



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]	EIRP [dBm]	Limit [dBm]	Verdict
GSM1900	GSM/TM1	LCH	28.92	30.05	33	PASS
		MCH	29.03	30.16	33	PASS
		HCH	29.15	30.28	33	PASS
	GSM/TM2	LCH	24.19	25.32	33	PASS
		MCH	24.11	25.24	33	PASS
		HCH	24.07	25.2	33	PASS
WCDMA1900	UMTS/TM1	LCH	21.97	23.1	33	PASS
		MCH	21.6	22.73	33	PASS
		HCH	21.9	23.03	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	0.14	13	PASS
		MCH	0.14	13	PASS
		HCH	0.14	13	PASS
	GSM/TM2	LCH	2.89	13	PASS
		MCH	2.87	13	PASS
		HCH	2.85	13	PASS
Test Band	Test Mode	Test Channel	Measured[dB]	Limit [dB]	Verdict
WCDMA1900	UMTS/TM1	LCH	9.63	13	PASS
		MCH	3.15	13	PASS
		HCH	3.19	13	PASS

3Appendix_C: Modulation Characteristics

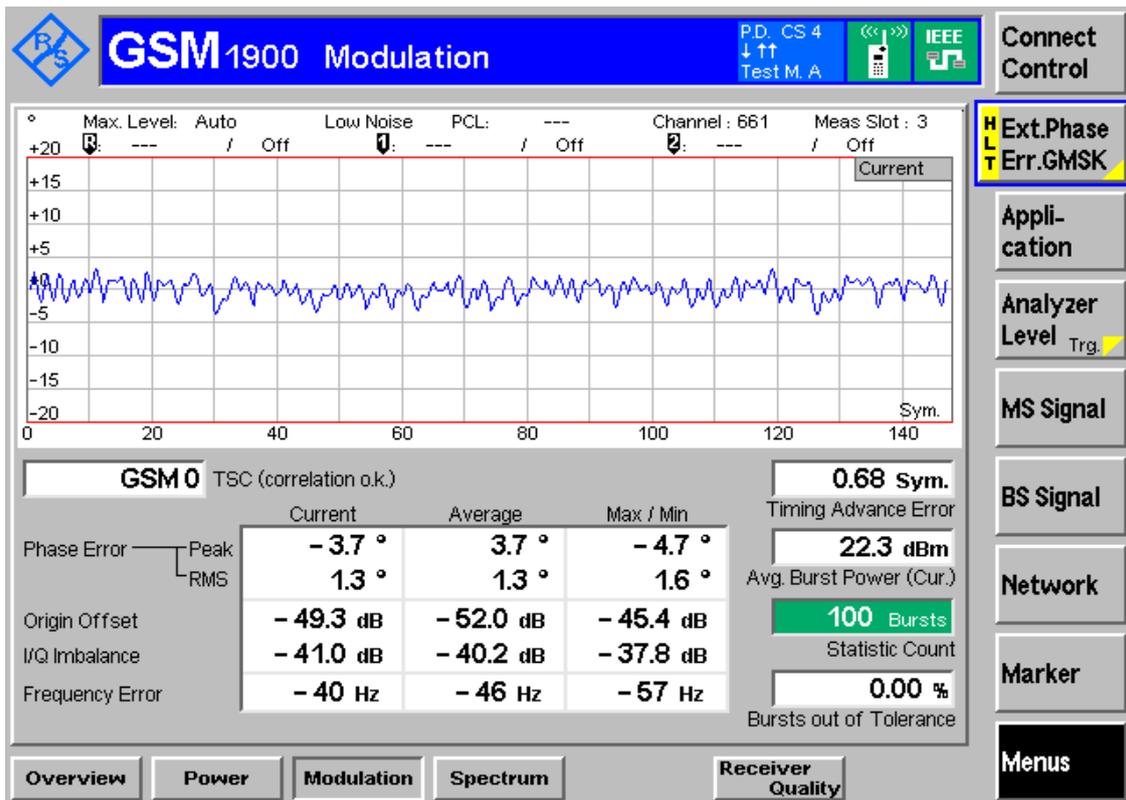
Part I - Test Plots

3.1 For GSM

3.1.2 Test Band = GSM1900

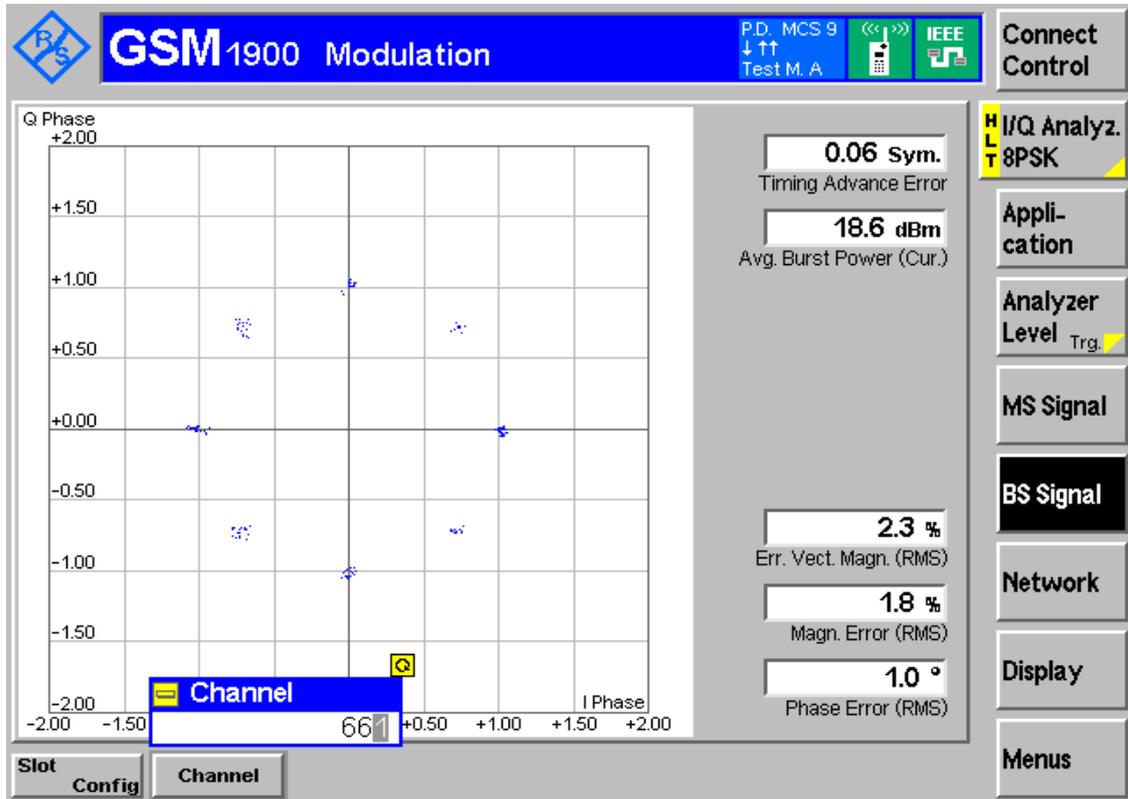
3.1.2.1 Test Mode = GSM/TM1

3.1.2.1.1 Test Channel = MCH



3.1.2.2 Test Mode = GSM/TM2

3.1.2.2.1 Test Channel = MCH

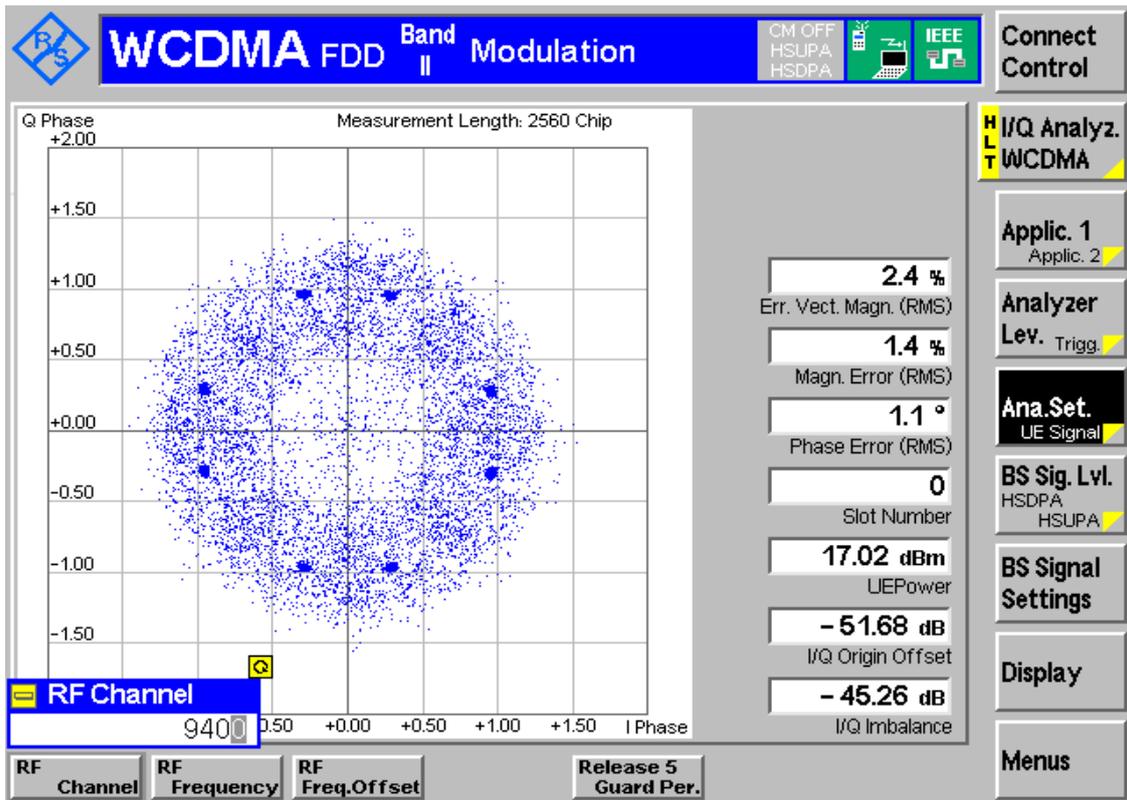


3.2 For UMTS

3.2.2 Test Band = WCDMA1900

3.2.2.1 Test Mode = UMTS/TM1

3.2.2.1.1 Test Channel = MCH



4Appendix_D: Bandwidth

Part I - Test Results

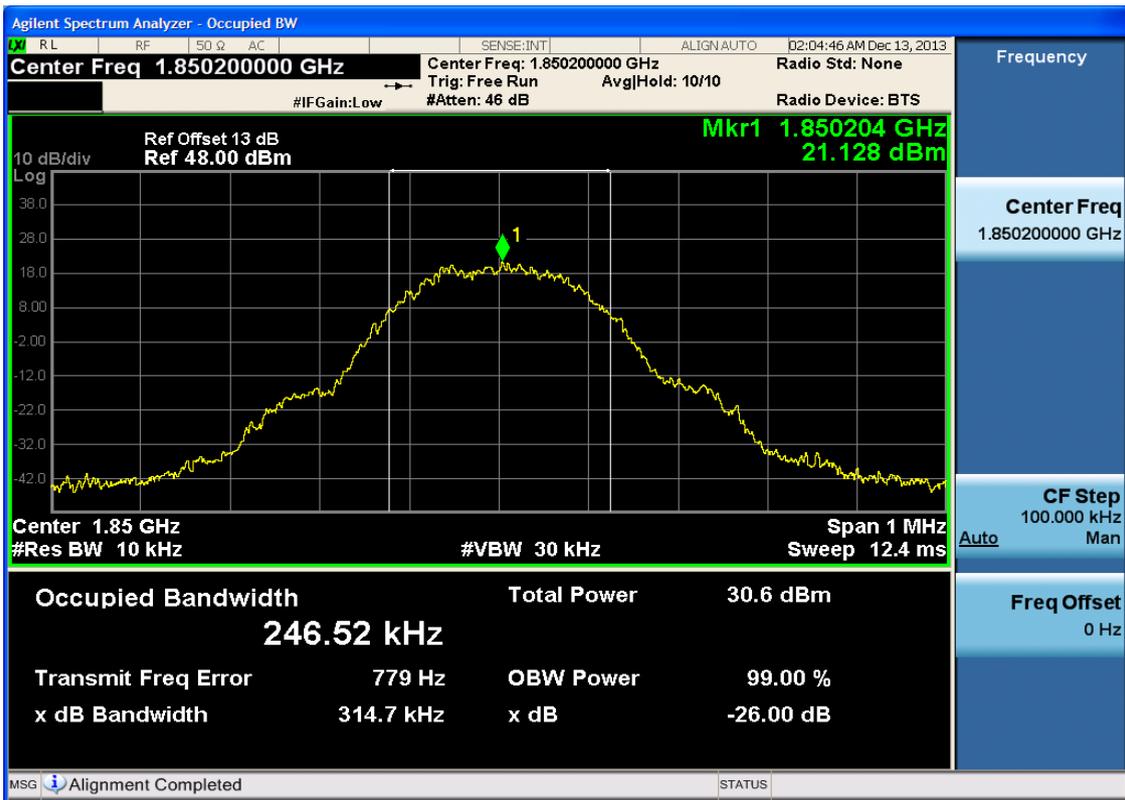
Test Band	Test Mode	Test Channel	Occupied Bandwidth [kHz]	Emission Bandwidth [kHz]	Verdict
GSM1900	GSM/TM1	LCH	246.52	314.67	Pass
		MCH	242.73	311.02	Pass
		HCH	243.90	312.47	Pass
	GSM/TM2	LCH	241.55	305.98	Pass
		MCH	249.63	323.71	Pass
		HCH	243.42	307.03	Pass
Test Band	Test Mode	Test Channel	Occupied Bandwidth [MHz]	Emission Bandwidth [MHz]	Verdict
WCDMA1900	UMTS/TM1	LCH	4.16	4.71	Pass
		MCH	4.15	4.71	Pass
		HCH	4.16	4.72	Pass

Part II - Test Plots

4.1.2 Test Band = GSM1900

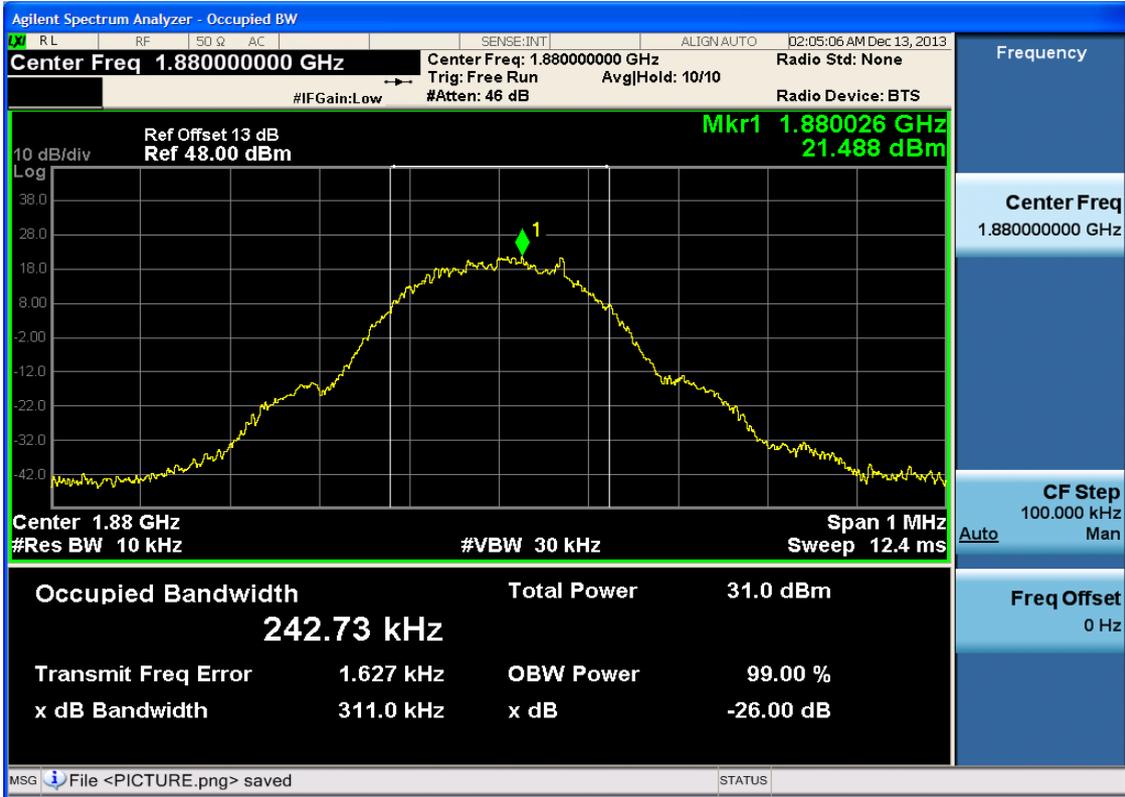
4.1.2.1 Test Mode = GSM/TM1

4.1.2.1.1 Test Channel = LCH



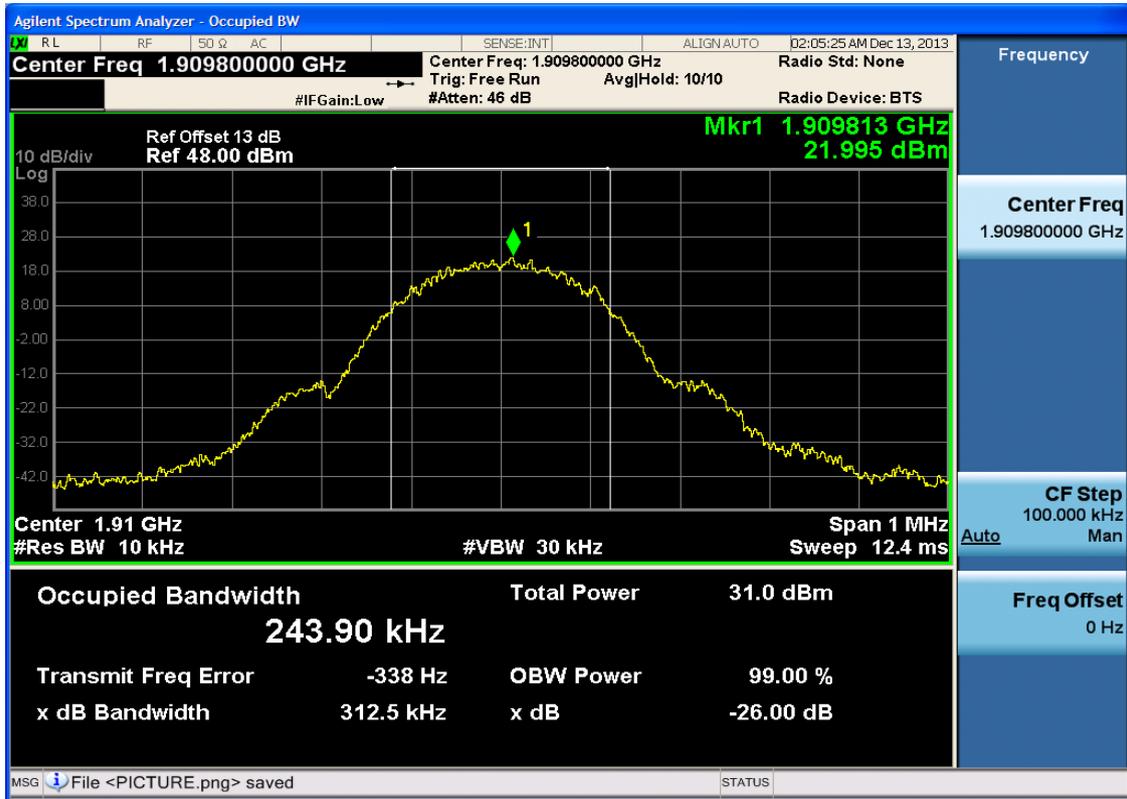


4.1.2.1.2 Test Channel = MCH





4.1.2.1.3 Test Channel = HCH





4.1.2.2 Test Mode = GSM/TM2

4.1.2.2.1 Test Channel = LCH

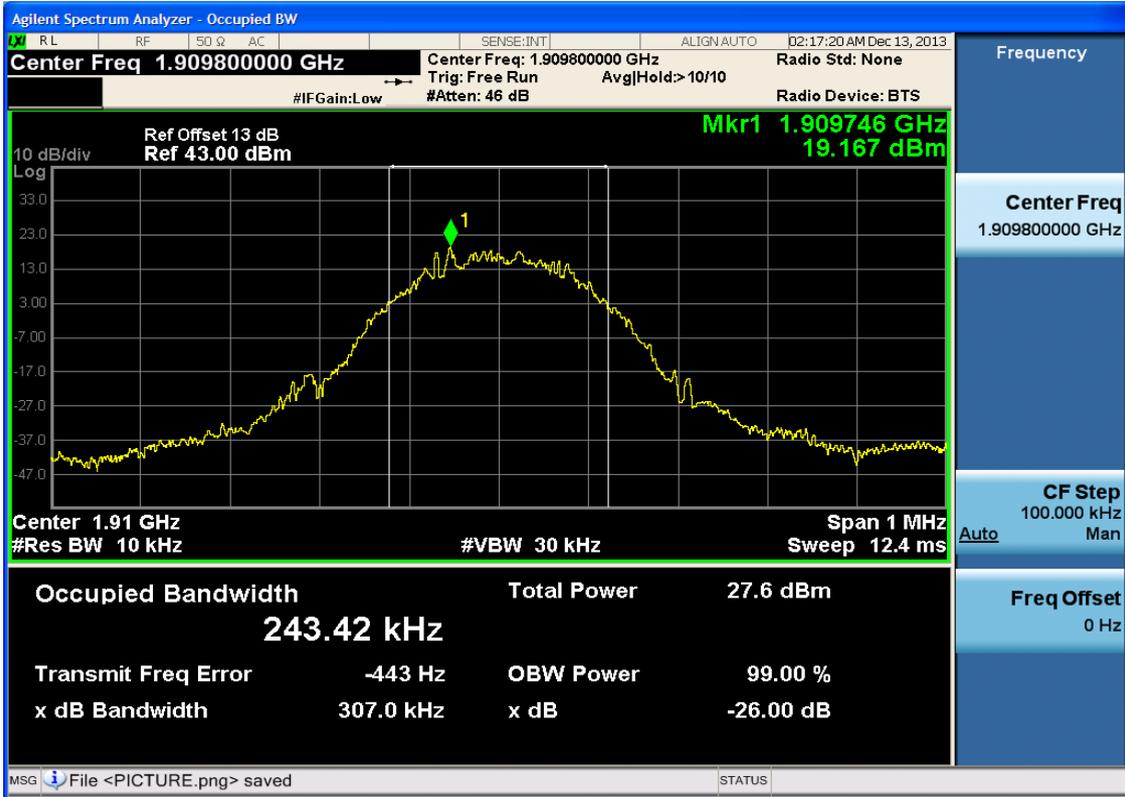




4.1.2.2.2 Test Channel = MCH



4.1.2.2.3 Test Channel = HCH

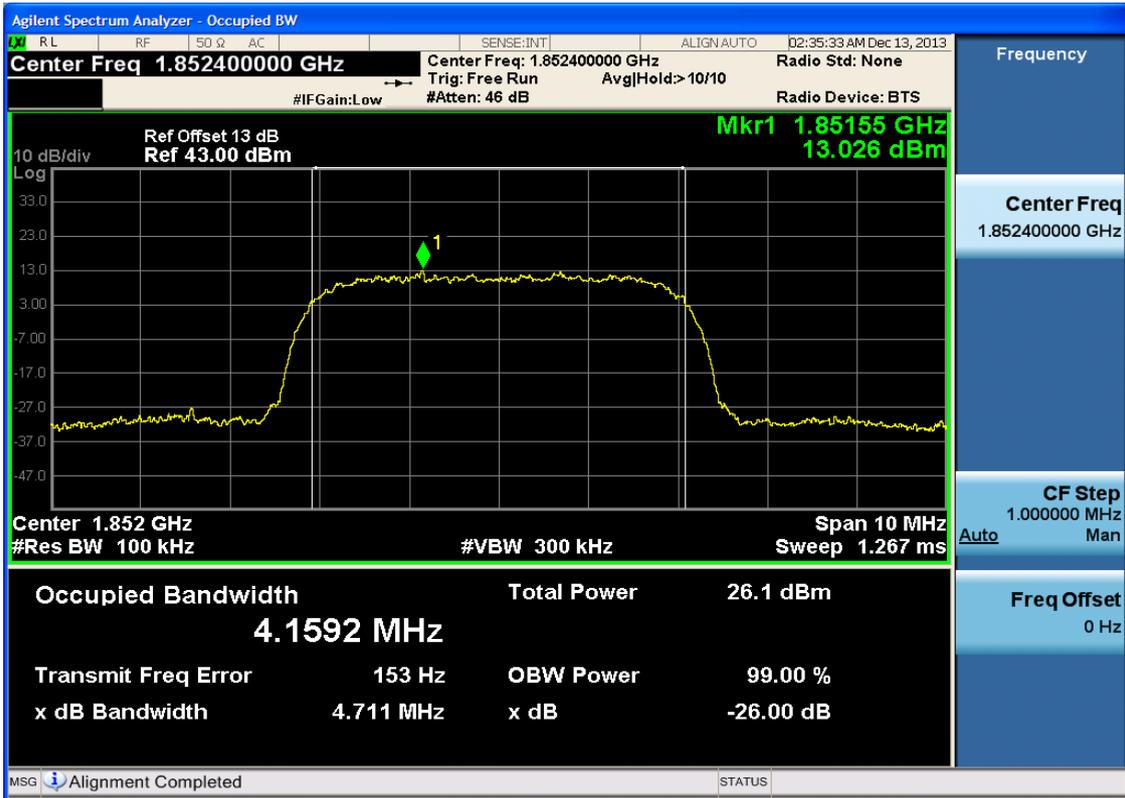


4.2 For UMTS

4.2.2 Test Band = WCDMA1900

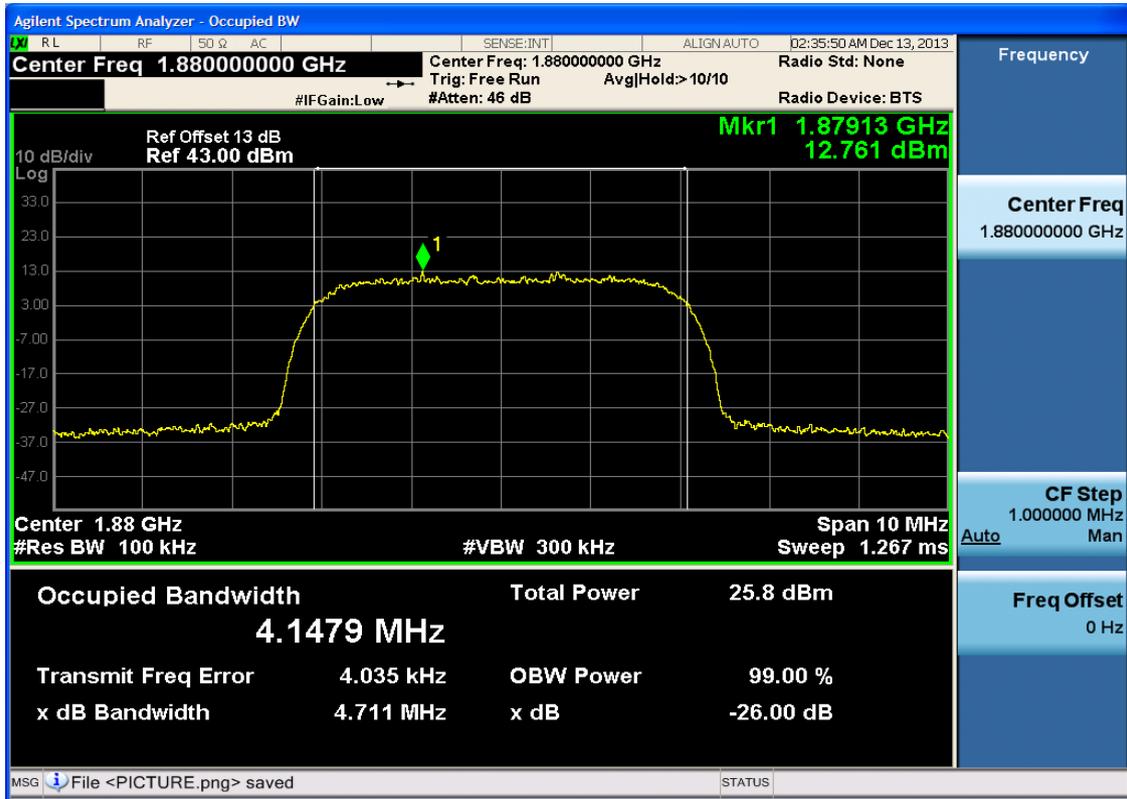
4.2.2.1 Test Mode = UMTS/TM1

4.2.2.1.1 Test Channel = LCH



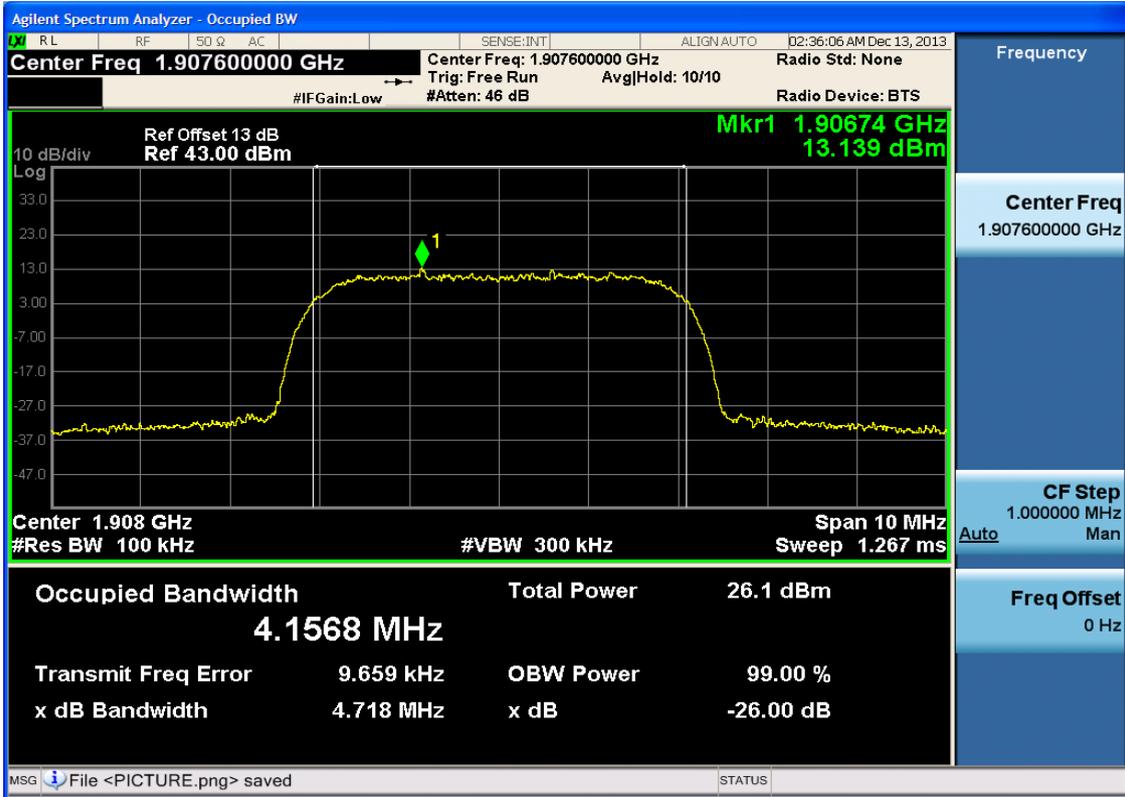


4.2.2.1.2 Test Channel = MCH





4.2.2.1.3 Test Channel = HCH





5Appendix_E: Band Edges Compliance

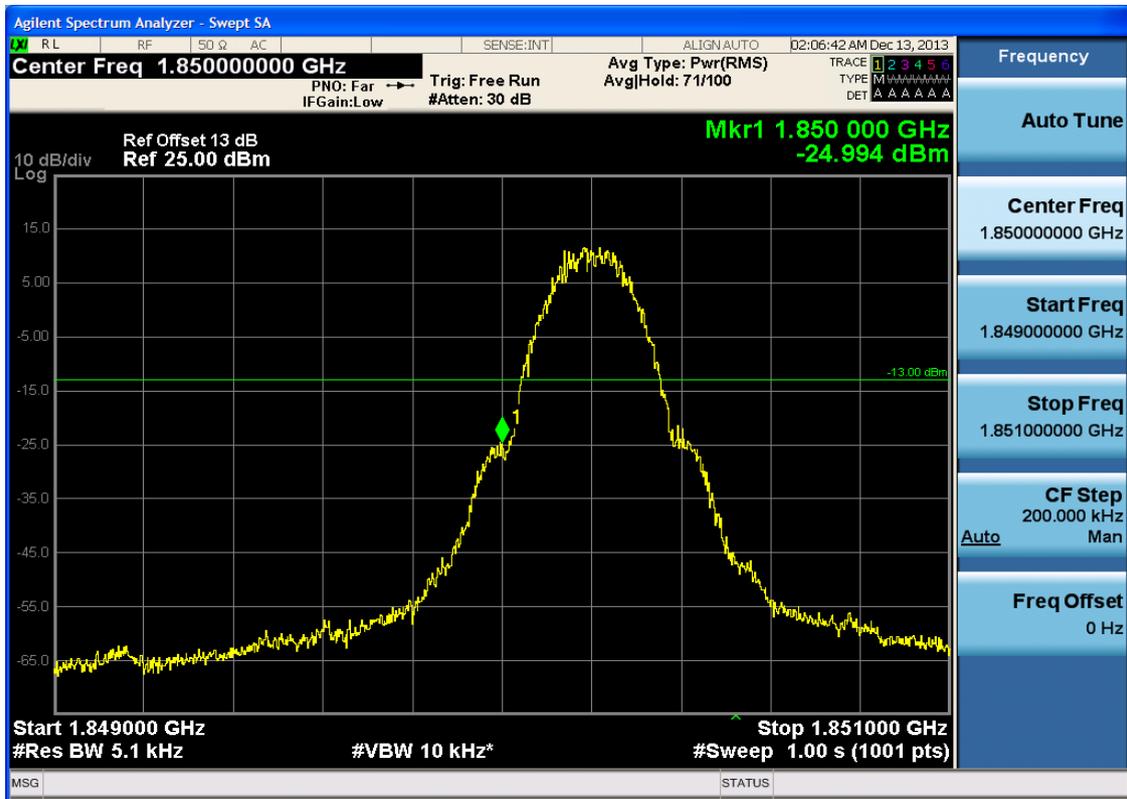
Part I - Test Plots

5.1 For GSM

5.1.2 Test Band = GSM1900

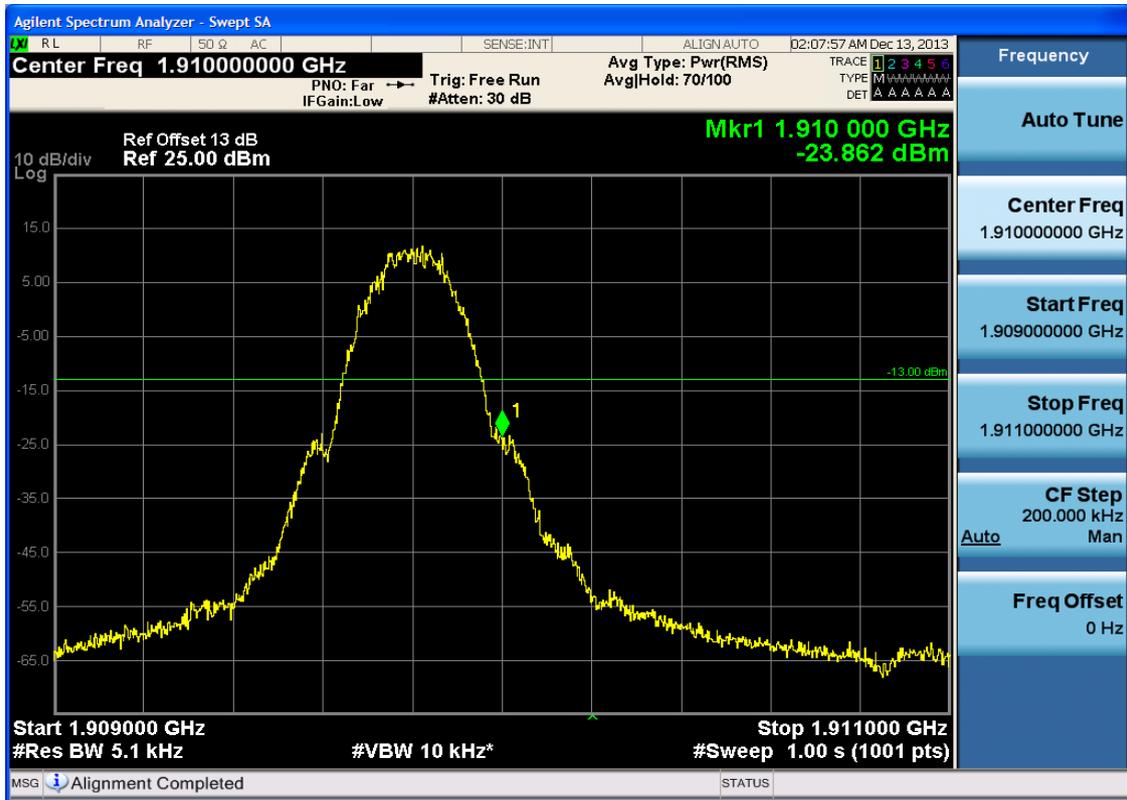
5.1.2.1 Test Mode = GSM/TM1

5.1.2.1.1 Test Channel = LCH





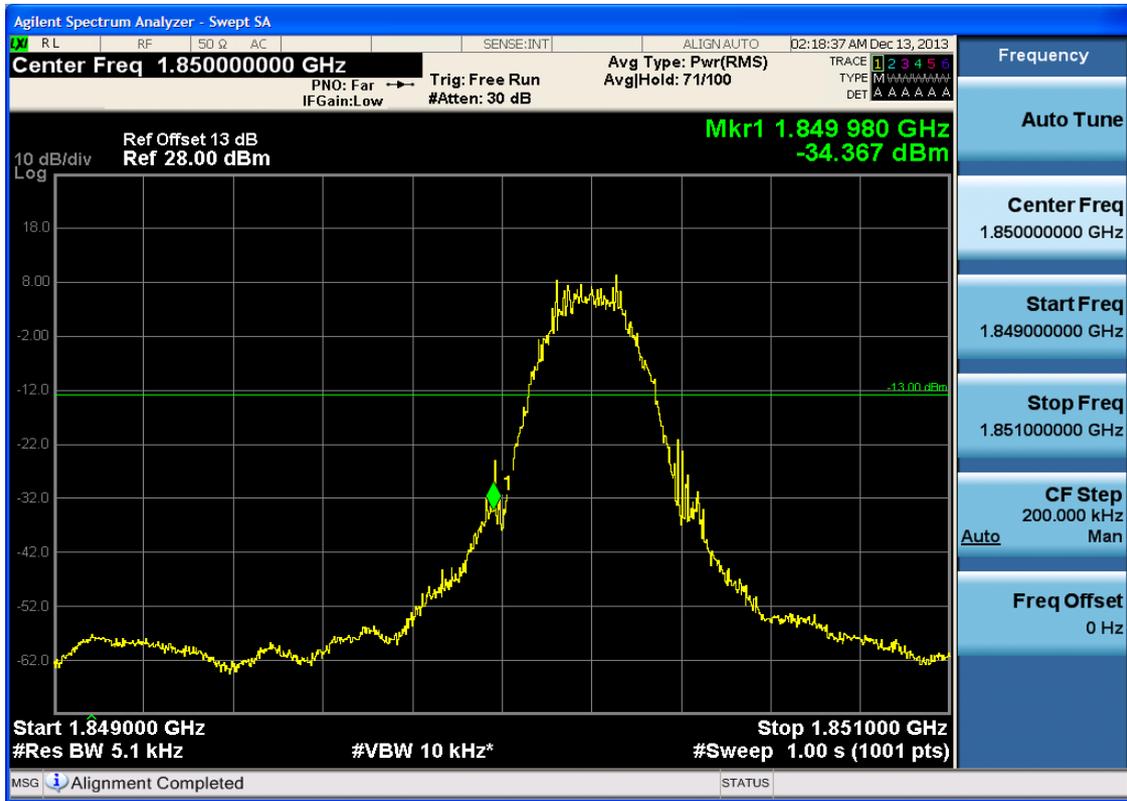
5.1.2.1.2 Test Channel = HCH





5.1.2.2 Test Mode = GSM/TM2

5.1.2.2.1 Test Channel = LCH



5.1.2.2.2 Test Channel = HCH





5.2 For UMTS

5.2.2 Test Band = WCDMA1900

5.2.2.1 Test Mode = UMTS/TM1

5.2.2.1.1 Test Channel = LCH





5.2.2.1.2 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

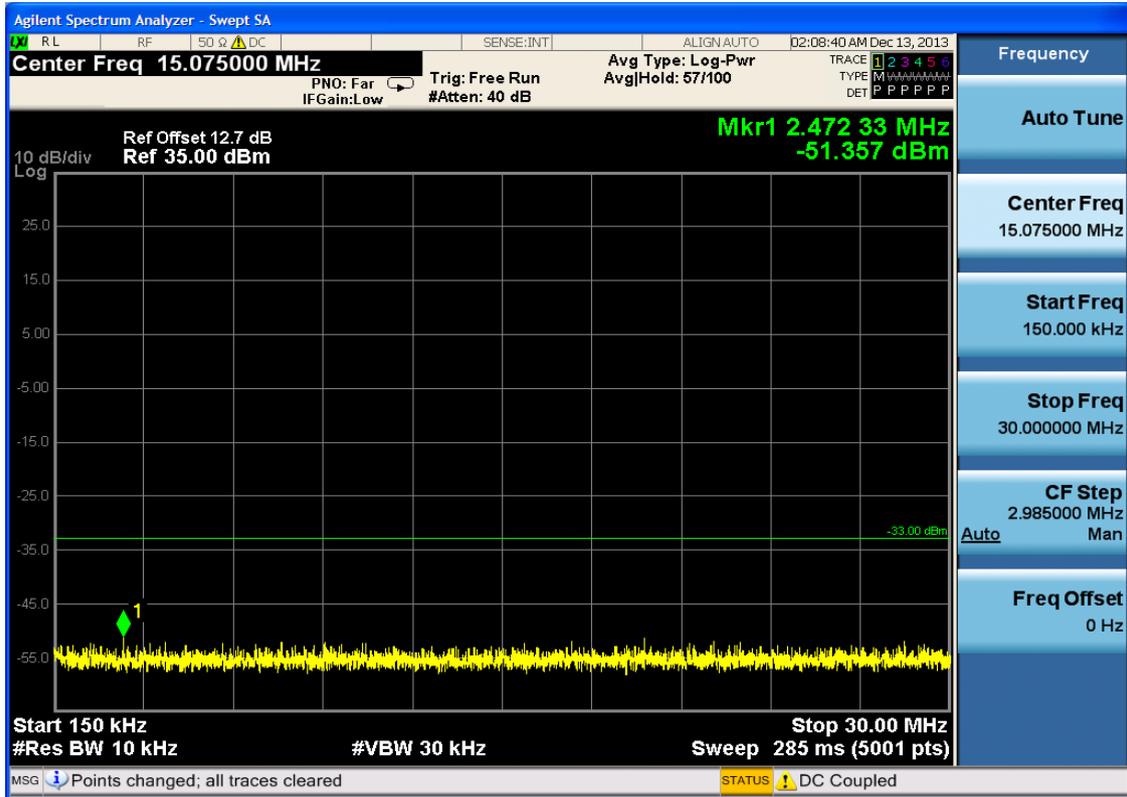
6.1 For GSM

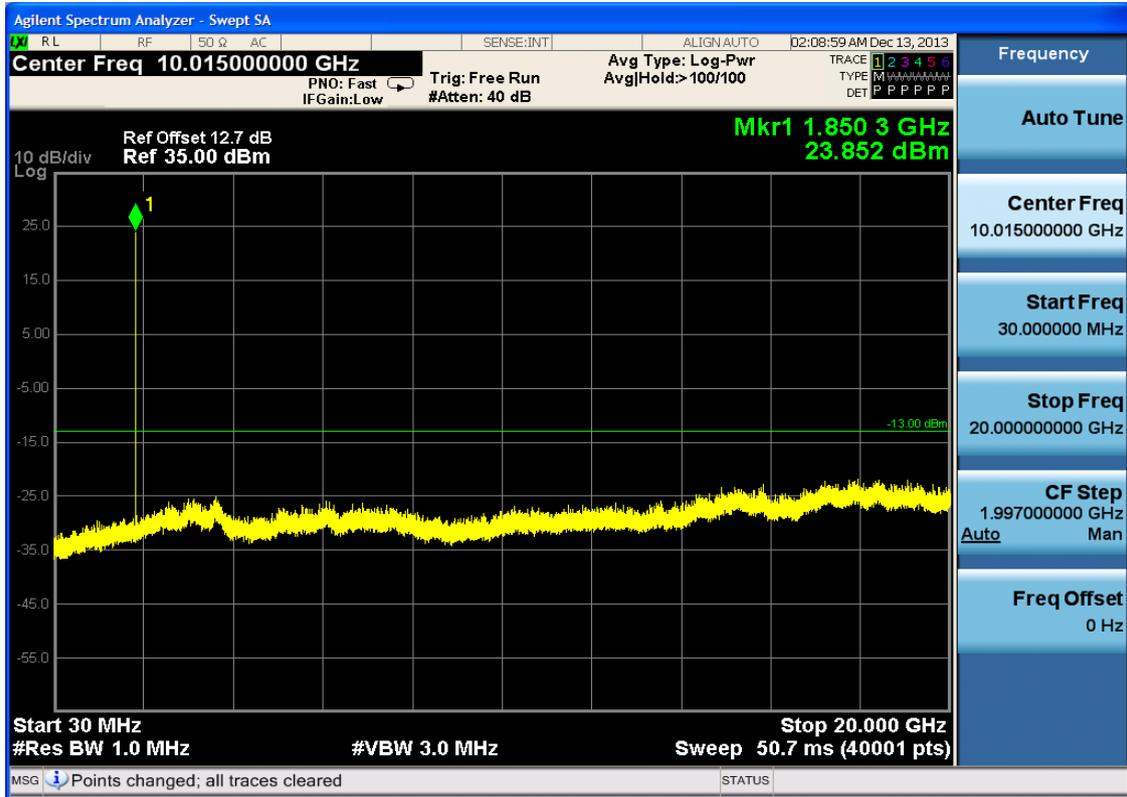
6.1.2 Test Band = GSM1900

6.1.2.1 Test Mode = GSM/TM1

6.1.2.1.1 Test Channel = LCH

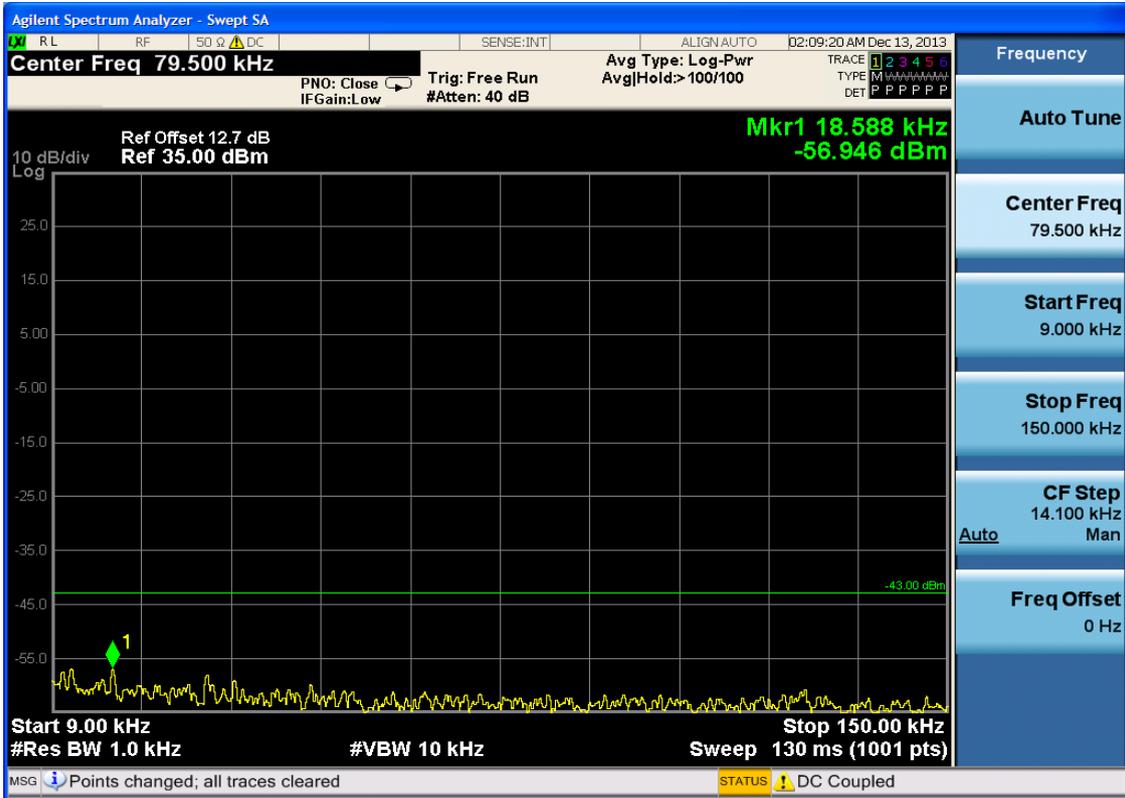


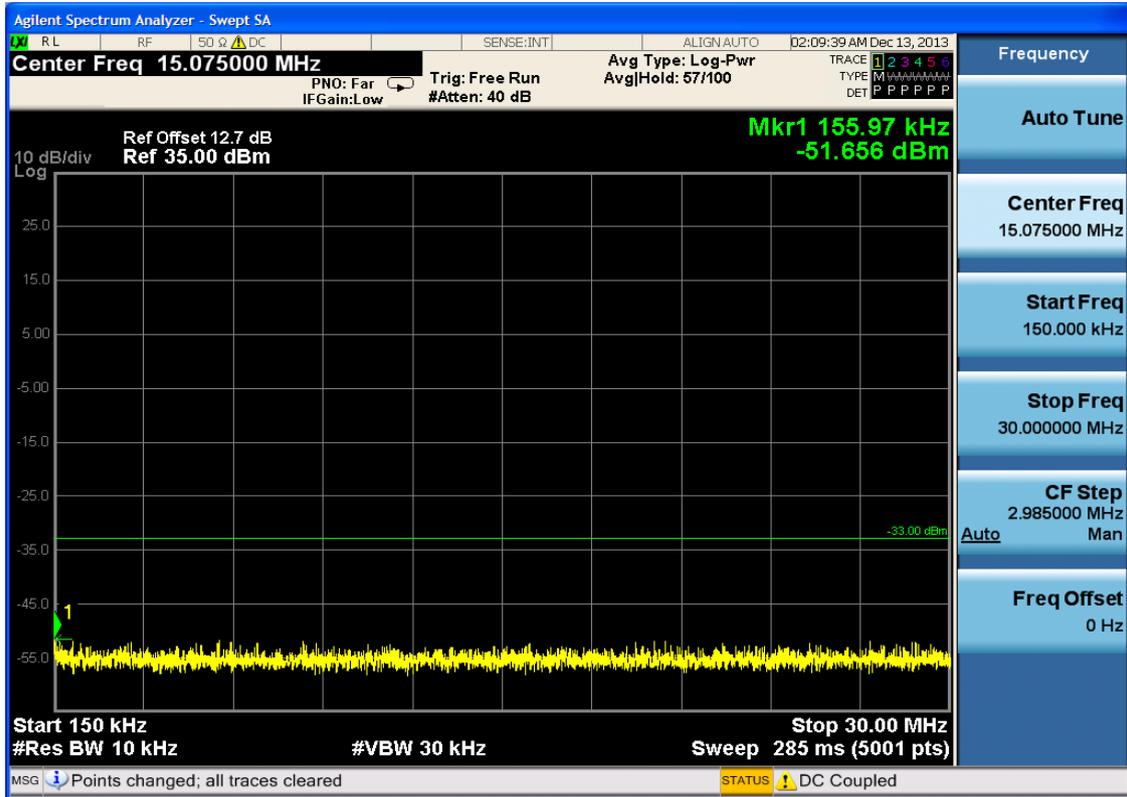






6.1.2.1.2 Test Channel = MCH



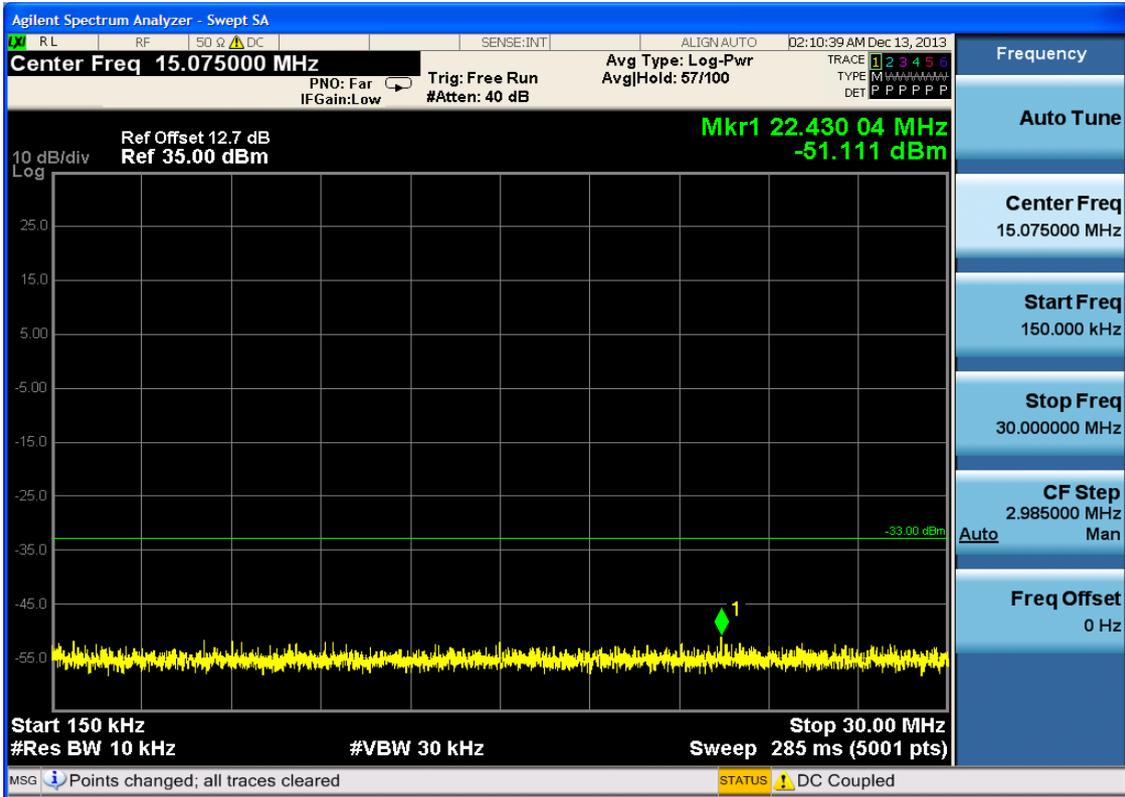


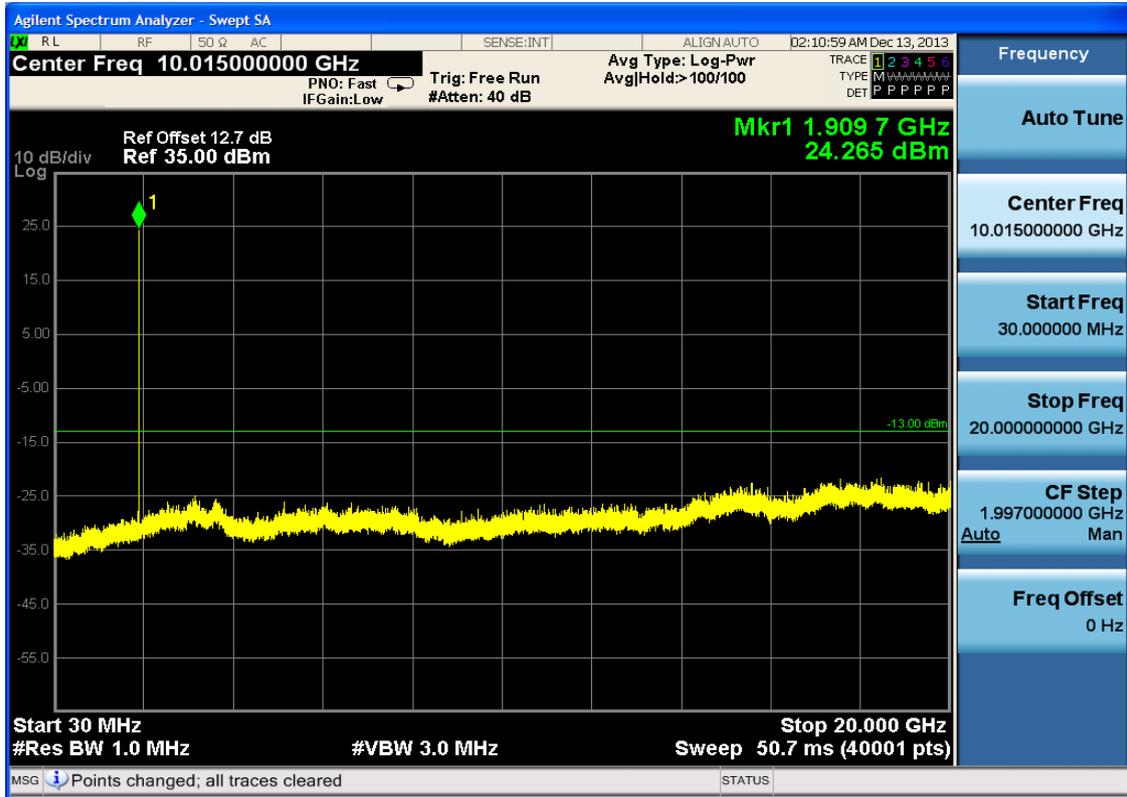




6.1.2.1.3 Test Channel = HCH



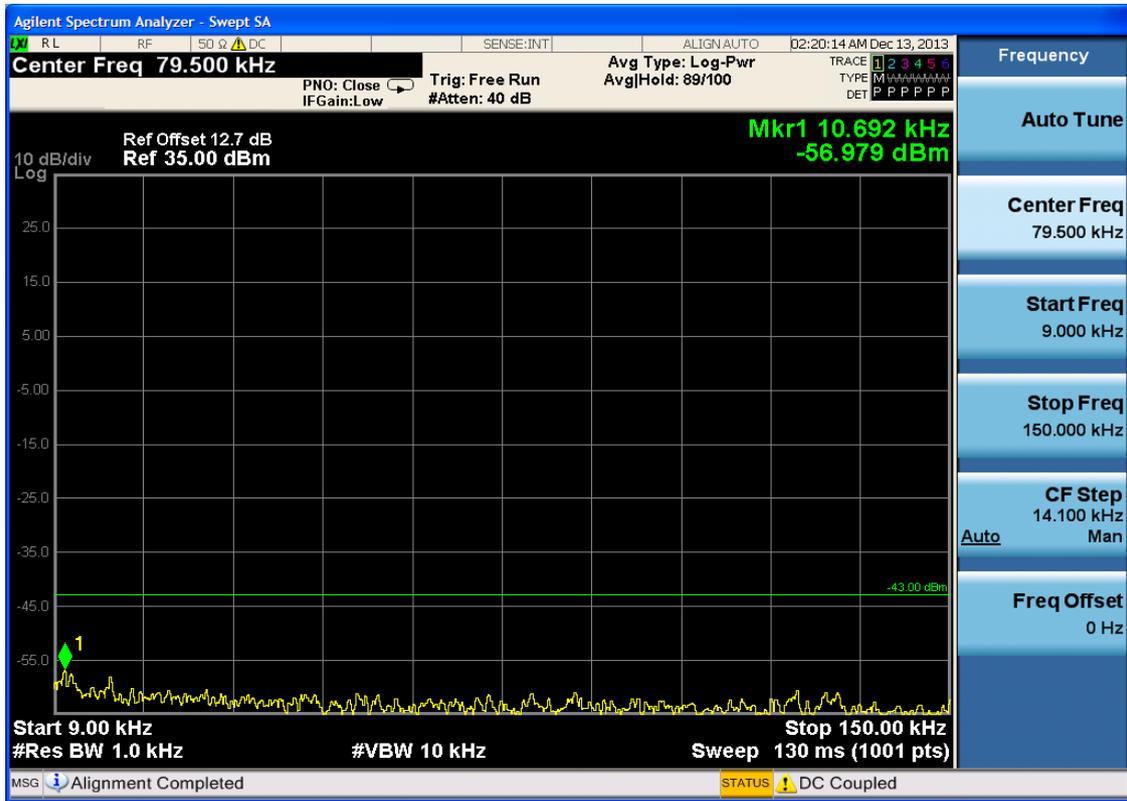


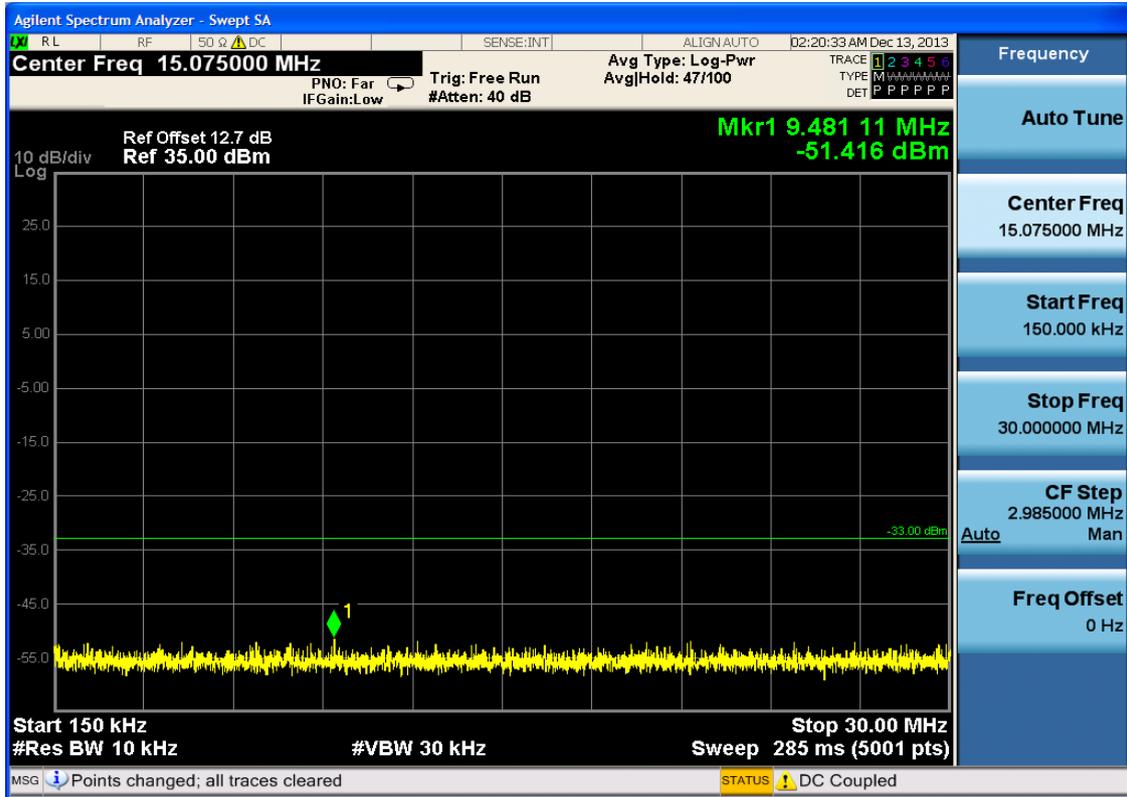


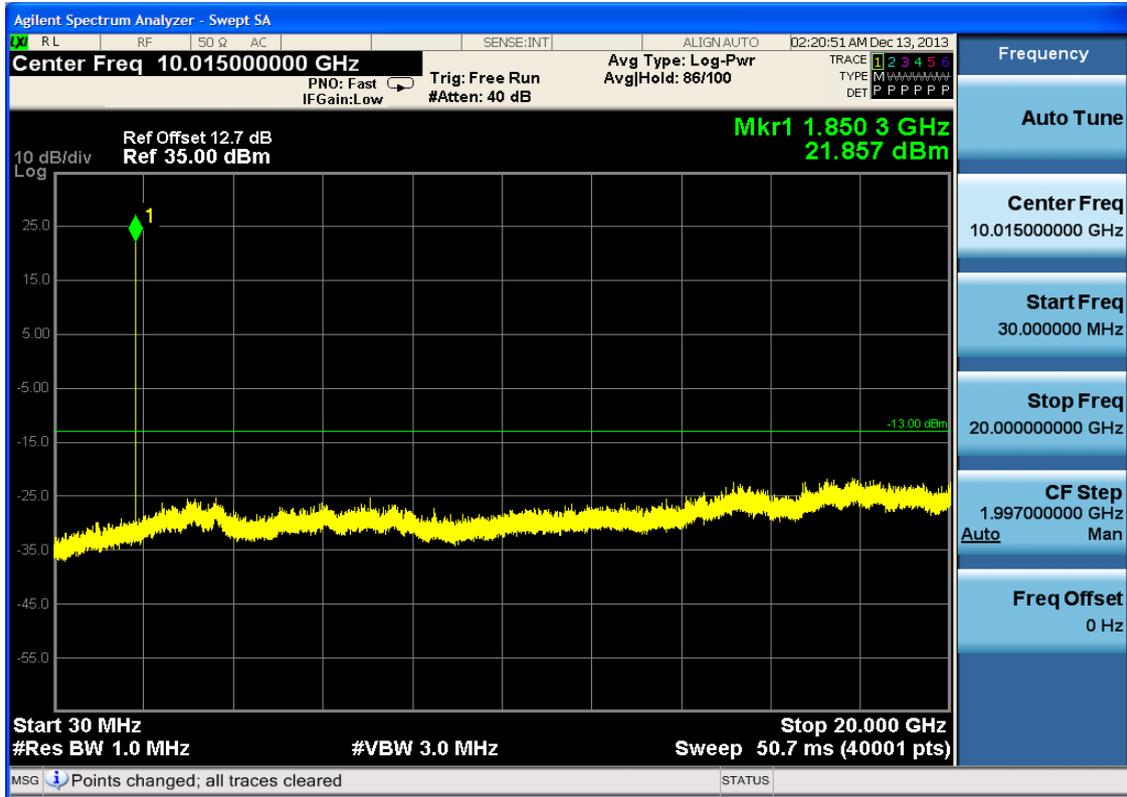


6.1.2.2 Test Mode = GSM/TM2

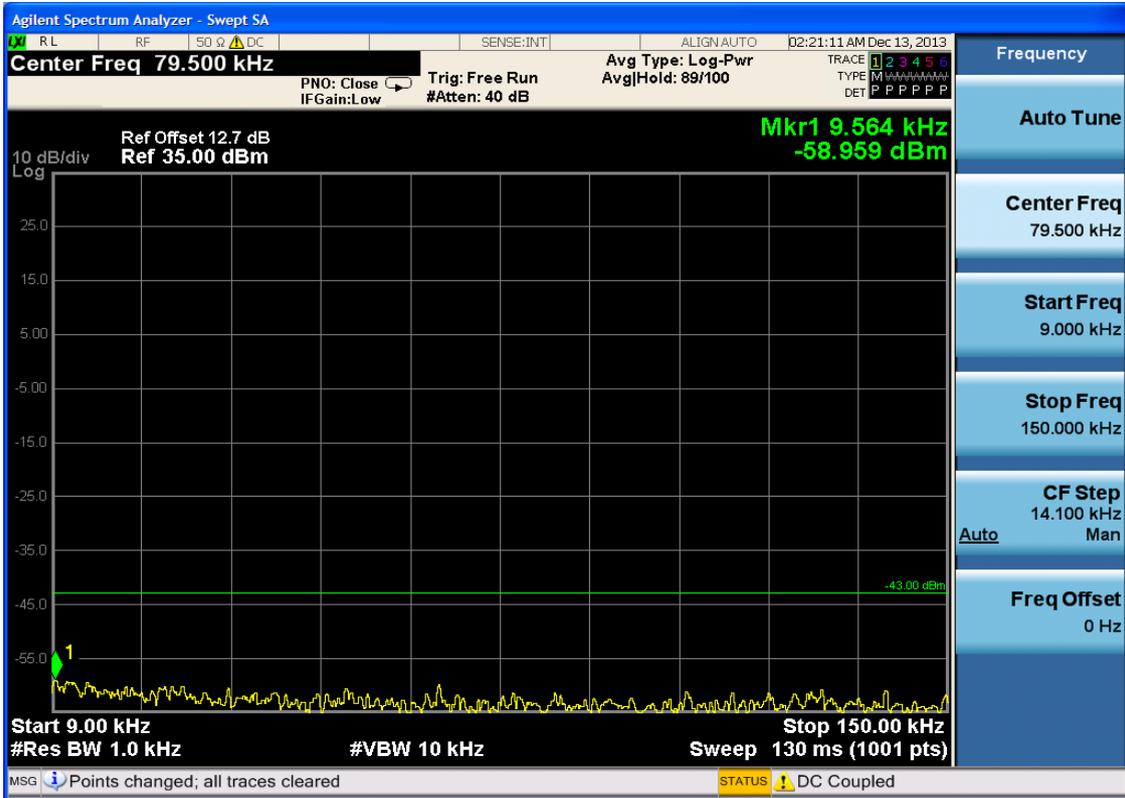
6.1.2.2.1 Test Channel = LCH

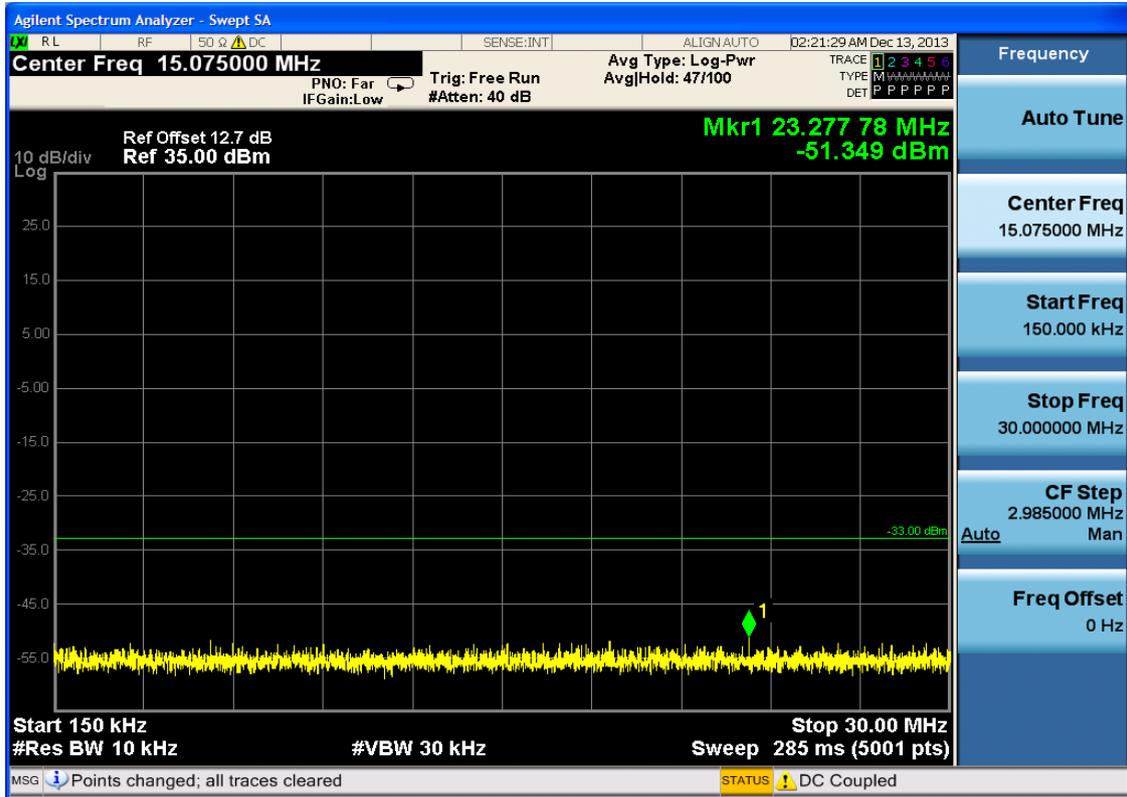






6.1.2.2.2 Test Channel = MCH



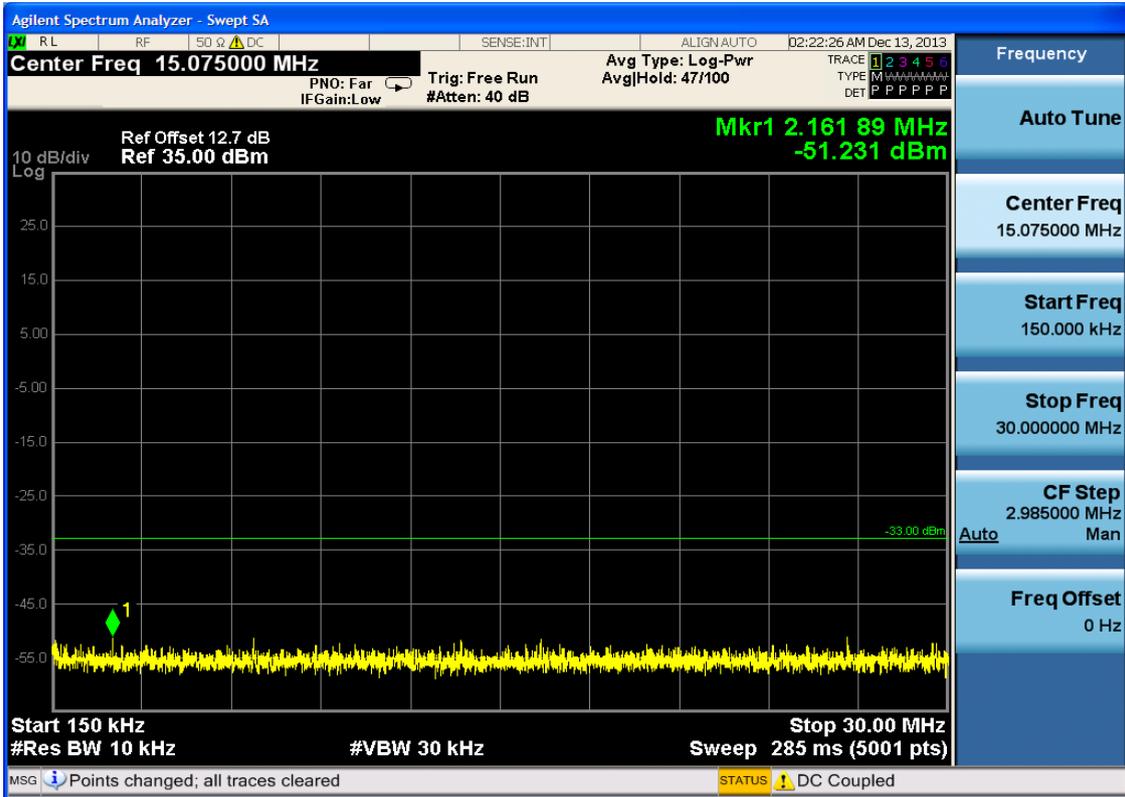






6.1.2.2.3 Test Channel = HCH







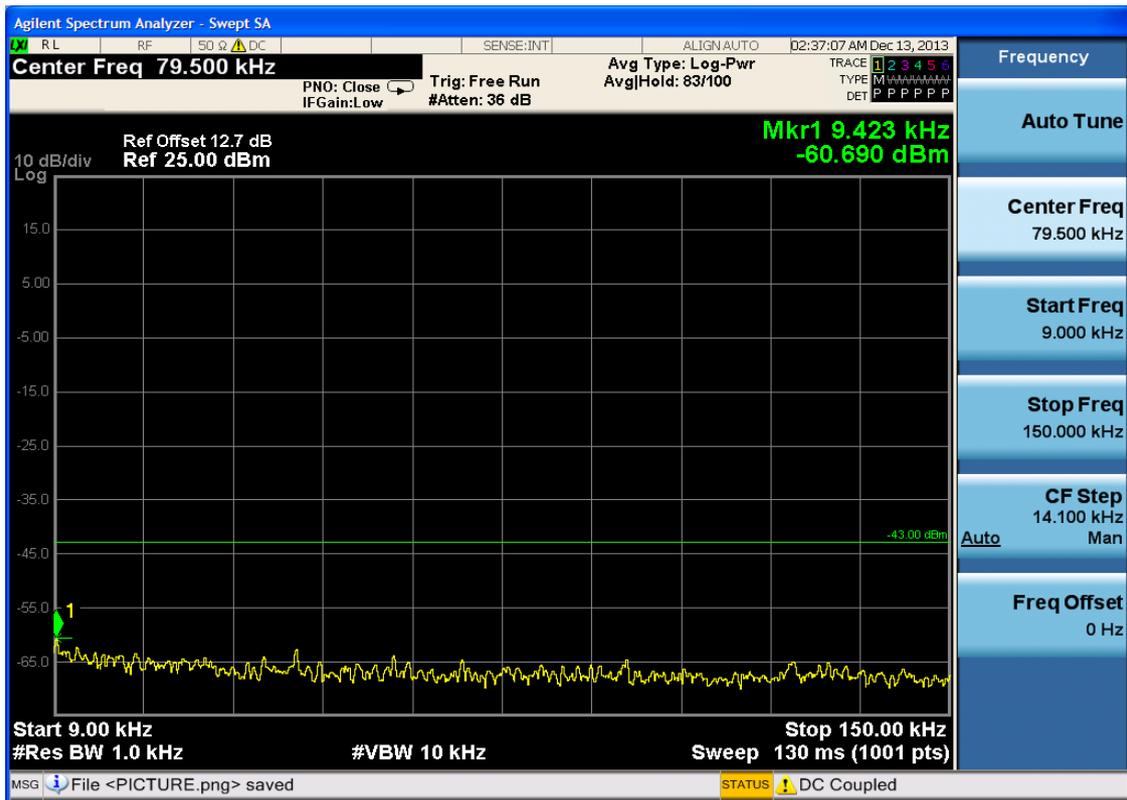


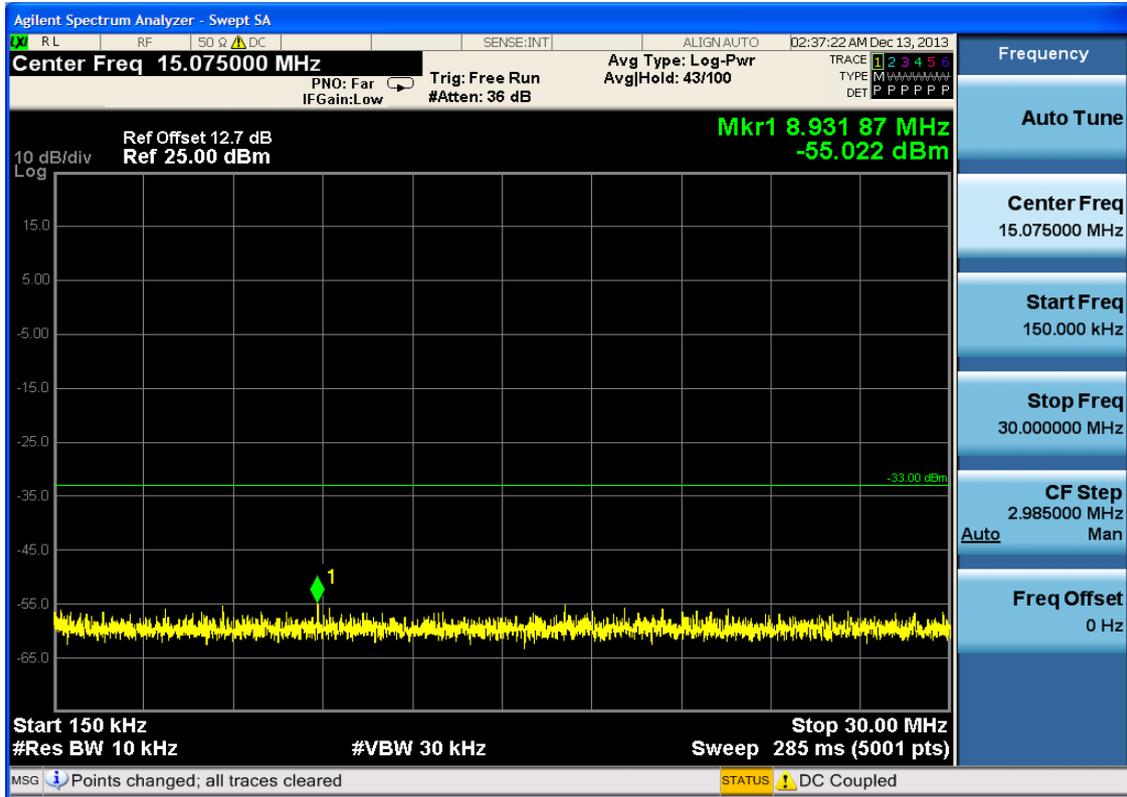
6.2 For UMTS

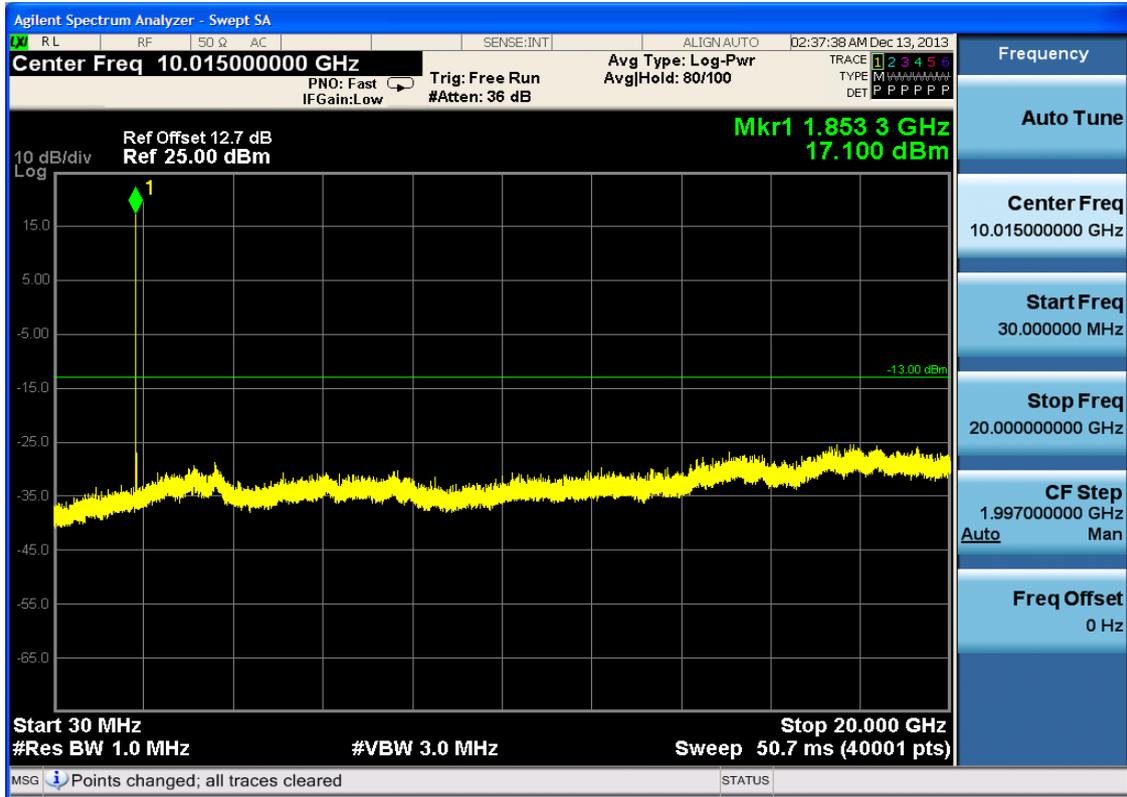
6.2.2 Test Band = WCDMA1900

6.2.2.1 Test Mode = UMTS/TM1

6.2.2.1.1 Test Channel = LCH

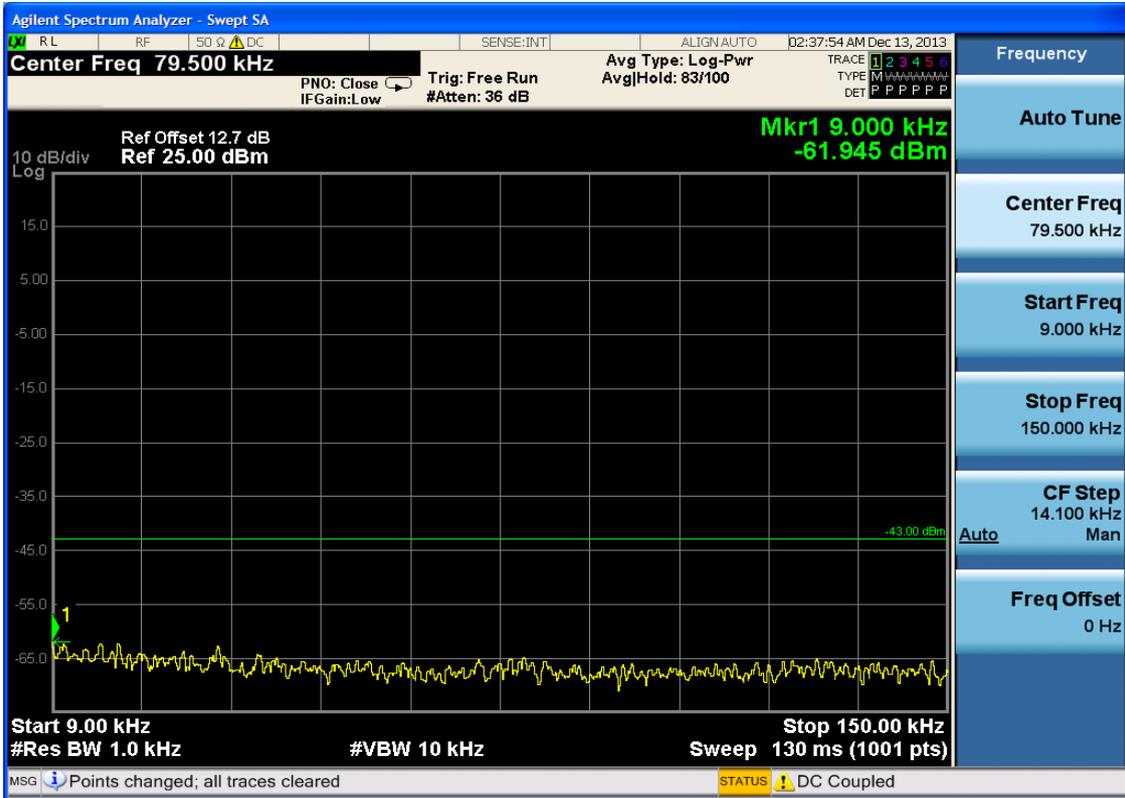


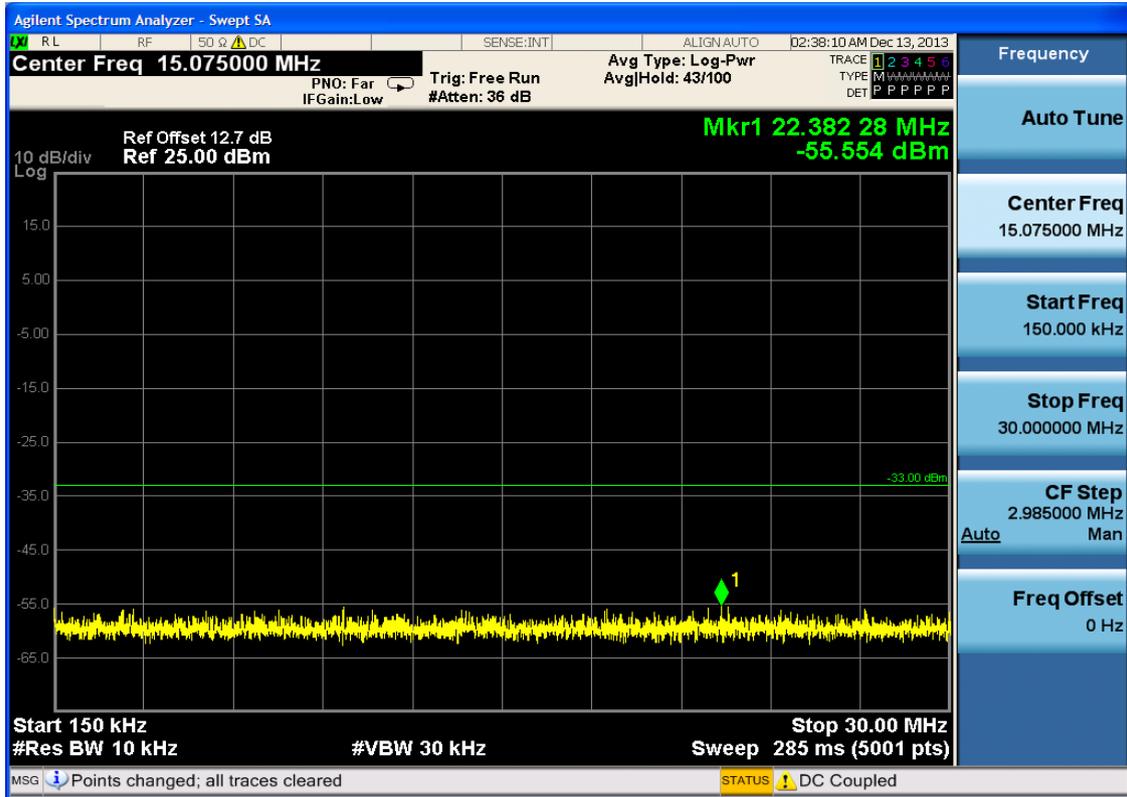


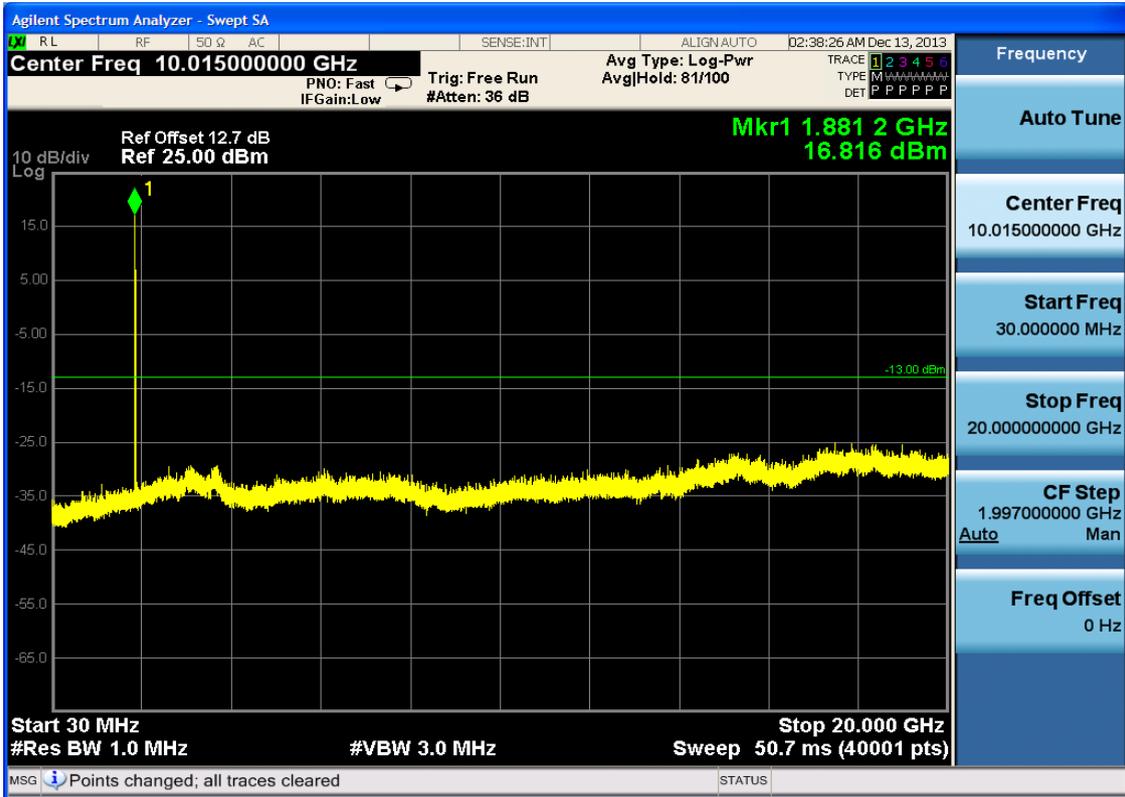




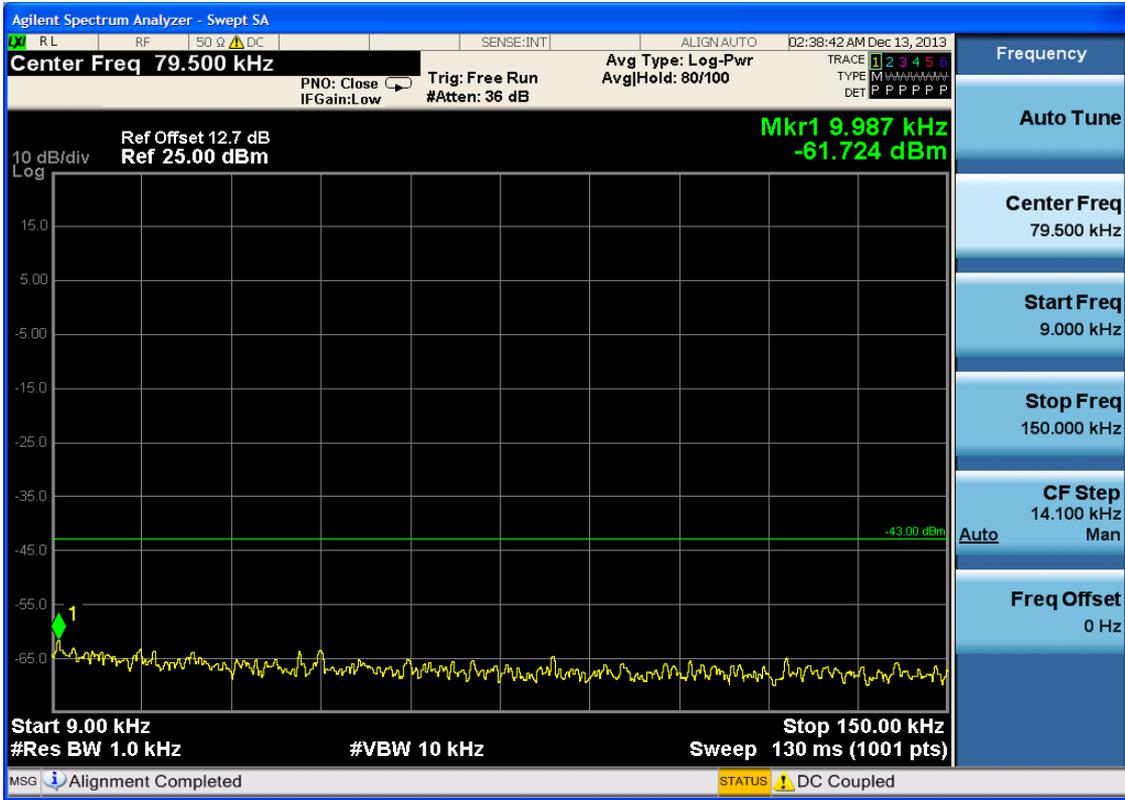
6.2.2.1.2 Test Channel = MCH

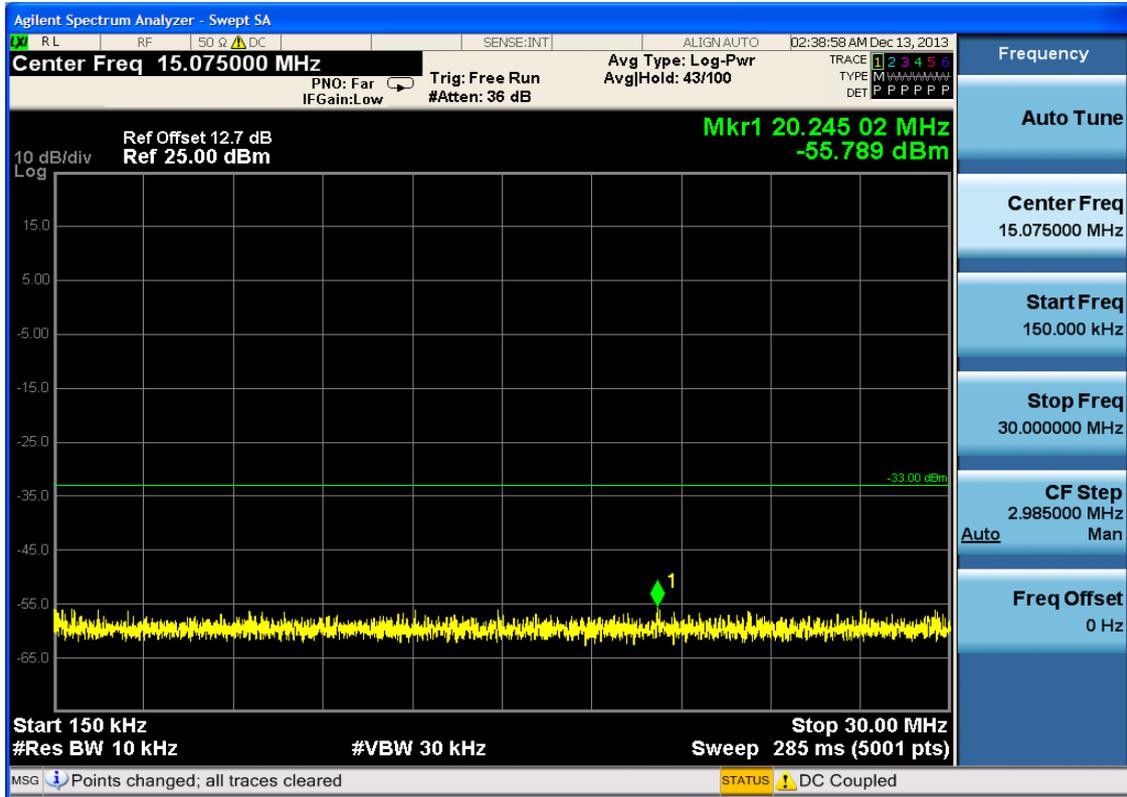






6.2.2.1.3 Test Channel = HCH







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

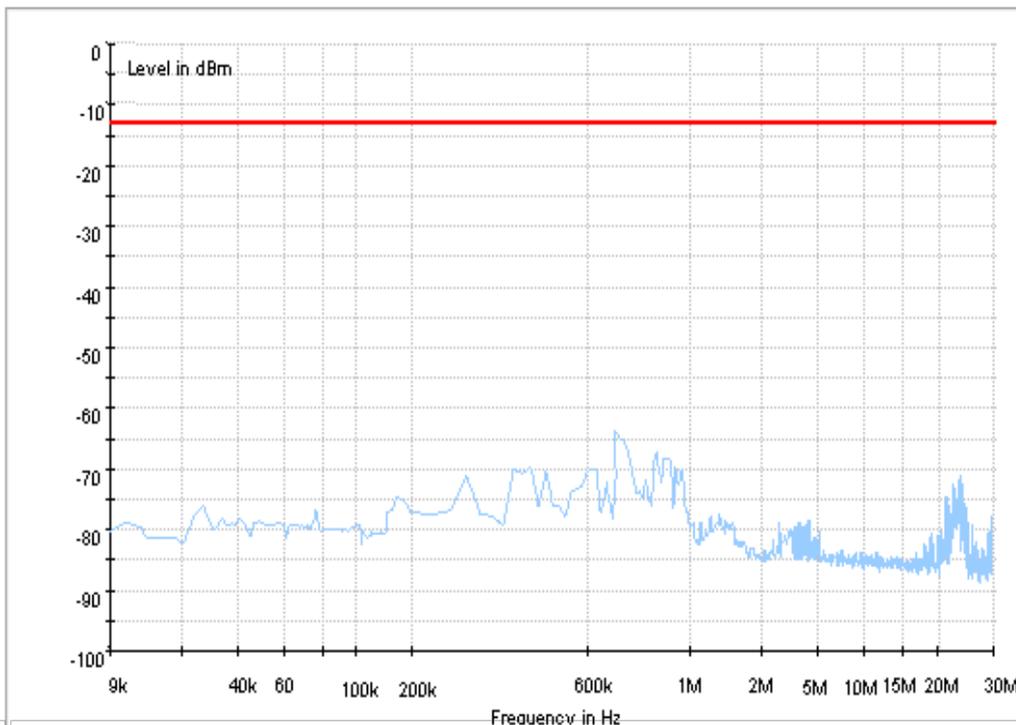
Above 1GHz, RBW = 1 MHz, VBW = 3 MHz. Detector: PK

Part I - Test Plots

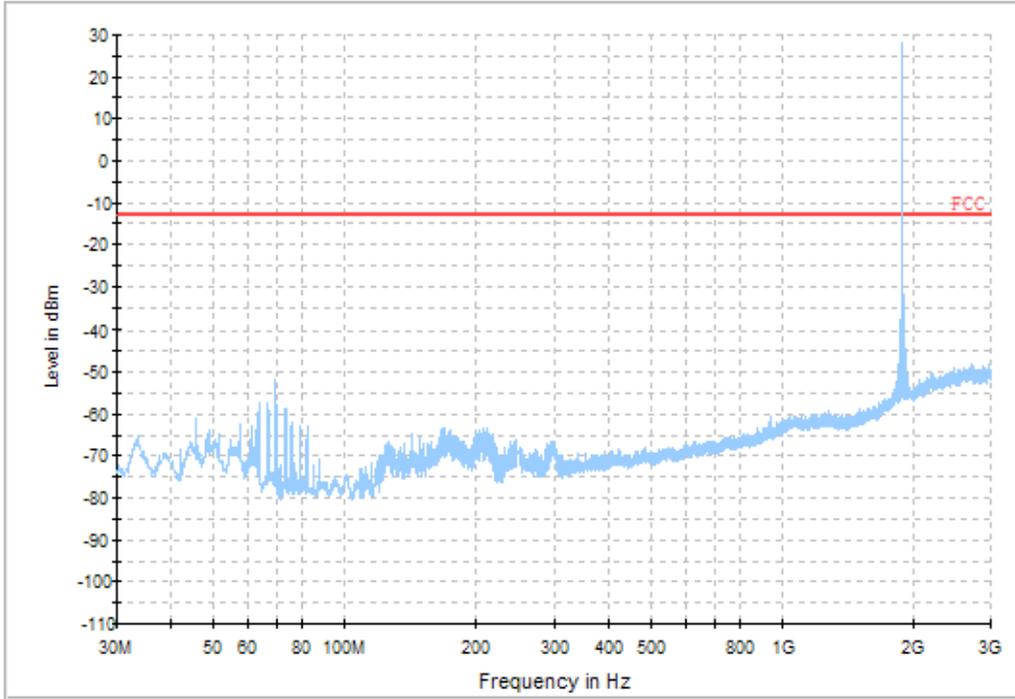
7.1 For GSM

7.1.2 Test Band = GSM1900

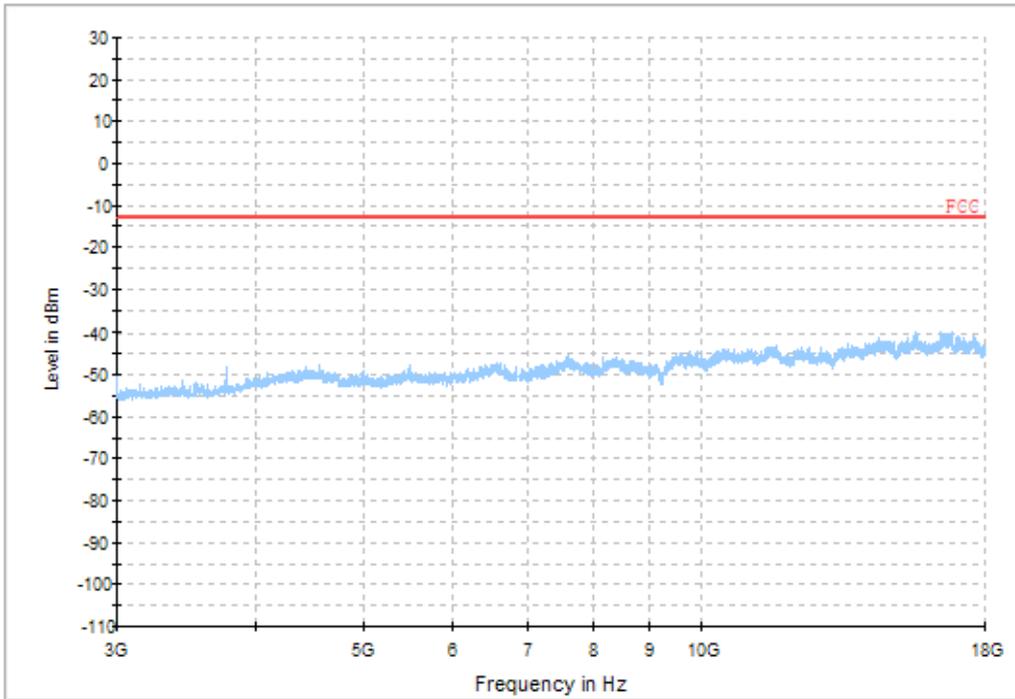
7.1.2.1 Test Mode = GSM/TM1

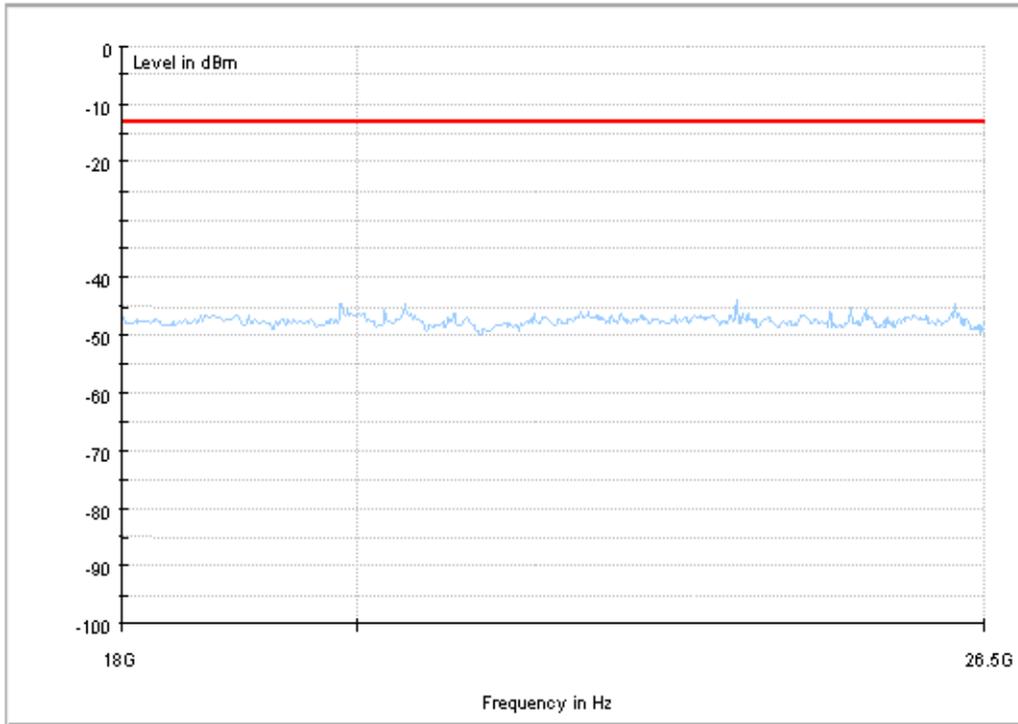


Copy of FCC PART24 GSM1900_L

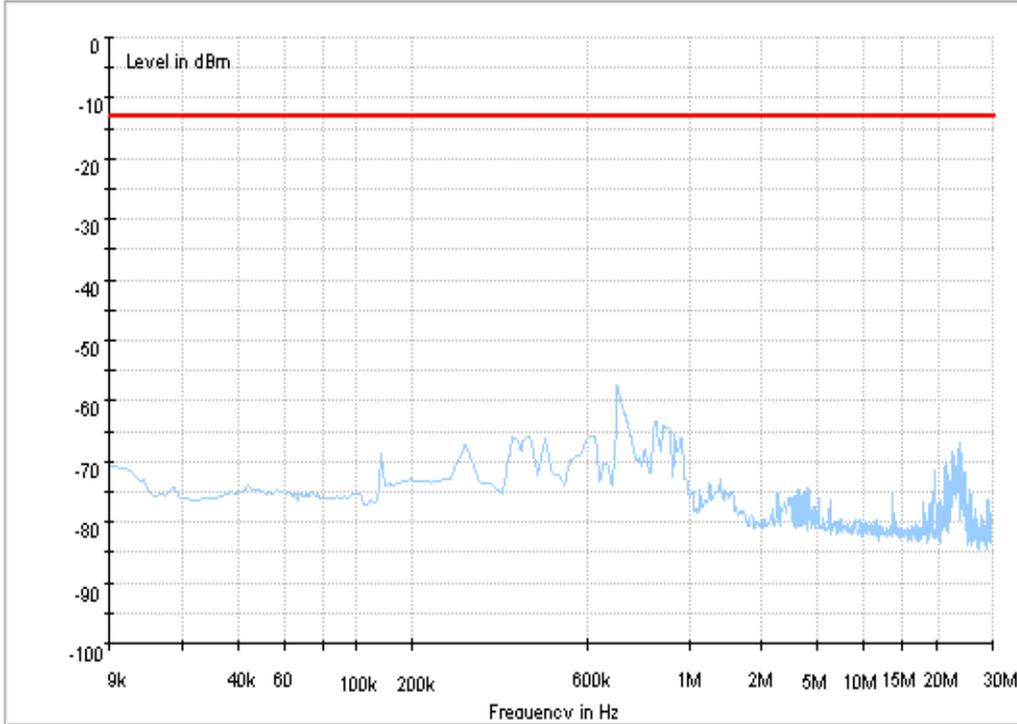


Copy of FCC PART24 GSM1900_H

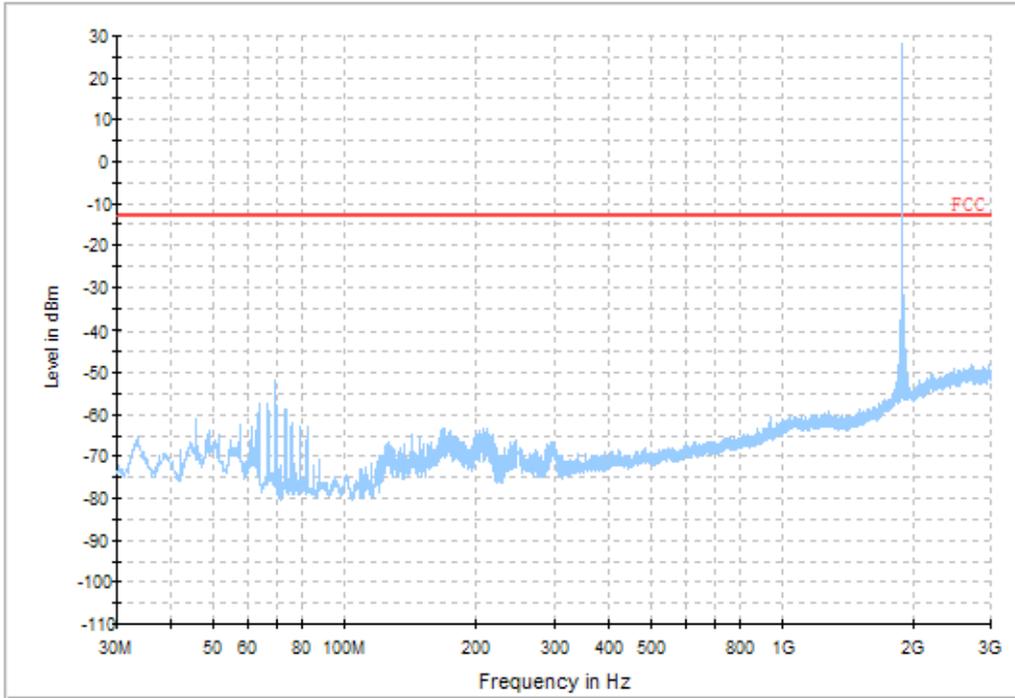




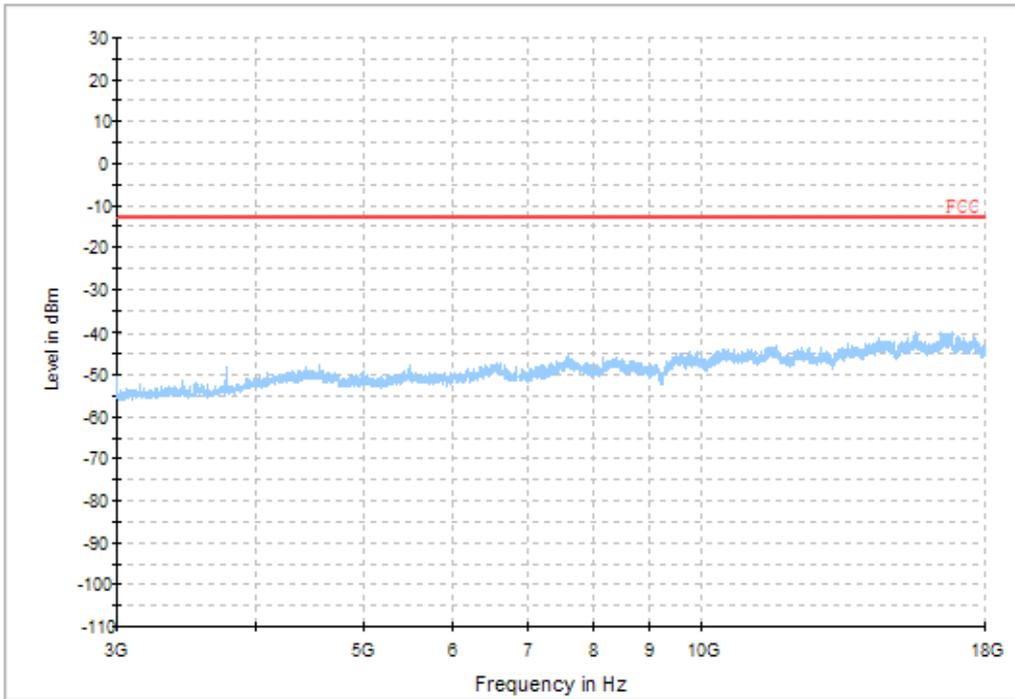
7.1.2.2 Test Mode = GSM/TM2

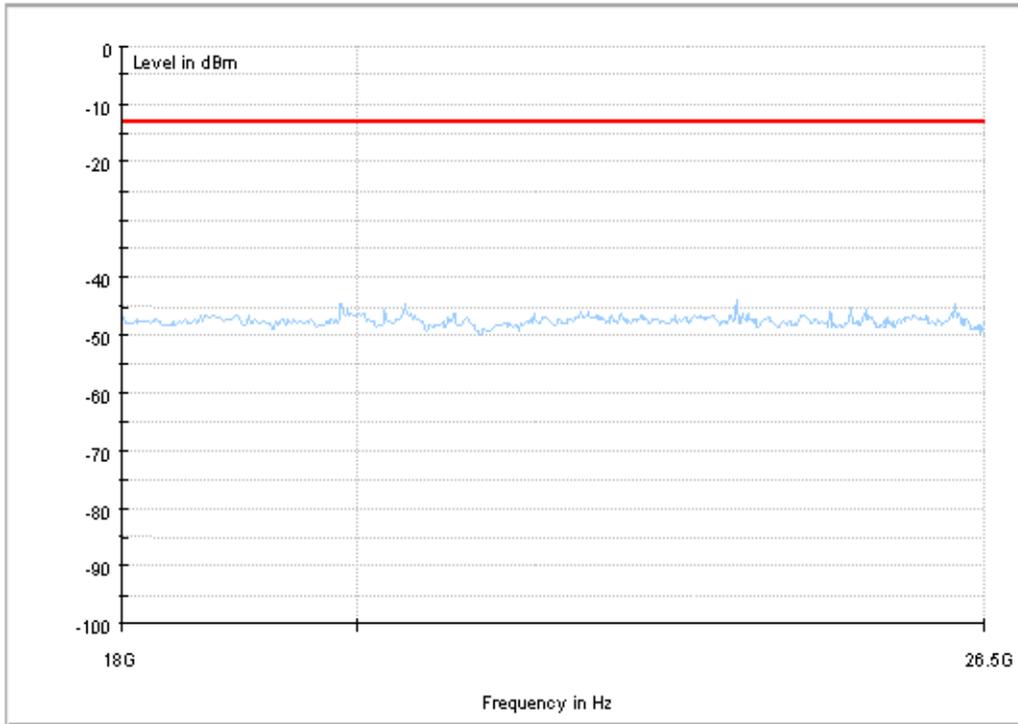


Copy of FCC PART24 GSM1900_L



Copy of FCC PART24 GSM1900_H

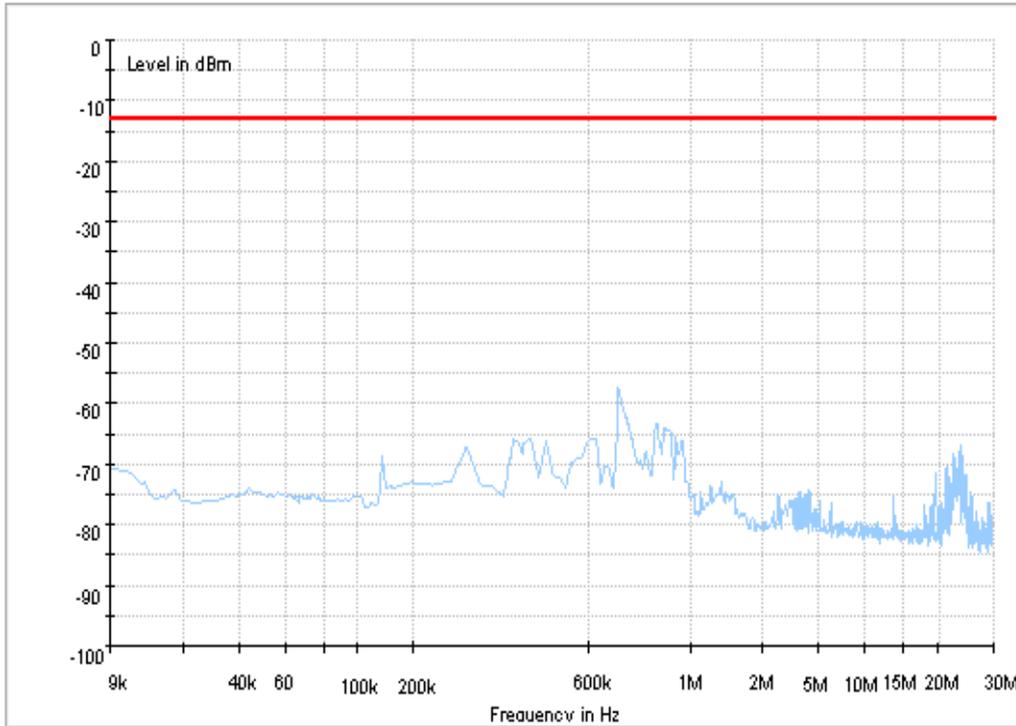




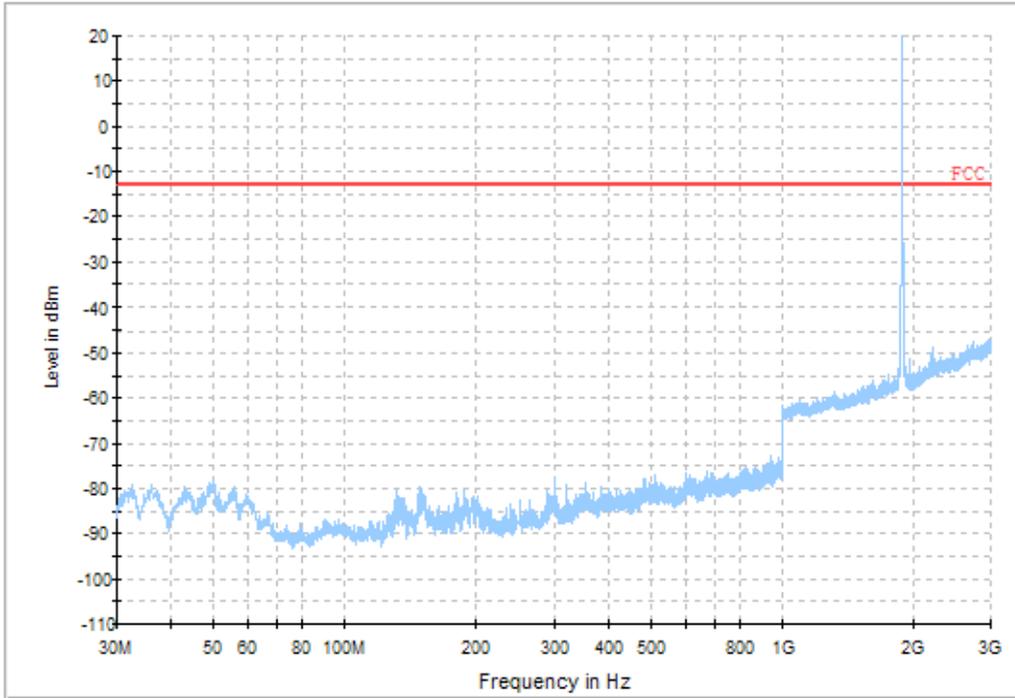
7.2 For UMTS

7.2.2 Test Band = WCDMA1900

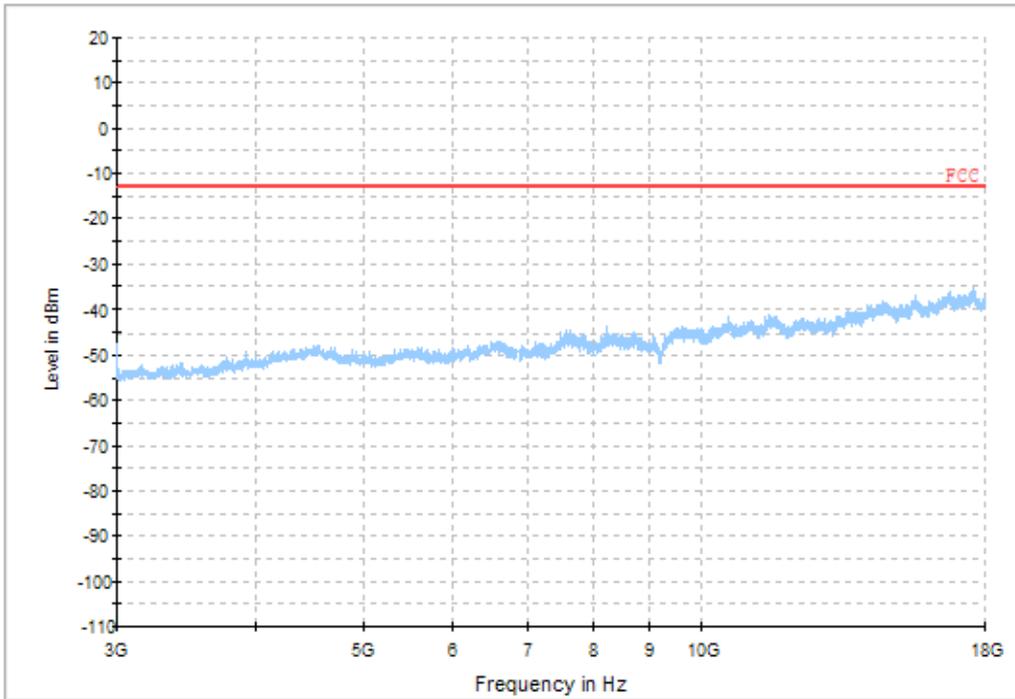
7.2.2.1 Test Mode = UMTS/TM1

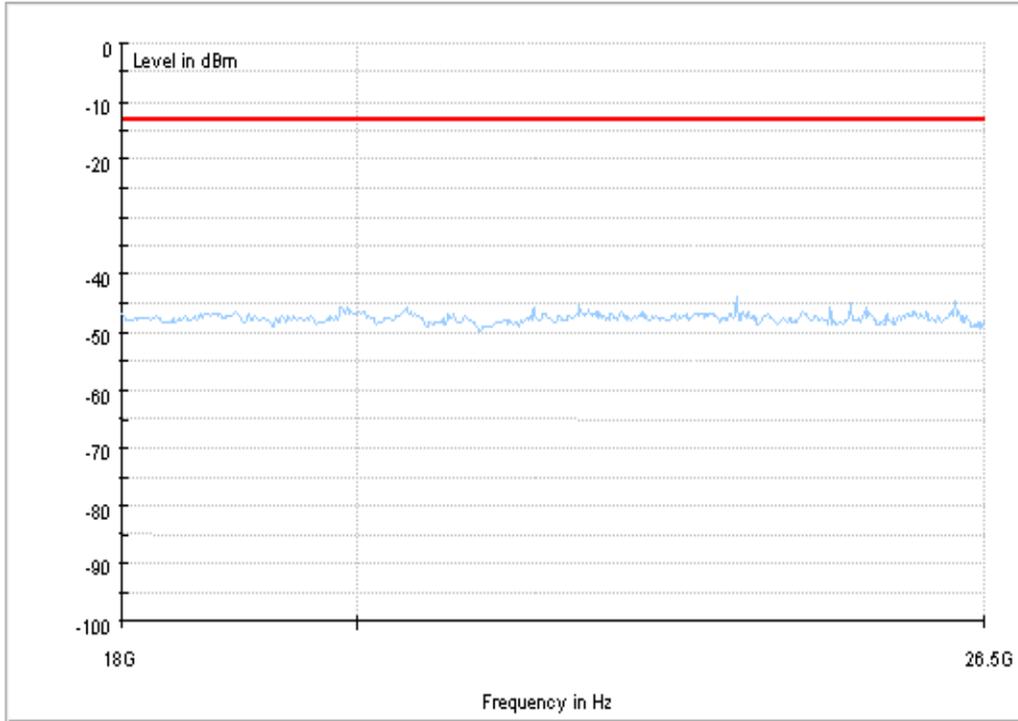


Copy of FCC PART24 WCDMA1900_L



Copy of FCC PART24 WCDMA1900_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	-49.78	-0.02691	PASS
				VN	-56.31	-0.03043	PASS
				VH	-59.28	-0.03204	PASS
		MCH	TN	VL	-46.10	-0.02452	PASS
				VN	-49.27	-0.02621	PASS
				VH	-37.19	-0.01978	PASS
		HCH	TN	VL	-54.69	-0.02864	PASS
				VN	-50.43	-0.02641	PASS
				VH	-54.43	-0.0285	PASS
	GSM/TM2	LCH	TN	VL	-84.04	-0.04542	PASS
				VN	-67.83	-0.03666	PASS
				VH	-76.78	-0.0415	PASS
		MCH	TN	VL	-57.66	-0.03067	PASS
				VN	-68.12	-0.03623	PASS
				VH	-57.08	-0.03036	PASS
		HCH	TN	VL	-74.52	-0.03902	PASS
				VN	-73.81	-0.03865	PASS
				VH	-62.31	-0.03263	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
GSM1900	GSM/TM1	LCH	VN	-30	-62.51	-0.03379	PASS
				-20	-58.76	-0.03176	PASS
				-10	-59.47	-0.03214	PASS
				0	-59.28	-0.03204	PASS
				10	-59.41	-0.03211	PASS
				20	-63.09	-0.0341	PASS
				30	-61.08	-0.03301	PASS



Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				40	-58.37	-0.03155	PASS
				50	-55.14	-0.0298	PASS
		MCH	VN	-30	-37.39	-0.01989	PASS
				-20	-46.75	-0.02487	PASS
				-10	-43.20	-0.02298	PASS
				0	-41.84	-0.02226	PASS
				10	-44.68	-0.02377	PASS
				20	-44.68	-0.02377	PASS
				30	-42.29	-0.02249	PASS
				40	-46.49	-0.02473	PASS
				50	-39.00	-0.02074	PASS
				HCH	VN	-30	-50.82
		-20	-49.14			-0.02573	PASS
		-10	-51.85			-0.02715	PASS
		0	-52.63			-0.02756	PASS
		10	-58.37			-0.03056	PASS
		20	-51.53			-0.02698	PASS
		30	-50.95			-0.02668	PASS
		40	-49.72			-0.02603	PASS
		50	-53.59	-0.02806	PASS		
	GSM/TM2	LCH	VN	-30	-66.83	-0.03612	PASS
				-20	-76.81	-0.04151	PASS
				-10	-80.42	-0.04347	PASS
				0	-82.59	-0.04464	PASS
				10	-84.49	-0.04567	PASS
				20	-76.87	-0.04155	PASS
				30	-73.03	-0.03947	PASS
				40	-77.52	-0.0419	PASS
		50	-67.86	-0.03668	PASS		
		MCH	VN	-30	-56.56	-0.03009	PASS
				-20	-63.51	-0.03378	PASS
				-10	-56.56	-0.03009	PASS
0	-63.38			-0.03371	PASS		
10	-52.24			-0.02779	PASS		
20	-81.55			-0.04338	PASS		
30	-60.25			-0.03205	PASS		
40	-46.14	-0.02454	PASS				
50	-56.89	-0.03026	PASS				
HCH	VN	-30	-58.02	-0.03038	PASS		



Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				-20	-58.95	-0.03087	PASS
				-10	-81.91	-0.04289	PASS
				0	-68.90	-0.03608	PASS
				10	-66.64	-0.03489	PASS
				20	-63.76	-0.03339	PASS
				30	-71.77	-0.03758	PASS
				40	-66.83	-0.03499	PASS
				50	-66.86	-0.03501	PASS

8.2 For UMTS

8.2.1 Frequency Error vs. Voltage:

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
WCDMA1900	UMTS/TM1	LCH	TN	VL	0.40	0.00022	PASS
				VN	3.25	0.00175	PASS
				VH	-4.73	-0.00255	PASS
		MCH	TN	VL	2.04	0.00109	PASS
				VN	-0.20	-0.00011	PASS
				VH	1.34	0.00071	PASS
		HCH	TN	VL	0.15	0.00008	PASS
				VN	3.72	0.00195	PASS
				VH	0.44	0.00023	PASS

8.2.2 Frequency Error vs. Temperature:

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
WCDMA1900	UMTS/TM1	LCH	VN	-30	-3.37	-0.00182	PASS
				-20	-6.61	-0.00357	PASS
				-10	0.43	0.00023	PASS
				0	-5.98	-0.00323	PASS
				10	-1.34	-0.00072	PASS
				20	-0.78	-0.00042	PASS
				30	0.35	0.00019	PASS
				40	4.61	0.00249	PASS
				50	1.30	0.0007	PASS
		MCH	VN	-30	1.30	0.00069	PASS
				-20	-0.18	-0.0001	PASS



Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				-10	2.32	0.00123	PASS
				0	6.47	0.00344	PASS
				10	4.43	0.00236	PASS
				20	-2.64	-0.0014	PASS
				30	2.67	0.00142	PASS
				40	4.52	0.0024	PASS
				50	3.95	0.0021	PASS
		HCH	VN	-30	0.27	0.00014	PASS
				-20	-6.96	-0.00365	PASS
				-10	1.34	0.0007	PASS
				0	-4.35	-0.00228	PASS
				10	2.06	0.00108	PASS
				20	8.45	0.00443	PASS
				30	0.02	0.00001	PASS
				40	-6.61	-0.00347	PASS
				50	5.63	0.00295	PASS

END