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	32.07	29.42	38.5	PASS
		MCH	32.11	29.46	38.5	PASS
		HCH	32	29.35	38.5	PASS
	GSM/TM2	LCH	25.91	23.26	38.5	PASS
		MCH	25.89	23.24	38.5	PASS
		HCH	25.83	23.18	38.5	PASS
WCDMA850	UMTS/TM1	LCH	23.17	20.52	38.5	PASS
		MCH	23.13	20.48	38.5	PASS
		HCH	23.06	20.41	38.5	PASS

Test Band	Test Mode	Test Channel	Conducted Power [dBm]	EIRP [dBm]	Limit [dBm]	Verdict
GSM1900	GSM/TM1	LCH	29.45	31.05	38.5	PASS
		MCH	29.56	31.16	38.5	PASS
		HCH	29.44	31.04	38.5	PASS
	GSM/TM2	LCH	25.35	26.95	38.5	PASS
		MCH	25.26	26.86	38.5	PASS
		HCH	25.24	26.84	38.5	PASS

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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,

ERP [dBm] = SGP [dBm] - Cable Loss [dB] + Gain [dBd]

EIRP [dBm] = SGP [dBm] - Cable Loss [dB] + Gain [dBi]

b, SGP=Signal Generator Level

Note2: RBW > emission bandwidth, VBW > 3 x RBW.

Detector: RMS

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2Appendix_B: Peak-to-Average Ratio

Part I - Test Results

Test Band	Test Mode	Test Channel	Measured[dB]	Limit [dB]	Verdict
GSM850	GSM/TM1	LCH	0.18	13	PASS
		MCH	0.17	13	PASS
		HCH	0.19	13	PASS
	GSM/TM2	LCH	3.08	13	PASS
		MCH	2.95	13	PASS
		HCH	2.83	13	PASS
GSM1900	GSM/TM1	LCH	0.14	13	PASS
		MCH	0.15	13	PASS
		HCH	0.14	13	PASS
	GSM/TM2	LCH	3.1	13	PASS
		MCH	3.34	13	PASS
		HCH	3.15	13	PASS
Test Band	**Test Mode**	**Test Channel**	**Measured[dB]**	**Limit [dB]**	**Verdict**
WCDMA850	UMTS/TM1	LCH	2.4	13	PASS
		MCH	2.71	13	PASS
		HCH	2.54	13	PASS

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3Appendix_C: Modulation Characteristics

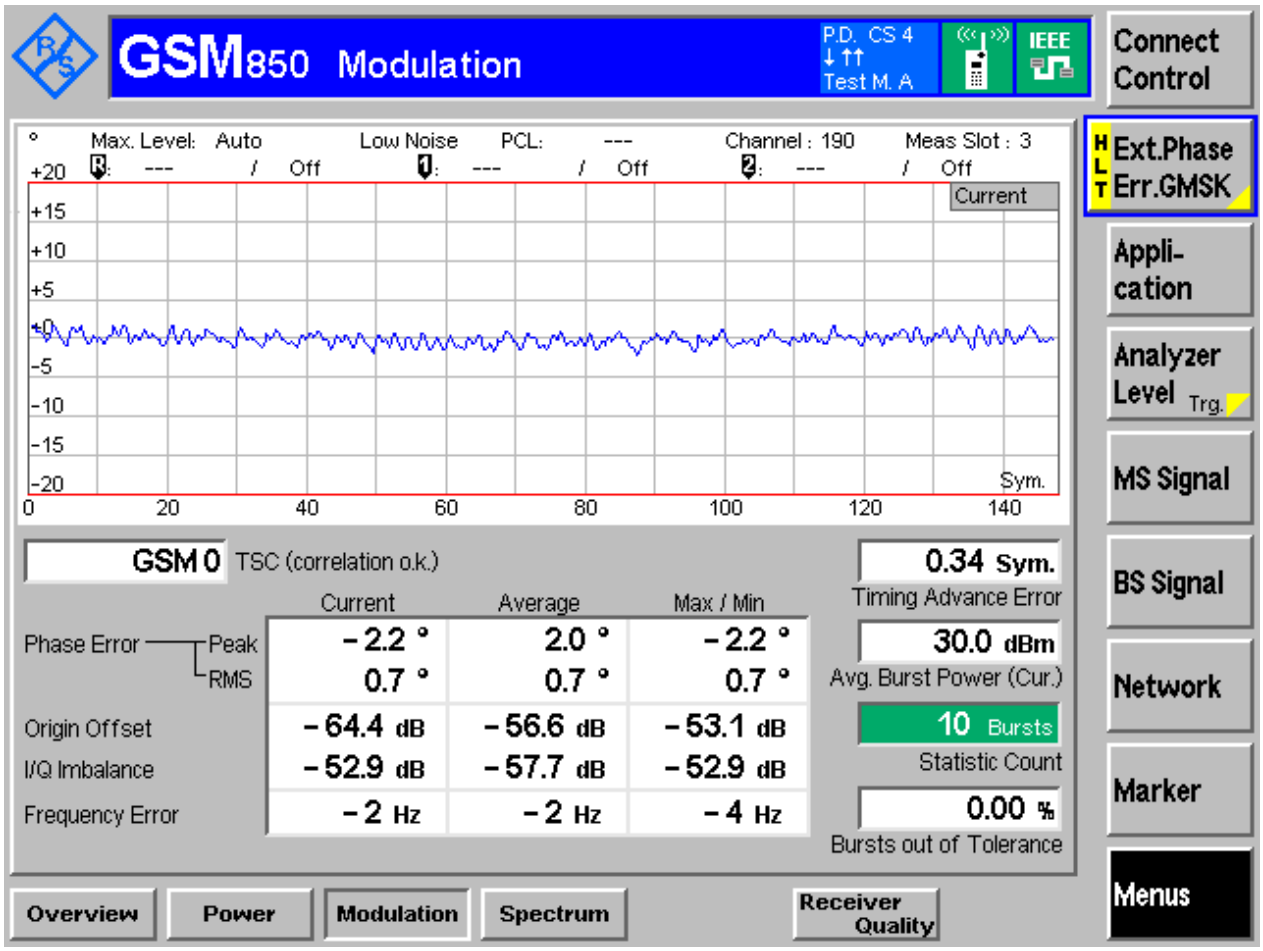
Part I - Test Plots

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



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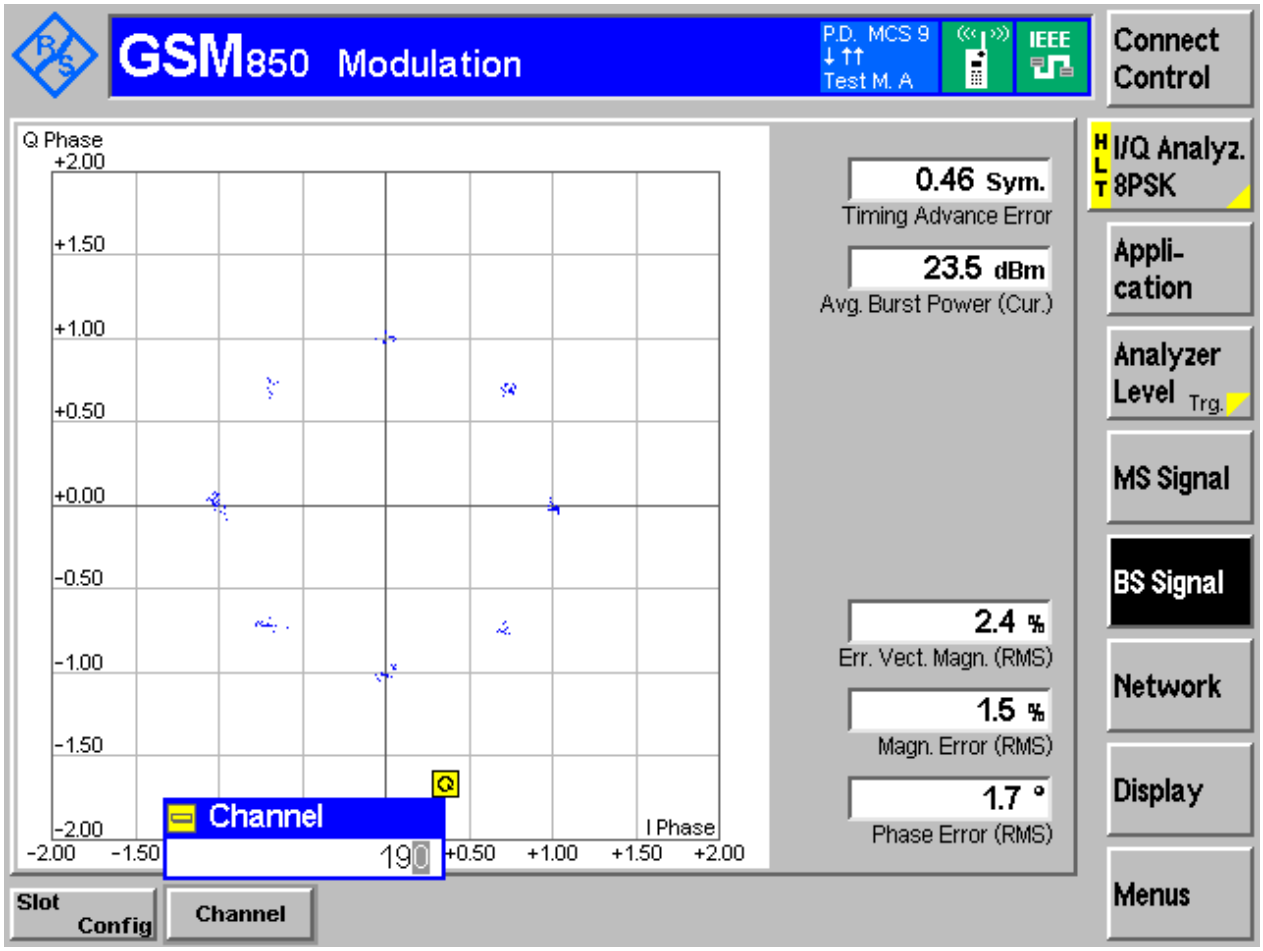
3.1.1.2 Test Mode = GSM/TM2

3.1.1.2.1 Test Channel = MCH



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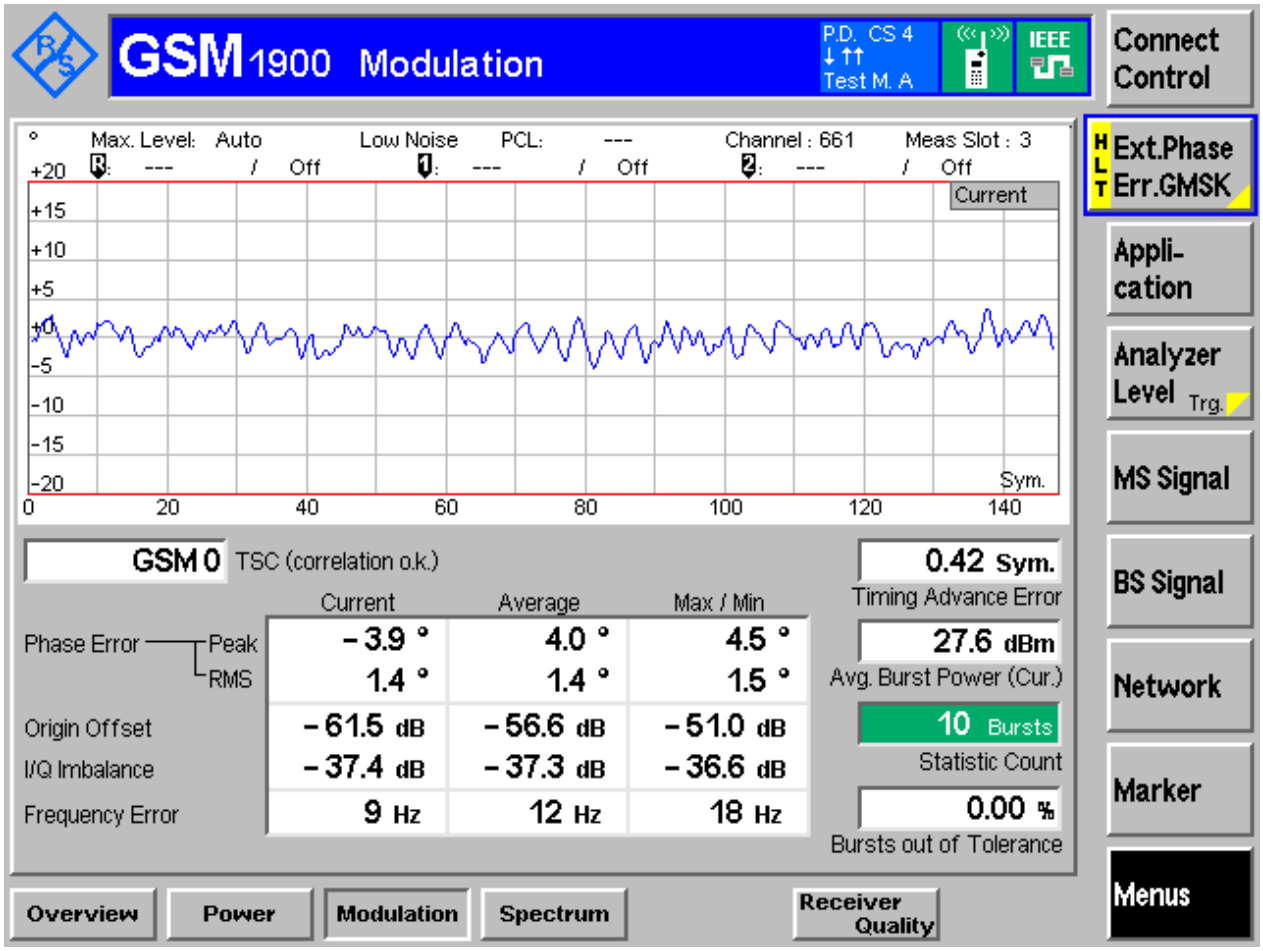
3.1.2 Test Band = GSM1900

3.1.2.1 Test Mode = GSM/TM1

3.1.2.1.1 Test Channel = MCH



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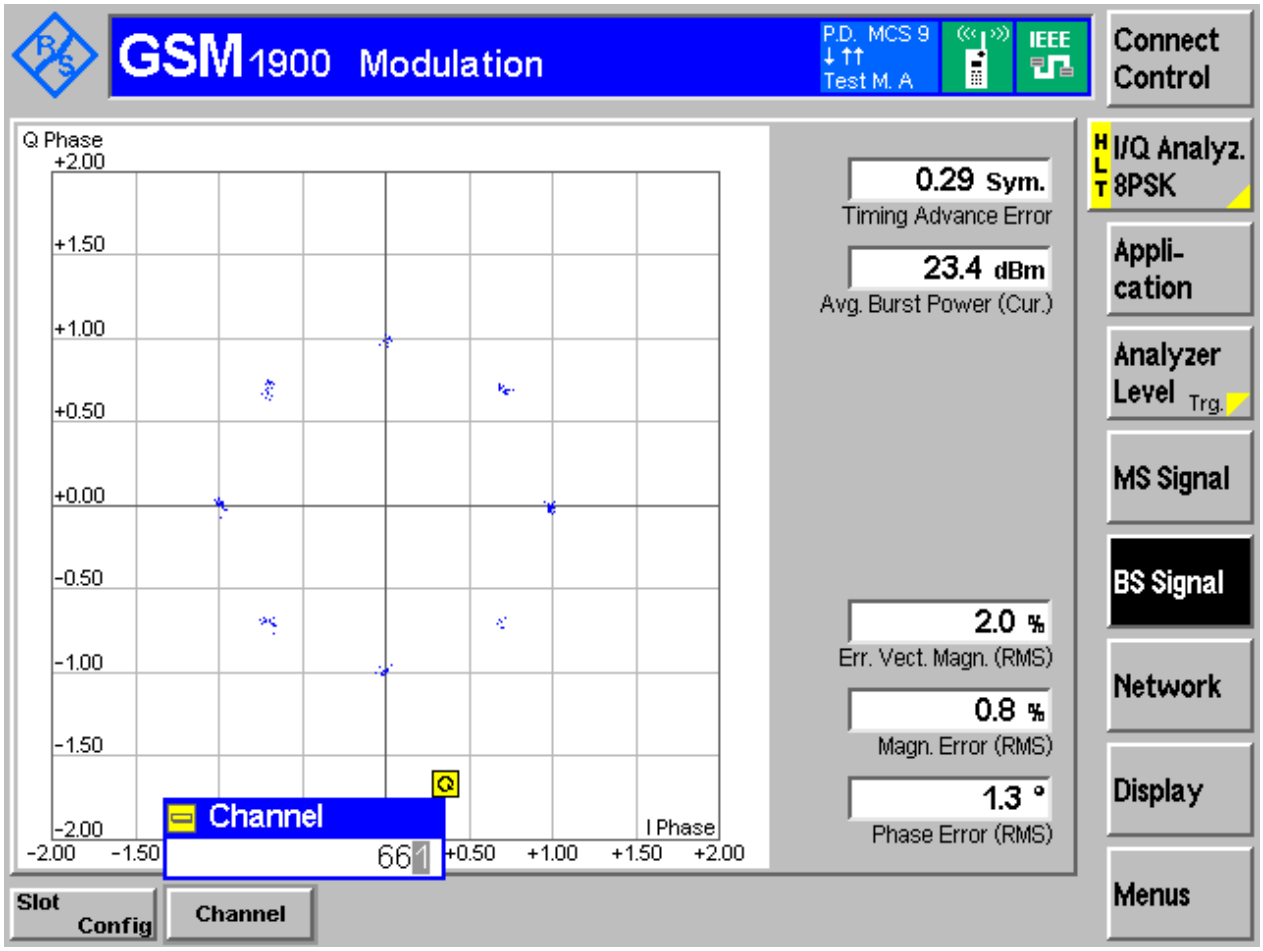
3.1.2.2 Test Mode = GSM/TM2

3.1.2.2.1 Test Channel = MCH



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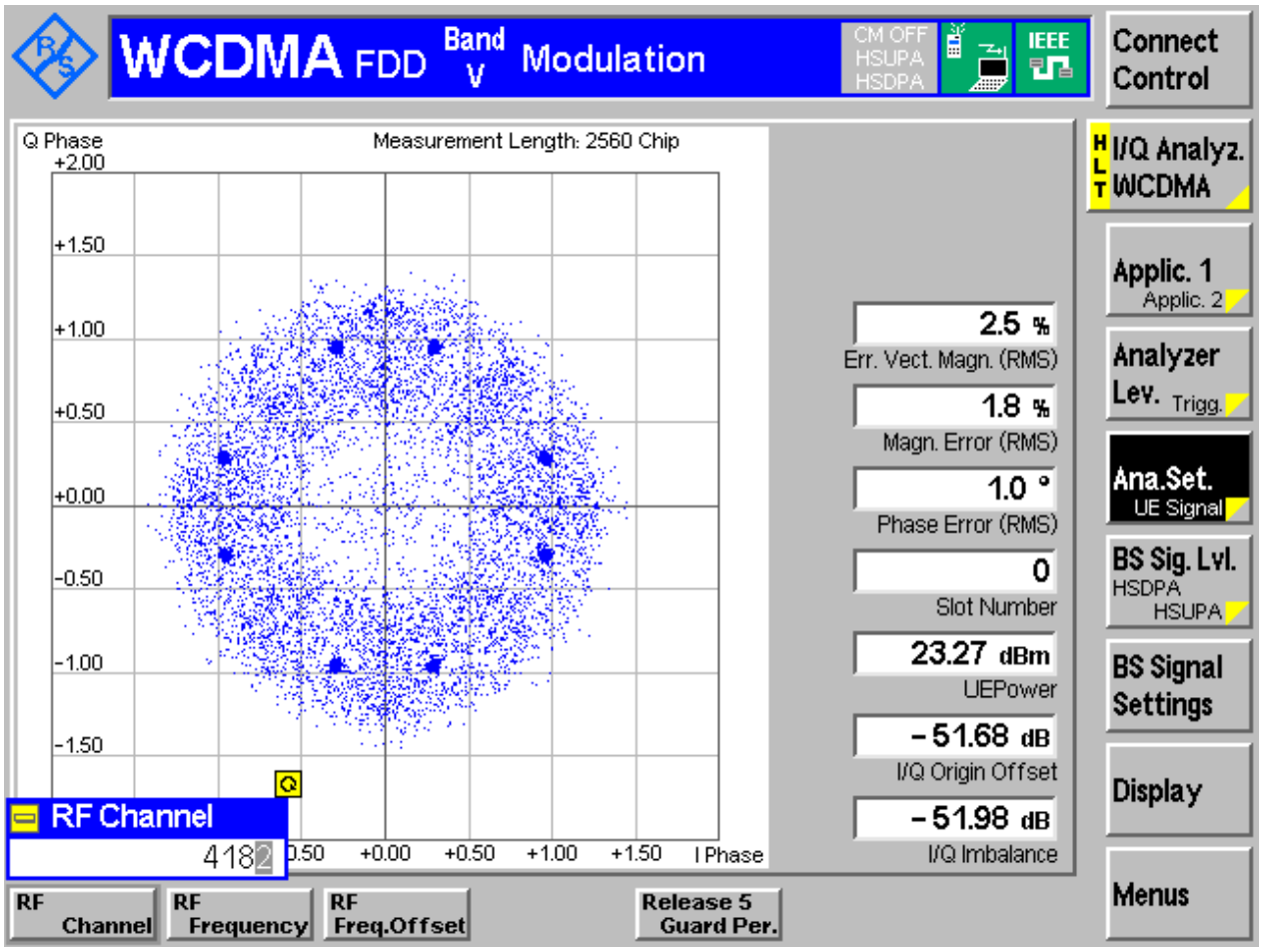
3.2 For UMTS

3.2.1 Test Band = WCDMA850

3.2.1.1 Test Mode = UMTS/TM1

3.2.1.1.1 Test Channel = MCH



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4Appendix_D: Bandwidth

Part I - Test Results

Test Band	Test Mode	Test Channel	Occupied Bandwidth [kHz]	Emission Bandwidth [kHz]	Verdict
GSM850	GSM/TM1	LCH	244.10	317.87	Pass
		MCH	245.80	312.48	Pass
		HCH	241.42	311.02	Pass
	GSM/TM2	LCH	239.82	311.95	Pass
		MCH	242.33	320.36	Pass
		HCH	243.28	313.93	Pass
GSM1900	GSM/TM1	LCH	243.11	310.30	Pass
		MCH	243.16	315.19	Pass
		HCH	243.07	315.72	Pass
	GSM/TM2	LCH	248.25	325.53	Pass
		MCH	242.60	311.50	Pass
		HCH	236.45	306.10	Pass

Test Band	Test Mode	Test Channel	Occupied Bandwidth [MHz]	Emission Bandwidth [MHz]	Verdict
WCDMA850	UMTS/TM1	LCH	4.16	4.74	Pass
		MCH	4.18	4.73	Pass
		HCH	4.16	4.75	Pass

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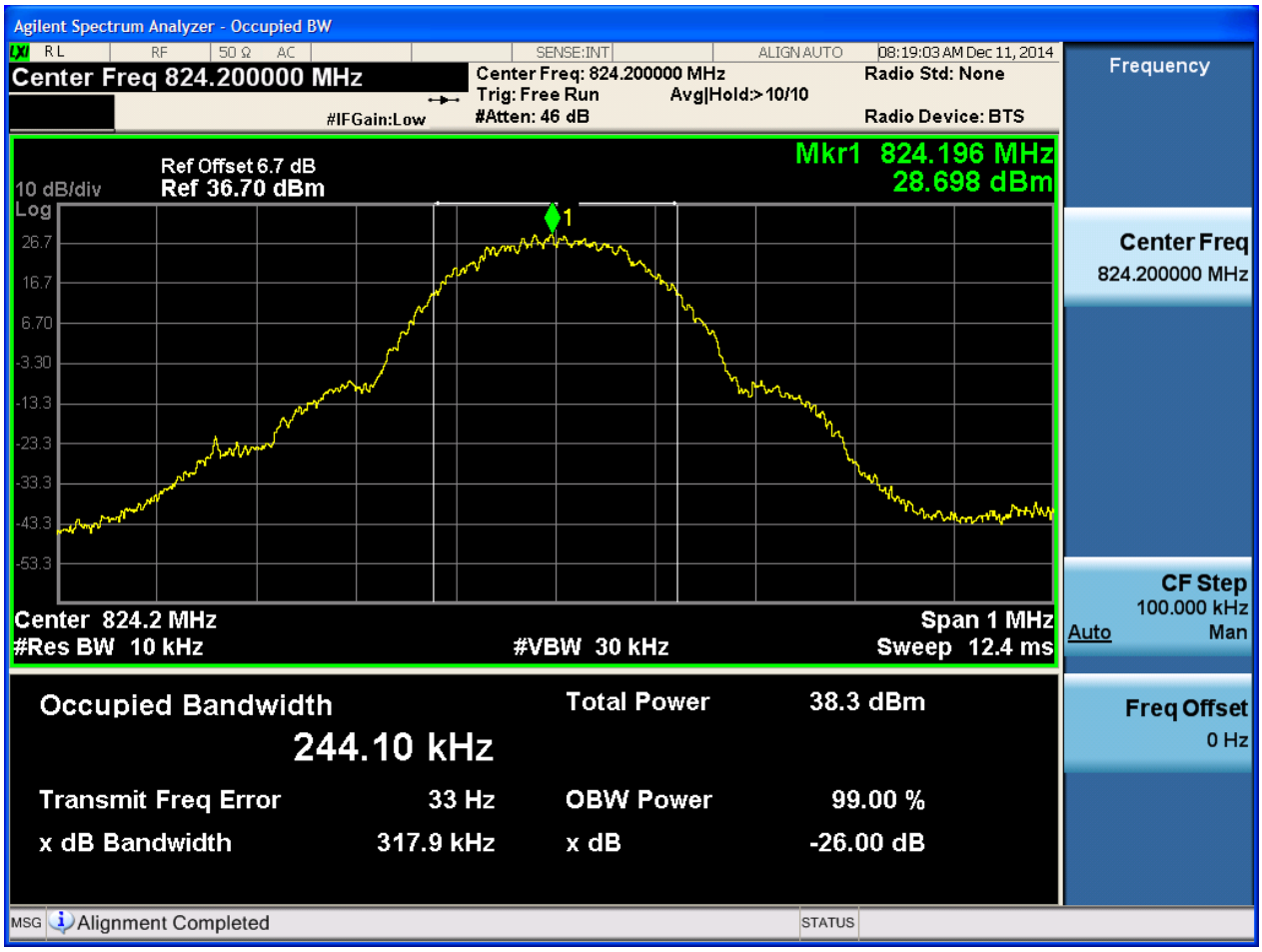
Part II - Test Plots

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



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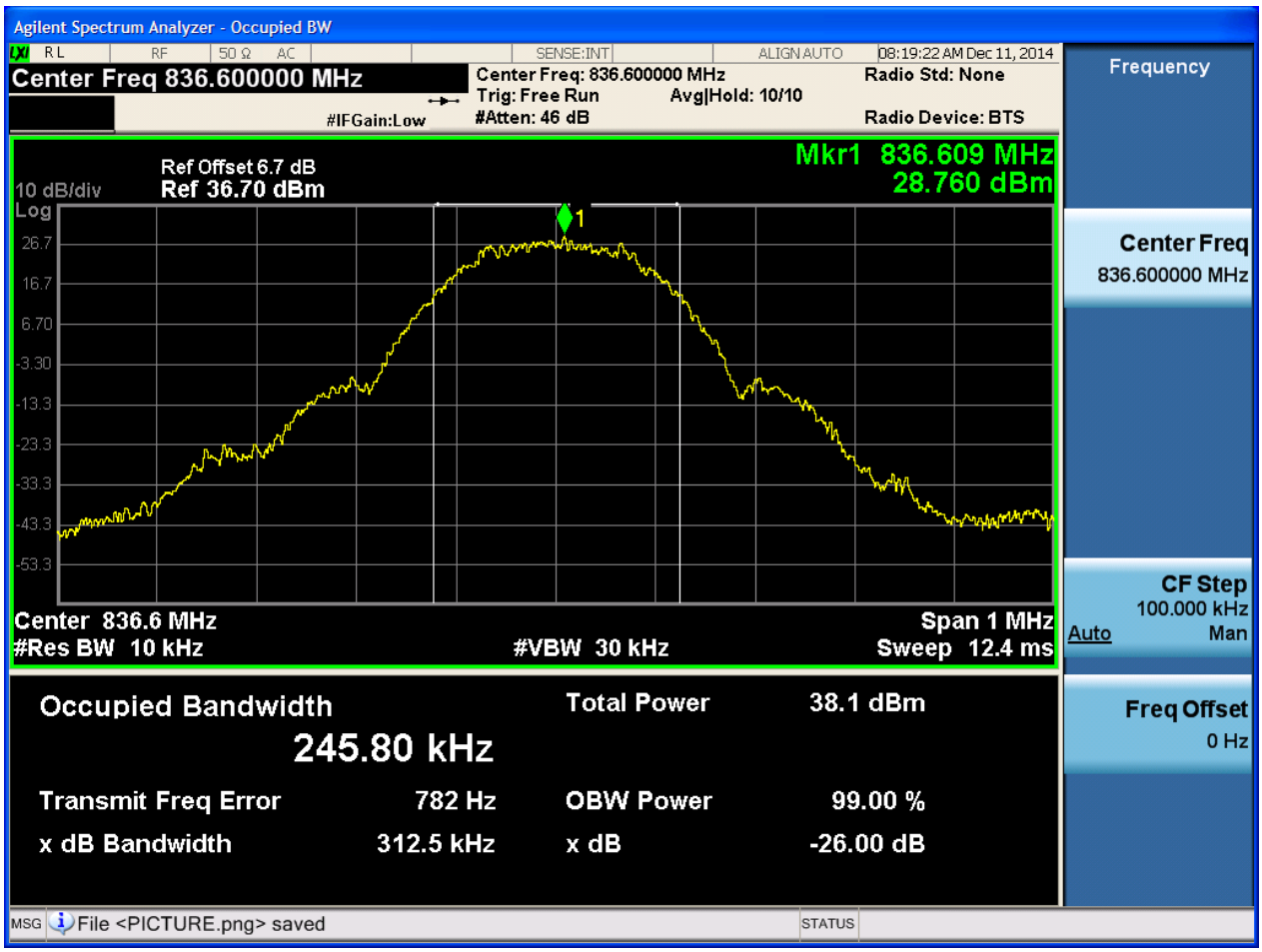
4.1.1.1.2 Test Channel = MCH



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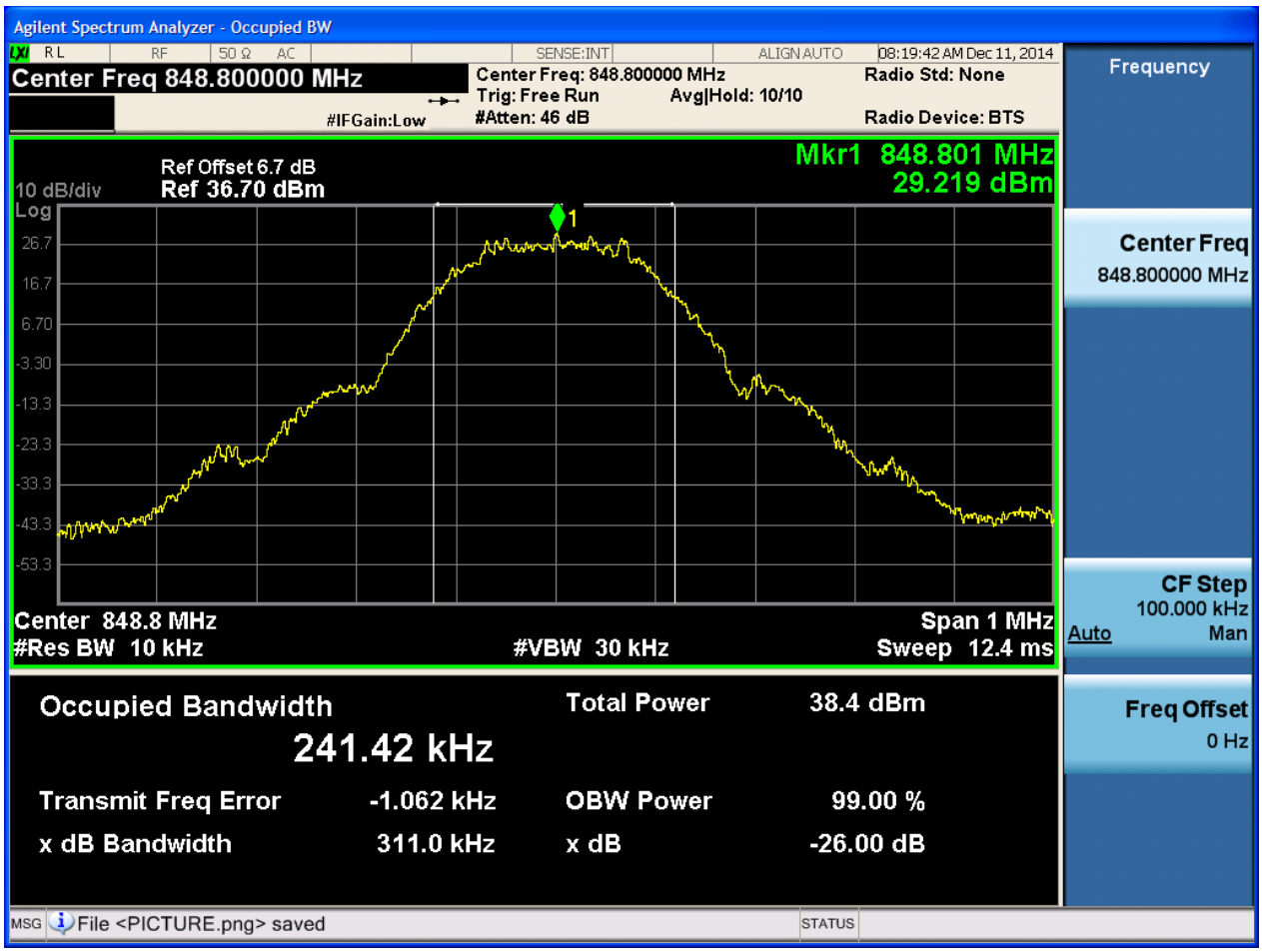
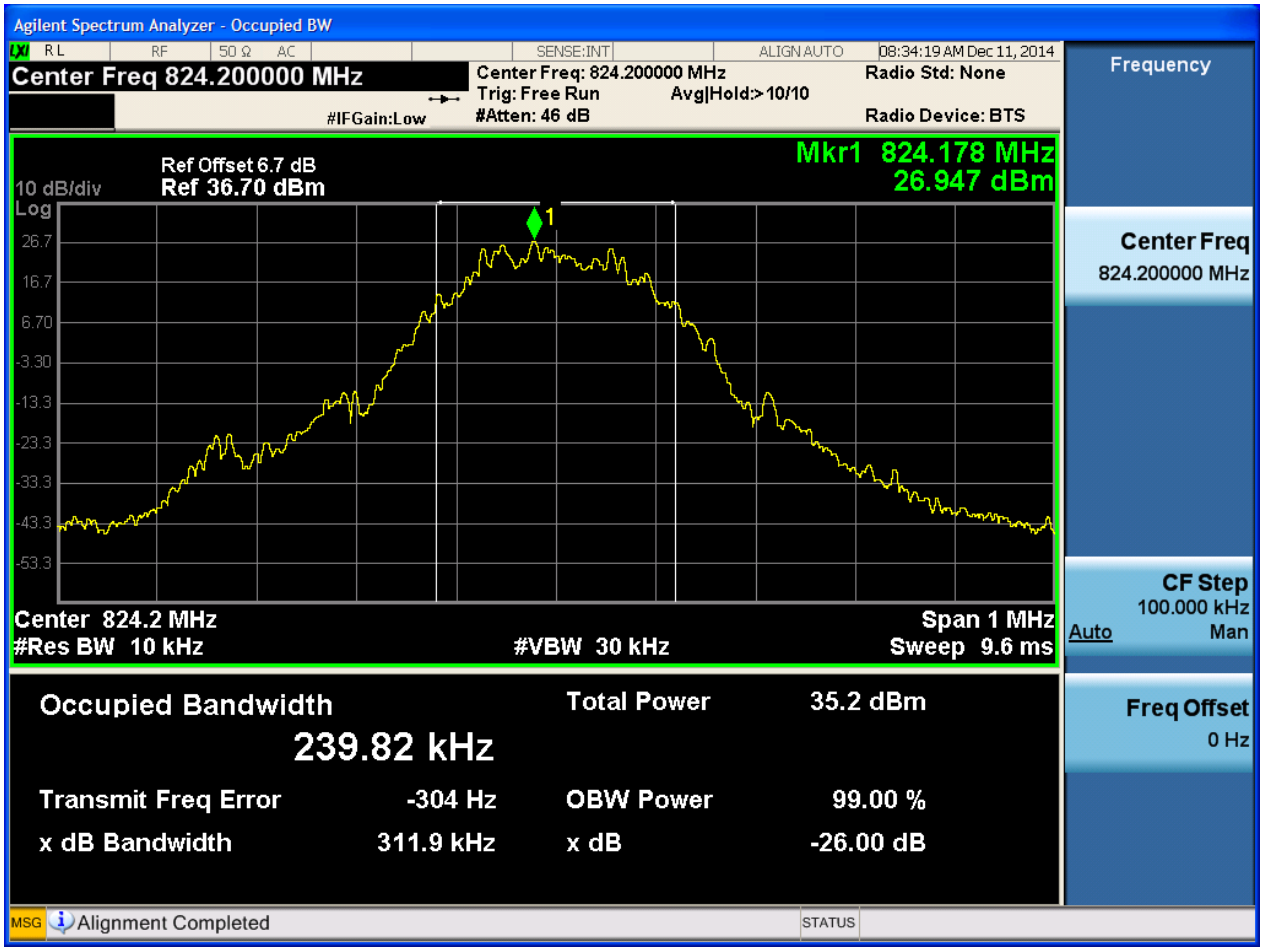
4.1.1.1.3 Test Channel = HCH



4.1.1.2 Test Mode = GSM/TM2

4.1.1.2.1 Test Channel = LCH



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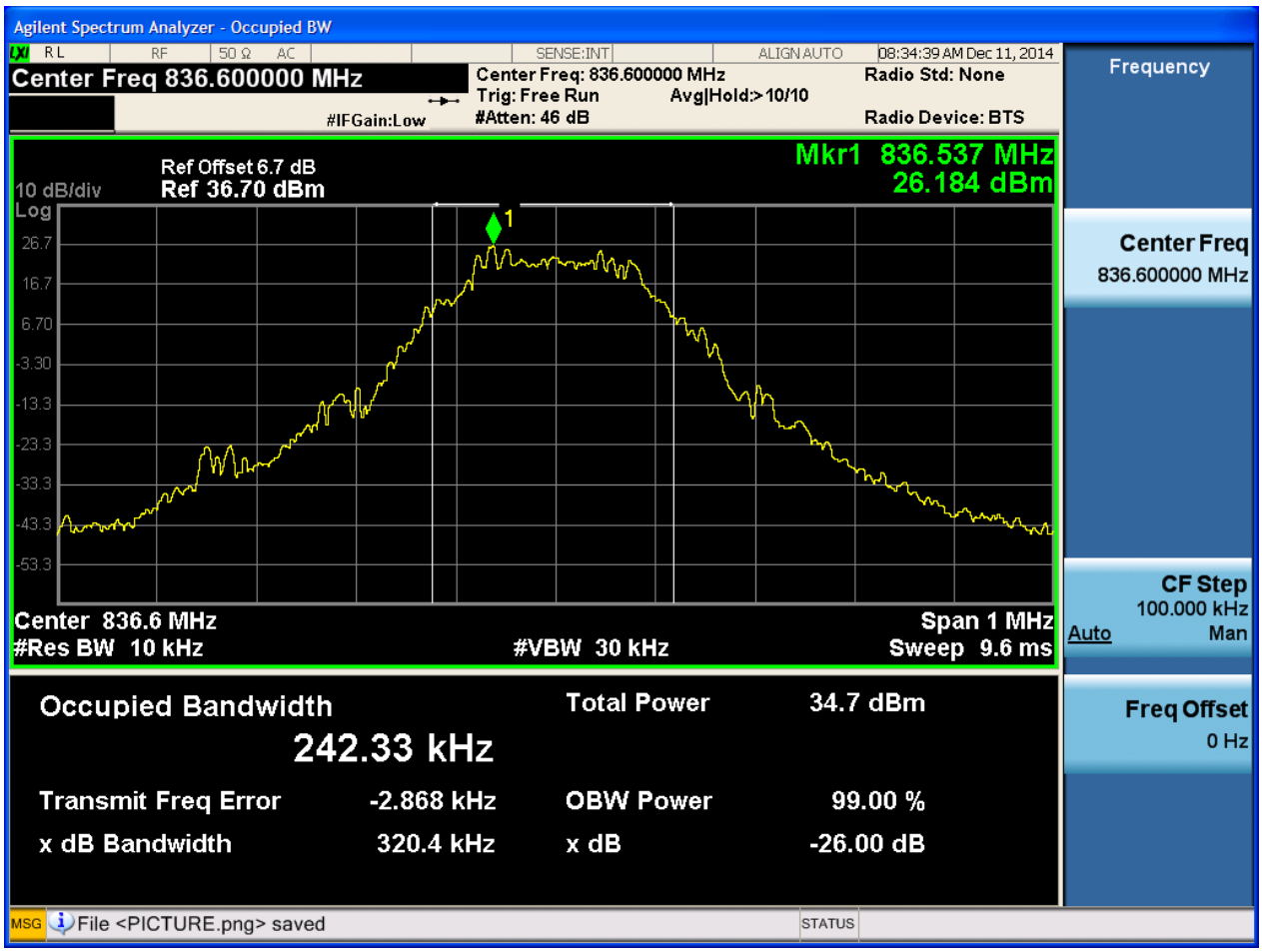
4.1.1.2.2 Test Channel = MCH



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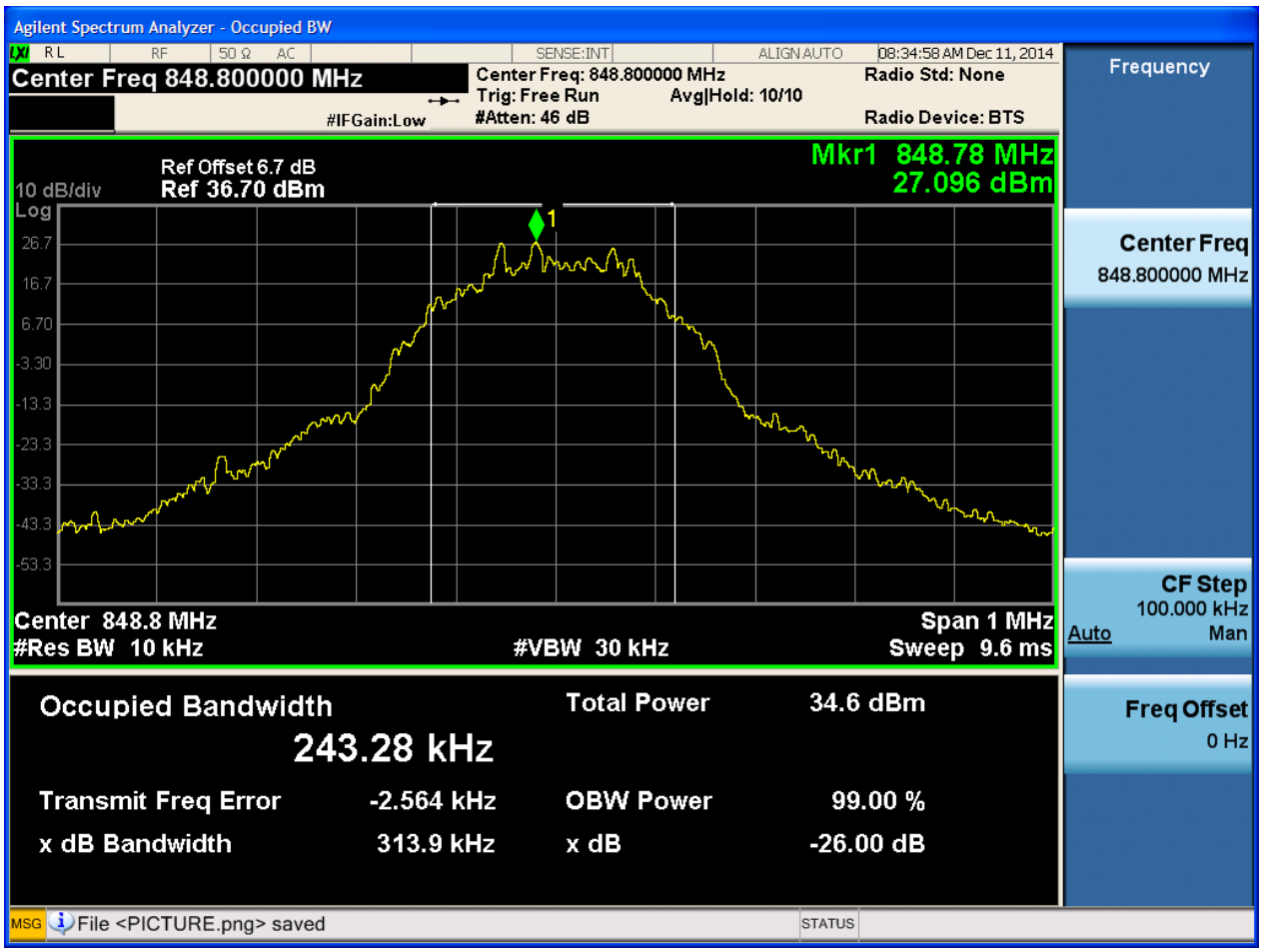
4.1.1.2.3 Test Channel = HCH



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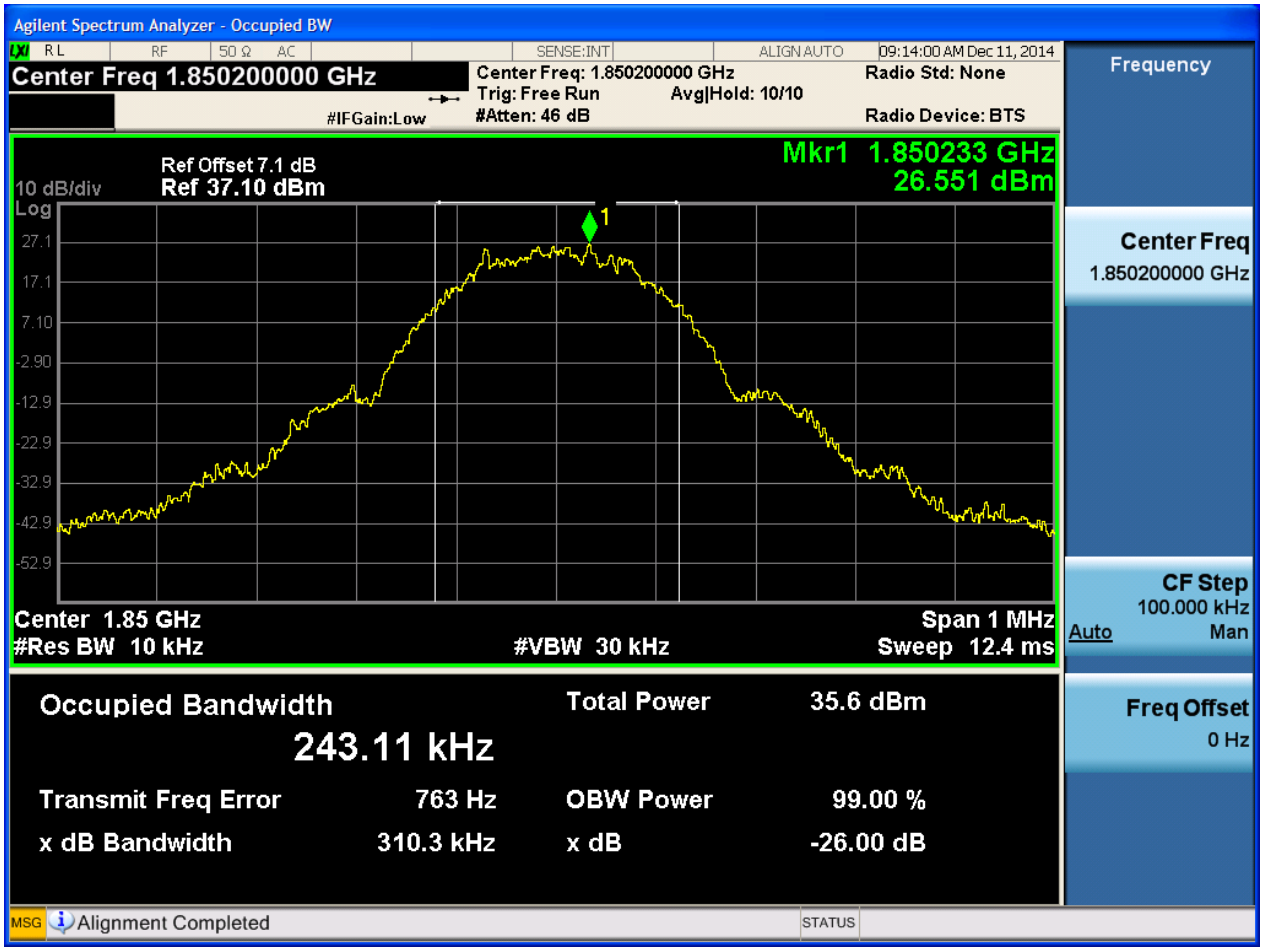
4.1.2 Test Band = GSM1900

4.1.2.1 Test Mode = GSM/TM1

4.1.2.1.1 Test Channel = LCH



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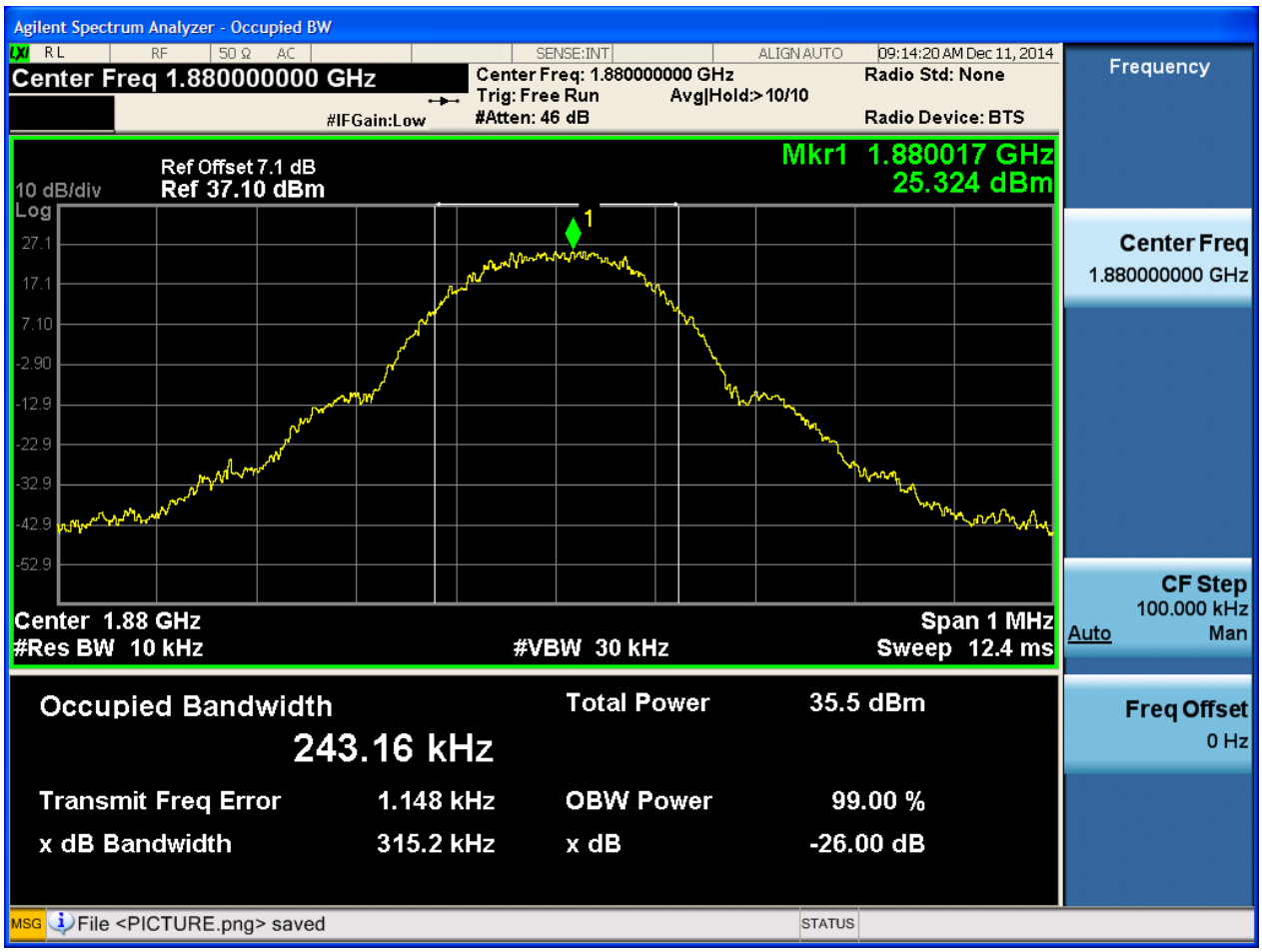
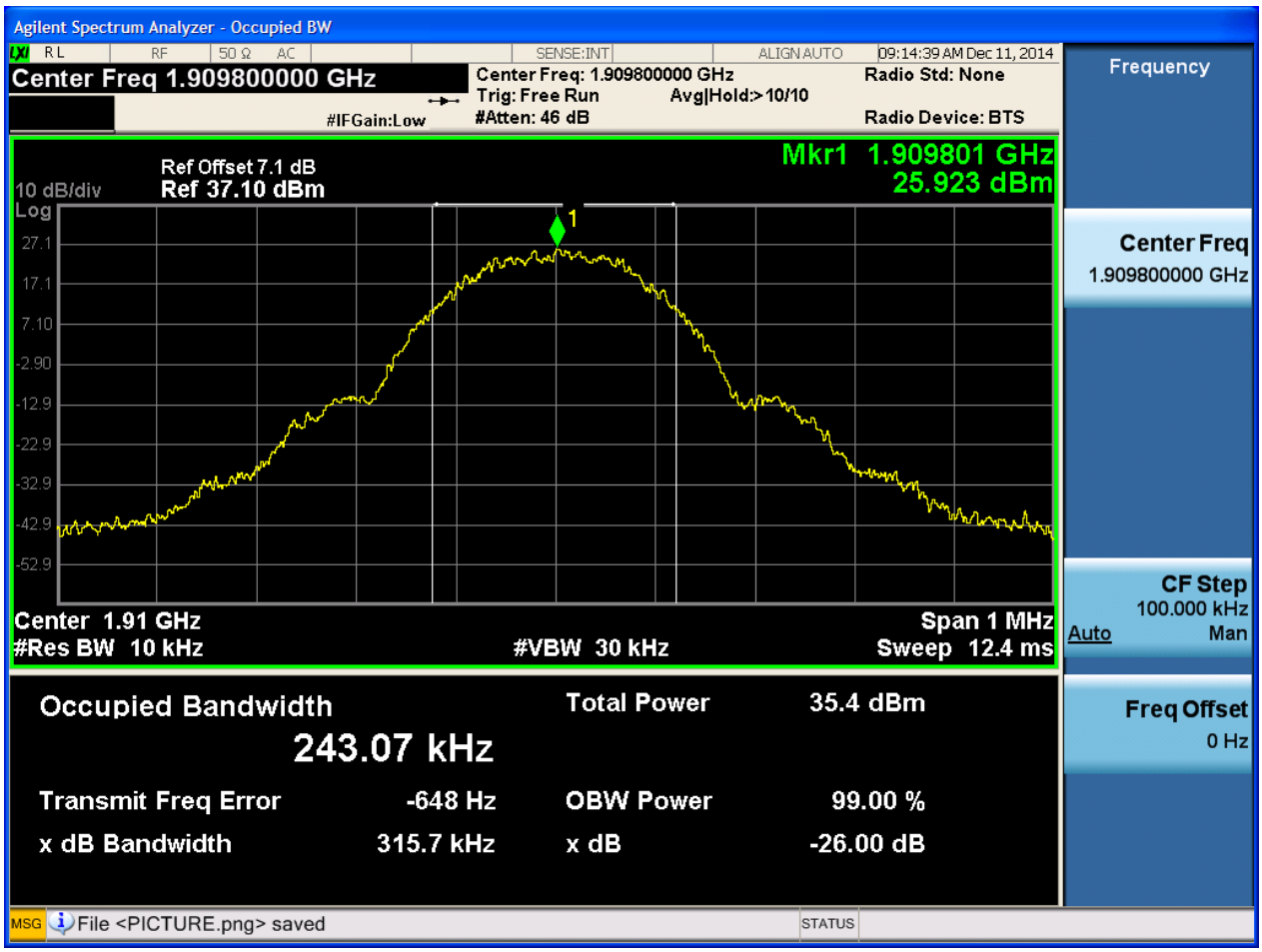
4.1.2.1.2 Test Channel = MCH

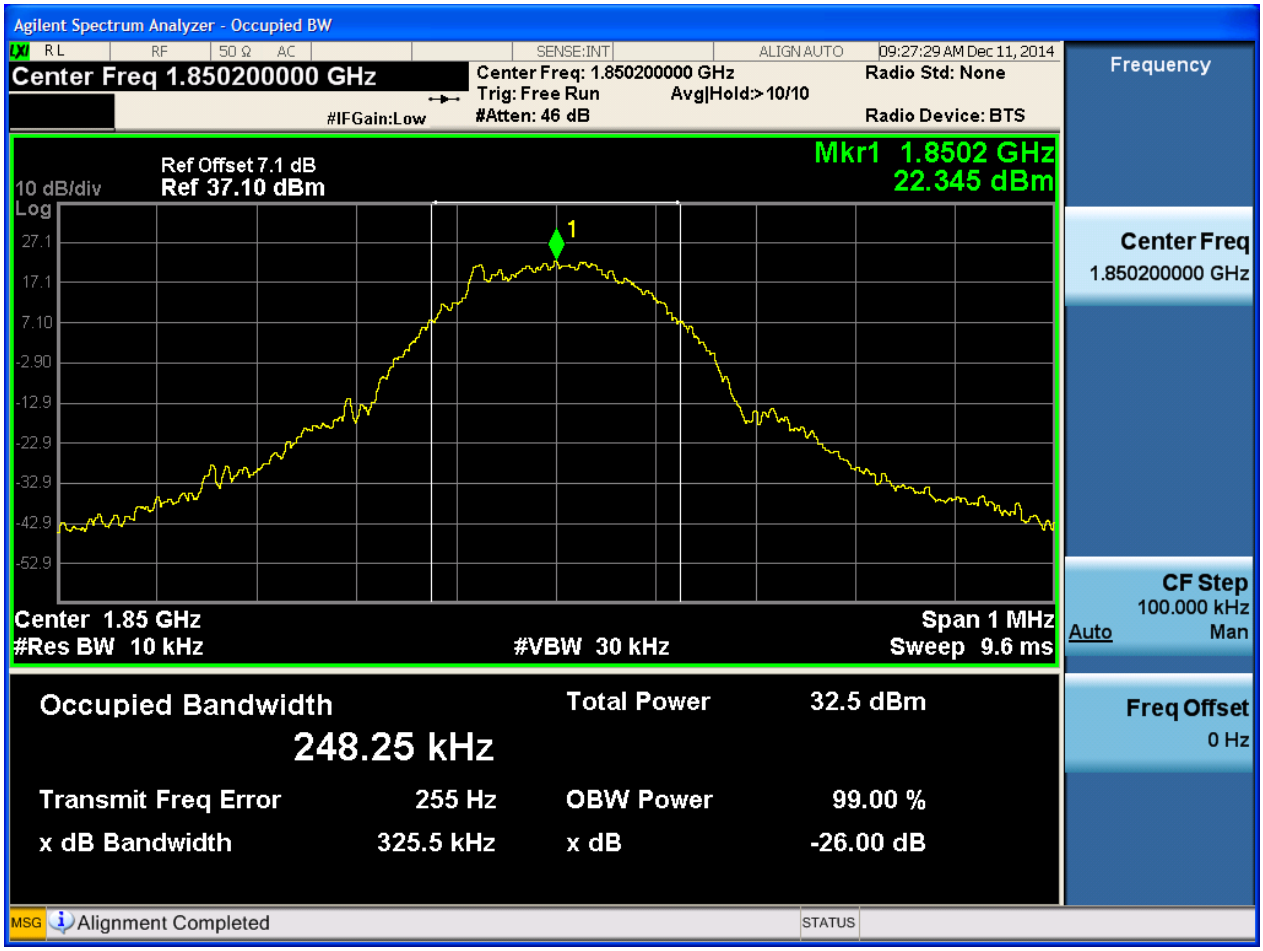


4.1.2.1.3 Test Channel = HCH



4.1.2.2 Test Mode = GSM/TM2

4.1.2.2.1 Test Channel = LCH



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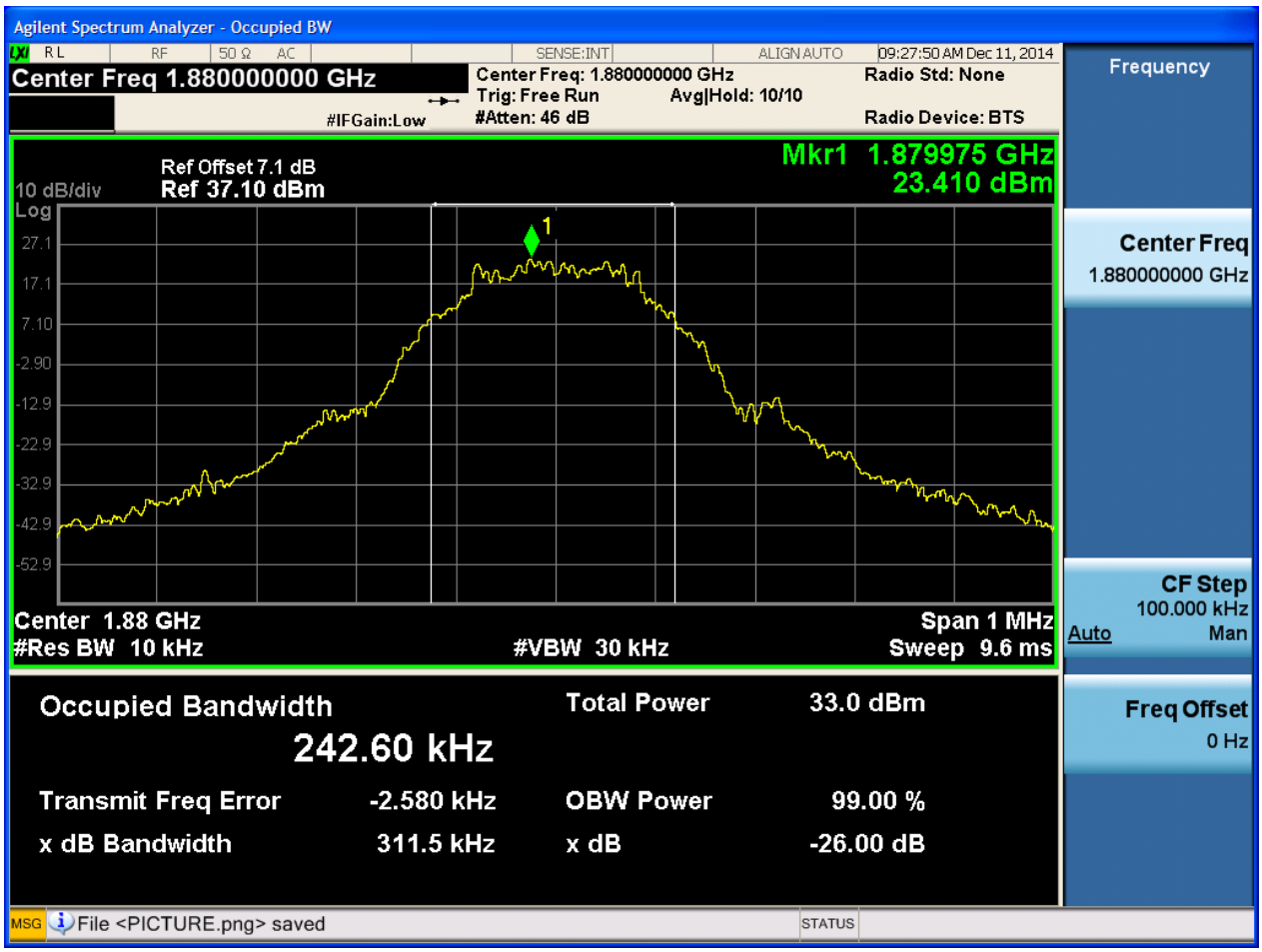
4.1.2.2.2 Test Channel = MCH



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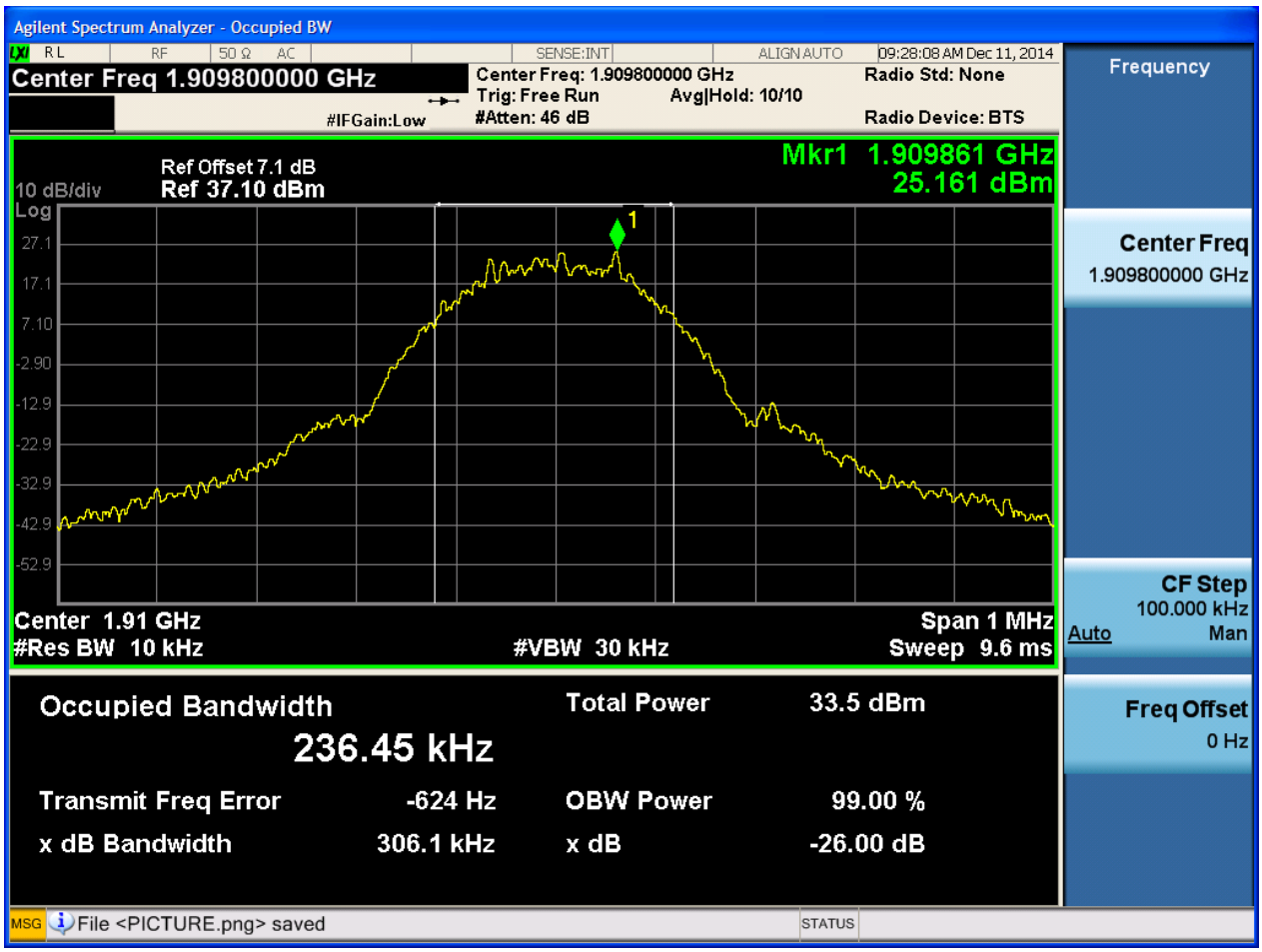
4.1.2.2.3 Test Channel = HCH



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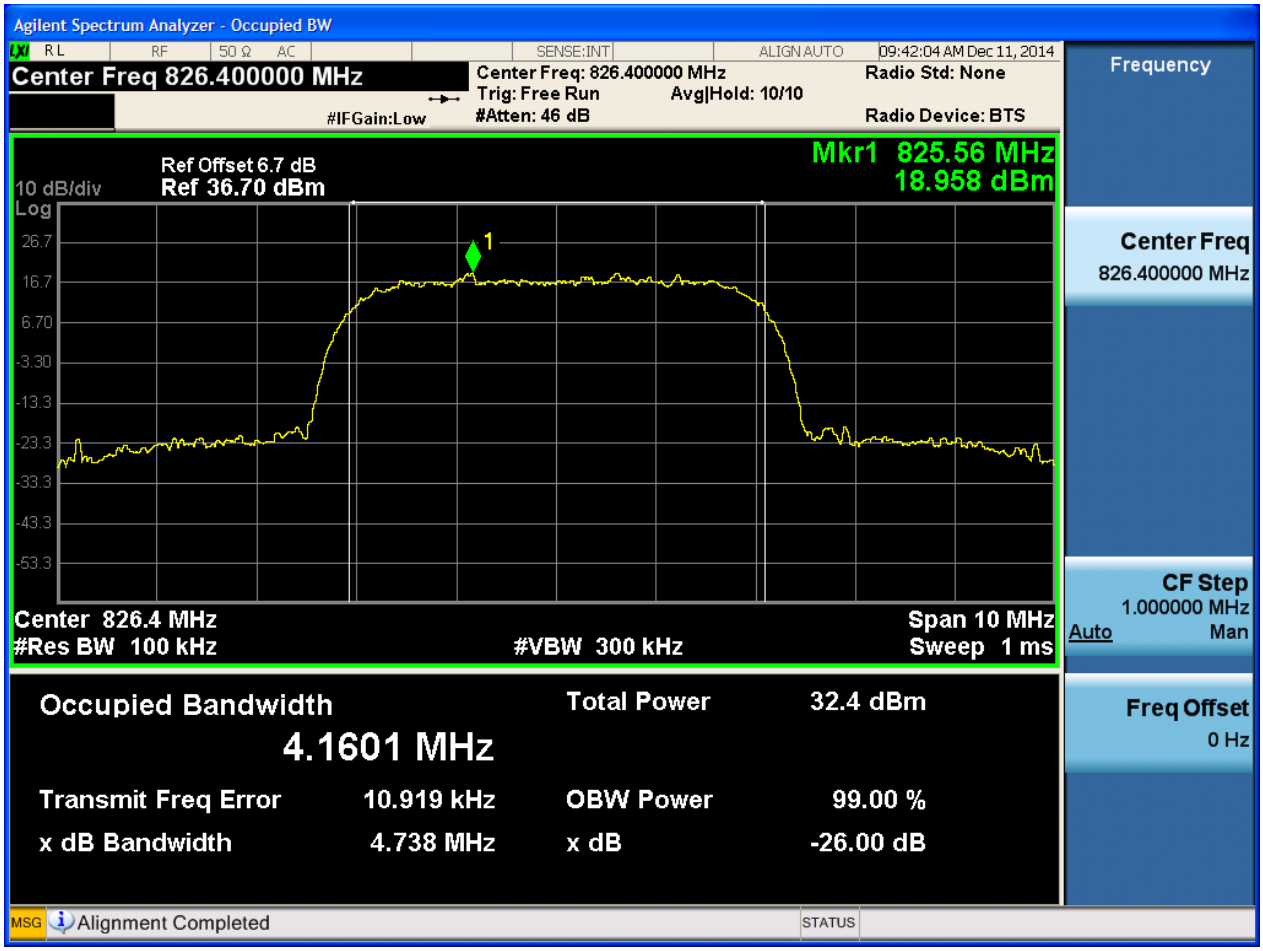
4.2 For UMTS

4.2.1 Test Band = WCDMA850

4.2.1.1 Test Mode = UMTS/TM1

4.2.1.1.1 Test Channel = LCH



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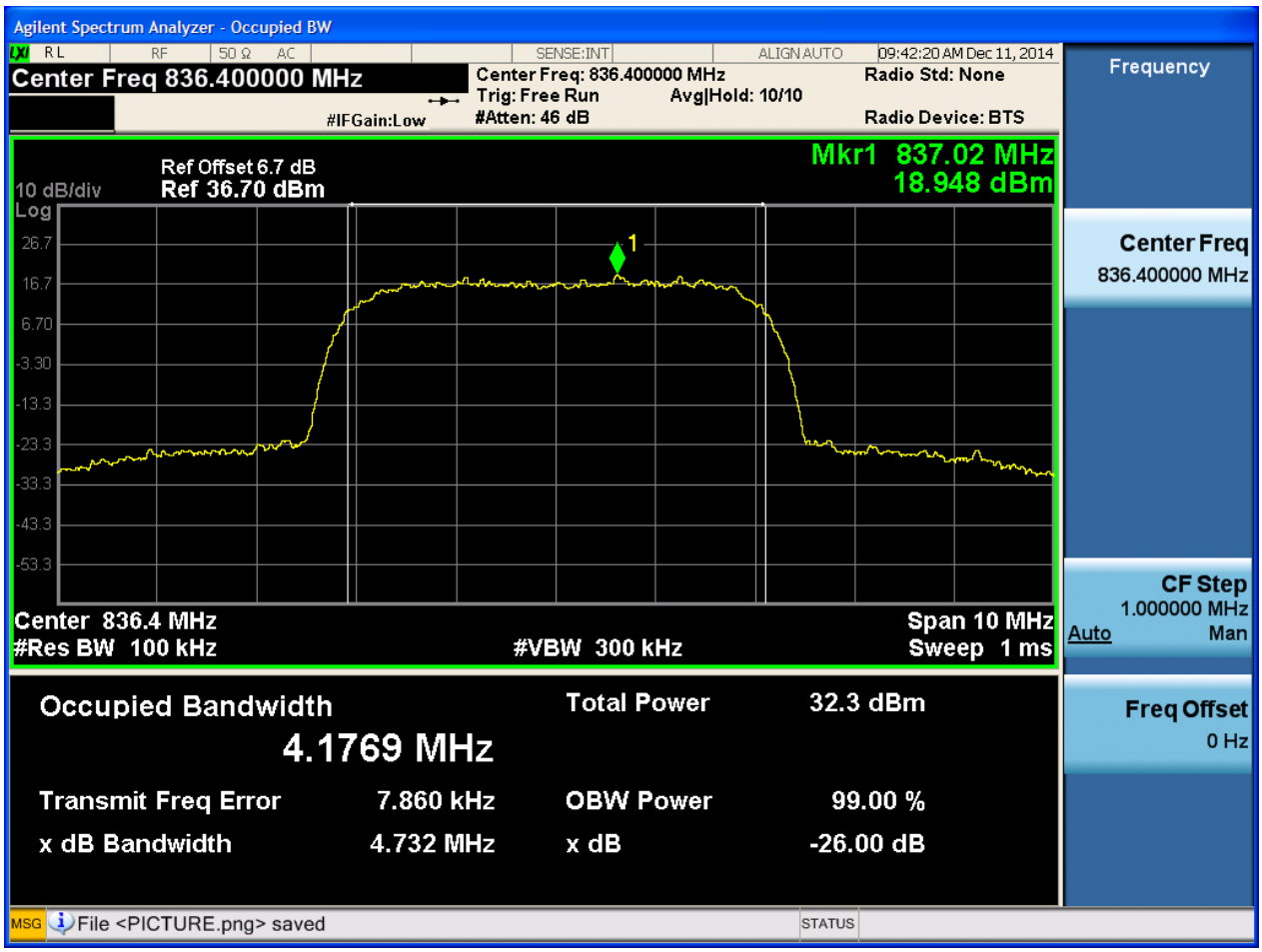
4.2.1.1.2 Test Channel = MCH



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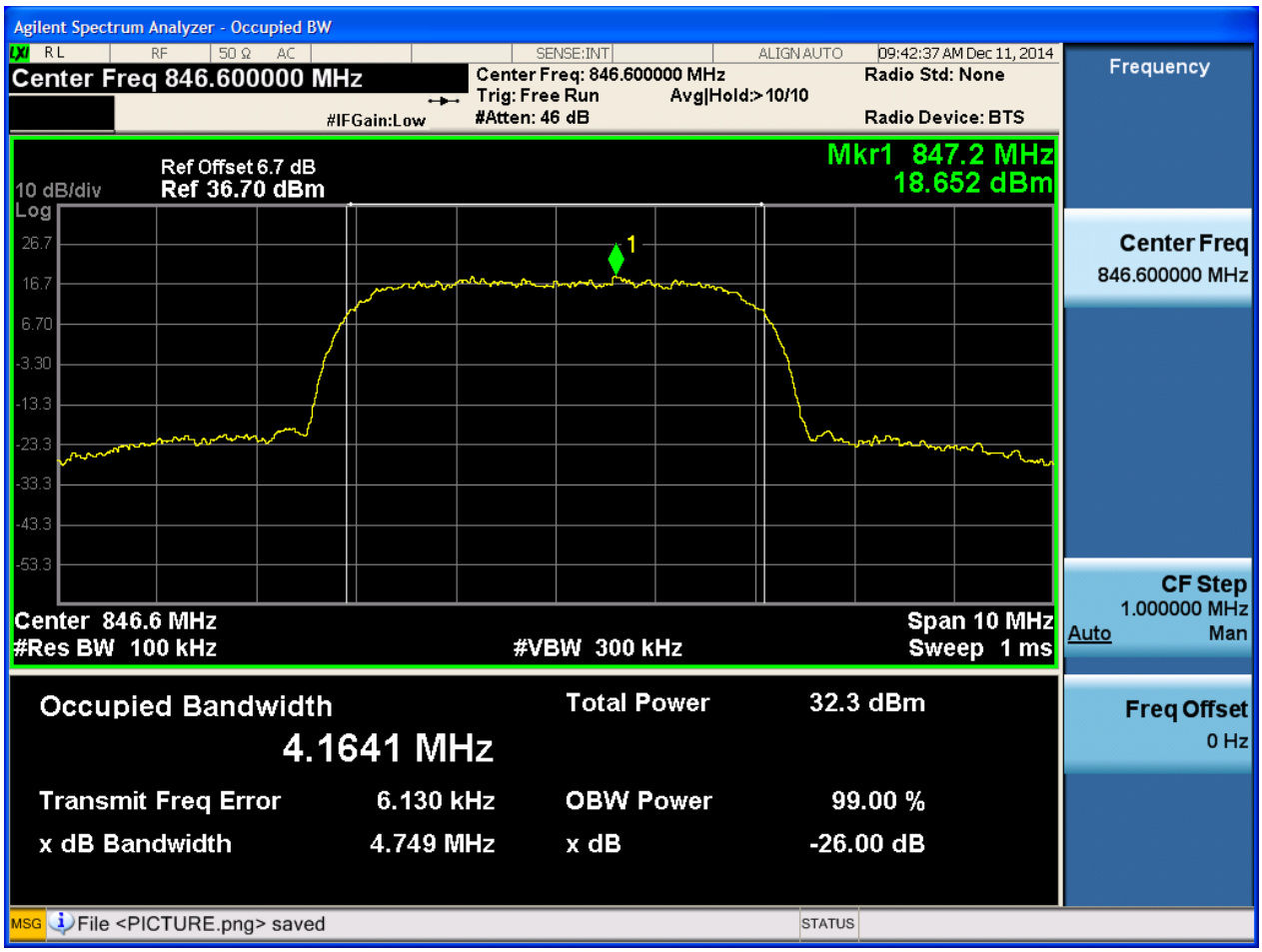
4.2.1.1.3 Test Channel = HCH



5Appendix_E: Band Edges Compliance

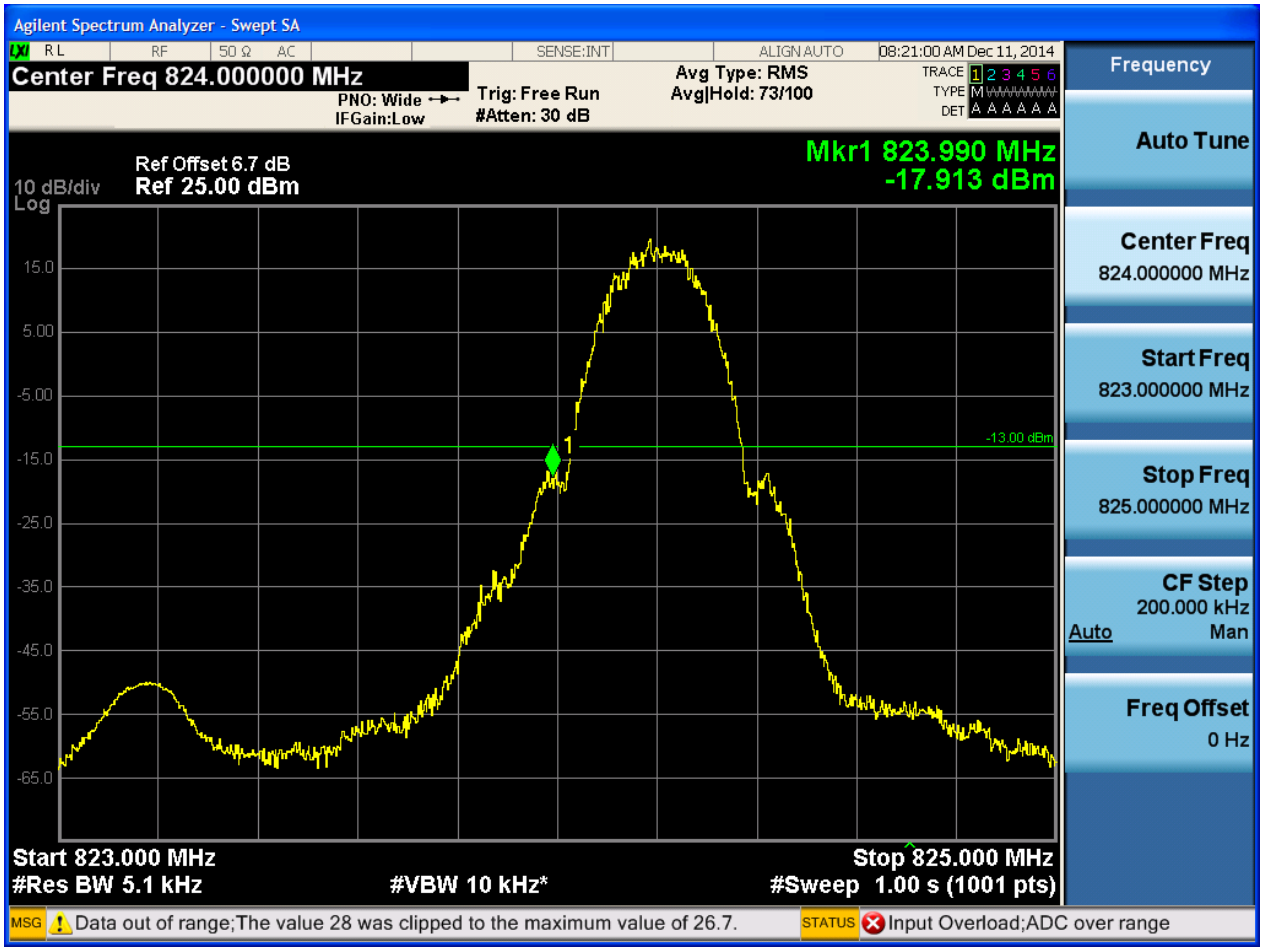
Part I - Test Plots

5.1 For GSM

5.1.1 Test Band = GSM850

5.1.1.1 Test Mode = GSM/TM1

5.1.1.1.1 Test Channel = LCH



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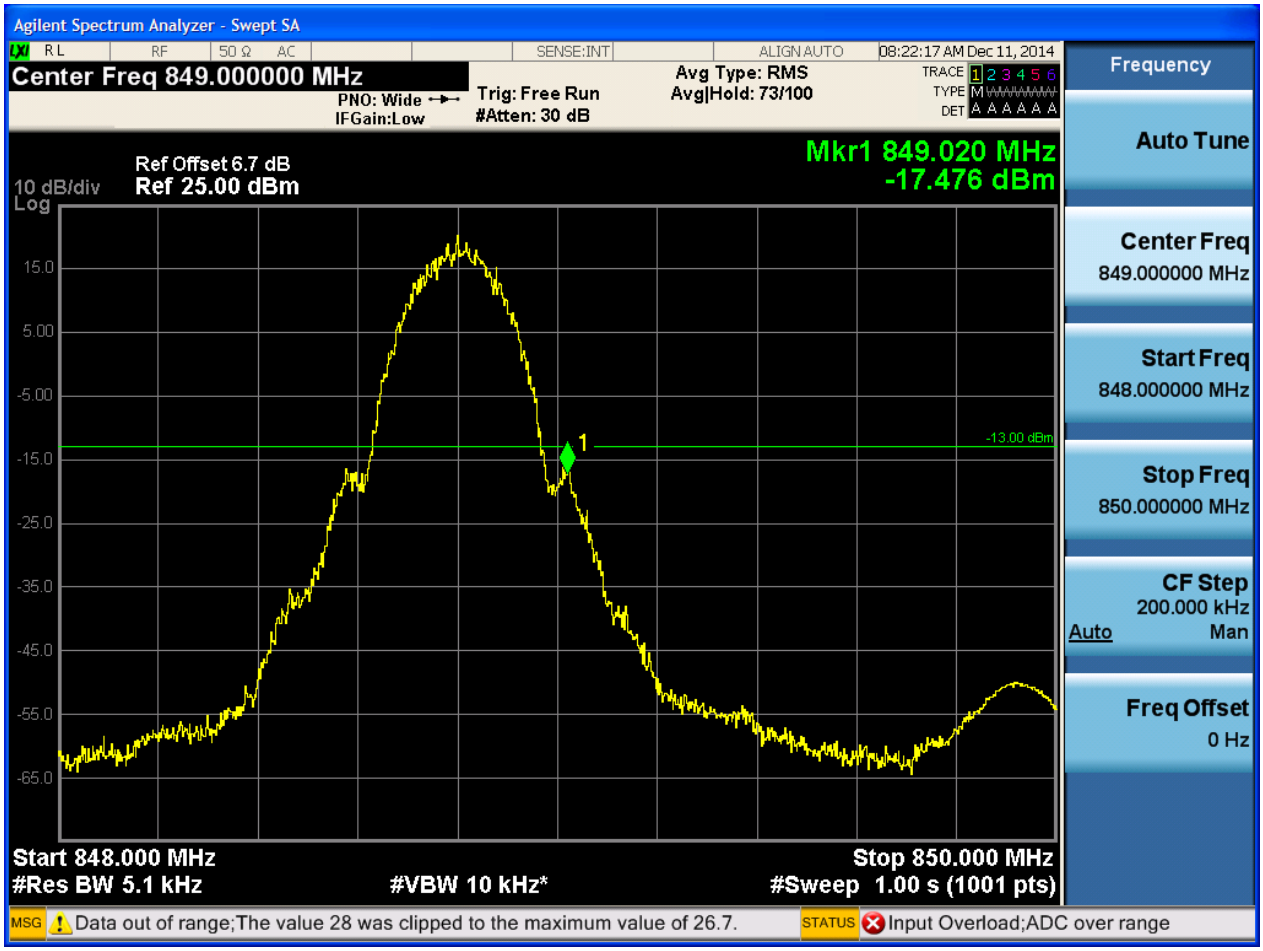
5.1.1.1.2 Test Channel = HCH



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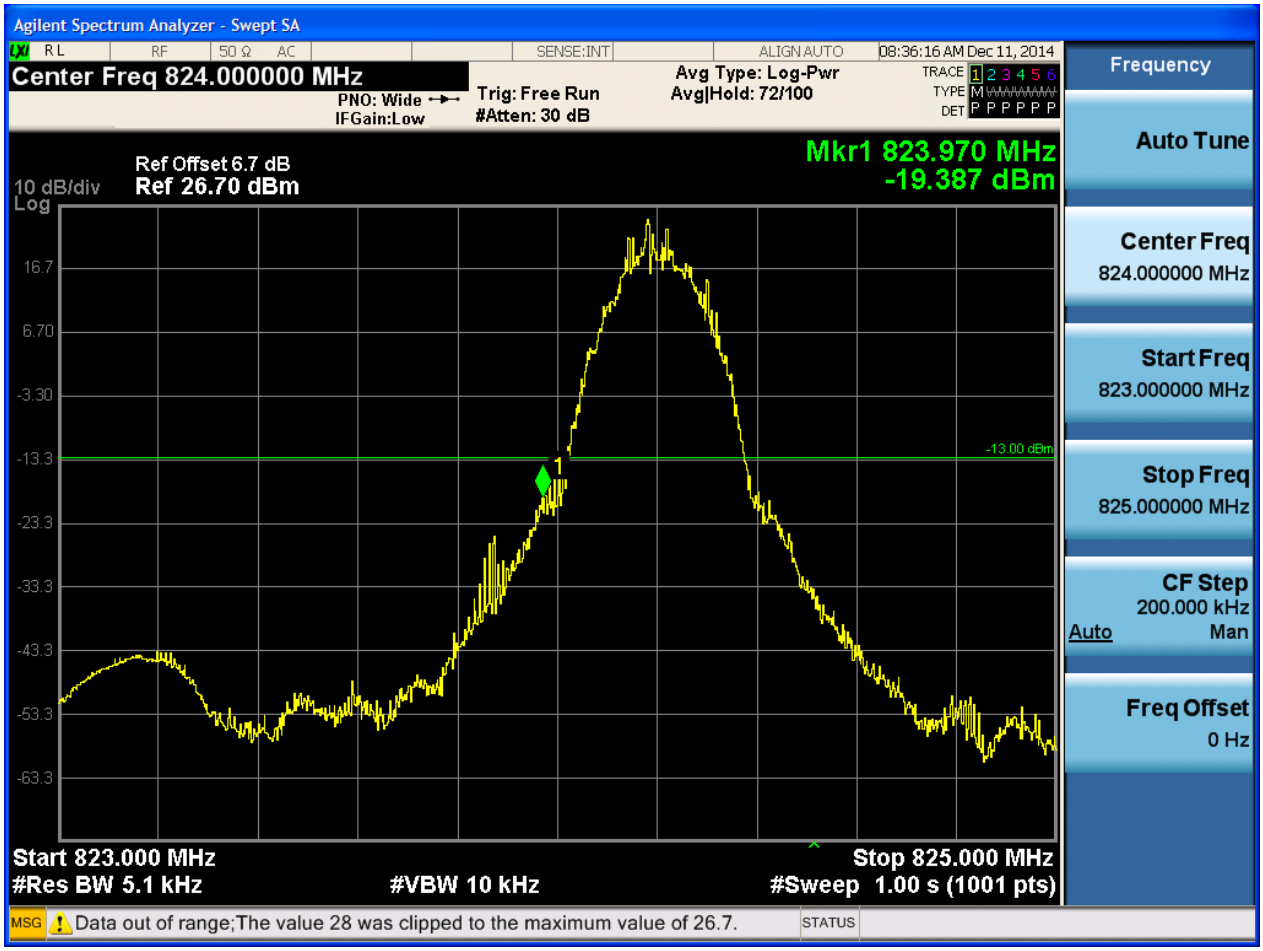
5.1.1.2 Test Mode = GSM/TM2

5.1.1.2.1 Test Channel = LCH



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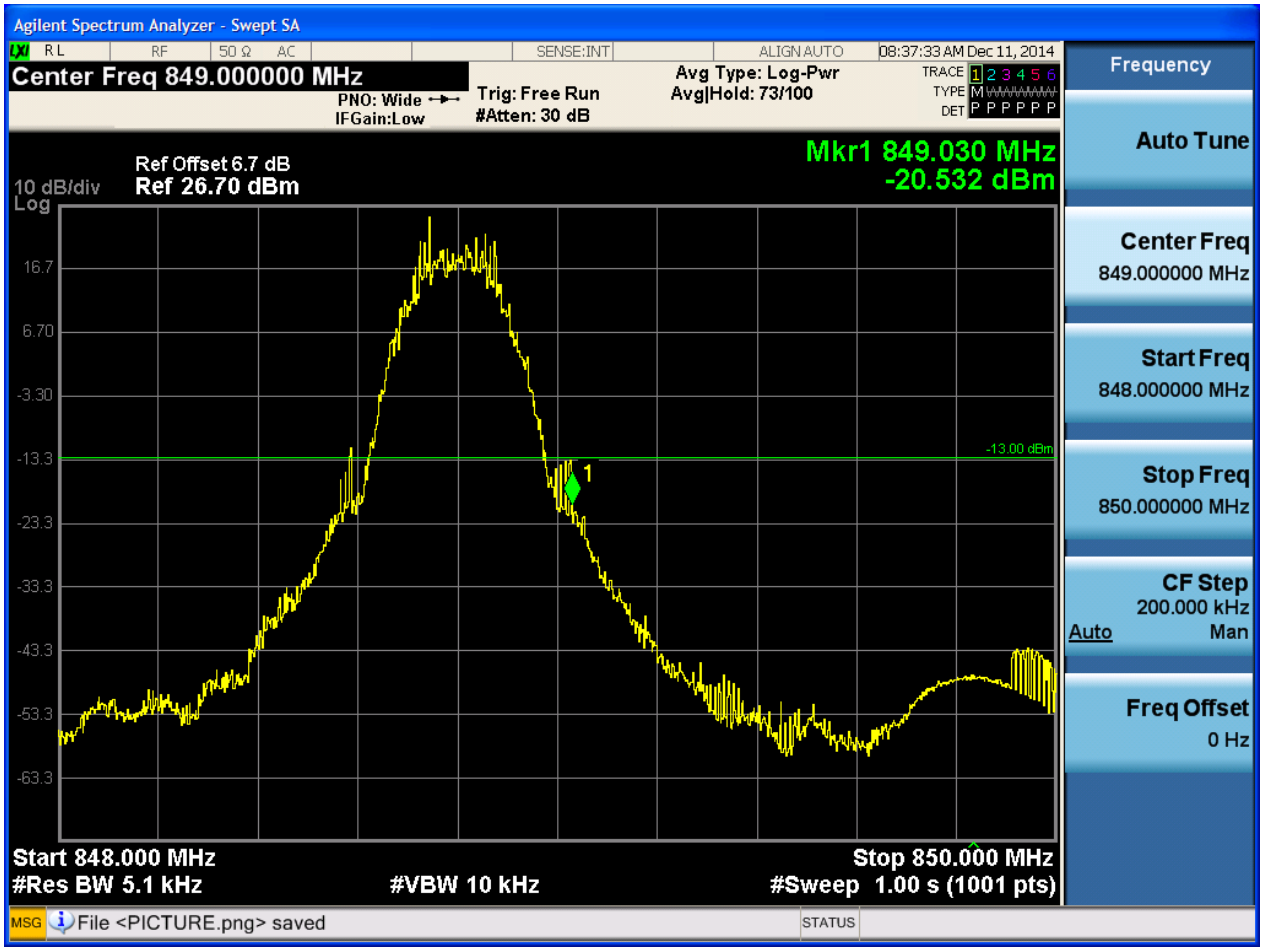
5.1.1.2.2 Test Channel = HCH



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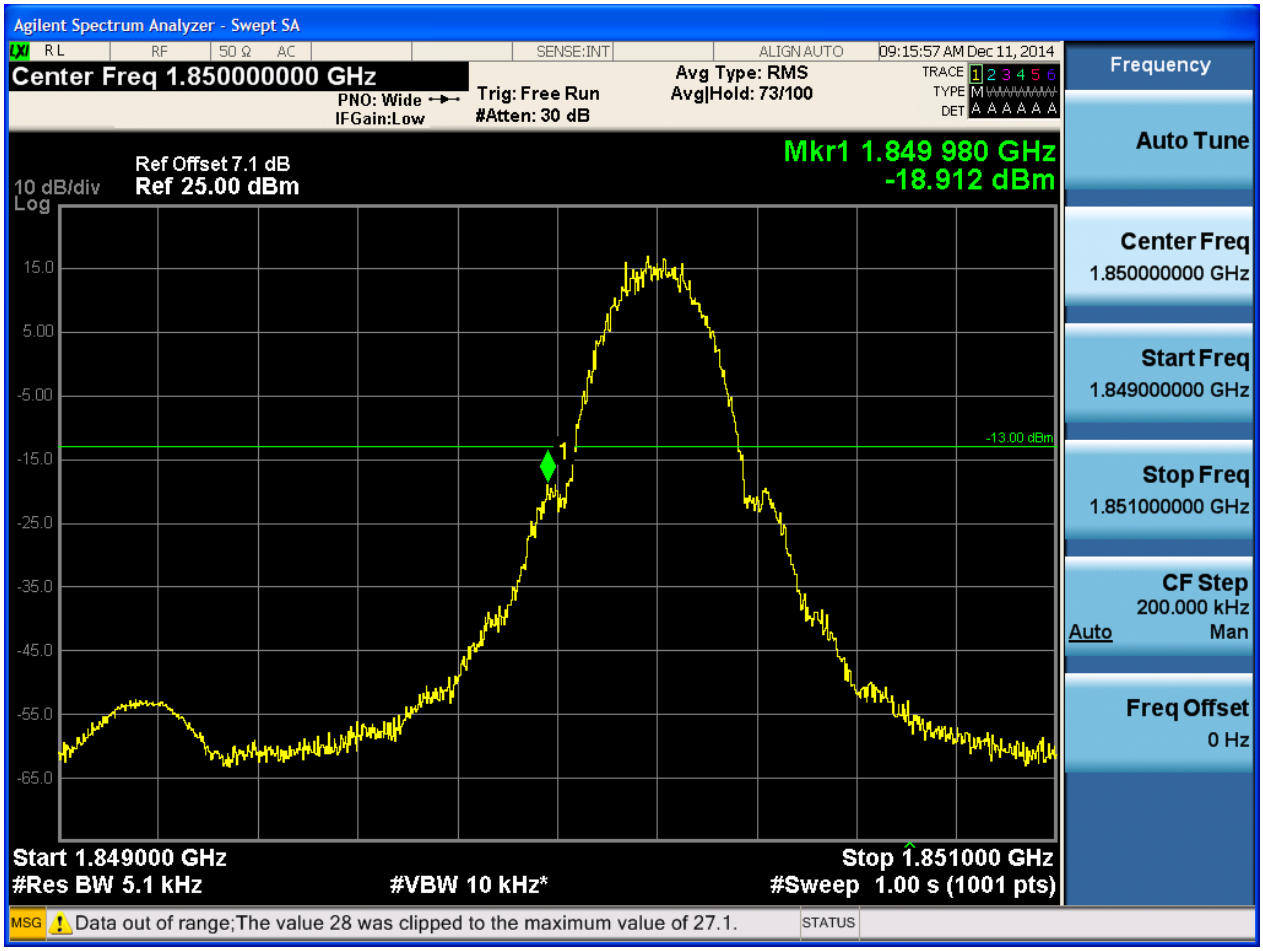
5.1.2 Test Band = GSM1900

5.1.2.1 Test Mode = GSM/TM1

5.1.2.1.1 Test Channel = LCH



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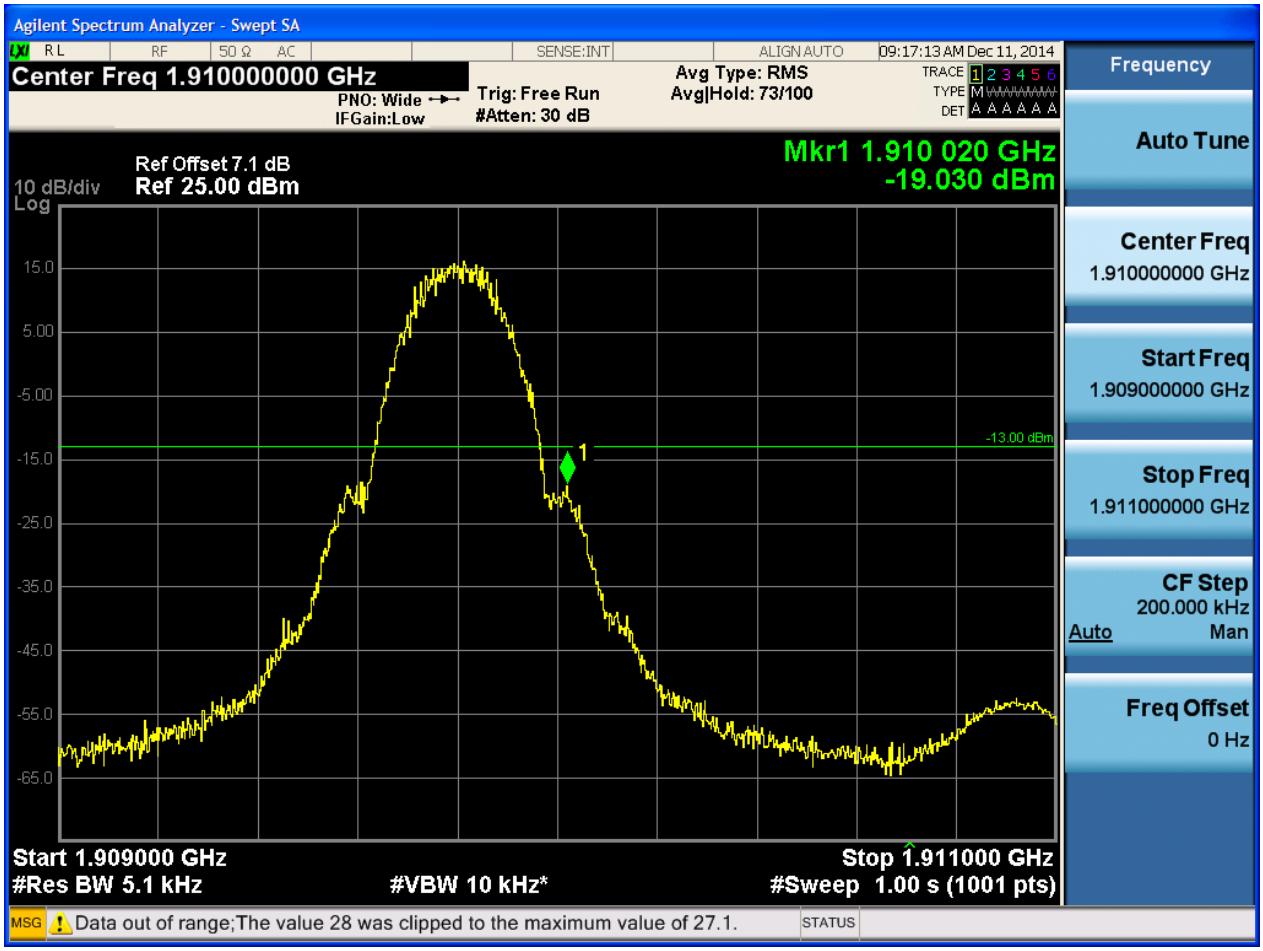
5.1.2.1.2 Test Channel = HCH



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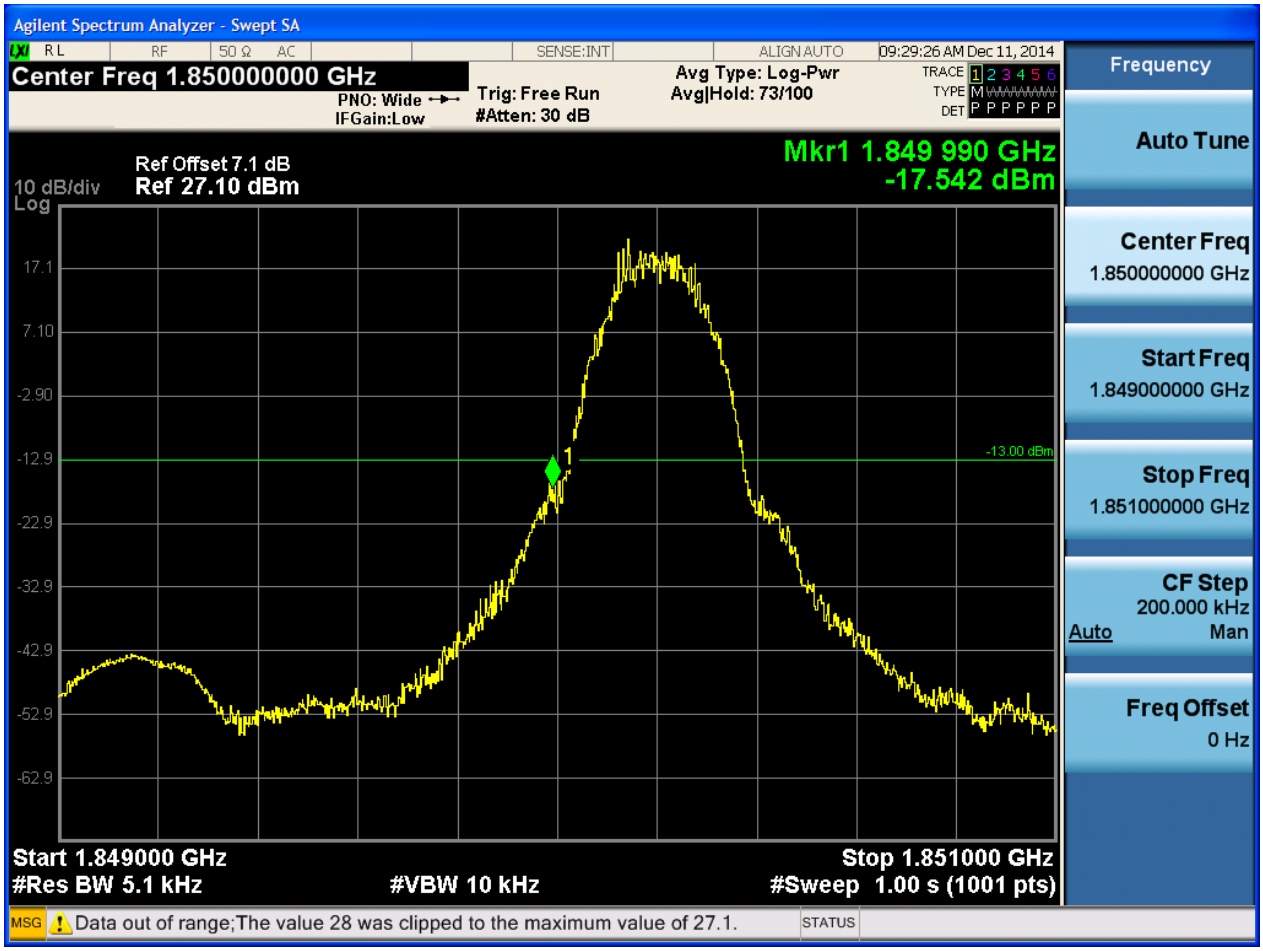
5.1.2.2 Test Mode = GSM/TM2

5.1.2.2.1 Test Channel = LCH



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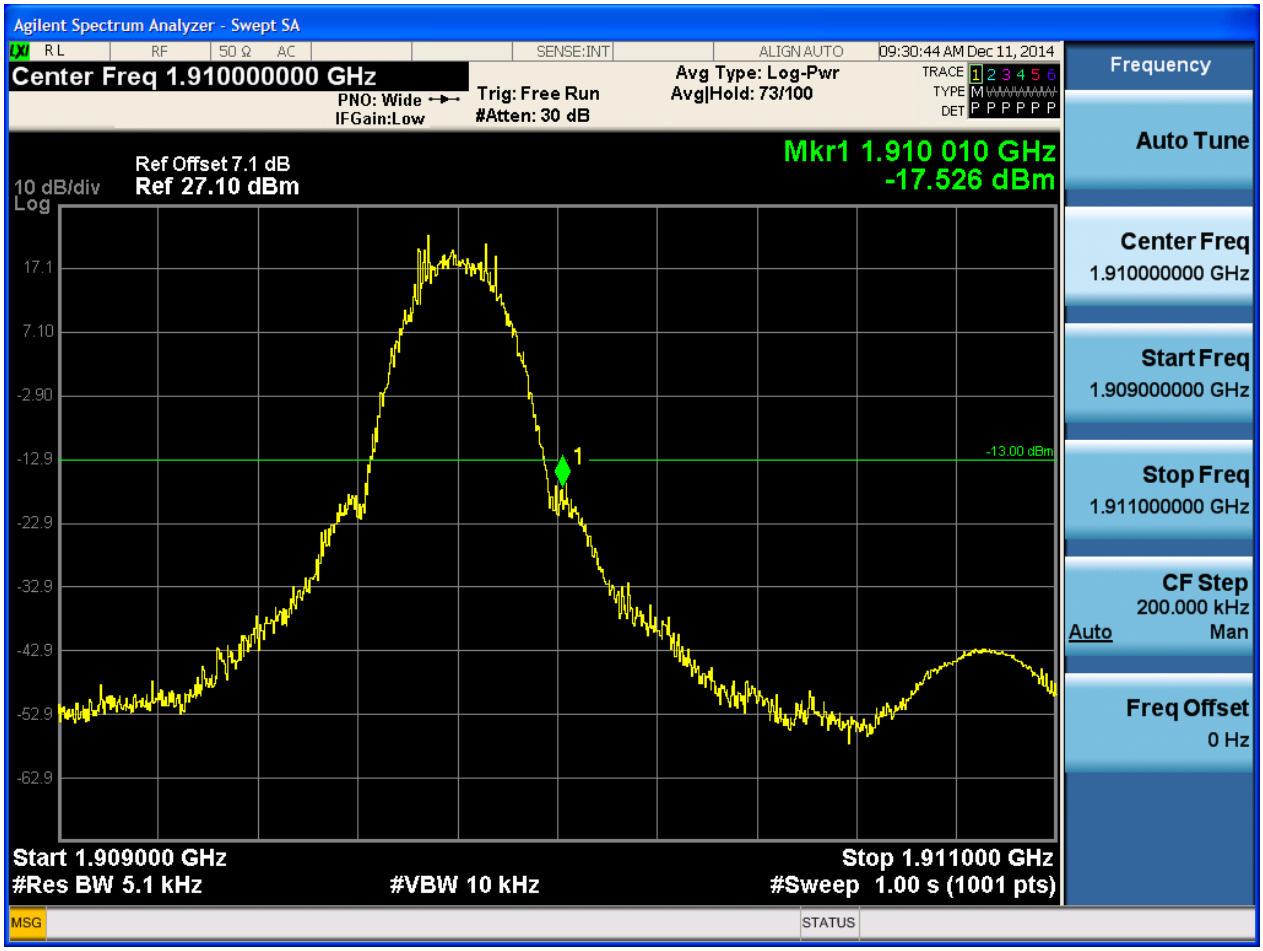
5.1.2.2.2 Test Channel = HCH



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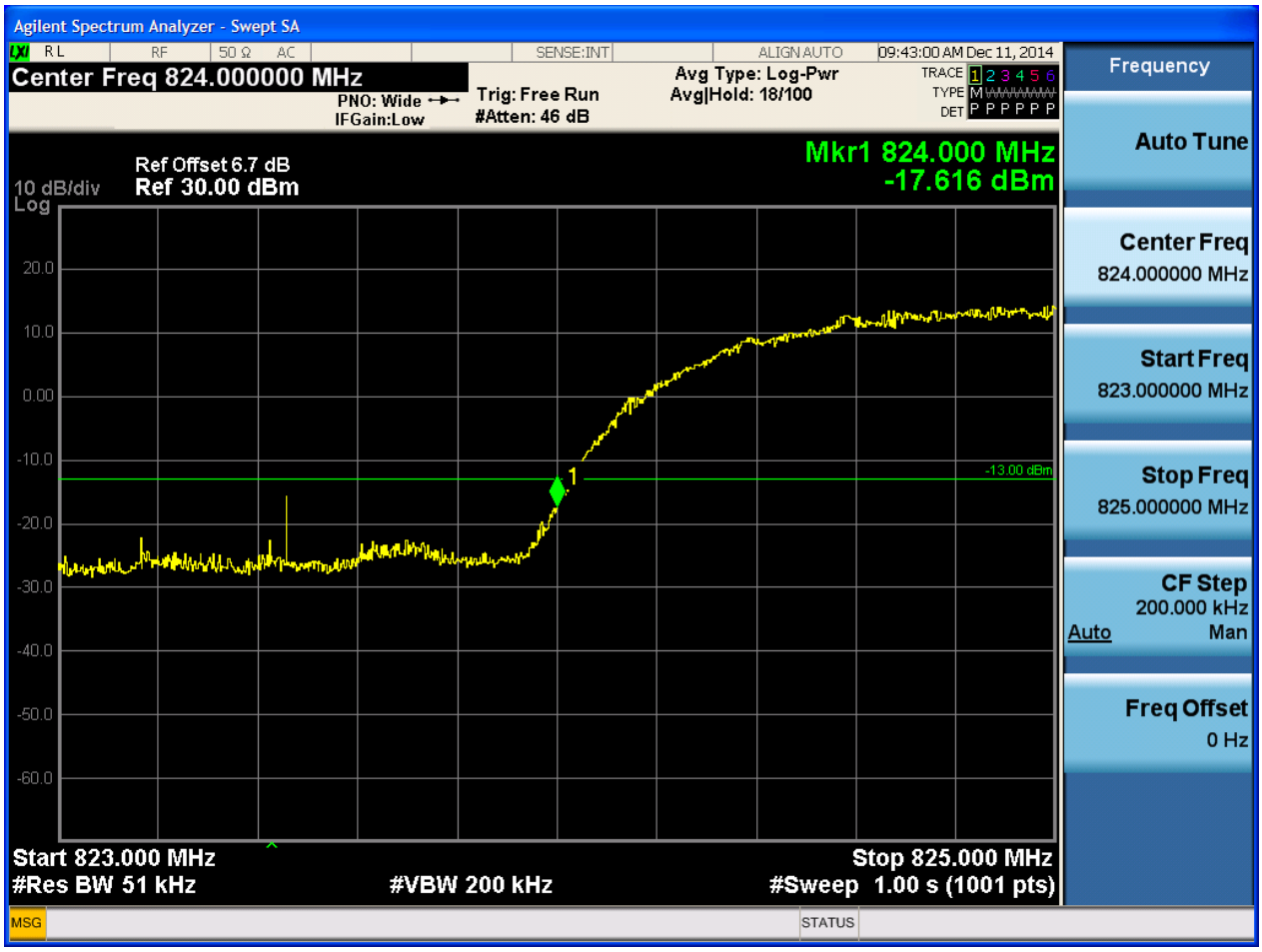
5.2 For UMTS

5.2.1 Test Band = WCDMA850

5.2.1.1 Test Mode = UMTS/TM1

5.2.1.1.1 Test Channel = LCH



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5.2.1.1.2 Test Channel = HCH

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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.

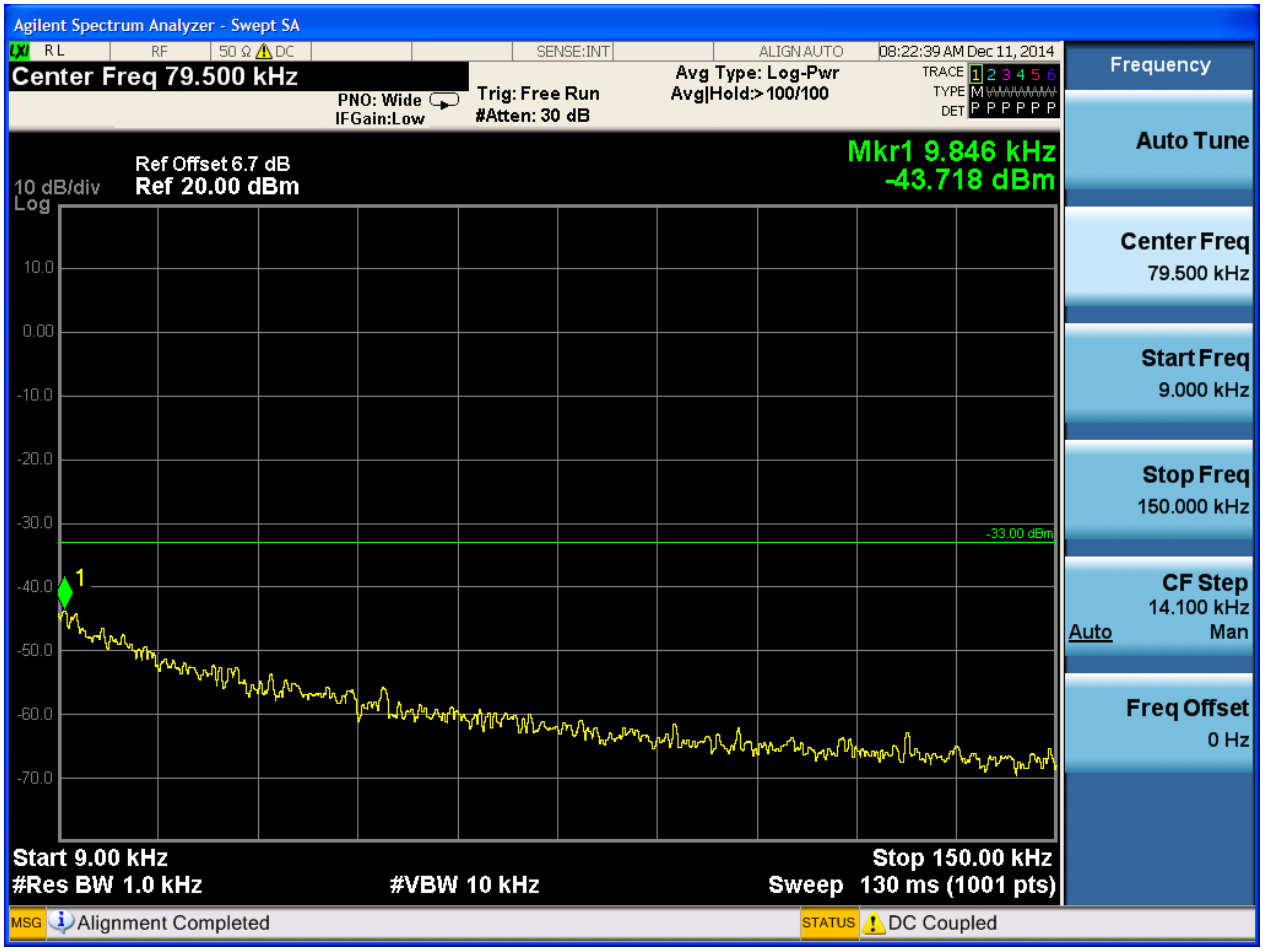
Part I - Test Plots

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



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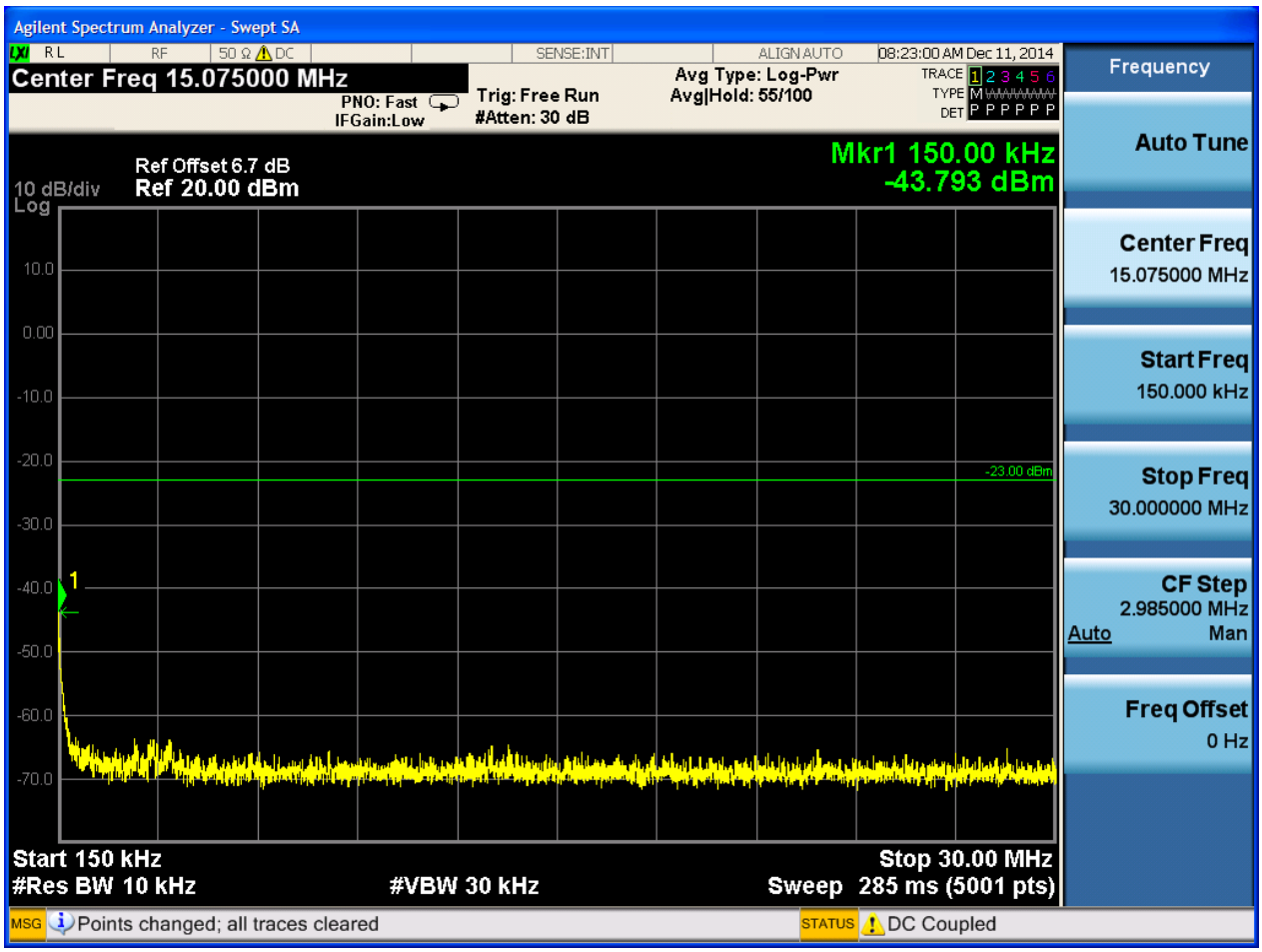

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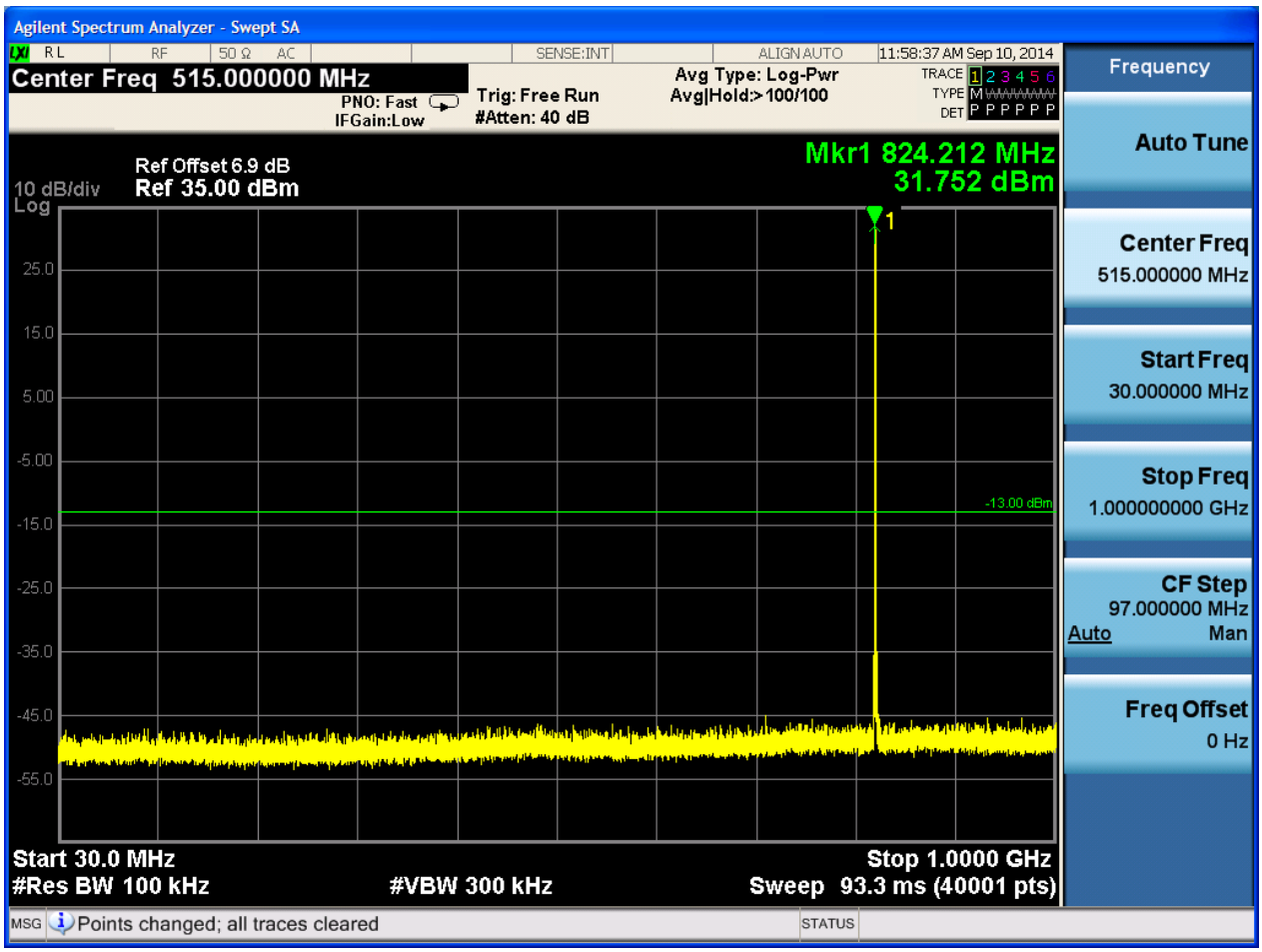

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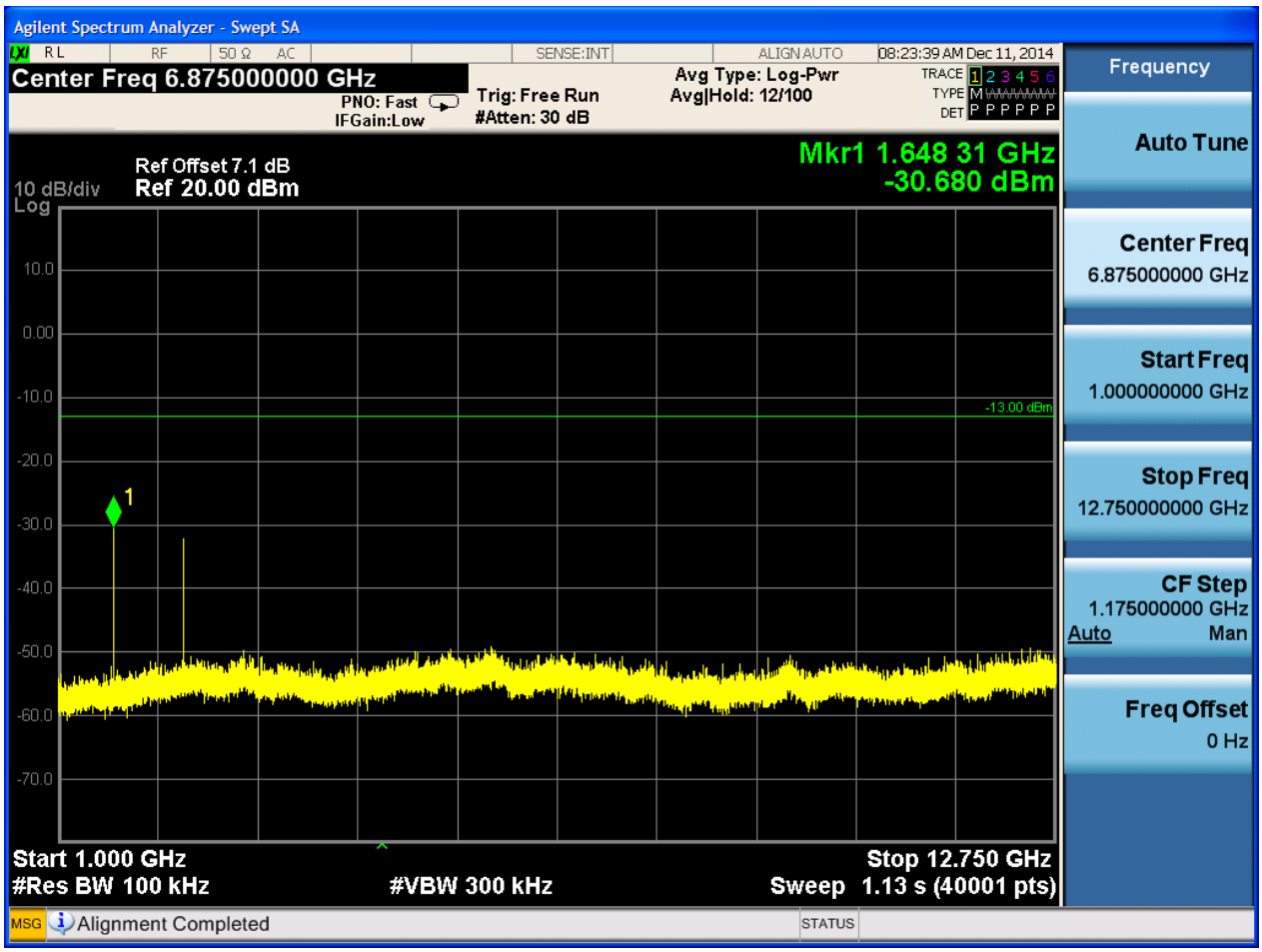

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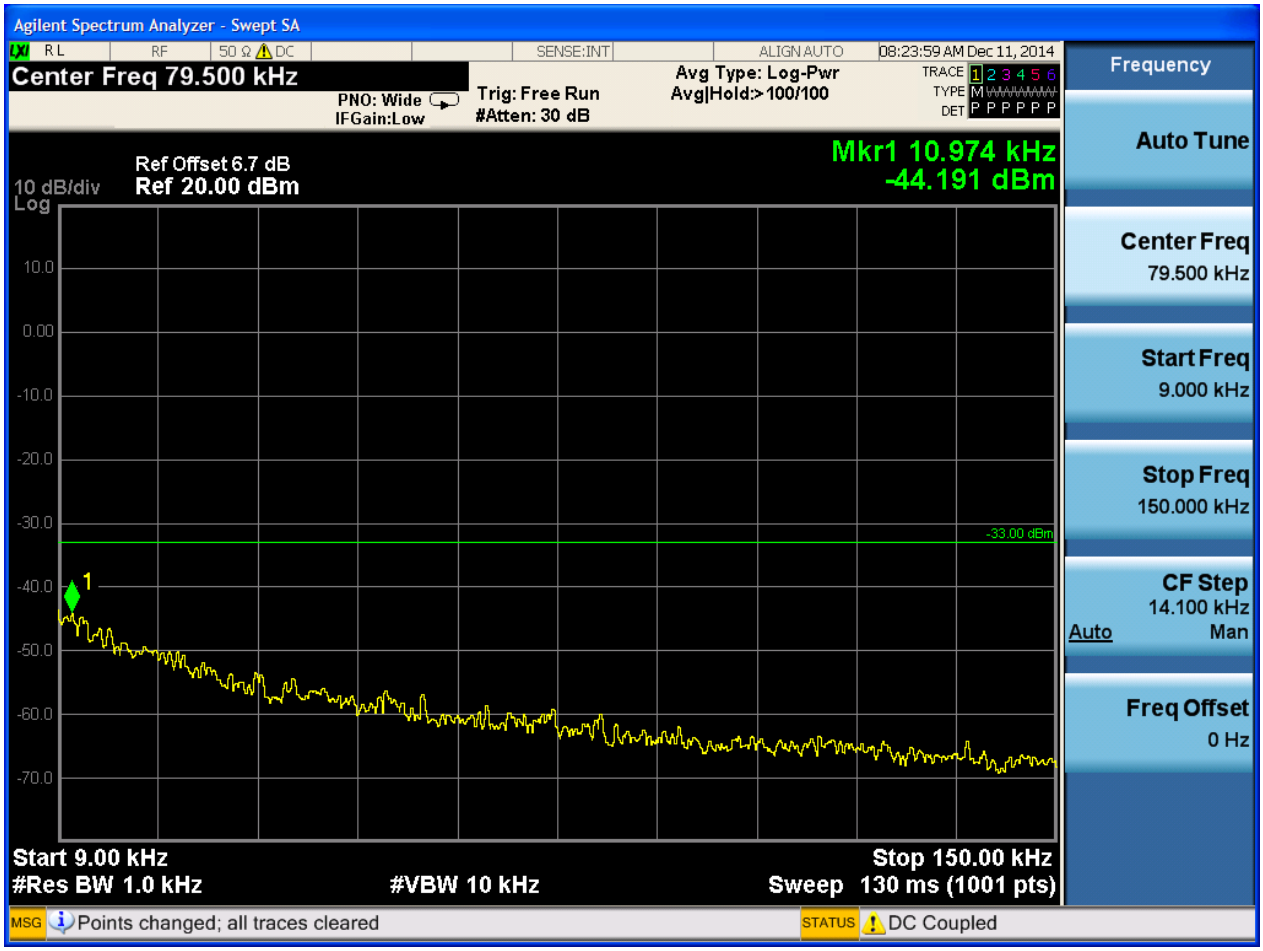
6.1.1.1.2 Test Channel = MCH



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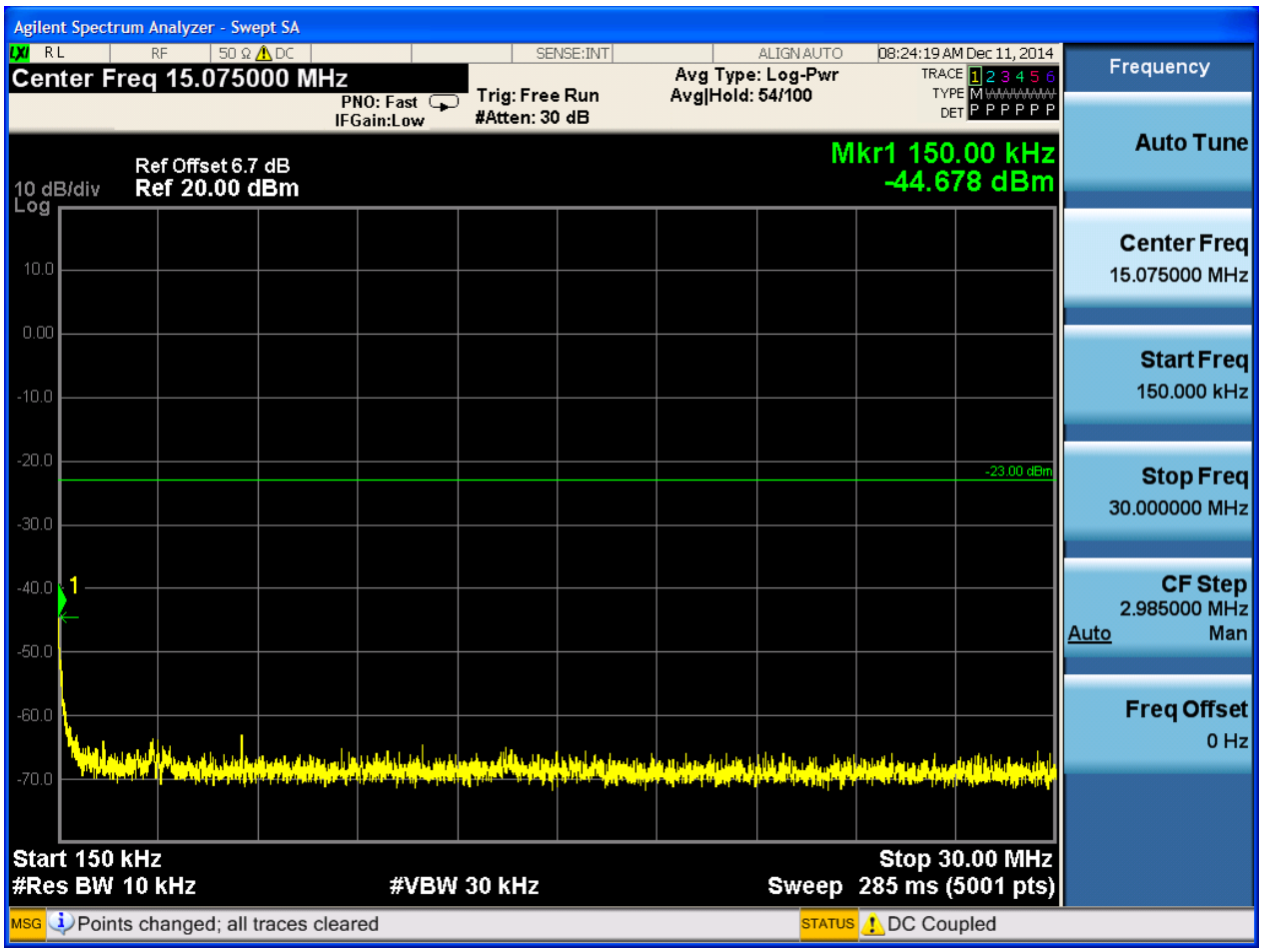

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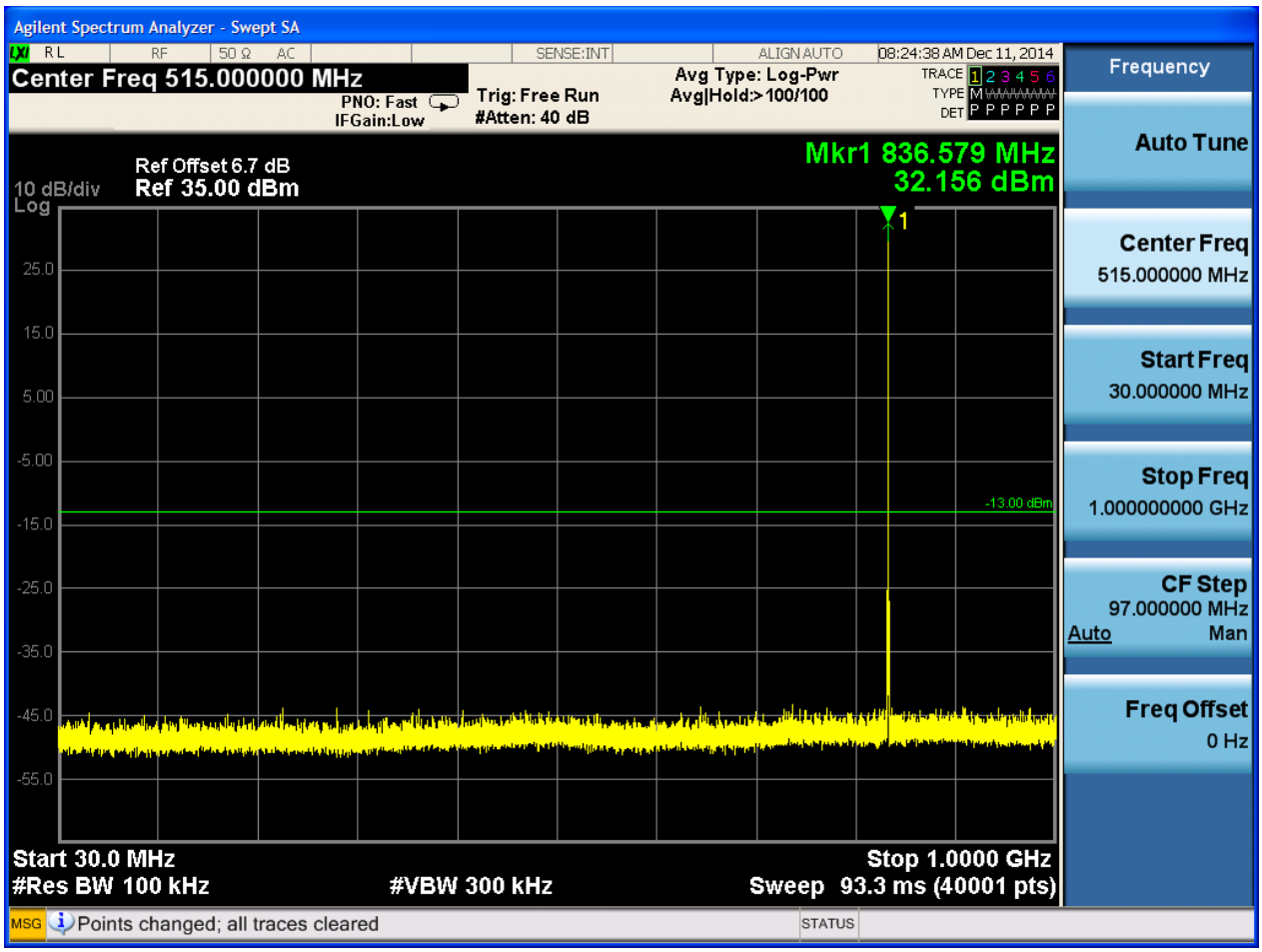

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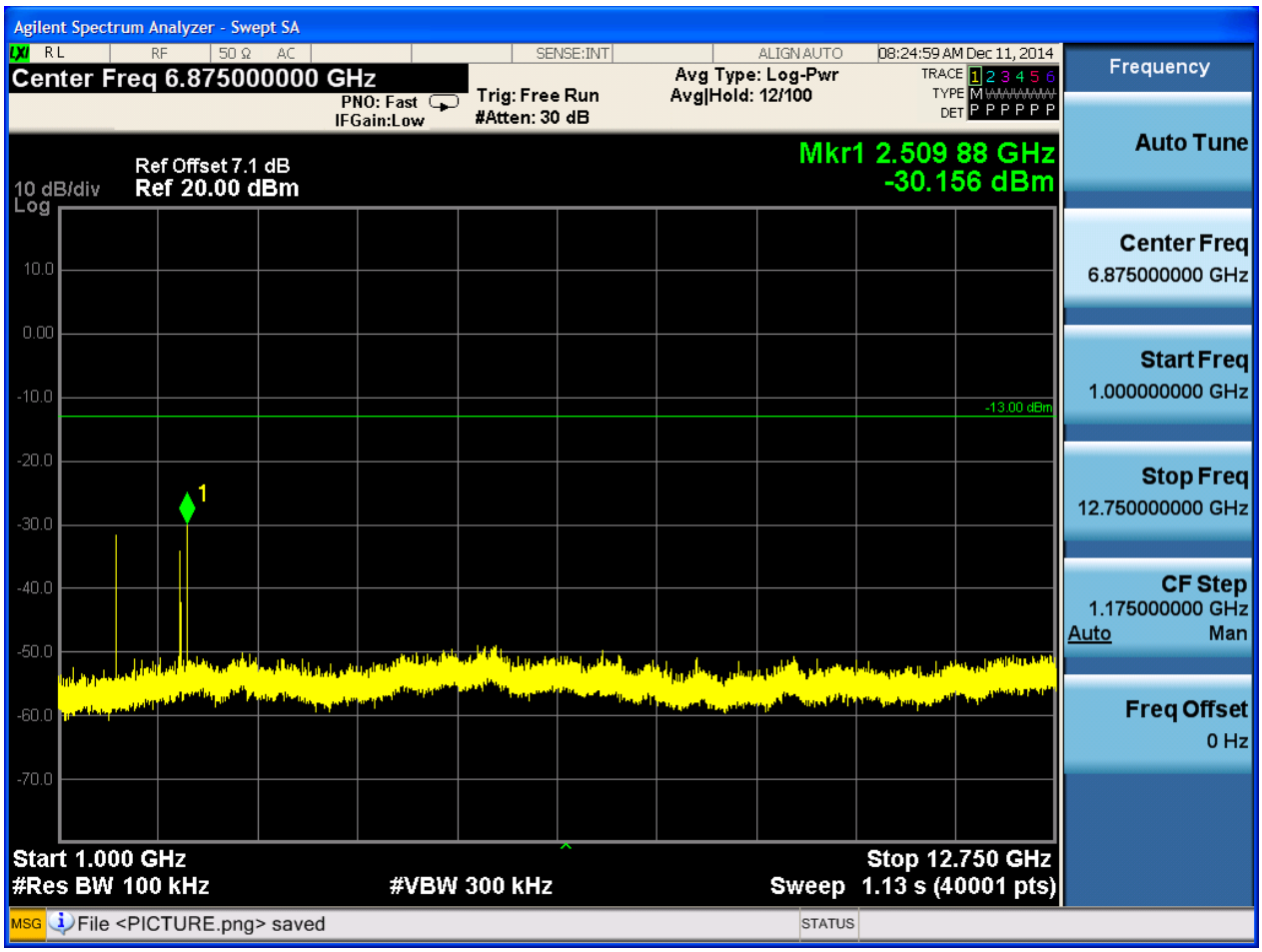

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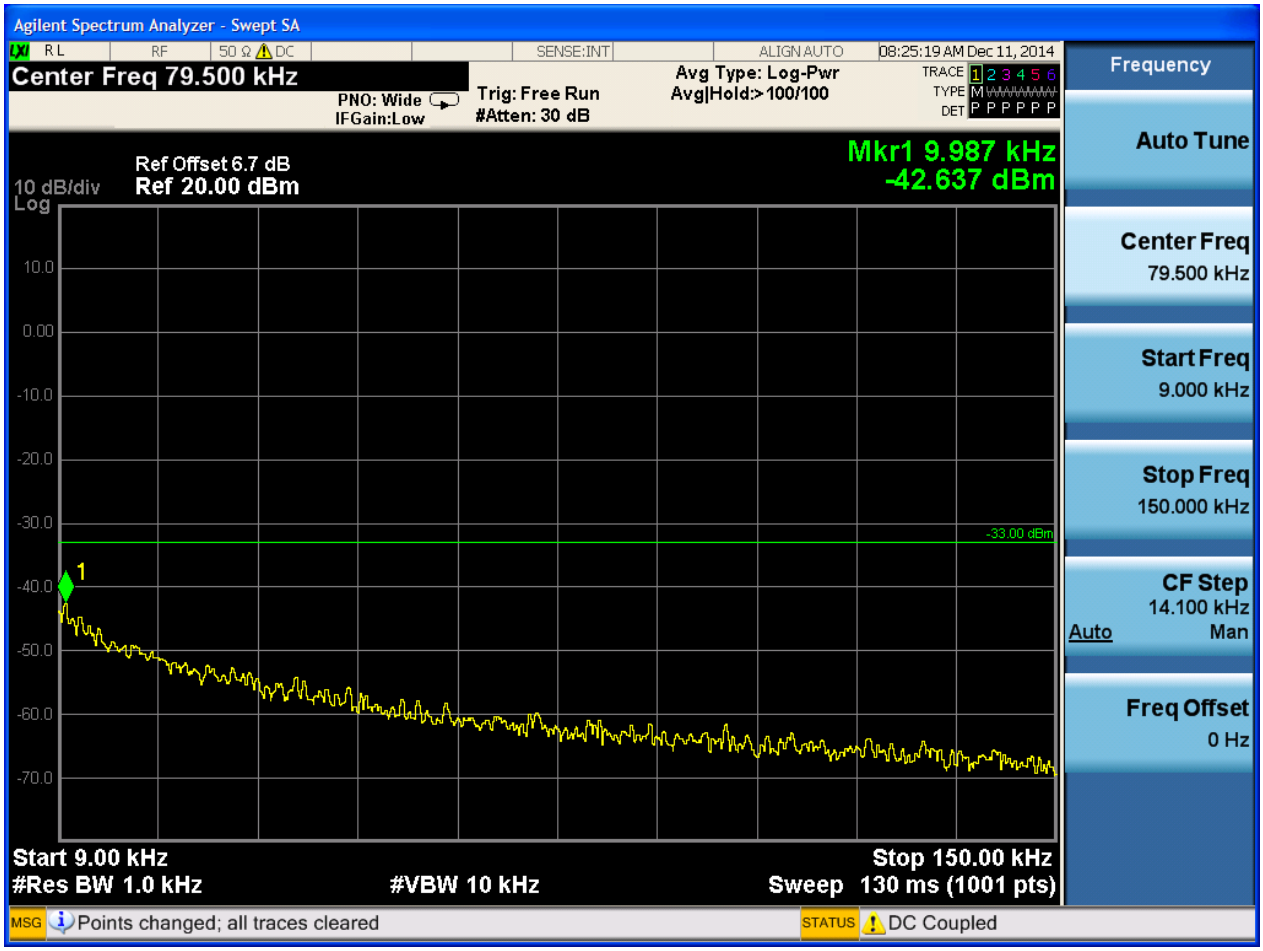
6.1.1.1.3 Test Channel = HCH



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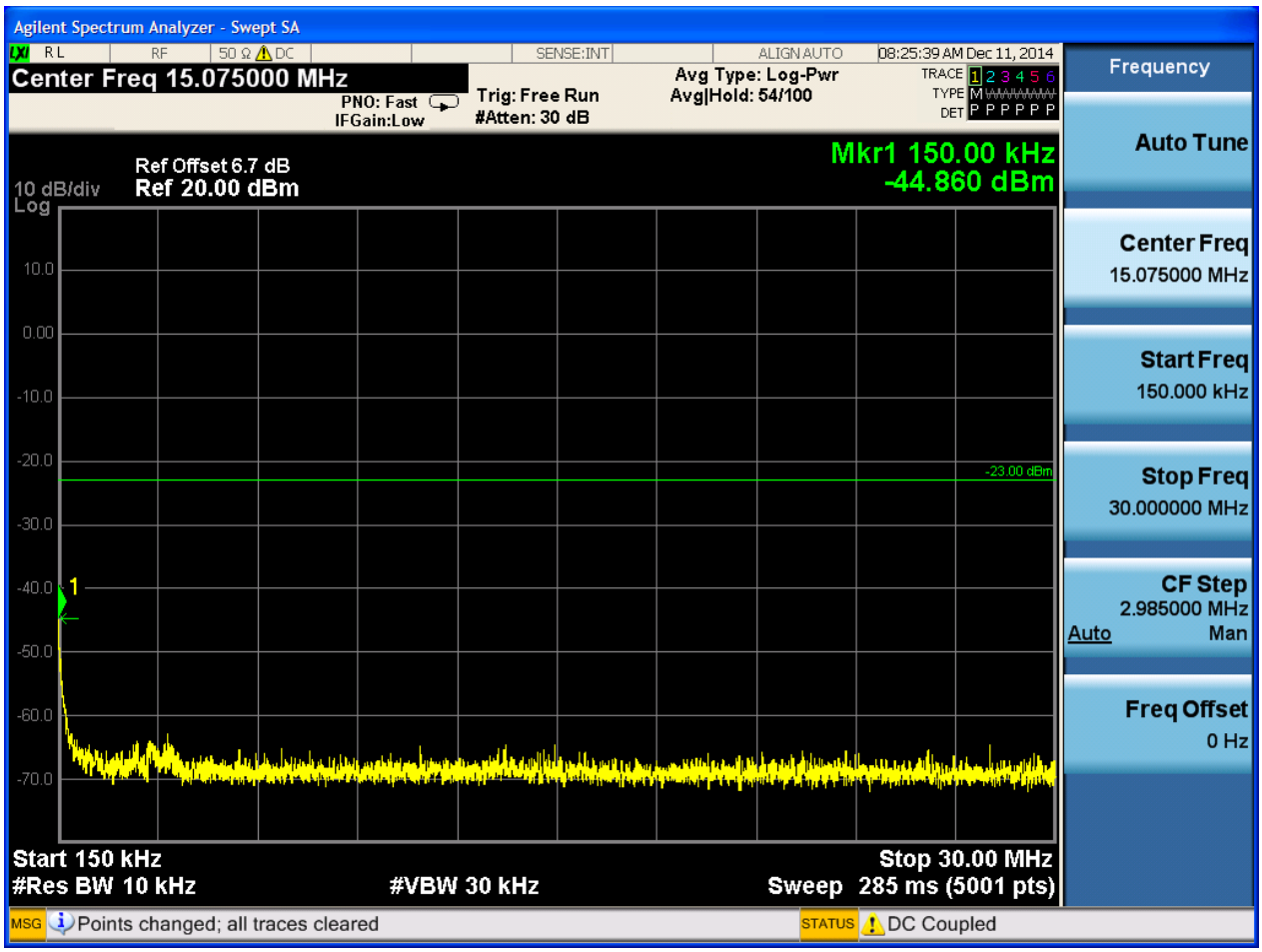

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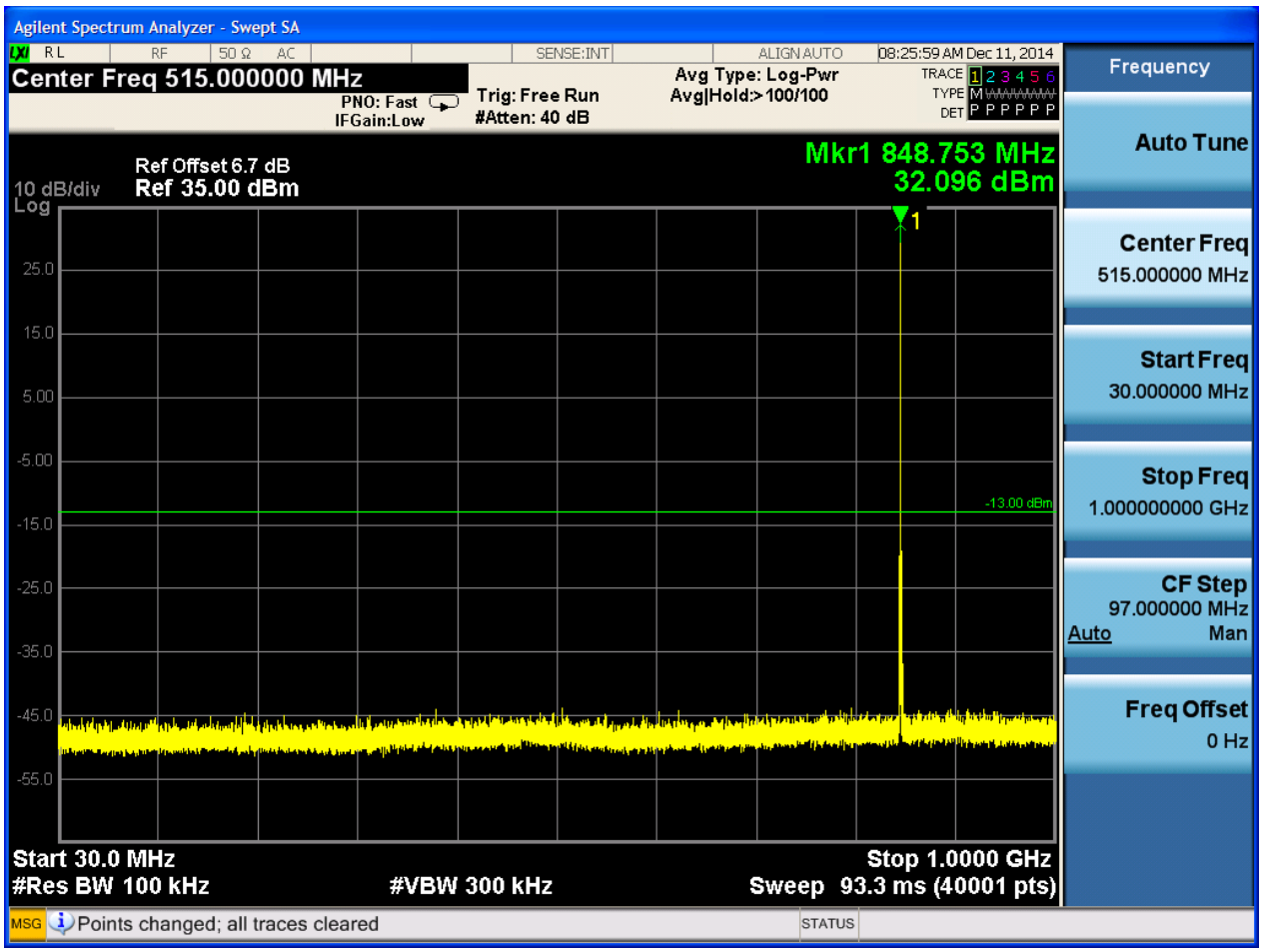

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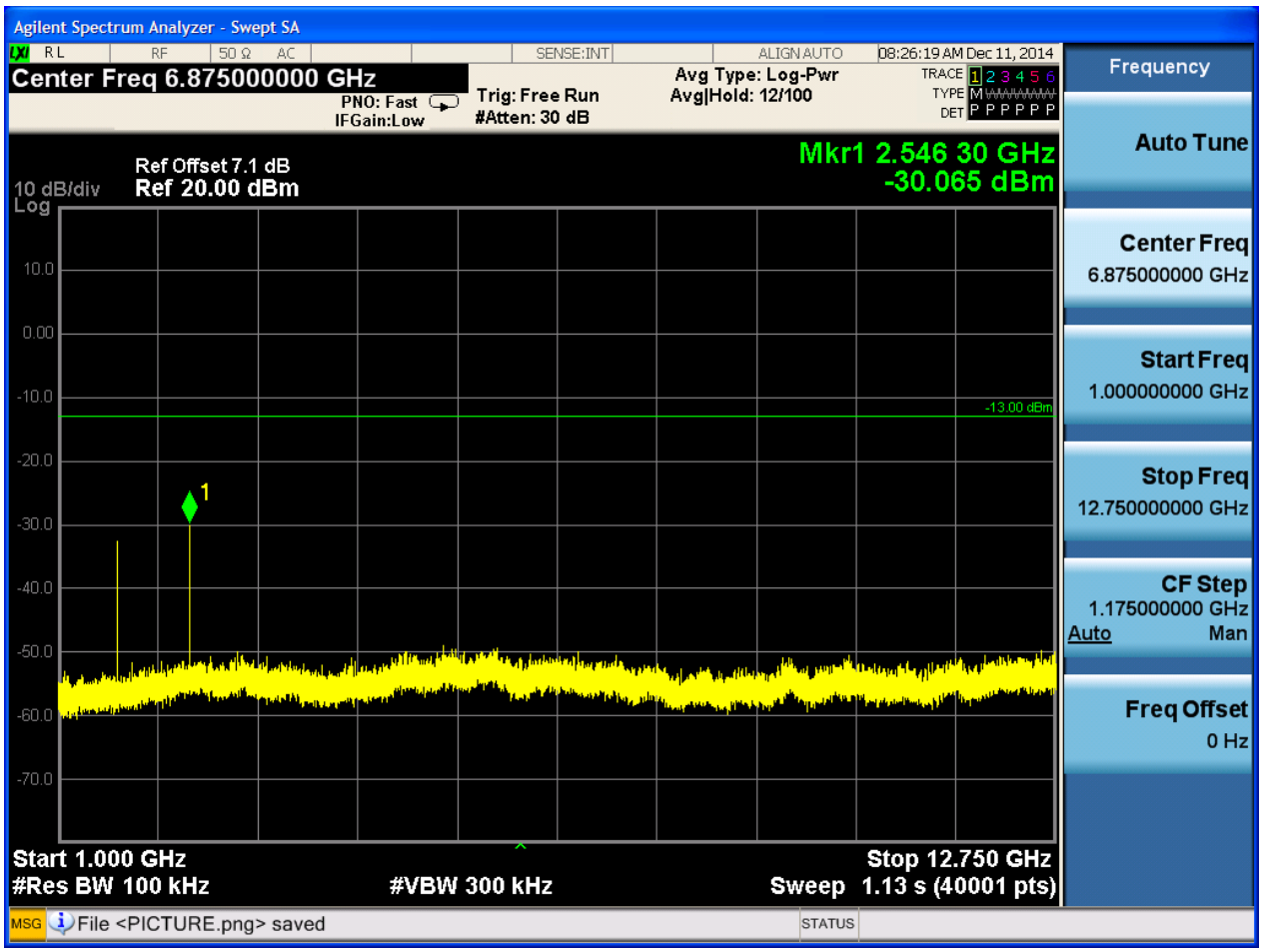

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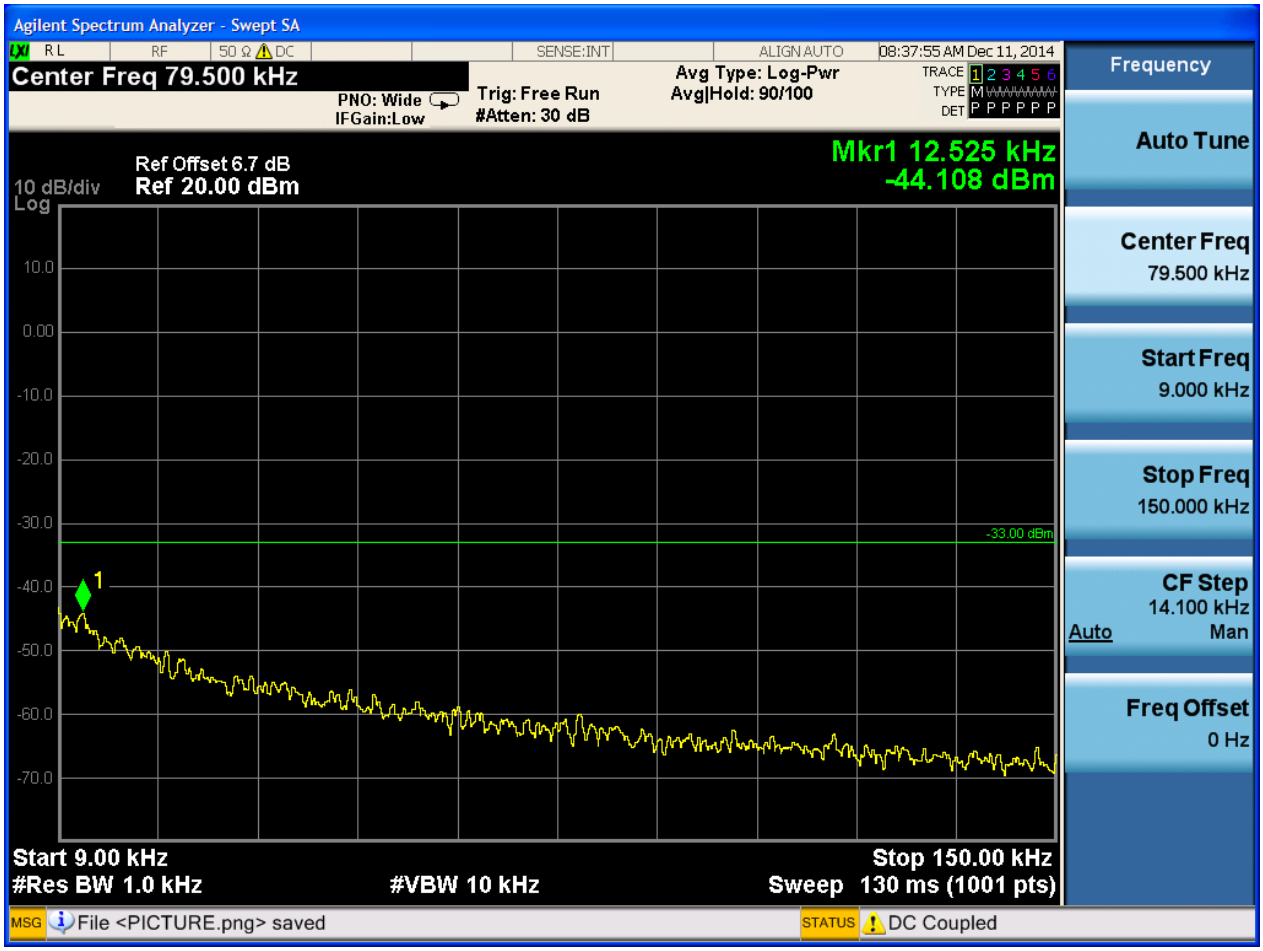
6.1.1.2 Test Mode = GSM/TM2

6.1.1.2.1 Test Channel = LCH



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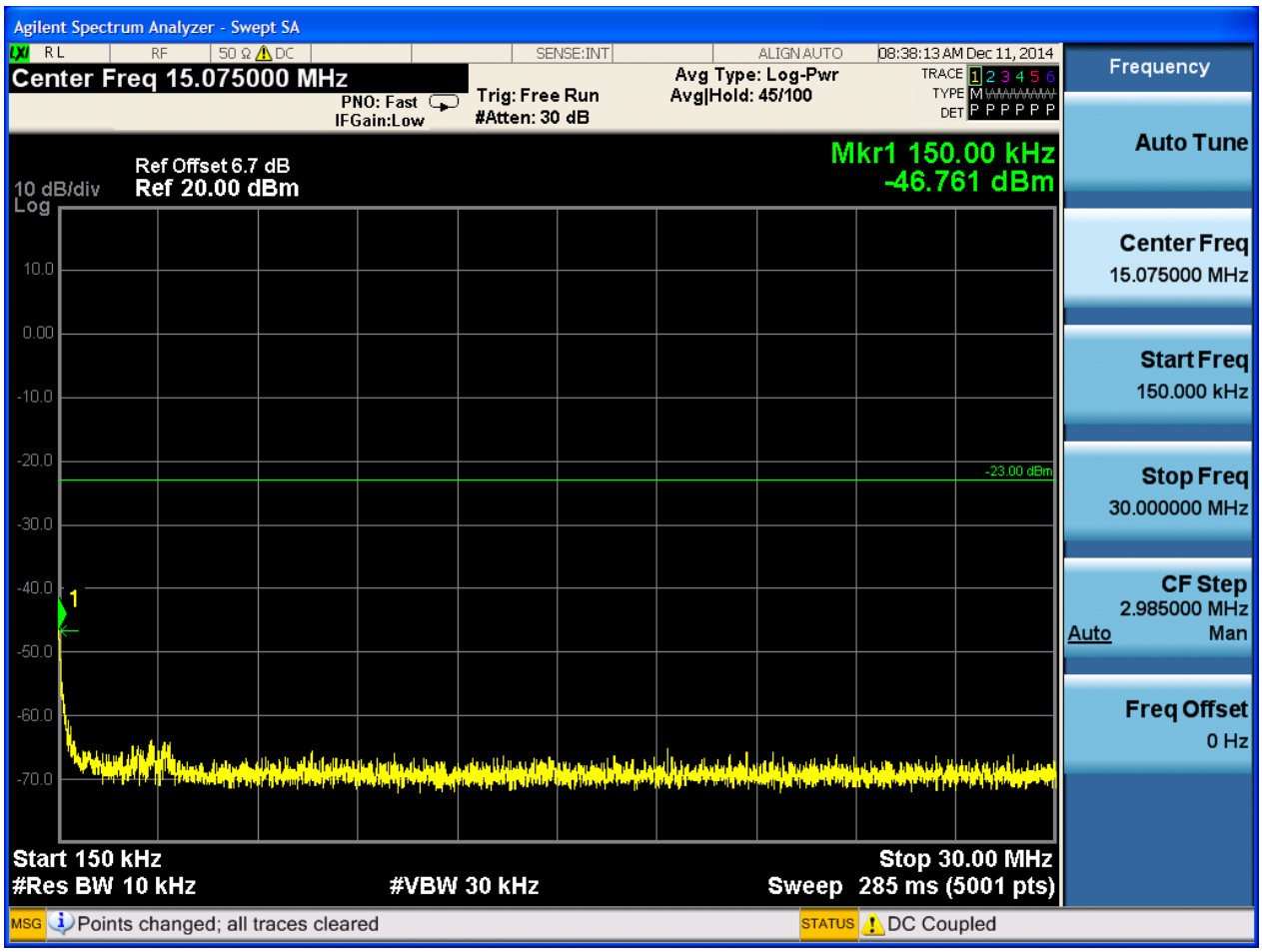

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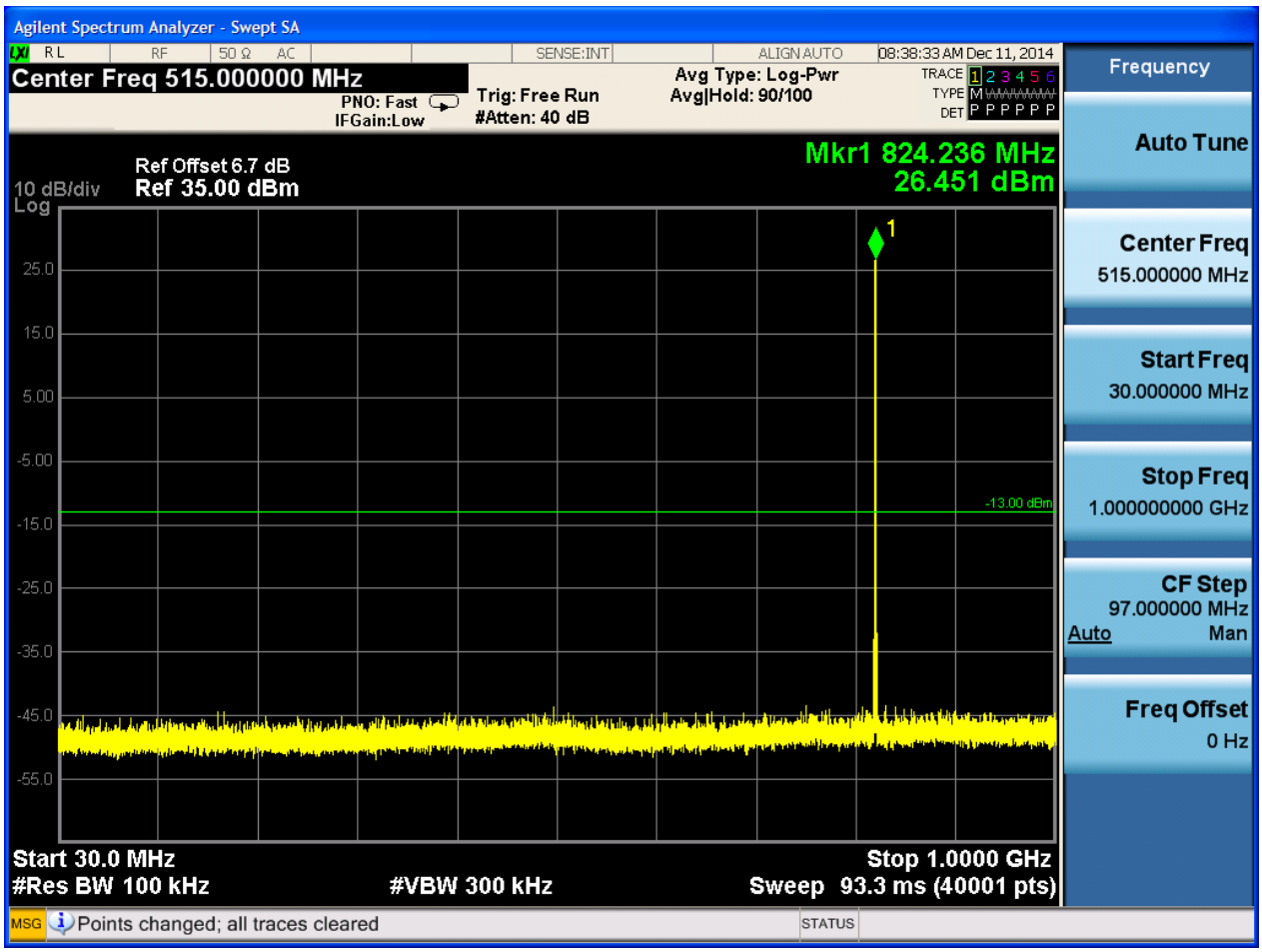
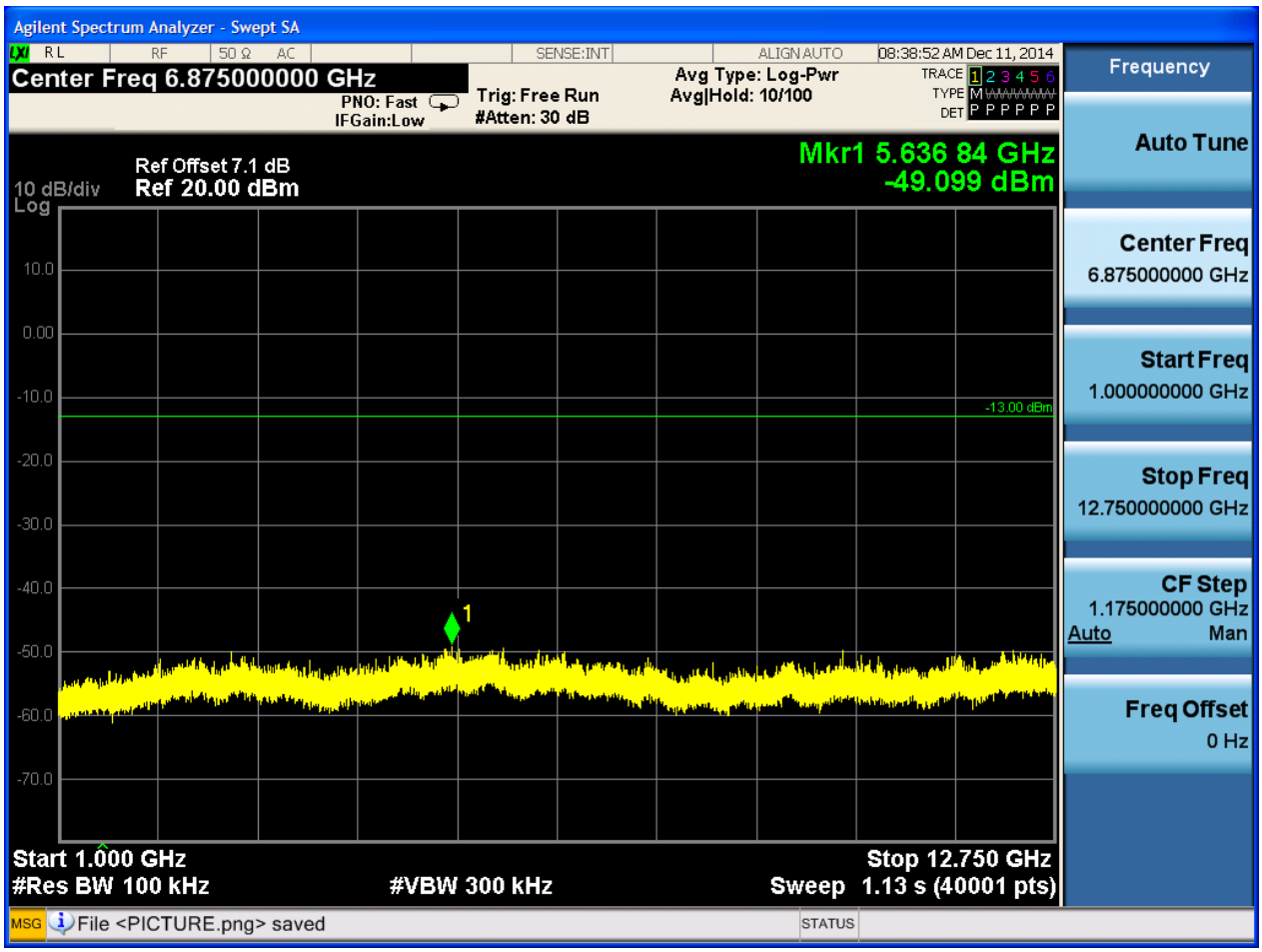

Agilent Spectrum Analyzer - Swept SA
Center Freq 515.000000 MHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 40 dB
Avg Type: Log-Pwr
Avg|Hold: 90/100
08:38:33 AM Dec 11, 2014
Ref Offset 6.7 dB
10 dB/div
Ref 35.00 dBm
Log
Mkr1 824.236 MHz
26.451 dBm
-13.00 dBm
Start 30.0 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 1.0000 GHz
Sweep 93.3 ms (40001 pts)
Points changed; all traces cleared
Frequency
Auto Tune
Center Freq
515.000000 MHz
Start Freq
30.000000 MHz
Stop Freq
1.000000000 GHz
CF Step
97.000000 MHz
Auto
Man
Freq Offset
0 Hz



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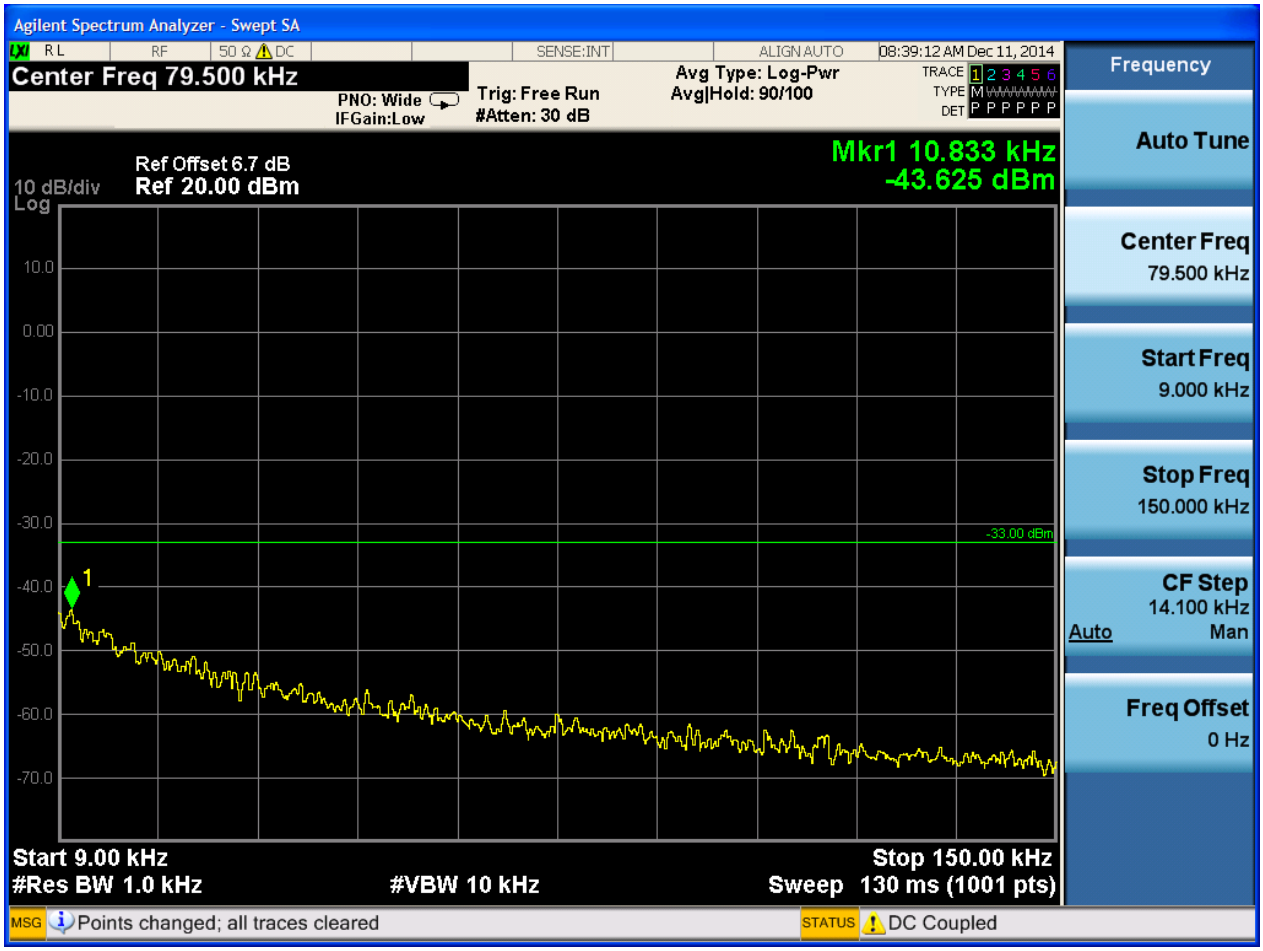
6.1.1.2.2 Test Channel = MCH



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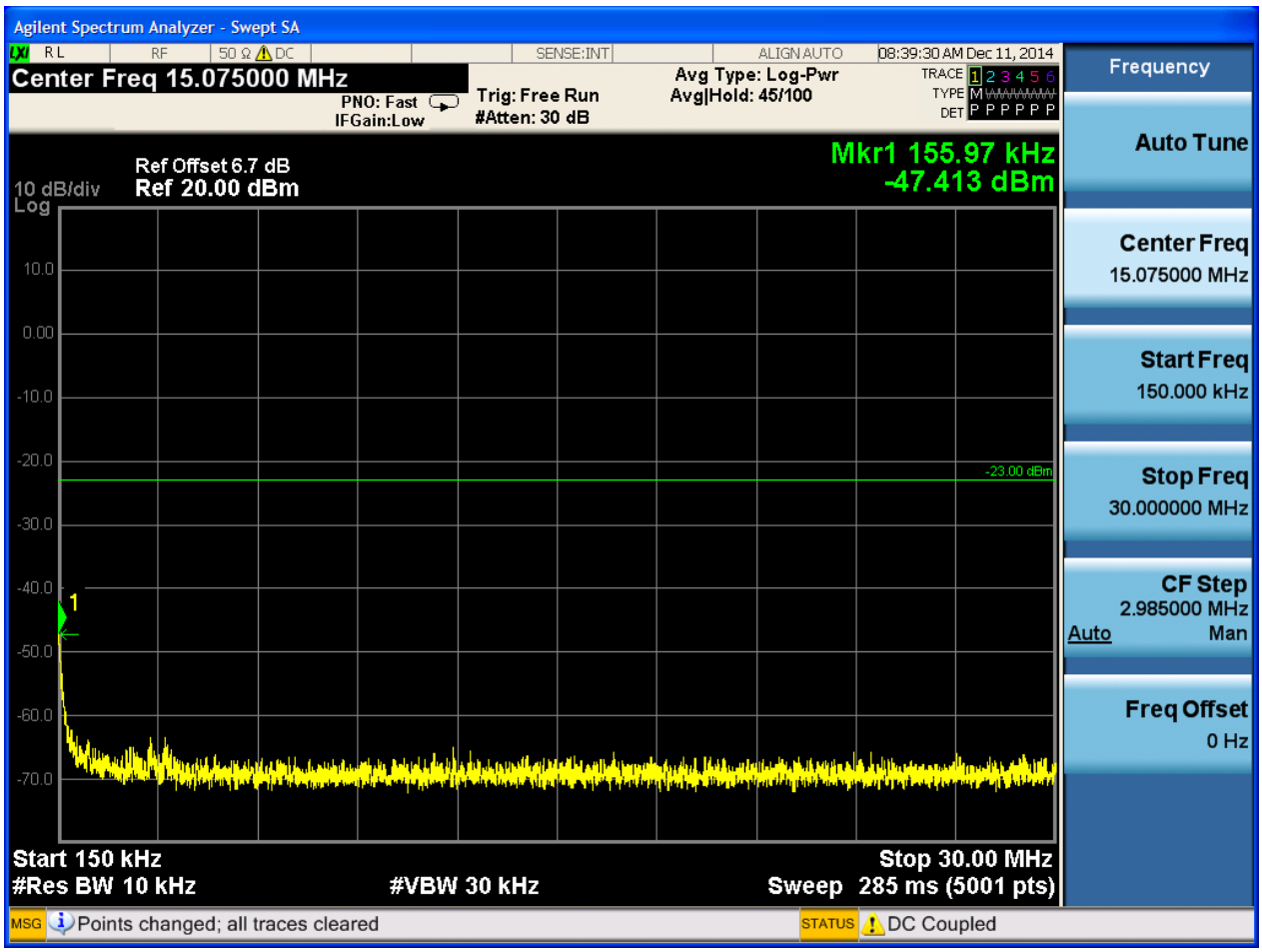

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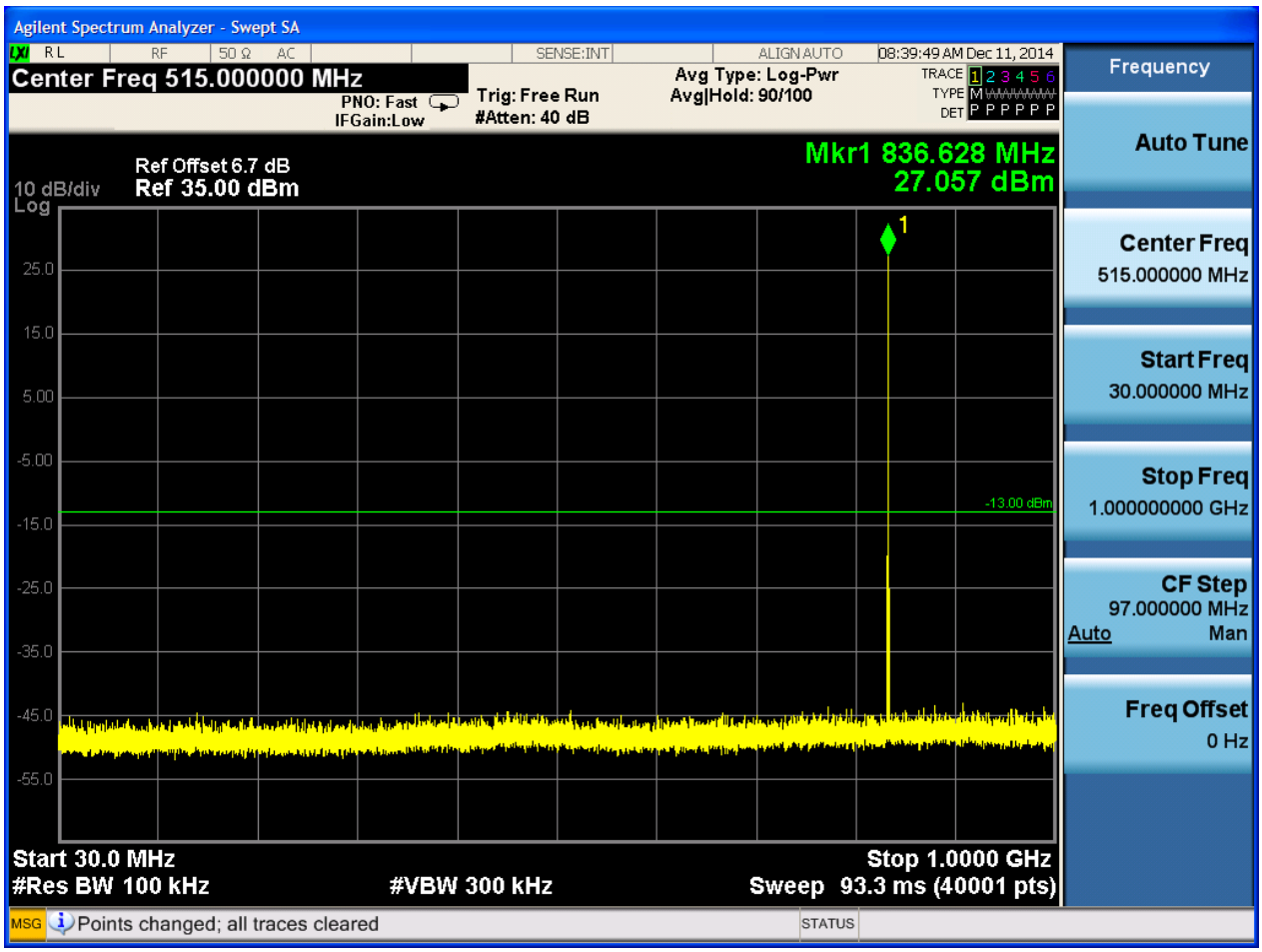

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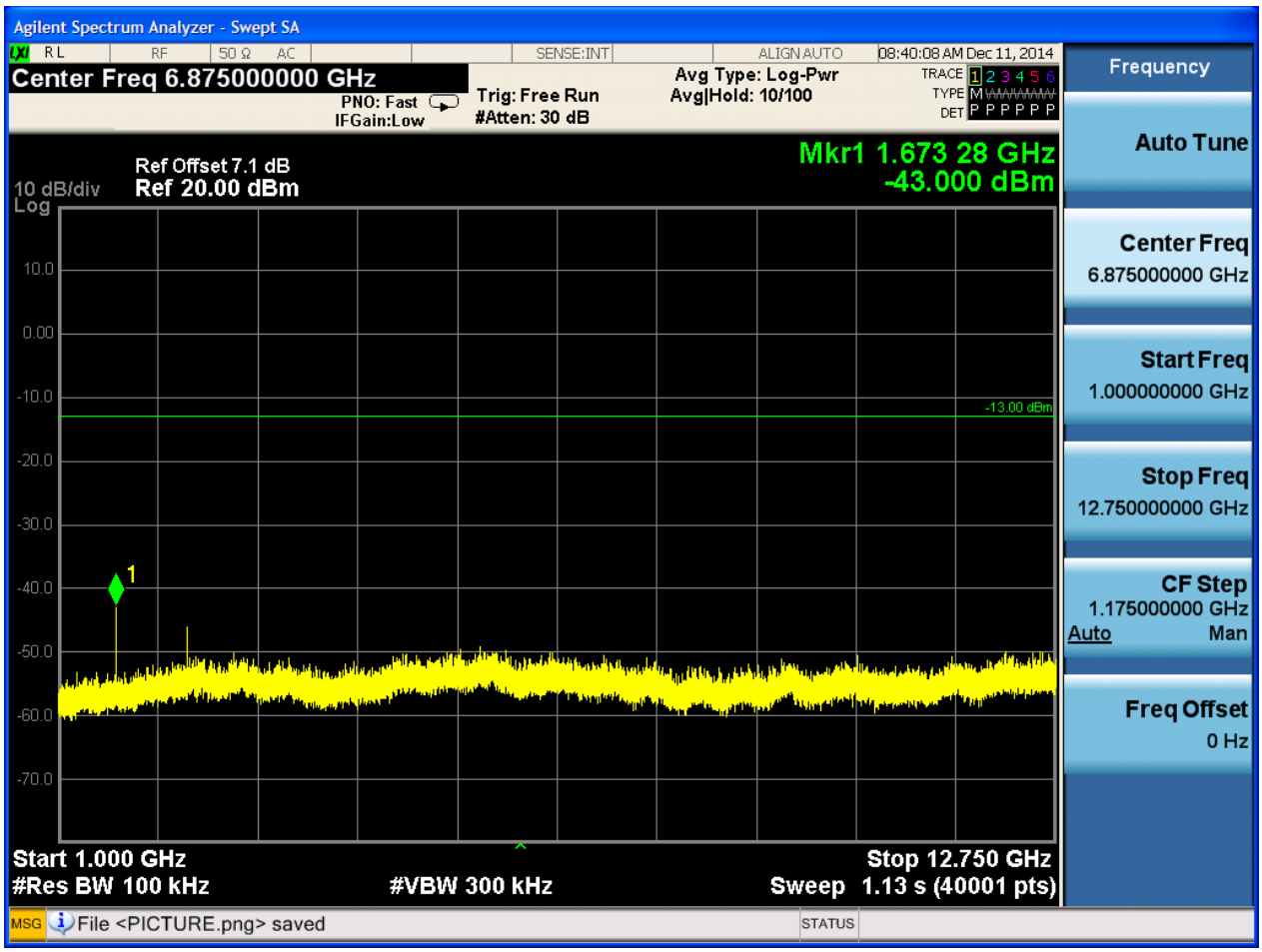

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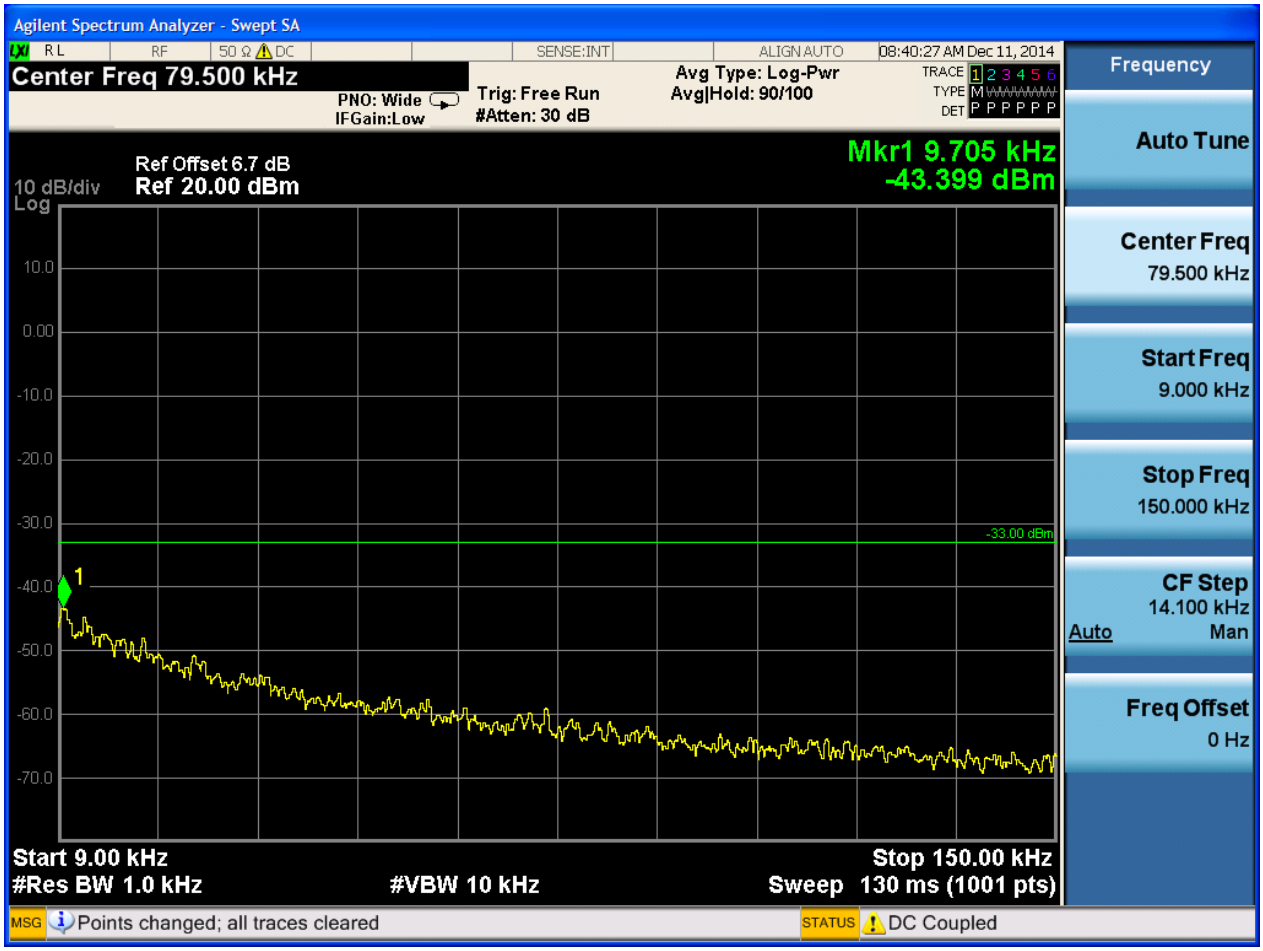
6.1.1.2.3 Test Channel = HCH



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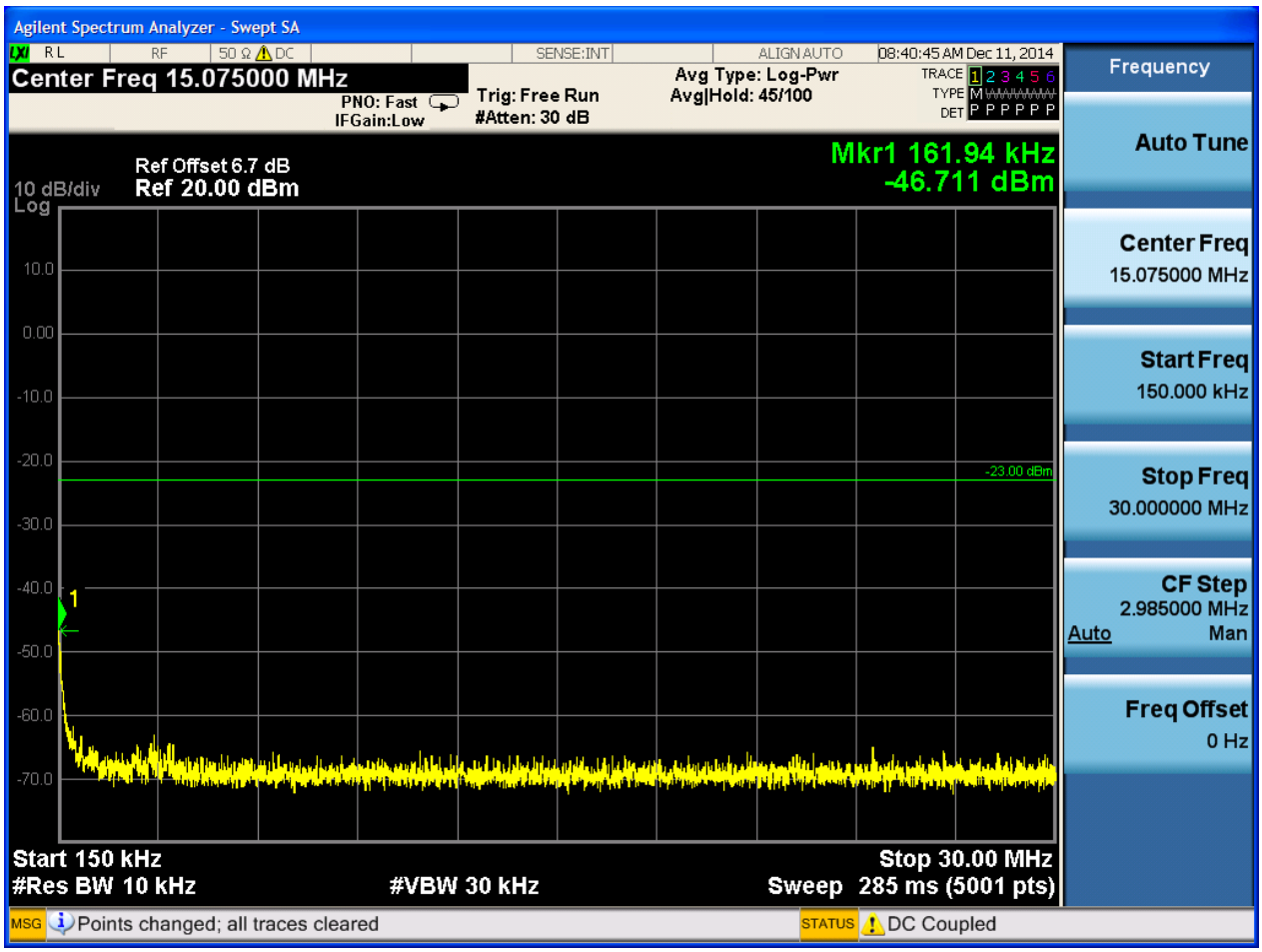

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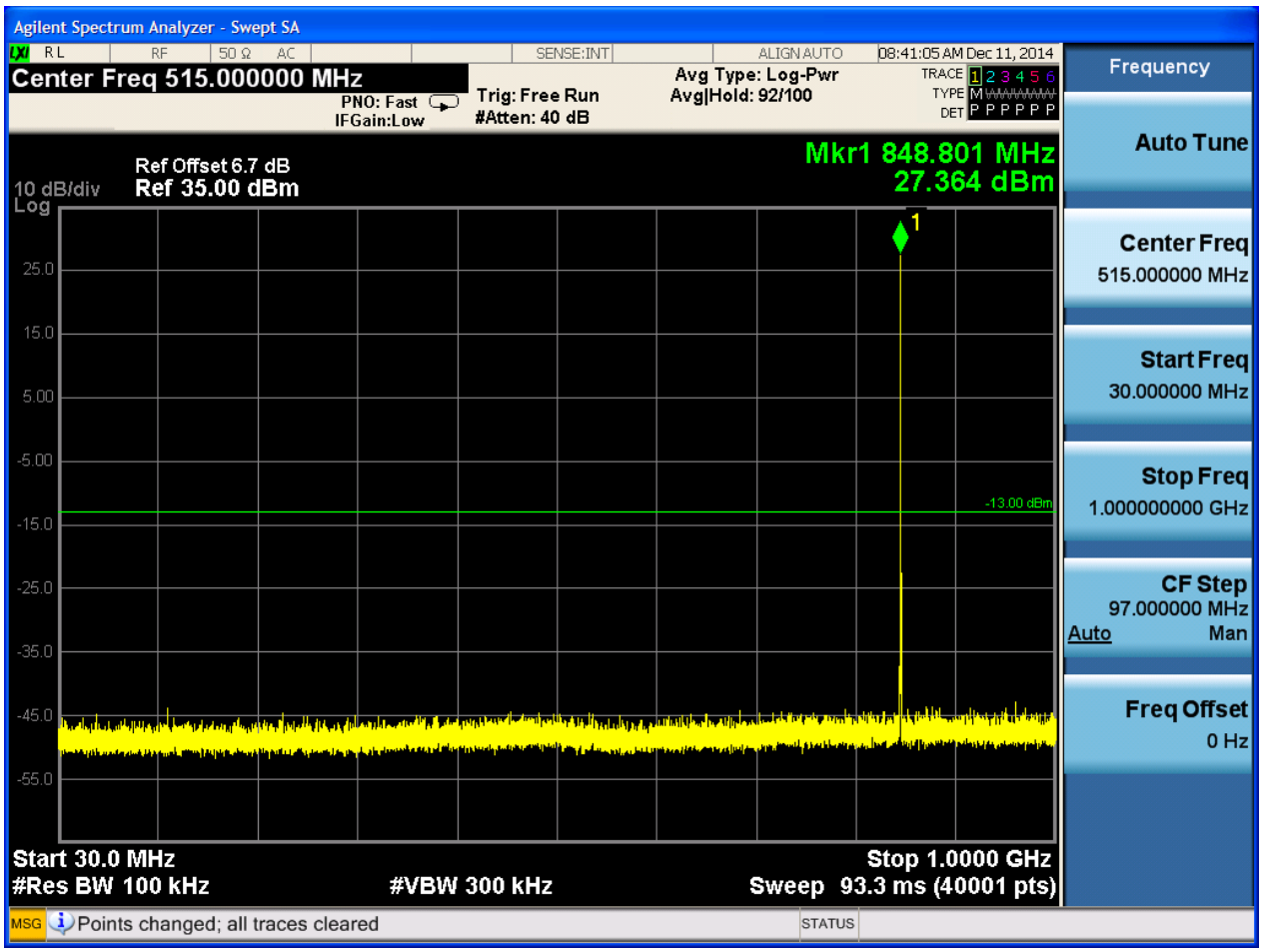

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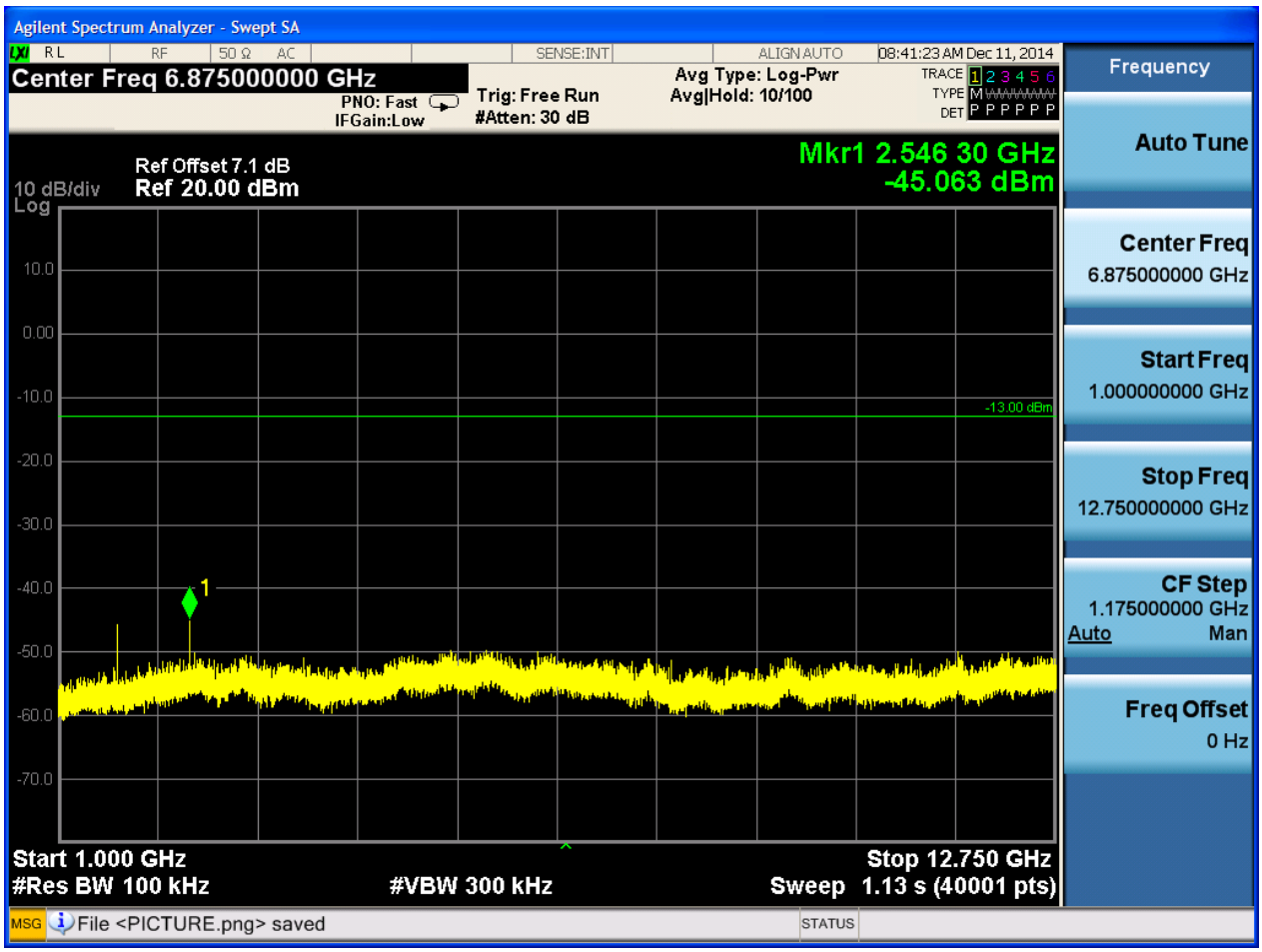

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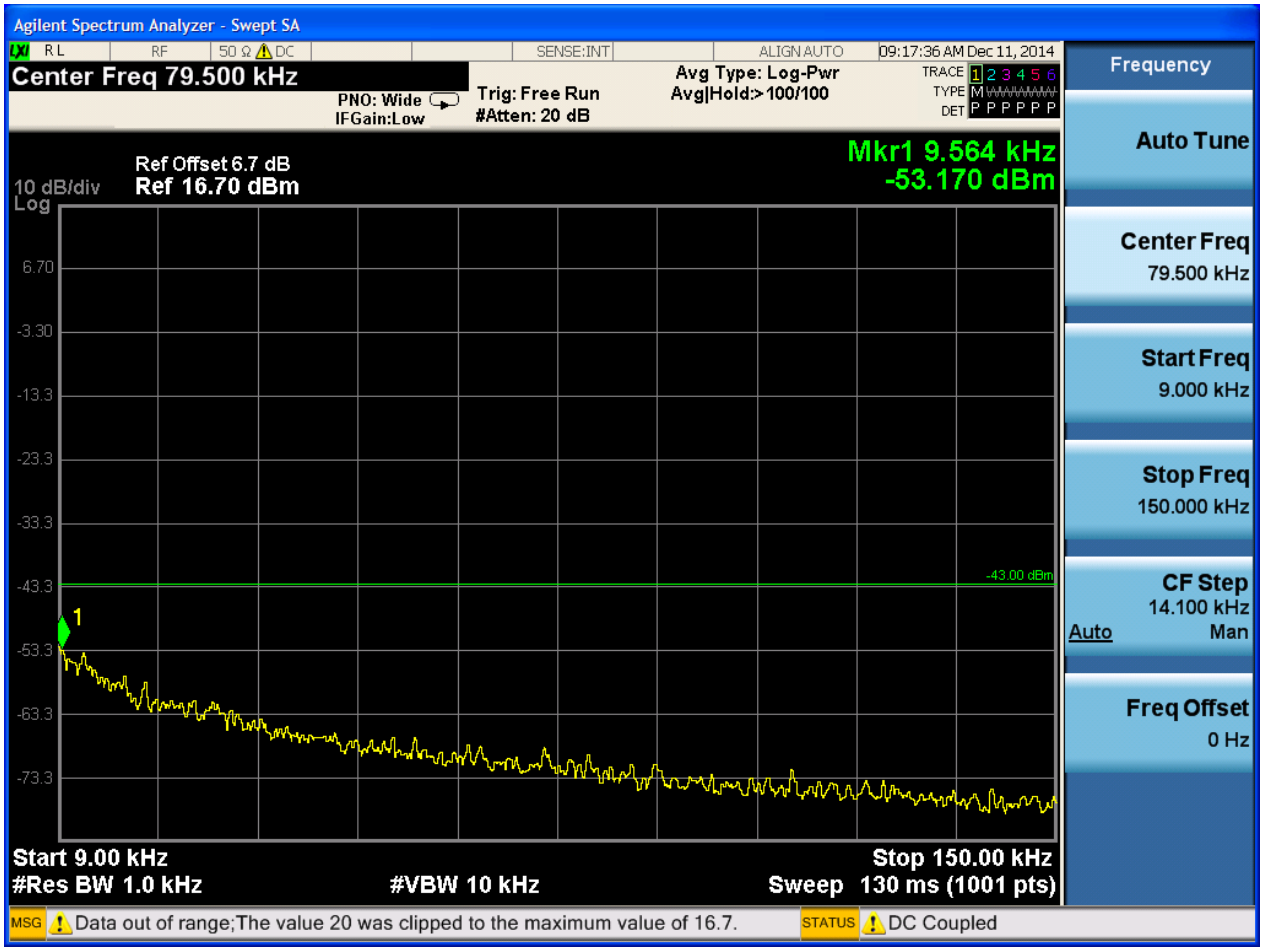
6.1.2 Test Band = GSM1900

6.1.2.1 Test Mode = GSM/TM1

6.1.2.1.1 Test Channel = LCH



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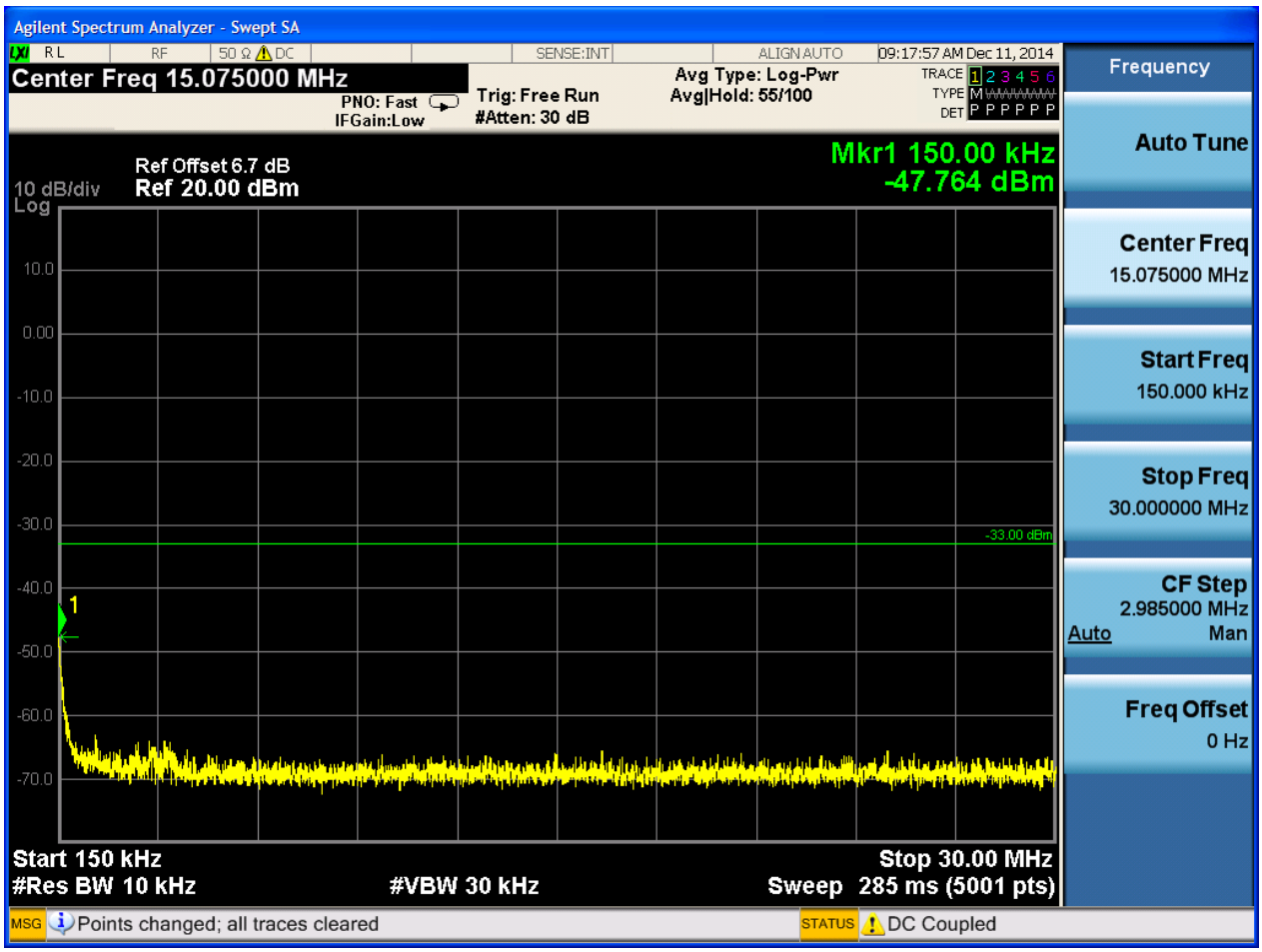

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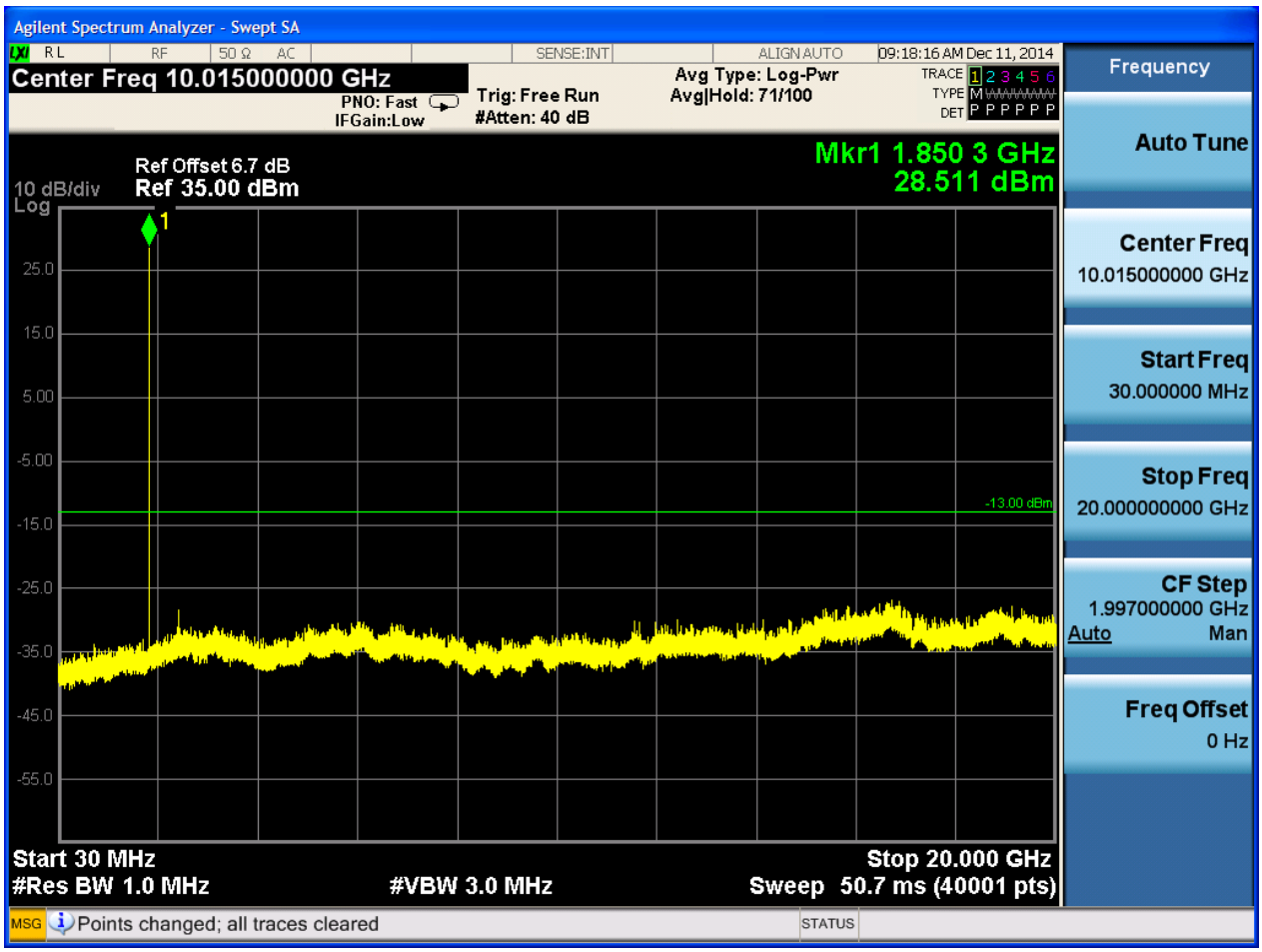

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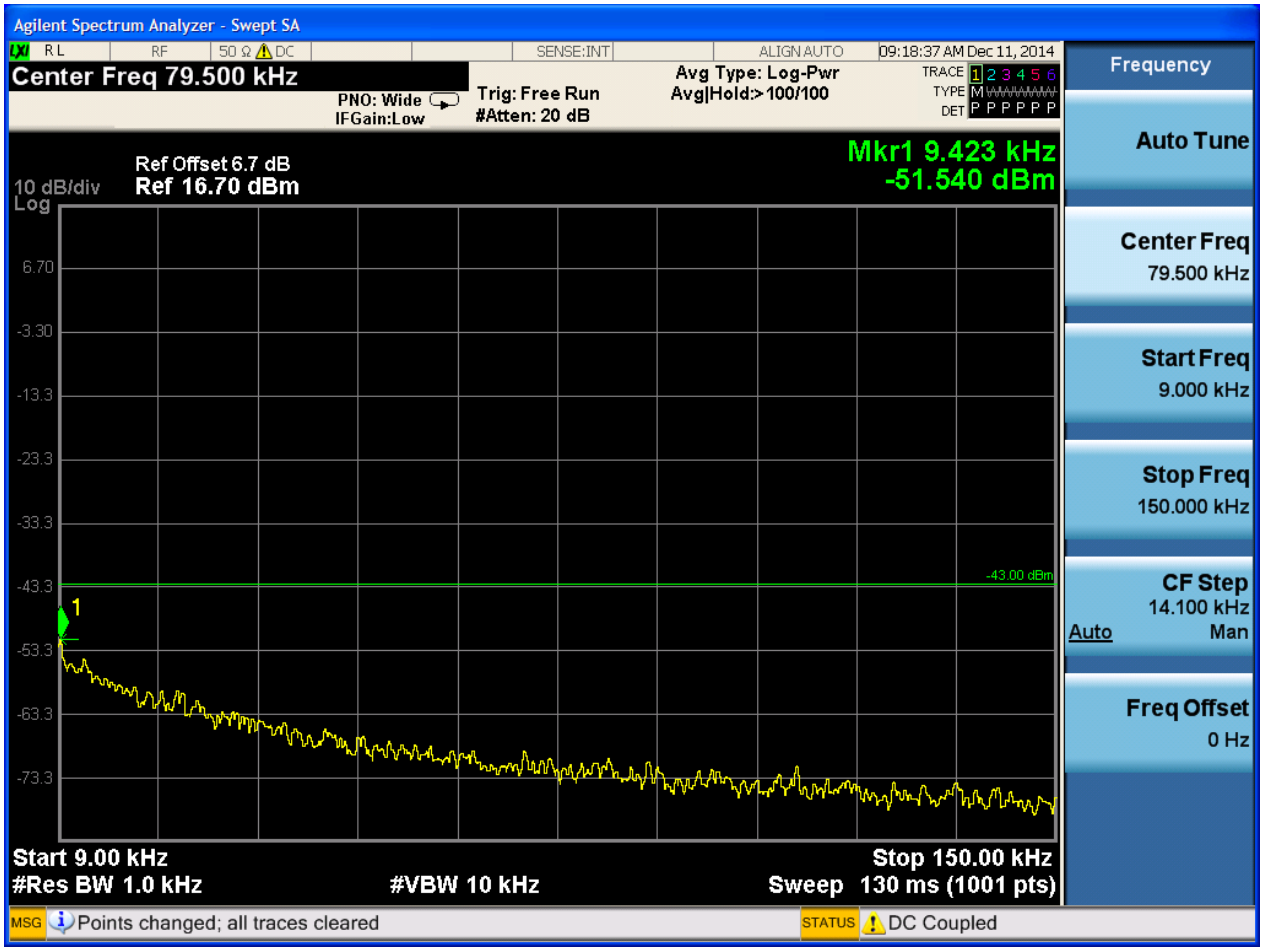
6.1.2.1.2 Test Channel = MCH



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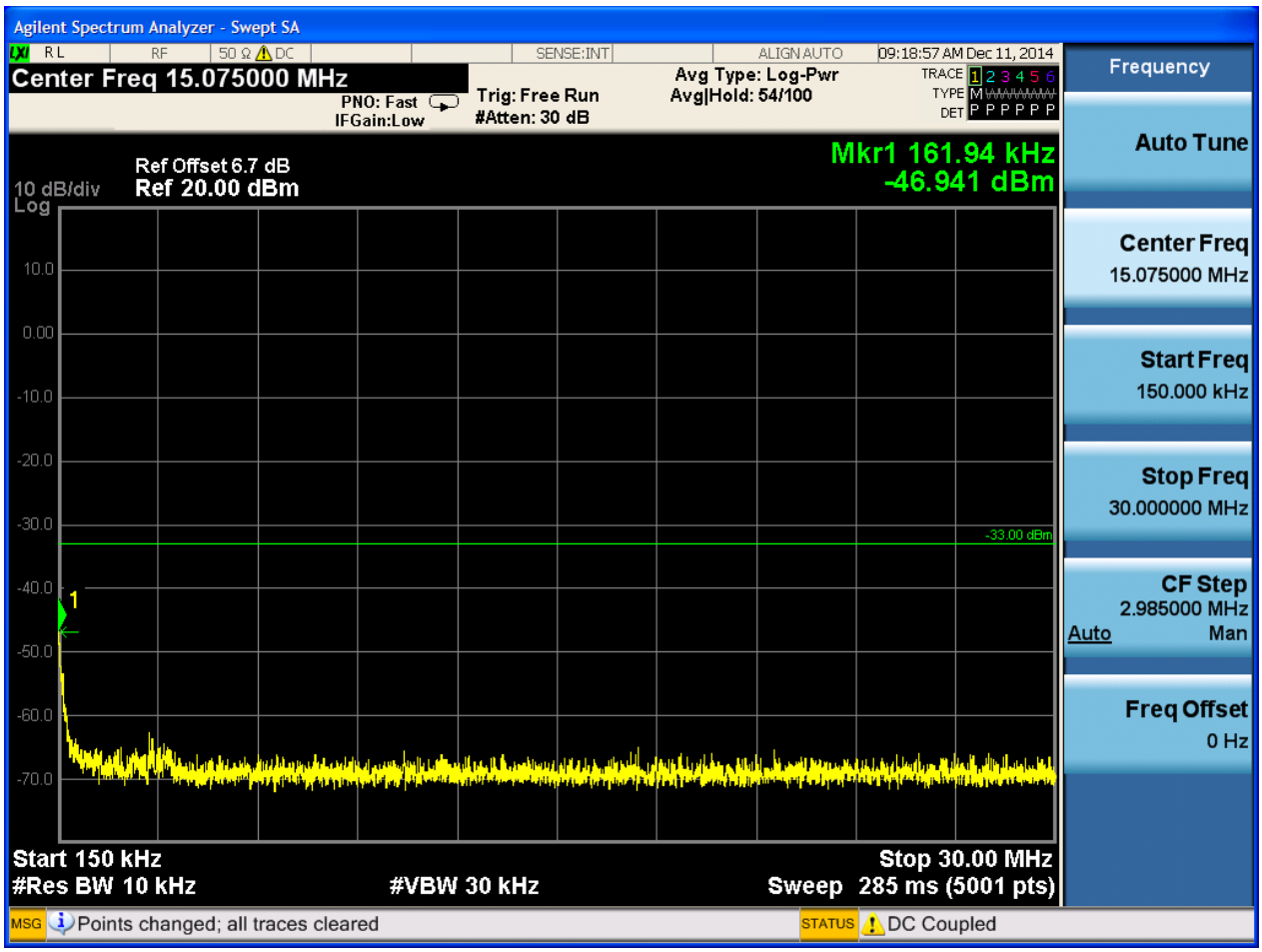

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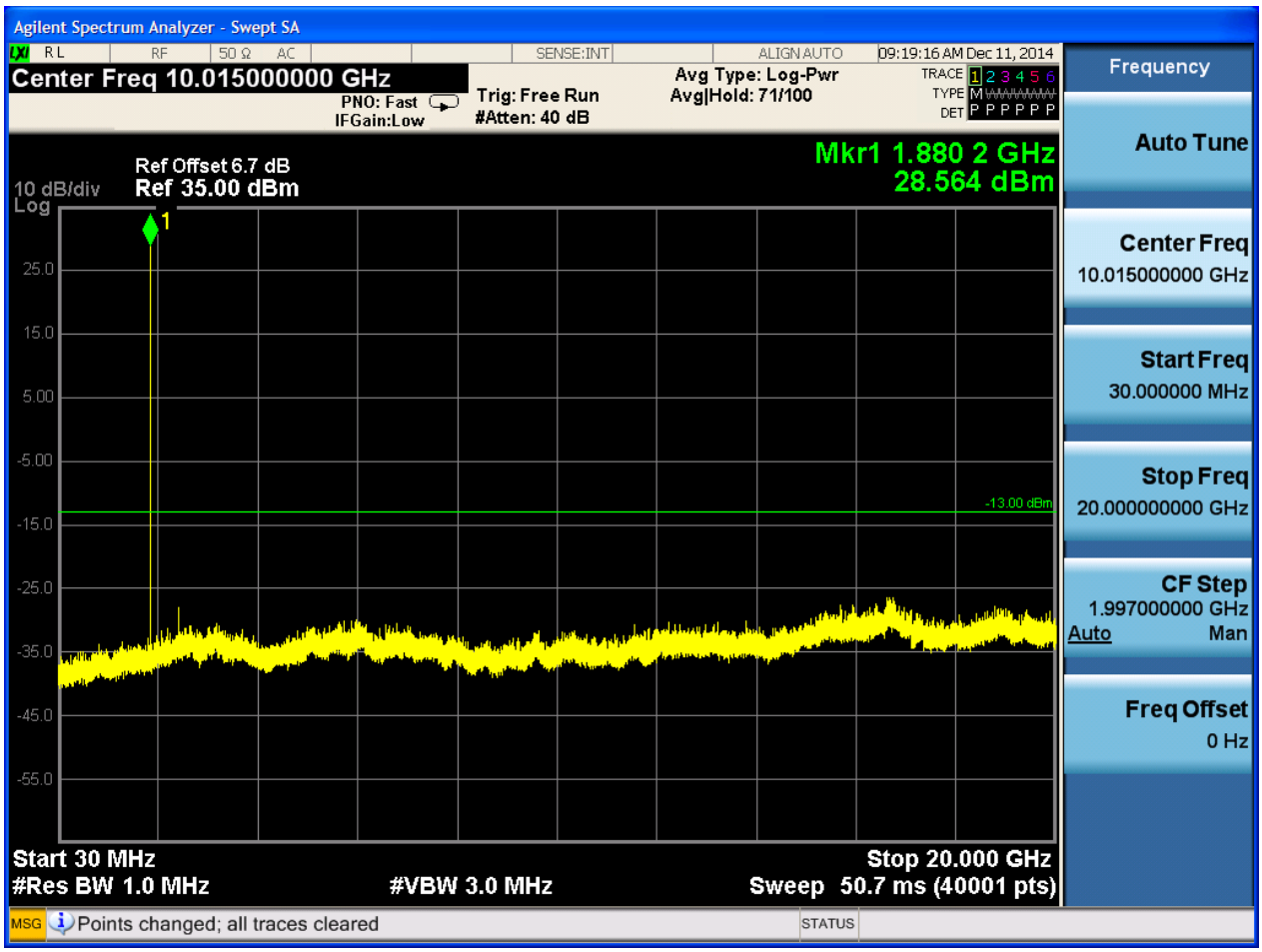

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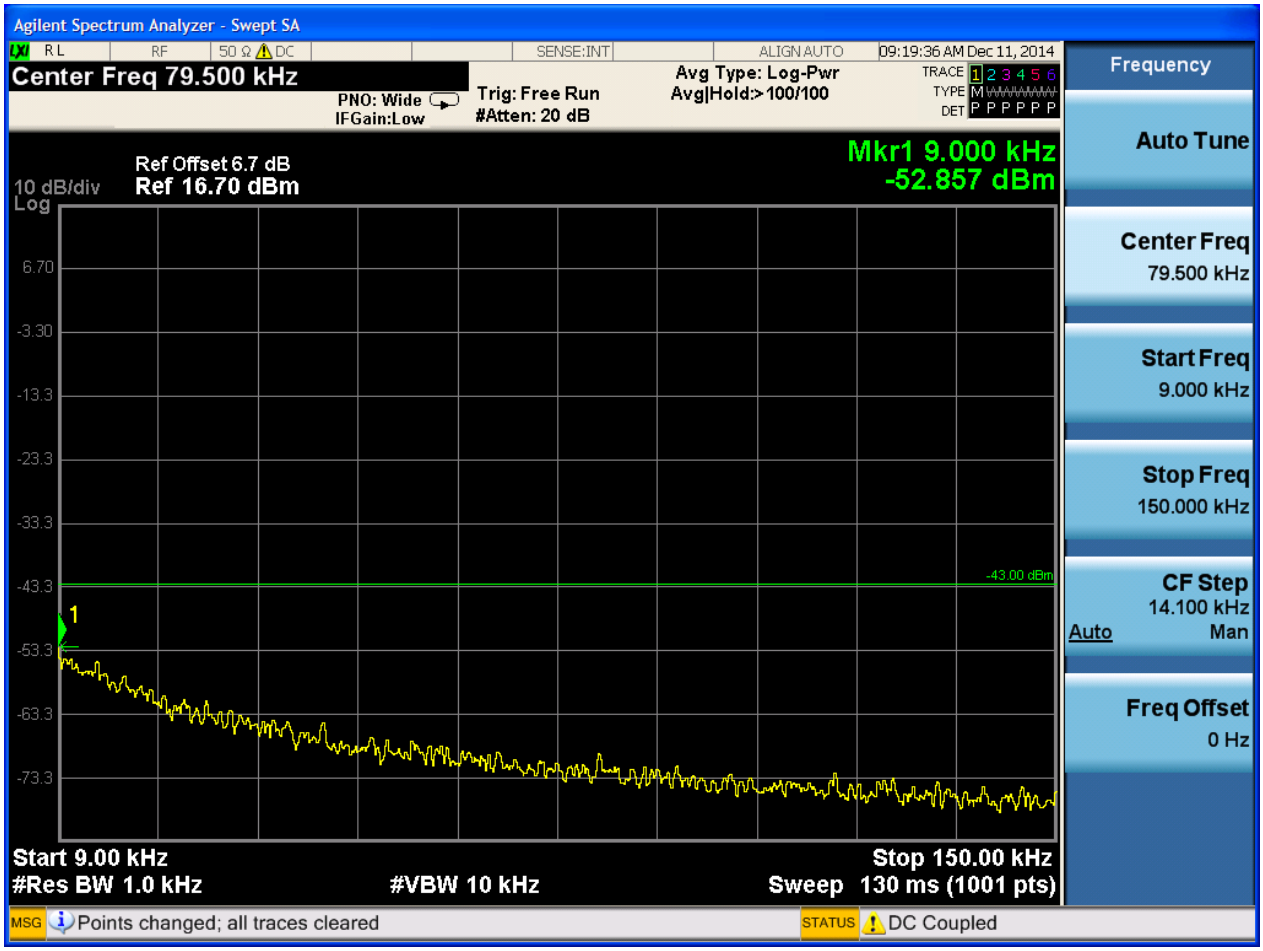
6.1.2.1.3 Test Channel = HCH



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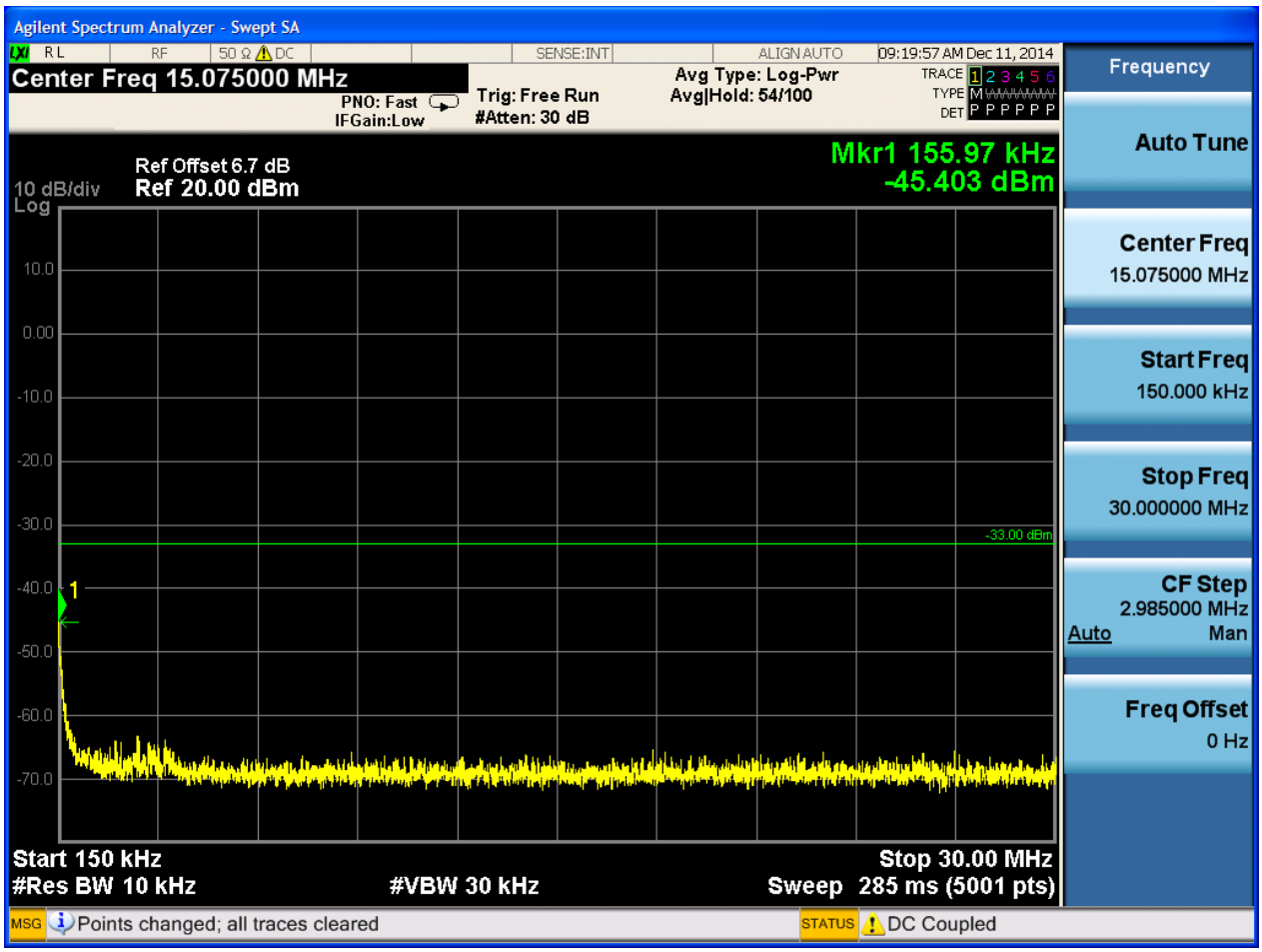

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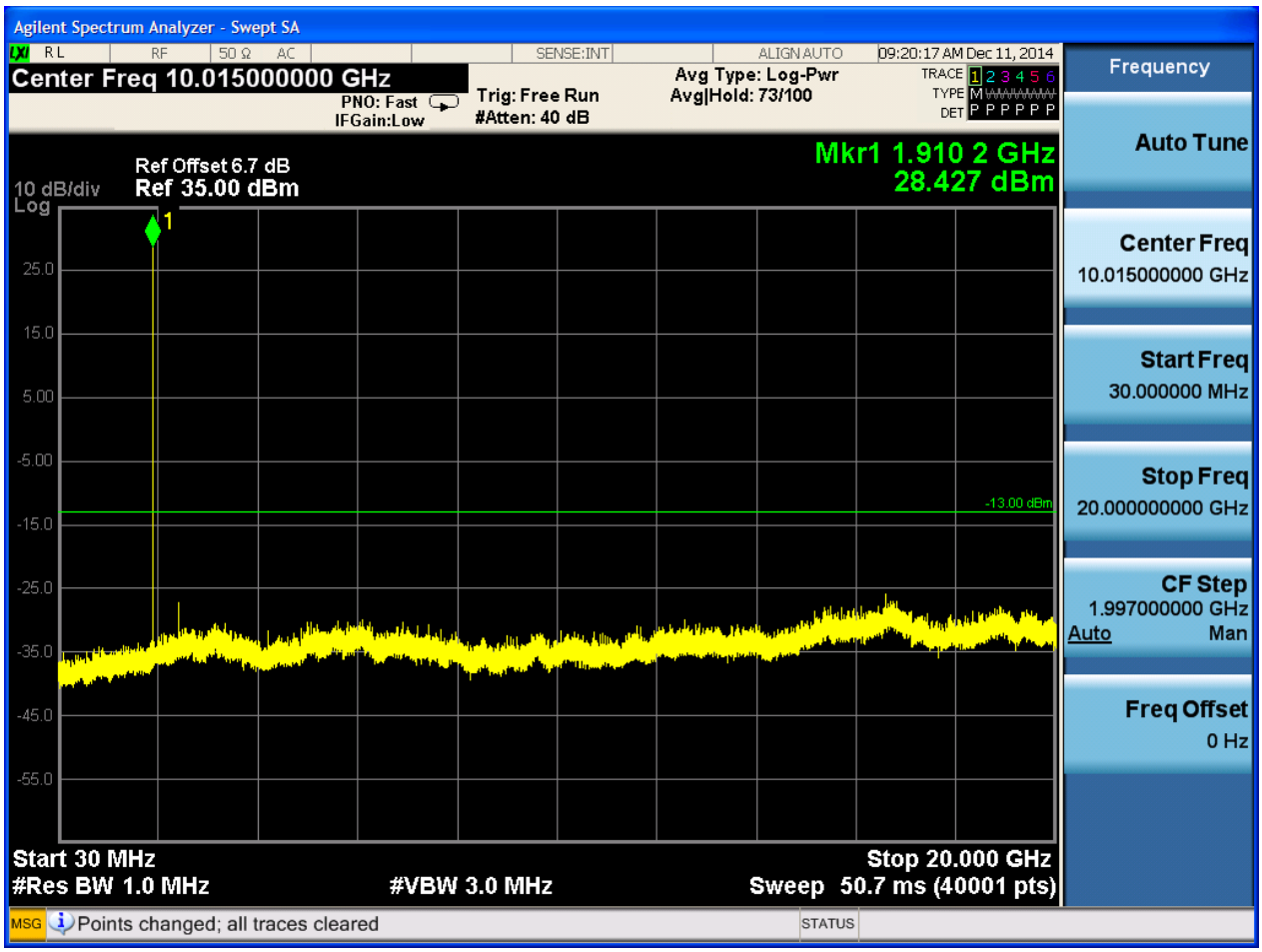

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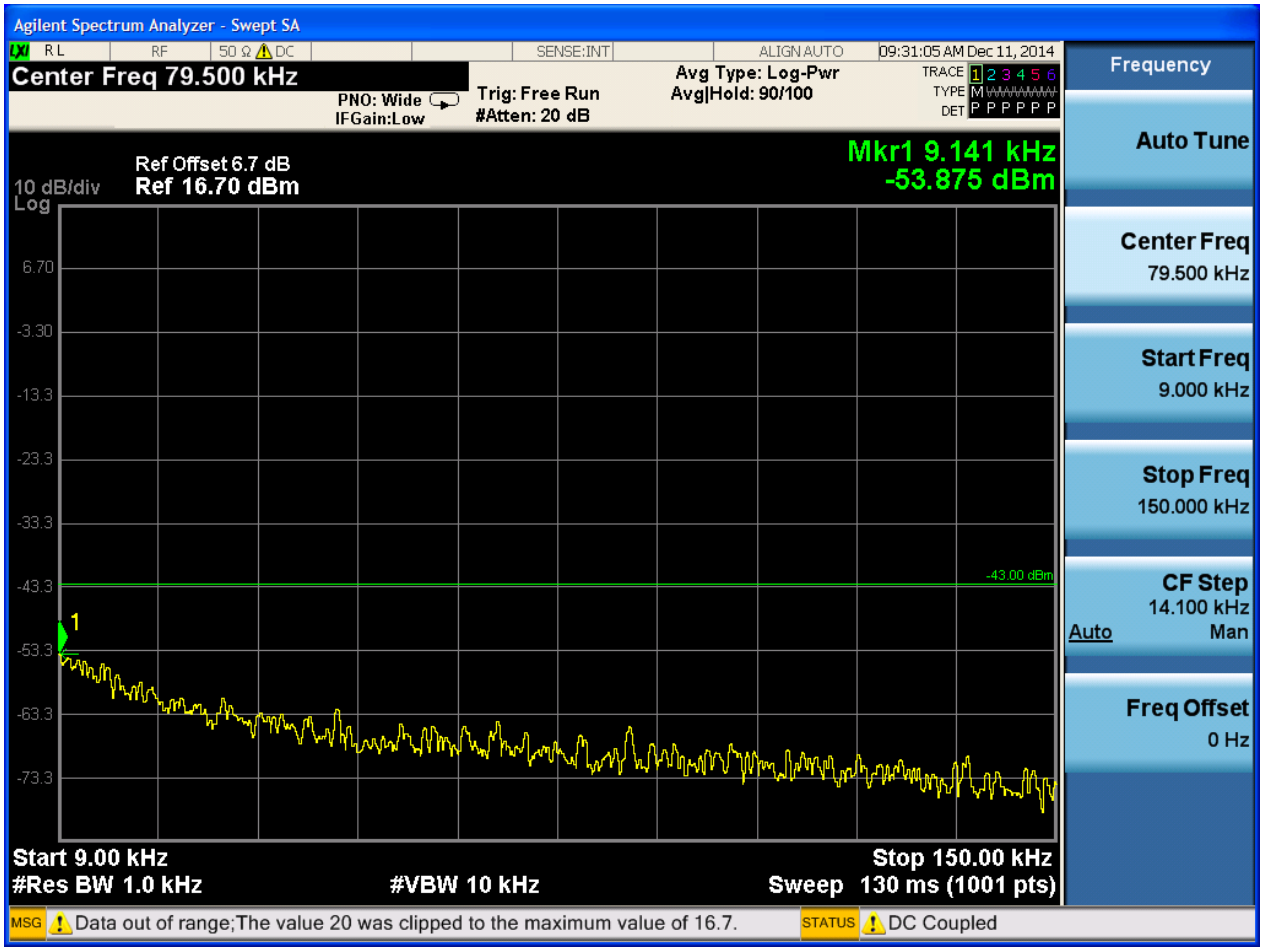
6.1.2.2 Test Mode = GSM/TM2

6.1.2.2.1 Test Channel = LCH



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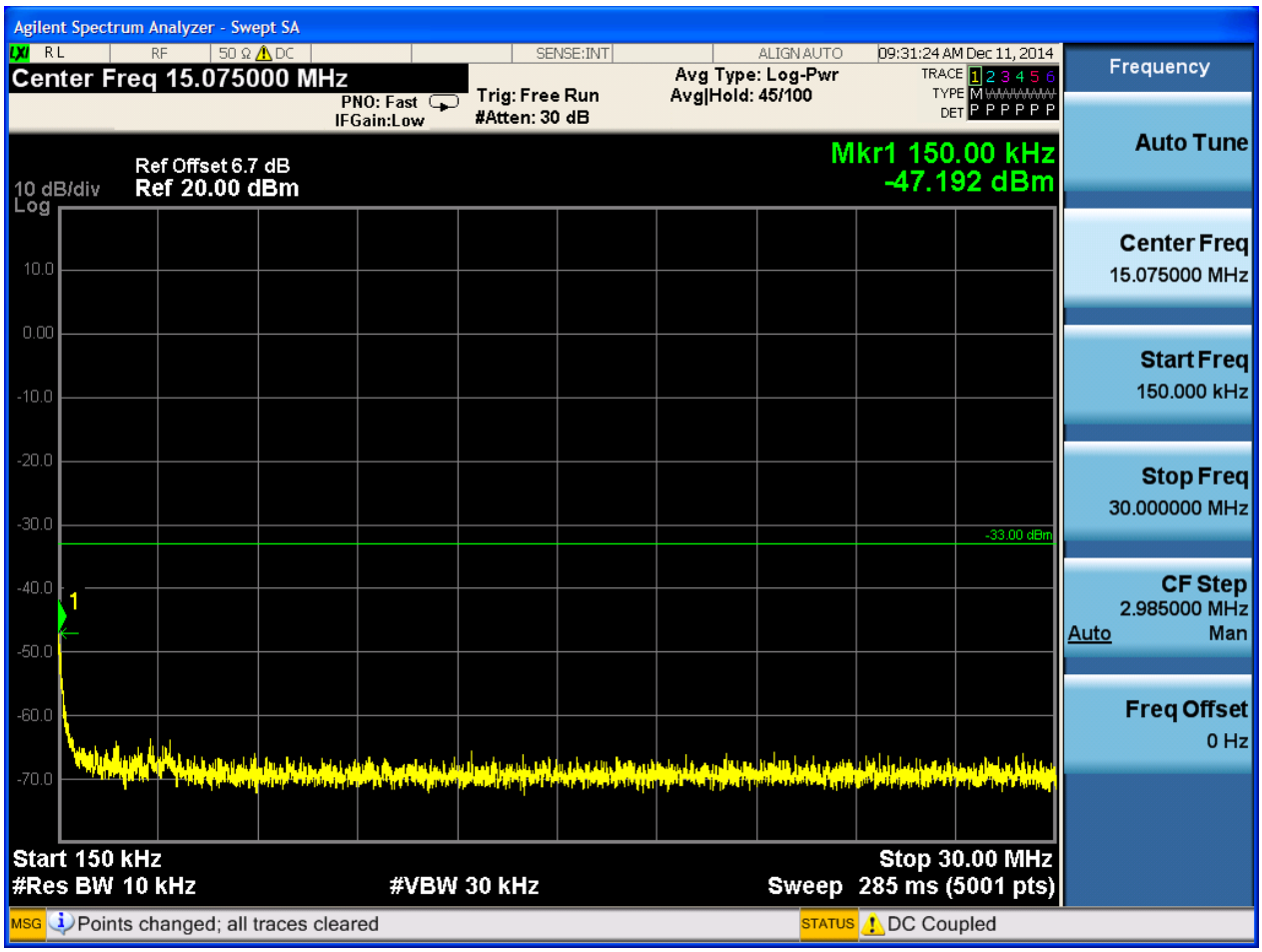

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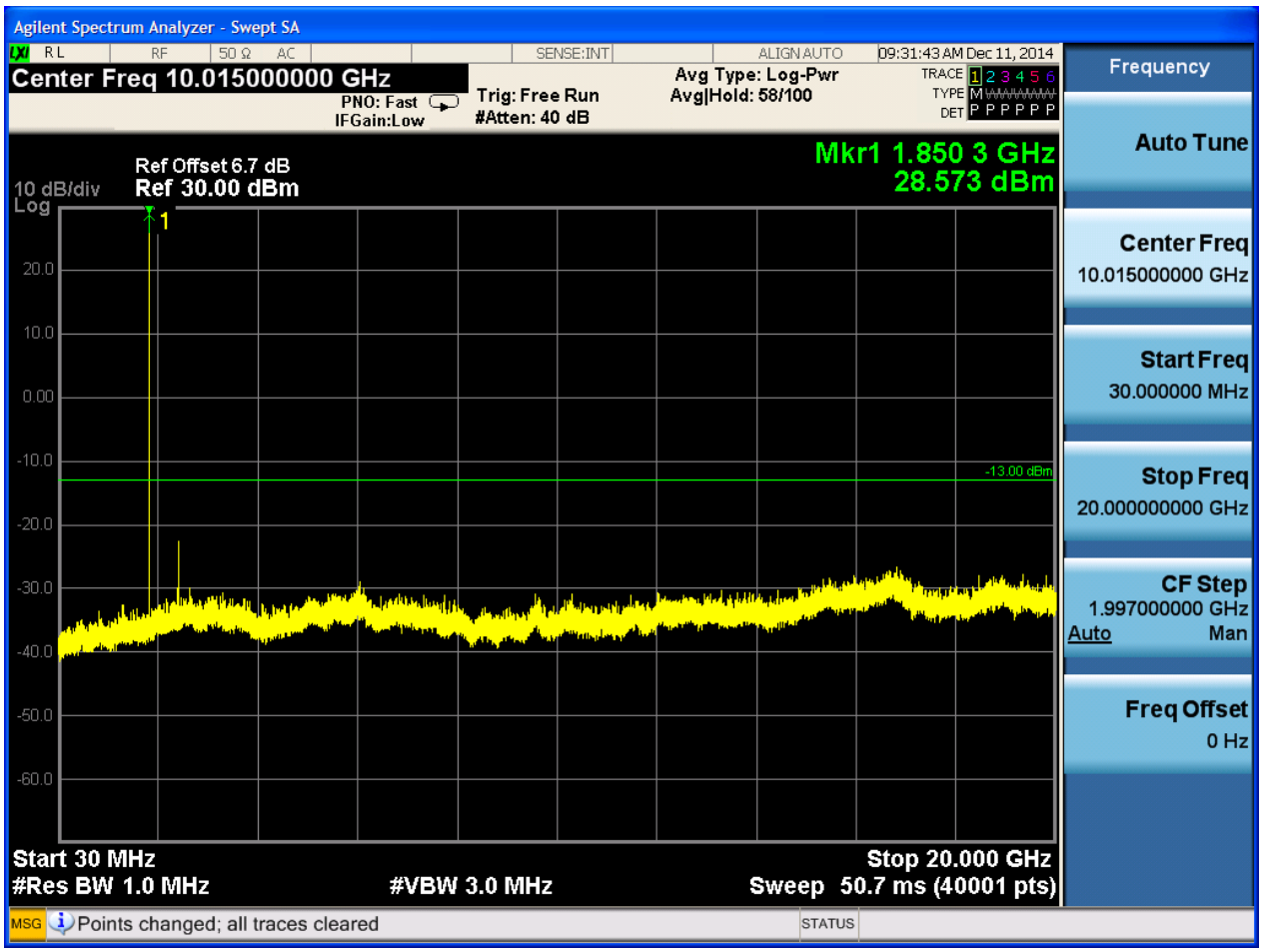

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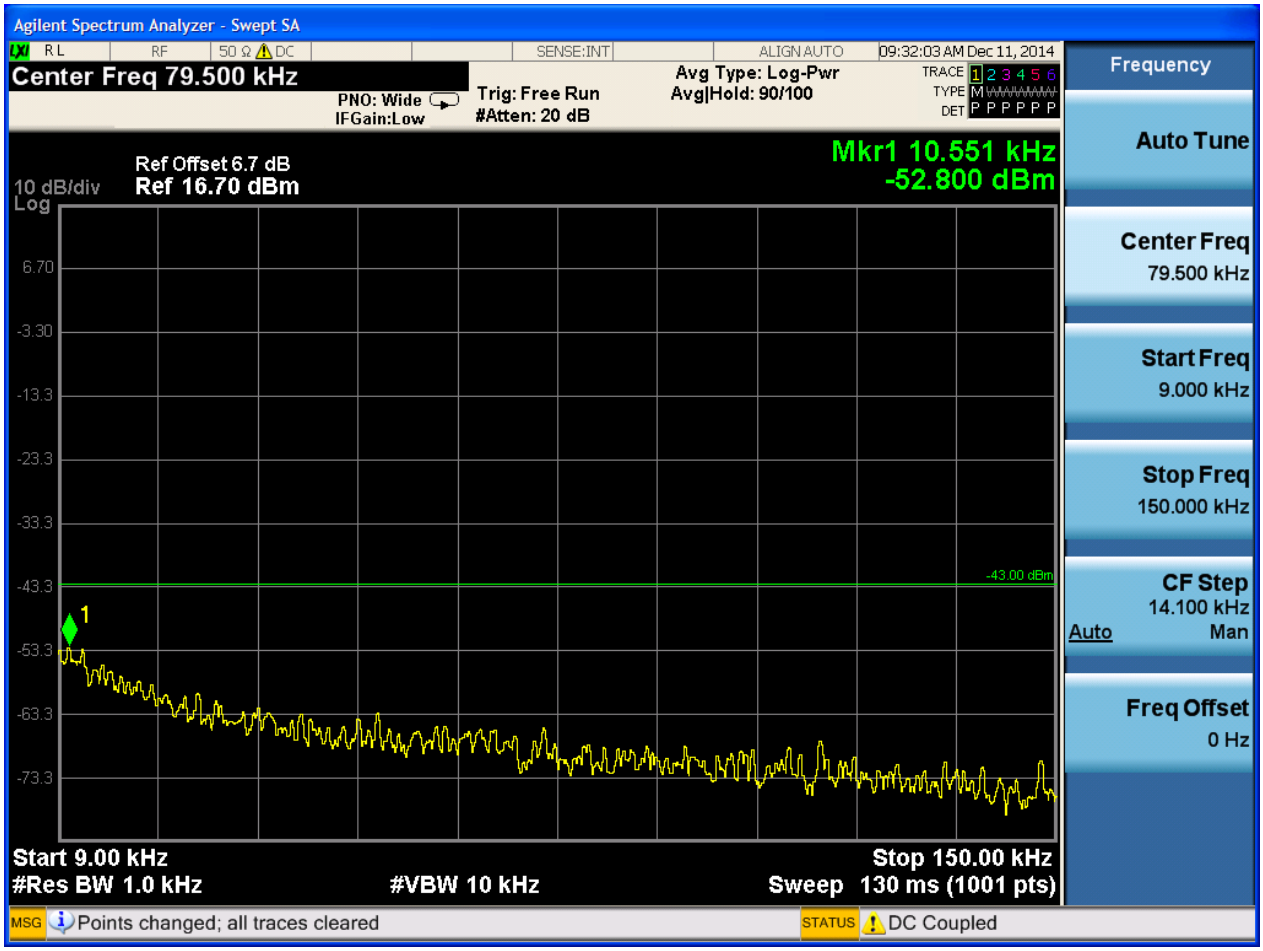
6.1.2.2.2 Test Channel = MCH



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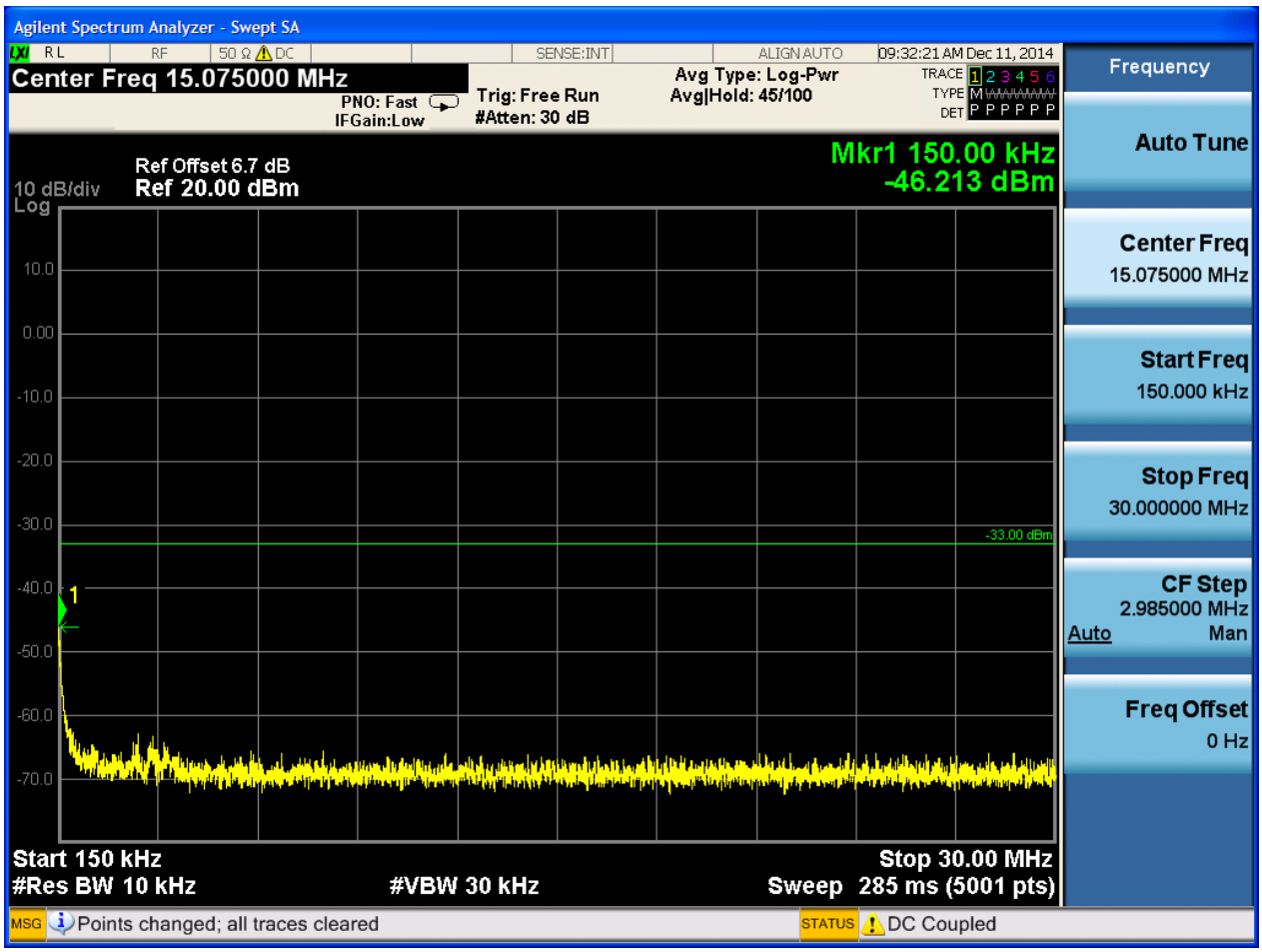

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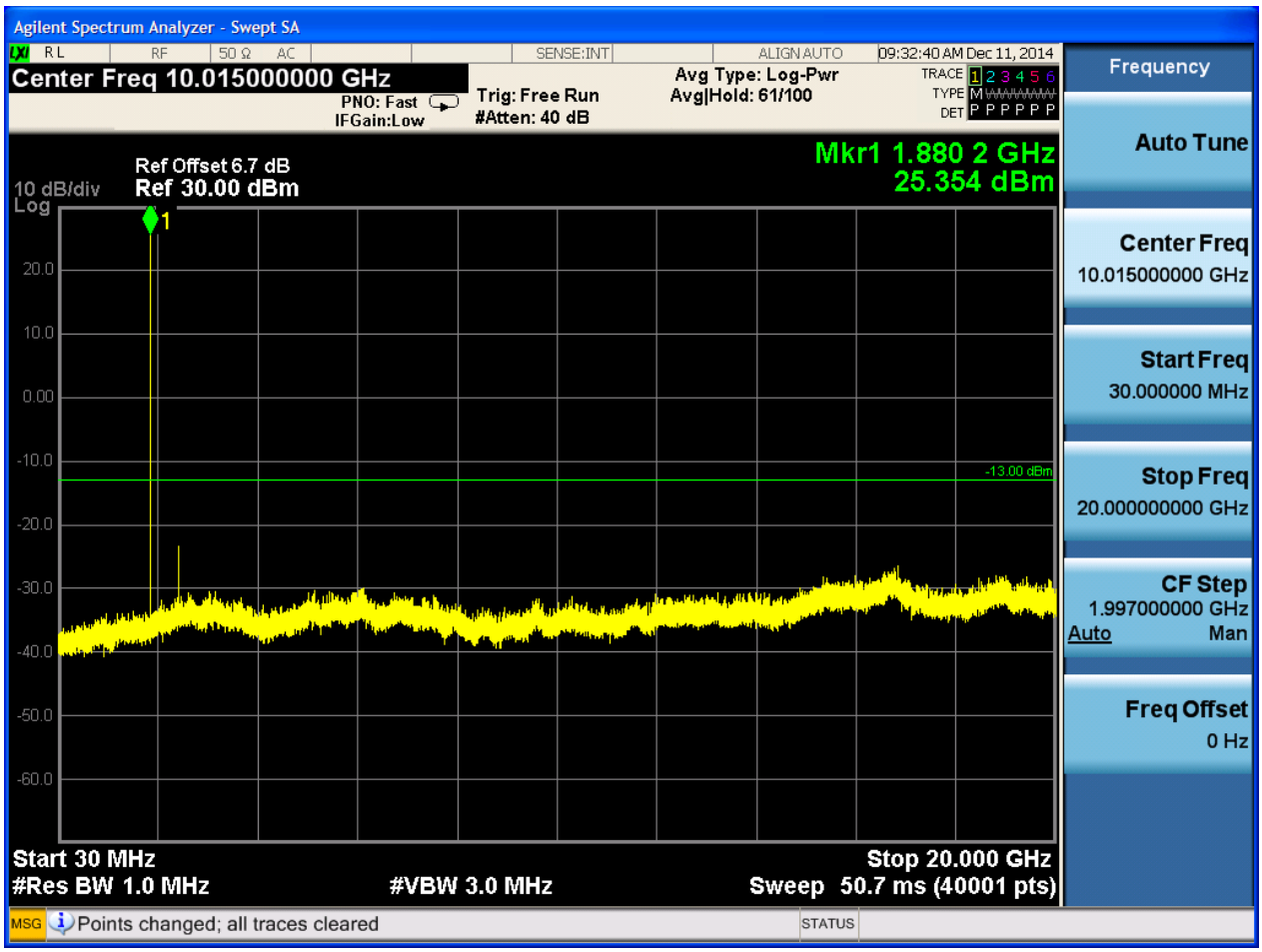

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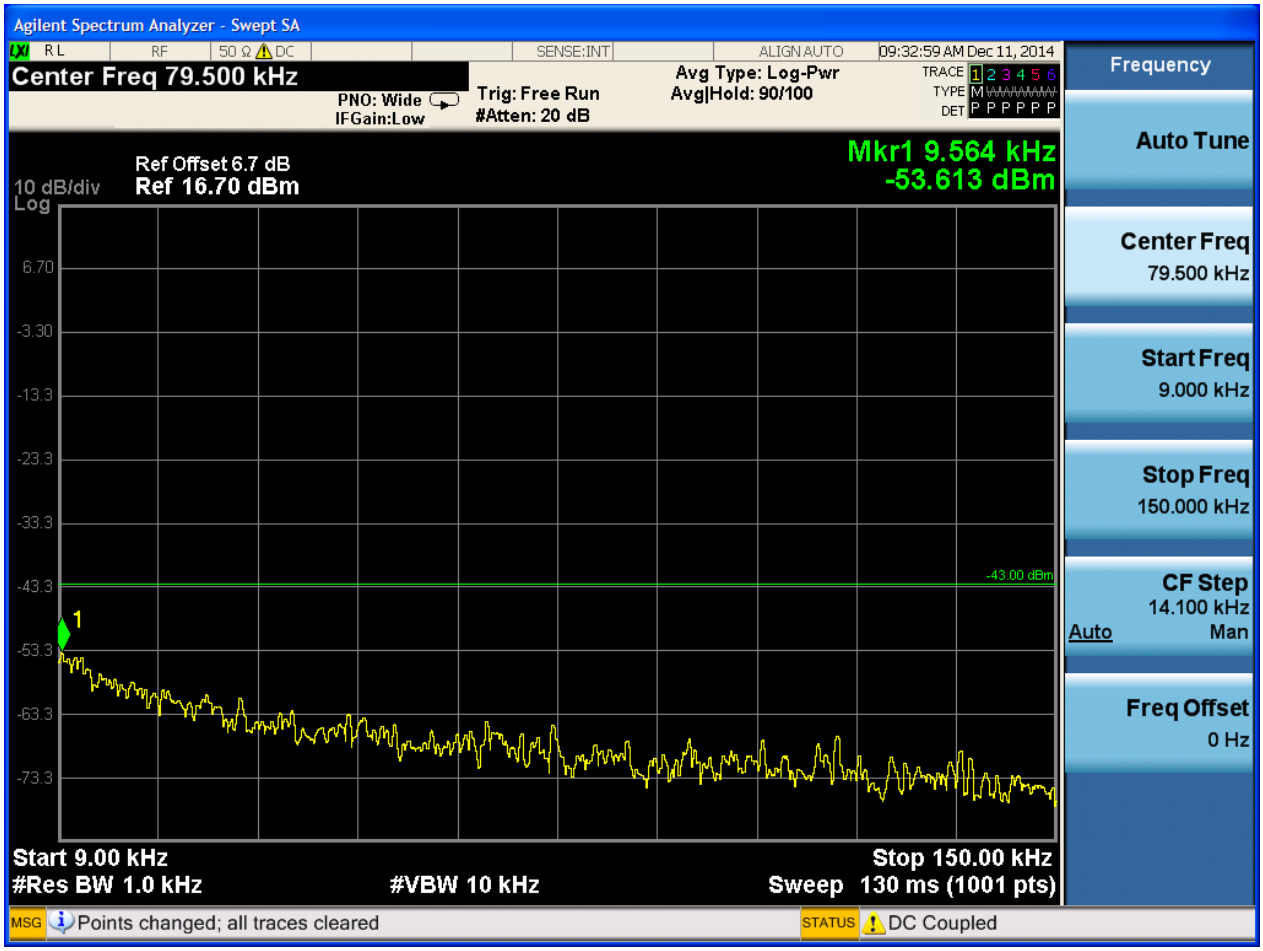
6.1.2.2.3 Test Channel = HCH



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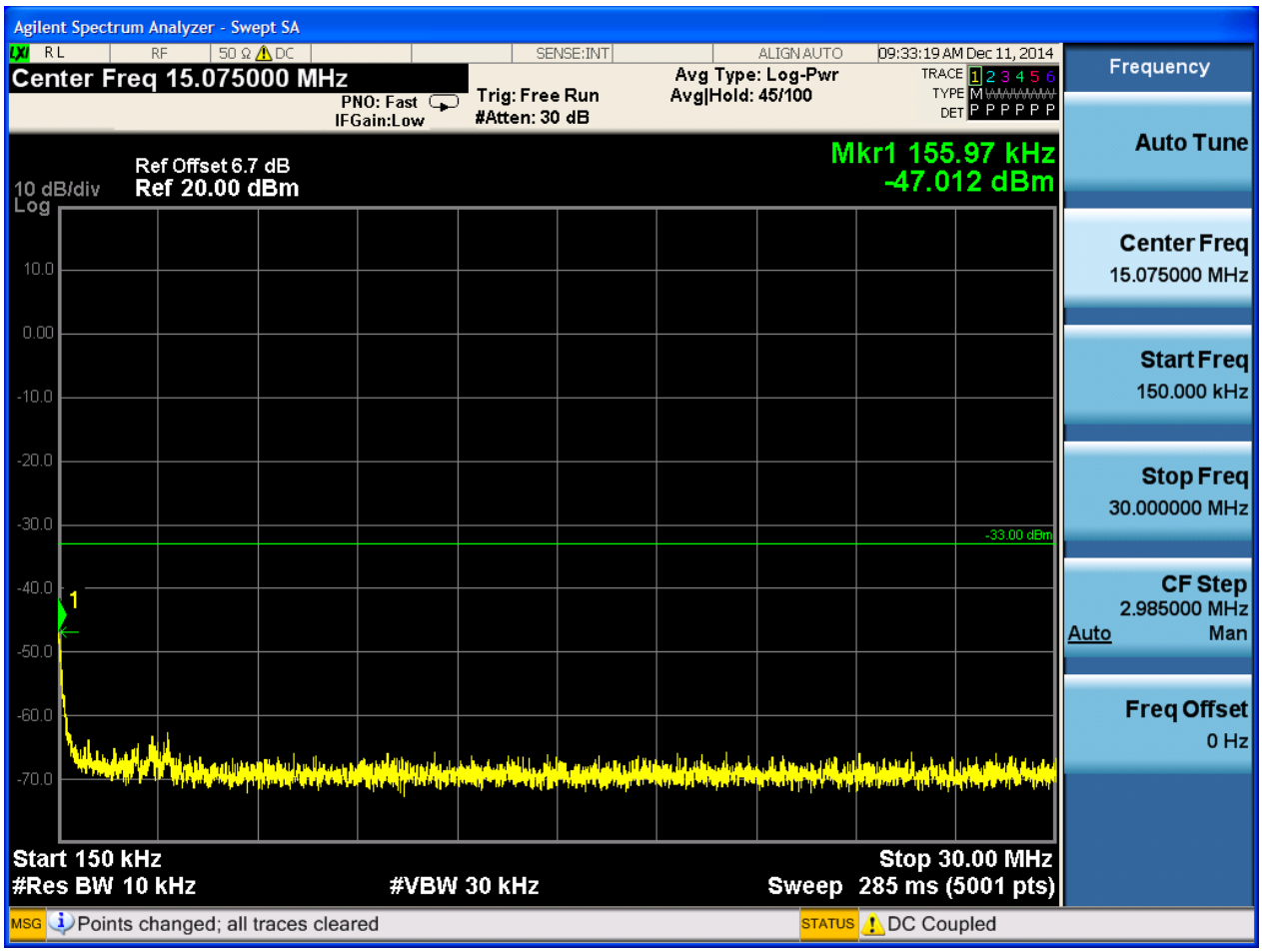
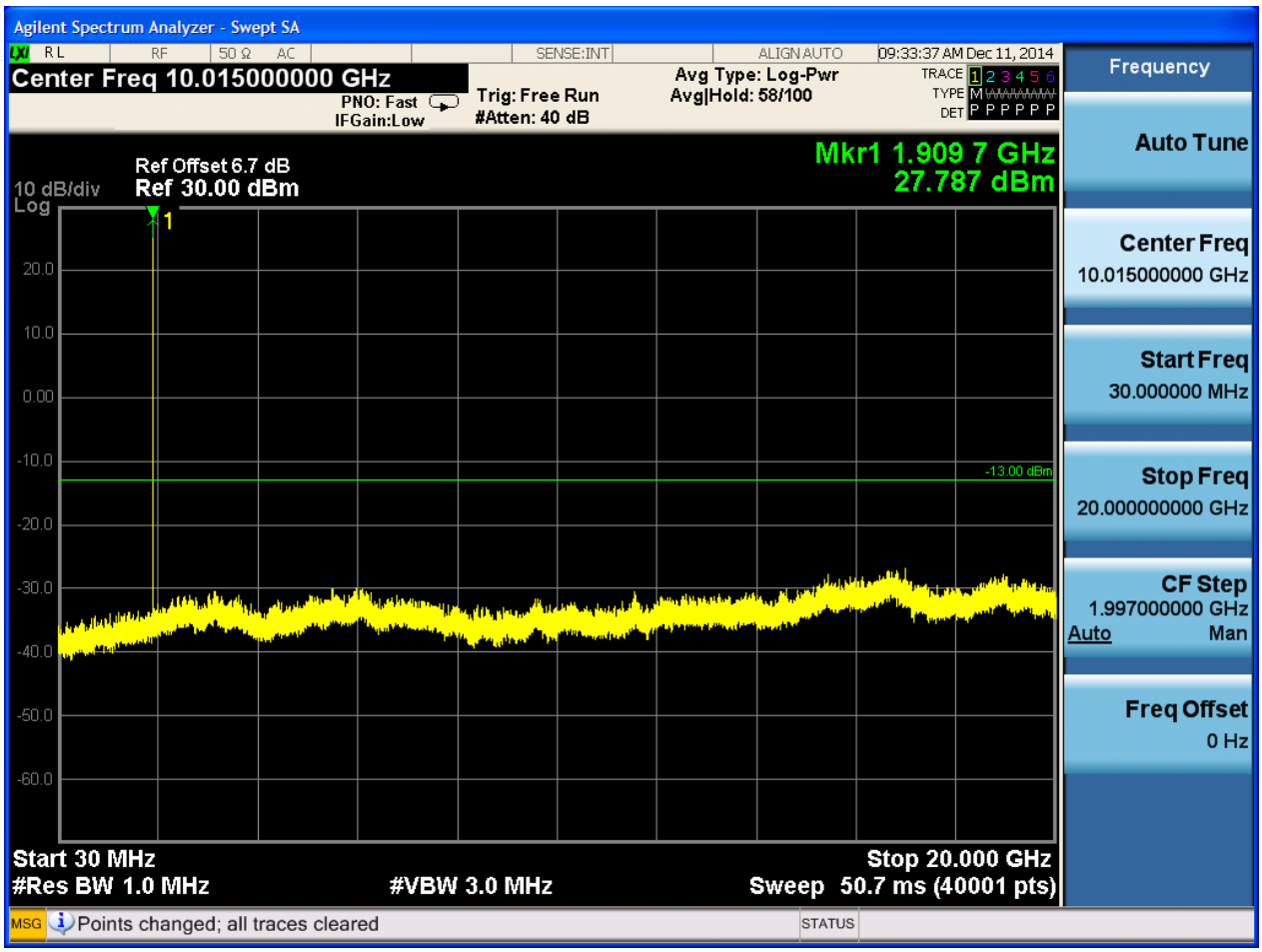

Agilent Spectrum Analyzer - Swept SA
Center Freq 15.075000 MHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 45/100
09:33:19 AM Dec 11, 2014
Ref Offset 6.7 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr1 155.97 kHz
-47.012 dBm
-33.00 dBm
Start 150 kHz
#Res BW 10 kHz
#VBW 30 kHz
Stop 30.00 MHz
Sweep 285 ms (5001 pts)
Points changed; all traces cleared
DC Coupled
Frequency
Auto Tune
Center Freq
15.075000 MHz
Start Freq
150.000 kHz
Stop Freq
30.000000 MHz
CF Step
2.985000 MHz
Auto
Man
Freq Offset
0 Hz



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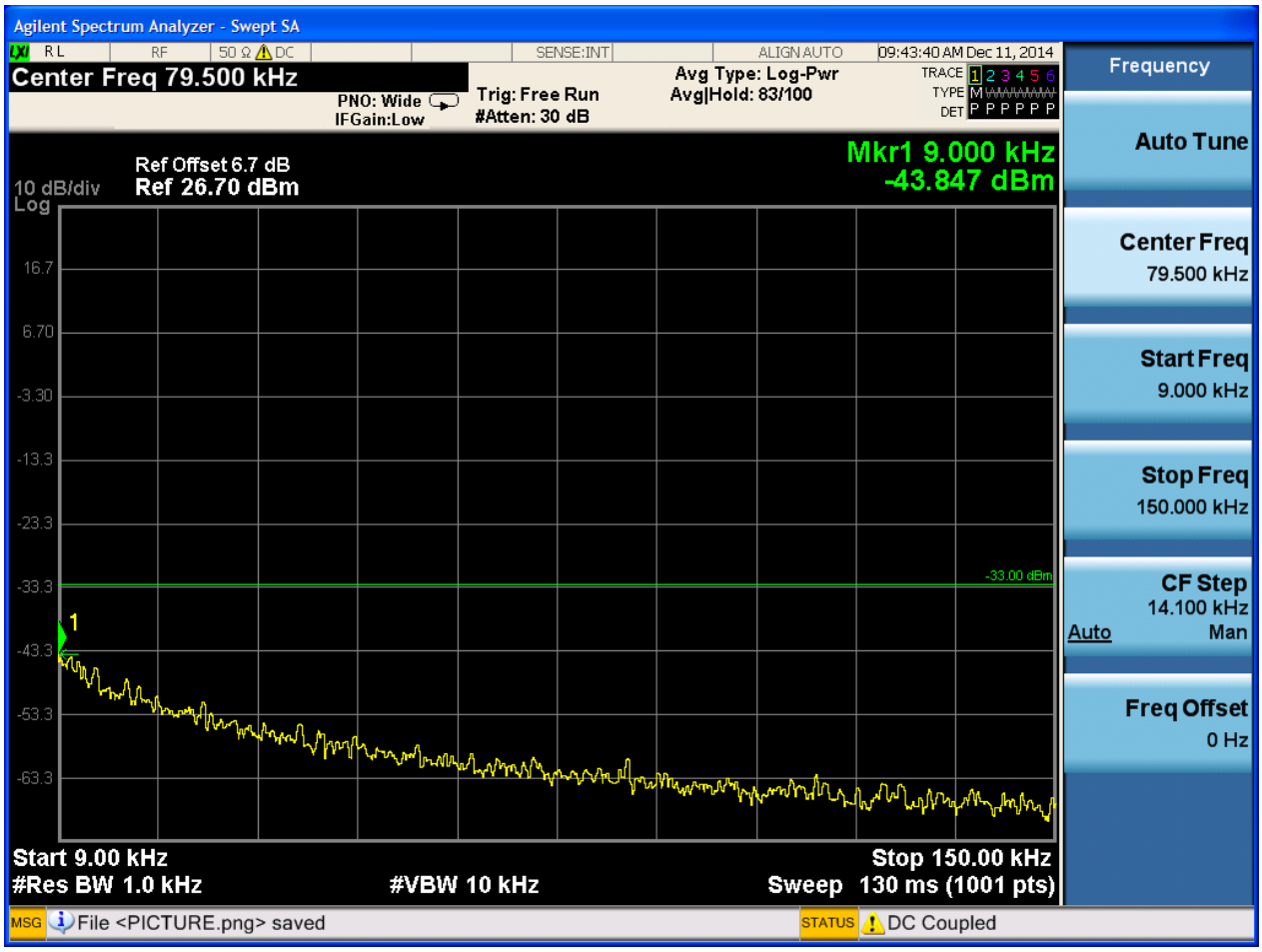
6.2 For UMTS

6.2.1 Test Band = WCDMA850

6.2.1.1 Test Mode = UMTS/TM1

6.2.1.1.1 Test Channel = LCH



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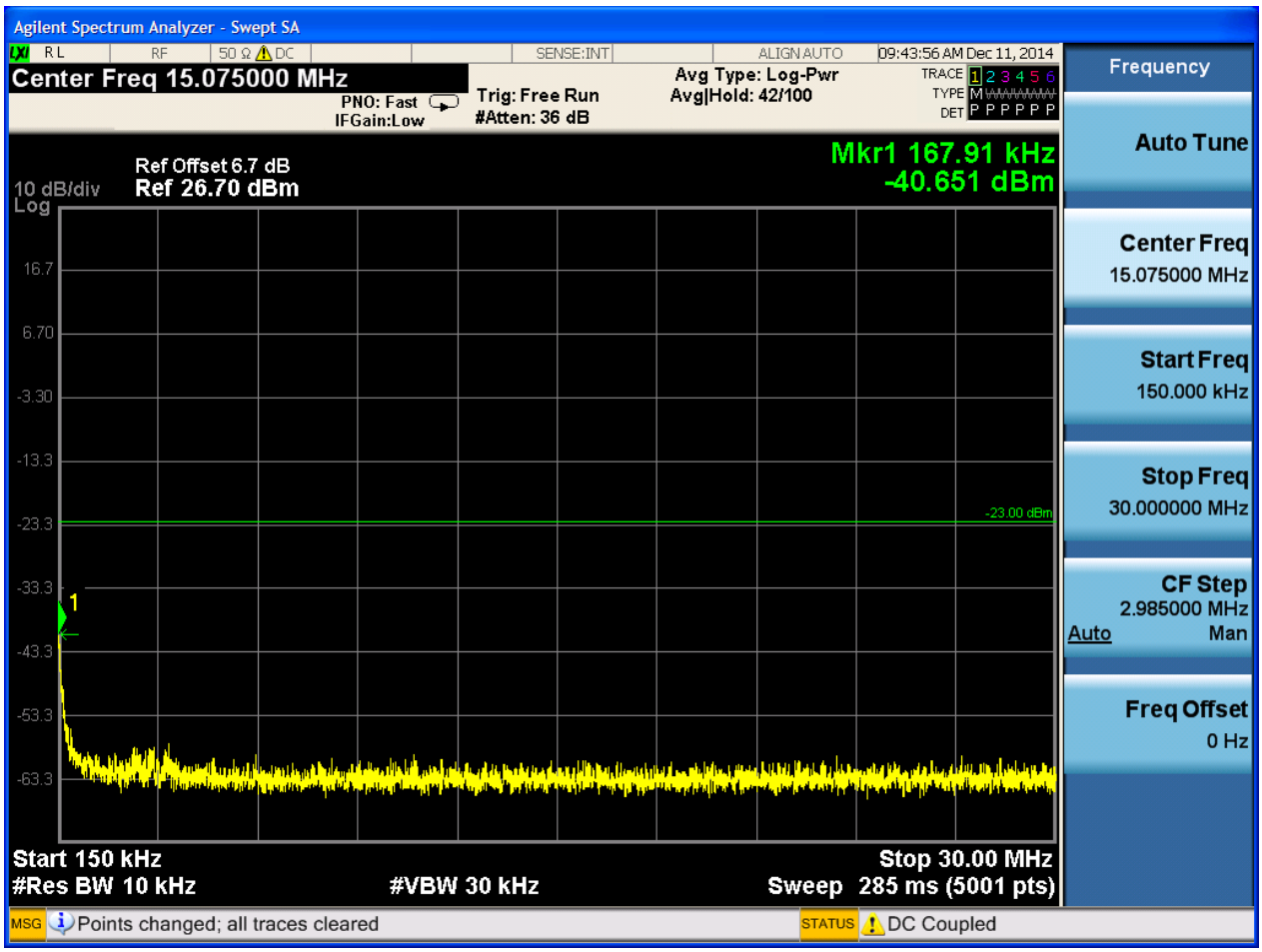
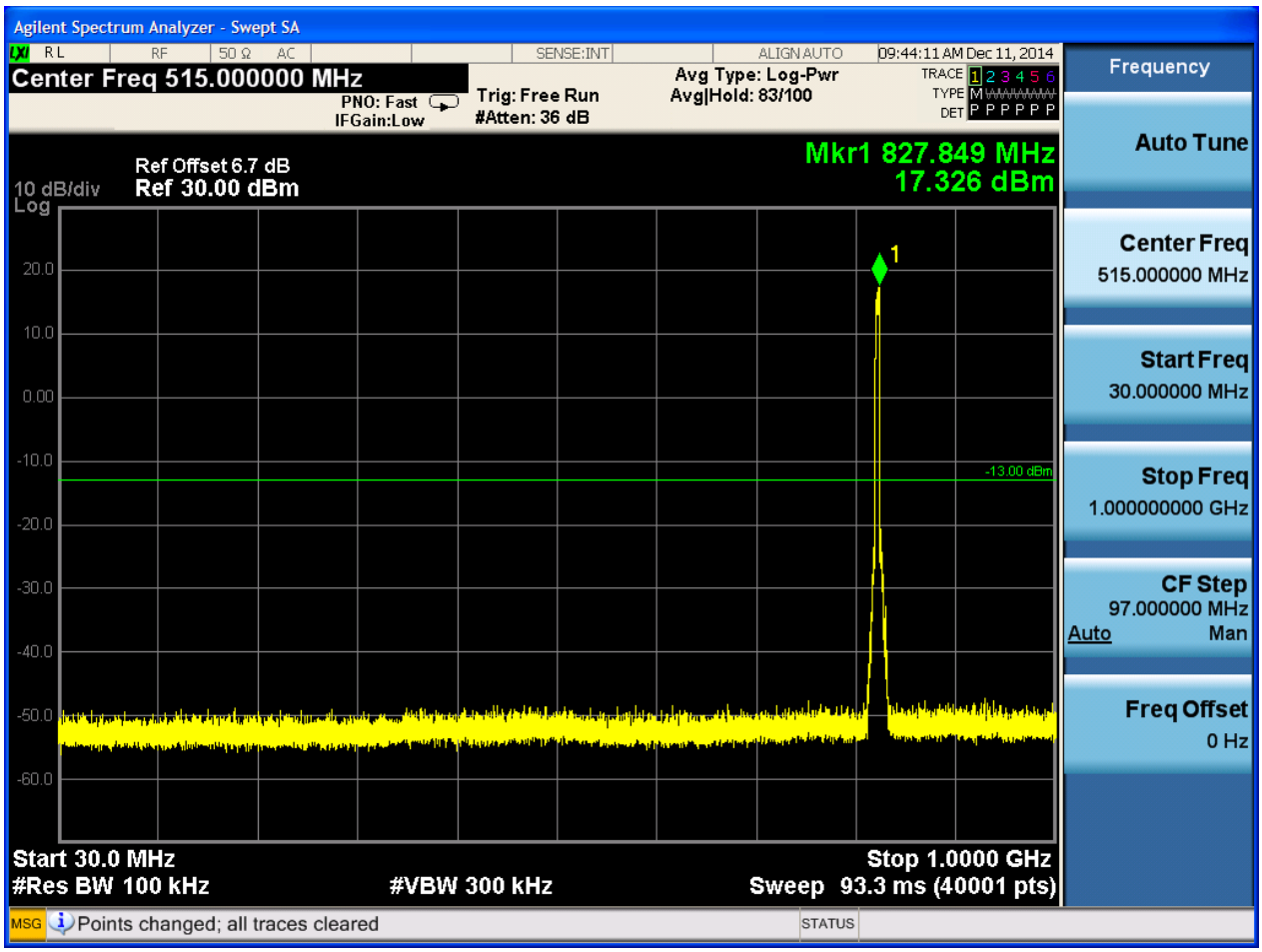

Agilent Spectrum Analyzer - Swept SA
Center Freq 15.075000 MHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 36 dB
Avg Type: Log-Pwr
Avg|Hold: 42/100
09:43:56 AM Dec 11, 2014
Ref Offset 6.7 dB
10 dB/div
Ref 26.70 dBm
Log
Mkr1 167.91 kHz
-40.651 dBm
-23.00 dBm
Start 150 kHz
#Res BW 10 kHz
#VBW 30 kHz
Stop 30.00 MHz
Sweep 285 ms (5001 pts)
Points changed; all traces cleared
DC Coupled
Frequency
Auto Tune
Center Freq
15.075000 MHz
Start Freq
150.000 kHz
Stop Freq
30.000000 MHz
CF Step
2.985000 MHz
Auto
Man
Freq Offset
0 Hz



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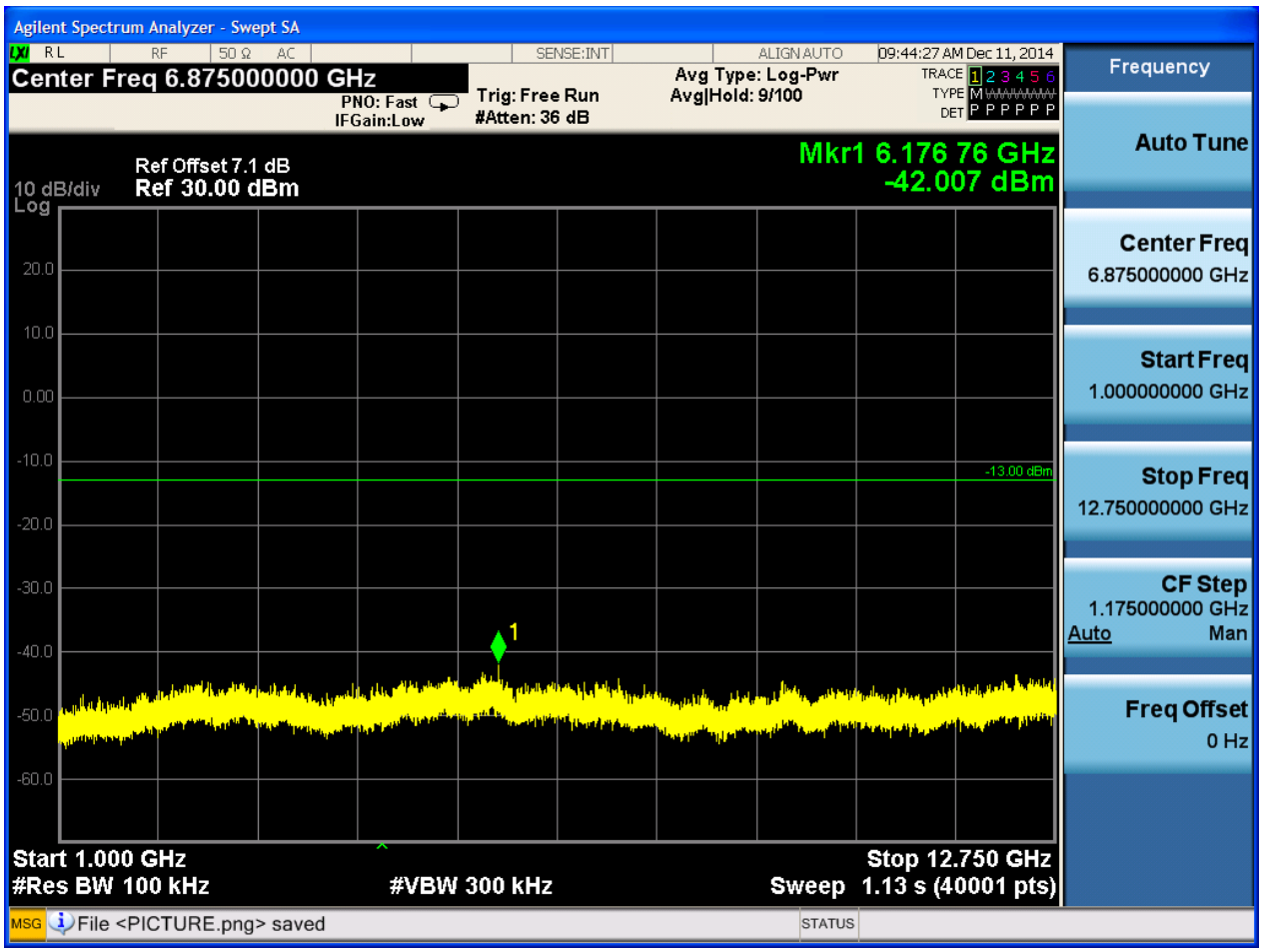

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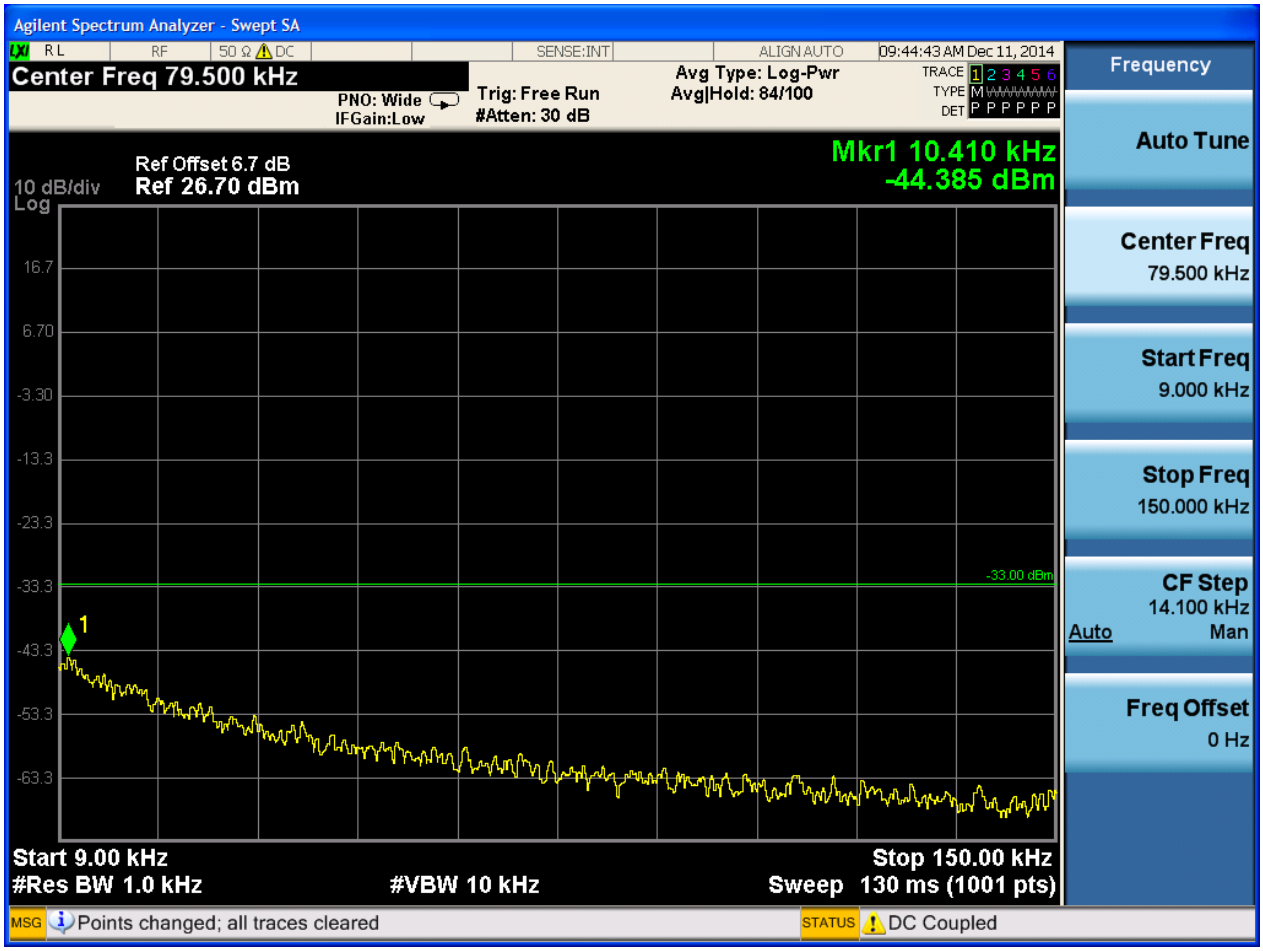
6.2.1.1.2 Test Channel = MCH



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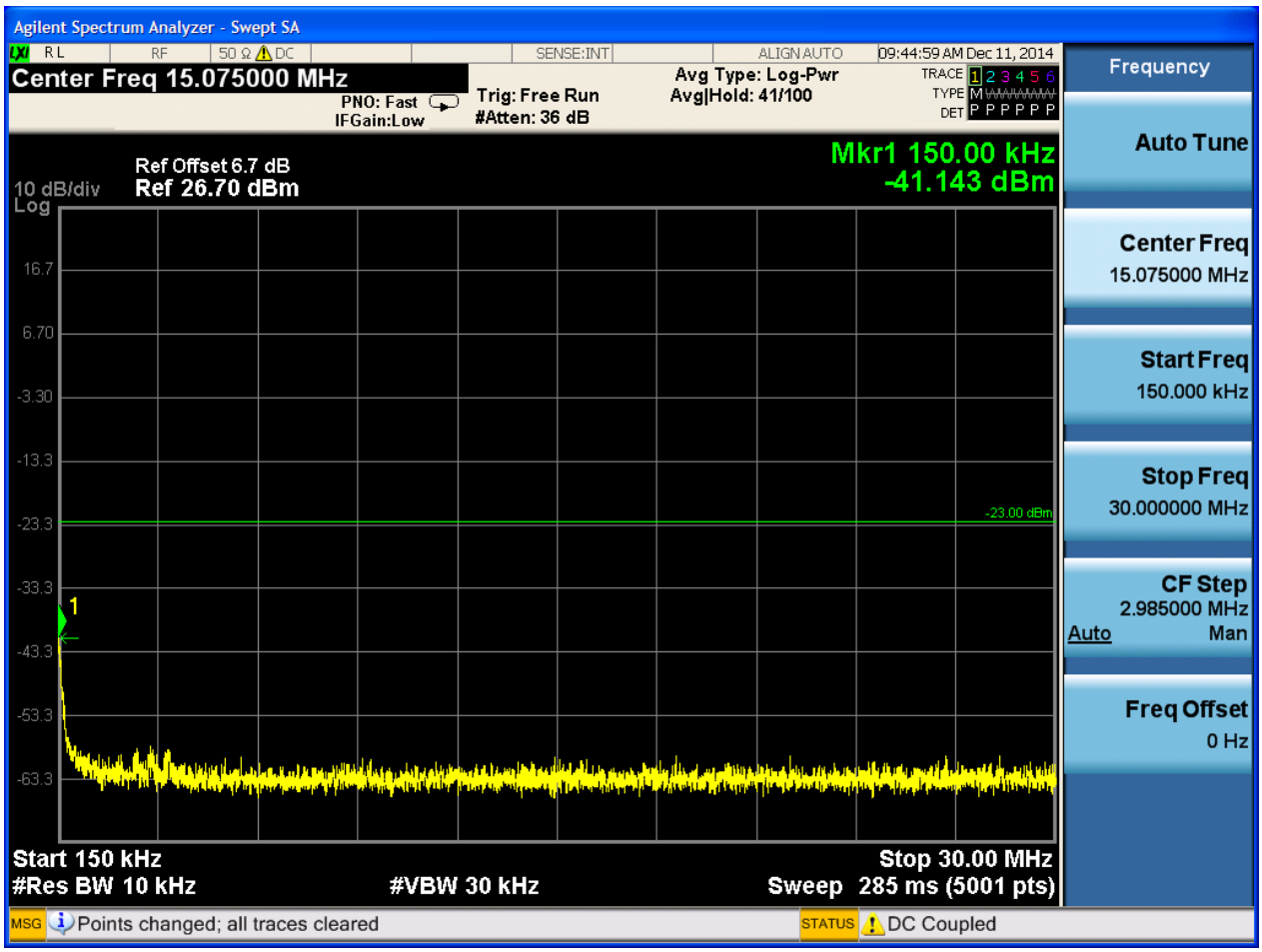

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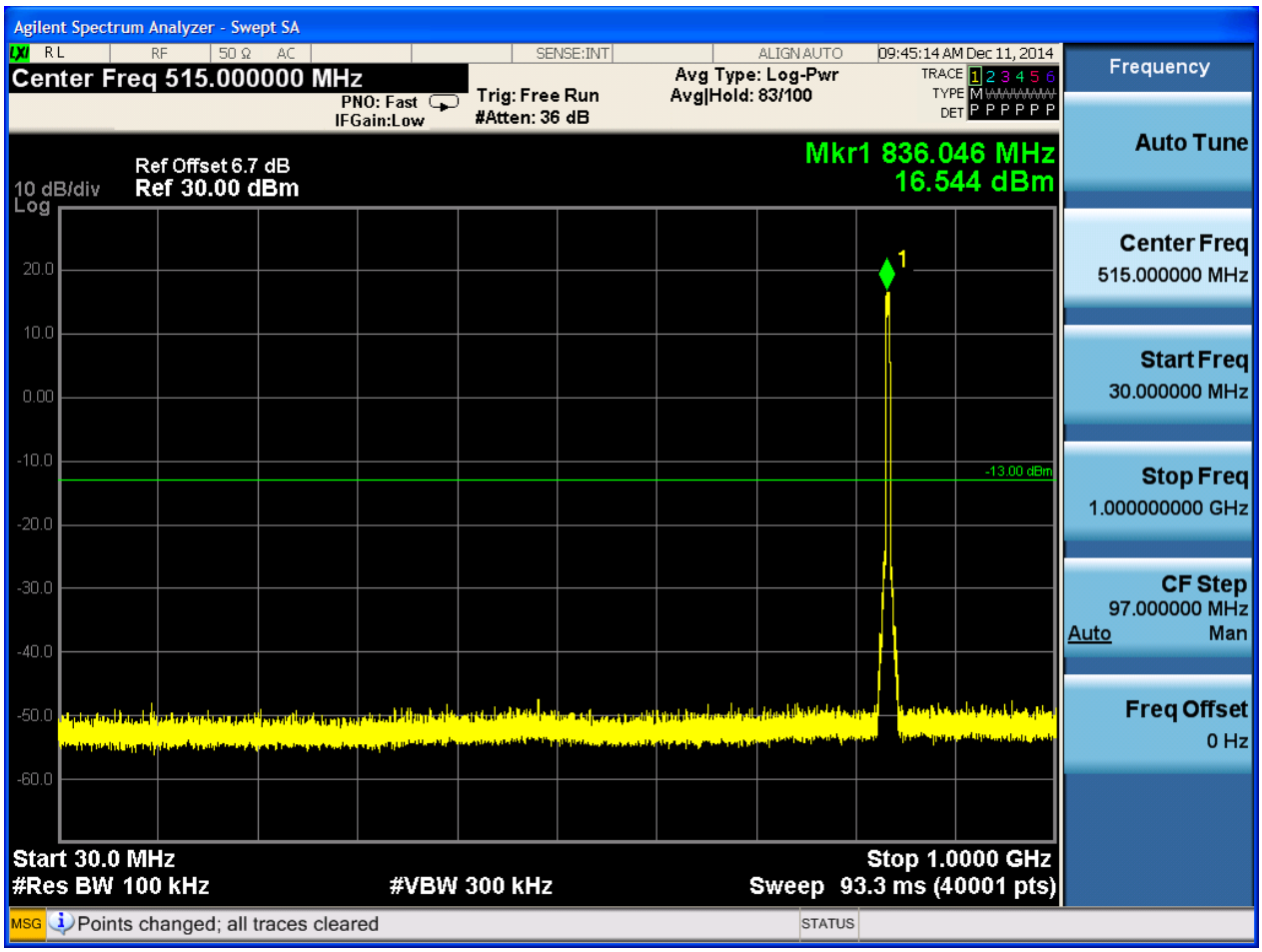

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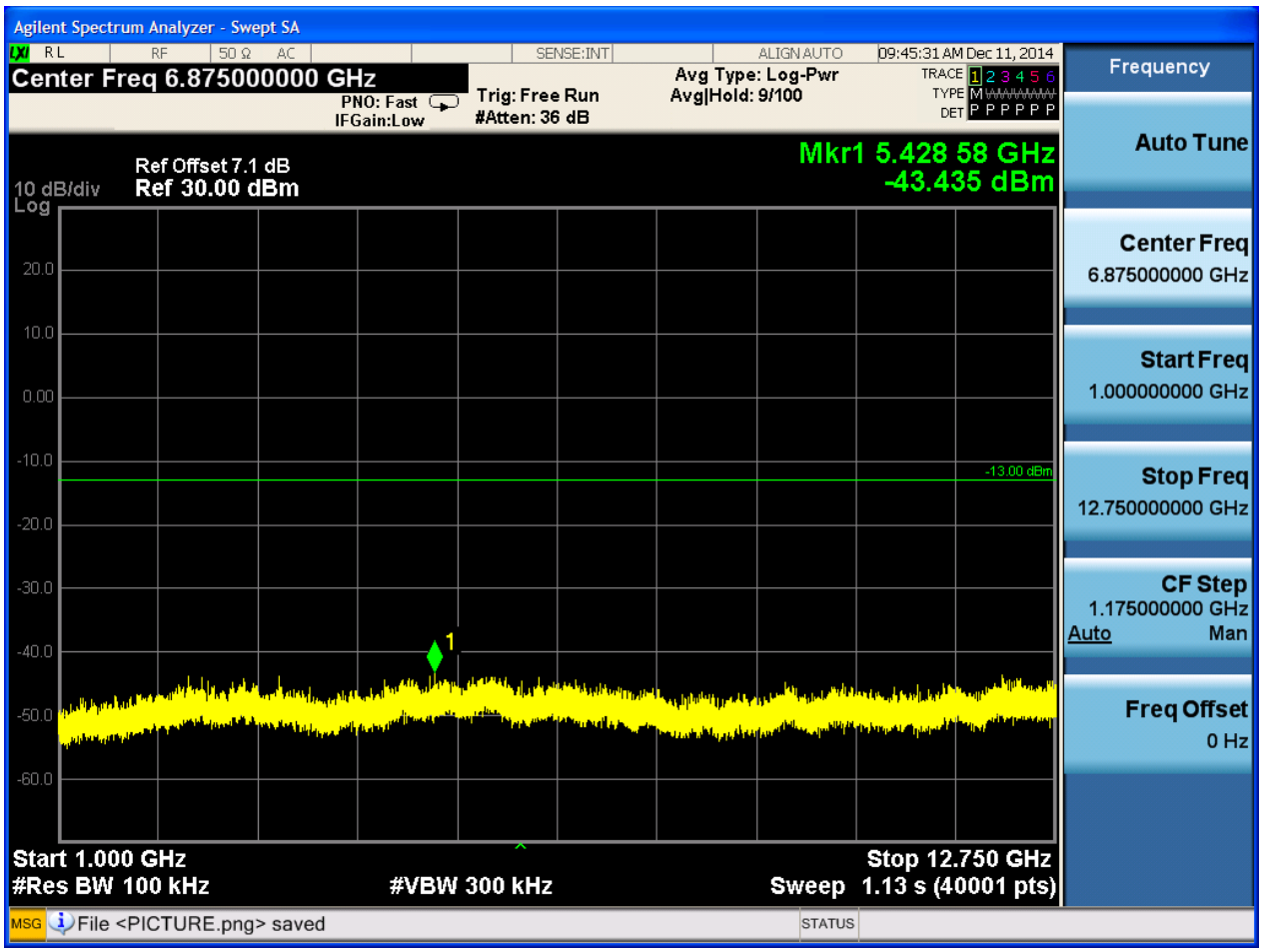

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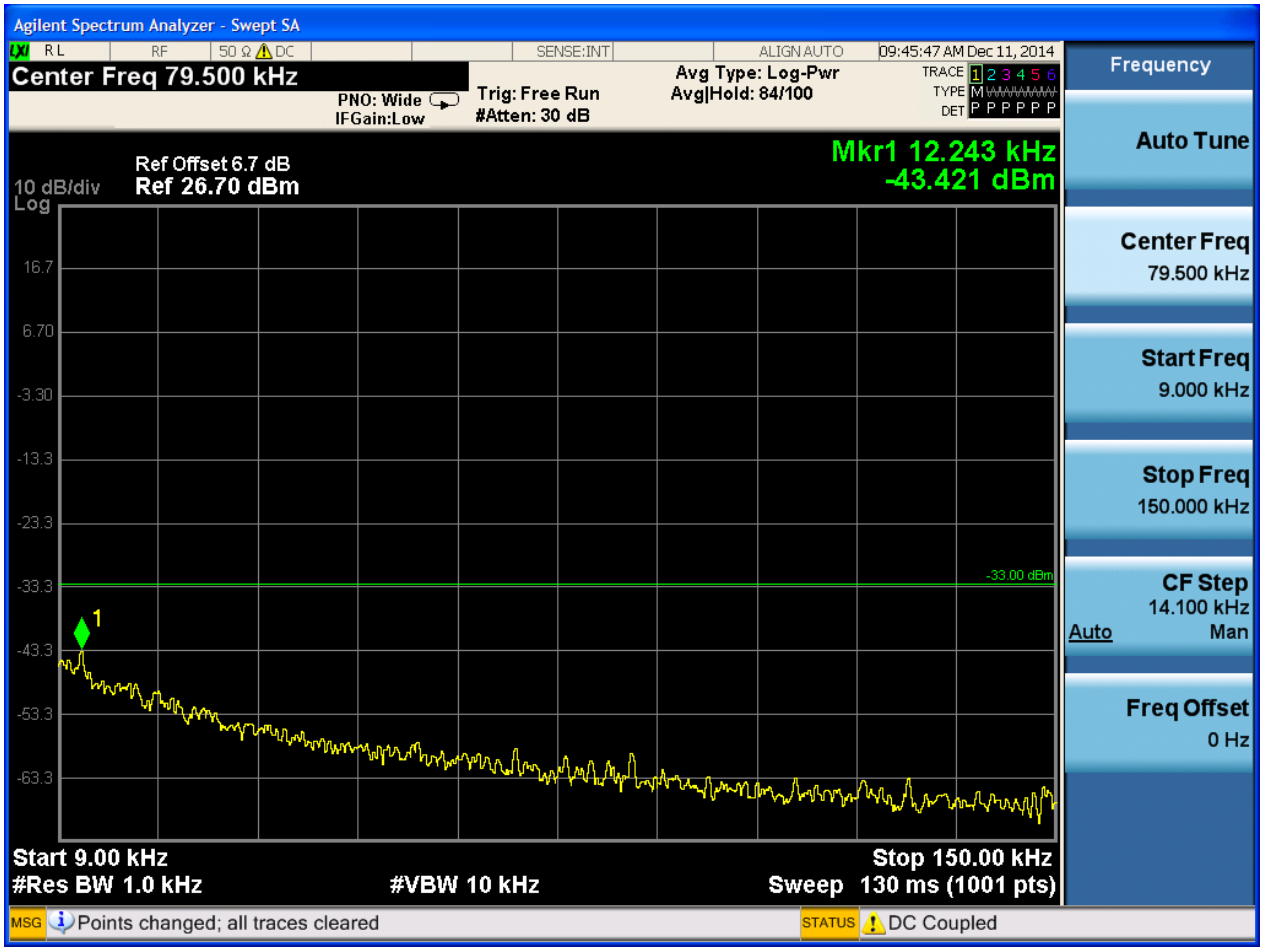
6.2.1.1.3 Test Channel = HCH



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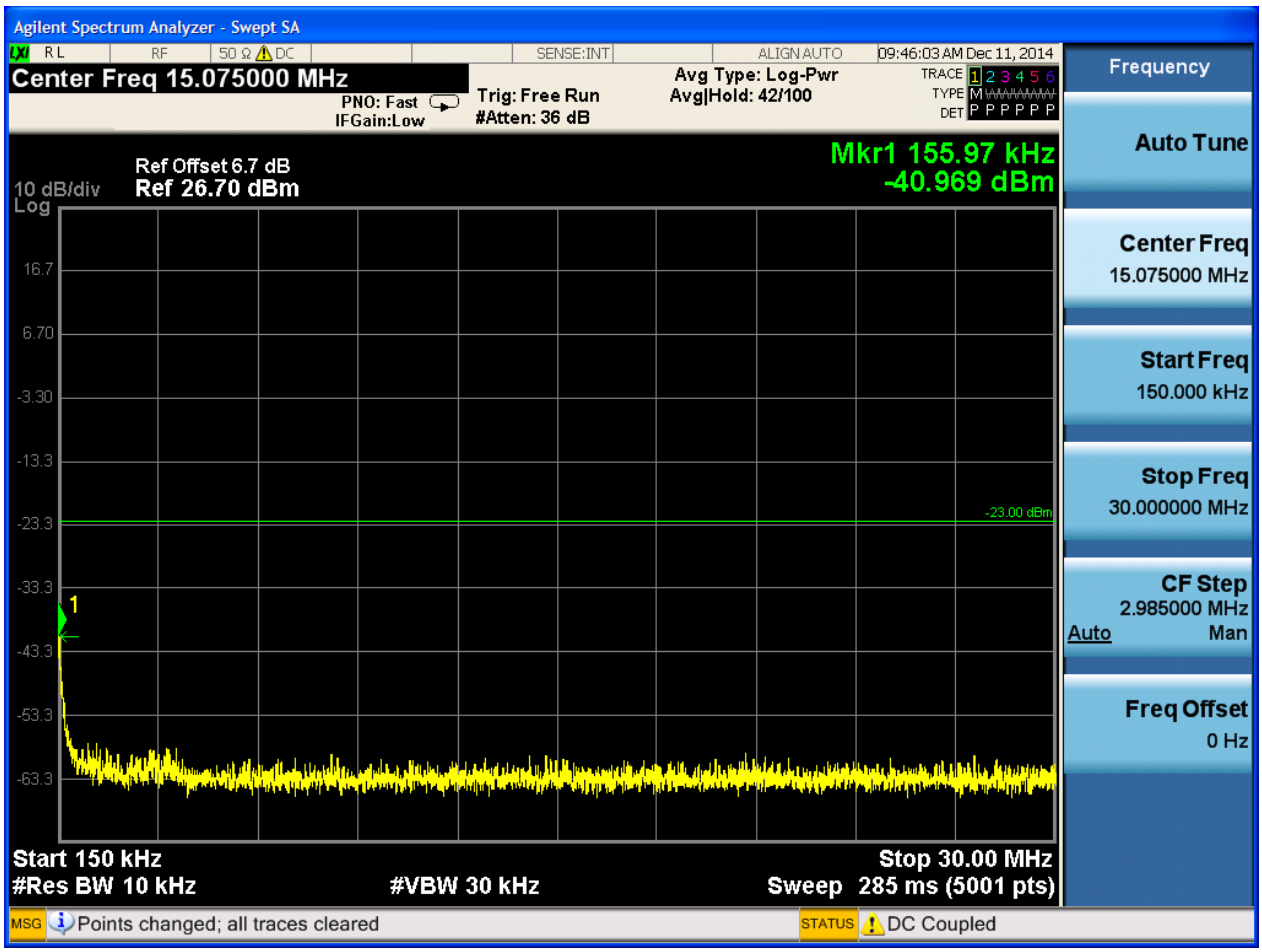

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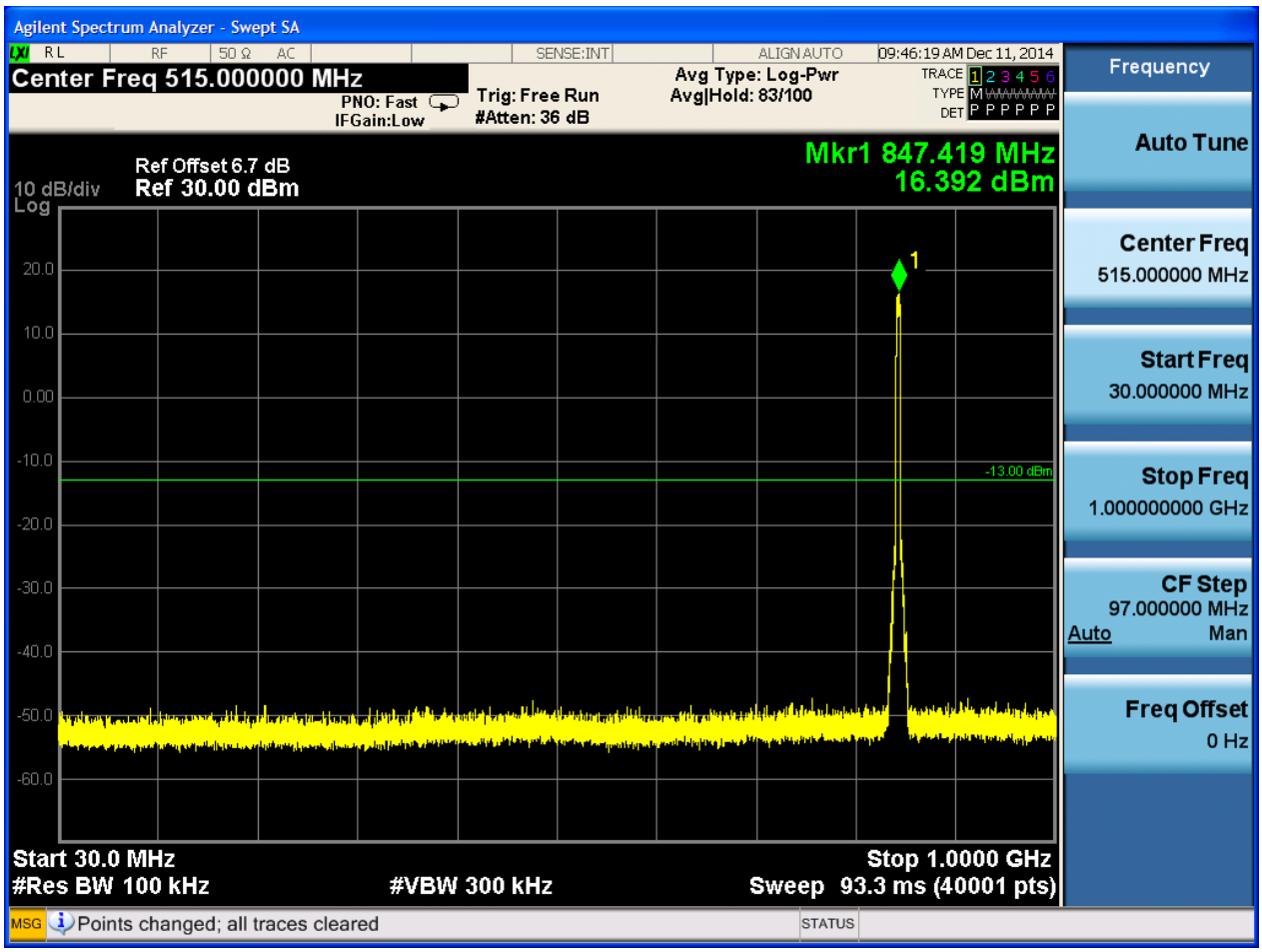

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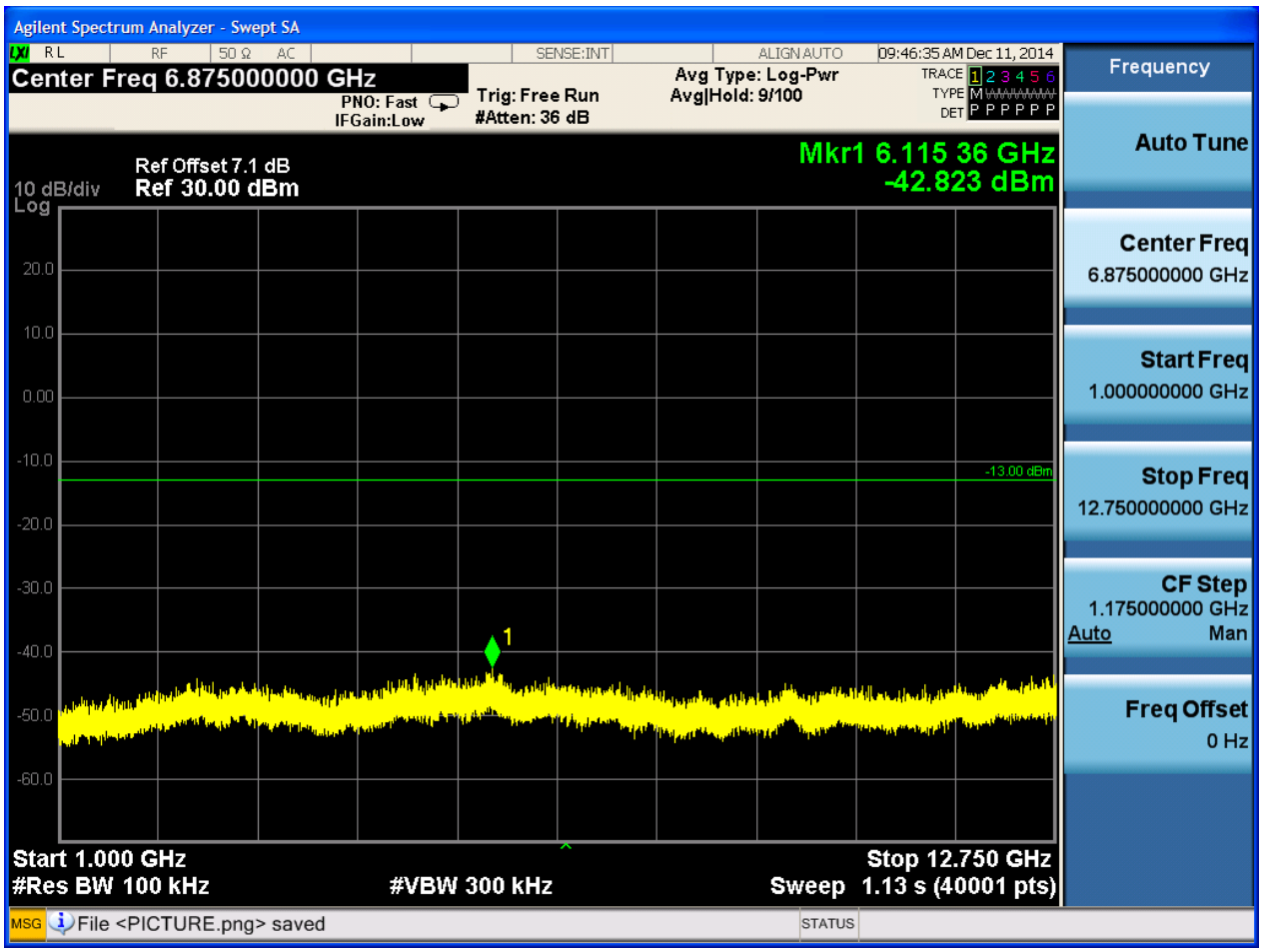

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7Appendix_G: Field Strength of Spurious Radiation

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

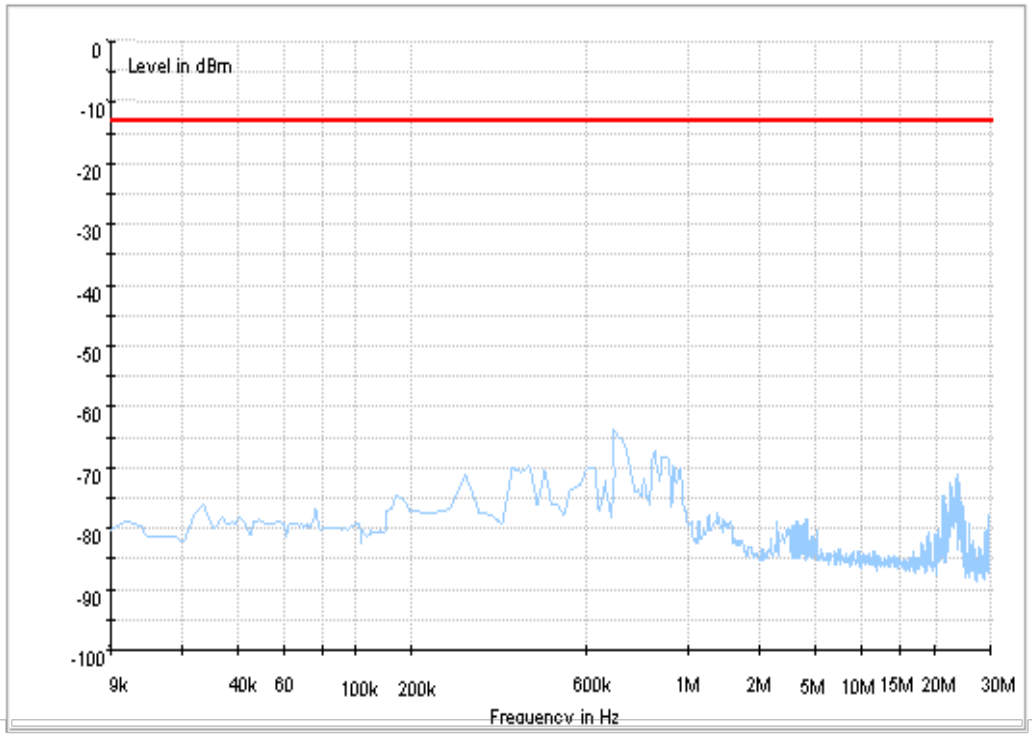
Above 1GHz, RBW = 1 MHz, VBW = 3 MHz. Detector: PK

Part I - Test Plots

7.1 For GSM

7.1.1 Test Band = GSM850

7.1.1.1 Test Mode = GSM/TM1



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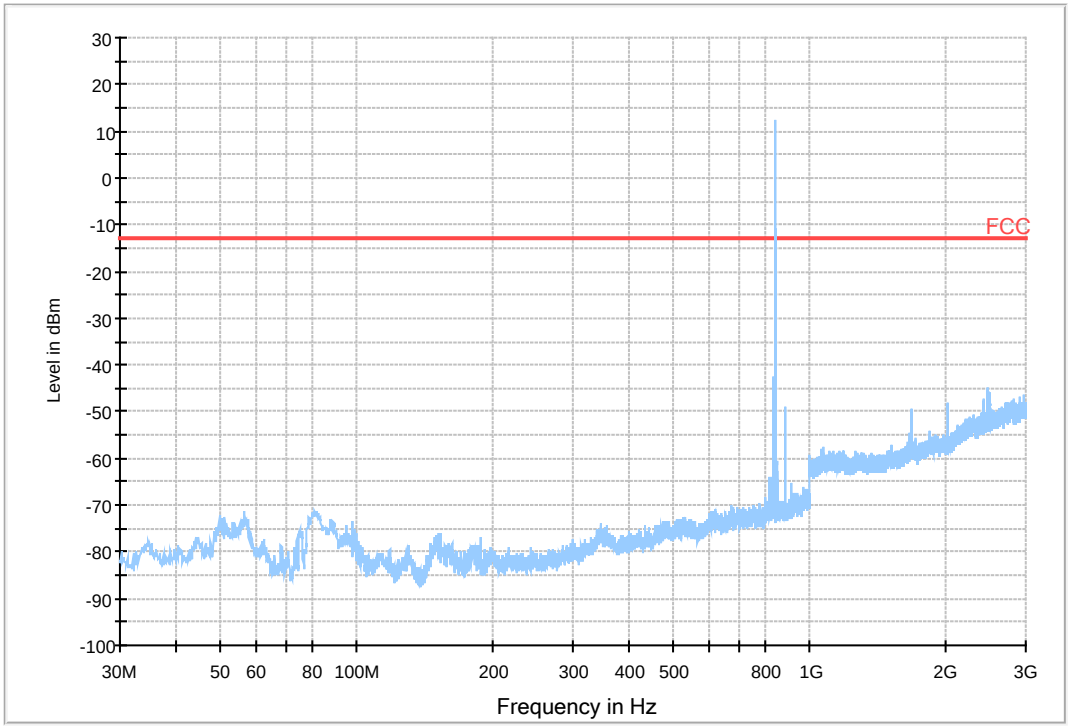
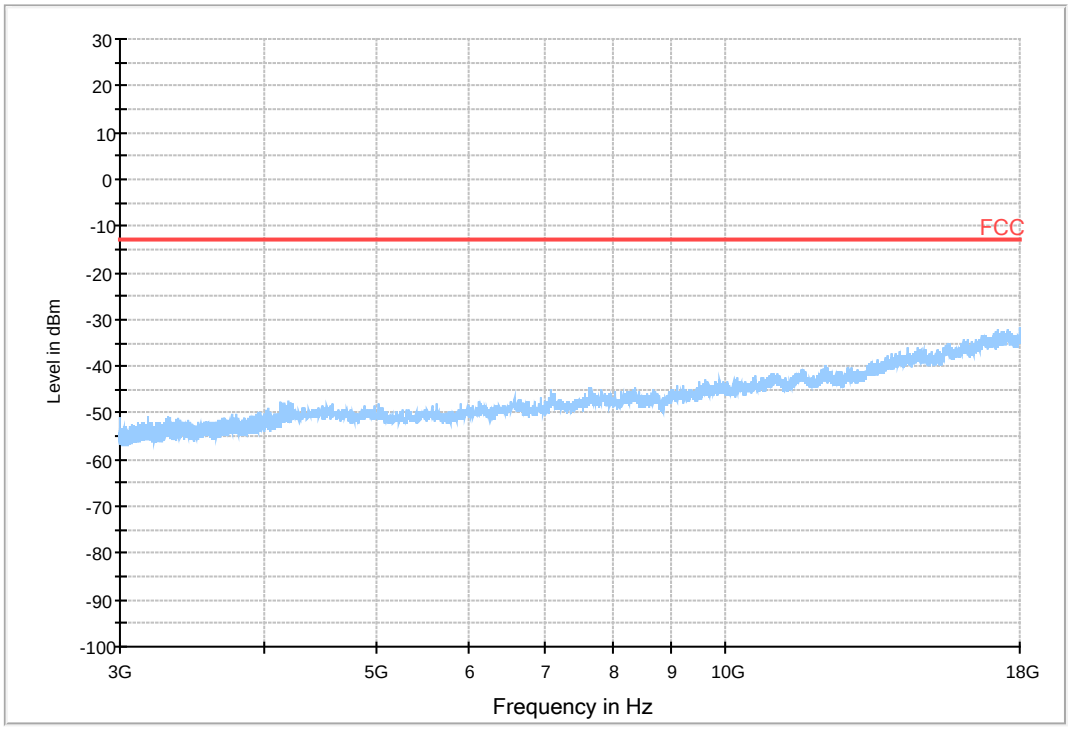
Copy of FCC PART22 GSM850_L



Copy of FCC PART22 GSM850_H



7.1.1.2 Test Mode = GSM/TM2

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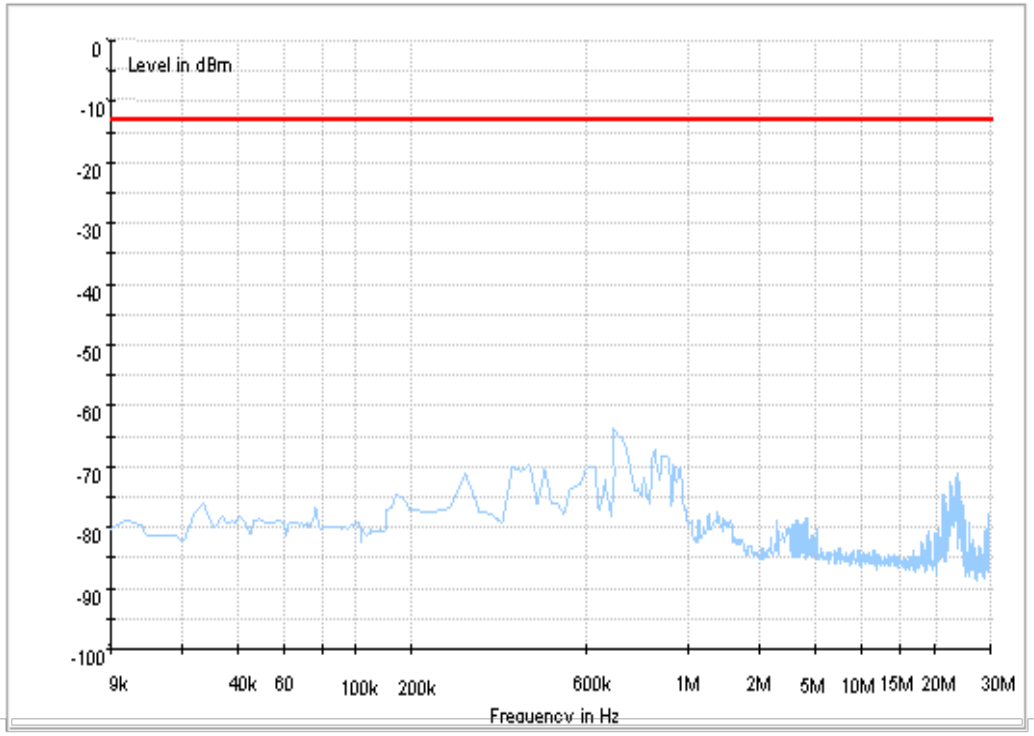

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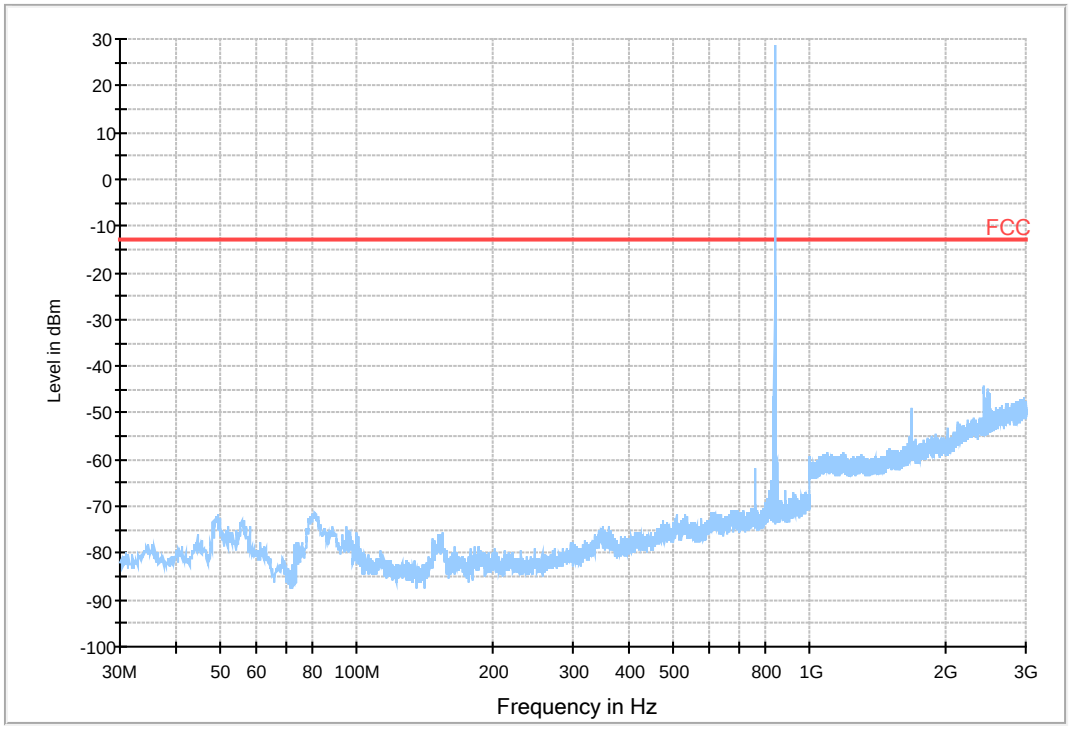

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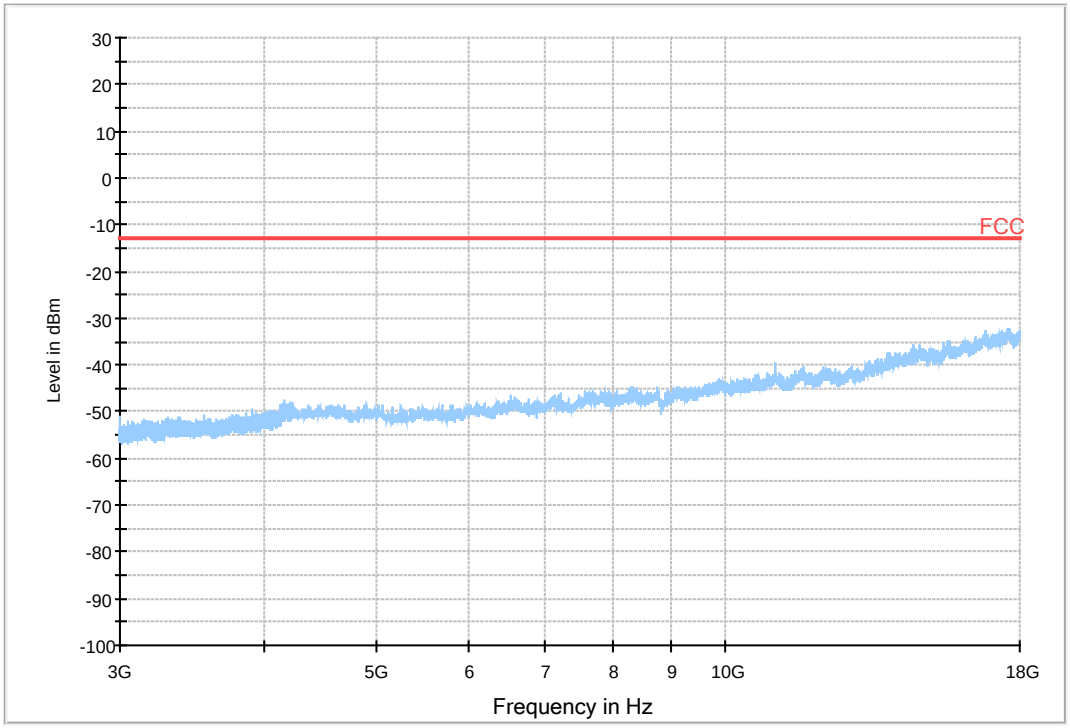
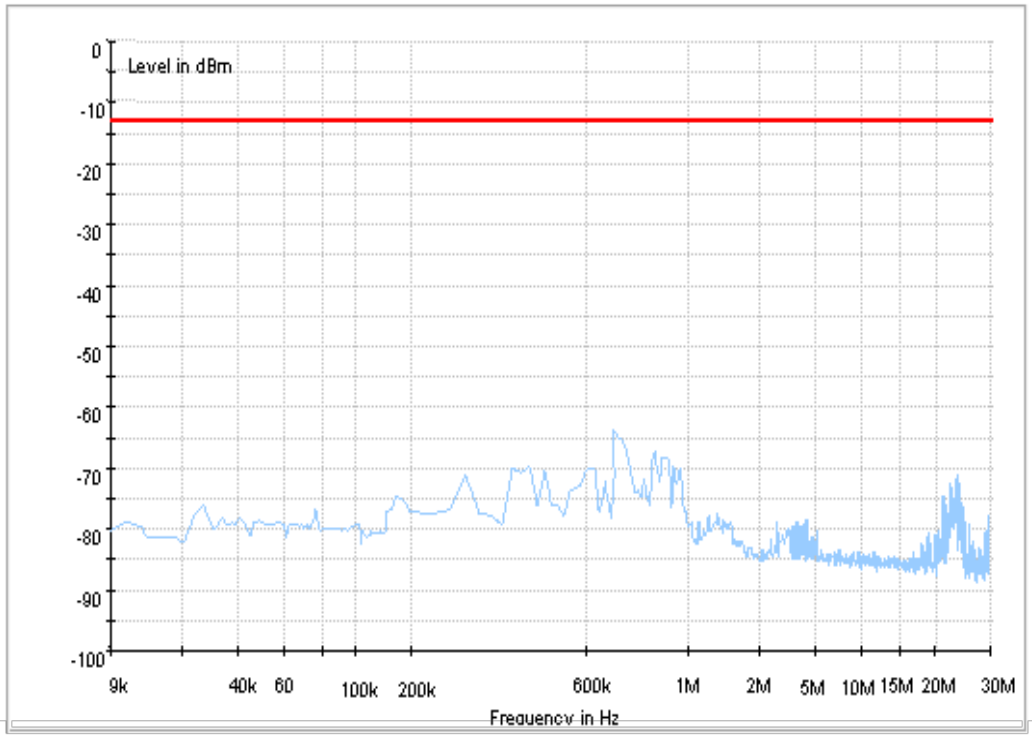


7.1.2 Test Band = GSM1900

7.1.2.1 Test Mode = GSM/TM1



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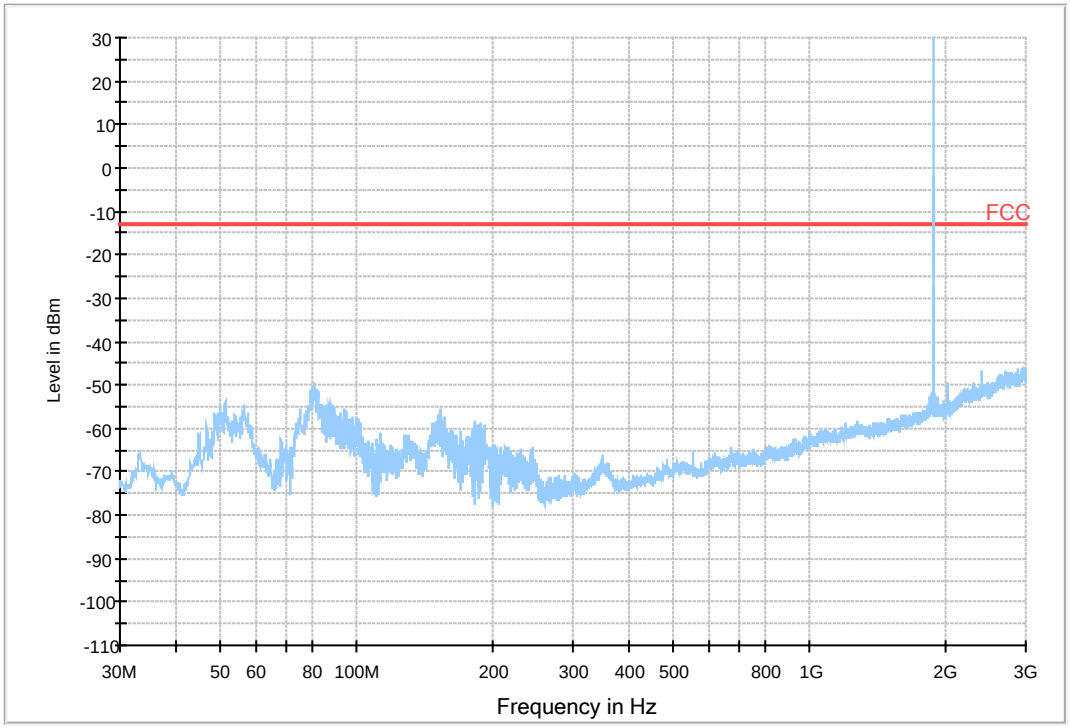
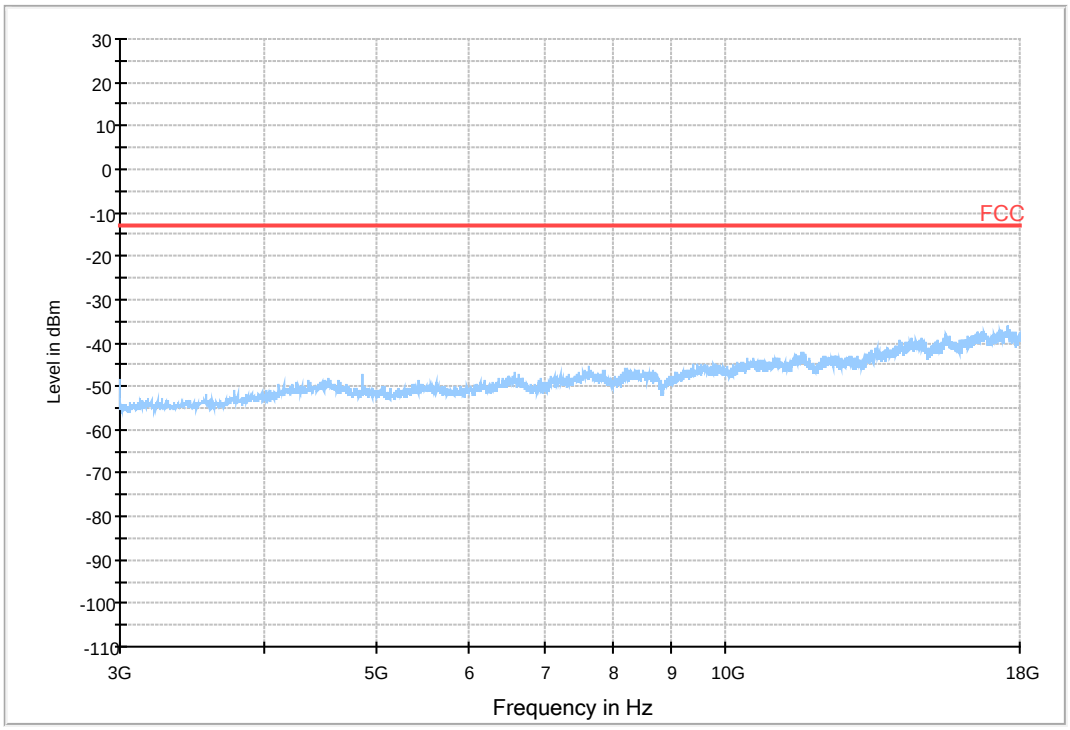
Copy of FCC PART24 GSM1900_L



Copy of FCC PART24 GSM1900_H



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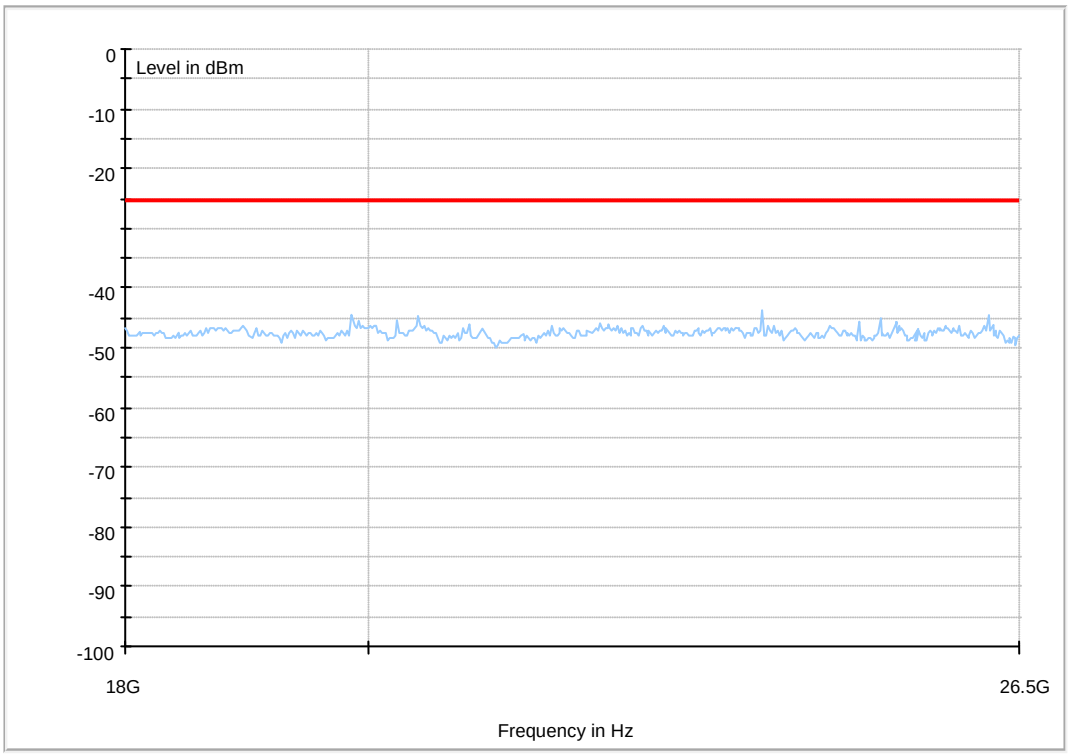
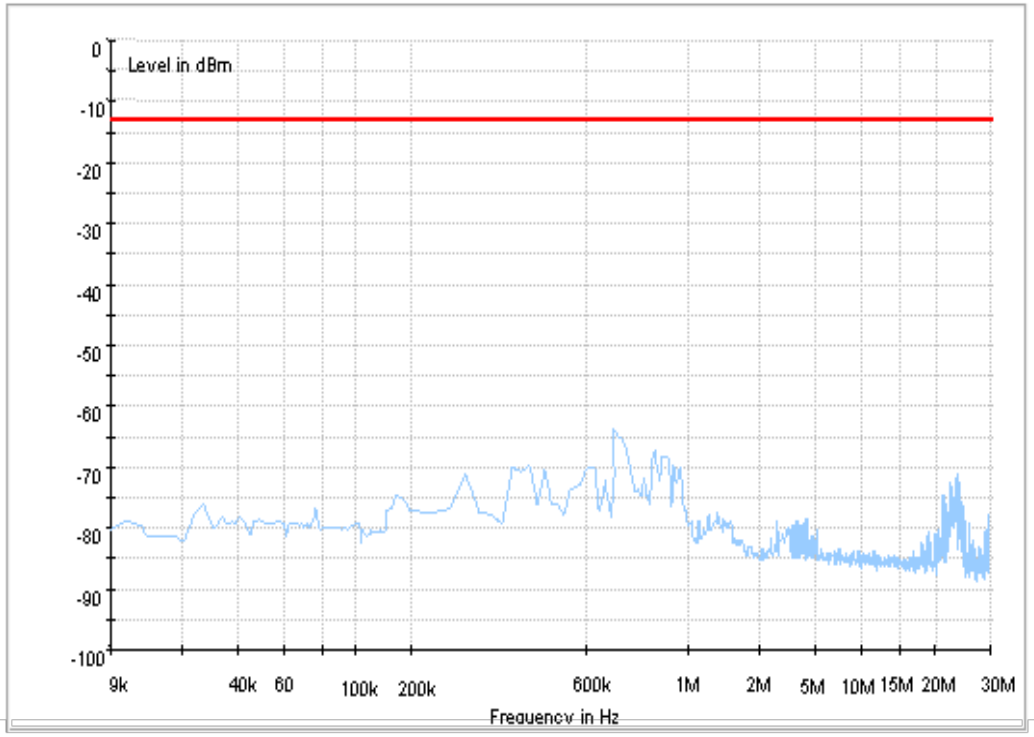


7.1.2.2 Test Mode = GSM/TM2



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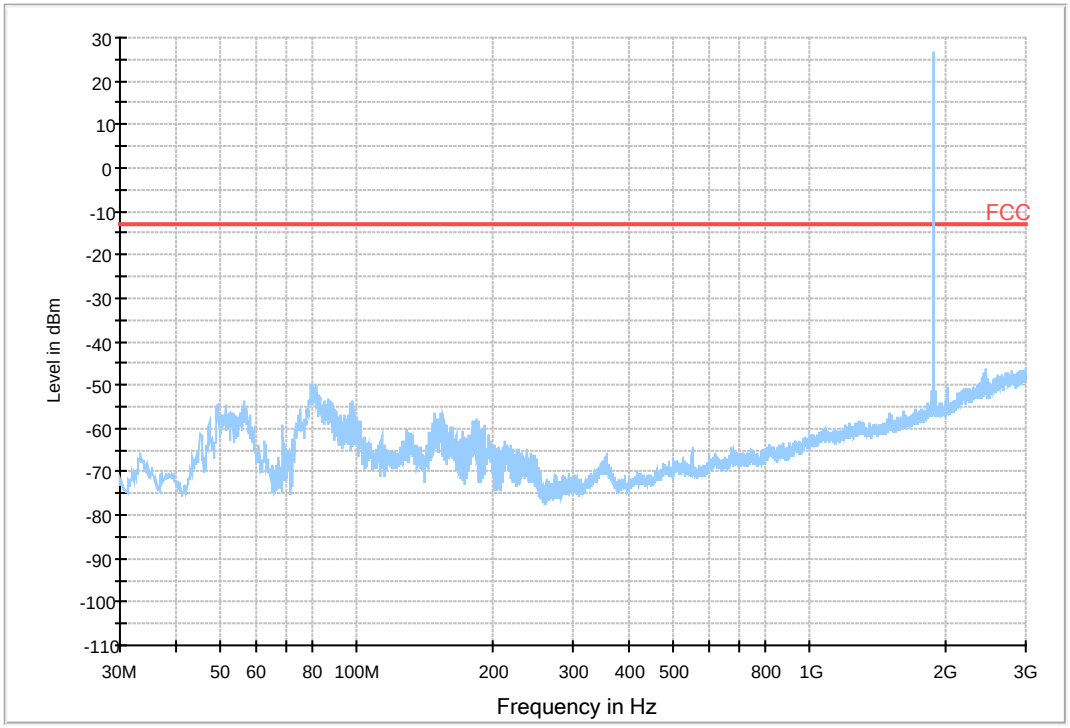

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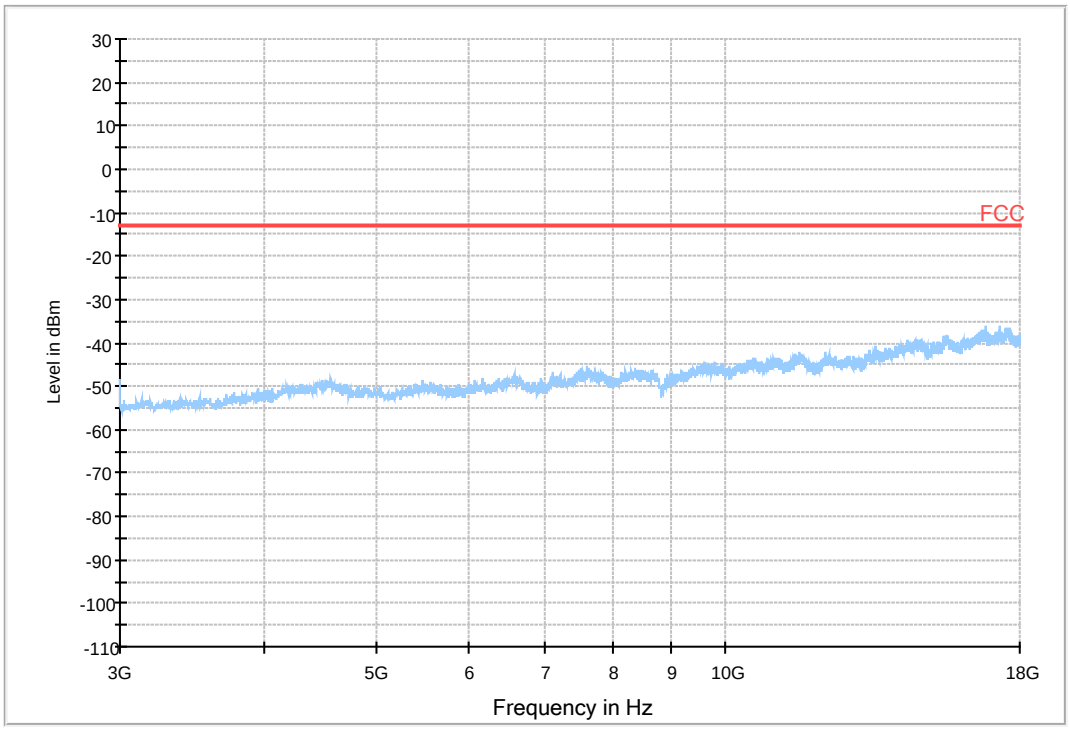

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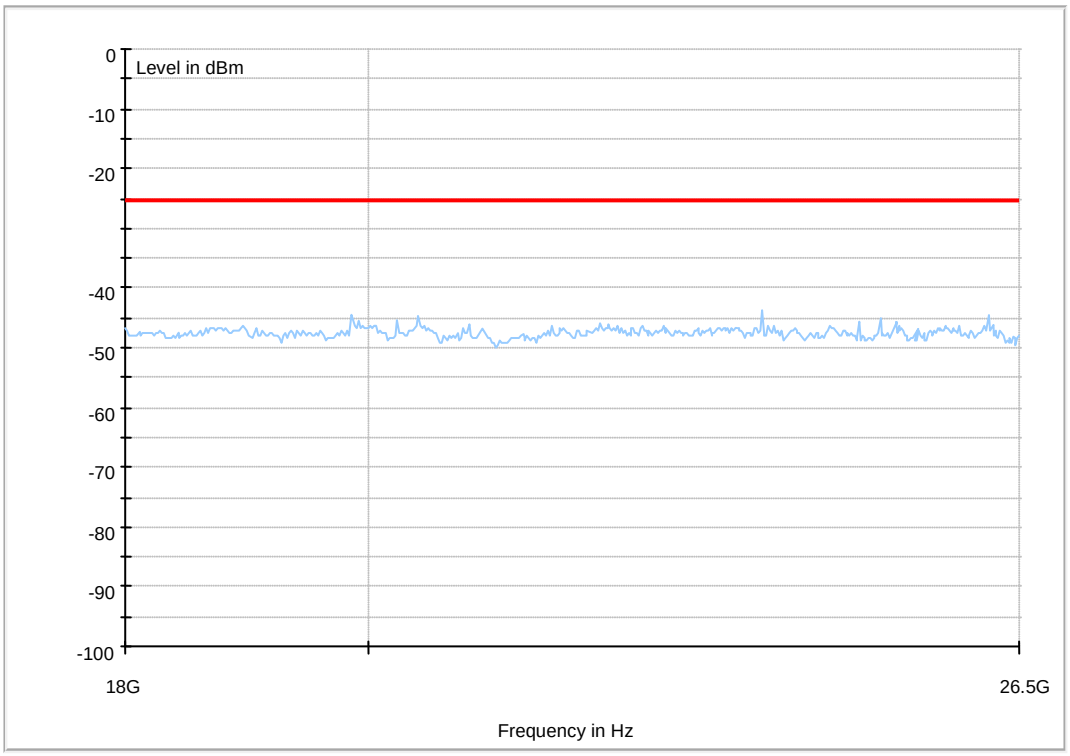

7.2 For UMTS

7.2.1 Test Band = WCDMA850

7.2.1.1 Test Mode = UMTS/TM1

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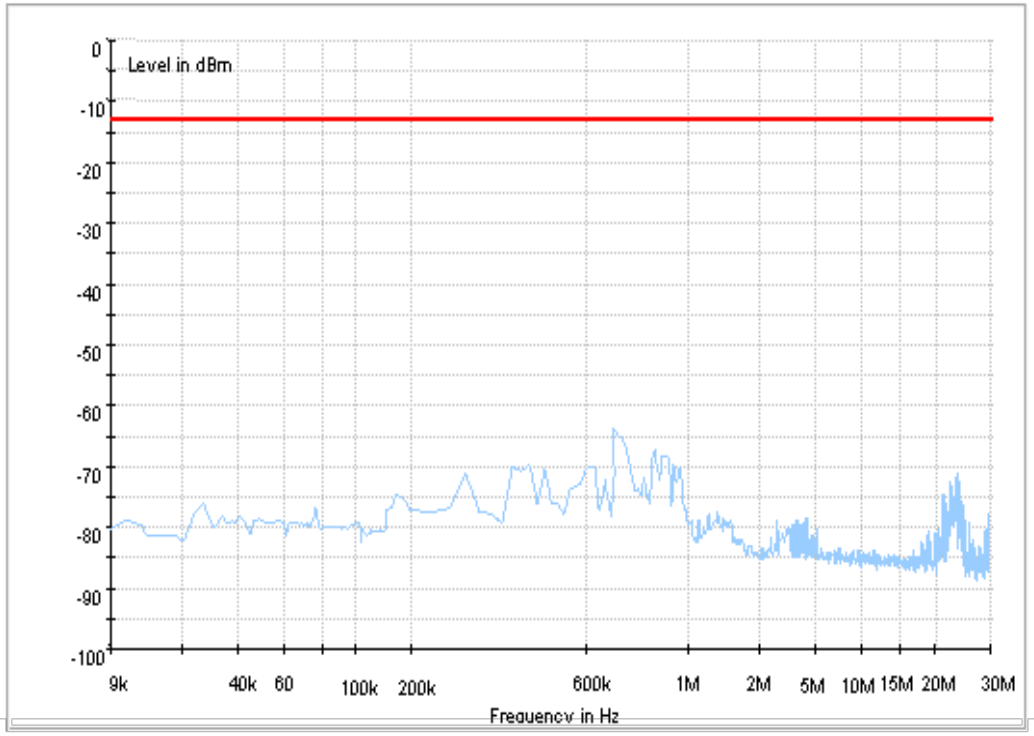

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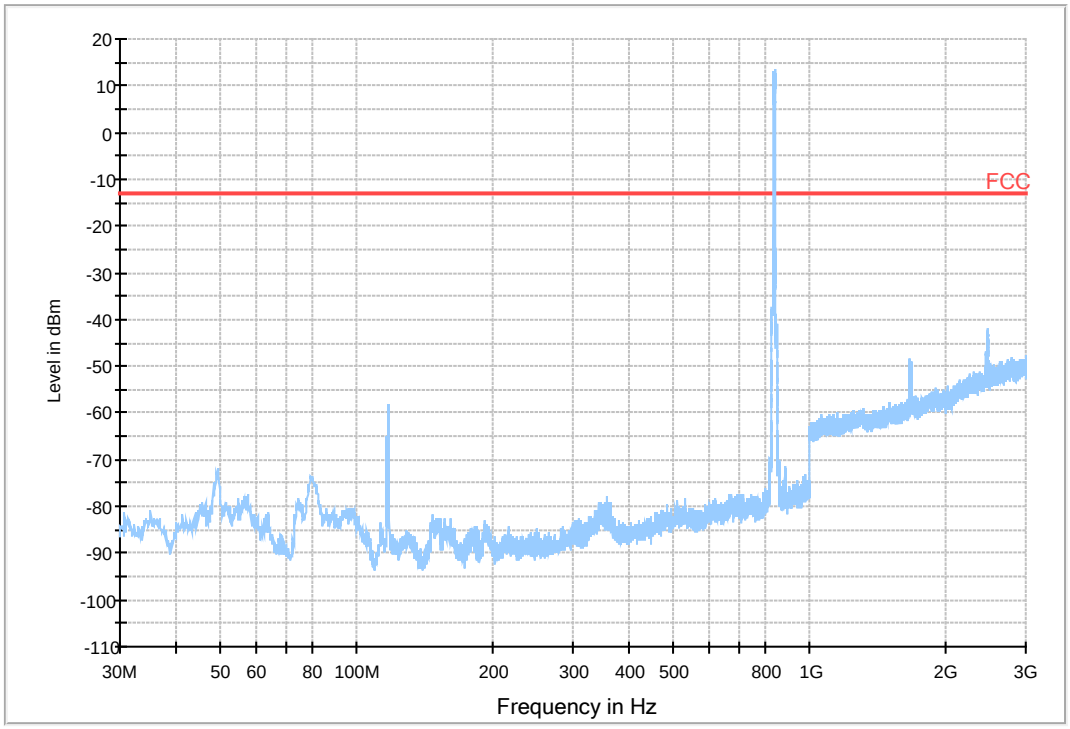

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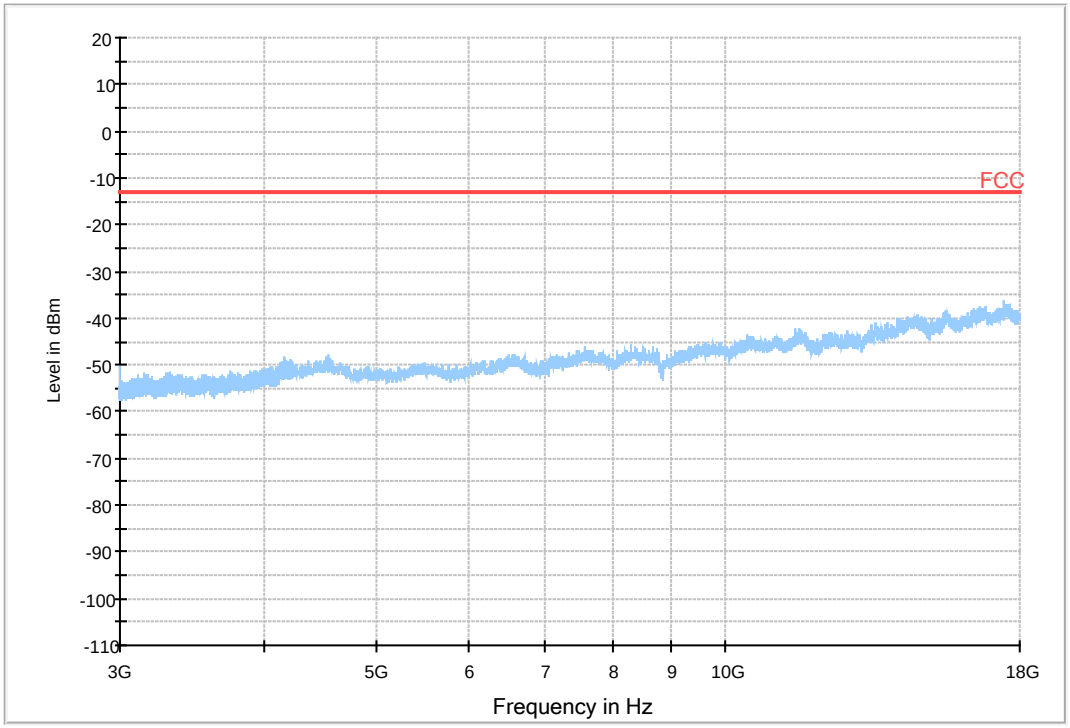

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8Appendix_H: Frequency Stability

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	-11.88	-0.01441	PASS
				VN	-12.40	-0.01504	PASS
				VH	-9.36	-0.01136	PASS
		MCH	TN	VL	-8.46	-0.01011	PASS
				VN	-9.23	-0.01103	PASS
				VH	-9.49	-0.01134	PASS
		HCH	TN	VL	-6.46	-0.00761	PASS
				VN	-5.29	-0.00623	PASS
				VH	-8.78	-0.01034	PASS
	GSM/TM2	LCH	TN	VL	-11.43	-0.01387	PASS
				VN	-18.82	-0.02283	PASS
				VH	-19.47	-0.02362	PASS
		MCH	TN	VL	-22.60	-0.02701	PASS
				VN	-6.78	-0.0081	PASS
				VH	-16.92	-0.02022	PASS
		HCH	TN	VL	-21.83	-0.02572	PASS
				VN	-12.53	-0.01476	PASS
				VH	-23.50	-0.02769	PASS
GSM1900	GSM/TM1	LCH	TN	VL	2.07	0.00112	PASS
				VN	3.87	0.00209	PASS
				VH	-0.39	-0.00021	PASS
		MCH	TN	VL	12.20	0.00649	PASS
				VN	9.88	0.00526	PASS
				VH	9.04	0.00481	PASS
		HCH	TN	VL	-0.58	-0.0003	PASS
				VN	-0.26	-0.00014	PASS
				VH	-6.26	-0.00328	PASS
	GSM/TM2	LCH	TN	VL	-12.27	-0.00663	PASS
				VN	-4.58	-0.00248	PASS
				VH	-1.45	-0.00078	PASS

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Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
		MCH	TN	VL	4.62	0.00246	PASS
				VN	3.94	0.0021	PASS
				VH	-2.03	-0.00108	PASS
		HCH	TN	VL	-3.81	-0.00199	PASS
				VN	-17.89	-0.00937	PASS
				VH	-13.92	-0.00729	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	-6.59	-0.008	PASS
				-20	-8.33	-0.01011	PASS
				-10	-11.04	-0.01339	PASS
				0	-8.72	-0.01058	PASS
				10	-7.62	-0.00925	PASS
				20	-5.49	-0.00666	PASS
				30	-8.65	-0.0105	PASS
				40	-8.33	-0.01011	PASS
				50	-8.39	-0.01018	PASS
		MCH	VN	-30	-9.49	-0.01134	PASS
				-20	-10.65	-0.01273	PASS
				-10	-9.62	-0.0115	PASS
				0	-5.68	-0.00679	PASS
				10	-7.88	-0.00942	PASS
				20	-6.72	-0.00803	PASS
				30	-4.91	-0.00587	PASS
				40	-4.78	-0.00571	PASS
				50	-3.75	-0.00448	PASS
		HCH	VN	-30	-7.43	-0.00875	PASS
				-20	-5.55	-0.00654	PASS
				-10	-10.46	-0.01232	PASS
				0	-8.65	-0.01019	PASS
				10	-9.36	-0.01103	PASS
				20	-7.94	-0.00935	PASS
				30	-9.10	-0.01072	PASS
				40	-8.01	-0.00944	PASS
				50	-8.27	-0.00974	PASS
	GSM/TM2	LCH	VN	-30	-18.63	-0.0226	PASS
				-20	-13.14	-0.01594	PASS

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Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				-10	-15.27	-0.01853	PASS
				0	-14.46	-0.01754	PASS
				10	-8.98	-0.0109	PASS
				20	-12.01	-0.01457	PASS
				30	-17.72	-0.0215	PASS
				40	-16.89	-0.02049	PASS
				50	-18.60	-0.02257	PASS
		MCH	VN	-30	-9.98	-0.01193	PASS
				-20	-20.53	-0.02454	PASS
				-10	-24.18	-0.0289	PASS
				0	-22.99	-0.02748	PASS
				10	-24.76	-0.0296	PASS
				20	-15.98	-0.0191	PASS
				30	-20.02	-0.02393	PASS
				40	-17.40	-0.0208	PASS
				50	-21.92	-0.0262	PASS
		HCH	VN	-30	-14.53	-0.01712	PASS
				-20	-15.72	-0.01852	PASS
				-10	-15.79	-0.0186	PASS
				0	-18.76	-0.0221	PASS
				10	-13.59	-0.01601	PASS
				20	-15.88	-0.01871	PASS
				30	-14.01	-0.01651	PASS
				40	-14.92	-0.01758	PASS
				50	-8.27	-0.00974	PASS
GSM1900	GSM/TM1	LCH	VN	-30	8.20	0.00443	PASS
				-20	3.75	0.00203	PASS
				-10	0.71	0.00038	PASS
				0	0.26	0.00014	PASS
				10	8.14	0.0044	PASS
				20	6.01	0.00325	PASS
				30	1.81	0.00098	PASS
				40	1.03	0.00056	PASS
				50	4.65	0.00251	PASS
		MCH	VN	-30	7.36	0.00391	PASS
				-20	8.98	0.00478	PASS
				-10	7.43	0.00395	PASS
				0	12.59	0.0067	PASS
				10	8.07	0.00429	PASS
				20	10.33	0.00549	PASS

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Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				30	10.07	0.00536	PASS
				40	12.20	0.00649	PASS
				50	11.30	0.00601	PASS
		HCH	VN	-30	4.97	0.0026	PASS
				-20	3.94	0.00206	PASS
				-10	-0.97	-0.00051	PASS
				0	-1.23	-0.00064	PASS
				10	-3.03	-0.00159	PASS
				20	-3.49	-0.00183	PASS
				30	0.32	0.00017	PASS
				40	3.10	.00162	PASS
				50	3.10	0.00162	PASS
	GSM/TM2	LCH	VN	-30	-11.07	-0.00598	PASS
				-20	-6.01	-0.00325	PASS
				-10	-7.30	-0.00395	PASS
				0	-5.23	-0.00283	PASS
				10	-10.17	-0.0055	PASS
				20	-5.75	-0.00311	PASS
				30	-8.39	-0.00453	PASS
				40	1.58	0.00085	PASS
				50	-4.13	-0.00223	PASS
		MCH	VN	-30	3.20	0.0017	PASS
				-20	3.75	0.00199	PASS
				-10	0.97	0.00052	PASS
				0	5.20	0.00277	PASS
				10	-3.00	-0.0016	PASS
				20	3.55	0.00189	PASS
				30	-1.87	-0.00099	PASS
				40	5.59	0.00297	PASS
				50	-0.13	-0.00007	PASS
		HCH	VN	-30	-16.56	-0.00867	PASS
				-20	-15.30	-0.00801	PASS
				-10	-14.95	-0.00783	PASS
				0	-1.74	-0.00091	PASS
				10	-23.67	-0.01239	PASS
				20	-15.53	-0.00813	PASS
				30	-22.76	-0.01192	PASS
				40	-21.70	-0.01136	PASS
				50	-19.79	-0.01036	PASS

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8.2 For UMTS

8.2.1Frequency 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	-2.21	-0.00267	PASS
				VN	-4.59	-0.00555	PASS
				VH	-1.45	-0.00175	PASS
		MCH	TN	VL	-0.89	-0.00106	PASS
				VN	1.71	0.00204	PASS
				VH	-0.90	-0.00108	PASS
		HCH	TN	VL	-7.10	-0.00839	PASS
				VN	-2.27	-0.00268	PASS
				VH	0.70	0.00083	PASS

8.2.2Frequency 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	1.21	0.00146	PASS
				-20	2.64	0.00319	PASS
				-10	3.25	0.00393	PASS
				0	4.52	0.00547	PASS
				10	6.65	0.00805	PASS
				20	-0.23	-0.00028	PASS
				30	-5.48	-0.00663	PASS
				40	-1.25	-0.00151	PASS
				50	0.12	0.00015	PASS
		MCH	VN	-30	-12.71	-0.0152	PASS
				-20	-0.29	-0.00035	PASS
				-10	-3.34	-0.00399	PASS
				0	-1.40	-0.00167	PASS
				10	-5.43	-0.00649	PASS
				20	3.77	0.00451	PASS
				30	2.11	0.00252	PASS
				40	2.06	0.00246	PASS
				50	2.30	0.00275	PASS
		HCH	VN	-30	3.14	0.00371	PASS
				-20	0.52	0.00061	PASS
				-10	-2.66	-0.00314	PASS
				0	1.91	0.00226	PASS
				10	-2.44	-0.00288	PASS

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Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				20	-4.78	-0.00565	PASS
				30	0.49	0.00058	PASS
				40	3.13	0.0037	PASS
				50	-1.10	-0.0013	PASS

END

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