



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	32.55	27.85	38.5	PASS
		MCH	32.64	27.84	38.5	PASS
		HCH	32.67	27.88	38.5	PASS
	GSM/TM2	LCH	25.33	20.48	38.5	PASS
		MCH	25.34	20.69	38.5	PASS
		HCH	25.3	20.51	38.5	PASS

Test Band	Test Mode	Test Channel	Conducted Power [dBm]	EIRP [dBm]	Limit [dBm]	Verdict
GSM1900	GSM/TM1	LCH	29.54	28.45	33	PASS
		MCH	29.57	28.32	33	PASS
		HCH	29.51	28.39	33	PASS
	GSM/TM2	LCH	25.67	24.62	33	PASS
		MCH	25.51	24.18	33	PASS

Test Band	Test Mode	Test Channel	Conducted Power [dBm]	EIRP [dBm]	Limit [dBm]	Verdict
		HCH	25.53	24.45	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:

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

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

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

$$\text{SET Sweep time} = \text{auto-couple.}$$

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	0.13	13	PASS
		MCH	0.12	13	PASS
		HCH	0.13	13	PASS
	GSM/TM2	LCH	3.13	13	PASS
		MCH	3.17	13	PASS
		HCH	3.14	13	PASS
GSM1900	GSM/TM1	LCH	0.12	13	PASS
		MCH	0.13	13	PASS
		HCH	0.13	13	PASS
	GSM/TM2	LCH	3.44	13	PASS
		MCH	3.32	13	PASS
		HCH	3.36	13	PASS

3Appendix_C: Modulation Characteristics

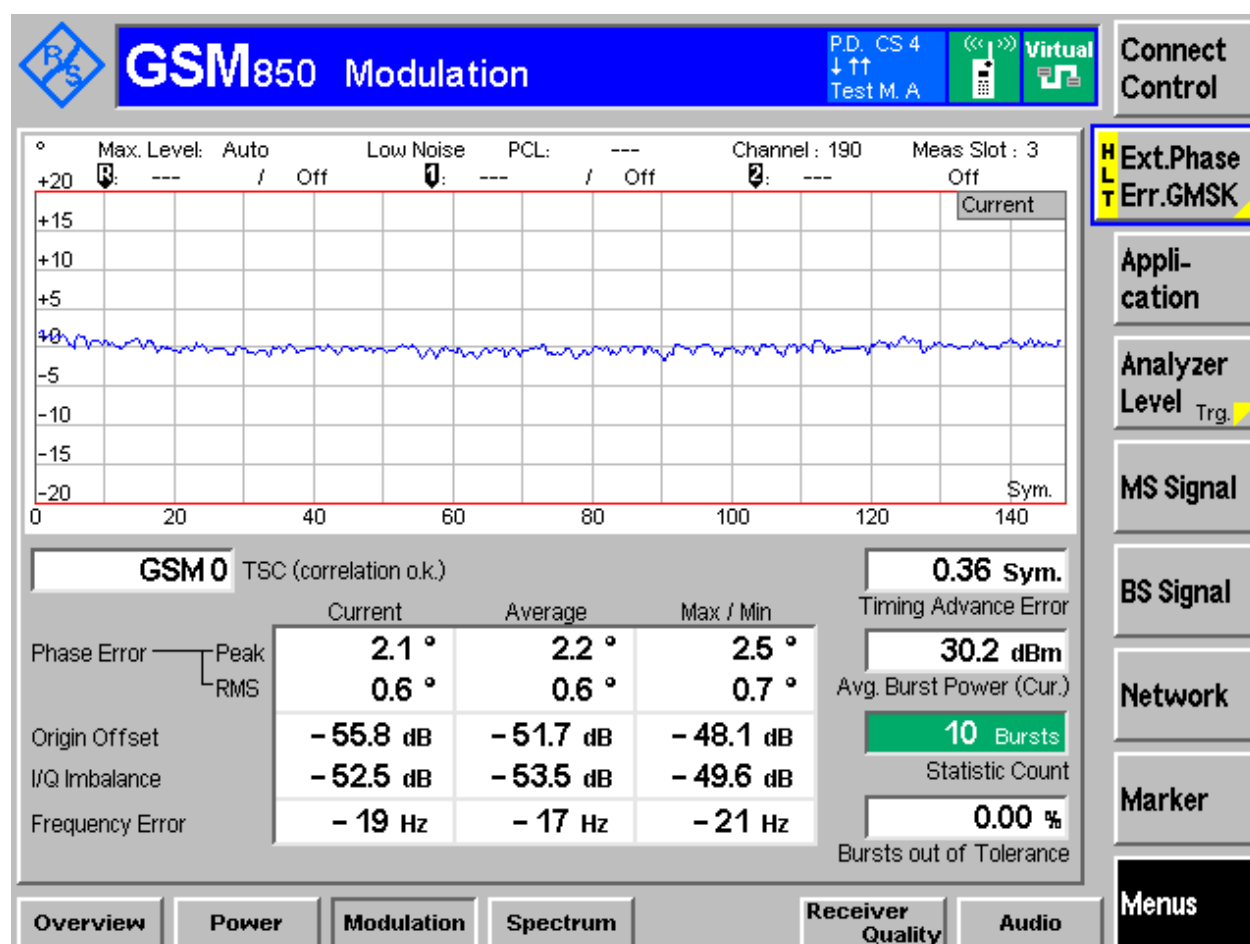
Part I - Test Plots

3.1 For GSM

3.1.1 Test Band = GSM850

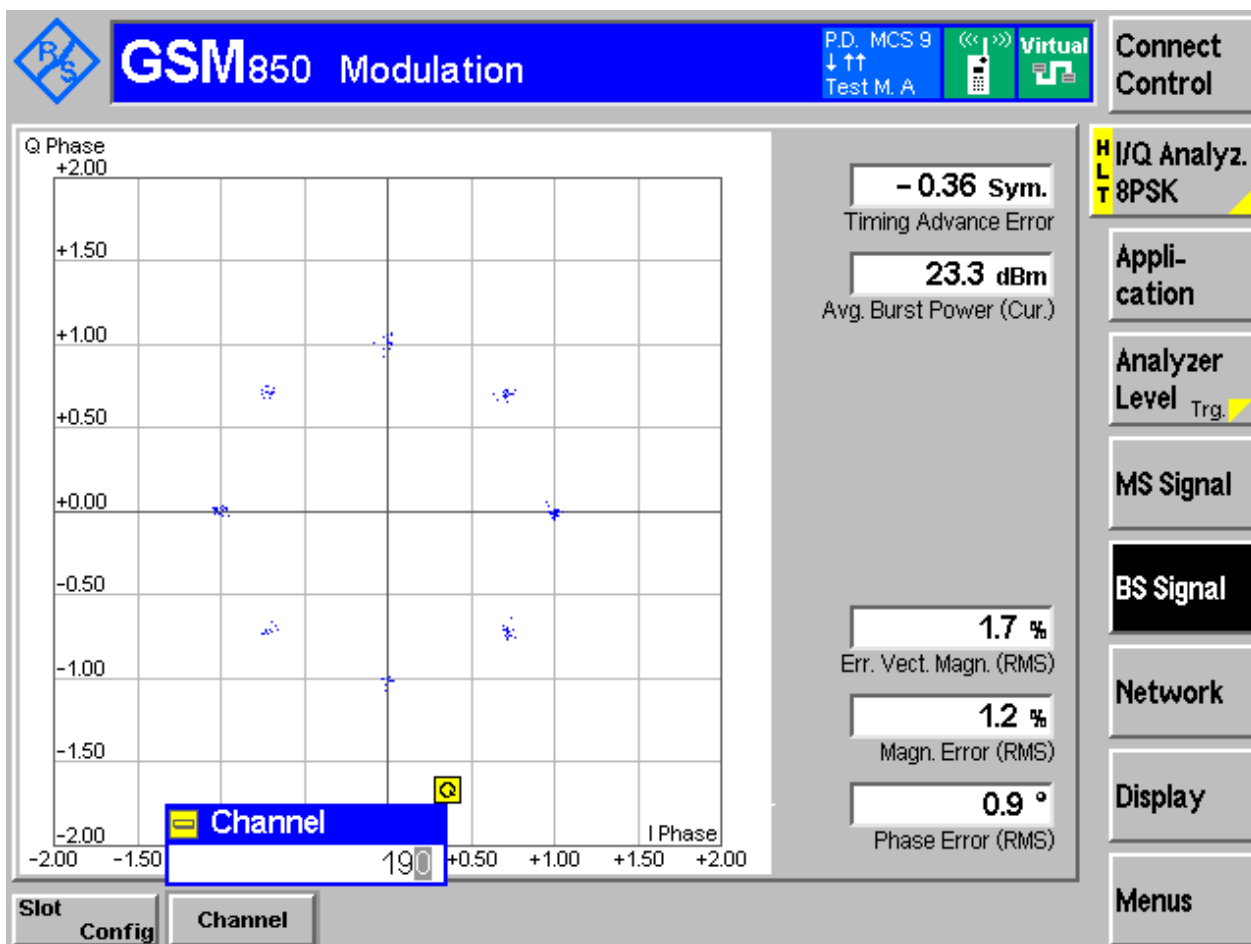
3.1.1.1 Test Mode = GSM/TM1

3.1.1.1.1 Test Channel = MCH



3.1.1.2 Test Mode = GSM/TM2

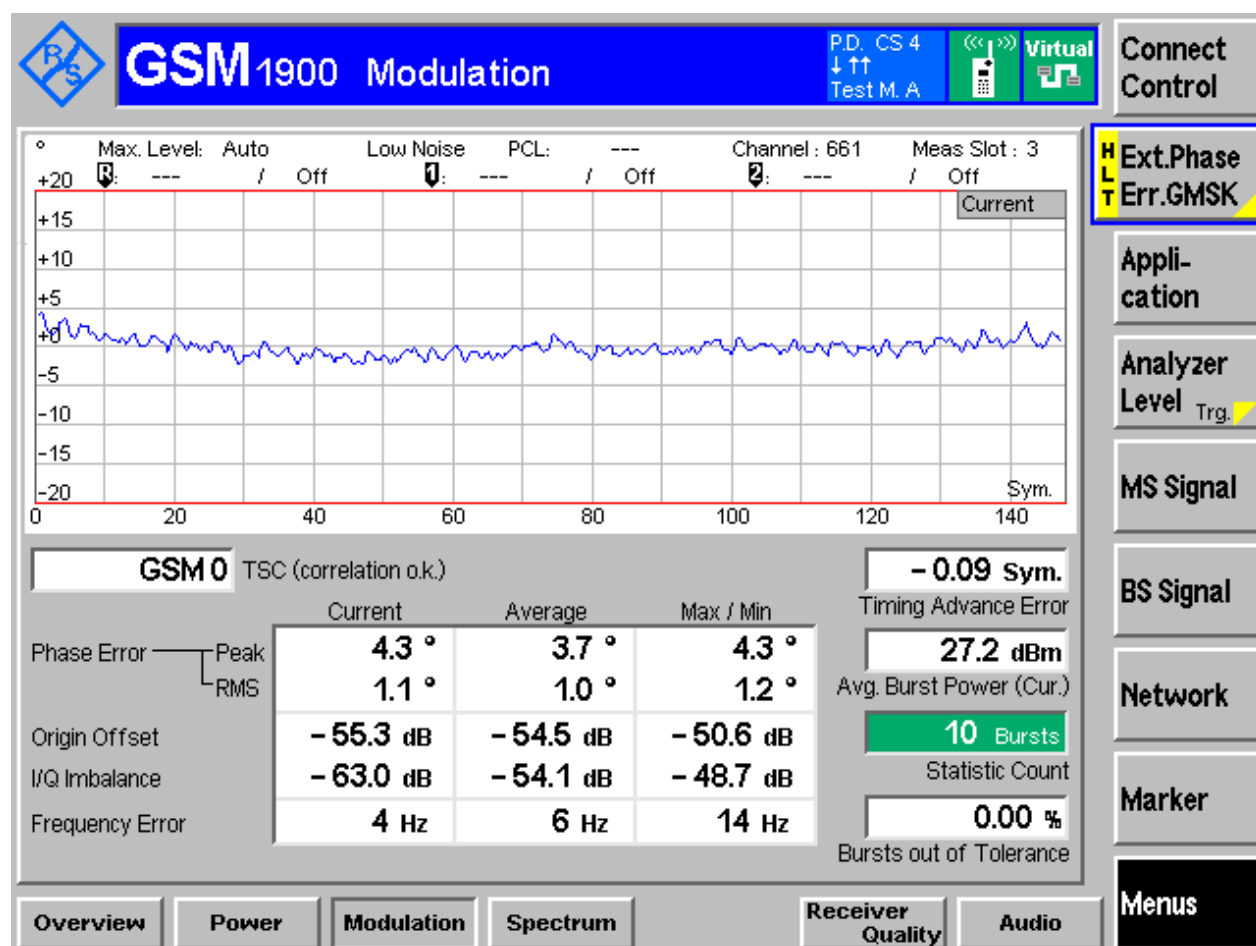
3.1.1.2.1 Test Channel = MCH



3.1.2 Test Band = GSM1900

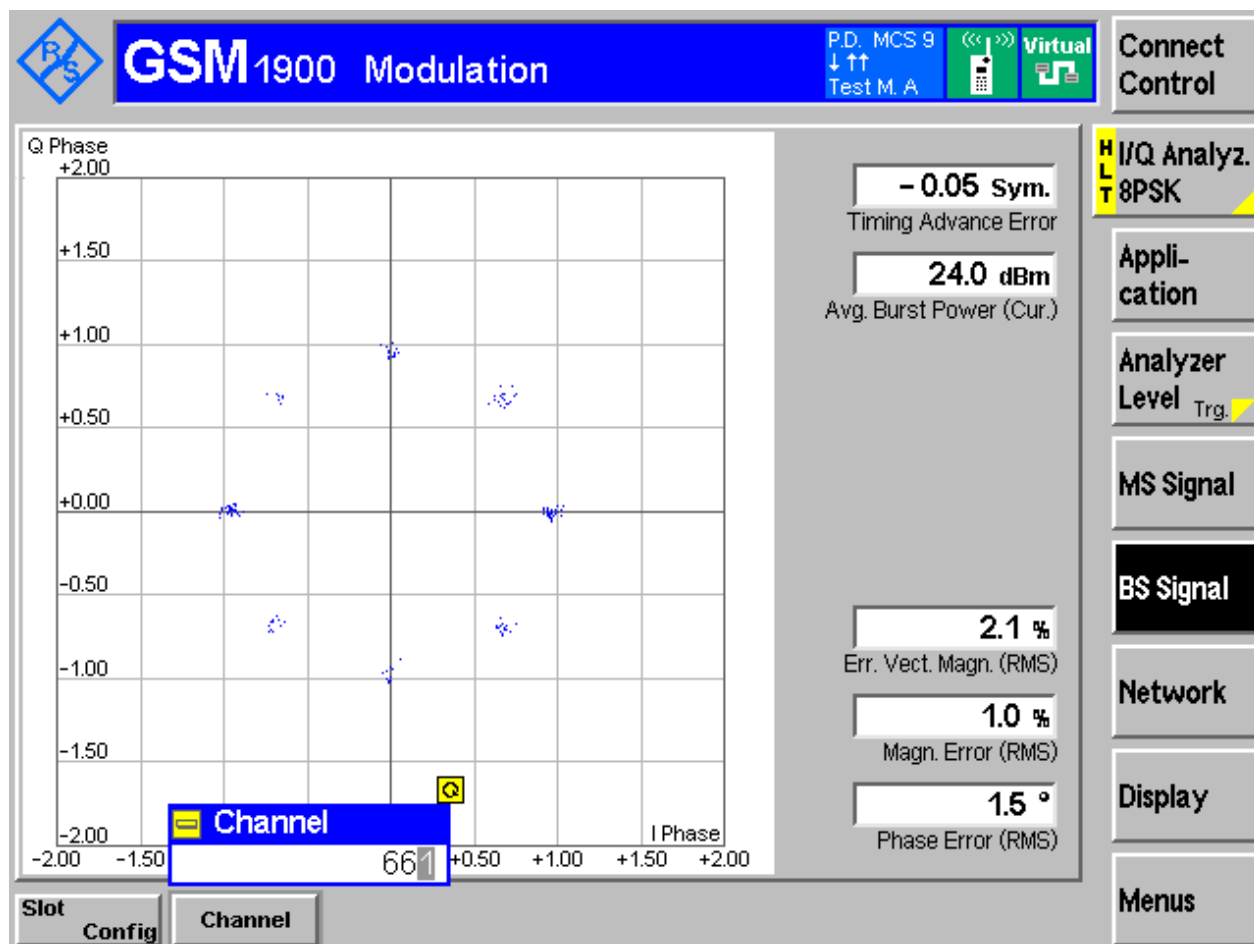
3.1.2.1 Test Mode = GSM/TM1

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	247.33	320.74	Pass
		MCH	245.86	316.13	Pass
		HCH	244.70	321.59	Pass
	GSM/TM2	LCH	233.70	289.16	Pass
		MCH	241.12	315.32	Pass
		HCH	244.14	299.73	Pass
GSM1900	GSM/TM1	LCH	246.87	321.38	Pass
		MCH	243.79	316.33	Pass
		HCH	244.92	320.74	Pass
	GSM/TM2	LCH	248.85	318.57	Pass
		MCH	247.58	321.60	Pass
		HCH	247.66	320.59	Pass

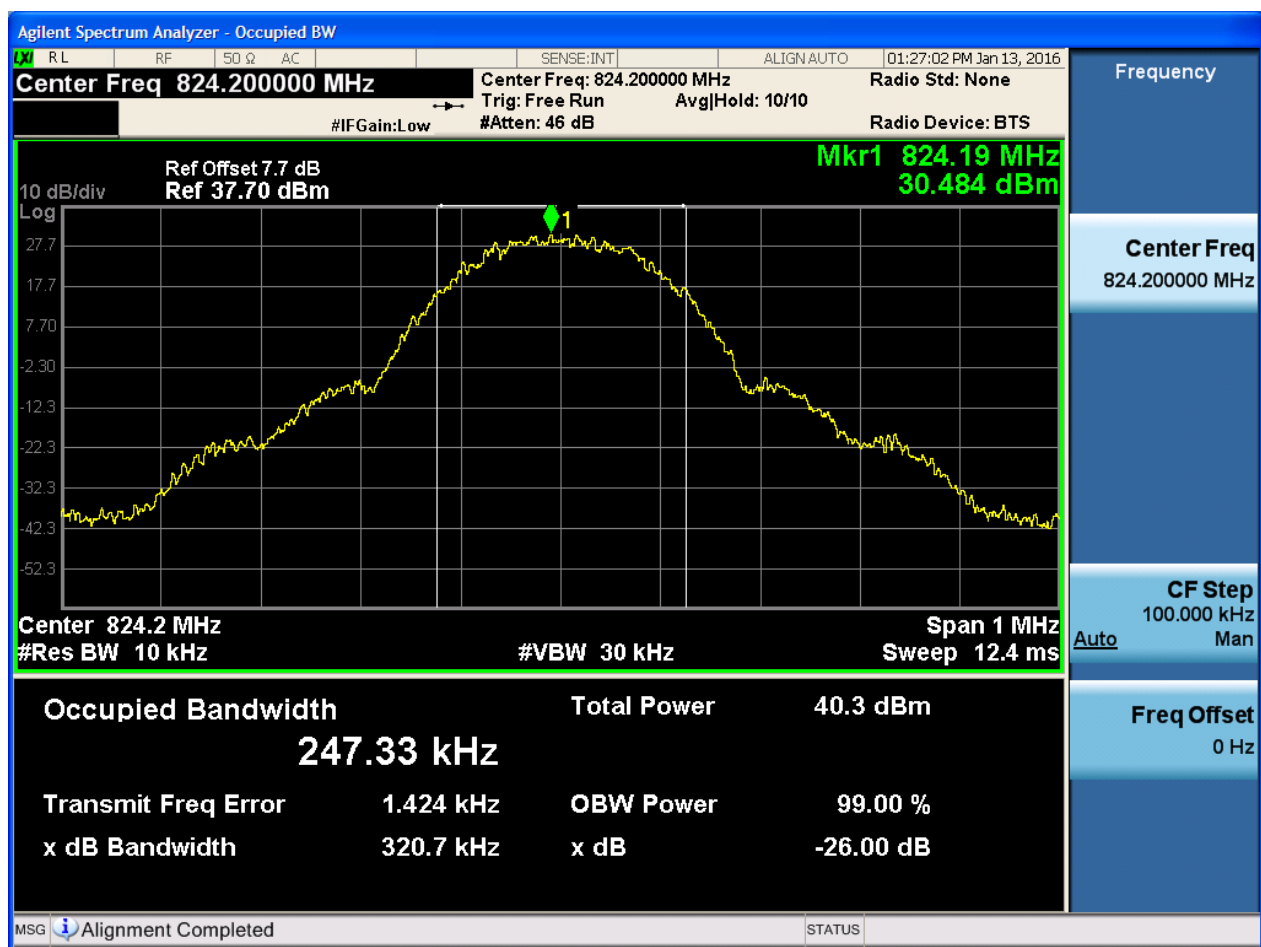
Part II - Test Plots

4.1 For GSM

4.1.1 Test Band = GSM850

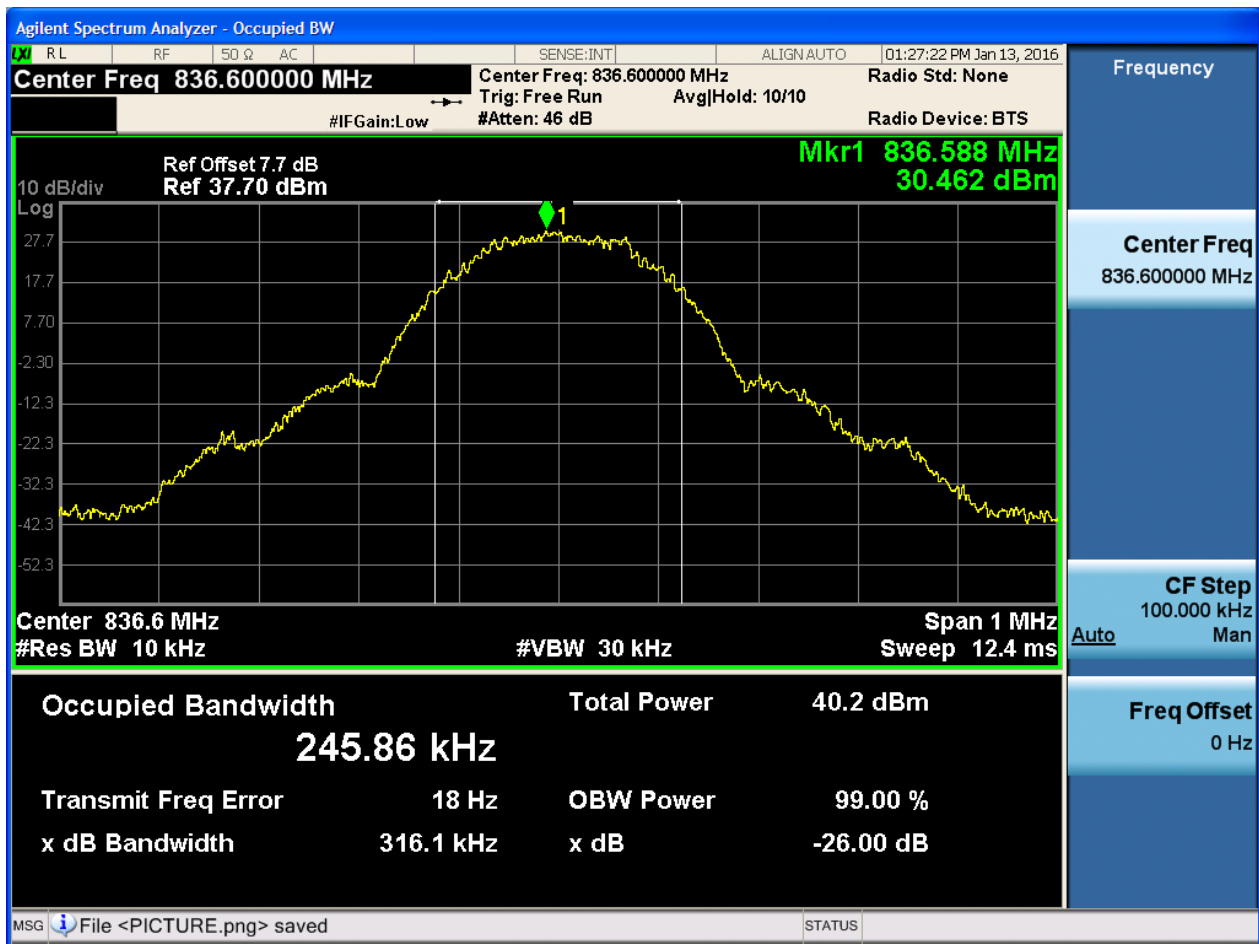
4.1.1.1 Test Mode = GSM/TM1

4.1.1.1.1 Test Channel = LCH



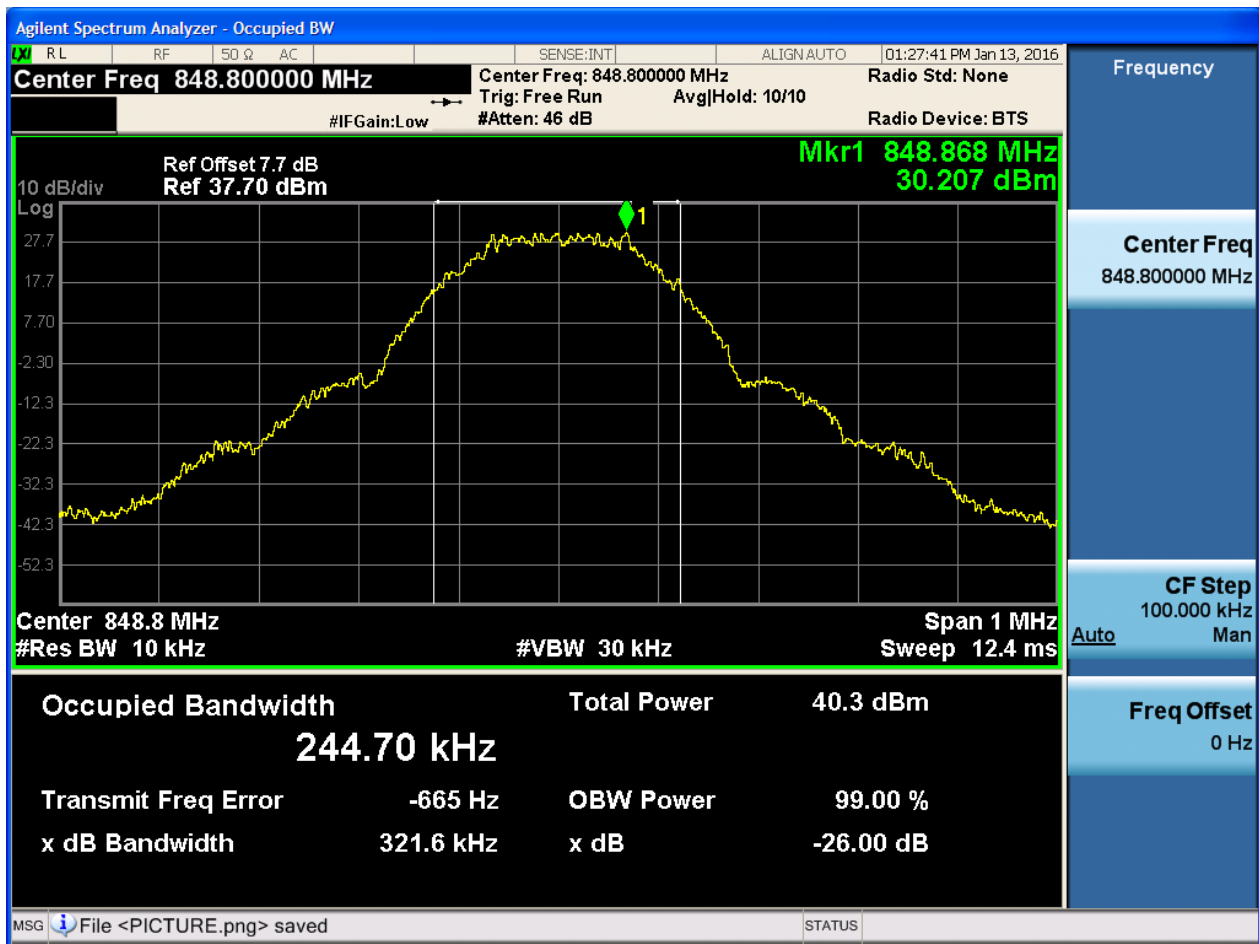


4.1.1.1.2 Test Channel = MCH





4.1.1.1.3 Test Channel = HCH





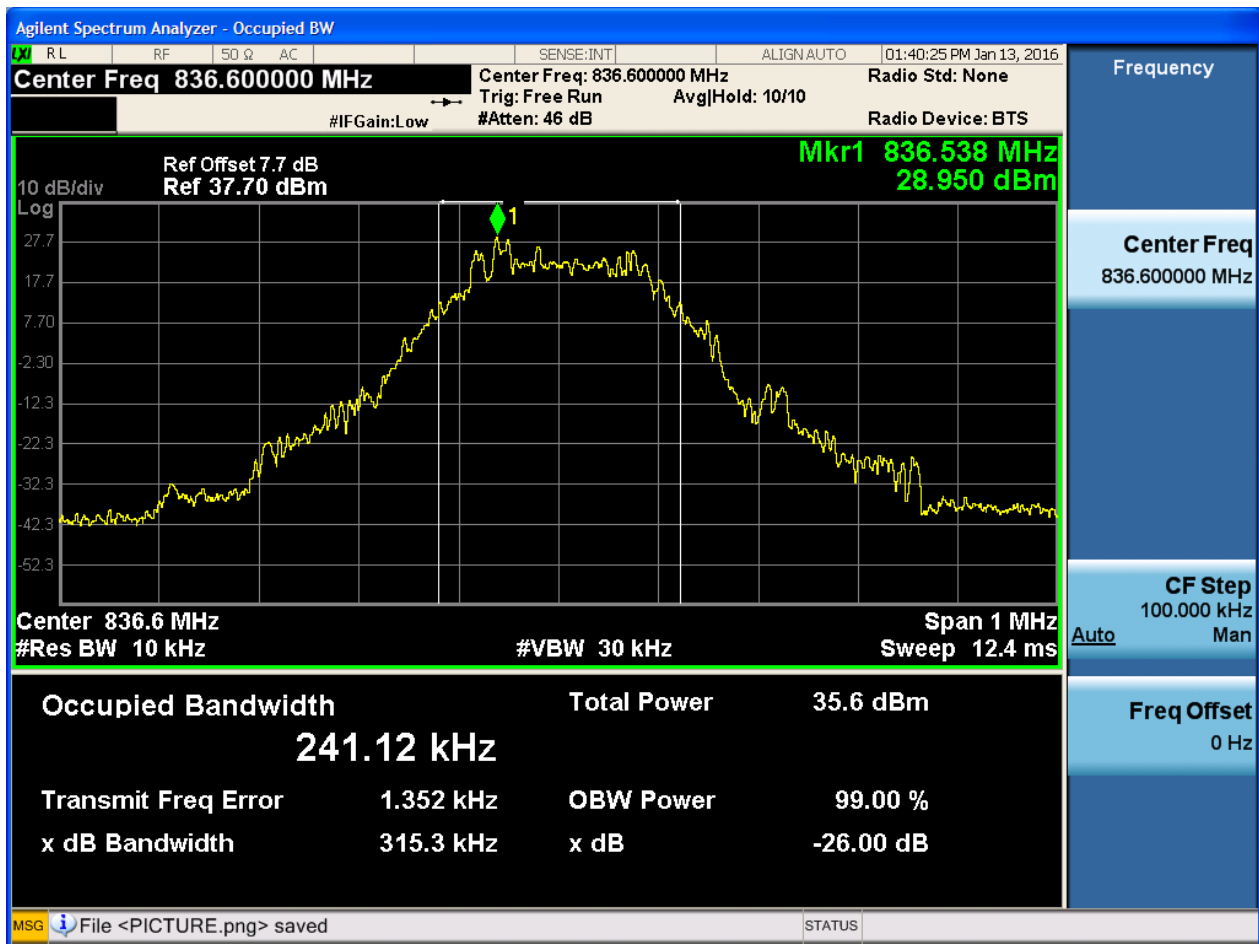
4.1.1.2 Test Mode = GSM/TM2

4.1.1.2.1 Test Channel = LCH



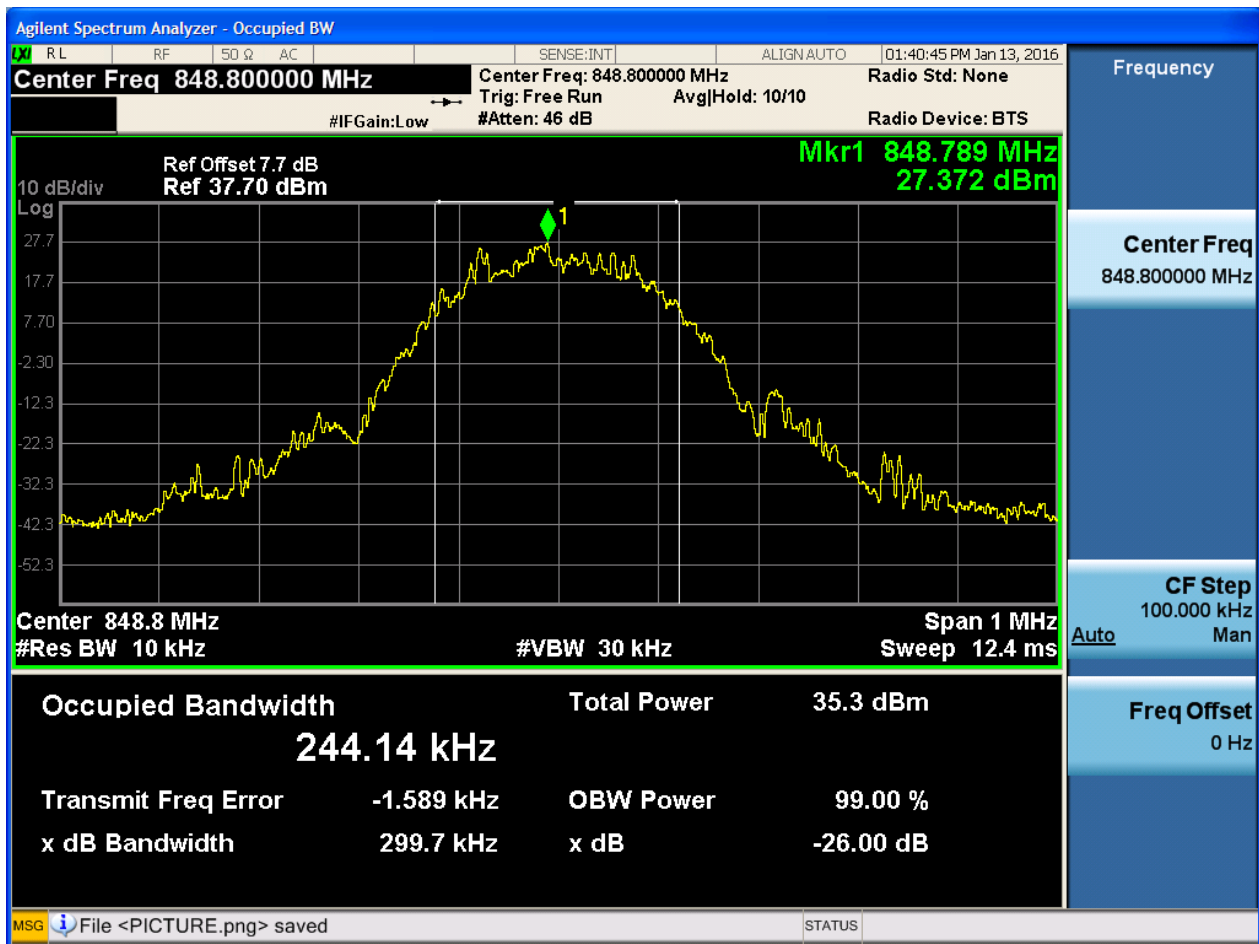


4.1.1.2.2 Test Channel = MCH





4.1.1.2.3 Test Channel = HCH

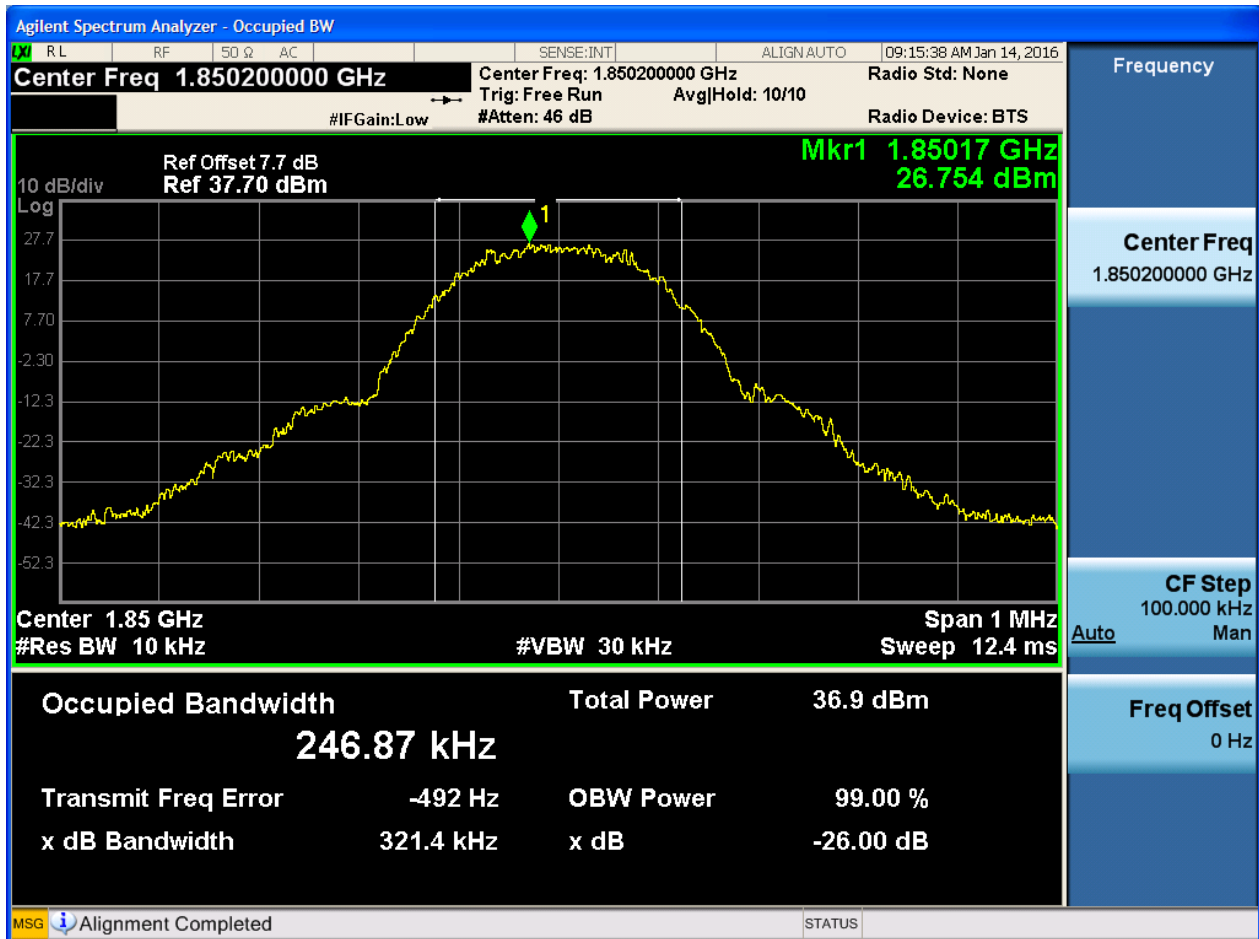




4.1.2 Test Band = GSM1900

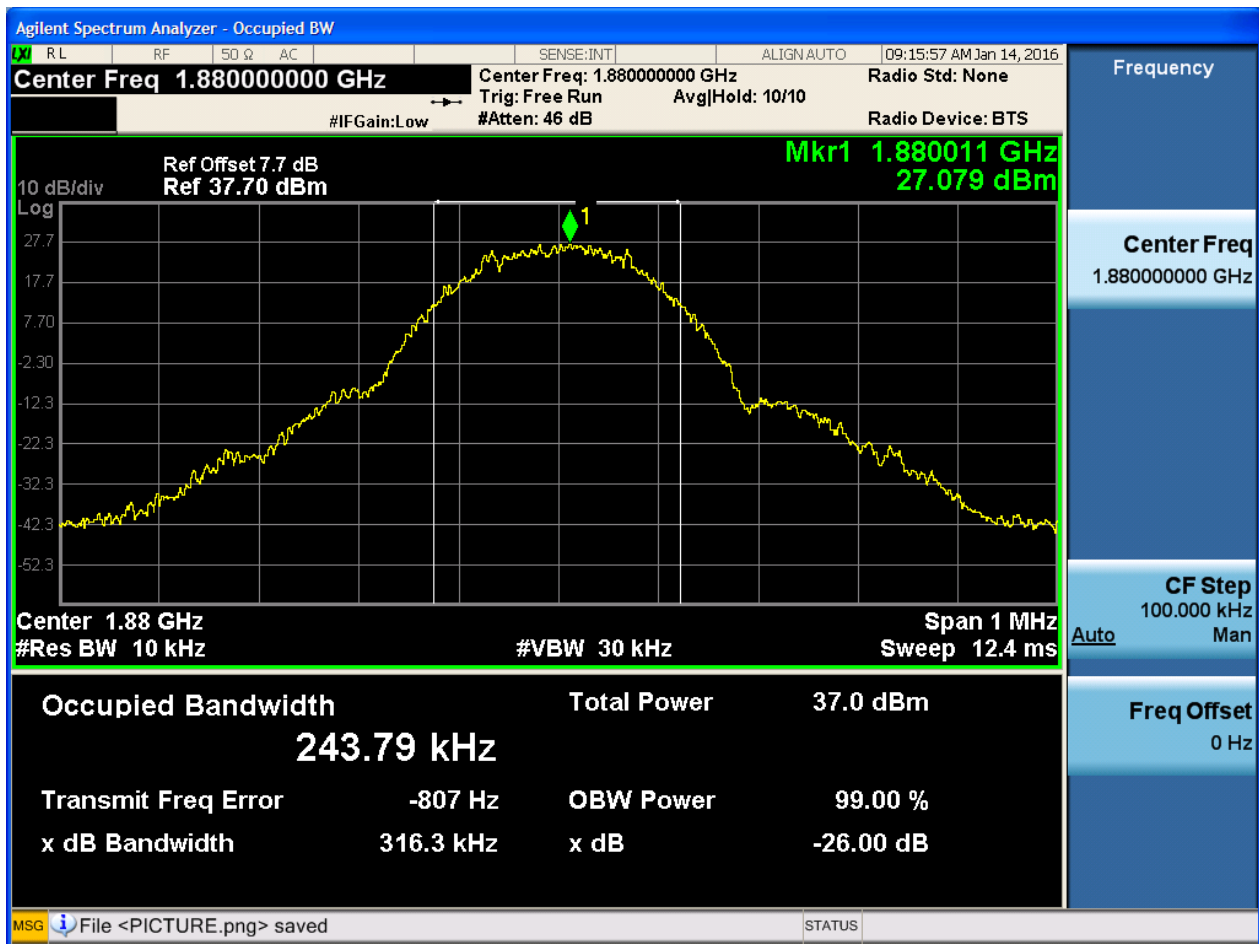
4.1.2.1 Test Mode = GSM/TM1

4.1.2.1.1 Test Channel = LCH



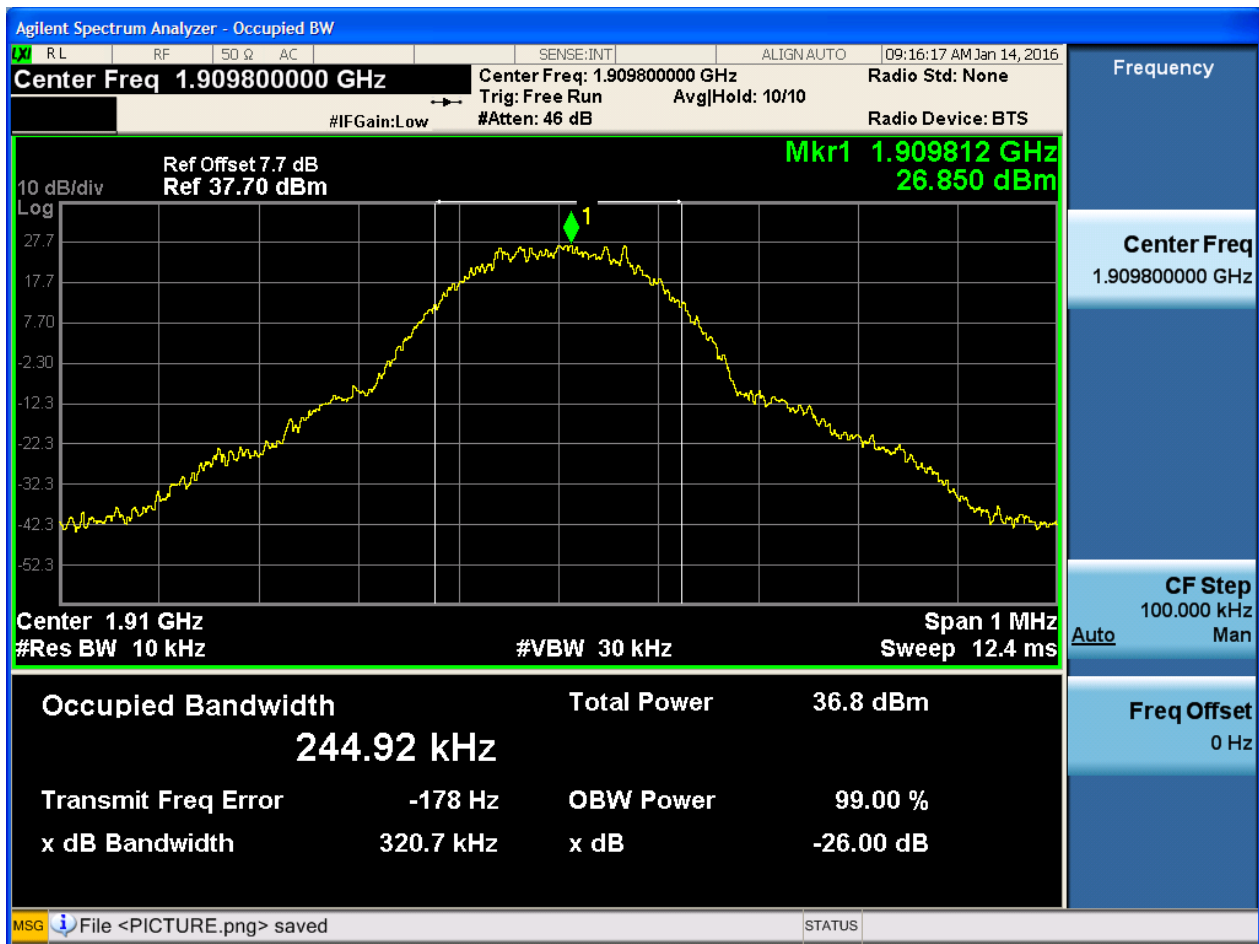


4.1.2.1.2 Test Channel = MCH



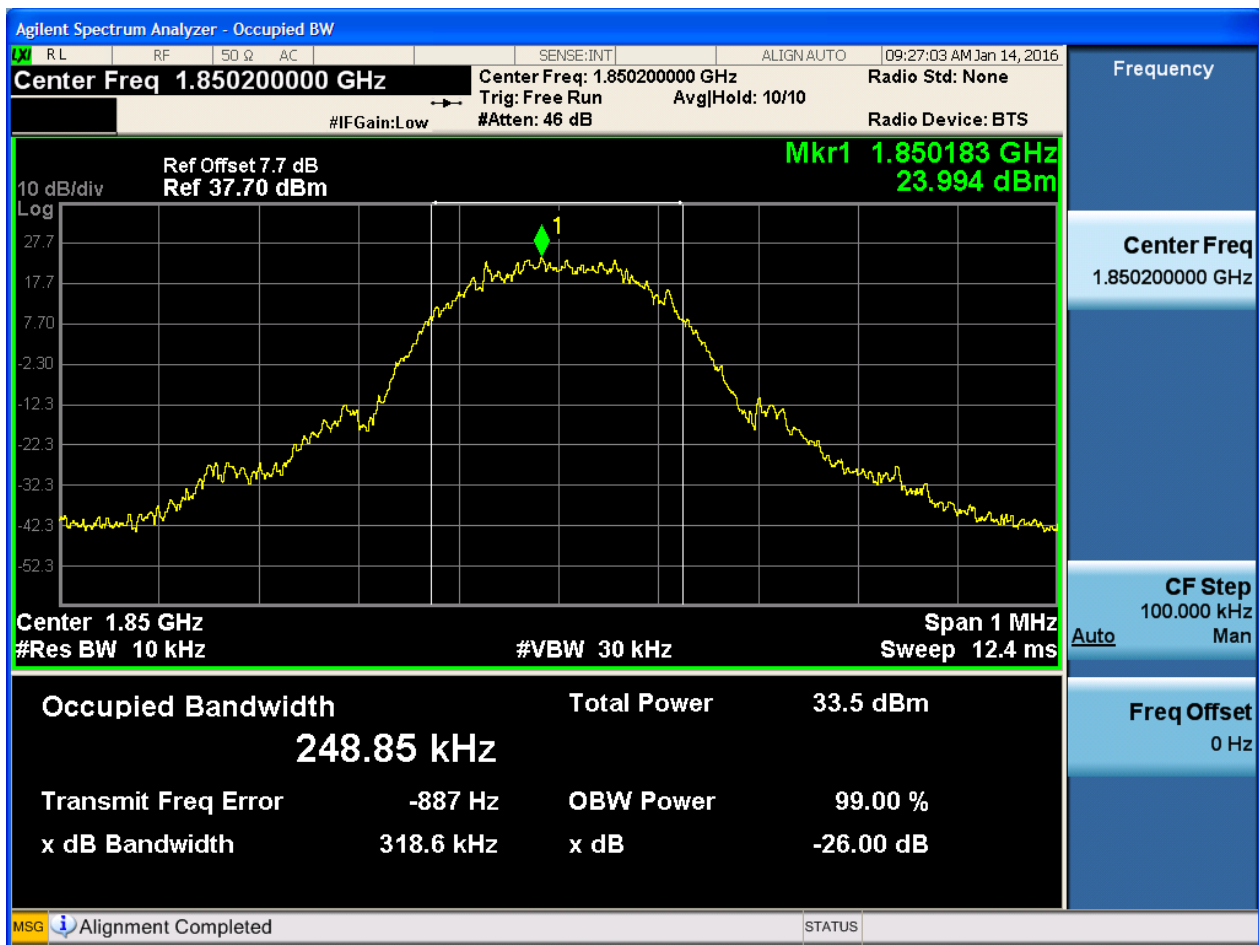


4.1.2.1.3 Test Channel = HCH



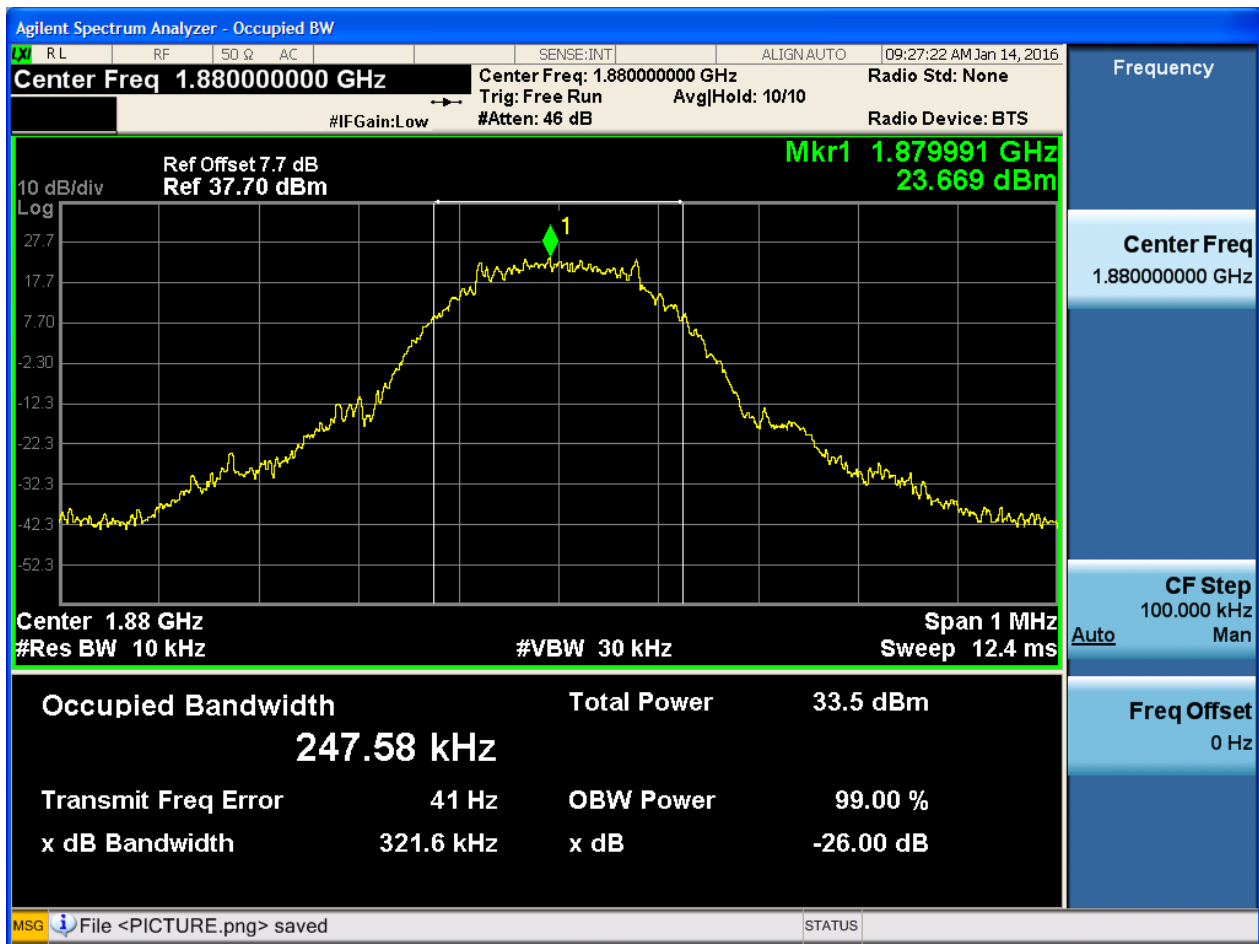
4.1.2.2 Test Mode = GSM/TM2

4.1.2.2.1 Test Channel = LCH



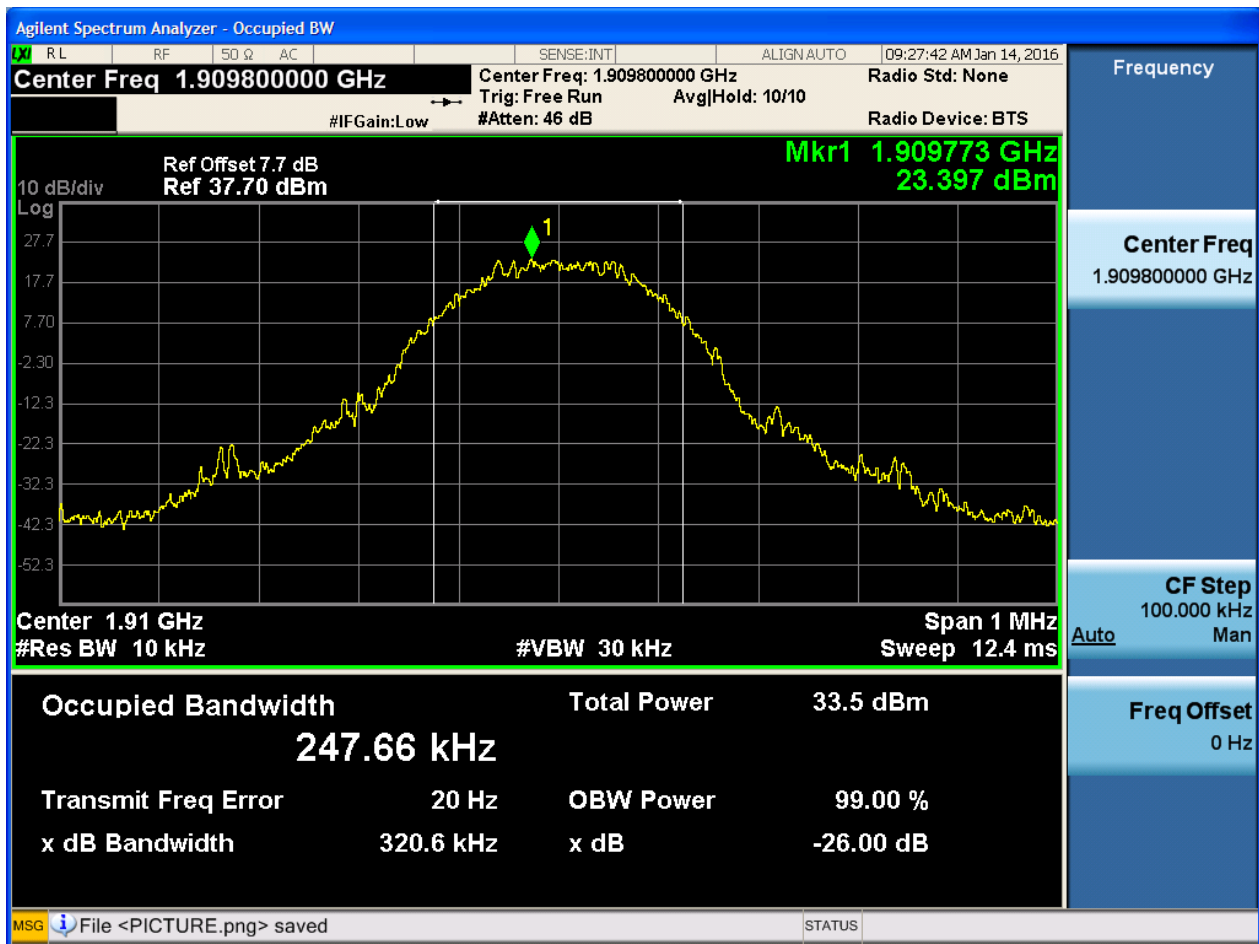


4.1.2.2.2 Test Channel = MCH





4.1.2.2.3 Test Channel = HCH





5Appendix_E: Band Edges Compliance

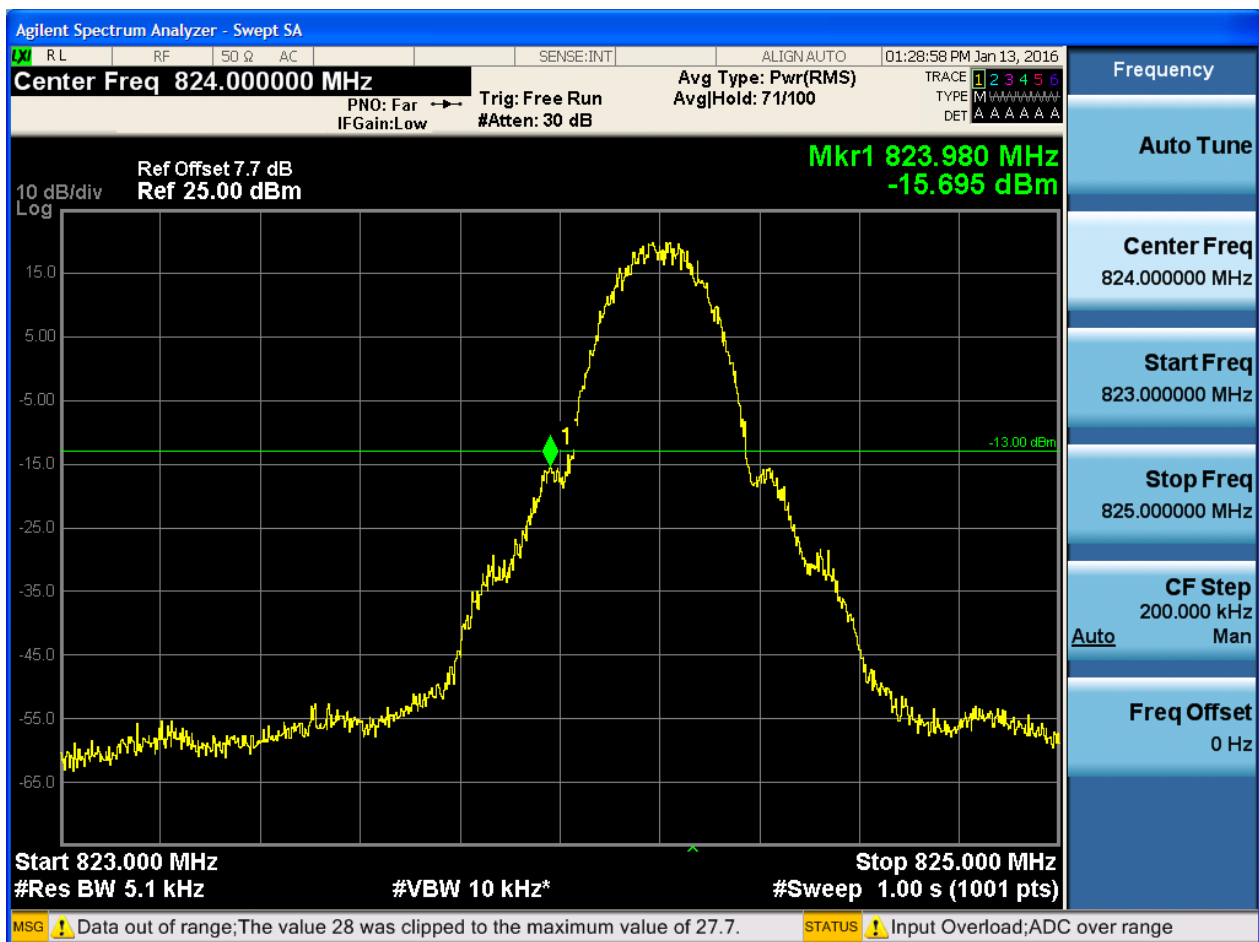
Part I - Test Plots

5.1 For GSM

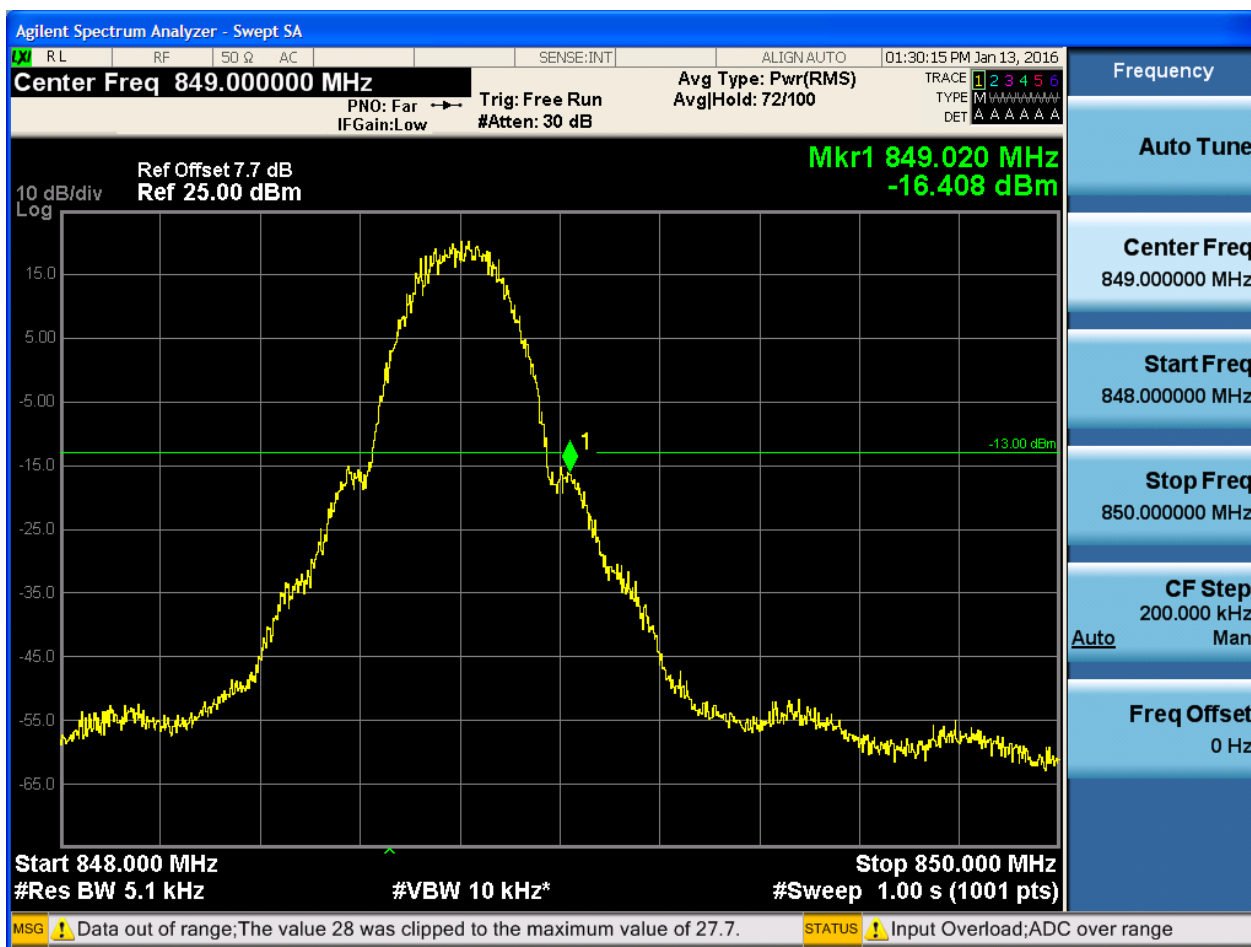
5.1.1 Test Band = GSM850

5.1.1.1 Test Mode = GSM/TM1

5.1.1.1.1 Test Channel = LCH

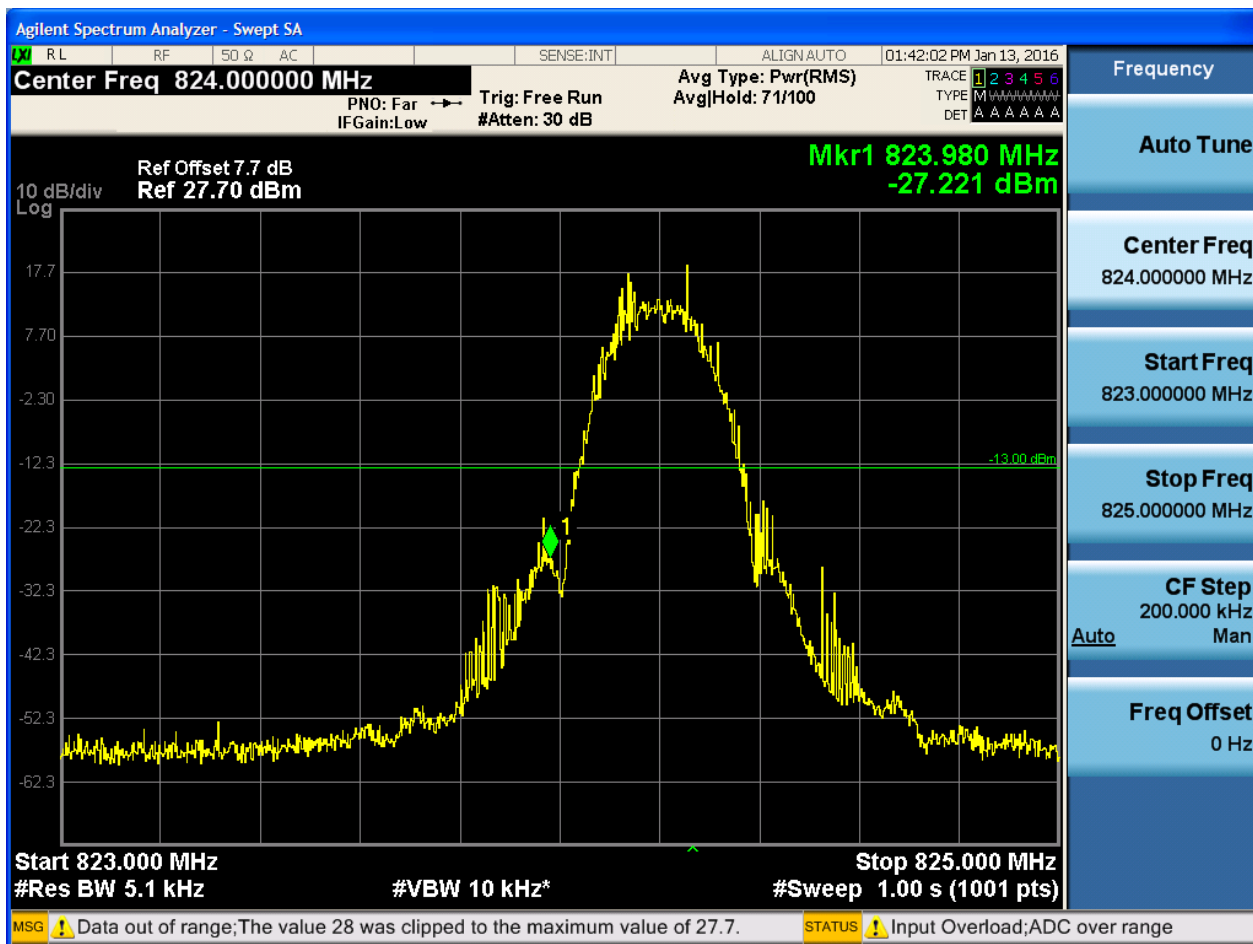


5.1.1.1.2 Test Channel = HCH

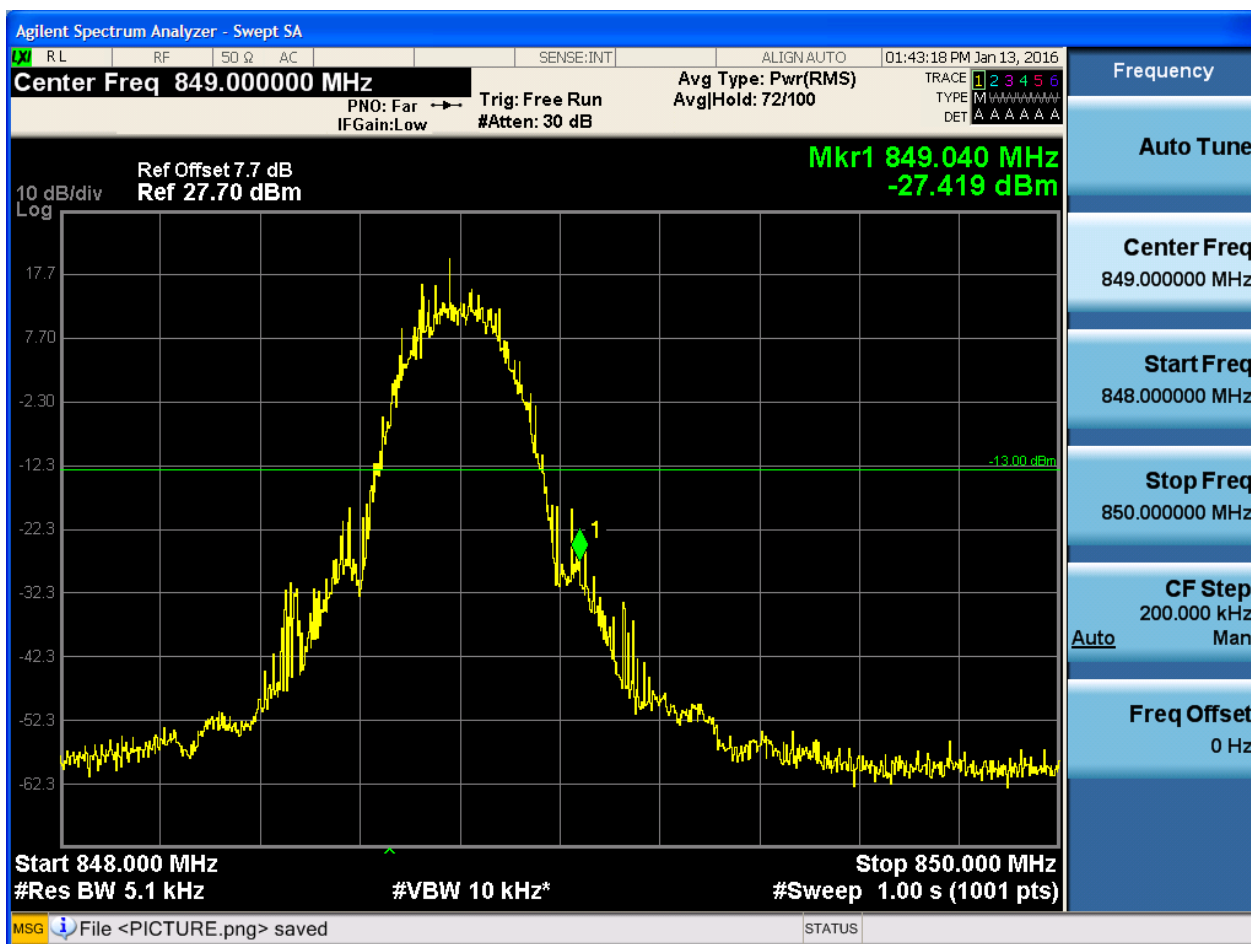


5.1.1.2 Test Mode = GSM/TM2

5.1.1.2.1 Test Channel = LCH



5.1.1.2.2 Test Channel = HCH

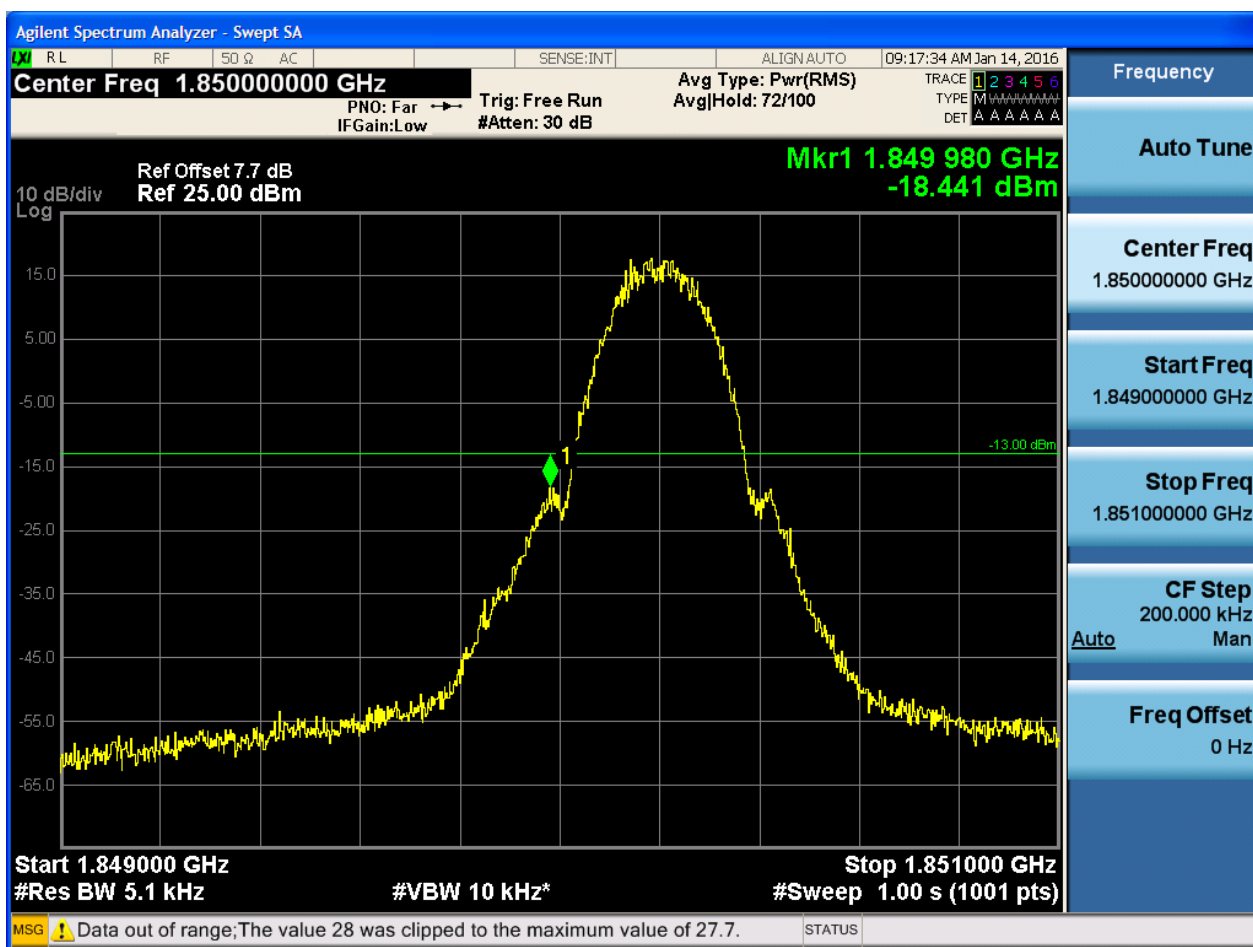




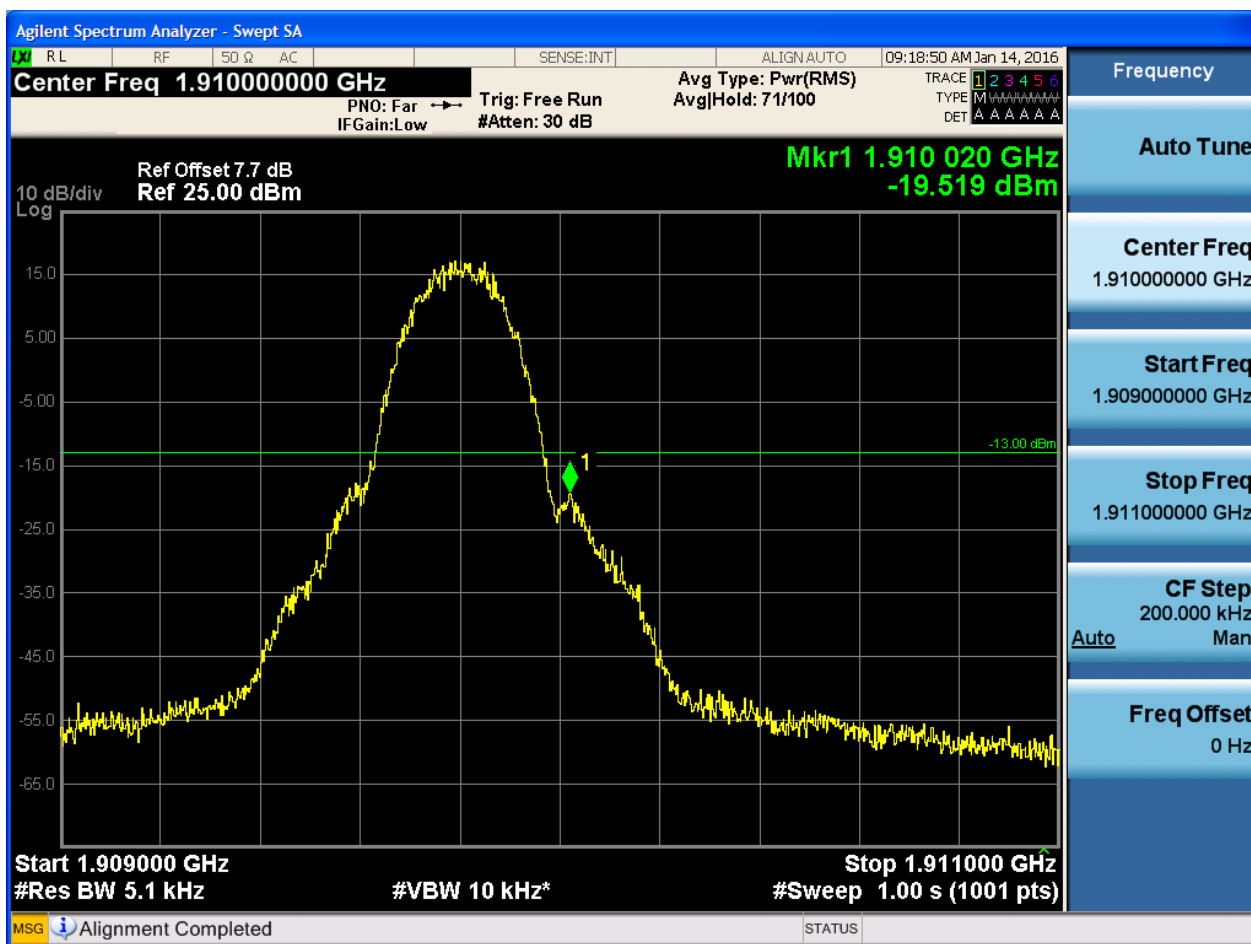
5.1.2 Test Band = GSM1900

5.1.2.1 Test Mode = GSM/TM1

5.1.2.1.1 Test Channel = LCH

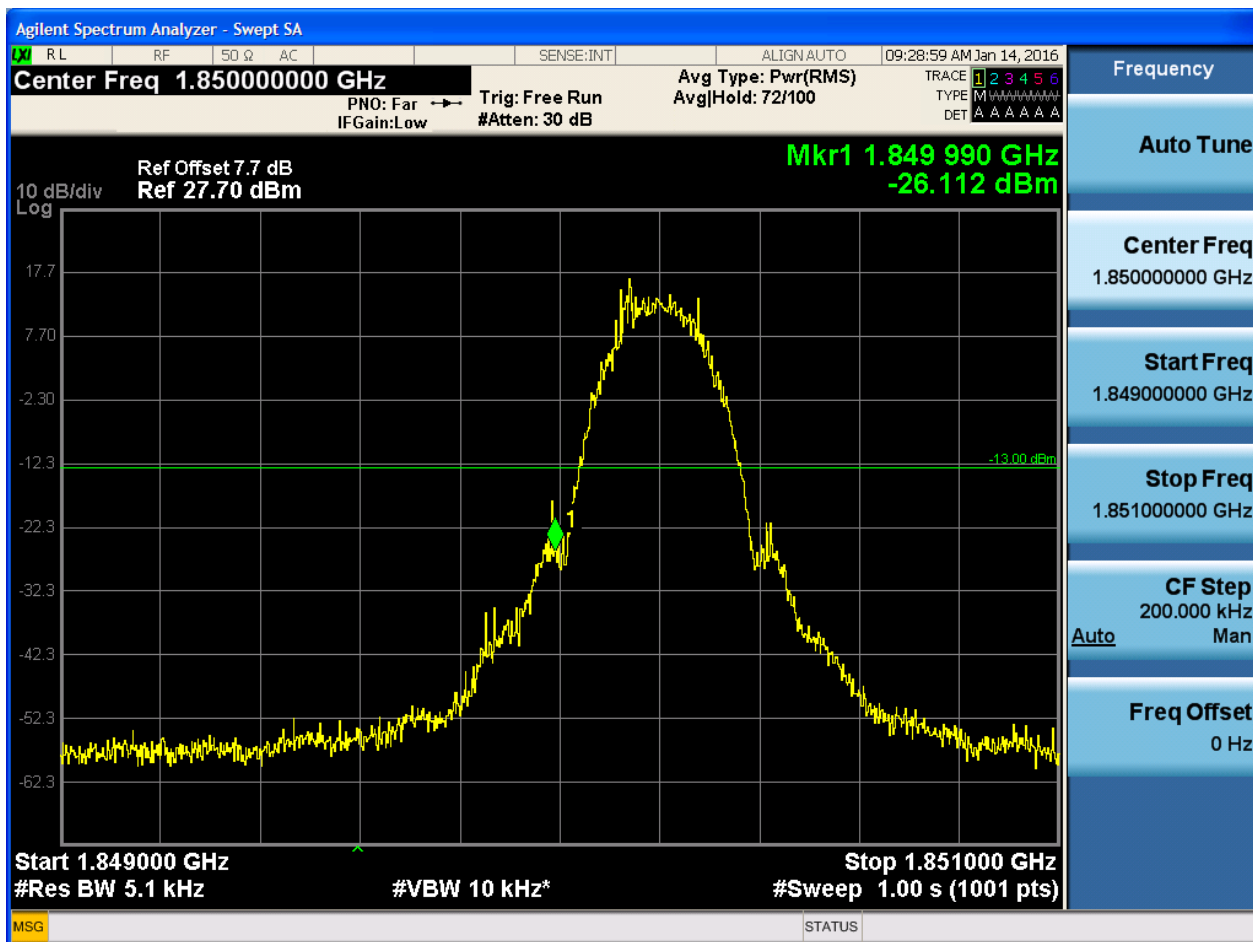


5.1.2.1.2 Test Channel = HCH

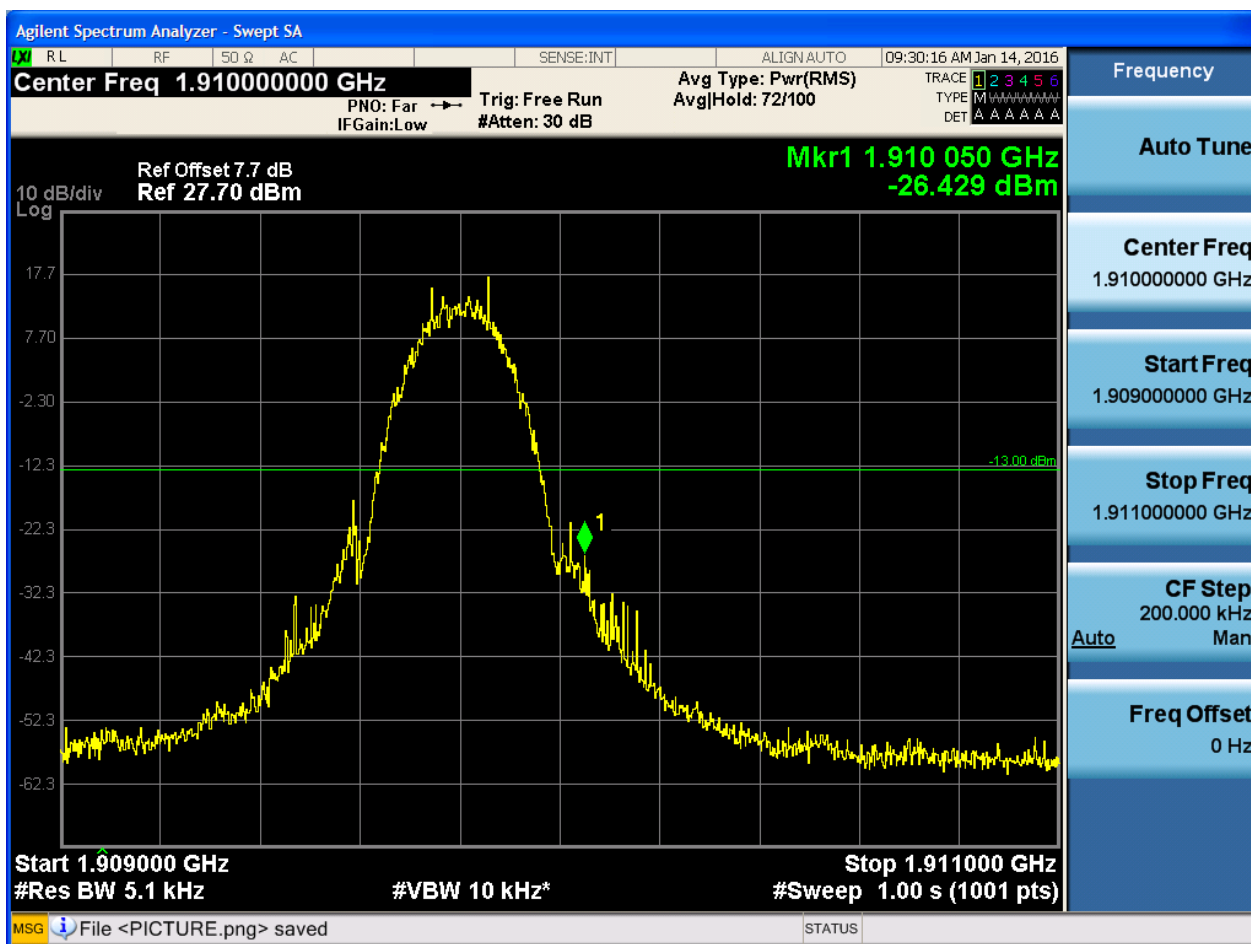


5.1.2.2 Test Mode = GSM/TM2

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.

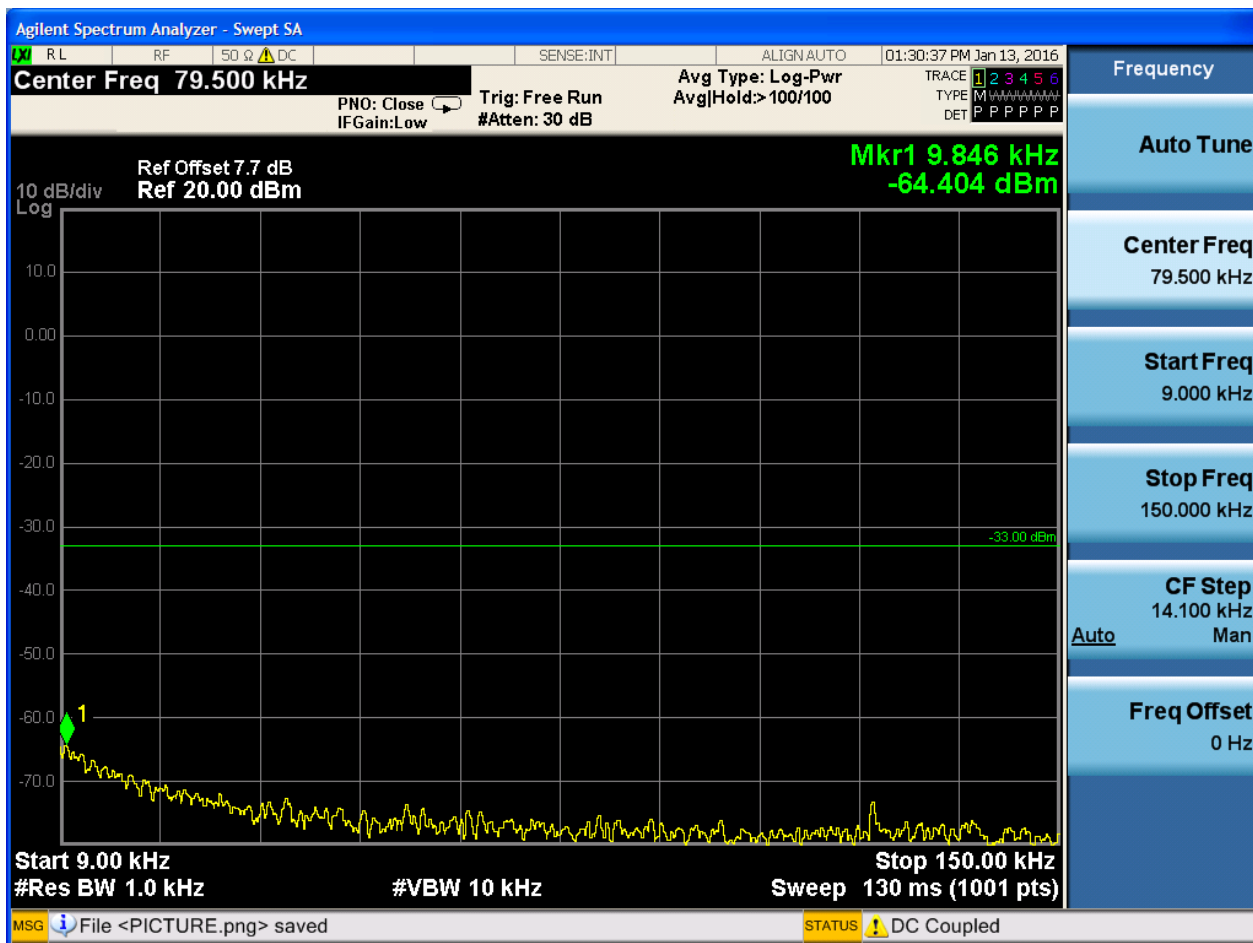
Part I - Test Plots

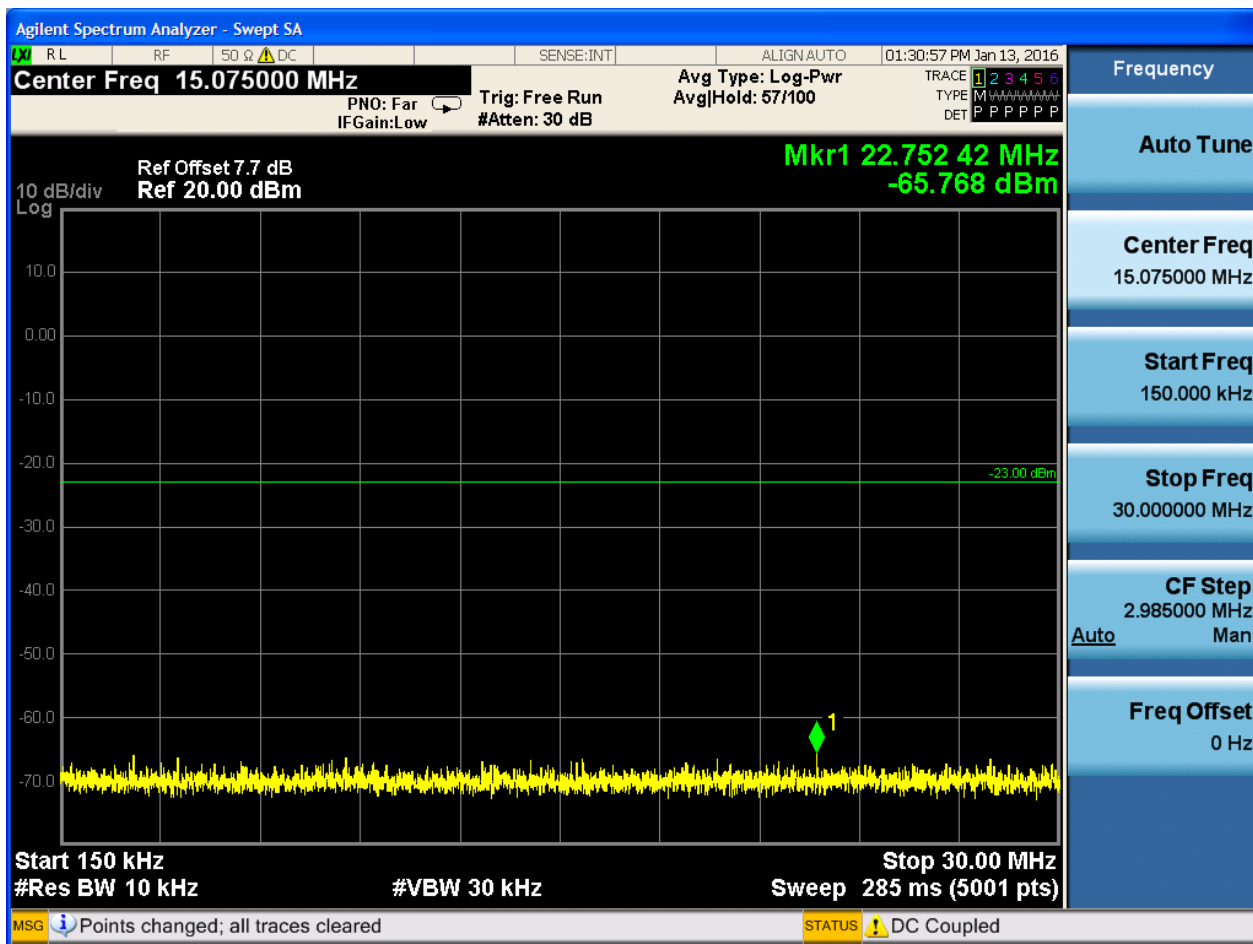
6.1 For GSM

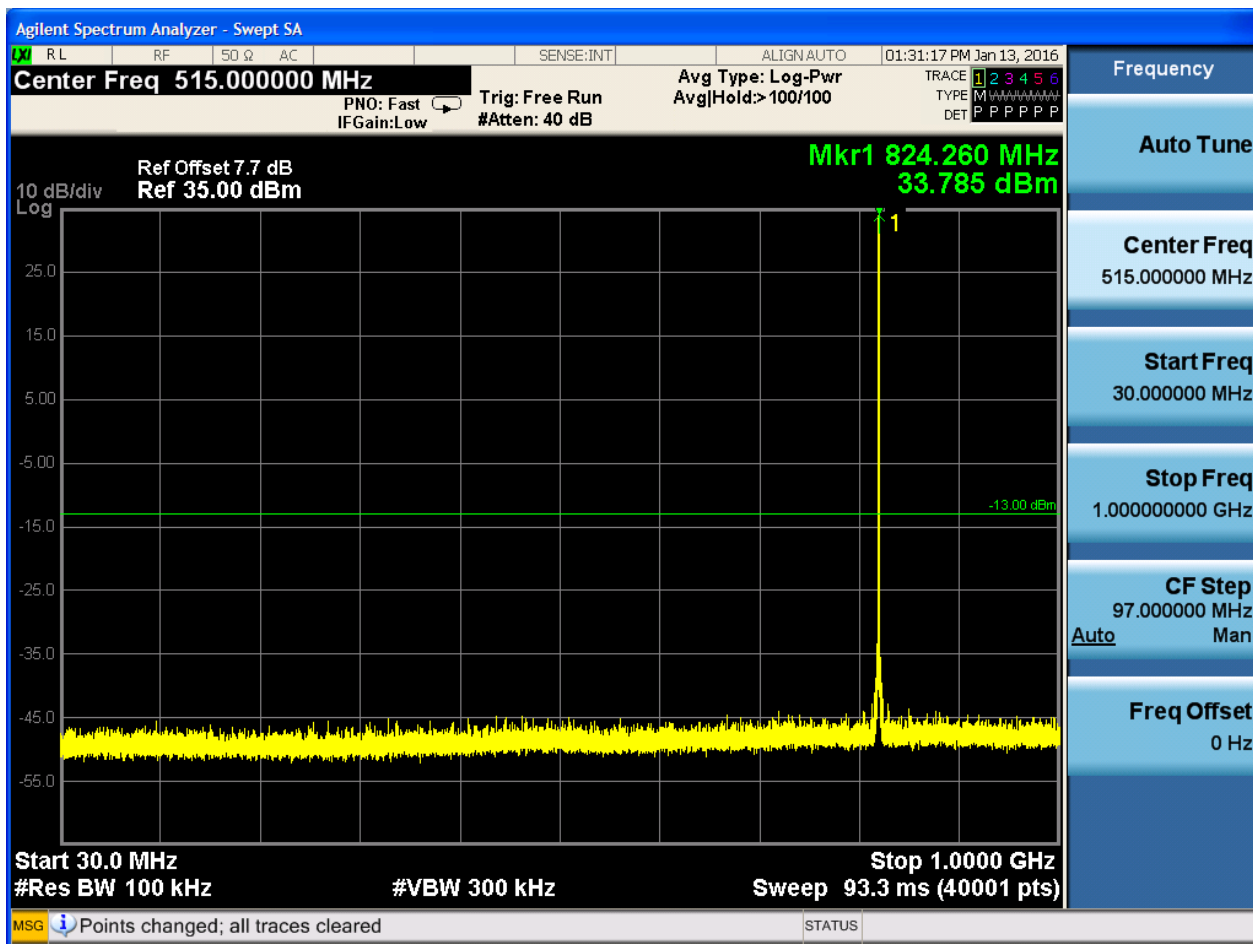
6.1.1 Test Band = GSM850

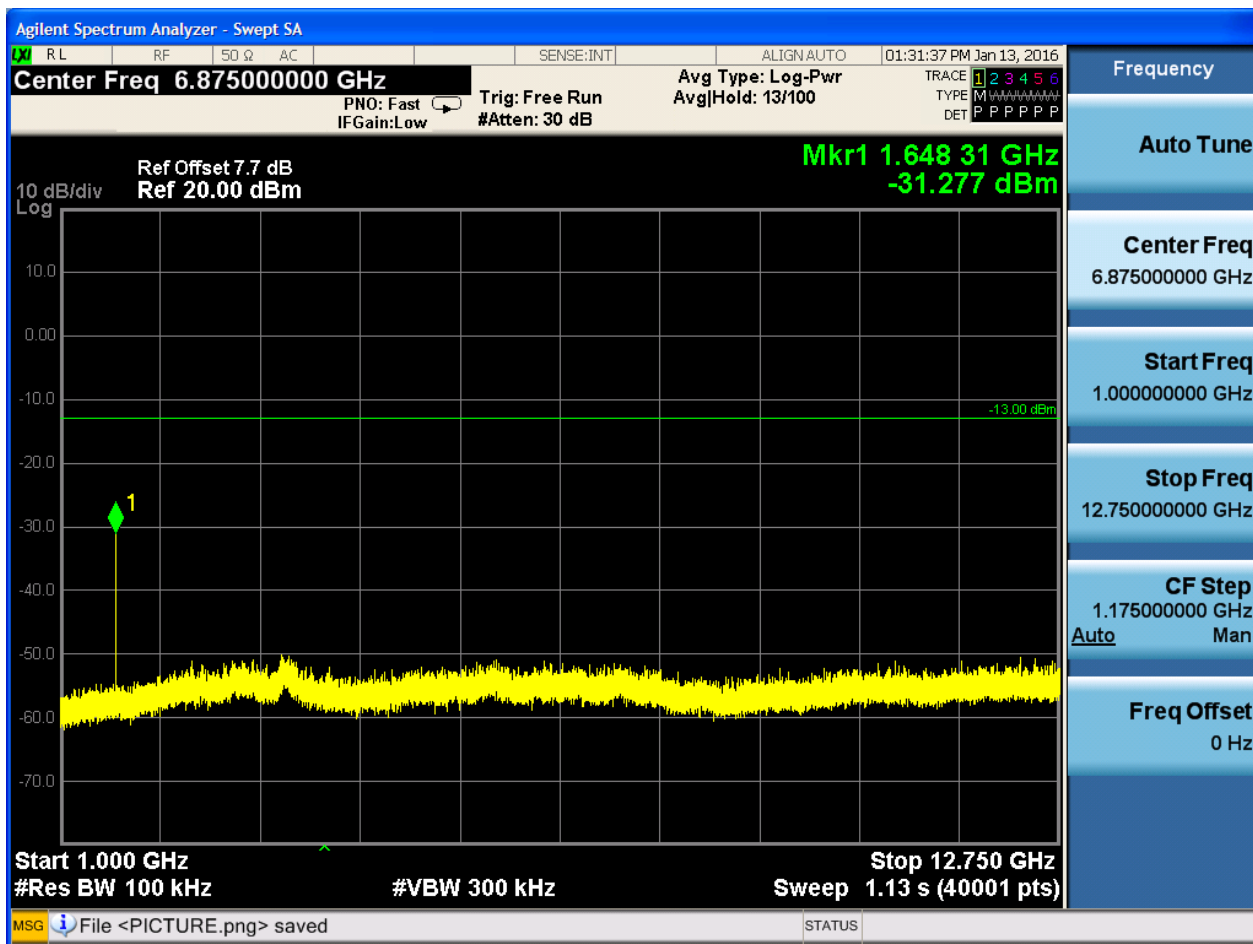
6.1.1.1 Test Mode = GSM/TM1

6.1.1.1.1 Test Channel = LCH

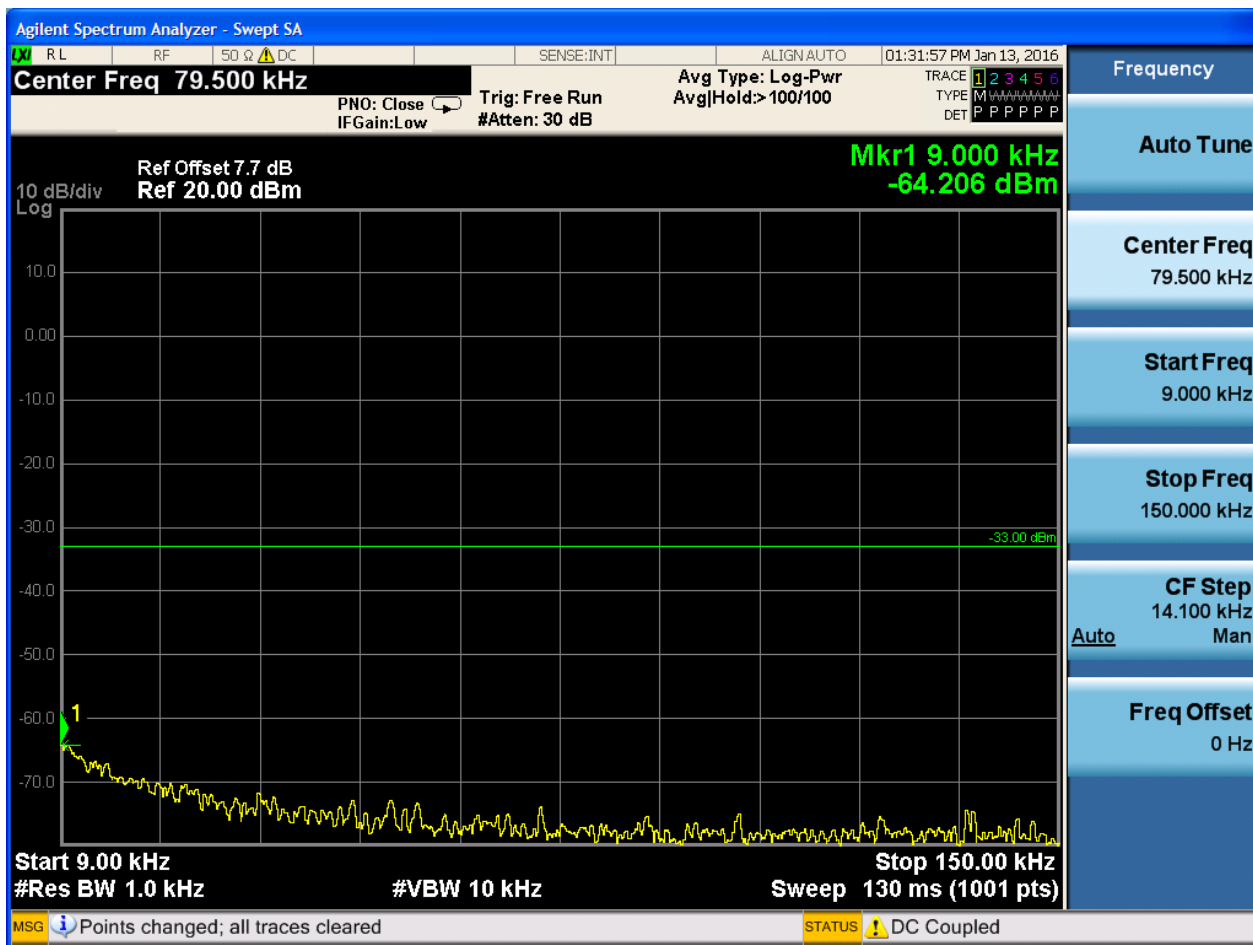


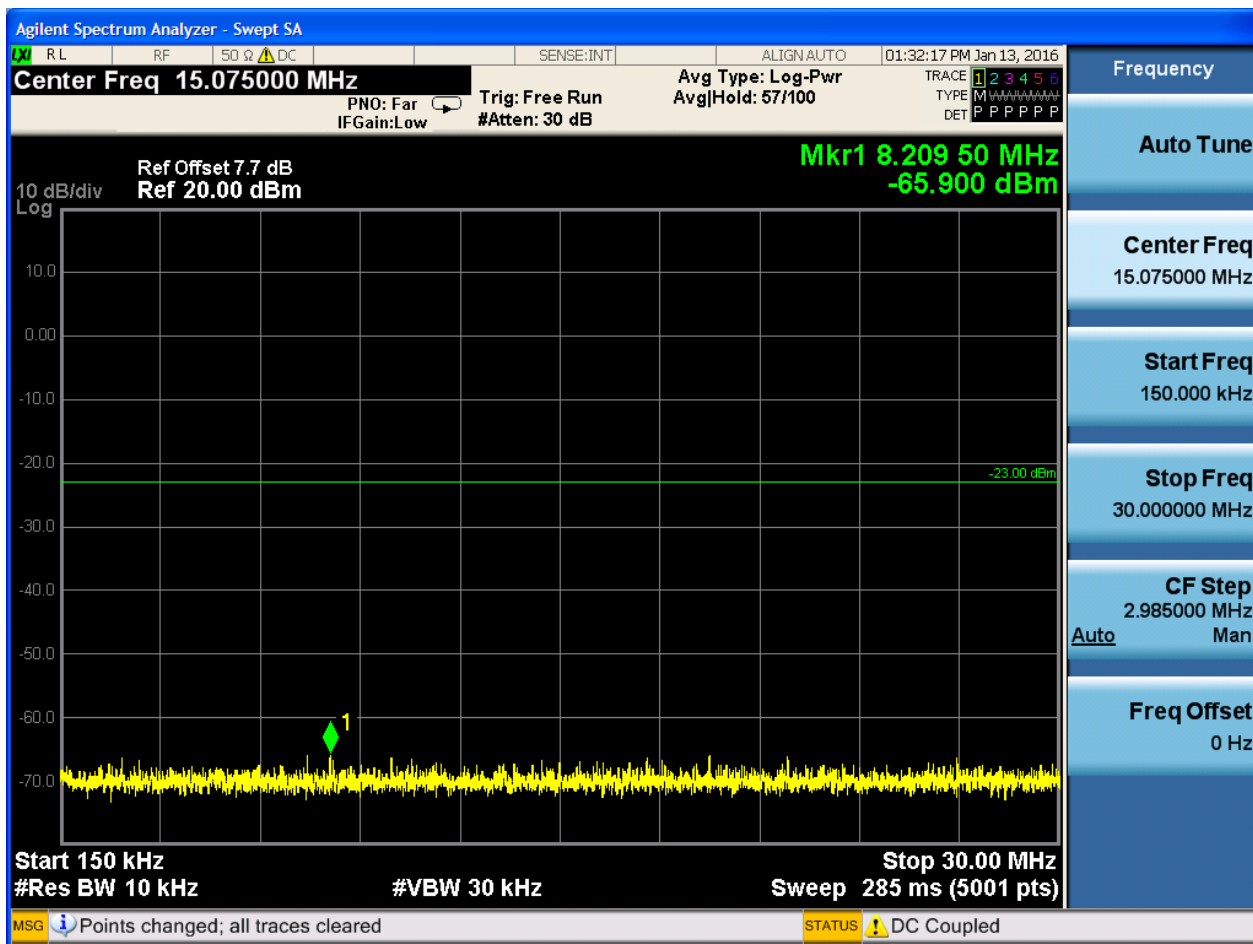


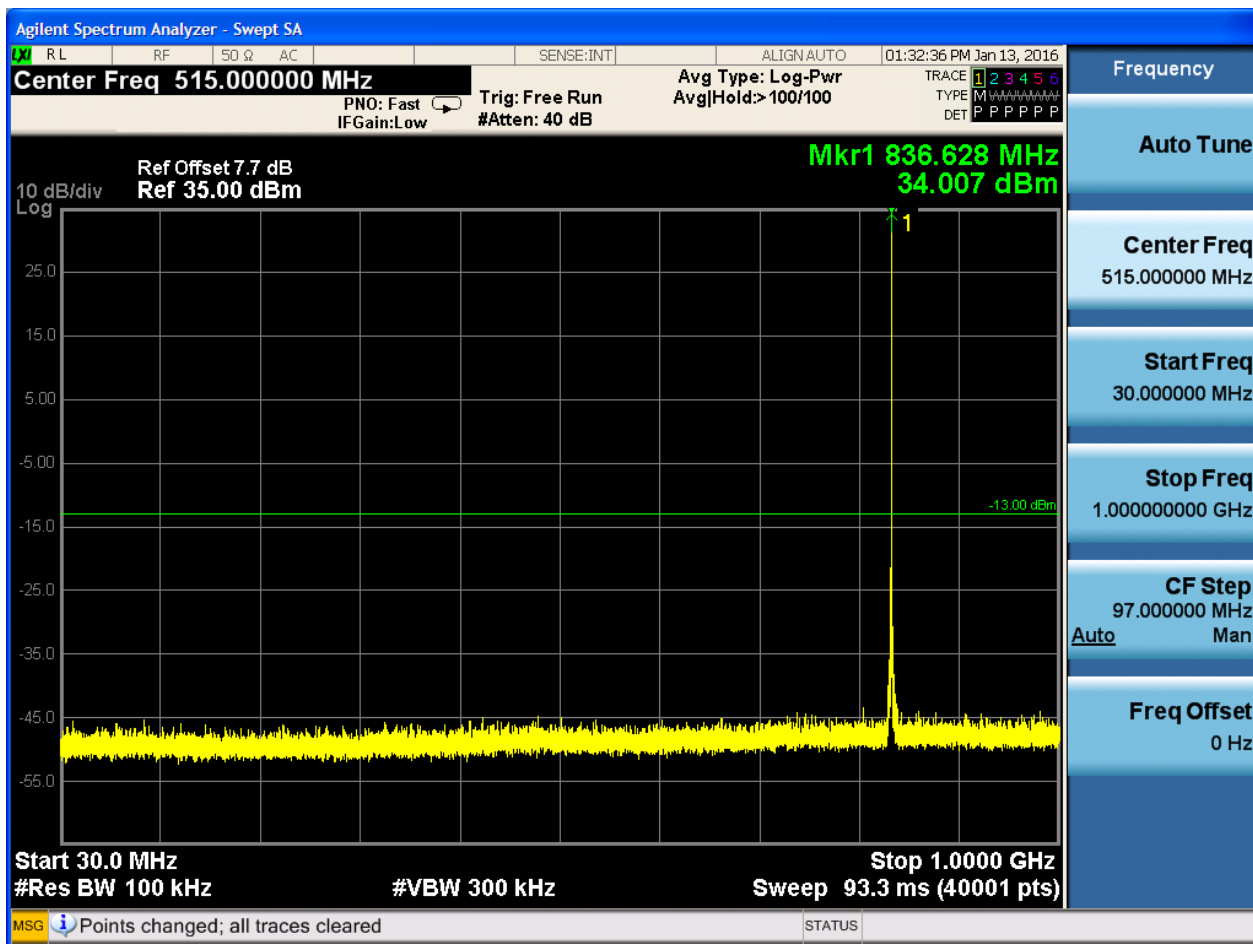


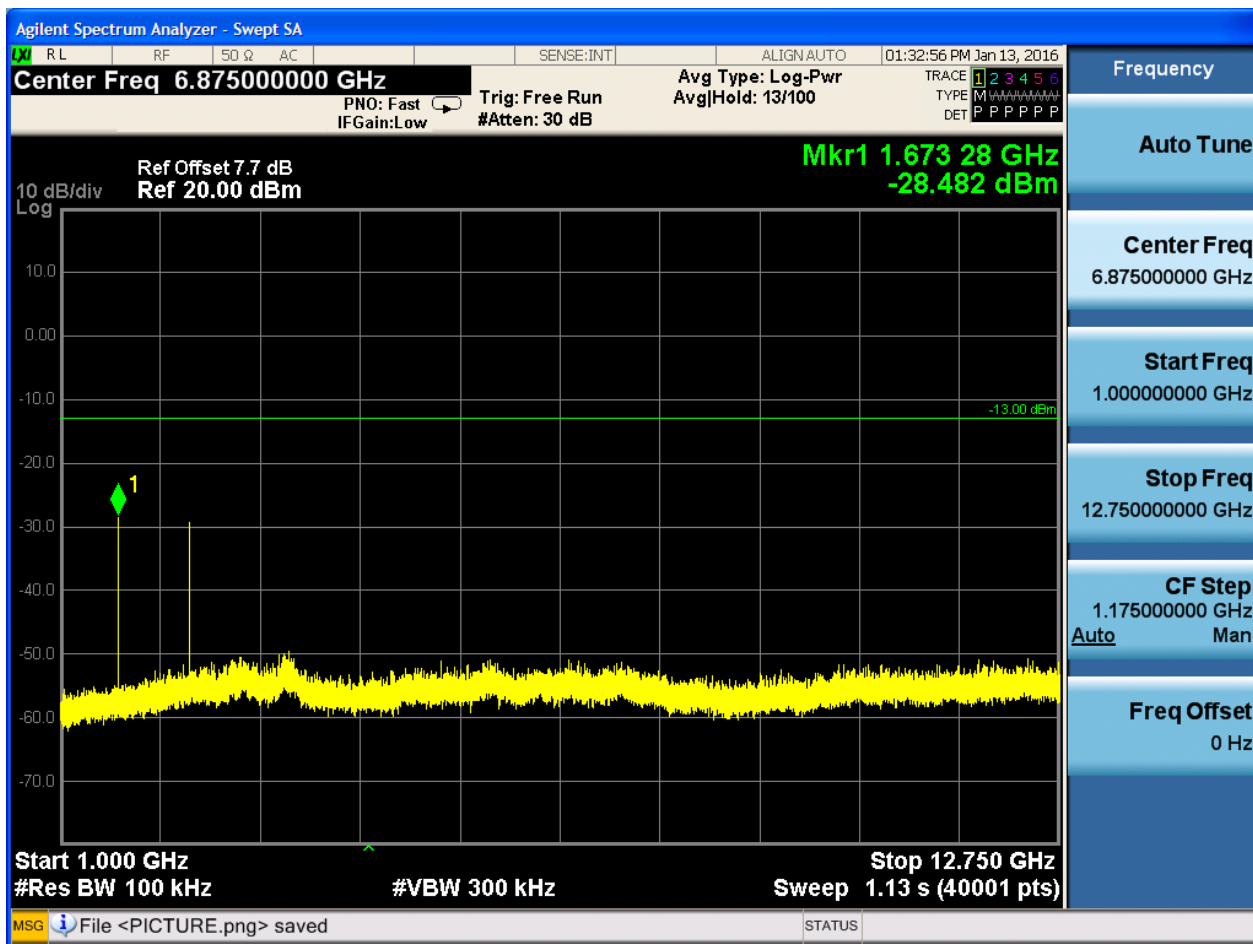


6.1.1.1.2 Test Channel = MCH

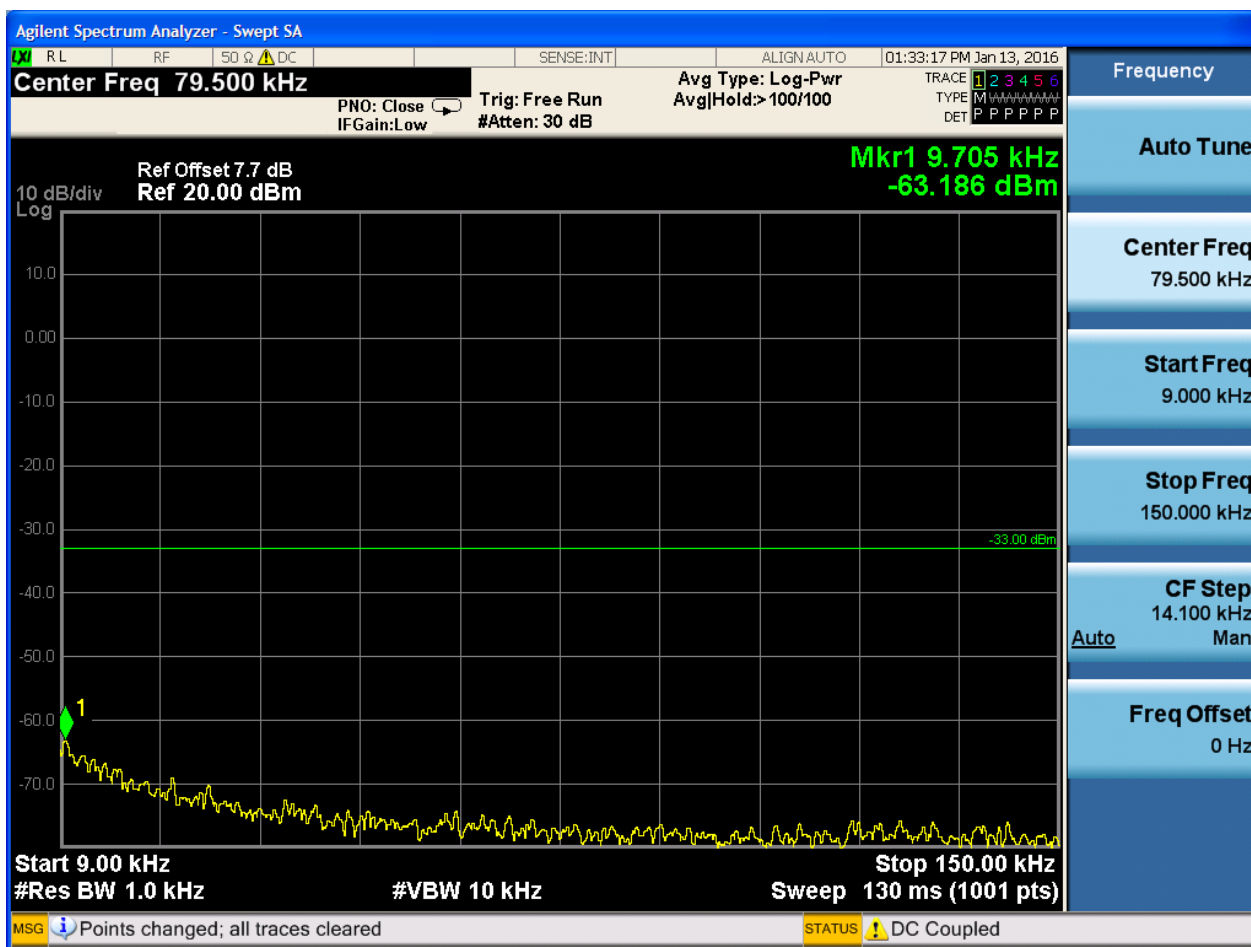


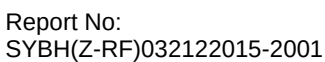


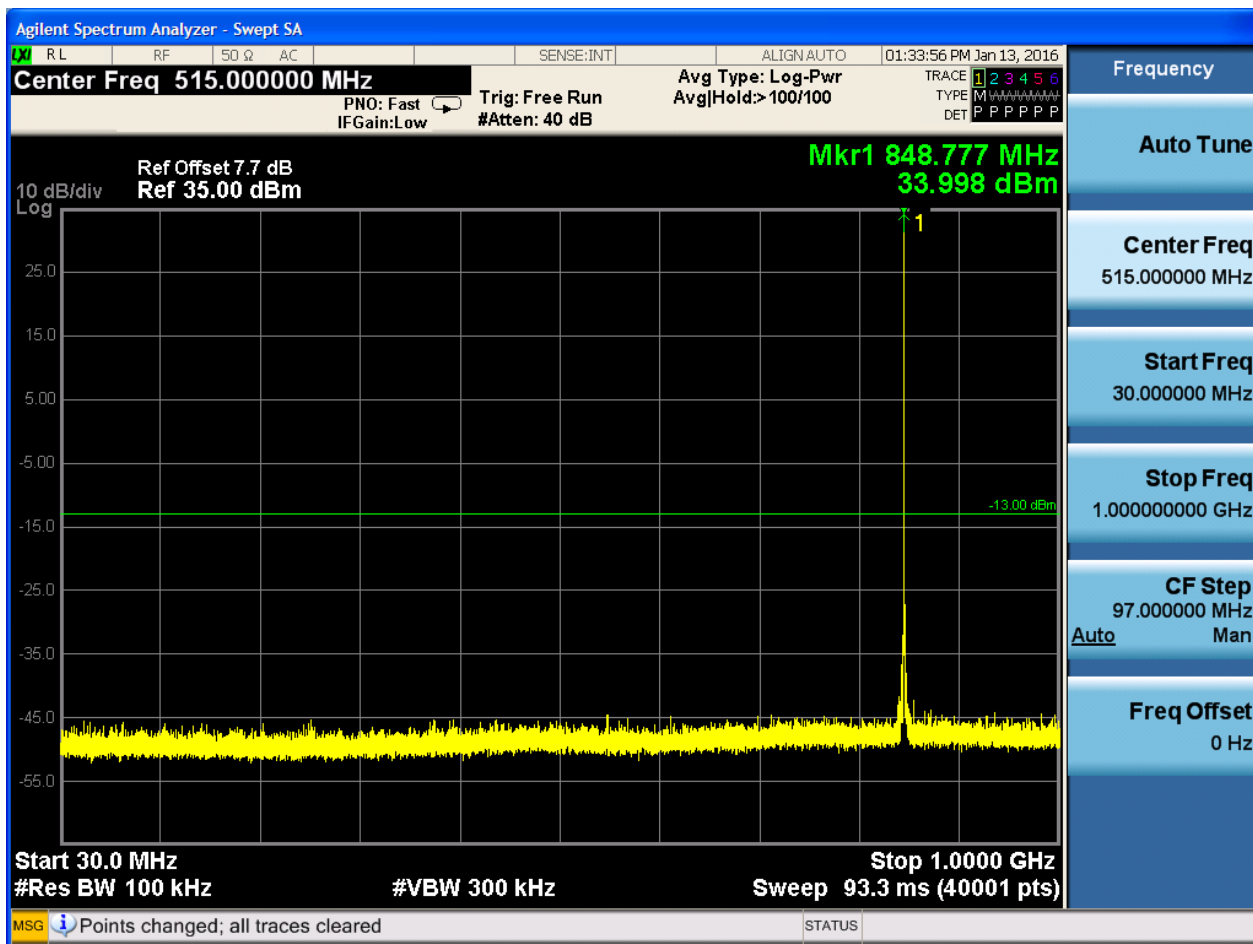


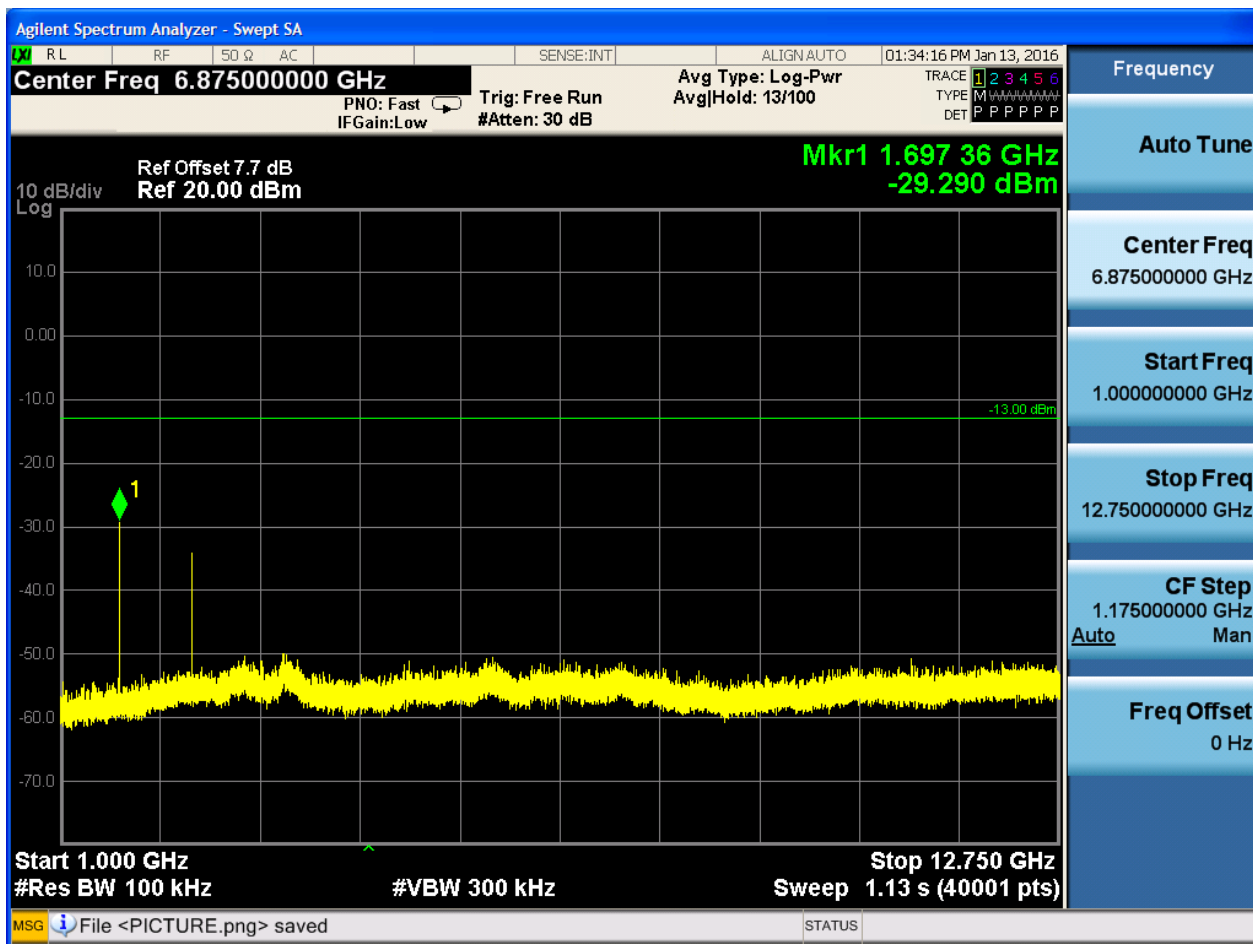


6.1.1.1.3 Test Channel = HCH



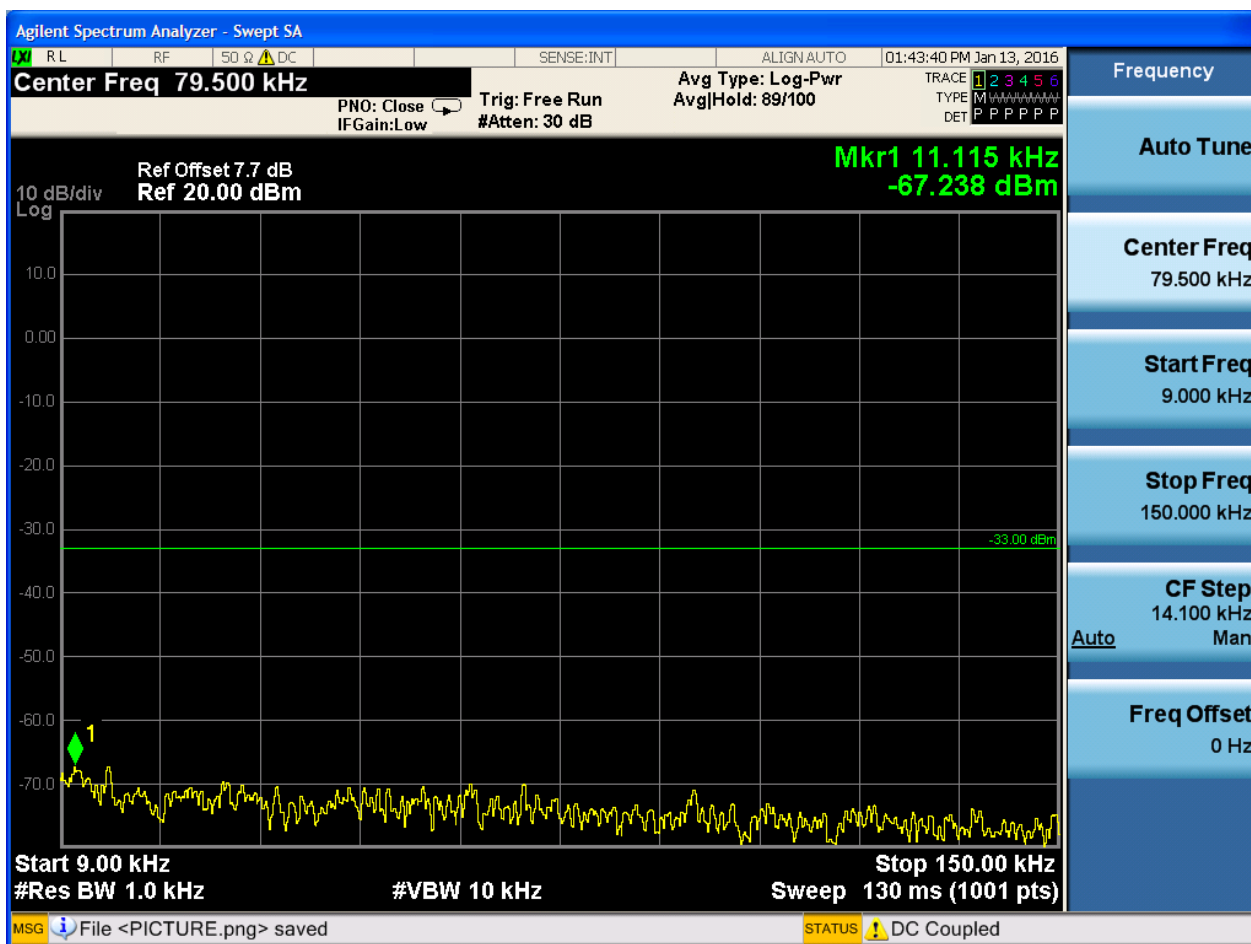


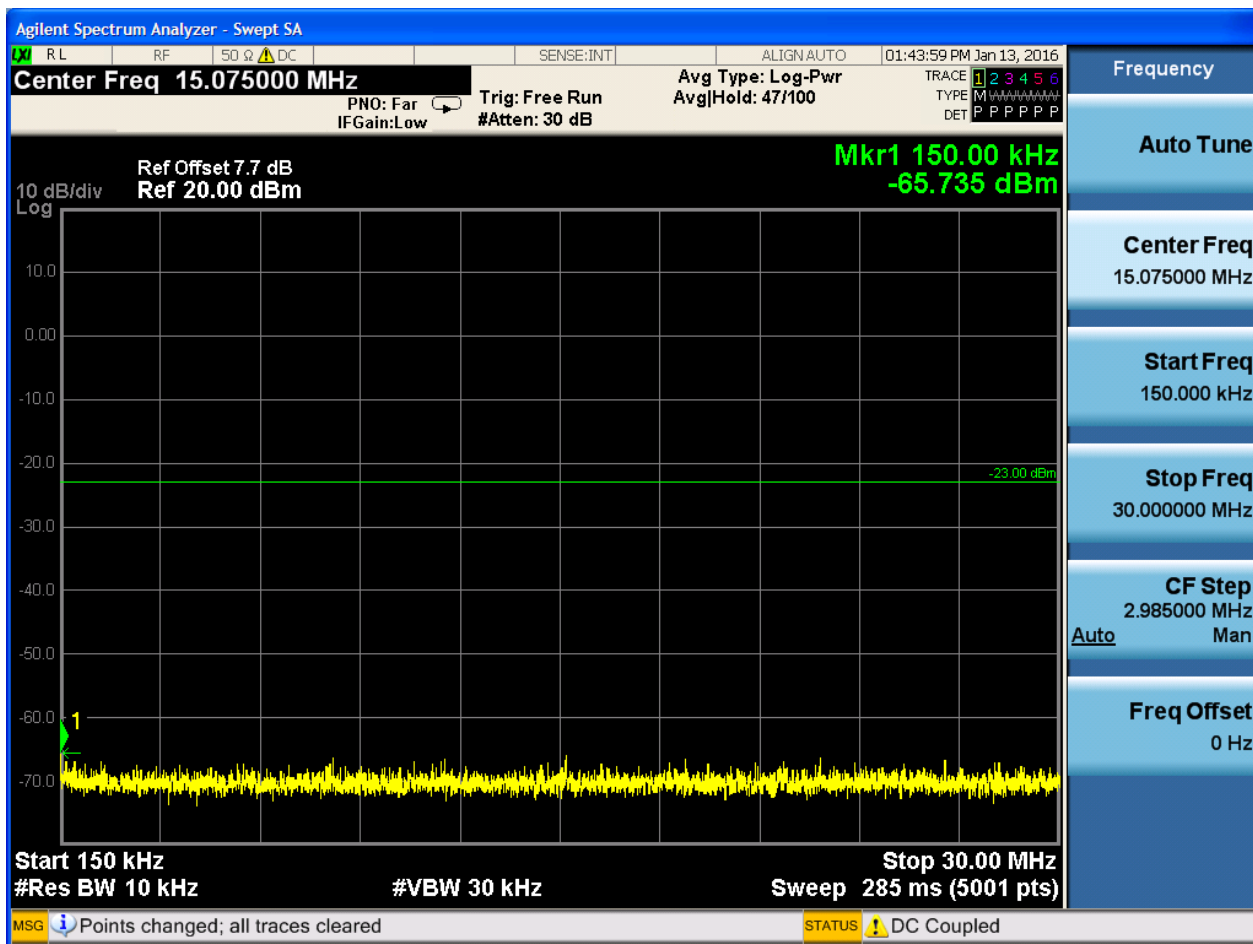


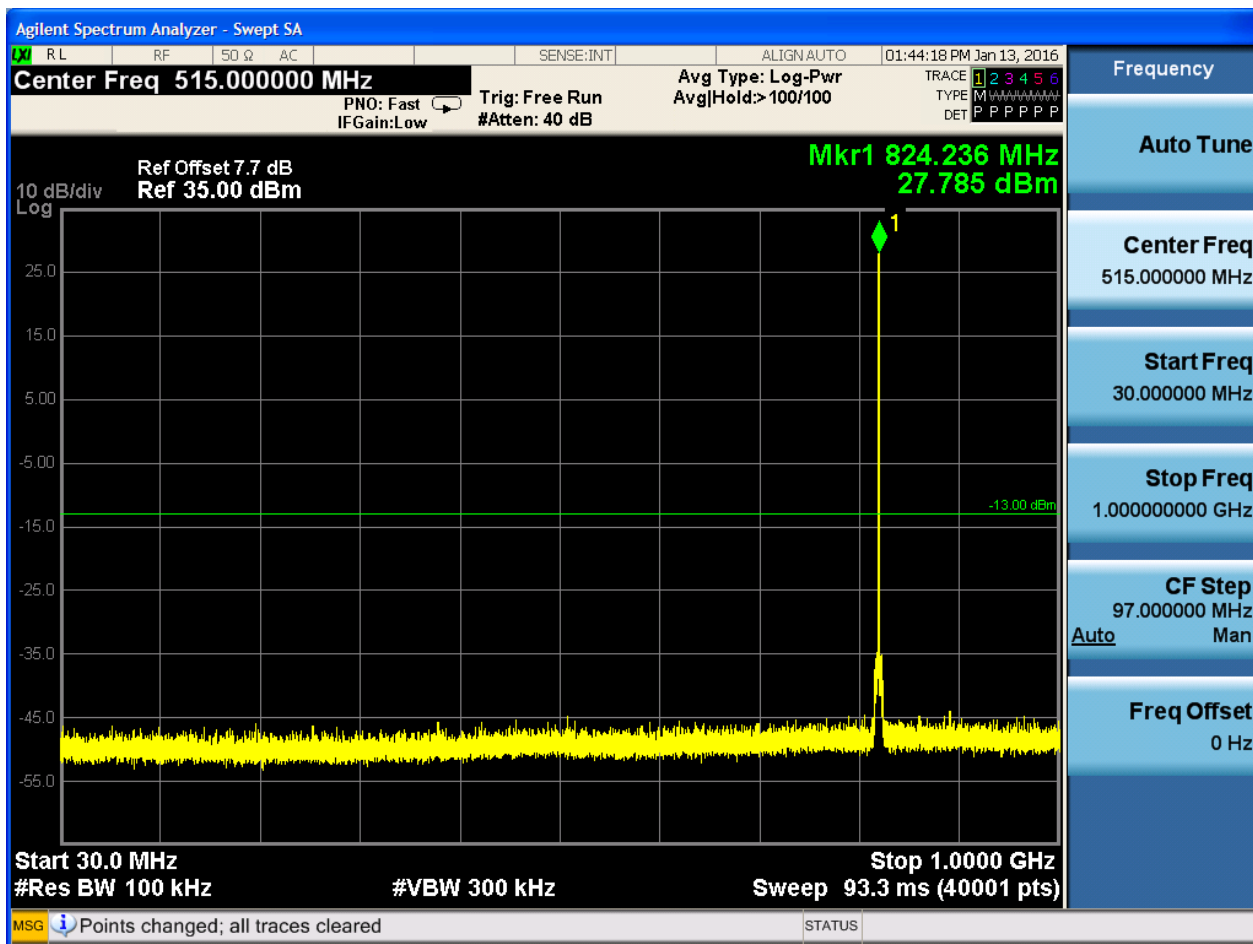


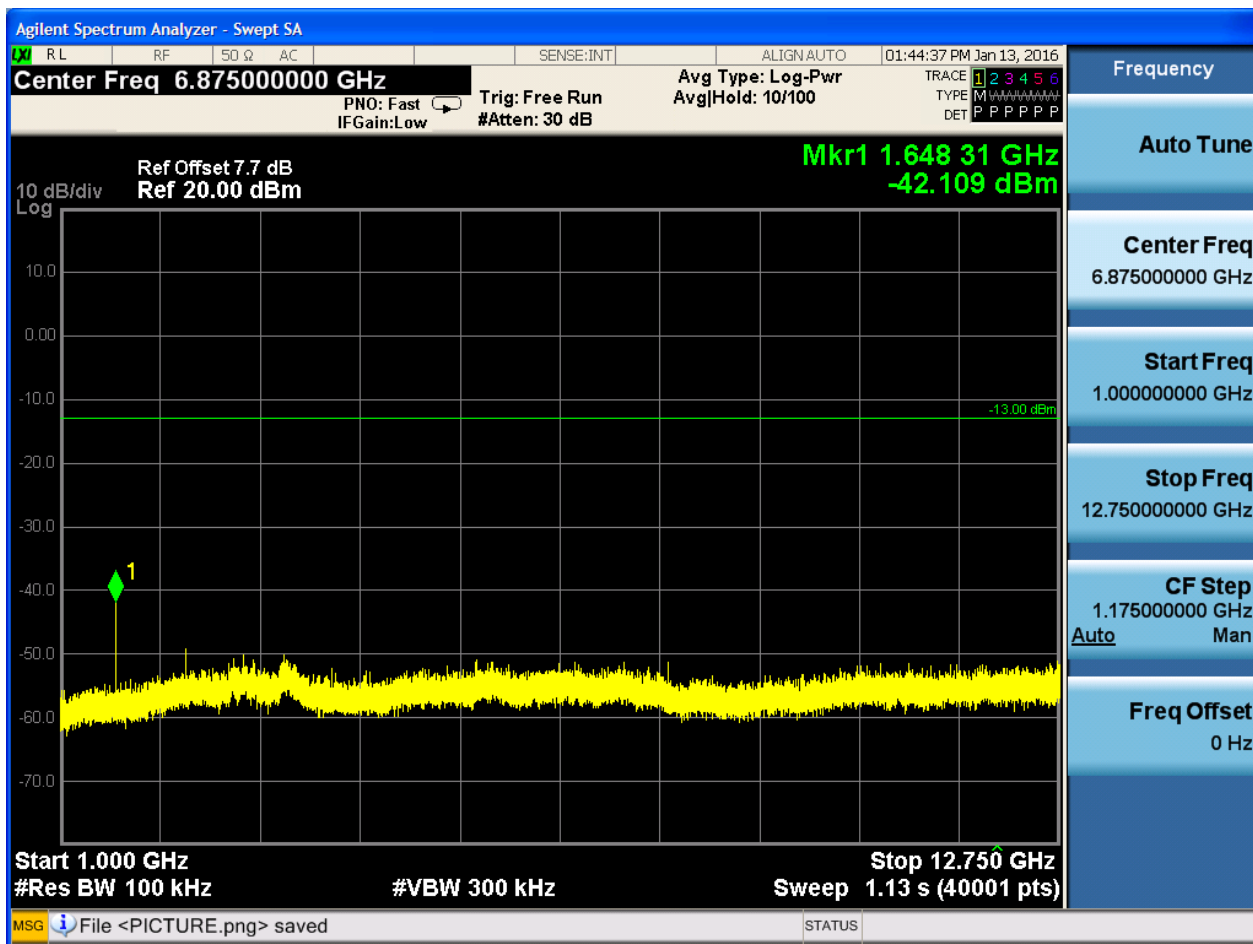
6.1.1.2 Test Mode = GSM/TM2

6.1.1.2.1 Test Channel = LCH

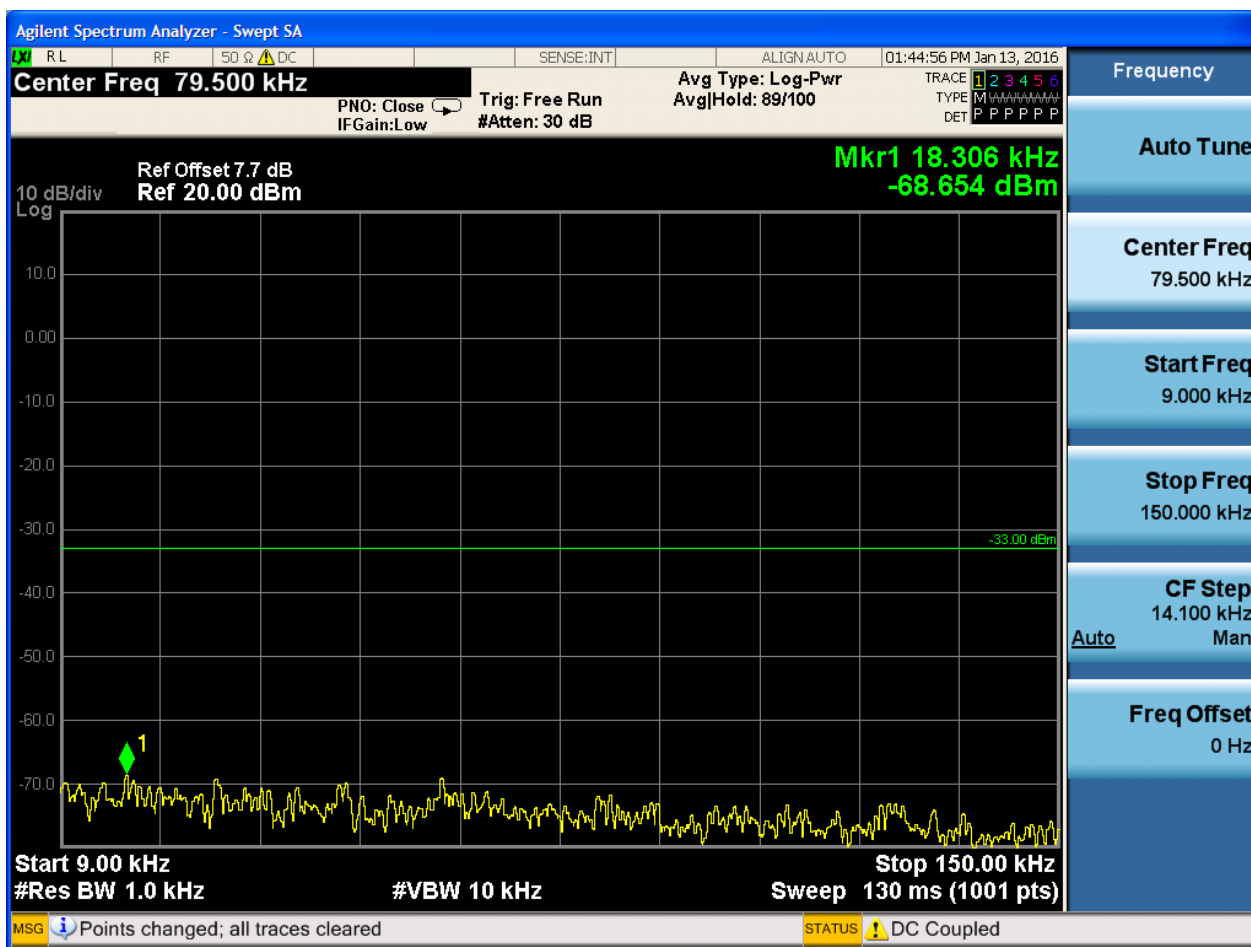


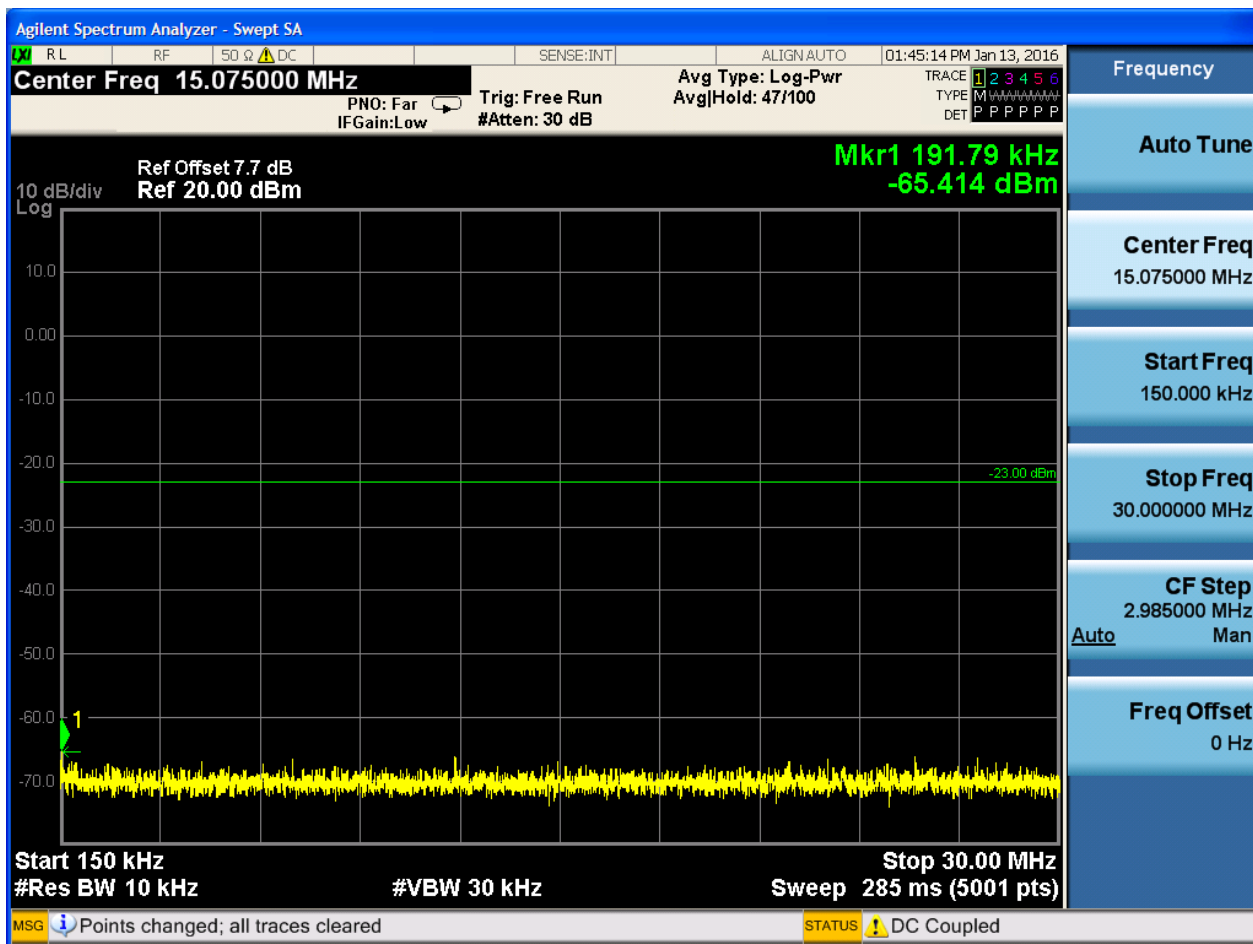


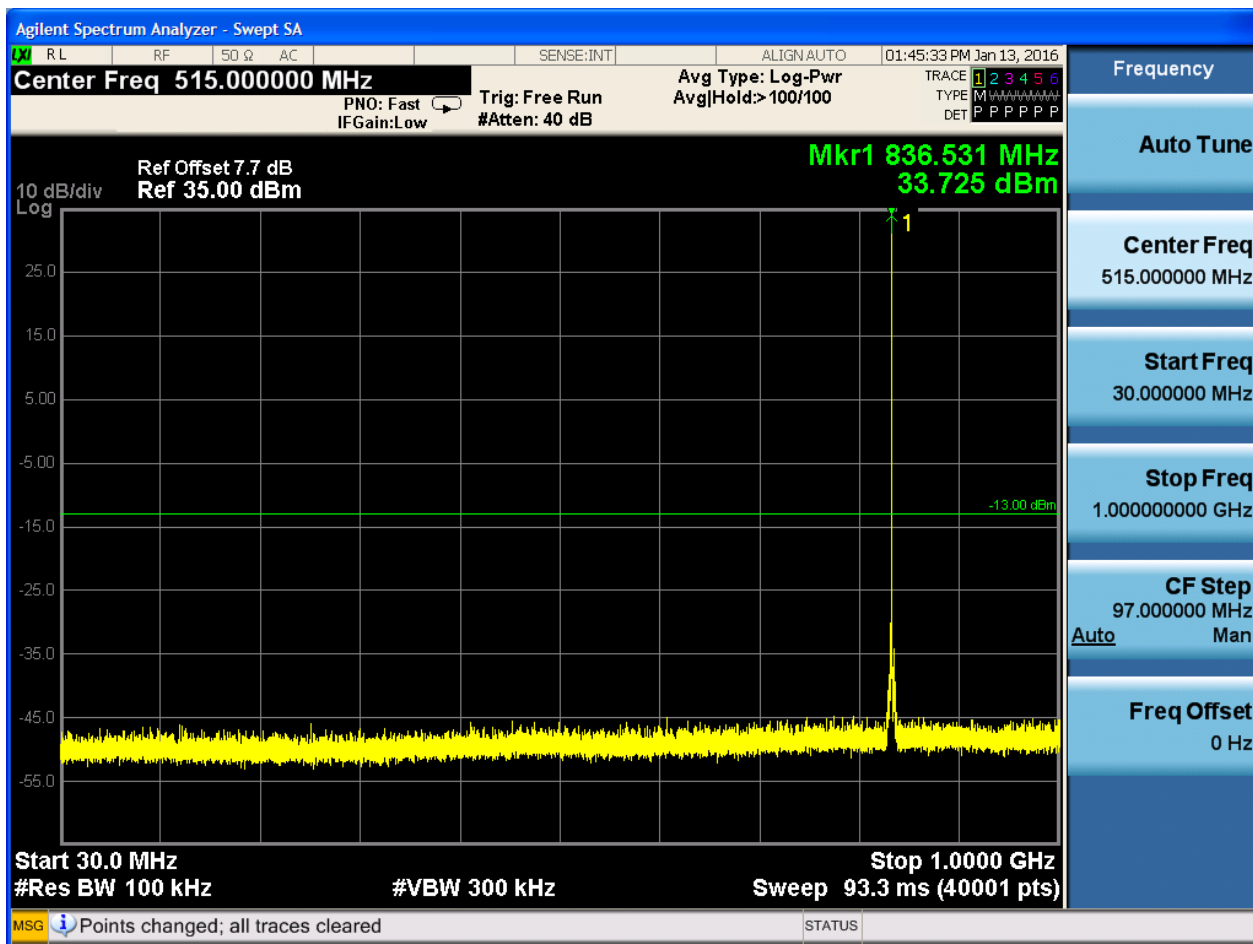


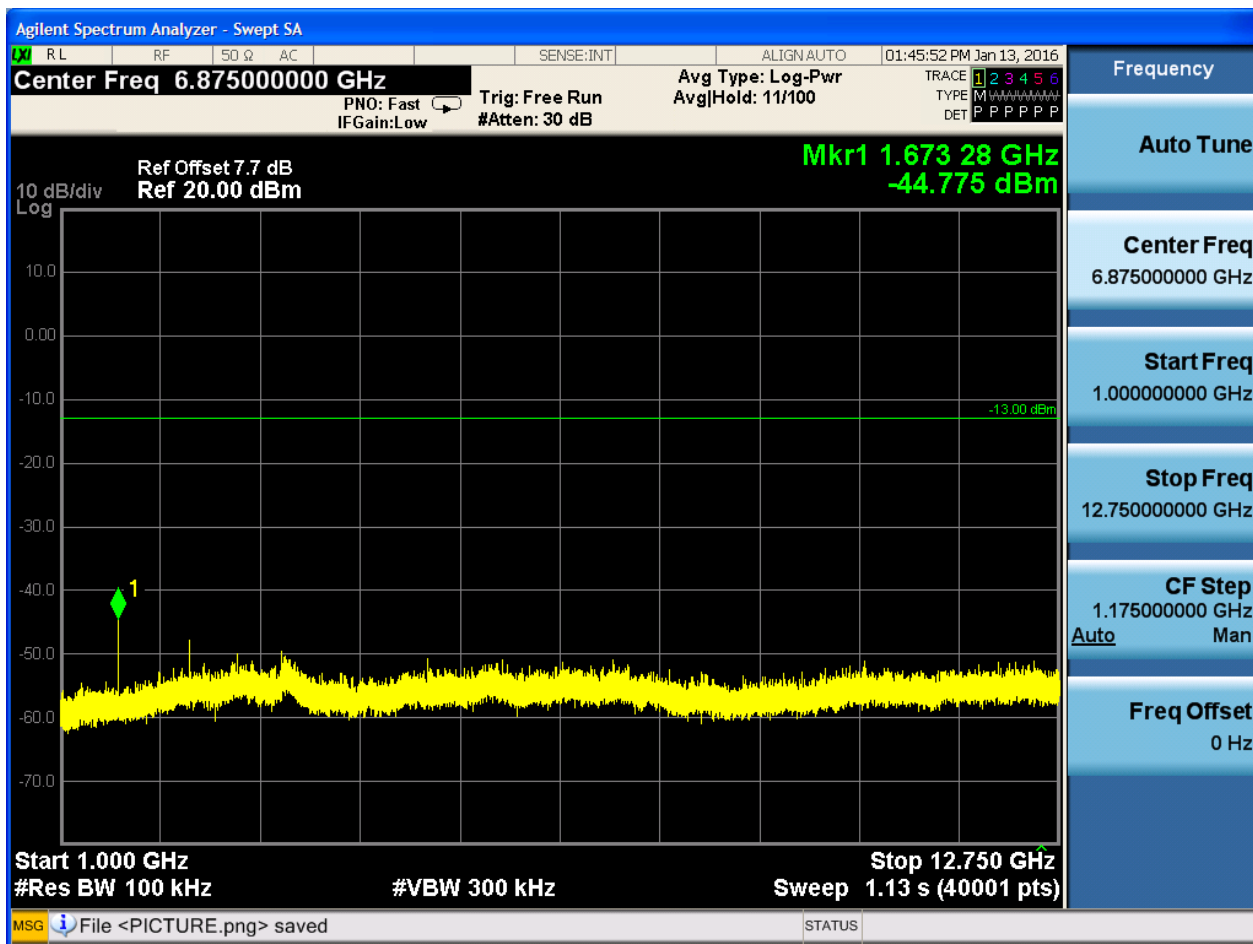


6.1.1.2.2 Test Channel = MCH



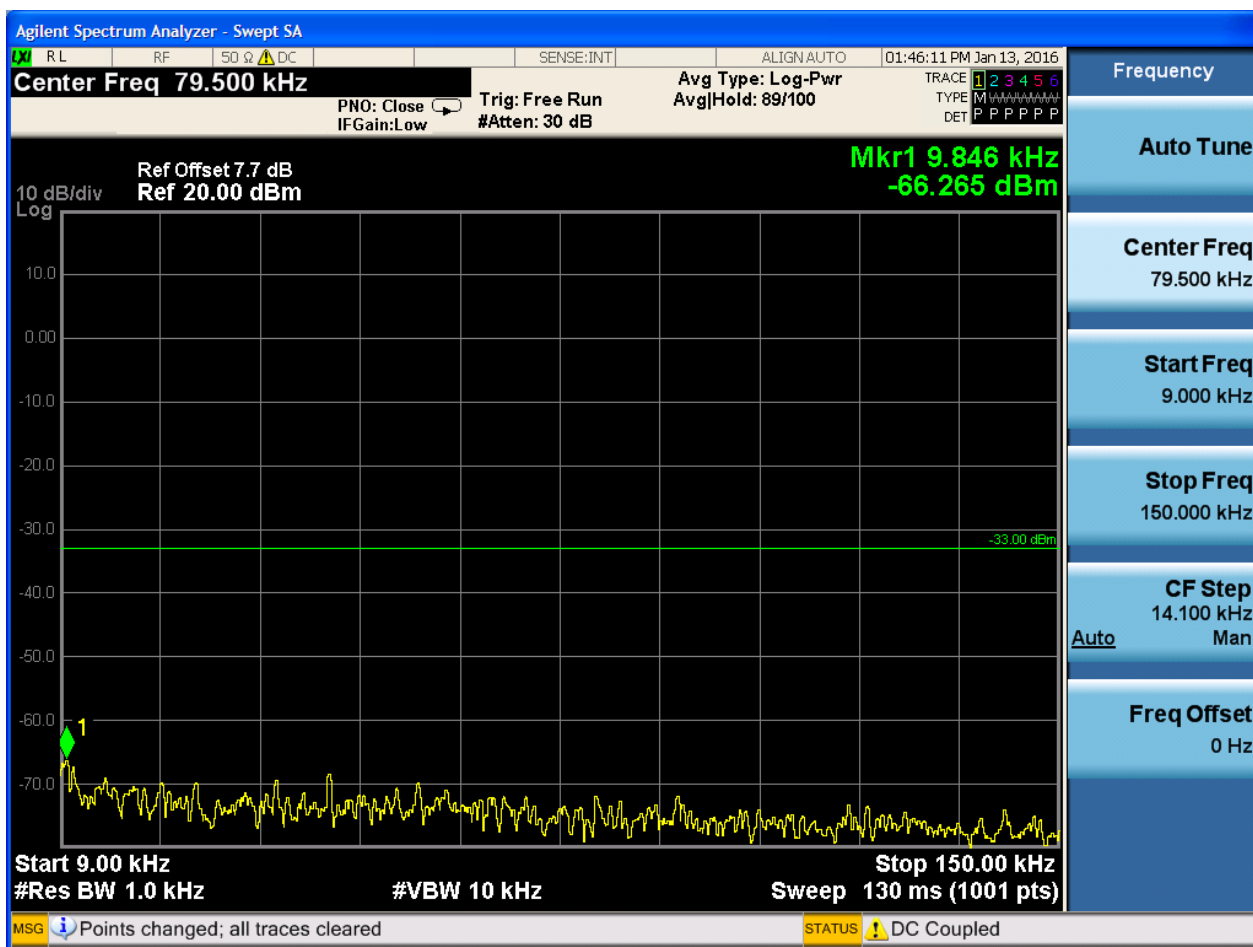


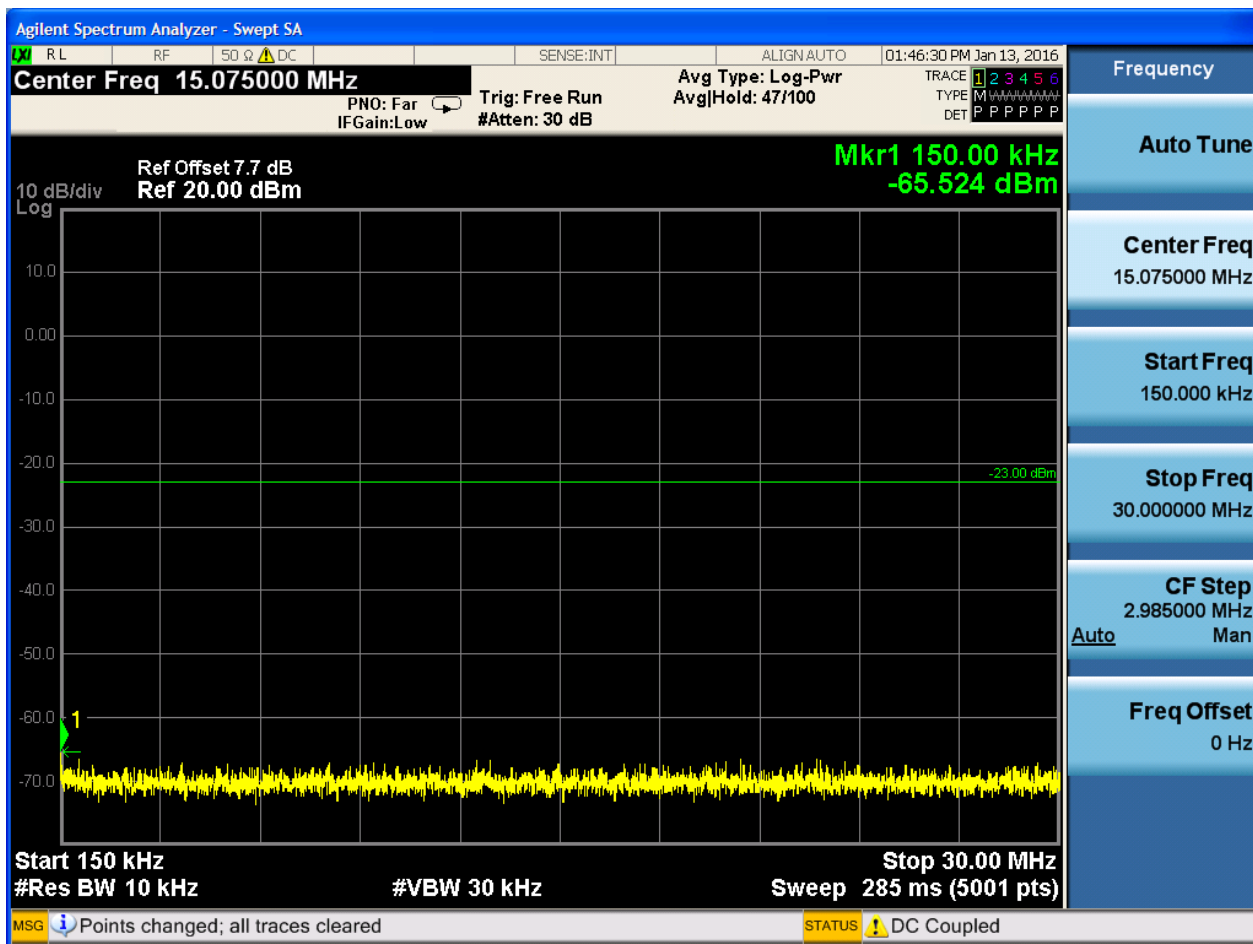


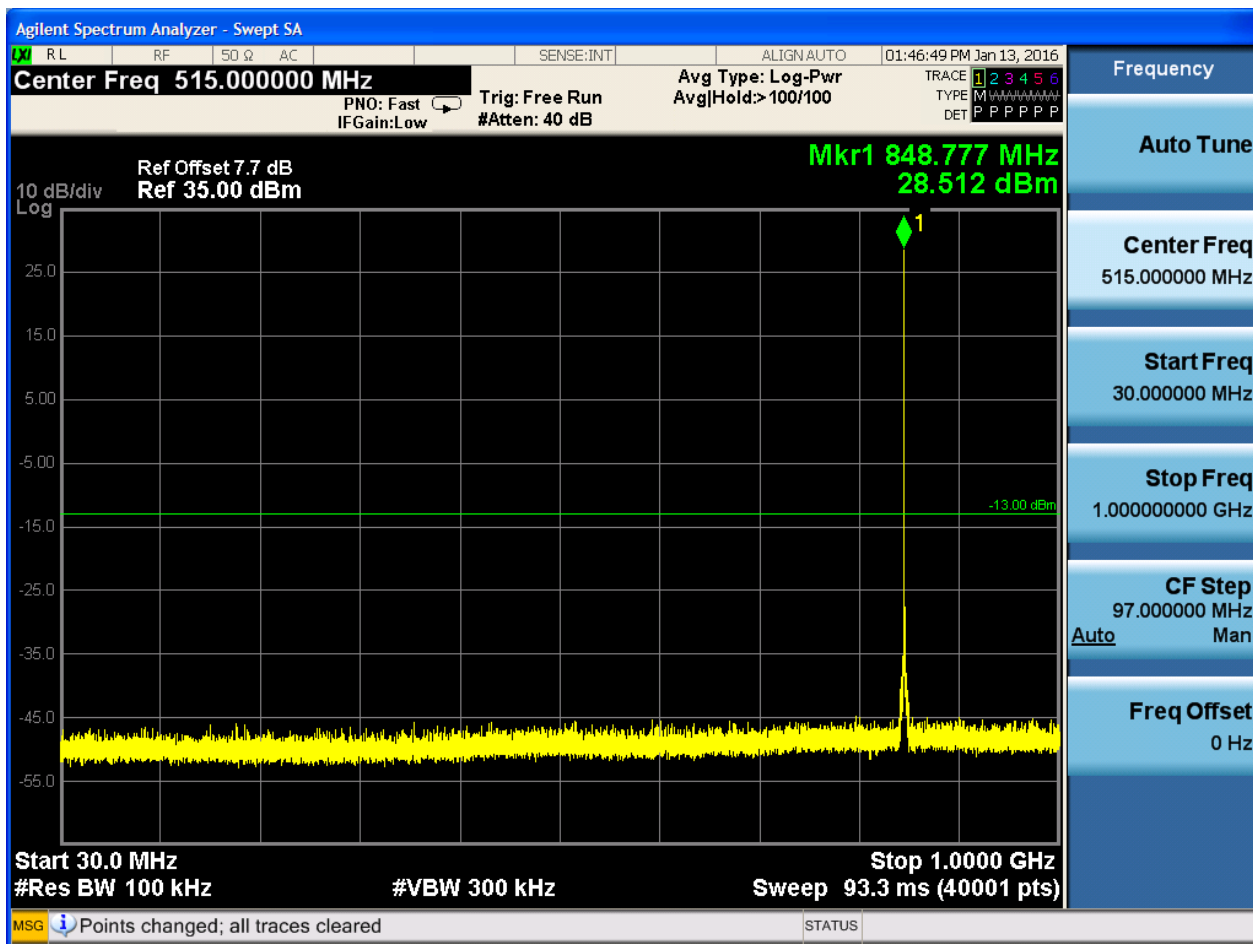


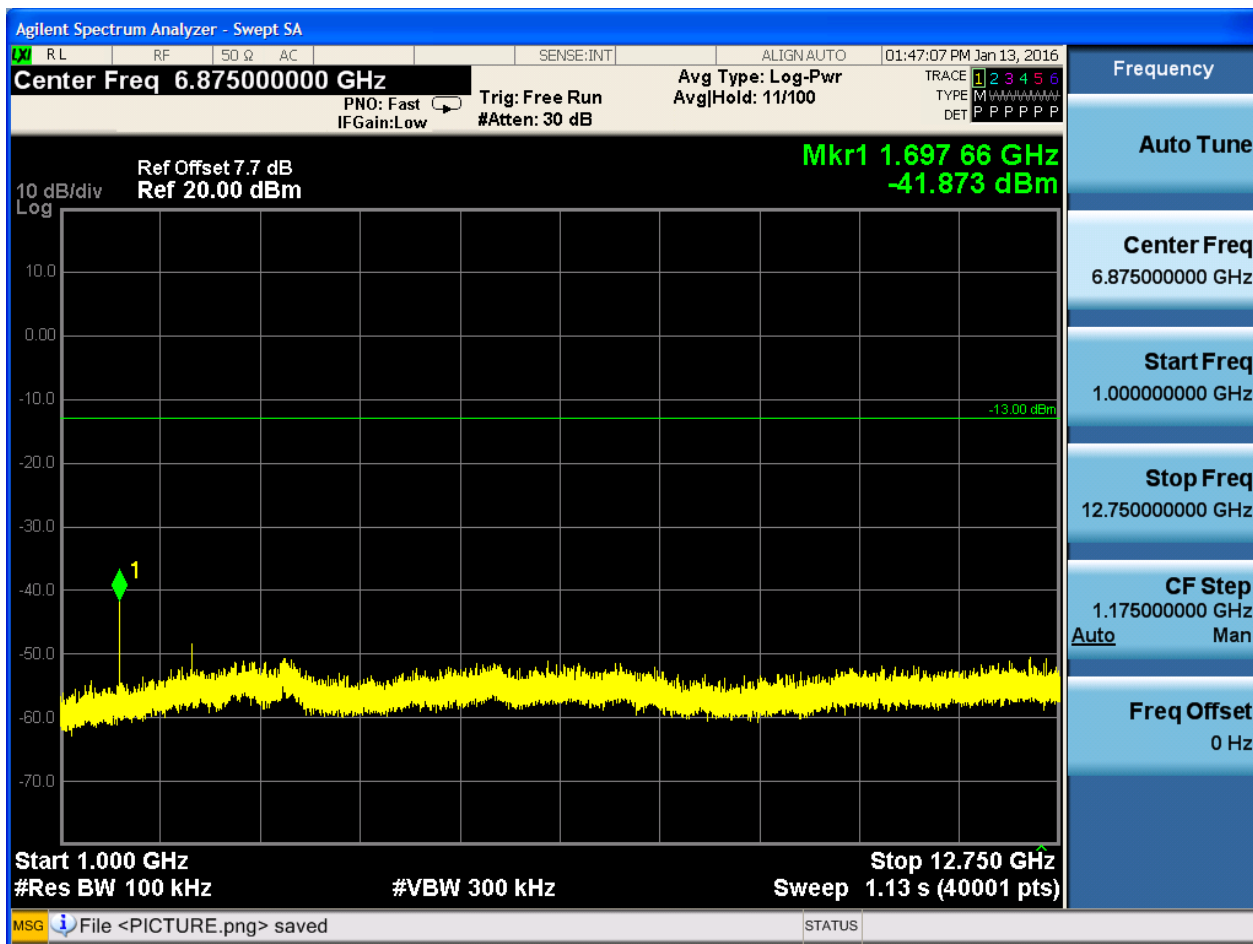


6.1.1.2.3 Test Channel = HCH







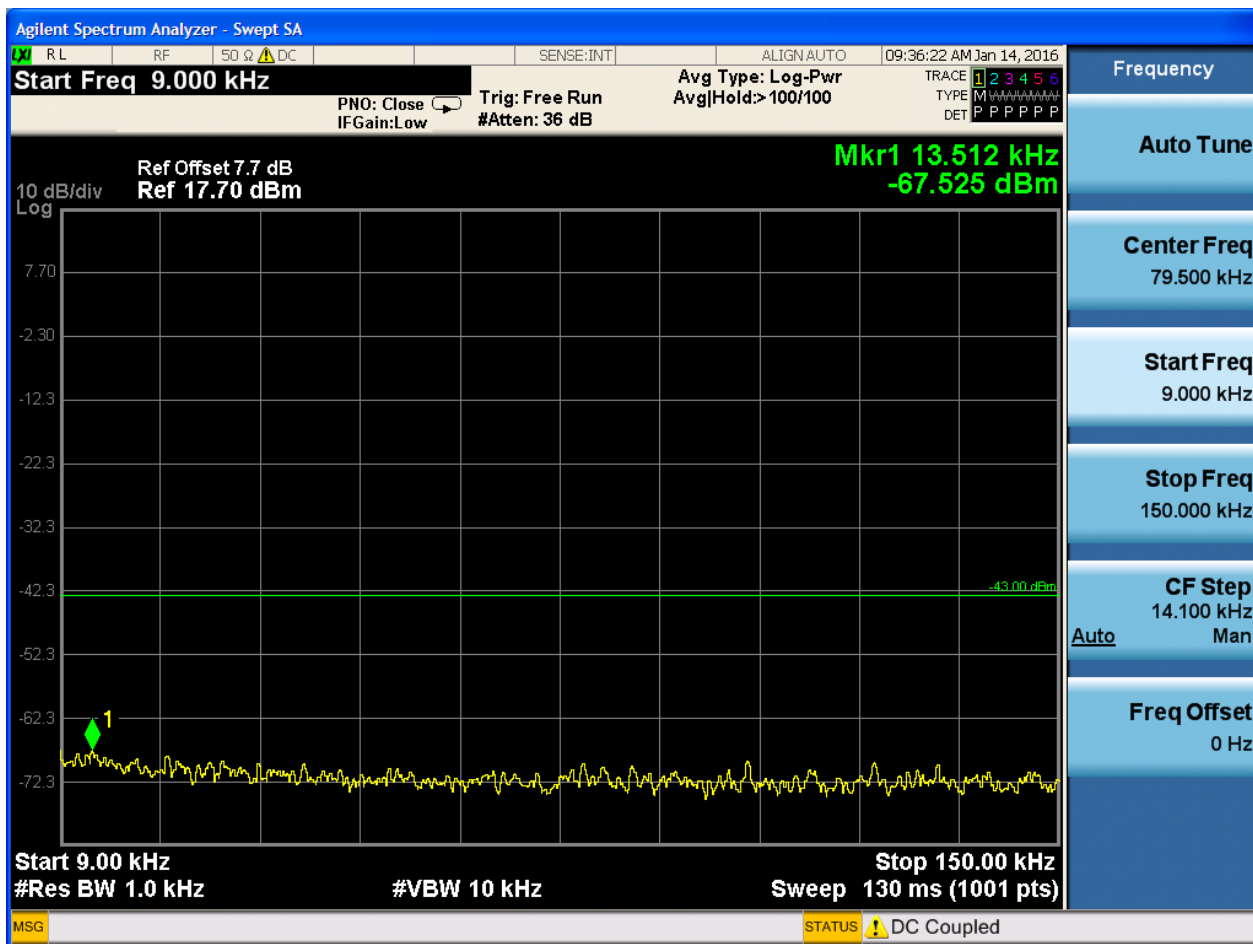


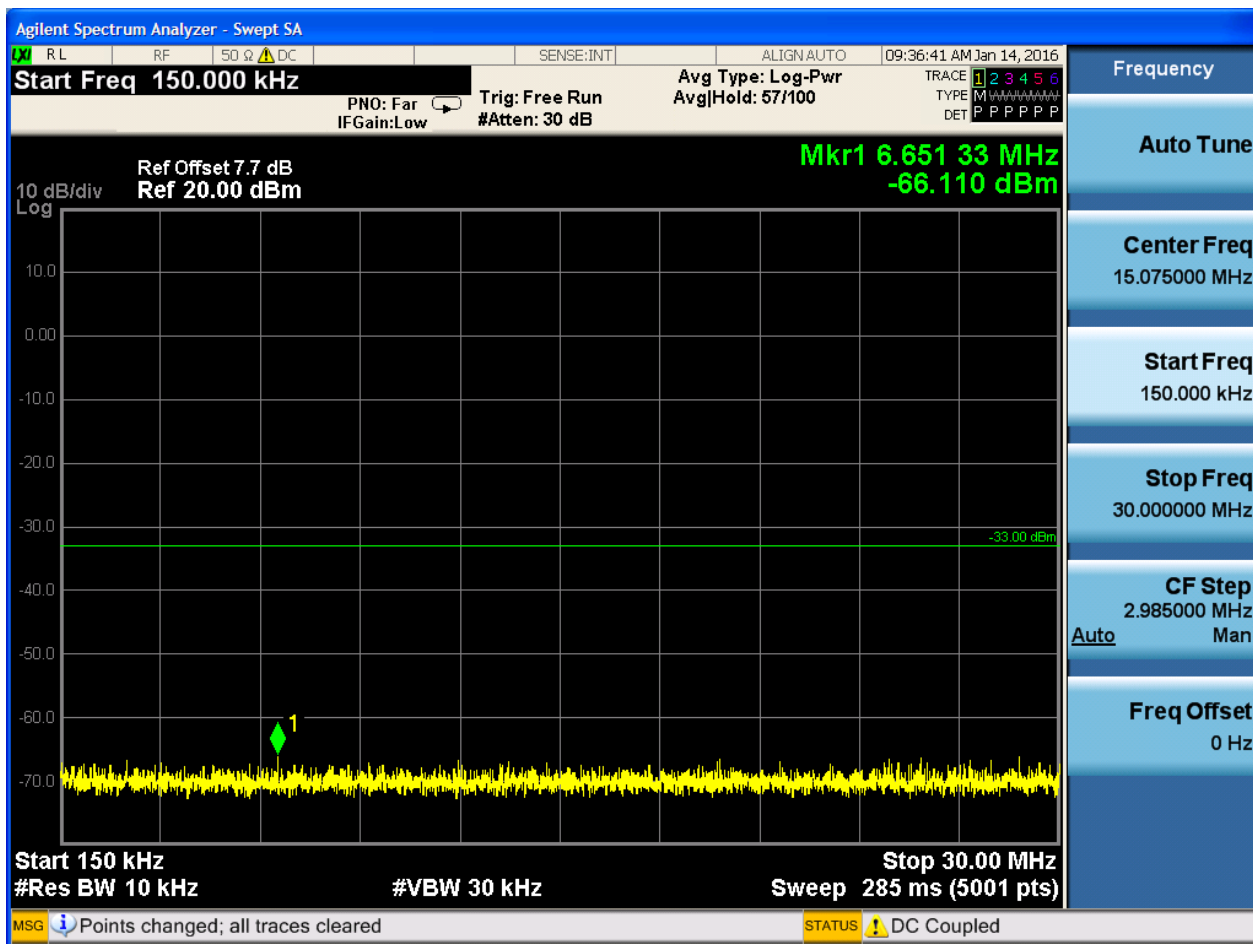


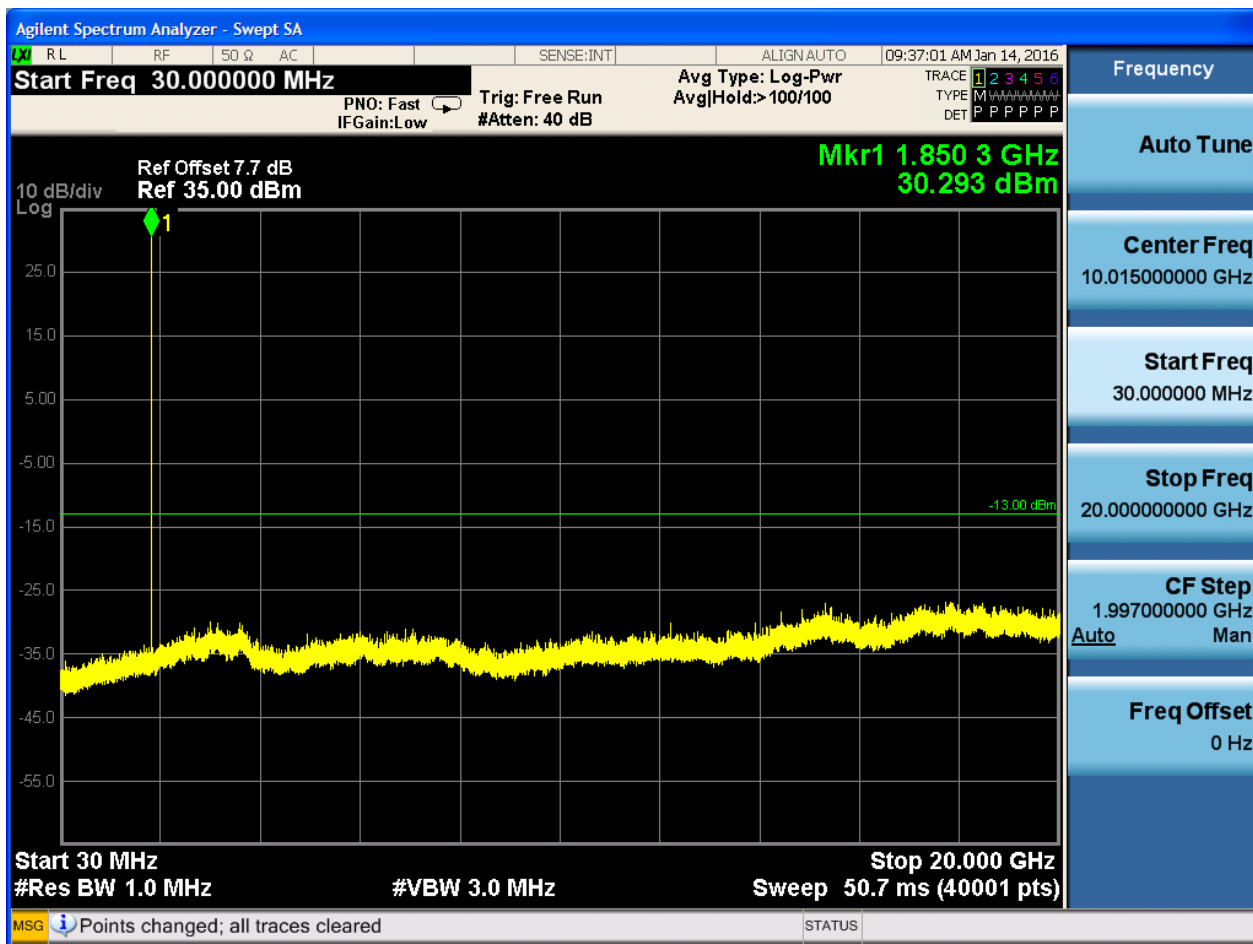
6.1.2 Test Band = GSM1900

6.1.2.1 Test Mode = GSM/TM1

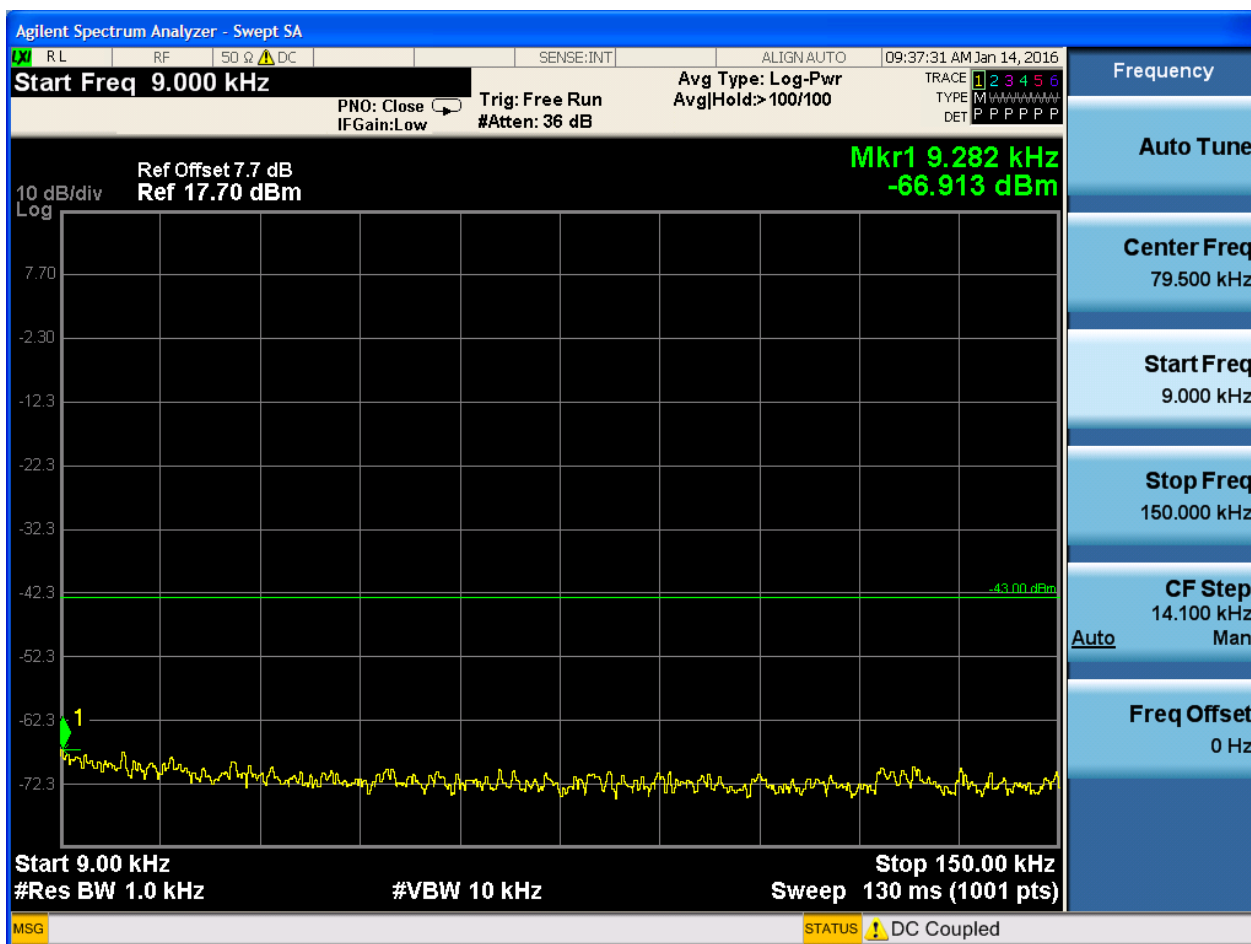
6.1.2.1.1 Test Channel = LCH

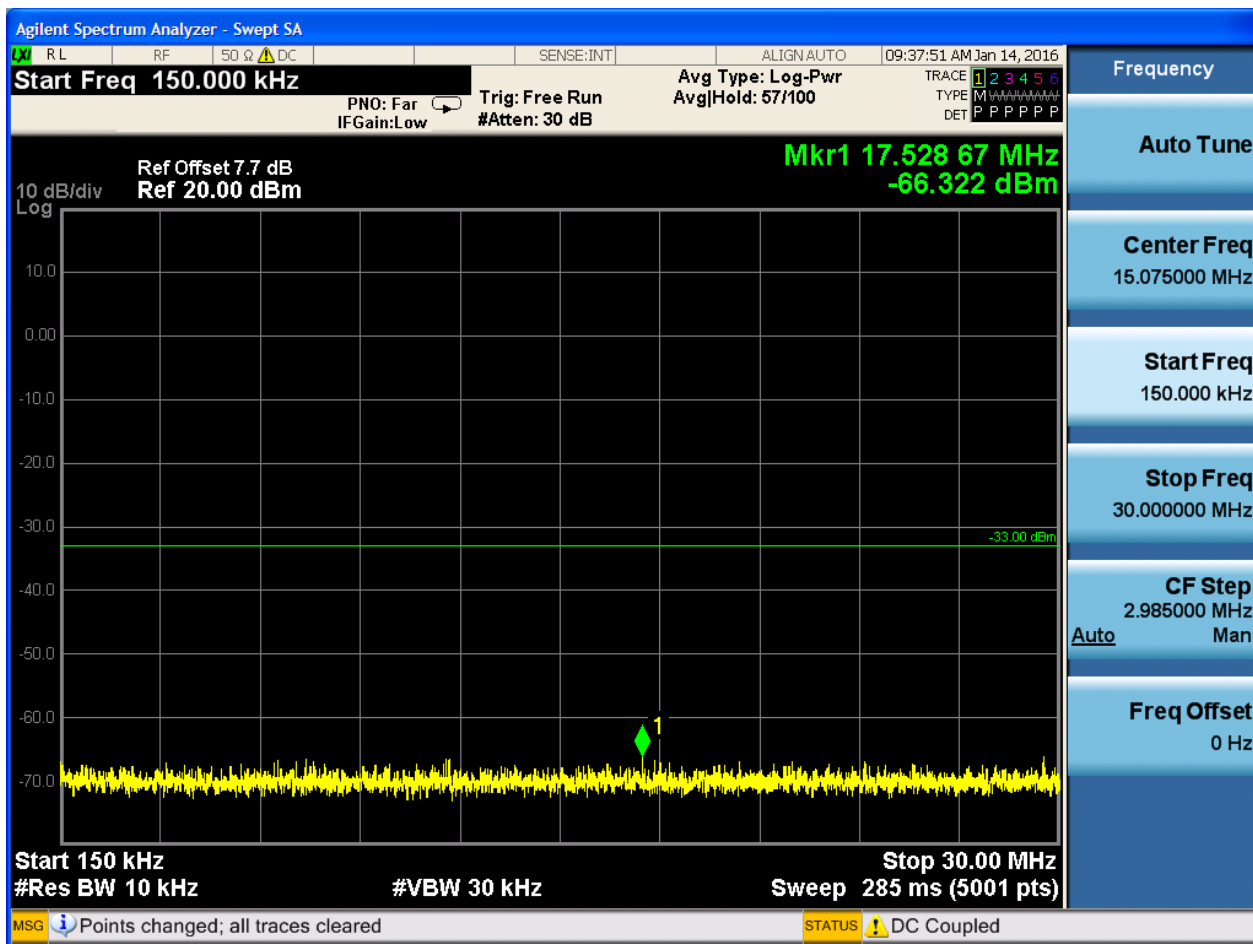


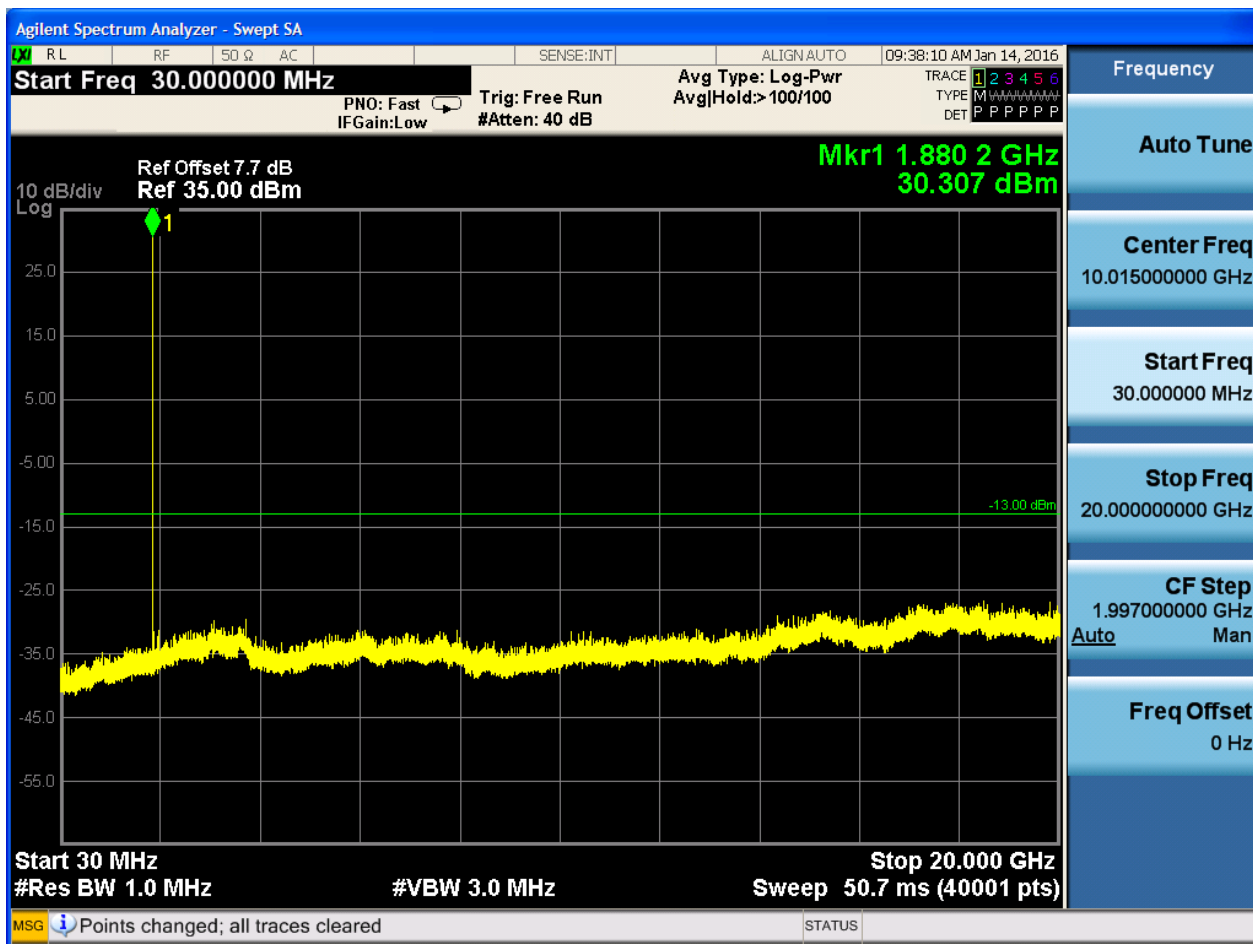




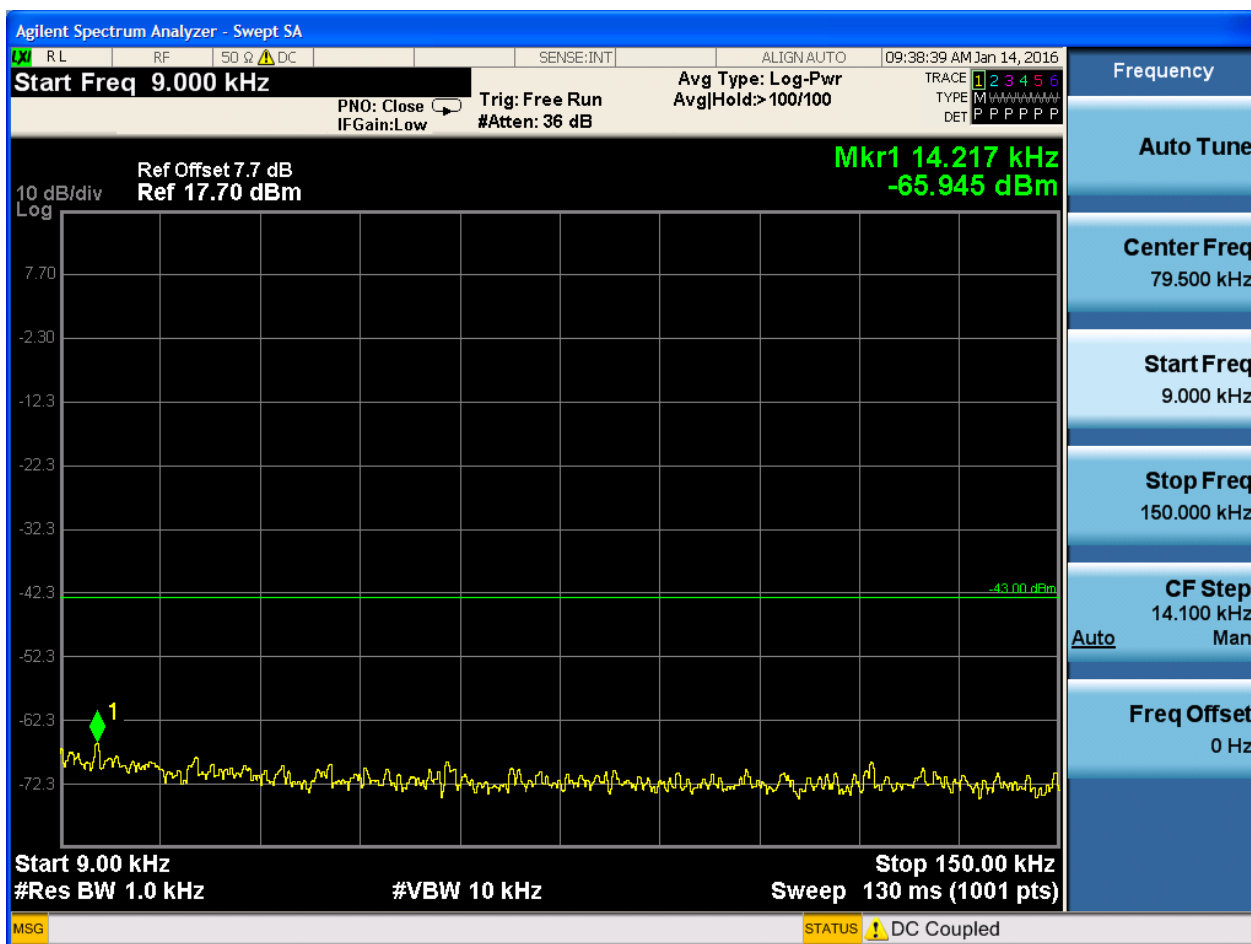
6.1.2.1.2 Test Channel = MCH

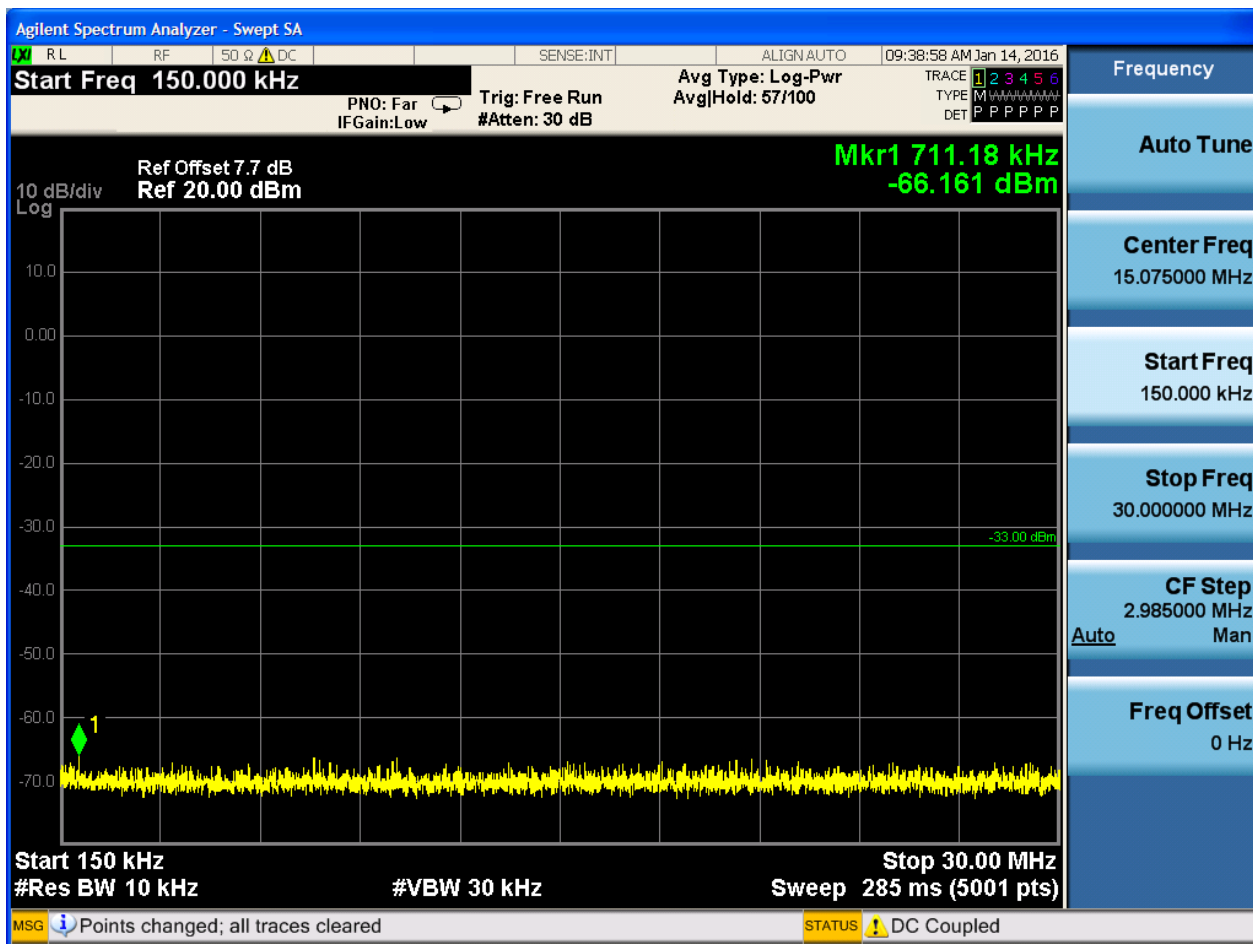


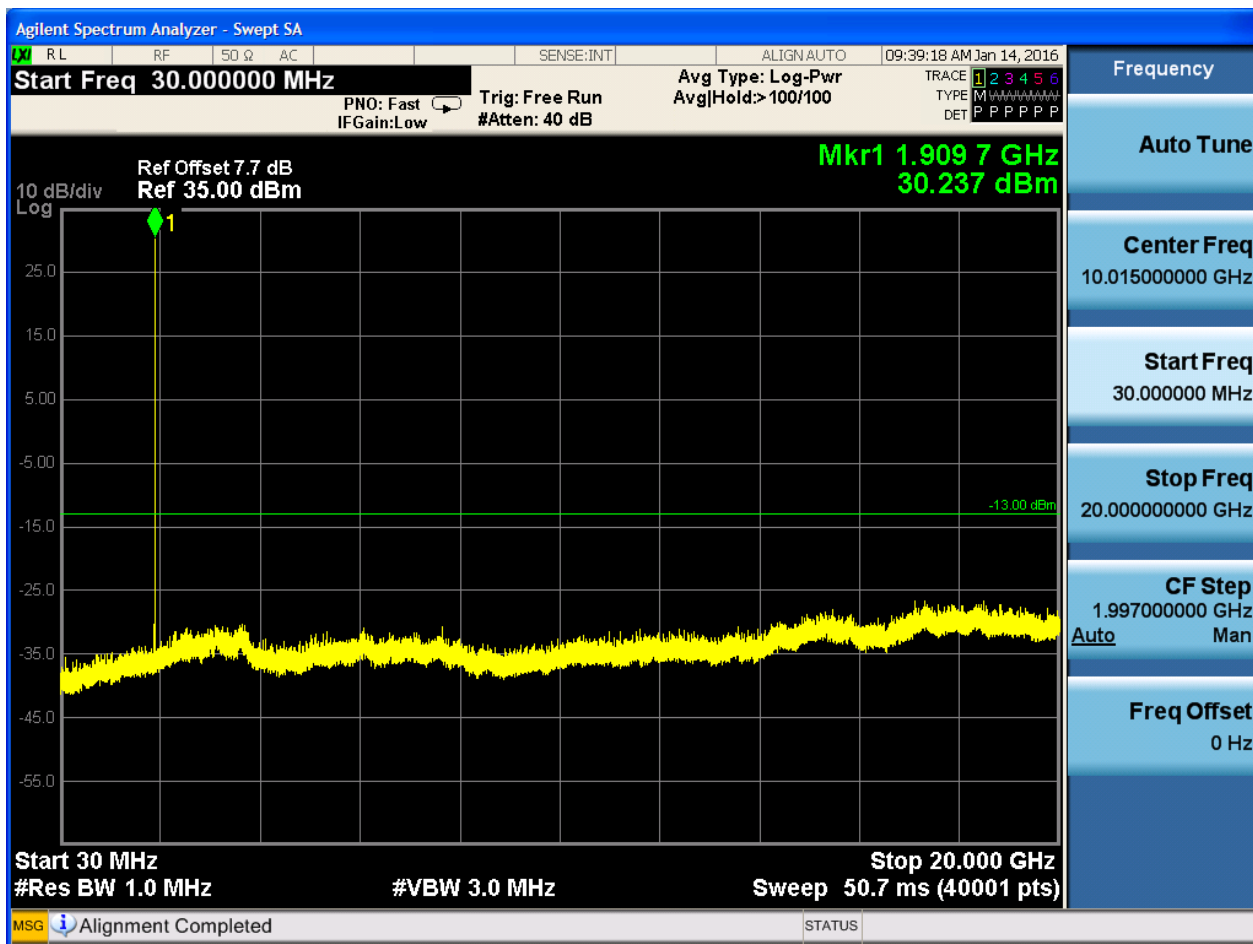




6.1.2.1.3 Test Channel = HCH

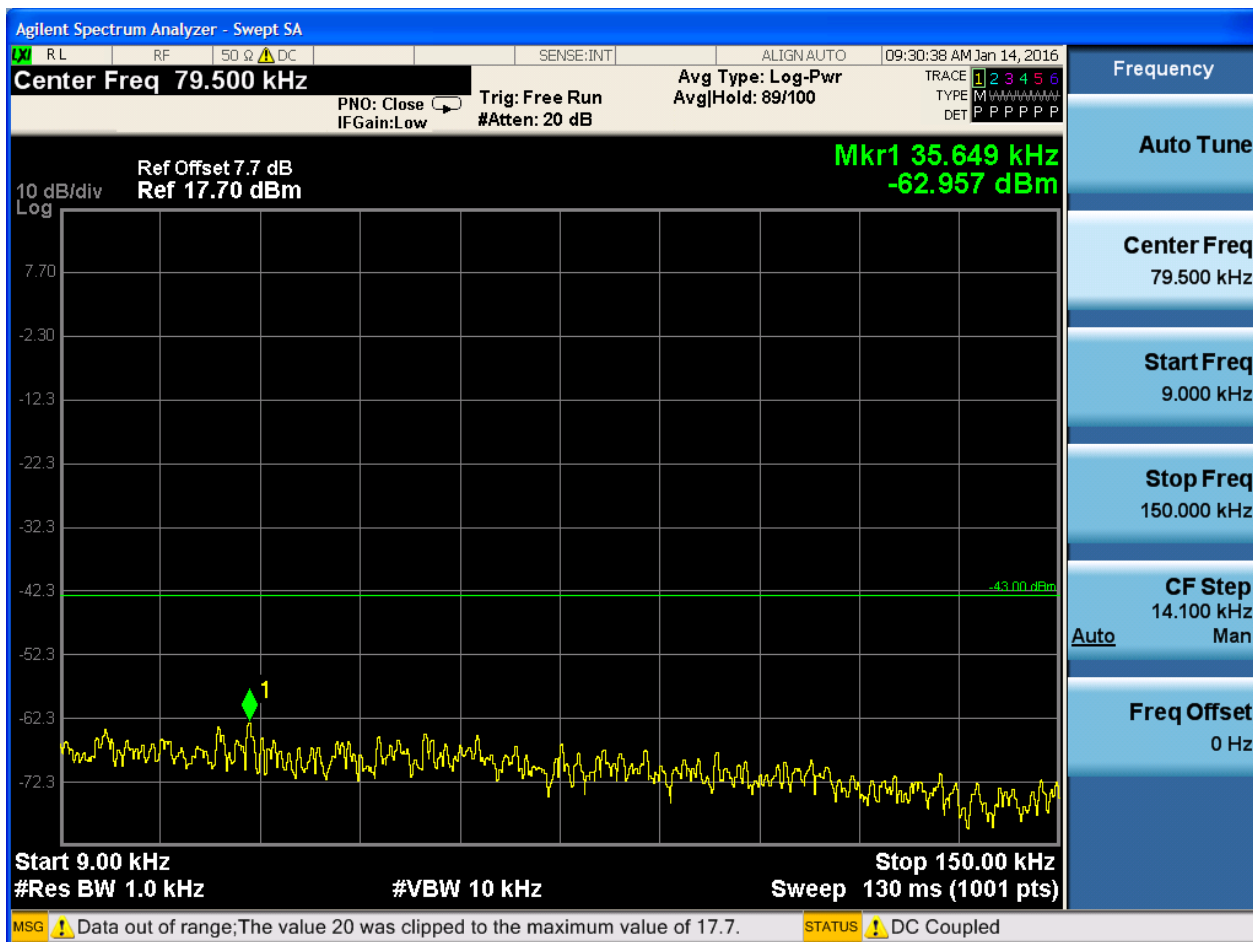


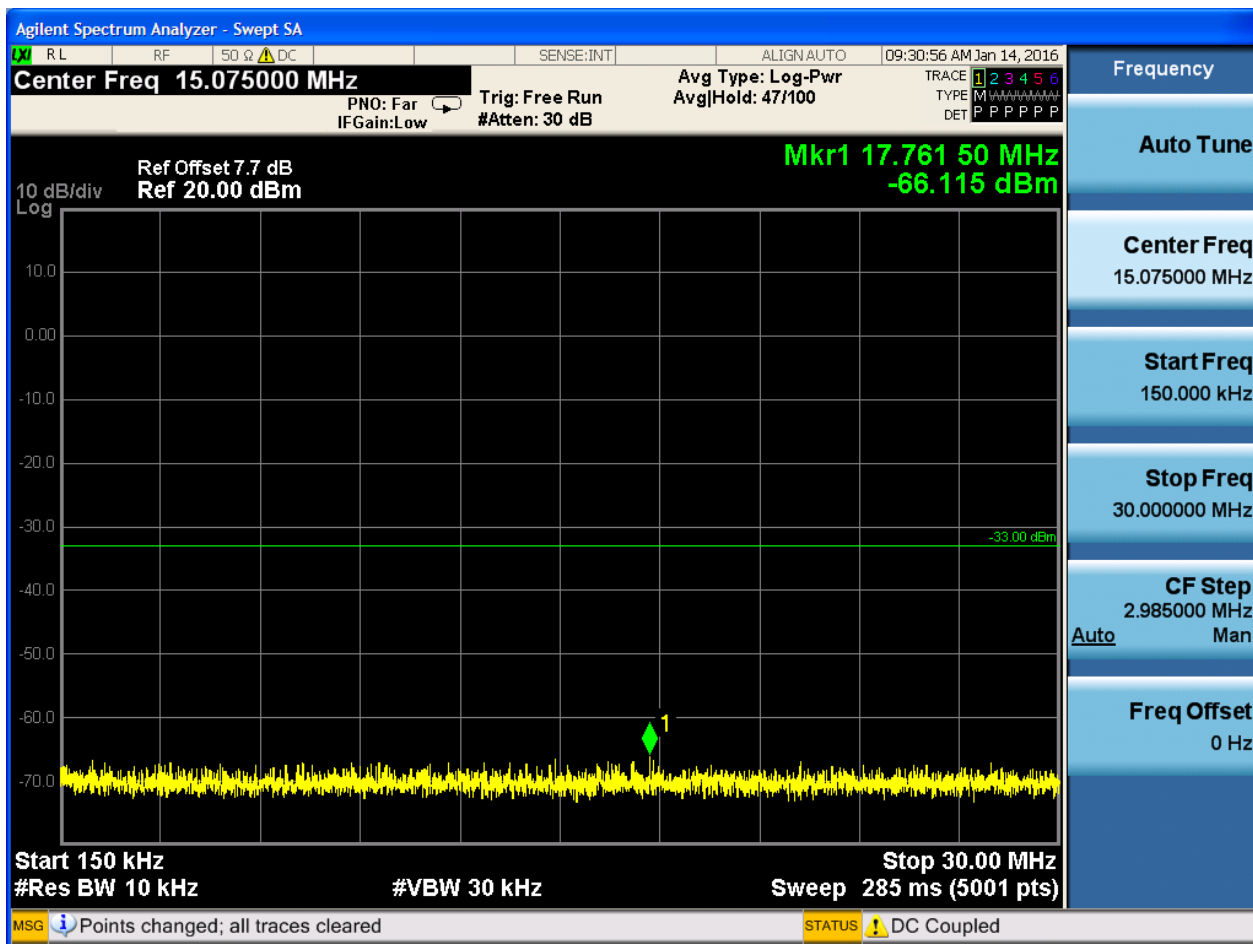


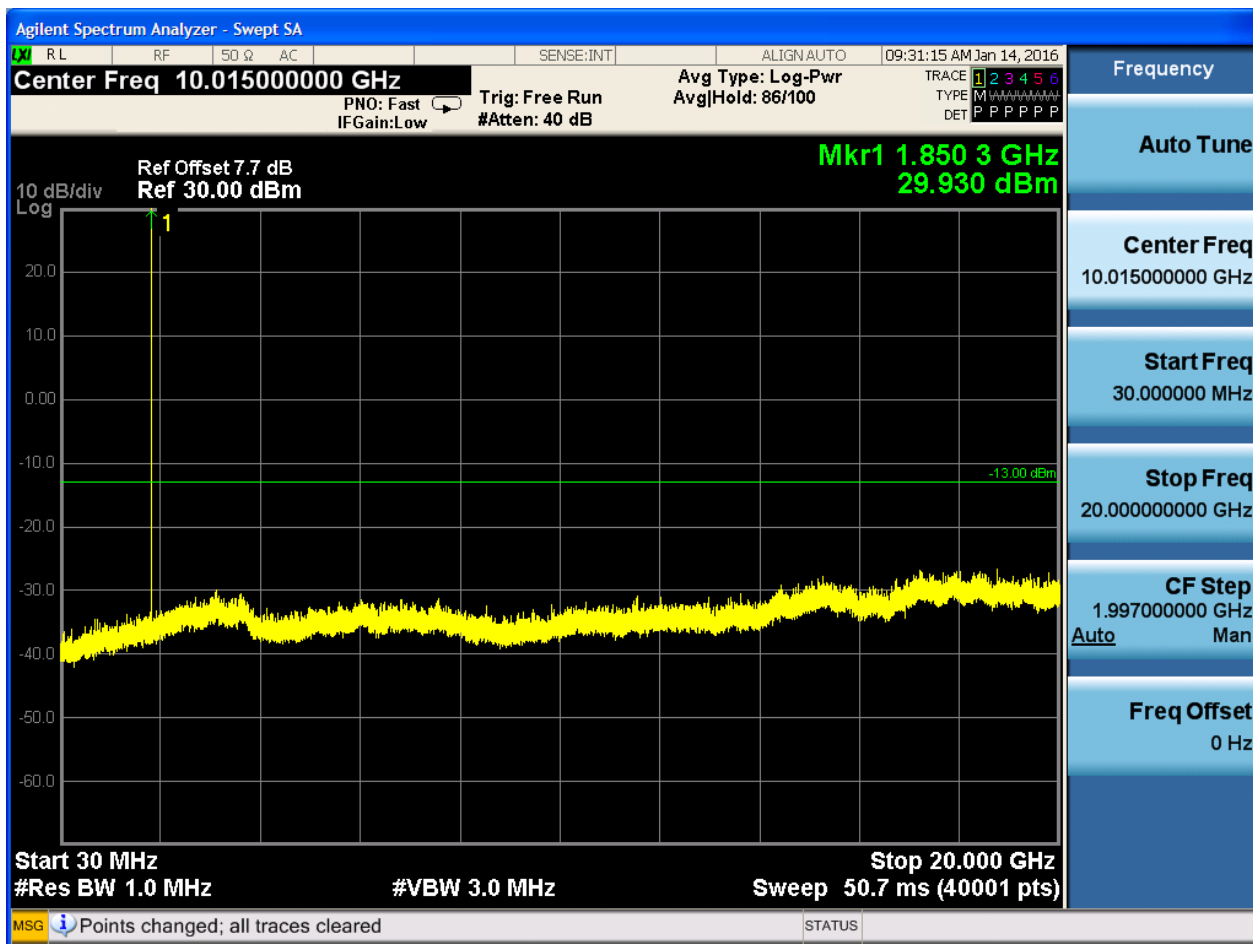


6.1.2.2 Test Mode = GSM/TM2

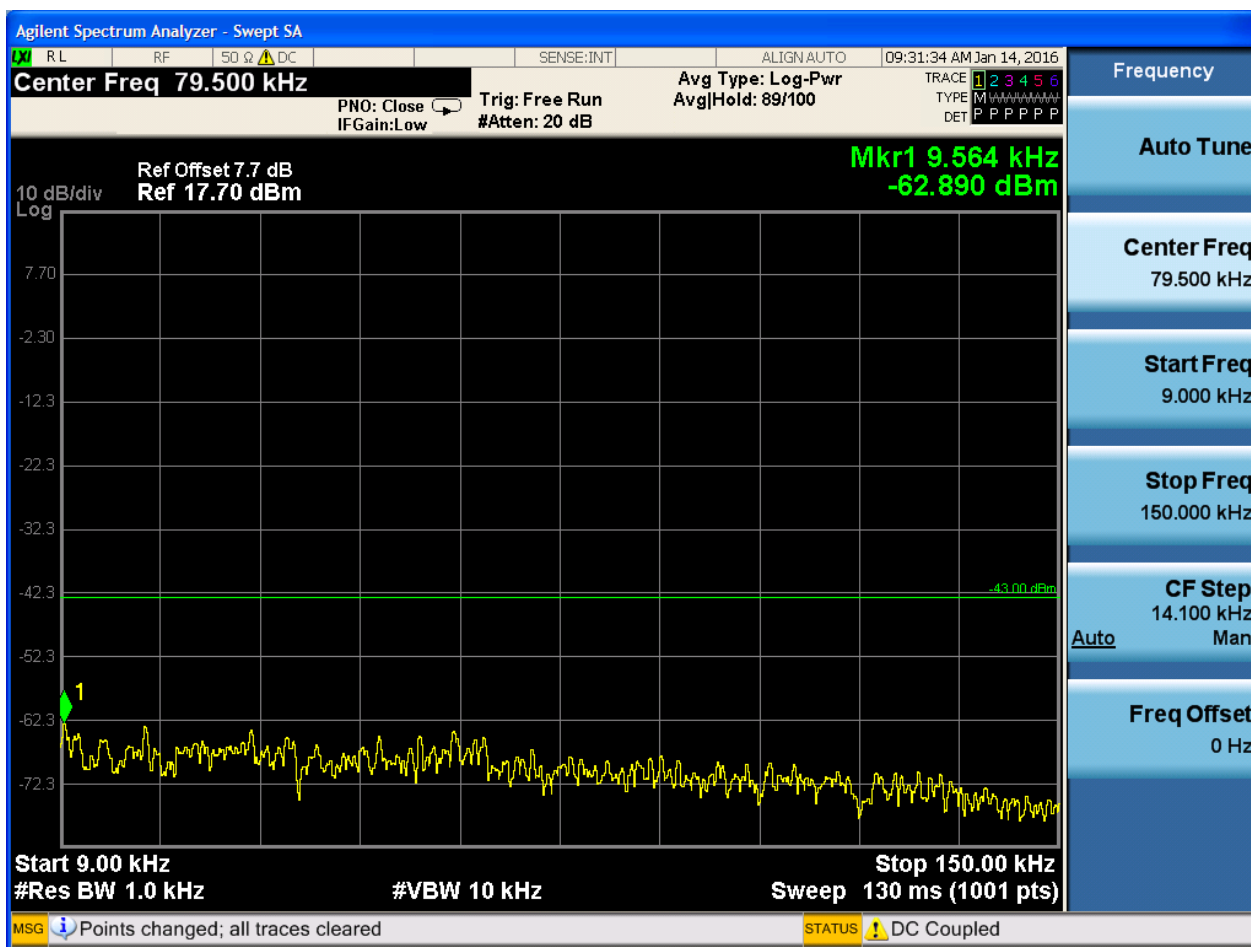
6.1.2.2.1 Test Channel = LCH

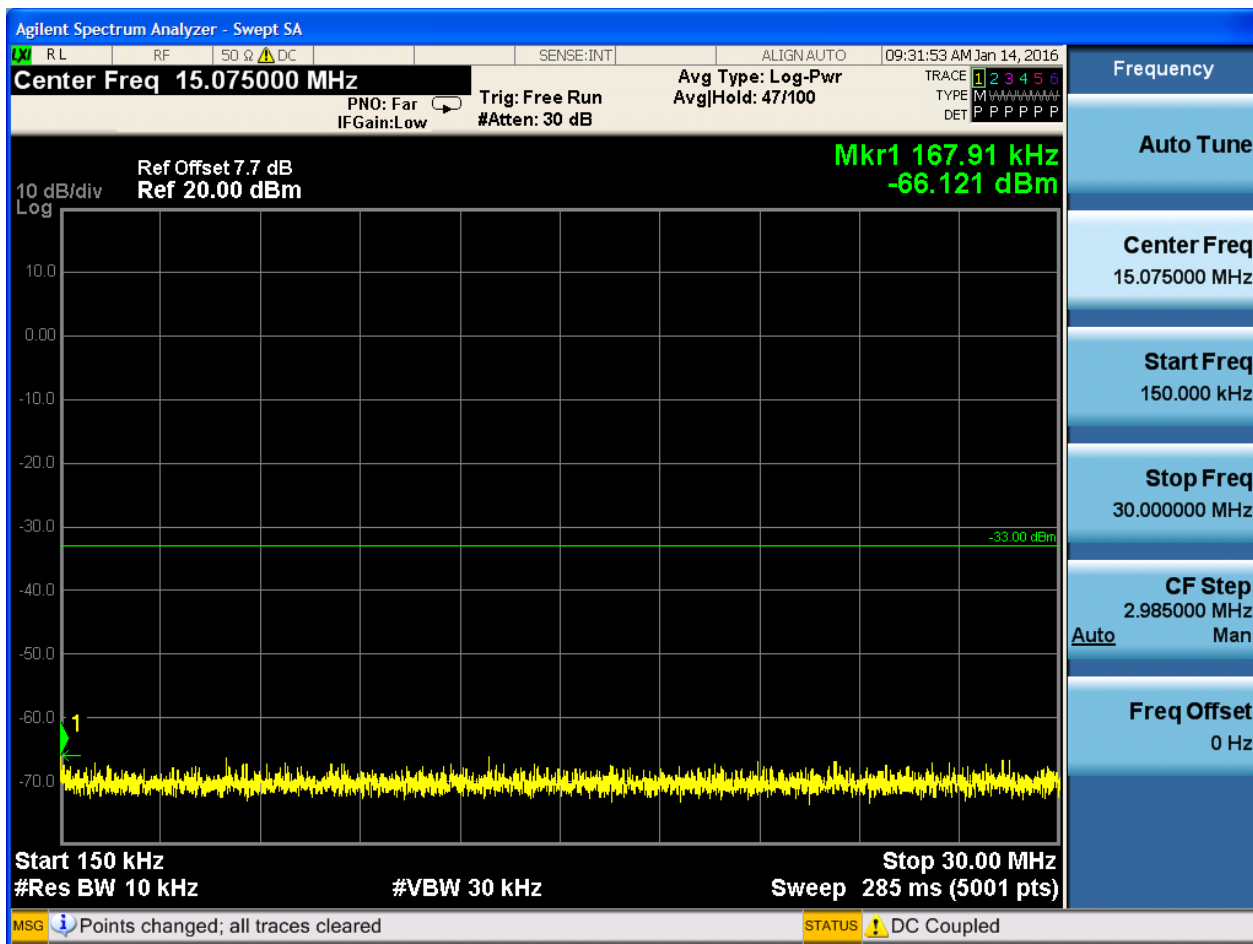


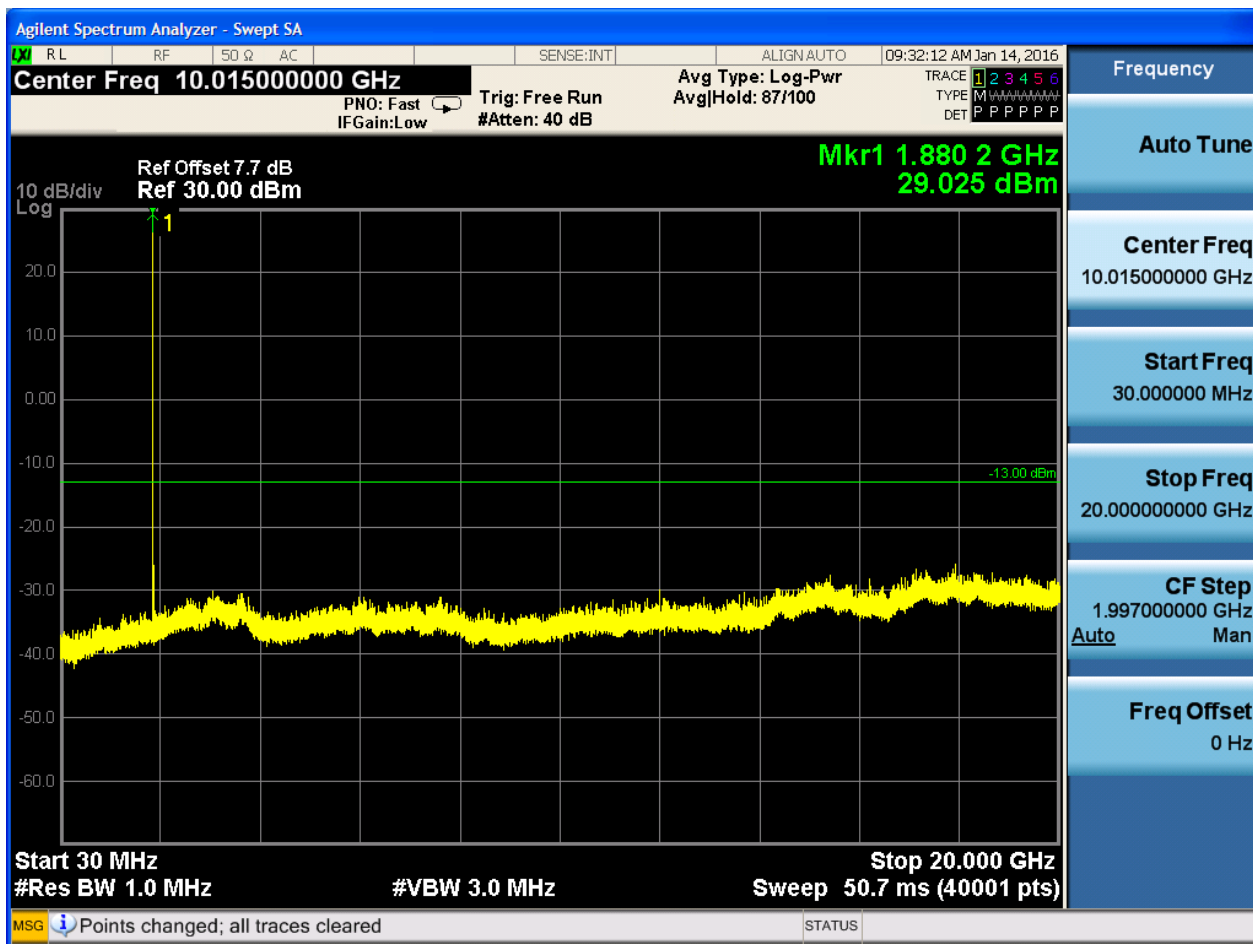




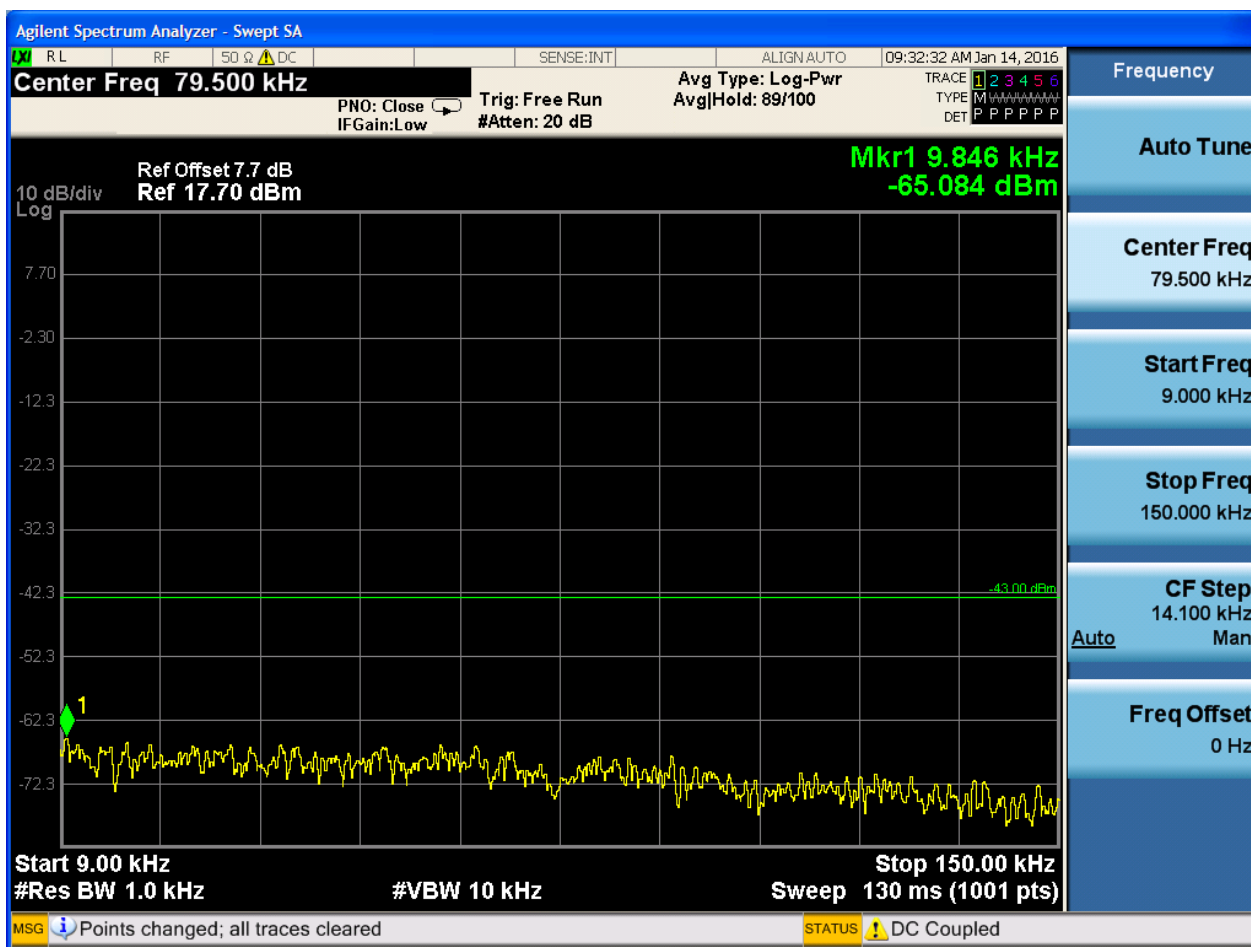
6.1.2.2.2 Test Channel = MCH

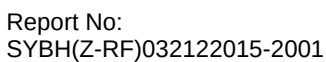


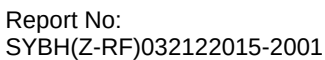




6.1.2.2.3 Test Channel = HCH







7Appendix_G: Field Strength of Spurious Radiation

Note:

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

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

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

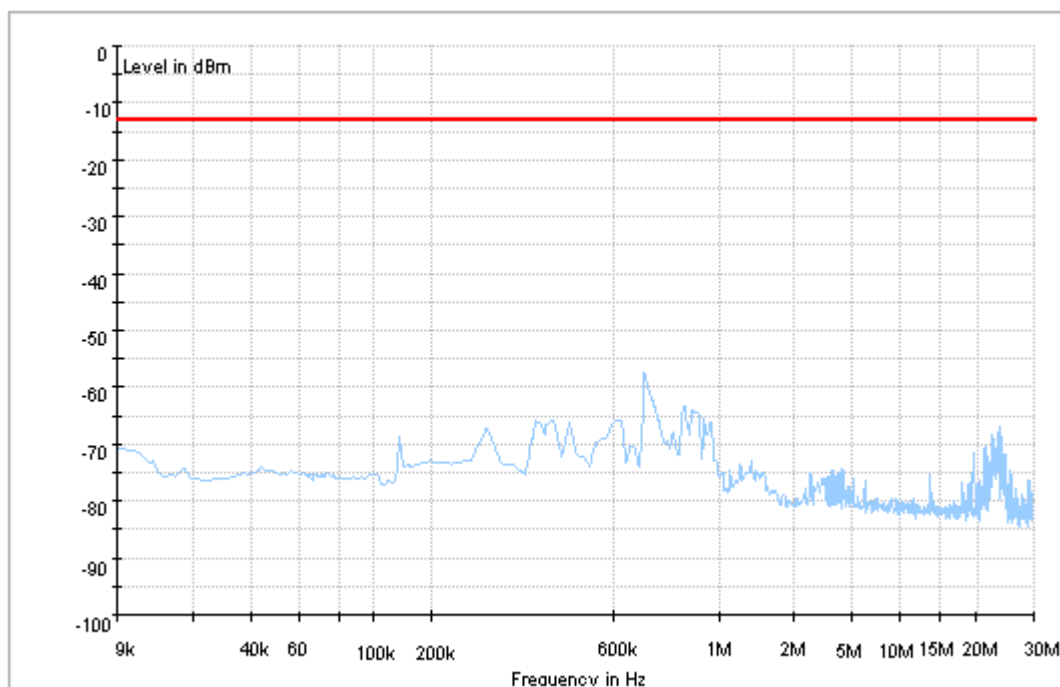
Above 1GHz, RBW = 1 MHz, VBW = 3 MHz. Detector: PK

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

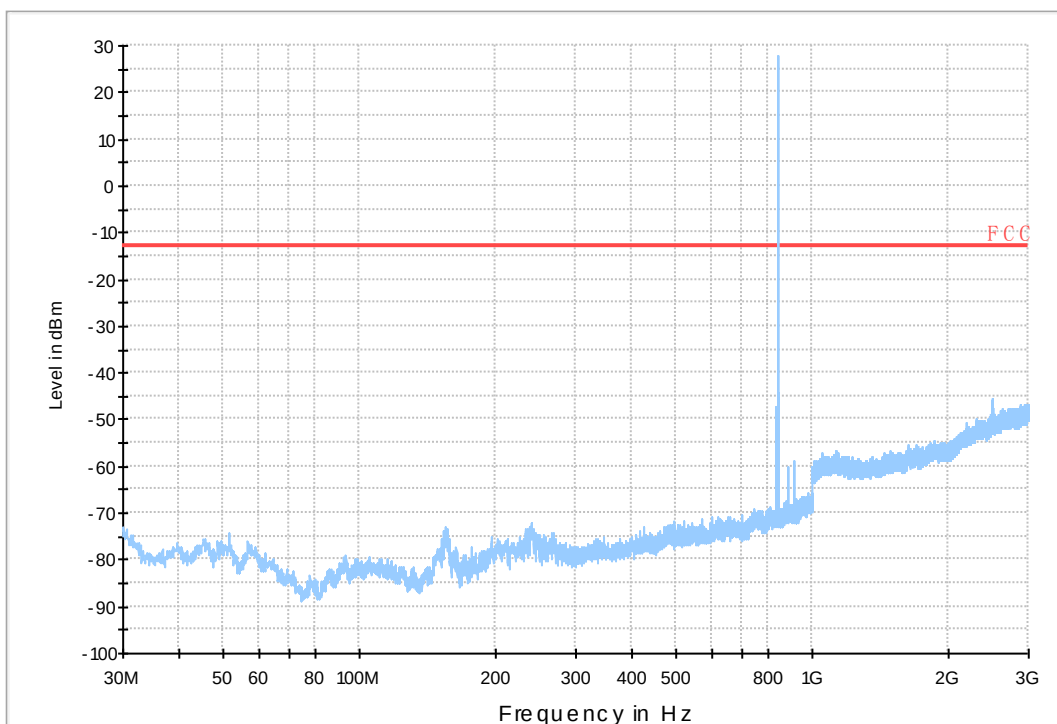
Part I - Test Plots

7.1 For GSM

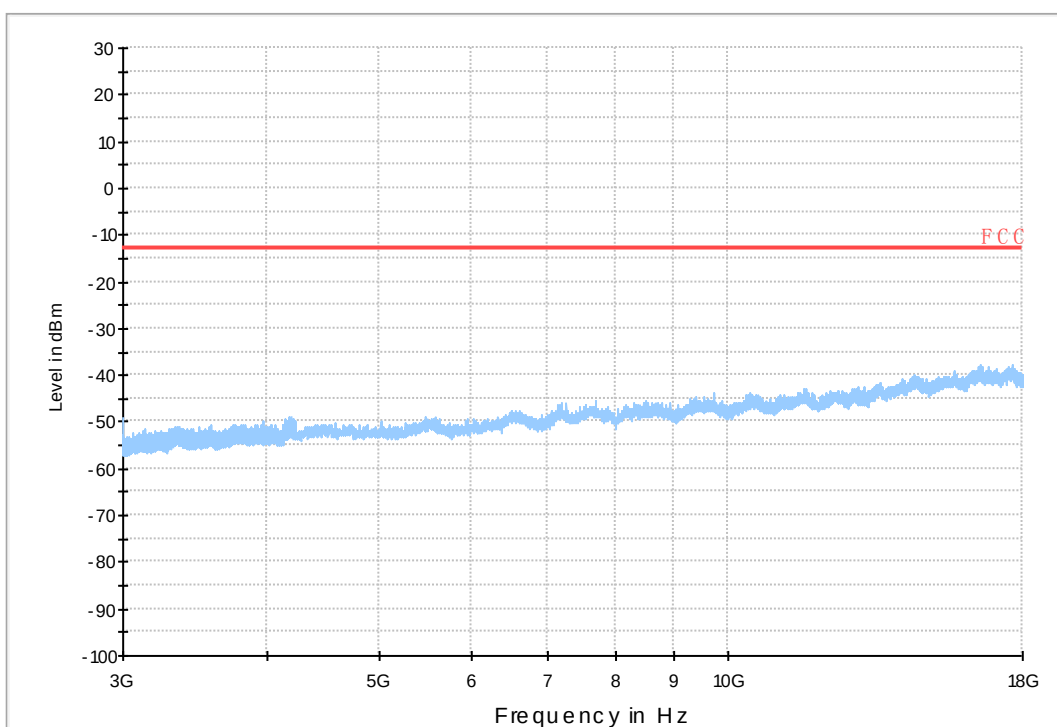
7.1.1 Test Band = GSM850



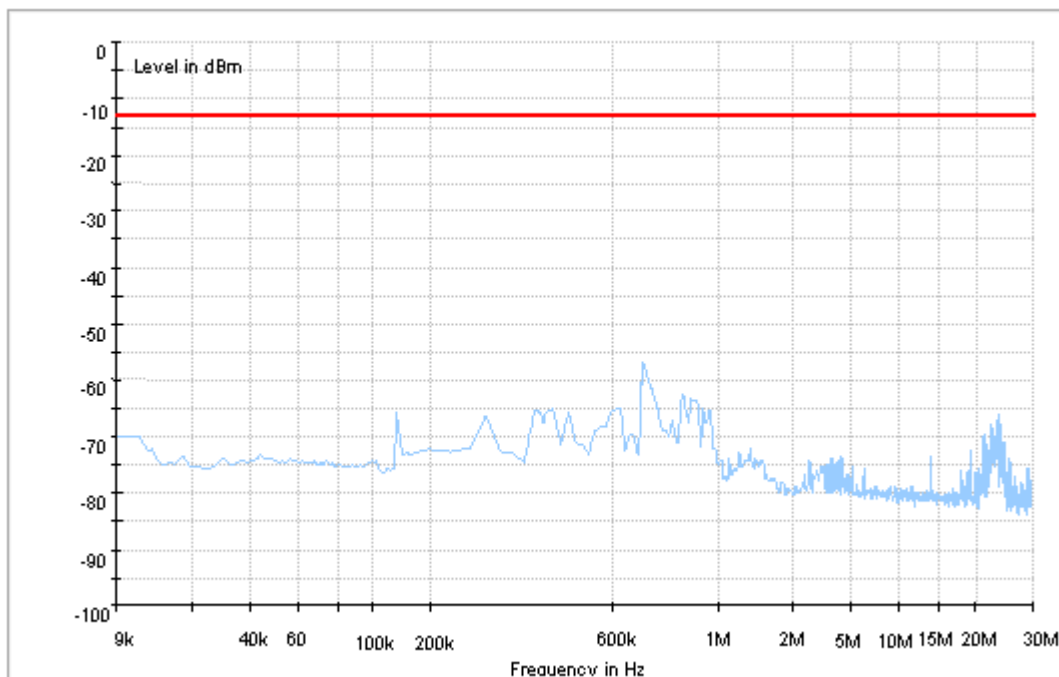
Copy of FCC PART22 G SM850_L



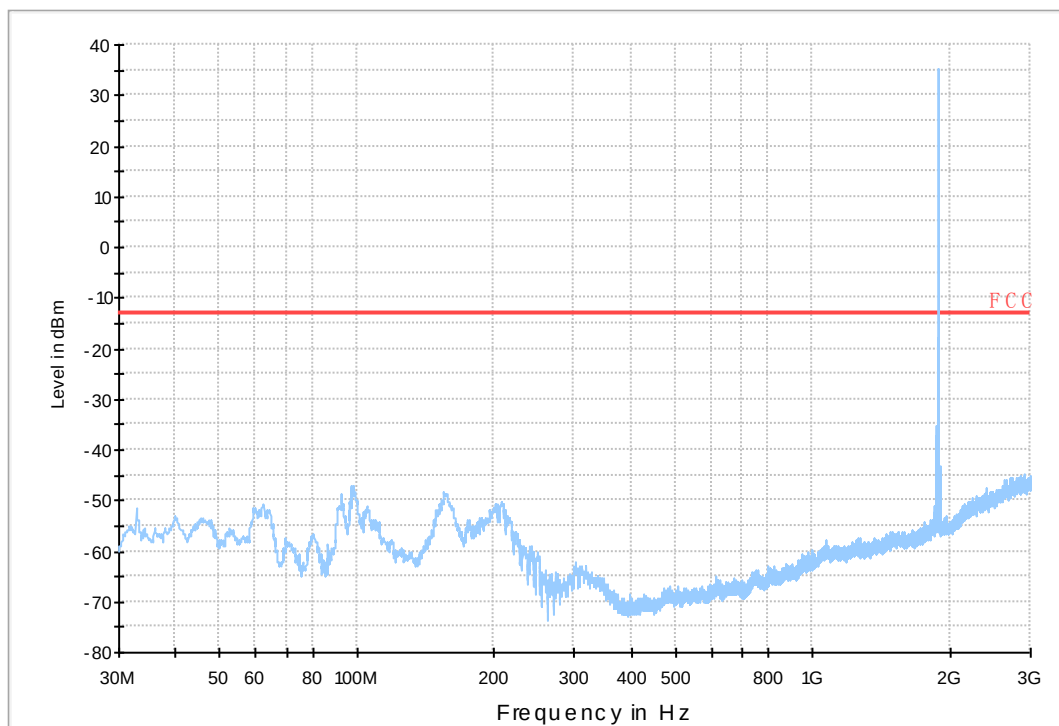
Copy of FCC PART22 G SM850_H



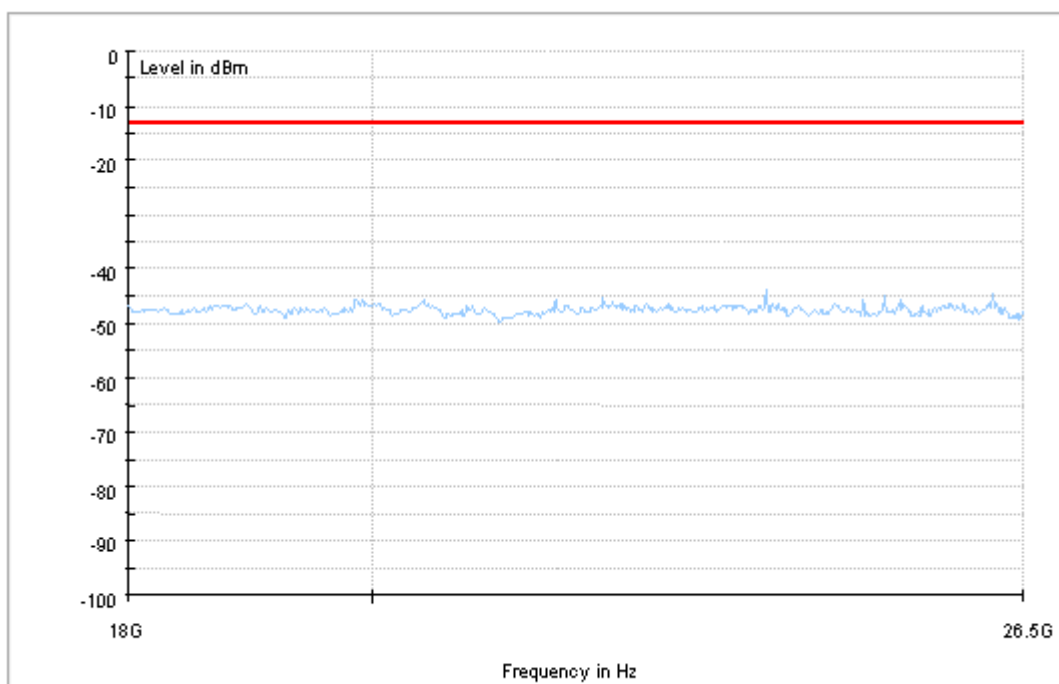
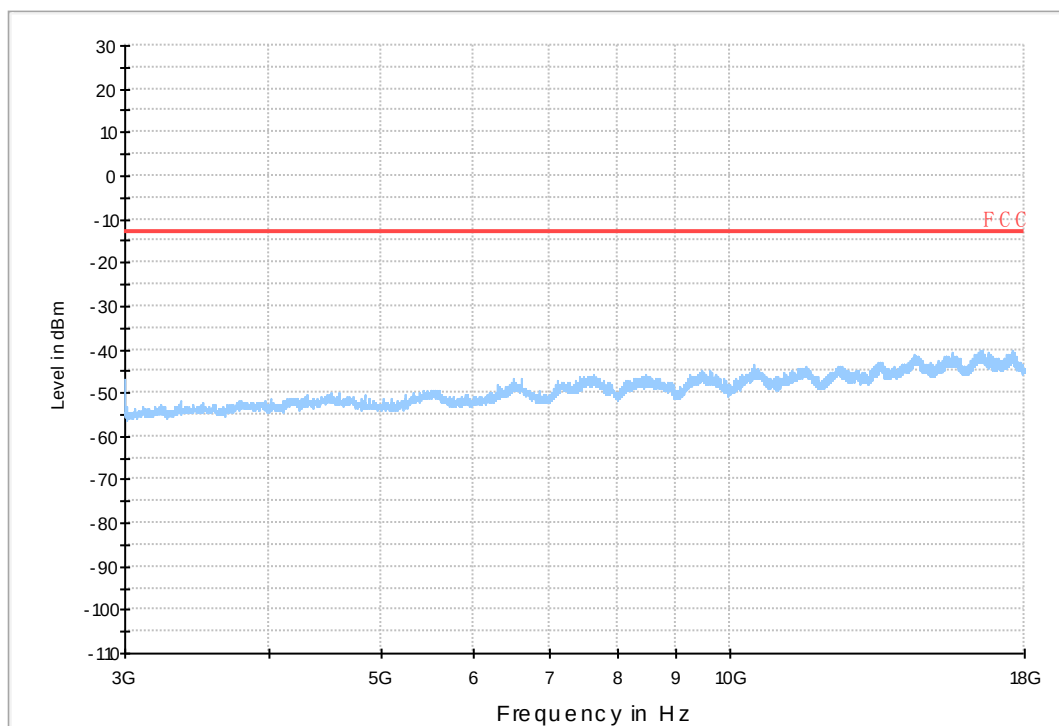
7.1.2 Test Band = GSM1900



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	-19.24	-0.02334	PASS
				VN	-21.7	-0.02633	PASS
				VH	-17.43	-0.02115	PASS
		MCH	TN	VL	-17.69	-0.02115	PASS
				VN	-19.89	-0.02377	PASS
				VH	-22.08	-0.02639	PASS
		HCH	TN	VL	-15.56	-0.01833	PASS
				VN	-20.92	-0.02465	PASS
				VH	-17.56	-0.02069	PASS
	GSM/TM2	LCH	TN	VL	-16.89	-0.02049	PASS
				VN	-12.98	-0.01575	PASS
				VH	-20.05	-0.02433	PASS
		MCH	TN	VL	-22.54	-0.02694	PASS
				VN	-17.89	-0.02138	PASS
				VH	-19.5	-0.02331	PASS
		HCH	TN	VL	-15.82	-0.01864	PASS
				VN	-18.24	-0.02149	PASS
				VH	-23.99	-0.02826	PASS
GSM1900	GSM/TM1	LCH	TN	VL	-7.3	-0.00395	PASS
				VN	12.33	0.00666	PASS
				VH	4.2	0.00227	PASS
		MCH	TN	VL	1.55	0.00082	PASS
				VN	4.33	0.0023	PASS
				VH	-0.9	-0.00048	PASS
		HCH	TN	VL	5.55	0.00291	PASS
				VN	11.82	0.00619	PASS
				VH	17.24	0.00903	PASS
	GSM/TM2	LCH	TN	VL	-12.82	-0.00693	PASS
				VN	-7.46	-0.00403	PASS
				VH	-9.14	-0.00494	PASS
		MCH	TN	VL	-9.59	-0.0051	PASS
				VN	-7.65	-0.00407	PASS
				VH	-7.65	-0.00407	PASS

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
		HCH	TN	VH	-18.89	-0.01005	PASS
				VL	9.52	0.00498	PASS
				VN	15.85	0.0083	PASS
				VH	10.69	0.0056	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	-16.85	-0.02044	PASS
				-20	-17.95	-0.02178	PASS
				-10	-18.08	-0.02194	PASS
				0	-18.21	-0.02209	PASS
				10	-14.79	-0.01794	PASS
				20	-19.57	-0.02374	PASS
				30	-17.82	-0.02162	PASS
				40	-15.88	-0.01927	PASS
				50	-17.5	-0.02123	PASS
		MCH	VN	-30	-21.11	-0.02523	PASS
				-20	-15.63	-0.01868	PASS
				-10	-17.31	-0.02069	PASS
				0	-21.76	-0.02601	PASS
				10	-19.57	-0.02339	PASS
				20	-20.34	-0.02431	PASS
				30	-23.05	-0.02755	PASS
				40	-22.99	-0.02748	PASS
				50	-19.63	-0.02346	PASS
		HCH	VN	-30	-21.83	-0.02572	PASS
				-20	-15.05	-0.01773	PASS
				-10	-20.02	-0.02359	PASS
				0	-18.66	-0.02198	PASS
				10	-16.98	-0.02	PASS
				20	-17.43	-0.02053	PASS
				30	-19.5	-0.02297	PASS
				40	-18.34	-0.02161	PASS
				50	-21.24	-0.02502	PASS
	GSM/TM2	LCH	VN	-30	-16.66	-0.02021	PASS
				-20	-17.24	-0.02092	PASS
				-10	-16.3	-0.01978	PASS
				0	-18.92	-0.02296	PASS

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				10	-17.14	-0.0208	PASS
				20	-19.53	-0.0237	PASS
				30	-18.24	-0.02213	PASS
				40	-22.31	-0.02707	PASS
				50	-23.5	-0.02851	PASS
		MCH	VN	-30	-19.69	-0.02354	PASS
				-20	-28.09	-0.03358	PASS
				-10	-19.89	-0.02377	PASS
				0	-23.05	-0.02755	PASS
				10	-19.69	-0.02354	PASS
				20	-13.3	-0.0159	PASS
				30	-15.88	-0.01898	PASS
				40	-17.53	-0.02095	PASS
				50	-20.82	-0.02489	PASS
		HCH	VN	-30	-17.21	-0.02028	PASS
				-20	-21.21	-0.02499	PASS
				-10	-22.41	-0.0264	PASS
				0	-15.85	-0.01867	PASS
				10	-17.5	-0.02062	PASS
				20	-15.46	-0.01821	PASS
				30	-20.79	-0.02449	PASS
				40	-17.56	-0.02069	PASS
				50	-19.27	-0.0227	PASS
GSM1900	GSM/TM1	LCH	VN	-30	15.63	0.00845	PASS
				-20	9.75	0.00527	PASS
				-10	6.13	0.00331	PASS
				0	6.91	0.00373	PASS
				10	2.91	0.00157	PASS
				20	8.78	0.00475	PASS
				30	6.2	0.00335	PASS
				40	-6.01	-0.00325	PASS
				50	5.1	0.00276	PASS
		MCH	VN	-30	-0.52	-0.00028	PASS
				-20	4.71	0.00251	PASS
				-10	10.07	0.00536	PASS
				0	6.91	0.00368	PASS
				10	10.91	0.0058	PASS
				20	7.62	0.00405	PASS
				30	-0.71	-0.00038	PASS
				40	7.94	0.00422	PASS

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
		HCH	VN	50	-3.94	-0.0021	PASS
				-30	3.49	0.00183	PASS
				-20	0.97	0.00051	PASS
				-10	9.88	0.00517	PASS
				0	6.33	0.00331	PASS
				10	7.3	0.00382	PASS
				20	20.21	0.01058	PASS
				30	9.56	0.00501	PASS
				40	18.6	0.00974	PASS
				50	7.81	0.00409	PASS
	GSM/TM2	LCH	VN	-30	-2.94	-0.00159	PASS
				-20	-2.36	-0.00128	PASS
				-10	3.58	0.00193	PASS
				0	0.84	0.00045	PASS
				10	2.52	0.00136	PASS
				20	8.01	0.00433	PASS
				30	-12.49	-0.00675	PASS
				40	2.23	0.00121	PASS
				50	5.23	0.00283	PASS
		MCH	VN	-30	-1.84	-0.00098	PASS
				-20	-1.97	-0.00105	PASS
				-10	-5.42	-0.00288	PASS
				0	-2.55	-0.00136	PASS
				10	-2.52	-0.00134	PASS
				20	-1	-0.00053	PASS
				30	0.19	0.0001	PASS
				40	-9.78	-0.0052	PASS
				50	6.26	0.00333	PASS
		HCH	VN	-30	0.94	0.00049	PASS
				-20	1.07	0.00056	PASS
				-10	-2.42	-0.00127	PASS
				0	-1.45	-0.00076	PASS
				10	-0.45	-0.00024	PASS
				20	-3.81	-0.00199	PASS
				30	8.56	0.00448	PASS
				40	-14.46	-0.00757	PASS
				50	1.1	0.00058	PASS

END