



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	32.53	32.38	38.5	PASS
		MCH	32.65	32.5	38.5	PASS
		HCH	32.52	32.37	38.5	PASS
WCDMA850	UMTS/TM1	LCH	23.49	23.34	38..5	PASS
		MCH	23.2	23.05	38.5	PASS
		HCH	23.15	23	38.5	PASS

Test Band	Test Mode	Test Channel	Conducted Power [dBm]	EIRP [dBm]	Limit [dBm]	Verdict
GSM1900	GSM/TM1	LCH	29.54	30.99	33	PASS
		MCH	29.62	31.07	33	PASS
		HCH	29.67	31.12	33	PASS
WCDMA1900	UMTS/TM1	LCH	23.12	22.97	33	PASS
		MCH	23.18	23.03	33	PASS
		HCH	23.14	22.99	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	0.13	13	PASS
		MCH	0.15	13	PASS
		HCH	0.14	13	PASS

Test Band	Test Mode	Test Channel	Measured[dB]	Limit [dB]	Verdict
WCDMA1900	UMTS/TM1	LCH	3.19	13	PASS
		MCH	3.2	13	PASS
		HCH	3.06	13	PASS

3Appendix_C: Modulation Characteristics

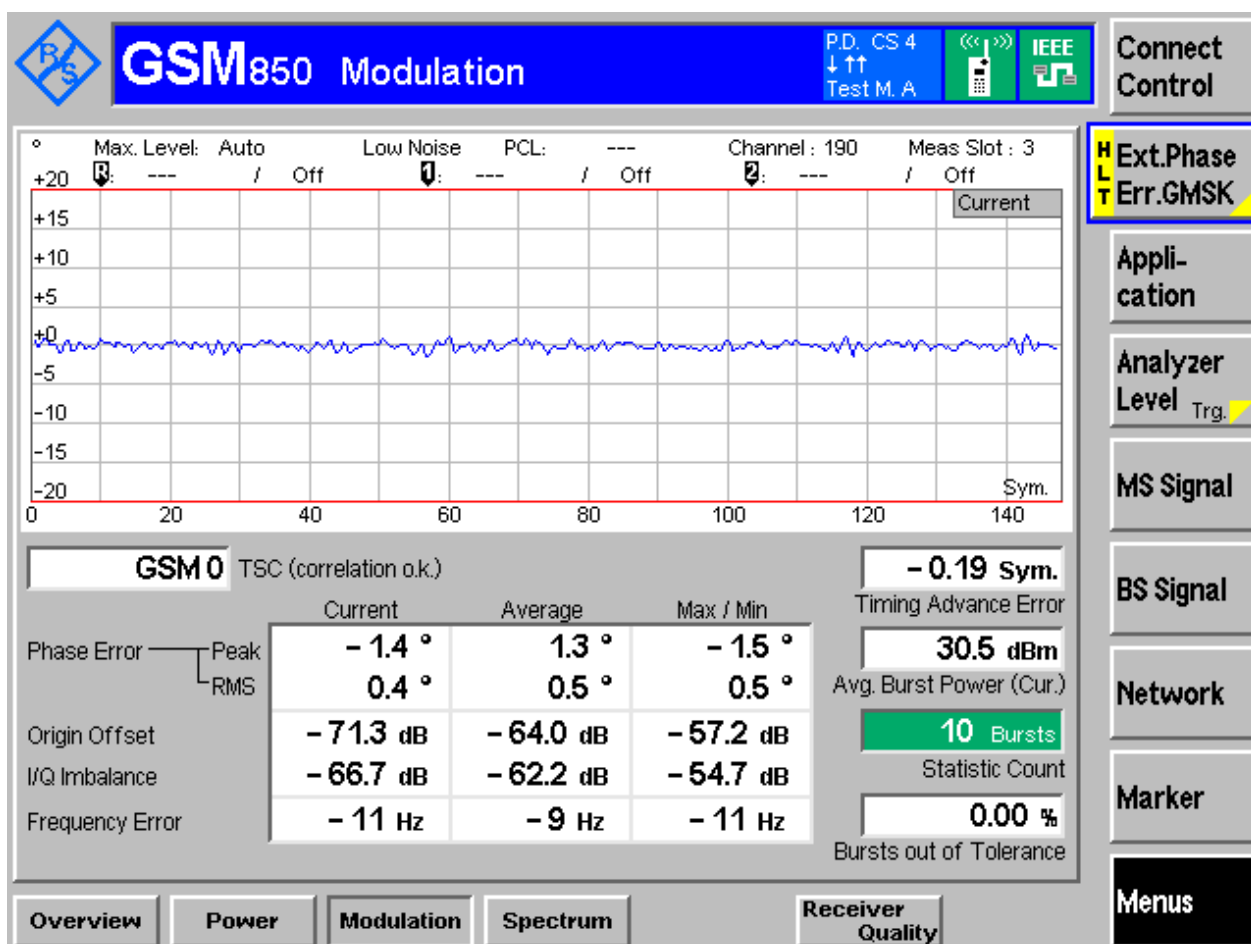
Part I - Test Plots

2.1 For GSM

2.1.1 Test Band = GSM850

2.1.1.1 Test Mode = GSM/TM1

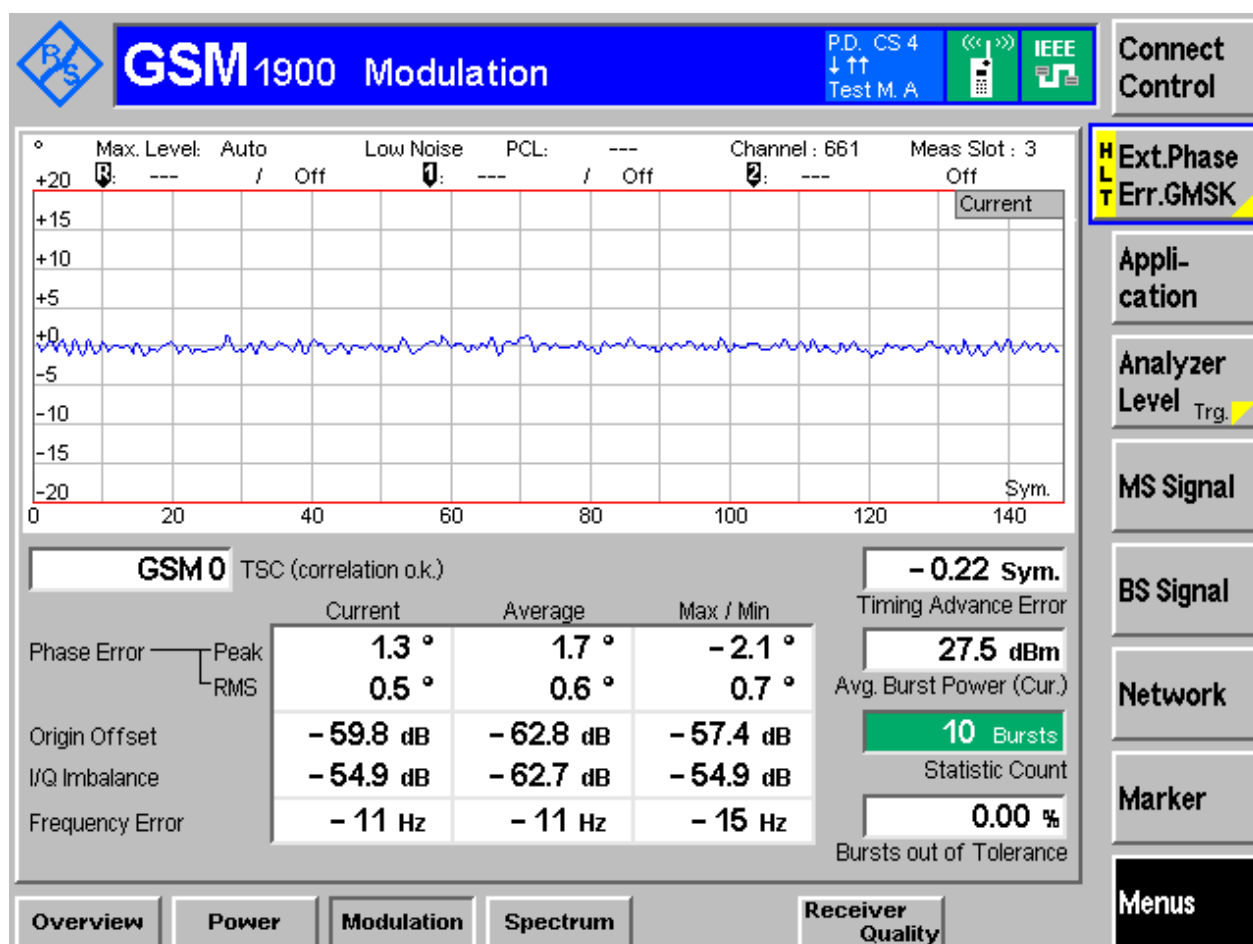
2.1.1.1.1 Test Channel = MCH



2.1.2 Test Band = GSM1900

2.1.2.1 Test Mode = GSM/TM1

2.1.2.1.2 Test Channel = MCH

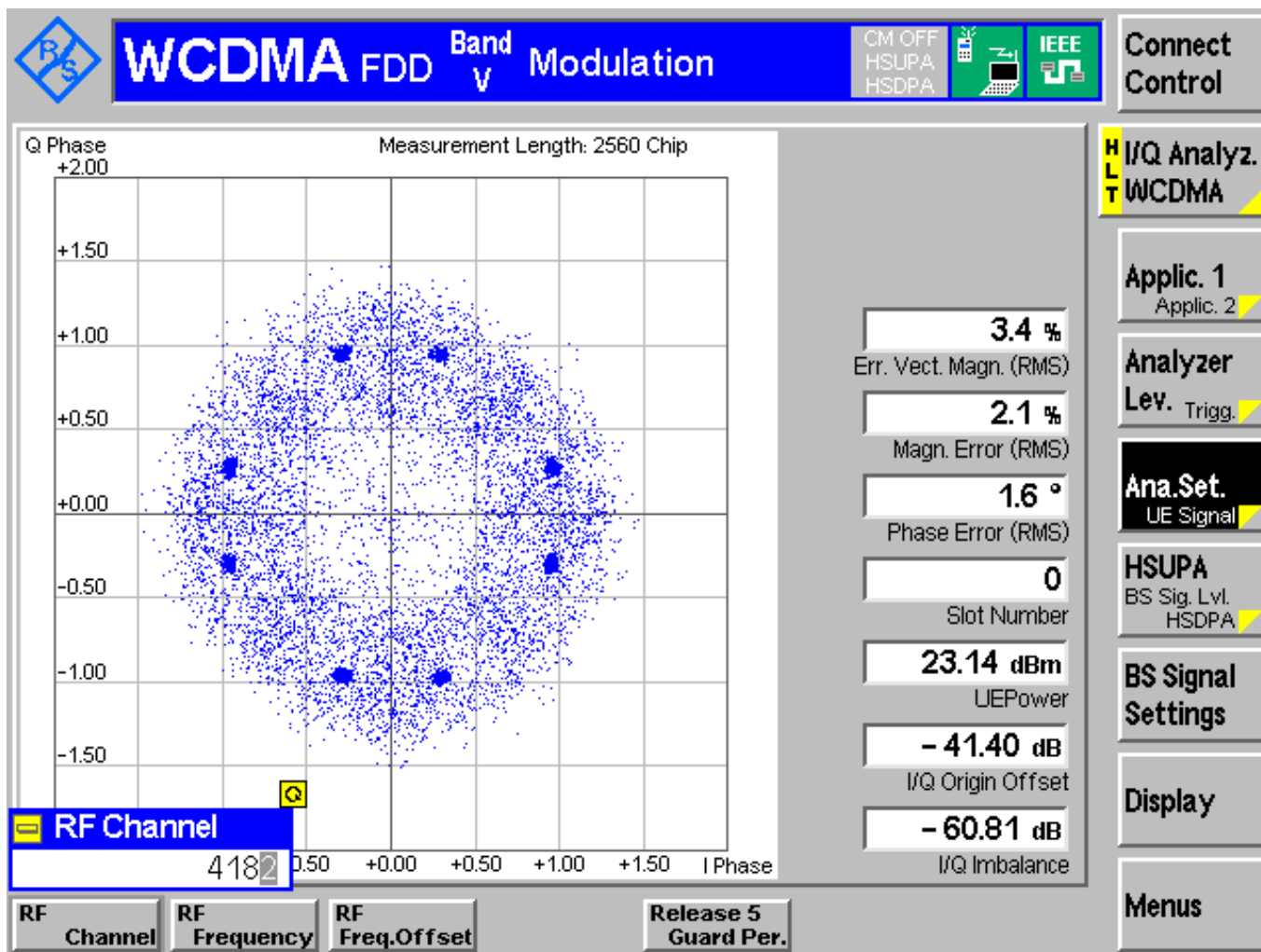


2.2 For UMTS

2.2.1 Test Band = WCDMA850

2.2.1.1 Test Mode = UMTS/TM1

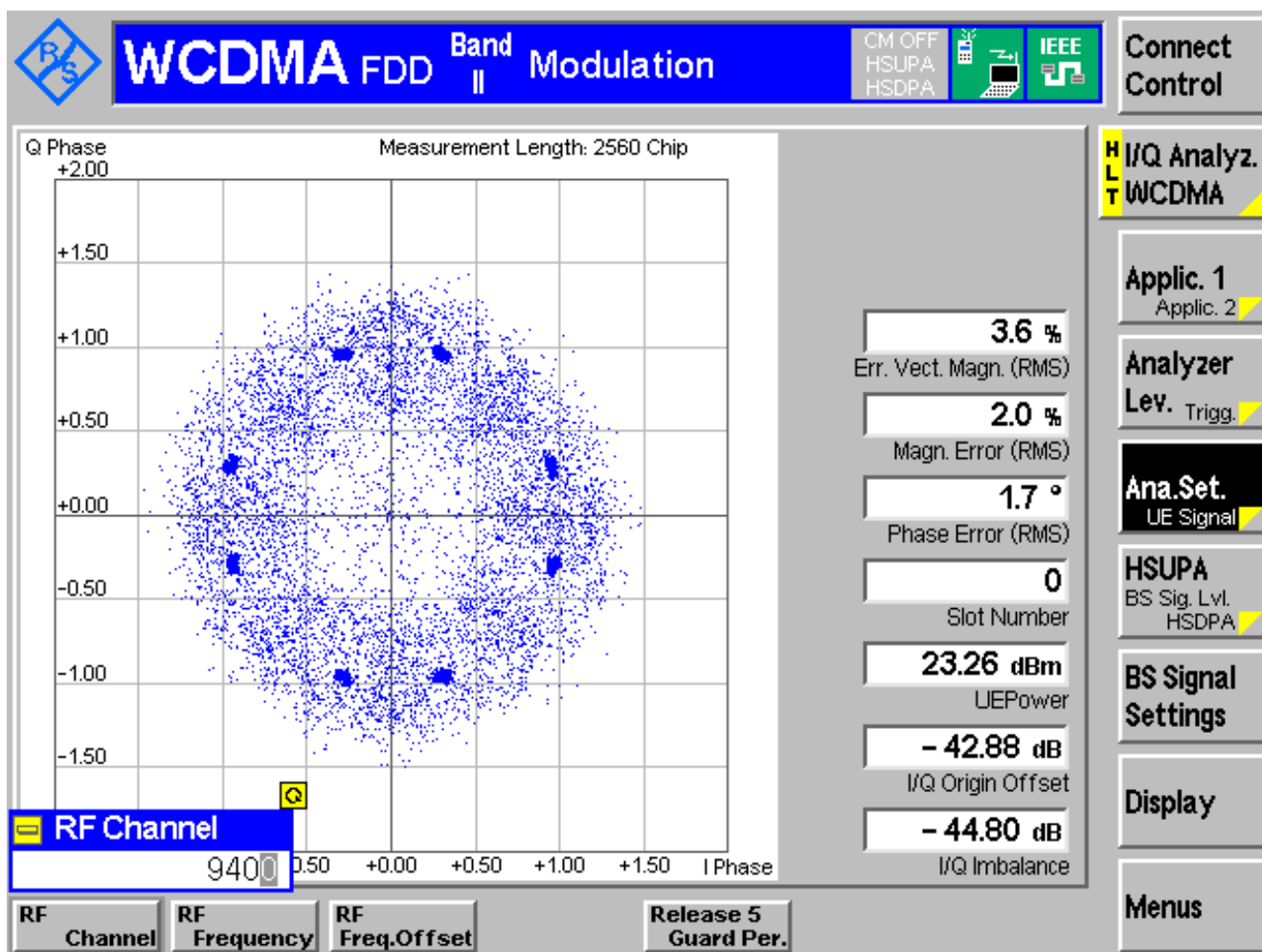
2.2.1.1.2 Test Channel = MCH



2.2.2 Test Band = WCDMA1900

2.2.2.1 Test Mode = UMTS/TM1

2.2.2.1.2 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	245.17	320.16	Pass
		MCH	249.03	311.62	Pass
		HCH	245.25	323.2	Pass
GSM1900	GSM/TM1	LCH	244.46	320.42	Pass
		MCH	243.47	317.68	Pass
		HCH	247.01	322.13	Pass
Test Band	Test Mode	Test Channel	Occupied Bandwidth [MHz]	Emission Bandwidth [MHz]	Verdict
WCDMA850	UMTS/TM1	LCH	4.09	4.67	Pass
		MCH	4.11	4.68	Pass
		HCH	4.10	4.67	Pass
WCDMA1900	UMTS/TM1	LCH	4.09	4.67	Pass
		MCH	4.11	4.68	Pass
		HCH	4.10	4.68	Pass

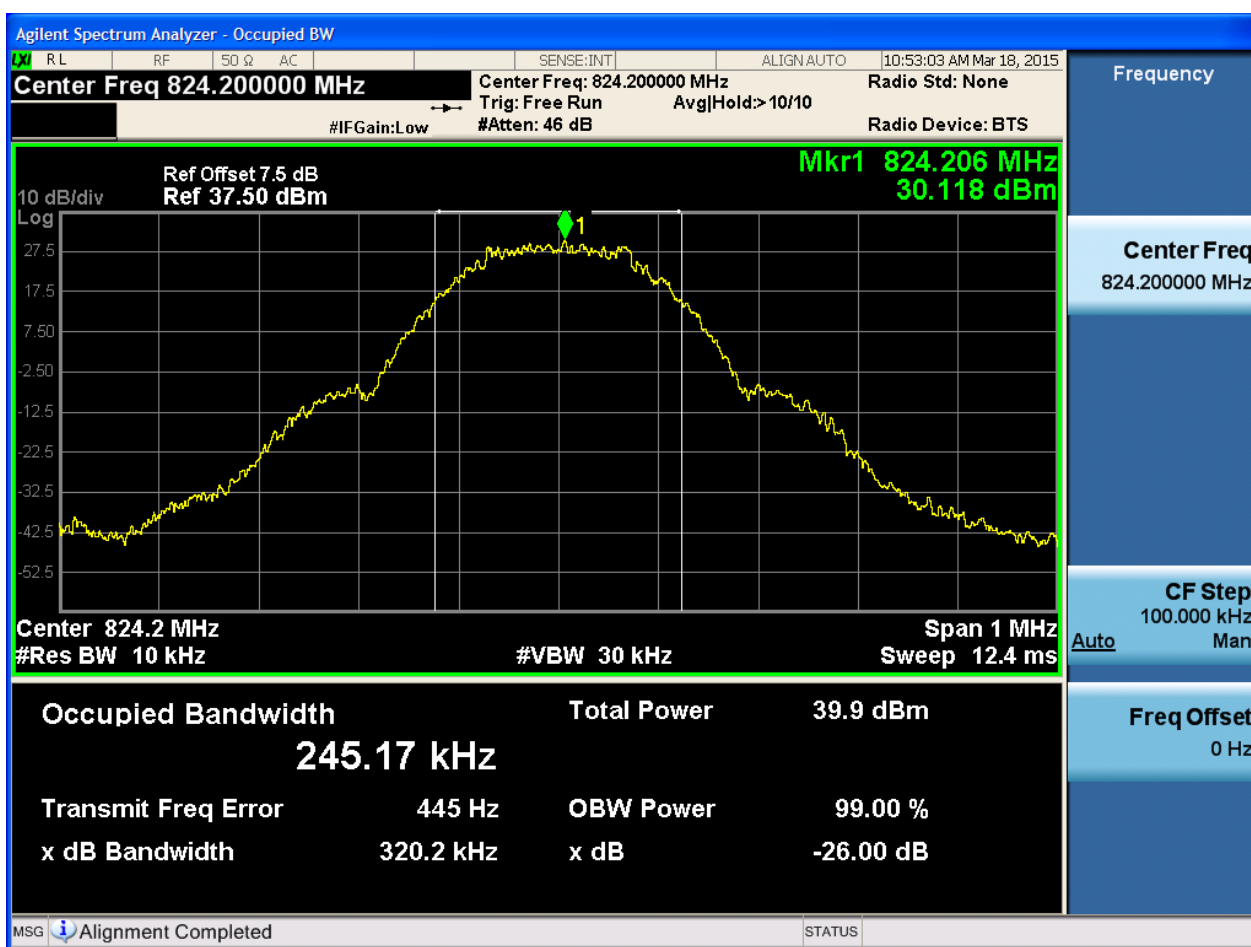
Part II - Test Plots

4.1 For GSM

4.1.1 Test Band = GSM850

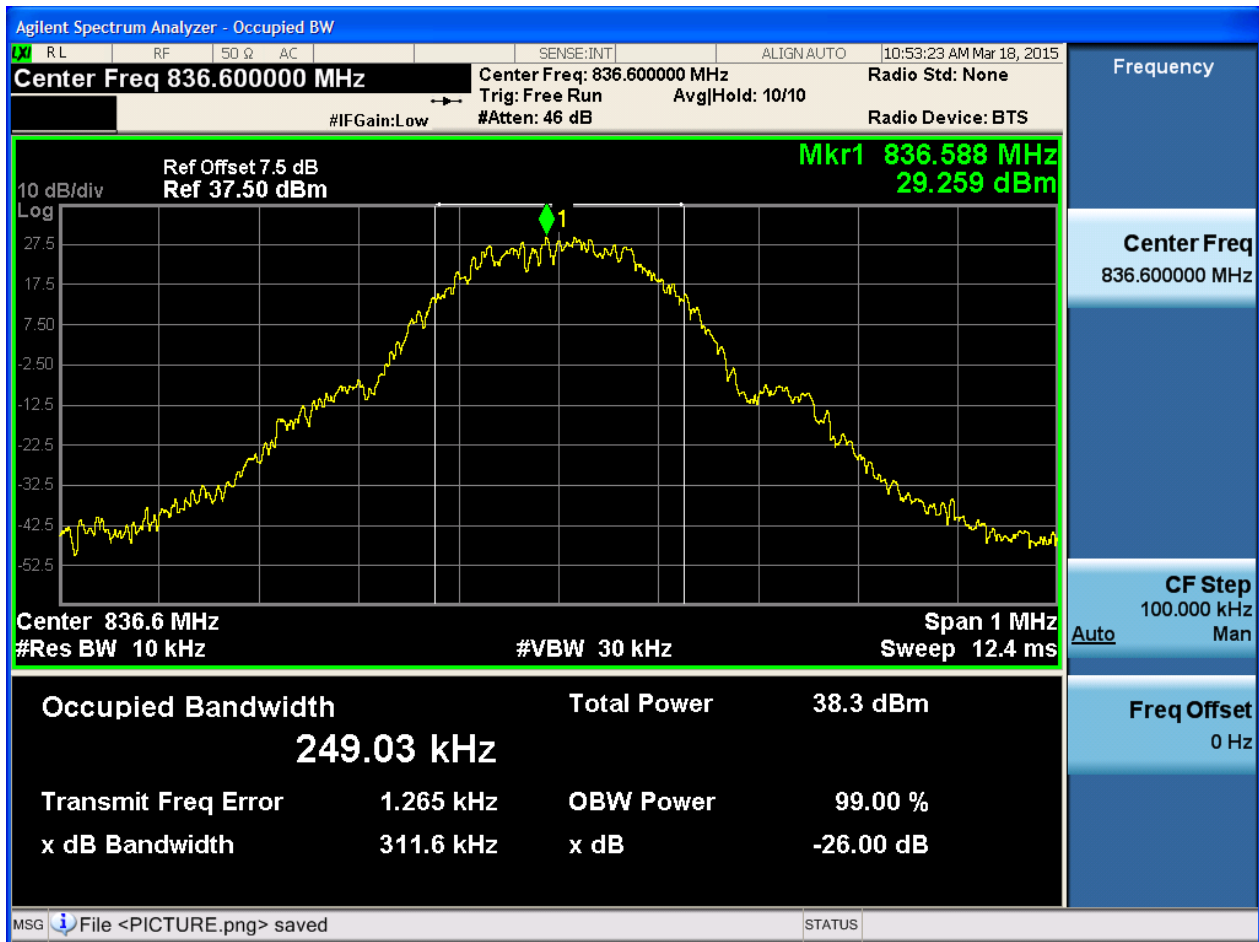
4.1.1.1 Test Mode = GSM/TM1

4.1.1.1.1 Test Channel = LCH



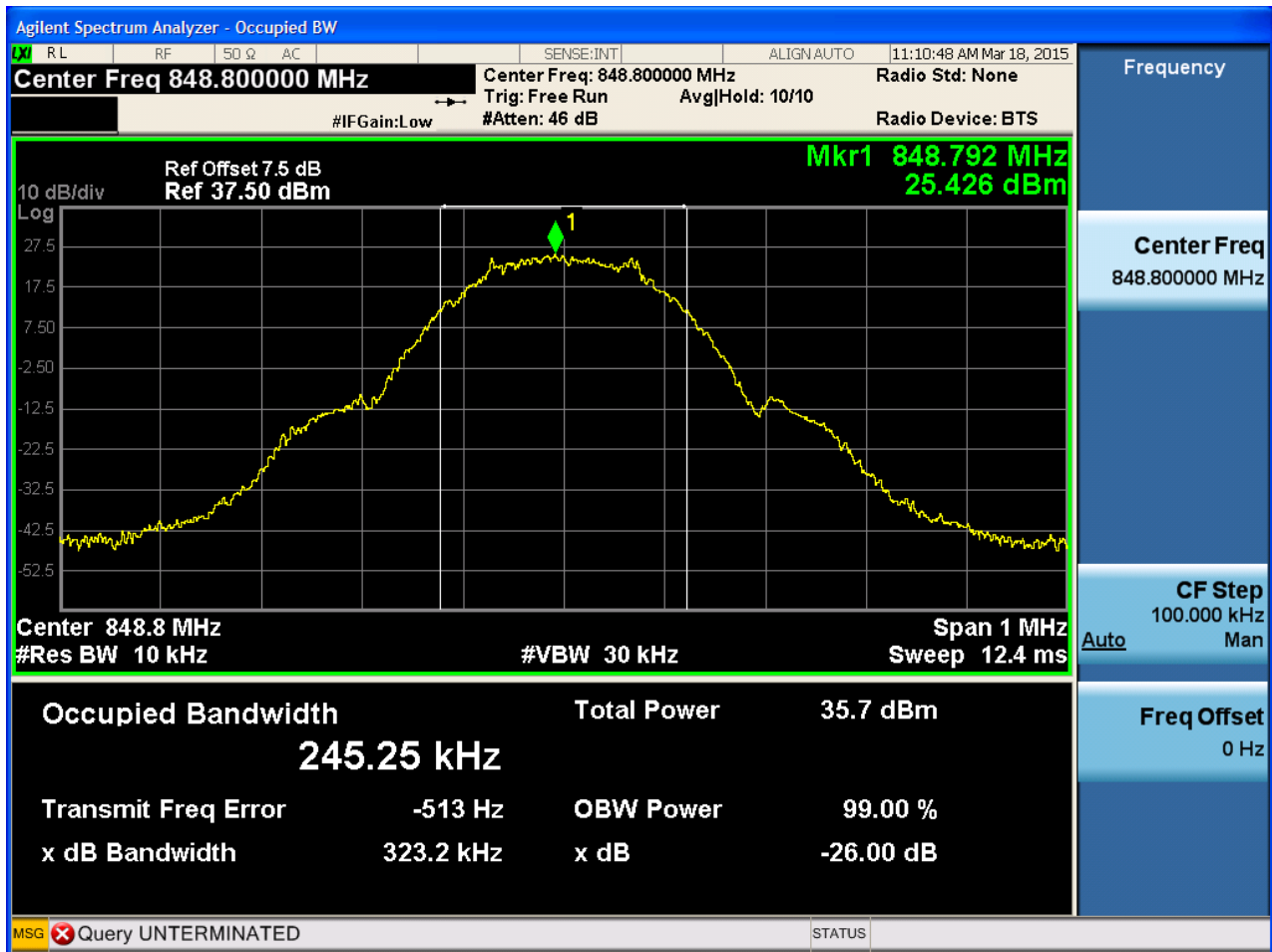


4.1.1.1.2 Test Channel = MCH





4.1.1.1.3 Test Channel = HCH

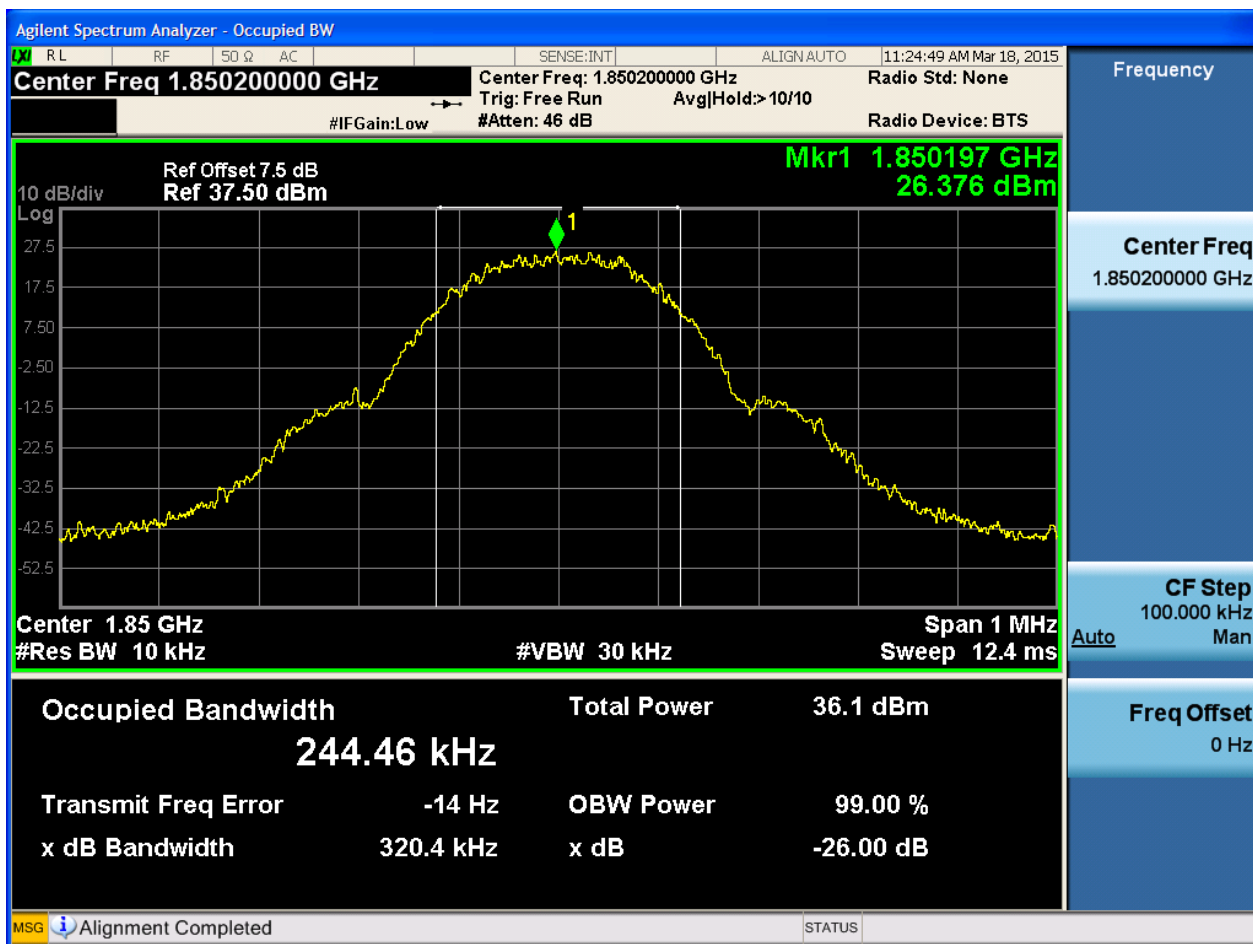




4.1.2 Test Band = GSM1900

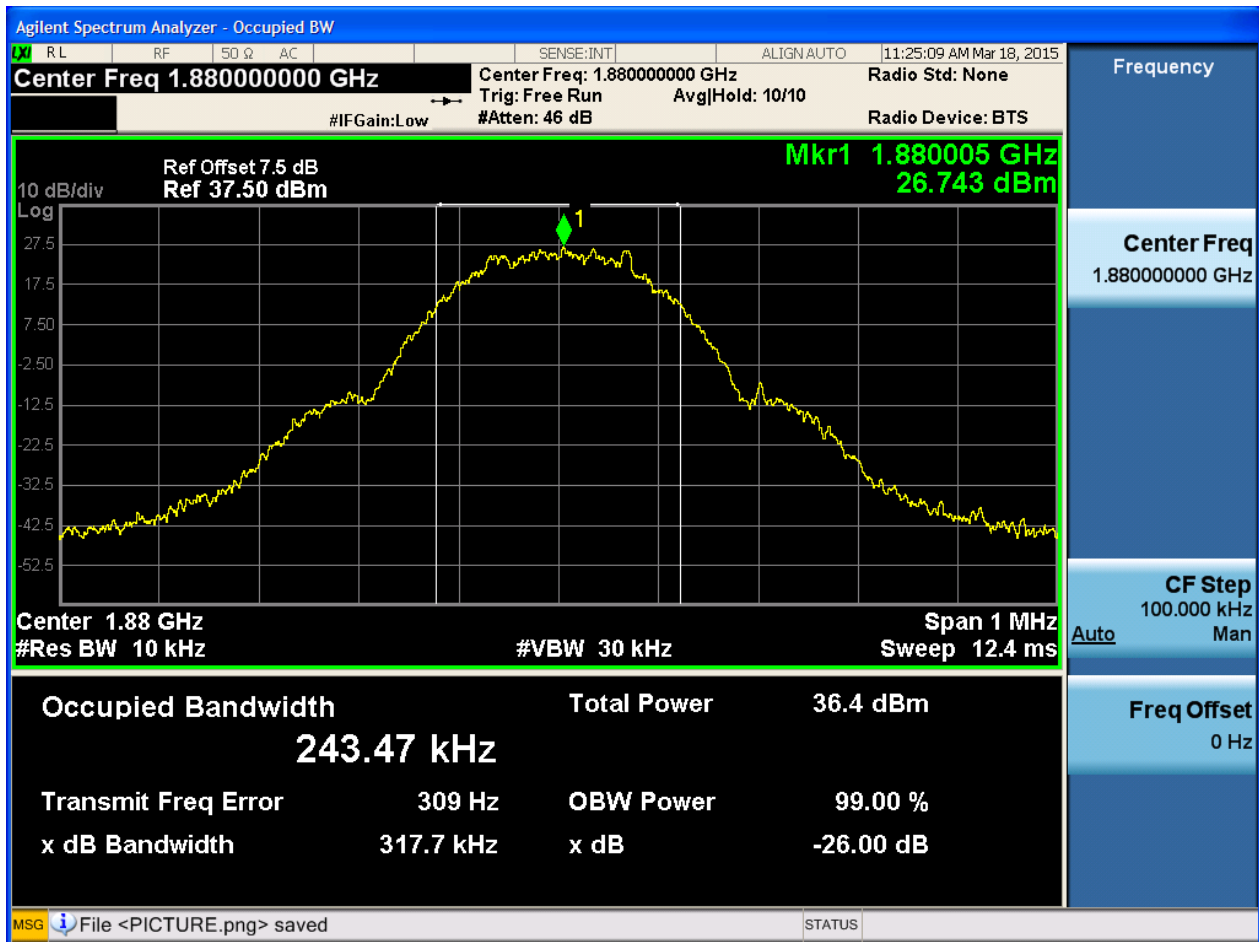
4.1.2.1 Test Mode = GSM/TM1

4.1.2.1.1 Test Channel = LCH



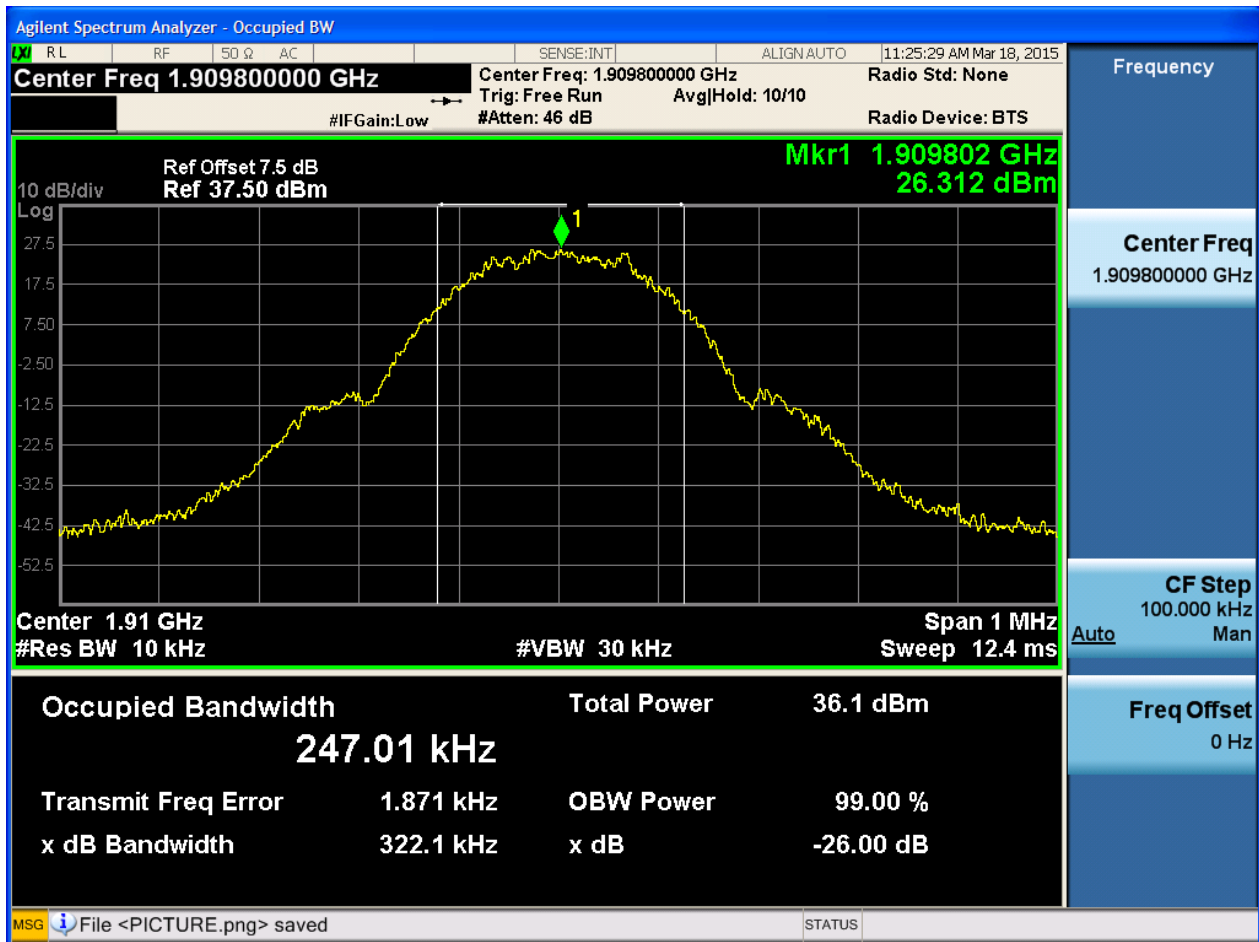


4.1.2.1.2 Test Channel = MCH





4.1.2.1.3 Test Channel = HCH

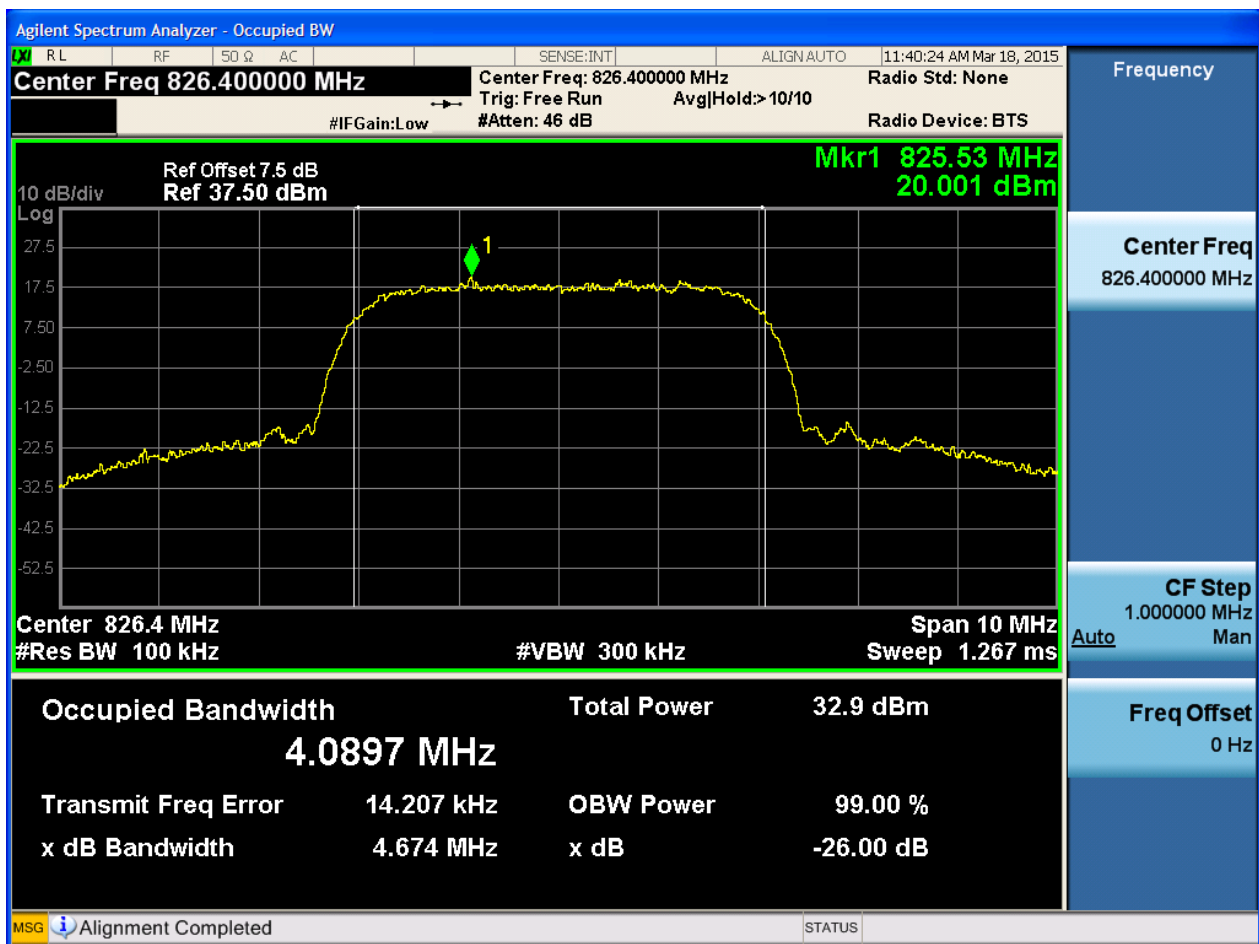


4.2 For UMTS

4.2.1 Test Band = WCDMA850

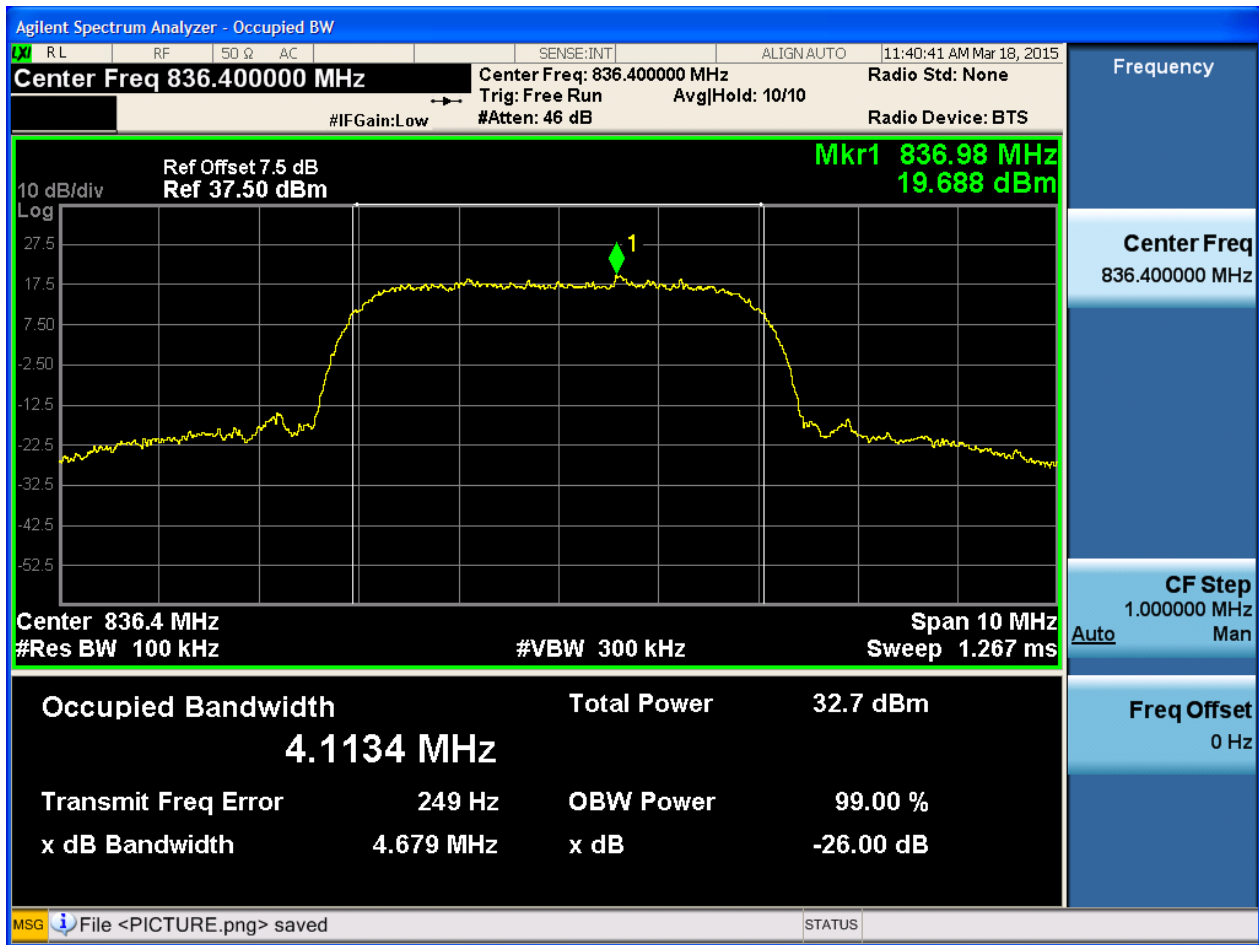
4.2.1.1 Test Mode = UMTS/TM1

4.2.1.1.1 Test Channel = LCH



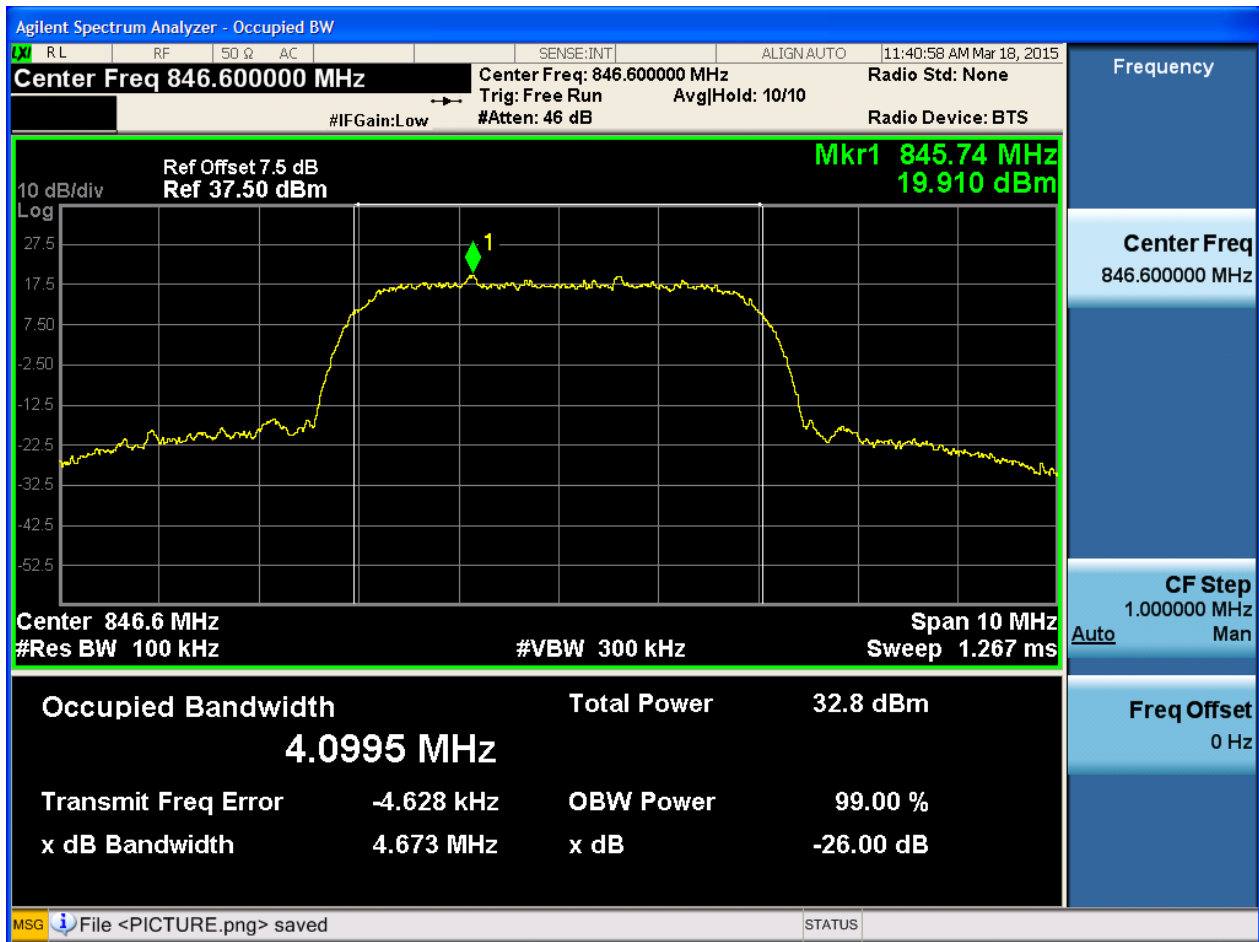


4.2.1.1.2 Test Channel = MCH





4.2.1.1.3 Test Channel = HCH

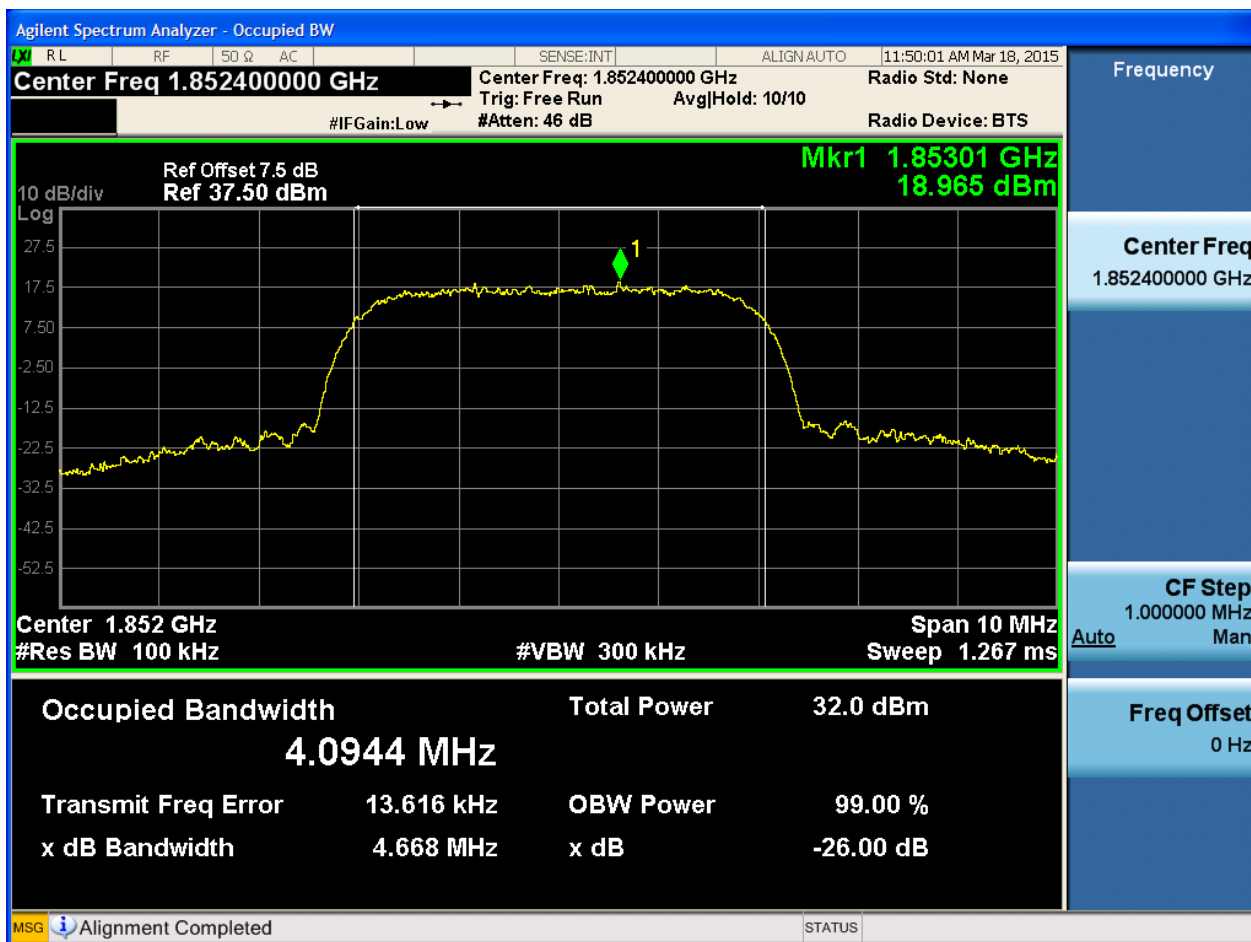




4.2.2 Test Band = WCDMA1900

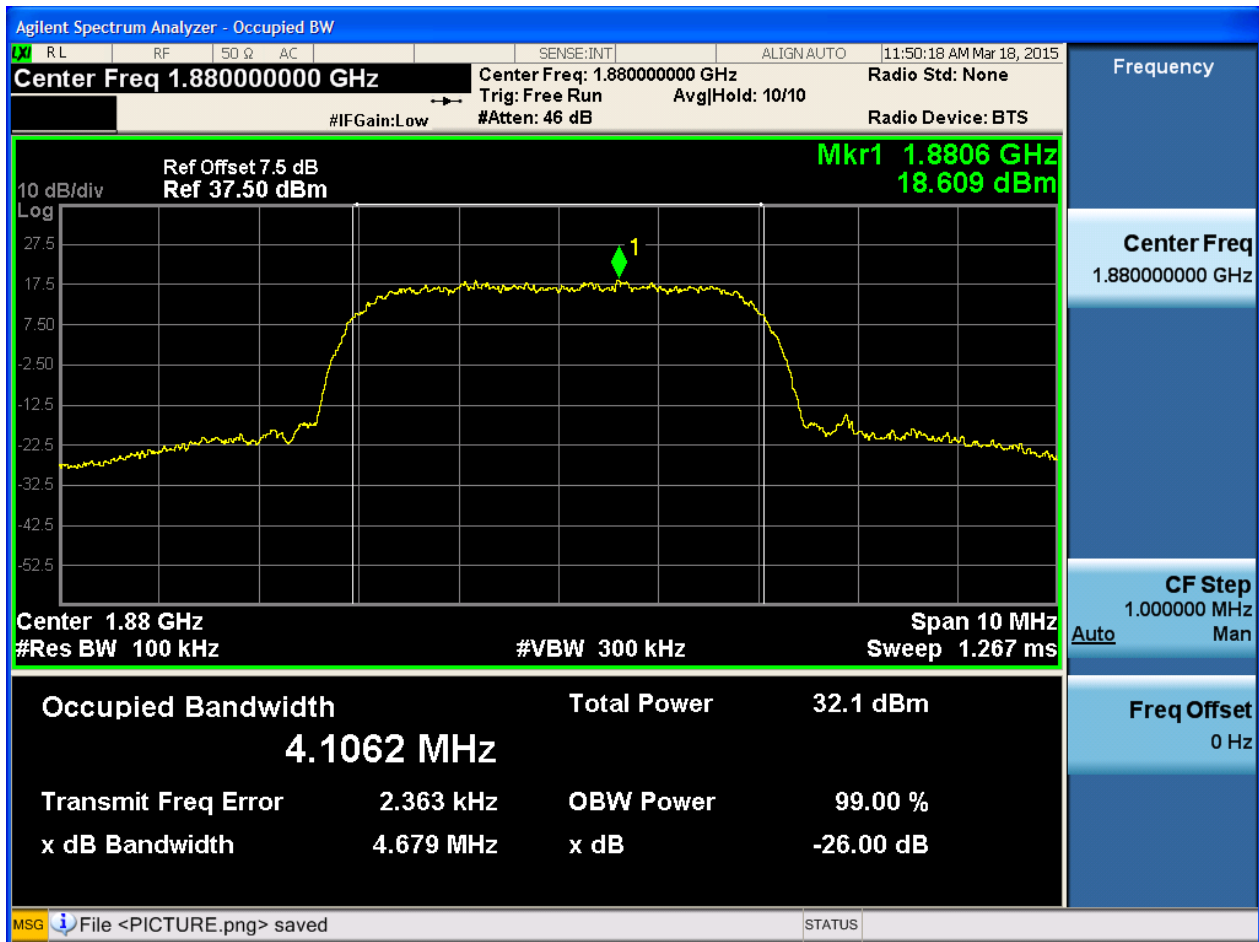
4.2.2.1 Test Mode = UMTS/TM1

4.2.2.1.1 Test Channel = LCH



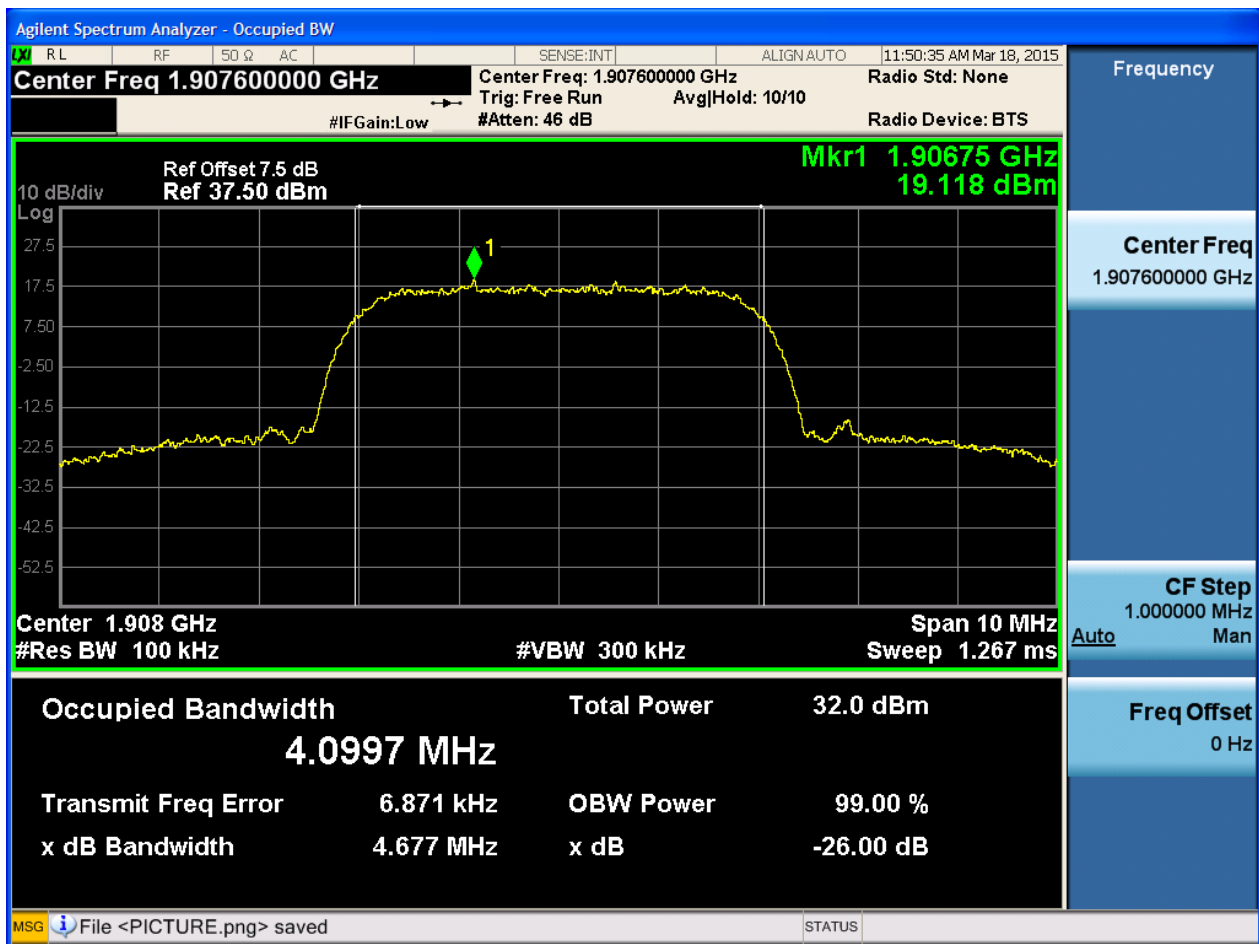


4.2.2.1.2 Test Channel = MCH





4.2.2.1.3 Test Channel = HCH



5Appendix_E: Band Edges Compliance

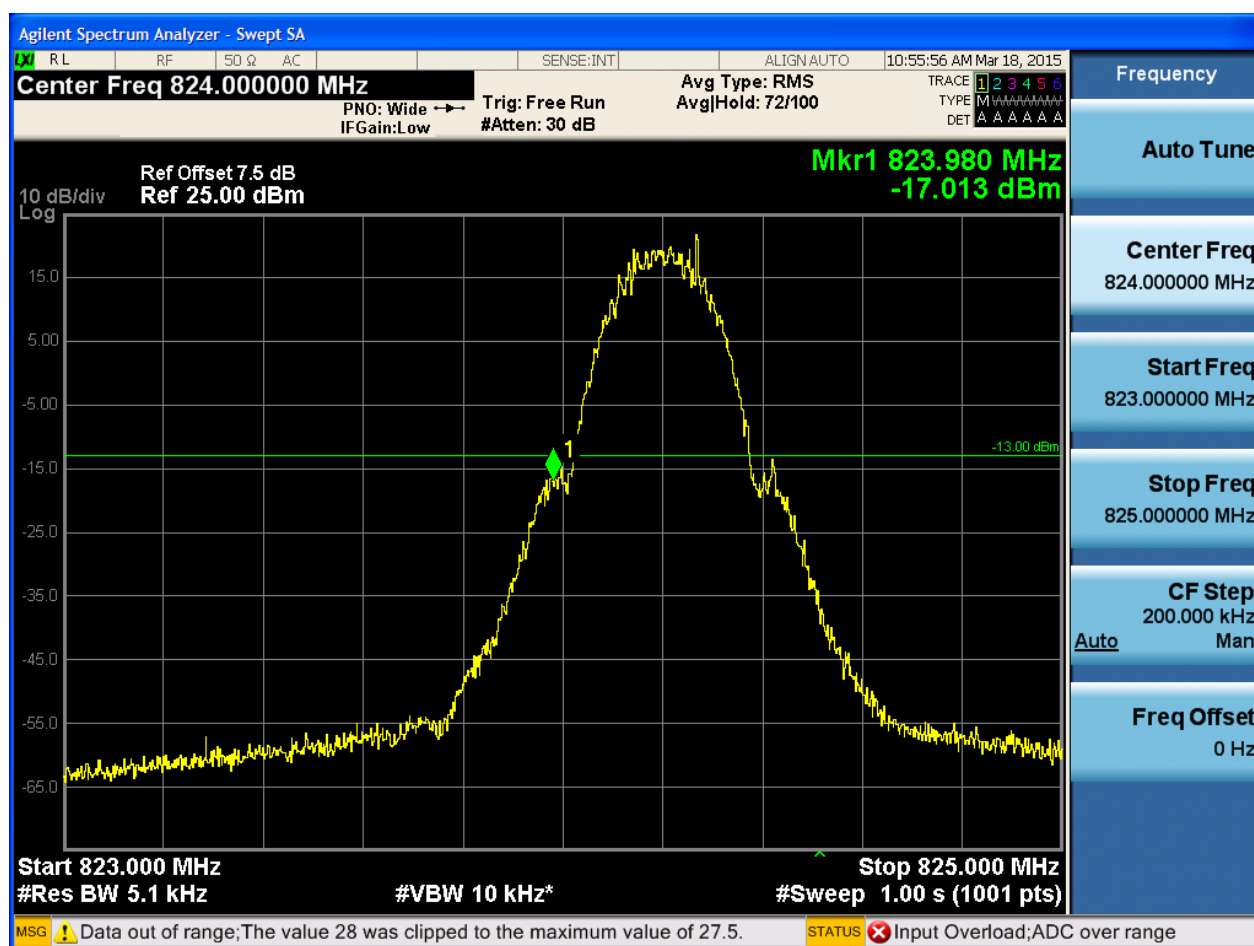
Part I - Test Plots

5.1 For GSM

5.1.1 Test Band = GSM850

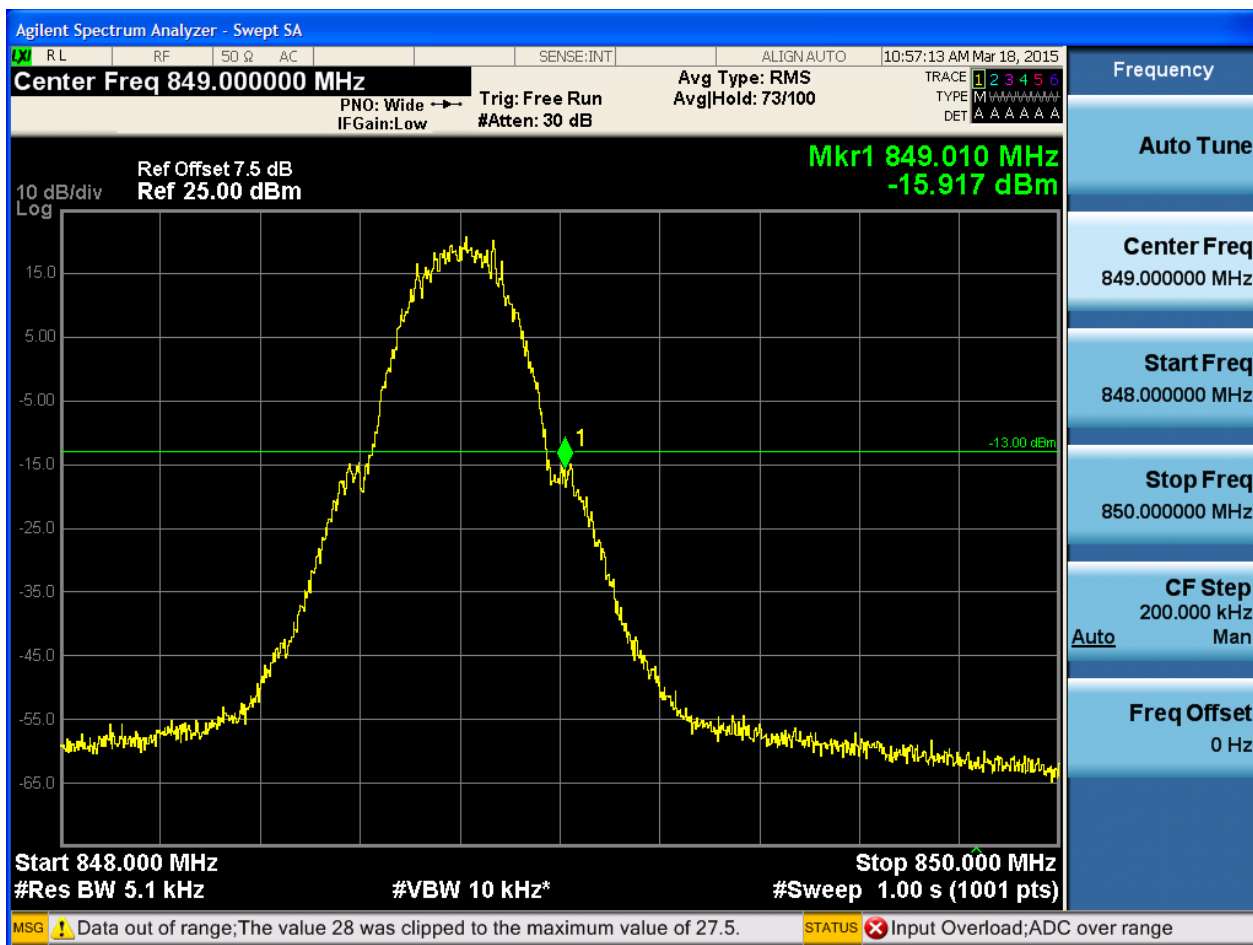
5.1.1.1 Test Mode = GSM/TM1

5.1.1.1.1 Test Channel = LCH





5.1.1.1.2 Test Channel = HCH

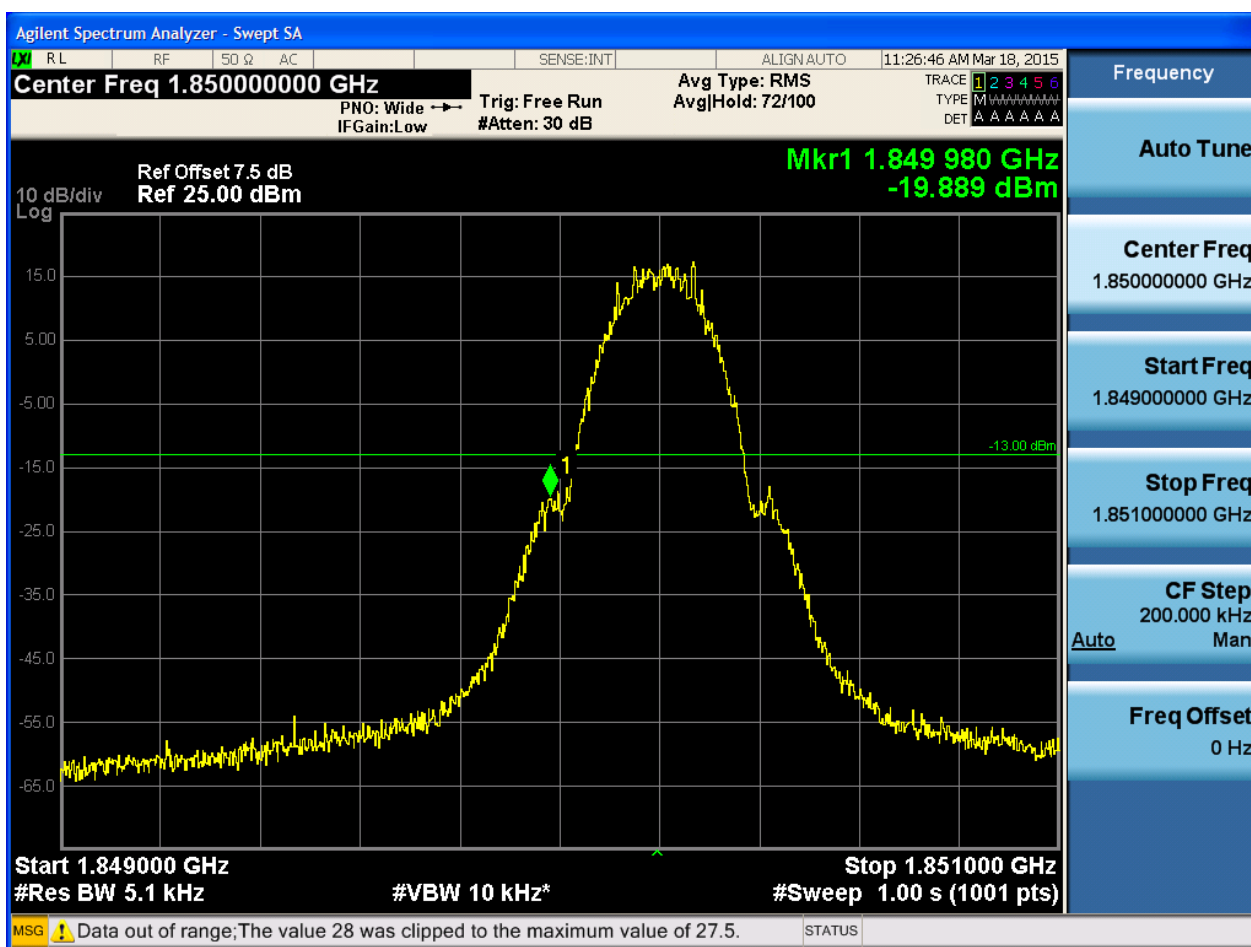




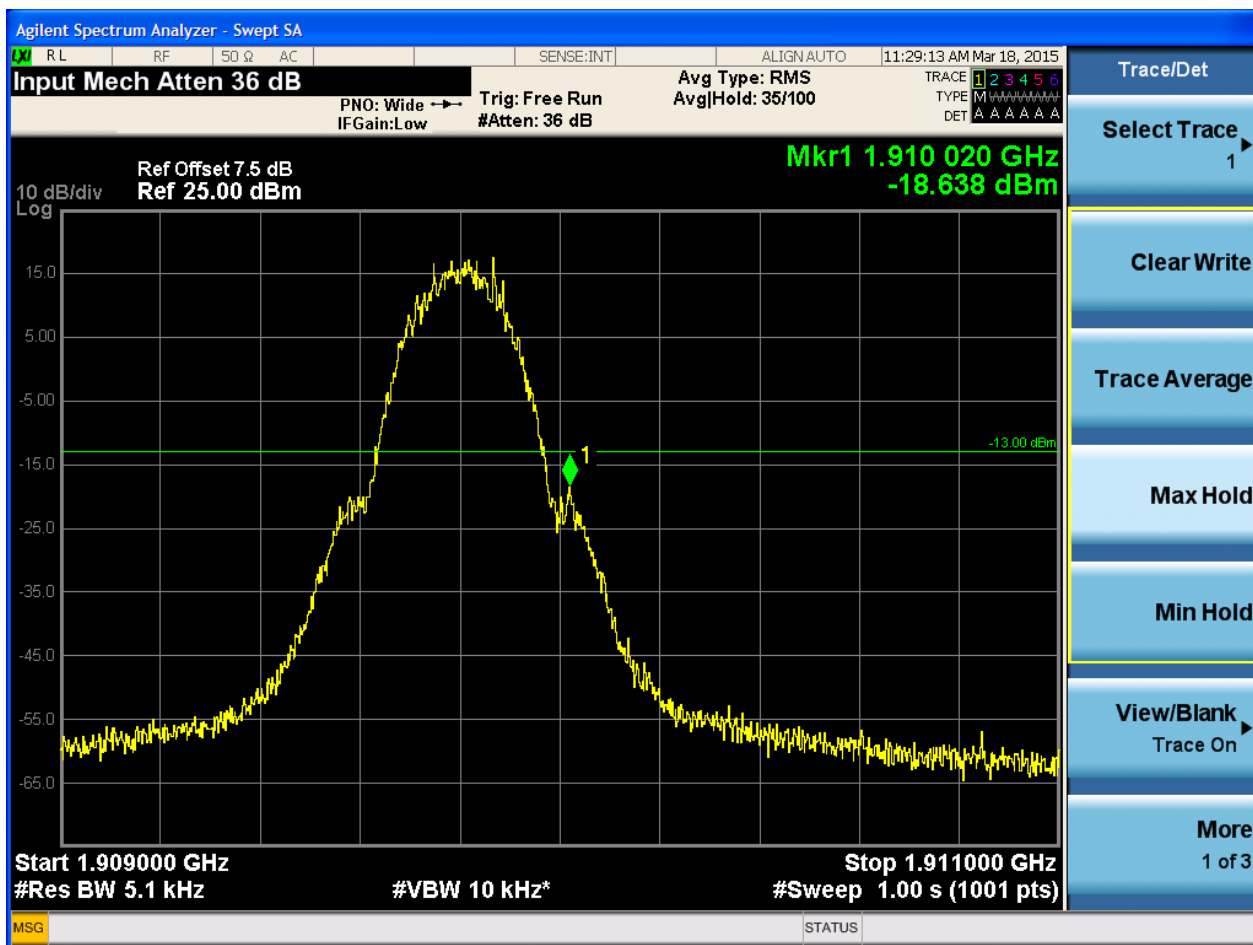
5.1.2 Test Band = GSM1900

5.1.2.1 Test Mode = GSM/TM1

5.1.2.1.1 Test Channel = LCH



5.1.2.1.2 Test Channel = HCH



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.

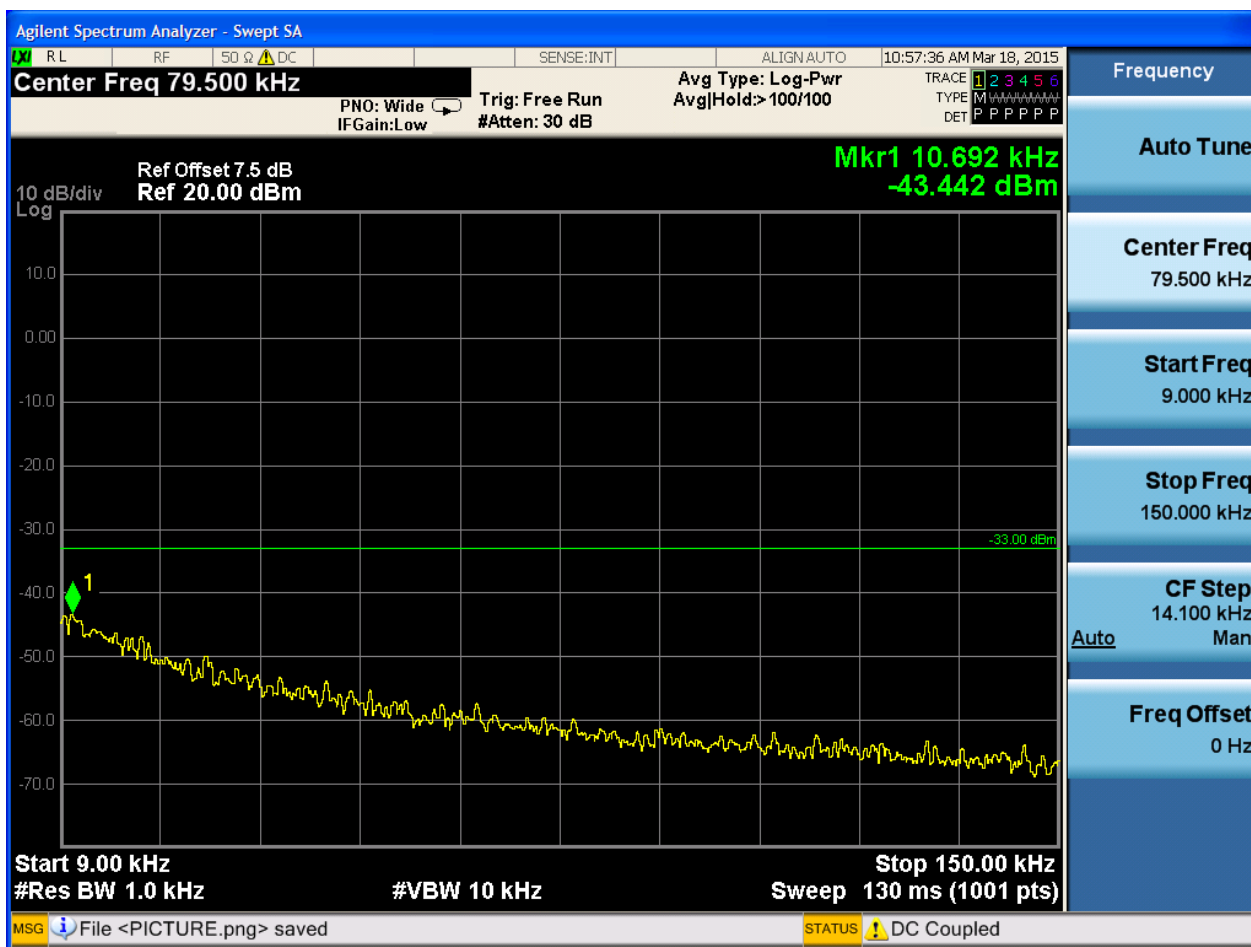
Part I - Test Plots

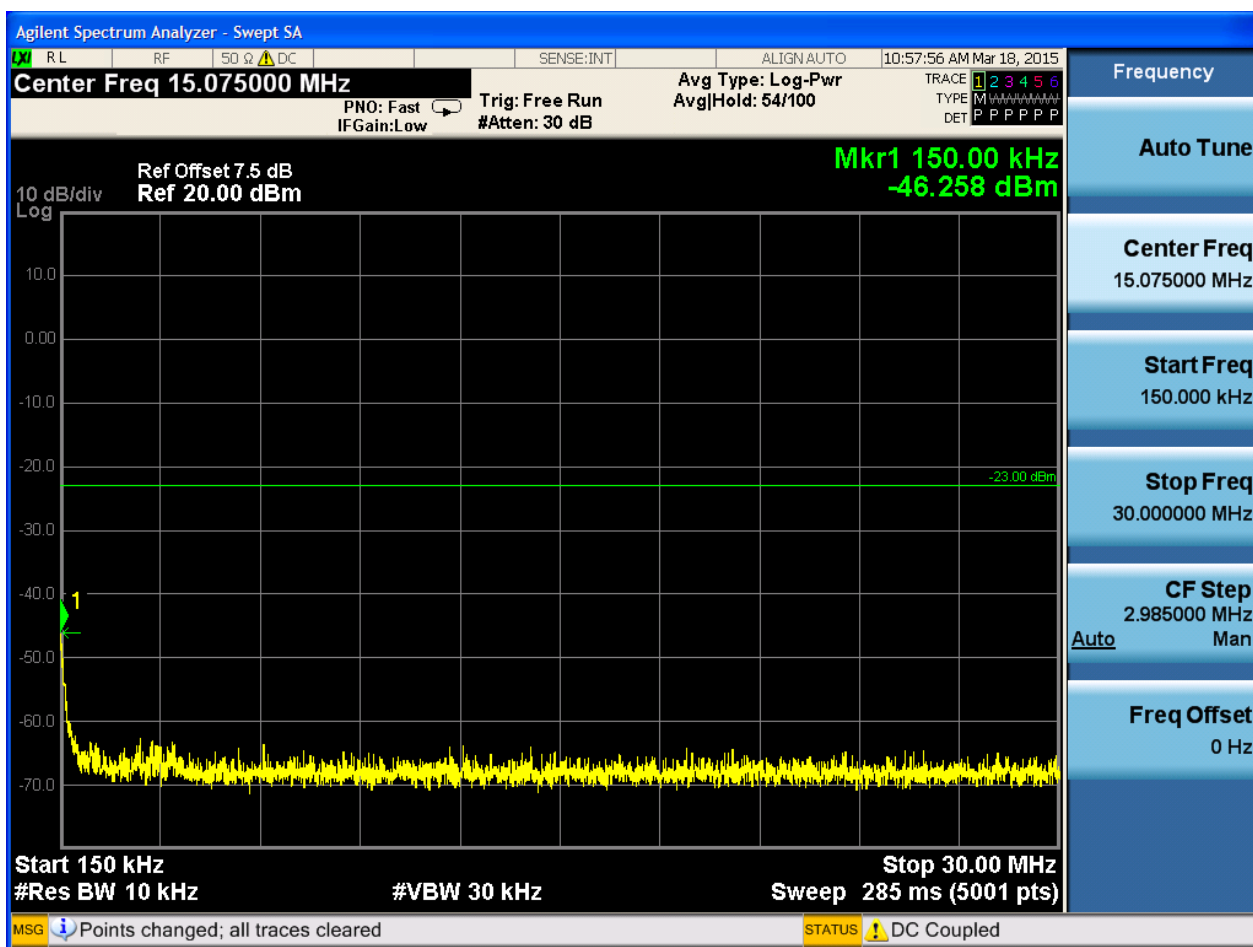
6.1 For GSM

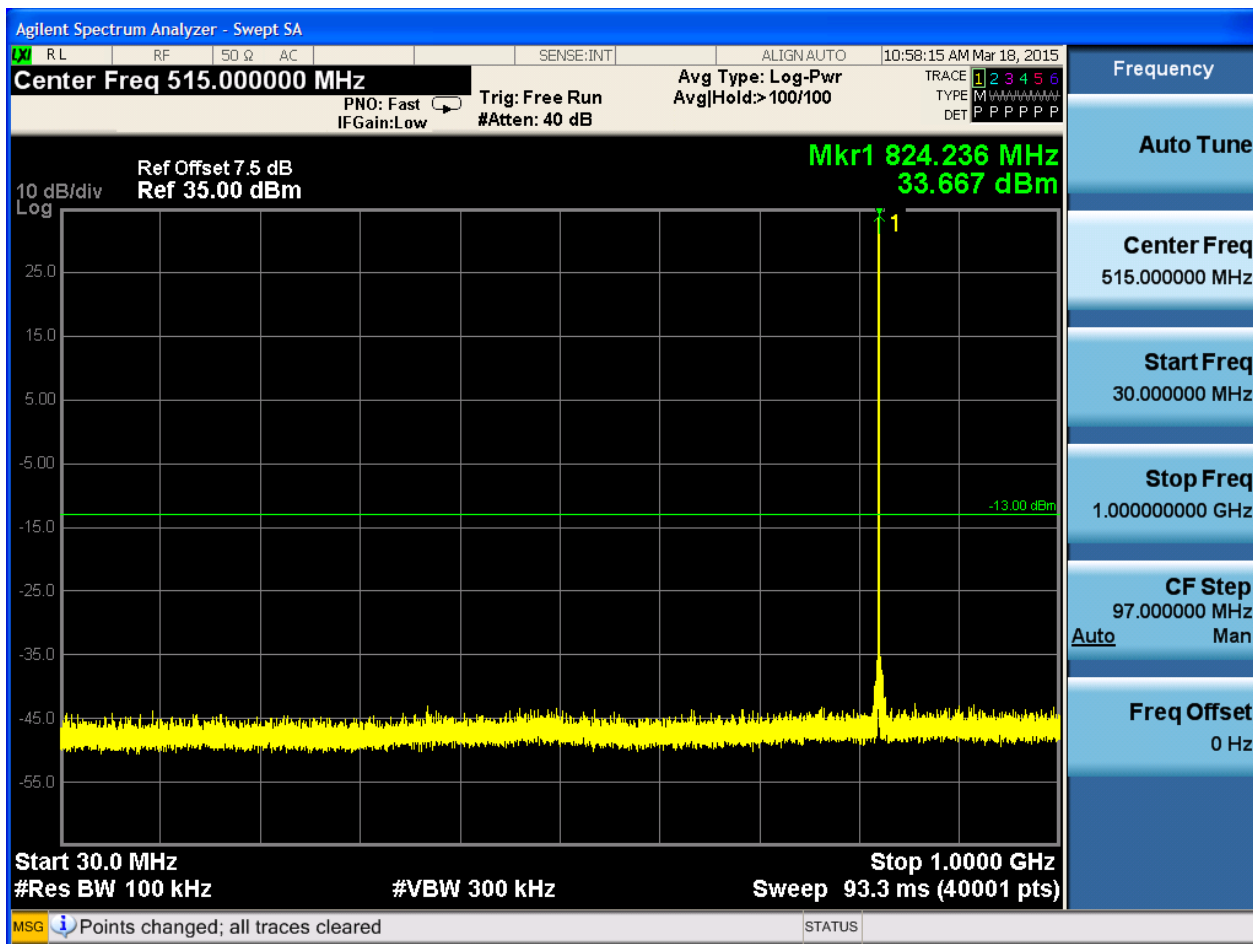
6.1.1 Test Band = GSM850

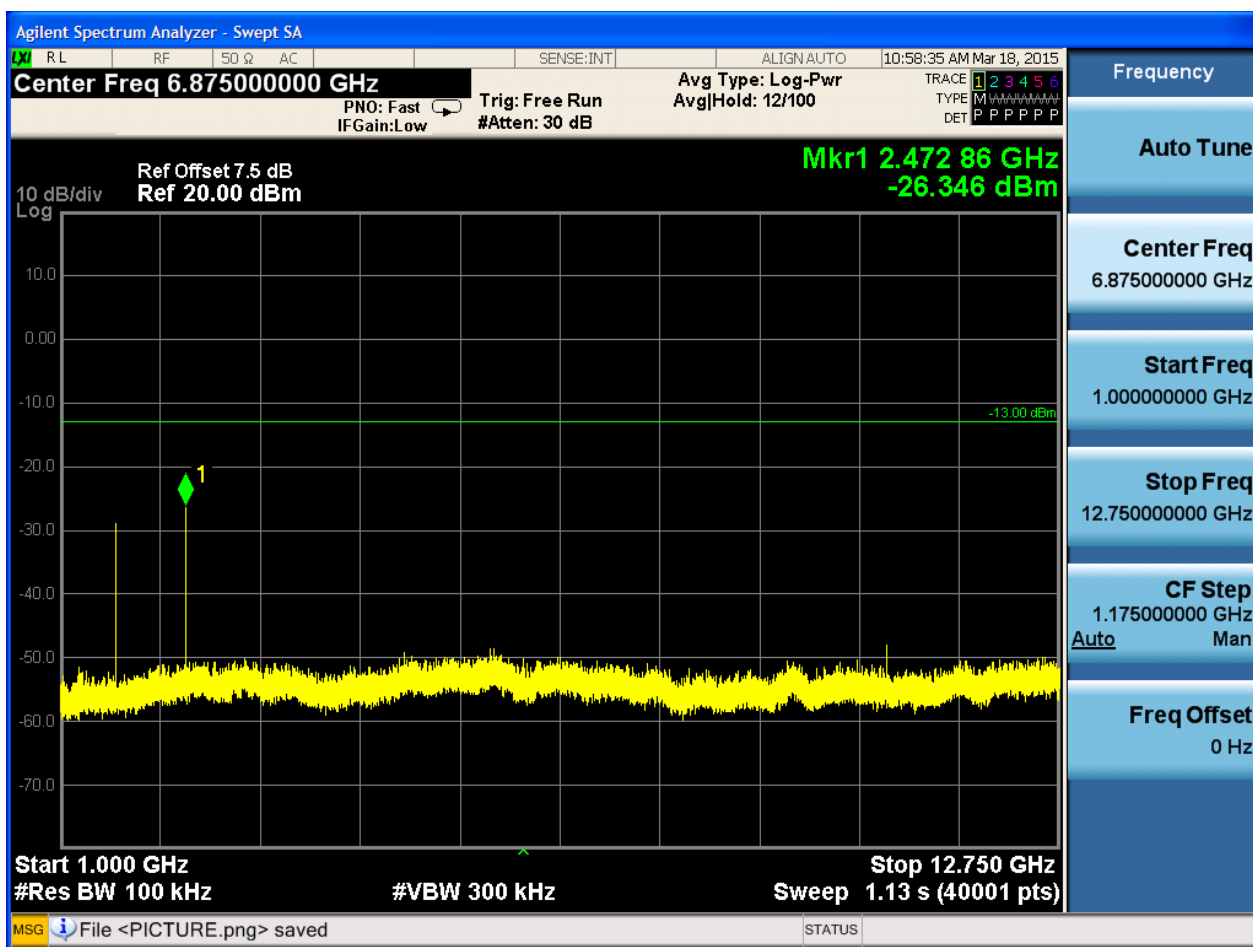
6.1.1.1 Test Mode = GSM/TM1

6.1.1.1.1 Test Channel = LCH

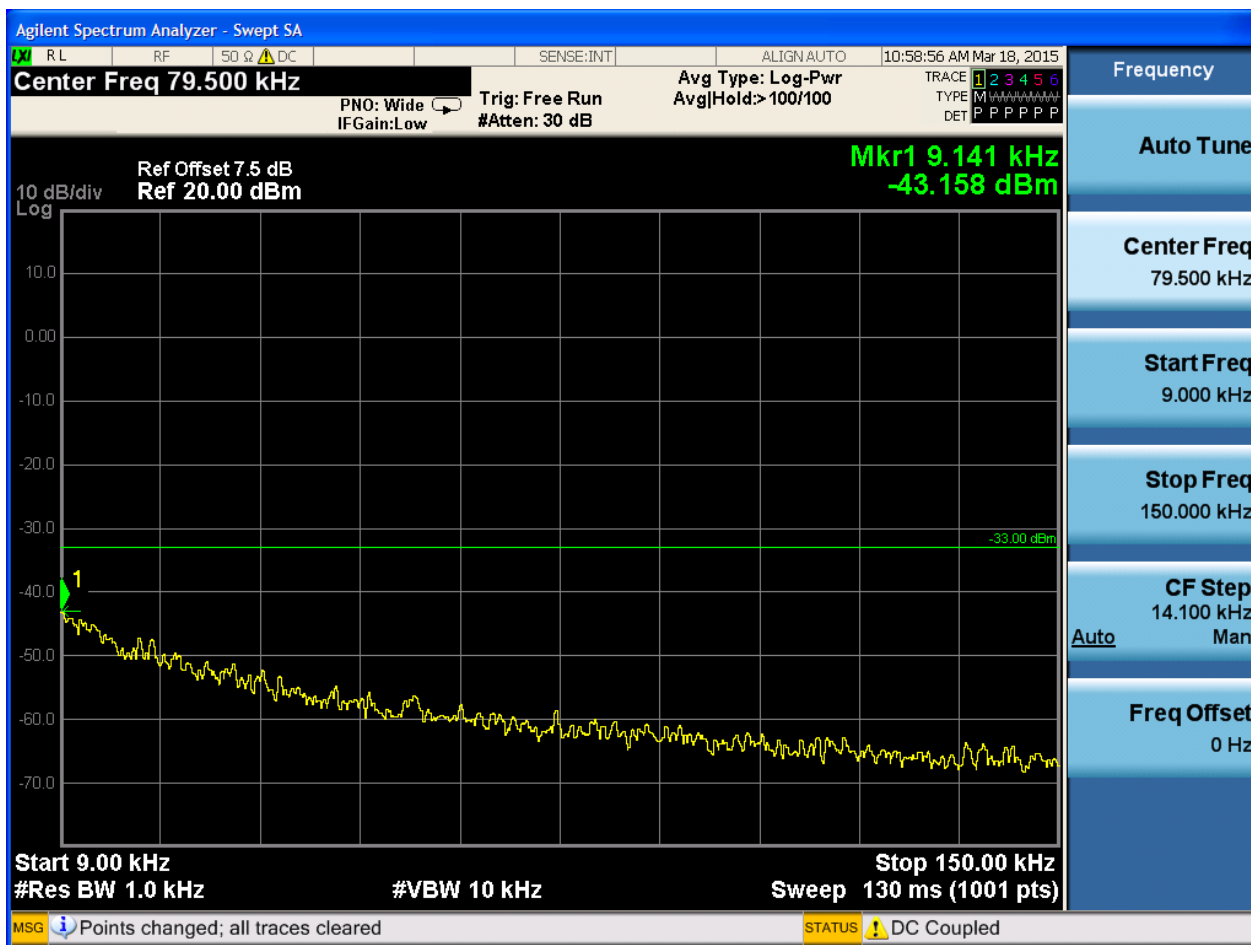


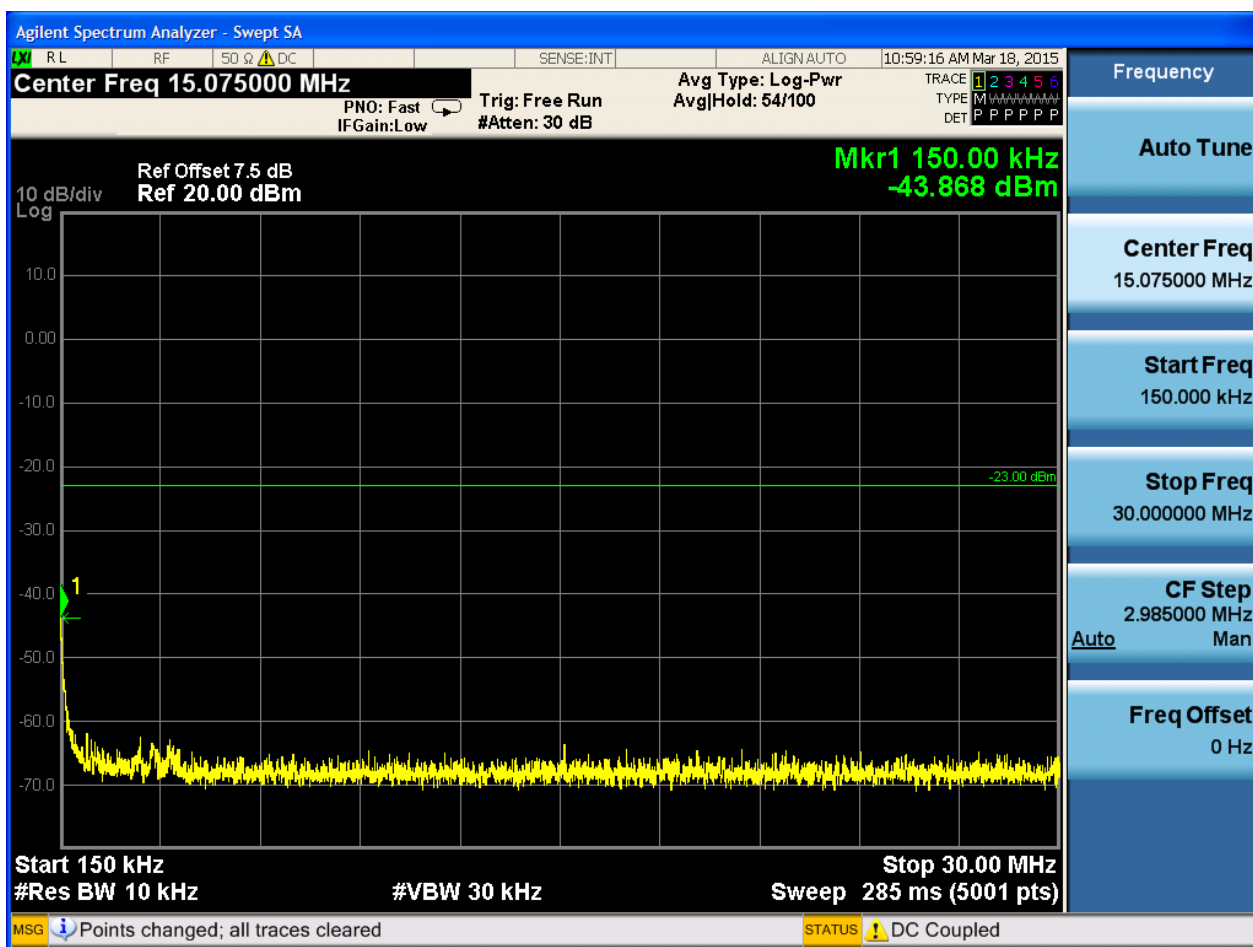


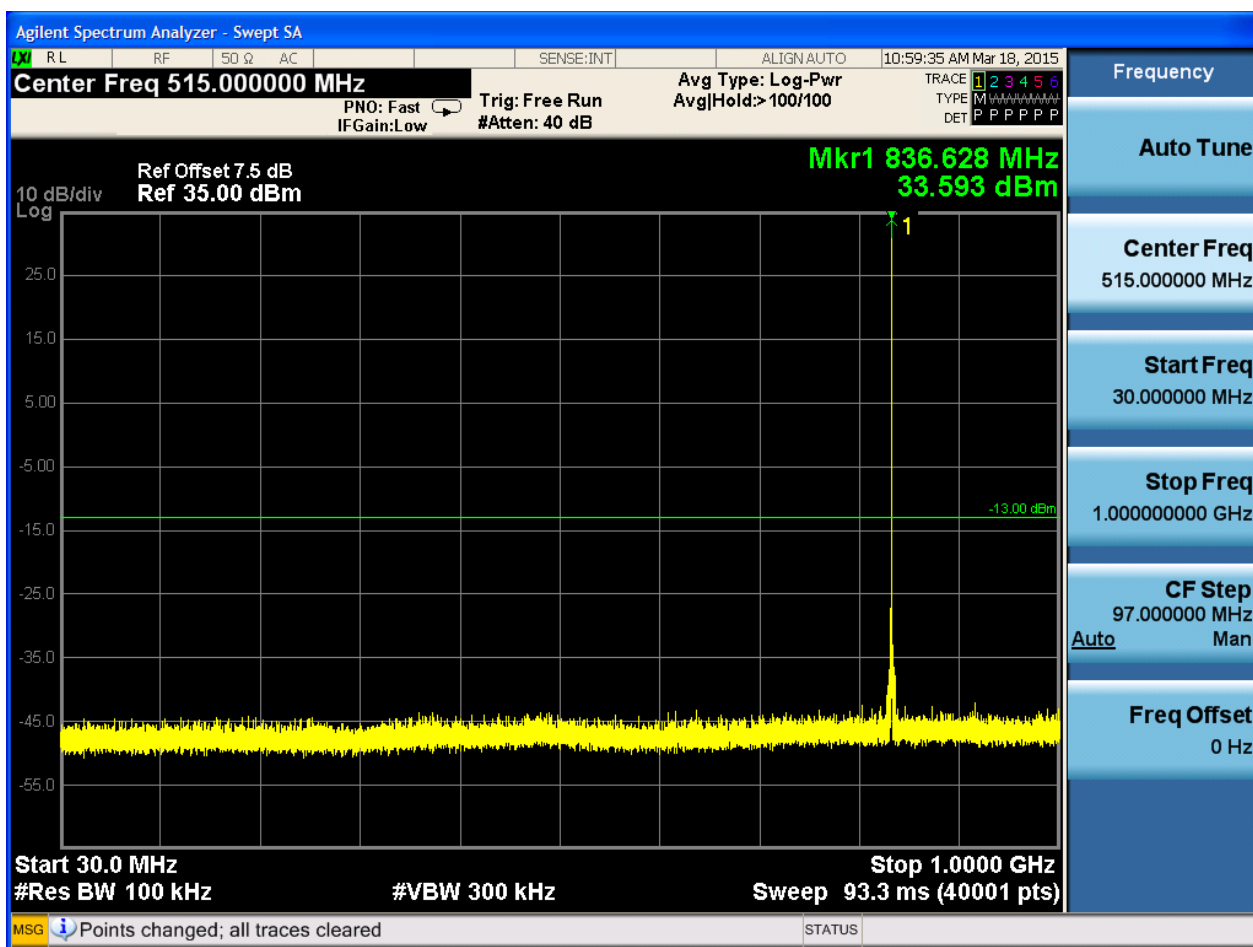


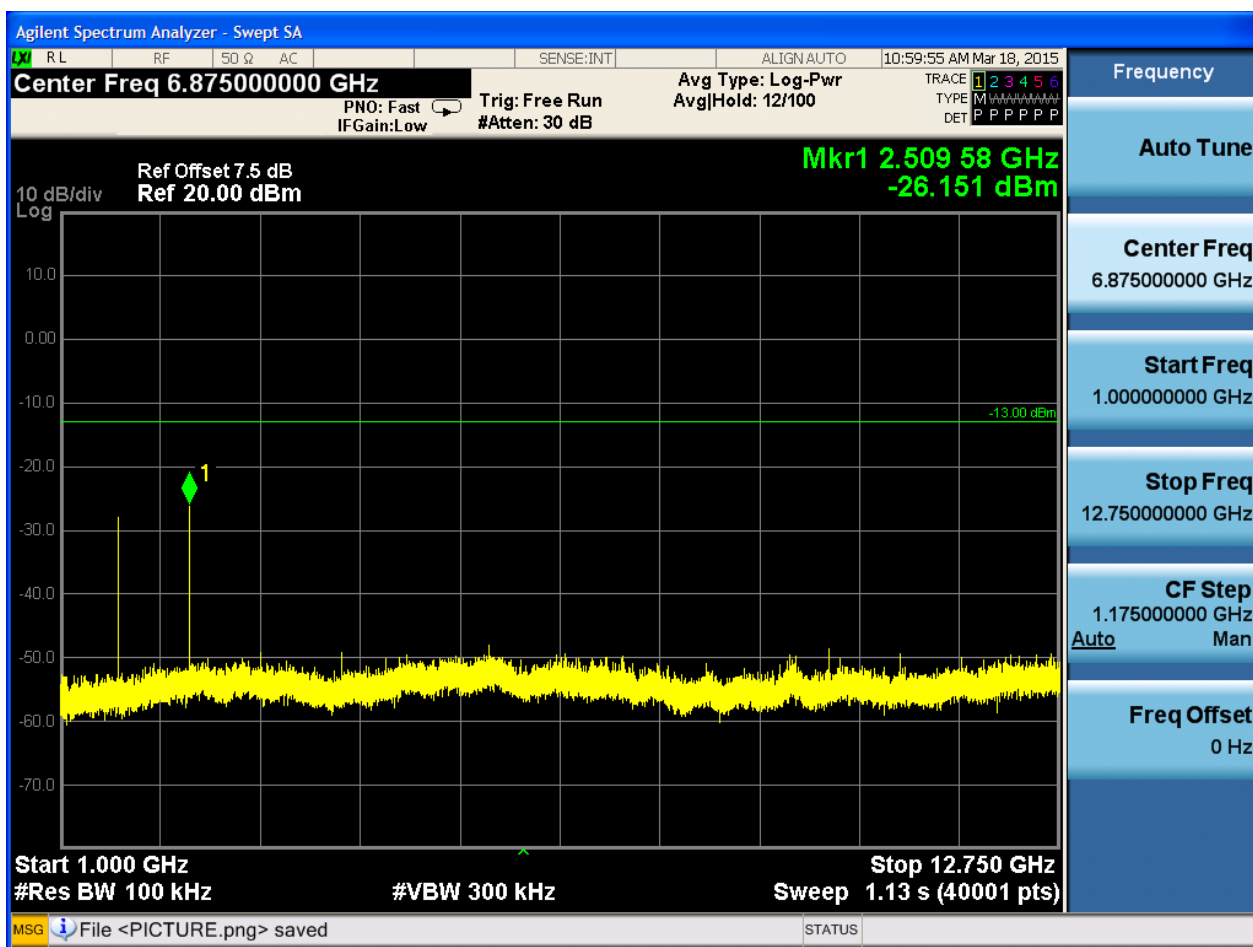


6.1.1.1.2 Test Channel = MCH











Agilent Spectrum Analyzer - Swept SA

RL RF 50 Ω DC SENSE:INT ALIGN: AUTO 11:00:16 AM Mar 18, 2015

Center Freq 79.500 kHz Avg Type: Log-Pwr Avg|Hold:>100/100

PNO: Wide IFGain:Low Trig: Free Run #Atten: 30 dB

TRACE 1 2 3 4 5 6
TYPE M
DET P P P P P P

Ref Offset 7.5 dB
Ref 20.00 dBm

Mkr1 9.000 kHz
-42.971 dBm

10 dB/div
Log

Start 9.00 kHz
#Res BW 1.0 kHz
#VBW 10 kHz

Stop 150.00 kHz
Sweep 130 ms (1001 pts)

MSG Points changed; all traces cleared

STATUS DC Coupled

Frequency

Auto Tune

Center Freq
79.500 kHz

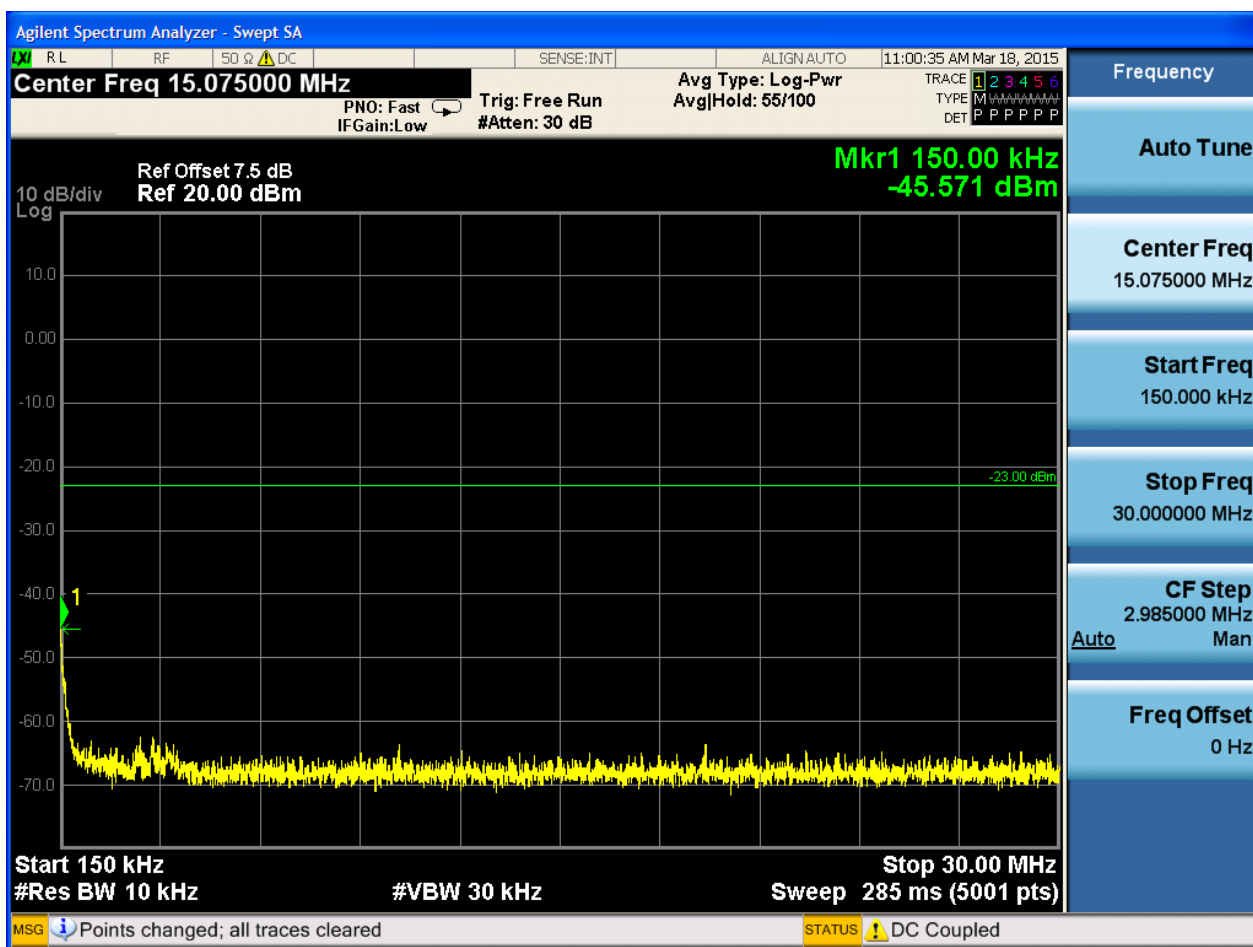
Start Freq
9.000 kHz

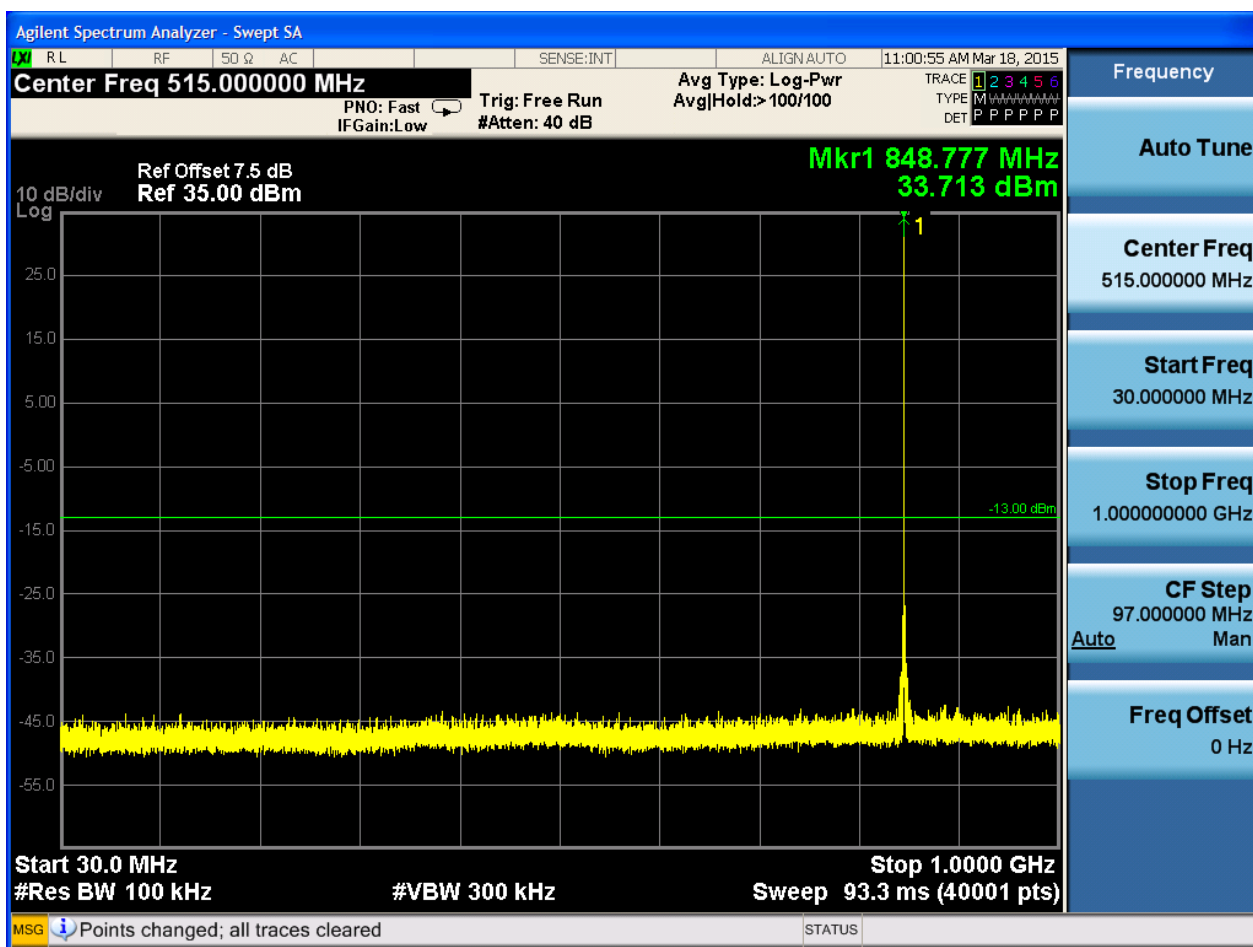
Stop Freq
150.000 kHz

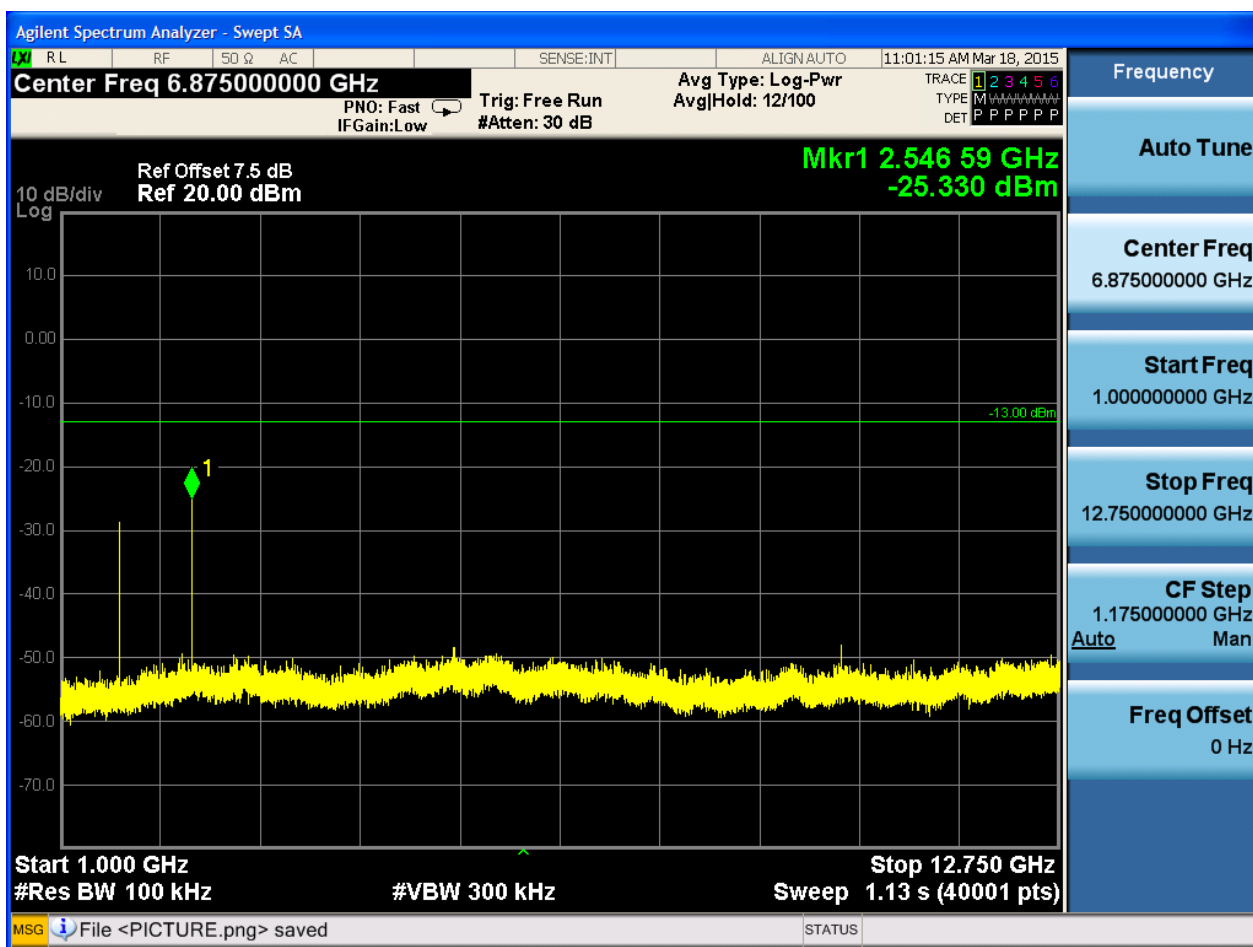
CF Step
14.100 kHz
Man

Auto

Freq Offset
0 Hz





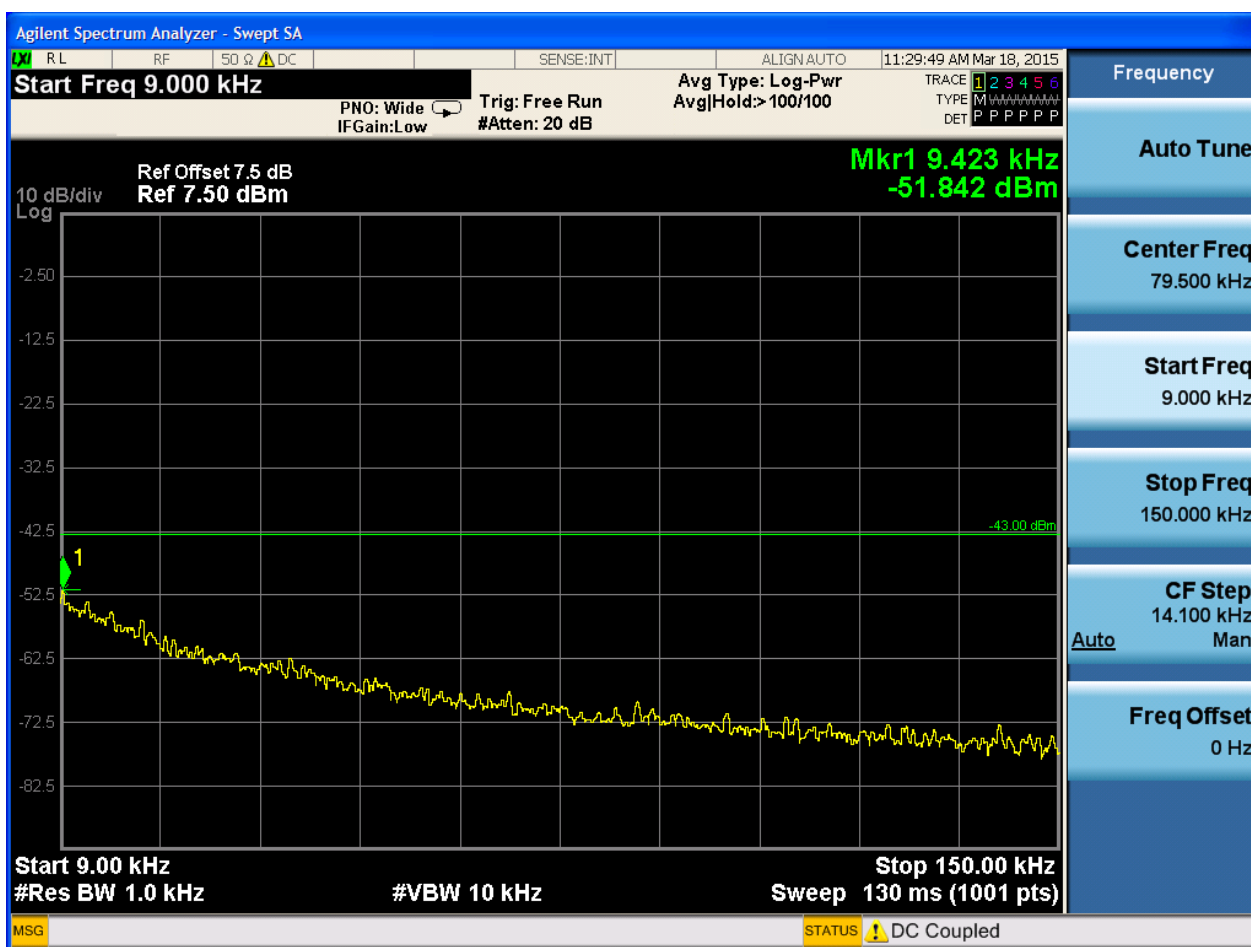


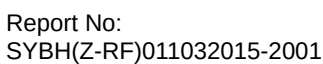


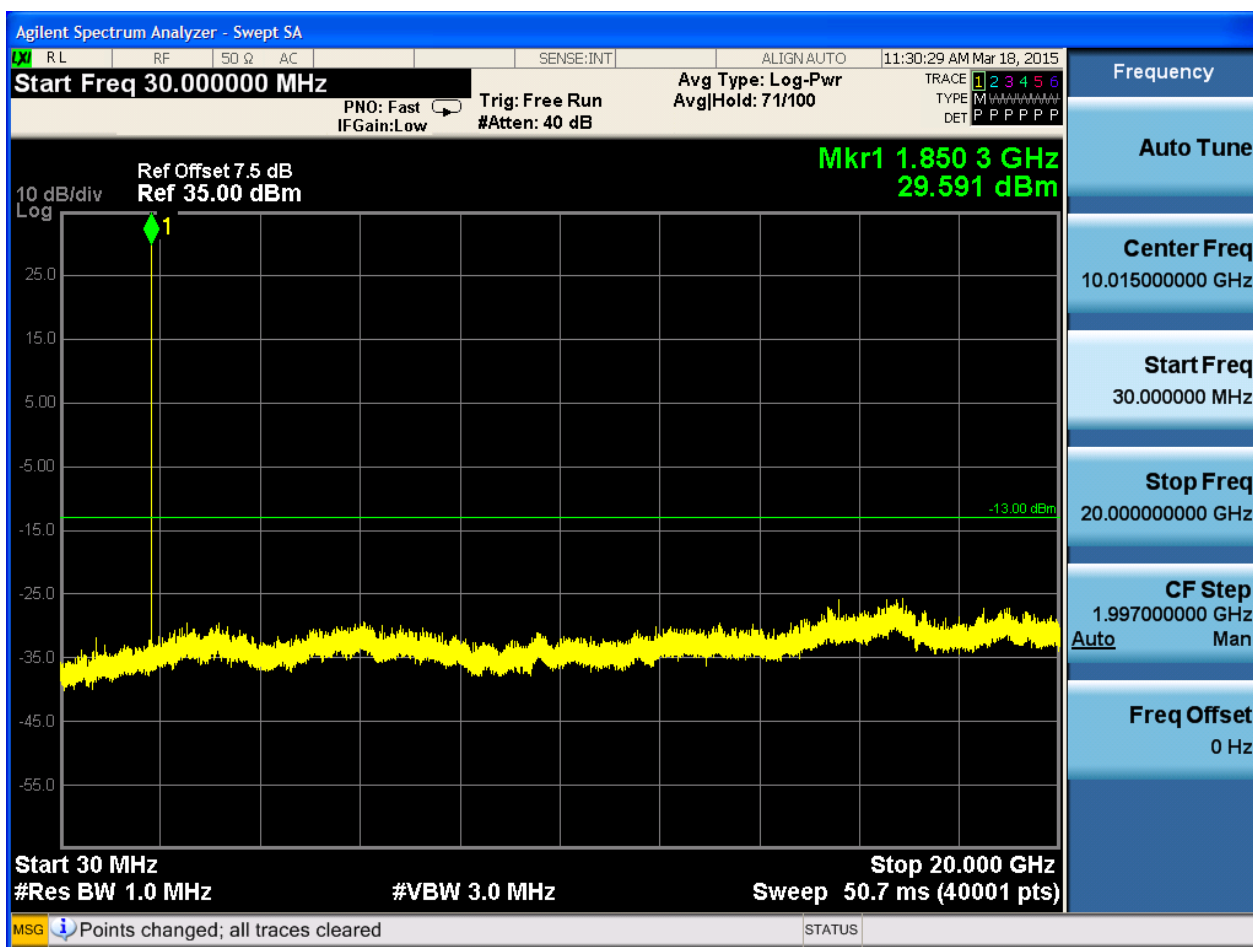
6.1.2 Test Band = GSM1900

6.1.2.1 Test Mode = GSM/TM1

6.1.2.1.1 Test Channel = LCH



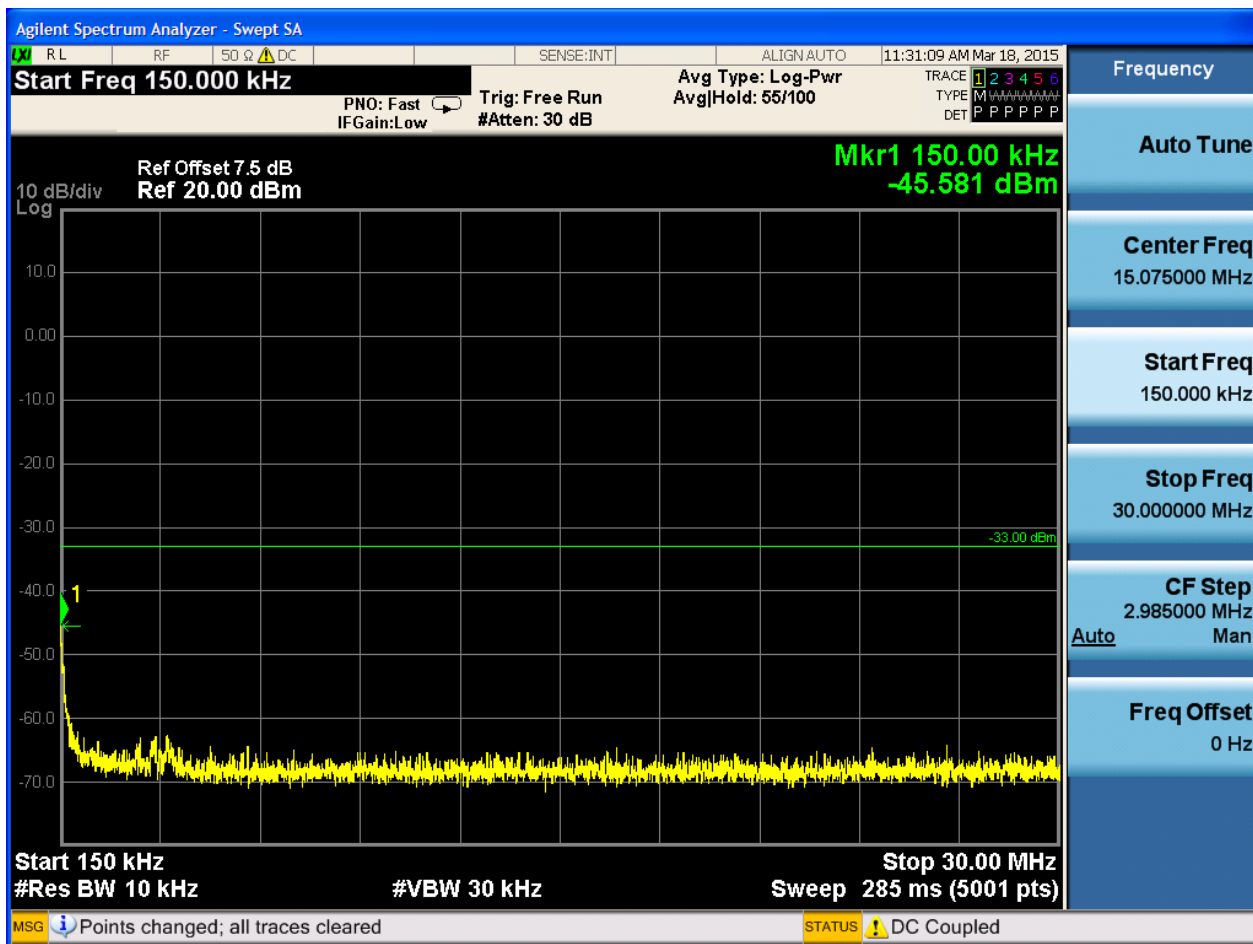


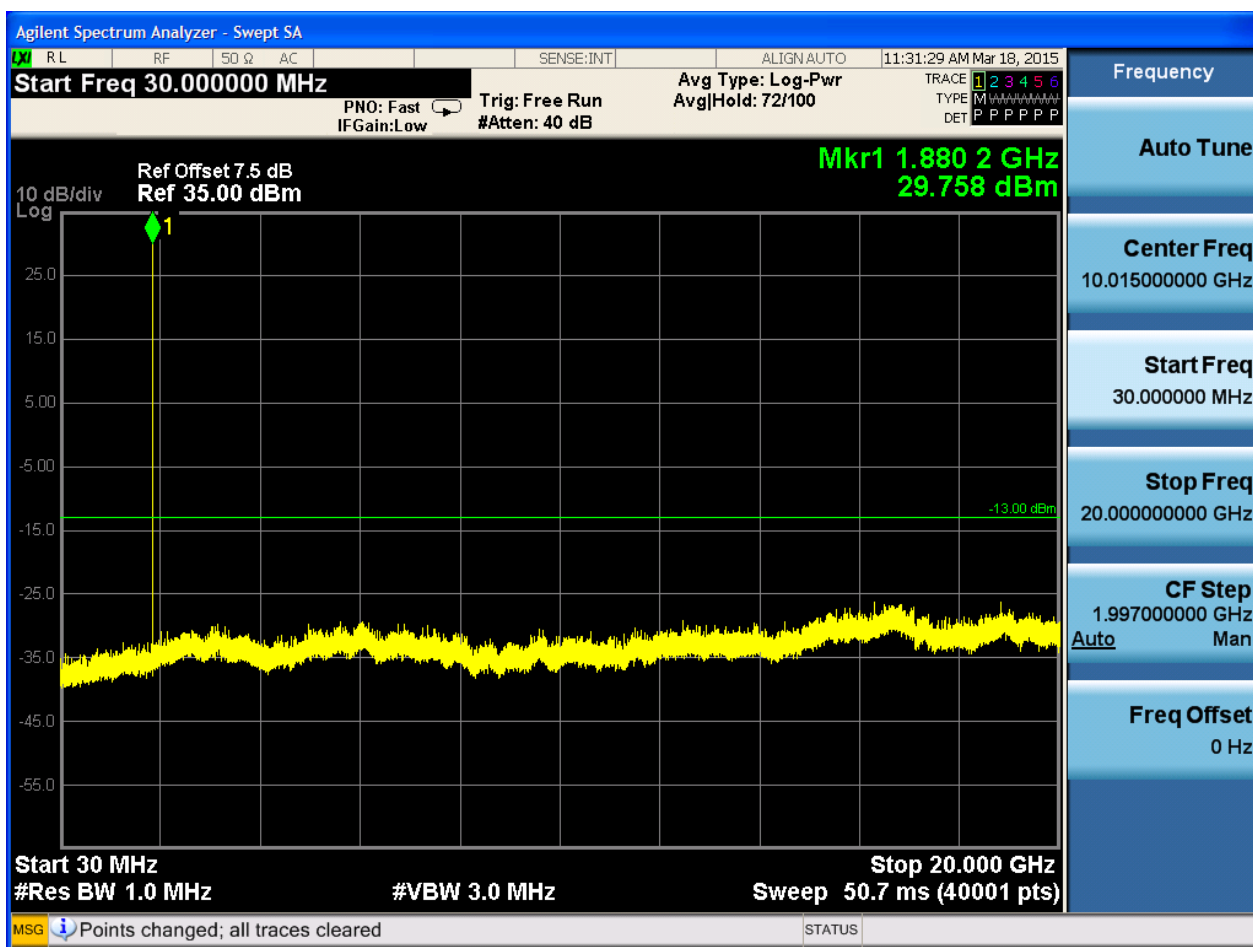




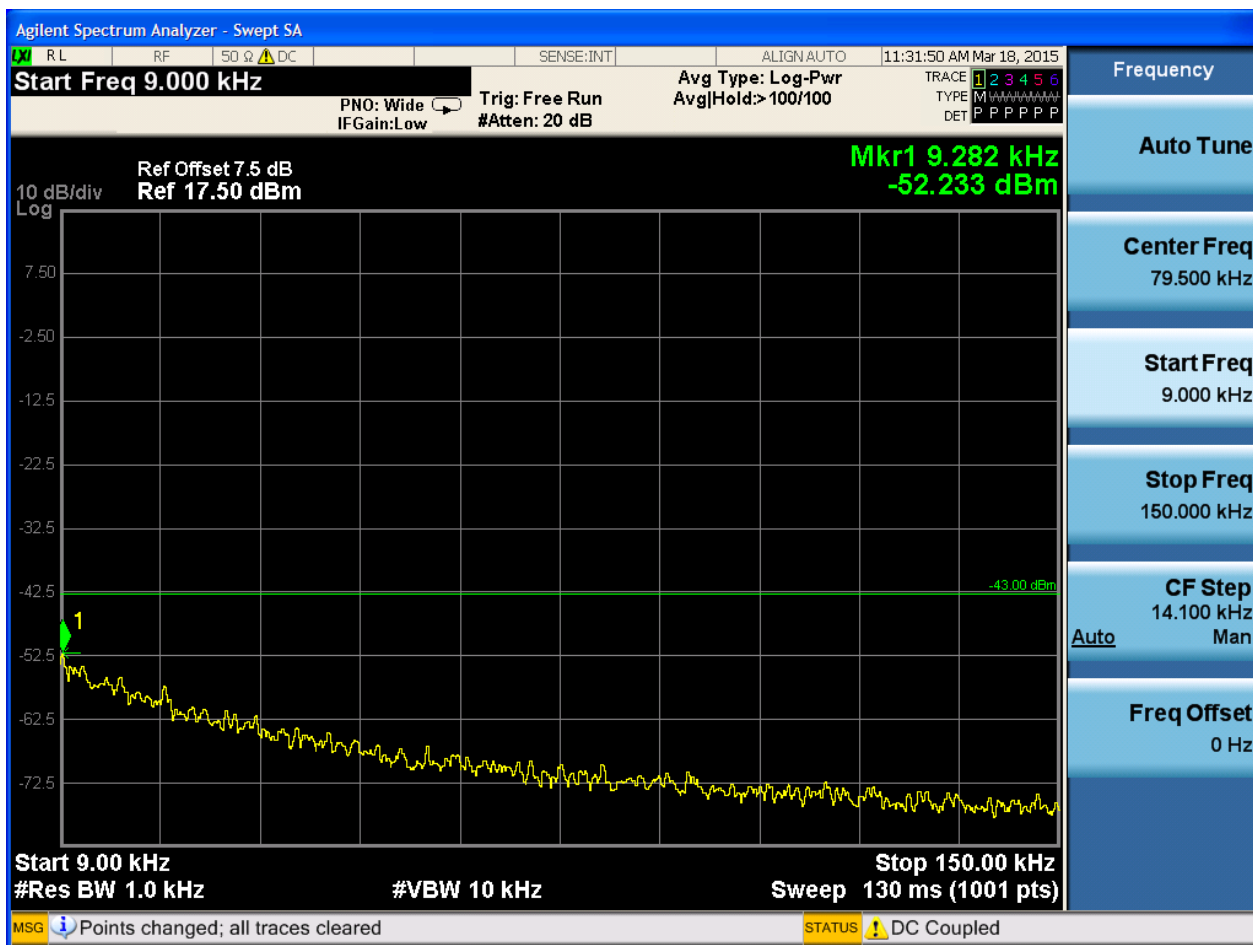
6.1.2.1.2 Test Channel = MCH

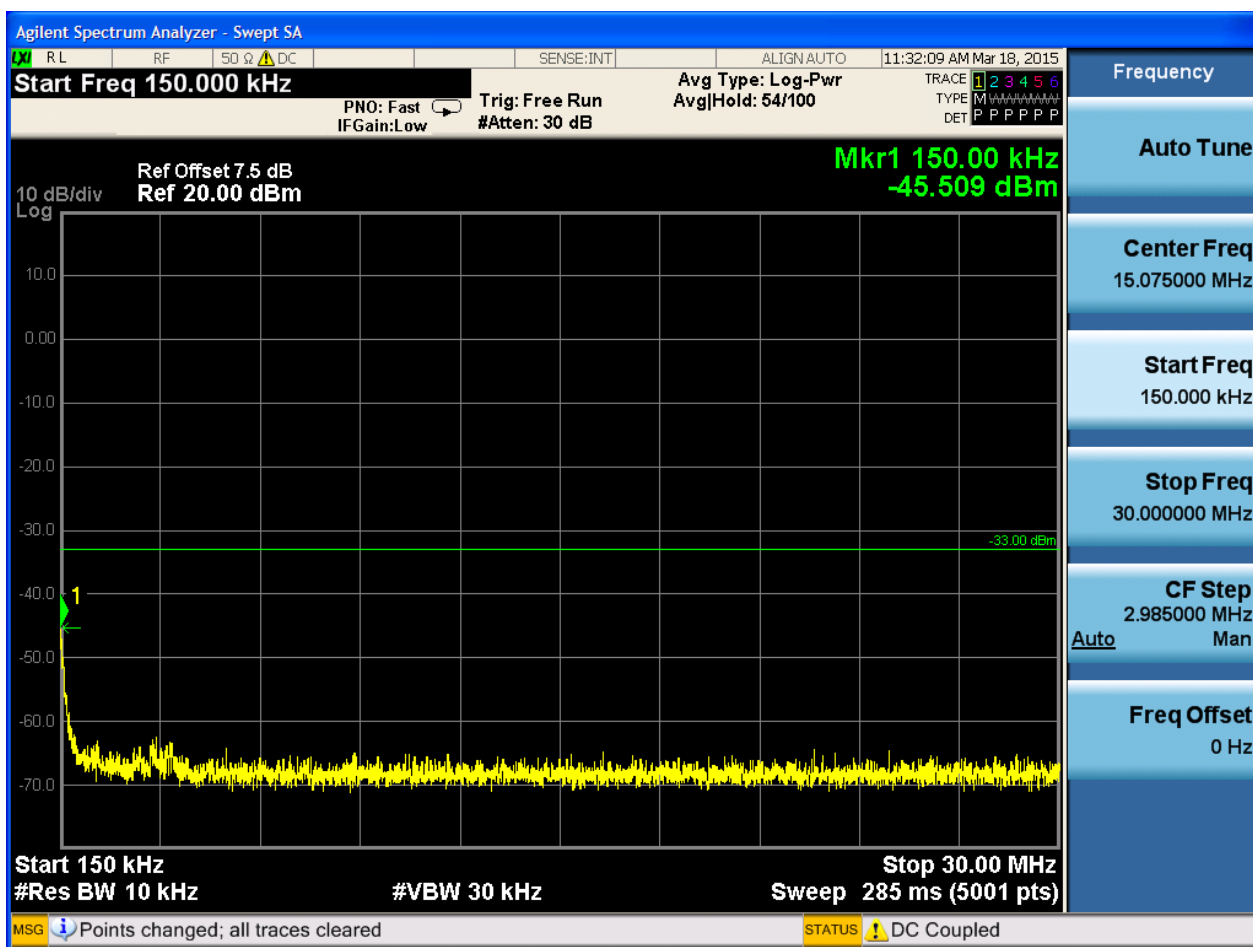


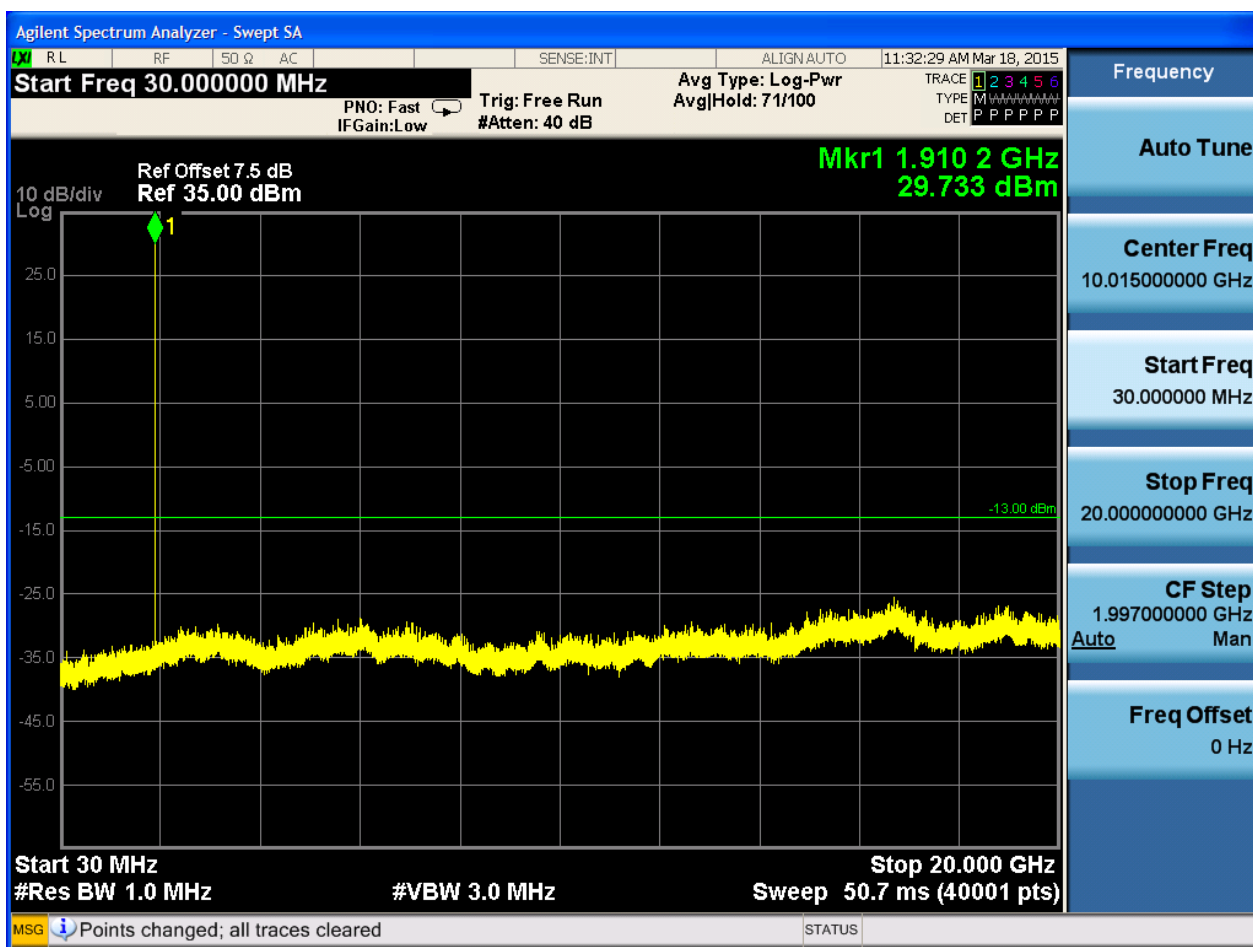




6.1.2.1.3 Test Channel = HCH





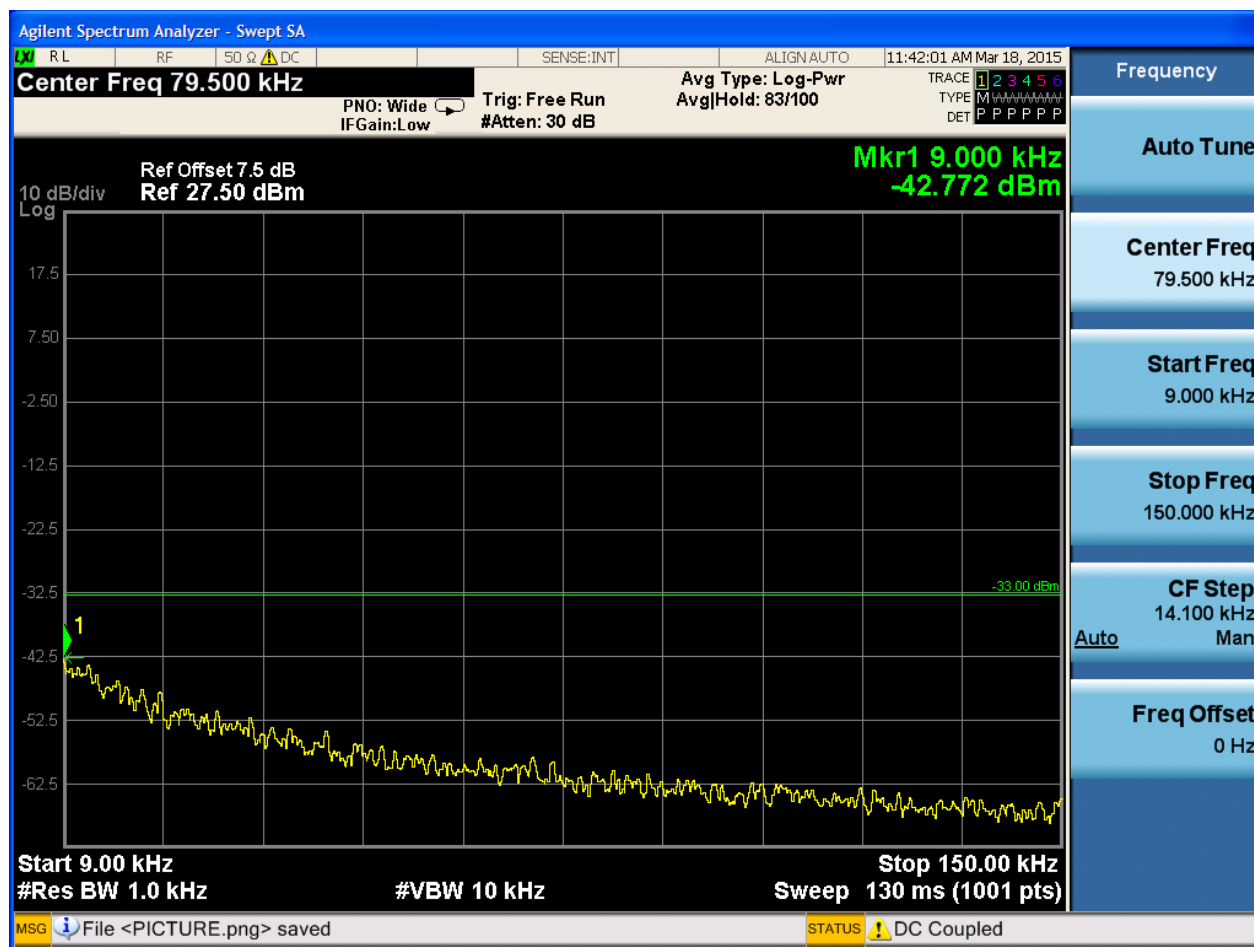


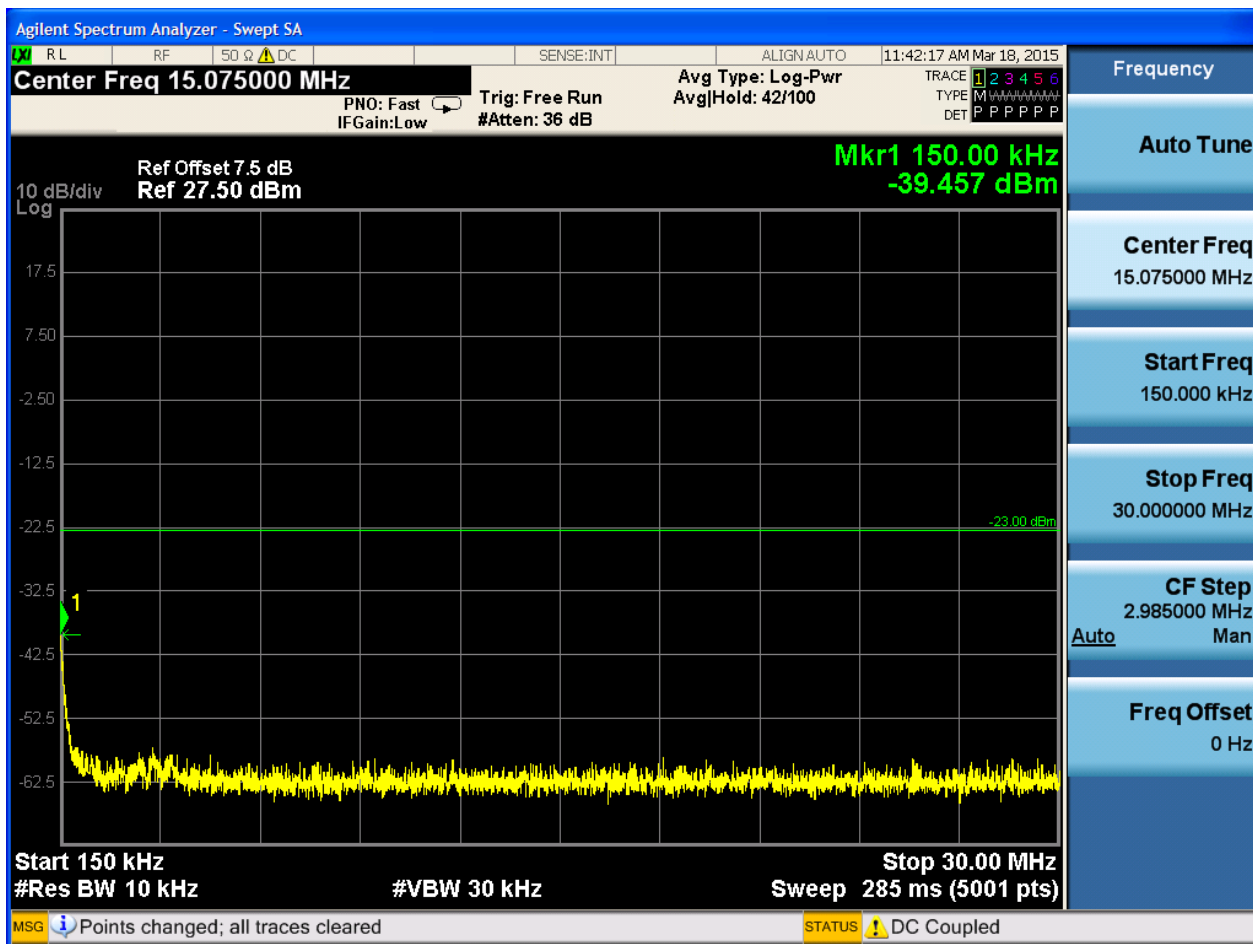
6.2 For UMTS

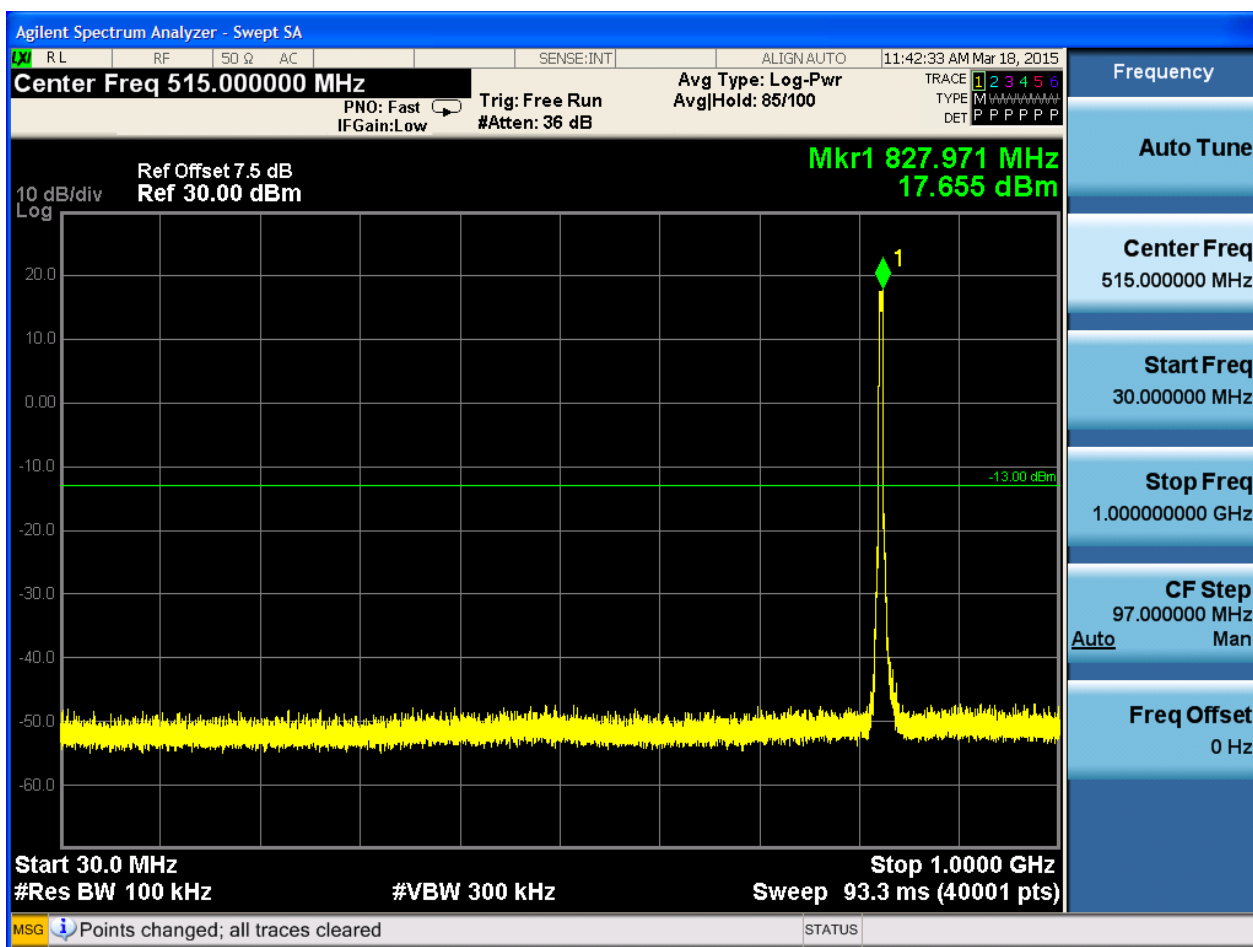
6.2.1 Test Band = WCDMA850

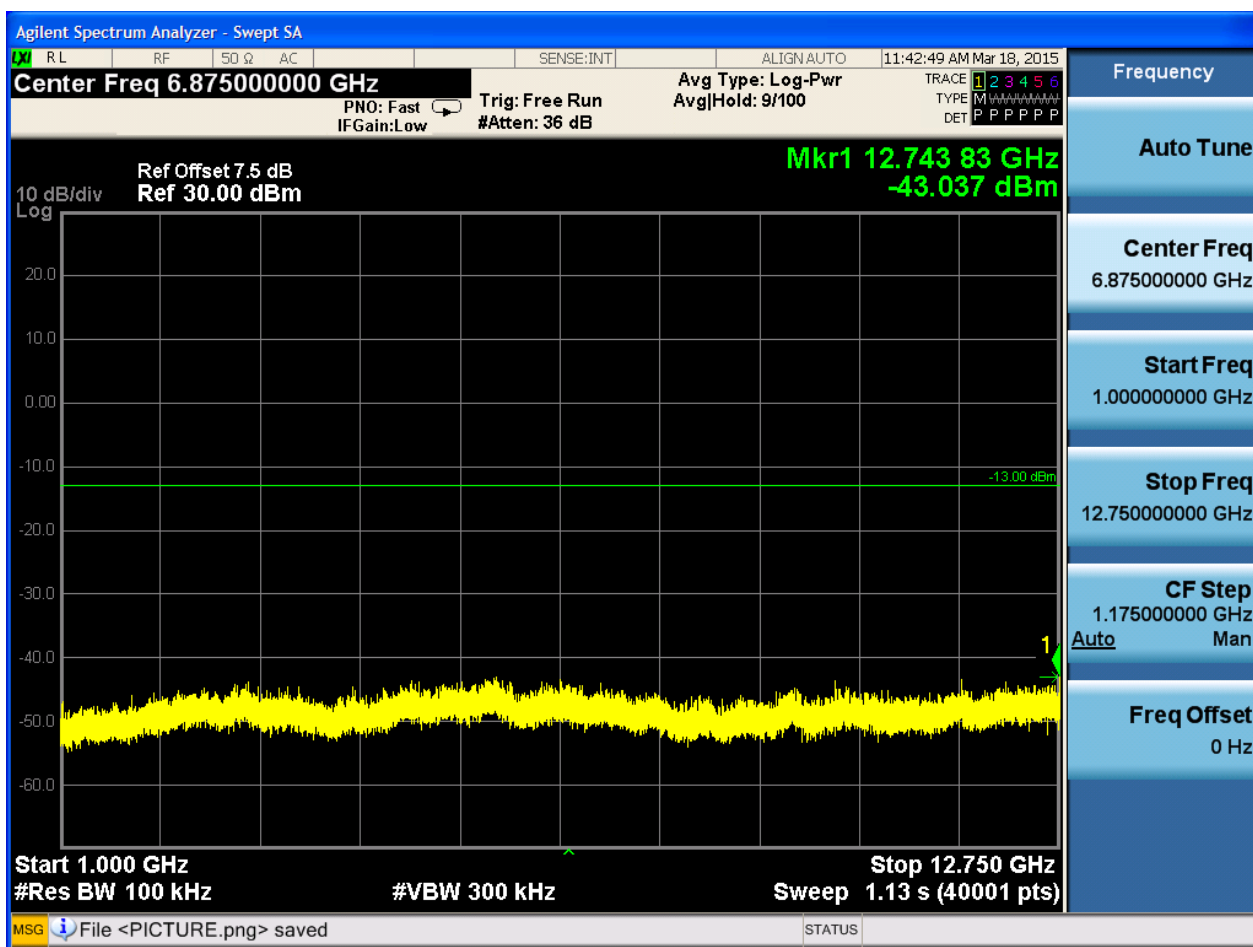
6.2.1.1 Test Mode = UMTS/TM1

6.2.1.1.1 Test Channel = LCH

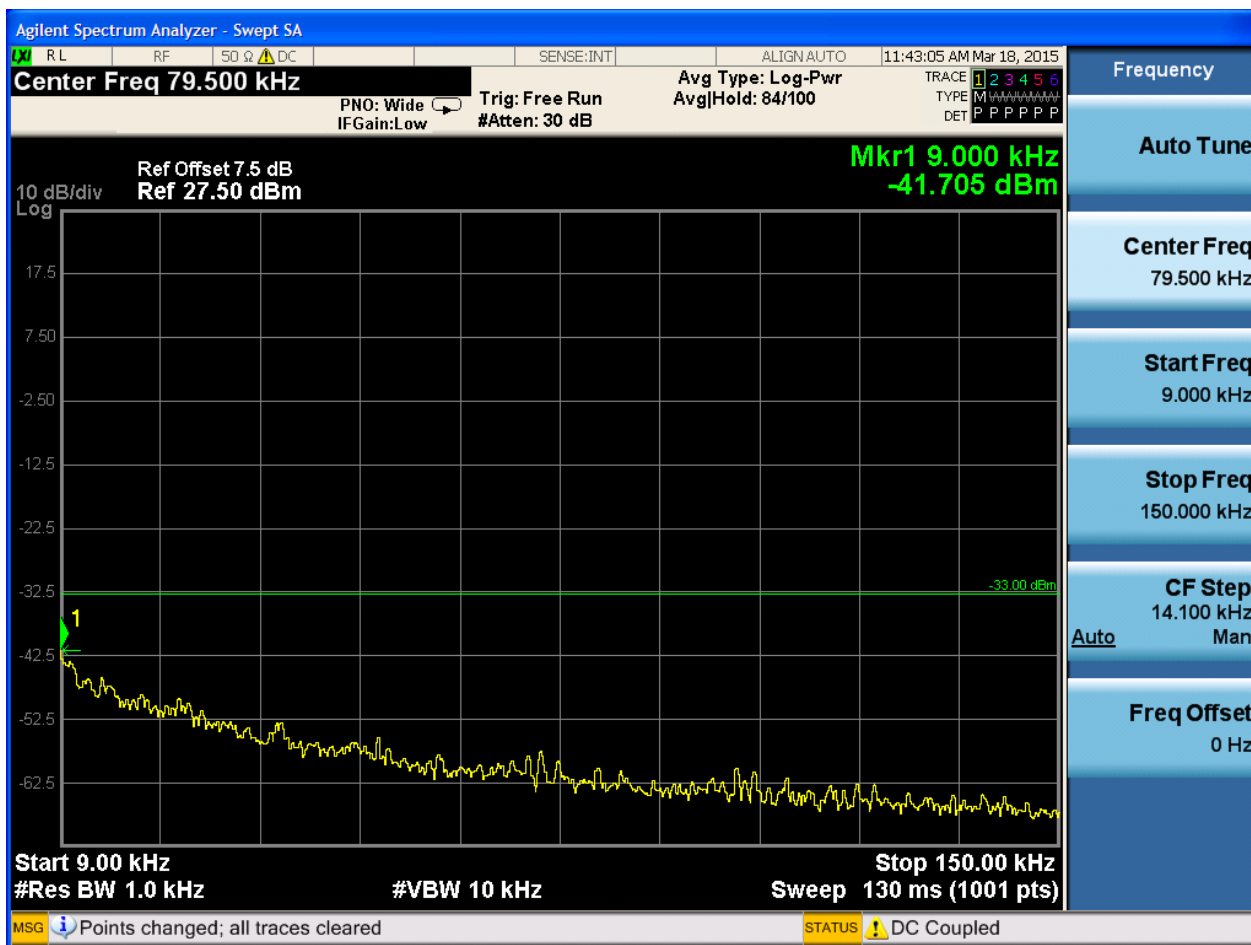


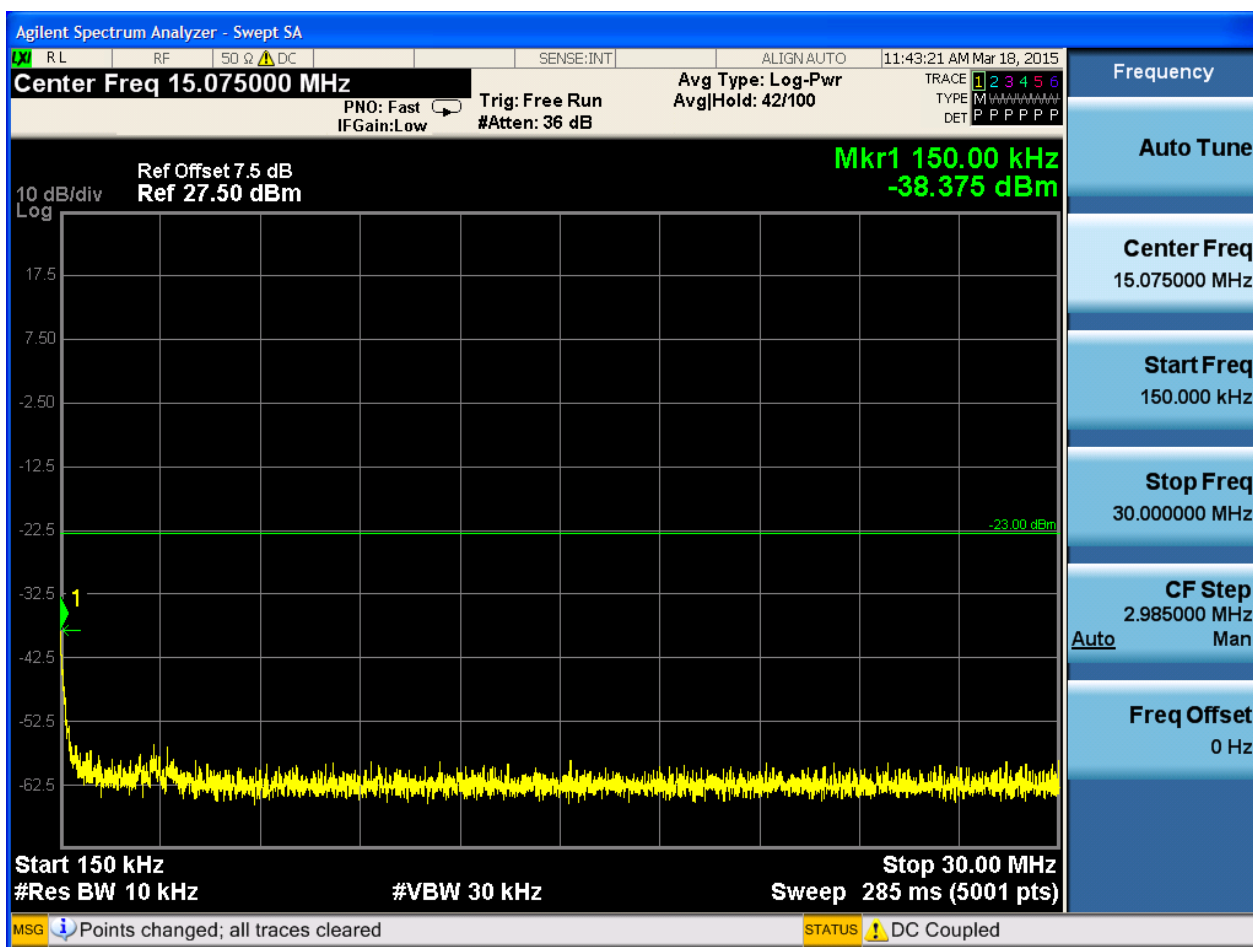


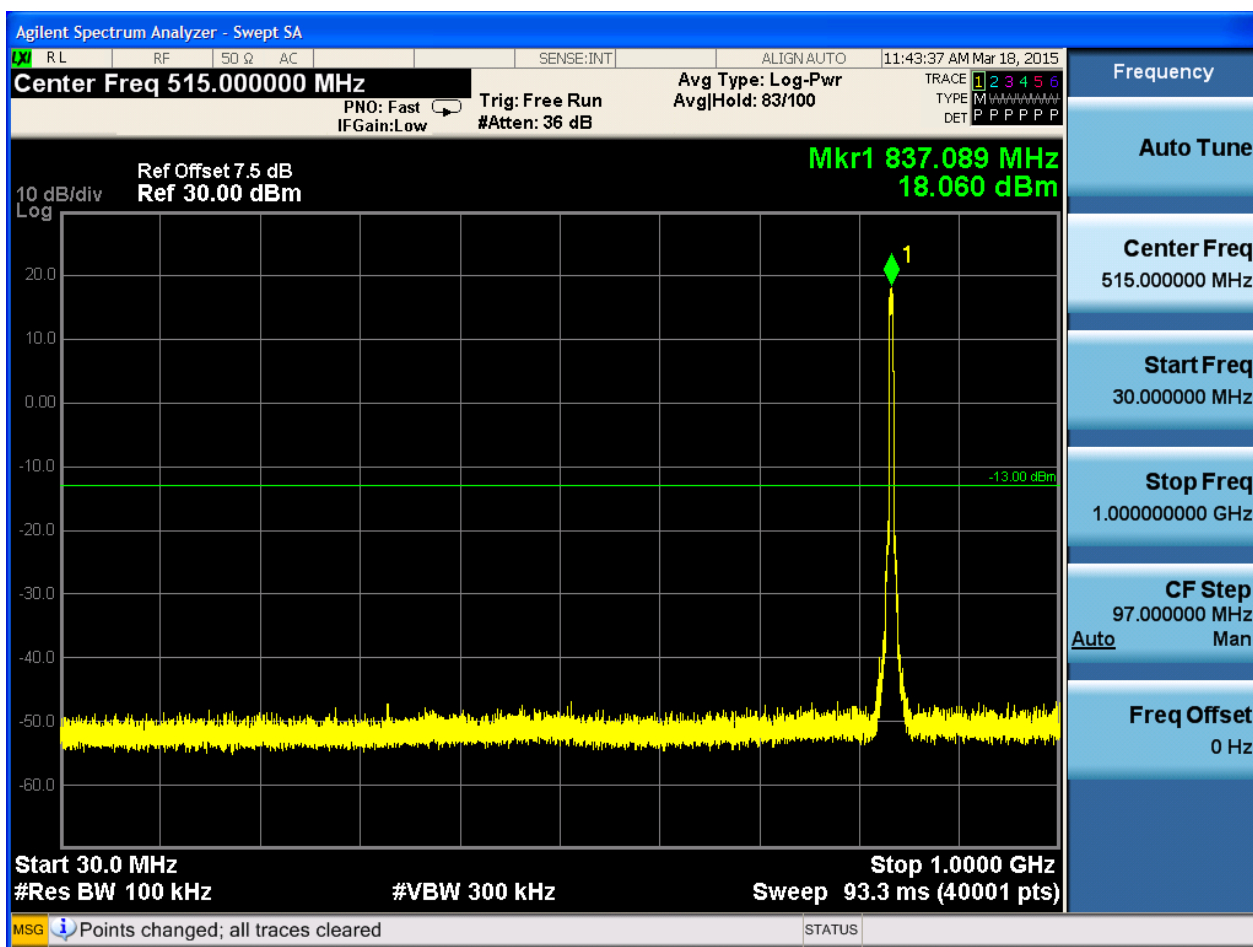


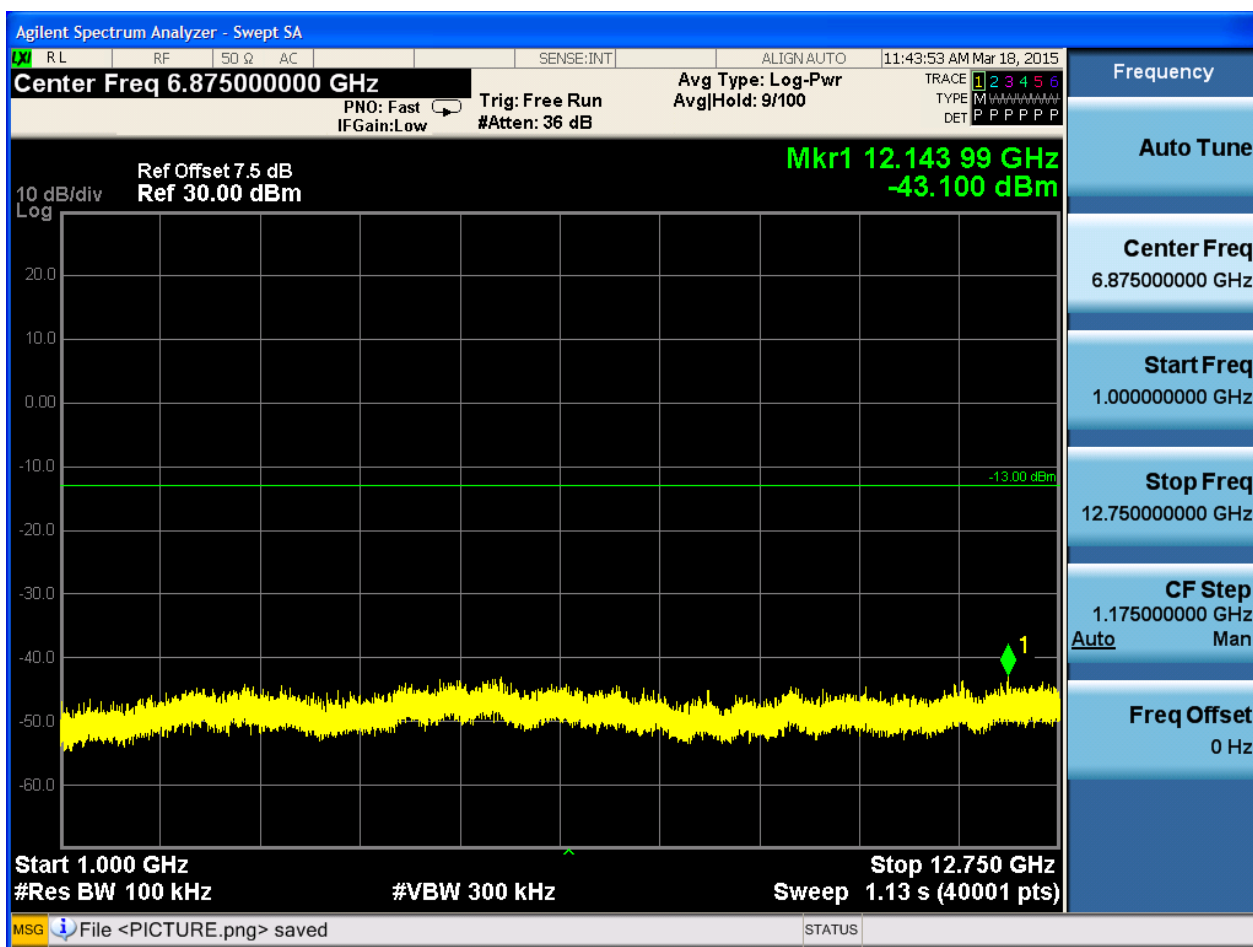


6.2.1.1.2 Test Channel = MCH

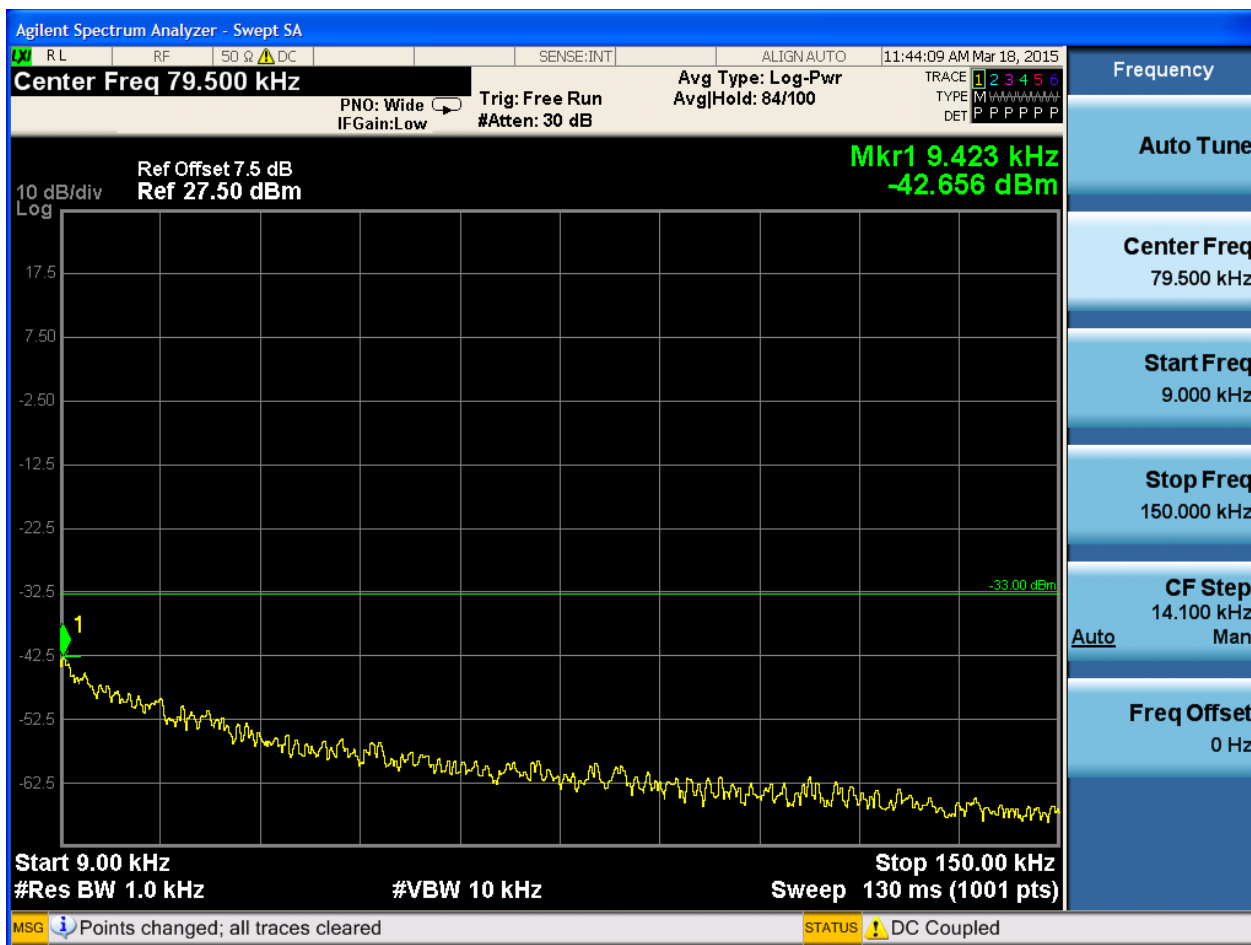


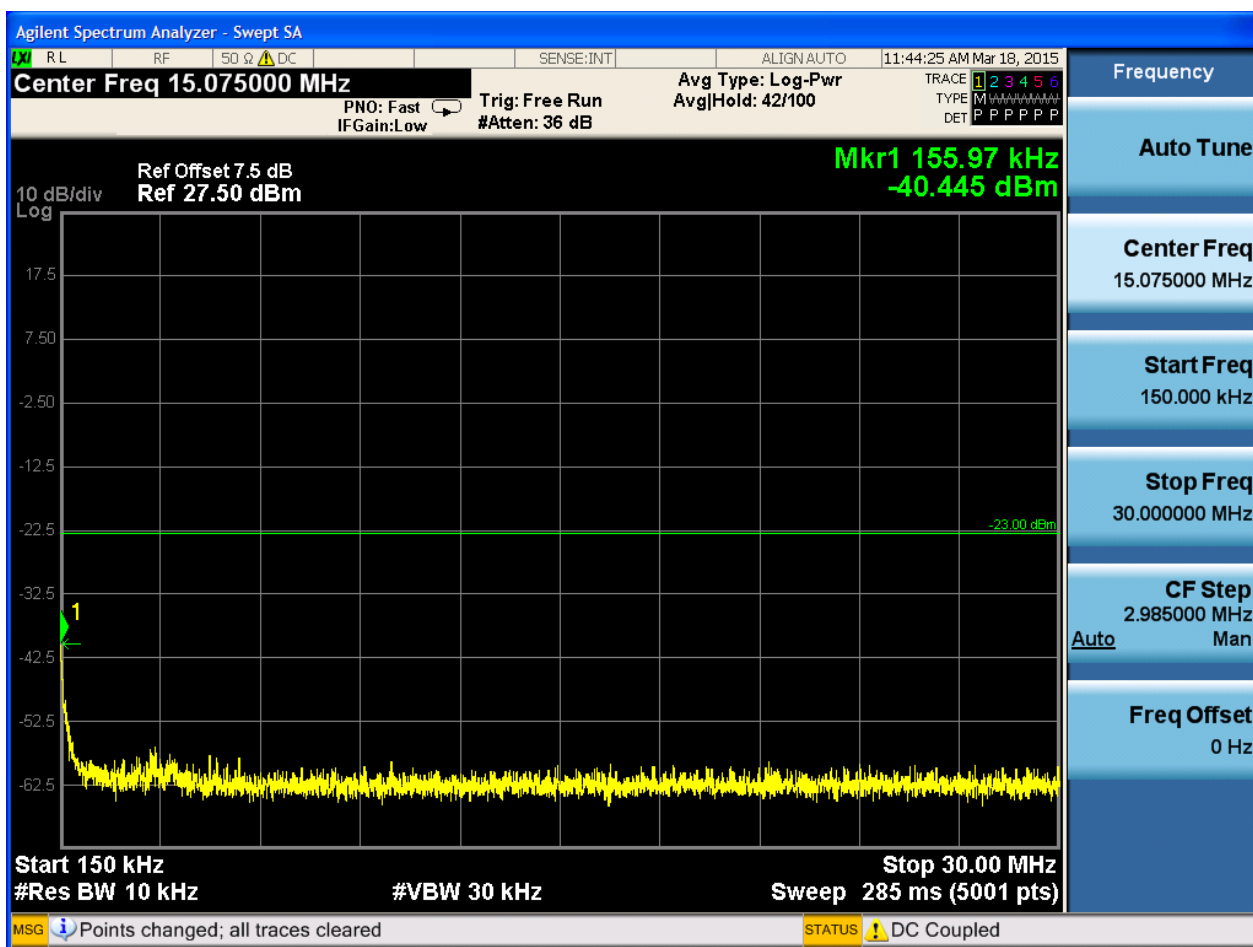


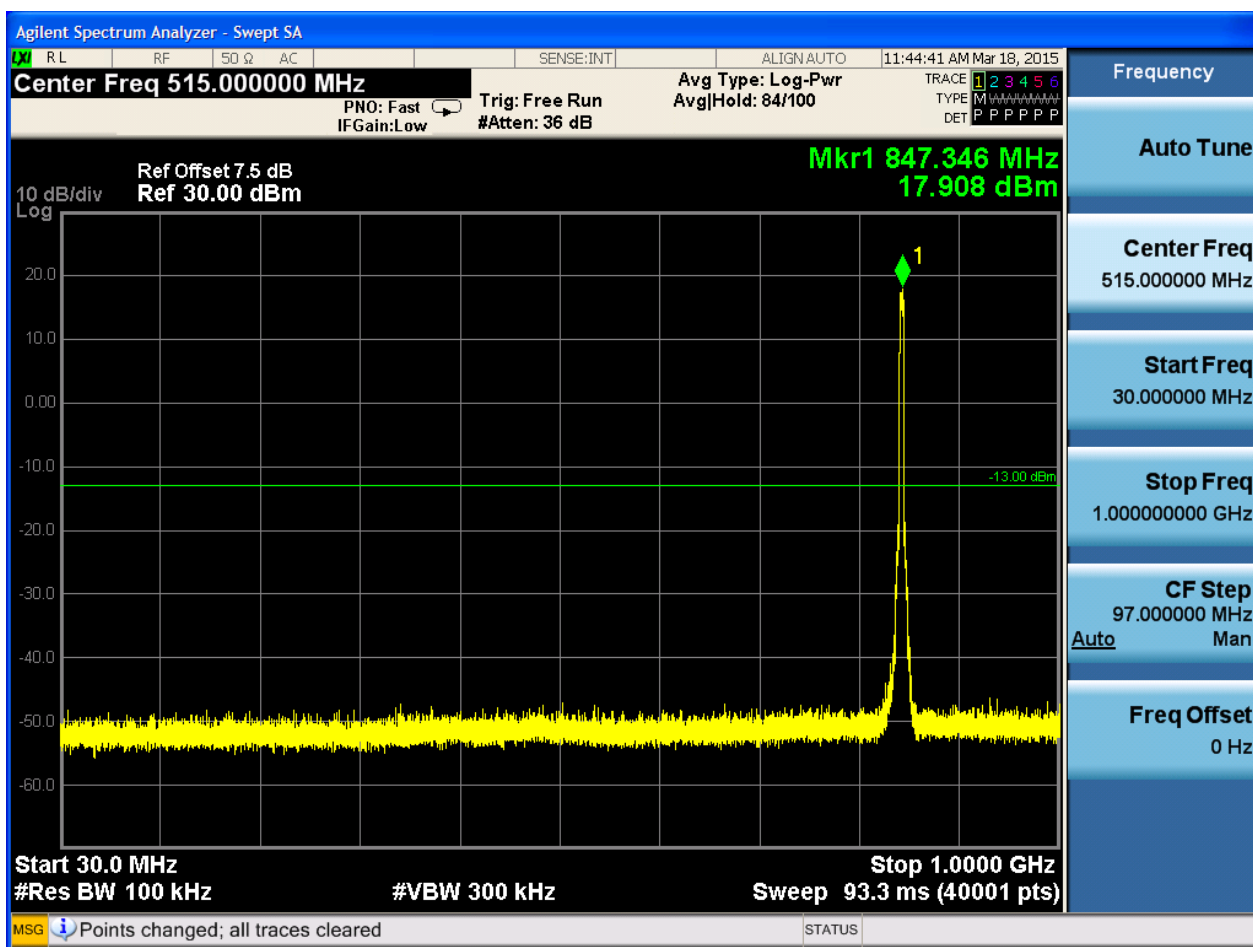


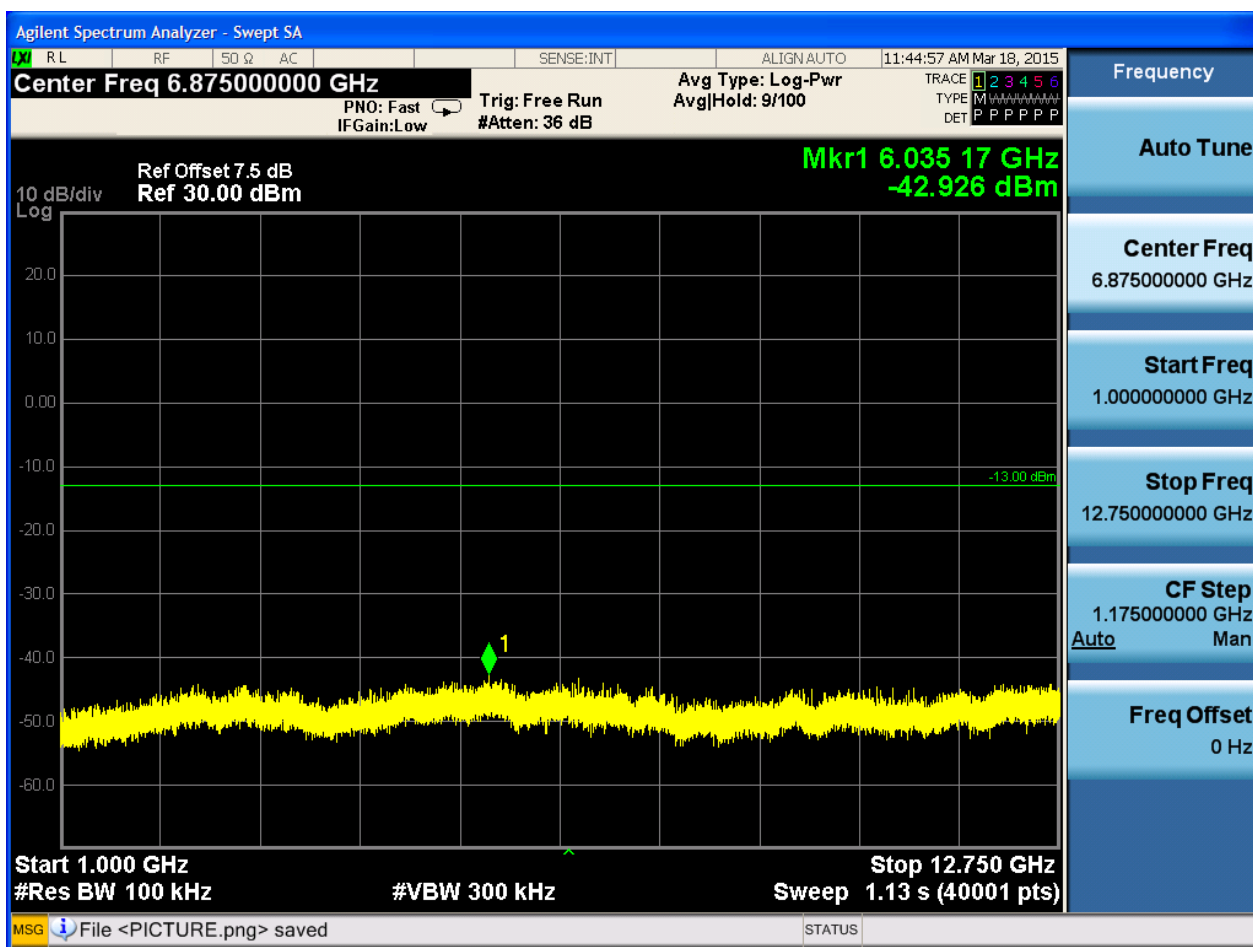


6.2.1.1.3 Test Channel = HCH







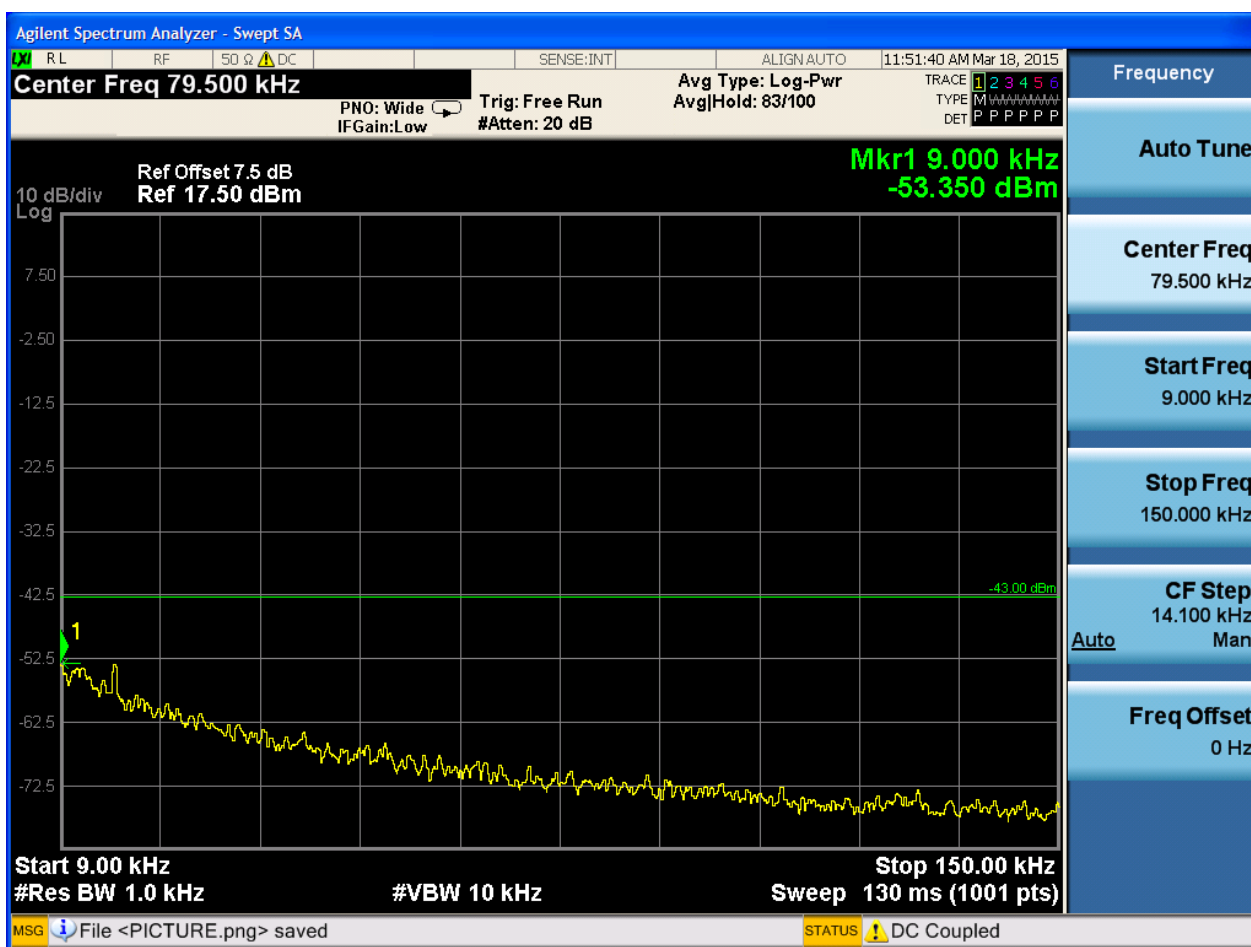


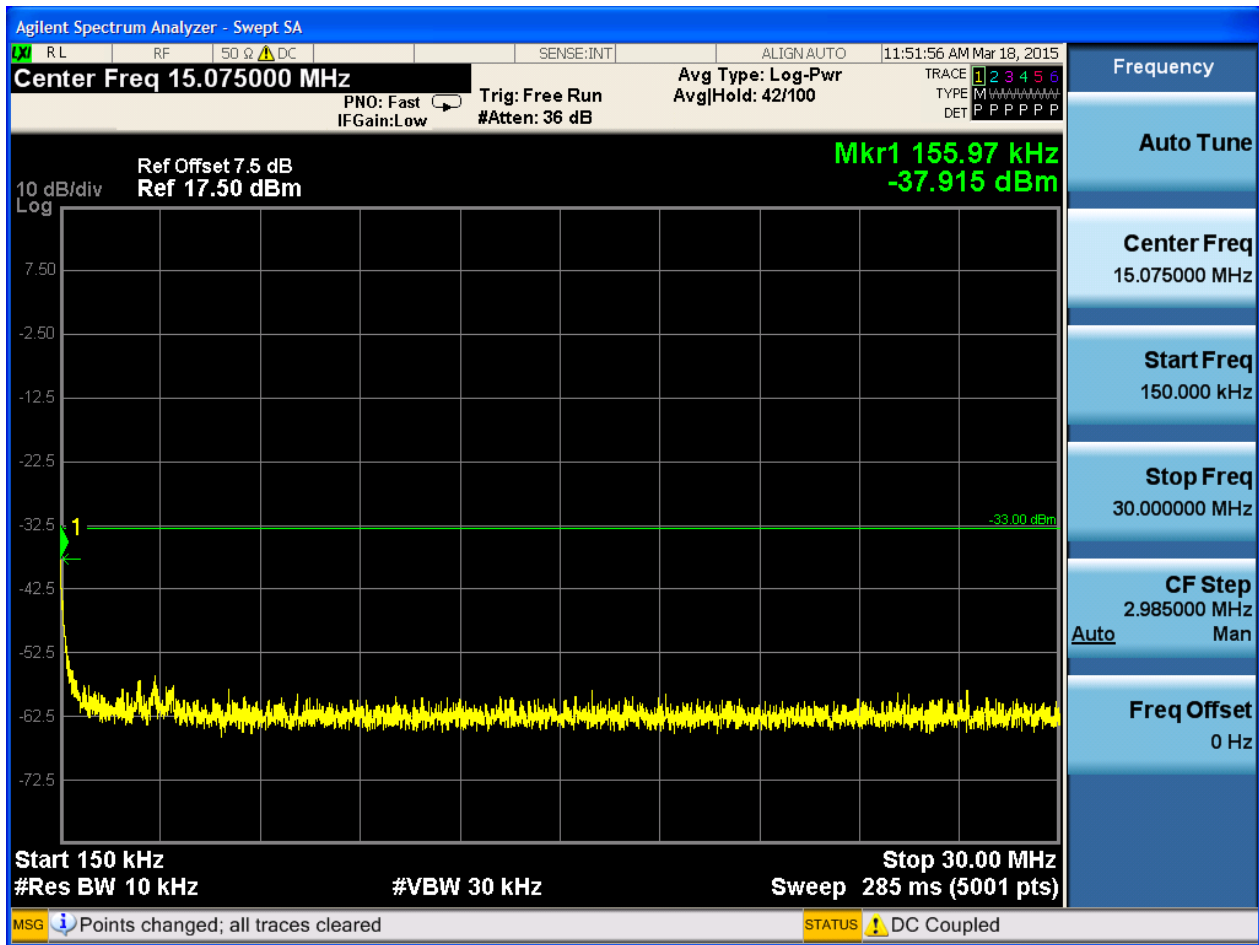


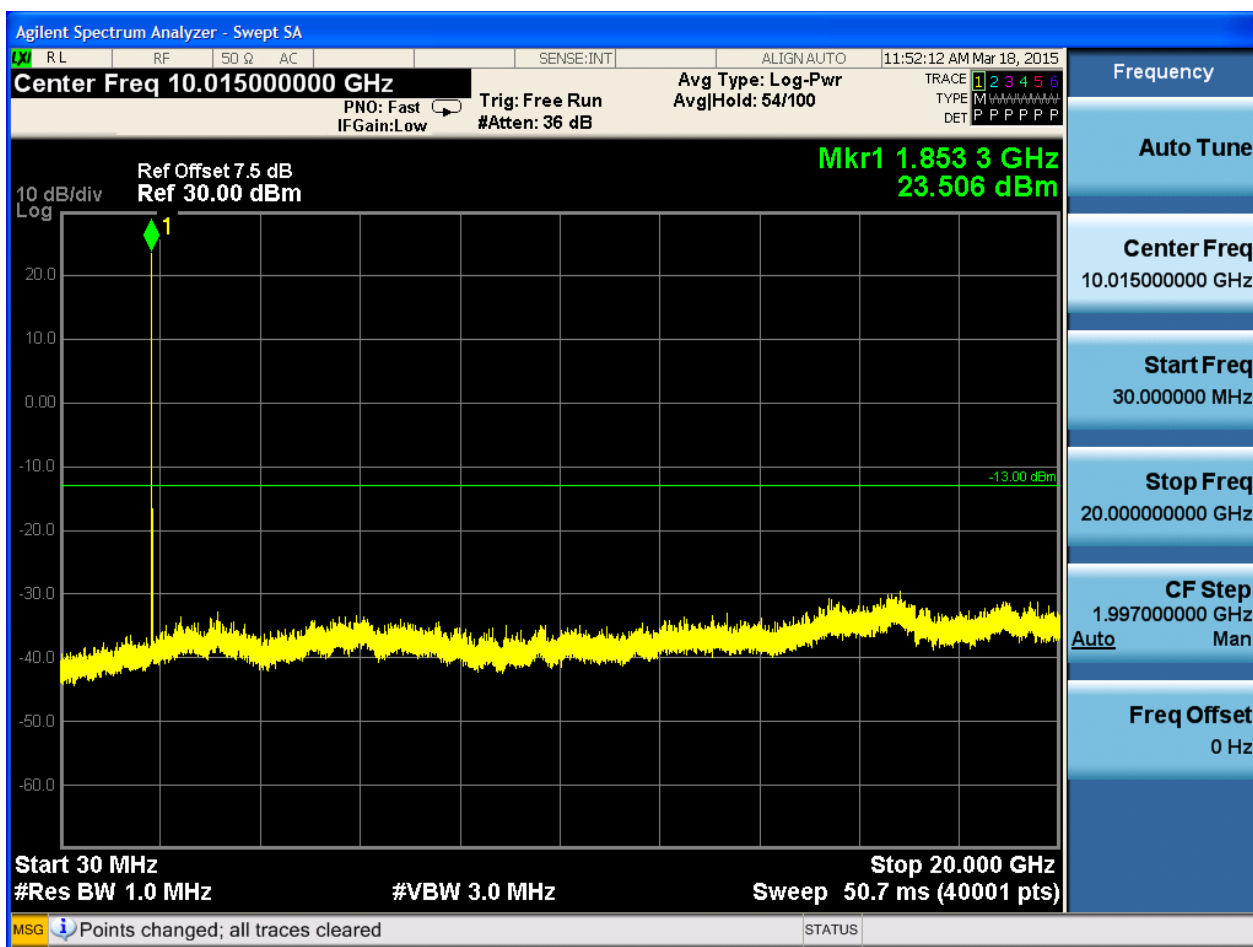
6.2.2 Test Band = WCDMA1900

6.2.2.1 Test Mode = UMTS/TM1

6.2.2.1.1 Test Channel = LCH

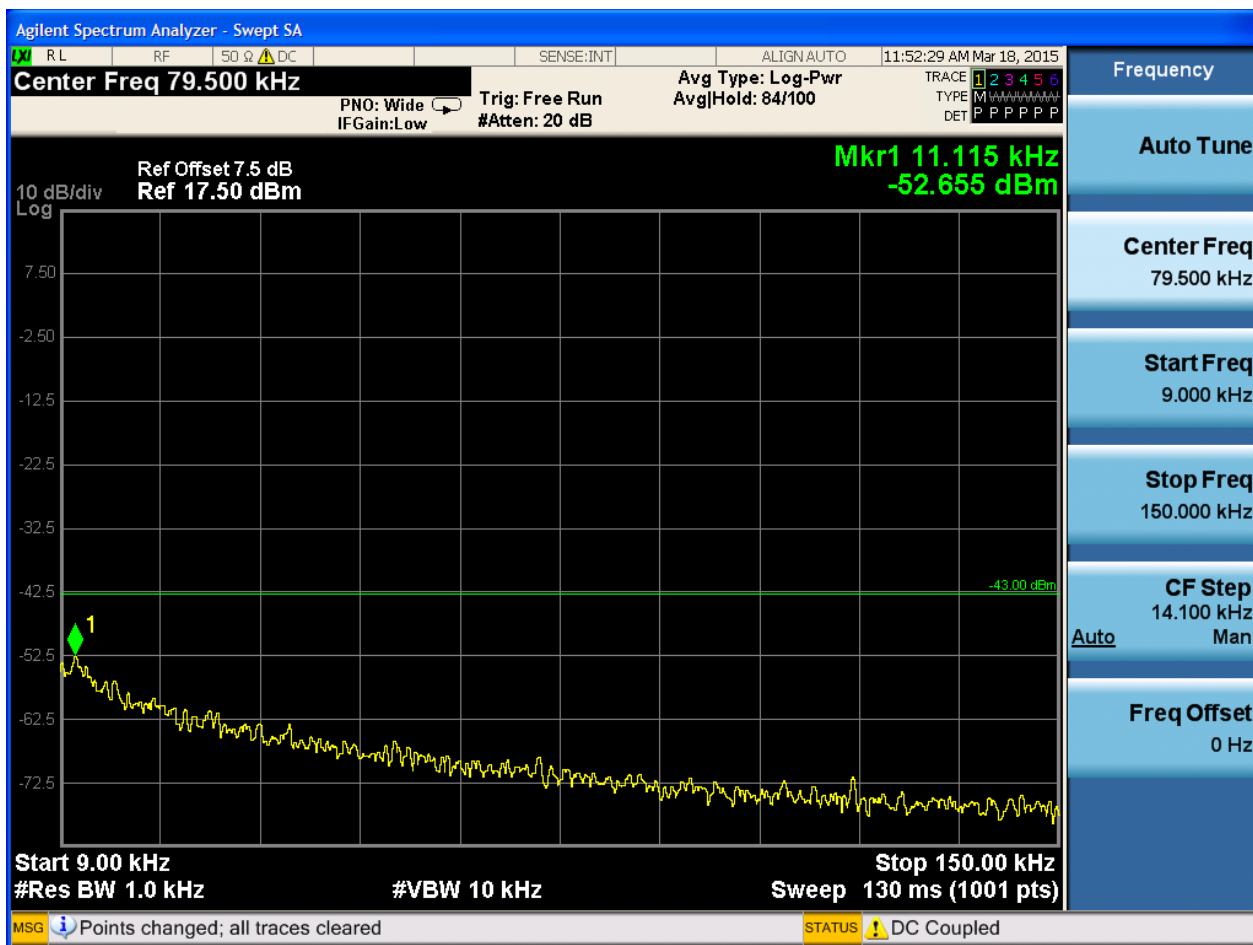


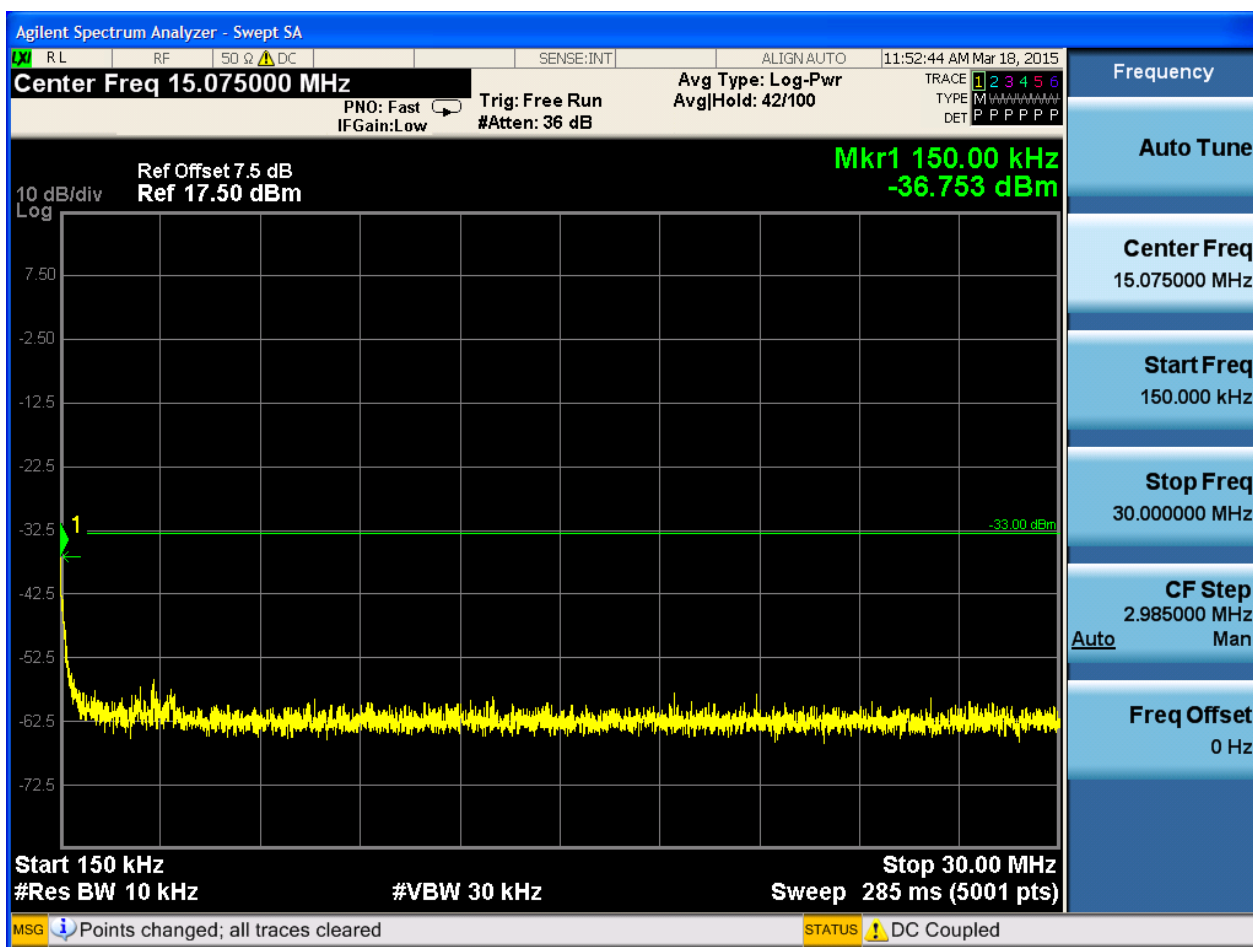


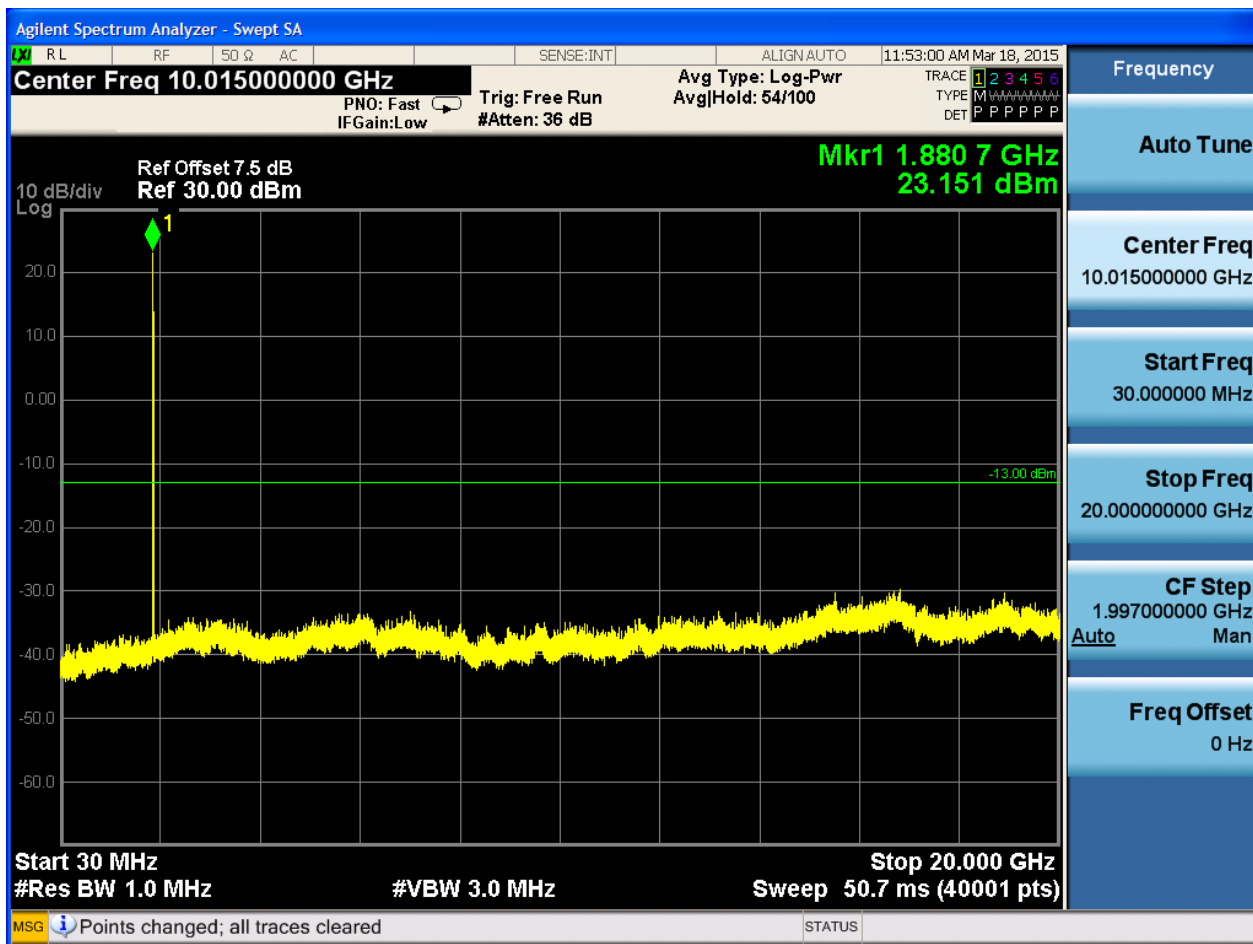




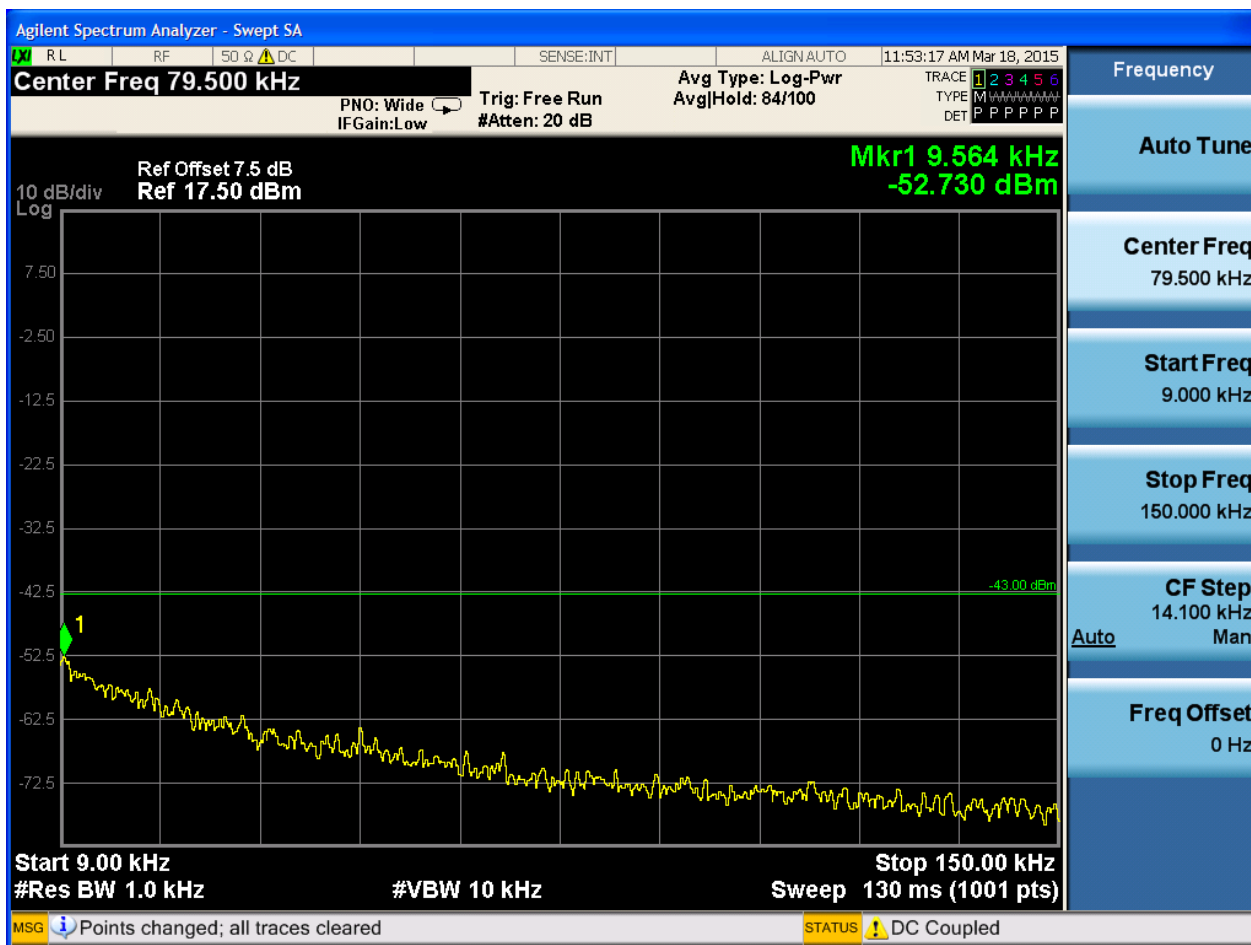
6.2.2.1.2 Test Channel = MCH

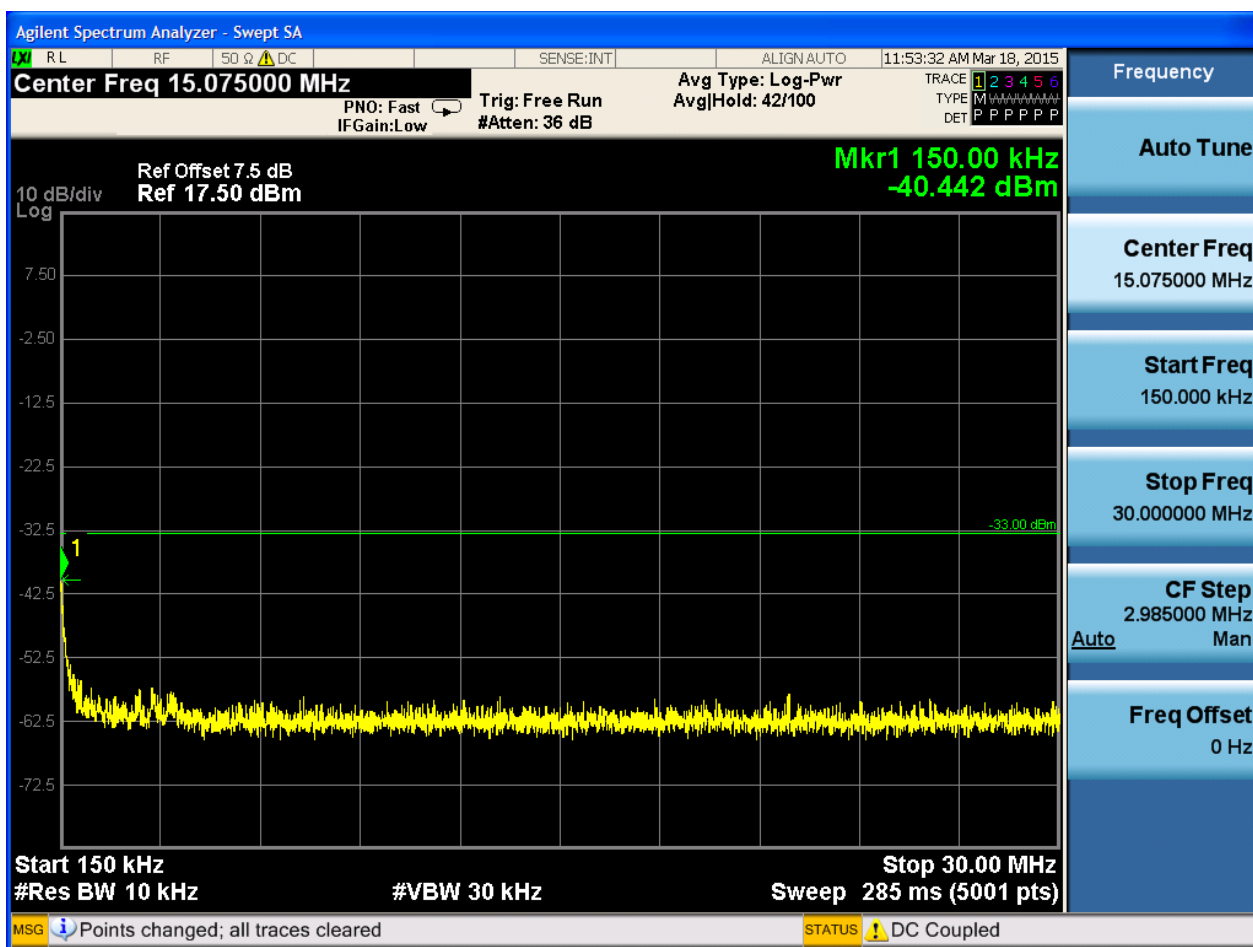


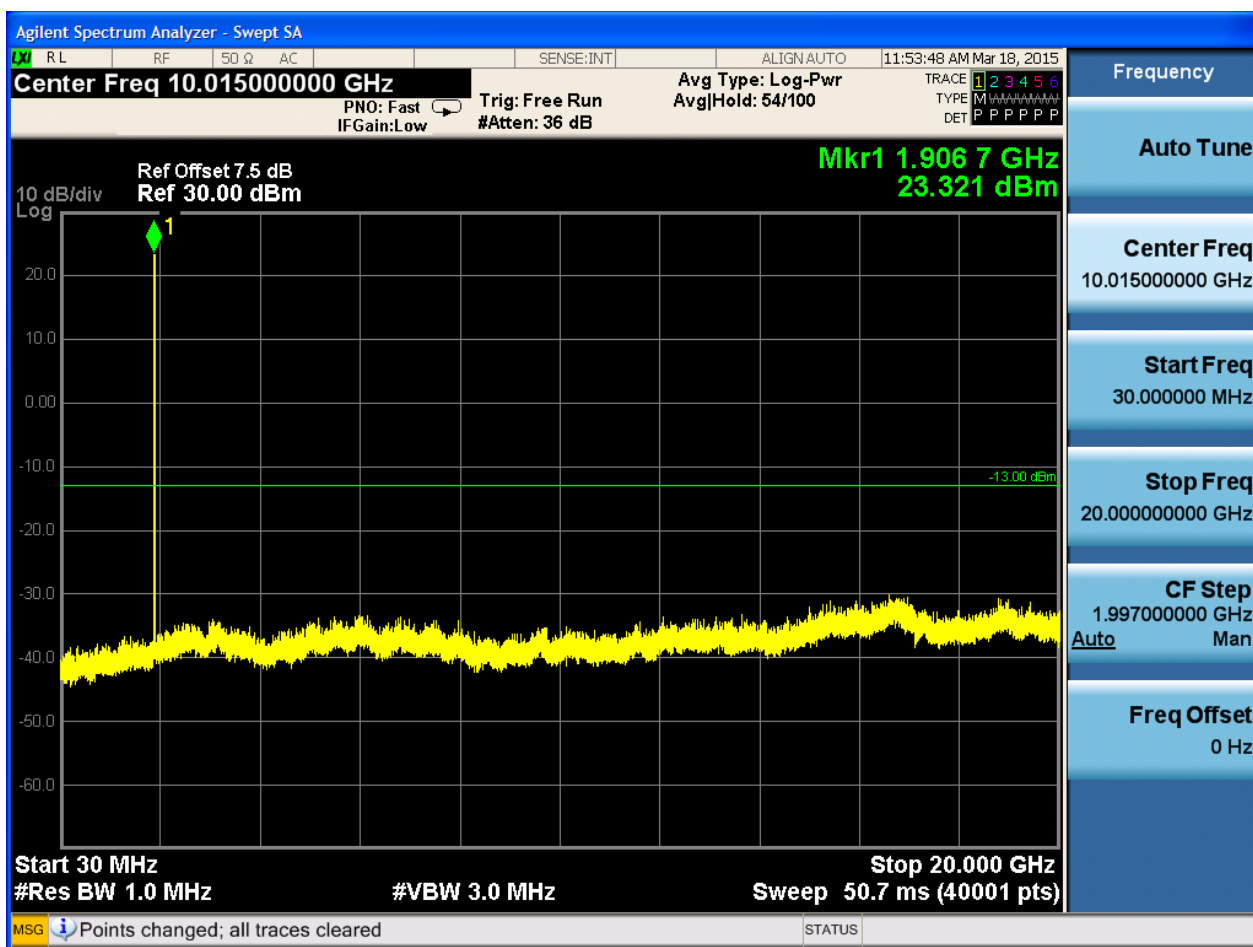




6.2.2.1.3 Test Channel = HCH







7Appendix_G: Field Strength of Spurious Radiation

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

NOTE1: No peak found in the Test Range of “9 kHz to 30MHz”

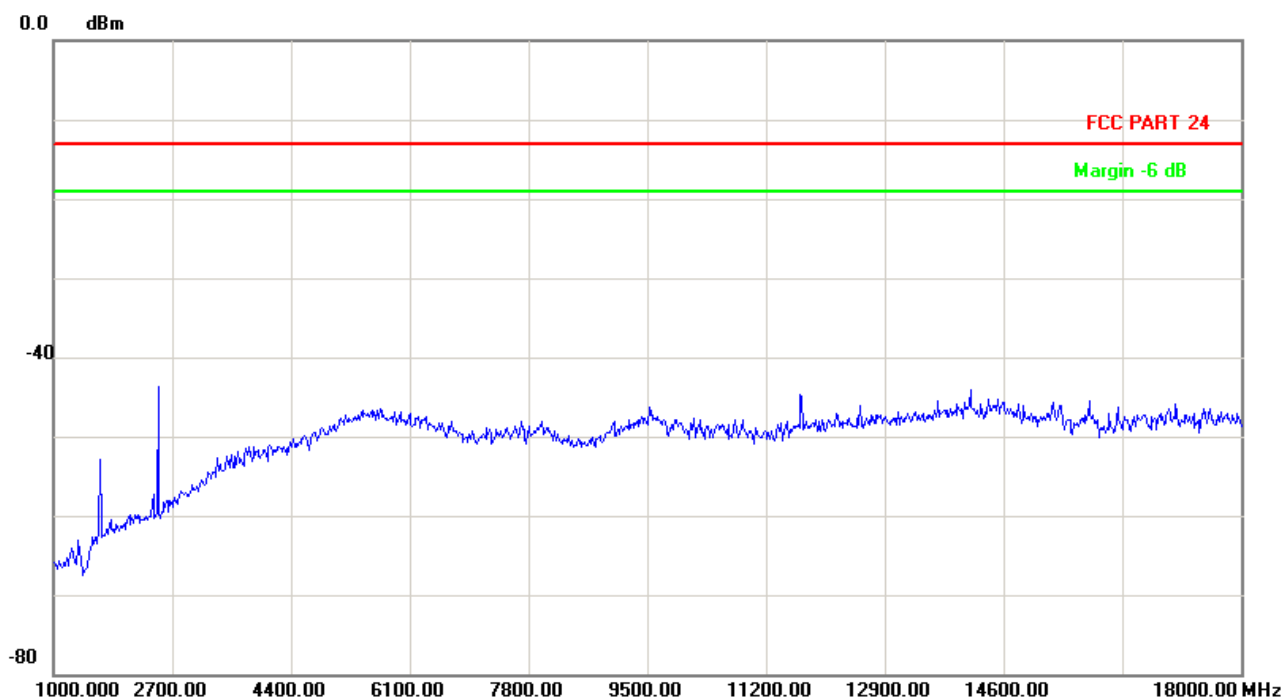
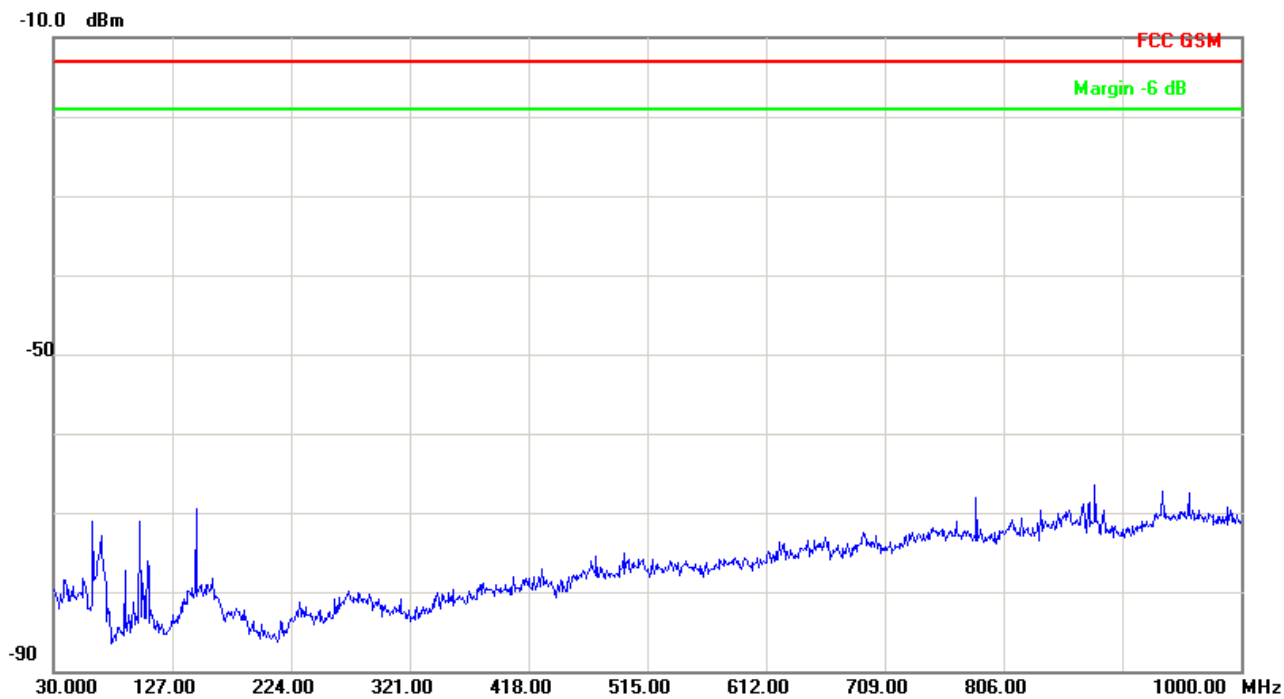
NOTE2: We tested all modes, but the data presented below is the worst case.

Part I - Test Plots

7.1 For GSM

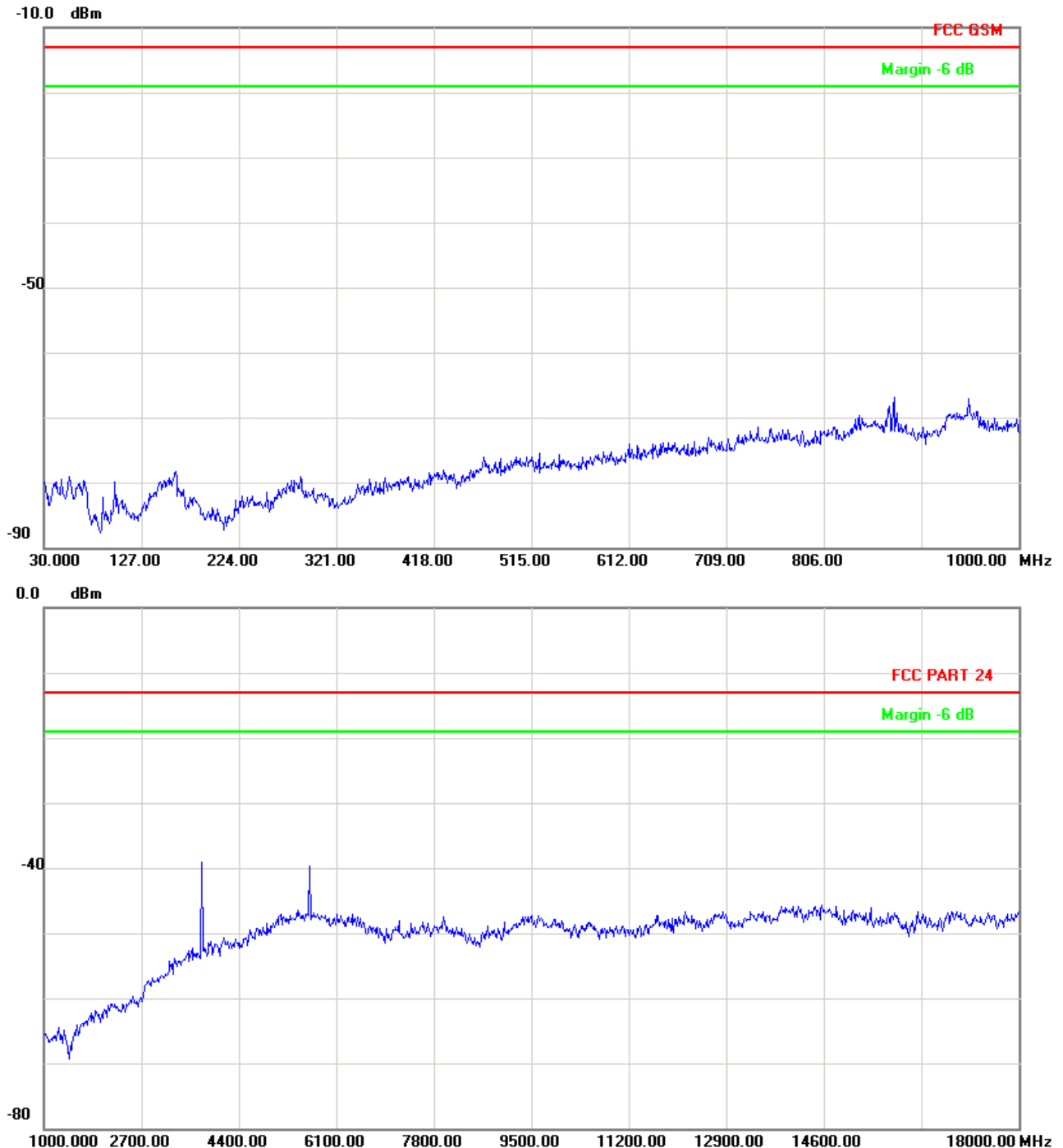
7.1.1 Test Band = GSM850

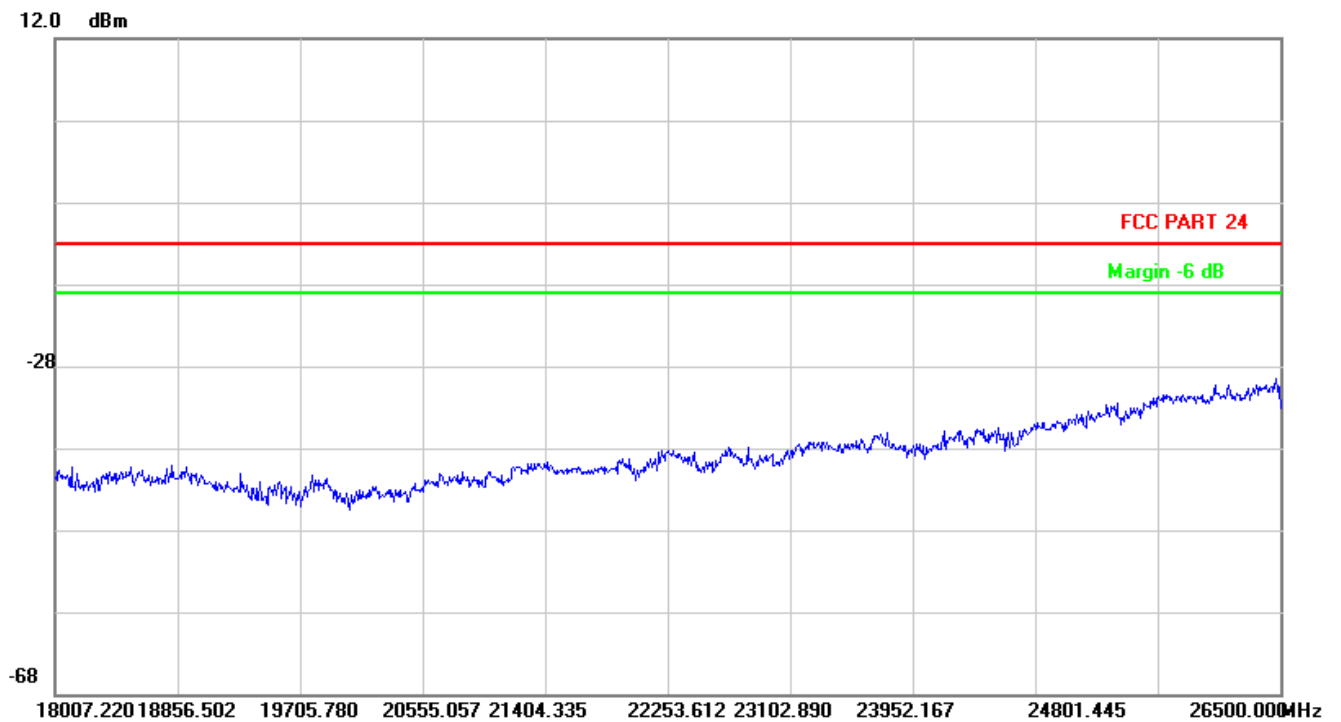
7.1.1.1 Test Mode = GSM/TM1



7.1.2 Test Band = GSM1900

7.1.2.1 Test Mode = GSM/TM1

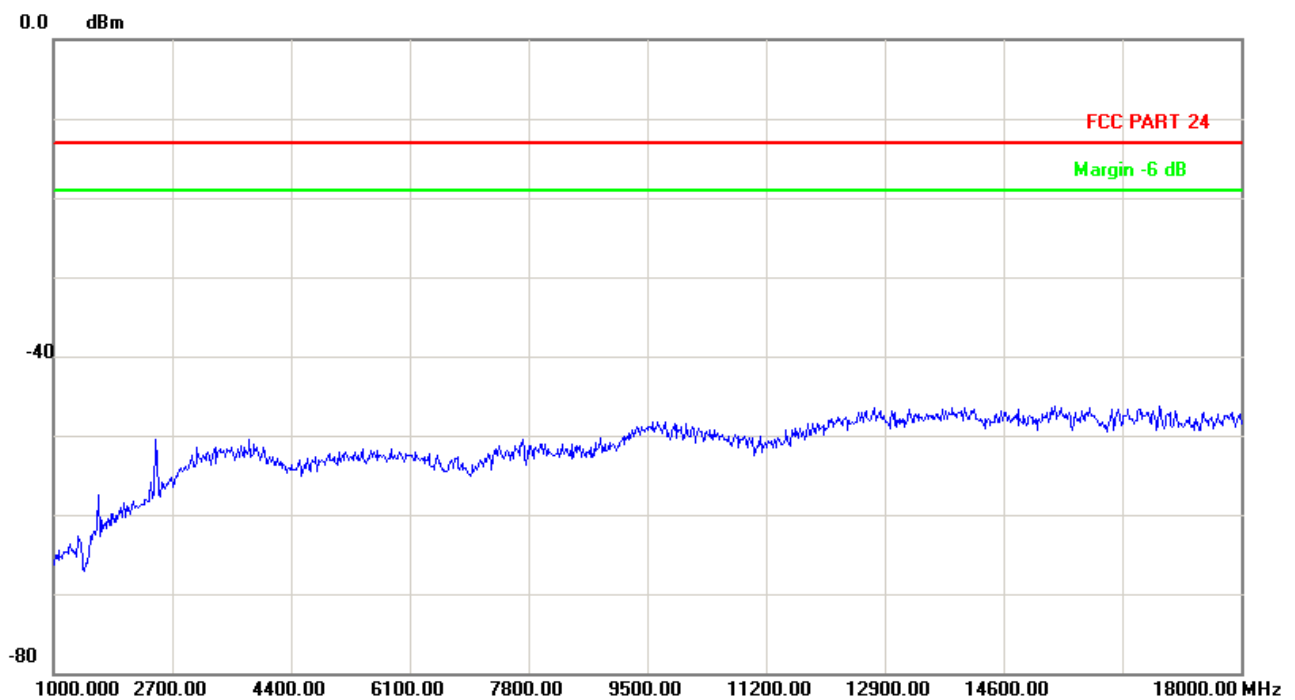
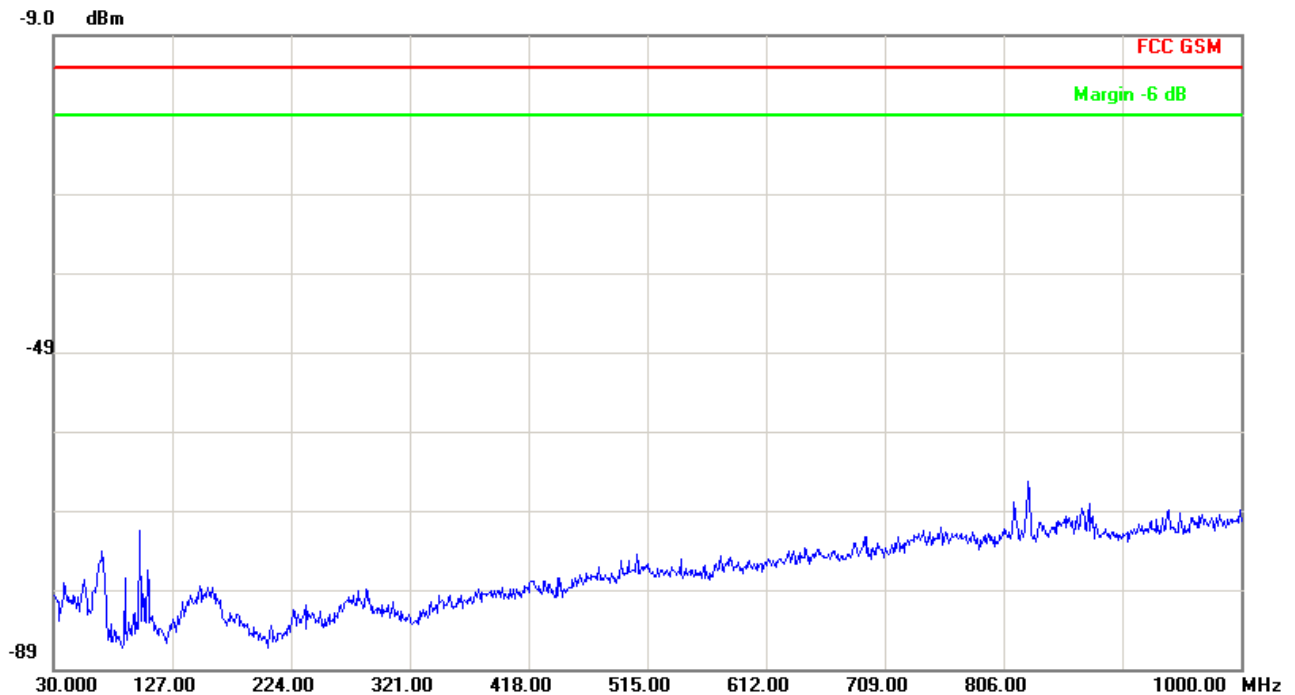




7.2 For UMTS

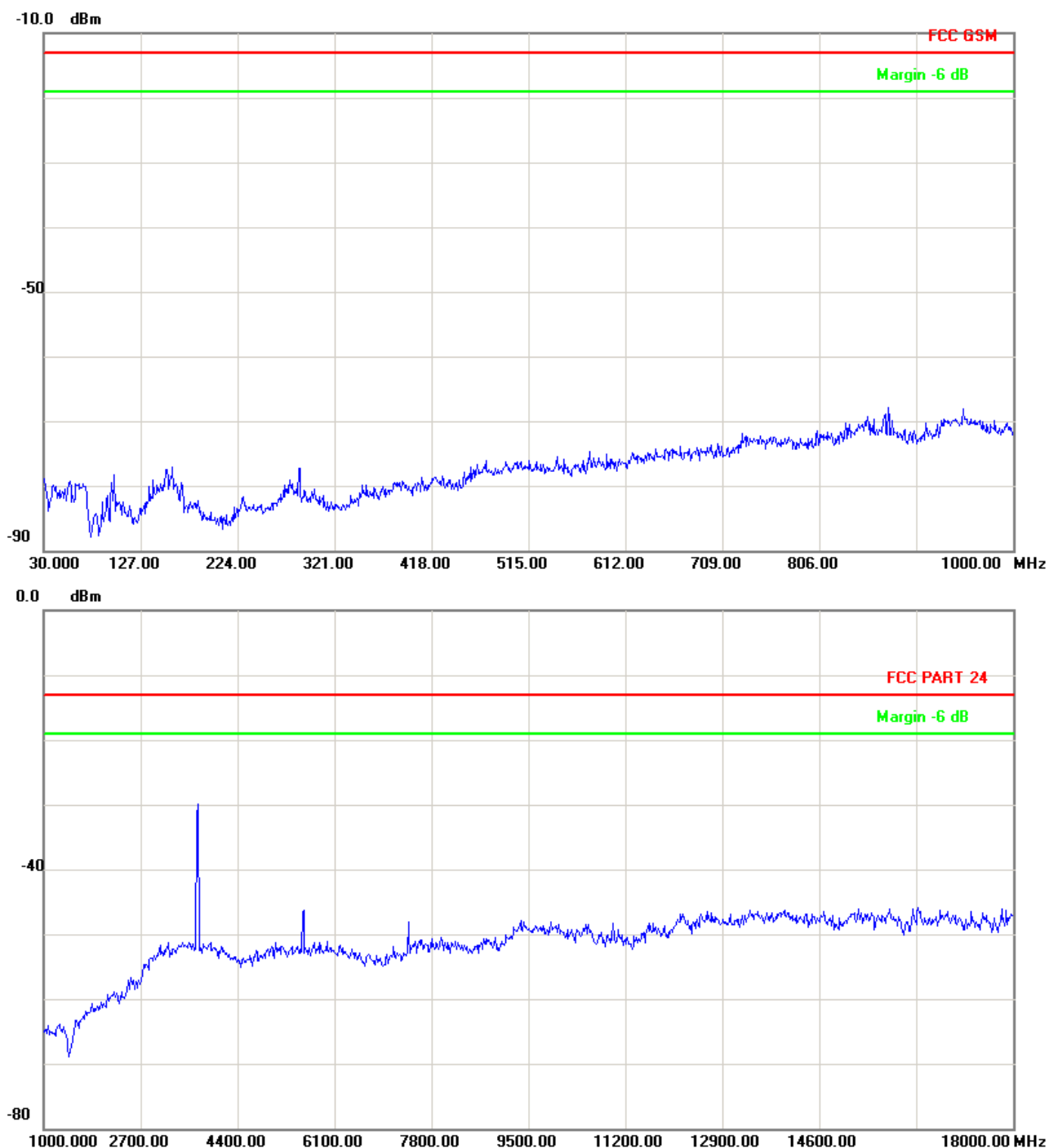
7.2.1 Test Band = WCDMA850

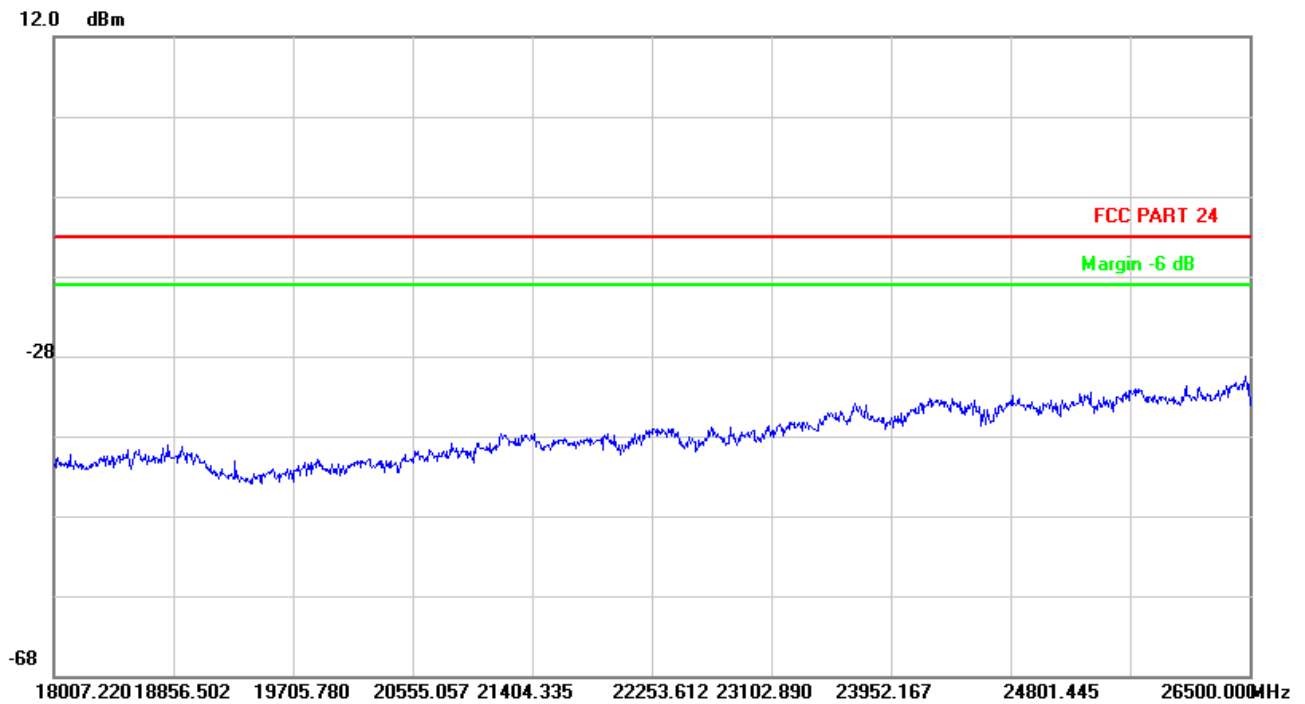
7.2.1.1 Test Mode = UMTS/TM1



7.2.2 Test Band = WCDMA1900

7.2.2.1 Test Mode = UMTS/TM1





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	-19.05	-0.02311	PASS
				VN	-12.85	-0.01559	PASS
				VH	-19.5	-0.02366	PASS
		MCH	TN	VL	-18.98	-0.02269	PASS
				VN	-11.36	-0.01358	PASS
				VH	-14.27	-0.01706	PASS
		HCH	TN	VL	-19.05	-0.02244	PASS
				VN	-21.31	-0.02511	PASS
				VH	-22.47	-0.02647	PASS
GSM1900	GSM/TM1	LCH	TN	VL	-14.53	-0.00785	PASS
				VN	-19.24	-0.0104	PASS
				VH	-16.01	-0.00865	PASS
		MCH	TN	VL	-7.62	-0.00405	PASS
				VN	-18.4	-0.00979	PASS
				VH	-13.5	-0.00718	PASS
		HCH	TN	VL	-30.87	-0.01616	PASS
				VN	-24.86	-0.01302	PASS
				VH	-28.41	-0.01488	PASS

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
WCDMA850	UMTS/TM1	LCH	TN	VL	1.45	0.00175	PASS
				VN	2.35	0.00284	PASS
				VH	-2.29	-0.00277	PASS
		MCH	TN	VL	-4.85	-0.0058	PASS
				VN	-0.31	-0.00037	PASS
				VH	-7.71	-0.00922	PASS
		HCH	TN	VL	0.4	0.00047	PASS

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
WCDMA1900	UMTS/TM1	LCH	TN	VN	3.69	0.00436	PASS
				VH	3.17	0.00374	PASS
				VL	8.41	0.00454	PASS
		MCH	TN	VN	10.82	0.00584	PASS
				VH	8.35	0.00451	PASS
				VL	3.01	0.0016	PASS
		HCH	TN	VN	6.76	0.0036	PASS
				VH	1.25	0.00066	PASS
				VL	-0.32	-0.00017	PASS
				VN	5.54	0.0029	PASS
				VH	-3.95	-0.00207	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	-15.3	-0.01856	PASS
				-20	-23.76	-0.02883	PASS
				-10	-21.24	-0.02577	PASS
				0	-20.47	-0.02484	PASS
				10	-16.53	-0.02006	PASS
				20	-19.63	-0.02382	PASS
				30	-17.95	-0.02178	PASS
				40	-18.85	-0.02287	PASS
				50	-21.44	-0.02601	PASS
		MCH	VN	-30	-19.57	-0.02339	PASS
				-20	-17.24	-0.02061	PASS
				-10	-18.79	-0.02246	PASS
				0	-12.72	-0.0152	PASS
				10	-20.73	-0.02478	PASS
				20	-16.08	-0.01922	PASS
				30	-22.66	-0.02709	PASS
				40	-21.44	-0.02563	PASS
				50	-13.62	-0.01628	PASS
		HCH	VN	-30	-14.21	-0.01674	PASS
				-20	-13.62	-0.01605	PASS
				-10	-19.11	-0.02251	PASS
				0	-20.6	-0.02427	PASS

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				10	-13.43	-0.01582	PASS
				20	-20.34	-0.02396	PASS
				30	-12.72	-0.01499	PASS
				40	-17.18	-0.02024	PASS
				50	-22.92	-0.027	PASS
GSM1900	GSM/TM1	LCH	VN	-30	-5.81	-0.00314	PASS
				-20	-33.9	-0.01832	PASS
				-10	-23.37	-0.01263	PASS
				0	-27.38	-0.0148	PASS
				10	-14.92	-0.00806	PASS
				20	-15.24	-0.00824	PASS
				30	-17.63	-0.00953	PASS
				40	-14.01	-0.00757	PASS
				50	-17.76	-0.0096	PASS
		MCH	VN	-30	-21.37	-0.01137	PASS
				-20	-13.88	-0.00738	PASS
				-10	-6.84	-0.00364	PASS
				0	-11.3	-0.00601	PASS
				10	-9.43	-0.00502	PASS
				20	-7.81	-0.00415	PASS
				30	-9.04	-0.00481	PASS
				40	-20.99	-0.01116	PASS
				50	-13.11	-0.00697	PASS
		HCH	VN	-30	-30.74	-0.0161	PASS
				-20	-36.94	-0.01934	PASS
				-10	-31.32	-0.0164	PASS
				0	-31.77	-0.01664	PASS
				10	-29.57	-0.01548	PASS
				20	-26.47	-0.01386	PASS
				30	-22.28	-0.01167	PASS
				40	-22.86	-0.01197	PASS
				50	-34.22	-0.01792	PASS
WCDMA850	UMTS/TM1	LCH	VN	-30	-5.17	-0.00626	PASS
				-20	-11.55	-0.01398	PASS
				-10	2.87	0.00347	PASS
				0	-1.11	-0.00134	PASS
				10	-12.28	-0.01486	PASS
				20	-2.78	-0.00336	PASS
				30	-4.73	-0.00572	PASS
				40	-6.23	-0.00754	PASS

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
		MCH	VN	50	-0.08	-0.0001	PASS
				-30	-2.85	-0.00341	PASS
				-20	-5.31	-0.00635	PASS
				-10	-2.14	-0.00256	PASS
				0	-0.92	-0.0011	PASS
				10	-4.62	-0.00552	PASS
				20	-2.56	-0.00306	PASS
				30	-4.21	-0.00503	PASS
				40	-2.06	-0.00246	PASS
				50	0.14	0.00017	PASS
		HCH	VN	-30	3.83	0.00452	PASS
				-20	4.55	0.00537	PASS
				-10	3.95	0.00467	PASS
				0	8.18	0.00966	PASS
				10	4.78	0.00565	PASS
				20	2.3	0.00272	PASS
				30	9.41	0.01112	PASS
				40	3.57	0.00422	PASS
				50	-0.93	-0.0011	PASS
WCDMA1900	UMTS/TM1	LCH	VN	-30	2.76	0.00149	PASS
				-20	7.28	0.00393	PASS
				-10	-1.5	-0.00081	PASS
				0	8.06	0.00435	PASS
				10	-14.22	-0.00768	PASS
				20	3.34	0.0018	PASS
				30	9.81	0.0053	PASS
				40	7.66	0.00414	PASS
				50	9.46	0.00511	PASS
		MCH	VN	-30	-3.72	-0.00198	PASS
				-20	7.31	0.00389	PASS
				-10	5.87	0.00312	PASS
				0	1.27	0.00068	PASS
				10	7.68	0.00409	PASS
				20	3.83	0.00204	PASS
				30	3.34	0.00178	PASS
				40	-0.99	-0.00053	PASS
				50	3.69	0.00196	PASS
		HCH	VN	-30	3.36	0.00176	PASS
				-20	7.71	0.00404	PASS
				-10	13.49	0.00707	PASS



Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				0	-3.01	-0.00158	PASS
				10	-1.31	-0.00069	PASS
				20	-0.76	-0.0004	PASS
				30	0.96	0.0005	PASS
				40	14.71	0.00771	PASS
				50	-4.76	-0.0025	PASS

END