



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	32.98	30.03	38.5	PASS
		MCH	32.95	30	38.5	PASS
		HCH	32.84	29.89	38.5	PASS
	GSM/TM2	LCH	27.68	24.73	38.5	PASS
		MCH	27.43	24.48	38.5	PASS
		HCH	27.1	24.15	38.5	PASS
WCDMA850	UMTS/TM1	LCH	23.8	20.85	38.5	PASS
		MCH	23.9	20.95	38.5	PASS
		HCH	23.87	20.92	38.5	PASS

Test Band	Test Mode	Test Channel	Conducted Power [dBm]	EIRP [dBm]	Limit [dBm]	Verdict
GSM1900	GSM/TM1	LCH	29.41	31.34	33	PASS
		MCH	29.45	31.38	33	PASS

Test Band	Test Mode	Test Channel	Conducted Power [dBm]	EIRP [dBm]	Limit [dBm]	Verdict
	GSM/TM2	HCH	29.25	31.18	33	PASS
		LCH	26.08	28.01	33	PASS
		MCH	26.09	28.02	33	PASS
		HCH	26.03	27.96	33	PASS
WCDMA1900	UMTS/TM1	LCH	22.97	24.9	33	PASS
		MCH	22.8	24.73	33	PASS
		HCH	22.81	24.74	33	PASS
WCDMA1700	UMTS/TM1	LCH	22.65	22.82	30	PASS
		MCH	22.78	22.95	30	PASS
		HCH	22.98	23.15	30	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	0.18	13	PASS
		MCH	0.18	13	PASS
		HCH	0.16	13	PASS
	GSM/TM2	LCH	3.27	13	PASS
		MCH	3.28	13	PASS
		HCH	3.22	13	PASS
Test Band	Test Mode	Test Channel	Measured[dB]	Limit [dB]	Verdict
WCDMA1900	UMTS/TM1	LCH	3.45	13	PASS
		MCH	3.46	13	PASS
		HCH	3.37	13	PASS
WCDMA1700	UMTS/TM1	LCH	3.44	13	PASS
		MCH	3.52	13	PASS
		HCH	3.67	13	PASS

3Appendix_C: Modulation Characteristics

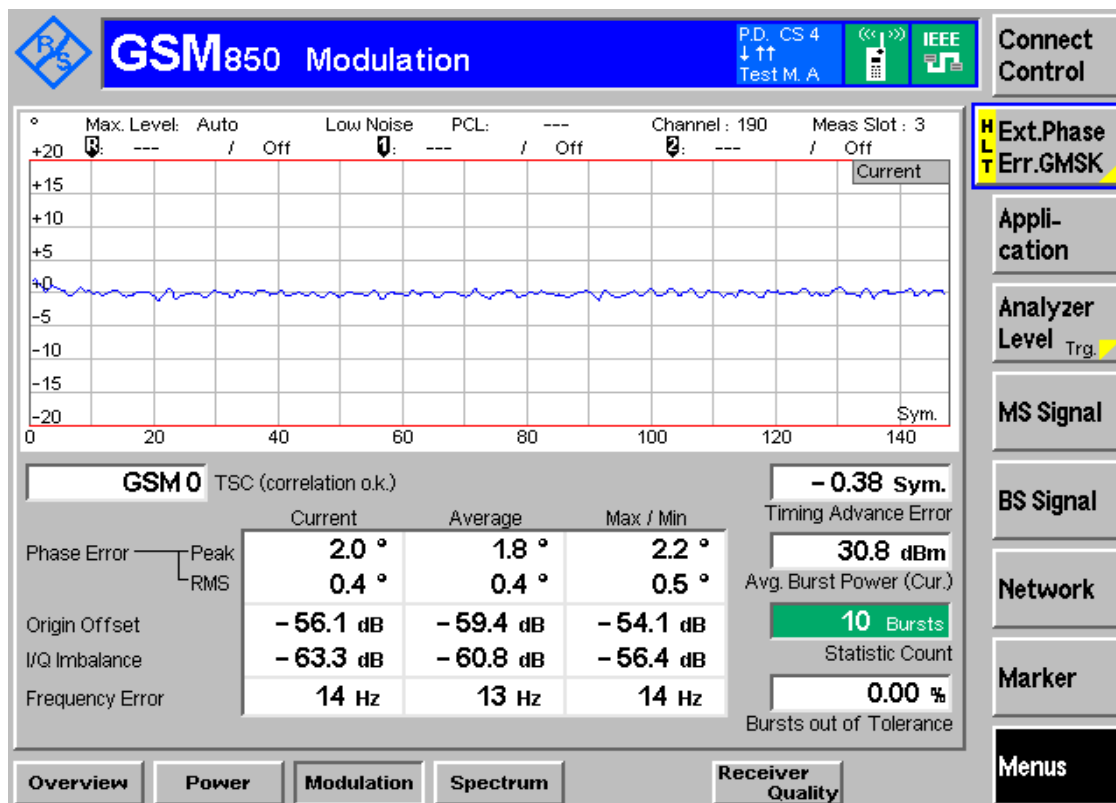
Part I - Test Plots

3.1 For GSM

3.1.1 Test Band = GSM850

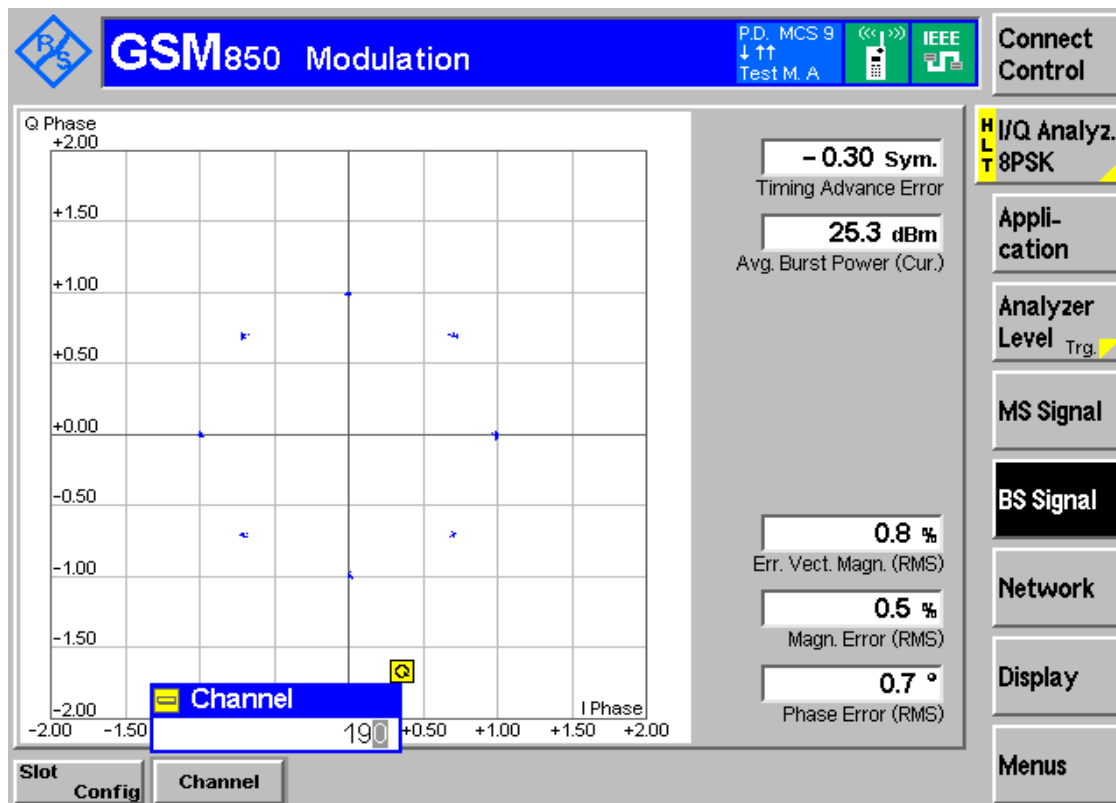
3.1.1.1 Test Mode = GSM/TM1

3.1.1.1.1 Test Channel = MCH



3.1.1.2 Test Mode = GSM/TM2

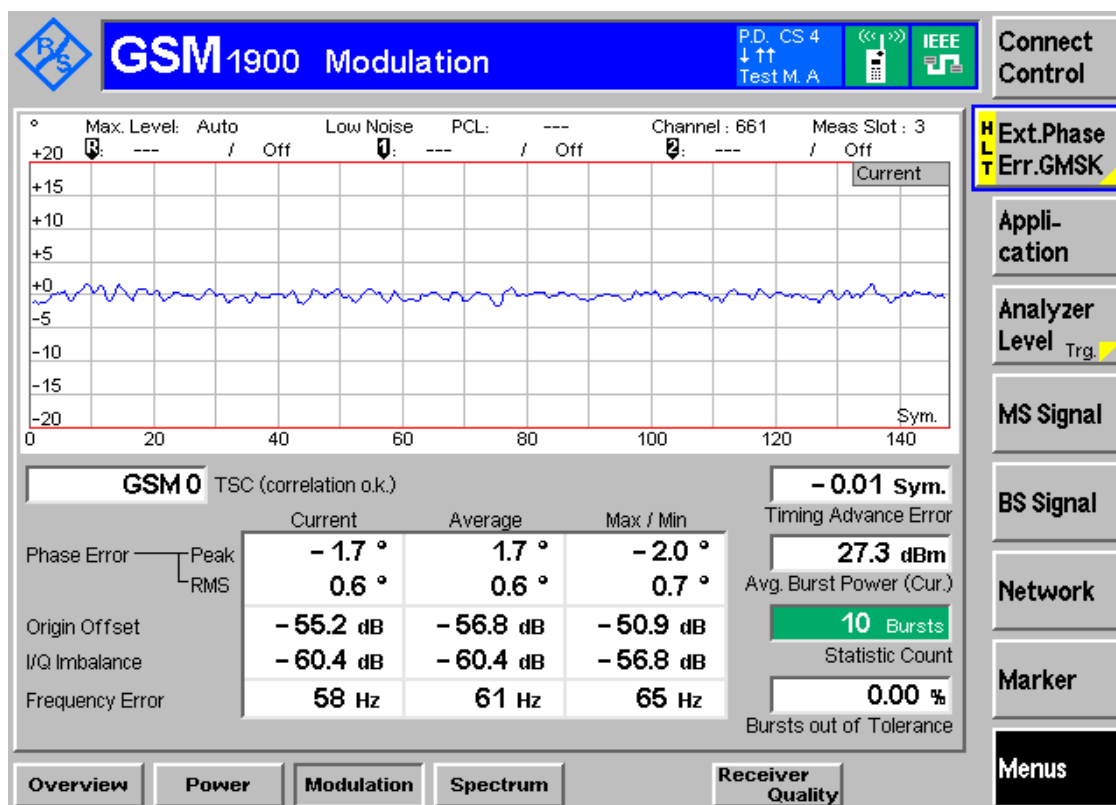
3.1.1.2.1 Test Channel = MCH



3.1.2 Test Band = GSM1900

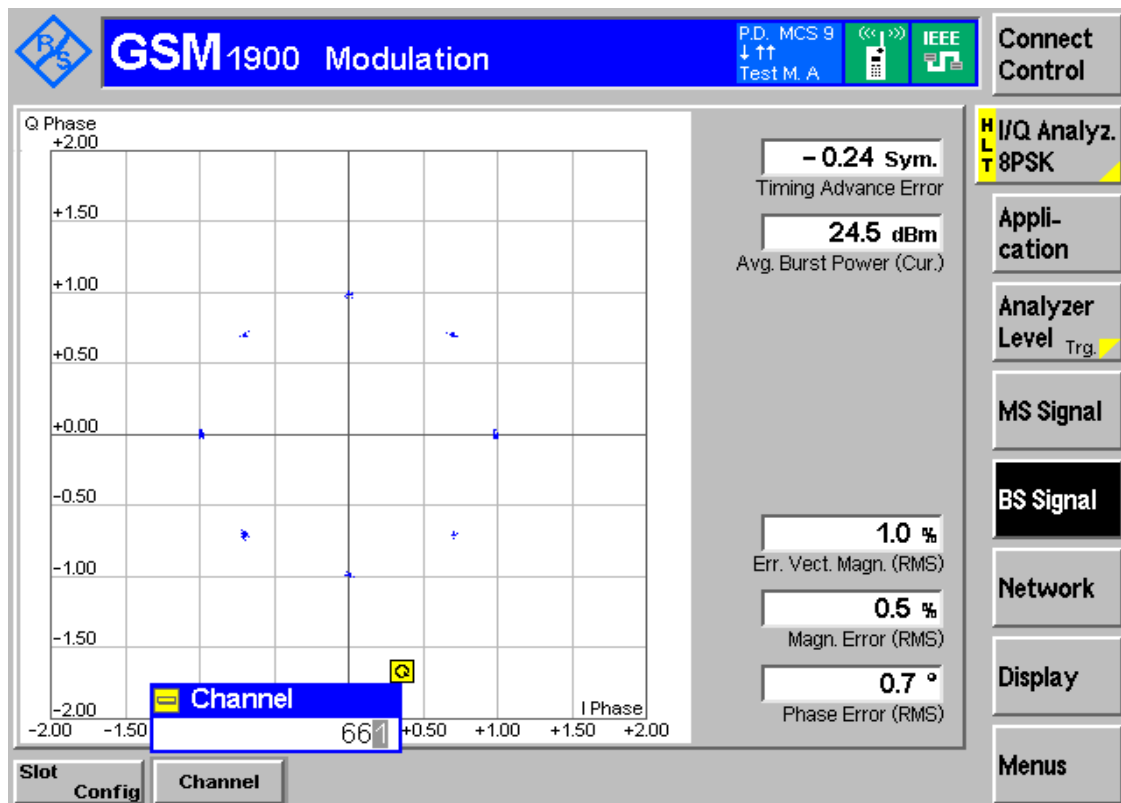
3.1.2.1 Test Mode = GSM/TM1

3.1.2.1.1 Test Channel = MCH



3.1.2.2 Test Mode = GSM/TM2

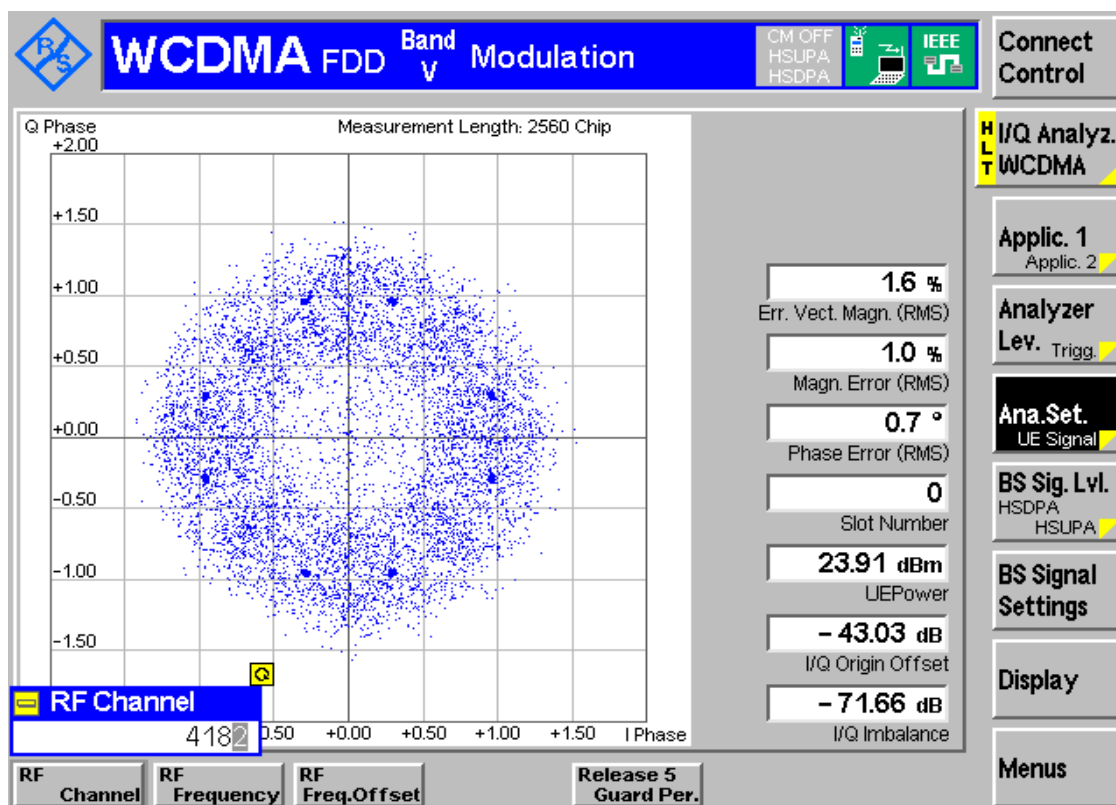
3.1.2.2.1 Test Channel = MCH



3.2.1 Test Band = WCDMA850

3.2.1.1 Test Mode = UMTS/TM1

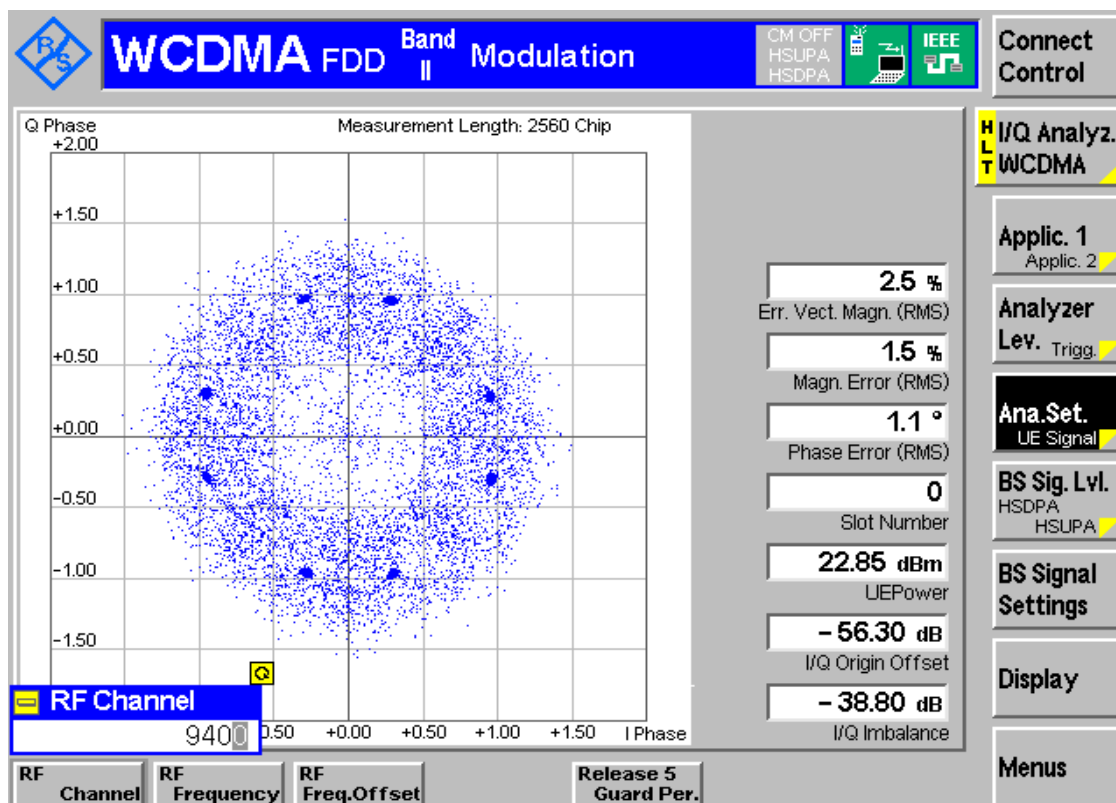
3.2.1.1.1 Test Channel = MCH



3.2.2 Test Band = WCDMA1900

3.2.2.1 Test Mode = UMTS/TM1

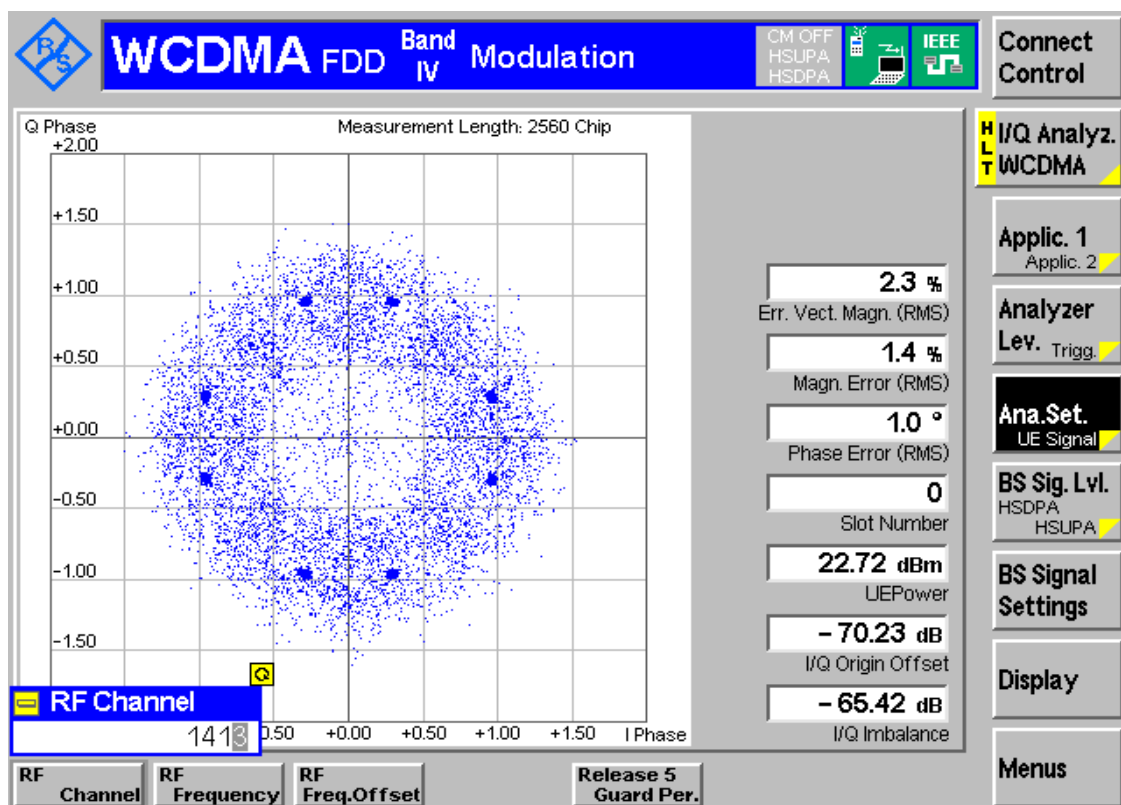
3.2.2.1.1 Test Channel = MCH



3.2.3 Test Band = WCDMA1700

3.2.3.1 Test Mode = UMTS/TM1

3.2.3.1.1 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	244.07	314.82	Pass
		MCH	243.54	316.55	Pass
		HCH	246.20	317.43	Pass
	GSM/TM2	LCH	237.20	314.24	Pass
		MCH	244.25	302.80	Pass
		HCH	240.56	317.78	Pass
GSM1900	GSM/TM1	LCH	247.01	314.58	Pass
		MCH	243.88	312.81	Pass
		HCH	244.78	312.96	Pass
	GSM/TM2	LCH	241.59	319.25	Pass
		MCH	240.67	312.27	Pass
		HCH	237.65	307.61	Pass
Test Band	Test Mode	Test Channel	Occupied Bandwidth [MHz]	Emission Bandwidth [MHz]	Verdict
WCDMA850	UMTS/TM1	LCH	4.16	4.68	Pass
		MCH	4.17	4.68	Pass
		HCH	4.18	4.67	Pass
WCDMA1900	UMTS/TM1	LCH	4.15	4.69	Pass
		MCH	4.15	4.68	Pass
		HCH	4.16	4.69	Pass
WCDMA1700	UMTS/TM1	LCH	4.17	4.69	Pass
		MCH	4.17	4.69	Pass
		HCH	4.16	4.69	Pass

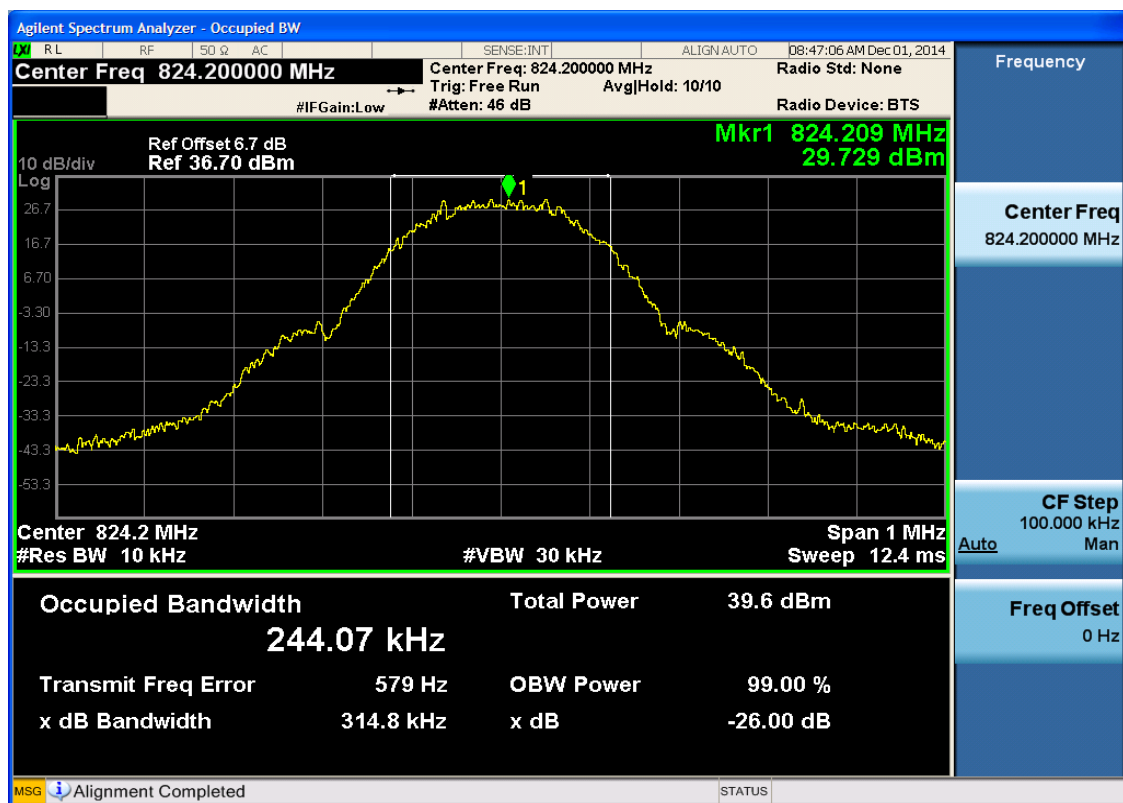
Part II - Test Plots

4.1 For GSM

4.1.1 Test Band = GSM850

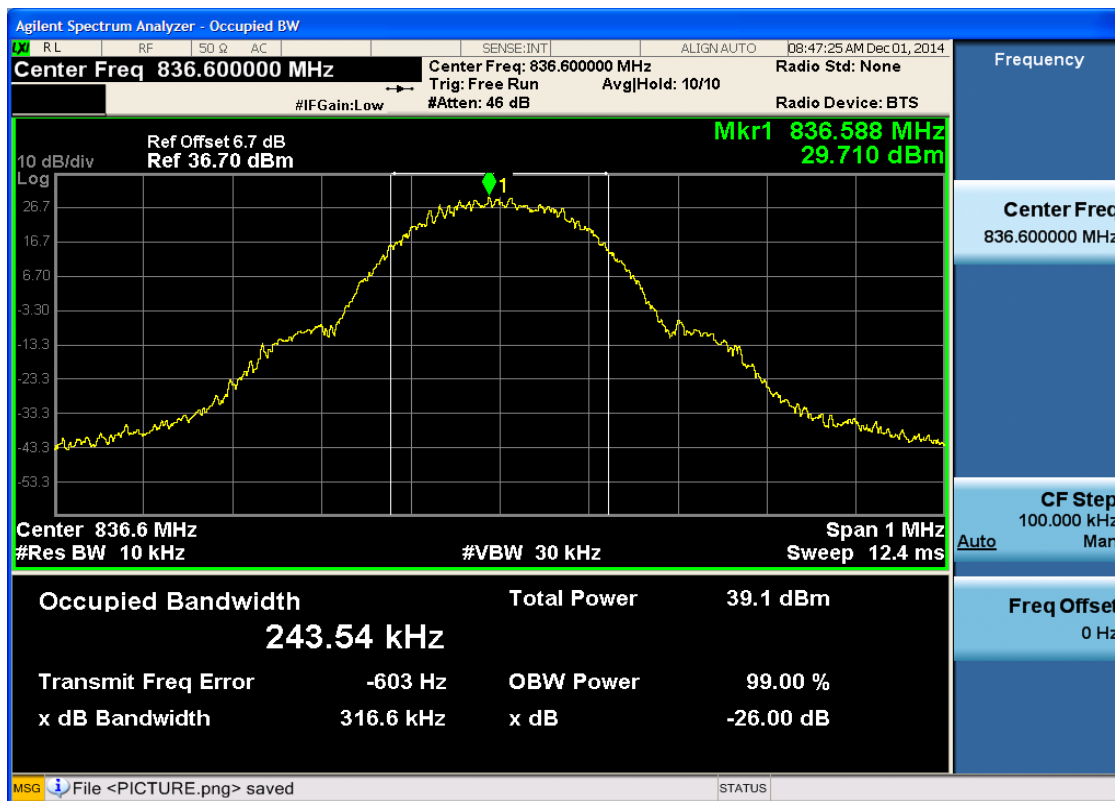
4.1.1.1 Test Mode = GSM/TM1

4.1.1.1.1 Test Channel = LCH



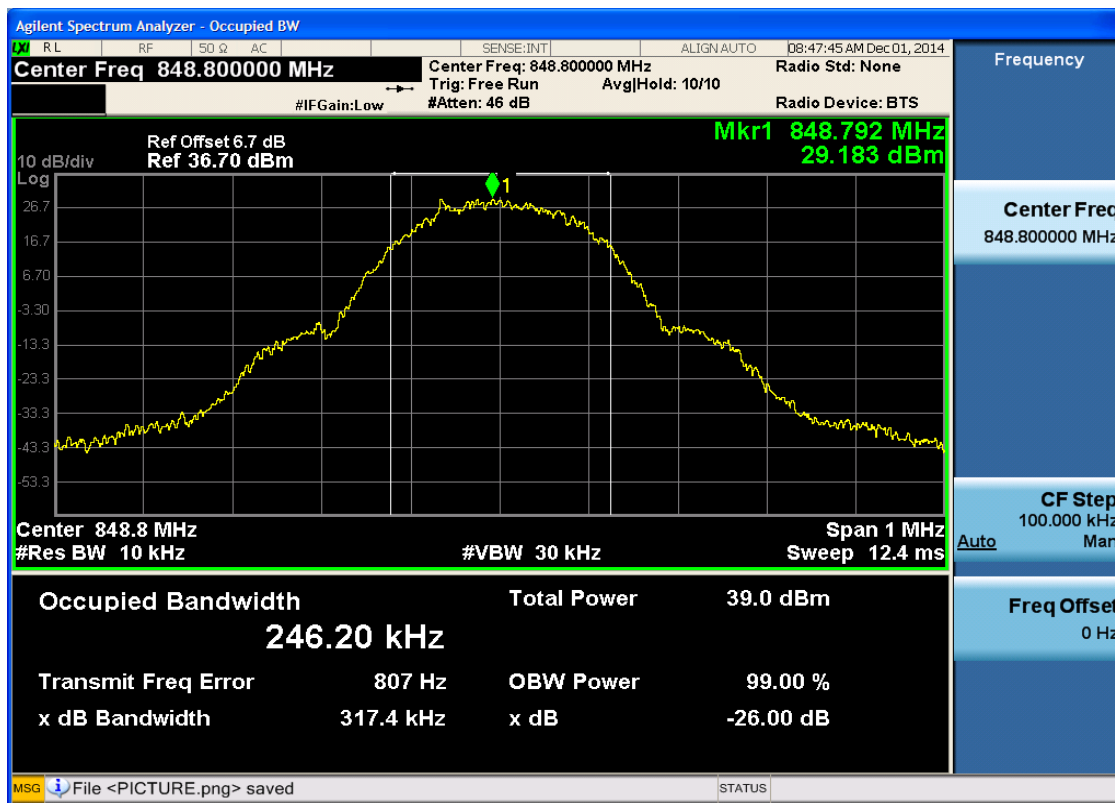


4.1.1.1.2 Test Channel = MCH





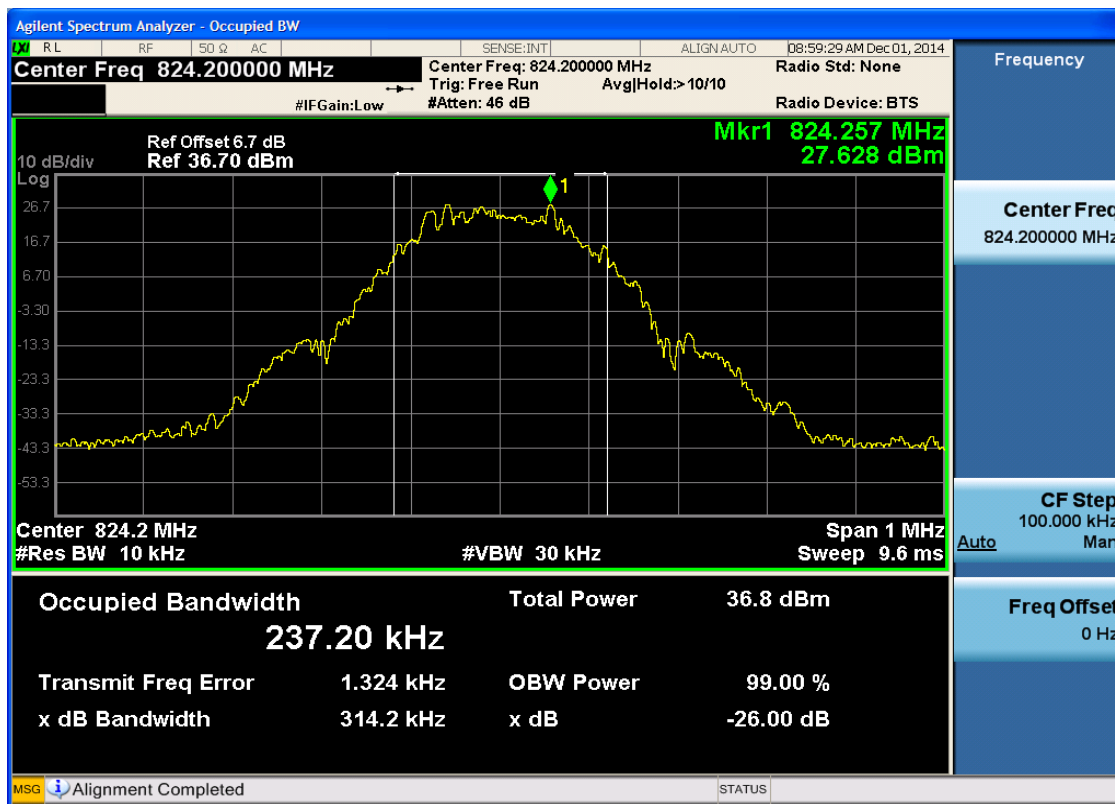
4.1.1.1.3 Test Channel = HCH





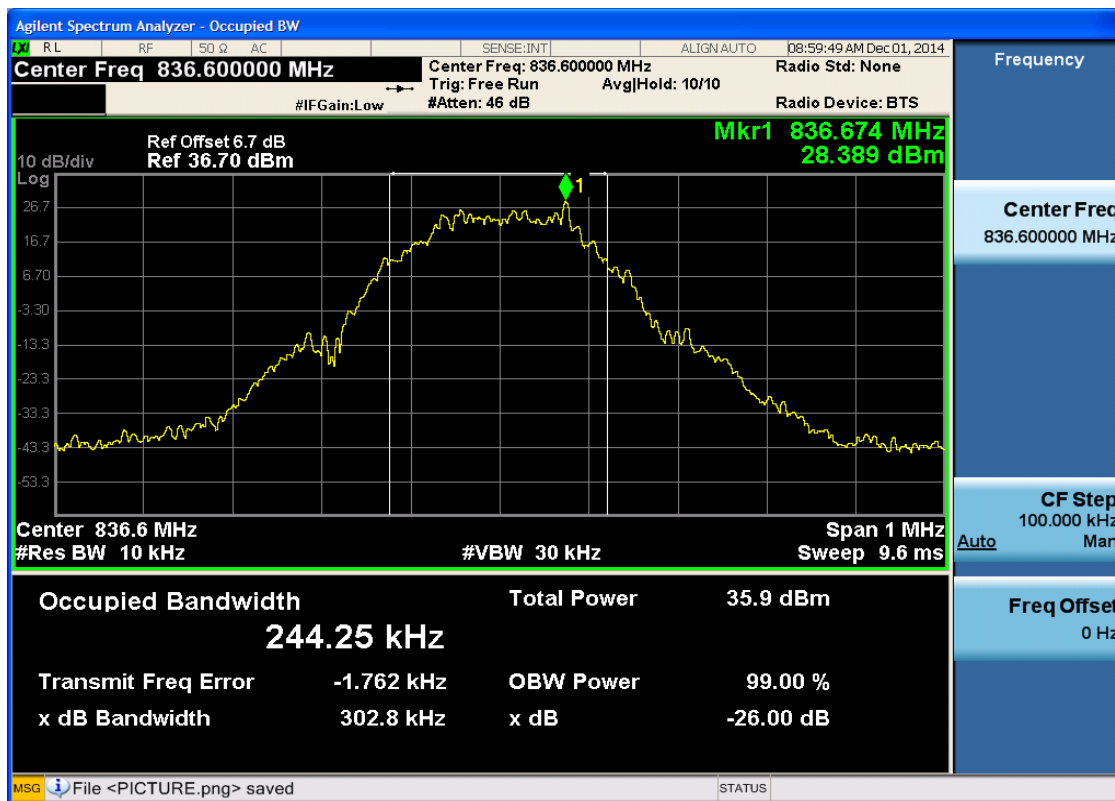
4.1.1.2 Test Mode = GSM/TM2

4.1.1.2.1 Test Channel = LCH



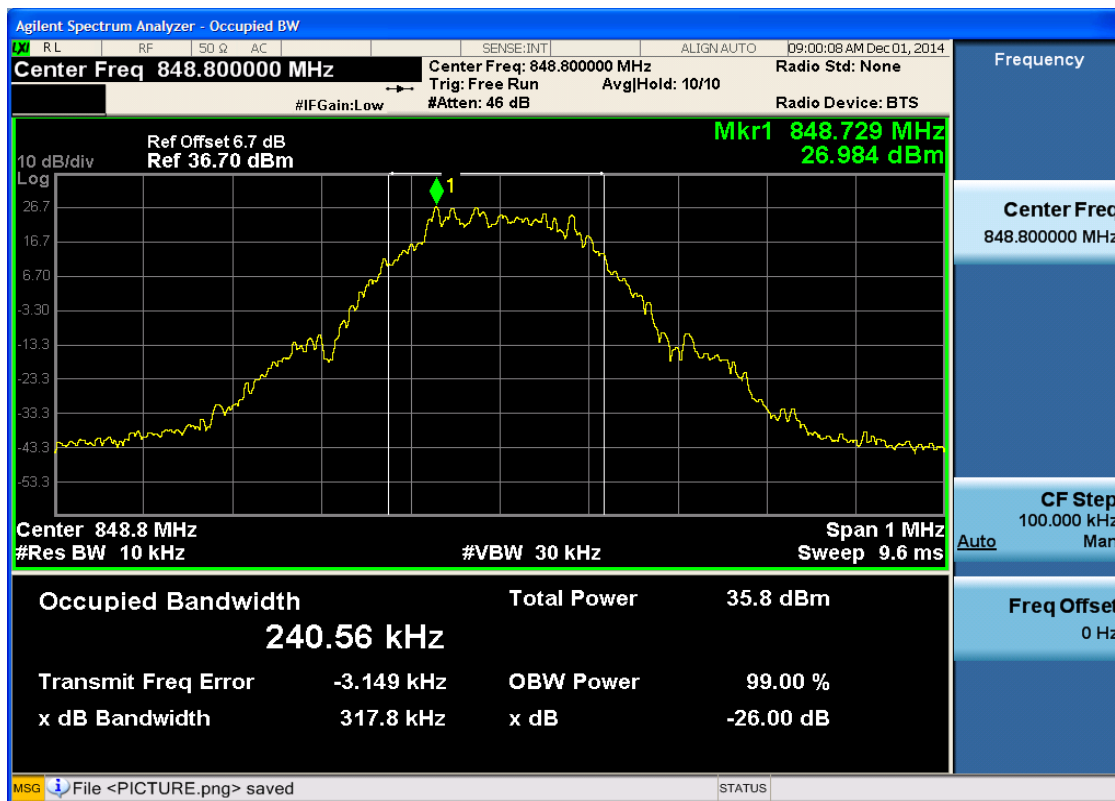


4.1.1.2.2 Test Channel = MCH





4.1.1.2.3 Test Channel = HCH

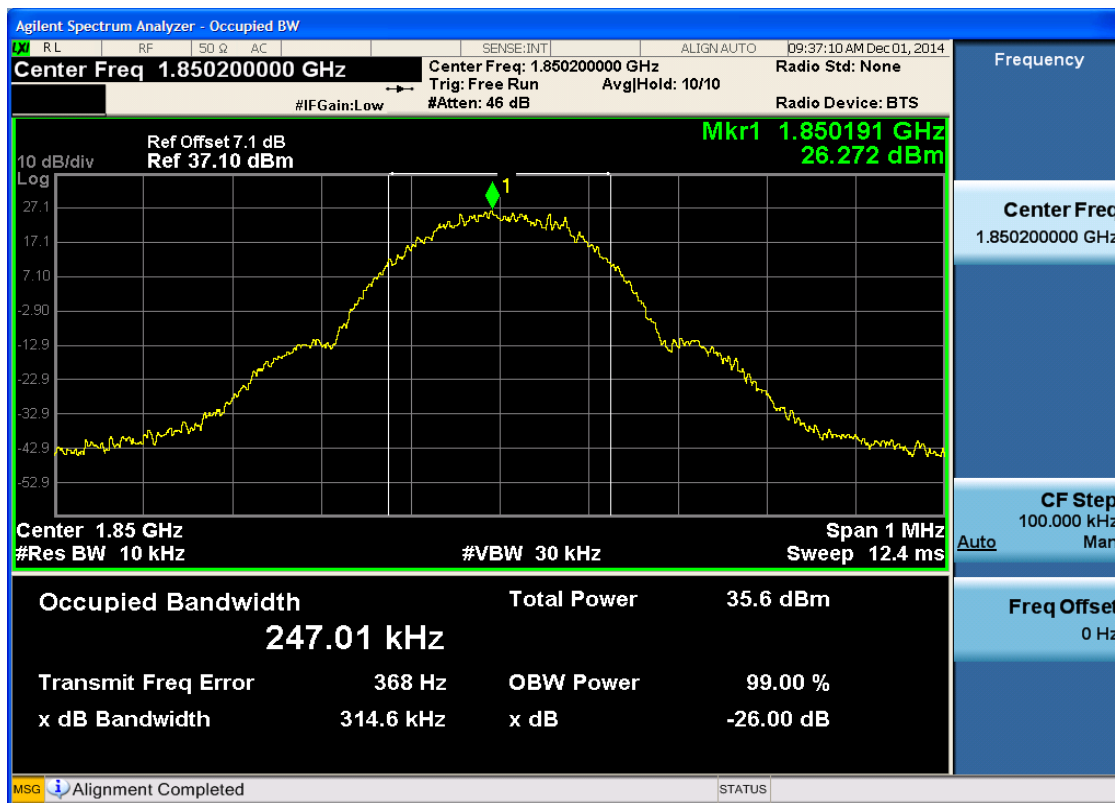




4.1.2 Test Band = GSM1900

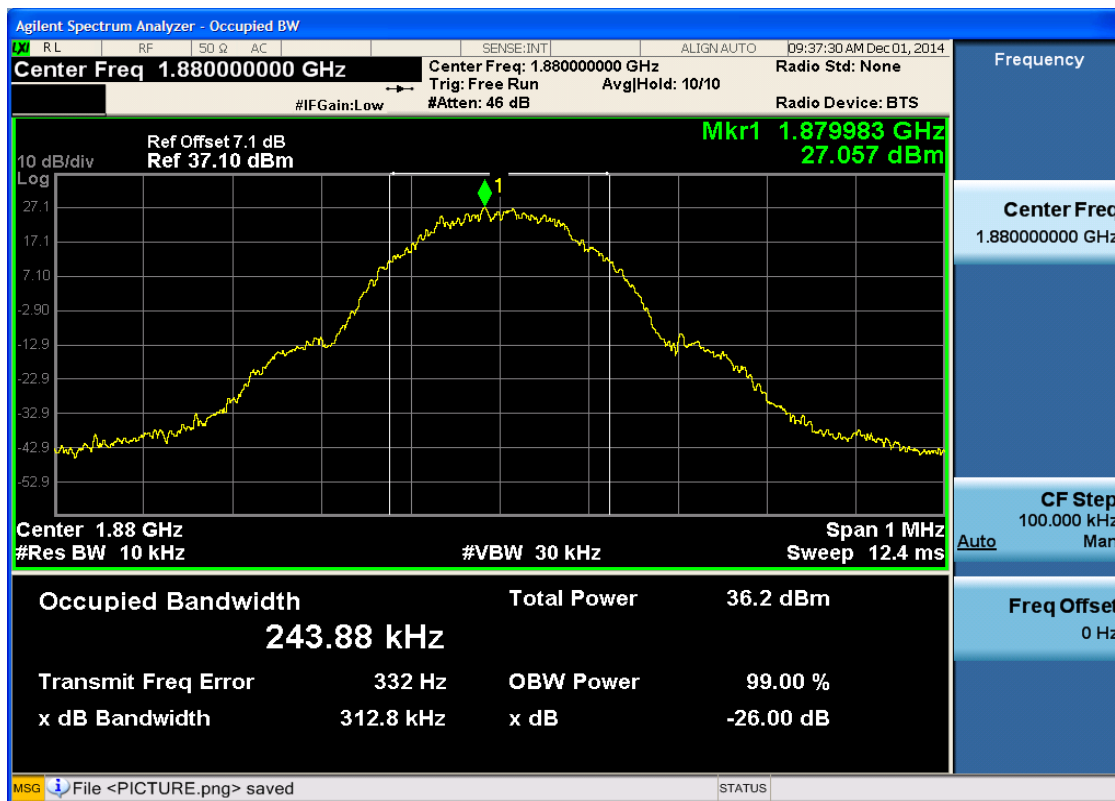
4.1.2.1 Test Mode = GSM/TM1

4.1.2.1.1 Test Channel = LCH



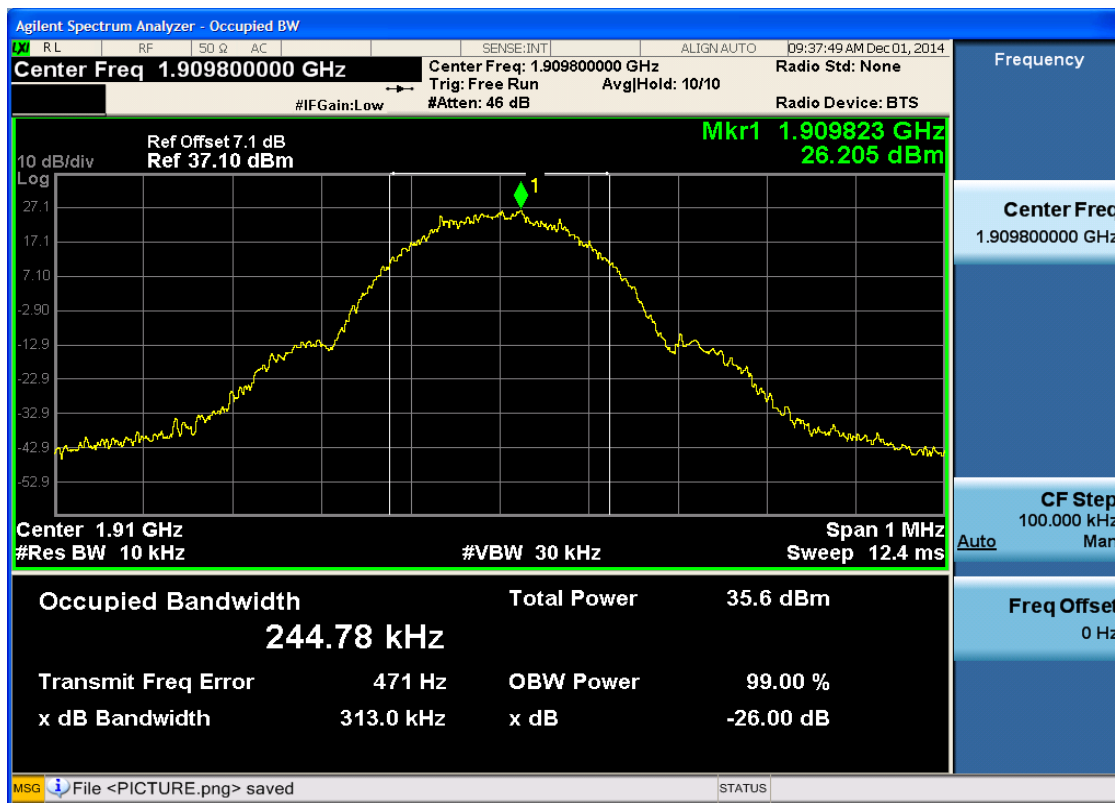


4.1.2.1.2 Test Channel = MCH





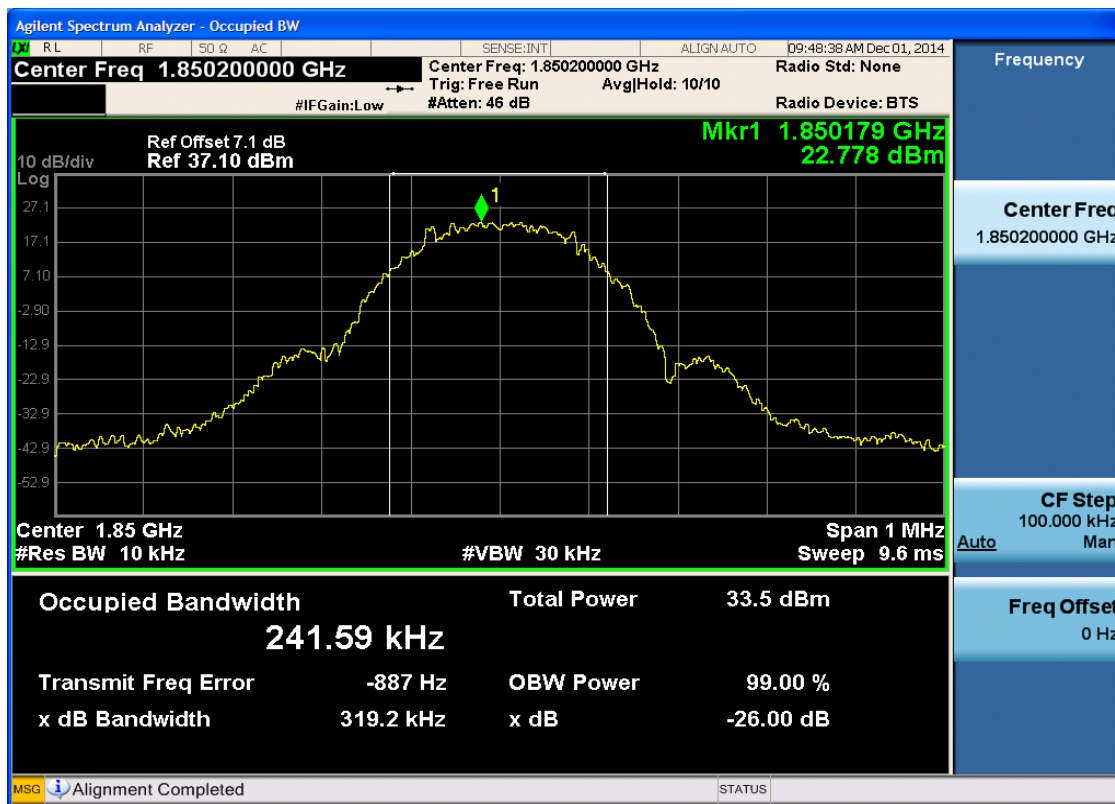
4.1.2.1.3 Test Channel = HCH





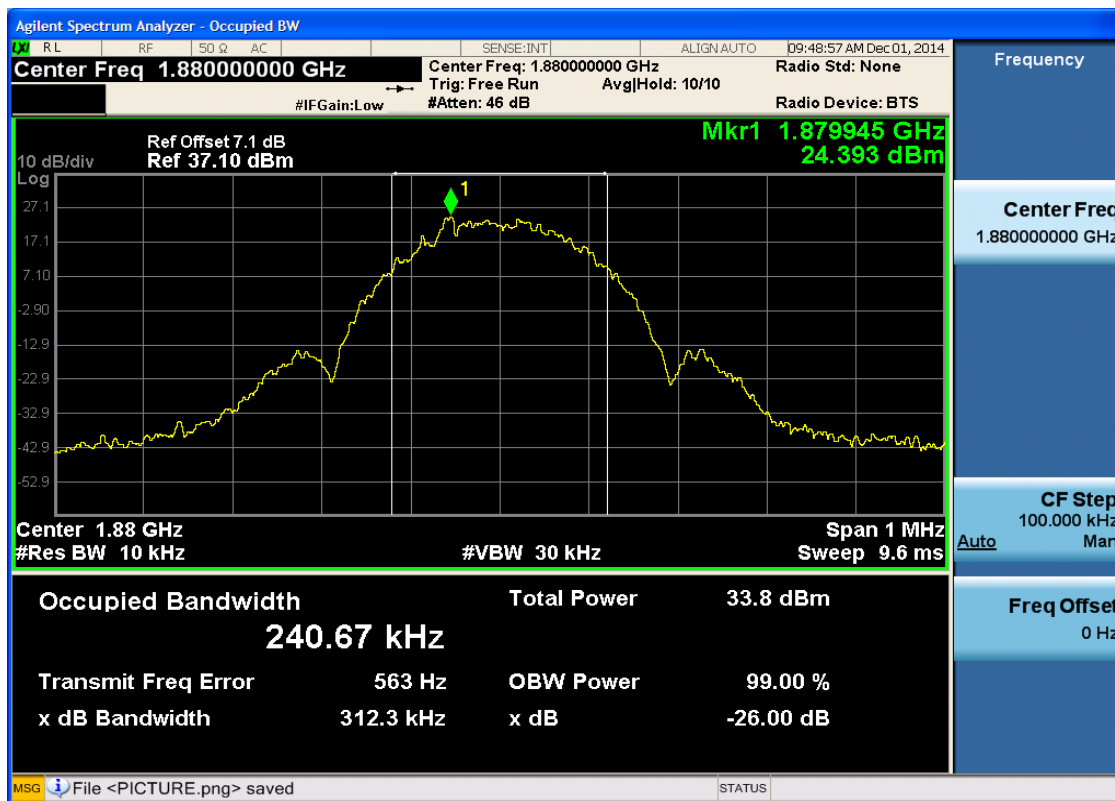
4.1.2.2 Test Mode = GSM/TM2

4.1.2.2.1 Test Channel = LCH



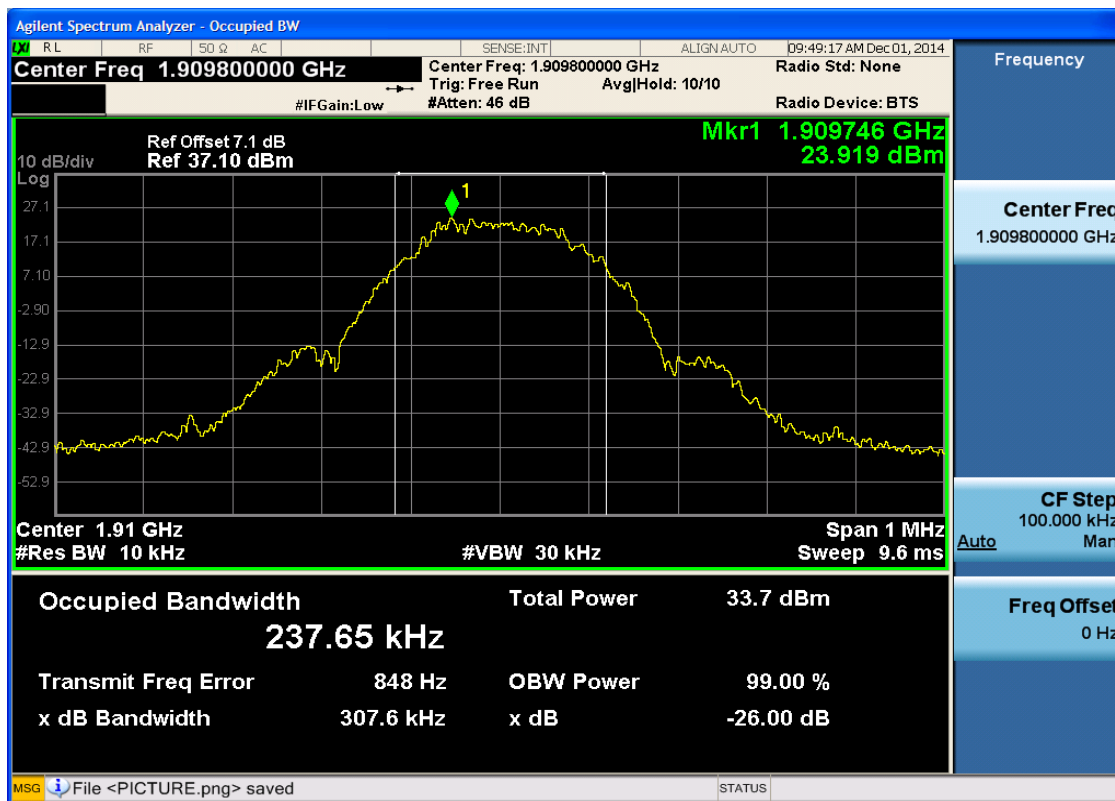


4.1.2.2.2 Test Channel = MCH





4.1.2.2.3 Test Channel = HCH



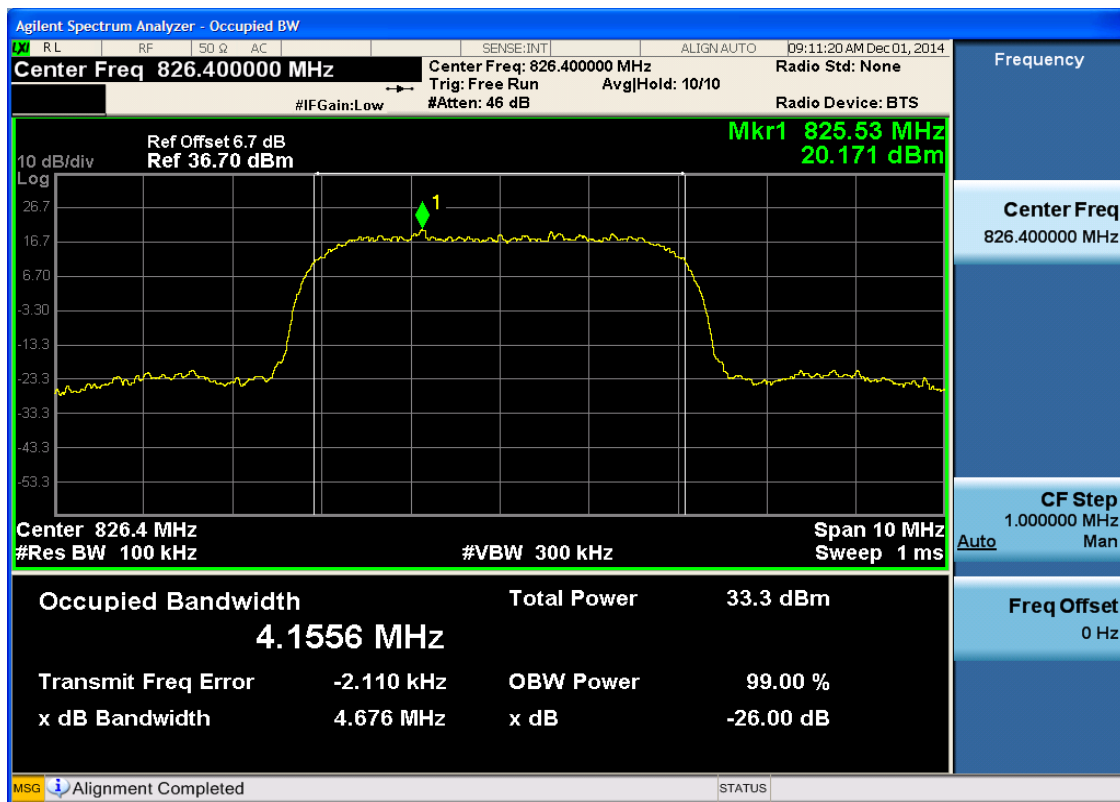


4.2 For UMTS

4.2.1 Test Band = WCDMA850

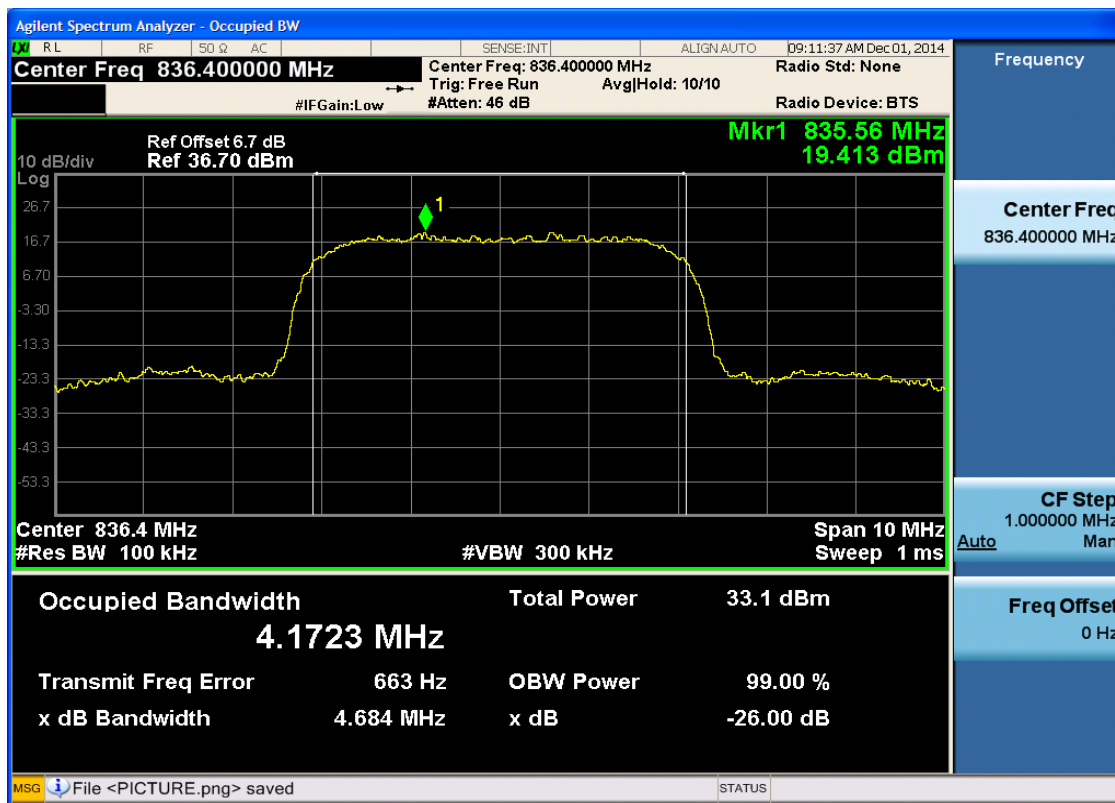
4.2.1.1 Test Mode = UMTS/TM1

4.2.1.1.1 Test Channel = LCH



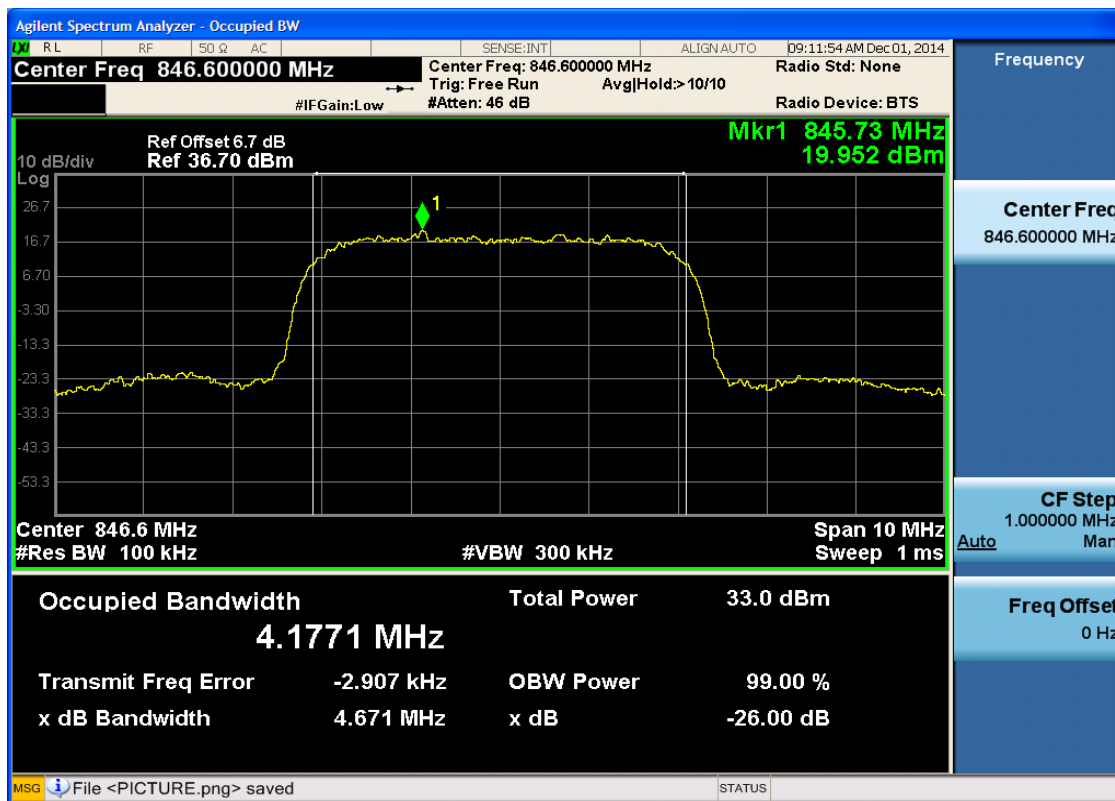


4.2.1.1.2 Test Channel = MCH





4.2.1.1.3 Test Channel = HCH

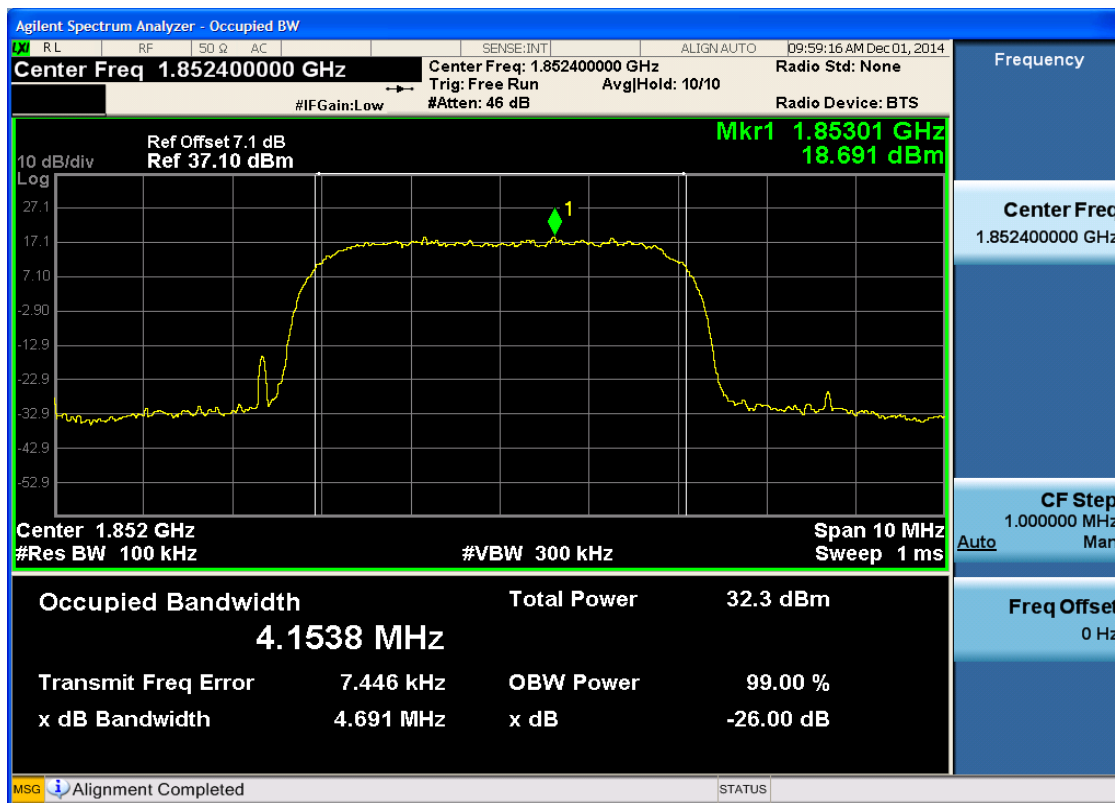




4.2.2 Test Band = WCDMA1900

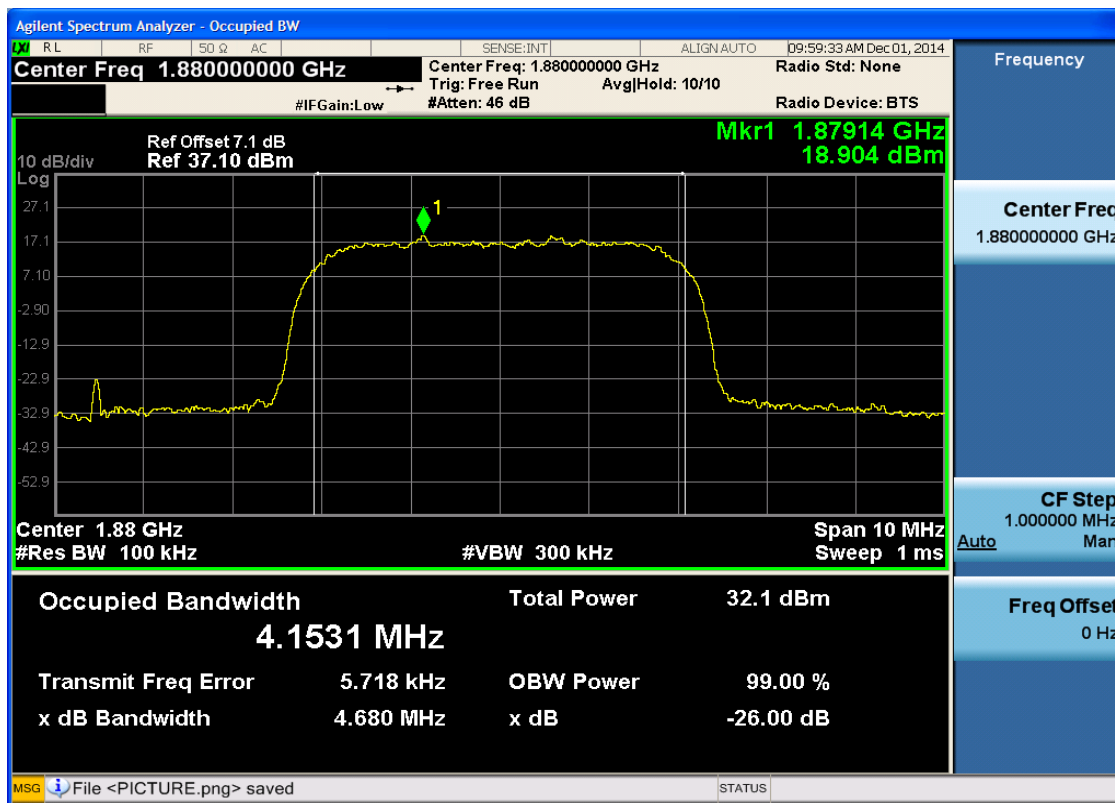
4.2.2.1 Test Mode = UMTS/TM1

4.2.2.1.1 Test Channel = LCH



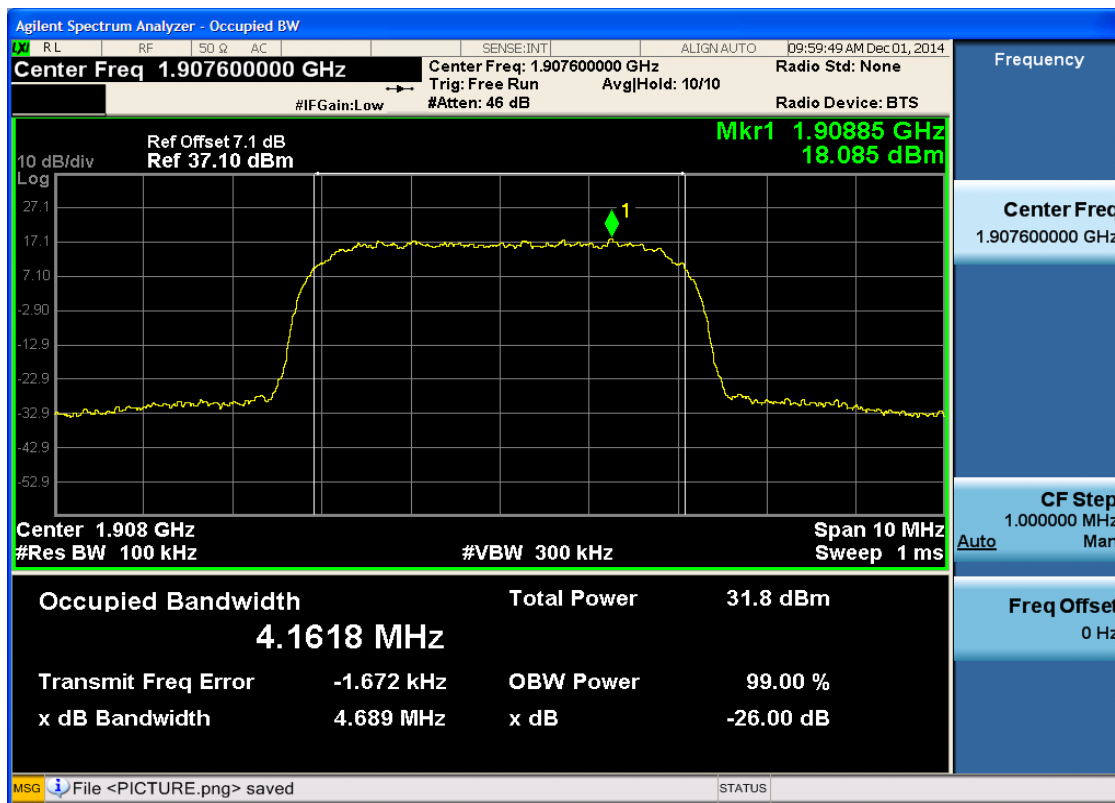


4.2.2.1.2 Test Channel = MCH





4.2.2.1.3 Test Channel = HCH

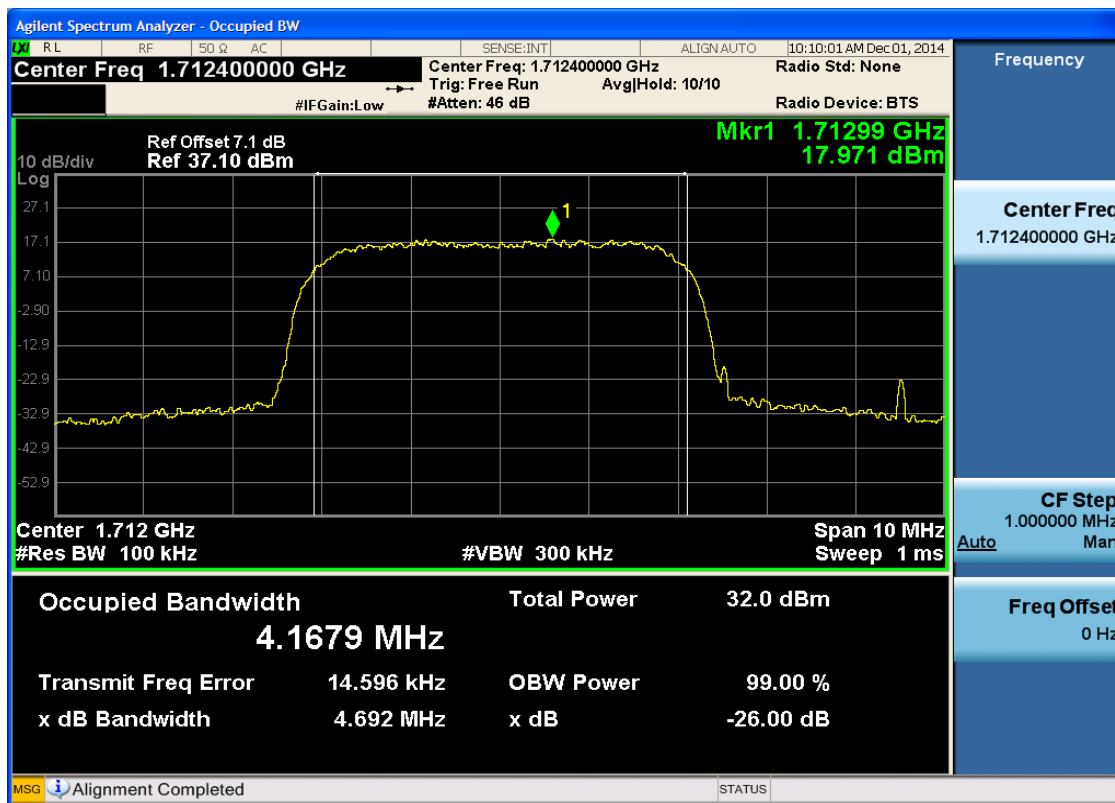




4.2.3 Test Band = WCDMA1700

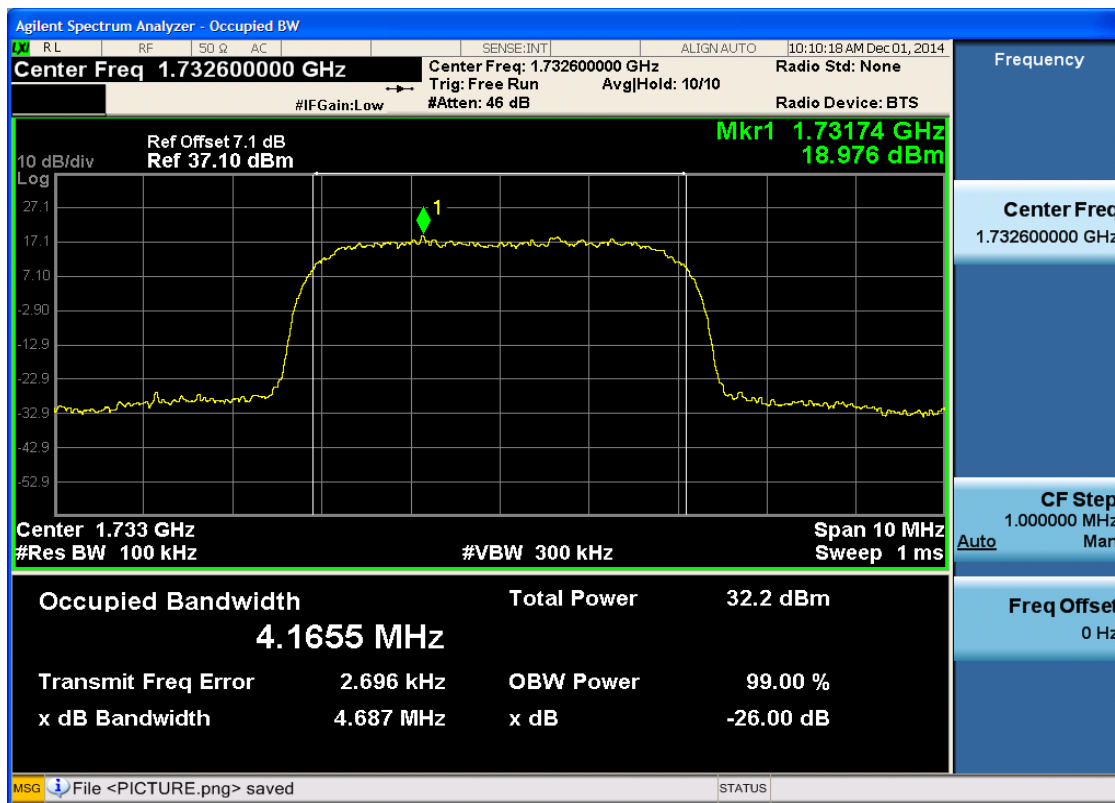
4.2.3.1 Test Mode = UMTS/TM1

4.2.3.1.1 Test Channel = LCH



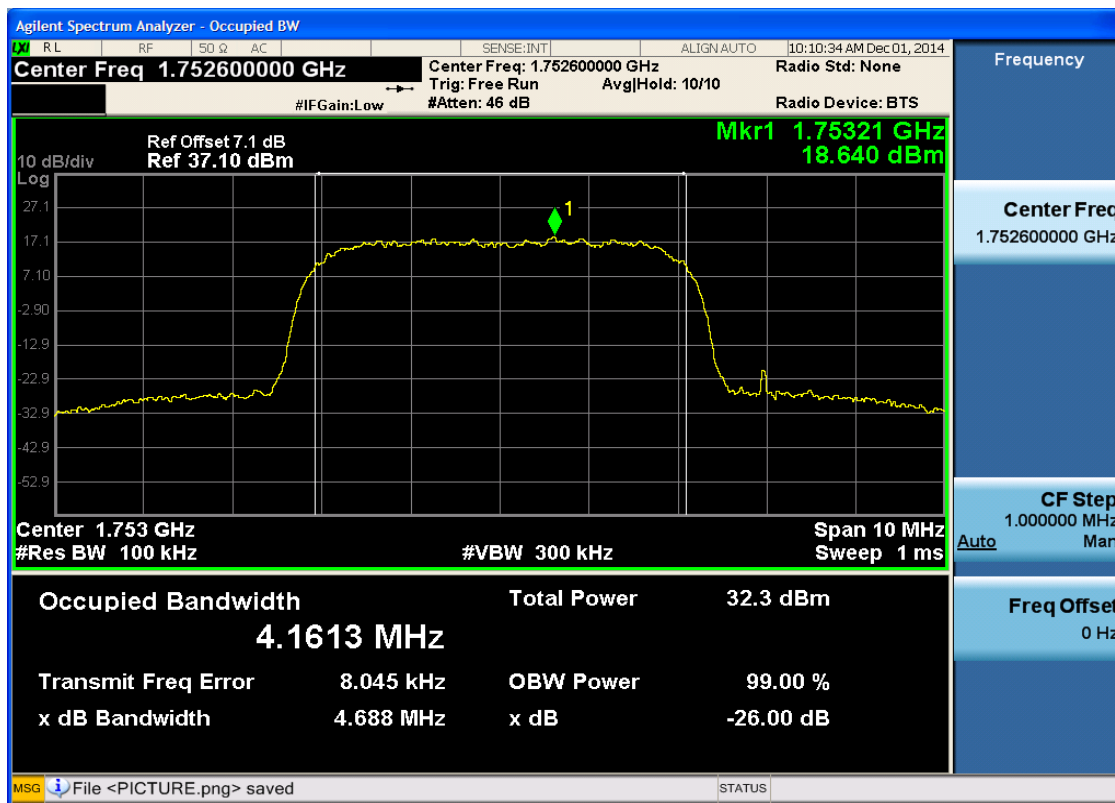


4.2.3.1.2 Test Channel = MCH





4.2.3.1.3 Test Channel = HCH



5Appendix_E: Band Edges Compliance

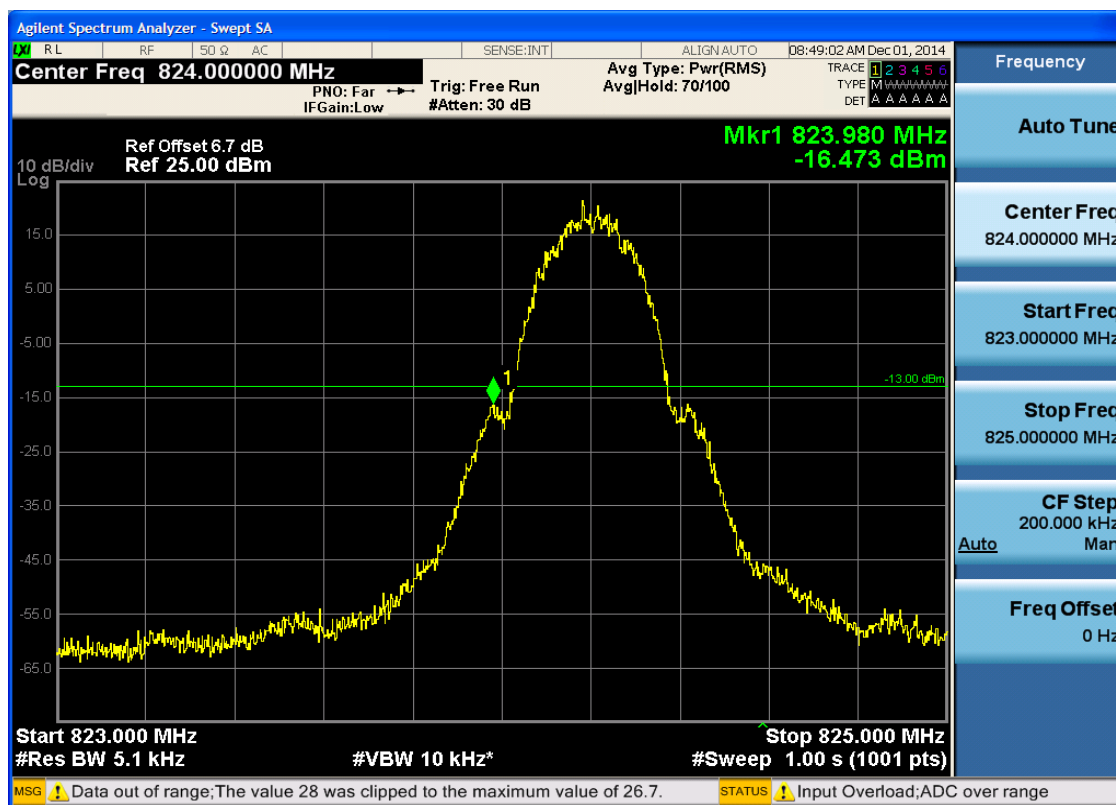
Part I - Test Plots

5.1 For GSM

5.1.1 Test Band = GSM850

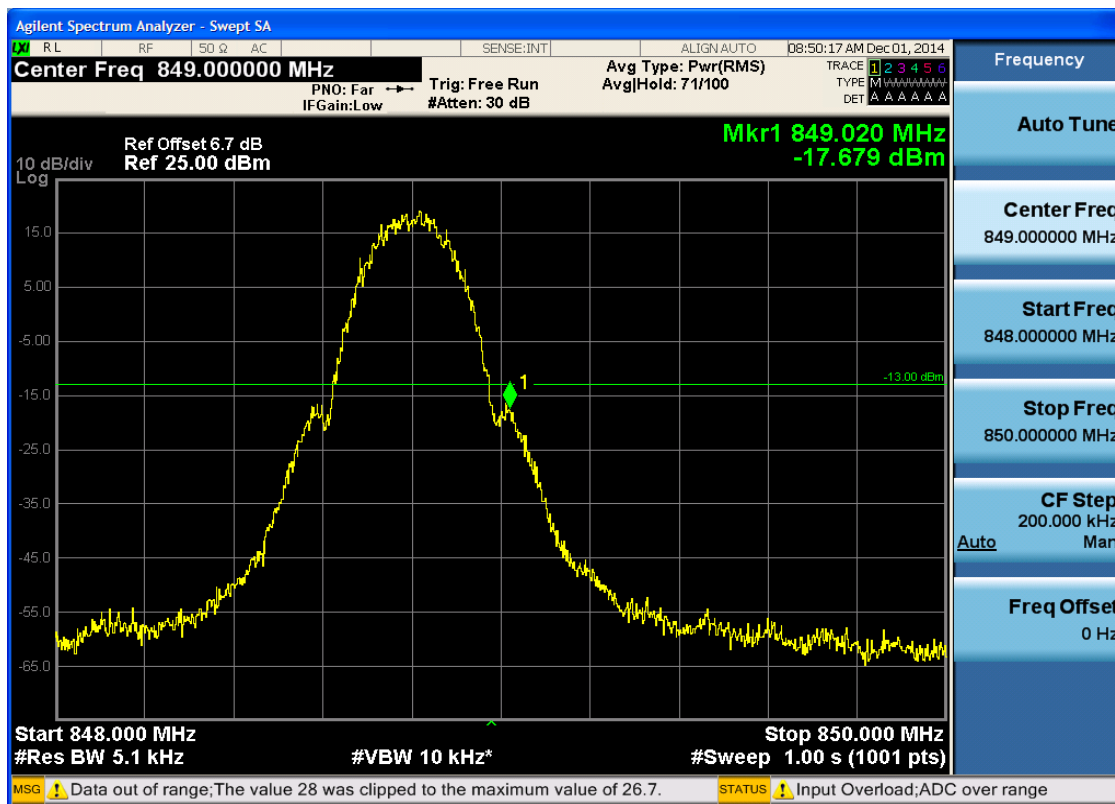
5.1.1.1 Test Mode = GSM/TM1

5.1.1.1.1 Test Channel = LCH



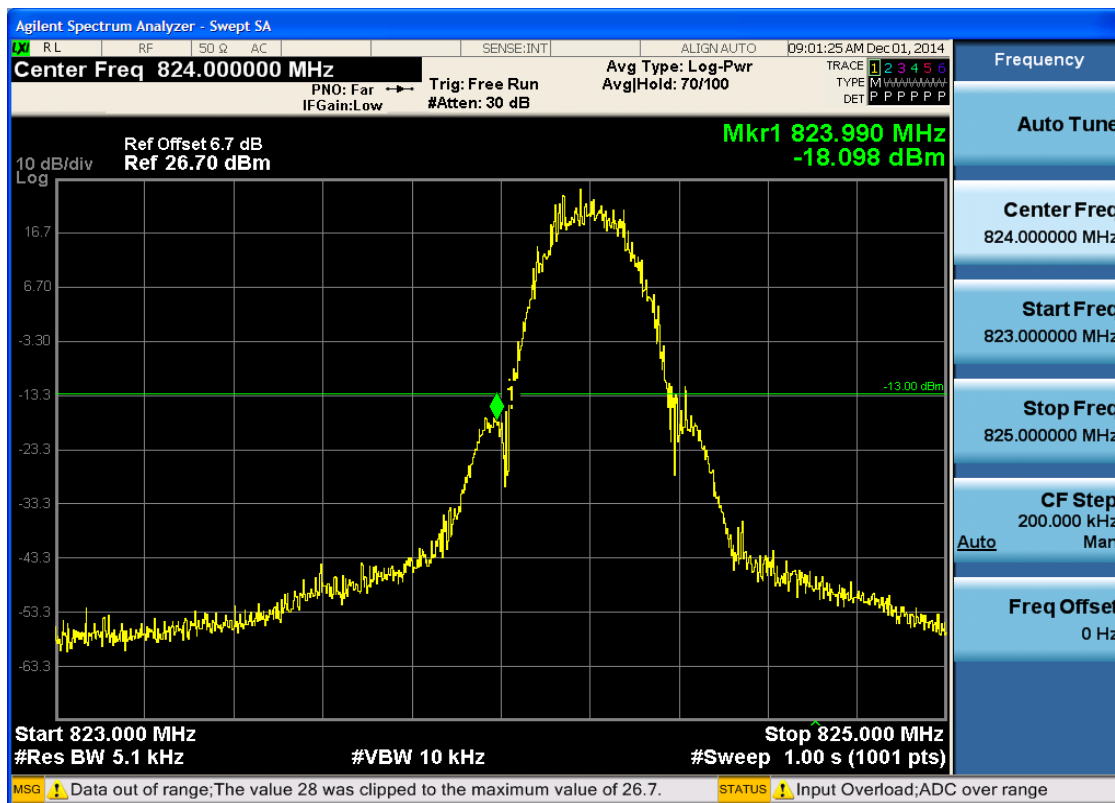


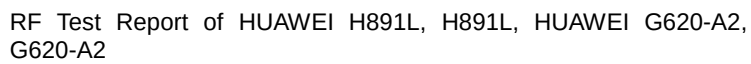
5.1.1.1.2 Test Channel = HCH



5.1.1.2 Test Mode = GSM/TM2

5.1.1.2.1 Test Channel = LCH





Agilent Spectrum Analyzer - Swept SA

Center Freq 849.00000 MHz

PNO: Far → Trig: Free Run
IFGain: Low #Atten: 30 dB

Avg Type: Log-Pwr Avg/Hold: 71/100

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

Ref Offset 6.7 dB
Ref 26.70 dBm

Mkr1 849.040 MHz
-18.360 dBm

Start 848.000 MHz Stop 850.000 MHz
#Res BW 5.1 kHz #VBW 10 kHz #Sweep 1.00 s (1001 pts)

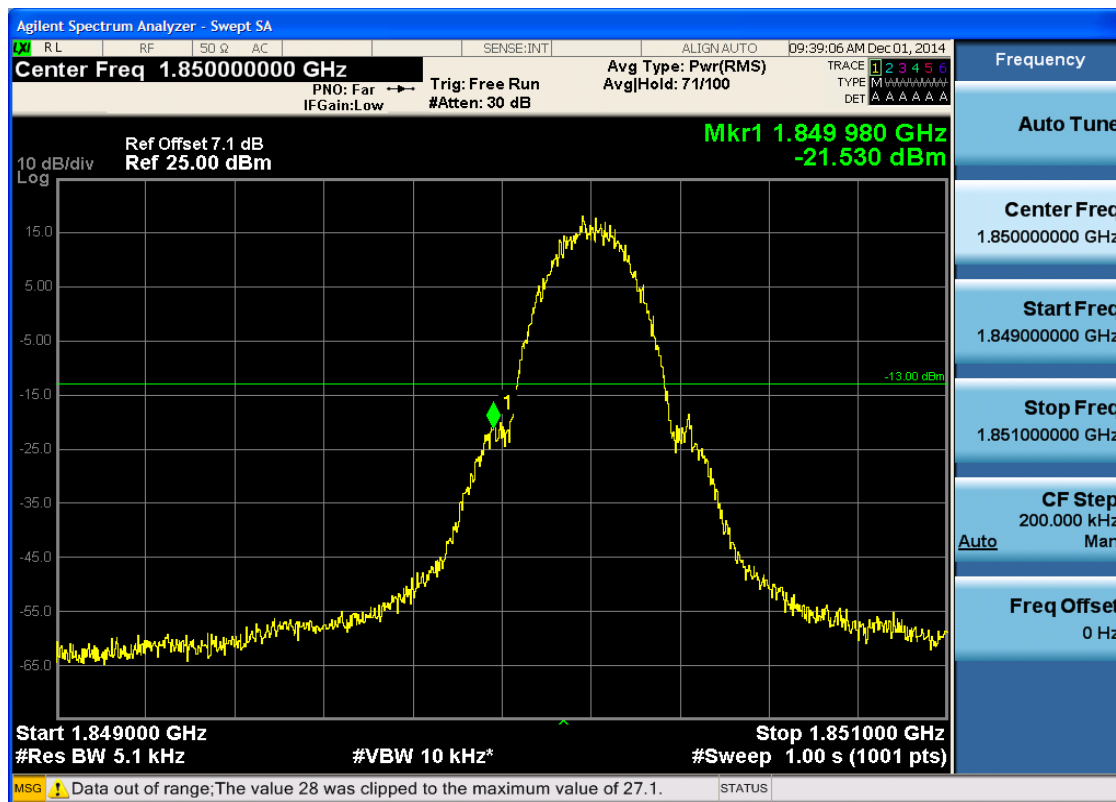
MSG Alignment Completed STATUS



5.1.2 Test Band = GSM1900

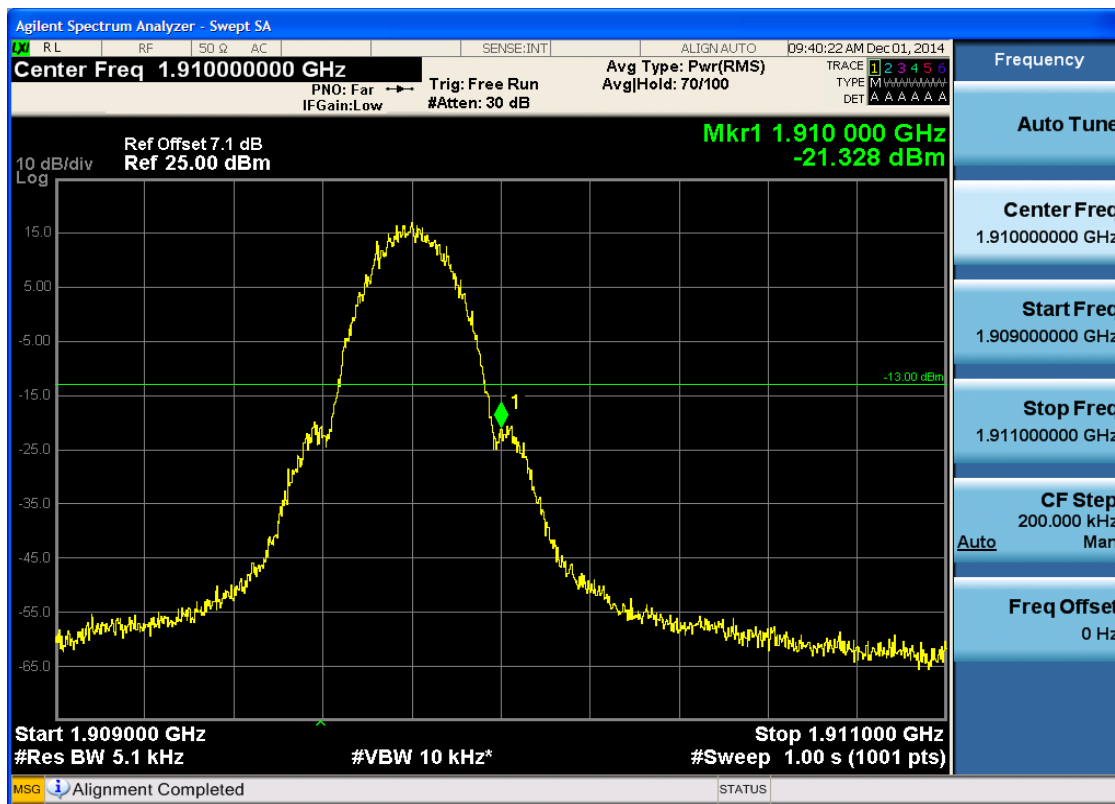
5.1.2.1 Test Mode = GSM/TM1

5.1.2.1.1 Test Channel = LCH



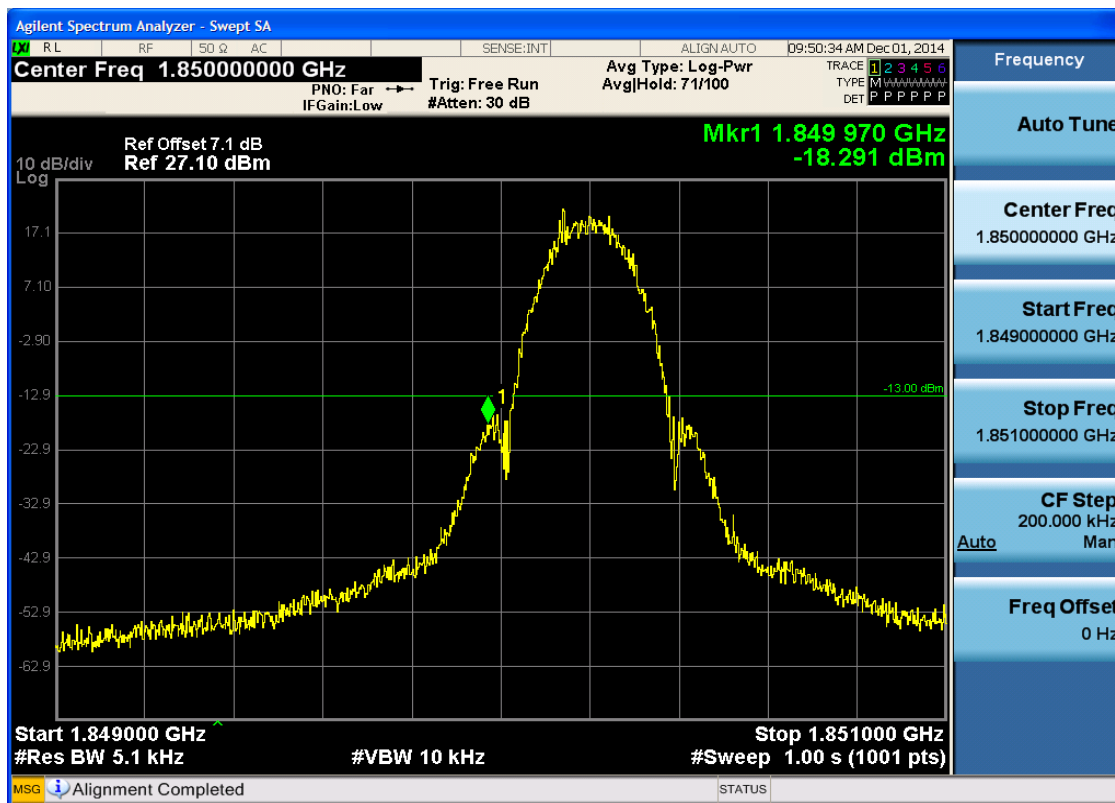


5.1.2.1.2 Test Channel = HCH



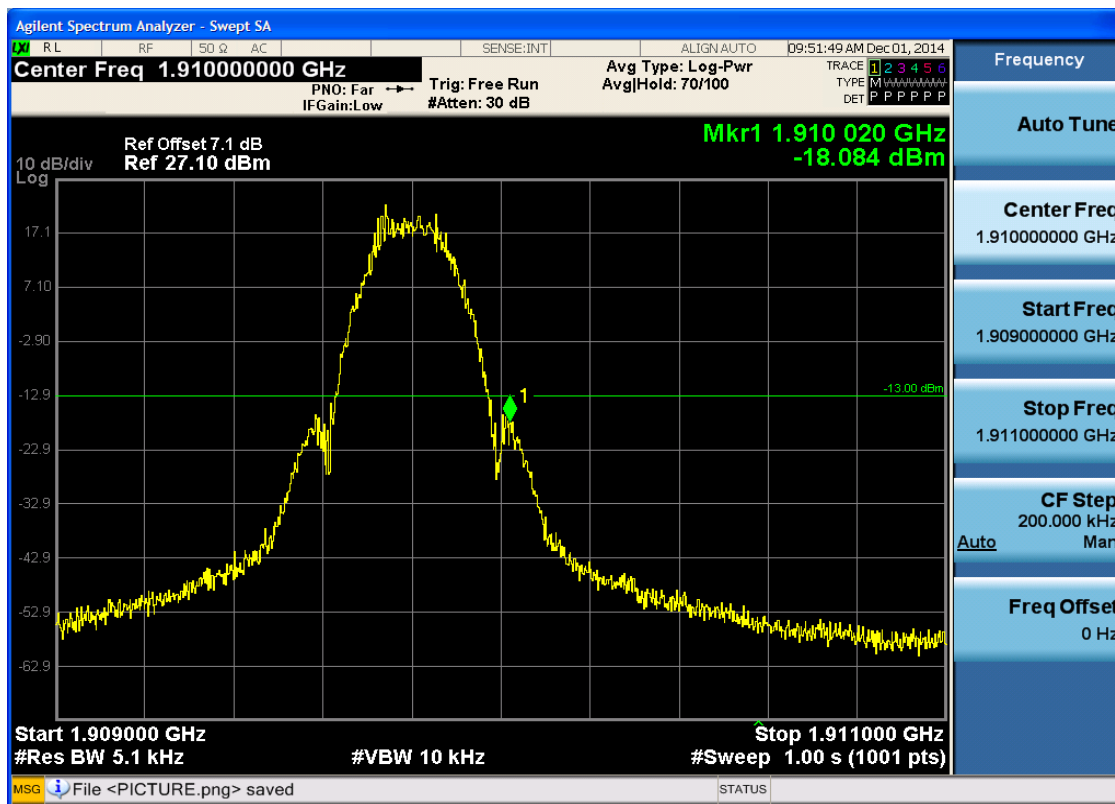
5.1.2.2 Test Mode = GSM/TM2

5.1.2.2.1 Test Channel = LCH





5.1.2.2.2 Test Channel = HCH

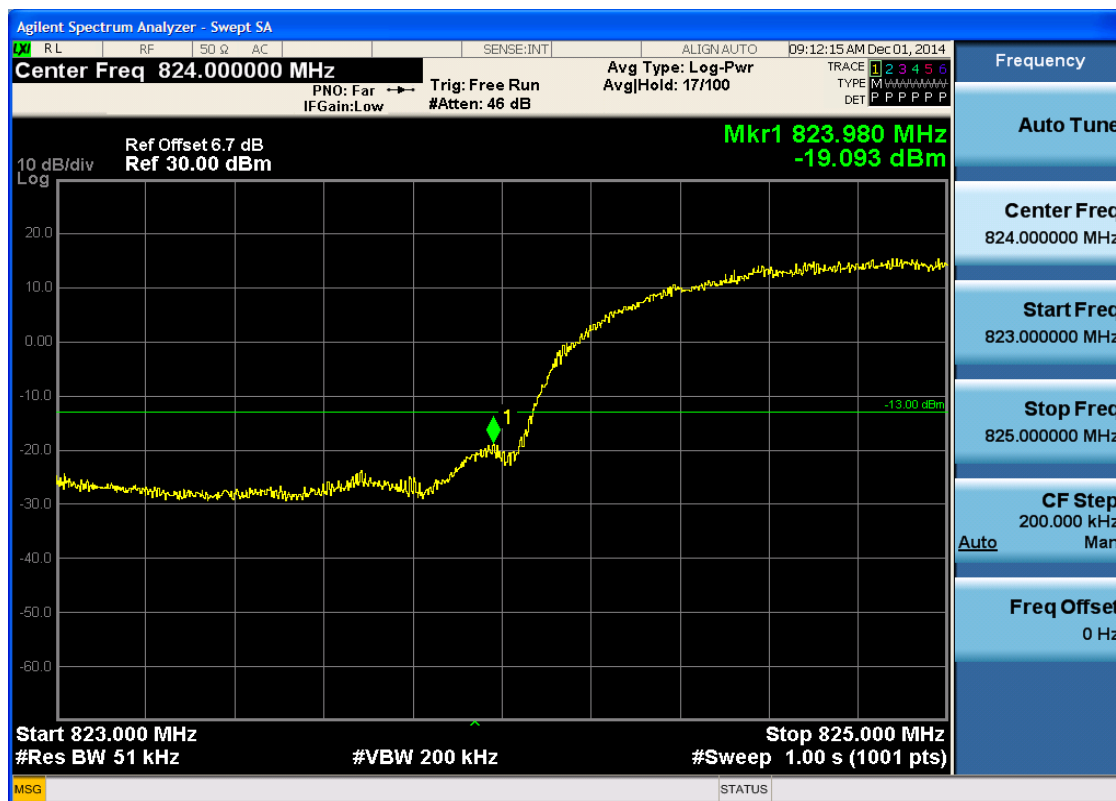


5.2 For UMTS

5.2.1 Test Band = WCDMA850

5.2.1.1 Test Mode = UMTS/TM1

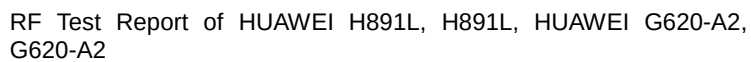
5.2.1.1.1 Test Channel = LCH

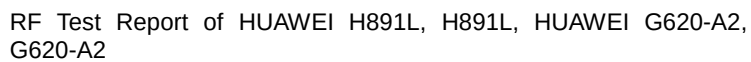




5.2.1.1.2 Test Channel = HCH







Agilent Spectrum Analyzer - Swept SA

☒ R.L. RF 50 Ω AC SENSE:INT ALIGN:AUTO 10:00:32 AM Dec 01, 2014
Center Freq 1.91000000 GHz PNO: Far → Trig: Free Run Avg Type: Log-Pwr TRACE 1 2 3 4 5 6
 IFGain:Low #Atten: 46 dB AvgHold: 17/100 TYPE M P P P P P P
 DET P P P P P P P

Ref Offset 7.1 dB **Mkr1 1.910 030 GHz**
 Ref 30.00 dBm **-23.636 dBm**

10 dB/div
Log

-13.00 dBm

Start 1.909000 GHz **Stop 1.911000 GHz**
#Res BW 51 kHz **#VBW 200 kHz** **#Sweep 1.00 s (1001 pts)**

MSG File <PICTURE.png> saved STATUS

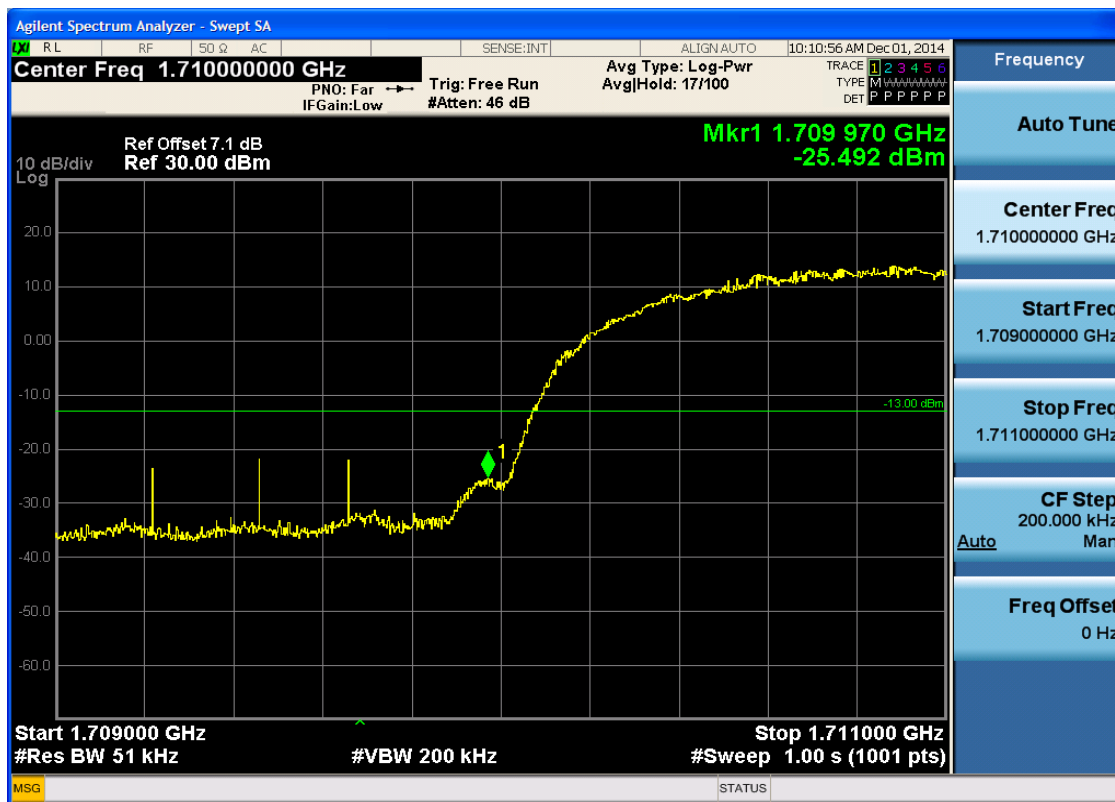
Frequency
 Auto Tune
 Center Freq
 1.91000000 GHz
 Start Freq
 1.909000000 GHz
 Stop Freq
 1.911000000 GHz
 CF Step
 200.000 kHz
 Auto Man
 Freq Offset
 0 Hz



5.2.3 Test Band = WCDMA1700

5.2.3.1 Test Mode = UMTS/TM1

5.2.3.1.1 Test Channel = LCH





5.2.3.1.2 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.

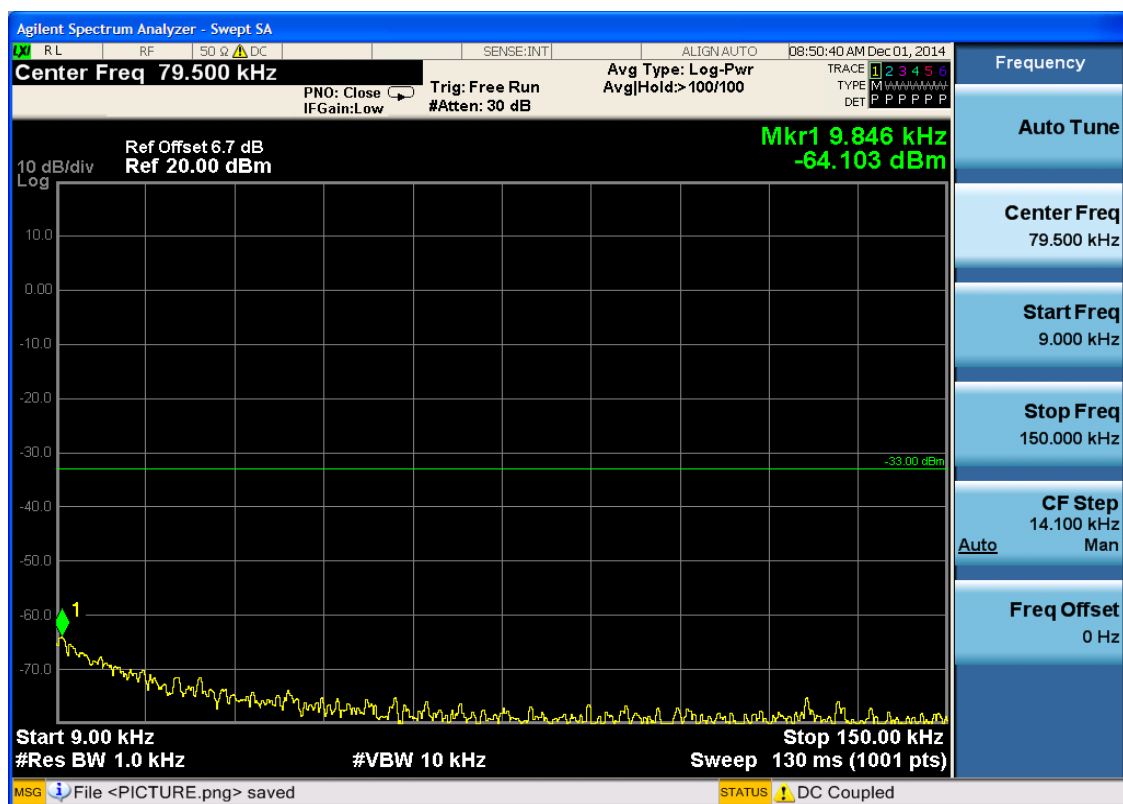
Part I - Test Plots

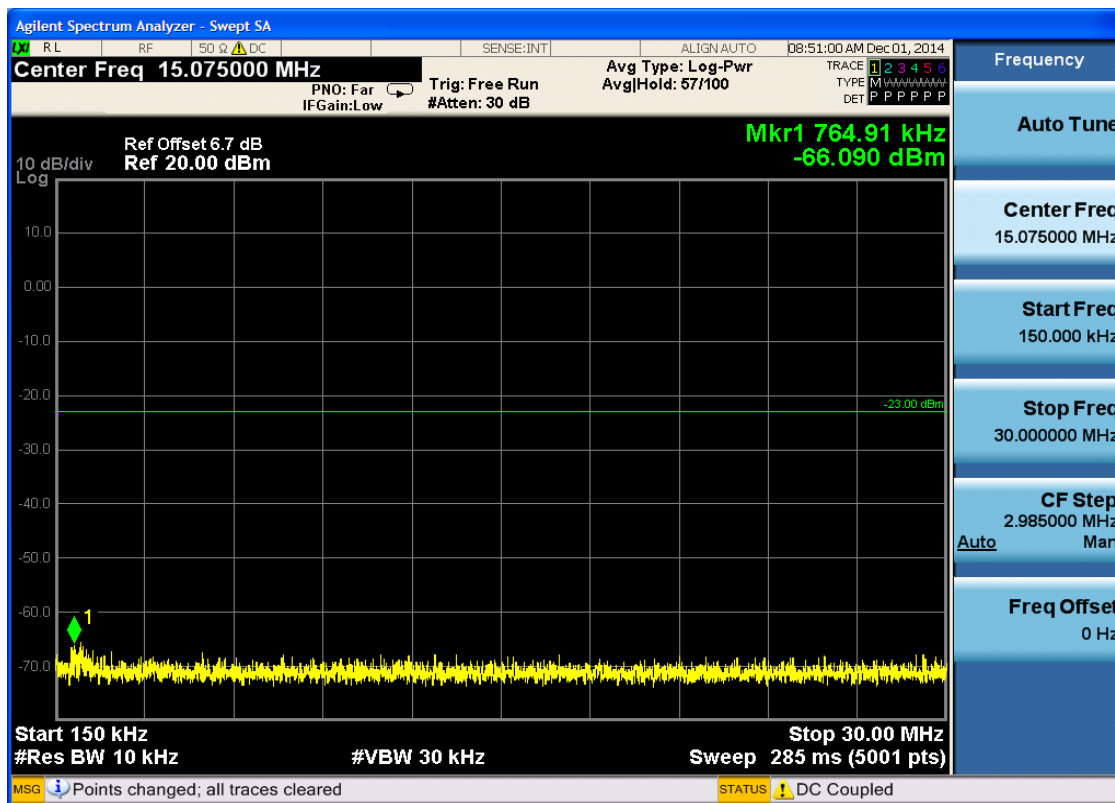
6.1 For GSM

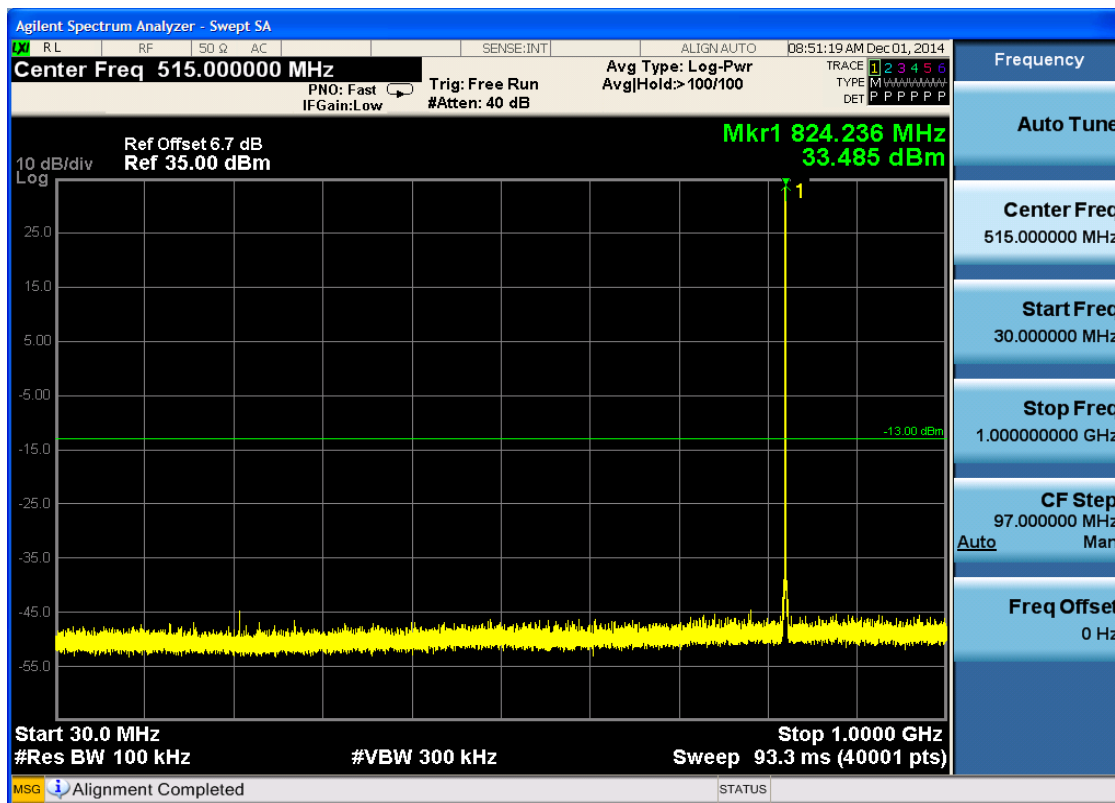
6.1.1 Test Band = GSM850

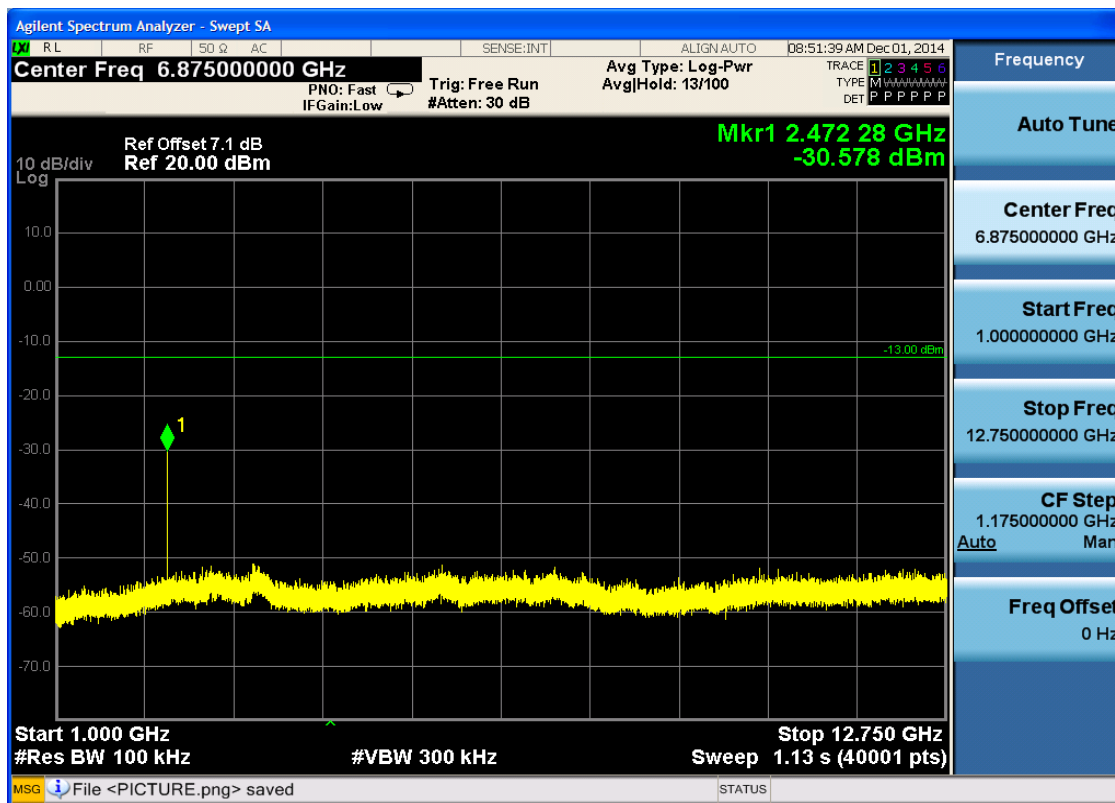
6.1.1.1 Test Mode = GSM/TM1

6.1.1.1.1 Test Channel = LCH



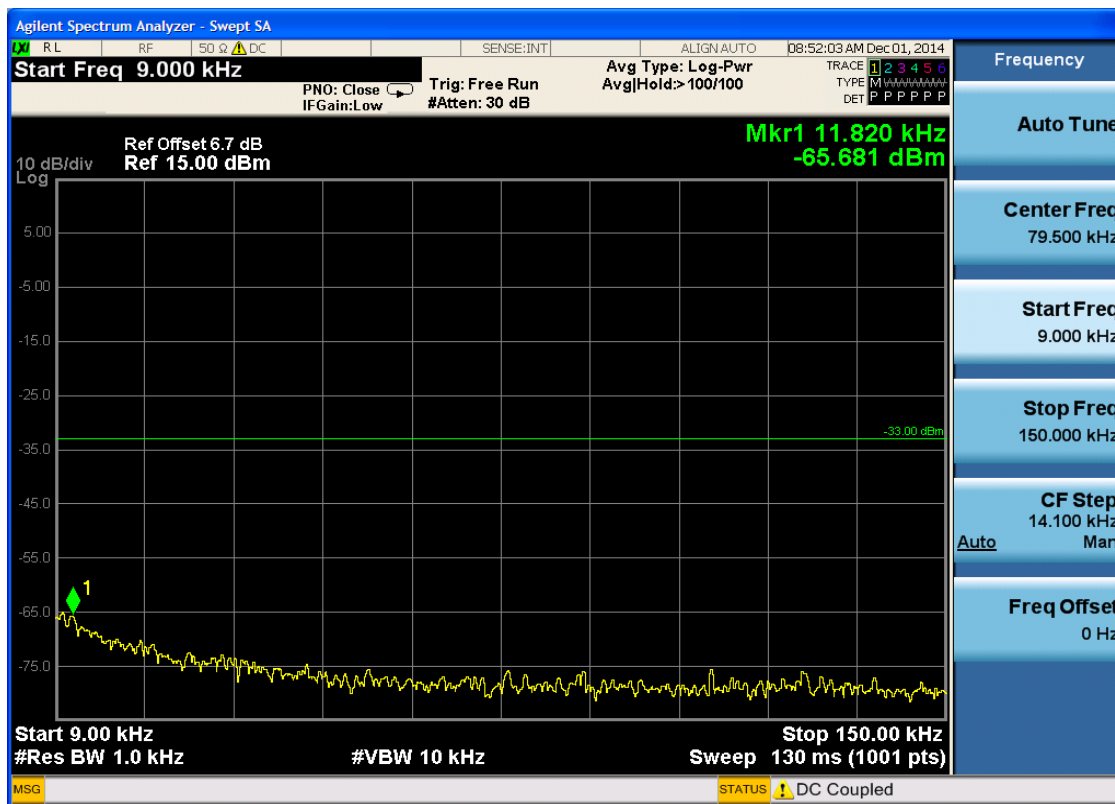


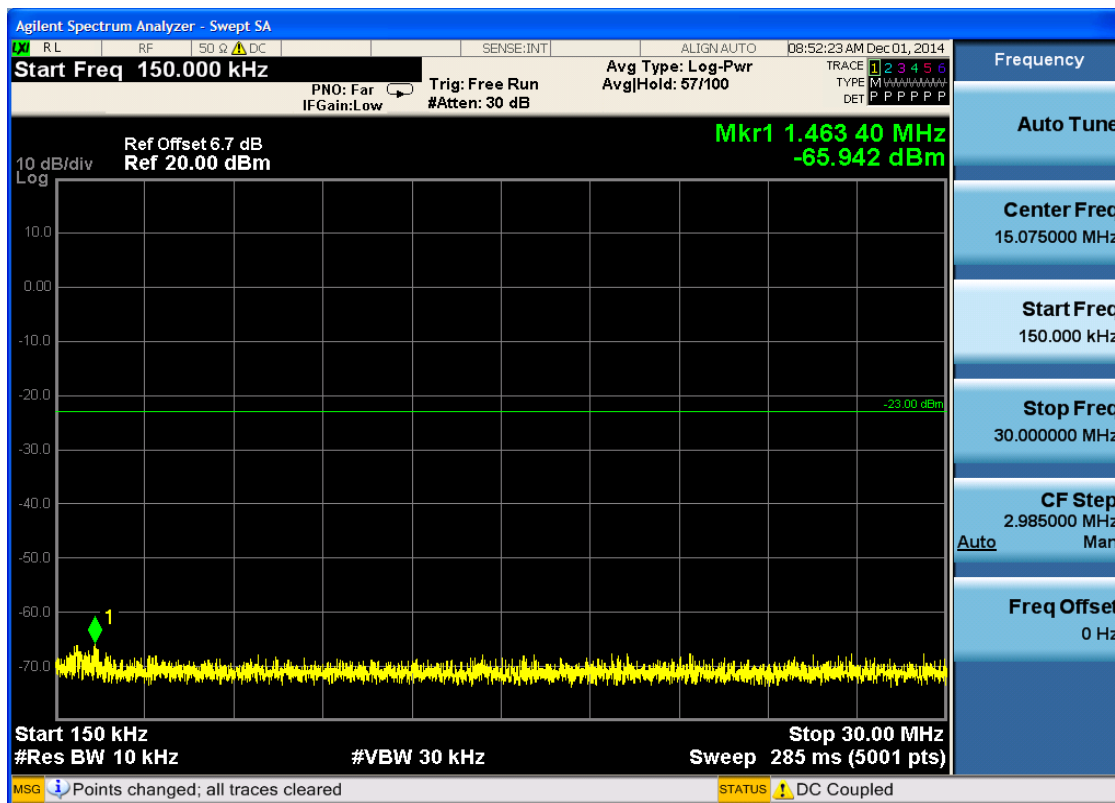


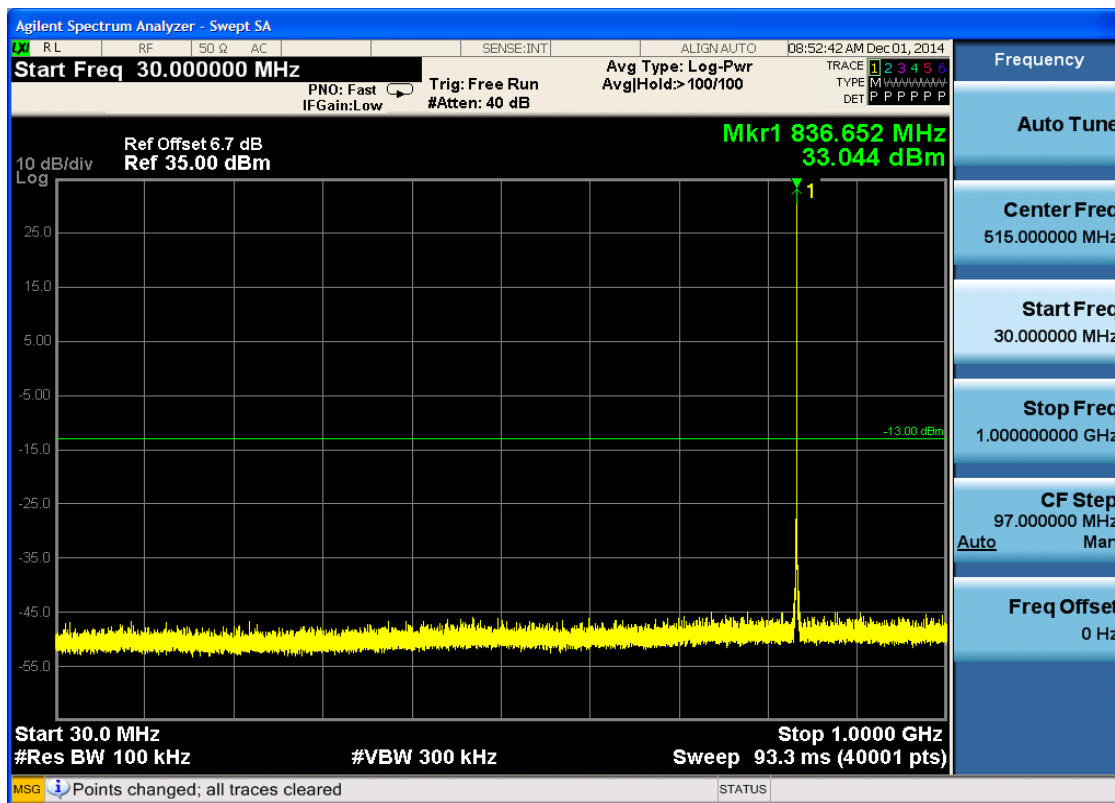


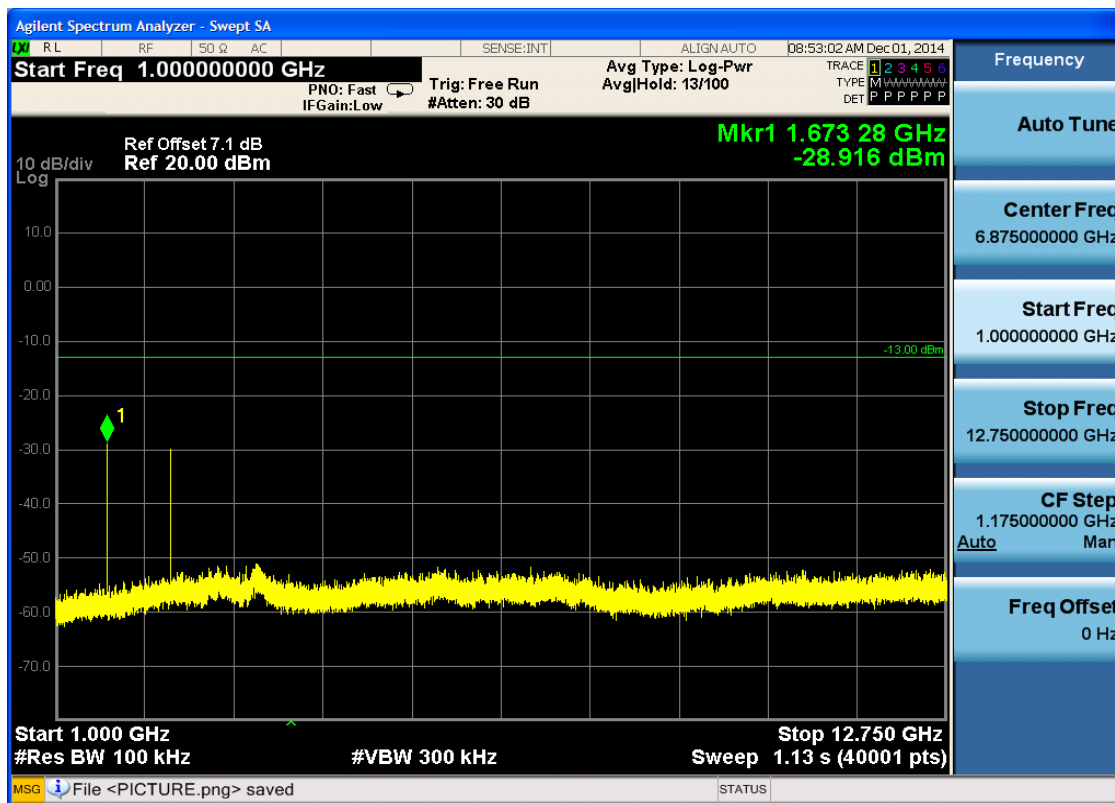


6.1.1.1.2 Test Channel = MCH



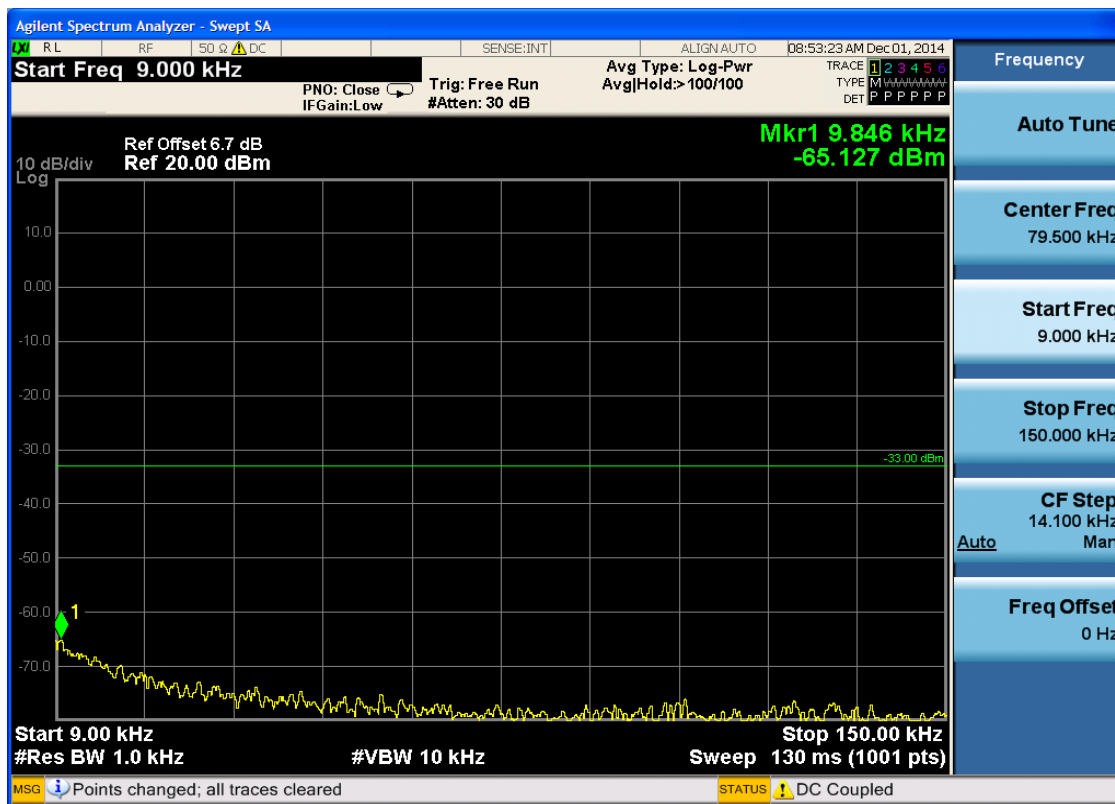


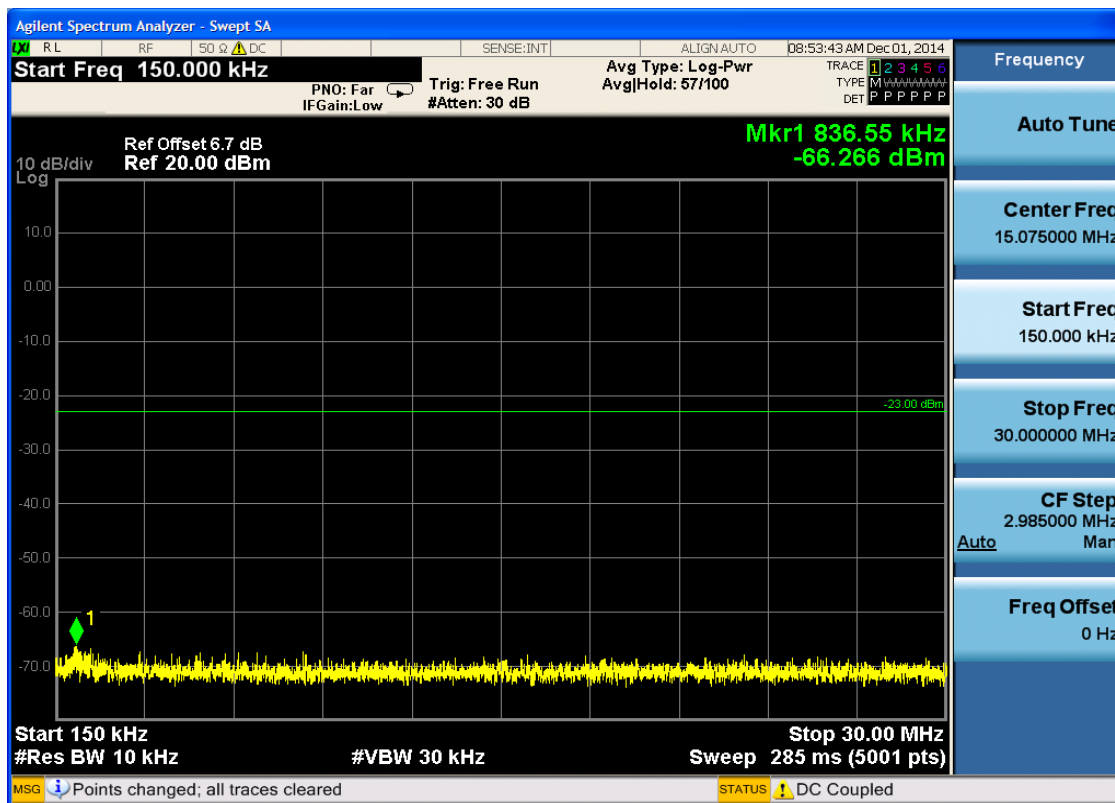


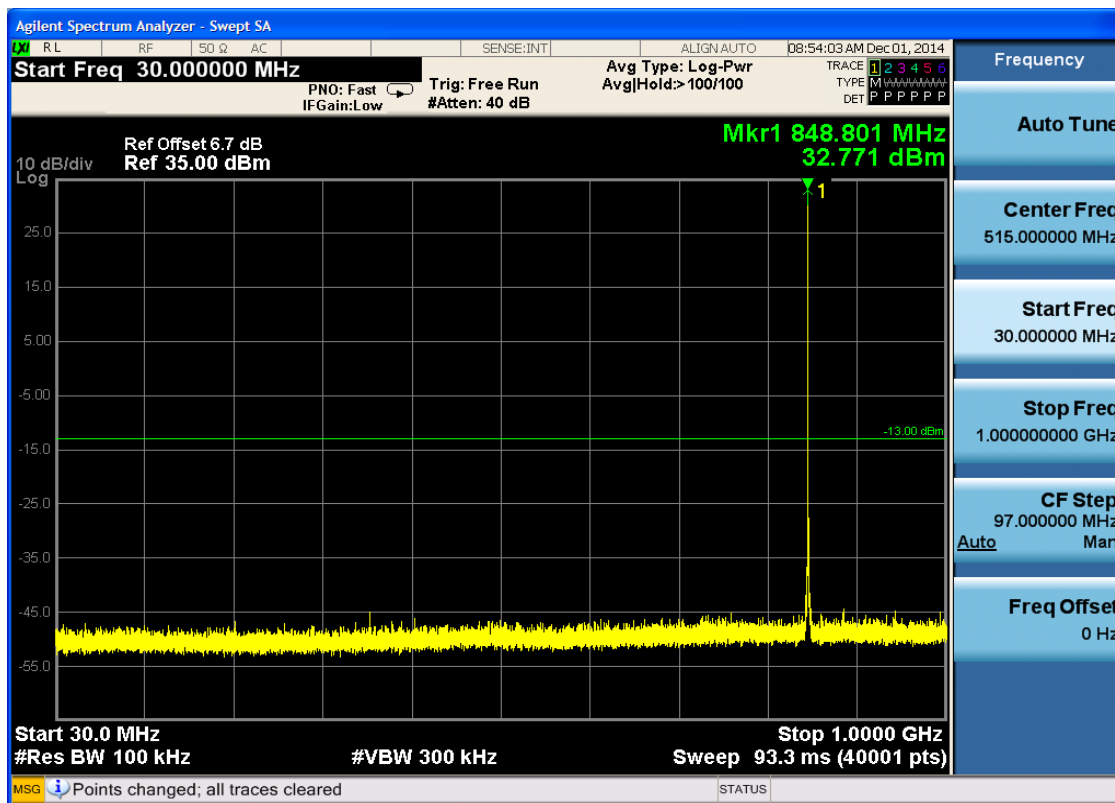


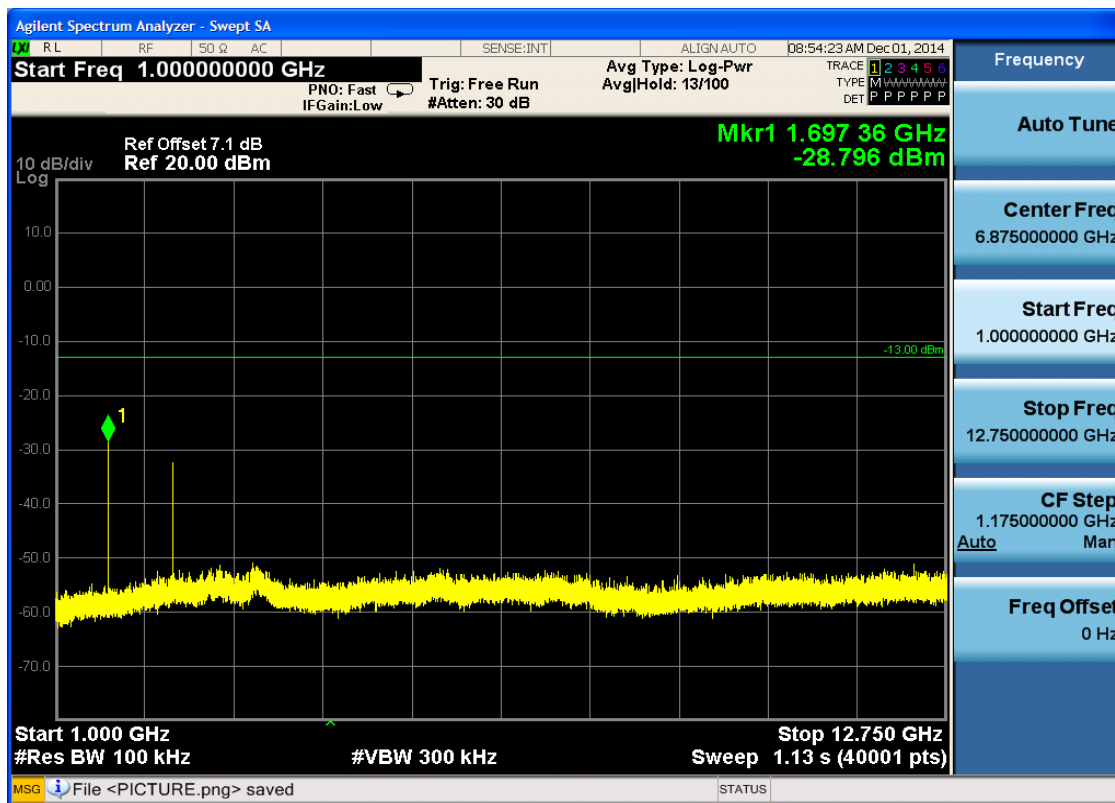


6.1.1.1.3 Test Channel = HCH





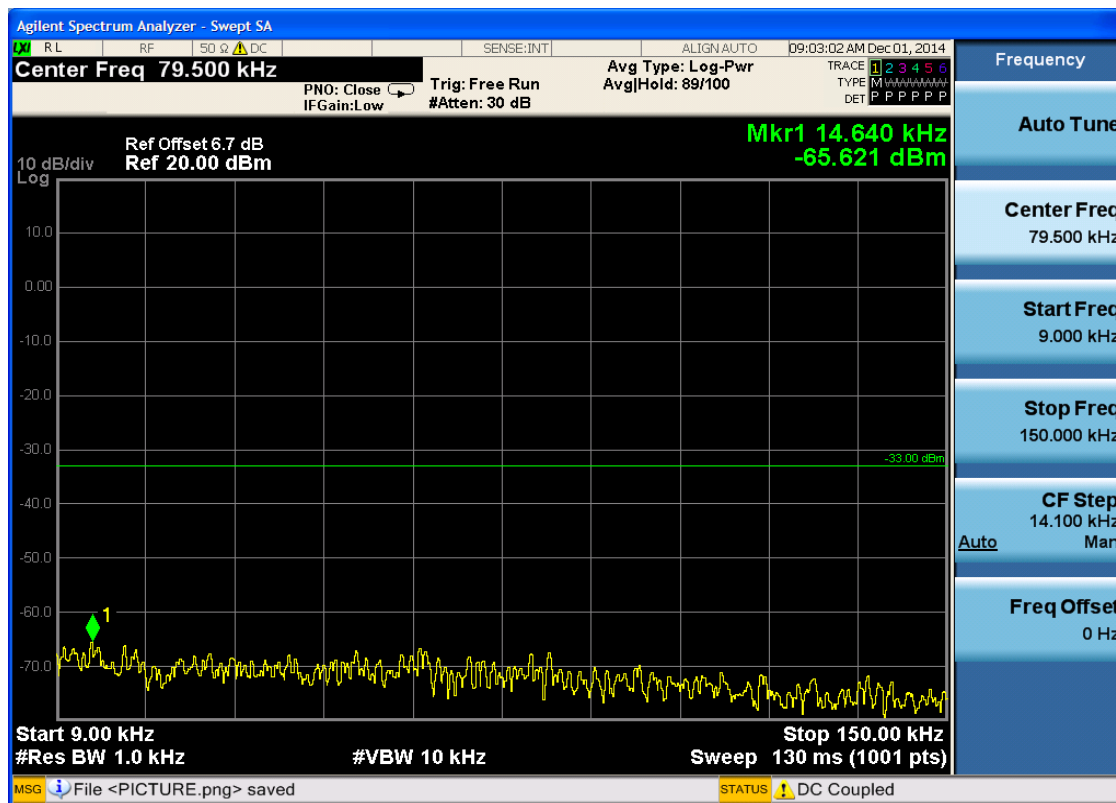


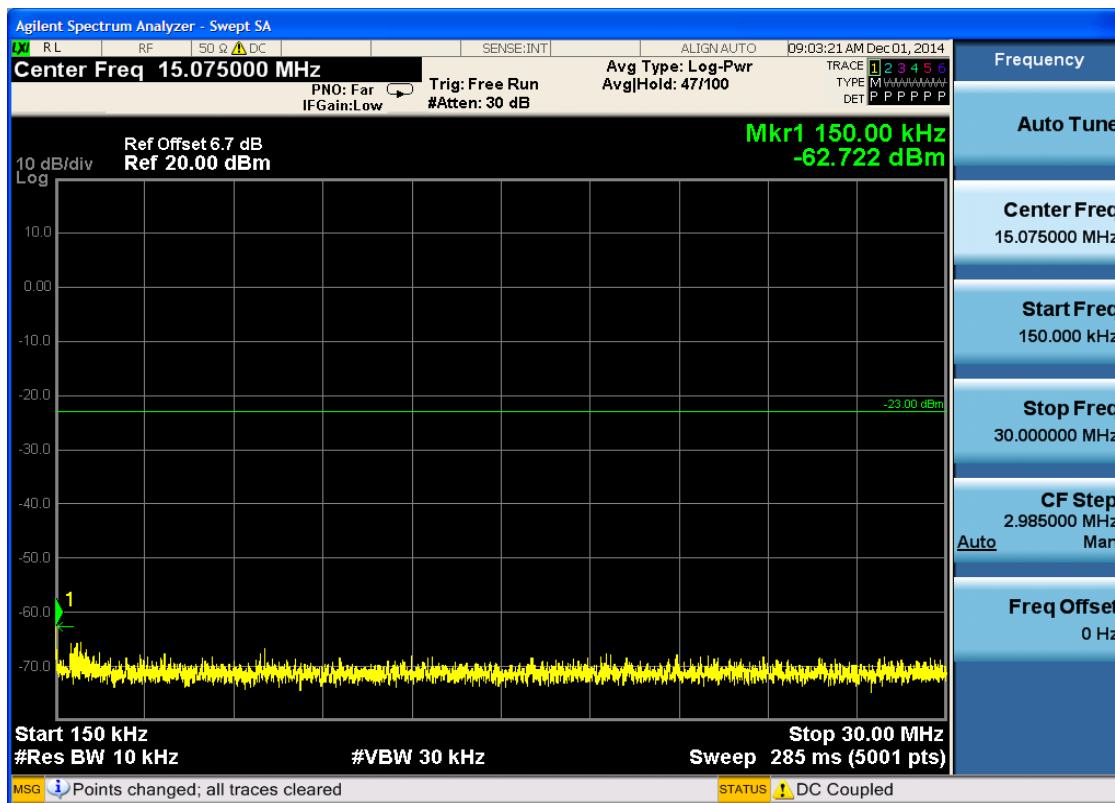


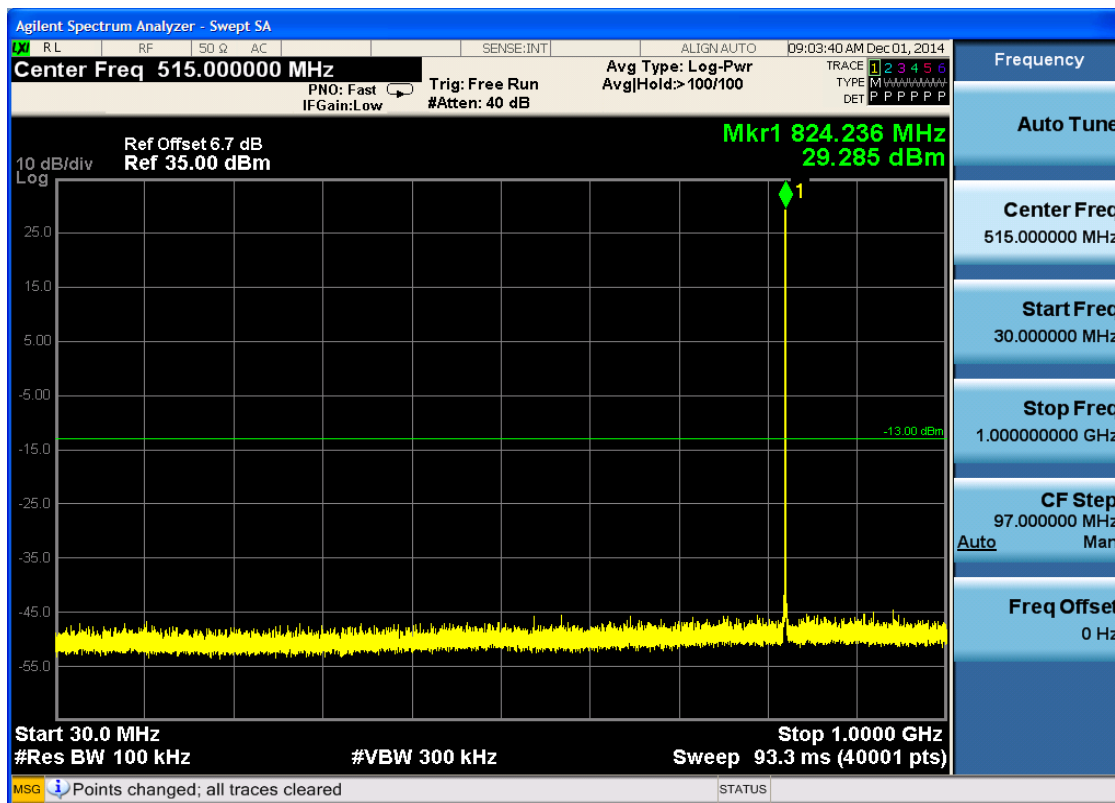


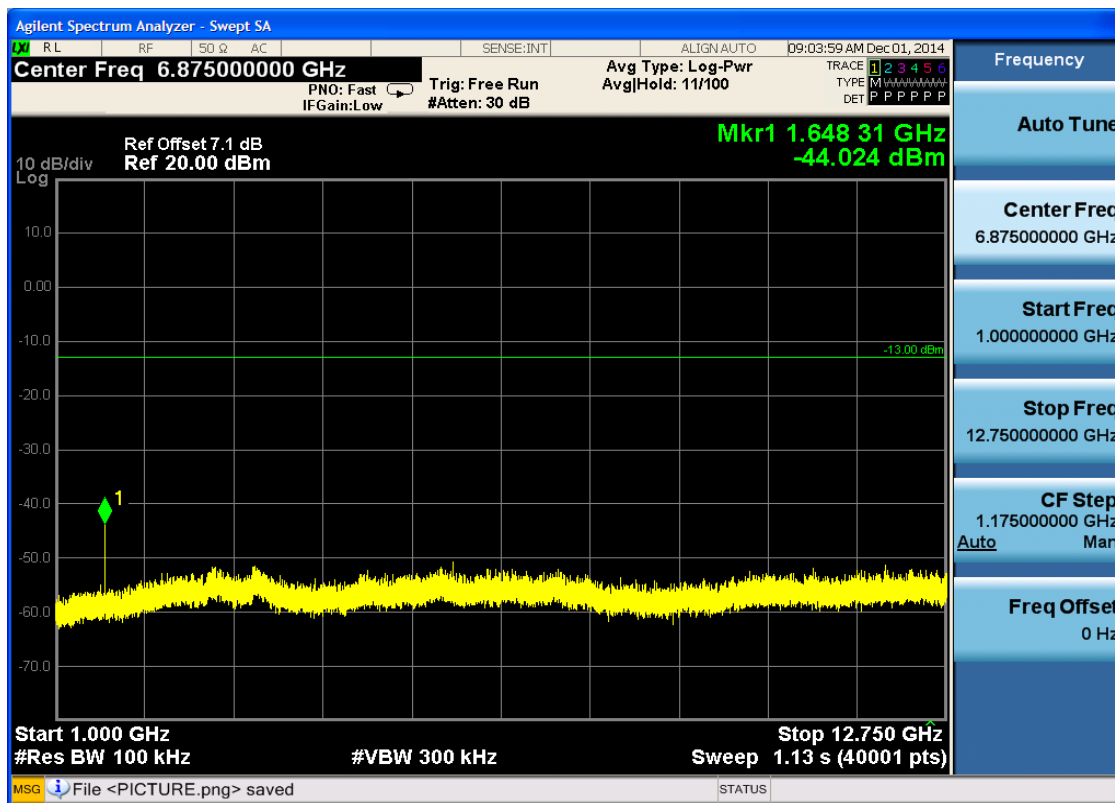
6.1.1.2 Test Mode = GSM/TM2

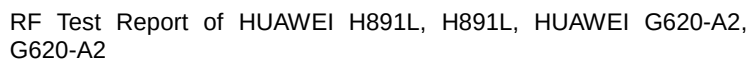
6.1.1.2.1 Test Channel = LCH











Agilent Spectrum Analyzer - Swept SA

R/L RF 50.0 DC SENSE:INT ALIGN:AUTO 09:04:19 AM Dec 01, 2014

Center Freq 79.500 kHz PNO: Close IF Gain: Low Trig: Free Run #Atten: 30 dB Avg Type: Log-Pwr Avg/Hold: 90/100 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 6.7 dB Ref 20.00 dB Mkr1 22.395 kHz -65.202 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

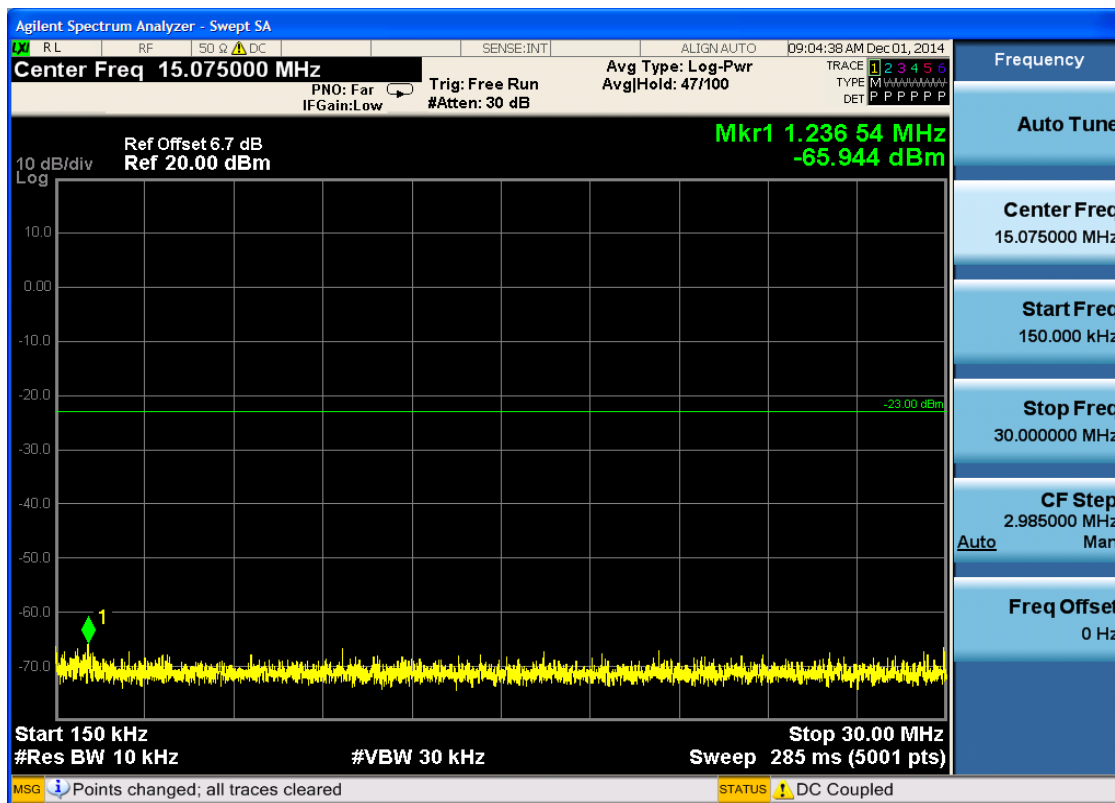
Start Freq 9.000 kHz

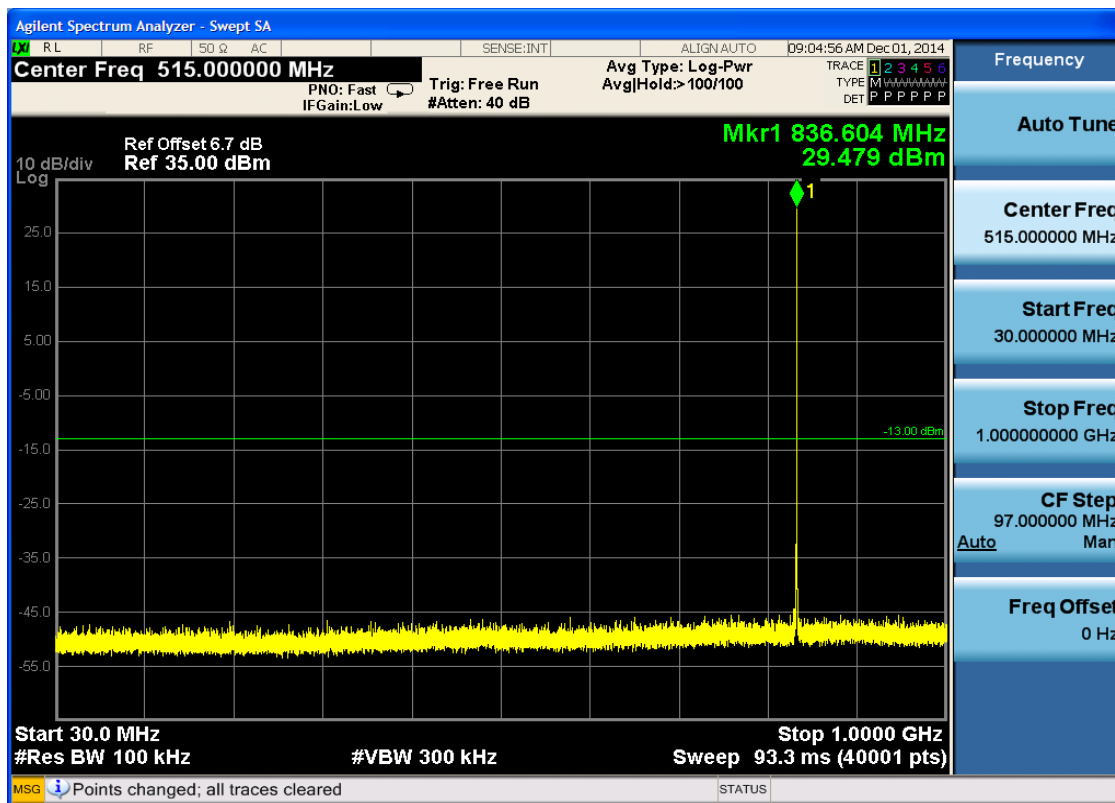
Stop Freq 150.000 kHz

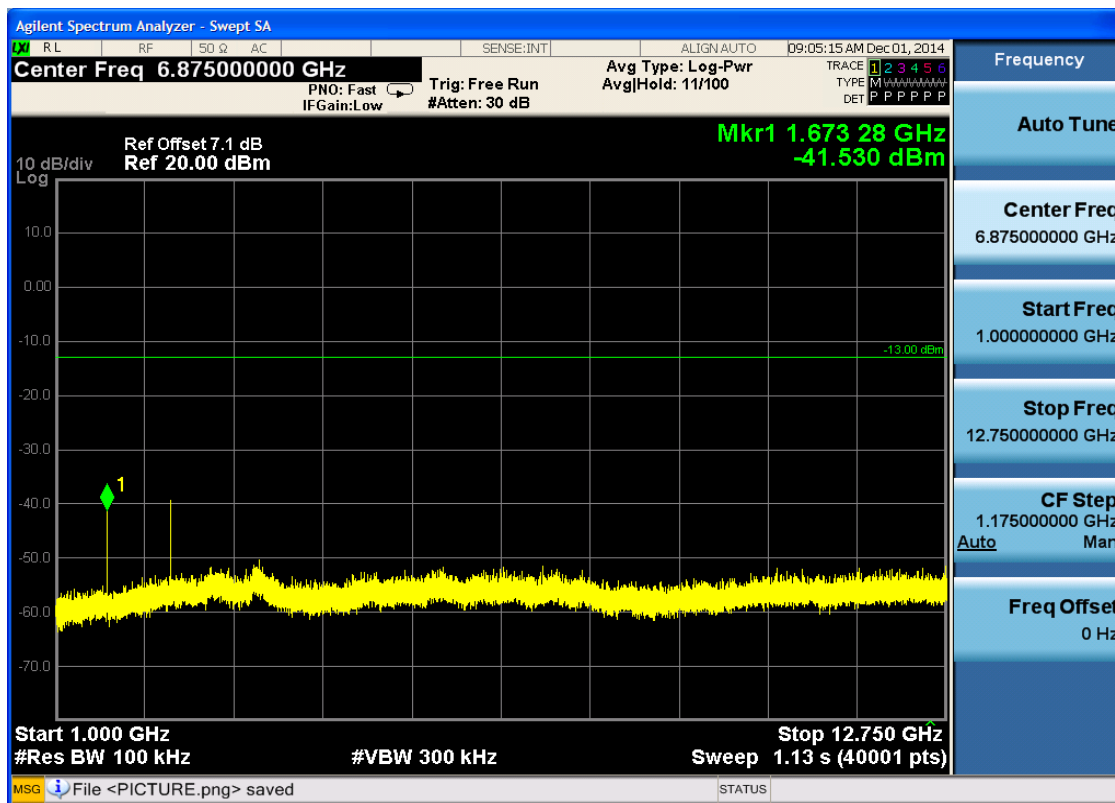
CF Step 14.100 kHz Man

Auto

Freq Offset 0 Hz

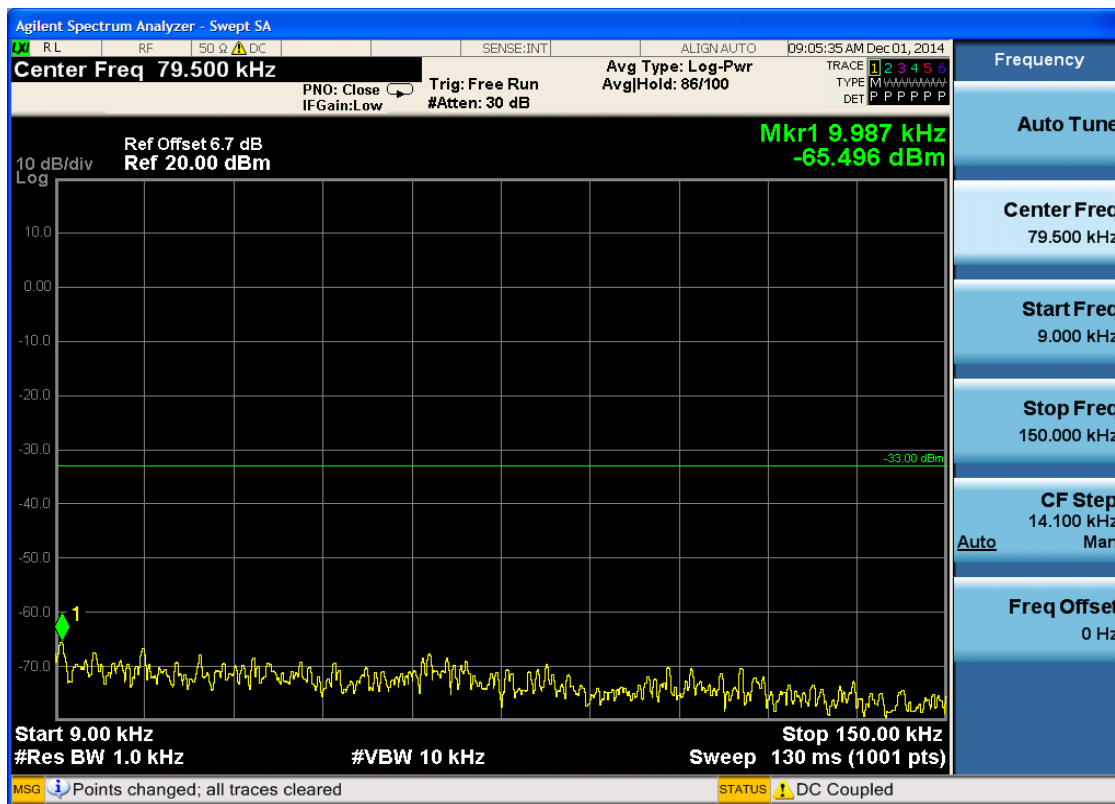


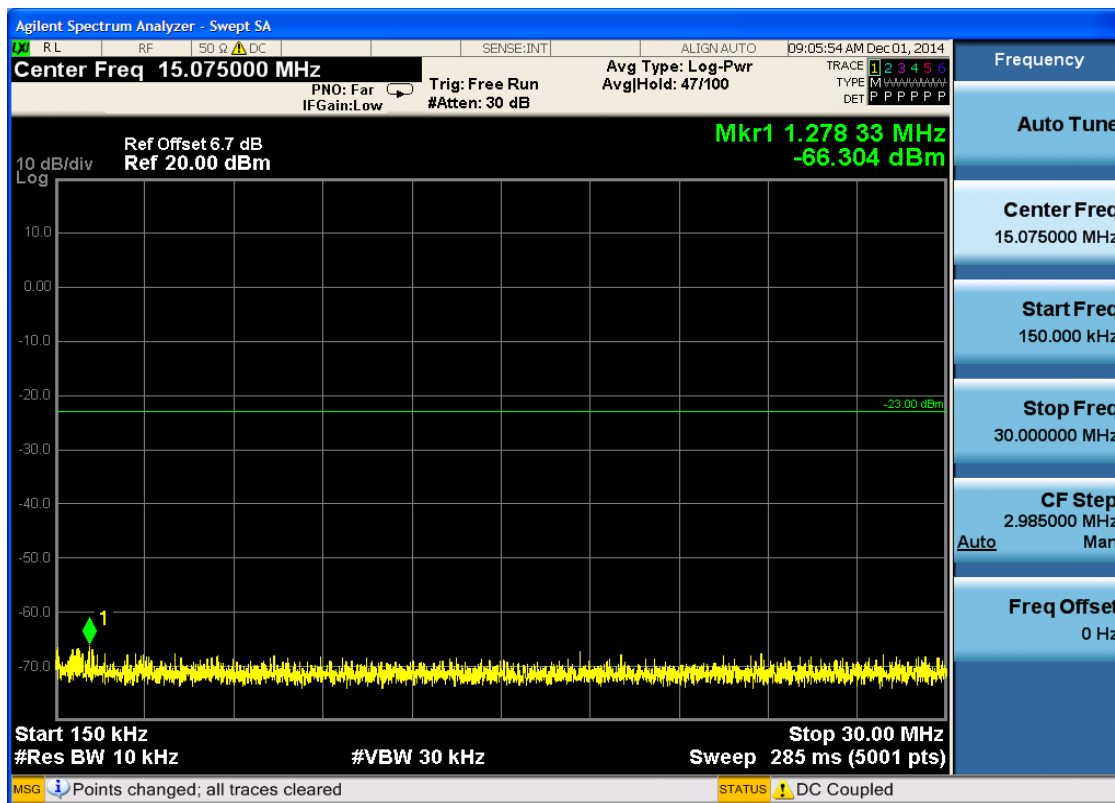


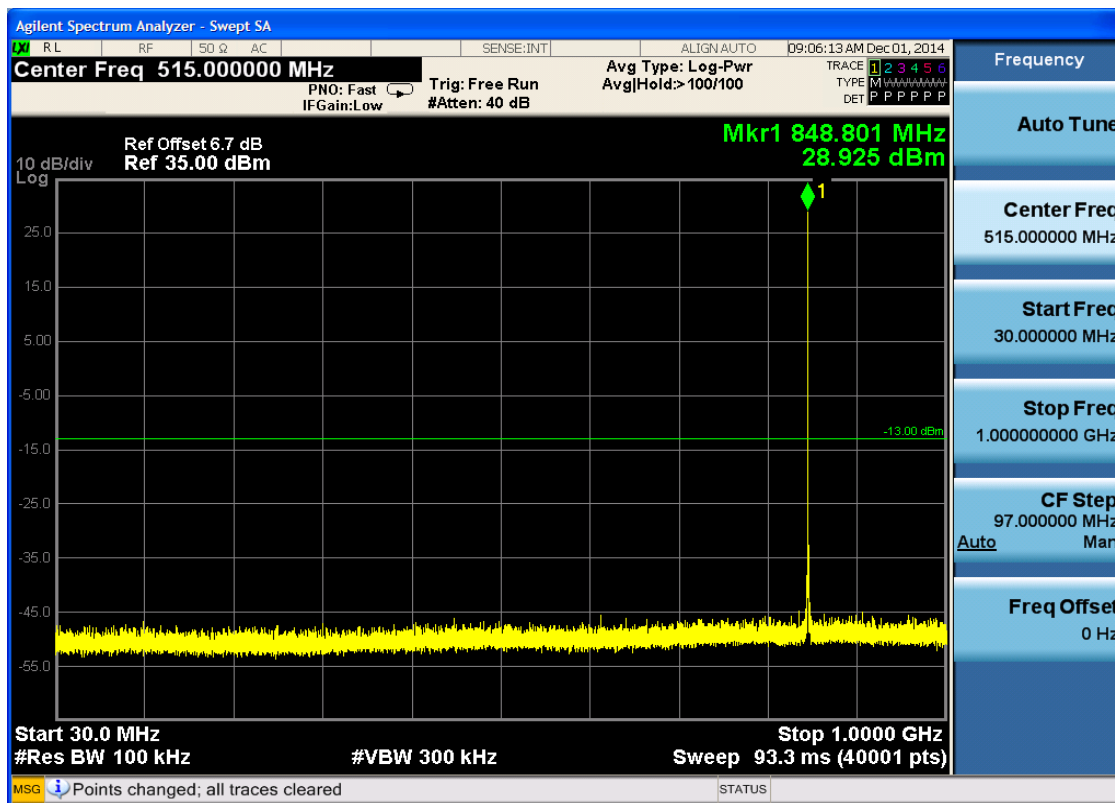


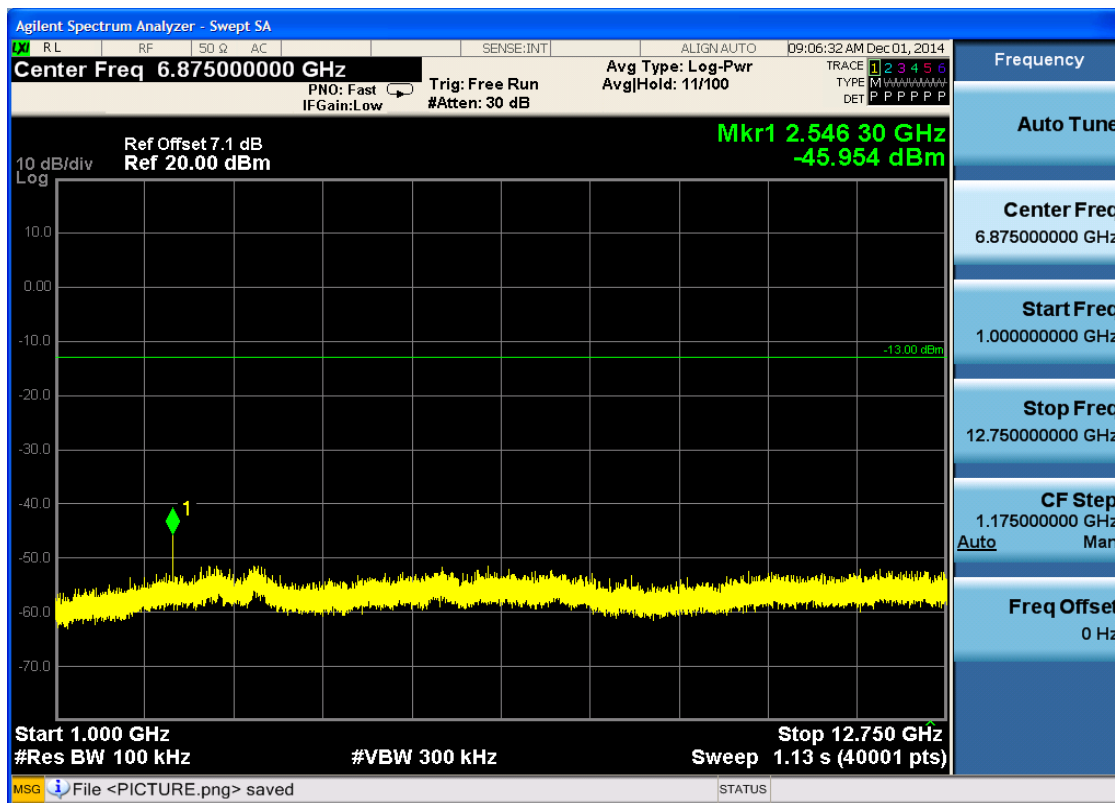


6.1.1.2.3 Test Channel = HCH







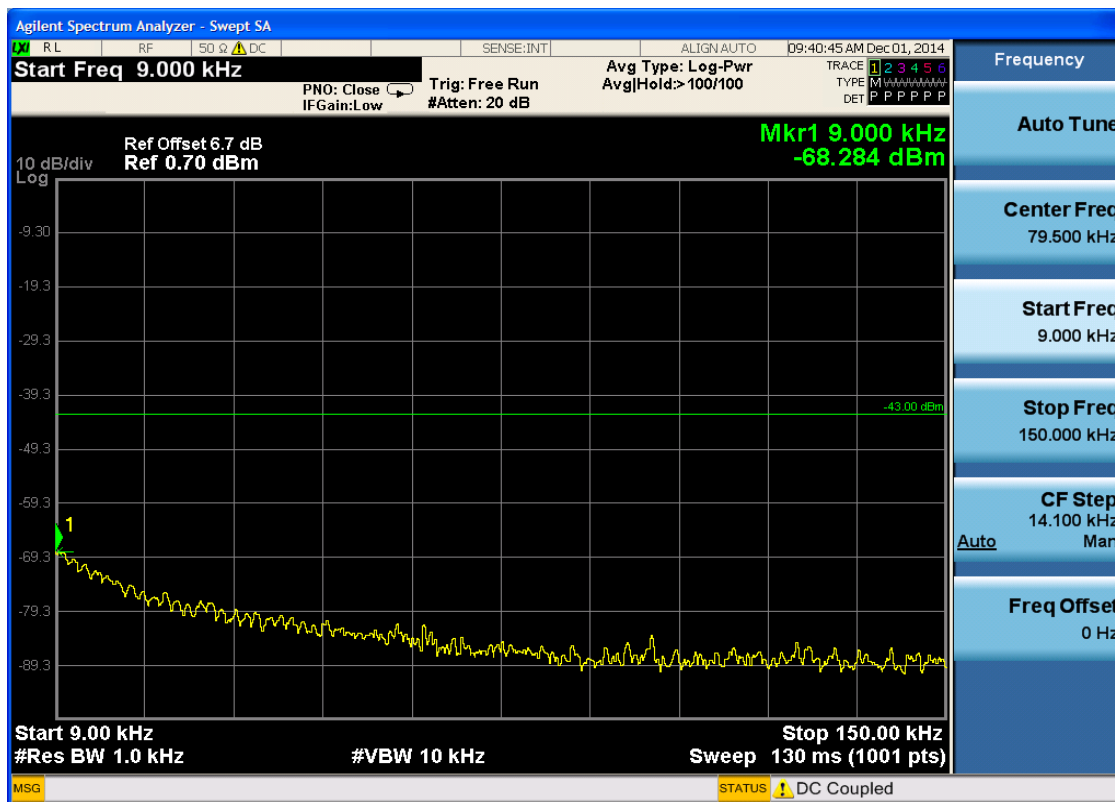


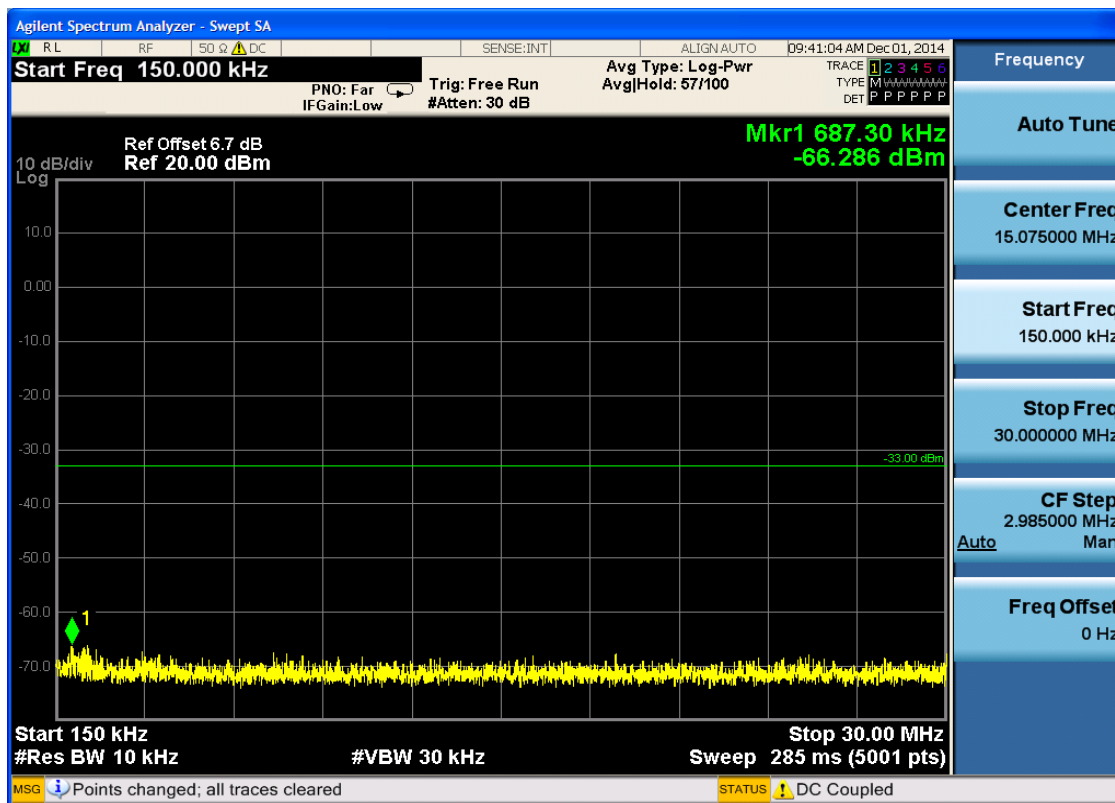


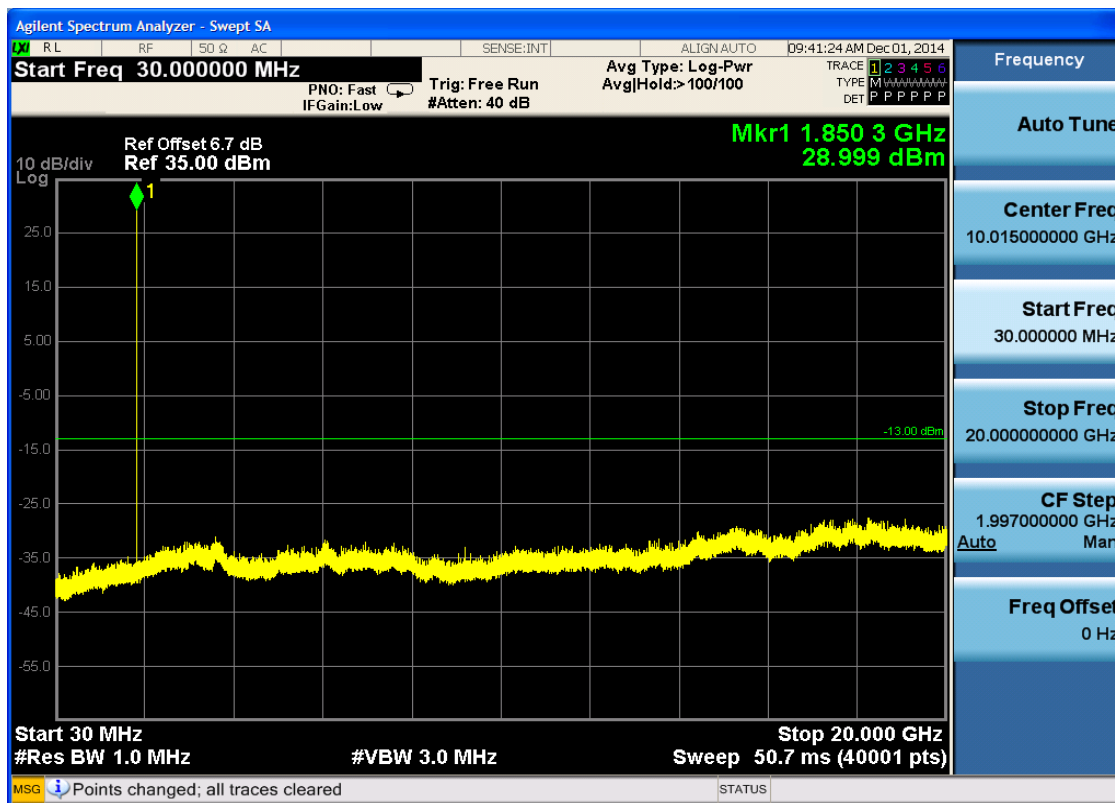
6.1.2 Test Band = GSM1900

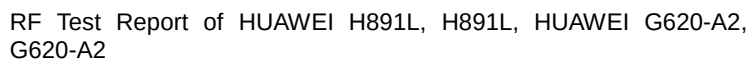
6.1.2.1 Test Mode = GSM/TM1

6.1.2.1.1 Test Channel = LCH









Agilent Spectrum Analyzer - Swept SA

R/L RF 50 Ω DC SENSE:INT ALIGN AUTO 09:41:48 AM Dec 01, 2014

Start Freq 9.000 kHz PNO: Close IFGain:Low Trig: Free Run Avg Type: Log-Pwr AvgHld: 100/100
#Atten: 20 dB

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 6.7 dB Ref -0.30 dBm **Mkr1 9.846 kHz -67.807 dBm**

10 dB/div Log

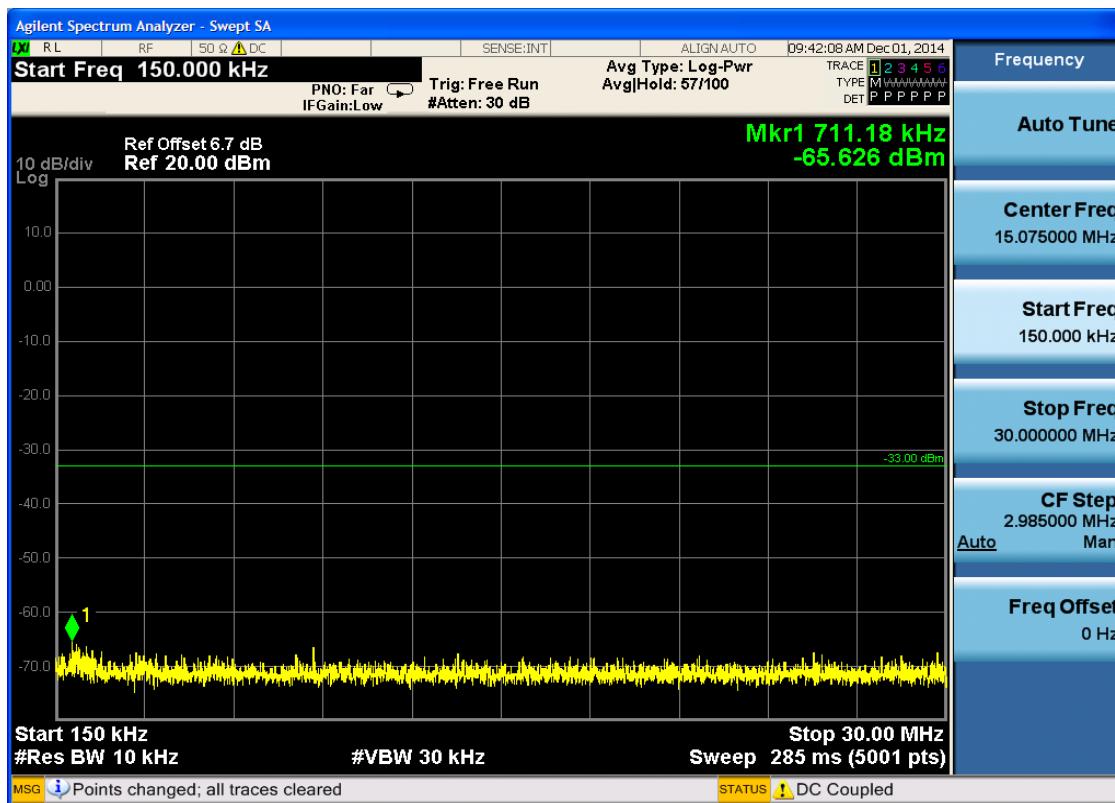
-10.3
-20.3
-30.3
-40.3
-50.3
-60.3
-70.3
-80.3
-90.3

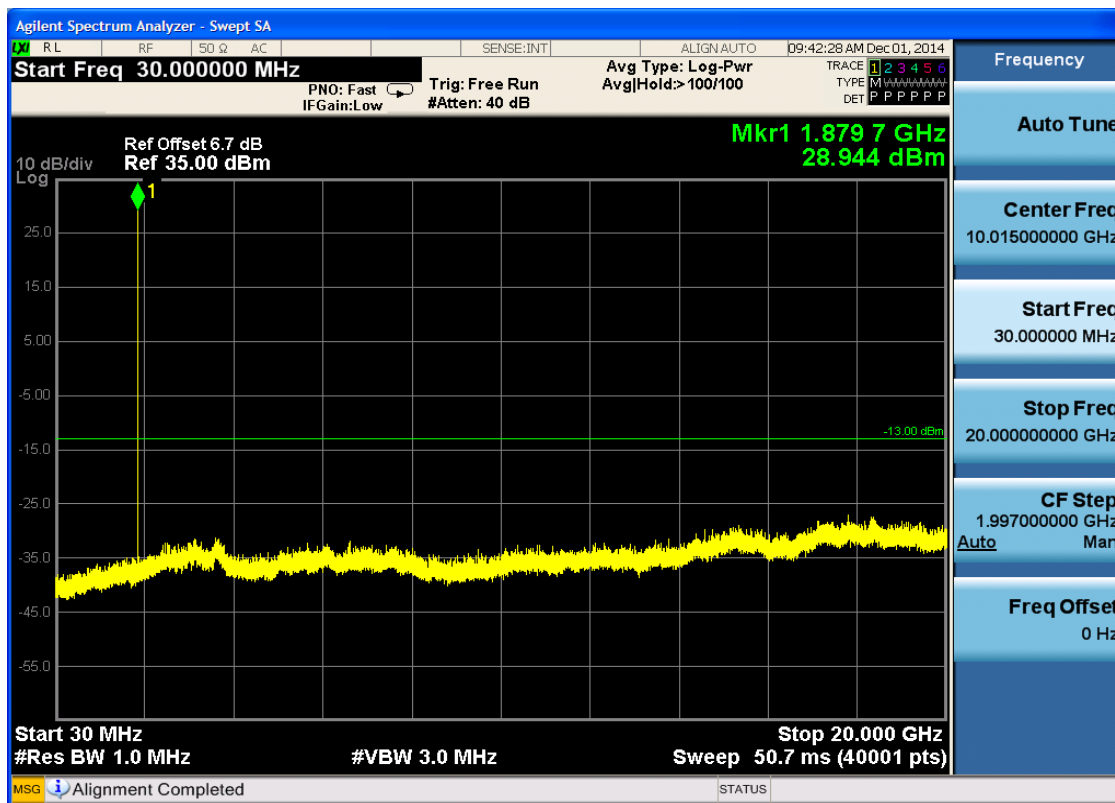
-43.00 dBm

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

MSG STATUS ⚠ DC Coupled

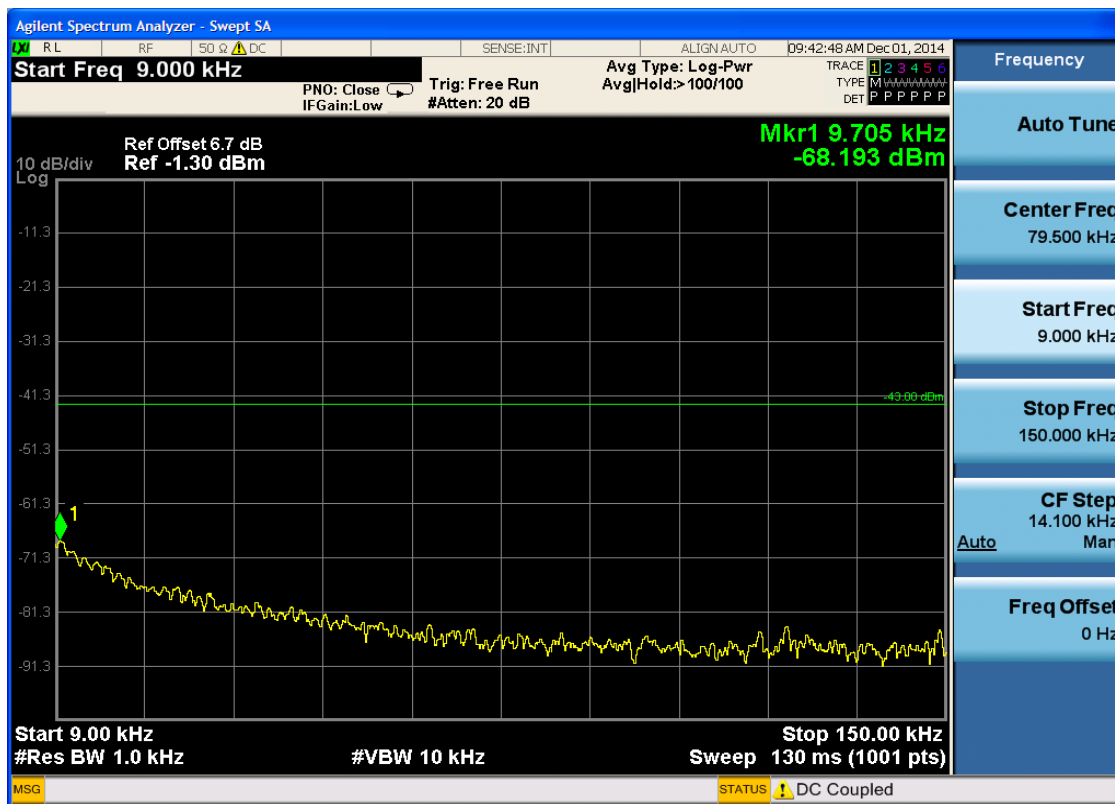
Frequency
Auto Tune
Center Freq 79.500 kHz
Start Freq 9.000 kHz
Stop Freq 150.000 kHz
CF Step 14.100 kHz Man
Freq Offset 0 Hz

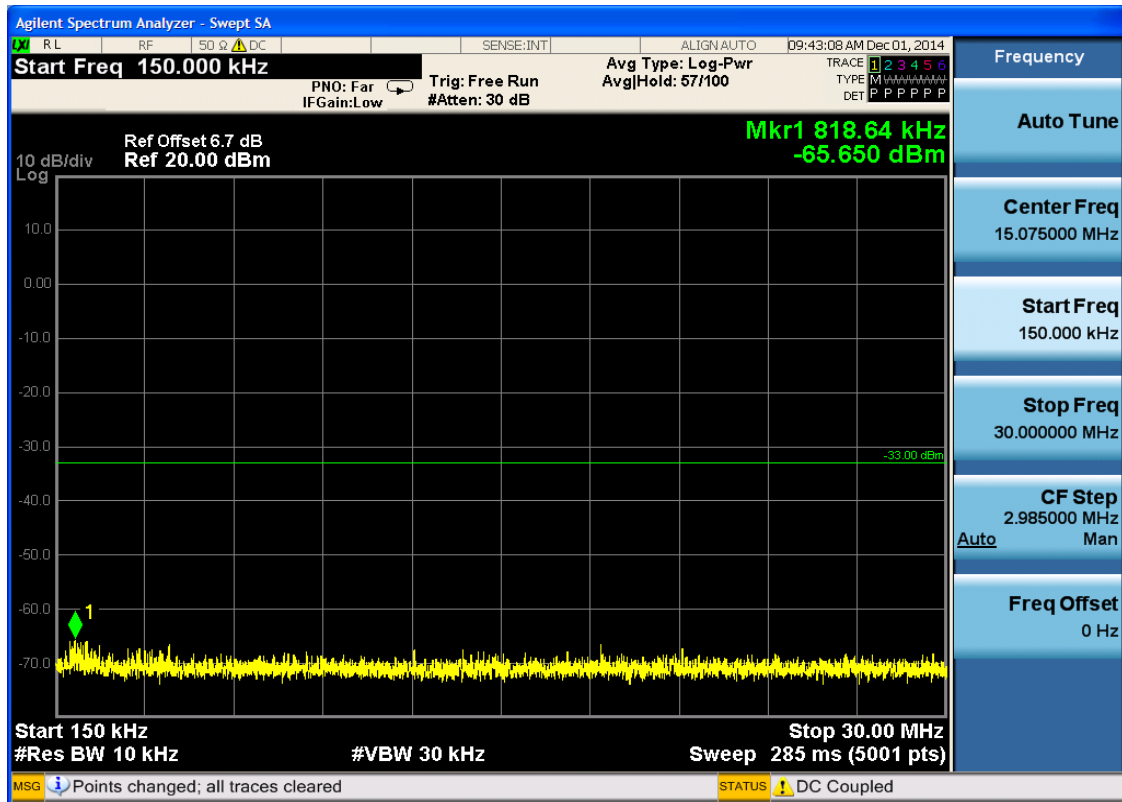


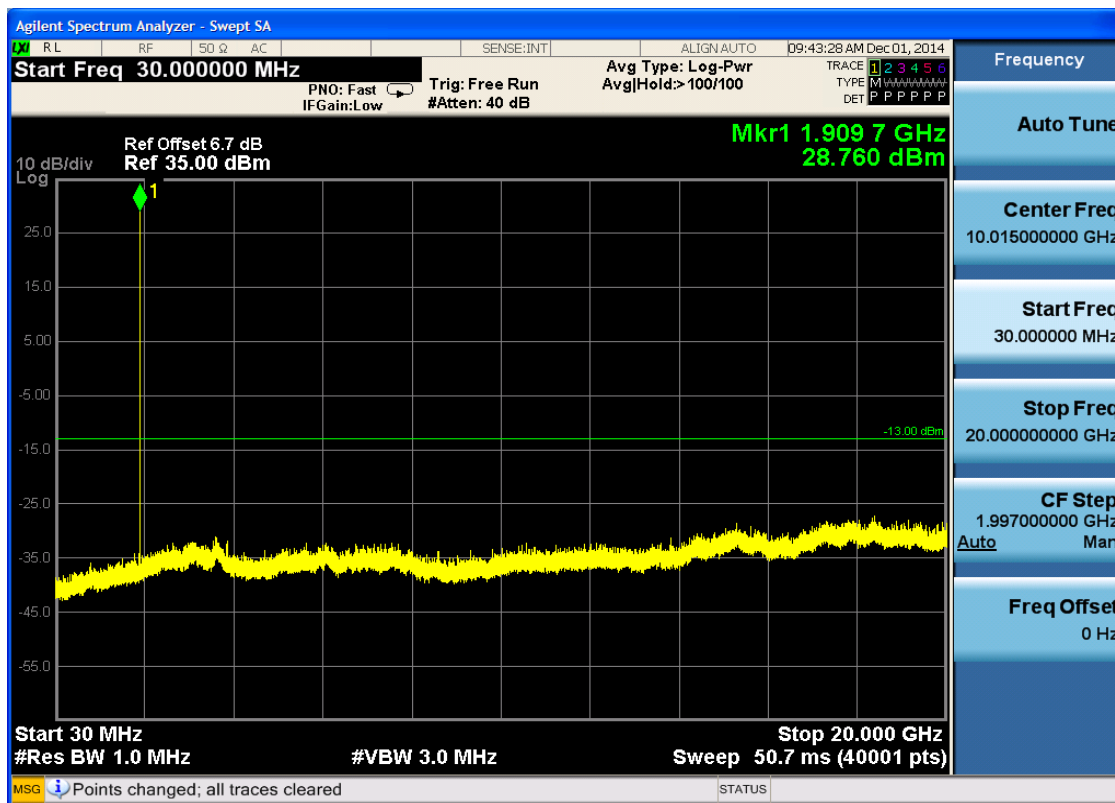




6.1.2.1.3 Test Channel = HCH



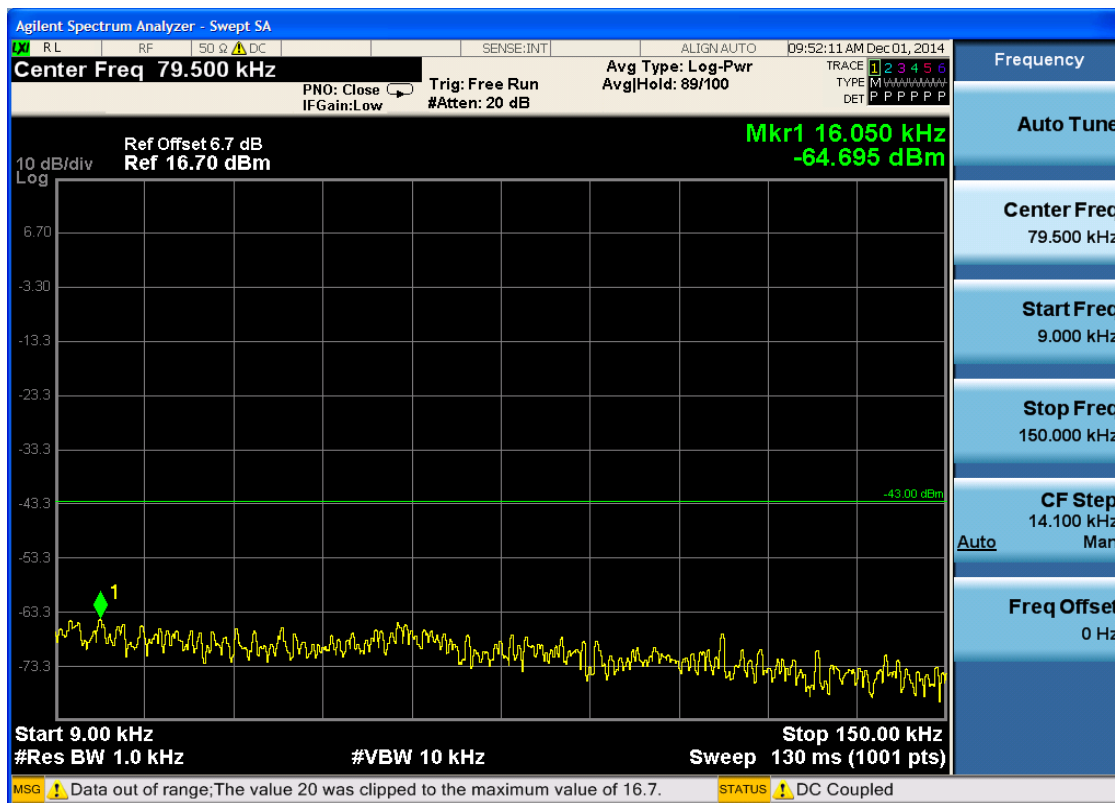


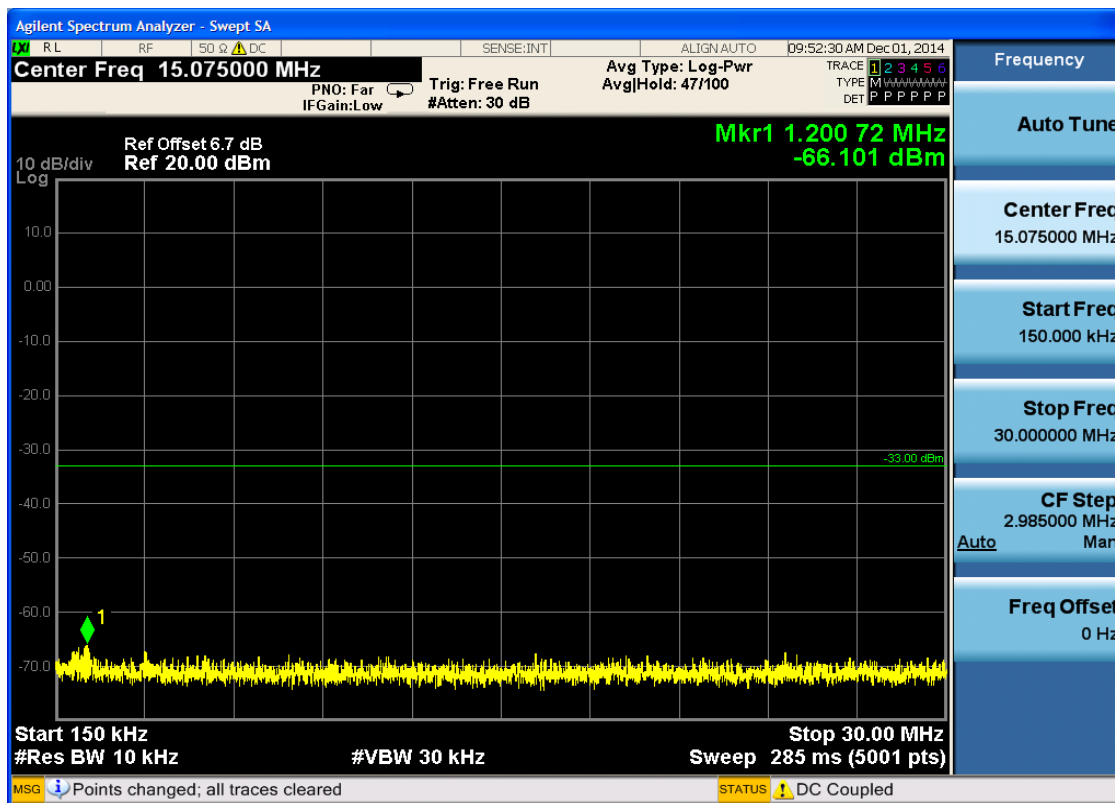


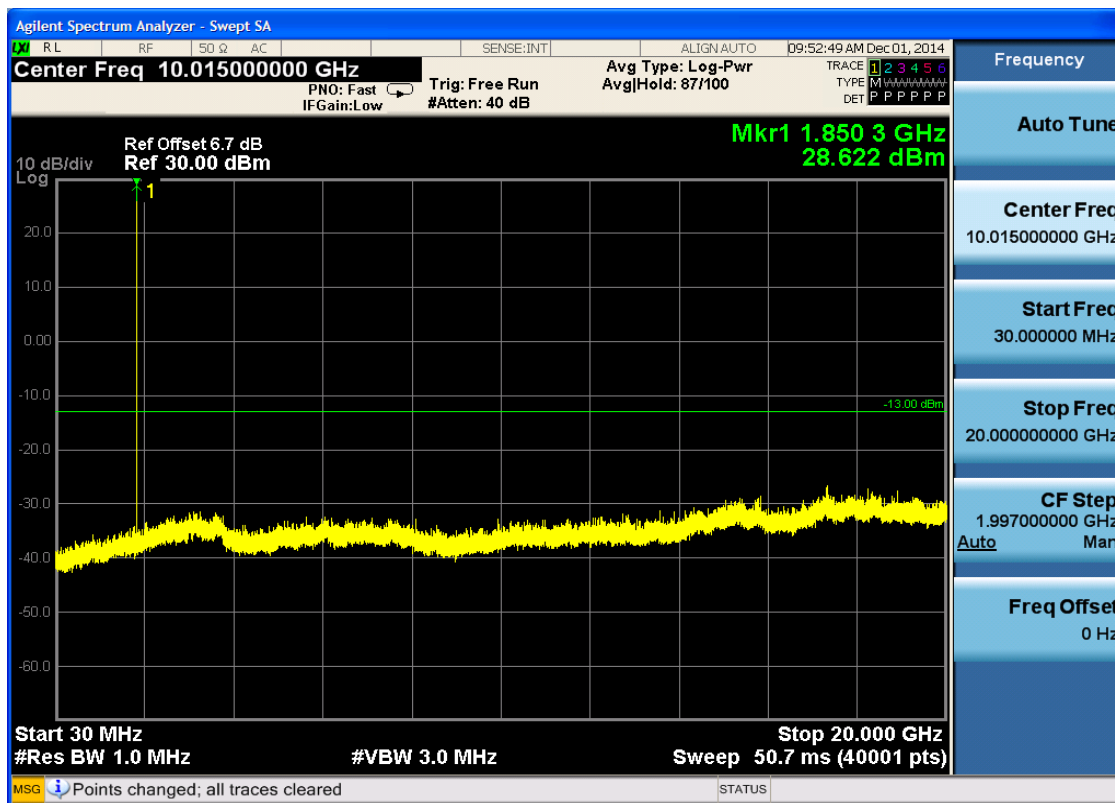


6.1.2.2 Test Mode = GSM/TM2

6.1.2.2.1 Test Channel = LCH

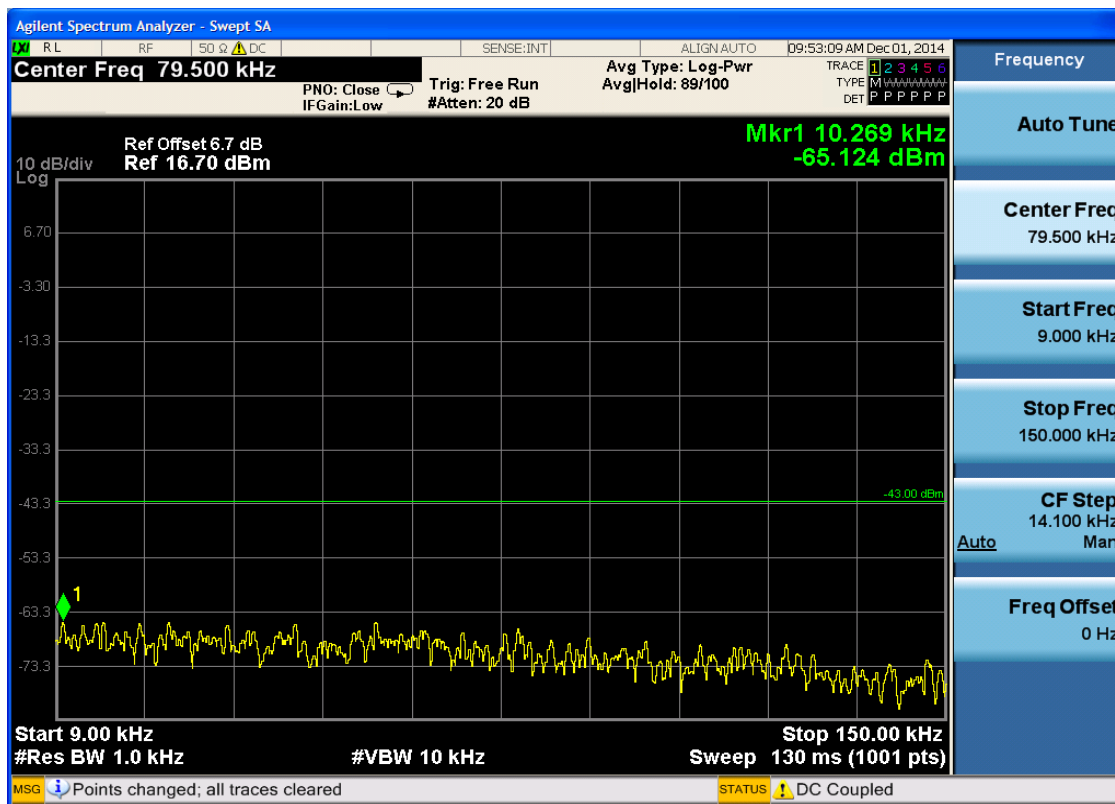


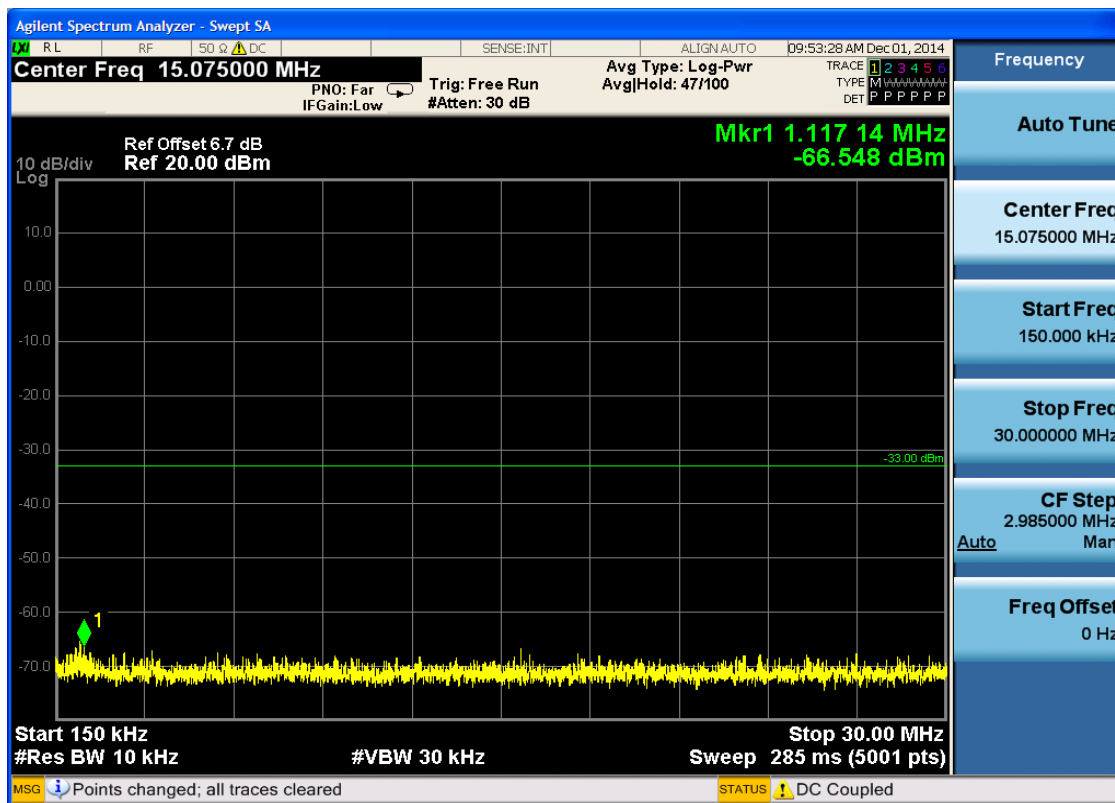


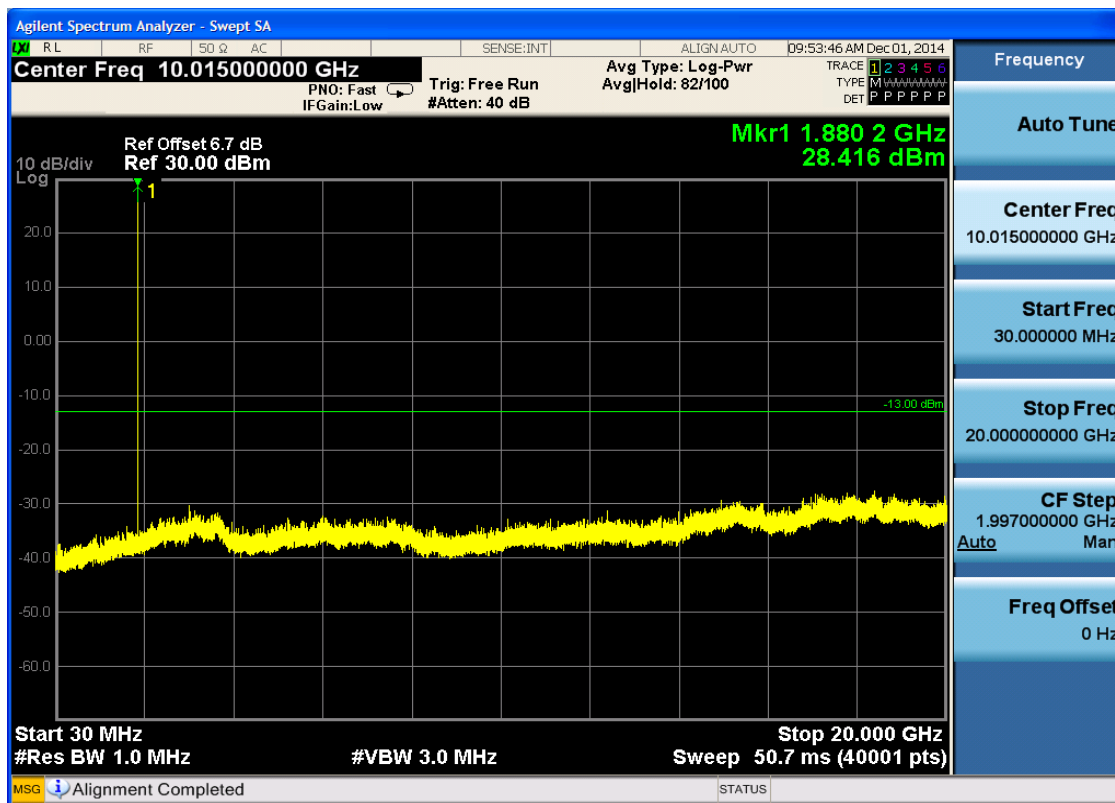




6.1.2.2.2 Test Channel = MCH

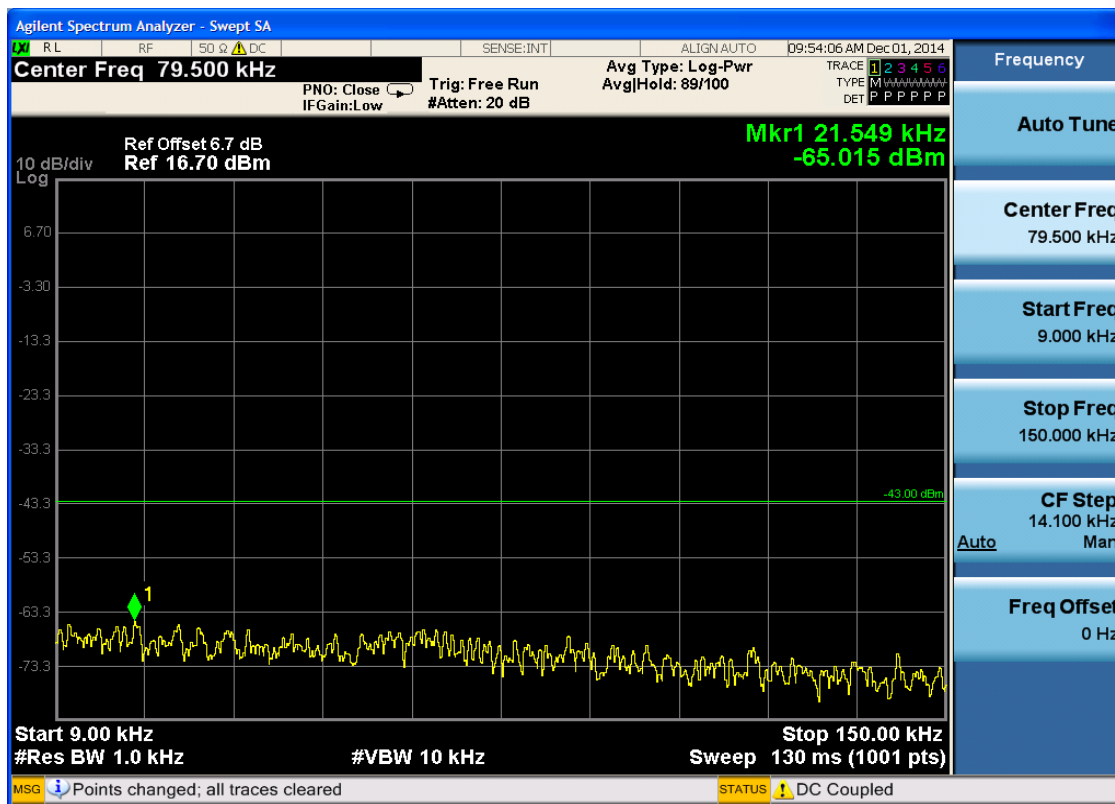


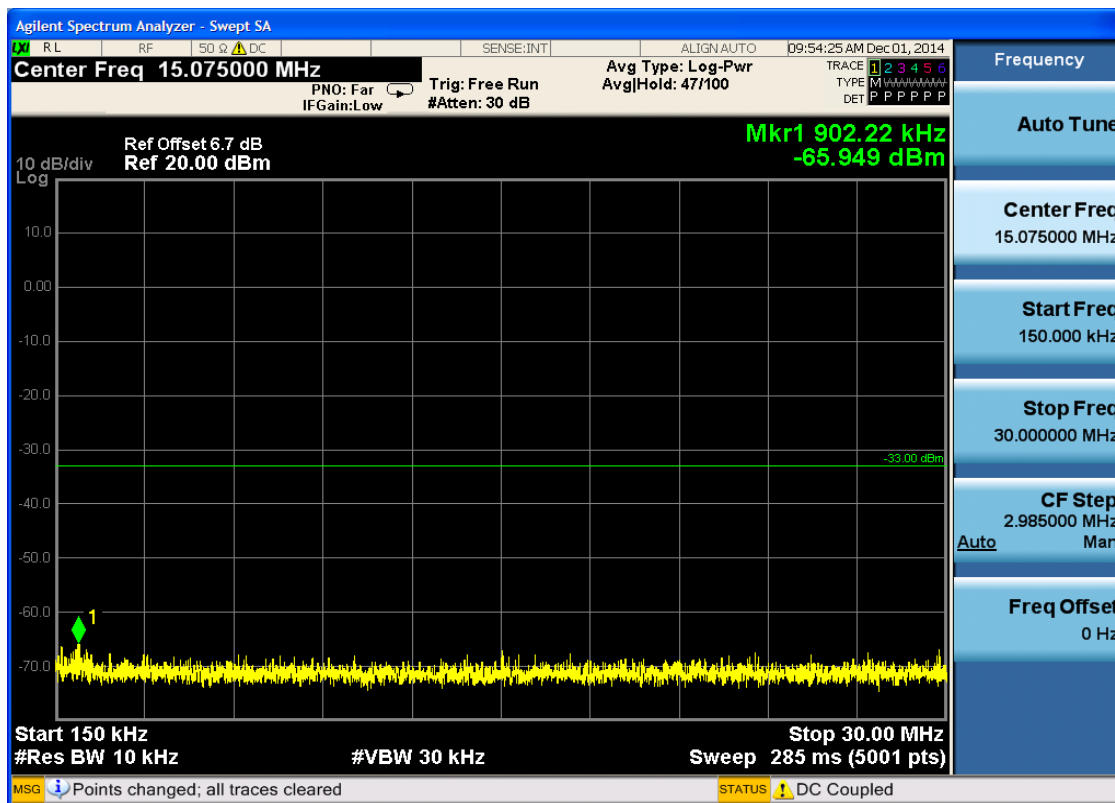


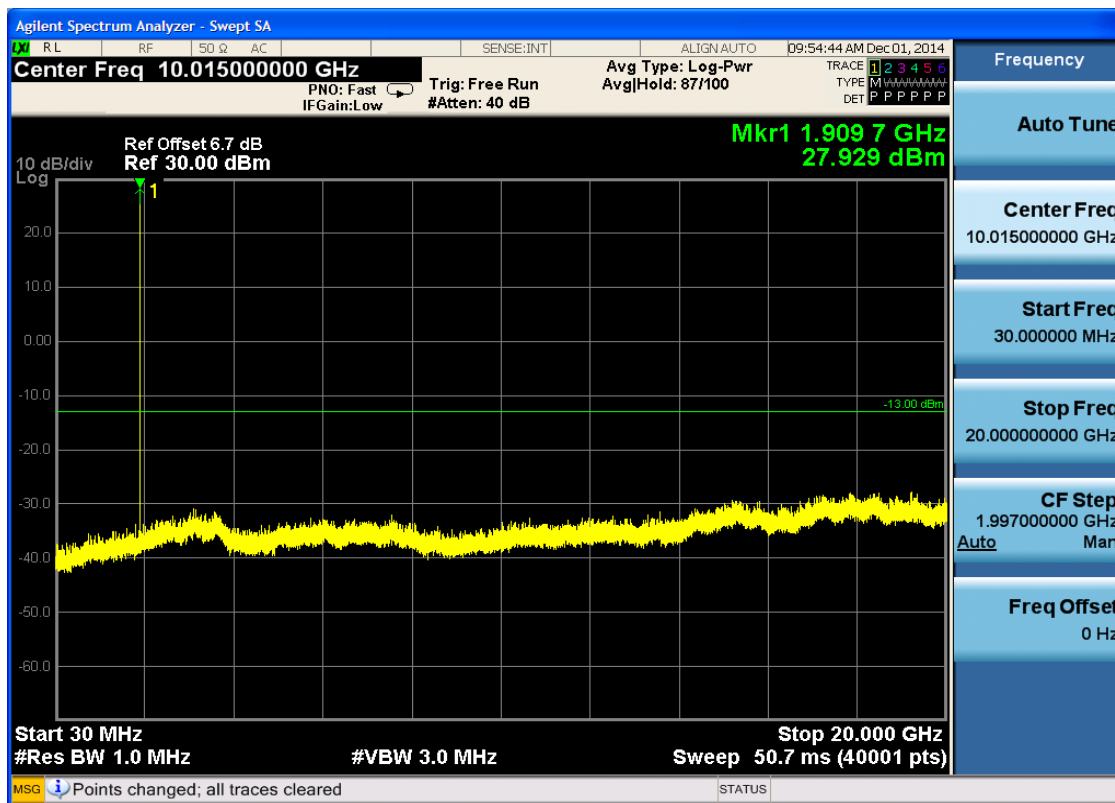




6.1.2.2.3 Test Channel = HCH







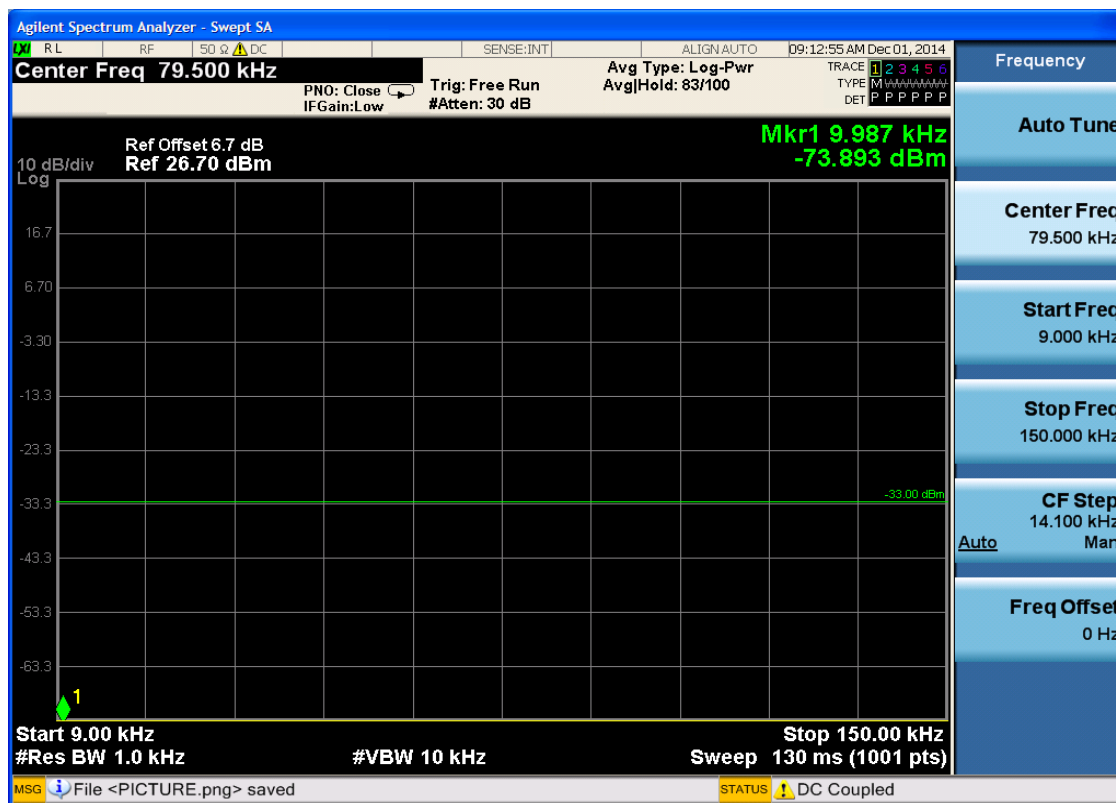


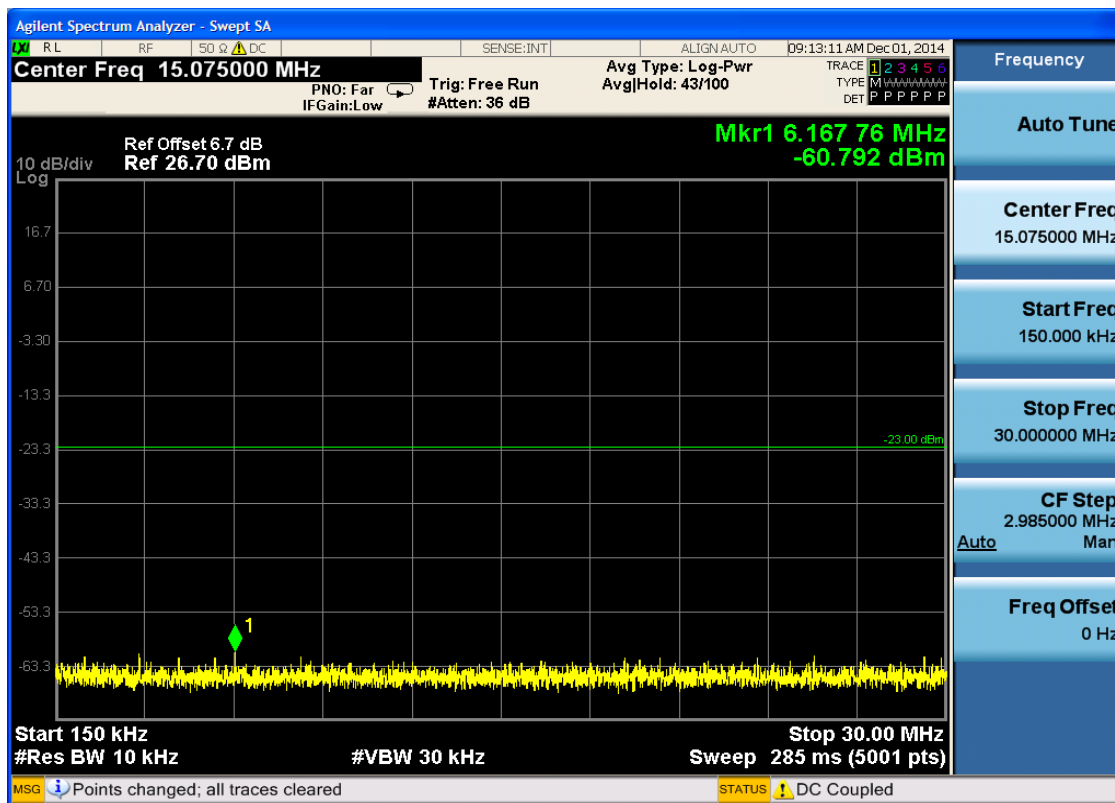
6.2 For UMTS

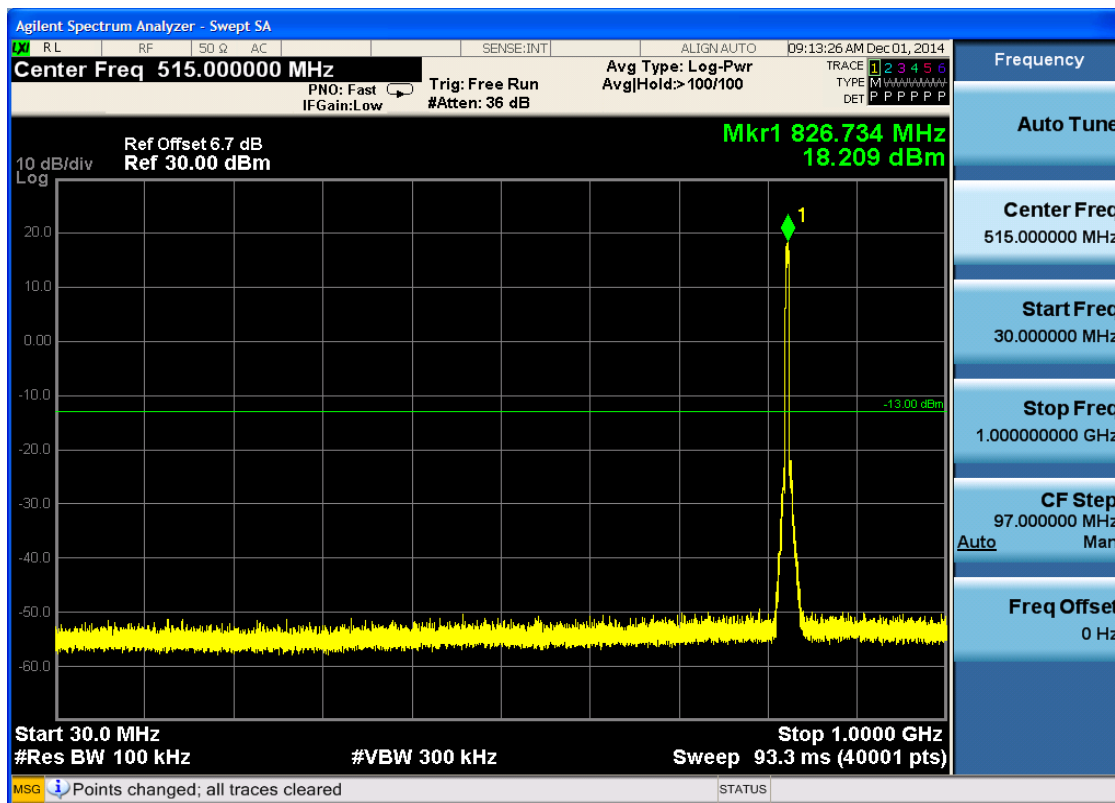
6.2.1 Test Band = WCDMA850

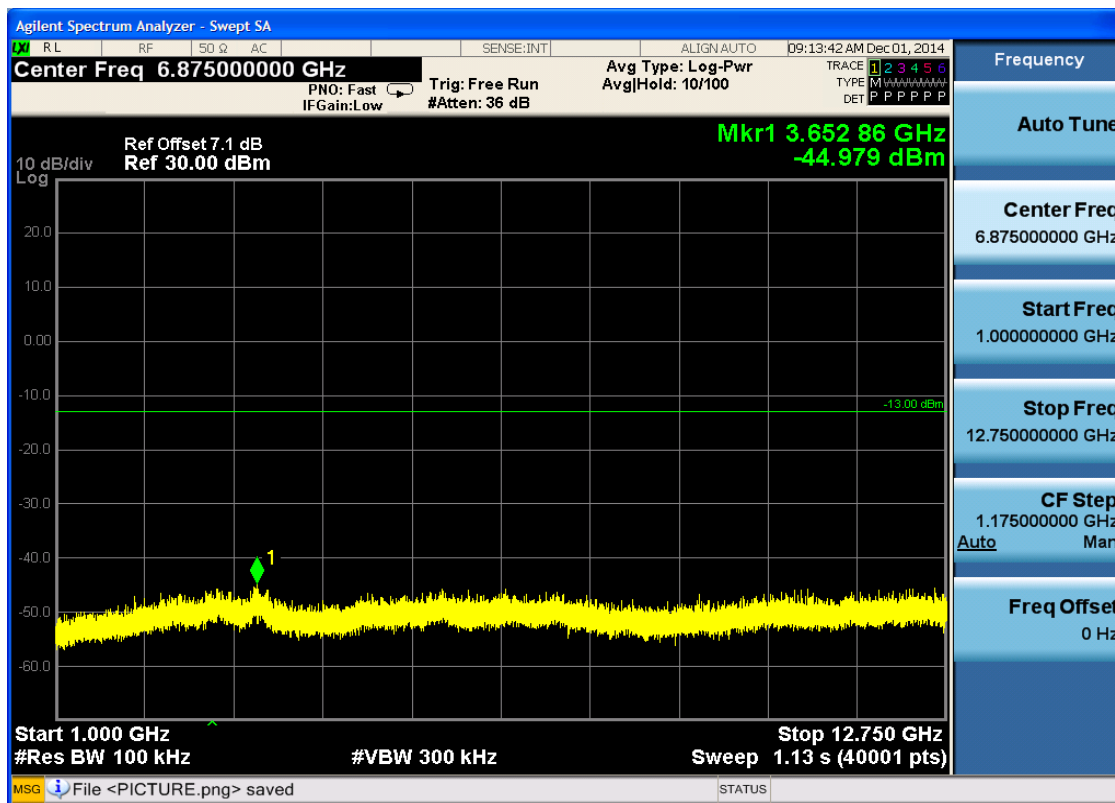
6.2.1.1 Test Mode = UMTS/TM1

6.2.1.1.1 Test Channel = LCH



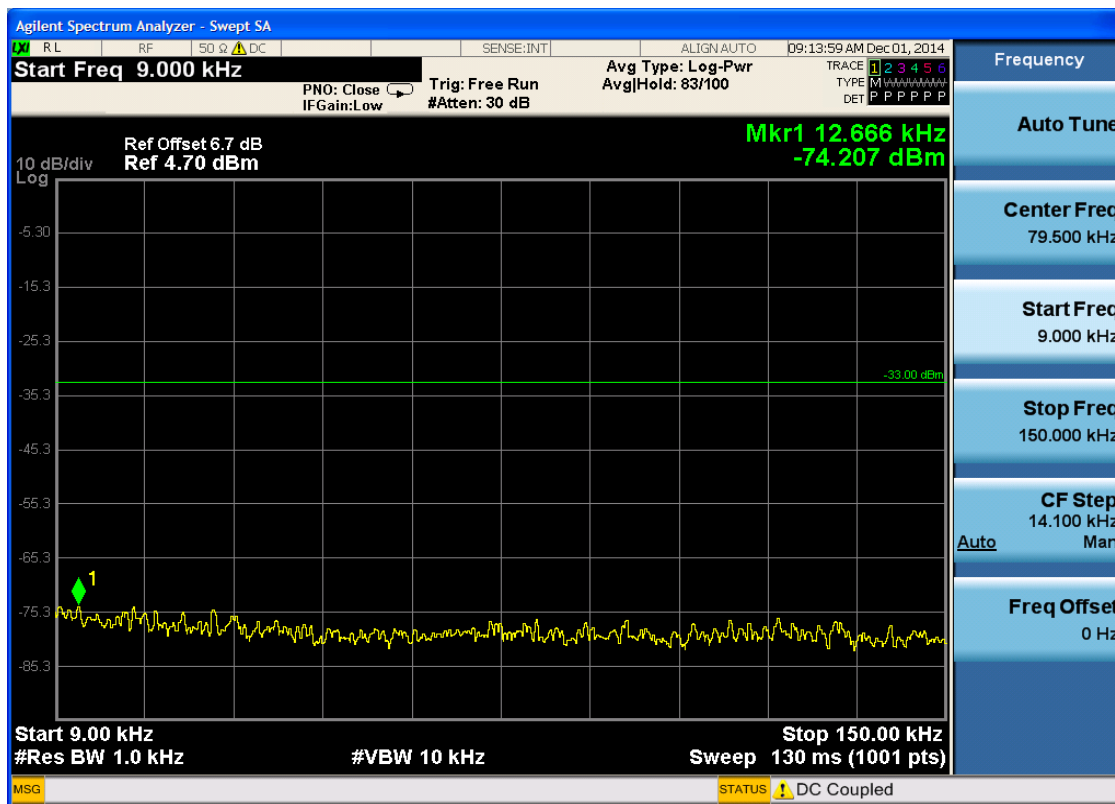


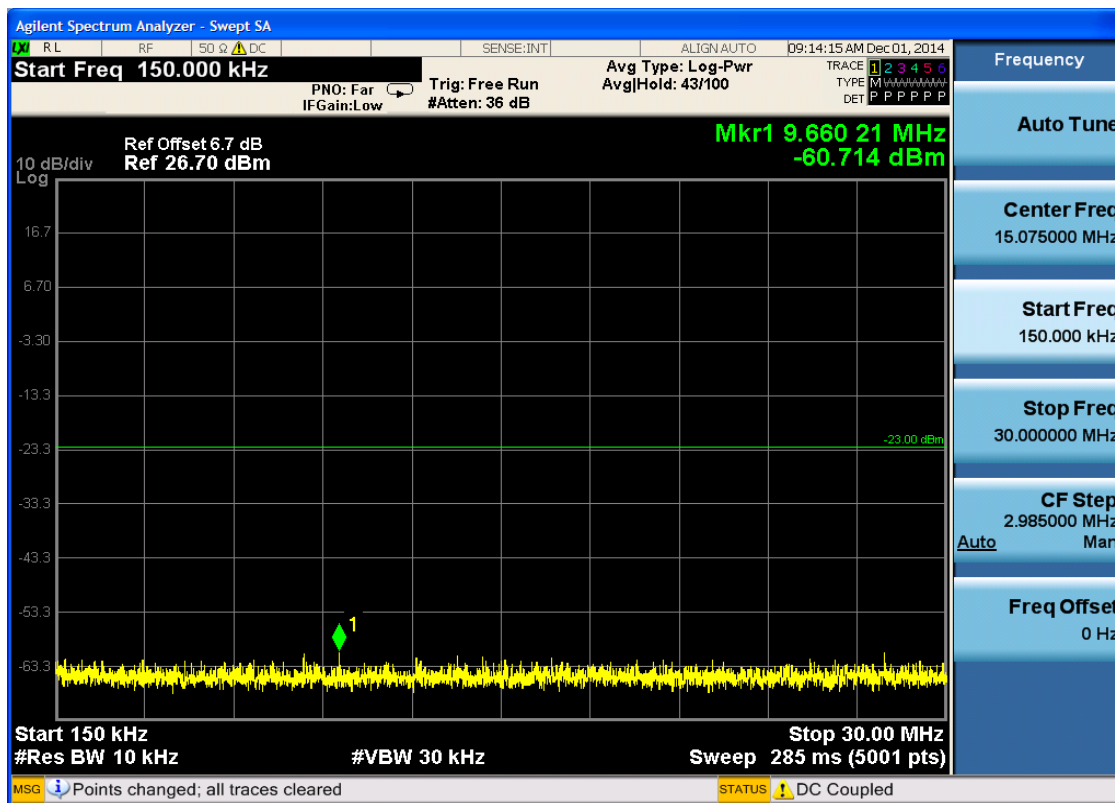


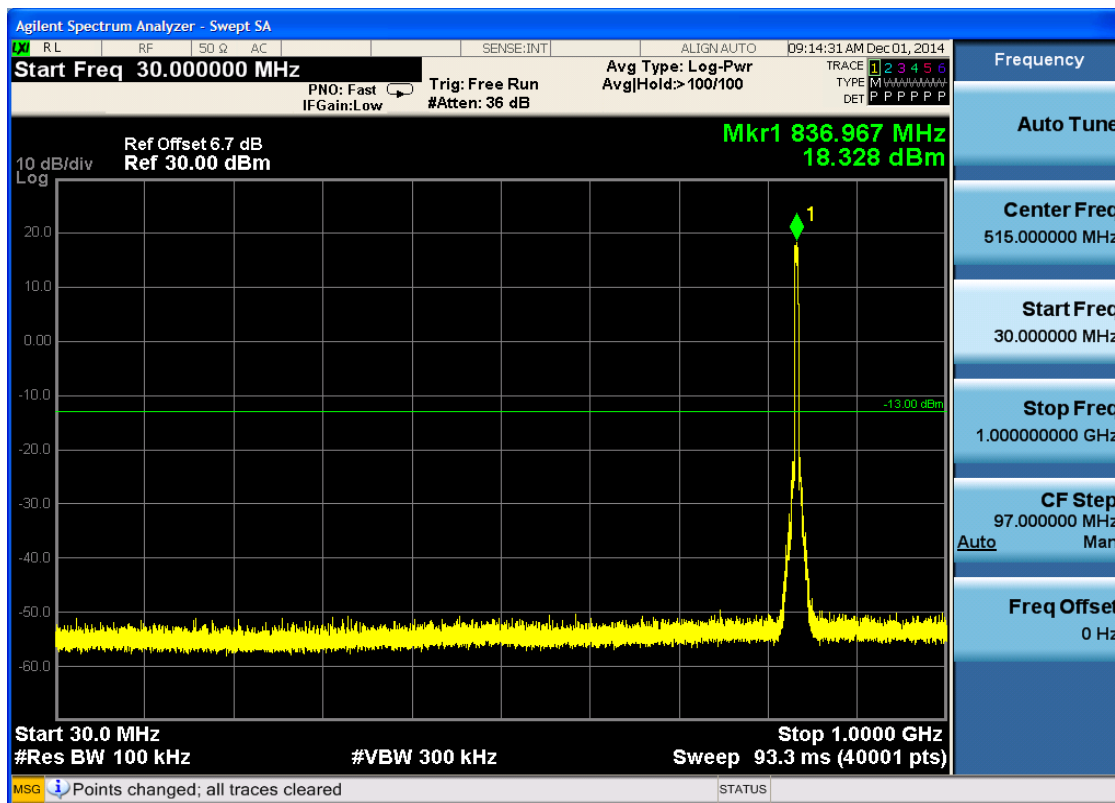


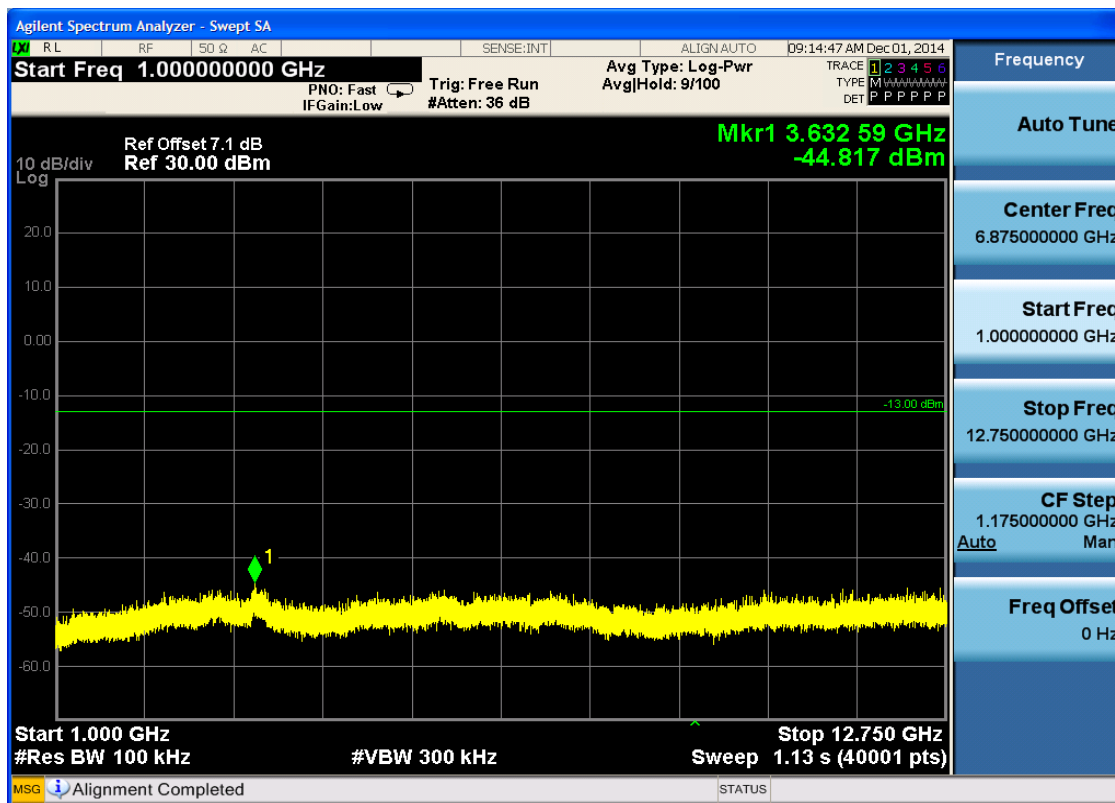


6.2.1.1.2 Test Channel = MCH











6.2.1.1.3 Test Channel = HCH

