Appendix for Test report

Huawei Proprietary and Confidential
Copyright © Huawei Technologies Co., Ltd.

APPENDIX FOR TEST REPORT 1

1APPENDIX_A: TRANSMIT OUTPUT POWER DATA 3
Part I - Test Results *3*
2APPENDIX_B: PEAK-TO-AVERAGE RATIO 5
Part I - Test Results *5*
3APPENDIX_C: MODULATION CHARACTERISTICS 6
Part I - Test Plots *6*
4APPENDIX_D: BANDWIDTH 10
Part I - Test Results *10*
Part II - Test Plots *11*
5APPENDIX_E: BAND EDGES COMPLIANCE 23
Part I - Test Plots *23*
6APPENDIX_F: SPURIOUS EMISSION AT ANTENNA TERMINAL 31
Part I - Test Plots *31*
7APPENDIX_G: FIELD STRENGTH OF SPURIOUS RADIATION 73
Part I - Test Plots *73*
8APPENDIX_H: FREQUENCY STABILITY 83
8.1.1Frequency Error vs. Voltage: *83*
8.1.2Frequency Error vs. Temperature: *84*
8.2.1Frequency Error vs. Voltage: *86*
8.2.2Frequency Error vs. Temperature: *87*

Huawei Proprietary and Confidential
Copyright © Huawei Technologies Co., Ltd.

1Appendix_A: Transmit Output Power Data

Part I - Test Results

Test Band	Test Mode	Test Channel	Conducted Power [dBm]	ERP [dBm]	Limit [dBm]	Verdict
GSM850	GSM/TM1	LCH	32.15	28.96	38.5	PASS
		MCH	32.21	28.89	38.5	PASS
		HCH	32.24	29.21	38.5	PASS
WCDMA850	UMTS/TM1	LCH	23.61	20.67	38.5	PASS
		MCH	23.67	20.42	38.5	PASS
		HCH	23.44	20.29	38.5	PASS
Test Band	**Test Mode**	**Test Channel**	**Conducted Power [dBm]**	**EIRP [dBm]**	**Limit [dBm]**	**Verdict**
GSM1900	GSM/TM1	LCH	30.11	28.71	33	PASS
		MCH	29.97	28.55	33	PASS
		HCH	29.98	28.62	33	PASS
WCDMA1900	UMTS/TM1	LCH	22.95	21.58	33	PASS
		MCH	23.19	21.76	33	PASS
		HCH	23.06	21.63	33	PASS

Huawei Proprietary and Confidential
Copyright © Huawei Technologies Co., Ltd.

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.

Huawei Proprietary and Confidential
Copyright © Huawei Technologies Co., Ltd.

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	0.14	13	PASS
		HCH	0.14	13	PASS
Test Band	**Test Mode**	**Test Channel**	**Measured[dB]**	**Limit [dB]**	**Verdict**
WCDMA1900	UMTS/TM1	LCH	3.31	13	PASS
		MCH	2.66	13	PASS
		HCH	2.56	13	PASS

Huawei Proprietary and Confidential
Copyright © Huawei Technologies Co., Ltd.

3Appendix_C: Modulation Characteristics

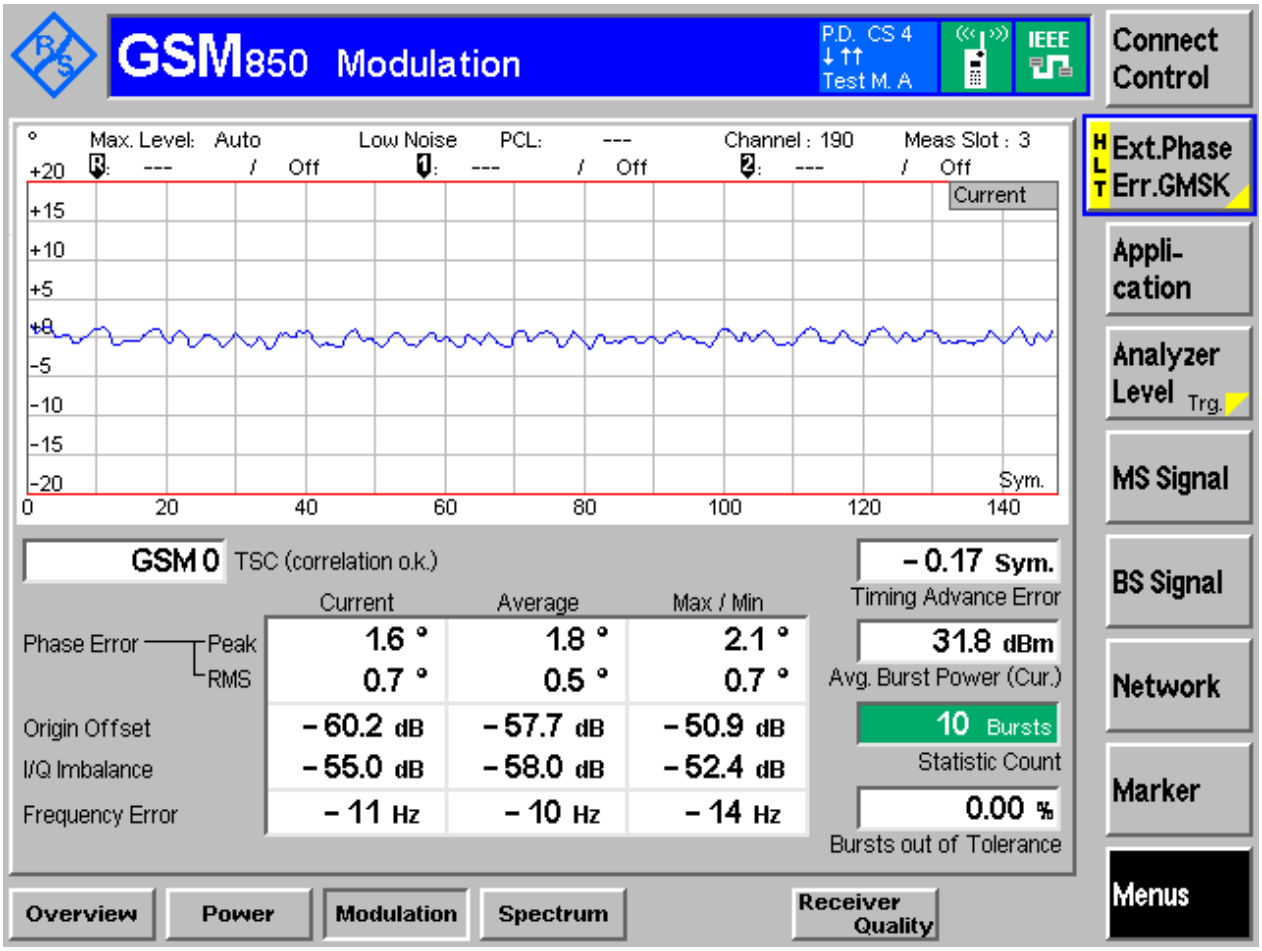
Part I - Test Plots

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

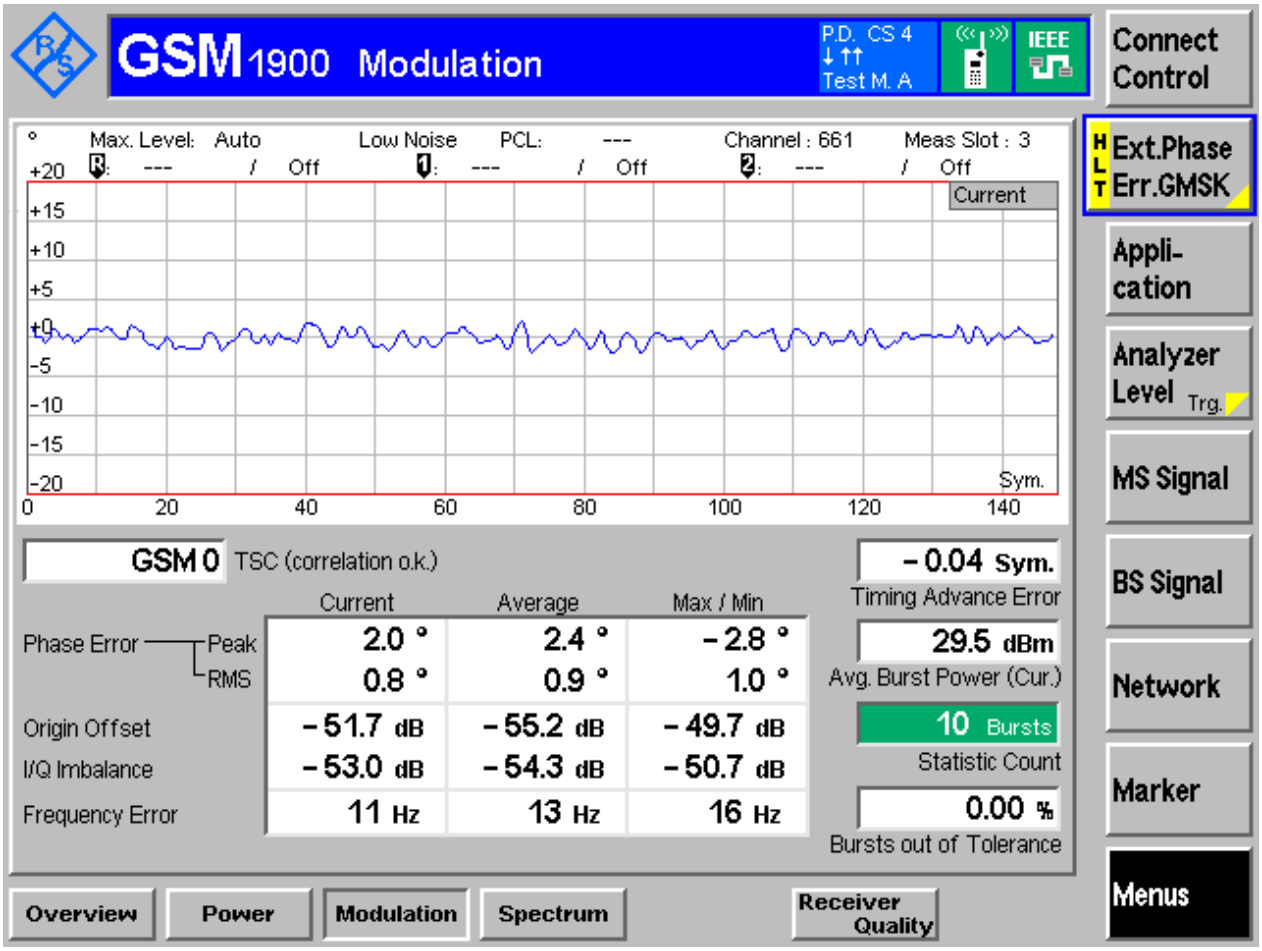


Copyright © Huawei Technologies Co., Ltd.

3.1.2 Test Band = GSM1900

3.1.2.1 Test Mode = GSM/TM1

3.1.2.1.1 Test Channel = MCH



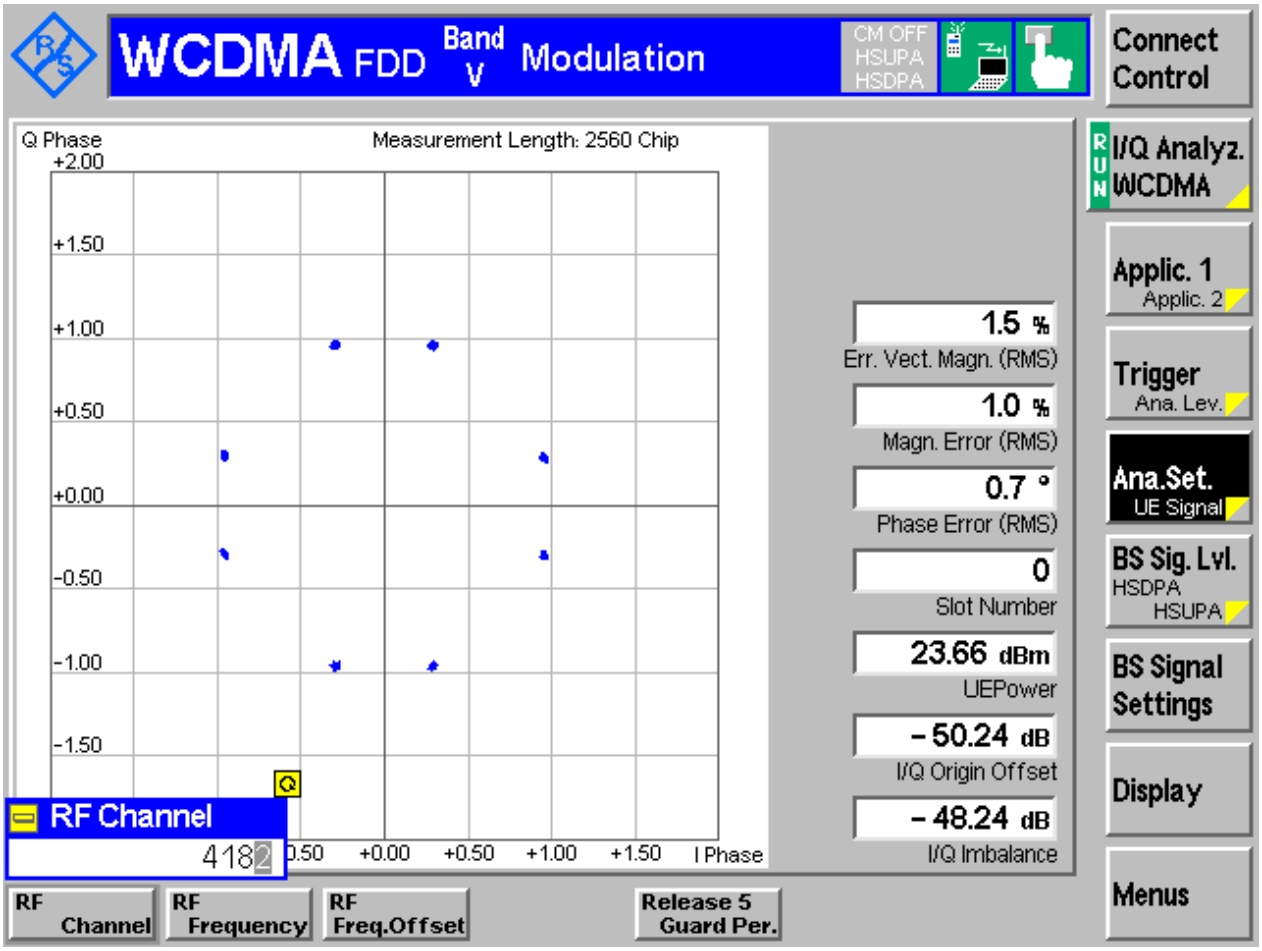
Copyright © Huawei Technologies Co., Ltd.

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

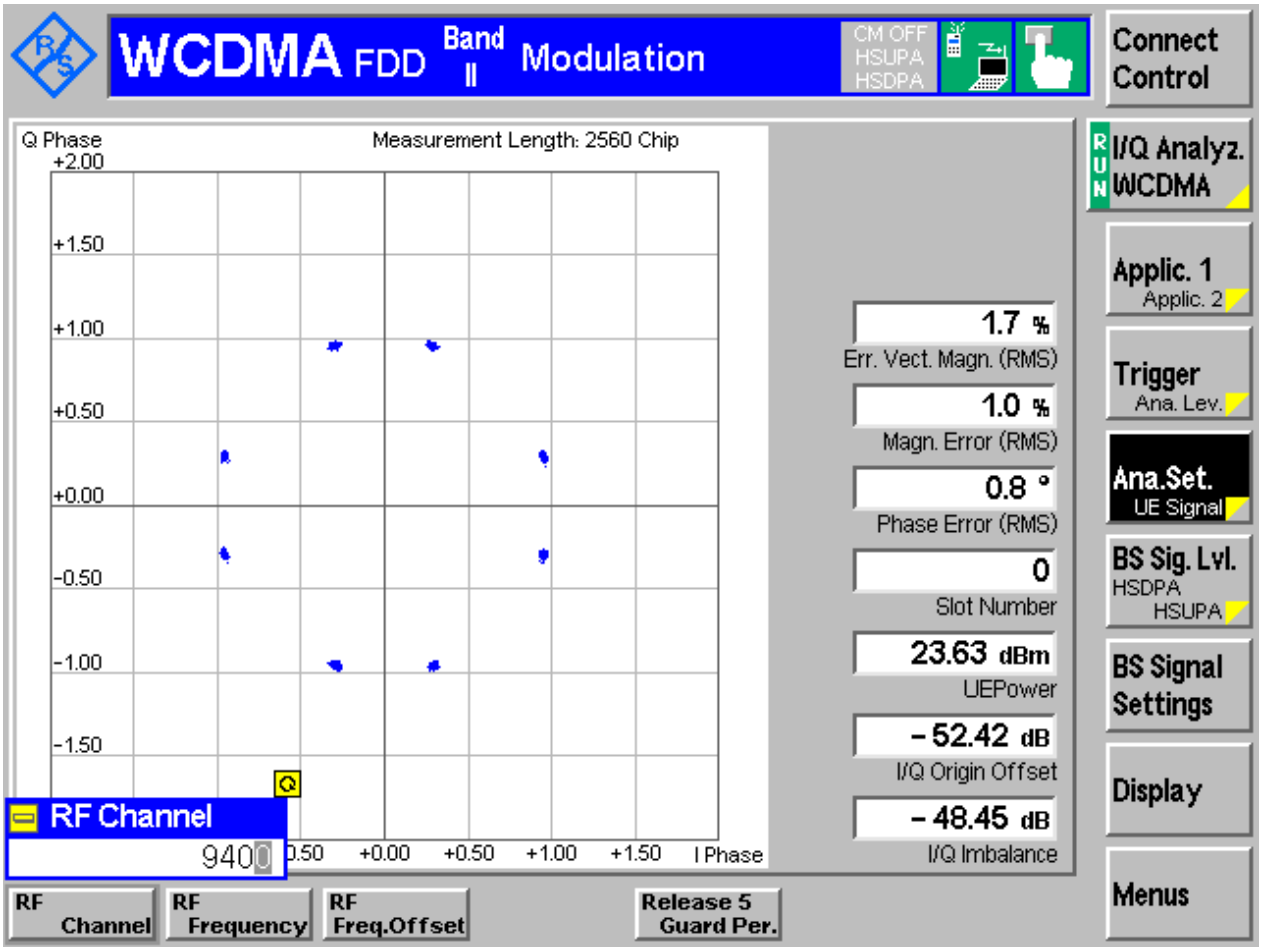


Huawei Proprietary and Confidential
Copyright © Huawei Technologies Co., Ltd.

3.2.2 Test Band = WCDMA1900

3.2.2.1 Test Mode = UMTS/TM1

3.2.2.1.1 Test Channel = MCH



Copyright © Huawei Technologies Co., Ltd.

4Appendix_D: Bandwidth

Part I - Test Results

Test Band	Test Mode	Test Channel	Occupied Bandwidth [kHz]	Emission Bandwidth [kHz]	Verdict
GSM850	GSM/TM1	LCH	245.63	317.00	Pass
		MCH	244.75	321.16	Pass
		HCH	247.53	312.94	Pass
GSM1900	GSM/TM1	LCH	245.54	320.92	Pass
		MCH	247.20	314.33	Pass
		HCH	247.59	318.73	Pass
Test Band	**Test Mode**	**Test Channel**	**Occupied Bandwidth [MHz]**	**Emission Bandwidth [MHz]**	**Verdict**
WCDMA850	UMTS/TM1	LCH	4.17	4.69	Pass
		MCH	4.16	4.69	Pass
		HCH	4.17	4.68	Pass
WCDMA1900	UMTS/TM1	LCH	4.16	4.66	Pass
		MCH	4.16	4.70	Pass
		HCH	4.18	4.68	Pass

Huawei Proprietary and Confidential
Copyright © Huawei Technologies Co., Ltd.

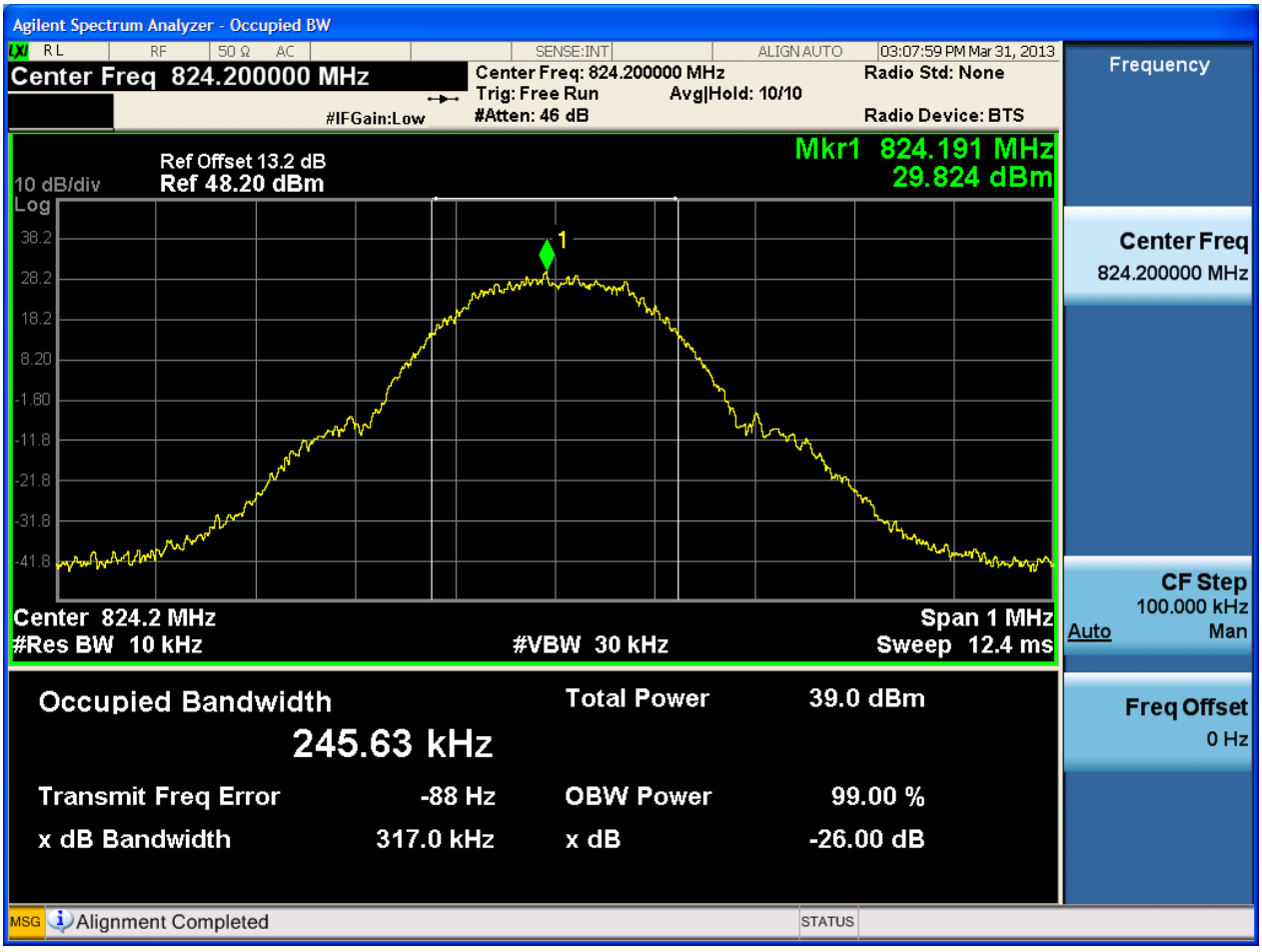
Part II - Test Plots

4.1 For GSM

4.1.1 Test Band = GSM850

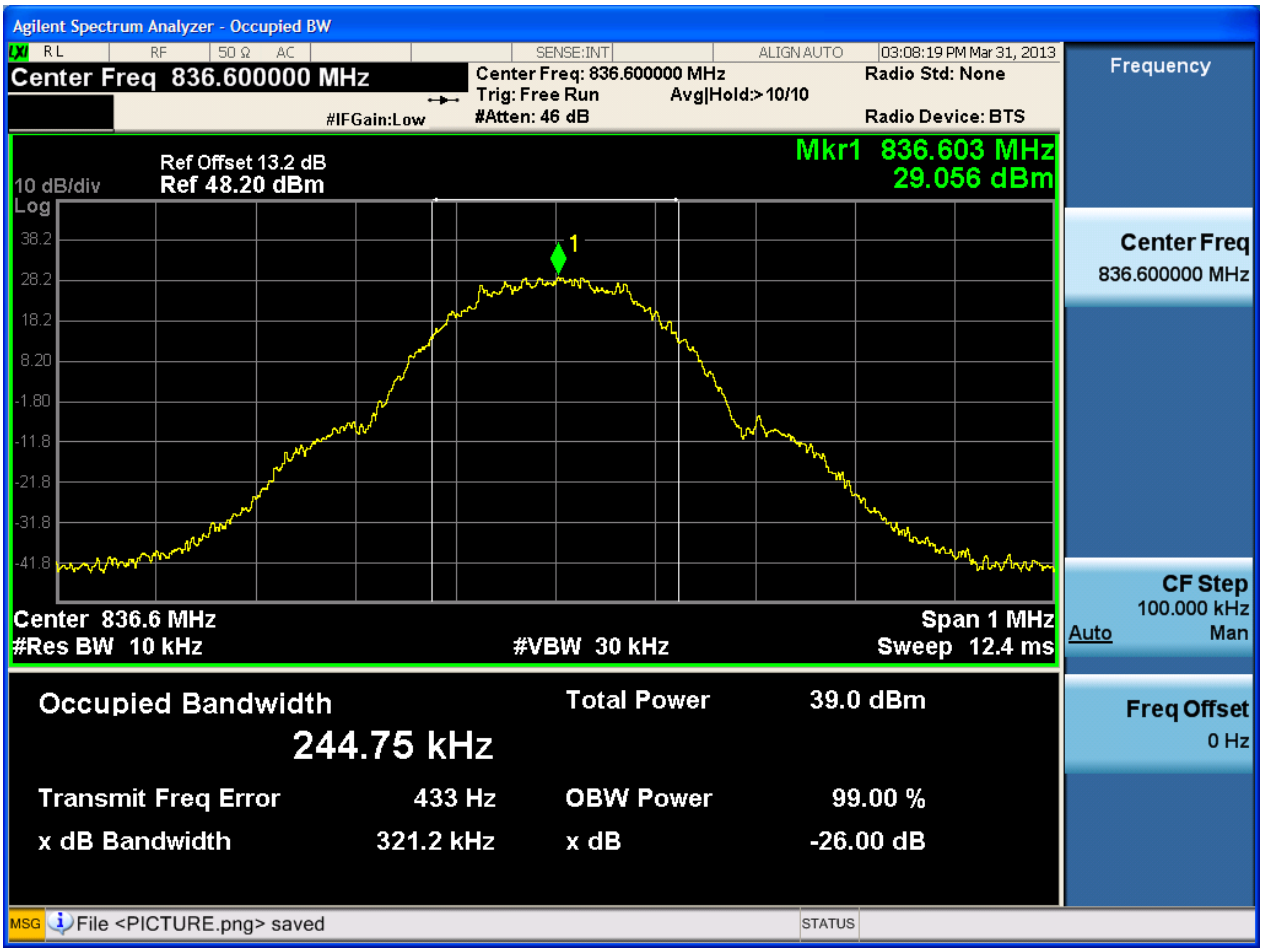
4.1.1.1 Test Mode = GSM/TM1

4.1.1.1.1 Test Channel = LCH



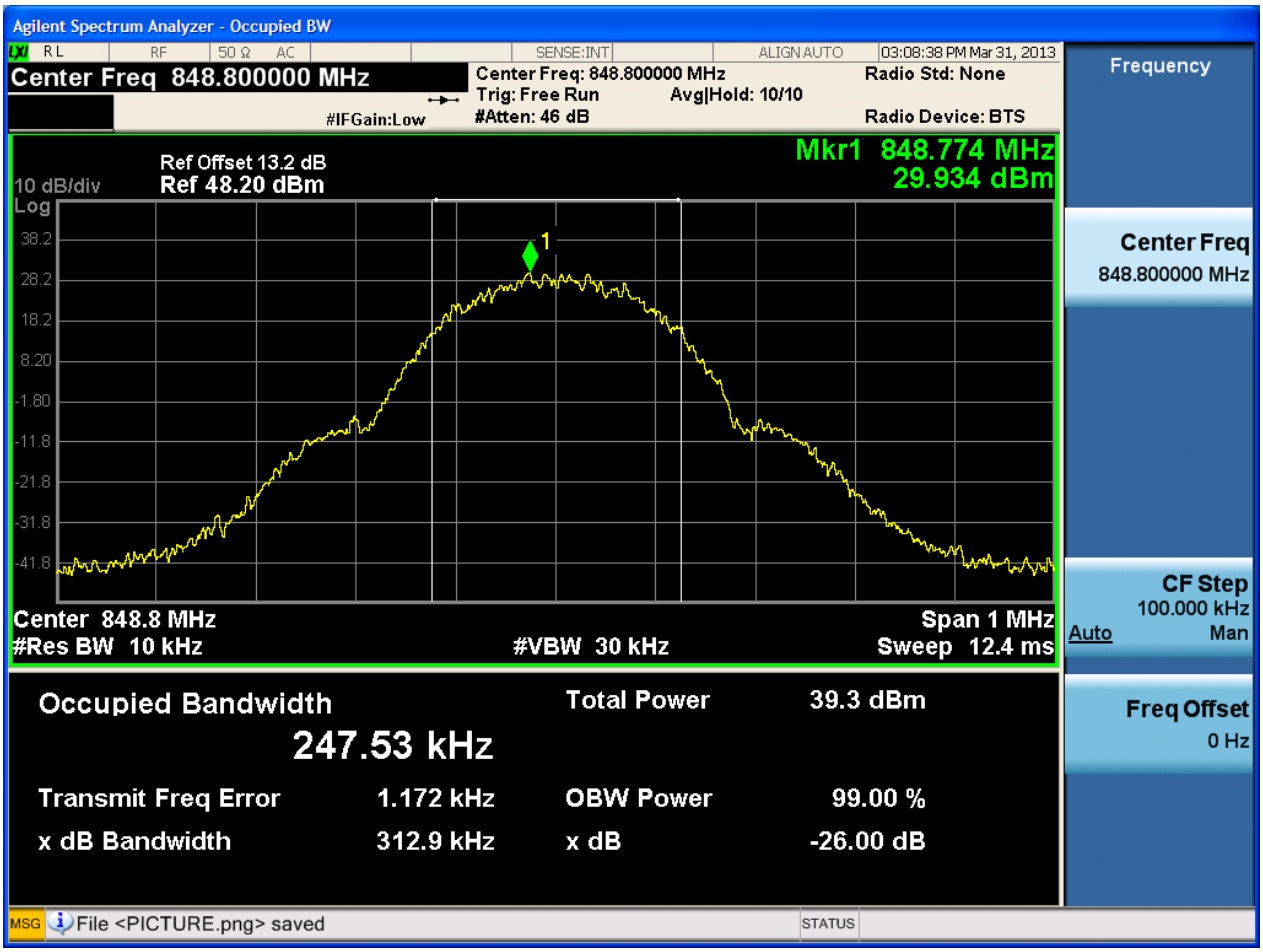
Huawei Proprietary and Confidential
Copyright © Huawei Technologies Co., Ltd.

4.1.1.1.2 Test Channel = MCH



Copyright © Huawei Technologies Co., Ltd.

4.1.1.1.3 Test Channel = HCH

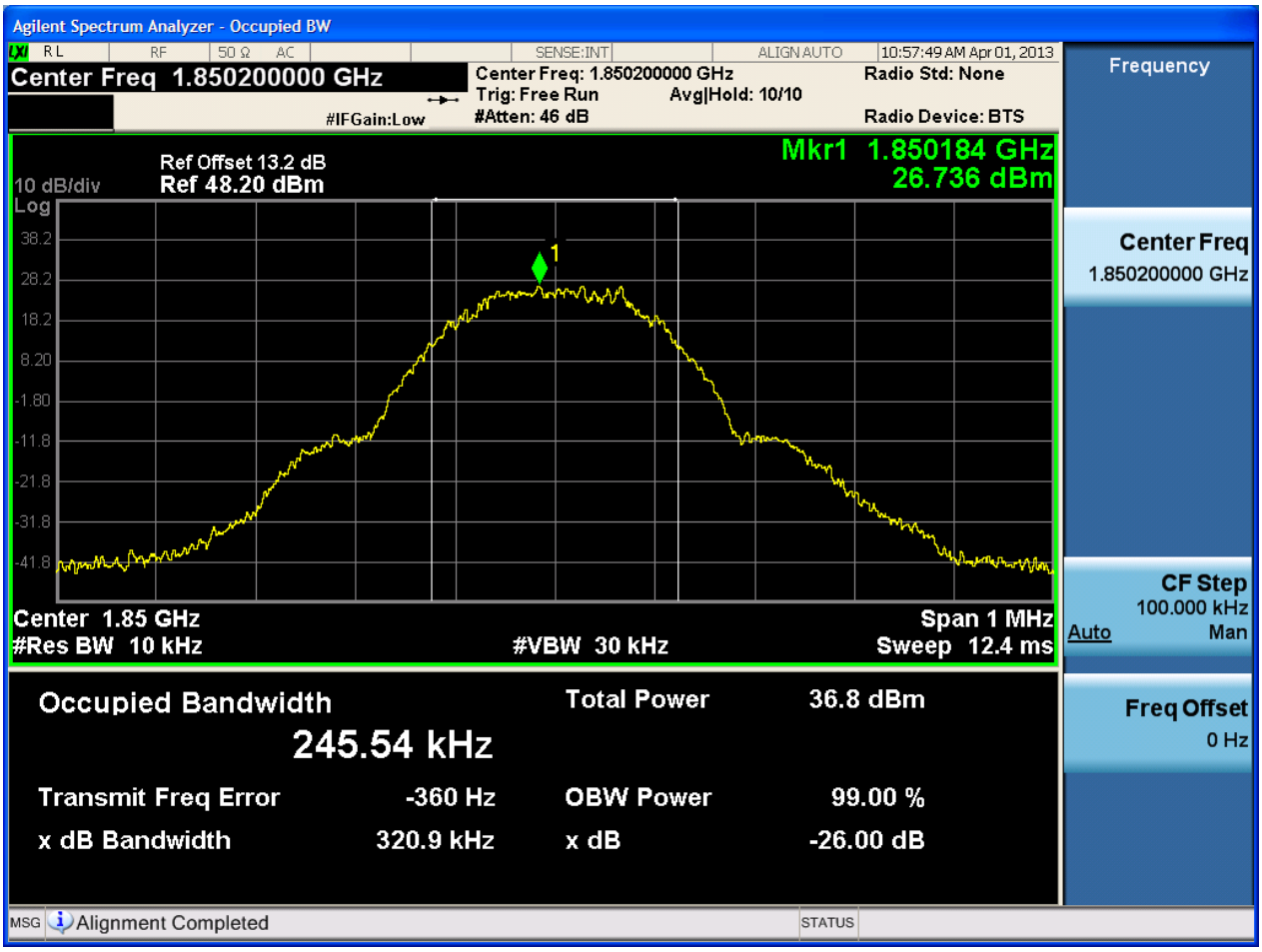


Copyright © Huawei Technologies Co., Ltd.

4.1.2 Test Band = GSM1900

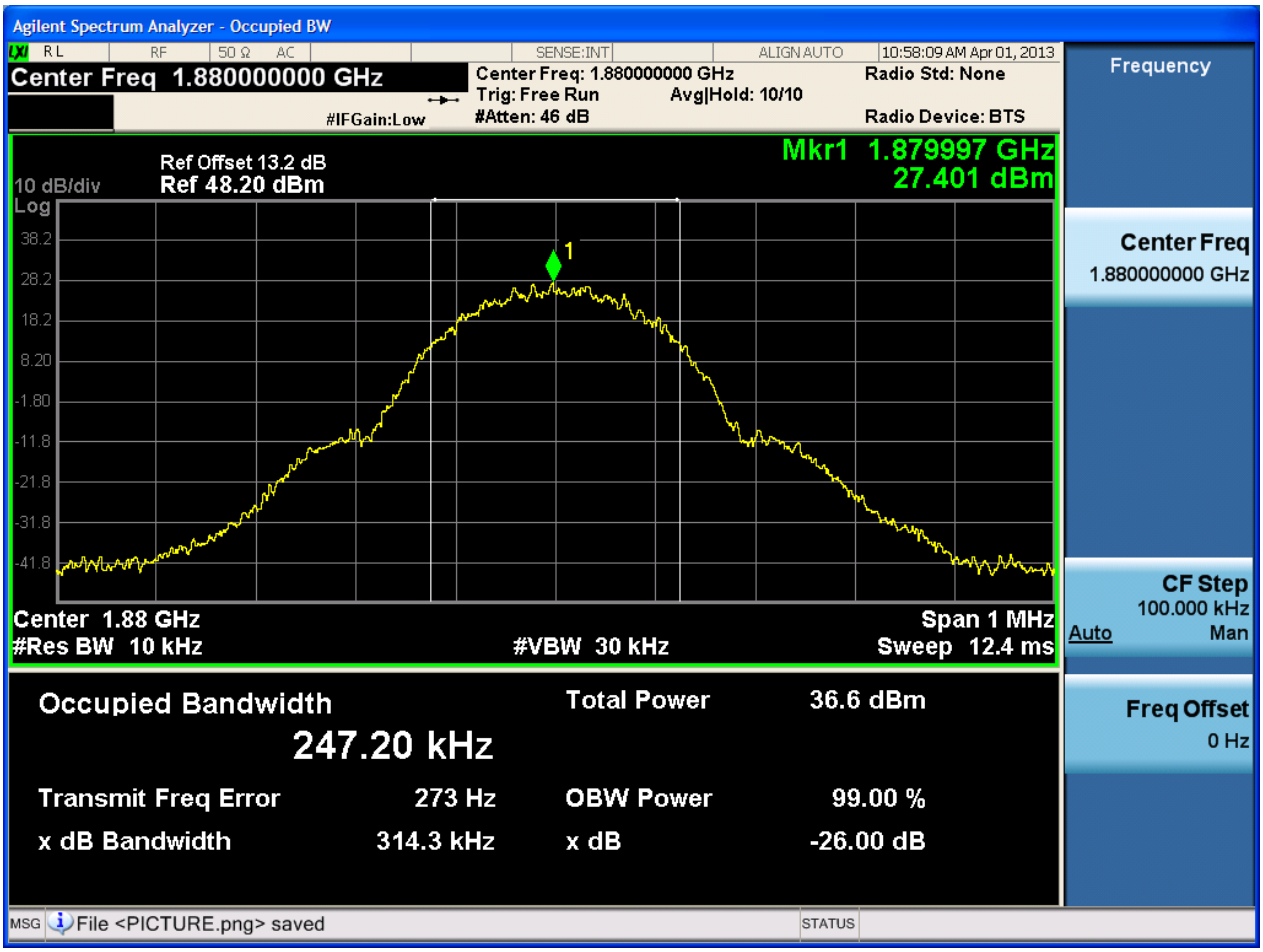
4.1.2.1 Test Mode = GSM/TM1

4.1.2.1.1 Test Channel = LCH



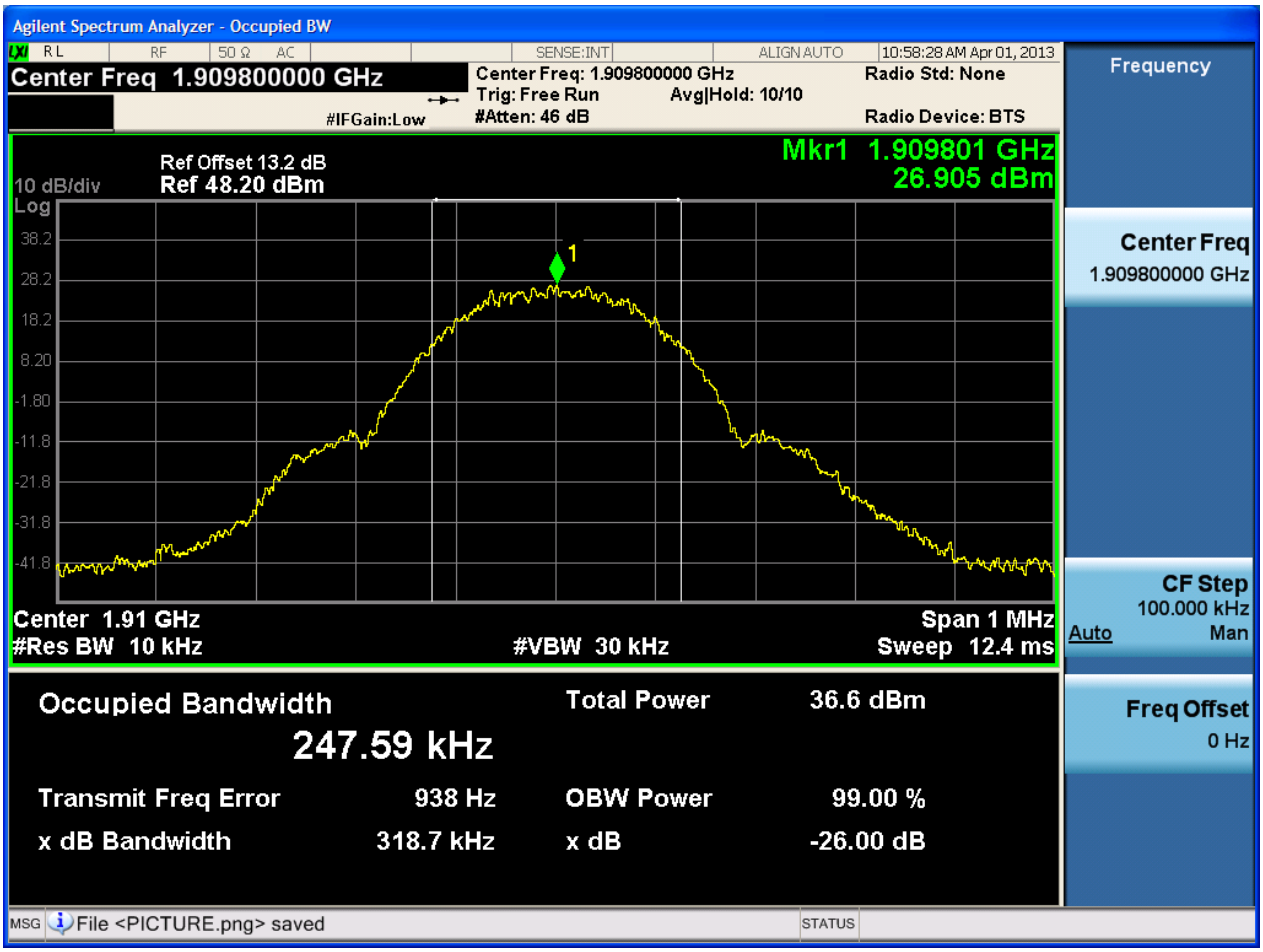
Copyright © Huawei Technologies Co., Ltd.

4.1.2.1.2 Test Channel = MCH



Copyright © Huawei Technologies Co., Ltd.

4.1.2.1.3 Test Channel = HCH



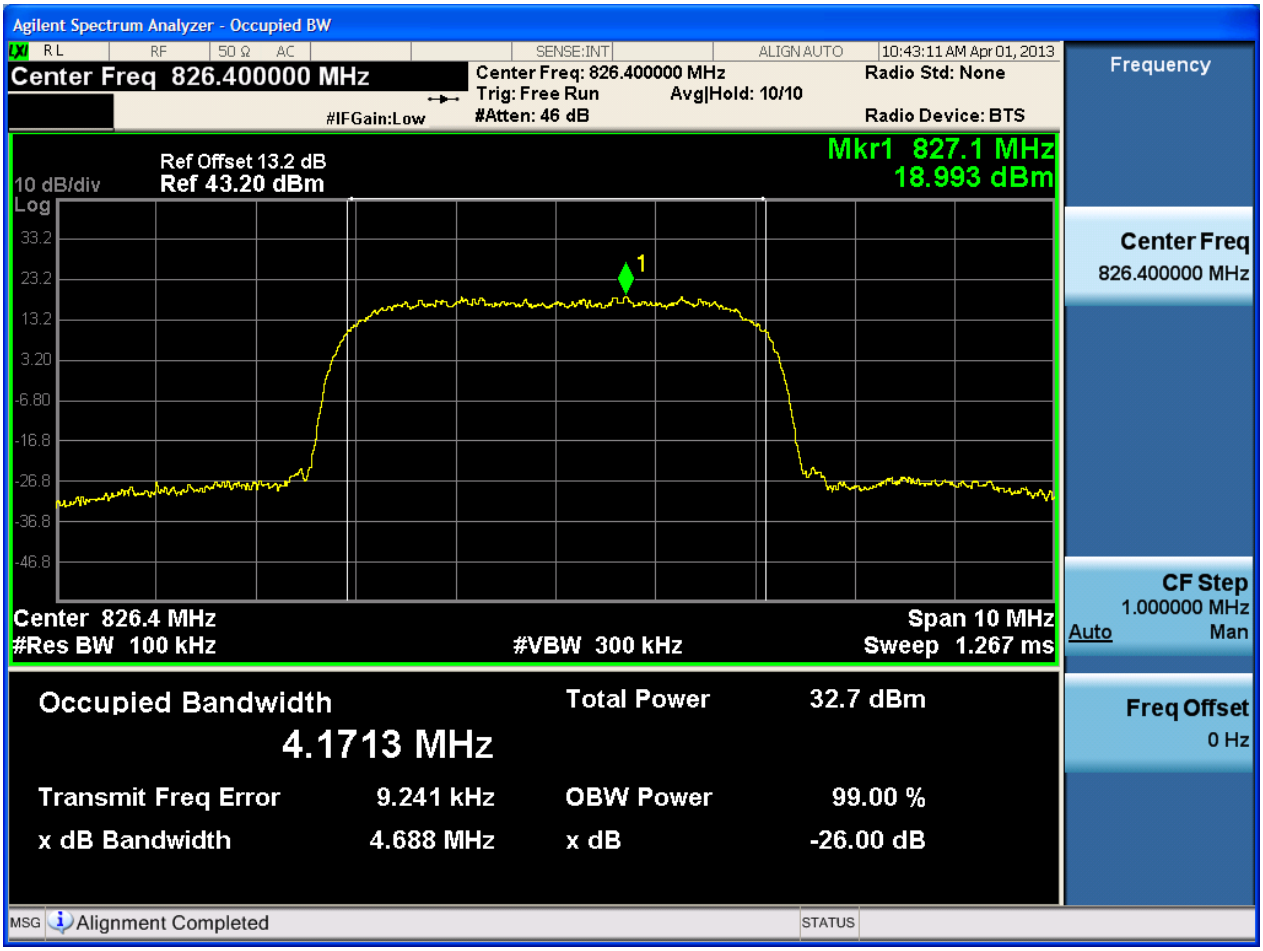
Copyright © Huawei Technologies Co., Ltd.

4.2 For UMTS

4.2.1 Test Band = WCDMA850

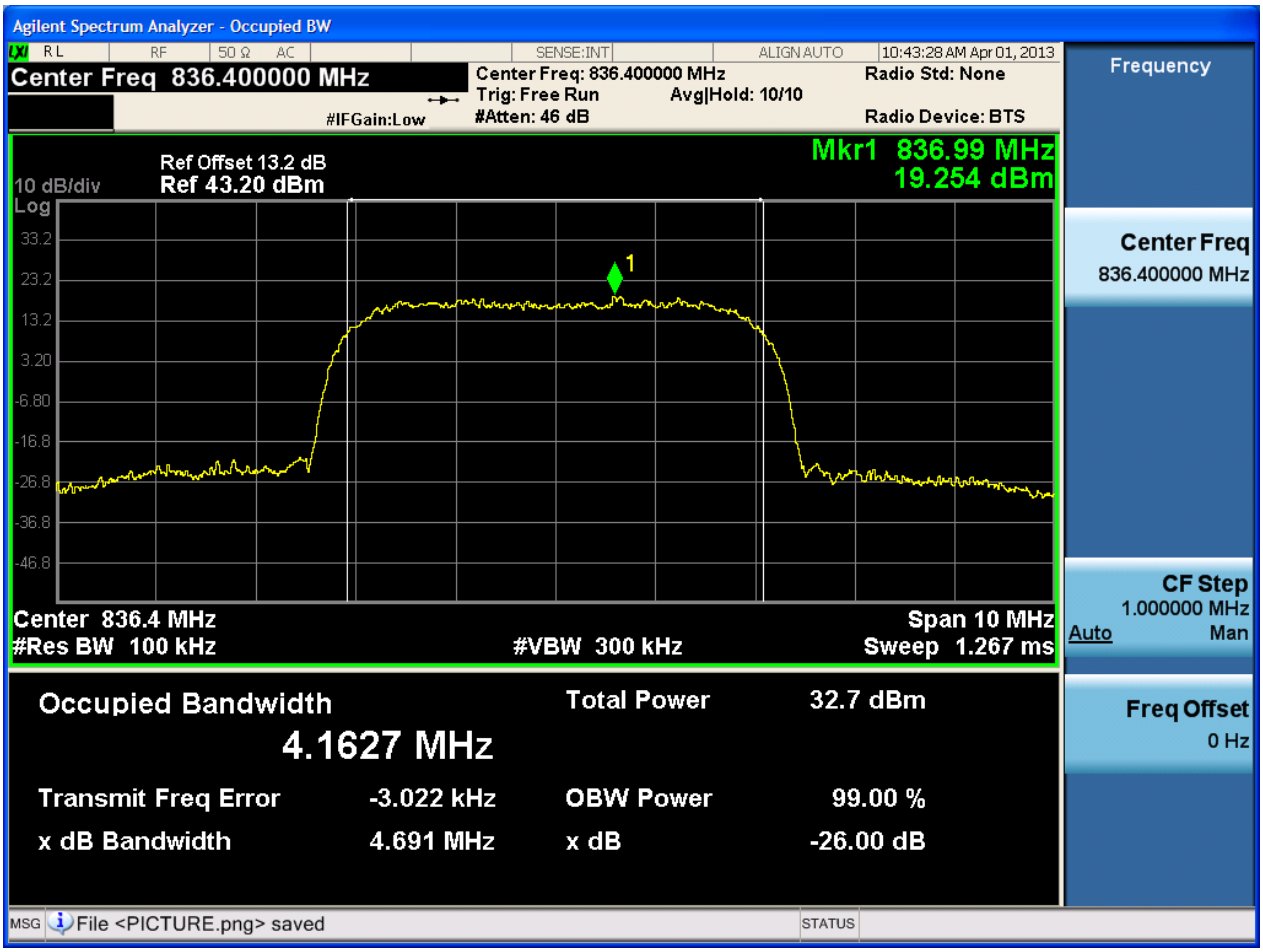
4.2.1.1 Test Mode = UMTS/TM1

4.2.1.1.1 Test Channel = LCH



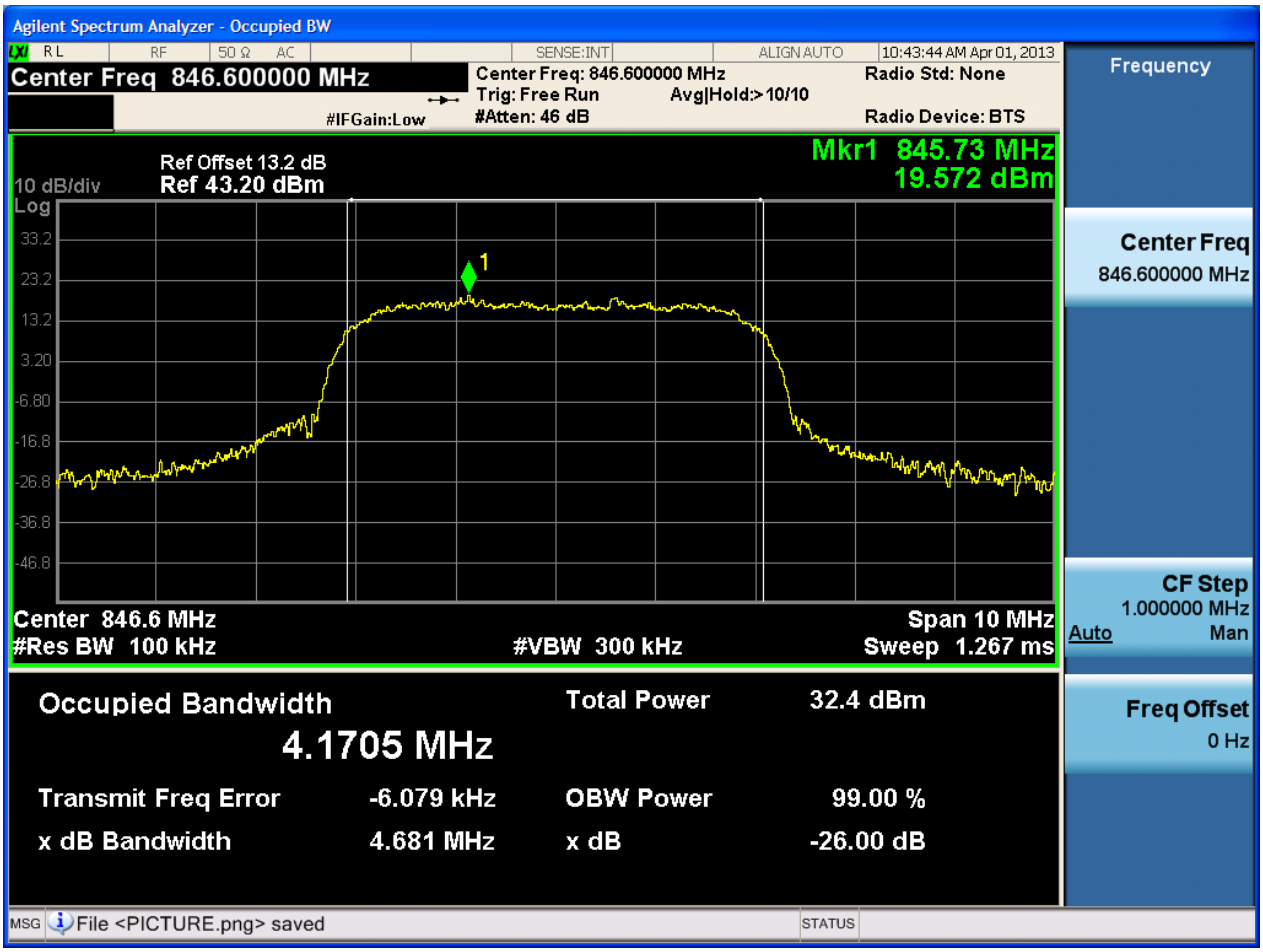
Copyright © Huawei Technologies Co., Ltd.

4.2.1.1.2 Test Channel = MCH



Copyright © Huawei Technologies Co., Ltd.

4.2.1.1.3 Test Channel = HCH

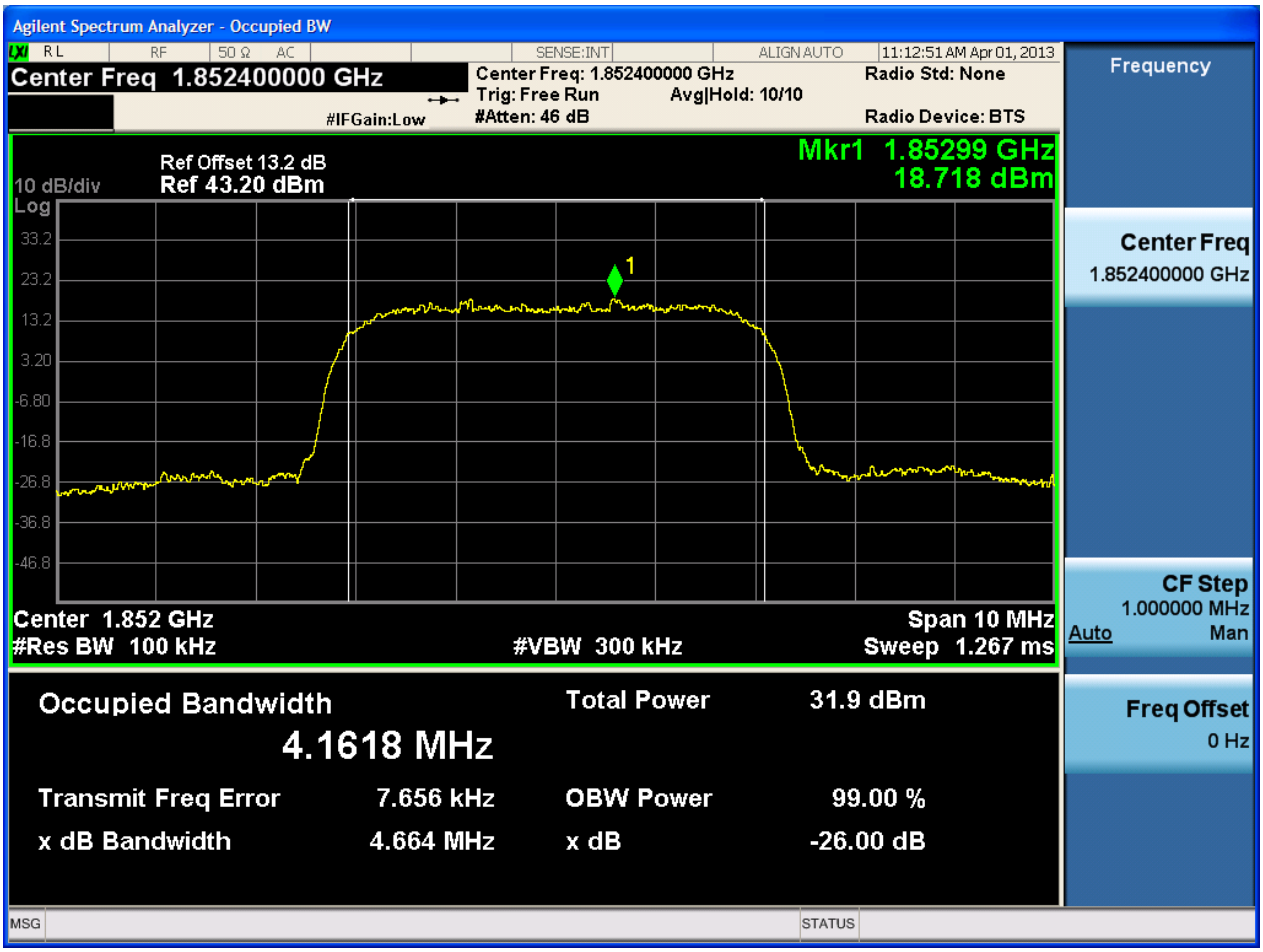


Copyright © Huawei Technologies Co., Ltd.

4.2.2 Test Band = WCDMA1900

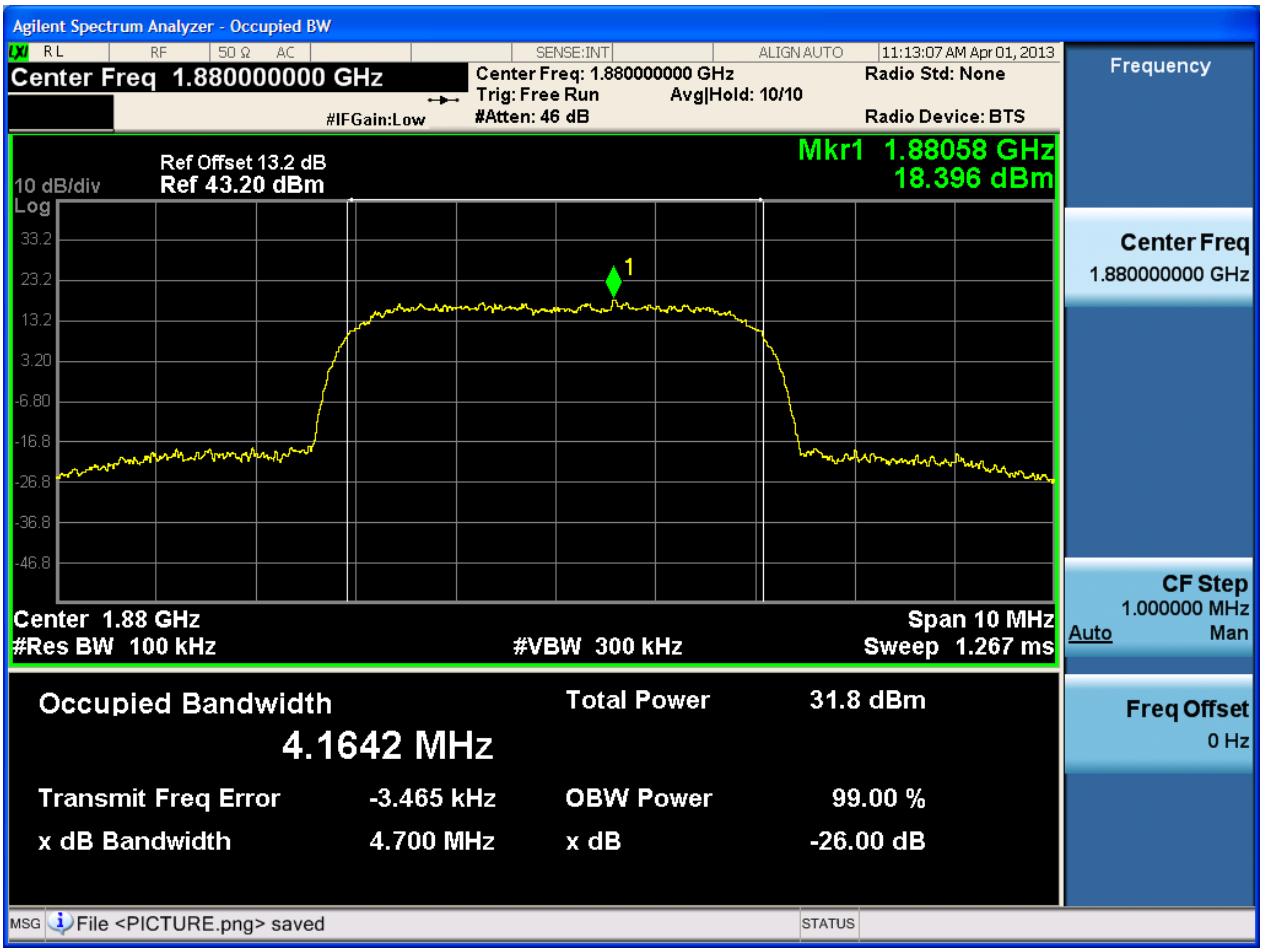
4.2.2.1 Test Mode = UMTS/TM1

4.2.2.1.1 Test Channel = LCH



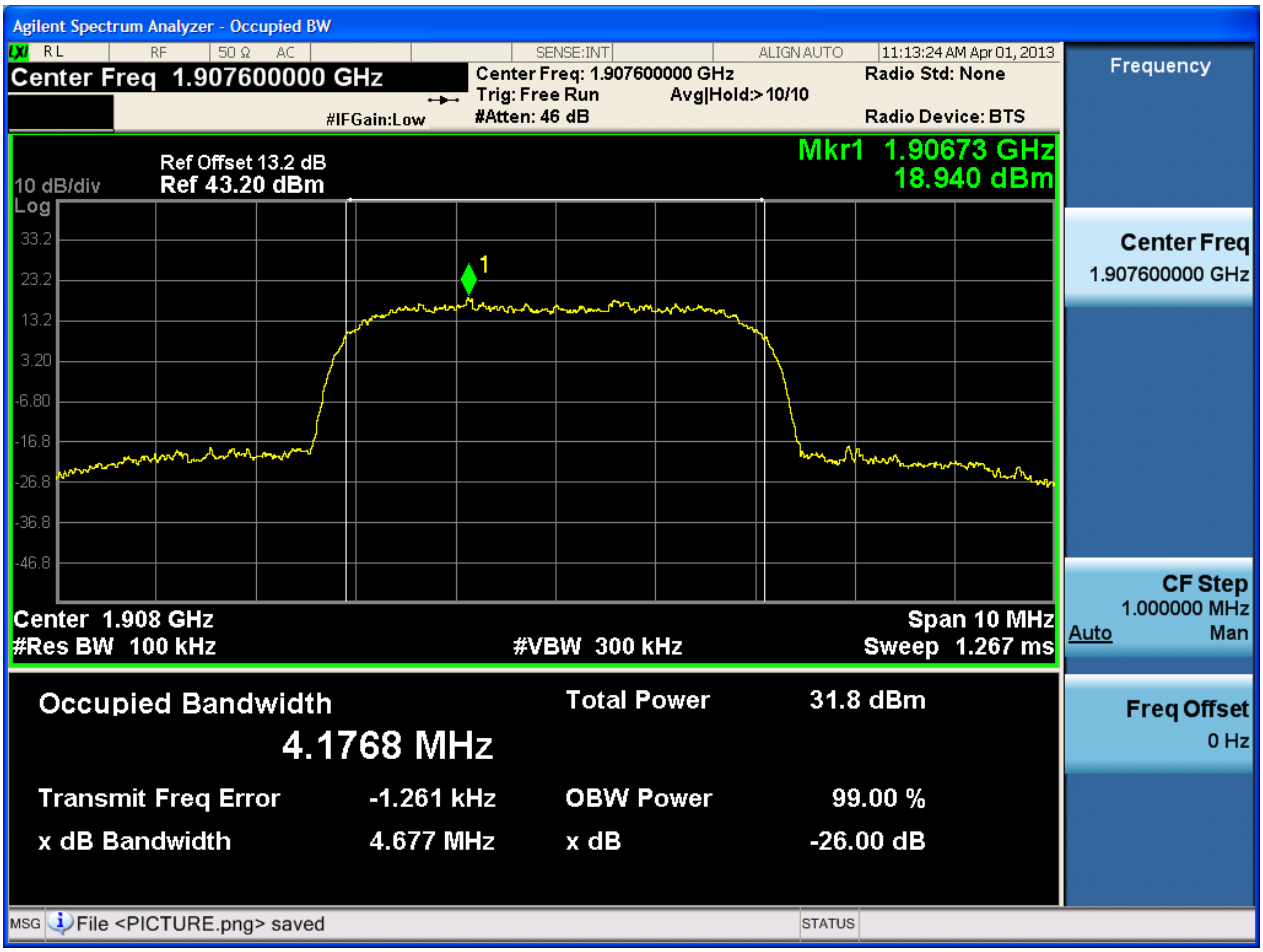
Copyright © Huawei Technologies Co., Ltd.

4.2.2.1.2 Test Channel = MCH



Copyright © Huawei Technologies Co., Ltd.

4.2.2.1.3 Test Channel = HCH



Copyright © Huawei Technologies Co., Ltd.

5Appendix_E: Band Edges Compliance

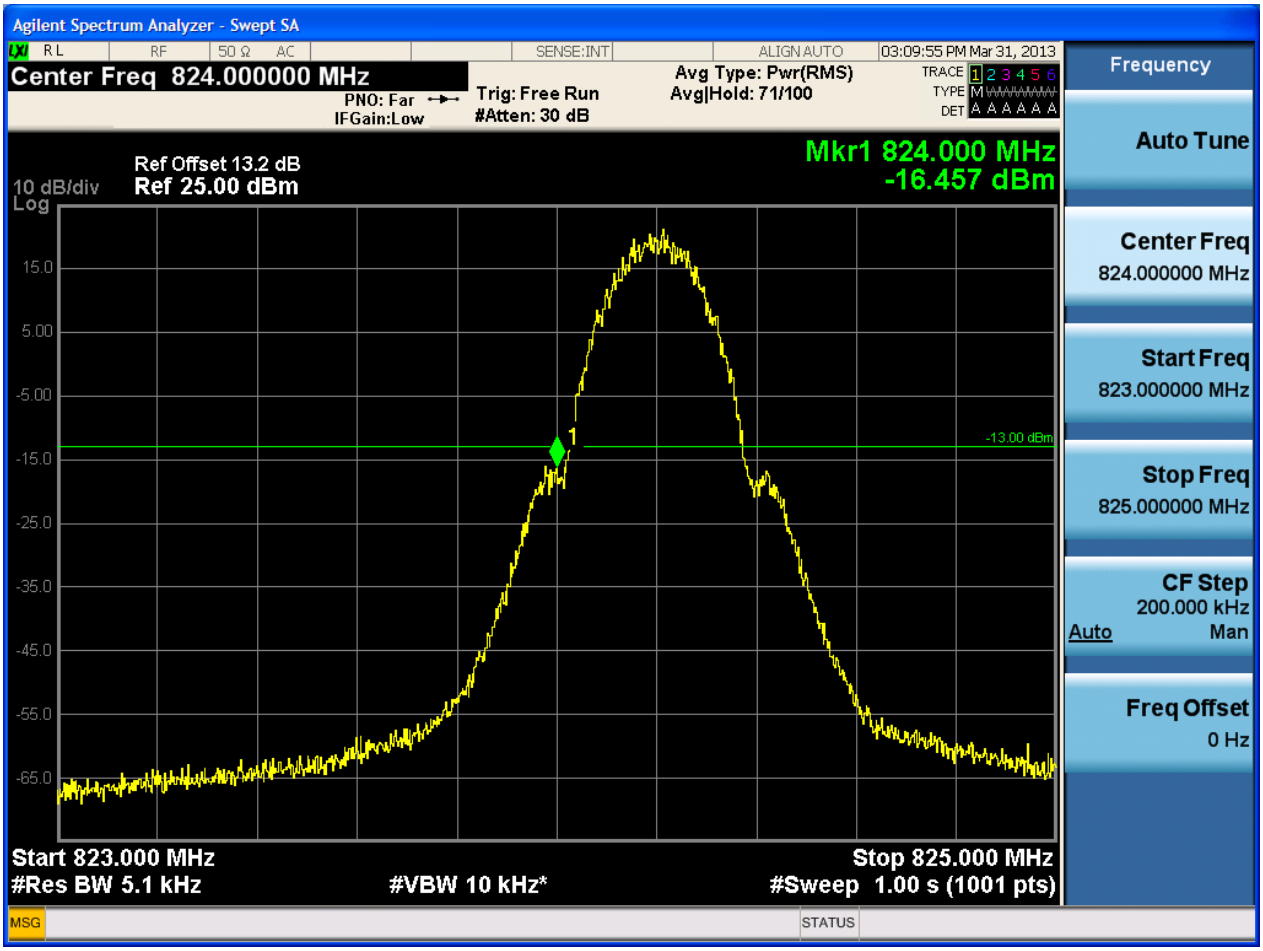
Part I - Test Plots

5.1 For GSM

5.1.1 Test Band = GSM850

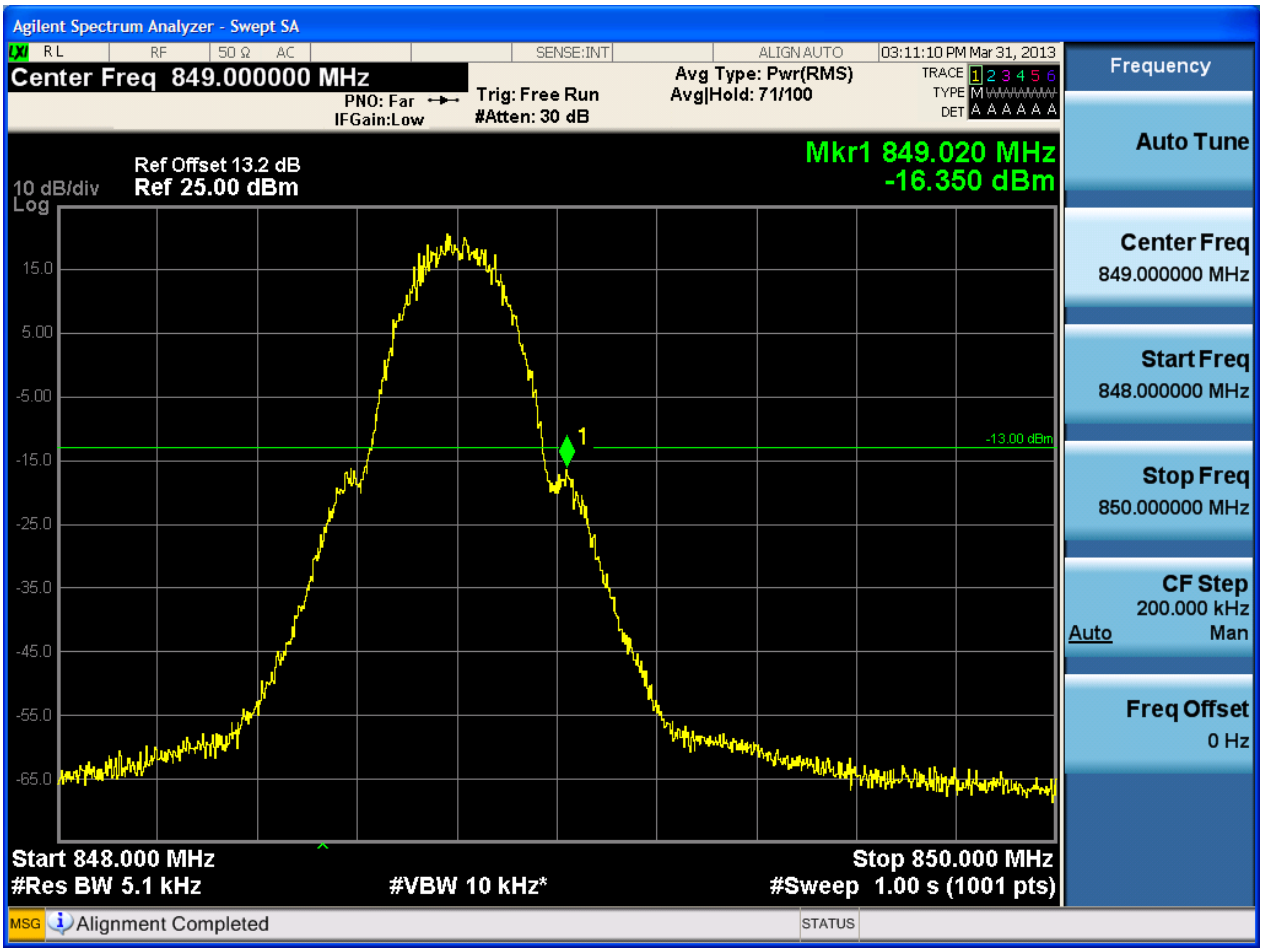
5.1.1.1 Test Mode = GSM/TM1

5.1.1.1.1 Test Channel = LCH



Copyright © Huawei Technologies Co., Ltd.

5.1.1.1.2 Test Channel = HCH

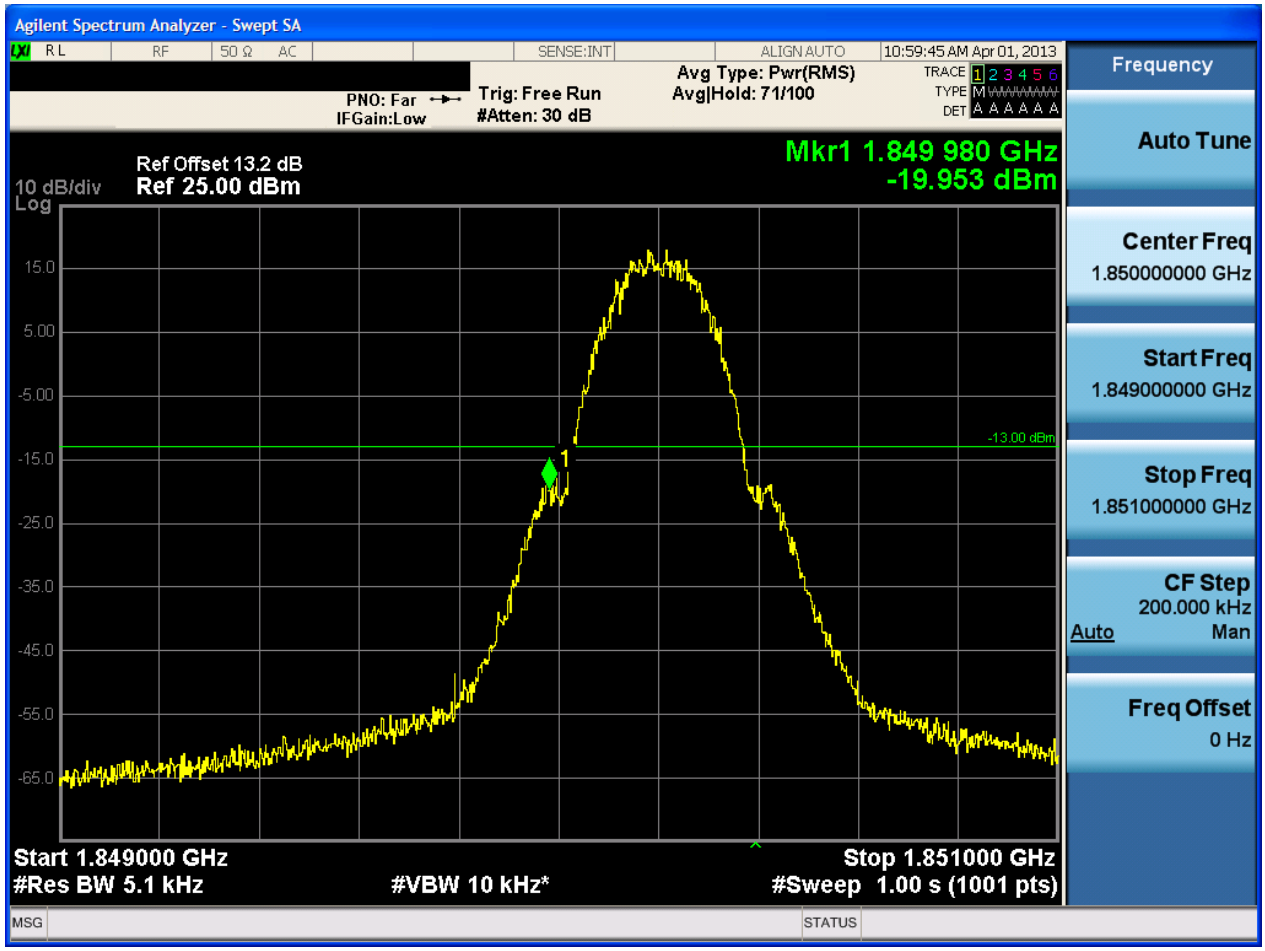


Copyright © Huawei Technologies Co., Ltd.

5.1.2 Test Band = GSM1900

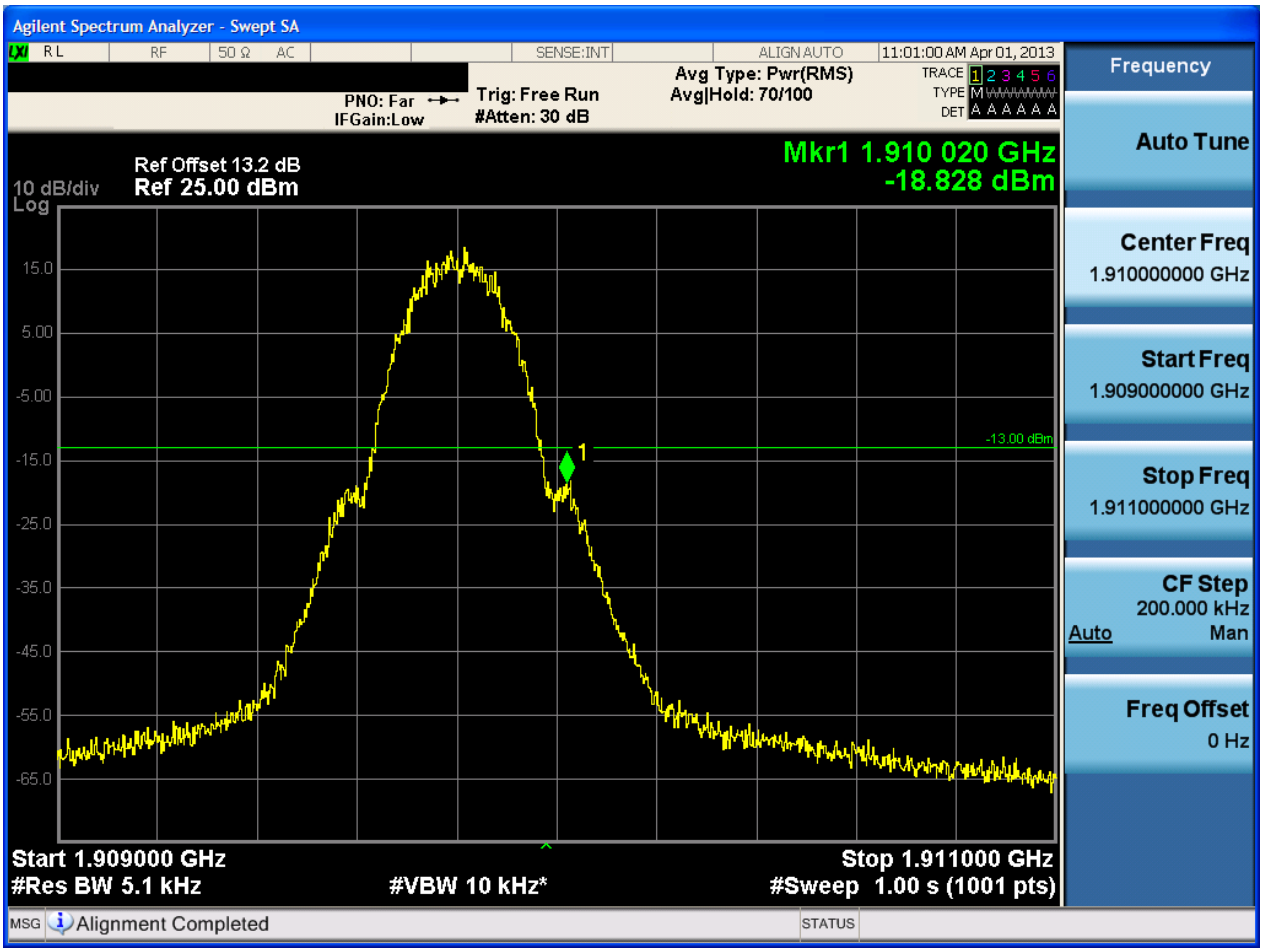
5.1.2.1 Test Mode = GSM/TM1

5.1.2.1.1 Test Channel = LCH



Copyright © Huawei Technologies Co., Ltd.

5.1.2.1.2 Test Channel = HCH



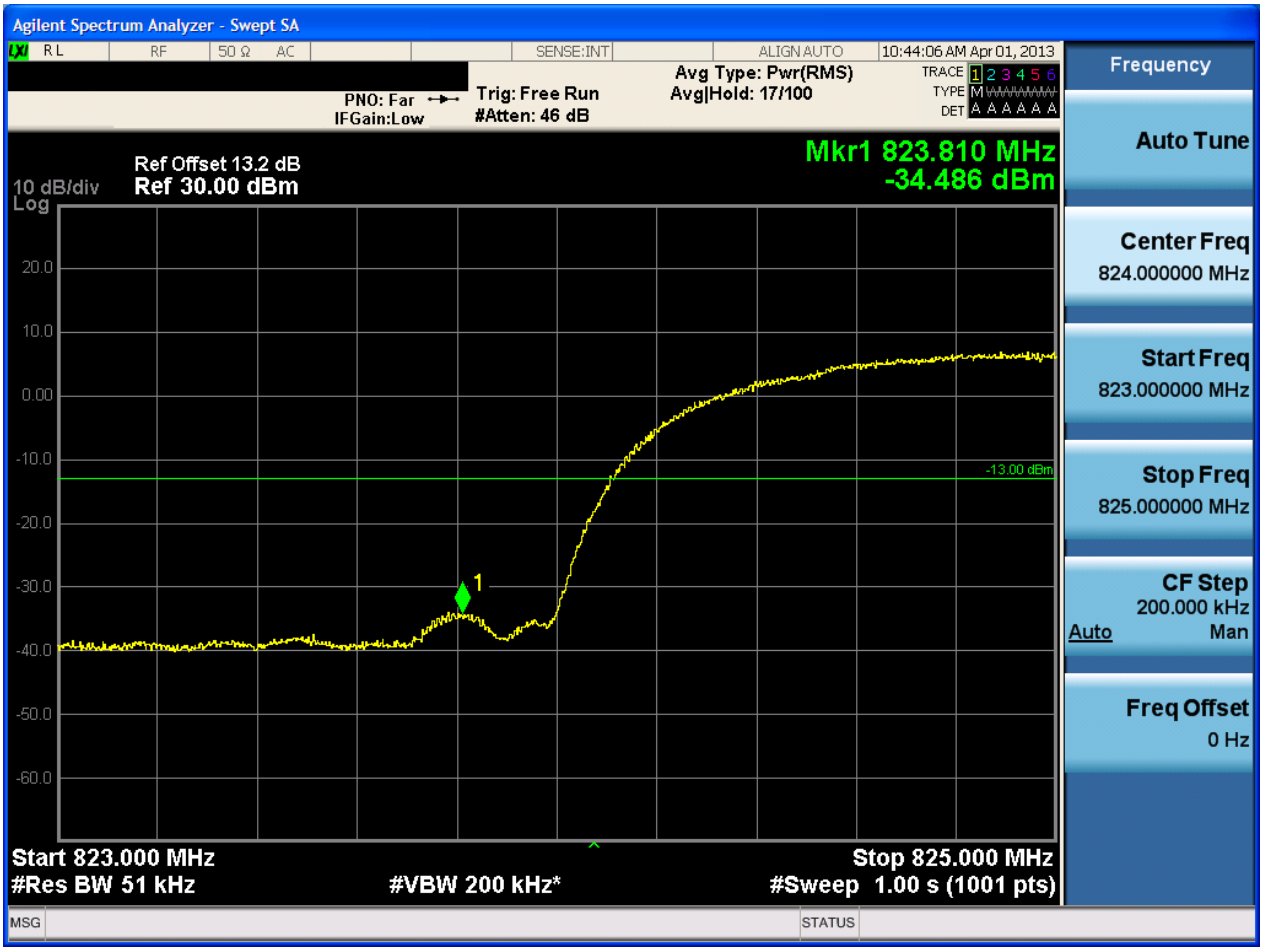
Copyright © Huawei Technologies Co., Ltd.

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



Copyright © Huawei Technologies Co., Ltd.

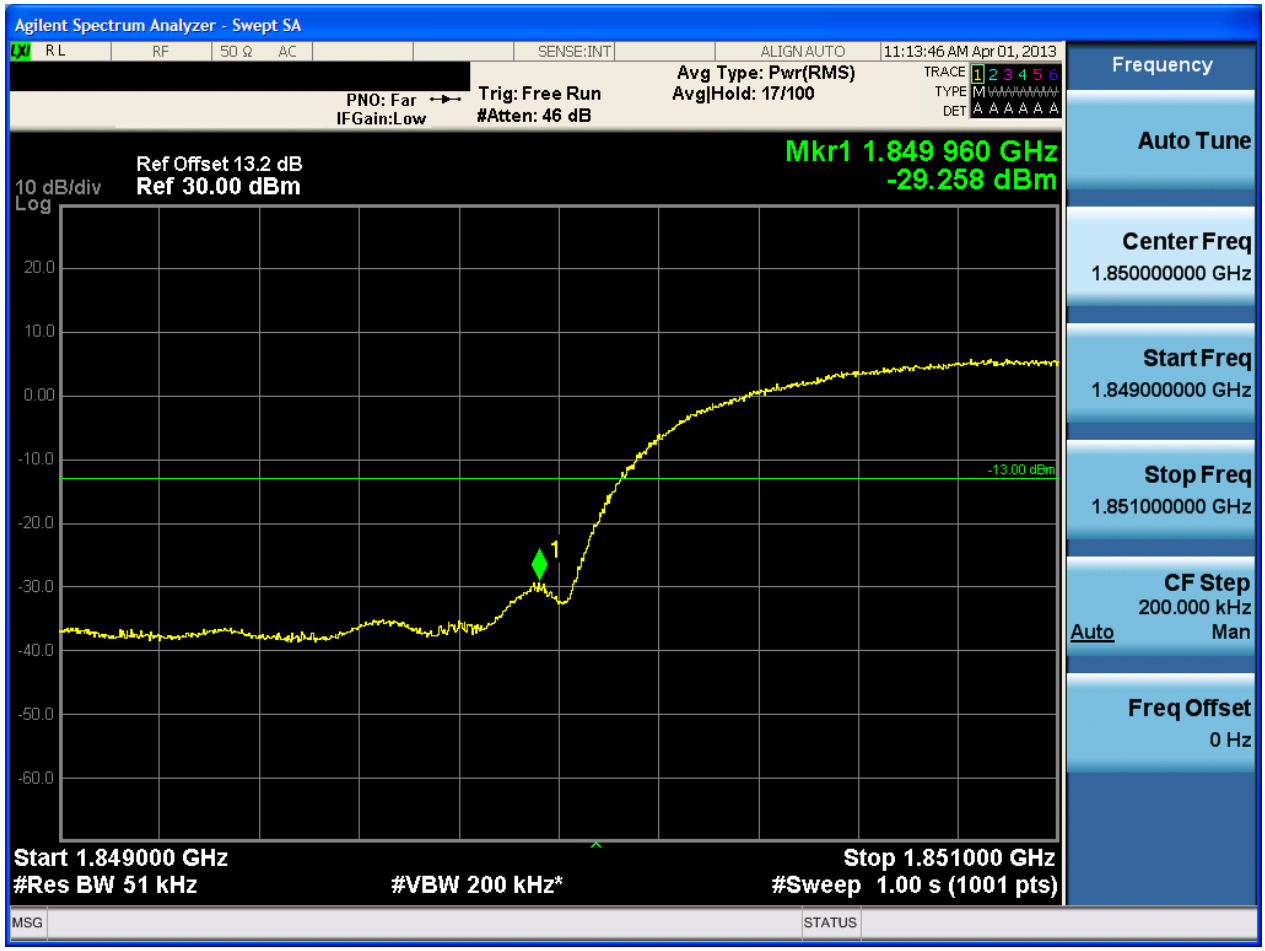
5.2.1.1.2 Test Channel = HCH

Copyright © Huawei Technologies Co., Ltd.

5.2.2 Test Band = WCDMA1900

5.2.2.1 Test Mode = UMTS/TM1

5.2.2.1.1 Test Channel = LCH



Copyright © Huawei Technologies Co., Ltd.

5.2.2.1.2 Test Channel = HCH

Copyright © Huawei Technologies Co., Ltd.

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.

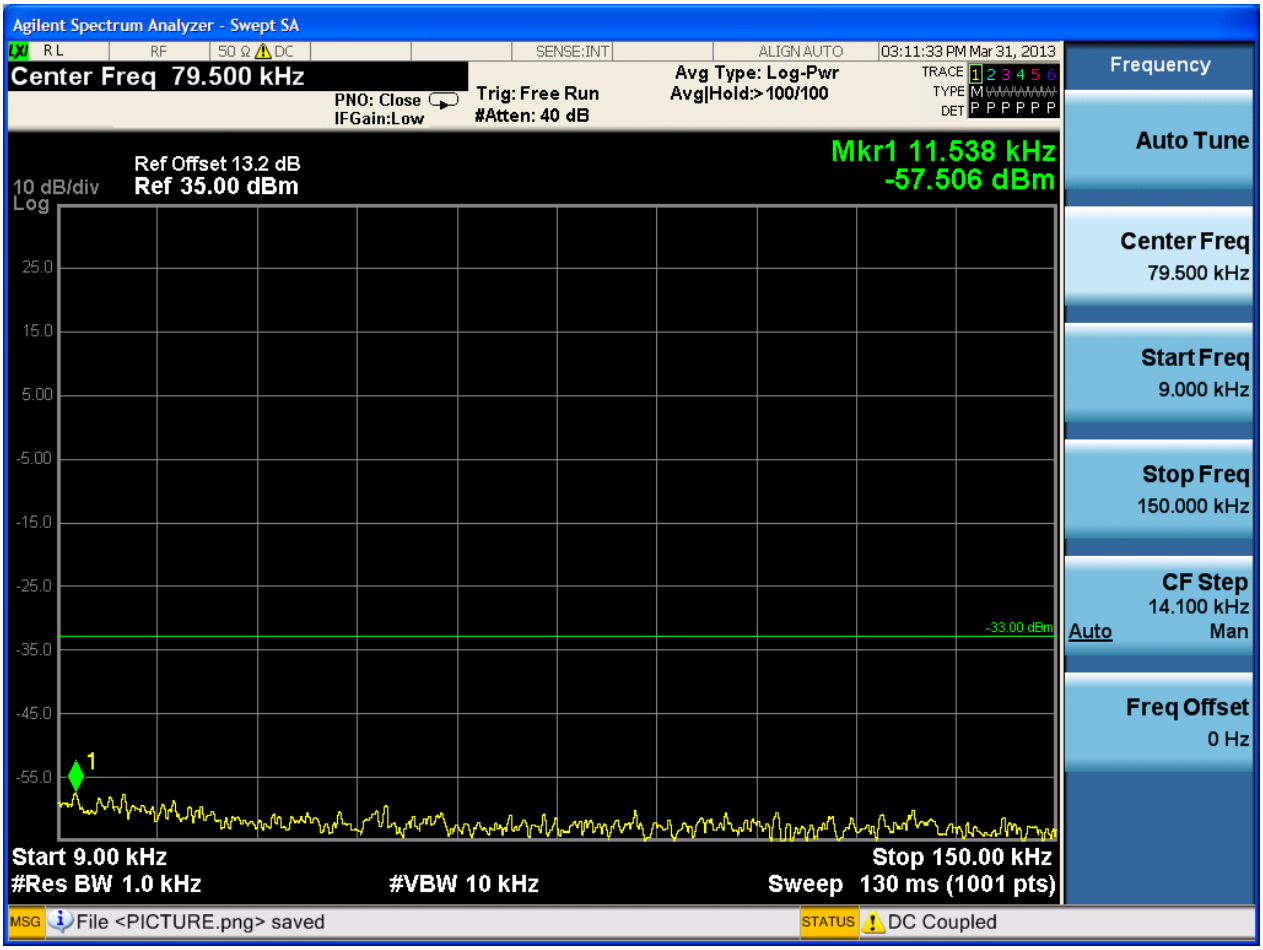
Part I - Test Plots

6.1 For GSM

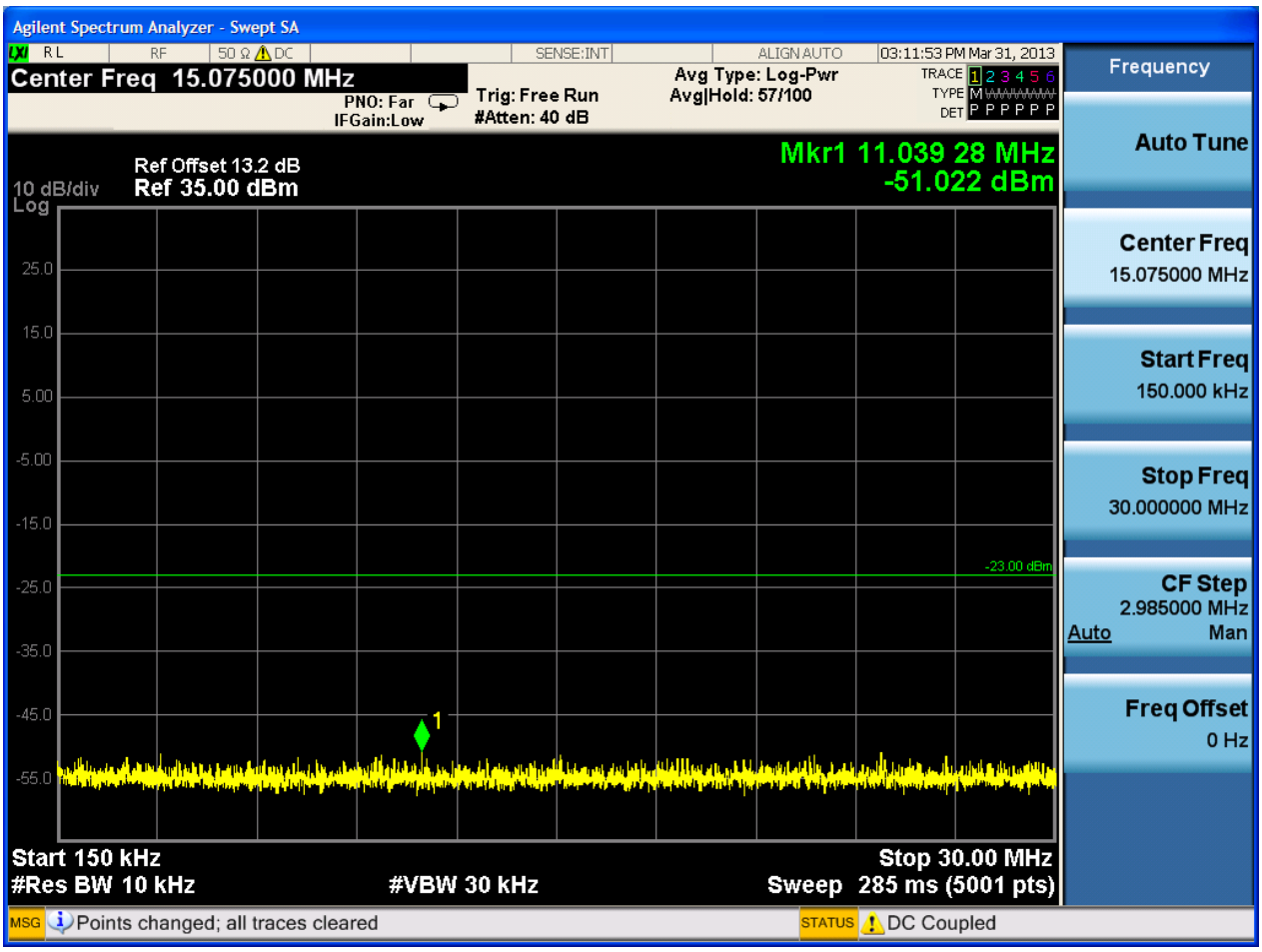
6.1.1 Test Band = GSM850

6.1.1.1 Test Mode = GSM/TM1

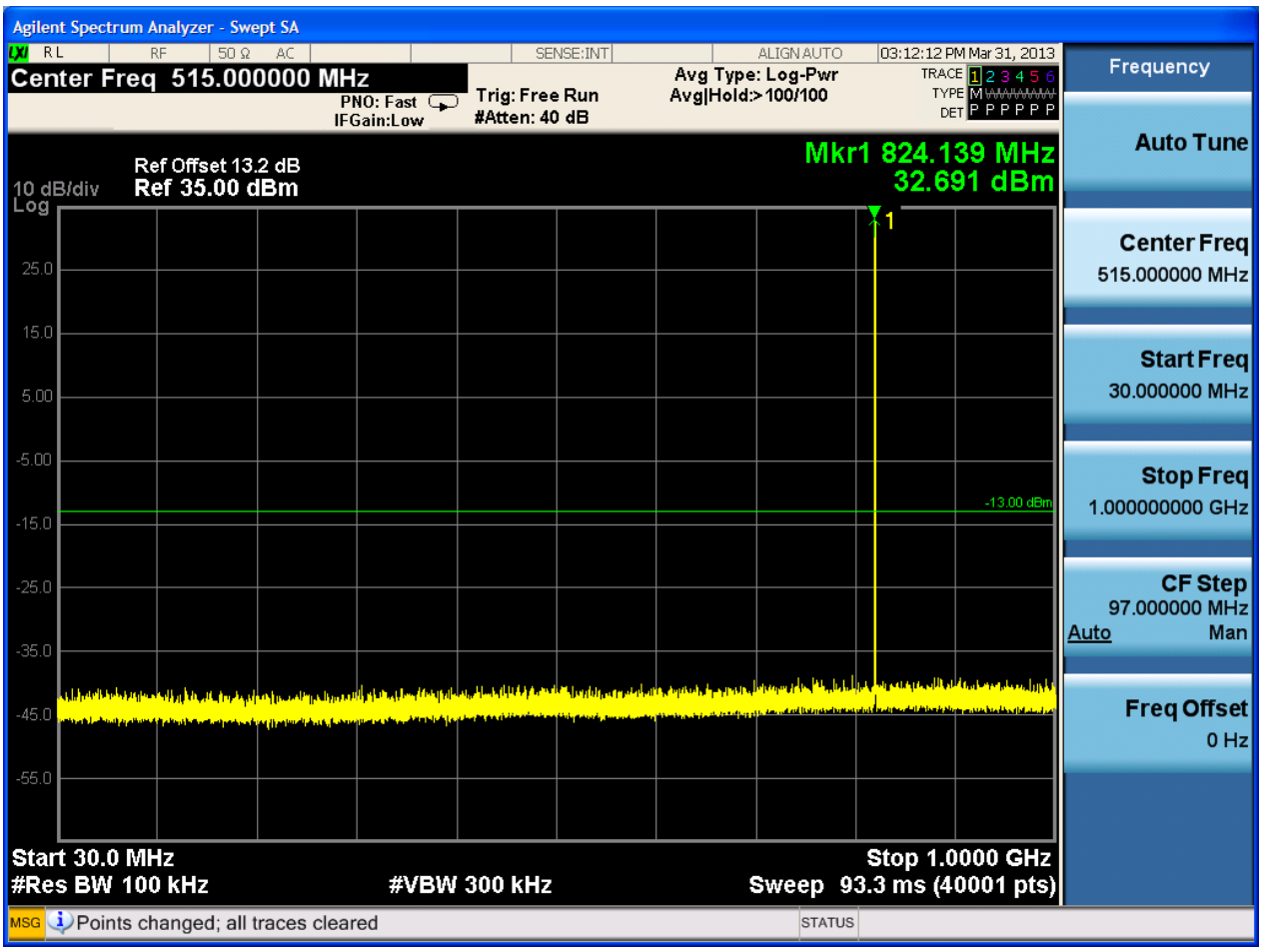
6.1.1.1.1 Test Channel = LCH



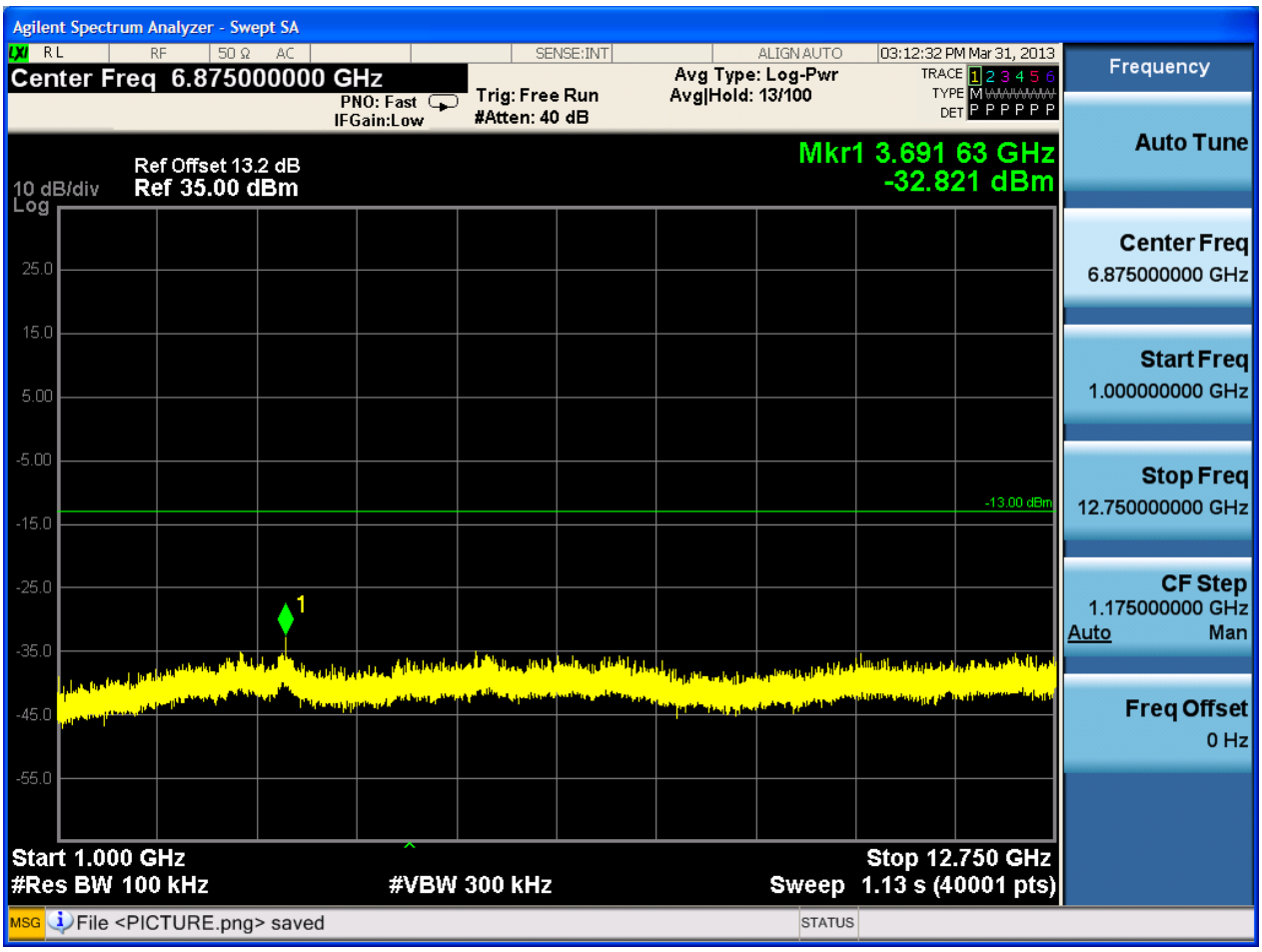
Copyright © Huawei Technologies Co., Ltd.



Copyright © Huawei Technologies Co., Ltd.

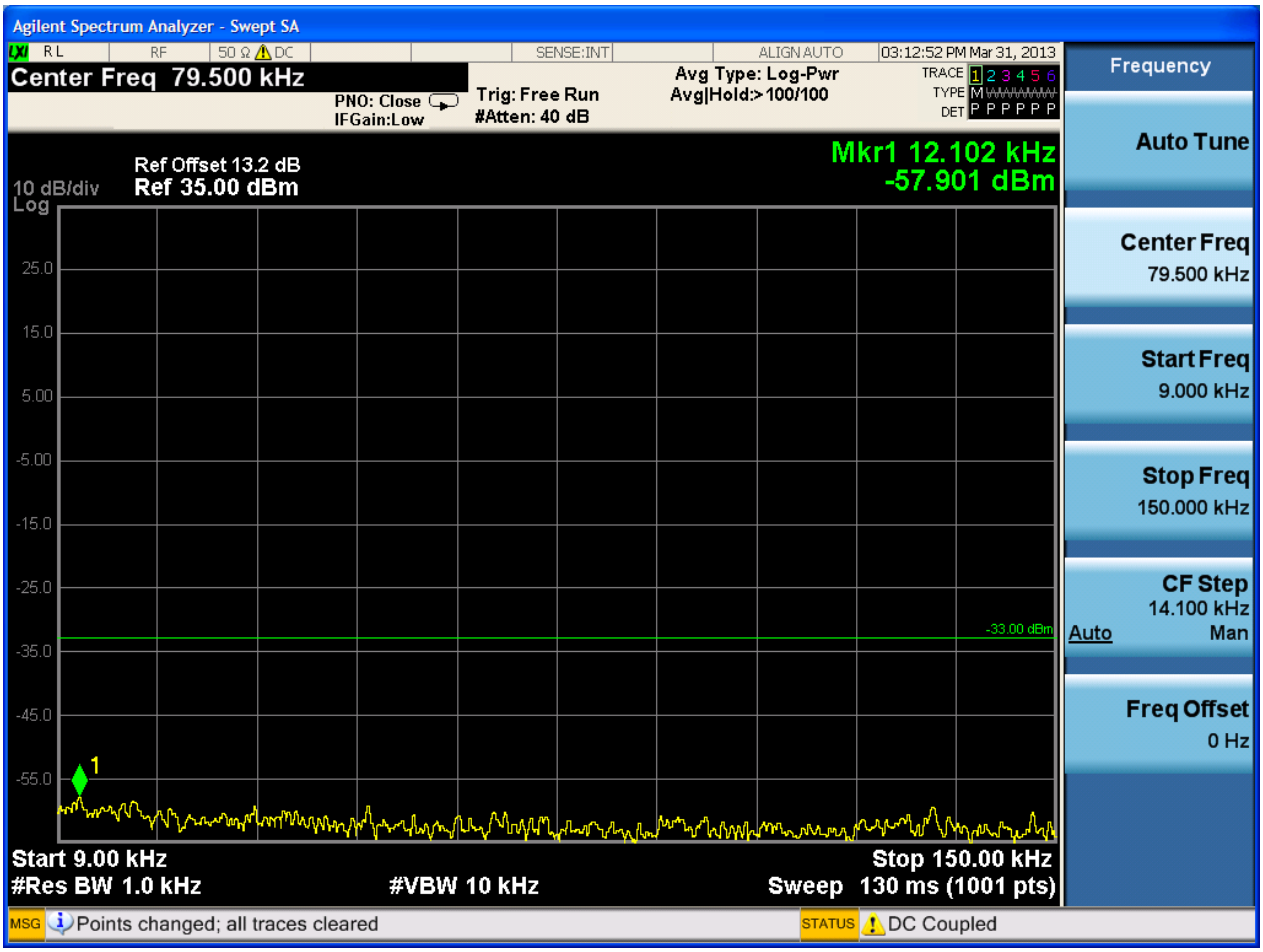


Copyright © Huawei Technologies Co., Ltd.

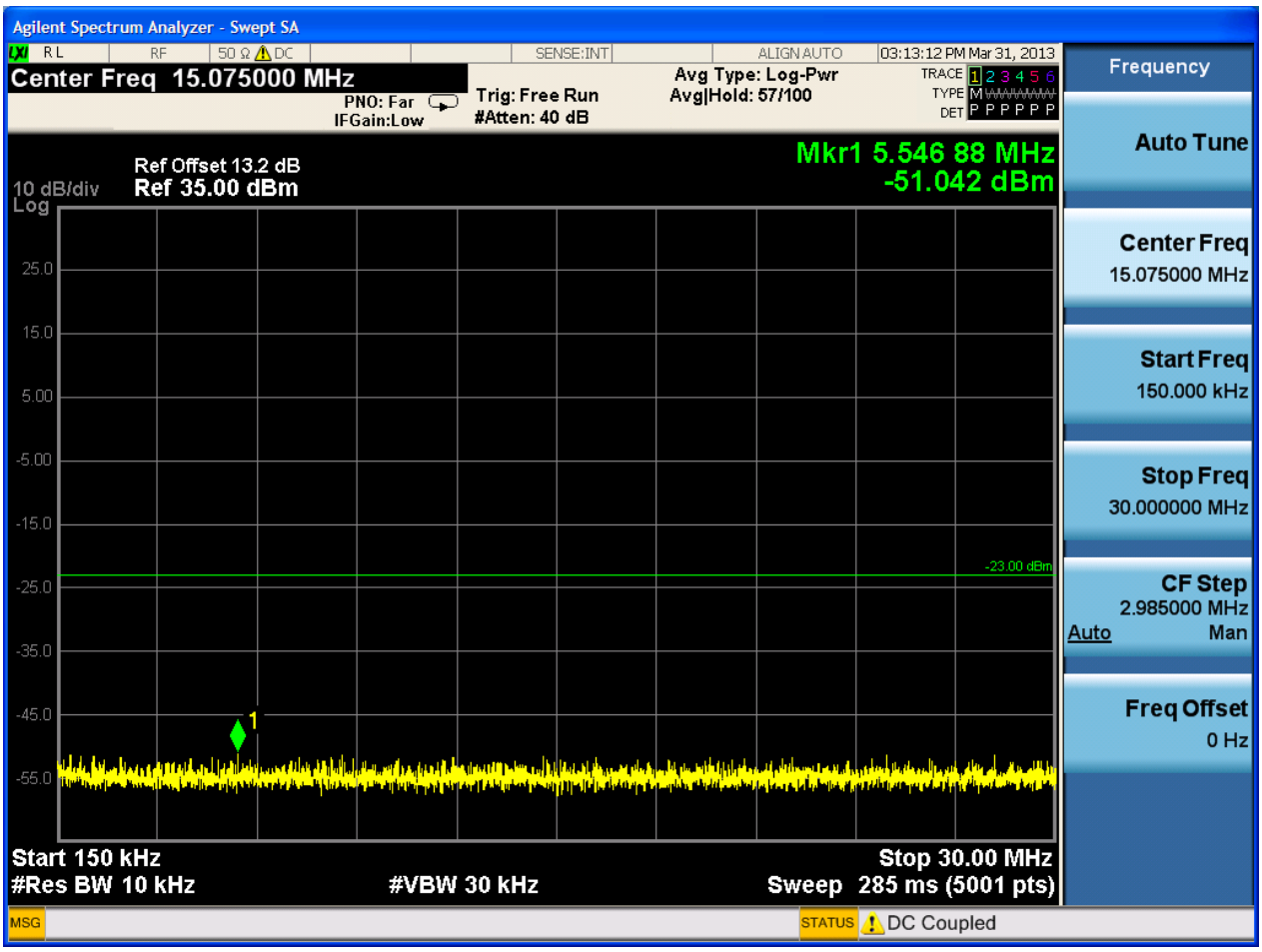


Copyright © Huawei Technologies Co., Ltd.

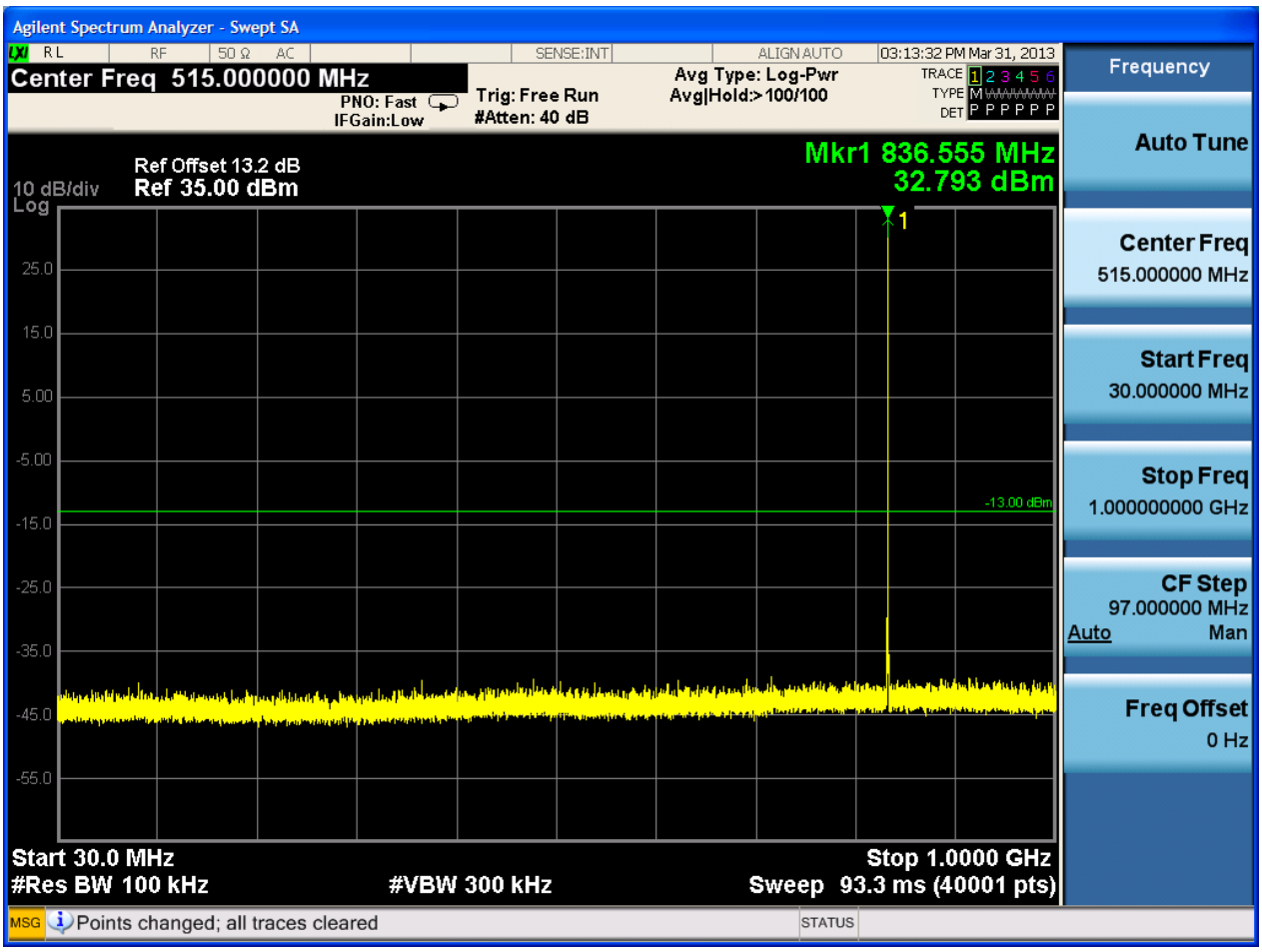
6.1.1.1.2 Test Channel = MCH



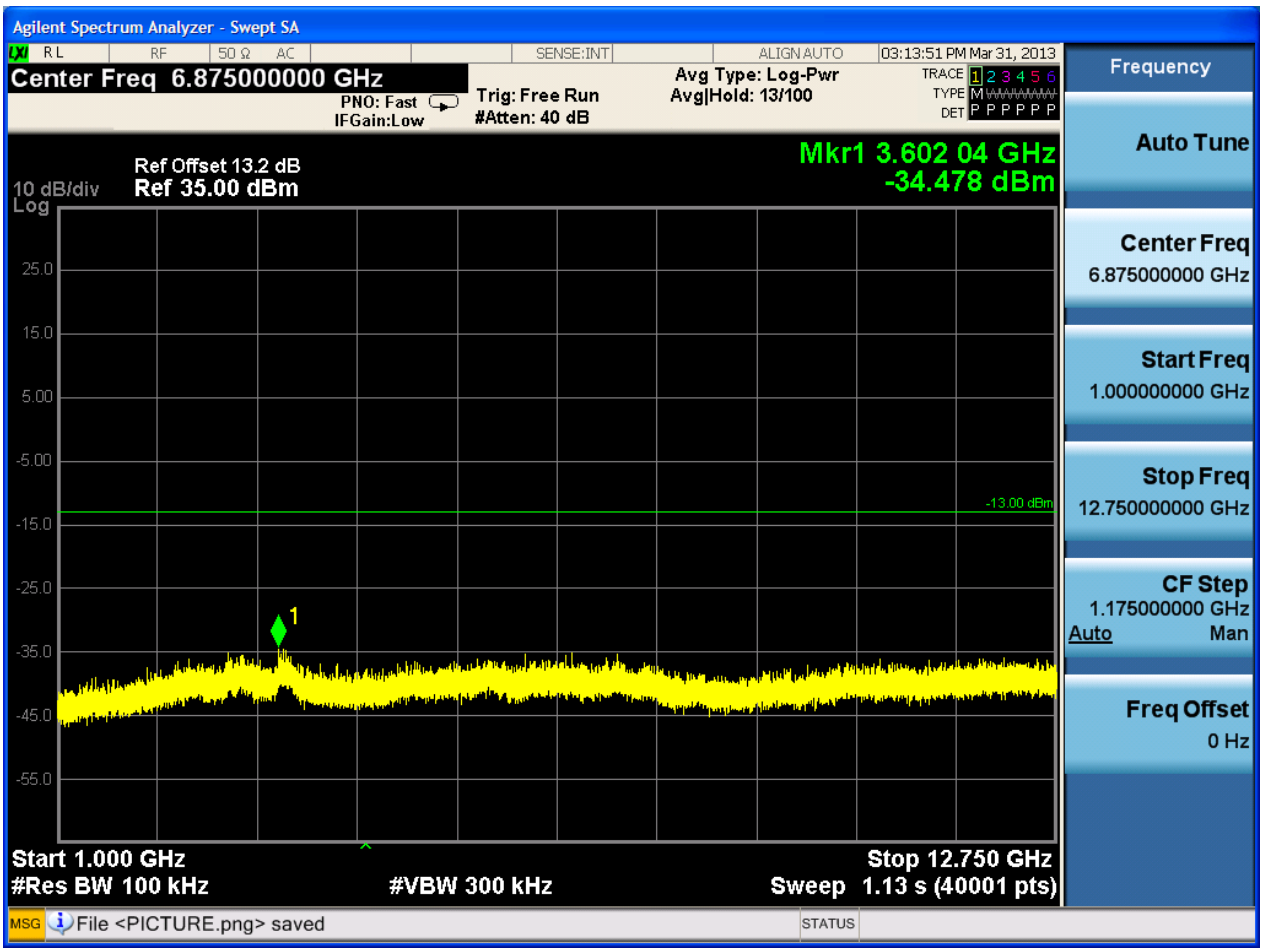
Copyright © Huawei Technologies Co., Ltd.



Huawei Proprietary and Confidential
Copyright © Huawei Technologies Co., Ltd.

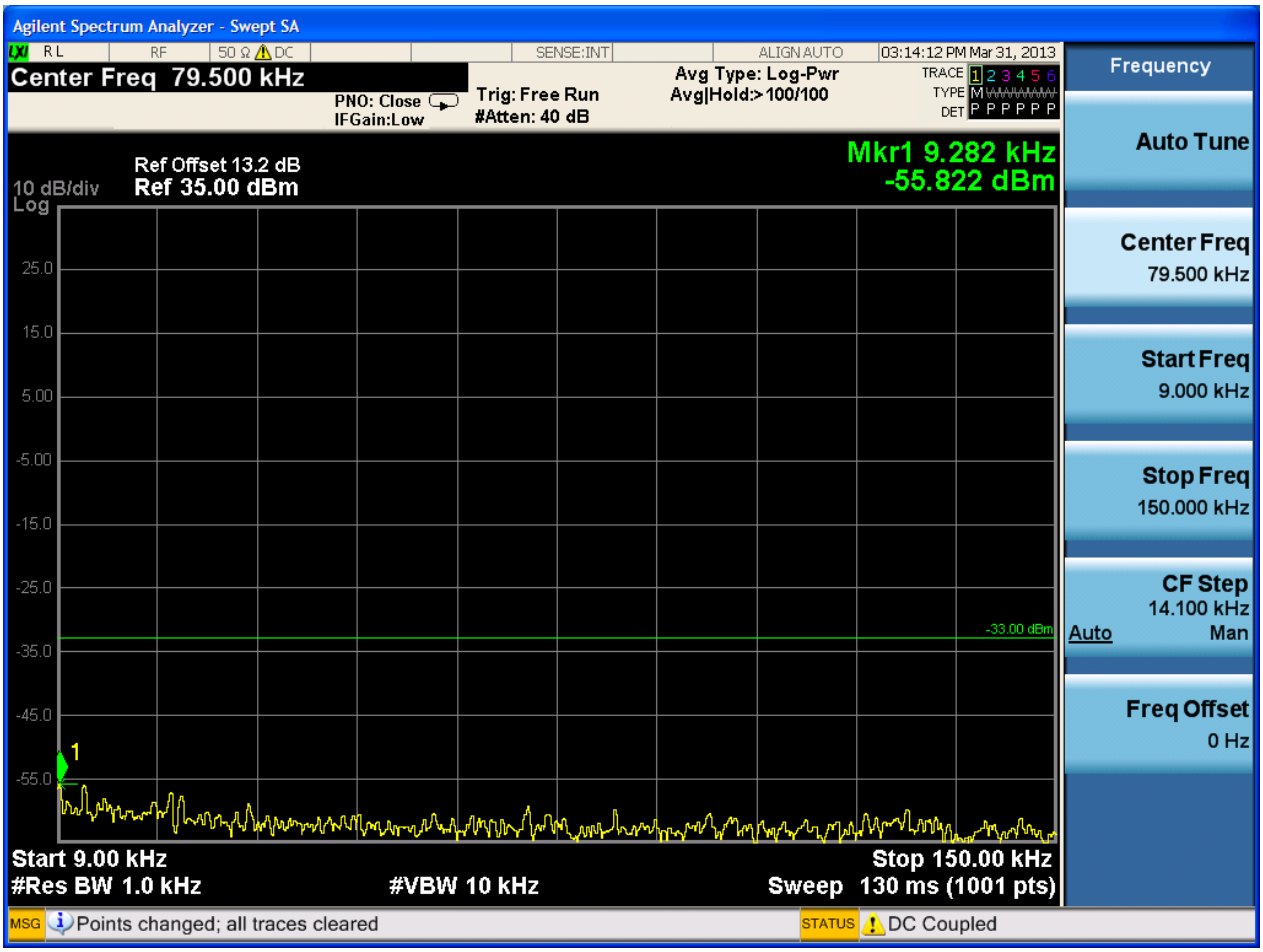


Copyright © Huawei Technologies Co., Ltd.

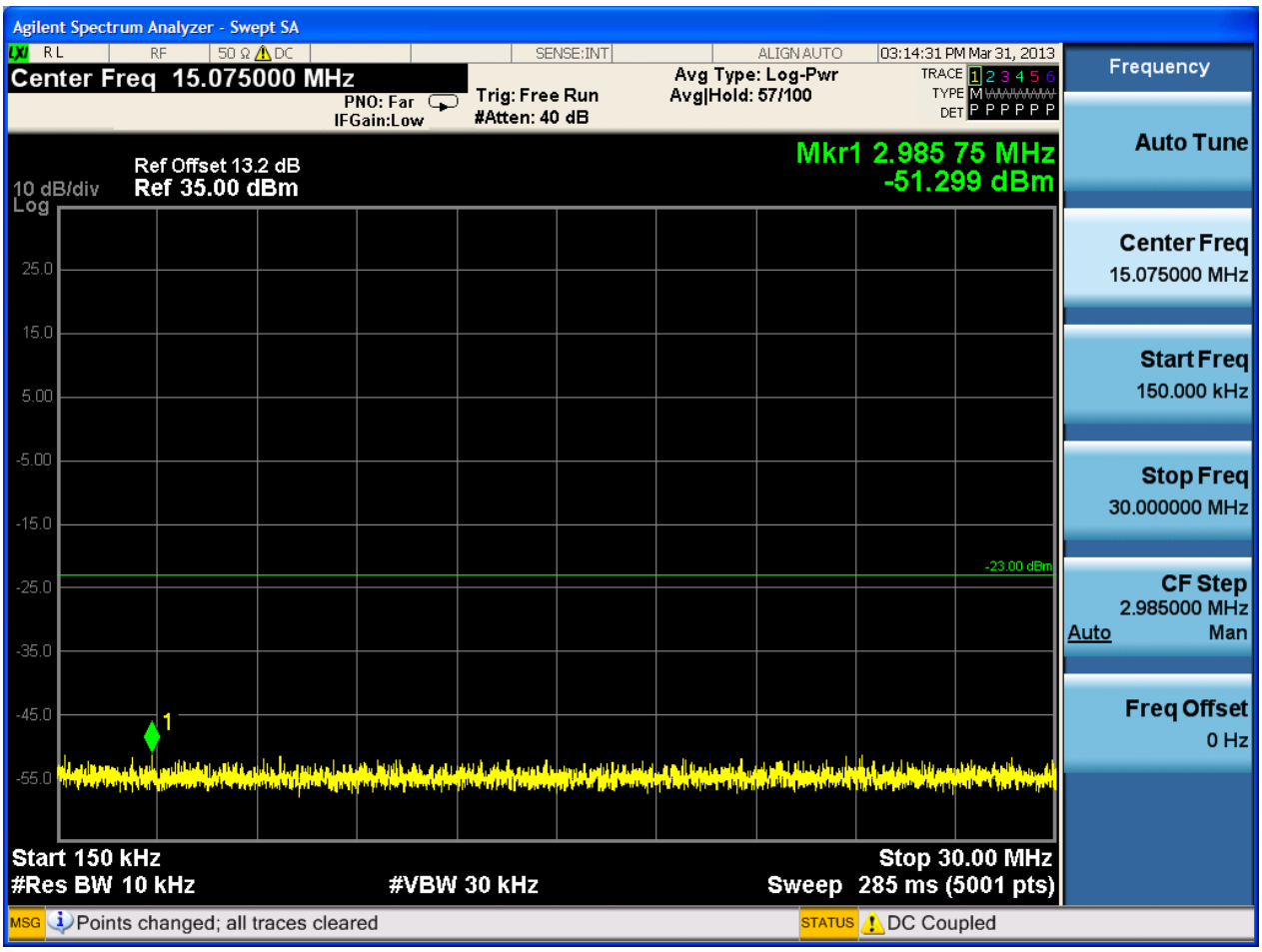


Huawei Proprietary and Confidential
Copyright © Huawei Technologies Co., Ltd.

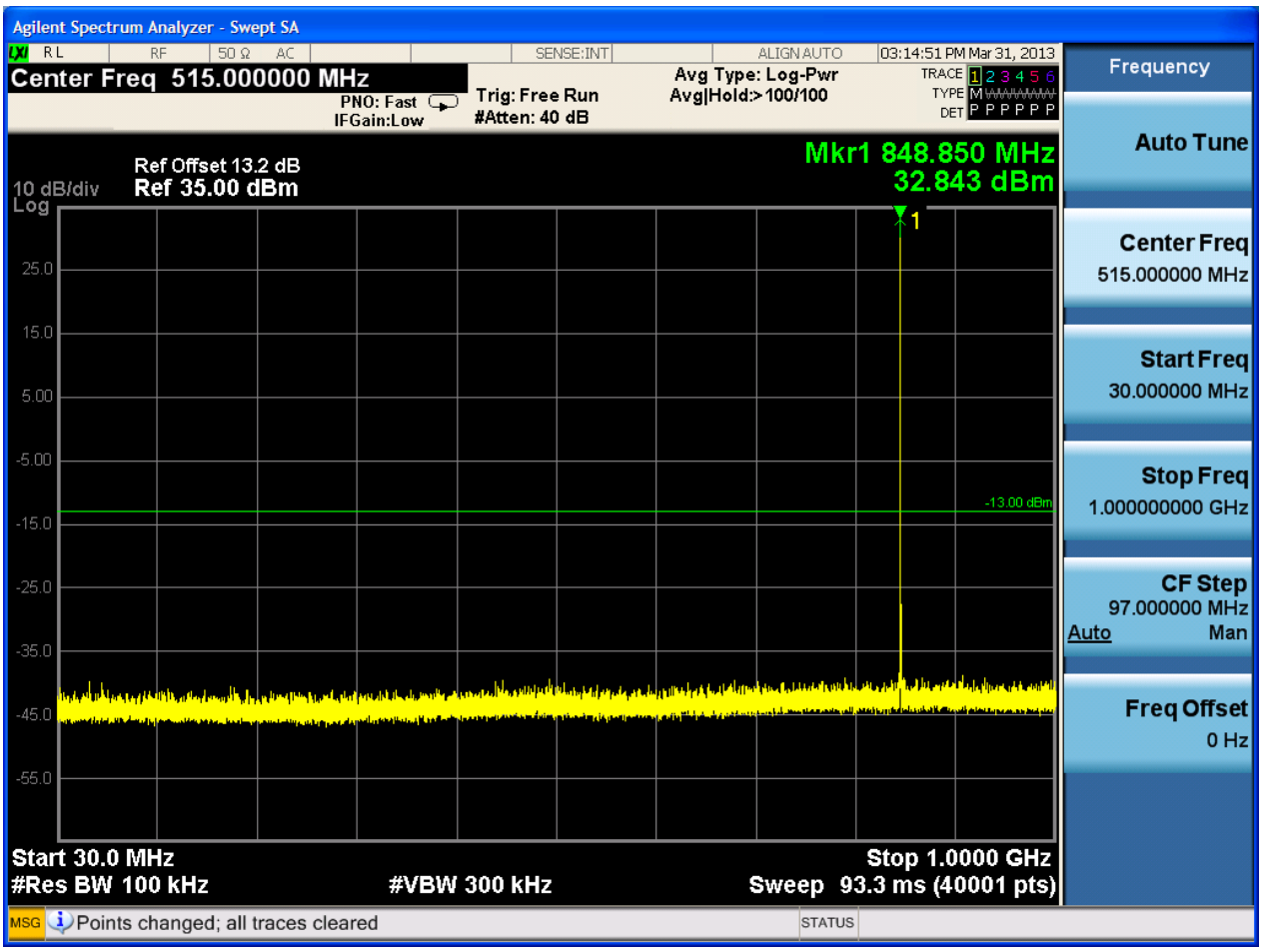
6.1.1.1.3 Test Channel = HCH



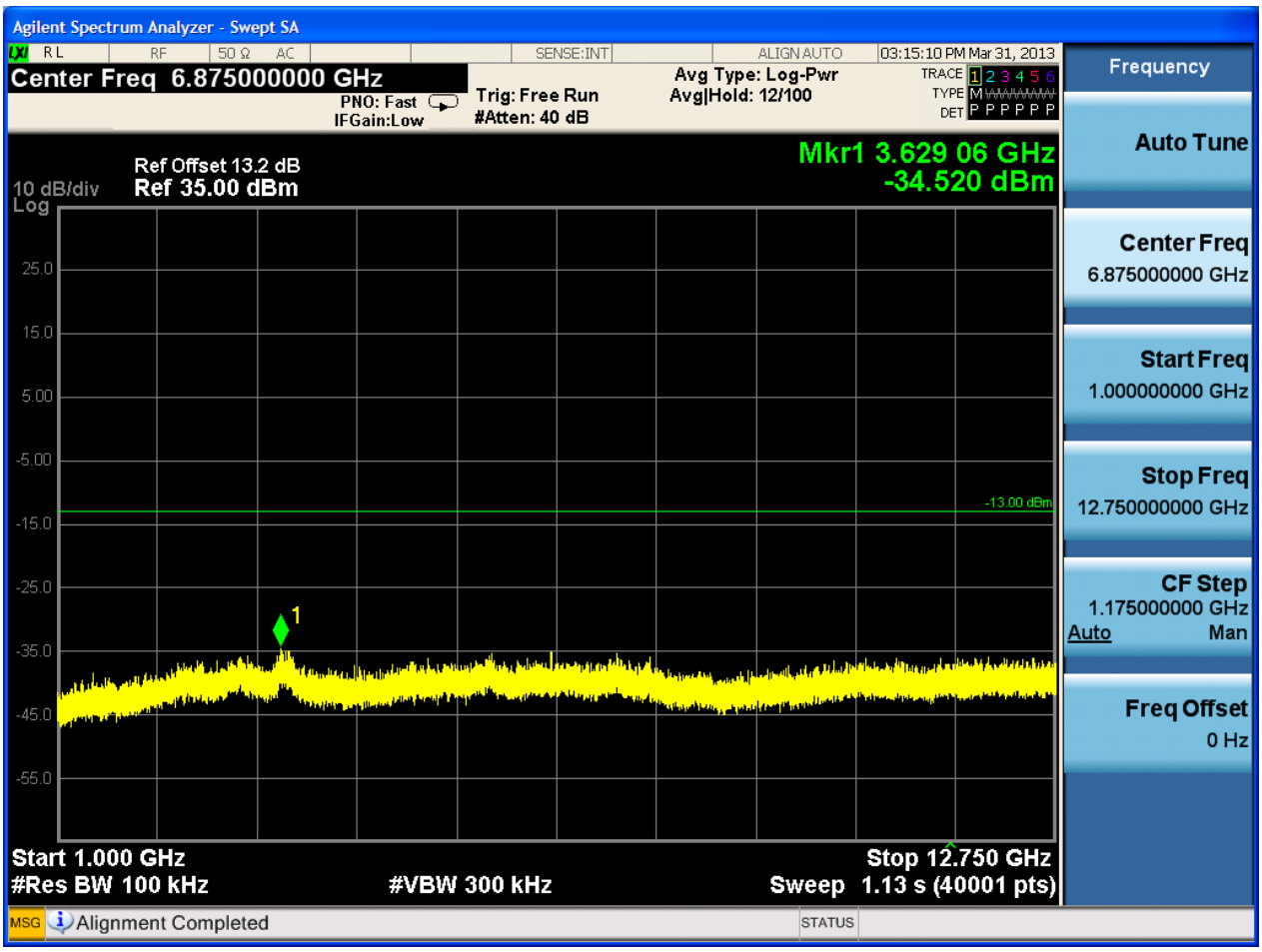
Copyright © Huawei Technologies Co., Ltd.



Copyright © Huawei Technologies Co., Ltd.



Copyright © Huawei Technologies Co., Ltd.

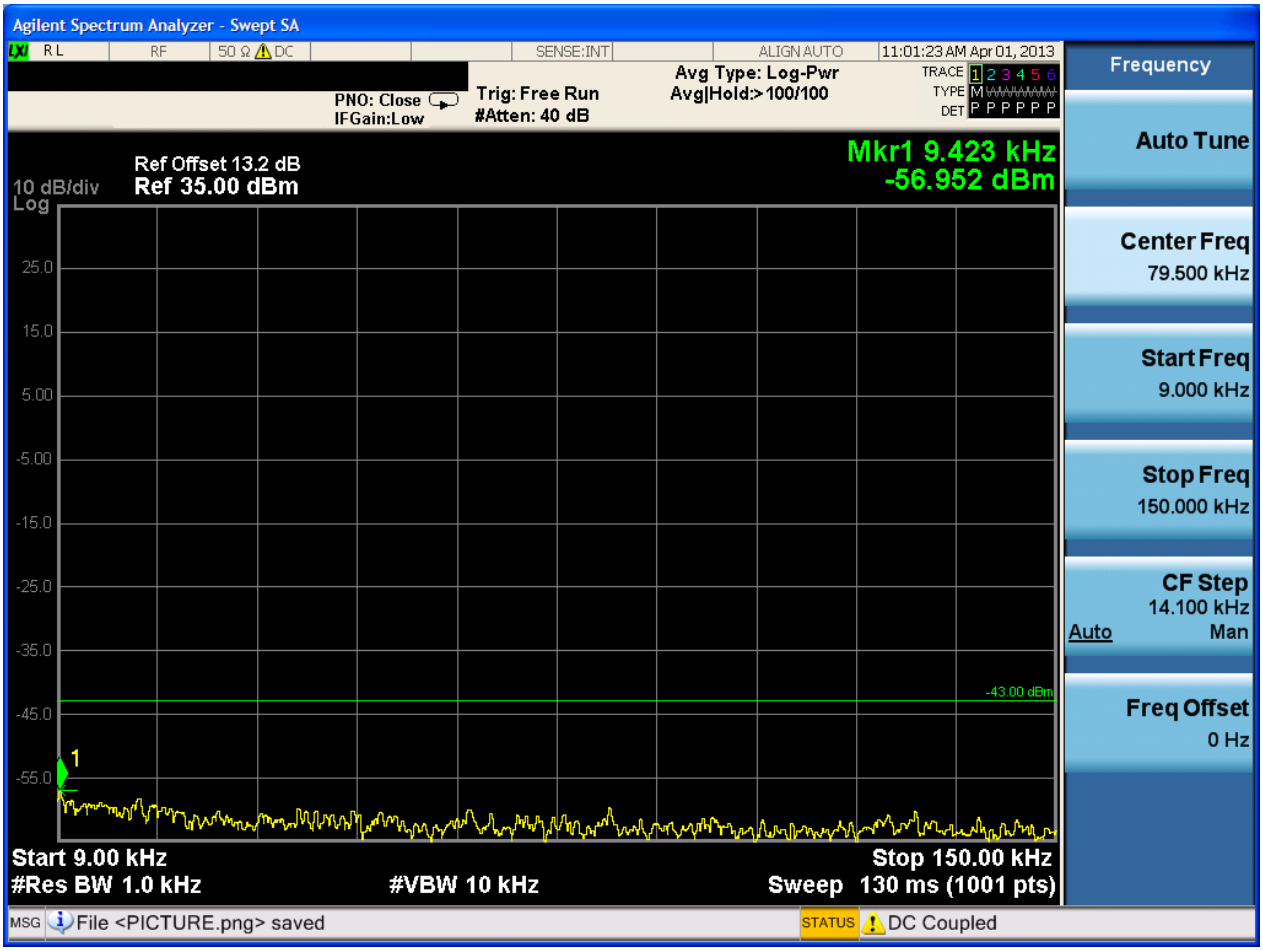


Copyright © Huawei Technologies Co., Ltd.

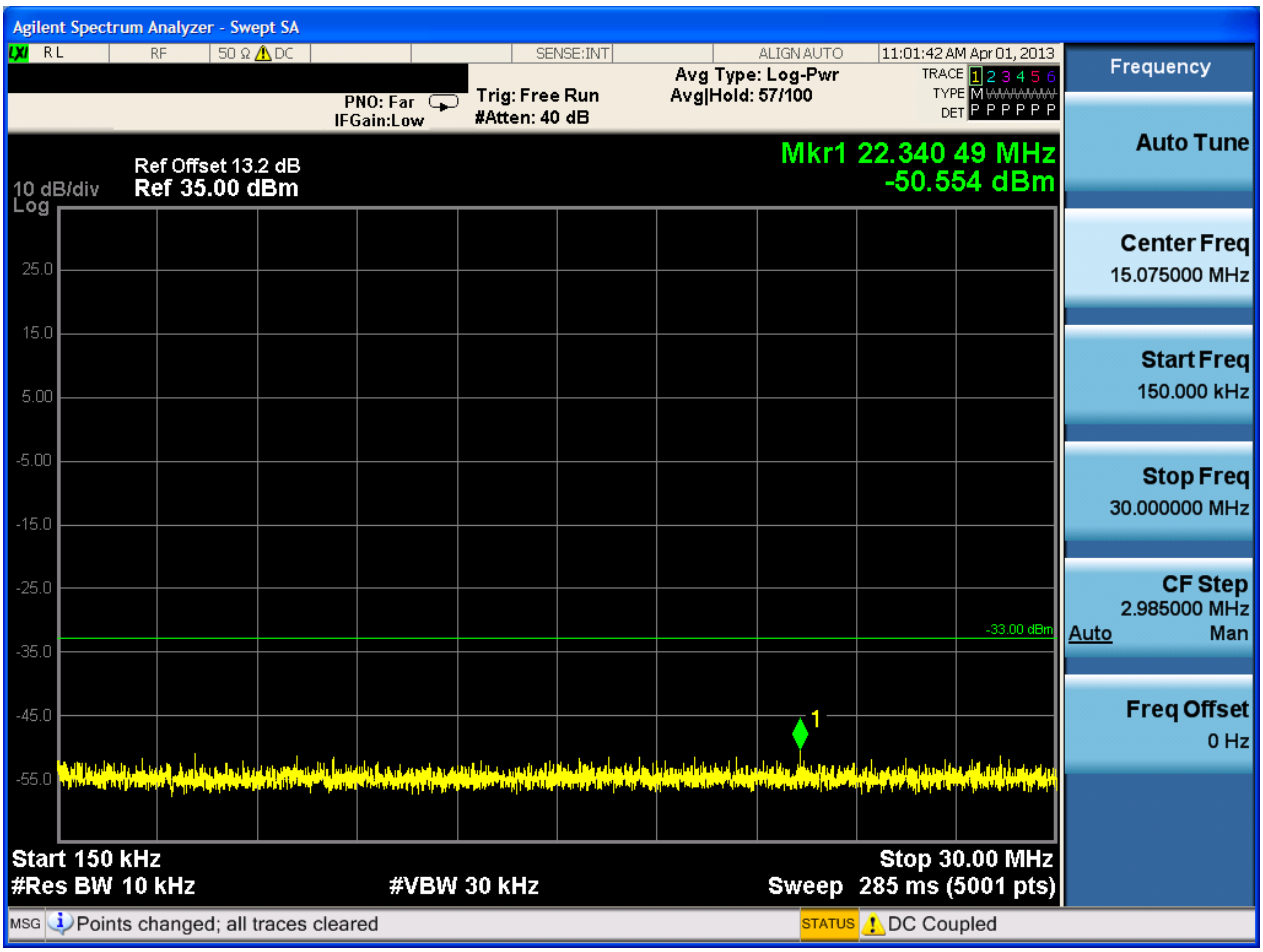
6.1.2 Test Band = GSM1900

6.1.2.1 Test Mode = GSM/TM1

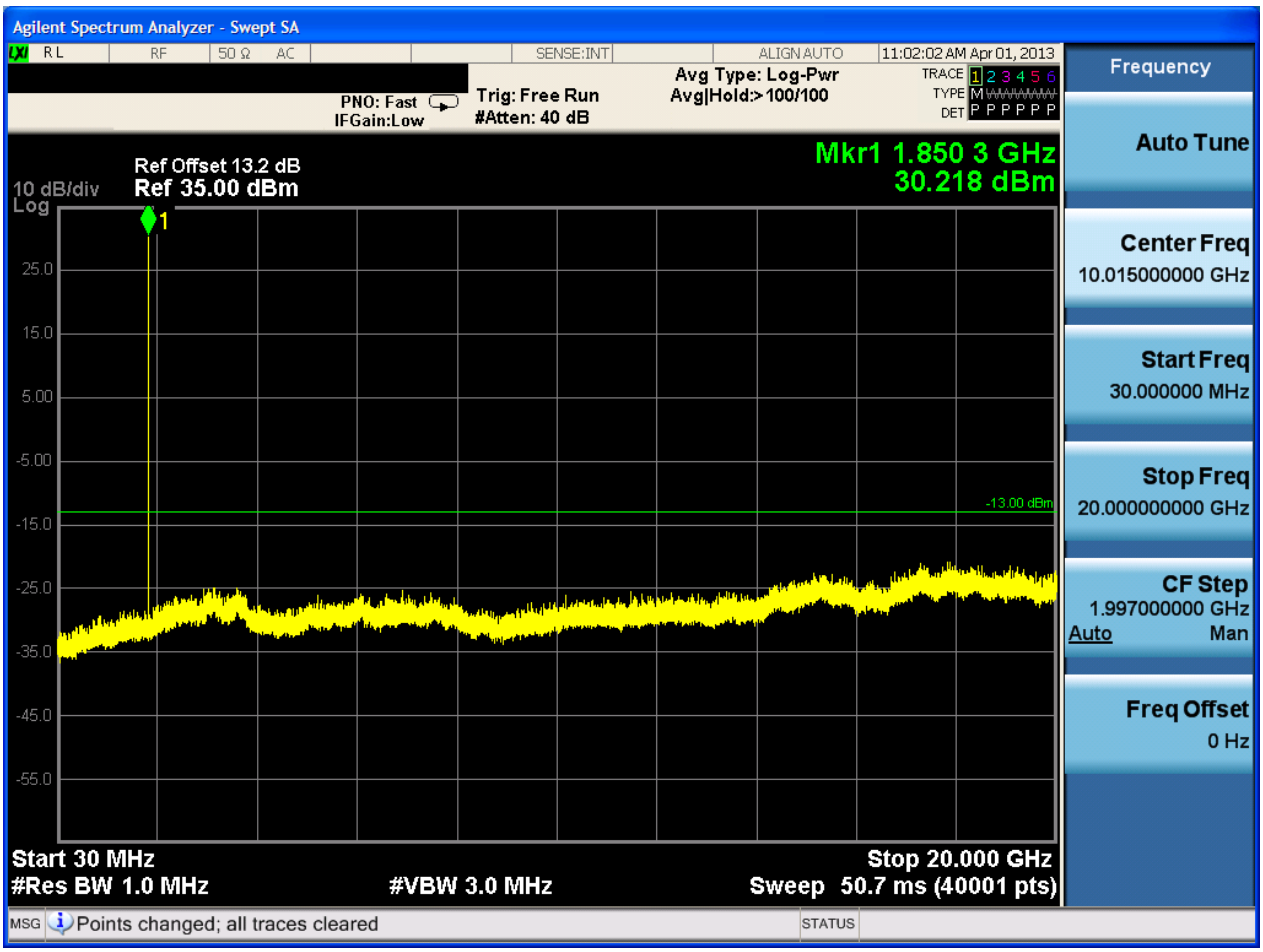
6.1.2.1.1 Test Channel = LCH



Copyright © Huawei Technologies Co., Ltd.

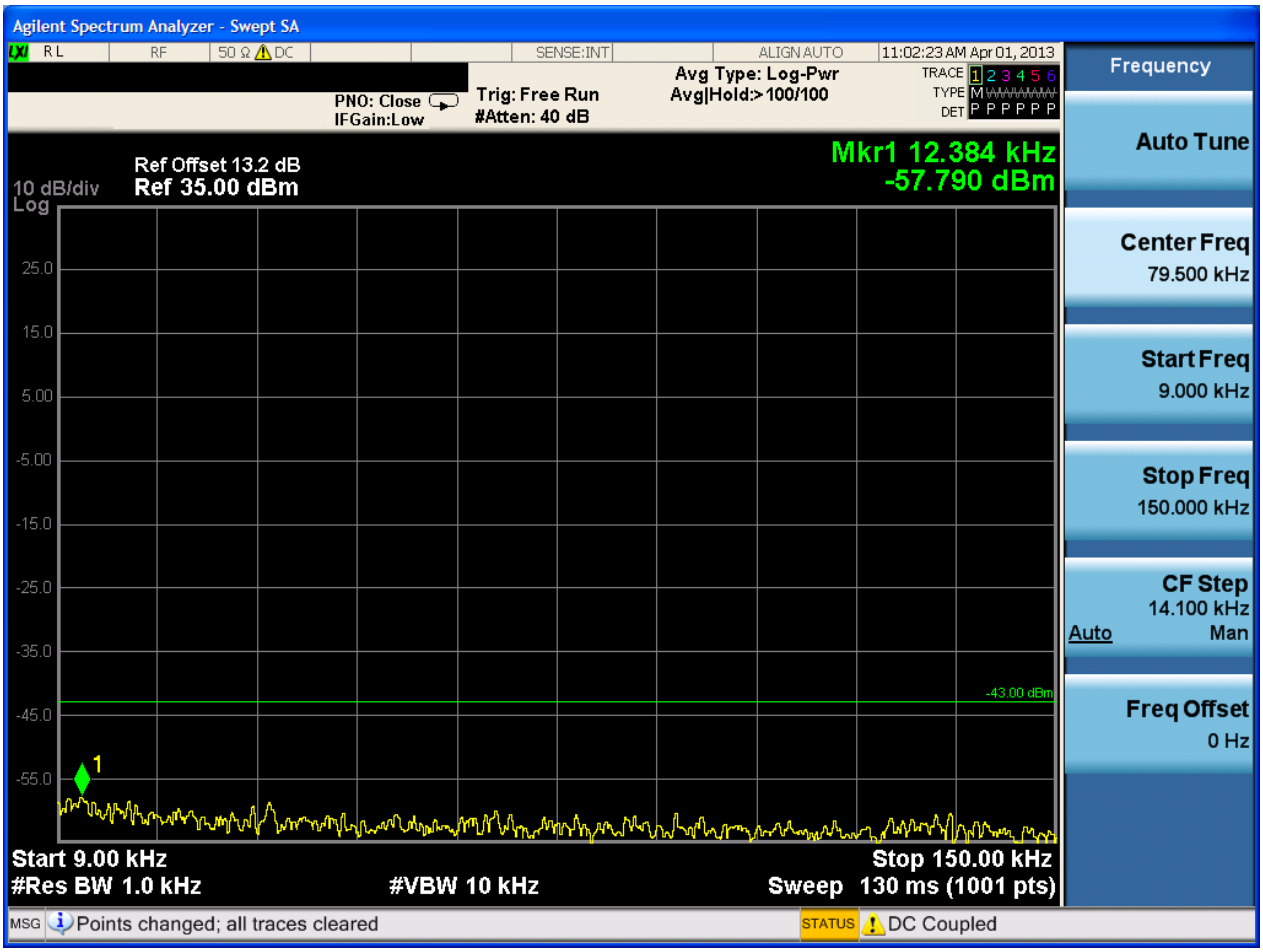


Huawei Proprietary and Confidential
Copyright © Huawei Technologies Co., Ltd.

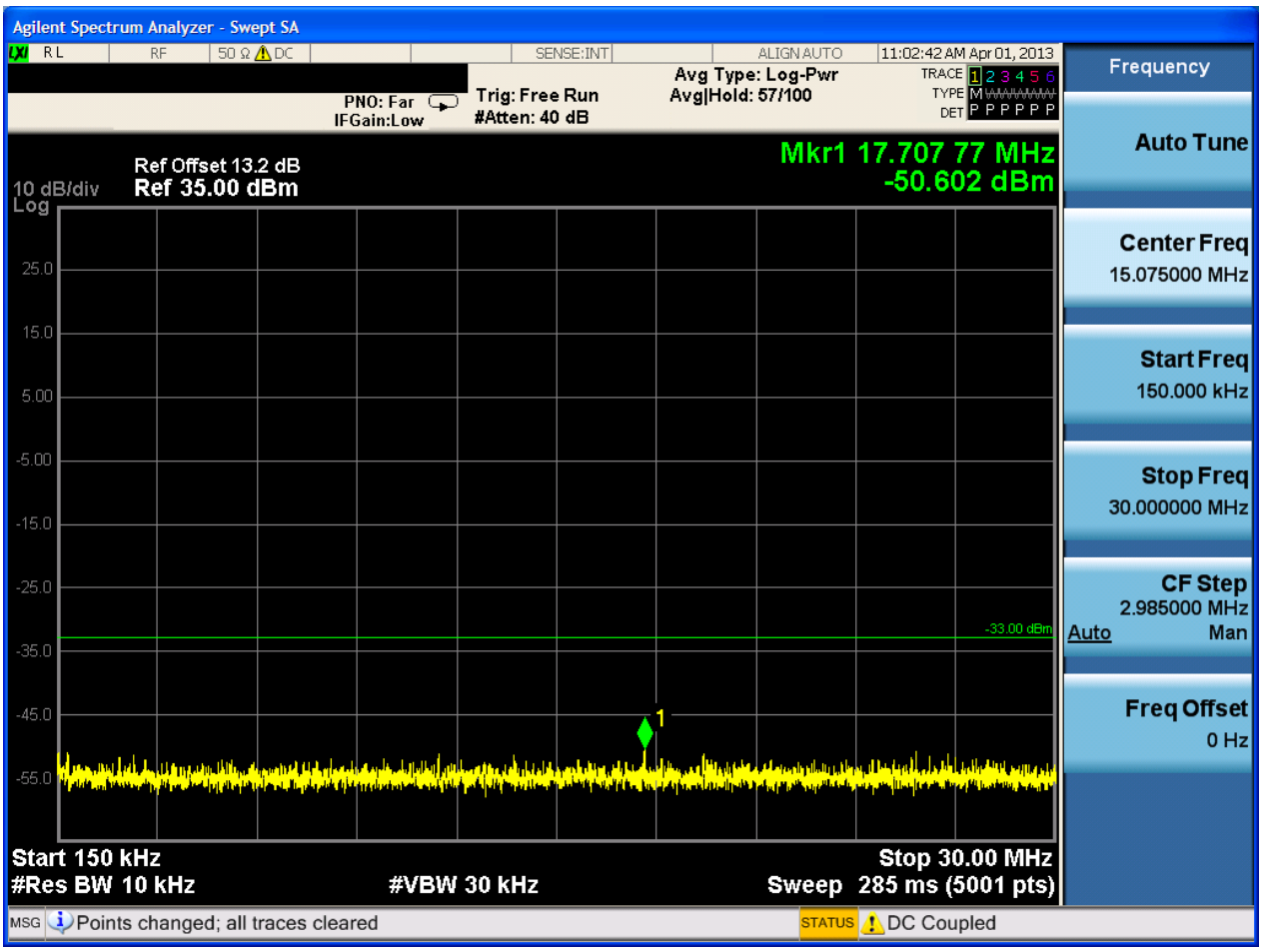


Copyright © Huawei Technologies Co., Ltd.

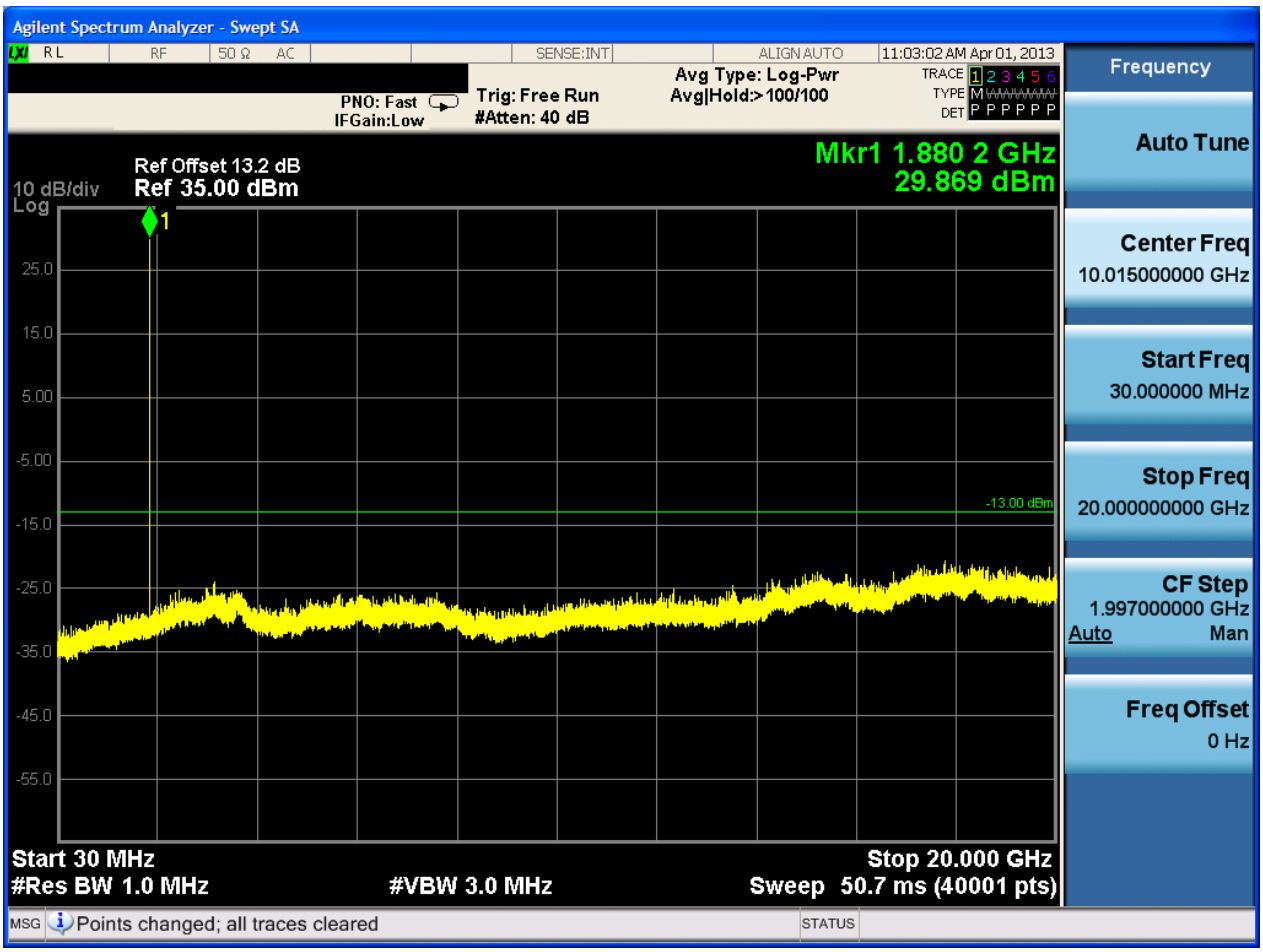
6.1.2.1.2 Test Channel = MCH



Copyright © Huawei Technologies Co., Ltd.

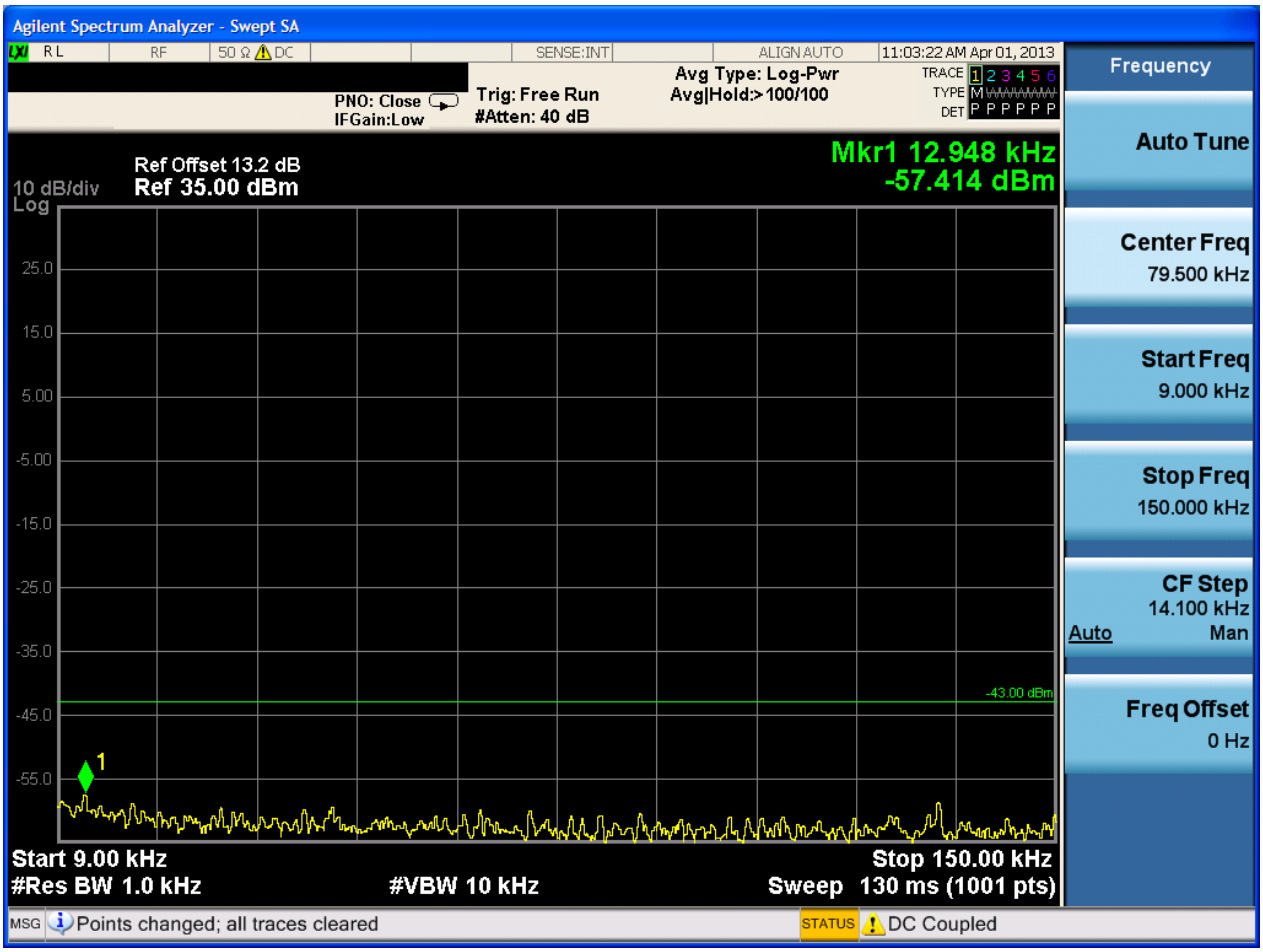


Huawei Proprietary and Confidential
Copyright © Huawei Technologies Co., Ltd.

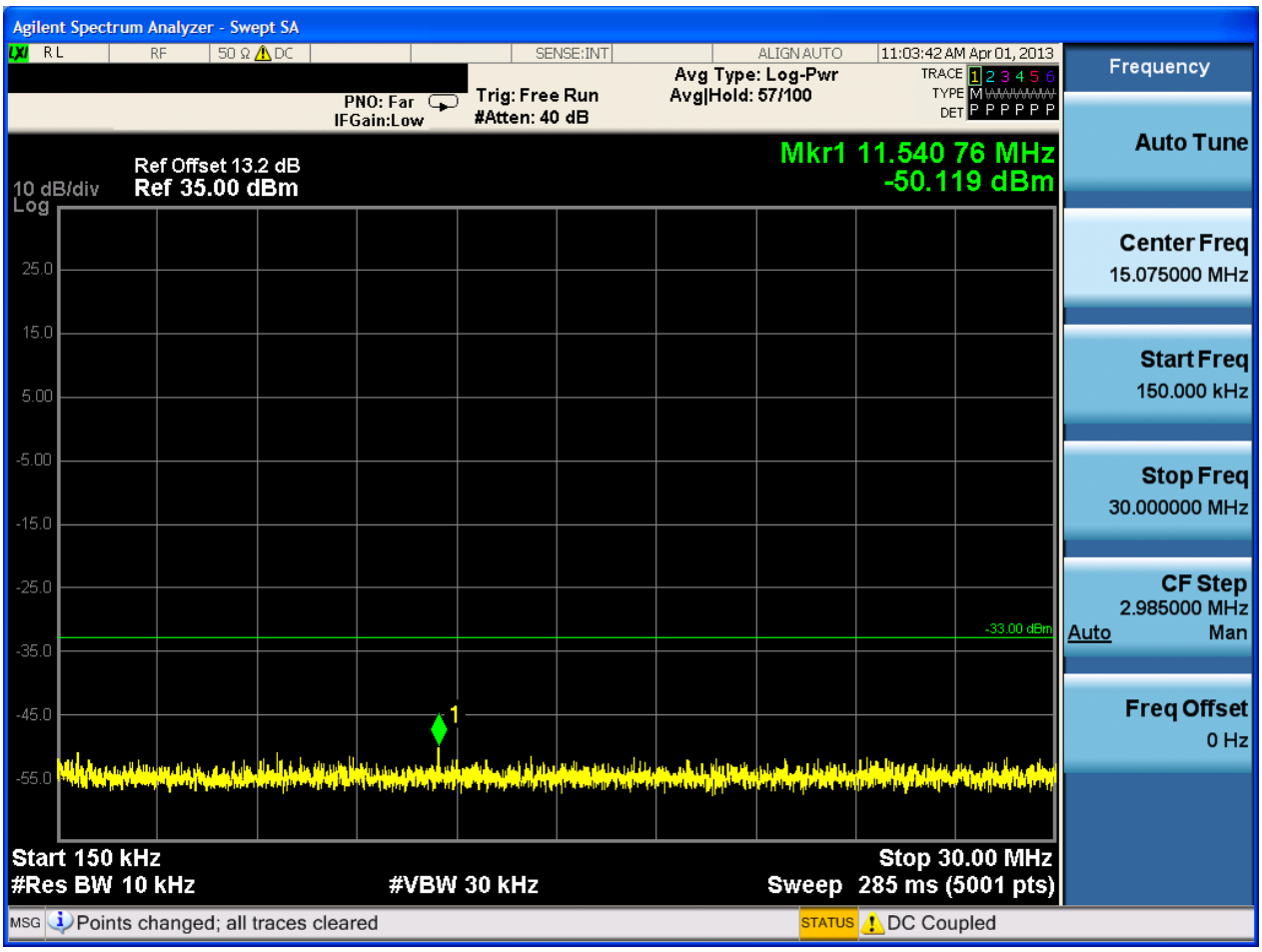


Copyright © Huawei Technologies Co., Ltd.

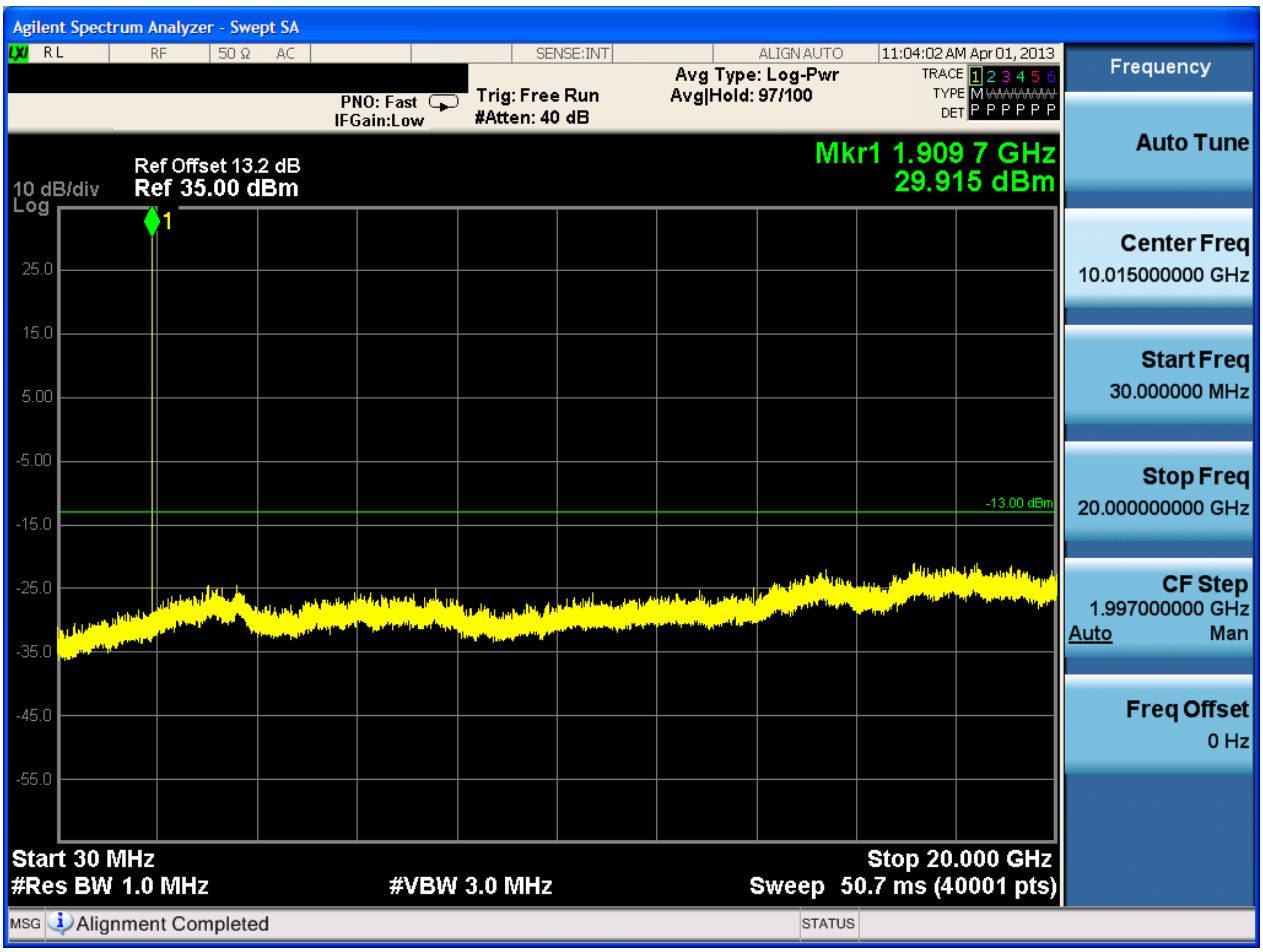
6.1.2.1.3 Test Channel = HCH



Copyright © Huawei Technologies Co., Ltd.



Huawei Proprietary and Confidential
Copyright © Huawei Technologies Co., Ltd.



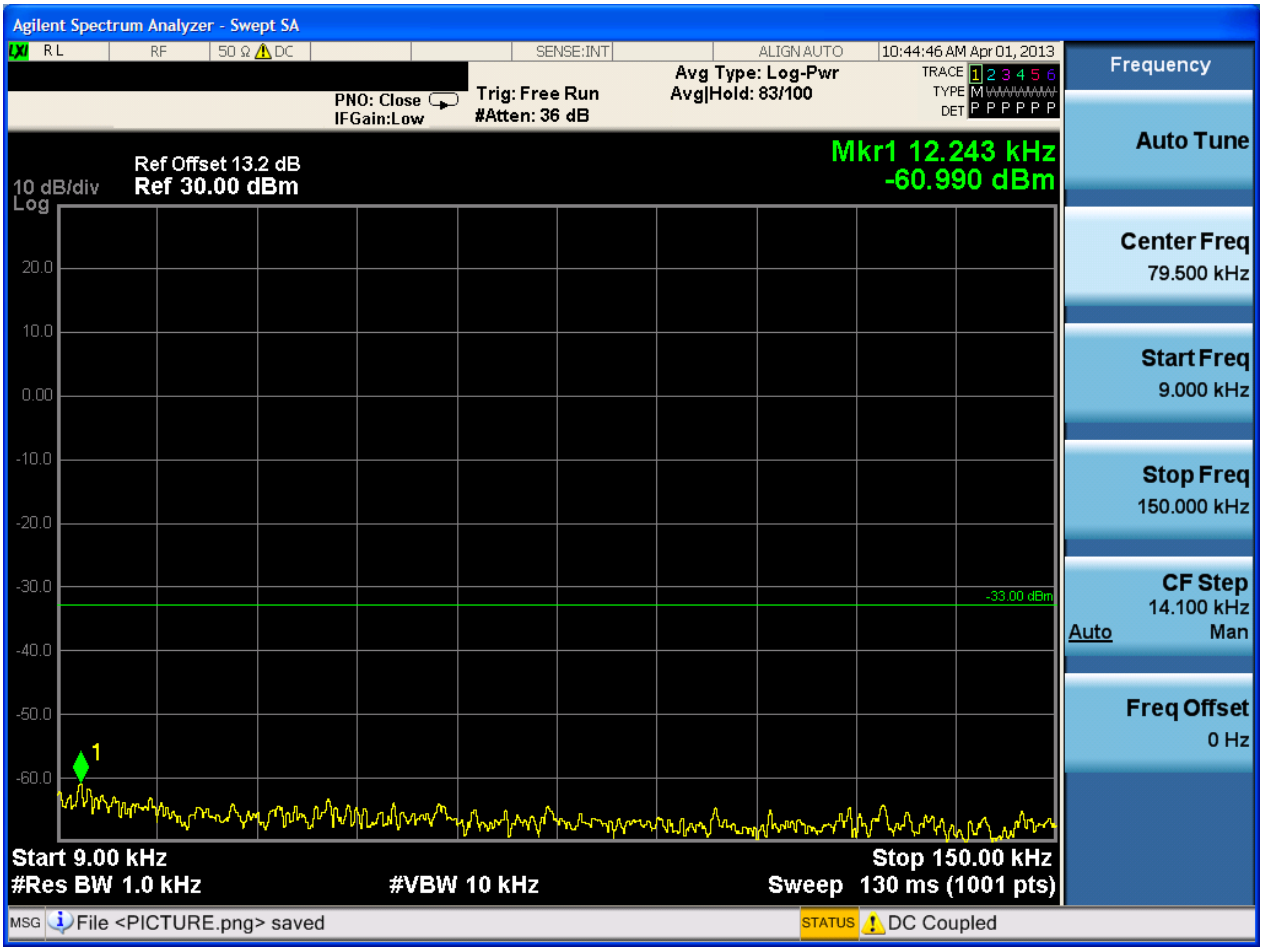
Huawei Proprietary and Confidential
Copyright © Huawei Technologies Co., Ltd.

6.2 For UMTS

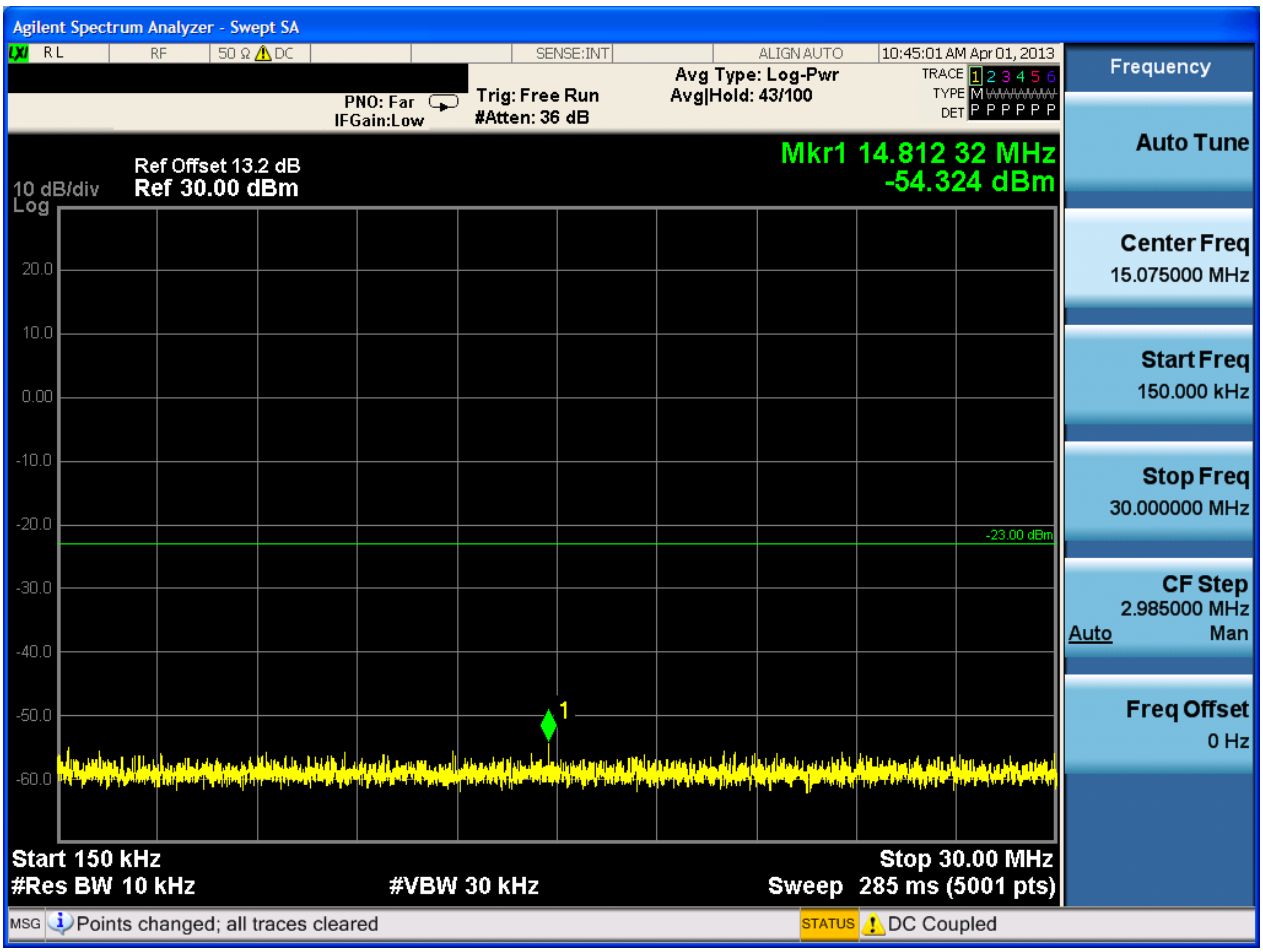
6.2.1 Test Band = WCDMA850

6.2.1.1 Test Mode = UMTS/TM1

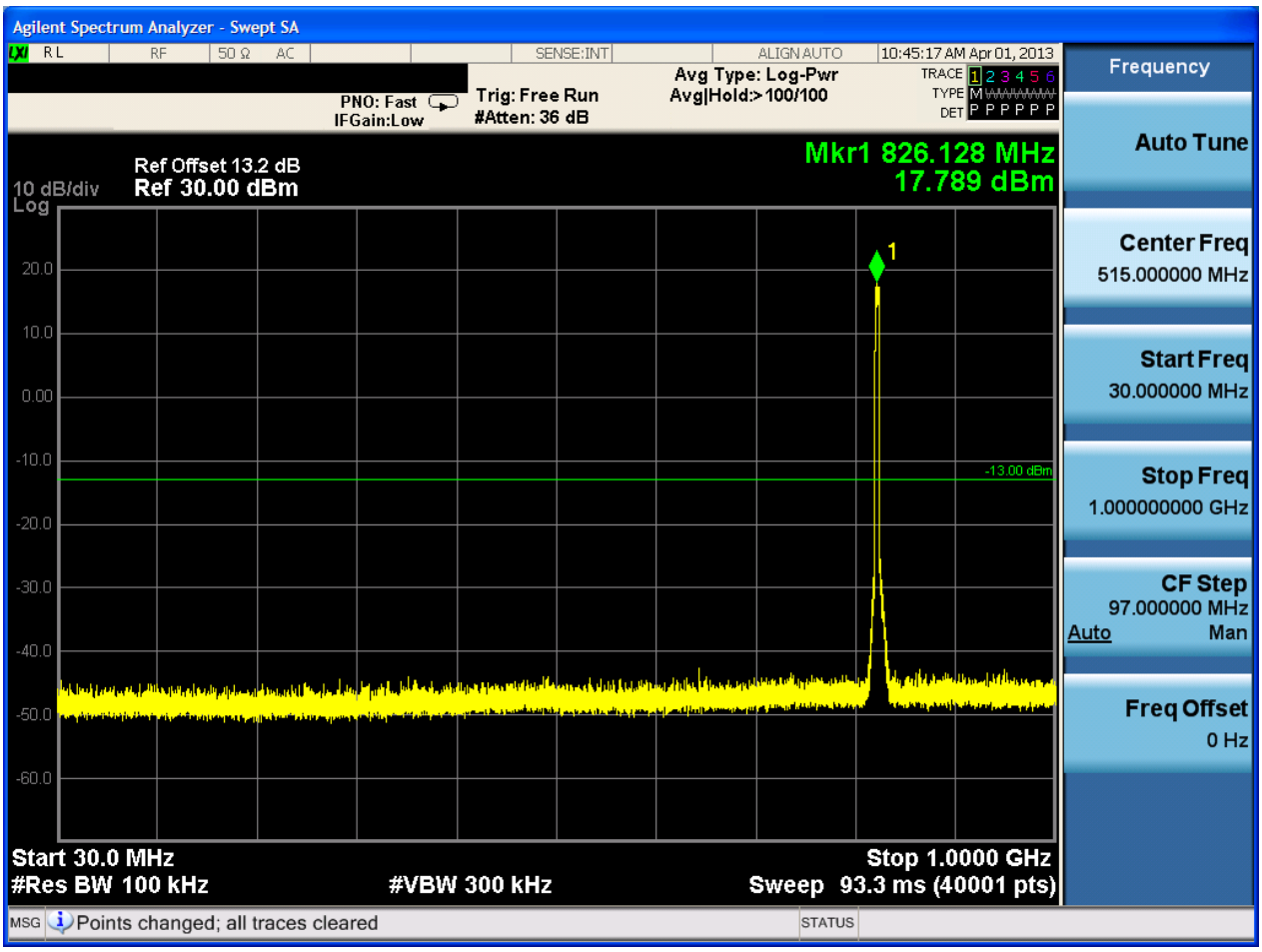
6.2.1.1.1 Test Channel = LCH



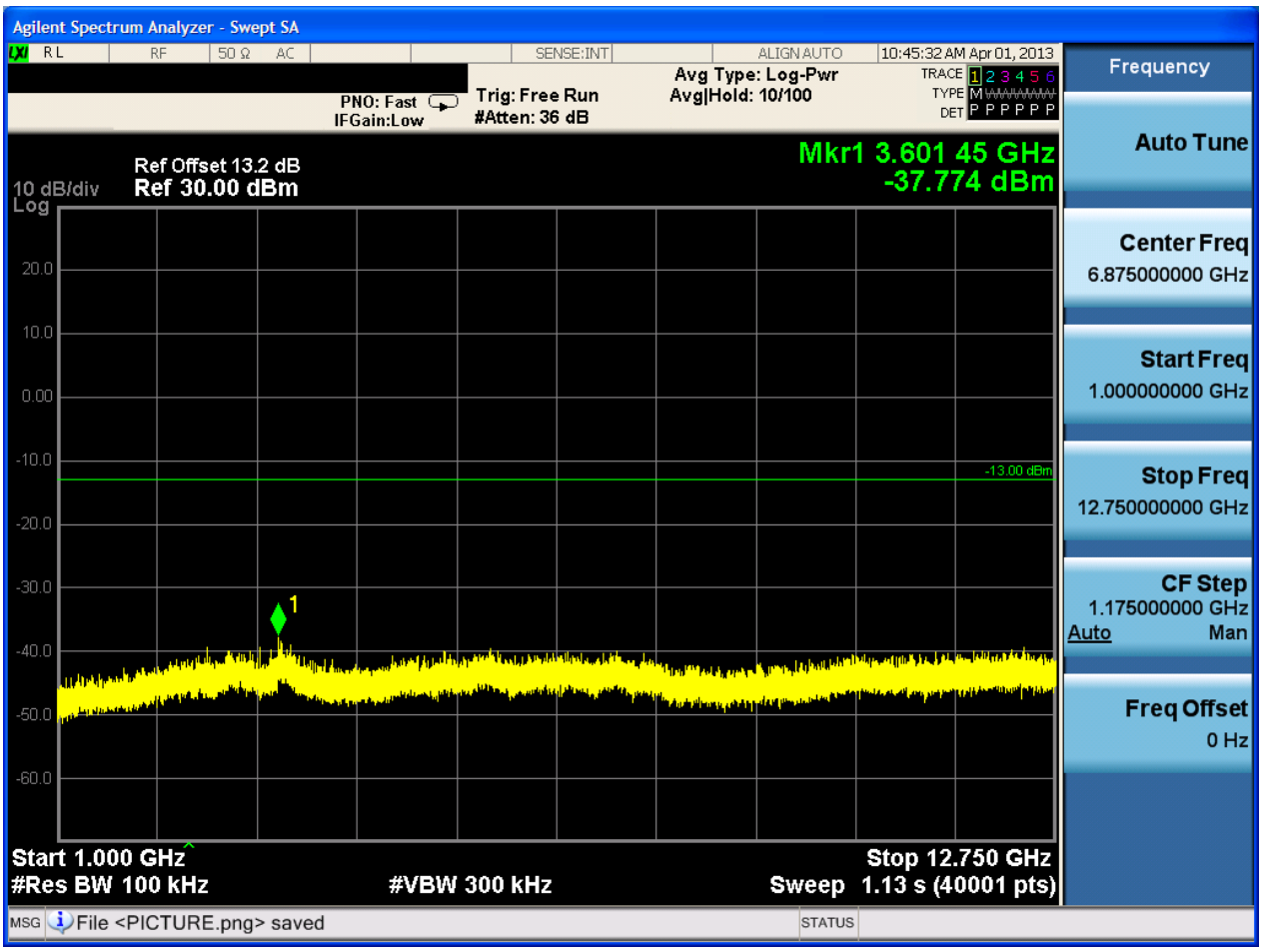
Copyright © Huawei Technologies Co., Ltd.



Huawei Proprietary and Confidential
Copyright © Huawei Technologies Co., Ltd.

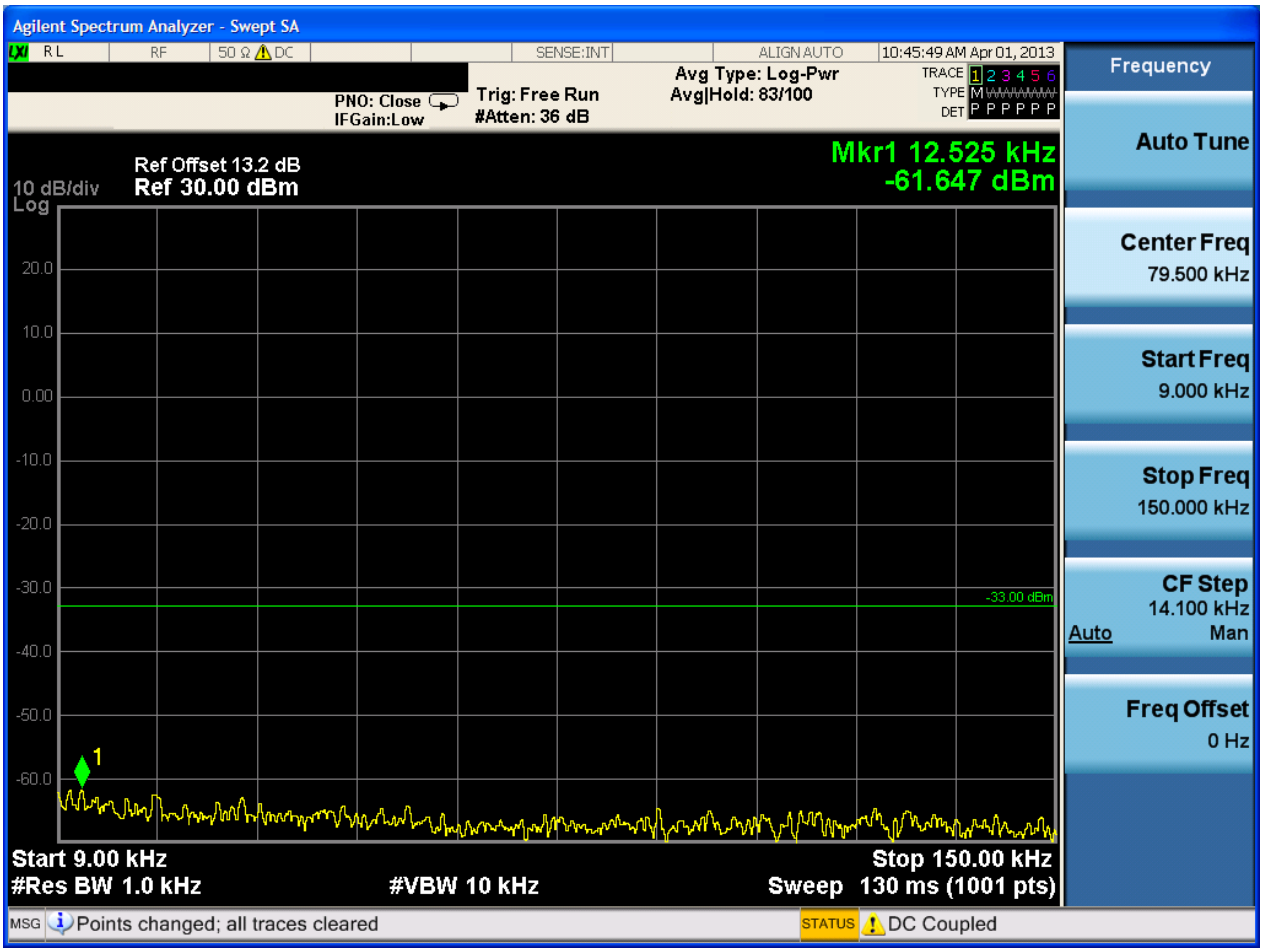


Copyright © Huawei Technologies Co., Ltd.

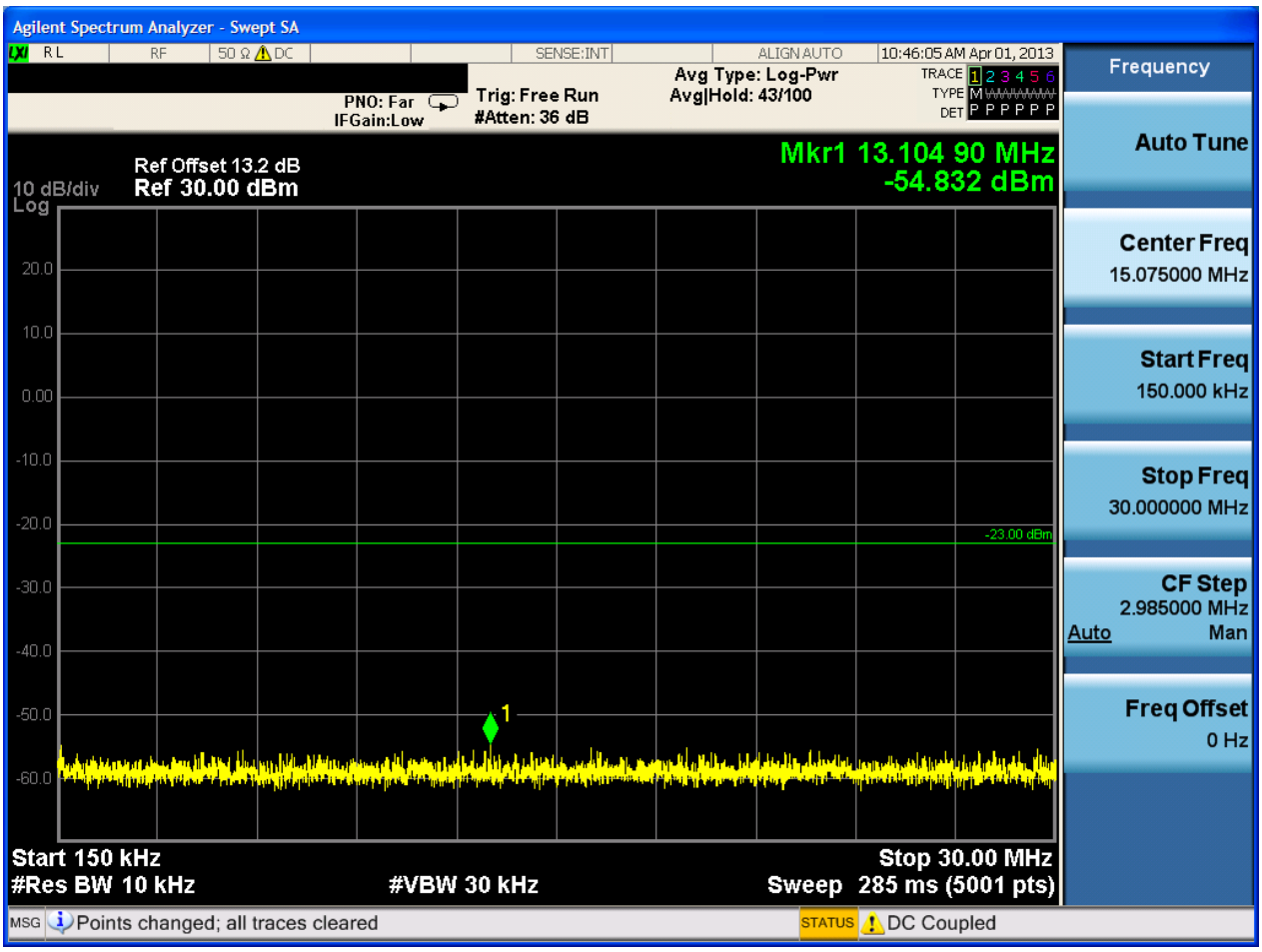


Huawei Proprietary and Confidential
Copyright © Huawei Technologies Co., Ltd.

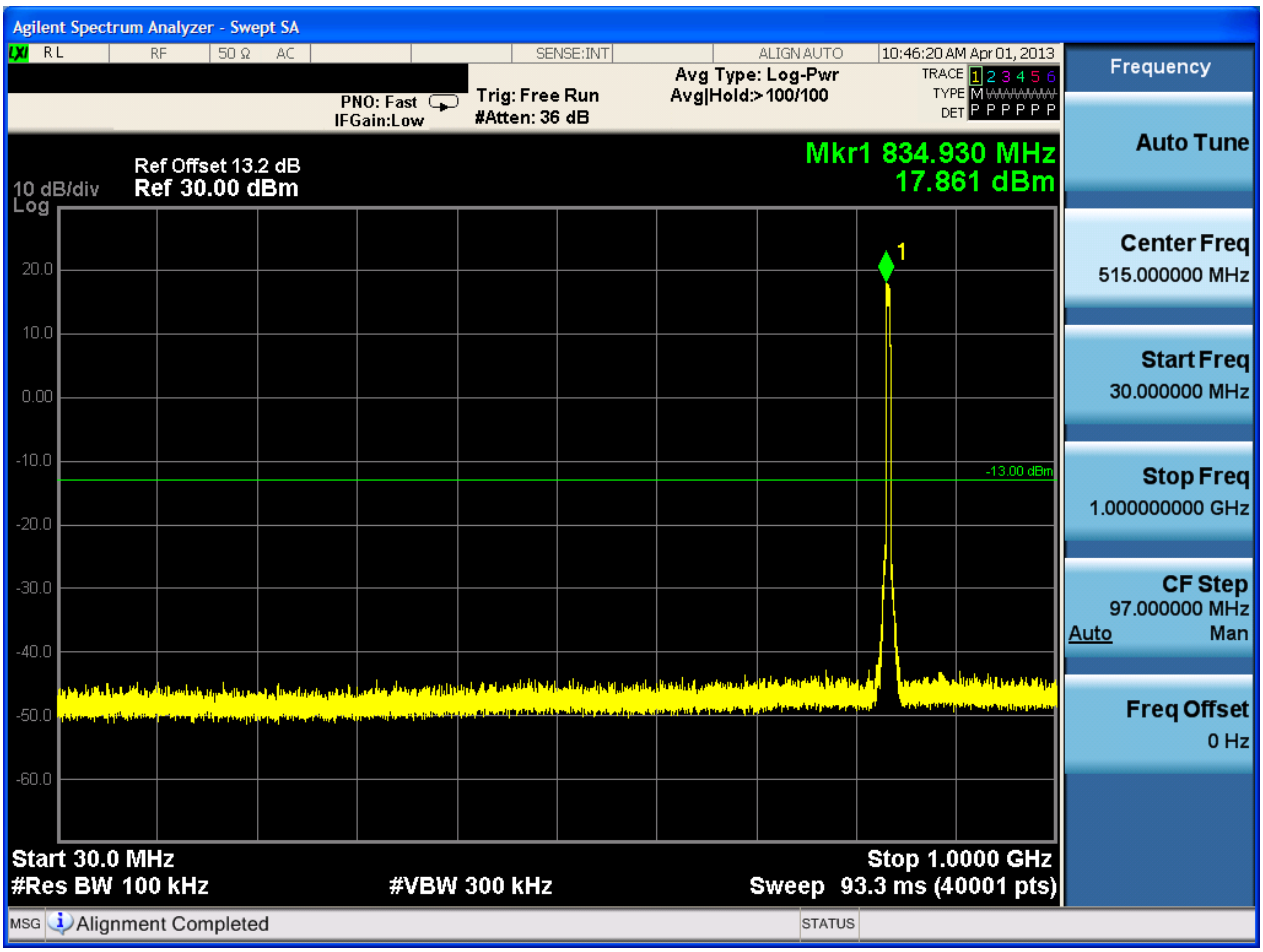
6.2.1.1.2 Test Channel = MCH



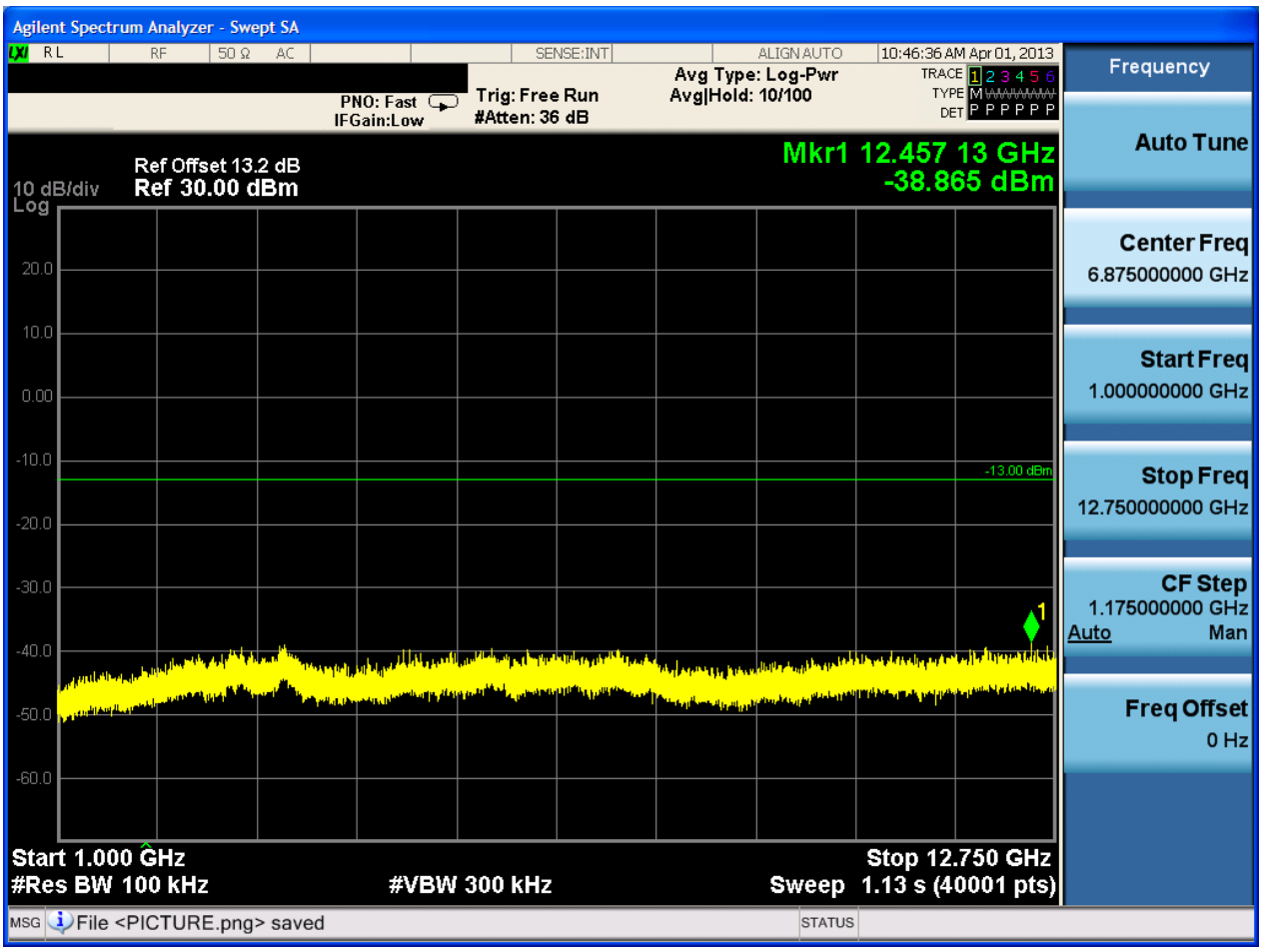
Copyright © Huawei Technologies Co., Ltd.



Copyright © Huawei Technologies Co., Ltd.

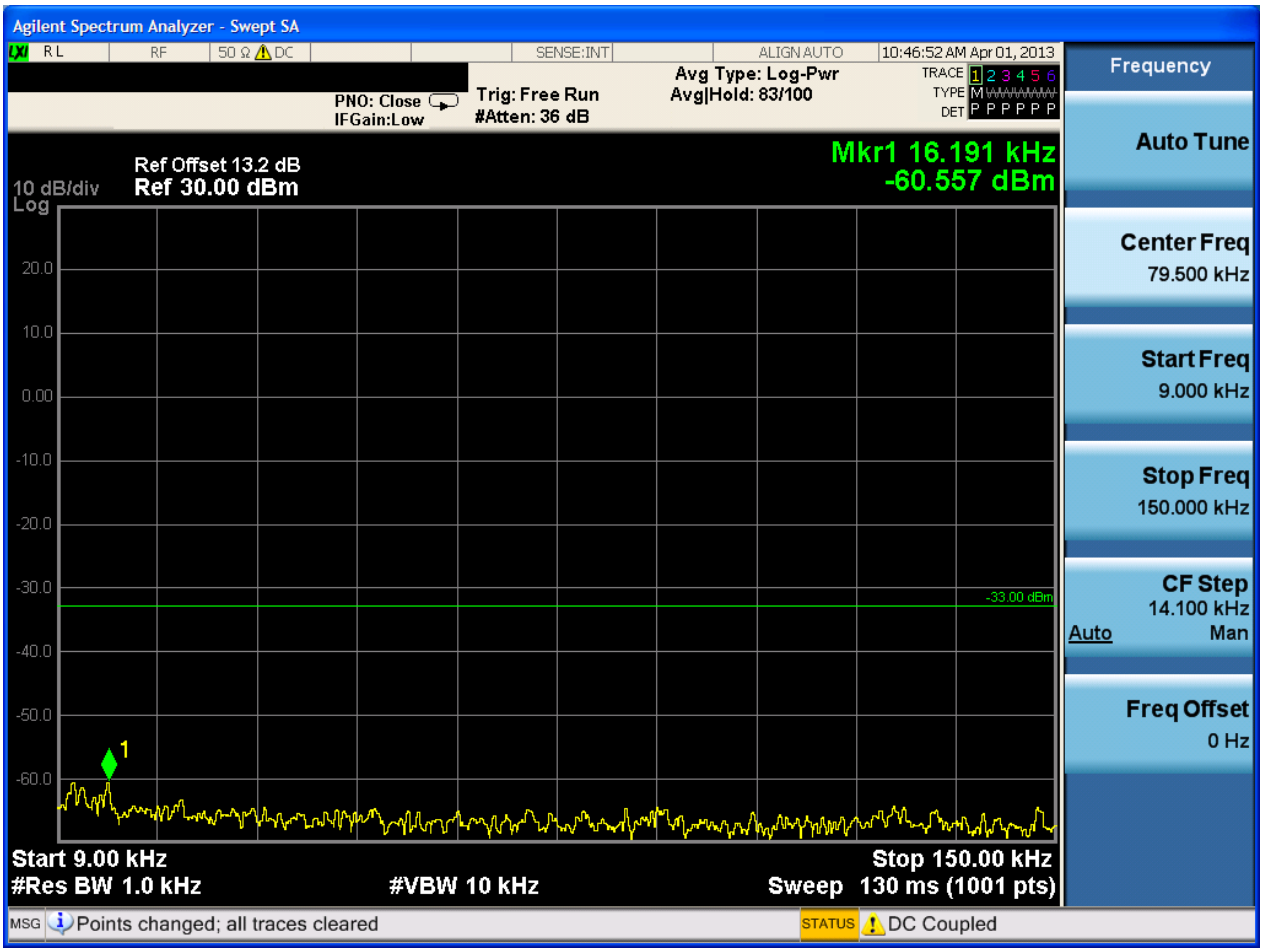


Copyright © Huawei Technologies Co., Ltd.

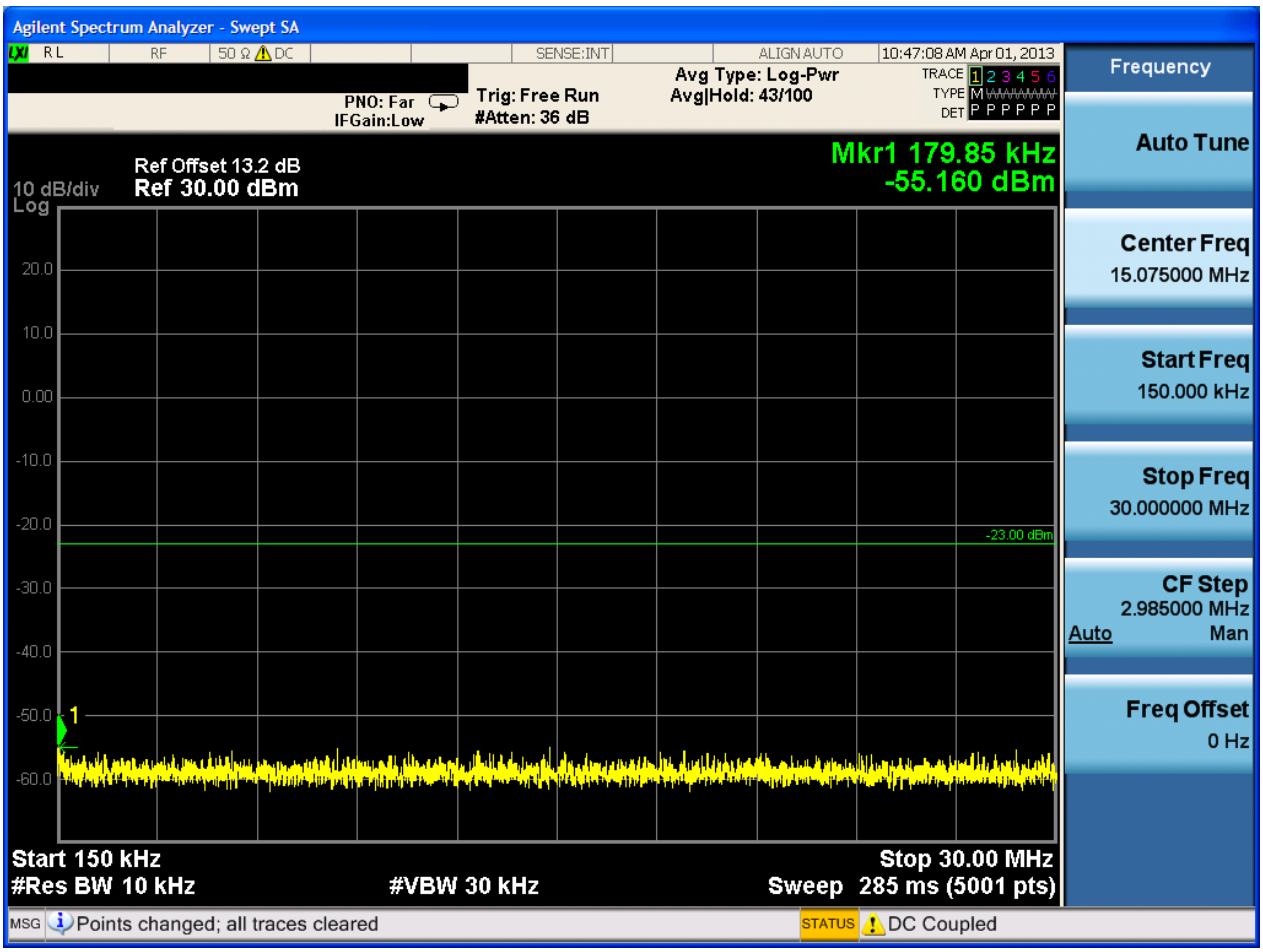


Huawei Proprietary and Confidential
Copyright © Huawei Technologies Co., Ltd.

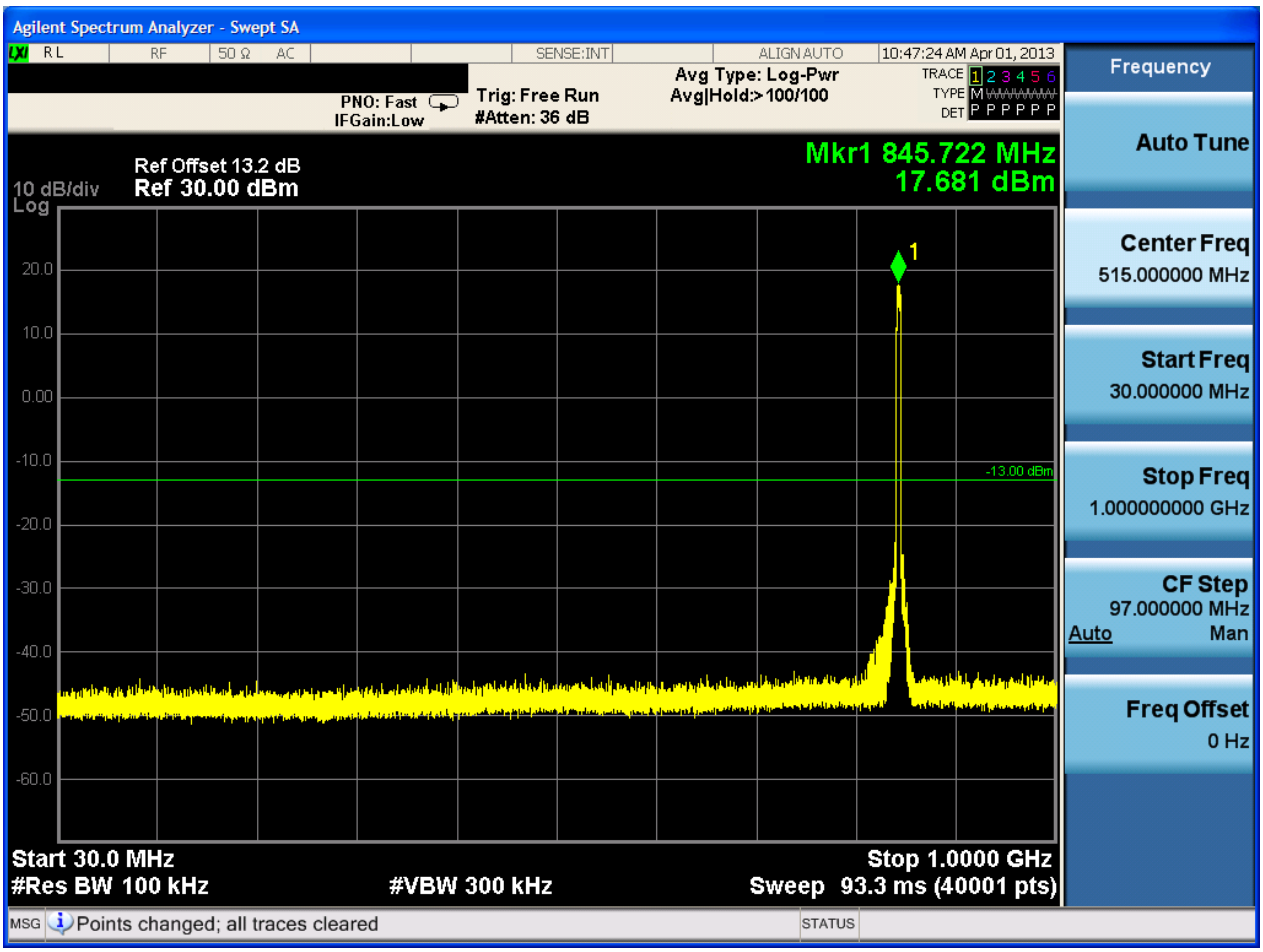
6.2.1.1.3 Test Channel = HCH



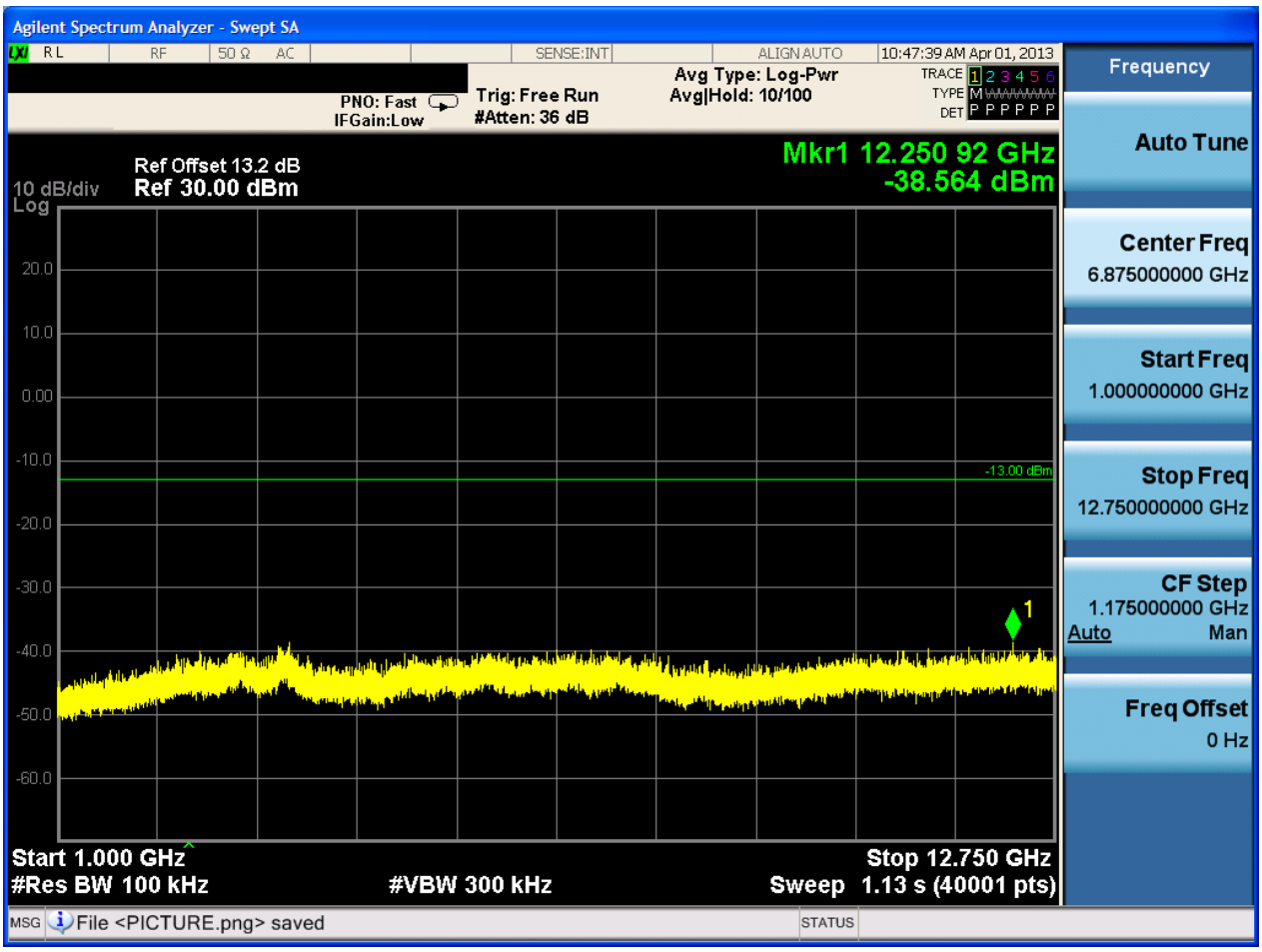
Copyright © Huawei Technologies Co., Ltd.



Huawei Proprietary and Confidential
Copyright © Huawei Technologies Co., Ltd.



Copyright © Huawei Technologies Co., Ltd.

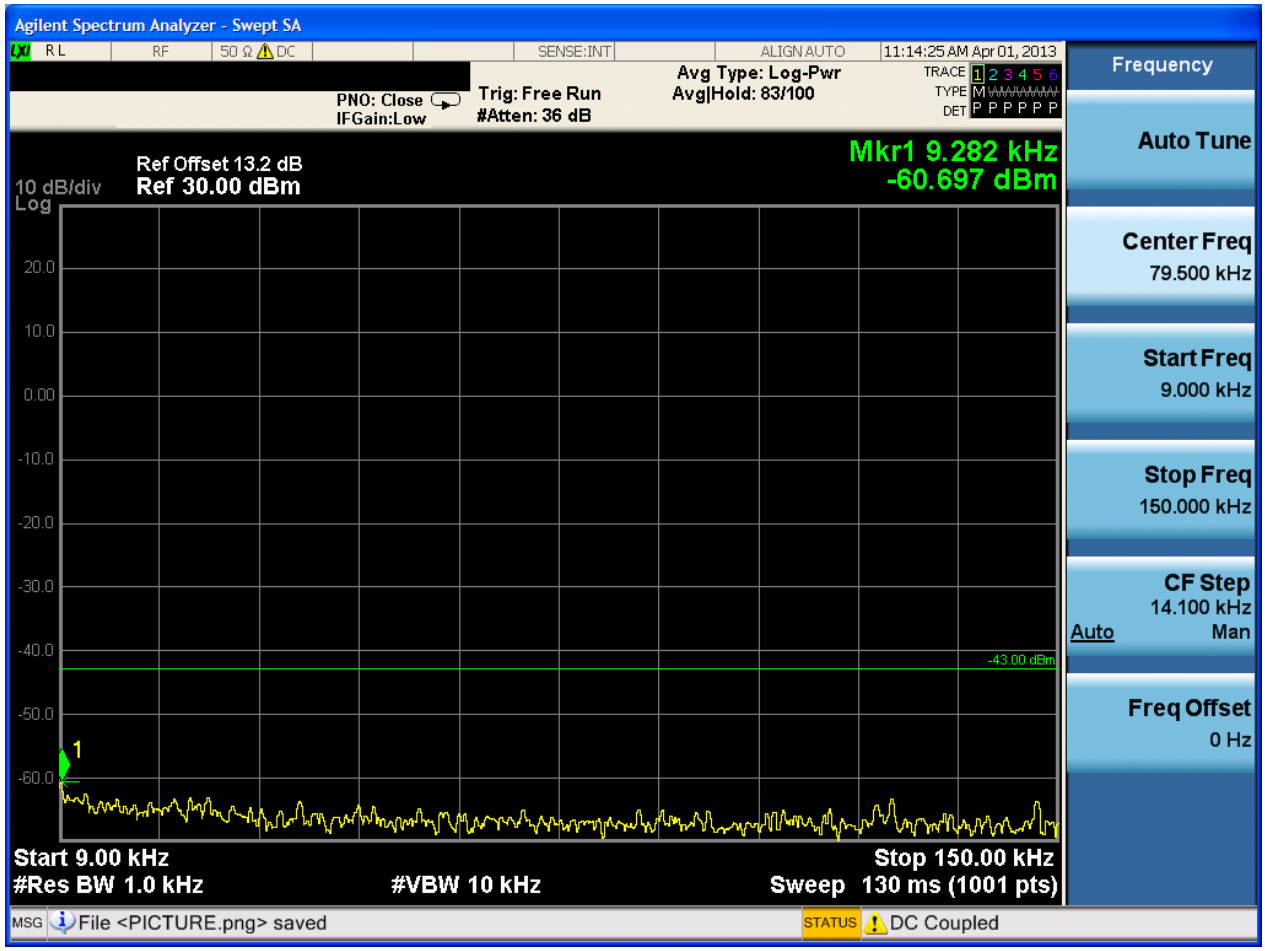


Copyright © Huawei Technologies Co., Ltd.

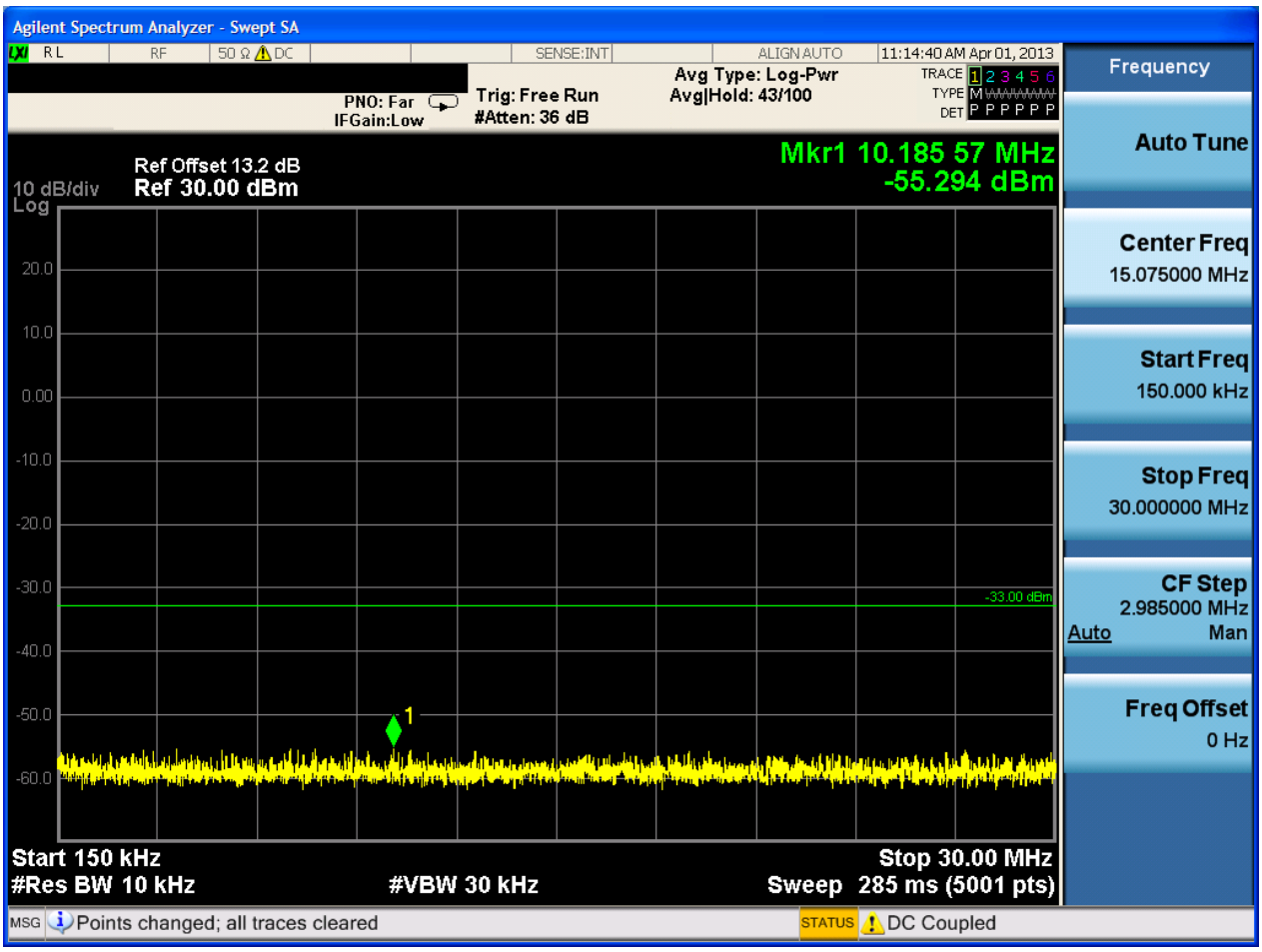
6.2.2 Test Band = WCDMA1900

6.2.2.1 Test Mode = UMTS/TM1

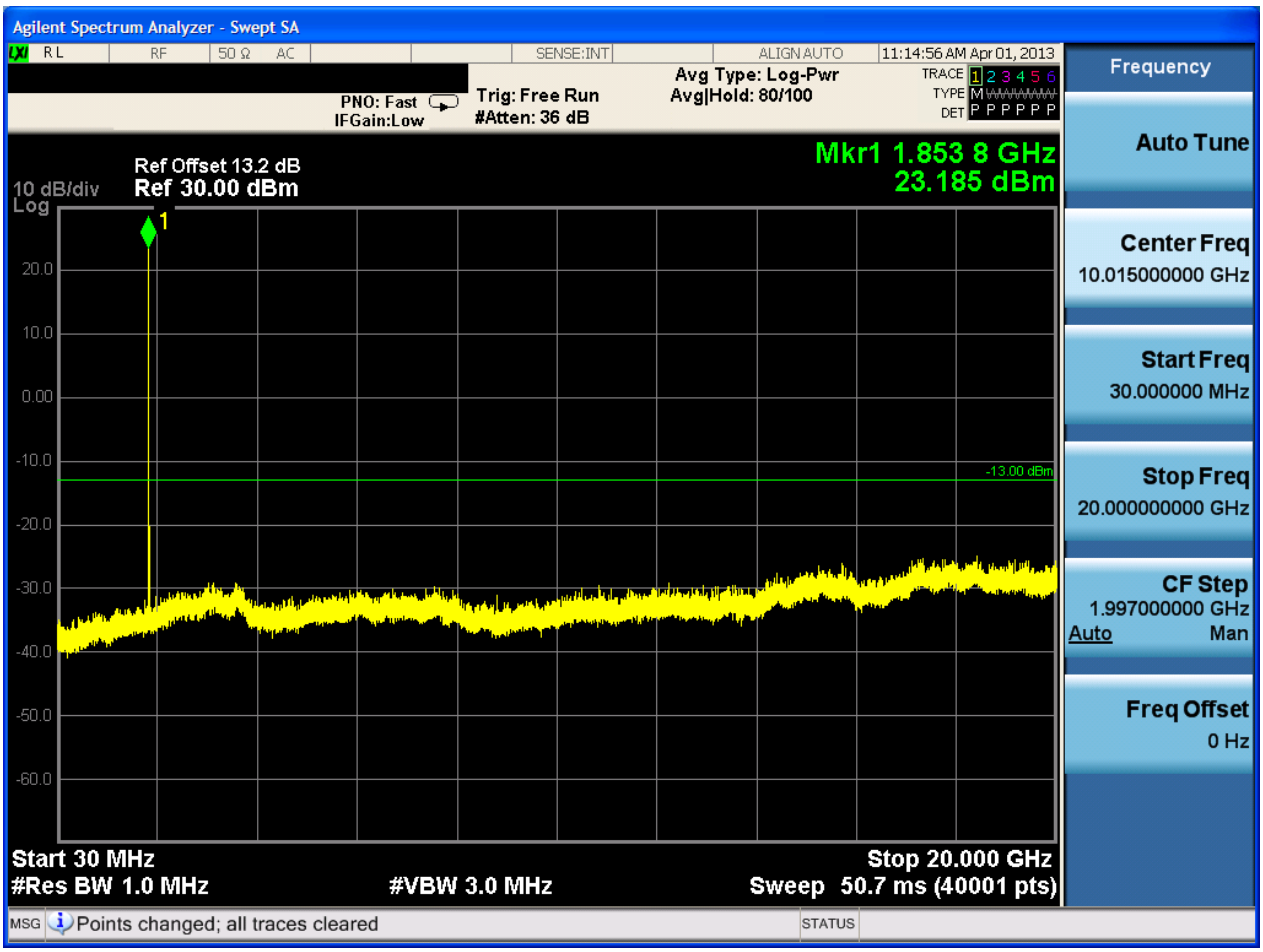
6.2.2.1.1 Test Channel = LCH



Copyright © Huawei Technologies Co., Ltd.

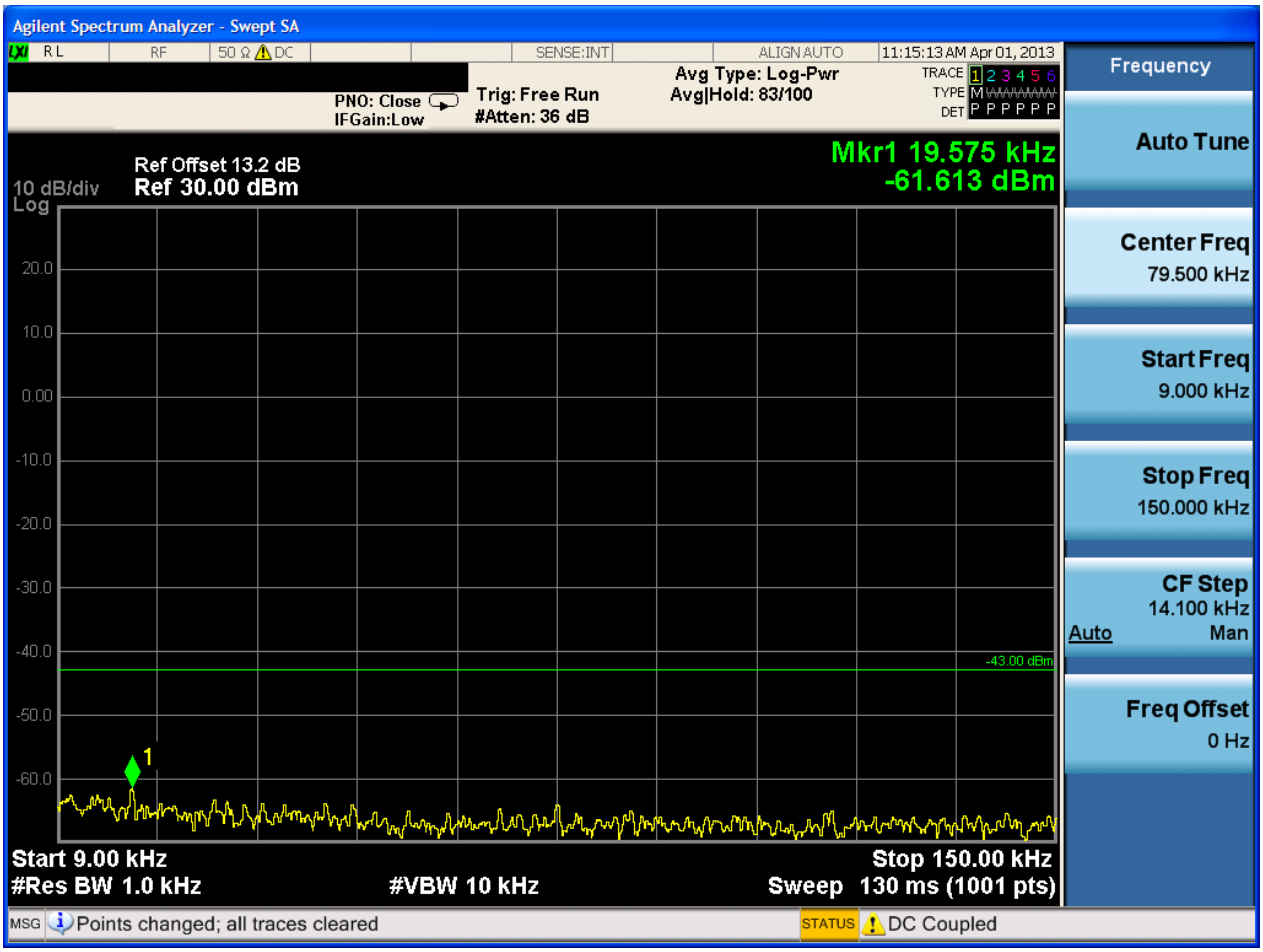


Huawei Proprietary and Confidential
Copyright © Huawei Technologies Co., Ltd.

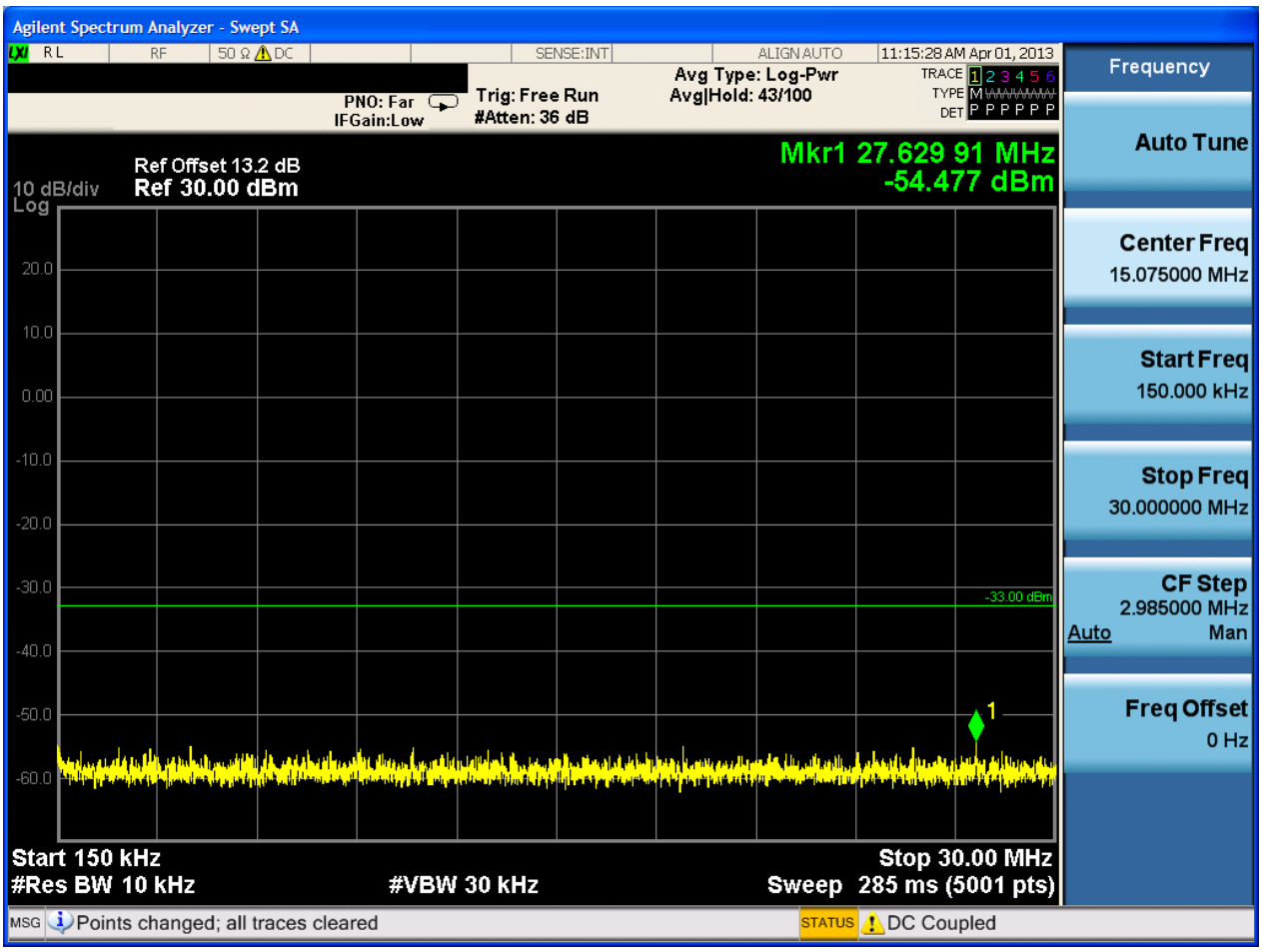


Copyright © Huawei Technologies Co., Ltd.

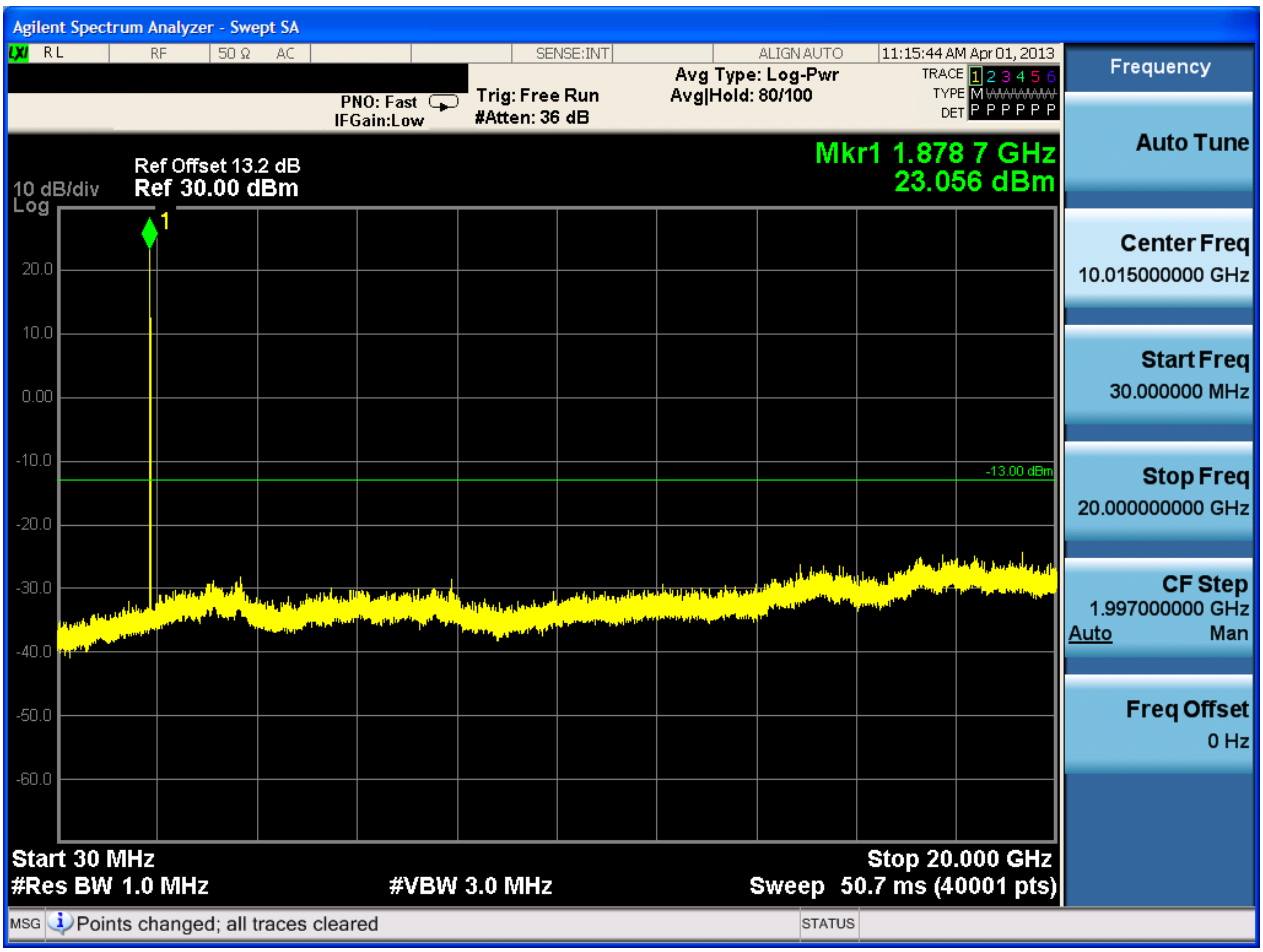
6.2.2.1.2 Test Channel = MCH



Huawei Proprietary and Confidential
Copyright © Huawei Technologies Co., Ltd.

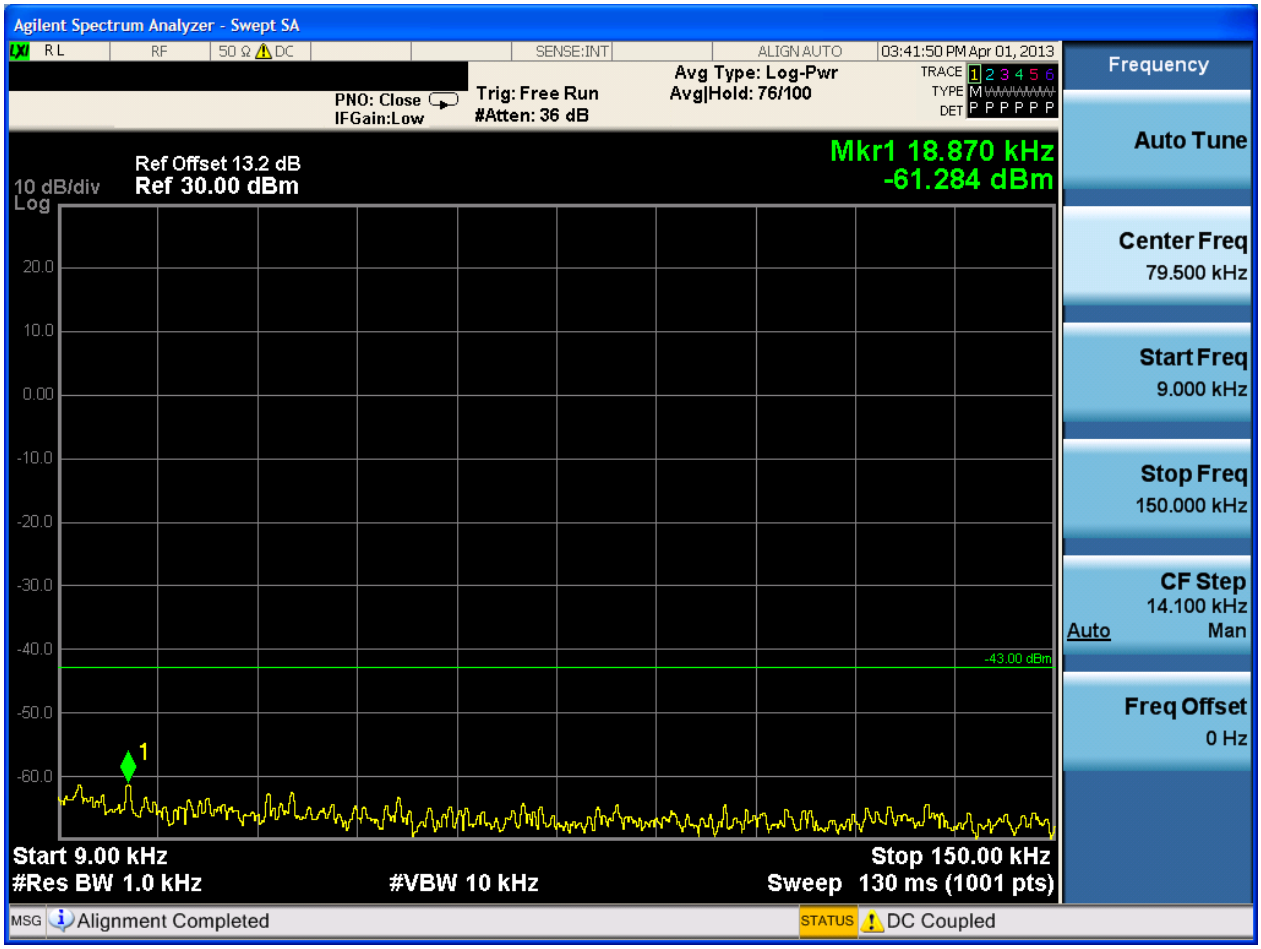


Huawei Proprietary and Confidential
Copyright © Huawei Technologies Co., Ltd.

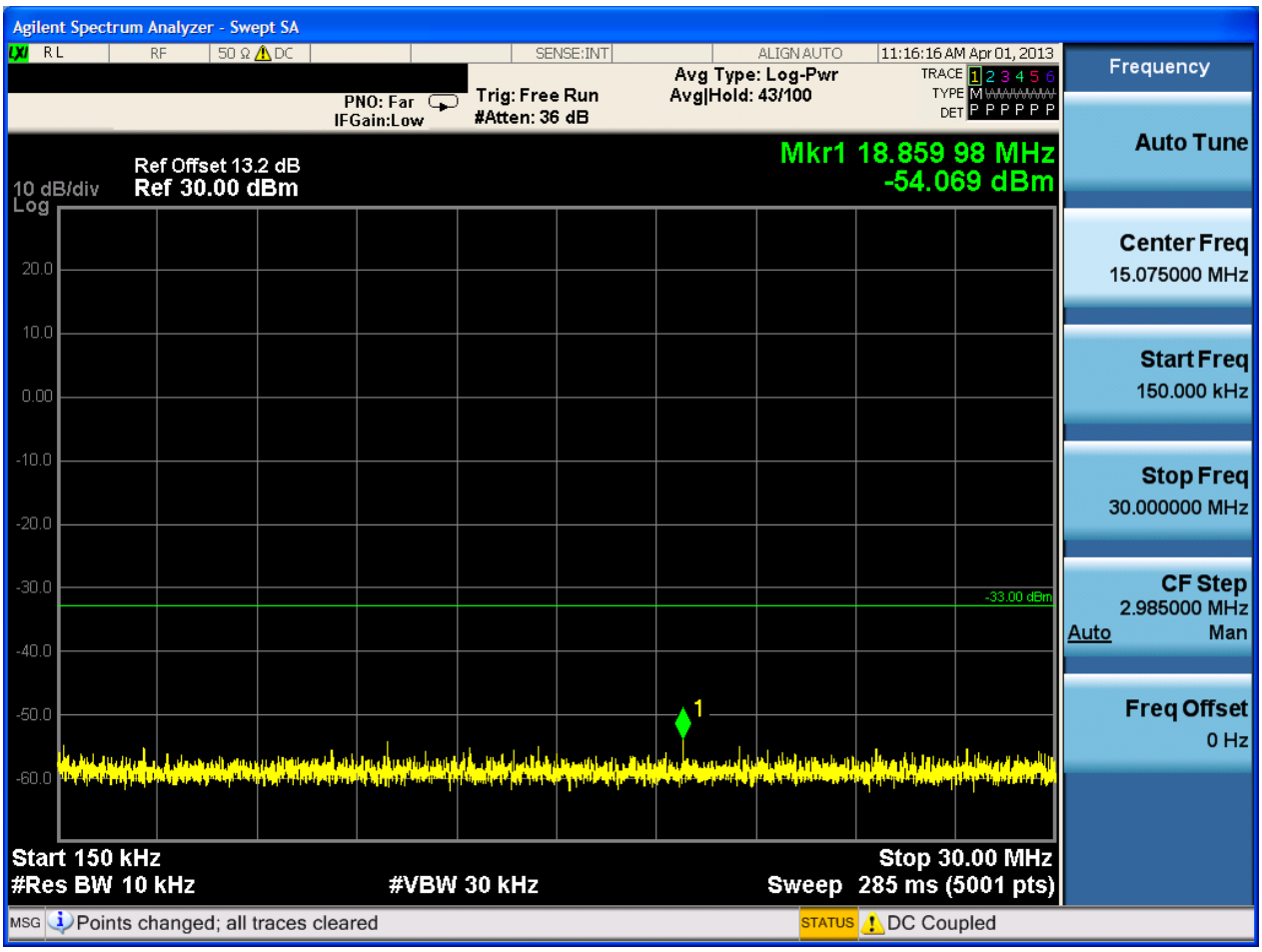


Copyright © Huawei Technologies Co., Ltd.

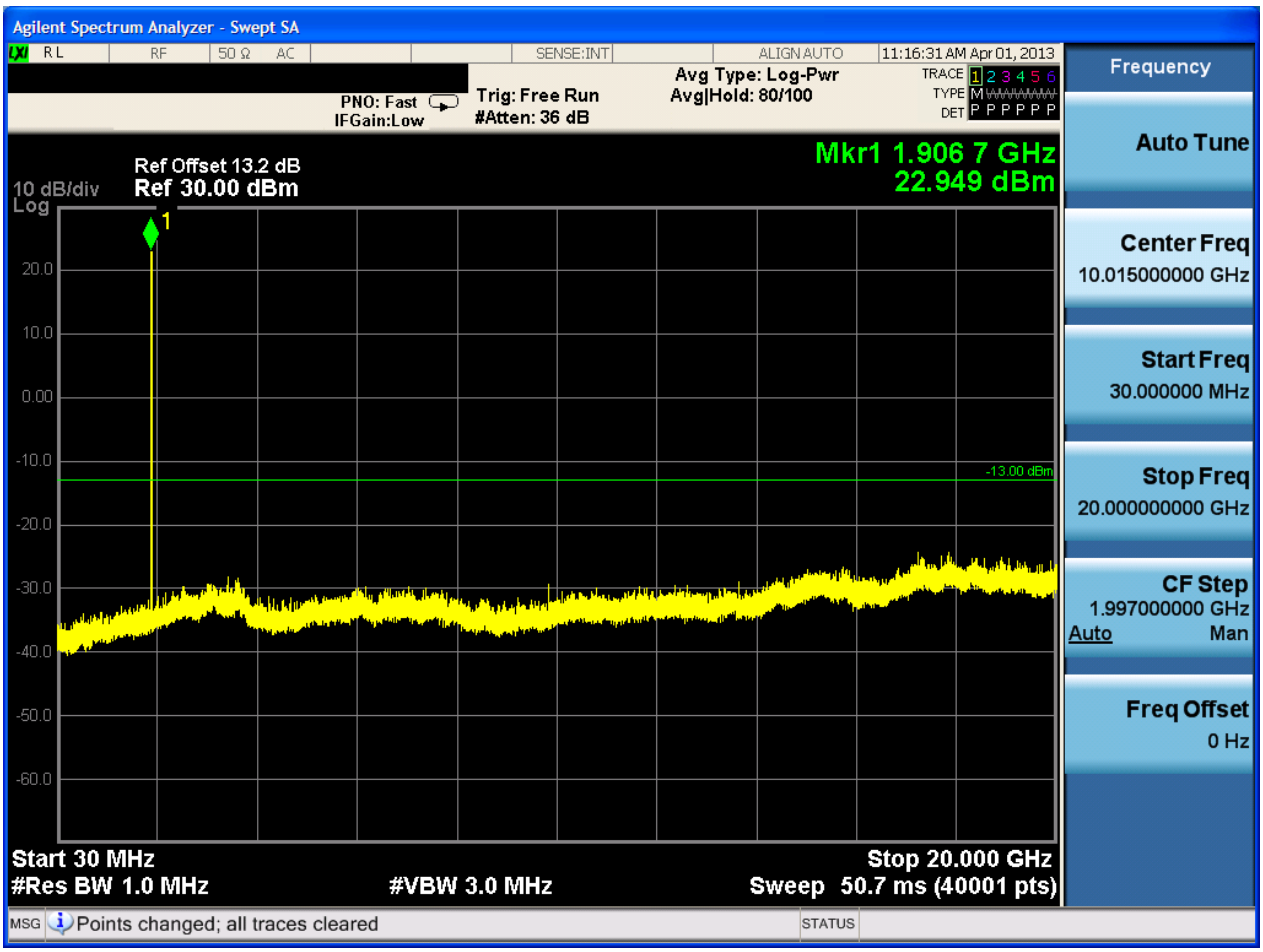
6.2.2.1.3 Test Channel = HCH



Copyright © Huawei Technologies Co., Ltd.



Huawei Proprietary and Confidential
Copyright © Huawei Technologies Co., Ltd.



Copyright © Huawei Technologies Co., Ltd.

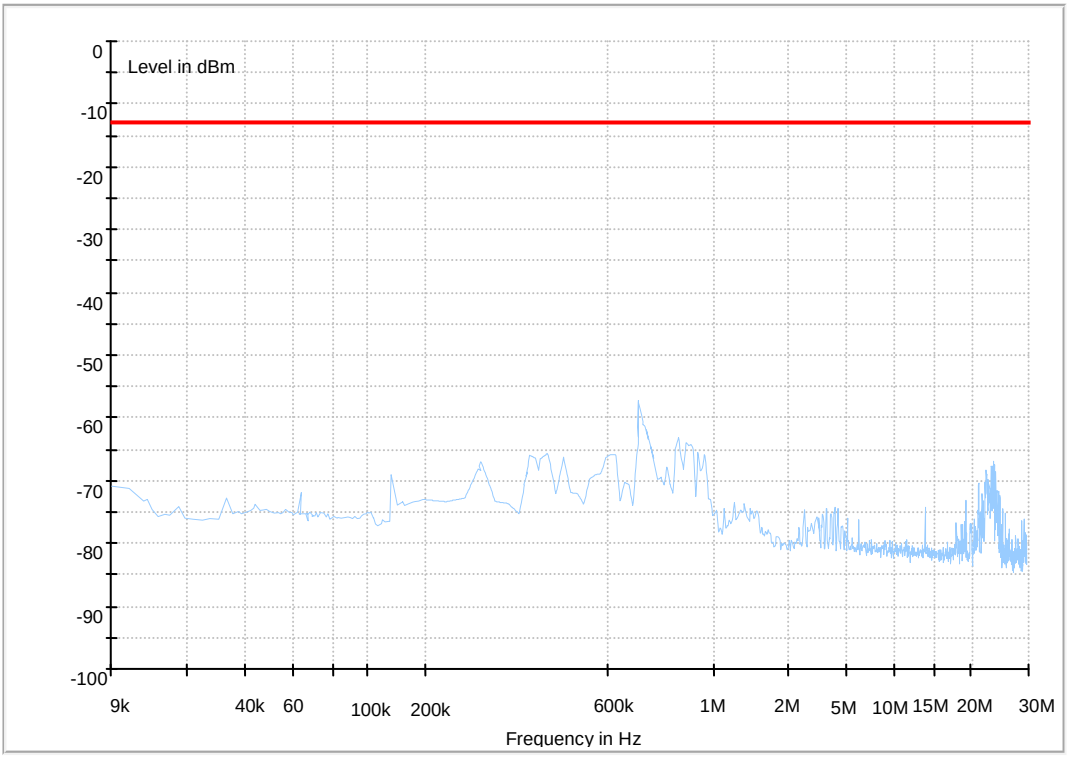
7Appendix_G: Field Strength of Spurious Radiation

Part I - Test Plots

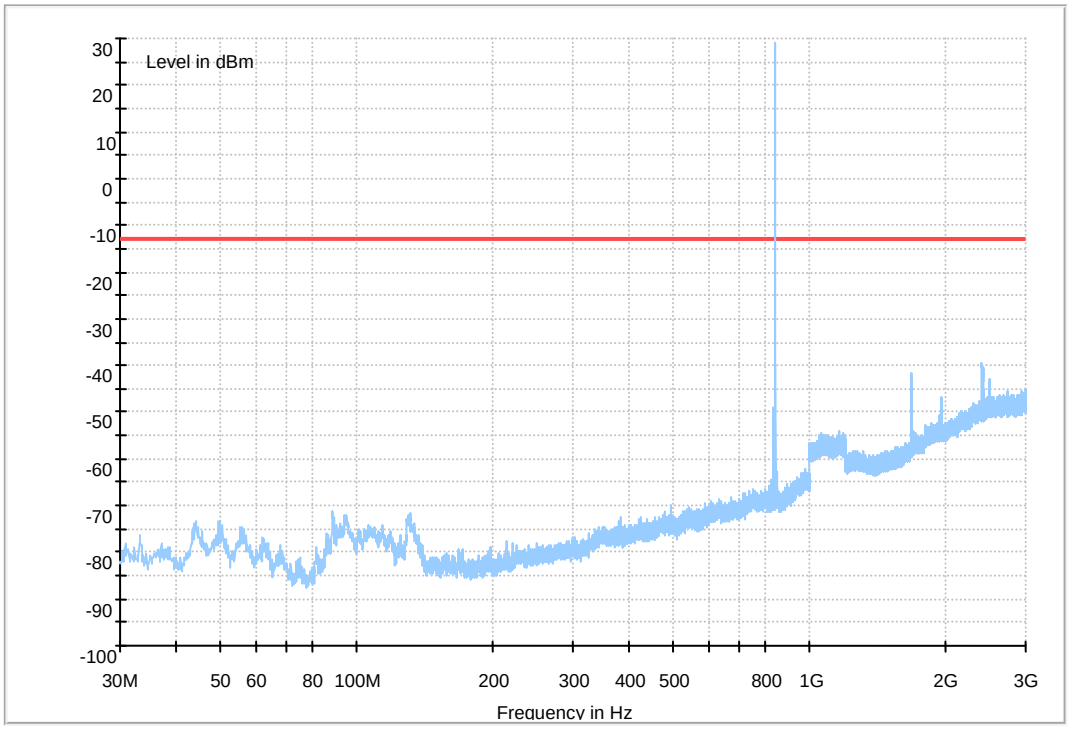
7.1 For GSM

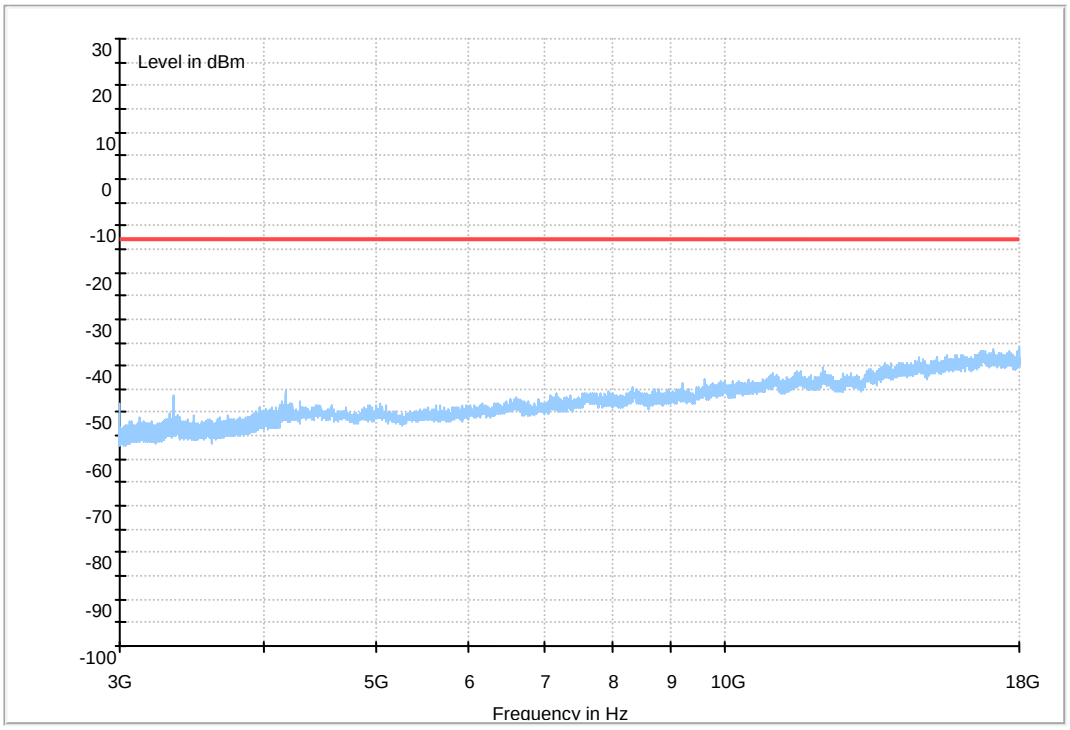
7.1.1 Test Band = GSM850

7.1.1.1 Test Mode = GSM/TM1



Copyright © Huawei Technologies Co., Ltd.

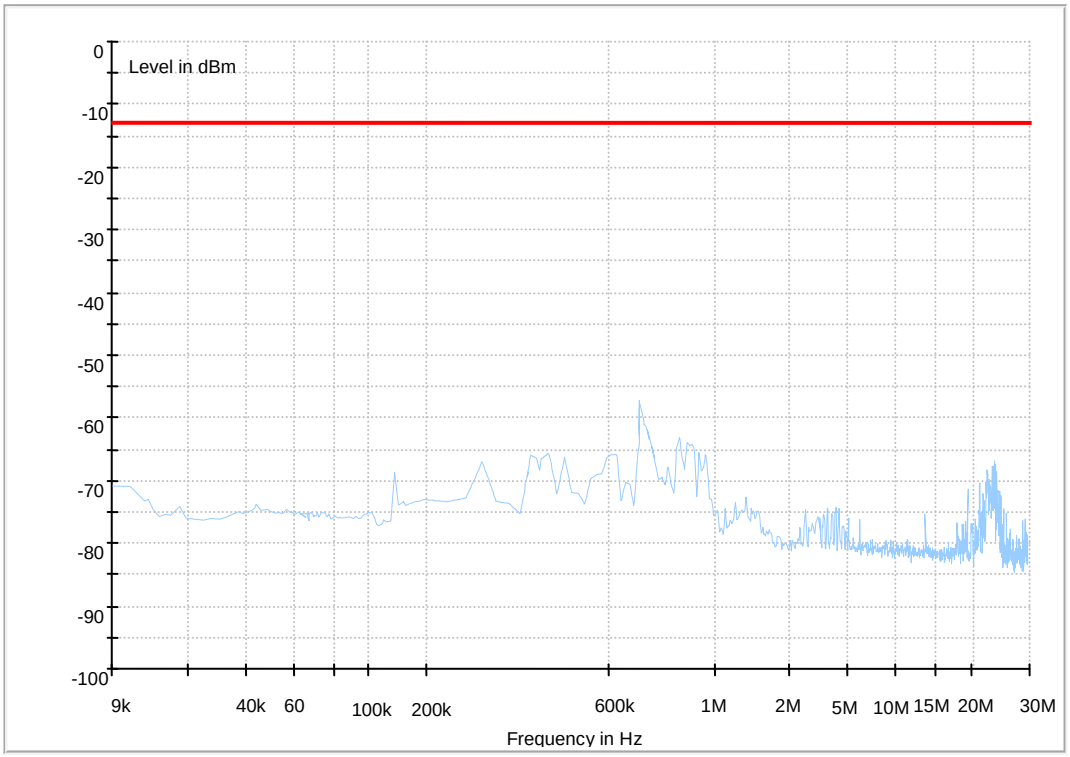




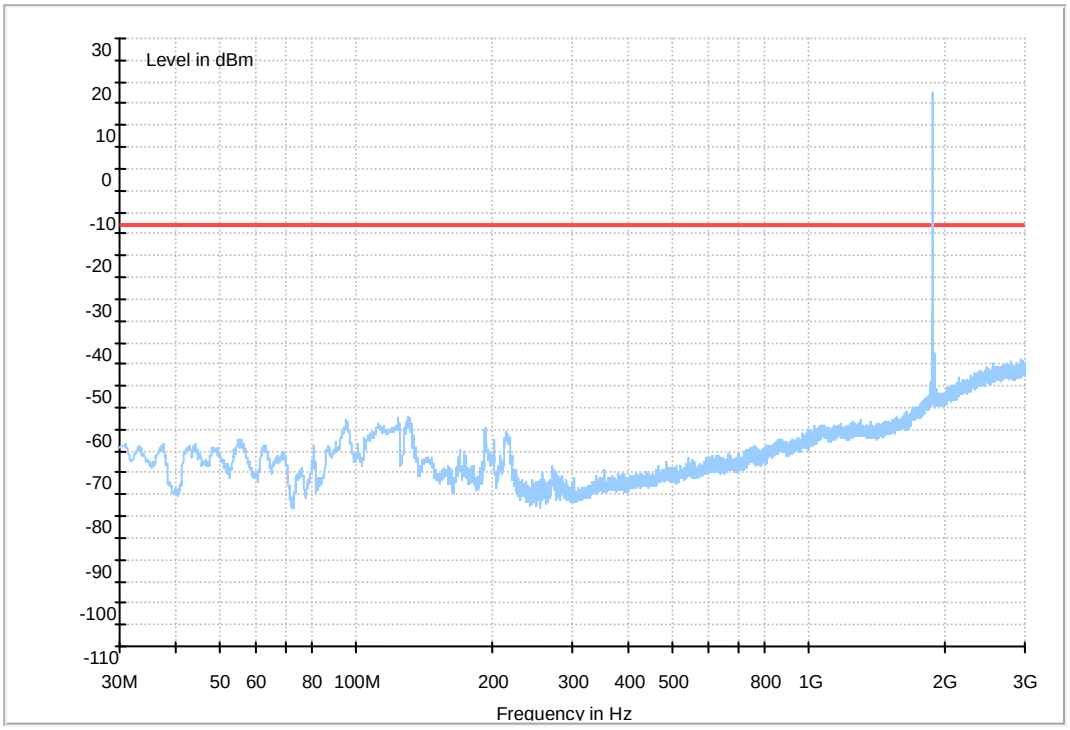
Huawei Proprietary and Confidential
Copyright © Huawei Technologies Co., Ltd.

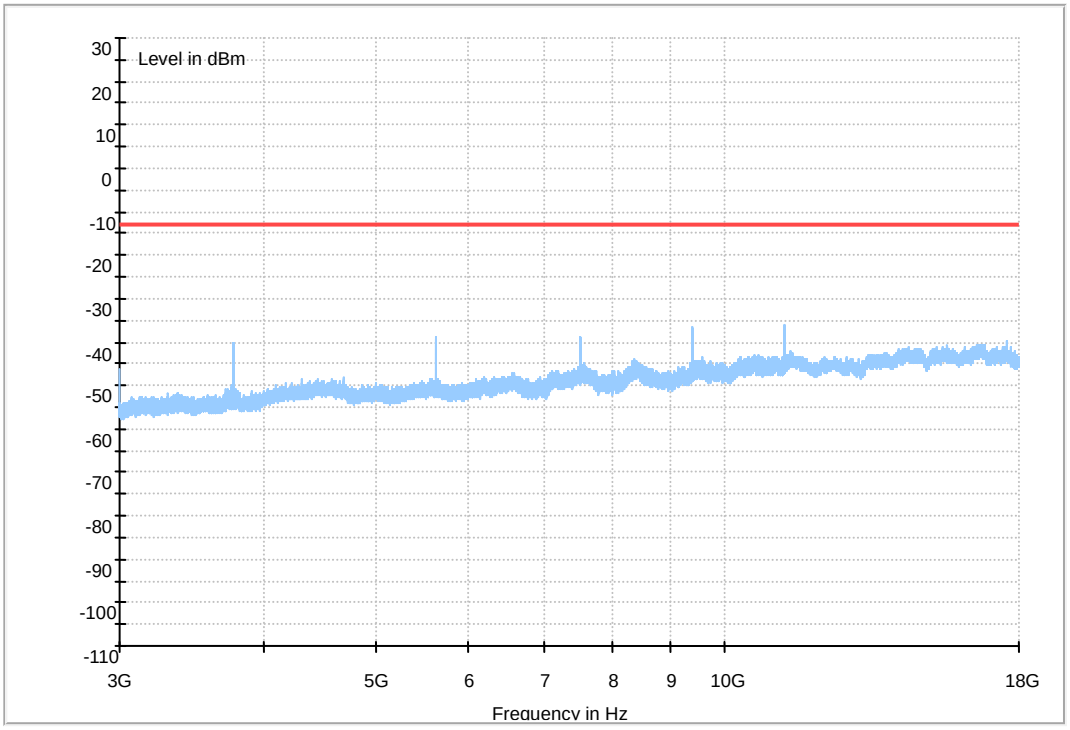
7.1.2 Test Band = GSM1900

7.1.2.1 Test Mode = GSM/TM1

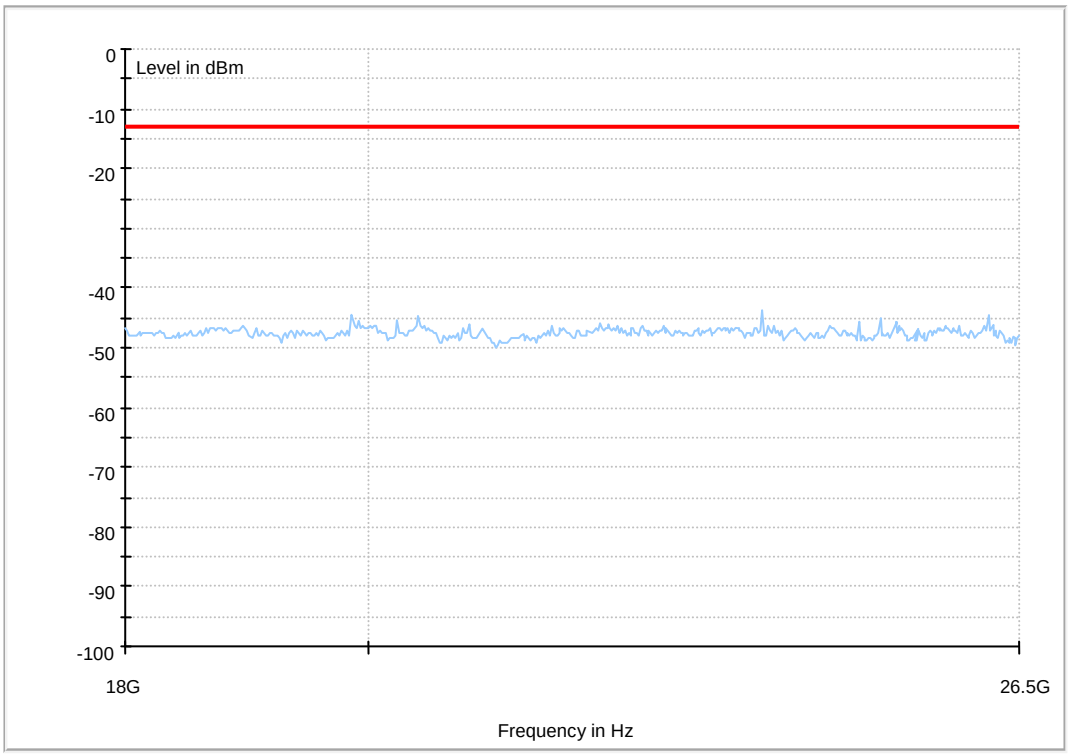


Huawei Proprietary and Confidential
Copyright © Huawei Technologies Co., Ltd.





Huawei Proprietary and Confidential
Copyright © Huawei Technologies Co., Ltd.

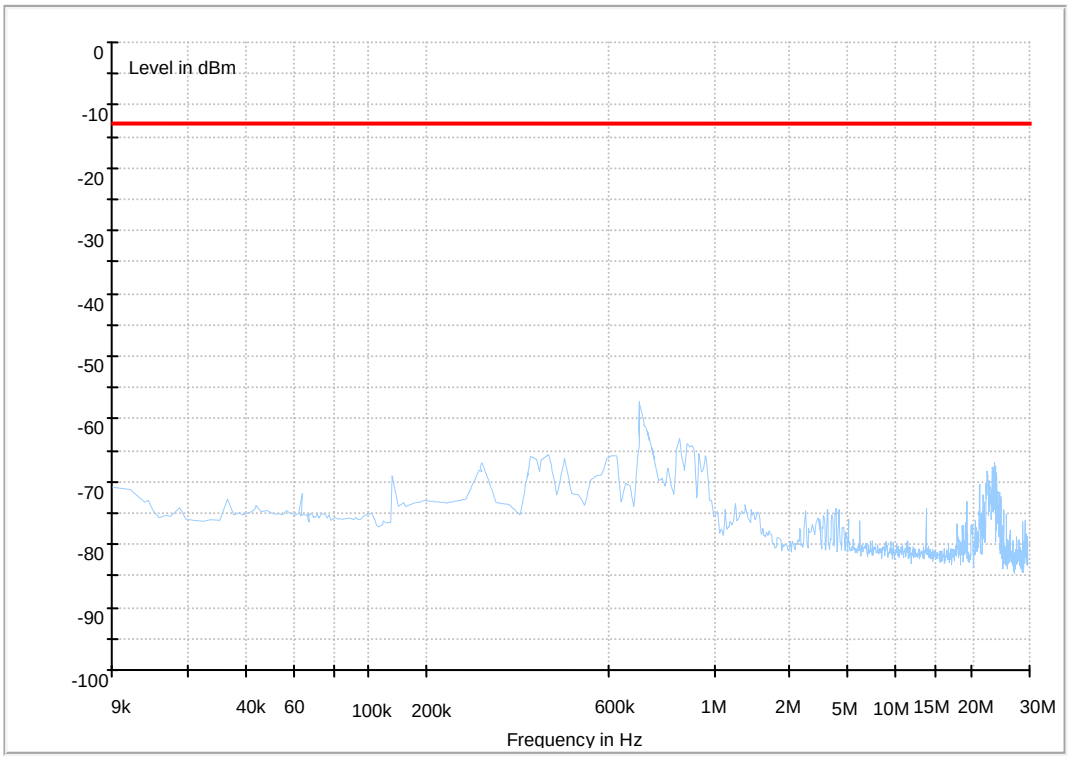


Copyright © Huawei Technologies Co., Ltd.

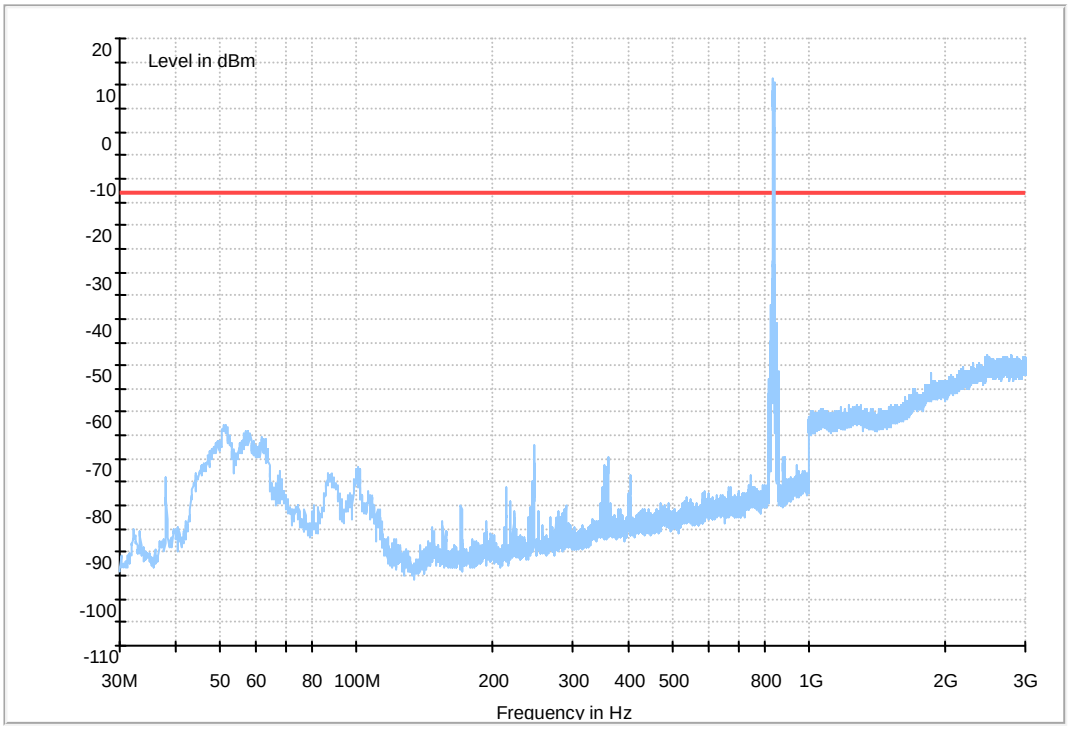
7.2 For UMTS

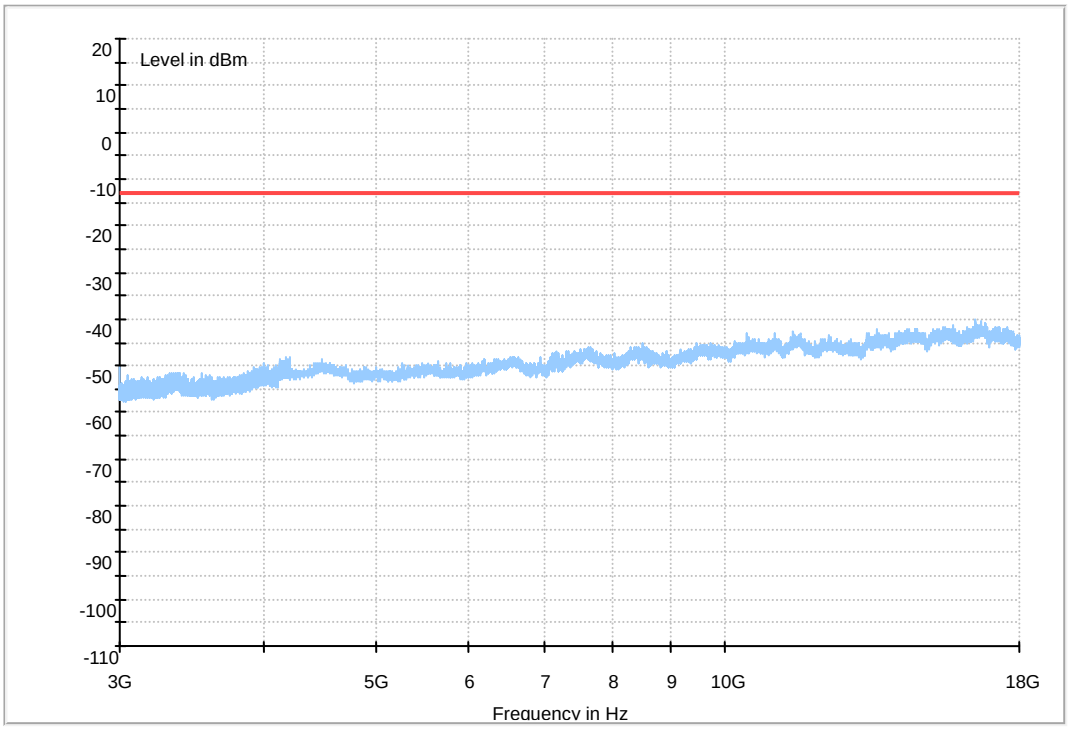
7.2.1 Test Band = WCDMA850

7.2.1.1 Test Mode = UMTS/TM1



Huawei Proprietary and Confidential
Copyright © Huawei Technologies Co., Ltd.

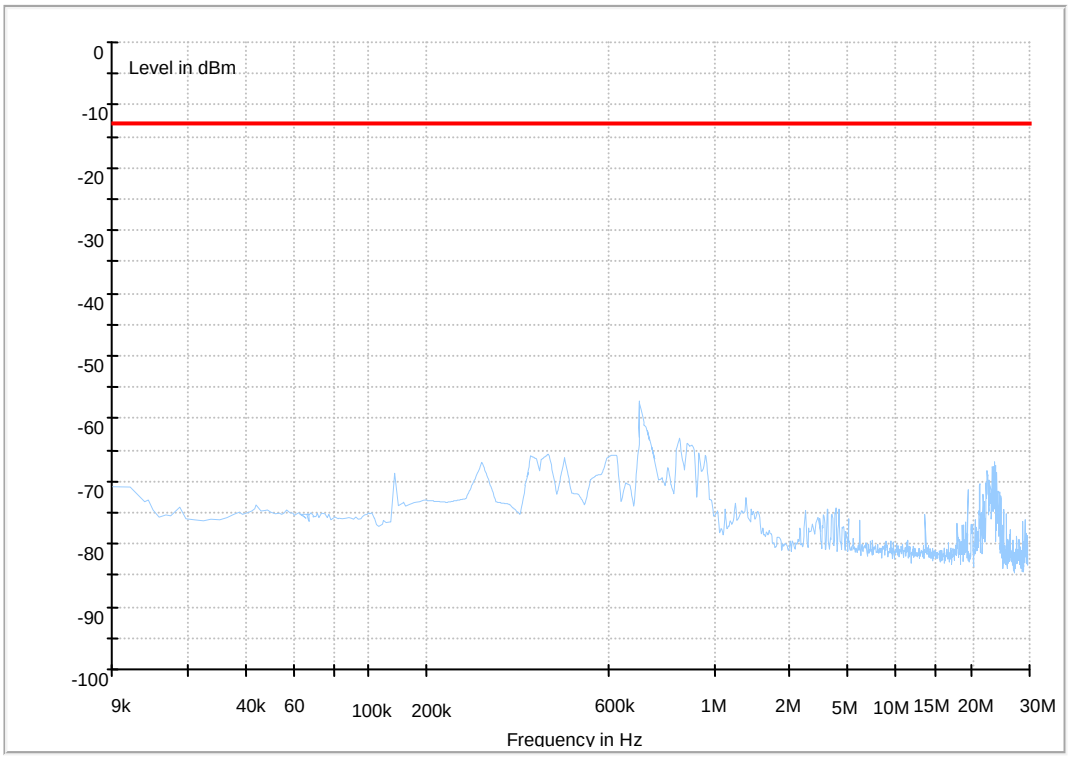




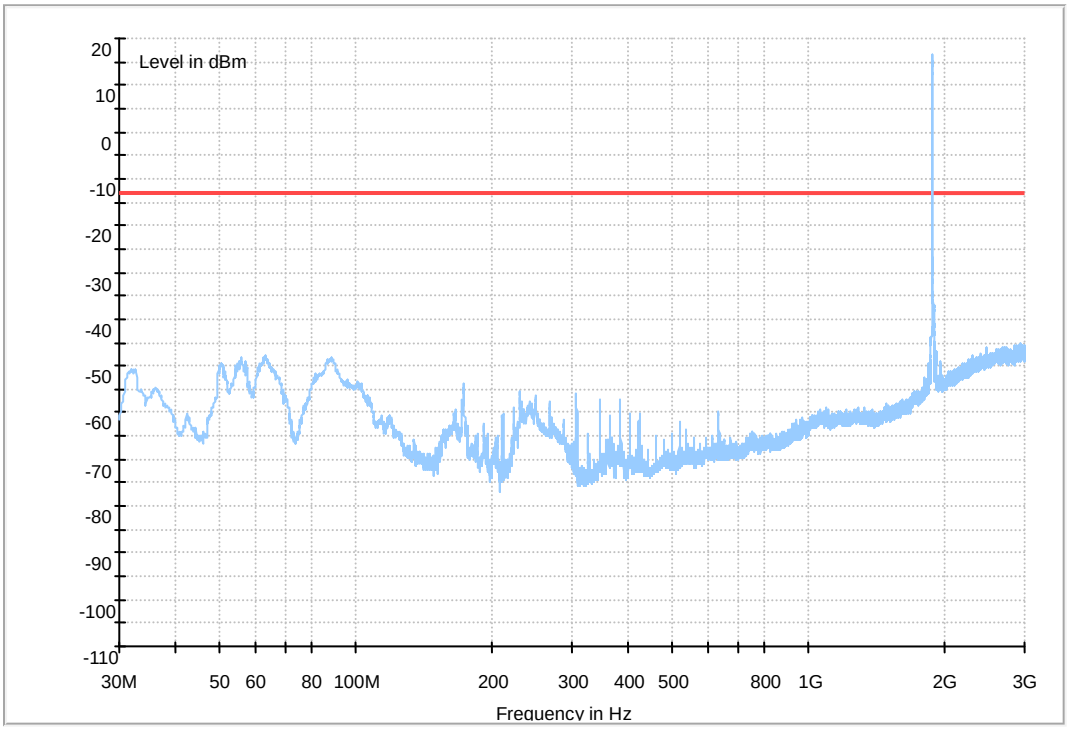
Huawei Proprietary and Confidential
Copyright © Huawei Technologies Co., Ltd.

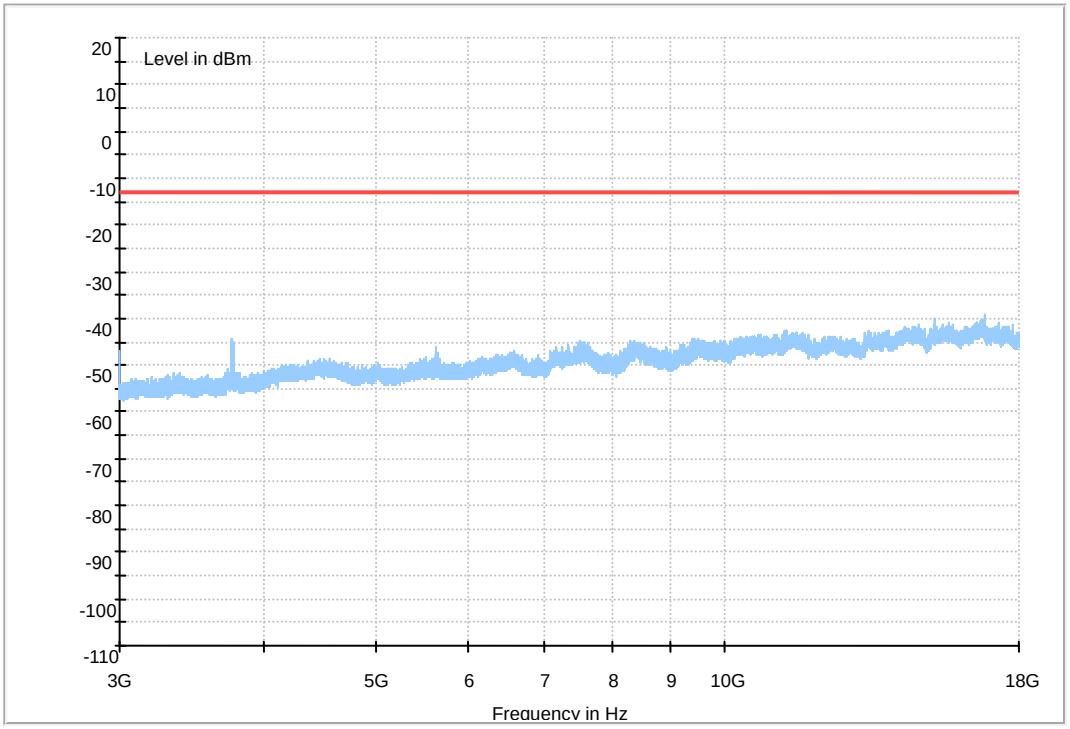
7.2.2 Test Band = WCDMA1900

7.2.2.1 Test Mode = UMTS/TM1

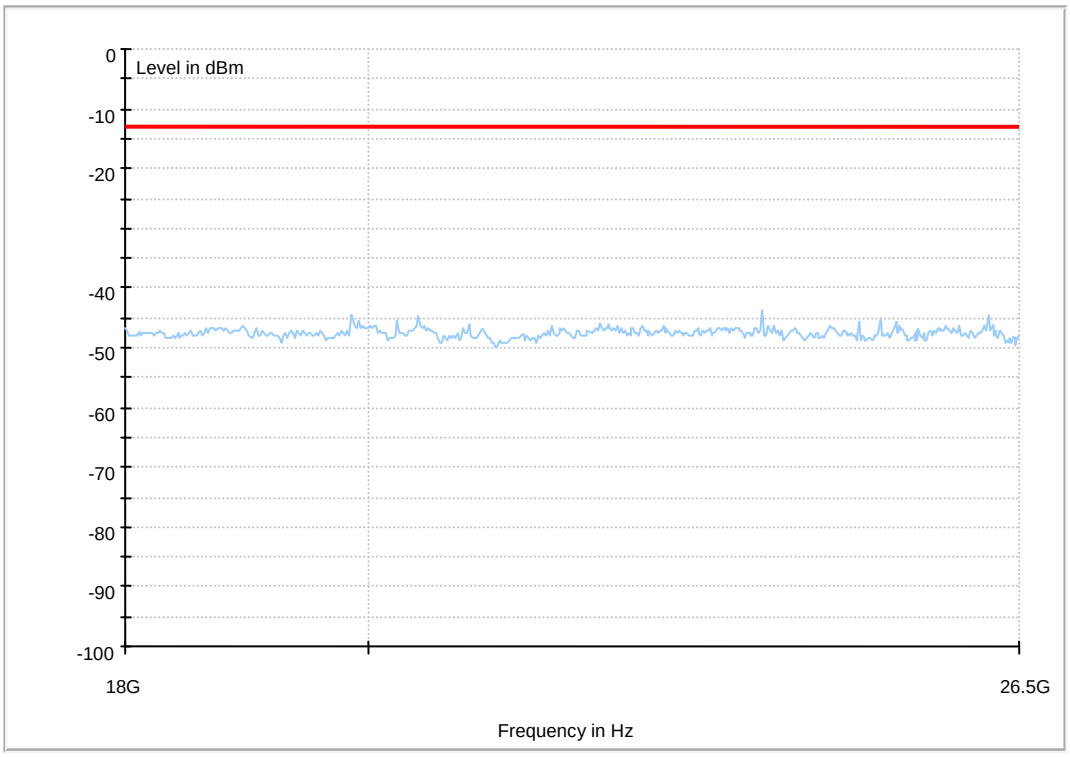


Huawei Proprietary and Confidential
Copyright © Huawei Technologies Co., Ltd.





Huawei Proprietary and Confidential
Copyright © Huawei Technologies Co., Ltd.



Huawei Proprietary and Confidential
Copyright © Huawei Technologies Co., Ltd.

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]	Limit [ppm]	Verdict
GSM850	GSM/TM1	LCH	TN	VL	2.07	0.00251	±2.5	PASS
				VN	-4.33	-0.00525	±2.5	PASS
				VH	-1.87	-0.00227	±2.5	PASS
		MCH	TN	VL	4.00	0.00478	±2.5	PASS
				VN	5.49	0.00656	±2.5	PASS
				VH	1.03	0.00123	±2.5	PASS
		HCH	TN	VL	1.42	0.00167	±2.5	PASS
				VN	0.00	0.00000	±2.5	PASS
				VH	7.36	0.00867	±2.5	PASS
GSM1900	GSM/TM1	LCH	TN	VL	26.93	0.01456	±2.5	PASS
				VN	33.90	0.01832	±2.5	PASS
				VH	39.00	0.02108	±2.5	PASS
		MCH	TN	VL	26.41	0.01405	±2.5	PASS
				VN	43.97	0.02339	±2.5	PASS
				VH	33.25	0.01769	±2.5	PASS
		HCH	TN	VL	25.31	0.01325	±2.5	PASS
				VN	39.58	0.02072	±2.5	PASS
				VH	29.25	0.01532	±2.5	PASS

Huawei Proprietary and Confidential
Copyright © Huawei Technologies Co., Ltd.

8.1.2Frequency Error vs. Temperature:

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Limit [ppm]	Verdict
GSM850	GSM/TM1	LCH	VN	-30	2.26	0.00274	±2.5	PASS
				-20	3.75	0.00455	±2.5	PASS
				-10	-5.55	-0.00673	±2.5	PASS
				0	-6.84	-0.0083	±2.5	PASS
				10	2.45	0.00297	±2.5	PASS
				20	0.26	0.00032	±2.5	PASS
				30	-2.65	-0.00322	±2.5	PASS
				40	-0.19	-0.00023	±2.5	PASS
				50	-4.33	-0.00525	±2.5	PASS
		MCH	VN	-30	5.29	0.00632	±2.5	PASS
				-20	11.56	0.01382	±2.5	PASS
				-10	5.62	0.00672	±2.5	PASS
				0	-1.29	-0.00154	±2.5	PASS
				10	-1.81	-0.00216	±2.5	PASS
				20	1.42	0.0017	±2.5	PASS
				30	2.78	0.00332	±2.5	PASS
				40	-0.26	-0.00031	±2.5	PASS
				50	3.75	0.00448	±2.5	PASS
		HCH	VN	-30	9.30	0.01096	±2.5	PASS
				-20	9.88	0.01164	±2.5	PASS
				-10	0.32	0.00038	±2.5	PASS
				0	4.84	0.0057	±2.5	PASS
				10	2.39	0.00282	±2.5	PASS
				20	7.17	0.00845	±2.5	PASS
				30	5.29	0.00623	±2.5	PASS
				40	3.75	0.00442	±2.5	PASS
				50	6.72	0.00792	±2.5	PASS
GSM1900	GSM/TM1	LCH	VN	-30	34.74	0.01878	±2.5	PASS
				-20	15.63	0.00845	±2.5	PASS
				-10	22.28	0.01204	±2.5	PASS
				0	22.66	0.01225	±2.5	PASS
				10	39.84	0.02153	±2.5	PASS
				20	17.05	0.00922	±2.5	PASS
				30	20.73	0.0112	±2.5	PASS
				40	28.35	0.01532	±2.5	PASS
				50	25.76	0.01392	±2.5	PASS

Huawei Proprietary and Confidential
Copyright © Huawei Technologies Co., Ltd.

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Limit [ppm]	Verdict
		MCH	VN	-30	18.73	0.00996	±2.5	PASS
				-20	26.99	0.01436	±2.5	PASS
				-10	29.70	0.0158	±2.5	PASS
				0	29.96	0.01594	±2.5	PASS
				10	32.61	0.01735	±2.5	PASS
				20	14.33	0.00762	±2.5	PASS
				30	27.18	0.01446	±2.5	PASS
				40	18.40	0.00979	±2.5	PASS
				50	26.47	0.01408	±2.5	PASS
		HCH	VN	-30	41.13	0.02154	±2.5	PASS
				-20	24.80	0.01299	±2.5	PASS
				-10	20.73	0.01085	±2.5	PASS
				0	23.83	0.01248	±2.5	PASS
				10	26.60	0.01393	±2.5	PASS
				20	41.39	0.02167	±2.5	PASS
				30	25.05	0.01312	±2.5	PASS
				40	8.27	0.00433	±2.5	PASS
				50	15.43	0.00808	±2.5	PASS

Huawei Proprietary and Confidential
Copyright © Huawei Technologies Co., Ltd.

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]	Limit [ppm]	Verdict
WCDMA850	UMTS/TM1	LCH	TN	VL	-0.53	-0.00064	±2.5	PASS
				VN	0.31	0.00038	±2.5	PASS
				VH	0.49	0.00059	±2.5	PASS
		MCH	TN	VL	0.60	0.00072	±2.5	PASS
				VN	-4.75	-0.00568	±2.5	PASS
				VH	1.21	0.00145	±2.5	PASS
		HCH	TN	VL	6.03	0.00712	±2.5	PASS
				VN	3.83	0.00452	±2.5	PASS
				VH	1.11	0.00131	±2.5	PASS
WCDMA1900	UMTS/TM1	LCH	TN	VL	0.32	0.00017	±2.5	PASS
				VN	2.69	0.00145	±2.5	PASS
				VH	-4.33	-0.00234	±2.5	PASS
		MCH	TN	VL	7.26	0.00386	±2.5	PASS
				VN	-0.66	-0.00035	±2.5	PASS
				VH	-13.85	-0.00737	±2.5	PASS
		HCH	TN	VL	4.94	0.00259	±2.5	PASS
				VN	-2.26	-0.00118	±2.5	PASS
				VH	4.18	0.00219	±2.5	PASS

Huawei Proprietary and Confidential
Copyright © Huawei Technologies Co., Ltd.

8.2.2Frequency Error vs. Temperature:

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Limit [ppm]	Verdict
WCDMA850	UMTS/TM1	LCH	VN	-30	0.58	0.0007	±2.5	PASS
				-20	0.09	0.00011	±2.5	PASS
				-10	0.15	0.00018	±2.5	PASS
				0	-3.43	-0.00415	±2.5	PASS
				10	2.96	0.00358	±2.5	PASS
				20	1.57	0.0019	±2.5	PASS
				30	0.53	0.00064	±2.5	PASS
				40	0.82	0.00099	±2.5	PASS
				50	2.37	0.00287	±2.5	PASS
		MCH	VN	-30	-5.66	-0.00677	±2.5	PASS
				-20	3.60	0.0043	±2.5	PASS
				-10	3.27	0.00391	±2.5	PASS
				0	-1.60	-0.00191	±2.5	PASS
				10	-0.79	-0.00094	±2.5	PASS
				20	5.78	0.00691	±2.5	PASS
				30	0.84	0.001	±2.5	PASS
				40	-0.73	-0.00087	±2.5	PASS
				50	-0.84	-0.001	±2.5	PASS
		HCH	VN	-30	4.47	0.00528	±2.5	PASS
				-20	-0.53	-0.00063	±2.5	PASS
				-10	-4.36	-0.00515	±2.5	PASS
				0	1.08	0.00128	±2.5	PASS
				10	1.40	0.00165	±2.5	PASS
				20	-2.35	-0.00278	±2.5	PASS
				30	1.34	0.00158	±2.5	PASS
				40	-0.05	-0.00006	±2.5	PASS
				50	-1.54	-0.00182	±2.5	PASS
WCDMA1900	UMTS/TM1	LCH	VN	-30	2.01	0.00109	±2.5	PASS
				-20	-5.11	-0.00276	±2.5	PASS
				-10	0.96	0.00052	±2.5	PASS
				0	2.73	0.00147	±2.5	PASS
				10	-4.73	-0.00255	±2.5	PASS
				20	4.90	0.00265	±2.5	PASS
				30	6.18	0.00334	±2.5	PASS
				40	-8.56	-0.00462	±2.5	PASS
				50	-10.70	-0.00578	±2.5	PASS

Huawei Proprietary and Confidential
Copyright © Huawei Technologies Co., Ltd.

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Limit [ppm]	Verdict
		MCH	VN	-30	1.42	0.00076	±2.5	PASS
				-20	4.91	0.00261	±2.5	PASS
				-10	-14.48	-0.0077	±2.5	PASS
				0	-2.11	-0.00112	±2.5	PASS
				10	1.57	0.00084	±2.5	PASS
				20	3.78	0.00201	±2.5	PASS
				30	7.57	0.00403	±2.5	PASS
				40	4.70	0.0025	±2.5	PASS
				50	8.76	0.00466	±2.5	PASS
		HCH	VN	-30	-7.28	-0.00382	±2.5	PASS
				-20	-0.21	-0.00011	±2.5	PASS
				-10	5.72	0.003	±2.5	PASS
				0	-2.44	-0.00128	±2.5	PASS
				10	4.14	0.00217	±2.5	PASS
				20	-1.43	-0.00075	±2.5	PASS
				30	-6.35	-0.00333	±2.5	PASS
				40	12.41	0.00651	±2.5	PASS
				50	-5.60	-0.00294	±2.5	PASS

END

Huawei Proprietary and Confidential
Copyright © Huawei Technologies Co., Ltd.