



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	33.23	29.28	38.5	PASS
		MCH	33.15	29.2	38.5	PASS
		HCH	33.09	29.14	38.5	PASS
	GSM/TM2	LCH	26.37	22.42	38.5	PASS
		MCH	26.36	22.41	38.5	PASS
		HCH	26.37	22.42	38.5	PASS
GSM1900	GSM/TM1	LCH	29.51	27.01	33	PASS
		MCH	29.54	27.04	33	PASS
		HCH	29.65	27.15	33	PASS
	GSM/TM2	LCH	25.99	23.49	33	PASS
		MCH	25.97	23.47	33	PASS
		HCH	25.95	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:

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

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

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

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

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	0.19	13	PASS
		MCH	0.2	13	PASS
		HCH	0.17	13	PASS
	GSM/TM2	LCH	2.91	13	PASS
		MCH	2.99	13	PASS
		HCH	3.21	13	PASS
GSM1900	GSM/TM1	LCH	0.13	13	PASS
		MCH	0.13	13	PASS
		HCH	0.12	13	PASS
	GSM/TM2	LCH	3.04	13	PASS
		MCH	3.08	13	PASS
		HCH	3.01	13	PASS

3Appendix_C: Modulation Characteristics

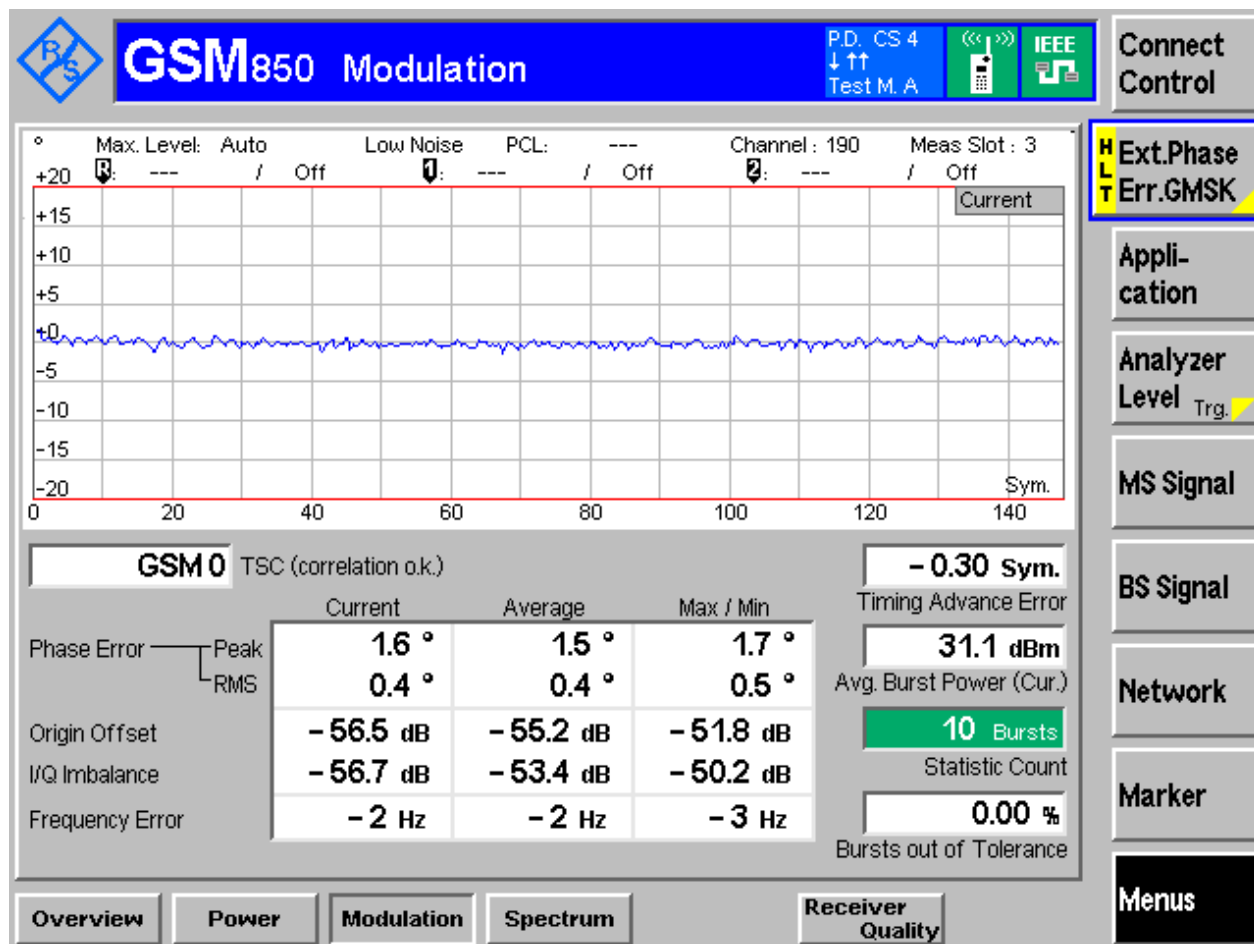
Part I - Test Plots

3.1 For GSM

3.1.1 Test Band = GSM850

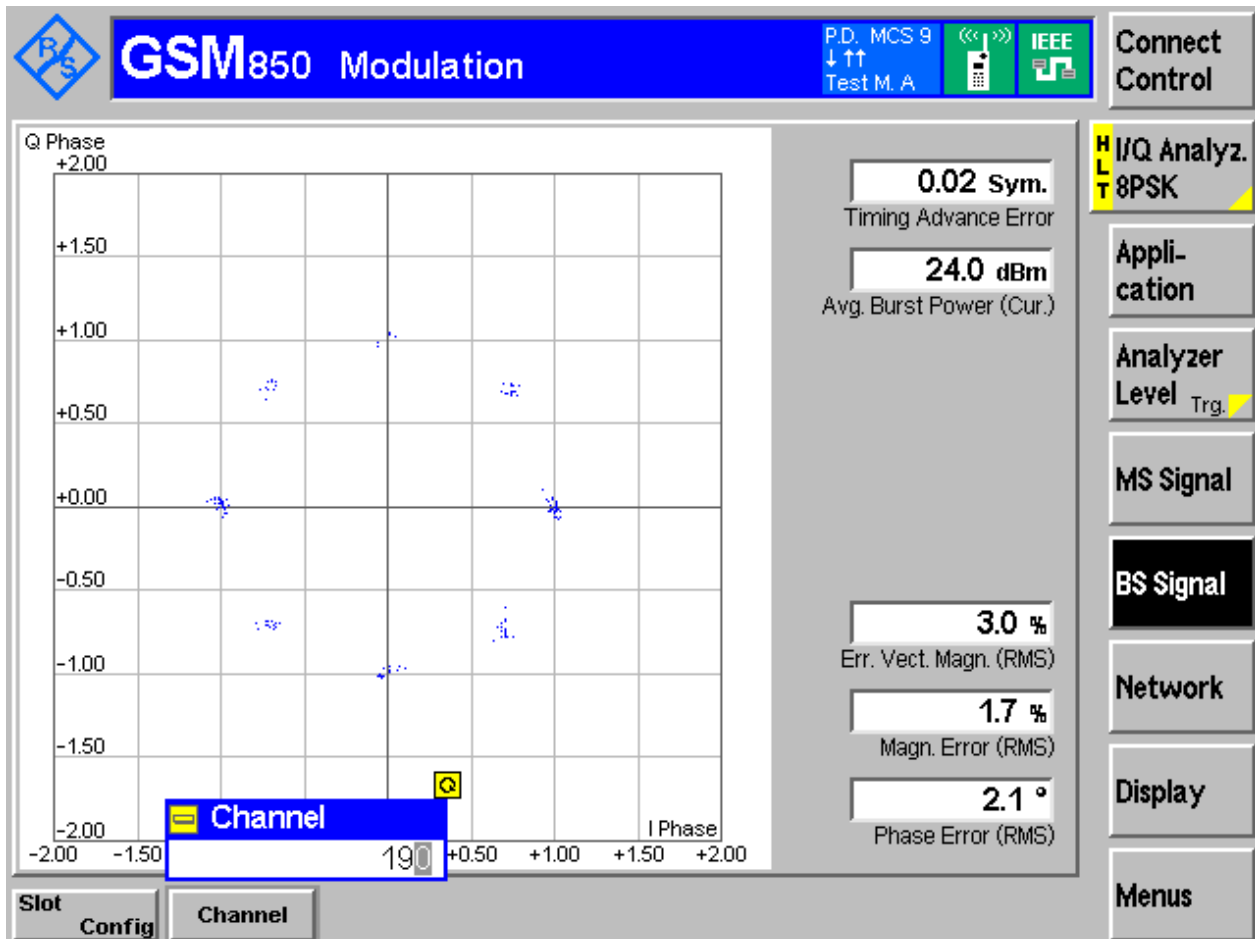
3.1.1.1 Test Mode = GSM/TM1

3.1.1.1.1 Test Channel = MCH



3.1.1.2 Test Mode = GSM/TM2

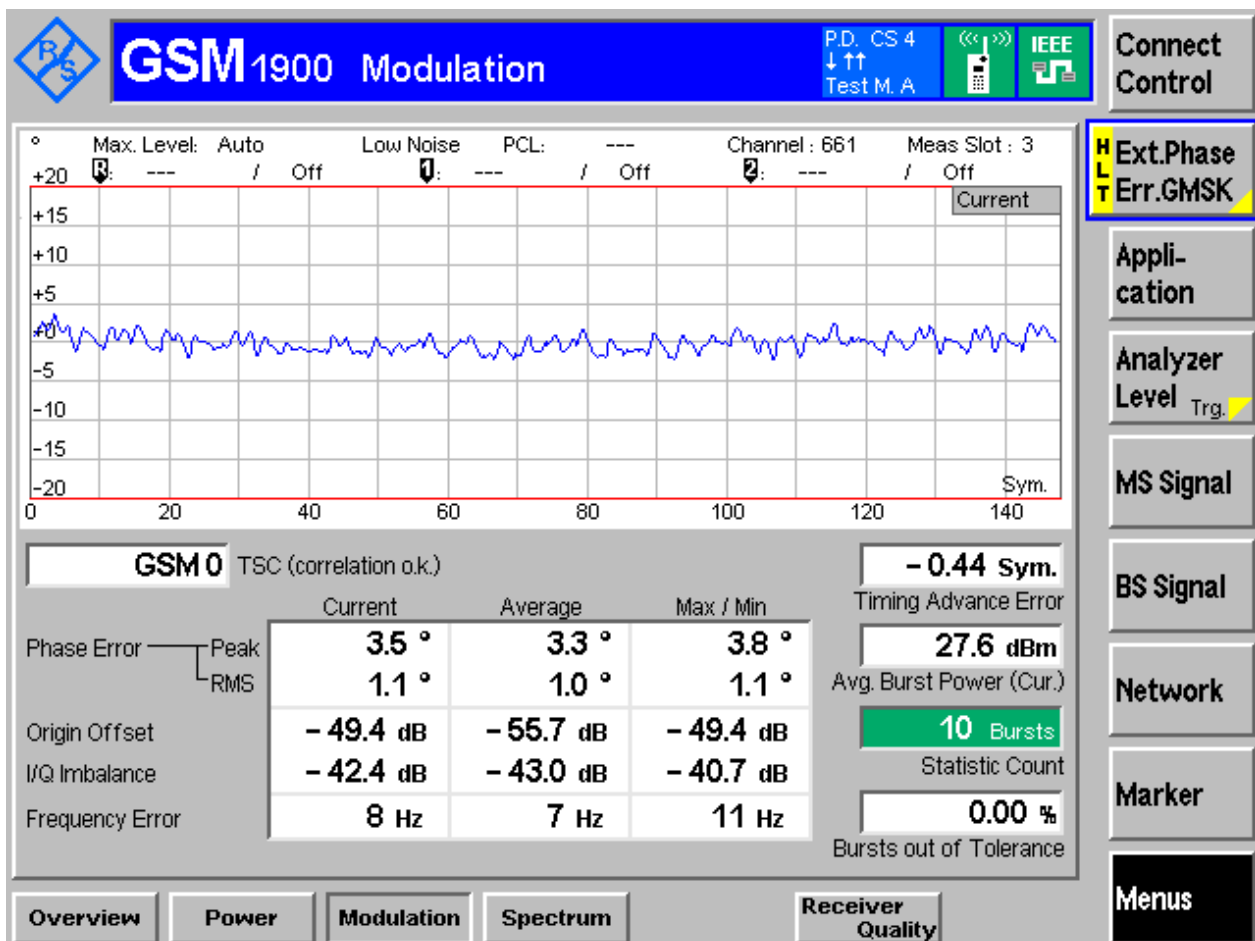
3.1.1.2.1 Test Channel = MCH



3.1.2 Test Band = GSM1900

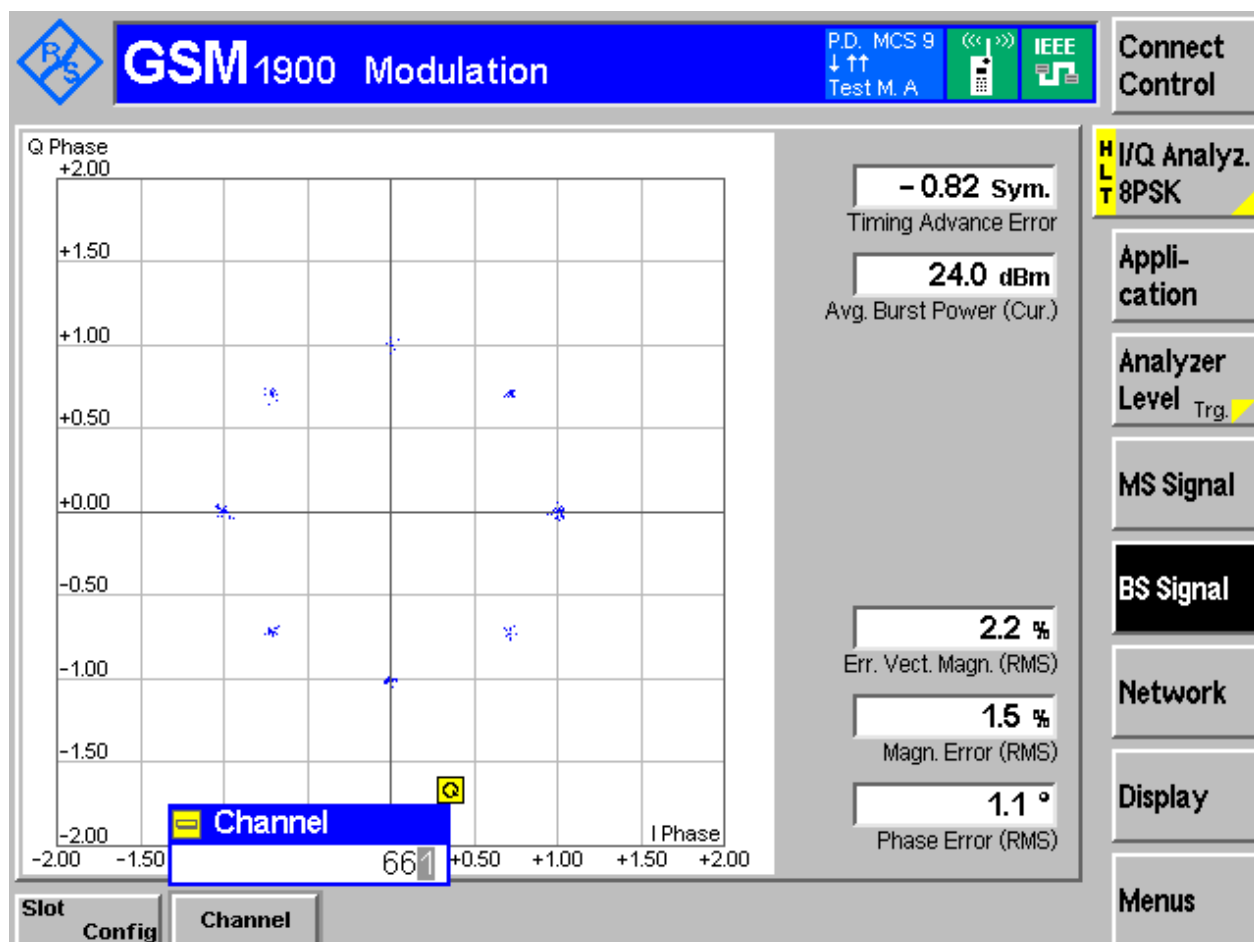
3.1.2.1 Test Mode = GSM/TM1

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
GSM1900	GSM/TM1	LCH	245.45	320.92	Pass
		MCH	243.99	312.56	Pass
		HCH	243.80	310.23	Pass
	GSM/TM2	LCH	247.16	319.09	Pass
		MCH	247.43	310.86	Pass
		HCH	249.80	323.99	Pass
GSM850	GSM/TM1	LCH	242.92	317.11	Pass
		MCH	243.21	321.06	Pass
		HCH	243.85	321.64	Pass
	GSM/TM2	LCH	232.95	307.92	Pass
		MCH	256.21	313.79	Pass
		HCH	238.85	309.63	Pass

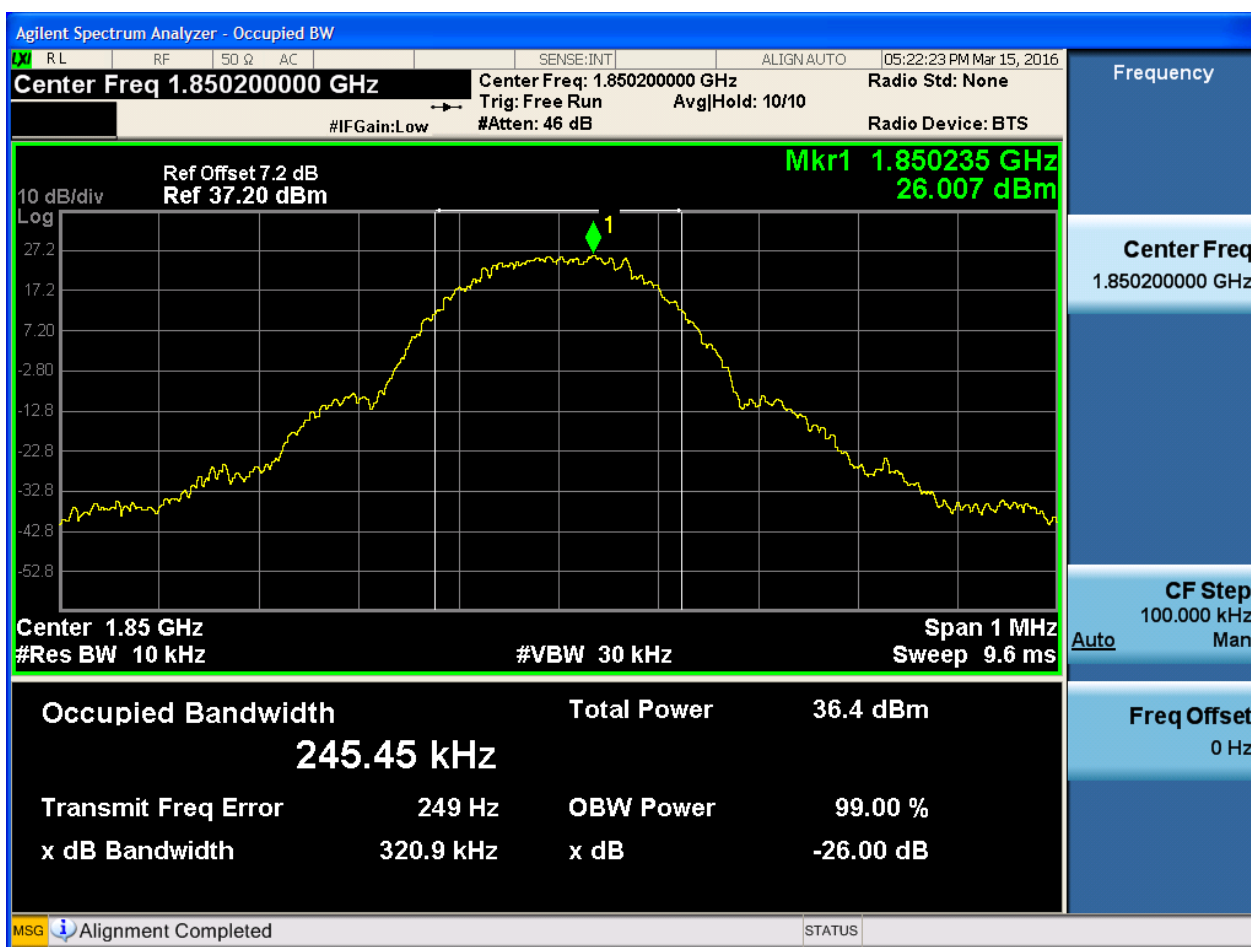
Part II - Test Plots

4.1 For GSM

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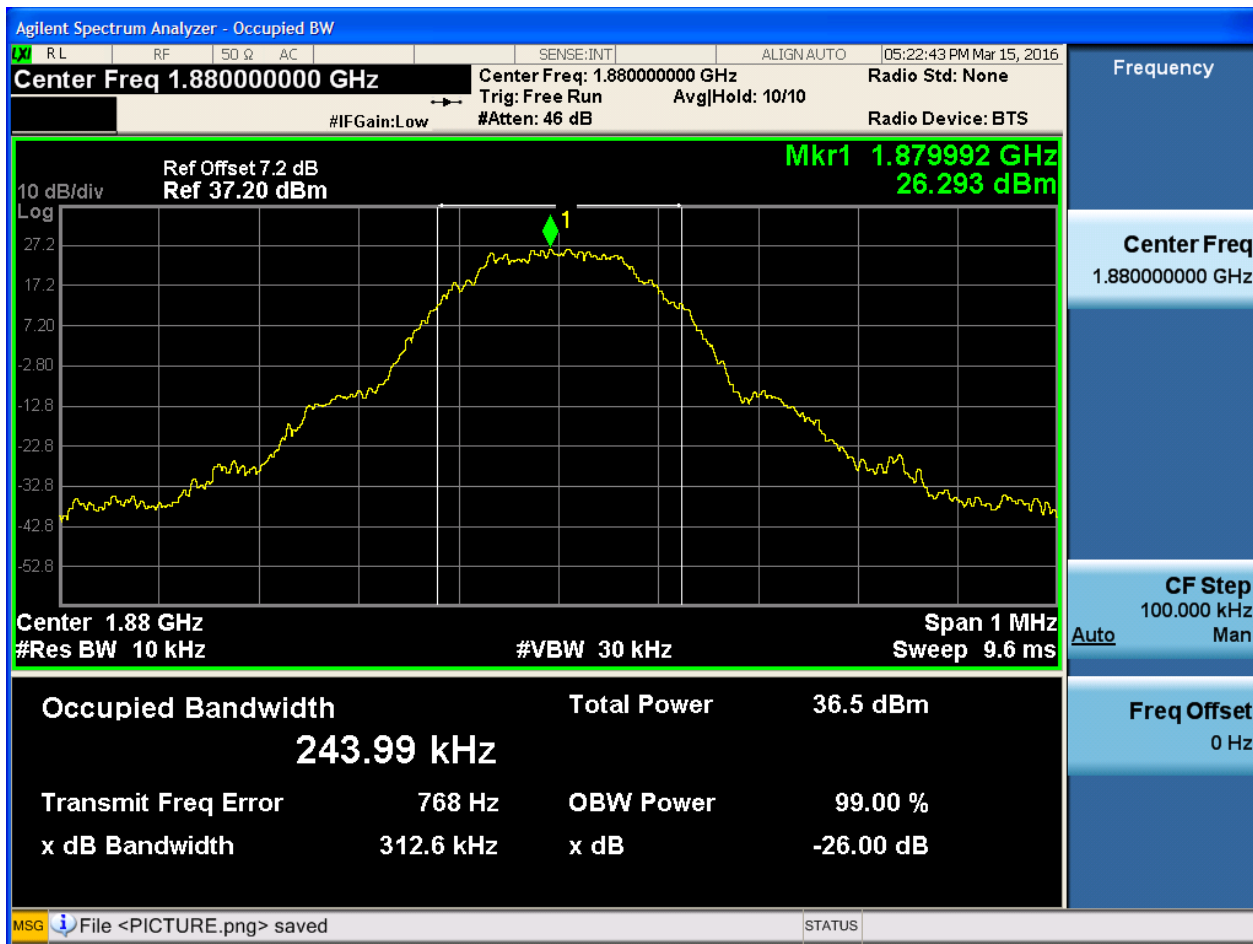
4.1.1.1 Test Mode = GSM/TM1

4.1.1.1.1 Test Channel = LCH



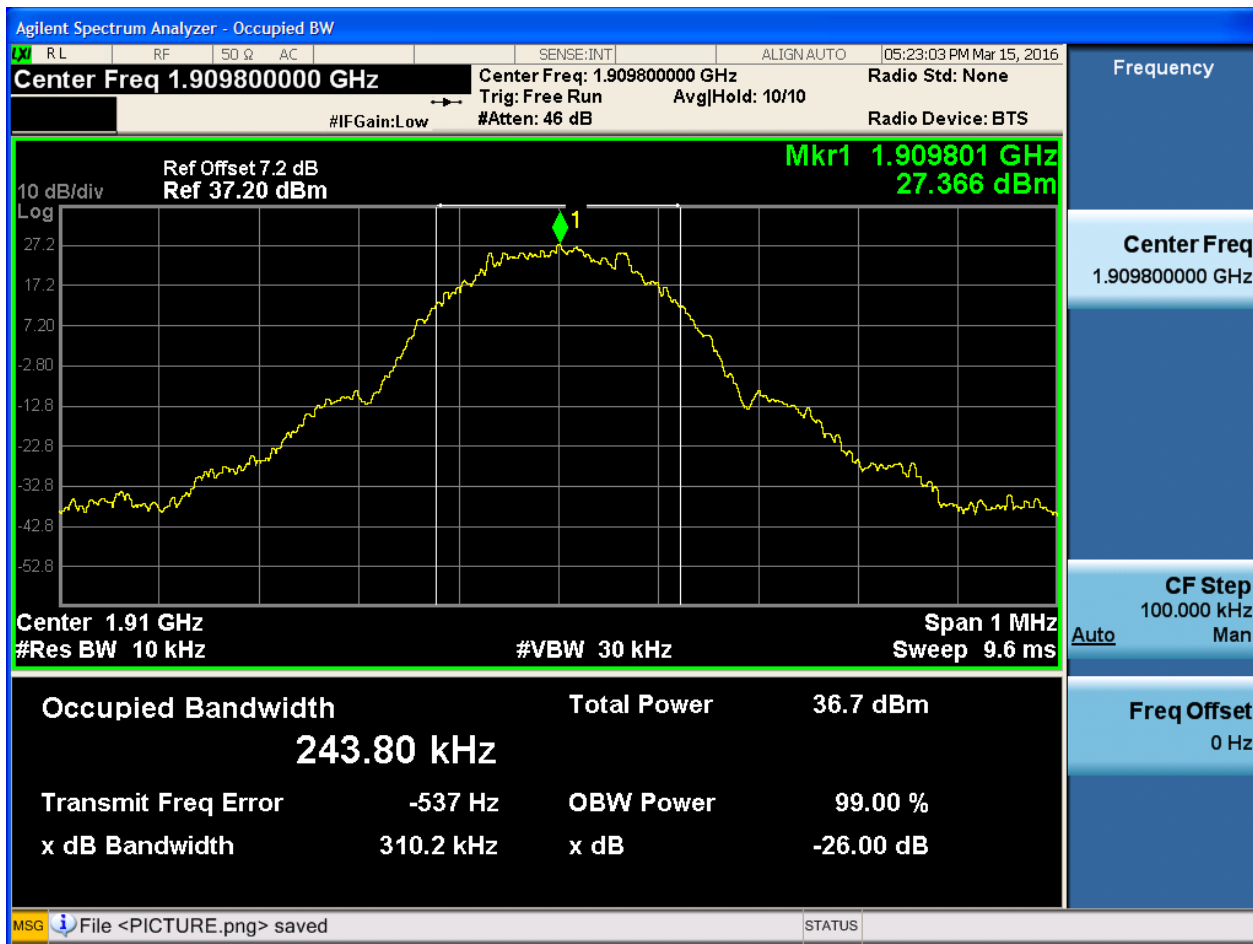


4.1.1.1.2 Test Channel = MCH





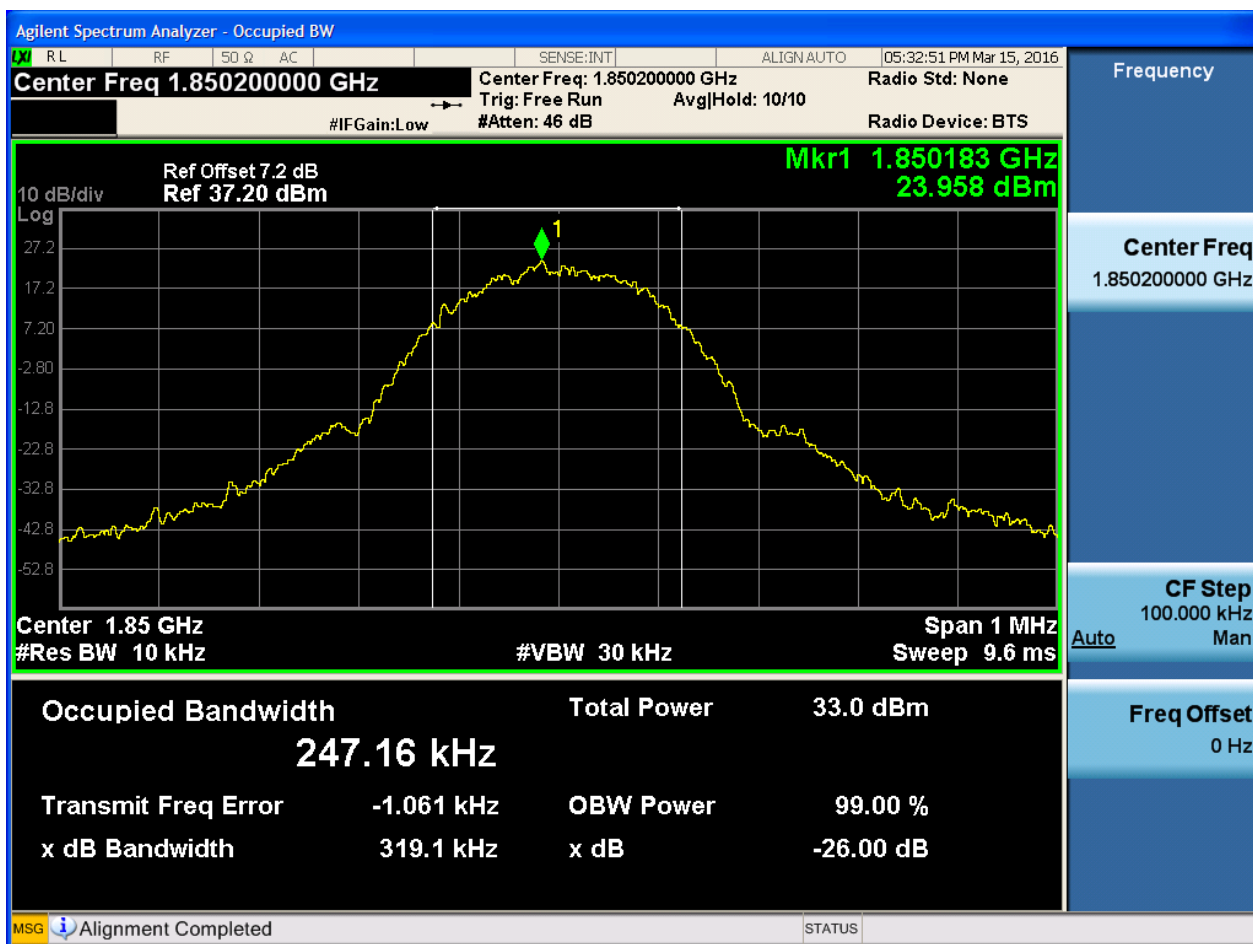
4.1.1.1.3 Test Channel = HCH





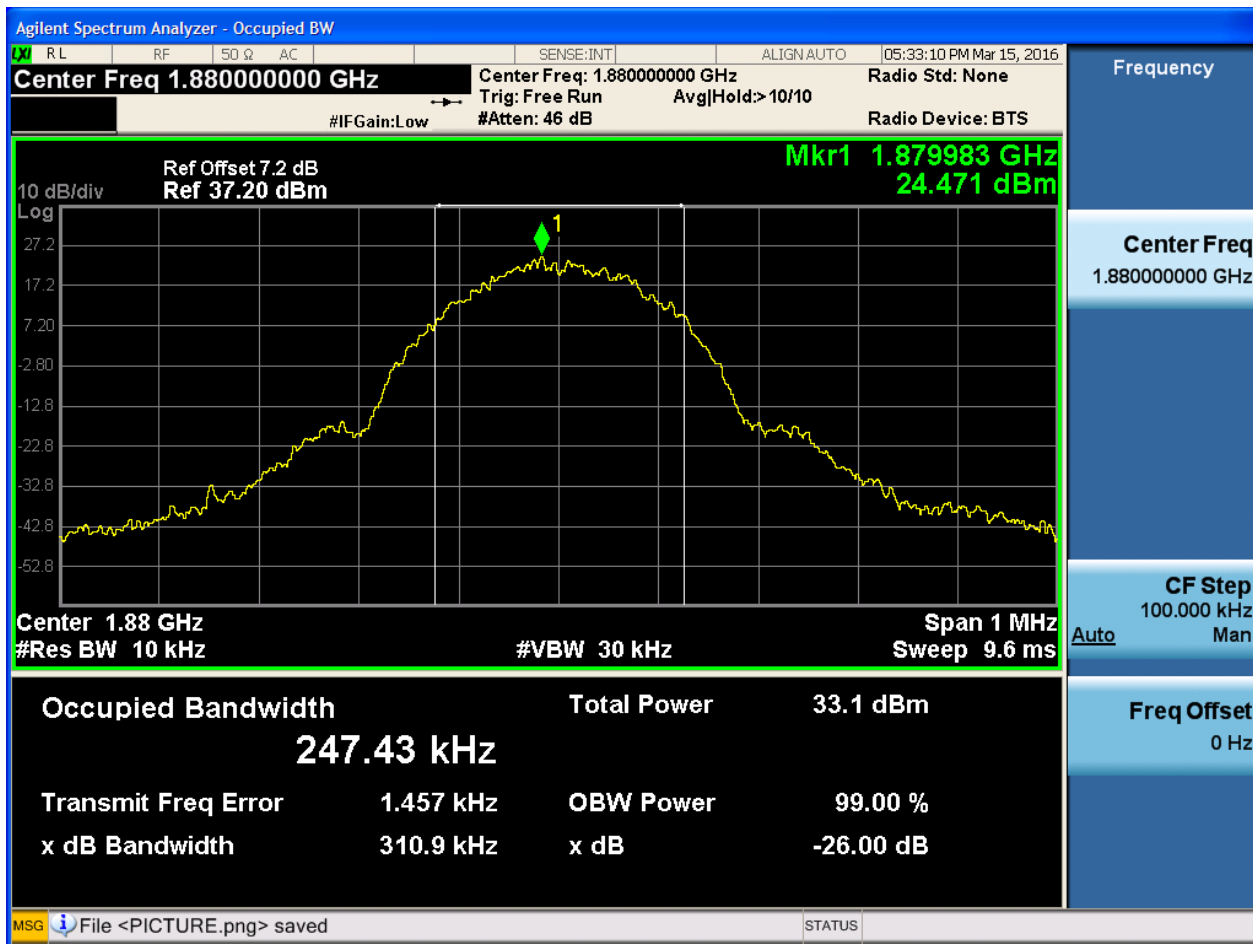
4.1.1.2 Test Mode = GSM/TM2

4.1.1.2.1 Test Channel = LCH



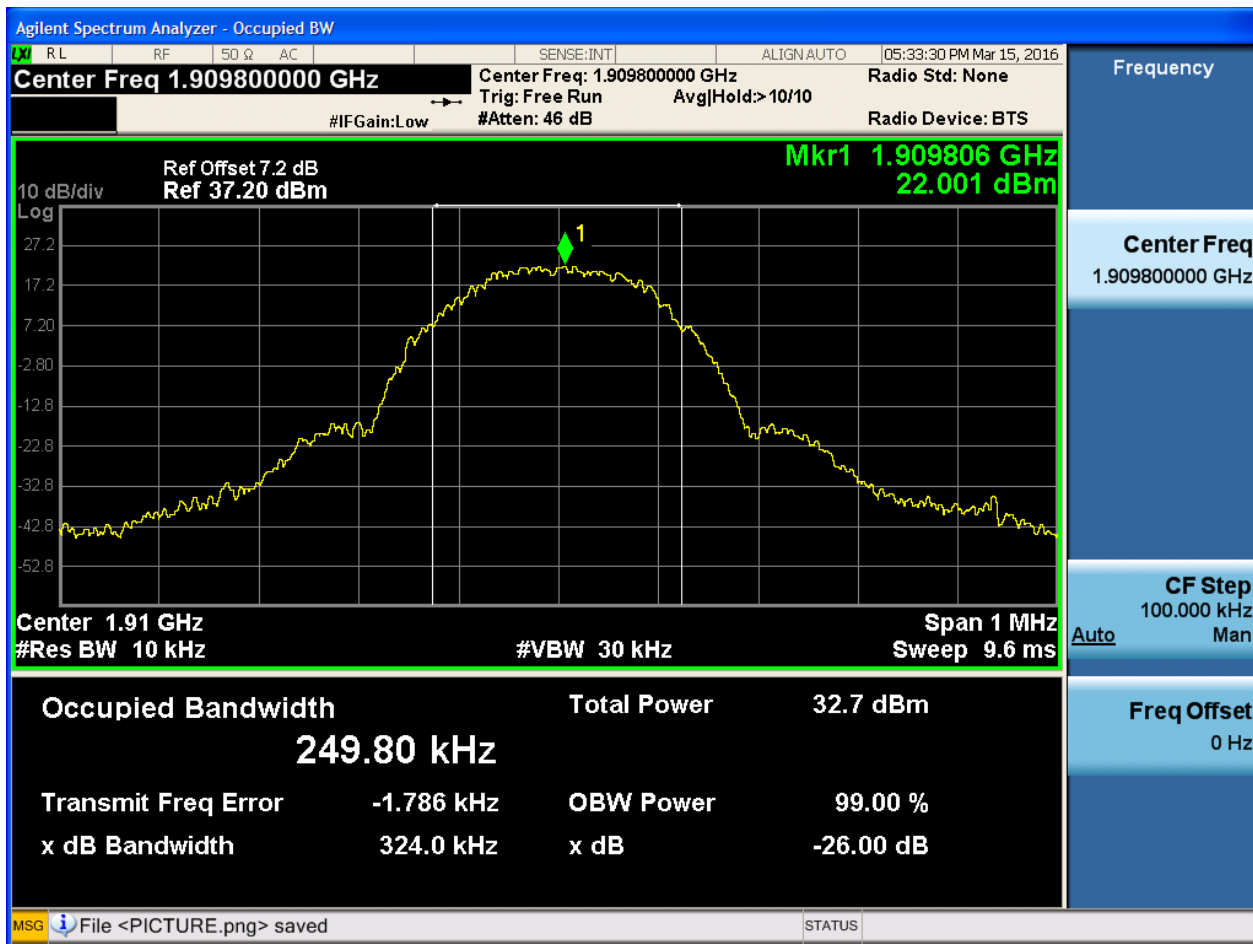


4.1.1.2.2 Test Channel = MCH





4.1.1.2.3 Test Channel = HCH

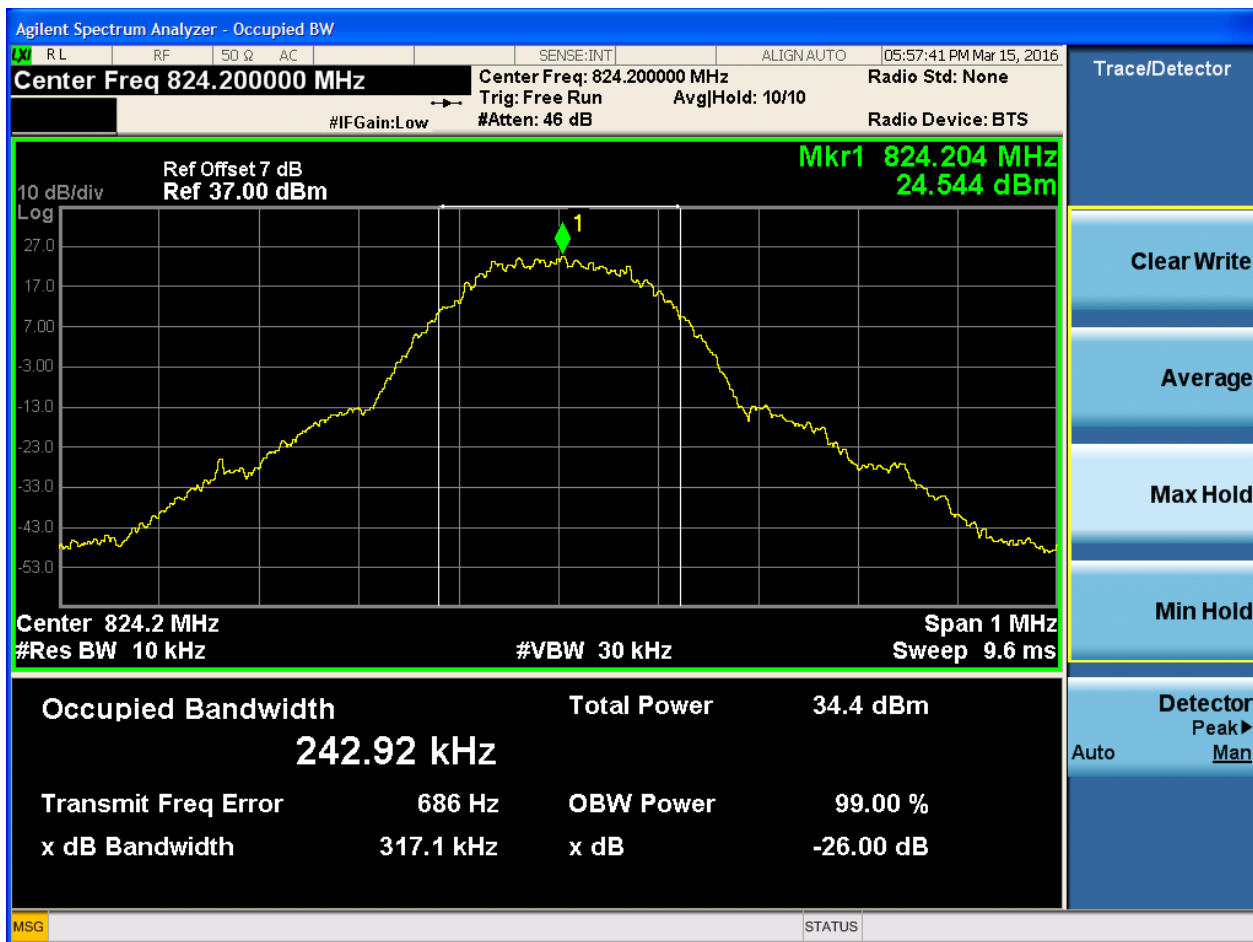




4.1.3 Test Band = GSM850

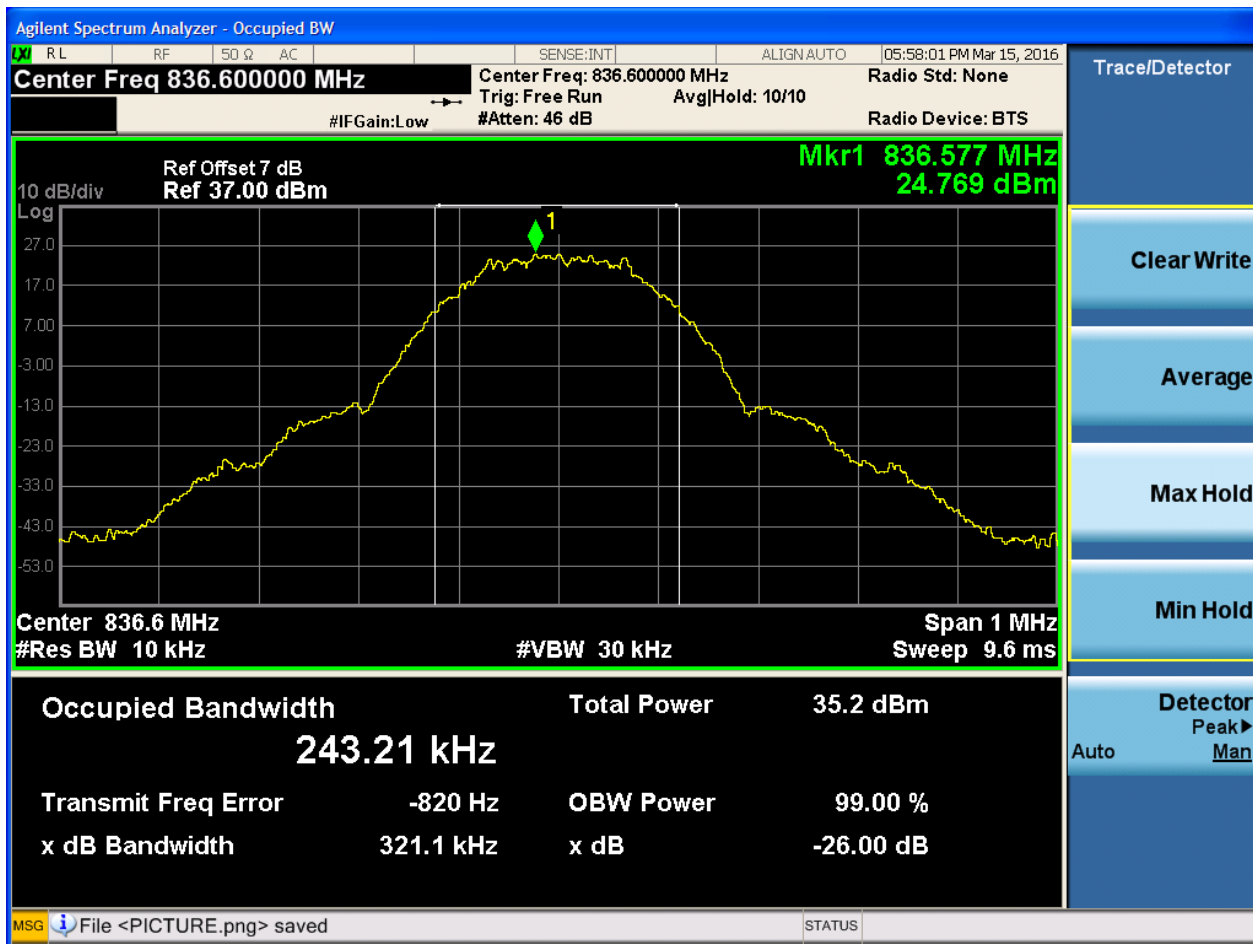
4.1.3.1 Test Mode = GSM/TM1

4.1.3.1.1 Test Channel = LCH



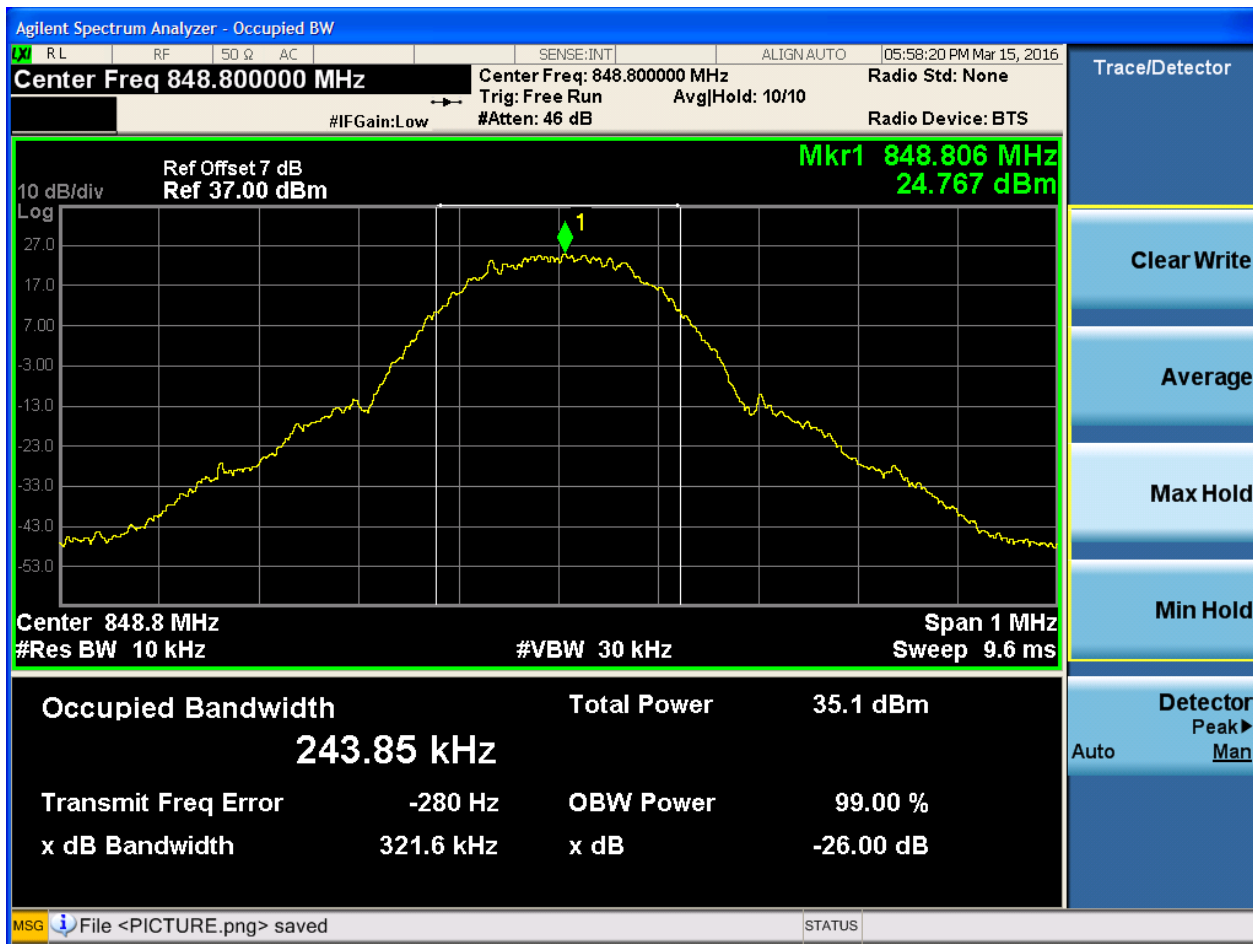


4.1.3.1.2 Test Channel = MCH





4.1.3.1.3 Test Channel = HCH



4.1.3.2 Test Mode = GSM/TM2

4.1.3.2.1 Test Channel = LCH



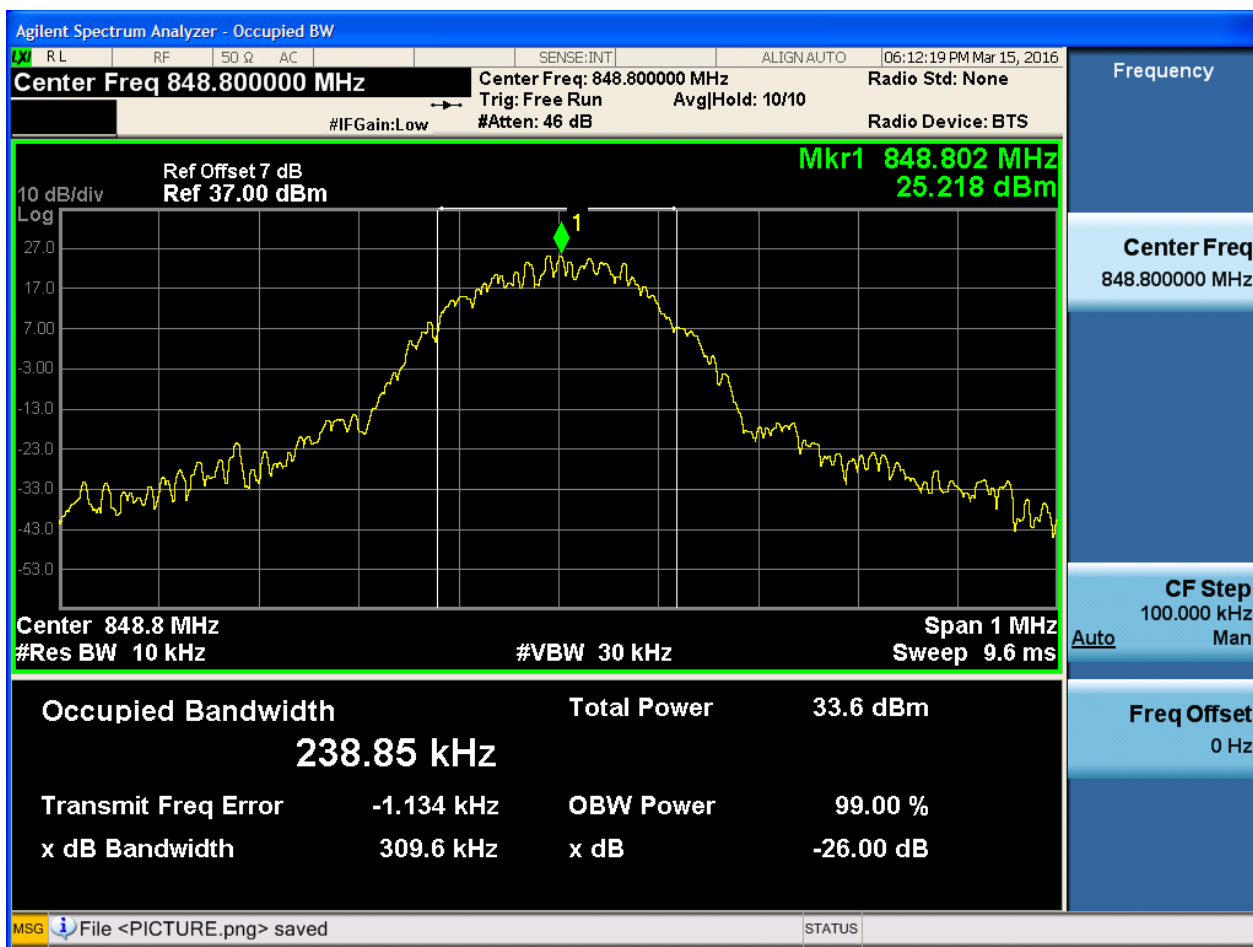


4.1.3.2.2 Test Channel = MCH





4.1.3.2.3 Test Channel = HCH





5Appendix_E: Band Edges Compliance

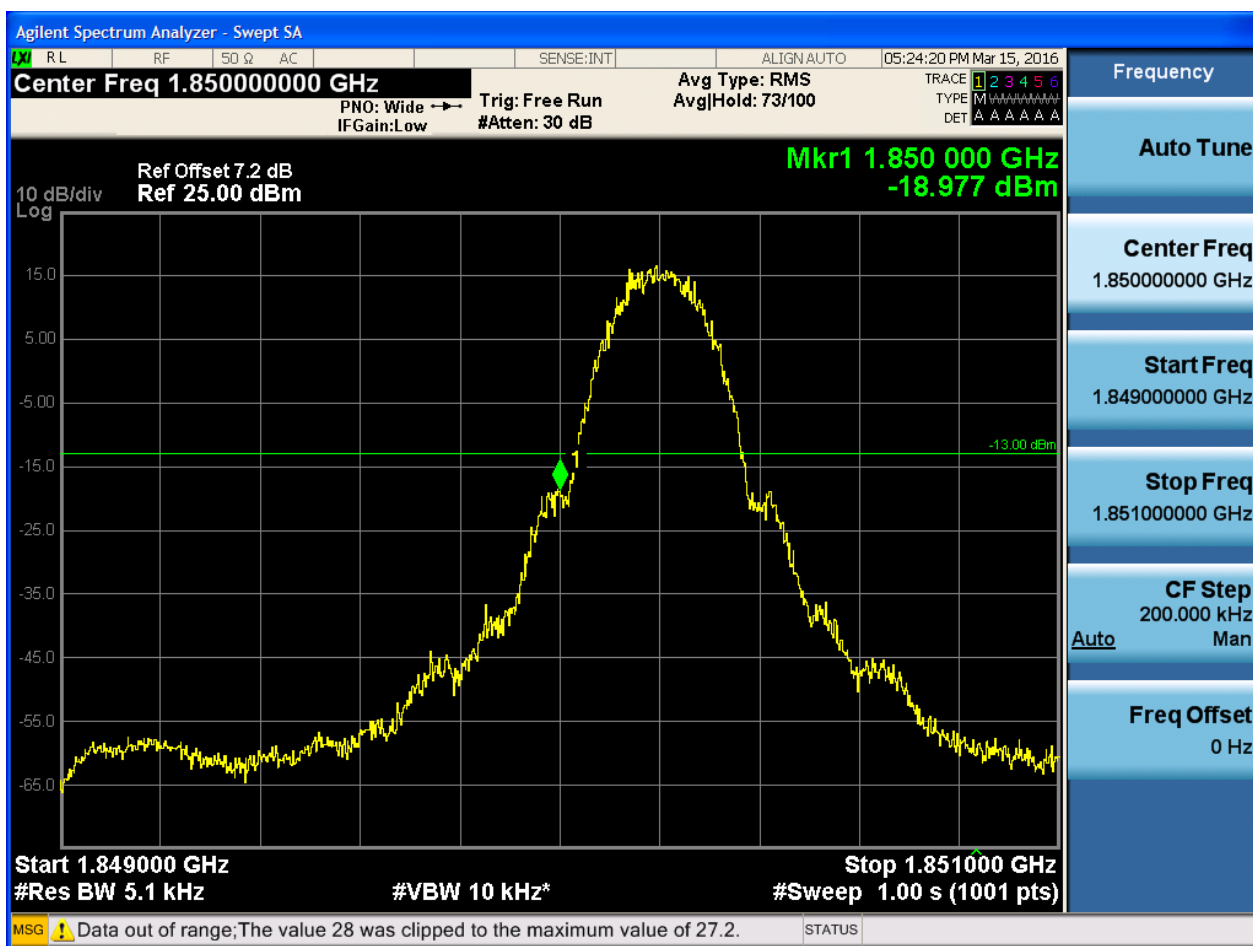
Part I - Test Plots

5.1 For GSM

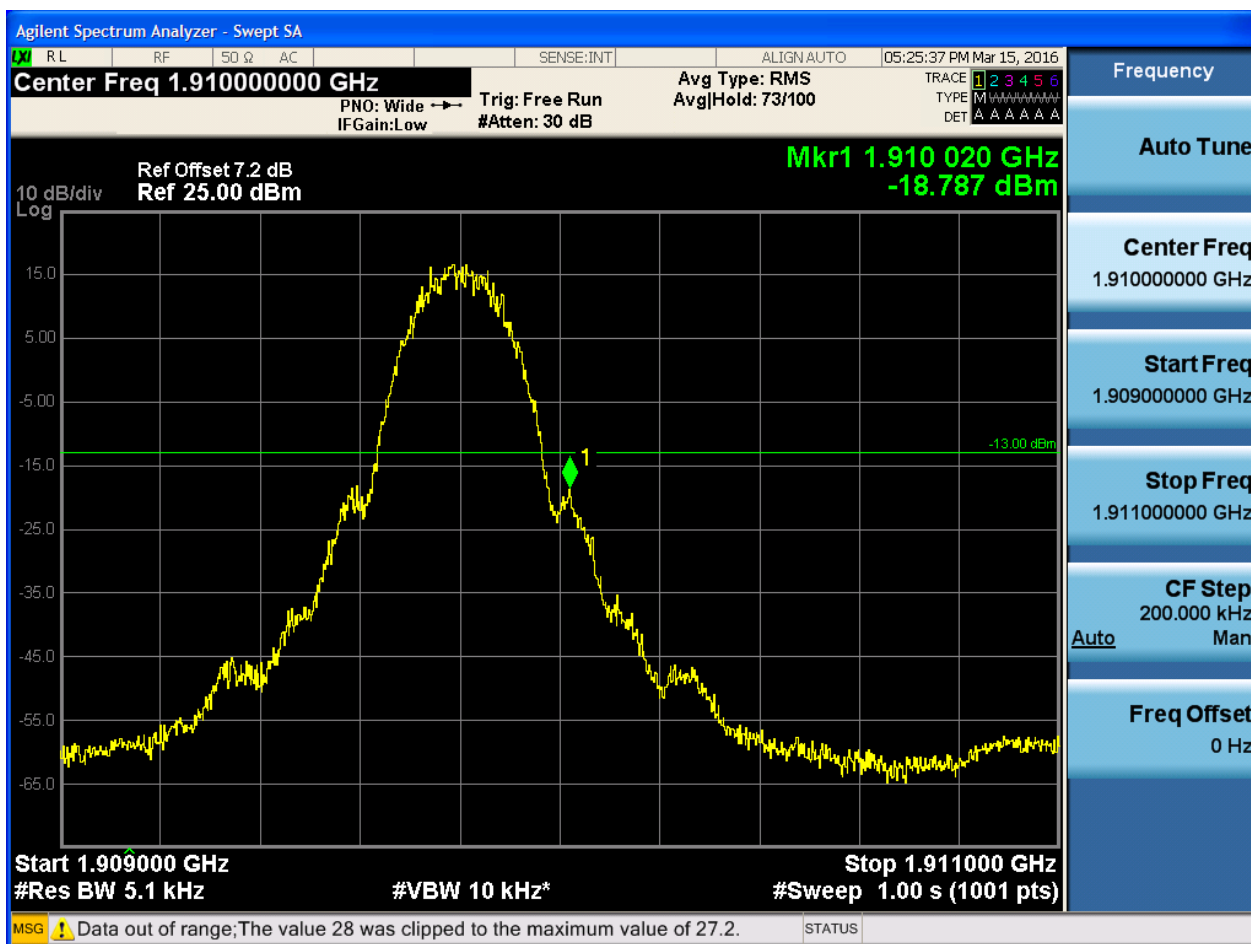
5.1.1 Test Band = GSM1900

5.1.1.1 Test Mode = GSM/TM1

5.1.1.1.1 Test Channel = LCH

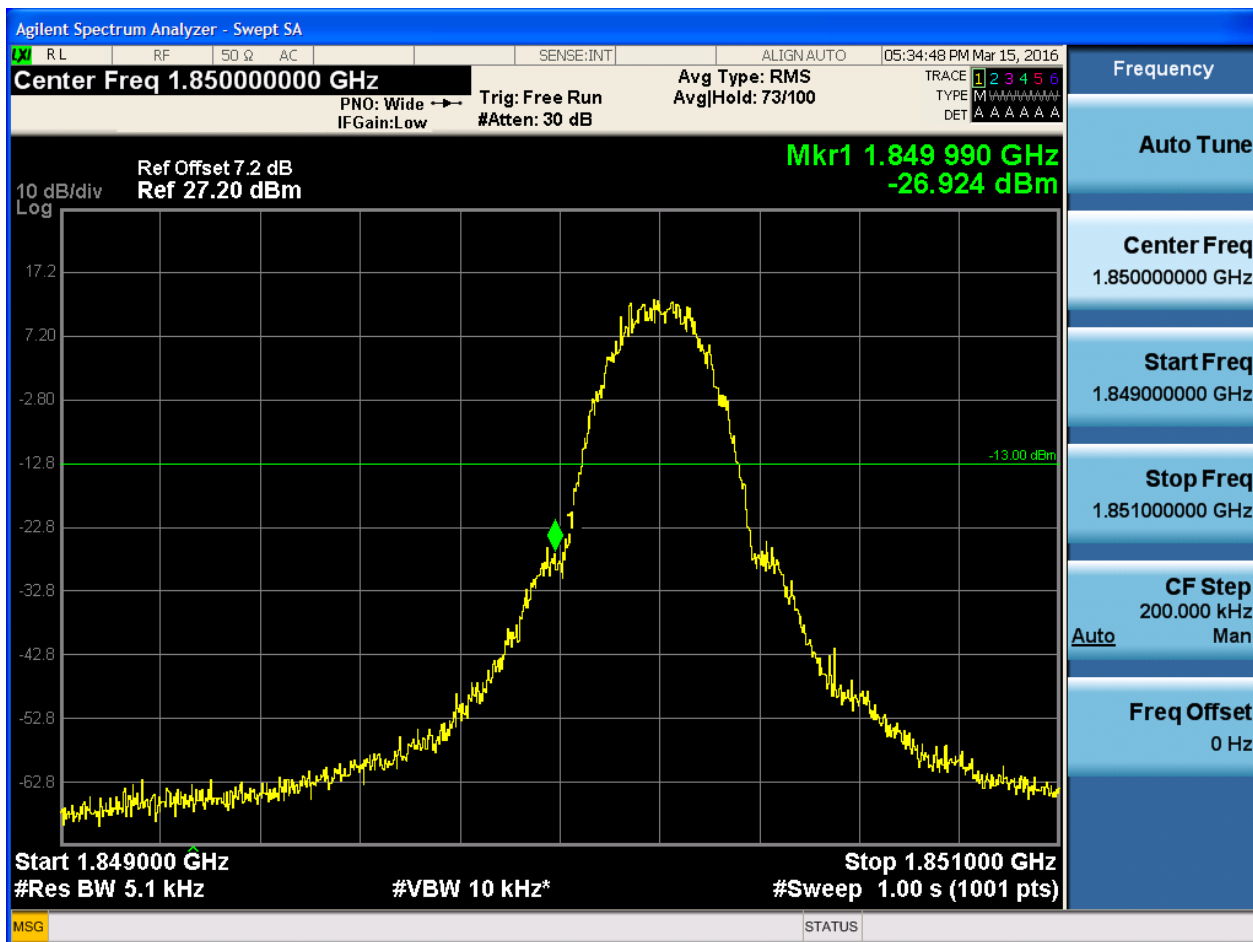


5.1.1.1.2 Test Channel = HCH

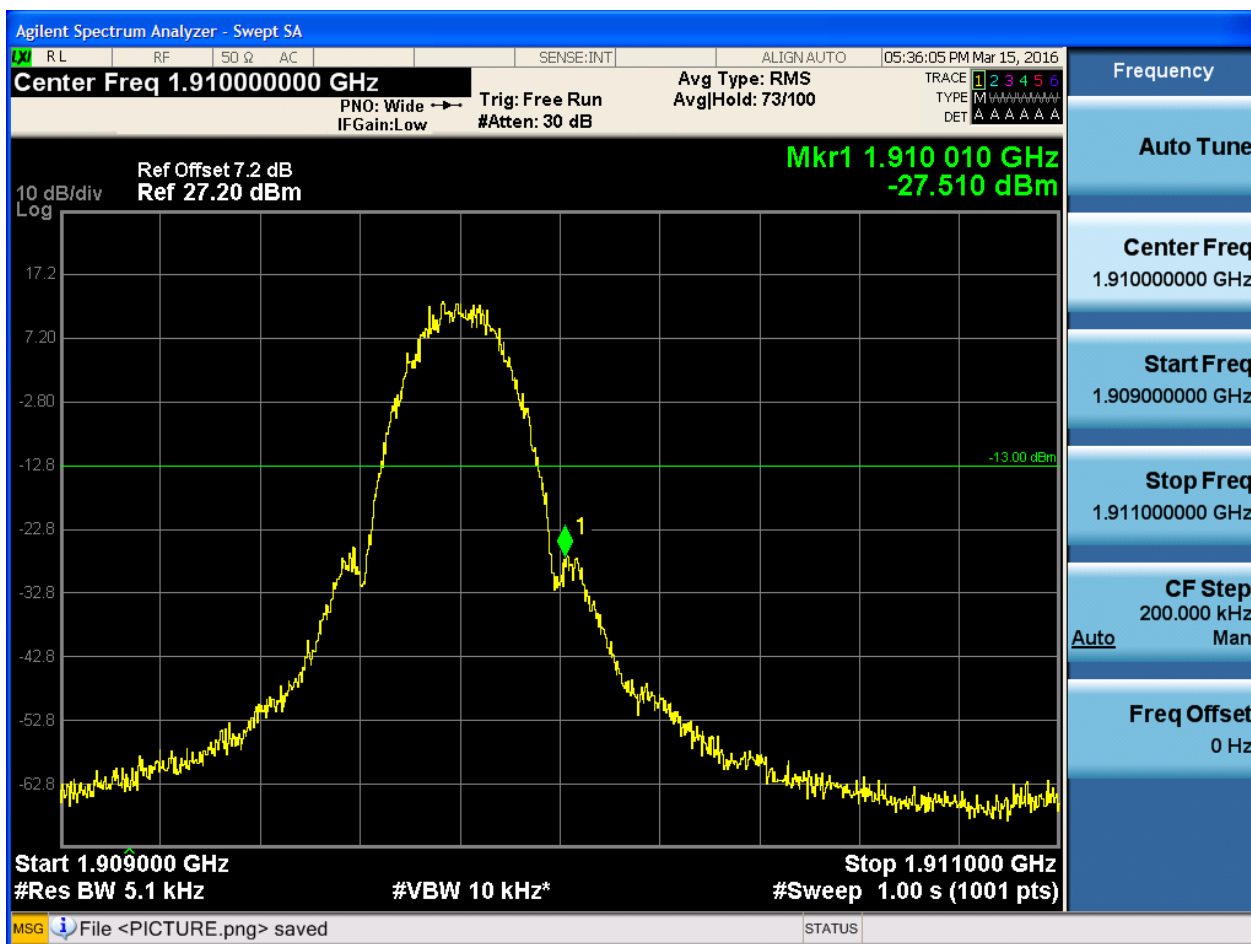


5.1.1.2 Test Mode = GSM/TM2

5.1.1.2.1 Test Channel = LCH



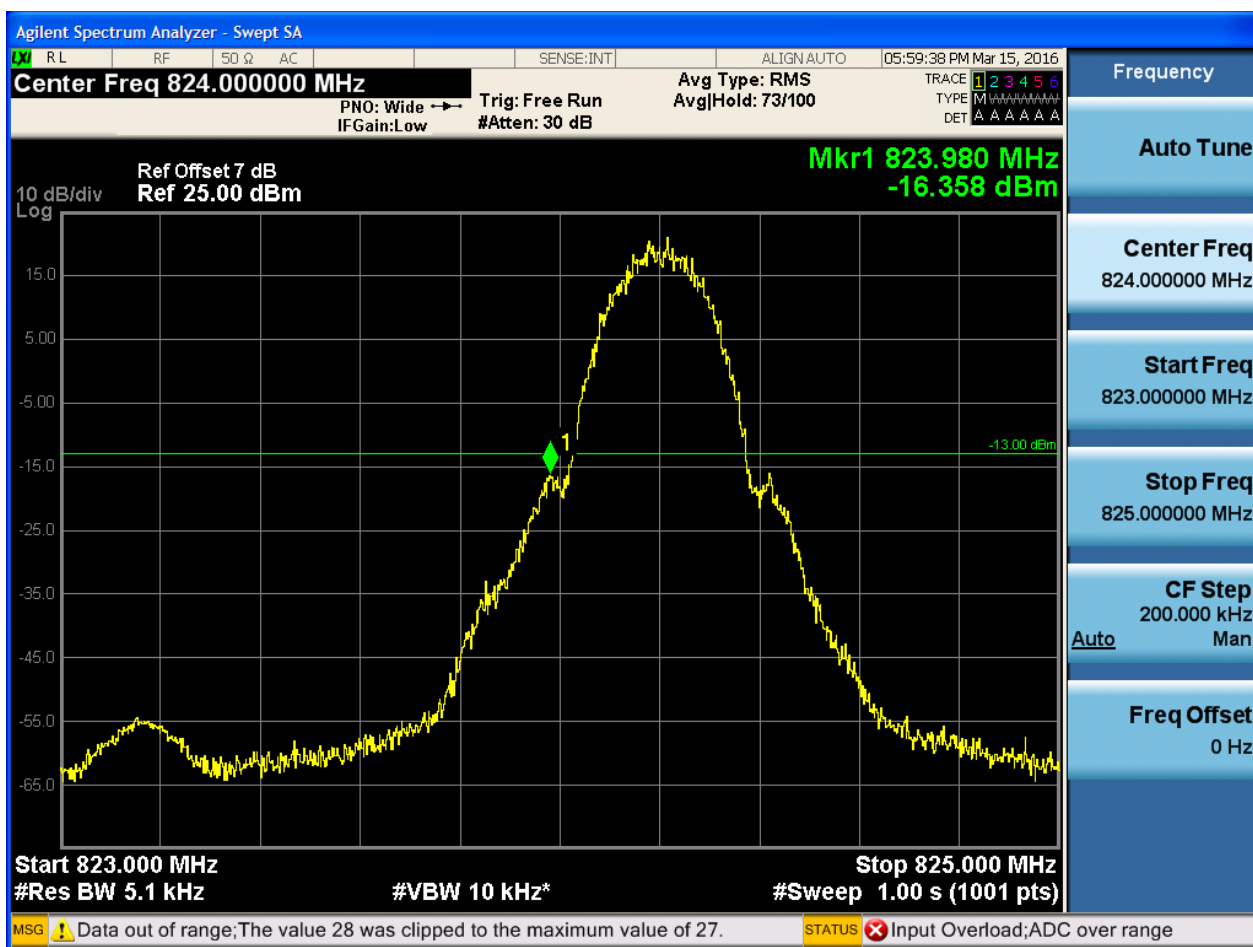
5.1.1.2.2 Test Channel = HCH



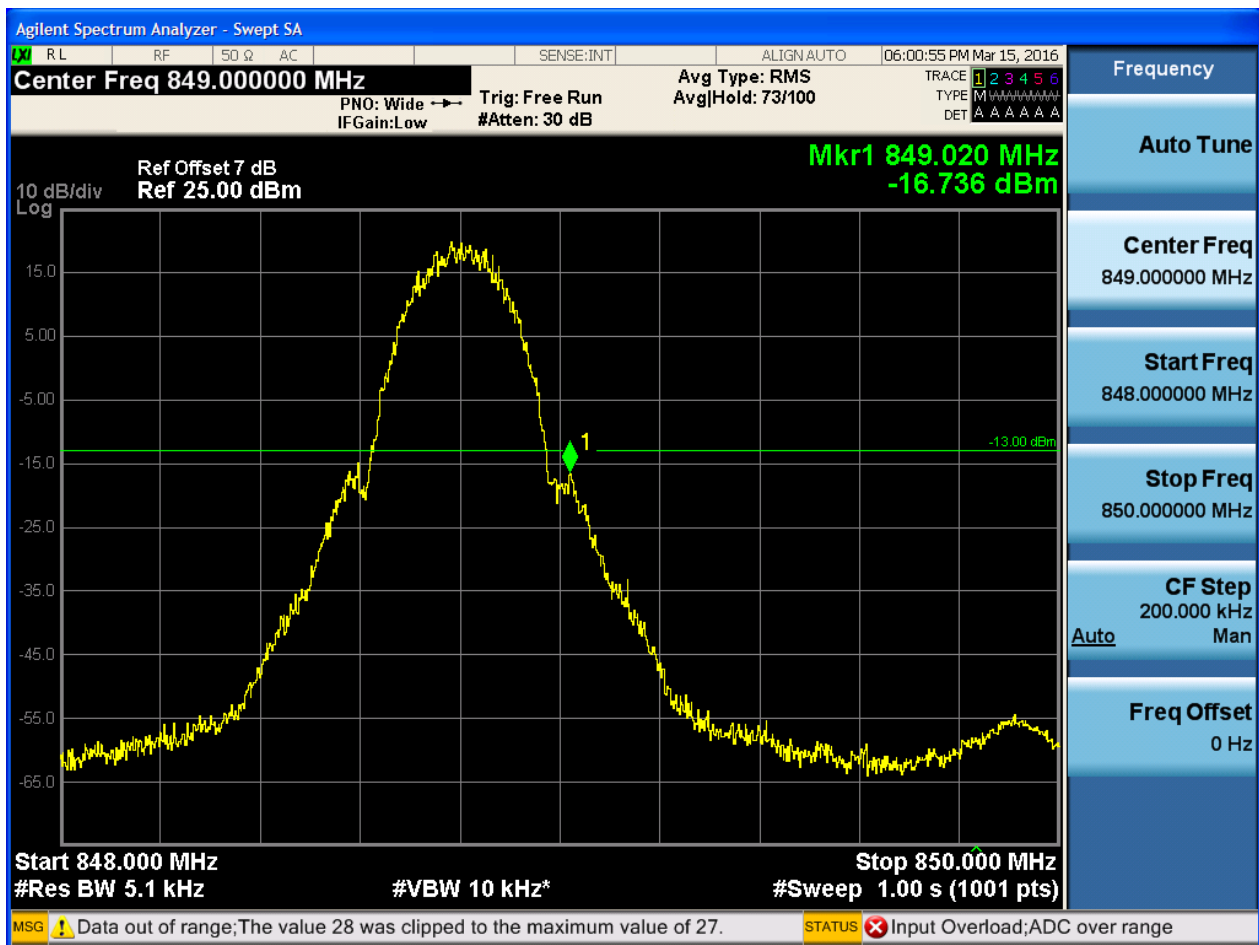
5.1.2 Test Band = GSM850

5.1.3.1 Test Mode = GSM/TM1

5.1.3.1.1 Test Channel = LCH

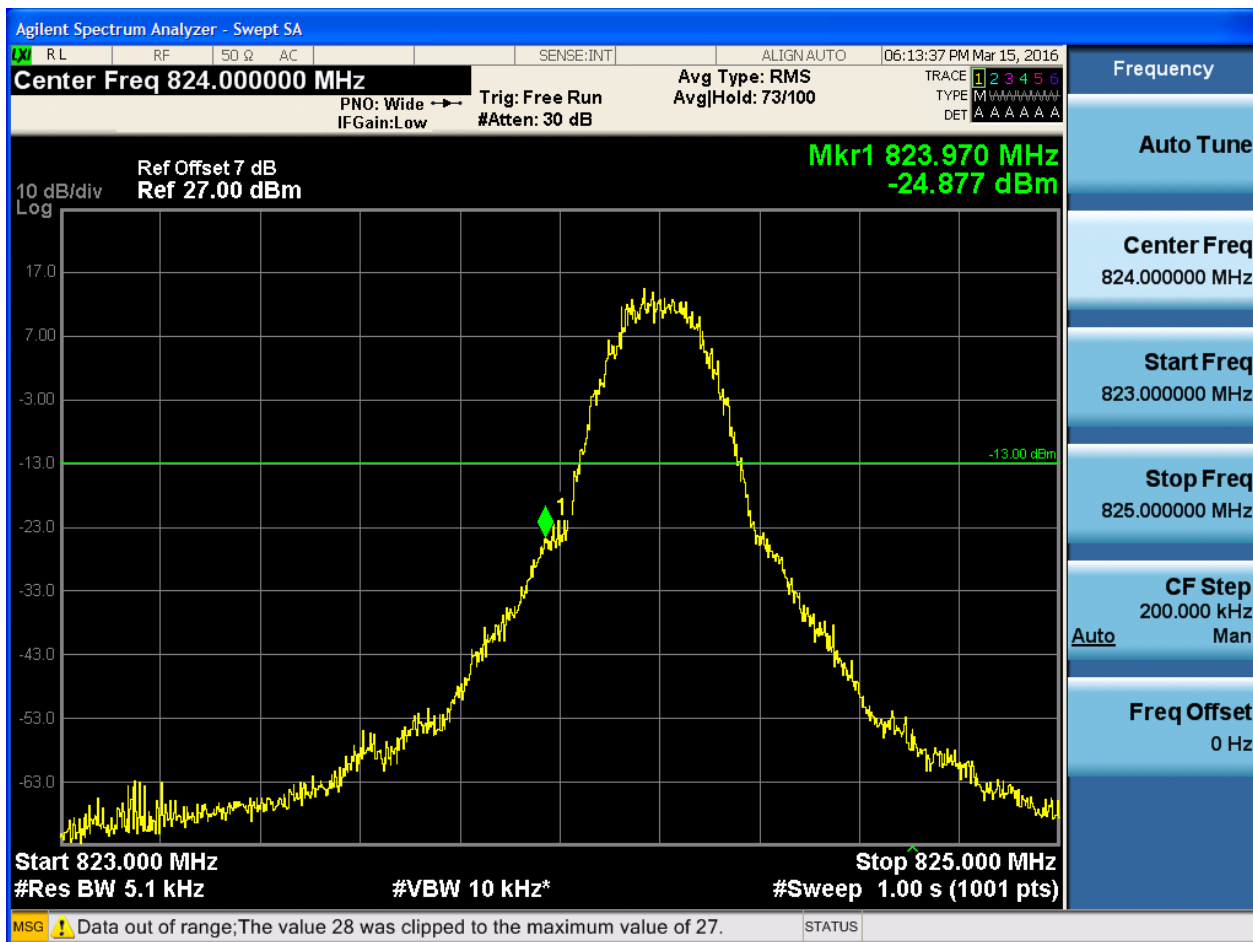


5.1.3.1.2 Test Channel = HCH

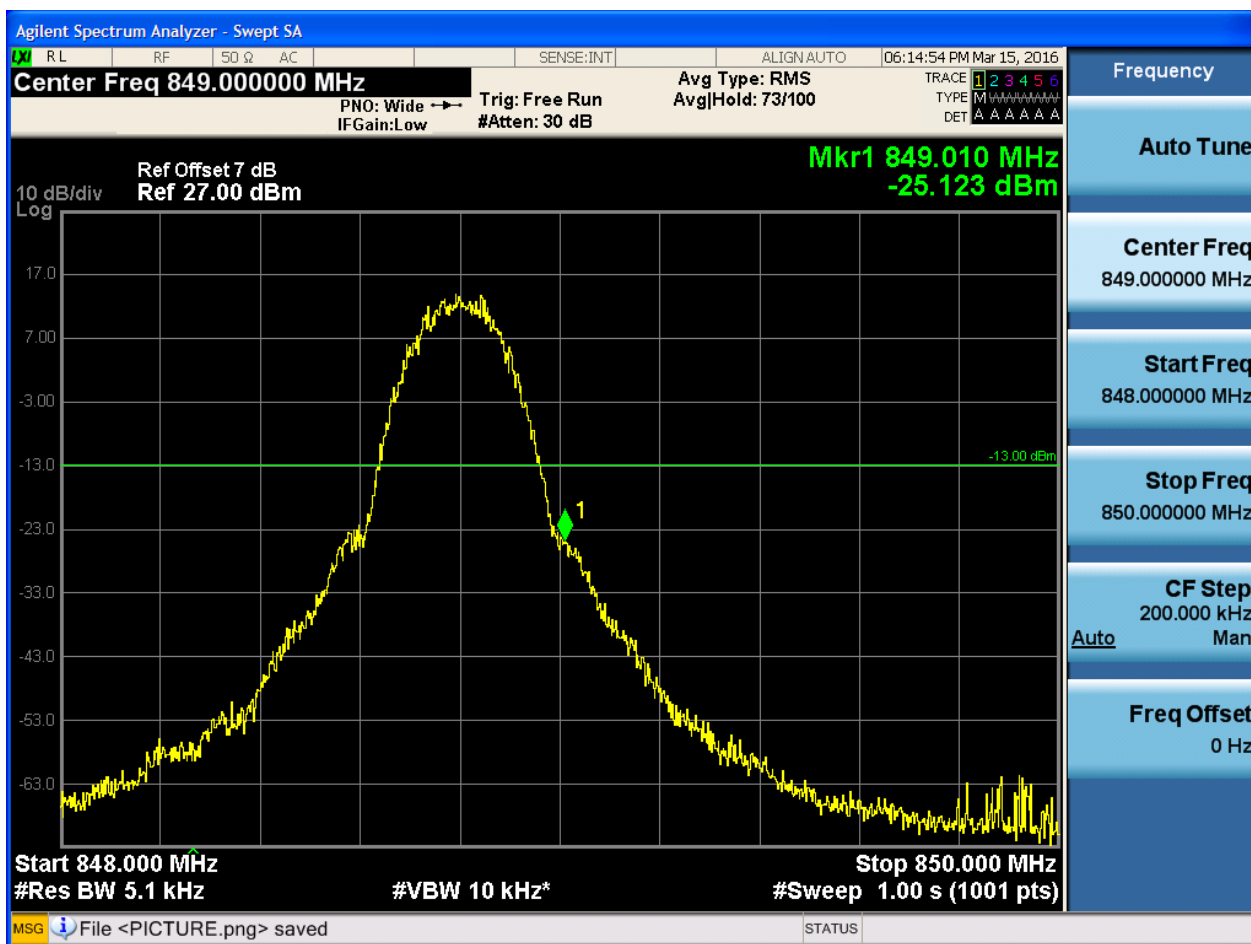




5.1.3.2.1 Test Channel = LCH



5.1.3.2.2 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

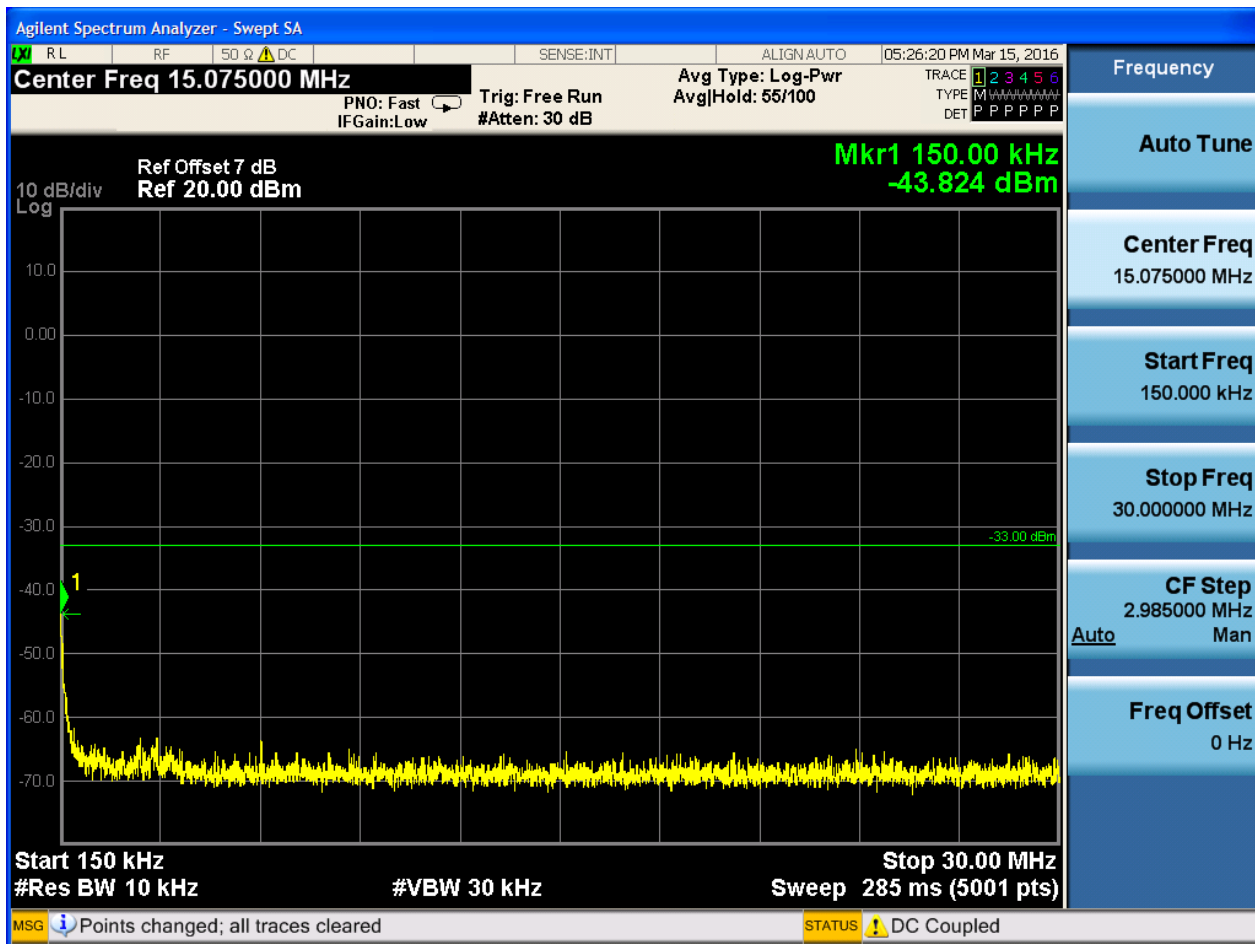
6.1 For GSM

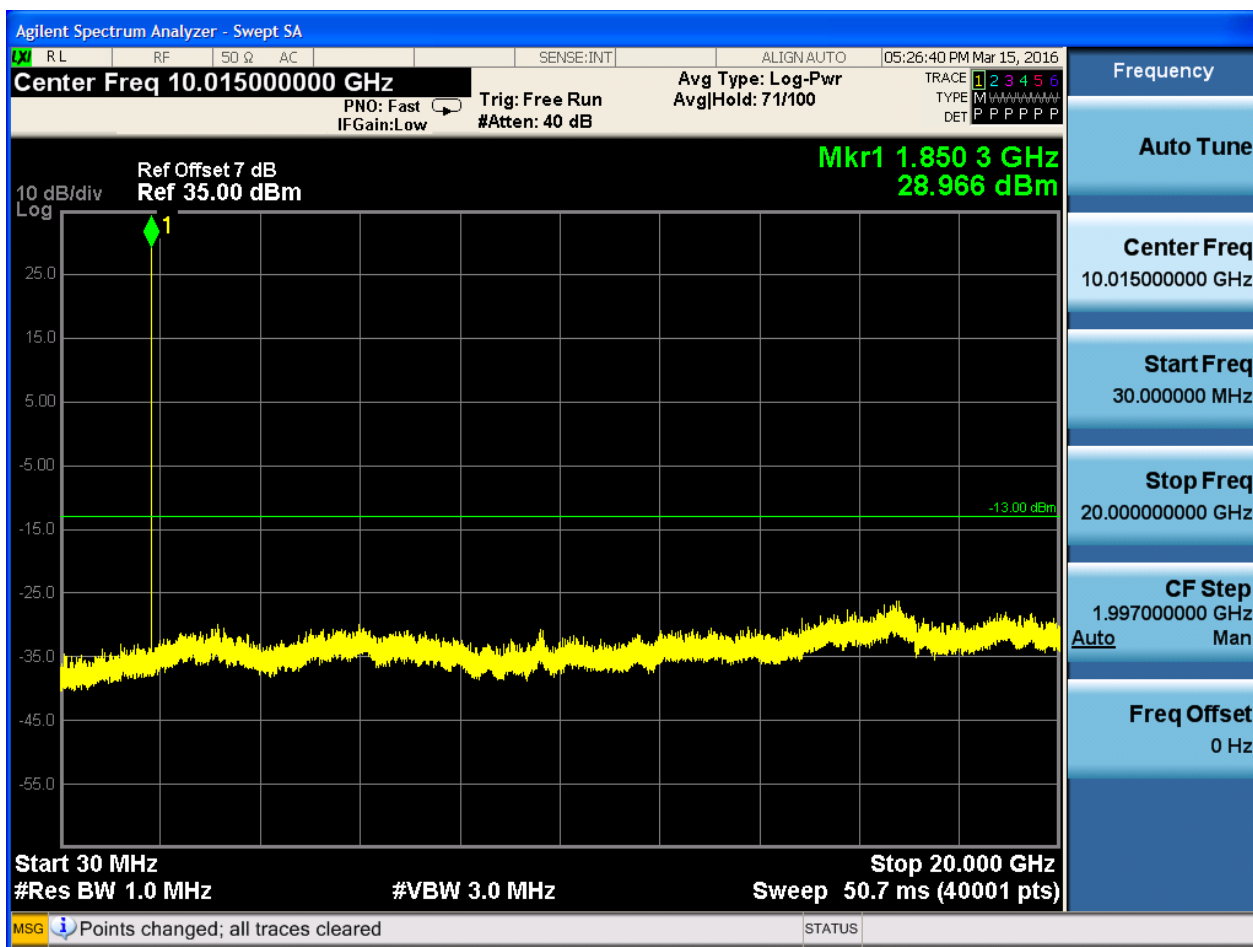
6.1.1 Test Band = GSM1900

6.1.1.1 Test Mode = GSM/TM1

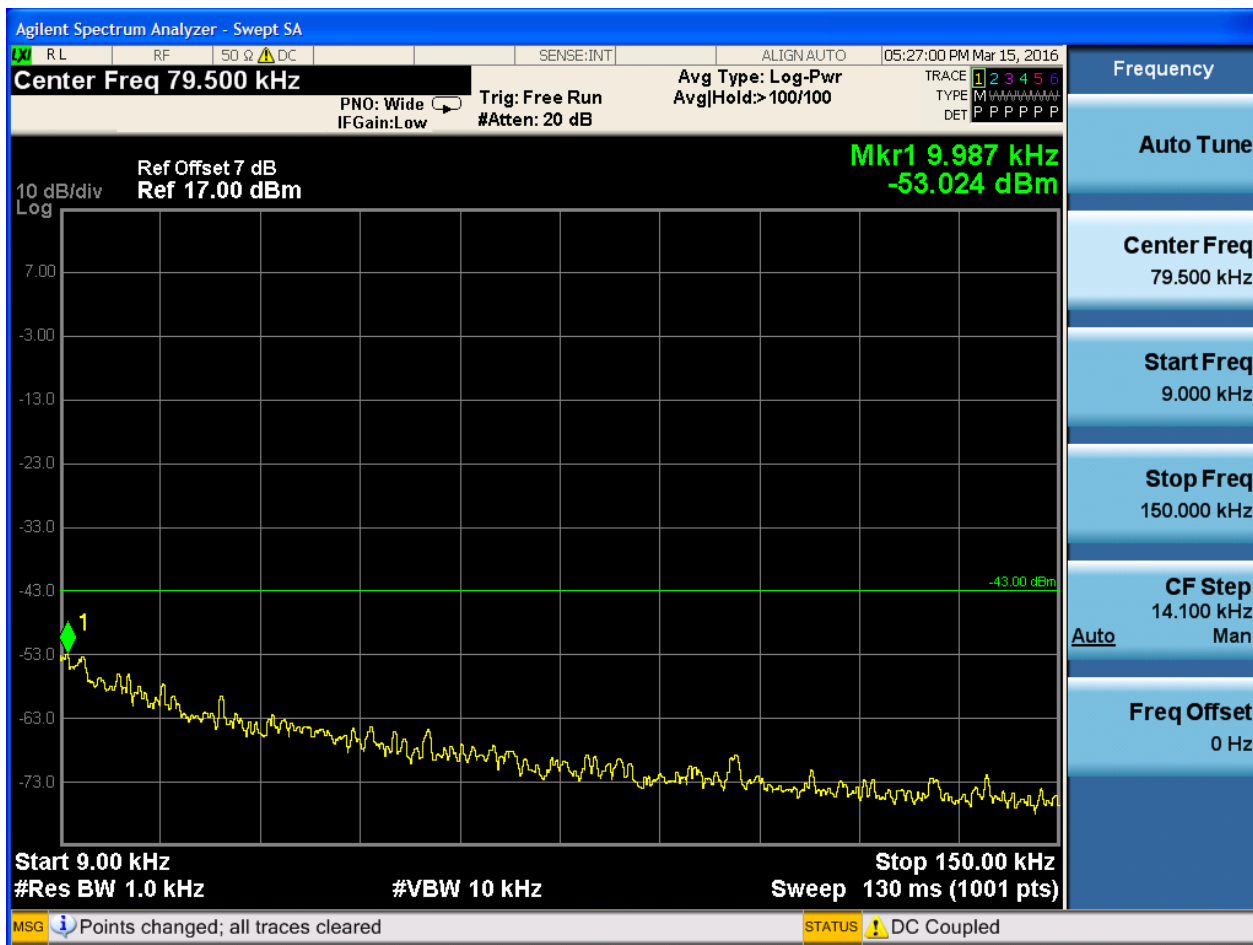
6.1.1.1.1 Test Channel = LCH

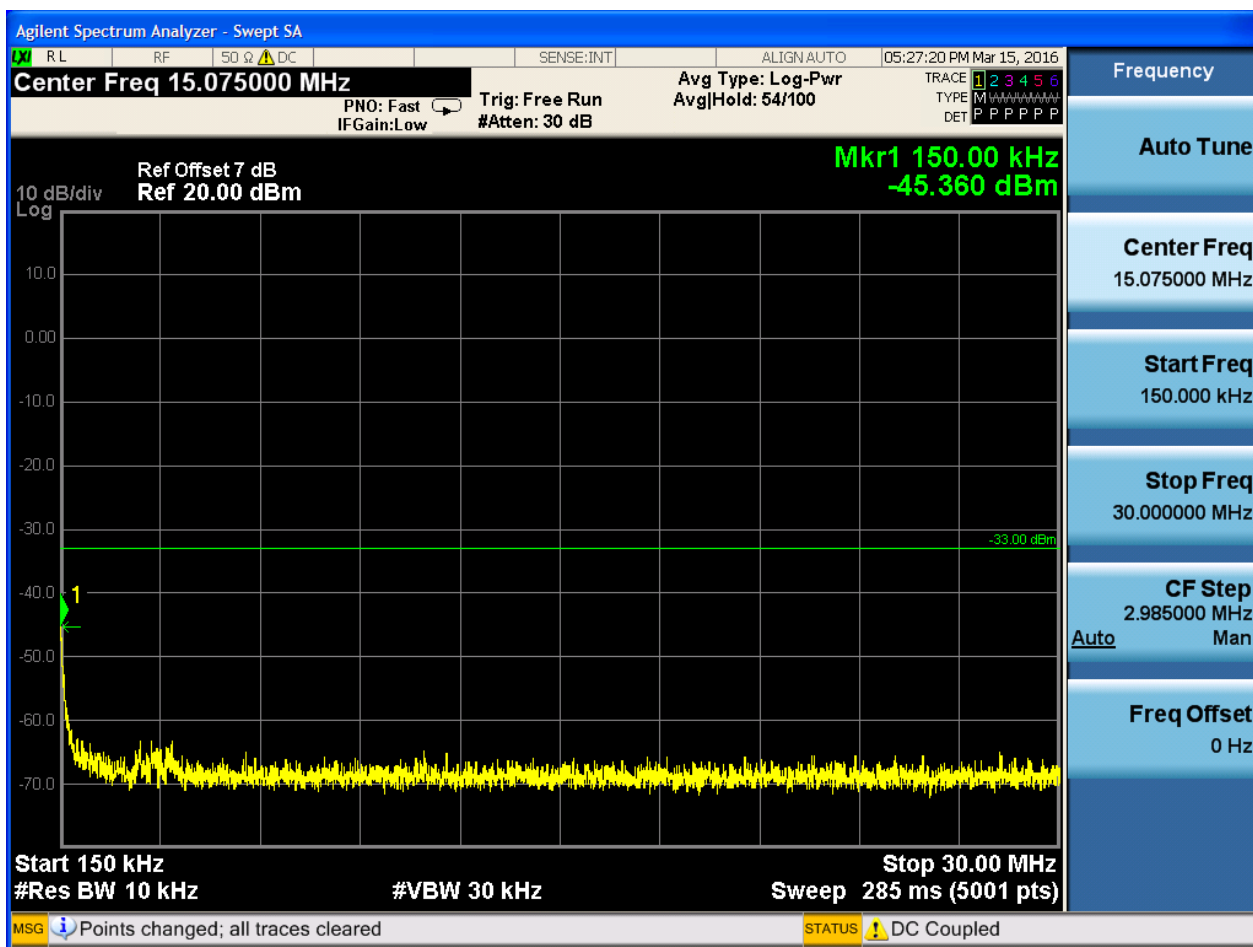


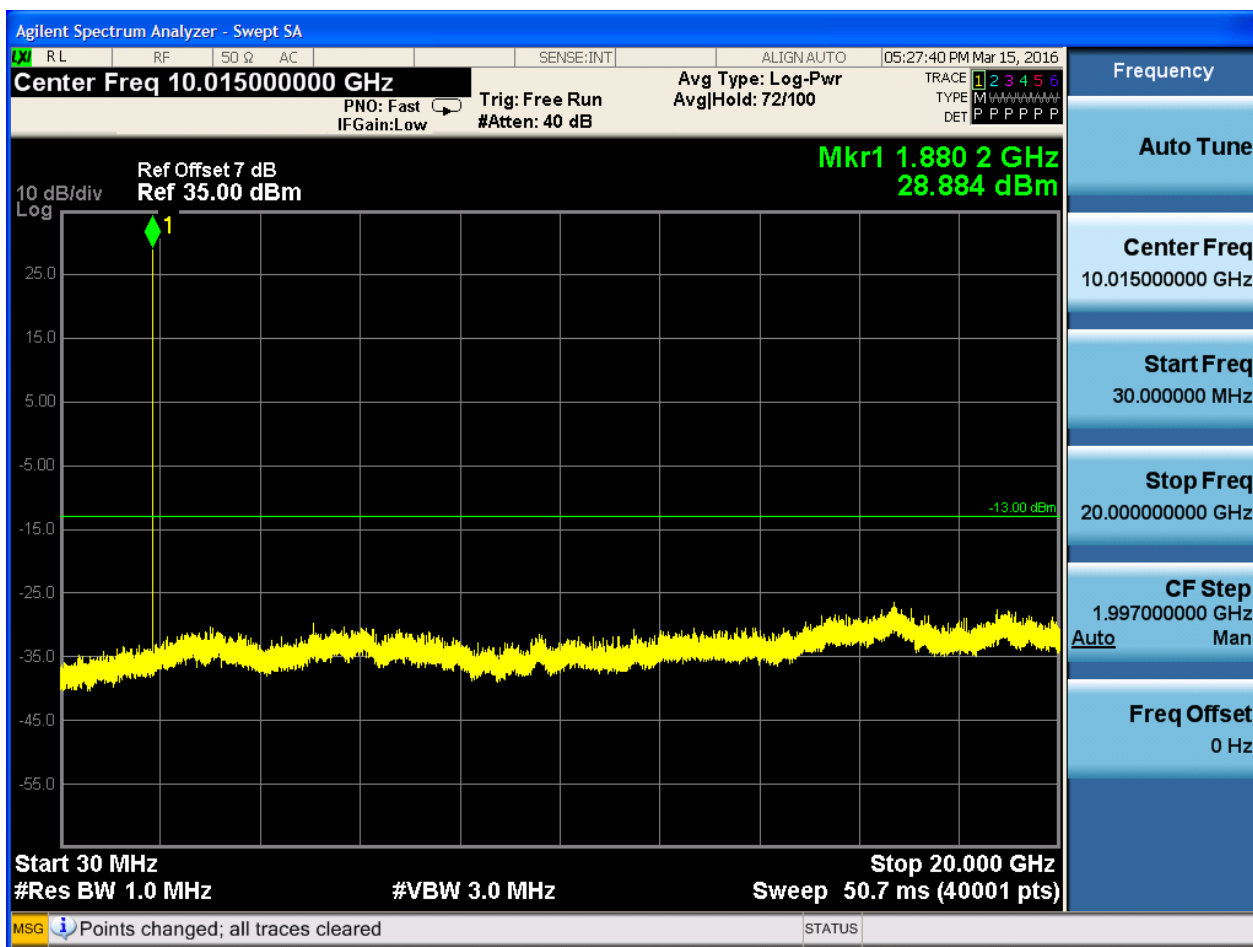




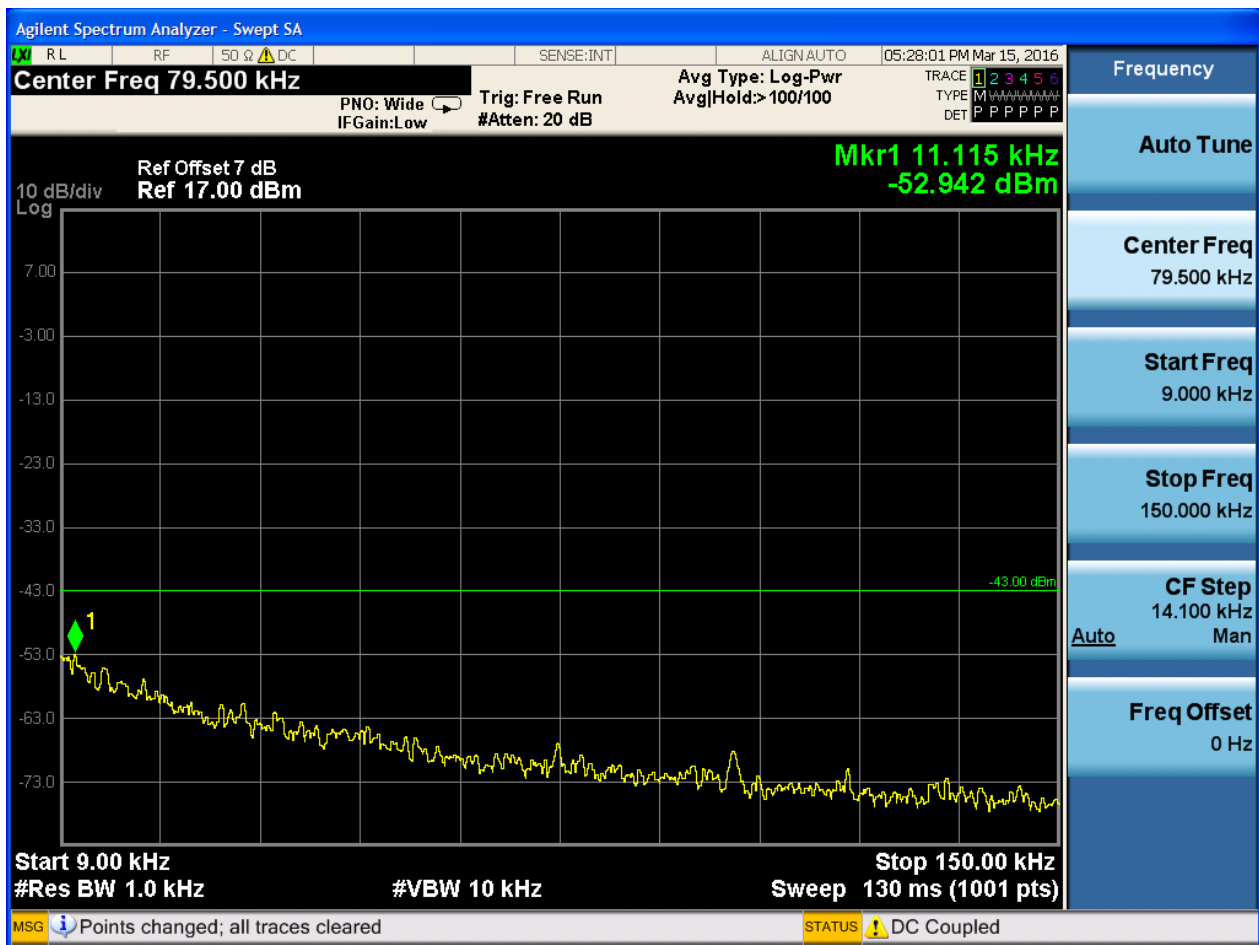
6.1.1.1.2 Test Channel = MCH

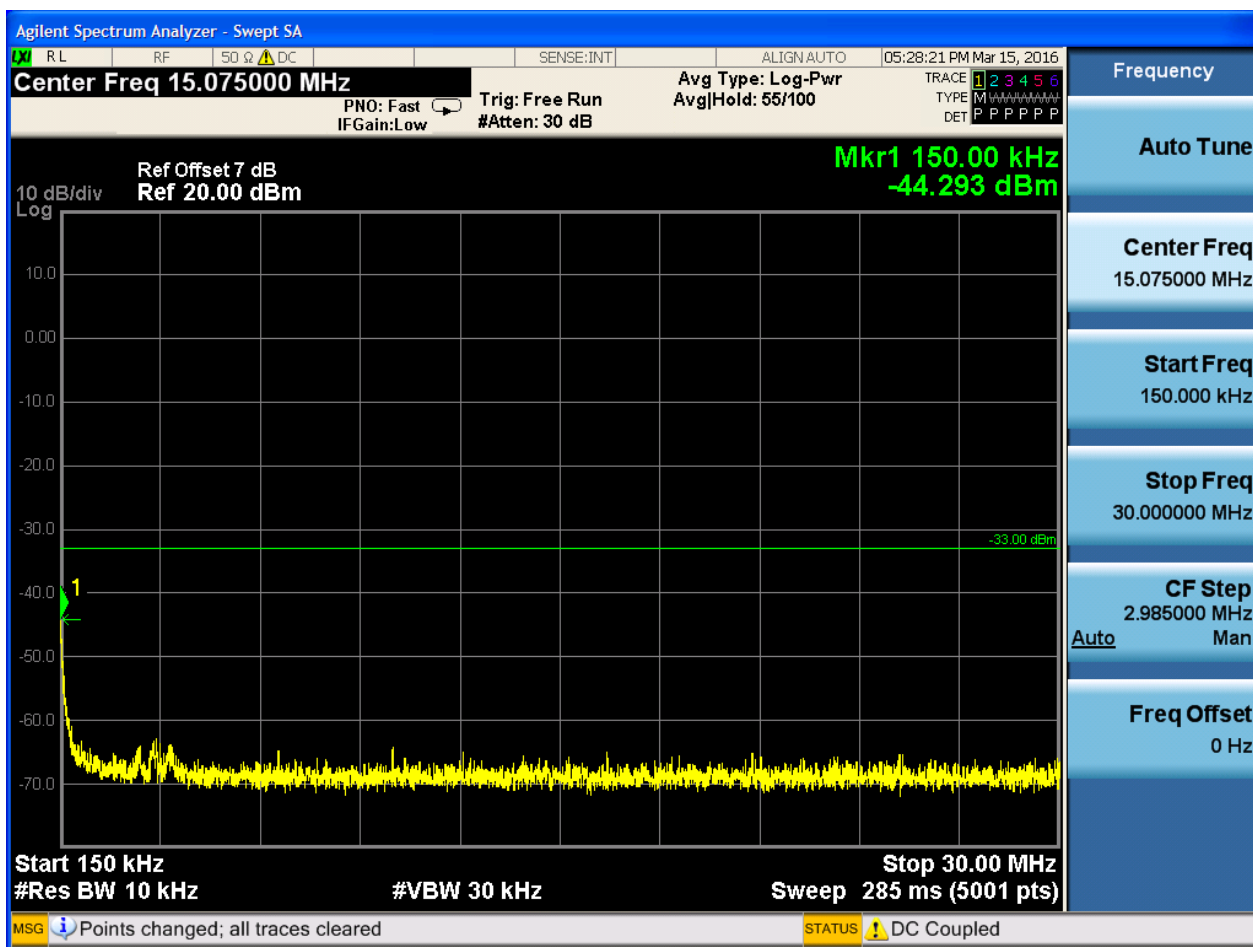


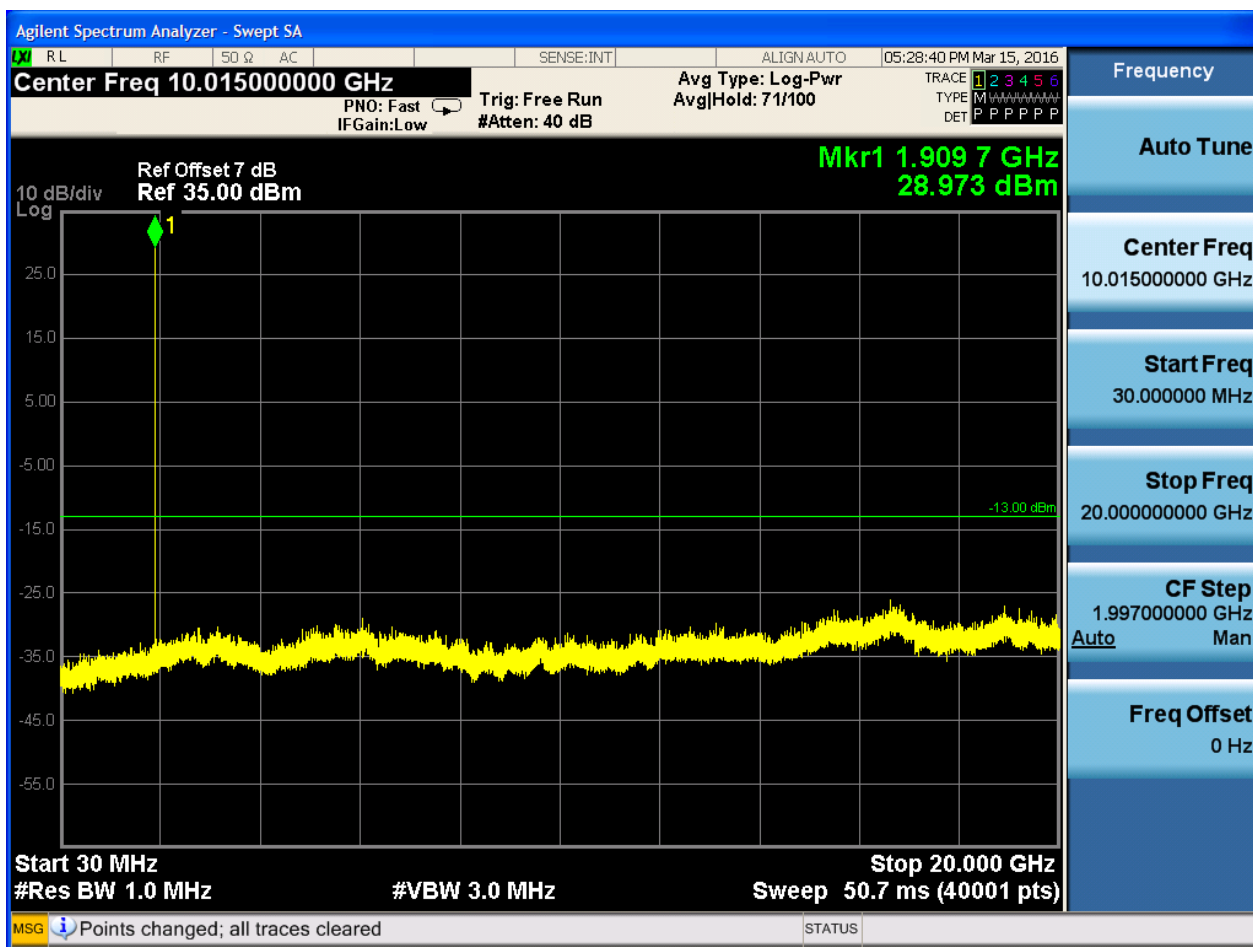




6.1.1.1.3 Test Channel = HCH



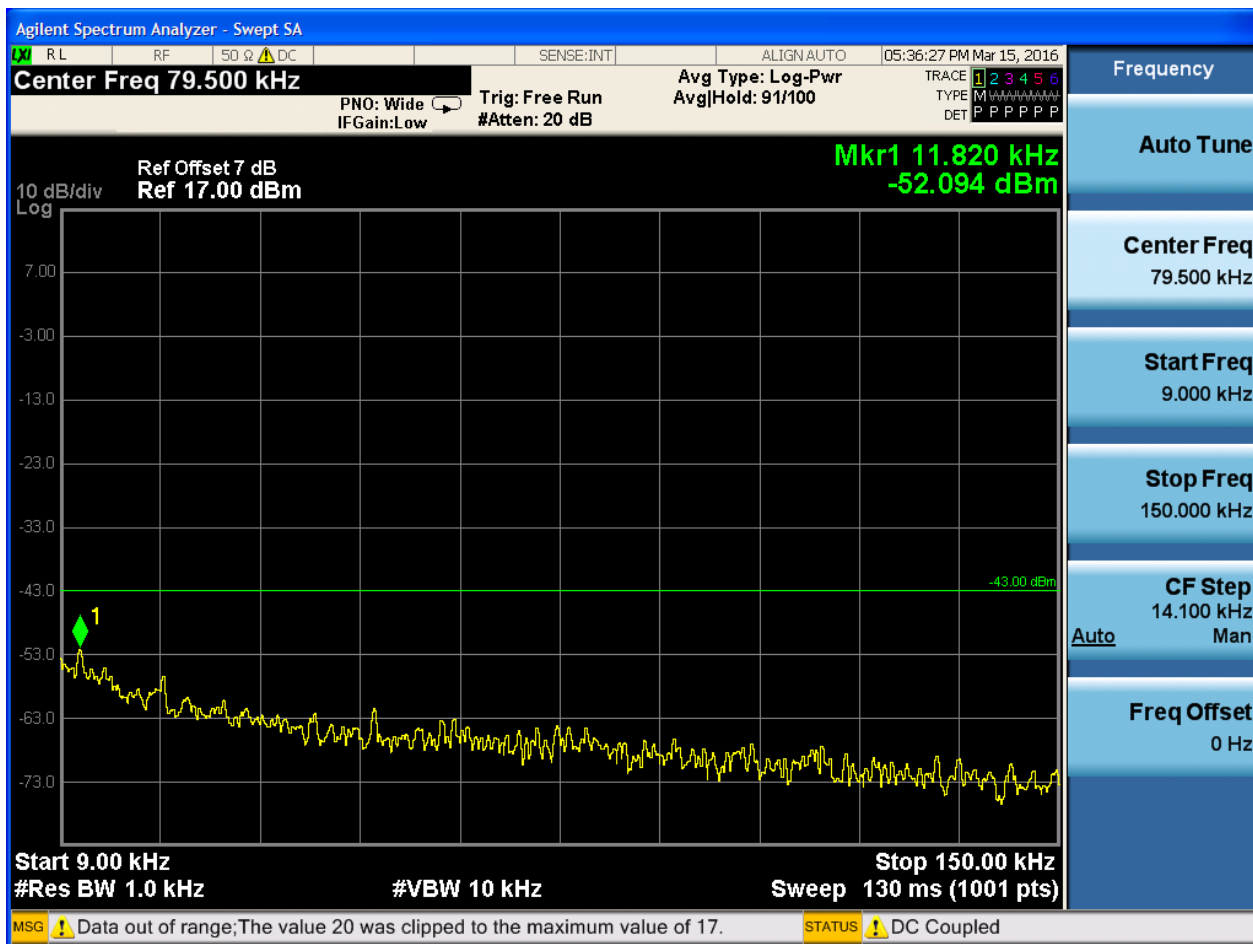


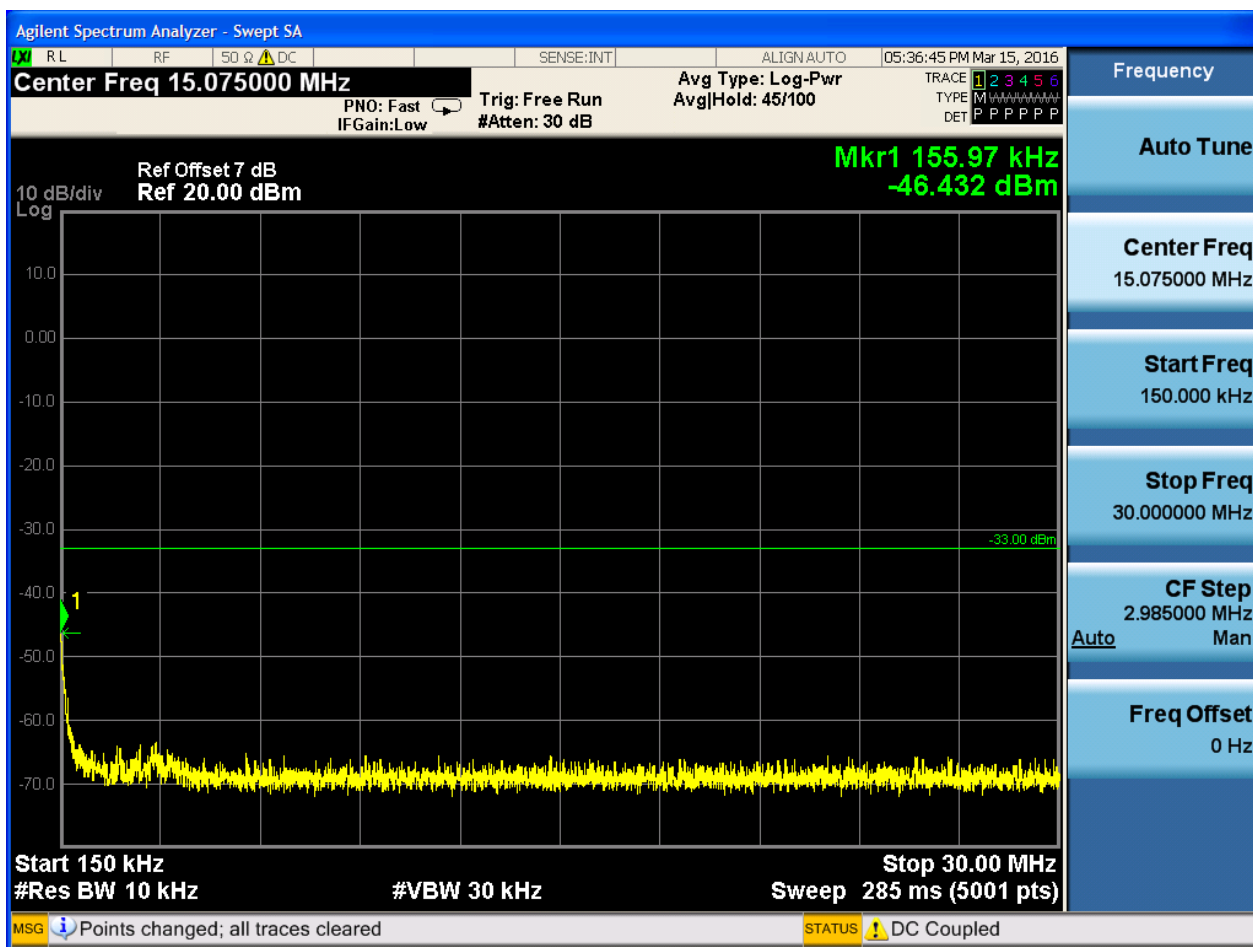


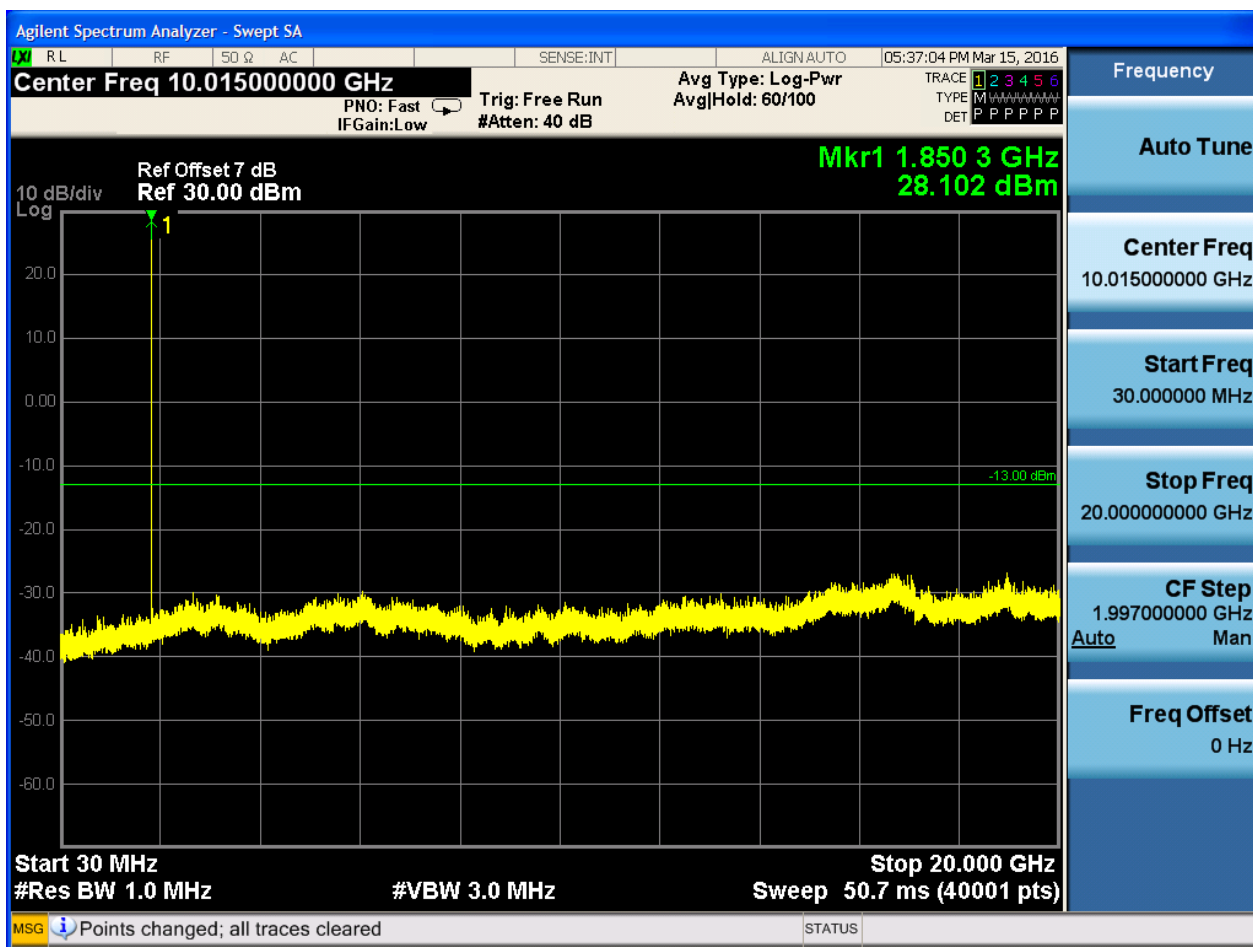


6.1.1.2 Test Mode = GSM/TM2

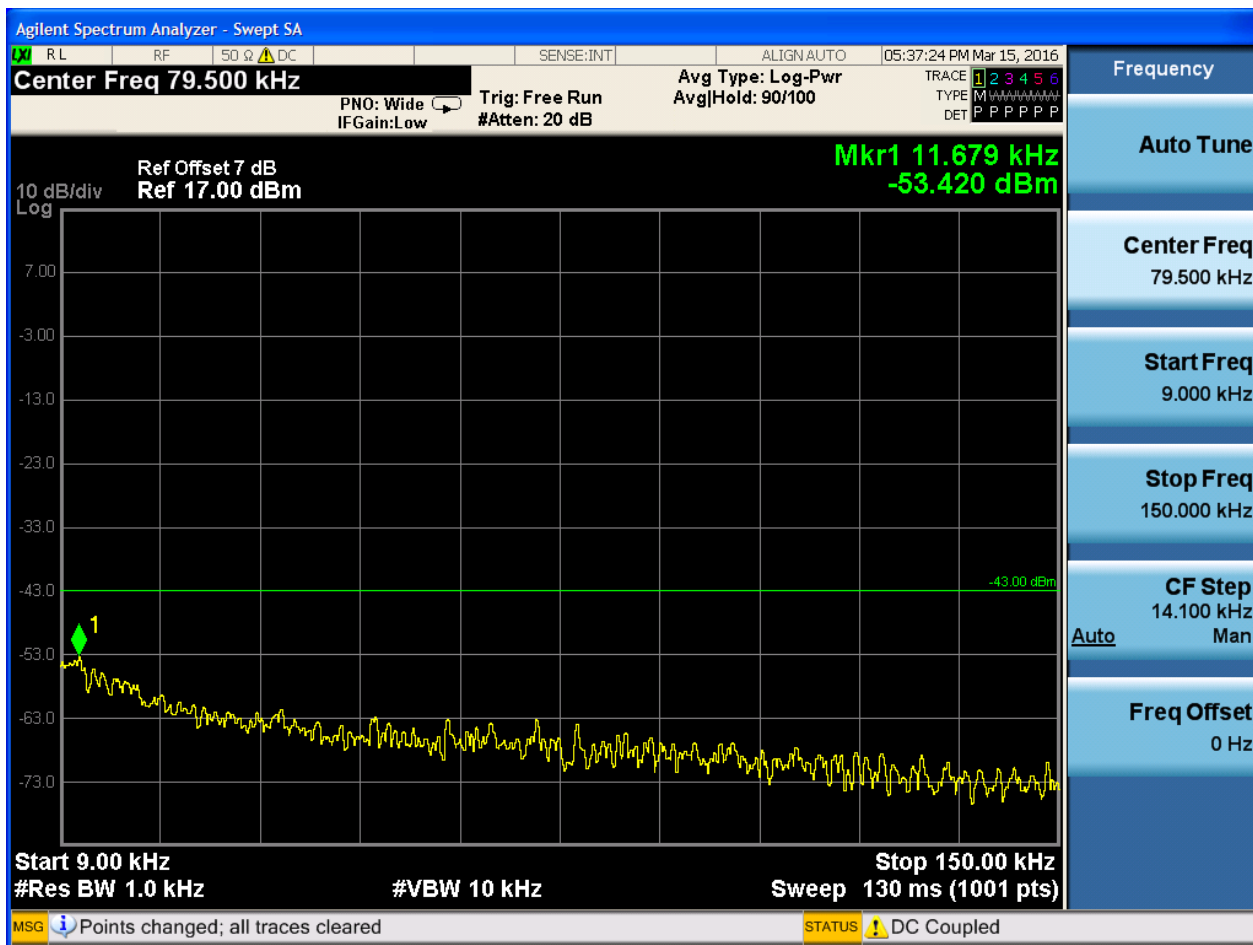
6.1.1.2.1 Test Channel = LCH

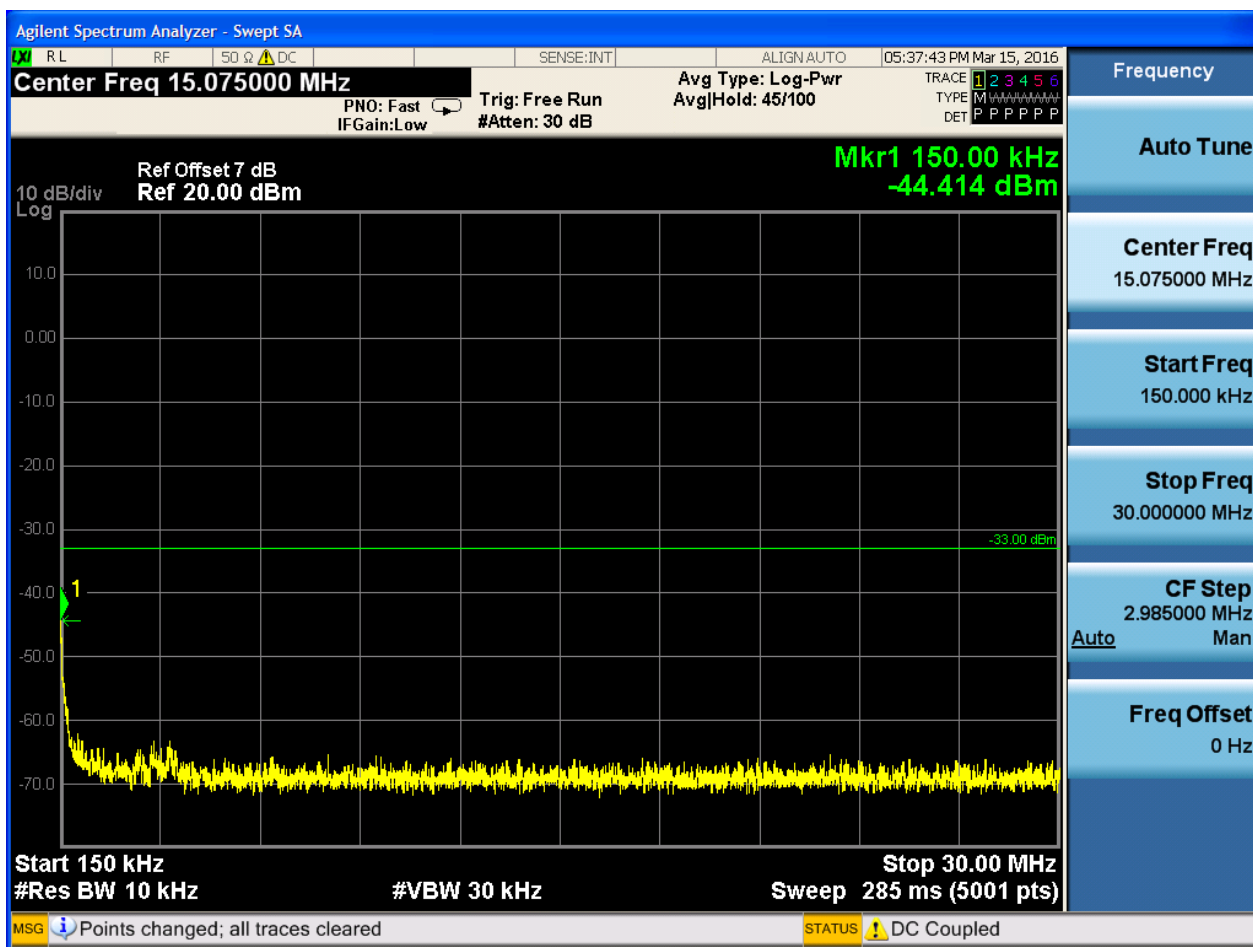


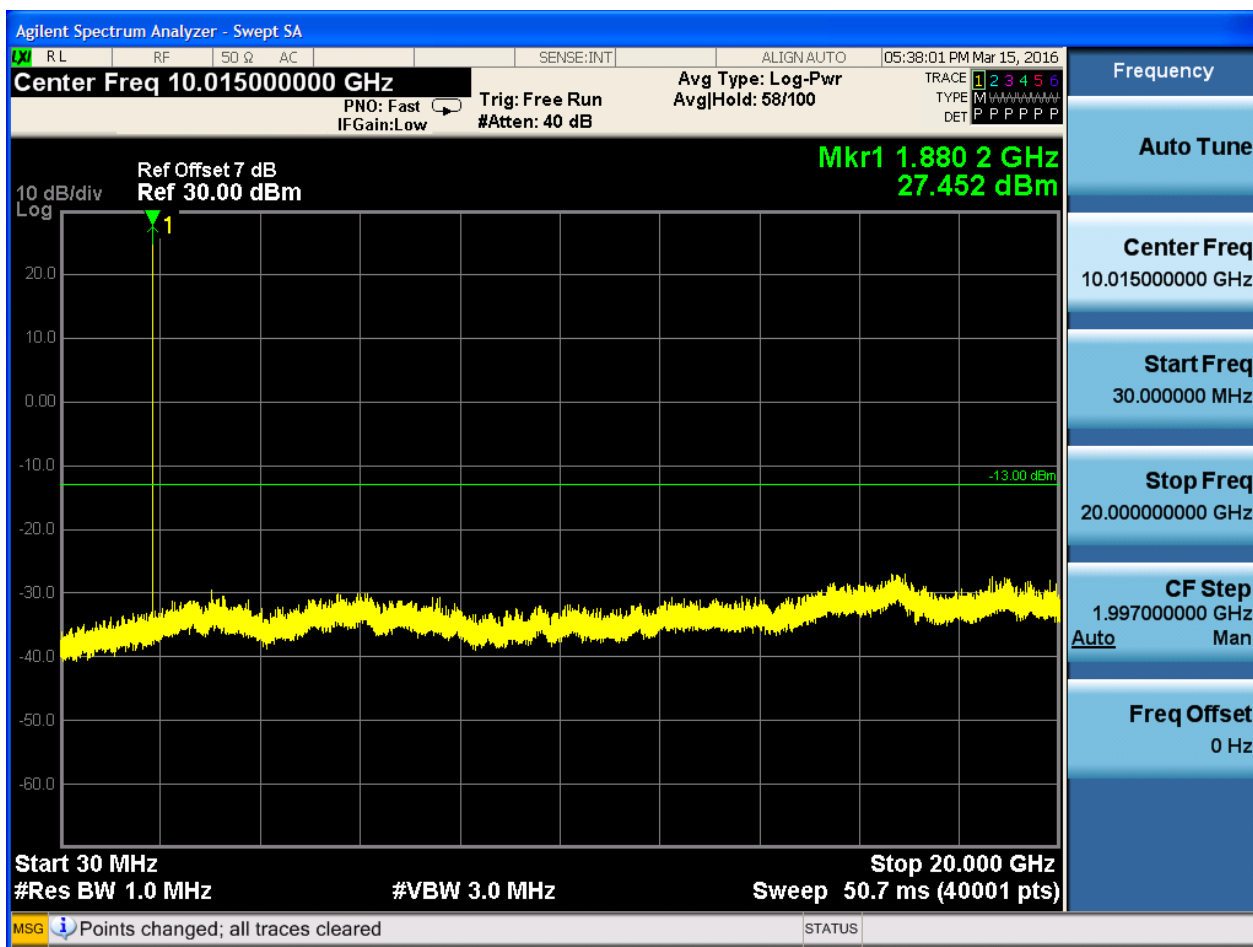




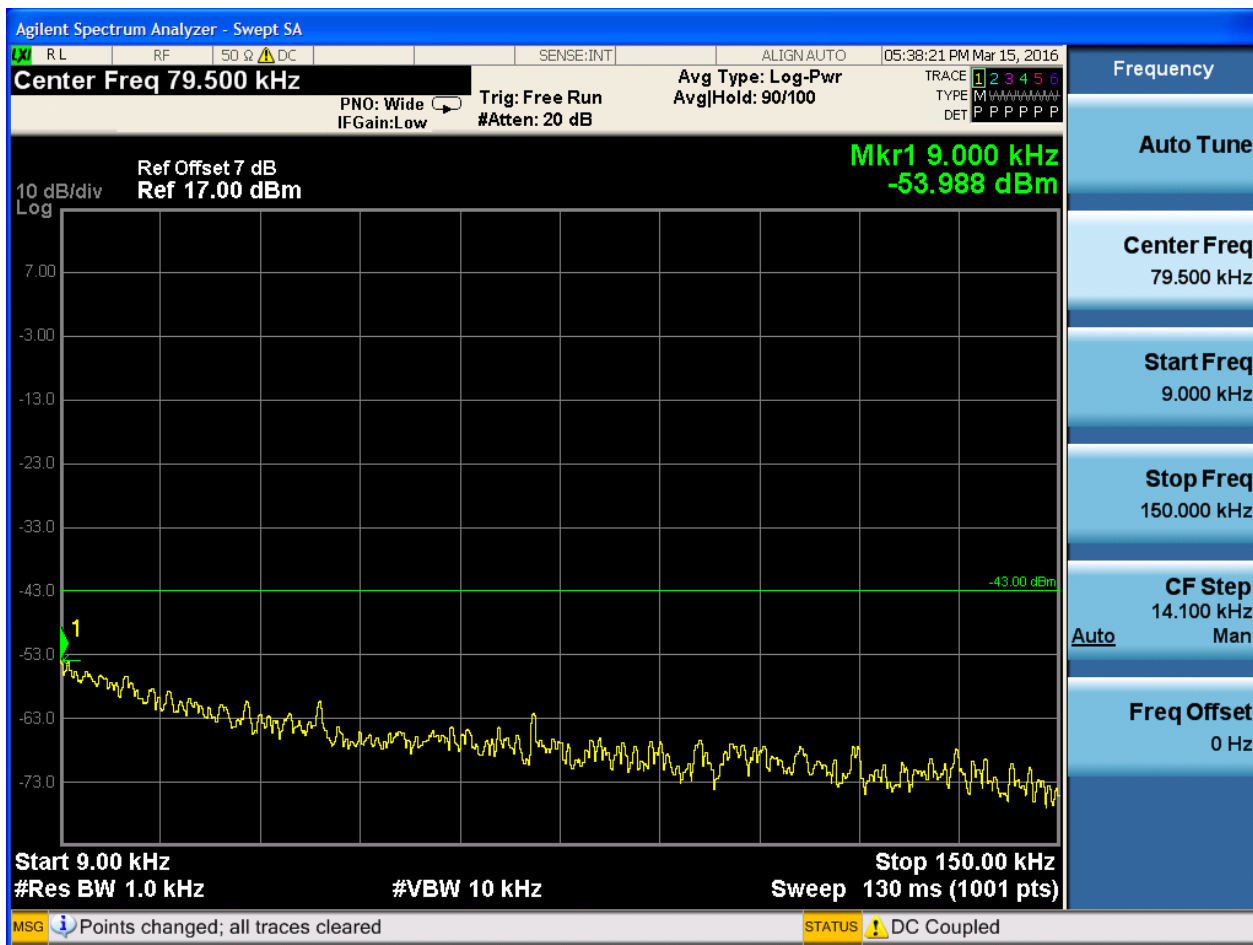
6.1.1.2.2 Test Channel = MCH

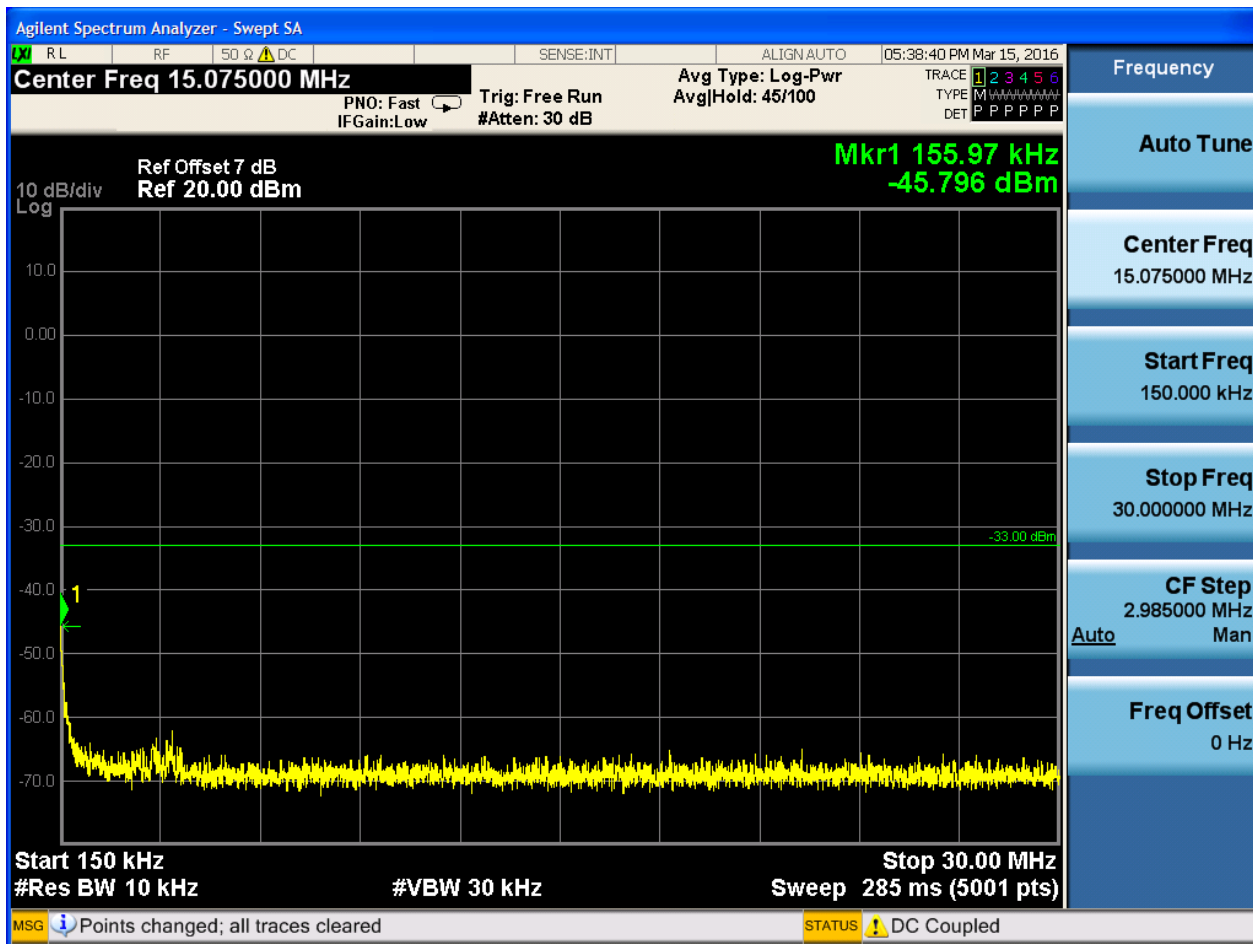


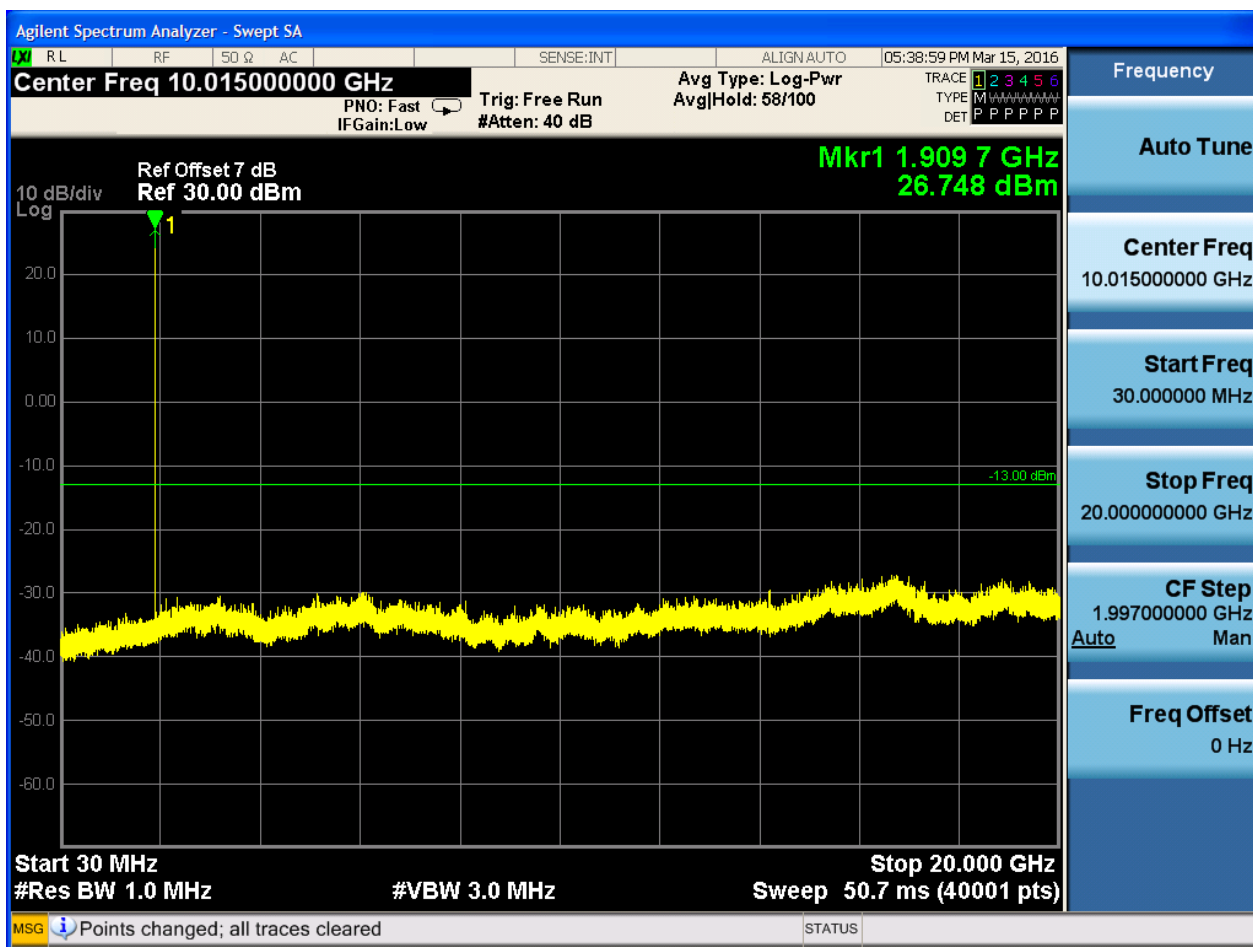




6.1.1.2.3 Test Channel = HCH





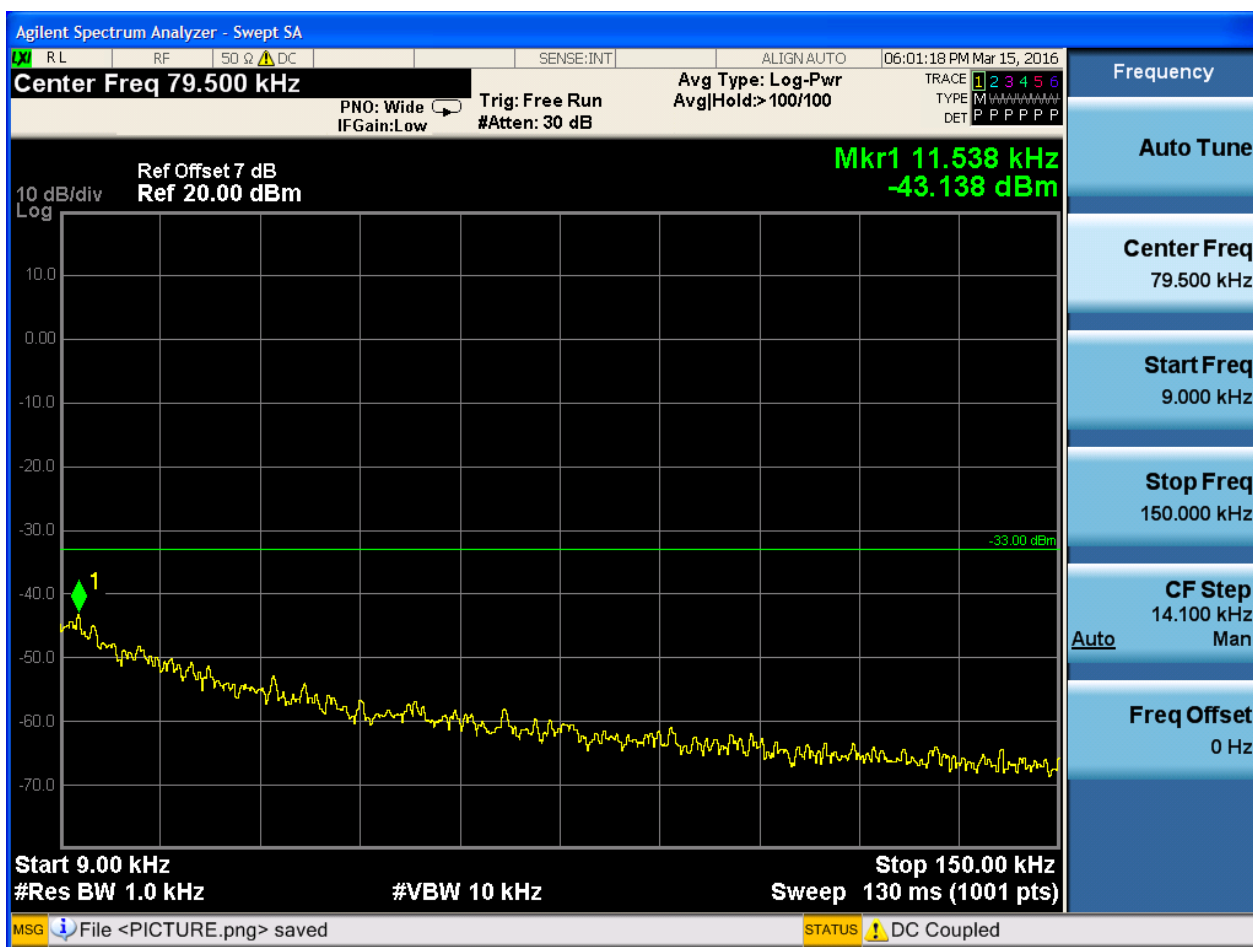


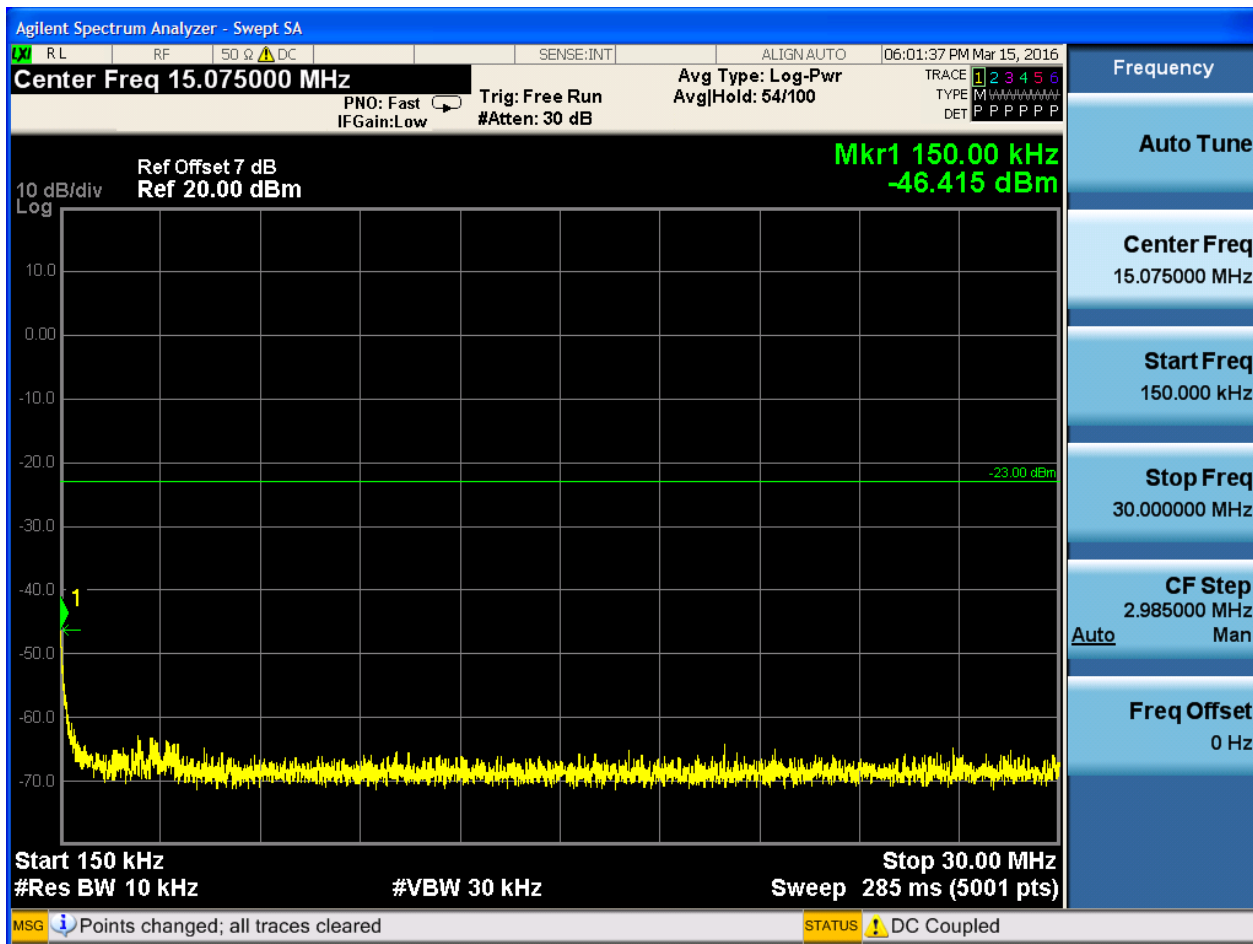


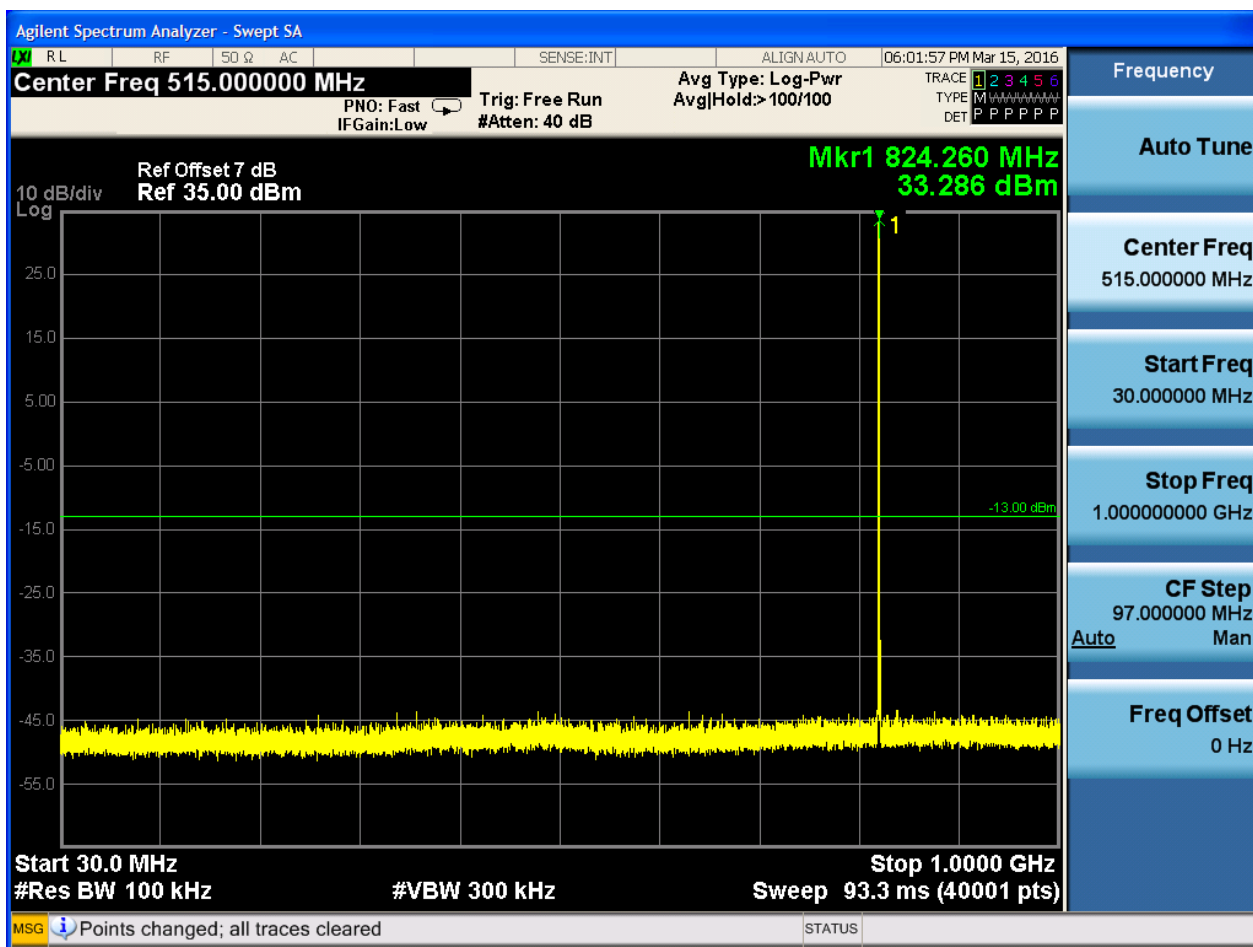
6.1.2 Test Band = GSM850

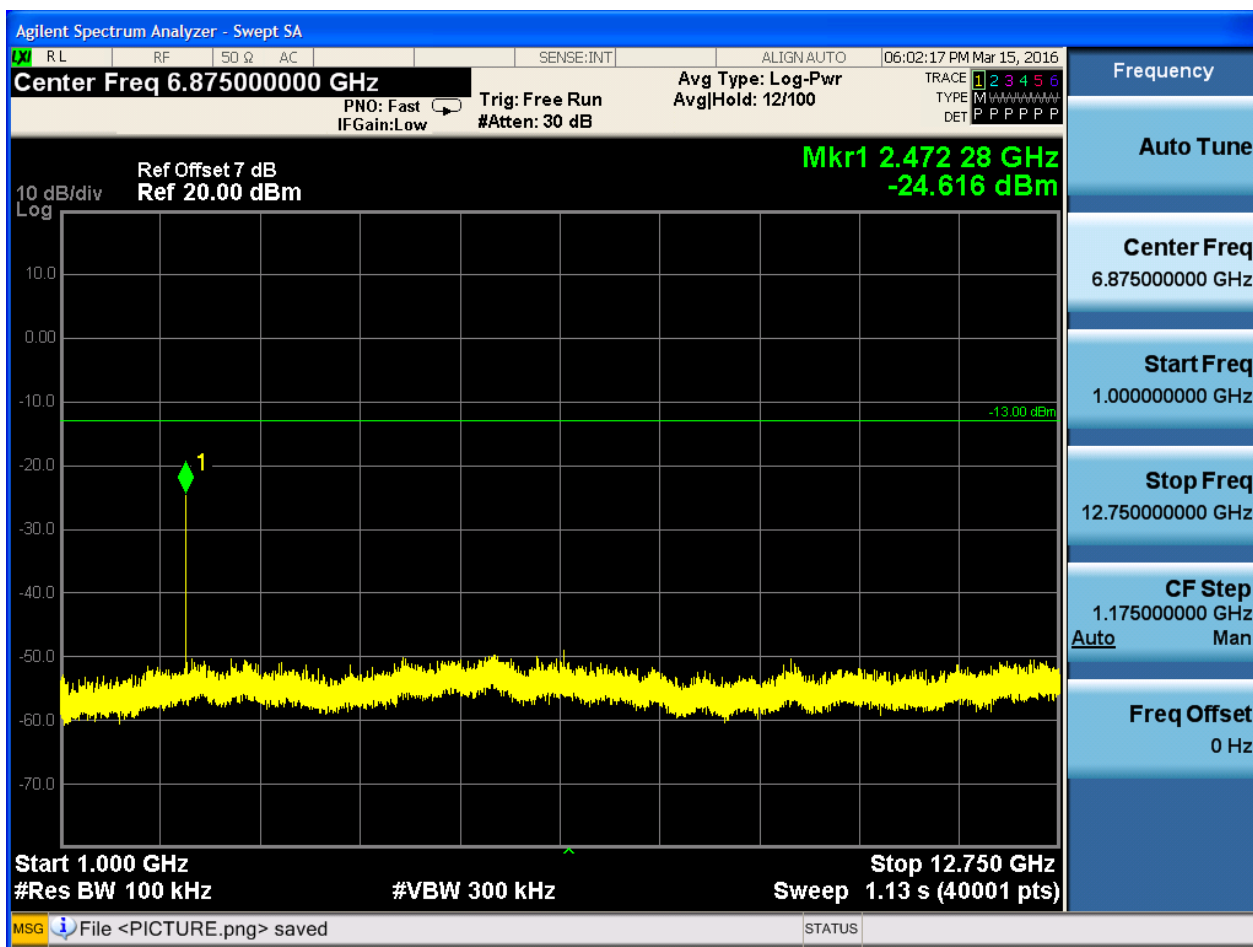
6.1.2.1 Test Mode = GSM/TM1

6.1.2.1.1 Test Channel = LCH

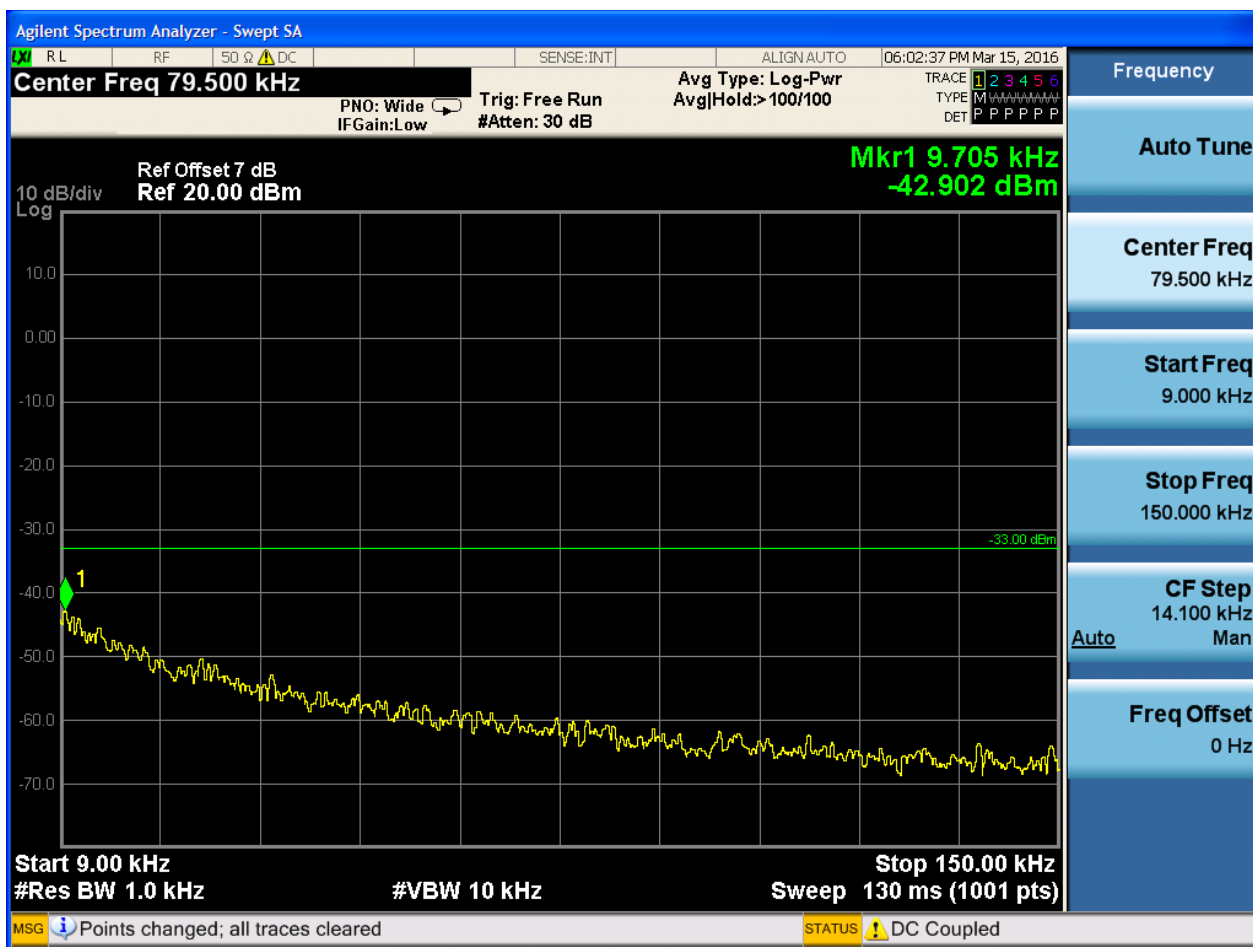


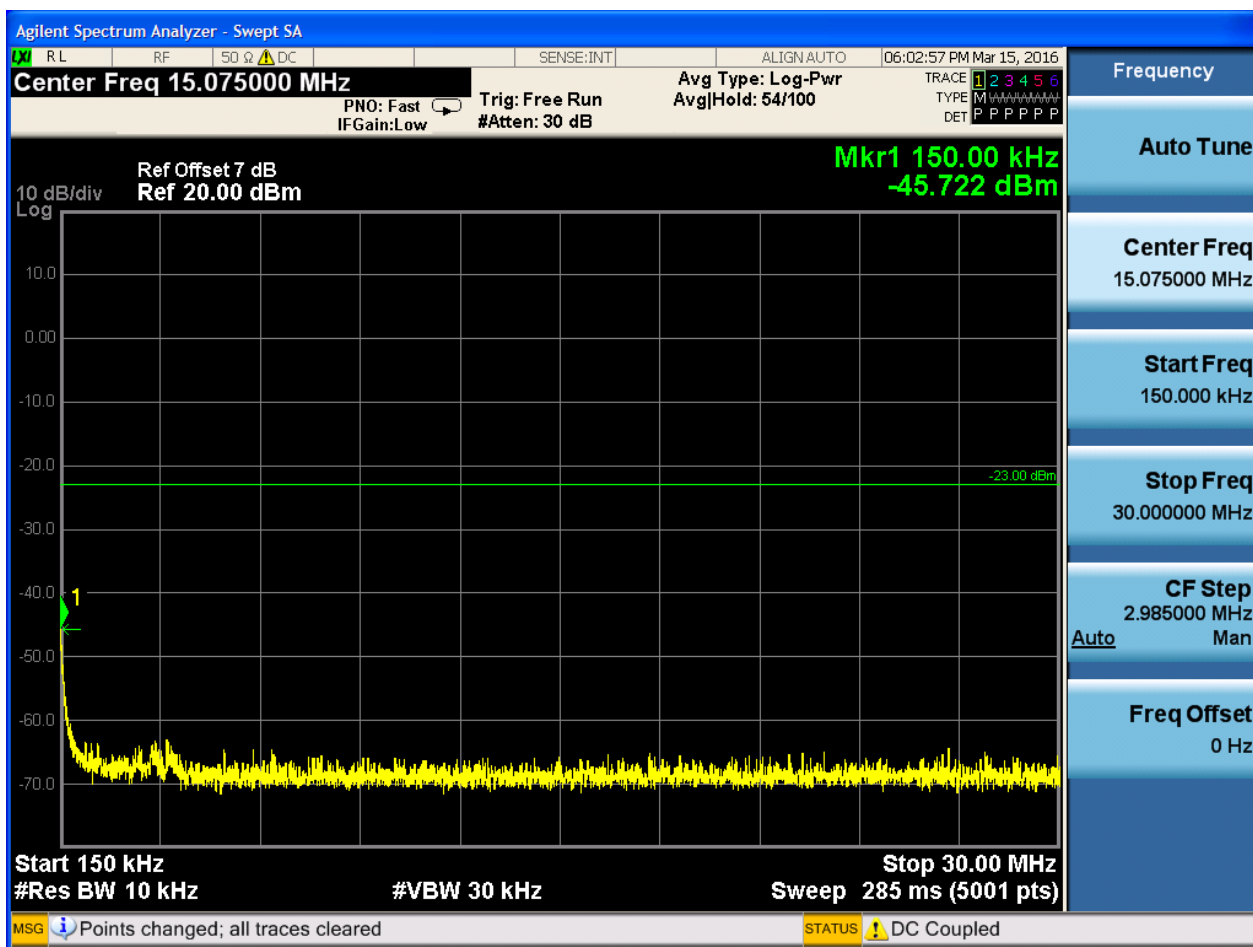


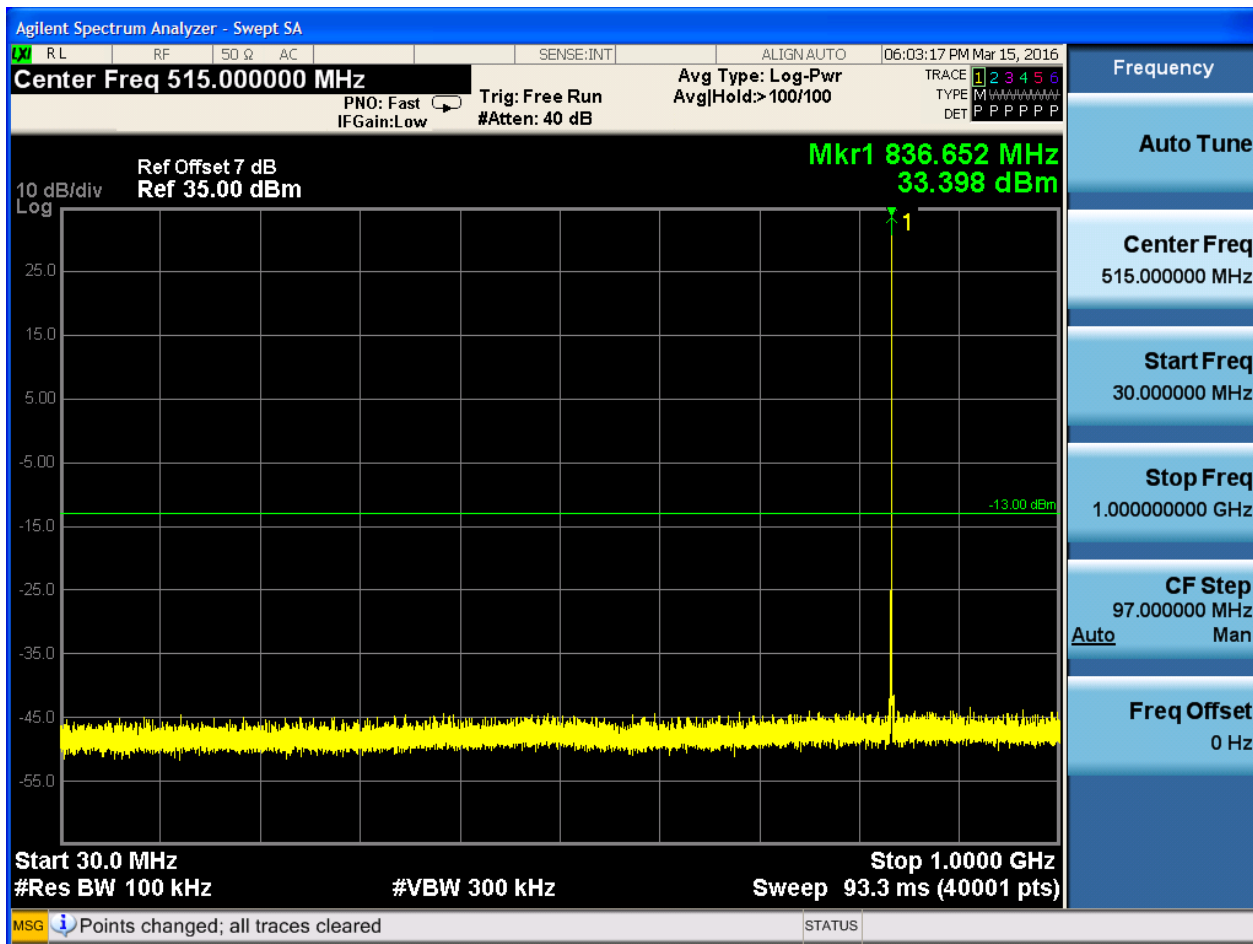


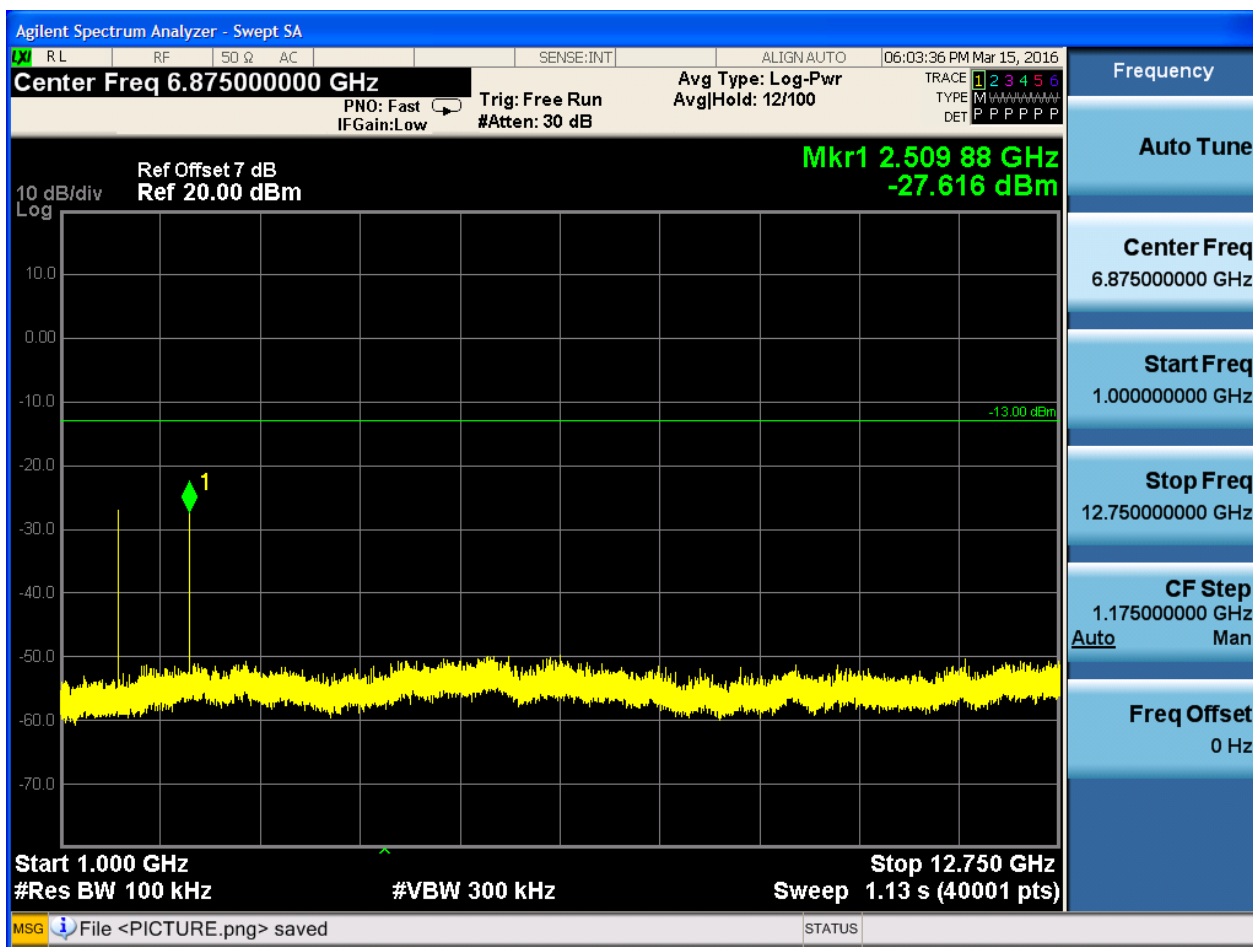


6.1.2.1.2 Test Channel = MCH

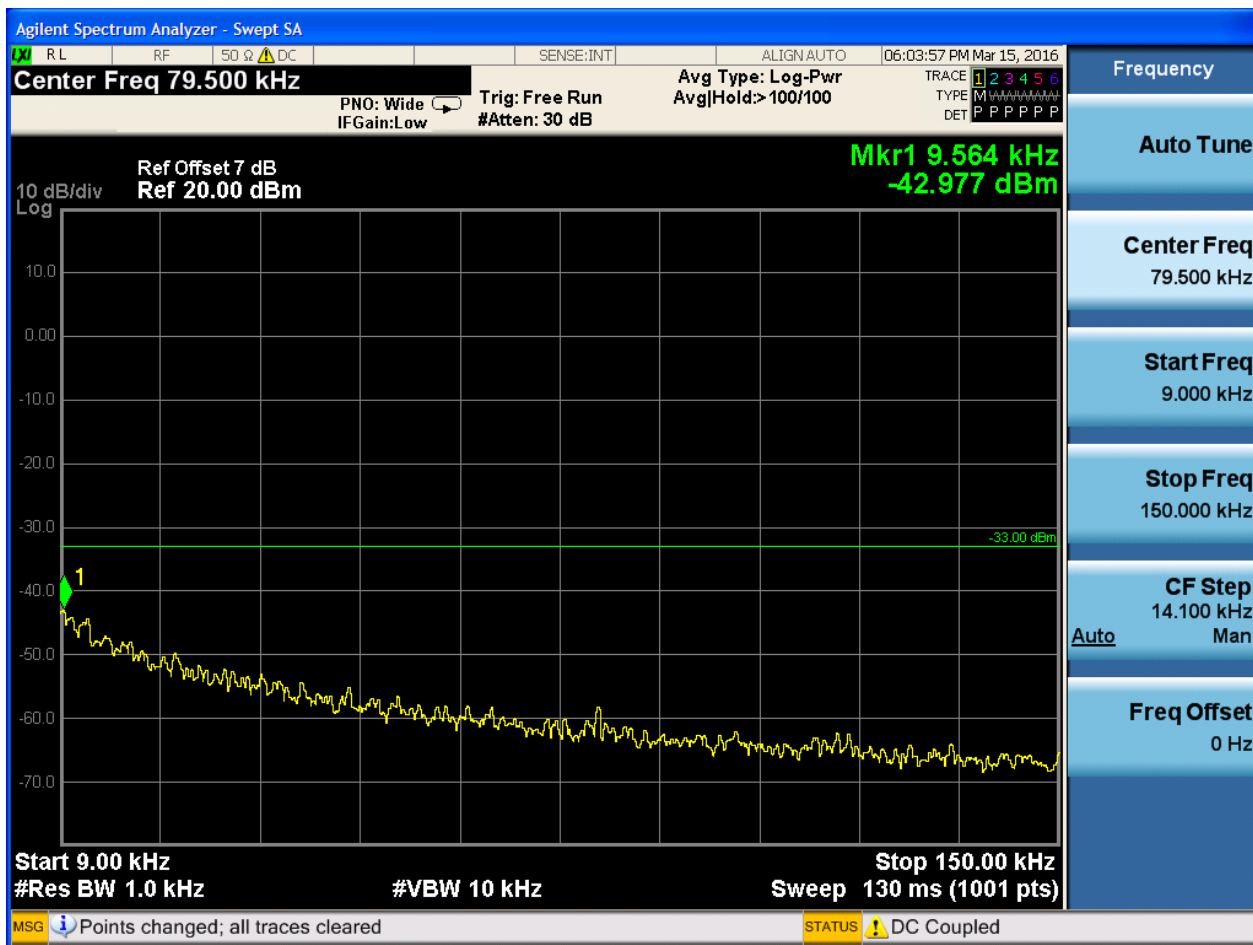


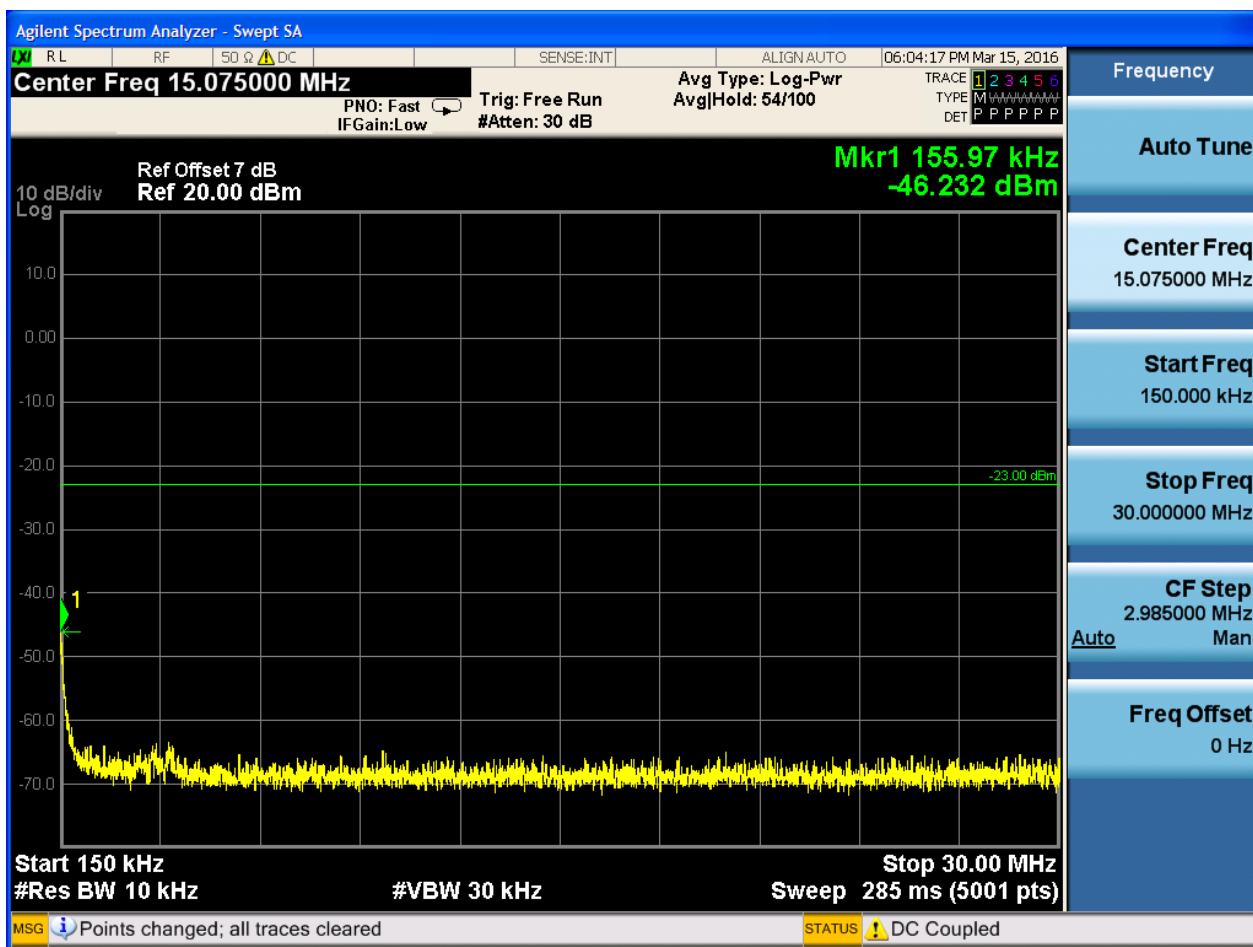


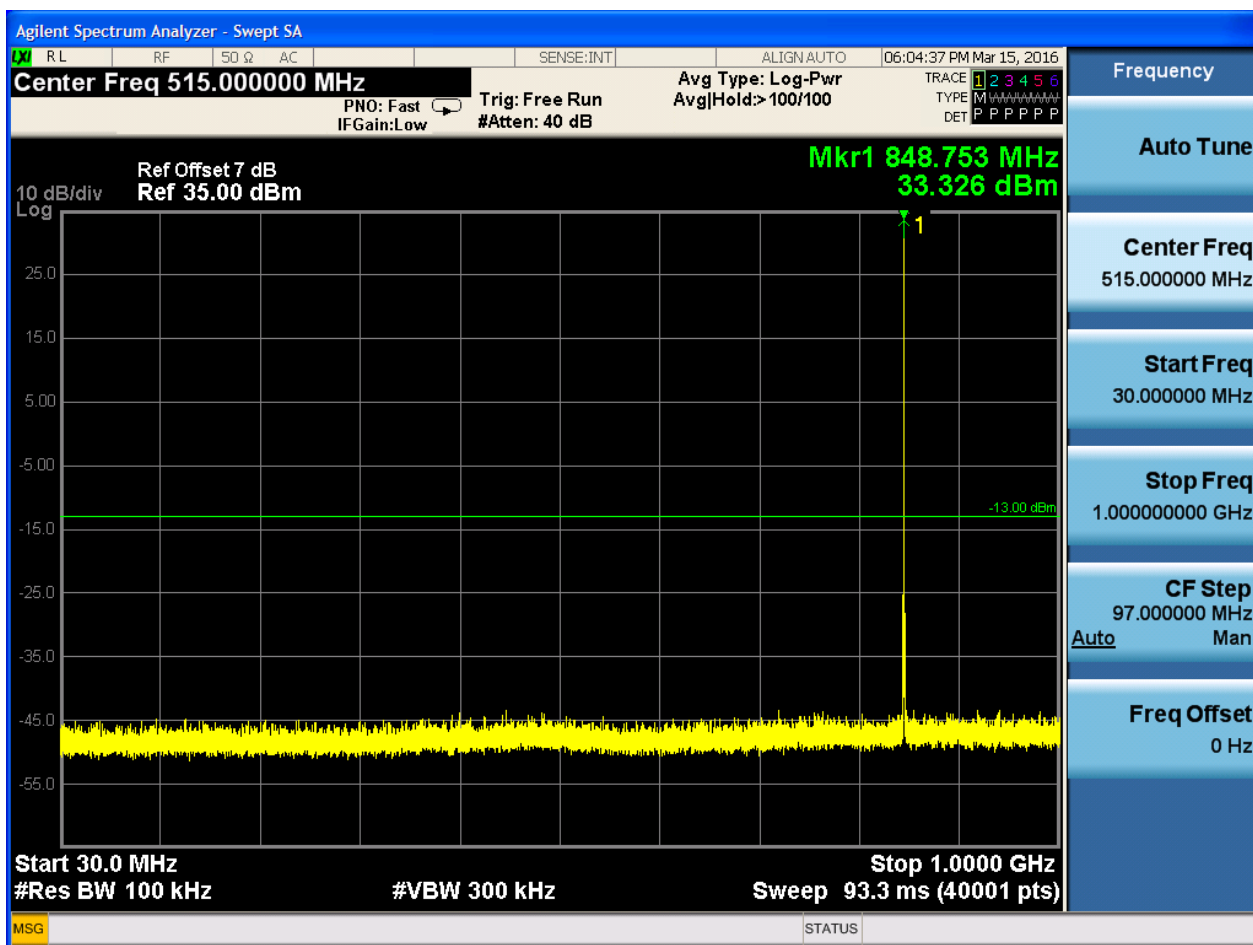


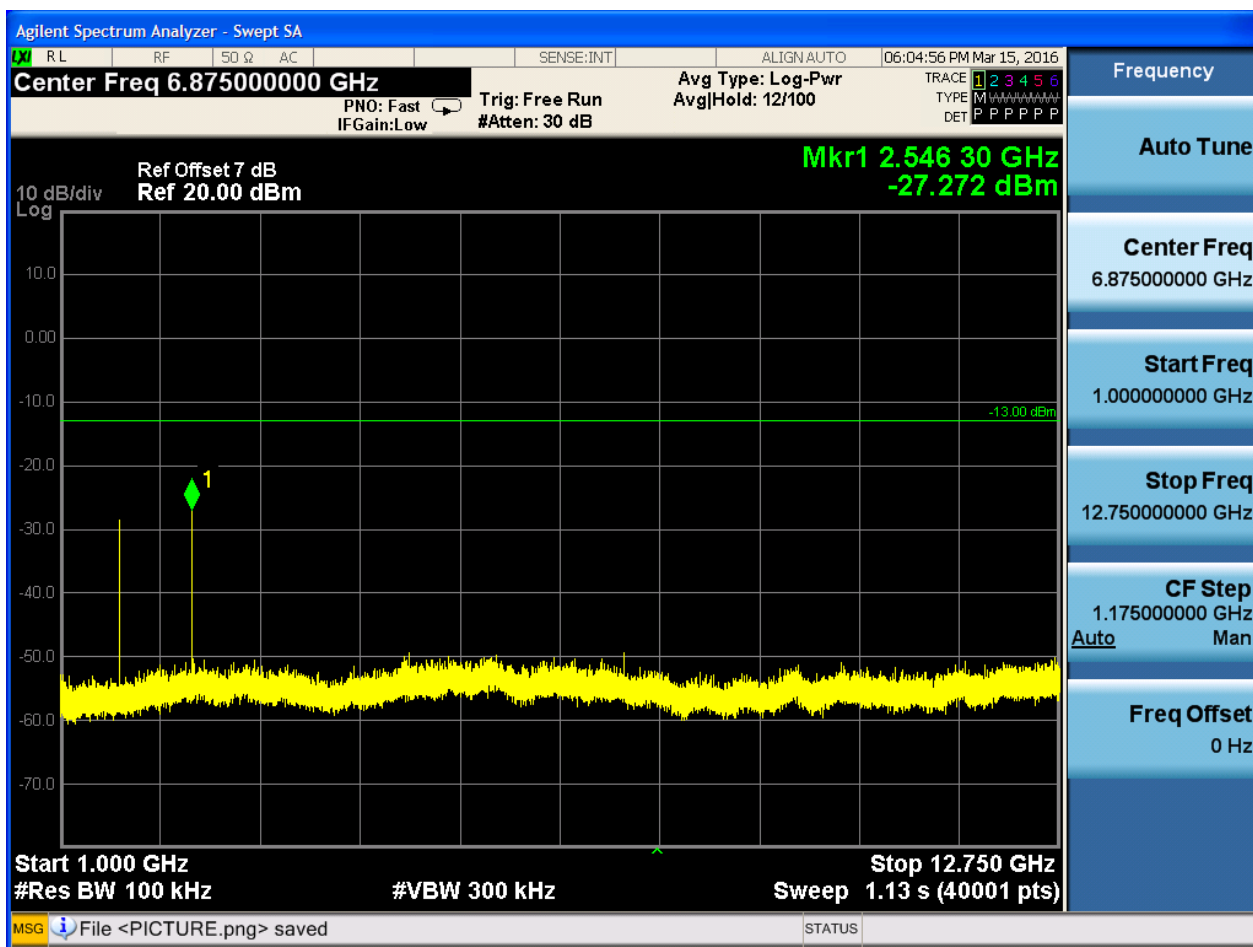


6.1.2.1.3 Test Channel = HCH





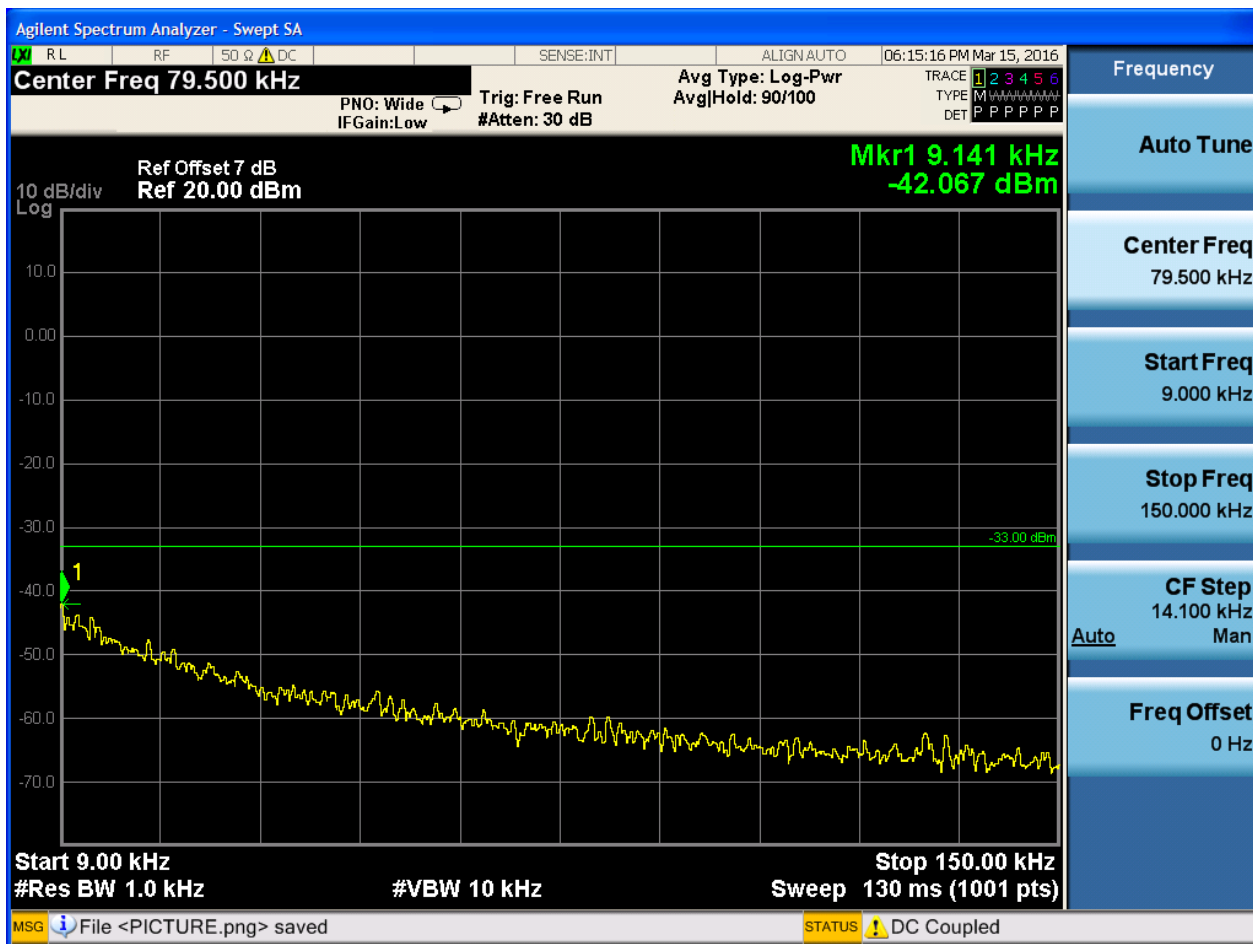


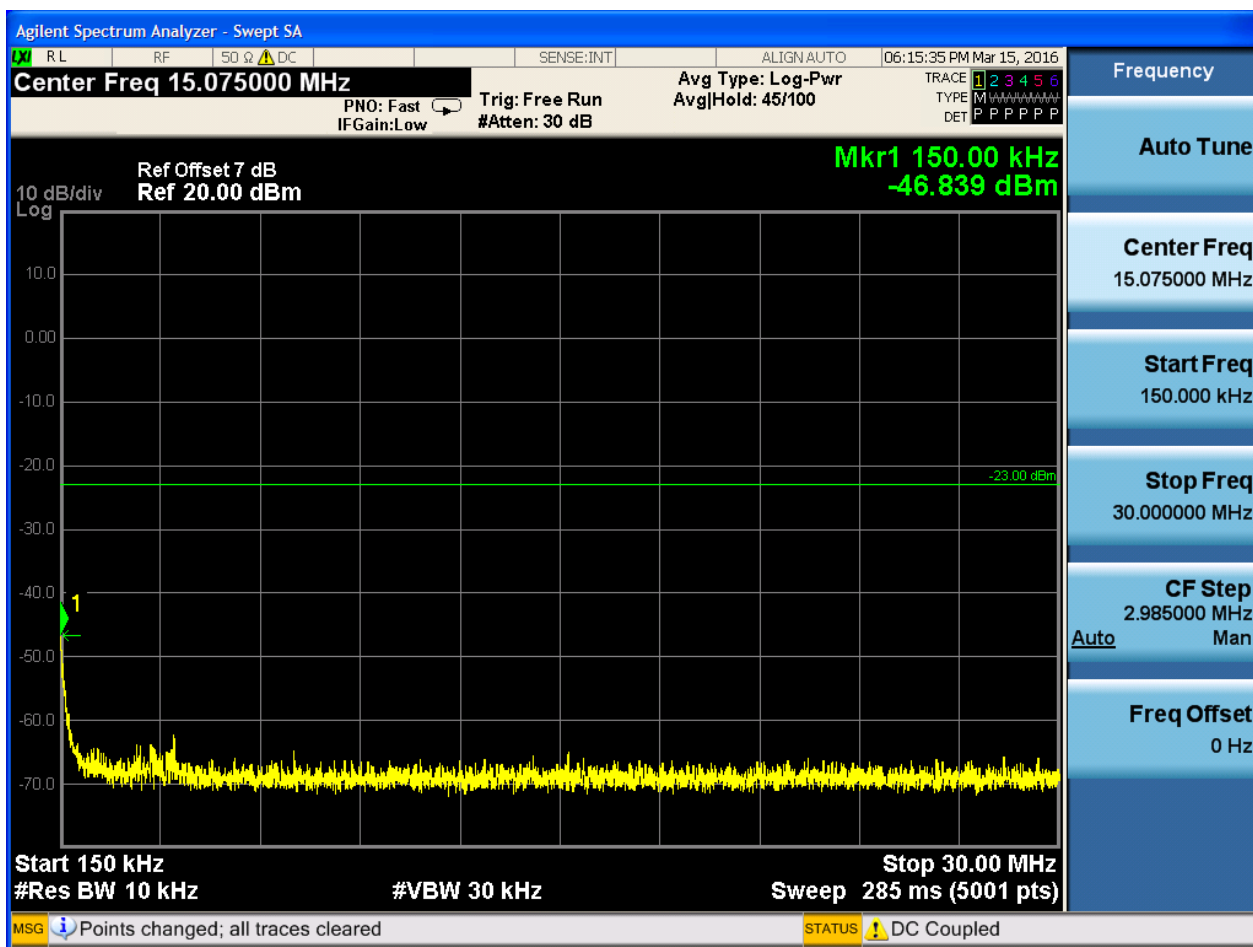


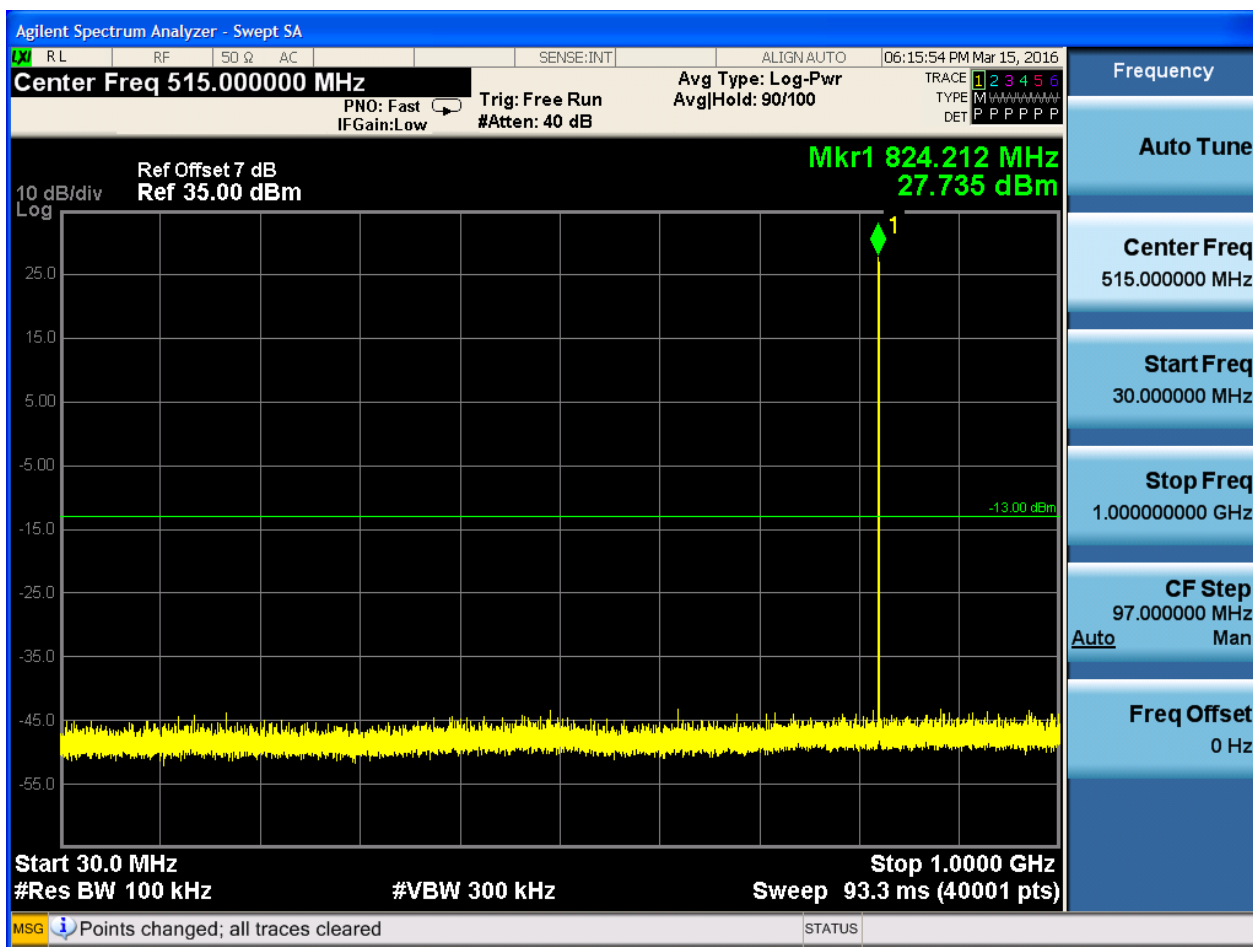


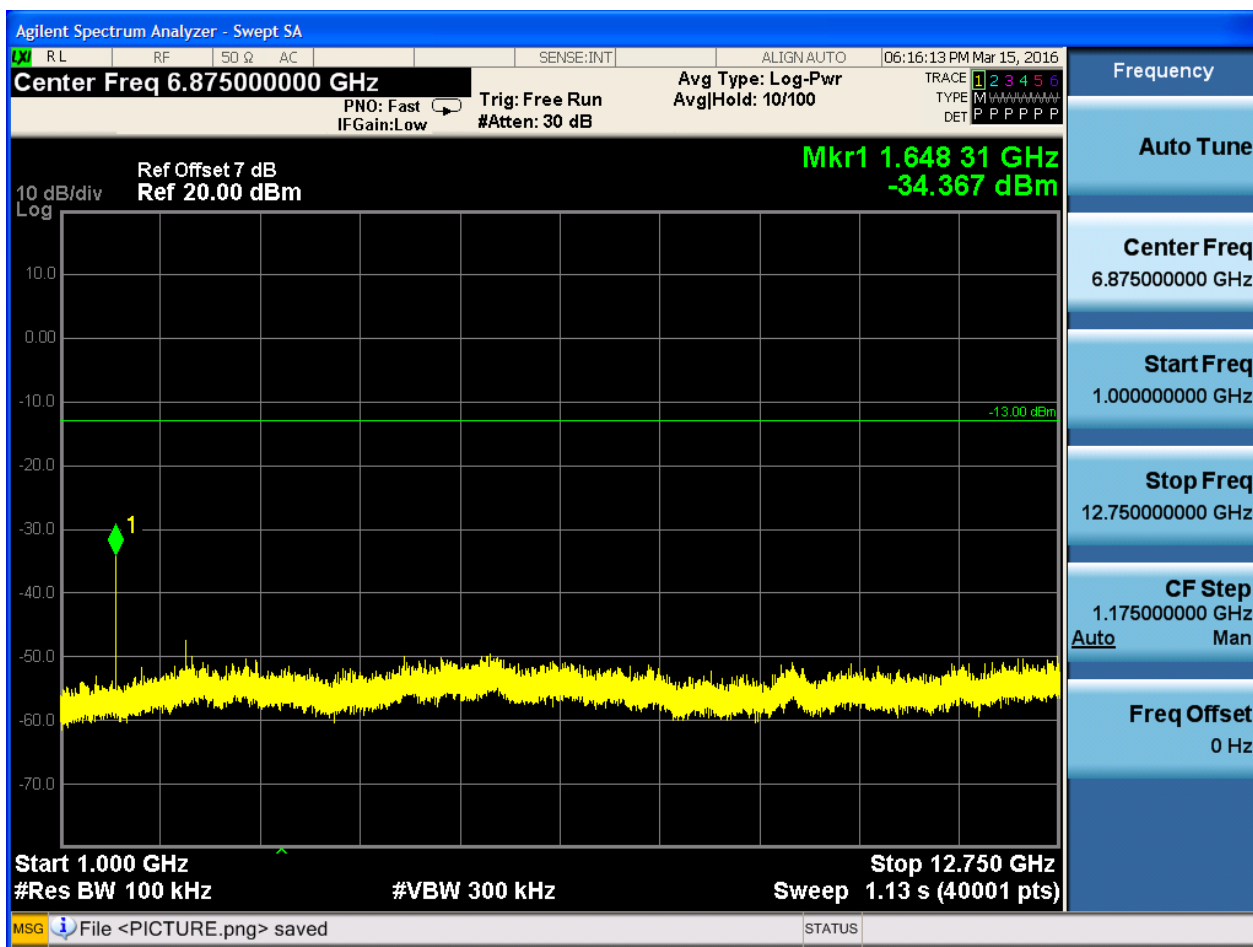
6.1.2.2 Test Mode = GSM/TM2

6.1.2.2.1 Test Channel = LCH

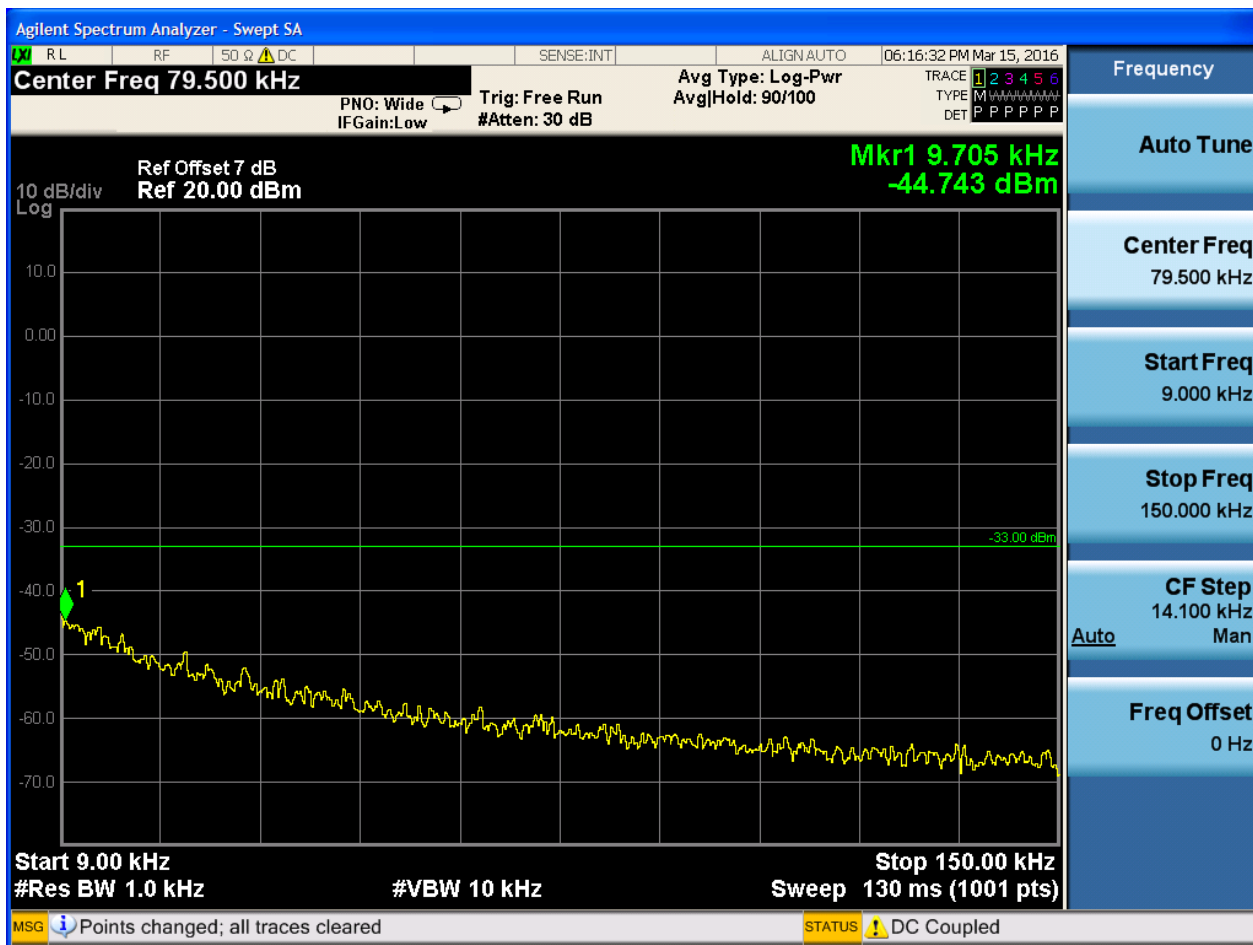


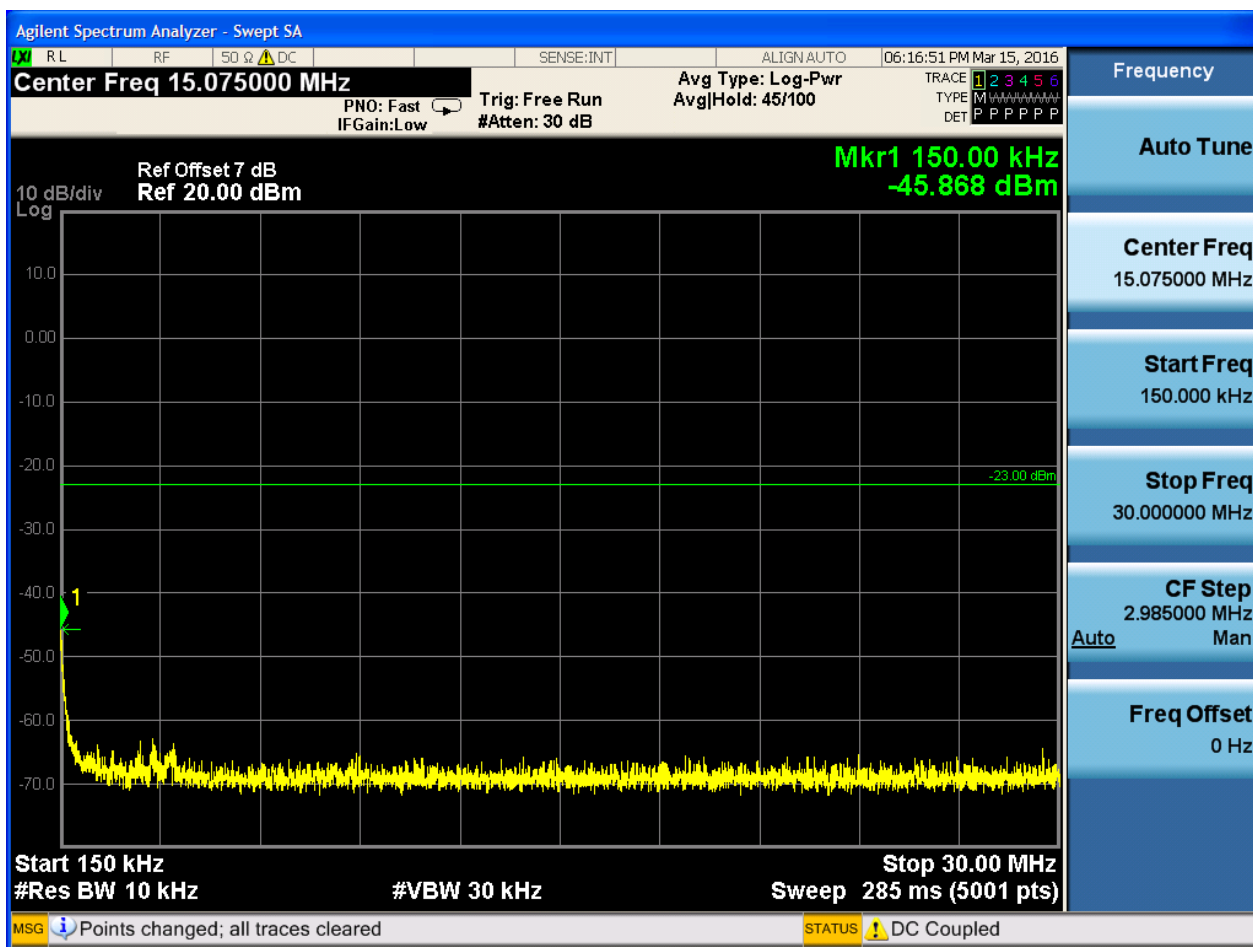


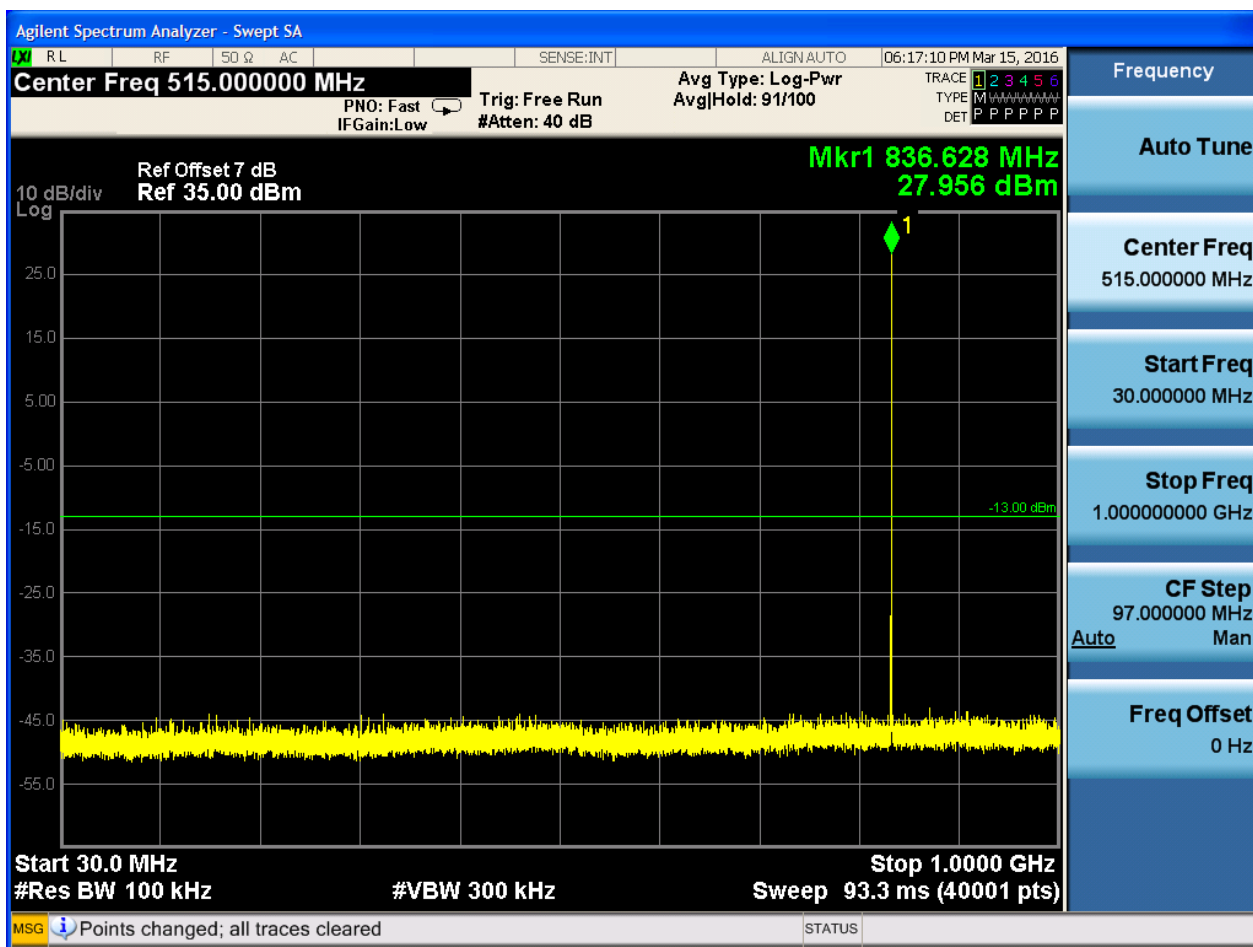


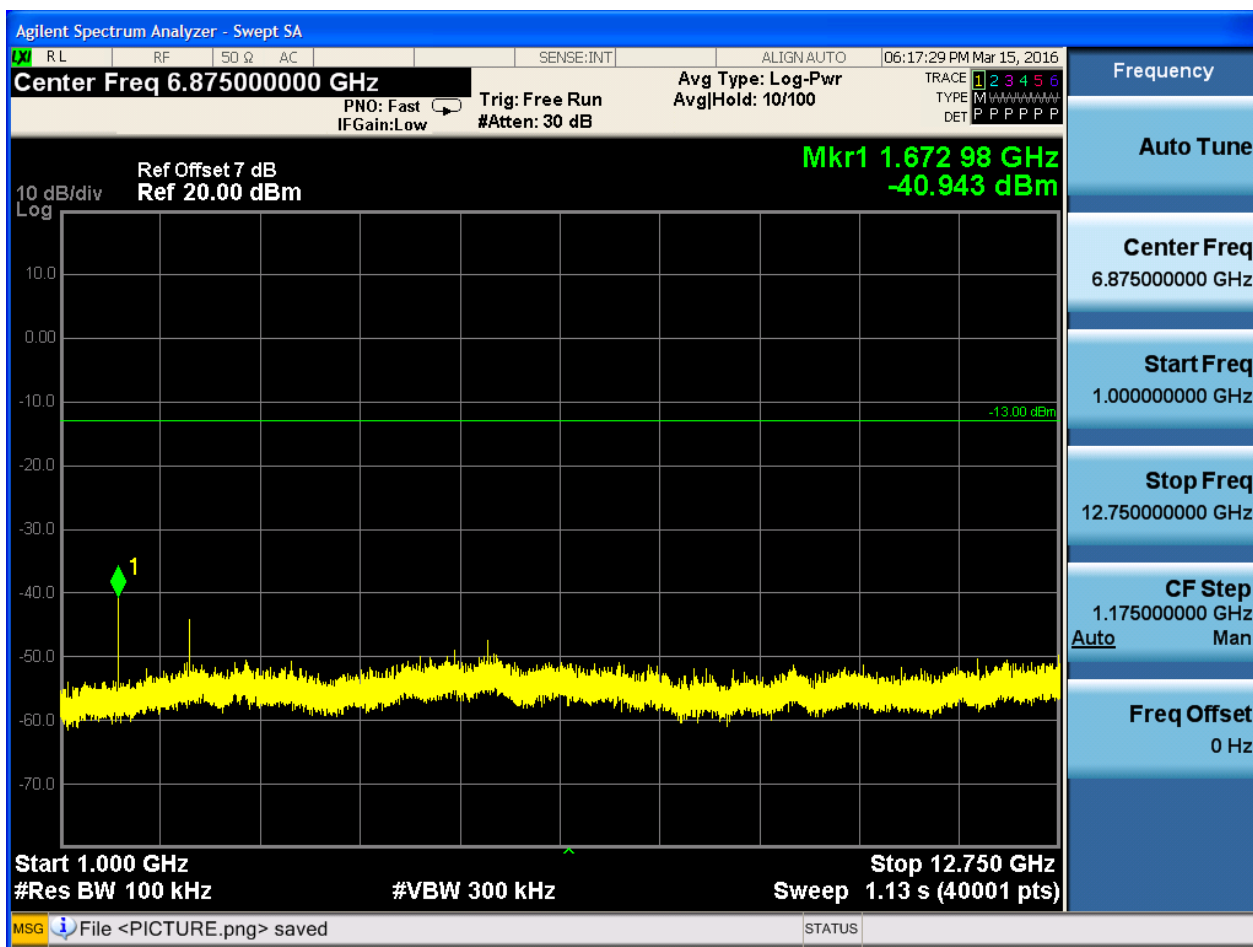


6.1.2.2.2 Test Channel = MCH

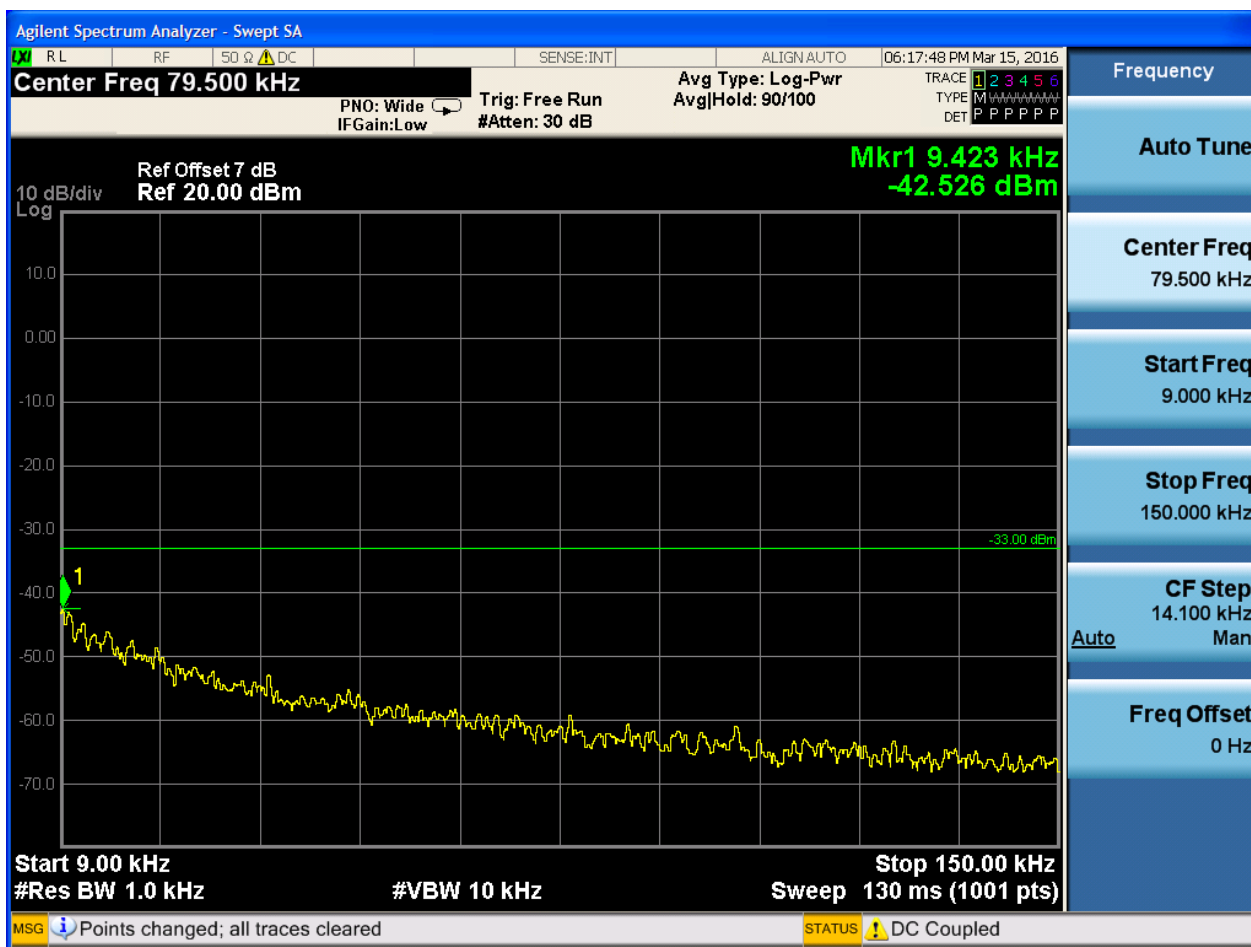


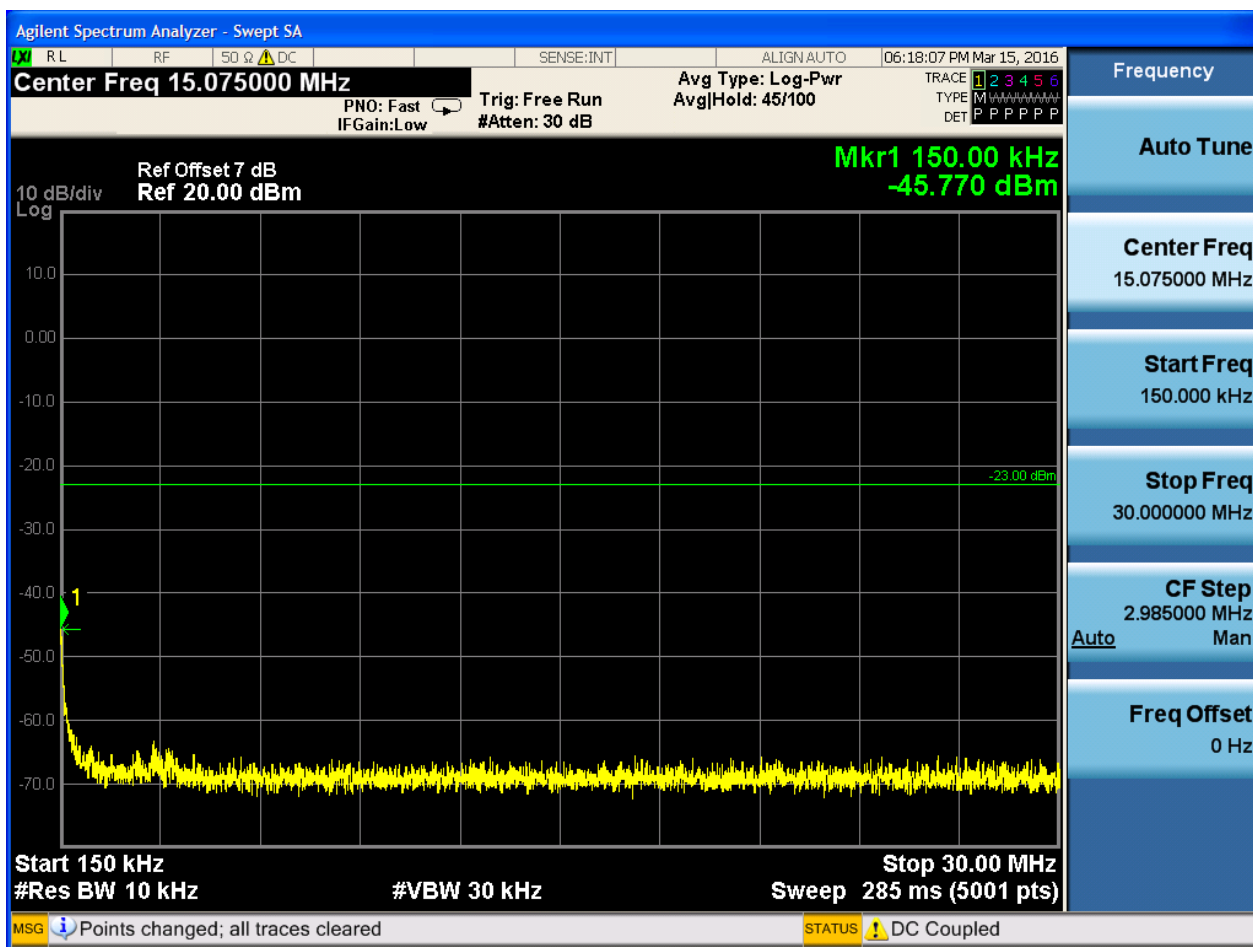


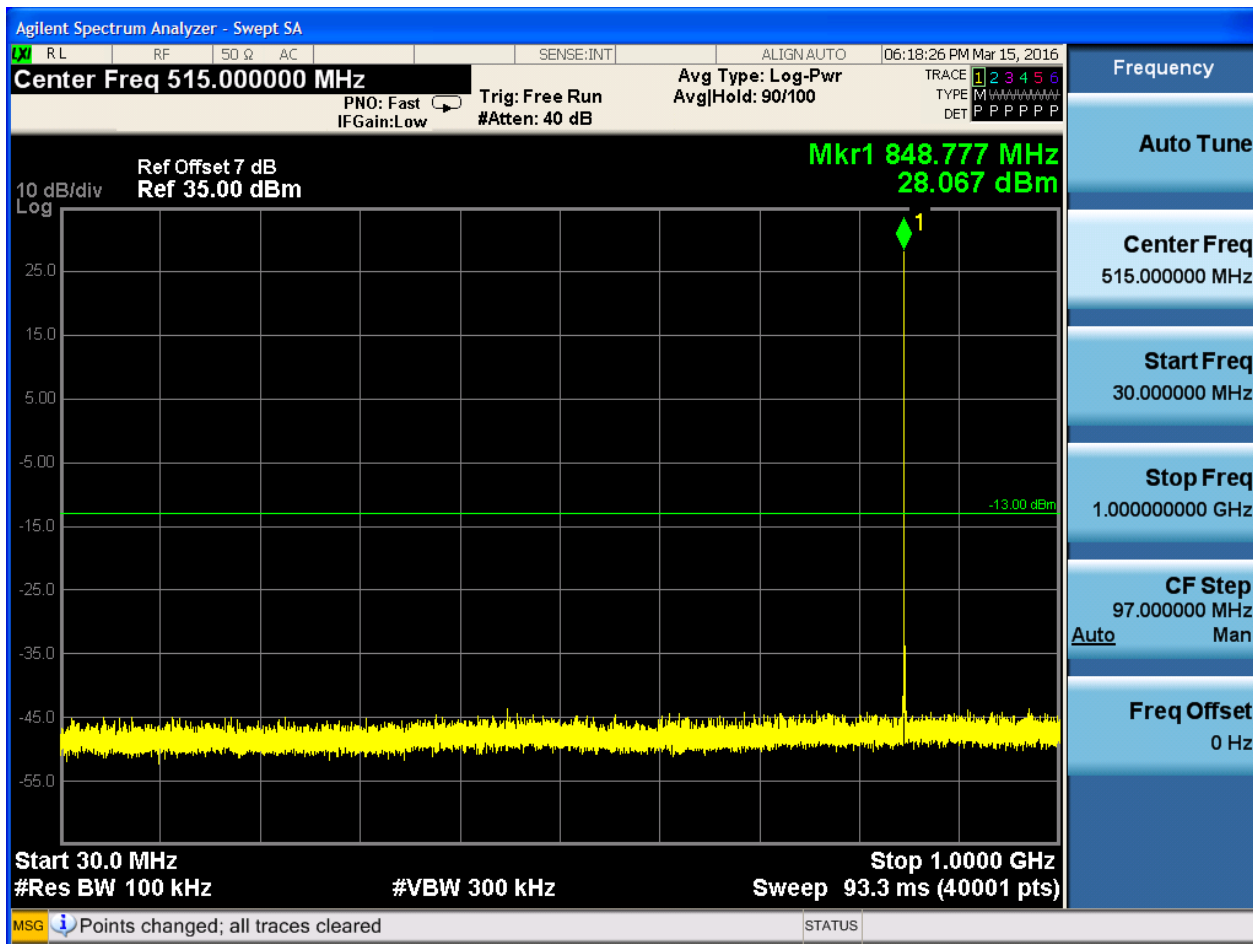


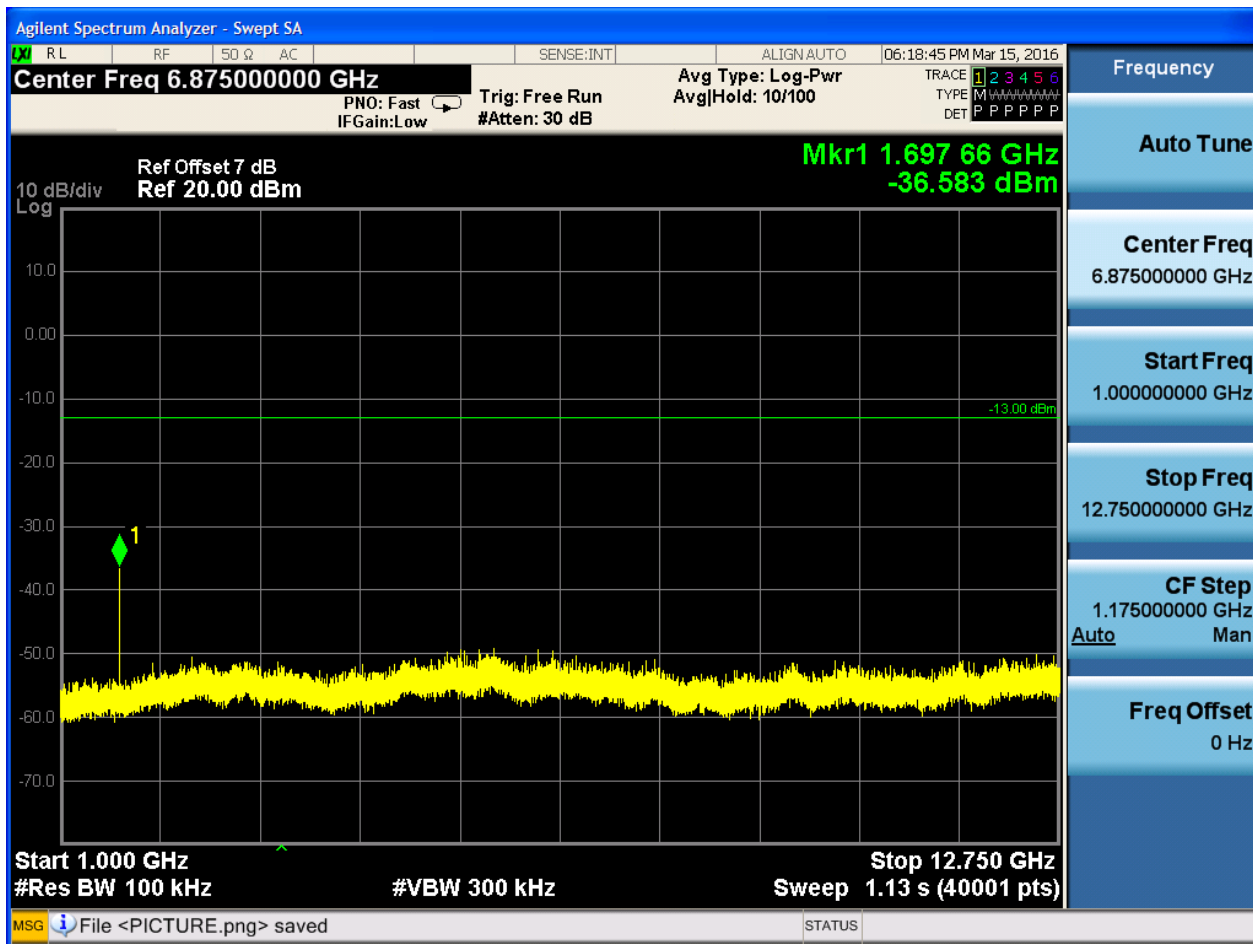


6.1.2.2.3 Test Channel = HCH









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

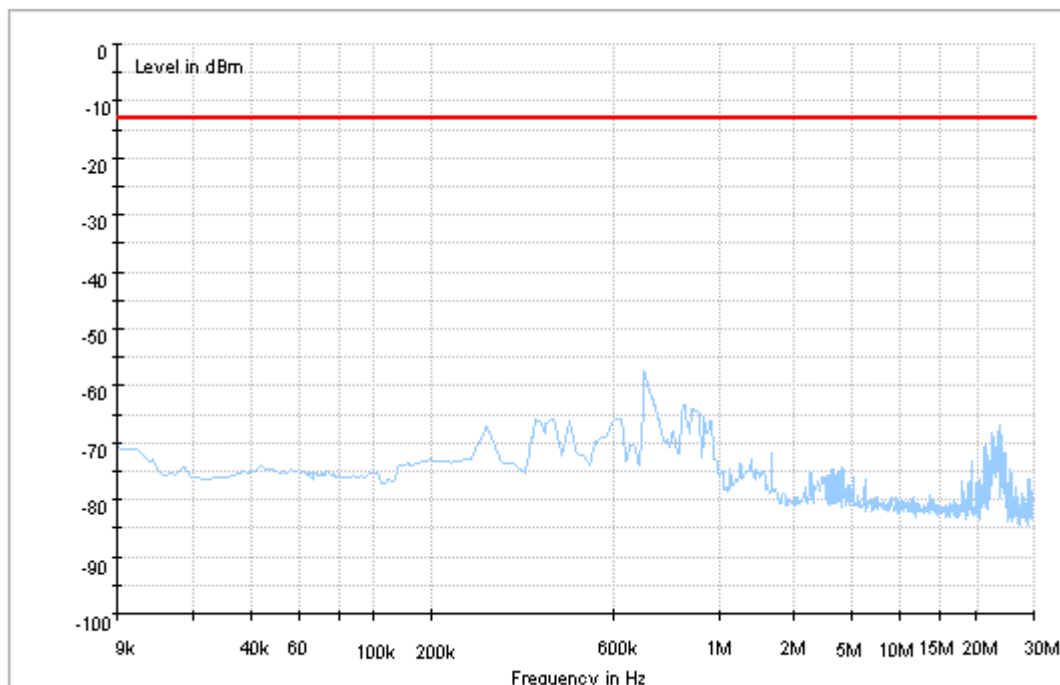
Above 1GHz, RBW = 1 MHz, VBW = 3 MHz. Detector: PK

Part I - Test Plots

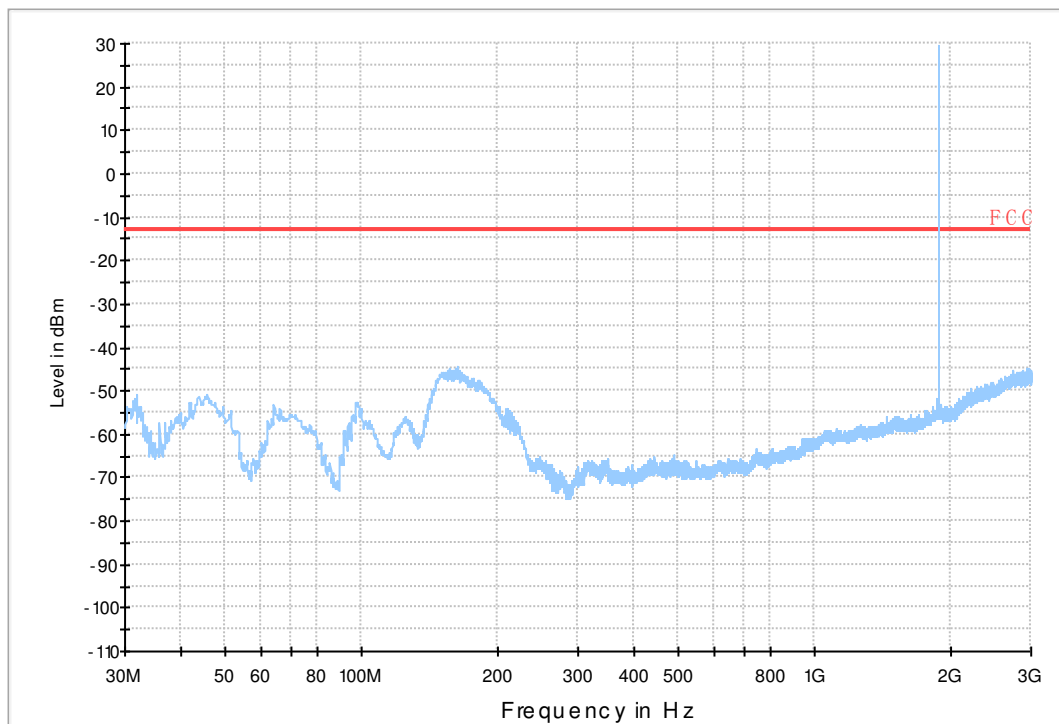
7.1 For GSM

7.1.1 Test Band = GSM1900

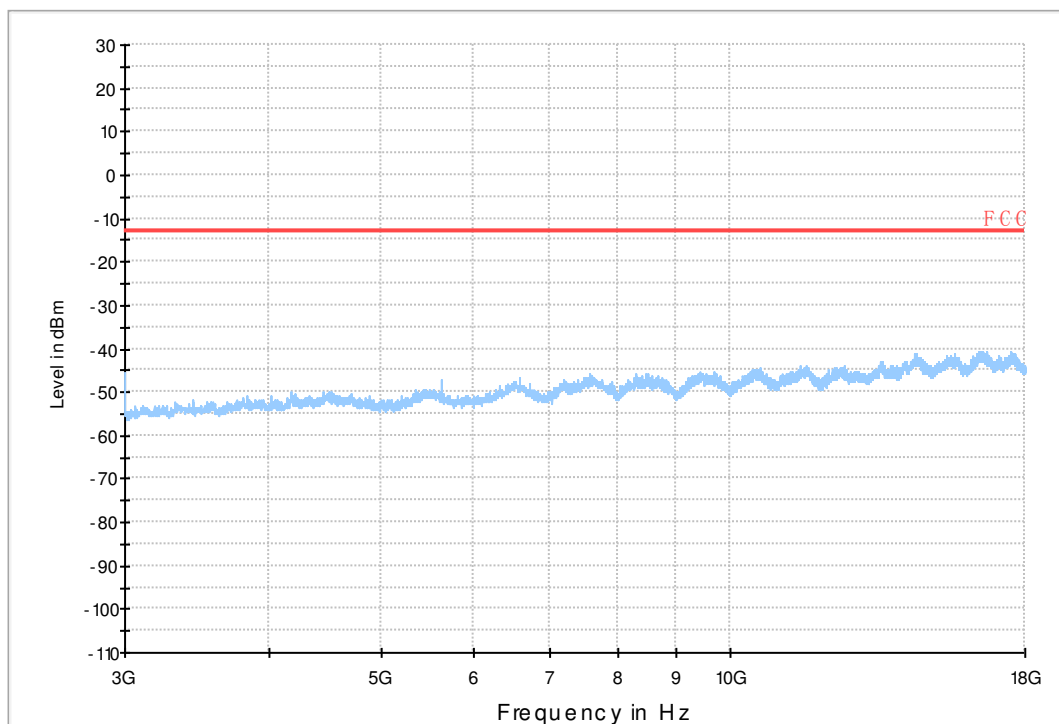
7.1.1.1 Test Mode = GSM/TM1

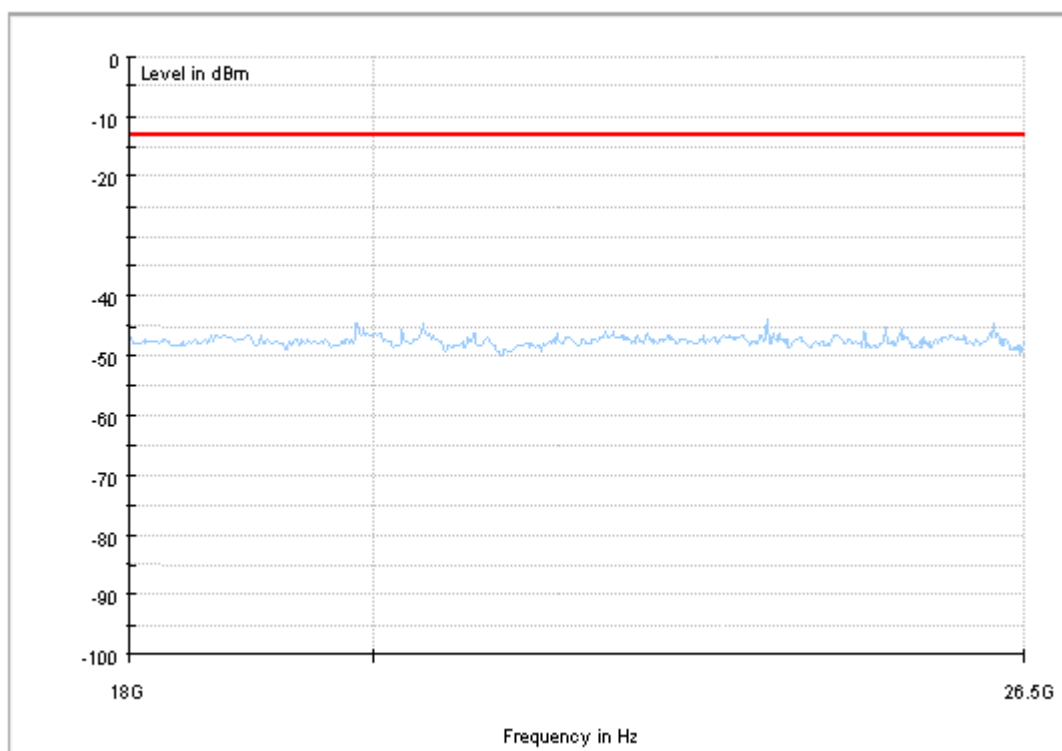


Copy of FCC PART24 GSM 1900_L



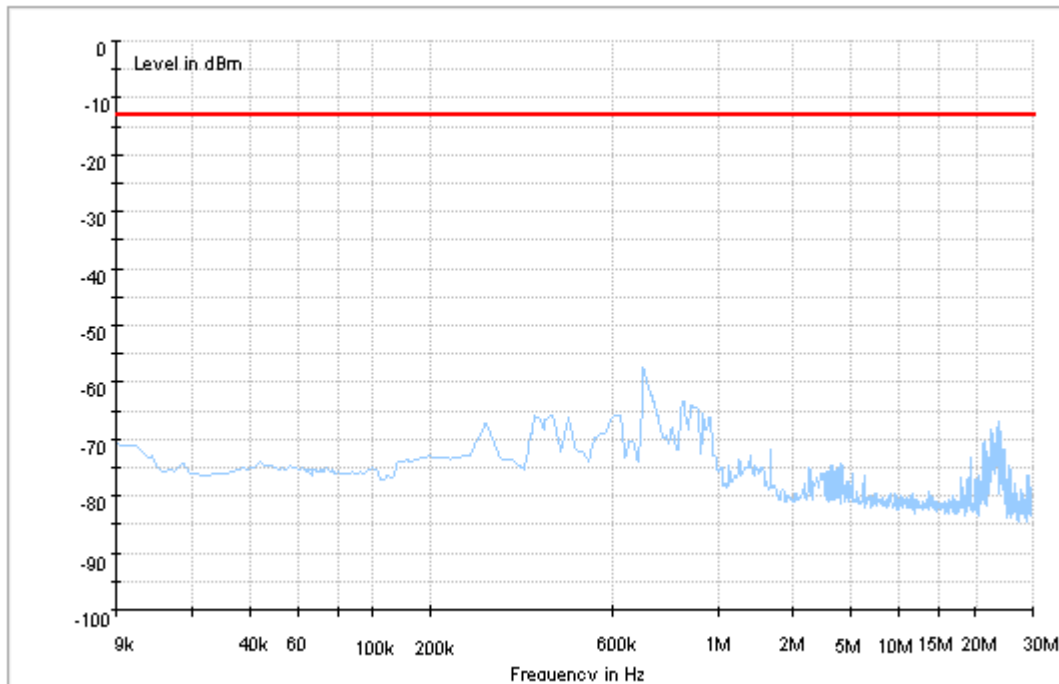
Copy of FCC PART24 GSM 1900_H



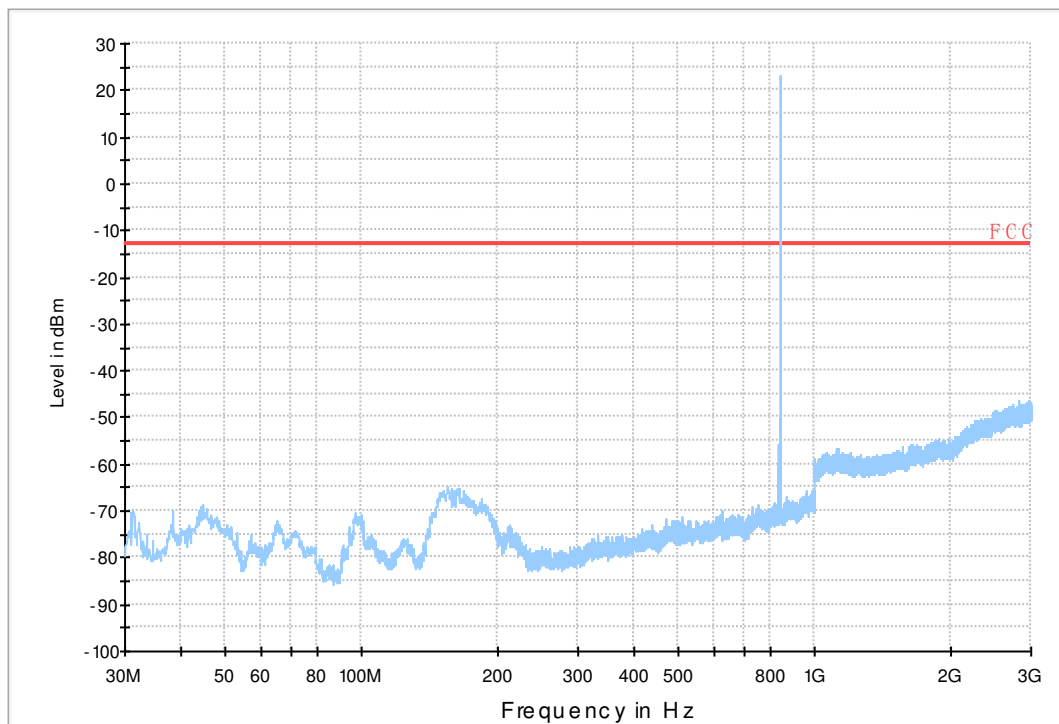


7.1.2 Test Band = GSM850

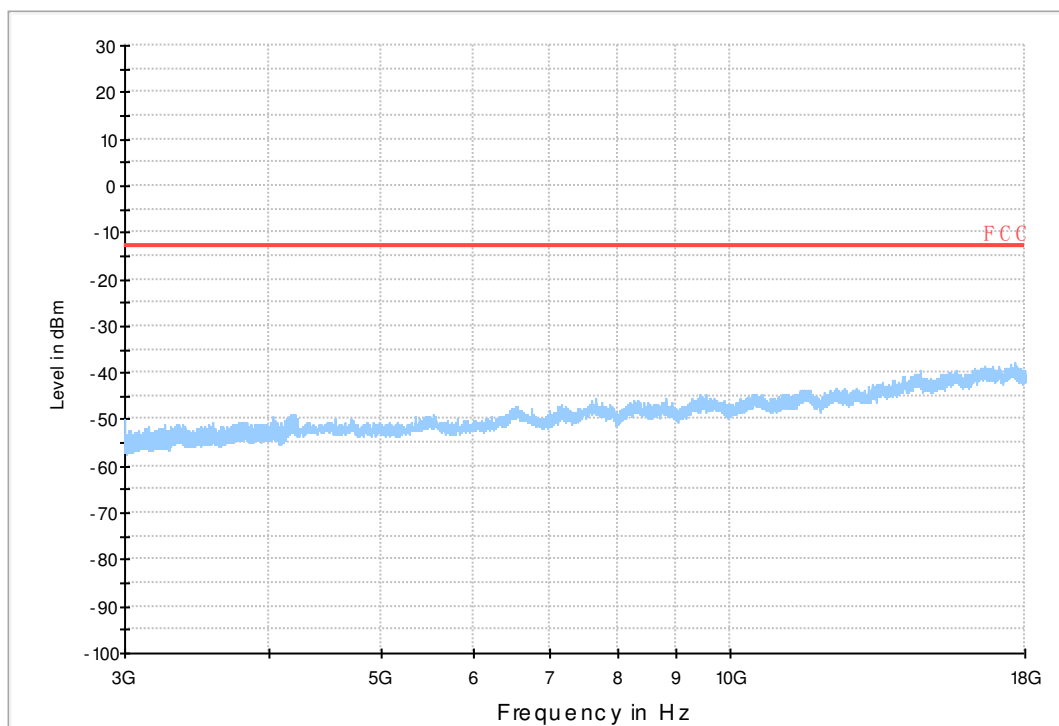
7.1.2.1 Test Mode = GSM/TM1



Copy of FCC PART22 GSM850_L



Copy of FCC PART22 GSM850_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
GSM1900	GSM/TM1	LCH	TN	VL	9.36	0.00506	PASS
				VN	21.95	0.01186	PASS
				VH	9.04	0.00489	PASS
		MCH	TN	VL	9.23	0.00491	PASS
				VN	12.33	0.00656	PASS
				VH	5.36	0.00285	PASS
		HCH	TN	VL	16.53	0.00866	PASS
				VN	17.56	0.00919	PASS
				VH	15.88	0.00832	PASS
	GSM/TM2	LCH	TN	VL	-6.01	-0.00325	PASS
				VN	1.94	0.00105	PASS
				VH	-2.62	-0.00142	PASS
		MCH	TN	VL	-7.62	-0.00405	PASS
				VN	-0.32	-0.00017	PASS
				VH	0.19	0.0001	PASS
		HCH	TN	VL	2.68	0.0014	PASS
				VN	-5.33	-0.00279	PASS
				VH	3.71	0.00194	PASS
GSM850	GSM/TM1	LCH	TN	VL	0.00	0	PASS
				VN	-3.62	-0.00439	PASS
				VH	-2.39	-0.0029	PASS
		MCH	TN	VL	-4.58	-0.00547	PASS
				VN	-4.20	-0.00502	PASS
				VH	-0.13	-0.00016	PASS
		HCH	TN	VL	-1.87	-0.0022	PASS
				VN	0.19	0.00022	PASS
				VH	0.90	0.00106	PASS
	GSM/TM2	LCH	TN	VL	-14.04	-0.01703	PASS
				VN	-5.00	-0.00607	PASS
				VH	-8.78	-0.01065	PASS
		MCH	TN	VL	-9.36	-0.01119	PASS
				VN	-8.78	-0.01049	PASS
				VH	-14.79	-0.01768	PASS

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
		HCH	TN	VL	-10.75	-0.01266	PASS
				VN	-7.39	-0.00871	PASS
				VH	-26.35	-0.03104	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
GSM1900	GSM/TM1	LCH	VN	-30	9.04	0.00489	PASS
				-20	20.28	0.01096	PASS
				-10	9.43	0.0051	PASS
				0	10.91	0.0059	PASS
				10	2.71	0.00146	PASS
				20	18.34	0.00991	PASS
				30	12.20	0.00659	PASS
				40	10.72	0.00579	PASS
				50	18.21	0.00984	PASS
		MCH	VN	-30	6.39	0.0034	PASS
				-20	5.10	0.00271	PASS
				-10	6.84	0.00364	PASS
				0	6.13	0.00326	PASS
				10	10.78	0.00573	PASS
				20	1.49	0.00079	PASS
				30	8.27	0.0044	PASS
				40	10.07	0.00536	PASS
				50	6.01	0.0032	PASS
		HCH	VN	-30	10.78	0.00564	PASS
				-20	15.37	0.00805	PASS
				-10	16.34	0.00856	PASS
				0	15.11	0.00791	PASS
				10	16.01	0.00838	PASS
				20	15.82	0.00828	PASS
				30	14.53	0.00761	PASS
				40	13.82	0.00724	PASS
				50	16.79	0.00879	PASS
	GSM/TM2	LCH	VN	-30	-5.39	-0.00291	PASS
				-20	-5.78	-0.00312	PASS
				-10	-3.75	-0.00203	PASS
				0	0.19	0.0001	PASS
				10	0.71	0.00038	PASS

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				20	8.49	0.00459	PASS
				30	8.65	0.00468	PASS
				40	9.10	0.00492	PASS
				50	3.71	0.00201	PASS
		MCH	VN	-30	-4.68	-0.00249	PASS
				-20	-4.23	-0.00225	PASS
				-10	-11.24	-0.00598	PASS
				0	-7.52	-0.004	PASS
				10	-1.36	-0.00072	PASS
				20	-9.49	-0.00505	PASS
				30	-3.29	-0.00175	PASS
				40	-10.49	-0.00558	PASS
				50	-14.59	-0.00776	PASS
		HCH	VN	-30	5.88	0.00308	PASS
				-20	1.19	0.00062	PASS
				-10	3.26	0.00171	PASS
				0	-1.39	-0.00073	PASS
				10	-2.81	-0.00147	PASS
				20	4.36	0.00228	PASS
				30	-0.06	-0.00003	PASS
				40	9.27	0.00485	PASS
				50	-0.58	-0.0003	PASS
GSM850	GSM/TM1	LCH	VN	-30	-3.62	-0.00439	PASS
				-20	-2.39	-0.0029	PASS
				-10	-1.29	-0.00157	PASS
				0	-5.49	-0.00666	PASS
				10	-1.68	-0.00204	PASS
				20	-1.81	-0.0022	PASS
				30	-5.62	-0.00682	PASS
				40	-2.07	-0.00251	PASS
				50	-5.81	-0.00705	PASS
		MCH	VN	-30	-2.07	-0.00247	PASS
				-20	-2.00	-0.00239	PASS
				-10	-1.36	-0.00163	PASS
				0	-0.77	-0.00092	PASS
				10	-2.91	-0.00348	PASS
				20	-2.20	-0.00263	PASS
				30	-2.84	-0.00339	PASS
				40	-2.84	-0.00339	PASS
				50	-3.16	-0.00378	PASS

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
		HCH	VN	-30	-3.03	-0.00357	PASS
				-20	-3.68	-0.00434	PASS
				-10	1.29	0.00152	PASS
				0	-0.90	-0.00106	PASS
				10	-1.16	-0.00137	PASS
				20	-2.00	-0.00236	PASS
				30	-3.68	-0.00434	PASS
				40	-2.39	-0.00282	PASS
				50	-2.71	-0.00319	PASS
	GSM/TM2	LCH	VN	-30	-9.33	-0.01132	PASS
				-20	-16.63	-0.02018	PASS
				-10	-13.14	-0.01594	PASS
				0	-9.81	-0.0119	PASS
				10	-16.05	-0.01947	PASS
				20	-4.16	-0.00505	PASS
				30	-13.11	-0.01591	PASS
				40	-15.79	-0.01916	PASS
				50	-2.81	-0.00341	PASS
		MCH	VN	-30	-3.78	-0.00452	PASS
				-20	-18.50	-0.02211	PASS
				-10	-12.40	-0.01482	PASS
				0	-14.95	-0.01787	PASS
				10	-10.46	-0.0125	PASS
				20	-17.14	-0.02049	PASS
				30	-14.66	-0.01752	PASS
				40	-16.01	-0.01914	PASS
				50	-11.11	-0.01328	PASS
		HCH	VN	-30	-13.59	-0.01601	PASS
				-20	-15.82	-0.01864	PASS
				-10	-15.24	-0.01795	PASS
				0	-7.07	-0.00833	PASS
				10	-13.85	-0.01632	PASS
				20	-14.43	-0.017	PASS
				30	-10.91	-0.01285	PASS
				40	-15.21	-0.01792	PASS
				50	-10.01	-0.01179	PASS

END