



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	32.1	27.44	38.5	PASS
		MCH	32.19	27.57	38.5	PASS
		HCH	32.22	27.28	38.5	PASS
	GSM/TM2	LCH	25.79	21.11	38.5	PASS
		MCH	25.76	21.20	38.5	PASS
		HCH	25.69	21.04	38.5	PASS

Test Band	Test Mode	Test Channel	Conducted Power [dBm]	EIRP [dBm]	Limit [dBm]	Verdict
GSM1900	GSM/TM1	LCH	29.31	28.04	33	PASS
		MCH	29.27	28.05	33	PASS
		HCH	29.32	28.11	33	PASS
	GSM/TM2	LCH	24.98	23.69	33	PASS
		MCH	24.92	23.60	33	PASS

Test Band	Test Mode	Test Channel	Conducted Power [dBm]	EIRP [dBm]	Limit [dBm]	Verdict
		HCH	24.85	23.53	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:

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

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

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

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	0.29	13	PASS
		MCH	0.28	13	PASS
		HCH	0.21	13	PASS
	GSM/TM2	LCH	2.94	13	PASS
		MCH	2.87	13	PASS
		HCH	2.82	13	PASS
GSM1900	GSM/TM1	LCH	0.26	13	PASS
		MCH	0.27	13	PASS
		HCH	0.27	13	PASS
	GSM/TM2	LCH	2.92	13	PASS
		MCH	3.07	13	PASS
		HCH	2.91	13	PASS

3Appendix_C: Modulation Characteristics

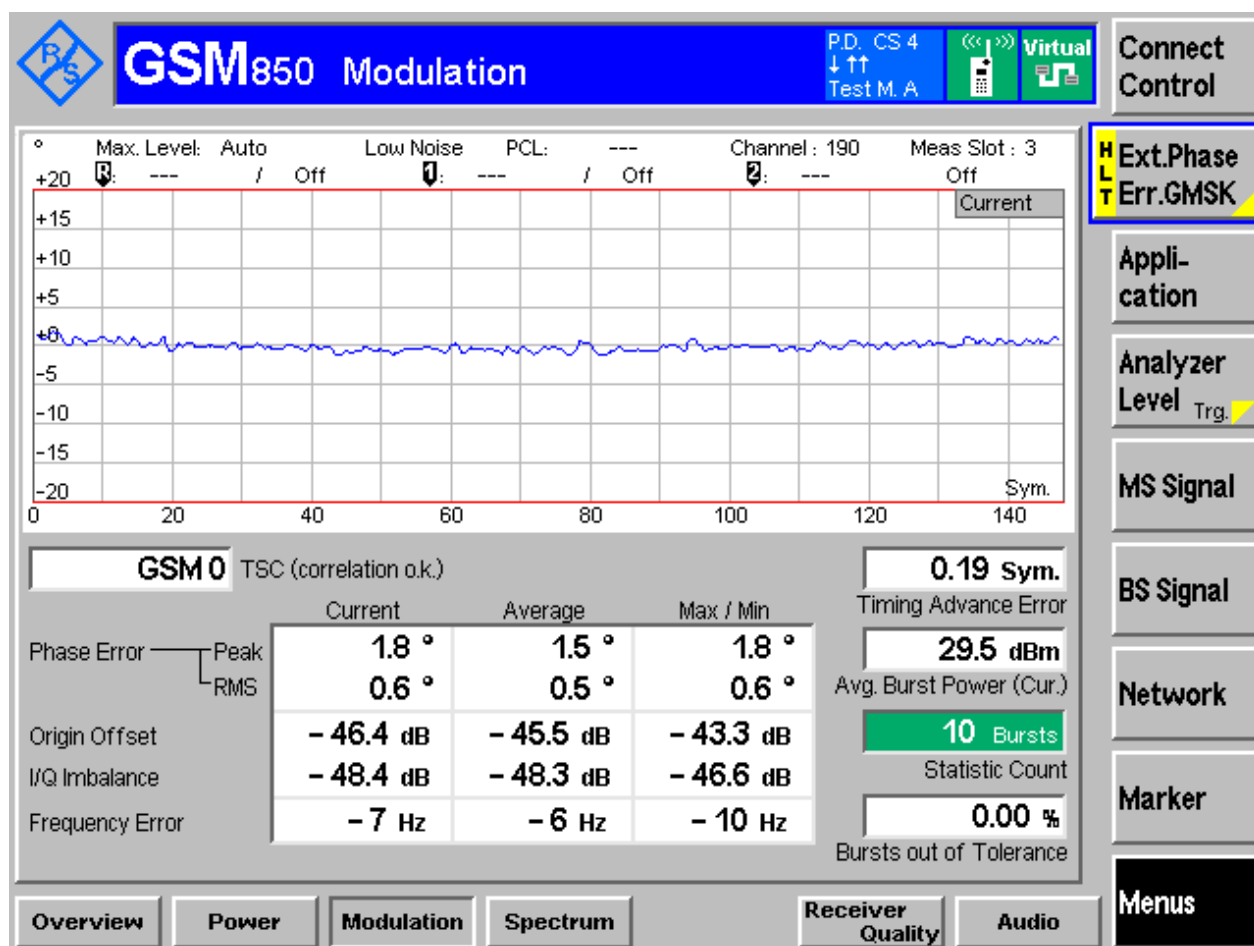
Part I - Test Plots

3.1 For GSM

3.1.1 Test Band = GSM850

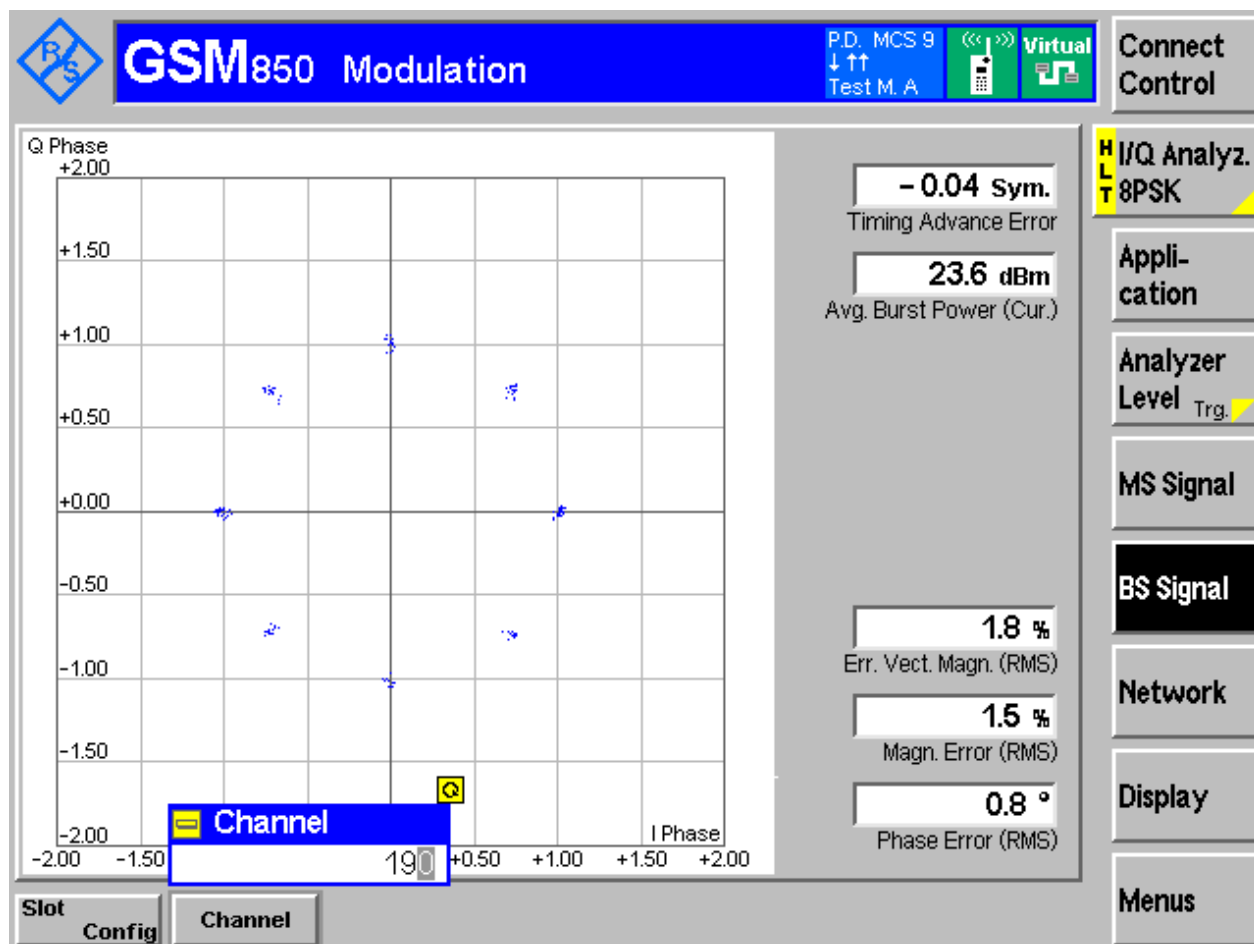
3.1.1.1 Test Mode = GSM/TM1

3.1.1.1.1 Test Channel = MCH



3.1.1.2 Test Mode = GSM/TM2

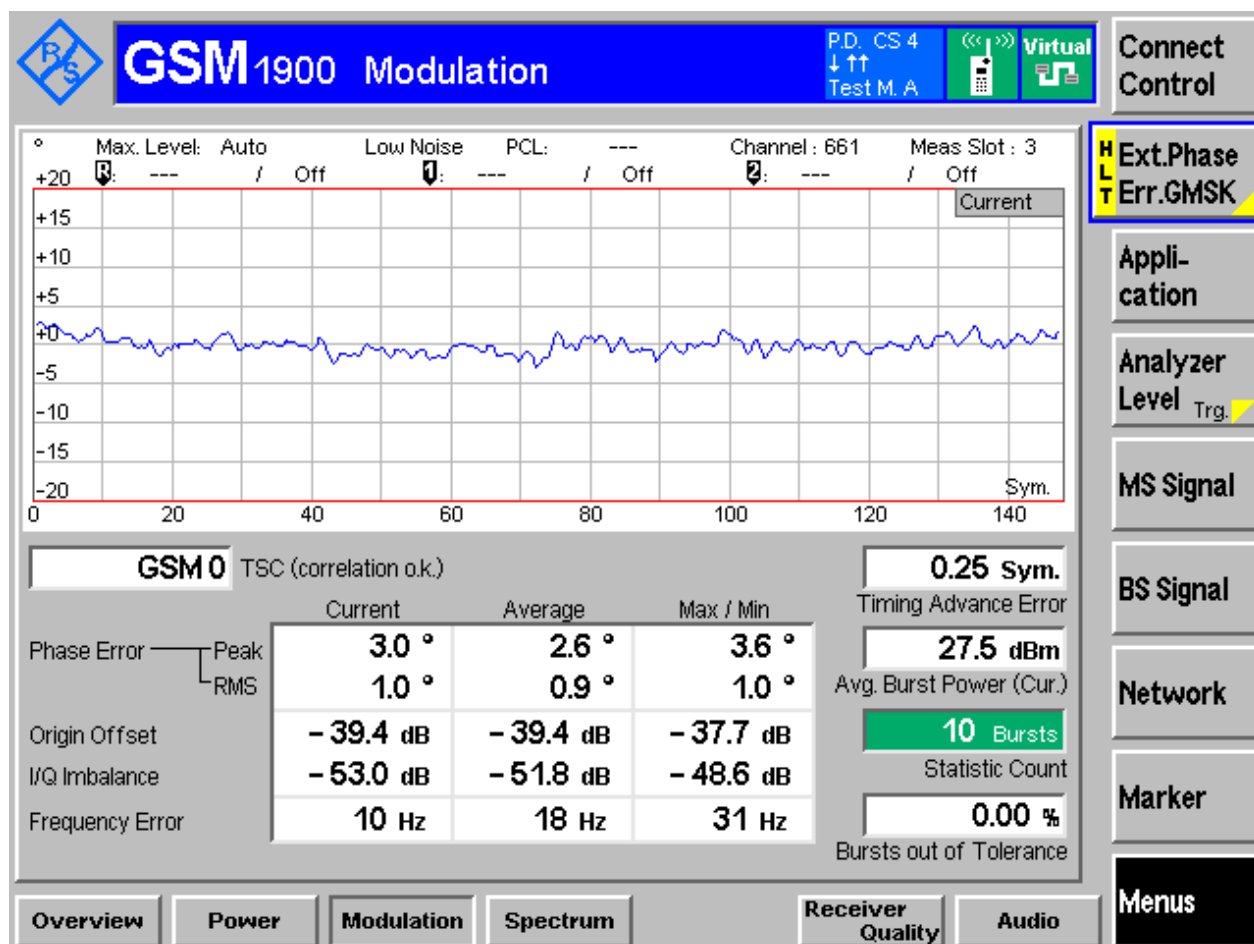
3.1.1.2.1 Test Channel = MCH



3.1.2 Test Band = GSM1900

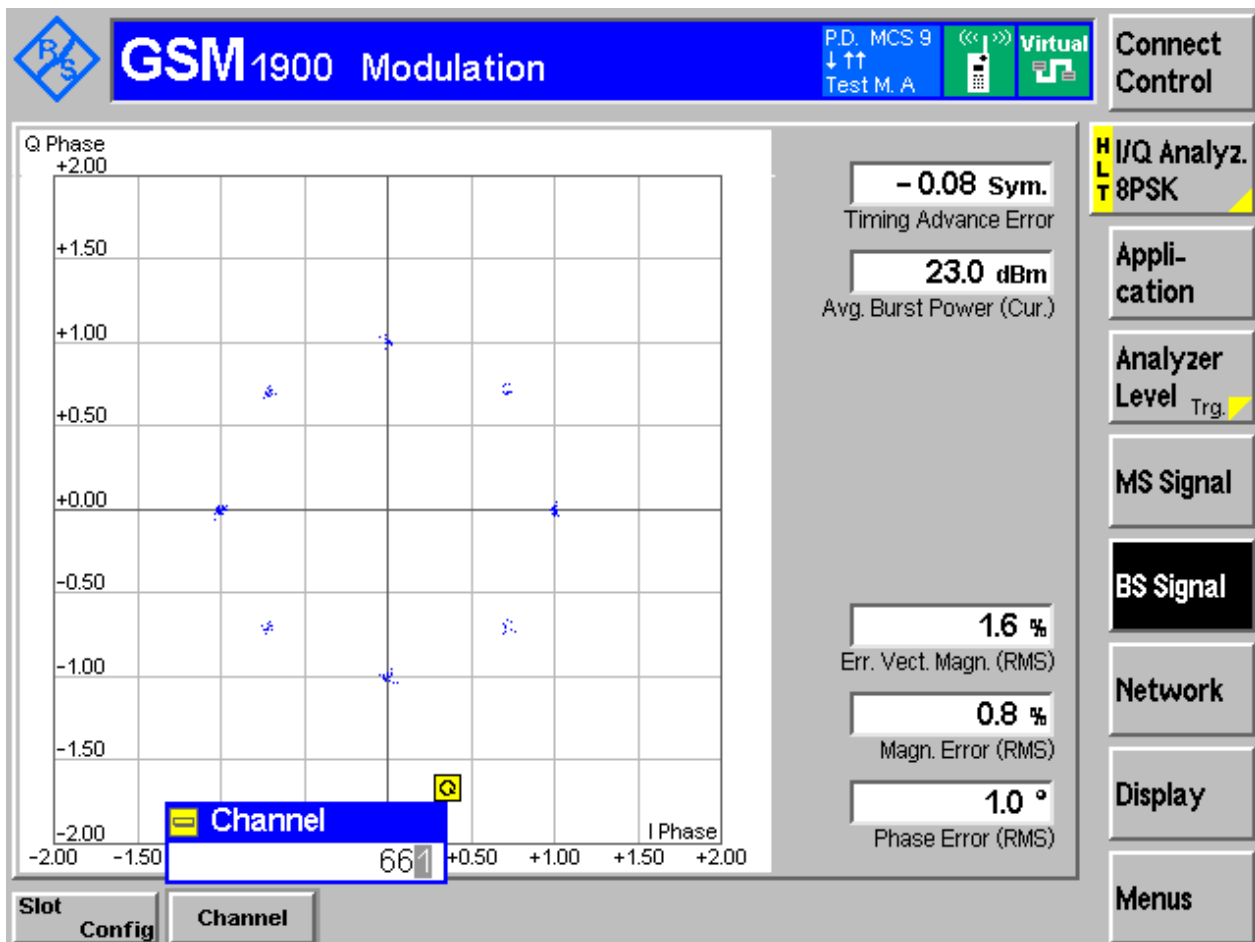
3.1.2.1 Test Mode = GSM/TM1

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	247.92	316.51	Pass
		MCH	248.45	320.21	Pass
		HCH	242.15	319.94	Pass
	GSM/TM2	LCH	254.56	319.56	Pass
		MCH	247.19	316.77	Pass
		HCH	254.74	318.58	Pass
GSM1900	GSM/TM1	LCH	248.58	319.82	Pass
		MCH	246.32	315.29	Pass
		HCH	246.21	317.22	Pass
	GSM/TM2	LCH	250.81	322.03	Pass
		MCH	248.35	318.36	Pass
		HCH	253.16	322.70	Pass

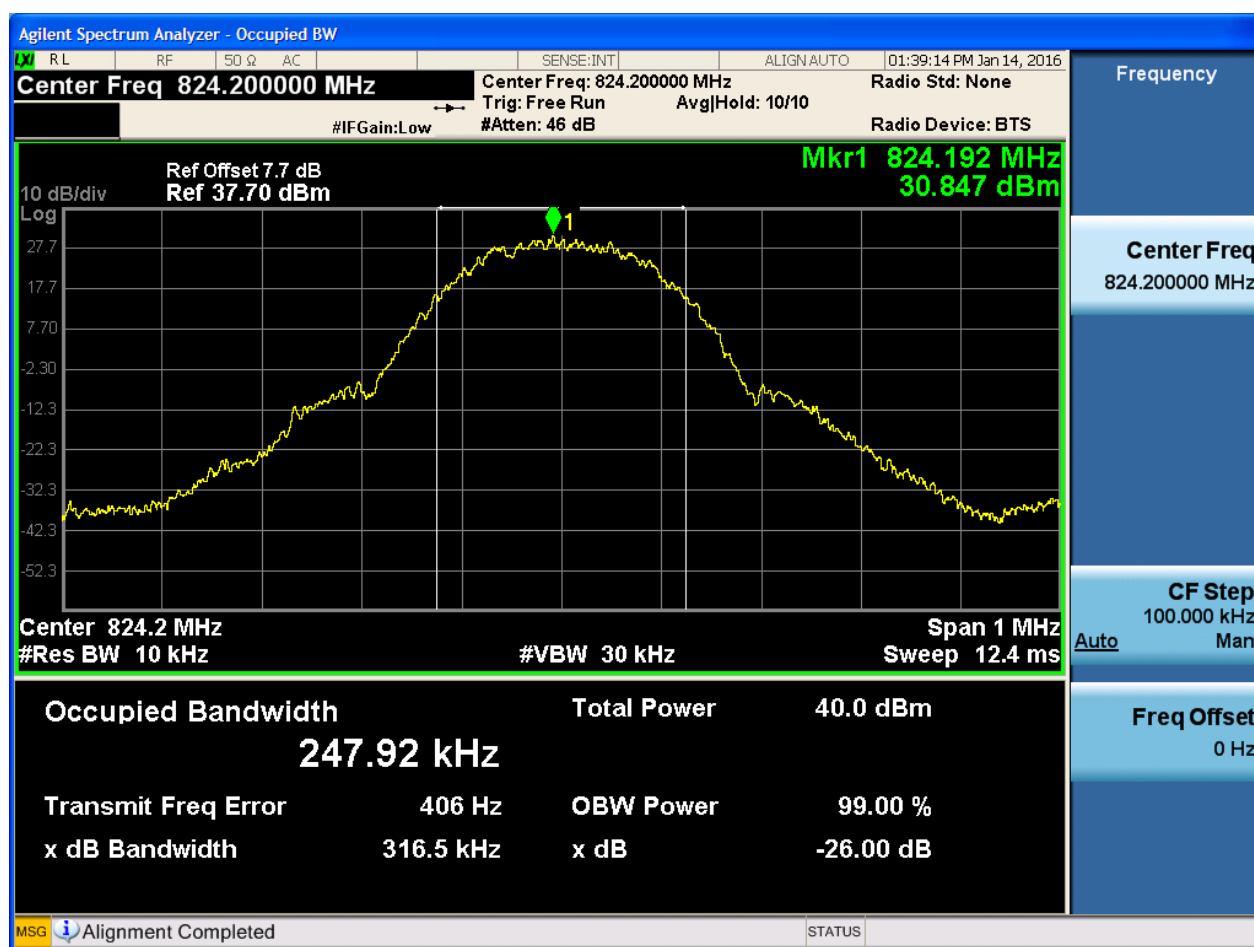
Part II - Test Plots

4.1 For GSM

4.1.1 Test Band = GSM850

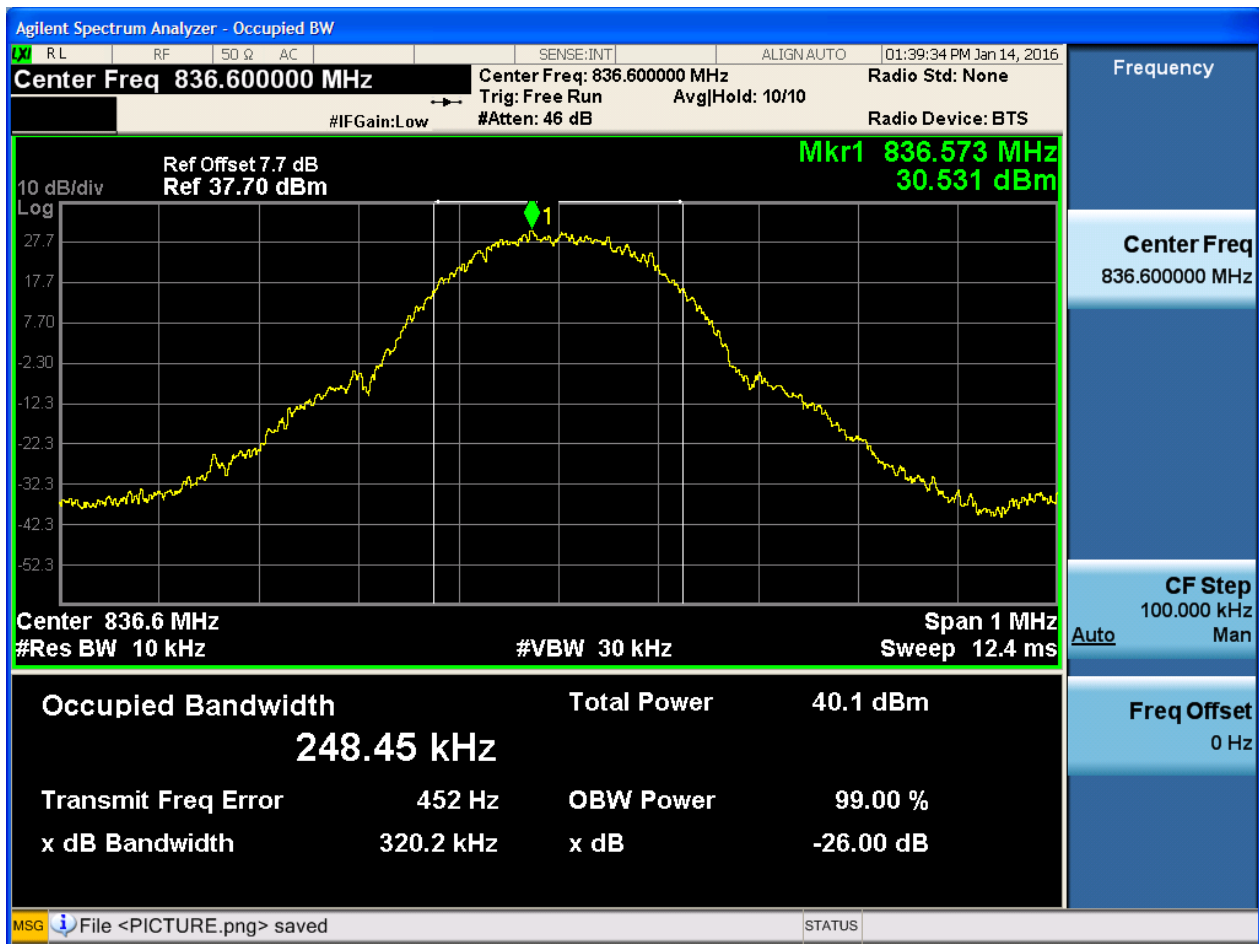
4.1.1.1 Test Mode = GSM/TM1

4.1.1.1.1 Test Channel = LCH



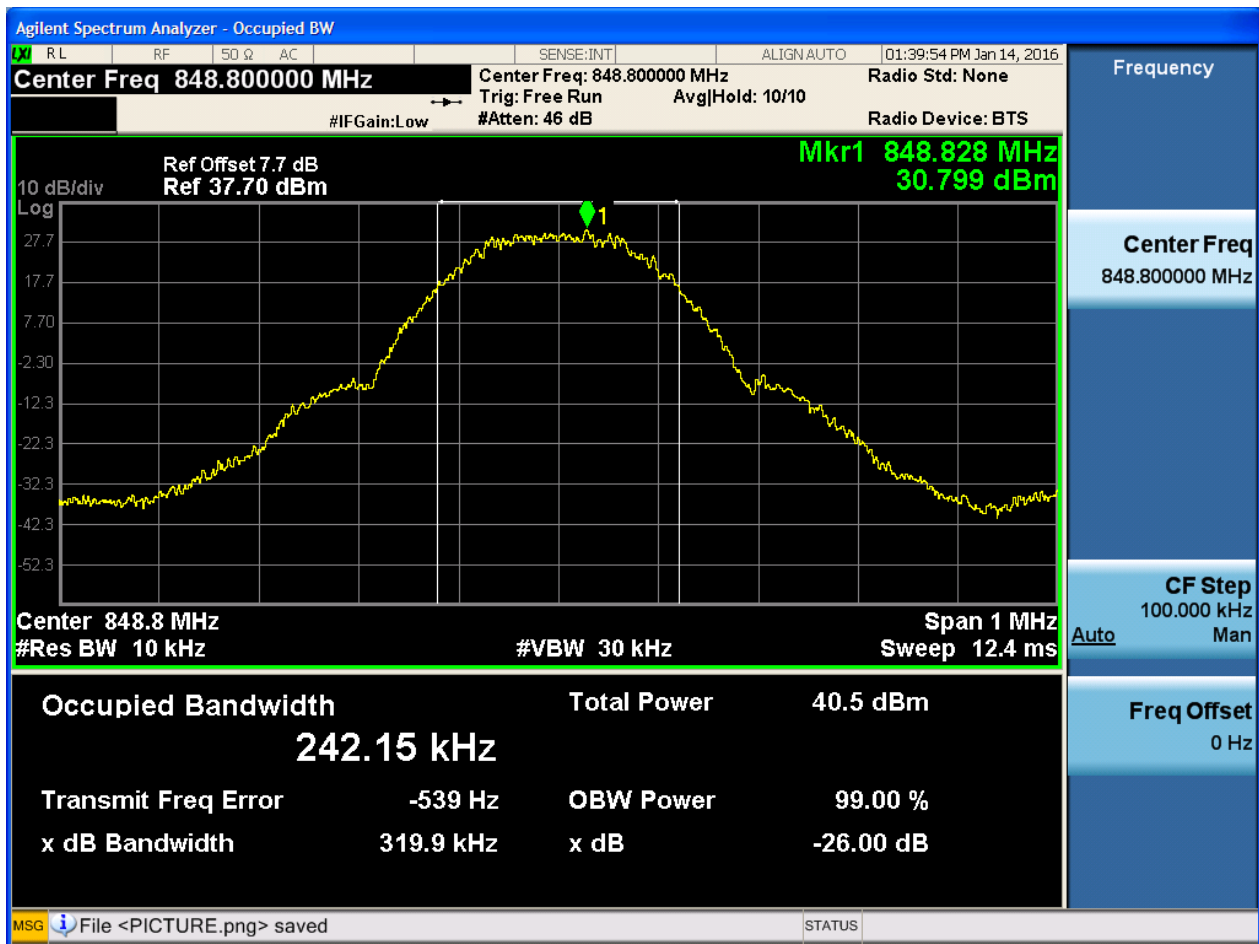


4.1.1.1.2 Test Channel = MCH





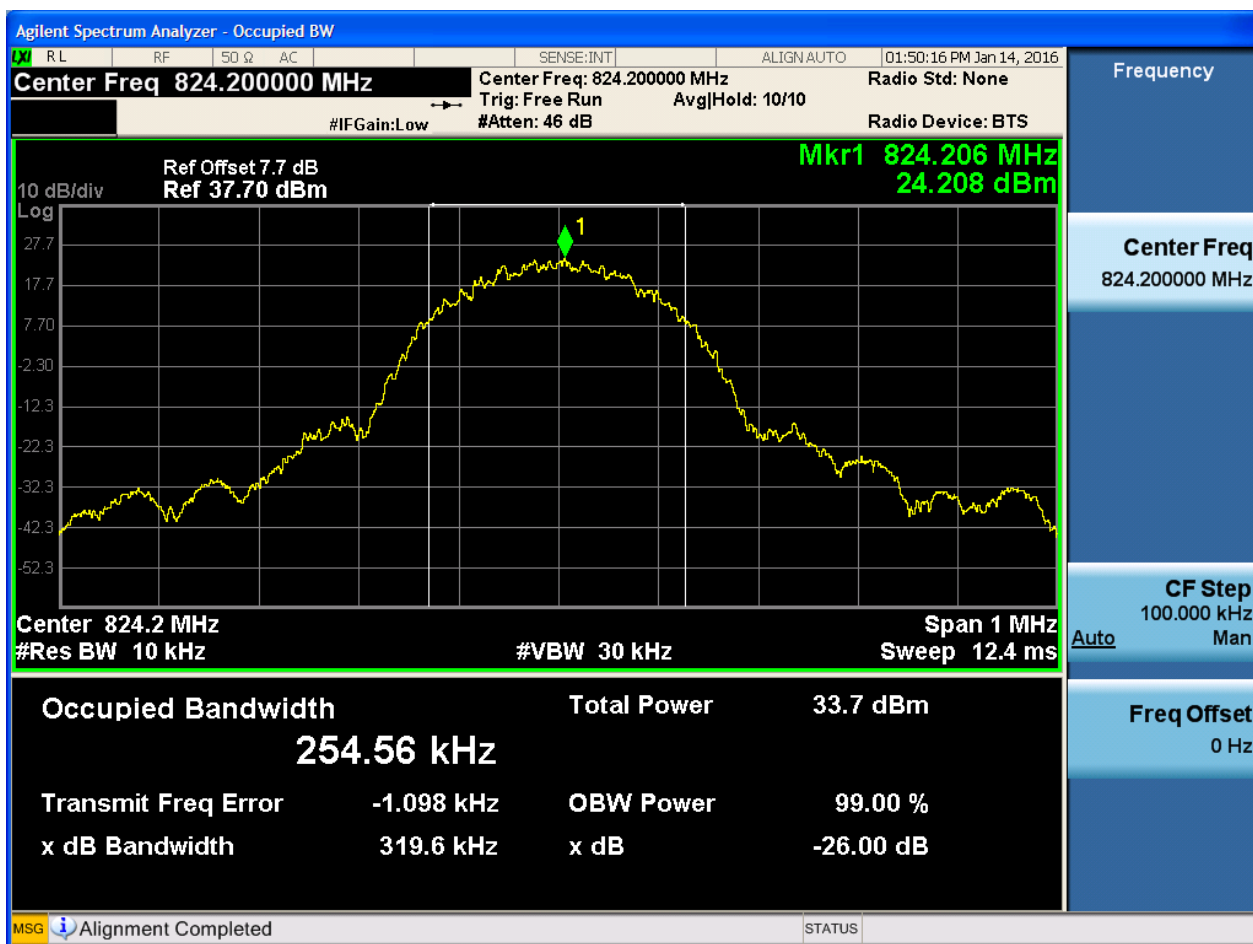
4.1.1.1.3 Test Channel = HCH





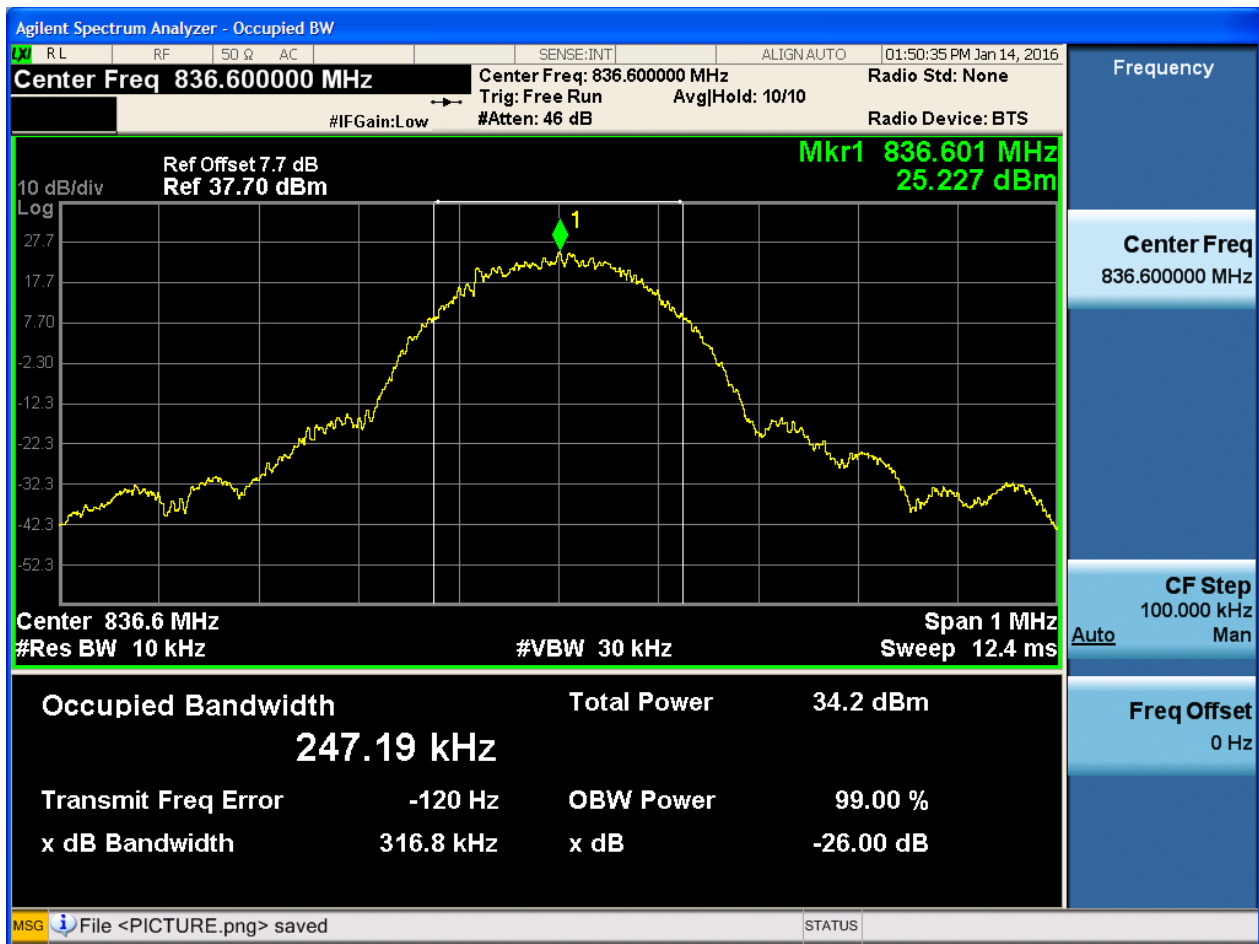
4.1.1.2 Test Mode = GSM/TM2

4.1.1.2.1 Test Channel = LCH



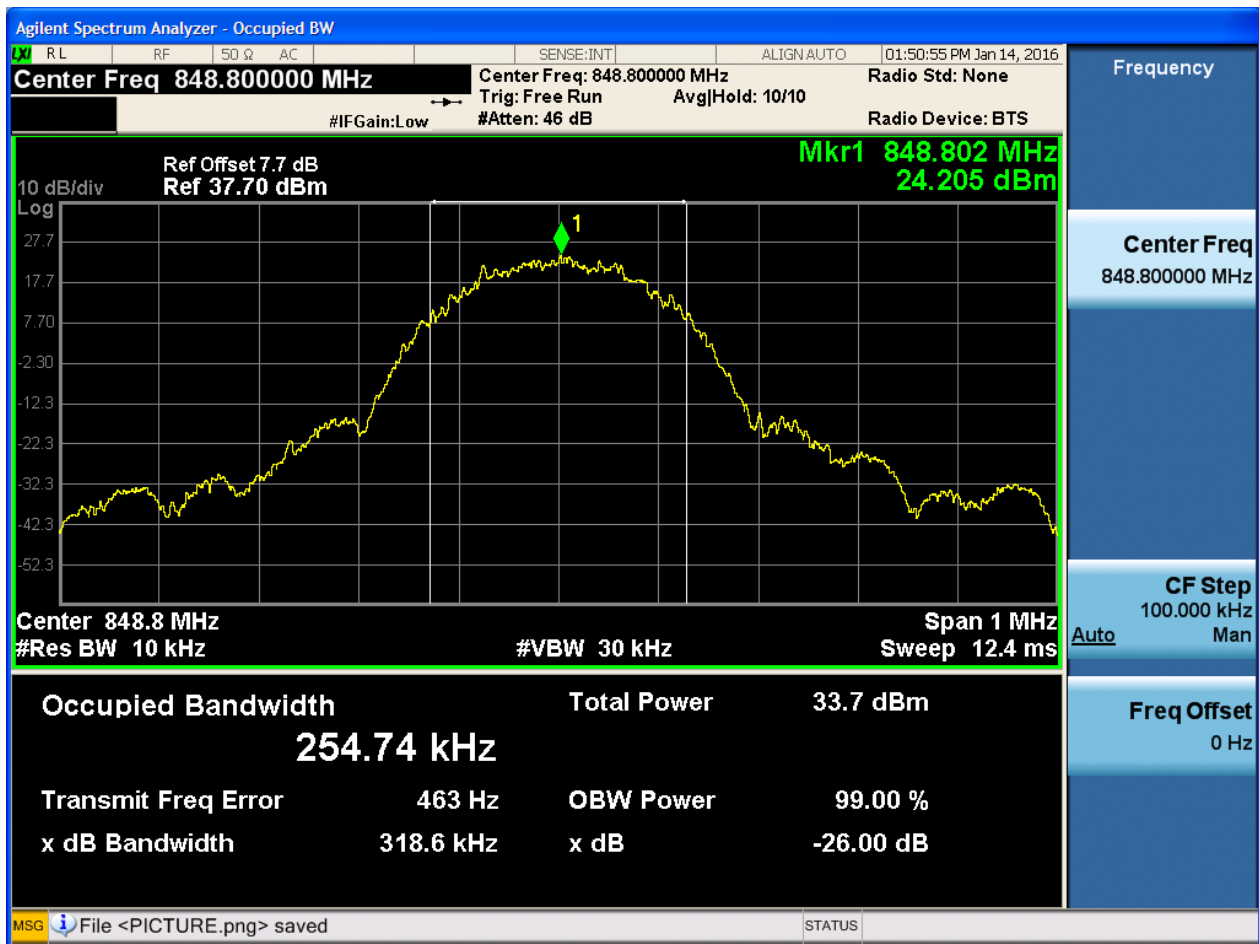


4.1.1.2.2 Test Channel = MCH





4.1.1.2.3 Test Channel = HCH

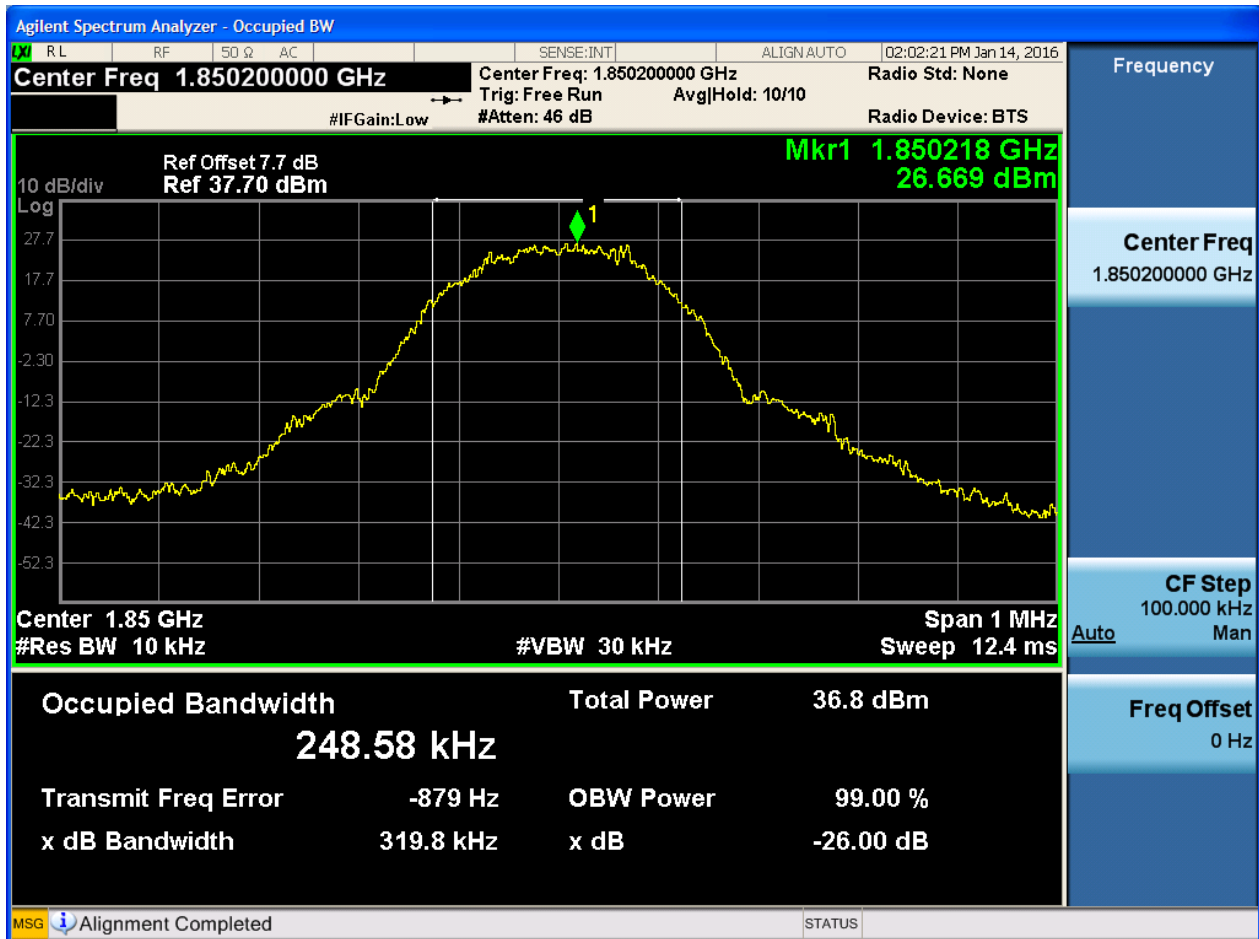




4.1.2 Test Band = GSM1900

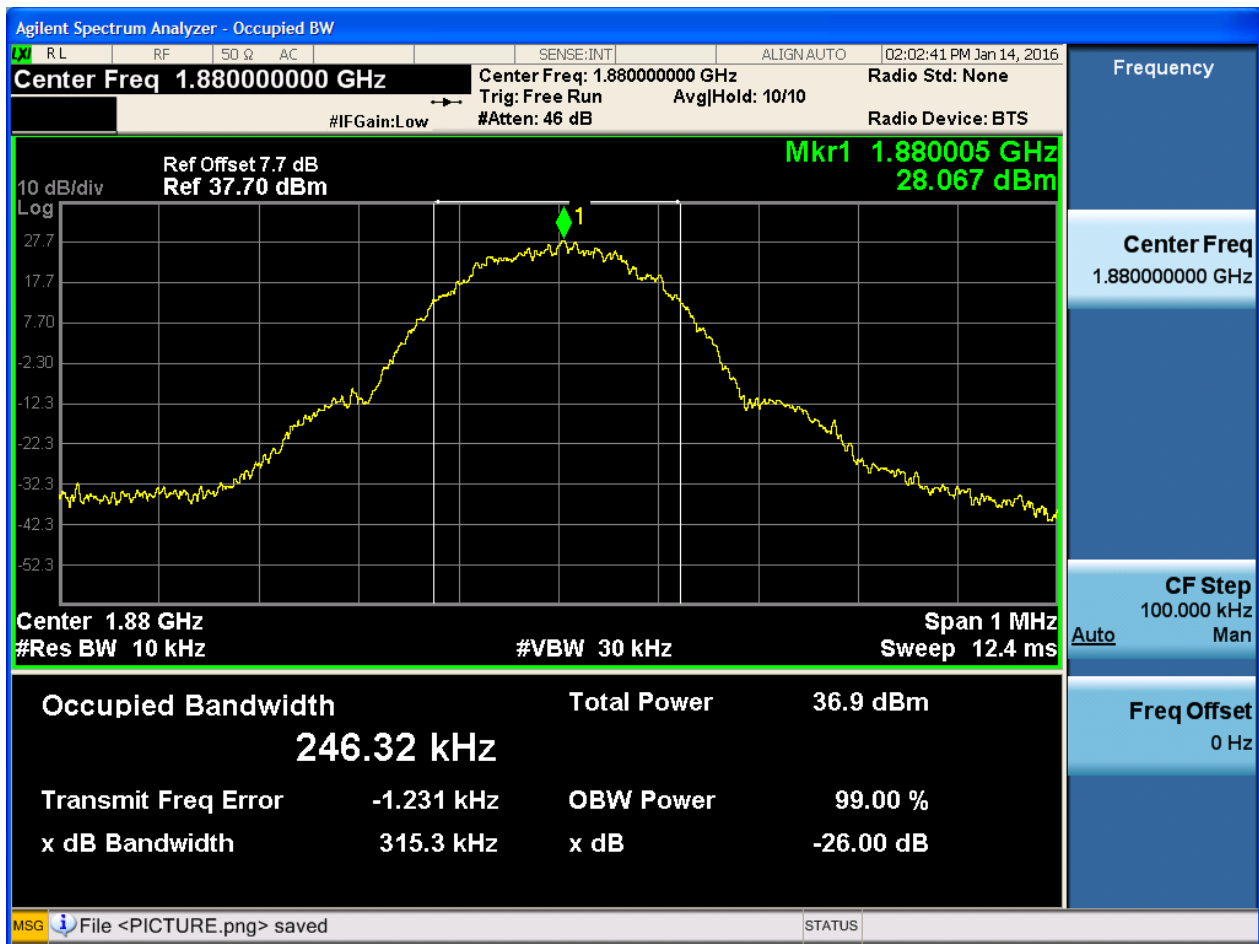
4.1.2.1 Test Mode = GSM/TM1

4.1.2.1.1 Test Channel = LCH



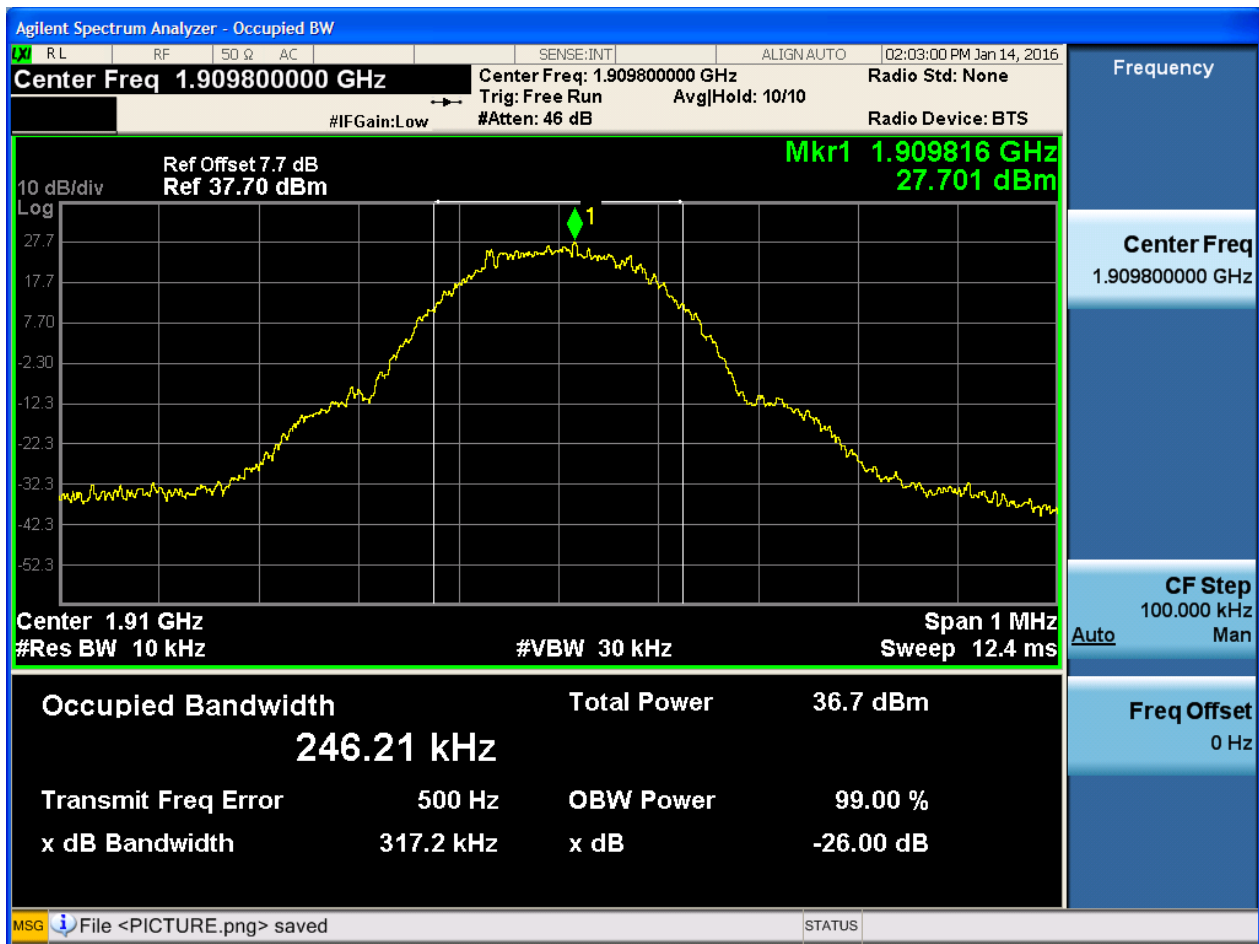


4.1.2.1.2 Test Channel = MCH



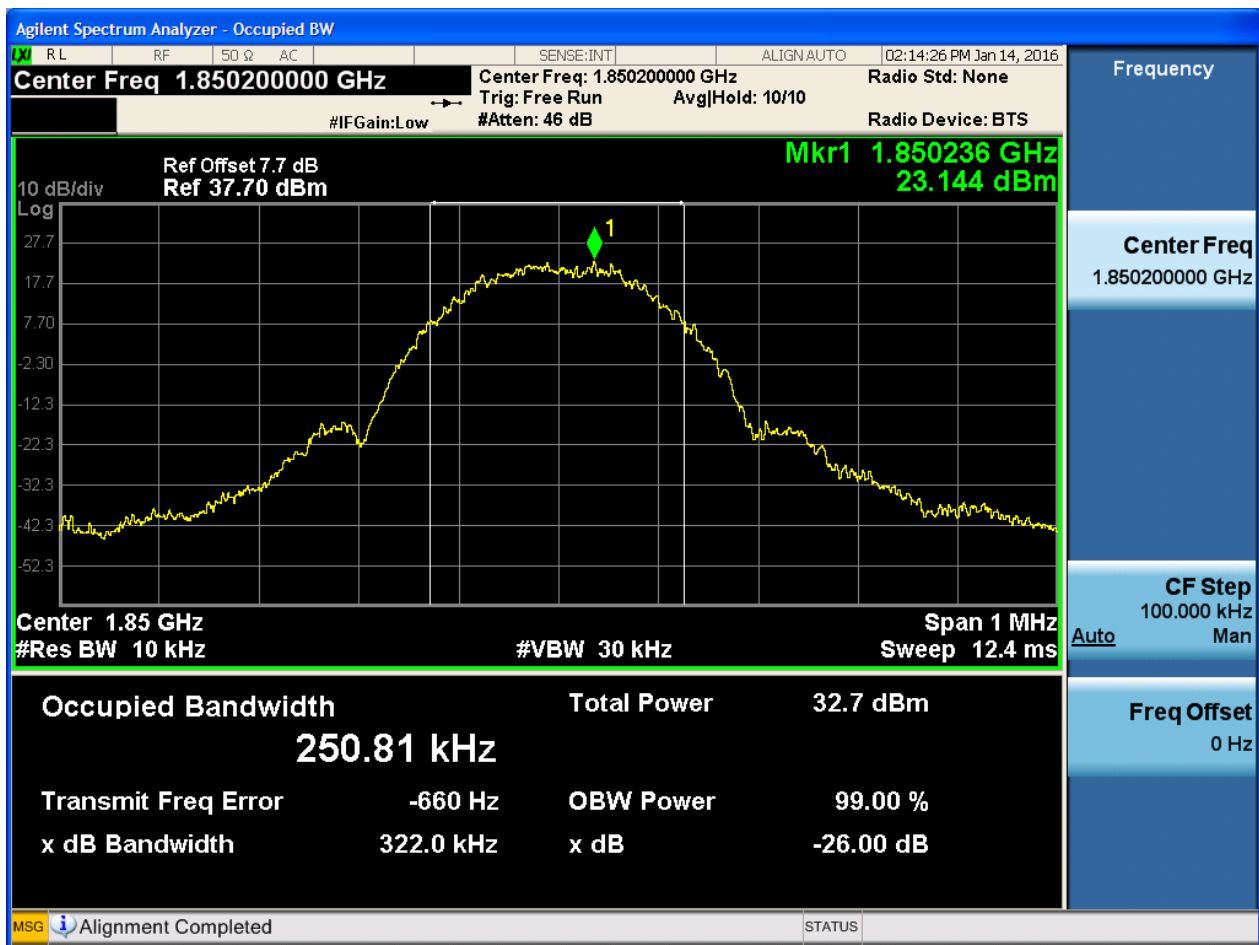


4.1.2.1.3 Test Channel = HCH



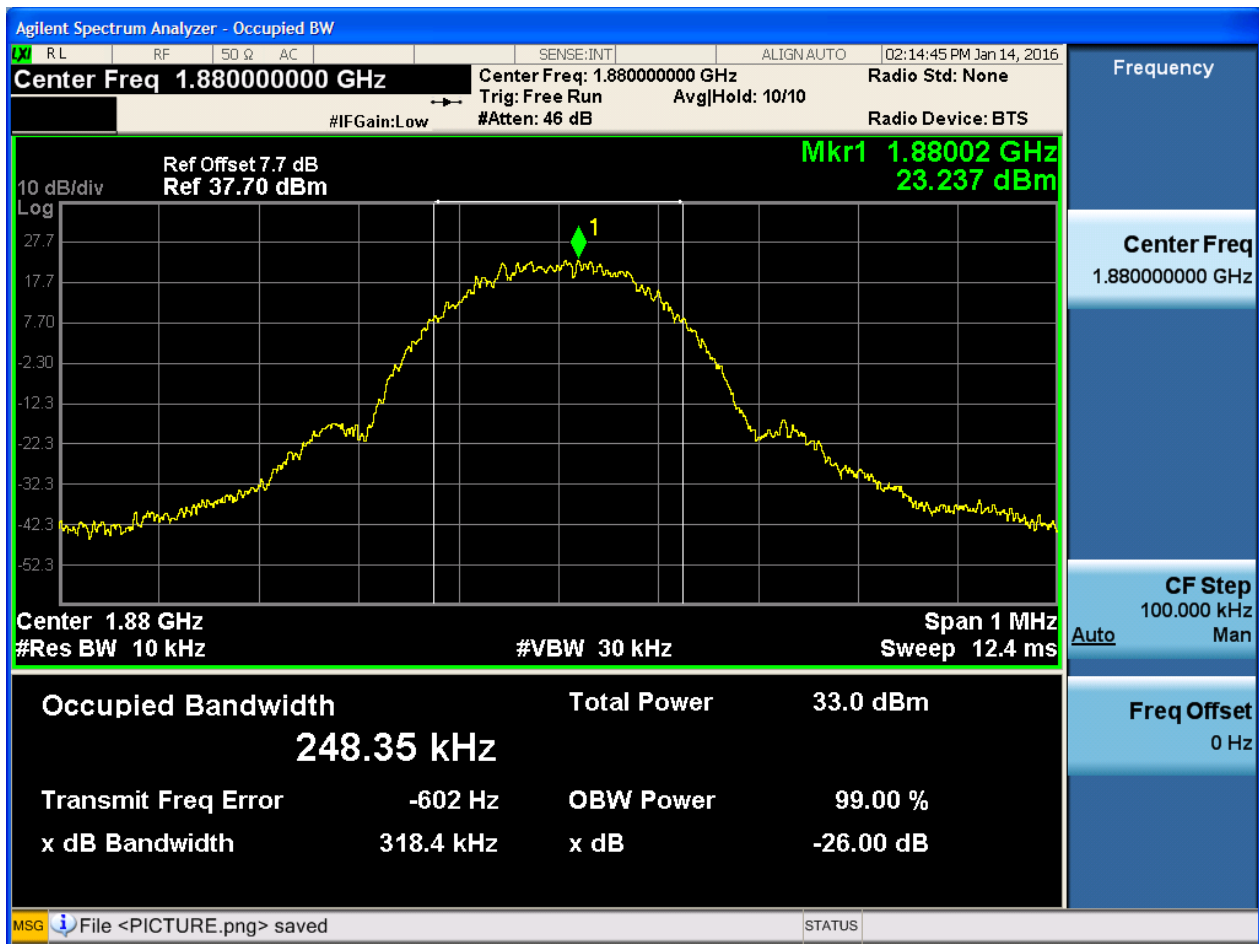
4.1.2.2 Test Mode = GSM/TM2

4.1.2.2.1 Test Channel = LCH



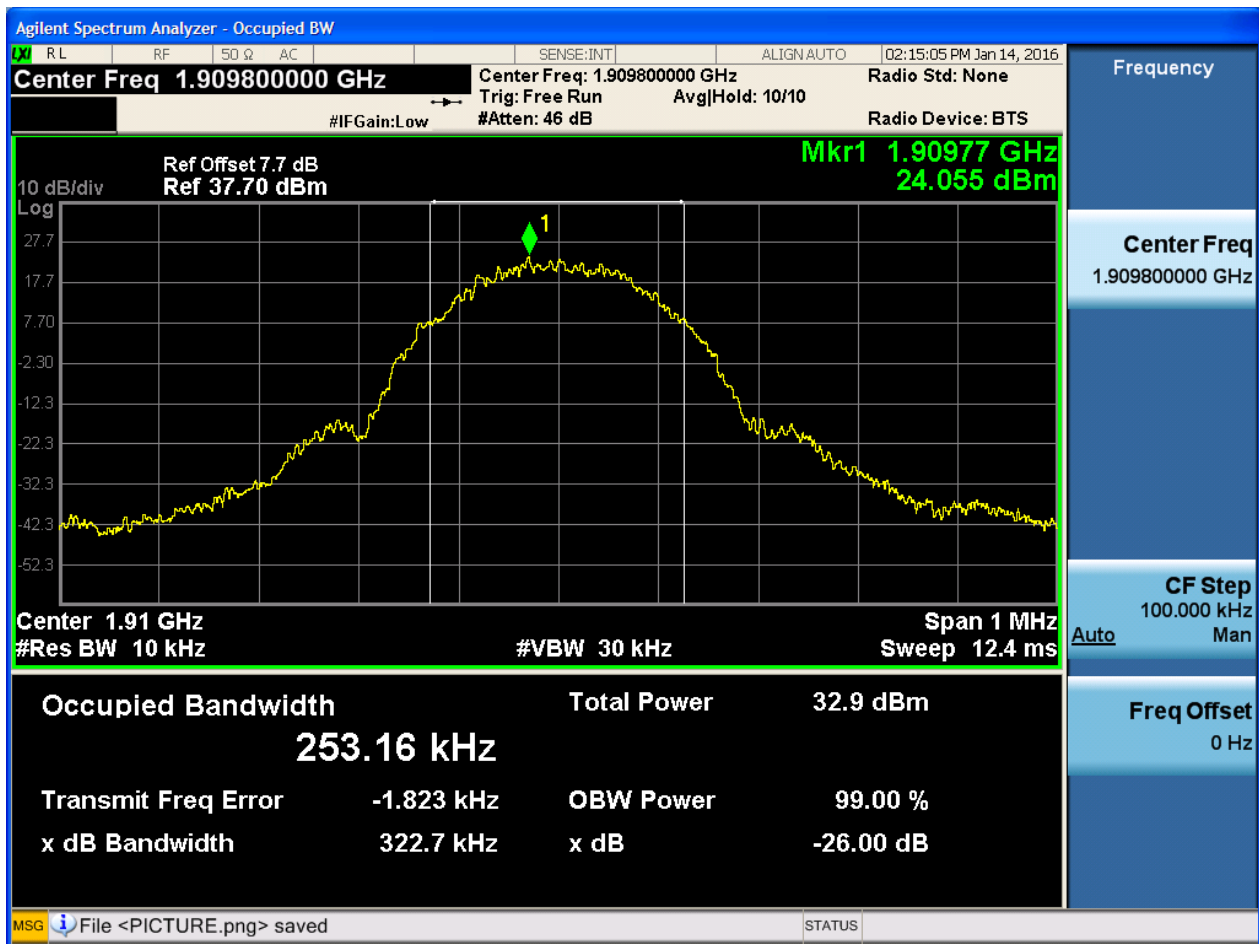


4.1.2.2.2 Test Channel = MCH





4.1.2.2.3 Test Channel = HCH



5Appendix_E: Band Edges Compliance

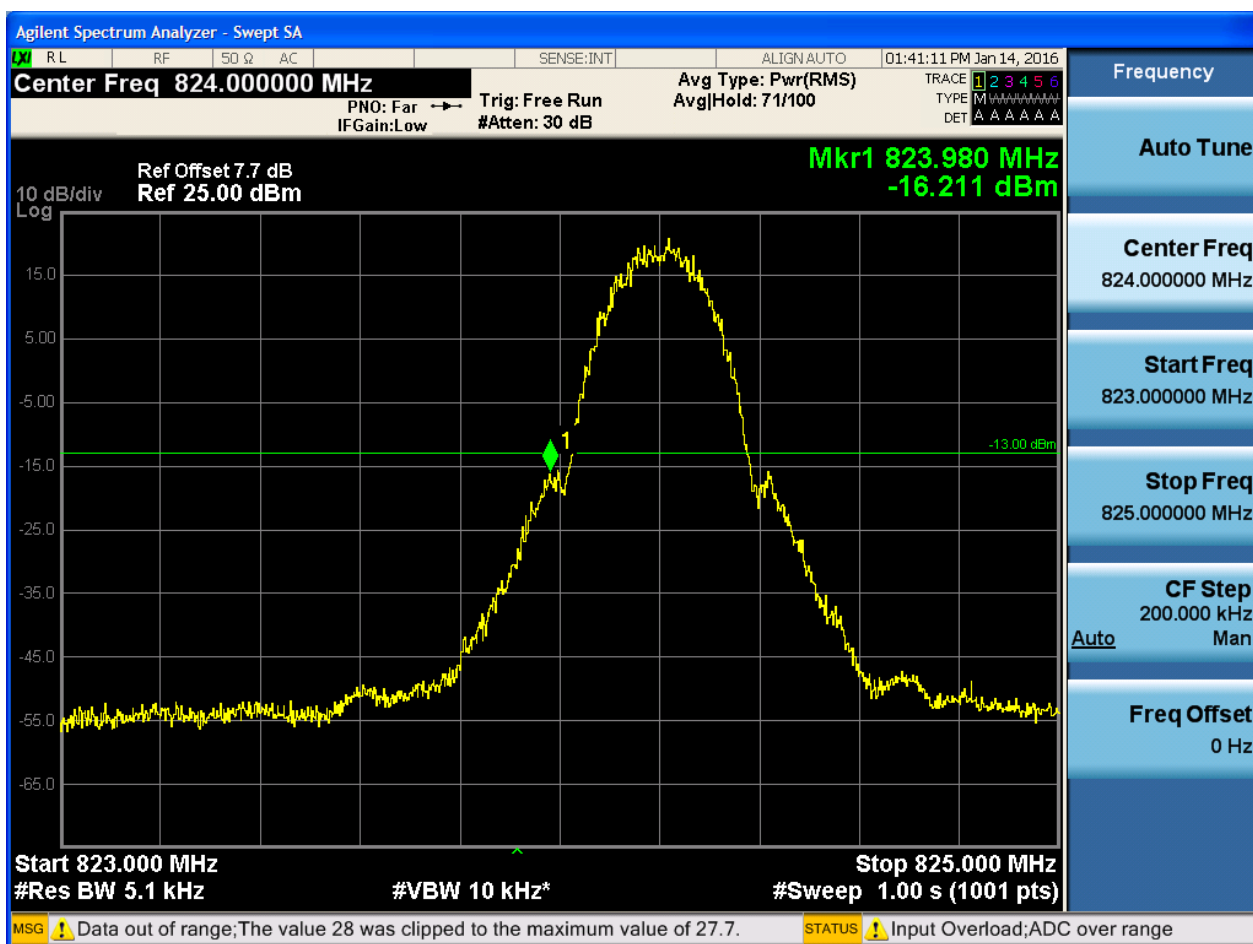
Part I - Test Plots

5.1 For GSM

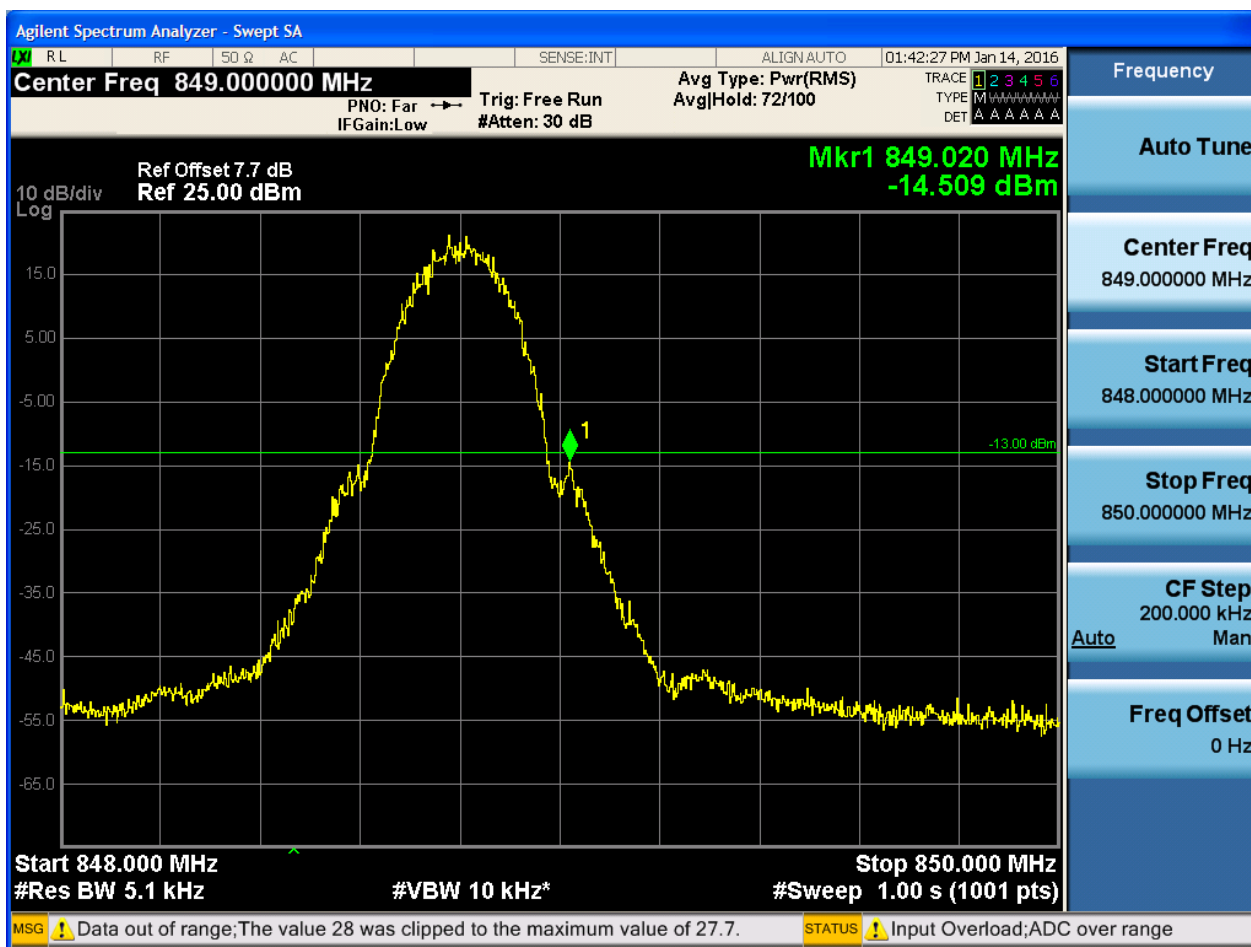
5.1.1 Test Band = GSM850

5.1.1.1 Test Mode = GSM/TM1

5.1.1.1.1 Test Channel = LCH

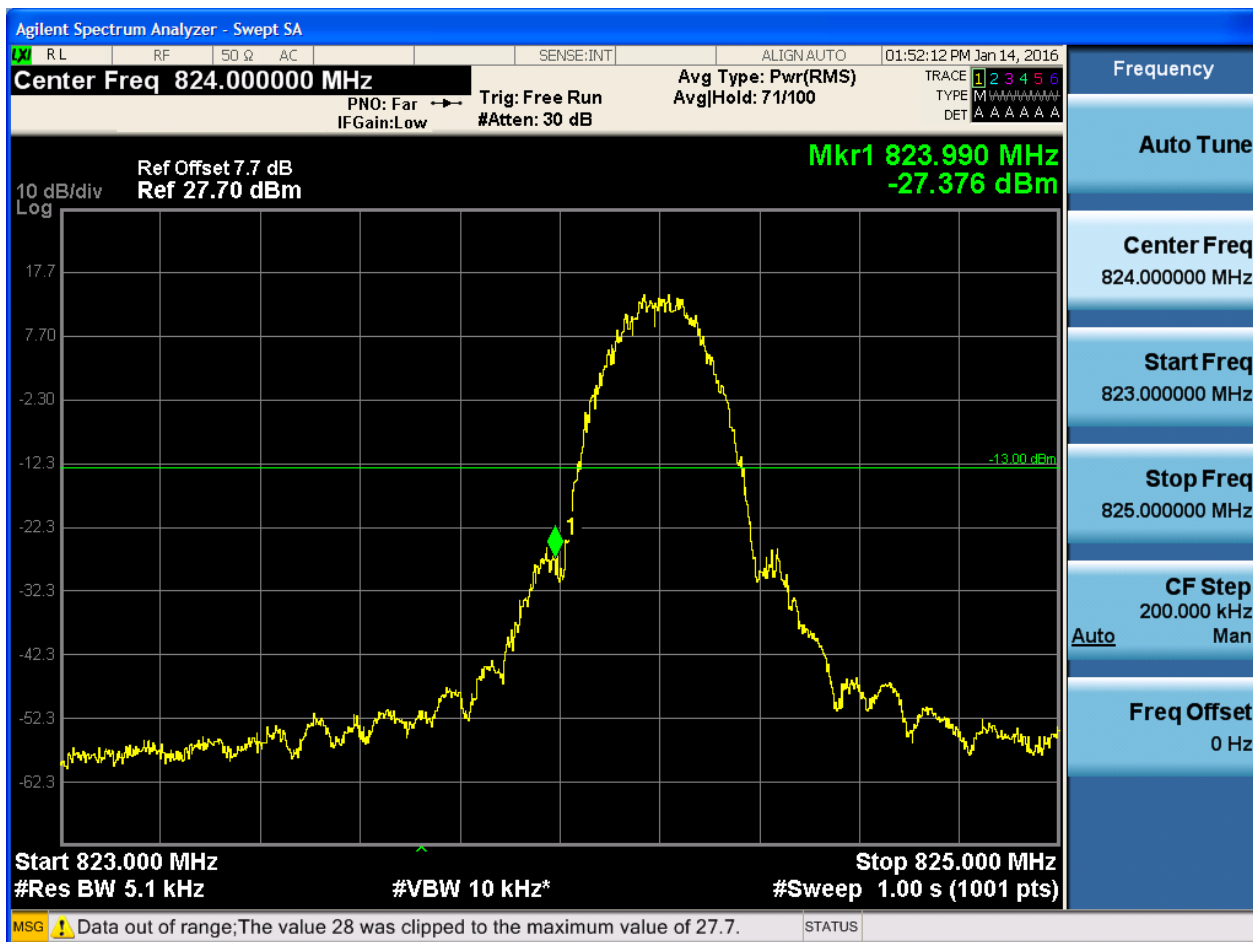


5.1.1.1.2 Test Channel = HCH

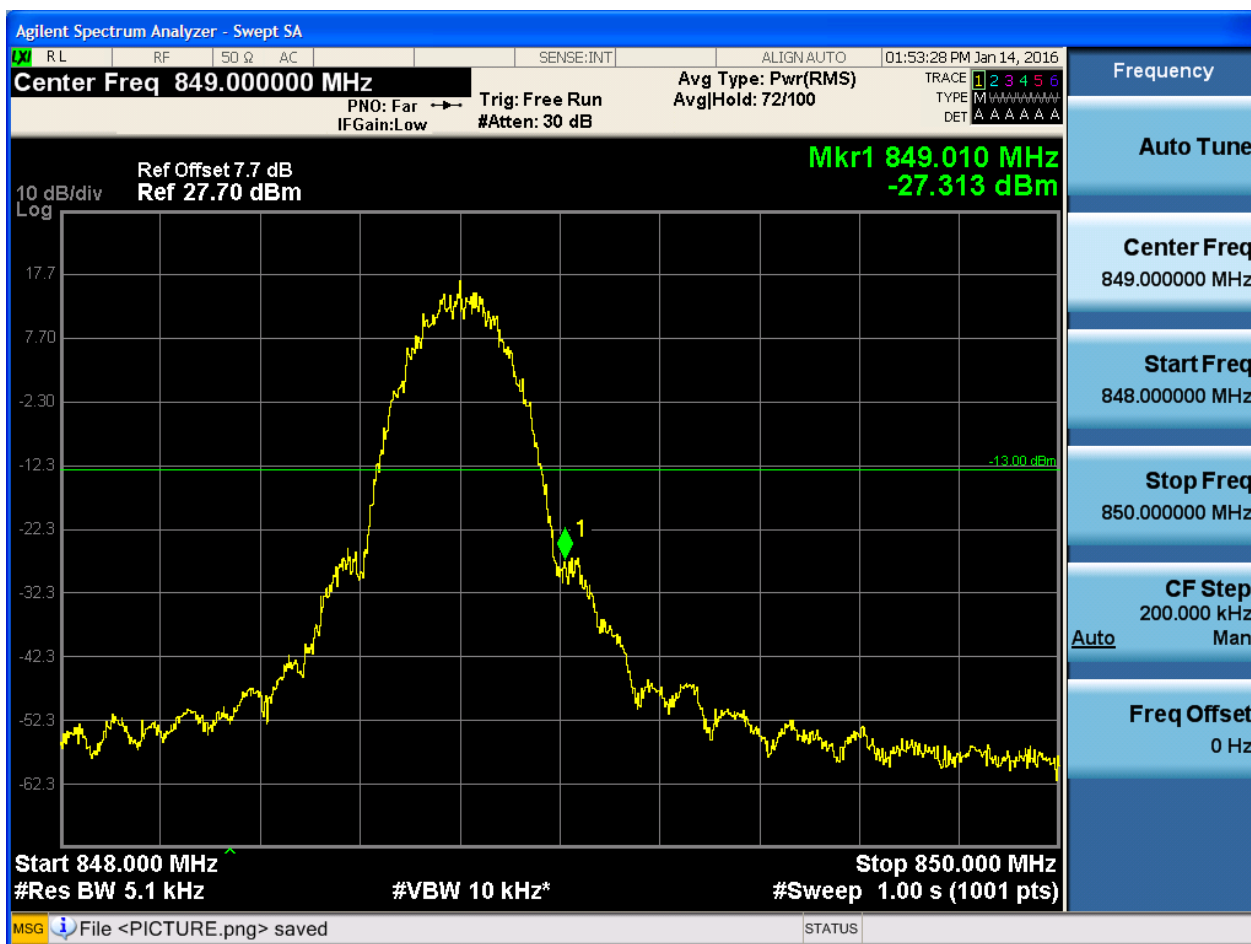


5.1.1.2 Test Mode = GSM/TM2

5.1.1.2.1 Test Channel = LCH



5.1.1.2.2 Test Channel = HCH

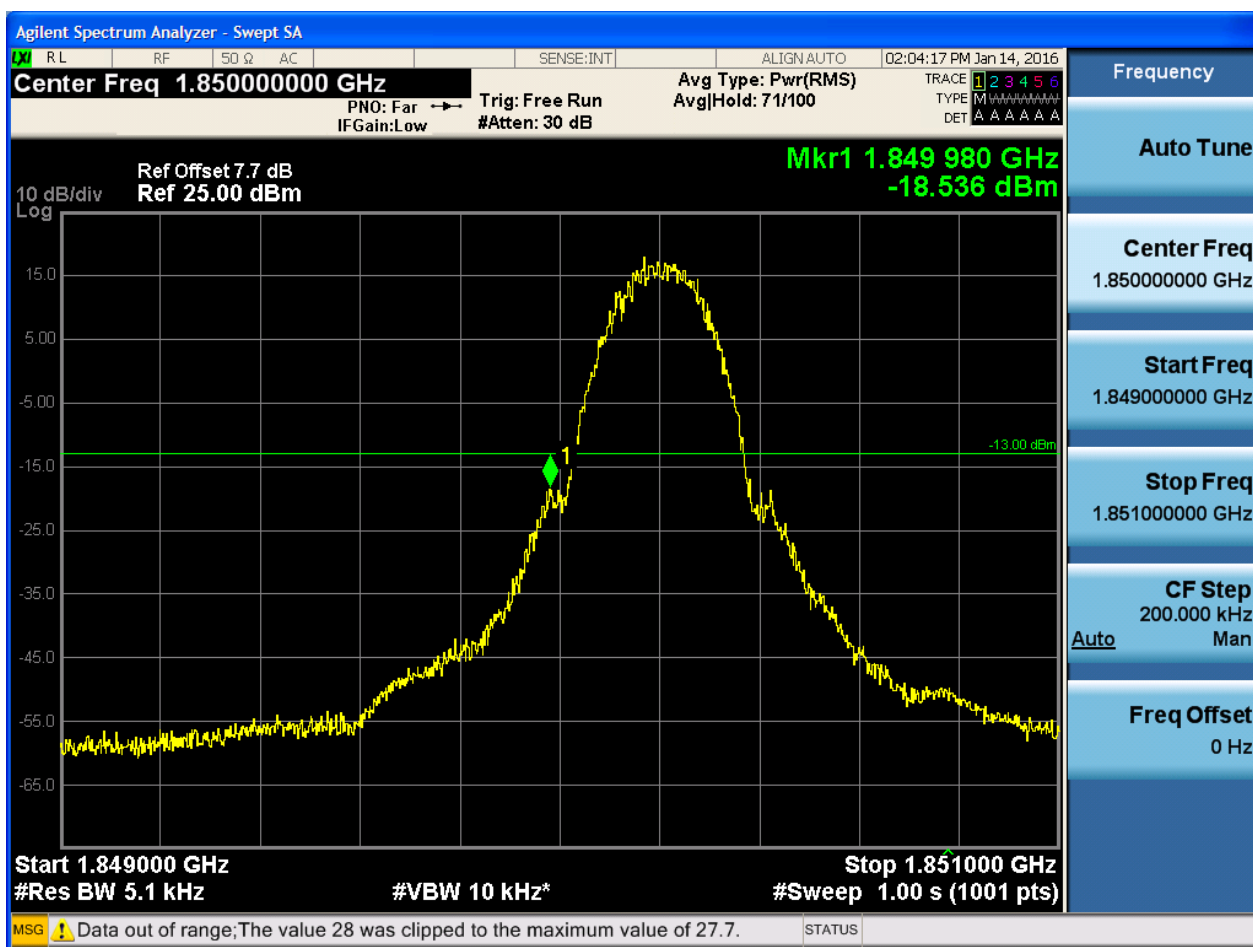




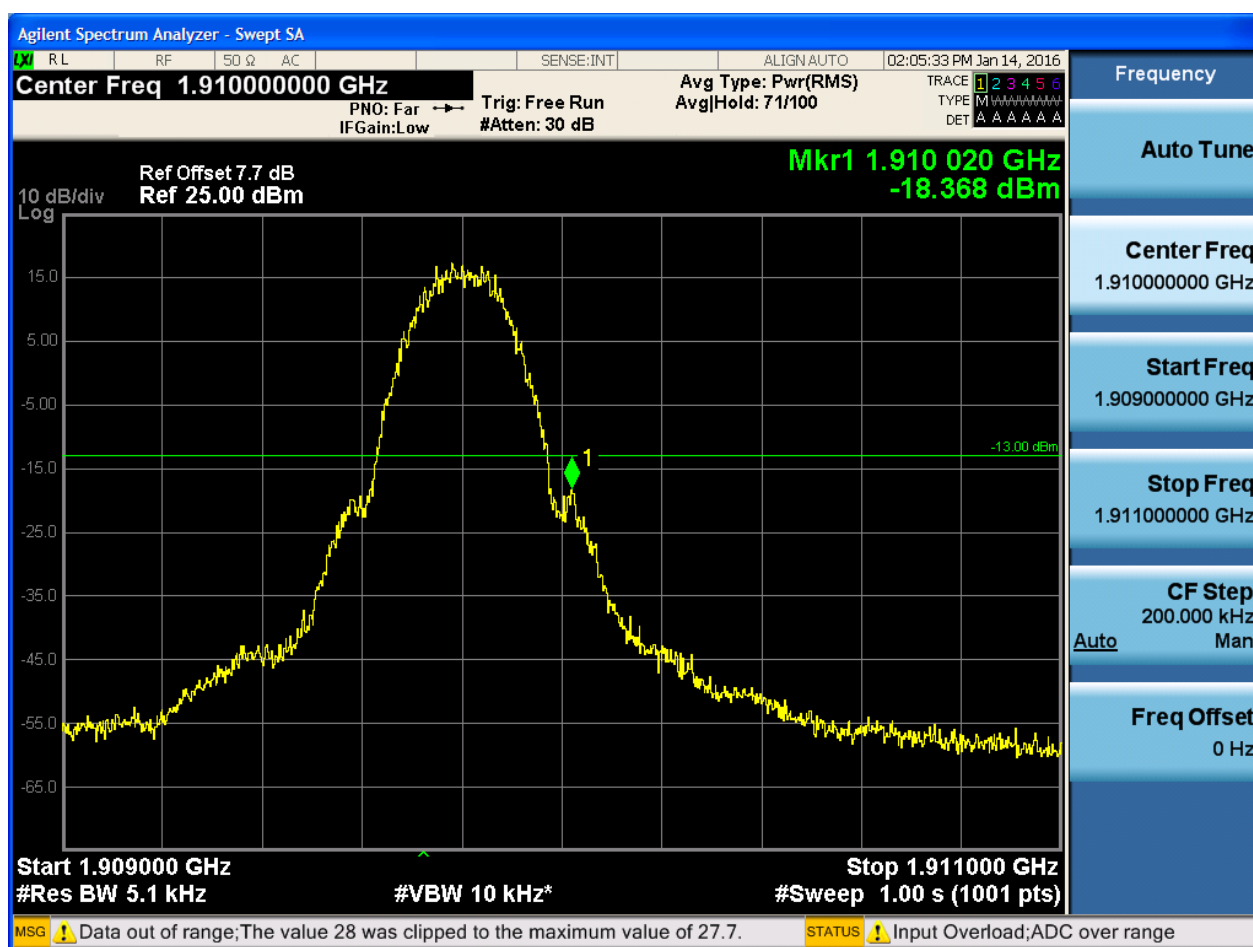
5.1.2 Test Band = GSM1900

5.1.2.1 Test Mode = GSM/TM1

5.1.2.1.1 Test Channel = LCH

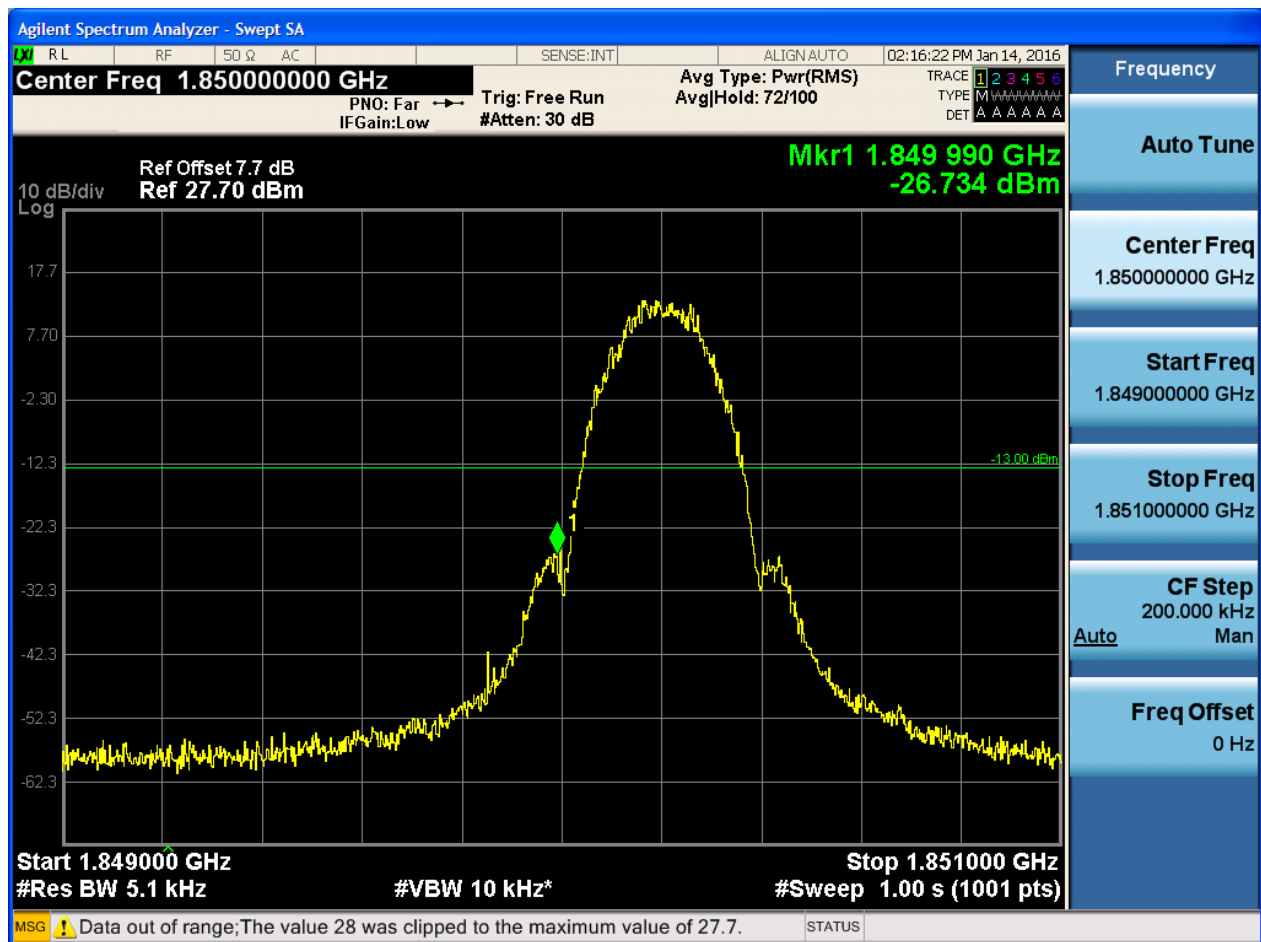


5.1.2.1.2 Test Channel = HCH

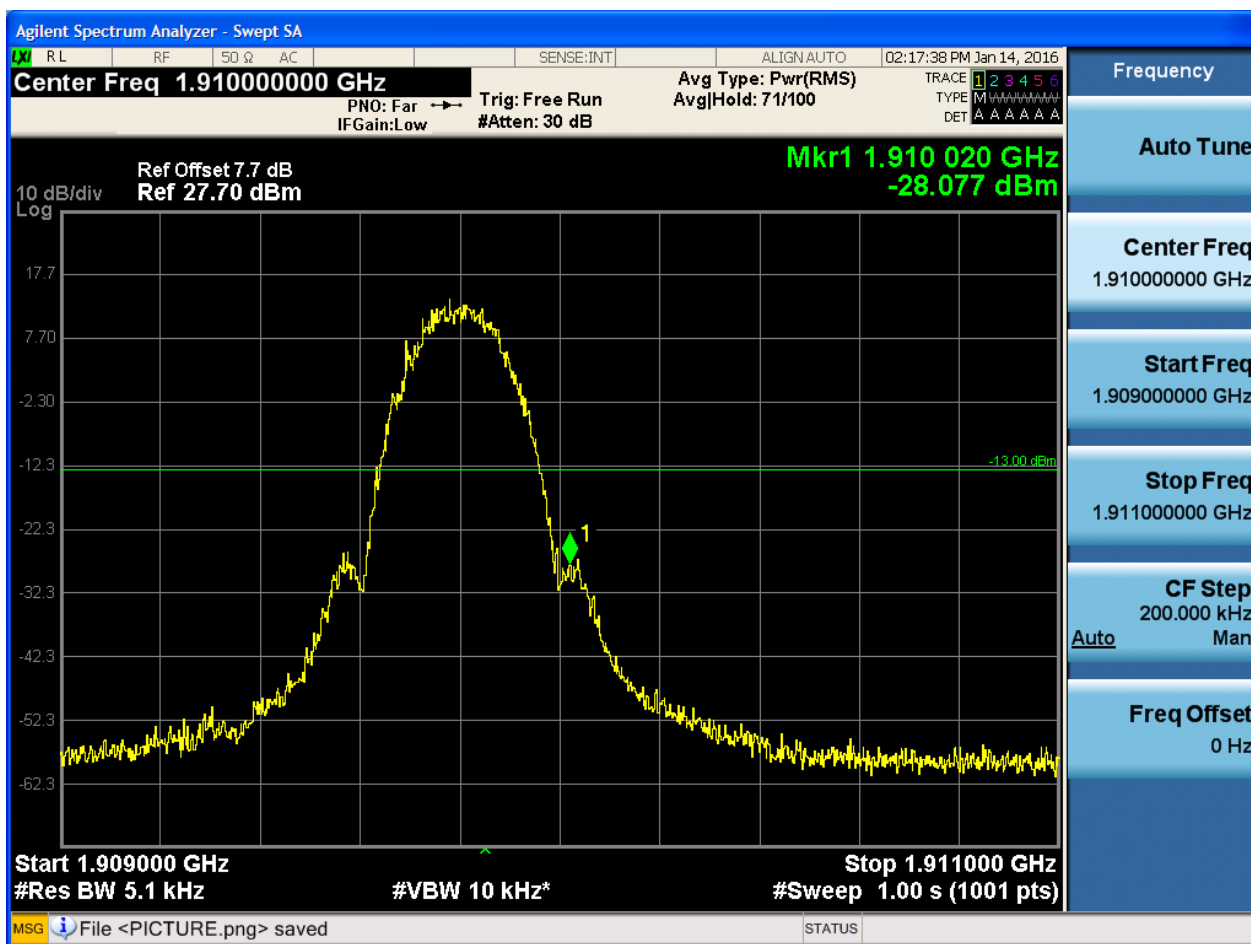


5.1.2.2 Test Mode = GSM/TM2

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.

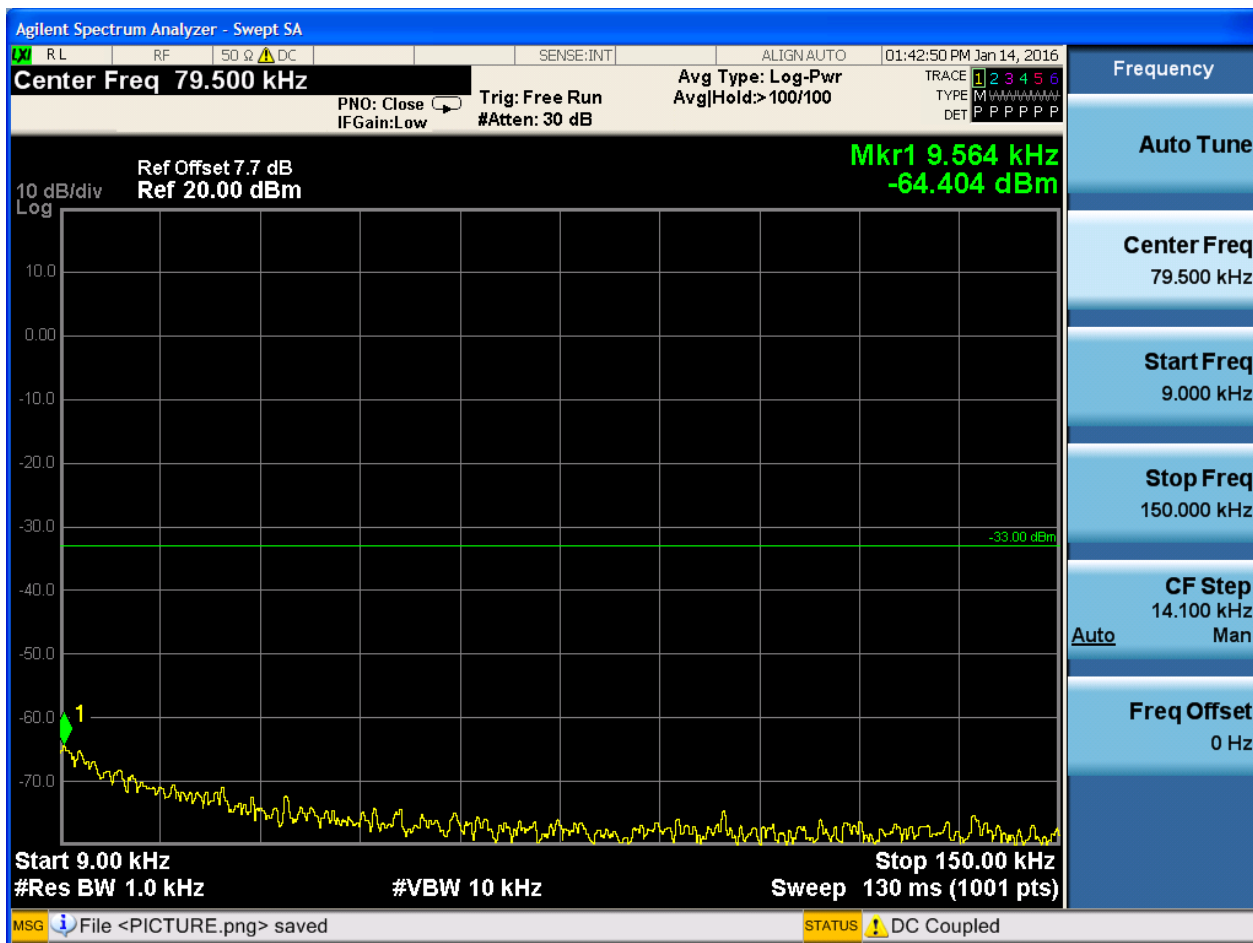
Part I - Test Plots

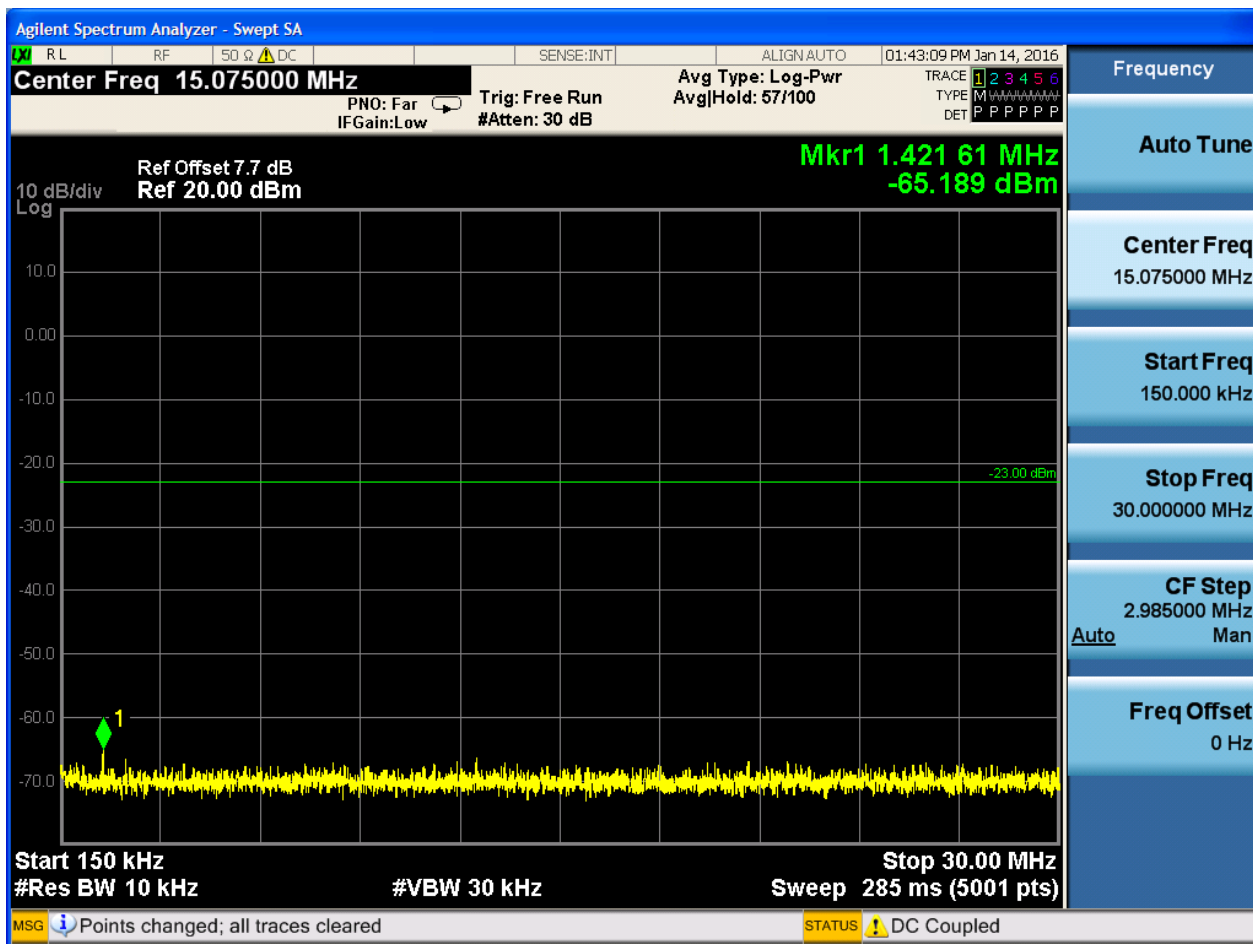
6.1 For GSM

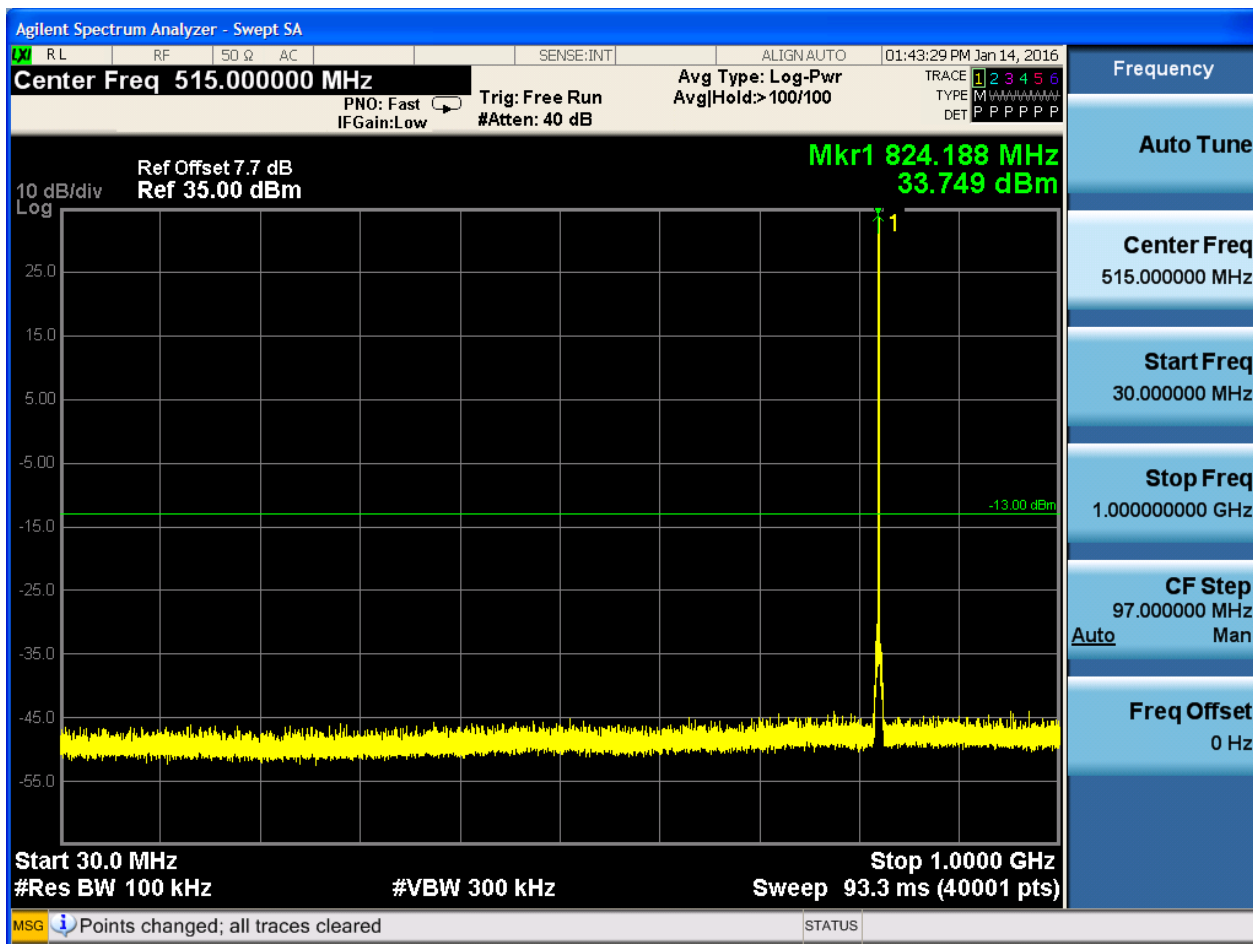
6.1.1 Test Band = GSM850

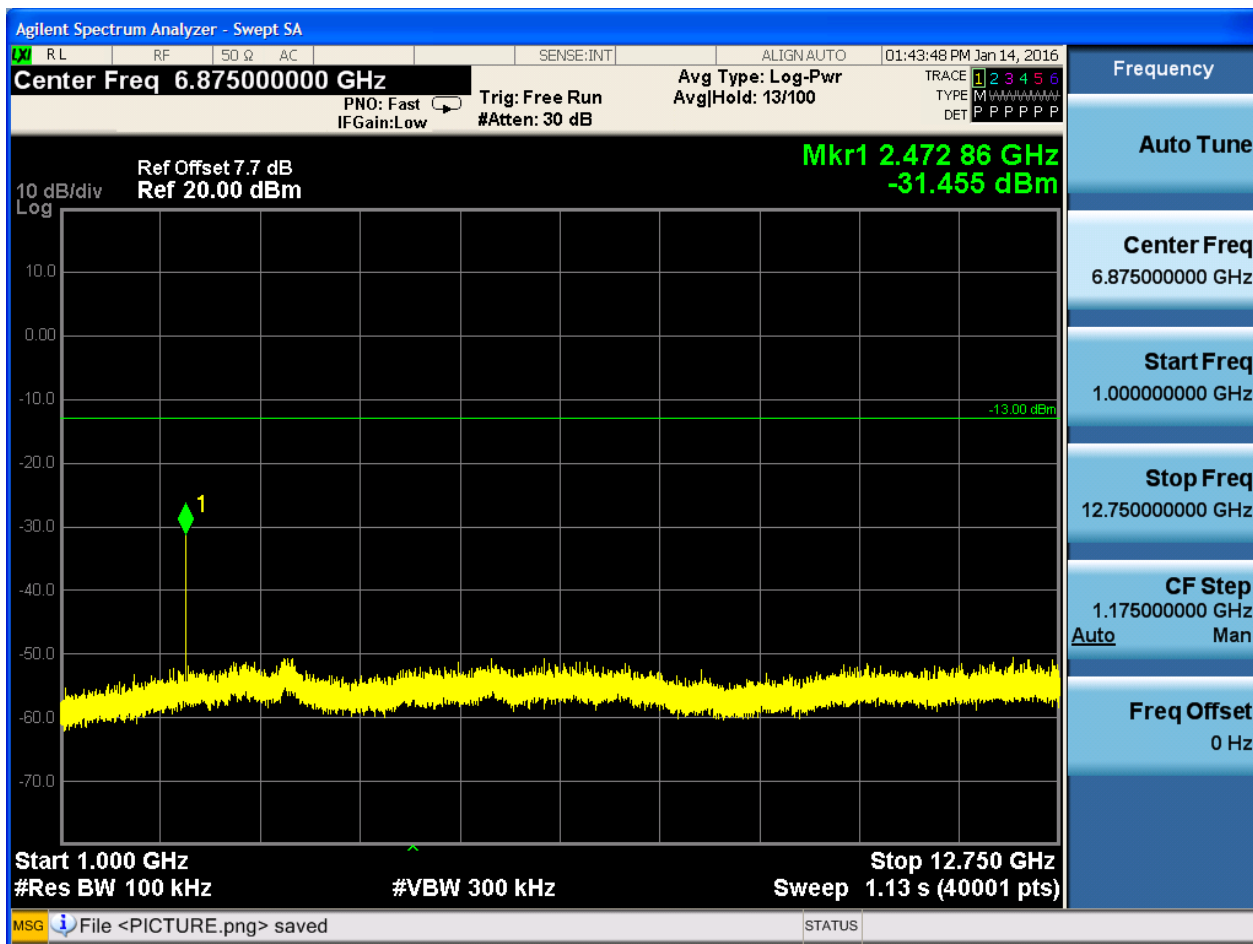
6.1.1.1 Test Mode = GSM/TM1

6.1.1.1.1 Test Channel = LCH

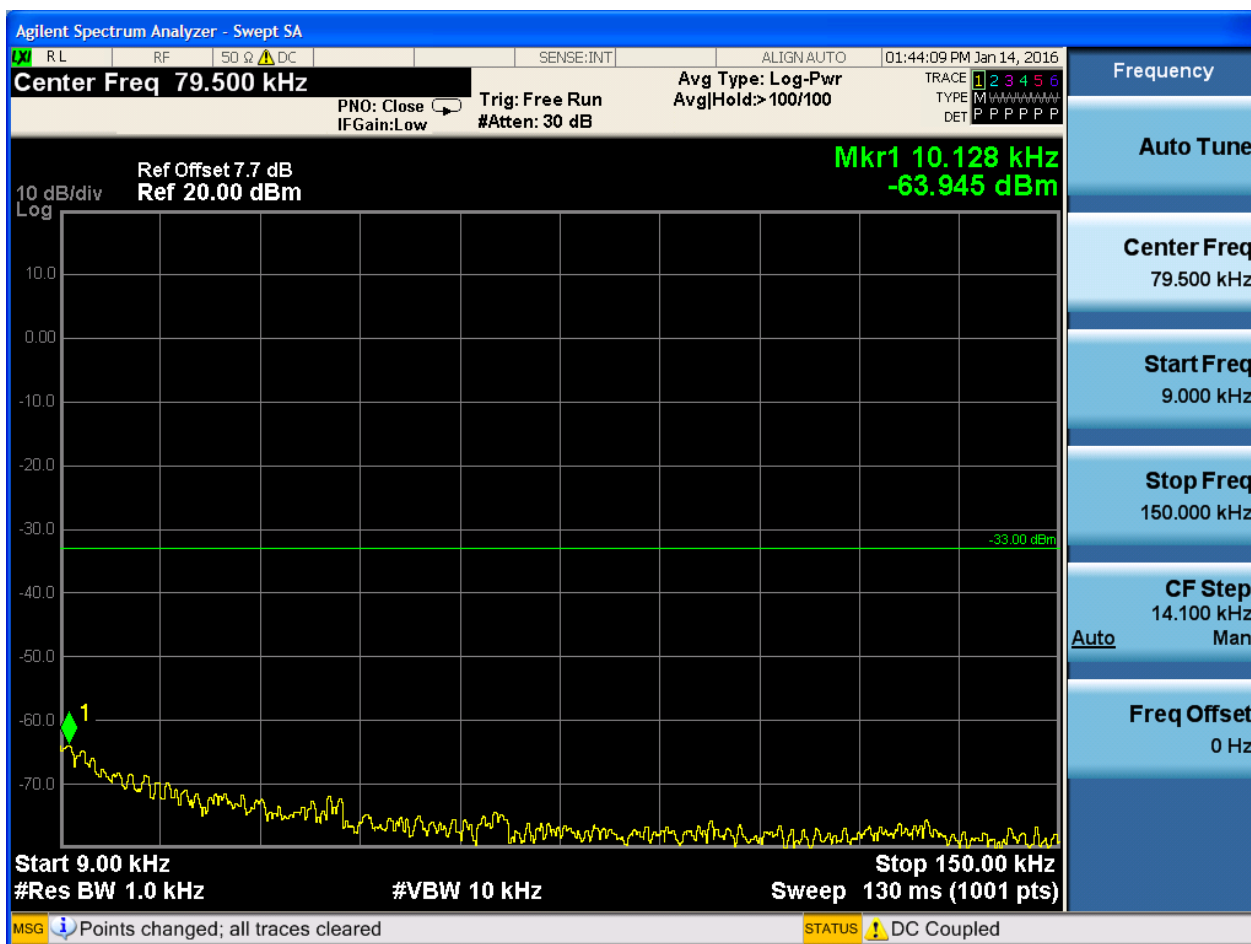


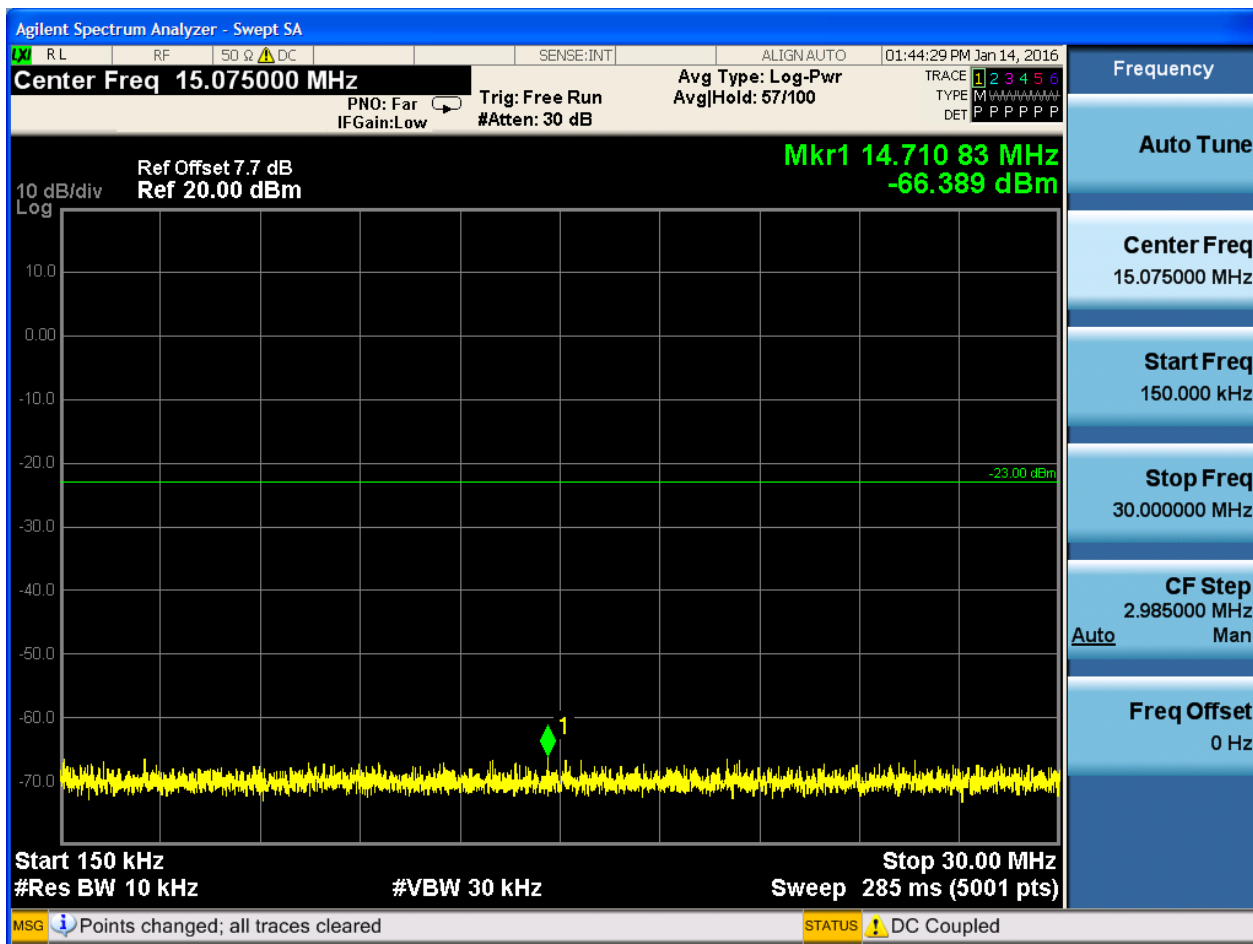


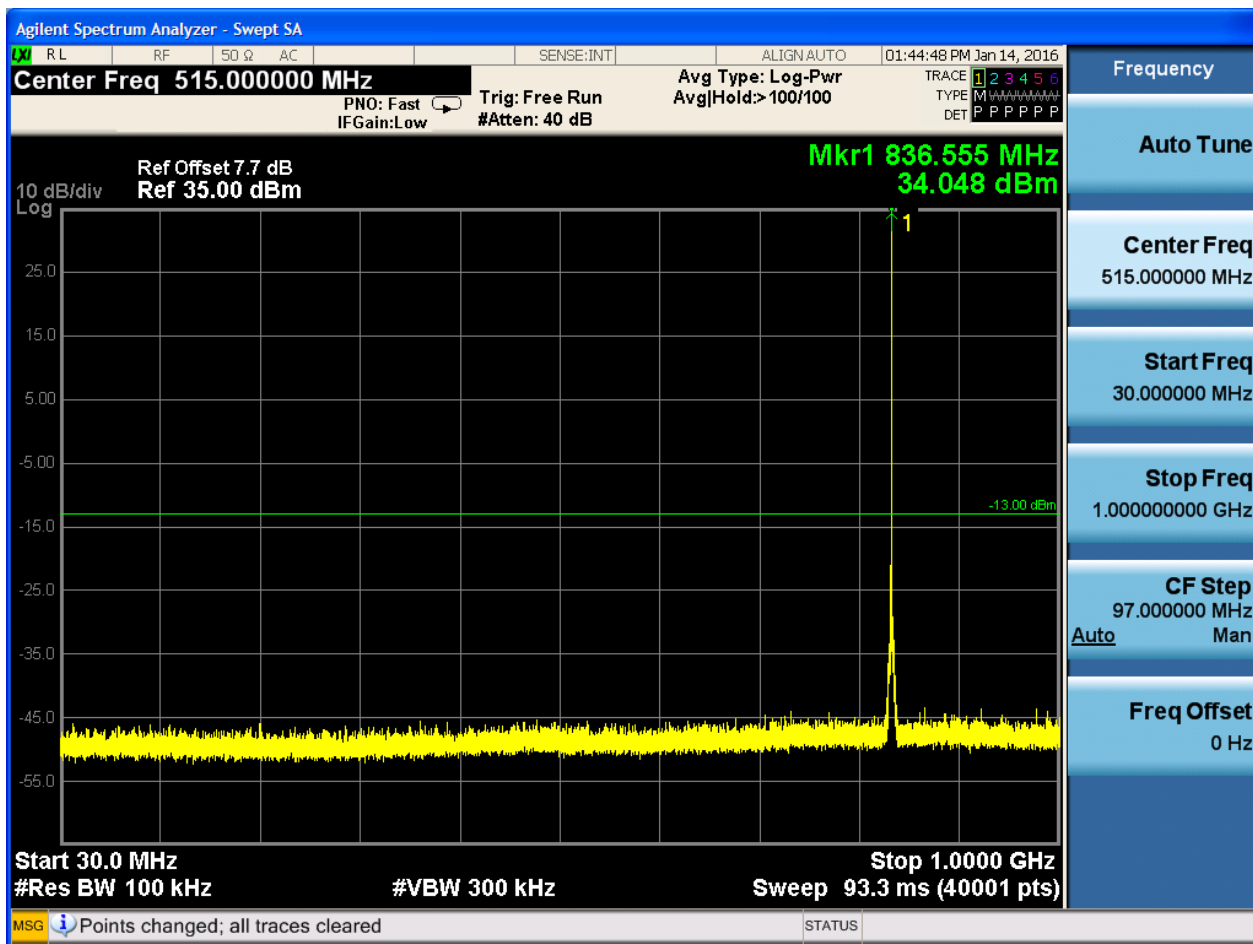


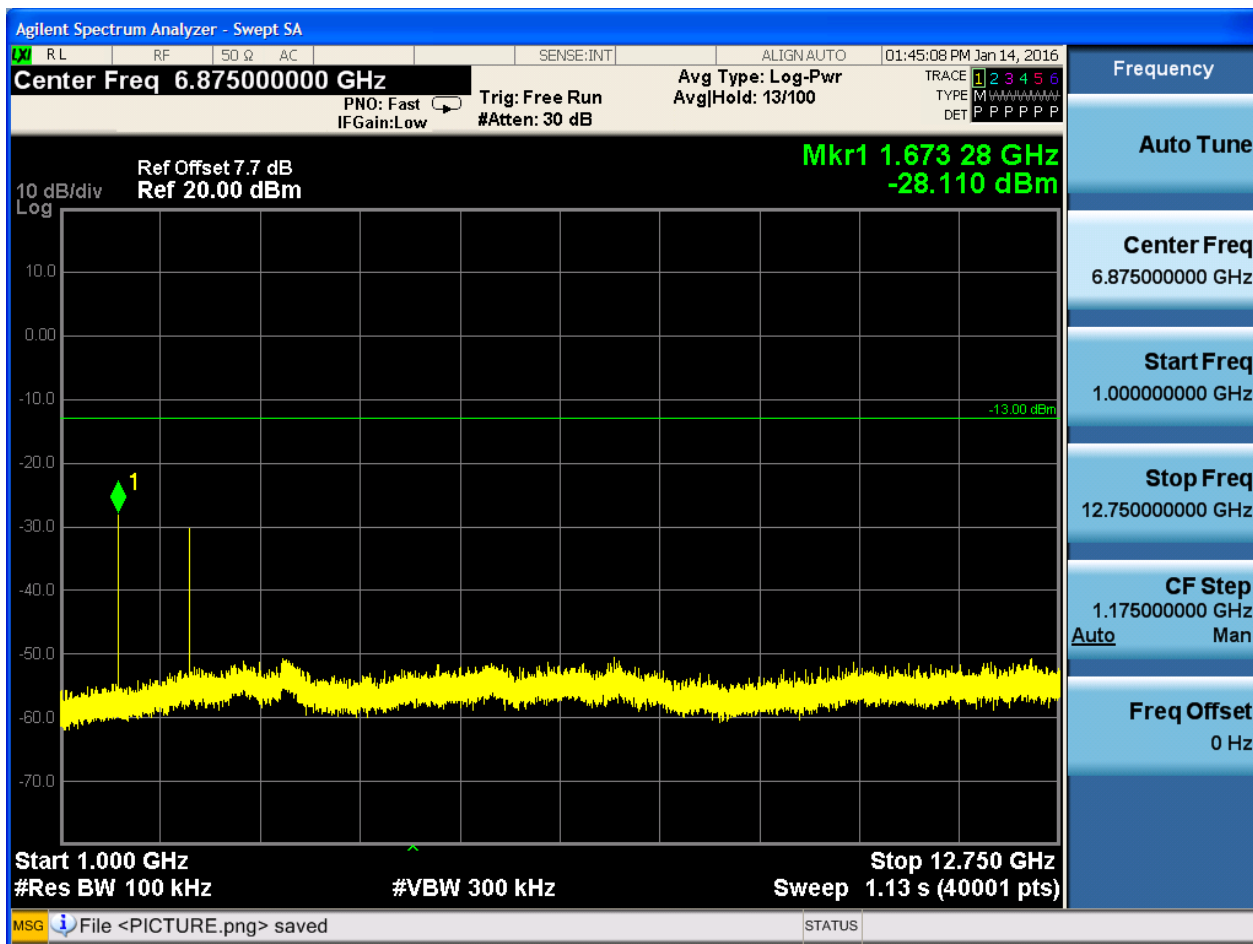


6.1.1.1.2 Test Channel = MCH



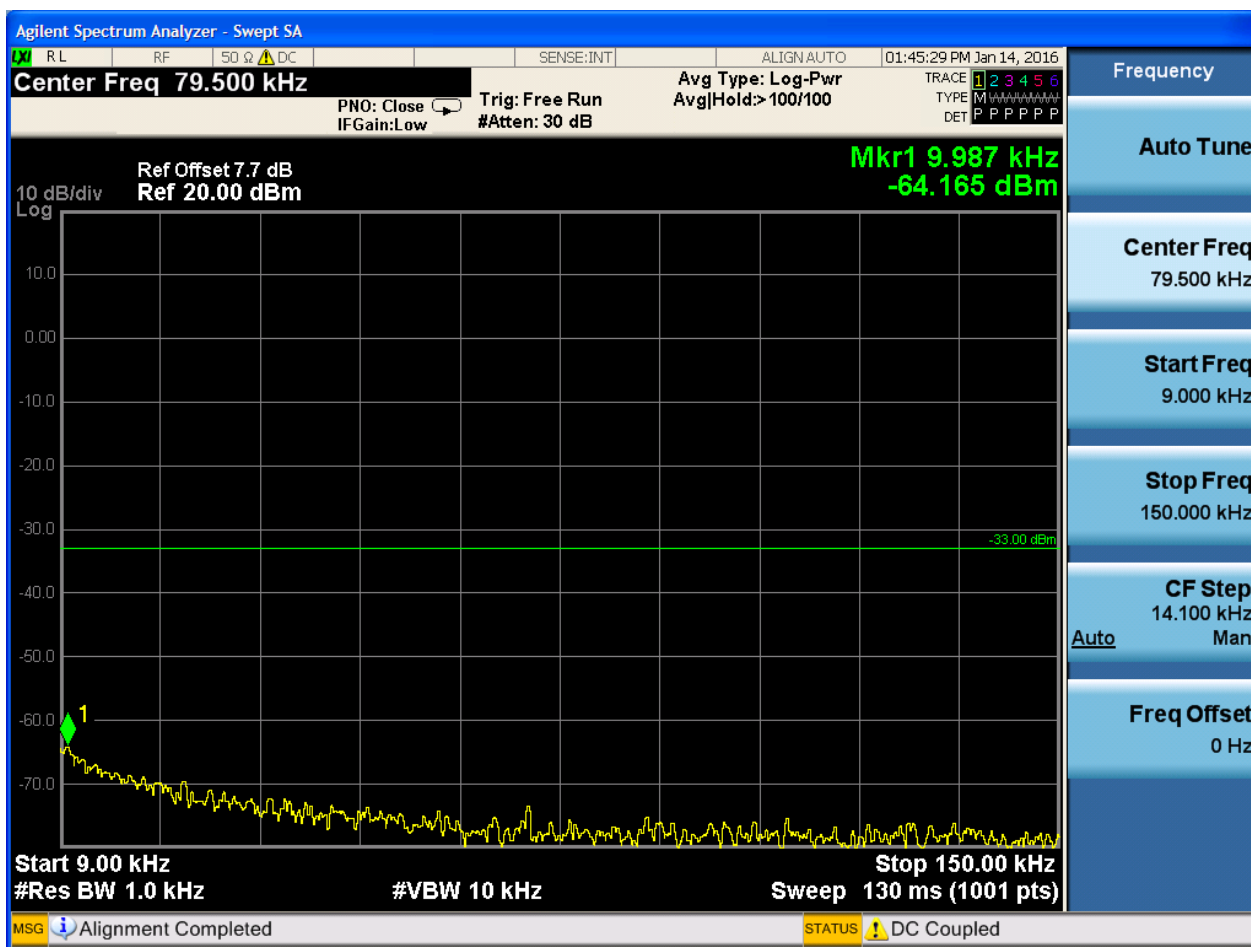


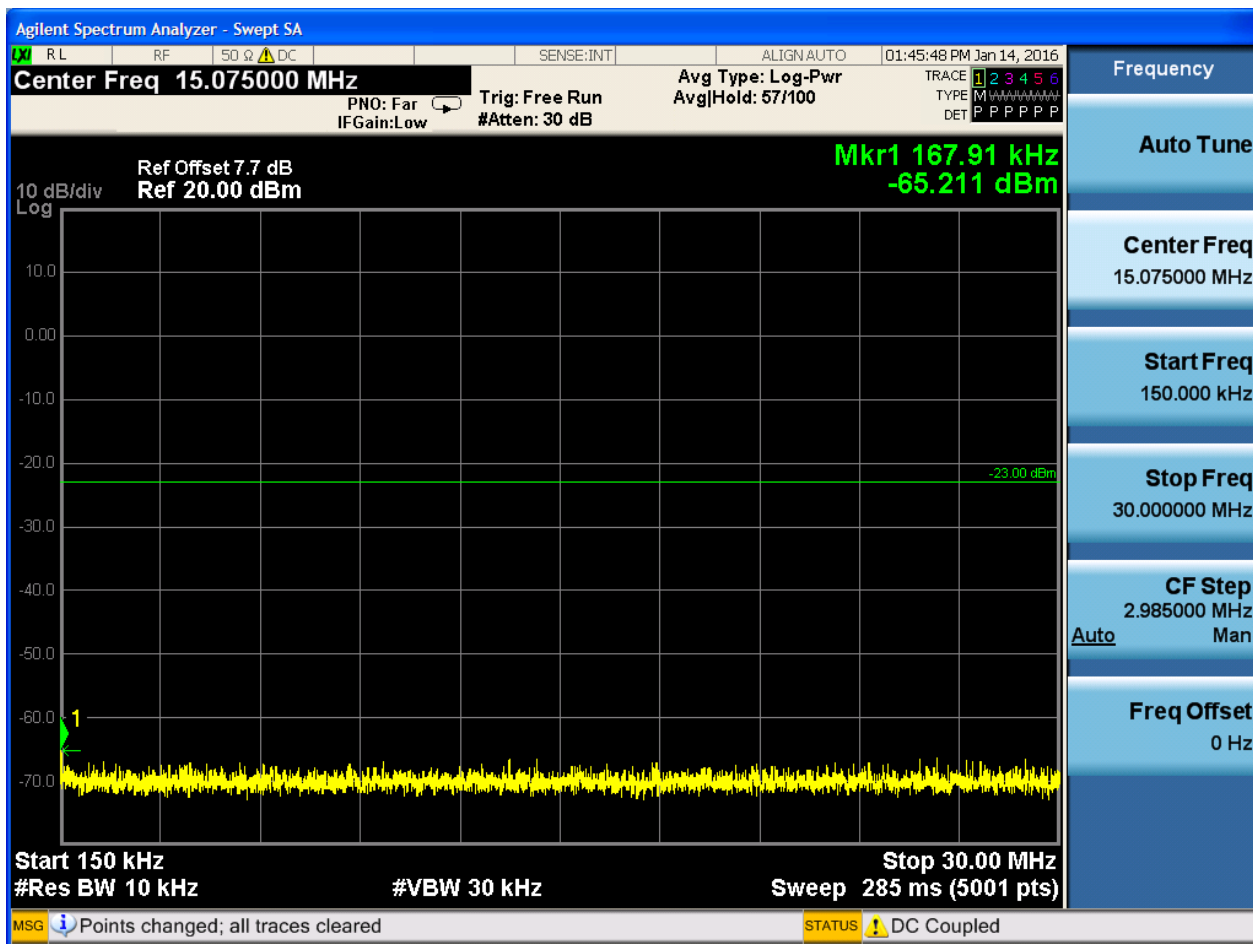


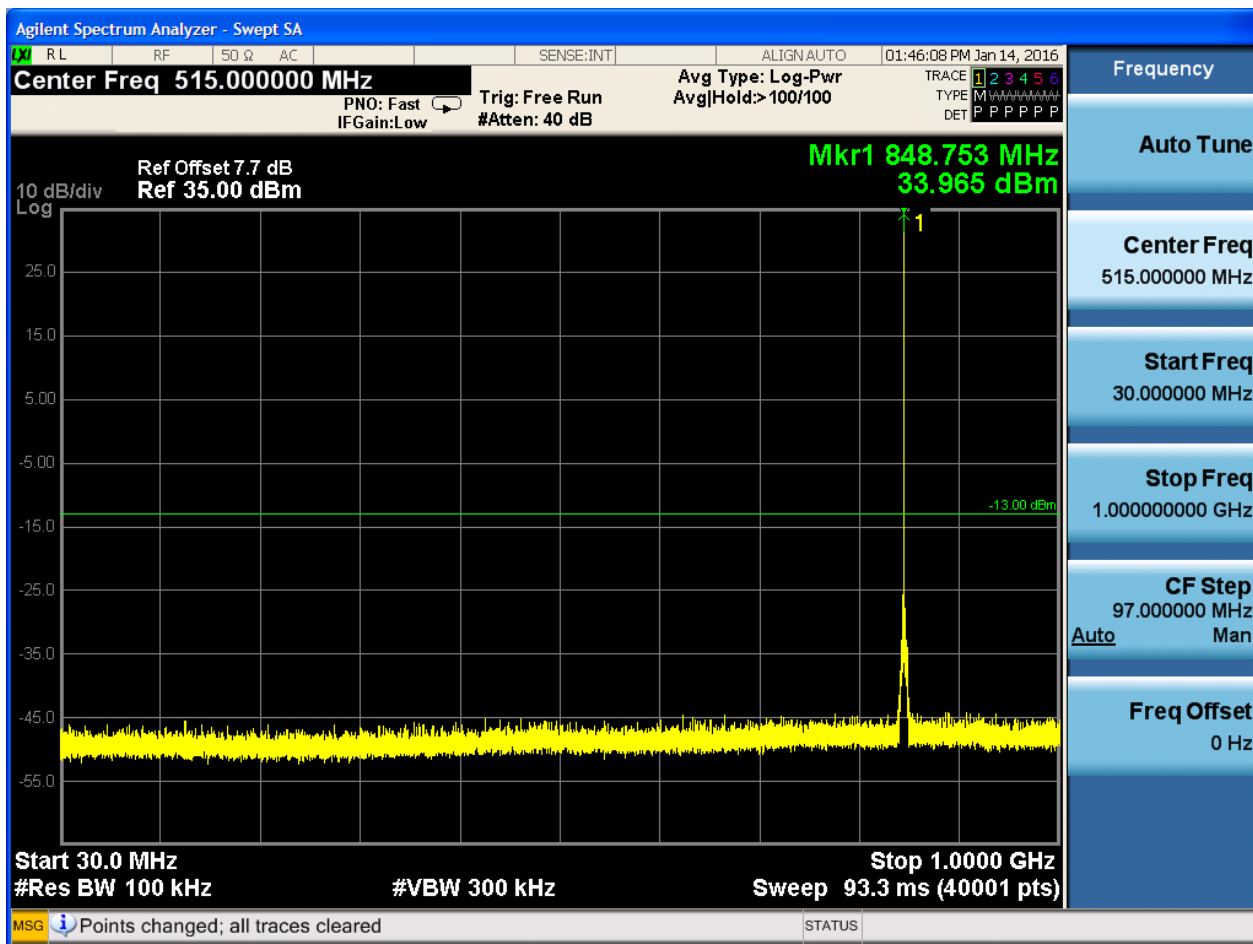


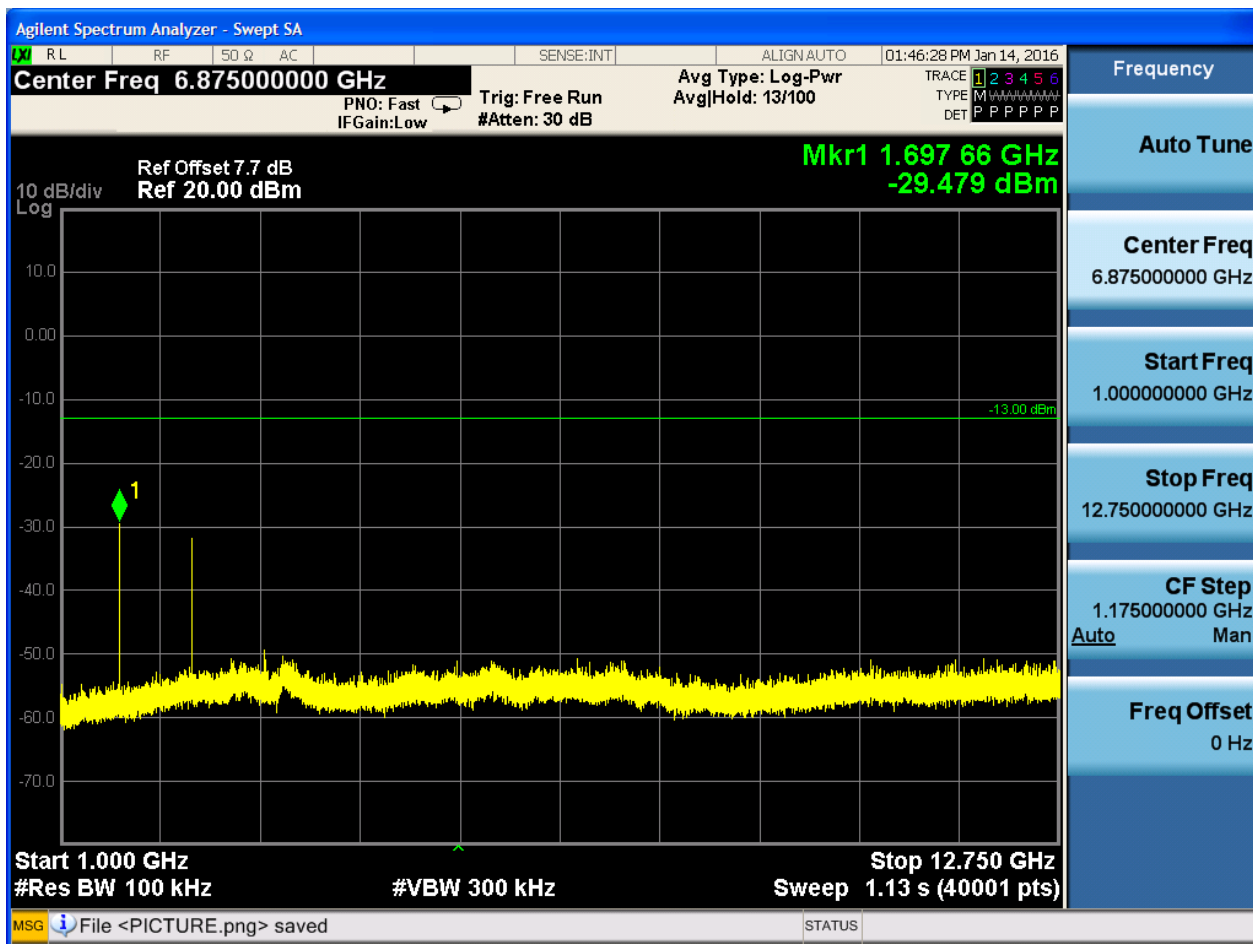


6.1.1.1.3 Test Channel = HCH



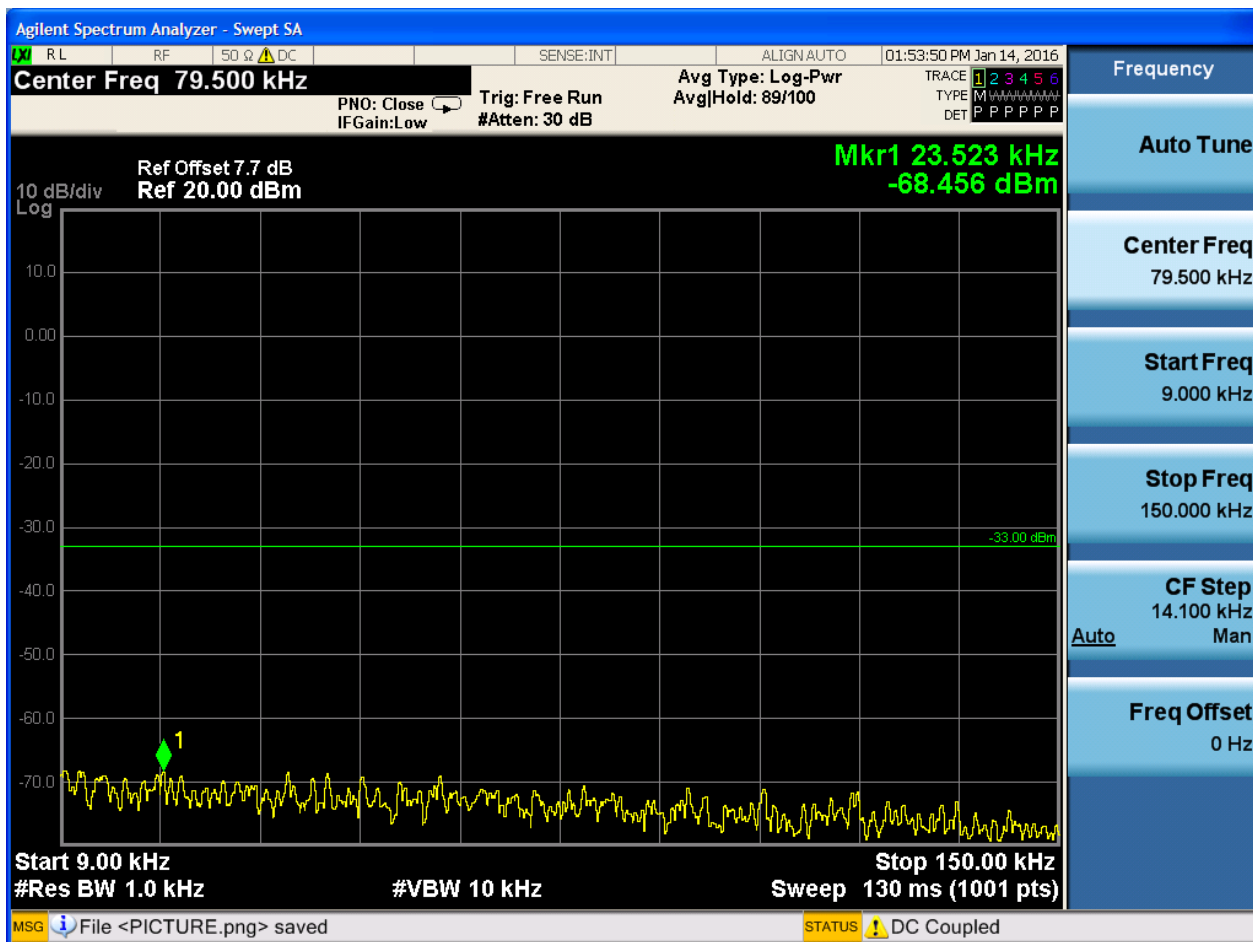


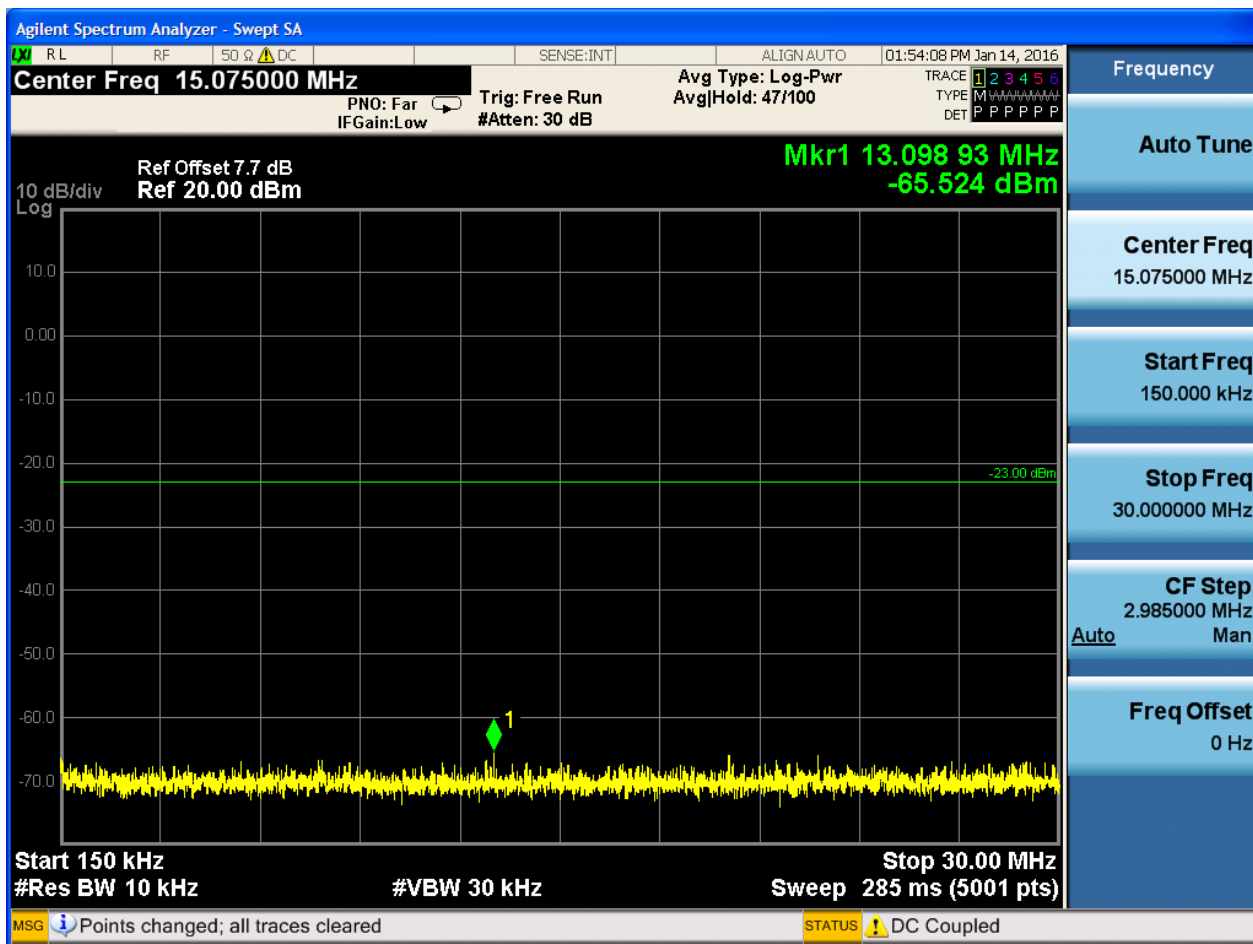


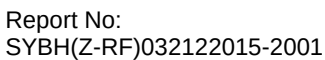


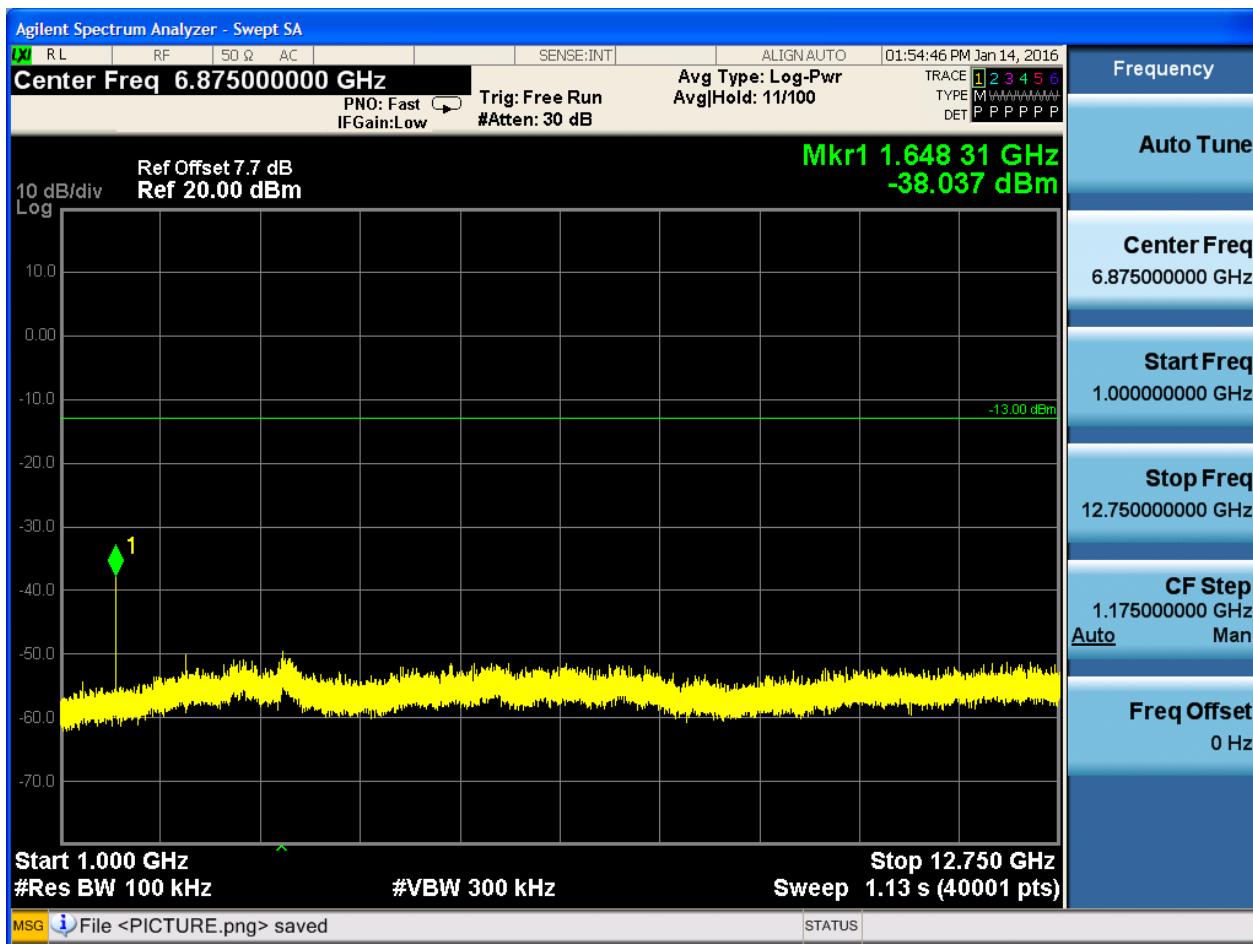
6.1.1.2 Test Mode = GSM/TM2

6.1.1.2.1 Test Channel = LCH

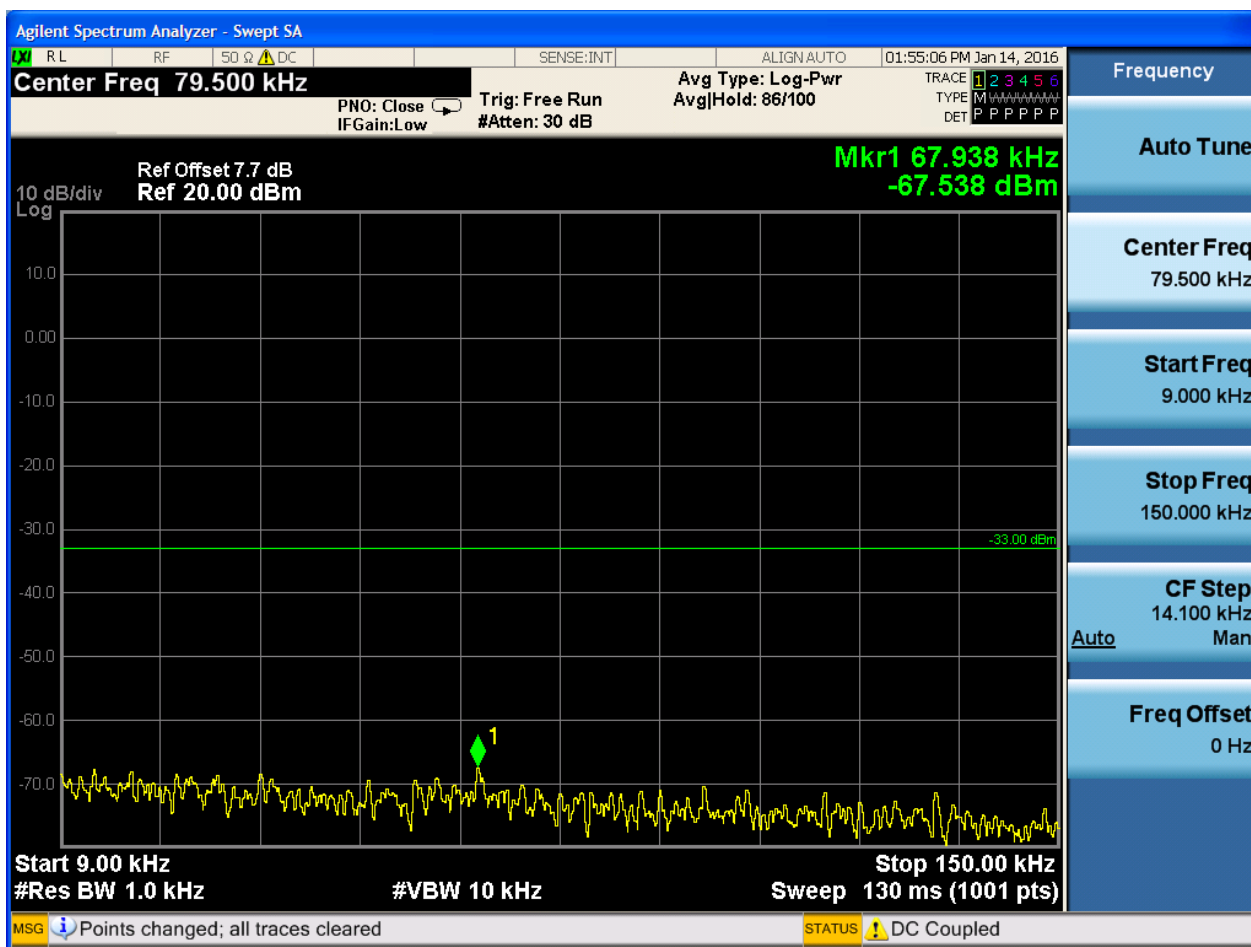


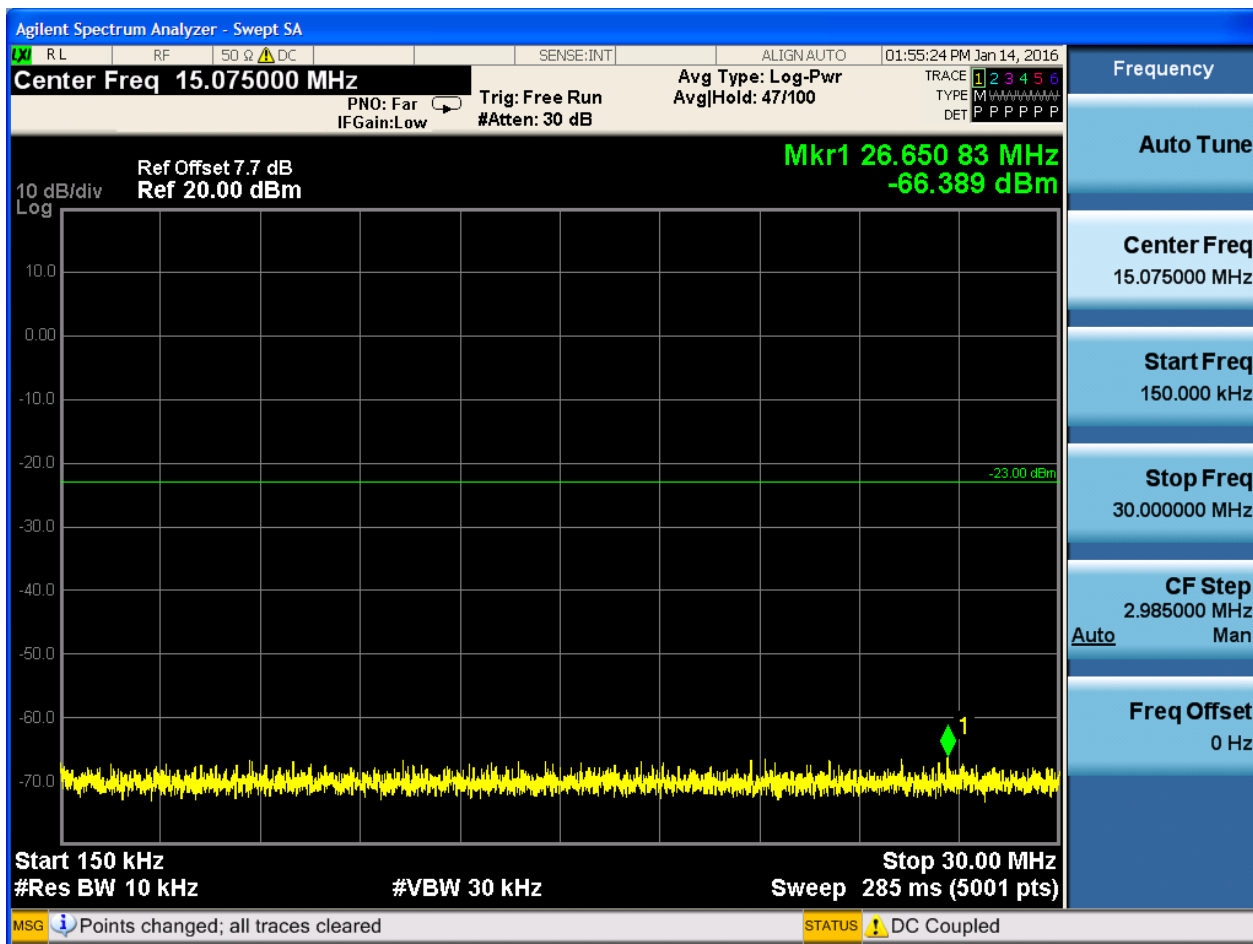


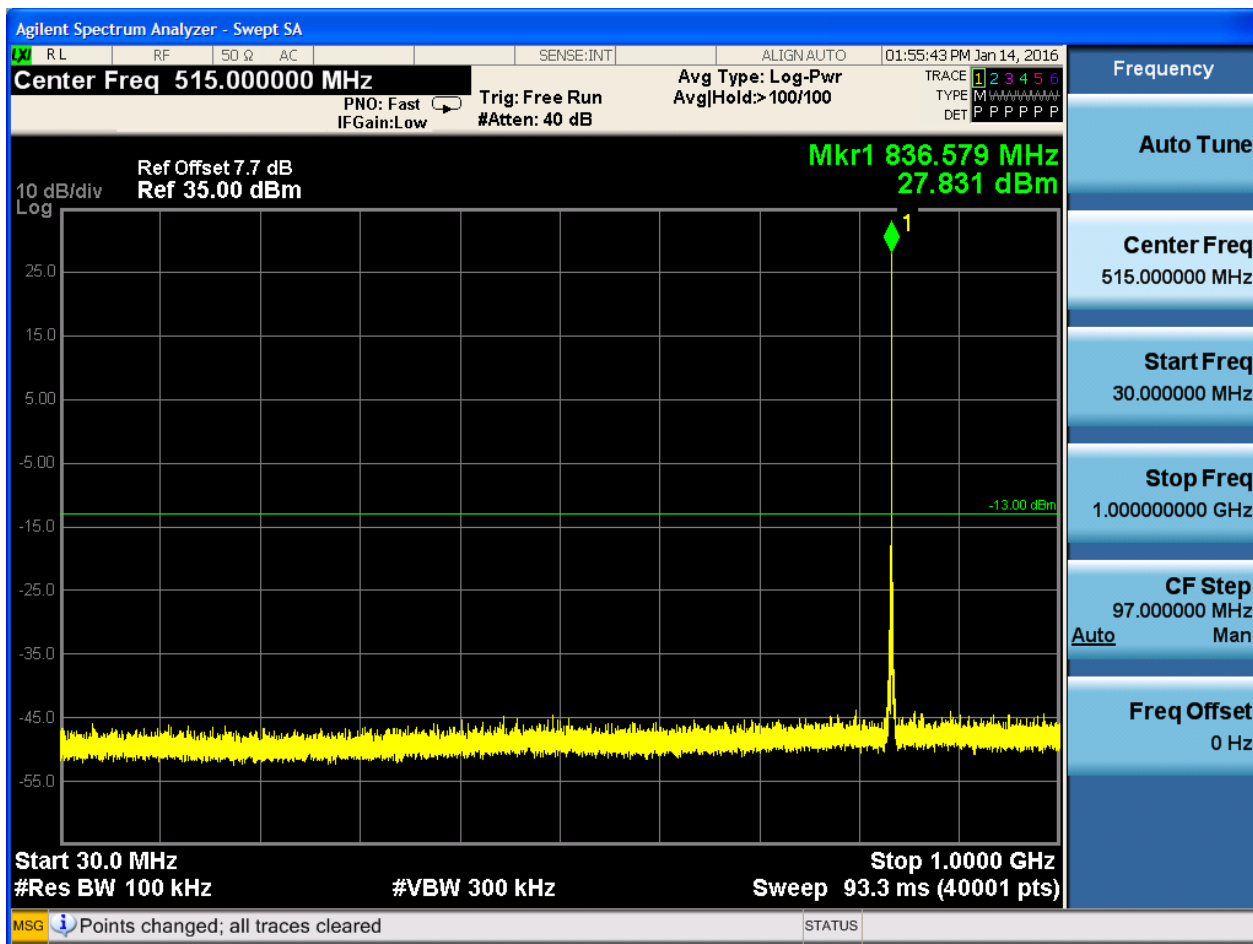


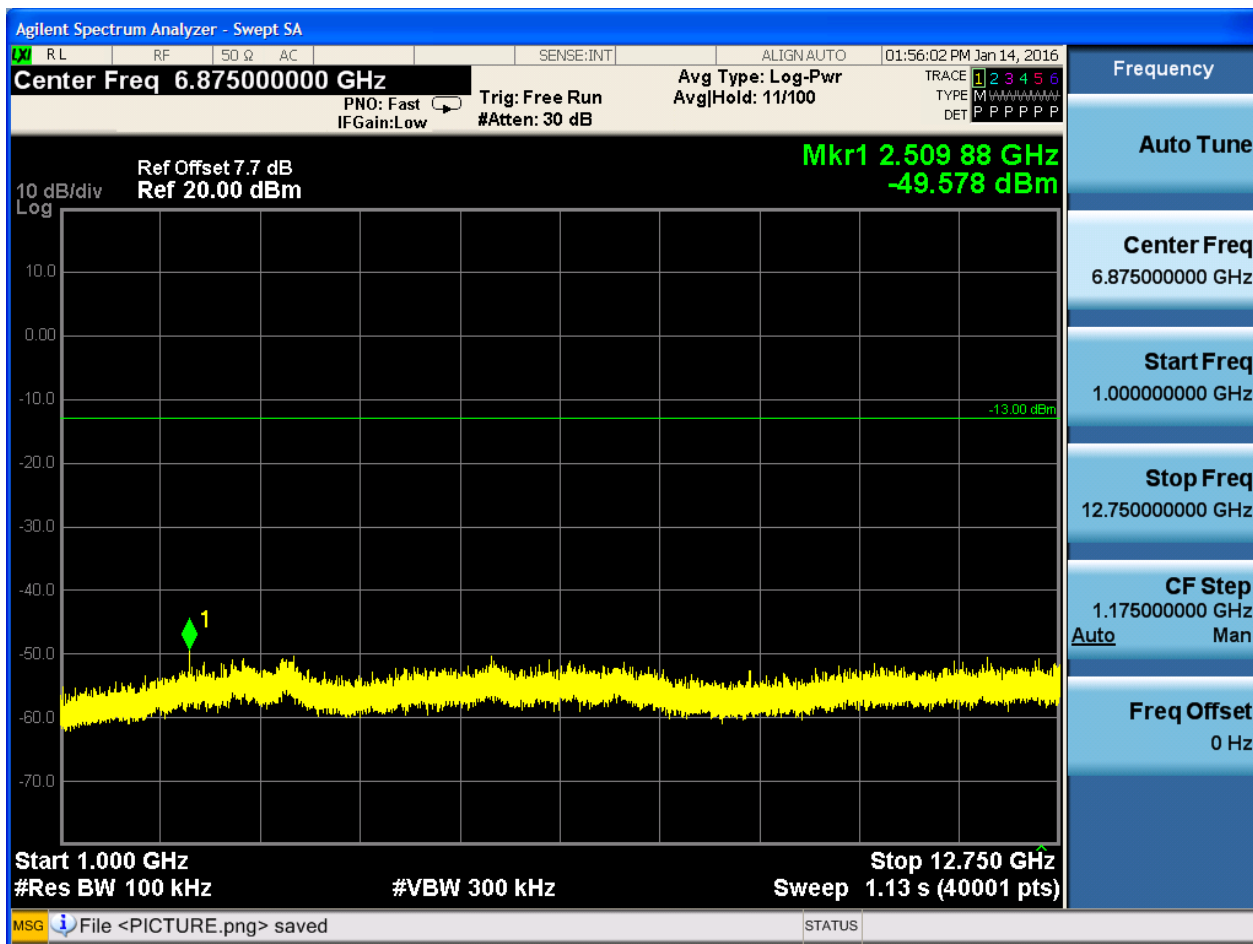


6.1.1.2.2 Test Channel = MCH

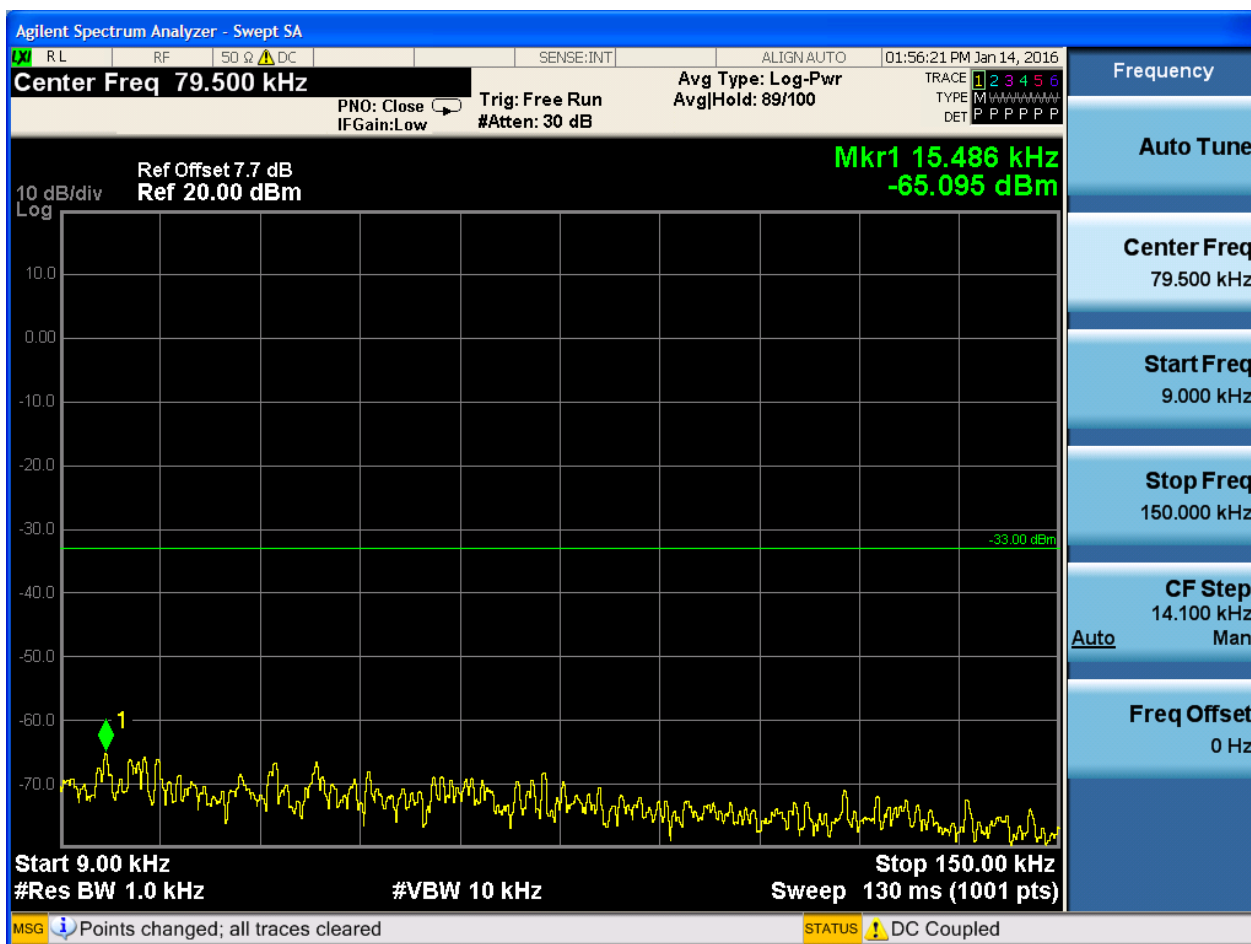


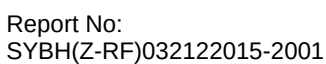


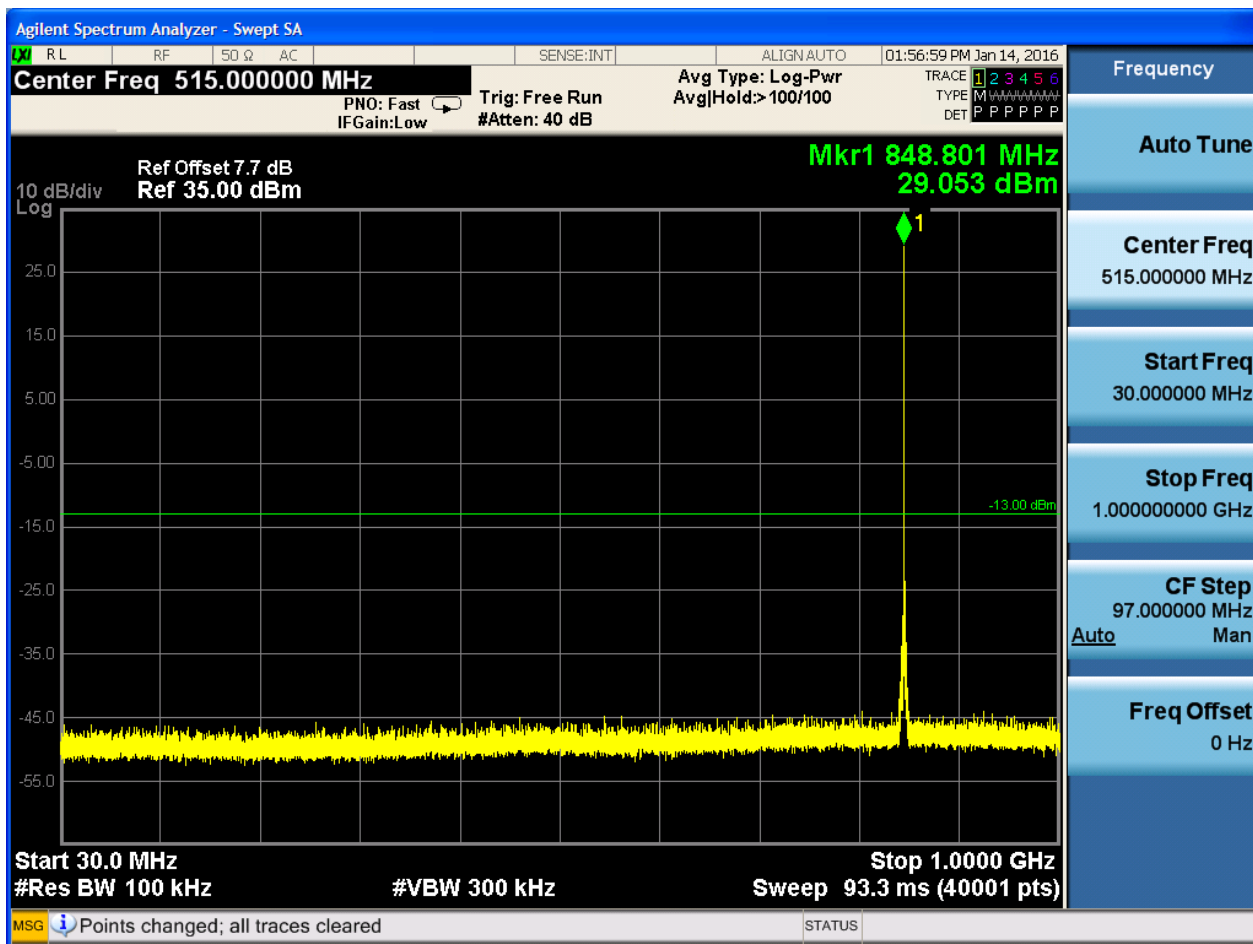


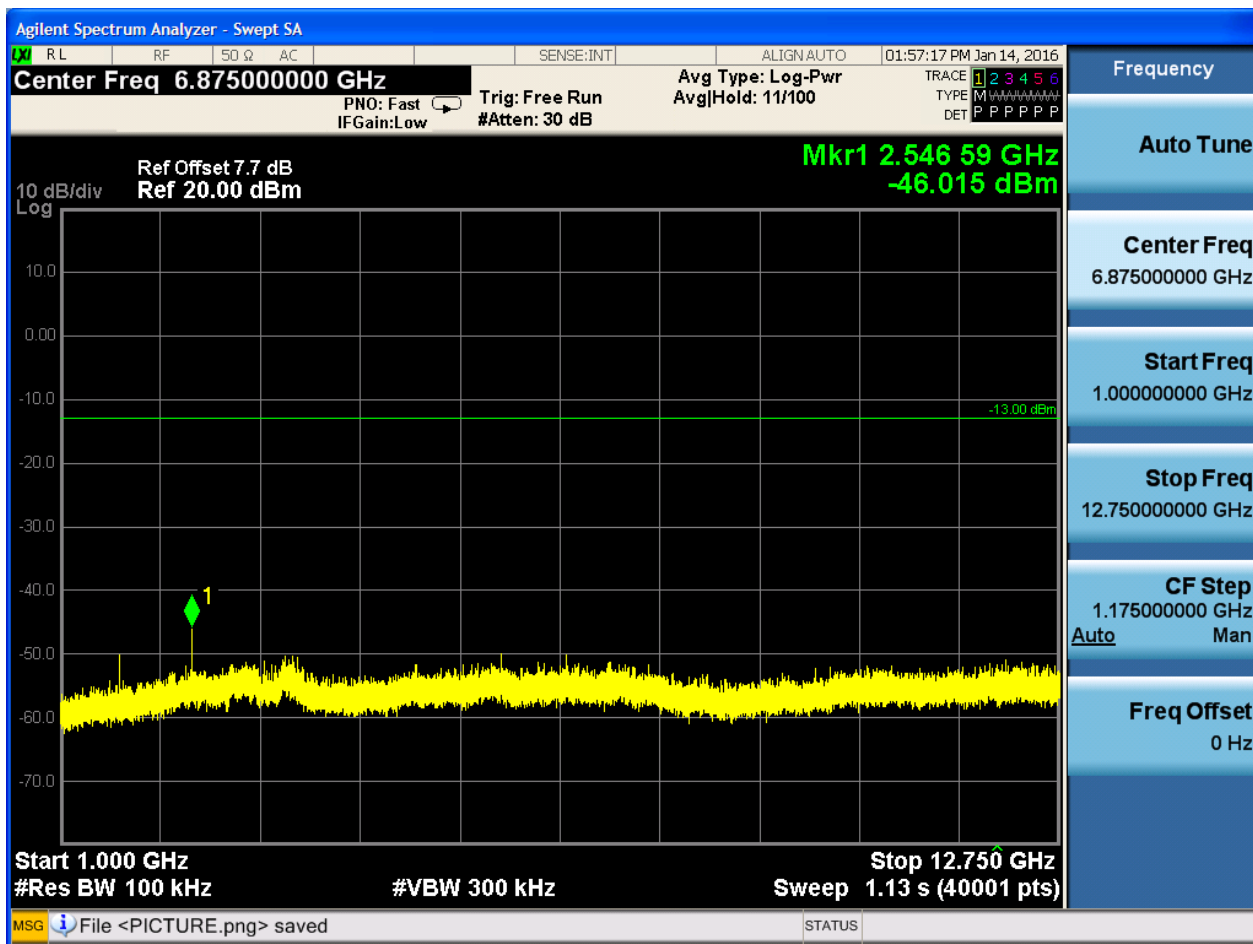


6.1.1.2.3 Test Channel = HCH





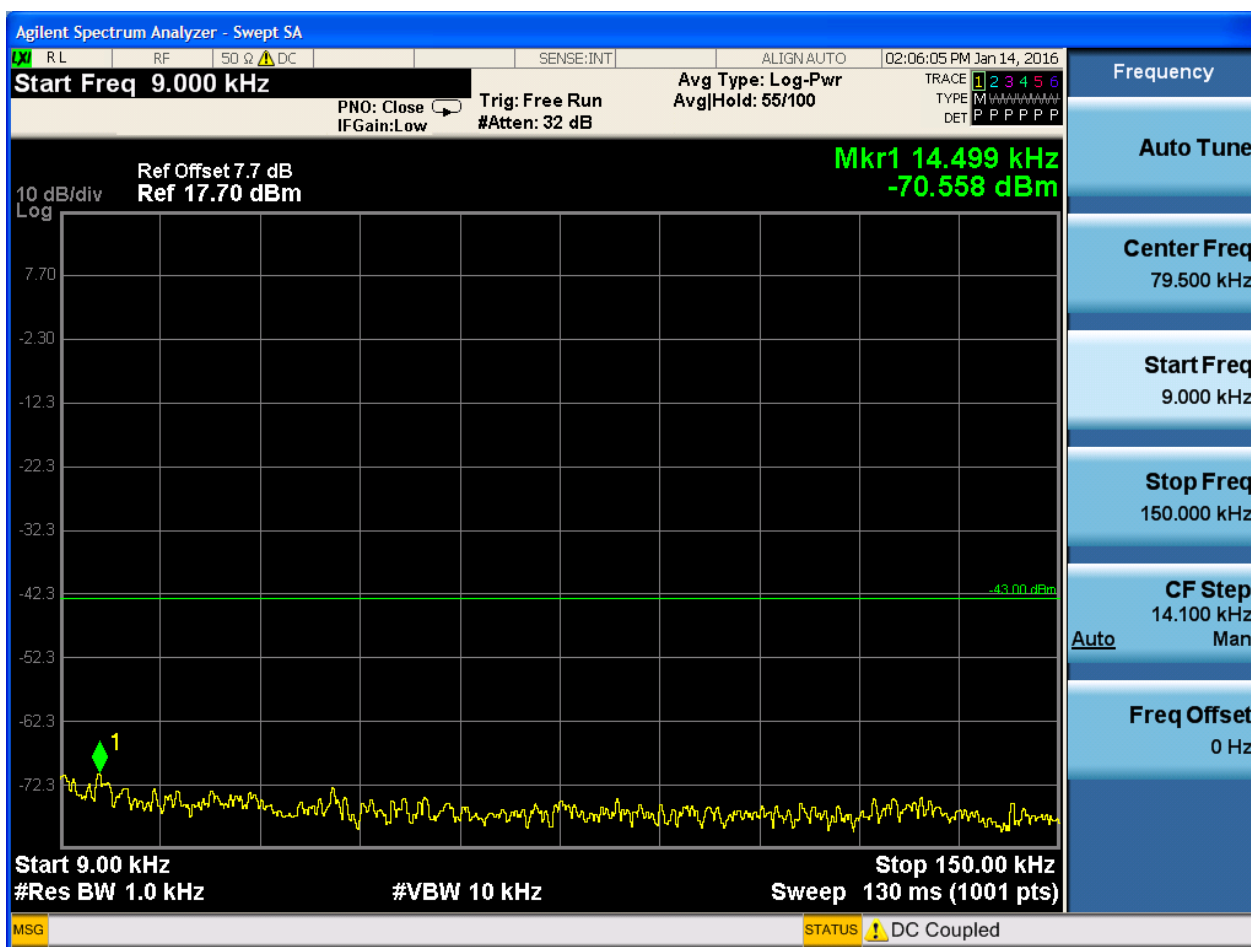


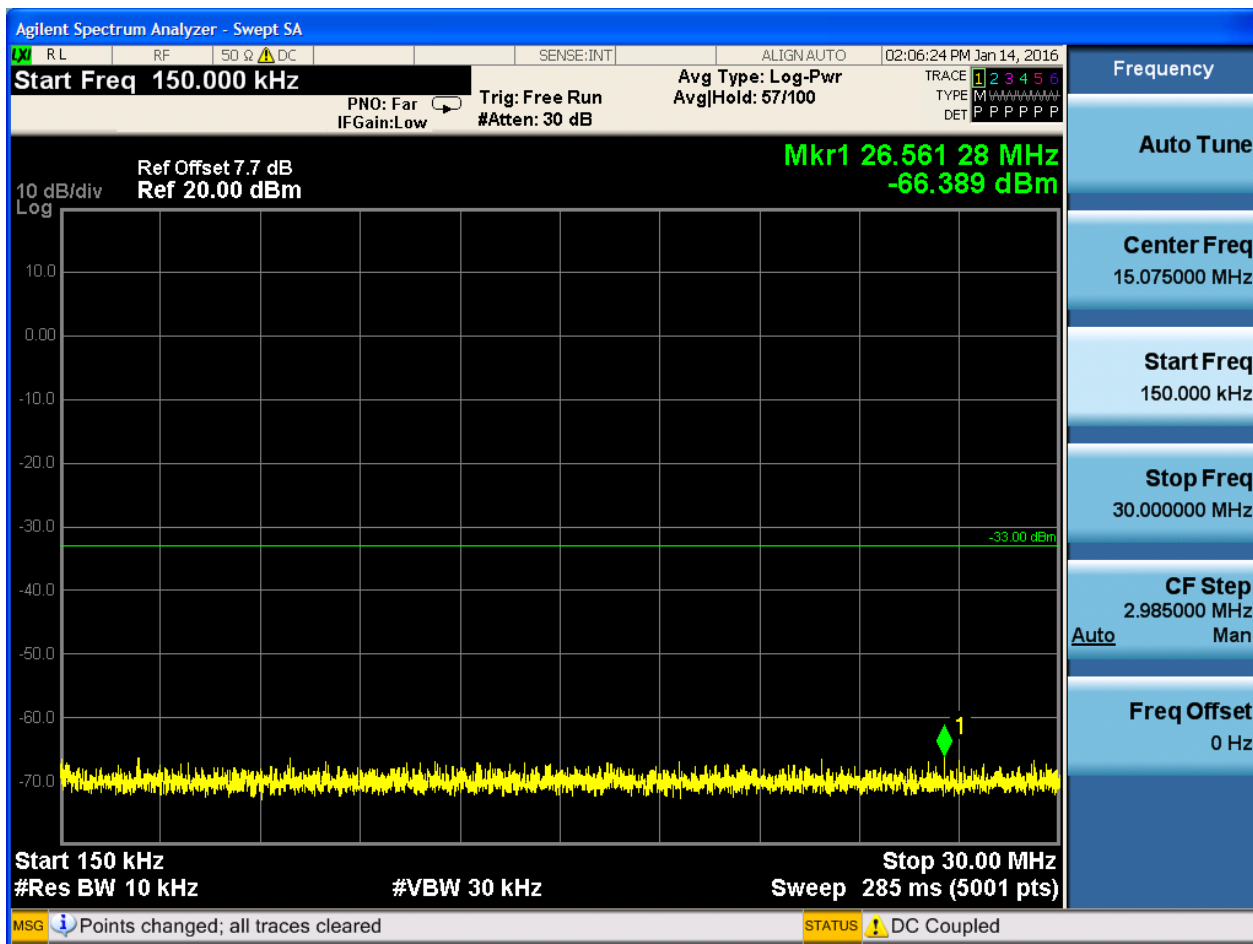


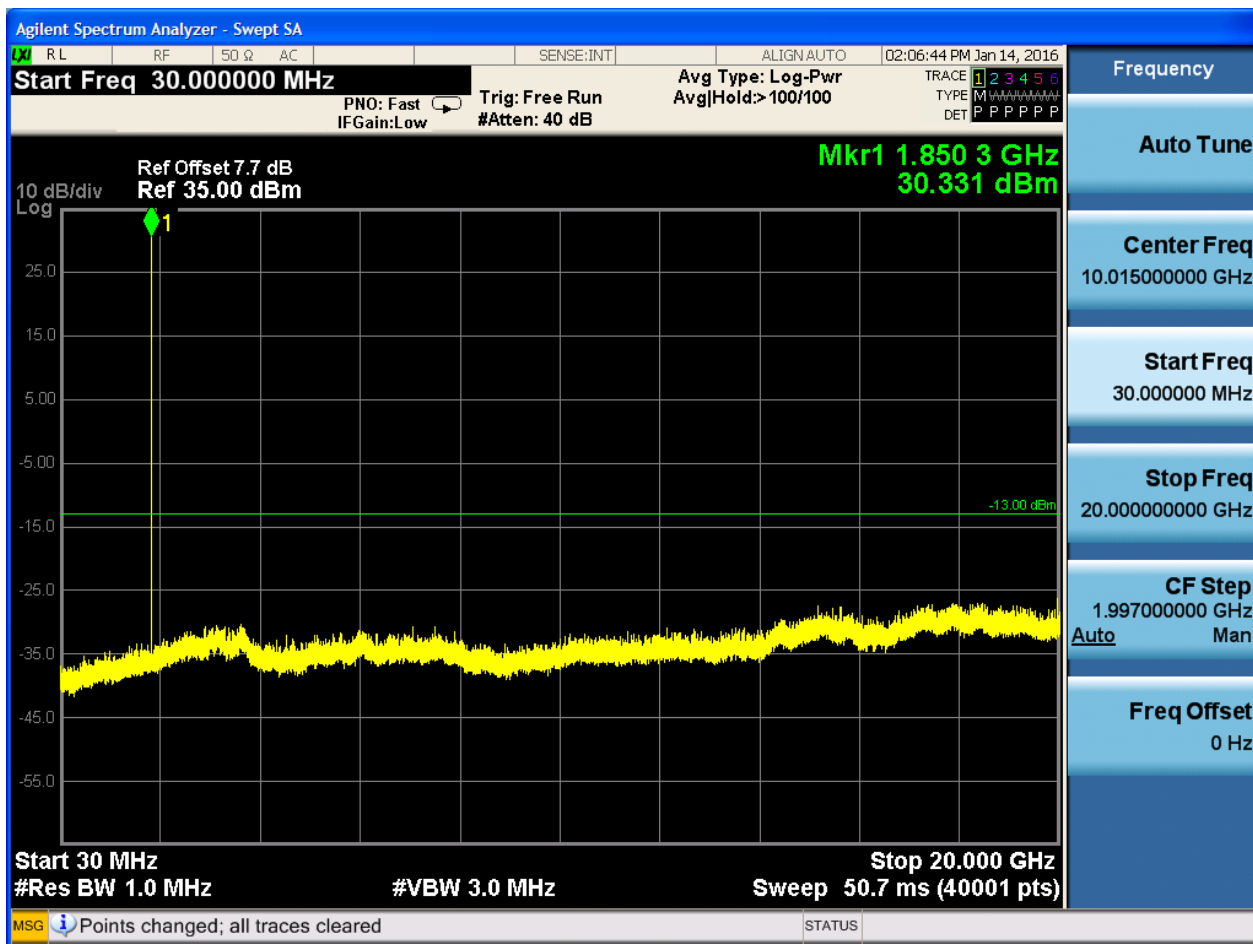
6.1.2 Test Band = GSM1900

6.1.2.1 Test Mode = GSM/TM1

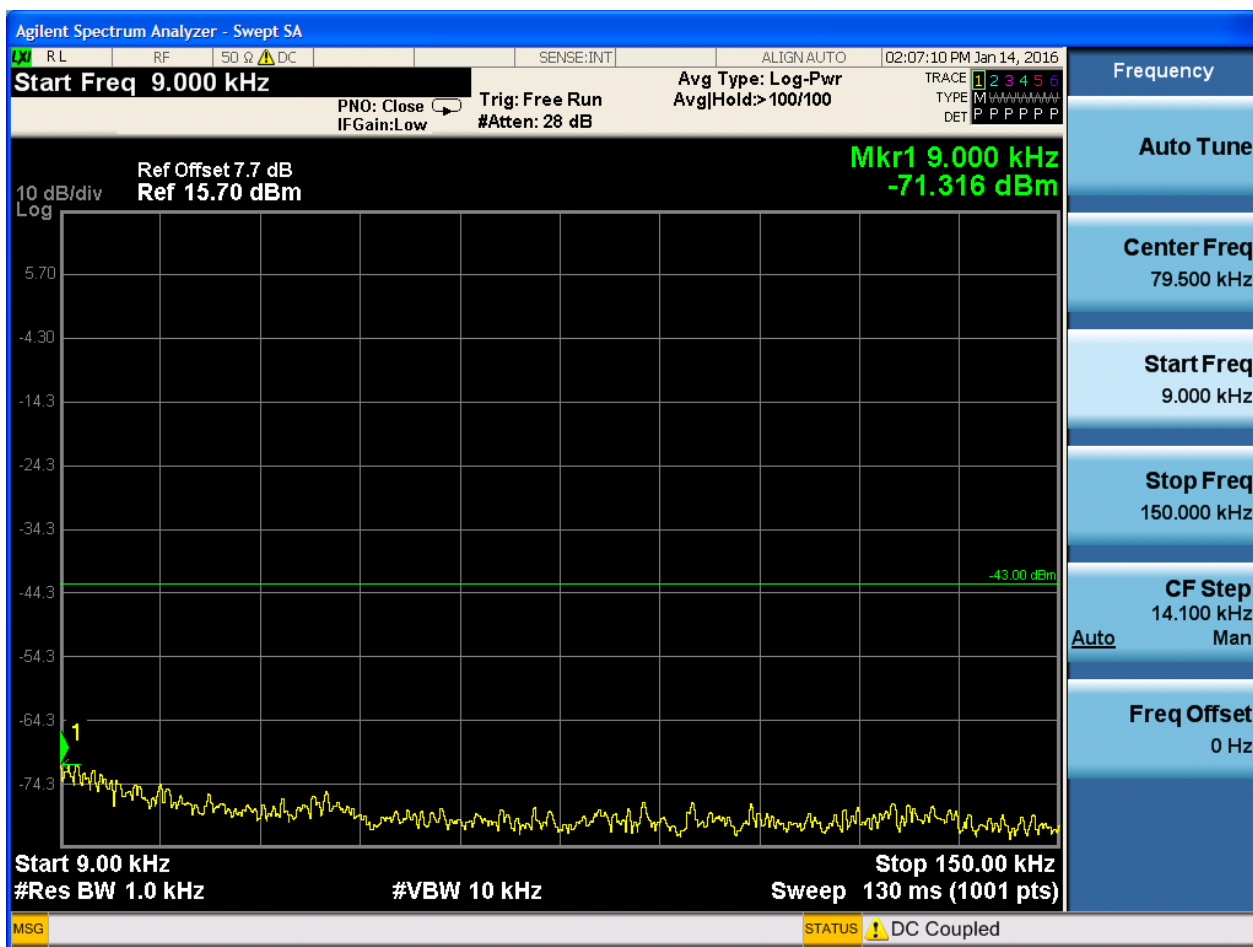
6.1.2.1.1 Test Channel = LCH

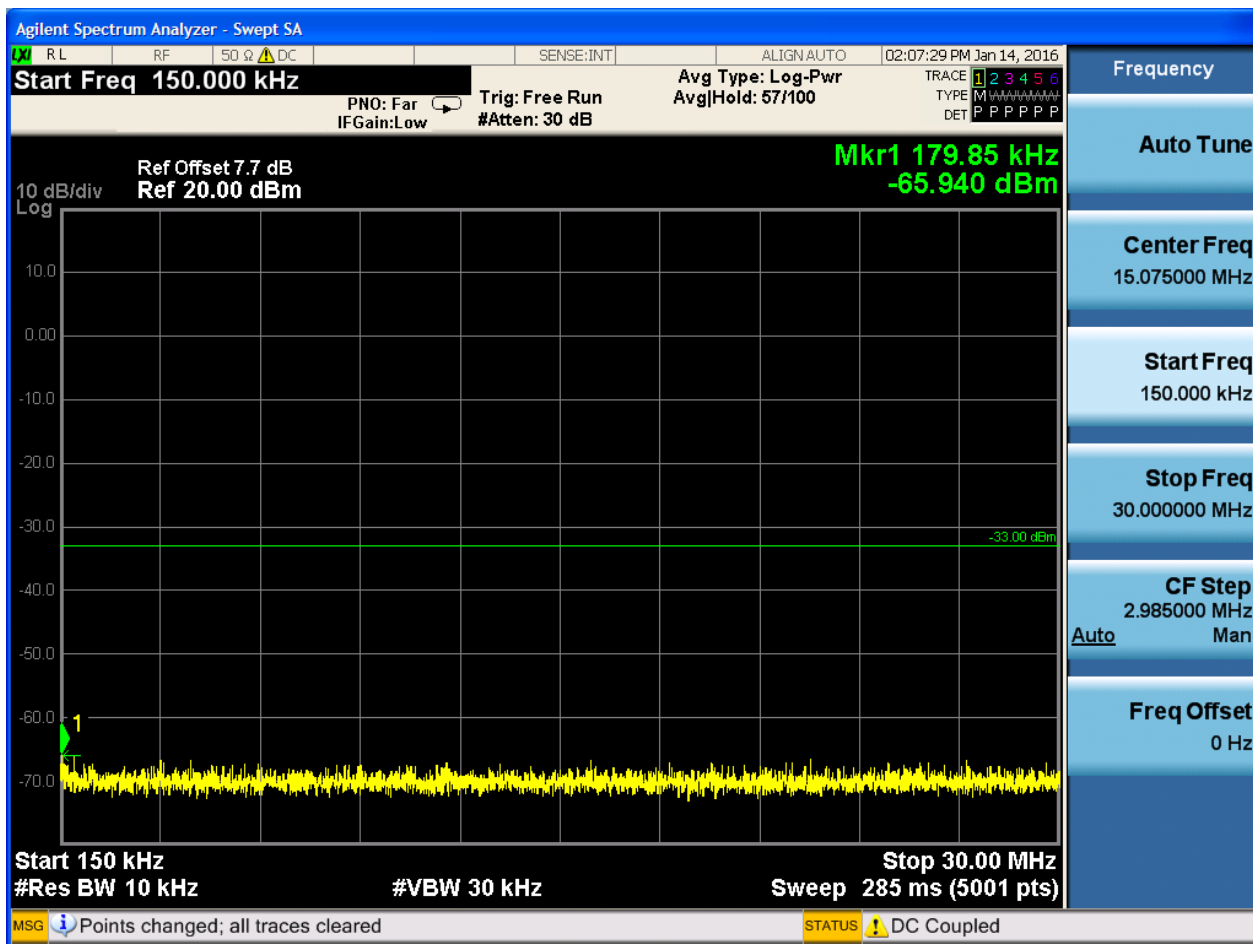


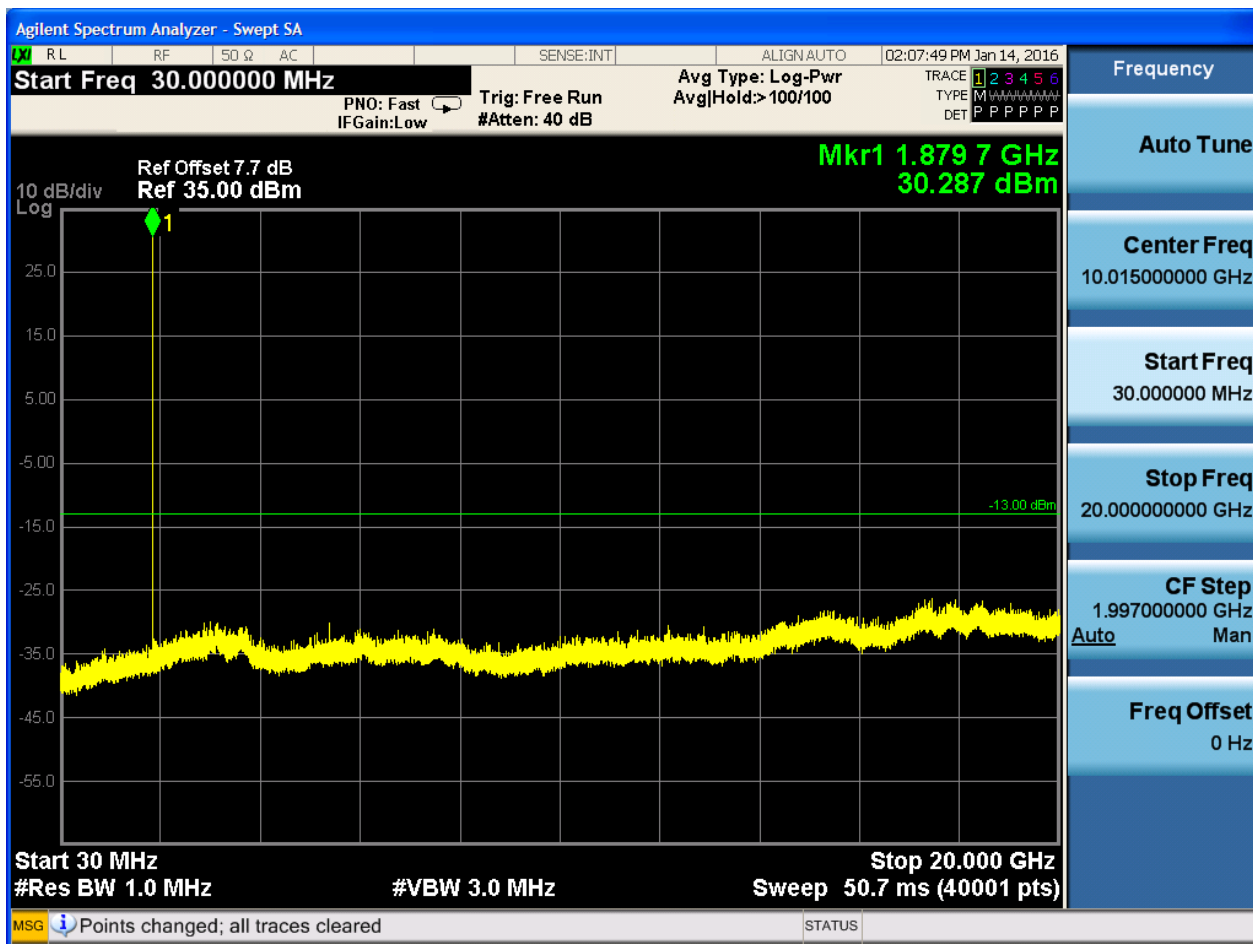




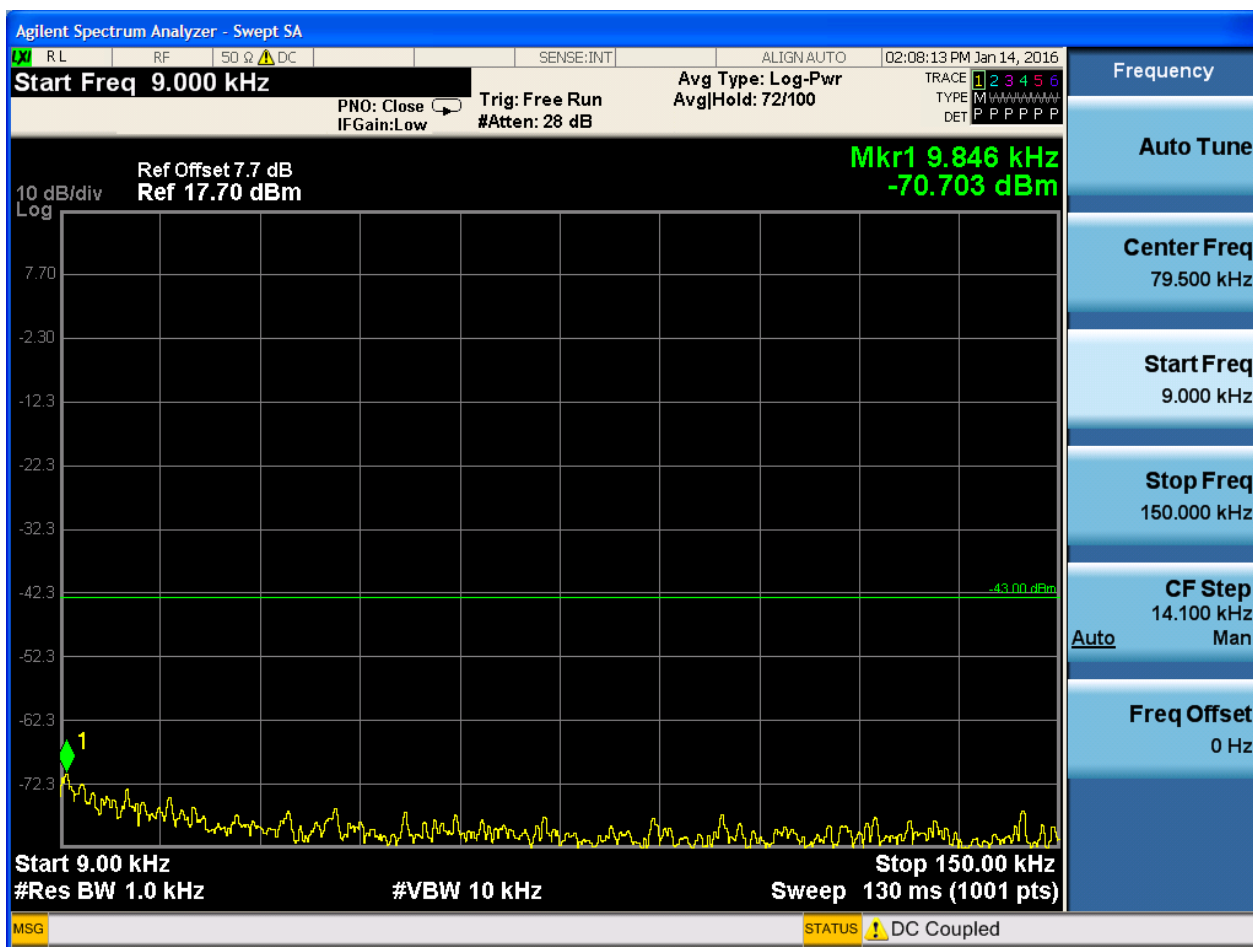
6.1.2.1.2 Test Channel = MCH

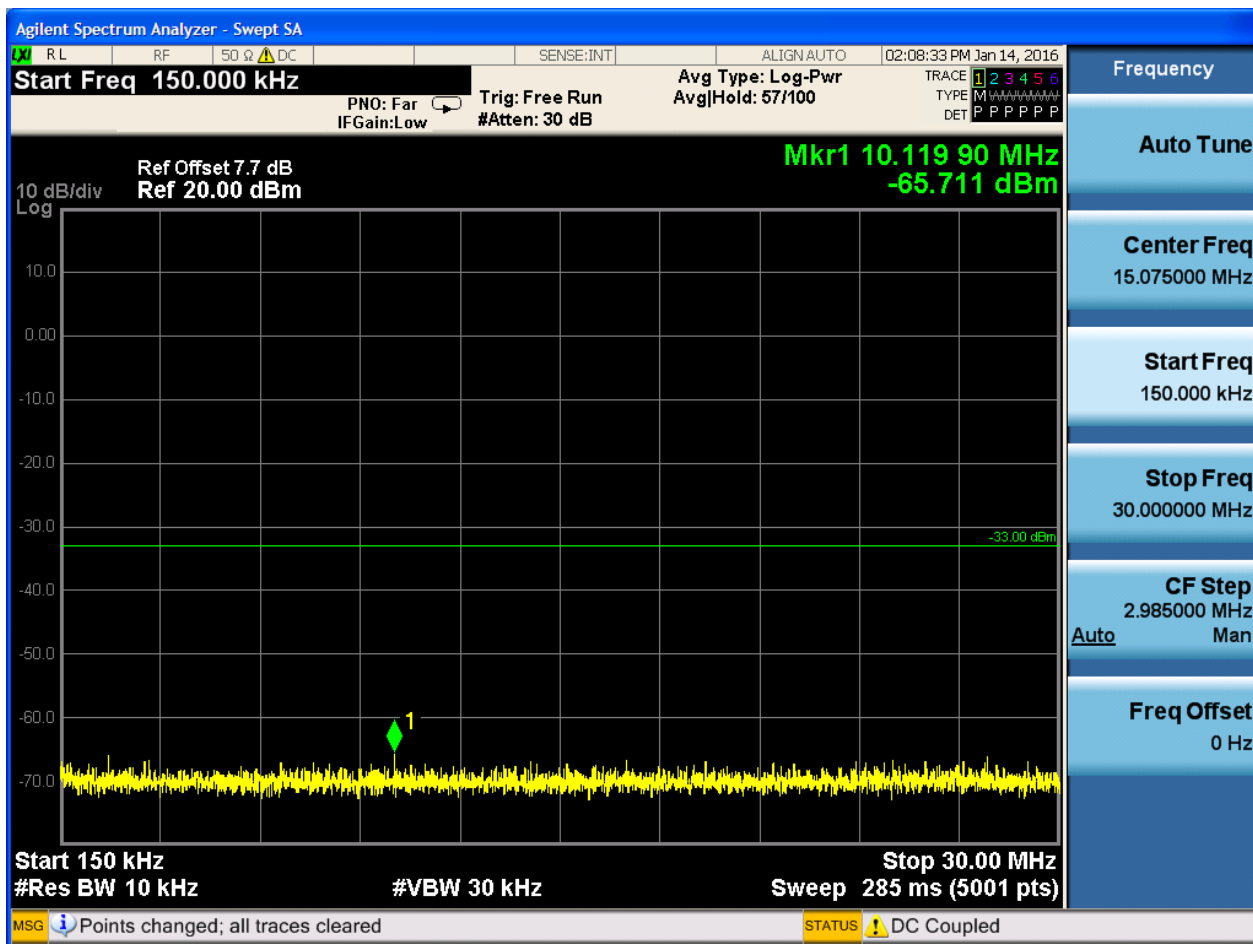


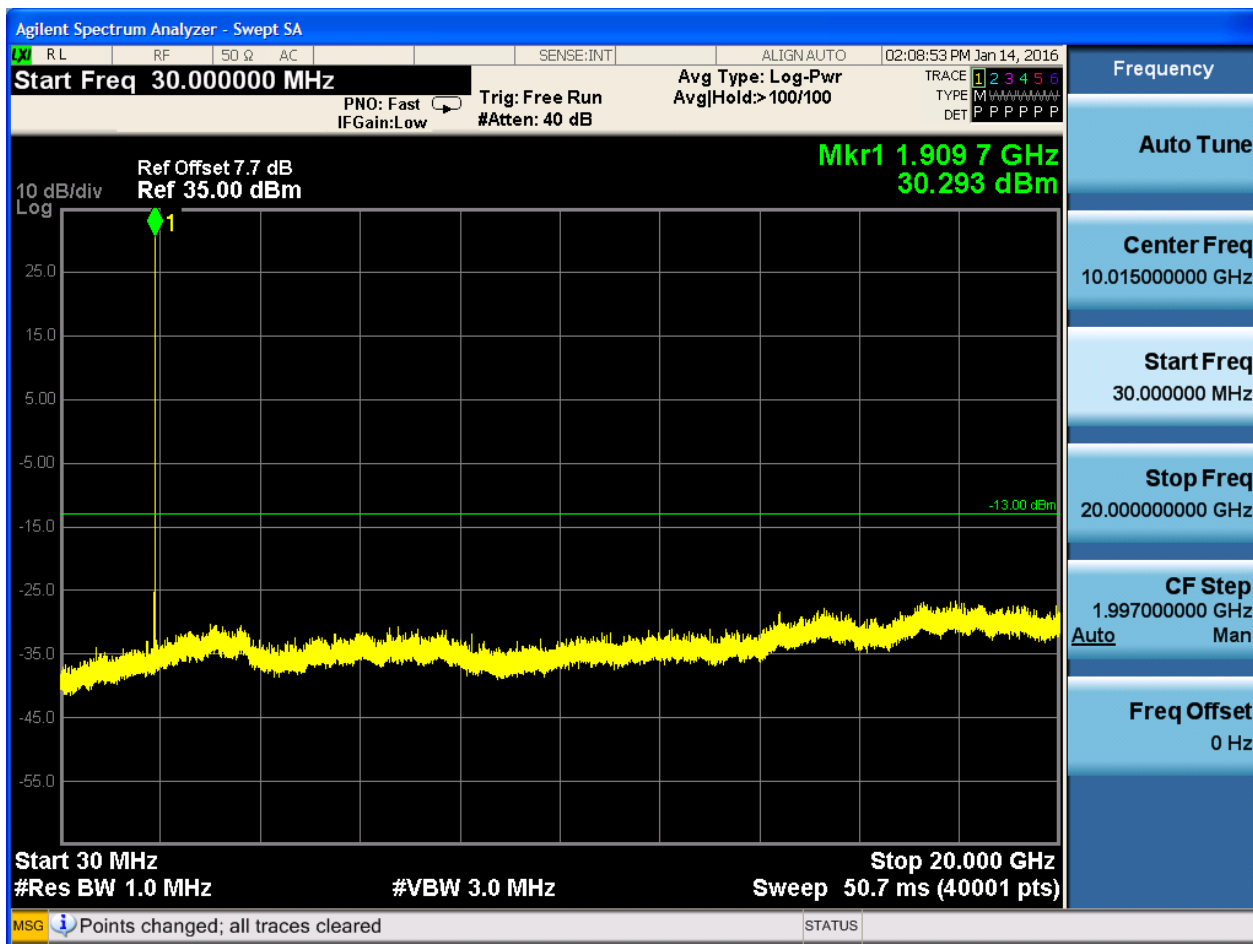




6.1.2.1.3 Test Channel = HCH



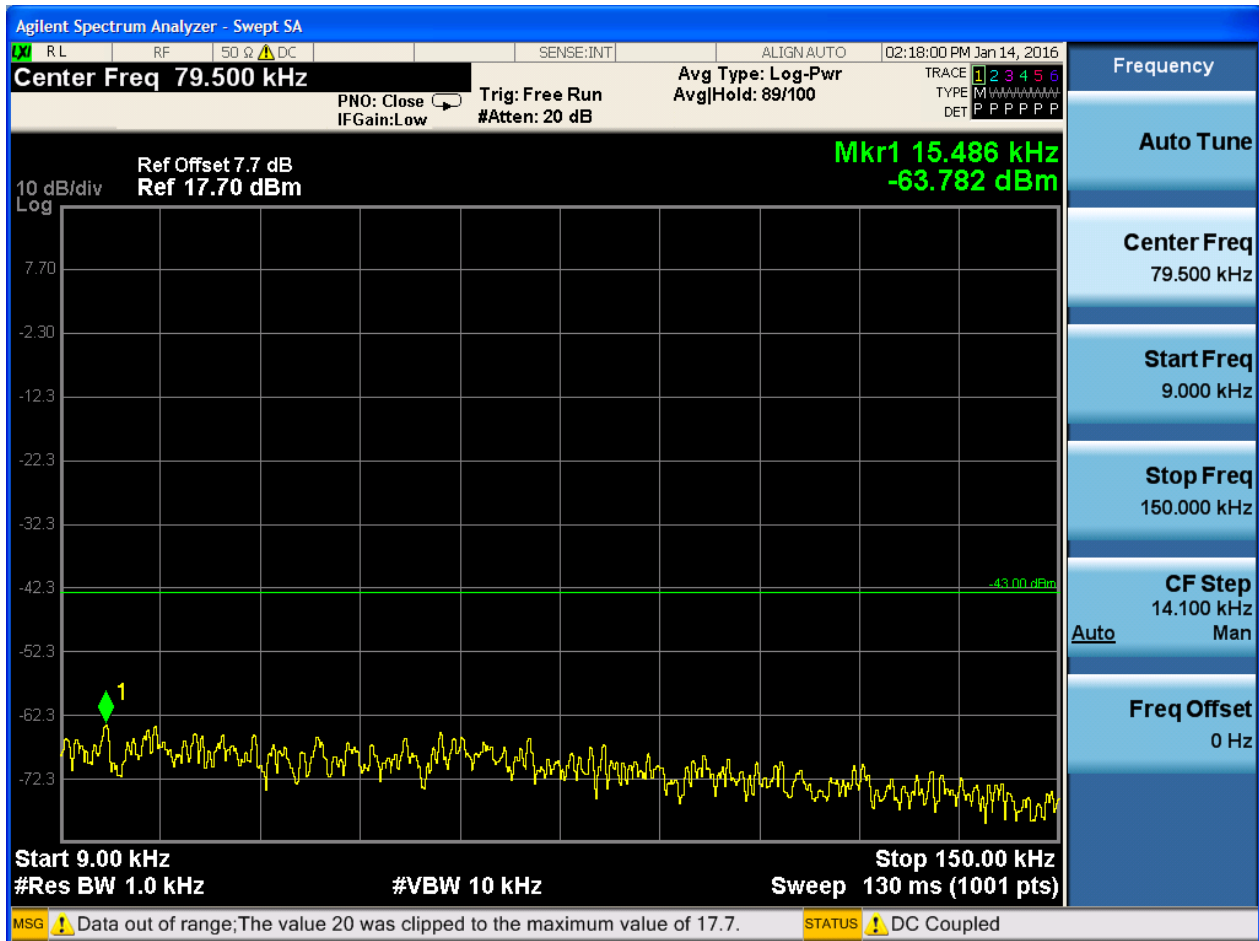


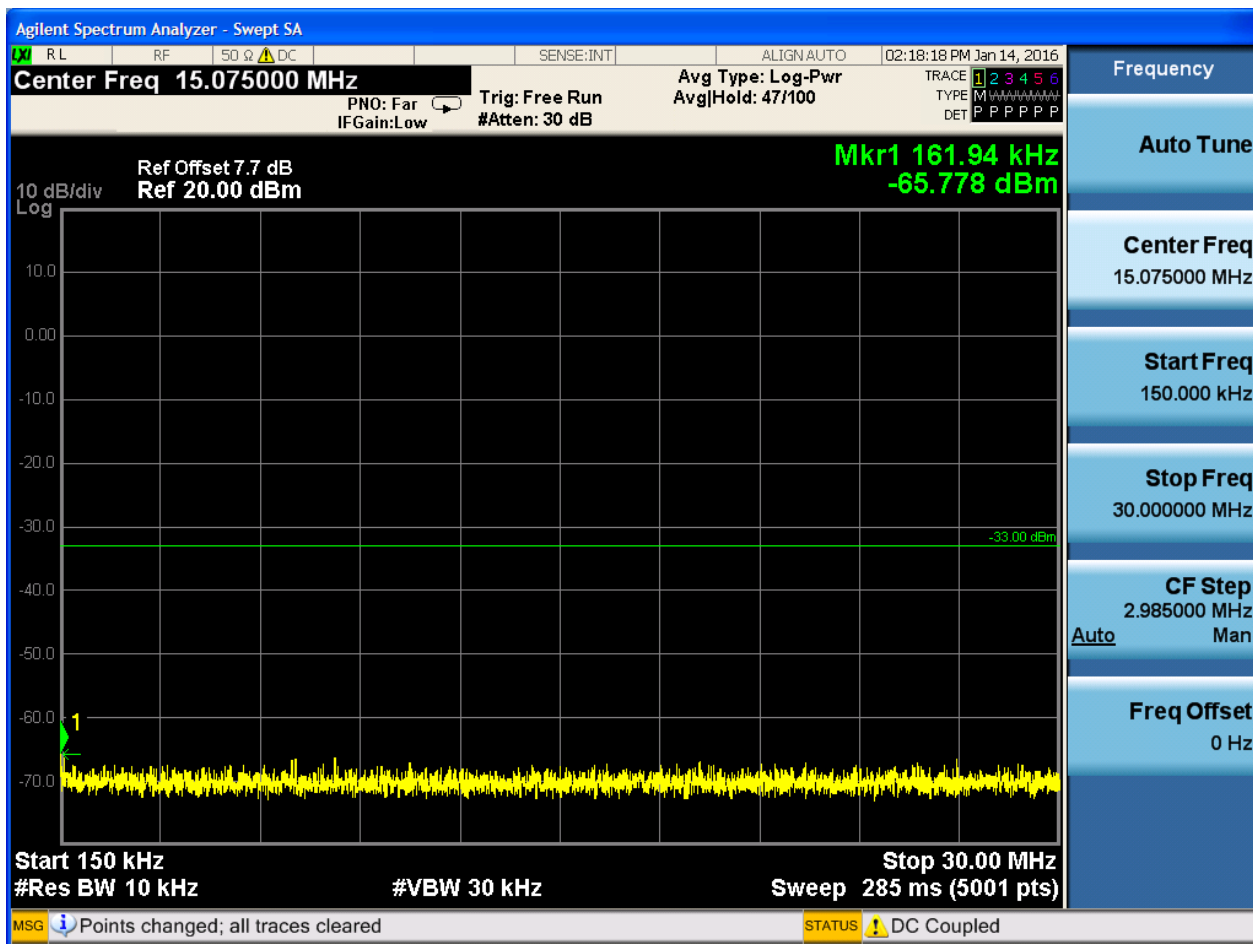


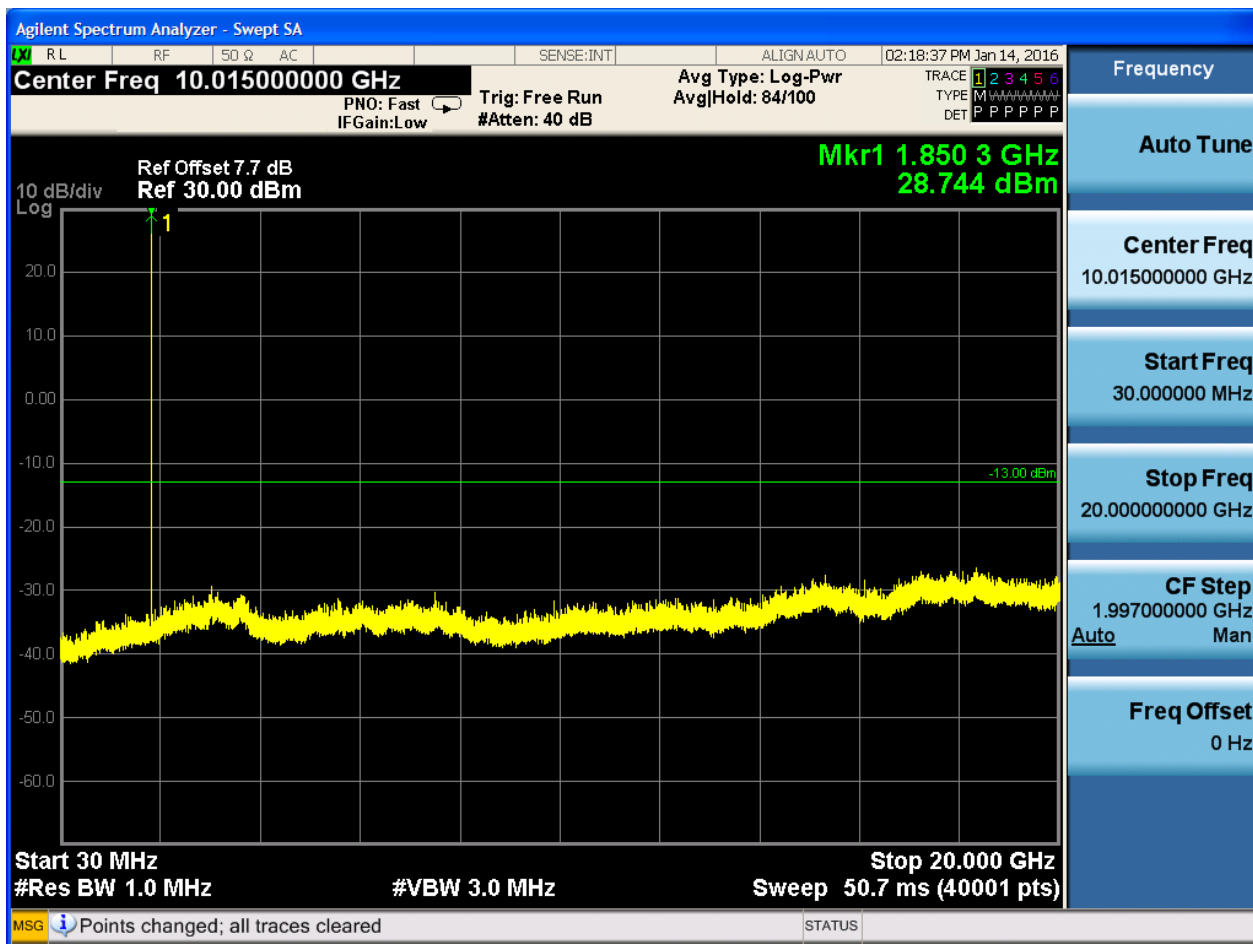


6.1.2.2 Test Mode = GSM/TM2

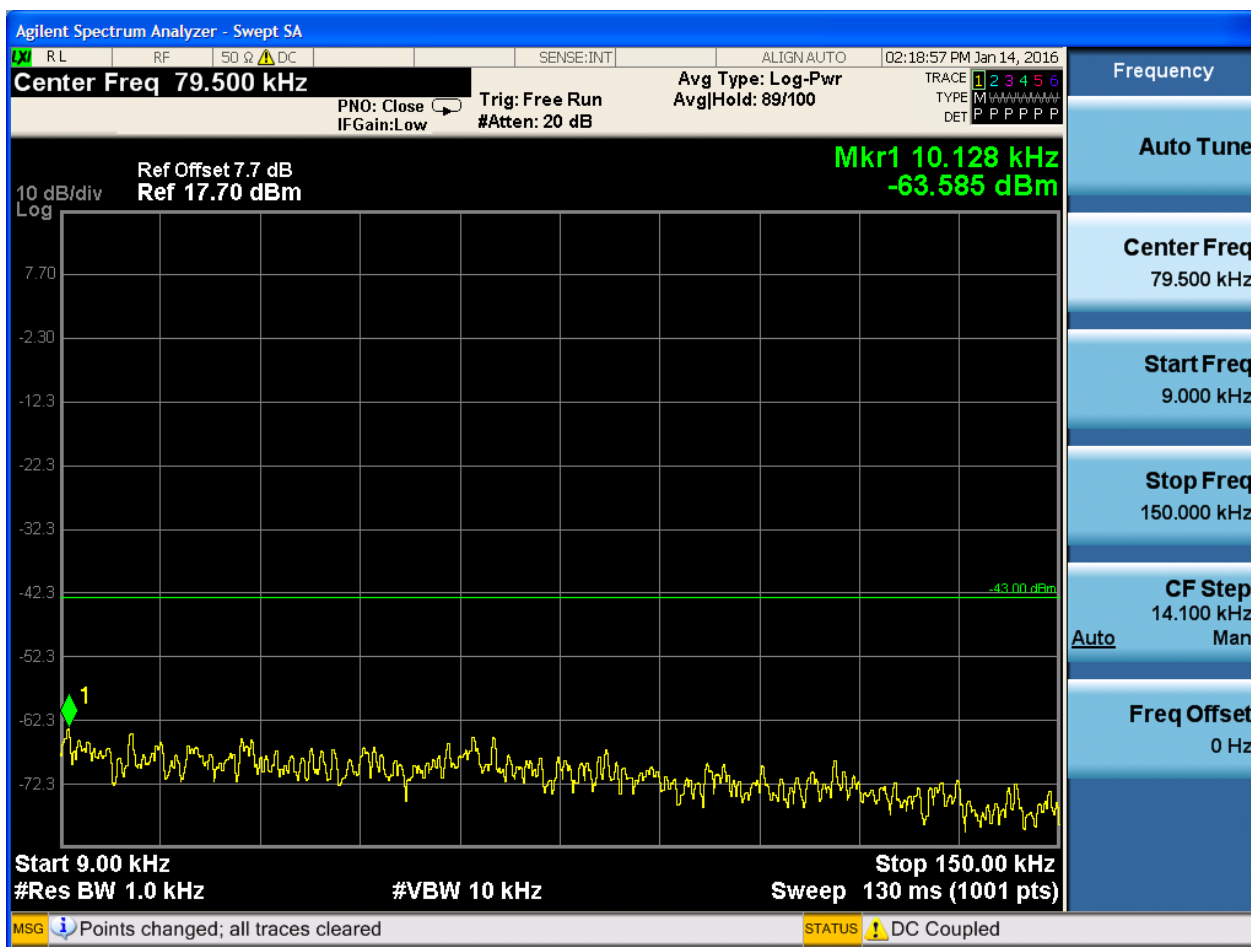
6.1.2.2.1 Test Channel = LCH

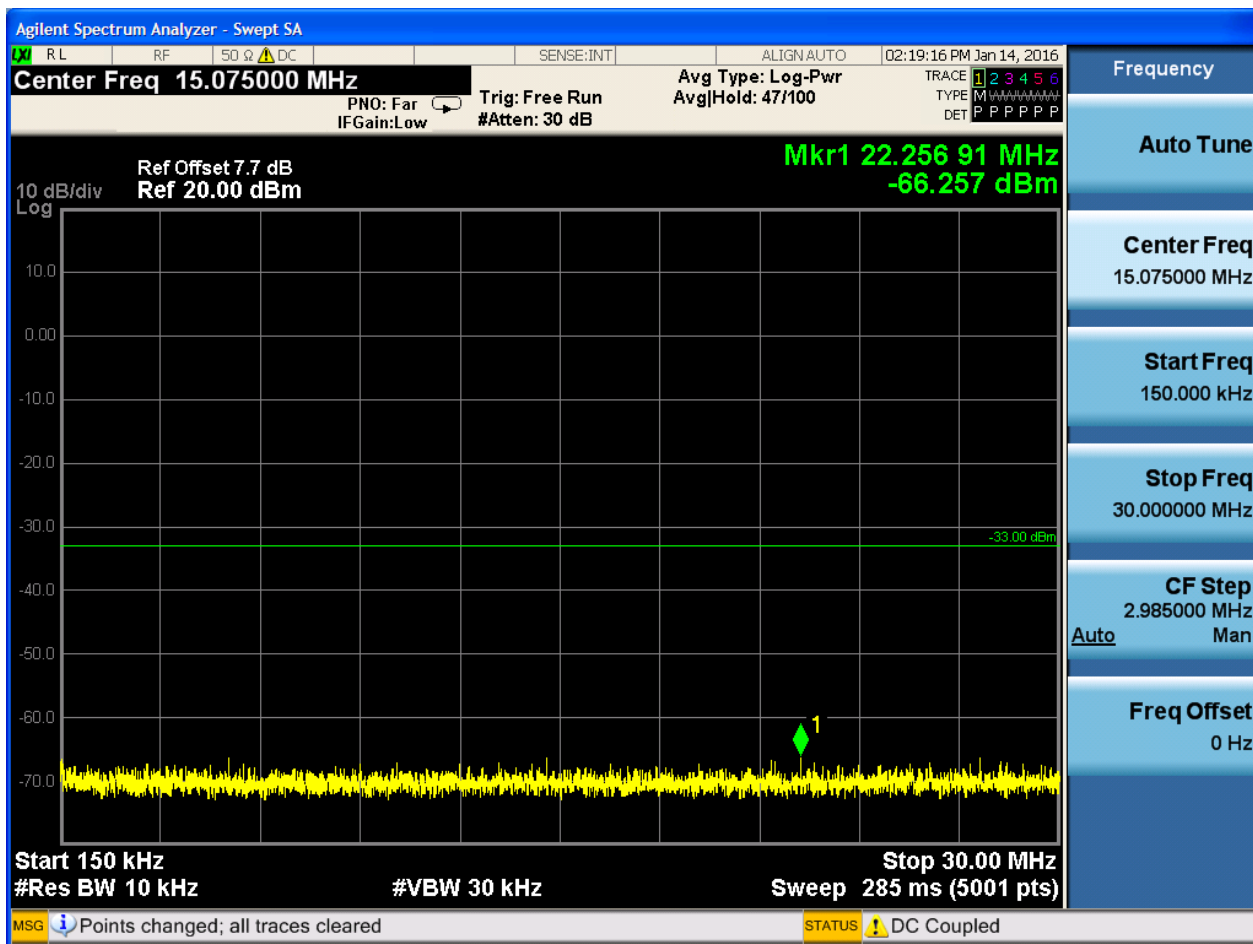


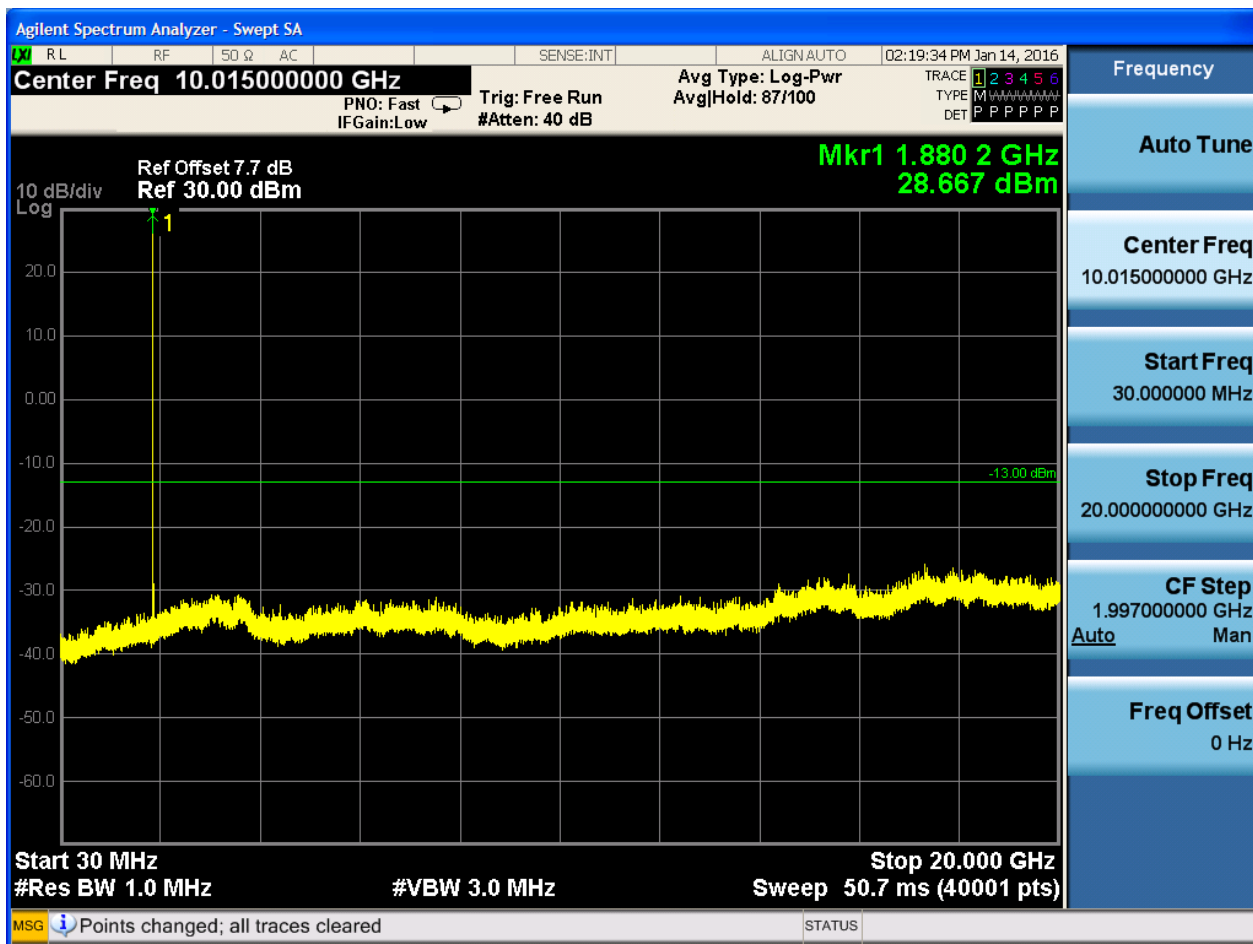




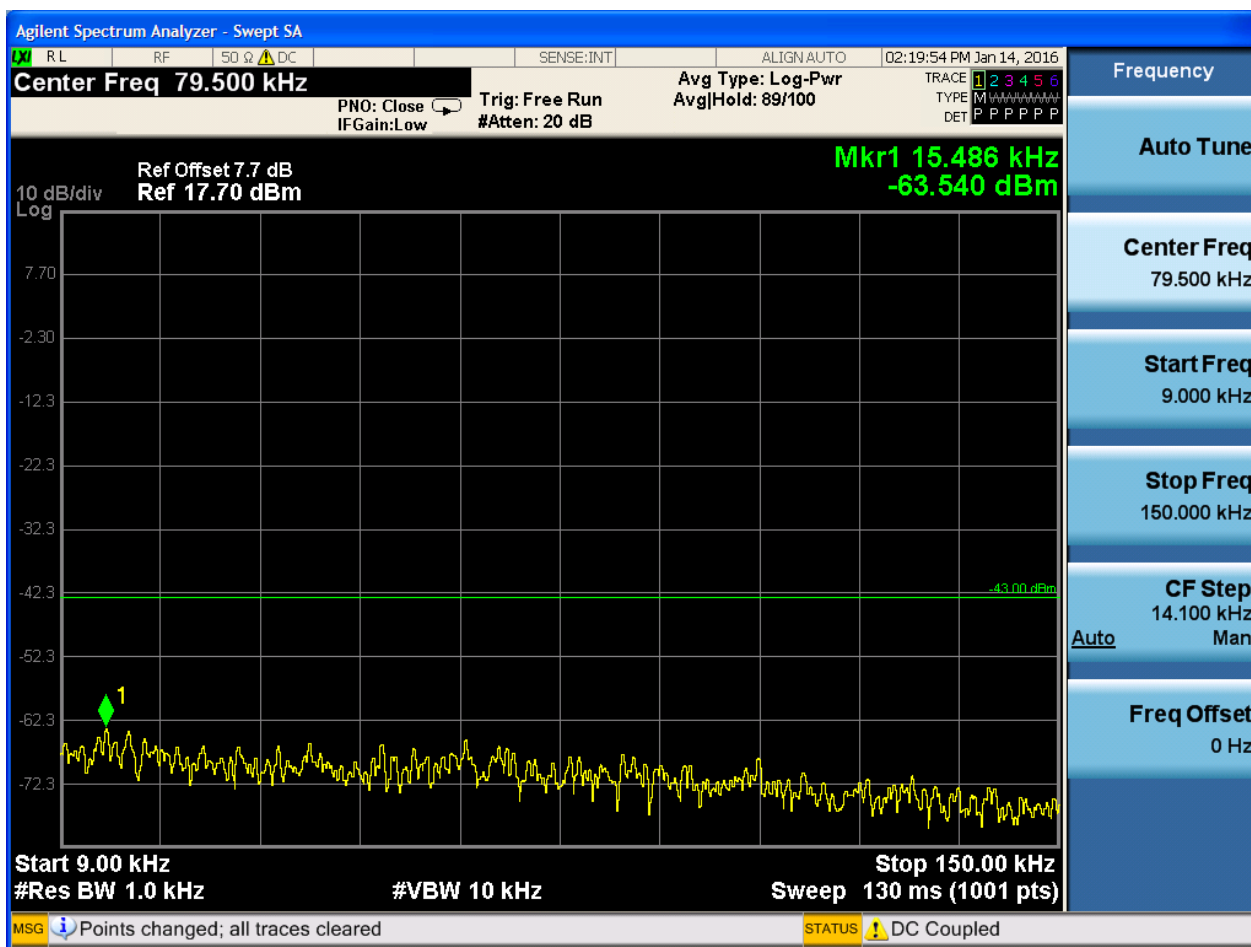
6.1.2.2.2 Test Channel = MCH

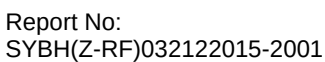


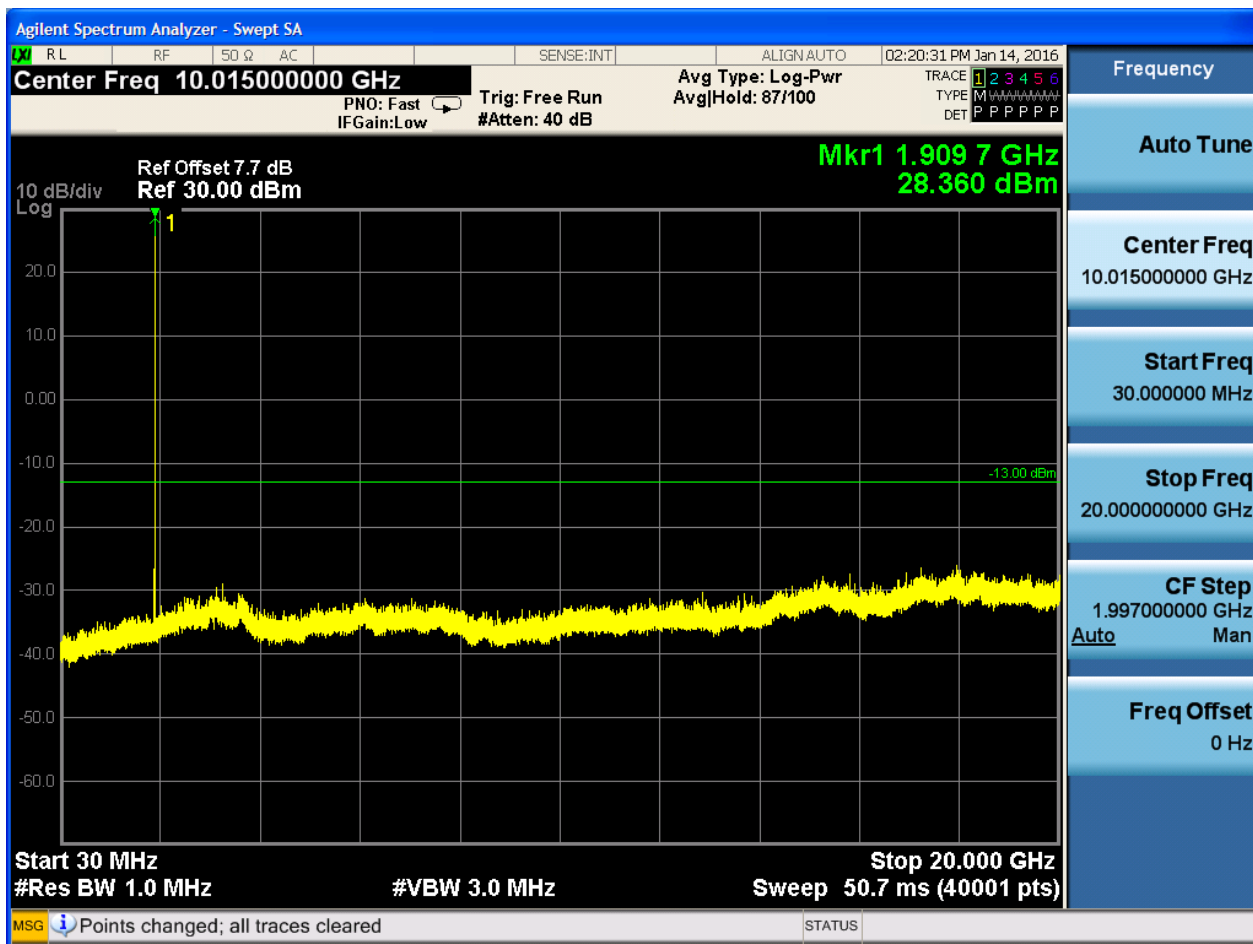




6.1.2.2.3 Test Channel = HCH







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

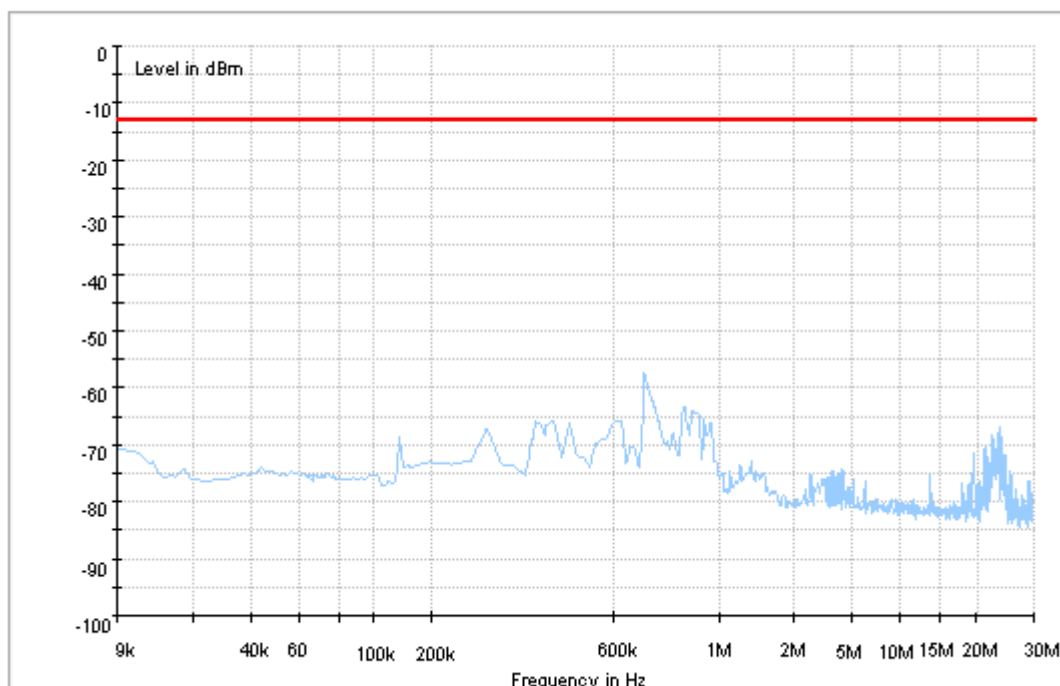
Above 1GHz, RBW = 1 MHz, VBW = 3 MHz. Detector: PK

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

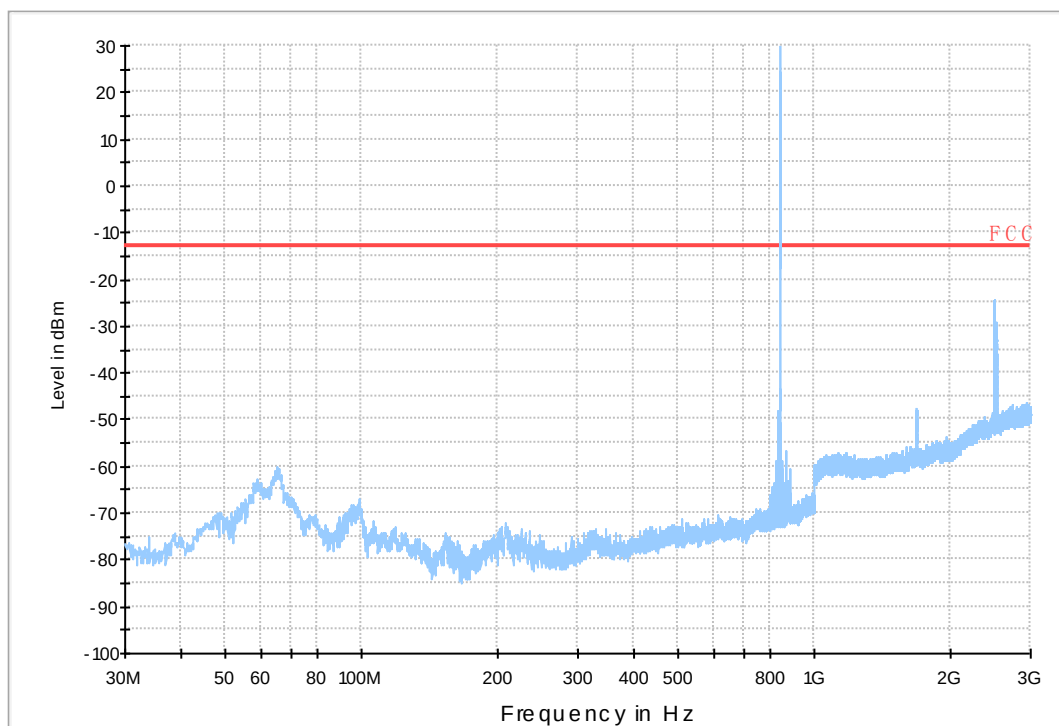
Part I - Test Plots

7.1 For GSM

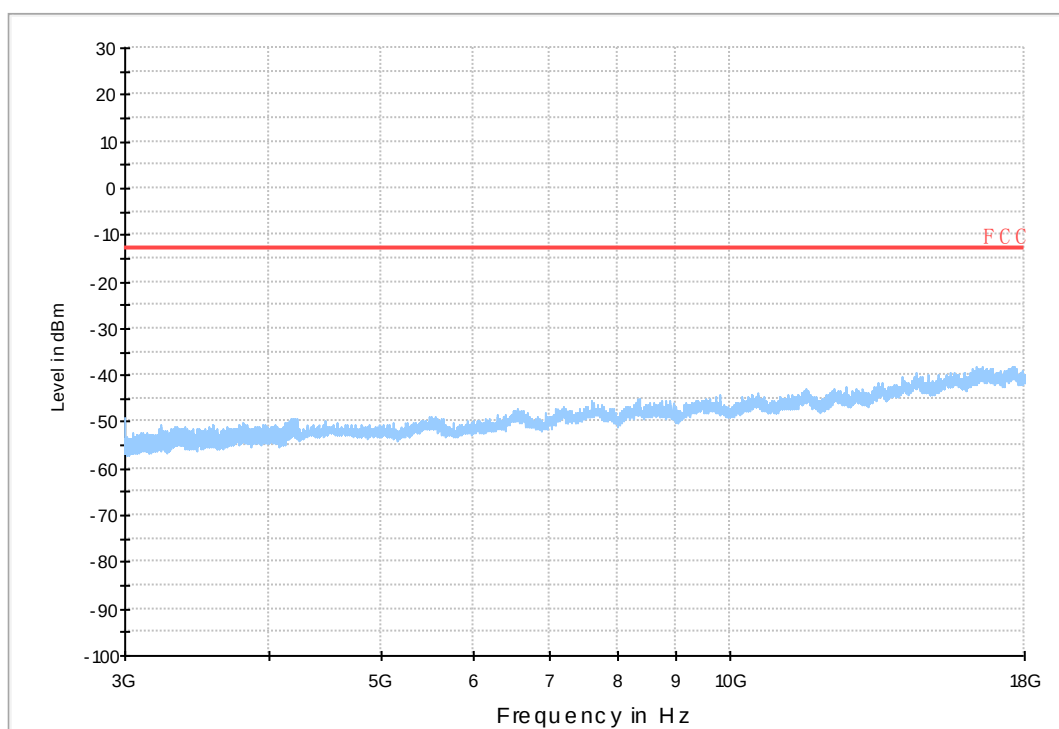
7.1.1 Test Band = GSM850



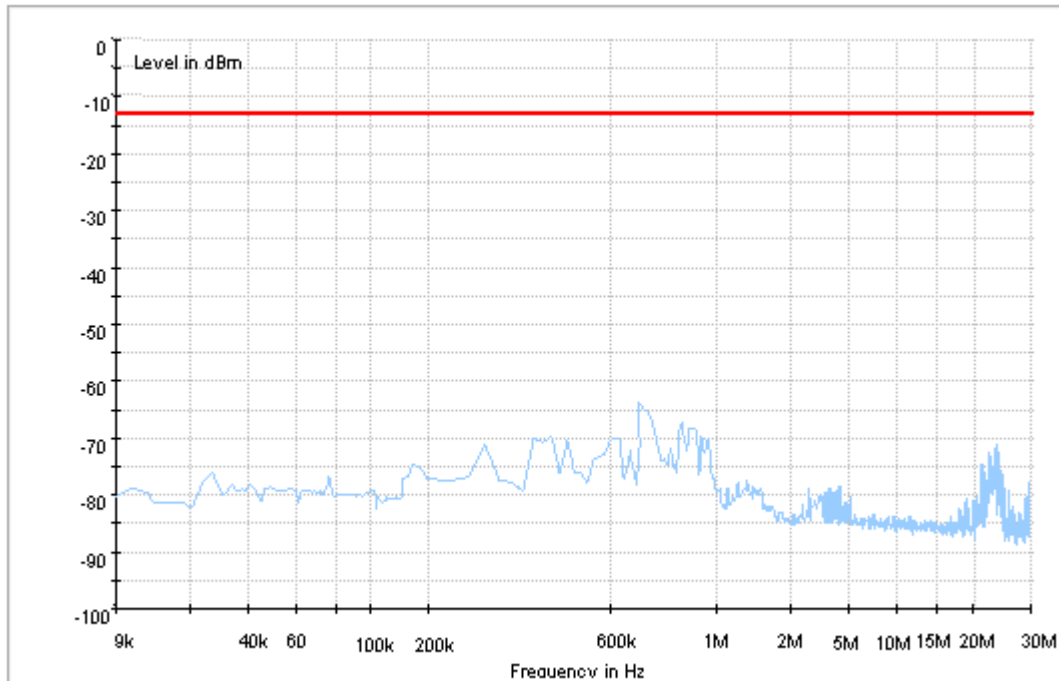
Copy of FCC PART22 G SM850_L



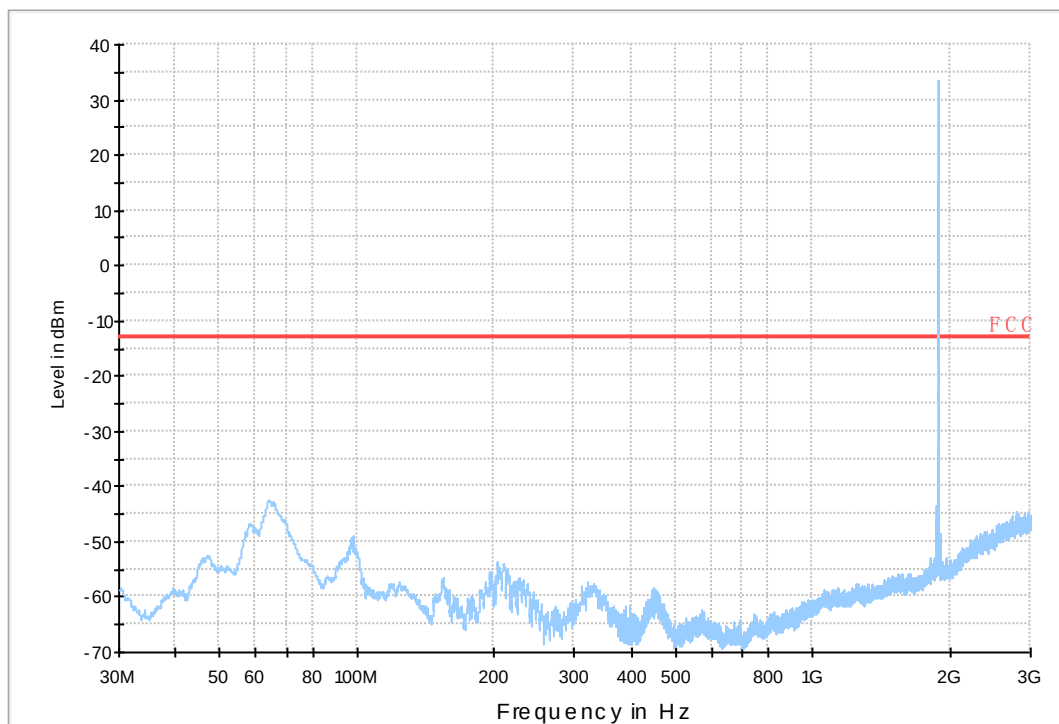
Copy of FCC PART22 G SM850_H



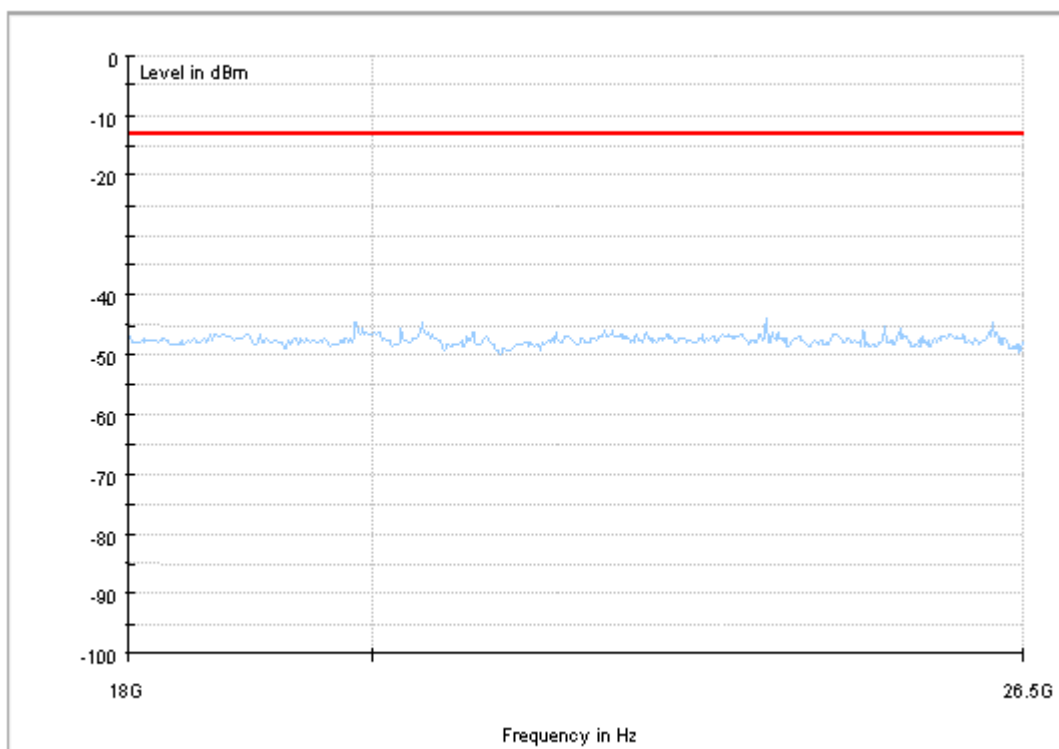
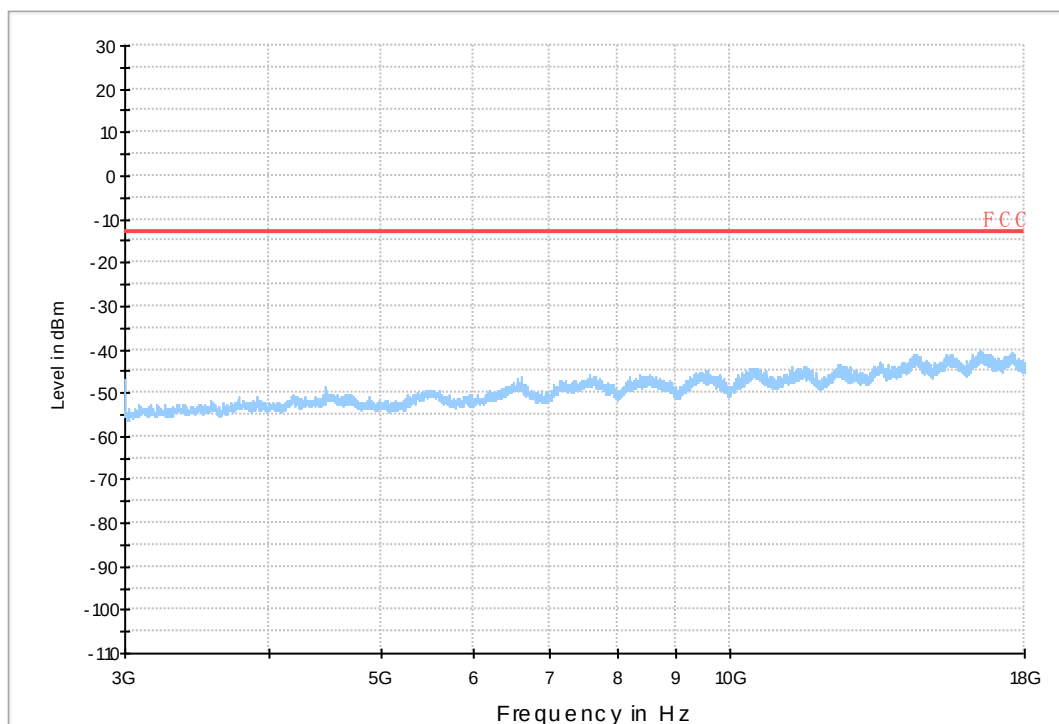
7.1.2 Test Band = GSM1900



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	-11.56	-0.01403	PASS
				VN	-10.59	-0.01285	PASS
				VH	-6.59	-0.008	PASS
		MCH	TN	VL	-9.62	-0.0115	PASS
				VN	-9.88	-0.01181	PASS
				VH	-12.33	-0.01474	PASS
		HCH	TN	VL	-8.65	-0.01019	PASS
				VN	-7.23	-0.00852	PASS
				VH	-13.62	-0.01605	PASS
	GSM/TM2	LCH	TN	VL	-17.53	-0.02127	PASS
				VN	-16.37	-0.01986	PASS
				VH	-11.4	-0.01383	PASS
		MCH	TN	VL	-12.75	-0.01524	PASS
				VN	-13.17	-0.01574	PASS
				VH	-10.36	-0.01238	PASS
		HCH	TN	VL	-13.59	-0.01601	PASS
				VN	-12.56	-0.0148	PASS
				VH	-11.75	-0.01384	PASS
GSM1900	GSM/TM1	LCH	TN	VL	17.69	0.00956	PASS
				VN	28.28	0.01528	PASS
				VH	18.79	0.01016	PASS
		MCH	TN	VL	17.31	0.00921	PASS
				VN	5.23	0.00278	PASS
				VH	15.95	0.00848	PASS
		HCH	TN	VL	18.92	0.00991	PASS
				VN	24.09	0.01261	PASS
				VH	19.44	0.01018	PASS
	GSM/TM2	LCH	TN	VL	3.13	0.00169	PASS
				VN	6.07	0.00328	PASS
				VH	-6.2	-0.00335	PASS
		MCH	TN	VL	6.04	0.00321	PASS
				VN	7.75	0.00412	PASS
				VH			

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
		HCH	TN	VH	12.79	0.0068	PASS
				VL	15.72	0.00823	PASS
				VN	16.59	0.00869	PASS
				VH	9.88	0.00517	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	-9.81	-0.0119	PASS
				-20	-10.72	-0.01301	PASS
				-10	-7.36	-0.00893	PASS
				0	-9.62	-0.01167	PASS
				10	-8.85	-0.01074	PASS
				20	-7.43	-0.00901	PASS
				30	-12.66	-0.01536	PASS
				40	-10.85	-0.01316	PASS
				50	-11.62	-0.0141	PASS
		MCH	VN	-30	-10.07	-0.01204	PASS
				-20	-8.14	-0.00973	PASS
				-10	-5.1	-0.0061	PASS
				0	-5.36	-0.00641	PASS
				10	-4.58	-0.00547	PASS
				20	-7.94	-0.00949	PASS
				30	-11.04	-0.0132	PASS
				40	-8.39	-0.01003	PASS
				50	-6.39	-0.00764	PASS
		HCH	VN	-30	-10.33	-0.01217	PASS
				-20	-11.17	-0.01316	PASS
				-10	-16.59	-0.01955	PASS
				0	-10.85	-0.01278	PASS
				10	-12.72	-0.01499	PASS
				20	-10.2	-0.01202	PASS
				30	-9.1	-0.01072	PASS
				40	-12.79	-0.01507	PASS
				50	-7.62	-0.00898	PASS
	GSM/TM2	LCH	VN	-30	-15.46	-0.01876	PASS
				-20	-11.24	-0.01364	PASS
				-10	-15.14	-0.01837	PASS
				0	-17.56	-0.02131	PASS

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				10	-14.08	-0.01708	PASS
				20	-10.3	-0.0125	PASS
				30	-10.75	-0.01304	PASS
				40	-14.5	-0.01759	PASS
				50	-9.69	-0.01176	PASS
		MCH	VN	-30	-10.75	-0.01285	PASS
				-20	-6.49	-0.00776	PASS
				-10	-10.4	-0.01243	PASS
				0	-15.5	-0.01853	PASS
				10	-12.91	-0.01543	PASS
				20	-12.49	-0.01493	PASS
				30	-11.27	-0.01347	PASS
				40	-9.27	-0.01108	PASS
				50	-13.66	-0.01633	PASS
		HCH	VN	-30	-11.33	-0.01335	PASS
				-20	-12.72	-0.01499	PASS
				-10	-11.14	-0.01312	PASS
				0	-10.94	-0.01289	PASS
				10	-17.63	-0.02077	PASS
				20	-16.89	-0.0199	PASS
				30	-12.49	-0.01471	PASS
				40	-9.49	-0.01118	PASS
				50	-13.17	-0.01552	PASS
GSM1900	GSM/TM1	LCH	VN	-30	9.56	0.00517	PASS
				-20	15.63	0.00845	PASS
				-10	23.25	0.01257	PASS
				0	10.98	0.00593	PASS
				10	15.05	0.00813	PASS
				20	23.89	0.01291	PASS
				30	21.31	0.01152	PASS
				40	13.56	0.00733	PASS
				50	22.6	0.01221	PASS
		MCH	VN	-30	10.59	0.00563	PASS
				-20	22.41	0.01192	PASS
				-10	13.56	0.00721	PASS
				0	14.46	0.00769	PASS
				10	19.05	0.01013	PASS
				20	16.14	0.00859	PASS
				30	12.01	0.00639	PASS
				40	27.51	0.01463	PASS

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
		HCH	VN	50	4.58	0.00244	PASS
				-30	26.86	0.01406	PASS
				-20	33.19	0.01738	PASS
				-10	20.02	0.01048	PASS
				0	30.09	0.01576	PASS
				10	29.38	0.01538	PASS
				20	13.75	0.0072	PASS
				30	19.63	0.01028	PASS
				40	26.02	0.01362	PASS
				50	25.18	0.01318	PASS
	GSM/TM2	LCH	VN	-30	8.39	0.00453	PASS
				-20	2.65	0.00143	PASS
				-10	-12.85	-0.00695	PASS
				0	-0.61	-0.00033	PASS
				10	2.1	0.00114	PASS
				20	-7.91	-0.00428	PASS
				30	-2.78	-0.0015	PASS
				40	8.78	0.00475	PASS
				50	6.62	0.00358	PASS
		MCH	VN	-30	8.81	0.00469	PASS
				-20	-2.36	-0.00126	PASS
				-10	6.3	0.00335	PASS
				0	-2.94	-0.00156	PASS
				10	7.94	0.00422	PASS
				20	9.23	0.00491	PASS
				30	1.58	0.00084	PASS
				40	1.84	0.00098	PASS
				50	3.49	0.00186	PASS
		HCH	VN	-30	10.46	0.00548	PASS
				-20	13.3	0.00696	PASS
				-10	18.37	0.00962	PASS
				0	4.42	0.00231	PASS
				10	7.1	0.00372	PASS
				20	4.68	0.00245	PASS
				30	7.3	0.00382	PASS
				40	9.94	0.0052	PASS
				50	7.23	0.00379	PASS

END