



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	33.08	27.83	38.5	PASS
		MCH	33.21	27.96	38.5	PASS
		HCH	33.19	27.94	38.5	PASS
	GSM/TM2	LCH	27.33	22.08	38.5	PASS
		MCH	27.32	22.43	38.5	PASS
		HCH	27.31	22.27	38.5	PASS
Test Band	Test Mode	Test Channel	Conducted Power [dBm]	EIRP [dBm]	Limit [dBm]	Verdict
GSM1900	GSM/TM1	LCH	30.19	28.8	33	PASS
		MCH	29.8	28.2	33	PASS
		HCH	29.7	28.1	33	PASS
	GSM/TM2	LCH	26.02	24.42	33	PASS
		MCH	25.98	24.6	33	PASS
		HCH	25.95	24.35	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: RBW > emission bandwidth, VBW > 3 x RBW.

Detector: RMS



2Appendix_B: Peak-to-Average Ratio

Part I - Test Results

Test Band	Test Mode	Test Channel	Measured[dB]	Limit [dB]	Verdict
GSM1900	GSM/TM1	LCH	0.19	13	PASS
		MCH	0.17	13	PASS
		HCH	0.18	13	PASS
	GSM/TM2	LCH	3.02	13	PASS
		MCH	3.14	13	PASS
		HCH	3	13	PASS

3Appendix_C: Modulation Characteristics

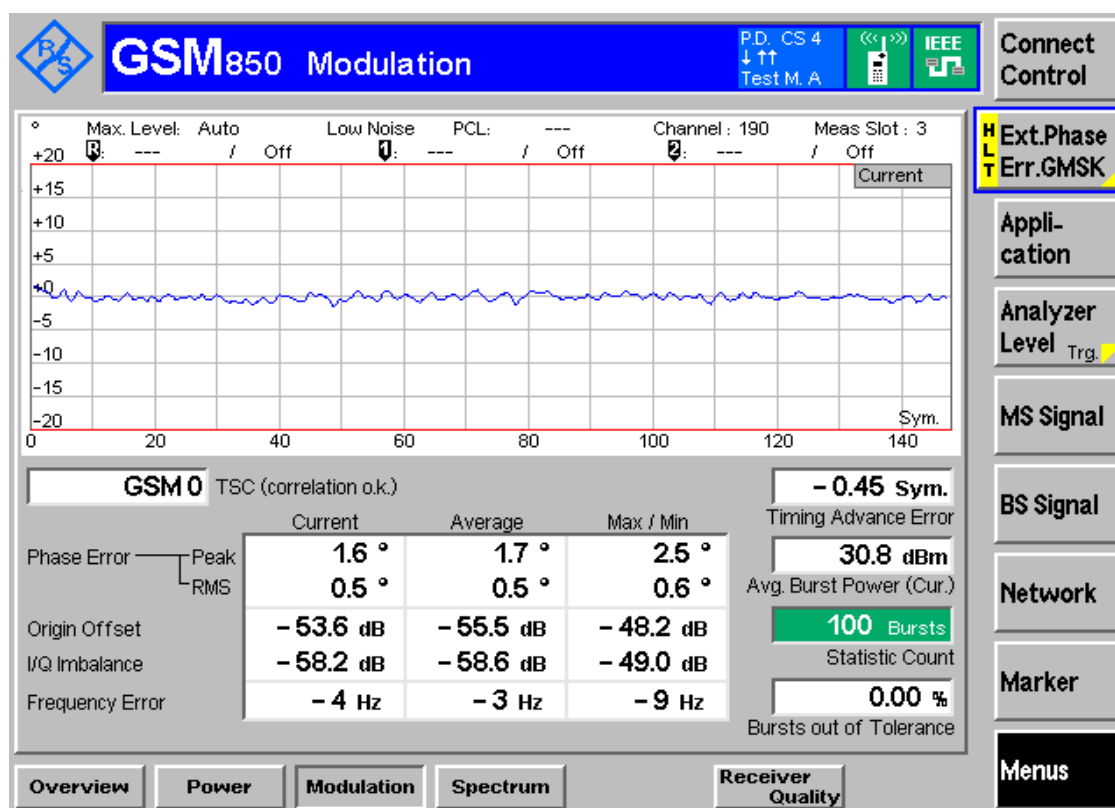
Part I - Test Plots

3.1 For GSM

3.1.1 Test Band = GSM850

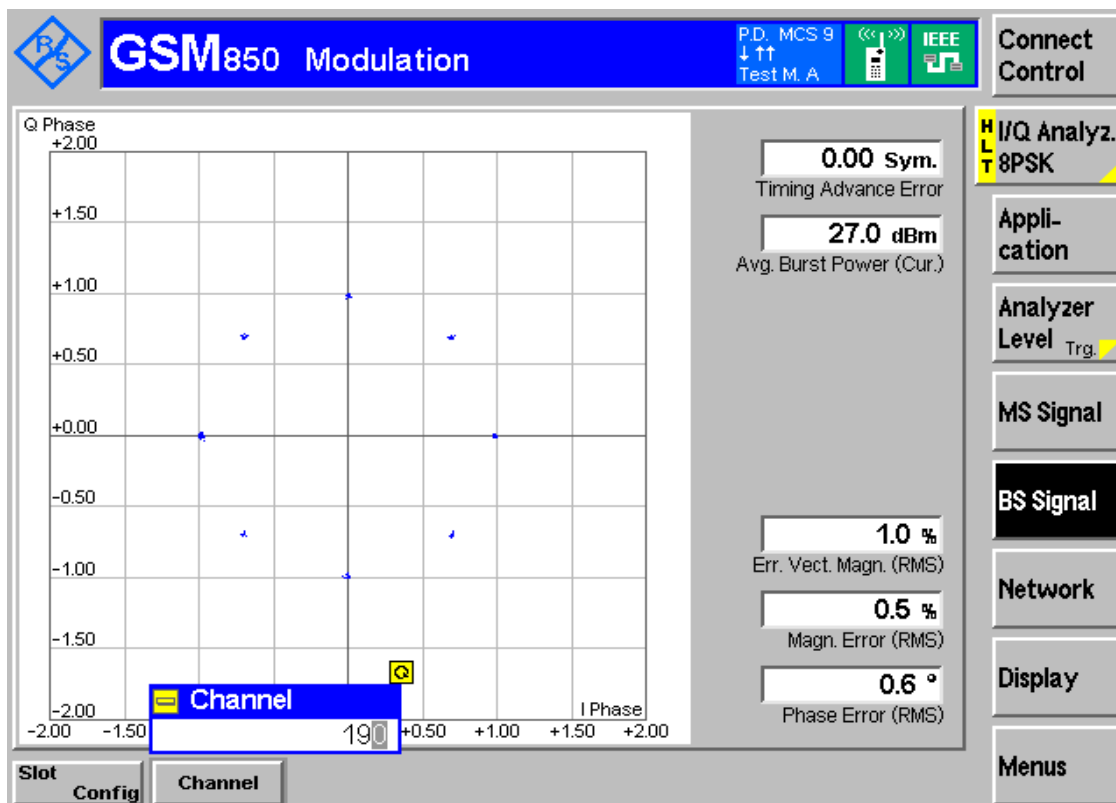
3.1.1.1 Test Mode = GSM/TM1

3.1.1.1.1 Test Channel = MCH



3.1.1.2 Test Mode = GSM/TM2

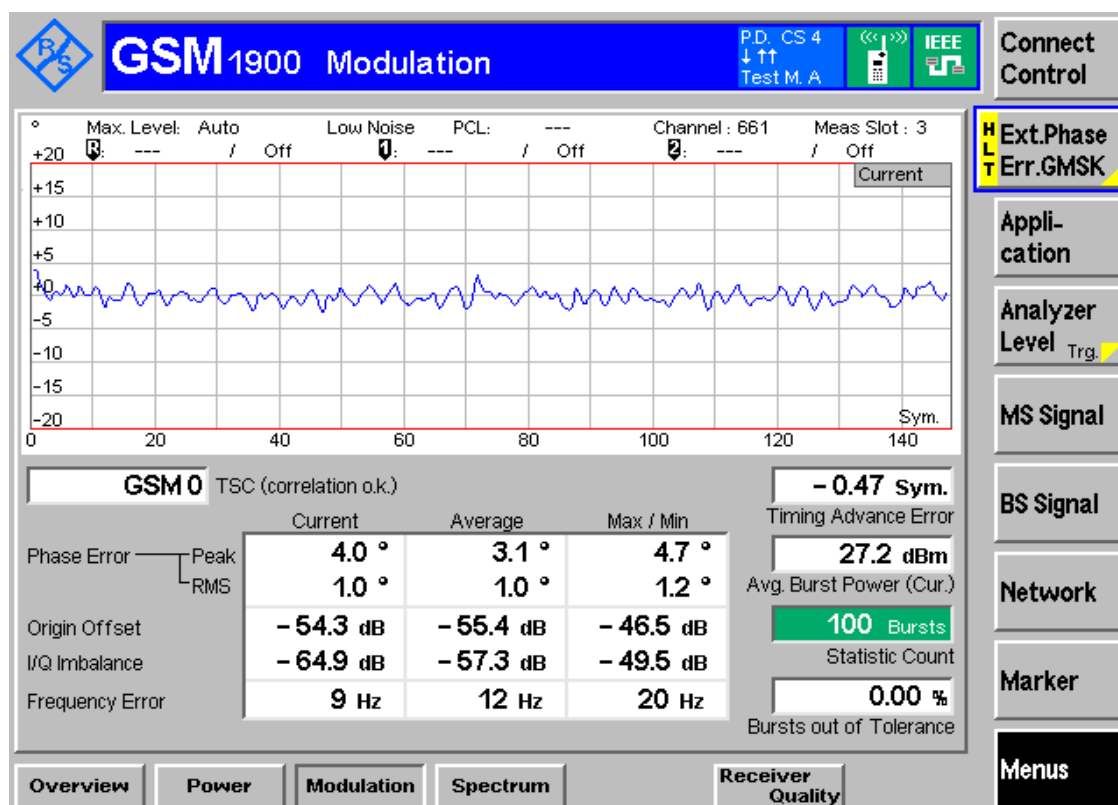
3.1.1.2.1 Test Channel = MCH



3.1.2 Test Band = GSM1900

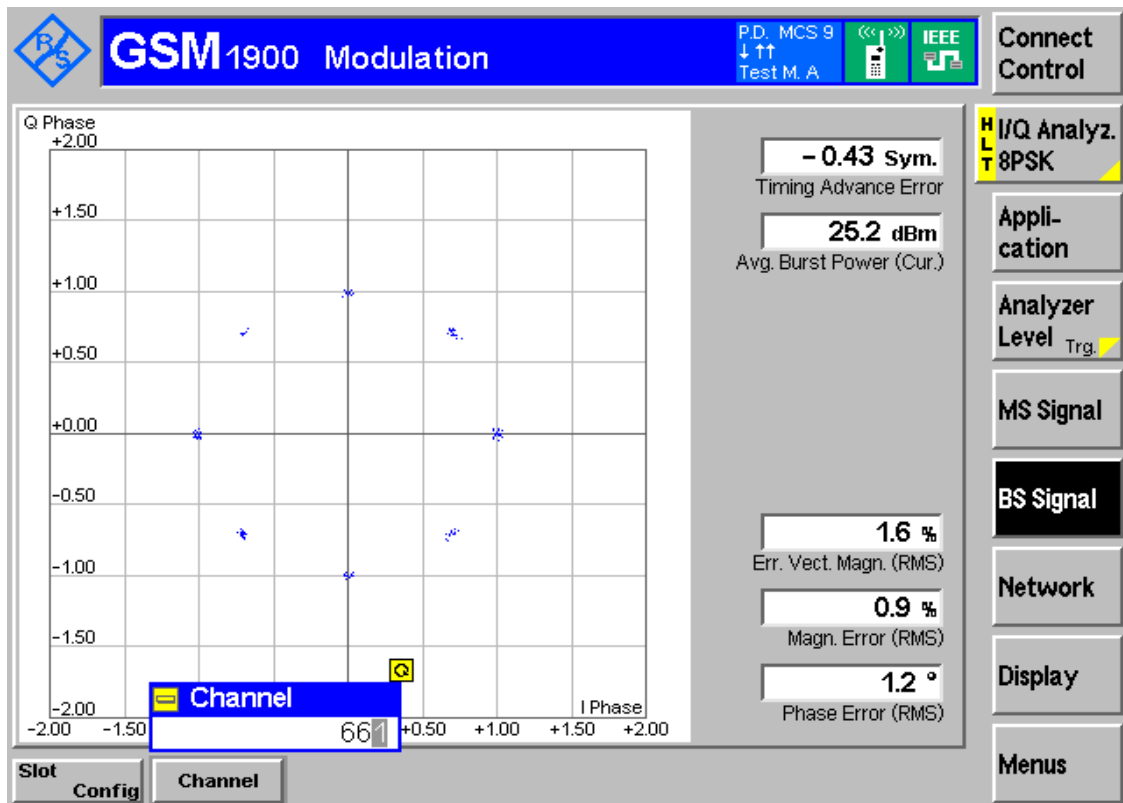
3.1.2.1 Test Mode = GSM/TM1

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	242.33	322.45	Pass
		MCH	248.60	316.23	Pass
		HCH	247.00	311.75	Pass
	GSM/TM2	LCH	236.36	306.46	Pass
		MCH	234.35	292.35	Pass
		HCH	234.82	293.30	Pass
GSM1900	GSM/TM1	LCH	242.38	313.11	Pass
		MCH	244.13	314.01	Pass
		HCH	240.12	310.84	Pass
	GSM/TM2	LCH	242.65	314.78	Pass
		MCH	242.15	309.42	Pass
		HCH	244.69	307.16	Pass

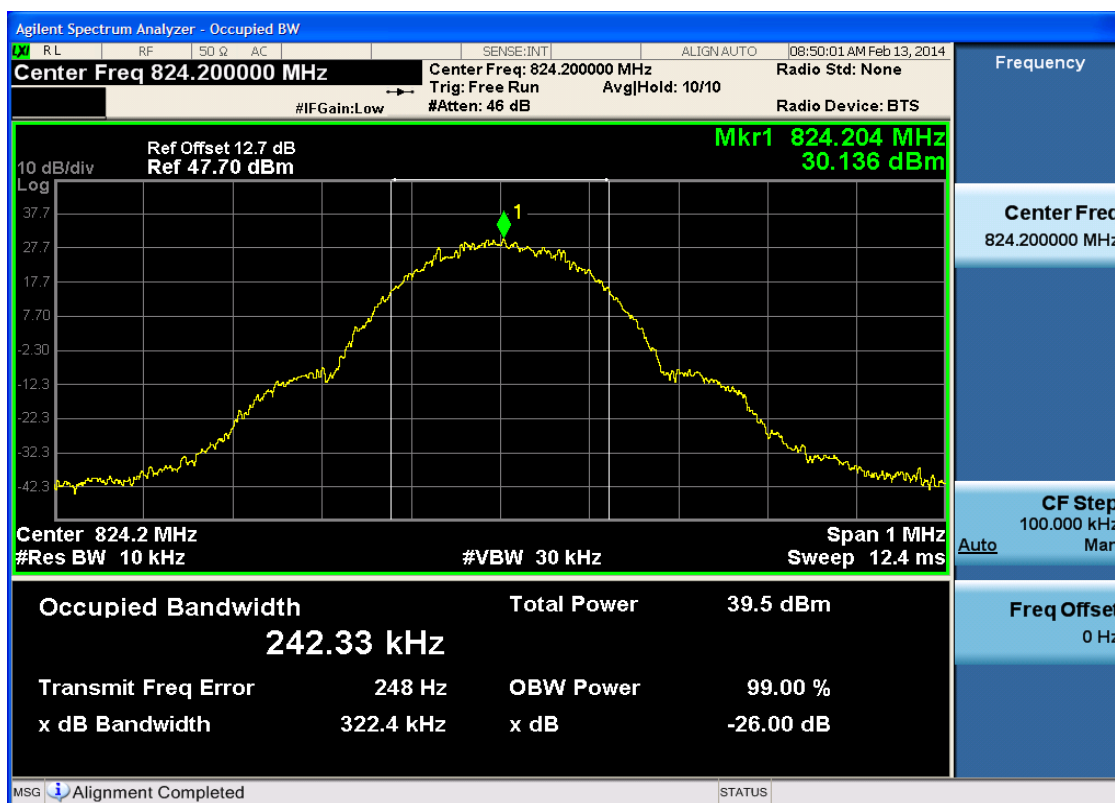
Part II - Test Plots

4.1 For GSM

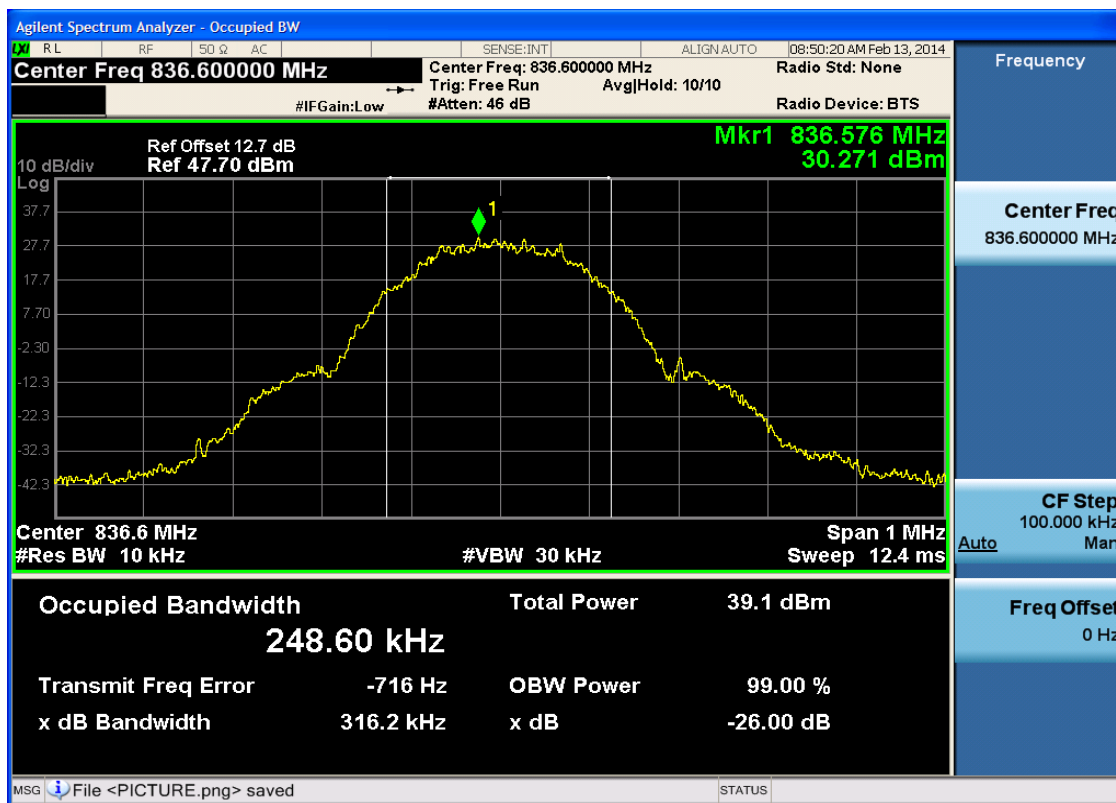
4.1.1 Test Band = GSM850

4.1.1.1 Test Mode = GSM/TM1

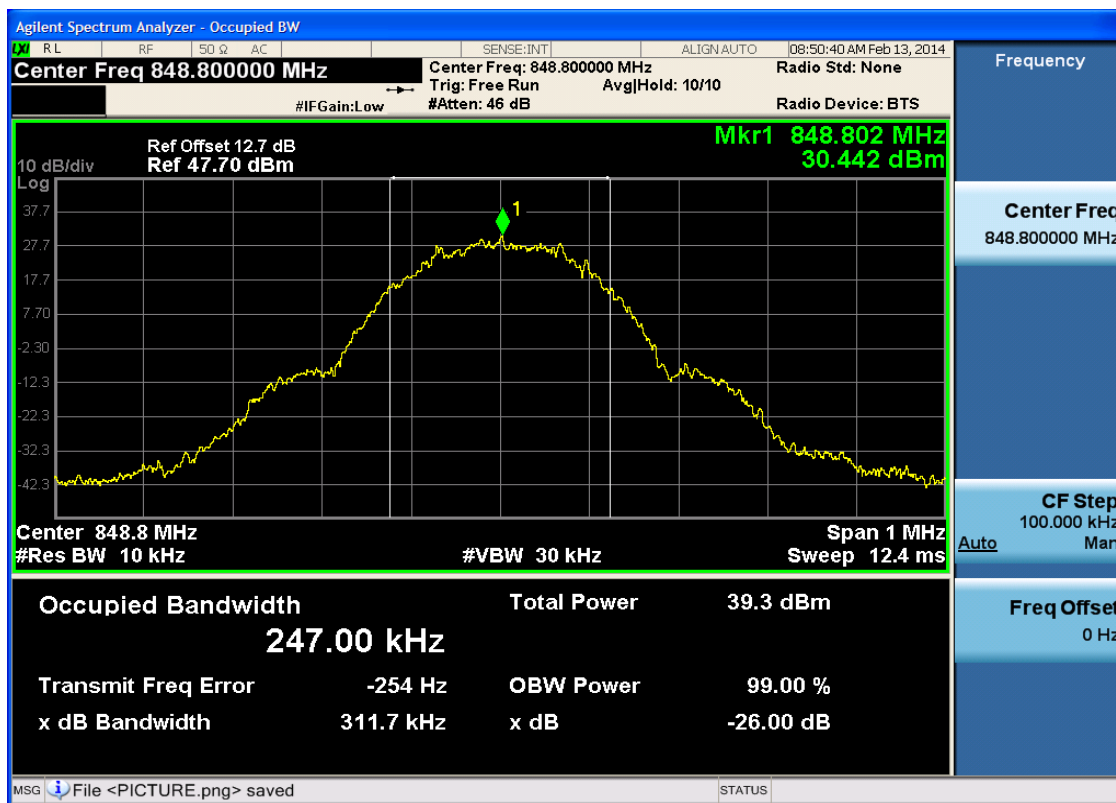
4.1.1.1.1 Test Channel = LCH



4.1.1.1.2 Test Channel = MCH

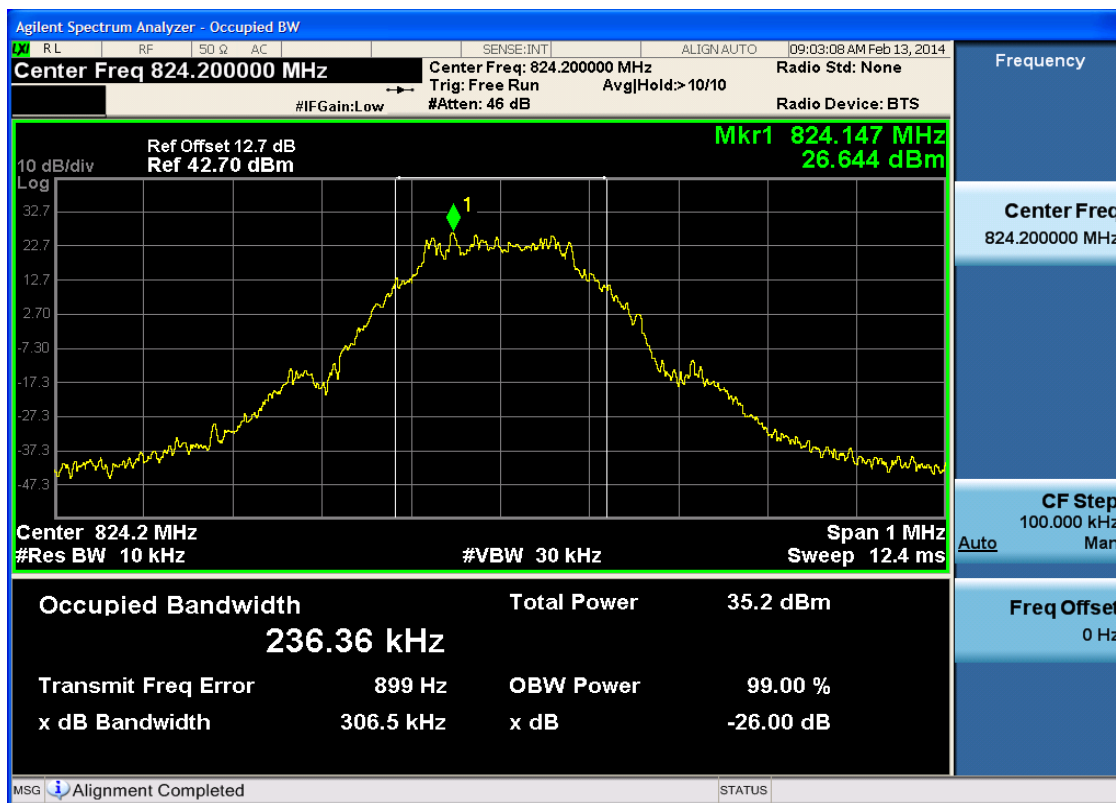


4.1.1.1.3 Test Channel = HCH



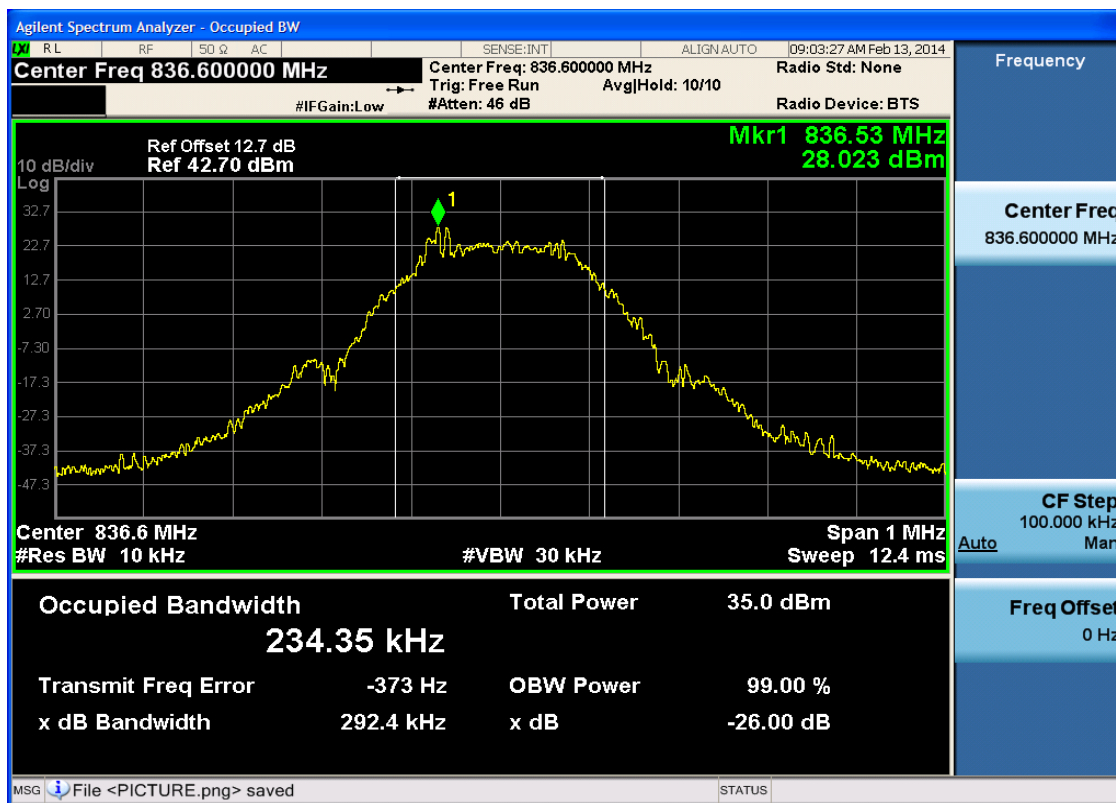
4.1.1.2 Test Mode = GSM/TM2

4.1.1.2.1 Test Channel = LCH

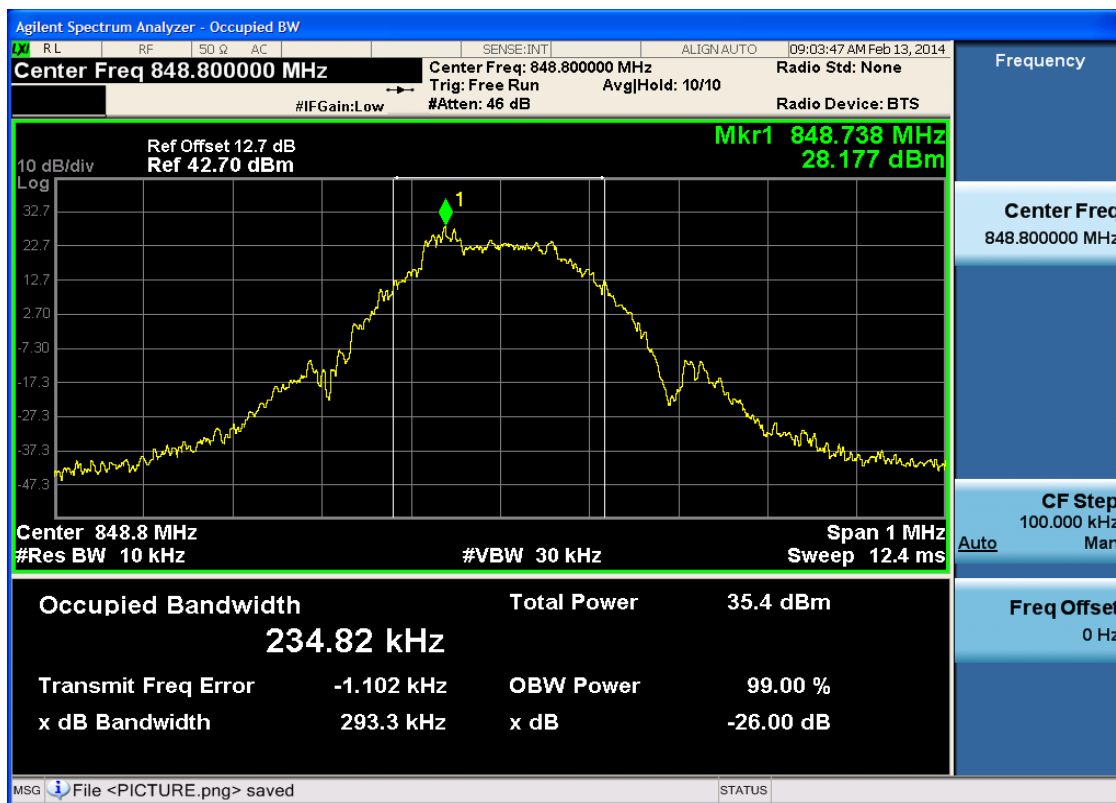




4.1.1.2.2 Test Channel = MCH



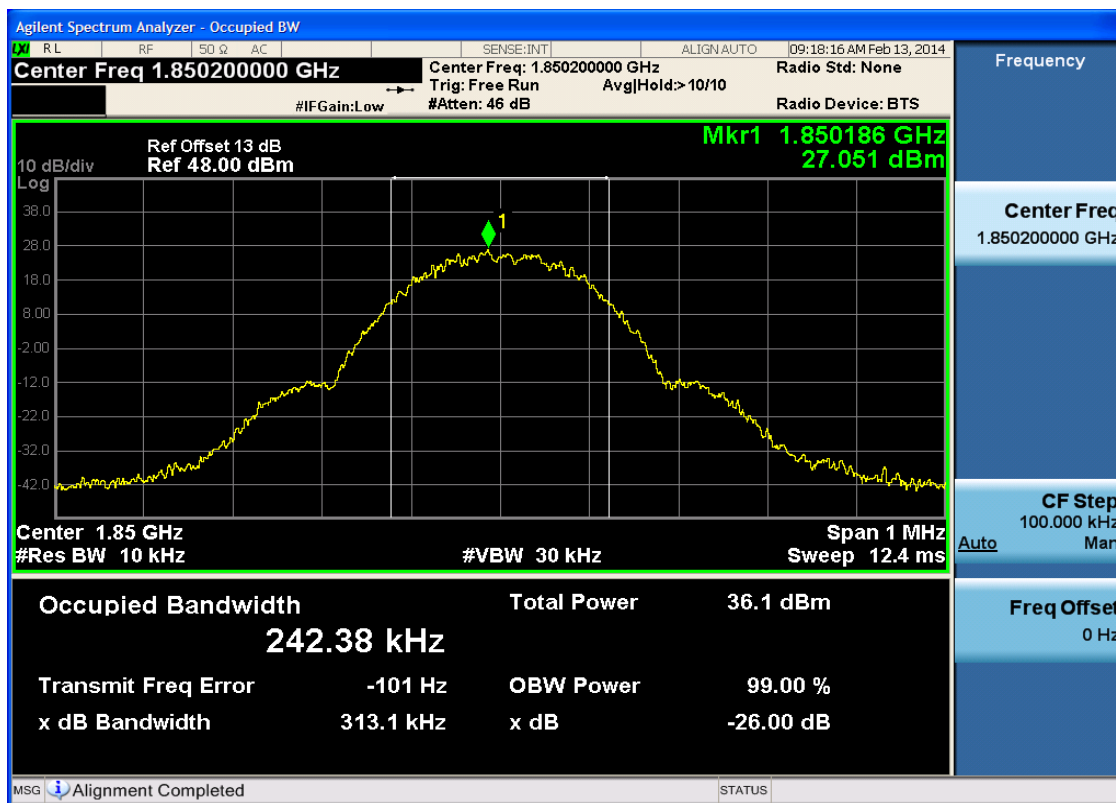
4.1.1.2.3 Test Channel = HCH



4.1.2 Test Band = GSM1900

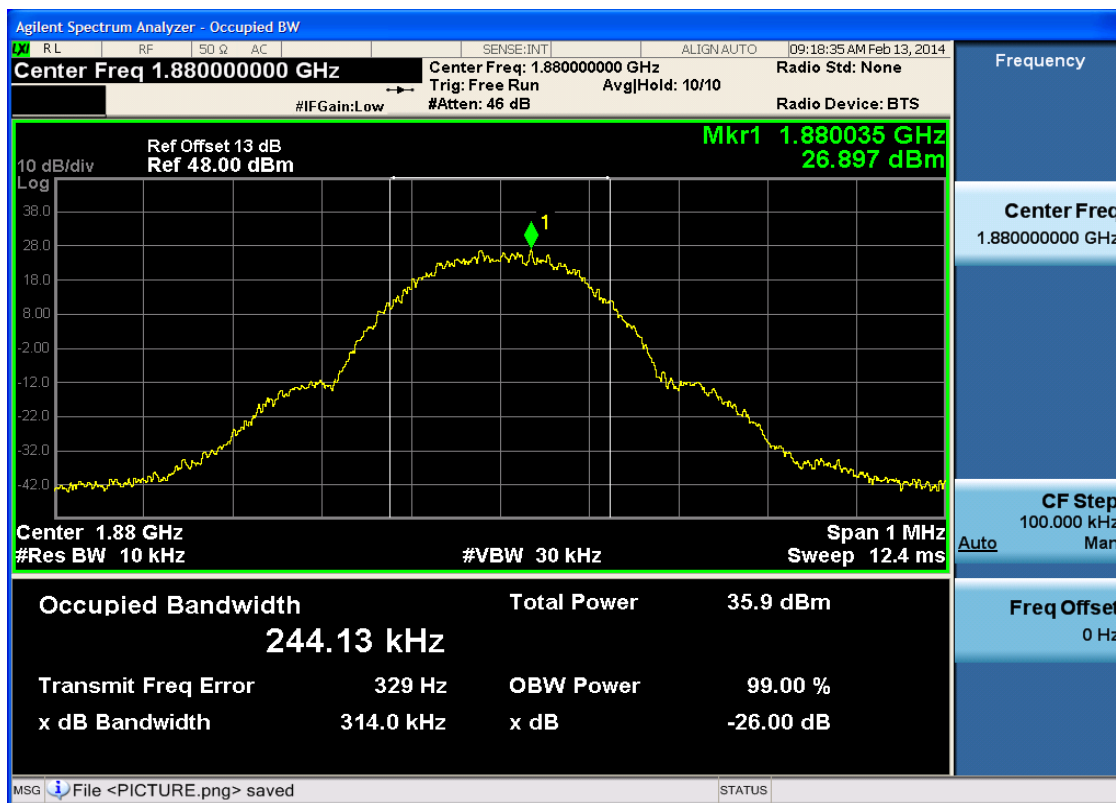
4.1.2.1 Test Mode = GSM/TM1

4.1.2.1.1 Test Channel = LCH

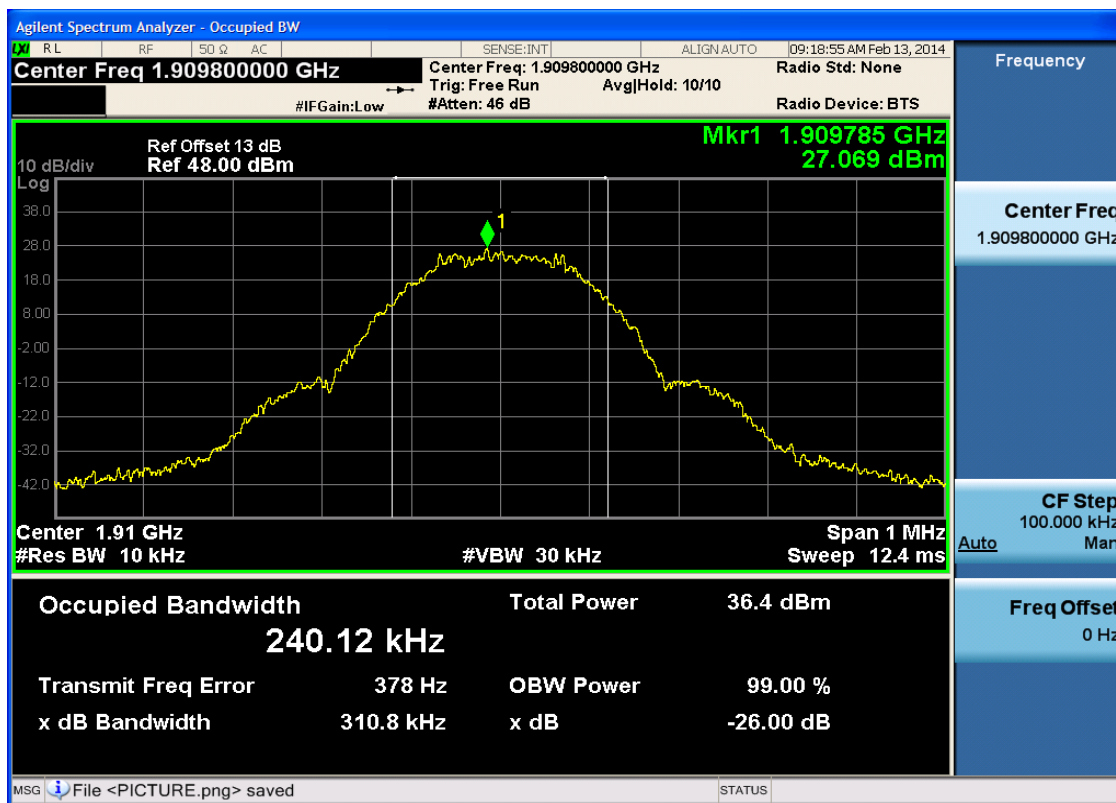




4.1.2.1.2 Test Channel = MCH



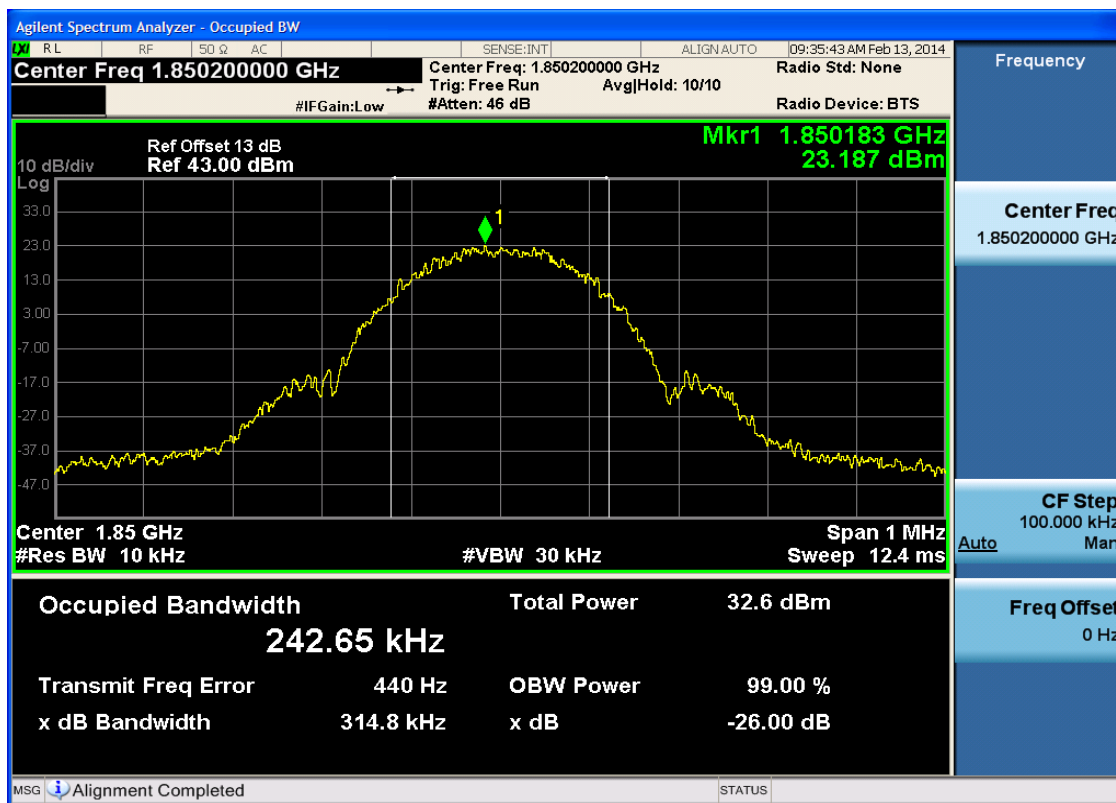
4.1.2.1.3 Test Channel = HCH



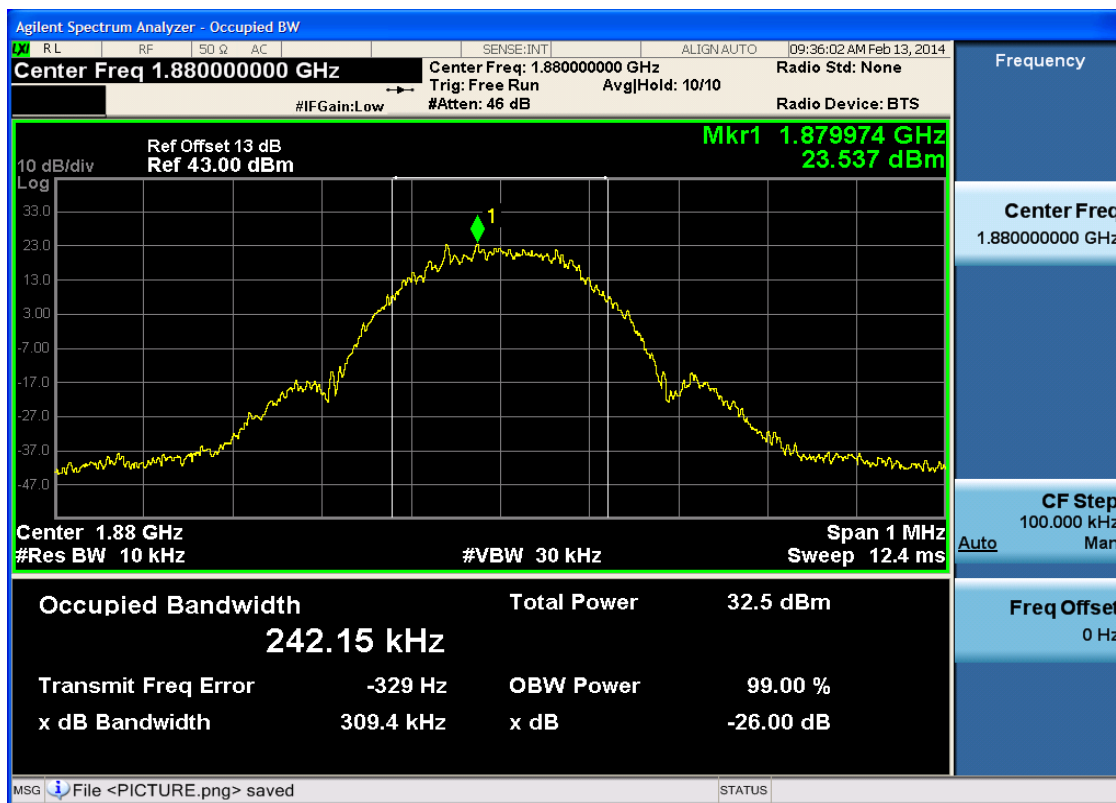


4.1.2.2 Test Mode = GSM/TM2

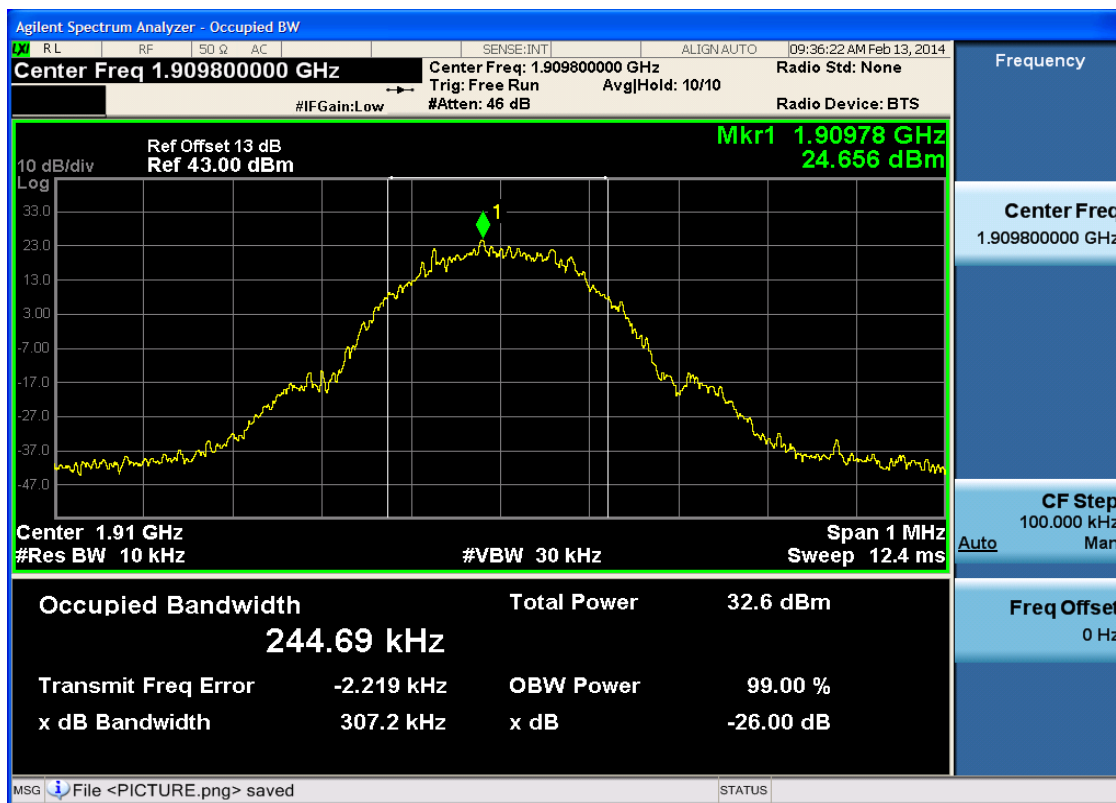
4.1.2.2.1 Test Channel = LCH



4.1.2.2.2 Test Channel = MCH



4.1.2.2.3 Test Channel = HCH



5Appendix_E: Band Edges Compliance

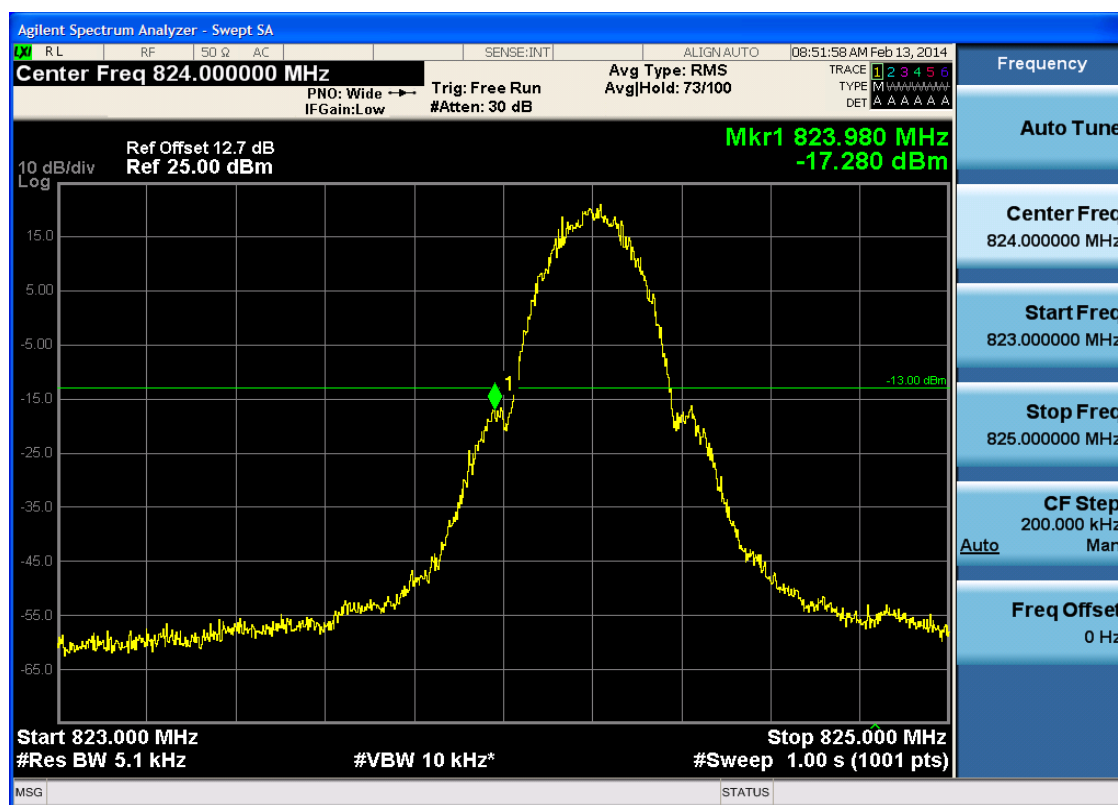
Part I - Test Plots

5.1 For GSM

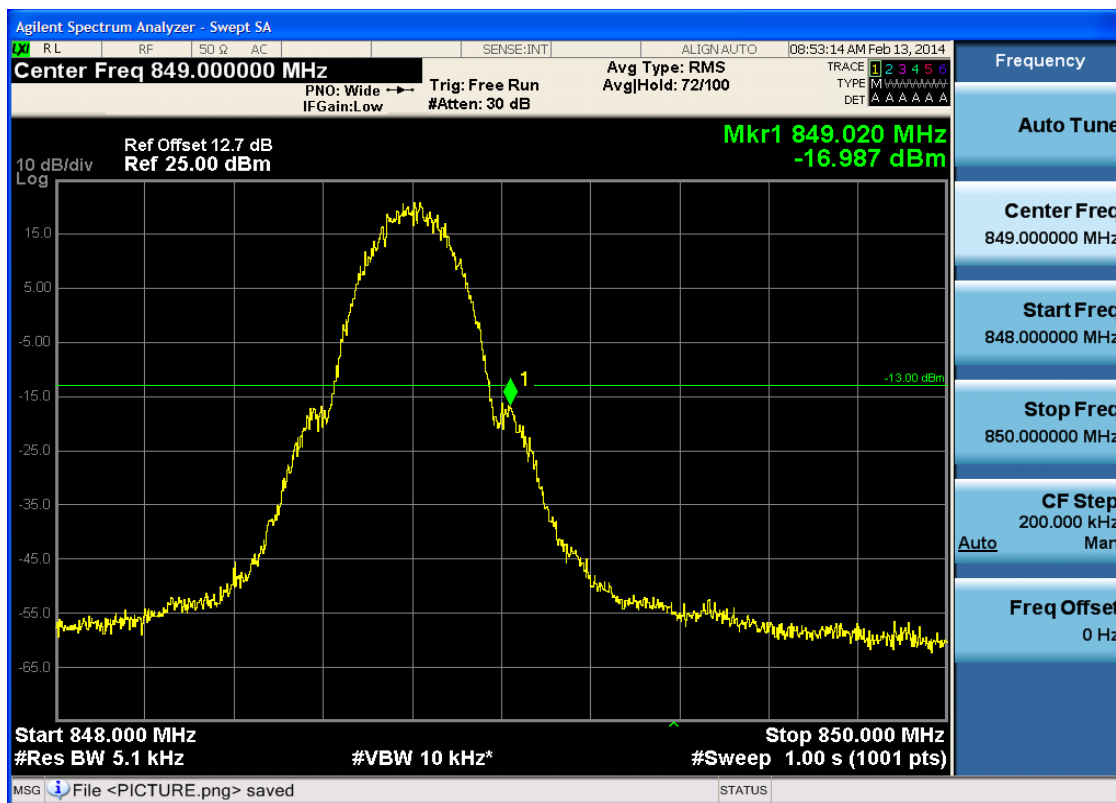
5.1.1 Test Band = GSM850

5.1.1.1 Test Mode = GSM/TM1

5.1.1.1.1 Test Channel = LCH

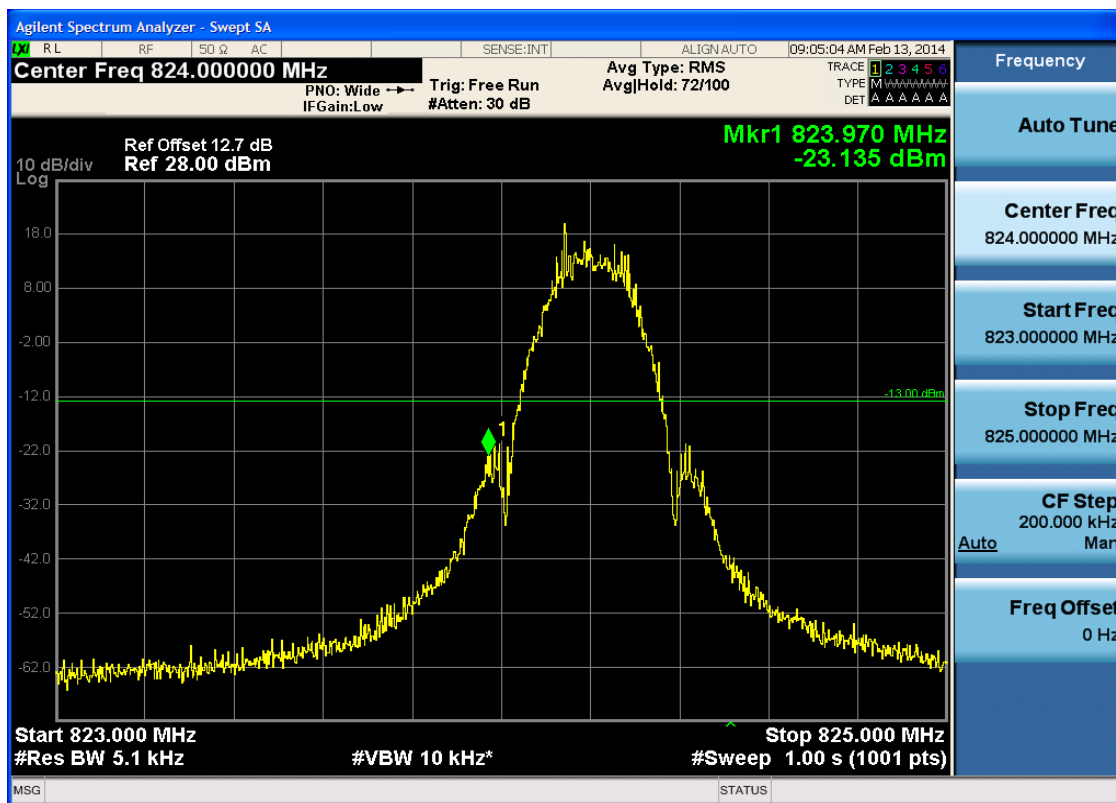


5.1.1.1.2 Test Channel = HCH

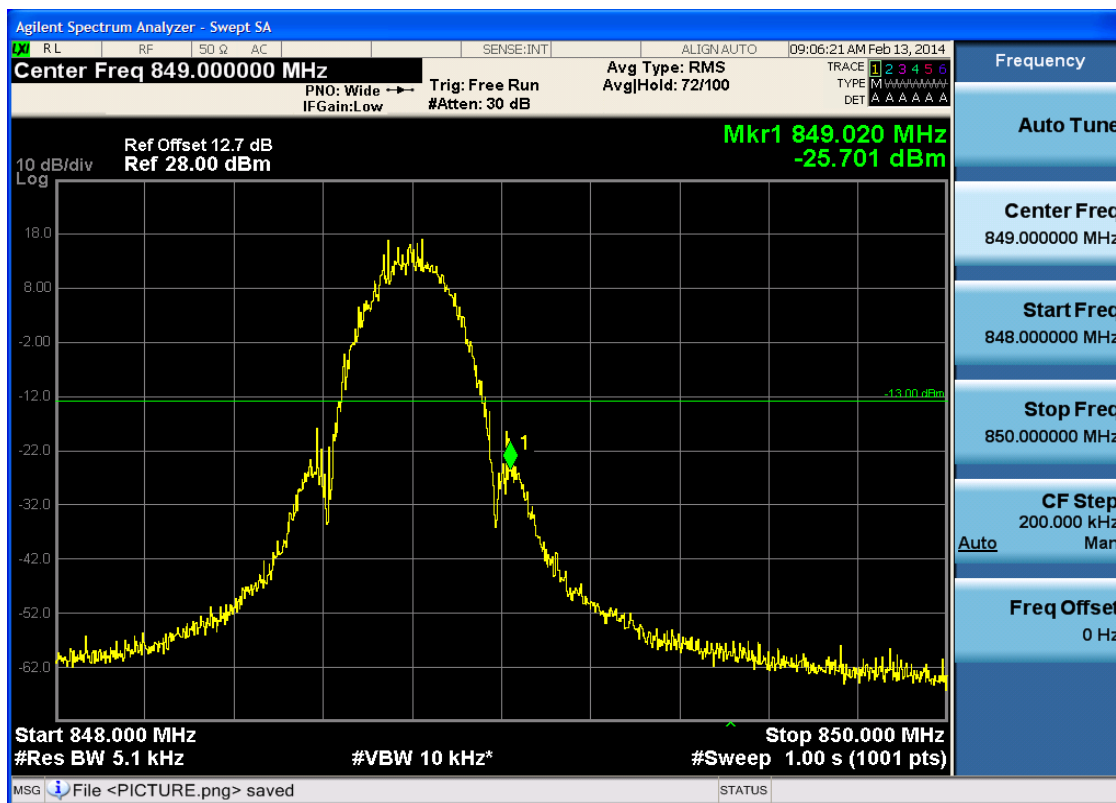


5.1.1.2 Test Mode = GSM/TM2

5.1.1.2.1 Test Channel = LCH



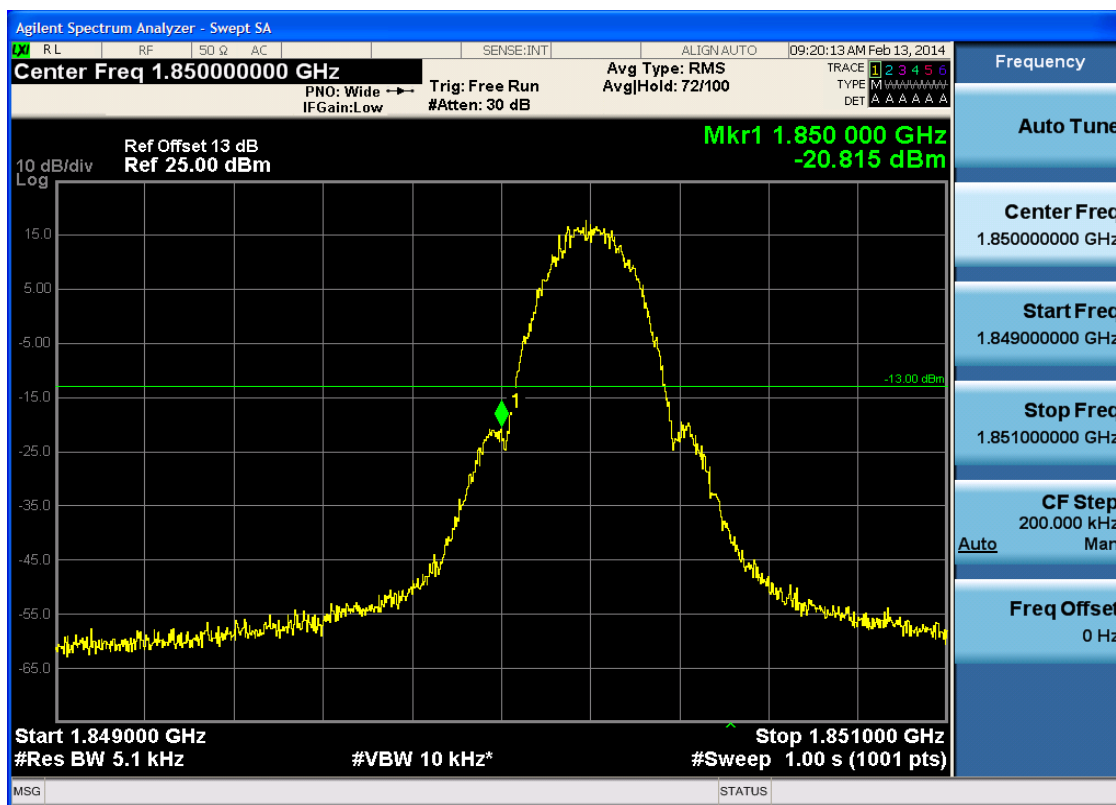
5.1.1.2.2 Test Channel = HCH



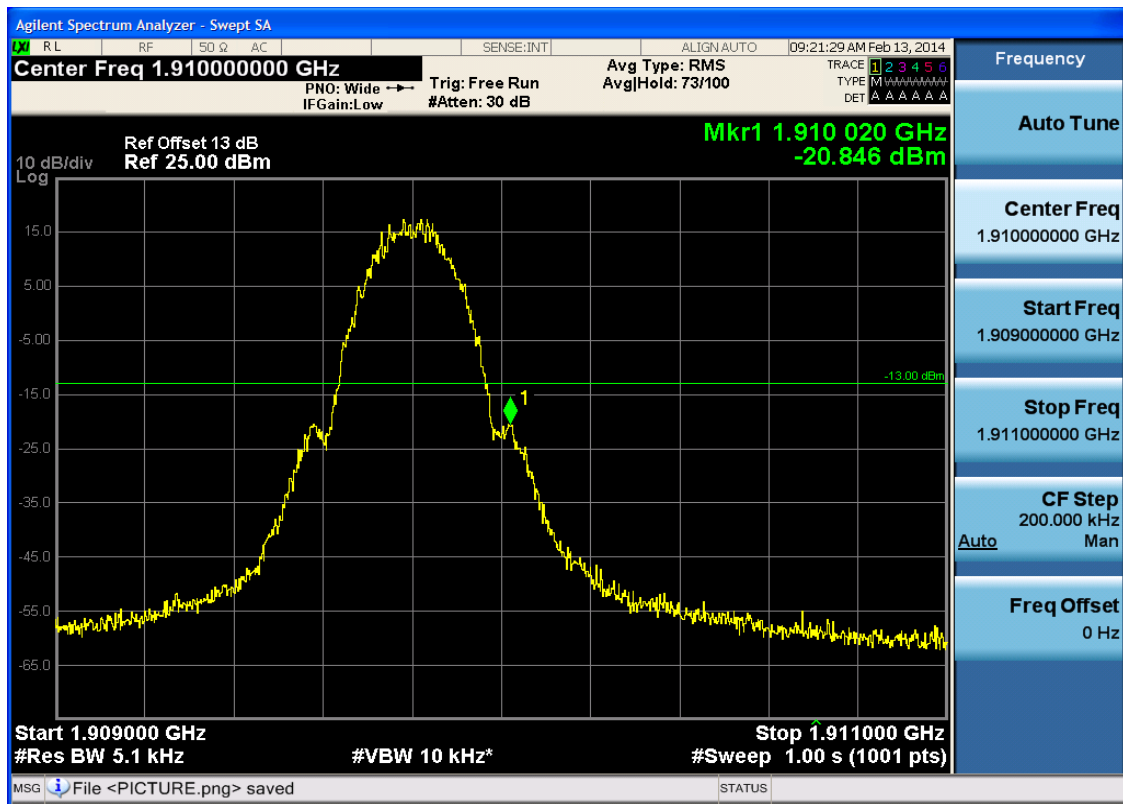
5.1.2 Test Band = GSM1900

5.1.2.1 Test Mode = GSM/TM1

5.1.2.1.1 Test Channel = LCH

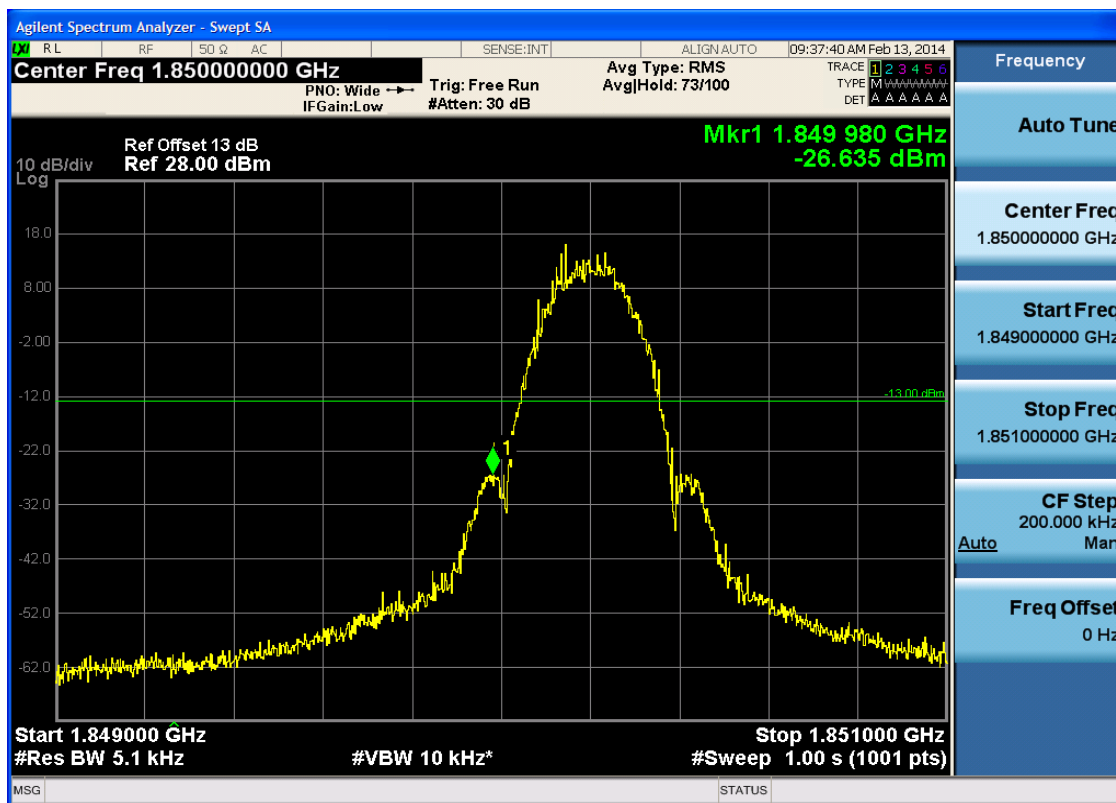


5.1.2.1.2 Test Channel = HCH

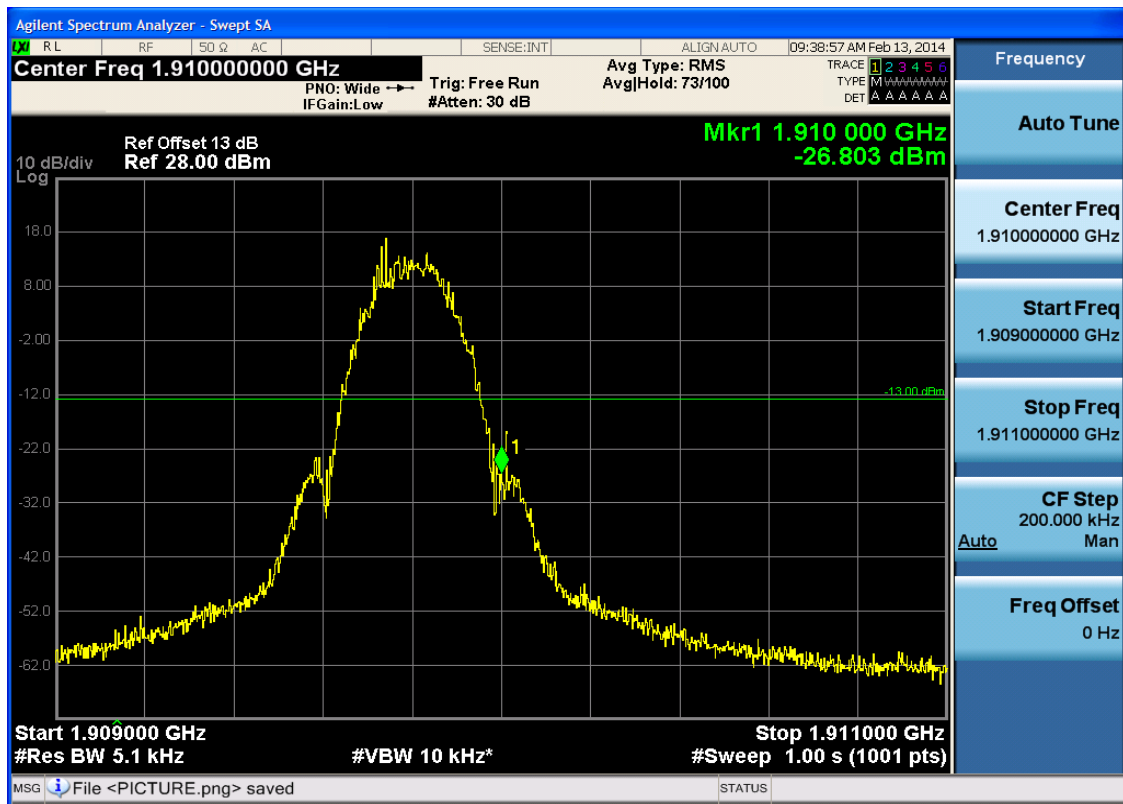


5.1.2.2 Test Mode = GSM/TM2

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.

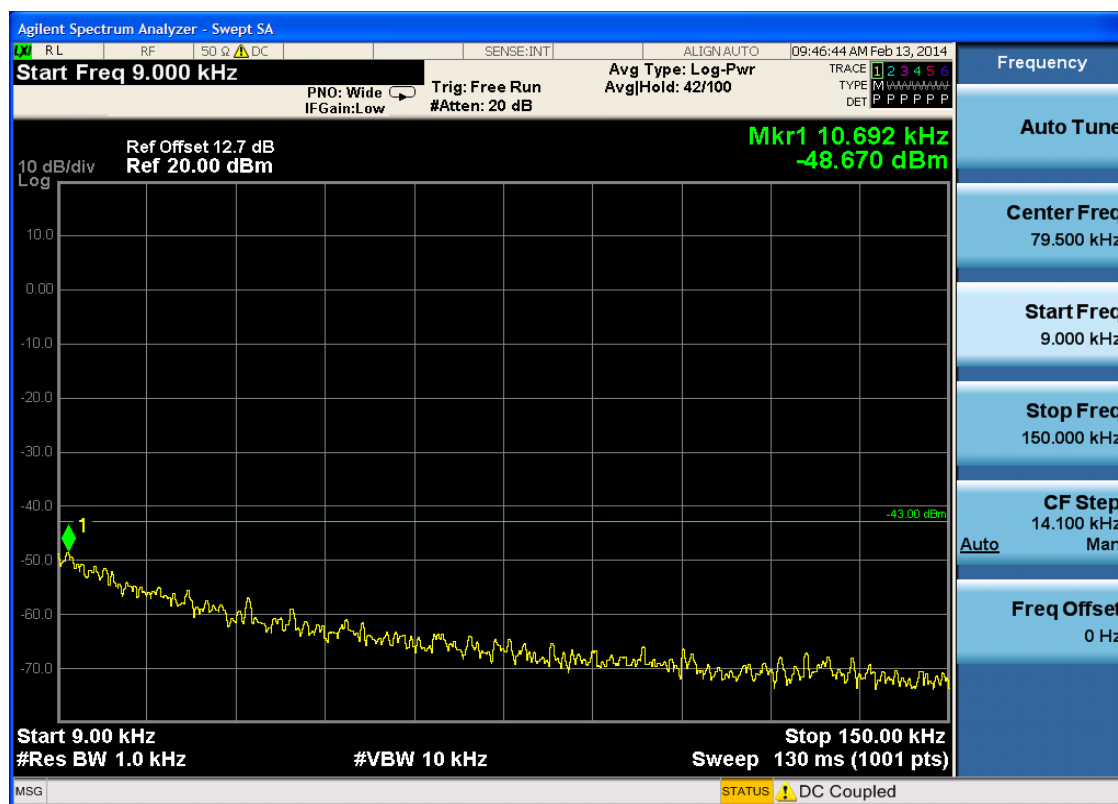
Part I - Test Plots

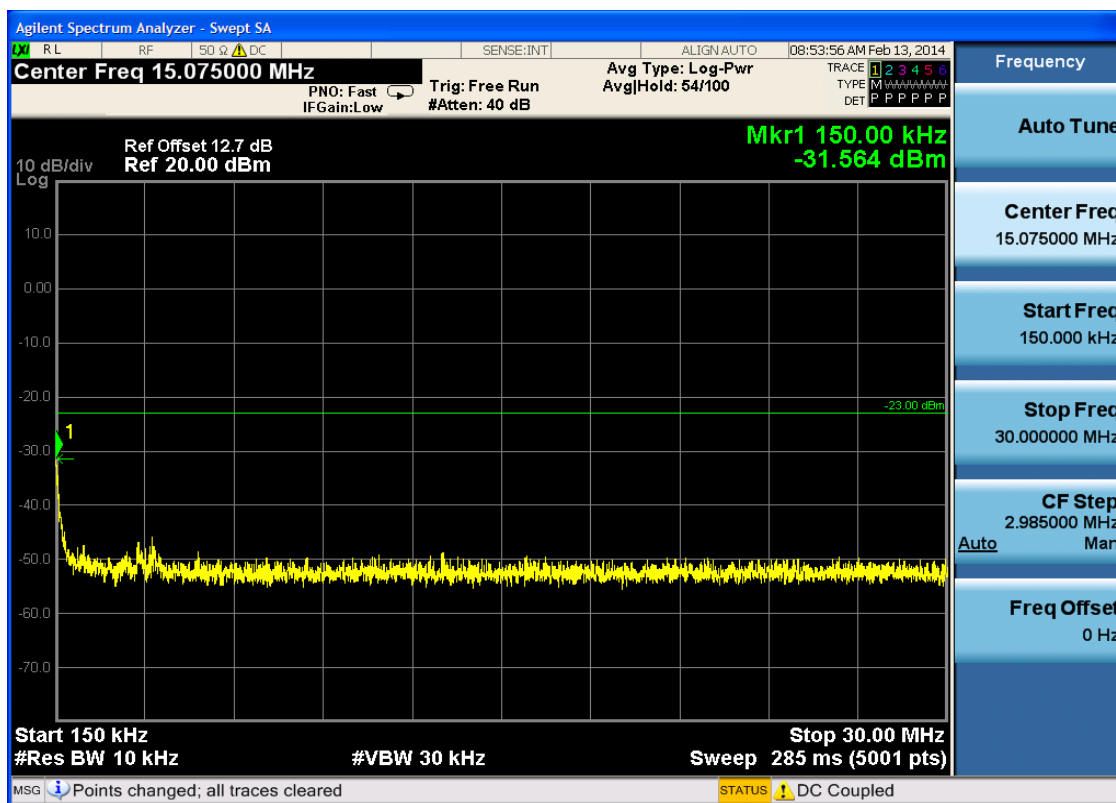
6.1 For GSM

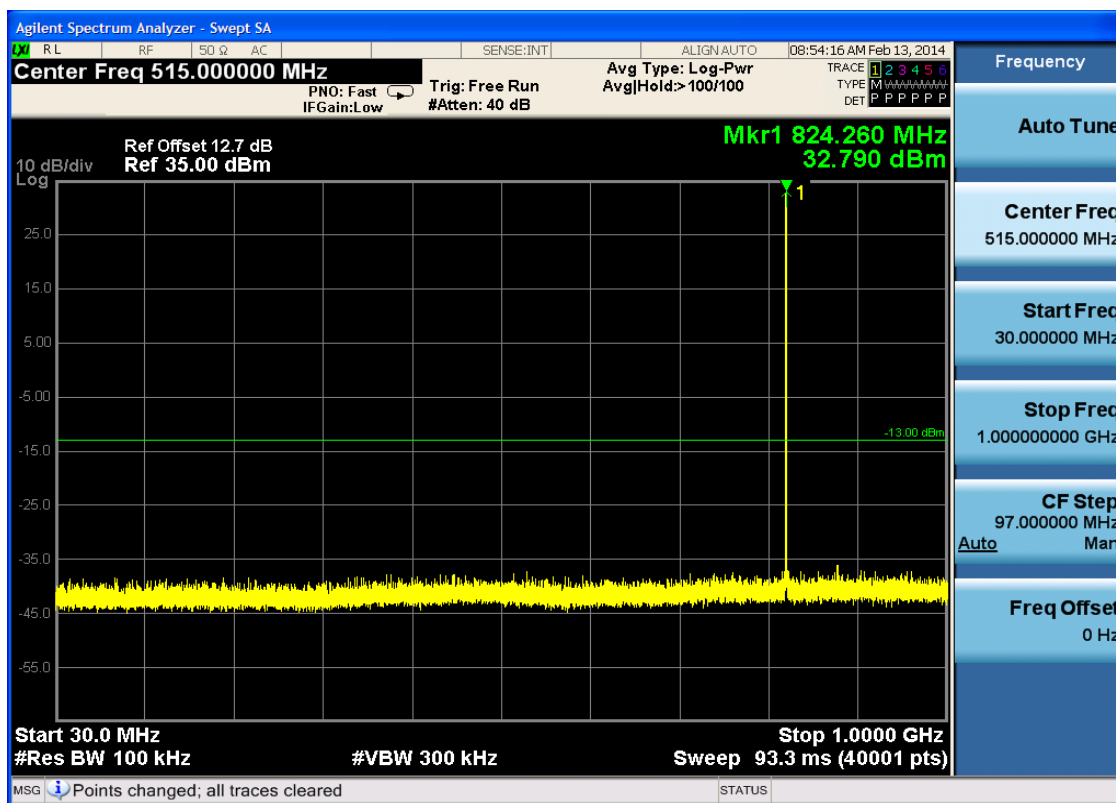
6.1.1 Test Band = GSM850

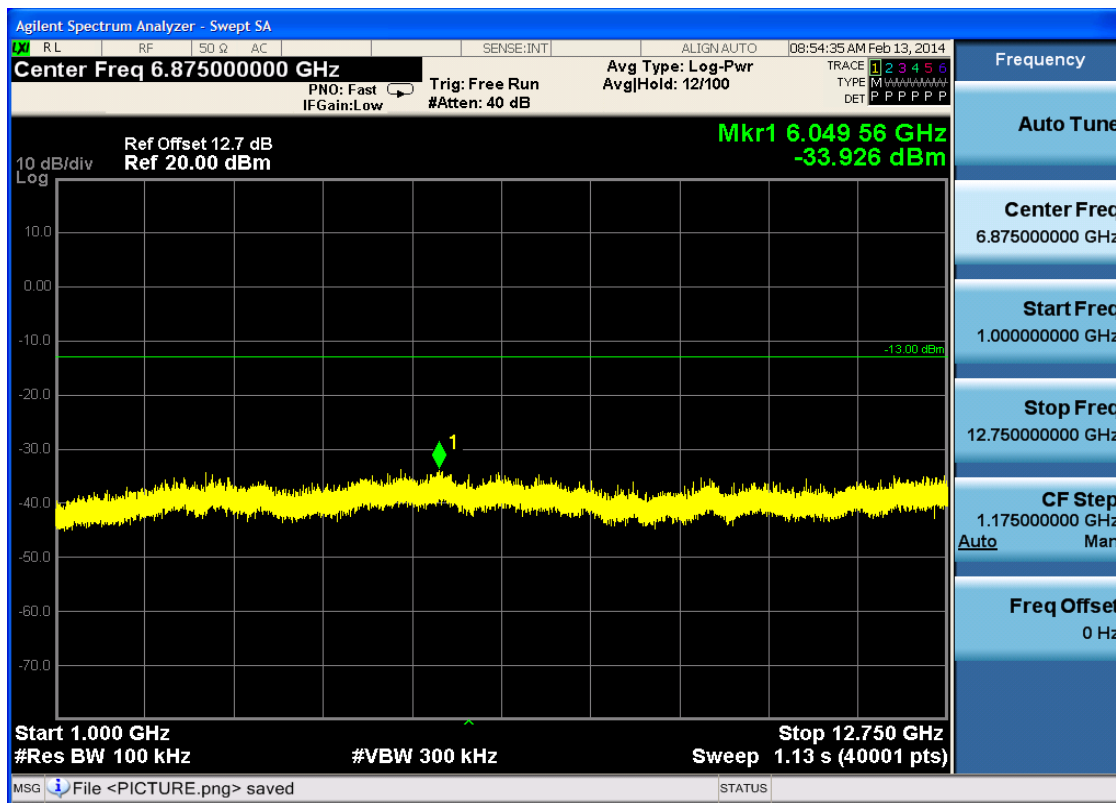
6.1.1.1 Test Mode = GSM/TM1

6.1.1.1.1 Test Channel = LCH

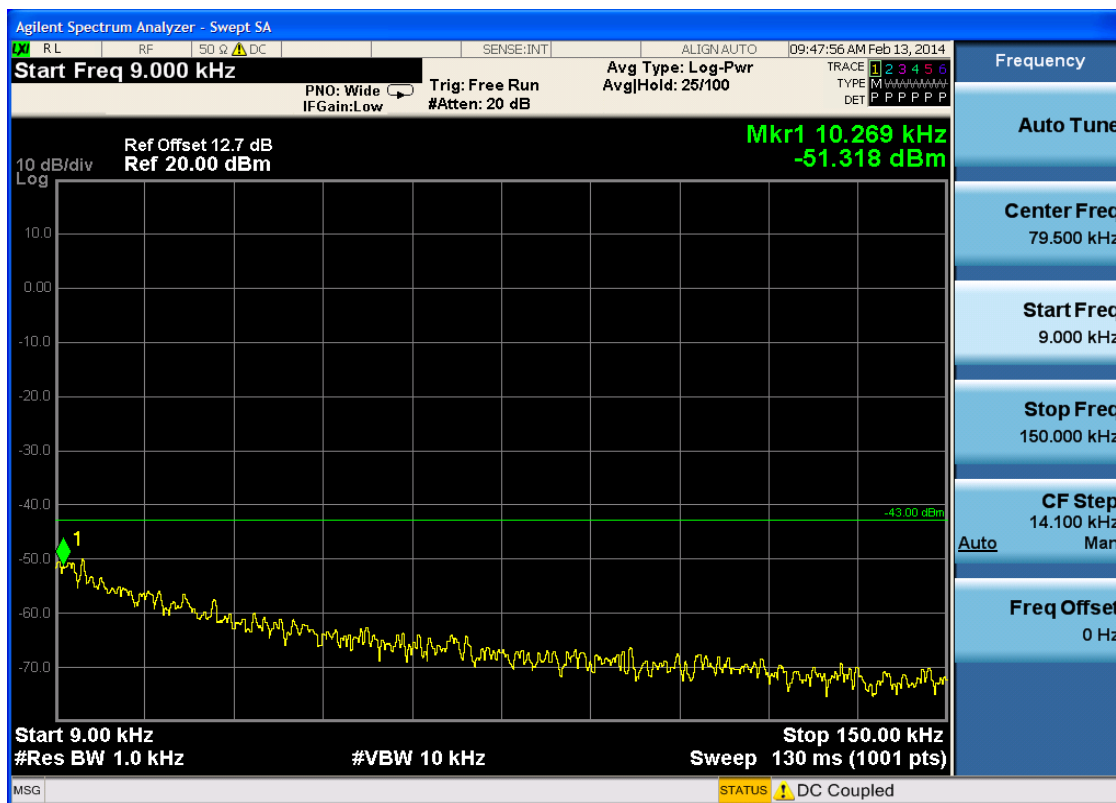


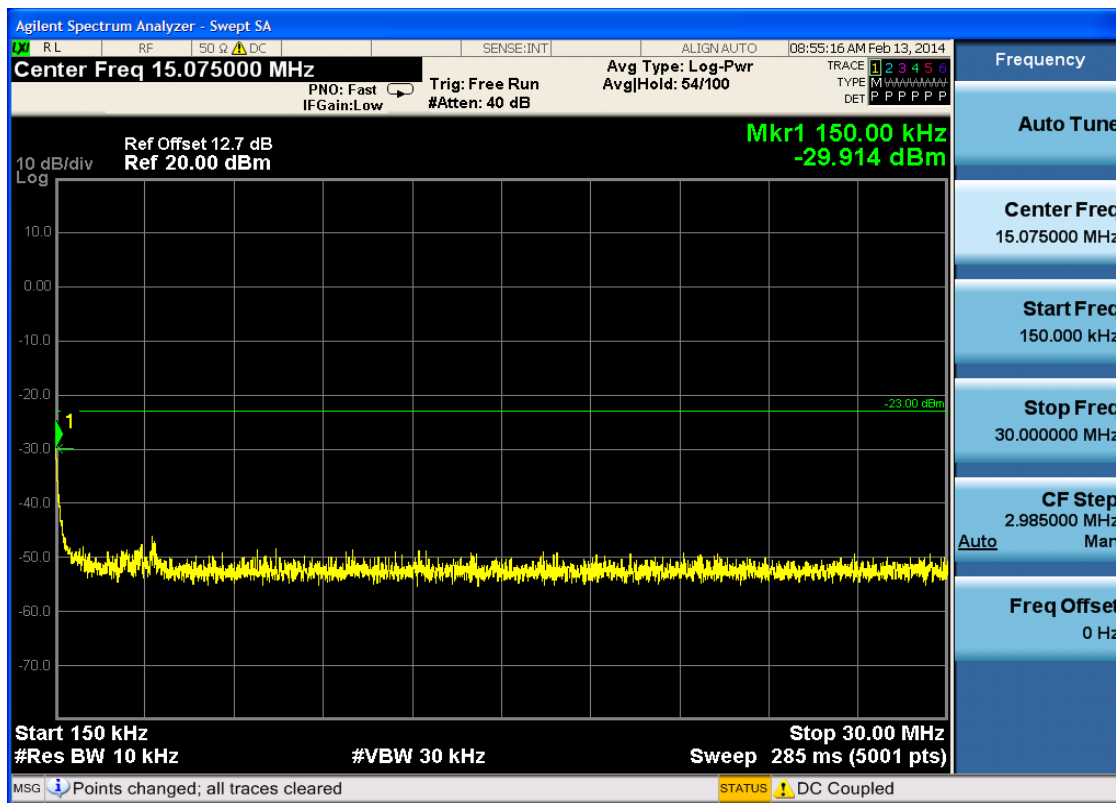


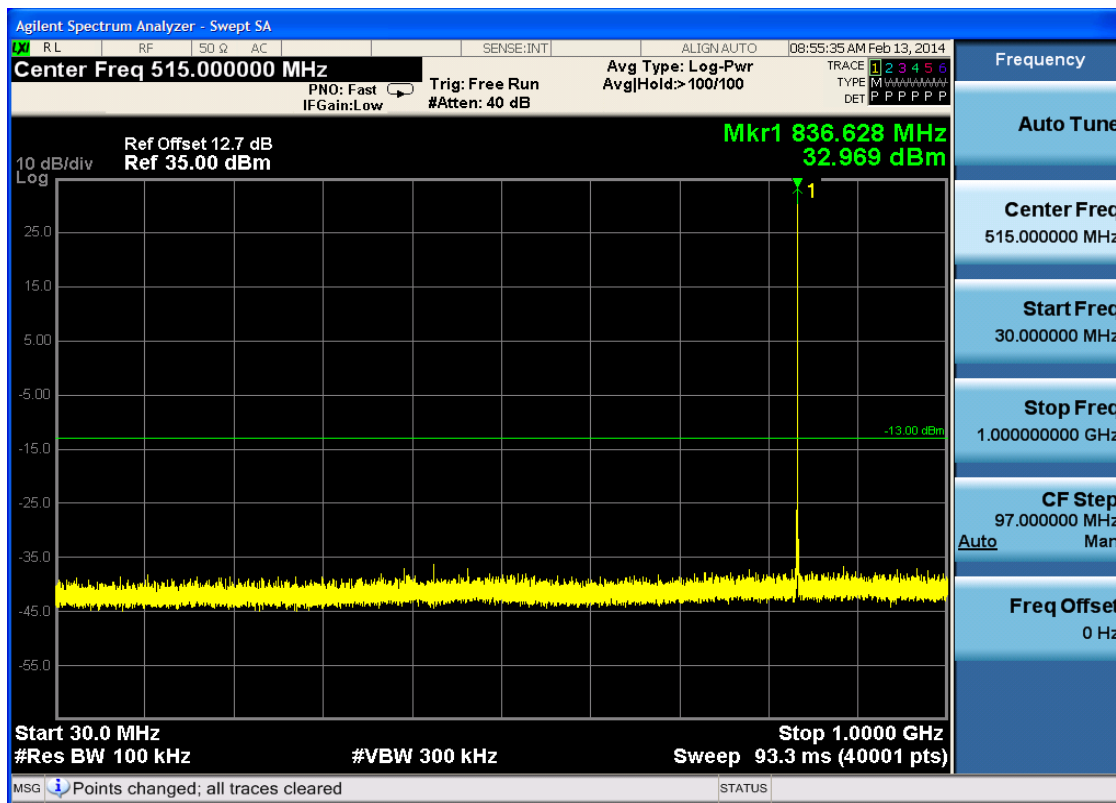


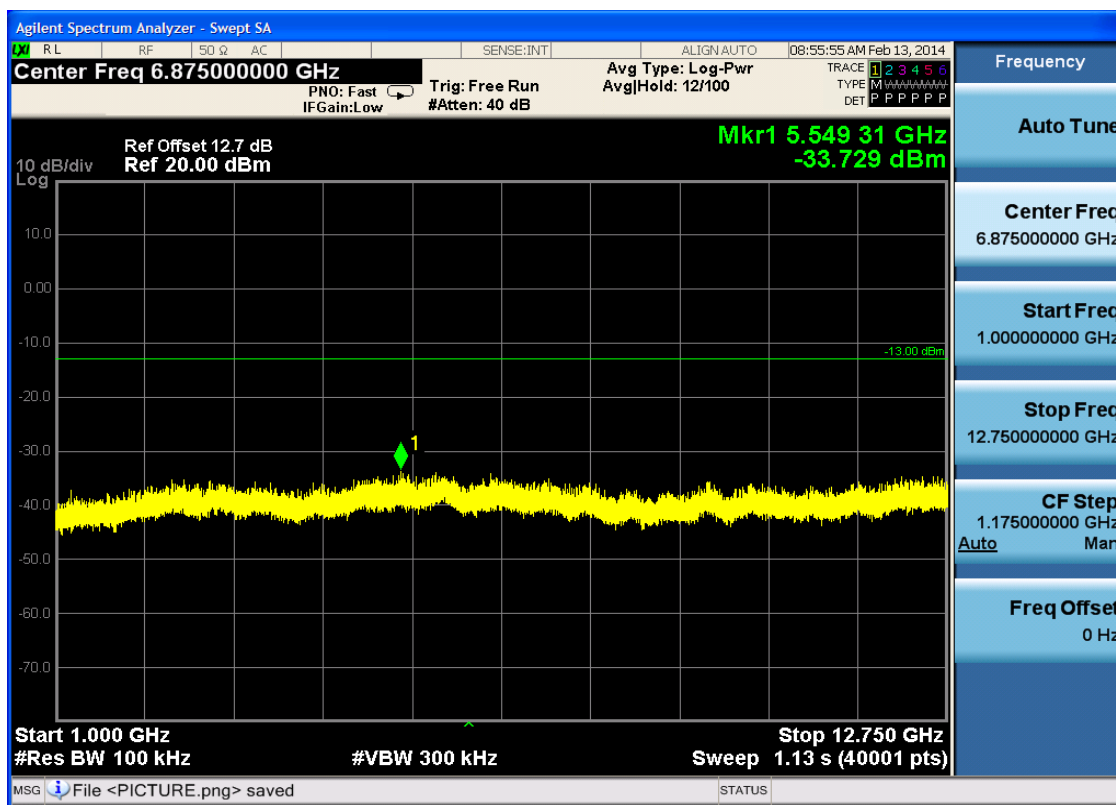


6.1.1.1.2 Test Channel = MCH



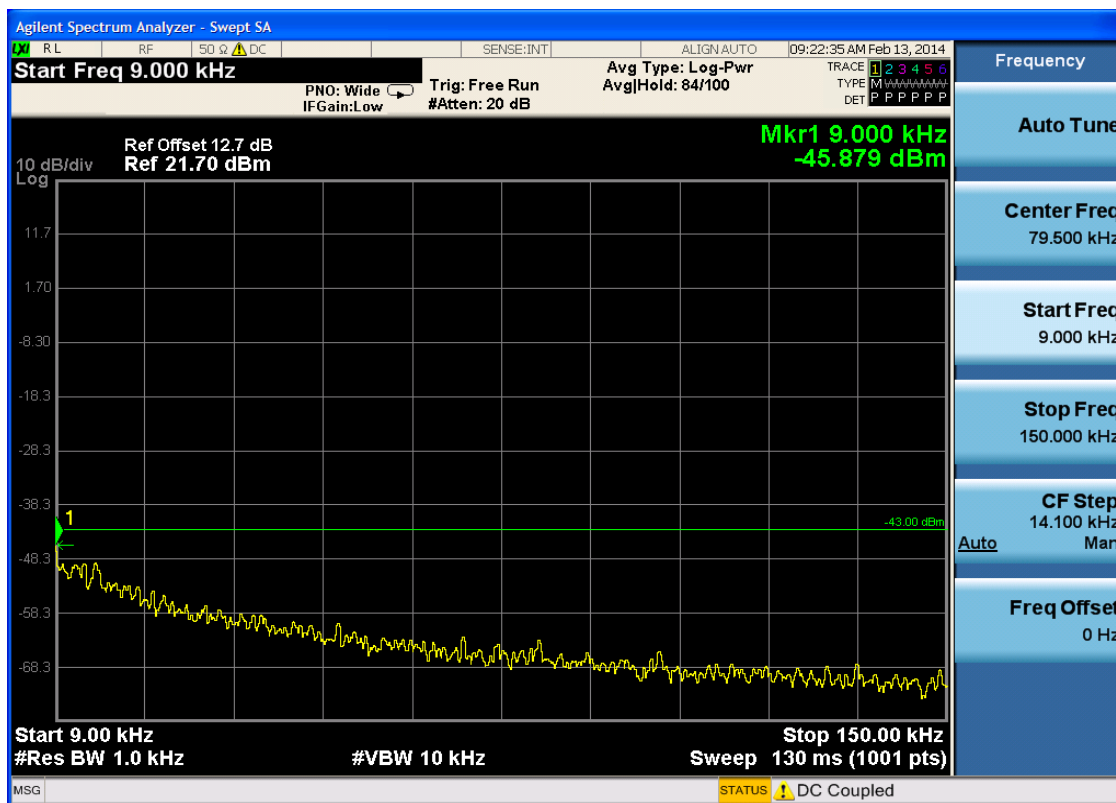


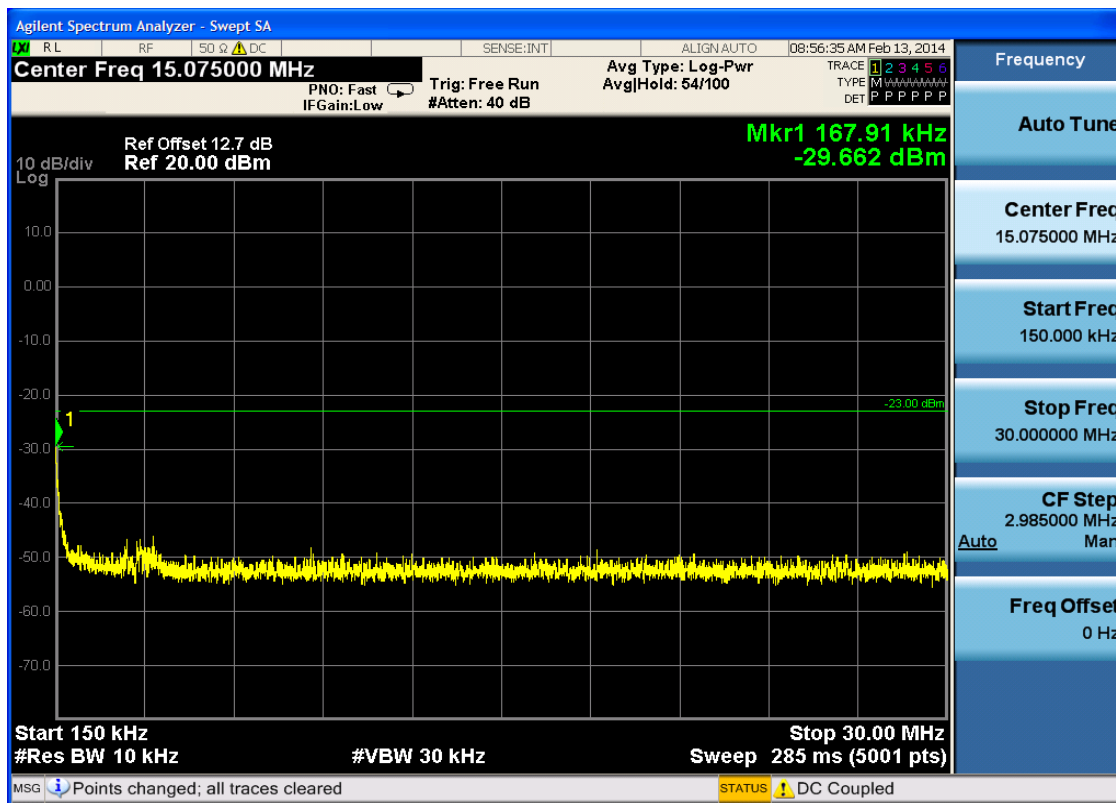


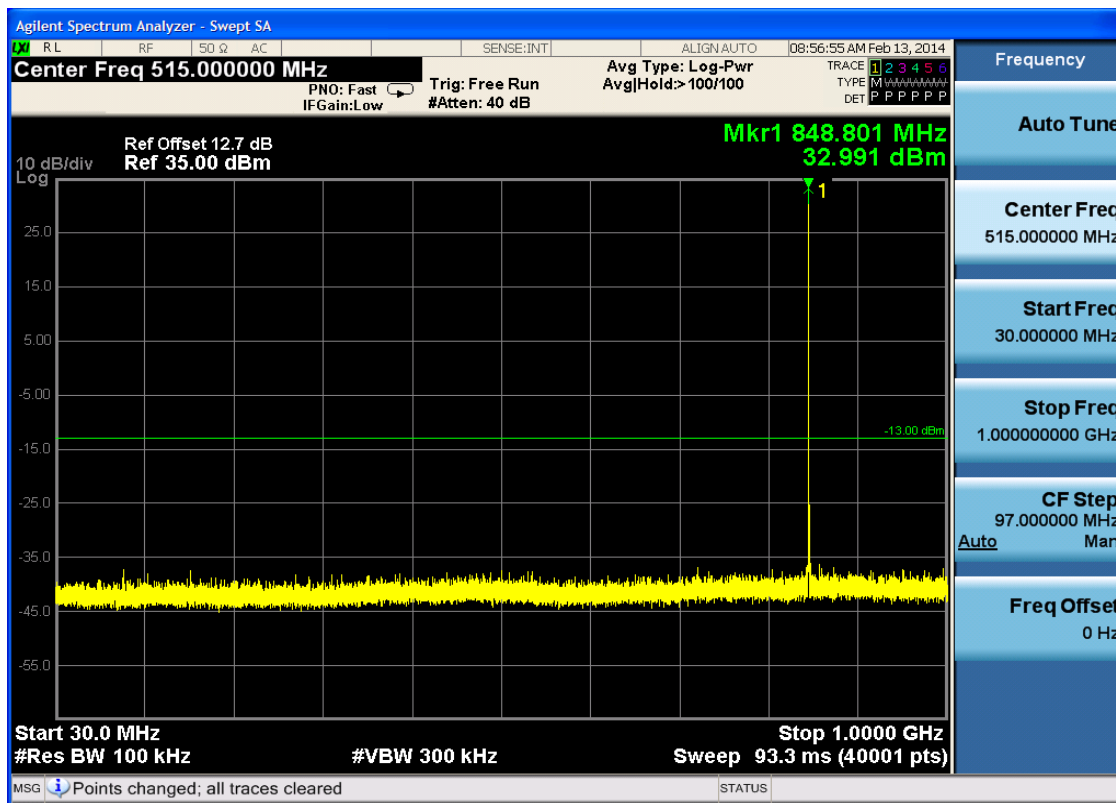


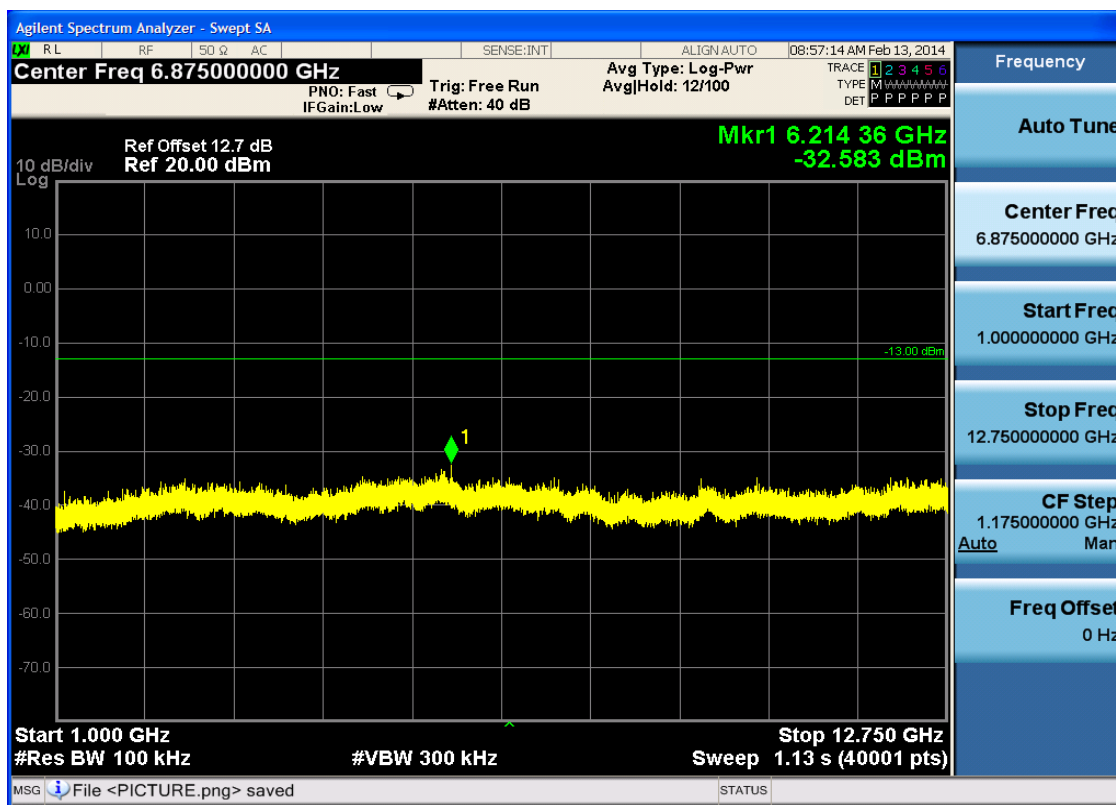


6.1.1.1.3 Test Channel = HCH



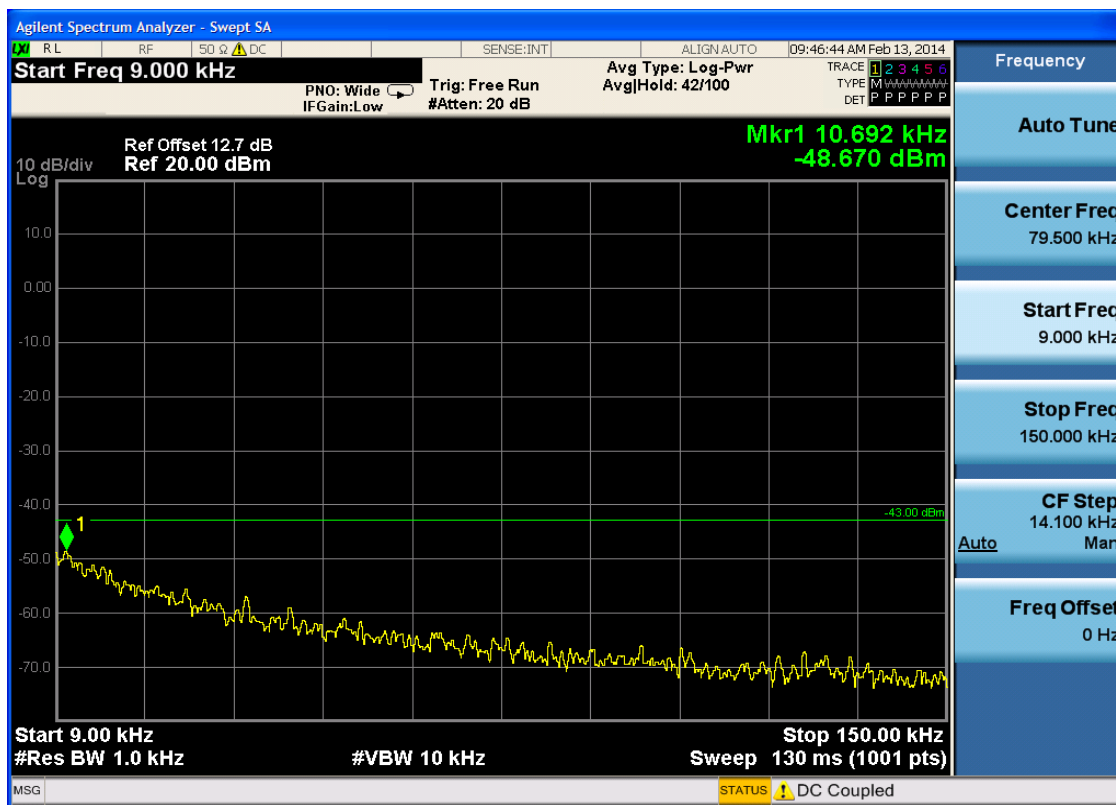


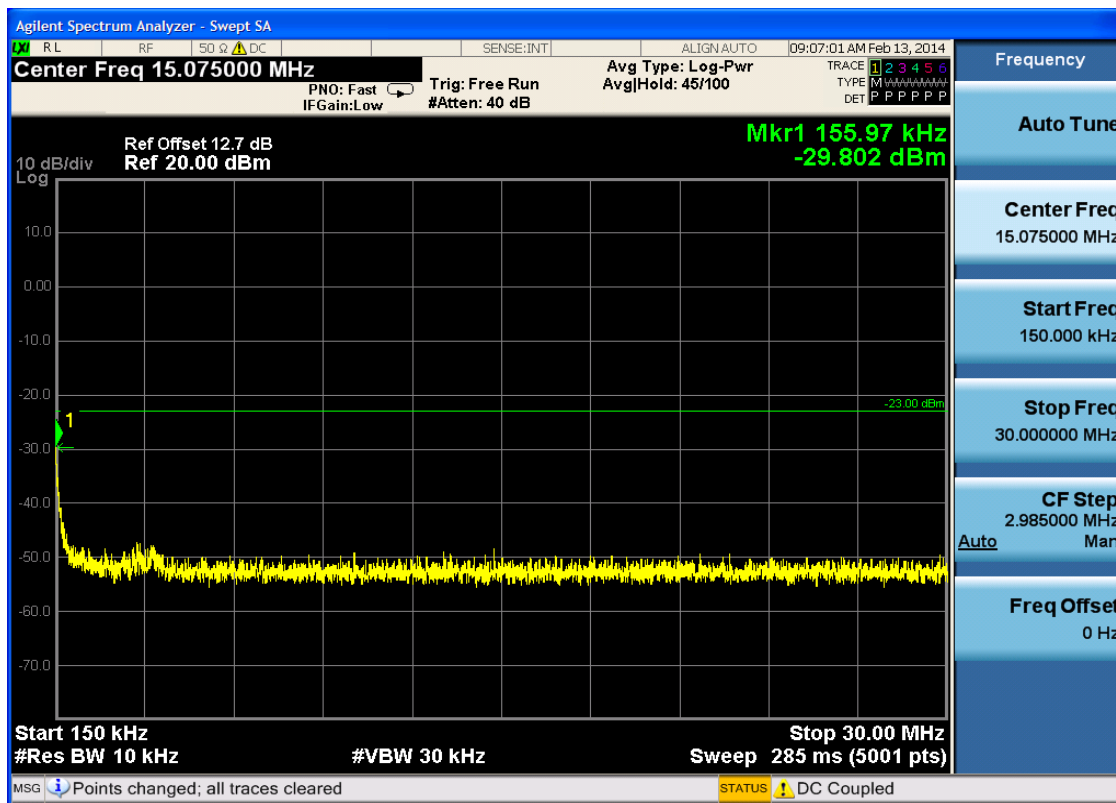


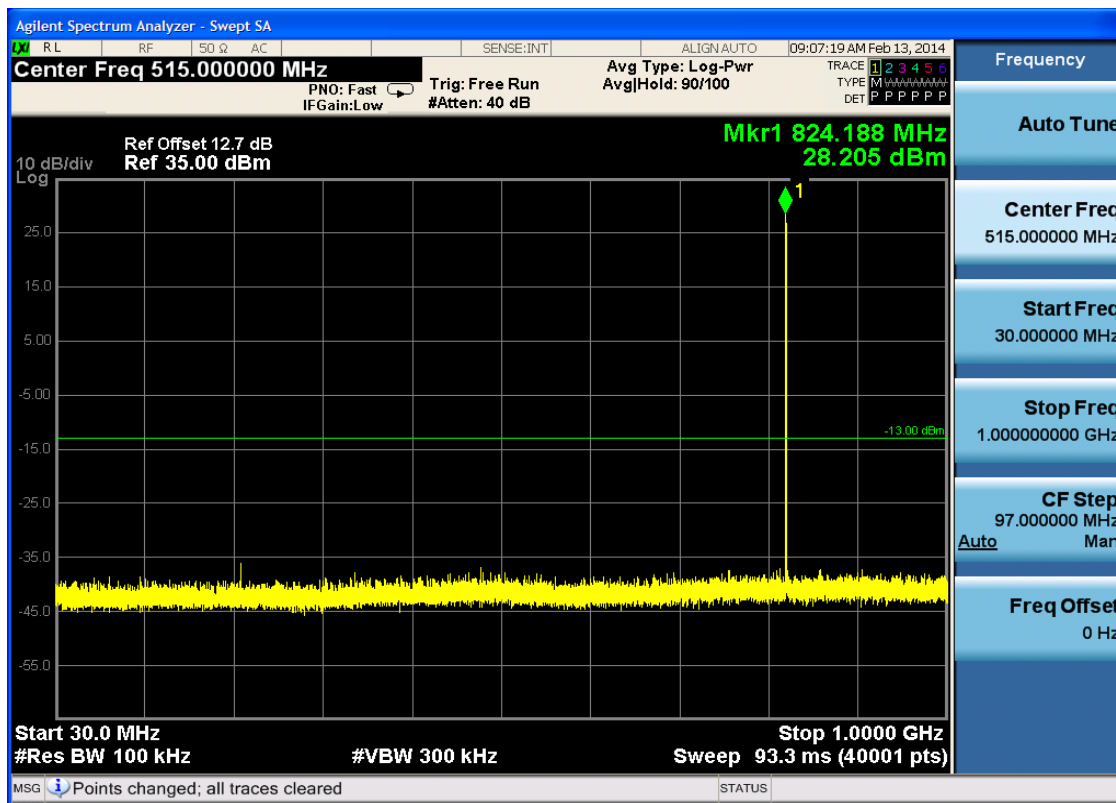


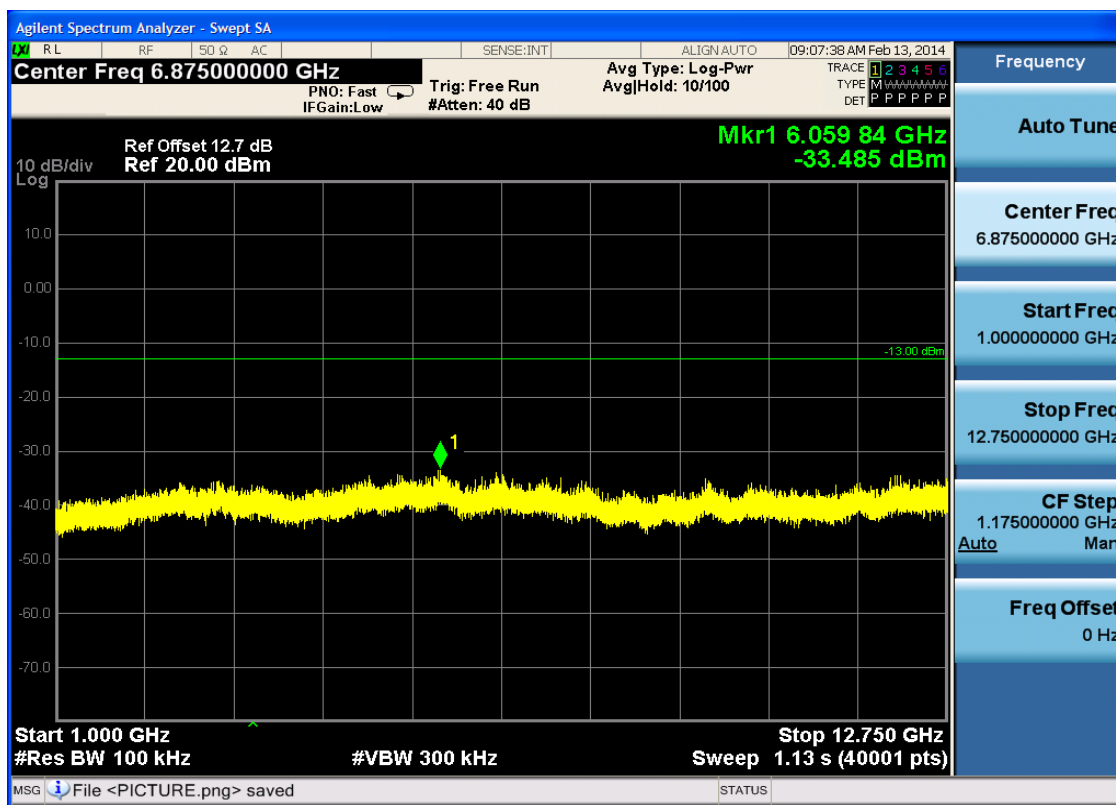
6.1.1.2 Test Mode = GSM/TM2

6.1.1.2.1 Test Channel = LCH



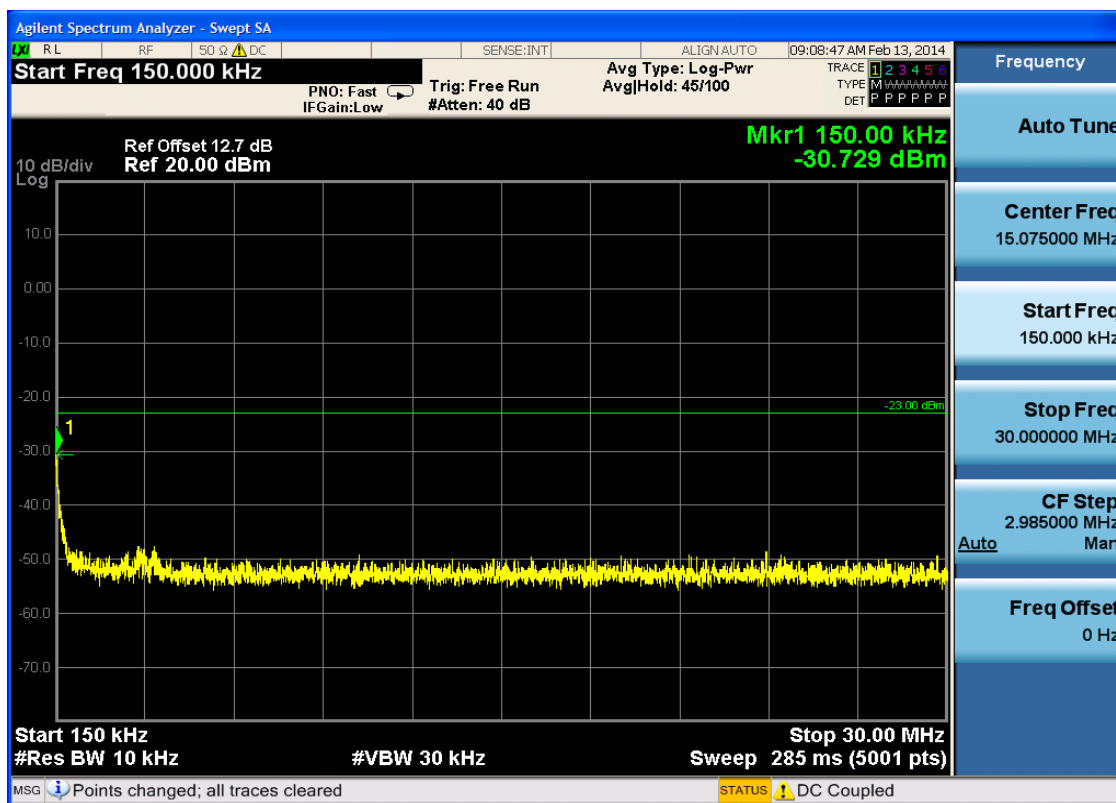


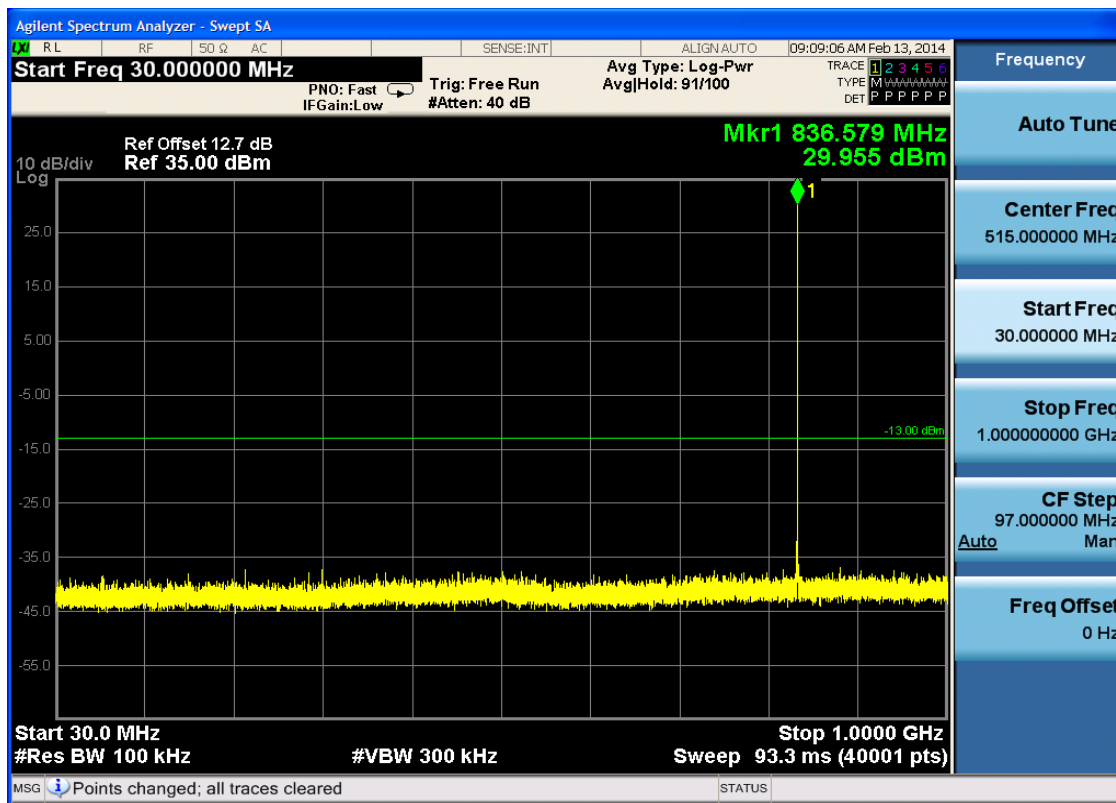


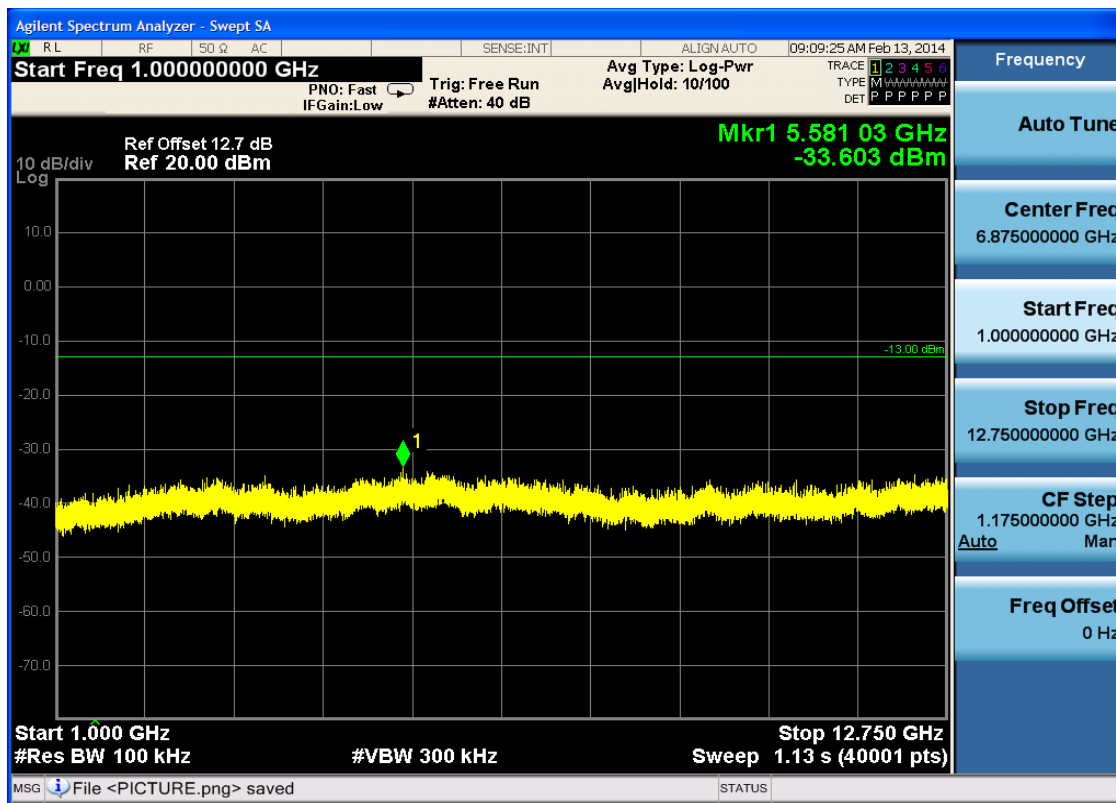


6.1.1.2.2 Test Channel = MCH











Agilent Spectrum Analyzer - Swept SA

R/L RF 50 Ω DC SENSE:INT ALIGN:AUTO 09:10:31 AM Feb 13, 2014

Reference Level 10.00 dBm PNO: Wide IFGain:Low Trig: Free Run Avg Type: Log-Pwr AvgHold>100/100

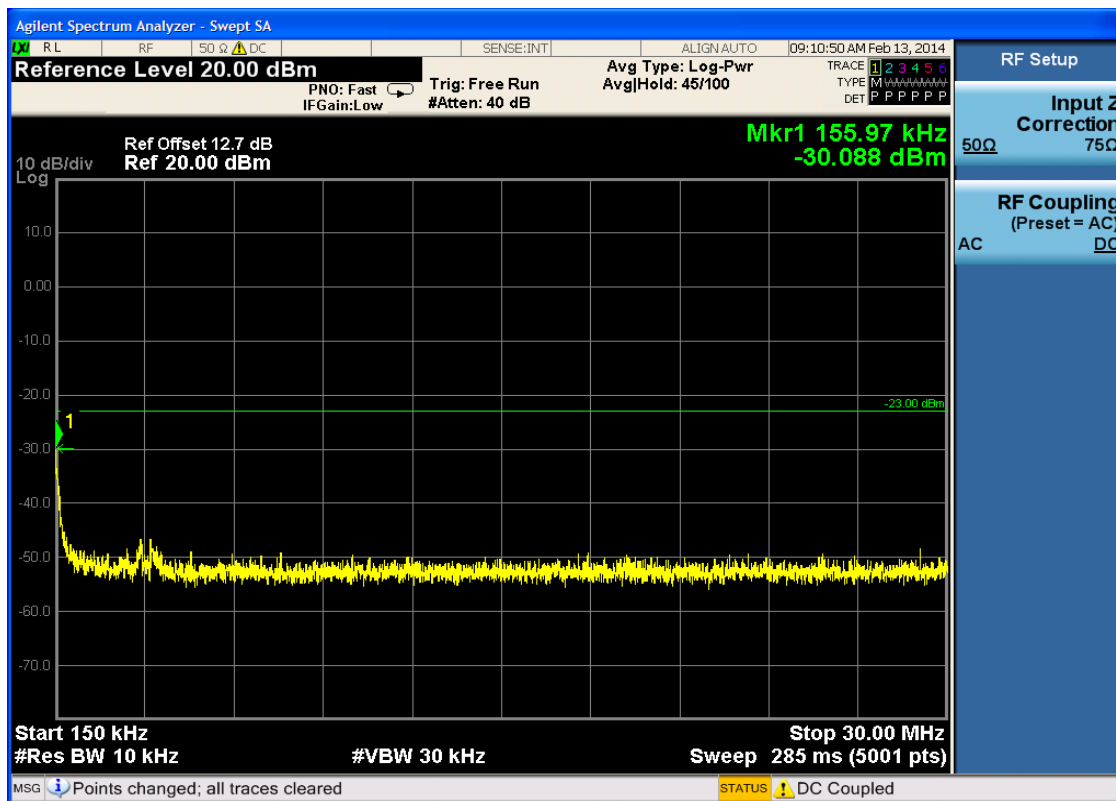
Mkr1 10.128 kHz -36.970 dBm

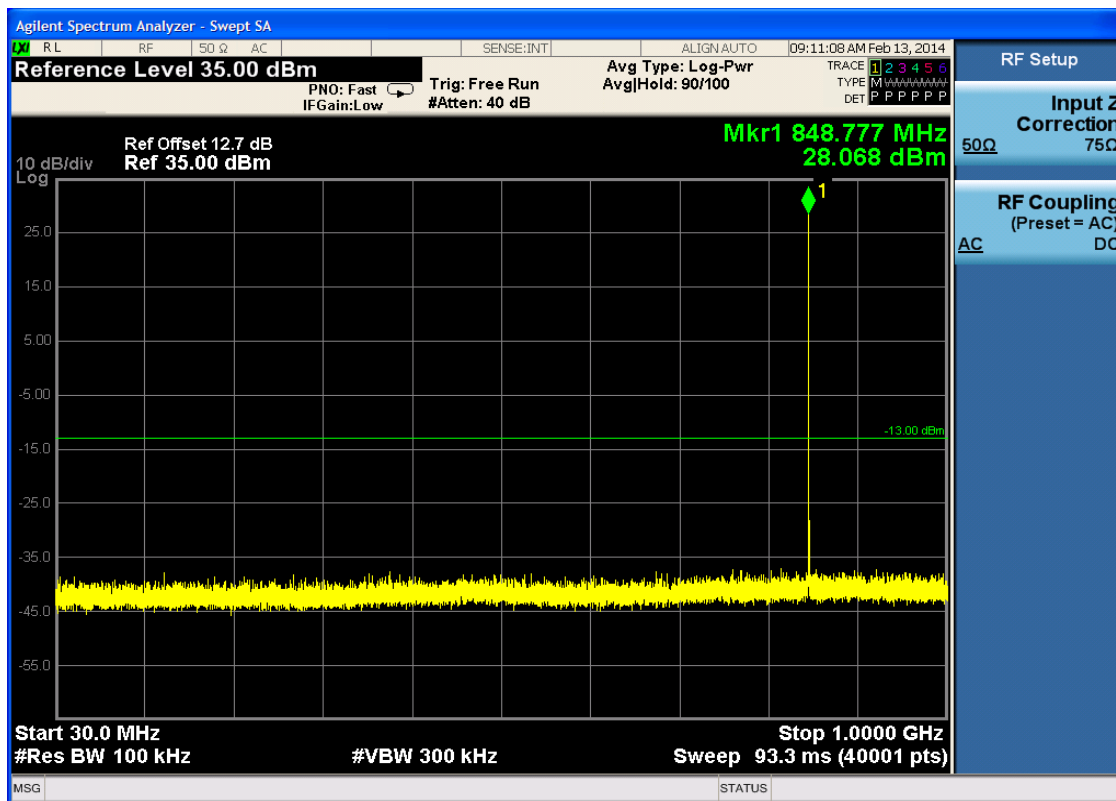
Ref Offset 12.7 dB Ref 10.00 dBm

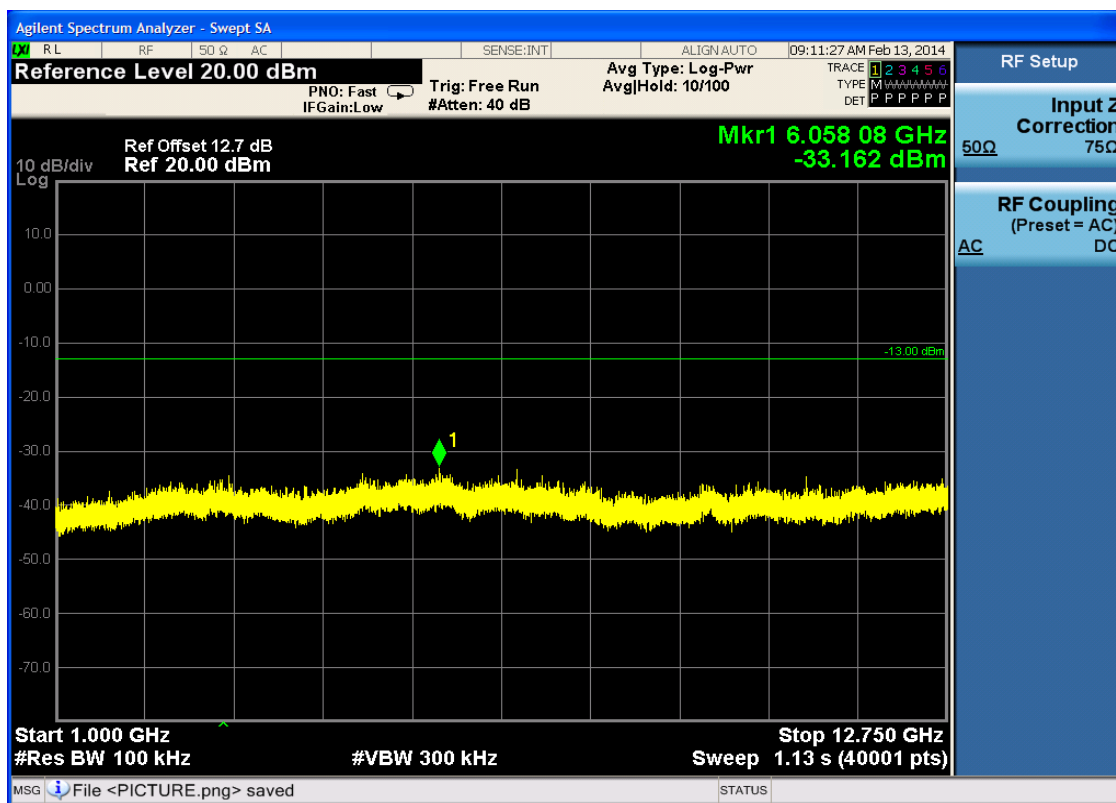
10 dB/div Log

Start 9.00 kHz Stop 150.00 kHz
#Res BW 1.0 kHz #VBW 10 kHz Sweep 130 ms (1001 pts)

MSG STATUS DC Coupled



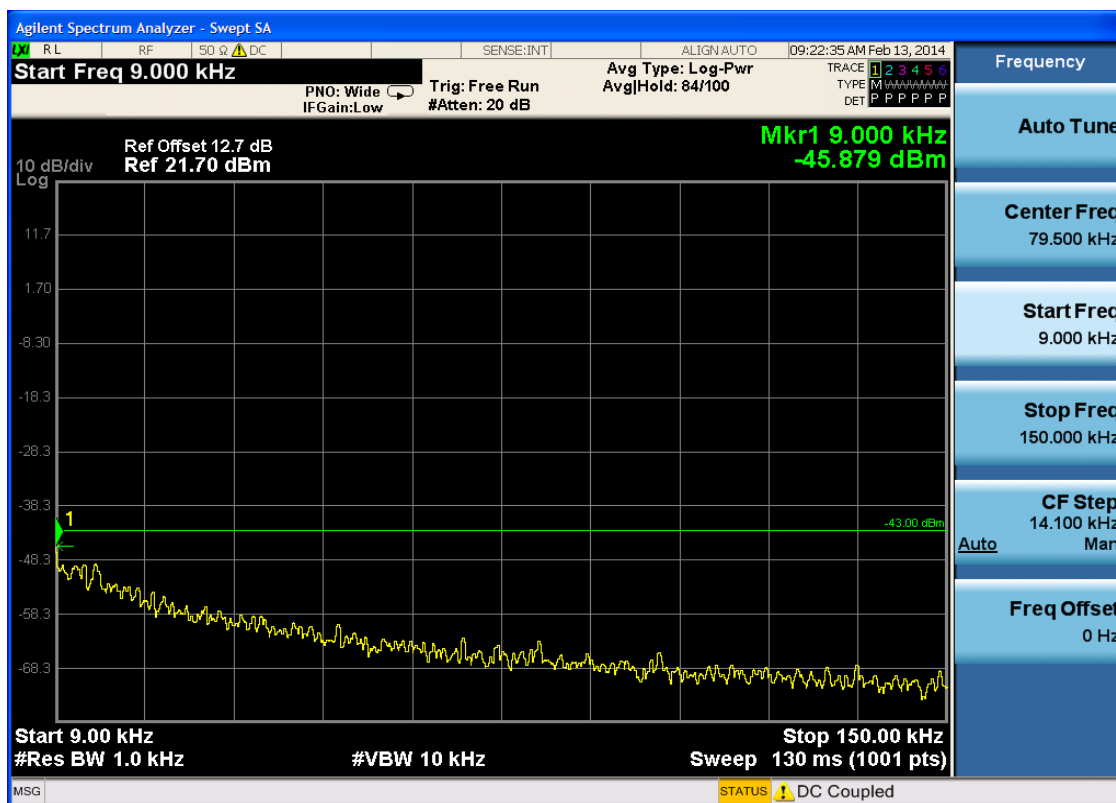


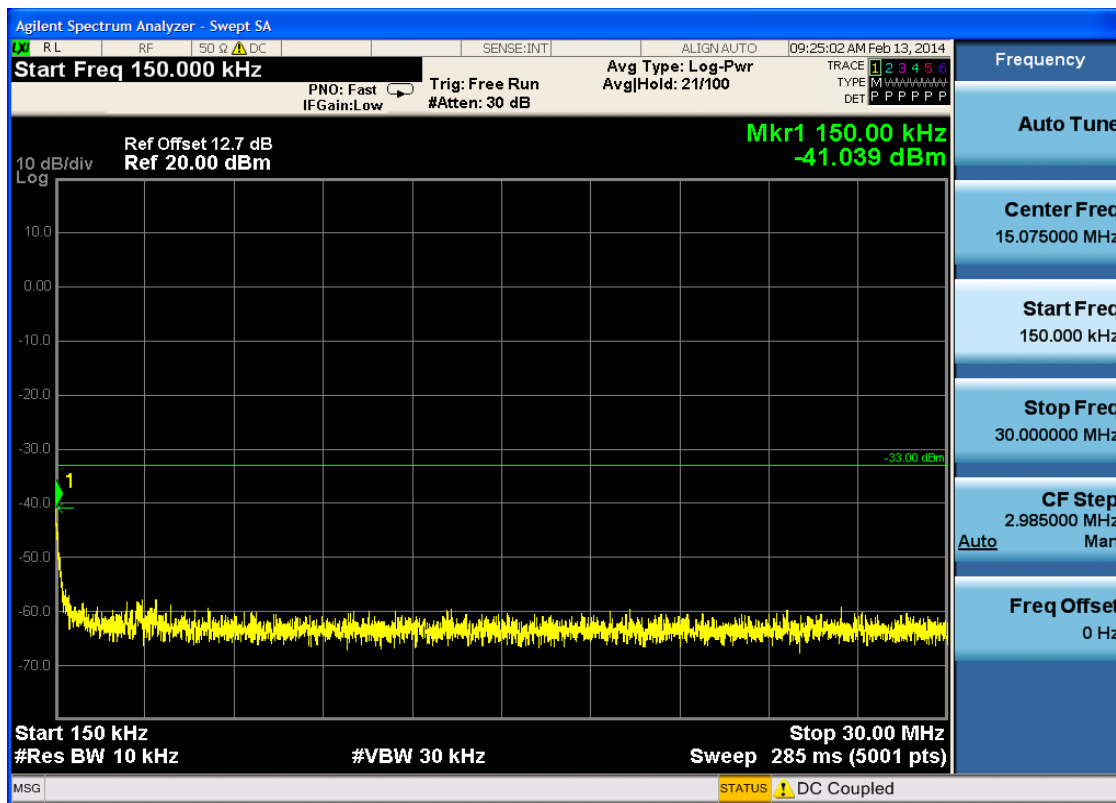


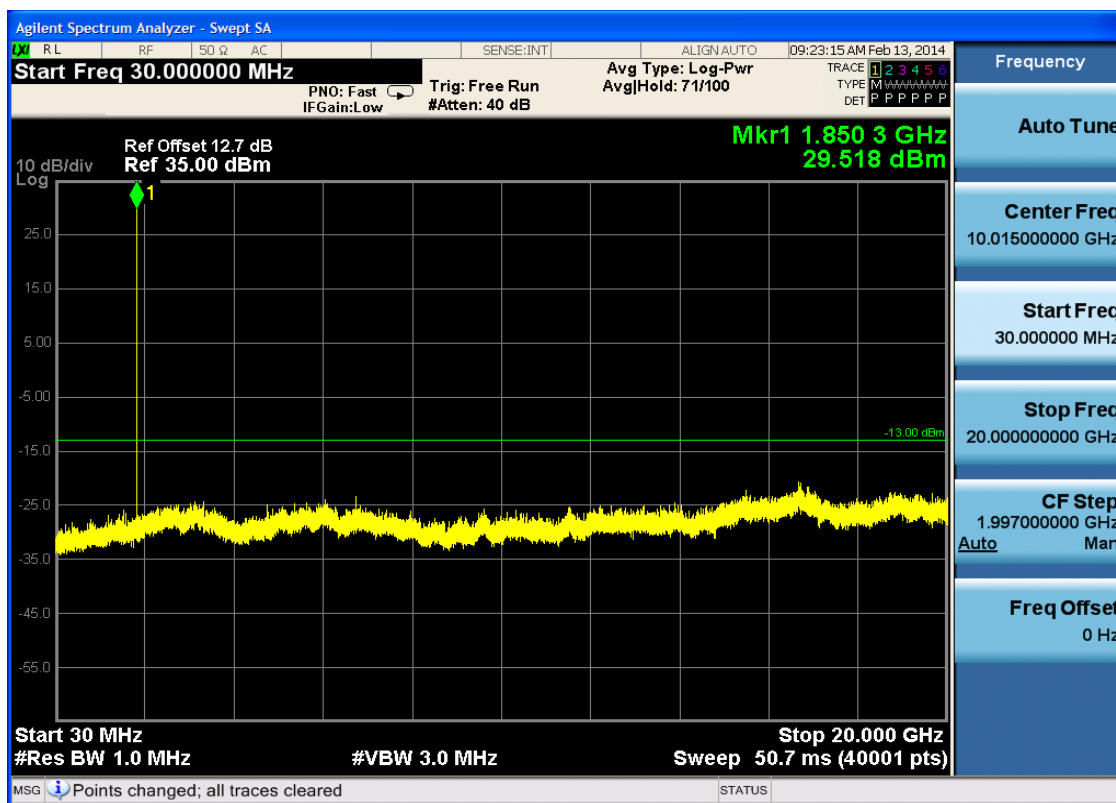
6.1.2 Test Band = GSM1900

6.1.2.1 Test Mode = GSM/TM1

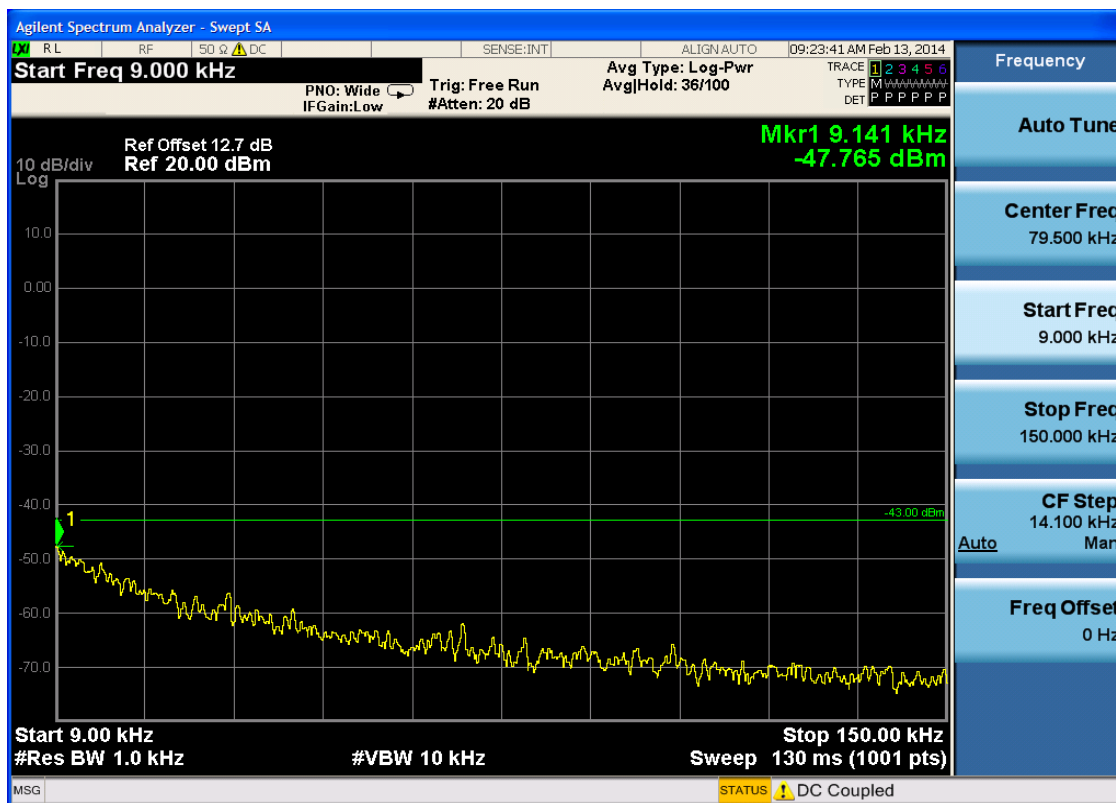
6.1.2.1.1 Test Channel = LCH

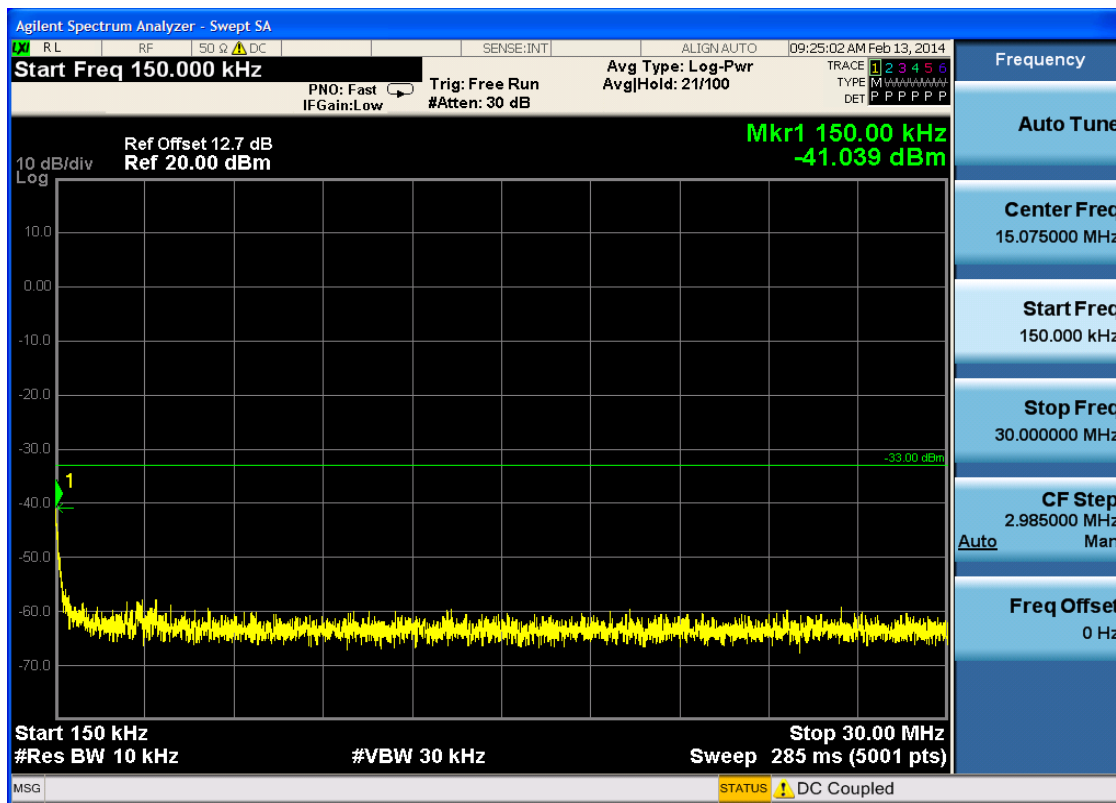


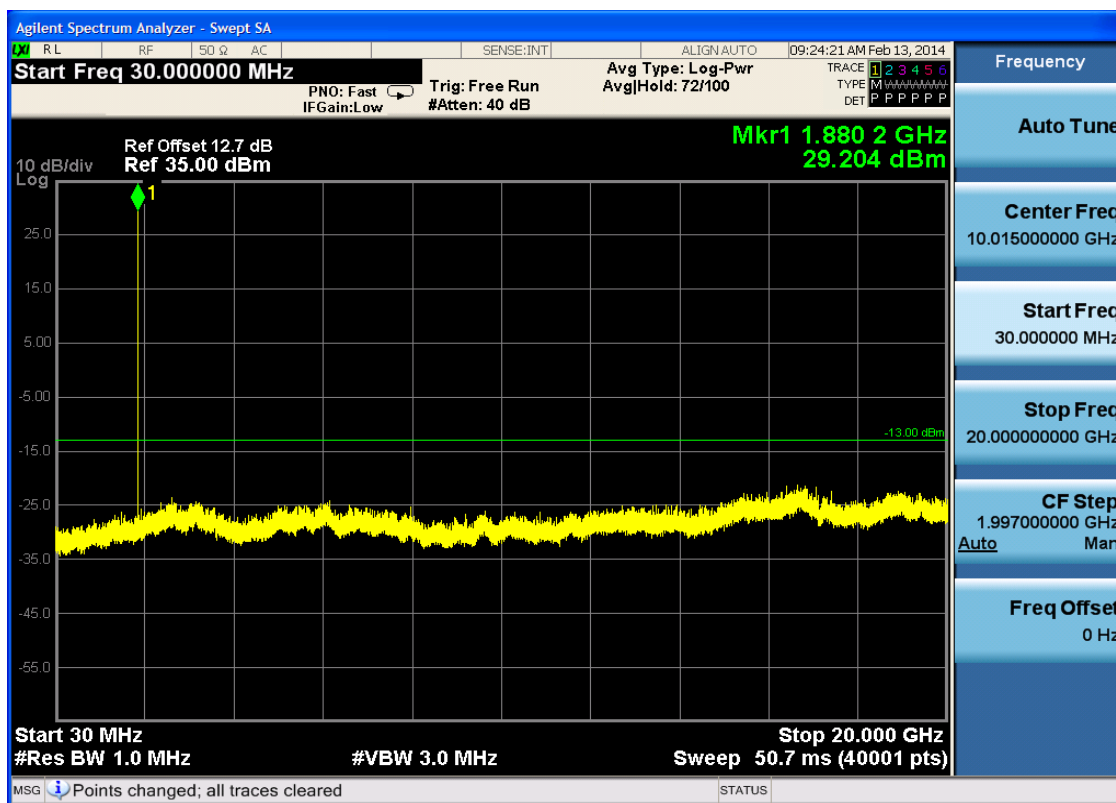




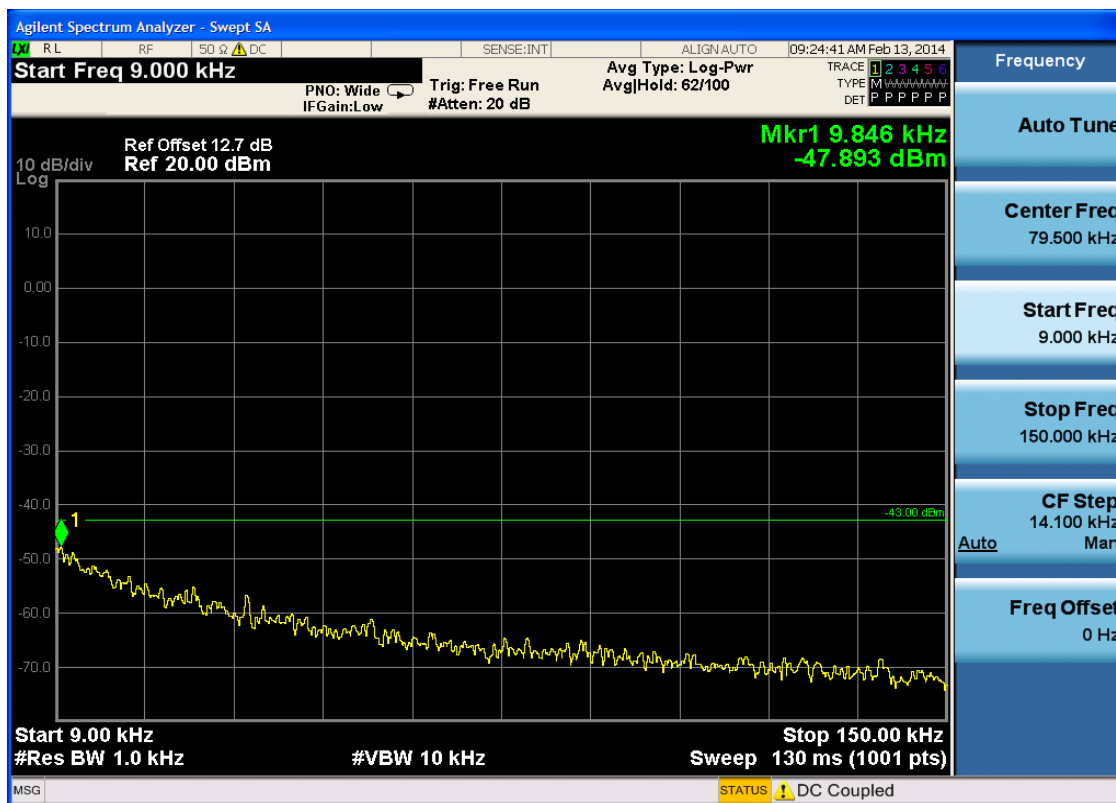
6.1.2.1.2 Test Channel = MCH

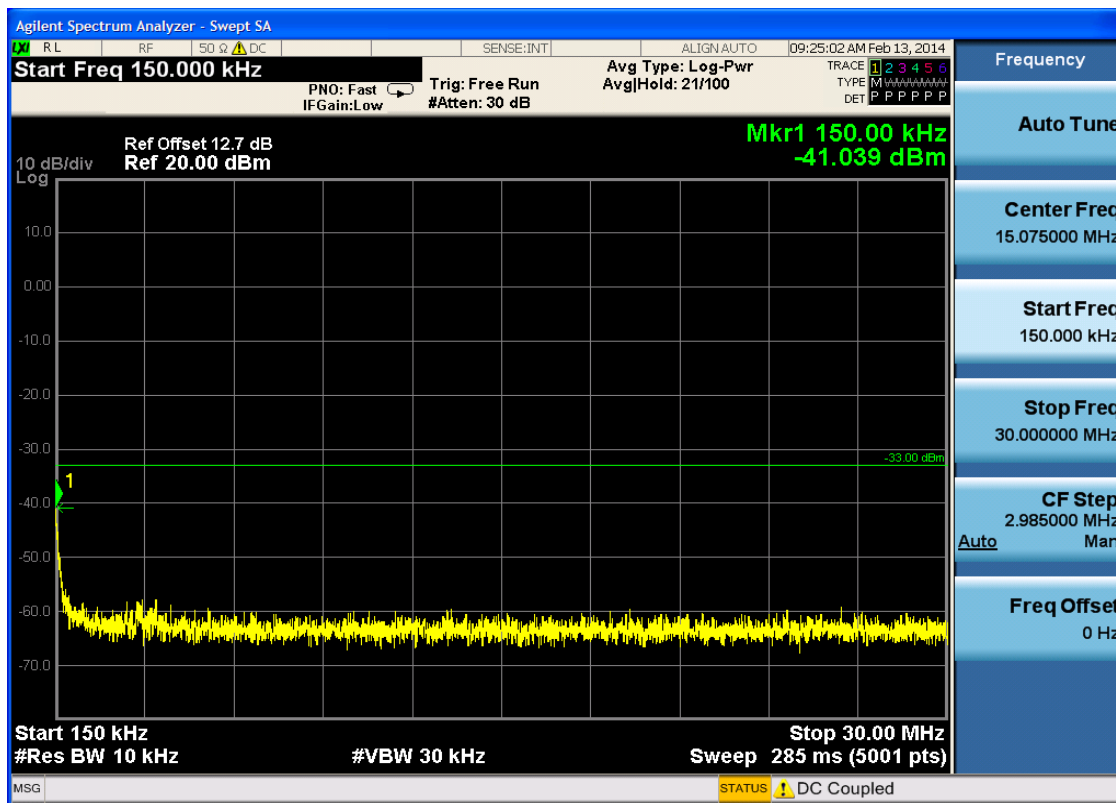


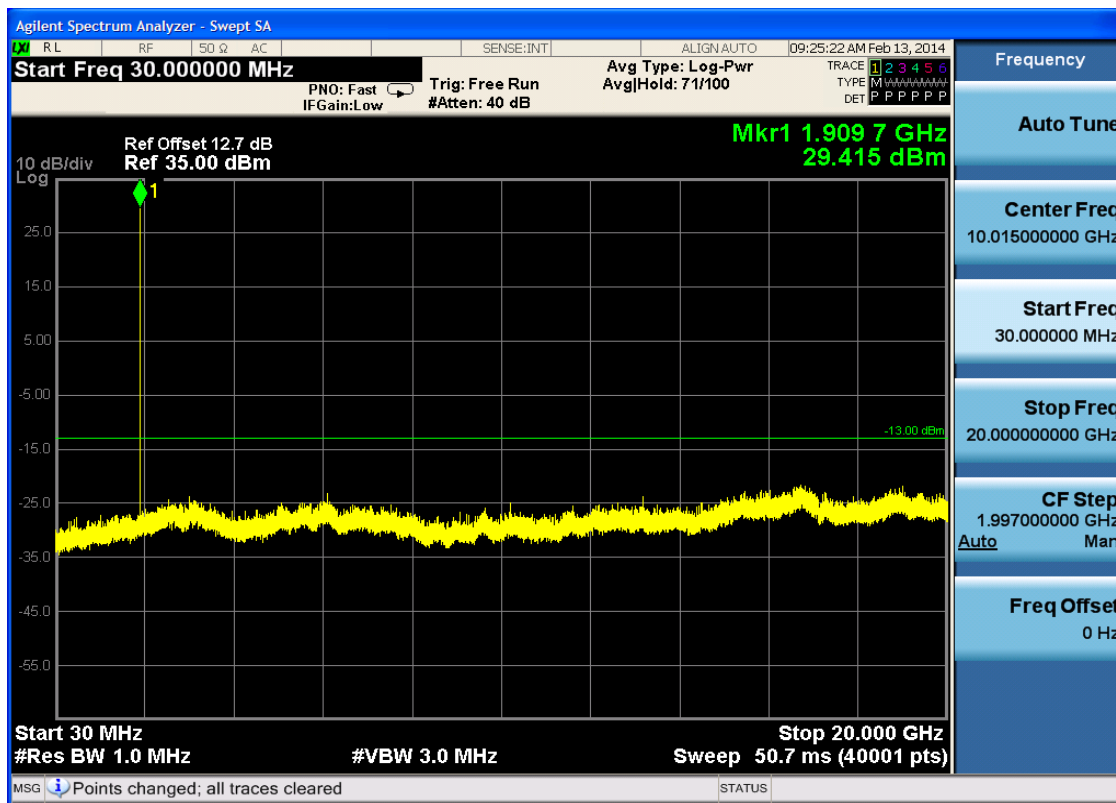




6.1.2.1.3 Test Channel = HCH

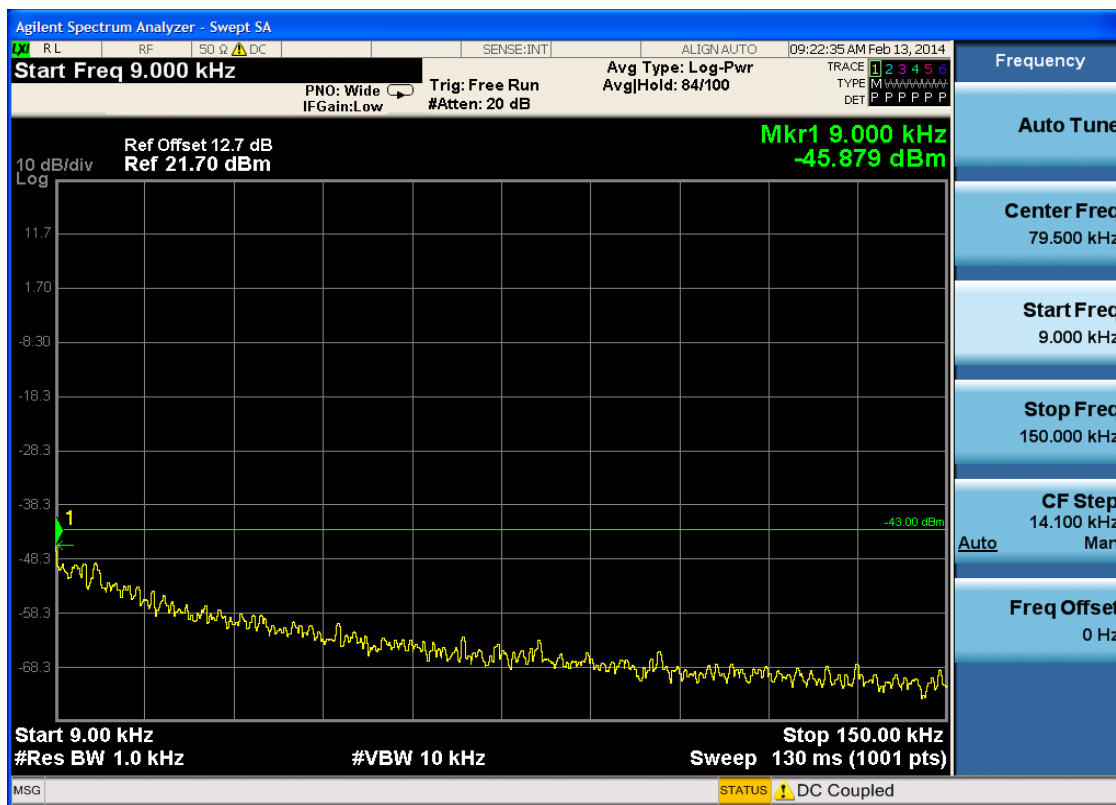


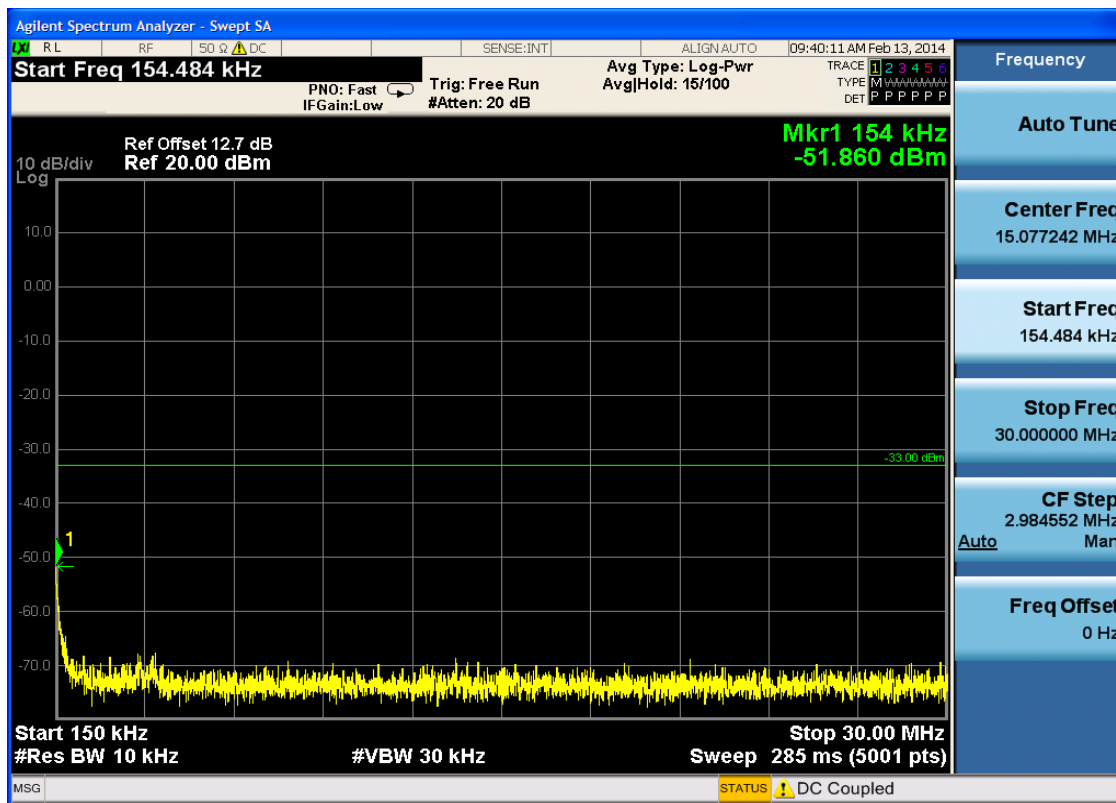


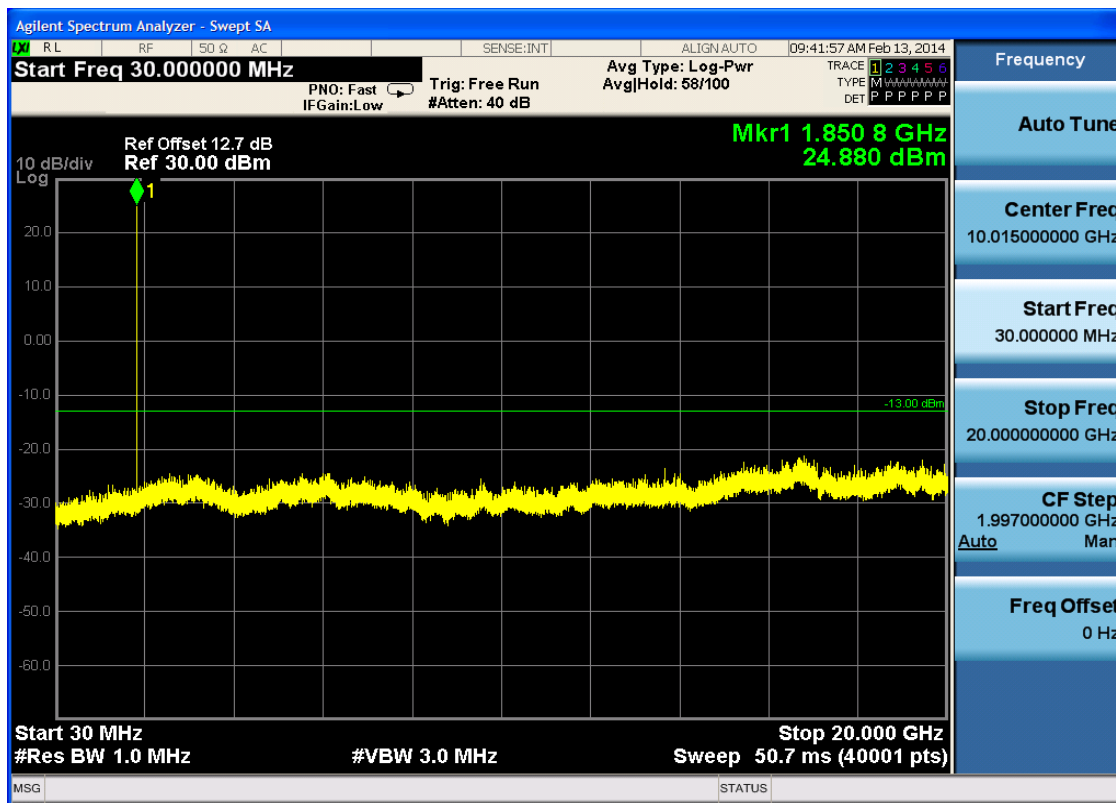


6.1.2.2 Test Mode = GSM/TM2

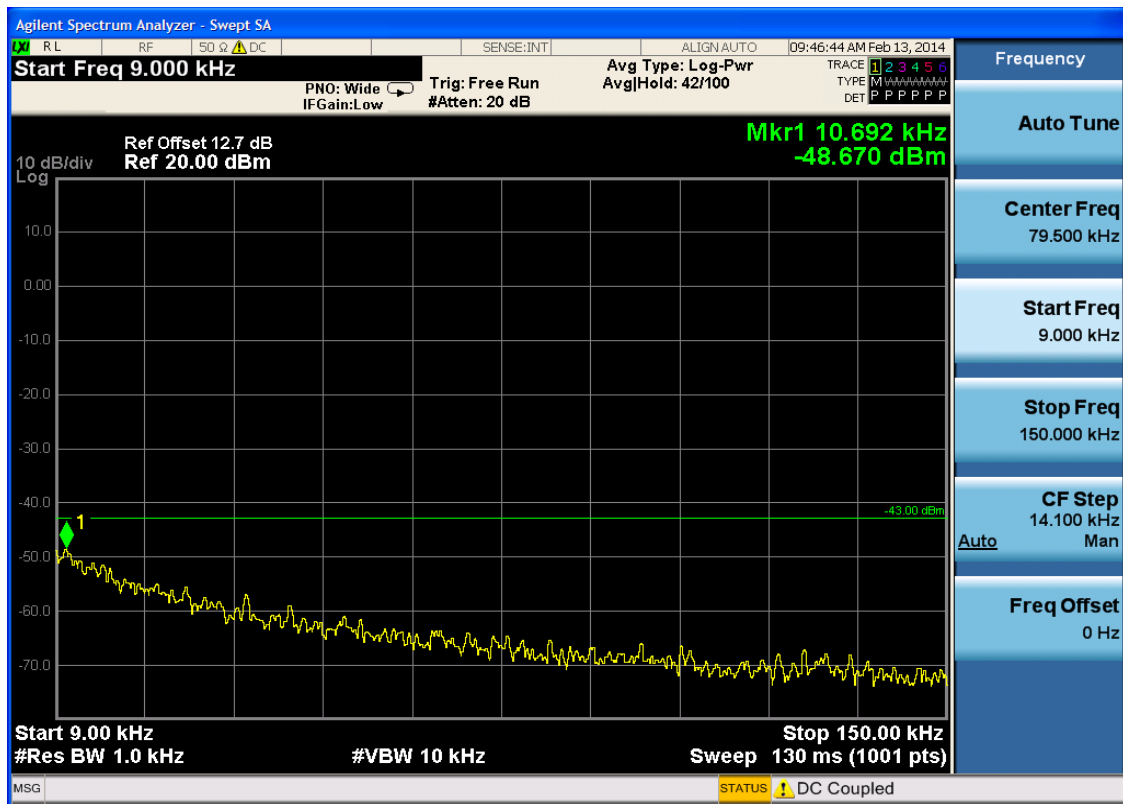
6.1.2.2.1 Test Channel = LCH

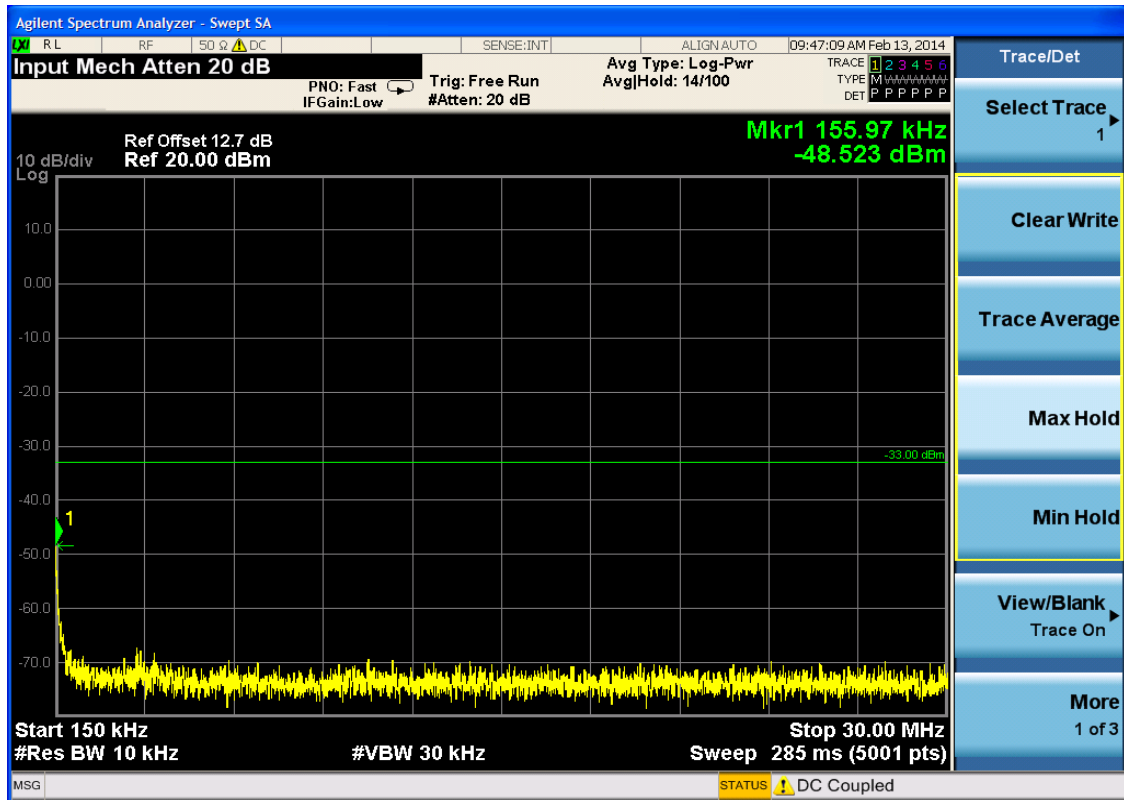


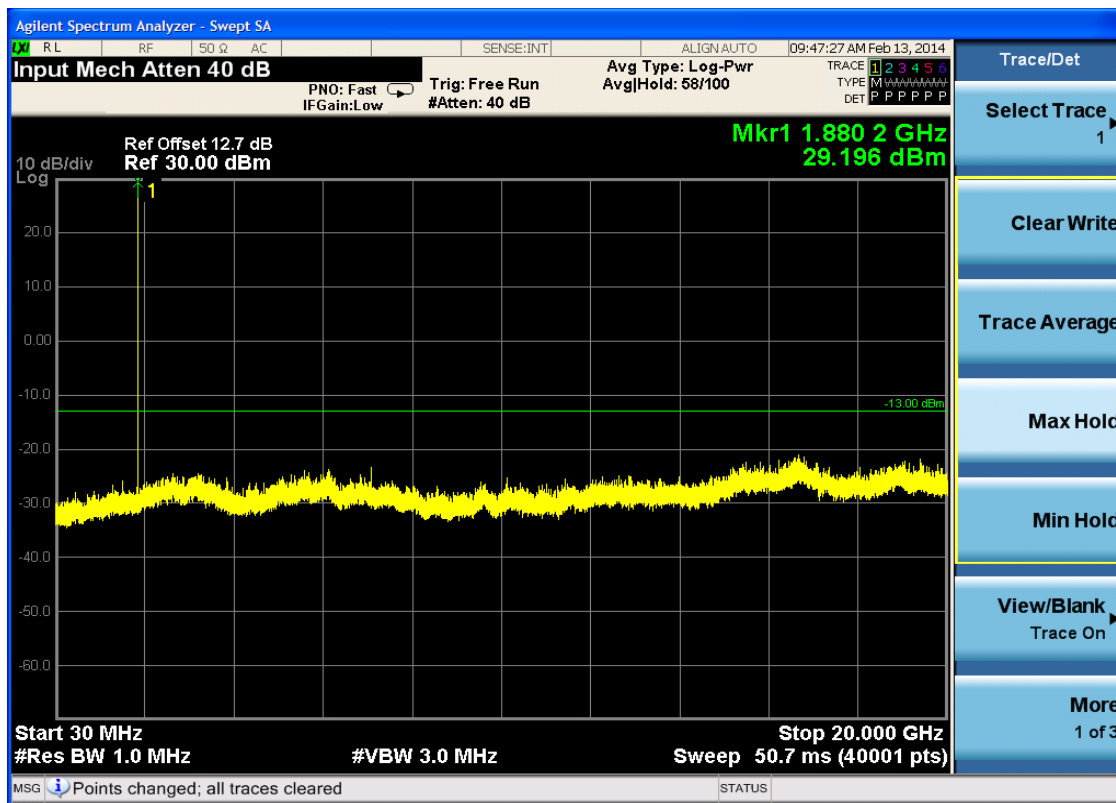




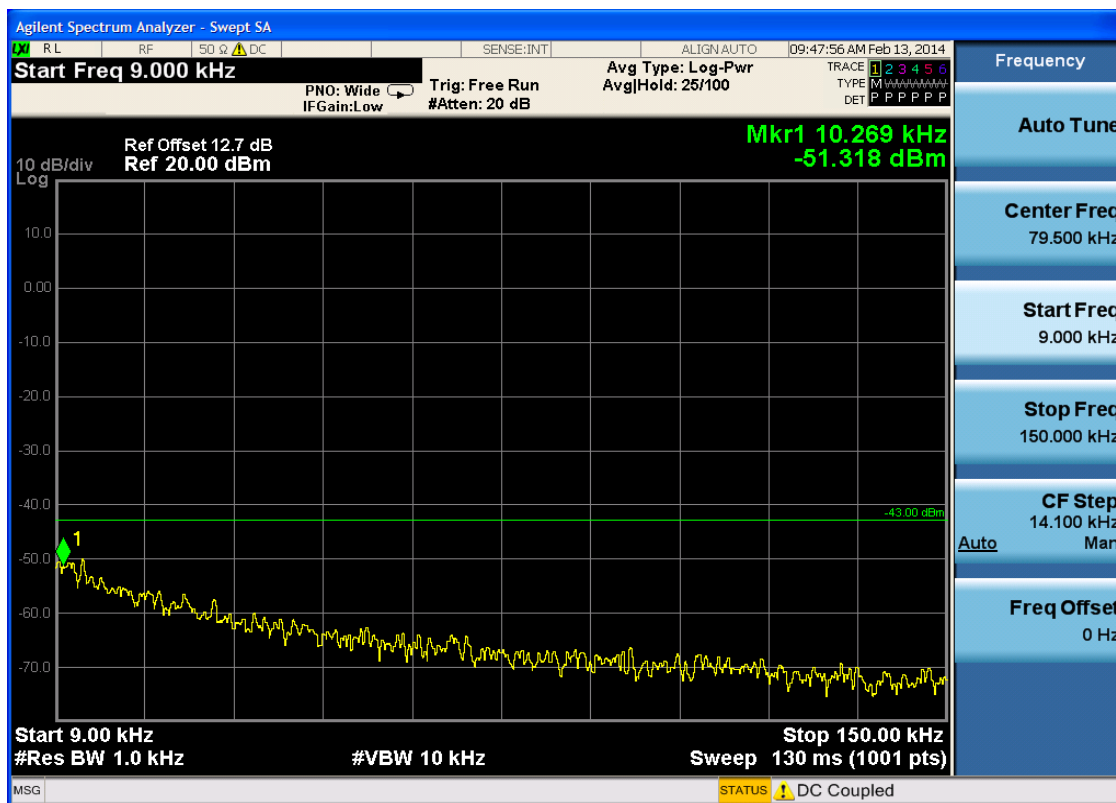
6.1.2.2.2 Test Channel = MCH

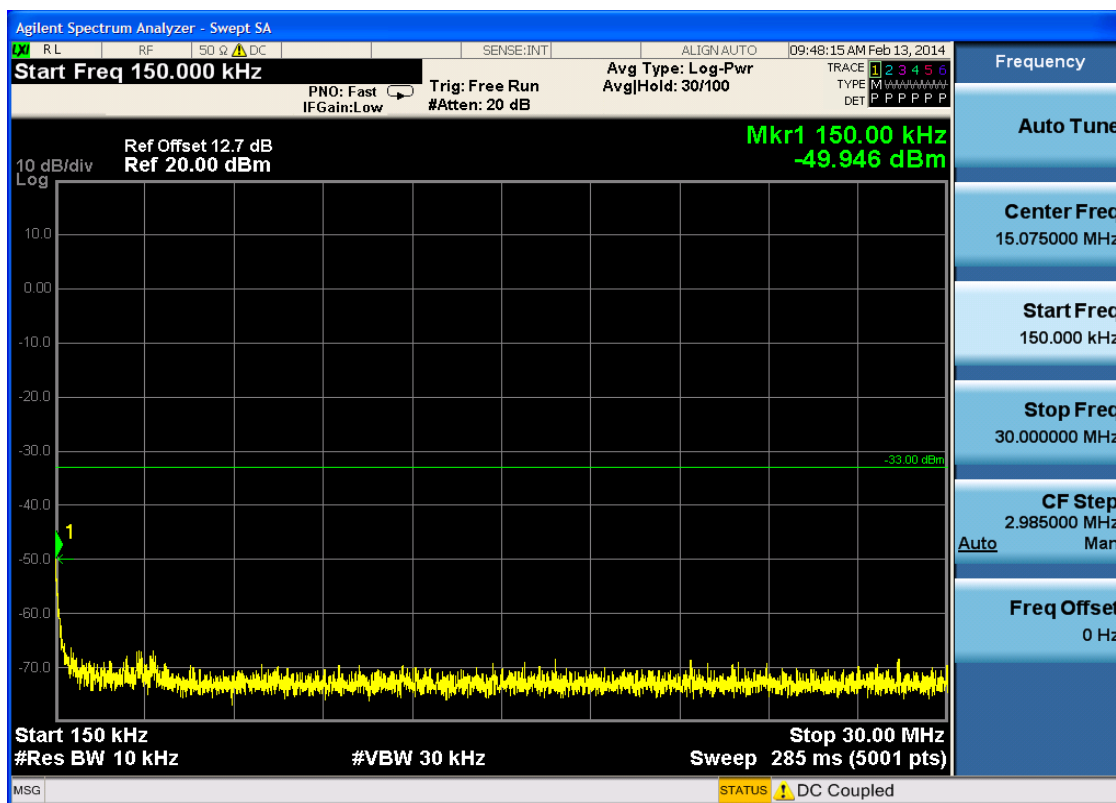


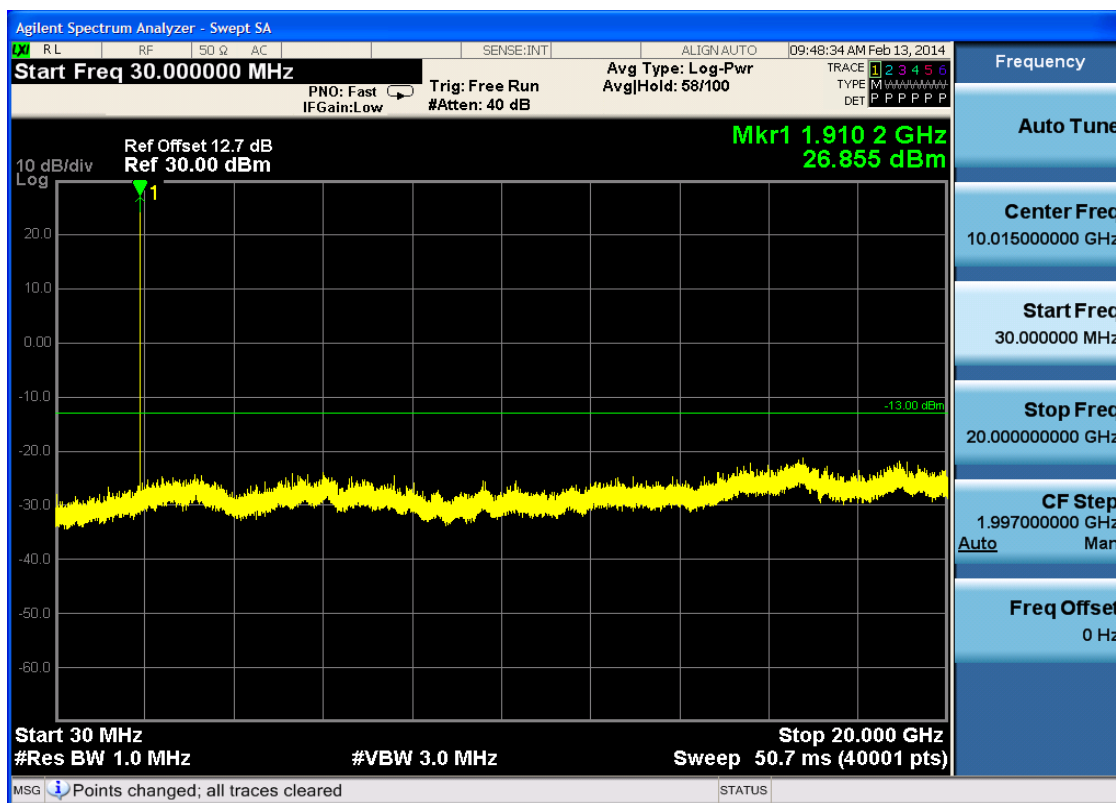




6.1.2.2.3 Test Channel = HCH







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

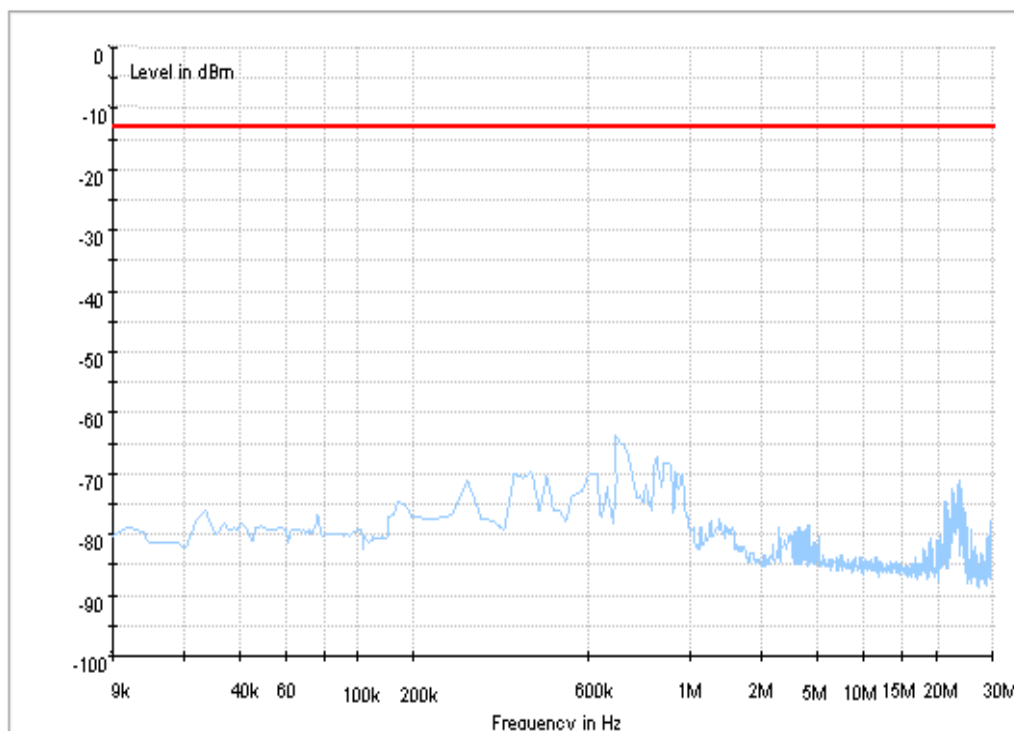
Above 1GHz, RBW = 1 MHz, VBW = 3 MHz. Detector: PK

Part I - Test Plots

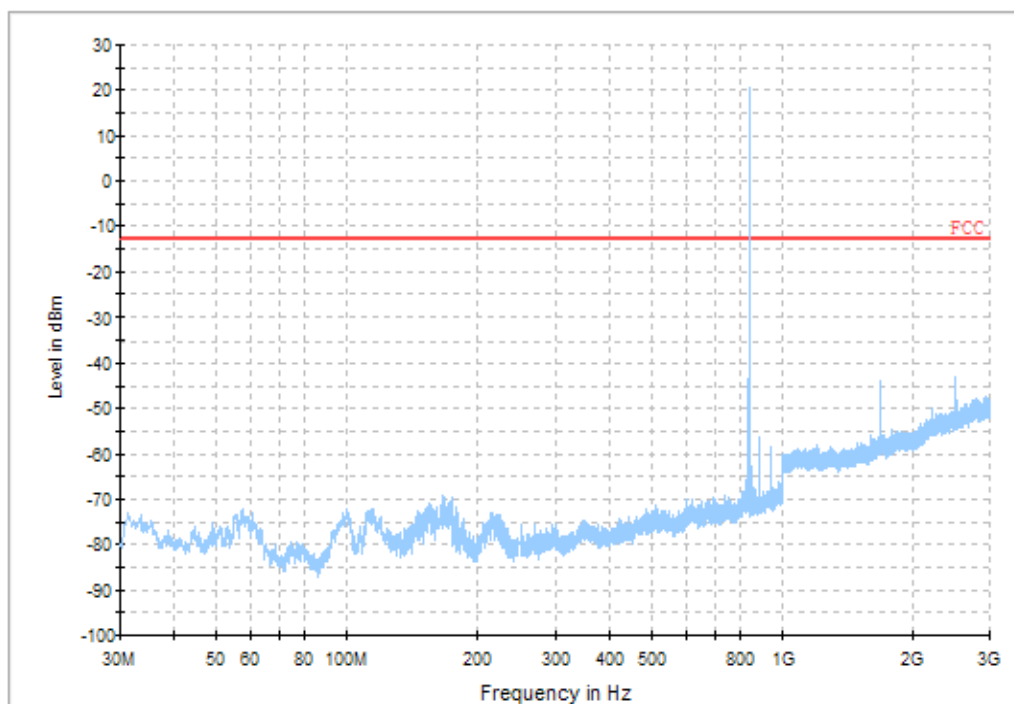
7.1 For GSM

7.1.1 Test Band = GSM850

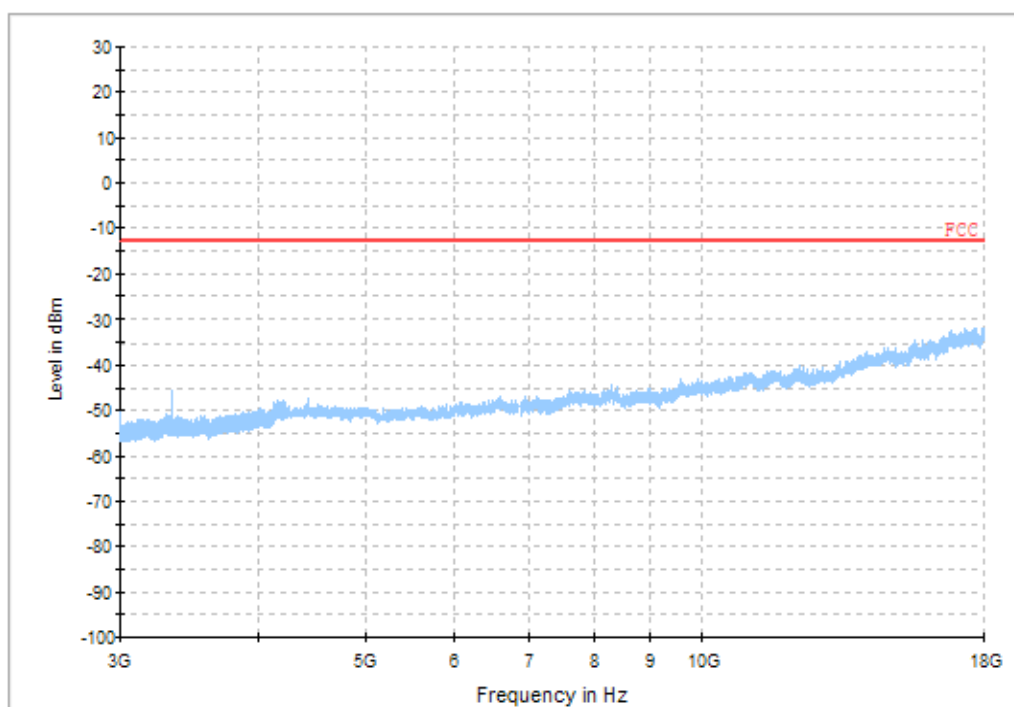
7.1.1.1 Test Mode = GSM/TM1



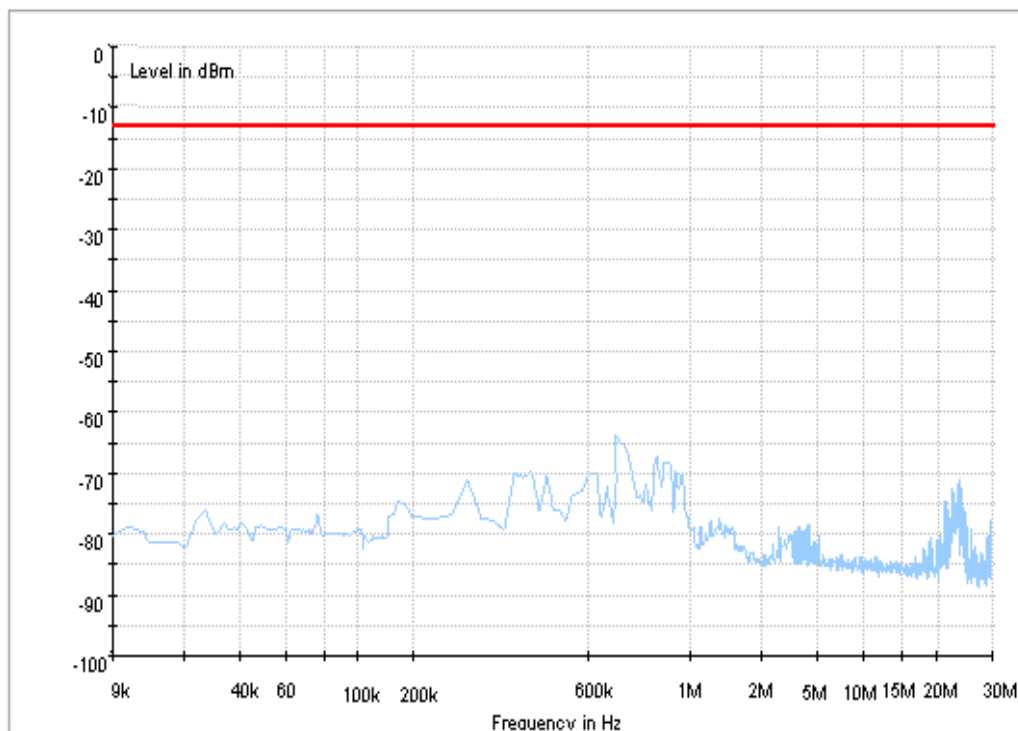
Copy of FCC PART22 GSM850_L



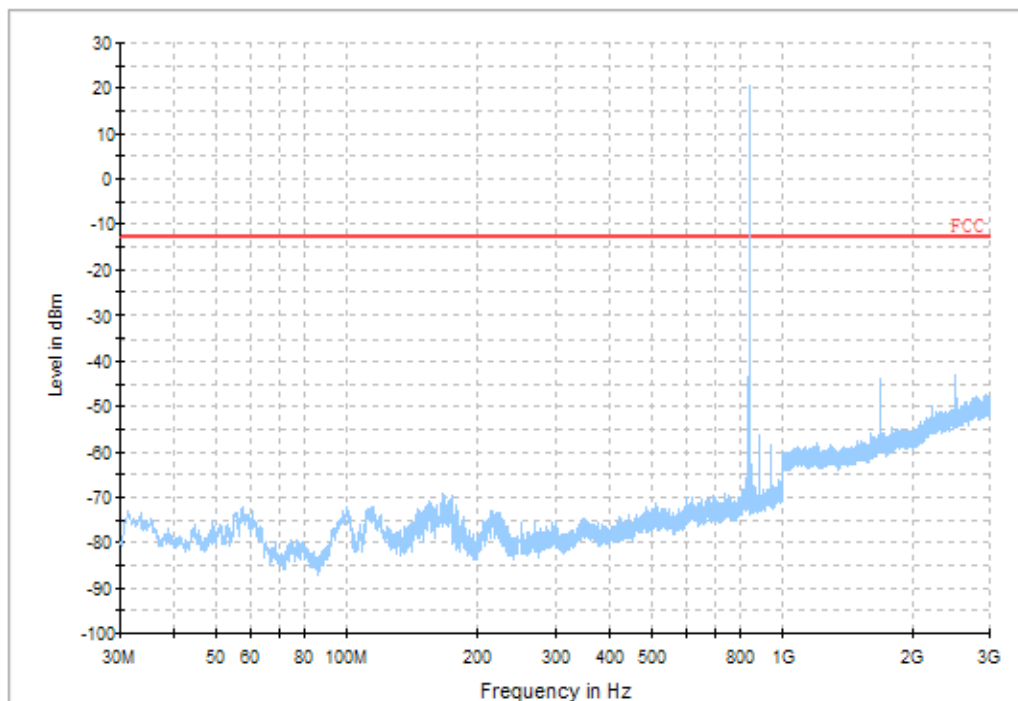
Copy of FCC PART22 GSM850_H



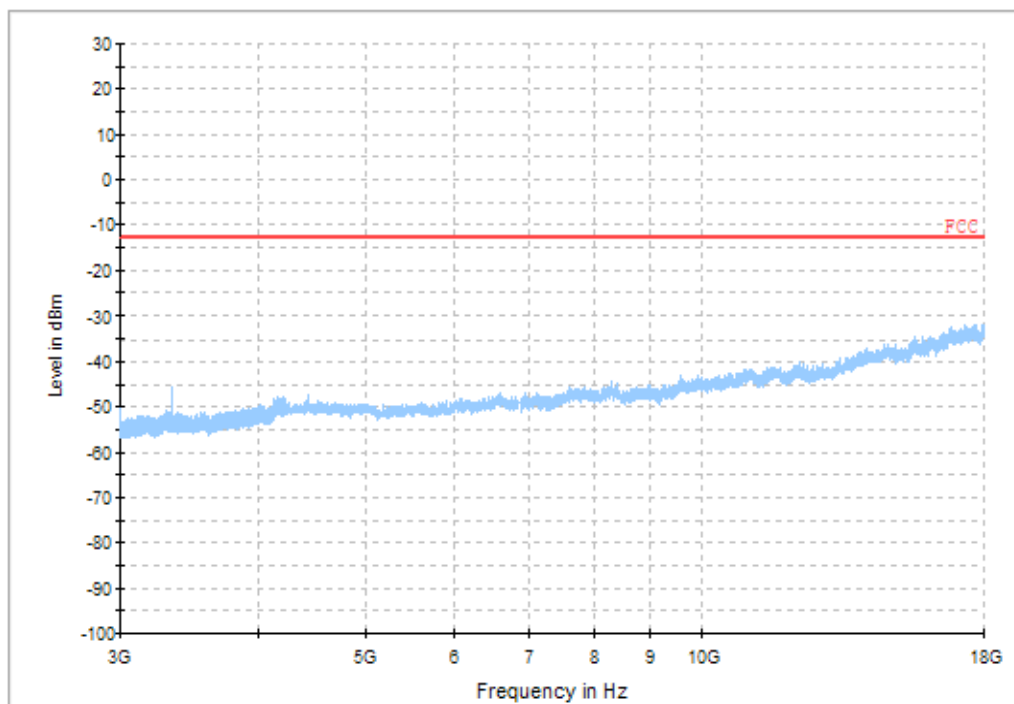
7.1.1.2 Test Mode = GSM/TM2



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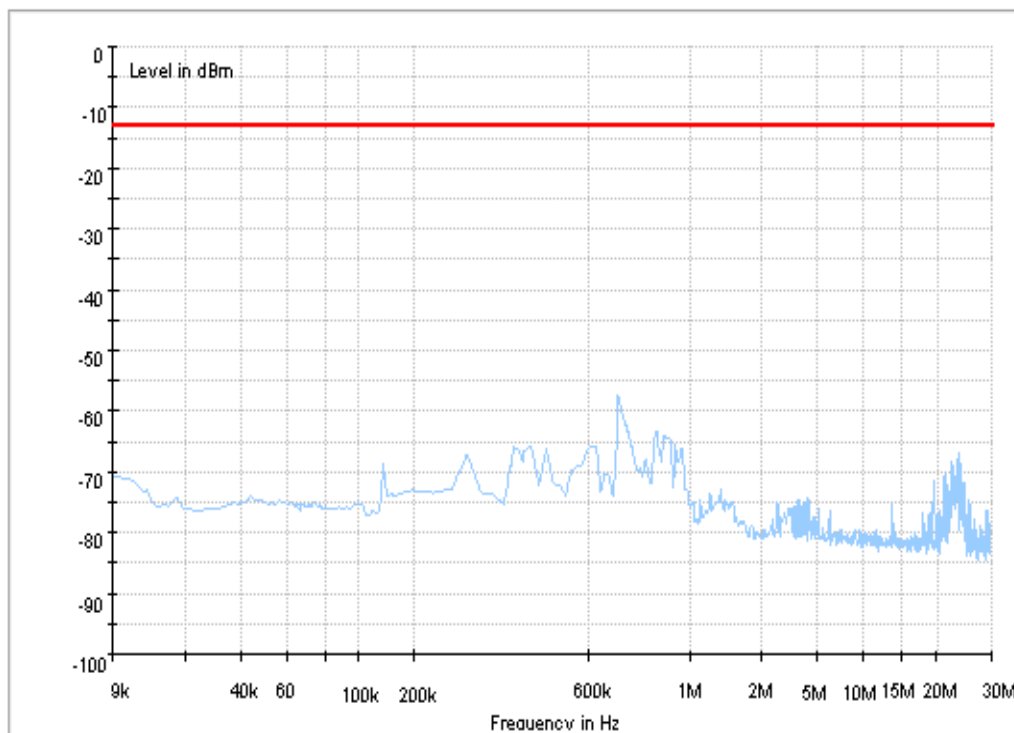


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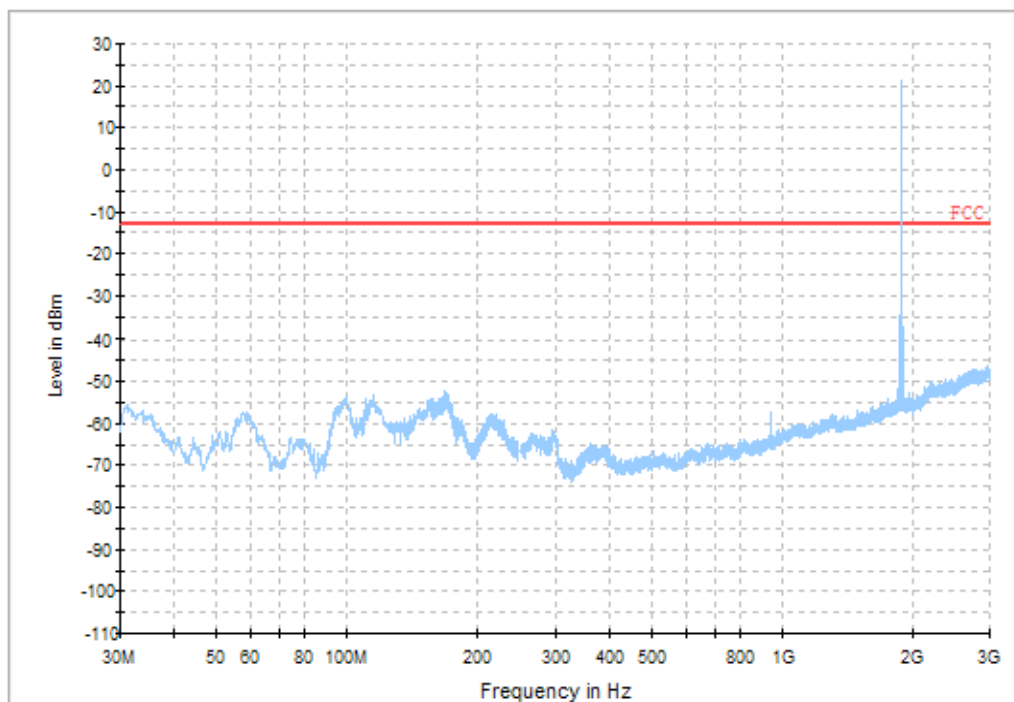


7.1.2 Test Band = GSM1900

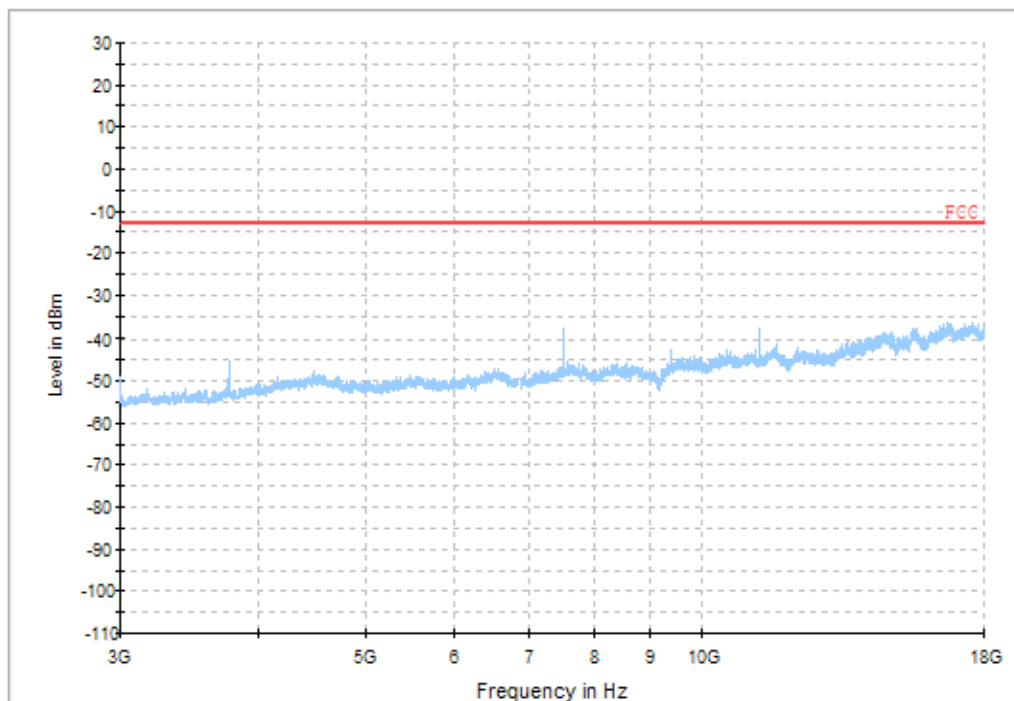
7.1.2.1 Test Mode = GSM/TM1

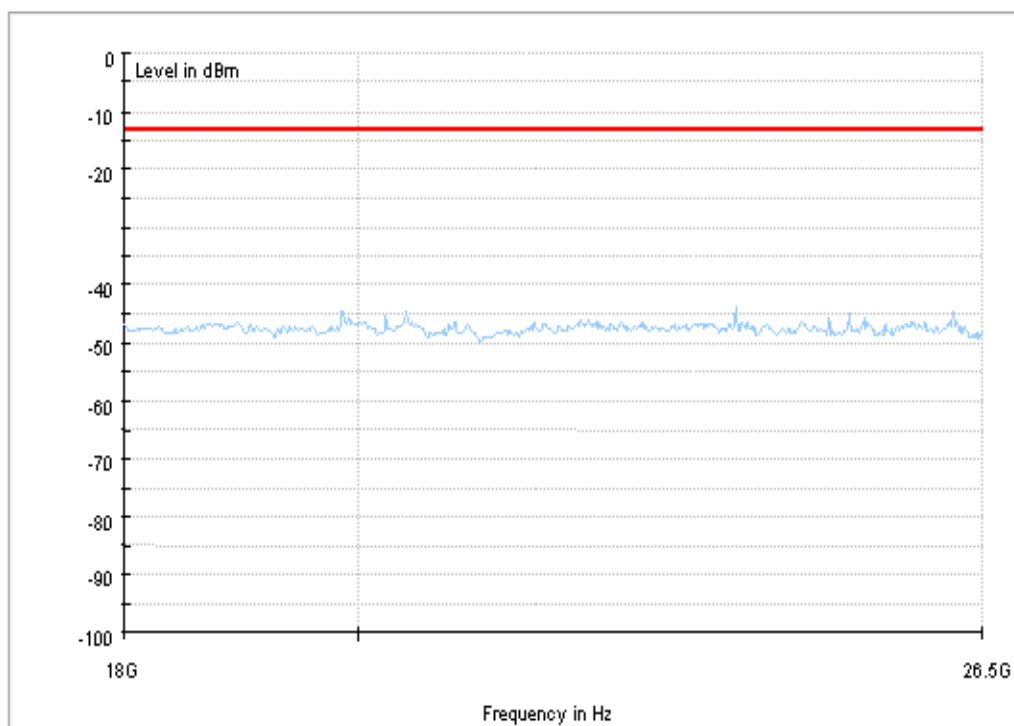


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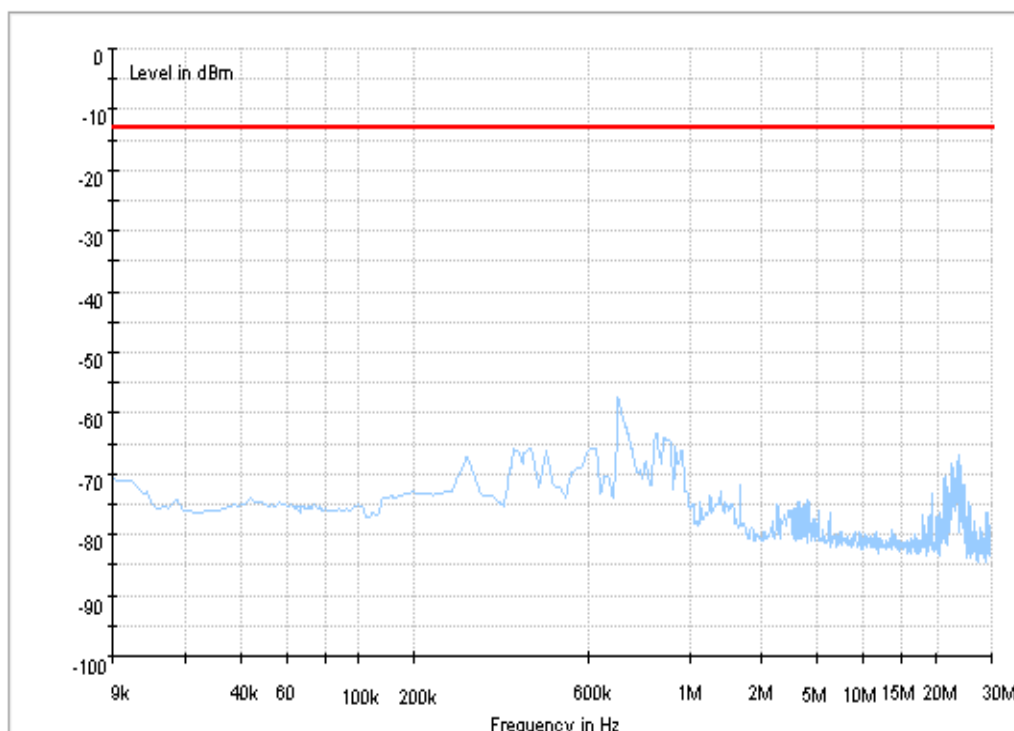


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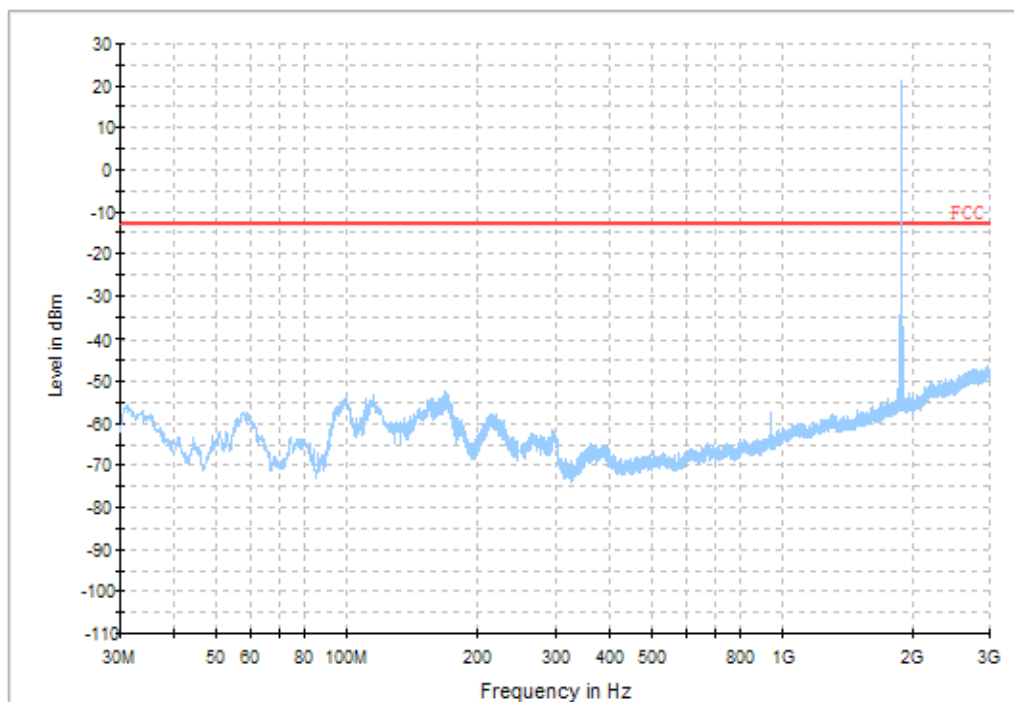




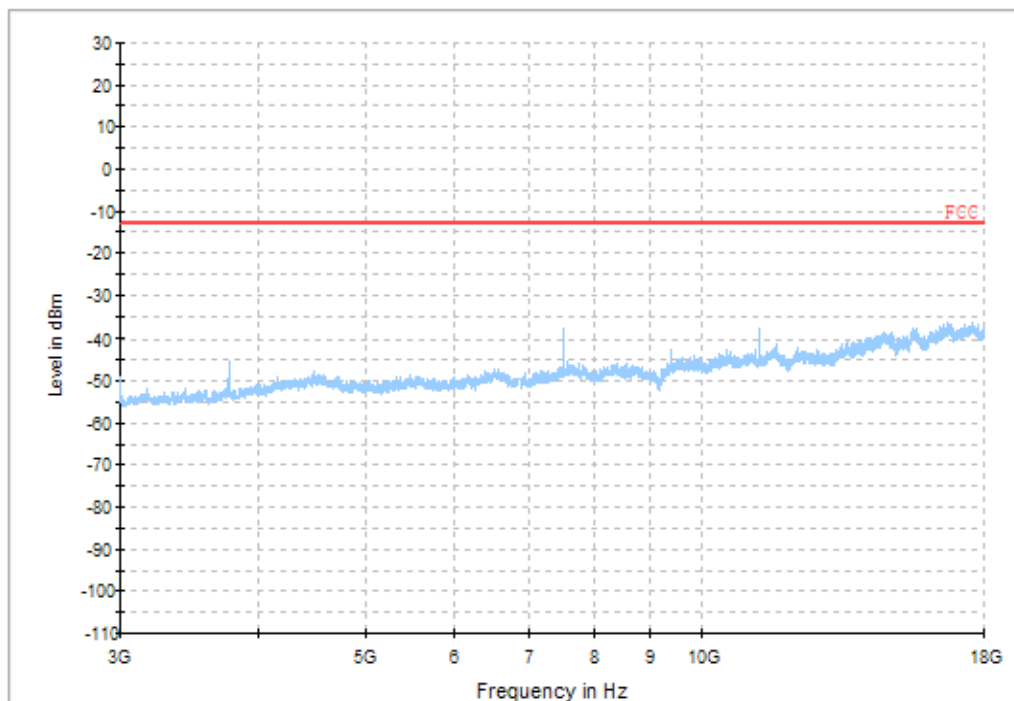
7.1.2.2 Test Mode = GSM/TM2

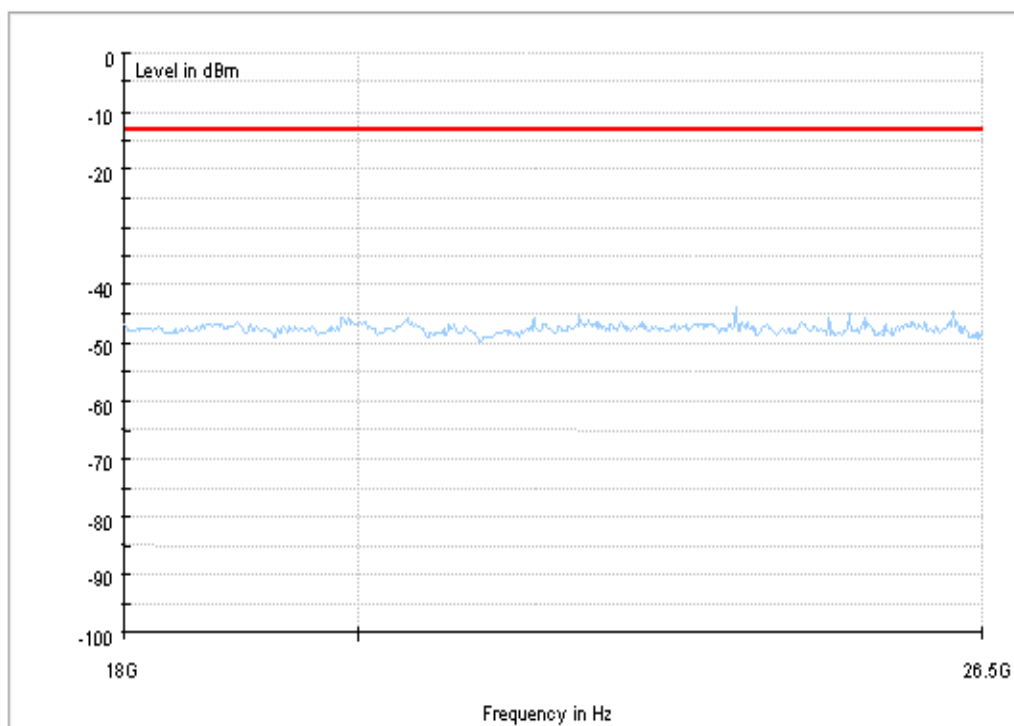


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8Appendix_H: Frequency Stability

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	-7.17	-0.0087	PASS
				VN	-4.20	-0.0051	PASS
				VH	-0.13	-0.00016	PASS
		MCH	TN	VL	-2.39	-0.00286	PASS
				VN	-1.74	-0.00208	PASS
				VH	-0.45	-0.00054	PASS
		HCH	TN	VL	1.29	0.00152	PASS
				VN	-4.07	-0.0048	PASS
				VH	-1.55	-0.00183	PASS
	GSM/TM2	LCH	TN	VL	-14.72	-0.01786	PASS
				VN	-7.85	-0.00952	PASS
				VH	-16.72	-0.02029	PASS
		MCH	TN	VL	-2.74	-0.00328	PASS
				VN	-7.85	-0.00938	PASS
				VH	-10.04	-0.012	PASS
		HCH	TN	VL	-2.23	-0.00263	PASS
				VN	-9.36	-0.01103	PASS
				VH	-0.68	-0.0008	PASS
GSM1900	GSM/TM1	LCH	TN	VL	-3.42	-0.00185	PASS
				VN	-9.23	-0.00499	PASS
				VH	-16.47	-0.0089	PASS
		MCH	TN	VL	5.81	0.00309	PASS
				VN	0.71	0.00038	PASS
				VH	14.85	0.0079	PASS
		HCH	TN	VL	-5.81	-0.00304	PASS
				VN	-3.94	-0.00206	PASS
				VH	-2.52	-0.00132	PASS
	GSM/TM2	LCH	TN	VL	-4.81	-0.0026	PASS
				VN	-13.92	-0.00752	PASS
				VH	-17.72	-0.00958	PASS

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
		MCH	TN	VL	6.94	0.00369	PASS
				VN	4.49	0.00239	PASS
				VH	5.71	0.00304	PASS
		HCH	TN	VL	-3.23	-0.00169	PASS
				VN	-6.78	-0.00355	PASS
				VH	-5.78	-0.00303	PASS

8.1.2Frequency 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	-6.13	-0.00744	PASS
				-20	-2.32	-0.00281	PASS
				-10	1.16	0.00141	PASS
				0	5.23	0.00635	PASS
				10	-0.06	-0.00007	PASS
				20	-6.97	-0.00846	PASS
				30	-0.26	-0.00032	PASS
				40	0.39	0.00047	PASS
				50	-1.03	-0.00125	PASS
		MCH	VN	-30	-2.58	-0.00308	PASS
				-20	-3.10	-0.00371	PASS
				-10	-3.49	-0.00417	PASS
				0	-0.52	-0.00062	PASS
				10	0.00	0	PASS
				20	1.81	0.00216	PASS
				30	-1.55	-0.00185	PASS
				40	-5.42	-0.00648	PASS
				50	-1.49	-0.00178	PASS
		HCH	VN	-30	0.13	0.00015	PASS
				-20	-6.78	-0.00799	PASS
				-10	-0.19	-0.00022	PASS
				0	-4.33	-0.0051	PASS
				10	0.52	0.00061	PASS
				20	-5.36	-0.00631	PASS
				30	-3.29	-0.00388	PASS
				40	-7.75	-0.00913	PASS
				50	-3.42	-0.00403	PASS
	GSM/TM2	LCH	VN	-30	-6.04	-0.00733	PASS
				-20	-6.81	-0.00826	PASS

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				-10	-4.52	-0.00548	PASS
				0	-9.10	-0.01104	PASS
				10	-7.43	-0.00901	PASS
				20	-10.07	-0.01222	PASS
				30	-1.55	-0.00188	PASS
				40	-3.78	-0.00459	PASS
				50	-1.55	-0.00188	PASS
		MCH	VN	-30	-5.36	-0.00641	PASS
				-20	-7.46	-0.00892	PASS
				-10	-4.20	-0.00502	PASS
				0	-10.17	-0.01216	PASS
				10	-10.14	-0.01212	PASS
				20	-4.39	-0.00525	PASS
				30	-4.10	-0.0049	PASS
				40	-4.10	-0.0049	PASS
				50	-10.01	-0.01197	PASS
		HCH	VN	-30	-8.52	-0.01004	PASS
				-20	-10.72	-0.01263	PASS
				-10	-0.58	-0.00068	PASS
				0	-12.33	-0.01453	PASS
				10	-11.30	-0.01331	PASS
				20	0.36	0.00042	PASS
				30	4.94	0.00582	PASS
				40	-12.43	-0.01464	PASS
				50	-1.26	-0.00148	PASS
GSM1900	GSM/TM1	LCH	VN	-30	-13.37	-0.00723	PASS
				-20	-8.91	-0.00482	PASS
				-10	-17.89	-0.00967	PASS
				0	-0.77	-0.00042	PASS
				10	-7.68	-0.00415	PASS
				20	-12.14	-0.00656	PASS
				30	-5.17	-0.00279	PASS
				40	-5.81	-0.00314	PASS
				50	-6.13	-0.00331	PASS
		MCH	VN	-30	0.52	0.00028	PASS
				-20	7.04	0.00374	PASS
				-10	13.82	0.00735	PASS
				0	10.98	0.00584	PASS
				10	6.91	0.00368	PASS
				20	2.52	0.00134	PASS

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				30	-2.39	-0.00127	PASS
				40	-4.97	-0.00264	PASS
				50	16.79	0.00893	PASS
		HCH	VN	-30	-10.59	-0.00555	PASS
				-20	-7.17	-0.00375	PASS
				-10	-8.59	-0.0045	PASS
				0	-5.49	-0.00287	PASS
				10	-17.63	-0.00923	PASS
				20	-14.85	-0.00778	PASS
				30	-12.40	-0.00649	PASS
				40	-7.10	-0.00372	PASS
				50	-3.94	-0.00206	PASS
	GSM/TM2	LCH	VN	-30	-3.49	-0.00189	PASS
				-20	-4.46	-0.00241	PASS
				-10	-12.82	-0.00693	PASS
				0	-4.62	-0.0025	PASS
				10	-16.69	-0.00902	PASS
				20	-6.65	-0.00359	PASS
				30	-13.53	-0.00731	PASS
				40	-8.30	-0.00449	PASS
				50	-8.56	-0.00463	PASS
		MCH	VN	-30	1.07	0.00057	PASS
				-20	12.85	0.00684	PASS
				-10	12.85	0.00684	PASS
				0	2.36	0.00126	PASS
				10	2.10	0.00112	PASS
				20	13.92	0.0074	PASS
				30	6.78	0.00361	PASS
				40	-0.06	-0.00003	PASS
				50	5.26	0.0028	PASS
		HCH	VN	-30	-5.07	-0.00265	PASS
				-20	-2.26	-0.00118	PASS
				-10	-5.94	-0.00311	PASS
				0	-2.26	-0.00118	PASS
				10	-12.11	-0.00634	PASS
				20	-13.11	-0.00686	PASS
				30	-14.92	-0.00781	PASS
				40	-6.52	-0.00341	PASS
				50	-4.78	-0.0025	PASS



END