



Appendix for test report

1Appendix_A: Effective (Isotropic) Radiated Power Output Data

Part I - Test Results

Test Band	Test Mode	Test Channel	Measured[dBm]	ERP/EIRP [dBm]	Limit [dBm]	Verdict
GSM850	GSM/TM1	LCH	32.04	27.29	38.5	PASS
		MCH	32.15	27.4	38.5	PASS
		HCH	32.16	27.41	38.5	PASS
	GSM/TM2	LCH	26.65	21.9	38.5	PASS
		MCH	26.53	21.78	38.5	PASS
		HCH	26.82	22.07	38.5	PASS
GSM1900	GSM/TM1	LCH	30.02	28.82	33	PASS
		MCH	30.07	28.87	33	PASS
		HCH	30.13	28.93	33	PASS
	GSM/TM2	LCH	25.82	24.62	33	PASS
		MCH	25.94	24.74	33	PASS
		HCH	25.89	24.69	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:

$$\text{SET Span} = 1.5 \times \text{OBW}$$

$$\text{SET RBW} = 1\% \text{ of the OBW, not to exceed 1MHz}$$

$$\text{SET VBW} \geq 3 \times \text{RBW}$$

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	0.28	13	PASS
		MCH	0.24	13	PASS
		HCH	0.26	13	PASS
	GSM/TM2	LCH	3.01	13	PASS
		MCH	2.95	13	PASS
		HCH	2.88	13	PASS
GSM1900	GSM/TM1	LCH	0.28	13	PASS
		MCH	0.35	13	PASS
		HCH	0.33	13	PASS
	GSM/TM2	LCH	2.88	13	PASS
		MCH	2.96	13	PASS
		HCH	2.86	13	PASS

3Appendix_C: Modulation Characteristics

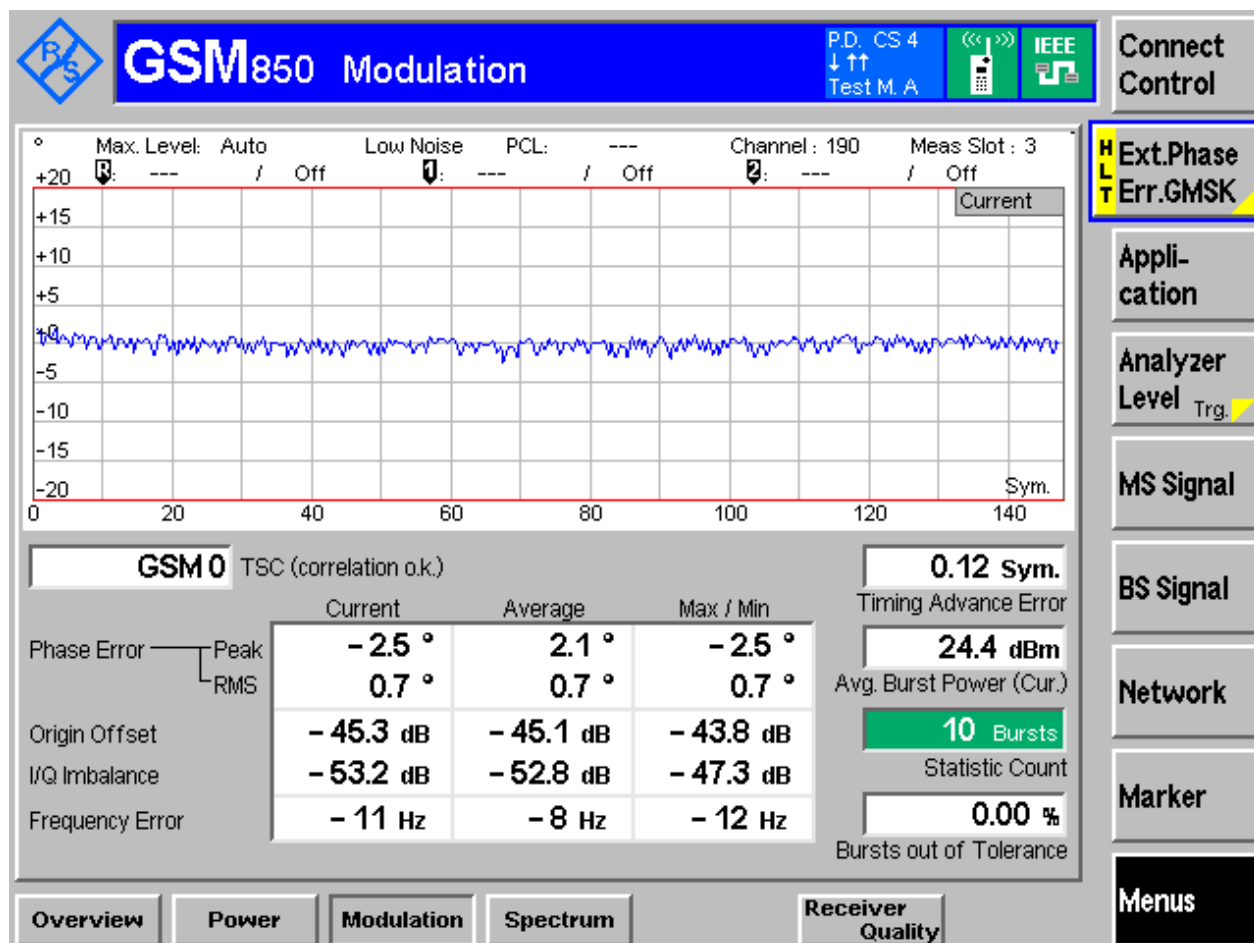
Part I - Test Plots

3.1 For GSM

3.1.1 Test Band = GSM850

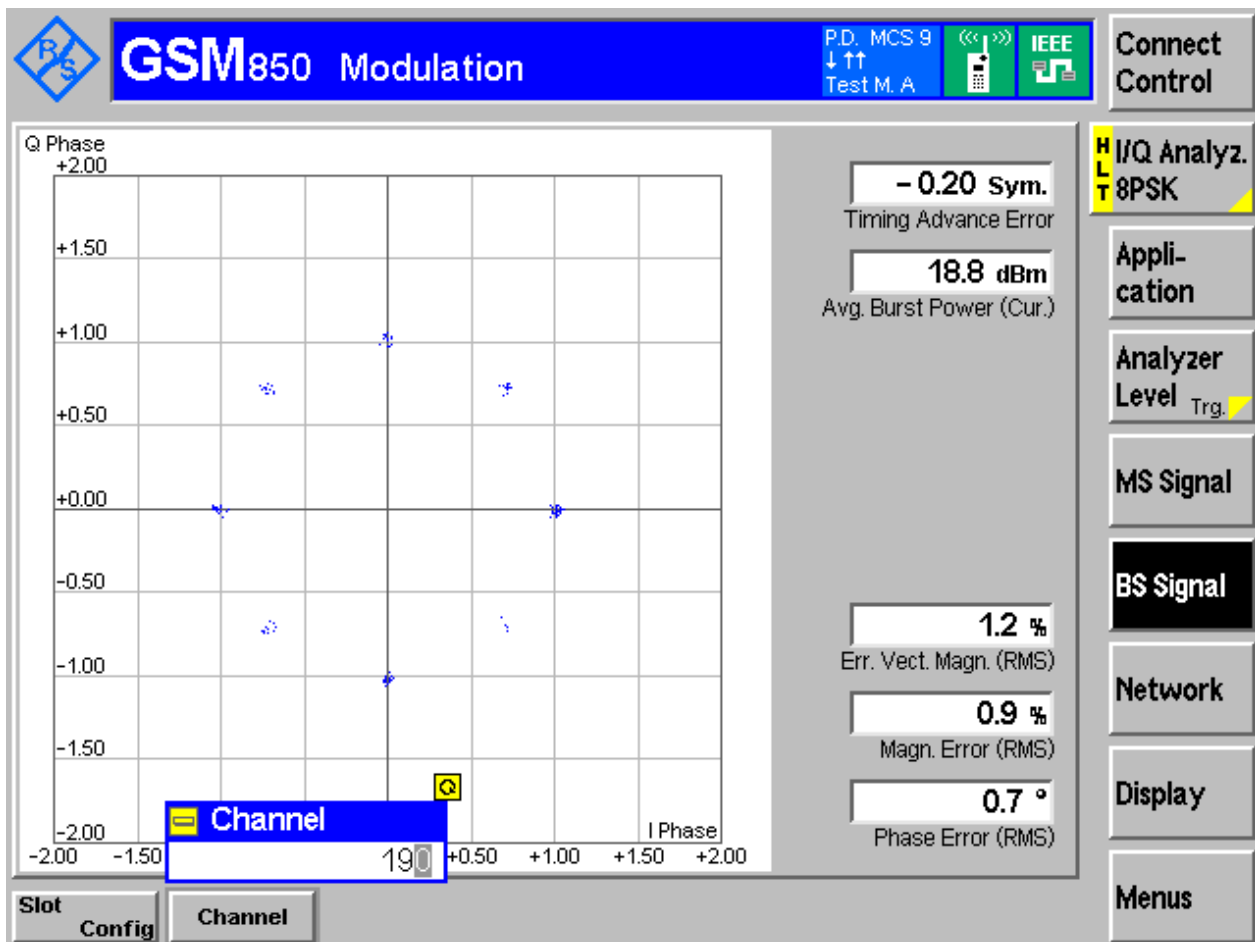
3.1.1.1 Test Mode = GSM/TM1

3.1.1.1.1 Test Channel = MCH



3.1.1.2 Test Mode = GSM/TM2

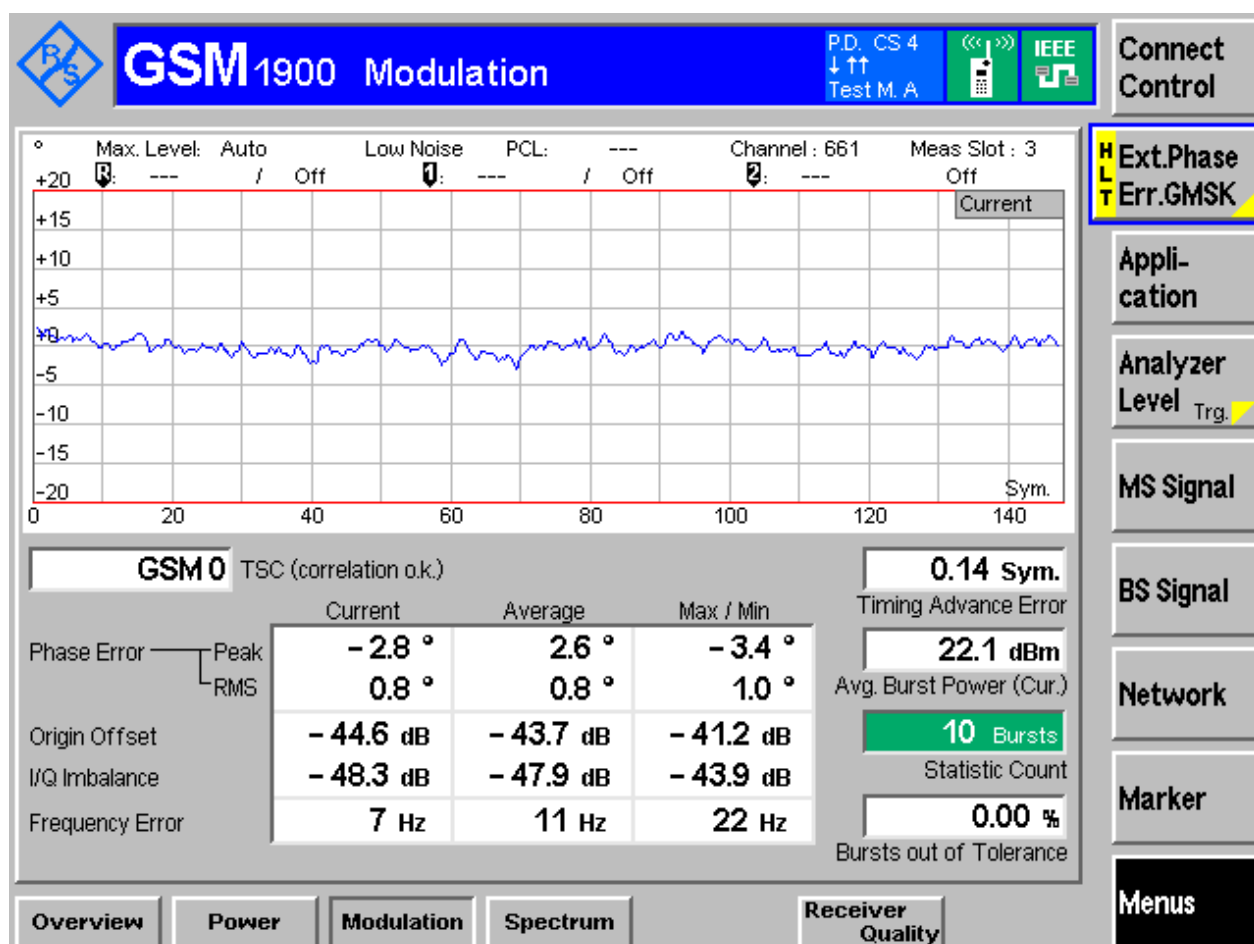
3.1.1.2.1 Test Channel = MCH



3.1.2 Test Band = GSM1900

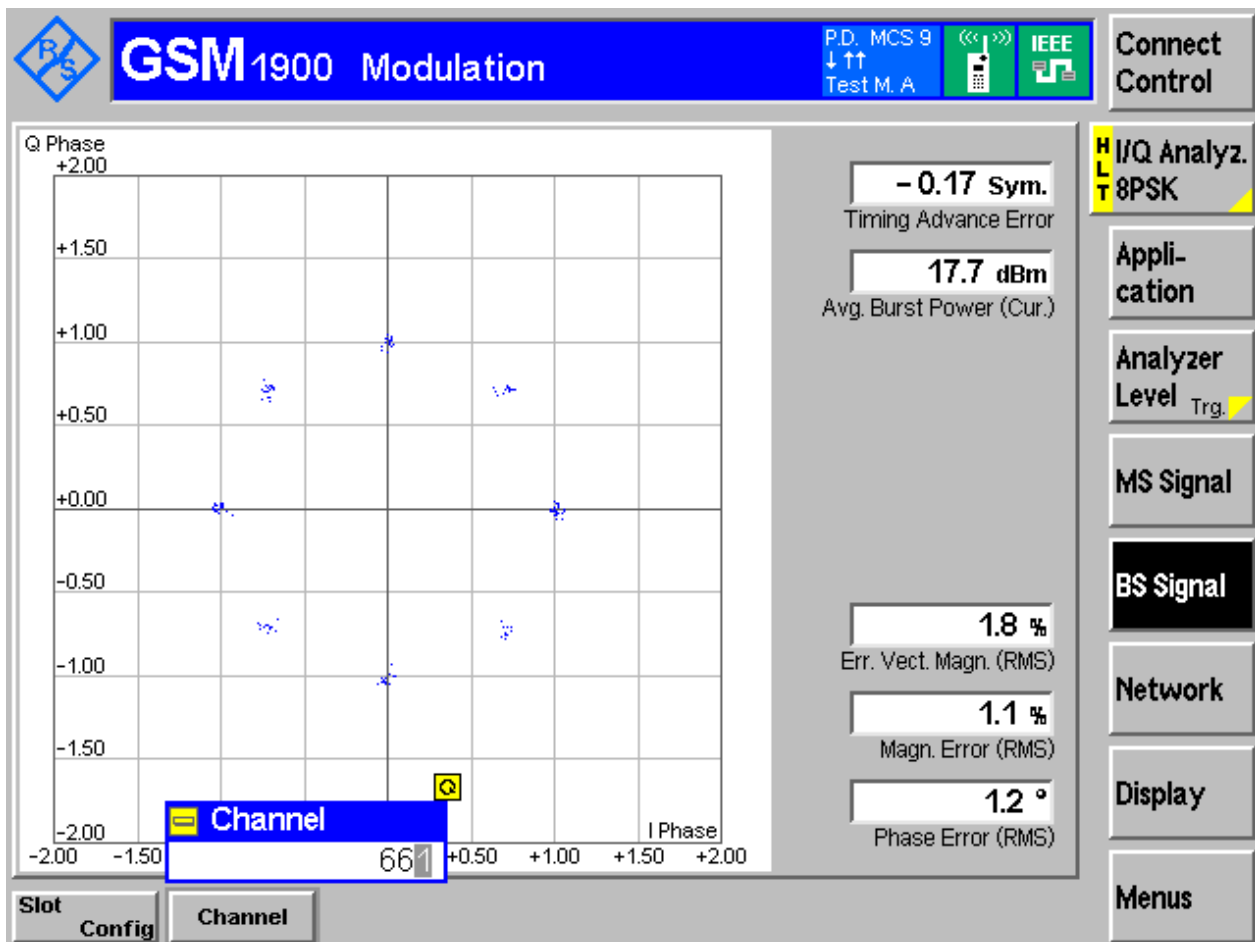
3.1.2.1 Test Mode = GSM/TM1

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	243.53	314.49	Pass
		MCH	244.13	314.03	Pass
		HCH	245.66	317.86	Pass
	GSM/TM2	LCH	242.86	306.07	Pass
		MCH	245.59	307.01	Pass
		HCH	245.21	310.22	Pass
GSM1900	GSM/TM1	LCH	246.05	320.43	Pass
		MCH	245.76	317.13	Pass
		HCH	241.56	320.32	Pass
	GSM/TM2	LCH	243.23	315.15	Pass
		MCH	246.65	307.75	Pass
		HCH	247.81	312.27	Pass

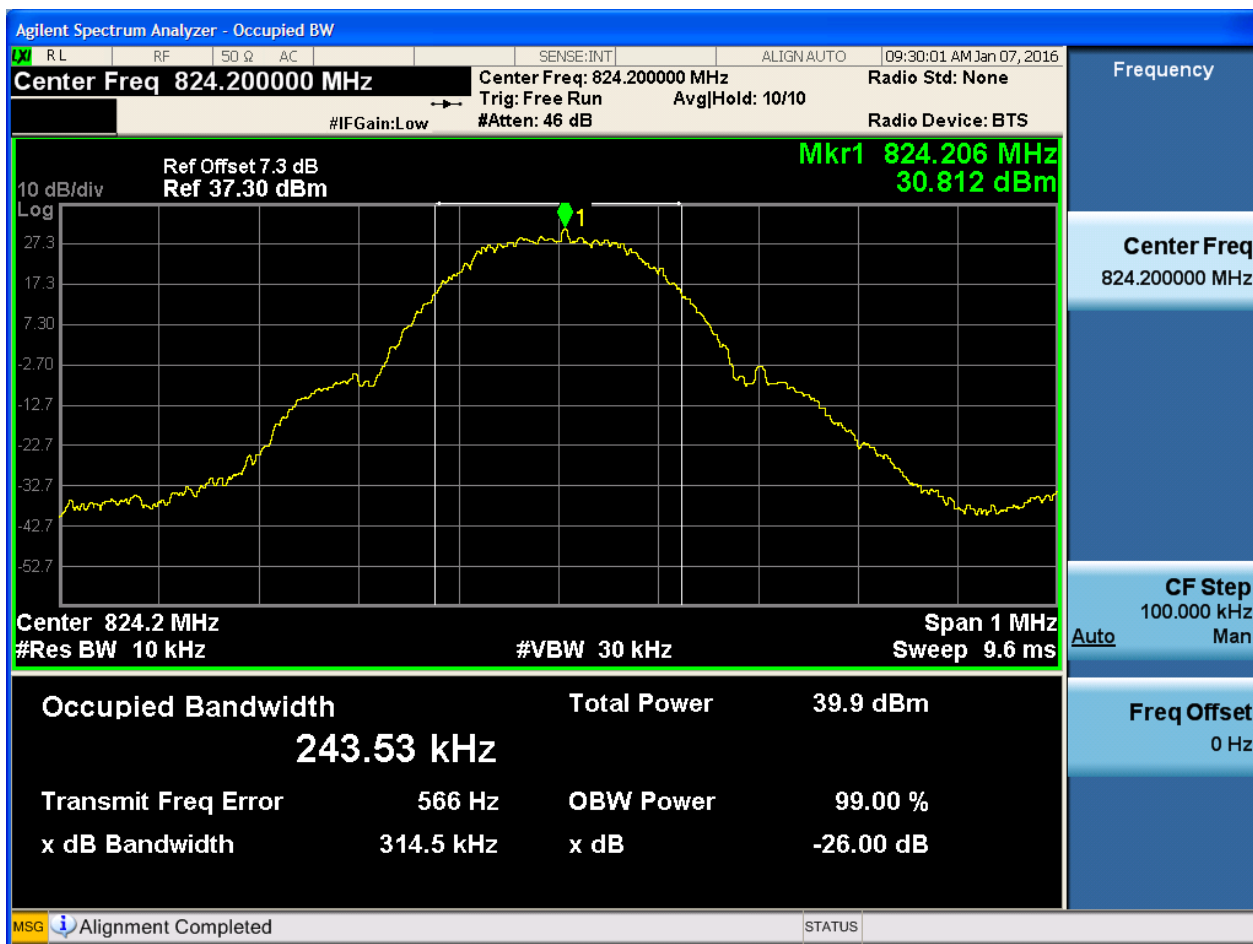
Part II - Test Plots

4.1 For GSM

4.1.1 Test Band = GSM850

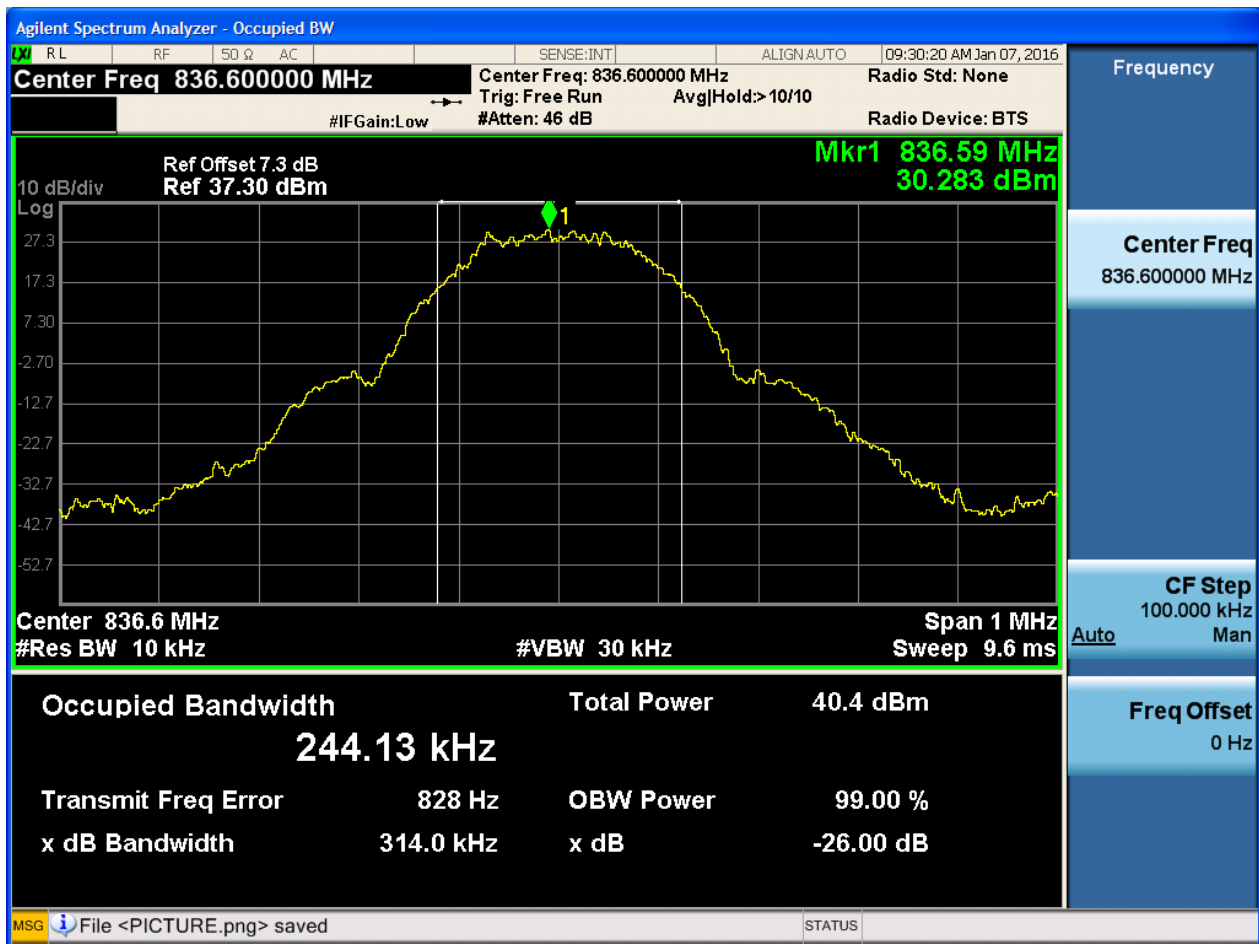
4.1.1.1 Test Mode = GSM/TM1

4.1.1.1.1 Test Channel = LCH



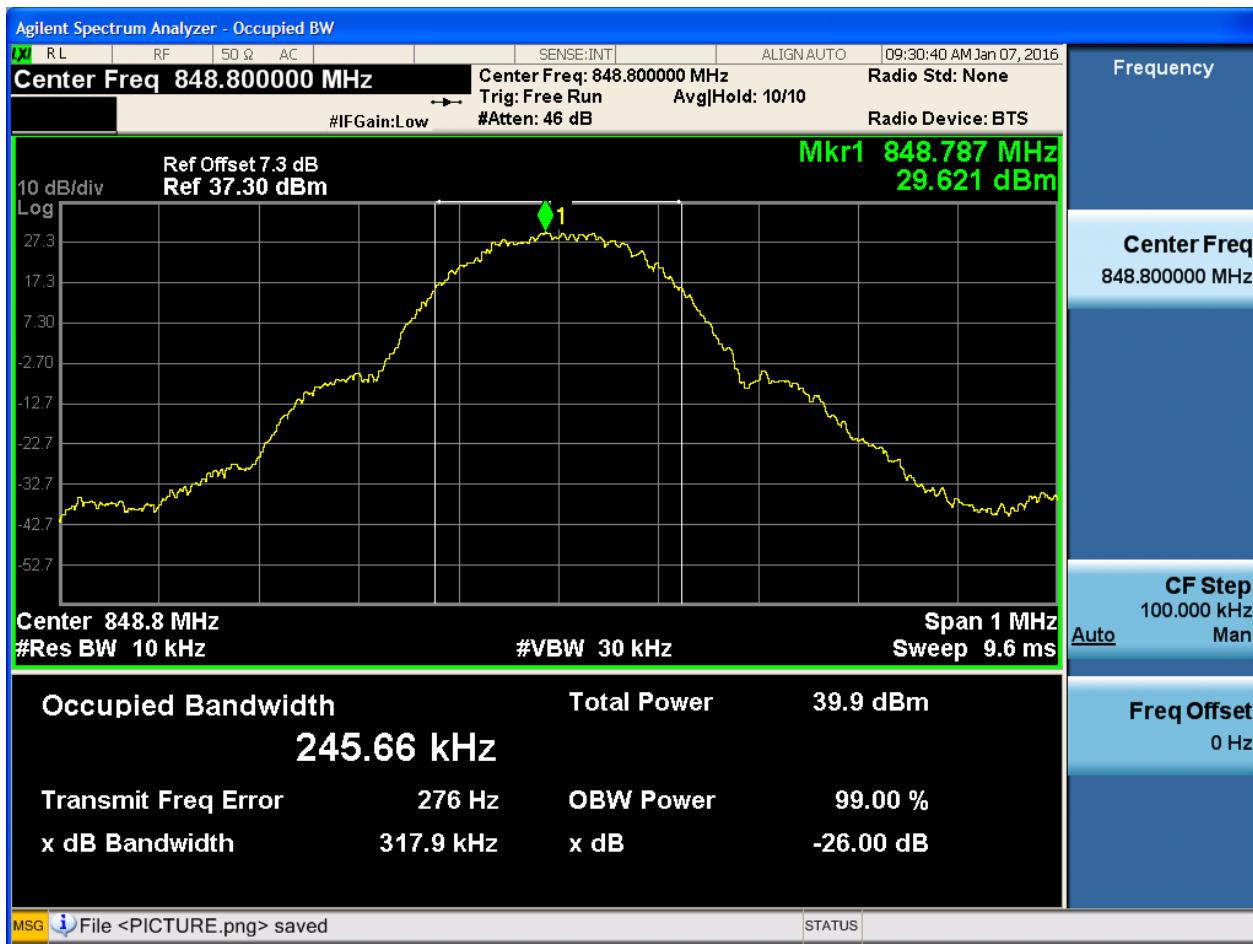


4.1.1.1.2 Test Channel = MCH





4.1.1.1.3 Test Channel = HCH





4.1.1.2 Test Mode = GSM/TM2

4.1.1.2.1 Test Channel = LCH



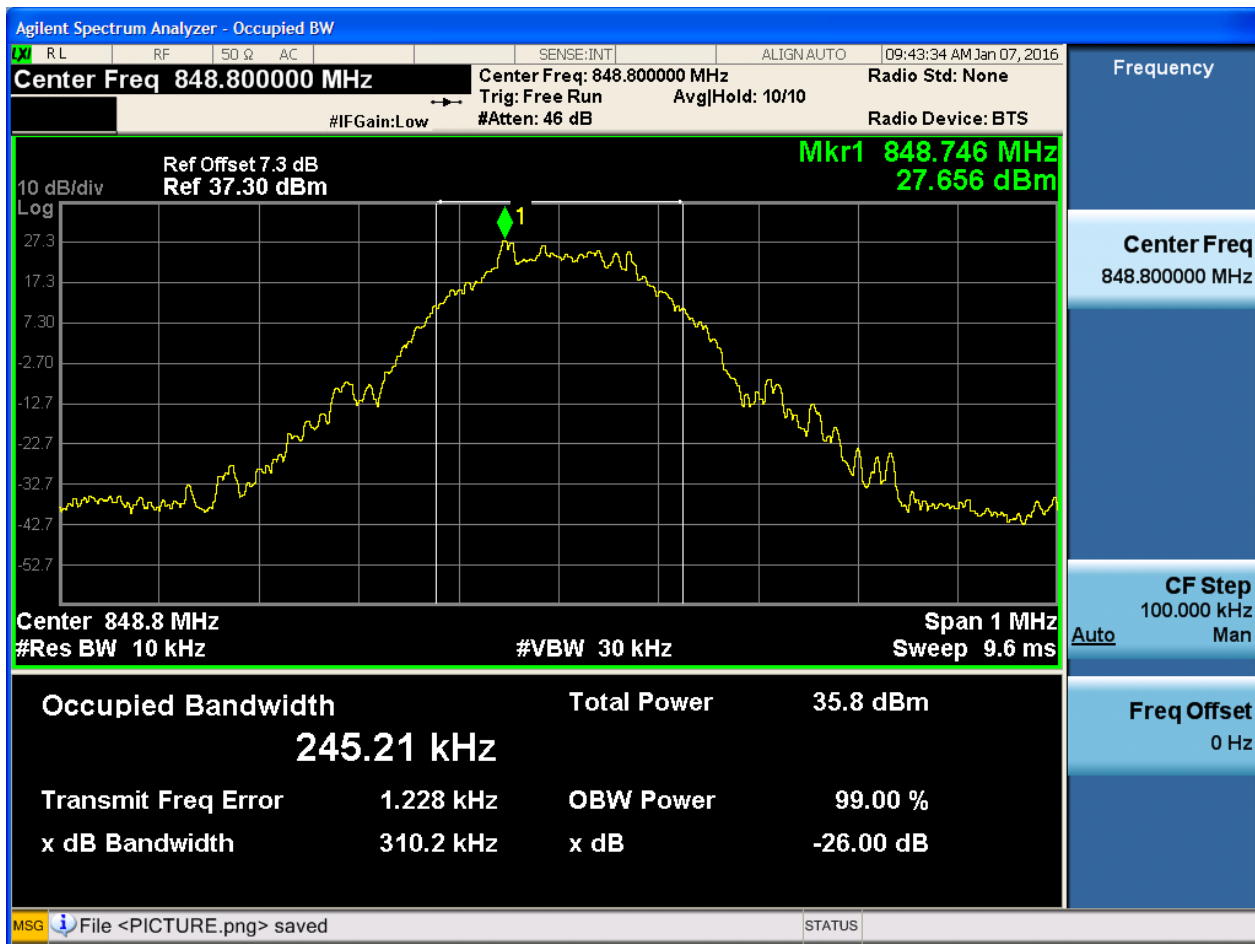


4.1.1.2.2 Test Channel = MCH





4.1.1.2.3 Test Channel = HCH

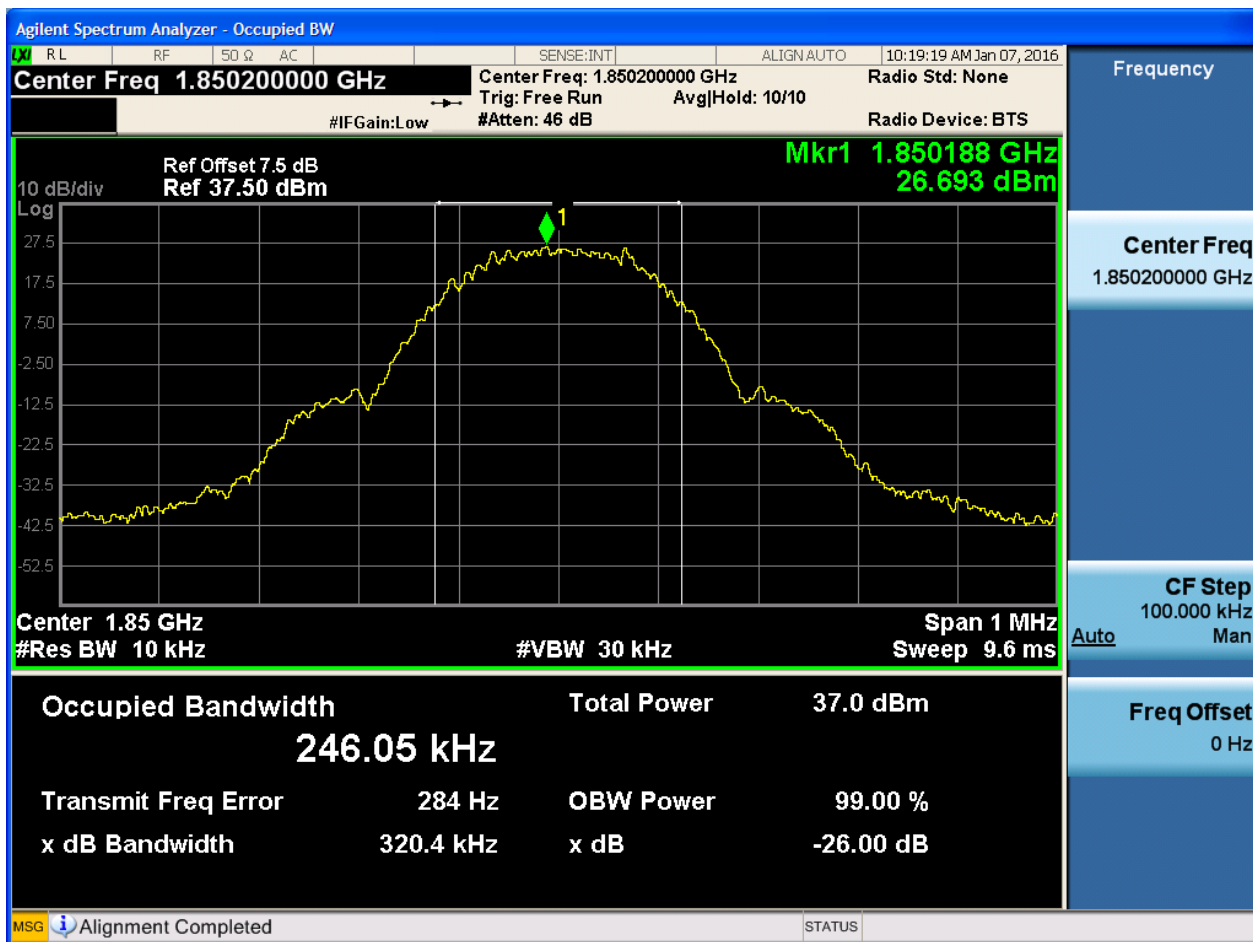




4.1.2 Test Band = GSM1900

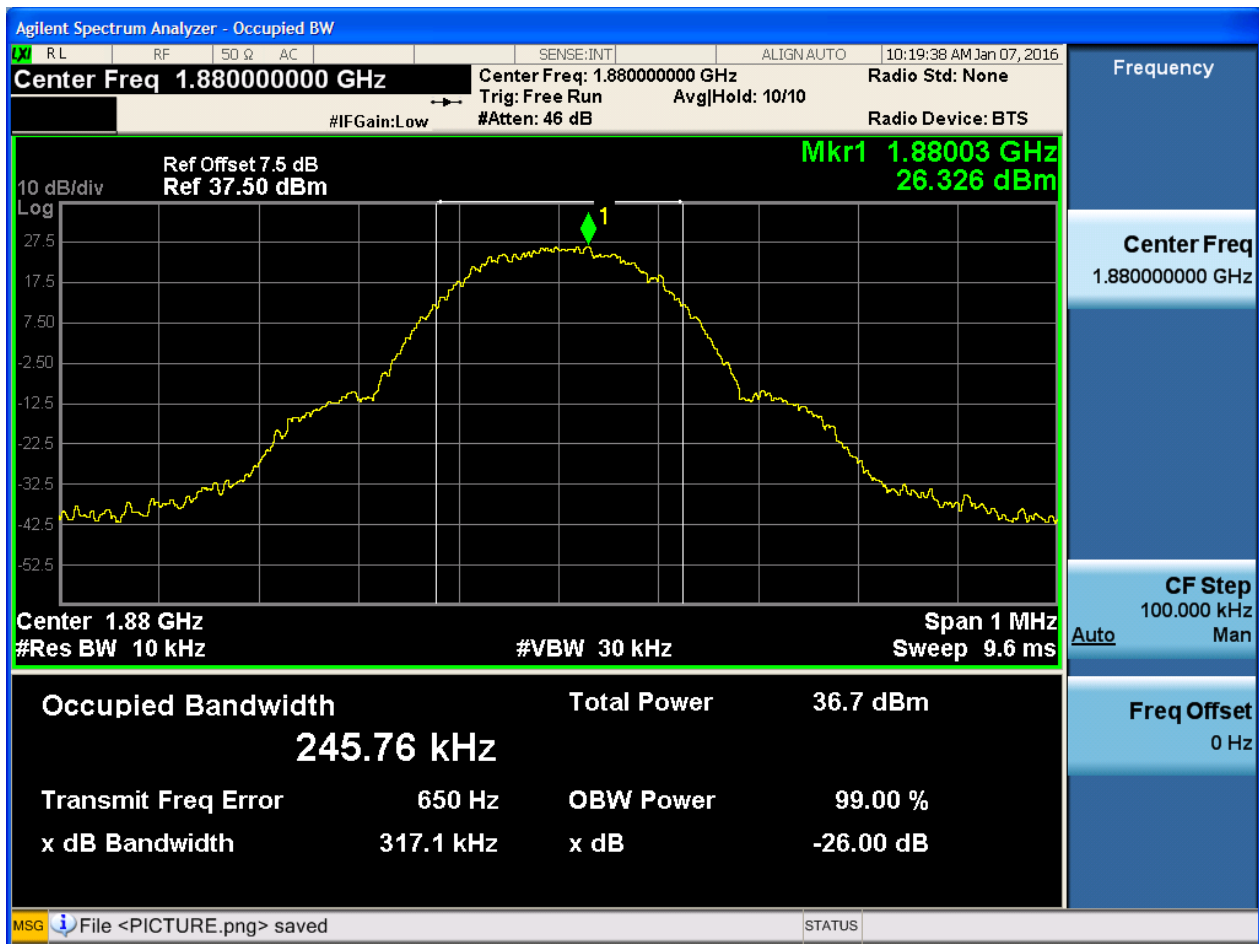
4.1.2.1 Test Mode = GSM/TM1

4.1.2.1.1 Test Channel = LCH



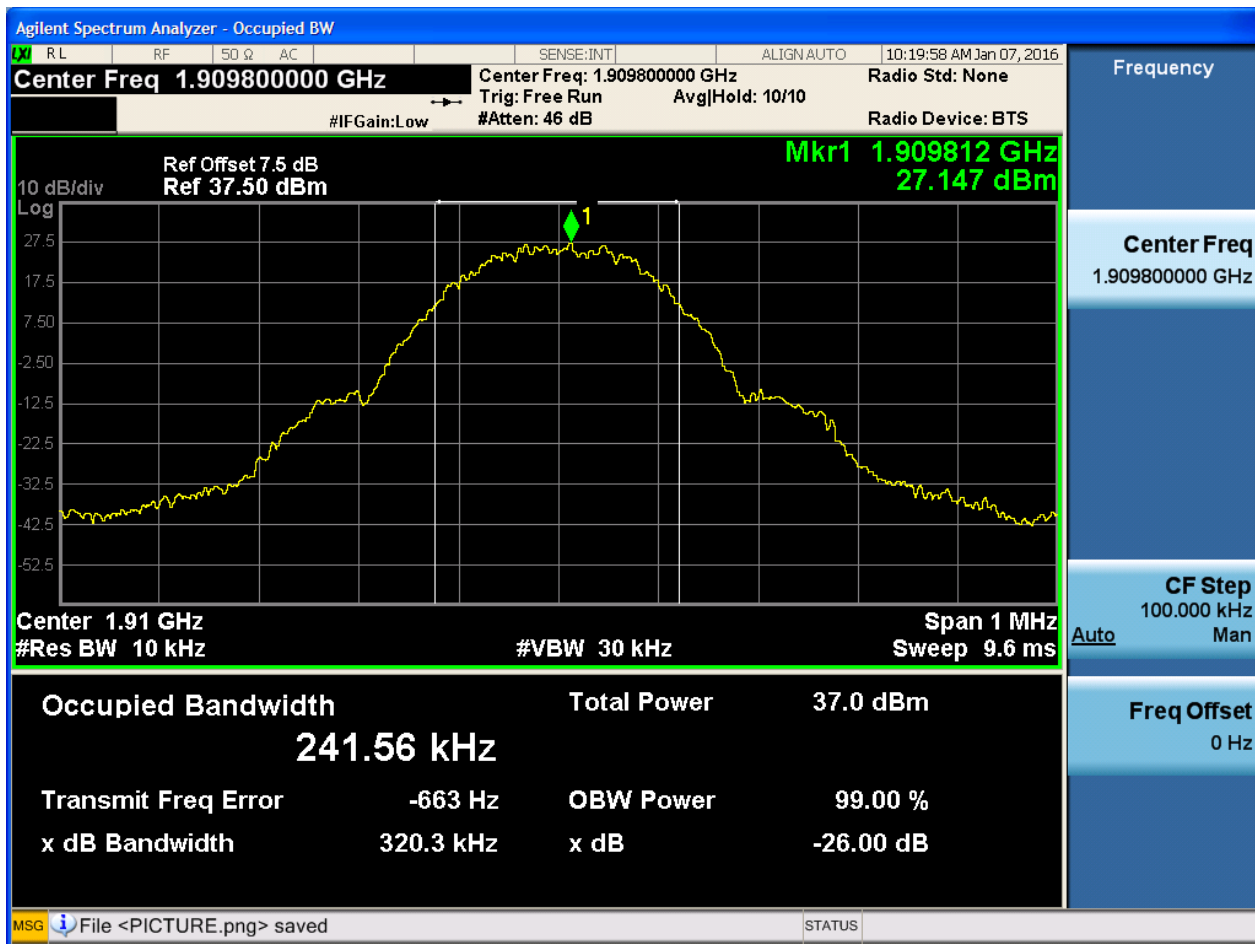


4.1.2.1.2 Test Channel = MCH





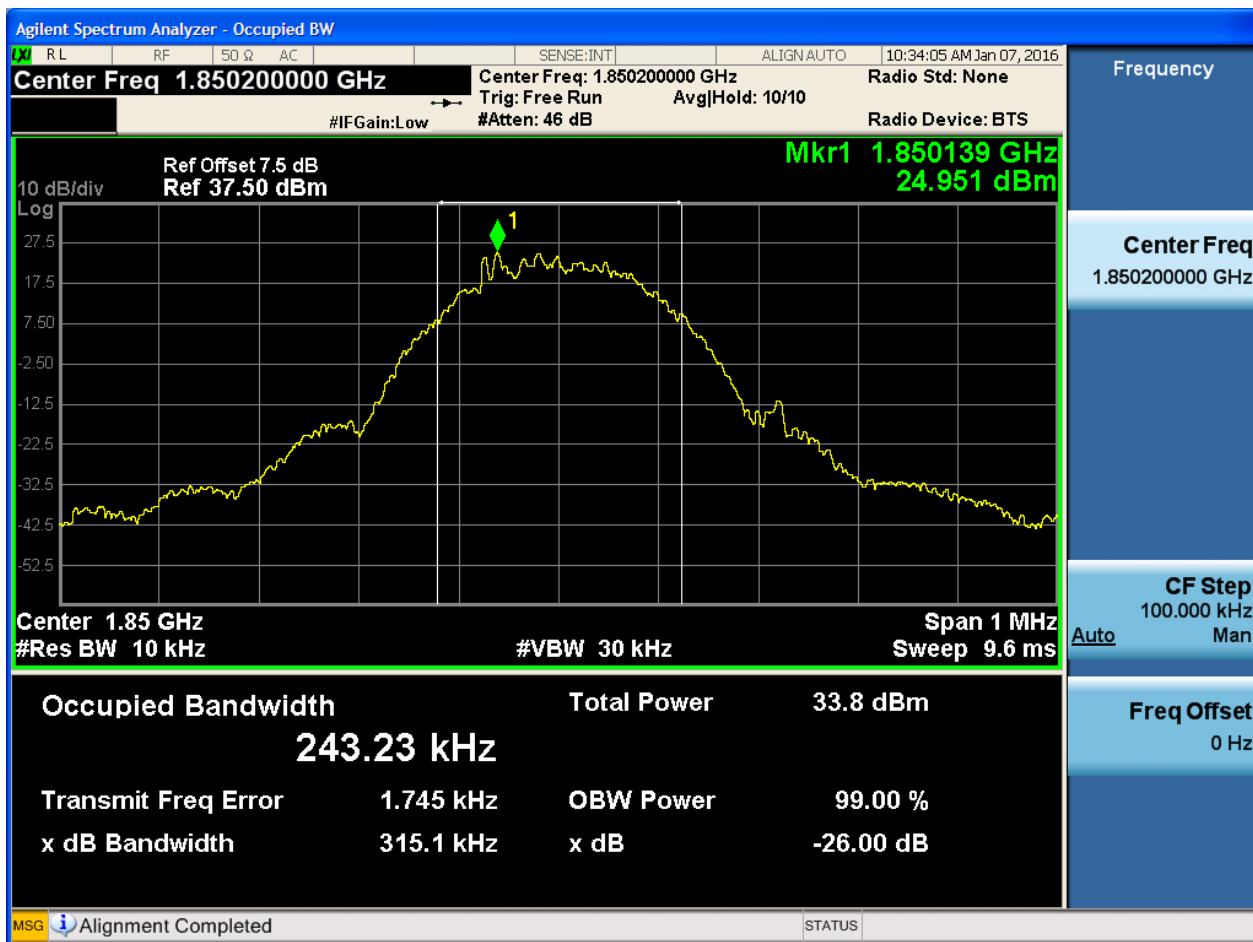
4.1.2.1.3 Test Channel = HCH





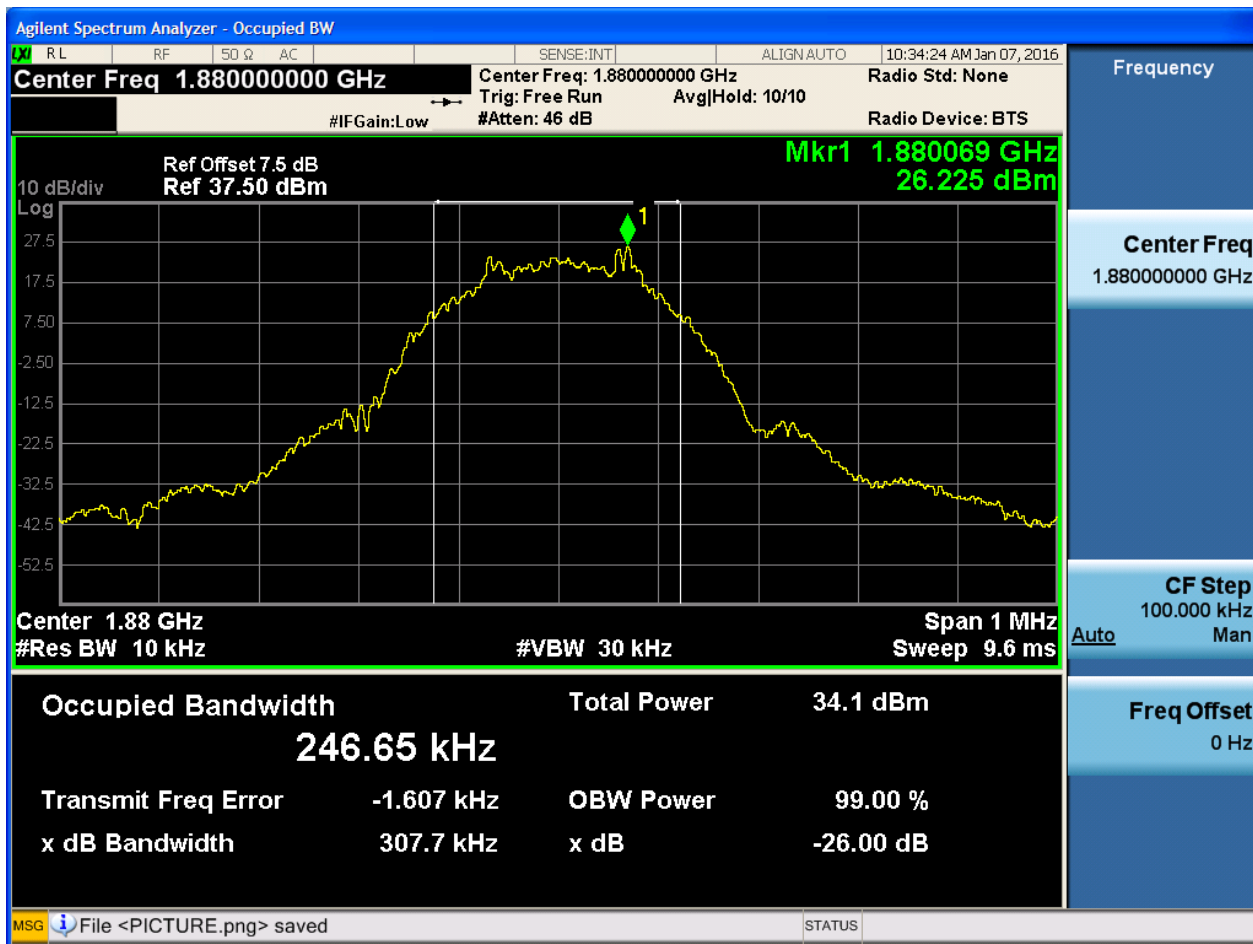
4.1.2.2 Test Mode = GSM/TM2

4.1.2.2.1 Test Channel = LCH



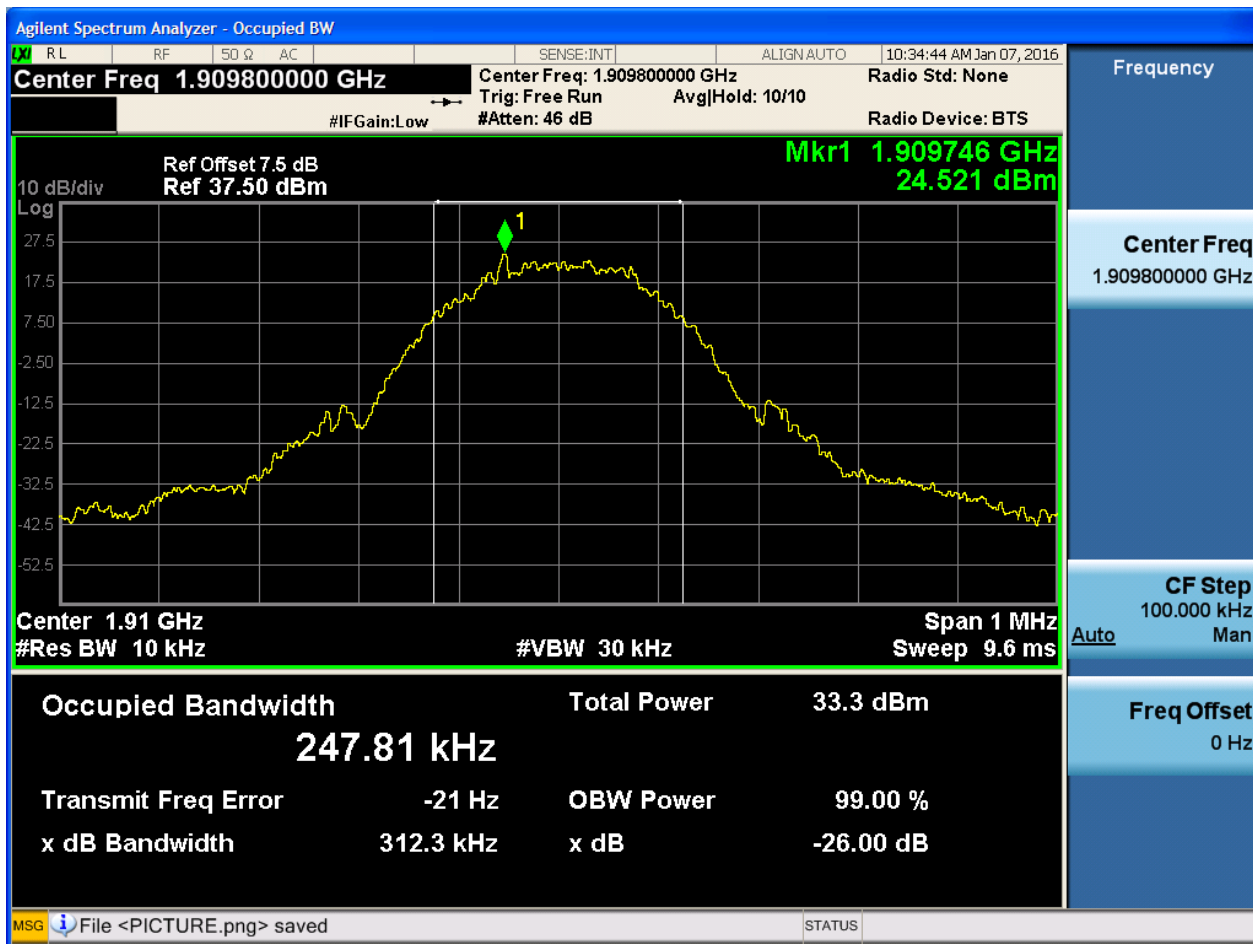


4.1.2.2.2 Test Channel = MCH





4.1.2.2.3 Test Channel = HCH





5Appendix_E: Band Edges Compliance

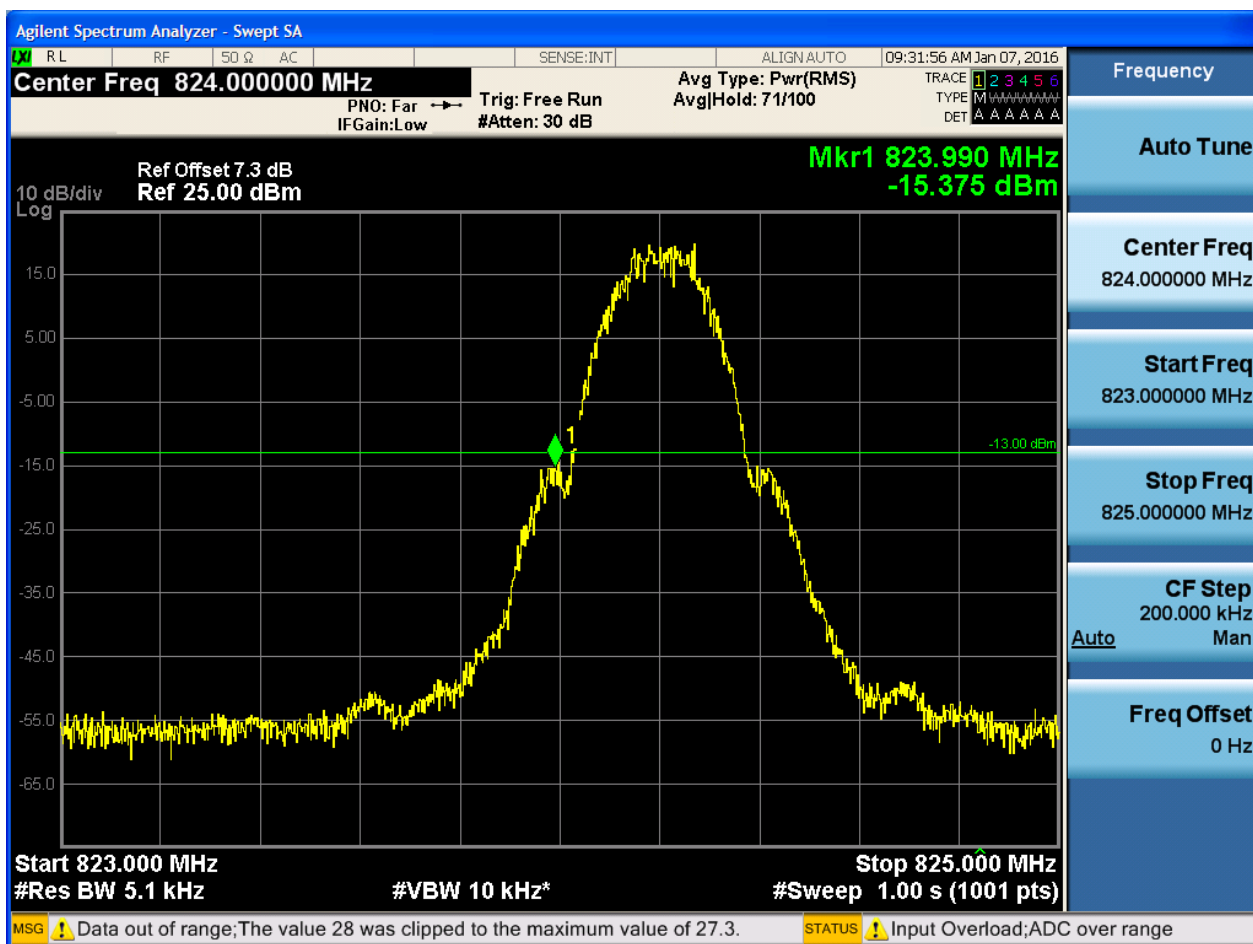
Part I - Test Plots

5.1 For GSM

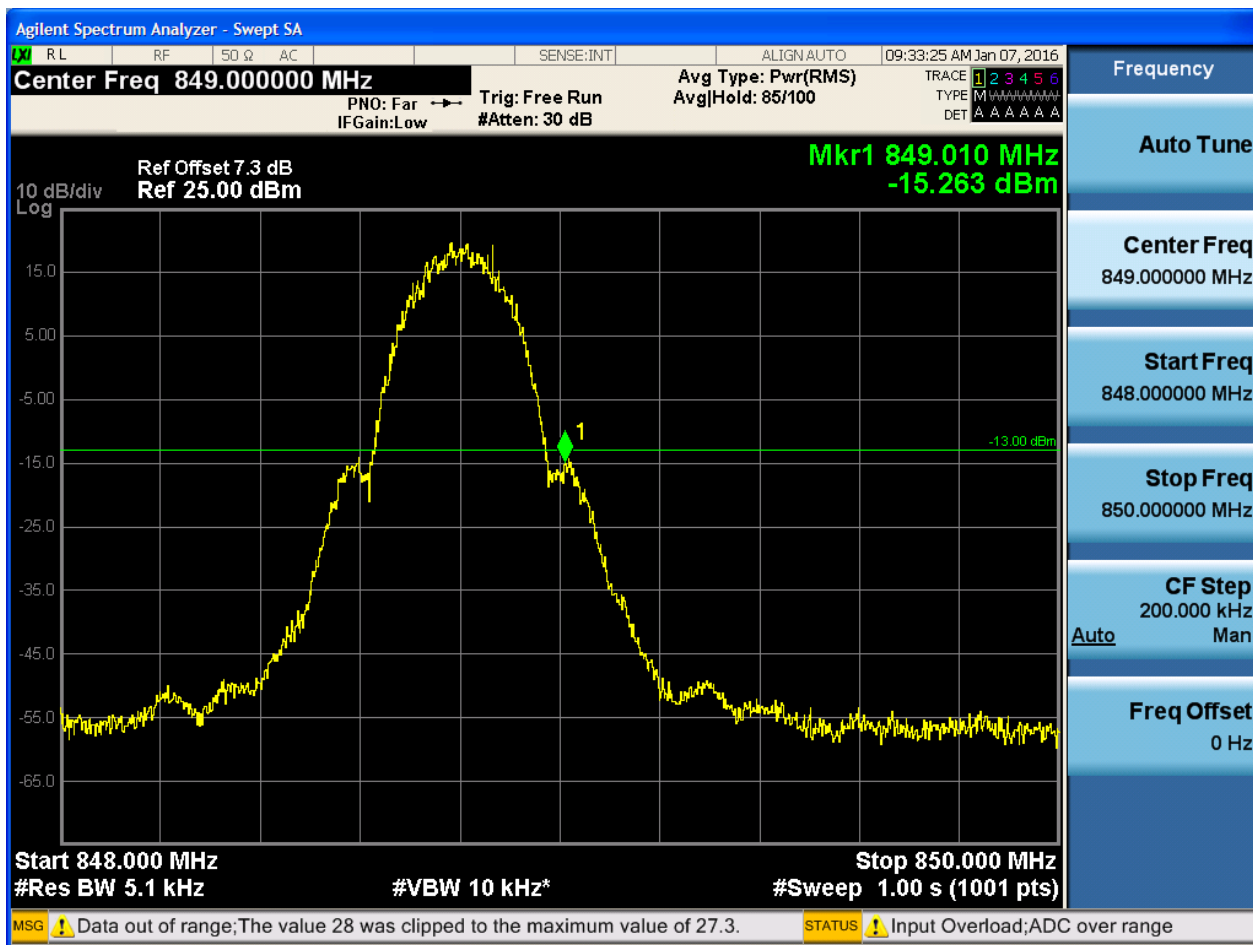
5.1.1 Test Band = GSM850

5.1.1.1 Test Mode = GSM/TM1

5.1.1.1.1 Test Channel = LCH

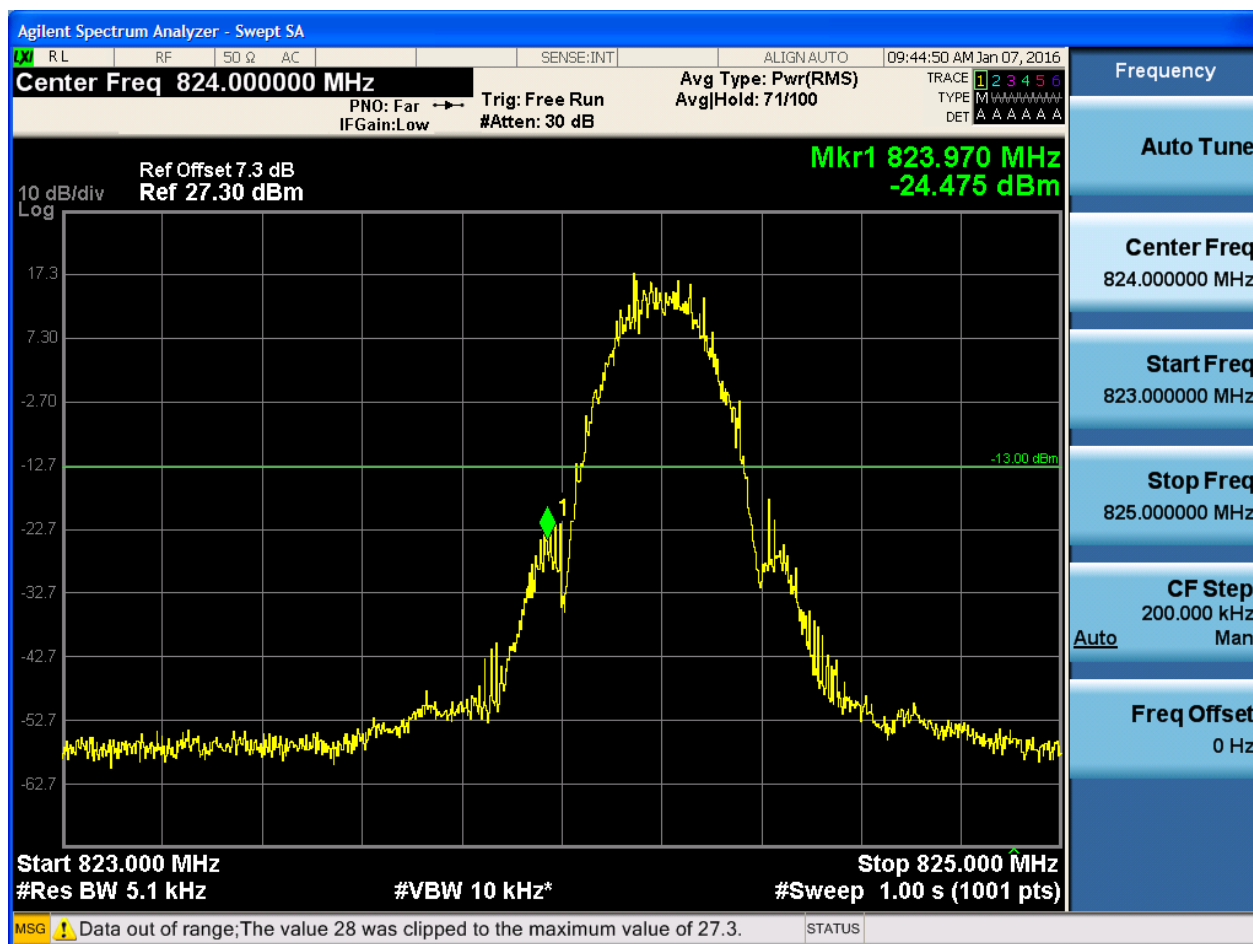


5.1.1.1.2 Test Channel = HCH

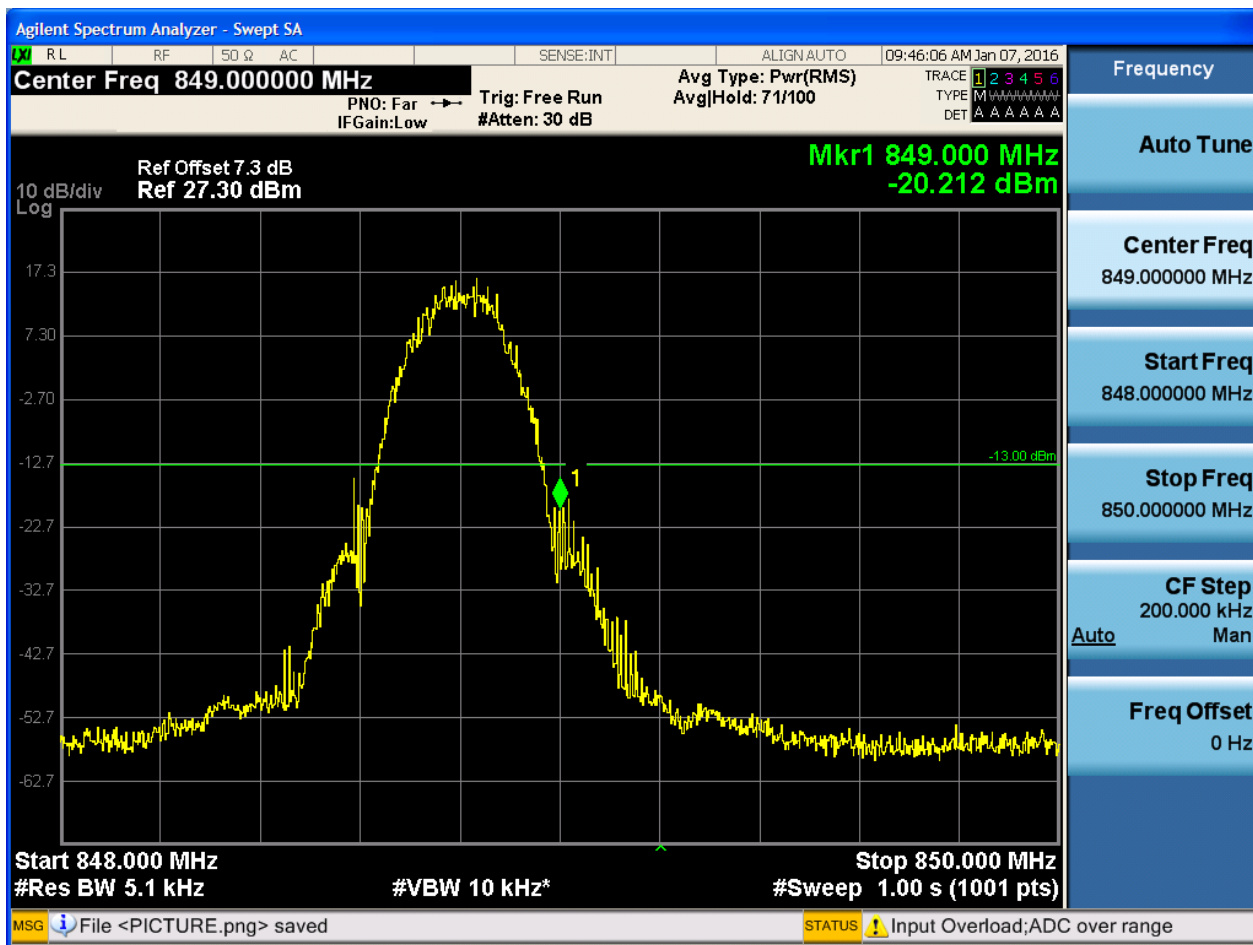




5.1.1.2.1 Test Channel = LCH



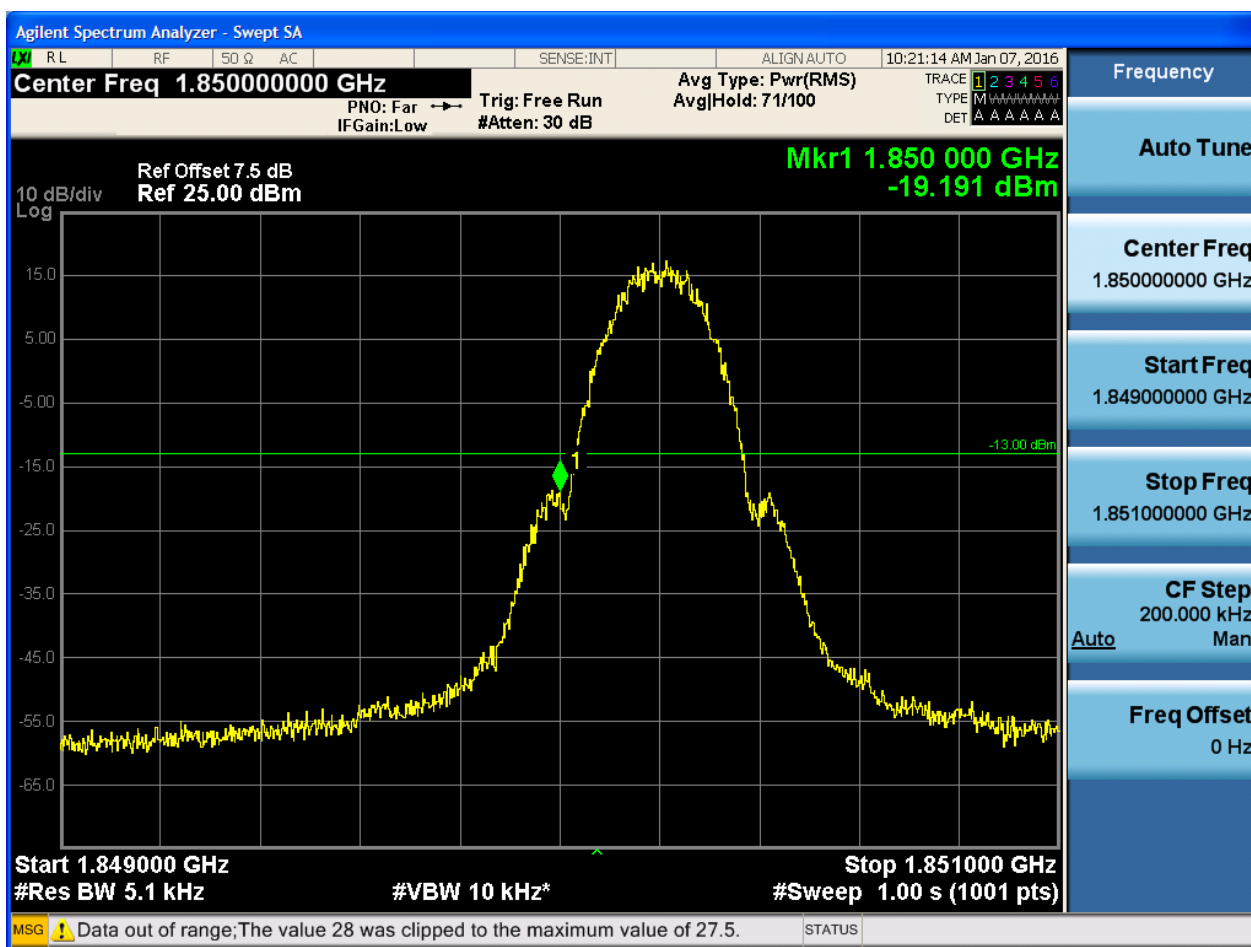
5.1.1.2.2 Test Channel = HCH



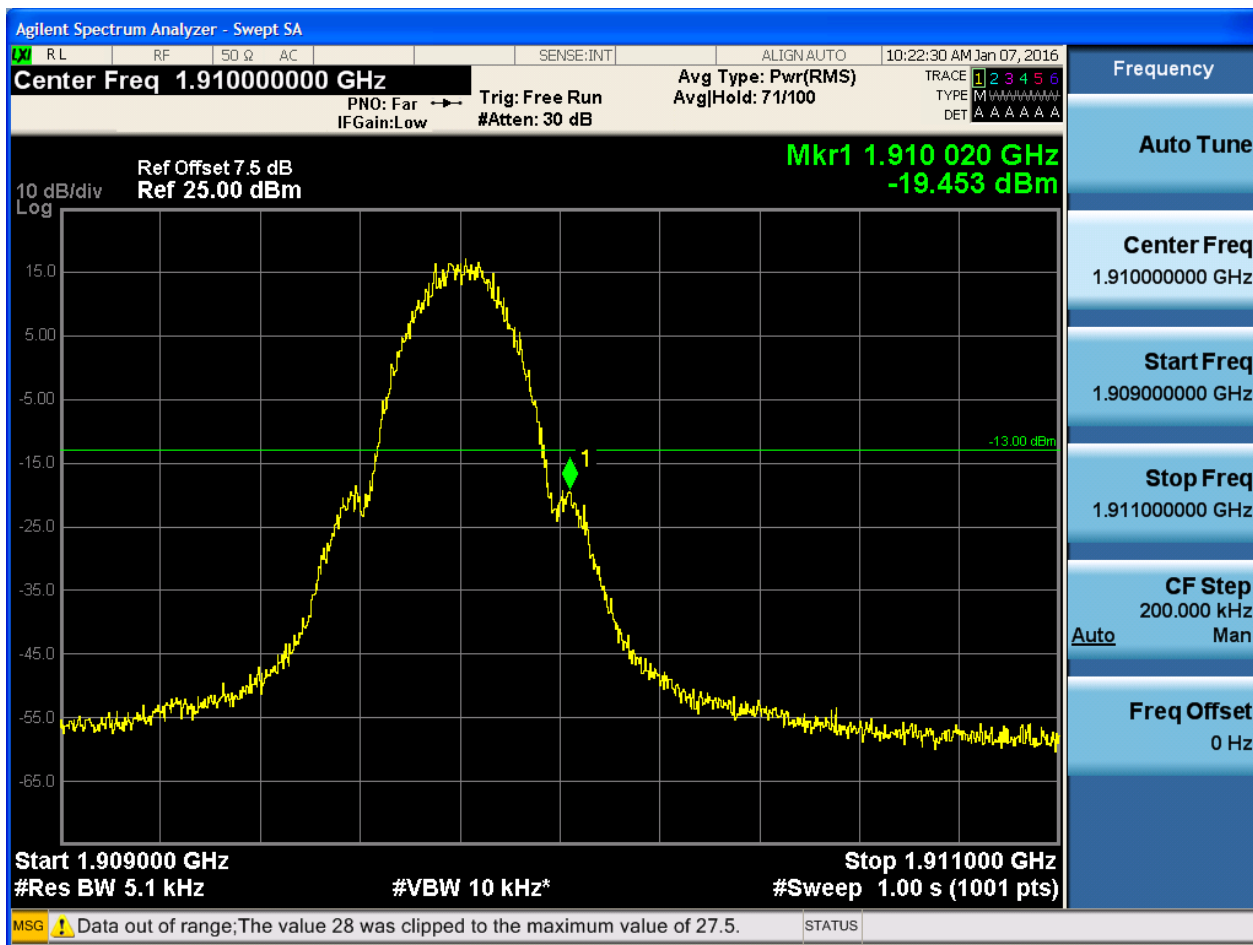
5.1.2 Test Band = GSM1900

5.1.2.1 Test Mode = GSM/TM1

5.1.2.1.1 Test Channel = LCH



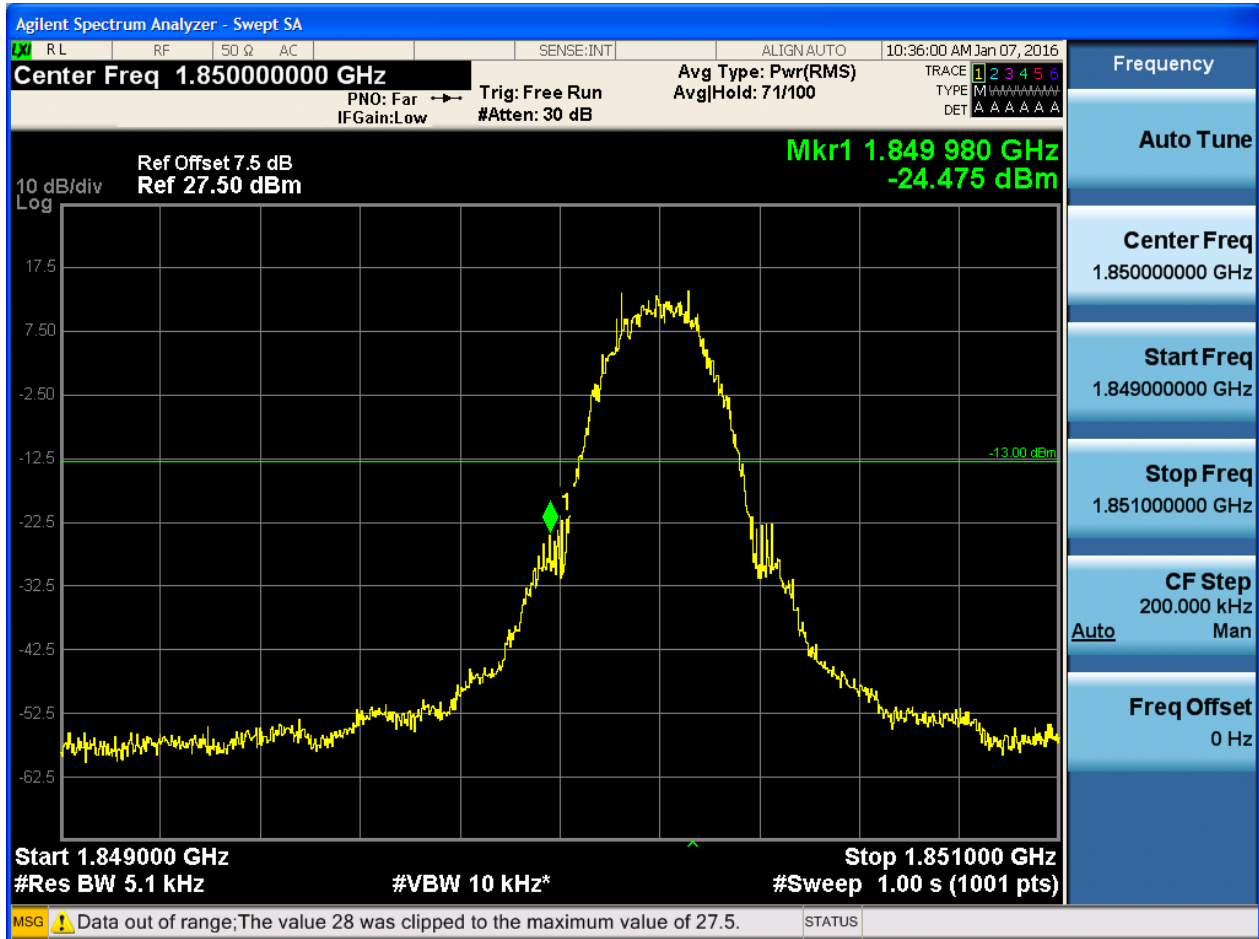
5.1.2.1.2 Test Channel = HCH



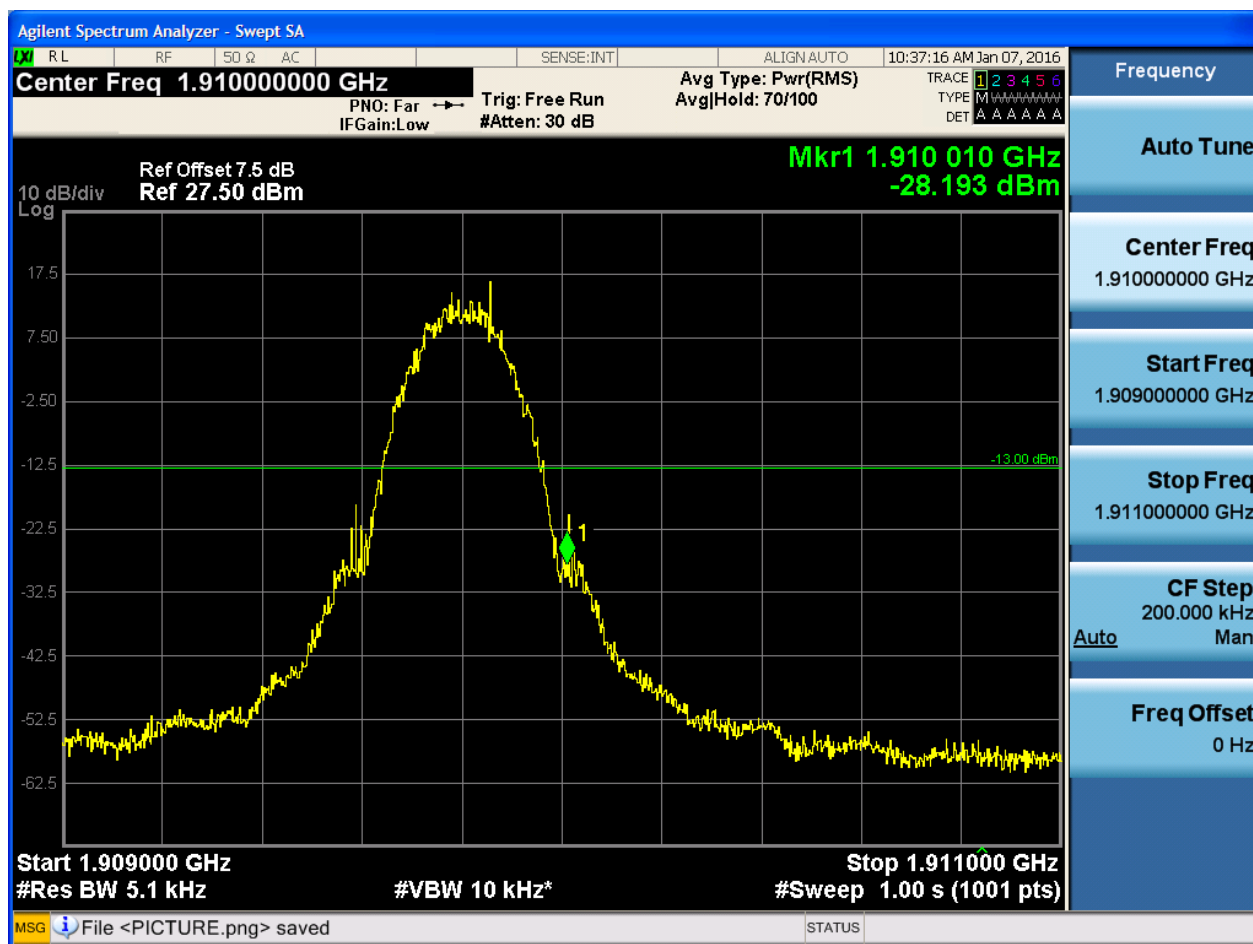


5.1.2.2 Test Mode = GSM/TM2

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.

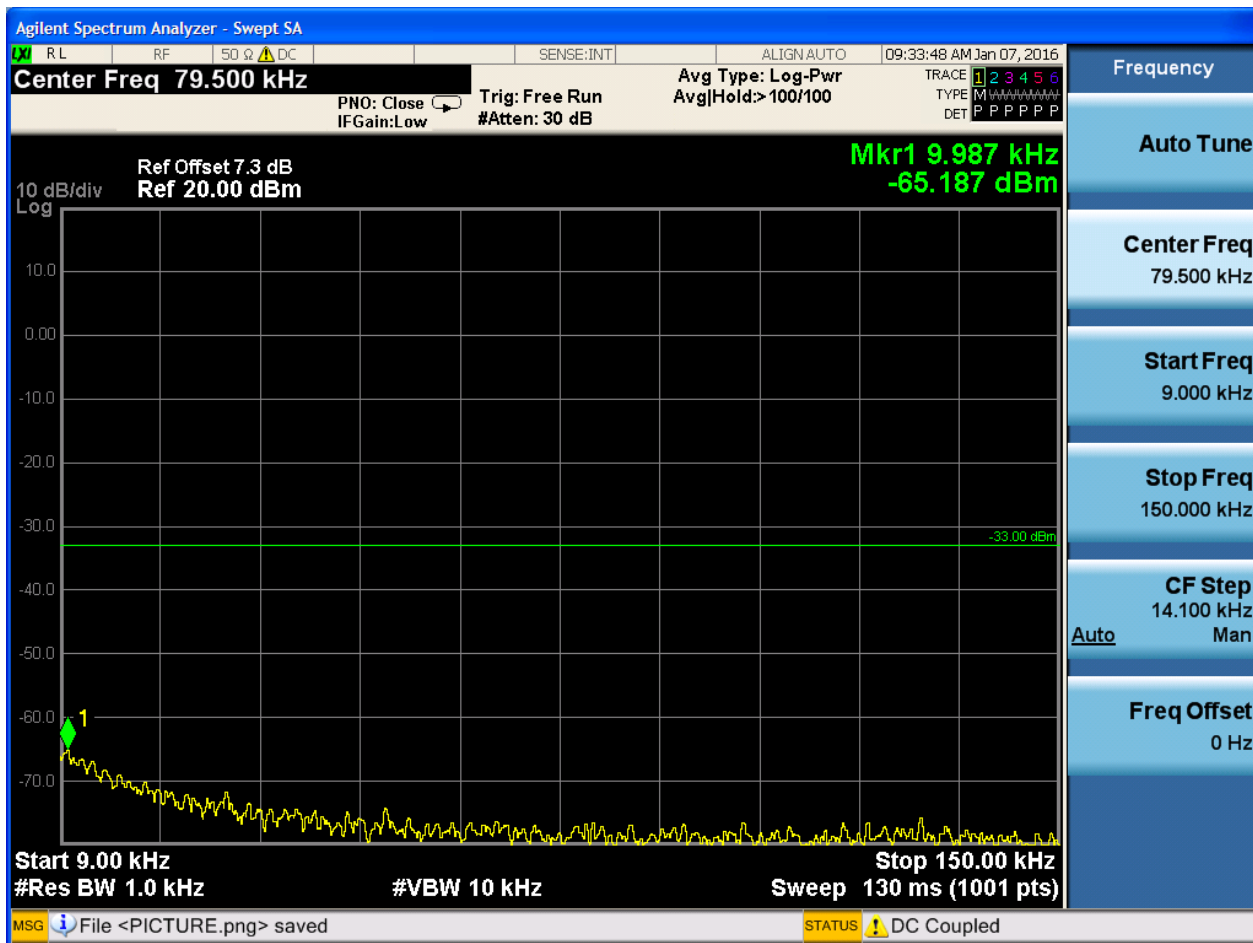
Part I - Test Plots

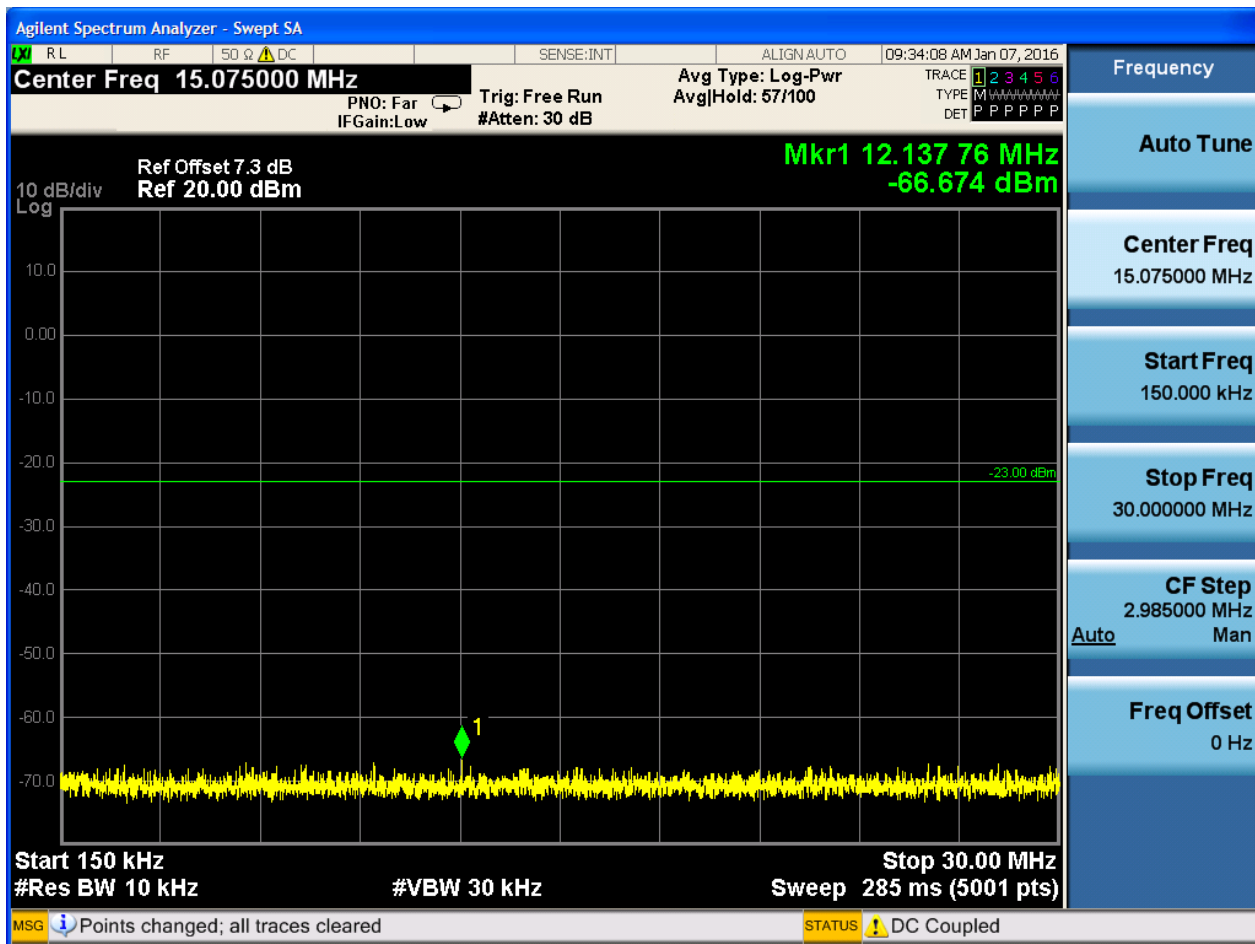
6.1 For GSM

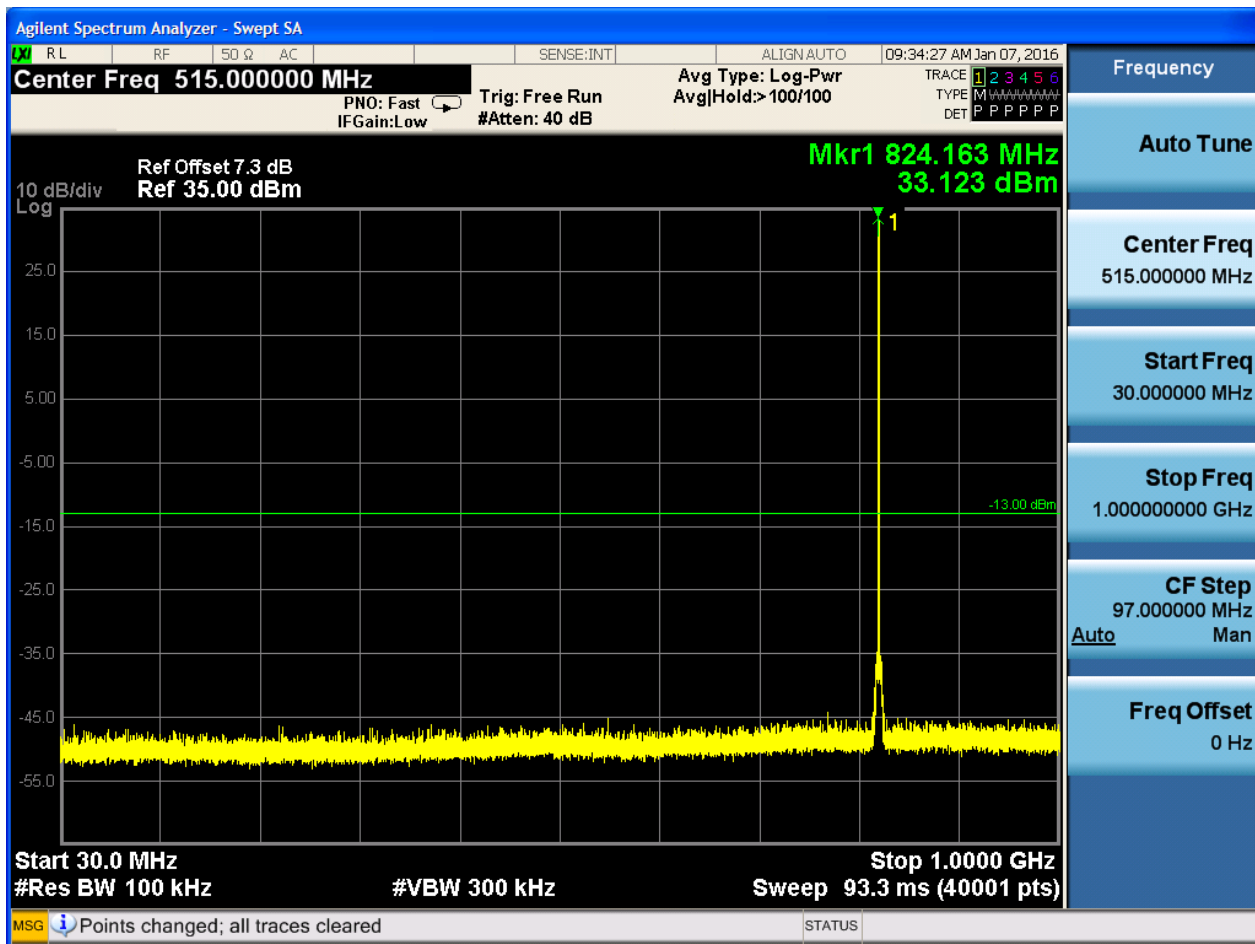
6.1.1 Test Band = GSM850

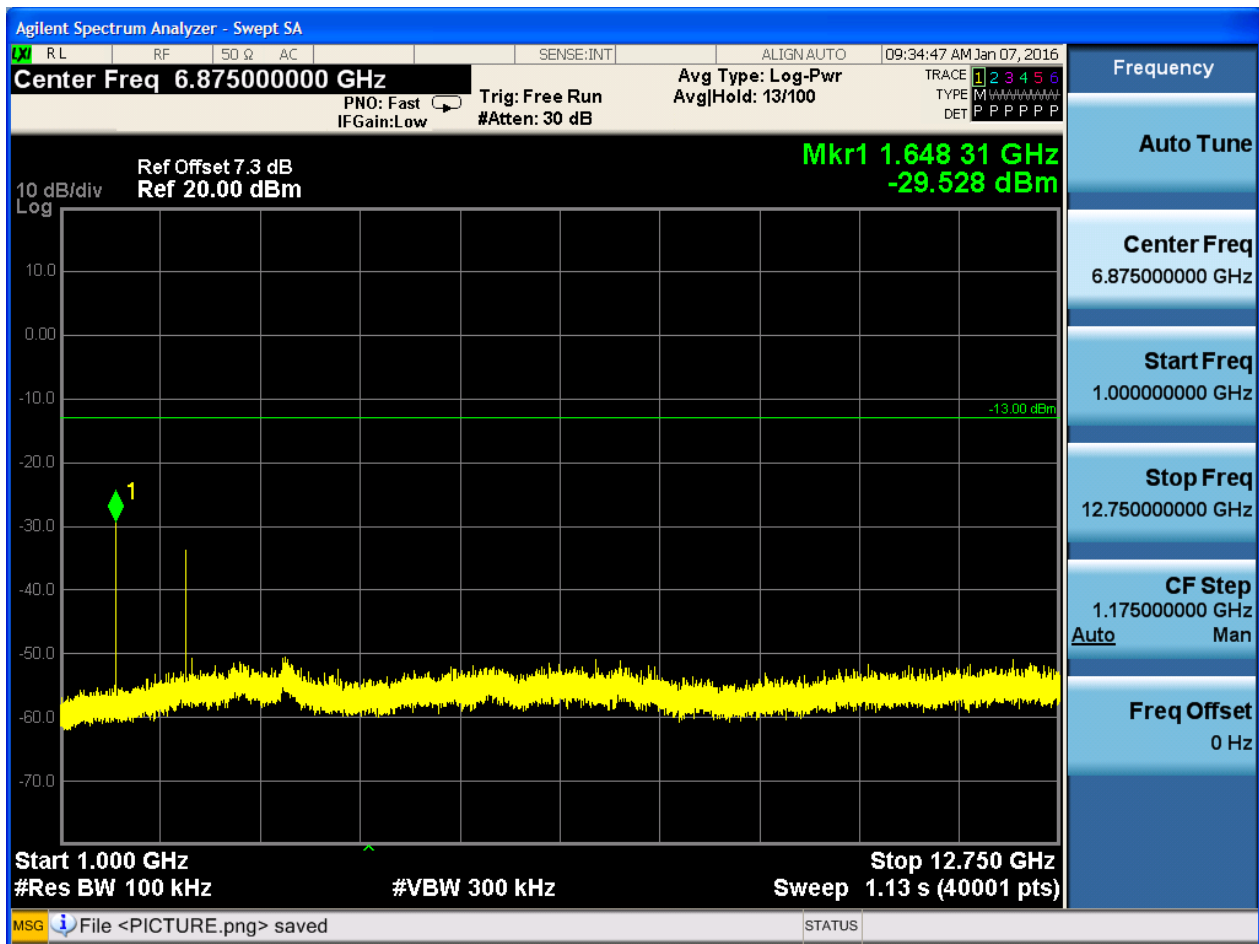
6.1.1.1 Test Mode = GSM/TM1

6.1.1.1.1 Test Channel = LCH

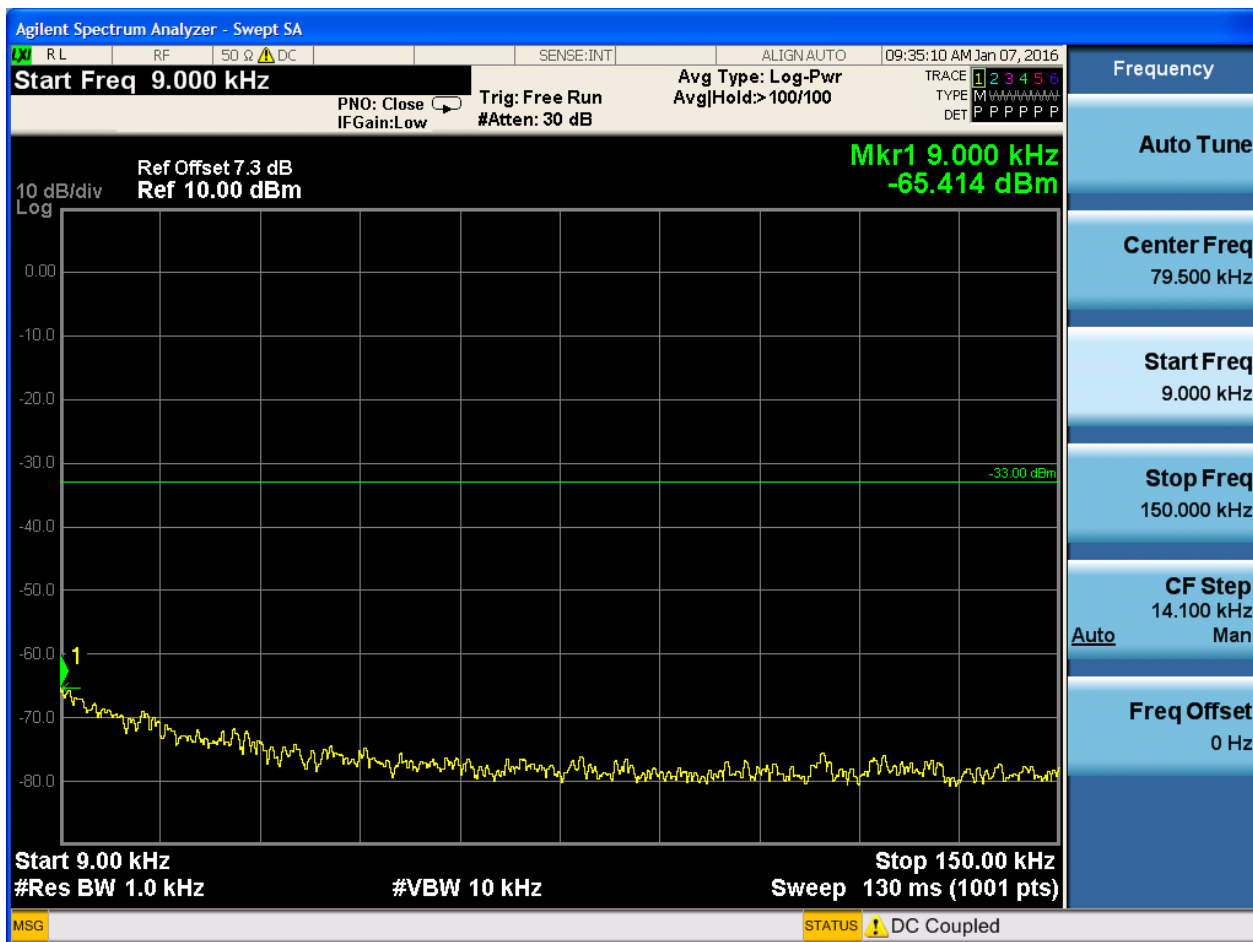


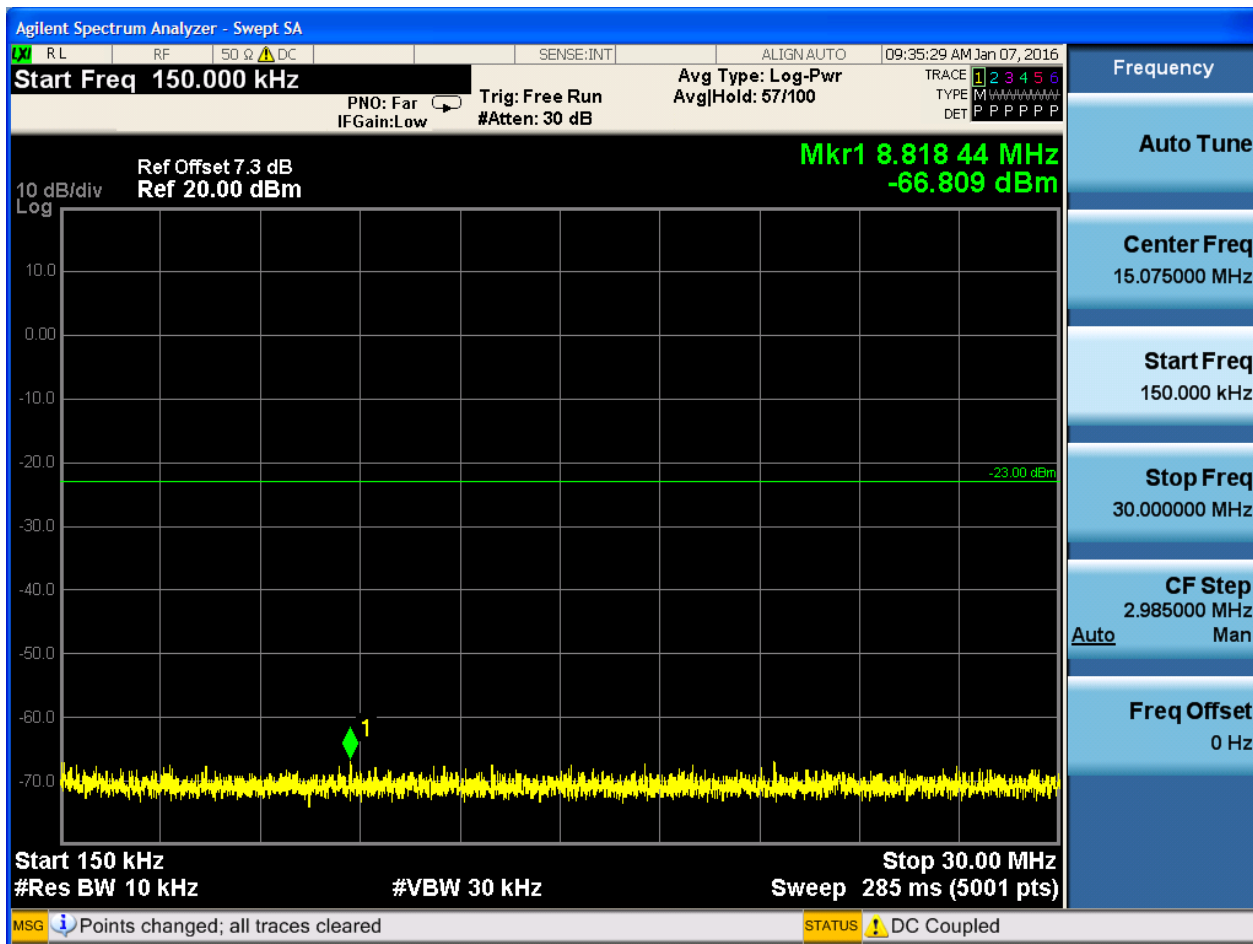


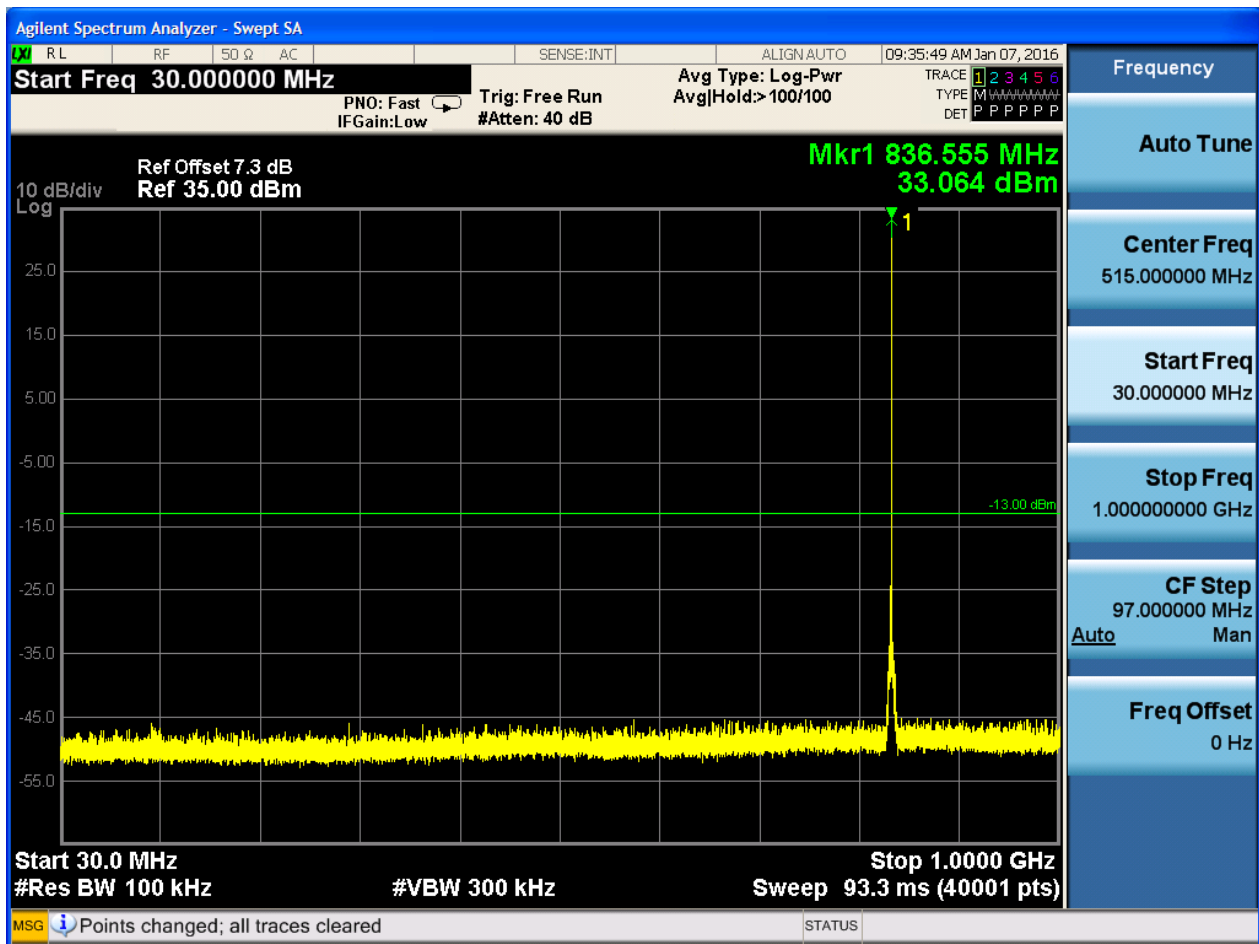


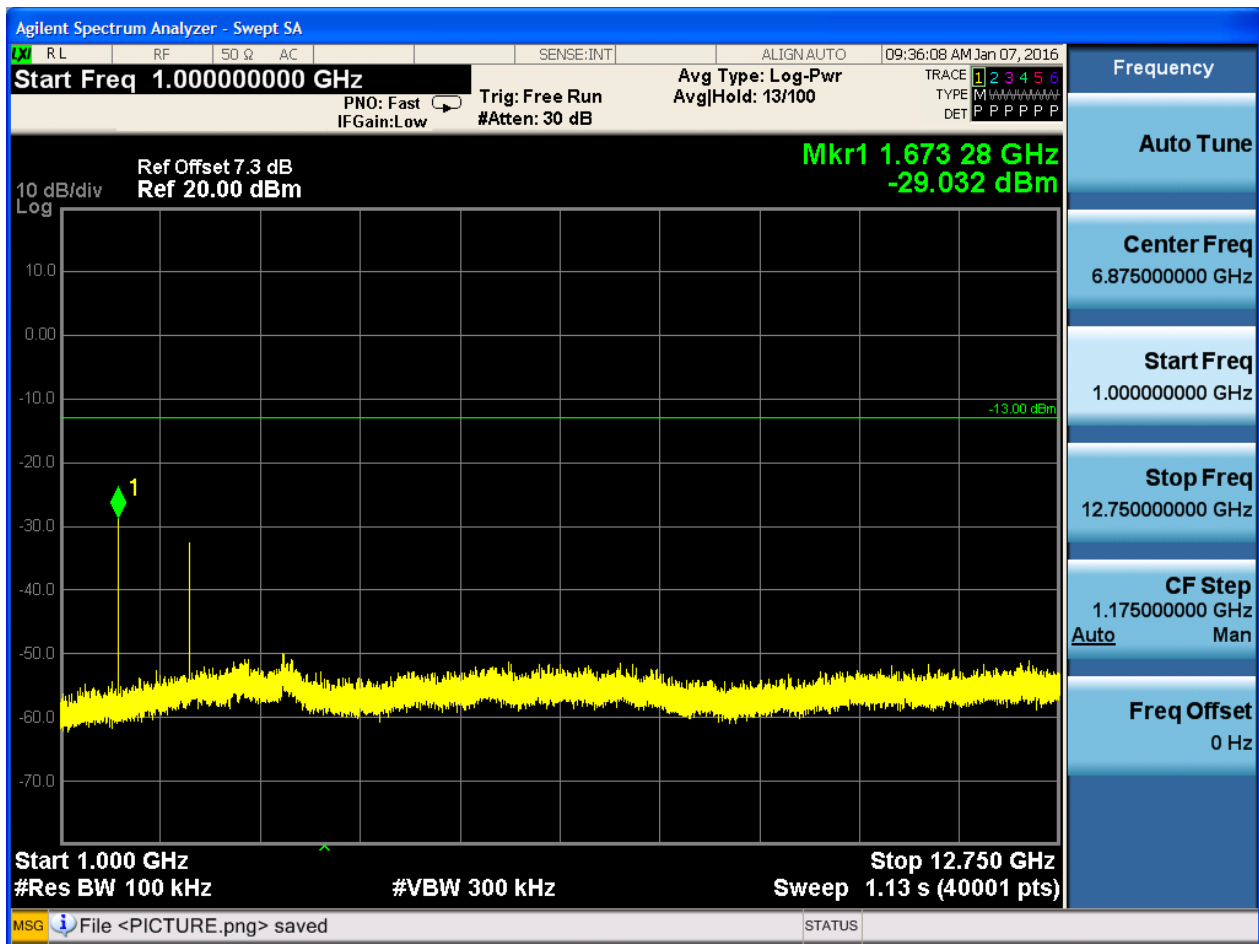


6.1.1.1.2 Test Channel = MCH

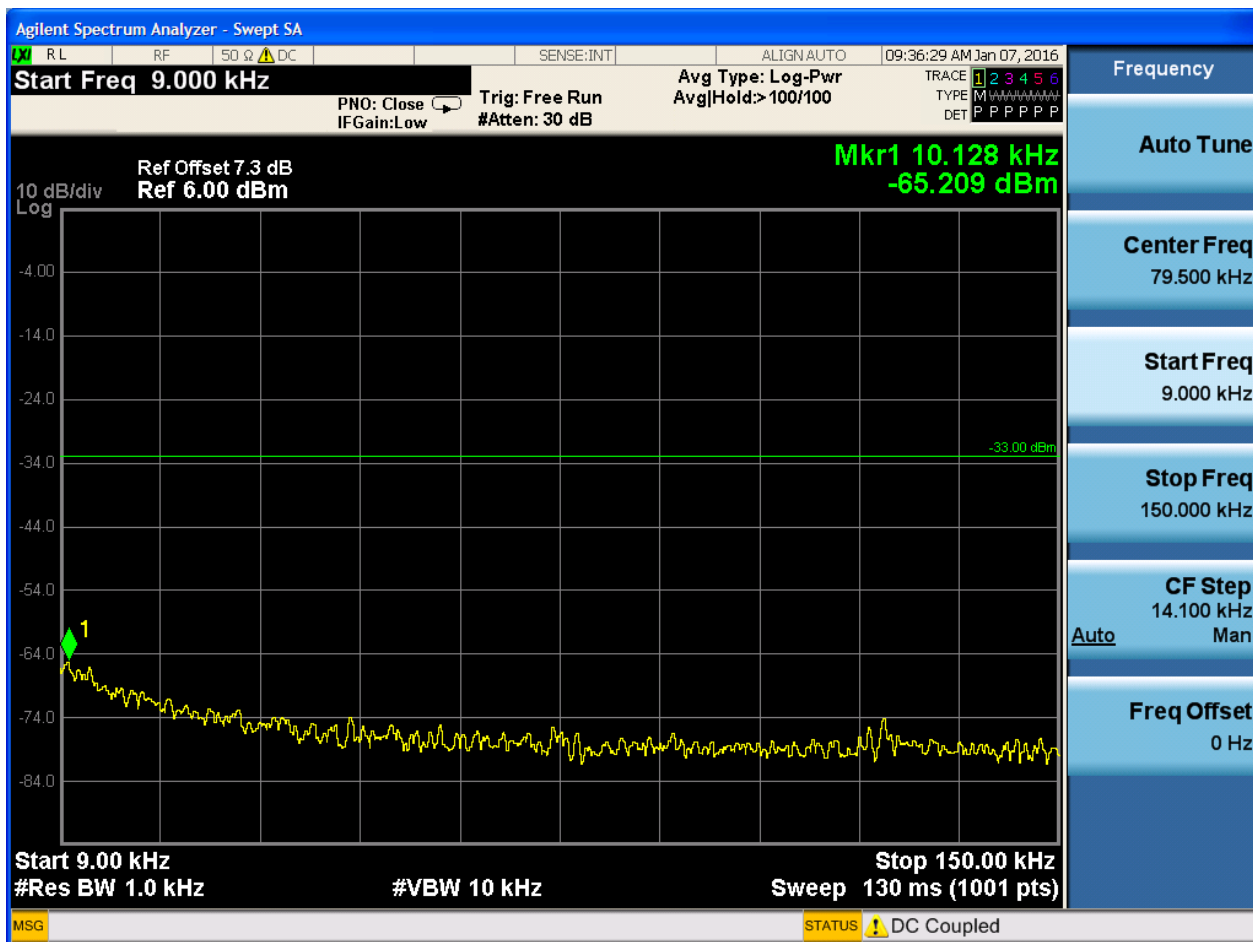


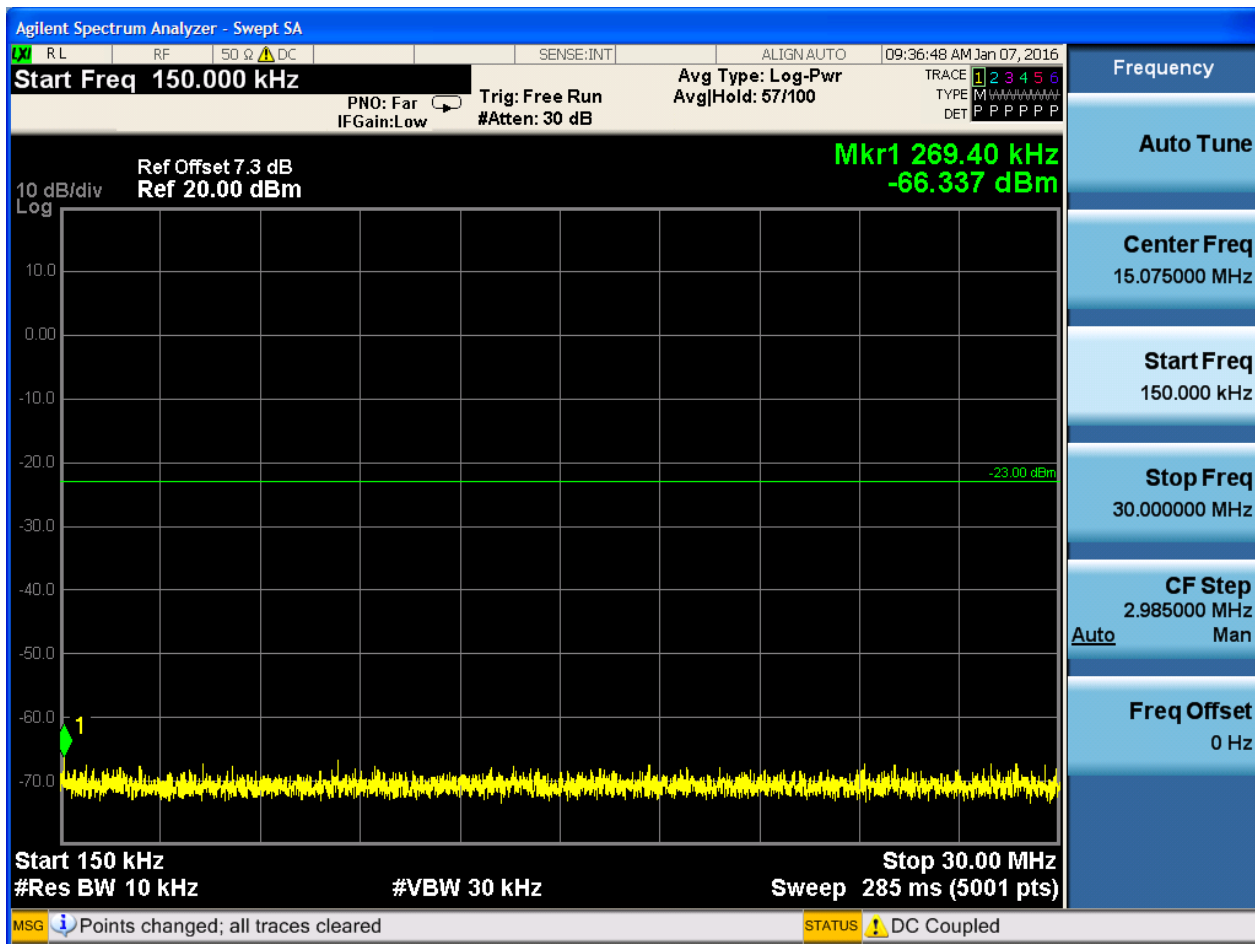


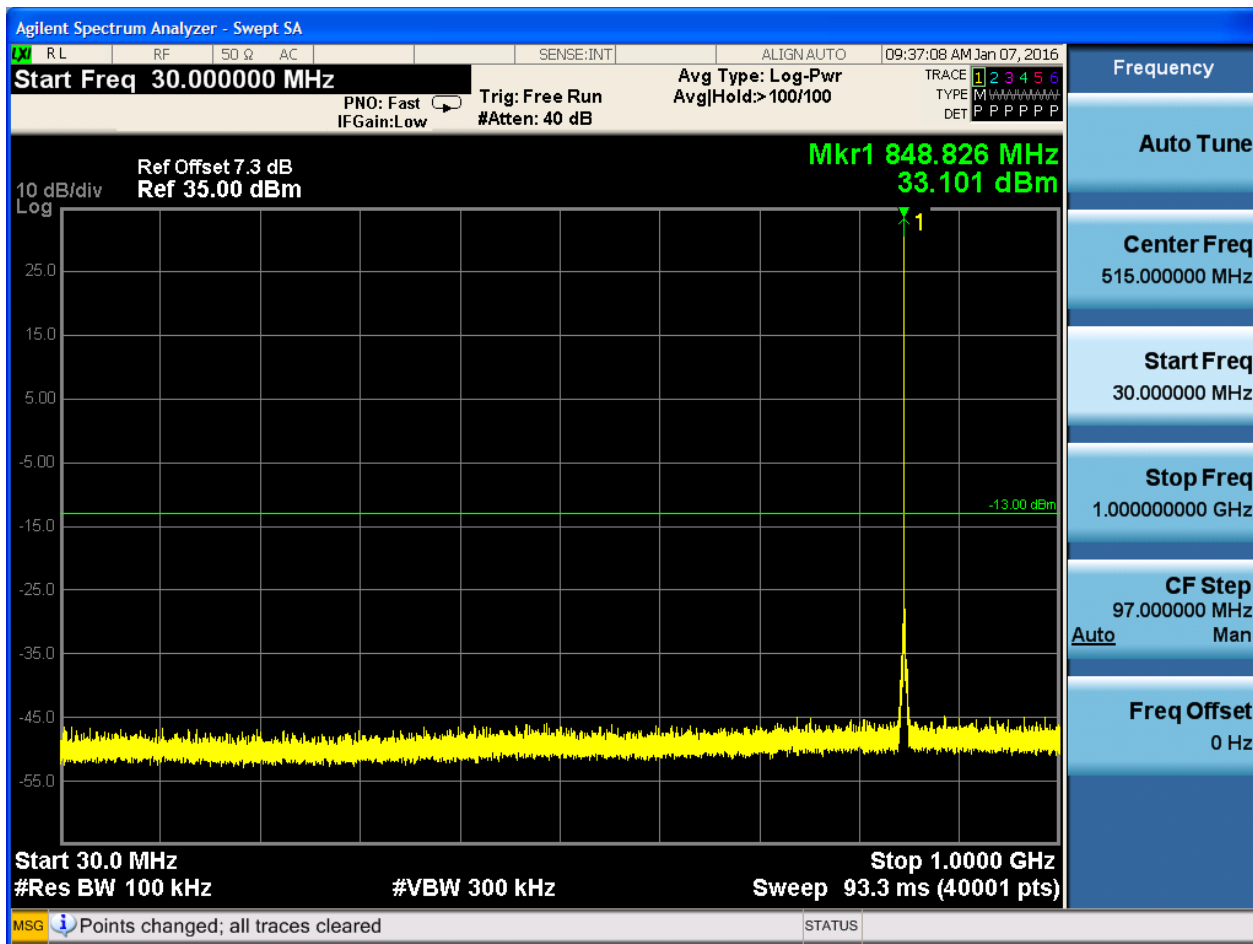


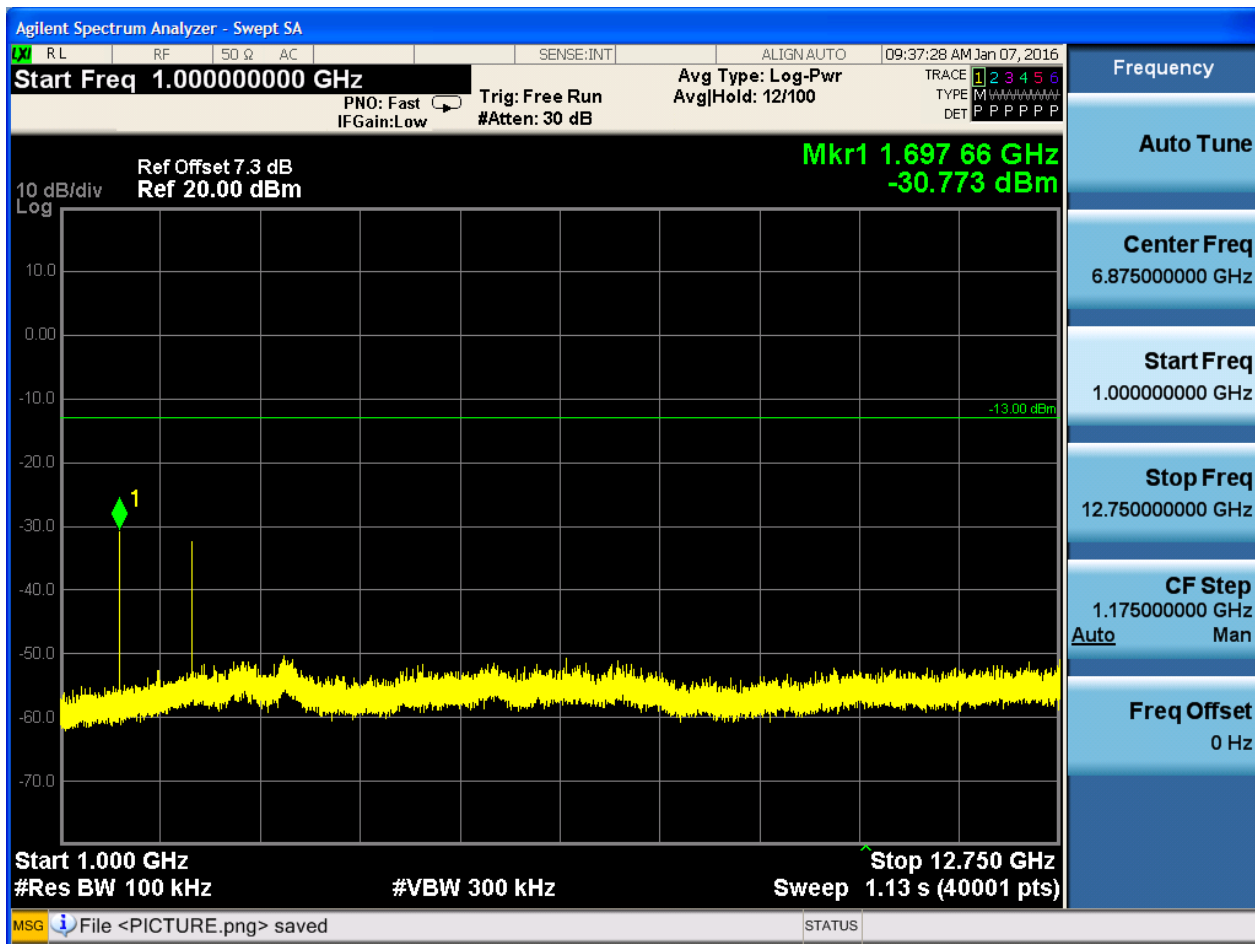


6.1.1.1.3 Test Channel = HCH



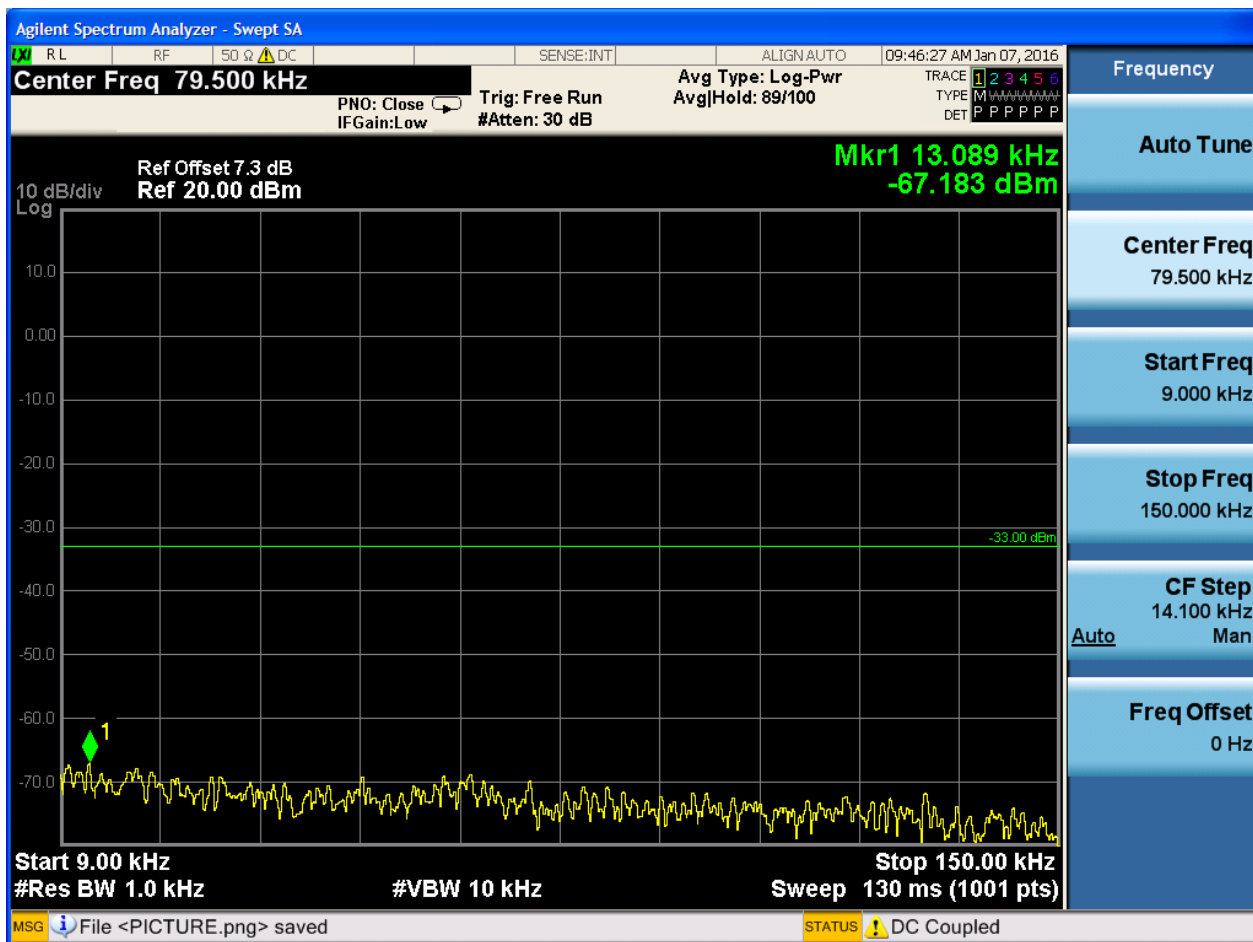


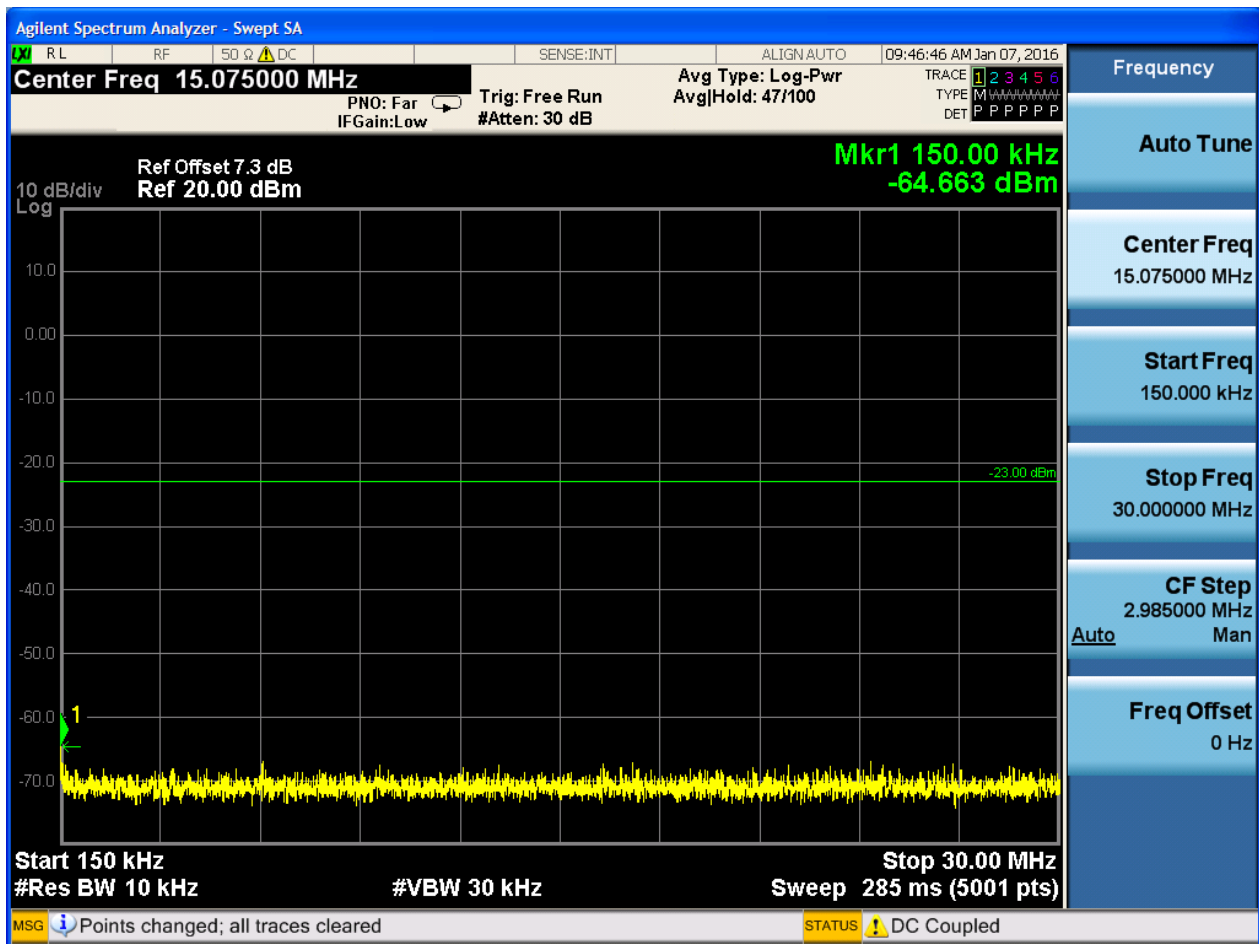


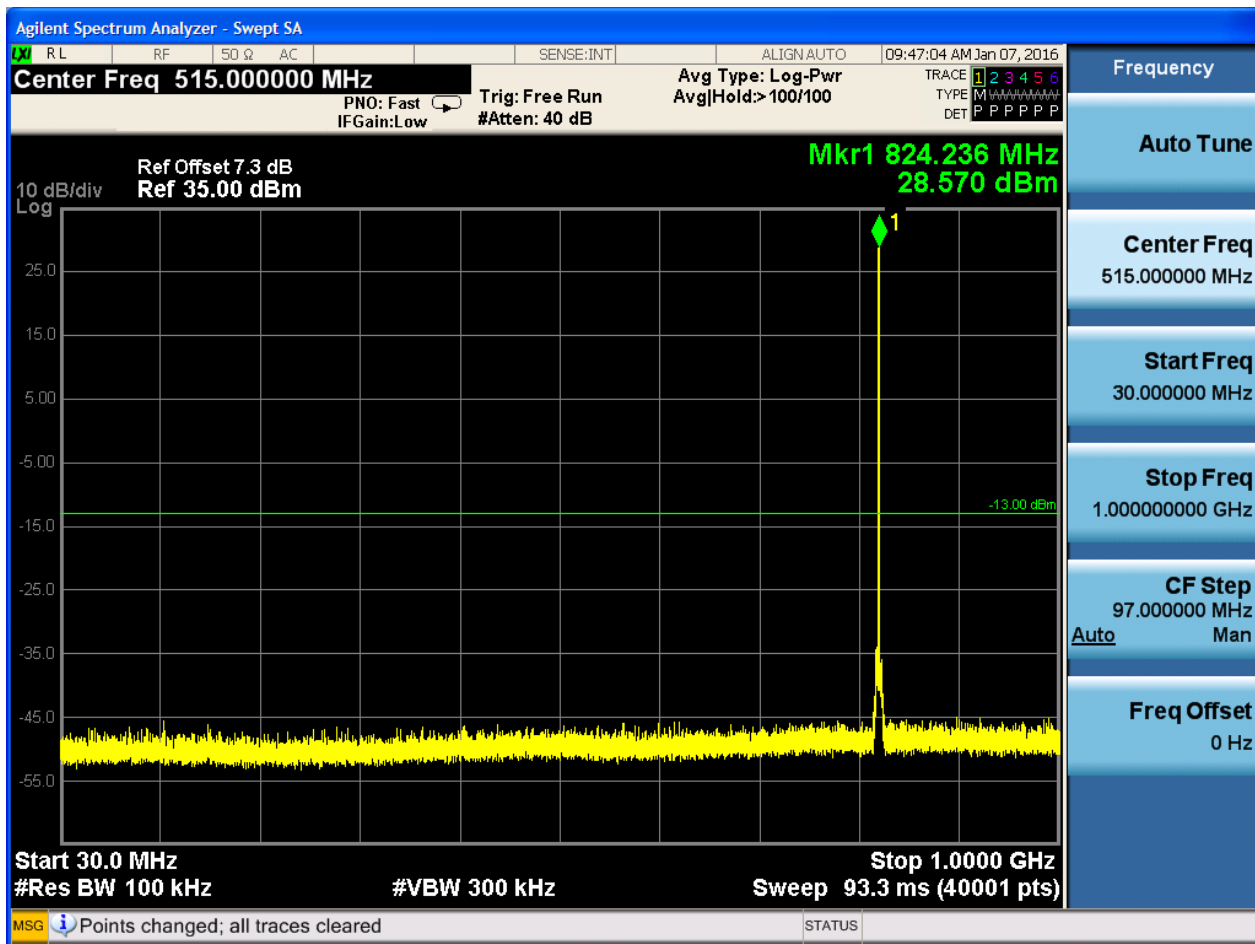


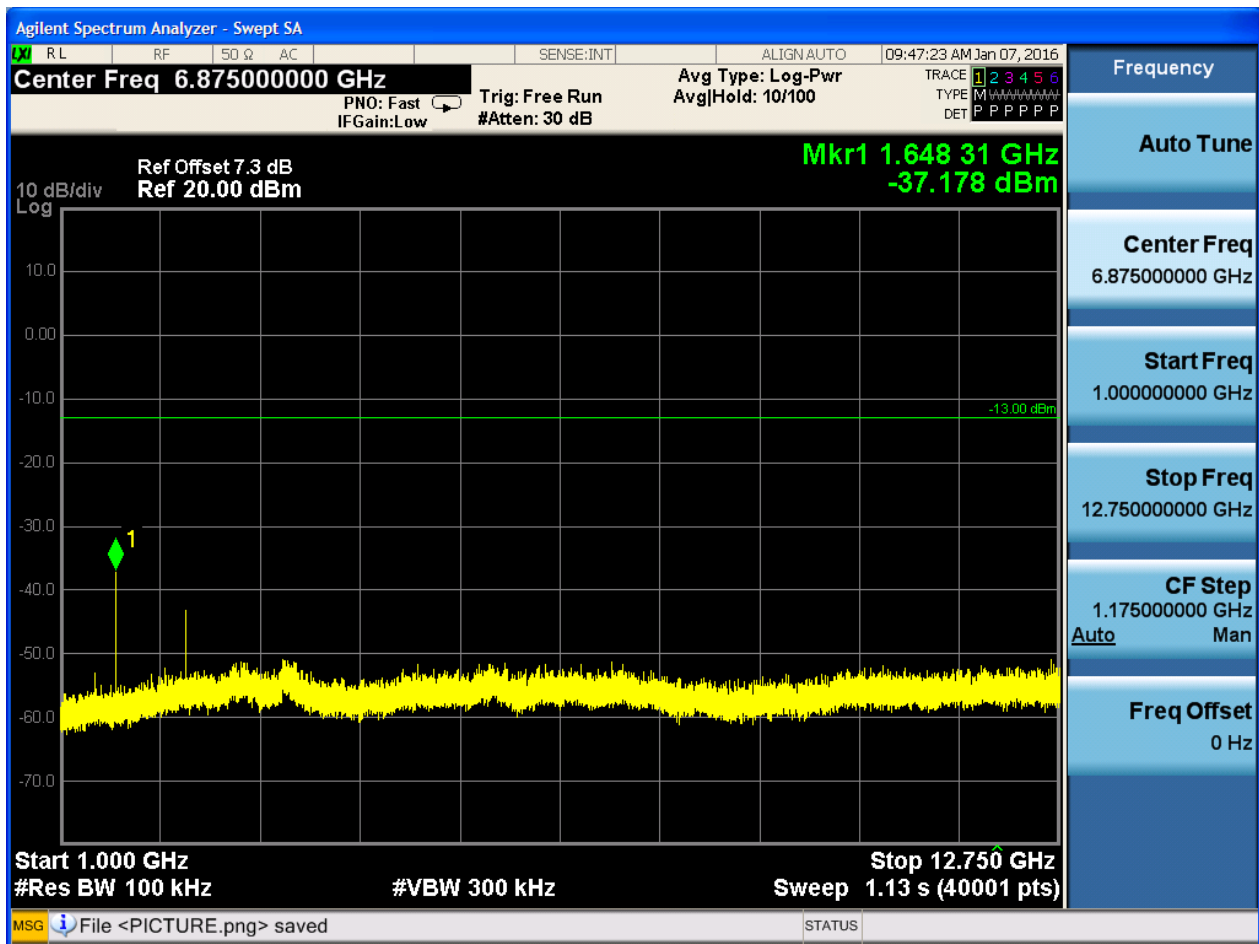
6.1.1.2 Test Mode = GSM/TM2

6.1.1.2.1 Test Channel = LCH

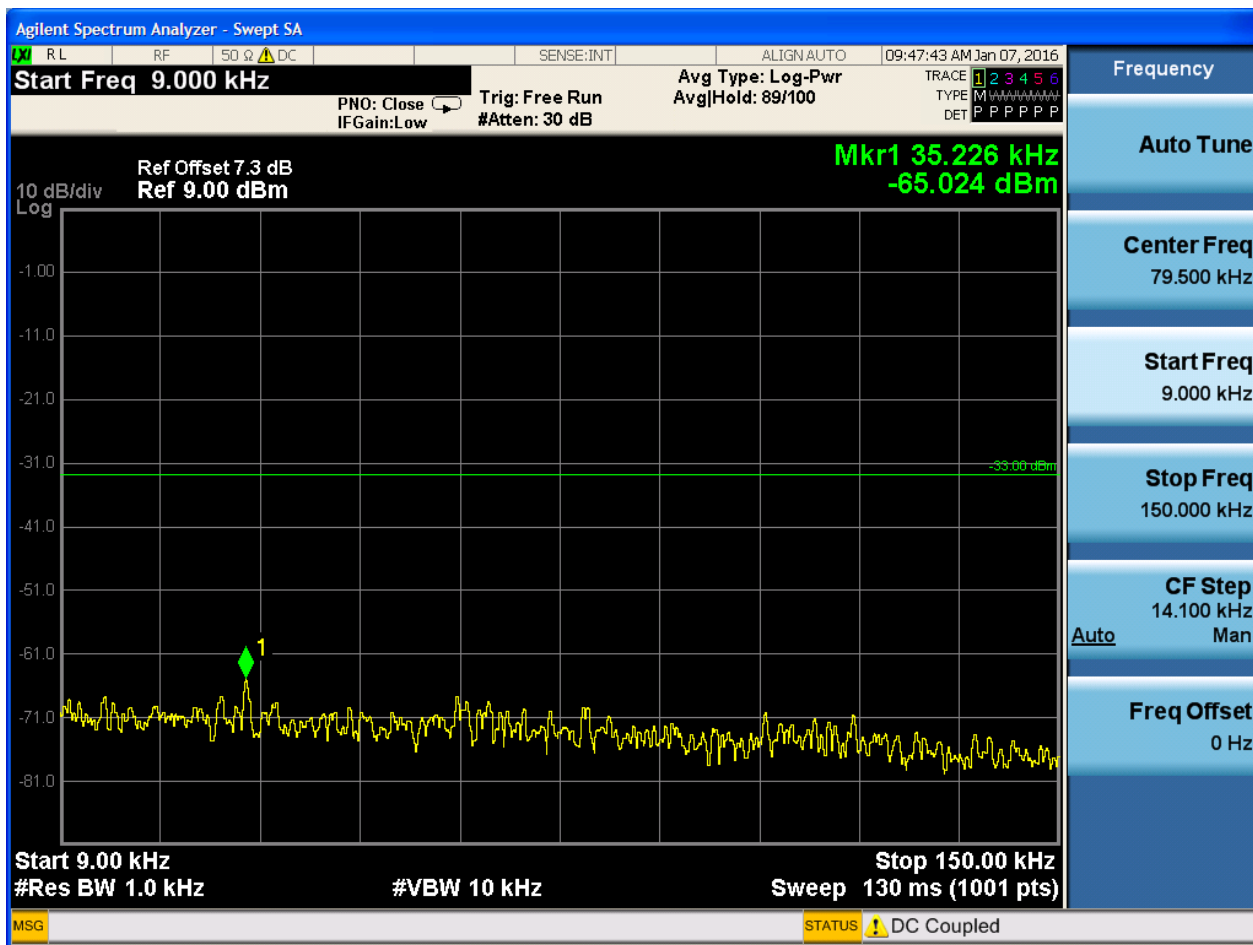


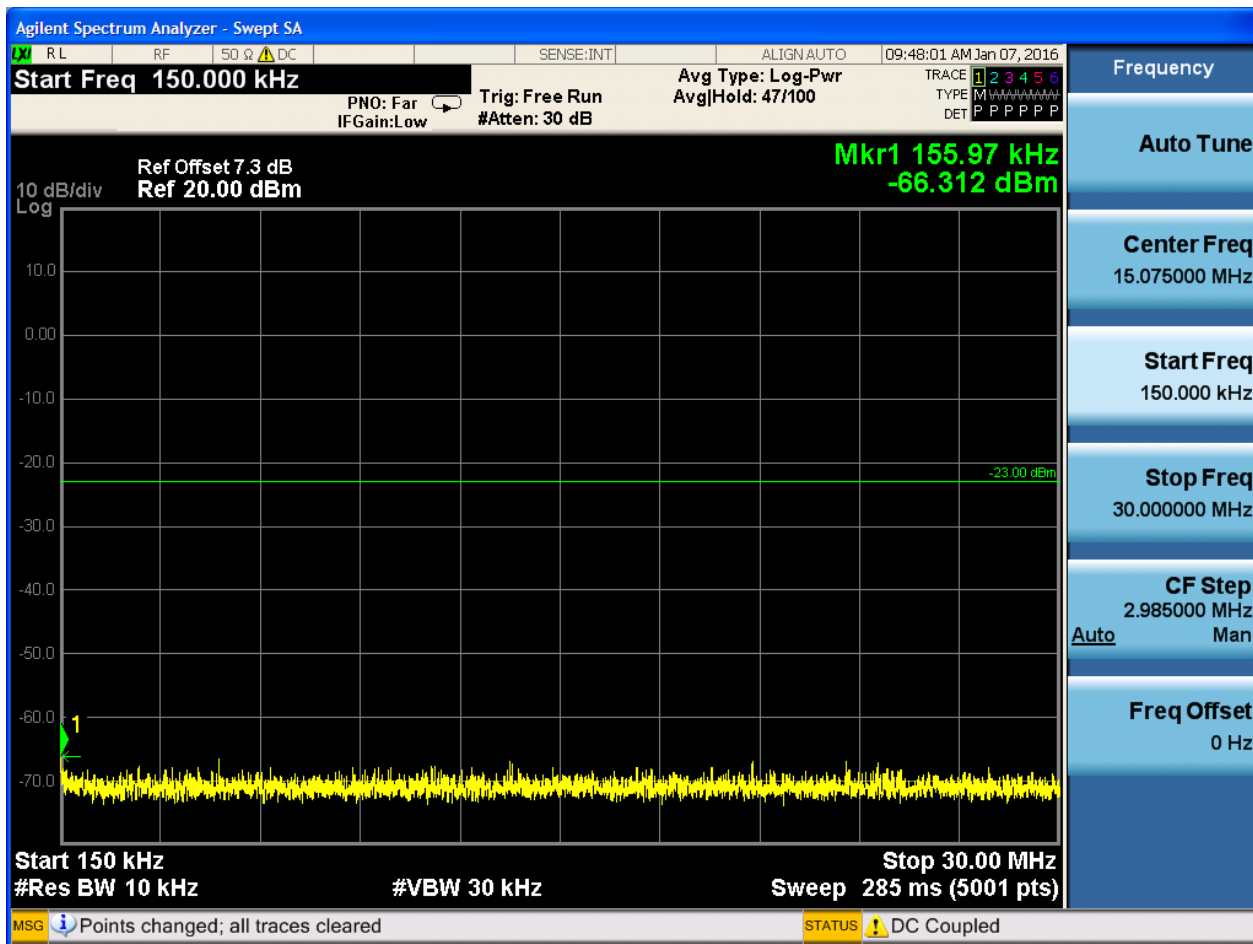


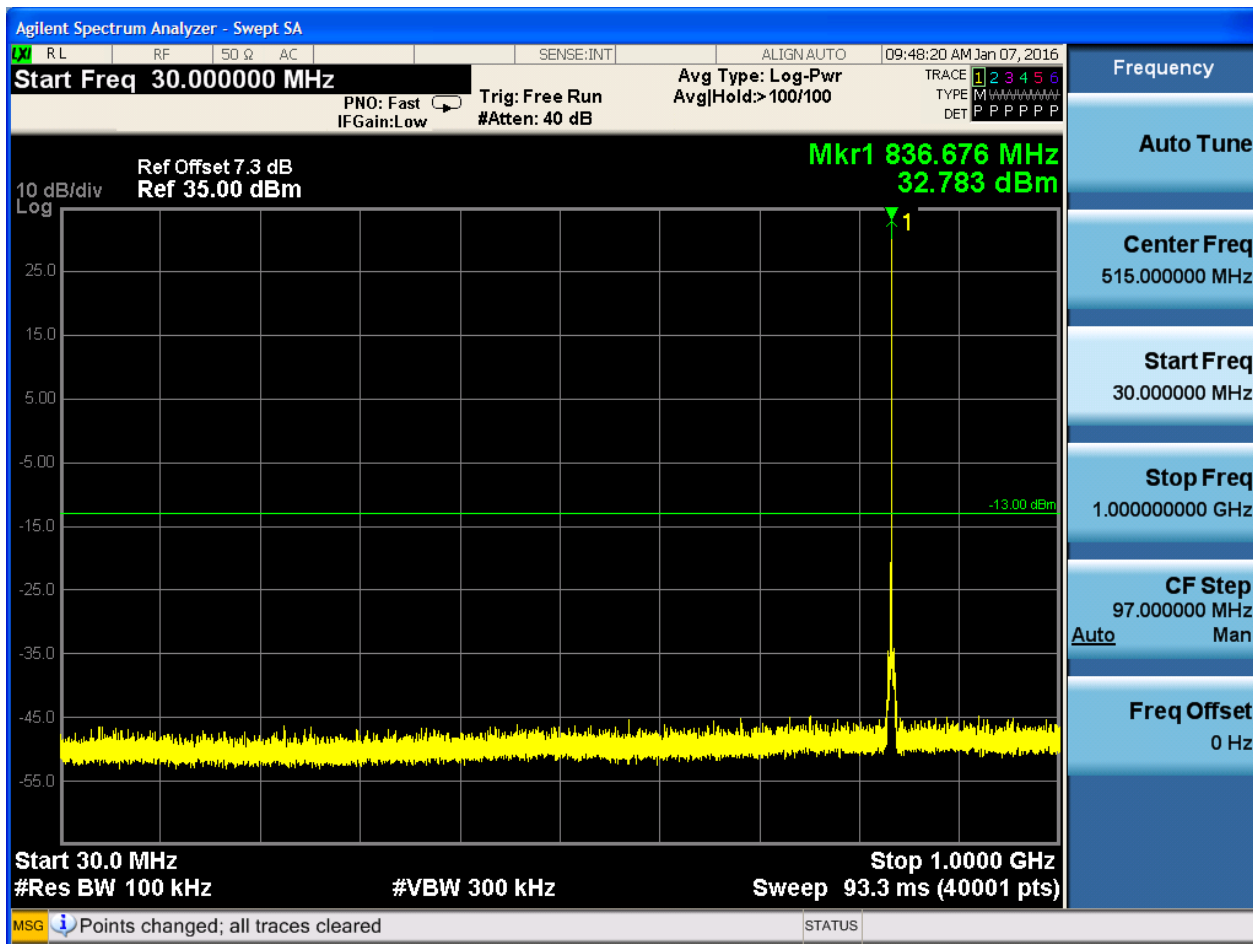


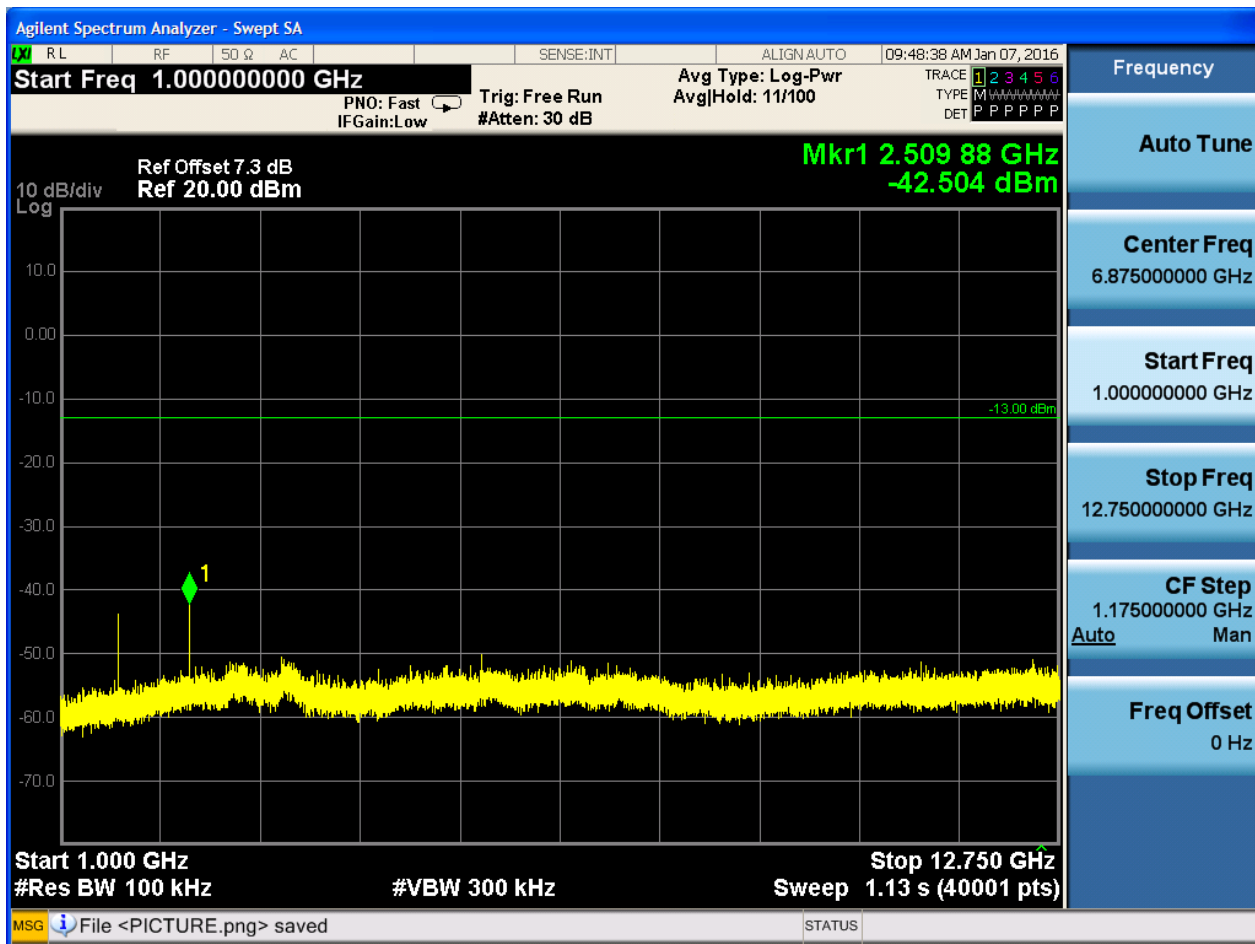


6.1.1.2.2 Test Channel = MCH



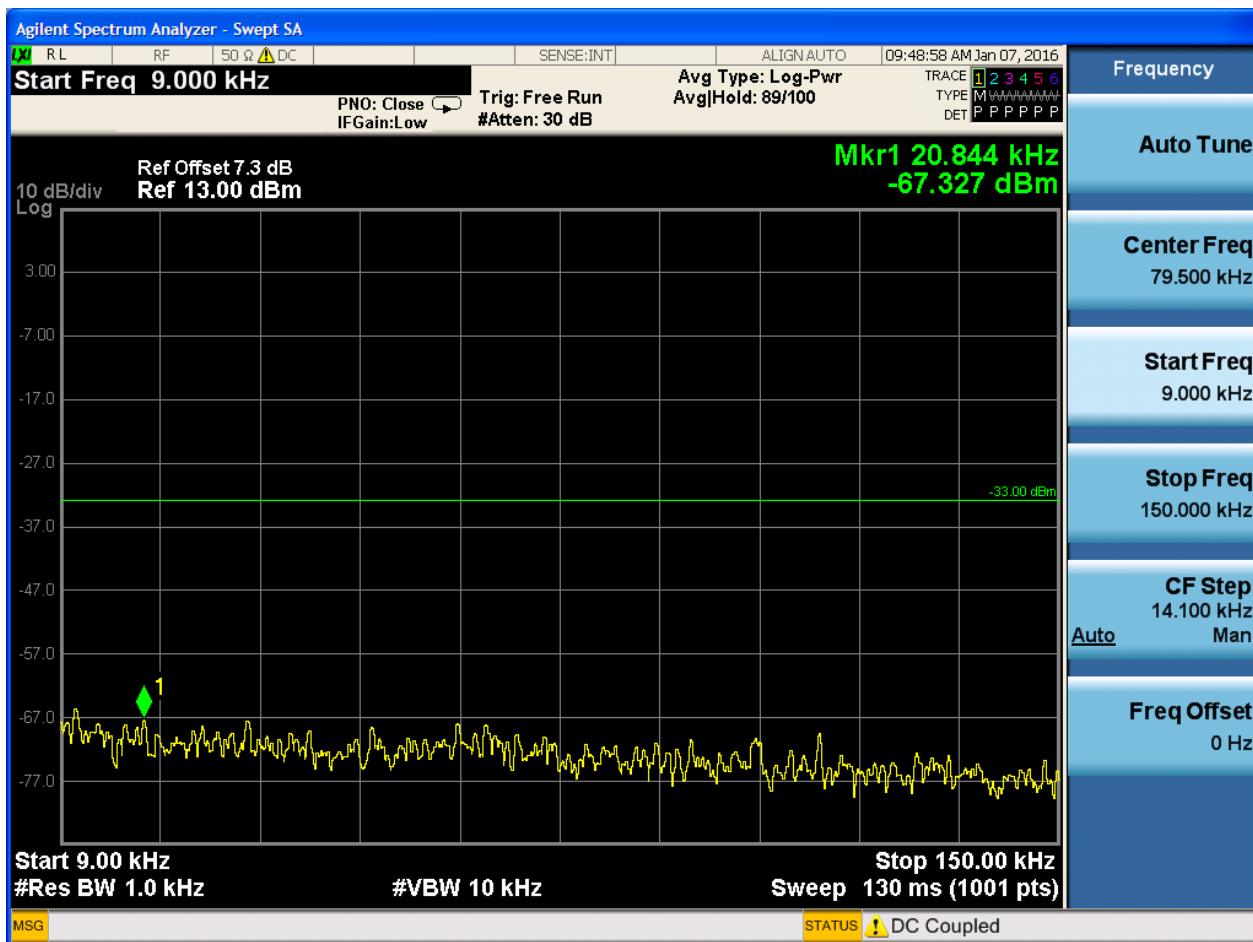


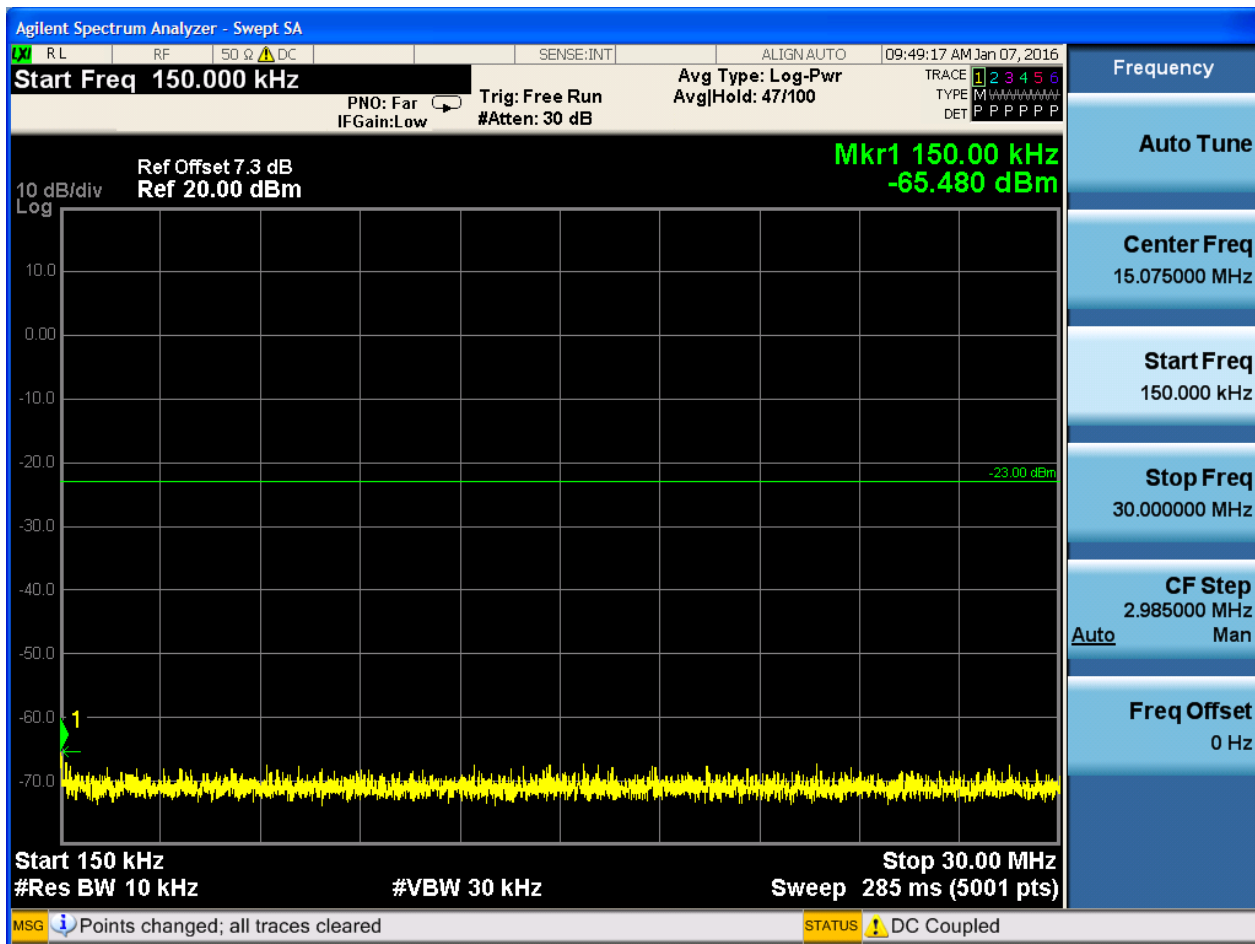


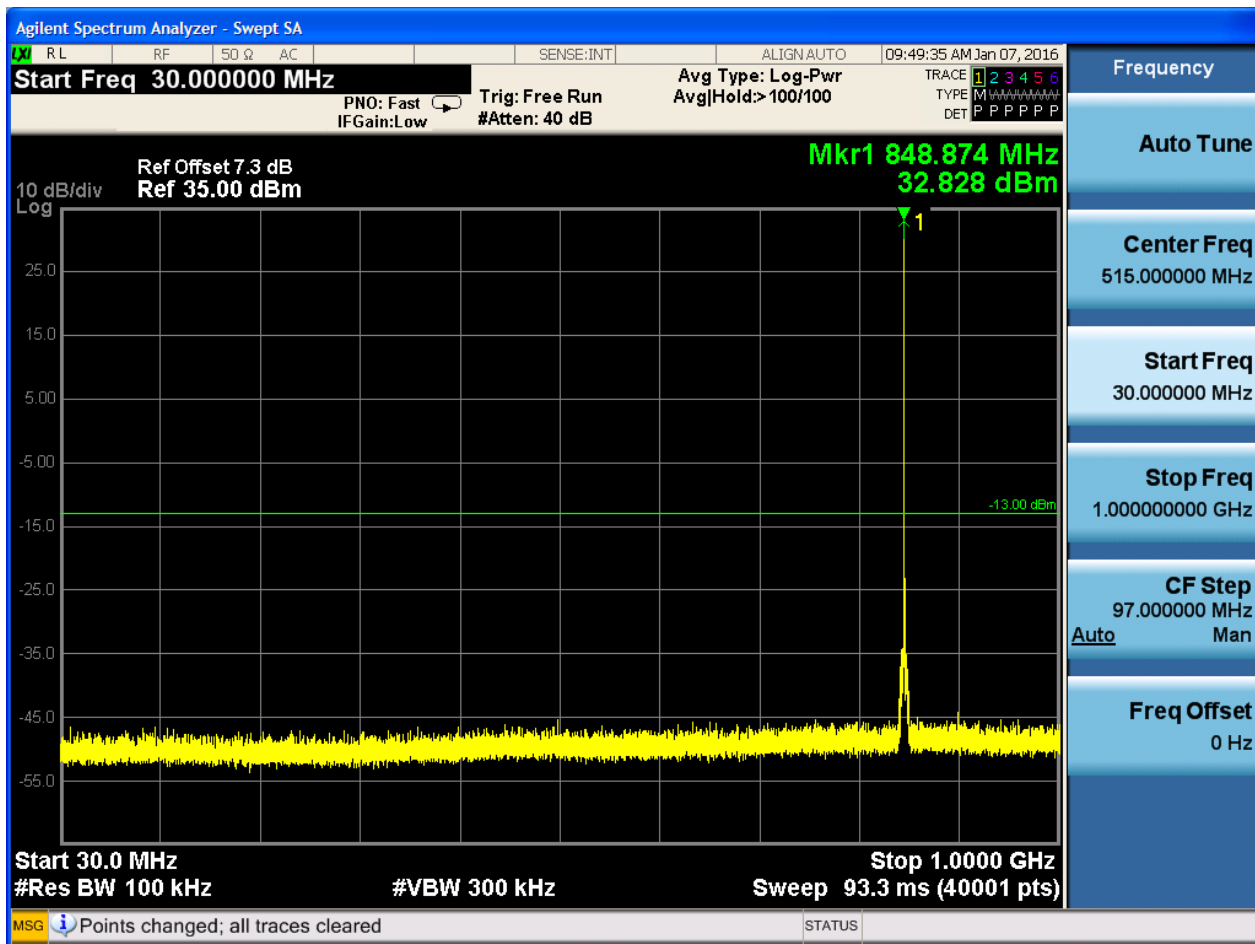


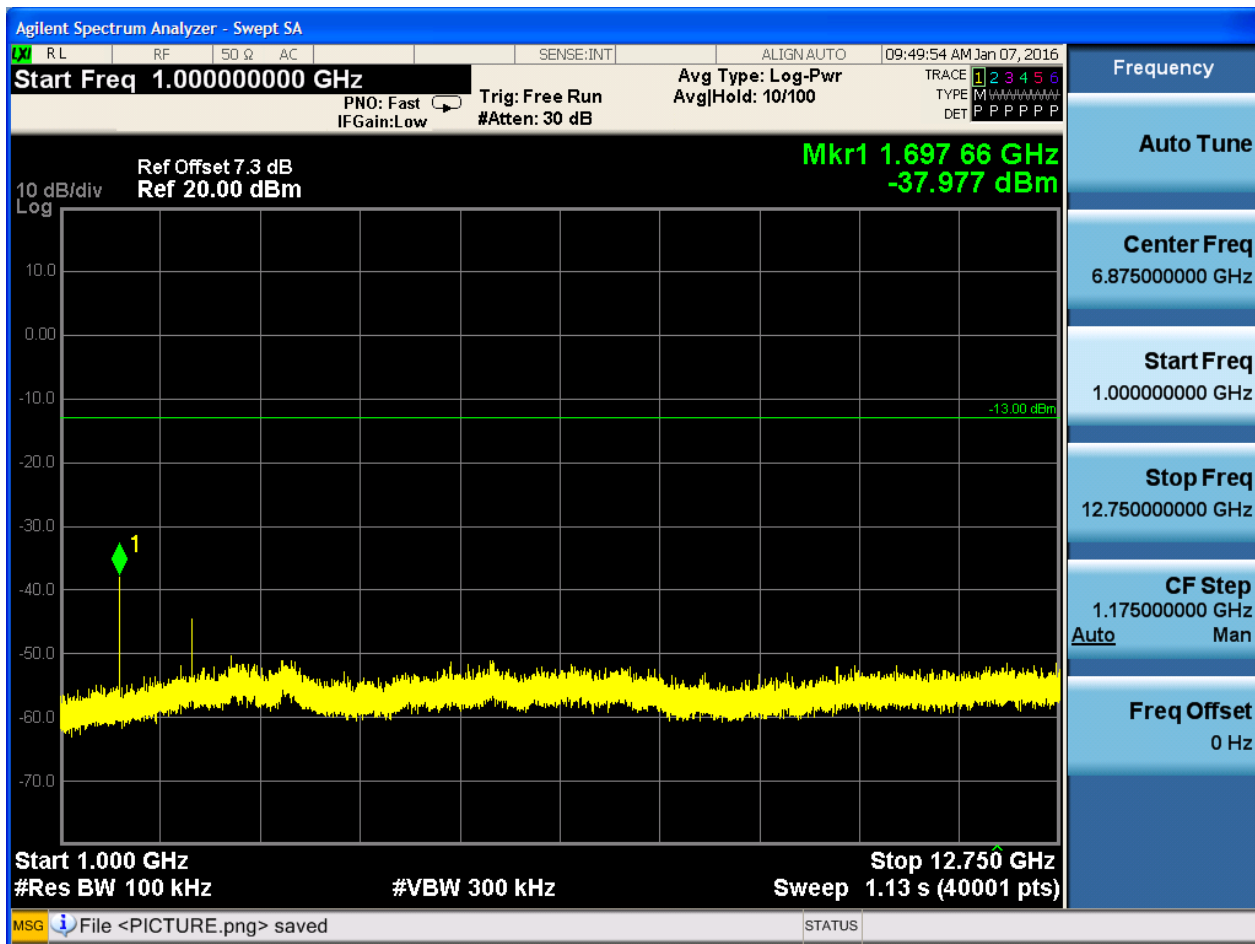


6.1.1.2.3 Test Channel = HCH







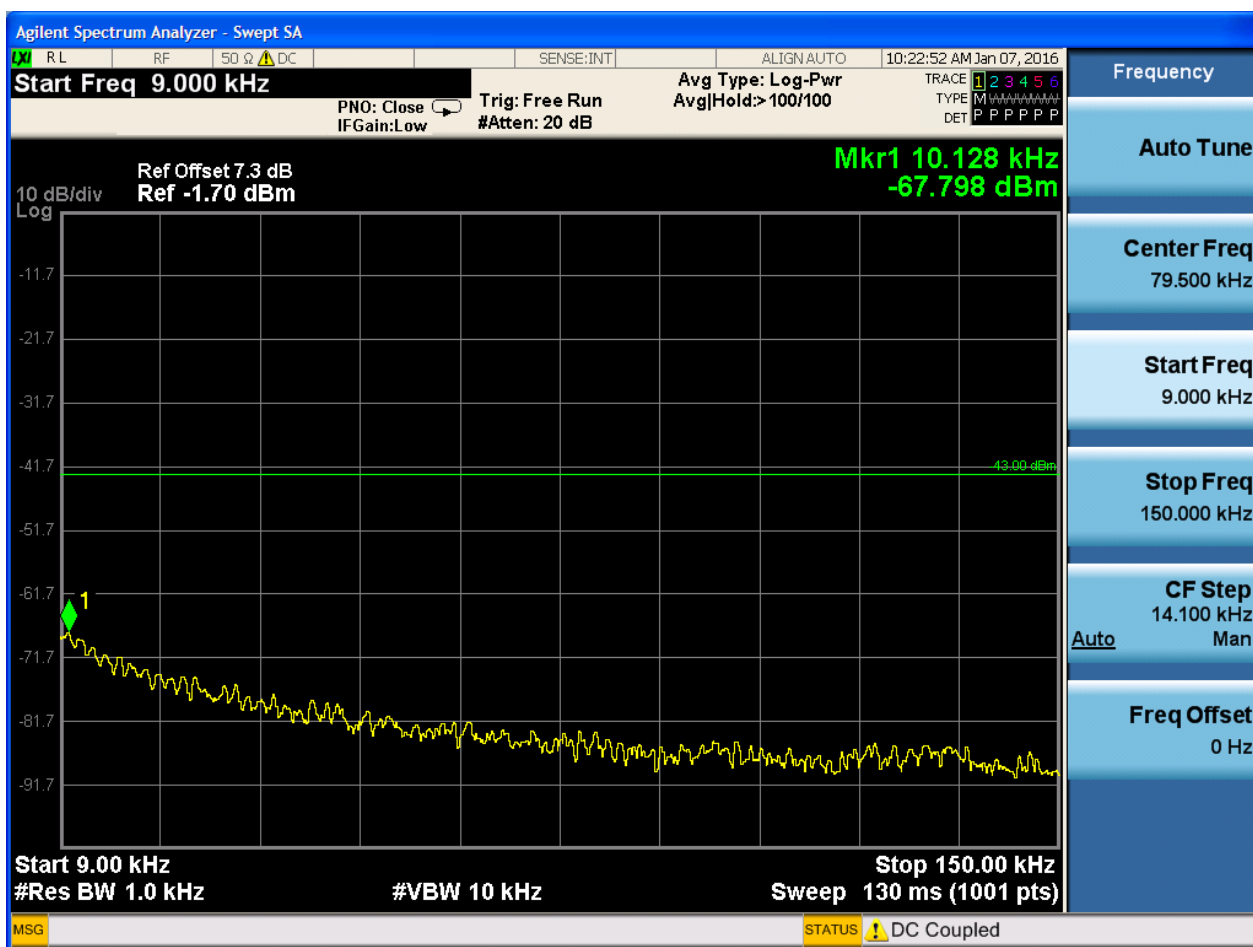


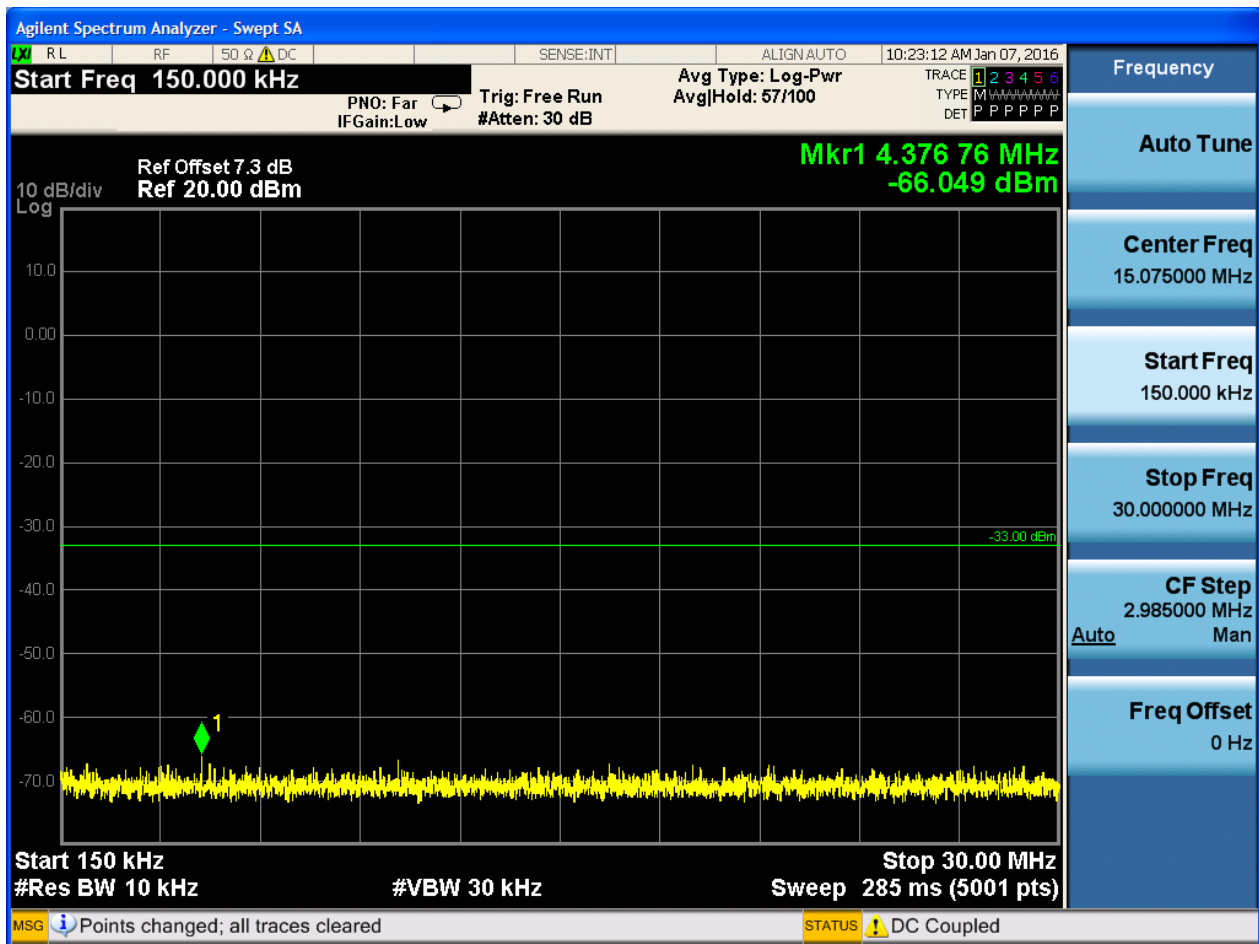


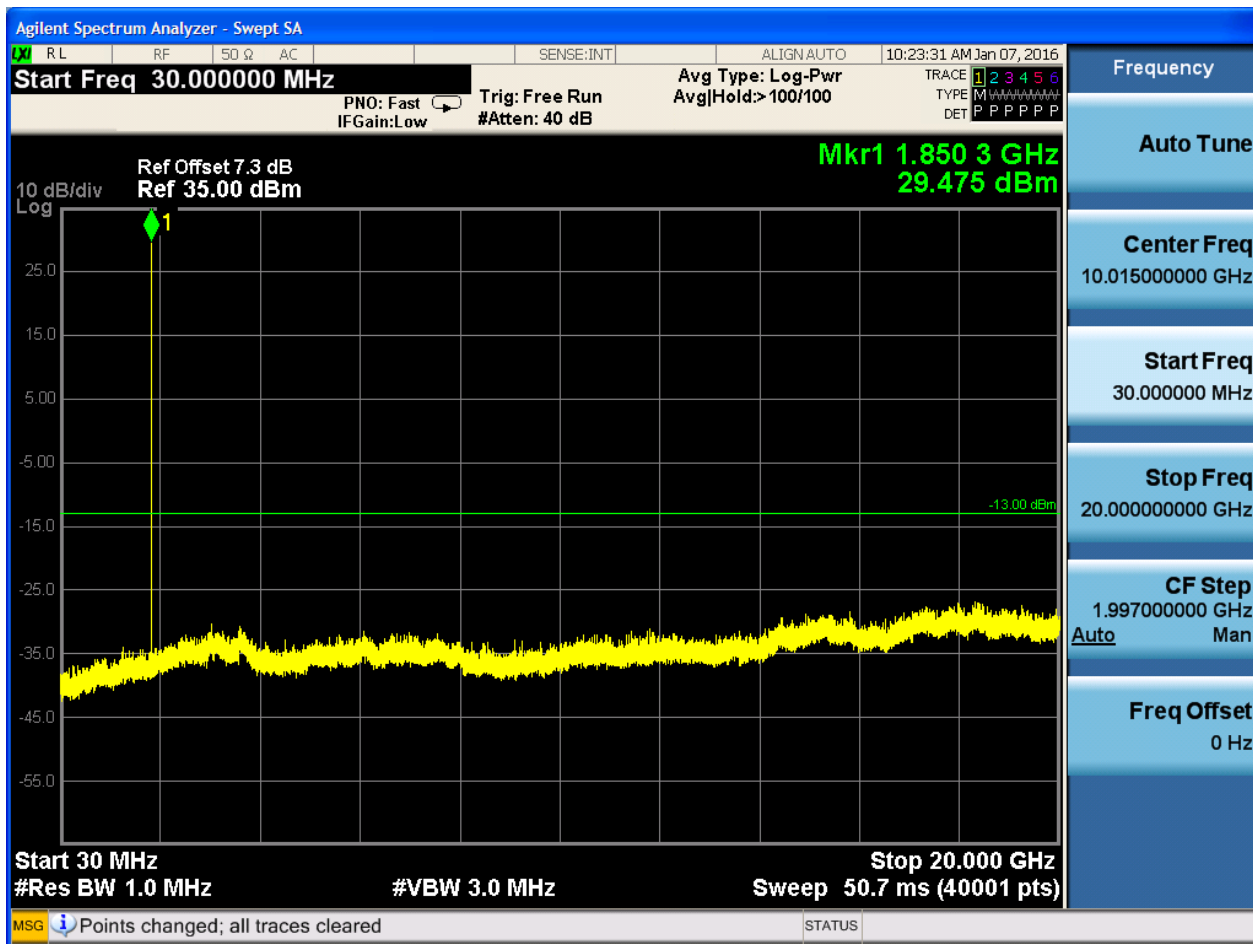
6.1.2 Test Band = GSM1900

6.1.2.1 Test Mode = GSM/TM1

6.1.2.1.1 Test Channel = LCH

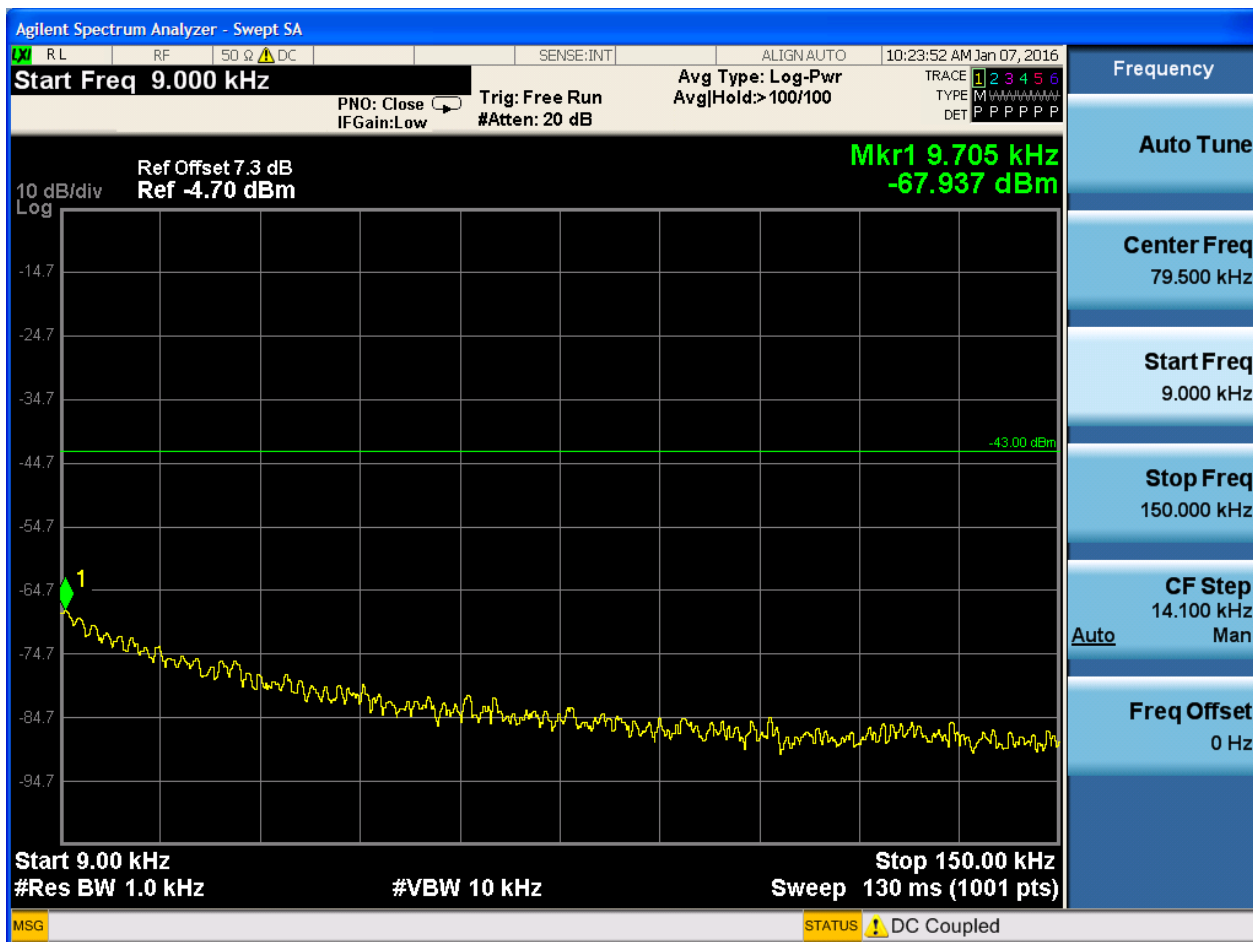


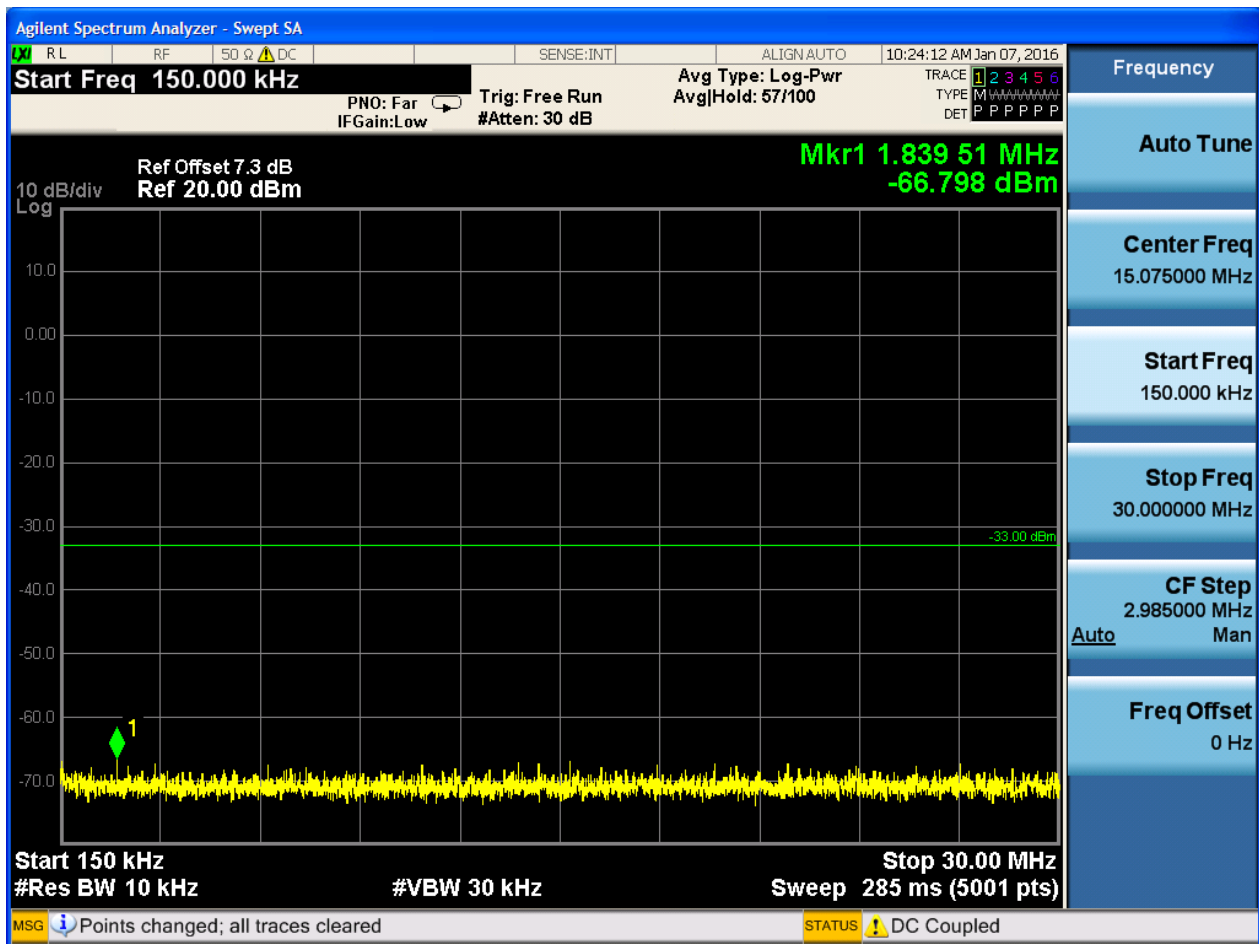


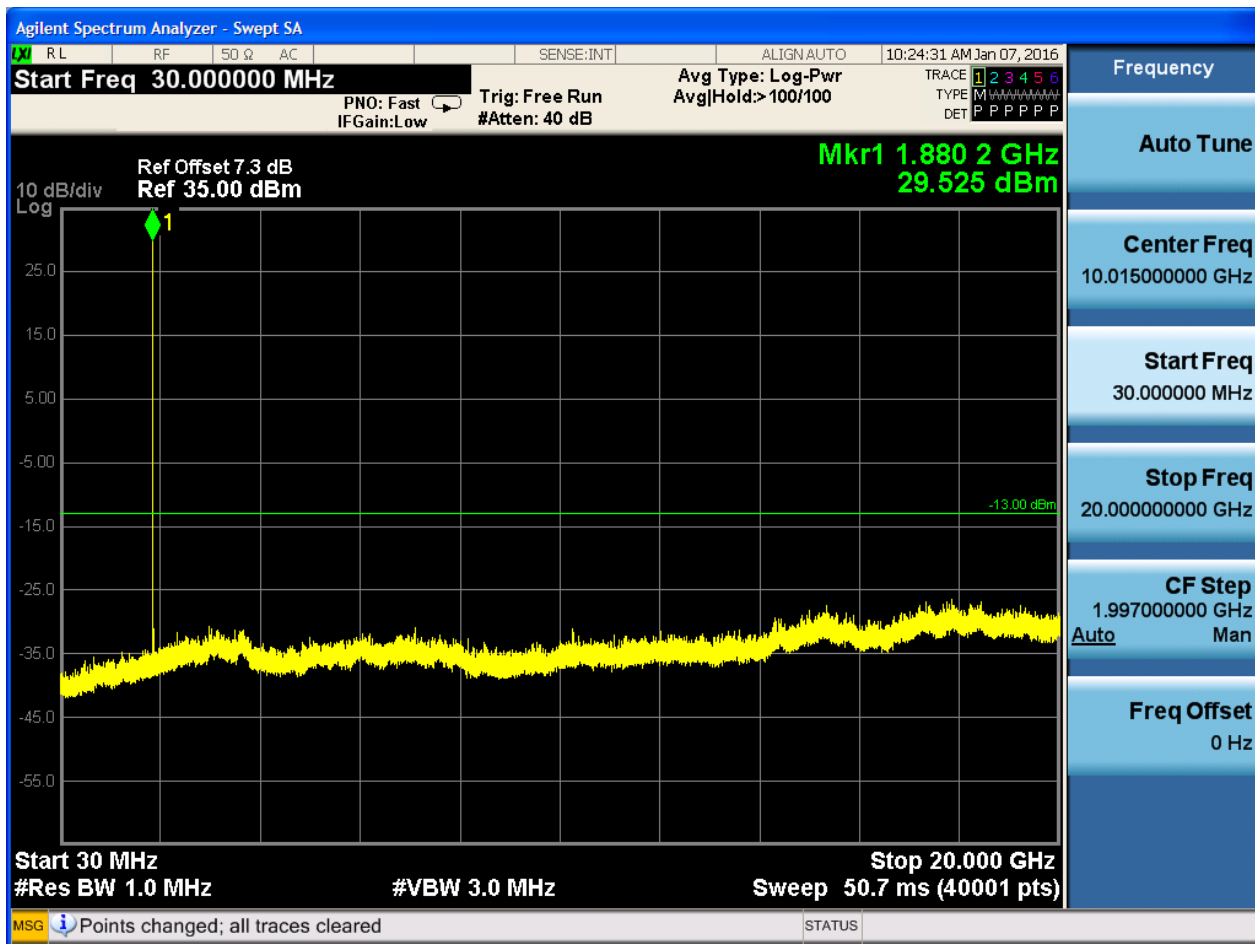




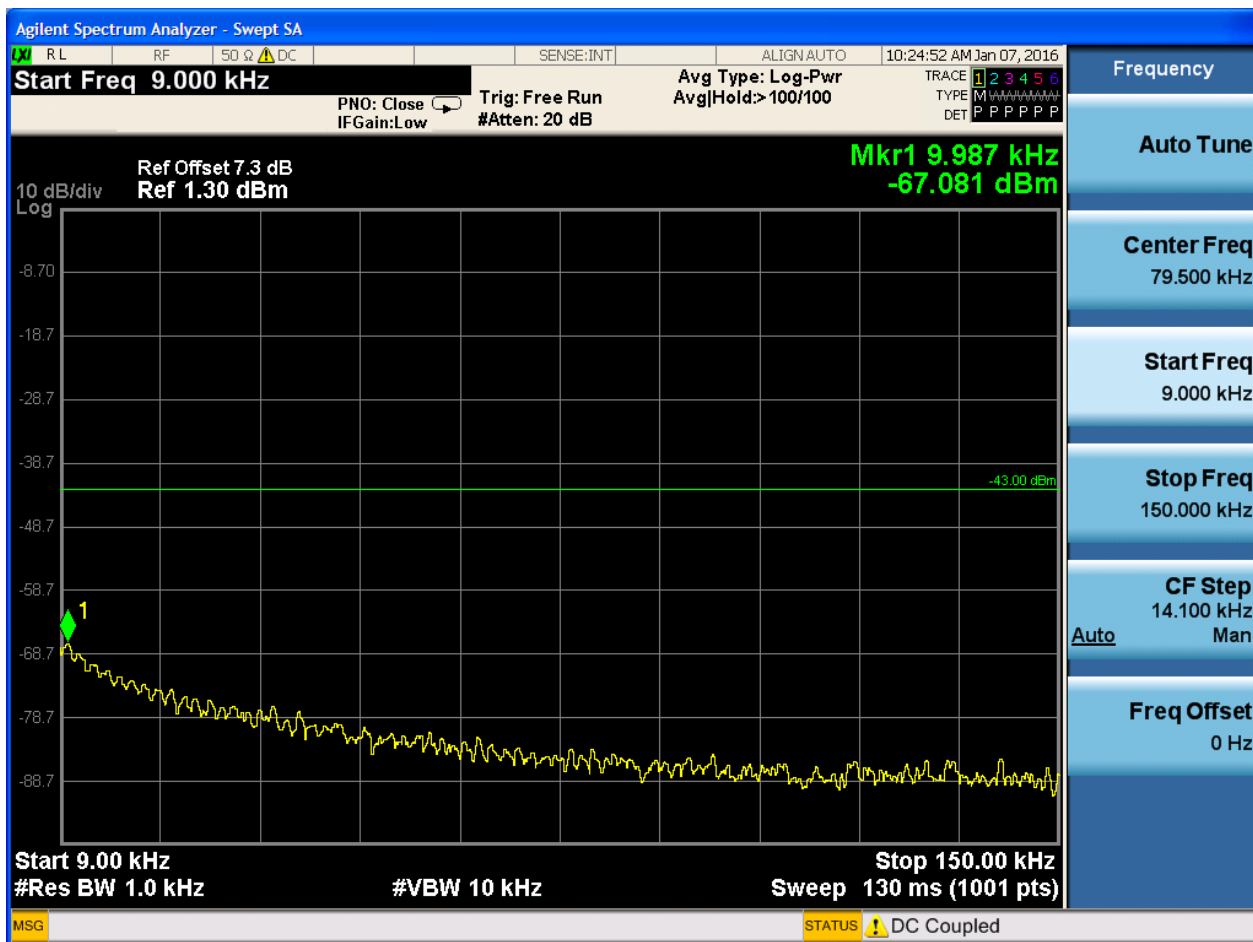
6.1.2.1.2 Test Channel = MCH

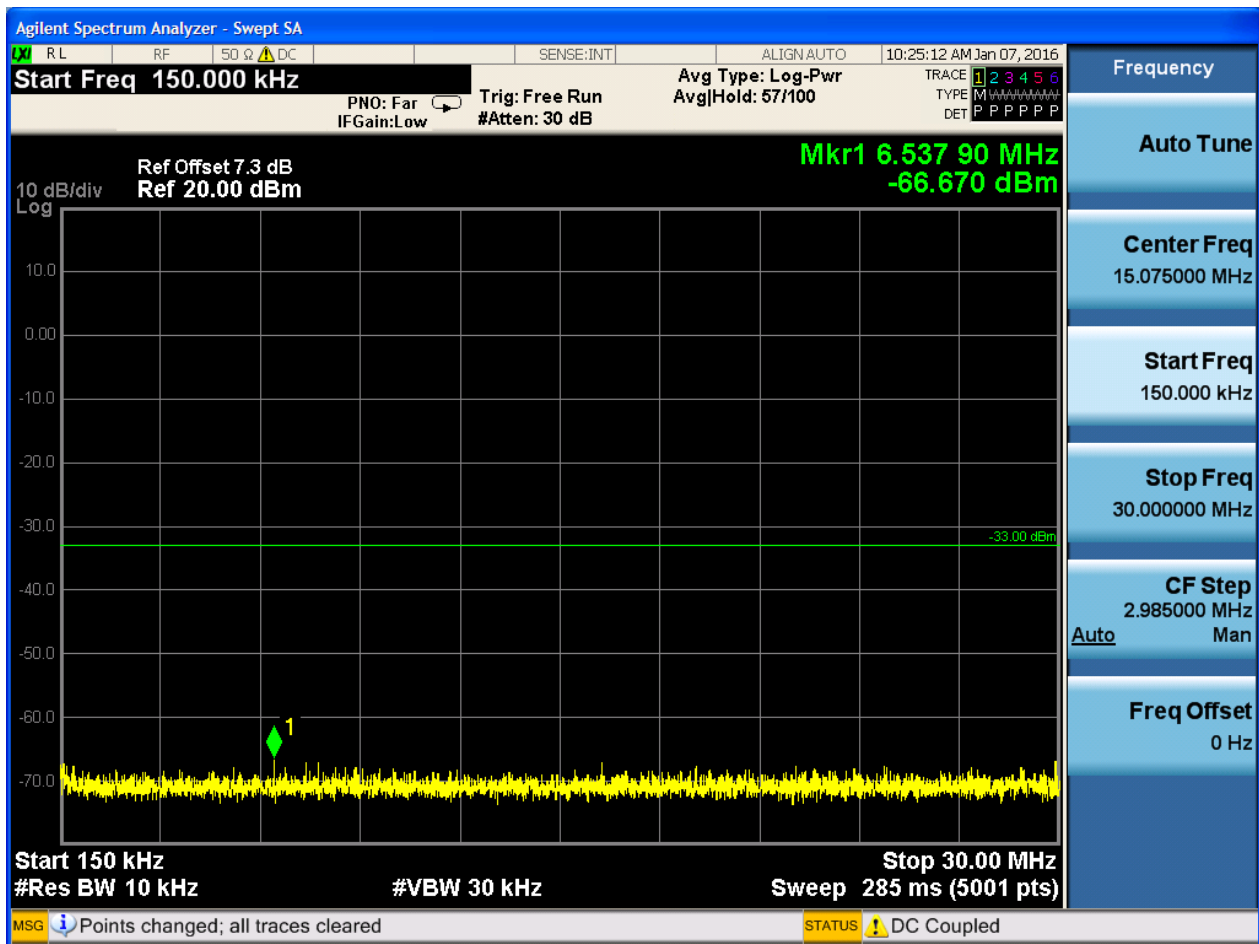


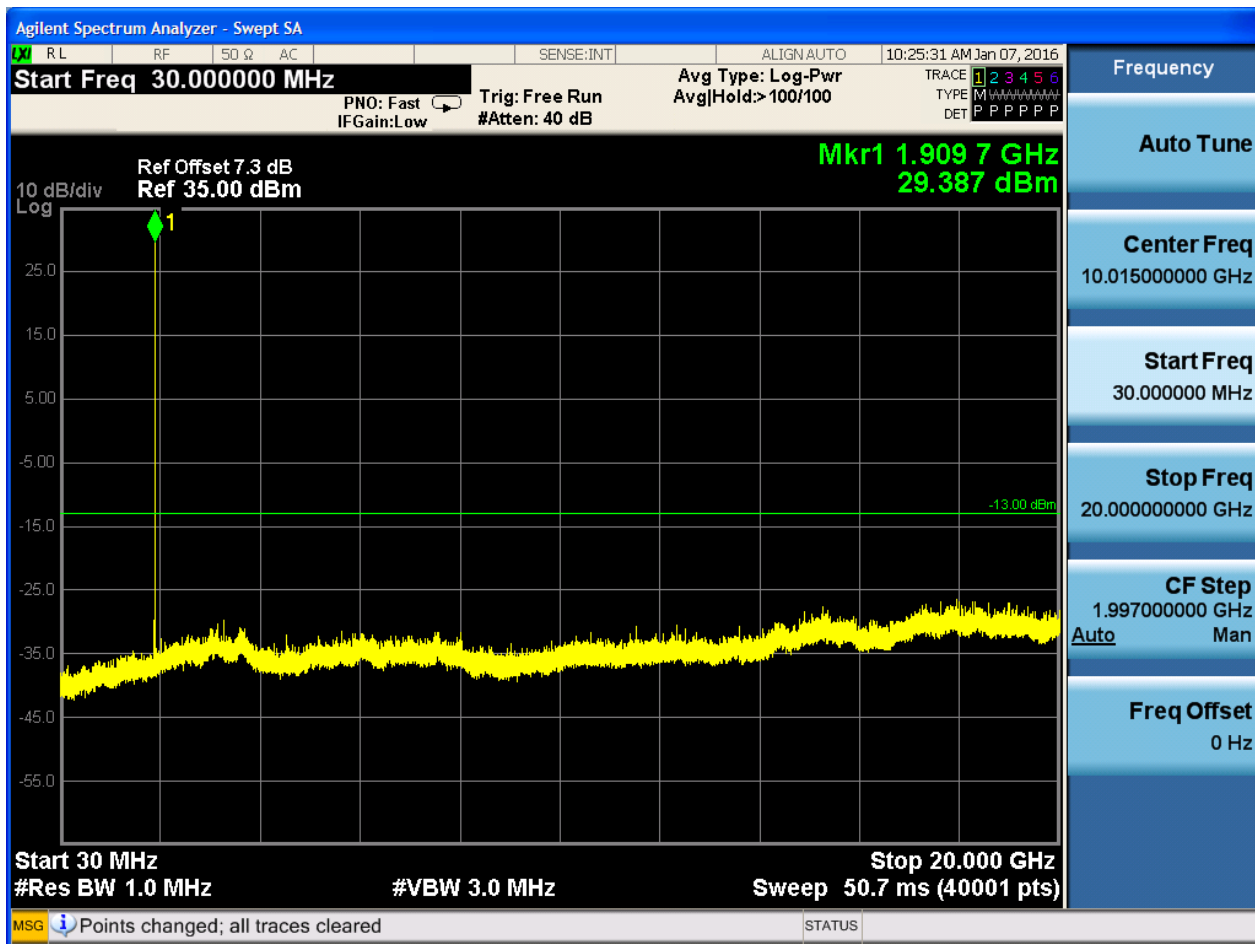




6.1.2.1.3 Test Channel = HCH



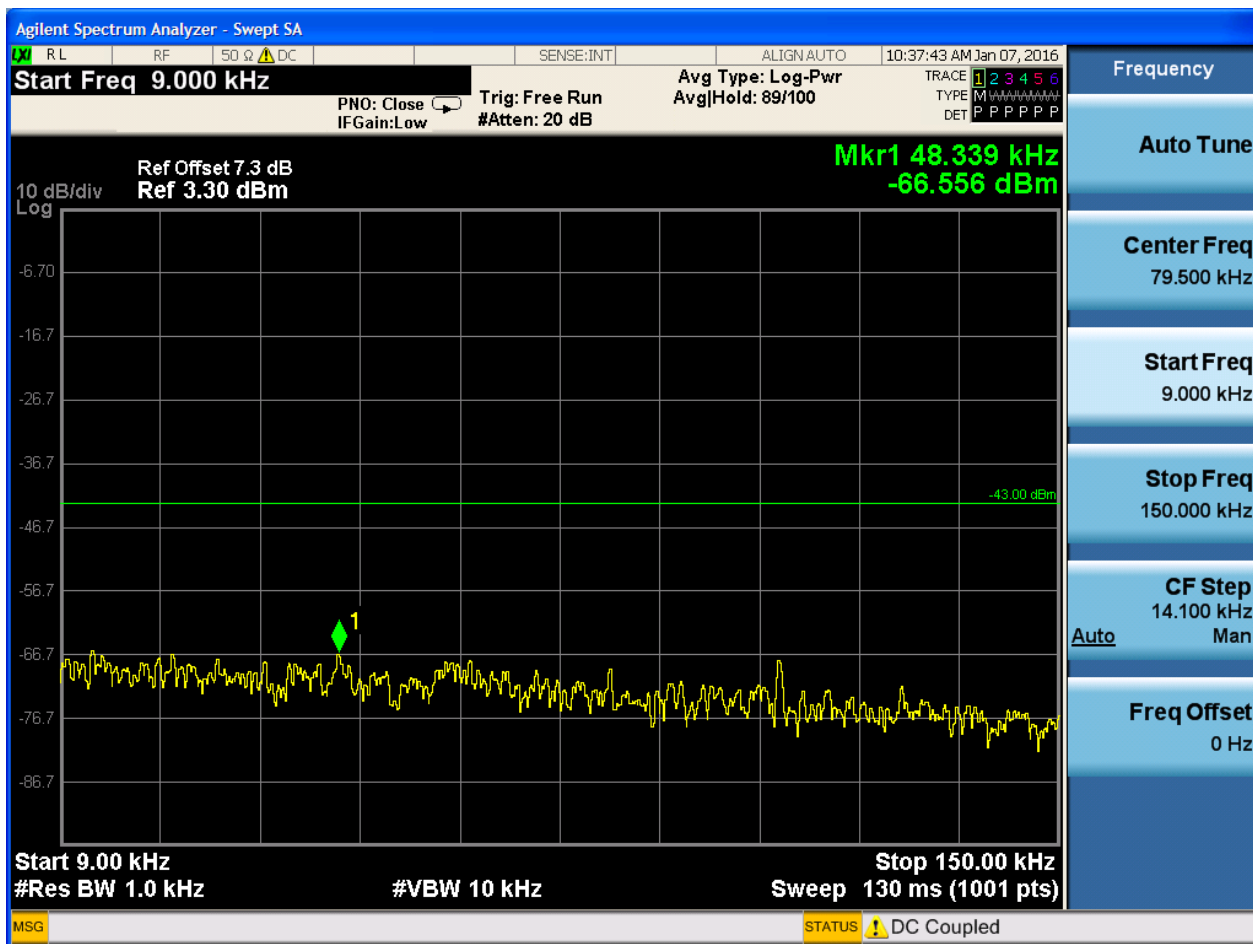


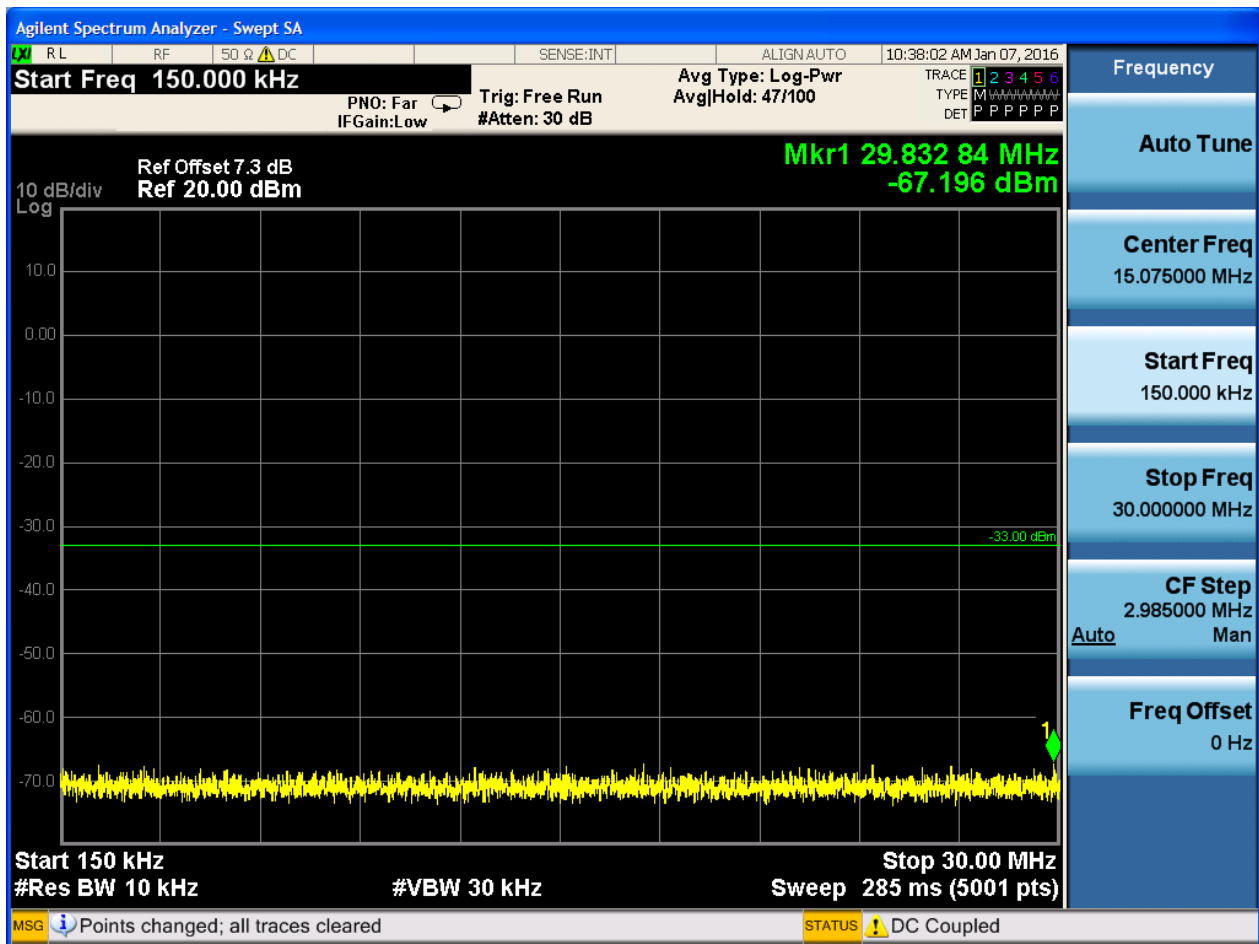


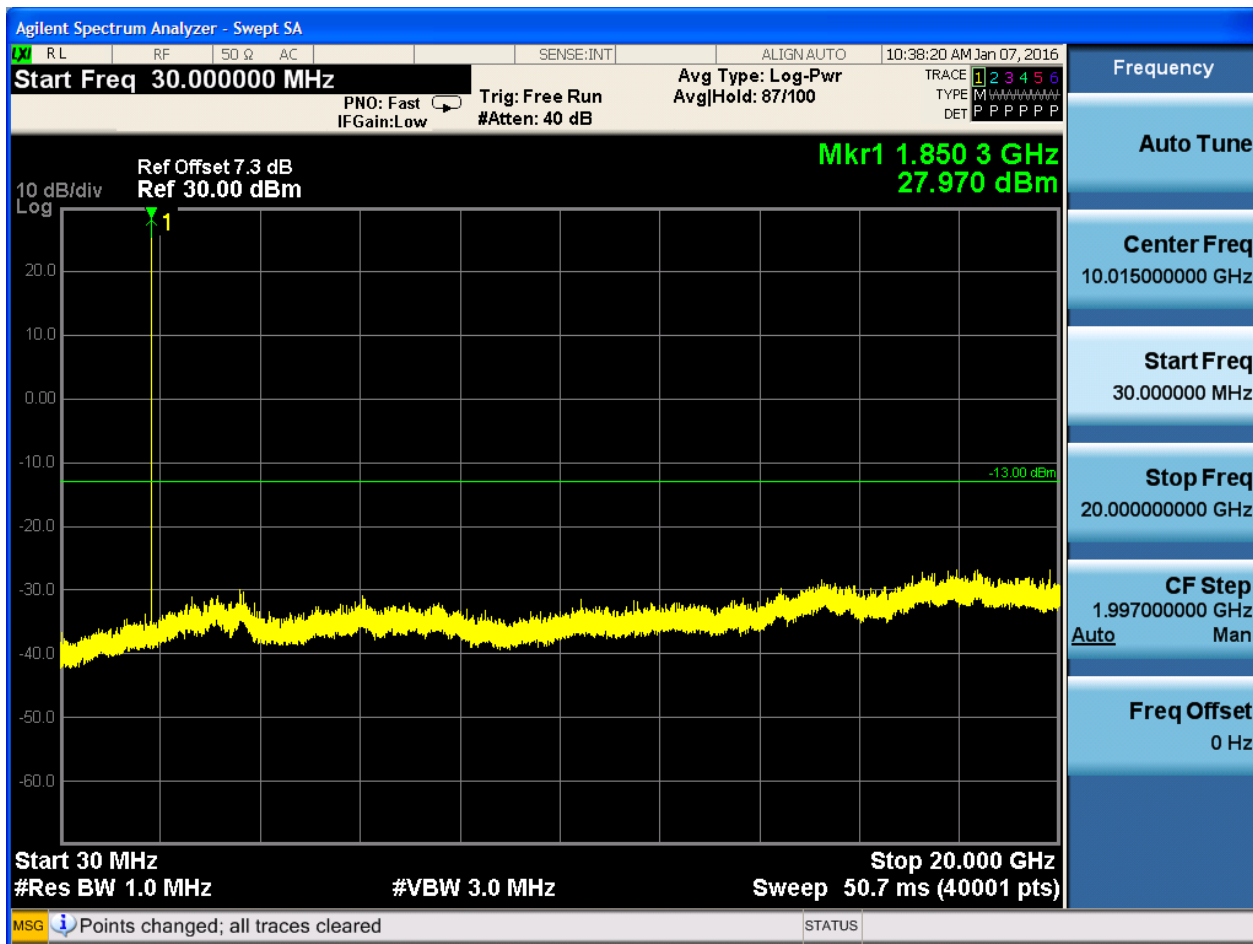


6.1.2.2 Test Mode = GSM/TM2

6.1.2.2.1 Test Channel = LCH

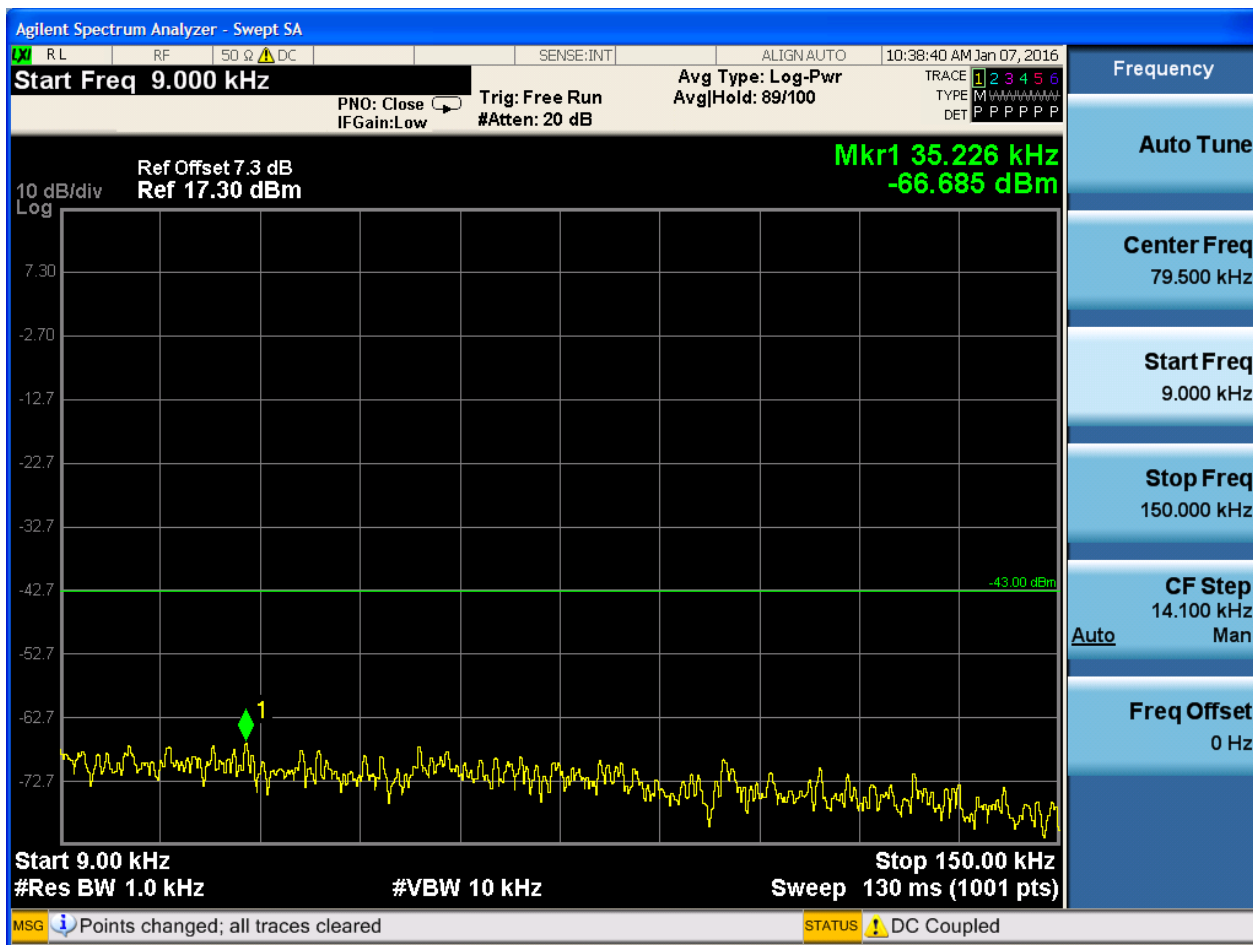


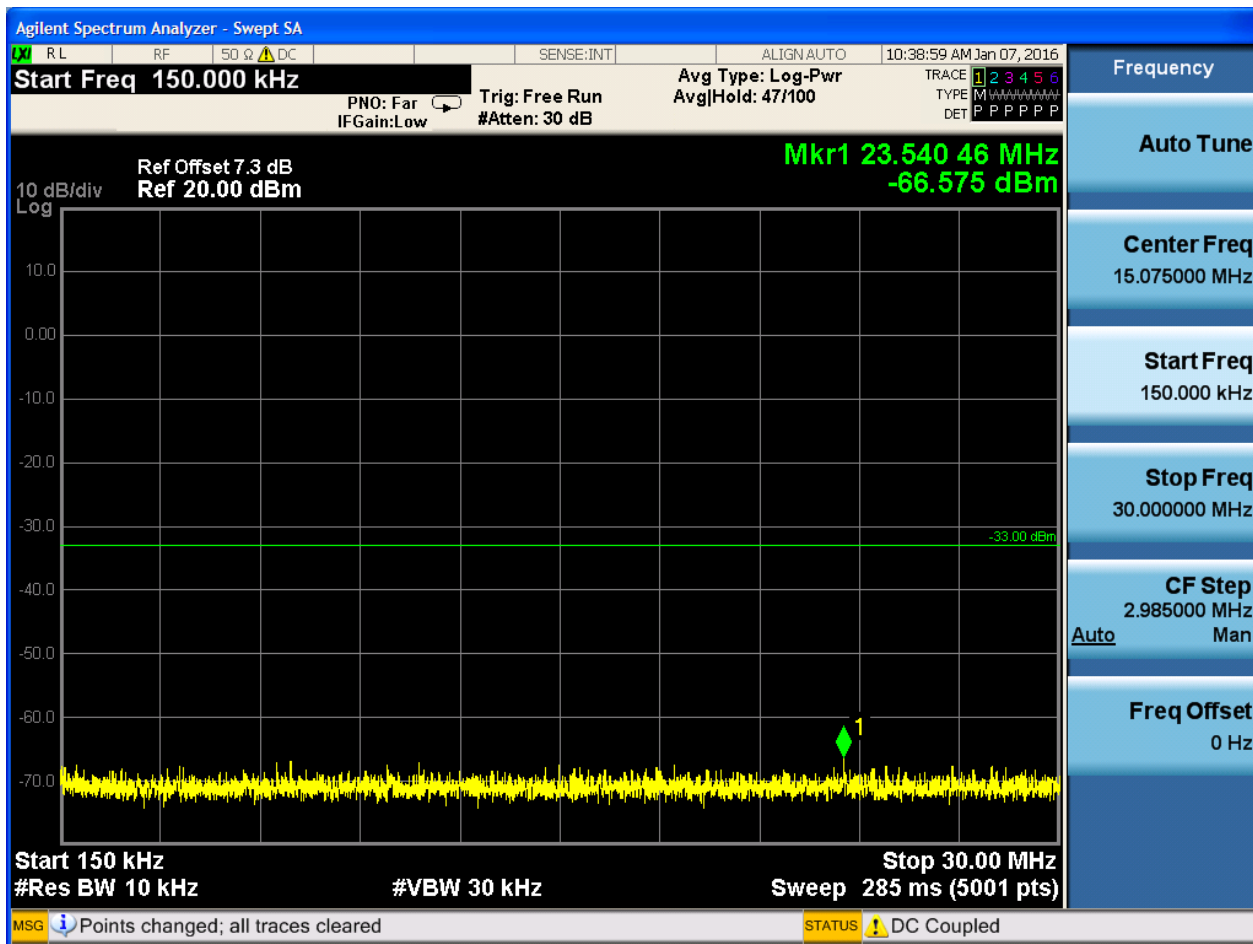


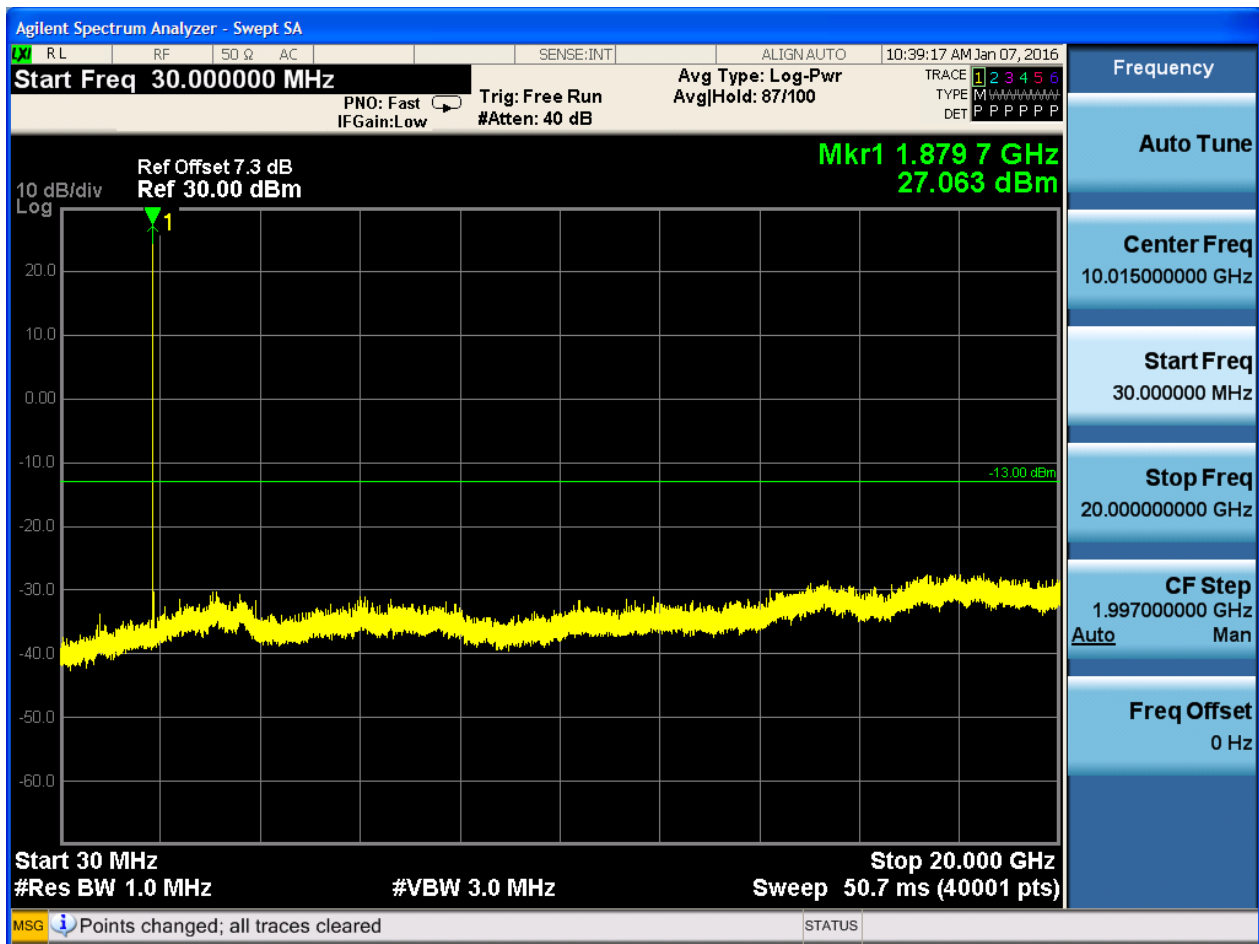




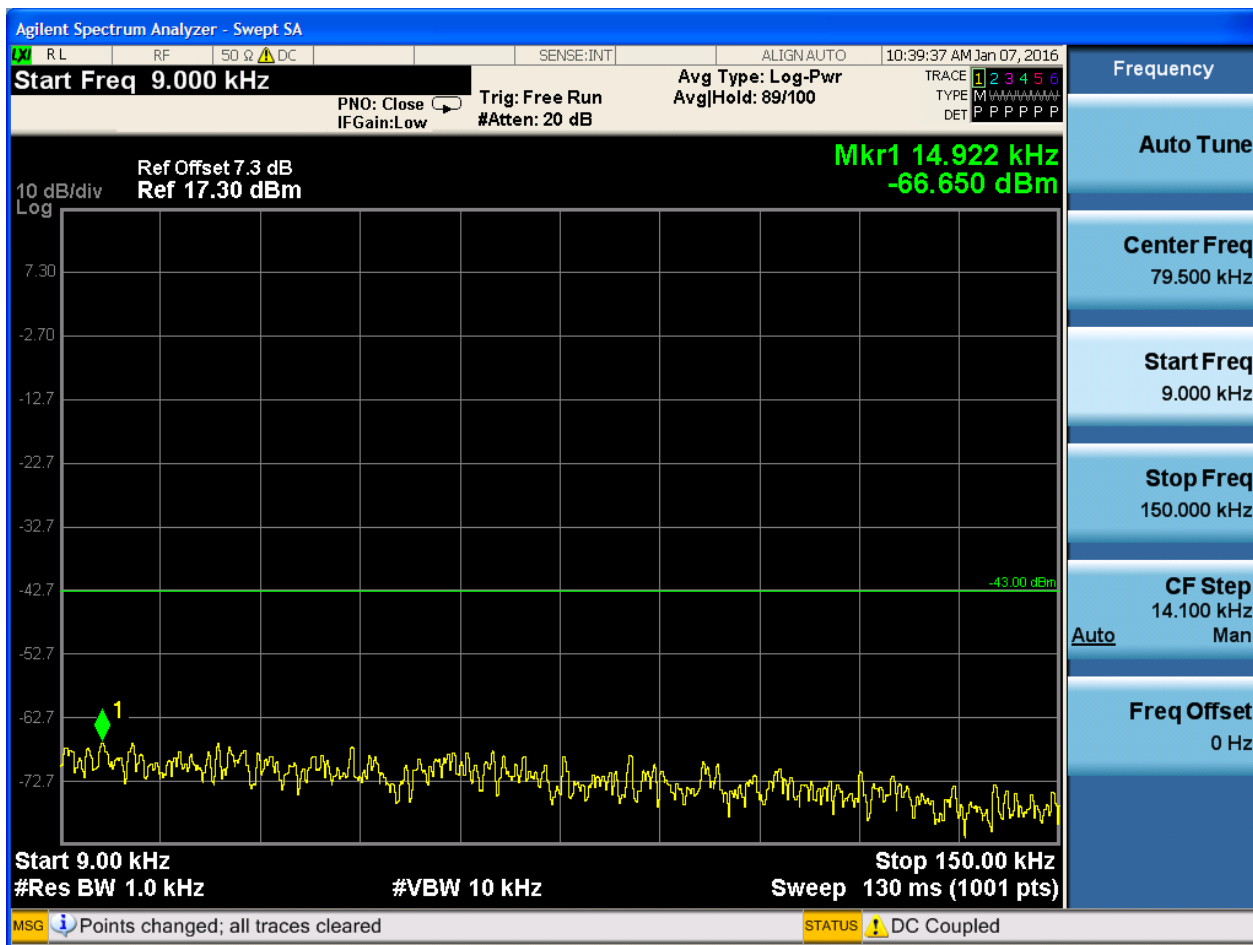
6.1.2.2.2 Test Channel = MCH

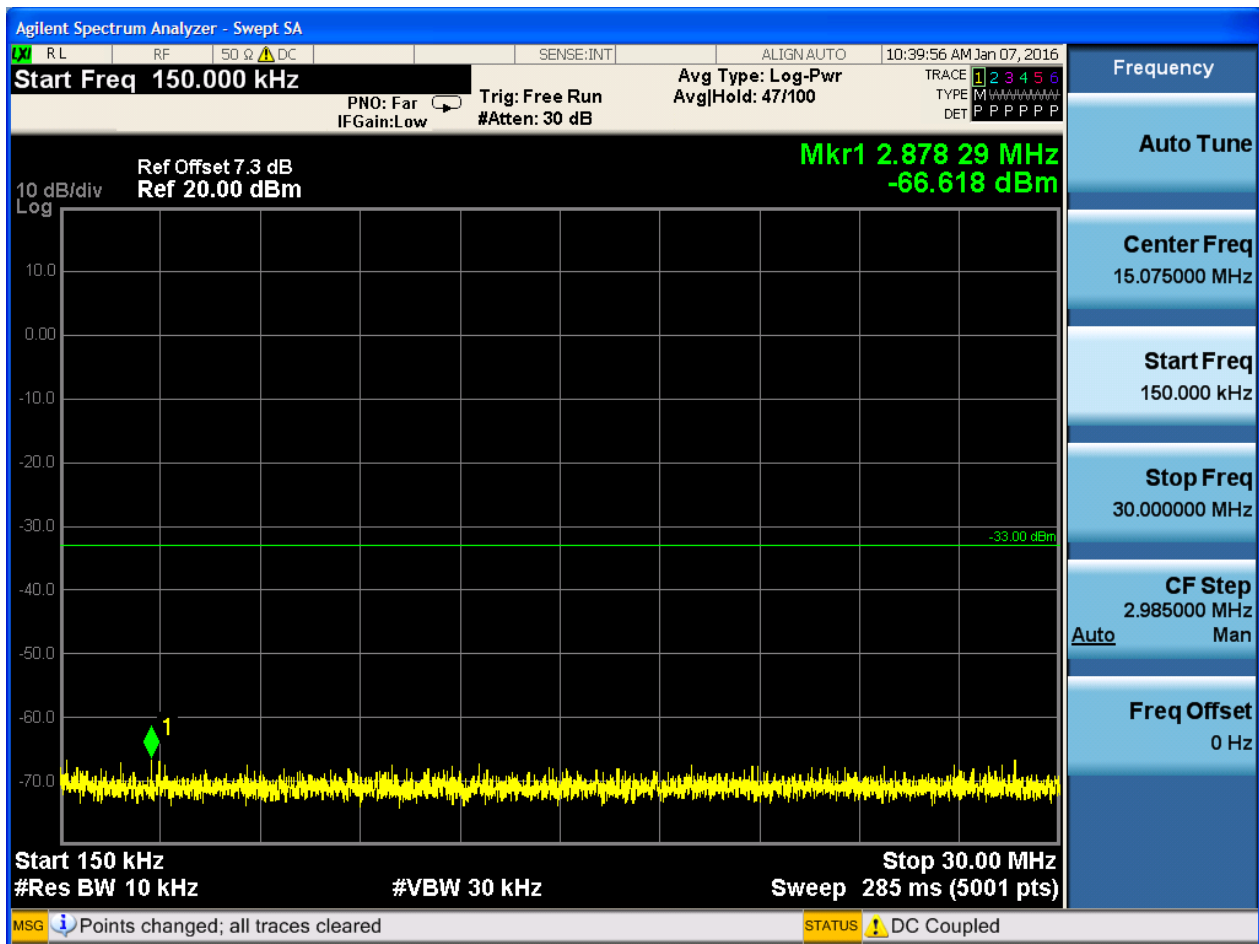


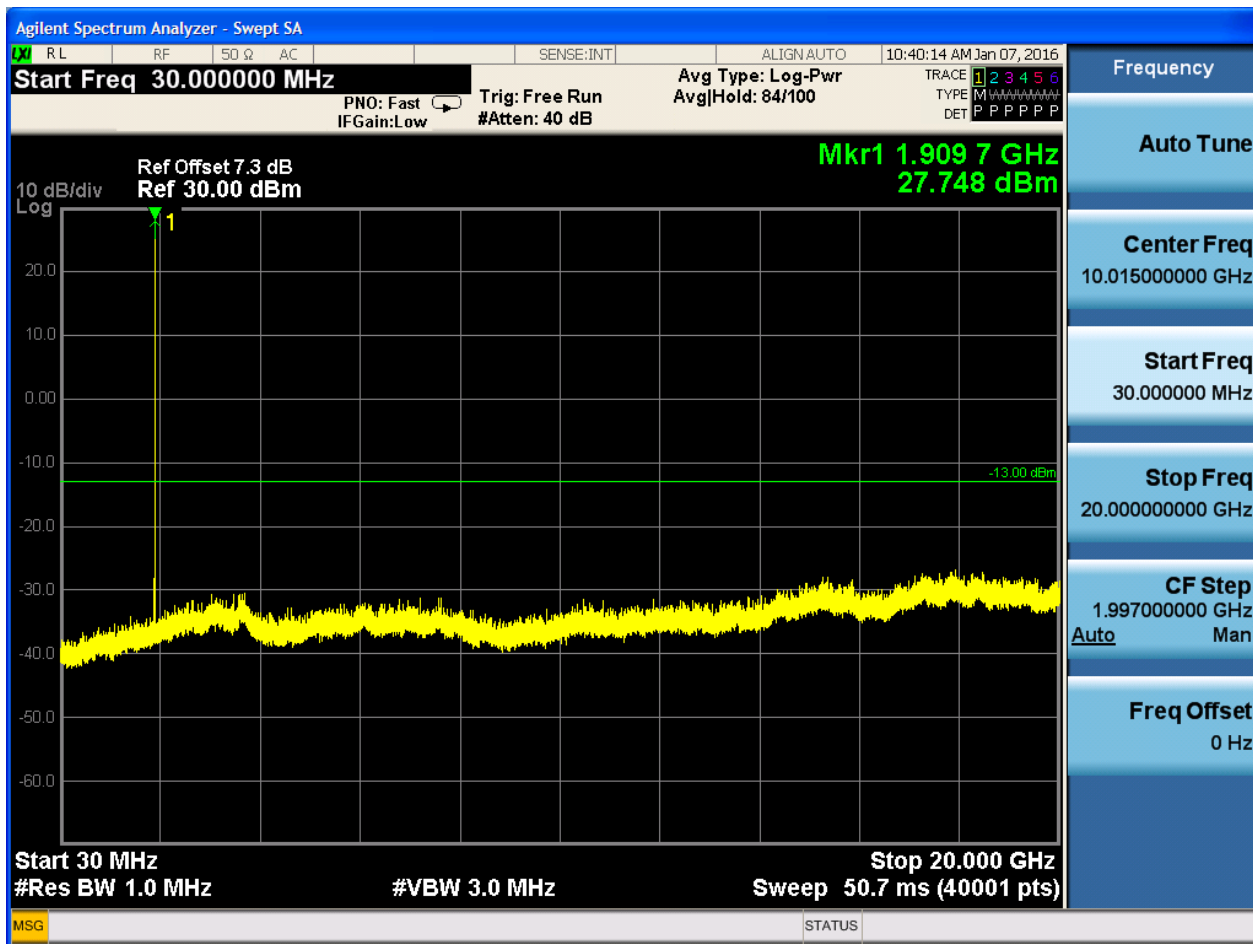




6.1.2.2.3 Test Channel = HCH







7Appendix_G: Field Strength of Spurious Radiation

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

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

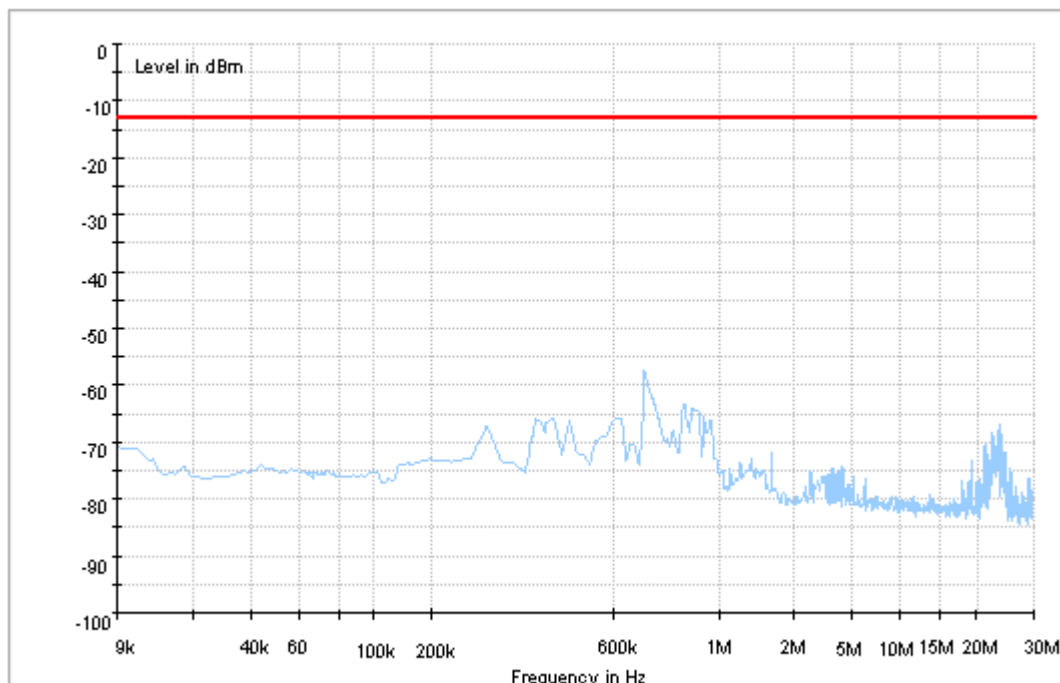
Above 1GHz, RBW = 1 MHz, VBW = 3 MHz. Detector: PK

Part I - Test Plots

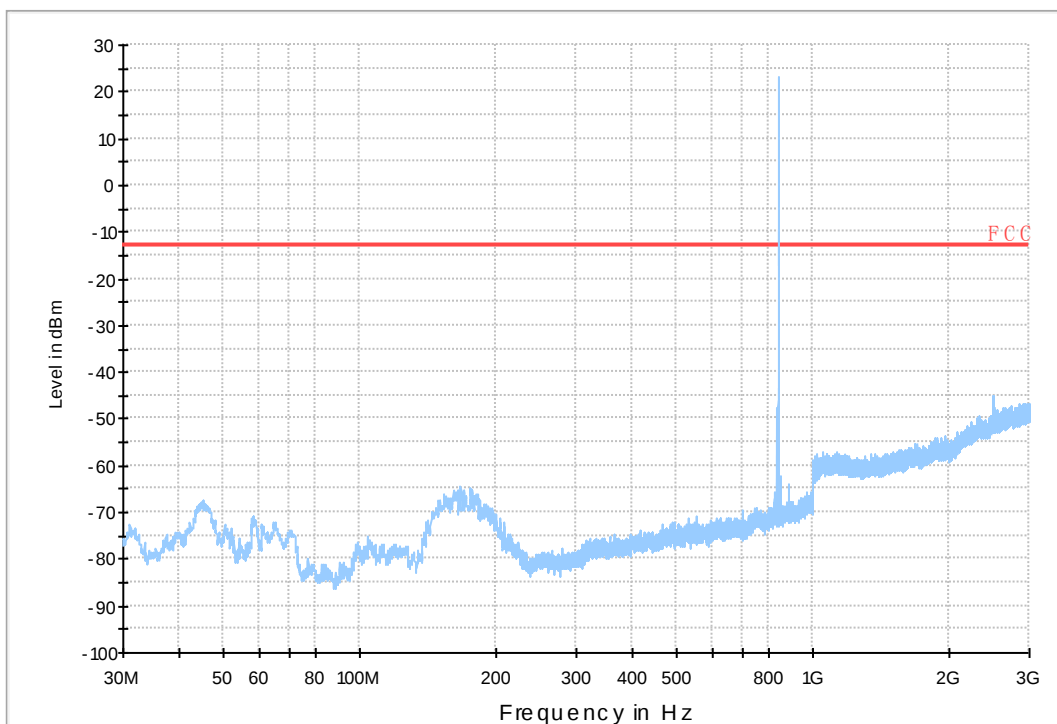
7.1 For GSM

7.1.1 Test Band = GSM850

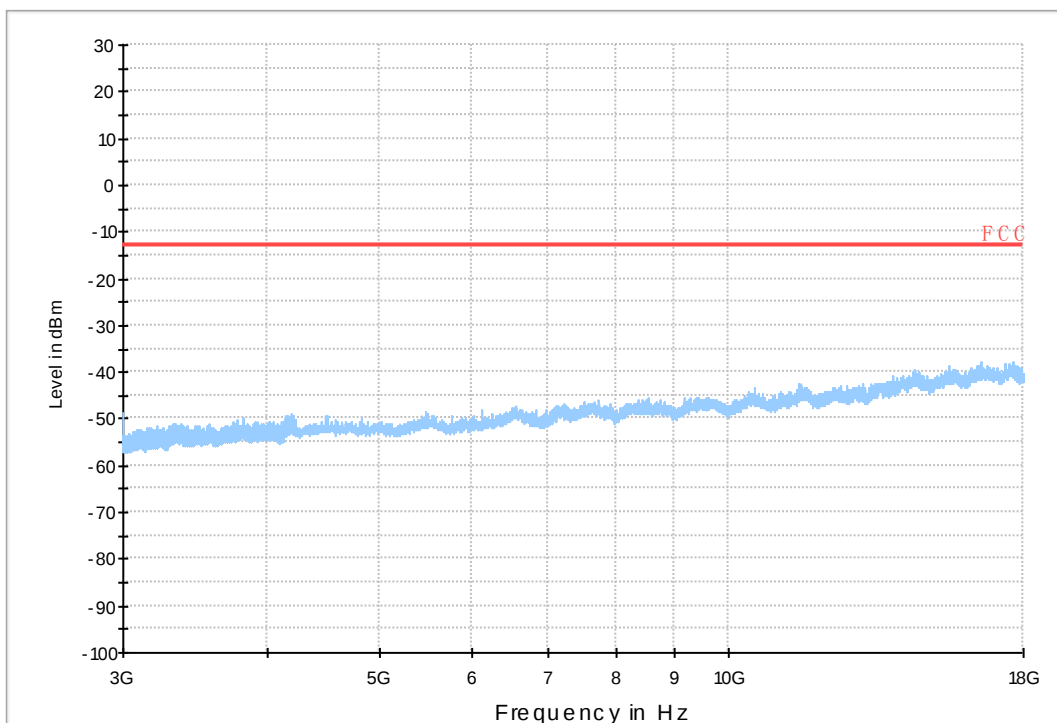
7.1.1.1 Test Mode = GSM/TM1



Copy of FCC PART22 GSM850_L

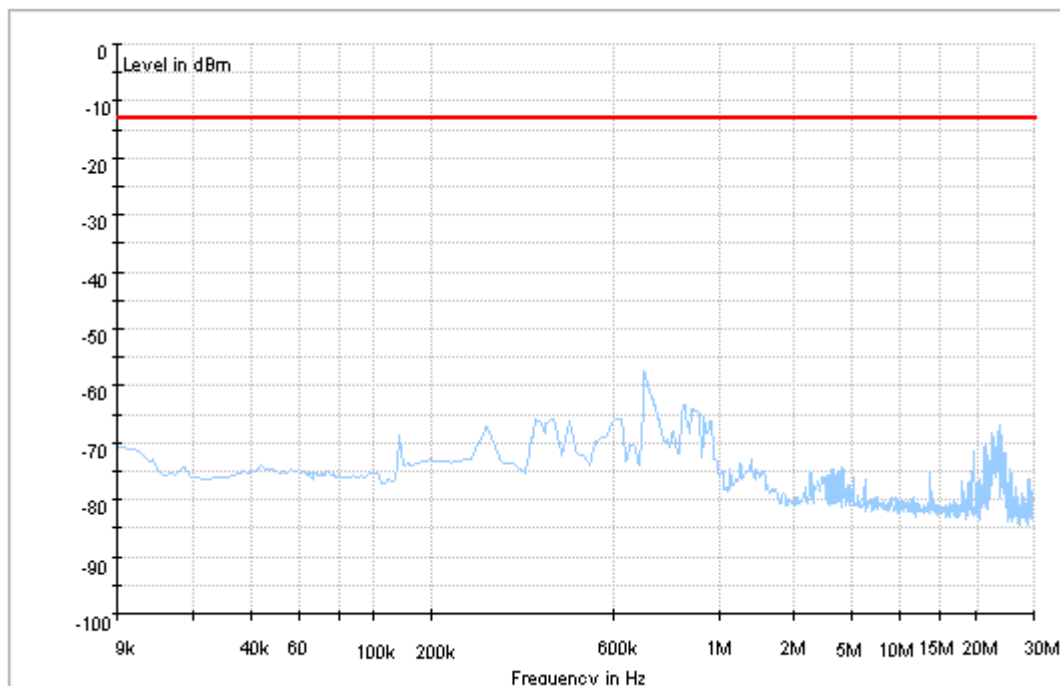


Copy of FCC PART22 GSM850_H

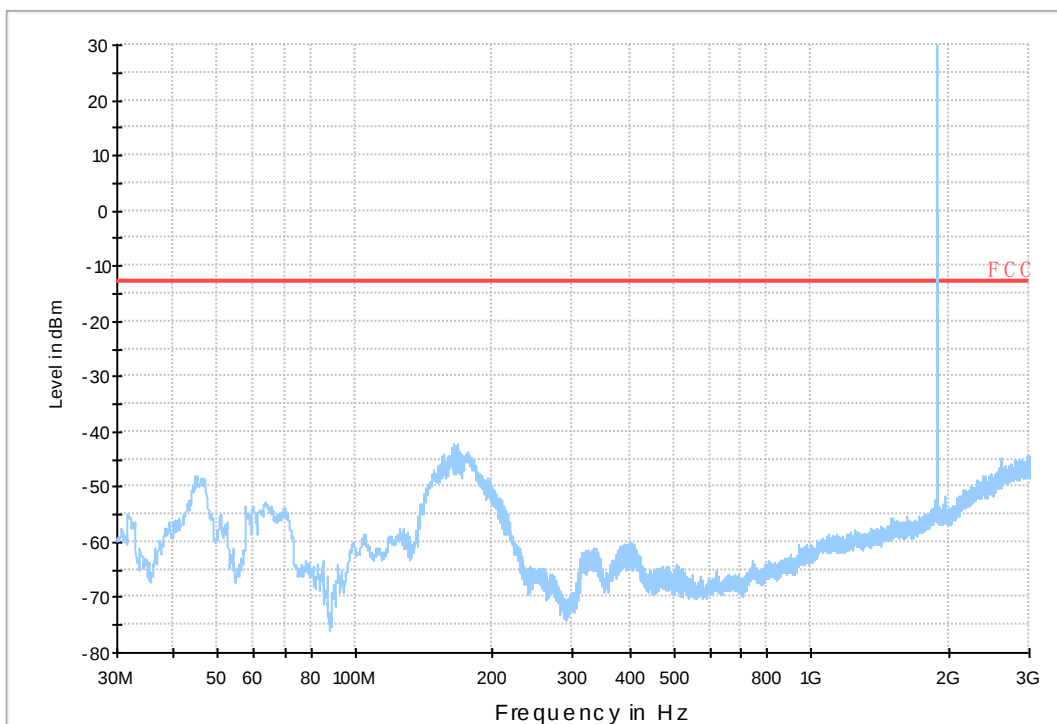


7.1.2 Test Band = GSM1900

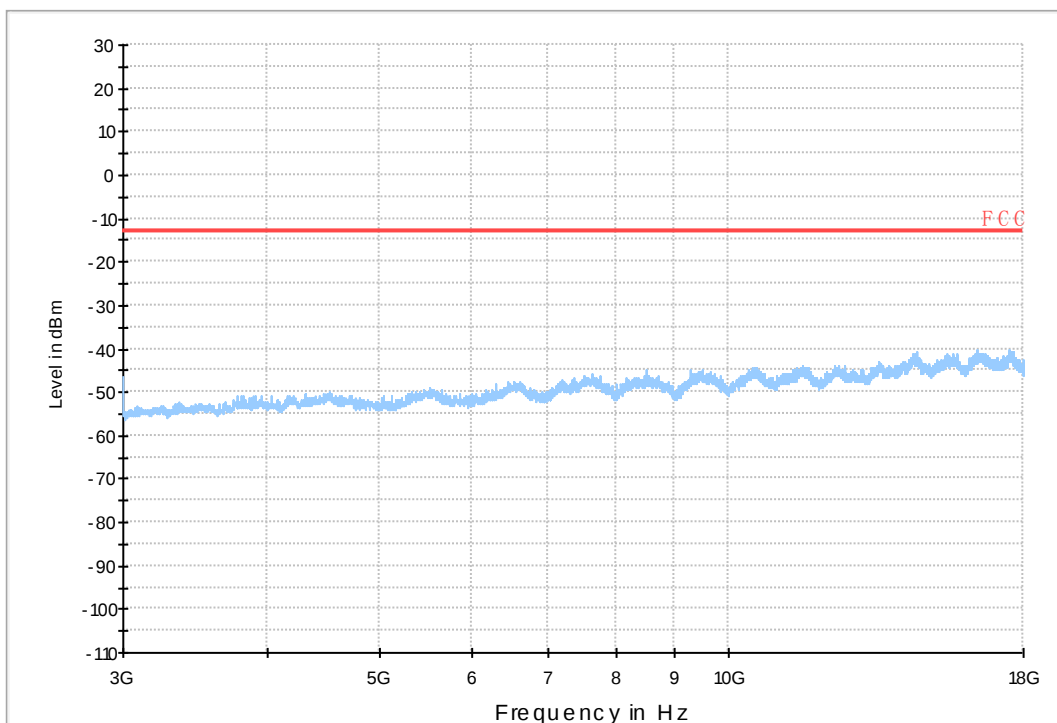
7.1.2.1 Test Mode = GSM/TM1

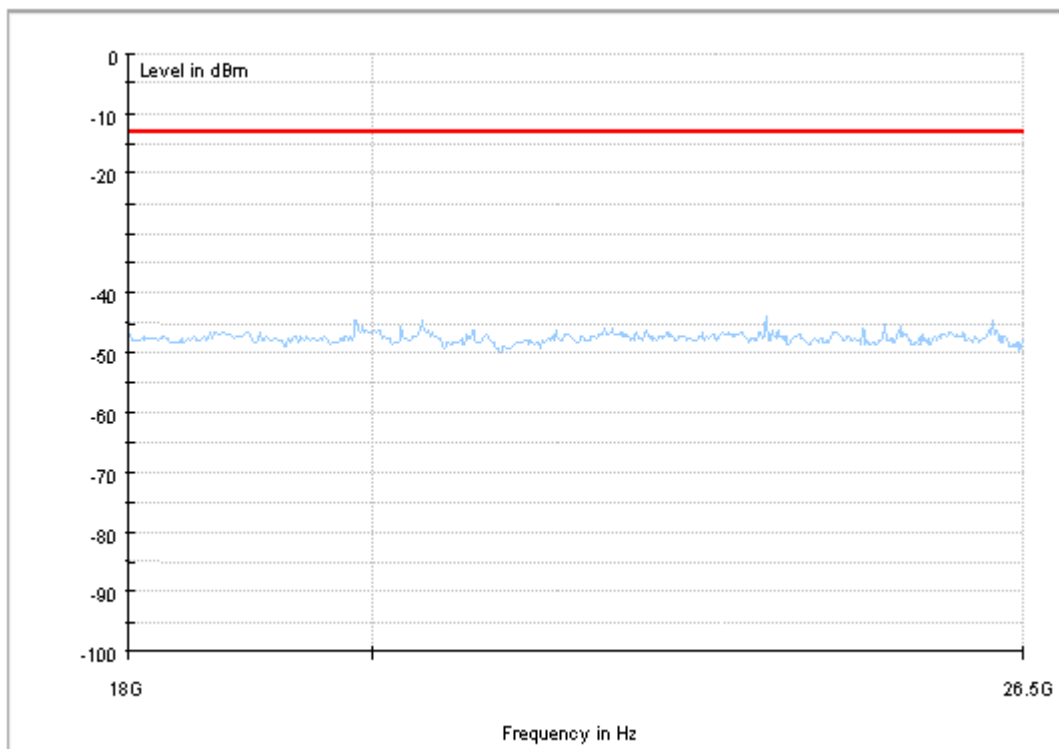


Copy of FCC PART24 GSM 1900_L



Copy of FCC PART24 GSM 1900_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	-12.07	-0.01464	PASS
				VN	-10.72	-0.01301	PASS
				VH	-9.62	-0.01167	PASS
		MCH	TN	VL	-9.62	-0.0115	PASS
				VN	-6.2	-0.00741	PASS
				VH	-6.26	-0.00748	PASS
		HCH	TN	VL	-9.81	-0.01156	PASS
				VN	-8.91	-0.0105	PASS
				VH	-4.78	-0.00563	PASS
	GSM/TM2	LCH	TN	VL	-14.56	-0.01767	PASS
				VN	-10.07	-0.01222	PASS
				VH	-12.37	-0.01501	PASS
		MCH	TN	VL	-7.97	-0.00953	PASS
				VN	-11.3	-0.01351	PASS
				VH	-10.88	-0.01301	PASS
		HCH	TN	VL	-14.4	-0.01697	PASS
				VN	-19.79	-0.02332	PASS
				VH	-14.92	-0.01758	PASS
GSM1900	GSM/TM1	LCH	TN	VL	18.53	0.01002	PASS
				VN	7.36	0.00398	PASS
				VH	13.37	0.00723	PASS
		MCH	TN	VL	19.18	0.0102	PASS
				VN	10.27	0.00546	PASS
				VH	12.27	0.00653	PASS
		HCH	TN	VL	9.88	0.00517	PASS
				VN	9.94	0.0052	PASS
				VH	18.66	0.00977	PASS
	GSM/TM2	LCH	TN	VL	-4.81	-0.0026	PASS
				VN	-8.85	-0.00478	PASS
				VH	-11.91	-0.00644	PASS
		MCH	TN	VL	-9.88	-0.00526	PASS
				VN	-5.91	-0.00314	PASS

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
		HCH	TN	VH	-0.71	-0.00038	PASS
				VL	-13.88	-0.00727	PASS
				VN	-6.91	-0.00362	PASS
				VH	-9.3	-0.00487	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	-9.49	-0.01151	PASS
				-20	-11.69	-0.01418	PASS
				-10	-8.72	-0.01058	PASS
				0	-9.1	-0.01104	PASS
				10	-12.27	-0.01489	PASS
				20	-10.65	-0.01292	PASS
				30	-7.49	-0.00909	PASS
				40	-14.01	-0.017	PASS
				50	-7.23	-0.00877	PASS
		MCH	VN	-30	-13.3	-0.0159	PASS
				-20	-6.97	-0.00833	PASS
				-10	-7.04	-0.00842	PASS
				0	-10.2	-0.01219	PASS
				10	-3.55	-0.00424	PASS
				20	-9.49	-0.01134	PASS
				30	-12.33	-0.01474	PASS
				40	-9.81	-0.01173	PASS
				50	-10.4	-0.01243	PASS
		HCH	VN	-30	-11.3	-0.01331	PASS
				-20	-8.98	-0.01058	PASS
				-10	-6.07	-0.00715	PASS
				0	-8.27	-0.00974	PASS
				10	-14.59	-0.01719	PASS
				20	-9.75	-0.01149	PASS
				30	-9.49	-0.01118	PASS
				40	-7.62	-0.00898	PASS
				50	-15.11	-0.0178	PASS
	GSM/TM2	LCH	VN	-30	-12.75	-0.01547	PASS
				-20	-14.27	-0.01731	PASS
				-10	-17.92	-0.02174	PASS
				0	-15.4	-0.01868	PASS

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				10	-10.3	-0.0125	PASS
				20	-13.43	-0.01629	PASS
				30	-14.92	-0.0181	PASS
				40	-6.36	-0.00772	PASS
				50	-14.63	-0.01775	PASS
		MCH	VN	-30	-13.95	-0.01667	PASS
				-20	-11.75	-0.01404	PASS
				-10	-7.14	-0.00853	PASS
				0	-7.39	-0.00883	PASS
				10	-10.56	-0.01262	PASS
				20	-15.79	-0.01887	PASS
				30	-12.88	-0.0154	PASS
				40	-16.82	-0.02011	PASS
				50	-9.85	-0.01177	PASS
		HCH	VN	-30	-13.04	-0.01536	PASS
				-20	-10.36	-0.01221	PASS
				-10	-8.17	-0.00963	PASS
				0	-12.91	-0.01521	PASS
				10	-12.24	-0.01442	PASS
				20	-14.37	-0.01693	PASS
				30	-8.46	-0.00997	PASS
				40	-12.24	-0.01442	PASS
				50	-11.75	-0.01384	PASS
GSM1900	GSM/TM1	LCH	VN	-30	9.3	0.00503	PASS
				-20	9.04	0.00489	PASS
				-10	16.27	0.00879	PASS
				0	14.14	0.00764	PASS
				10	17.63	0.00953	PASS
				20	10.78	0.00583	PASS
				30	11.49	0.00621	PASS
				40	0.9	0.00049	PASS
				50	2.84	0.00153	PASS
		MCH	VN	-30	25.89	0.01377	PASS
				-20	15.69	0.00835	PASS
				-10	10.46	0.00556	PASS
				0	18.92	0.01006	PASS
				10	21.57	0.01147	PASS
				20	15.17	0.00807	PASS
				30	15.82	0.00841	PASS
				40	15.37	0.00818	PASS

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
		HCH	VN	50	13.5	0.00718	PASS
				-30	18.47	0.00967	PASS
				-20	18.98	0.00994	PASS
				-10	14.53	0.00761	PASS
				0	3.42	0.00179	PASS
				10	13.24	0.00693	PASS
				20	9.88	0.00517	PASS
				30	8.78	0.0046	PASS
				40	11.62	0.00608	PASS
				50	14.14	0.0074	PASS
	GSM/TM2	LCH	VN	-30	-2.23	-0.00121	PASS
				-20	-0.61	-0.00033	PASS
				-10	2.42	0.00131	PASS
				0	-4.81	-0.0026	PASS
				10	-7.68	-0.00415	PASS
				20	-3.58	-0.00193	PASS
				30	-5.55	-0.003	PASS
				40	-22.15	-0.01197	PASS
				50	-18.69	-0.0101	PASS
		MCH	VN	-30	0.87	0.00046	PASS
				-20	-9.75	-0.00519	PASS
				-10	-2.36	-0.00126	PASS
				0	4.88	0.0026	PASS
				10	-8.75	-0.00465	PASS
				20	-16.3	-0.00867	PASS
				30	-13.5	-0.00718	PASS
				40	12.46	0.00663	PASS
				50	-9.07	-0.00482	PASS
		HCH	VN	-30	-2.65	-0.00139	PASS
				-20	-5.52	-0.00289	PASS
				-10	7.85	0.00411	PASS
				0	5.07	0.00265	PASS
				10	-2.97	-0.00156	PASS
				20	-10.23	-0.00536	PASS
				30	1.49	0.00078	PASS
				40	-5.17	-0.00271	PASS
				50	-11.2	-0.00586	PASS

END