



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	32.43	31.28	38.5	PASS
		MCH	32.46	31.31	38.5	PASS
		HCH	32.43	31.28	38.5	PASS
	GSM/TM2	LCH	25.42	24.64	38.5	PASS
		MCH	25.41	24.26	38.5	PASS
		HCH	25.43	24.28	38.5	PASS
Test Band	Test Mode	Test Channel	Conducted Power [dBm]	EIRP [dBm]	Limit [dBm]	Verdict
GSM1900	GSM/TM1	LCH	28.7	32.4	33	PASS
		MCH	28.78	32.48	33	PASS
		HCH	28.8	32.5	33	PASS
	GSM/TM2	LCH	23.58	27.28	33	PASS
		MCH	23.59	27.29	33	PASS
		HCH	23.65	27.35	33	PASS
WCDMA1900	UMTS/TM1	LCH	22.03	26.09	33	PASS
		MCH	21.78	25.48	33	PASS
		HCH	21.83	25.53	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: $\text{RBW} > \text{emission bandwidth}$, $\text{VBW} > 3 \times \text{RBW}$.

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	0.13	13	PASS
		MCH	0.12	13	PASS
		HCH	0.12	13	PASS
	GSM/TM2	LCH	2.8	13	PASS
		MCH	2.68	13	PASS
		HCH	2.66	13	PASS

Test Band	Test Mode	Test Channel	Measured[dB]	Limit [dB]	Verdict
WCDMA1900	UMTS/TM1	LCH	3.31	13	PASS
		MCH	3.60	13	PASS
		HCH	3.39	13	PASS

3Appendix_C: Modulation Characteristics

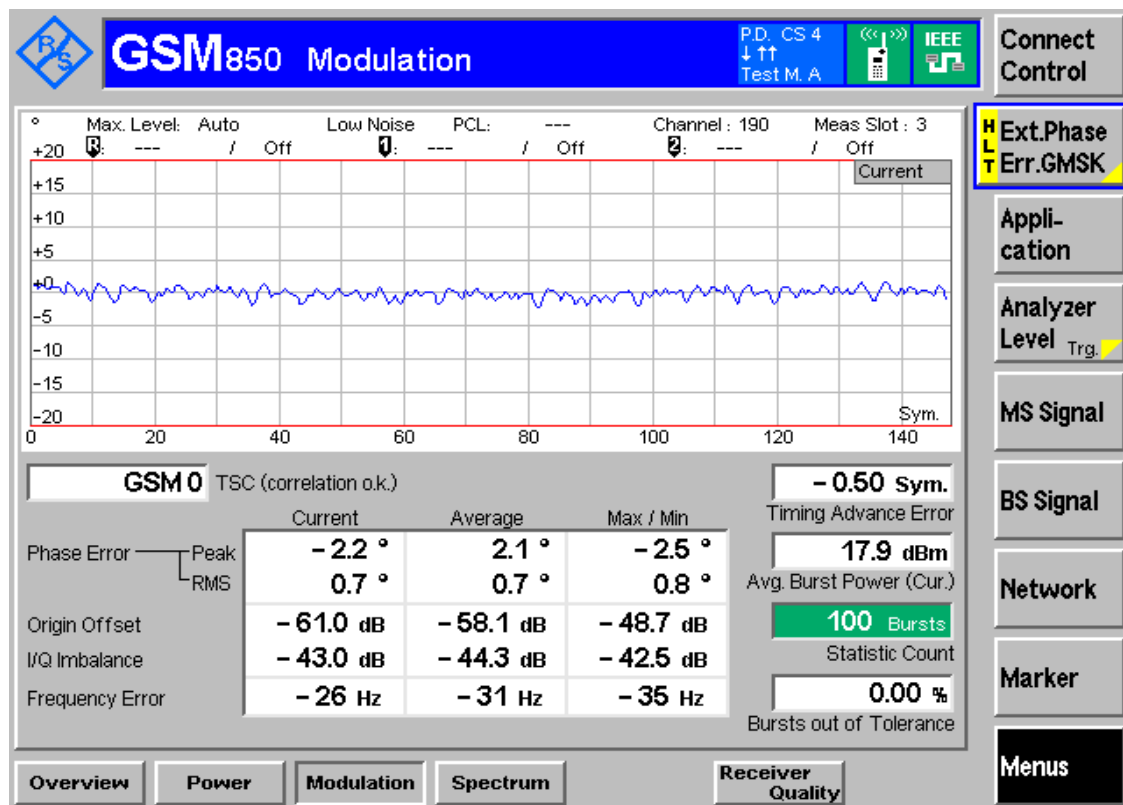
Part I - Test Plots

3.1 For GSM

3.1.1 Test Band = GSM850

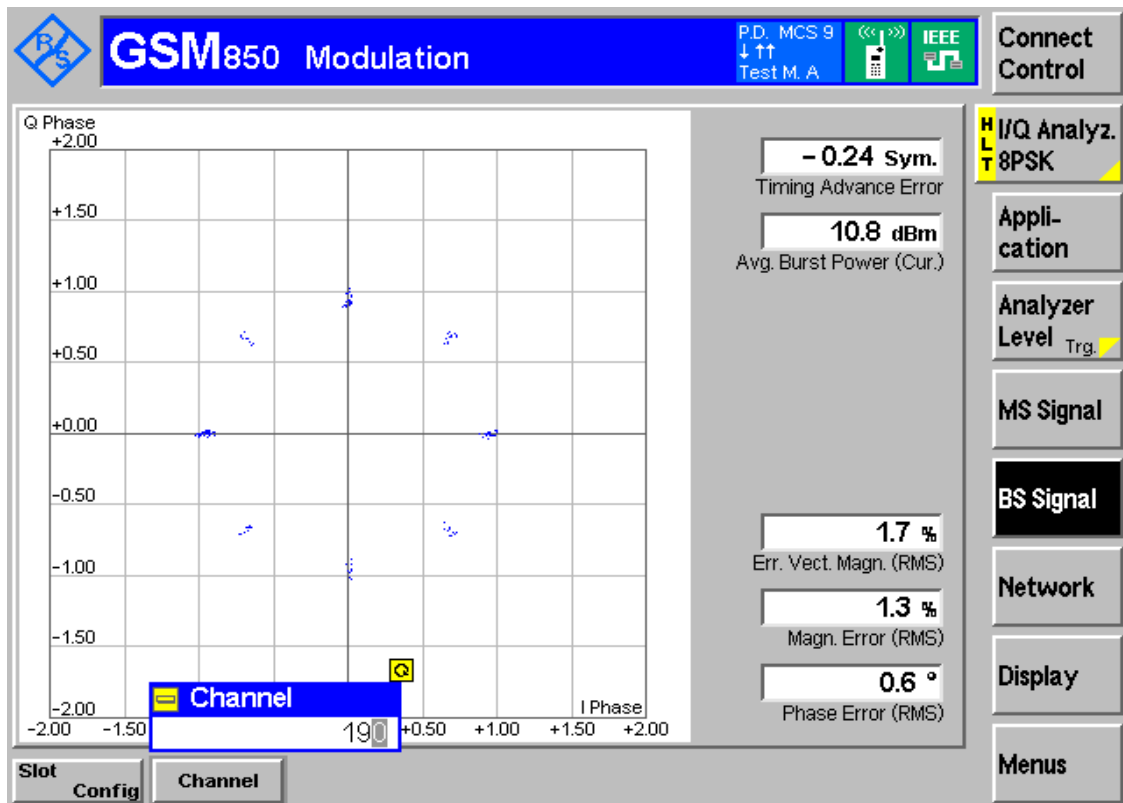
3.1.1.1 Test Mode = GSM/TM1

3.1.1.1.1 Test Channel = MCH



3.1.1.2 Test Mode = GSM/TM2

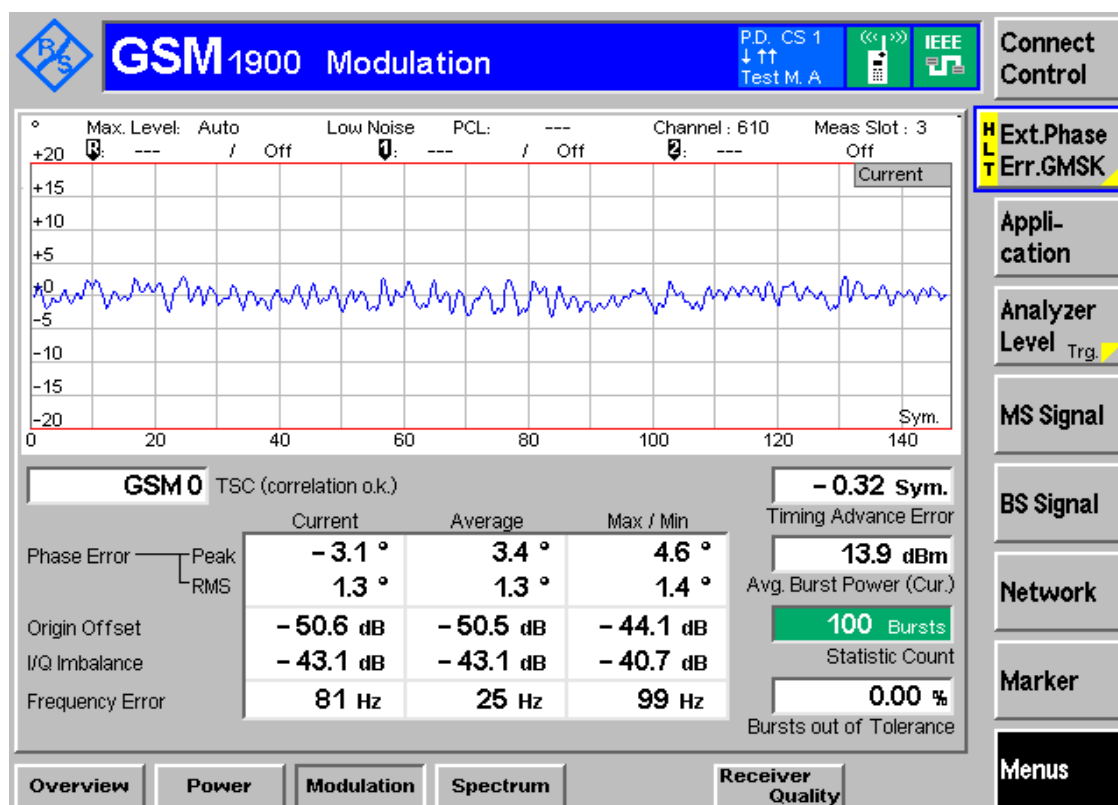
3.1.1.2.1 Test Channel = MCH



3.1.2 Test Band = GSM1900

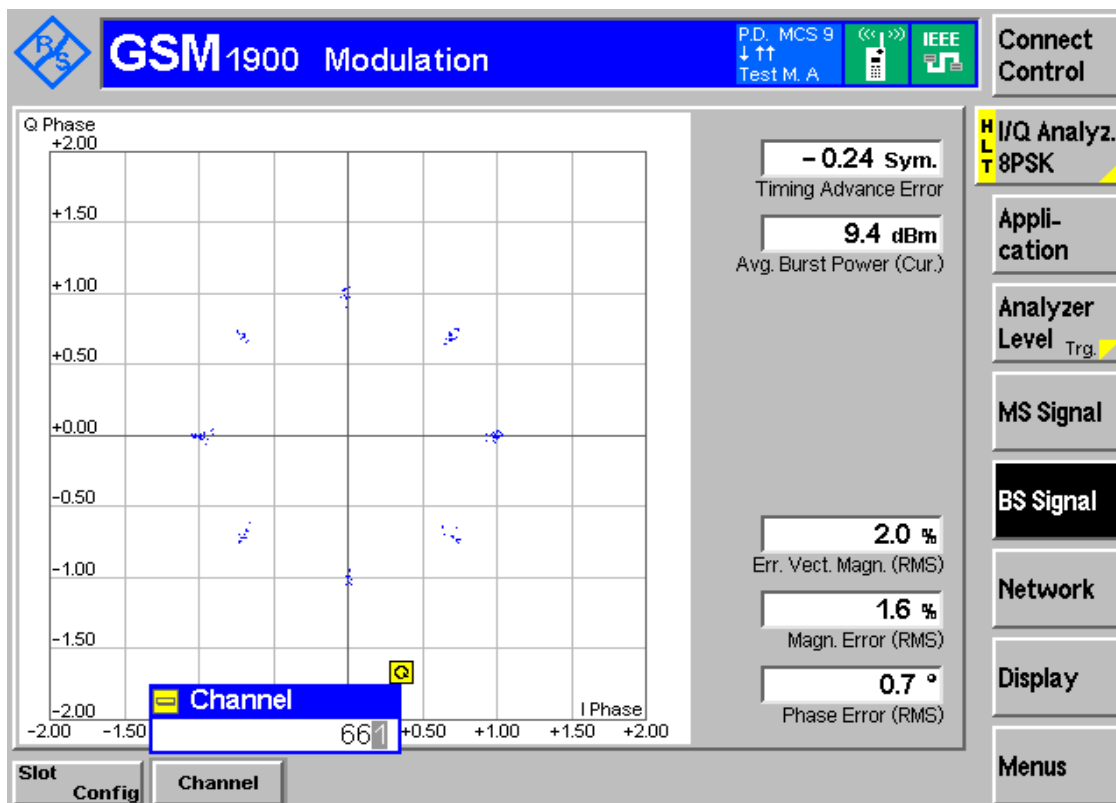
3.1.2.1 Test Mode = GSM/TM1

3.1.2.1.1 Test Channel = MCH



3.1.2.2 Test Mode = GSM/TM2

3.1.2.2.1 Test Channel = MCH

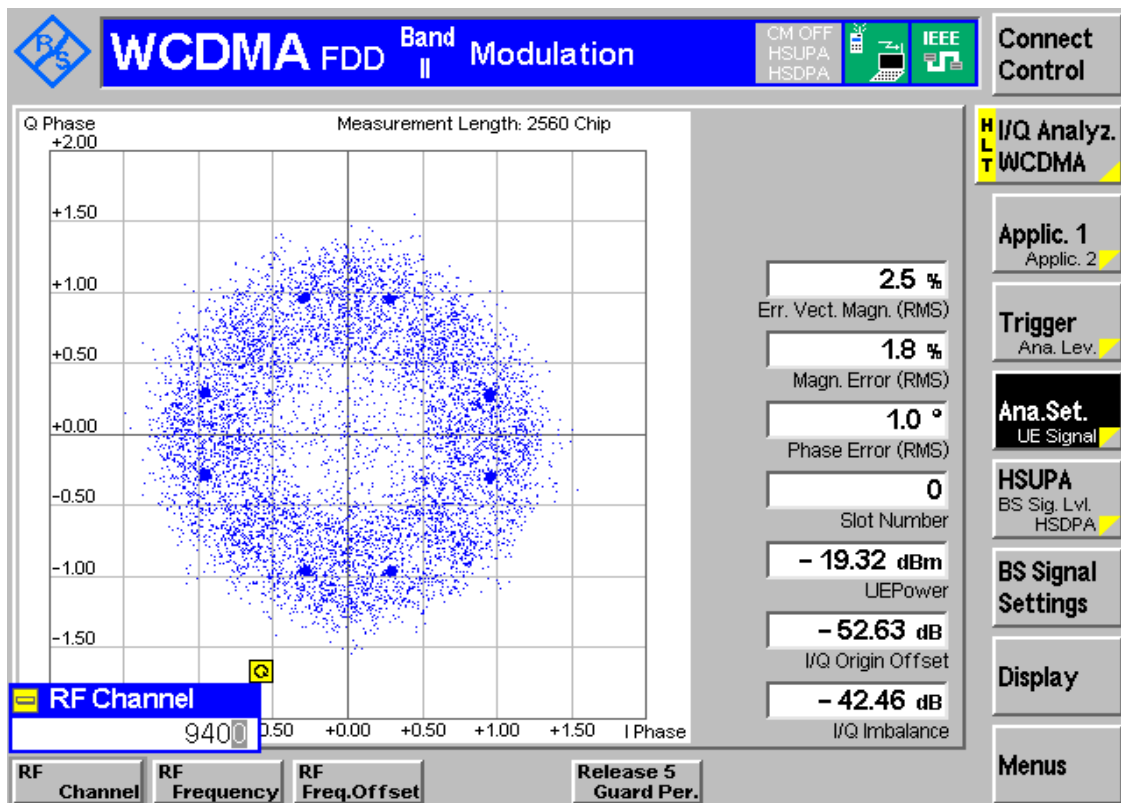


3.2 For UMTS

3.2.1 Test Band = WCDMA1900

3.2.1.1 Test Mode = UMTS/TM1

3.2.1.1.1 Test Channel = MCH



4Appendix_D: Bandwidth

Part I - Test Results

Test Band	Test Mode	Test Channel	Occupied Bandwidth [kHz]	Emission Bandwidth [kHz]	Verdict
GSM850	GSM/TM1	LCH	245.97	322.70	Pass
		MCH	241.36	313.45	Pass
		HCH	239.55	315.61	Pass
	GSM/TM2	LCH	245.01	317.35	Pass
		MCH	247.87	317.08	Pass
		HCH	248.70	317.33	Pass
GSM1900	GSM/TM1	LCH	245.22	319.11	Pass
		MCH	240.67	314.98	Pass
		HCH	245.57	315.71	Pass
	GSM/TM2	LCH	250.55	326.82	Pass
		MCH	250.49	322.33	Pass
		HCH	249.53	323.39	Pass
Test Band	Test Mode	Test Channel	Occupied Bandwidth [MHz]	Emission Bandwidth [MHz]	Verdict
WCDMA1900	UMTS/TM1	LCH	4.18	4.72	Pass
		MCH	4.18	4.74	Pass
		HCH	4.17	4.73	Pass

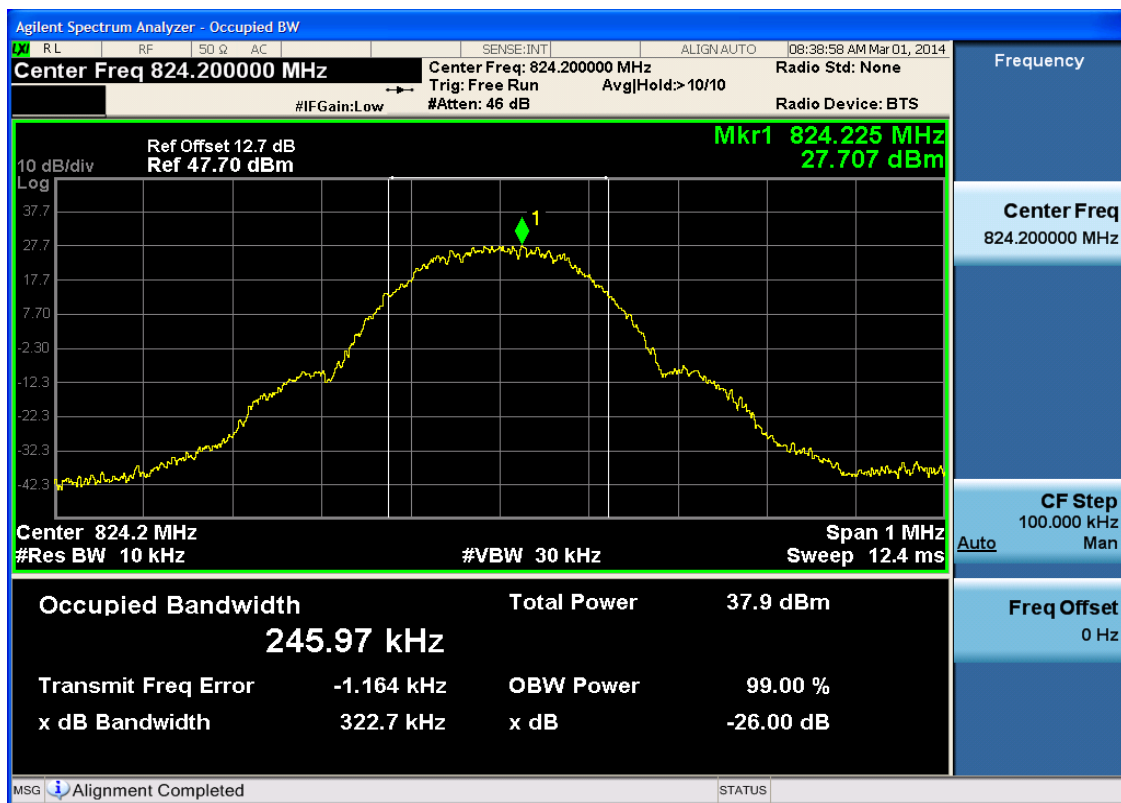
Part II - Test Plots

4.1 For GSM

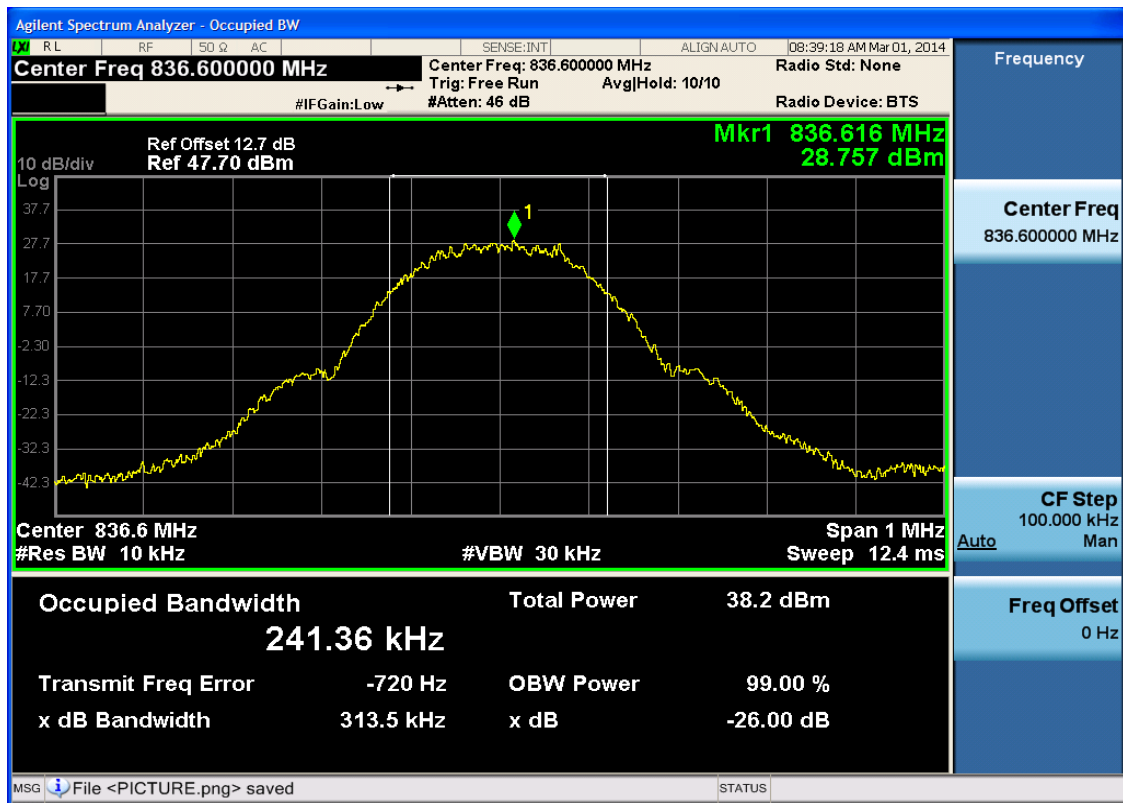
4.1.1 Test Band = GSM850

4.1.1.1 Test Mode = GSM/TM1

4.1.1.1.1 Test Channel = LCH

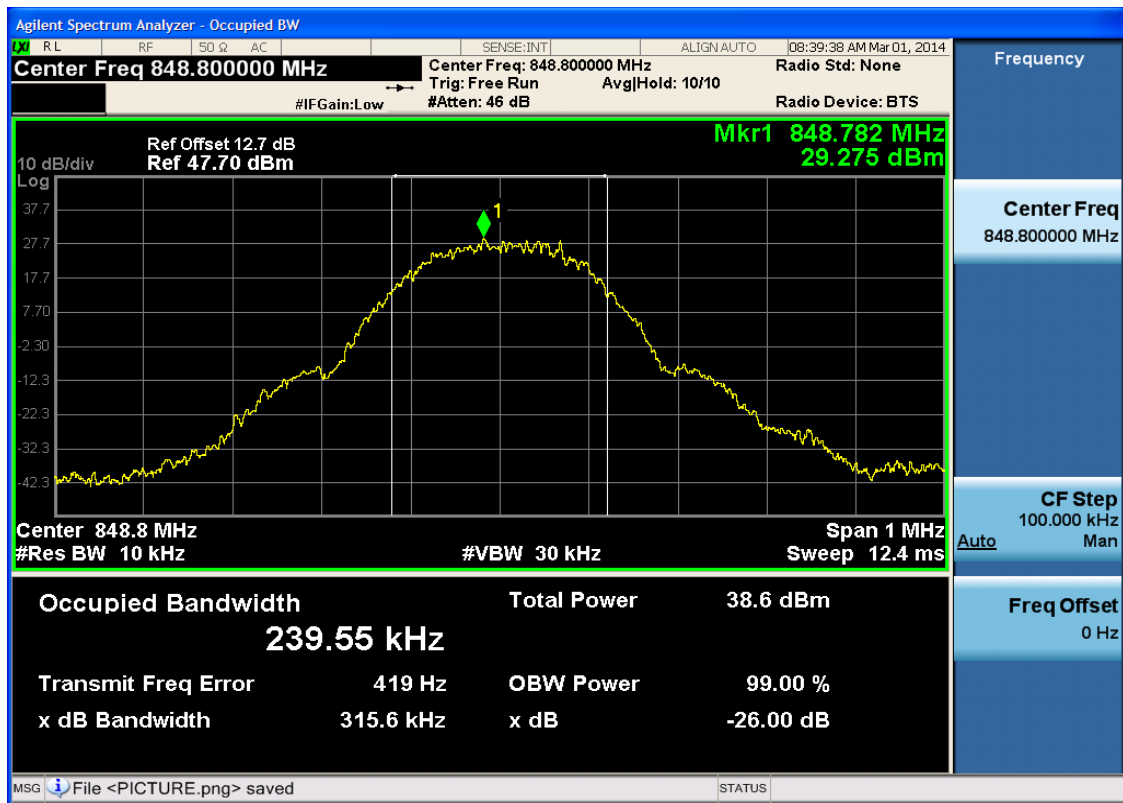


4.1.1.1.2 Test Channel = MCH





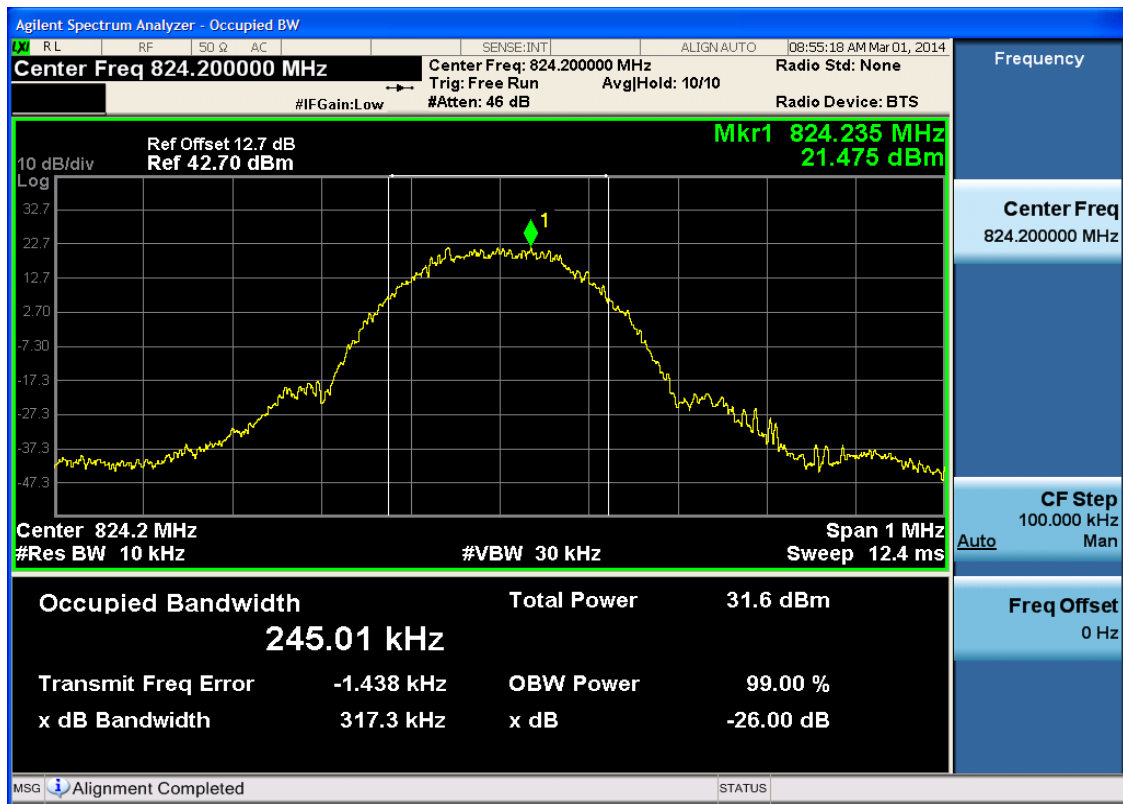
4.1.1.1.3 Test Channel = HCH



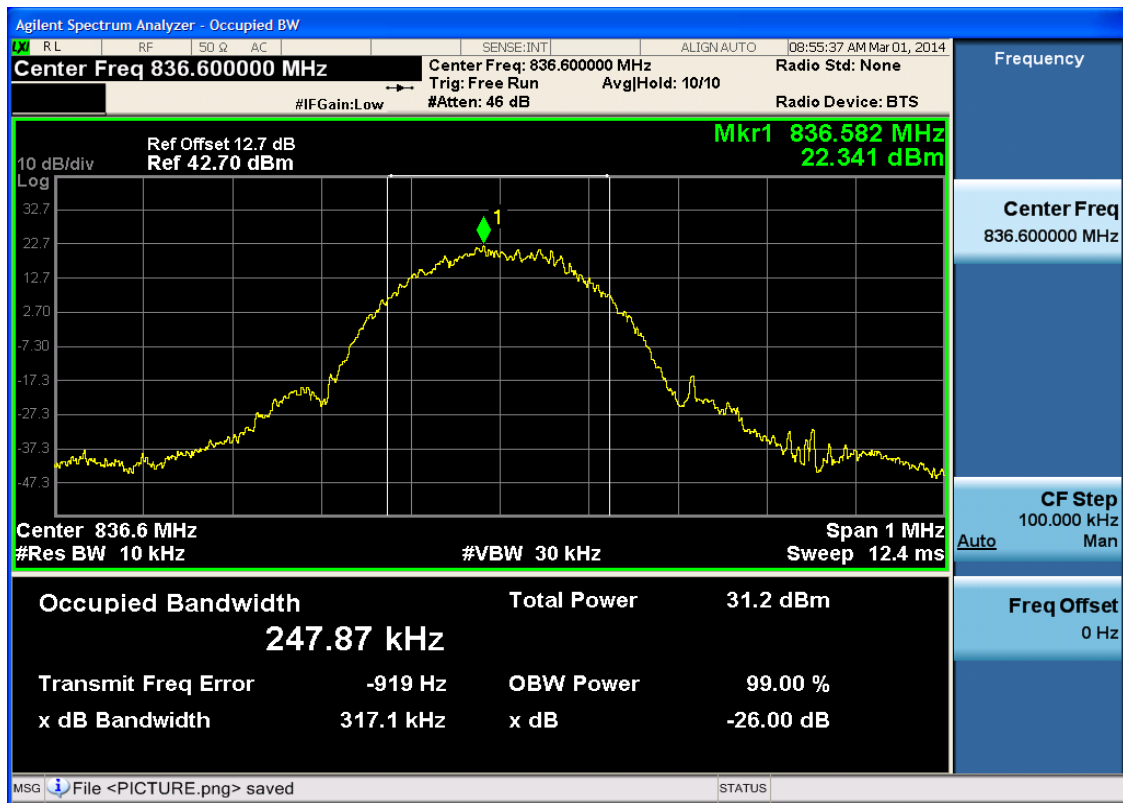


4.1.1.2 Test Mode = GSM/TM2

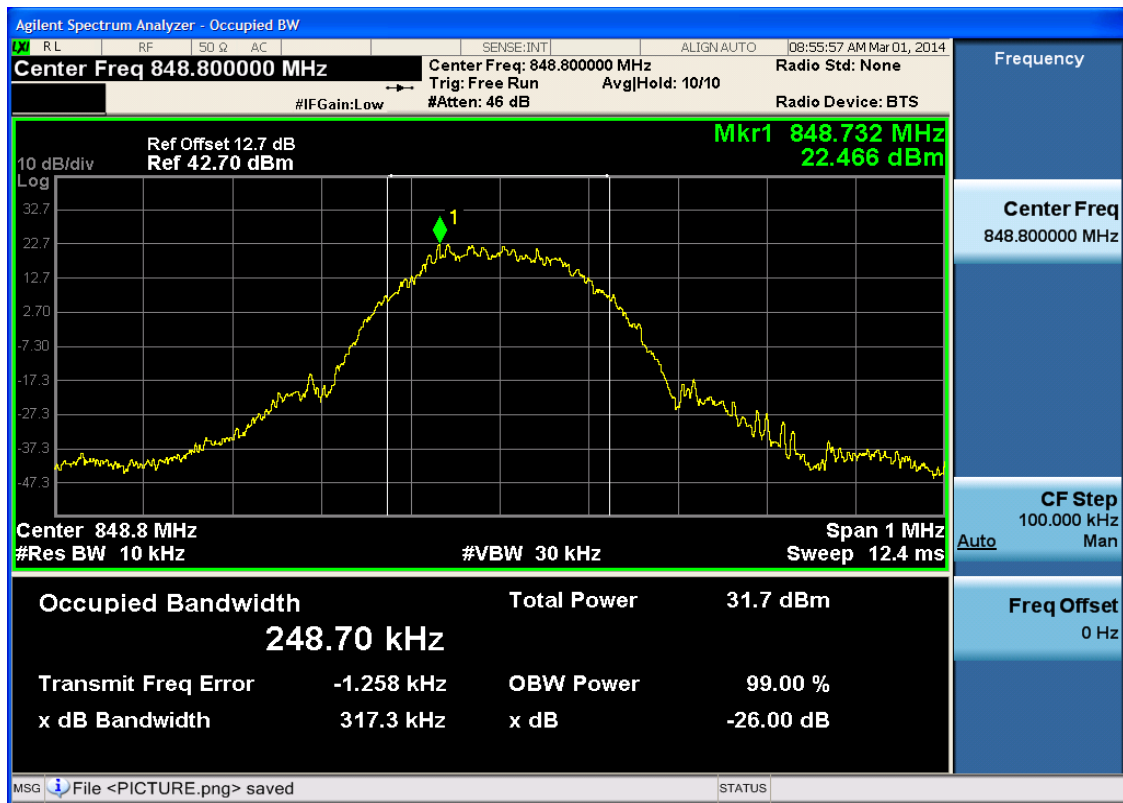
4.1.1.2.1 Test Channel = LCH



4.1.1.2.2 Test Channel = MCH



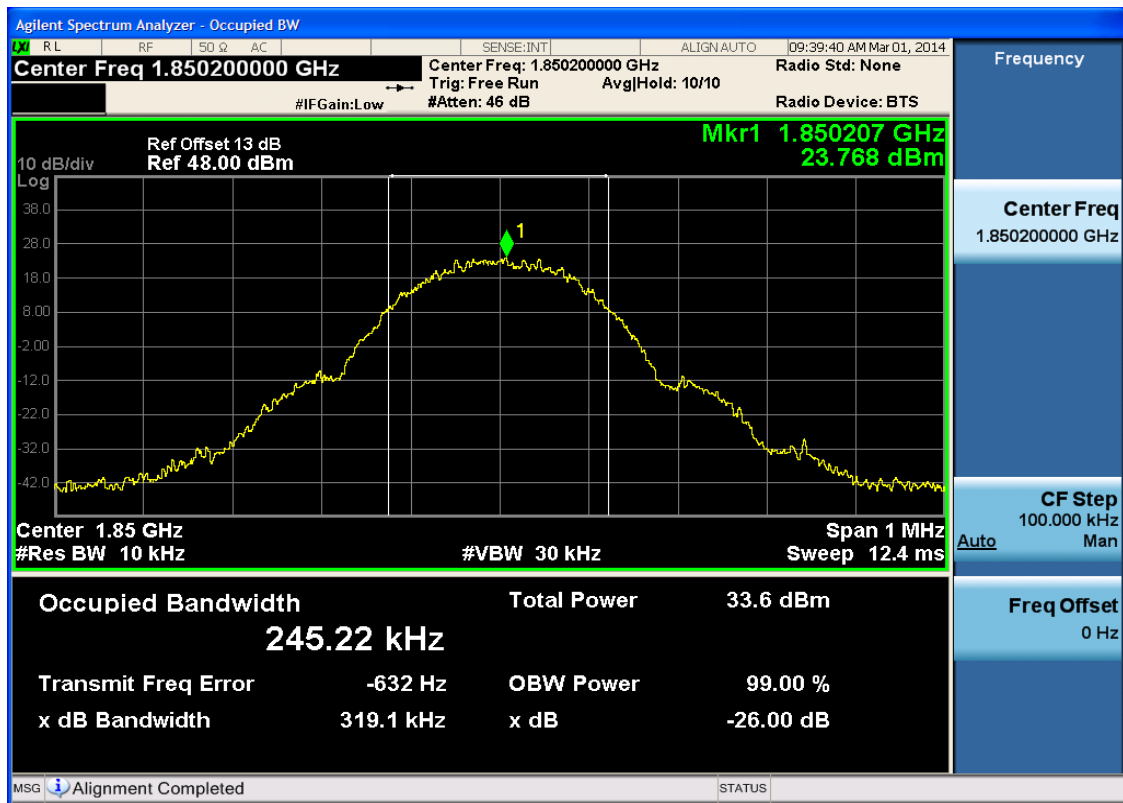
4.1.1.2.3 Test Channel = HCH



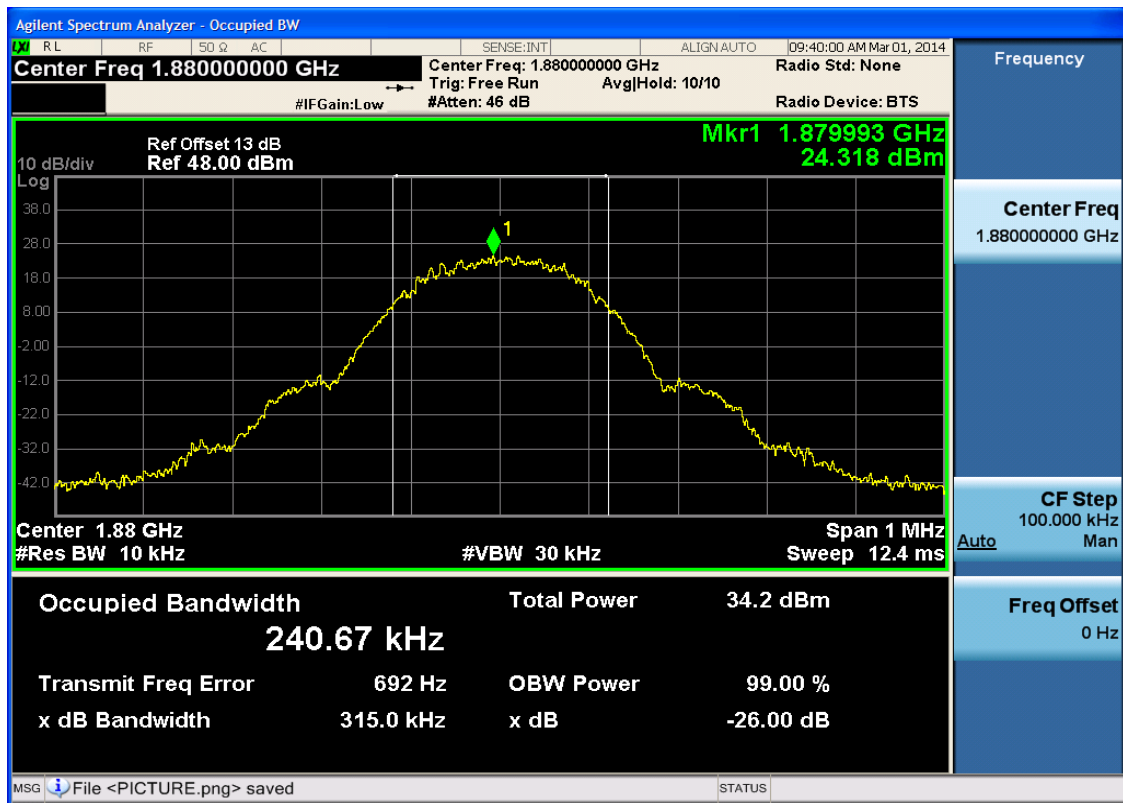
4.1.2 Test Band = GSM1900

4.1.2.1 Test Mode = GSM/TM1

4.1.2.1.1 Test Channel = LCH

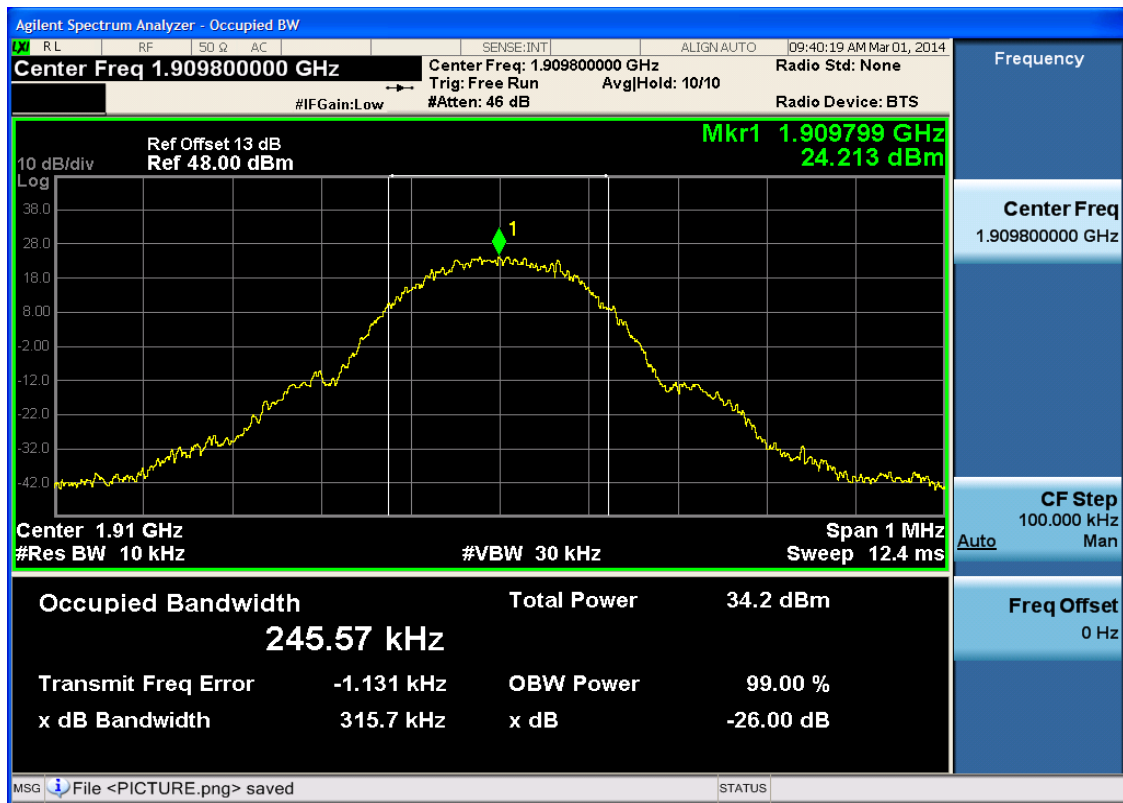


4.1.2.1.2 Test Channel = MCH



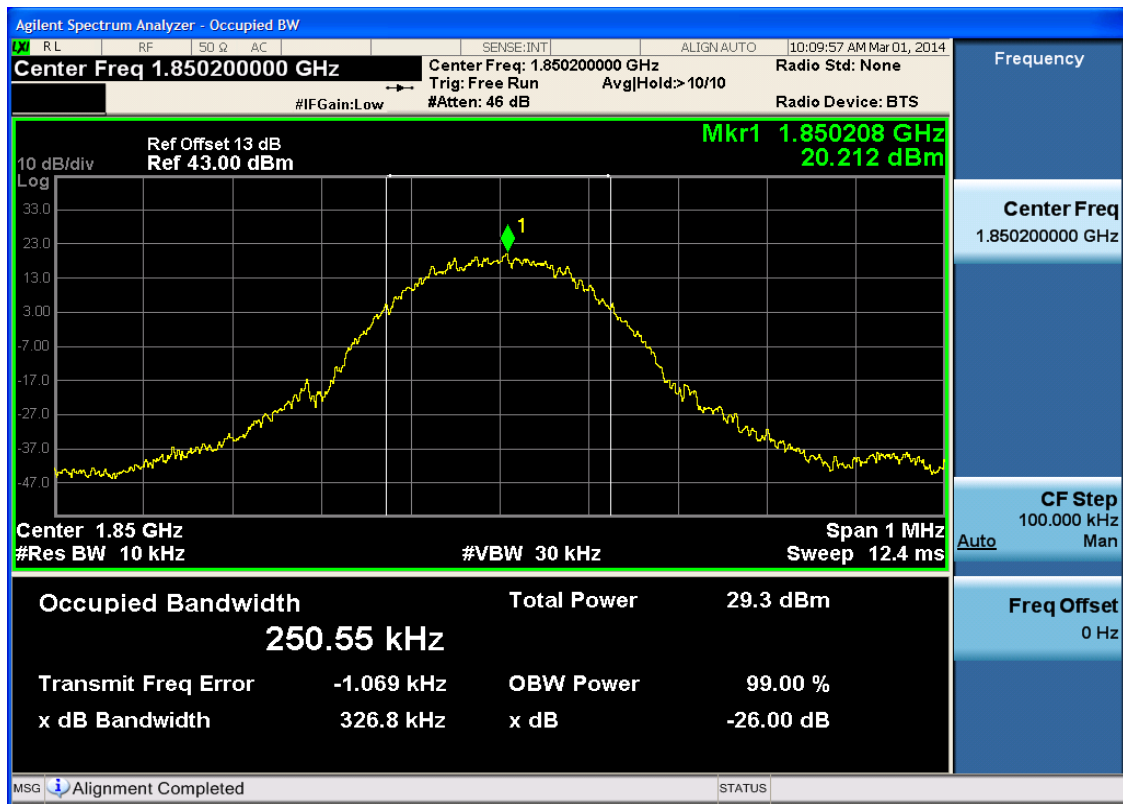


4.1.2.1.3 Test Channel = HCH

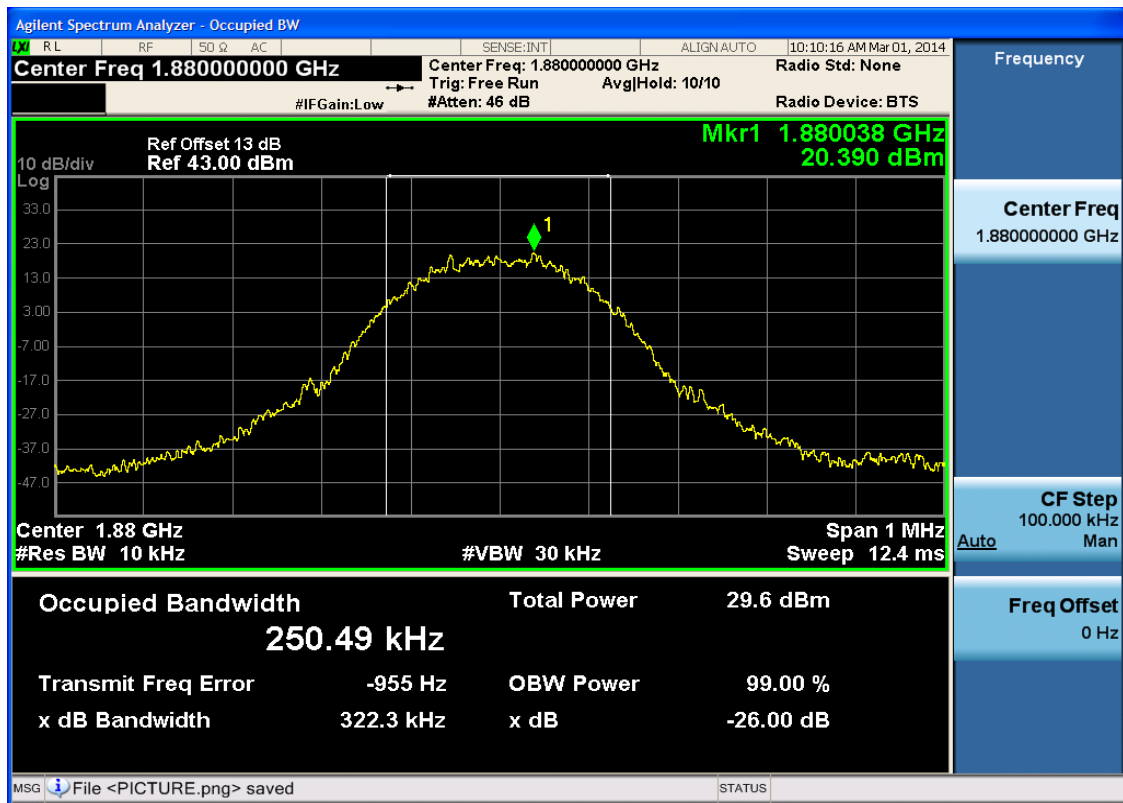


4.1.2.2 Test Mode = GSM/TM2

4.1.2.2.1 Test Channel = LCH

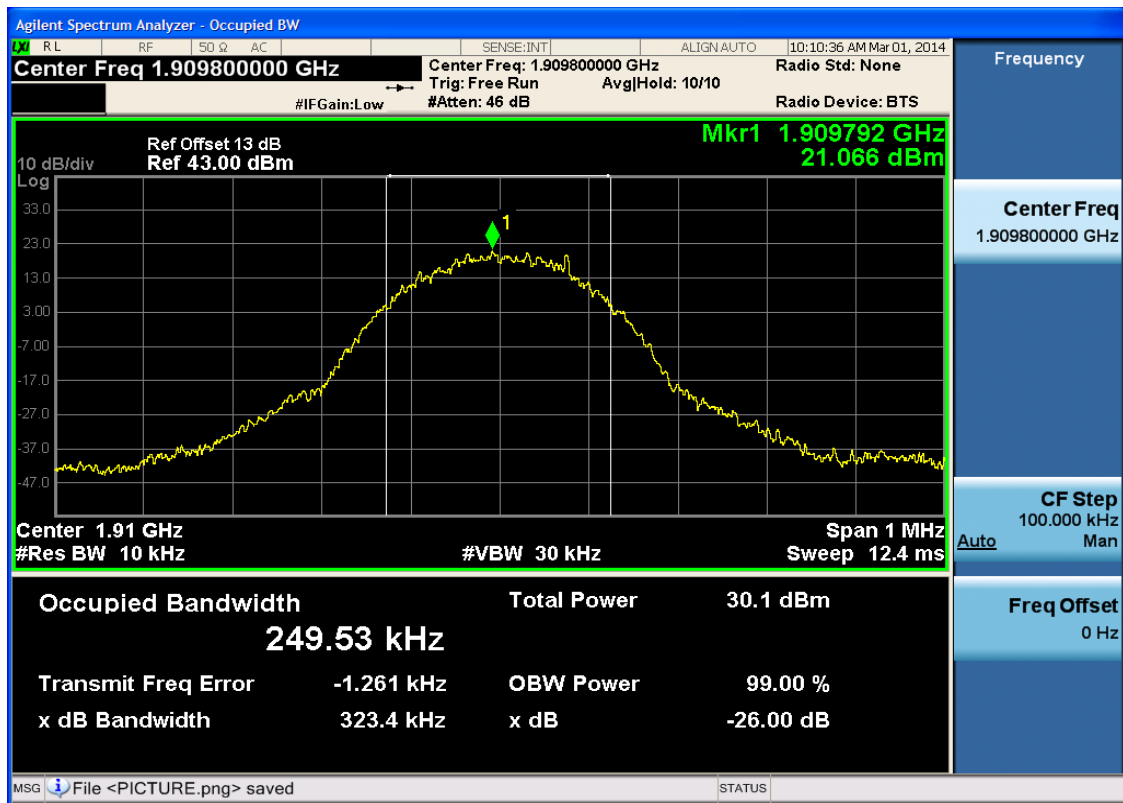


4.1.2.2.2 Test Channel = MCH





4.1.2.2.3 Test Channel = HCH

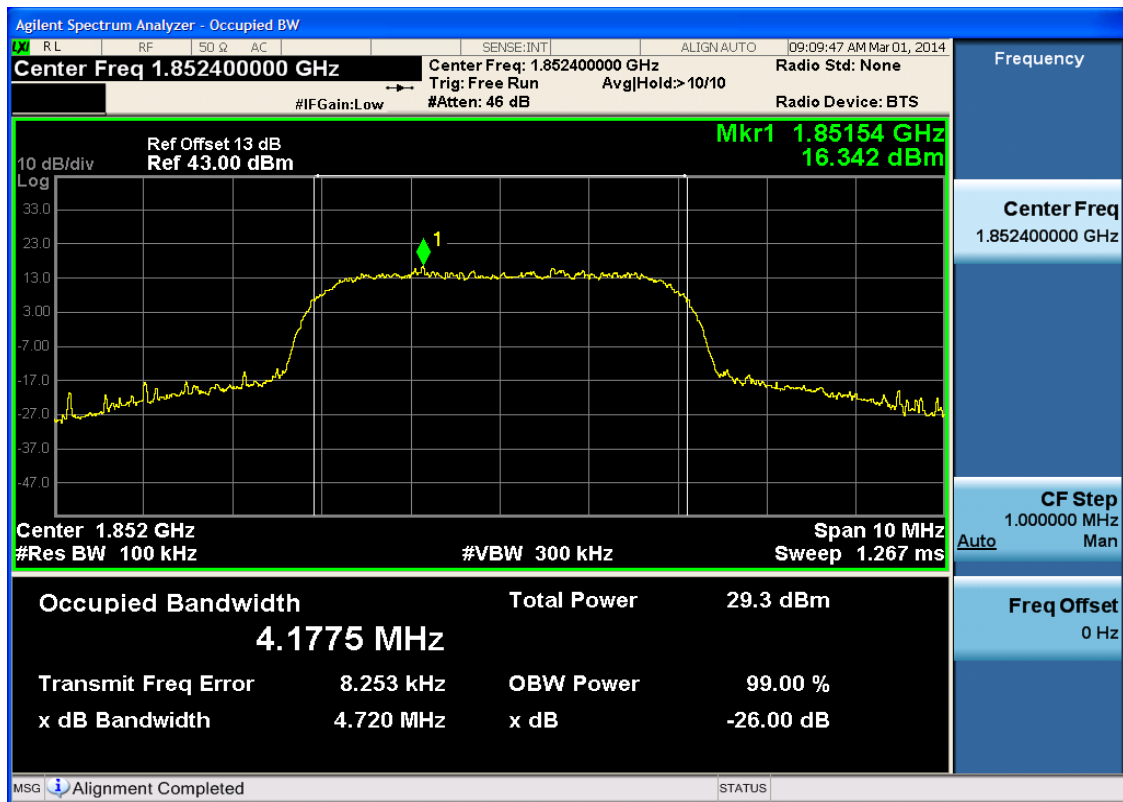


4.2 For UMTS

4.2.1 Test Band = WCDMA1900

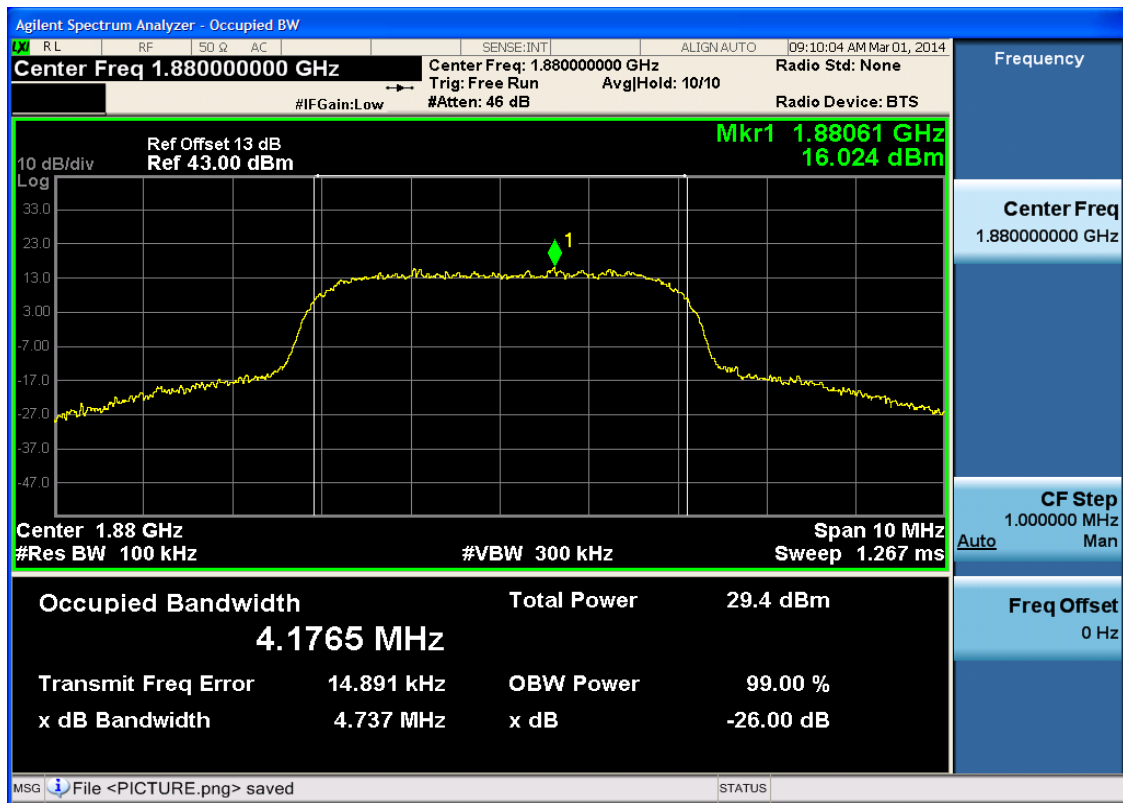
4.2.1.1 Test Mode = UMTS/TM1

4.2.1.1.1 Test Channel = LCH



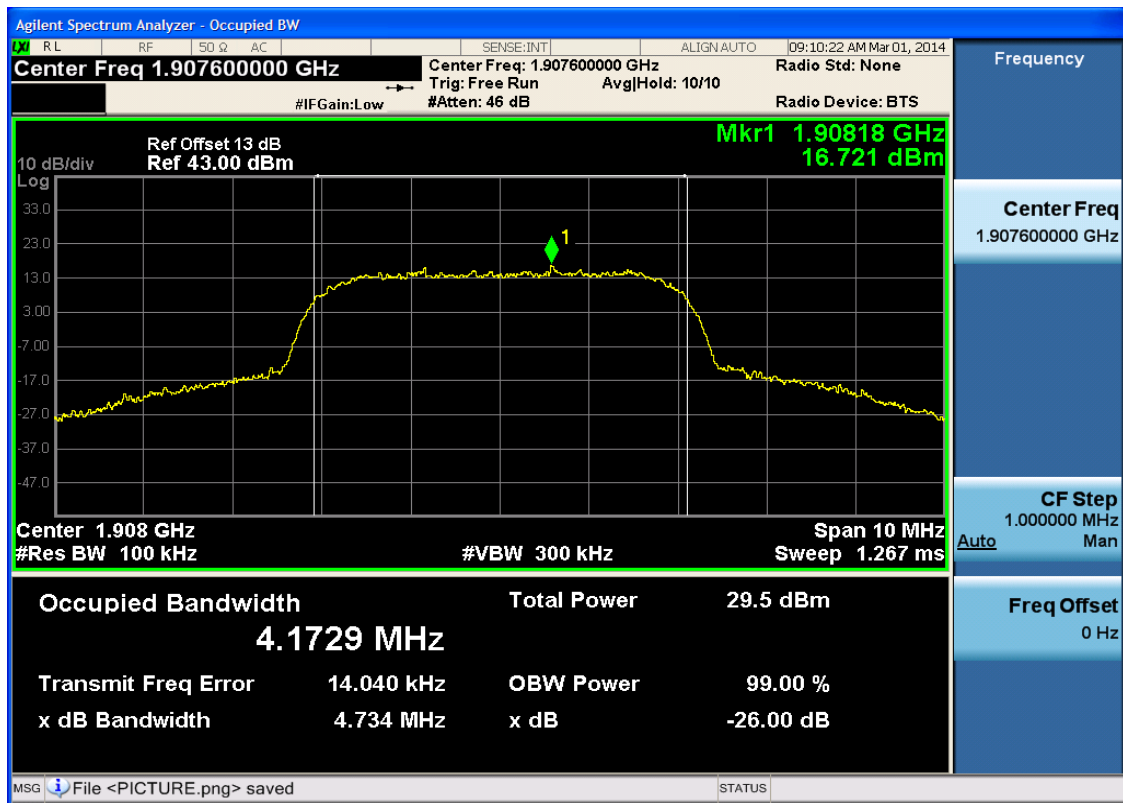


4.2.1.1.2 Test Channel = MCH





4.2.1.1.3 Test Channel = HCH



5Appendix_E: Band Edges Compliance

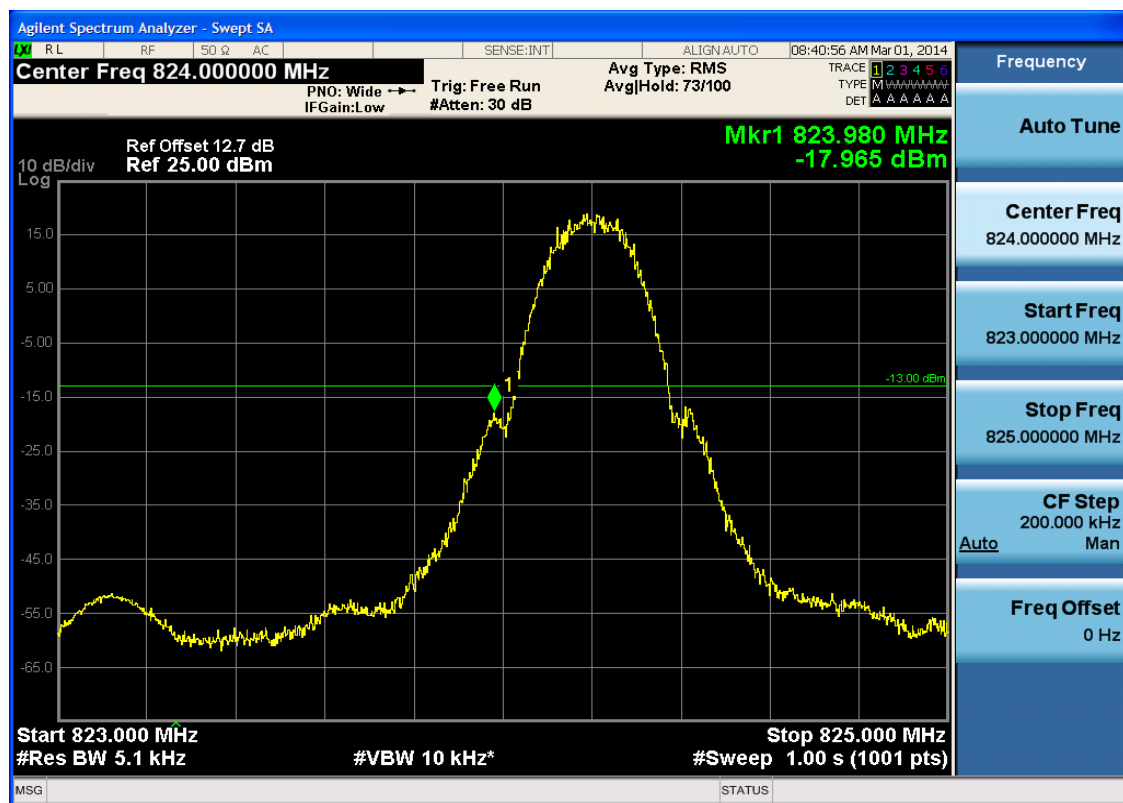
Part I - Test Plots

5.1 For GSM

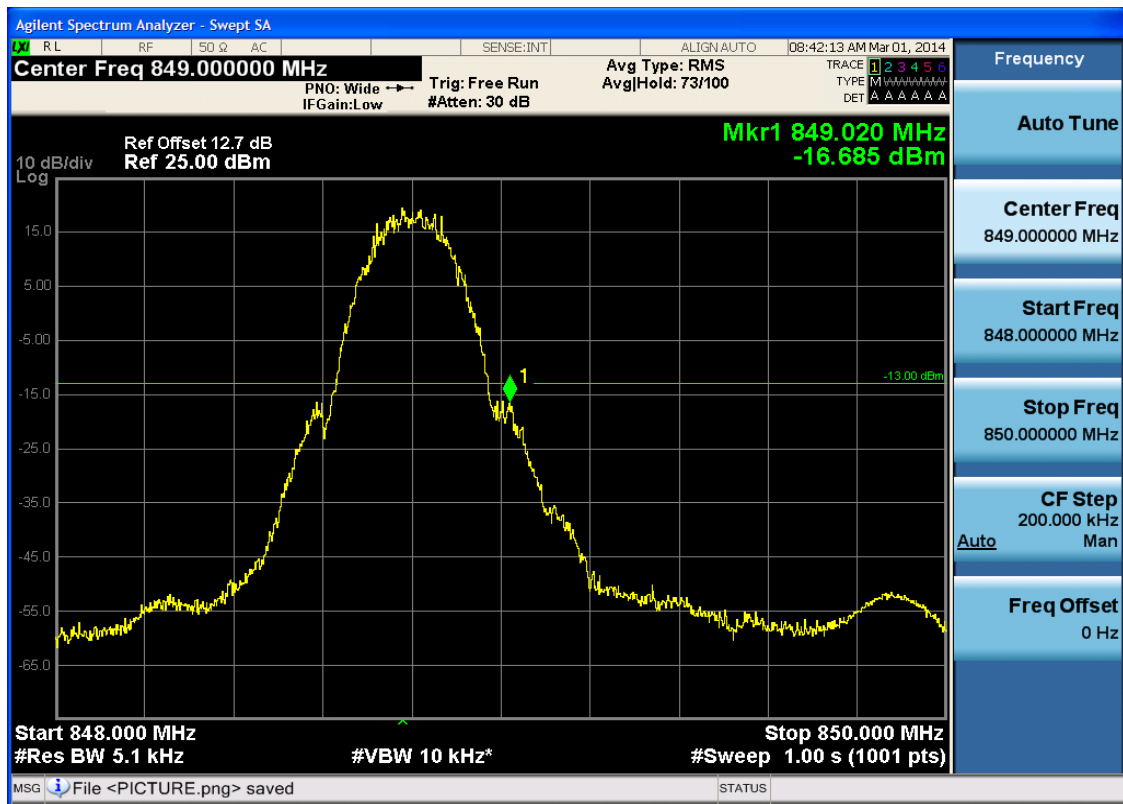
5.1.1 Test Band = GSM850

5.1.1.1 Test Mode = GSM/TM1

5.1.1.1.1 Test Channel = LCH

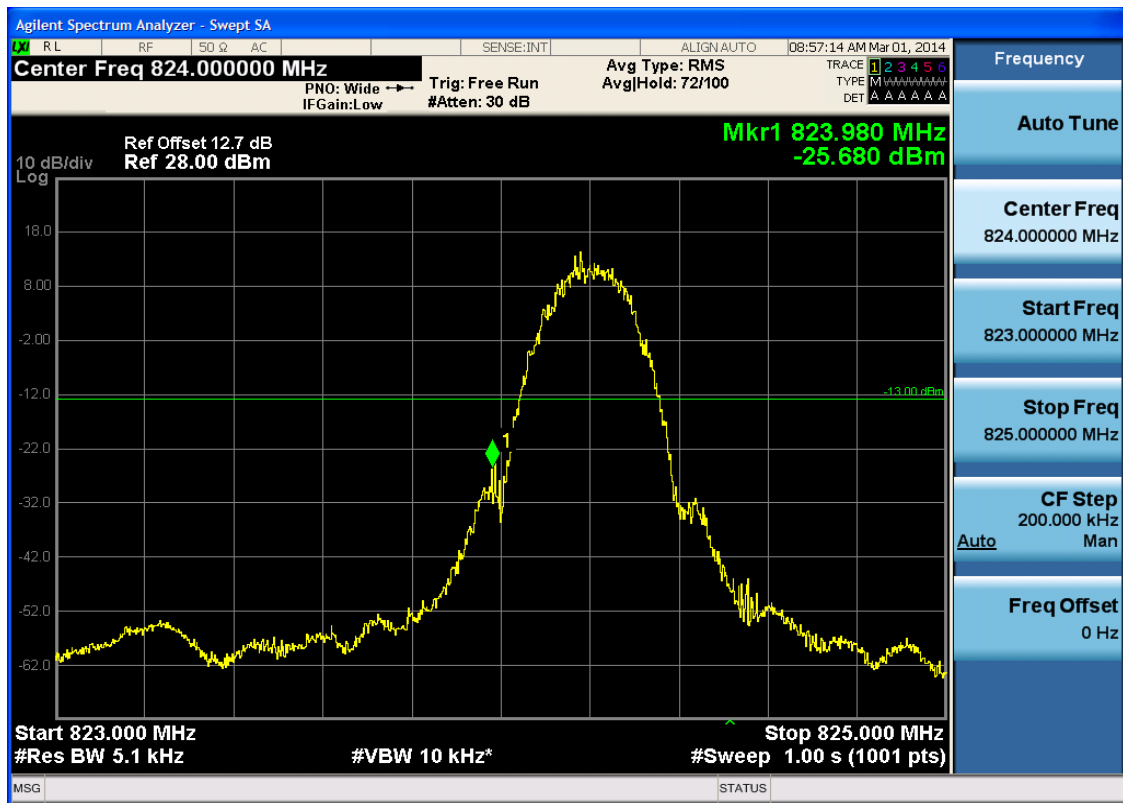


5.1.1.1.2 Test Channel = HCH

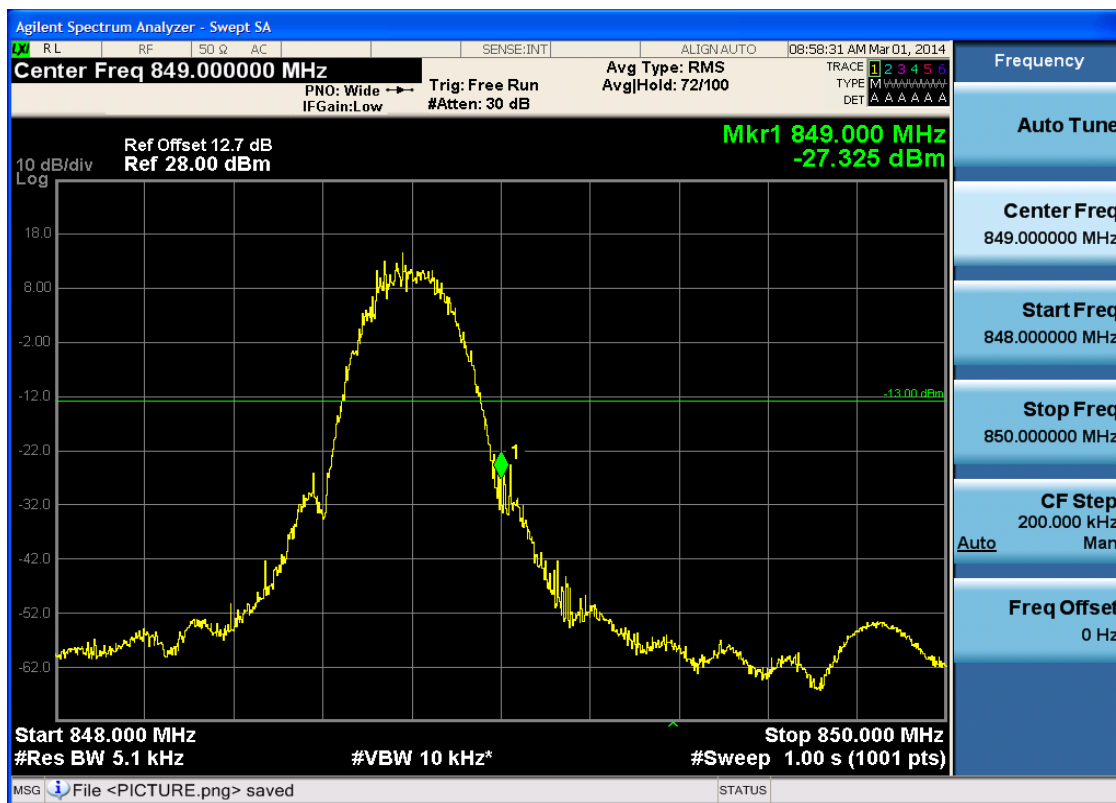


5.1.1.2 Test Mode = GSM/TM2

5.1.1.2.1 Test Channel = LCH



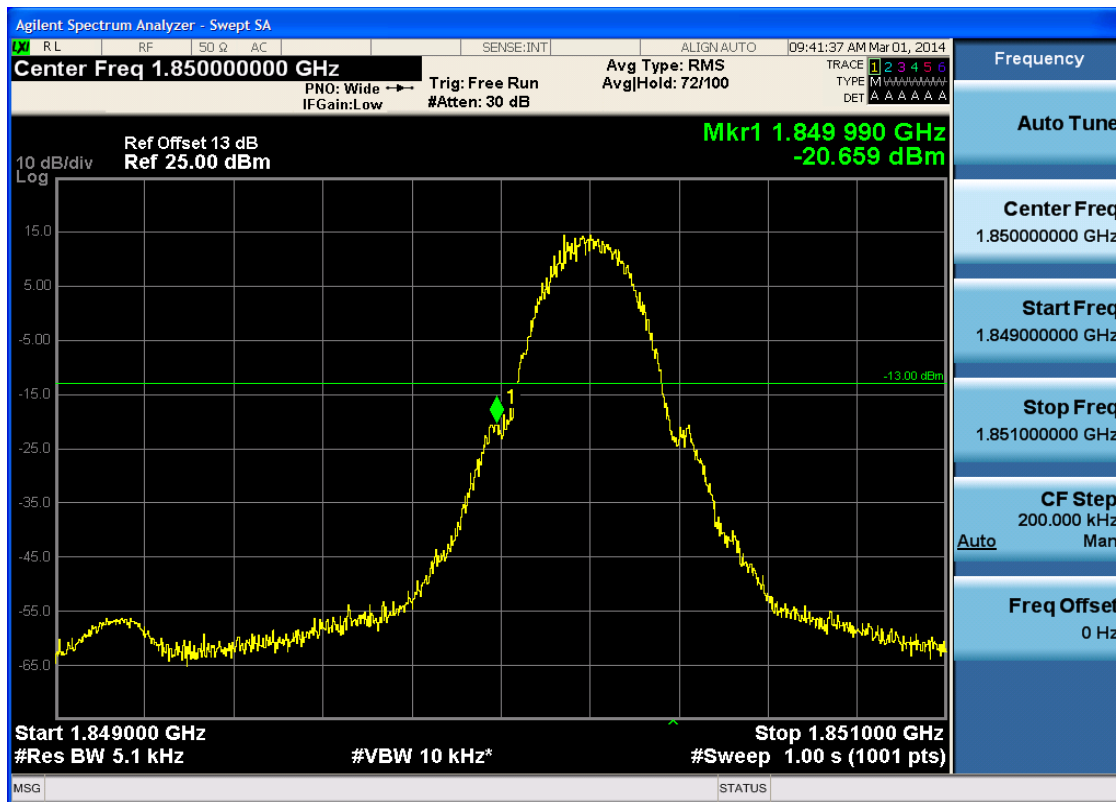
5.1.1.2.2 Test Channel = HCH



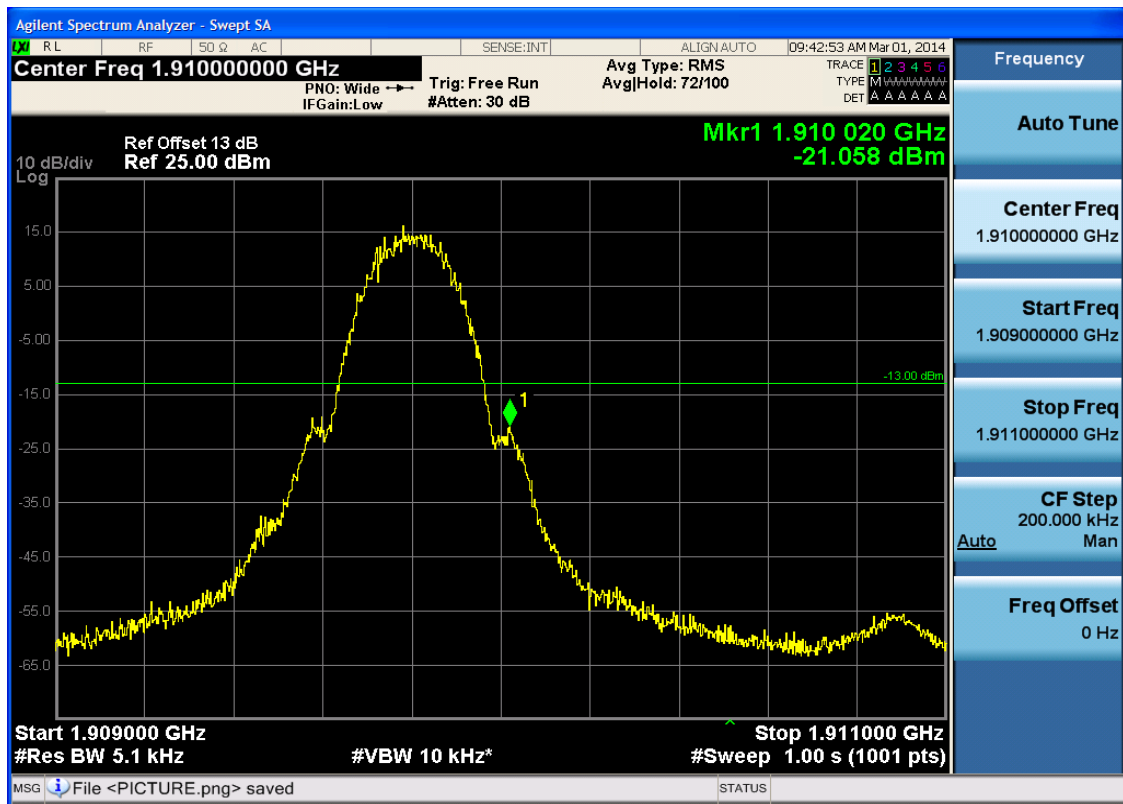
5.1.2 Test Band = GSM1900

5.1.2.1 Test Mode = GSM/TM1

5.1.2.1.1 Test Channel = LCH

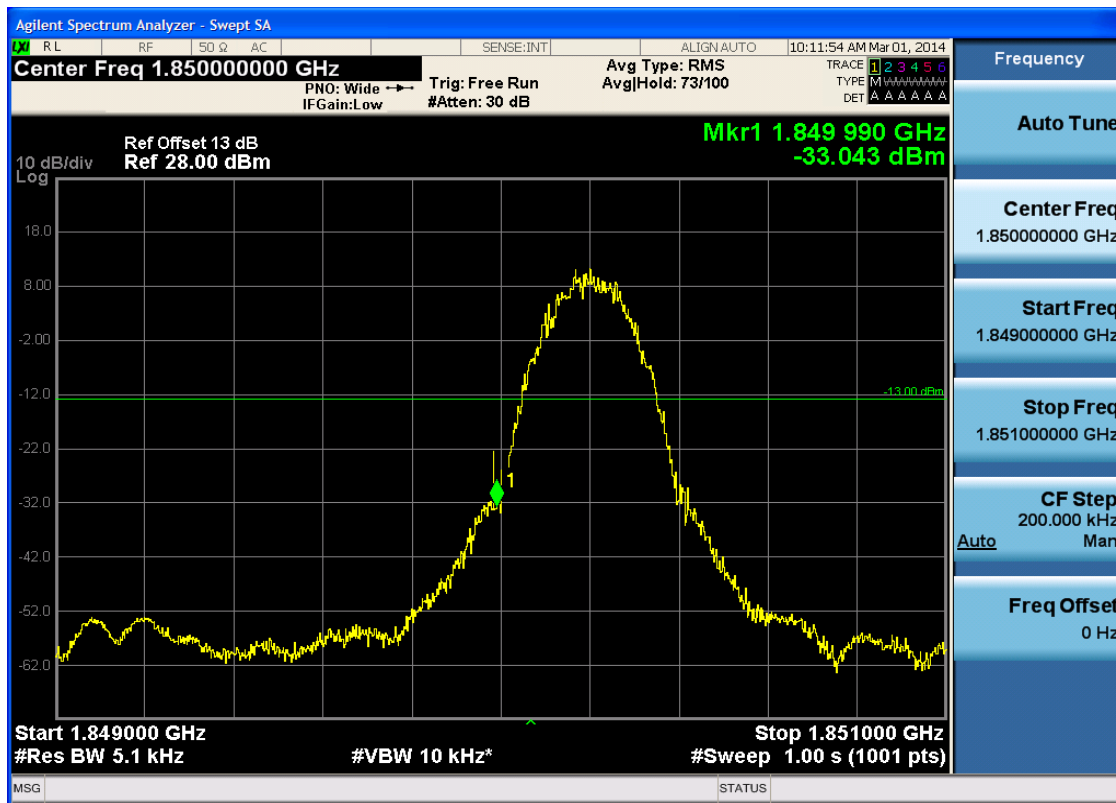


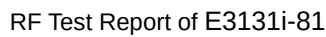
5.1.2.1.2 Test Channel = HCH



5.1.2.2 Test Mode = GSM/TM2

5.1.2.2.1 Test Channel = LCH





Agilent Spectrum Analyzer - Swept SA

RL RF 50 Ω AC SENSE:INT ALIGN: AUTO 10:13:12 AM Mar 01, 2014

Center Freq 1.91000000 GHz PNO: Wide Trig: Free Run Avg Type: RMS
IFGain: Low #Atten: 30 dB AvgHold: 73/100

TRACE 1 2 3 4 5 6
TYPE M H L L L L L L L L
DET A A A A A A A A

Ref Offset 13 dB
Ref 28.00 dBm

Mkr1 1.910 010 GHz
-24.839 dBm

10 dB/div
Log

18.0
8.00
-2.00
-12.0
-22.0
-32.0
-42.0
-52.0
-62.0

1.909000 GHz 1.910000 GHz

Start 1.909000 GHz Stop 1.911000 GHz
#Res BW 5.1 kHz #VBW 10 kHz*
#Sweep 1.00 s (1001 pts)

MSG File <PICTURE.png> saved STATUS

Frequency

Auto Tune

Center Freq
1.91000000 GHz

Start Freq
1.90900000 GHz

Stop Freq
1.91100000 GHz

CF Step
200.000 kHz
Man

Auto

Freq Offset
0 Hz

5.2 For UMTS

5.2.1 Test Band = WCDMA1900

5.2.1.1 Test Mode = UMTS/TM1

5.2.1.1.1 Test Channel = LCH



5.2.1.1.2 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.

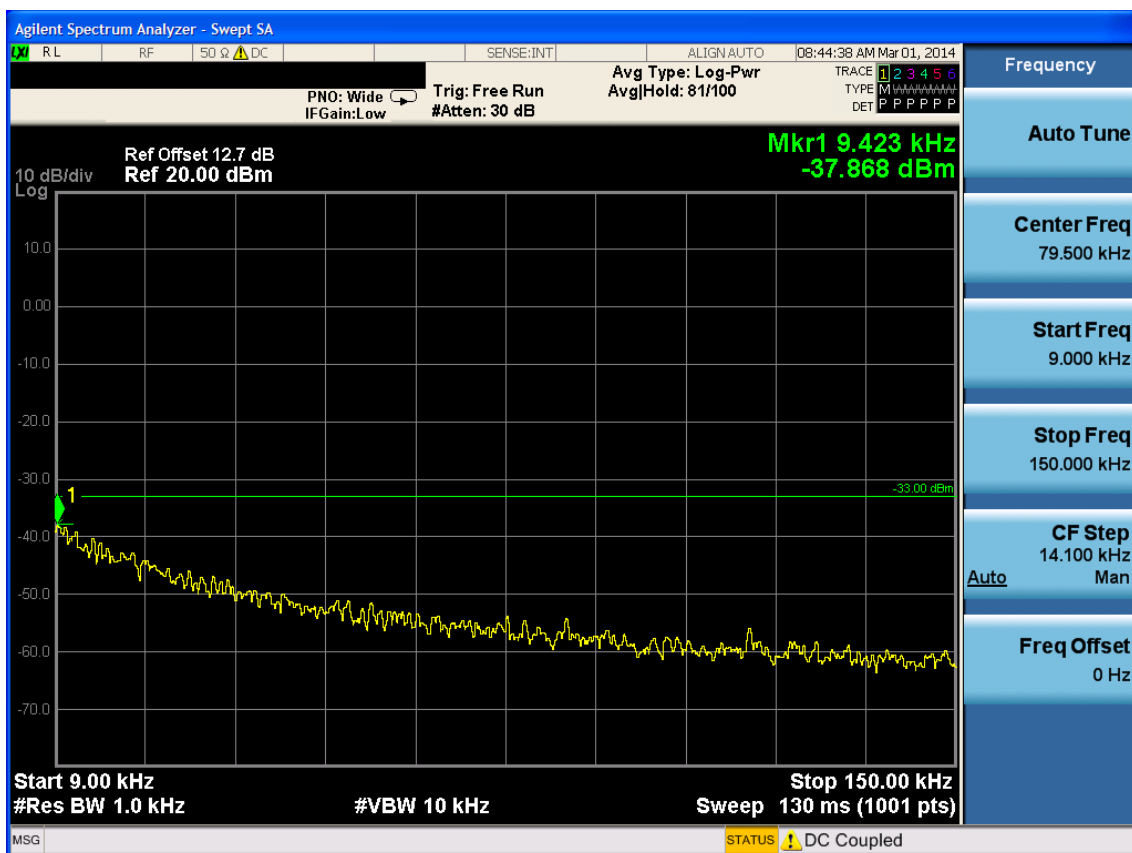
Part I - Test Plots

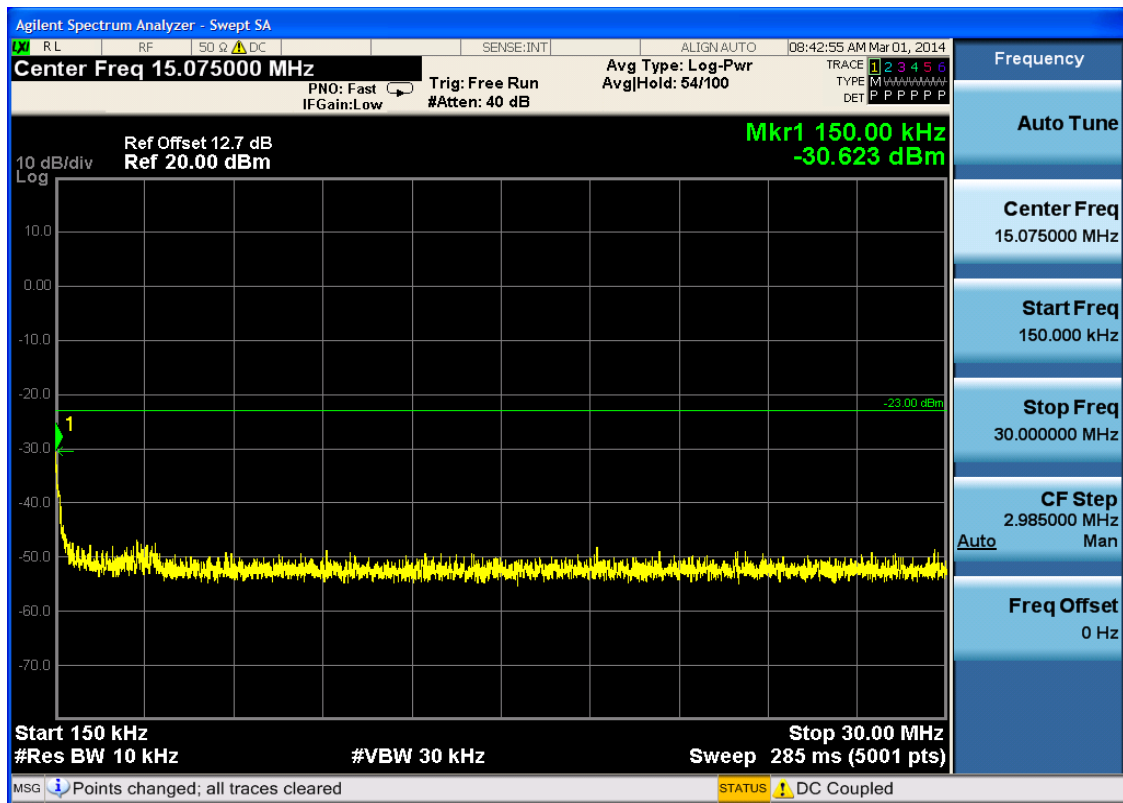
6.1 For GSM

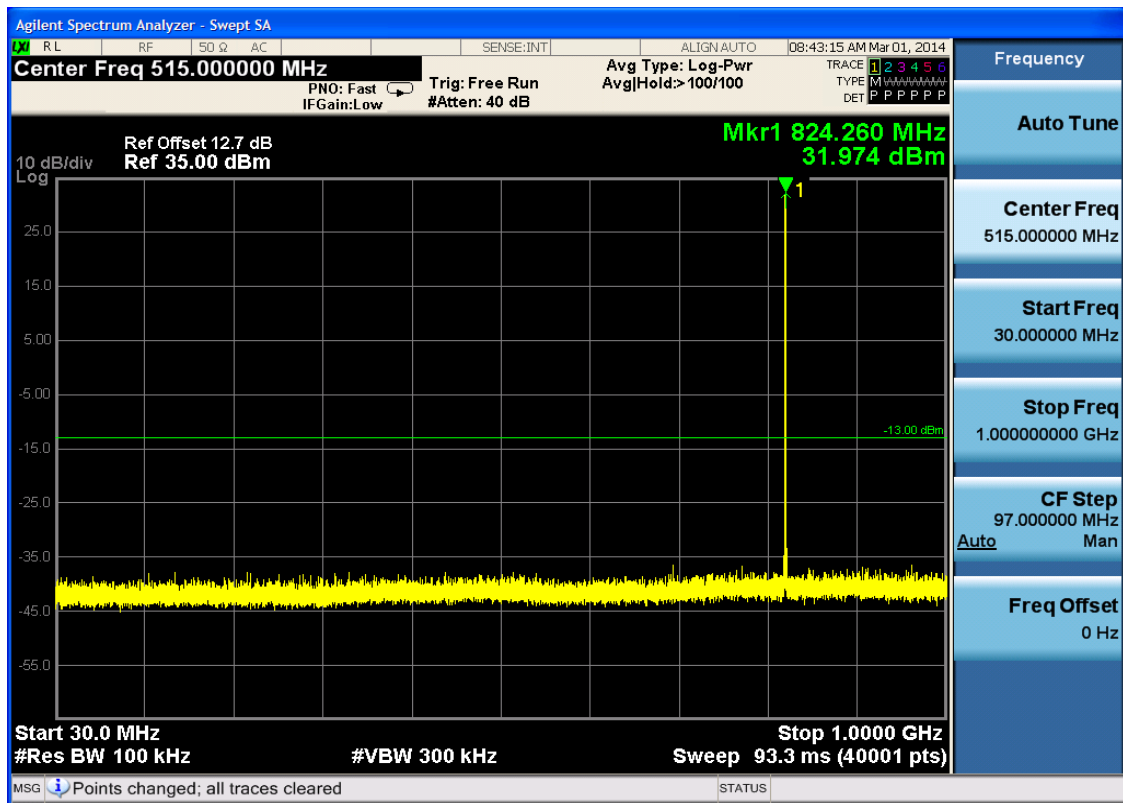
6.1.1 Test Band = GSM850

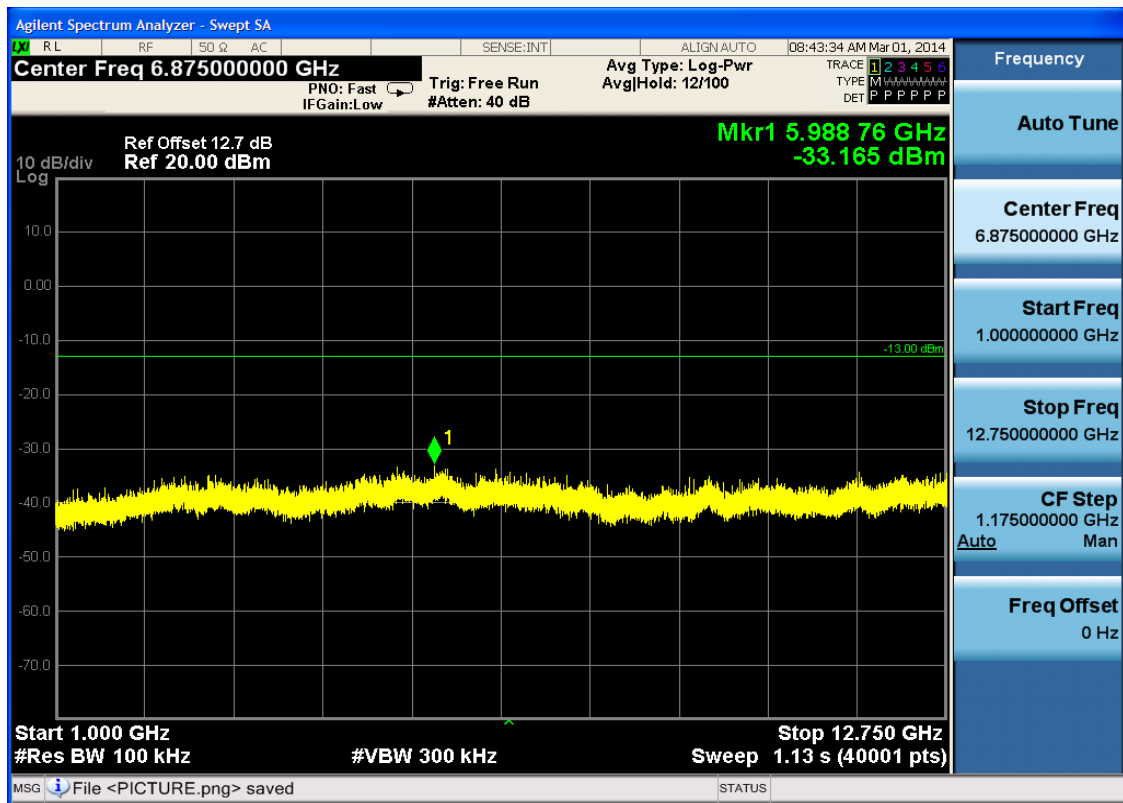
6.1.1.1 Test Mode = GSM/TM1

6.1.1.1.1 Test Channel = LCH



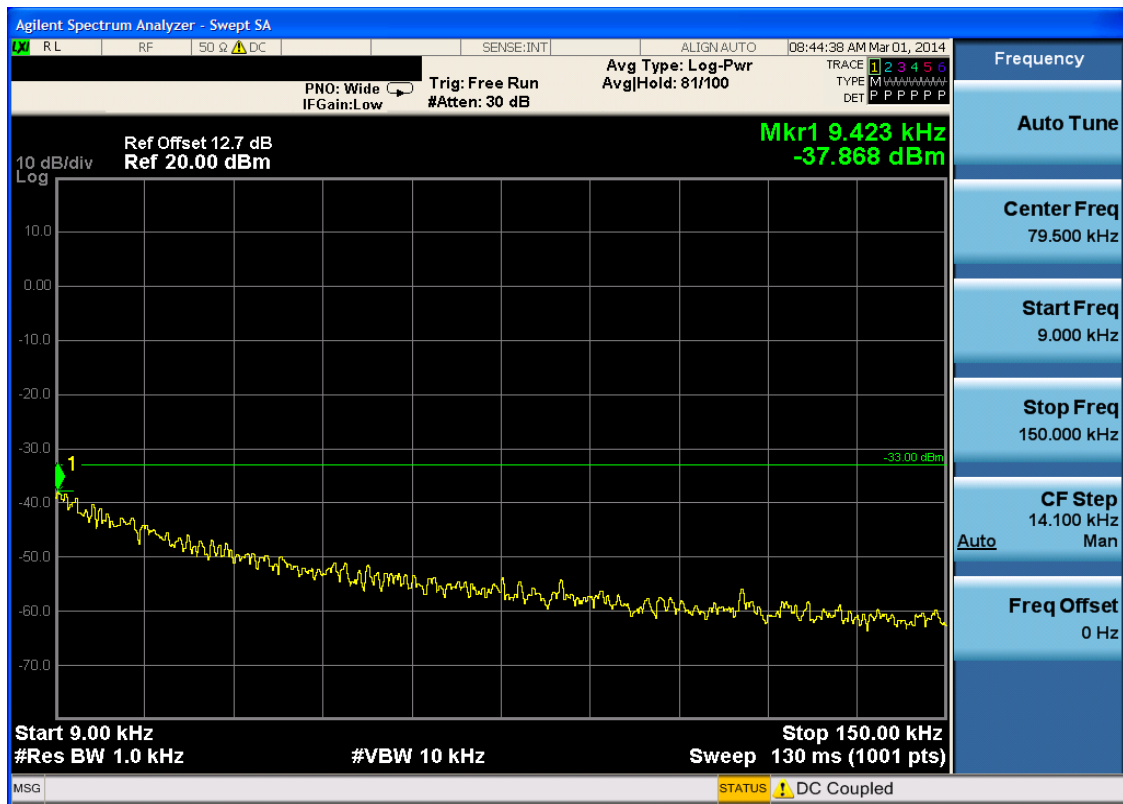


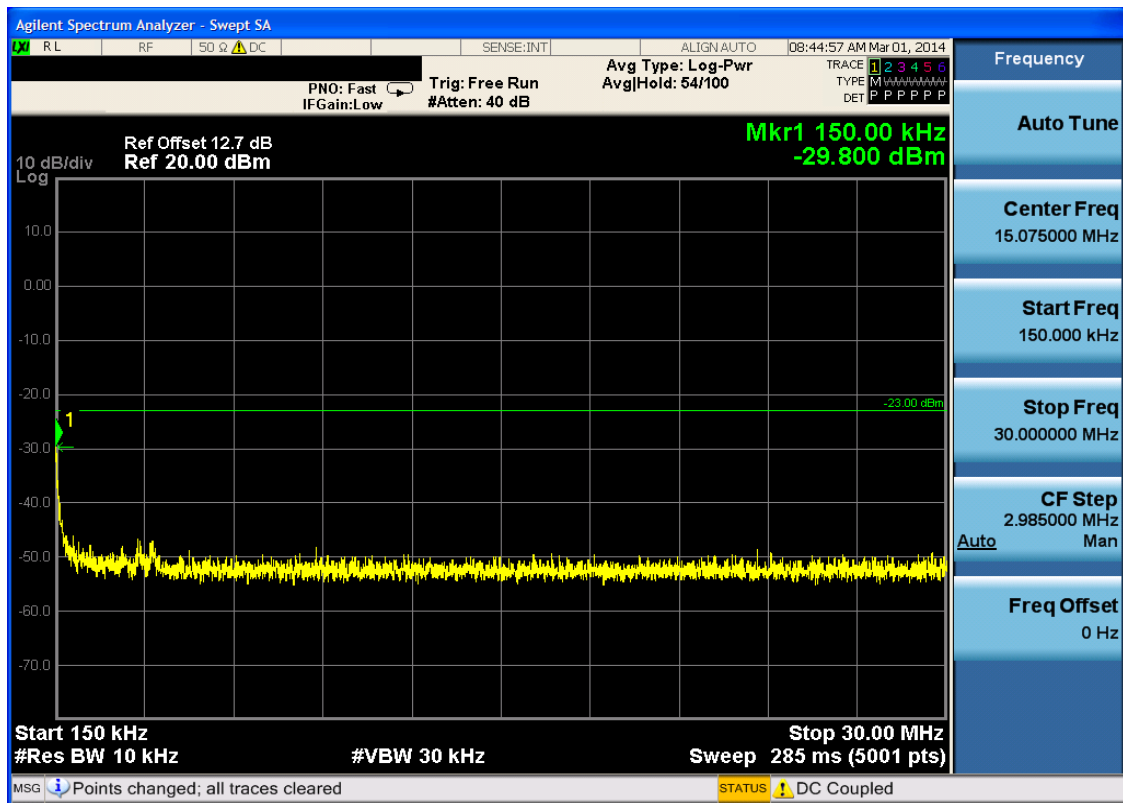


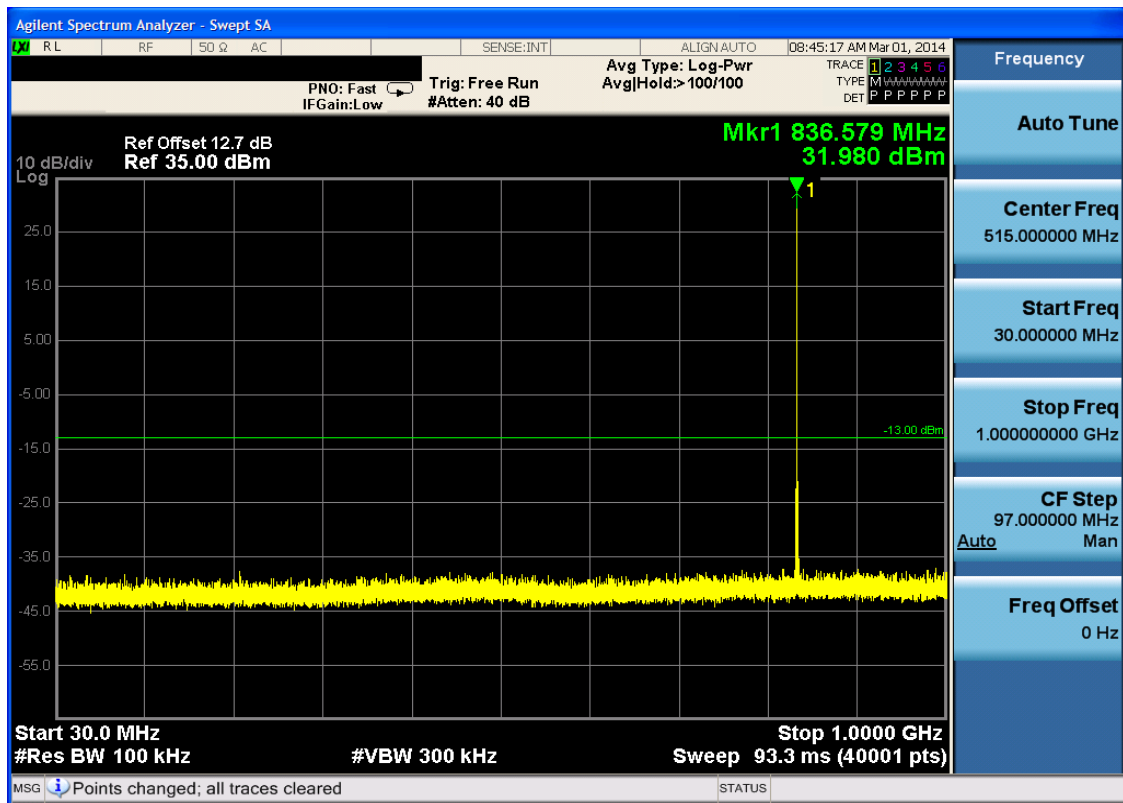


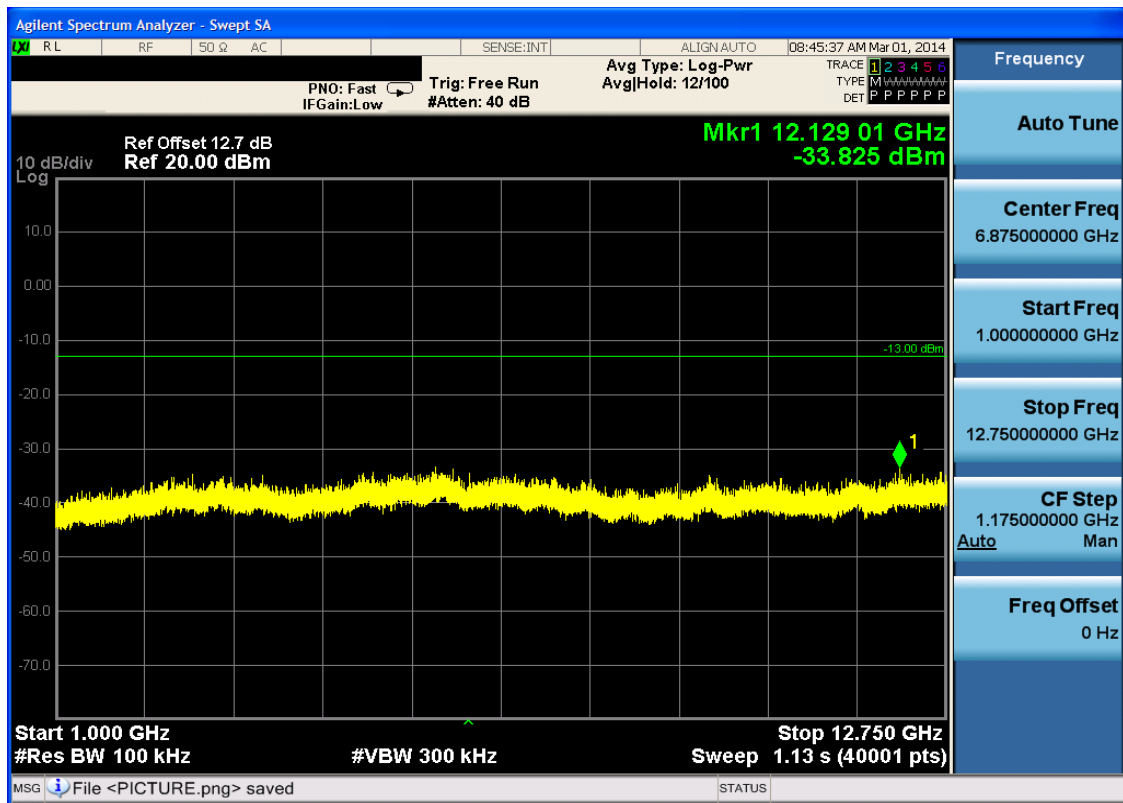


6.1.1.1.2 Test Channel = MCH

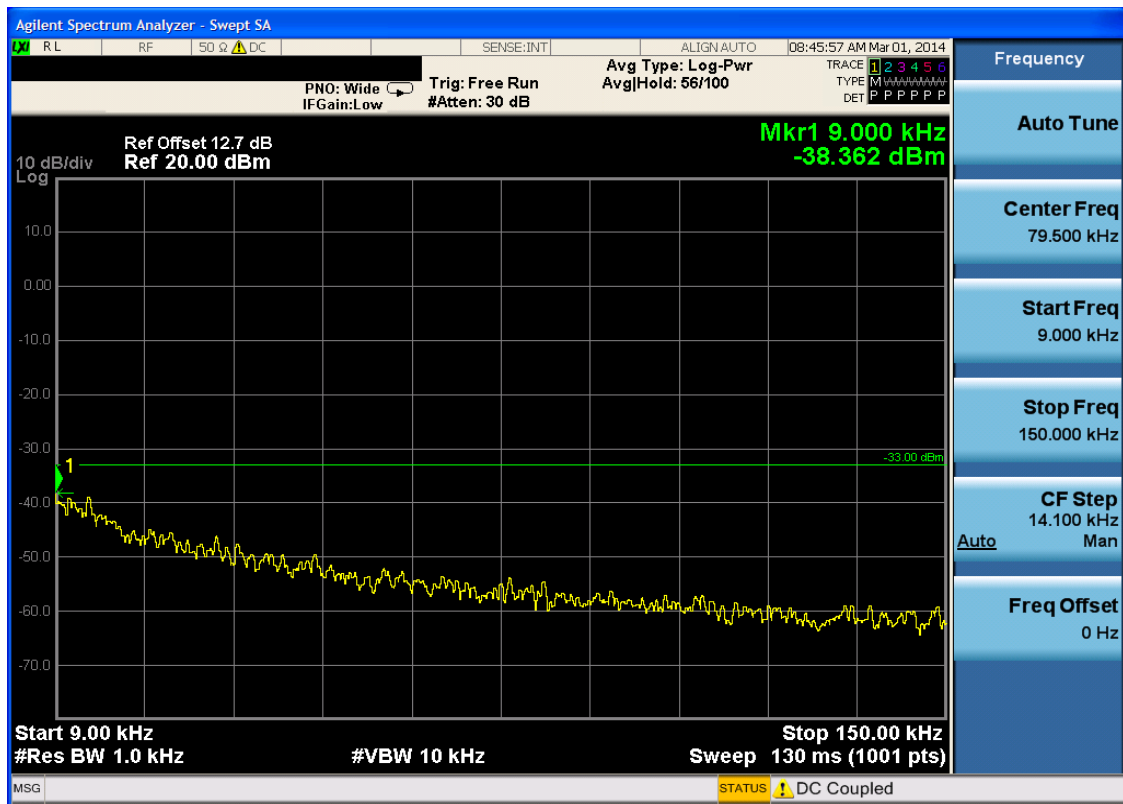


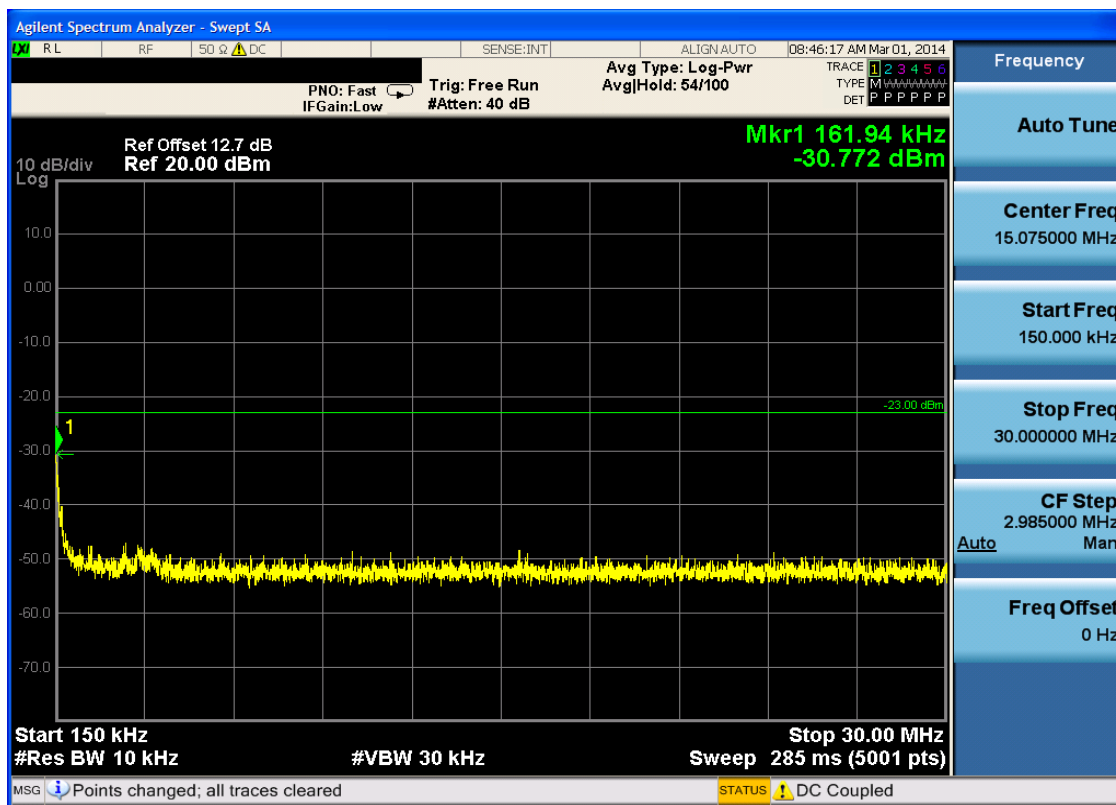


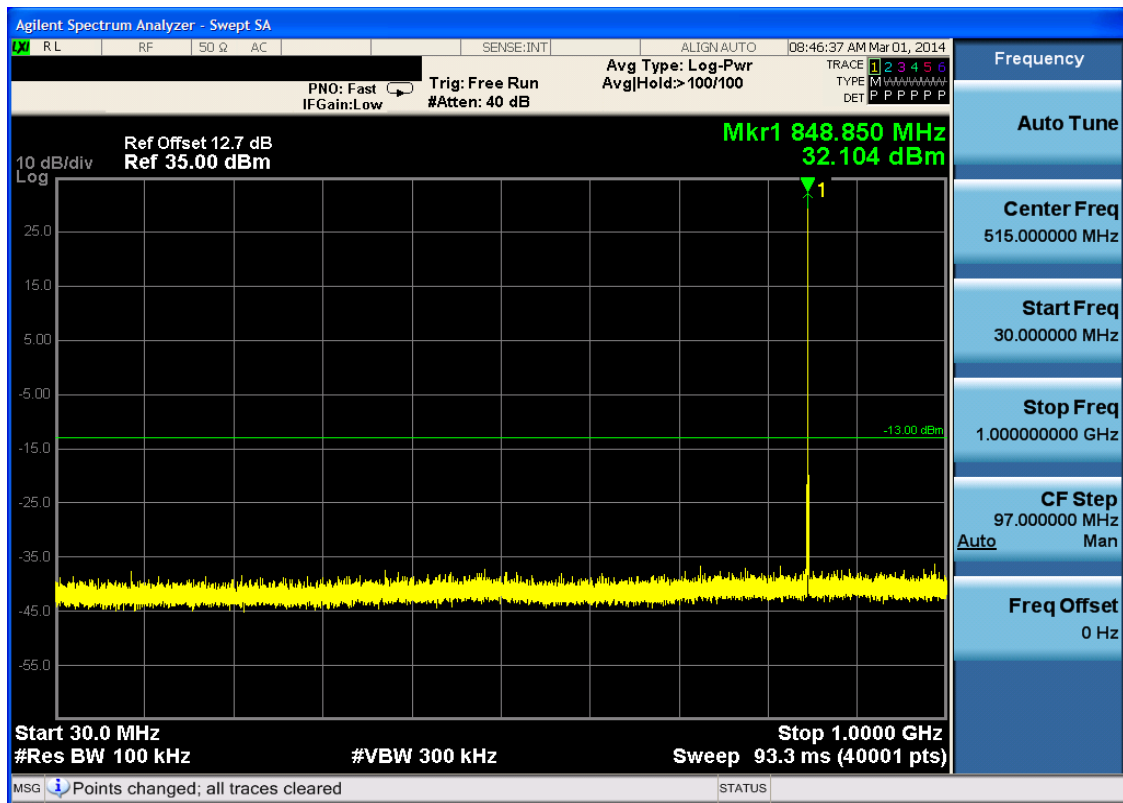


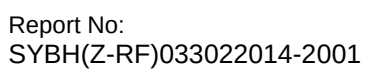
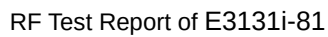


6.1.1.1.3 Test Channel = HCH



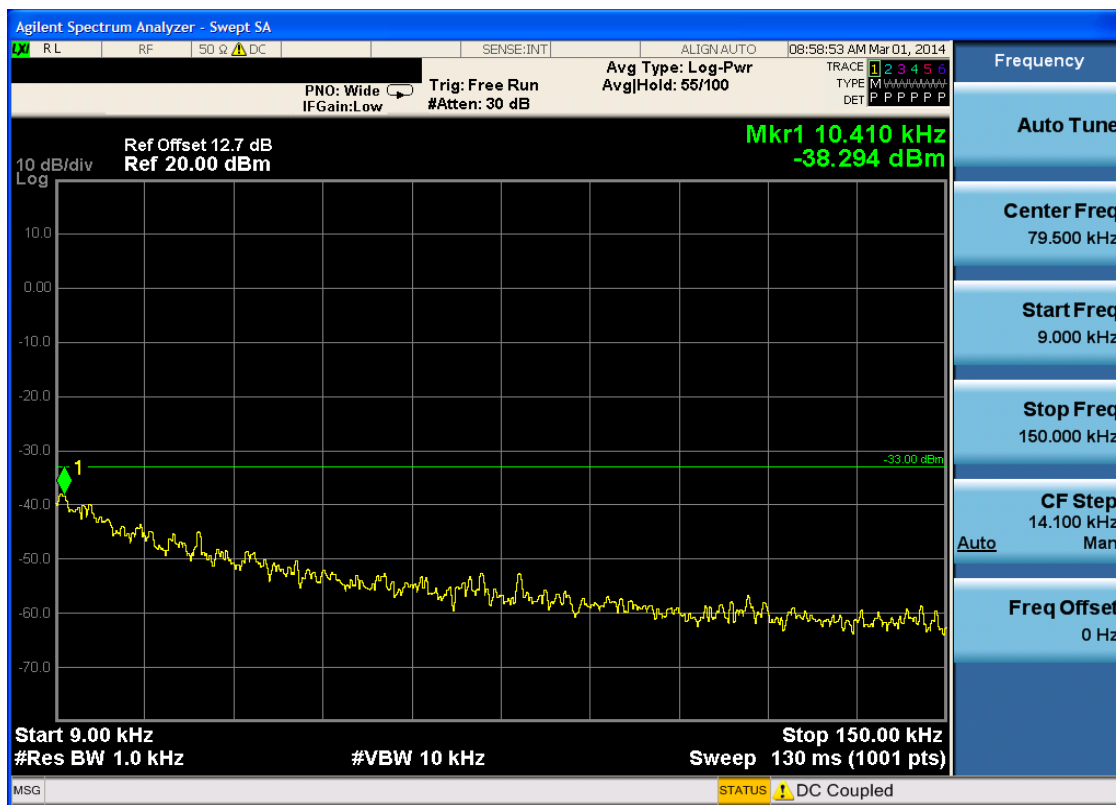


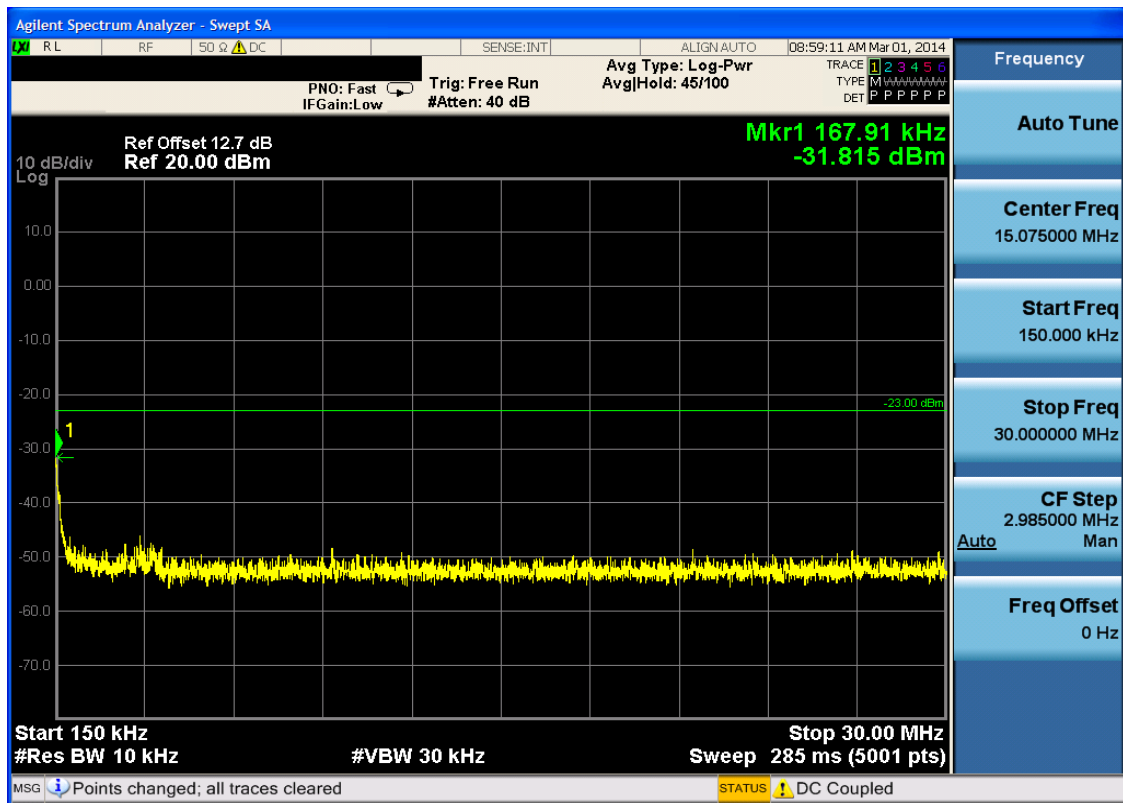


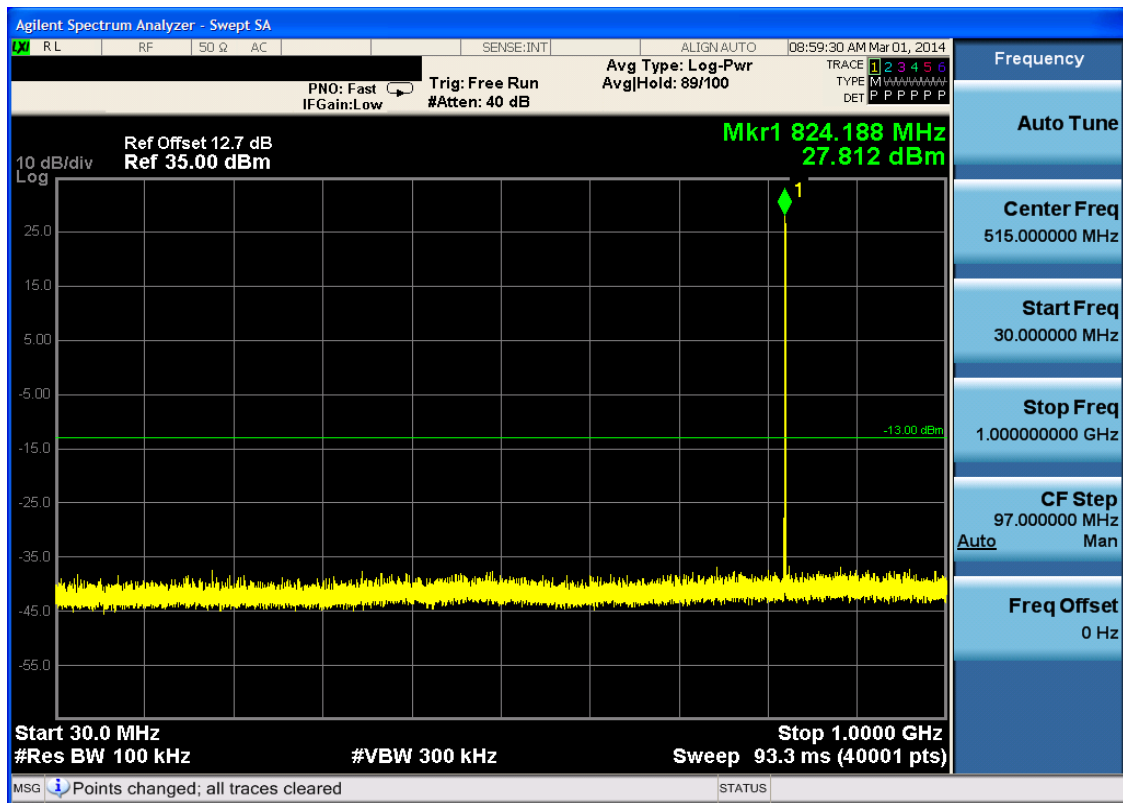


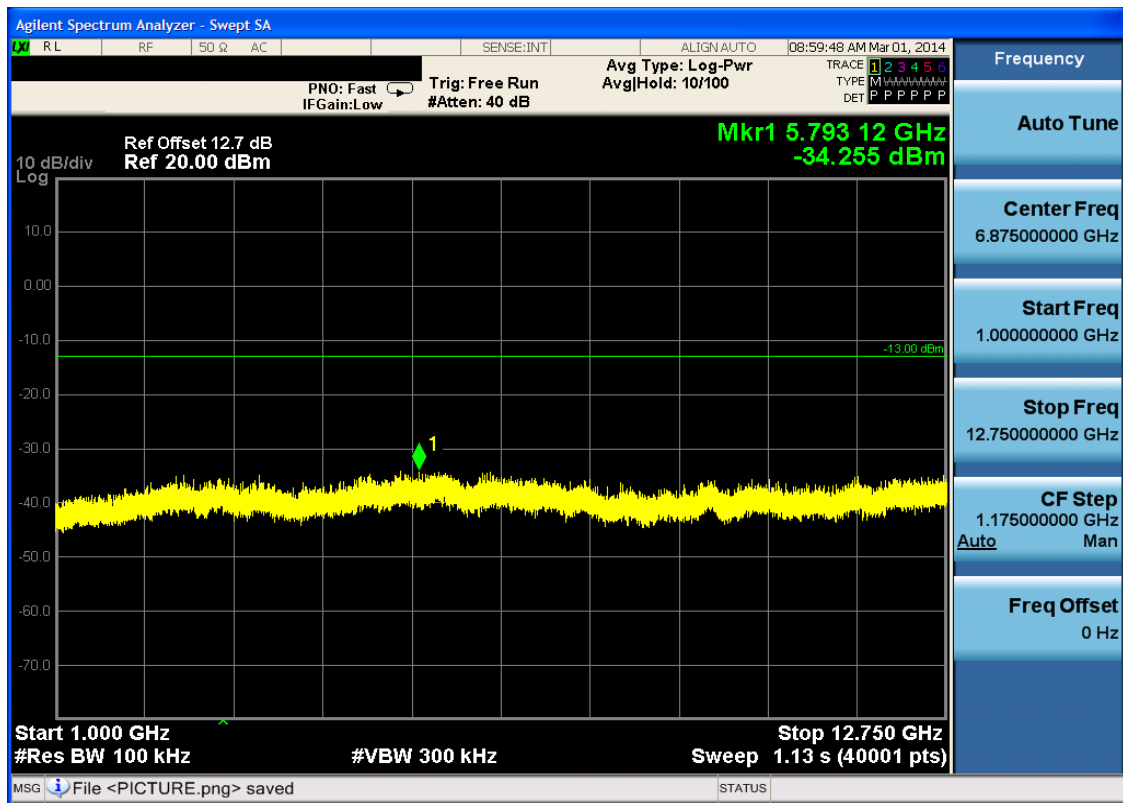
6.1.1.2 Test Mode = GSM/TM2

6.1.1.2.1 Test Channel = LCH

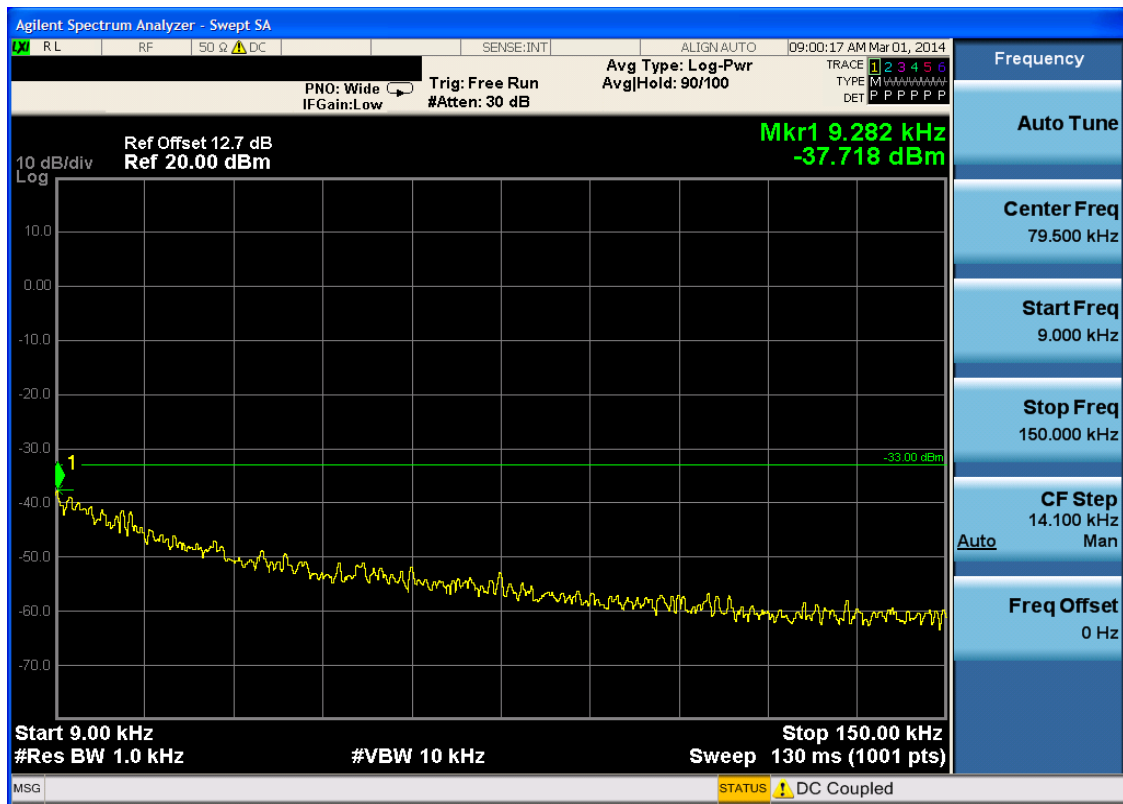


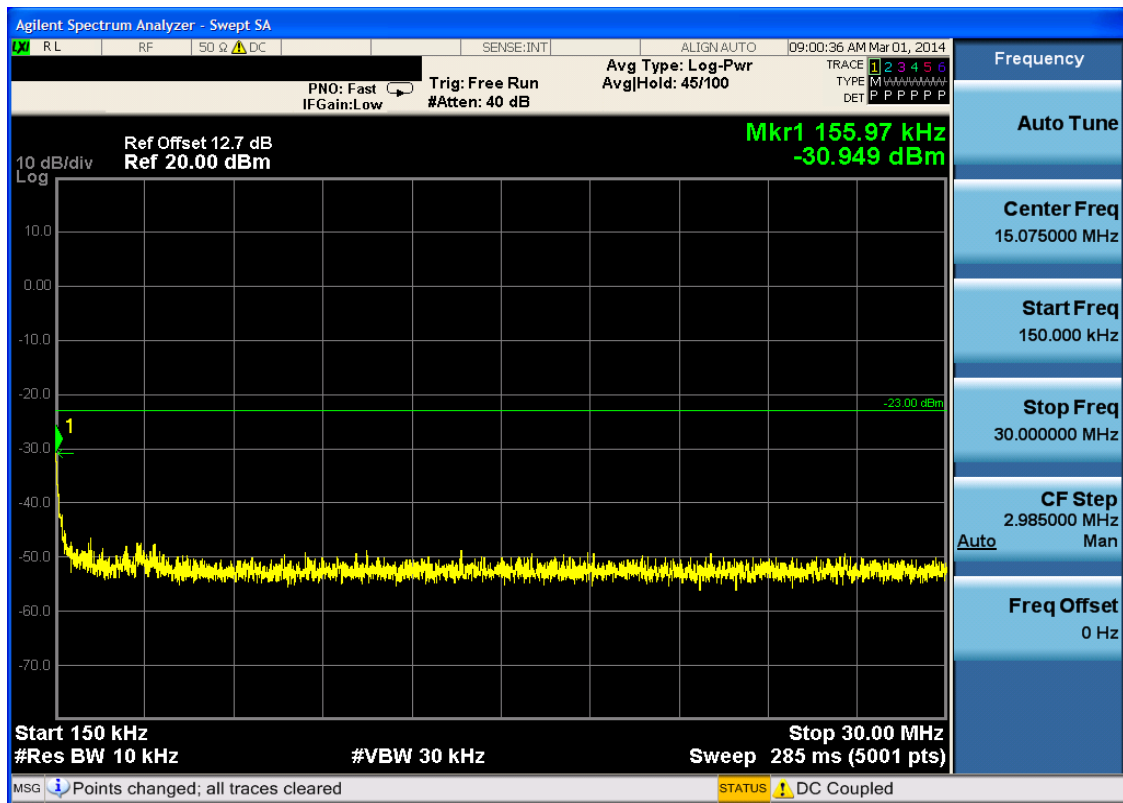


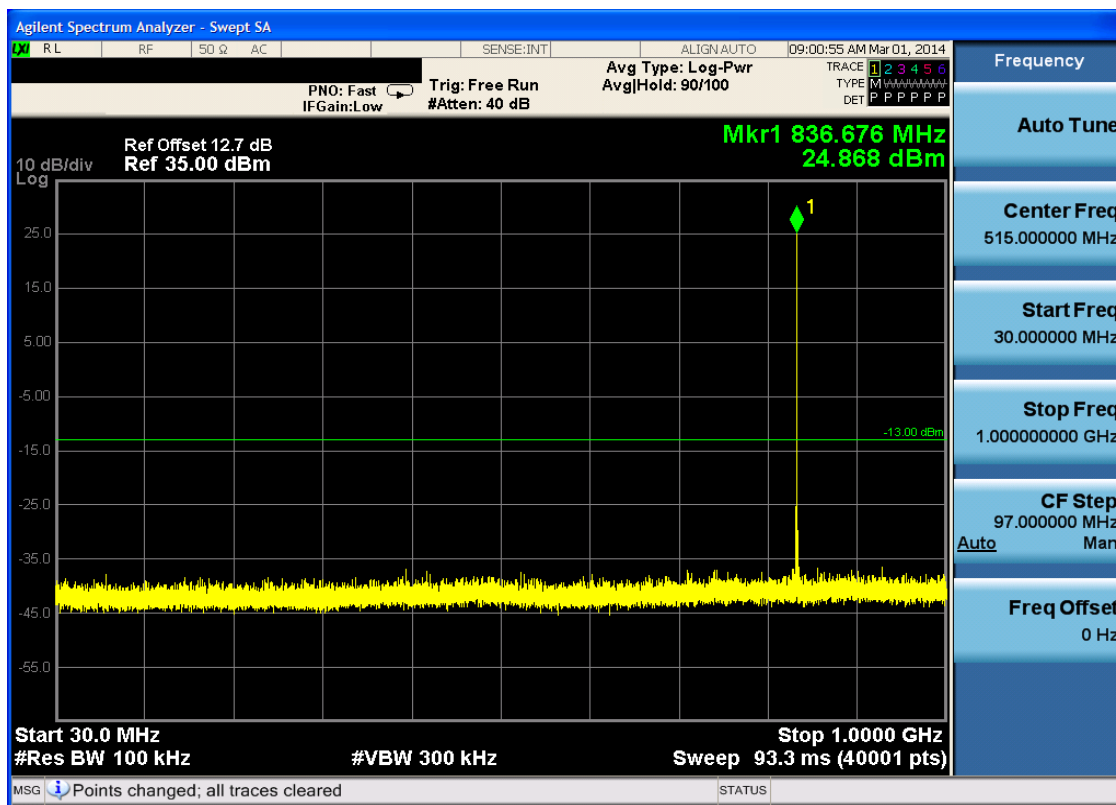


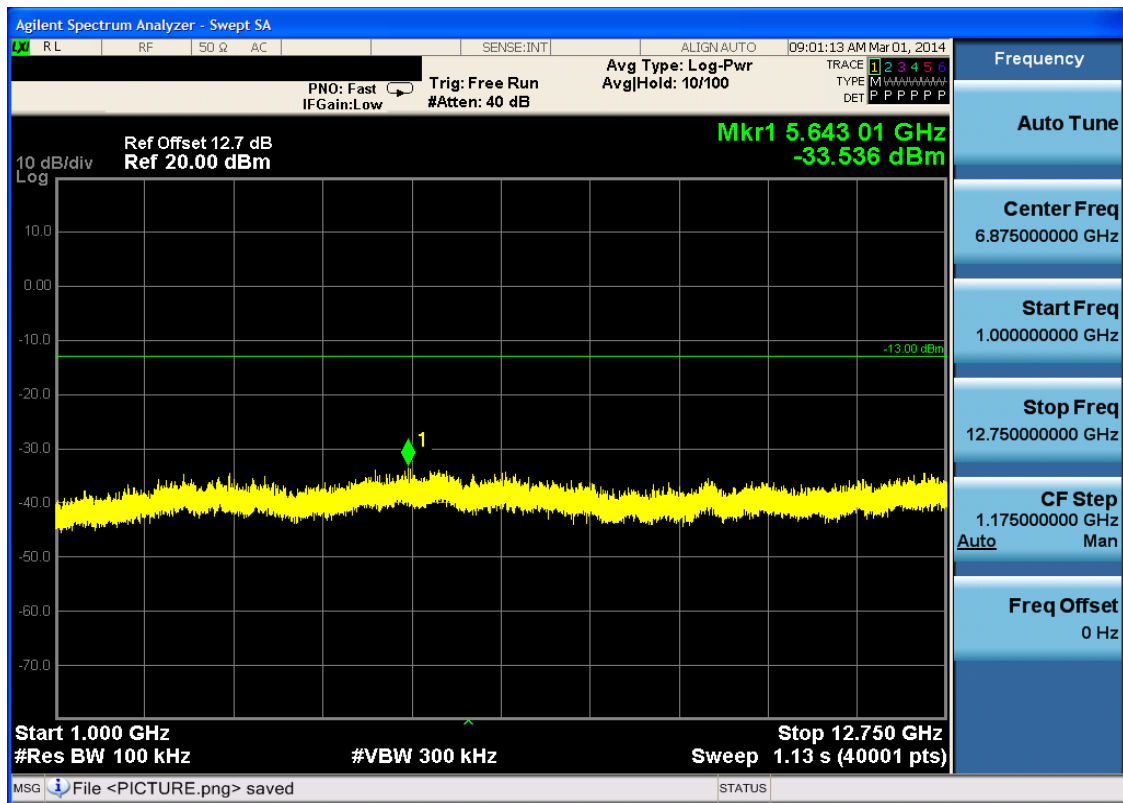


6.1.1.2.2 Test Channel = MCH



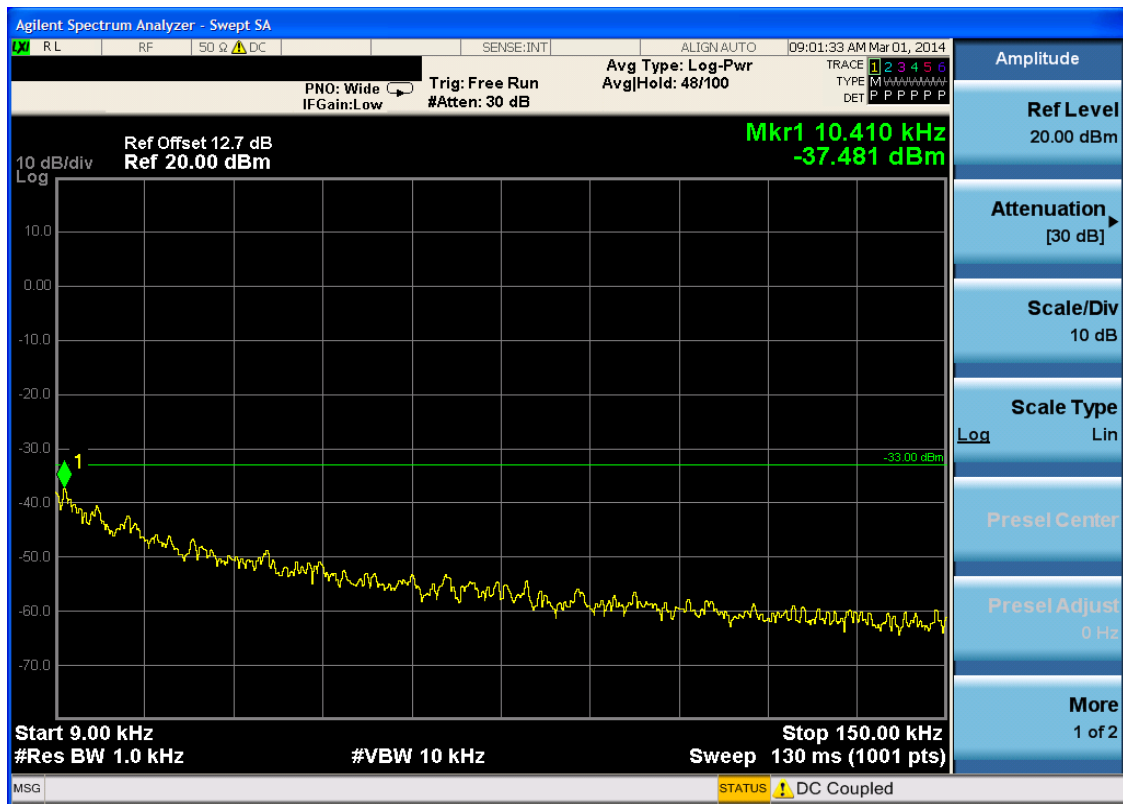


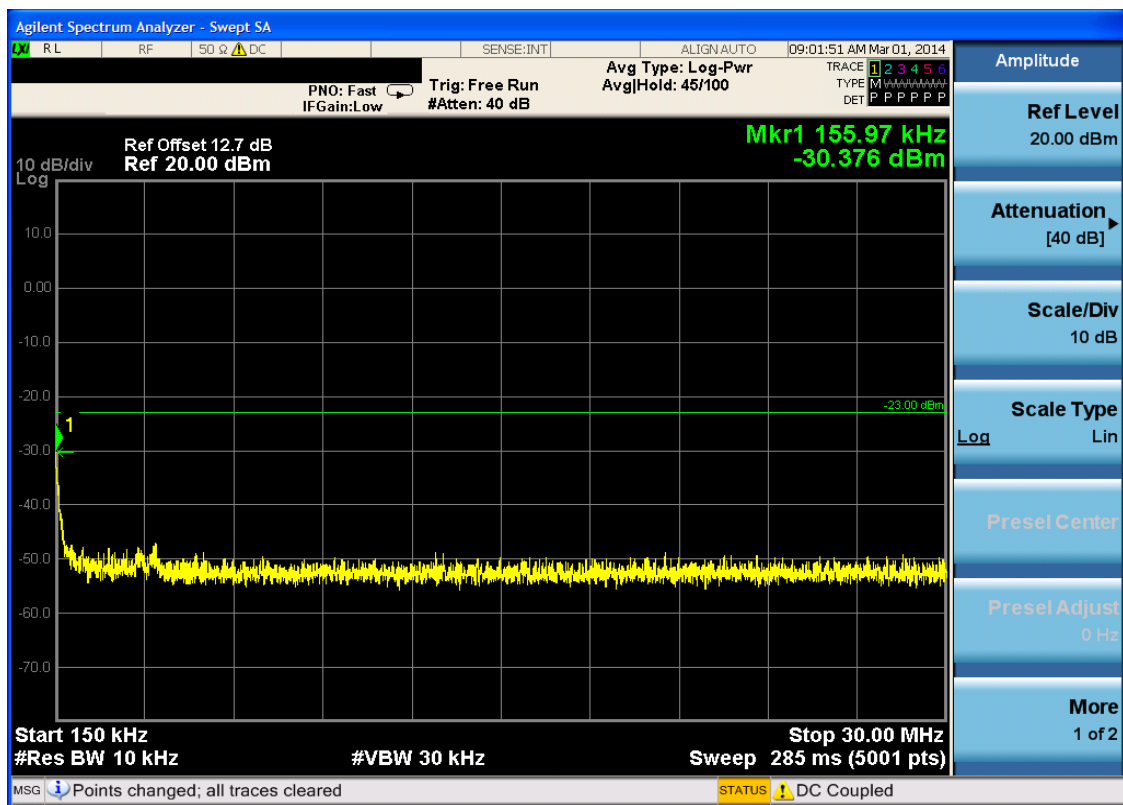


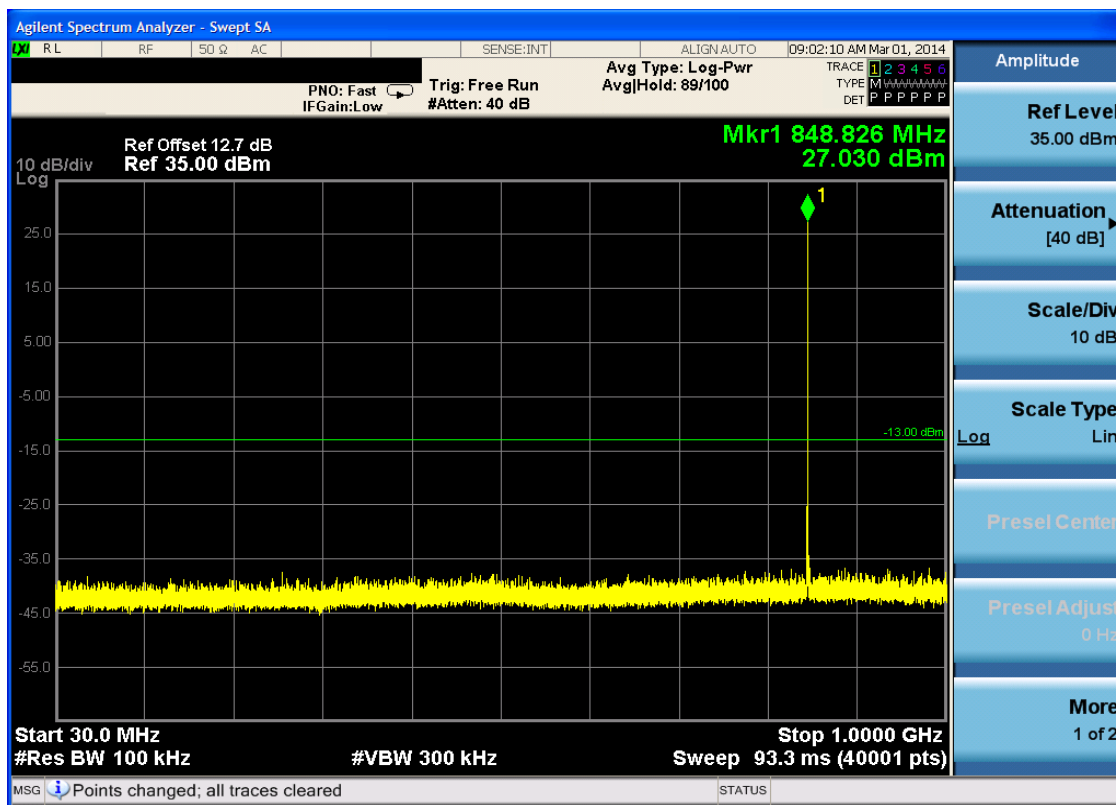


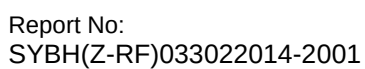
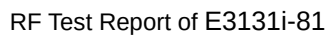


6.1.1.2.3 Test Channel = HCH





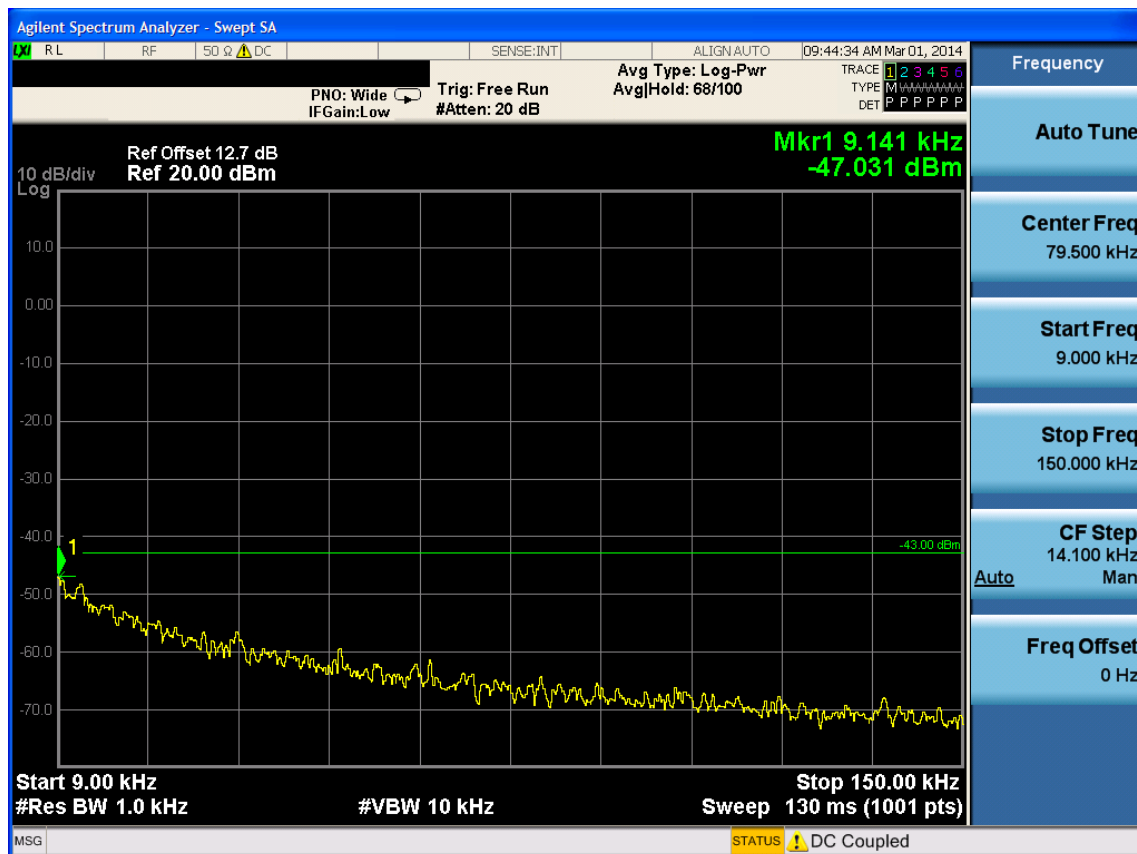


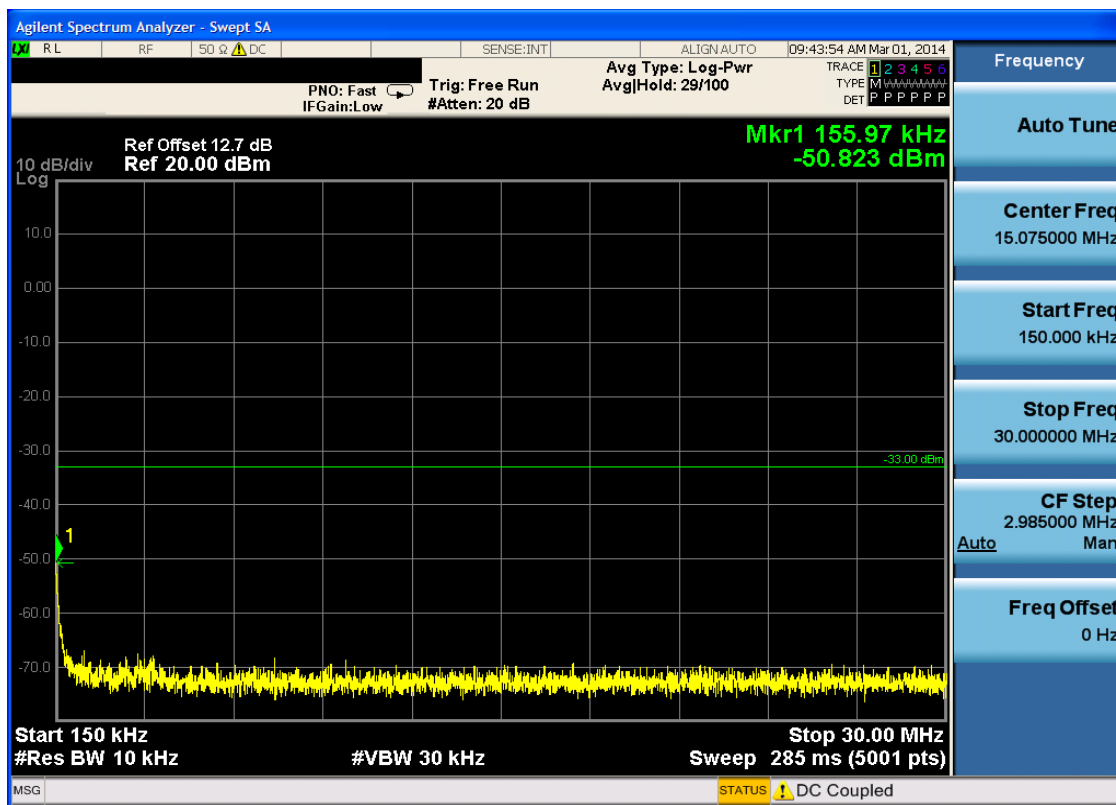


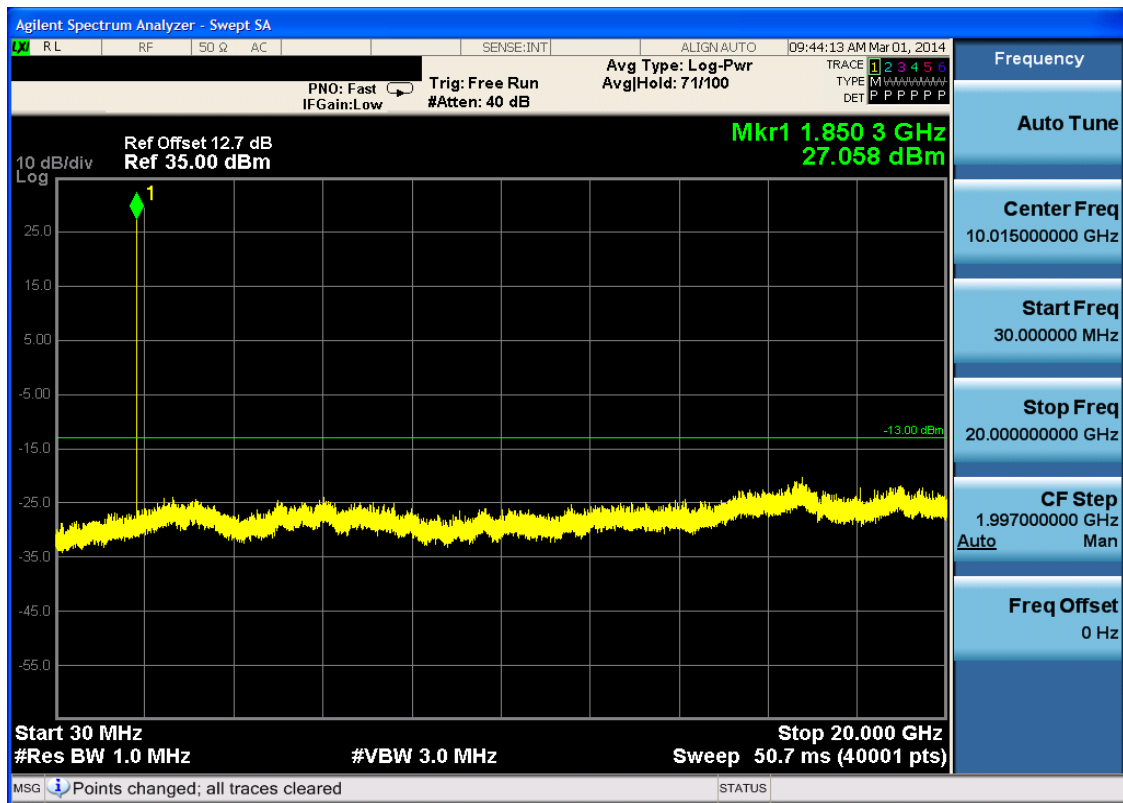
6.1.2 Test Band = GSM1900

6.1.2.1 Test Mode = GSM/TM1

6.1.2.1.1 Test Channel = LCH

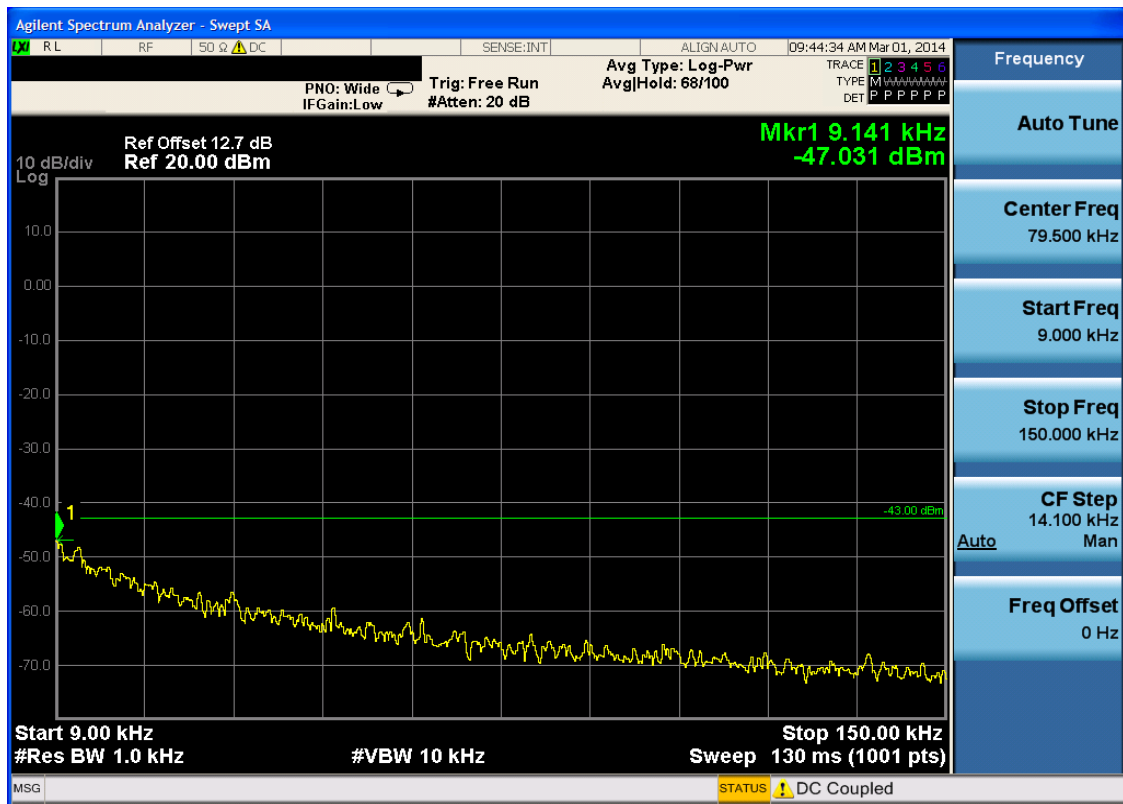


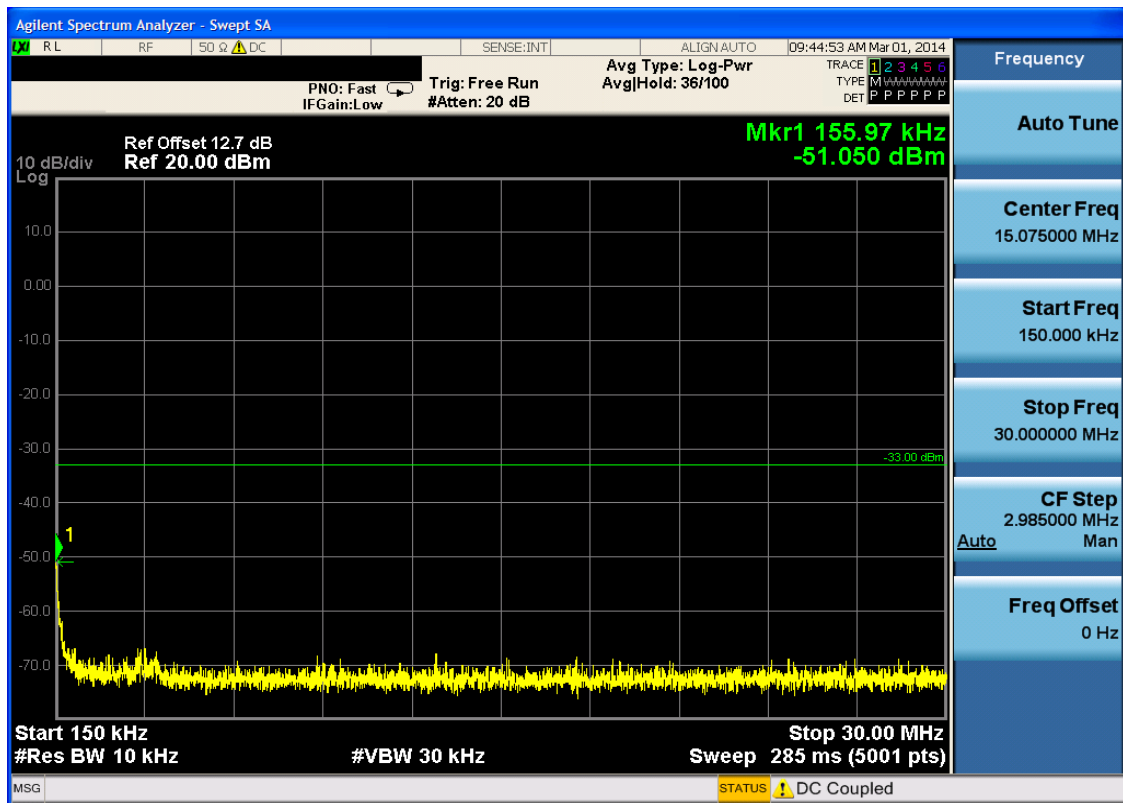


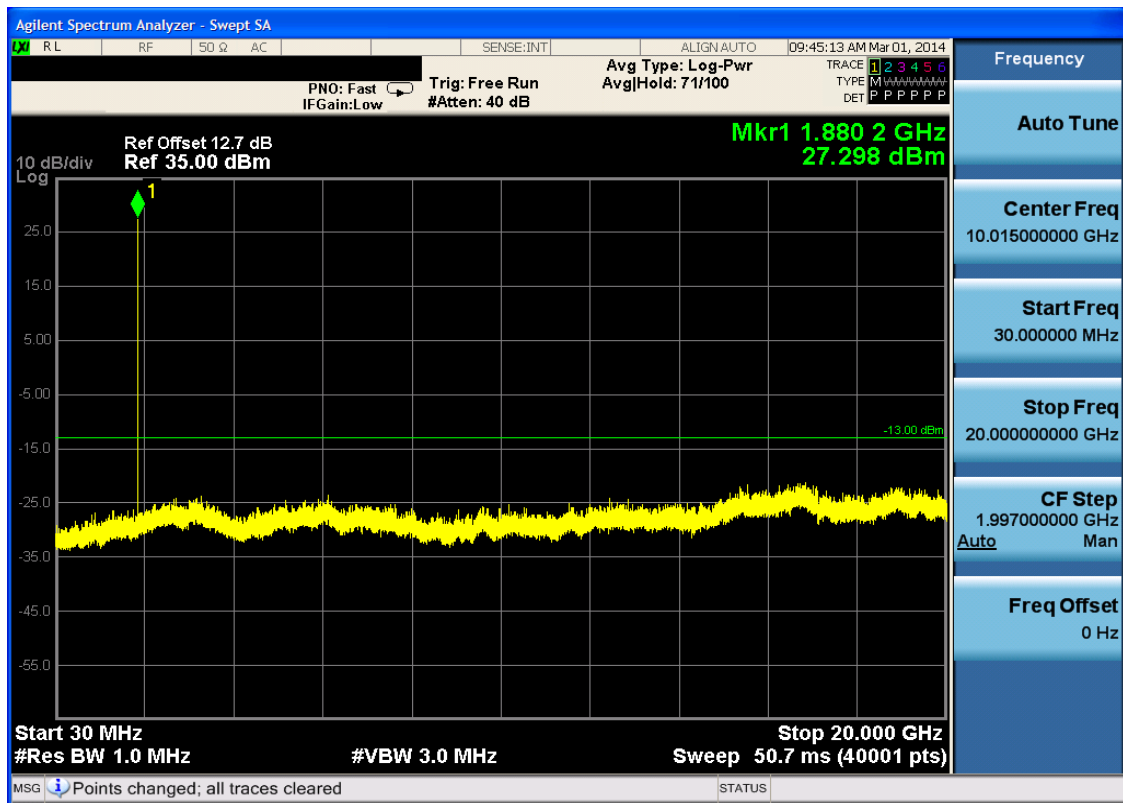




6.1.2.1.2 Test Channel = MCH

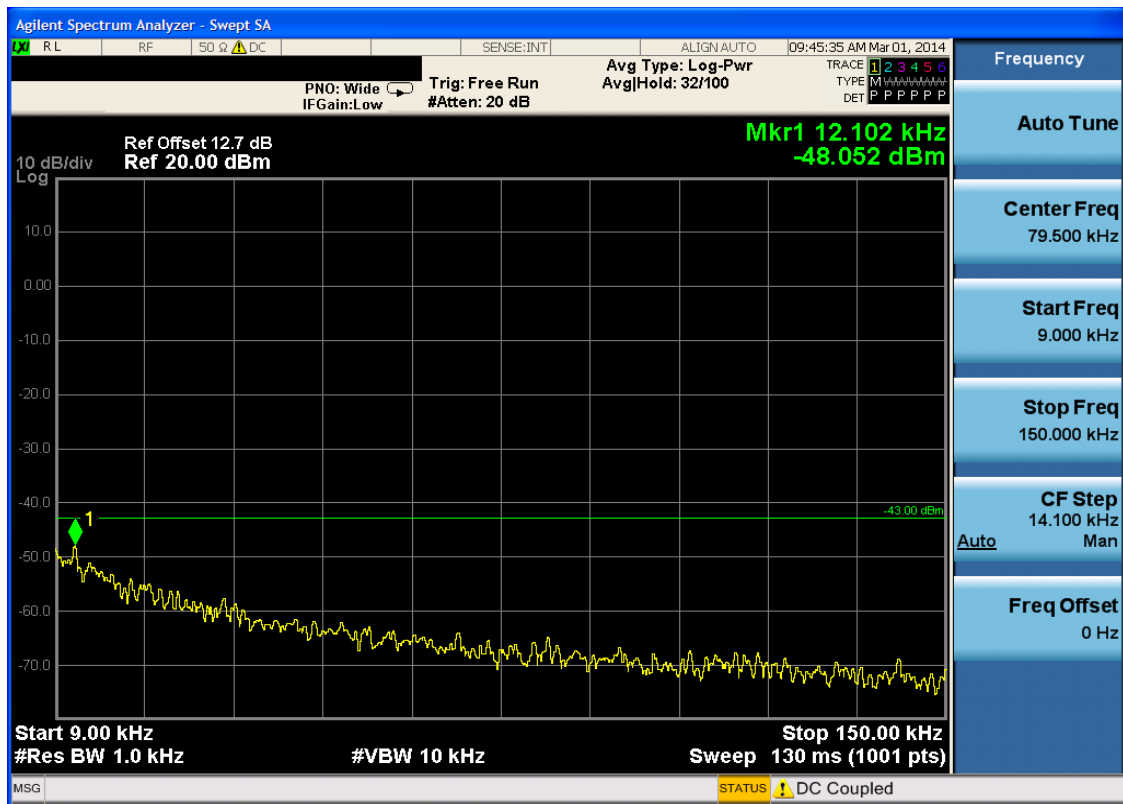


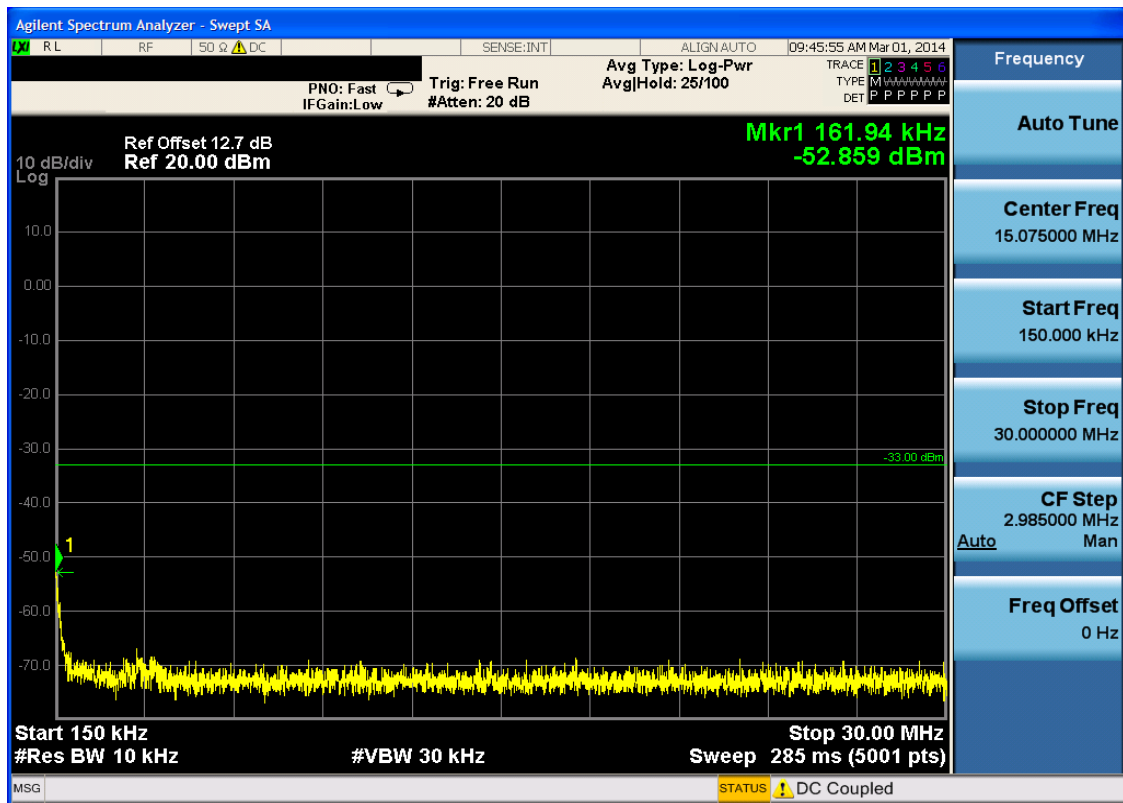


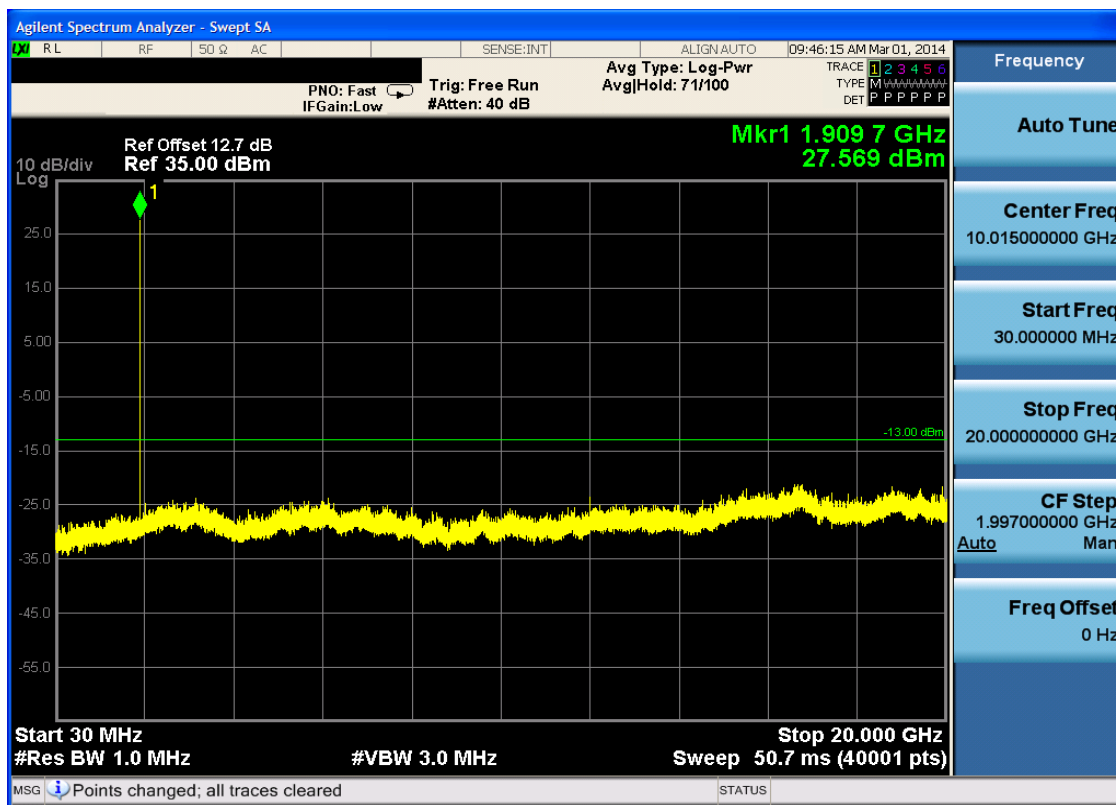




6.1.2.1.3 Test Channel = HCH



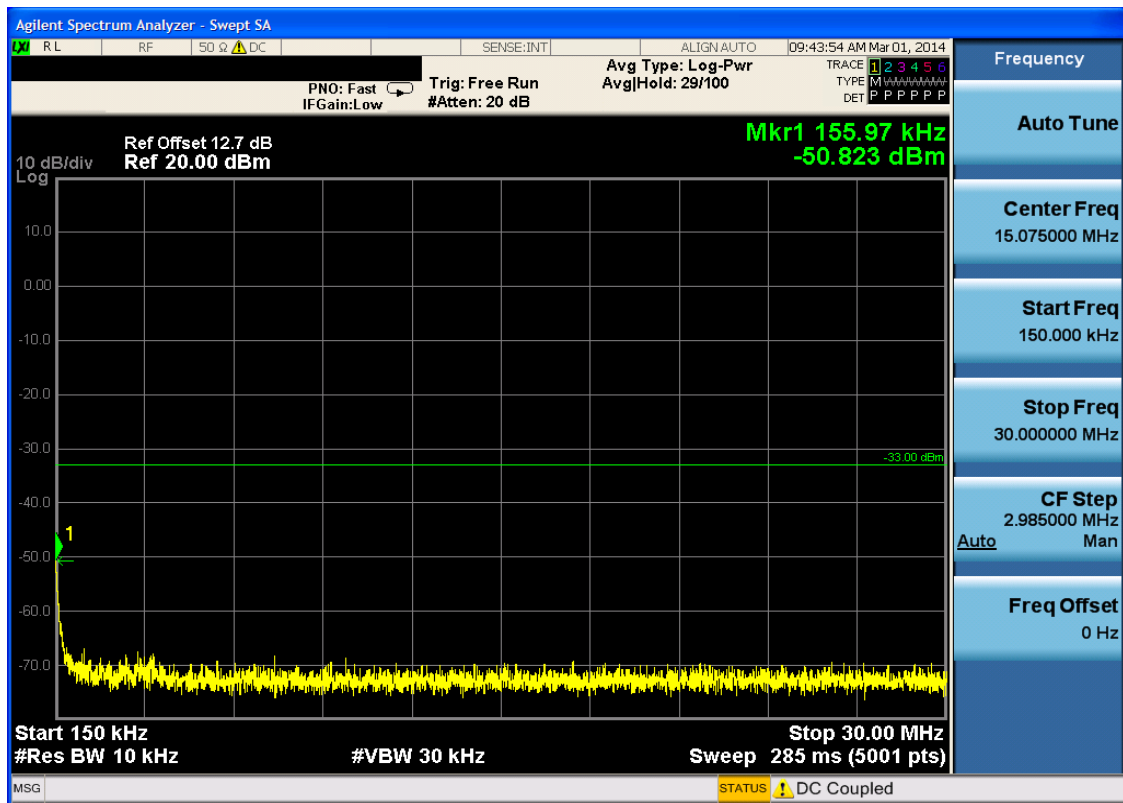


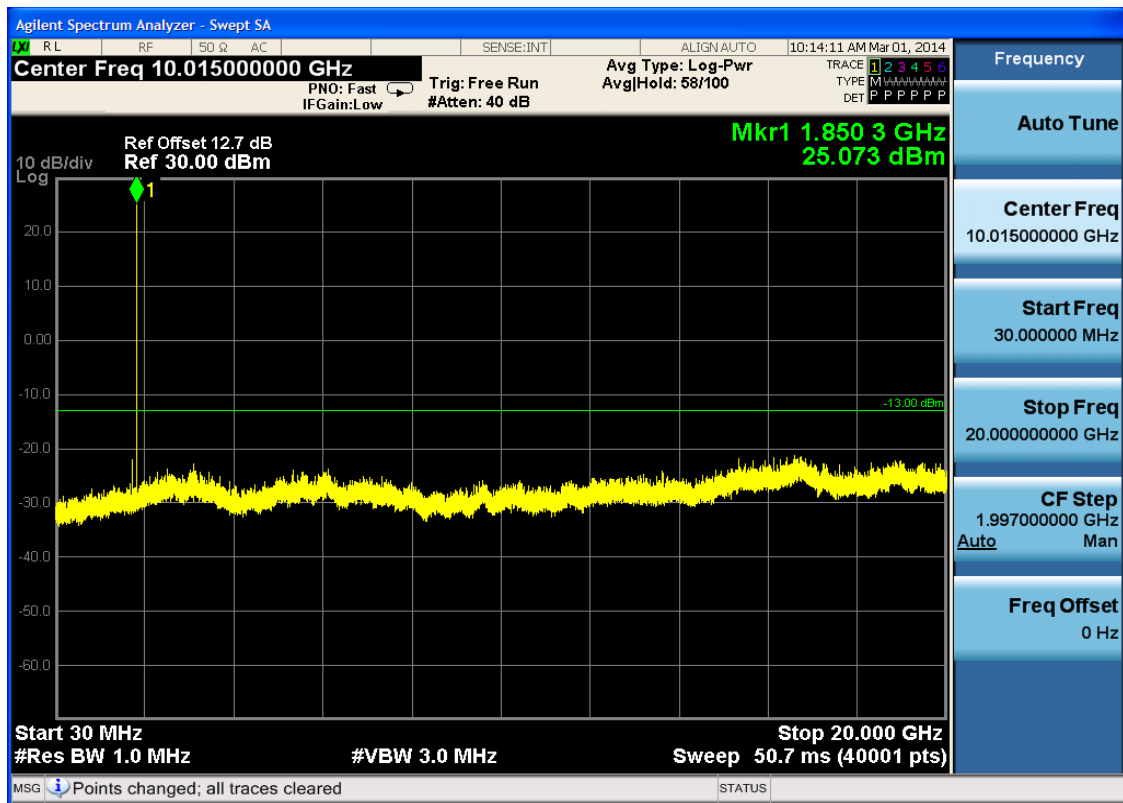


6.1.2.2 Test Mode = GSM/TM2

6.1.2.2.1 Test Channel = LCH



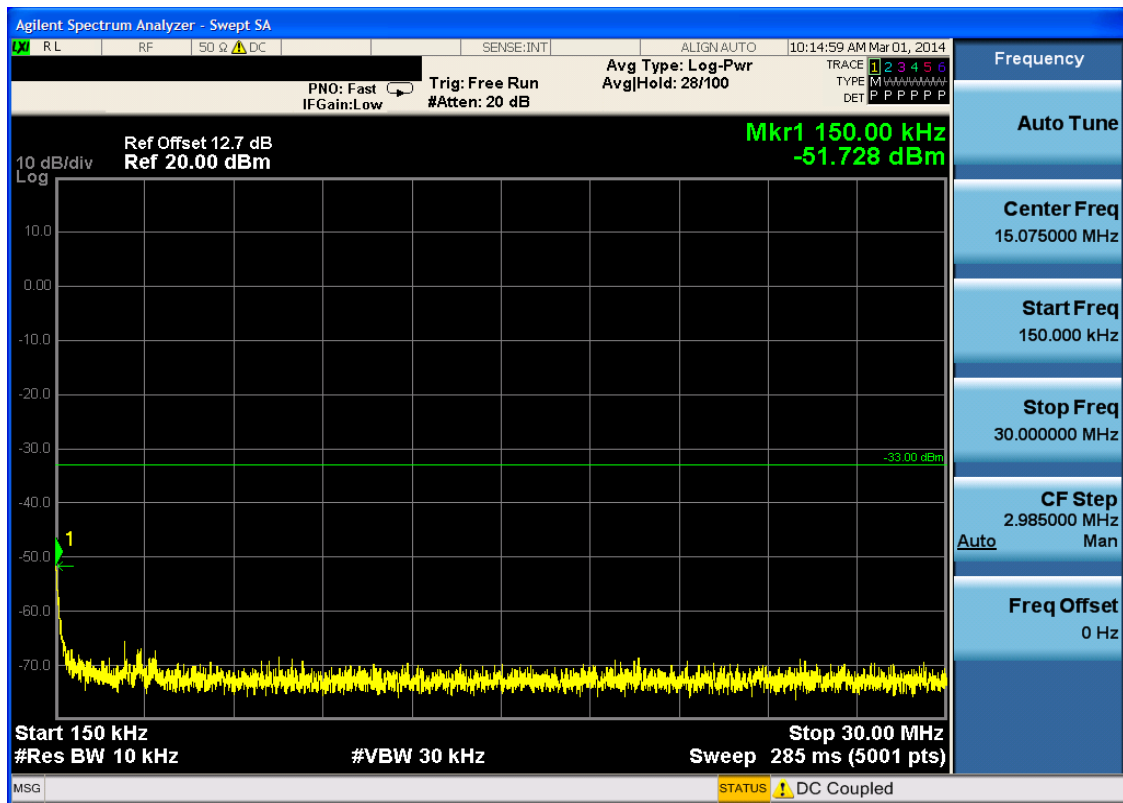


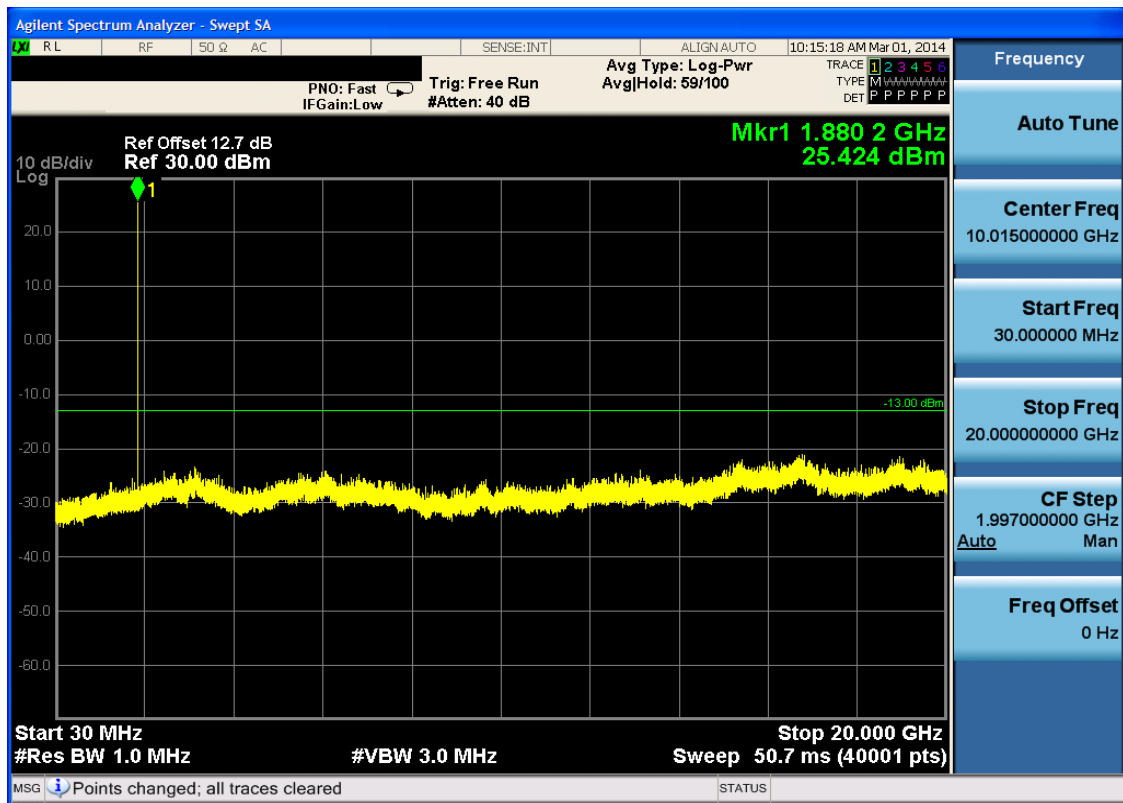




6.1.2.2.2 Test Channel = MCH

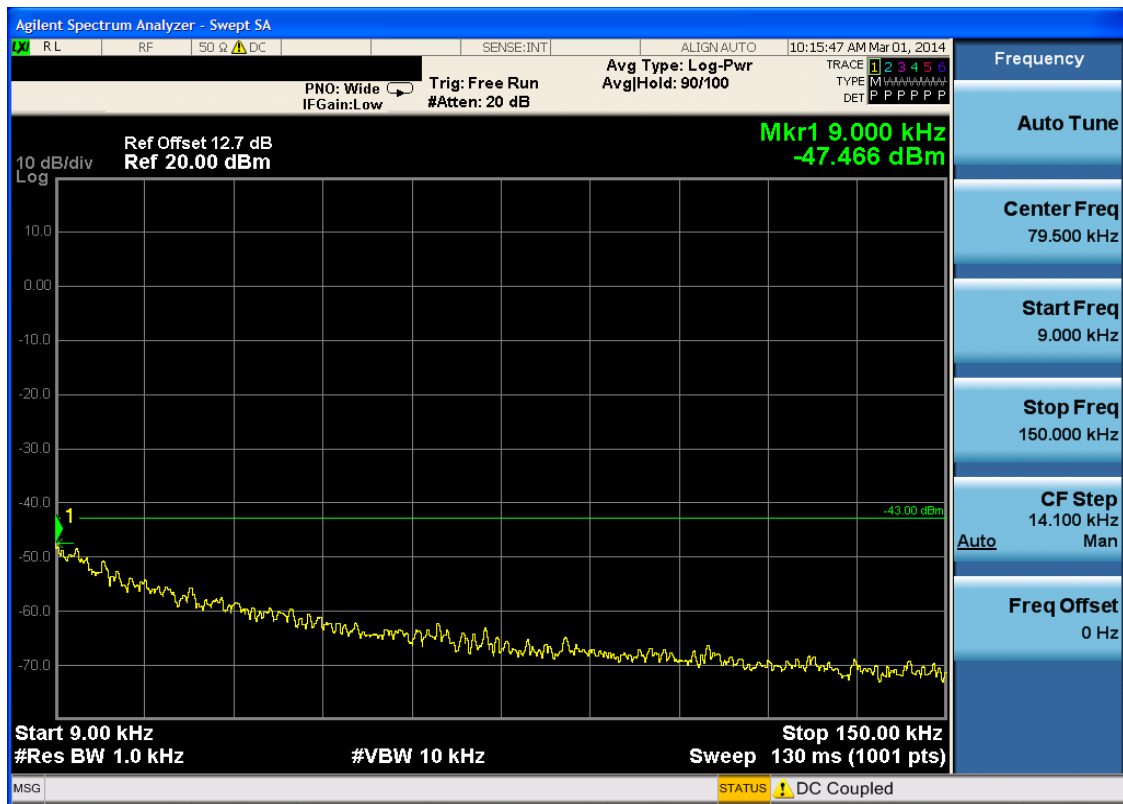


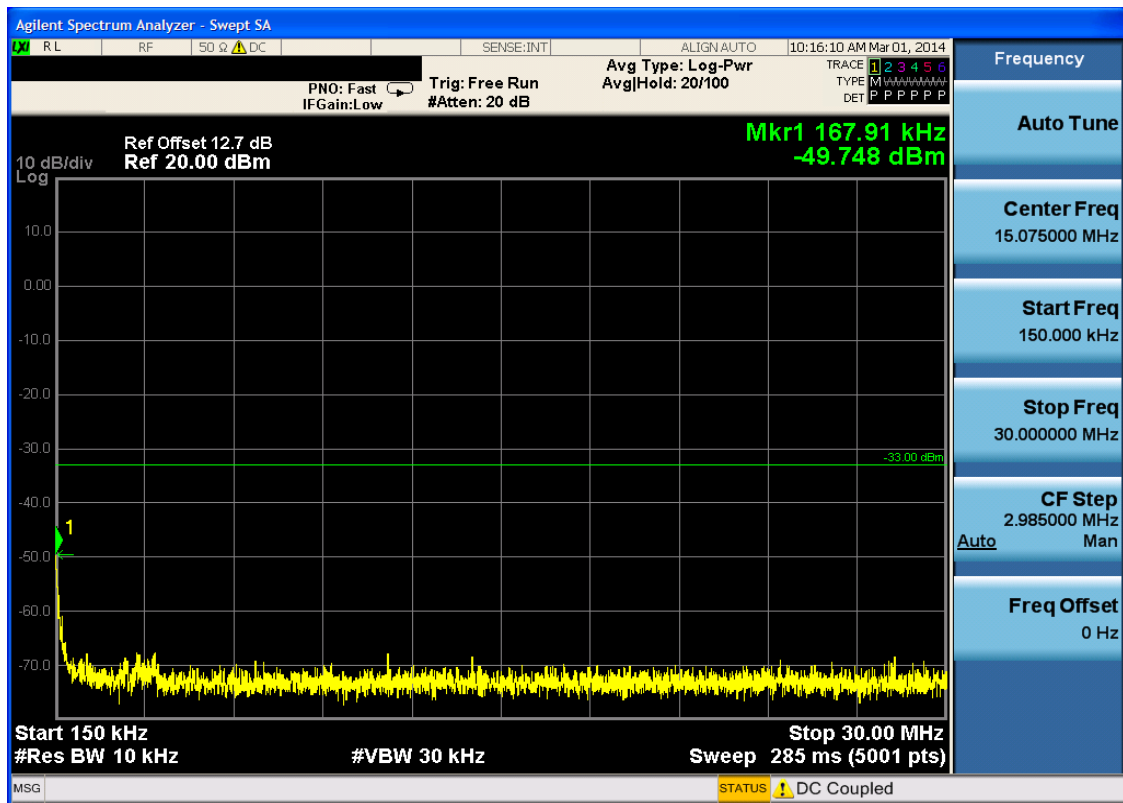


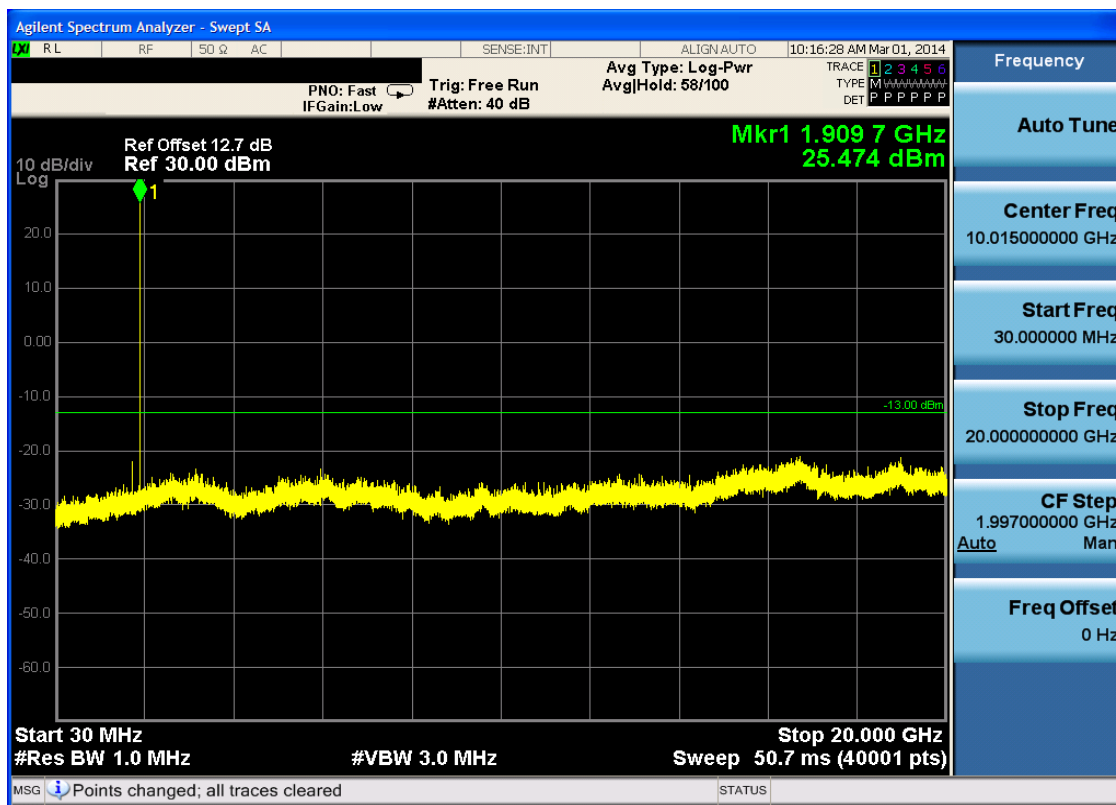




6.1.2.2.3 Test Channel = HCH







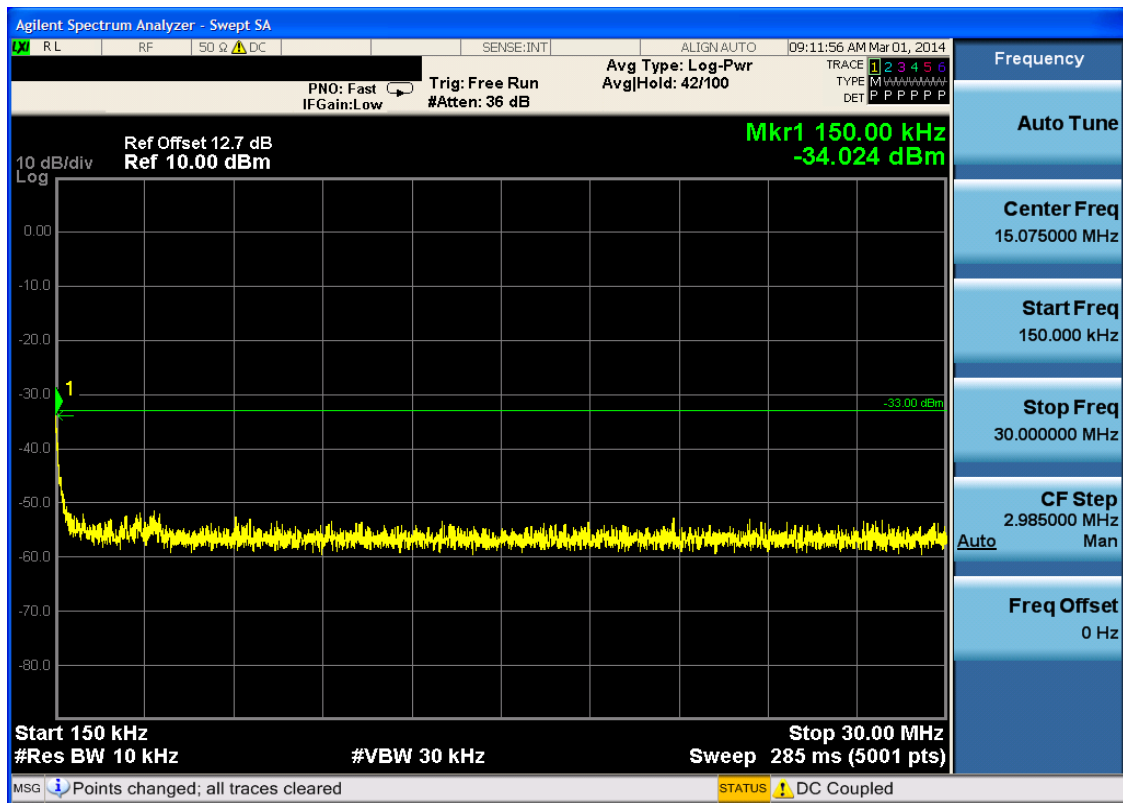
6.2 For UMTS

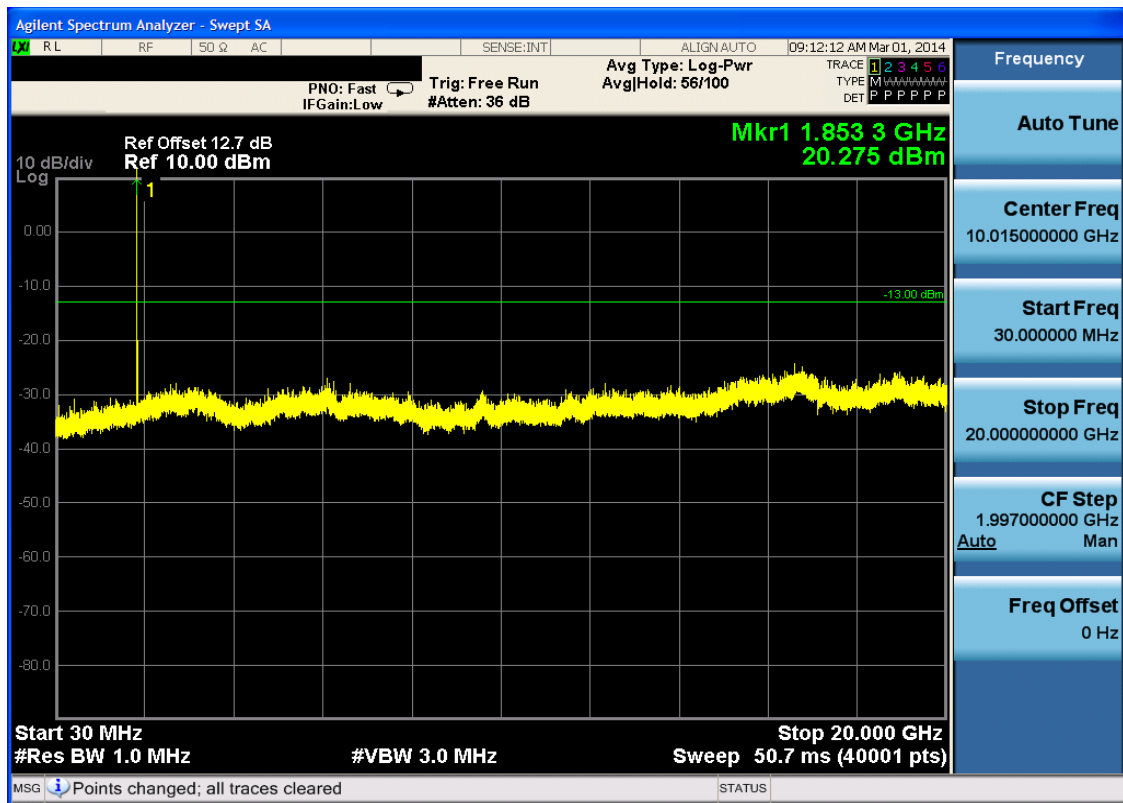
6.2.1 Test Band = WCDMA1900

6.2.1.1 Test Mode = UMTS/TM1

6.2.1.1.1 Test Channel = LCH

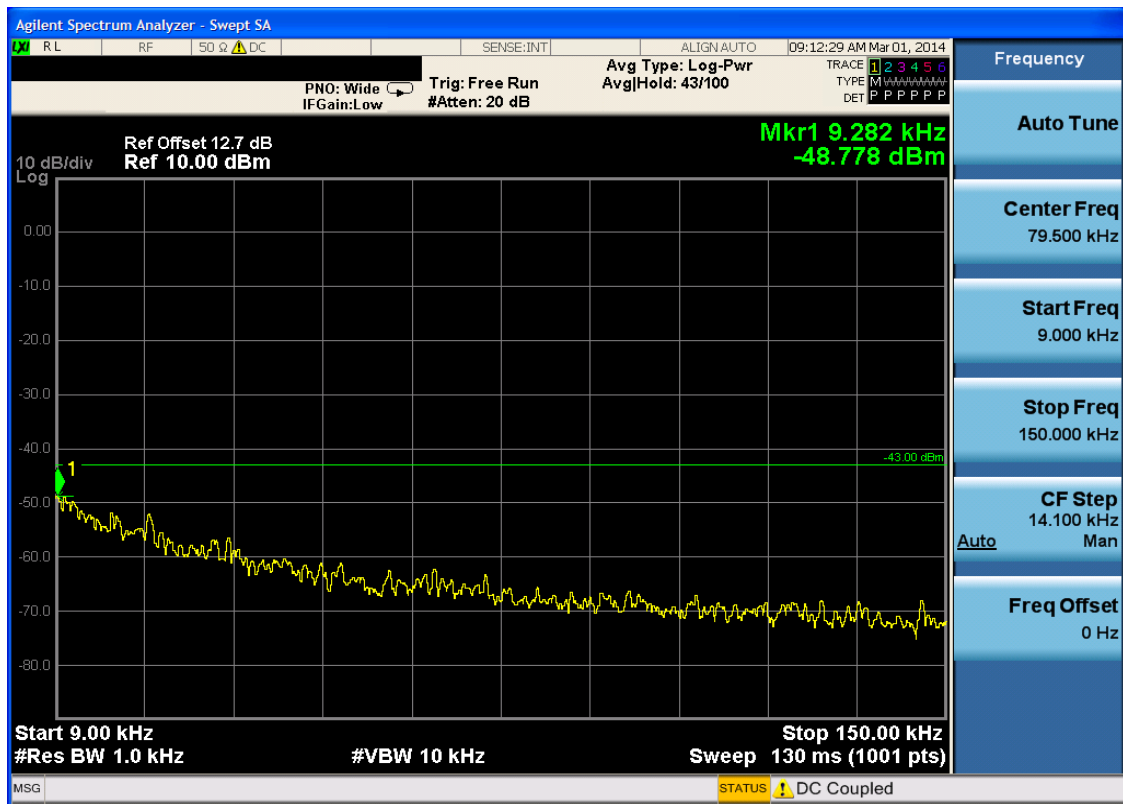


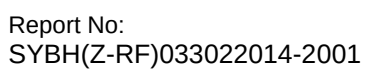
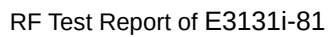


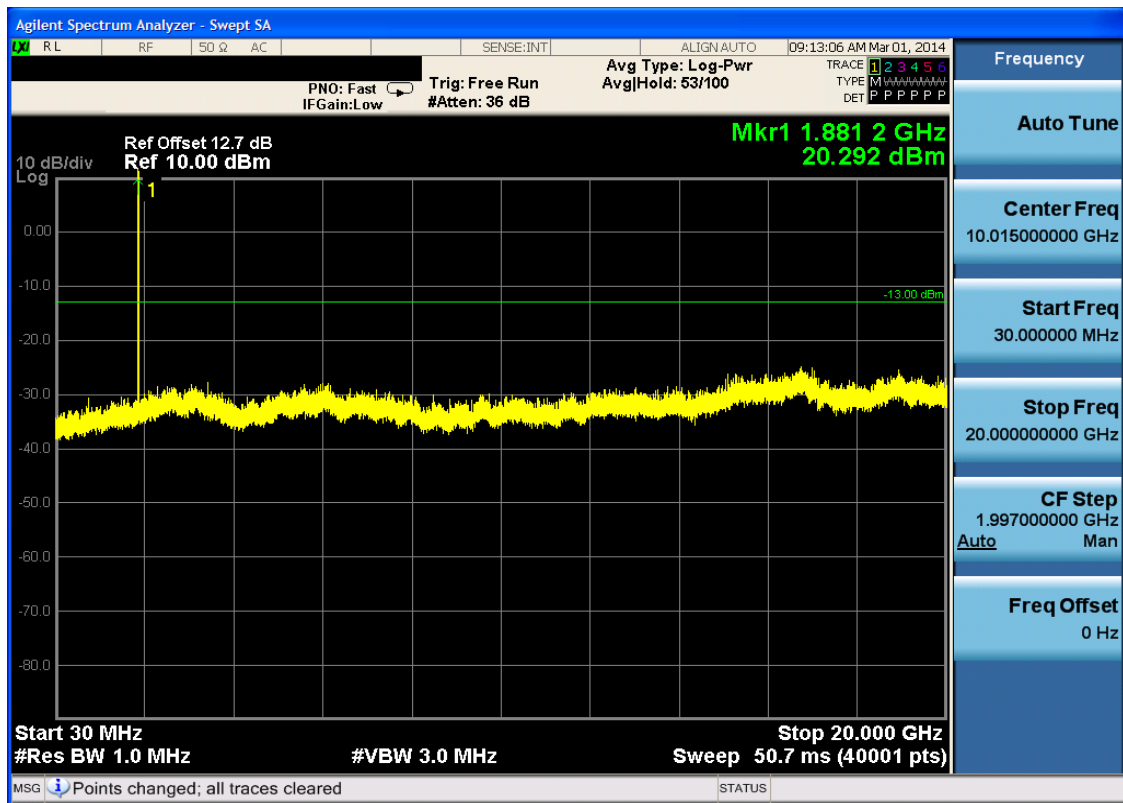




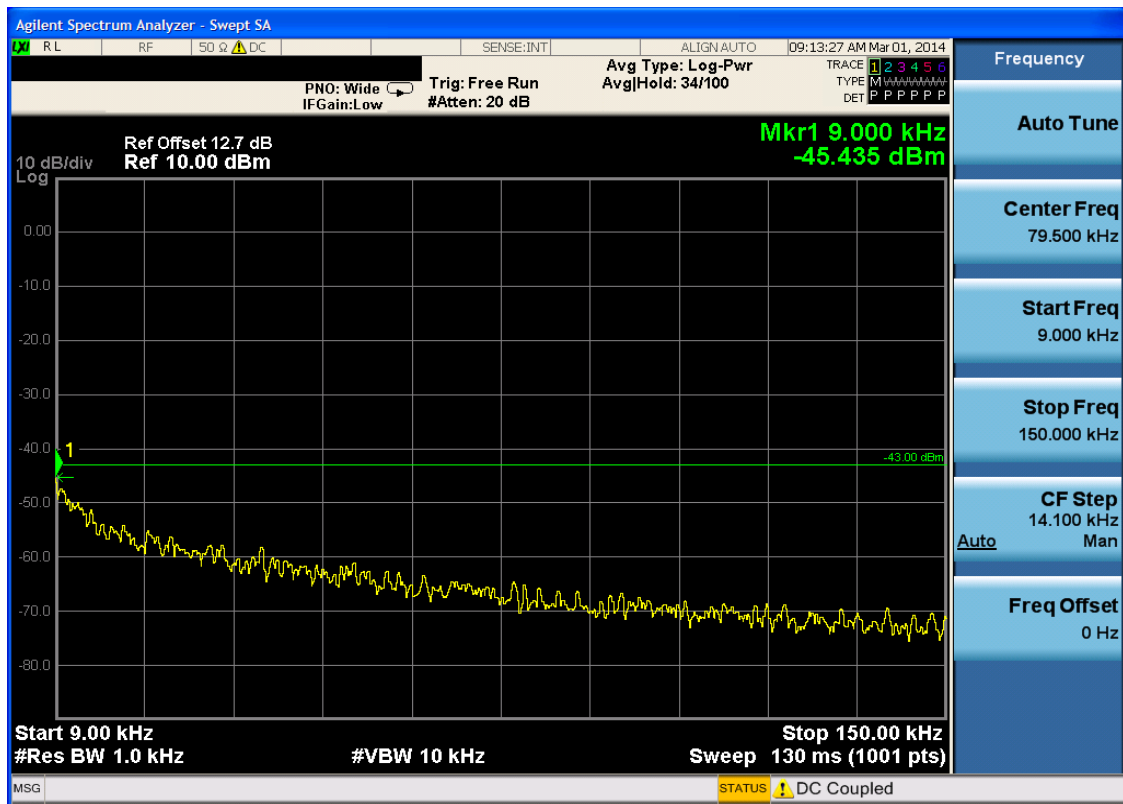
6.2.1.1.2 Test Channel = MCH

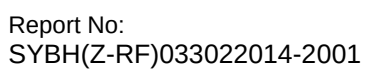
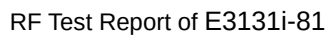


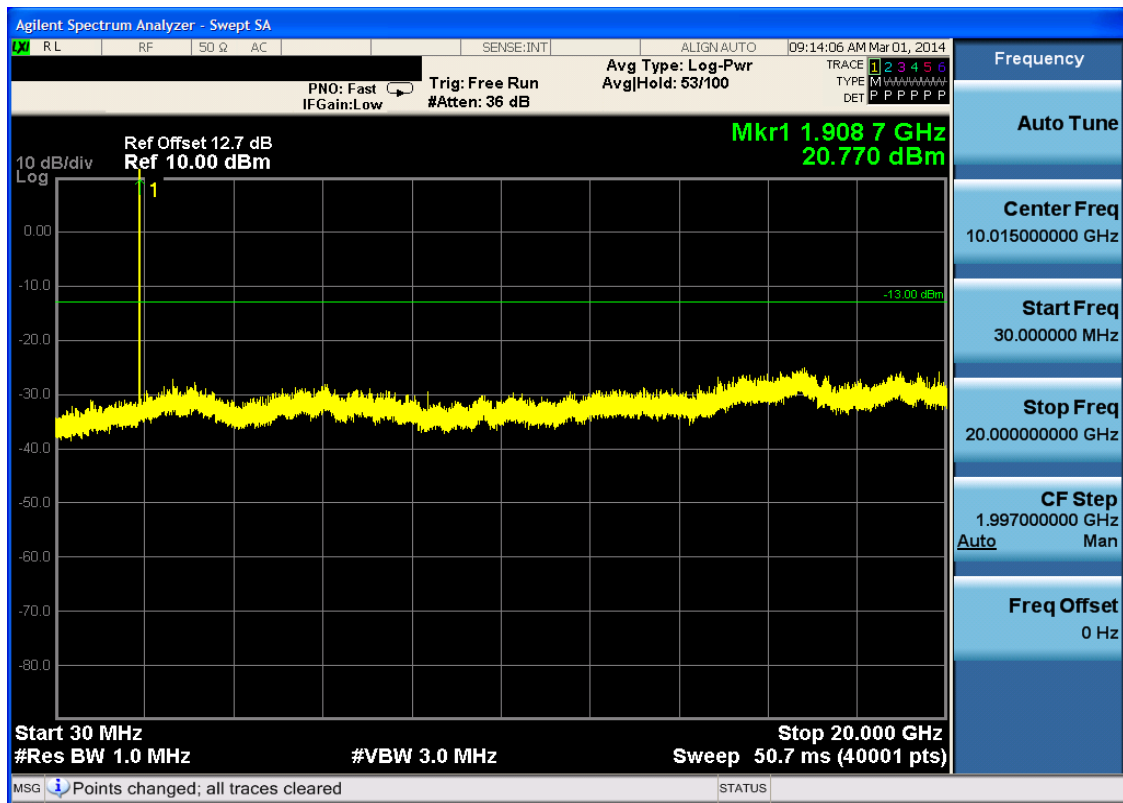




6.2.1.1.3 Test Channel = HCH







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

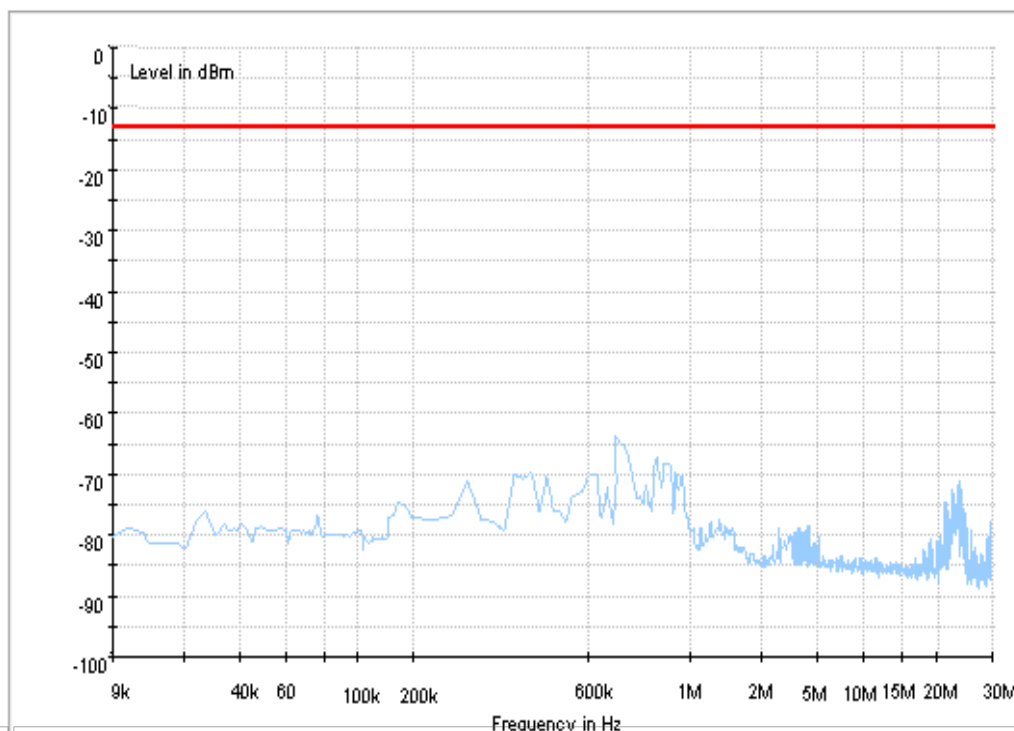
30MHz~1GHz, RBW = 100 kHz, VBW = 300 kHz. Detector: PK

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

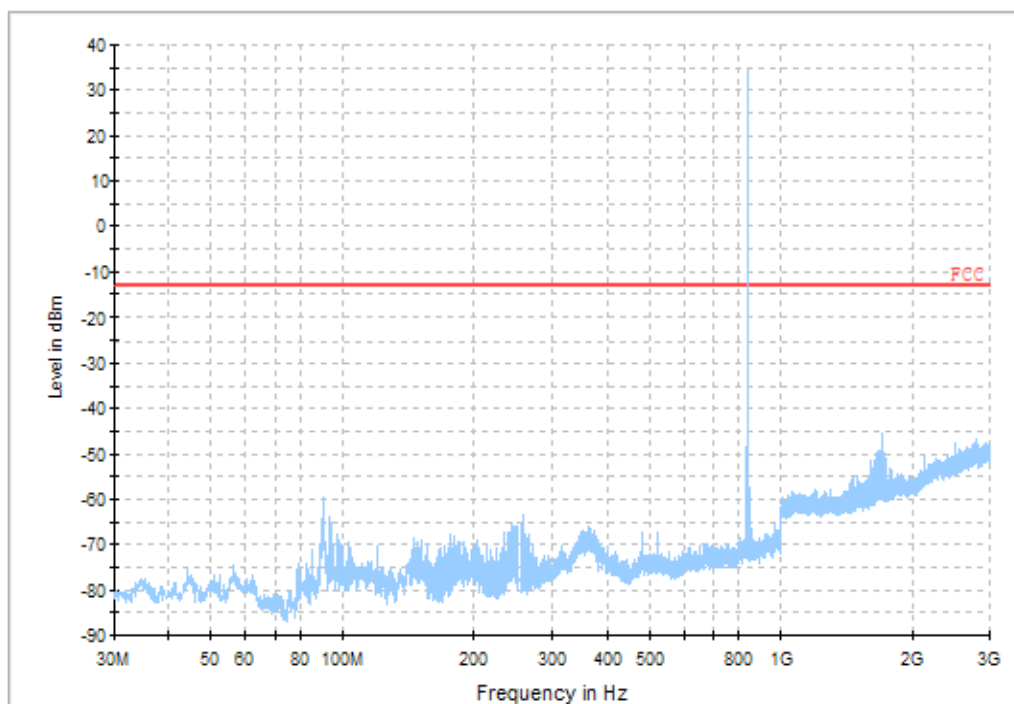
Part I - Test Plots

7.1 For GSM

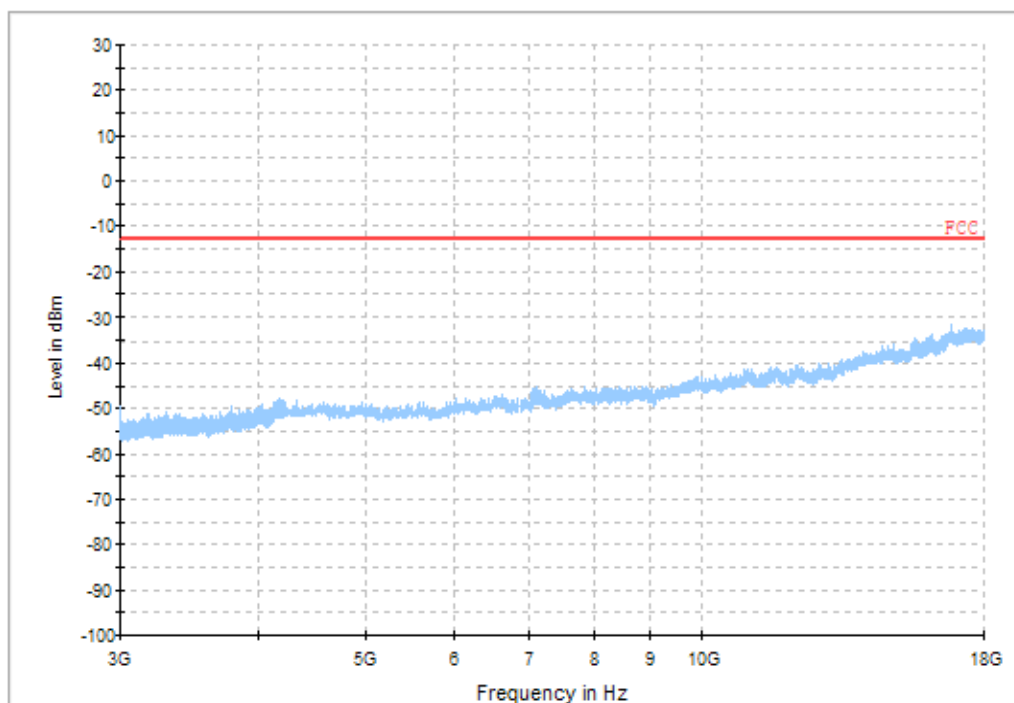
7.1.1.2 Test Mode = GSM/TM1



Copy of FCC PART22 GSM850_L

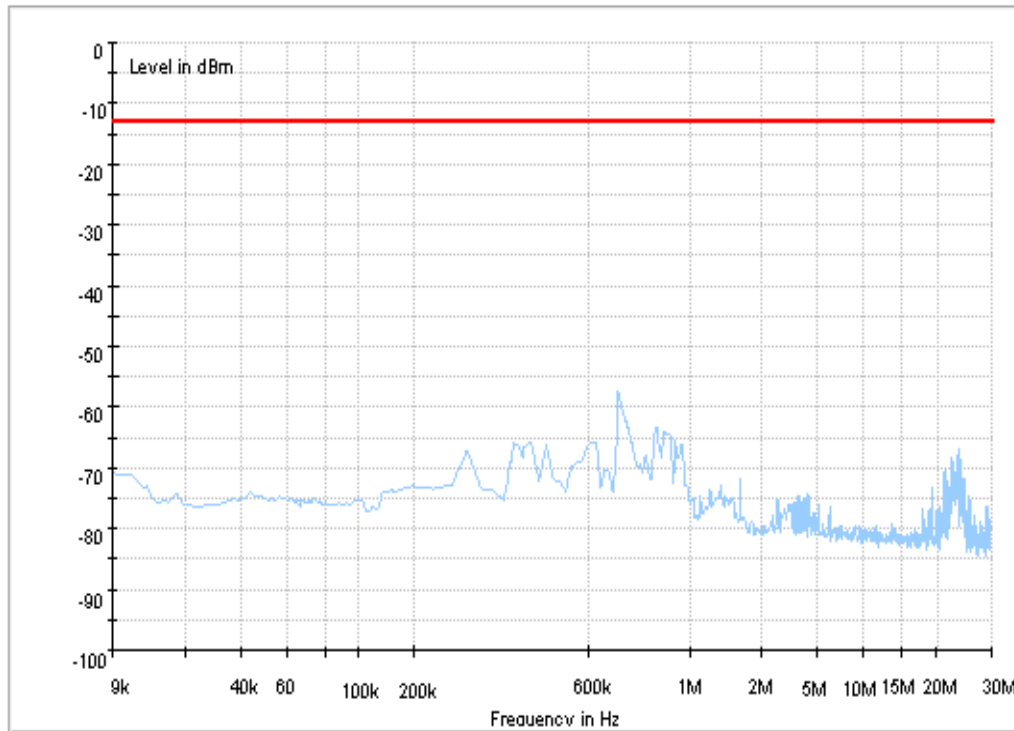


Copy of FCC PART22 GSM850_H

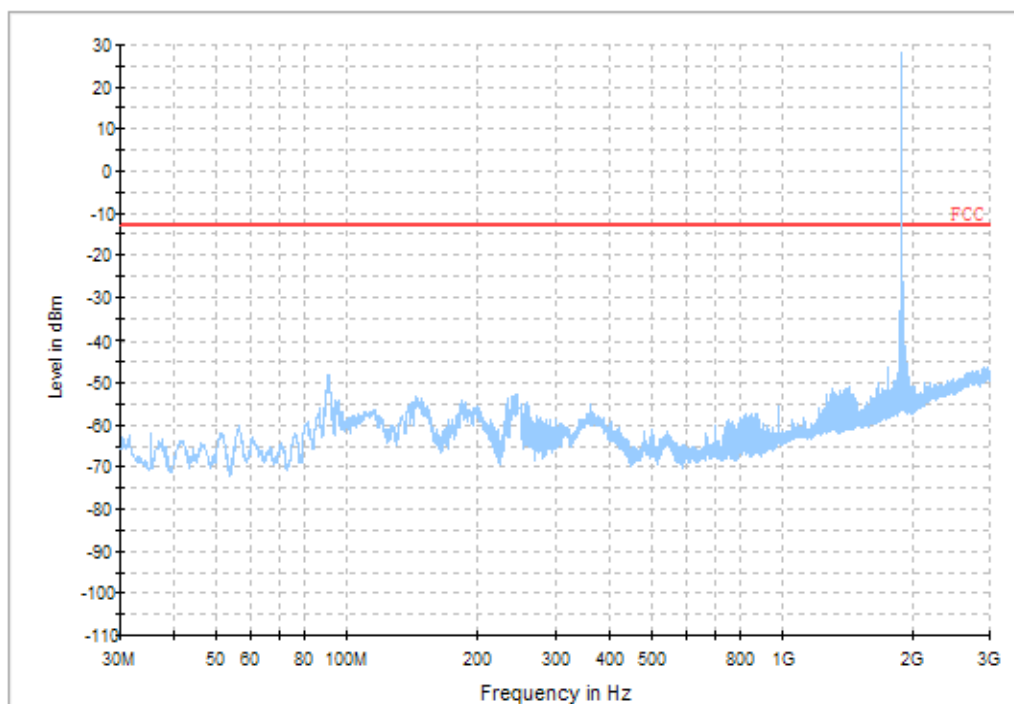


7.1.2 Test Band = GSM1900

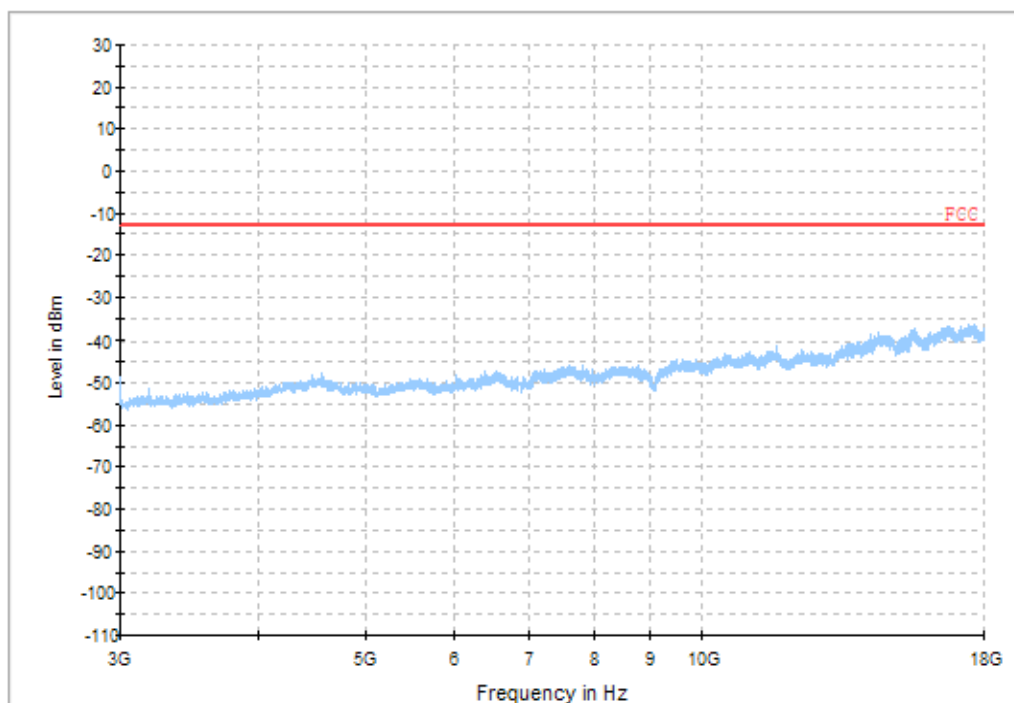
7.1.2.2 Test Mode = GSM/TM1

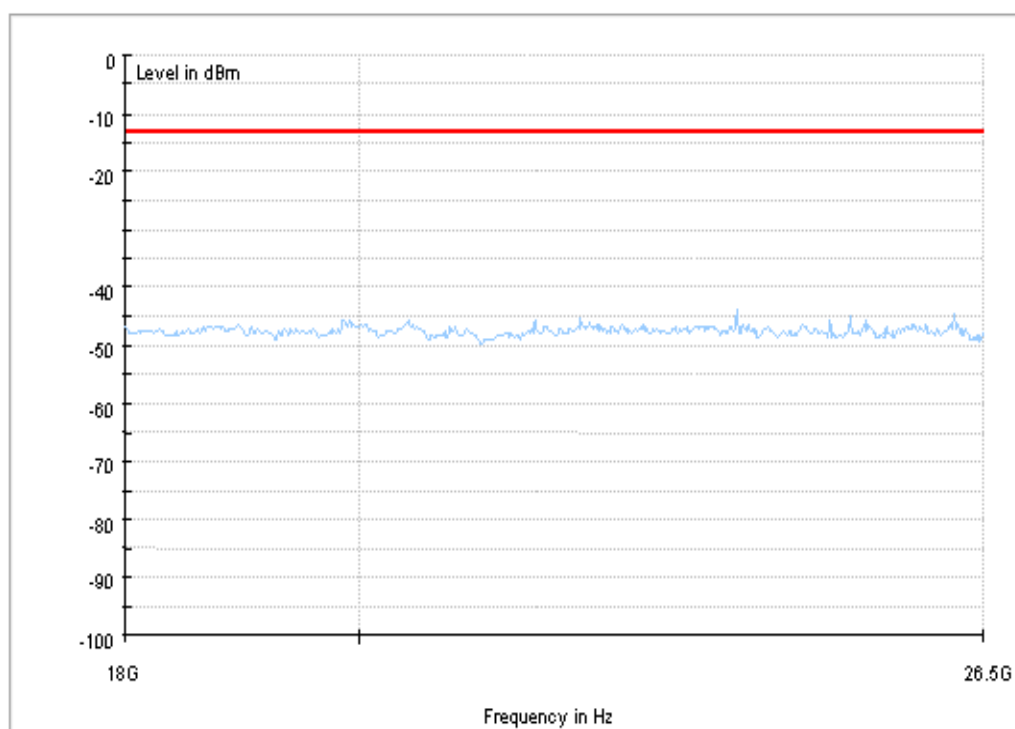


Copy of FCC PART24 GSM1900_L



Copy of FCC PART24 GSM1900_H

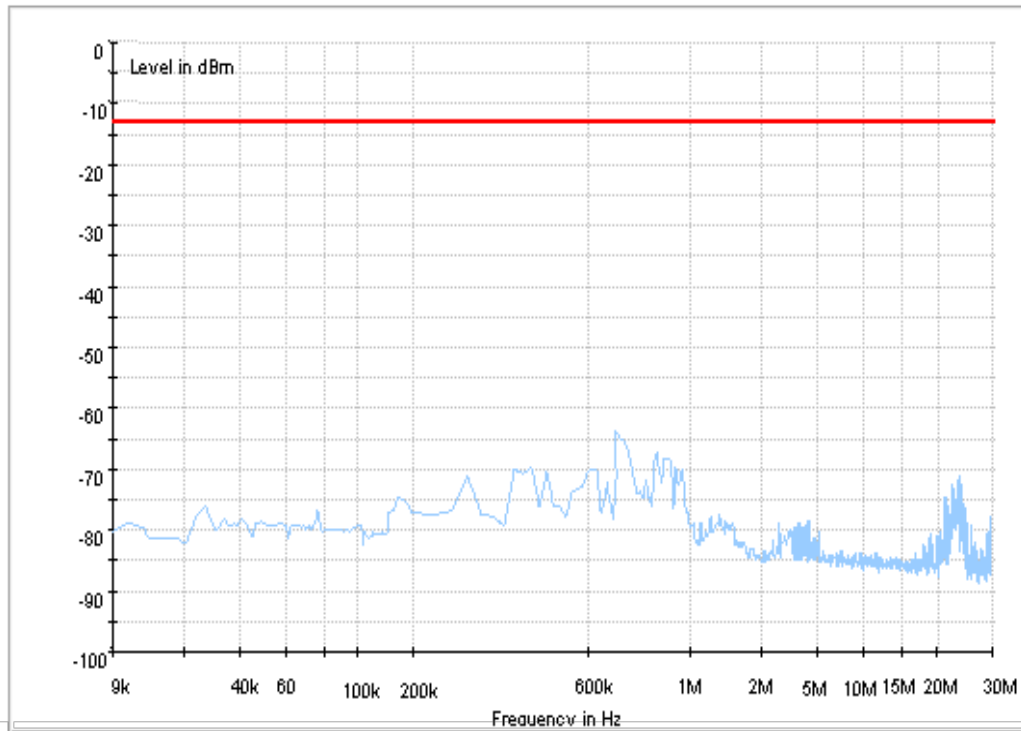




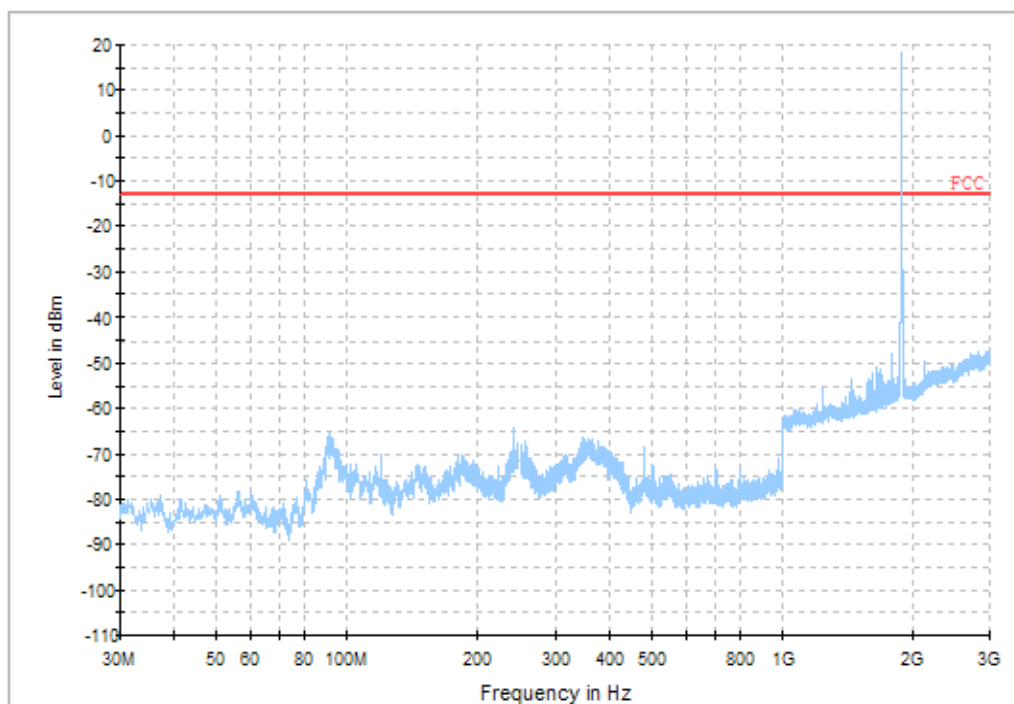
7.2 For UMTS

7.2.1 Test Band = WCDMA1900

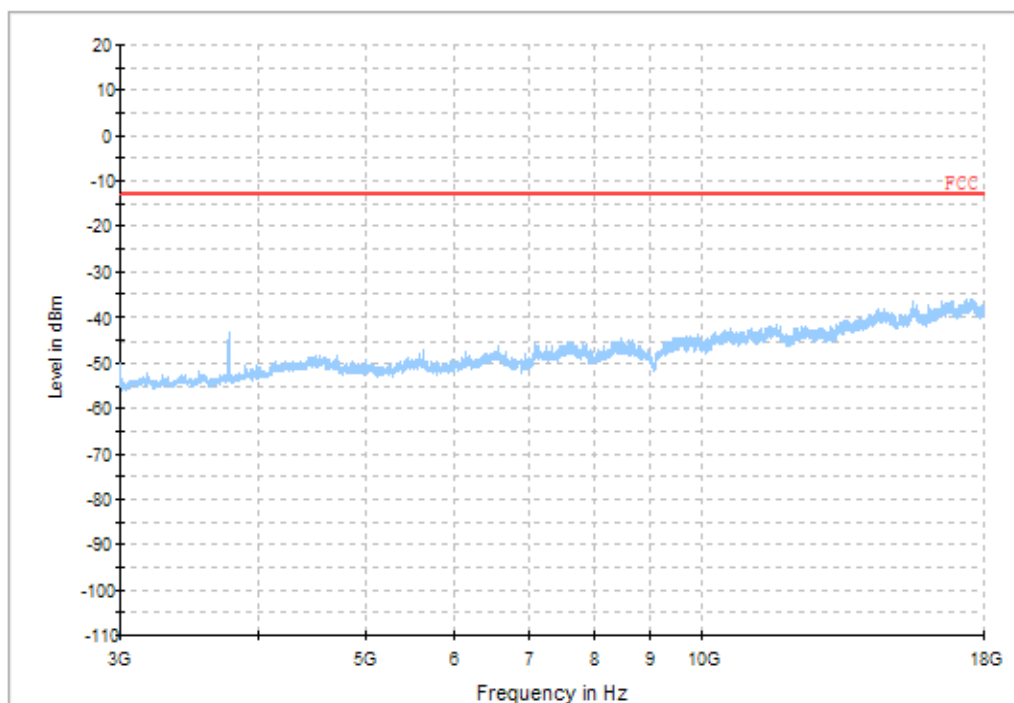
7.2.1.1 Test Mode = UMTS/TM1

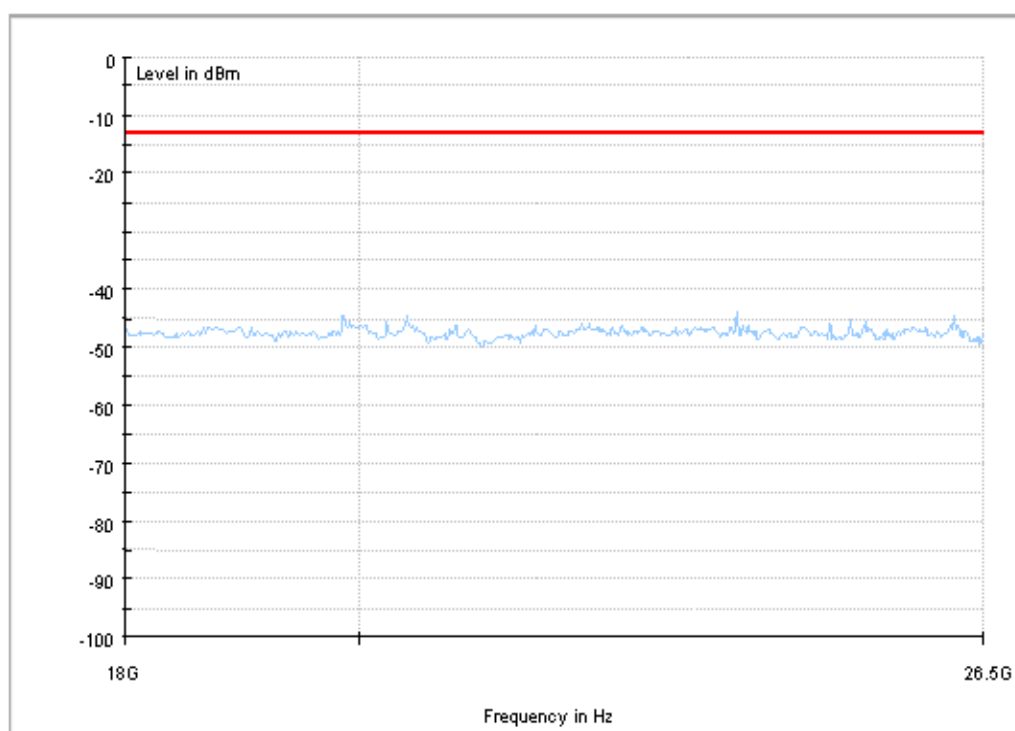


Copy of FCC PART24 WCDMA1900_L



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
GSM850	GSM/TM1	LCH	TN	VL	-29.12	-0.03533	PASS
				VN	-31.38	-0.03807	PASS
				VH	-27.44	-0.03329	PASS
		MCH	TN	VL	-19.95	-0.02385	PASS
				VN	-29.90	-0.03574	PASS
				VH	-21.05	-0.02516	PASS
		HCH	TN	VL	-26.86	-0.03164	PASS
				VN	-33.25	-0.03917	PASS
				VH	-28.67	-0.03378	PASS
	GSM/TM2	LCH	TN	VL	-26.64	-0.03232	PASS
				VN	-34.97	-0.04243	PASS
				VH	-19.57	-0.02374	PASS
		MCH	TN	VL	-22.79	-0.02724	PASS
				VN	-32.03	-0.03829	PASS
				VH	-22.18	-0.02651	PASS
		HCH	TN	VL	-7.55	-0.00889	PASS
				VN	-41.97	-0.04945	PASS
				VH	-26.05	-0.03069	PASS
GSM1900	GSM/TM1	LCH	TN	VL	-53.53	-0.02893	PASS
				VN	-64.51	-0.03487	PASS
				VH	-54.69	-0.02956	PASS
		MCH	TN	VL	-35.51	-0.01889	PASS
				VN	-31.96	-0.017	PASS
				VH	-40.94	-0.02178	PASS
		HCH	TN	VL	-59.60	-0.03121	PASS
				VN	-53.92	-0.02823	PASS
				VH	-48.75	-0.02553	PASS
	GSM/TM2	LCH	TN	VL	-57.05	-0.03083	PASS
				VN	-54.08	-0.02923	PASS
				VH	-90.14	-0.04872	PASS

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
		MCH	TN	VL	-67.74	-0.03603	PASS
				VN	-77.00	-0.04096	PASS
				VH	-31.32	-0.01666	PASS
		HCH	TN	VL	-33.06	-0.01731	PASS
				VN	-47.56	-0.0249	PASS
				VH	-58.21	-0.03048	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	-28.99	-0.03517	PASS
				-20	-24.15	-0.0293	PASS
				-10	-24.92	-0.03024	PASS
				0	-30.22	-0.03667	PASS
				10	-28.02	-0.034	PASS
				20	-24.34	-0.02953	PASS
				30	-27.70	-0.03361	PASS
				40	-31.70	-0.03846	PASS
				50	-26.47	-0.03212	PASS
		MCH	VN	-30	-27.89	-0.03334	PASS
				-20	-18.14	-0.02168	PASS
				-10	-18.92	-0.02262	PASS
				0	-22.99	-0.02748	PASS
				10	-19.95	-0.02385	PASS
				20	-20.15	-0.02409	PASS
				30	-20.47	-0.02447	PASS
				40	-22.99	-0.02748	PASS
				50	-18.60	-0.02223	PASS
		HCH	VN	-30	-30.74	-0.03622	PASS
				-20	-26.93	-0.03173	PASS
				-10	-26.02	-0.03066	PASS
				0	-24.09	-0.02838	PASS
				10	-28.22	-0.03325	PASS
				20	-23.44	-0.02762	PASS
				30	-24.34	-0.02868	PASS
				40	-26.47	-0.03119	PASS
				50	-26.93	-0.03173	PASS
	GSM/TM2	LCH	VN	-30	-29.93	-0.03631	PASS
				-20	-15.24	-0.01849	PASS

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				-10	-18.98	-0.02303	PASS
				0	-40.23	-0.04881	PASS
				10	-38.45	-0.04665	PASS
				20	-55.69	-0.06757	PASS
				30	-55.82	-0.06773	PASS
				40	-24.15	-0.0293	PASS
				50	-22.37	-0.02714	PASS
		MCH	VN	-30	-11.40	-0.01363	PASS
				-20	-29.77	-0.03558	PASS
				-10	-34.51	-0.04125	PASS
				0	4.84	0.00579	PASS
				10	-27.22	-0.03254	PASS
				20	-32.16	-0.03844	PASS
				30	-20.60	-0.02462	PASS
				40	-38.13	-0.04558	PASS
				50	-25.60	-0.0306	PASS
		HCH	VN	-30	-43.62	-0.05139	PASS
				-20	-32.09	-0.03781	PASS
				-10	-6.10	-0.00719	PASS
				0	-11.40	-0.01343	PASS
				10	-50.88	-0.05994	PASS
				20	-35.00	-0.04123	PASS
				30	-11.78	-0.01388	PASS
				40	-20.08	-0.02366	PASS
				50	-53.11	-0.06257	PASS
GSM1900	GSM/TM1	LCH	VN	-30	-56.76	-0.03068	PASS
				-20	-55.60	-0.03005	PASS
				-10	-55.66	-0.03008	PASS
				0	-65.80	-0.03556	PASS
				10	-66.51	-0.03595	PASS
				20	-50.04	-0.02705	PASS
				30	-61.34	-0.03315	PASS
				40	-49.85	-0.02694	PASS
				50	-59.73	-0.03228	PASS
		MCH	VN	-30	-33.96	-0.01806	PASS
				-20	-41.65	-0.02215	PASS
				-10	-34.68	-0.01845	PASS
				0	-37.13	-0.01975	PASS
				10	-36.35	-0.01934	PASS
				20	-40.16	-0.02136	PASS

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				30	-38.03	-0.02023	PASS
				40	-34.80	-0.01851	PASS
				50	-46.23	-0.02459	PASS
		HCH	VN	-30	-61.80	-0.03236	PASS
				-20	-53.40	-0.02796	PASS
				-10	-59.28	-0.03104	PASS
				0	-55.34	-0.02898	PASS
				10	-50.17	-0.02627	PASS
				20	-55.40	-0.02901	PASS
				30	-58.57	-0.03067	PASS
				40	-55.79	-0.02921	PASS
				50	-60.37	-0.03161	PASS
	GSM/TM2	LCH	VN	-30	-73.93	-0.03996	PASS
				-20	-63.28	-0.0342	PASS
				-10	-63.60	-0.03437	PASS
				0	-78.33	-0.04234	PASS
				10	-63.80	-0.03448	PASS
				20	-97.63	-0.05277	PASS
				30	-53.69	-0.02902	PASS
				40	-94.86	-0.05127	PASS
				50	-102.64	-0.05548	PASS
		MCH	VN	-30	-16.98	-0.00903	PASS
				-20	-31.03	-0.01651	PASS
				-10	-46.85	-0.02492	PASS
				0	-74.35	-0.03955	PASS
				10	-4.26	-0.00227	PASS
				20	-67.19	-0.03574	PASS
				30	-39.03	-0.02076	PASS
				40	-50.91	-0.02708	PASS
				50	-29.93	-0.01592	PASS
		HCH	VN	-30	-51.01	-0.02671	PASS
				-20	-57.15	-0.02992	PASS
				-10	-67.96	-0.03558	PASS
				0	-75.06	-0.0393	PASS
				10	-89.69	-0.04696	PASS
				20	-40.36	-0.02113	PASS
				30	-36.58	-0.01915	PASS
				40	-73.29	-0.03838	PASS
				50	-67.51	-0.03535	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	-10.22	-0.00552	PASS
				VN	-2.58	-0.00139	PASS
				VH	-0.20	-0.00011	PASS
		MCH	TN	VL	0.89	0.00047	PASS
				VN	-1.43	-0.00076	PASS
				VH	3.75	0.00199	PASS
		HCH	TN	VL	0.64	0.00034	PASS
				VN	3.42	0.00179	PASS
				VH	0.96	0.0005	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	0.37	0.0002	PASS
				-20	6.18	0.00334	PASS
				-10	1.88	0.00101	PASS
				0	-3.40	-0.00184	PASS
				10	2.93	0.00158	PASS
				20	-3.11	-0.00168	PASS
				30	5.34	0.00288	PASS
				40	-3.80	-0.00205	PASS
				50	9.19	0.00496	PASS
		MCH	VN	-30	1.89	0.00101	PASS
				-20	1.28	0.00068	PASS
				-10	1.04	0.00055	PASS
				0	6.48	0.00345	PASS
				10	-2.72	-0.00145	PASS
				20	4.43	0.00236	PASS
				30	-6.06	-0.00322	PASS
				40	0.08	0.00004	PASS
				50	2.44	0.0013	PASS
		HCH	VN	-30	-0.81	-0.00042	PASS
				-20	-2.20	-0.00115	PASS
				-10	-0.23	-0.00012	PASS
				0	-1.71	-0.0009	PASS
				10	1.75	0.00092	PASS



Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				20	1.48	0.00078	PASS
				30	1.22	0.00064	PASS
				40	2.43	0.00127	PASS
				50	0.61	0.00032	PASS

END