



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	32.23	29.79	38.5	PASS
		MCH	32.26	29.85	38.5	PASS
		HCH	32.31	29.73	38.5	PASS
WCDMA850	UMTS/TM1	LCH	23.68	21.43	38.5	PASS
		MCH	23.71	21.27	38.5	PASS
		HCH	23.62	21.19	38.5	PASS
Test Band	Test Mode	Test Channel	Conducted Power [dBm]	EIRP [dBm]	Limit [dBm]	Verdict
GSM1900	GSM/TM1	LCH	29.72	30.16	33	PASS
		MCH	29.82	30.29	33	PASS
		HCH	29.76	30.23	33	PASS
WCDMA1900	UMTS/TM1	LCH	22.72	23.12	33	PASS
		MCH	22.63	23.01	33	PASS
		HCH	22.54	22.95	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	0.11	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	3.08	13	PASS
		MCH	3.18	13	PASS
		HCH	3.26	13	PASS

3Appendix_C: Modulation Characteristics

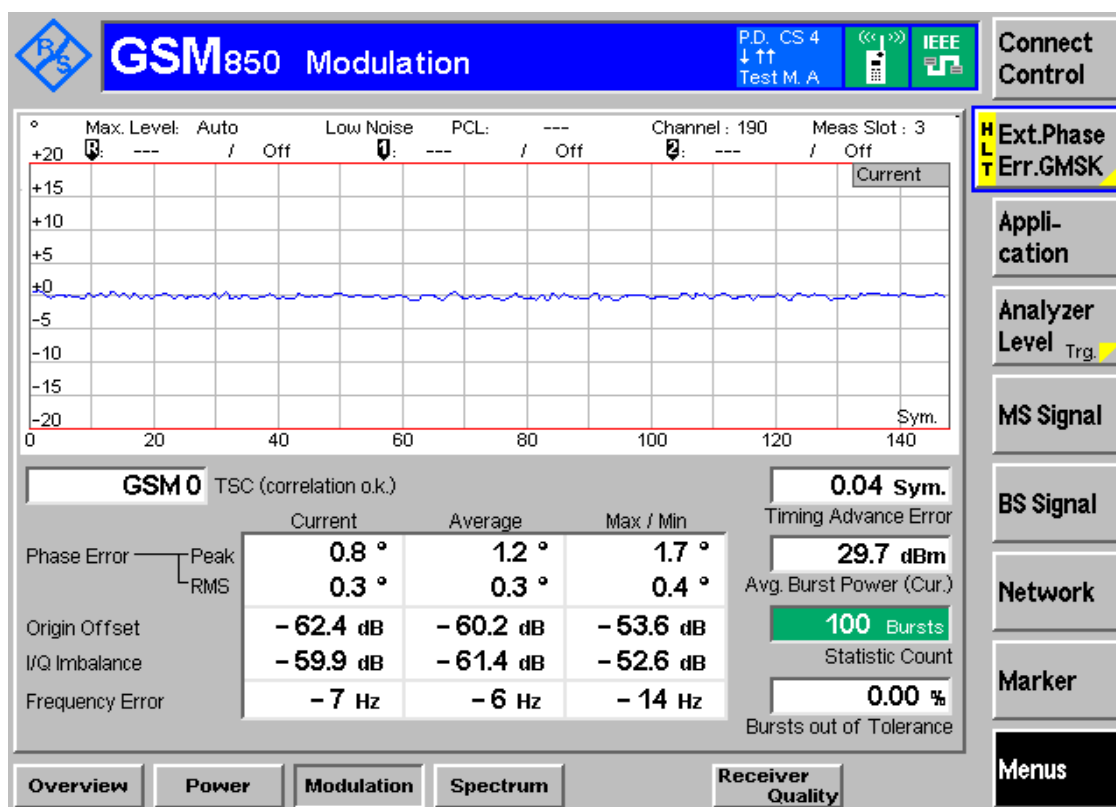
Part I - Test Plots

3.1 For GSM

3.1.1 Test Band = GSM850

3.1.1.1 Test Mode = GSM/TM1

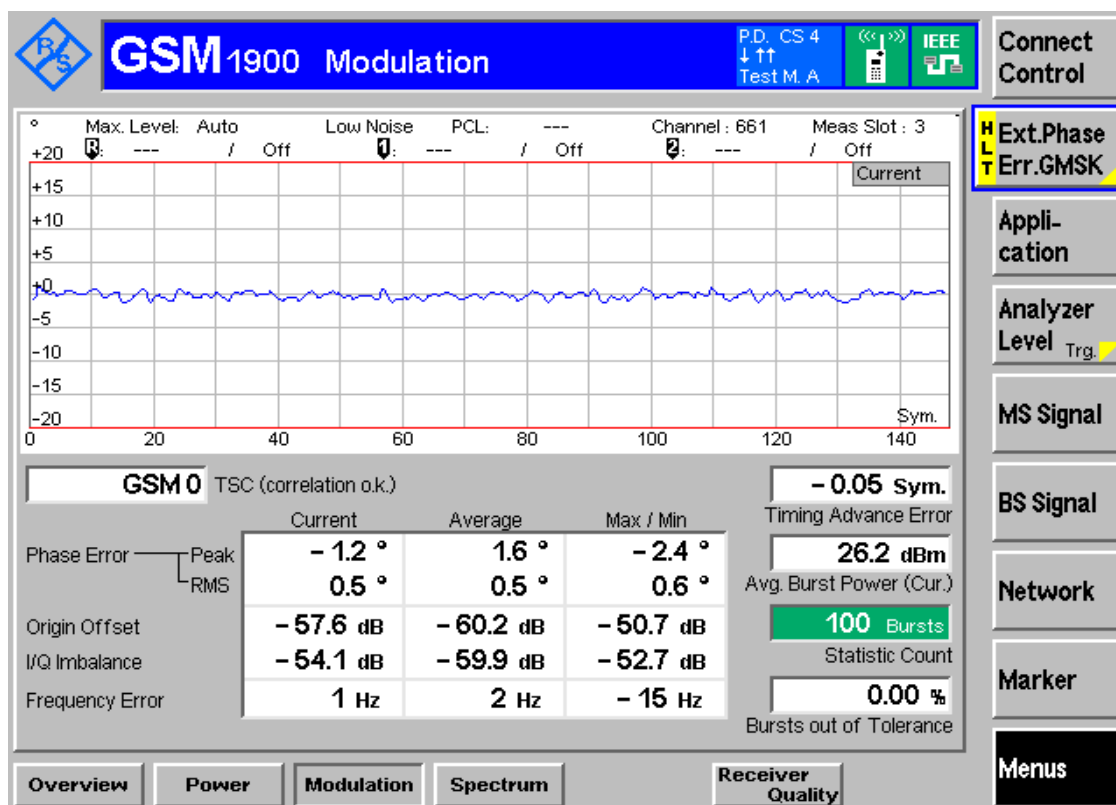
3.1.1.1.1 Test Channel = MCH



3.1.2 Test Band = GSM1900

3.1.2.1 Test Mode = GSM/TM1

3.1.2.1.1 Test Channel = MCH

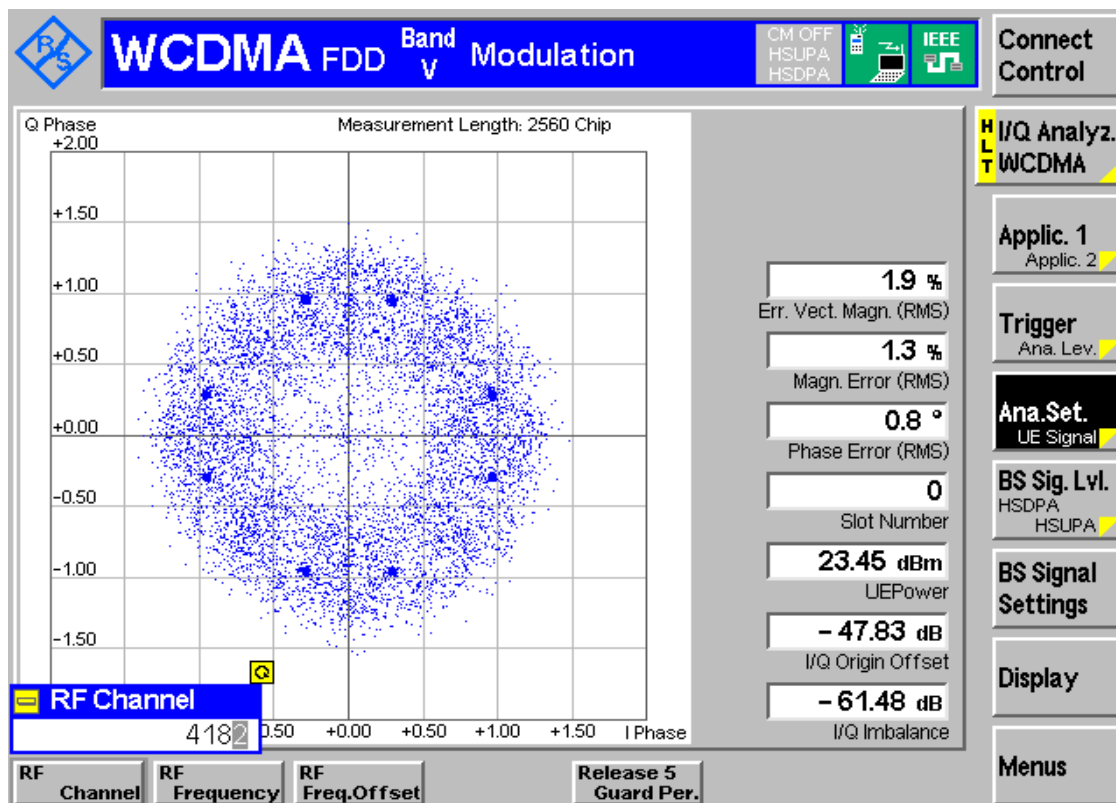


3.2 For UMTS

3.2.1 Test Band = WCDMA850

3.2.1.1 Test Mode = UMTS/TM1

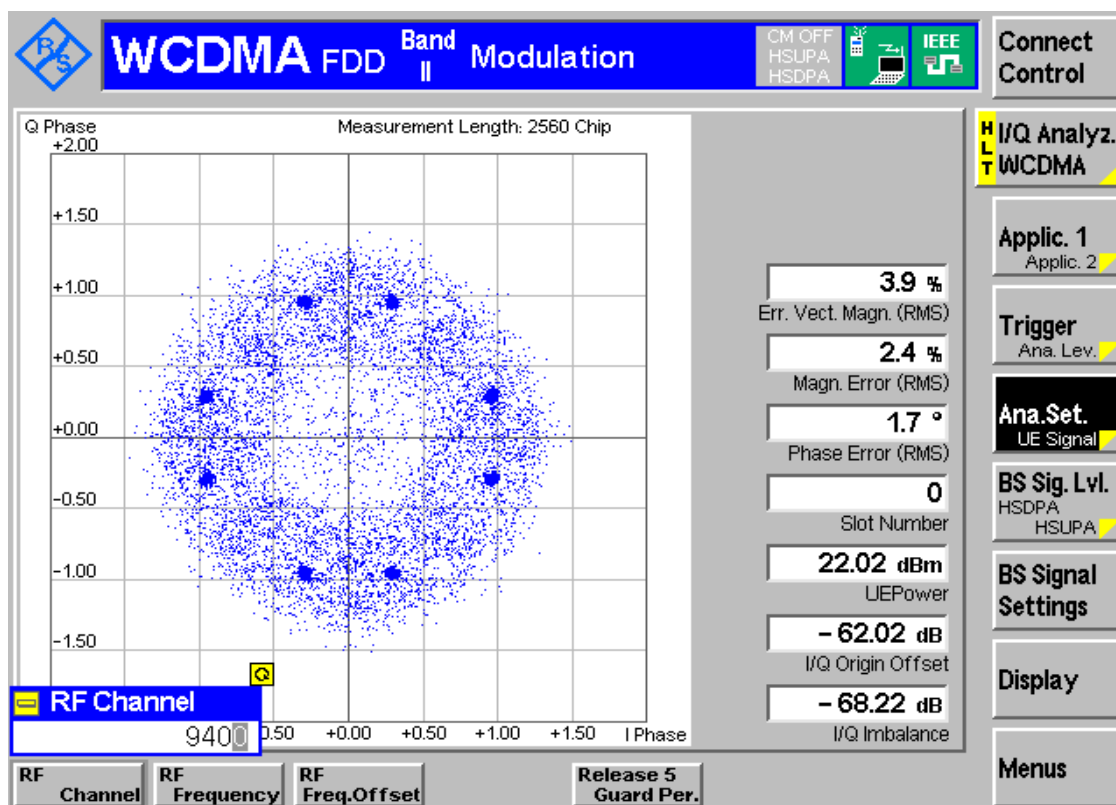
3.2.1.1.1 Test Channel = MCH



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	245.77	316.95	Pass
		MCH	245.59	318.20	Pass
		HCH	243.31	309.00	Pass
GSM1900	GSM/TM1	LCH	247.69	313.93	Pass
		MCH	243.62	317.17	Pass
		HCH	246.15	322.15	Pass
Test Band	Test Mode	Test Channel	Occupied Bandwidth [MHz]	Emission Bandwidth [MHz]	Verdict
WCDMA850	UMTS/TM1	LCH	4.16	4.69	Pass
		MCH	4.14	4.69	Pass
		HCH	4.16	4.69	Pass
WCDMA1900	UMTS/TM1	LCH	4.16	4.69	Pass
		MCH	4.16	4.69	Pass
		HCH	4.16	4.68	Pass

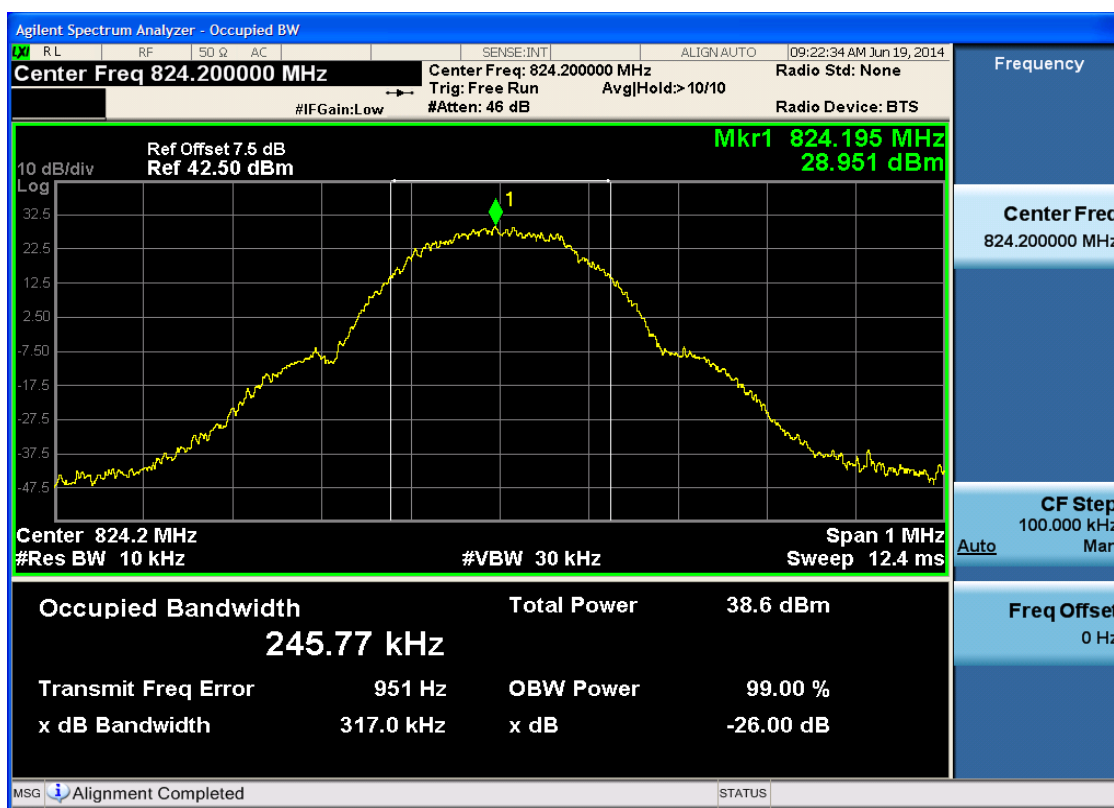
Part II - Test Plots

4.1 For GSM

4.1.1 Test Band = GSM850

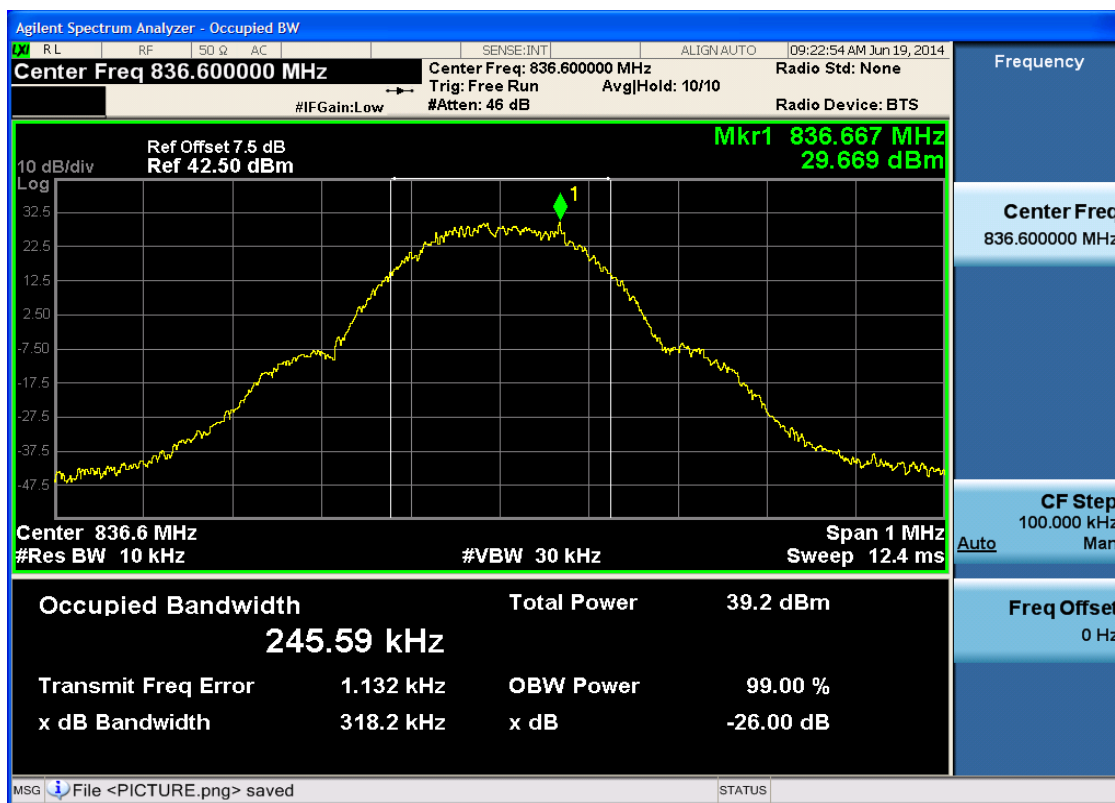
4.1.1.1 Test Mode = GSM/TM1

4.1.1.1.1 Test Channel = LCH



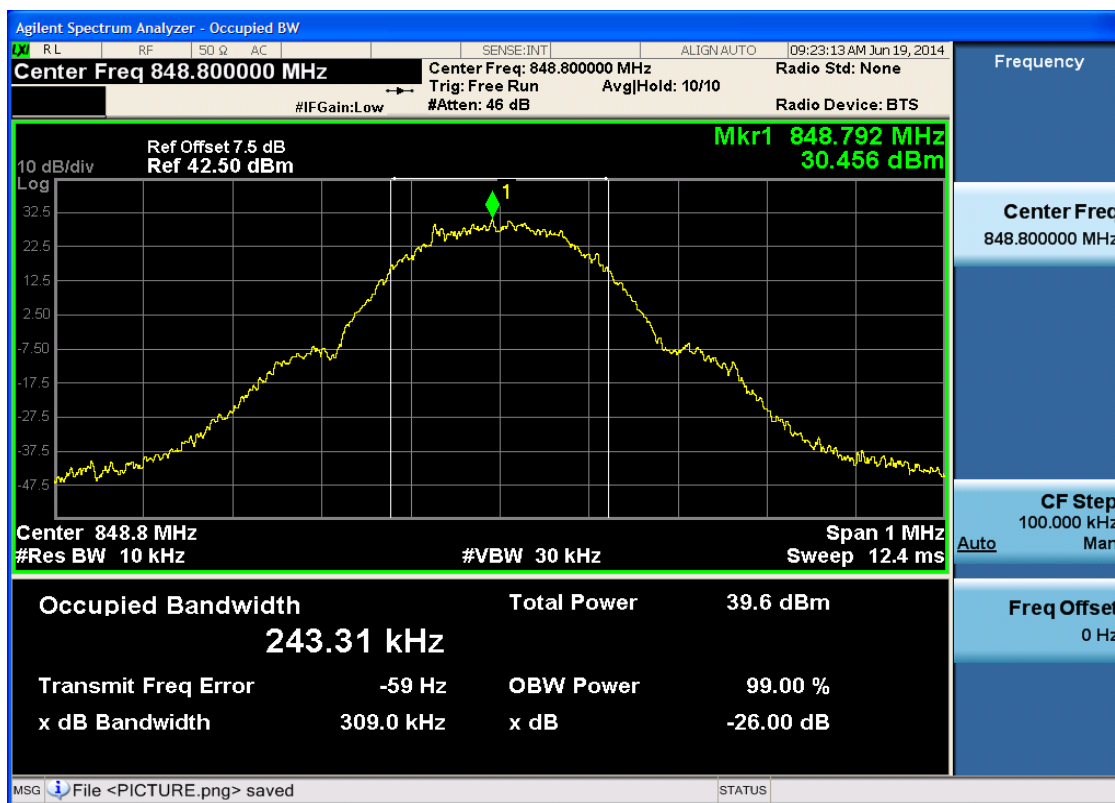


4.1.1.1.2 Test Channel = MCH





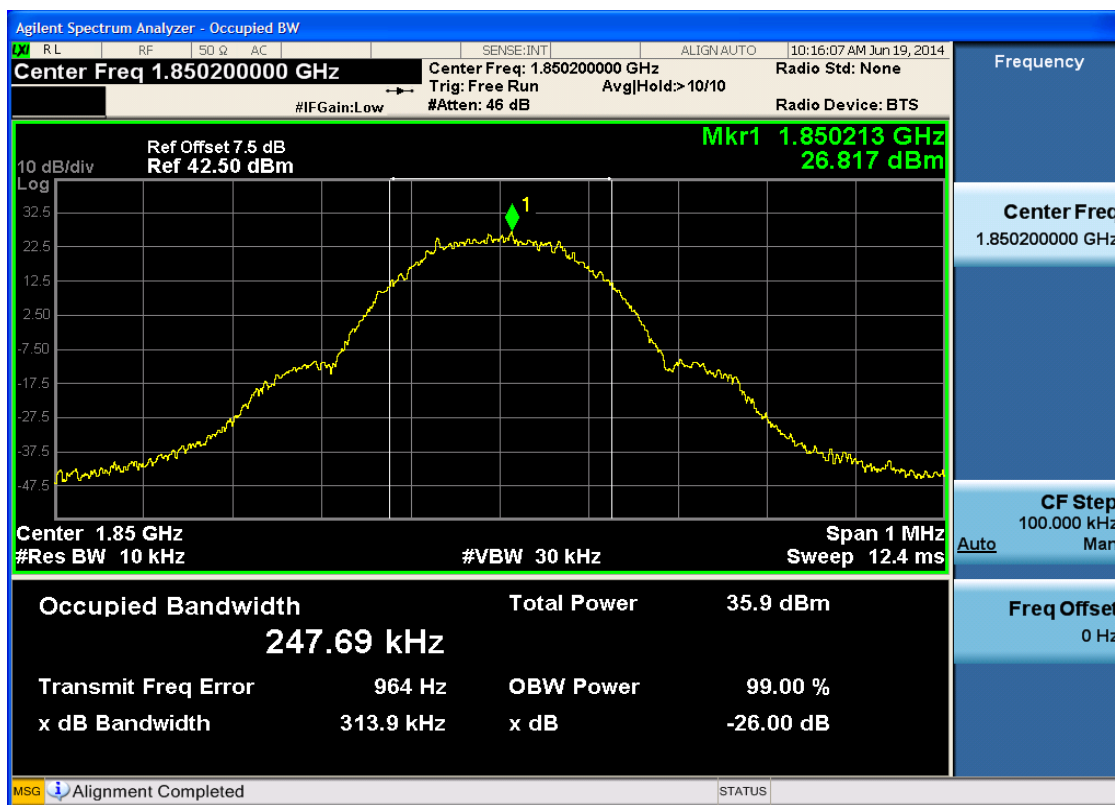
4.1.1.1.3 Test Channel = HCH



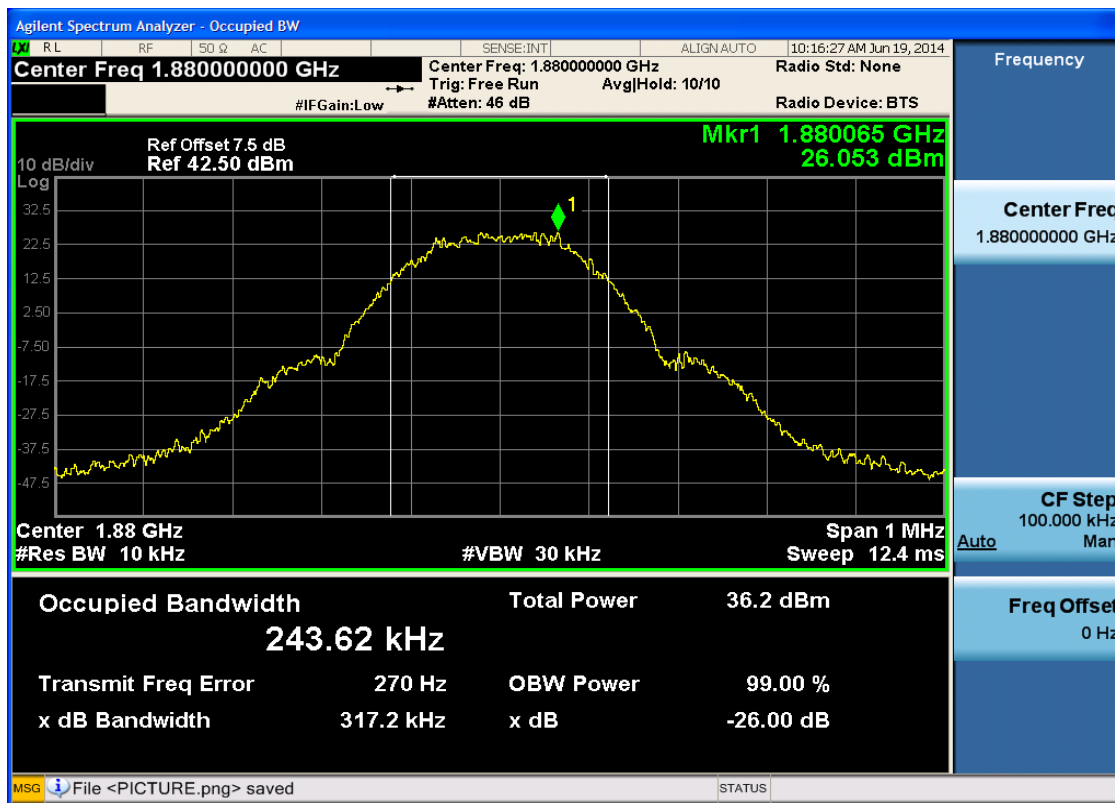
4.1.2 Test Band = GSM1900

4.1.2.1 Test Mode = GSM/TM1

4.1.2.1.1 Test Channel = LCH

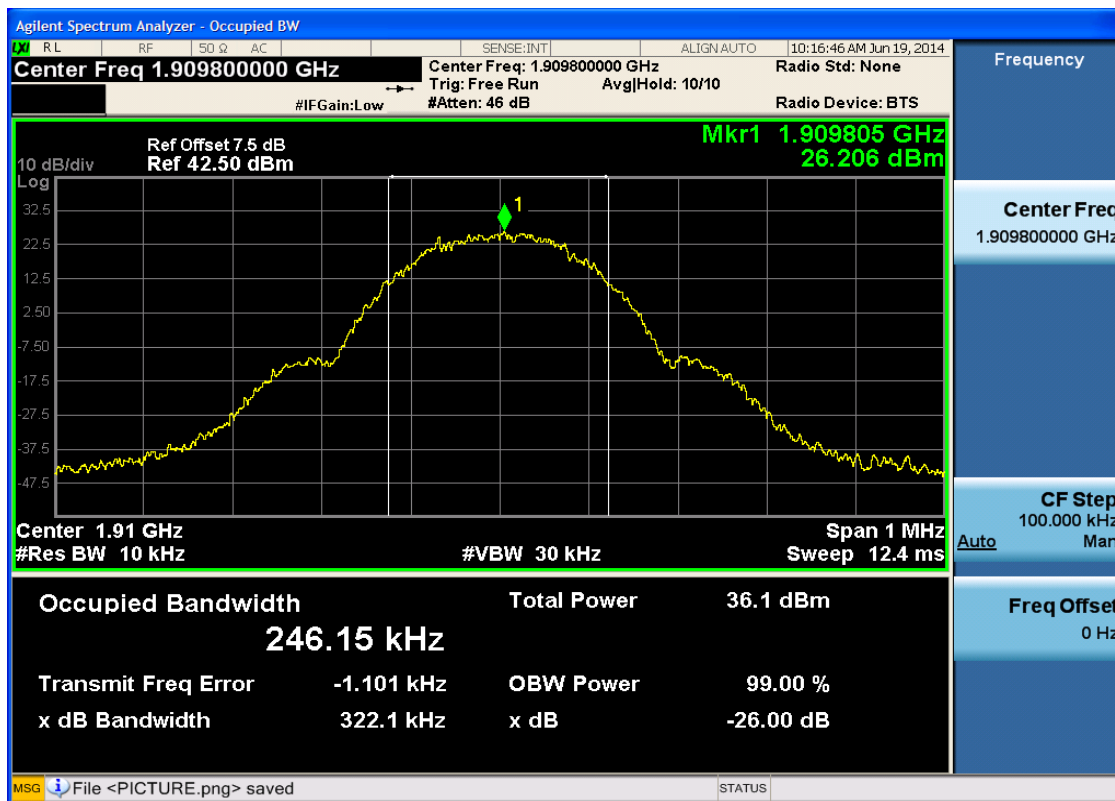


4.1.2.1.2 Test Channel = MCH





4.1.2.1.3 Test Channel = HCH

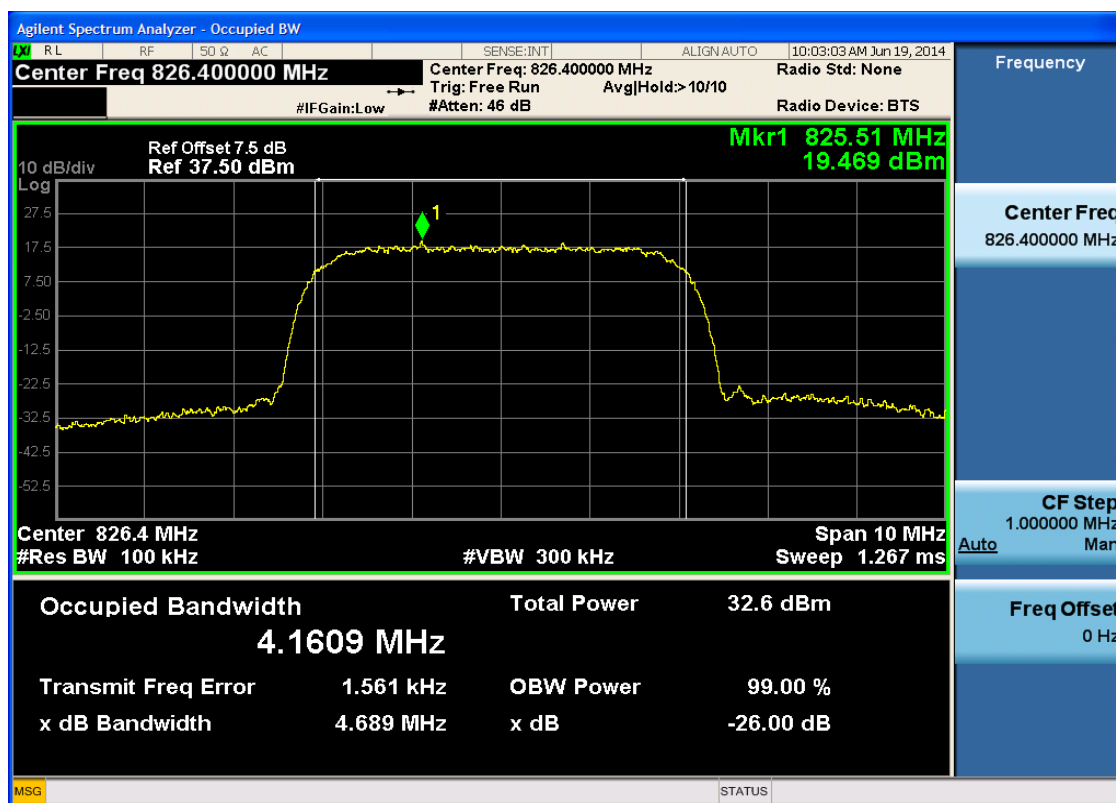


4.2 For UMTS

4.2.1 Test Band = WCDMA850

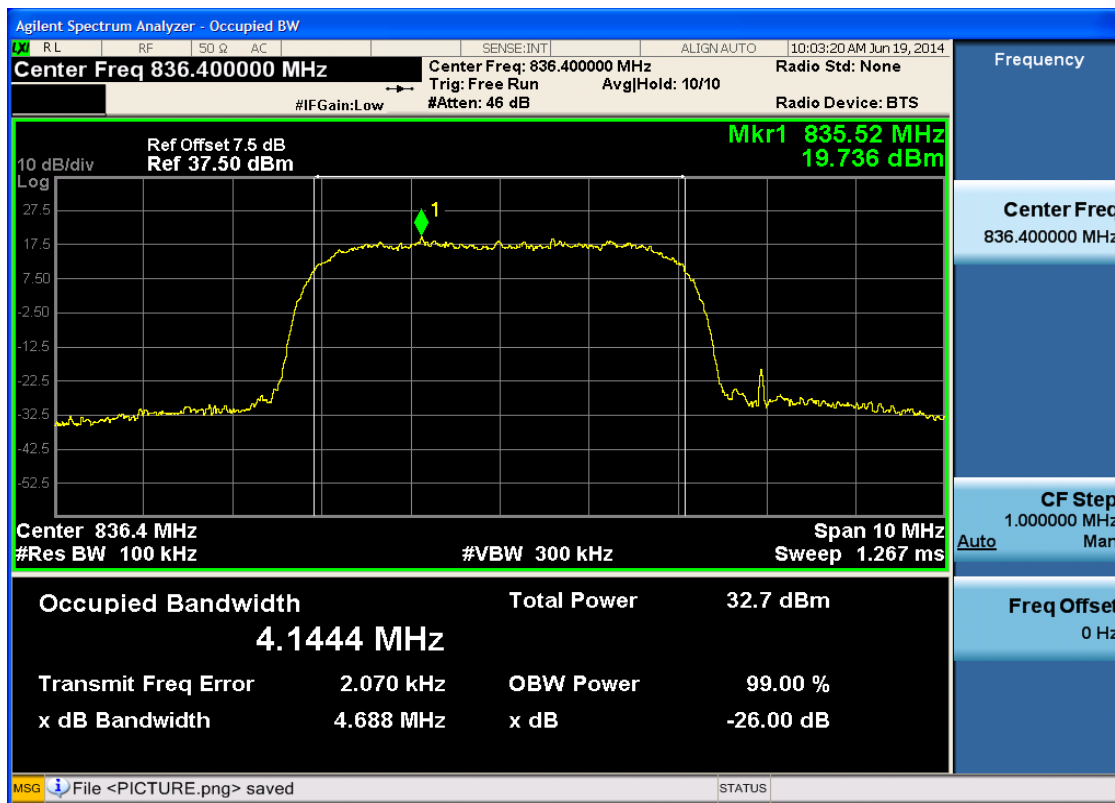
4.2.1.1 Test Mode = UMTS/TM1

4.2.1.1.1 Test Channel = LCH



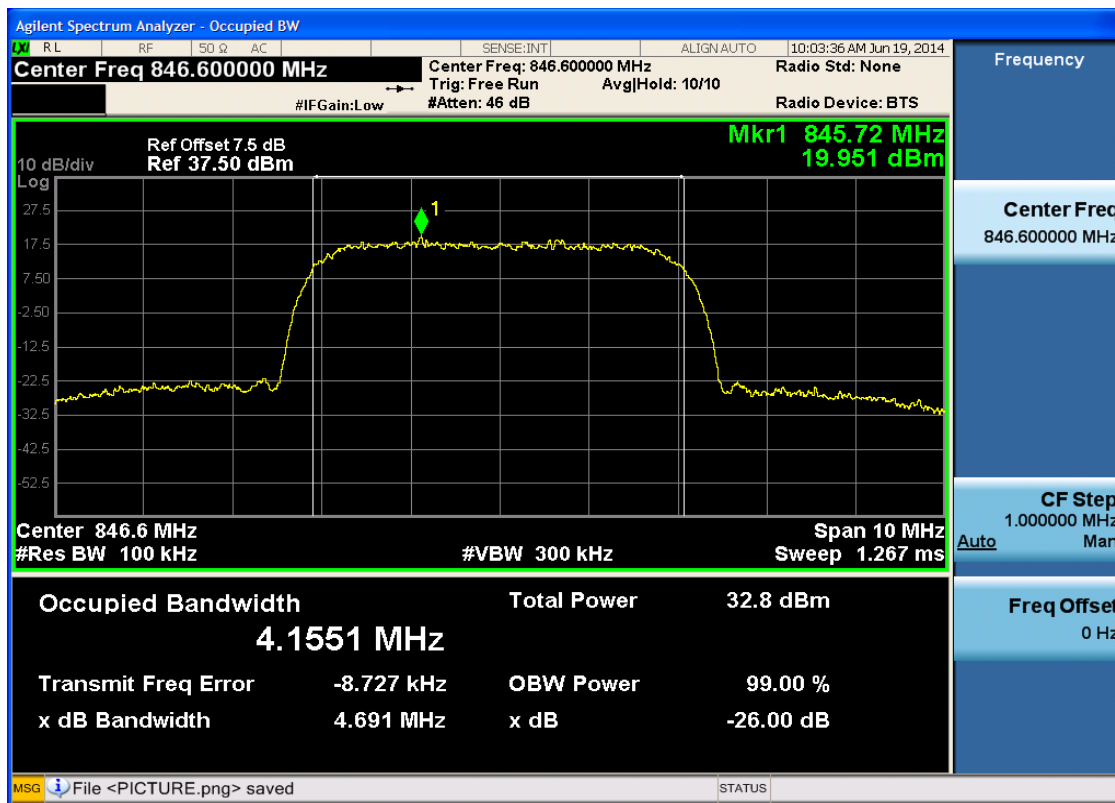


4.2.1.1.2 Test Channel = MCH





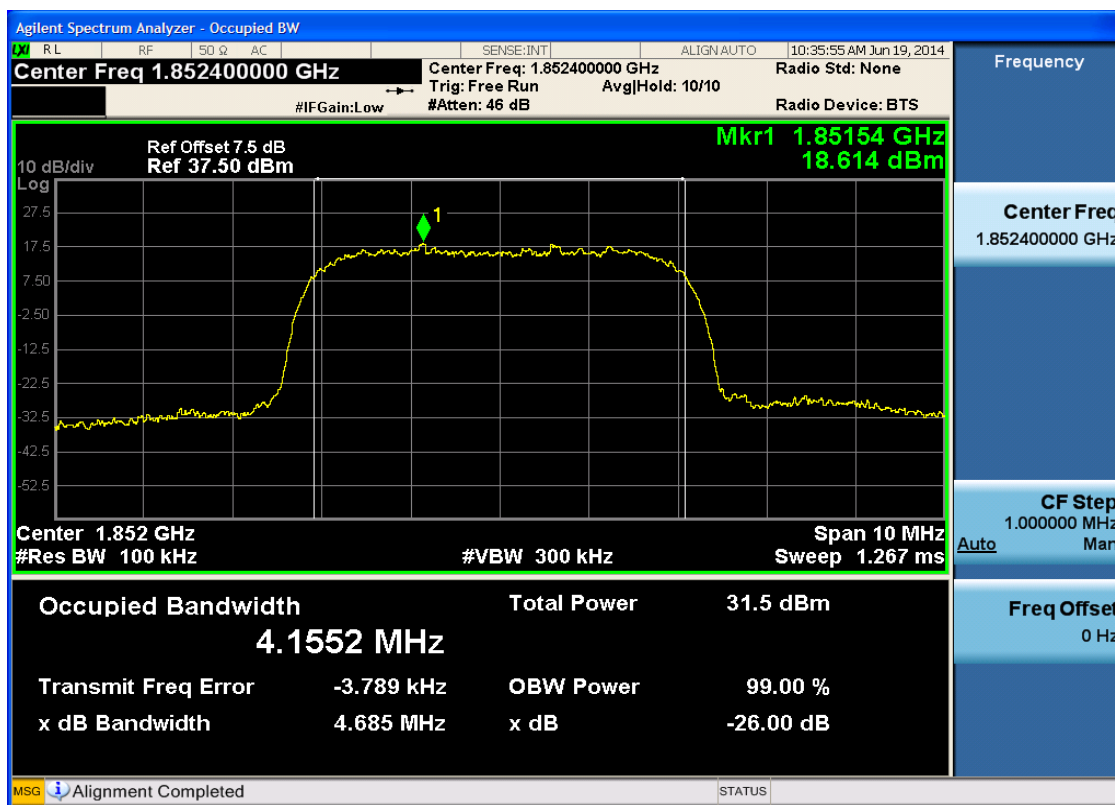
4.2.1.1.3 Test Channel = HCH



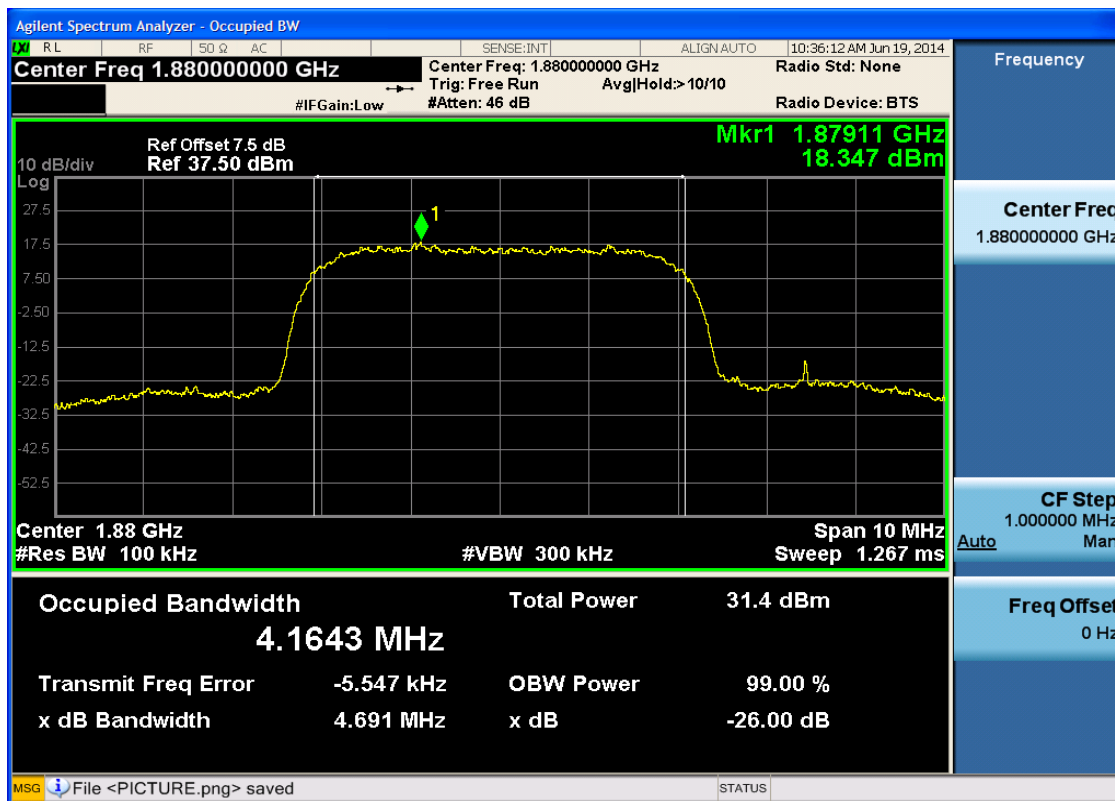
4.2.2 Test Band = WCDMA1900

4.2.2.1 Test Mode = UMTS/TM1

4.2.2.1.1 Test Channel = LCH

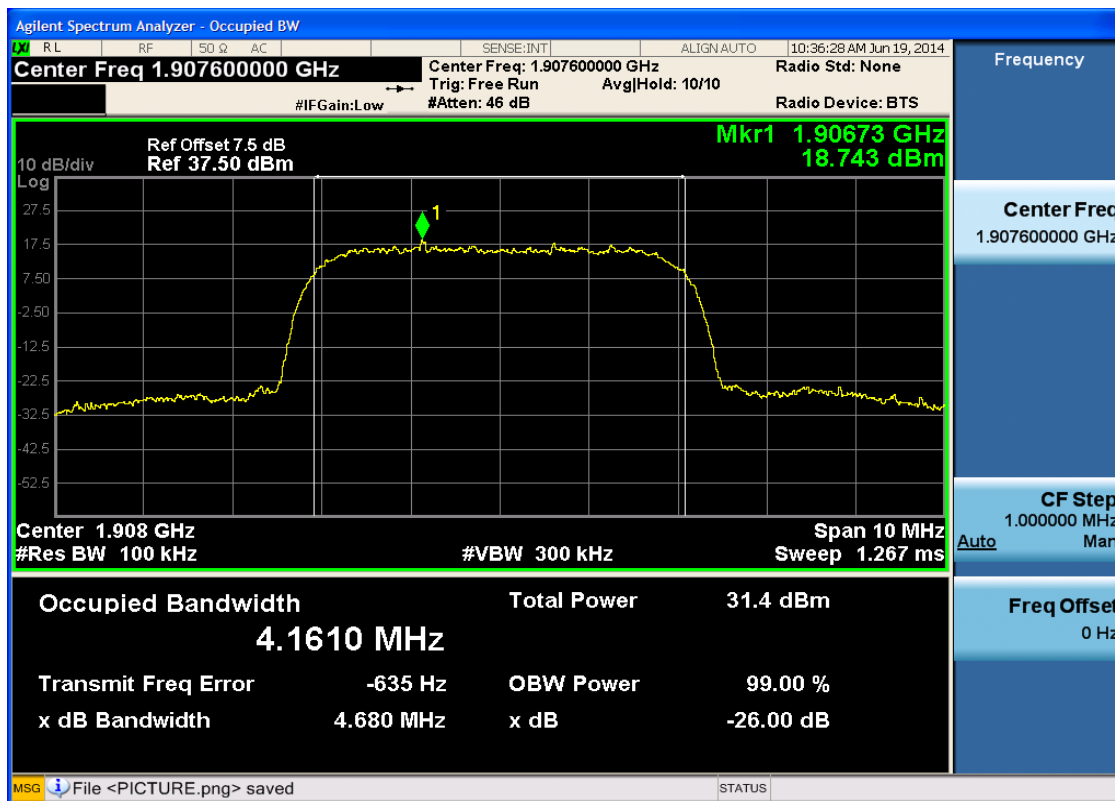


4.2.2.1.2 Test Channel = MCH





4.2.2.1.3 Test Channel = HCH



5Appendix_E: Band Edges Compliance

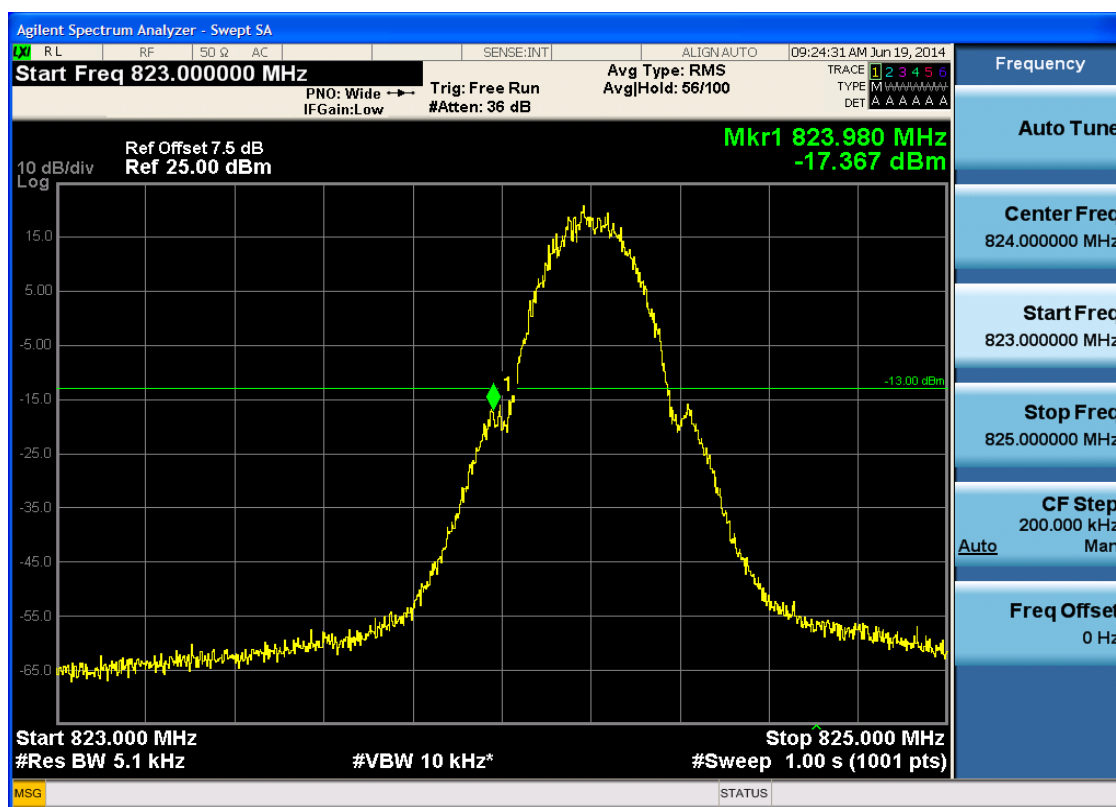
Part I - Test Plots

5.1 For GSM

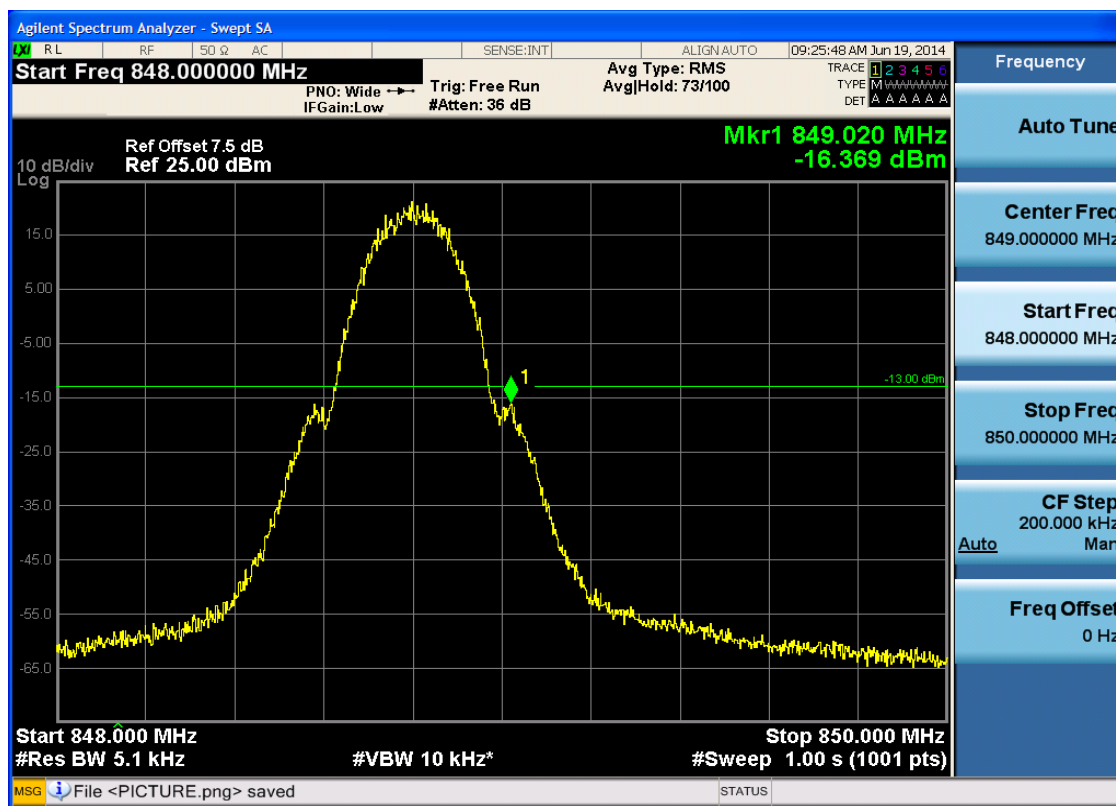
5.1.1 Test Band = GSM850

5.1.1.1 Test Mode = GSM/TM1

5.1.1.1.1 Test Channel = LCH



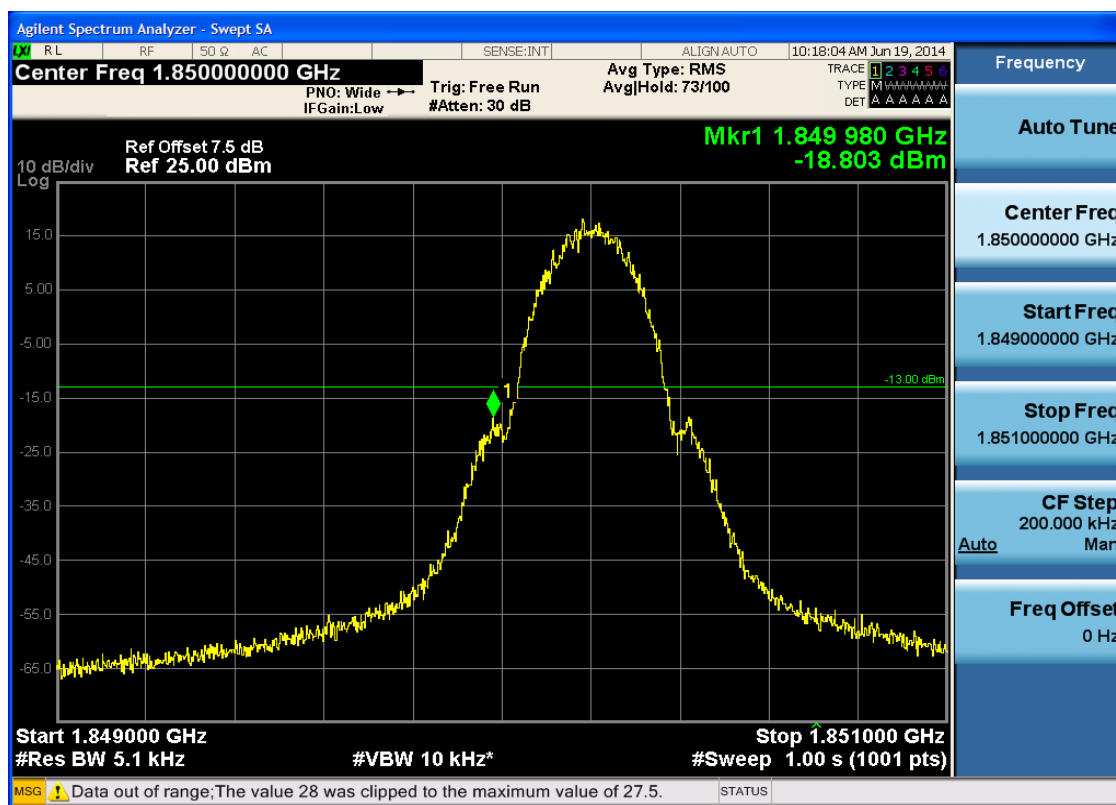
5.1.1.1.2 Test Channel = HCH



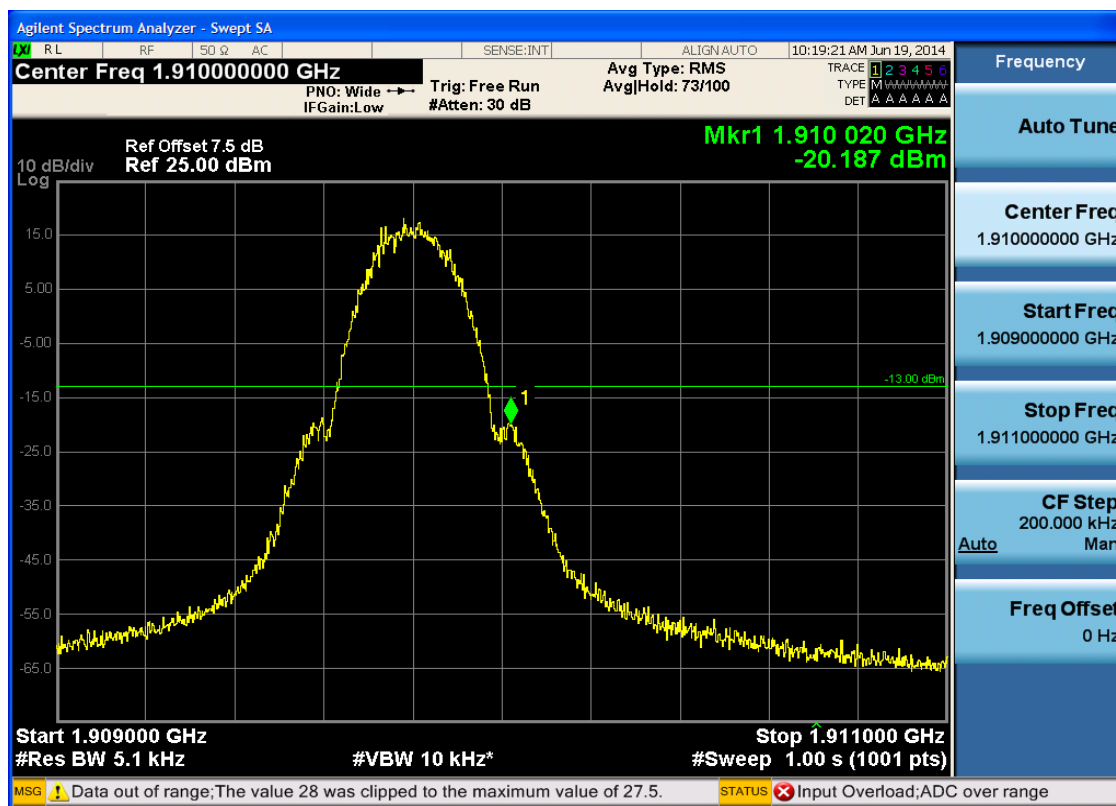
5.1.2 Test Band = GSM1900

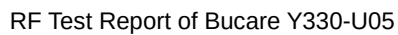
5.1.2.1 Test Mode = GSM/TM1

5.1.2.1.1 Test Channel = LCH



5.1.2.1.2 Test Channel = HCH





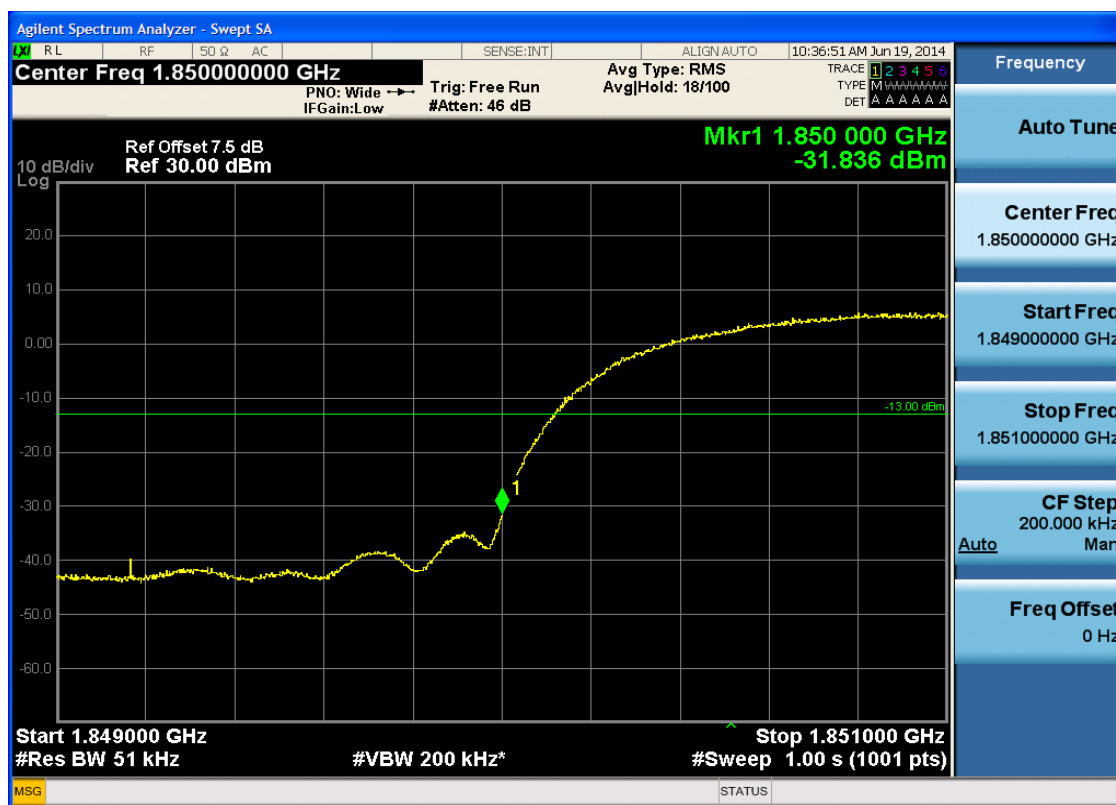
5.2.1.1.2 Test Channel = HCH



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.

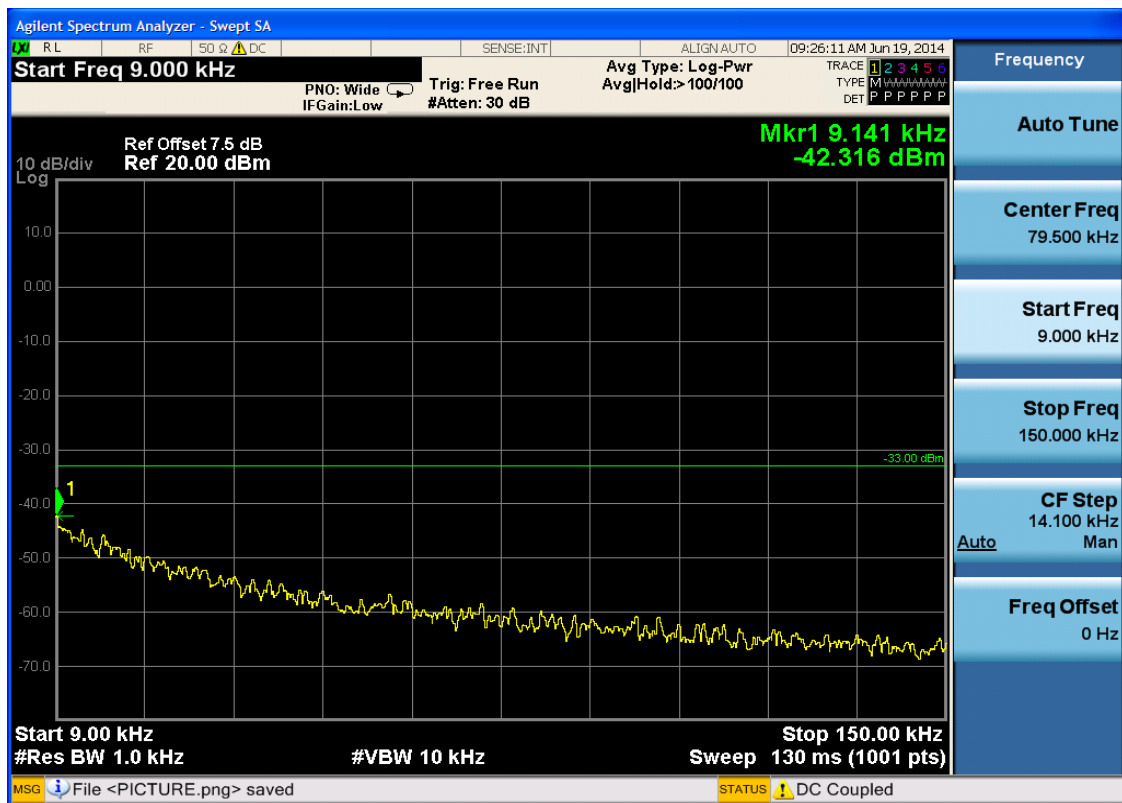
Part I - Test Plots

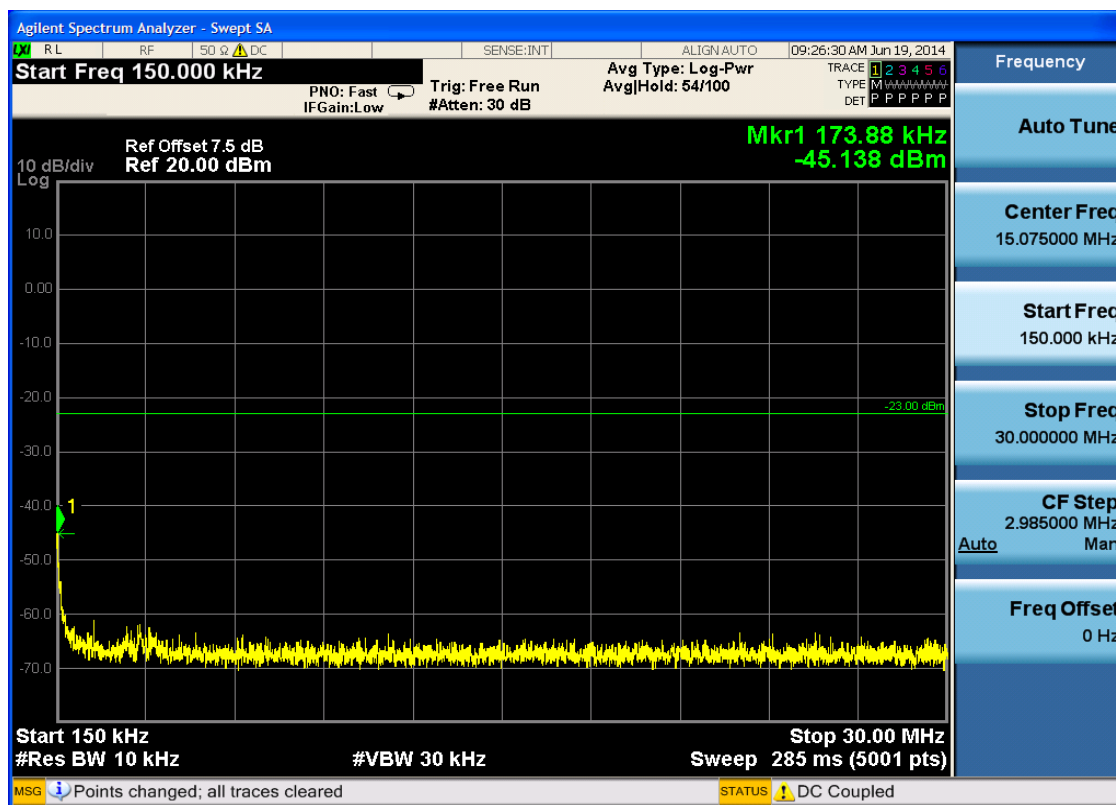
6.1 For GSM

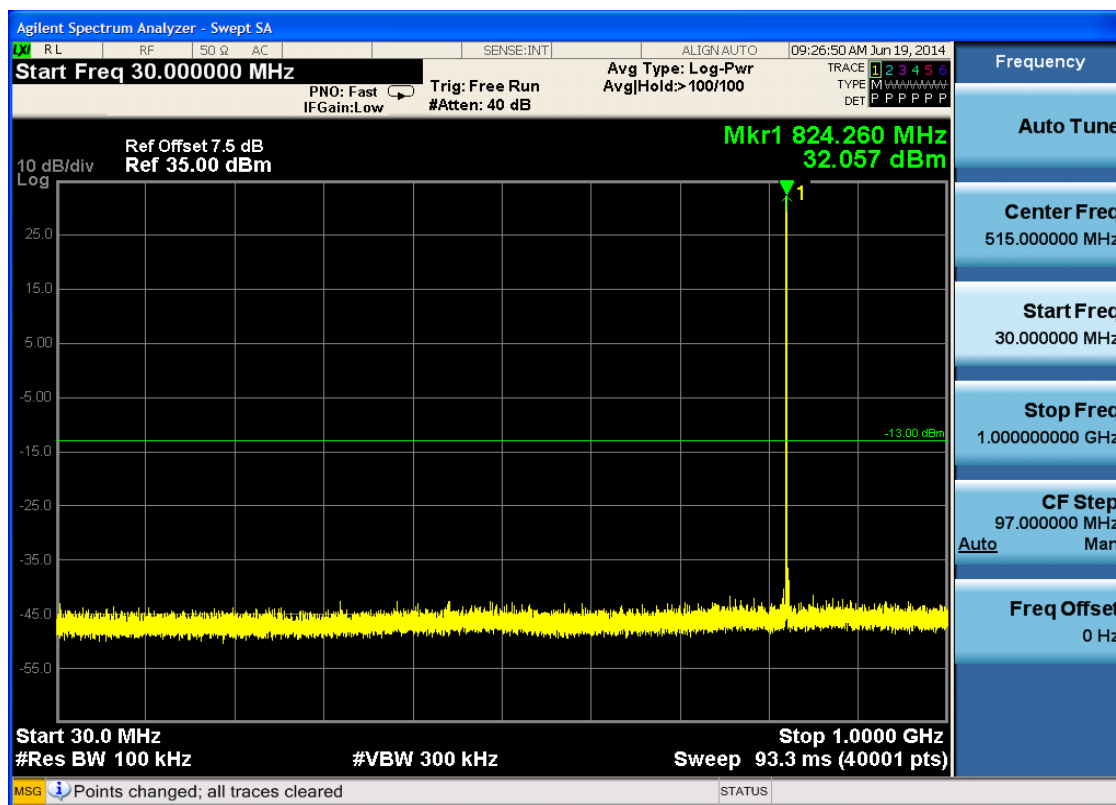
6.1.1 Test Band = GSM850

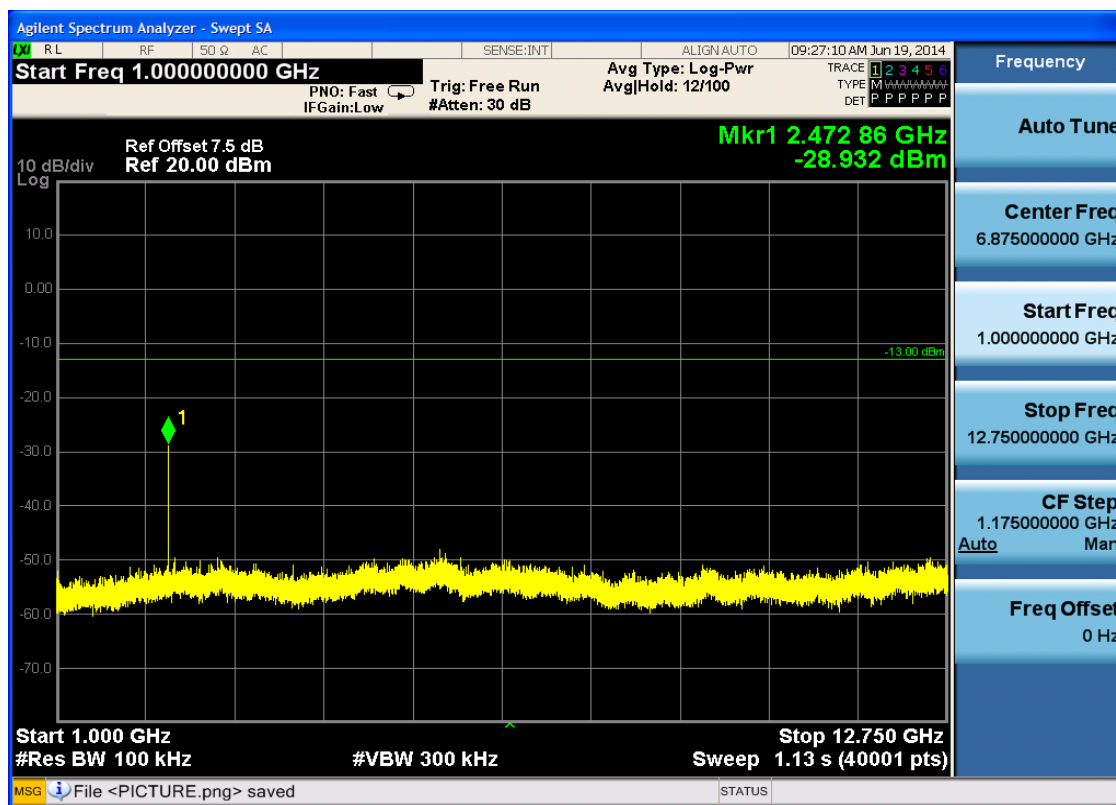
6.1.1.1 Test Mode = GSM/TM1

6.1.1.1.1 Test Channel = LCH

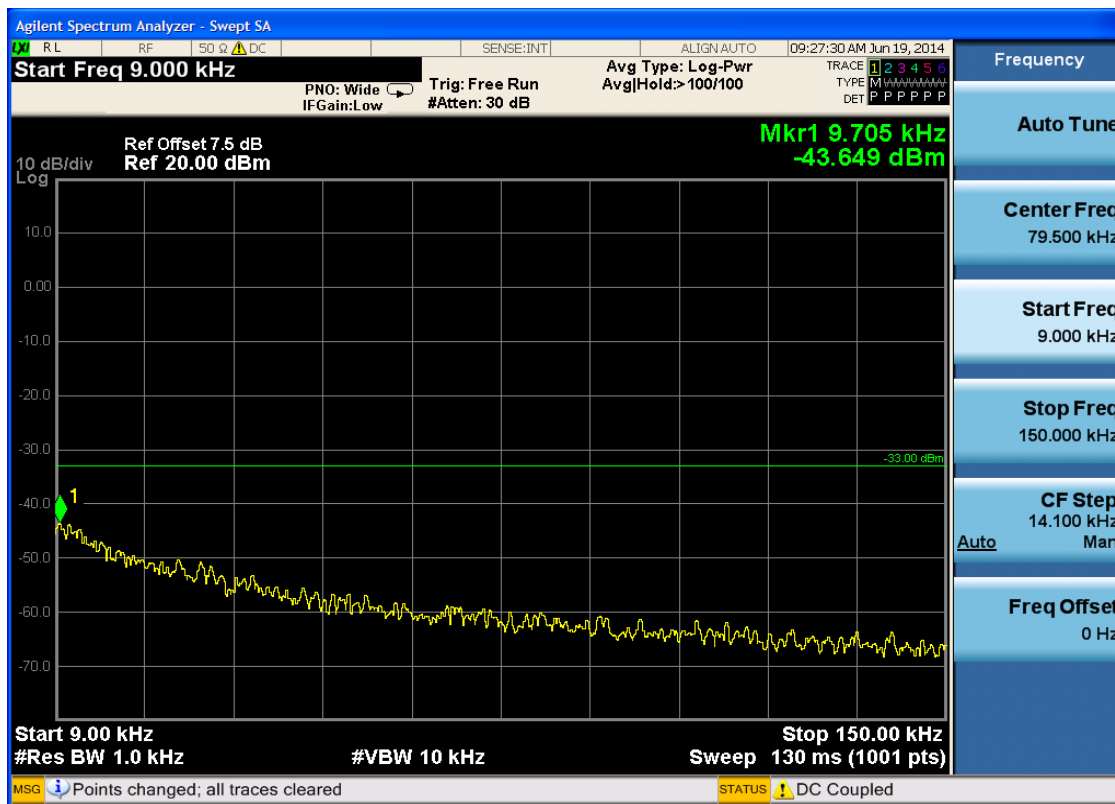


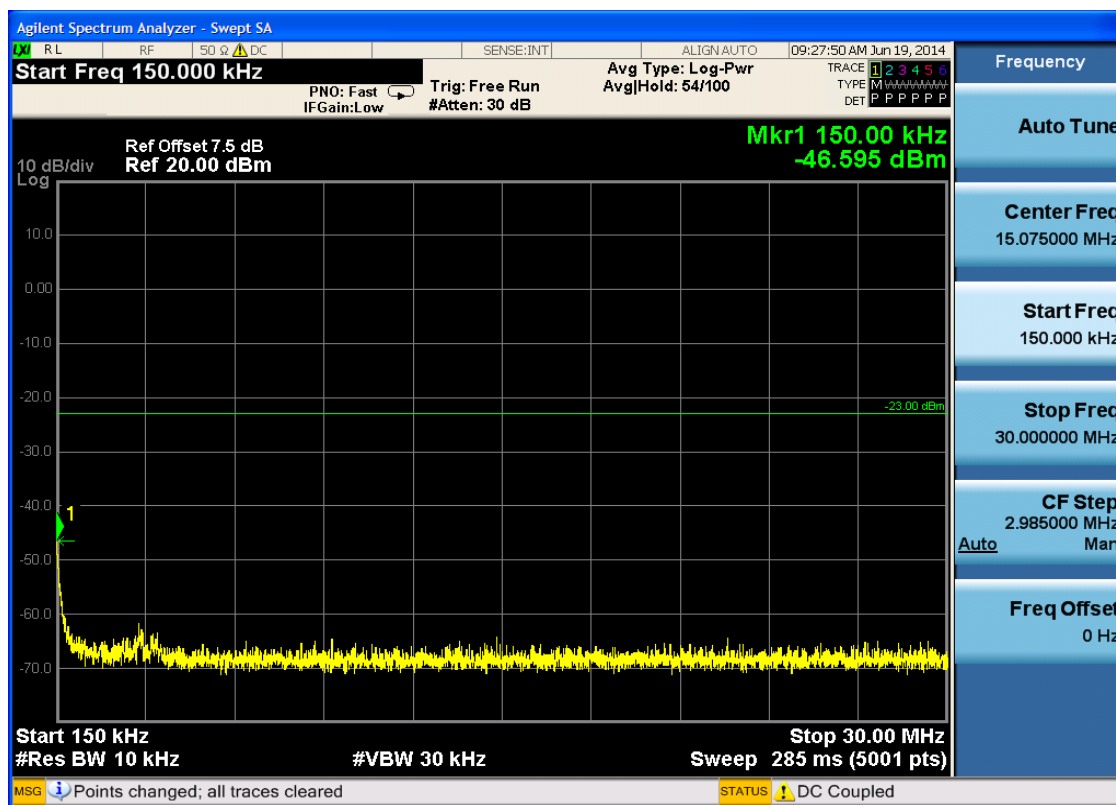


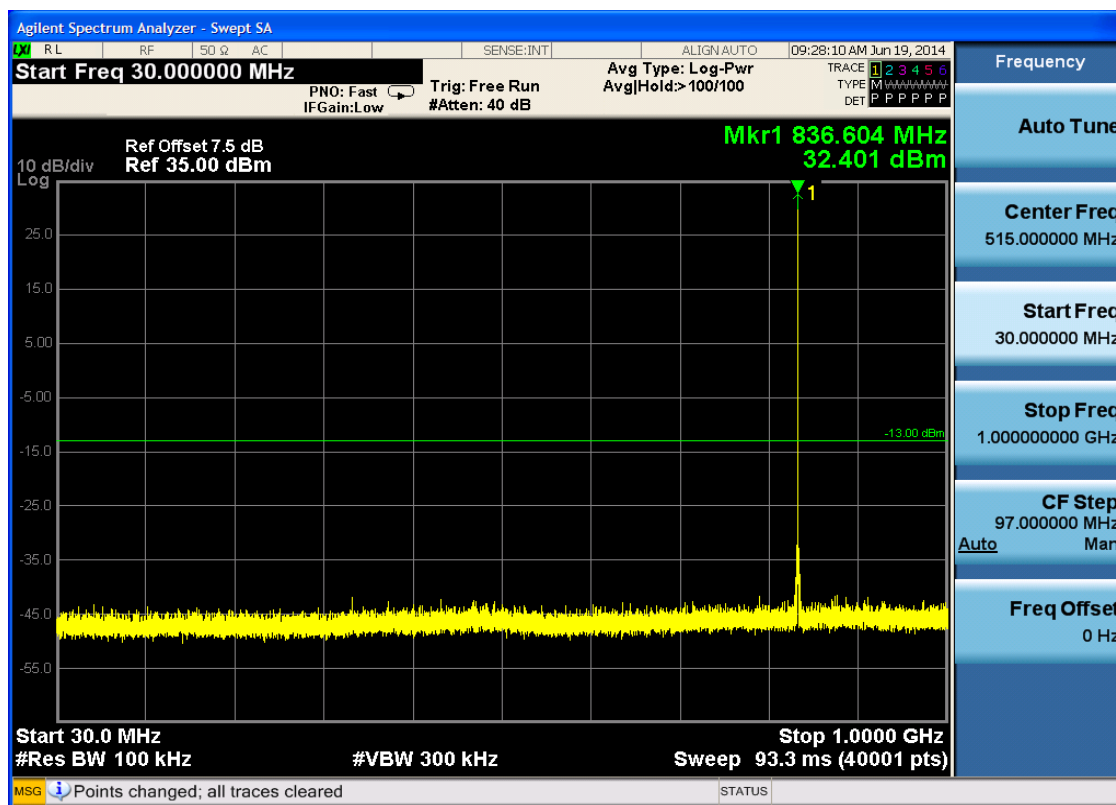


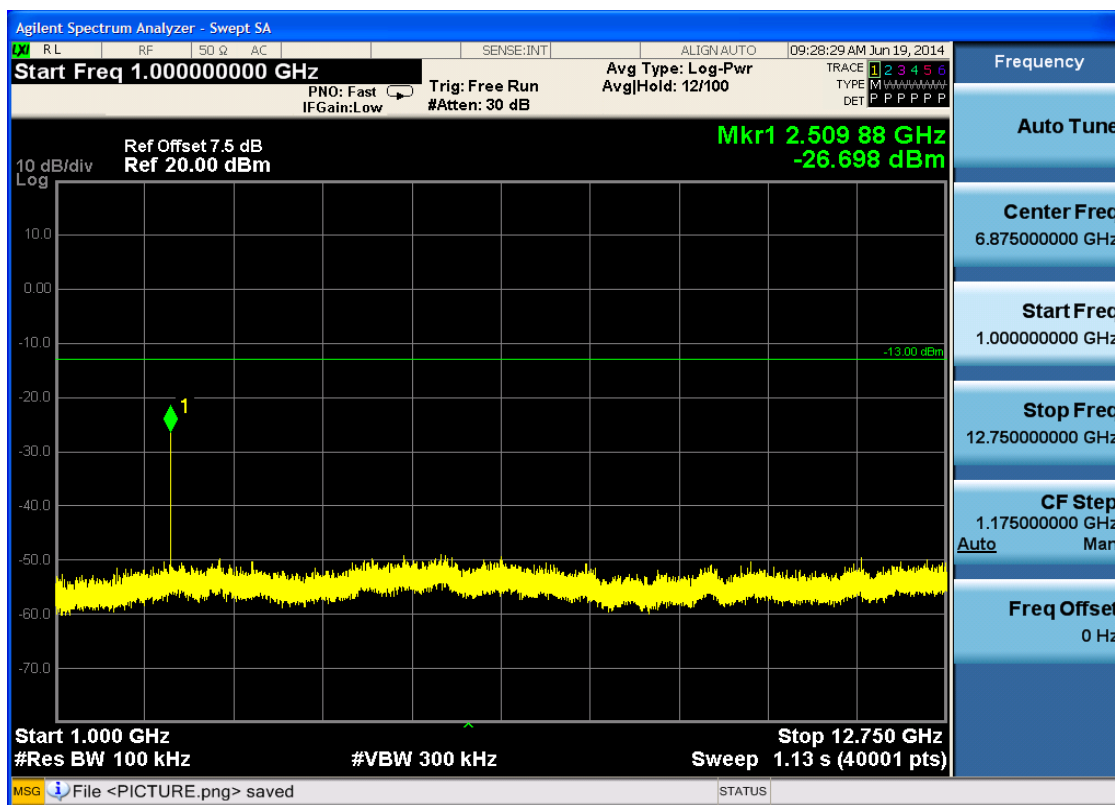


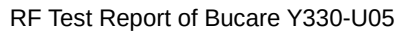
6.1.1.1.2 Test Channel = MCH











Agilent Spectrum Analyzer - Swept SA

Z F R L	RF	50 Ω DC		SENSE:INT	ALIGN AUTO	09:28:50 AM Jun 19, 2014
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Start Freq 9.000 kHz PNO: Wide Trg: Free Run Avg Type: Log-Pwr
IFGain: Low #Atten: 30 dB Avg|Hold: 96/100

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

Ref Offset 7.5 dB
Ref 20.00 dBm

Mkr1 9.987 kHz
-42.922 dBm

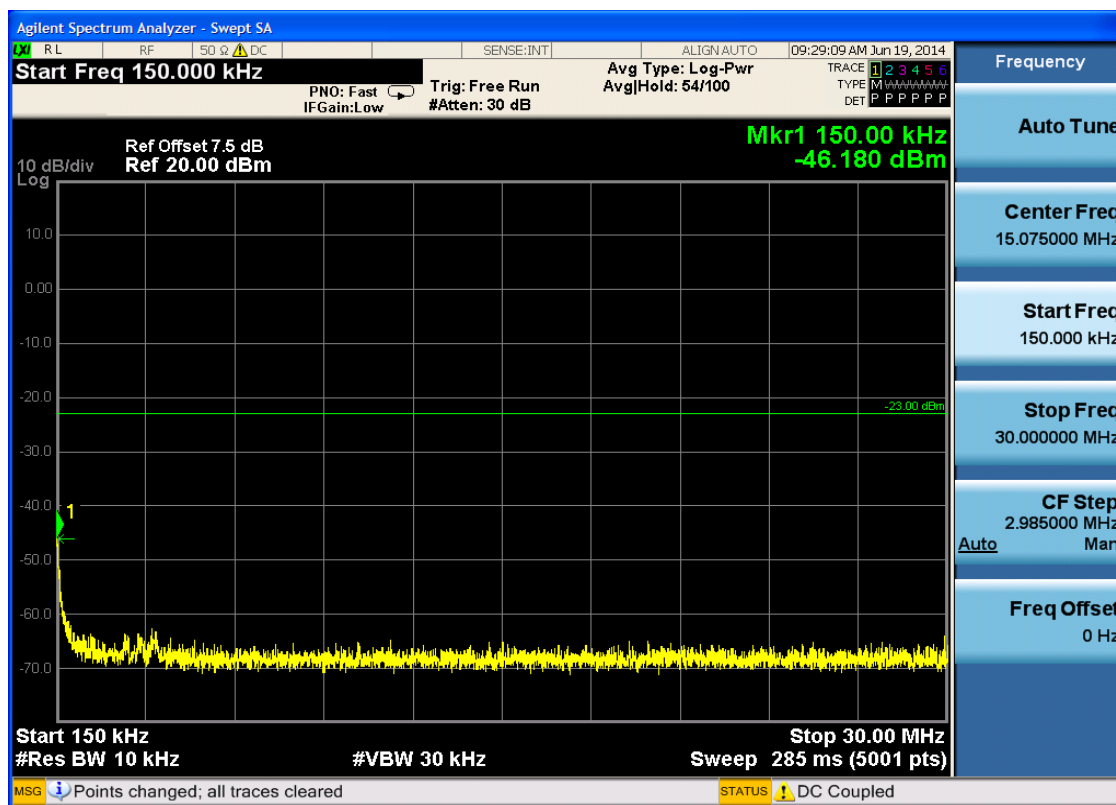
10 dB/div
Log

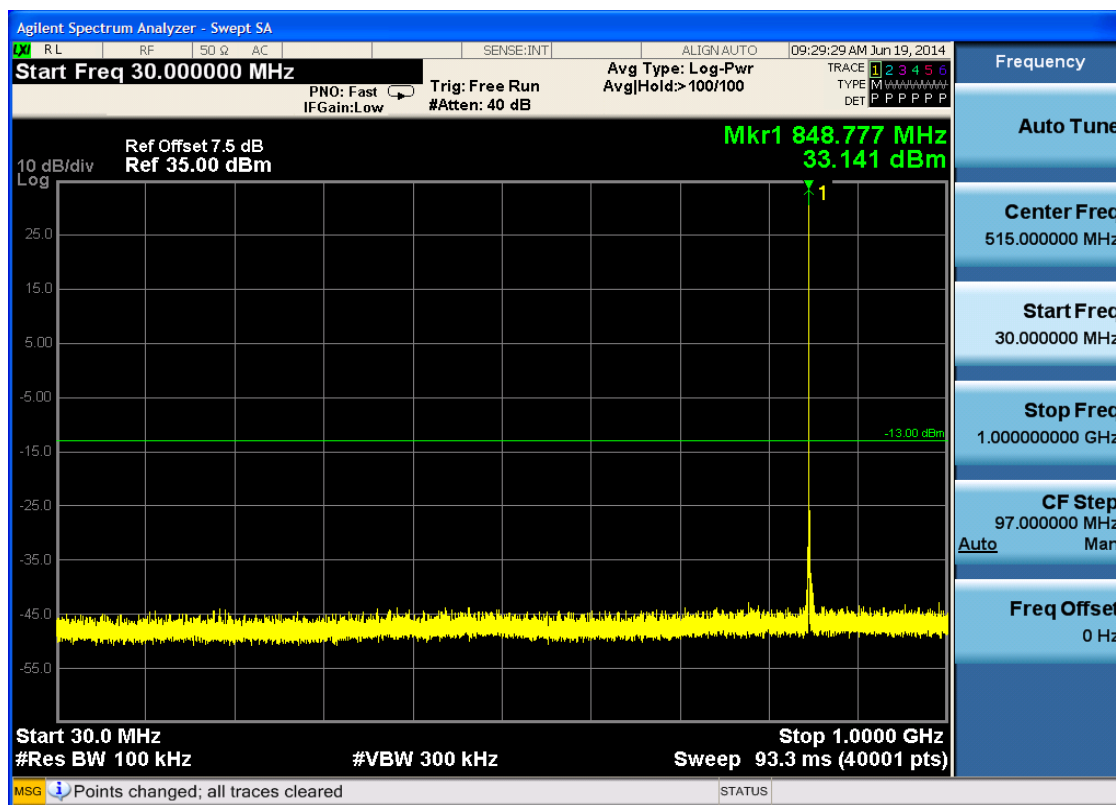
-33.00 dBm

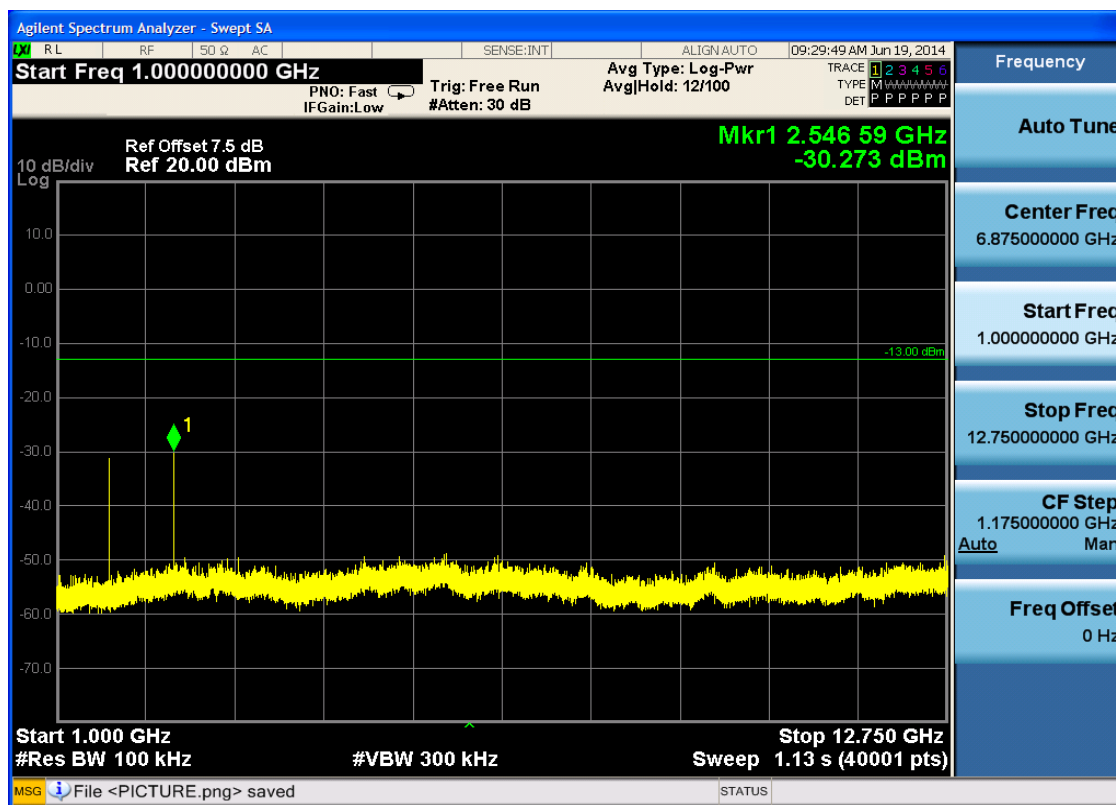
Start 9.00 kHz **Stop 150.00 kHz**
#Res BW 1.0 kHz **#VBW 10 kHz** **Sweep 130 ms (1001 pts)**

MSG Alignment Completed 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





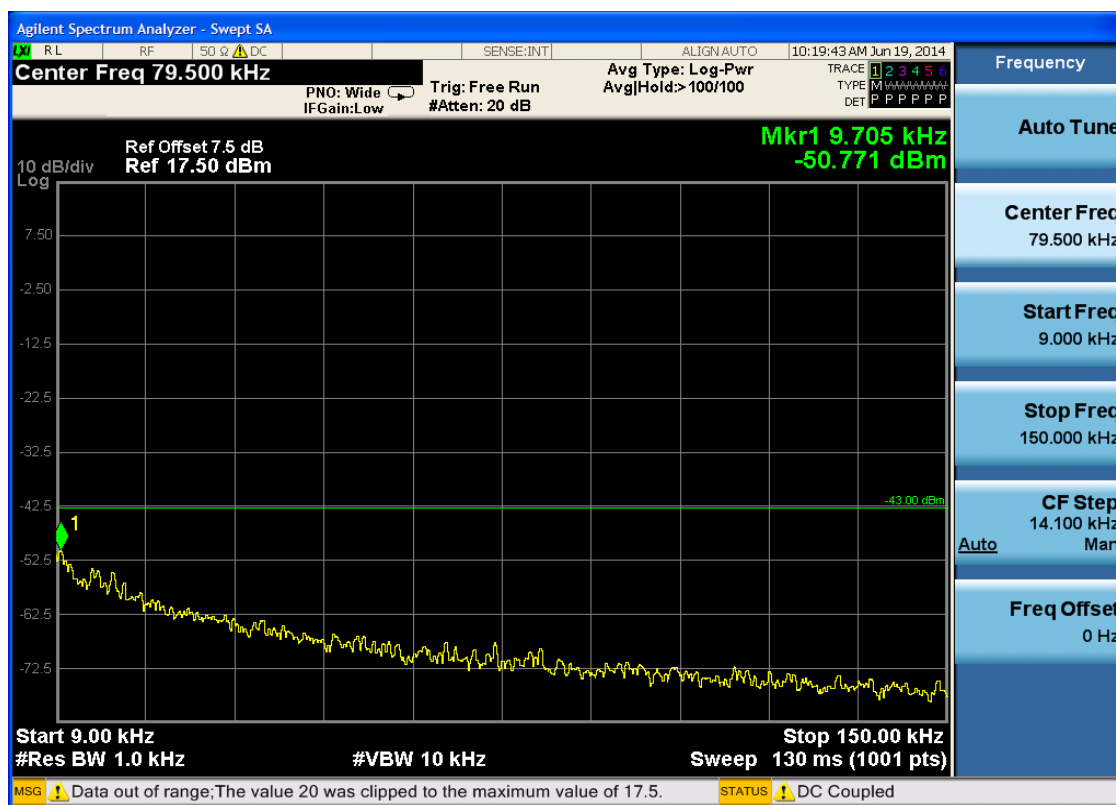


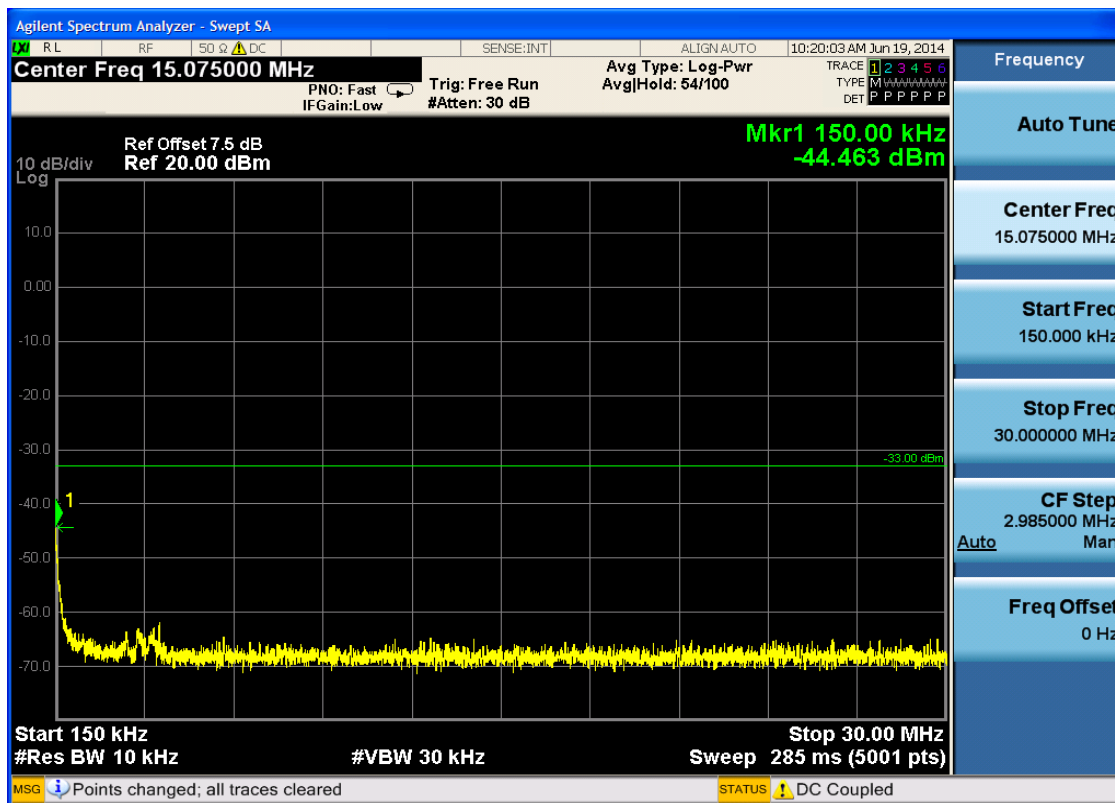


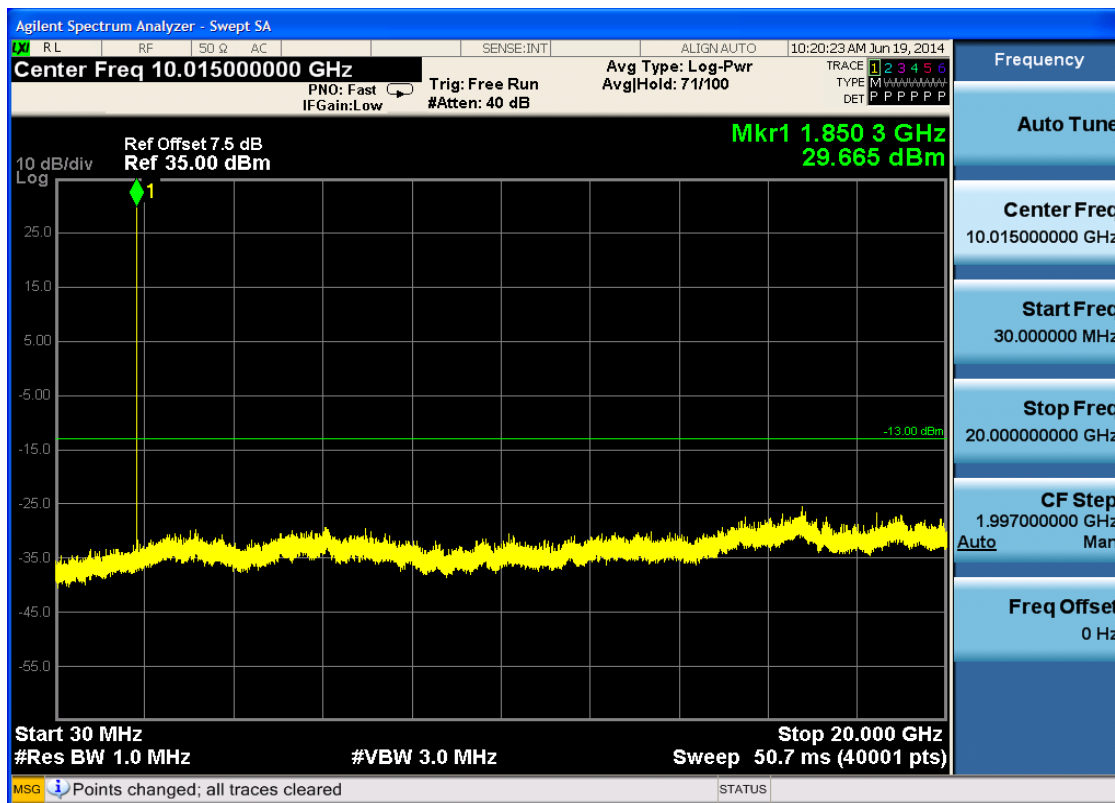
6.1.2 Test Band = GSM1900

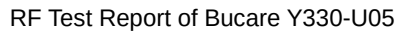
6.1.2.1 Test Mode = GSM/TM1

6.1.2.1.1 Test Channel = LCH









Agilent Spectrum Analyzer - Swept SA

R L RF 50 Ω DC SENSE:INT ALIGN AUTO 10:20:43 AM Jun 19, 2014

Center Freq 79.500 kHz

PNO: Wide IFGain:Low Trig: Free Run Avg Type: Log-Pwr AvgJHold: > 100/100

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

Ref Offset 7.5 dB
Ref 17.50 dBm

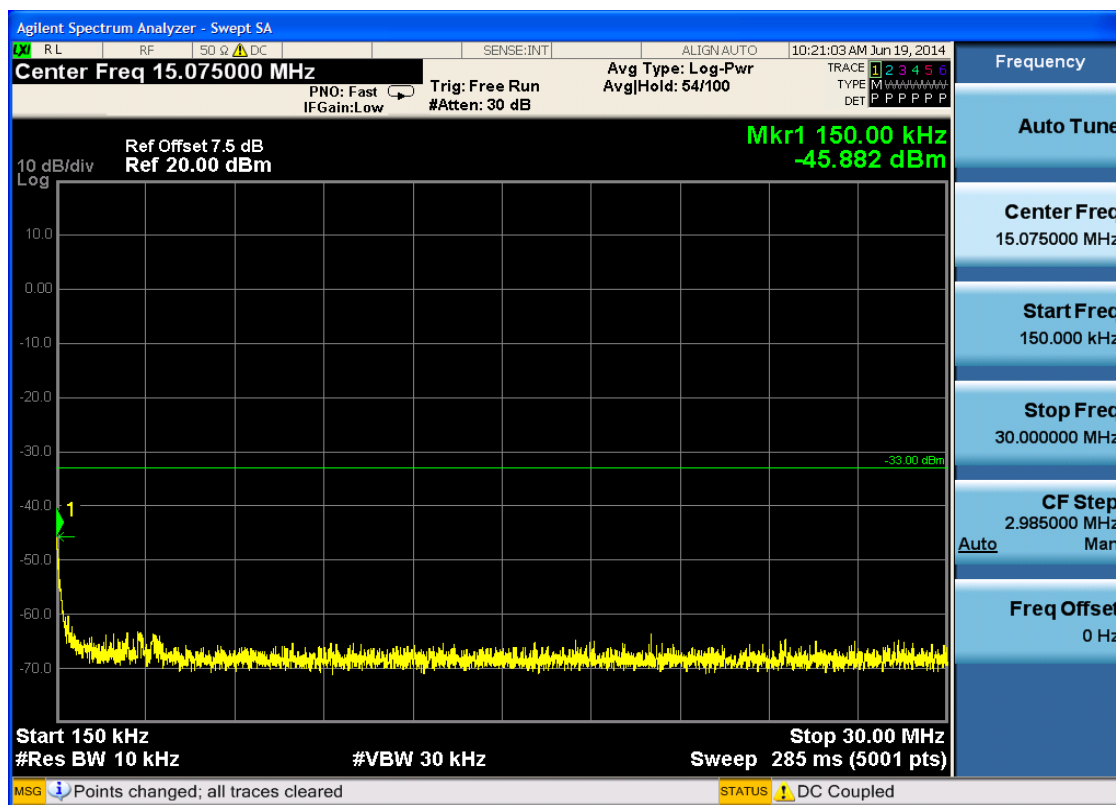
Mkr1 9.000 kHz
-52.799 dBm

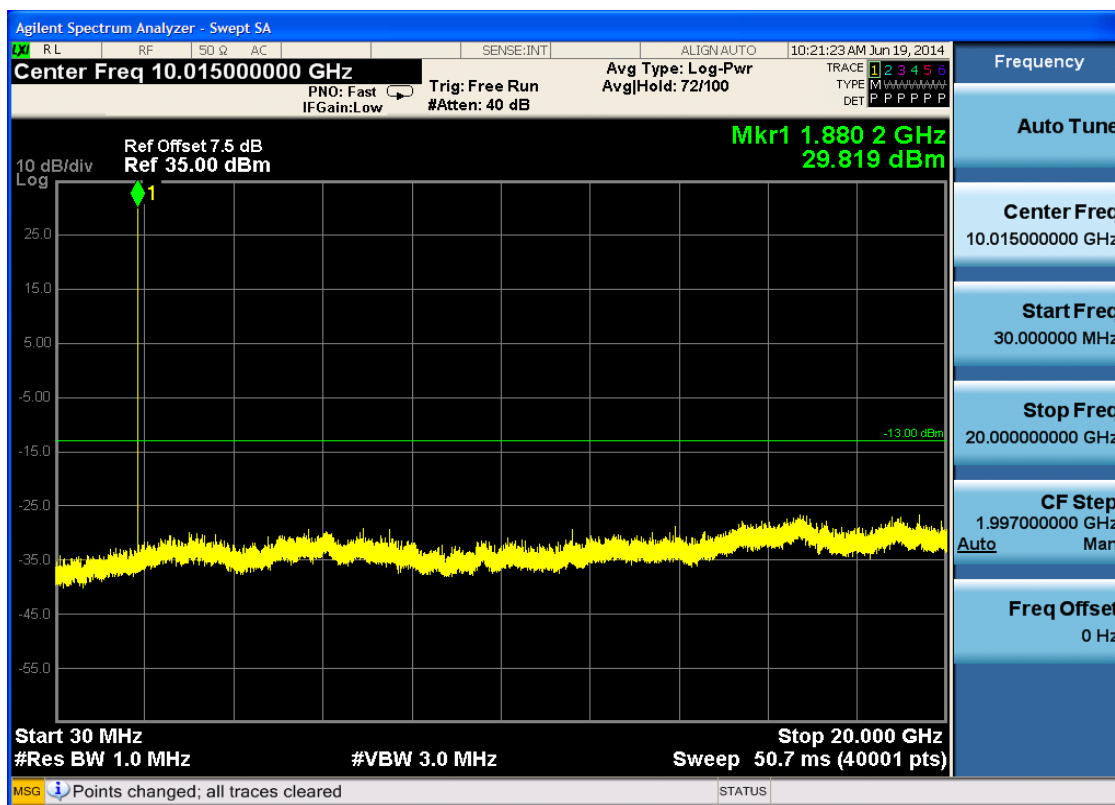
10 dB/div
Log

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

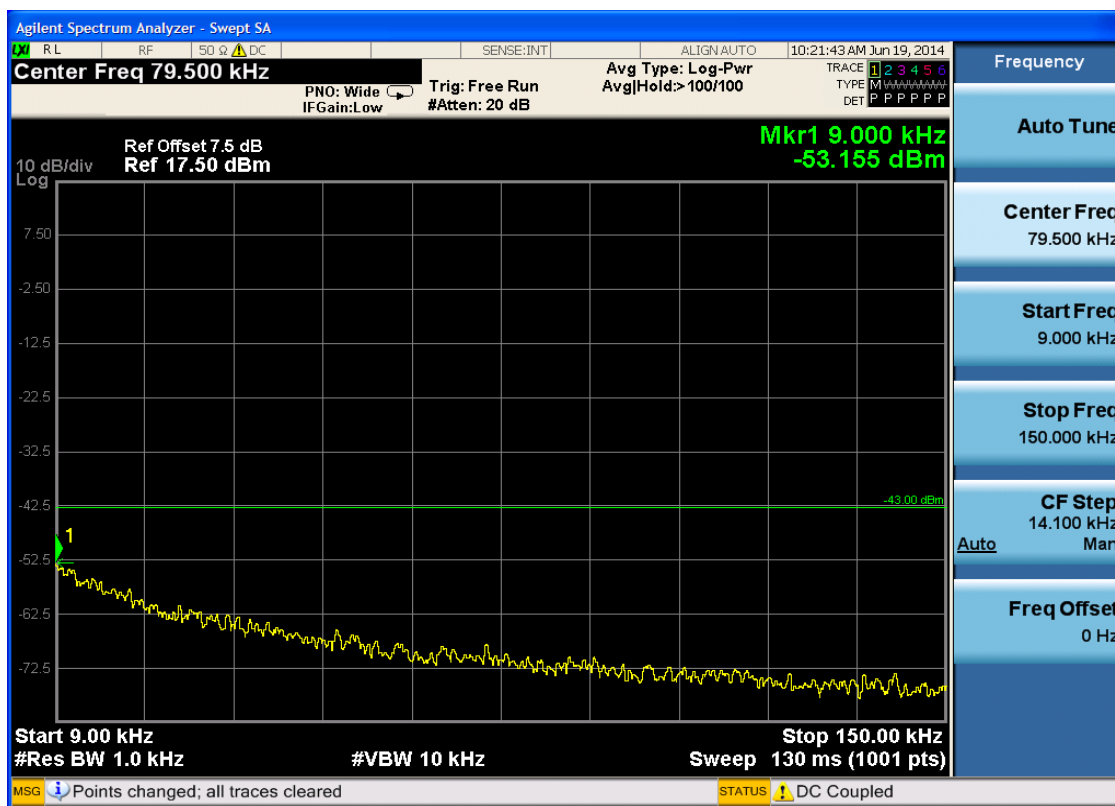
MSG Points changed; all traces cleared STATUS DC Coupled

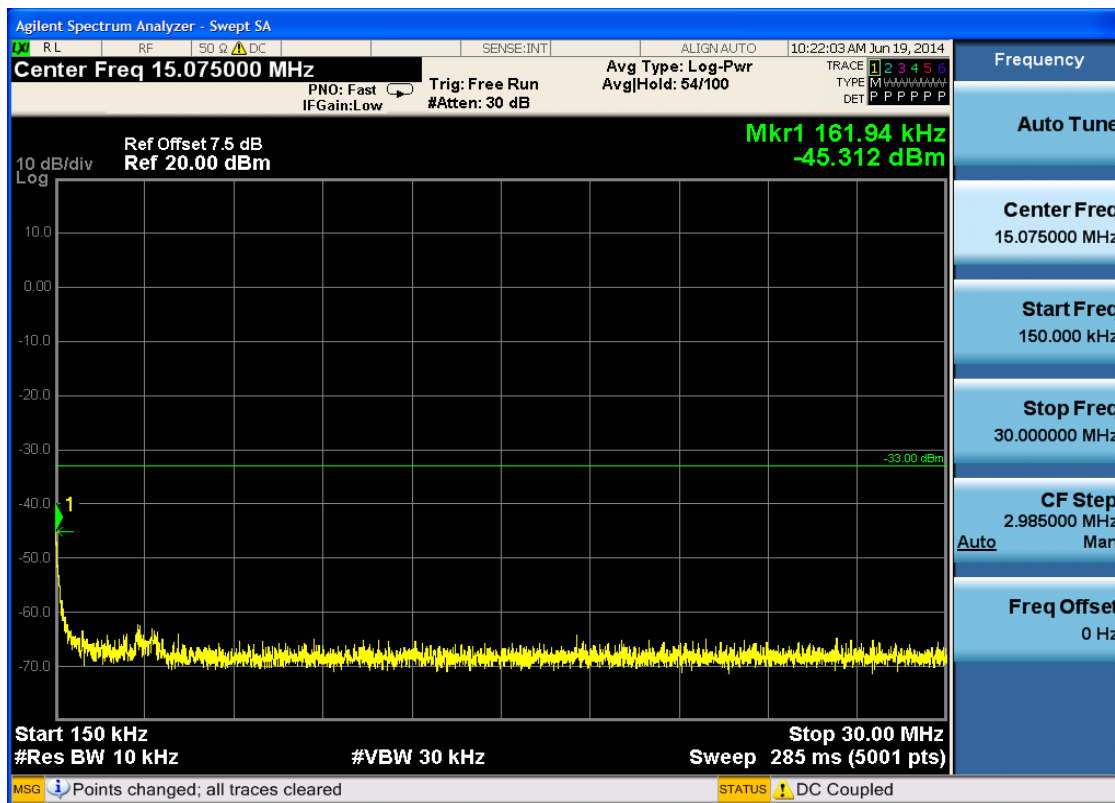
Frequency
Auto Tune
Center Freq 79.500 kHz
Start Freq 9.000 kHz
Stop Freq 150.000 kHz
CF Step 14.100 kHz Man
Auto
Freq Offset 0 Hz

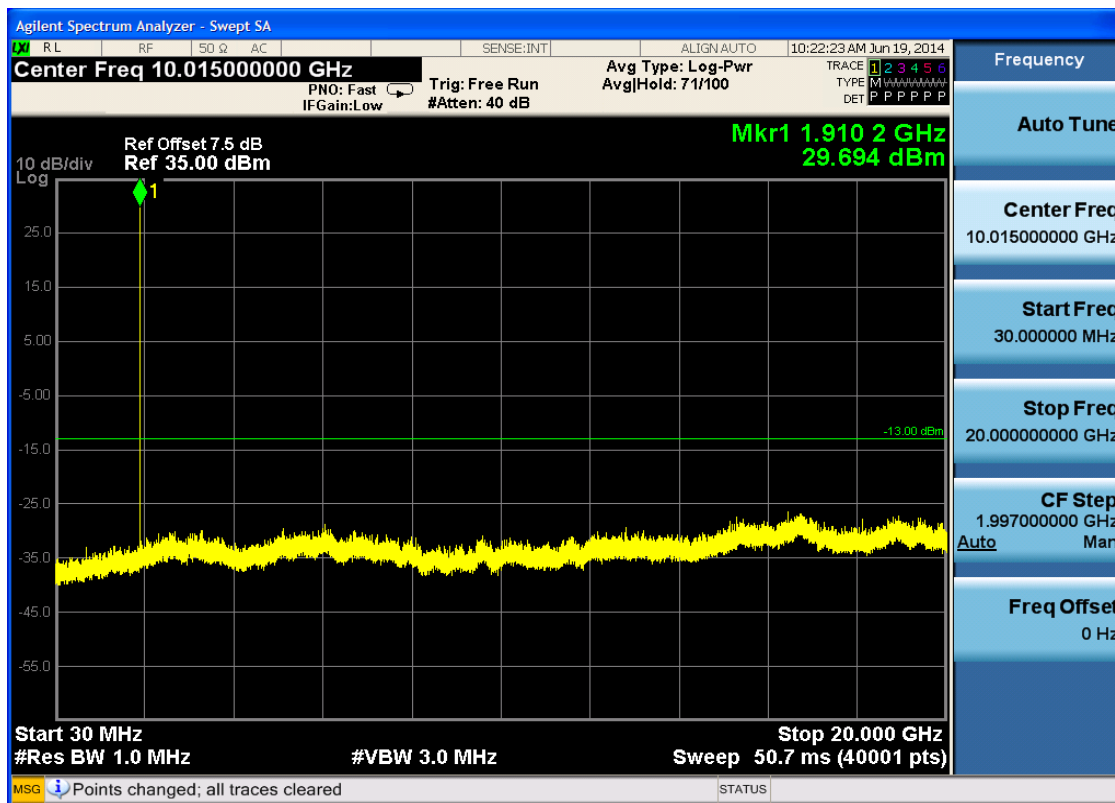




6.1.2.1.3 Test Channel = HCH





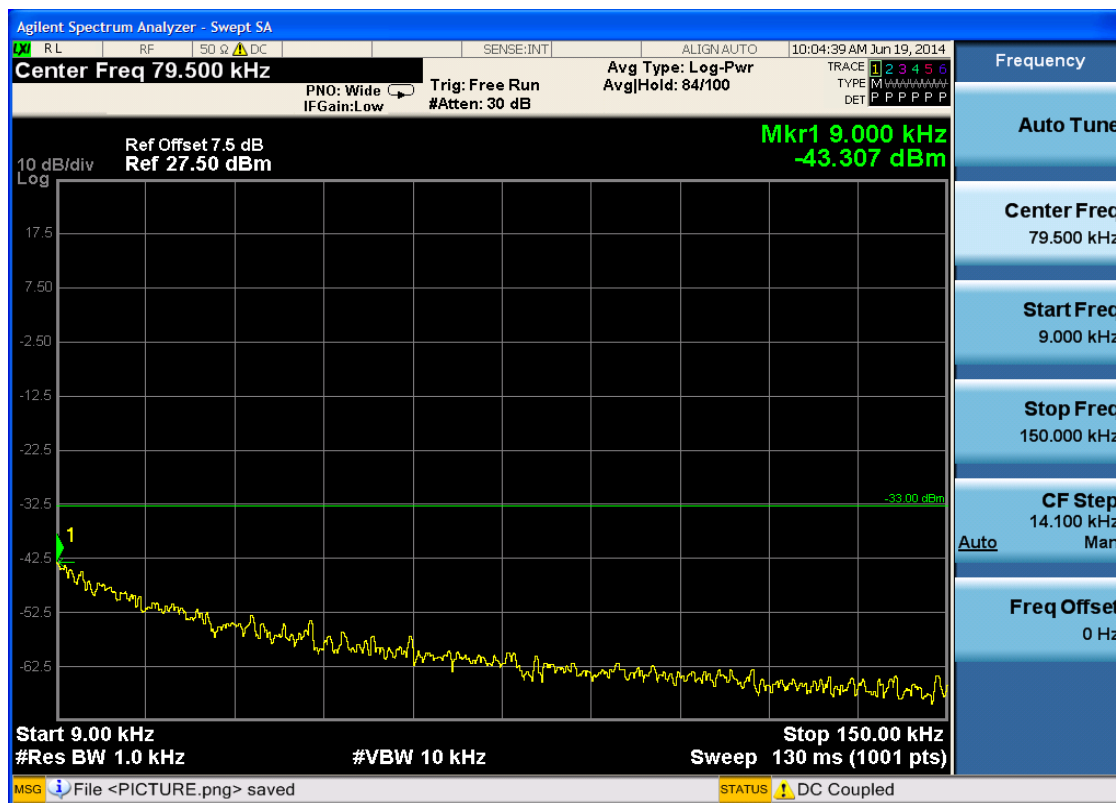


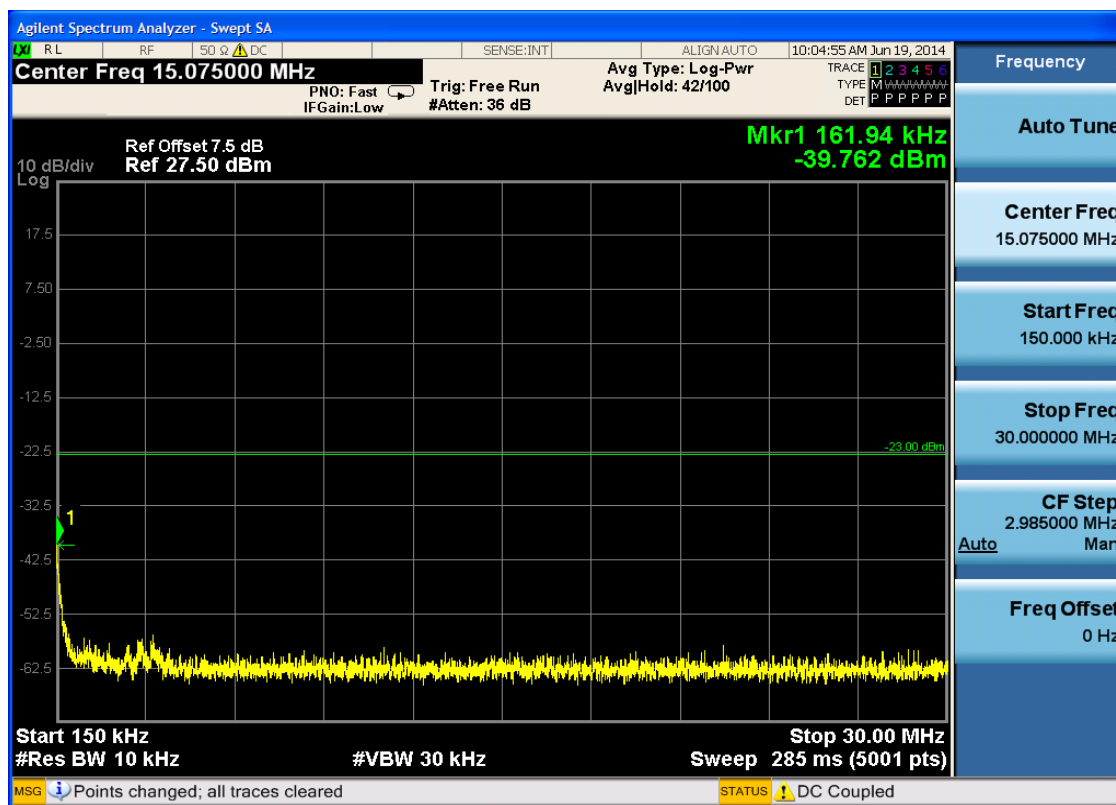
6.2 For UMTS

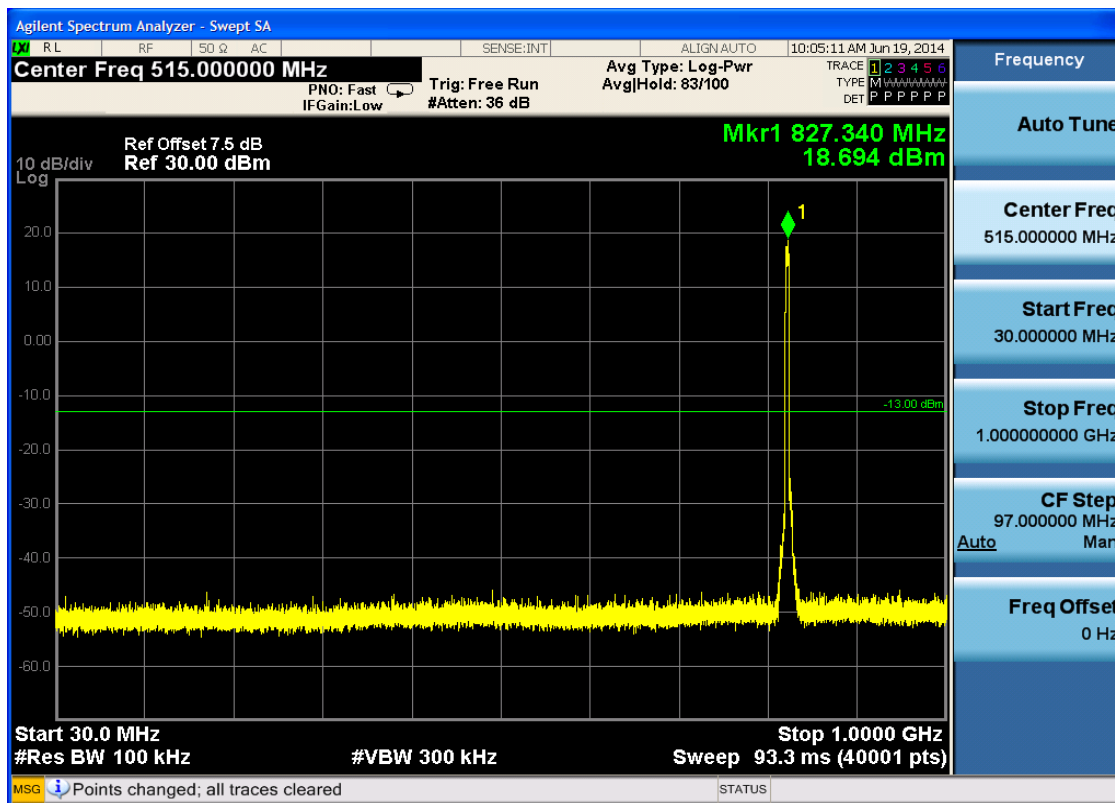
6.2.1 Test Band = WCDMA850

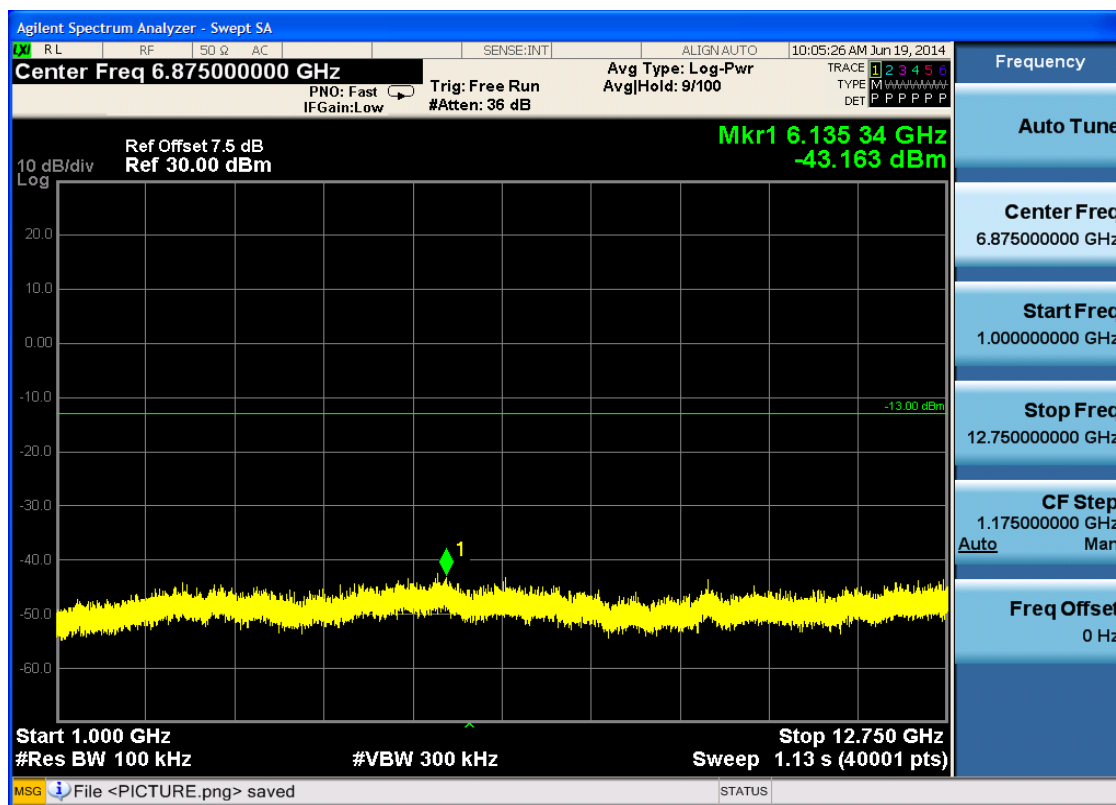
6.2.1.1 Test Mode = UMTS/TM1

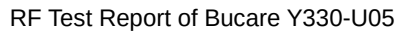
6.2.1.1.1 Test Channel = LCH











Agilent Spectrum Analyzer - Swept SA

R L RF 50 Ω DC SENSE:INT ALIGN:AUTO 10:05:43 AM Jun 19, 2014

Center Freq 79.500 kHz

PNO: Wide IFGain:Low Trig: Free Run Avg Type: Log-Pwr AvgHold: 83/100

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

Ref Offset 7.5 dB Ref 27.50 dBm

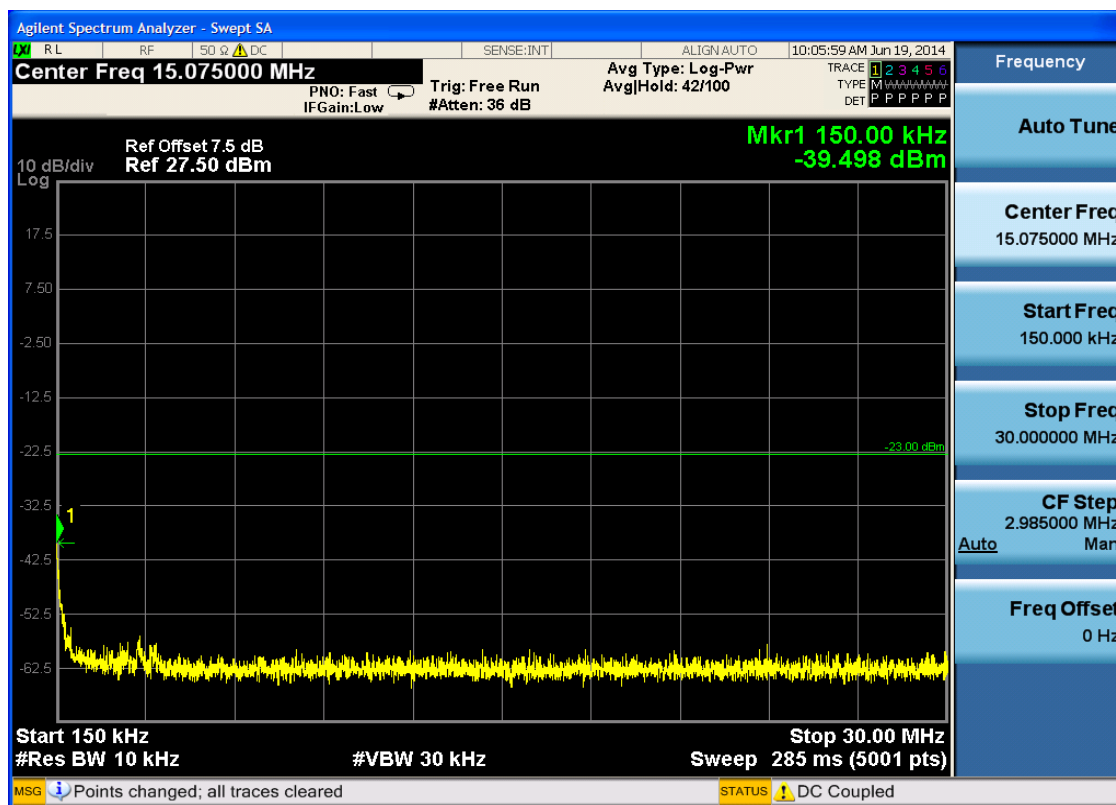
Mkr1 9.000 kHz -42.419 dBm

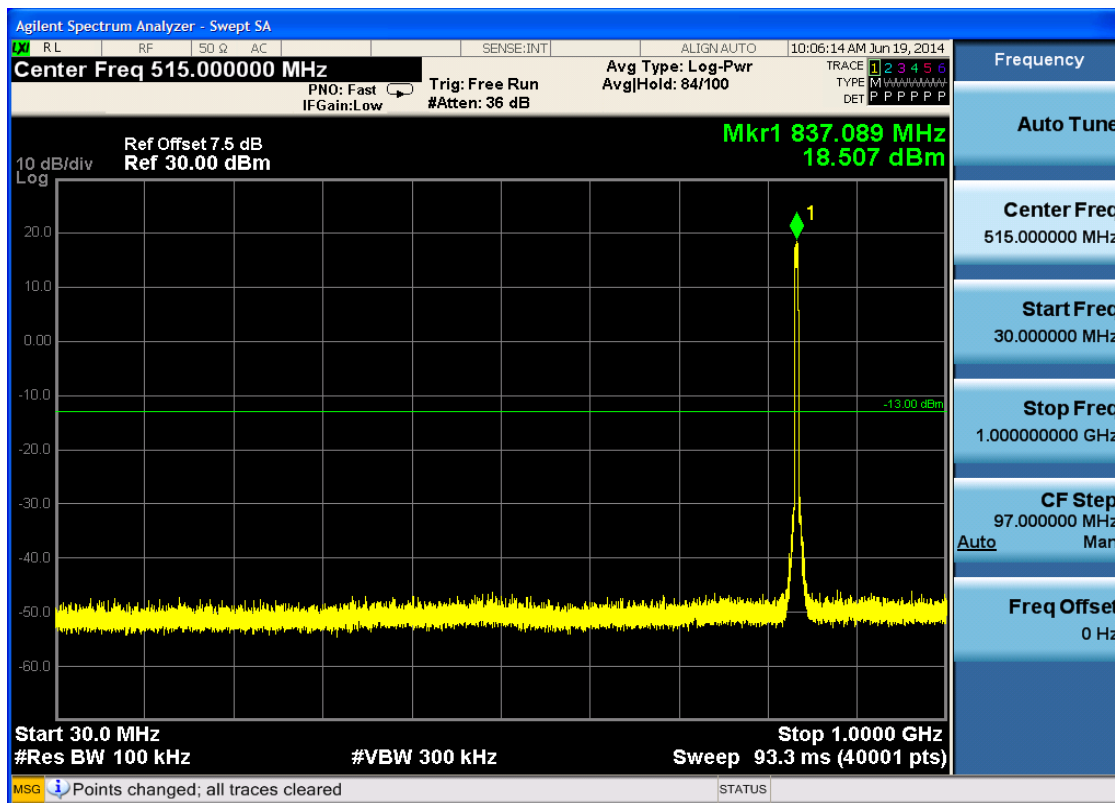
10 dB/div Log

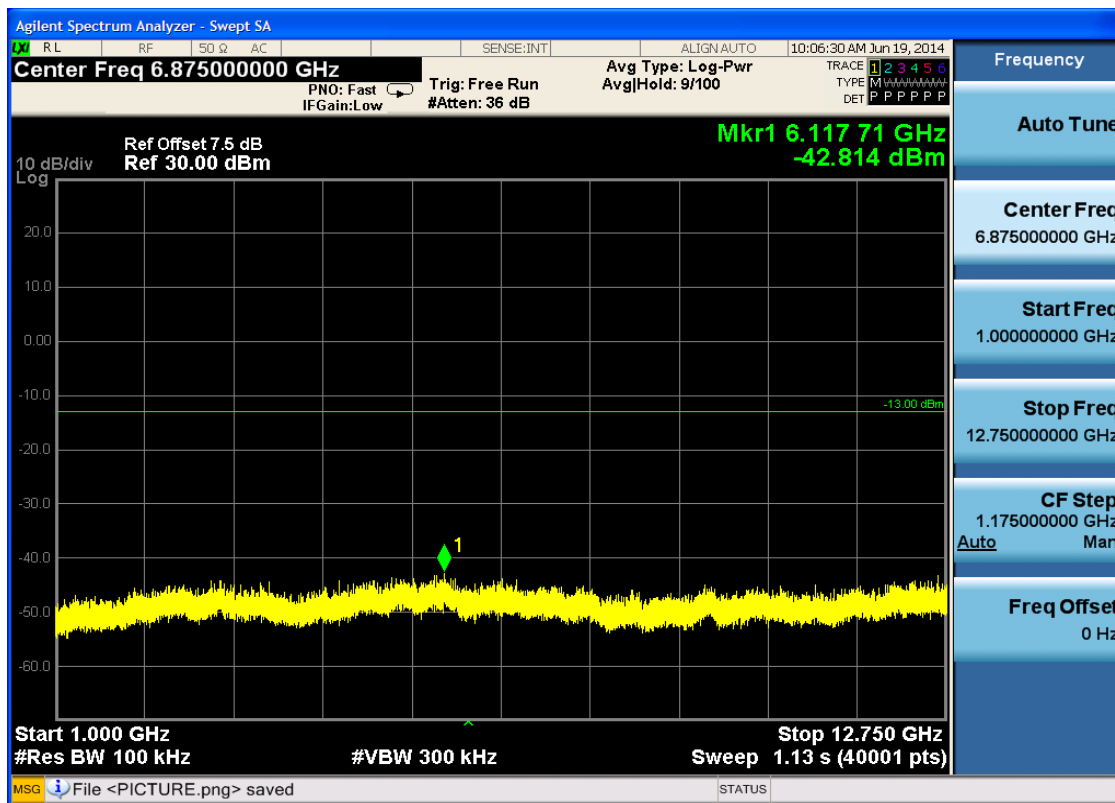
Start 9.00 kHz #Res BW 1.0 kHz #VBW 10 kHz Stop 150.00 kHz Sweep 130 ms (1001 pts)

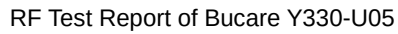
MSG Points changed; all traces cleared STATUS DC Coupled

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









Agilent Spectrum Analyzer - Swept SA

R L RF 50 Ω DC SENSE:INT ALIGN AUTO 10:06:46 AM Jun 19, 2014

Center Freq 79.500 kHz

PNO: Wide IFGain:Low Trig: Free Run #Atten: 30 dB Avg Type: Log-Pwr AvgHld: 84/100

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

Ref Offset 7.5 dB
Ref 27.50 dBm

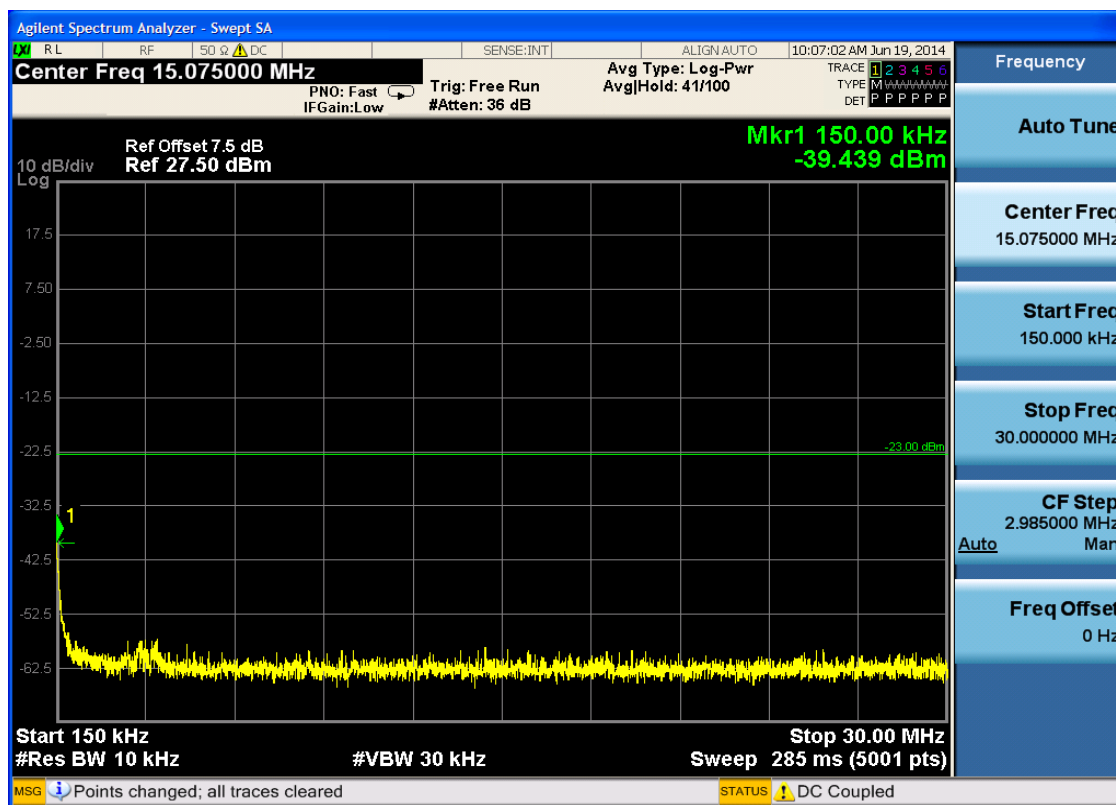
Mkr1 10.974 kHz
-43.386 dBm

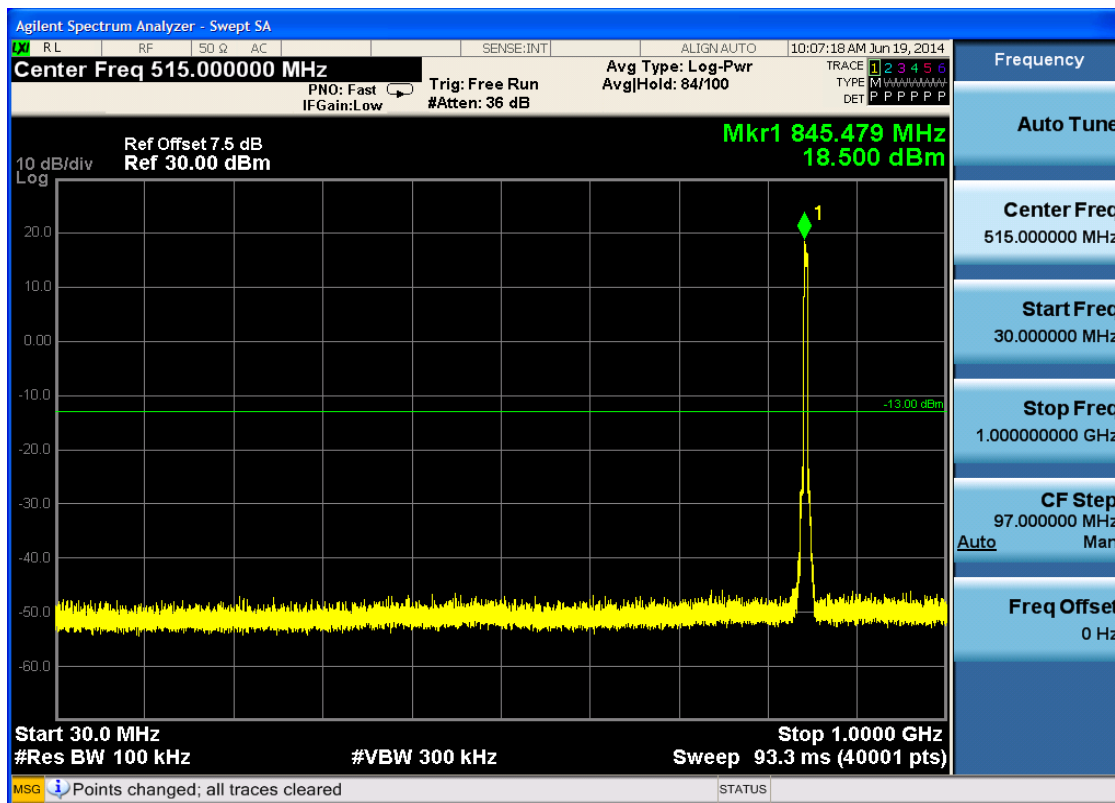
10 dB/div
Log

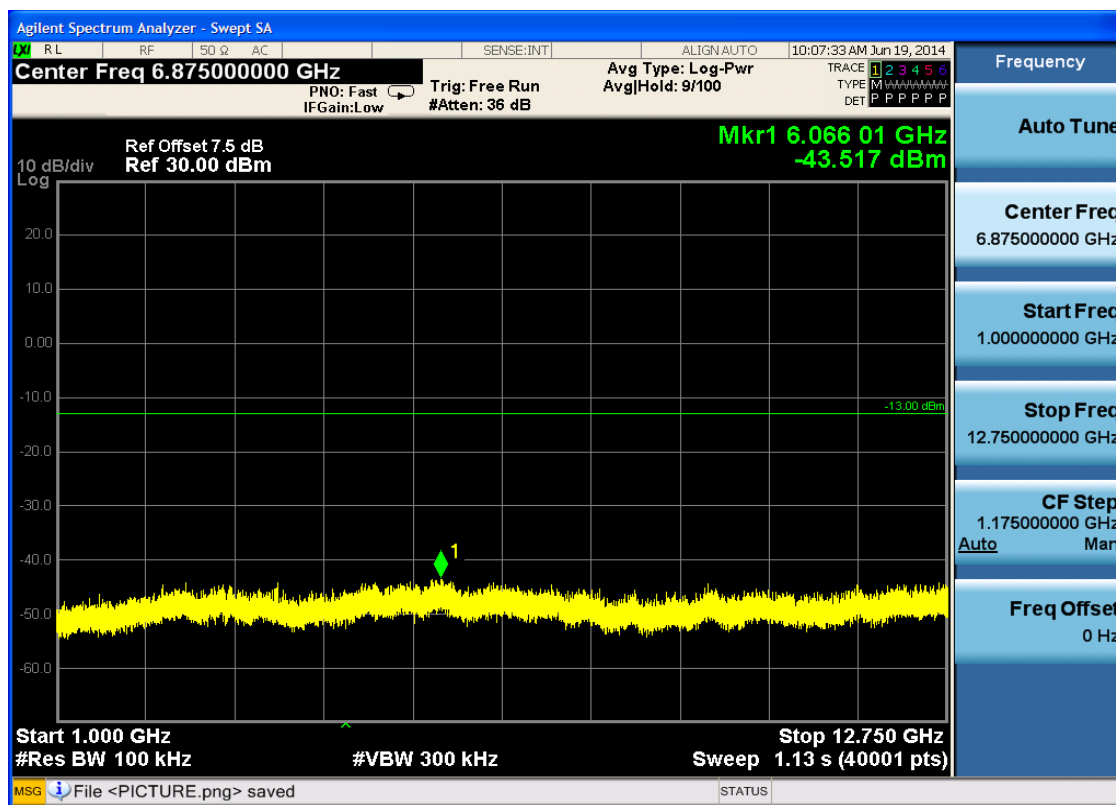
Start 9.00 kHz Stop 150.00 kHz
#Res BW 1.0 kHz #VBW 10 kHz Sweep 130 ms (1001 pts)

MSG 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 <u>Auto</u> Man
Freq Offset 0 Hz



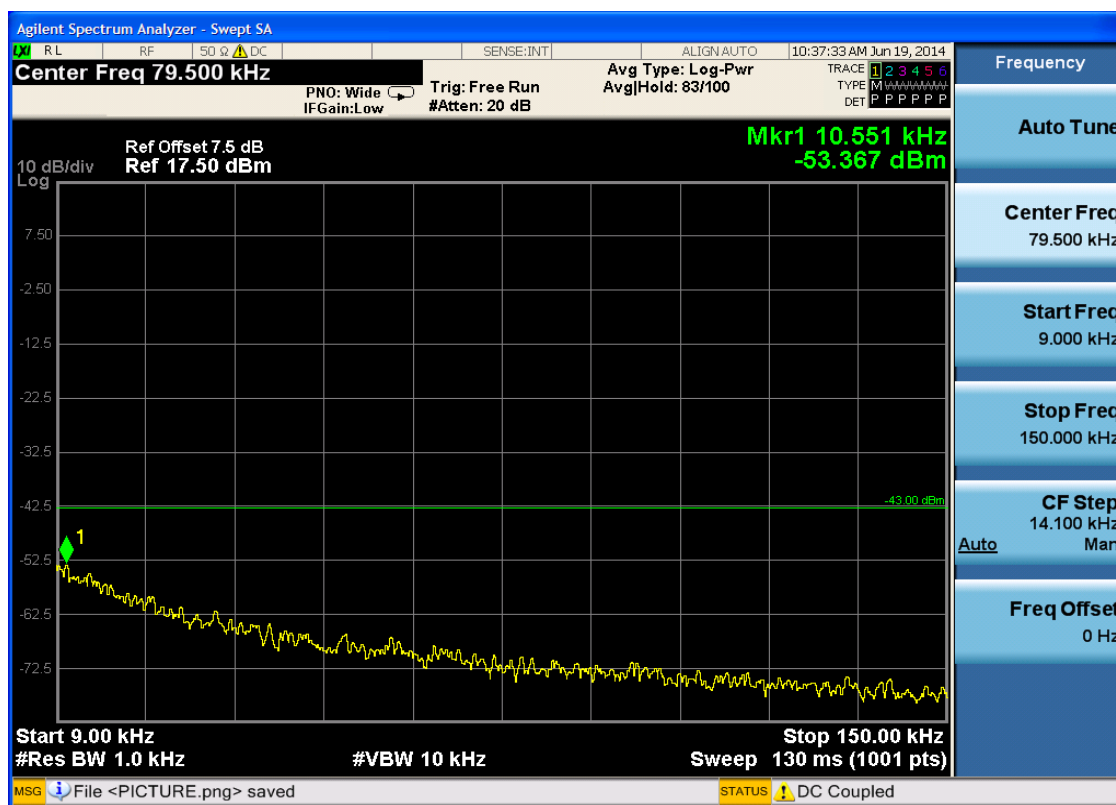


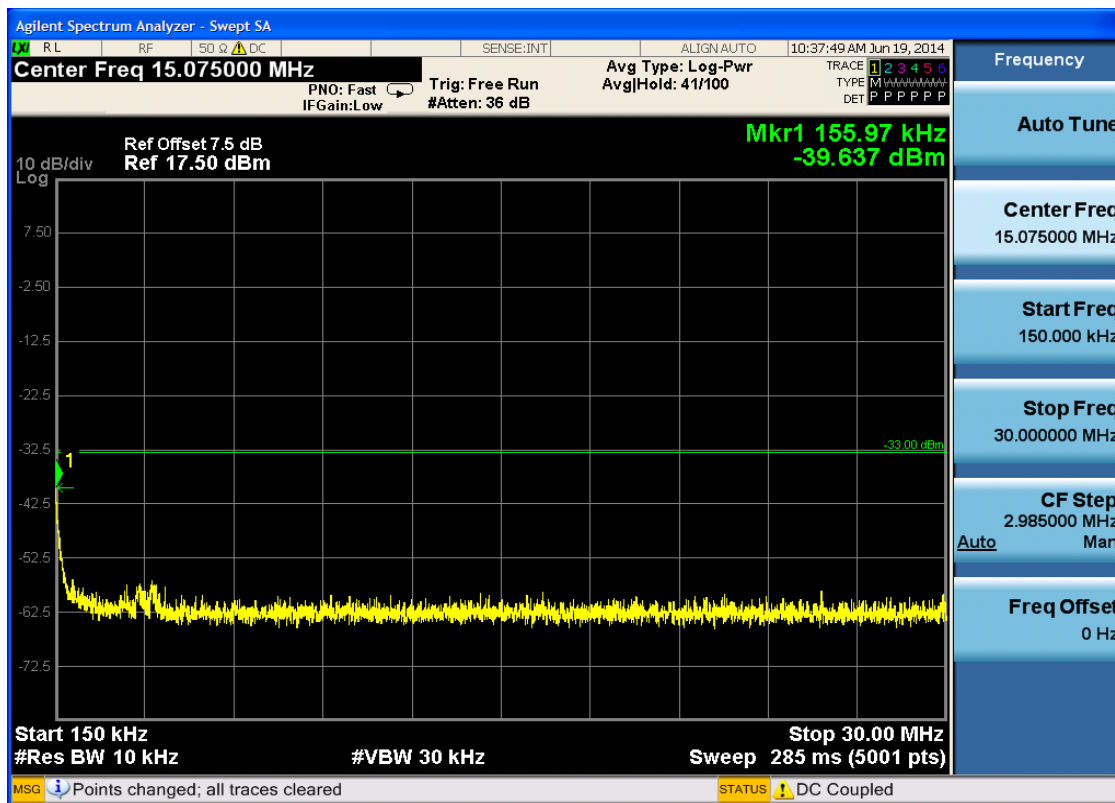


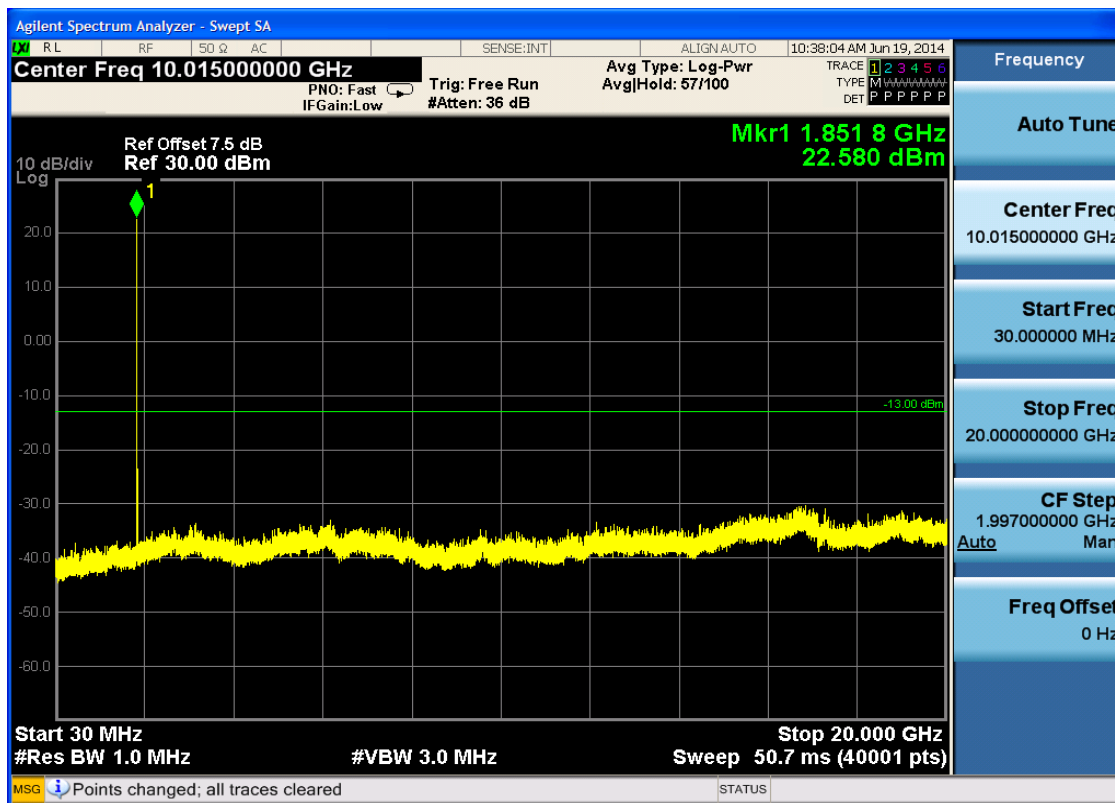
6.2.2 Test Band = WCDMA1900

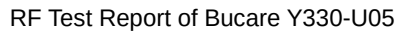
6.2.2.1 Test Mode = UMTS/TM1

6.2.2.1.1 Test Channel = LCH









Agilent Spectrum Analyzer - Swept SA

R L RF 50 Ω DC SENSE:INT ALIGN:AUTO 10:38:21 AM Jun 19, 2014

Center Freq 79.500 kHz

PNO: Wide IF Gain: Low Trig: Free Run #Atten: 20 dB Avg Type: Log-Pwr Avg/Hold: 84/100

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

Ref Offset 7.5 dB
Ref 17.50 dBm

Mkr1 11.679 kHz
-53.573 dBm

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

MSG Points changed; all traces cleared STATUS DC Coupled

Frequency

Auto Tune

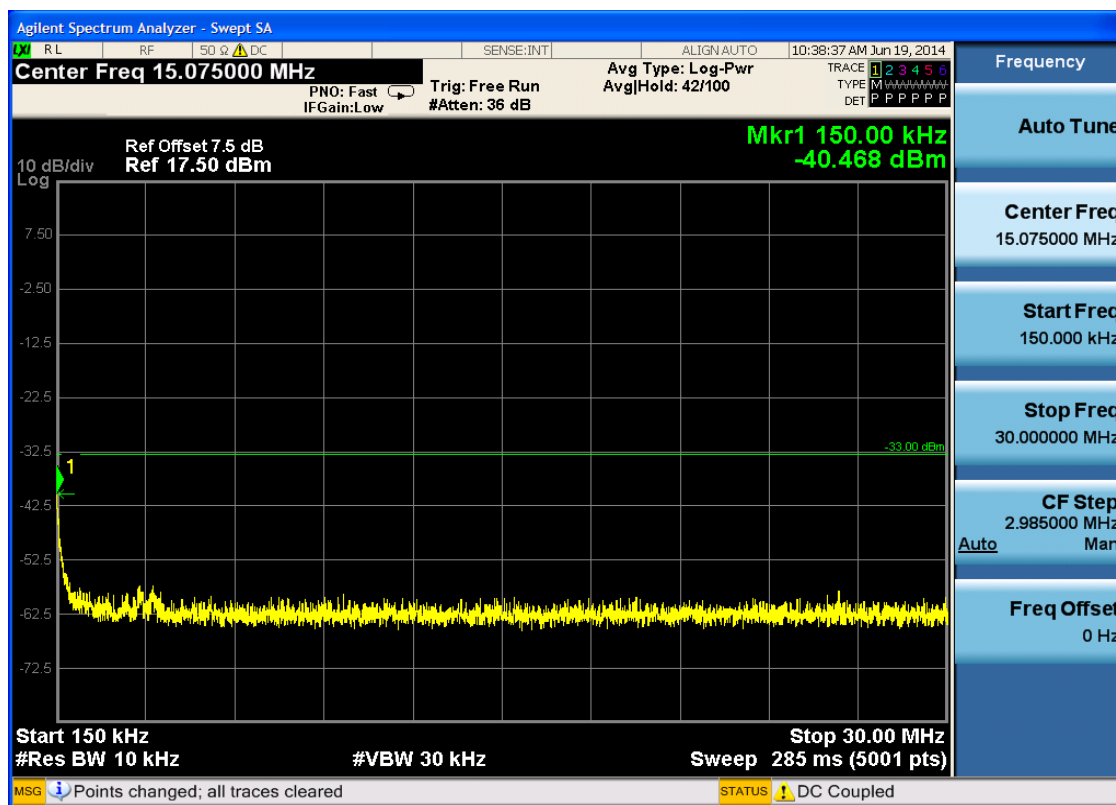
Center Freq
79.500 kHz

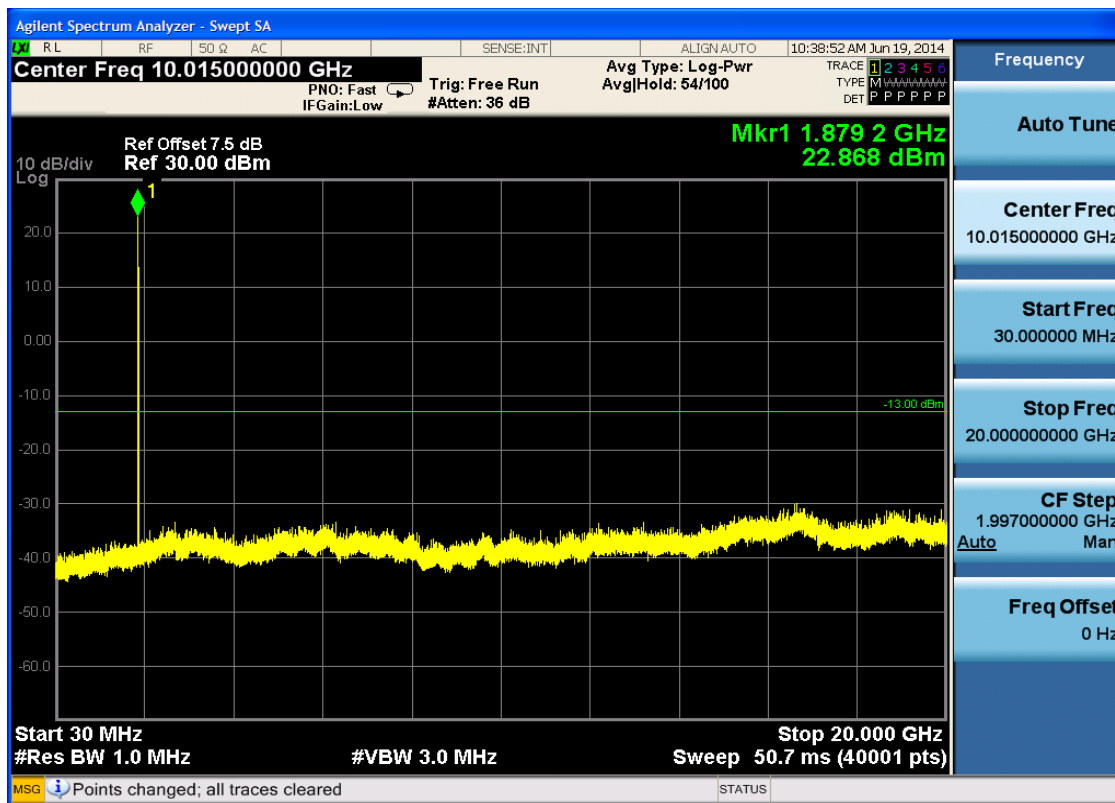
Start Freq
9.000 kHz

Stop Freq
150.000 kHz

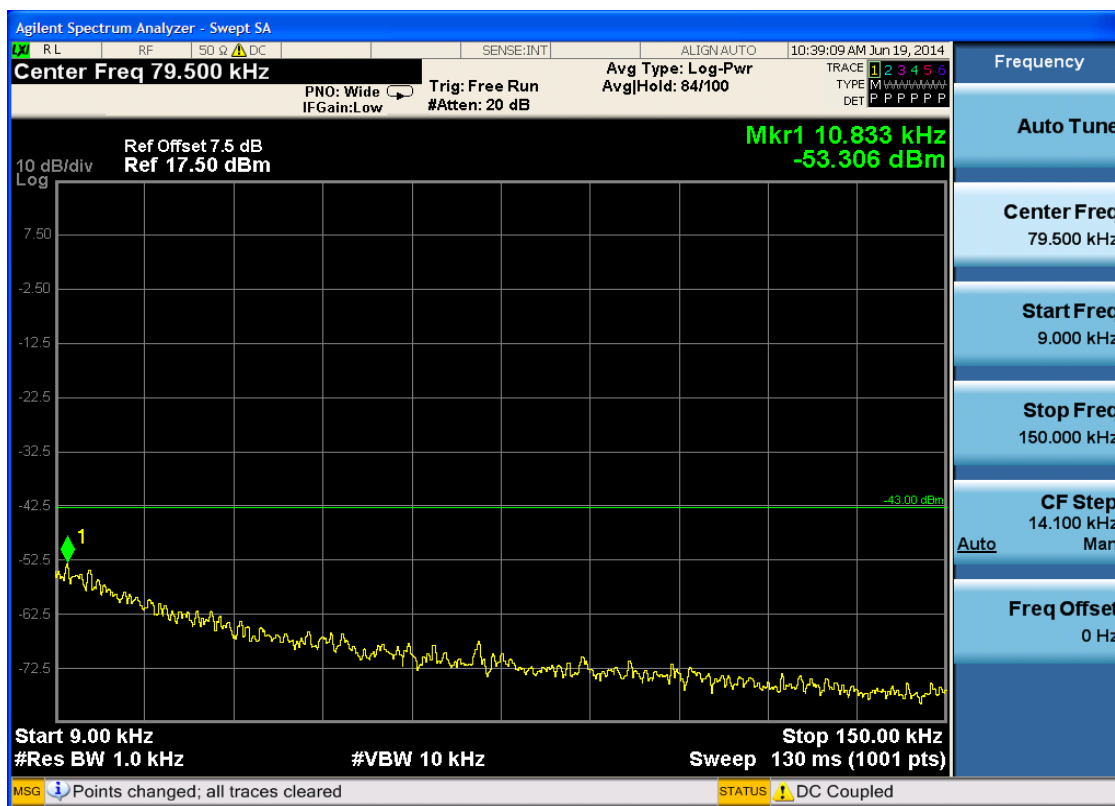
CF Step
14.100 kHz
Man

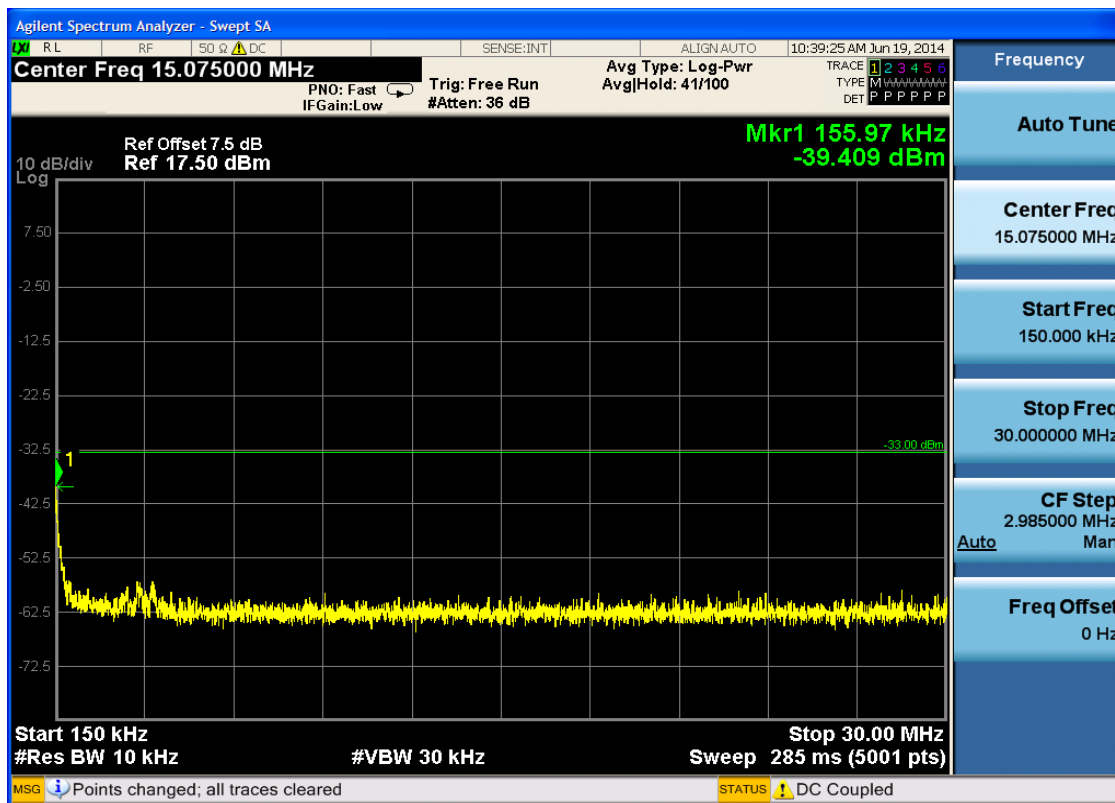
Freq Offset
0 Hz

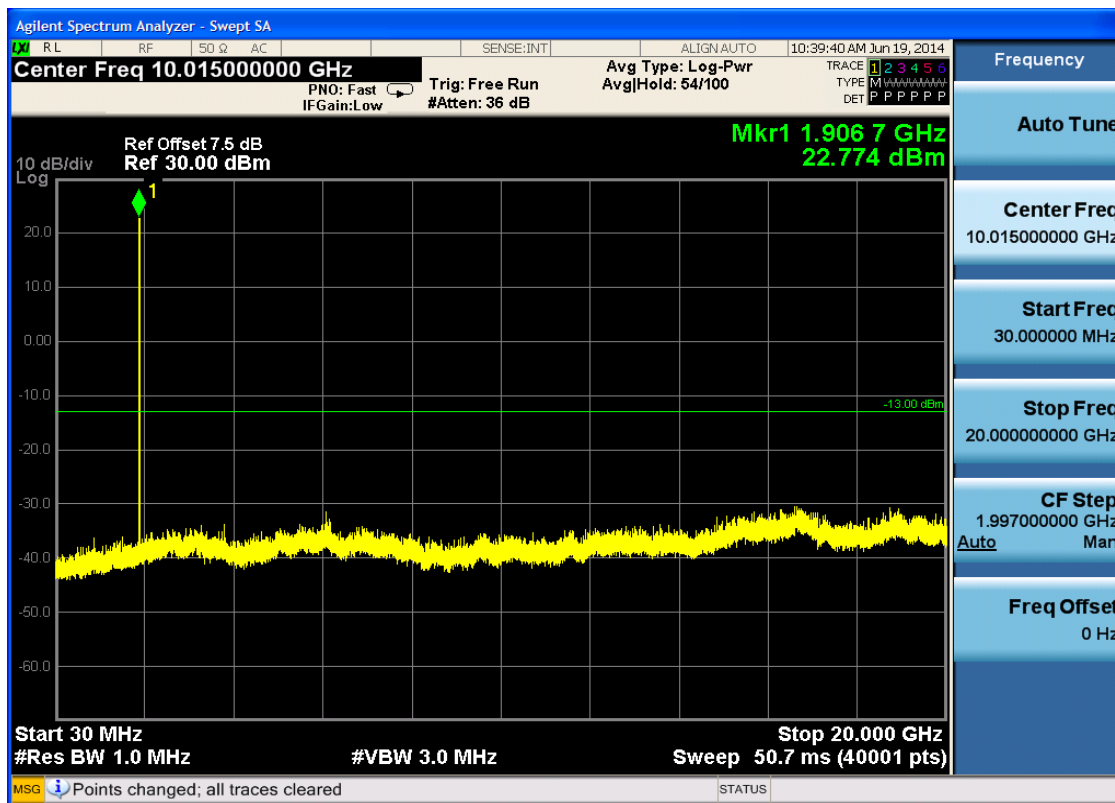




6.2.2.1.3 Test Channel = HCH







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

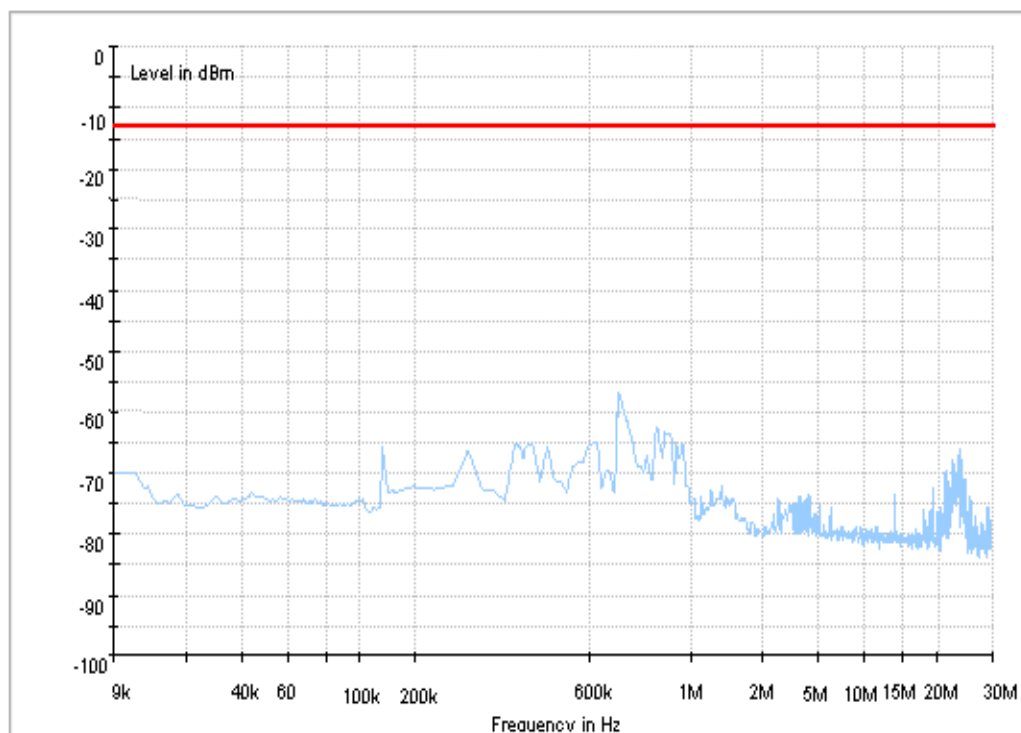
Above 1GHz, RBW = 1 MHz, VBW = 3 MHz. Detector: PK

Part I - Test Plots

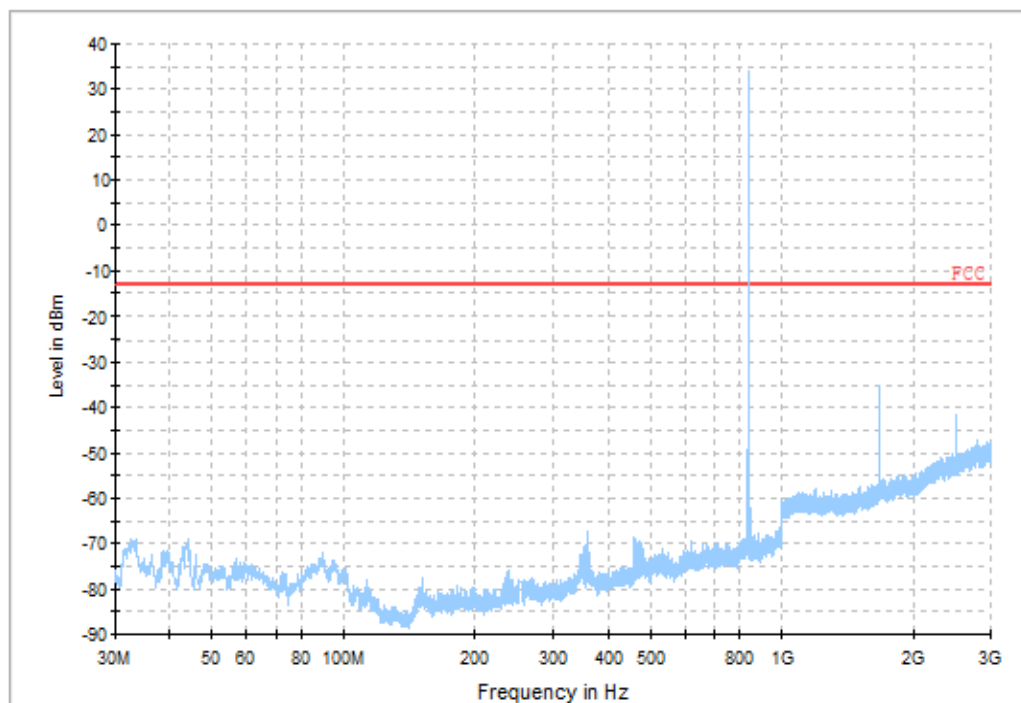
7.1 For GSM

7.1.1 Test Band = GSM850

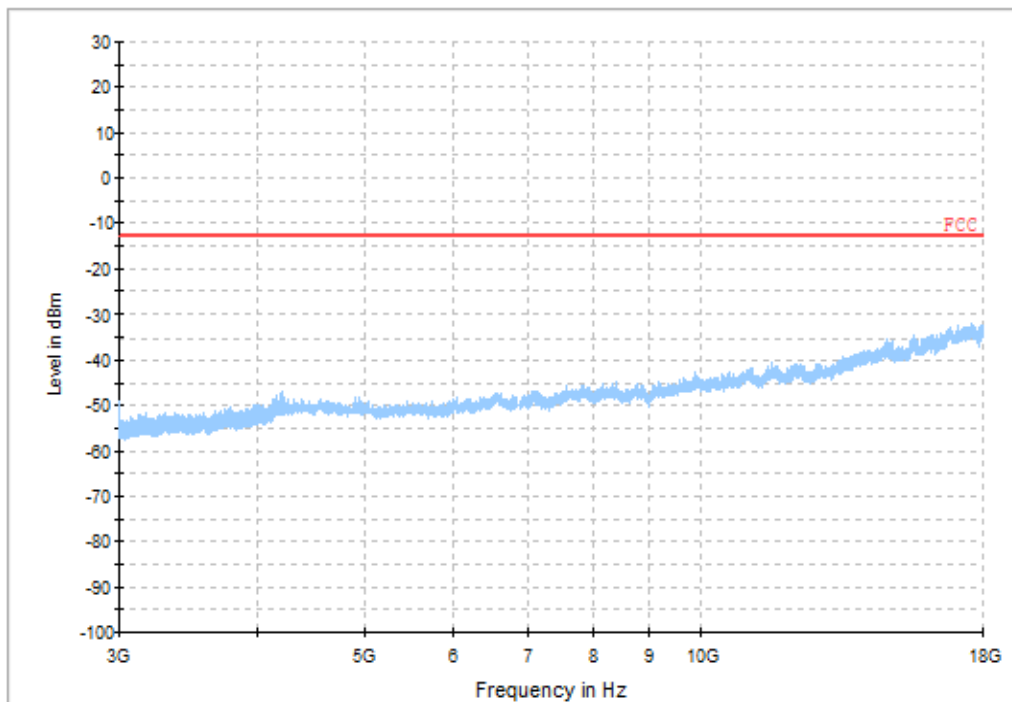
7.1.1.1 Test Mode = GSM/TM1



Copy of FCC PART22 GSM850_L

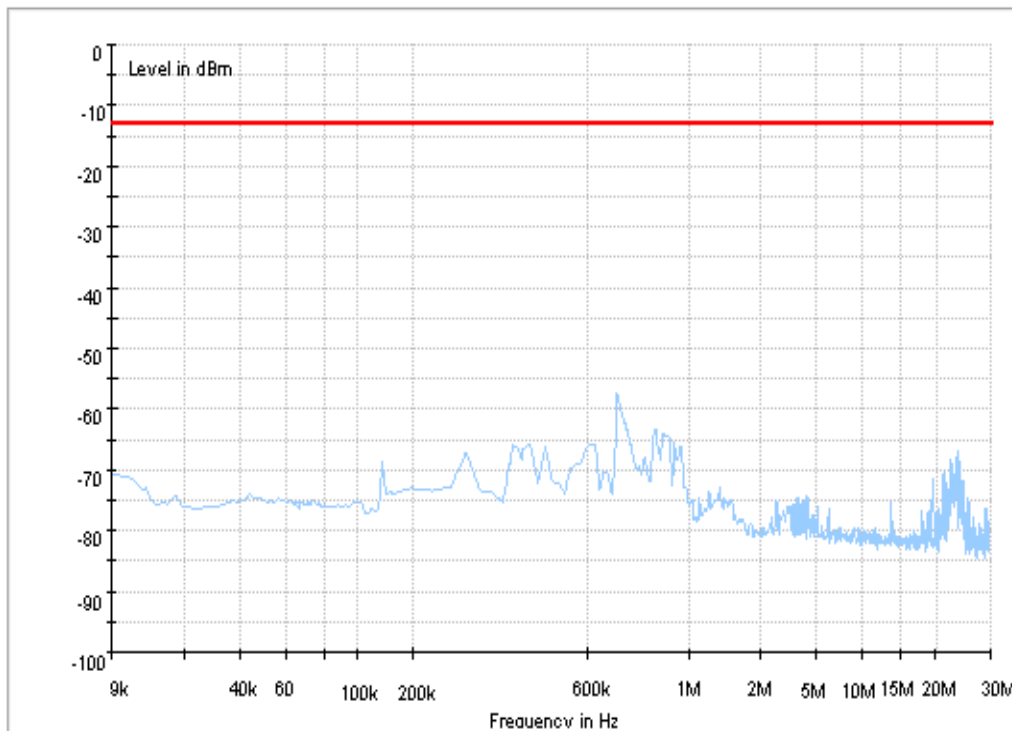


Copy of FCC PART22 GSM850_H

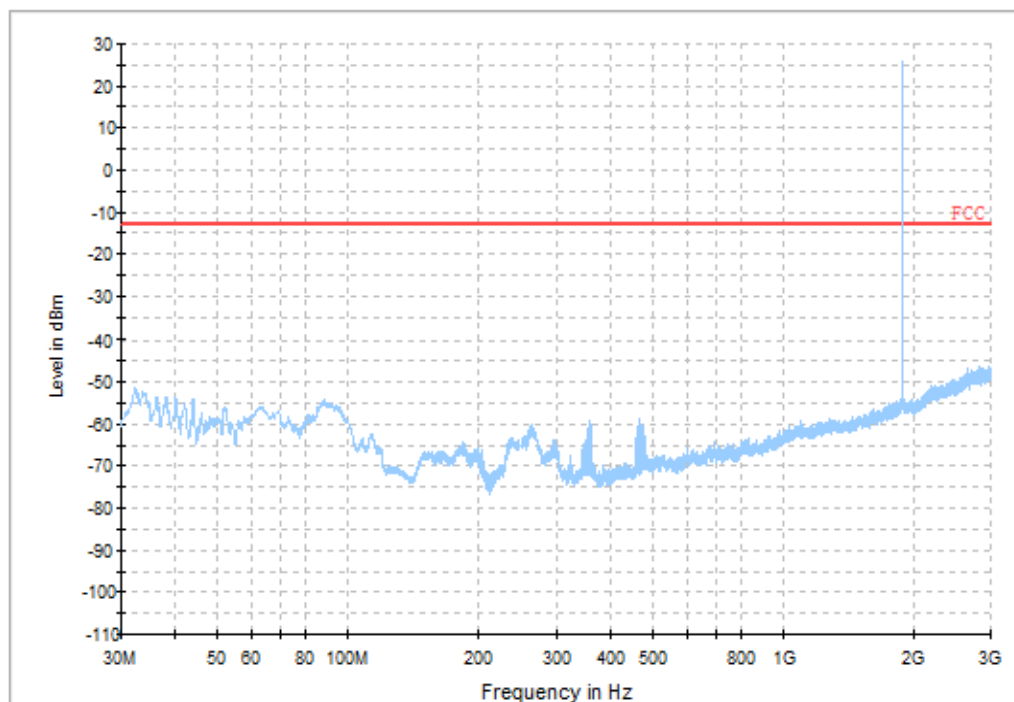


7.1.2 Test Band = GSM1900

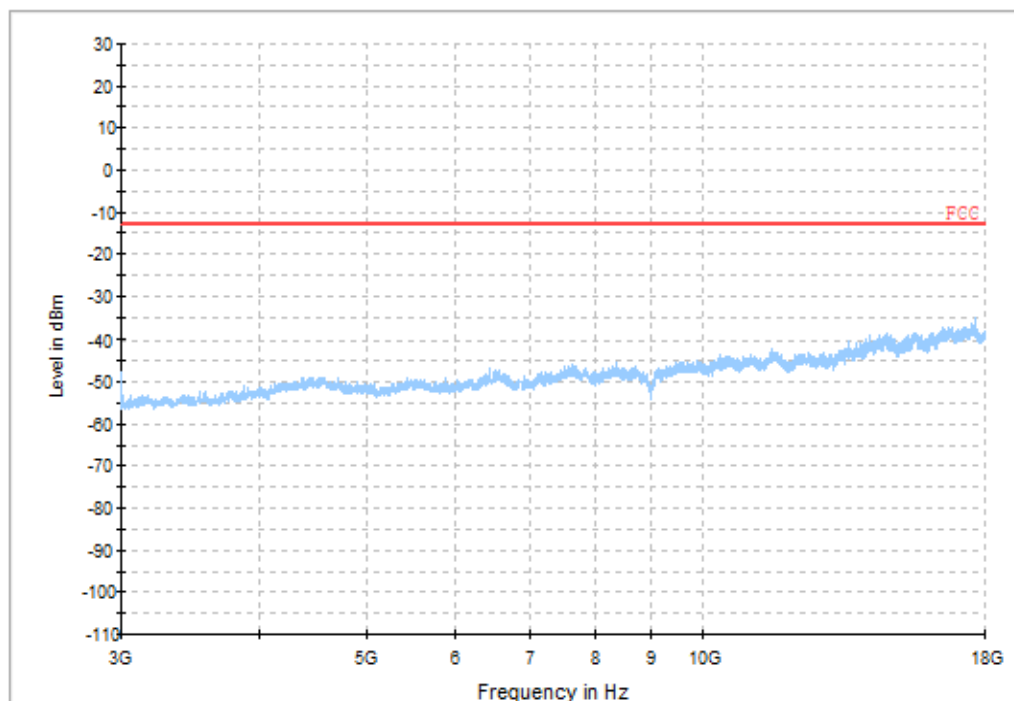
7.1.2.1 Test Mode = GSM/TM1

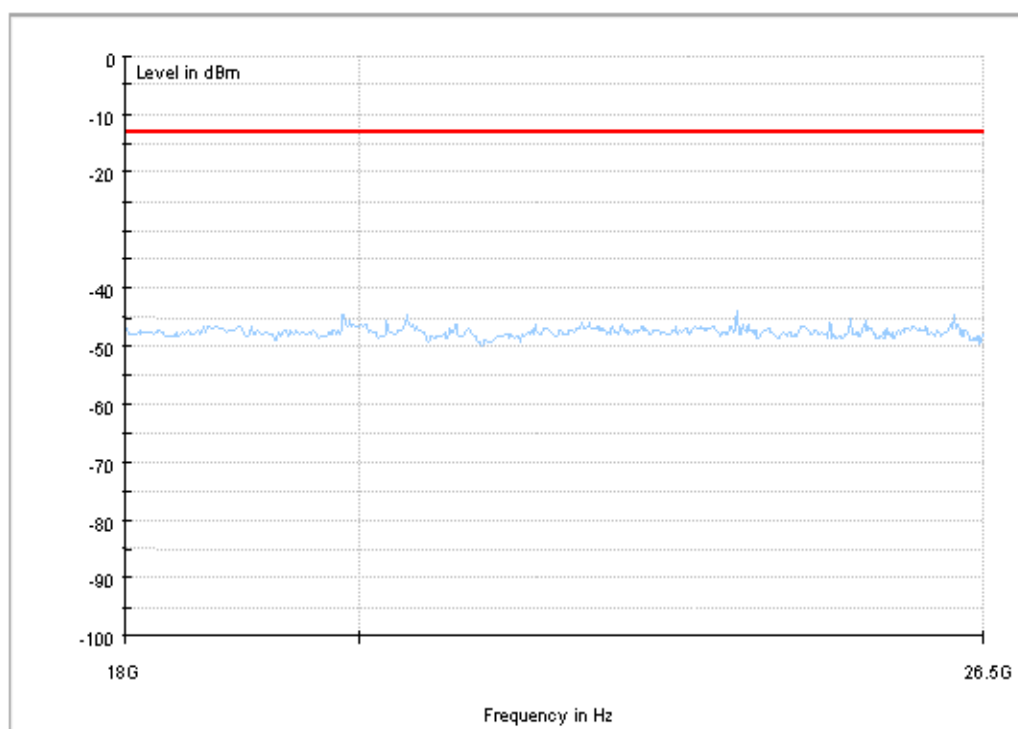


Copy of FCC PART24 GSM1900_L



Copy of FCC PART24 GSM1900_H

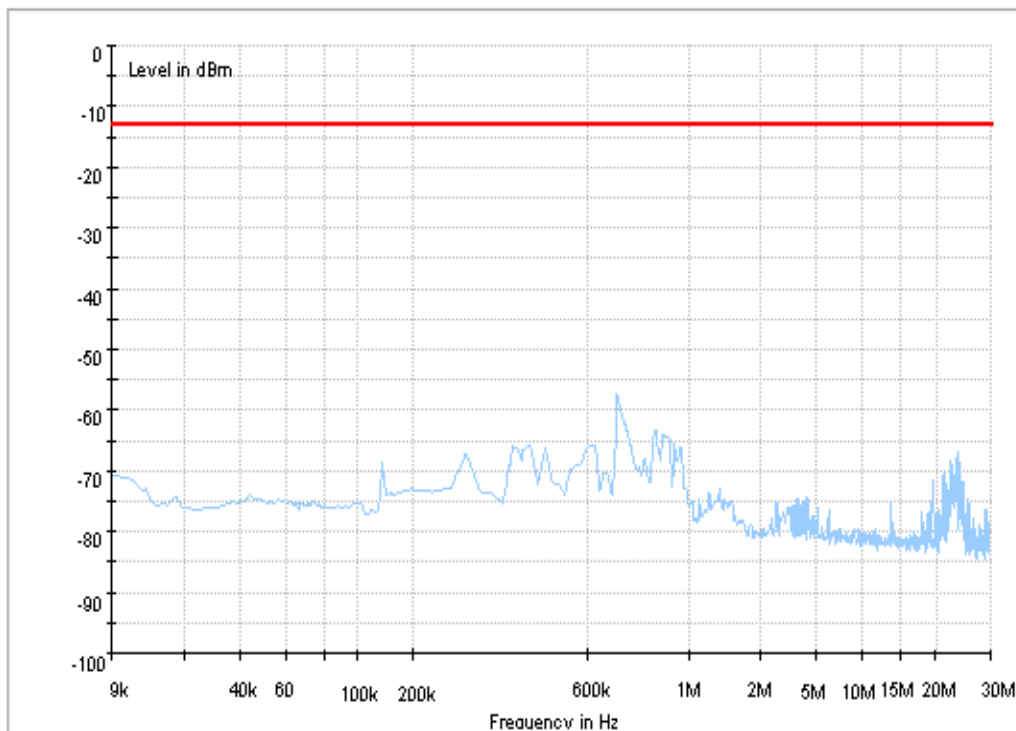




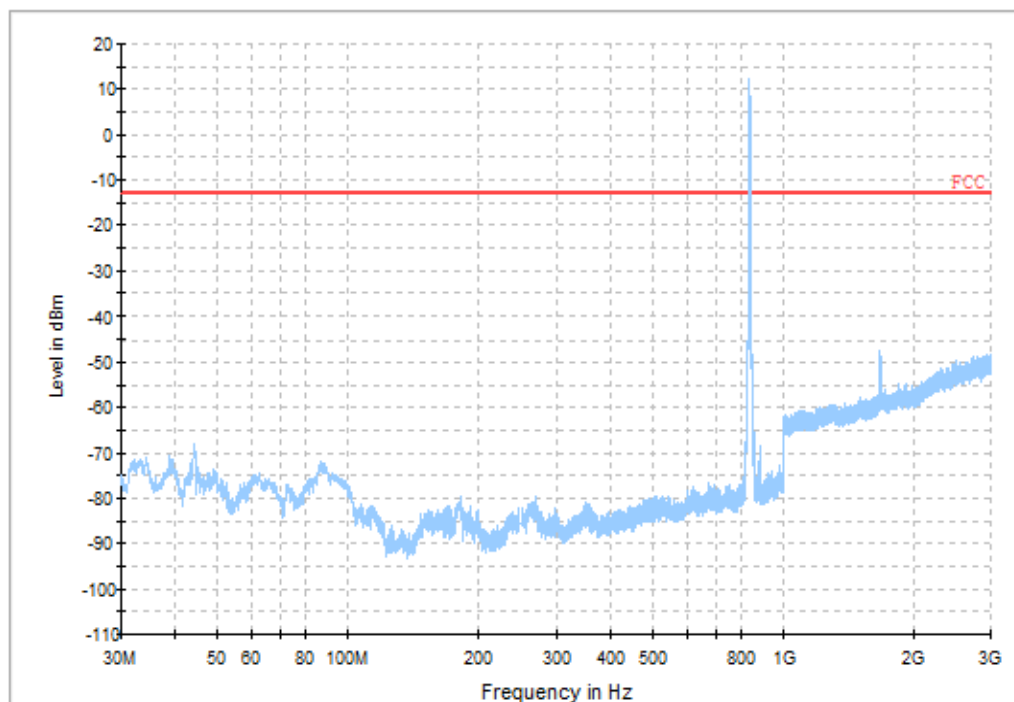
7.2 For UMTS

7.2.1 Test Band = WCDMA850

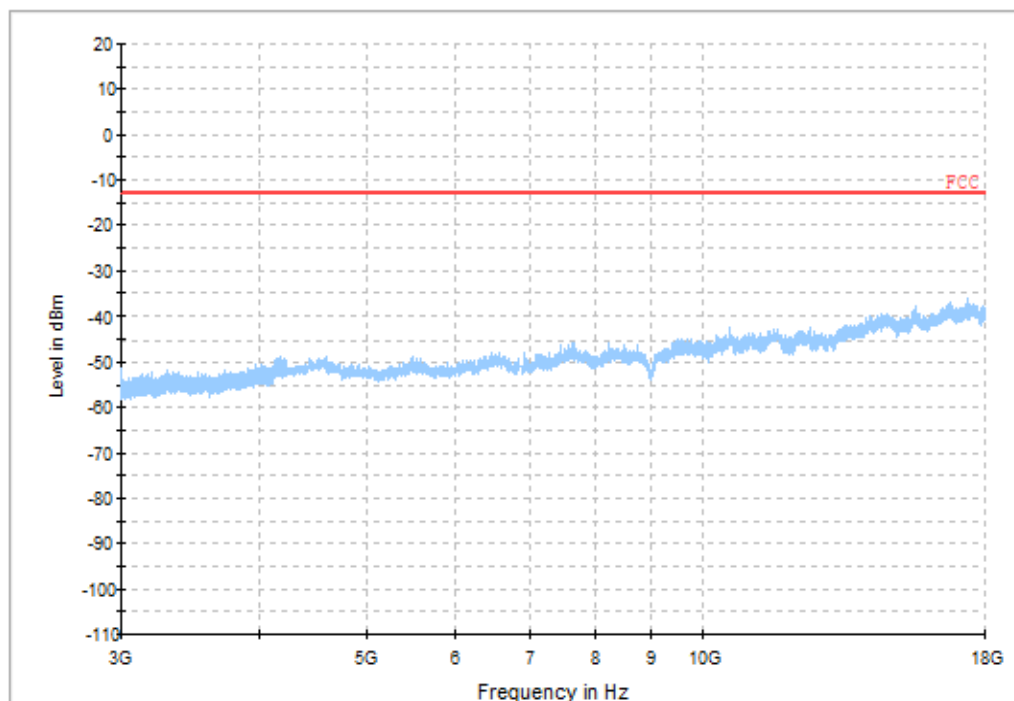
7.2.1.1 Test Mode = UMTS/TM1



Copy of FCC PART22 WCDMA850_L

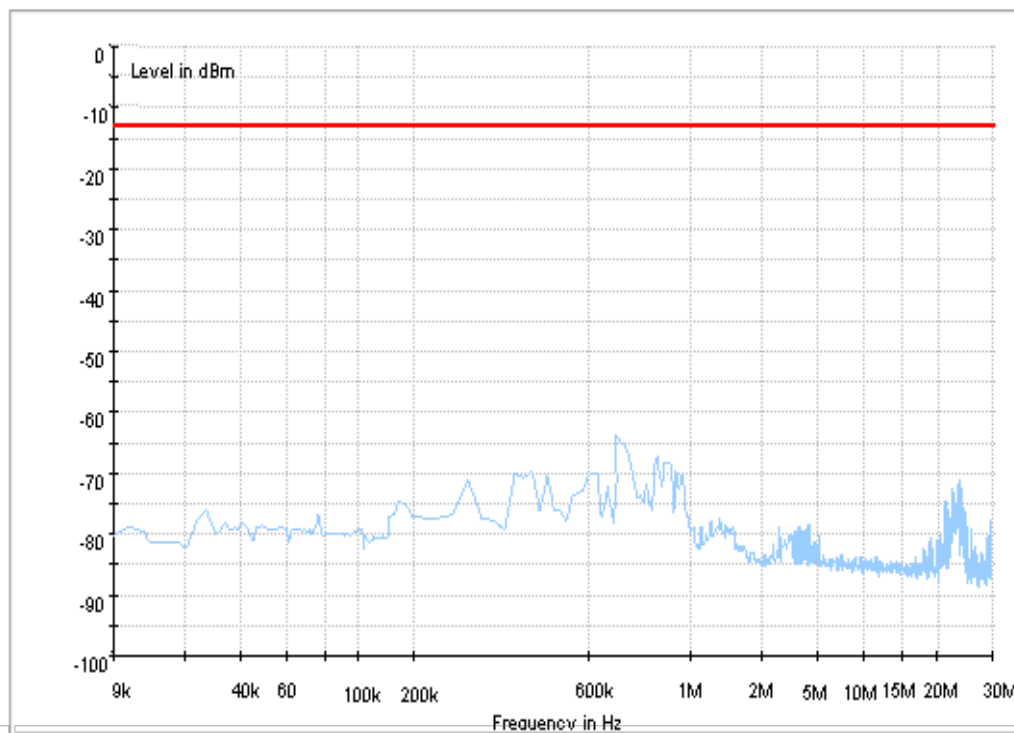


Copy of FCC PART22 WCDMA850_H

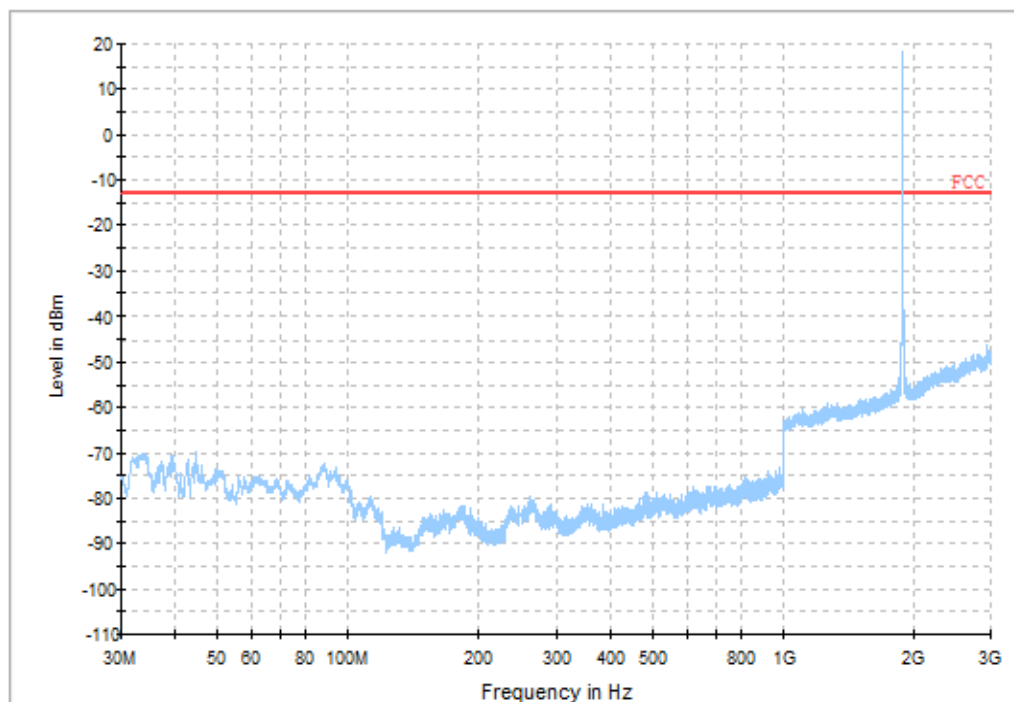


7.2.2 Test Band = WCDMA1900

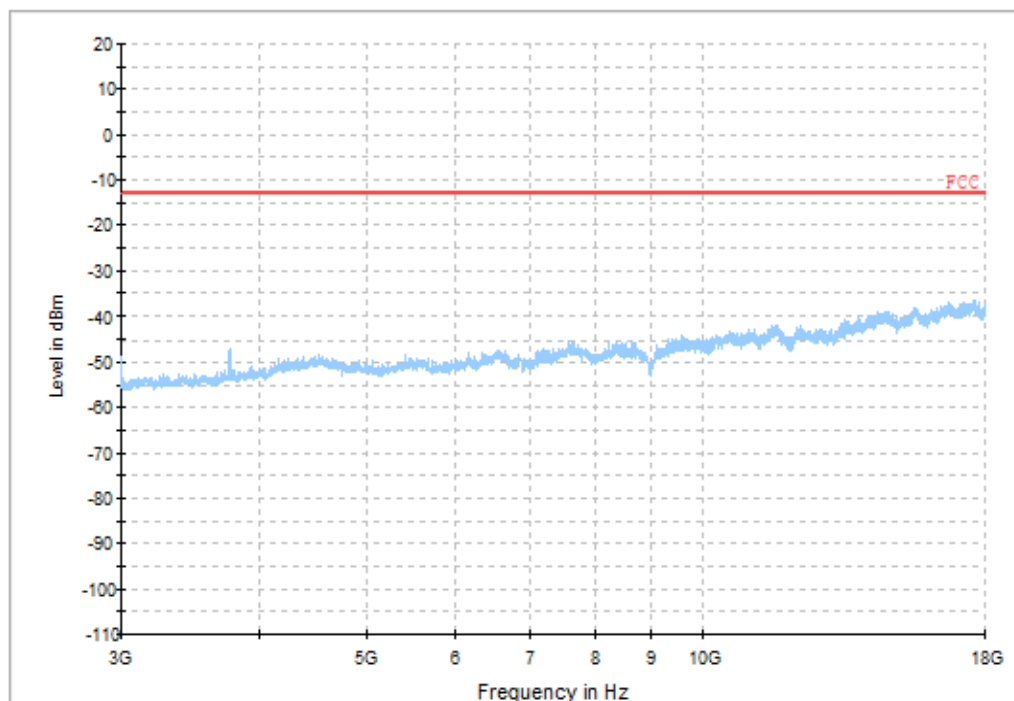
7.2.2.1 Test Mode = UMTS/TM1

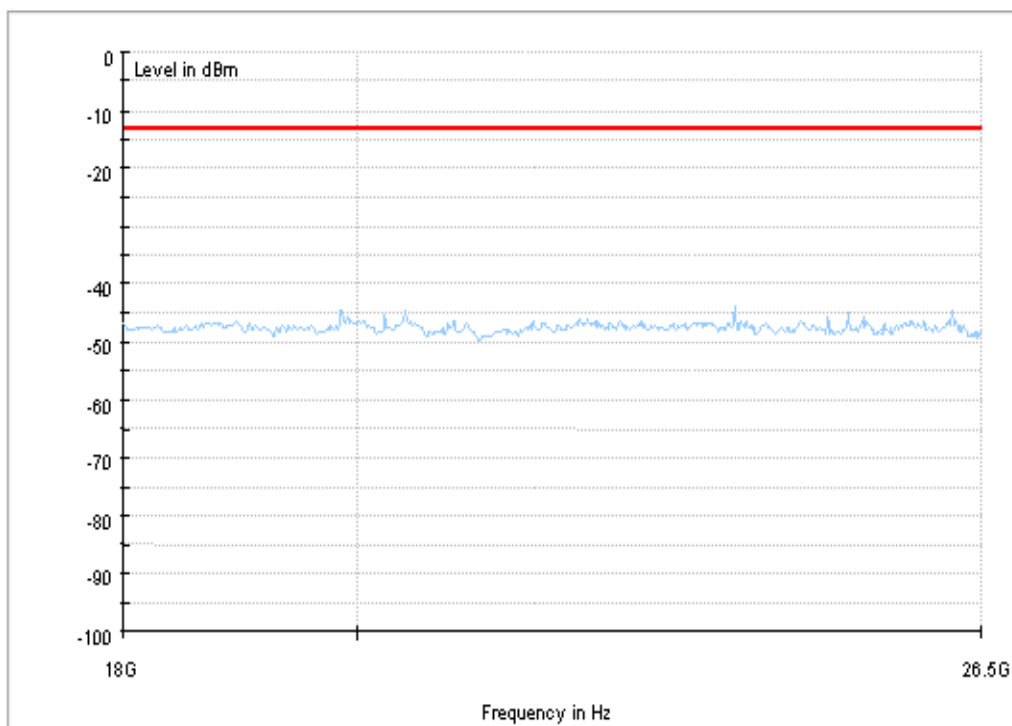


Copy of FCC PART24 WCDMA1900_L



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	-4.39	-0.00533	PASS
				VN	4.91	0.00596	PASS
				VH	10.07	0.01222	PASS
		MCH	TN	VL	0.45	0.00054	PASS
				VN	5.42	0.00648	PASS
				VH	2.84	0.00339	PASS
		HCH	TN	VL	1.81	0.00213	PASS
				VN	4.58	0.0054	PASS
				VH	-0.77	-0.00091	PASS
GSM1900	GSM/TM1	LCH	TN	VL	27.77	0.01501	PASS
				VN	25.51	0.01379	PASS
				VH	25.89	0.01399	PASS
		MCH	TN	VL	17.31	0.00921	PASS
				VN	22.66	0.01205	PASS
				VH	32.09	0.01707	PASS
		HCH	TN	VL	19.82	0.01038	PASS
				VN	25.70	0.01346	PASS
				VH	24.34	0.01274	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	2.45	0.00297	PASS
				-20	5.17	0.00627	PASS
				-10	0.77	0.00093	PASS
				0	-1.81	-0.0022	PASS
				10	6.97	0.00846	PASS
				20	-1.81	-0.0022	PASS
				30	-4.84	-0.00587	PASS

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				40	4.20	0.0051	PASS
				50	1.55	0.00188	PASS
		MCH	VN	-30	9.43	0.01127	PASS
				-20	8.46	0.01011	PASS
				-10	-2.65	-0.00317	PASS
				0	5.29	0.00632	PASS
				10	4.39	0.00525	PASS
				20	3.62	0.00433	PASS
				30	5.49	0.00656	PASS
				40	3.10	0.00371	PASS
				50	5.42	0.00648	PASS
		HCH	VN	-30	4.13	0.00487	PASS
				-20	7.23	0.00852	PASS
				-10	-0.52	-0.00061	PASS
				0	6.33	0.00746	PASS
				10	-1.23	-0.00145	PASS
				20	-1.55	-0.00183	PASS
				30	5.81	0.00684	PASS
				40	-3.36	-0.00396	PASS
				50	10.01	0.01179	PASS
GSM1900	GSM/TM1	LCH	VN	-30	17.31	0.00936	PASS
				-20	18.40	0.00994	PASS
				-10	23.31	0.0126	PASS
				0	8.91	0.00482	PASS
				10	10.01	0.00541	PASS
				20	13.62	0.00736	PASS
				30	19.69	0.01064	PASS
				40	22.34	0.01207	PASS
				50	6.59	0.00356	PASS
		MCH	VN	-30	19.57	0.01041	PASS
				-20	18.73	0.00996	PASS
				-10	3.29	0.00175	PASS
				0	7.88	0.00419	PASS
				10	29.12	0.01549	PASS
				20	8.27	0.0044	PASS
				30	27.38	0.01456	PASS
				40	15.82	0.00841	PASS
				50	16.59	0.00882	PASS
		HCH	VN	-30	14.72	0.00771	PASS
				-20	12.59	0.00659	PASS

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				-10	19.69	0.01031	PASS
				0	17.37	0.0091	PASS
				10	20.73	0.01085	PASS
				20	20.34	0.01065	PASS
				30	18.40	0.00963	PASS
				40	22.60	0.01183	PASS
				50	23.96	0.01255	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	1.83	0.00221	PASS
				VN	0.61	0.00074	PASS
				VH	-2.15	-0.0026	PASS
		MCH	TN	VL	0.20	0.00024	PASS
				VN	0.37	0.00044	PASS
				VH	4.56	0.00545	PASS
		HCH	TN	VL	3.52	0.00416	PASS
				VN	2.90	0.00343	PASS
				VH	1.34	0.00158	PASS
WCDMA1900	UMTS/TM1	LCH	TN	VL	7.40	0.00399	PASS
				VN	6.61	0.00357	PASS
				VH	6.71	0.00362	PASS
		MCH	TN	VL	4.32	0.0023	PASS
				VN	5.31	0.00282	PASS
				VH	7.52	0.004	PASS
		HCH	TN	VL	11.28	0.00591	PASS
				VN	7.02	0.00368	PASS
				VH	6.20	0.00325	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	0.06	0.00007	PASS
				-20	0.58	0.0007	PASS
				-10	0.02	0.00002	PASS
				0	-0.34	-0.00041	PASS
				10	0.41	0.0005	PASS
				20	1.45	0.00175	PASS
				30	0.44	0.00053	PASS
				40	-1.01	-0.00122	PASS
				50	1.48	0.00179	PASS
		MCH	VN	-30	1.86	0.00222	PASS
				-20	2.14	0.00256	PASS

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				-10	2.56	0.00306	PASS
				0	1.33	0.00159	PASS
				10	1.92	0.0023	PASS
				20	-2.17	-0.00259	PASS
				30	-0.85	-0.00102	PASS
				40	2.21	0.00264	PASS
				50	1.91	0.00228	PASS
		HCH	VN	-30	0.75	0.00089	PASS
				-20	3.04	0.00359	PASS
				-10	-0.92	-0.00109	PASS
				0	2.33	0.00275	PASS
				10	3.04	0.00359	PASS
				20	4.04	0.00477	PASS
				30	1.75	0.00207	PASS
				40	1.16	0.00137	PASS
				50	6.77	0.008	PASS
WCDMA1900	UMTS/TM1	LCH	VN	-30	11.08	0.00598	PASS
				-20	6.27	0.00338	PASS
				-10	5.92	0.0032	PASS
				0	8.71	0.0047	PASS
				10	-1.25	-0.00067	PASS
				20	2.15	0.00116	PASS
				30	5.77	0.00311	PASS
				40	9.08	0.0049	PASS
				50	10.15	0.00548	PASS
		MCH	VN	-30	3.54	0.00188	PASS
				-20	5.92	0.00315	PASS
				-10	1.83	0.00097	PASS
				0	2.43	0.00129	PASS
				10	2.44	0.0013	PASS
				20	6.90	0.00367	PASS
				30	6.59	0.00351	PASS
				40	9.02	0.0048	PASS
				50	4.17	0.00222	PASS
		HCH	VN	-30	6.29	0.0033	PASS
				-20	7.26	0.00381	PASS
				-10	7.13	0.00374	PASS
				0	4.91	0.00257	PASS
				10	4.71	0.00247	PASS
				20	7.55	0.00396	PASS



Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				30	6.90	0.00362	PASS
				40	11.96	0.00627	PASS
				50	8.06	0.00423	PASS

END