



Appendix for test report

APPENDIX FOR TEST REPORT

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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	32.36	29.88	38.5	PASS
		MCH	32.42	29.97	38.5	PASS
		HCH	32.38	29.80	38.5	PASS
WCDMA850	UMTS/TM1	LCH	24.29	21.86	38.5	PASS
		MCH	24.32	21.75	38.5	PASS
		HCH	24.16	21.69	38.5	PASS
Test Band	Test Mode	Test Channel	Conducted Power [dBm]	EIRP [dBm]	Limit [dBm]	Verdict
GSM1900	GSM/TM1	LCH	29.72	30.05	33	PASS
		MCH	29.75	30.22	33	PASS
		HCH	29.73	29.95	33	PASS
WCDMA1900	UMTS/TM1	LCH	22.14	22.53	33	PASS
		MCH	22.28	22.71	33	PASS
		HCH	22.30	22.68	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	0.12	13	PASS
		MCH	0.11	13	PASS
		HCH	0.12	13	PASS
Test Band	Test Mode	Test Channel	Measured[dB]	Limit [dB]	Verdict
WCDMA1900	UMTS/TM1	LCH	3.24	13	PASS
		MCH	3.35	13	PASS
		HCH	3.28	13	PASS

3Appendix_C: Modulation Characteristics

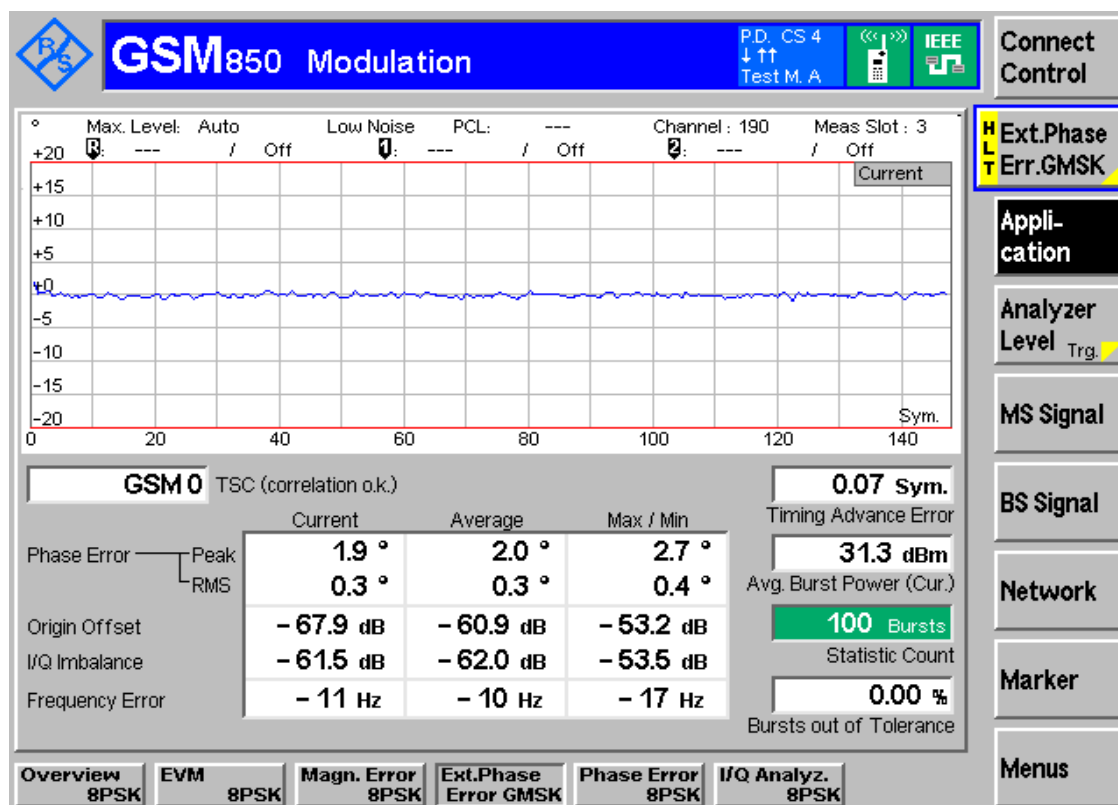
Part I - Test Plots

3.1 For GSM

3.1.1 Test Band = GSM850

3.1.1.1 Test Mode = GSM/TM1

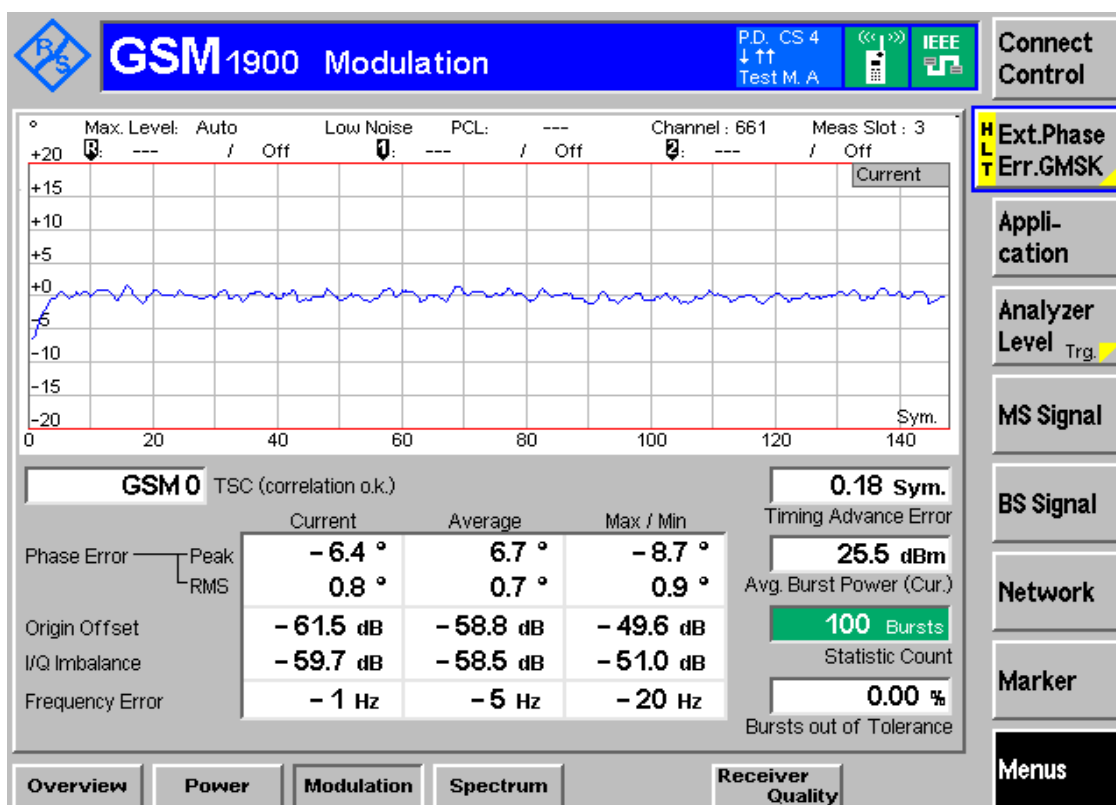
3.1.1.1.1 Test Channel = MCH



3.1.2 Test Band = GSM1900

3.1.2.1 Test Mode = GSM/TM1

3.1.2.1.1 Test Channel = MCH

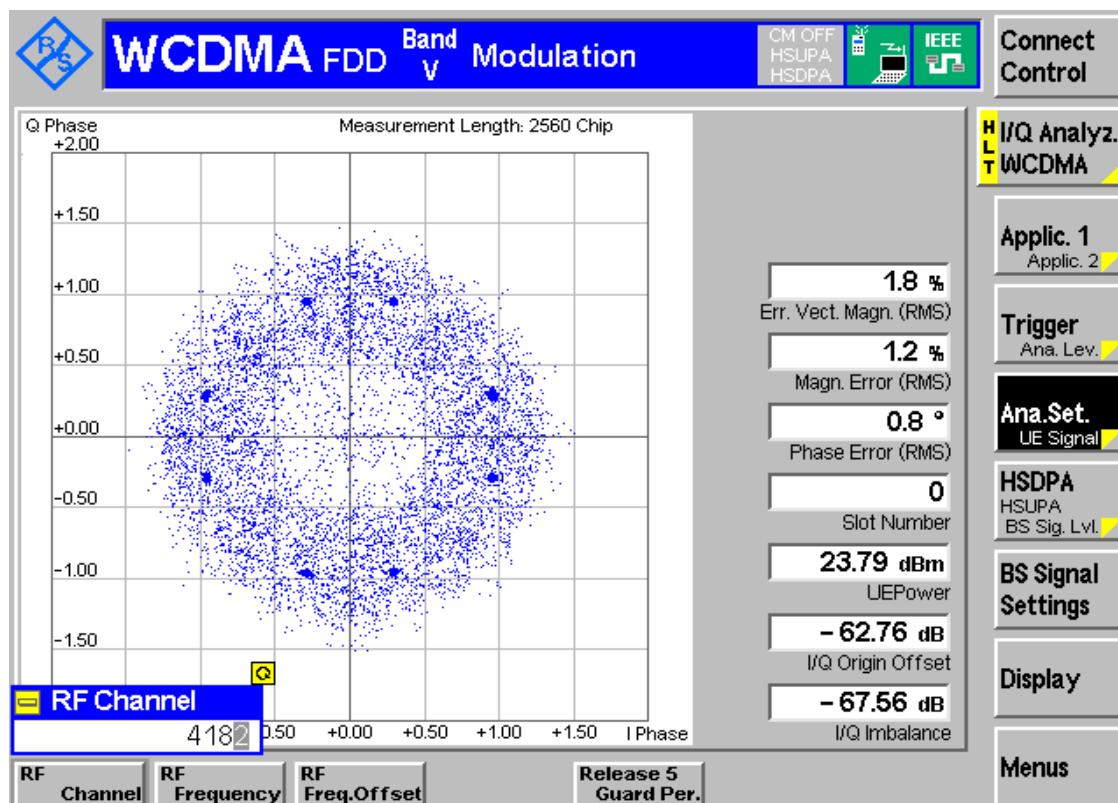


3.2 For UMTS

3.2.1 Test Band = WCDMA850

3.2.1.1 Test Mode = UMTS/TM1

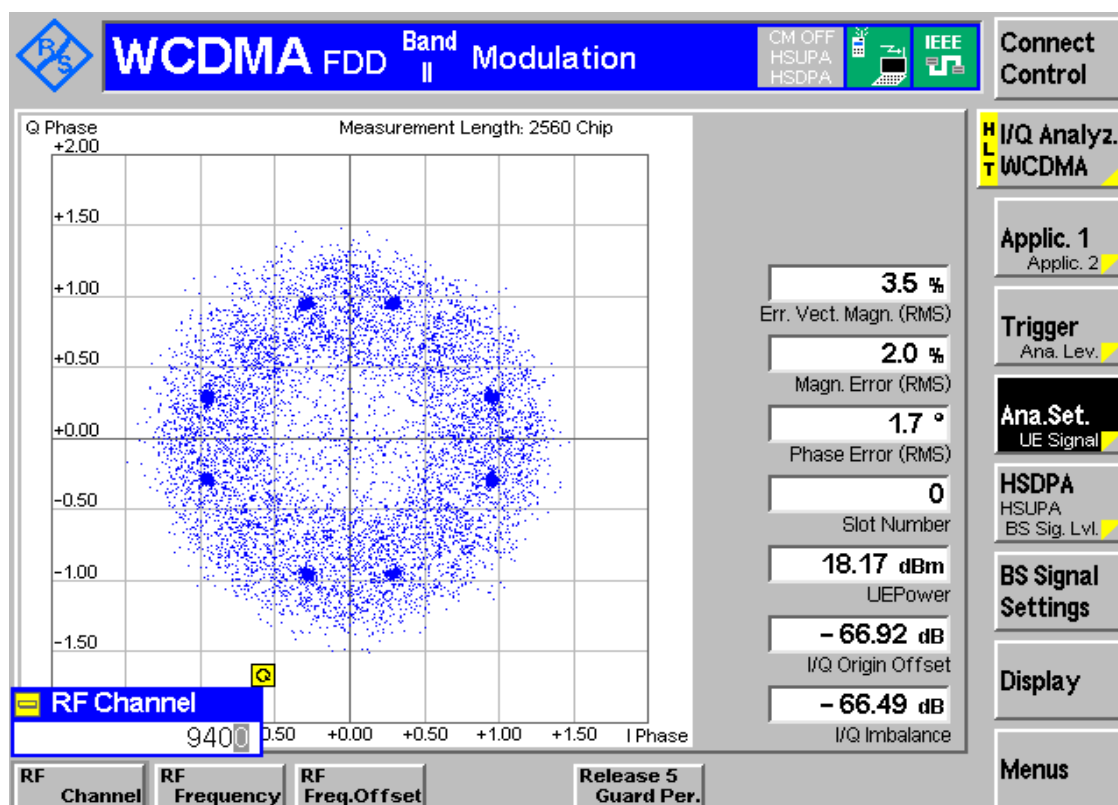
3.2.1.1.1 Test Channel = MCH



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
GSM850	GSM/TM1	LCH	247.62	314.95	Pass
		MCH	245.64	322.91	Pass
		HCH	246.04	312.78	Pass
GSM1900	GSM/TM1	LCH	243.93	315.81	Pass
		MCH	244.05	313.86	Pass
		HCH	245.27	314.31	Pass
Test Band	Test Mode	Test Channel	Occupied Bandwidth [MHz]	Emission Bandwidth [MHz]	Verdict
WCDMA850	UMTS/TM1	LCH	4.15	4.68	Pass
		MCH	4.16	4.70	Pass
		HCH	4.16	4.69	Pass
WCDMA1900	UMTS/TM1	LCH	4.16	4.69	Pass
		MCH	4.15	4.67	Pass
		HCH	4.18	4.70	Pass

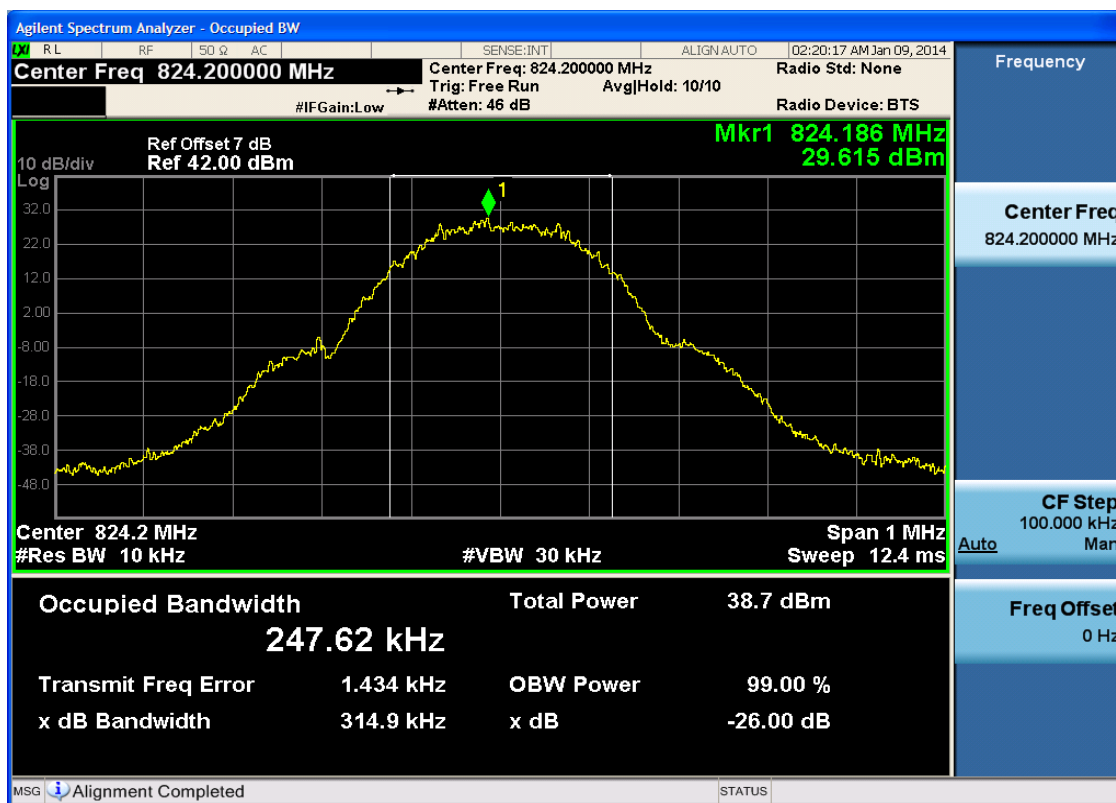
Part II - Test Plots

4.1 For GSM

4.1.1 Test Band = GSM850

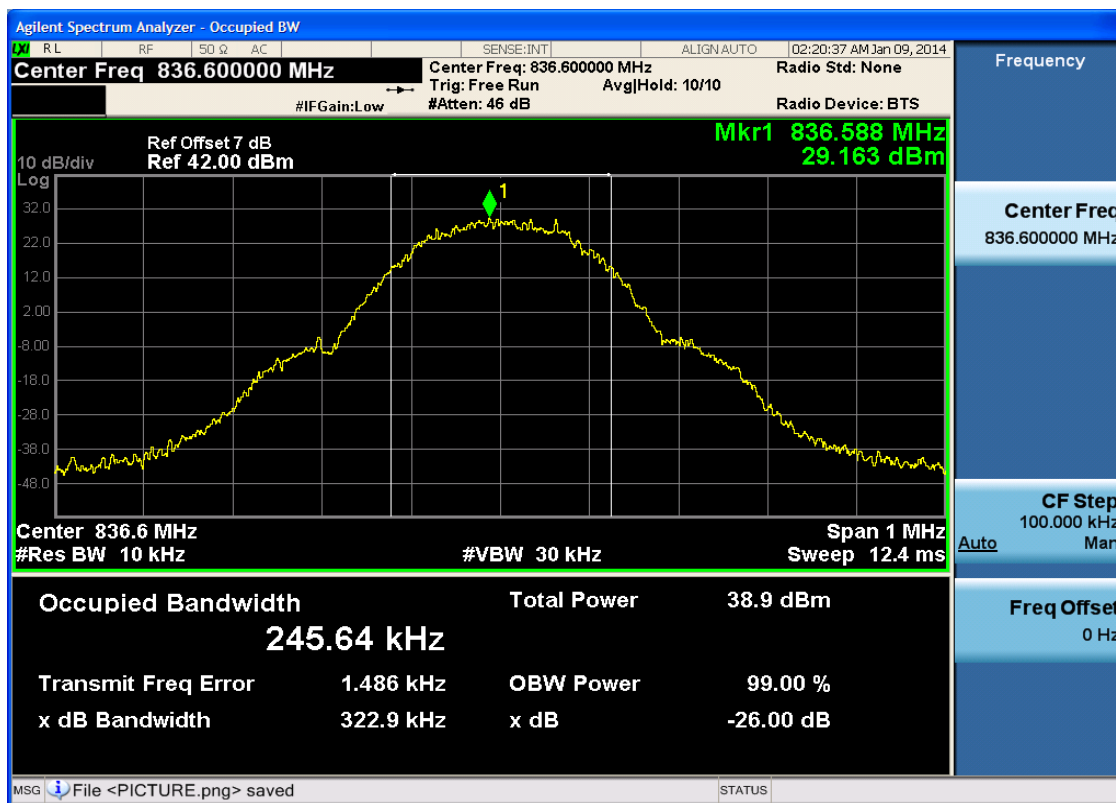
4.1.1.1 Test Mode = GSM/TM1

4.1.1.1.1 Test Channel = LCH

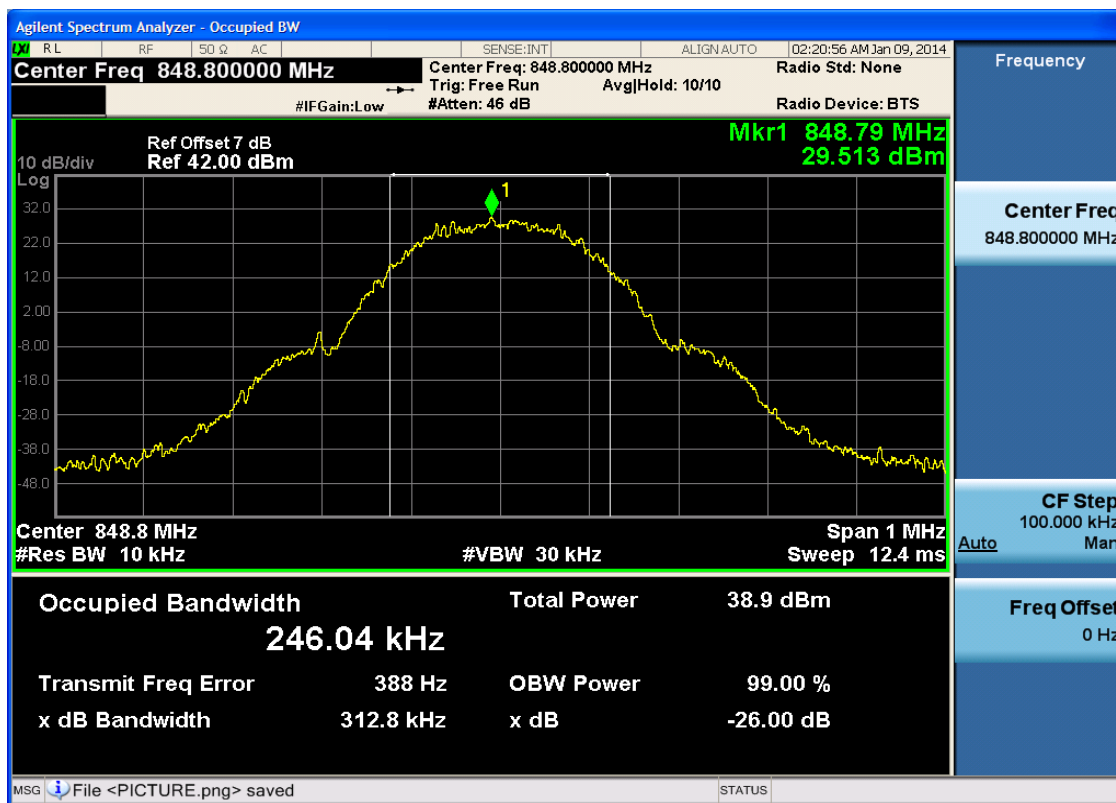




4.1.1.1.2 Test Channel = MCH



4.1.1.1.3 Test Channel = HCH

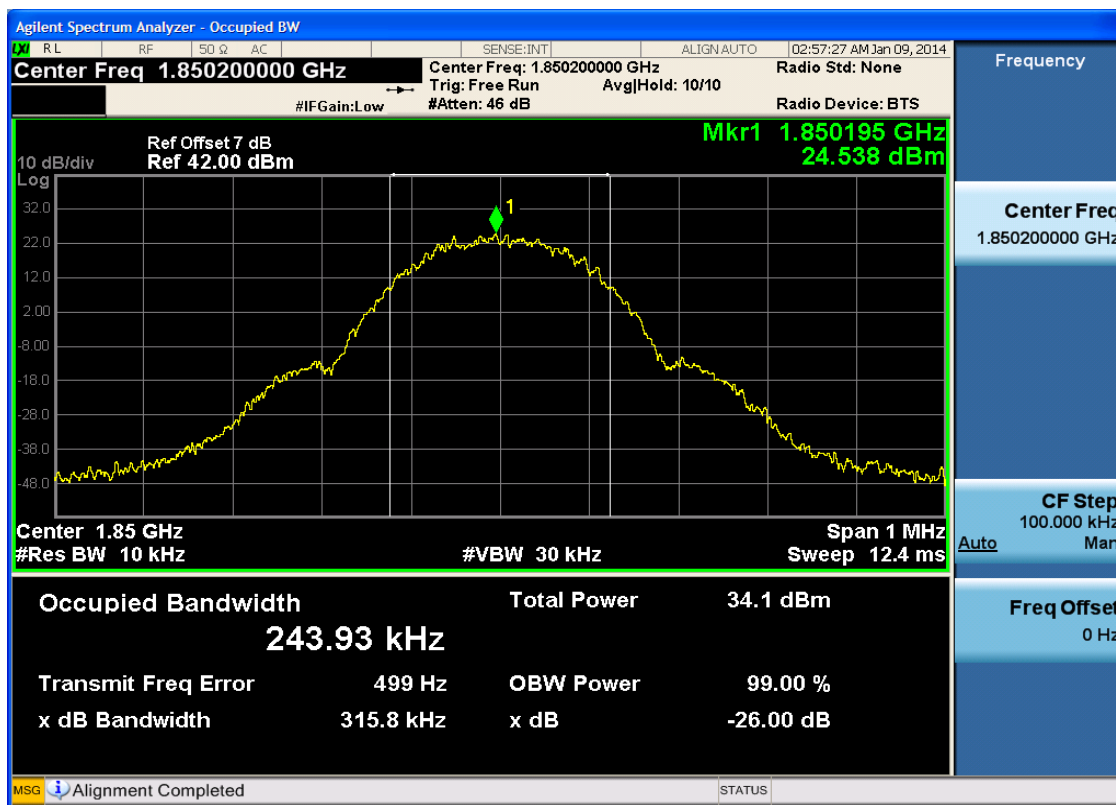




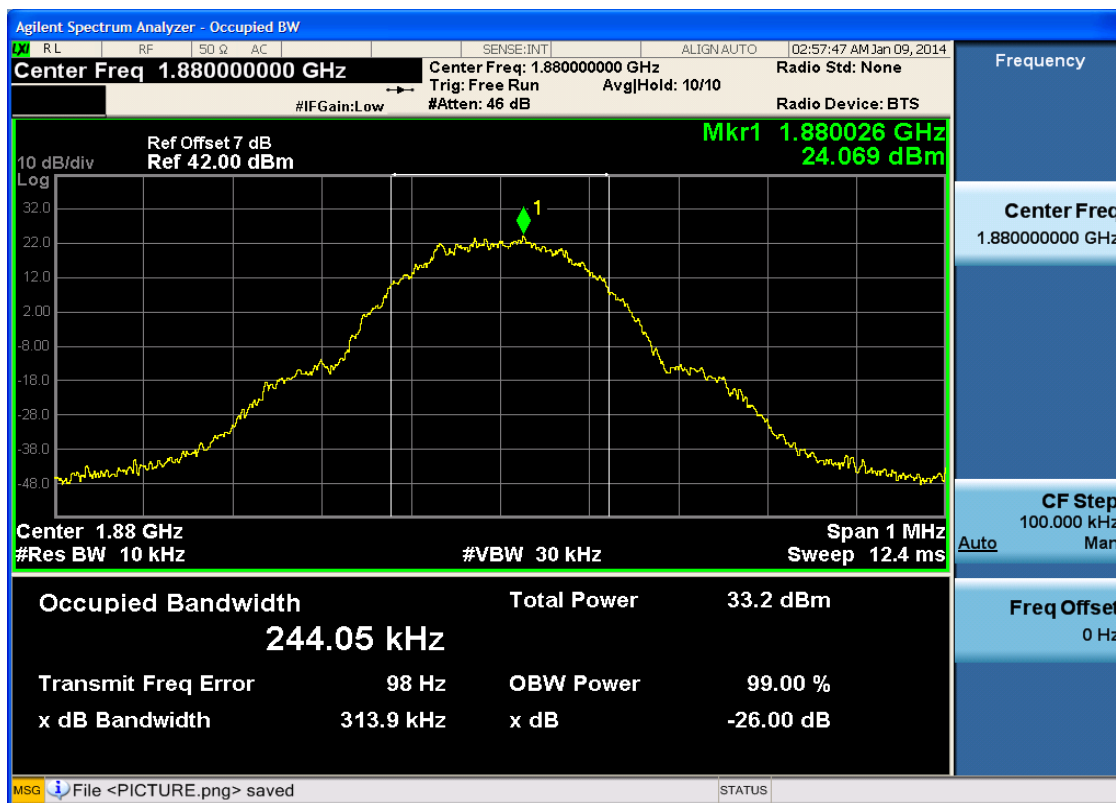
4.1.2 Test Band = GSM1900

4.1.2.1 Test Mode = GSM/TM1

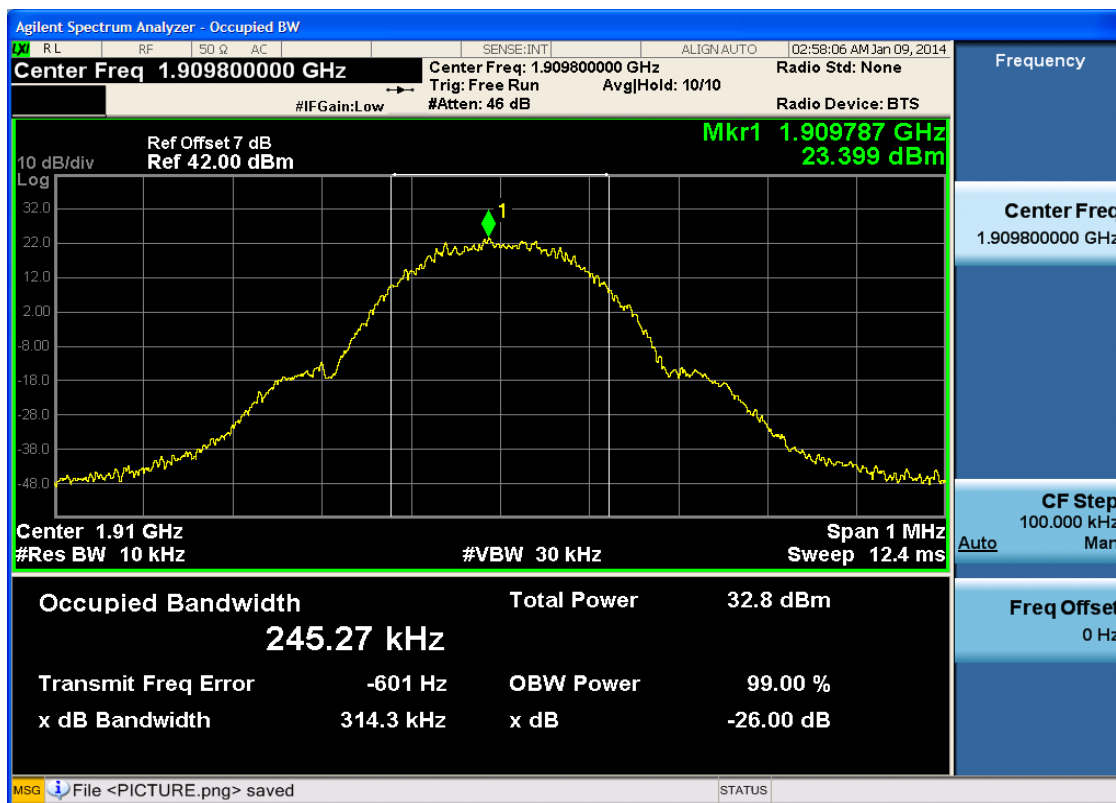
4.1.2.1.1 Test Channel = LCH

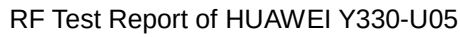


4.1.2.1.2 Test Channel = MCH

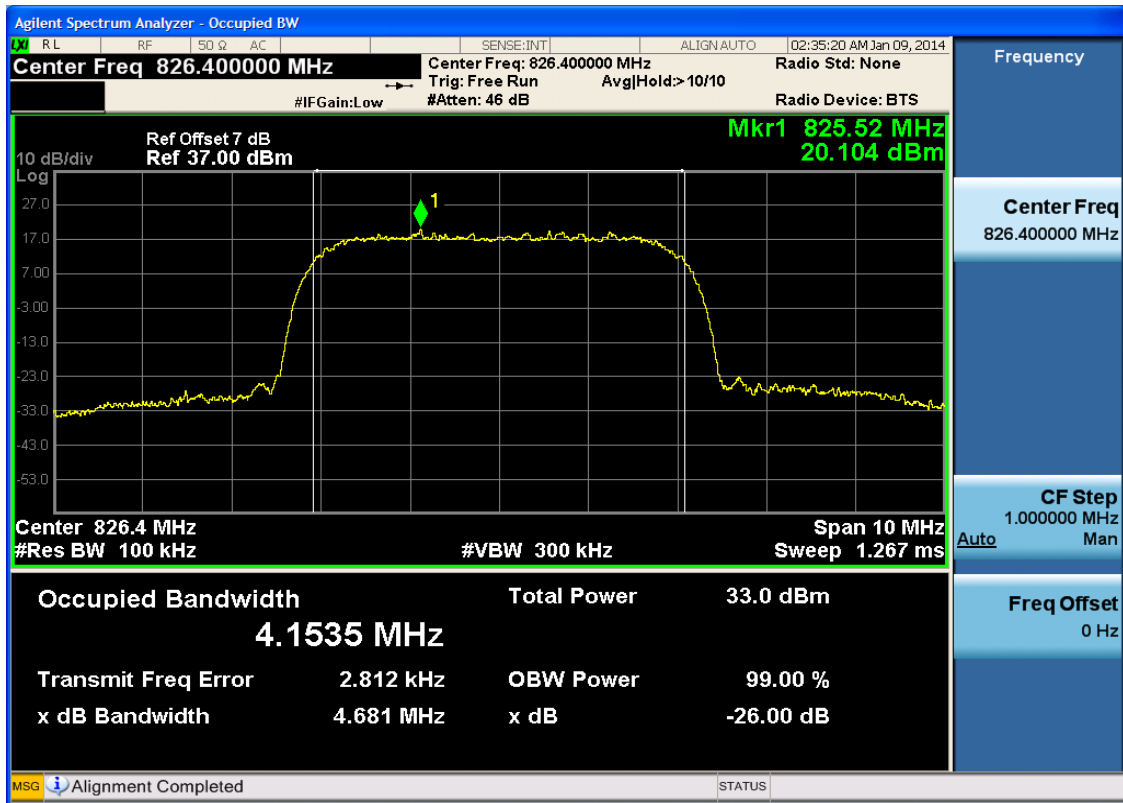


4.1.2.1.3 Test Channel = HCH

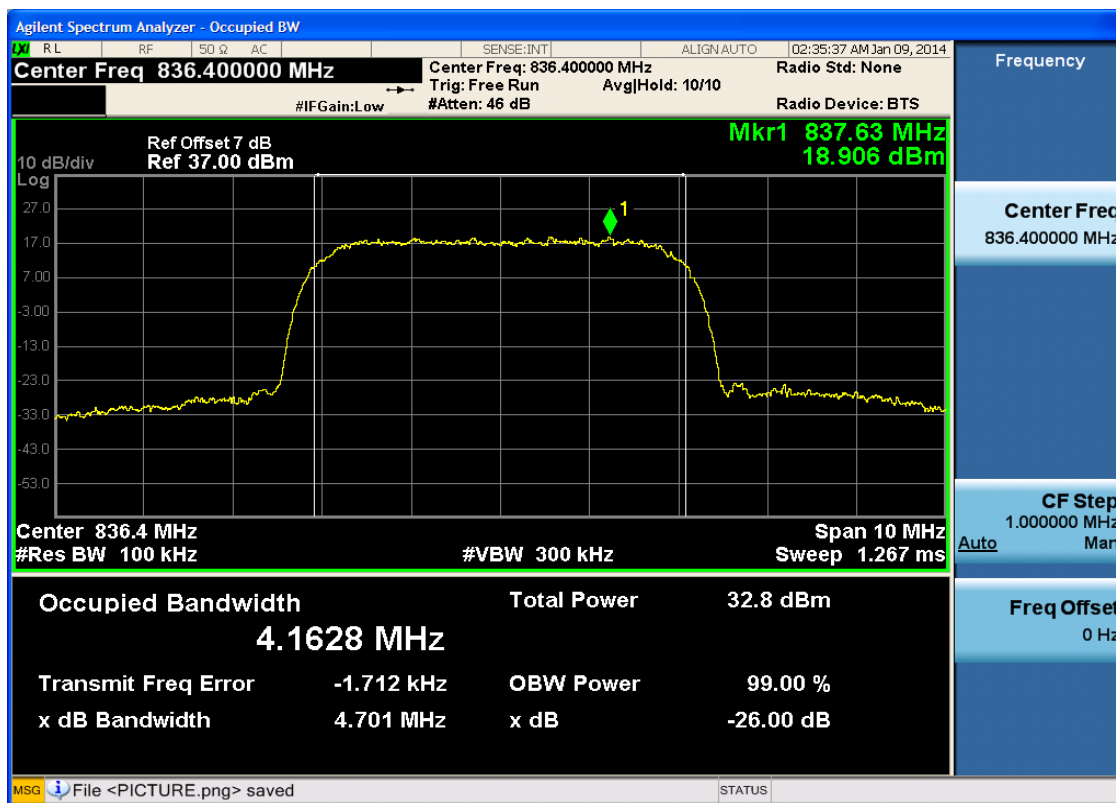




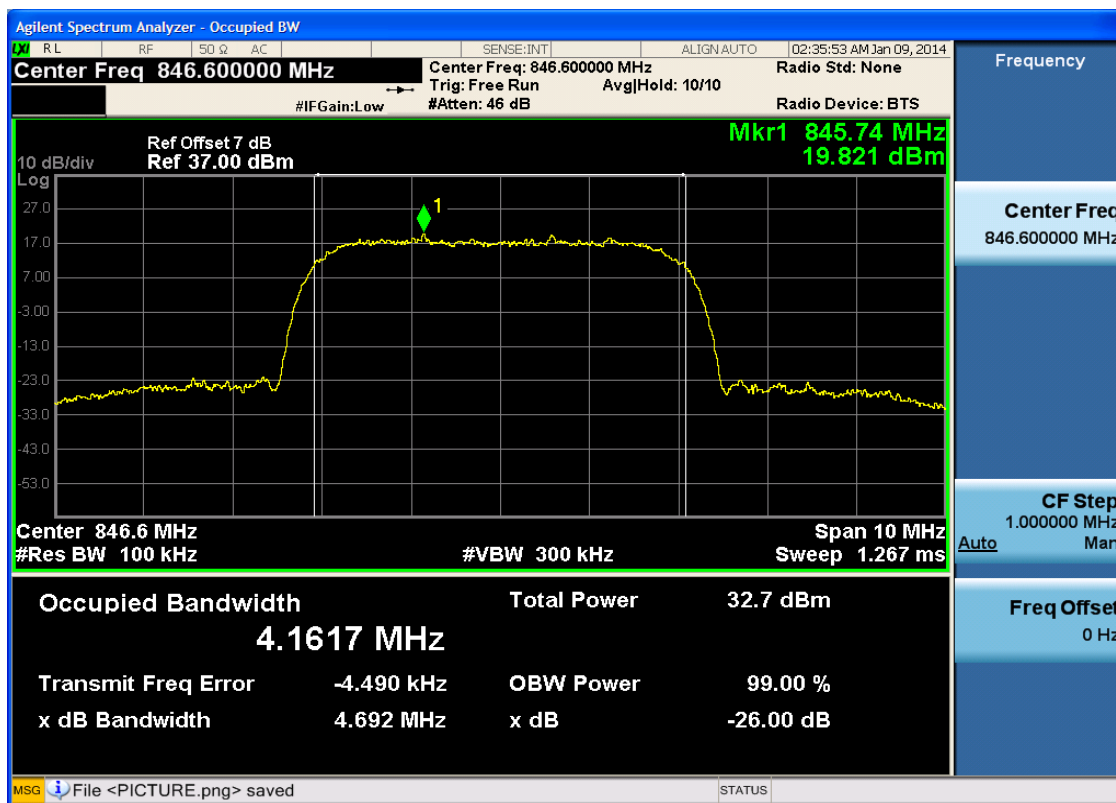
4.2.1.1.1 Test Channel = LCH



4.2.1.1.2 Test Channel = MCH



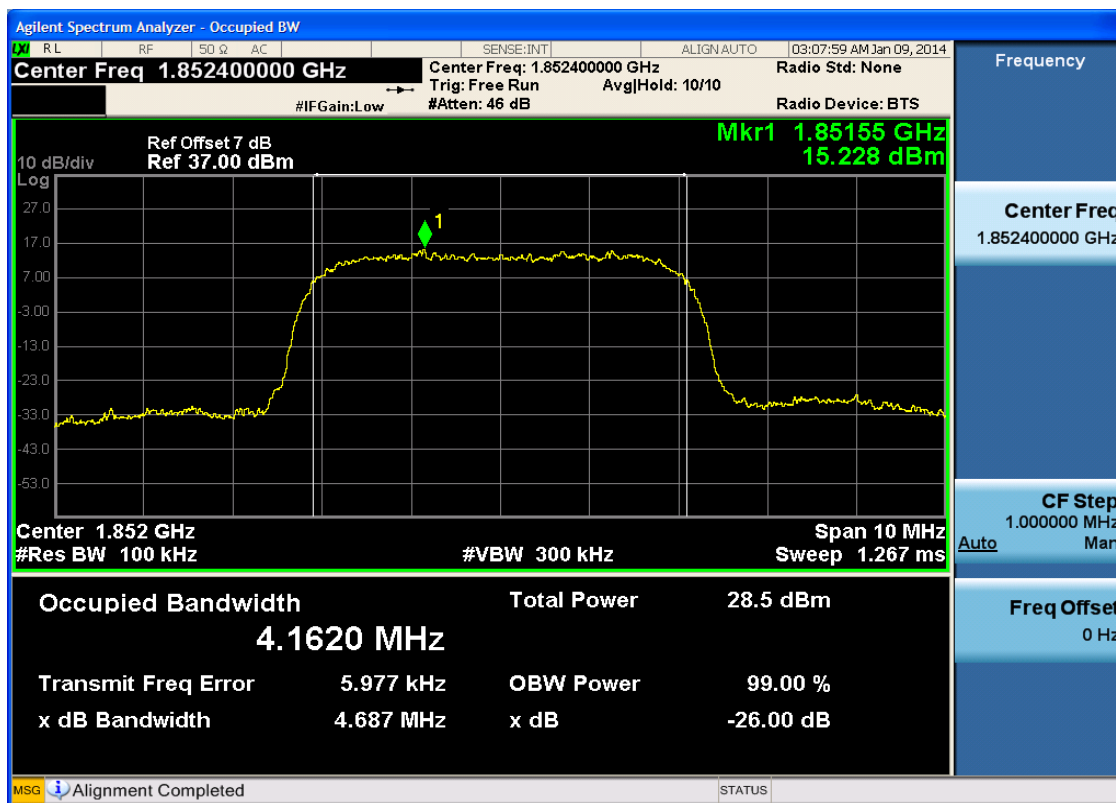
4.2.1.1.3 Test Channel = HCH



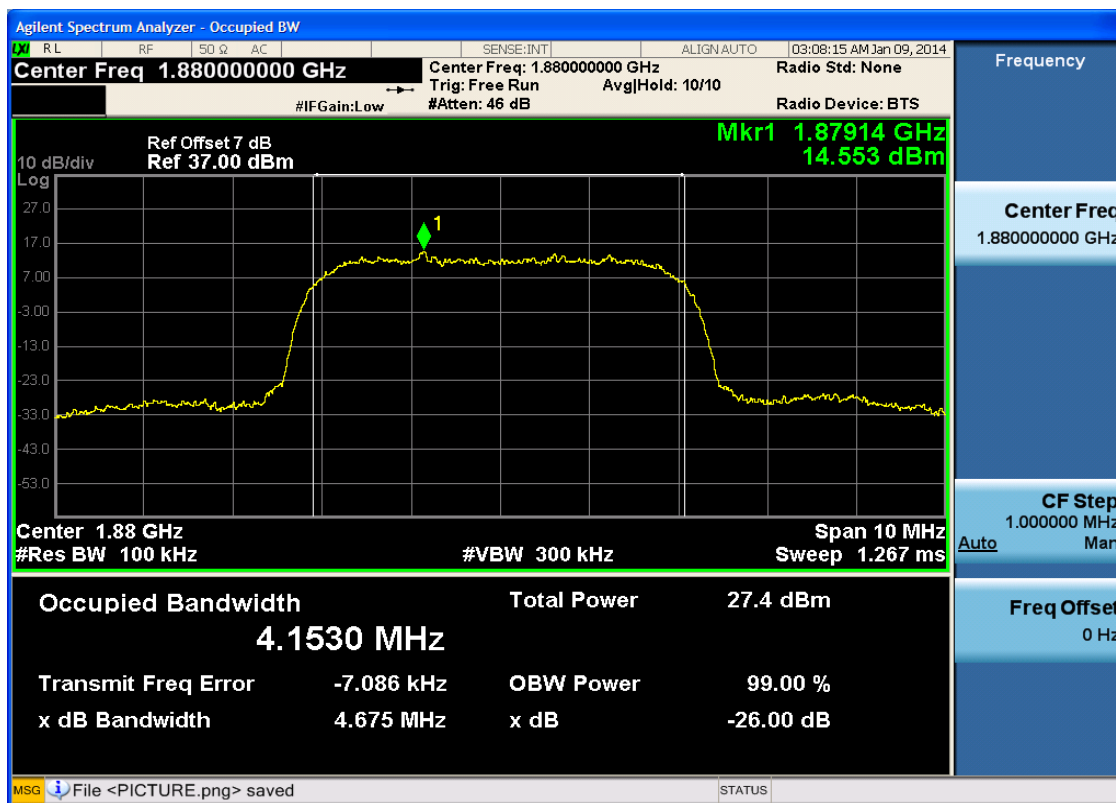
4.2.2 Test Band = WCDMA1900

4.2.2.1 Test Mode = UMTS/TM1

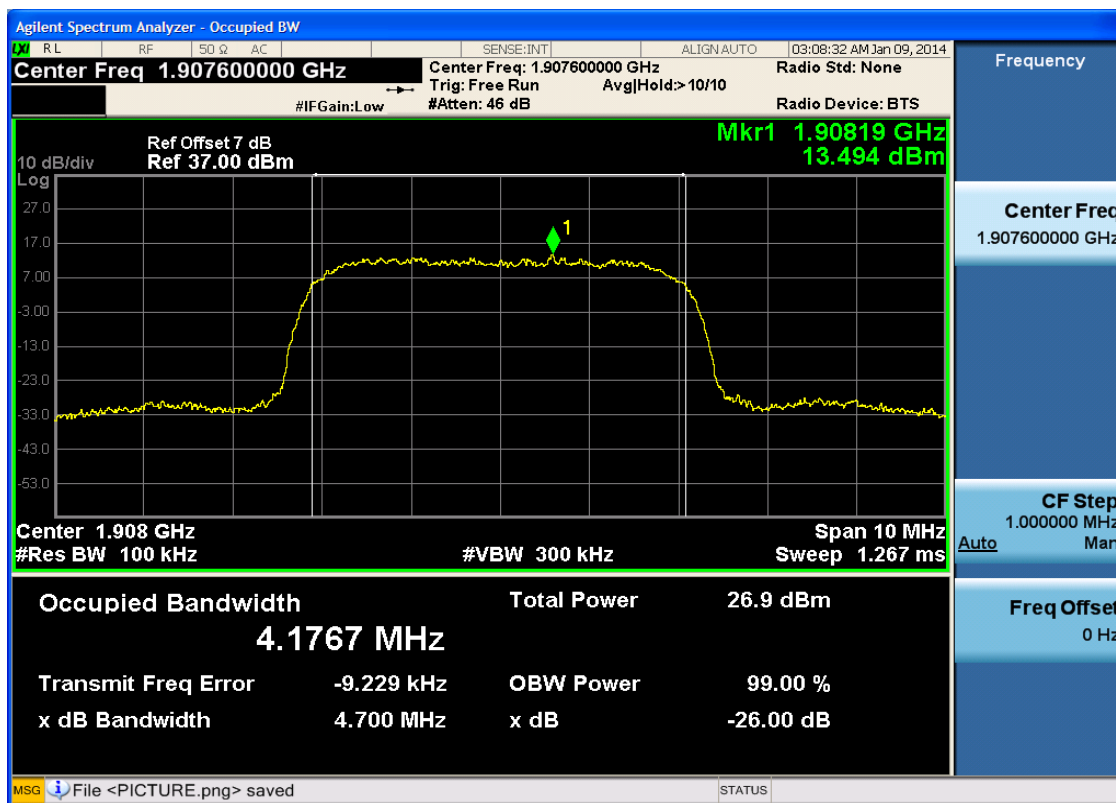
4.2.2.1.1 Test Channel = LCH



4.2.2.1.2 Test Channel = MCH



4.2.2.1.3 Test Channel = HCH



5Appendix_E: Band Edges Compliance

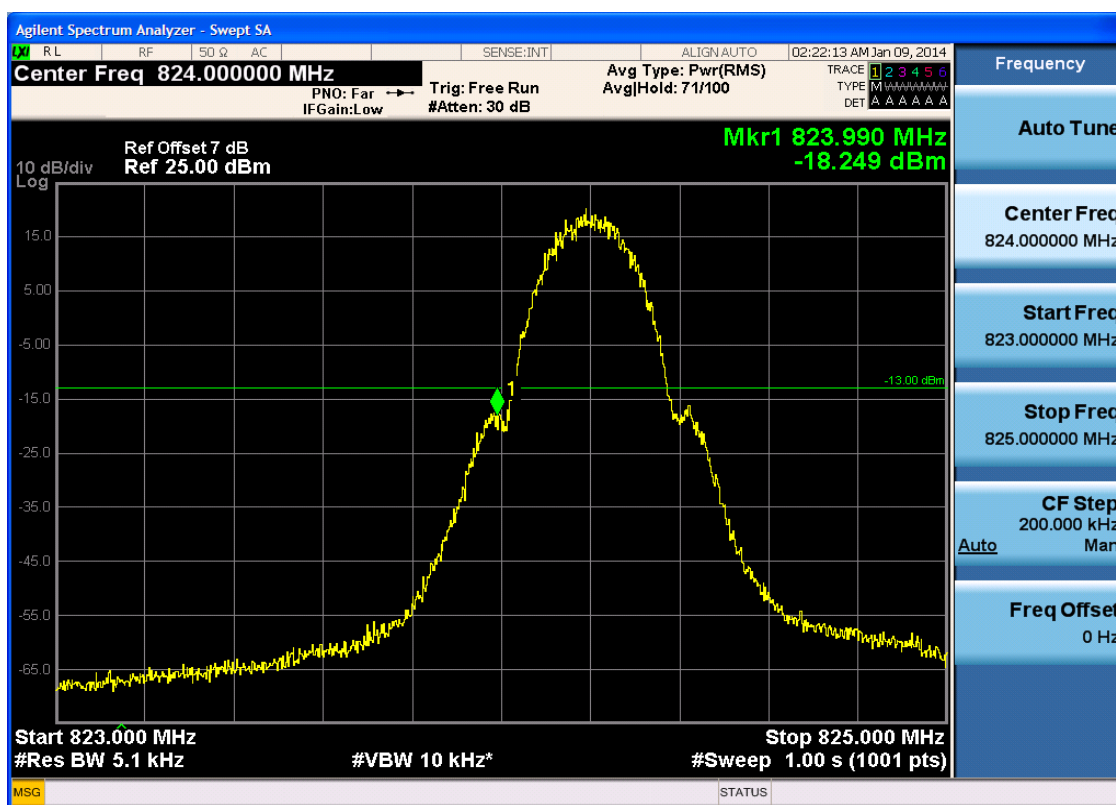
Part I - Test Plots

5.1 For GSM

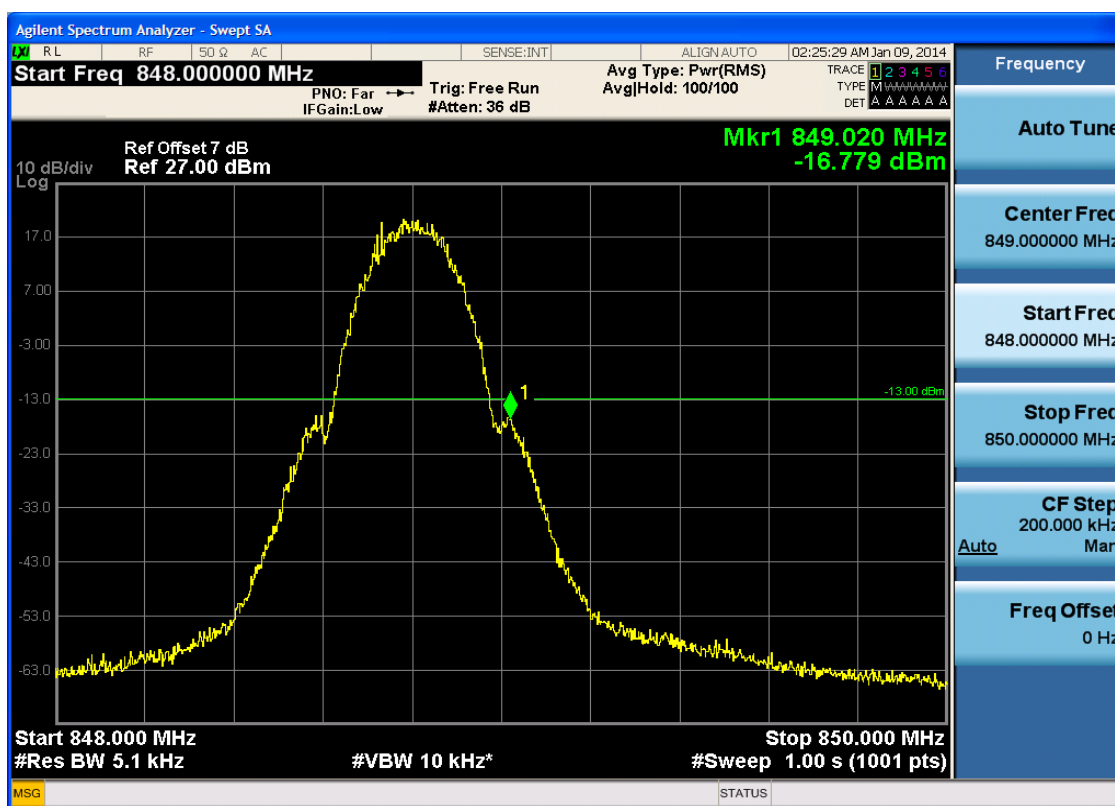
5.1.1 Test Band = GSM850

5.1.1.1 Test Mode = GSM/TM1

5.1.1.1.1 Test Channel = LCH



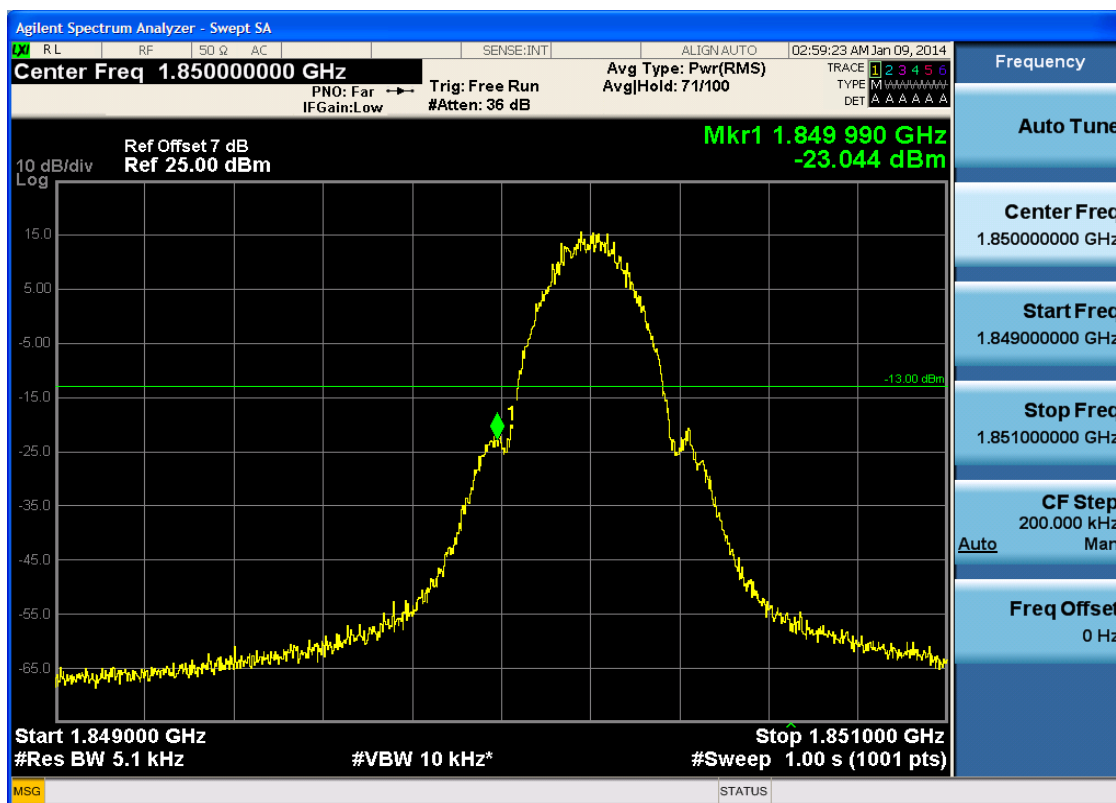
5.1.1.1.2 Test Channel = HCH

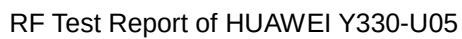


5.1.2 Test Band = GSM1900

5.1.2.1 Test Mode = GSM/TM1

5.1.2.1.1 Test Channel = LCH





Agilent Spectrum Analyzer - Swept SA

R/L RF 50 Ω AC SENSE:INT ALIGN:AUTO 03:00:38 AM Jan 09, 2014

Center Freq 1.91000000 GHz

PNO: Far → Trig: Free Run Avg Type: Pwr(RMS) TRACE 1 2 3 4 5 6
IFGain:Low #Atten: 36 dB Avg|Hold: 70/100 TYPE M *****
DET A A A A A

Ref Offset 7 dB Ref 25.00 dBm

Mkr1 1.910 020 GHz -23.103 dBm

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

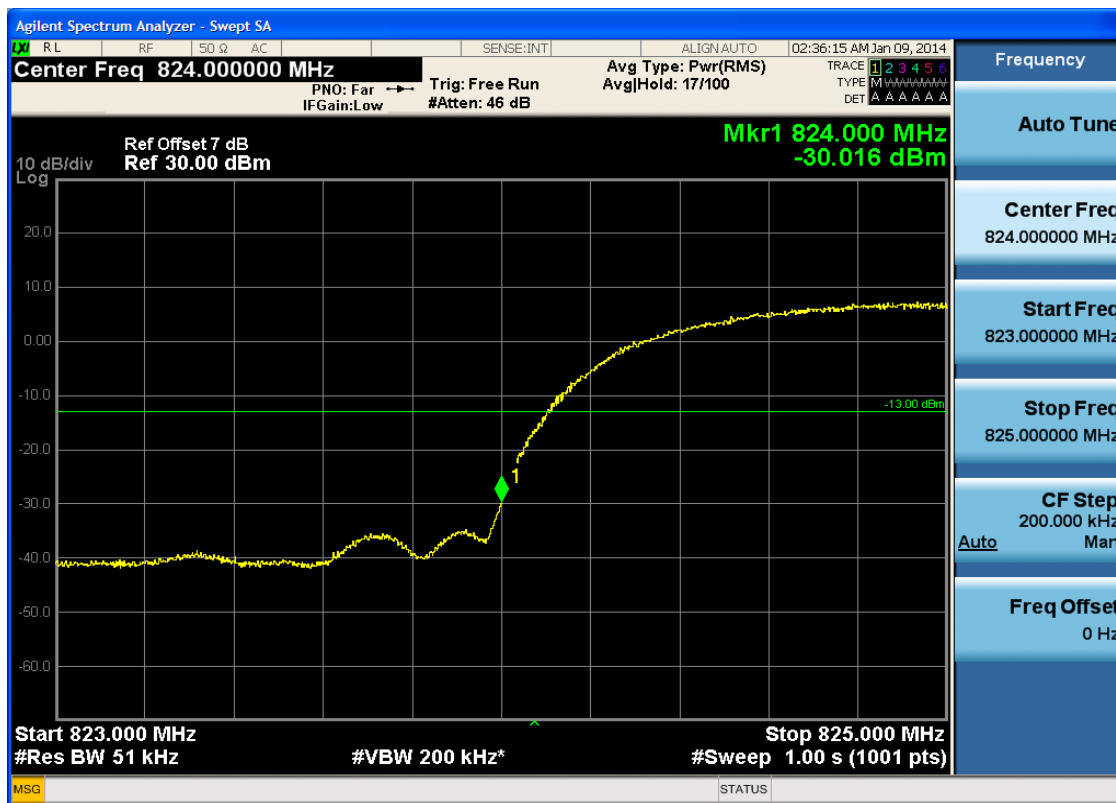
MSG Alignment Completed STATUS

5.2 For UMTS

5.2.1 Test Band = WCDMA850

5.2.1.1 Test Mode = UMTS/TM1

5.2.1.1.1 Test Channel = LCH



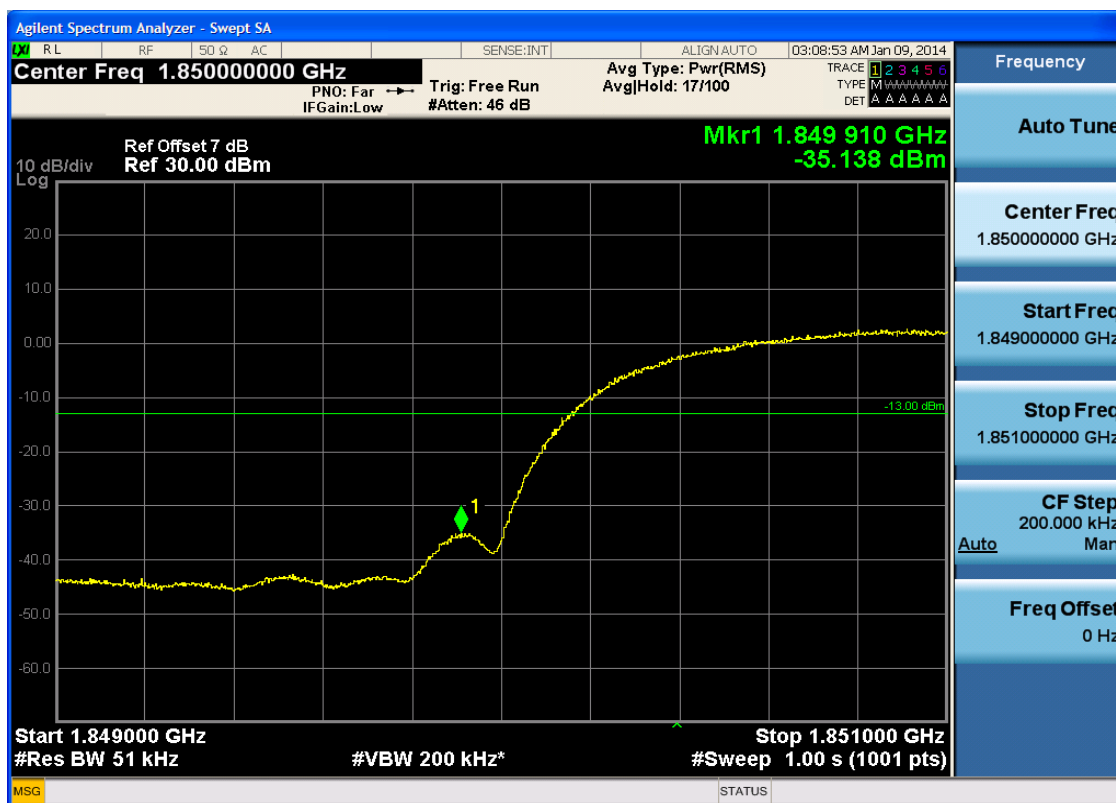
5.2.1.1.2 Test Channel = HCH



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.

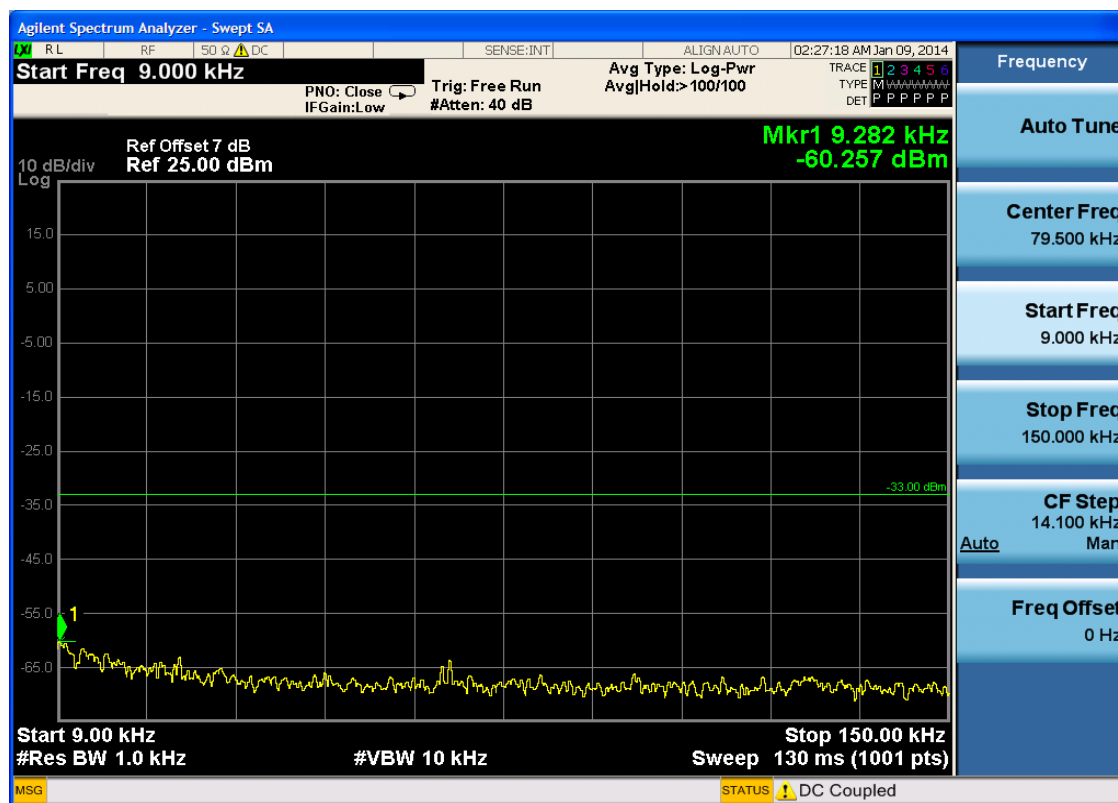
Part I - Test Plots

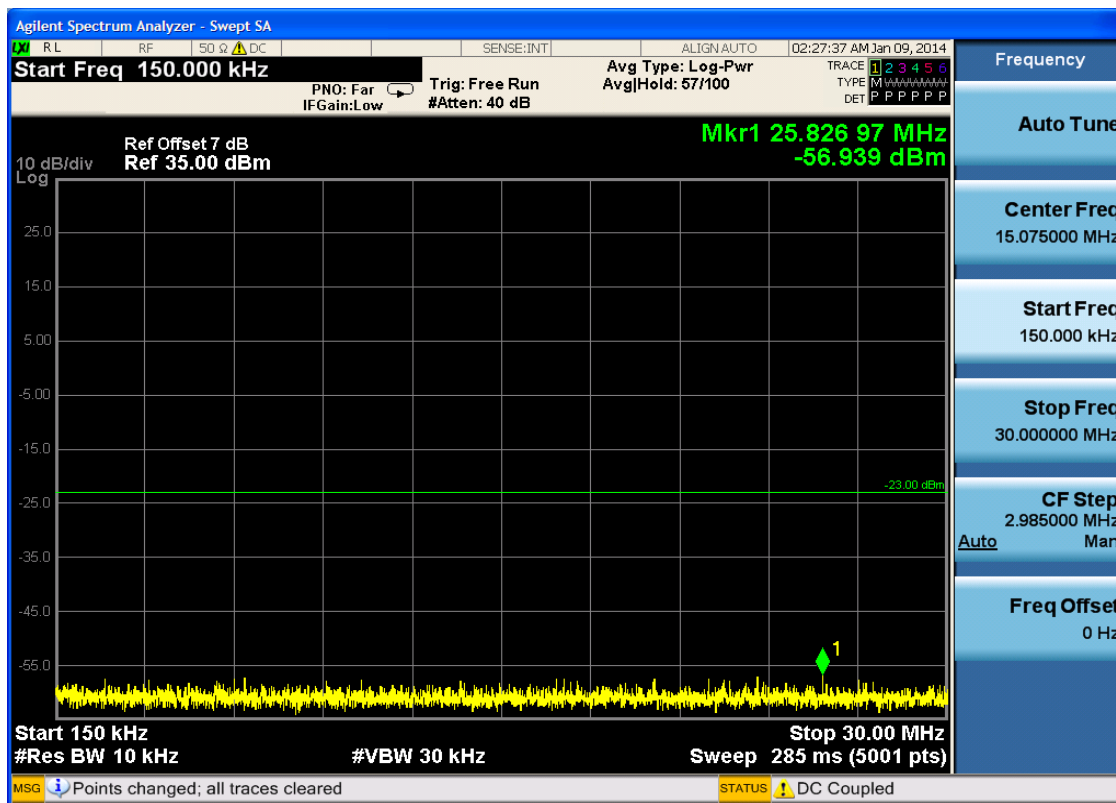
6.1 For GSM

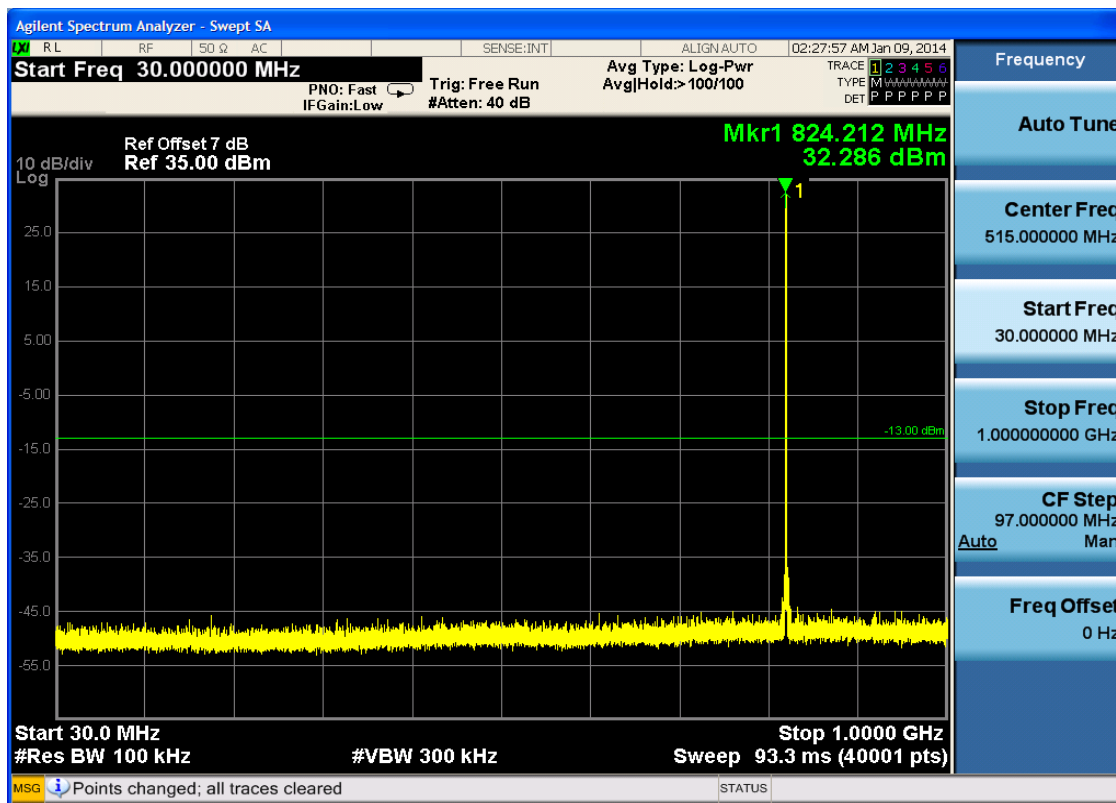
6.1.1 Test Band = GSM850

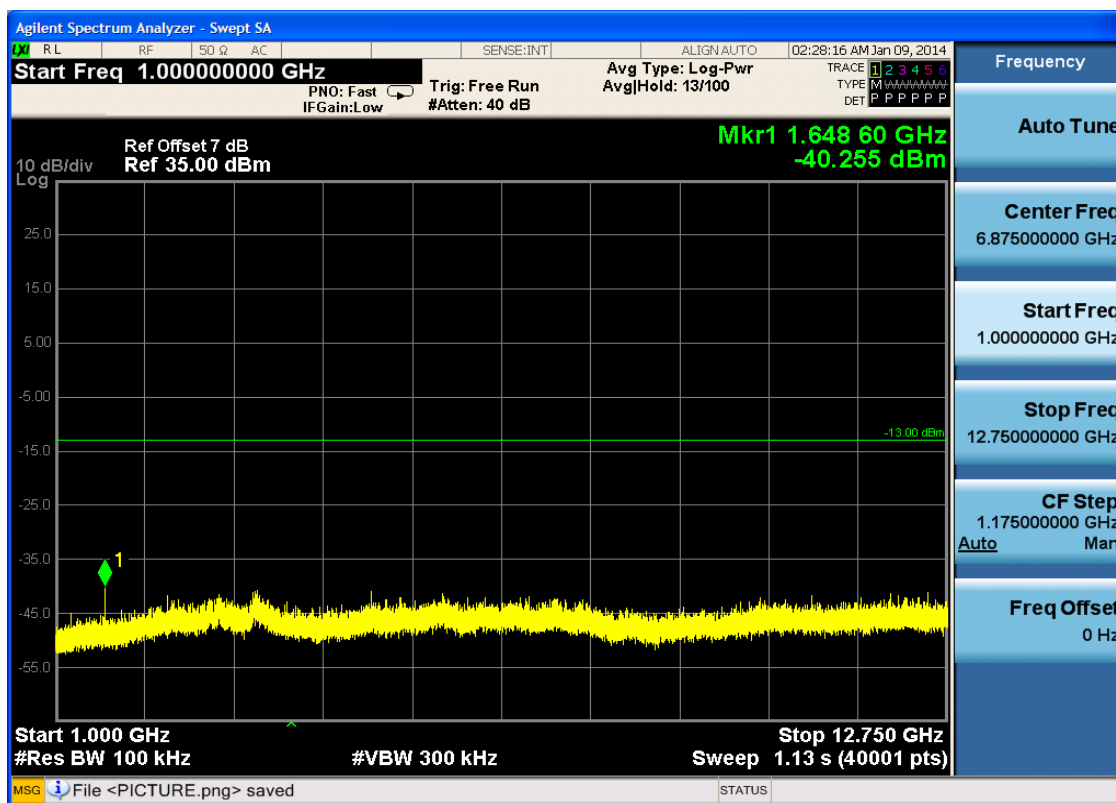
6.1.1.1 Test Mode = GSM/TM1

6.1.1.1.1 Test Channel = LCH

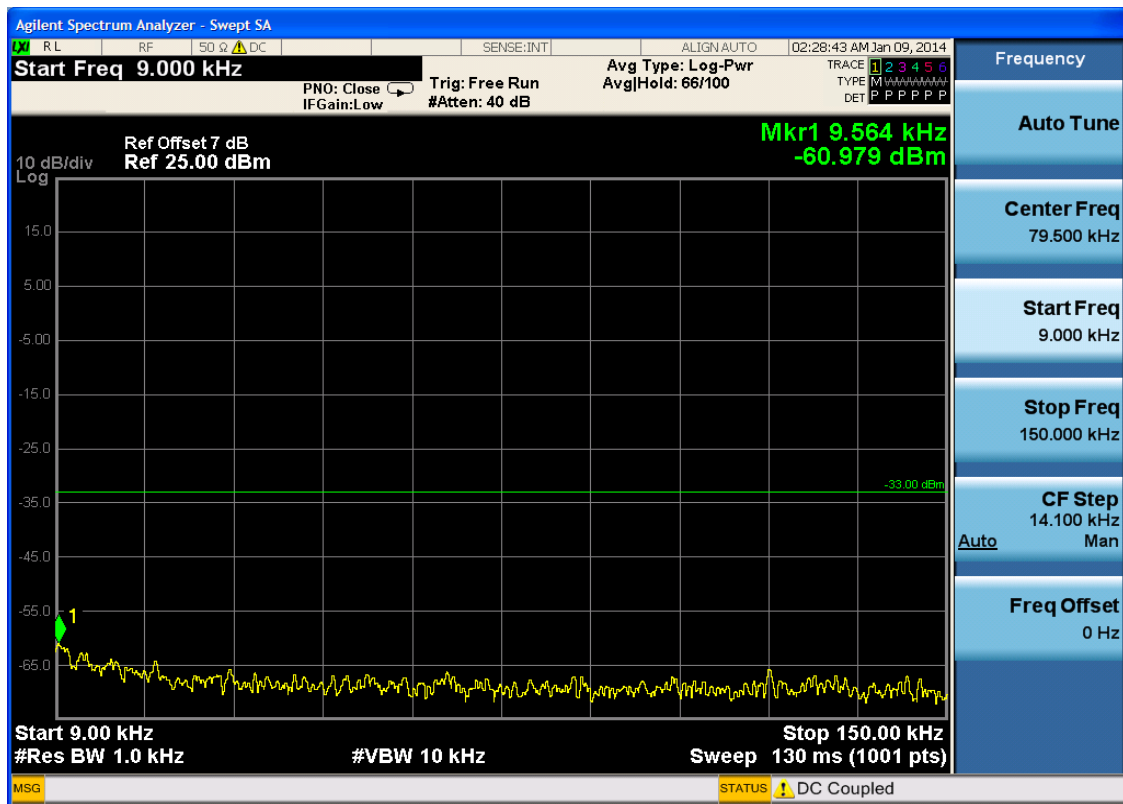


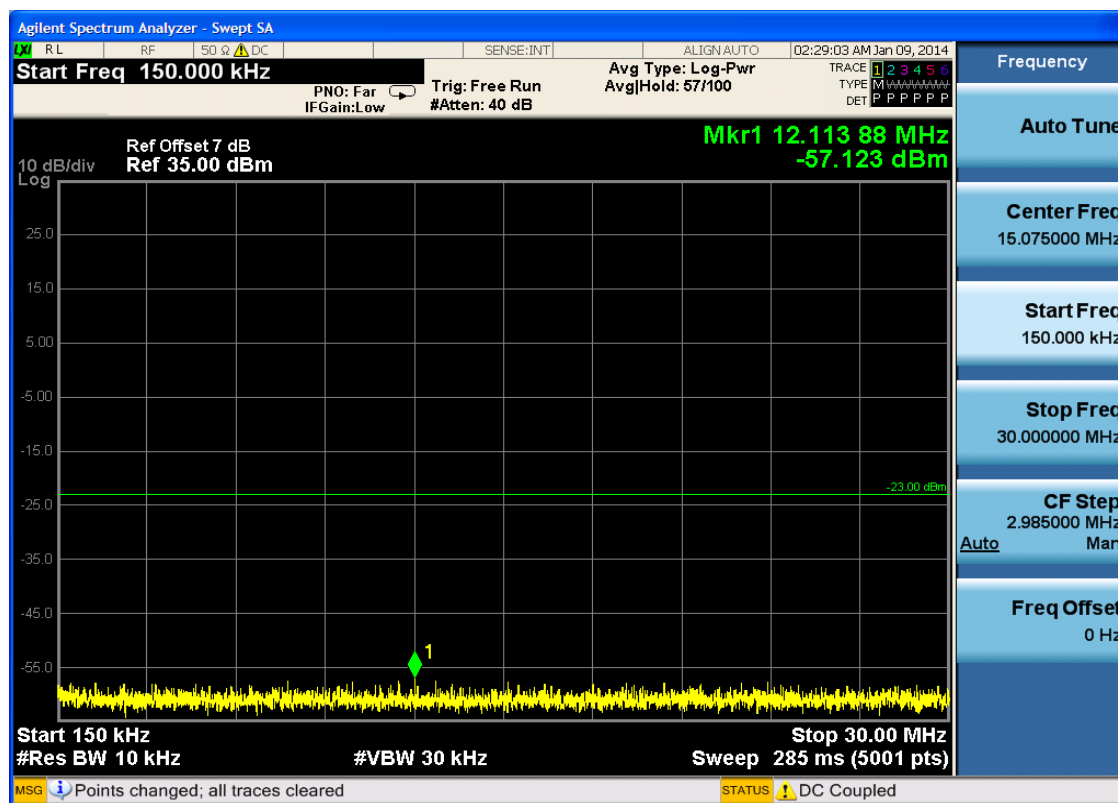


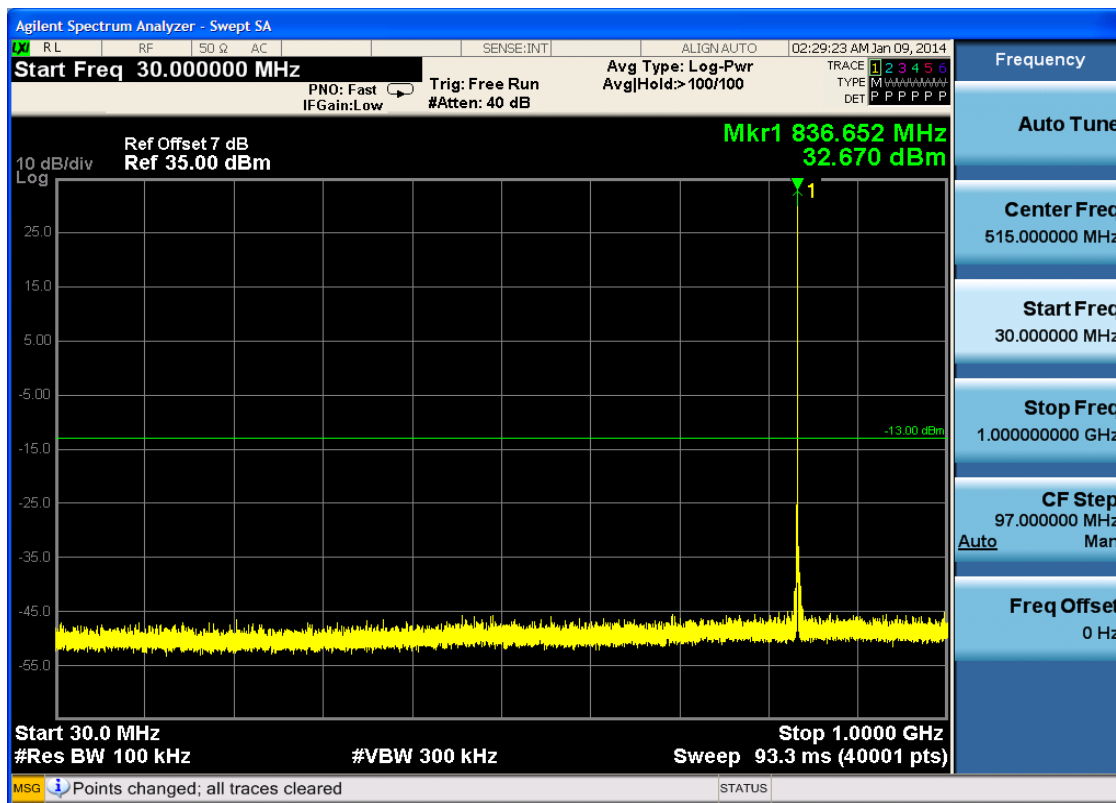


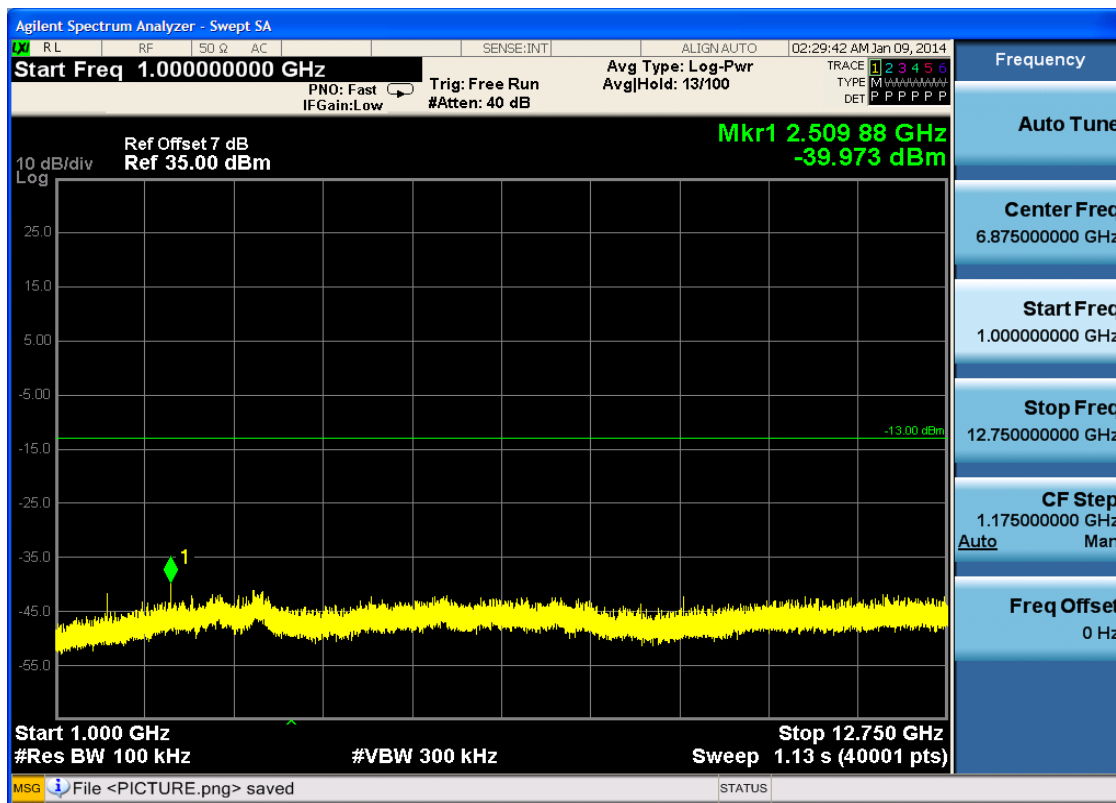


6.1.1.1.2 Test Channel = MCH

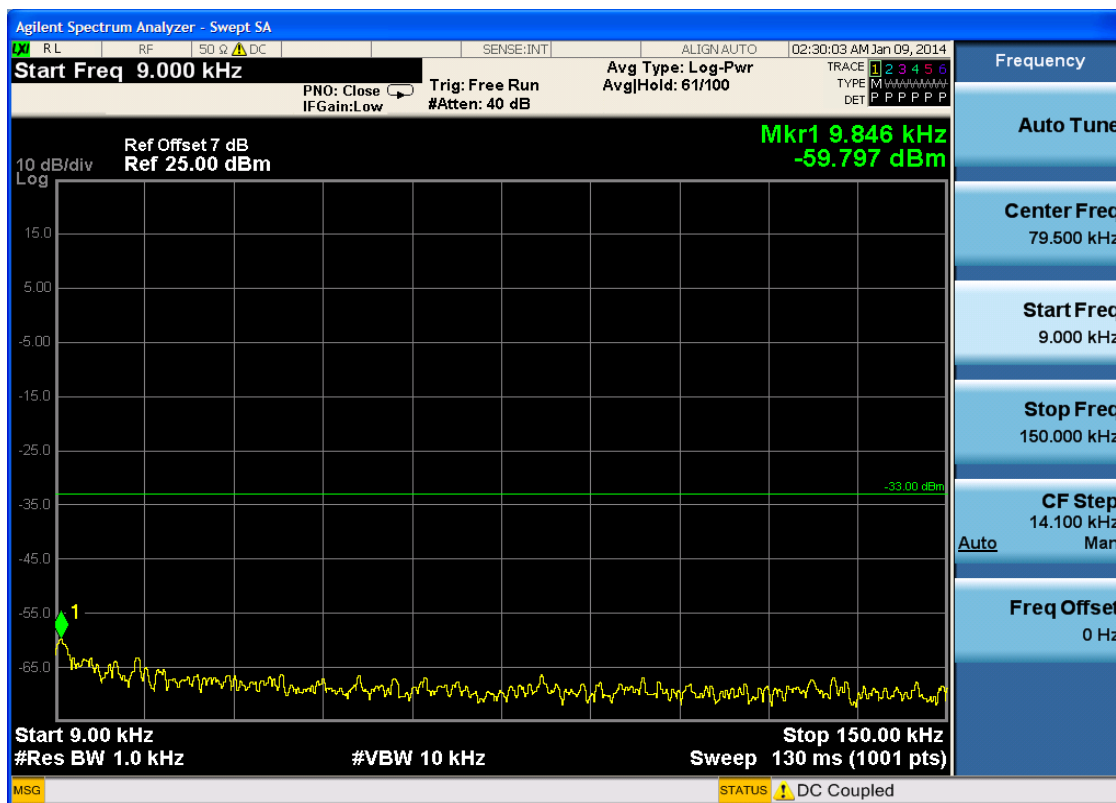


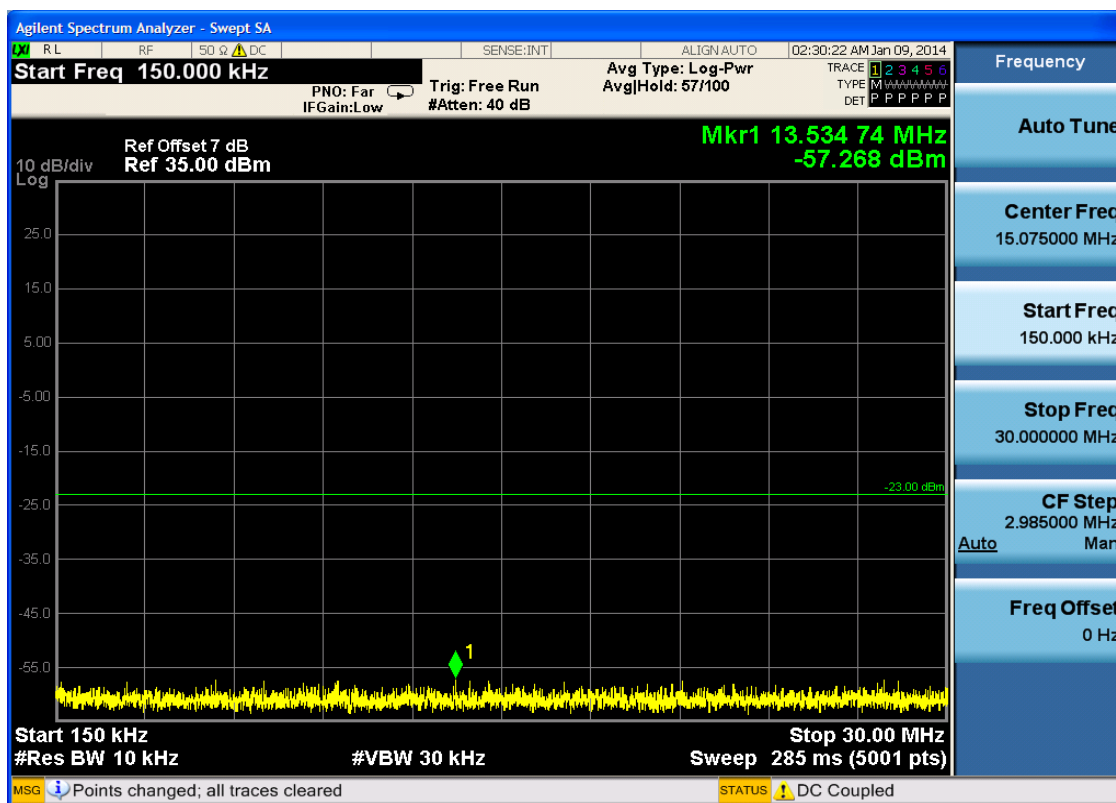


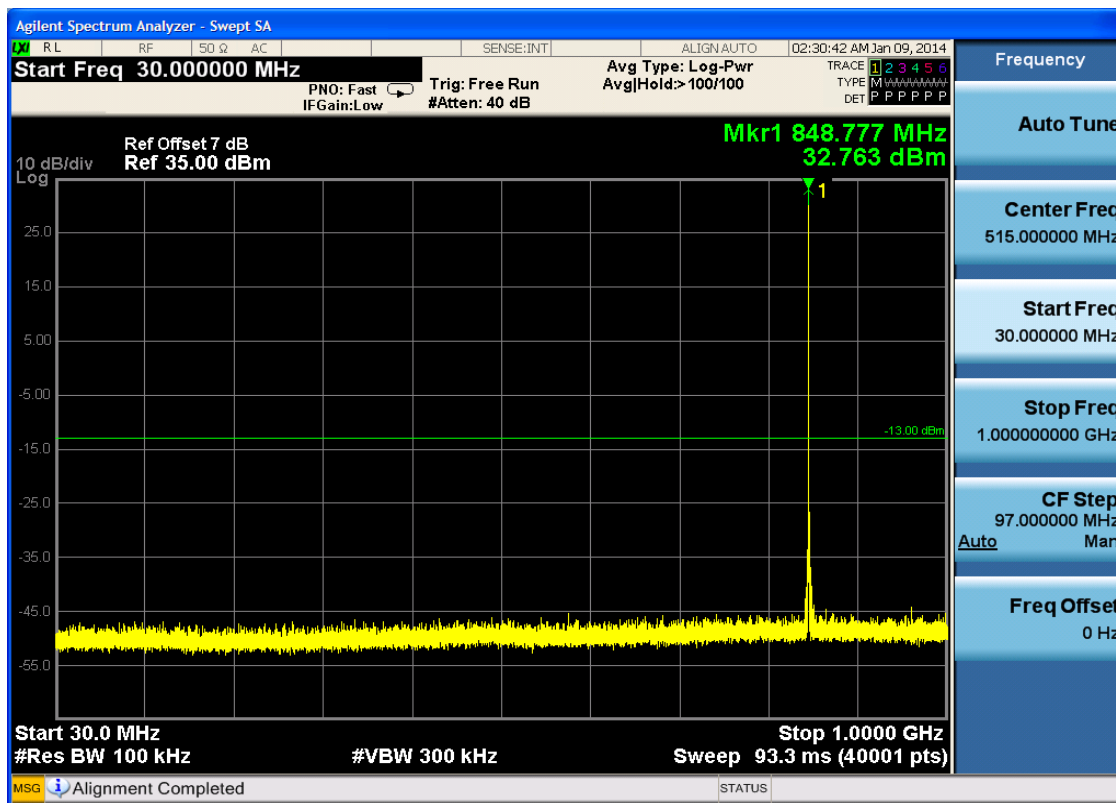


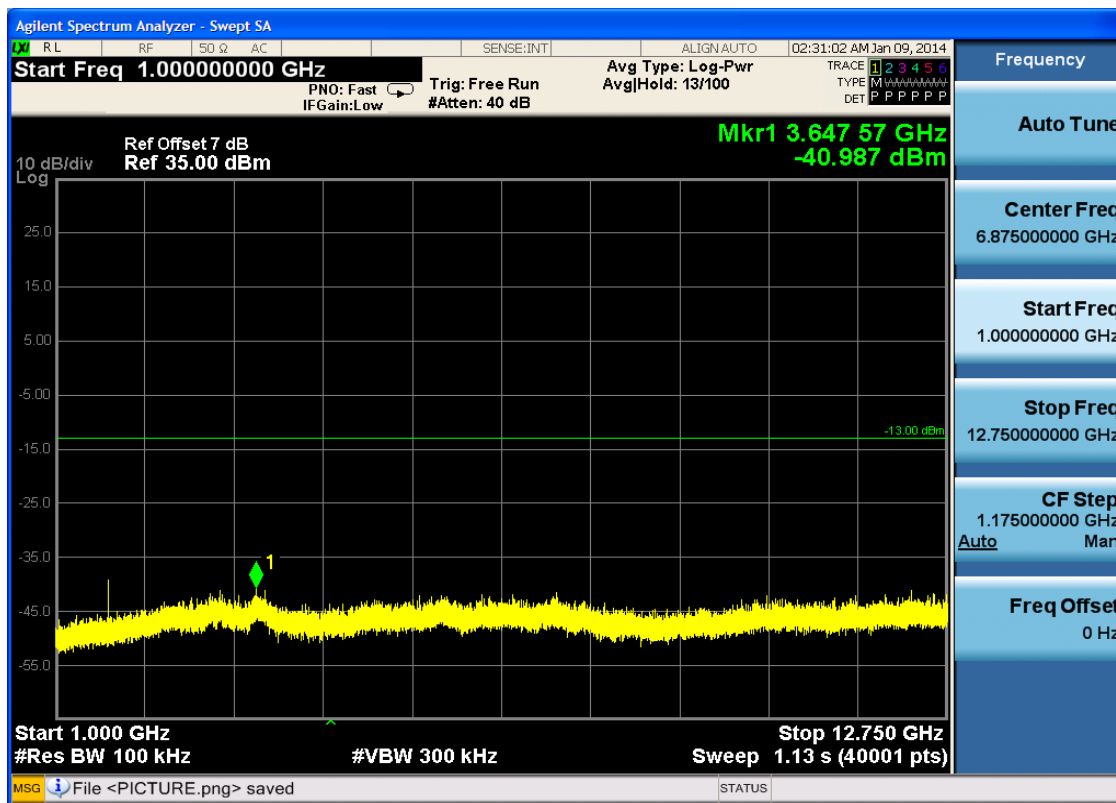


6.1.1.1.3 Test Channel = HCH





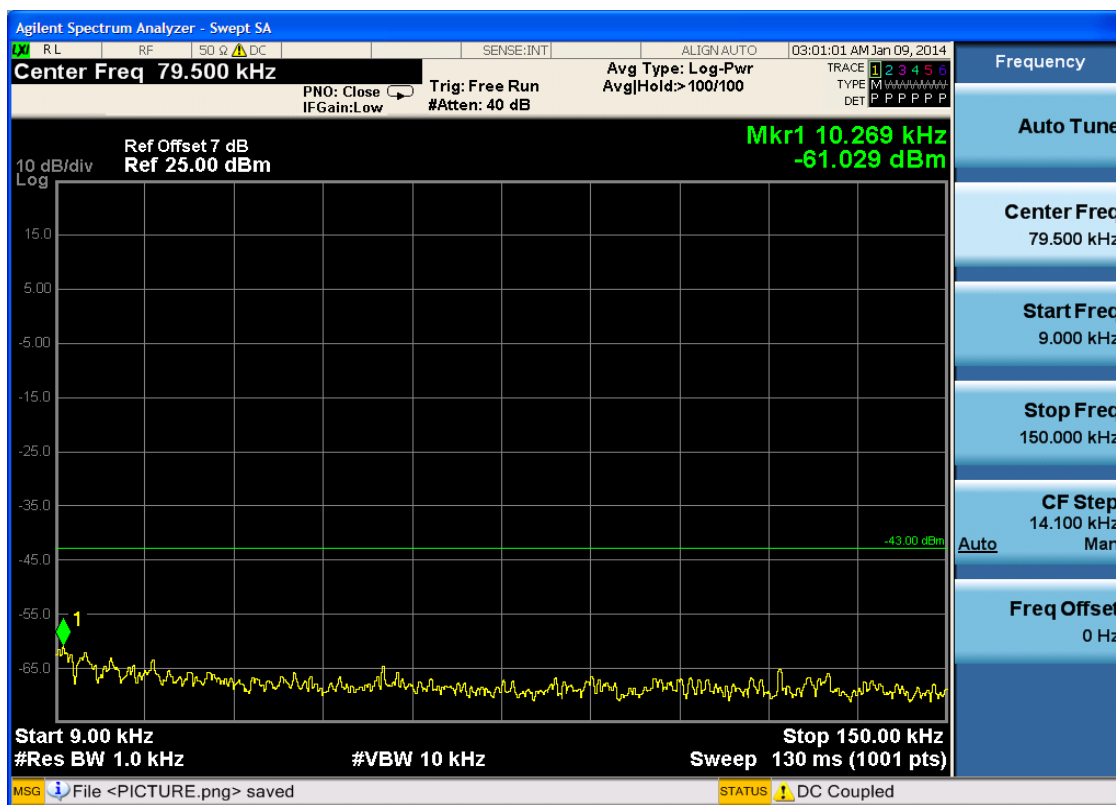


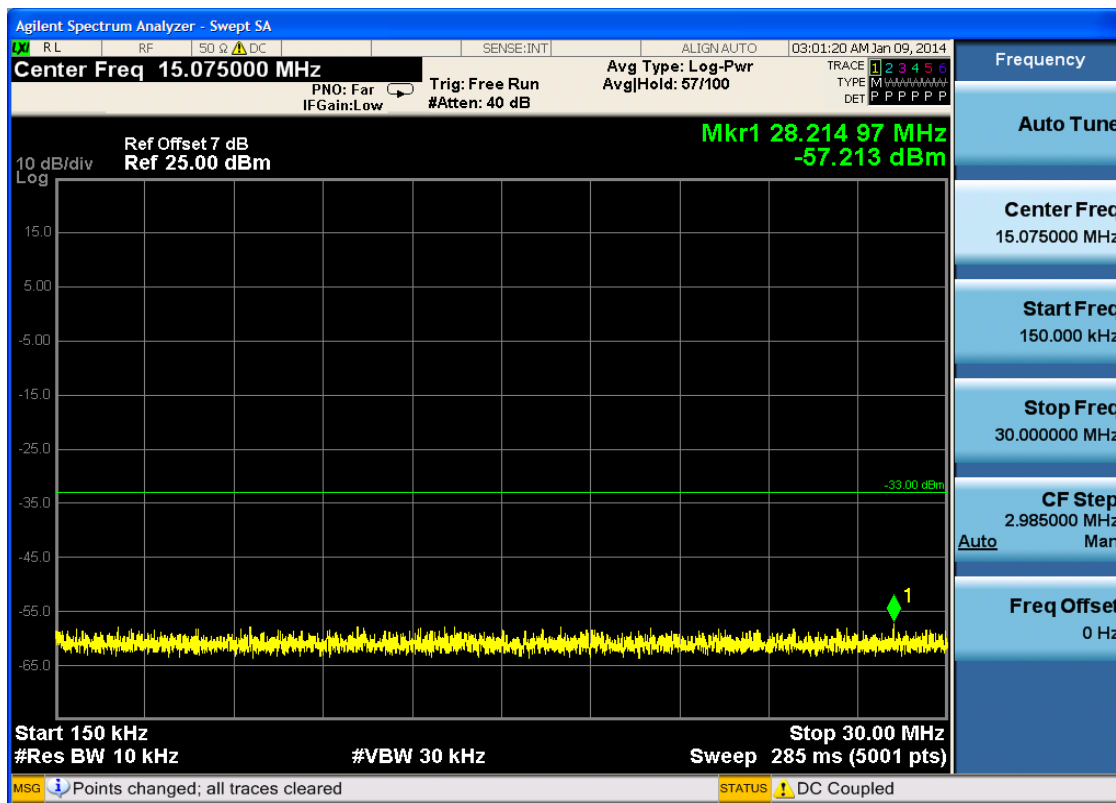


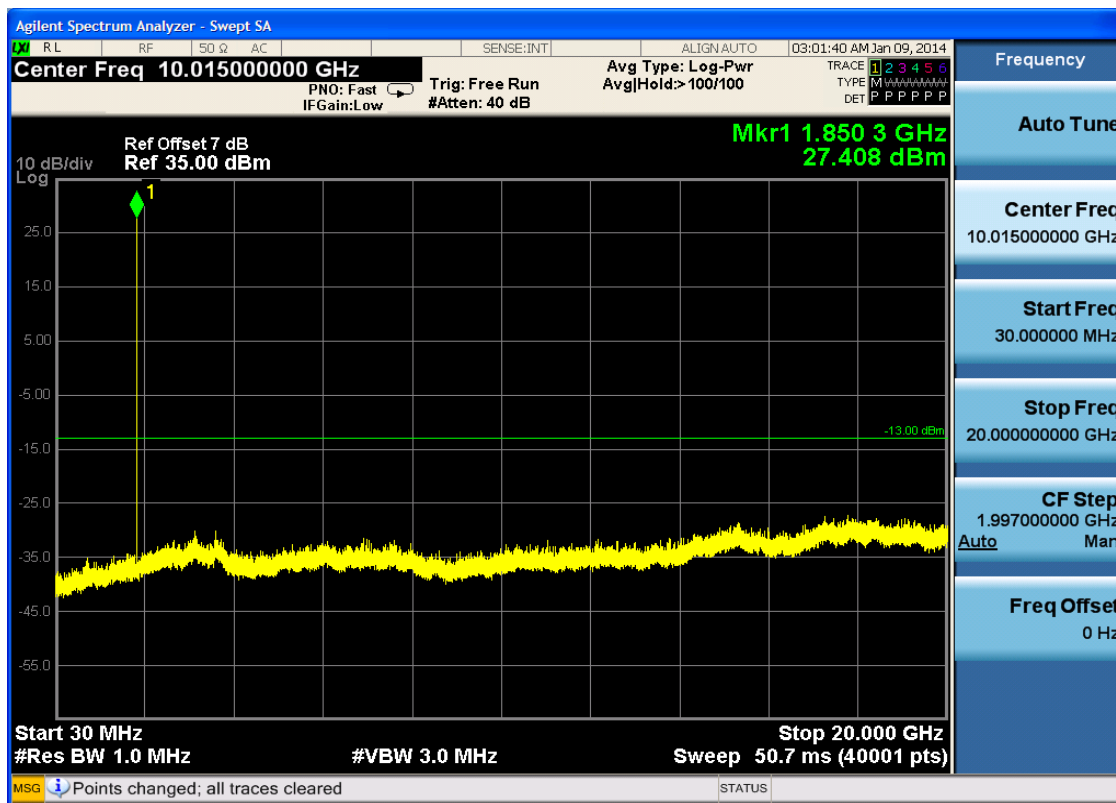
6.1.2 Test Band = GSM1900

6.1.2.1 Test Mode = GSM/TM1

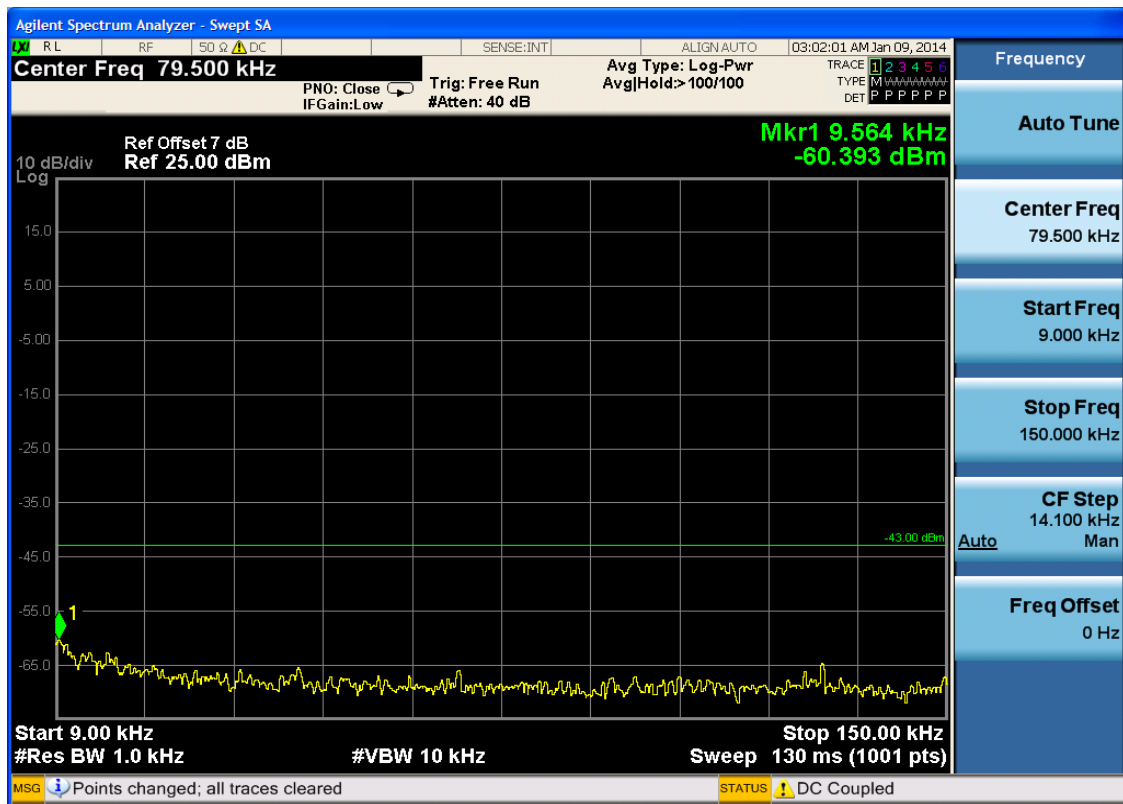
6.1.2.1.1 Test Channel = LCH

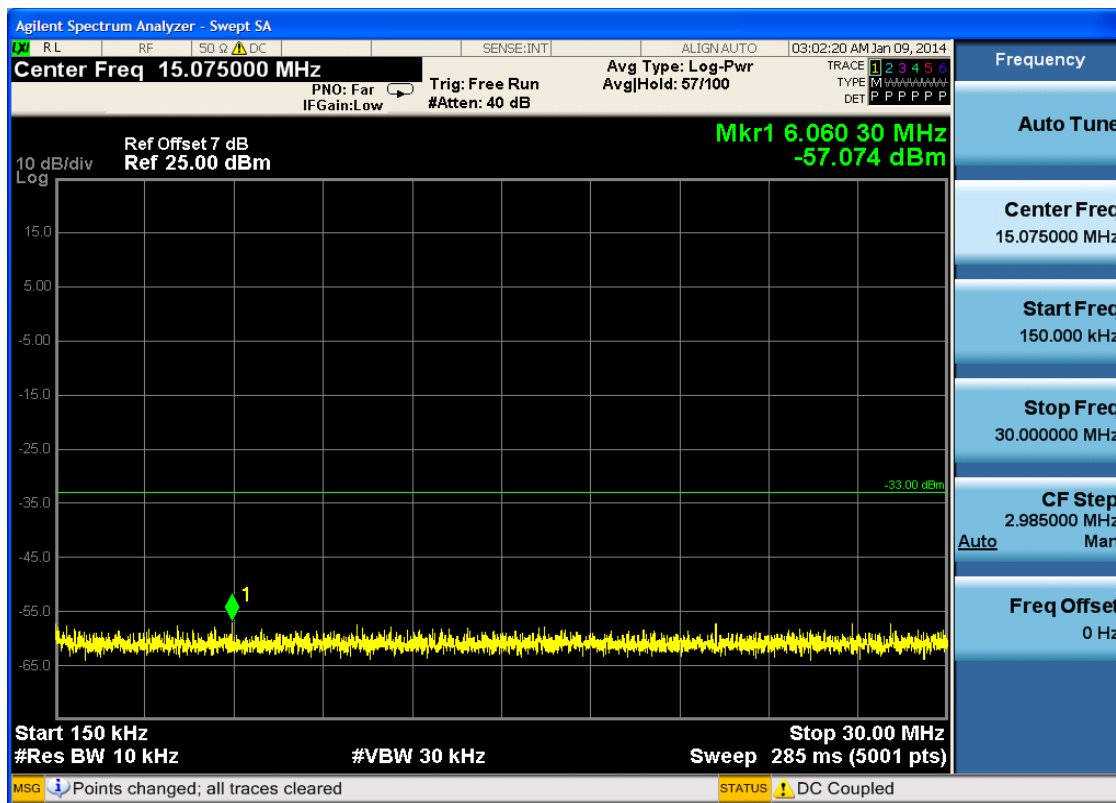


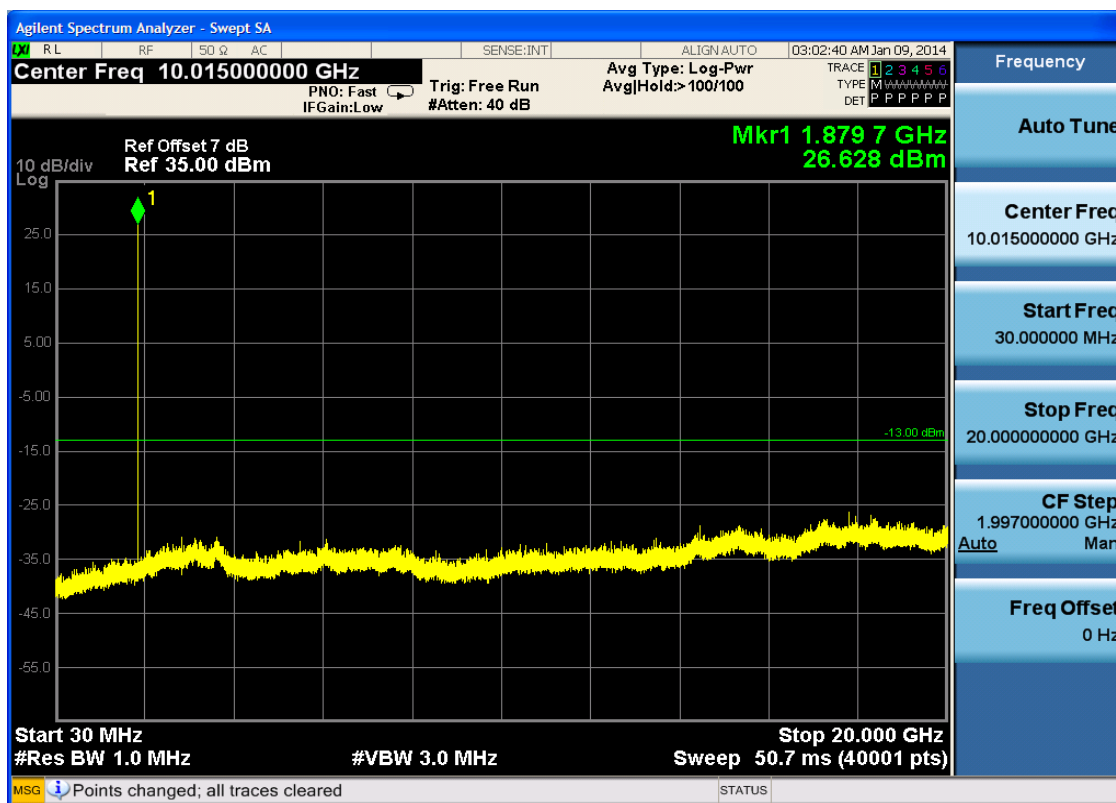




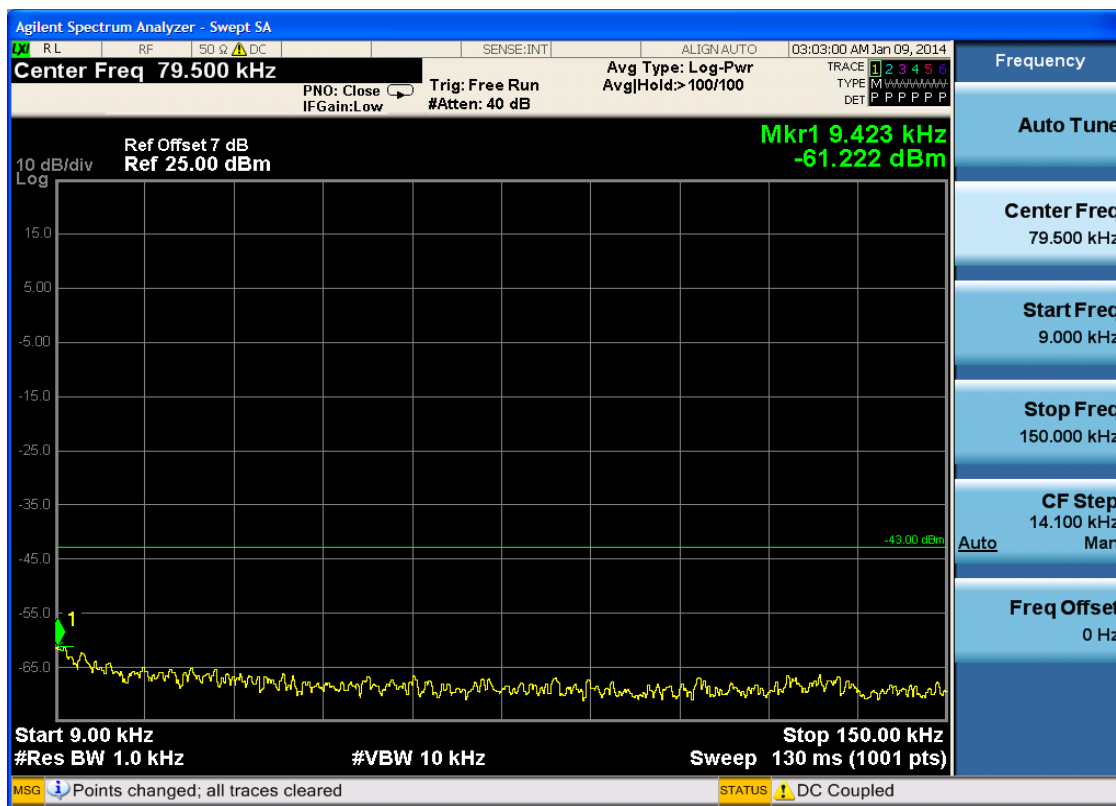
6.1.2.1.2 Test Channel = MCH

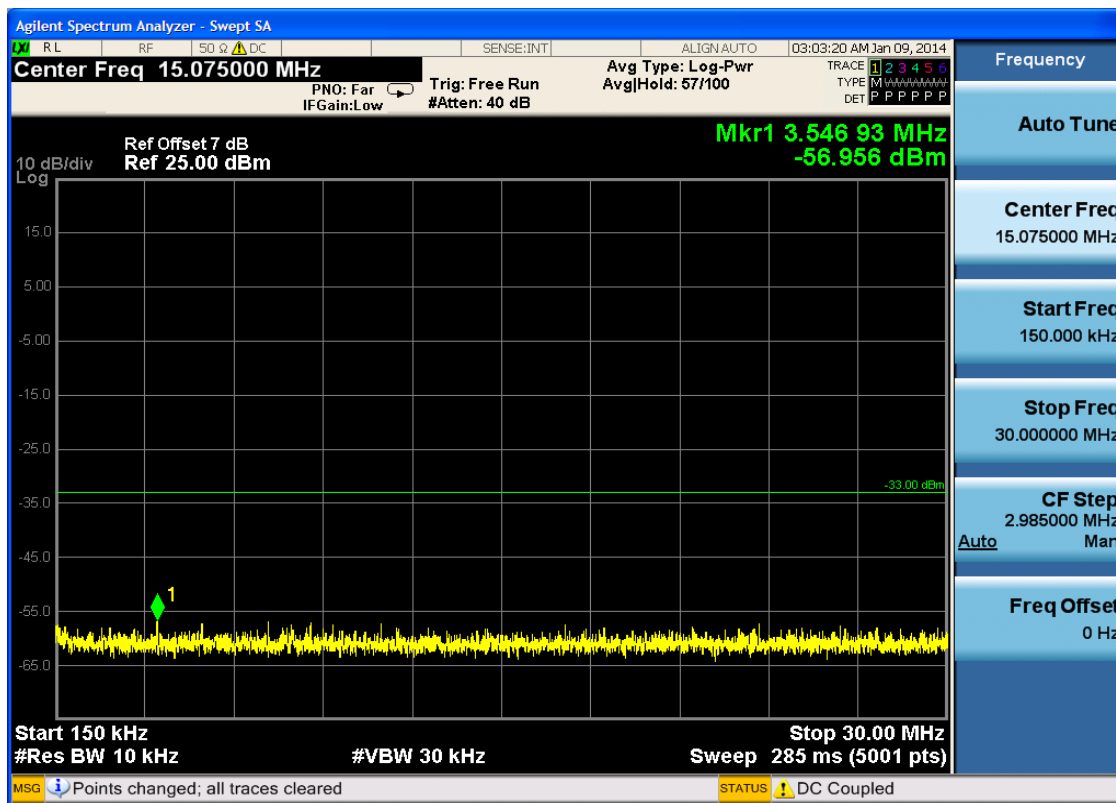


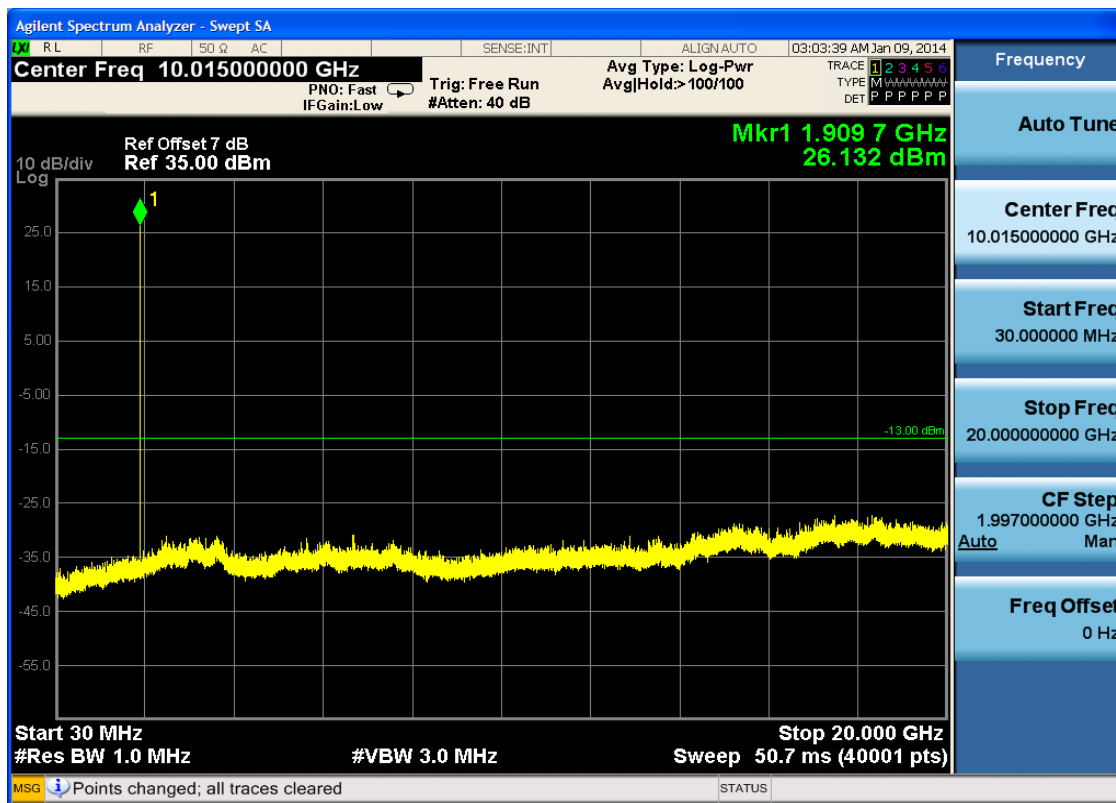




6.1.2.1.3 Test Channel = HCH





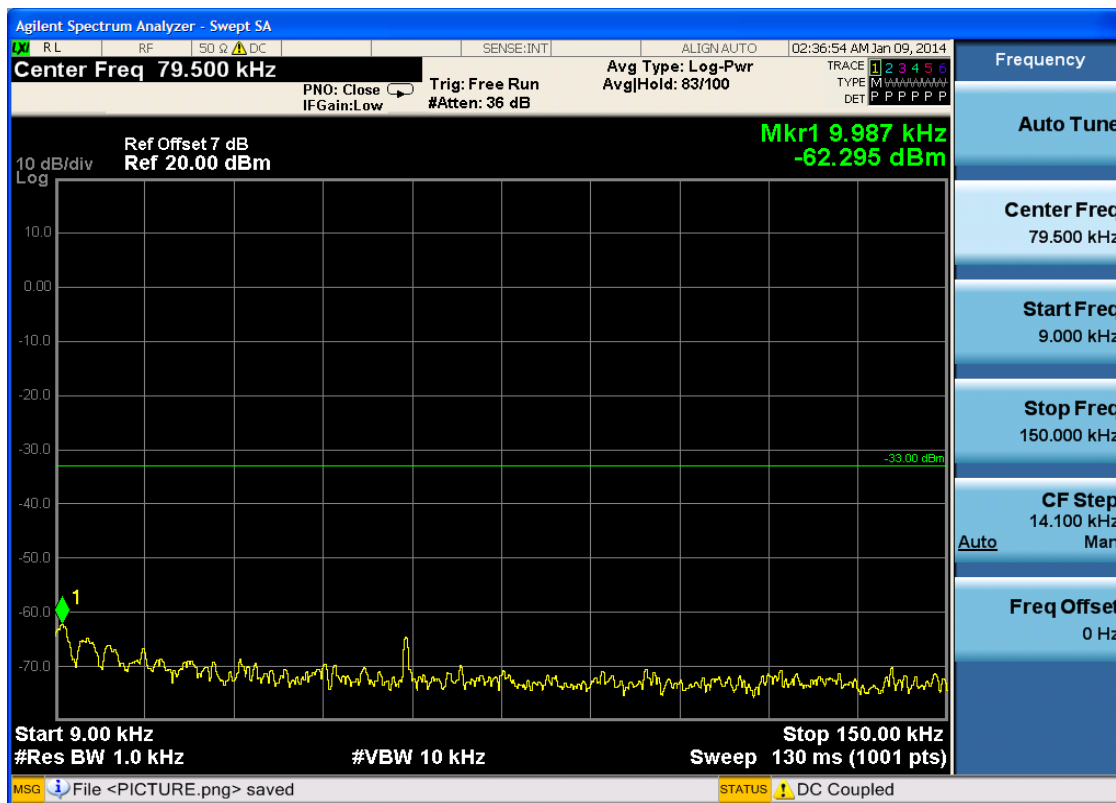


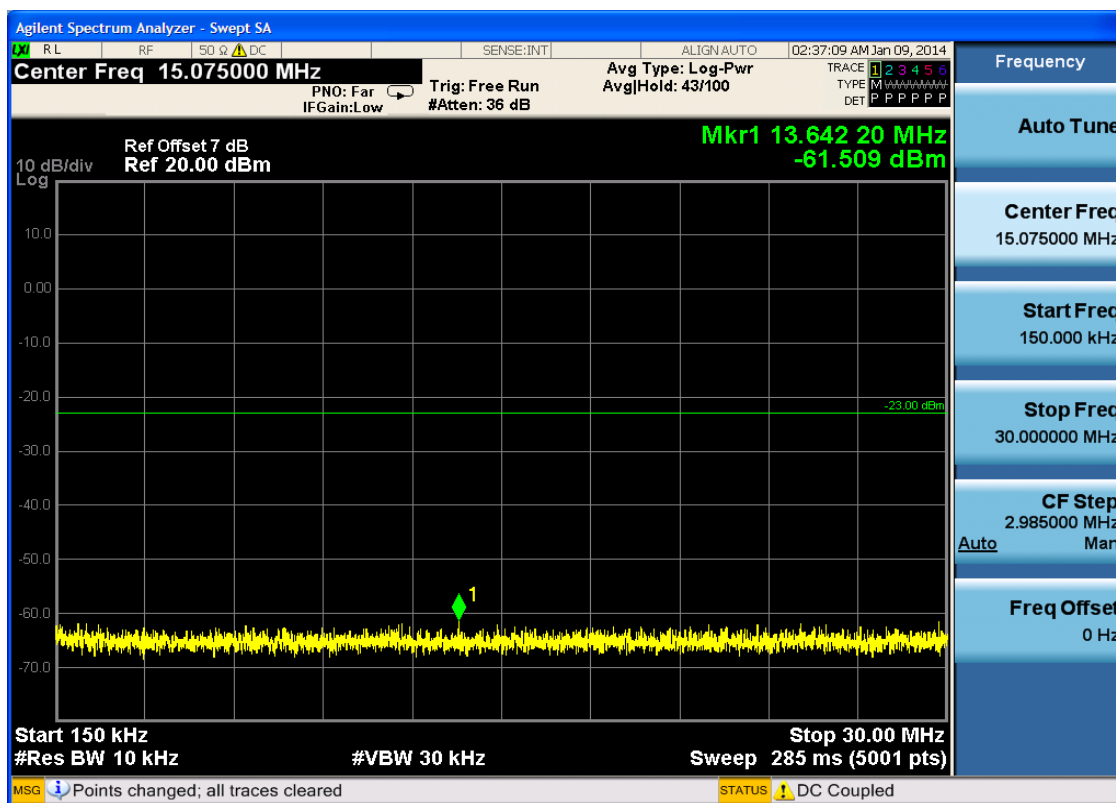
6.2 For UMTS

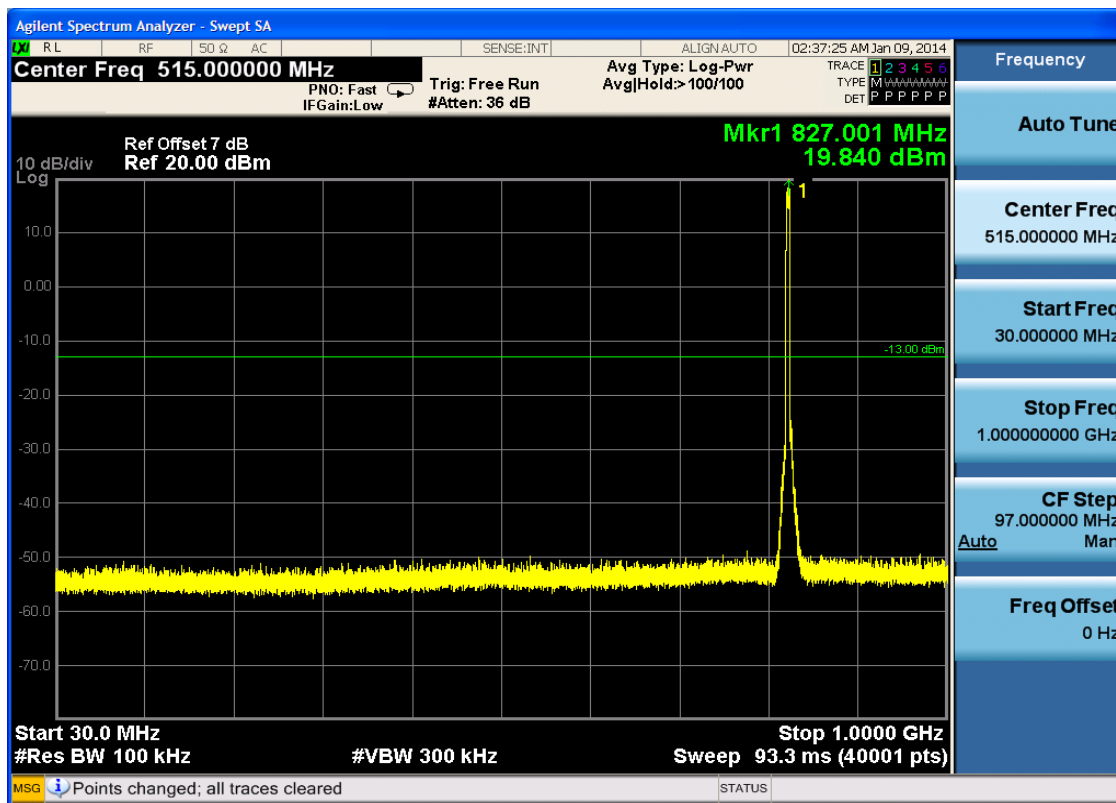
6.2.1 Test Band = WCDMA850

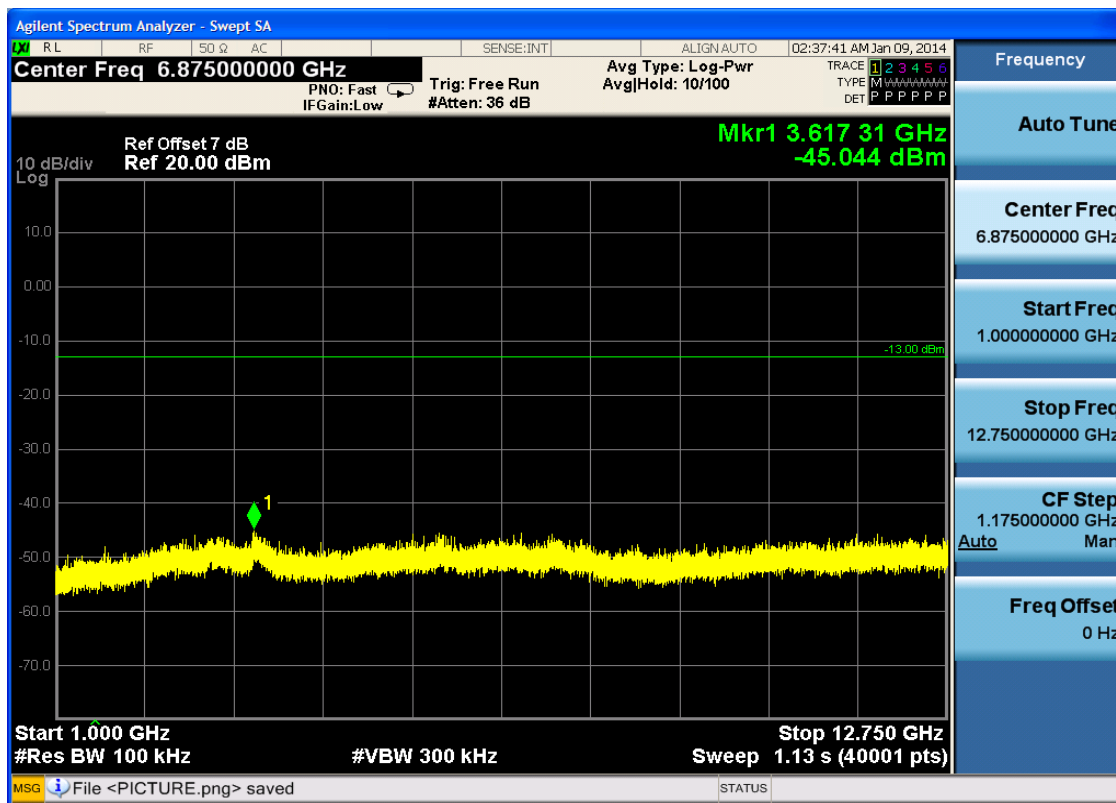
6.2.1.1 Test Mode = UMTS/TM1

6.2.1.1.1 Test Channel = LCH

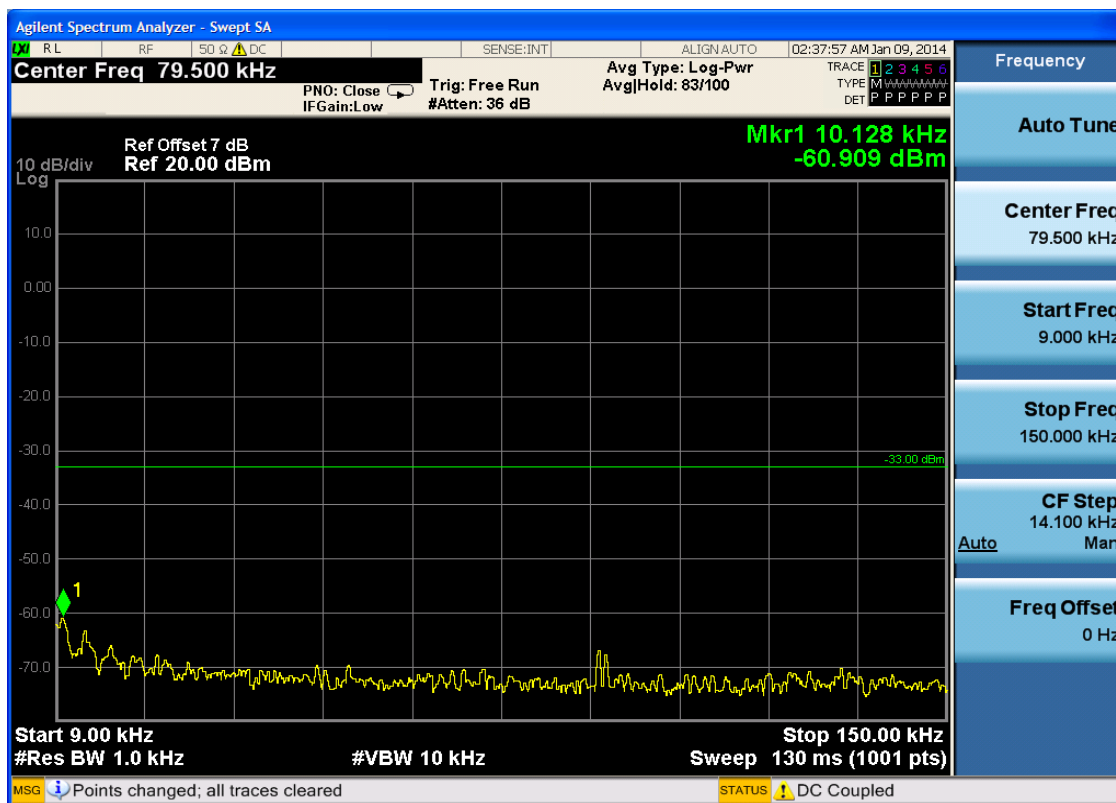


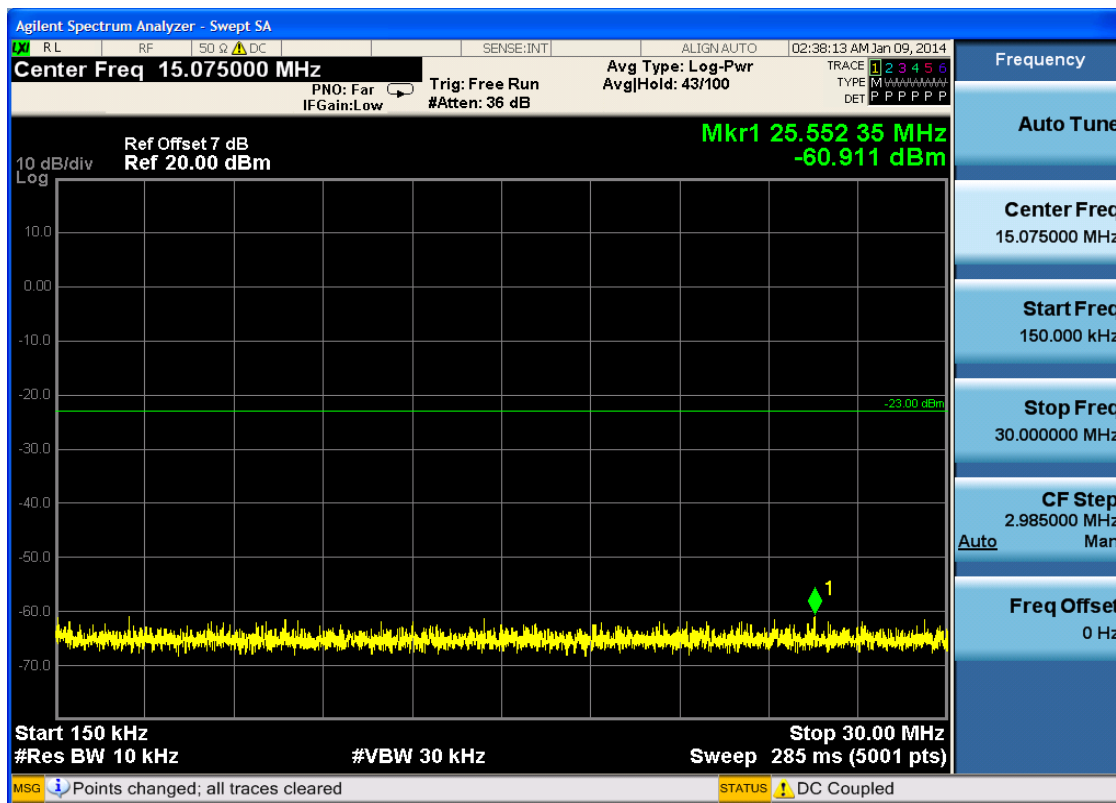


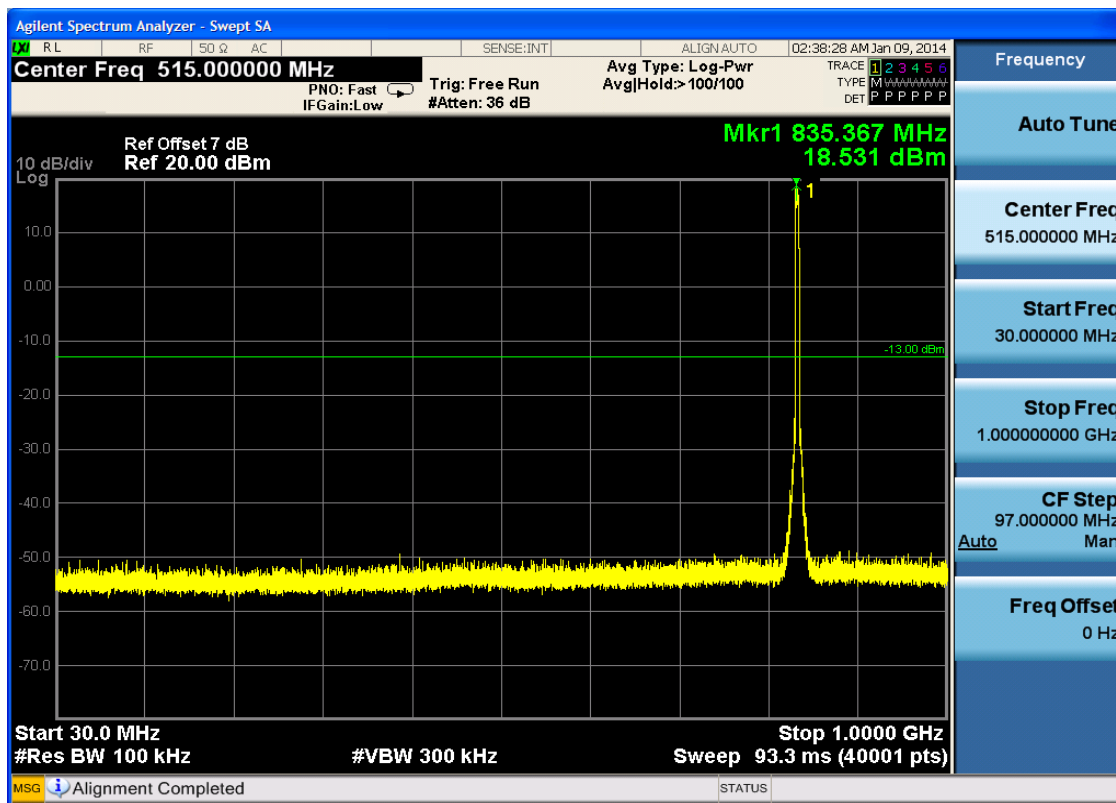


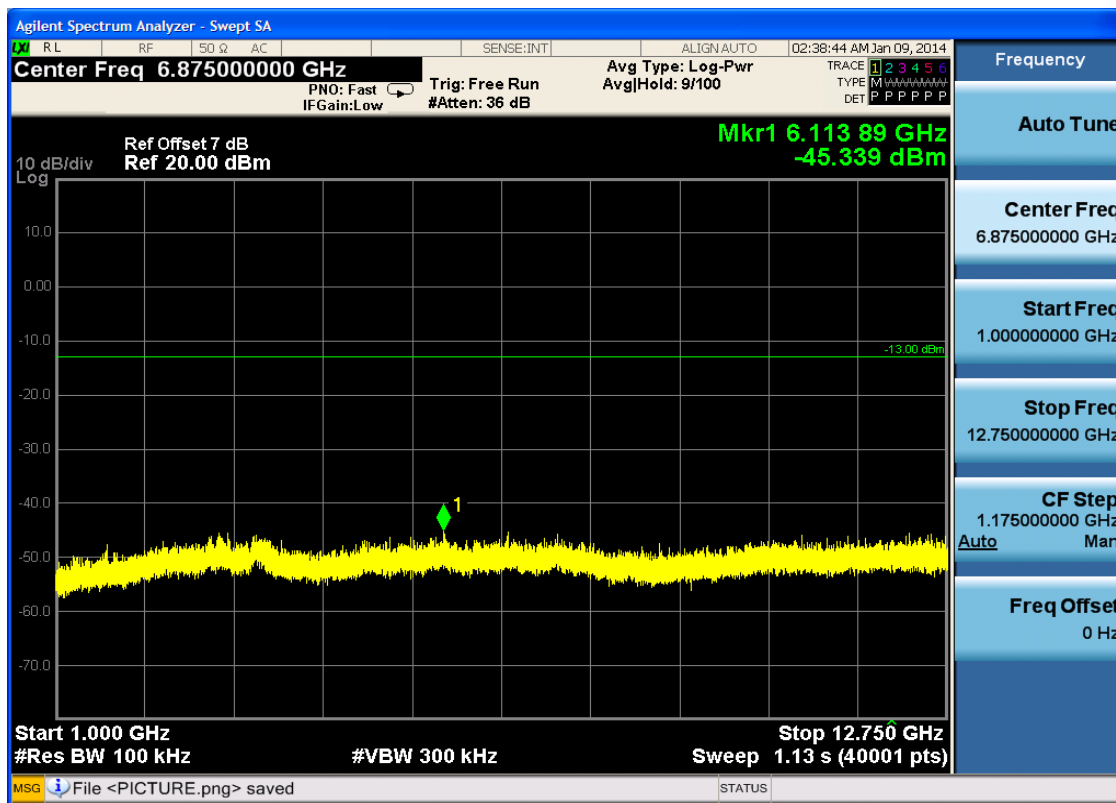


6.2.1.1.2 Test Channel = MCH

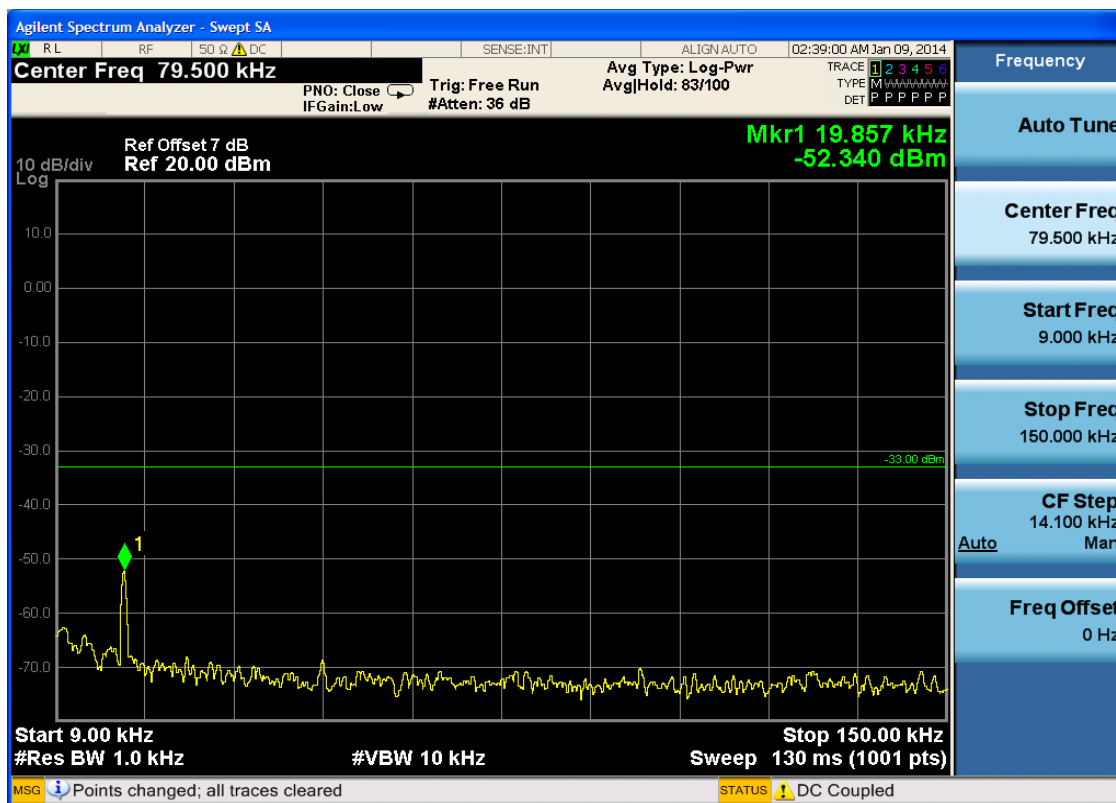


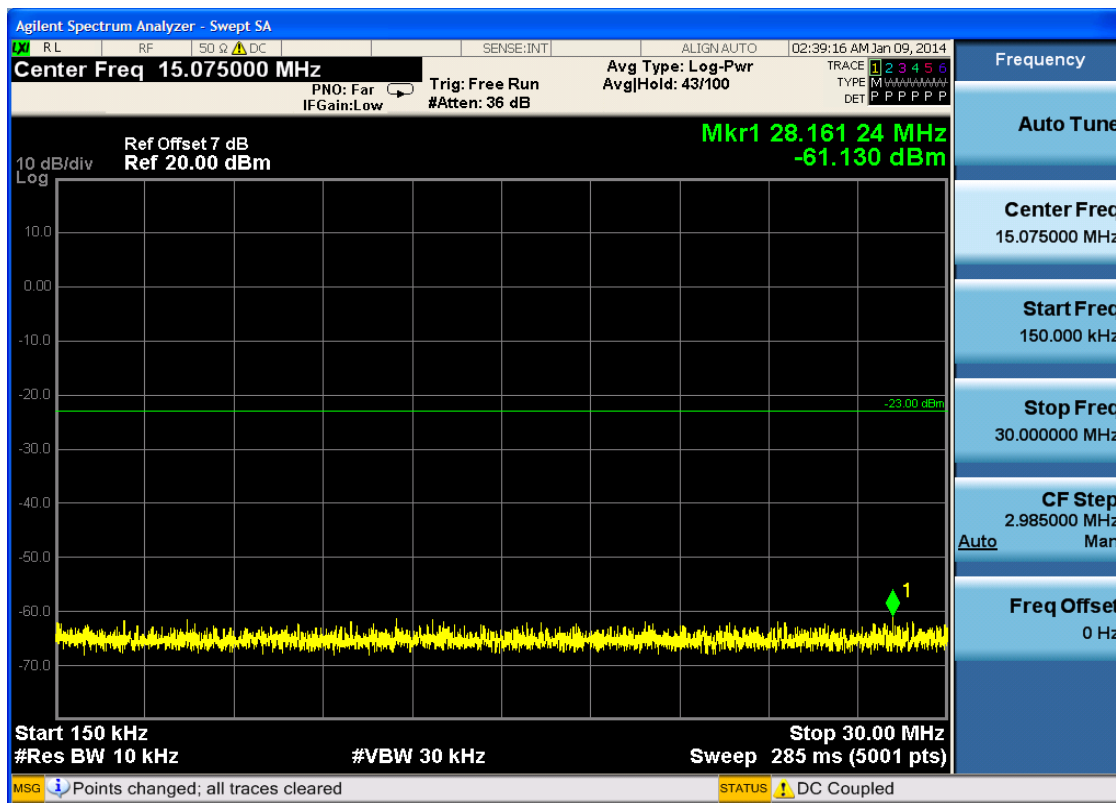


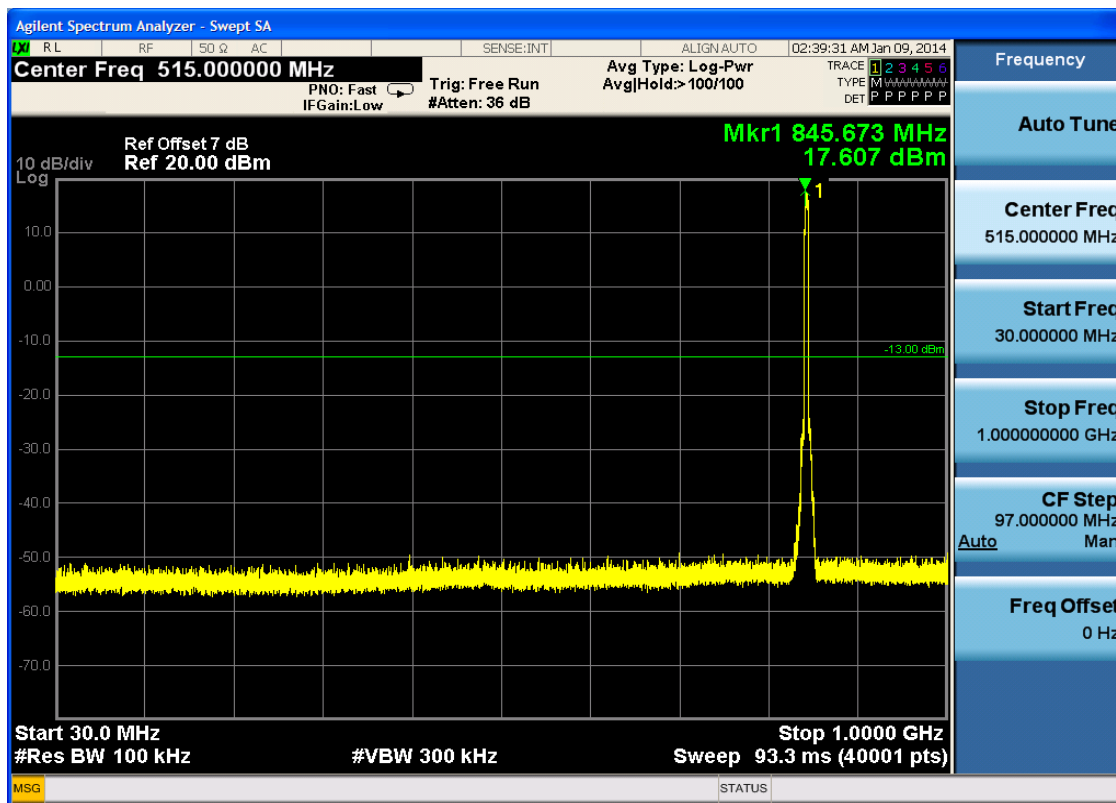


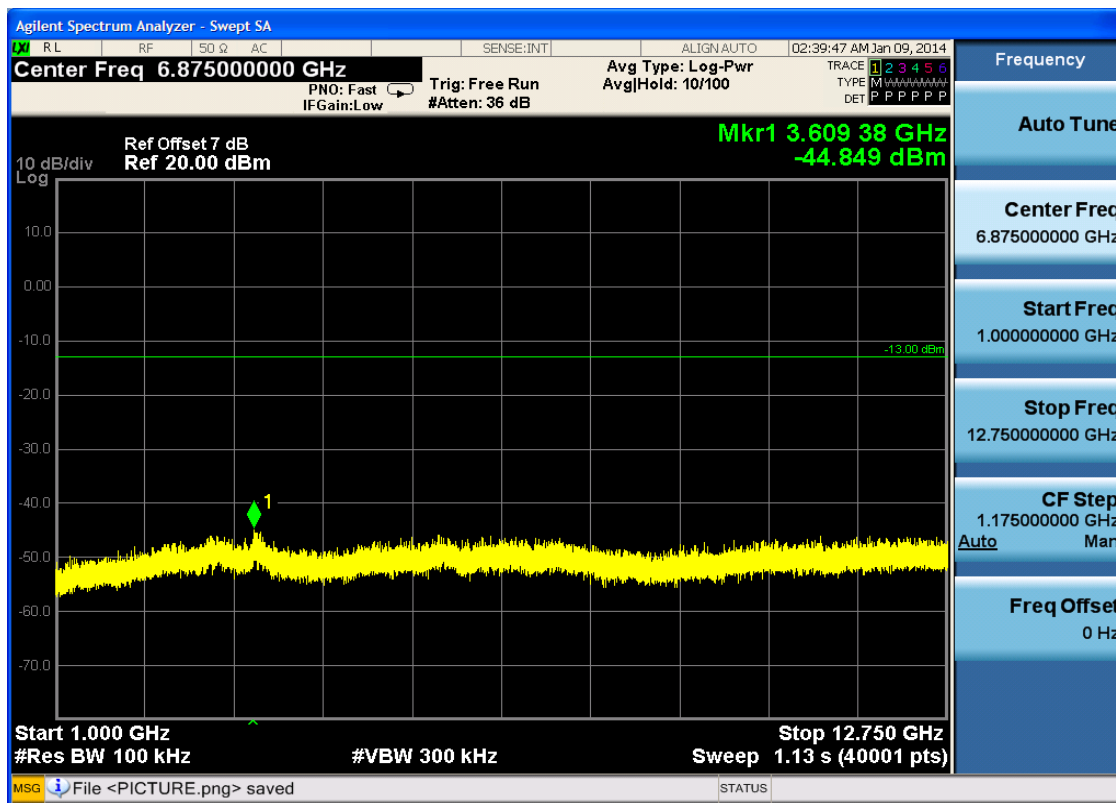


6.2.1.1.3 Test Channel = HCH





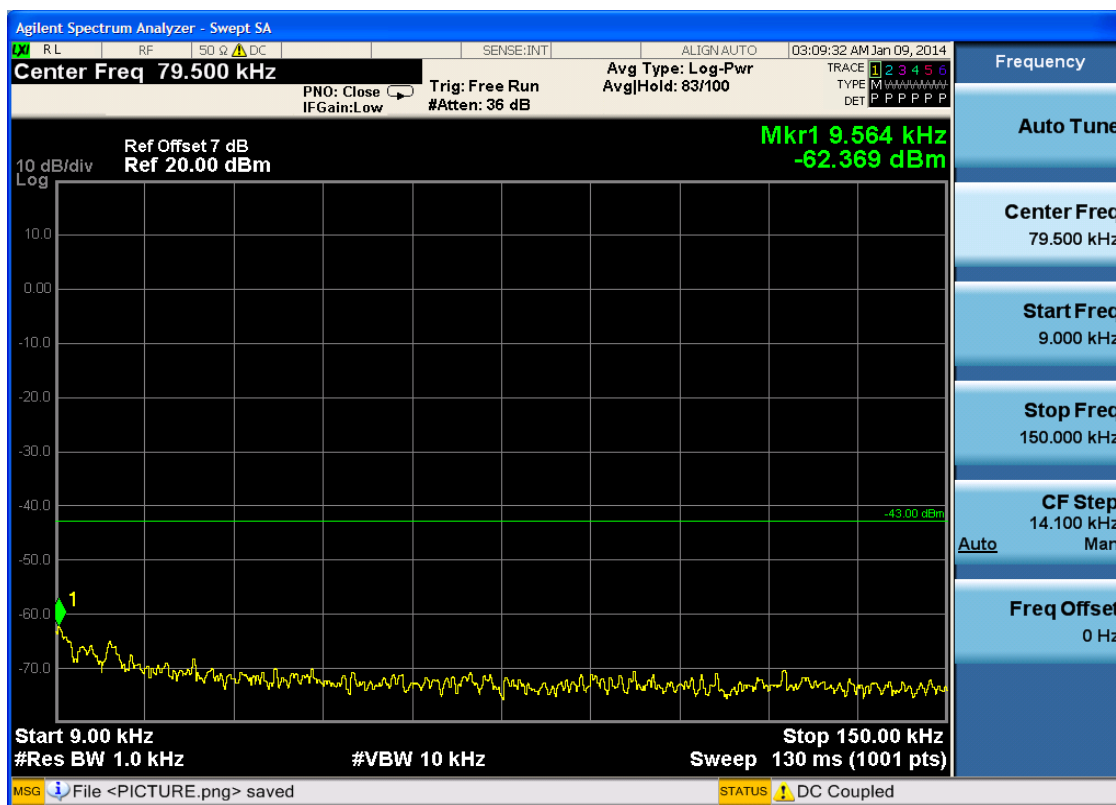


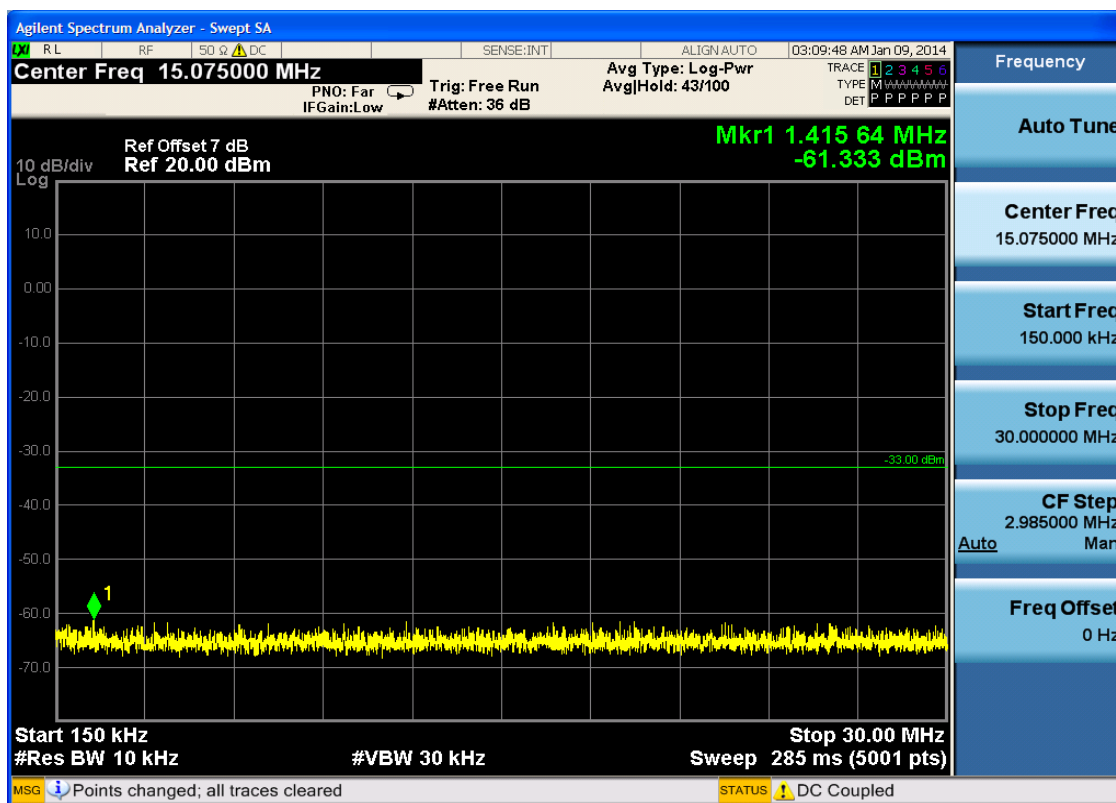


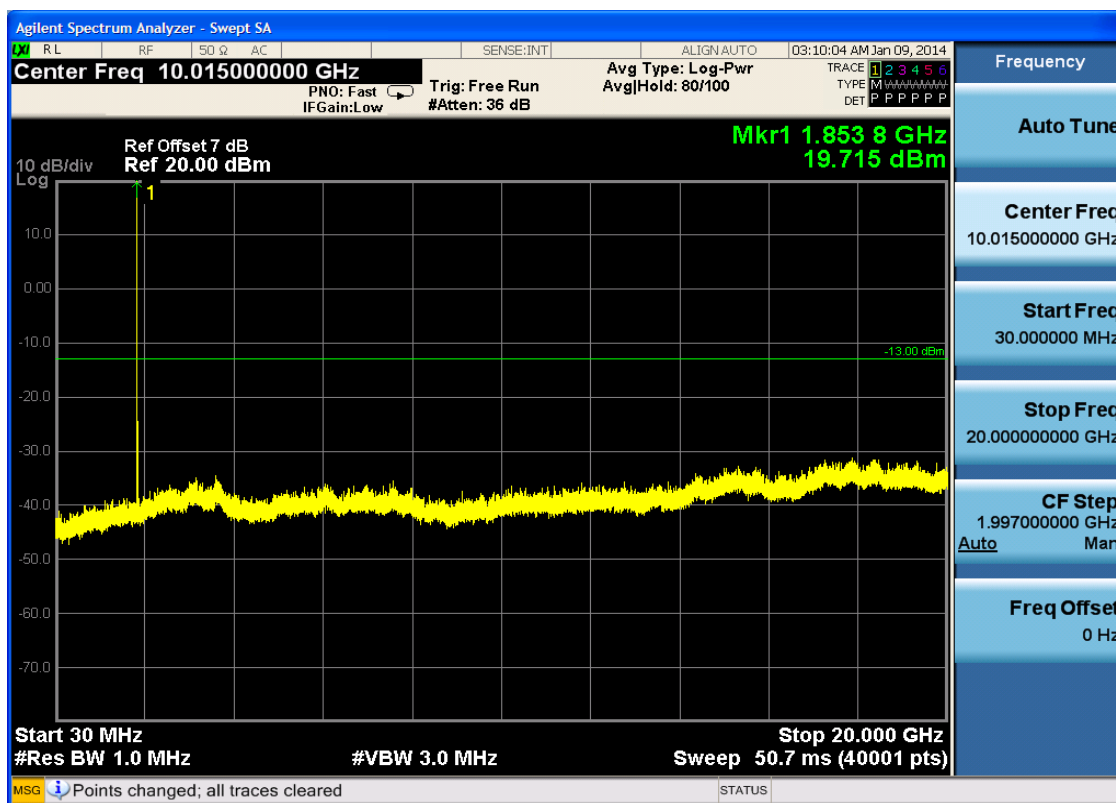
6.2.2 Test Band = WCDMA1900

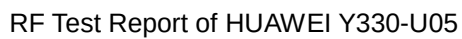
6.2.2.1 Test Mode = UMTS/TM1

6.2.2.1.1 Test Channel = LCH









Agilent Spectrum Analyzer - Swept SA

R/L	RF	50 Ω	DC	SENSE:INT	ALIGN:AUTO	03:10:20 AM Jan 09, 2014
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Center Freq 79.500 kHz

PNO: Close Trig: Free Run Avg Type: Log-Pwr
IFGain: Low #Atten: 36 dB Avg|Hold: 83/100

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

Ref Offset 7 dB
Ref 20.00 dBm

Mkr1 9.282 kHz
-62.333 dBm

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

Frequency

Auto Tune

Center Freq
79.500 kHz

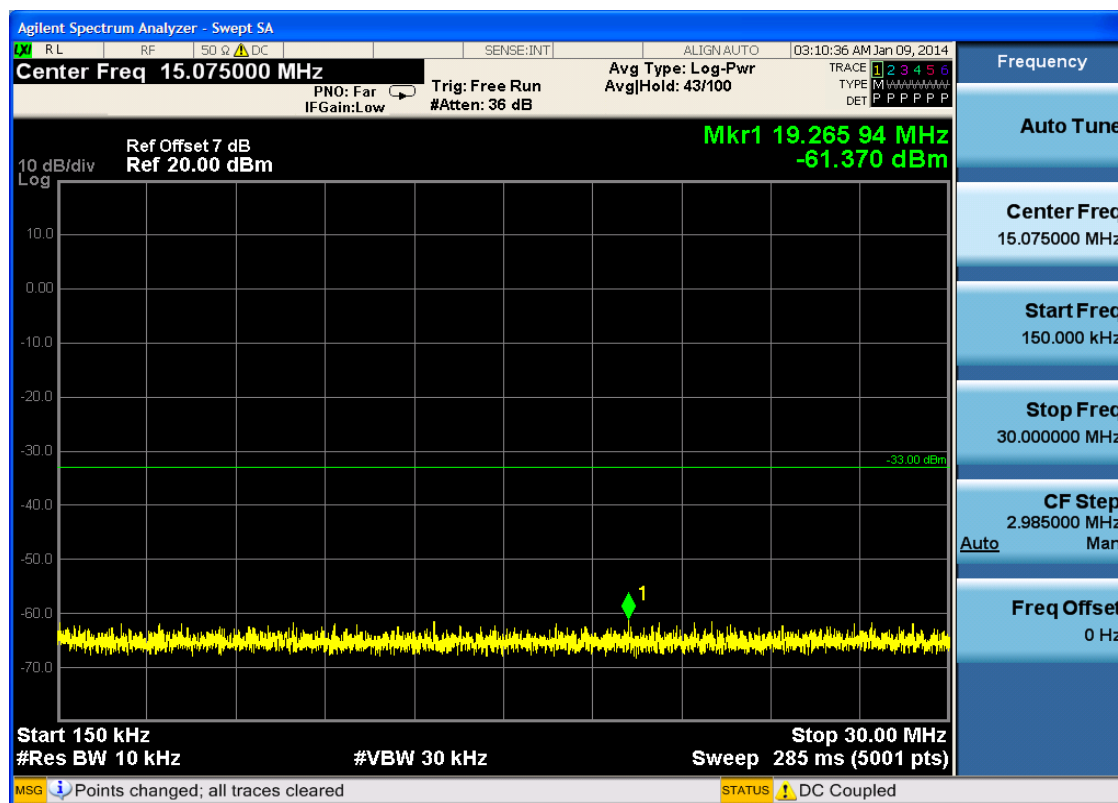
Start Freq
9.000 kHz

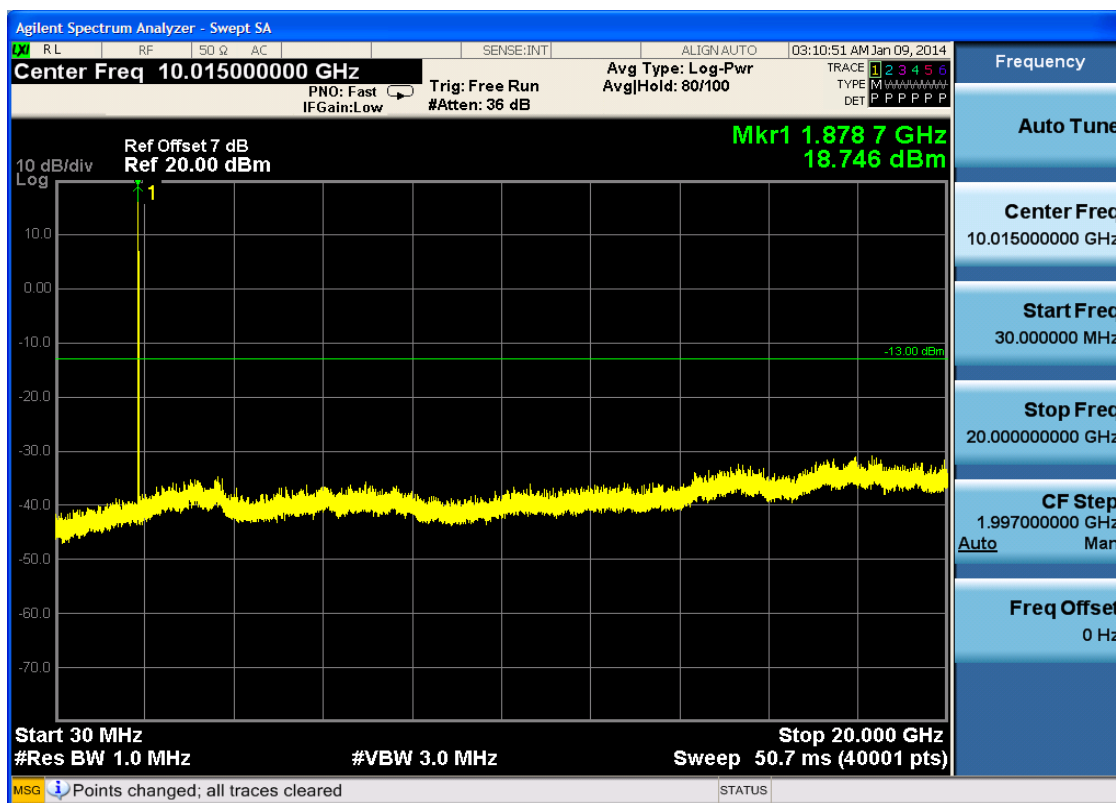
Stop Freq
150.000 kHz

CF Step
14.100 kHz
Man

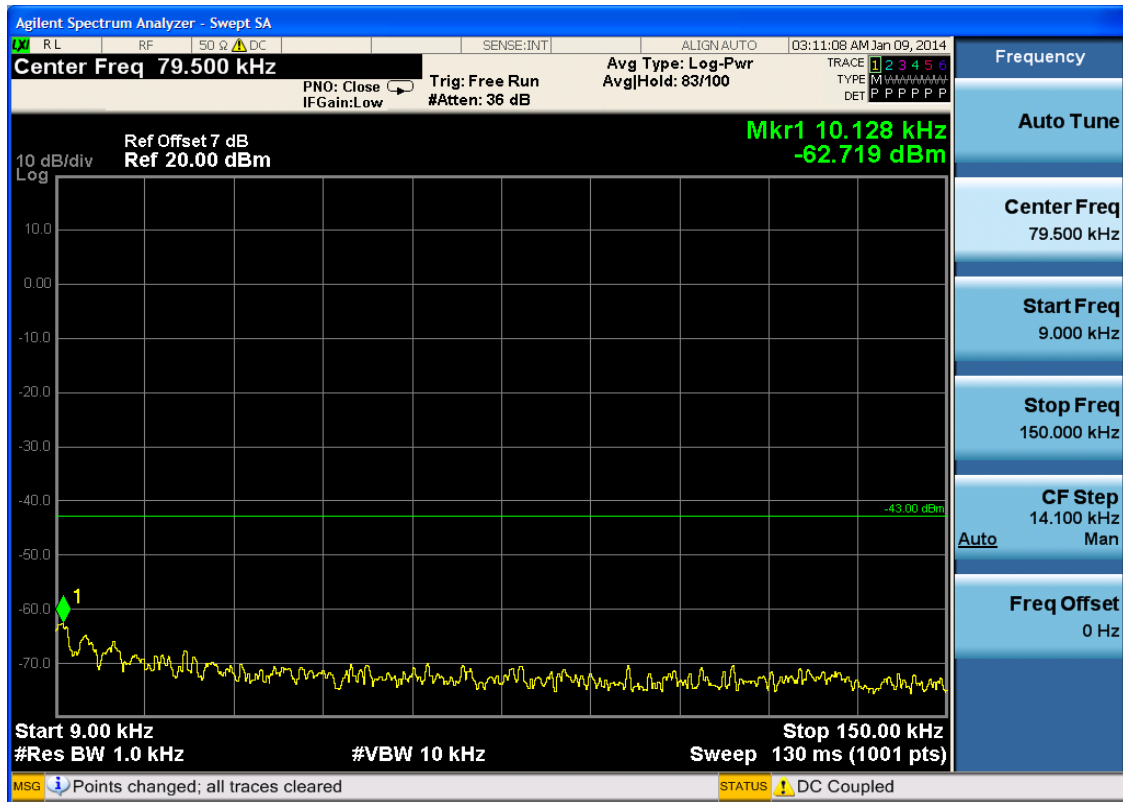
Auto

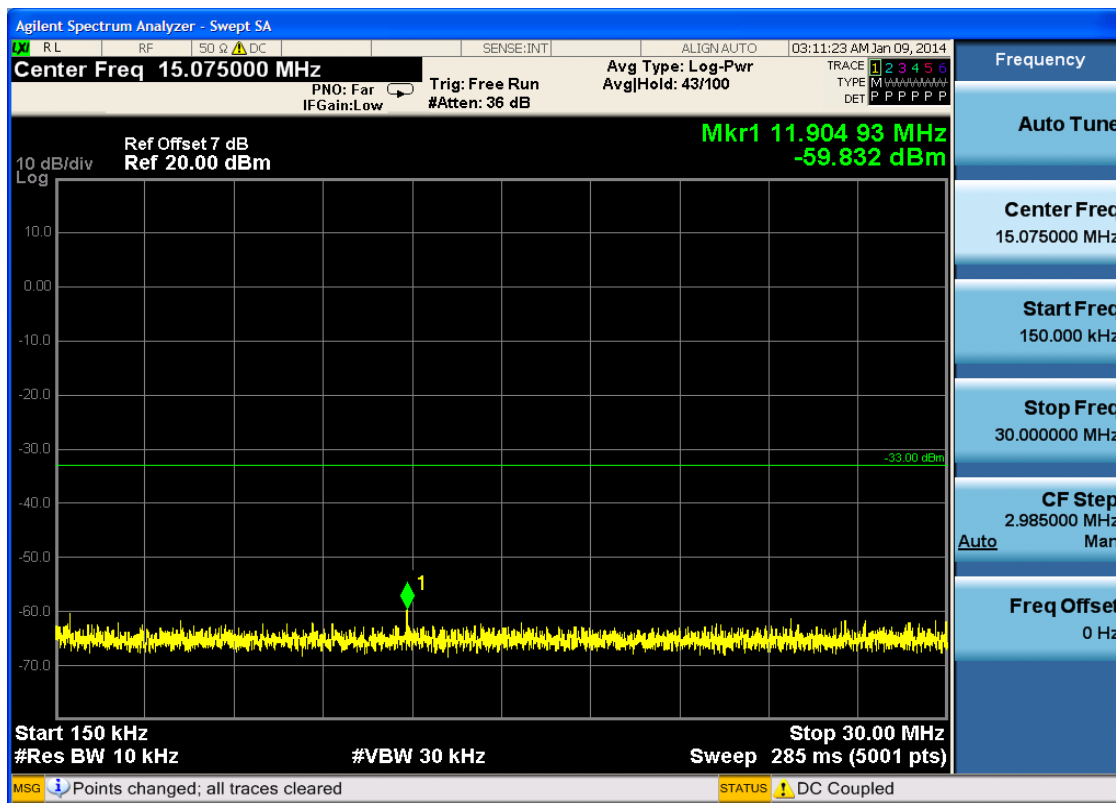
Freq Offset
0 Hz

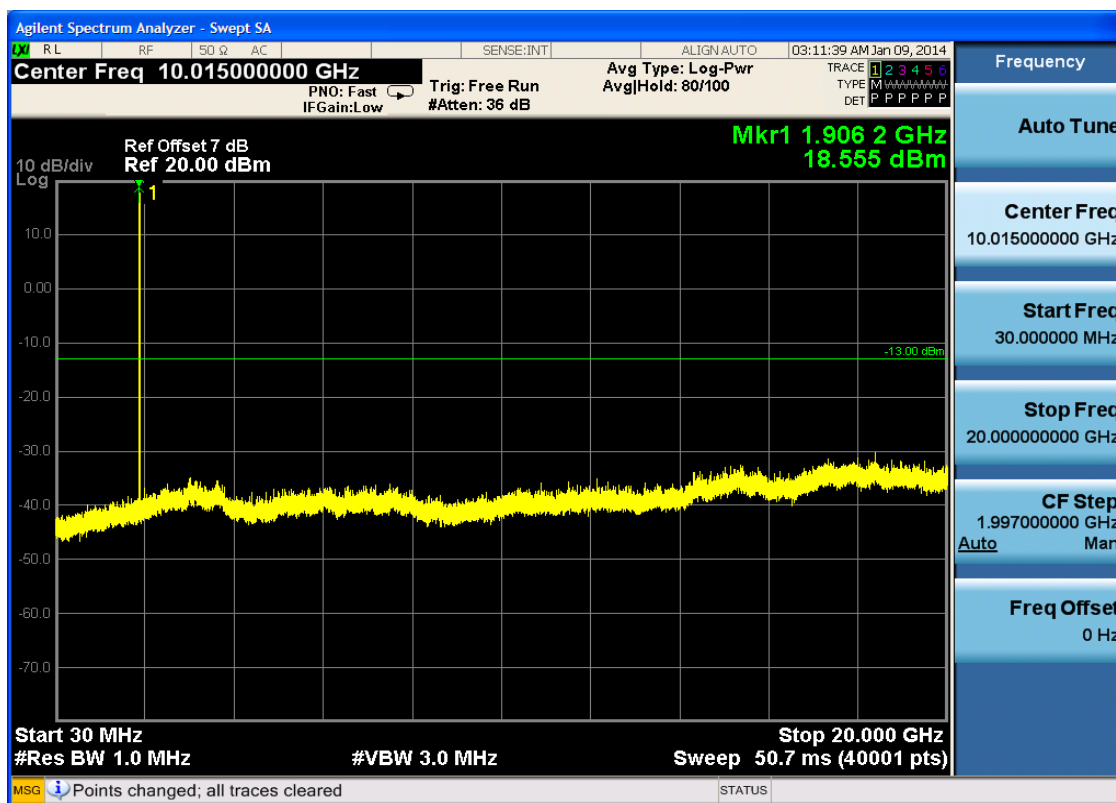




6.2.2.1.3 Test Channel = HCH







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

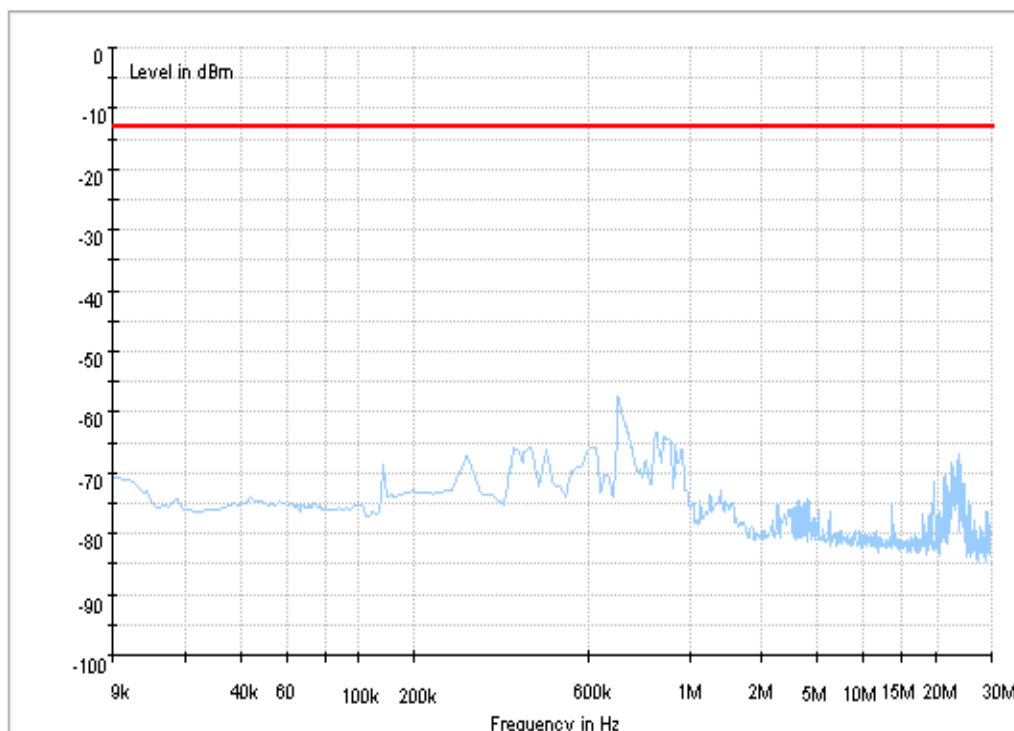
Above 1GHz, RBW = 1 MHz, VBW = 3 MHz. Detector: PK

Part I - Test Plots

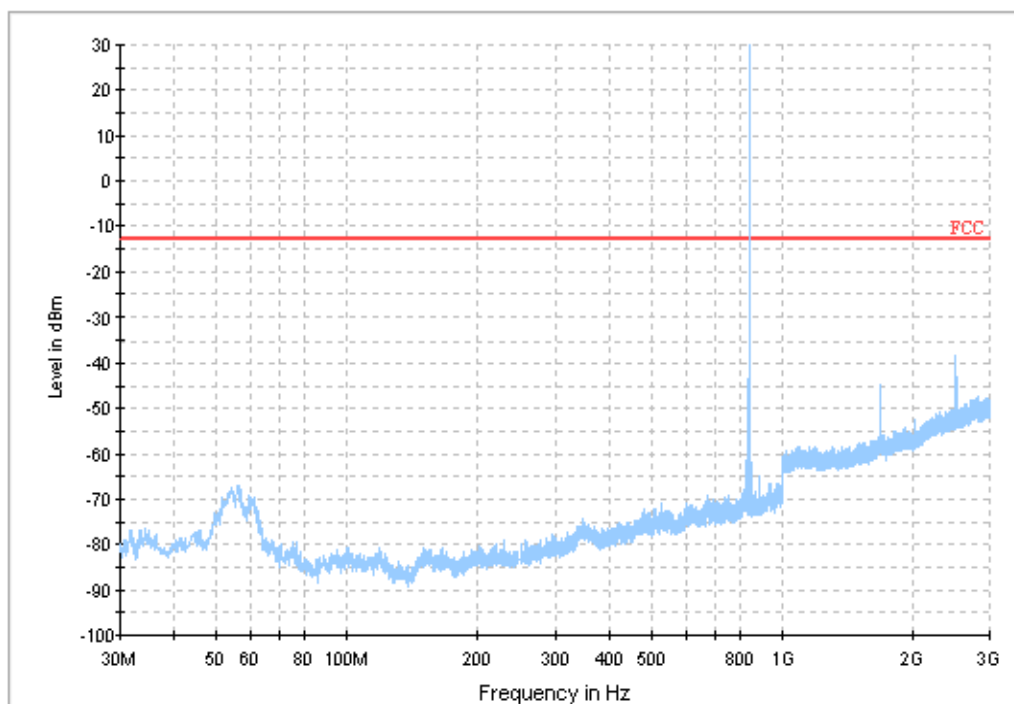
7.1 For GSM

7.1.1 Test Band = GSM850

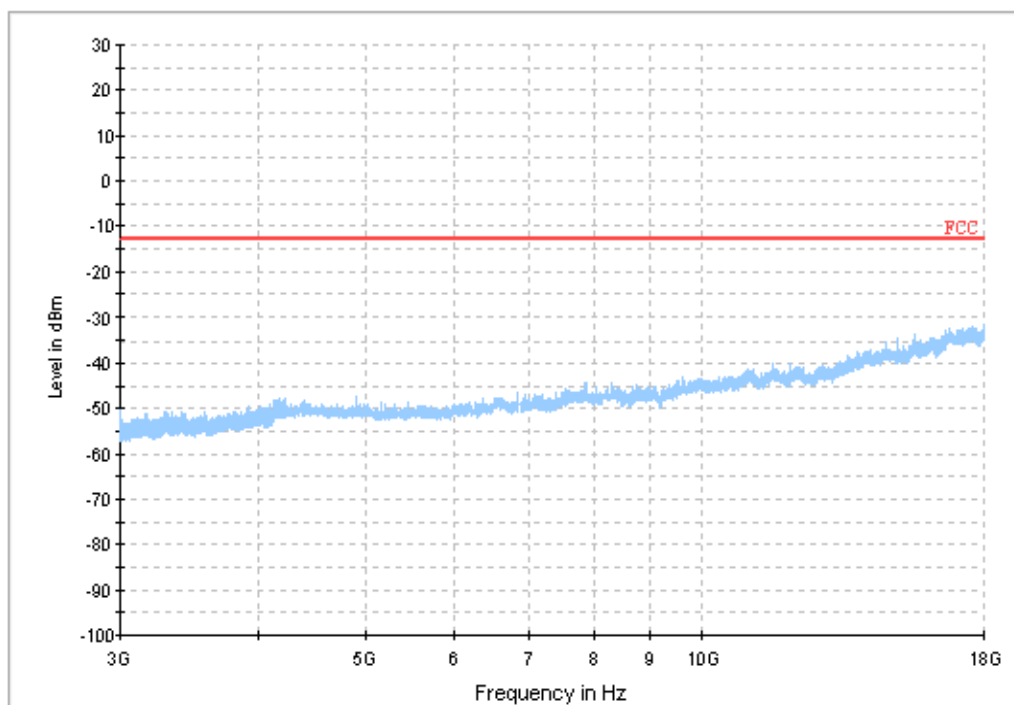
7.1.1.1 Test Mode = GSM/TM1



Copy of FCC PART22 GSM850_L

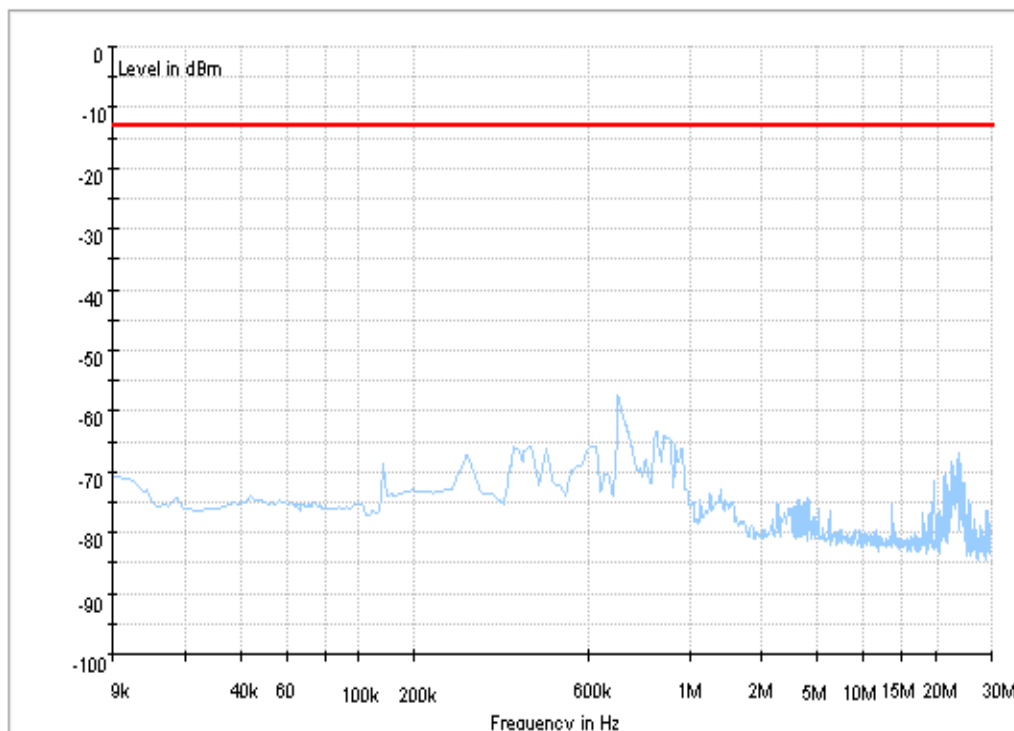


Copy of FCC PART22 GSM850_H

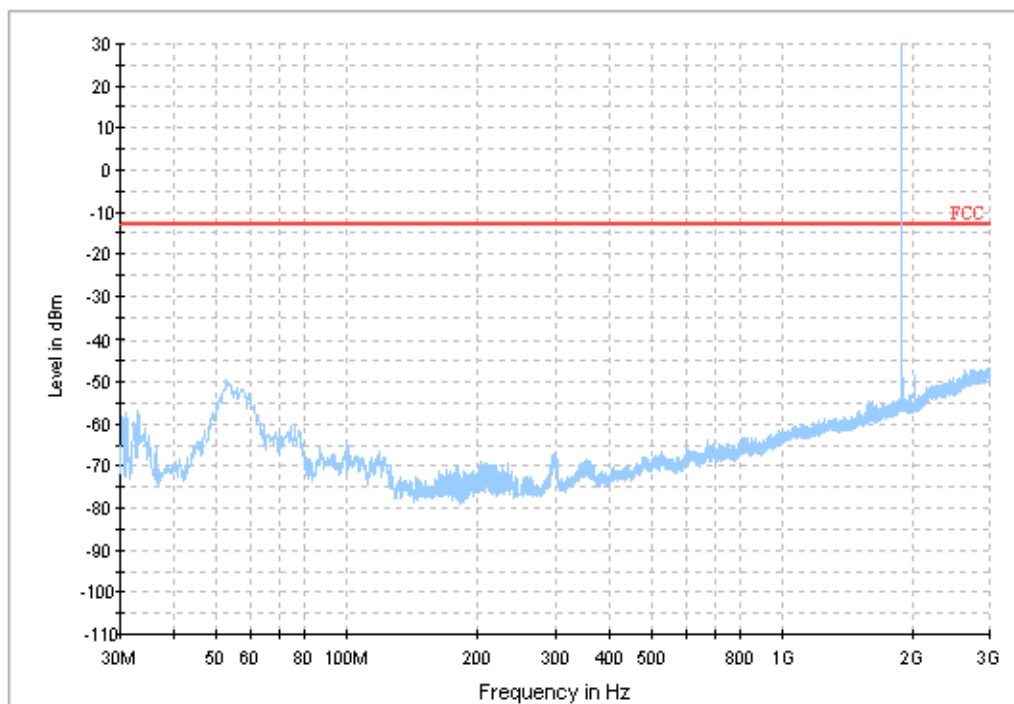


7.1.2 Test Band = GSM1900

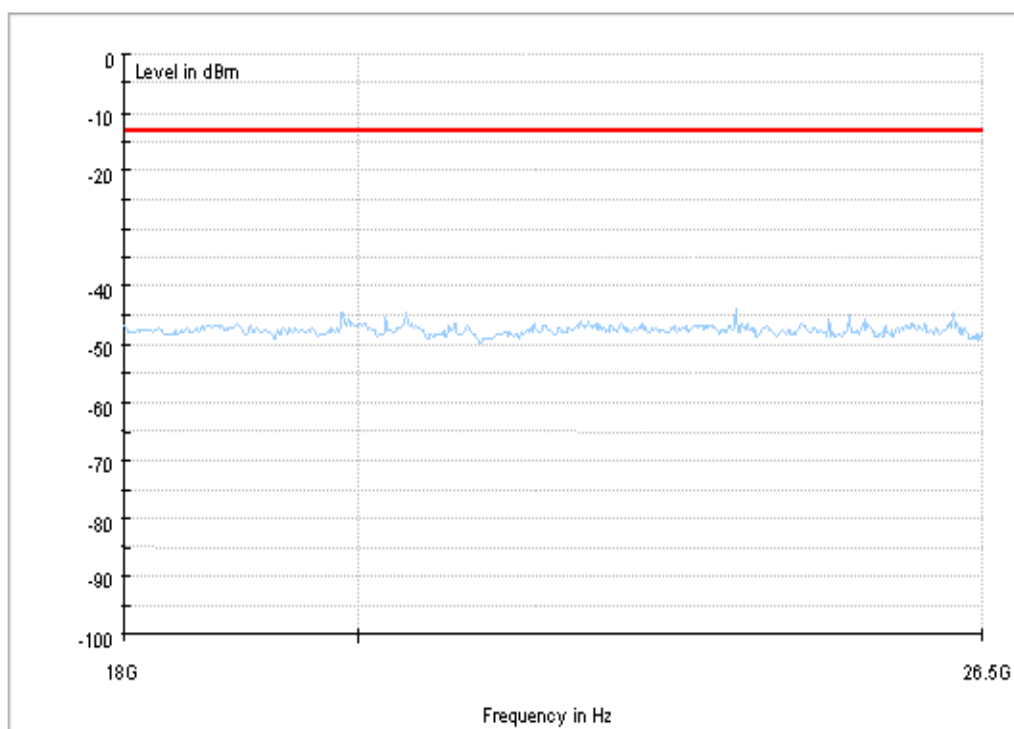
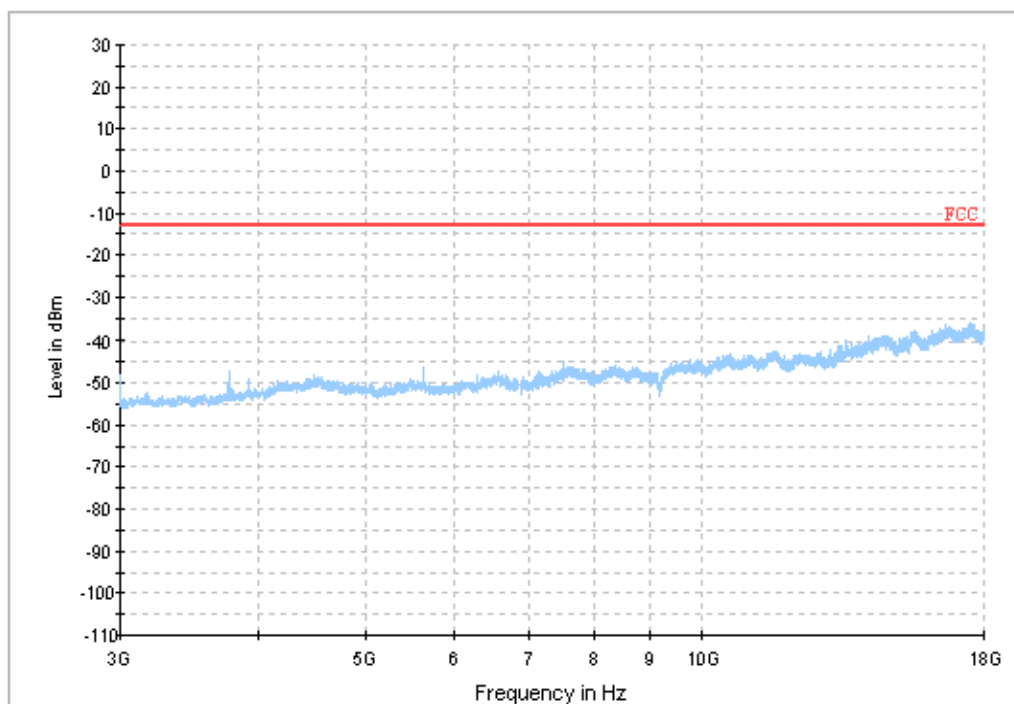
7.1.2.1 Test Mode = GSM/TM1



Copy of FCC PART24 GSM1900_L



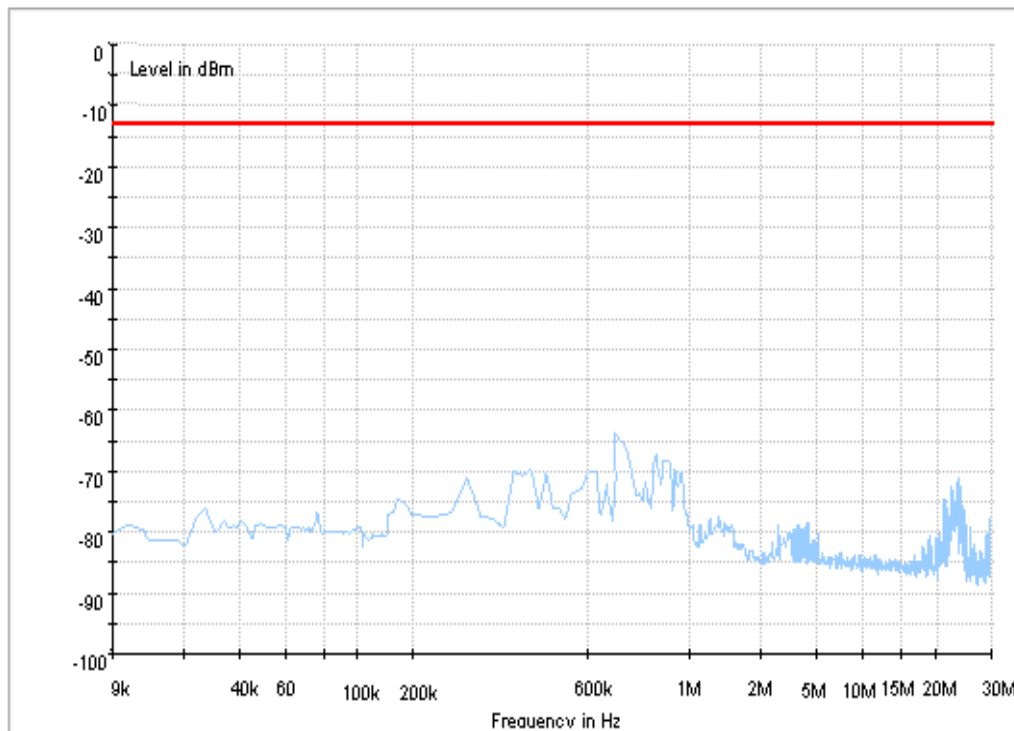
Copy of FCC PART24 GSM1900_H



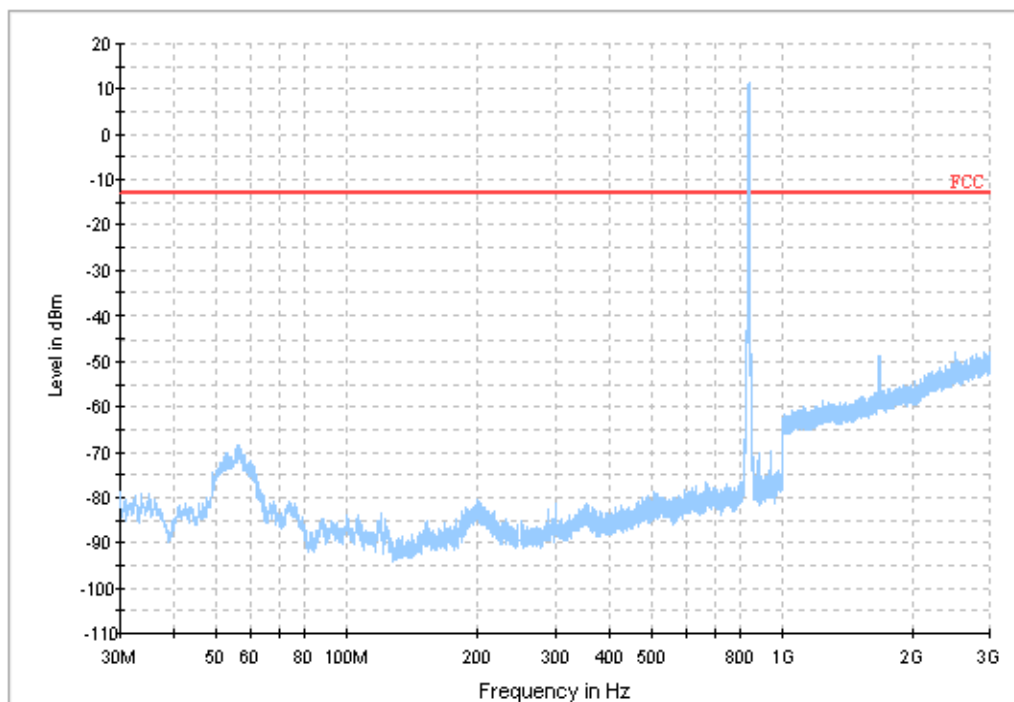
7.2 For UMTS

7.2.1 Test Band = WCDMA850

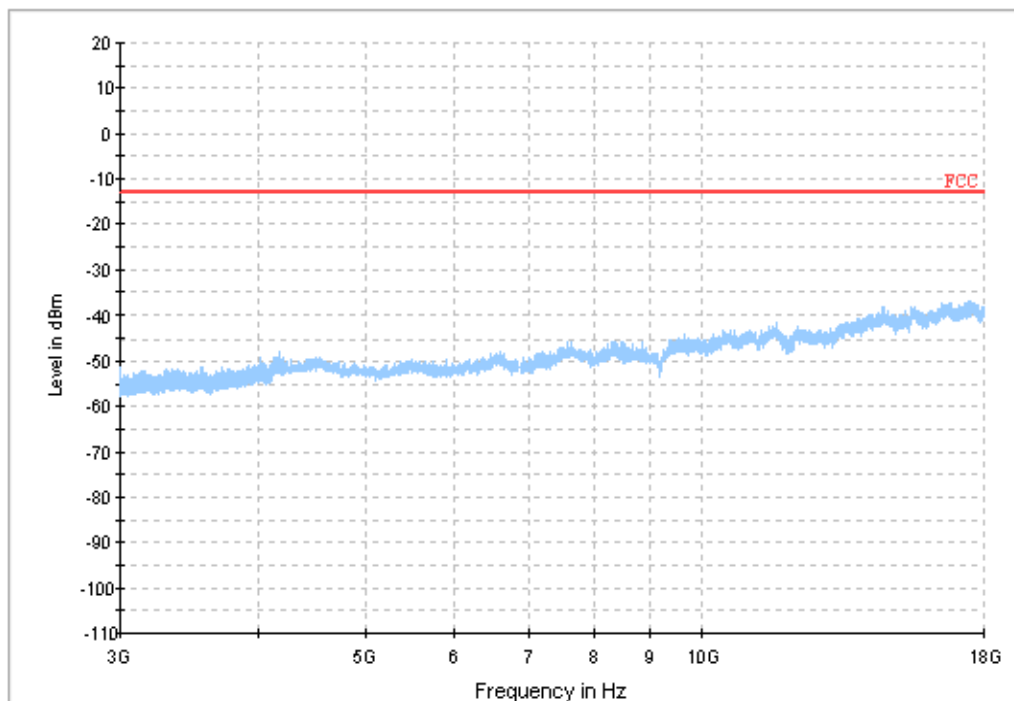
7.2.1.1 Test Mode = UMTS/TM1



Copy of FCC PART22 WCDMA850_L

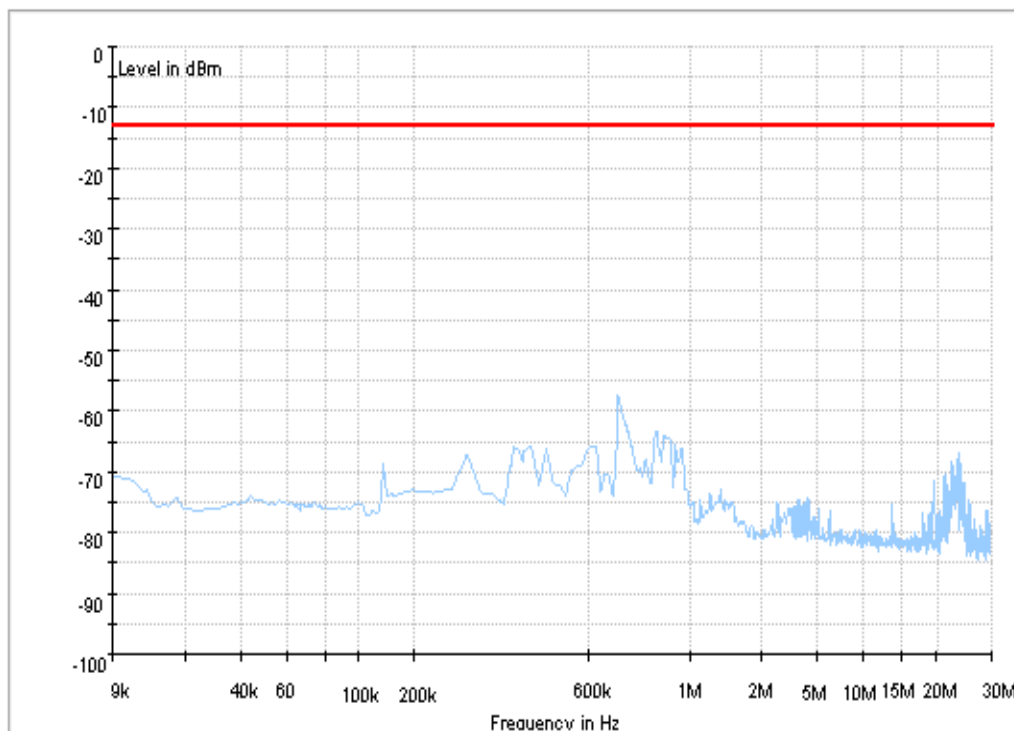


Copy of FCC PART22 WCDMA850_H

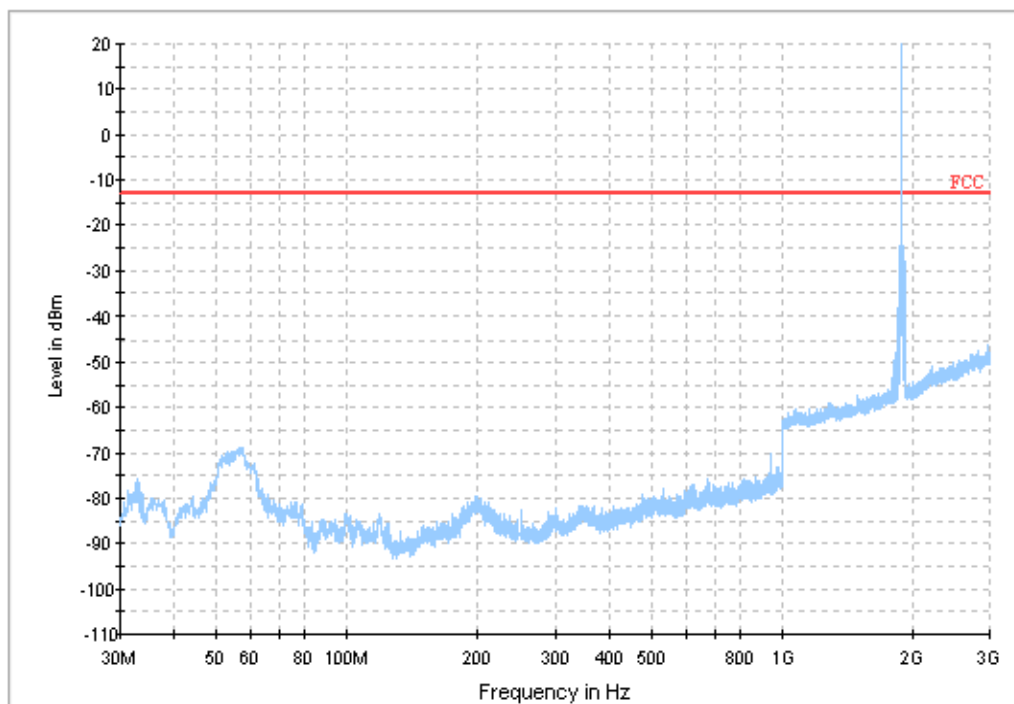


7.2.2 Test Band = WCDMA1900

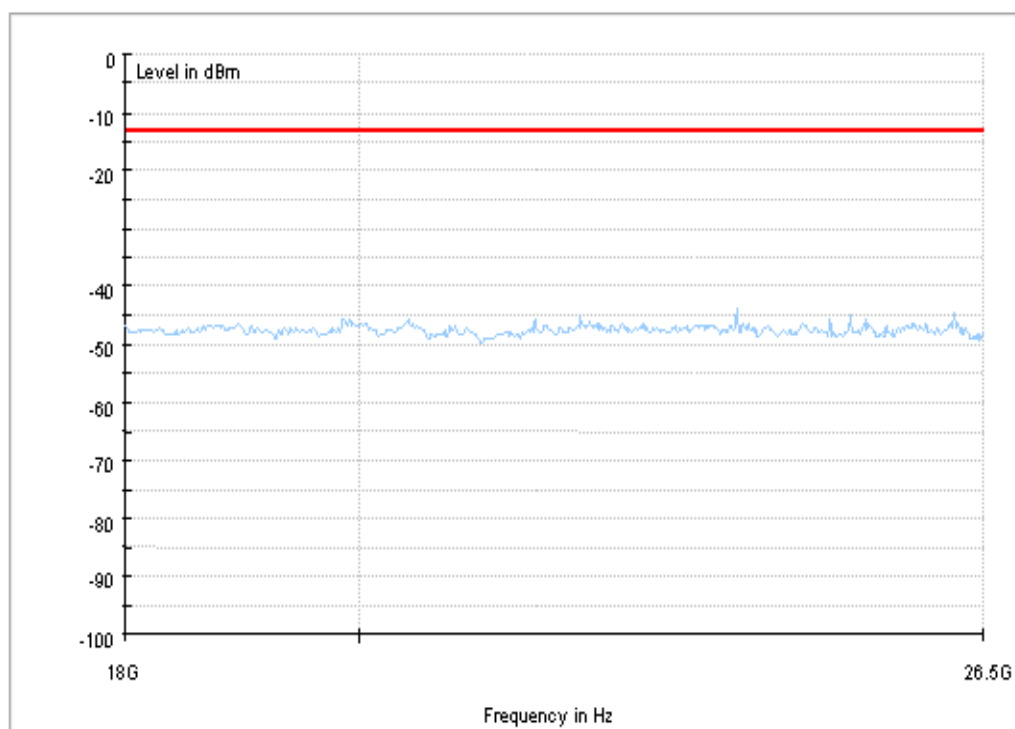
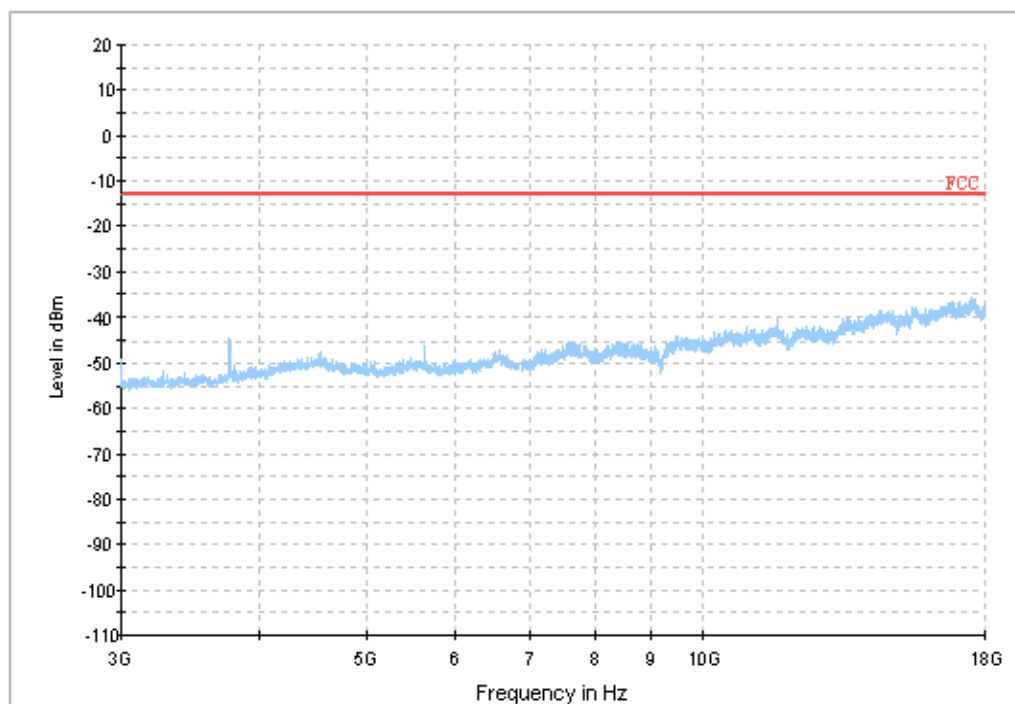
7.2.2.1 Test Mode = UMTS/TM1



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
GSM850	GSM/TM1	LCH	TN	VL	5.62	0.00682	PASS
				VN	6.20	0.00752	PASS
				VH	11.62	0.0141	PASS
		MCH	TN	VL	3.49	0.00417	PASS
				VN	9.75	0.01165	PASS
				VH	9.81	0.01173	PASS
		HCH	TN	VL	10.46	0.01232	PASS
				VN	12.66	0.01492	PASS
				VH	9.30	0.01096	PASS
GSM1900	GSM/TM1	LCH	TN	VL	31.83	0.0172	PASS
				VN	29.70	0.01605	PASS
				VH	25.38	0.01372	PASS
		MCH	TN	VL	28.67	0.01525	PASS
				VN	17.24	0.00917	PASS
				VH	26.99	0.01436	PASS
		HCH	TN	VL	21.95	0.01149	PASS
				VN	24.99	0.01309	PASS
				VH	27.18	0.01423	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	1.16	0.00141	PASS
				-20	2.58	0.00313	PASS
				-10	3.23	0.00392	PASS
				0	1.94	0.00235	PASS
				10	5.23	0.00635	PASS
				20	4.46	0.00541	PASS
				30	9.43	0.01144	PASS
				40	6.46	0.00784	PASS
				50	6.97	0.00846	PASS
		MCH	VN	-30	3.81	0.00455	PASS
				-20	7.30	0.00873	PASS
				-10	9.17	0.01096	PASS
				0	14.40	0.01721	PASS
				10	2.52	0.00301	PASS
				20	12.53	0.01498	PASS
				30	1.36	0.00163	PASS
				40	1.29	0.00154	PASS
				50	3.10	0.00371	PASS
		HCH	VN	-30	9.04	0.01065	PASS
				-20	10.40	0.01225	PASS
				-10	9.30	0.01096	PASS
				0	10.91	0.01285	PASS
				10	3.68	0.00434	PASS
				20	2.97	0.0035	PASS
				30	9.88	0.01164	PASS
				40	3.49	0.00411	PASS
				50	10.07	0.01186	PASS
GSM1900	GSM/TM1	LCH	VN	-30	22.34	0.01207	PASS
				-20	32.48	0.01755	PASS
				-10	29.96	0.01619	PASS
				0	21.57	0.01166	PASS
				10	28.61	0.01546	PASS
				20	33.71	0.01822	PASS
				30	25.76	0.01392	PASS
				40	12.46	0.00673	PASS
				50	20.66	0.01117	PASS

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
		MCH	VN	-30	25.44	0.01353	PASS
				-20	31.38	0.01669	PASS
				-10	24.41	0.01298	PASS
				0	12.98	0.0069	PASS
				10	19.69	0.01047	PASS
				20	26.60	0.01415	PASS
				30	30.74	0.01635	PASS
				40	21.63	0.01151	PASS
				50	31.25	0.01662	PASS
		HCH	VN	-30	30.15	0.01579	PASS
				-20	37.45	0.01961	PASS
				-10	30.09	0.01576	PASS
				0	23.37	0.01224	PASS
				10	37.00	0.01937	PASS
				20	34.09	0.01785	PASS
				30	17.56	0.00919	PASS
				40	31.38	0.01643	PASS
				50	32.61	0.01708	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
WCDMA850	UMTS/TM1	LCH	TN	VL	-4.20	-0.00508	PASS
				VN	-1.89	-0.00229	PASS
				VH	-3.30	-0.00399	PASS
		MCH	TN	VL	0.53	0.00063	PASS
				VN	-3.07	-0.00367	PASS
				VH	0.24	0.00029	PASS
		HCH	TN	VL	0.08	0.00009	PASS
				VN	0.21	0.00025	PASS
				VH	2.79	0.0033	PASS
WCDMA1900	UMTS/TM1	LCH	TN	VL	1.43	0.00077	PASS
				VN	6.41	0.00346	PASS
				VH	2.04	0.0011	PASS
		MCH	TN	VL	2.24	0.00119	PASS
				VN	0.49	0.00026	PASS
				VH	6.47	0.00344	PASS
		HCH	TN	VL	1.16	0.00061	PASS
				VN	4.58	0.0024	PASS
				VH	3.91	0.00205	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
WCDMA850	UMTS/TM1	LCH	VN	-30	-0.89	-0.00108	PASS
				-20	-2.58	-0.00312	PASS
				-10	-1.43	-0.00173	PASS
				0	-2.49	-0.00301	PASS
				10	-2.01	-0.00243	PASS
				20	-0.82	-0.00099	PASS
				30	-2.20	-0.00266	PASS
				40	-1.14	-0.00138	PASS
				50	0.55	0.00067	PASS
		MCH	VN	-30	0.12	0.00014	PASS
				-20	-0.44	-0.00053	PASS
				-10	3.43	0.0041	PASS
				0	0.40	0.00048	PASS
				10	1.60	0.00191	PASS
				20	0.92	0.0011	PASS
				30	2.33	0.00279	PASS
				40	1.83	0.00219	PASS
				50	-0.35	-0.00042	PASS
		HCH	VN	-30	-1.57	-0.00185	PASS
				-20	-1.40	-0.00165	PASS
				-10	0.49	0.00058	PASS
				0	2.01	0.00237	PASS
				10	2.41	0.00285	PASS
				20	2.03	0.0024	PASS
				30	2.96	0.0035	PASS
				40	1.34	0.00158	PASS
				50	0.31	0.00037	PASS
WCDMA1900	UMTS/TM1	LCH	VN	-30	8.30	0.00448	PASS
				-20	6.24	0.00337	PASS
				-10	4.82	0.0026	PASS
				0	4.70	0.00254	PASS
				10	6.59	0.00356	PASS
				20	6.59	0.00356	PASS
				30	-0.20	-0.00011	PASS
				40	6.44	0.00348	PASS
				50	0.89	0.00048	PASS

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
		MCH	VN	-30	5.13	0.00273	PASS
				-20	4.43	0.00236	PASS
				-10	3.27	0.00174	PASS
				0	5.04	0.00268	PASS
				10	4.12	0.00219	PASS
				20	3.91	0.00208	PASS
				30	2.61	0.00139	PASS
				40	6.18	0.00329	PASS
				50	5.20	0.00277	PASS
		HCH	VN	-30	3.80	0.00199	PASS
				-20	5.69	0.00298	PASS
				-10	4.09	0.00214	PASS
				0	8.09	0.00424	PASS
				10	2.93	0.00154	PASS
				20	-1.77	-0.00093	PASS
				30	7.72	0.00405	PASS
				40	6.00	0.00315	PASS
				50	2.20	0.00115	PASS

END