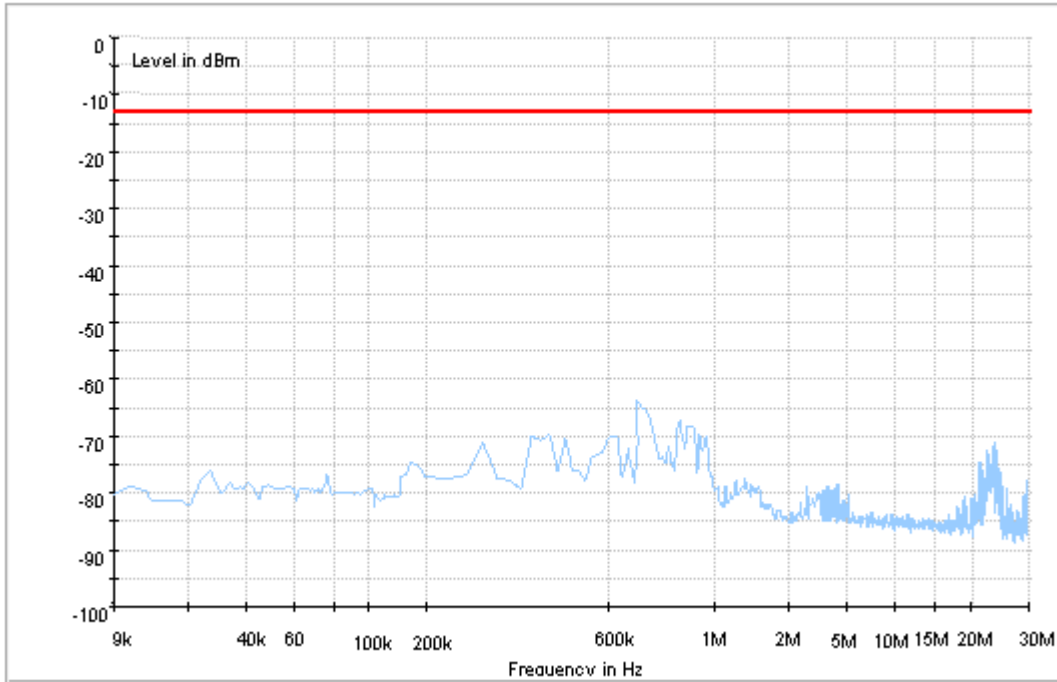


Copy of FCC PART22 GSM850_H

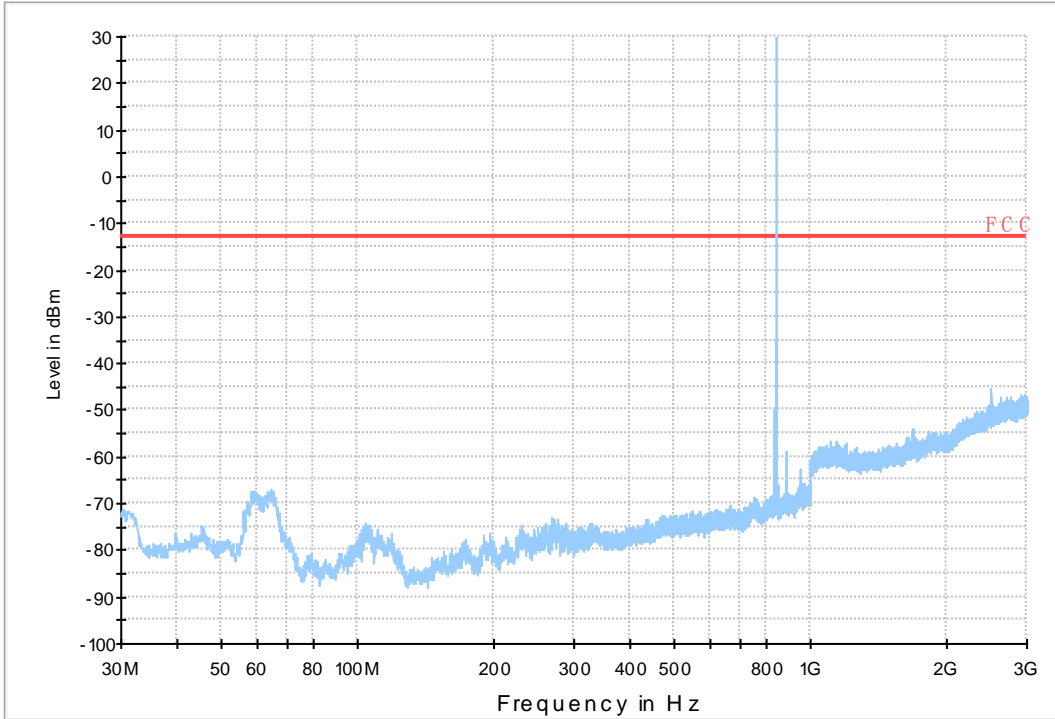


7.1.2 Test Band = GSM850_ANT2

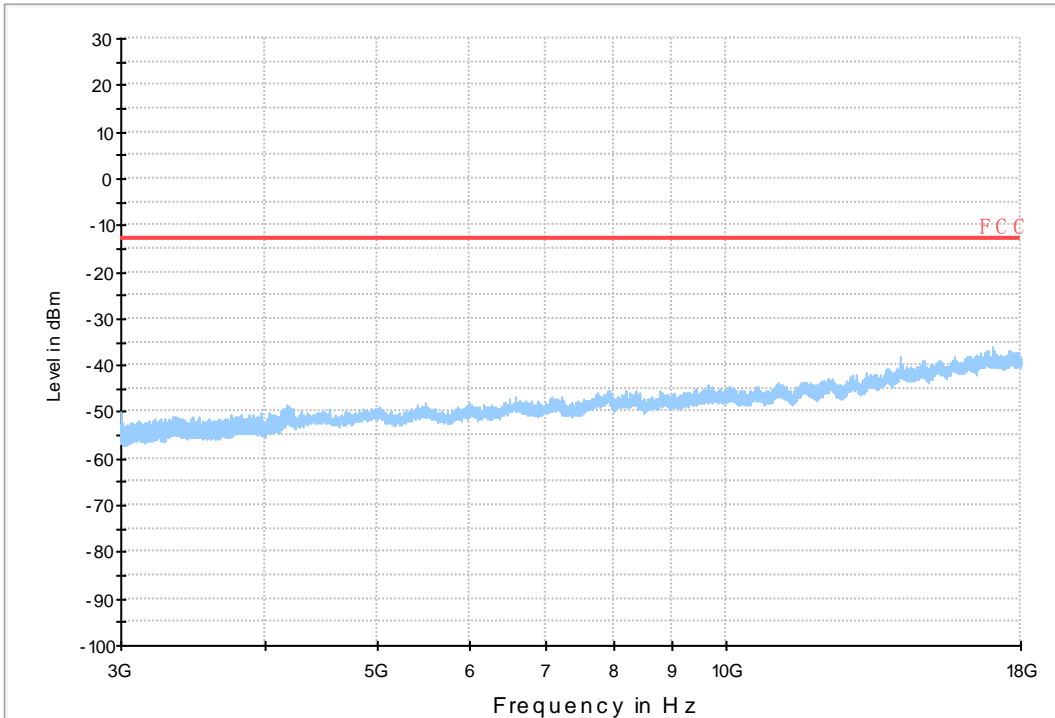
7.1.2.1 Test Mode = GSM/TM1



Copy of FCC PART22 GSM850_L

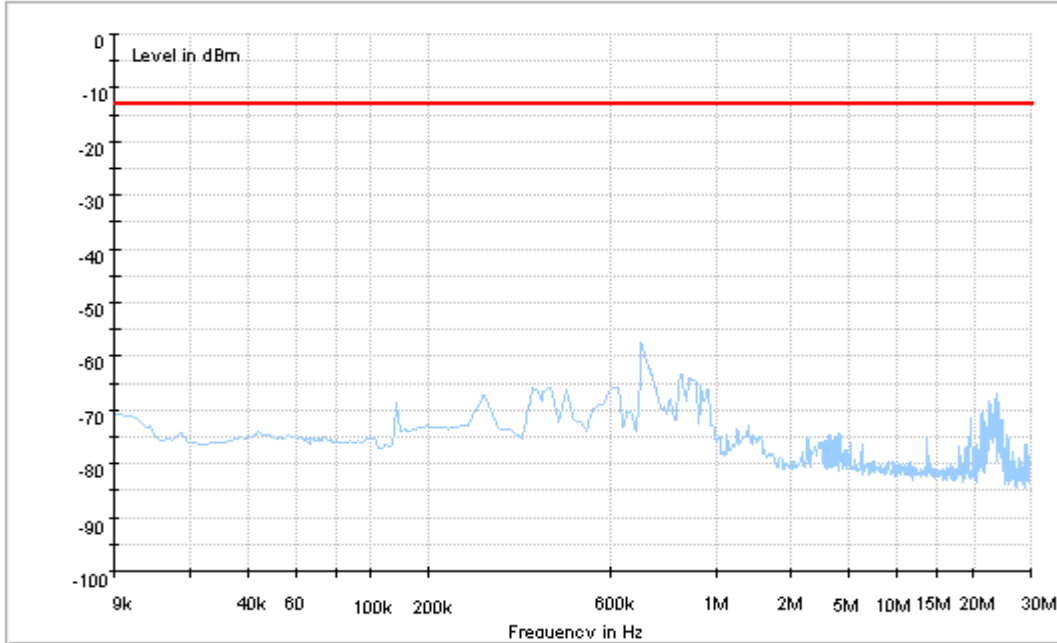


Copy of FCC PART22 GSM850_H

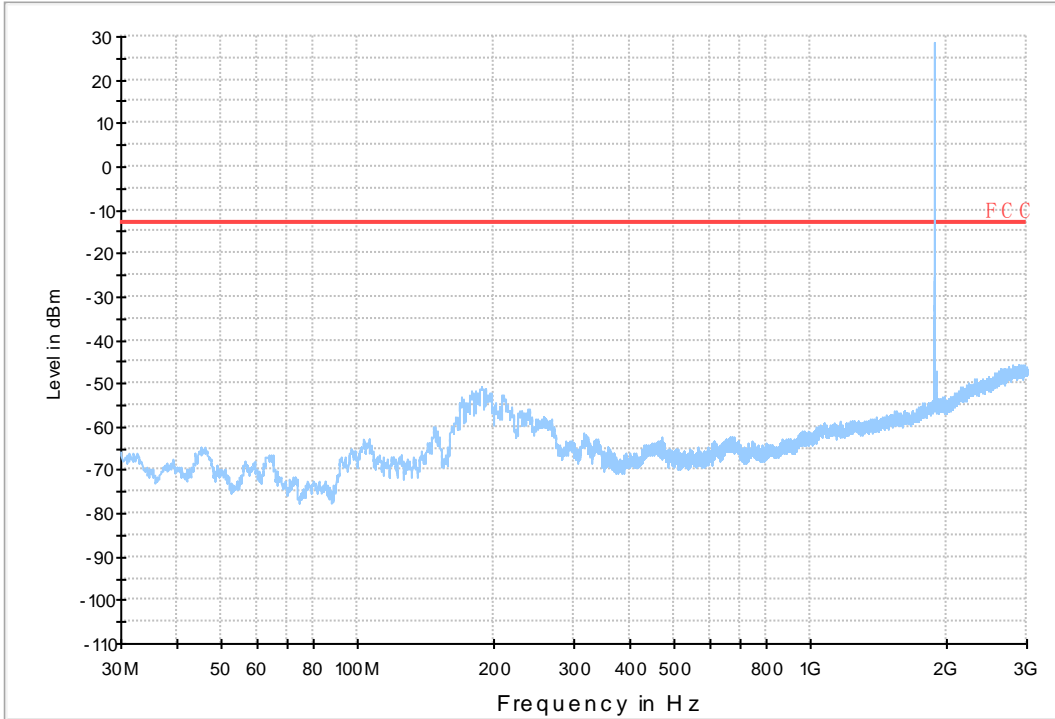


7.1.3 Test Band = GSM1900_ANT1

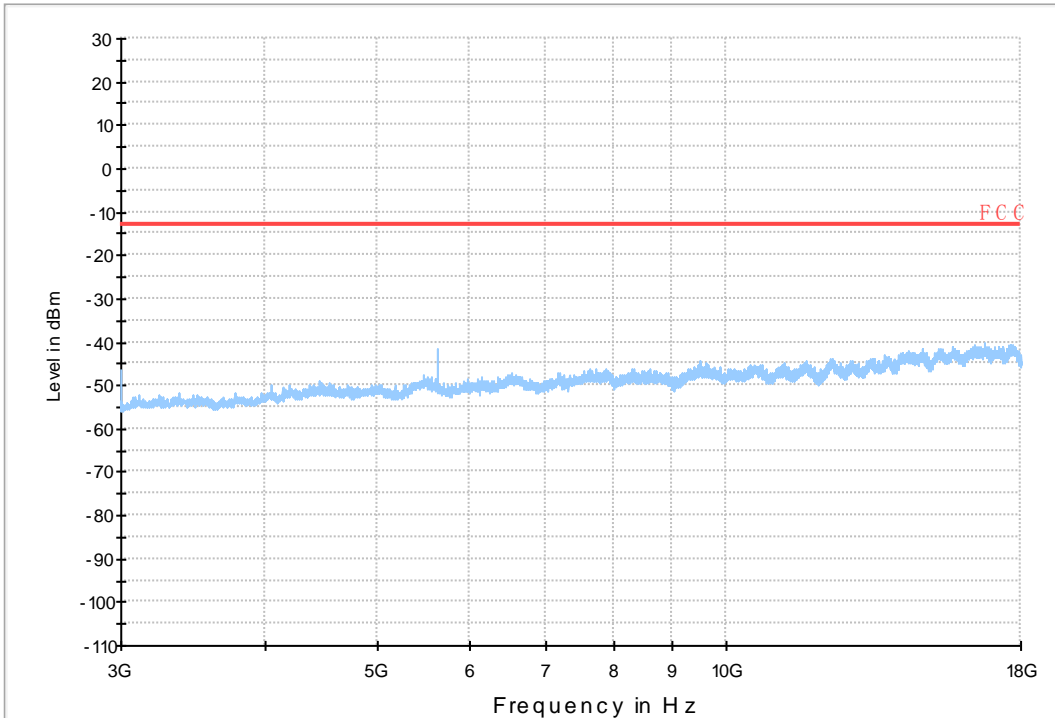
7.1.3.1 Test Mode = GSM/TM1

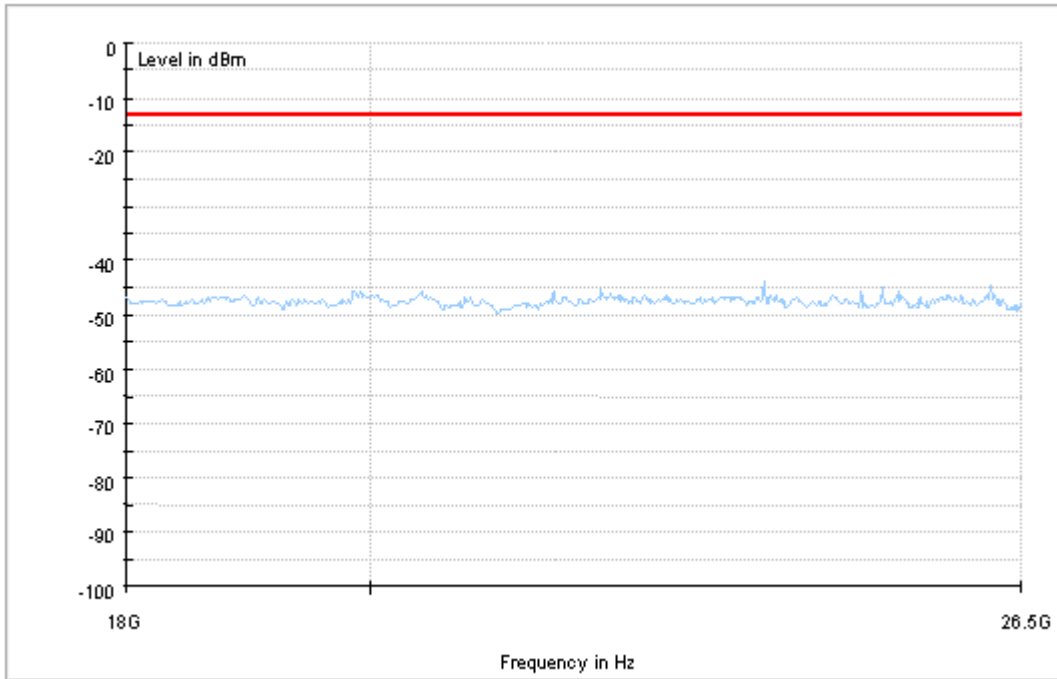


Copy of FCC PART24 GSM1900_L



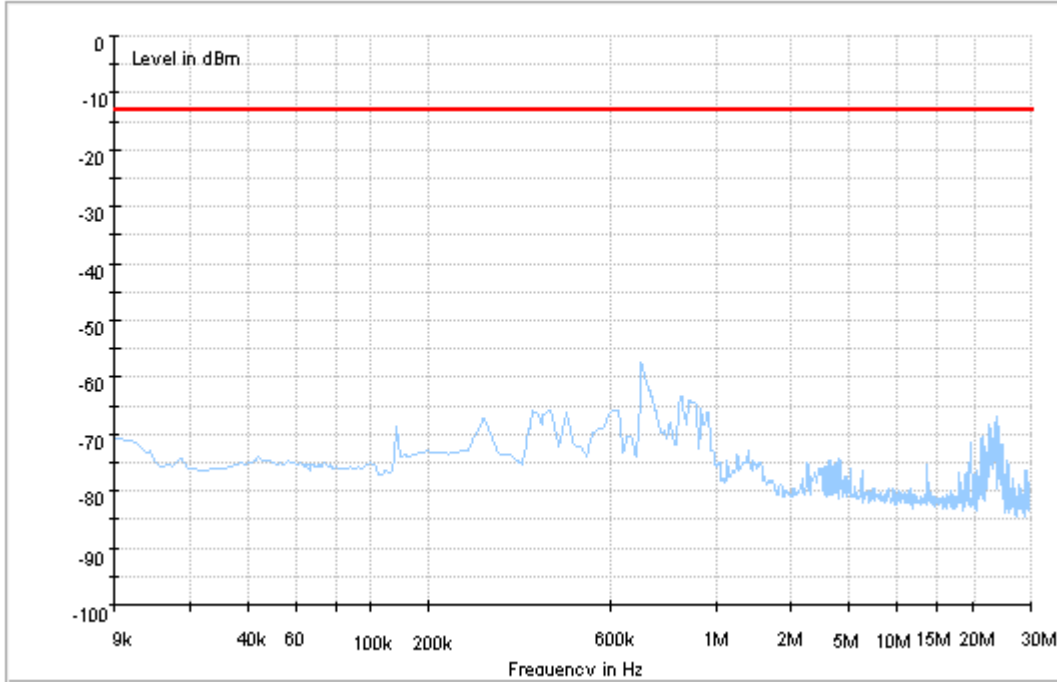
Copy of FCC PART24 GSM1900_H



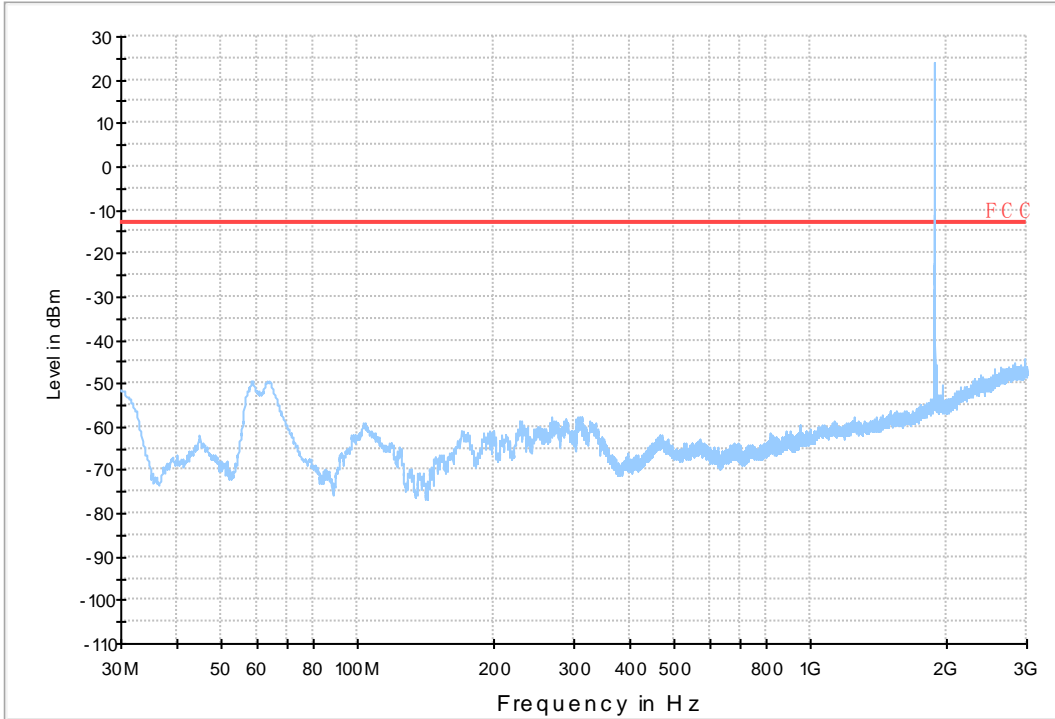


7.1.4 Test Band = GSM1900_ANT2

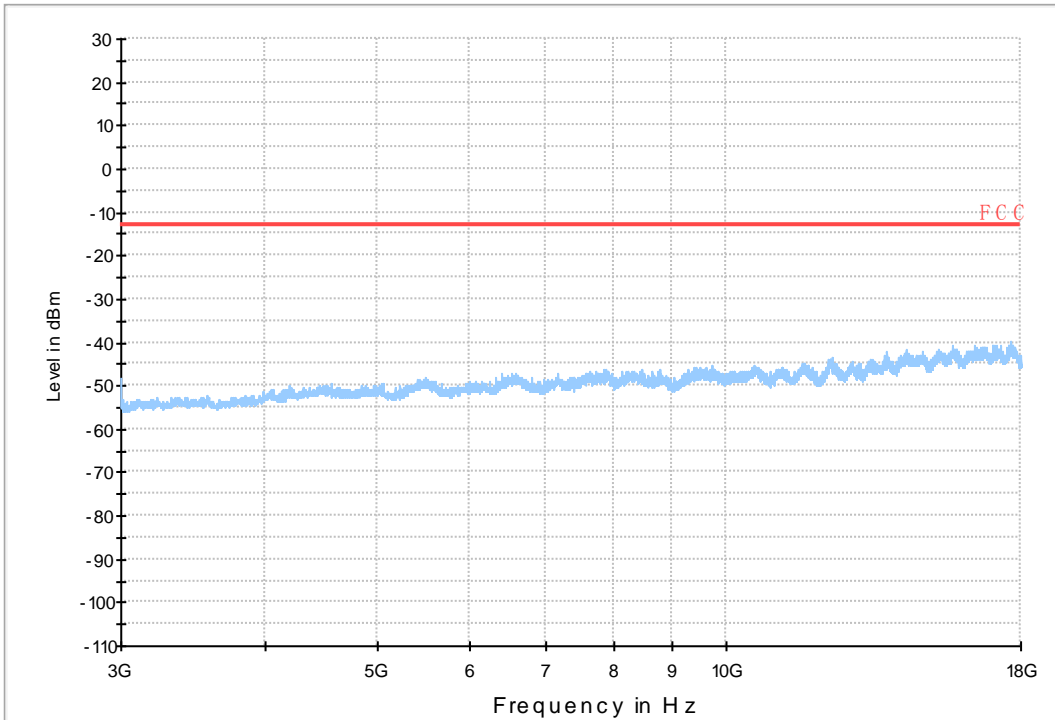
7.1.4.1 Test Mode = GSM/TM1

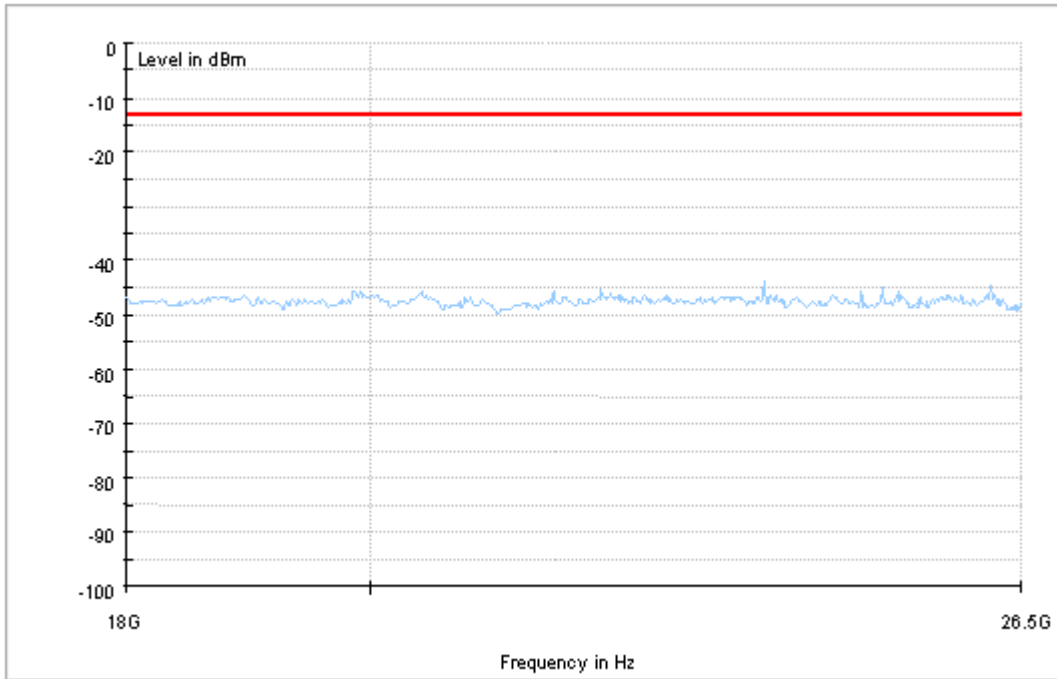


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8Appendix_H: Frequency Stability

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	-7.1	-0.00861	PASS
				VN	-6.65	-0.00807	PASS
				VH	-9.3	-0.01128	PASS
		MCH	TN	VL	-5.1	-0.0061	PASS
				VN	-4.07	-0.00486	PASS
				VH	-10.65	-0.01273	PASS
		HCH	TN	VL	-10.59	-0.01248	PASS
				VN	-9.62	-0.01133	PASS
				VH	-11.36	-0.01338	PASS
	GSM/TM2	LCH	TN	VL	-11.43	-0.01387	PASS
				VN	-12.98	-0.01575	PASS
				VH	-15.17	-0.01841	PASS
		MCH	TN	VL	-7.2	-0.00861	PASS
				VN	-4.39	-0.00525	PASS
				VH	-9.01	-0.01077	PASS
		HCH	TN	VL	-10.78	-0.0127	PASS
				VN	-12.2	-0.01437	PASS
				VH	-17.14	-0.02019	PASS
GSM1900	GSM/TM1	LCH	TN	VL	24.92	0.01347	PASS
				VN	29.64	0.01602	PASS
				VH	14.53	0.00785	PASS
		MCH	TN	VL	16.27	0.00865	PASS
				VN	5.1	0.00271	PASS
				VH	25.51	0.01357	PASS
		HCH	TN	VL	29.64	0.01552	PASS
				VN	23.44	0.01227	PASS
				VH	35.77	0.01873	PASS
	GSM/TM2	LCH	TN	VL	-0.97	-0.00052	PASS
				VN	9.01	0.00487	PASS
				VH	16.34	0.00883	PASS
		MCH	TN	VL	8.33	0.00443	PASS
				VN	12.75	0.00678	PASS
				VH			

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				VH	19.76	0.01051	PASS
		HCH	TN	VL	14.69	0.00769	PASS
				VN	14.43	0.00756	PASS
				VH	21.11	0.01105	PASS

8.1.2 Frequency Error vs. Temperature:

Test Band	Test Temp.	Test Mode	Test Channel	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
GSM850	-30	GSM/TM1	LCH	VN	-7.36	-0.00893	PASS
			MCH	VN	-9.49	-0.01134	PASS
			HCH	VN	-12.14	-0.0143	PASS
	-20	GSM/TM1	LCH	VN	-5.68	-0.00689	PASS
			MCH	VN	-4.91	-0.00587	PASS
			HCH	VN	-11.62	-0.01369	PASS
	-10	GSM/TM1	LCH	VN	-8.65	-0.0105	PASS
			MCH	VN	-5.55	-0.00663	PASS
			HCH	VN	-8.72	-0.01027	PASS
	0	GSM/TM1	LCH	VN	-10.14	-0.0123	PASS
			MCH	VN	-4.33	-0.00518	PASS
			HCH	VN	-10.33	-0.01217	PASS
	10	GSM/TM1	LCH	VN	-6.13	-0.00744	PASS
			MCH	VN	-7.49	-0.00895	PASS
			HCH	VN	-7.30	-0.0086	PASS
	20	GSM/TM1	LCH	VN	-10.01	-0.01215	PASS
			MCH	VN	-10.53	-0.01259	PASS
			HCH	VN	-8.07	-0.00951	PASS
	30	GSM/TM1	LCH	VN	-11.69	-0.01418	PASS
			MCH	VN	-10.72	-0.01281	PASS
			HCH	VN	-11.95	-0.01408	PASS
	40	GSM/TM1	LCH	VN	-26.60	-0.03227	PASS
			MCH	VN	-3.87	-0.00463	PASS
			HCH	VN	-13.30	-0.01567	PASS
	50	GSM/TM1	LCH	VN	-8.33	-0.01011	PASS
			MCH	VN	-6.01	-0.00718	PASS
			HCH	VN	-10.65	-0.01255	PASS
	-30	GSM/TM2	LCH	VN	-8.85	-0.01074	PASS
			MCH	VN	-12.24	-0.01463	PASS
			HCH	VN	-11.04	-0.01301	PASS
-20	GSM/TM2	LCH	VN	-11.17	-0.01355	PASS	

			MCH	VN	-5.04	-0.00602	PASS
			HCH	VN	-14.40	-0.01697	PASS
	-10	GSM/TM2	LCH	VN	-2.84	-0.00345	PASS
			MCH	VN	-11.82	-0.01413	PASS
			HCH	VN	-19.08	-0.02248	PASS
	0	GSM/TM2	LCH	VN	-36.97	-0.04486	PASS
			MCH	VN	-8.94	-0.01069	PASS
			HCH	VN	-9.14	-0.01077	PASS
	10	GSM/TM2	LCH	VN	-16.50	-0.02002	PASS
			MCH	VN	-10.78	-0.01289	PASS
			HCH	VN	-11.04	-0.01301	PASS
	20	GSM/TM2	LCH	VN	-3.26	-0.00396	PASS
			MCH	VN	-9.69	-0.01158	PASS
			HCH	VN	-8.46	-0.00997	PASS
	30	GSM/TM2	LCH	VN	-15.40	-0.01868	PASS
			MCH	VN	-13.59	-0.01624	PASS
			HCH	VN	-11.75	-0.01384	PASS
	40	GSM/TM2	LCH	VN	-6.97	-0.00846	PASS
MCH			VN	-10.88	-0.01301	PASS	
HCH			VN	-9.07	-0.01069	PASS	
50	GSM/TM2	LCH	VN	-7.43	-0.00901	PASS	
		MCH	VN	-12.62	-0.01508	PASS	
		HCH	VN	2.91	0.00343	PASS	
GSM1900	-30	GSM/TM1	LCH	VN	17.56	0.00949	PASS
			MCH	VN	20.47	0.01089	PASS
			HCH	VN	36.87	0.01931	PASS
	-20	GSM/TM1	LCH	VN	27.06	0.01463	PASS
			MCH	VN	33.00	0.01755	PASS
			HCH	VN	23.25	0.01217	PASS
	-10	GSM/TM1	LCH	VN	21.70	0.01173	PASS
			MCH	VN	25.76	0.0137	PASS
			HCH	VN	31.45	0.01647	PASS
	0	GSM/TM1	LCH	VN	26.60	0.01438	PASS
			MCH	VN	19.24	0.01023	PASS
			HCH	VN	26.93	0.0141	PASS
	10	GSM/TM1	LCH	VN	14.01	0.00757	PASS
			MCH	VN	18.79	0.00999	PASS
			HCH	VN	25.57	0.01339	PASS
	20	GSM/TM1	LCH	VN	24.54	0.01326	PASS
			MCH	VN	21.44	0.0114	PASS
			HCH	VN	30.87	0.01616	PASS

	30	GSM/TM1	LCH	VN	16.59	0.00897	PASS
			MCH	VN	14.27	0.00759	PASS
			HCH	VN	25.05	0.01312	PASS
	40	GSM/TM1	LCH	VN	29.83	0.01612	PASS
			MCH	VN	29.96	0.01594	PASS
			HCH	VN	31.12	0.01629	PASS
	50	GSM/TM1	LCH	VN	18.14	0.0098	PASS
			MCH	VN	19.50	0.01037	PASS
			HCH	VN	40.81	0.02137	PASS
	-30	GSM/TM2	LCH	VN	14.33	0.00775	PASS
			MCH	VN	8.36	0.00445	PASS
			HCH	VN	10.91	0.00571	PASS
	-20	GSM/TM2	LCH	VN	0.71	0.00038	PASS
			MCH	VN	10.98	0.00584	PASS
			HCH	VN	13.95	0.0073	PASS
	-10	GSM/TM2	LCH	VN	10.88	0.00588	PASS
			MCH	VN	16.85	0.00896	PASS
			HCH	VN	6.72	0.00352	PASS
	0	GSM/TM2	LCH	VN	12.46	0.00673	PASS
			MCH	VN	20.79	0.01106	PASS
			HCH	VN	16.82	0.00881	PASS
	10	GSM/TM2	LCH	VN	11.82	0.00639	PASS
			MCH	VN	3.75	0.00199	PASS
			HCH	VN	10.23	0.00536	PASS
	20	GSM/TM2	LCH	VN	16.05	0.00867	PASS
			MCH	VN	13.85	0.00737	PASS
			HCH	VN	18.11	0.00948	PASS
30	GSM/TM2	LCH	VN	13.69	0.0074	PASS	
		MCH	VN	2.26	0.0012	PASS	
		HCH	VN	22.37	0.01171	PASS	
40	GSM/TM2	LCH	VN	4.68	0.00253	PASS	
		MCH	VN	14.75	0.00785	PASS	
		HCH	VN	16.92	0.00886	PASS	
50	GSM/TM2	LCH	VN	1.90	0.00103	PASS	
		MCH	VN	8.27	0.0044	PASS	
		HCH	VN	16.89	0.00884	PASS	

END