



Appendix for test report

1Appendix_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	32.59	26.59	38.5	PASS
		MCH	32.64	26.64	38.5	PASS
		HCH	32.61	26.61	38.5	PASS
	GSM/TM2	LCH	26.31	20.31	38.5	PASS
		MCH	26.34	20.34	38.5	PASS
		HCH	26.36	20.36	38.5	PASS

Test Band	Test Mode	Test Channel	Conducted Power [dBm]	EIRP [dBm]	Limit [dBm]	Verdict
GSM1900	GSM/TM1	LCH	29.71	28.86	33	PASS
		MCH	29.61	28.76	33	PASS
		HCH	29.61	28.76	33	PASS
	GSM/TM2	LCH	25.39	24.54	33	PASS
		MCH	25.39	24.54	33	PASS
		HCH	25.39	24.54	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	0.12	13	PASS
		HCH	0.14	13	PASS
	GSM/TM2	LCH	3.13	13	PASS
		MCH	3.15	13	PASS
		HCH	3.12	13	PASS
GSM1900	GSM/TM1	LCH	0.12	13	PASS
		MCH	0.13	13	PASS
		HCH	0.12	13	PASS
	GSM/TM2	LCH	2.85	13	PASS
		MCH	2.77	13	PASS
		HCH	2.63	13	PASS

3Appendix_C: Modulation Characteristics

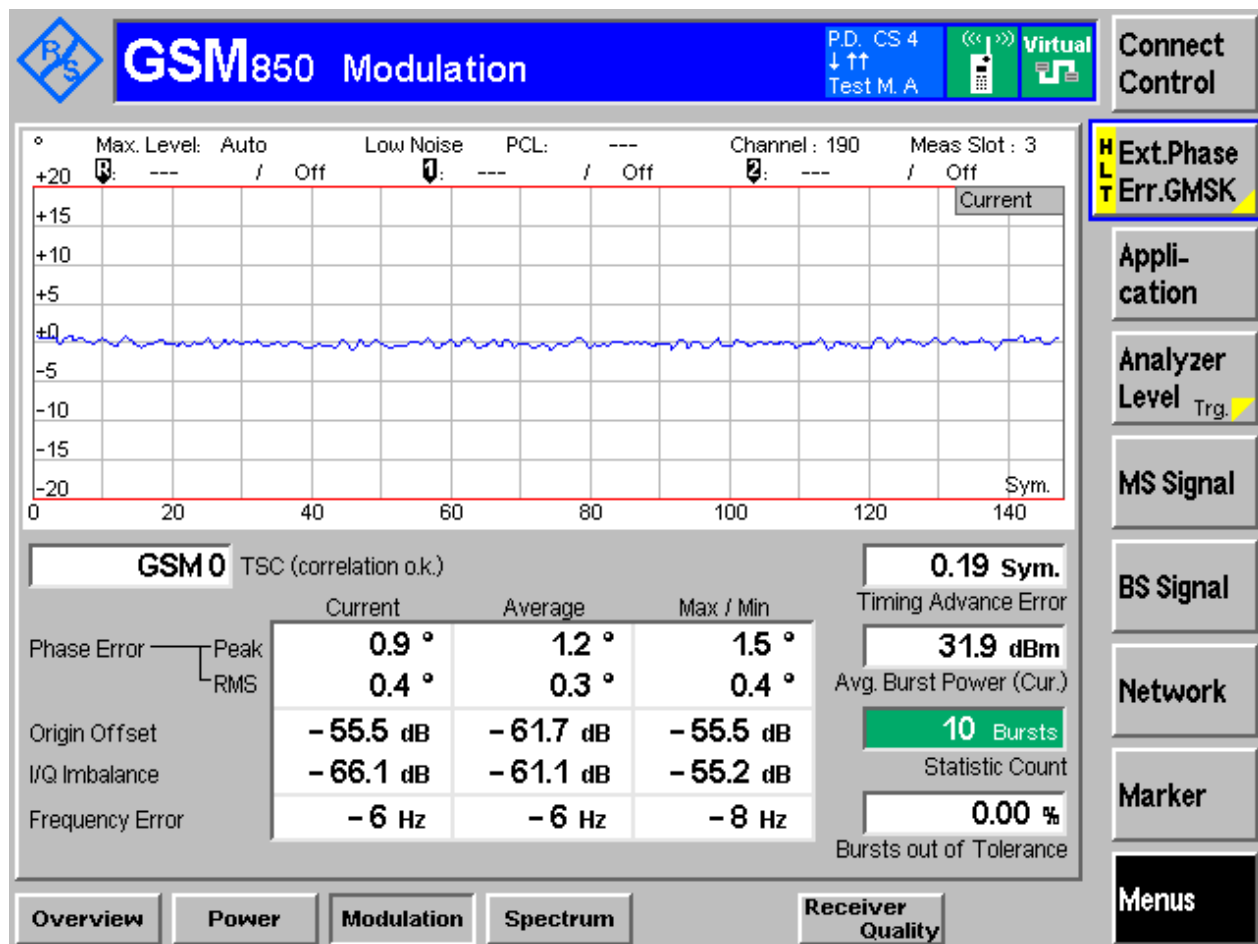
Part I - Test Plots

3.1 For GSM

3.1.1 Test Band = GSM850

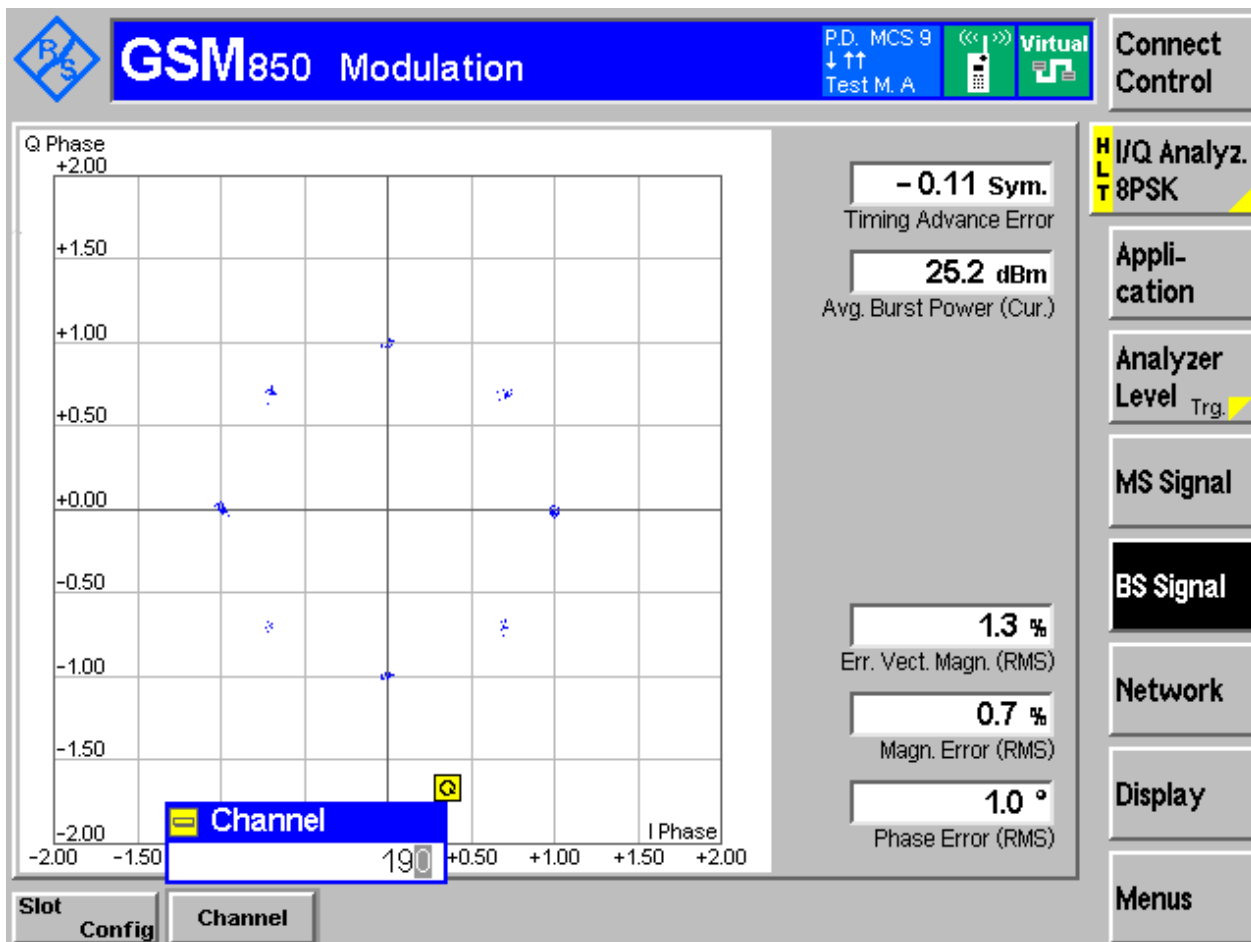
3.1.1.1 Test Mode = GSM/TM1

3.1.1.1.1 Test Channel = MCH



3.1.1.2 Test Mode = GSM/TM2

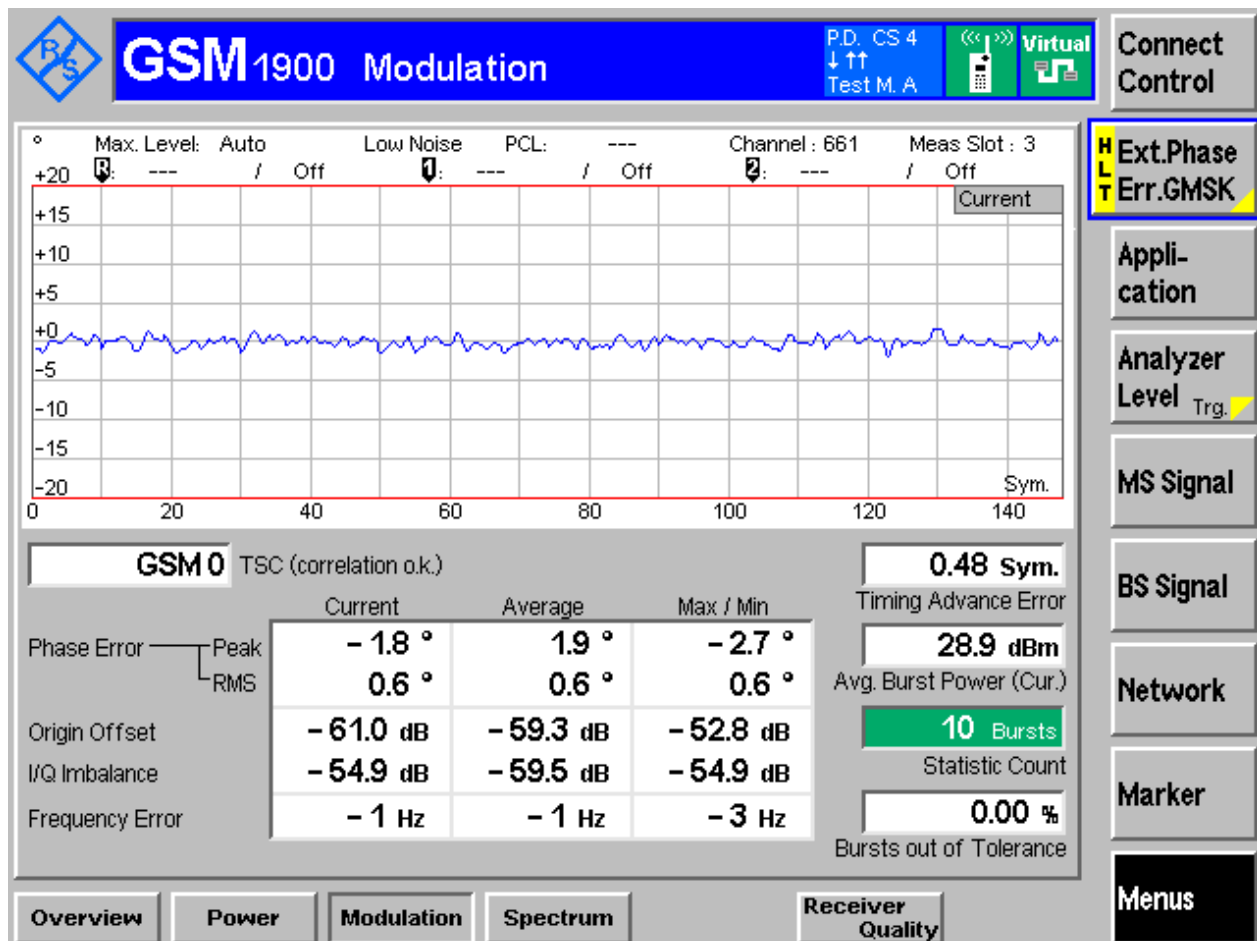
3.1.1.2.1 Test Channel = MCH



3.1.2 Test Band = GSM1900

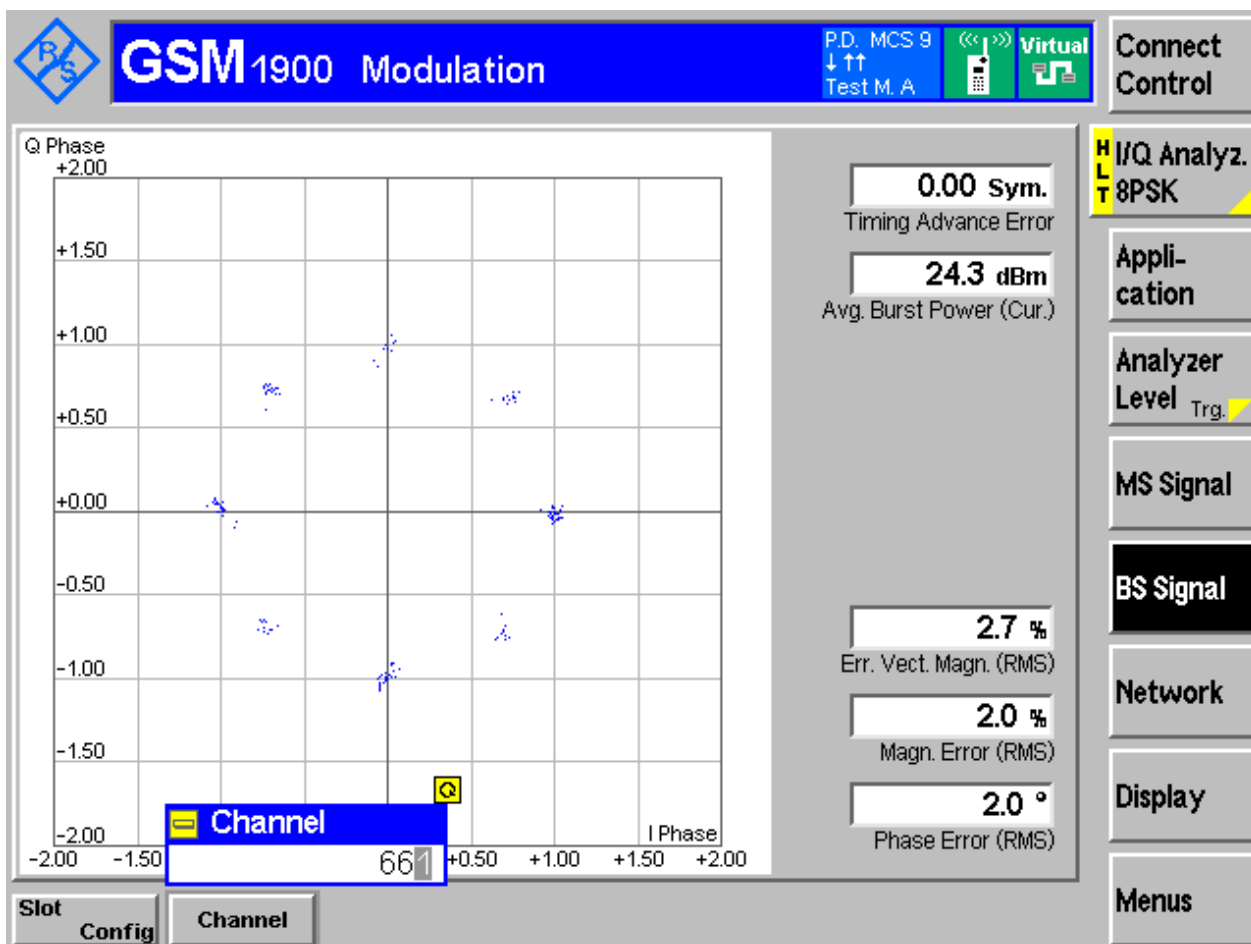
3.1.2.1 Test Mode = GSM/TM1

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	247.26	319.49	Pass
		MCH	247.10	316.54	Pass
		HCH	244.71	321.05	Pass
	GSM/TM2	LCH	244.41	306.79	Pass
		MCH	247.13	319.57	Pass
		HCH	244.78	317.78	Pass
GSM1900	GSM/TM1	LCH	245.24	313.77	Pass
		MCH	247.90	315.75	Pass
		HCH	245.52	310.31	Pass
	GSM/TM2	LCH	253.16	321.86	Pass
		MCH	254.63	322.28	Pass
		HCH	253.24	316.63	Pass

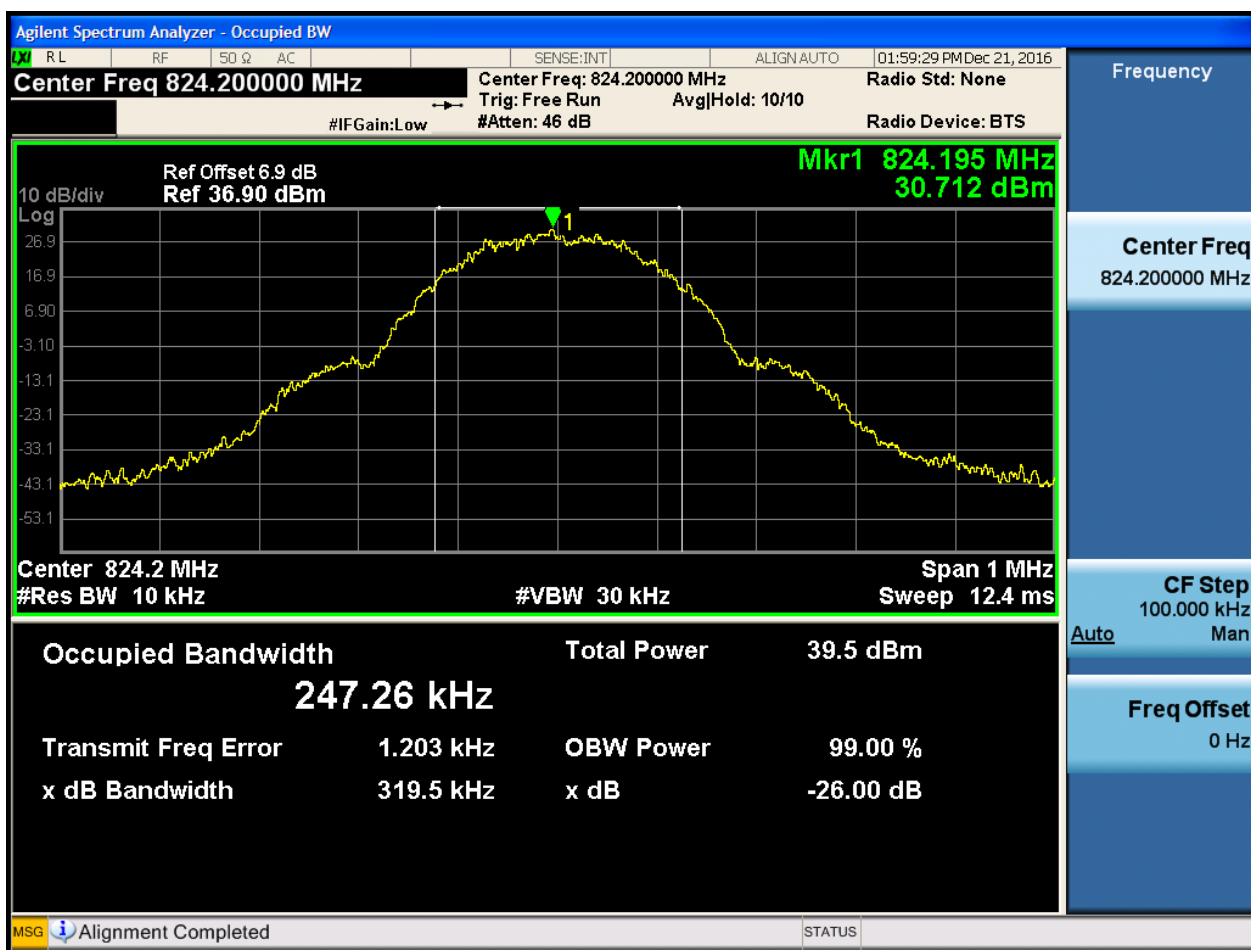
Part II - Test Plots

4.1 For GSM

4.1.1 Test Band = GSM850

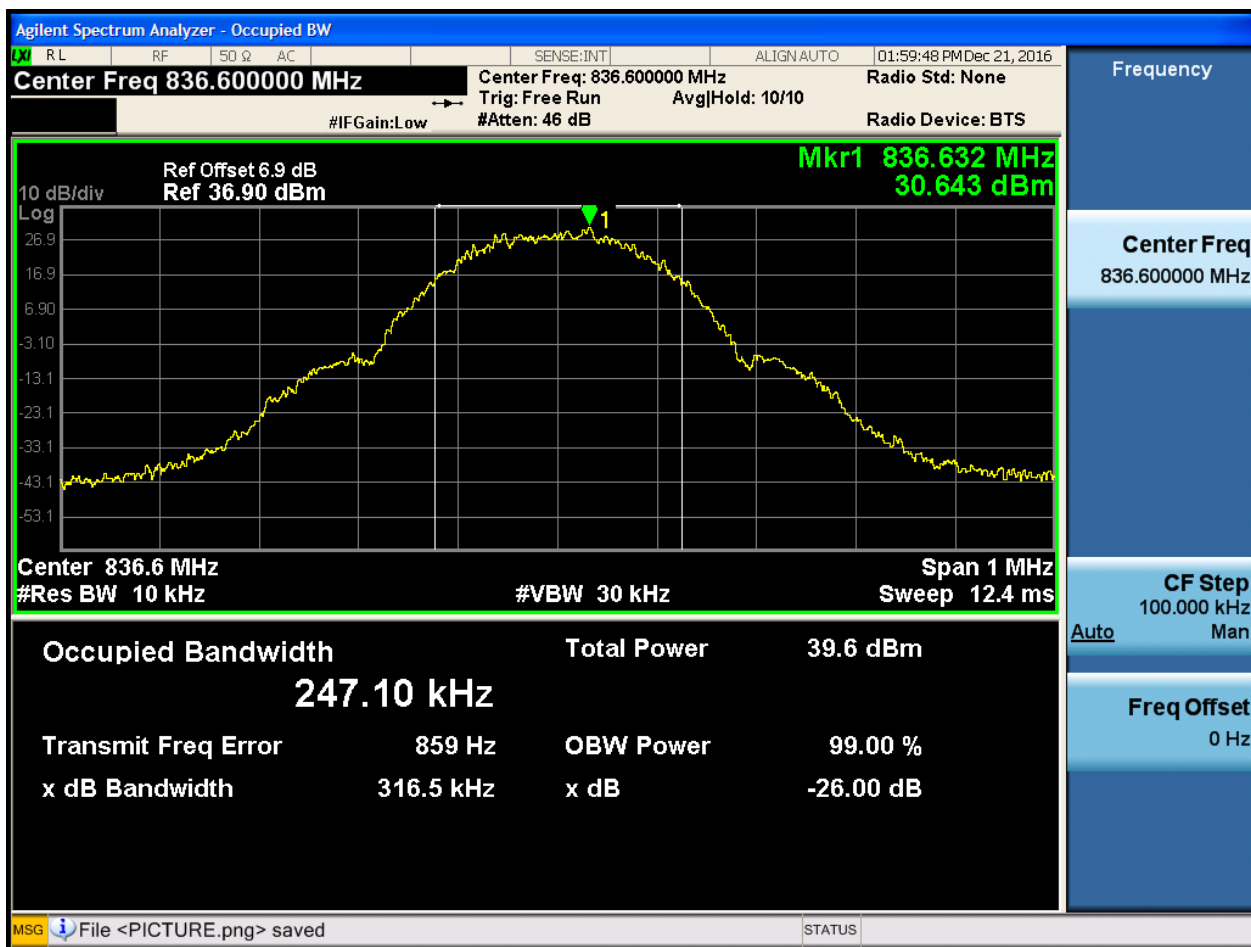
4.1.1.1 Test Mode = GSM/TM1

4.1.1.1.1 Test Channel = LCH



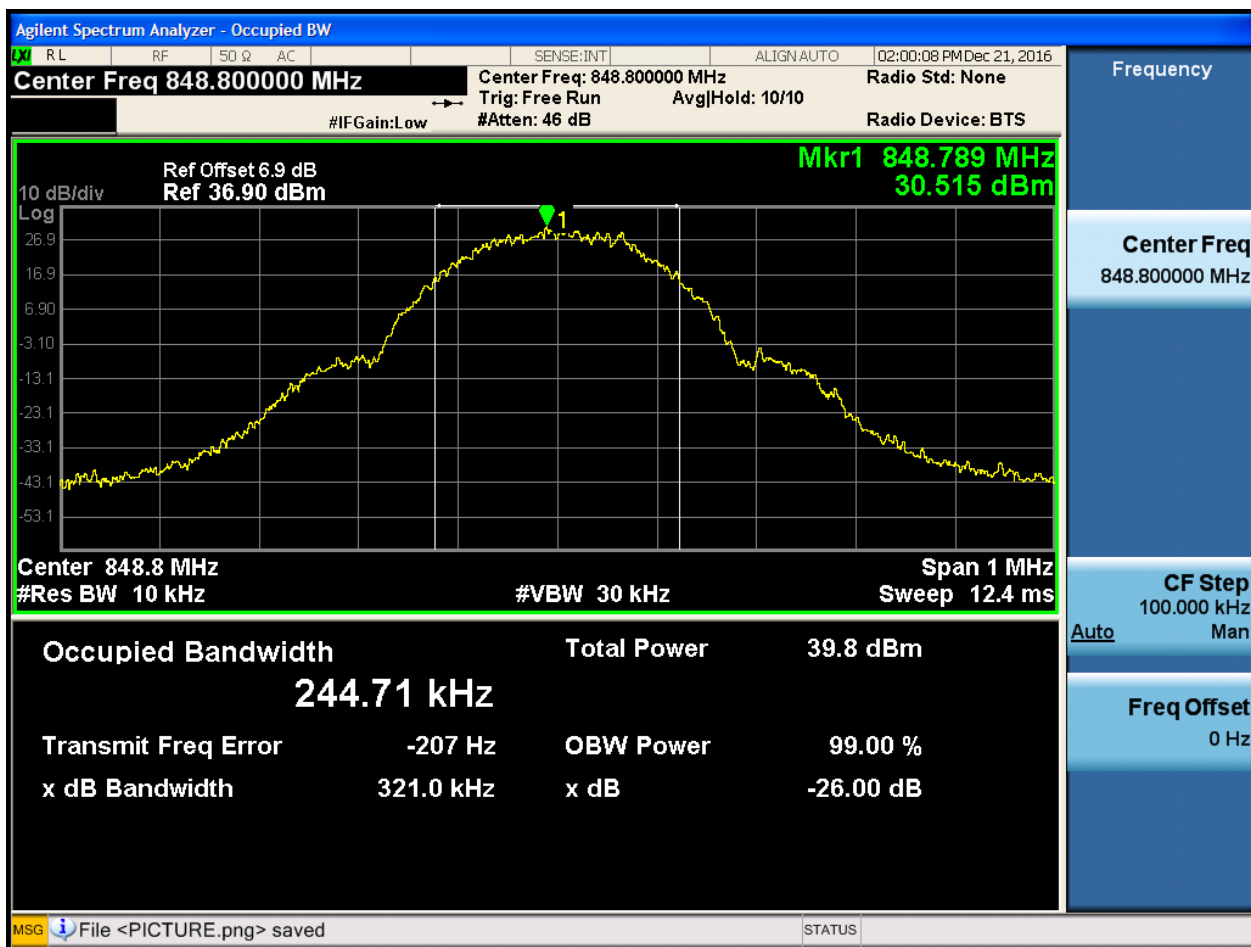


4.1.1.1.2 Test Channel = MCH





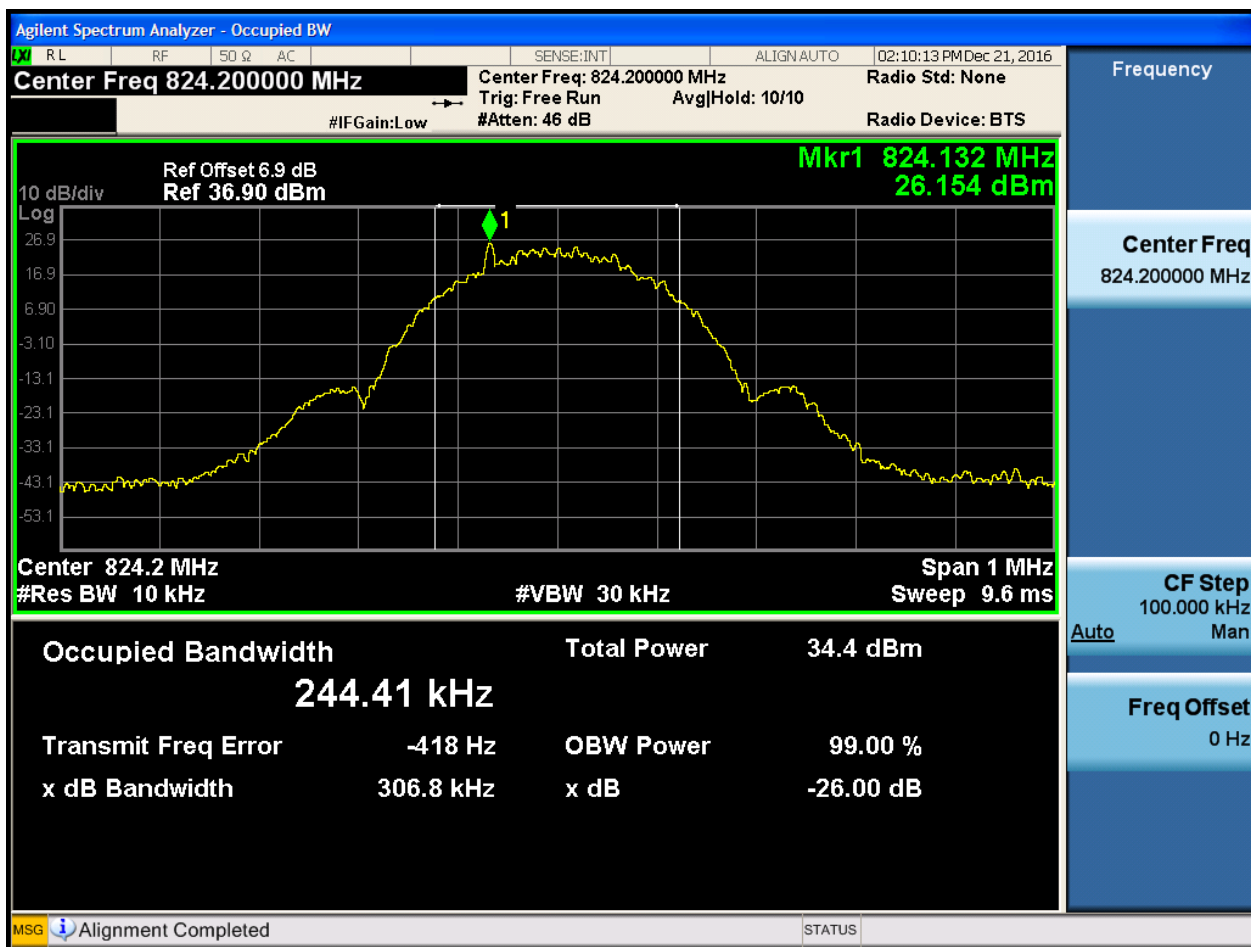
4.1.1.1.3 Test Channel = HCH





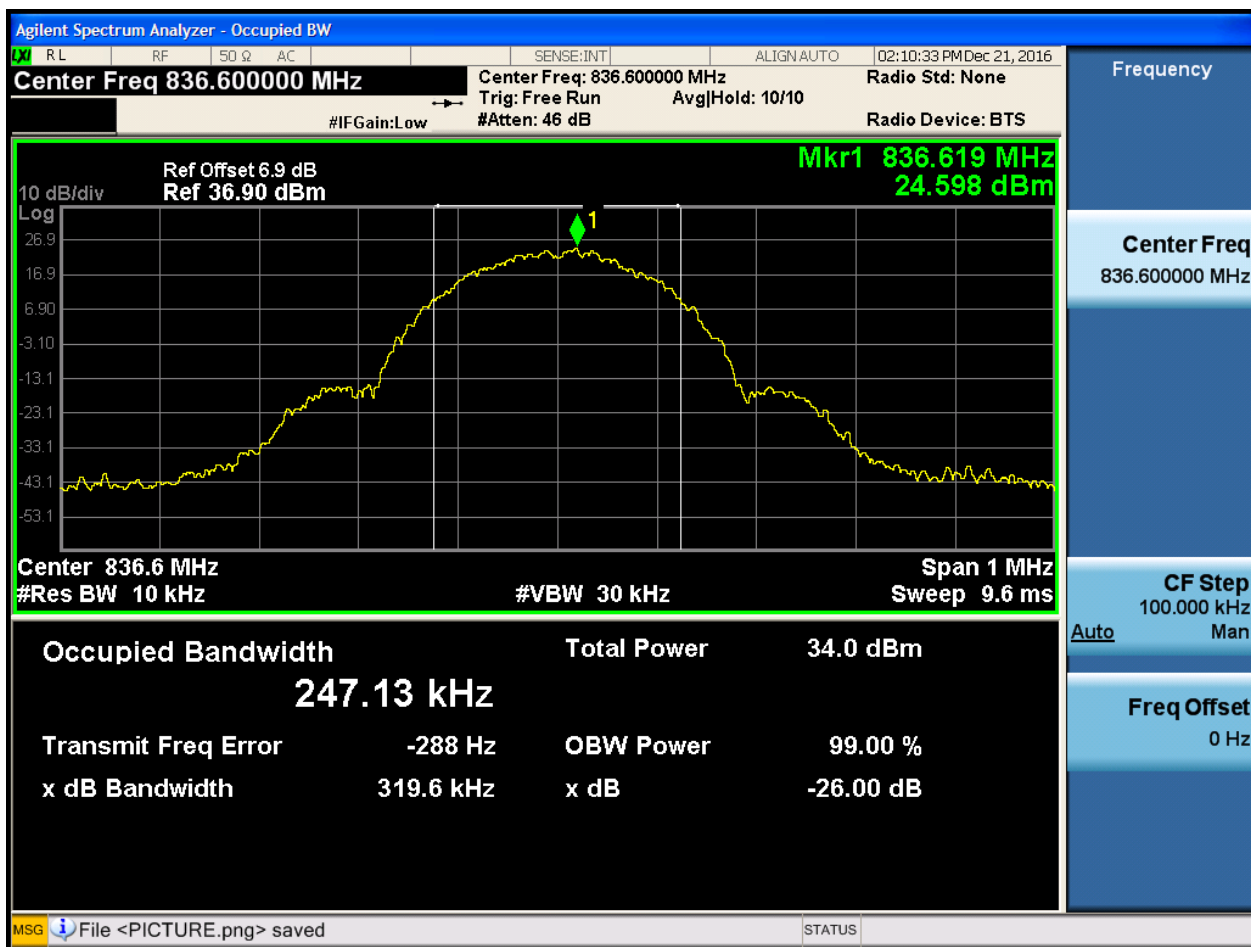
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4.1.1.2.1 Test Channel = LCH



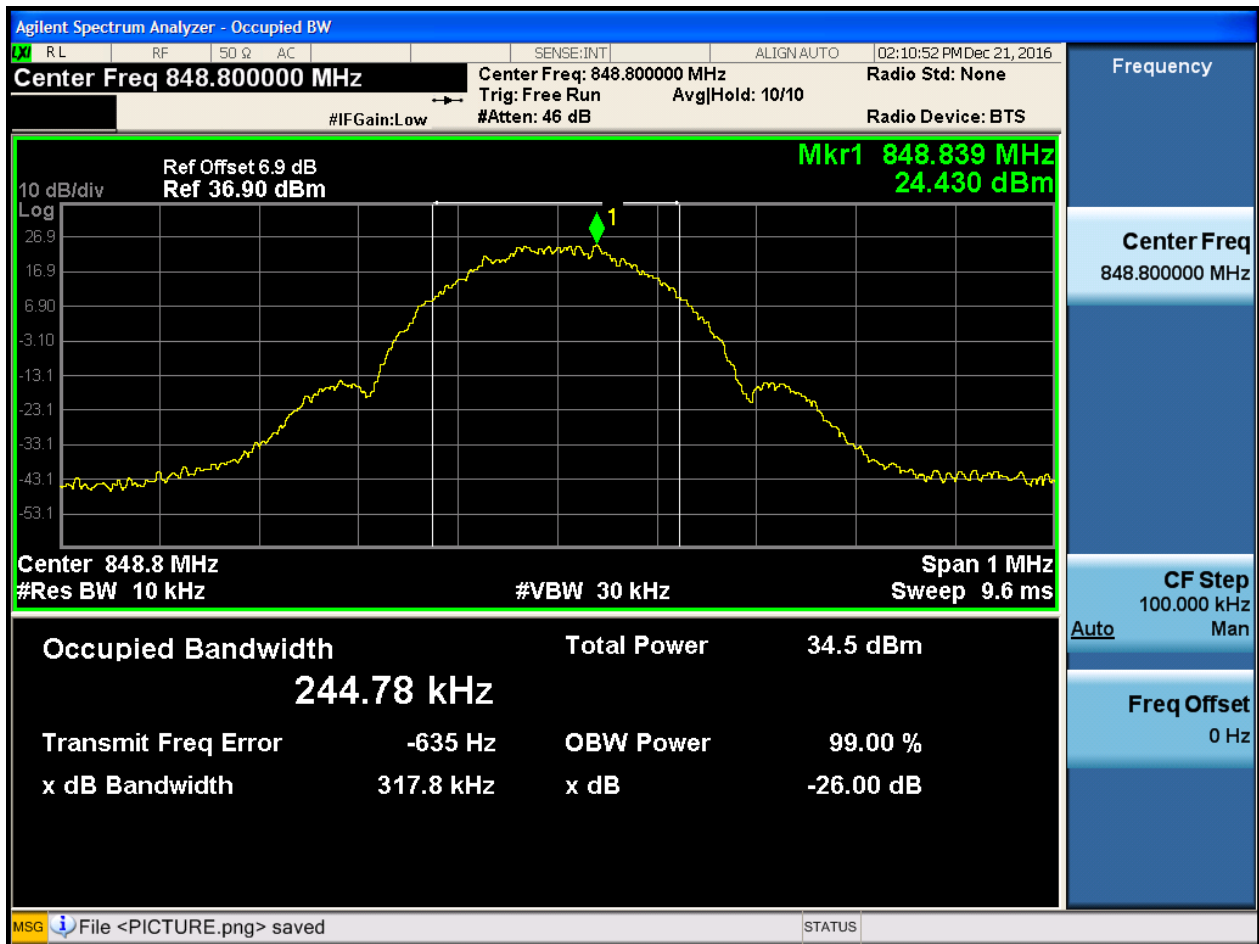


4.1.1.2.2 Test Channel = MCH





4.1.1.2.3 Test Channel = HCH

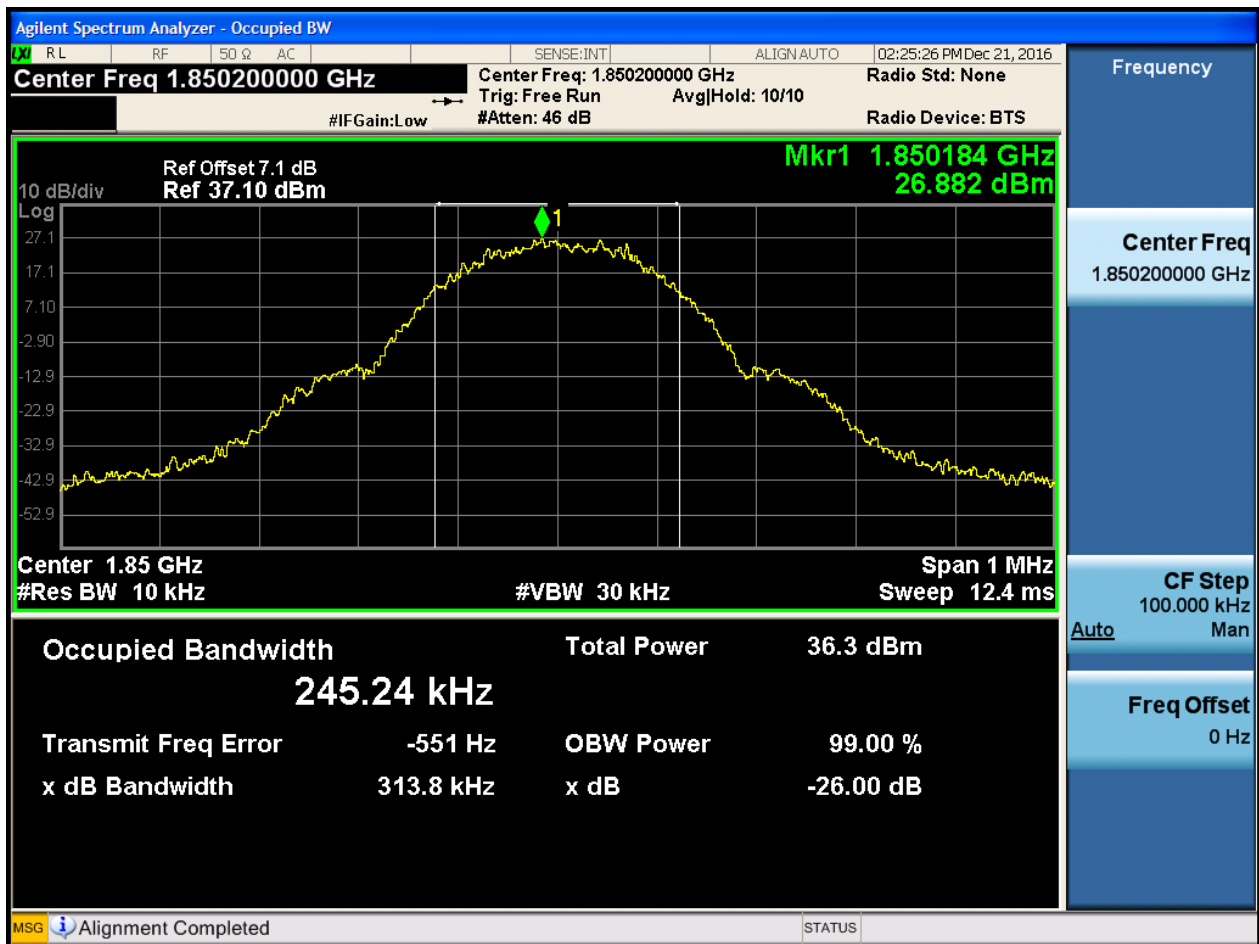




4.1.2 Test Band = GSM1900

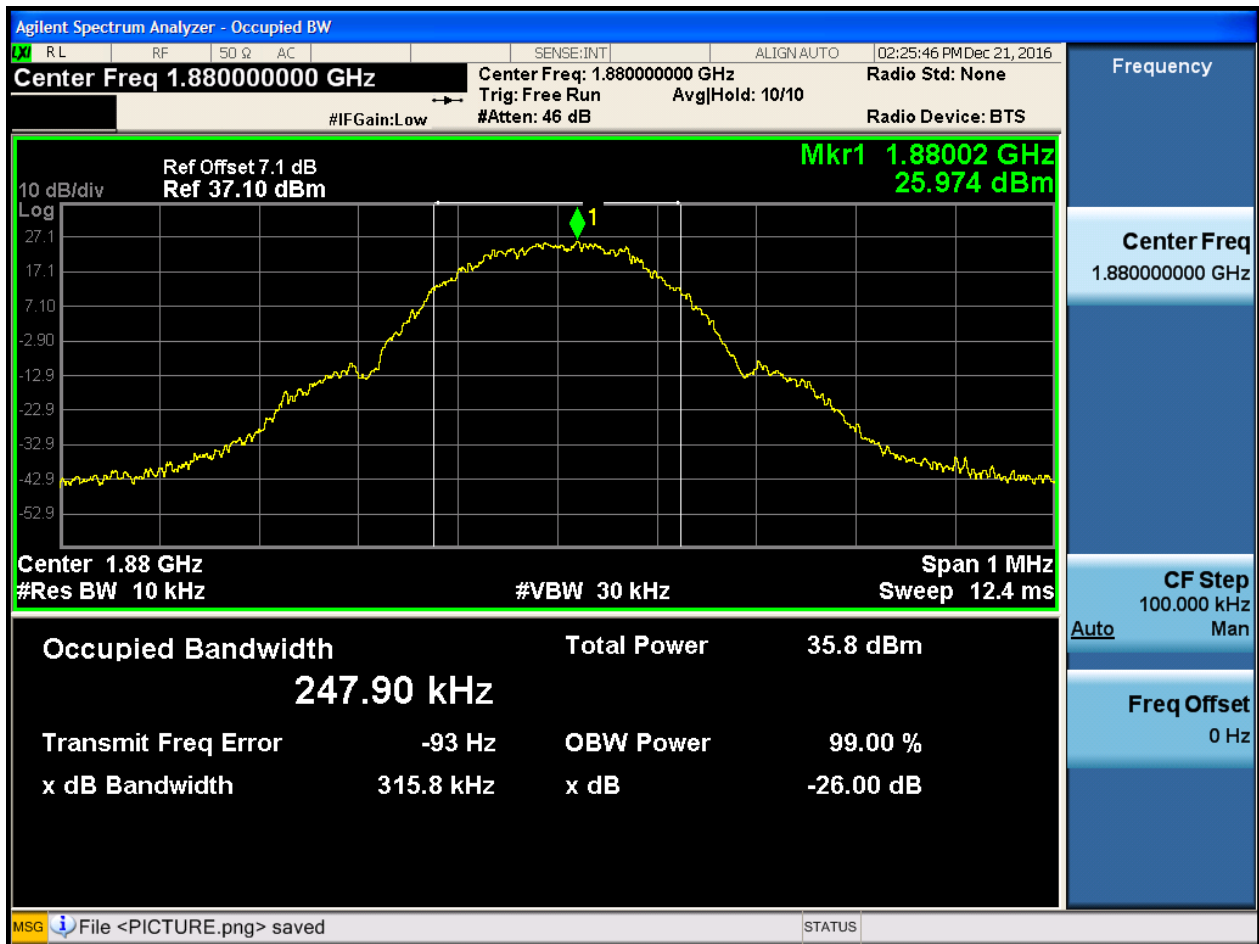
4.1.2.1 Test Mode = GSM/TM1

4.1.2.1.1 Test Channel = LCH



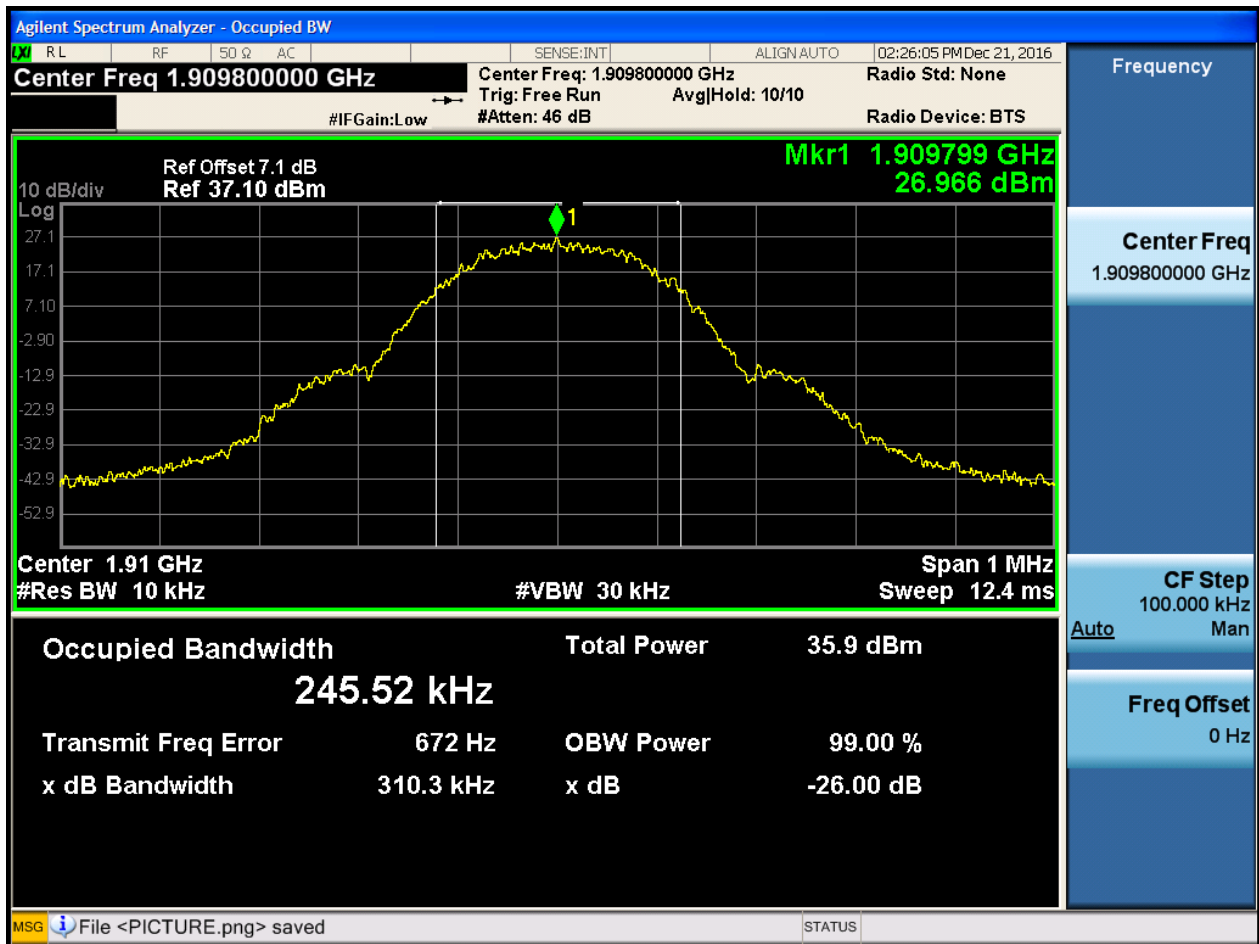


4.1.2.1.2 Test Channel = MCH





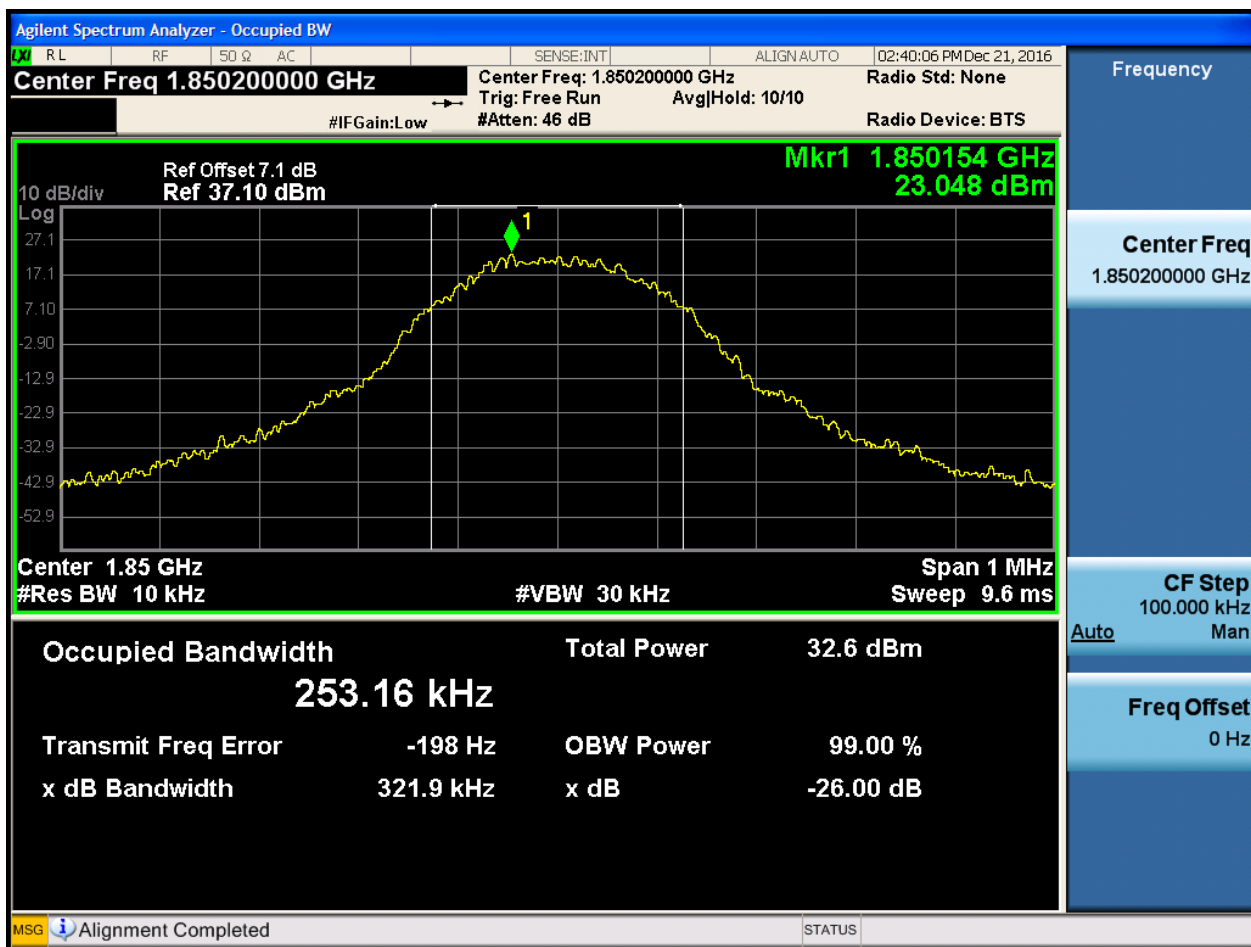
4.1.2.1.3 Test Channel = HCH





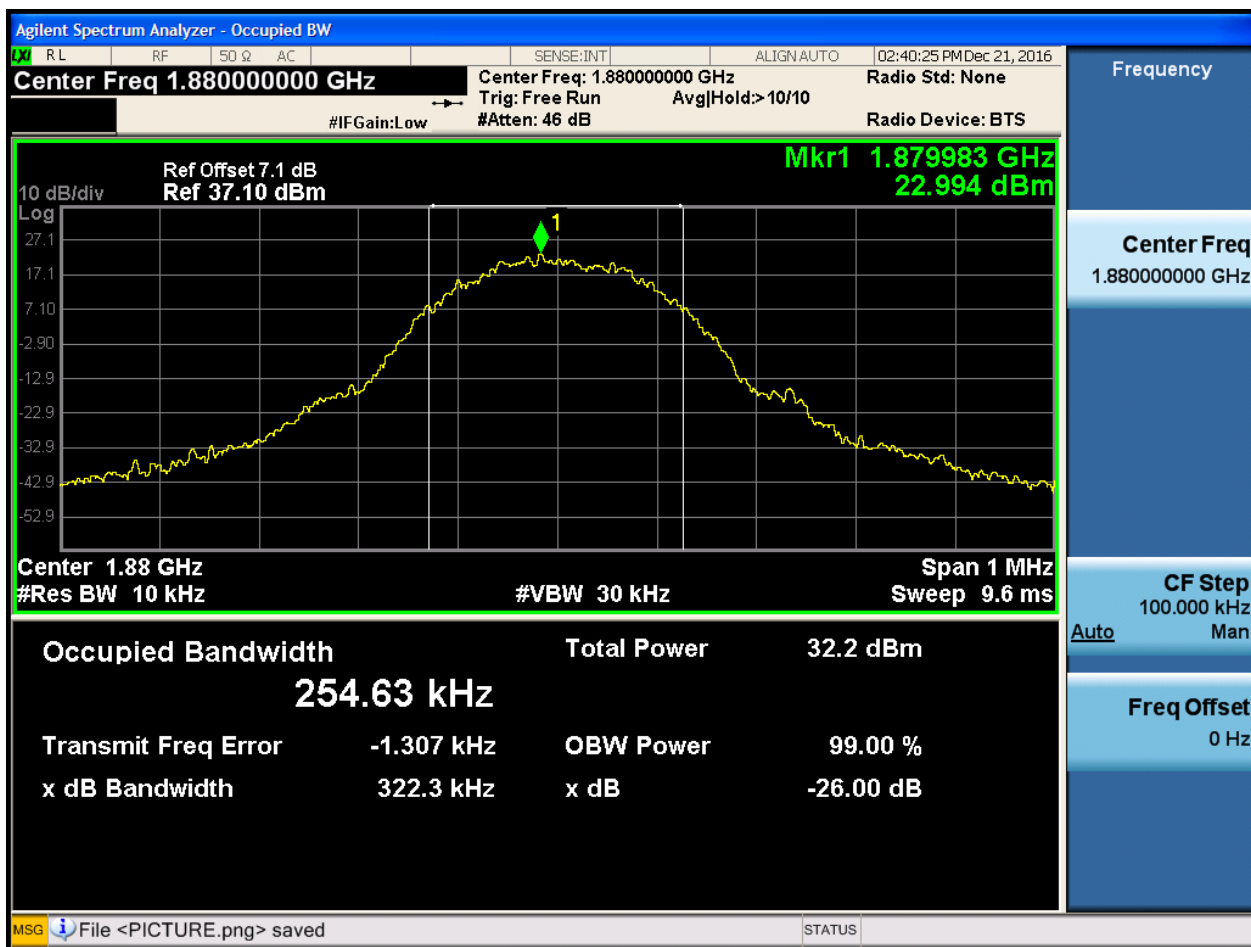
4.1.2.3 Test Mode = GSM/TM2

4.1.2.3.1 Test Channel = LCH



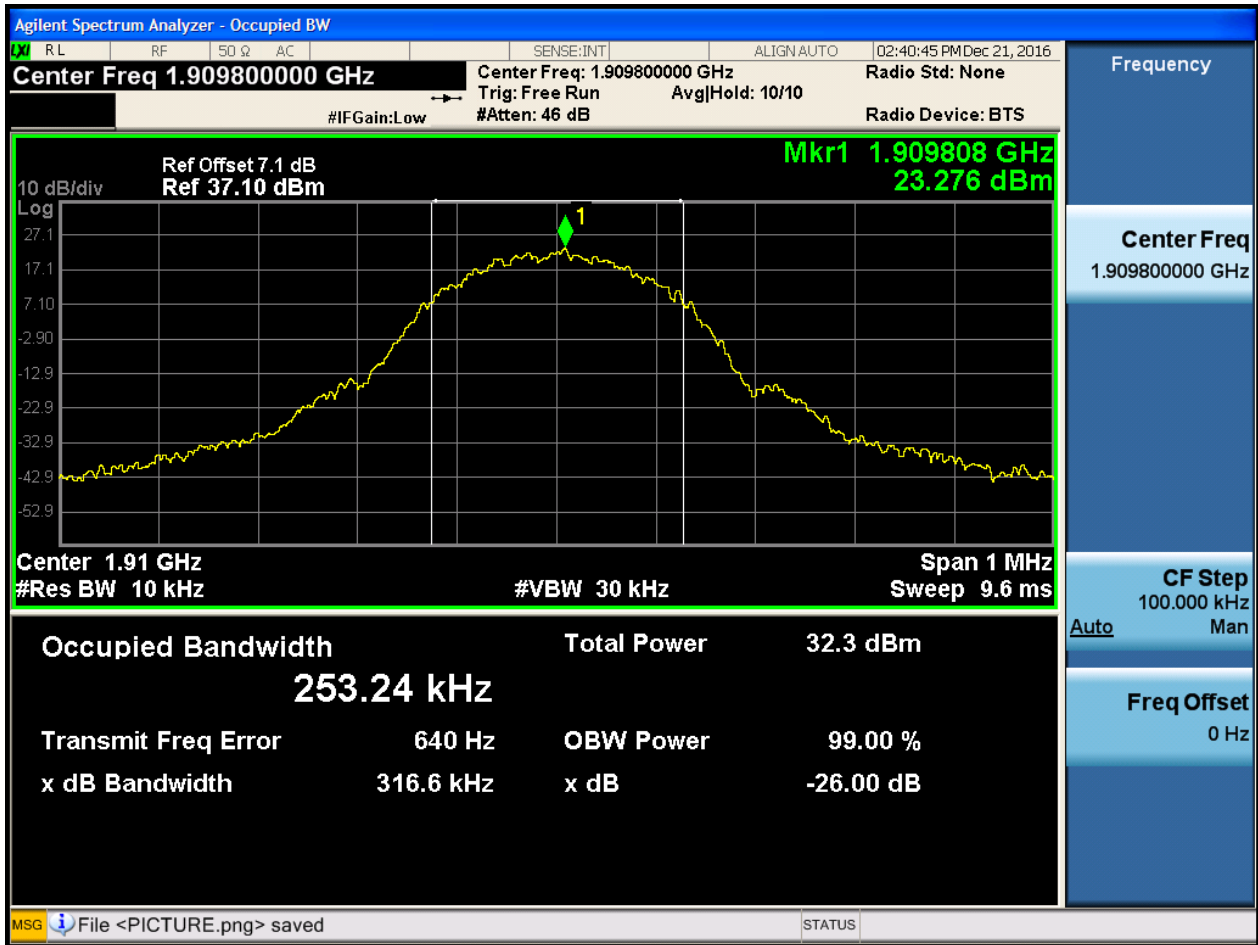


4.1.2.3.2 Test Channel = MCH





4.1.2.3.3 Test Channel = HCH



5Appendix_E: Band Edges Compliance

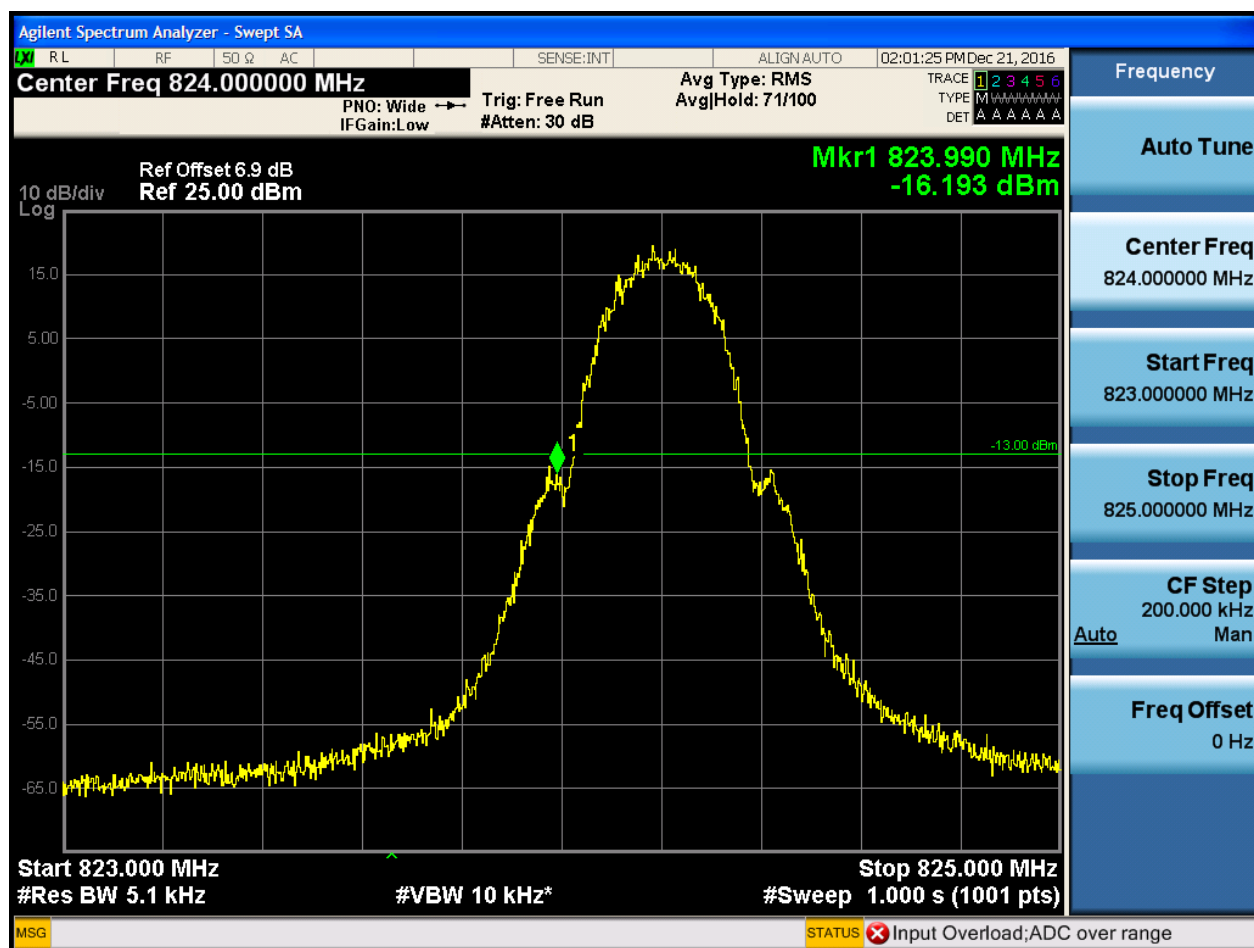
Part I - Test Plots

5.1 For GSM

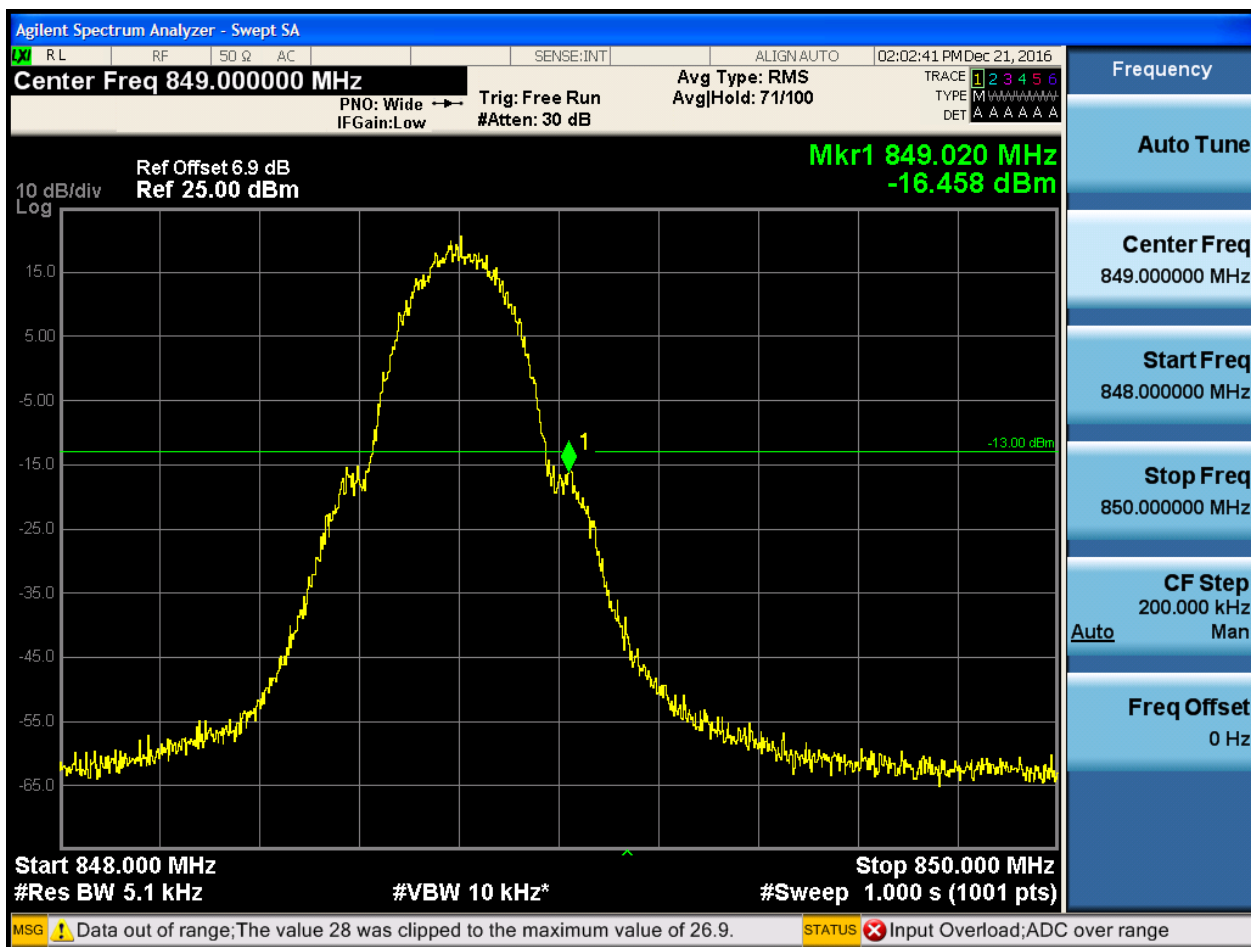
5.1.1 Test Band = GSM850

5.1.1.1 Test Mode = GSM/TM1

5.1.1.1.1 Test Channel = LCH

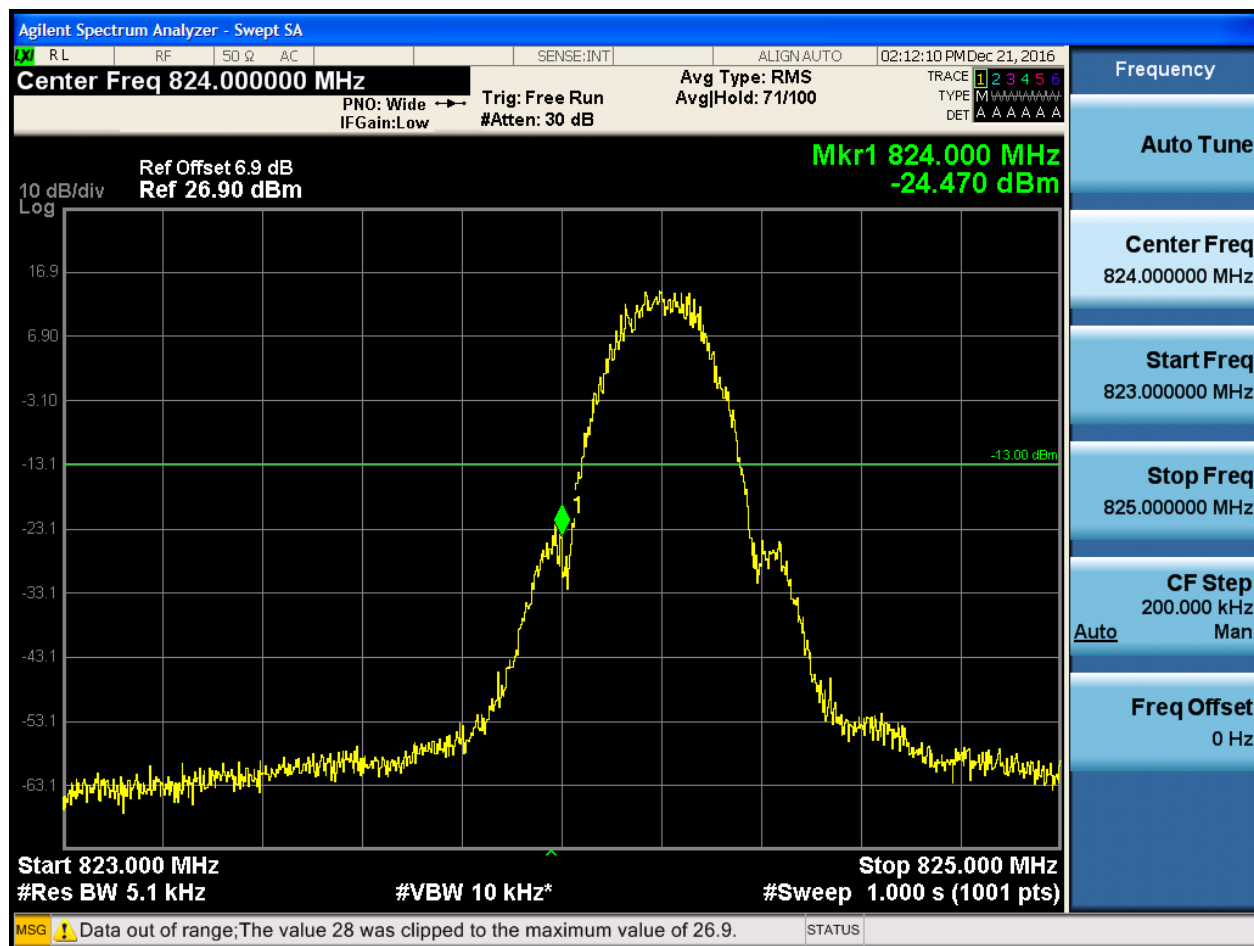


5.1.1.1.2 Test Channel = HCH

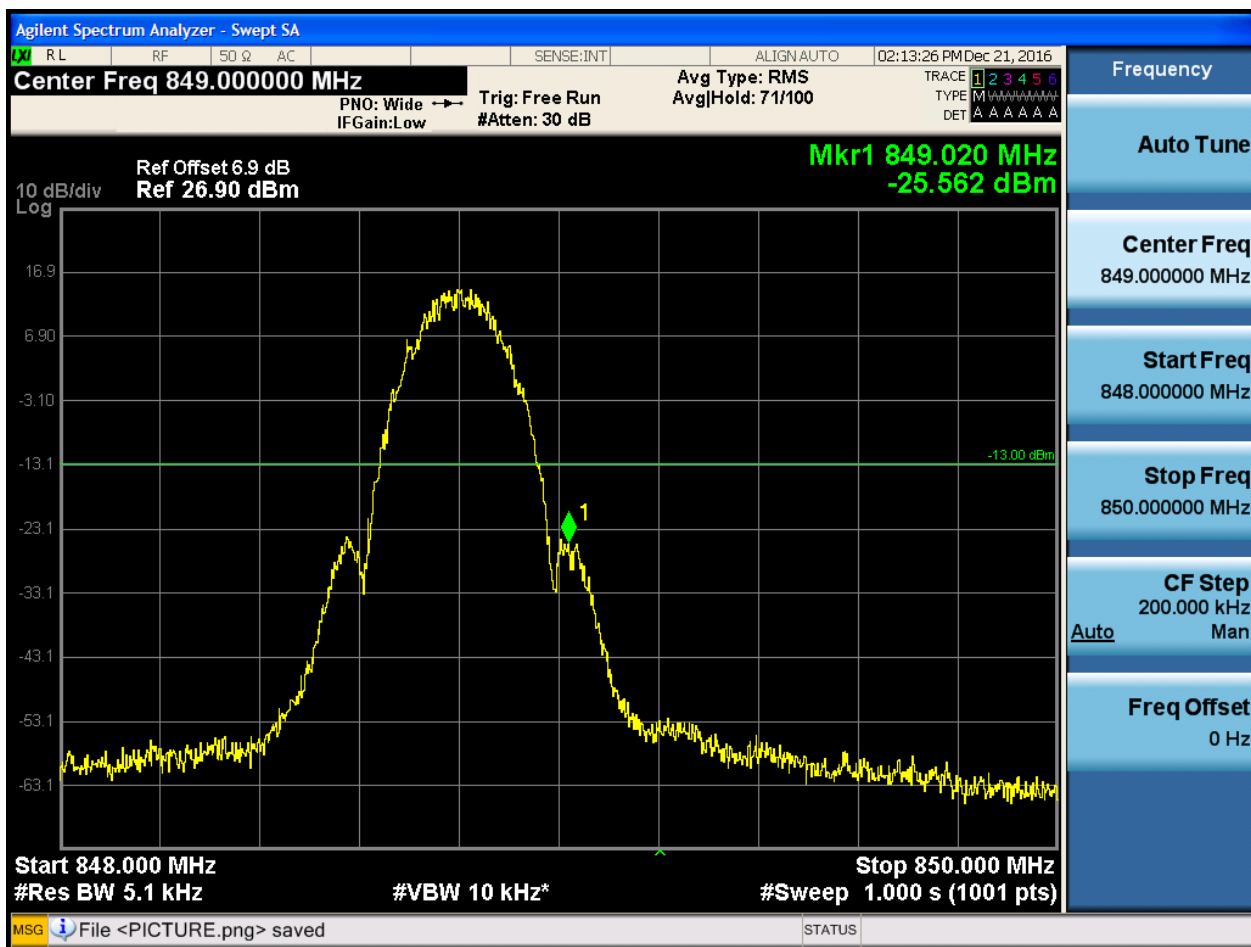


5.1.1.2 Test Mode = GSM/TM2

5.1.1.2.1 Test Channel = LCH



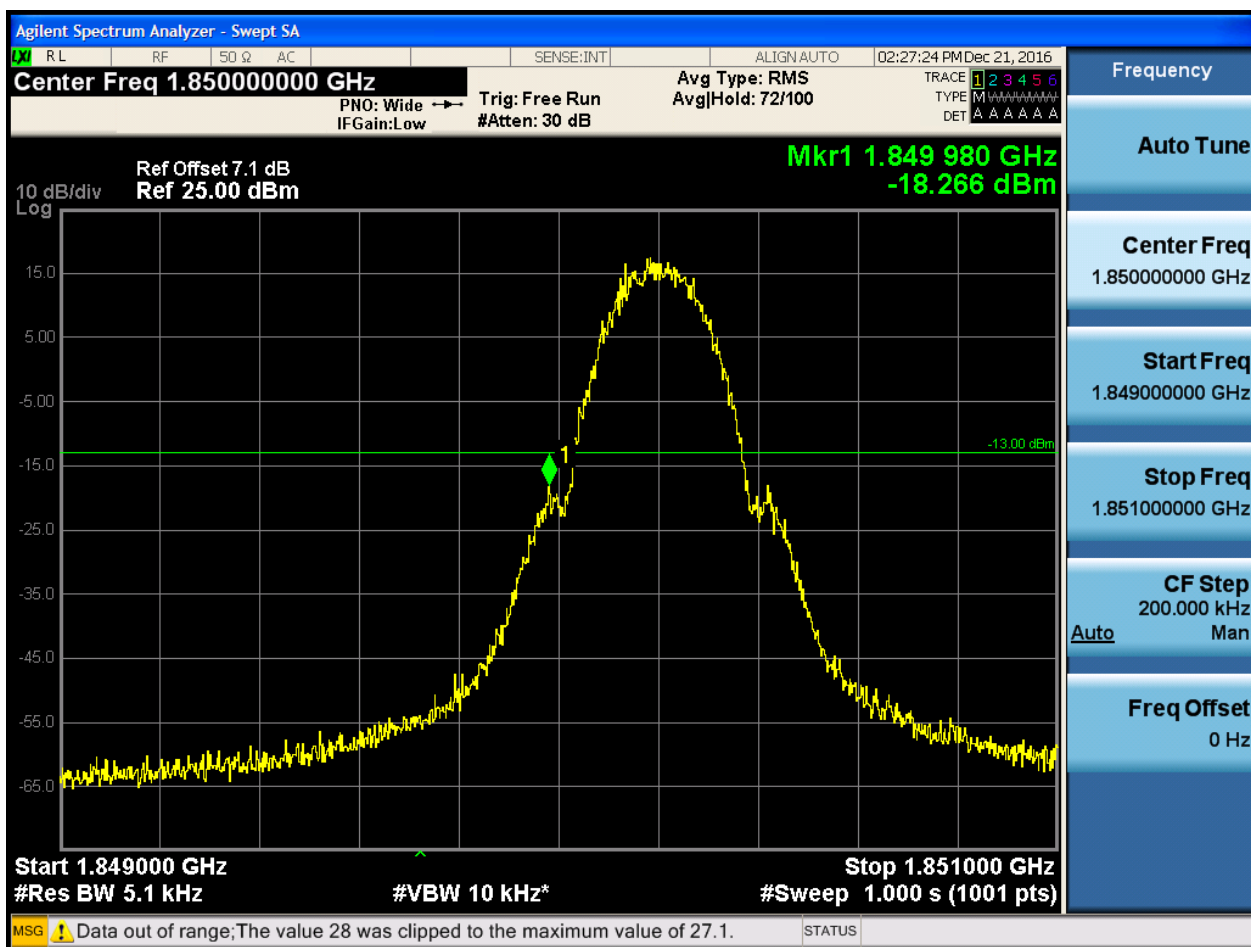
5.1.1.2.2 Test Channel = HCH

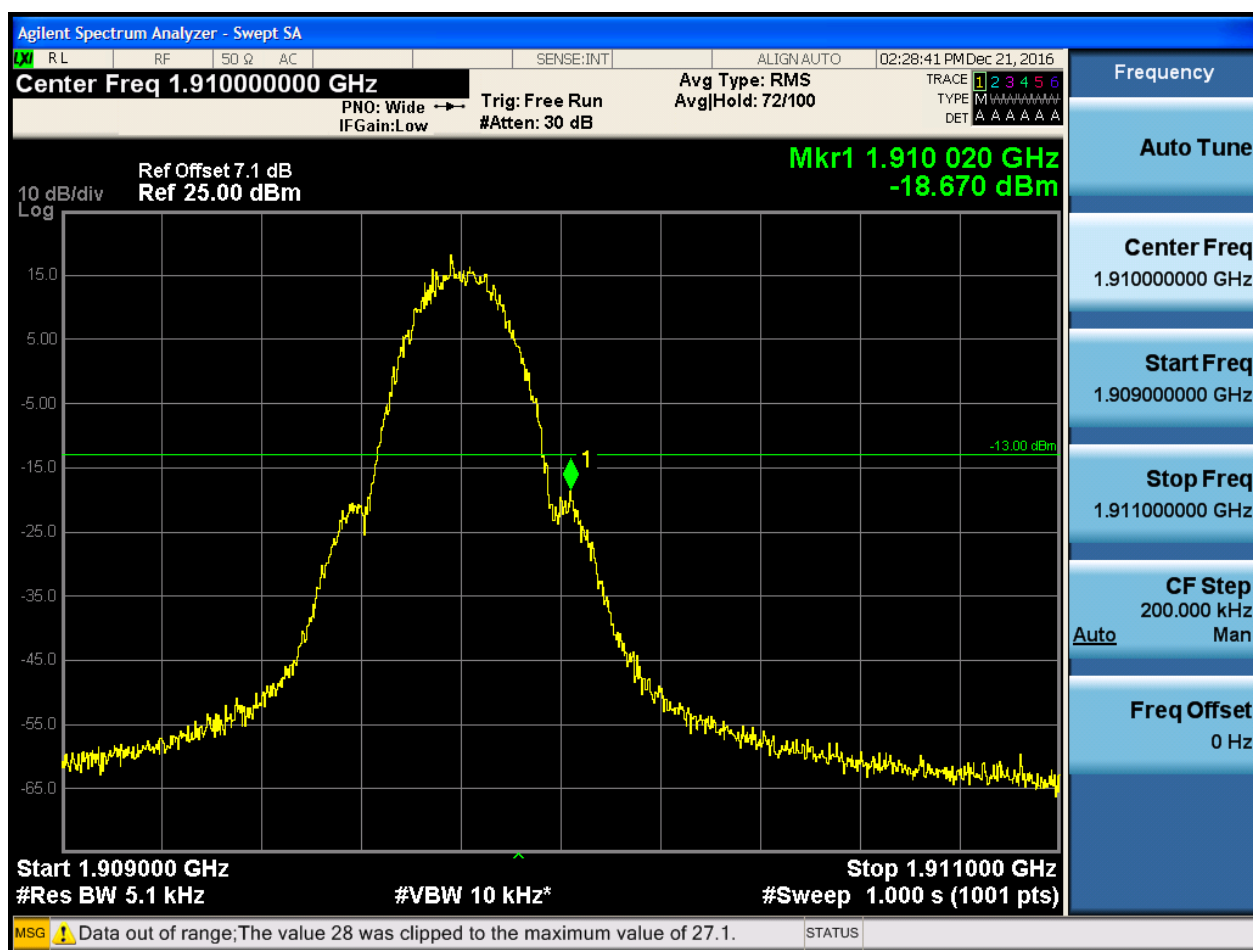


5.1.2 Test Band = GSM1900

5.1.2.1 Test Mode = GSM/TM1

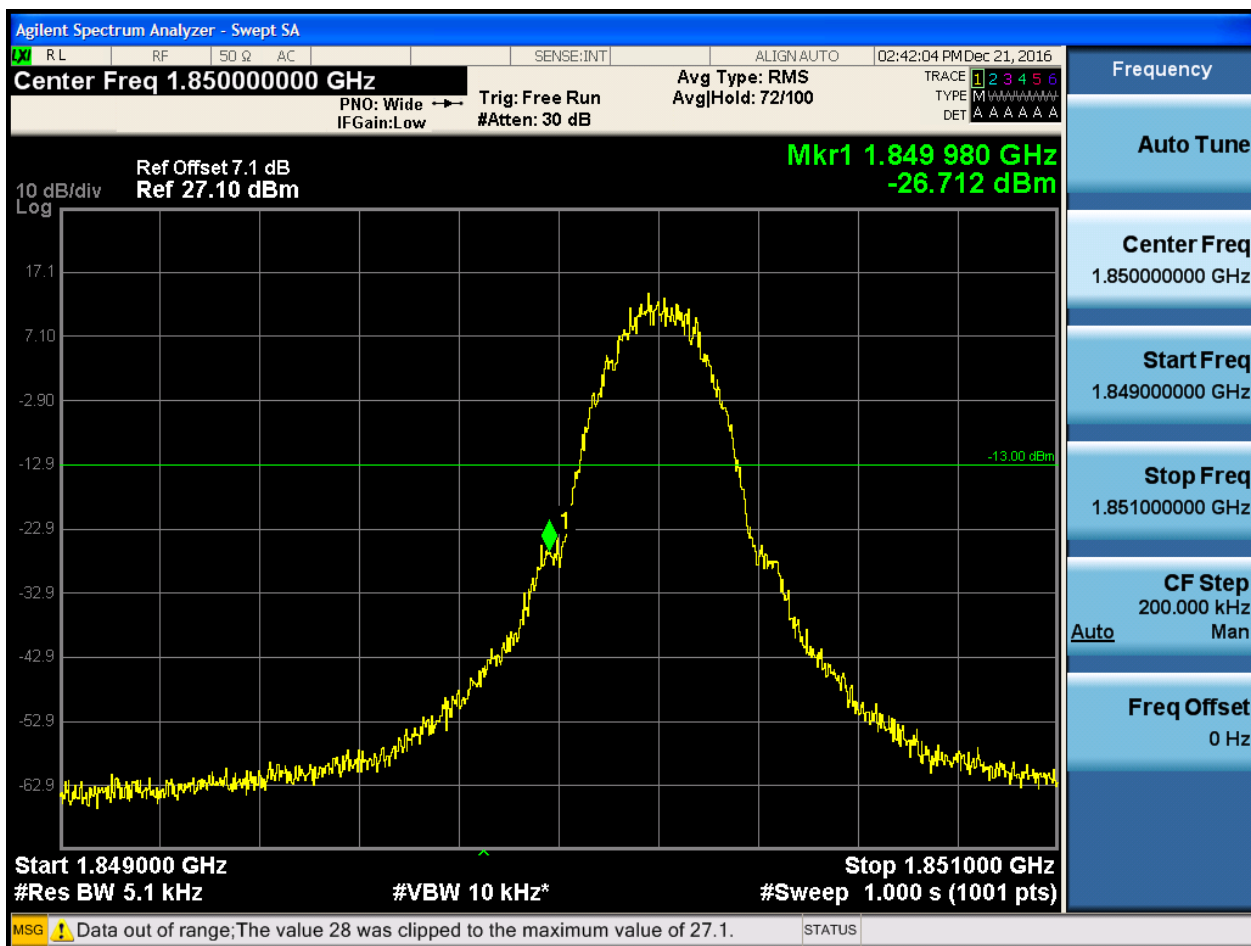
5.1.2.1.1 Test Channel = LCH



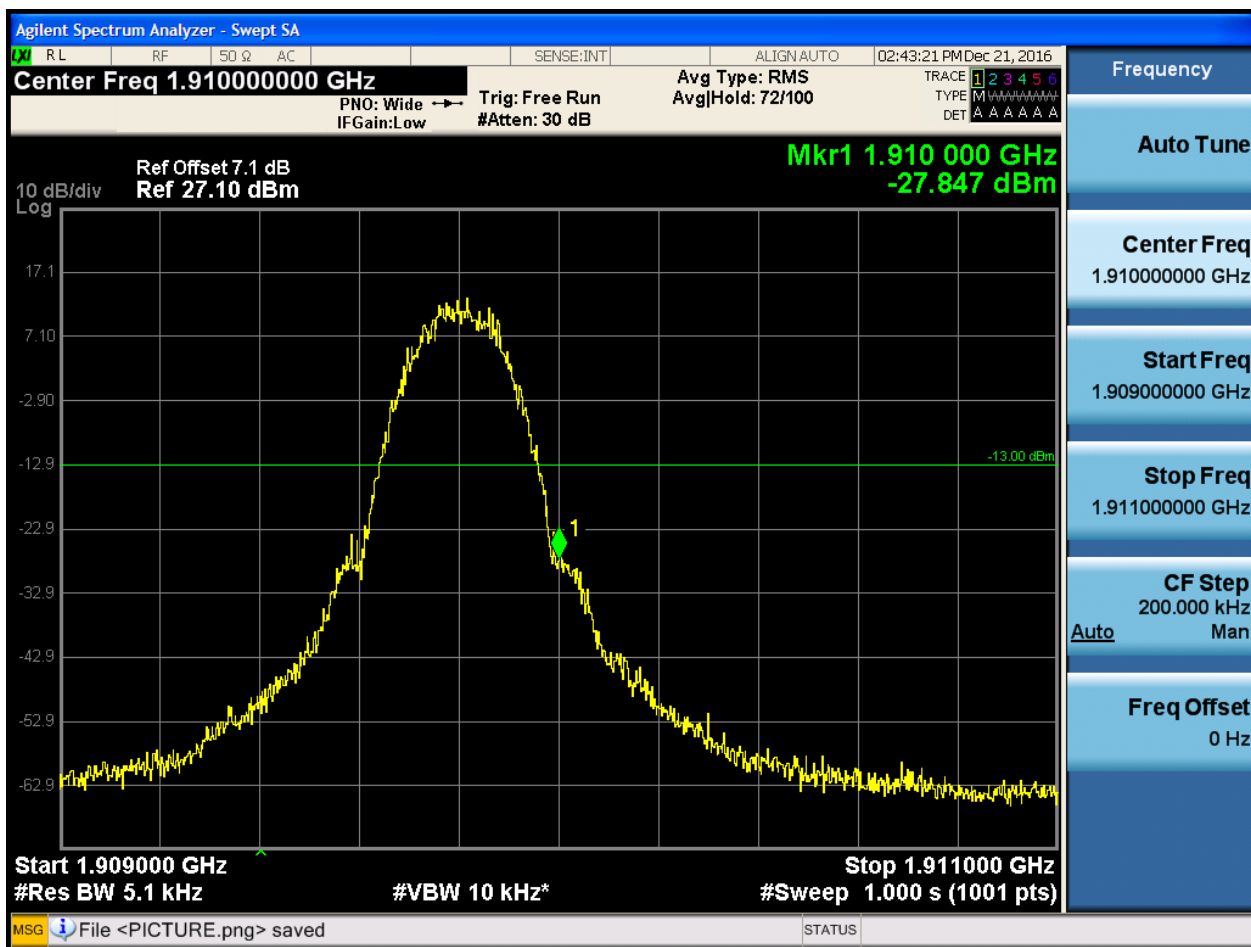


5.1.2.2 Test Mode = GSM/TM2

5.1.2.2.1 Test Channel = LCH



5.1.2.2.2 Test Channel = HCH



6Appendix_F: Spurious Emission at Antenna Terminal

NOTE: For the averaged unwanted emissions measurements, the measurement points in each sweep is greater than twice the Span/RBW in order to ensure bin-to-bin spacing of $< RBW/2$ so that narrowband signals are not lost between frequency bins. As to the present test item, the "Measurement Points = $k * (Span / RBW)$ " with k between 4 and 5, which results in an acceptable level error of less than 0.5 dB.

Part I - Test Plots

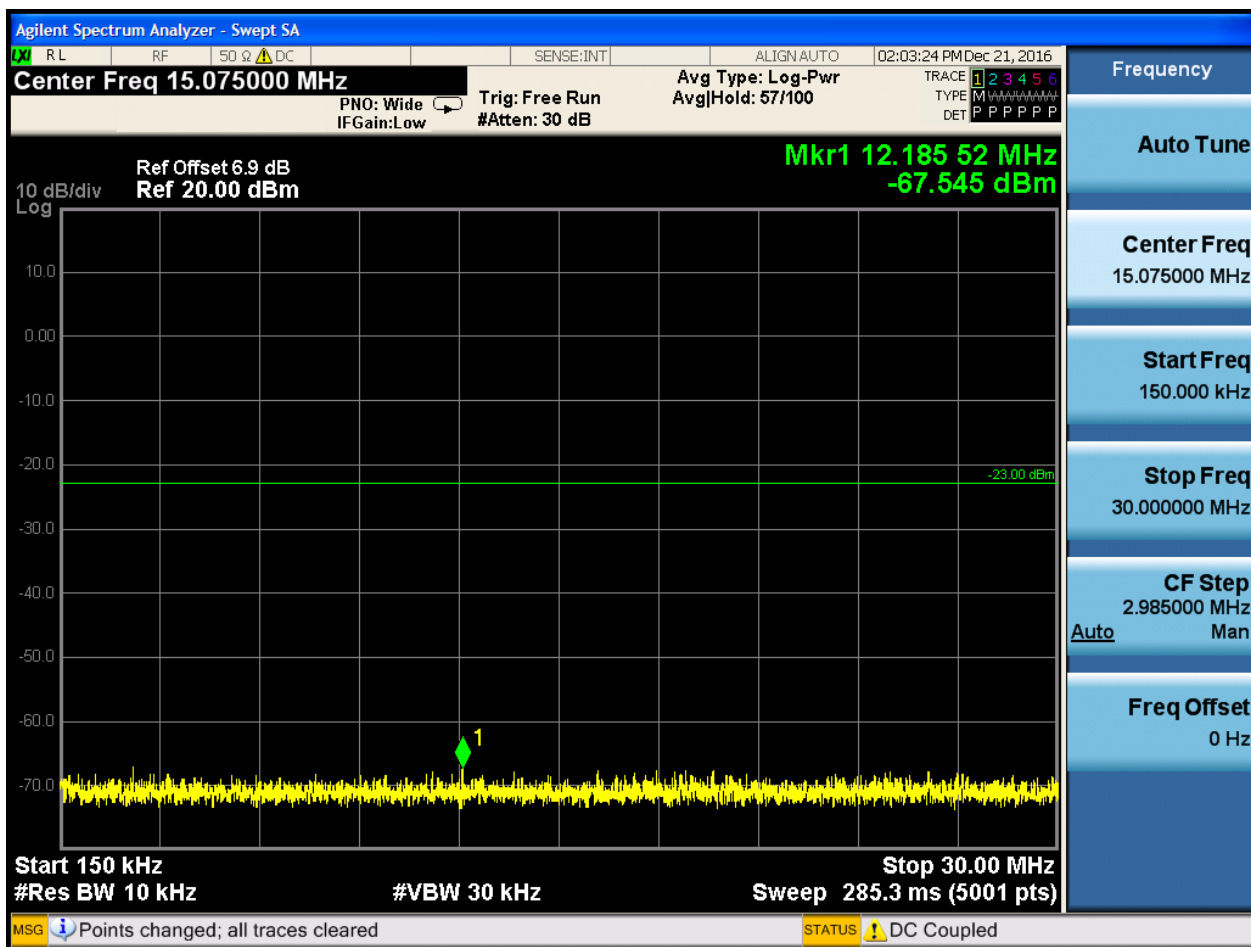
6.1 For GSM

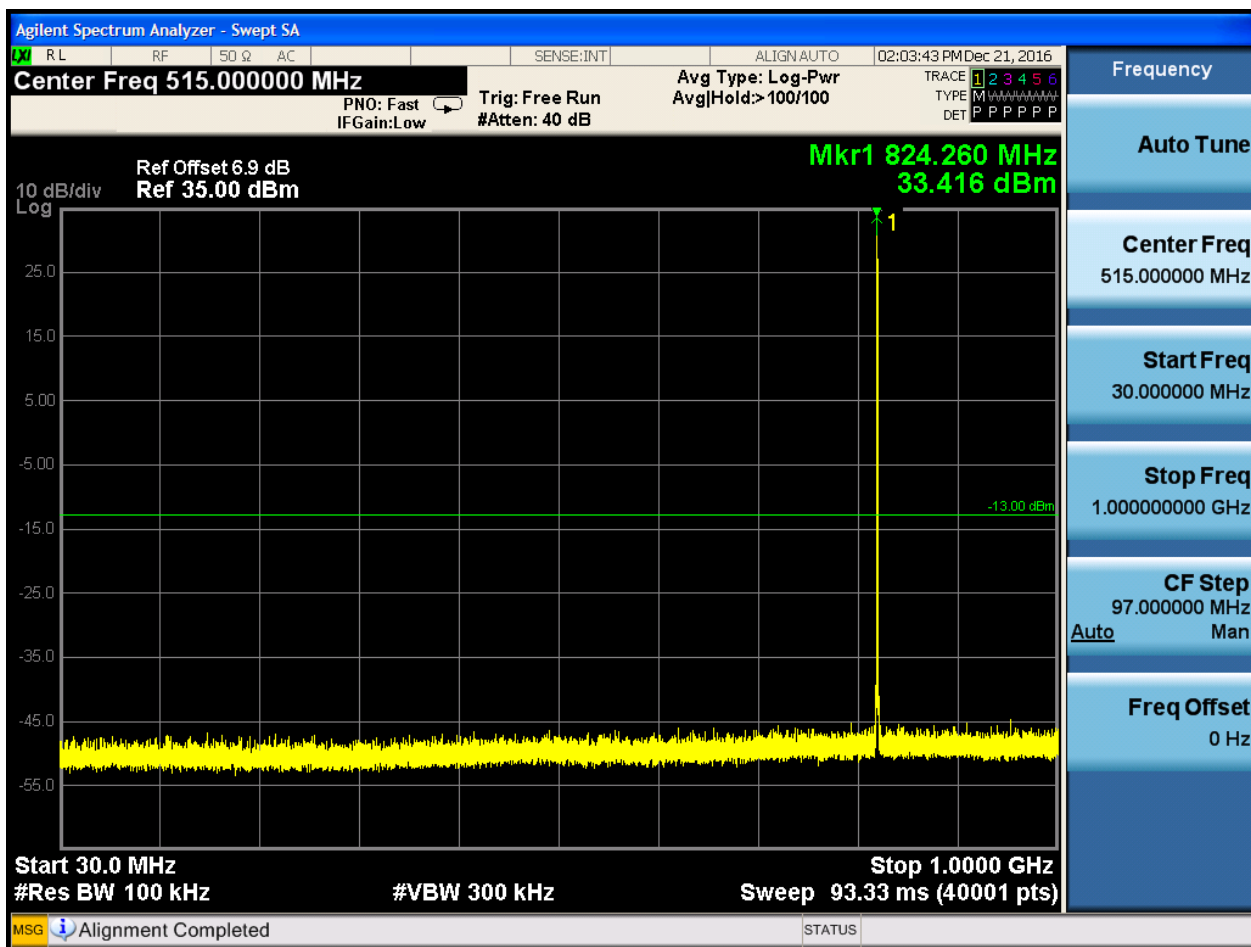
6.1.1 Test Band = GSM850

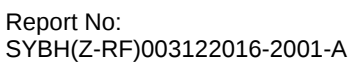
6.1.1.1 Test Mode = GSM/TM1

6.1.1.1.1 Test Channel = LCH





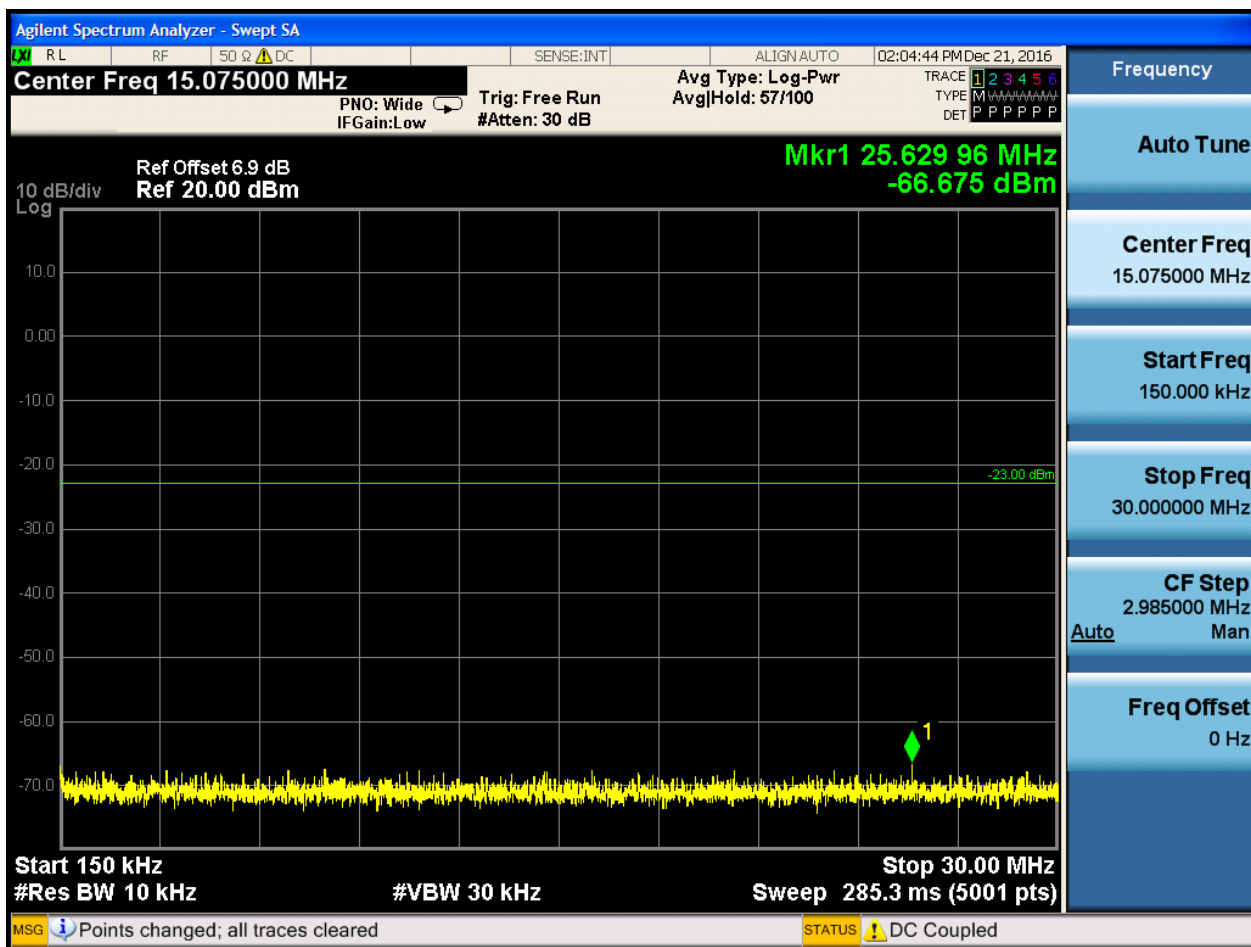


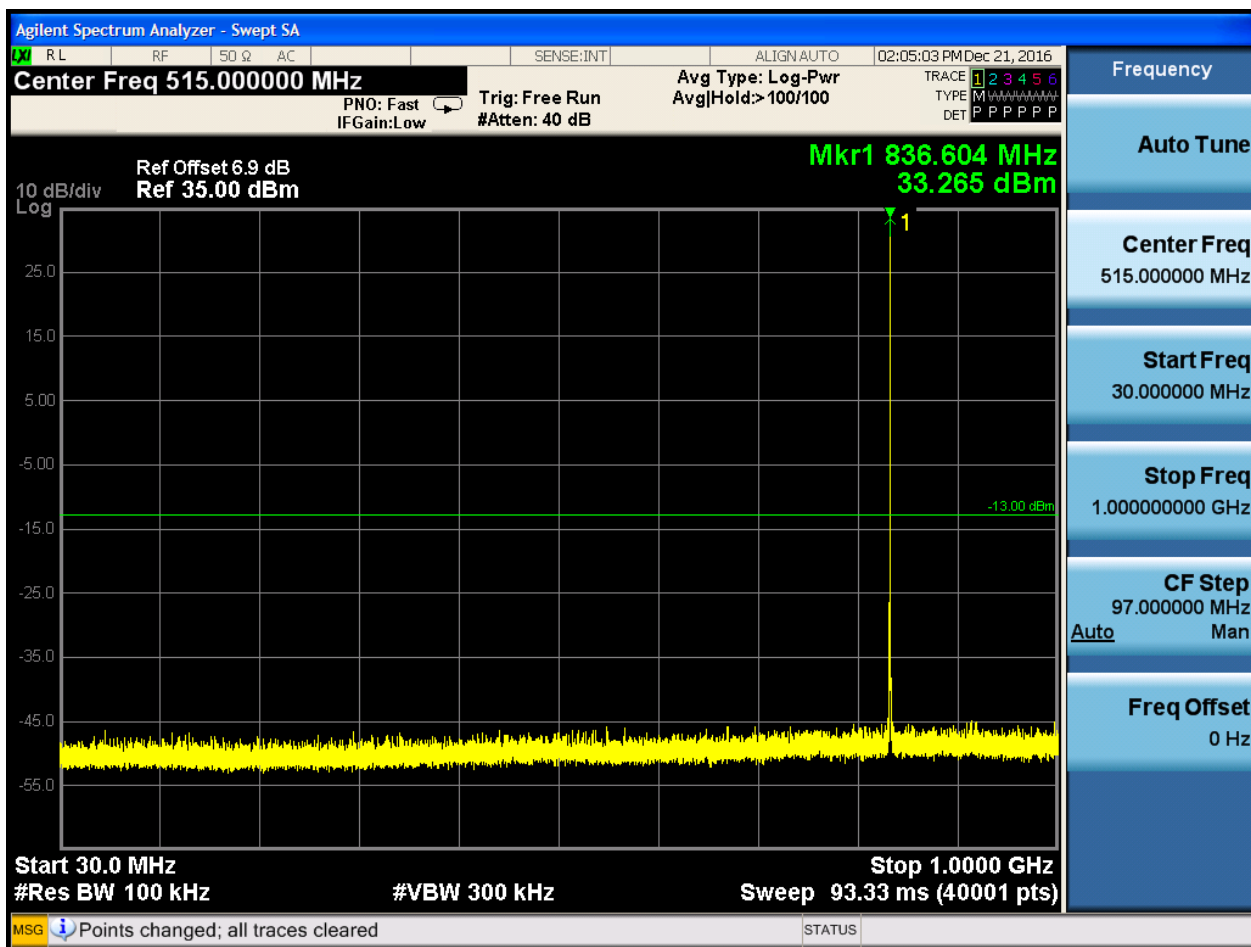


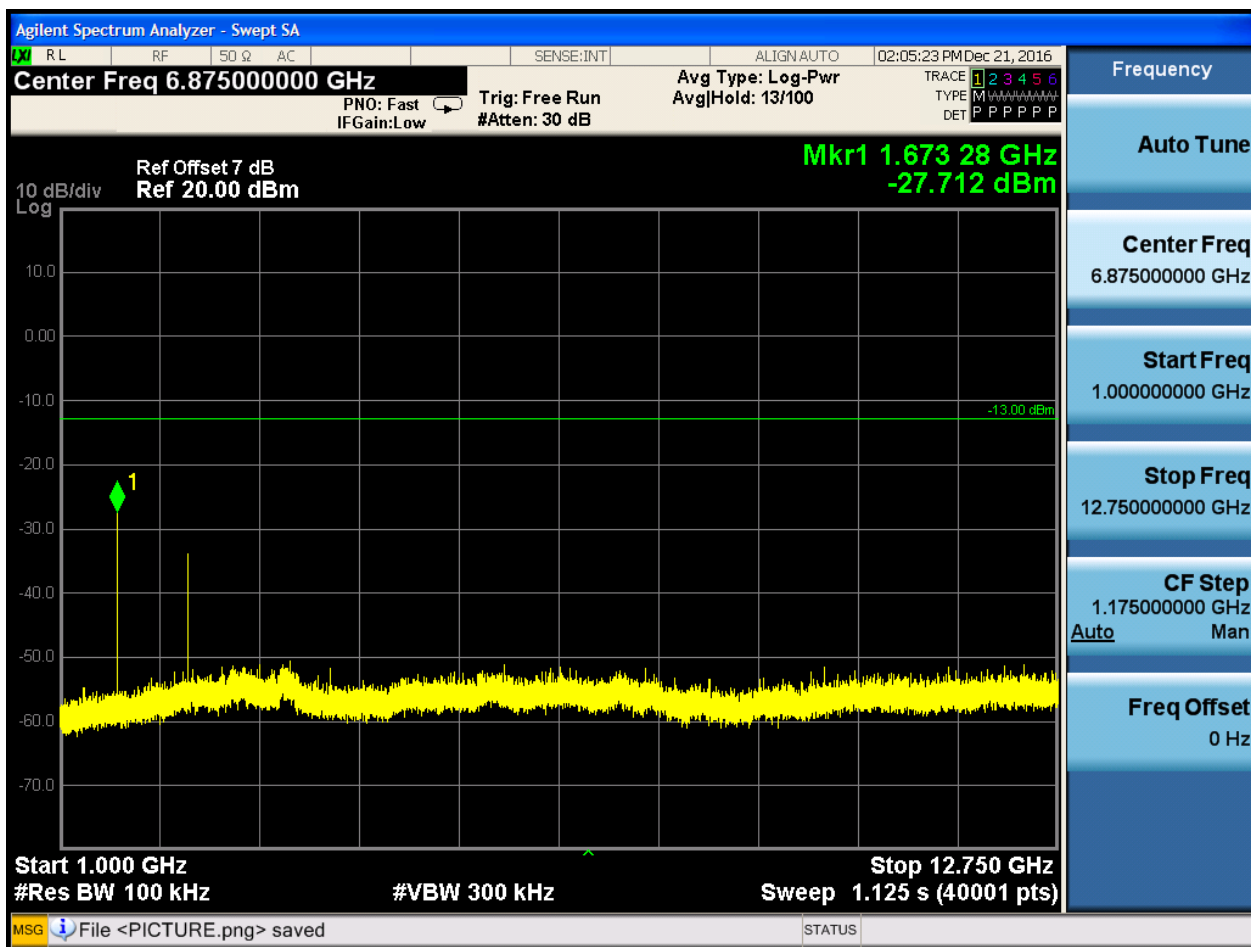


6.1.1.1.2 Test Channel = MCH





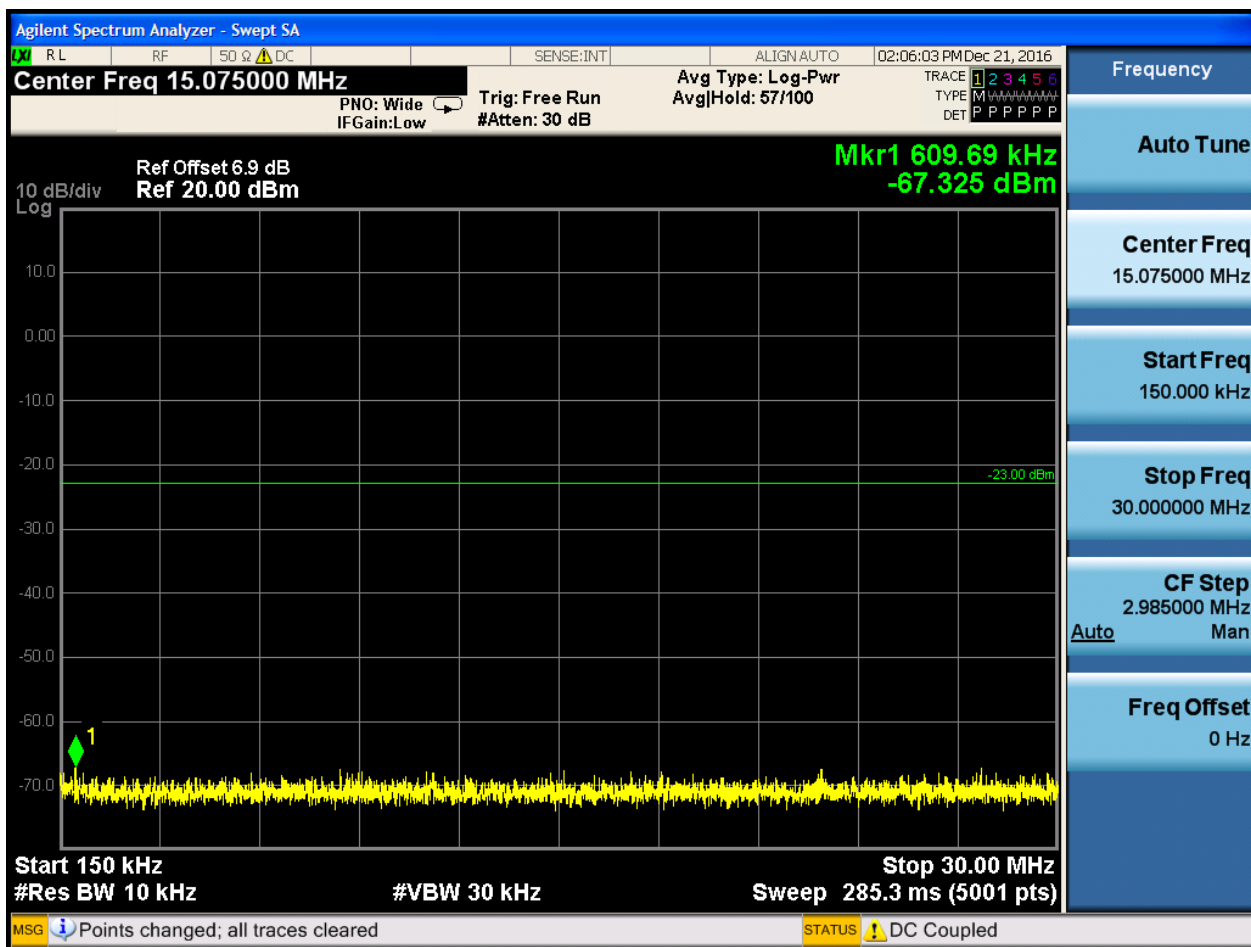


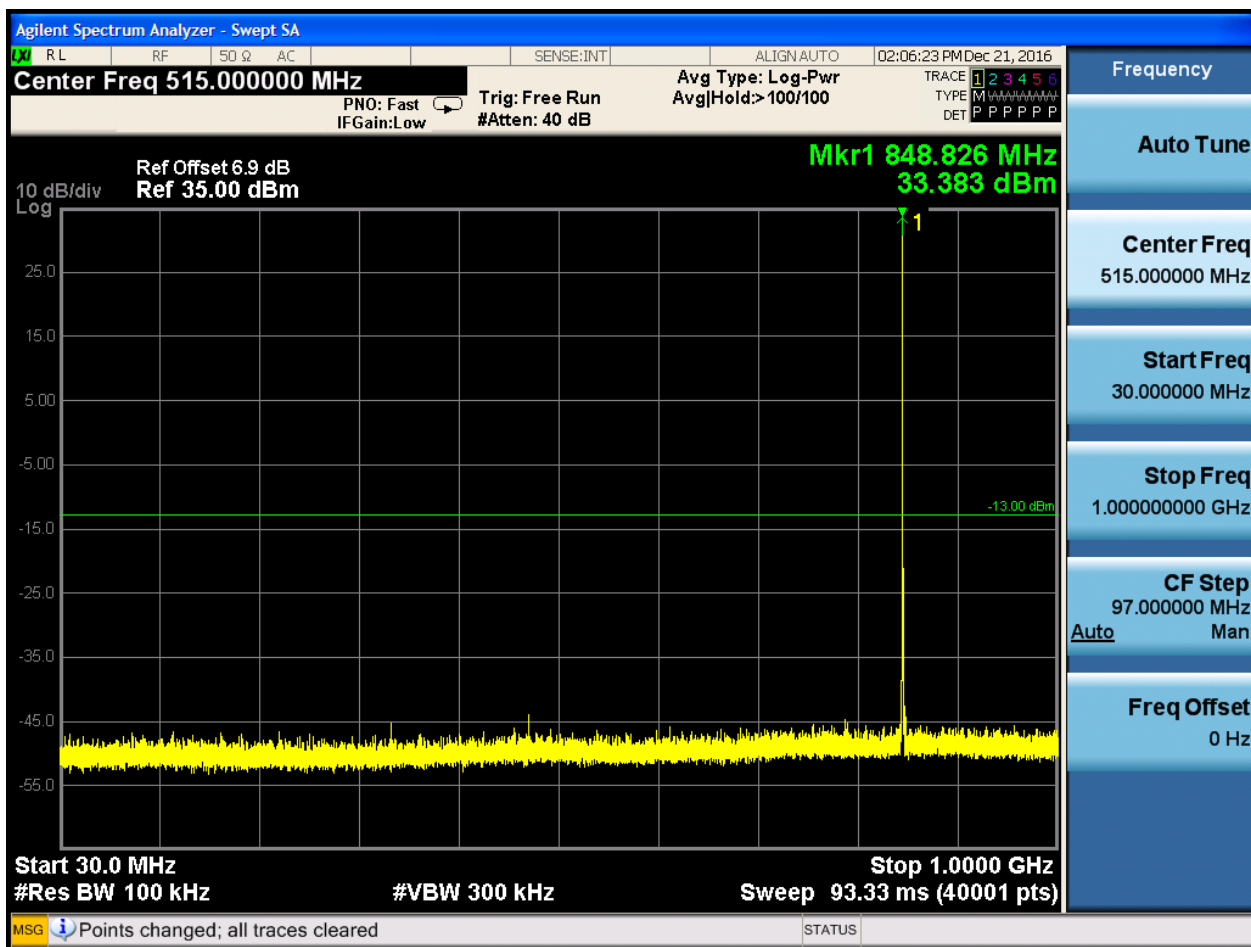


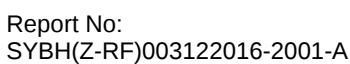


6.1.1.1.3 Test Channel = HCH



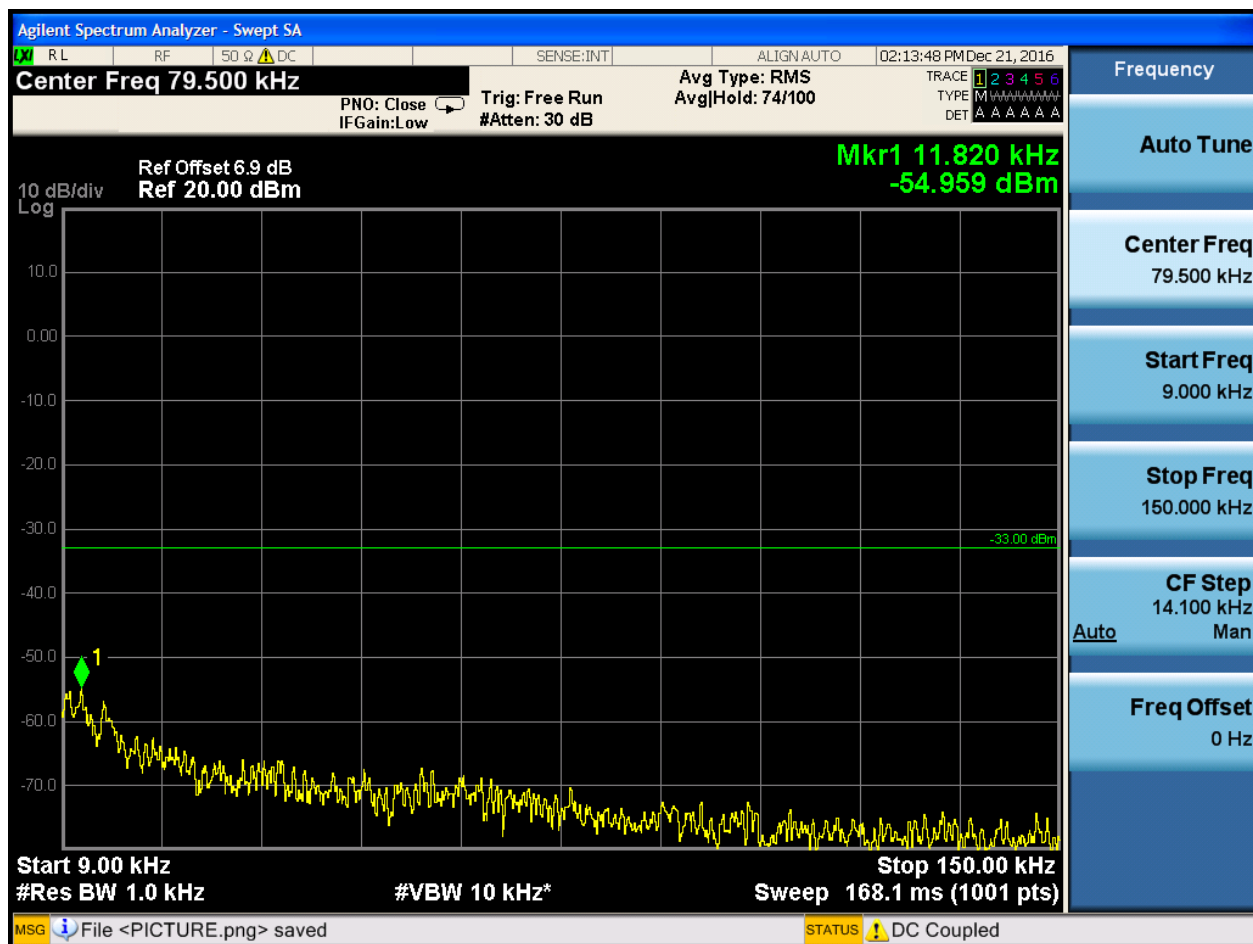


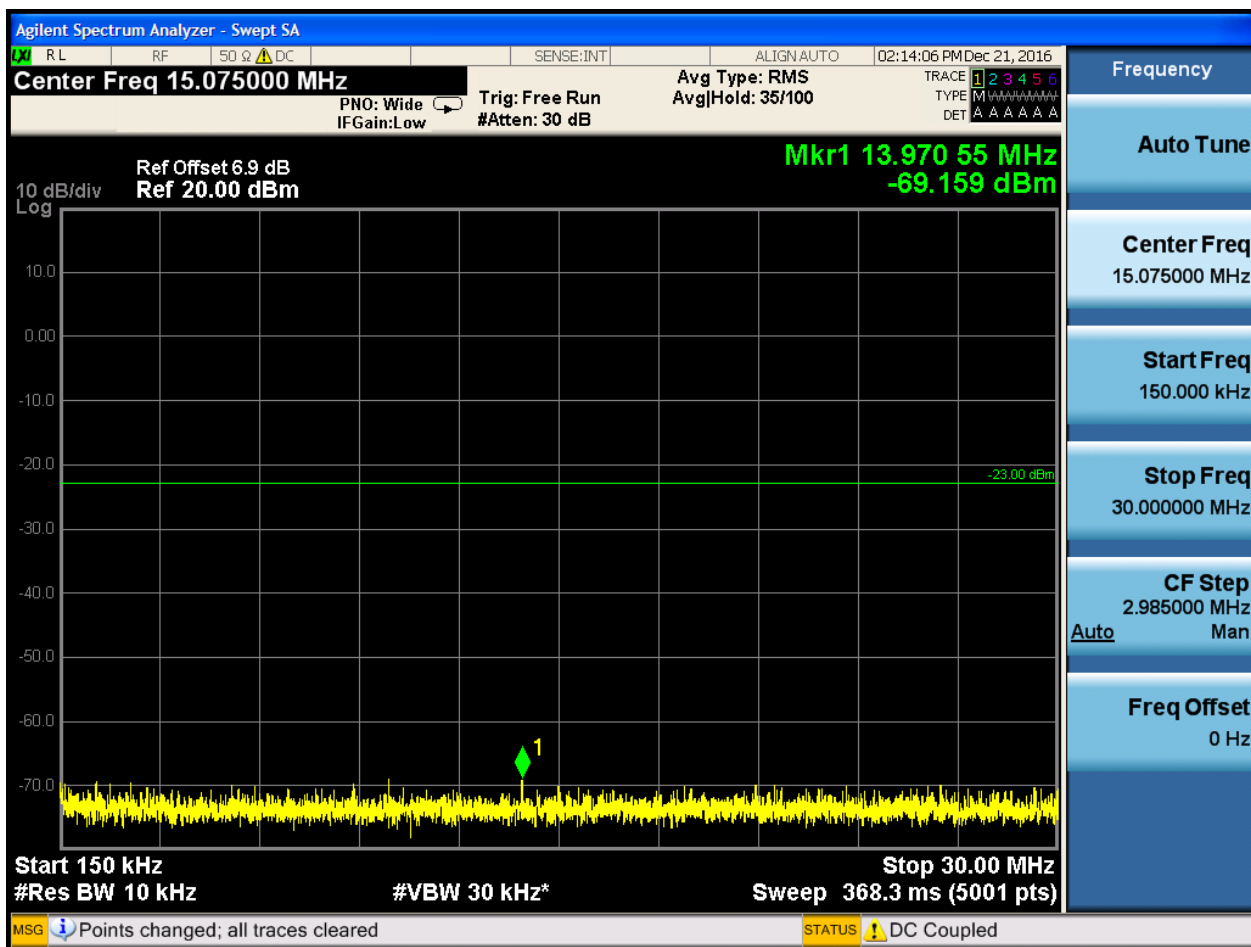


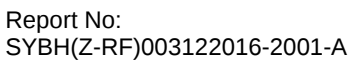


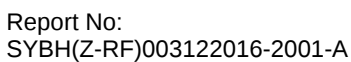
6.1.1.2 Test Mode = GSM/TM2

6.1.1.2.1 Test Channel = LCH

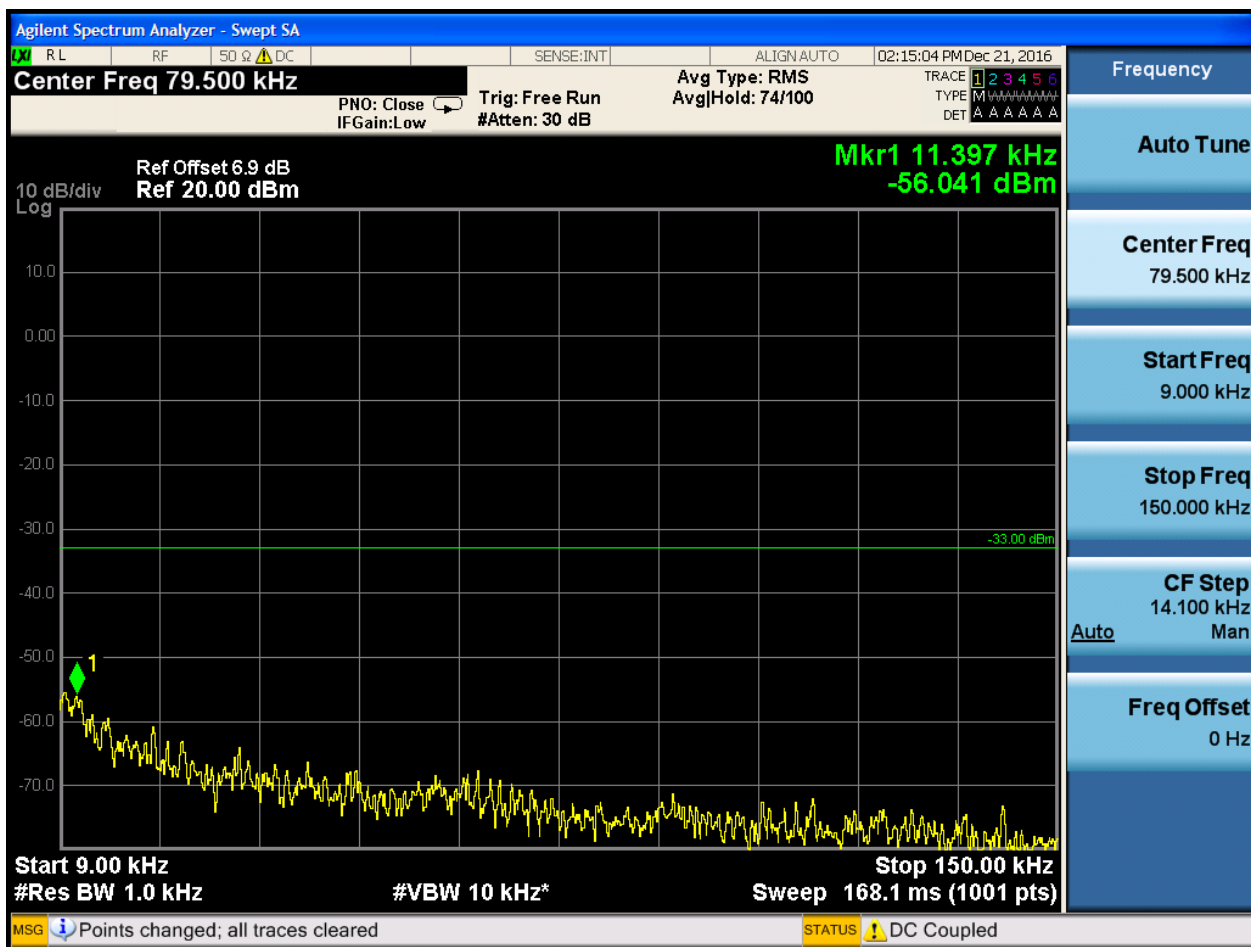


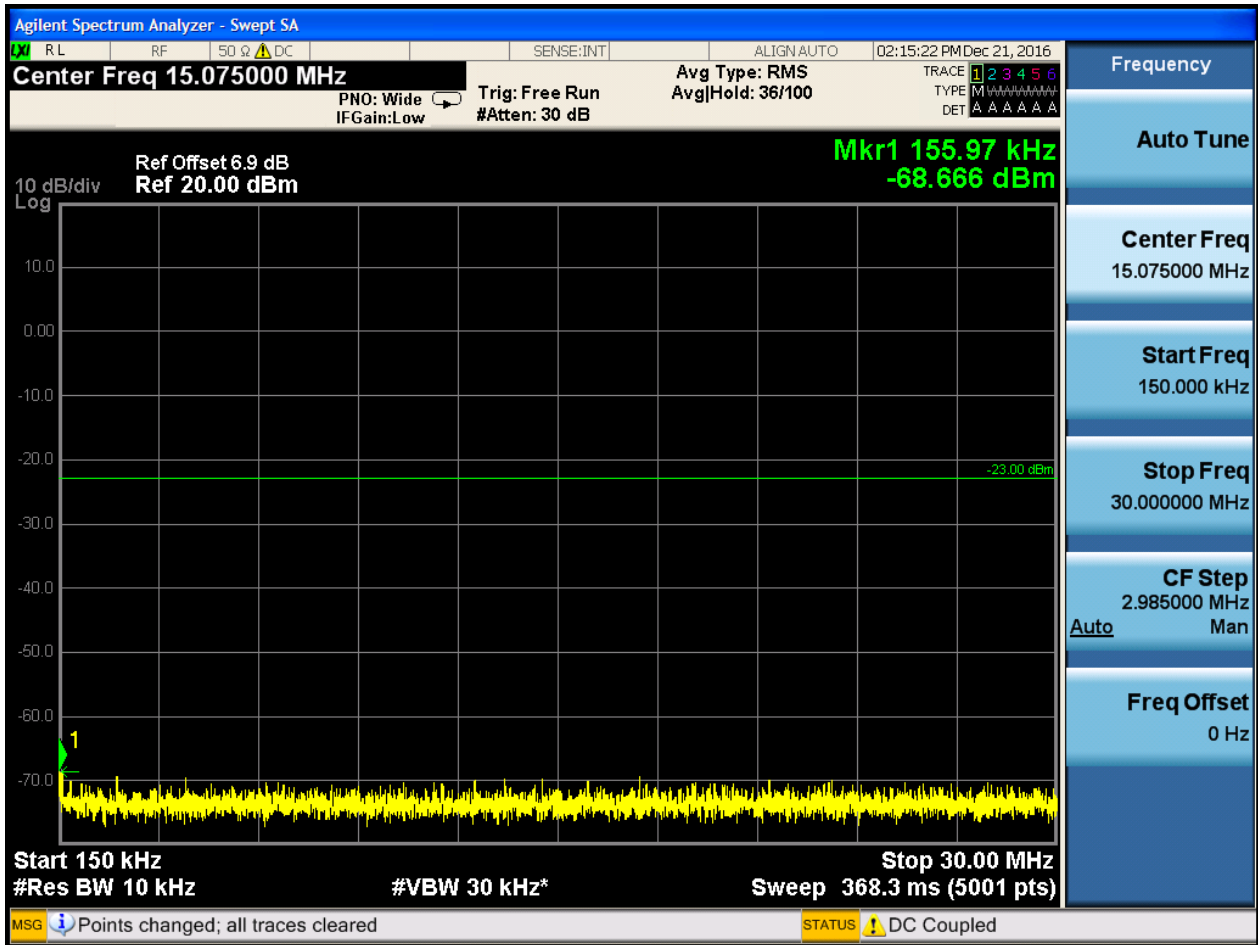


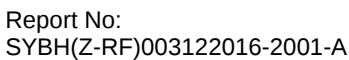


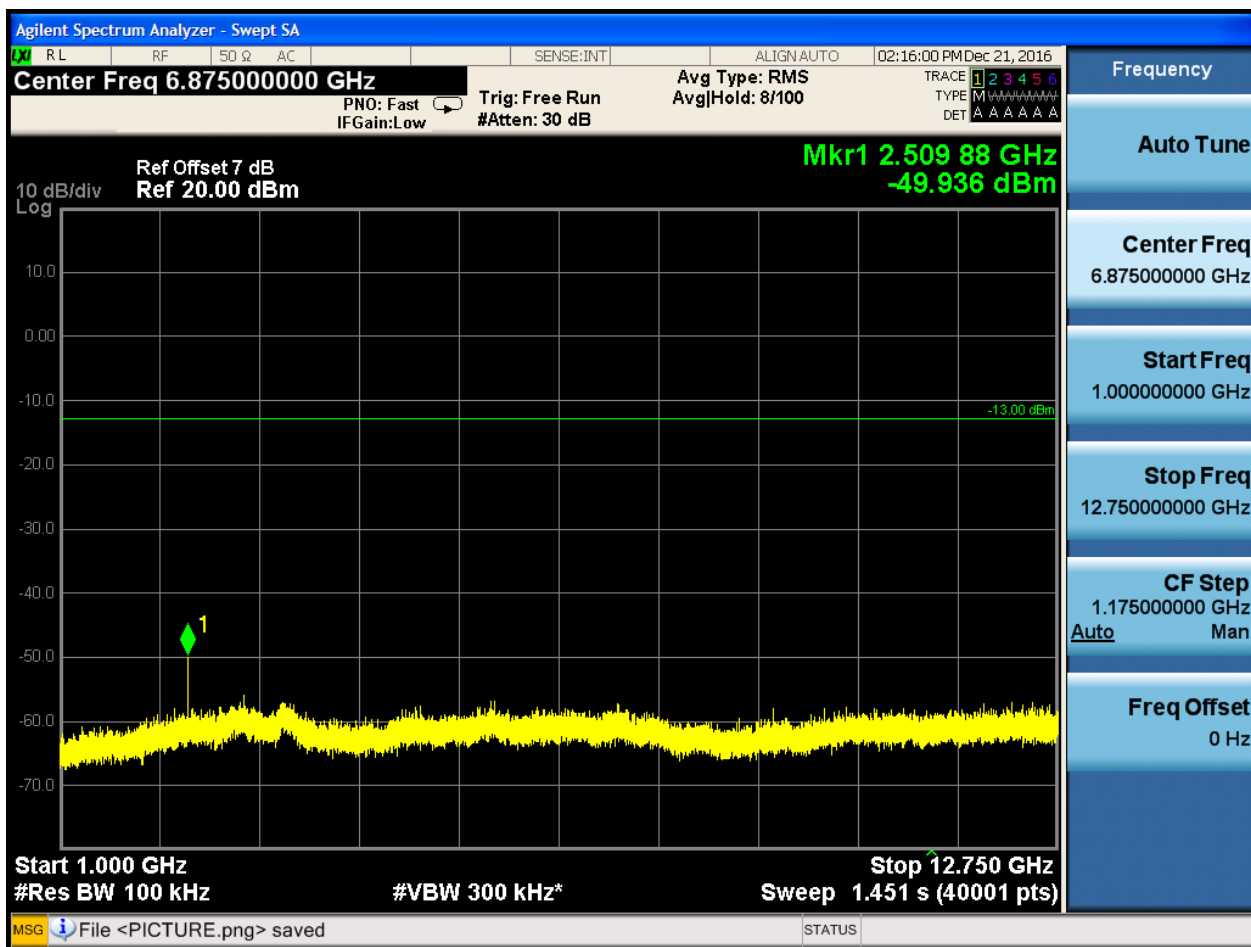


6.1.1.2.2 Test Channel = MCH

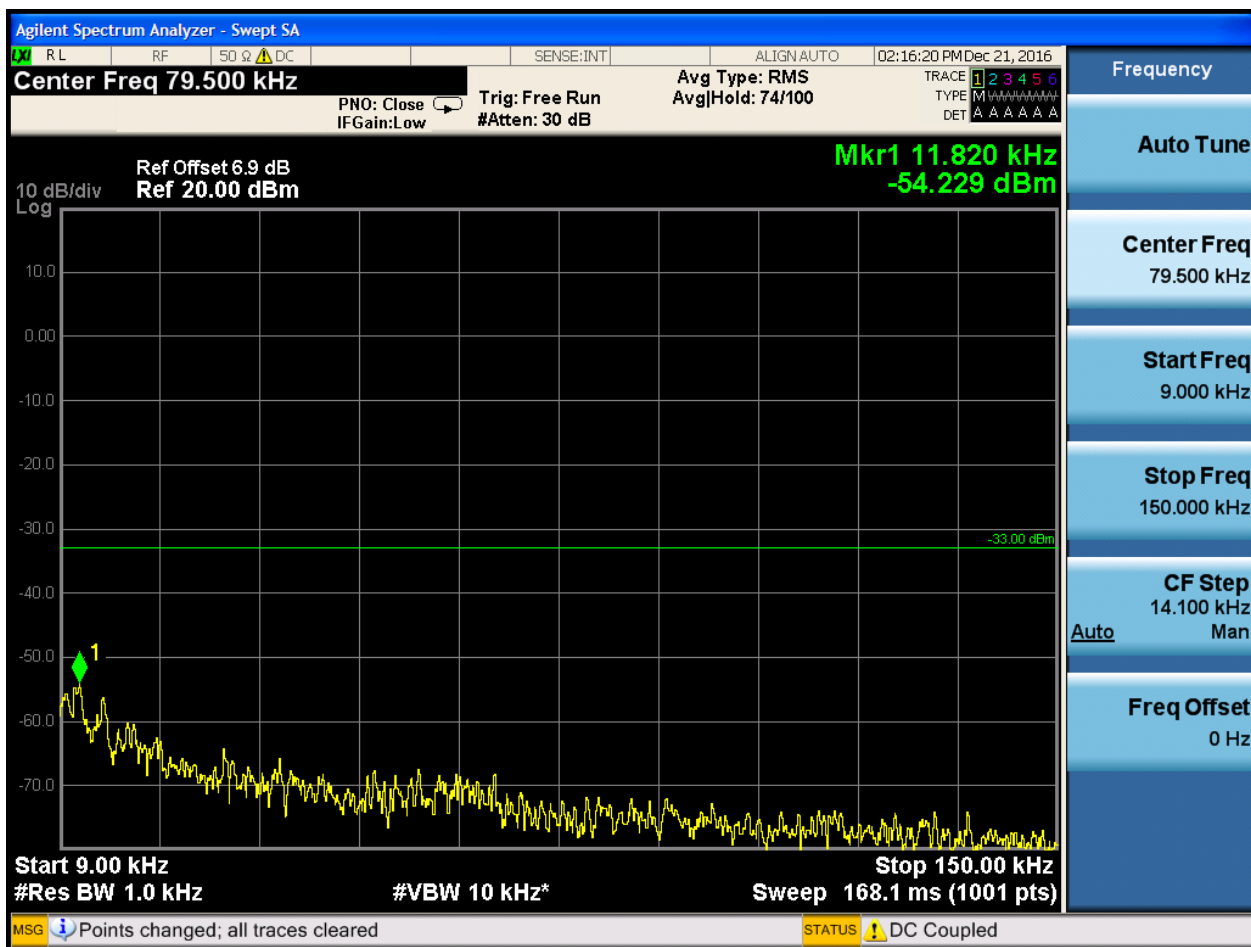


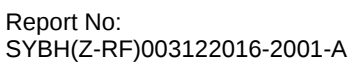


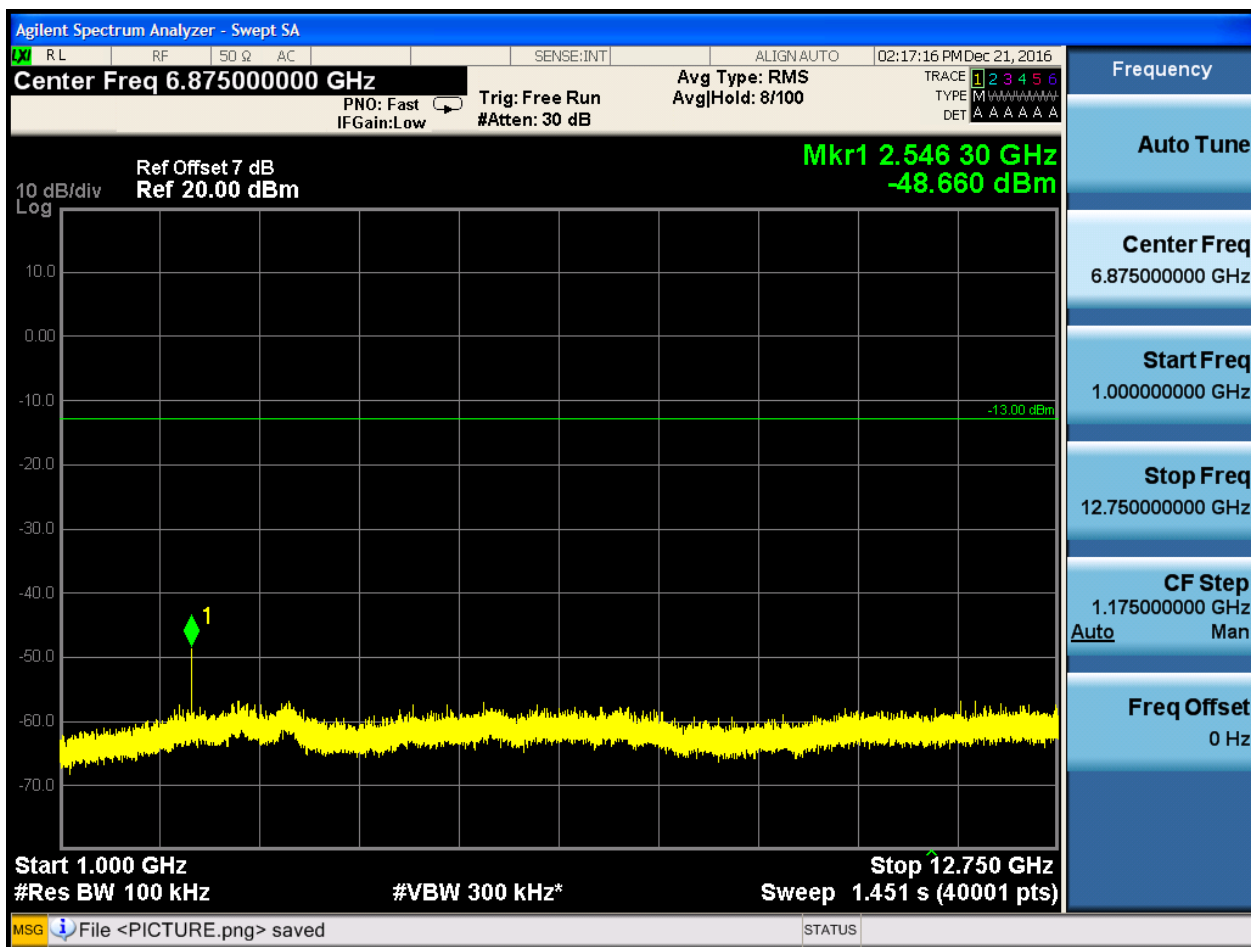




6.1.1.2.3 Test Channel = HCH



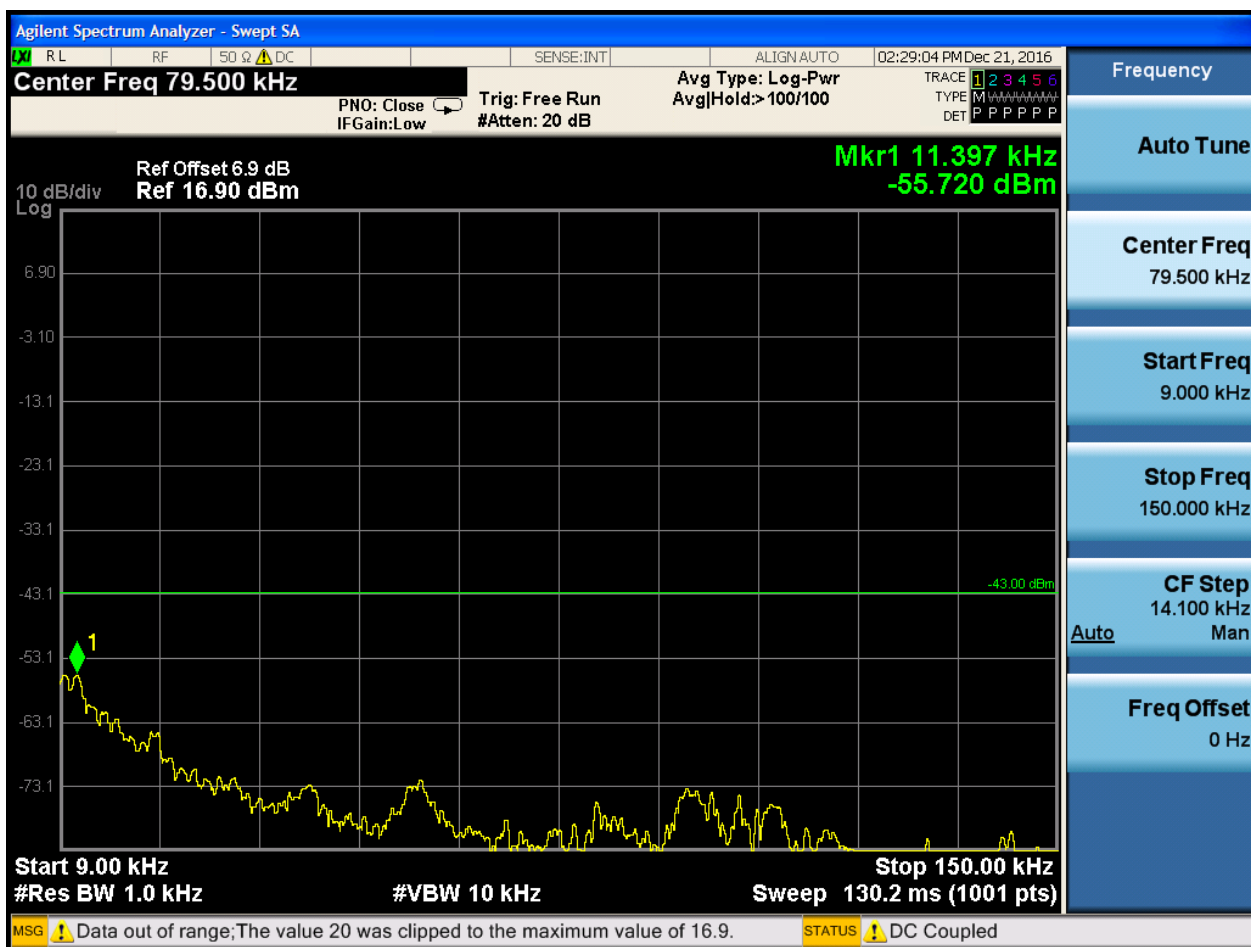


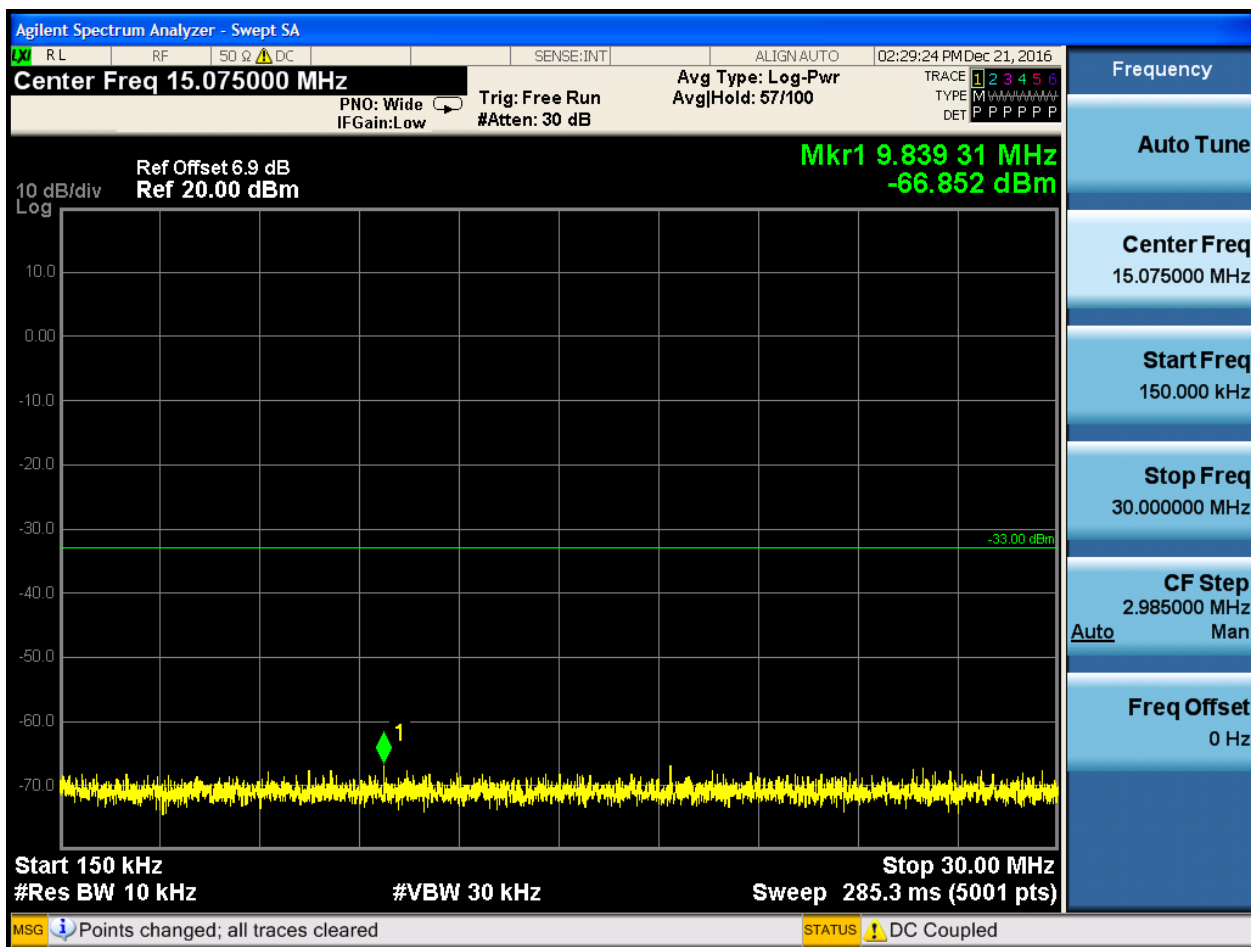


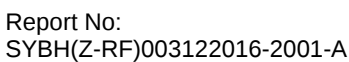
6.1.2 Test Band = GSM1900

6.1.2.1 Test Mode = GSM/TM1

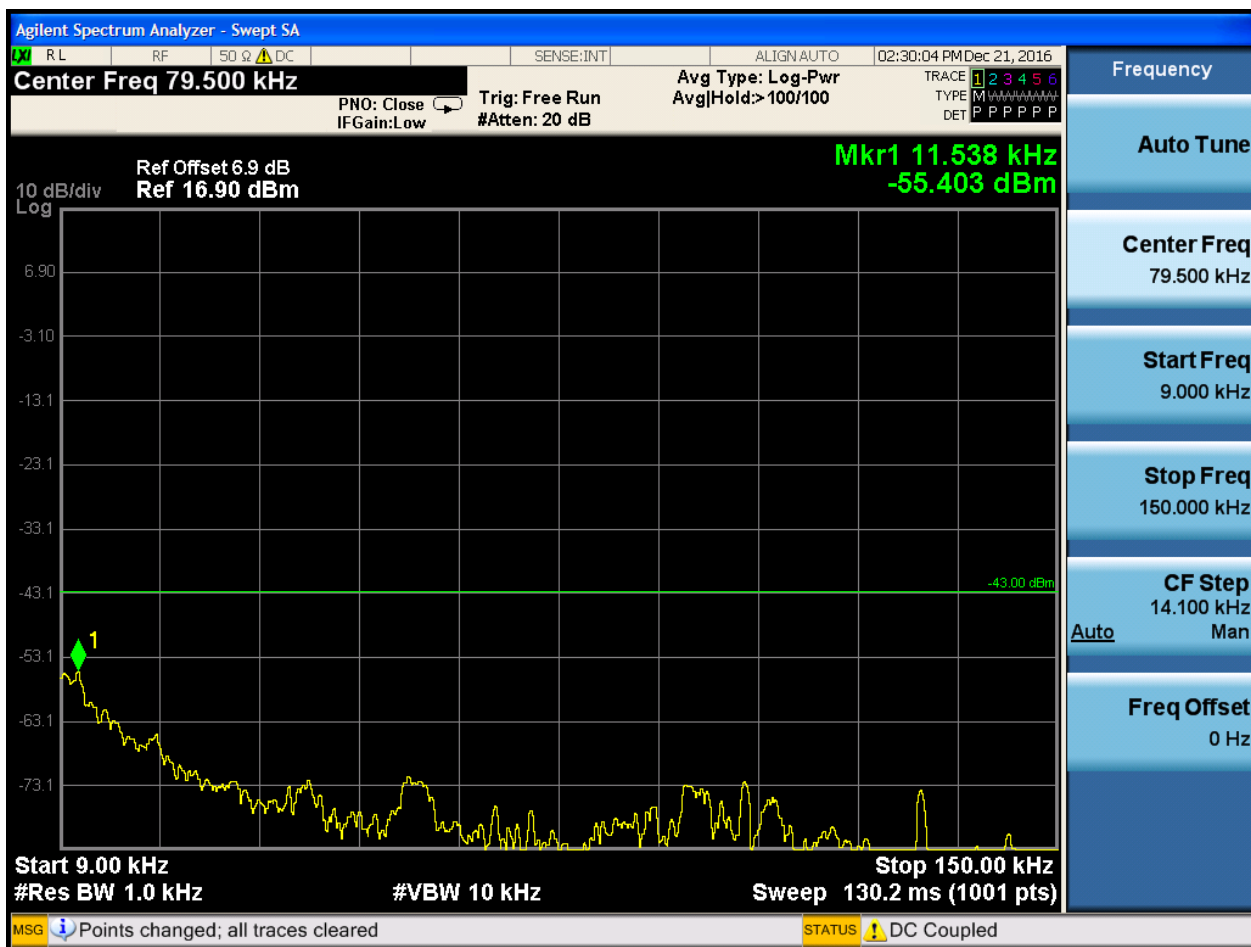
6.1.2.1.1 Test Channel = LCH

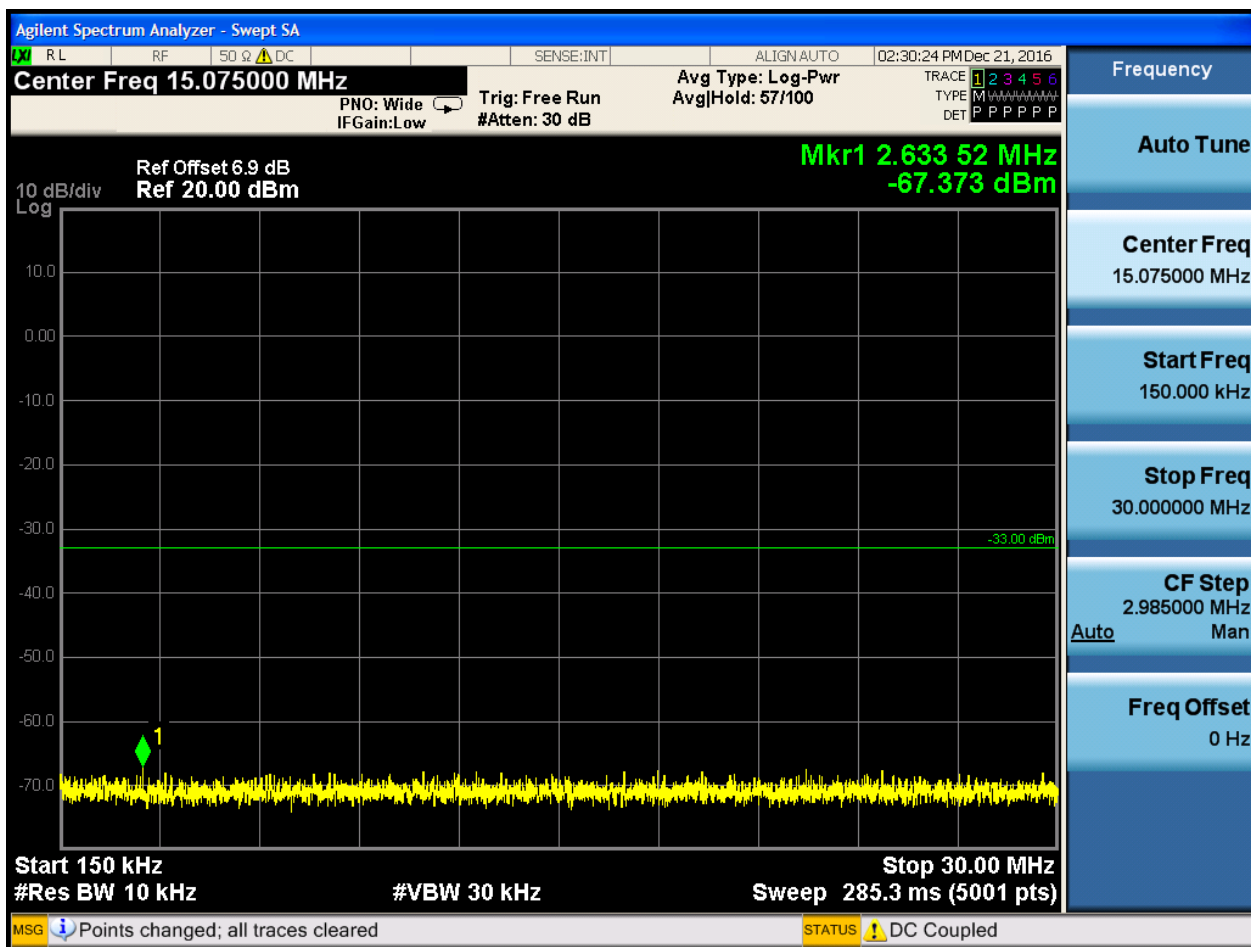


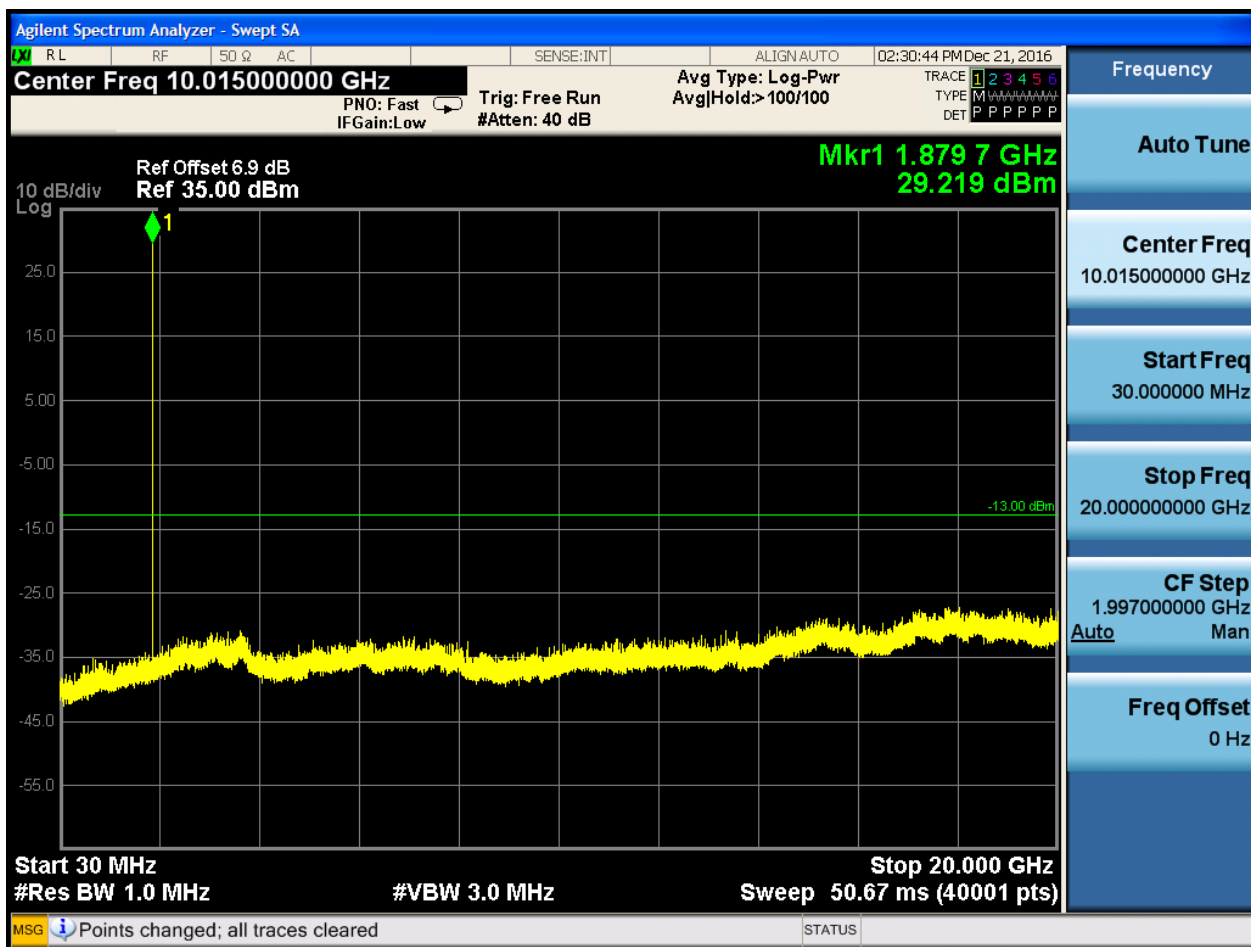




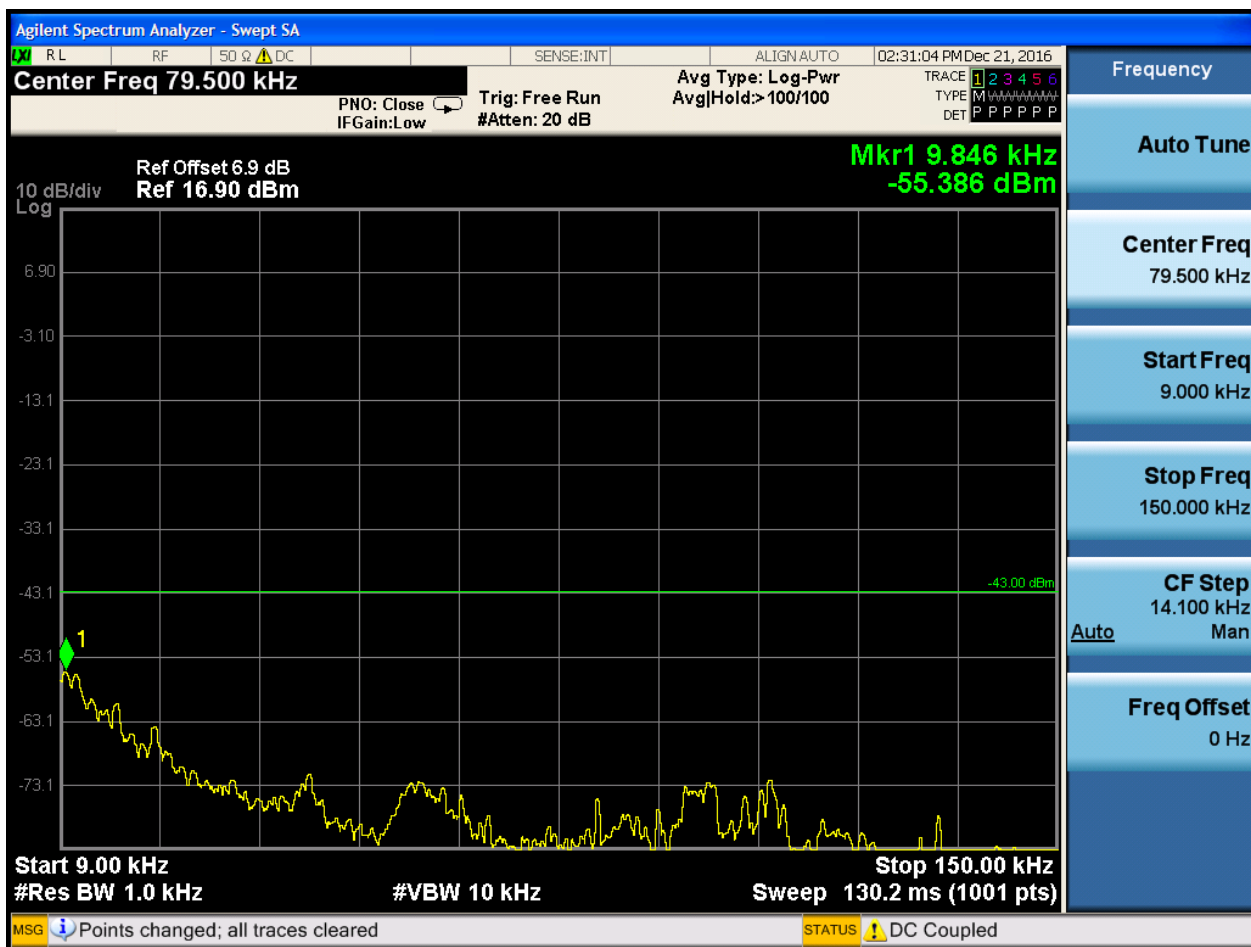
6.1.2.1.2 Test Channel = MCH

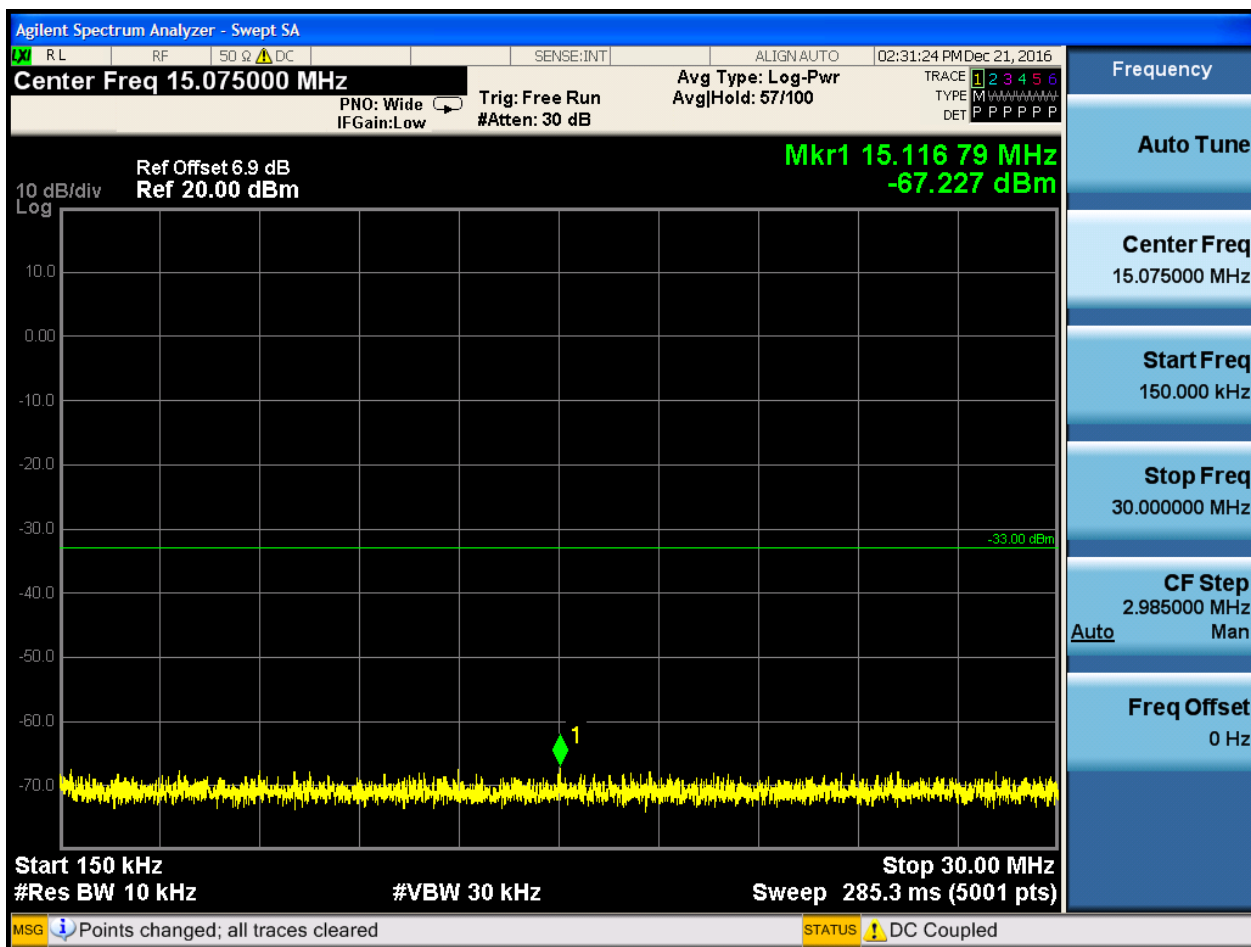


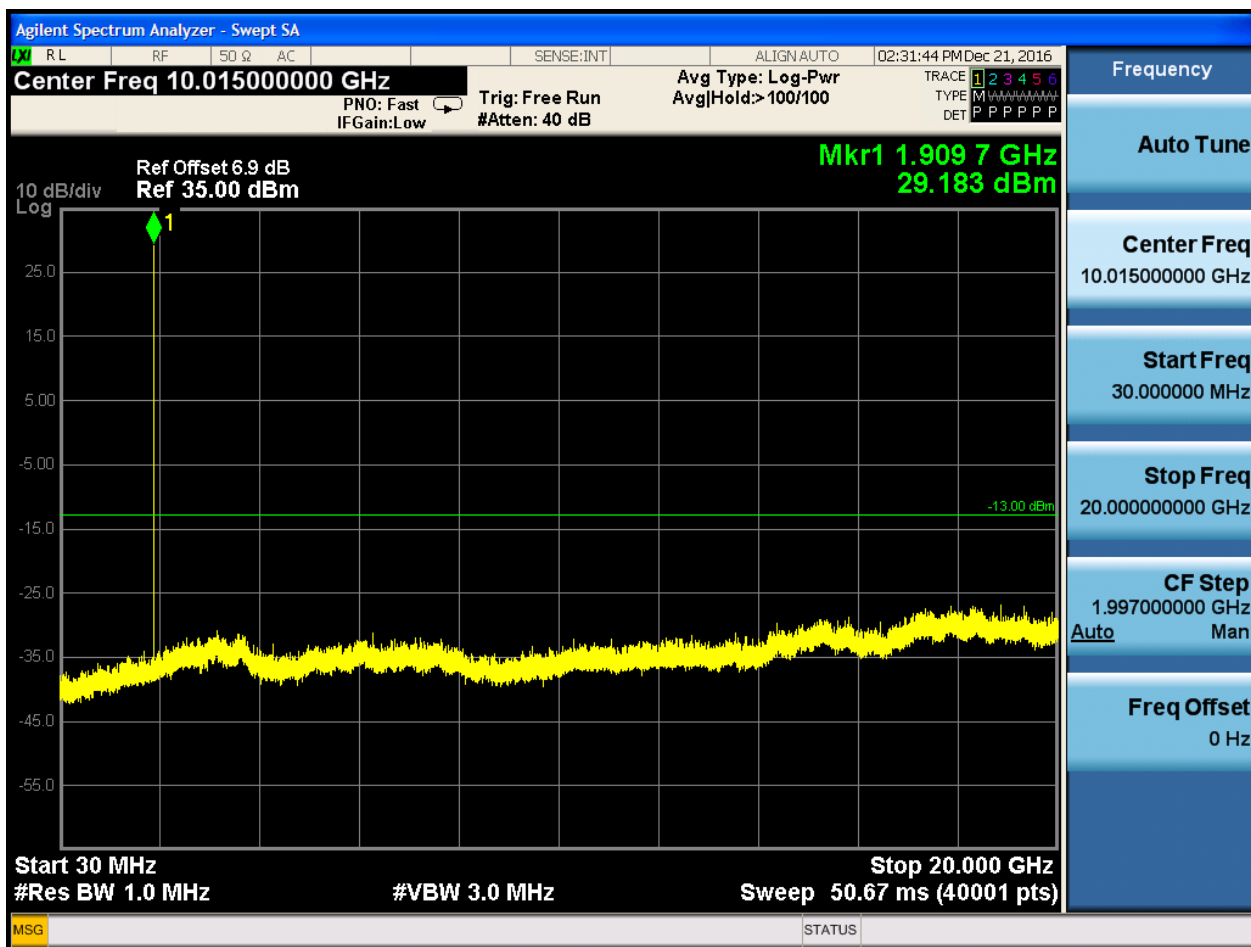




6.1.2.1.3 Test Channel = HCH

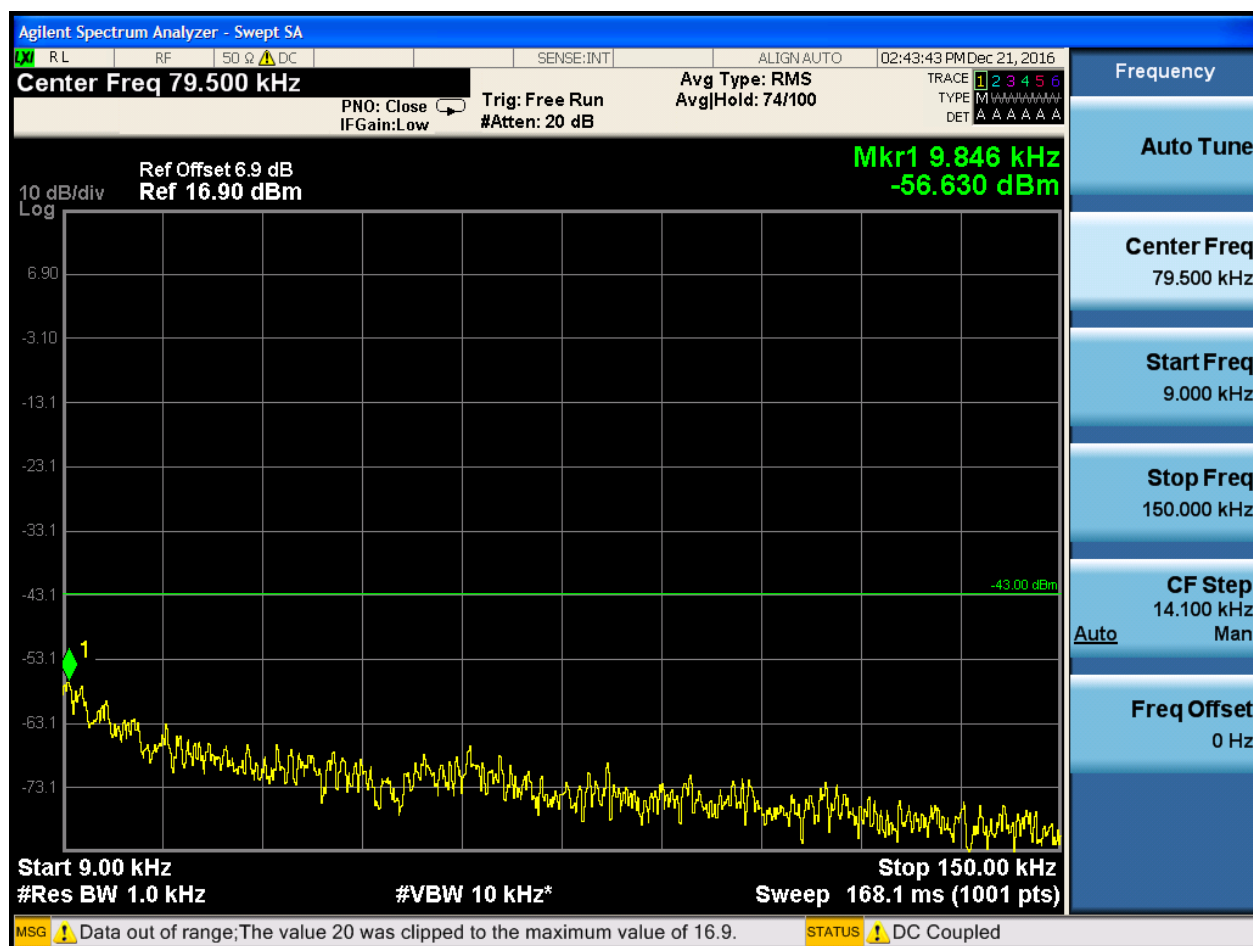


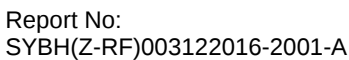


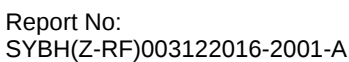


6.1.2.2 Test Mode = GSM/TM2

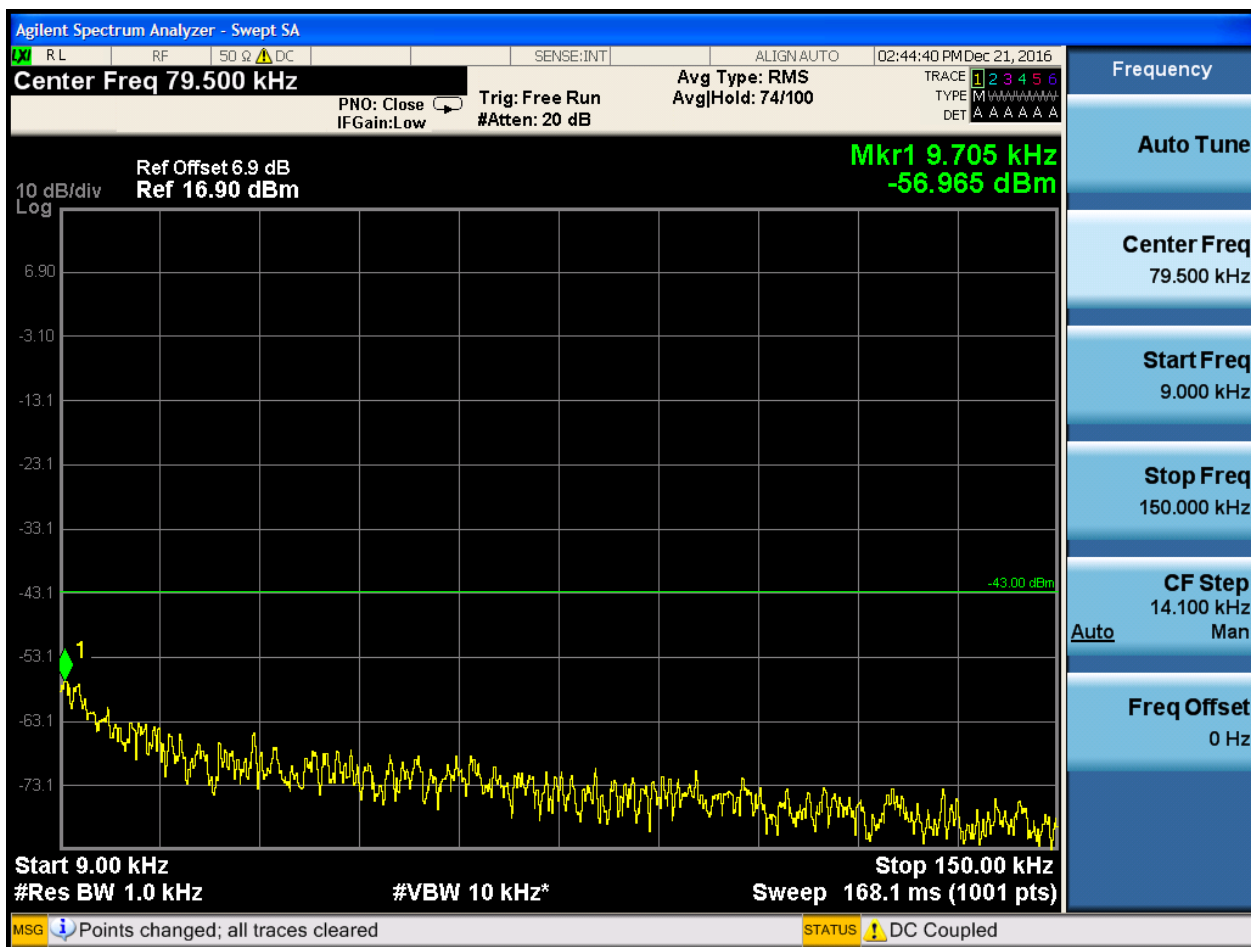
6.1.2.2.1 Test Channel = LCH

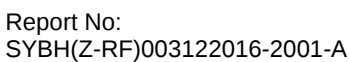


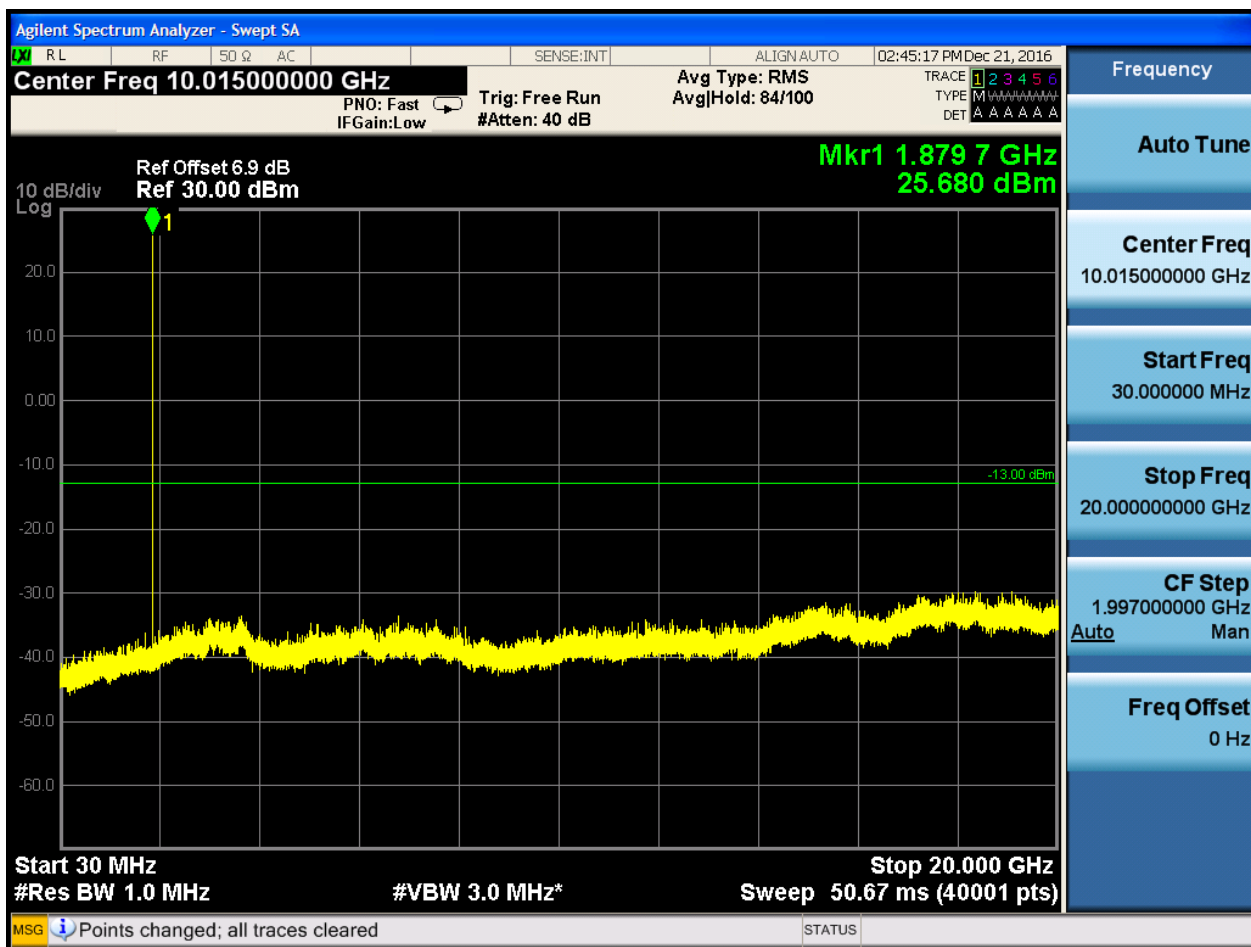




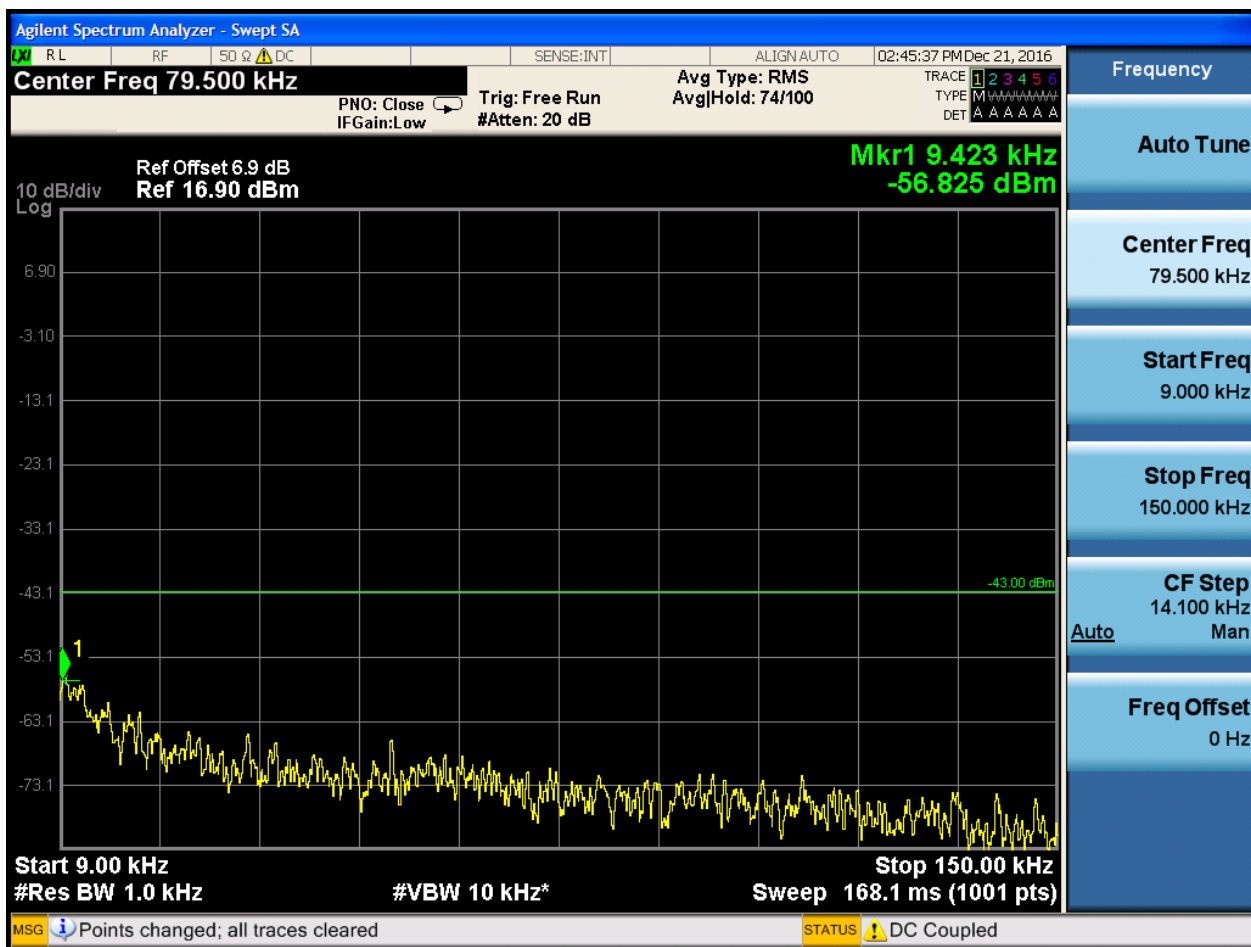
6.1.2.2.2 Test Channel = MCH

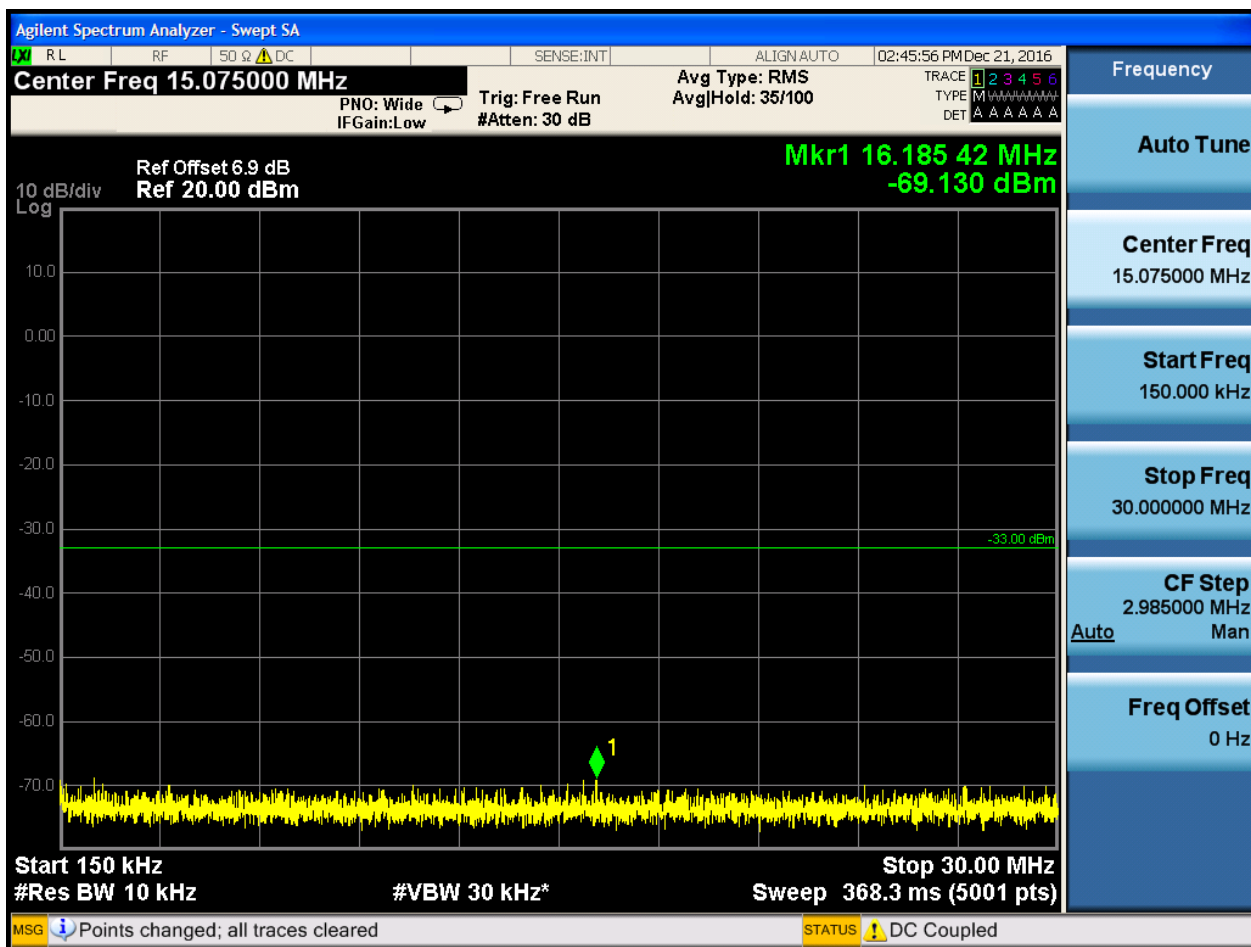


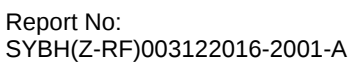




6.1.2.2.3 Test Channel = HCH







7Appendix_G: Field Strength of Spurious Radiation

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

9kHz~150kHz, 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

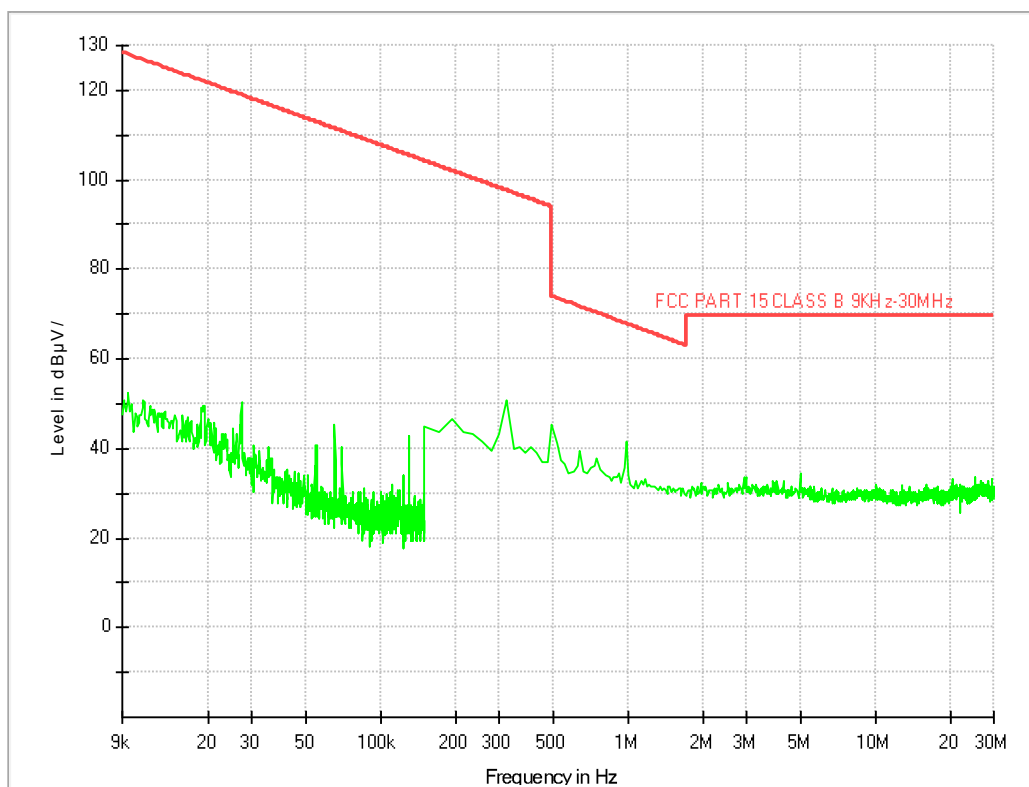
Above 1GHz, RBW = 1 MHz, VBW = 3 MHz. Detector: PK

Part I - Test Plots

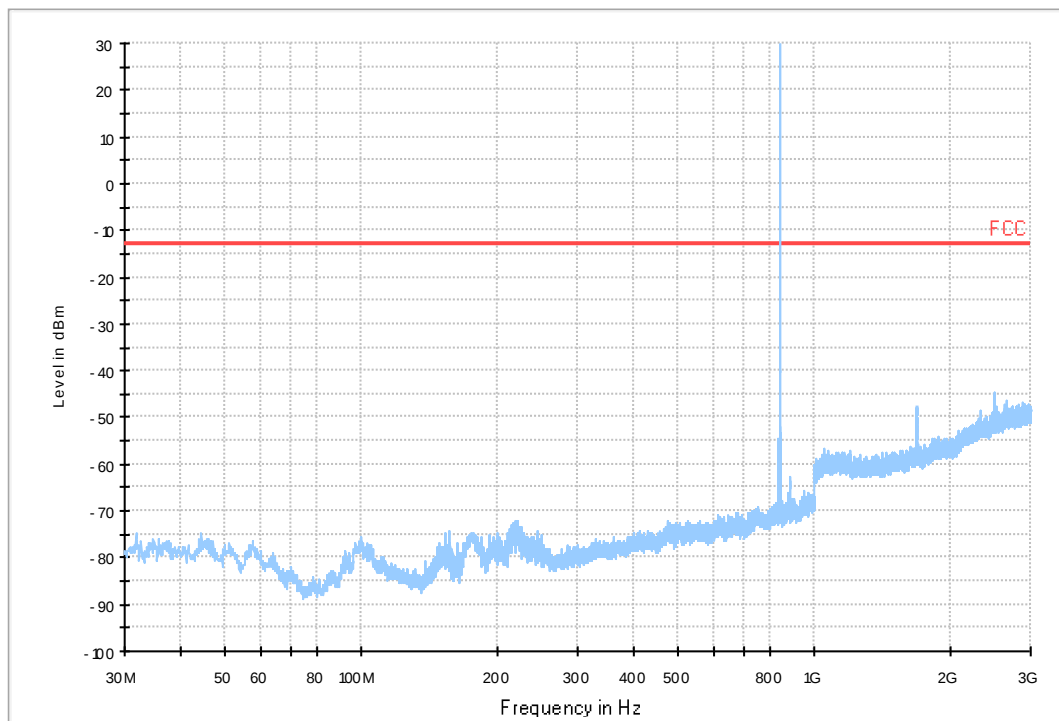
7.1 For GSM

7.1.1 Test Band = GSM850

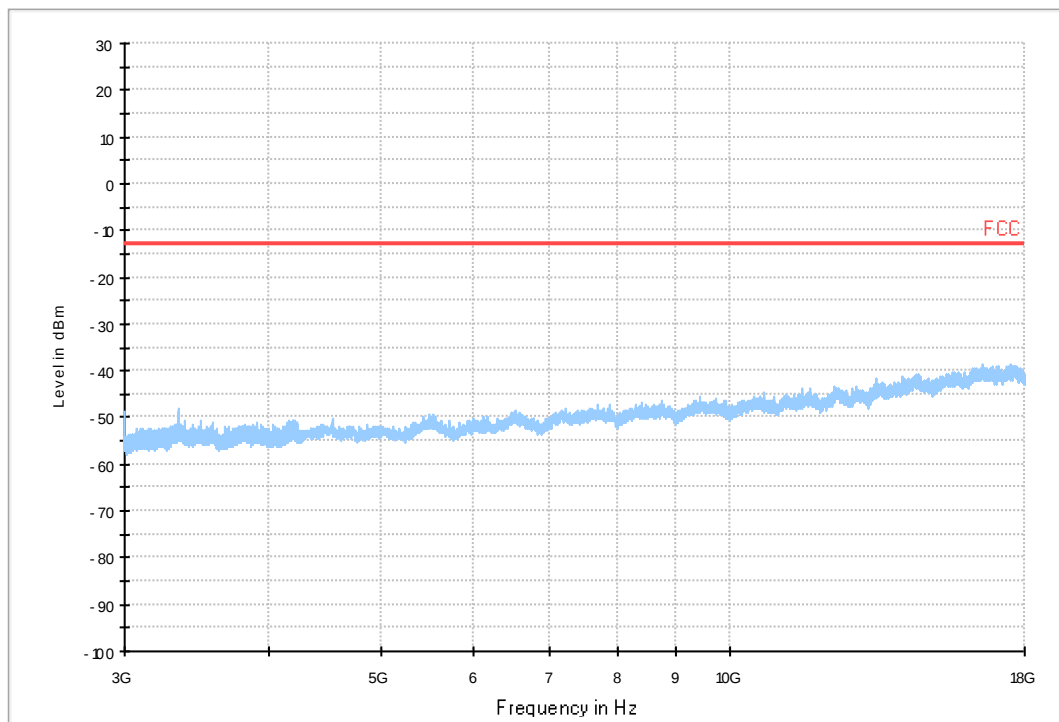
7.1.1.1 Test Mode = GSM/TM1



Copy of FCC PART 22 GSM850_L

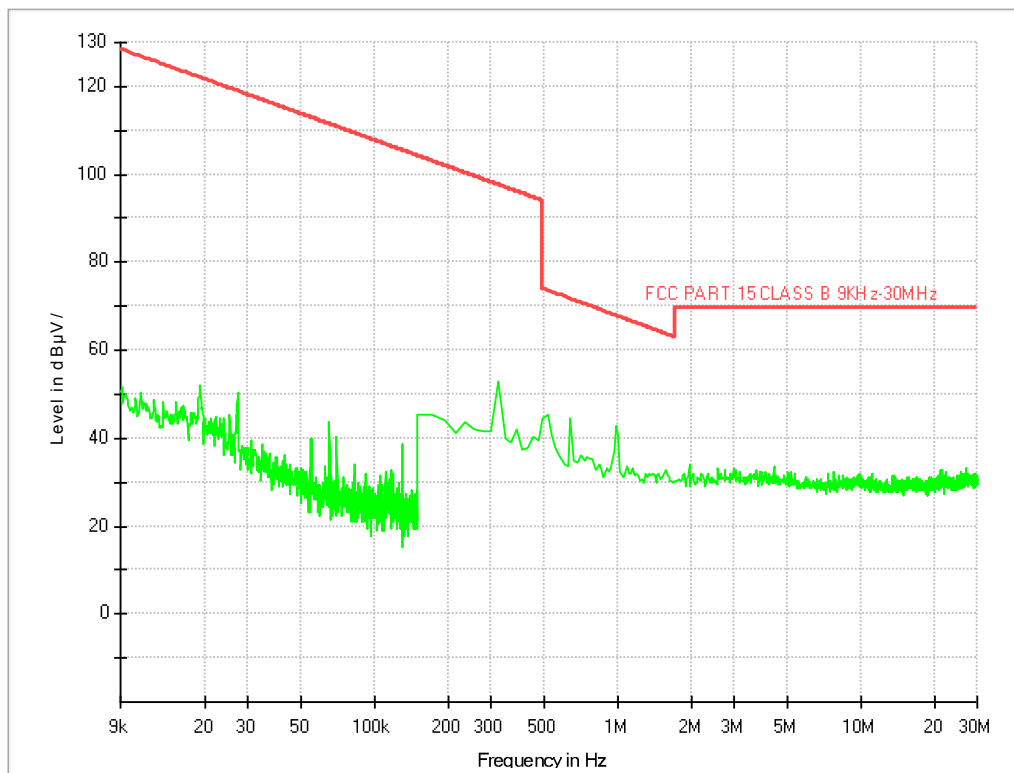


Copy of FCC PART 22 GSM850_H

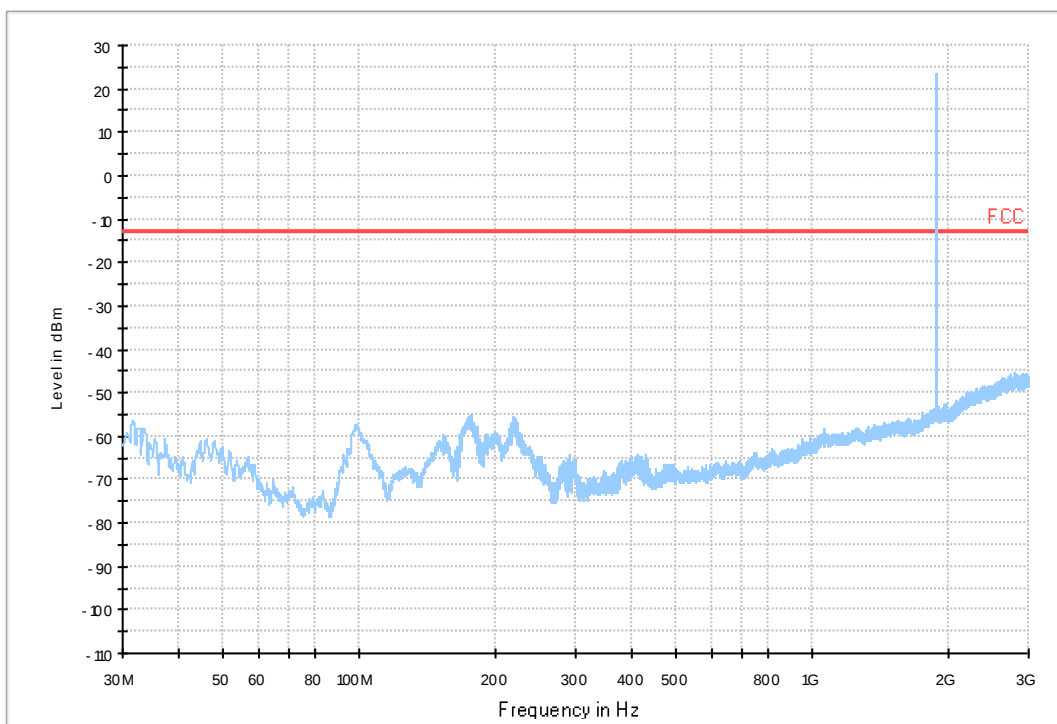


7.1.2 Test Band = GSM1900

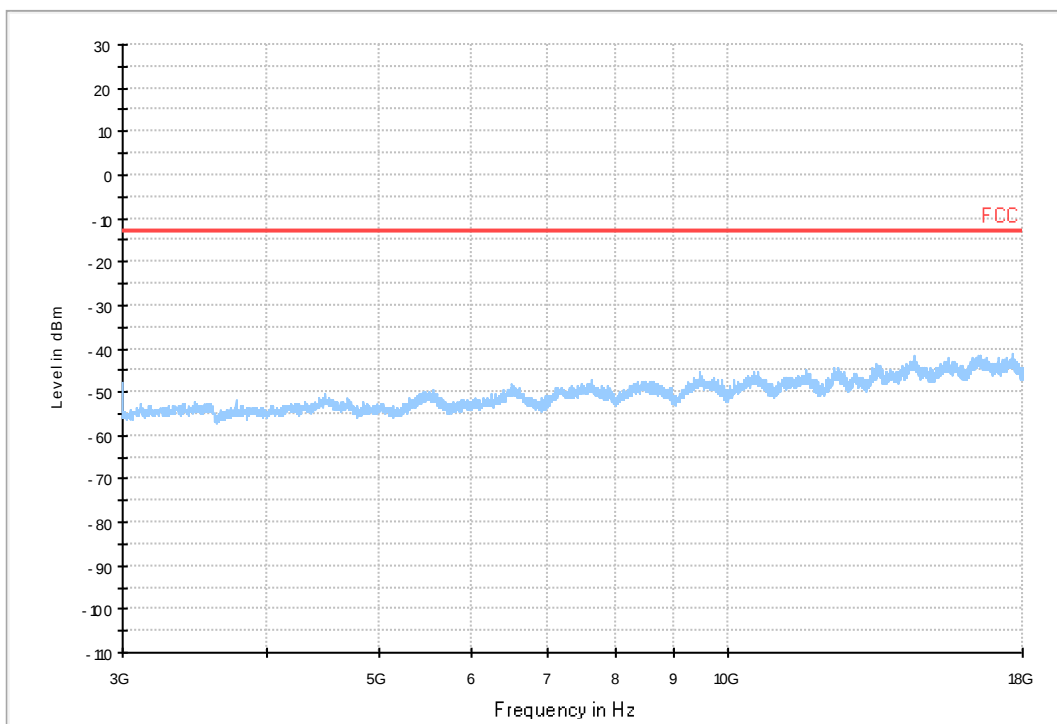
7.1.2.1 Test Mode = GSM/TM1

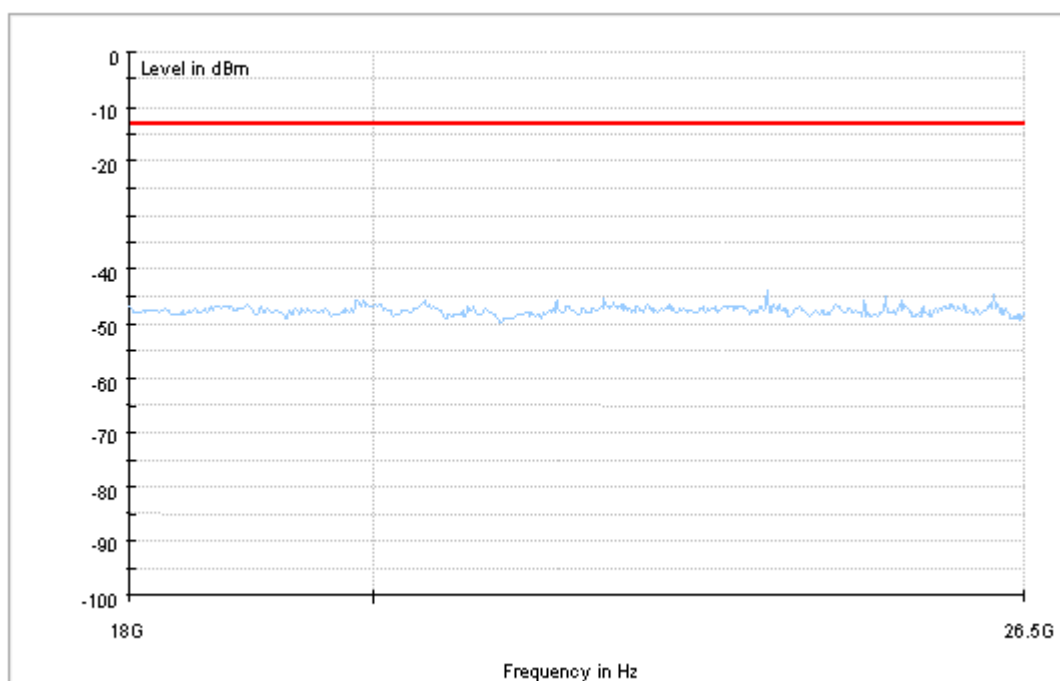


Copy of FCC PART 24 GSM1900_L



Copy of FCC PART 24 GSM1900_H





8Appendix_H: Frequency Stability

8.1 For GSM

8.1.1Frequency 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	0.26	0.00032	PASS
				VN	-4.97	-0.00603	PASS
				VH	-4.07	-0.00494	PASS
		MCH	TN	VL	-2.58	-0.00308	PASS
				VN	1.29	0.00154	PASS
				VH	-5.36	-0.00641	PASS
		HCH	TN	VL	1.16	0.00137	PASS
				VN	1.03	0.00121	PASS
				VH	-3.10	-0.00365	PASS
	GSM/TM2	LCH	TN	VL	-2.74	-0.00332	PASS
				VN	4.39	0.00533	PASS
				VH	5.78	0.00701	PASS
		MCH	TN	VL	6.62	0.00791	PASS
				VN	3.71	0.00443	PASS
				VH	4.78	0.00571	PASS
		HCH	TN	VL	4.78	0.00563	PASS
				VN	6.88	0.00811	PASS
				VH	3.42	0.00403	PASS
GSM1900	GSM/TM1	LCH	TN	VL	5.23	0.00283	PASS
				VN	0.90	0.00049	PASS
				VH	2.00	0.00108	PASS
		MCH	TN	VL	8.01	0.00426	PASS
				VN	-7.04	-0.00374	PASS
				VH	0.65	0.00035	PASS
		HCH	TN	VL	0.77	0.0004	PASS
				VN	3.16	0.00165	PASS
				VH	3.75	0.00196	PASS
	GSM/TM2	LCH	TN	VL	10.59	0.00572	PASS
				VN	5.81	0.00314	PASS
				VH	8.49	0.00459	PASS
		MCH	TN	VL	12.27	0.00653	PASS
				VN	5.62	0.00299	PASS
				VH			

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
		HCH	TN	VH	7.55	0.00402	PASS
				VL	5.29	0.00277	PASS
				VN	-5.52	-0.00289	PASS
				VH	-3.75	-0.00196	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	-5.36	-0.0065	PASS
				-20	-2.00	-0.00243	PASS
				-10	-0.26	-0.00032	PASS
				0	-8.46	-0.01026	PASS
				10	-0.52	-0.00063	PASS
				20	-1.55	-0.00188	PASS
				30	-1.16	-0.00141	PASS
				40	-6.33	-0.00768	PASS
				50	-1.36	-0.00165	PASS
		MCH	VN	-30	-0.65	-0.00078	PASS
				-20	-6.26	-0.00748	PASS
				-10	-10.91	-0.01304	PASS
				0	-0.13	-0.00016	PASS
				10	-5.36	-0.00641	PASS
				20	1.29	0.00154	PASS
				30	1.61	0.00192	PASS
				40	-0.90	-0.00108	PASS
				50	-4.84	-0.00579	PASS
		HCH	VN	-30	-1.94	-0.00229	PASS
				-20	1.42	0.00167	PASS
				-10	-3.29	-0.00388	PASS
				0	-3.87	-0.00456	PASS
				10	-0.19	-0.00022	PASS
				20	-5.42	-0.00639	PASS
				30	-4.07	-0.0048	PASS
				40	-2.52	-0.00297	PASS
				50	-0.52	-0.00061	PASS
	GSM/TM2	LCH	VN	-30	3.42	0.00415	PASS
				-20	-0.52	-0.00063	PASS
				-10	4.20	0.0051	PASS
				0	4.84	0.00587	PASS

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				10	2.32	0.00281	PASS
				20	2.16	0.00262	PASS
				30	1.13	0.00137	PASS
				40	2.39	0.0029	PASS
				50	1.87	0.00227	PASS
		MCH	VN	-30	3.49	0.00417	PASS
				-20	10.17	0.01216	PASS
				-10	1.84	0.0022	PASS
				0	0.87	0.00104	PASS
				10	6.36	0.0076	PASS
				20	4.16	0.00497	PASS
				30	5.91	0.00706	PASS
				40	4.36	0.00521	PASS
				50	4.88	0.00583	PASS
		HCH	VN	-30	5.36	0.00631	PASS
				-20	0.45	0.00053	PASS
				-10	1.29	0.00152	PASS
				0	11.85	0.01396	PASS
				10	2.94	0.00346	PASS
				20	6.07	0.00715	PASS
				30	2.87	0.00338	PASS
				40	8.04	0.00947	PASS
				50	3.36	0.00396	PASS
GSM1900	GSM/TM1	LCH	VN	-30	5.42	0.00293	PASS
				-20	-0.19	-0.0001	PASS
				-10	0.19	0.0001	PASS
				0	-1.49	-0.00081	PASS
				10	8.07	0.00436	PASS
				20	-4.13	-0.00223	PASS
				30	-2.20	-0.00119	PASS
				40	-3.03	-0.00164	PASS
				50	8.72	0.00471	PASS
		MCH	VN	-30	3.42	0.00182	PASS
				-20	5.55	0.00295	PASS
				-10	8.65	0.0046	PASS
				0	4.00	0.00213	PASS
				10	-1.23	-0.00065	PASS
				20	5.04	0.00268	PASS
				30	7.04	0.00374	PASS
				40	1.29	0.00069	PASS

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
		HCH	VN	50	5.62	0.00299	PASS
				-30	-3.36	-0.00176	PASS
				-20	-5.62	-0.00294	PASS
				-10	-2.84	-0.00149	PASS
				0	4.52	0.00237	PASS
				10	-3.62	-0.0019	PASS
				20	-3.87	-0.00203	PASS
				30	-2.26	-0.00118	PASS
				40	6.13	0.00321	PASS
				50	3.42	0.00179	PASS
	GSM/TM2	LCH	VN	-30	2.26	0.00122	PASS
				-20	11.40	0.00616	PASS
				-10	-2.39	-0.00129	PASS
				0	1.29	0.0007	PASS
				10	16.50	0.00892	PASS
				20	8.14	0.0044	PASS
				30	3.81	0.00206	PASS
				40	1.42	0.00077	PASS
				50	4.26	0.0023	PASS
		MCH	VN	-30	1.84	0.00098	PASS
				-20	4.81	0.00256	PASS
				-10	-1.61	-0.00086	PASS
				0	5.94	0.00316	PASS
				10	7.62	0.00405	PASS
				20	4.88	0.0026	PASS
				30	7.14	0.0038	PASS
				40	0.13	0.00007	PASS
				50	5.26	0.0028	PASS
		HCH	VN	-30	3.49	0.00183	PASS
				-20	4.81	0.00252	PASS
				-10	6.17	0.00323	PASS
				0	3.52	0.00184	PASS
				10	3.42	0.00179	PASS
				20	1.07	0.00056	PASS
				30	3.49	0.00183	PASS
				40	5.49	0.00287	PASS
				50	2.55	0.00134	PASS

END