

FCC RF Test Report

Product Name: Vodafone Mobile Wi-Fi

Product Model: R206

Report Number: SYBH(Z-RF)009022013-2001

FCC ID: QISR206

Reliability Laboratory of Huawei Technologies Co., Ltd.

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2. The laboratory has Passed the accreditation by The American Association for Laboratory Accreditation (A2LA). The accreditation number is 2174.01.
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6. The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.
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Applicant: Huawei Technologies Co., Ltd.
Address: Administration Building, Headquarters of Huawei Technologies Co., Ltd.,
Bantian, Longgang District, Shenzhen, 518129, P.R.C
Product Name: Vodafone Mobile Wi-Fi
Product Model: R206

Date of Receipt Sample: 2013-03-05
Start Date of Test: 2013-03-08
End Date of Test: 2013-03-15

Test Result: Pass

Approved by Senior	2013-03-21	Dai Linjun	
Engineer:	Date	Name	Signature

Prepared by:	2013-03-21	Ling Kaiyun	
	Date	Name	Signature



Modification Record

No.	Last Report No.	Modification Description
1		First report.

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1 General Information

1.1 Applied Standard

Applied Rules: 47 CFR FCC Part 02:2012
47 CFR FCC Part 22: 2012
47 CFR FCC Part 24: 2012

Test Method: FCC KDB 971168 D01 Power Meas License Digital Systems v02
FCC KDB 662911 D01 Multiple Transmitter Output v01r2

1.2 Test Location

Test Location 1: Reliability Laboratory of Huawei Technologies Co., Ltd.
Address: Administration Building, Headquarters of Huawei Technologies Co., Ltd.,
Bantian, Longgang District, Shenzhen, 518129, P.R.C

1.3 Test Environment Condition

Ambient Temperature: 19.5 to 25 °C
Ambient Relative Humidity: 40 to 55 %
Atmospheric Pressure: Not applicable

2 Test Summary

2.1 Cellular Band (824-849 MHz paired with 869-894 MHz)

Test Item	FCC Rule No.	Requirements	Test Result	Verdict (NOTE 2)
Output Power Data	§2.1046, §22.913	FCC: ERP $\leq$ 7 W.	Appendix A	Pass
Modulation Characteristics	§2.1047	Digital modulation	Appendix C	Pass
Bandwidth	§2.1049, §22.917	OBW: No limit. EBW: No limit.	Appendix D	Pass
Band Edges Compliance	§2.1051, §22.917	$\leq$ -13 dBm/1%*EBW, in 1 MHz bands immediately outside and adjacent to the frequency block.	Appendix E	Pass
Spurious Emission at Antenna Terminals	§2.1051, §22.917	FCC: $\leq$ -13 dBm/100 kHz, from 9 kHz to 10 th harmonics but outside authorized operating frequency ranges.	Appendix F	Pass
Field Strength of Spurious Radiation	§2.1053, §22.917	FCC: $\leq$ -13 dBm/100 kHz.	Appendix G	Pass
Frequency Stability	§2.1055, §22.355	$\leq$ $\pm$ 2.5ppm.	Appendix H	Pass
NOTE 1: For Receiver Spurious Emissions, If the receiver has a detachable antenna of known impedance, antenna conducted spurious emissions measurement is permitted as an alternative to radiated measurement. However, the radiated method is recommended. The antenna conducted test shall be performed with the antenna disconnected and the receiver antenna terminals connected to a measuring instrument having equal impedance to that specified for the antenna. NOTE 2: For the verdict, the "N/A" denotes "not applicable", the "N/T" denotes "not tested".				

2.2 PCS Band (1850-1915 MHz paired with 1930-1995 MHz)

Test Item	FCC Rule No.	Requirements	Test Result	Verdict (NOTE 2)
Output Power Data	§2.1046, §24.232	EIRP $\leq$ 2 W	Appendix A	Pass
Peak-Average Ratio	§2.1046, §24.232	Peak-Average Ratio $\leq$ 13 dB	Appendix B	Pass
Modulation Characteristics	§2.1047	Digital modulation	Appendix C	Pass
Bandwidth	§2.1049, §24.238	OBW: No limit. EBW: No limit.	Appendix D	Pass
Band Edges Compliance	§2.1051, §24.238	$\leq$ -13 dBm/1%*EBW, in 1 MHz bands immediately outside and adjacent to the frequency block.	Appendix E	Pass
Spurious Emission at Antenna Terminals	§2.1051, §24.238	$\leq$ -13 dBm/1 MHz, from 9 kHz to 10 th harmonics but outside authorized operating frequency ranges.	Appendix F	Pass
Field Strength of Spurious Radiation	§2.1053, §24.238	$\leq$ -13 dBm/1 MHz.	Appendix G	Pass
Frequency Stability	§2.1055, §24.235	FCC: within authorized frequency block.	Appendix H	Pass
NOTE 1: For Receiver Spurious Emissions, If the receiver has a detachable antenna of known impedance, antenna conducted spurious emissions measurement is permitted as an alternative to radiated measurement. However, the radiated method is recommended. The antenna conducted test shall be performed with the antenna disconnected and the receiver antenna terminals connected to a measuring instrument having equal impedance to that specified for the antenna. NOTE 2: For the verdict, the "N/A" denotes "not applicable", the "N/T" denotes "not tested".				

3 Description of the Equipment under Test (EUT)

3.1 General Description

R206 HSPA+/2100M/900M/EDGE Quad Band is subscriber equipment in the UMTS/GSM system. R206 implement such functions as RF signal receiving/ transmitting, HSPA+/WCDMA protocol processing, data service etc, and it can act as a Wi-Fi hotspot for user accessing to internet. Externally it provides USB interface (to connect to the notebook etc.), USIM card interface. R206 has 3 internal antennas as default Wi-Fi, diversity, and main antenna.

3.2 EUT Identity

NOTE: Unless otherwise noted in the report, the functional boards installed in the units shall be selected from the below list, but not means all the functional boards listed below shall be installed in one unit.

3.2.1 Board

Board		
Hardware Version	Software version	Description
CH1E5220SM	21.143.05.00.11	Main board

3.2.2 Adapter

Name	Manufacture	Serials number	Description
Adapter	Huawei Technologies Co., Ltd.	HW-050100U1W	AC/DC adapter,0degC-45degC,100V-240V,5.0V/1.0 A, 2PIN/DC USB2.0,HUAWEI LOGO,ERP V

3.2.3 Battery

Name	Manufacture	Serials number	Description
Li-ion Battery	Huawei Technologies Co., Ltd.	HB5A2H	Rated capacity: 1150mAh Nominal Voltage:  +3.7V Charging Voltage:  +4.2V

3.2.4 USB Cable

Name	Manufacture	Description
USB Cable	Huawei Technologies Co., Ltd.	Terminal Accessory, Data Cable, Usb A male to Micro Usb , Terminal Dedicated

3.3 Technical Specification

Characteristics	Description	
Radio System Type	☒ GSM	
Supported Frequency Range	GSM850	Transmission (TX): 824-849 MHz
		Receiving (RX): 869-894 MHz
	GSM1900	Transmission (TX): 1850-1910 MHz
		Receiving (RX): 1930-1990 MHz
TX and RX Antenna Ports	TX & RX port:	1
	TX-only port:	0
	RX-only port:	0
TX Output Power	GSM850: 32dBm GSM1900: 29.5dBm	
Supported Channel Bandwidth	GSM system:	☒ 200 kHz
Designation of Emissions (Note: the necessary bandwidth of which is the worst value from the measured occupied bandwidths for each type of channel bandwidth configuration.)	GSM850: GSM1900:	250KGXW, 251KG7W 247KGXW, 250KG7W

4 General Test Conditions / Configurations

4.1 Test Modes

NOTE: The test mode(s) are selected according to relevant radio technology specifications.

Test Mode	Test Modes Description
GSM/TM1	GSM system, GSM/GPRS, GMSK modulation
GSM/TM2	GSM system, EDGE, 8PSK modulation

4.2 Test Environment

Environment Parameter	Selected Values During Tests	
Relative Humidity	Ambient	
Temperature	TN	Ambient
Voltage	VL	3.6V
	VN	3.7V
	VH	4.2V

NOTE1: VL= lower extreme test voltage
VN= nominal voltage
VH= upper extreme test voltage
TN= normal temperature

4.3 Test Frequency

Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
GSM/TM1& GSM/TM2	TX	Channel 128	Channel 190	Channel 251
		824.2MHz	836.6MHz	848.8MHz
	RX	Channel 128	Channel 190	Channel 251
		869.2MHz	881.6MHz	893.8MHz
GSM/TM1& GSM/TM2	TX	Channel 512	Channel 661	Channel 810
		1850.2MHz	1880.0MHz	1909.8MHz
	RX	Channel 512	Channel 661	Channel 810



Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
		1930.2 MHz	1960.0 MHz	1989.8 MHz

4.4 DESCRIPTION OF TESTS

4.4.1 Radiated Power and Radiated Spurious Emissions

Radiated spurious emissions are investigated indoors in a semi-anechoic chamber to determine the frequencies producing the worst case emissions. Final measurements for radiated power and radiated spurious emissions are performed on the 3 meter OATS per the guidelines of ANSI/TIA-603-C-2004. The equipment under test was transmitting while connected to its integral antenna and is placed on a wooden turntable 80cm above the ground plane and 3 meters from the receive antenna. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic. The receive antenna height is adjusted between 1 and 4 meter height, the turntable is rotated through 360 degrees, and the EUT is manipulated through all orthogonal planes representative of its typical use to achieve the highest reading on the receive spectrum analyzer. Emissions are also investigated with the receive antenna horizontally and vertically polarized.

A portable or small unlicensed wireless device shall be placed on a non-metallic test fixture or other non-metallic support during testing. The supporting fixture shall permit orientation of the EUT in each of three orthogonal (x, y, z) axis positions such that emissions from the EUT are maximized. Measure the EUT maximum RF power and record the result.

A half-wave dipole is then substituted in place of the EUT. For emissions above 1GHz, a horn antenna is substituted in place of the EUT. The substitute antenna is driven by a signal generator with the level of the signal generator being adjusted to obtain the same receive spectrum analyzer level previously recorded from the spurious emission from the EUT. The power of the emission is calculated using the following formula:

$$P_d \text{ [dBm]} = P_g \text{ [dBm]} - \text{cable loss [dB]} + \text{antenna gain [dBd/dBi]}$$

Where, P_d is the dipole equivalent power, P_g is the generator output into the substitution antenna, and the antenna gain is the gain of the substitute antenna used relative to either a half-wave dipole (dBd) or an isotropic source (dBi). The substitute level is equal to $P_g \text{ [dBm]} - \text{cable loss [dB]}$.

The calculated P_d levels are then compared to the absolute spurious emission limit of -13dBm which is equivalent to the required minimum attenuation of $43 + 10\log_{10}(\text{Power [Watts]})$.

Note: Reference test setup 3

4.4.2 Occupied Bandwidth

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured. The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts. The resolution bandwidth shall be set to as close to 1 percent of the selected span as is possible without being below 1 percent. The video bandwidth shall be set to 3 times the resolution bandwidth. Video averaging is not permitted. Where practical, a sampling detector shall be used since a peak or, peak hold, may produce a wider bandwidth than actual. The trace data points are recovered and are directly summed in linear terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5 percent of the total is reached and that frequency recorded. The process is repeated for the highest frequency data points. This frequency is recorded. The span between the two recorded frequencies is the occupied bandwidth.

Note: Reference test setup 1.

4.4.3 Spurious and Harmonic Emissions at Antenna Terminal

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic. On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least $43 + 10 \log(P)$ dB. Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.

Note: Reference test setup 1.

4.4.4 Peak-Average Ratio

A peak to average ratio measurement is performed at the conducted port of the EUT. For WCDMA signals, the spectrum analyzers Complementary Cumulative Distribution Function (CCDF) measurement profile is used to determine the largest deviation between the average and the peak power of the EUT in a given bandwidth. The CCDF curve shows how much time the peak waveform spends at or above a given average power level. The percent of time the signal spends at or above the level defines the probability for that particular power level. For GSM signals, an average and a peak trace are used on a spectrum analyzer to determine the largest deviation between the average and the peak power of the EUT in a bandwidth greater than the emission bandwidth. The traces are generated with the spectrum analyzer set to zero span mode.

Note: Reference test setup 1.

4.4.5 Frequency Stability / Temperature Variation

Frequency stability testing is performed in accordance with the guidelines of ANSI/TIA-603-C-2004. The frequency stability of the transmitter is measured by:

- a.) **Temperature:** The temperature is varied from -30°C to +50°C in 10°C increments using an environmental chamber.
- b.) **Primary Supply Voltage:** The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

Specification – The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within $\pm 0.00025\%$ (± 2.5 ppm) of the center frequency.

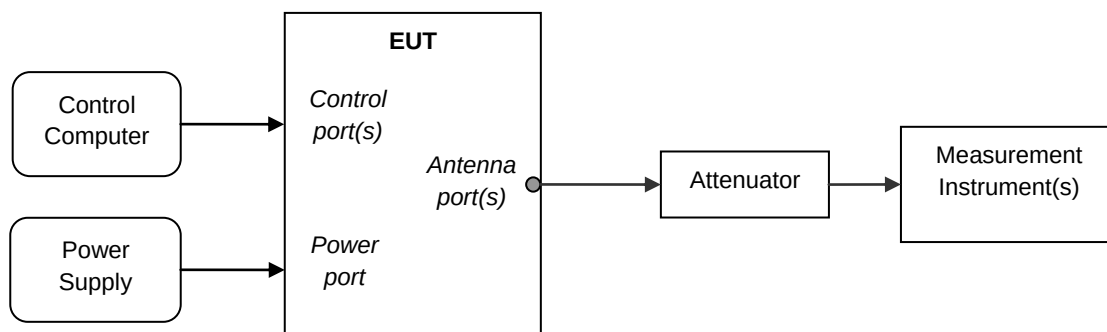
Time Period and Procedure:

1. The carrier frequency of the transmitter is measured at room temperature (20°C to provide a reference).
2. The equipment is turned on in a “standby” condition for fifteen minutes before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.
3. Frequency measurements are made at 10°C intervals ranging from -30°C to +50°C. A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

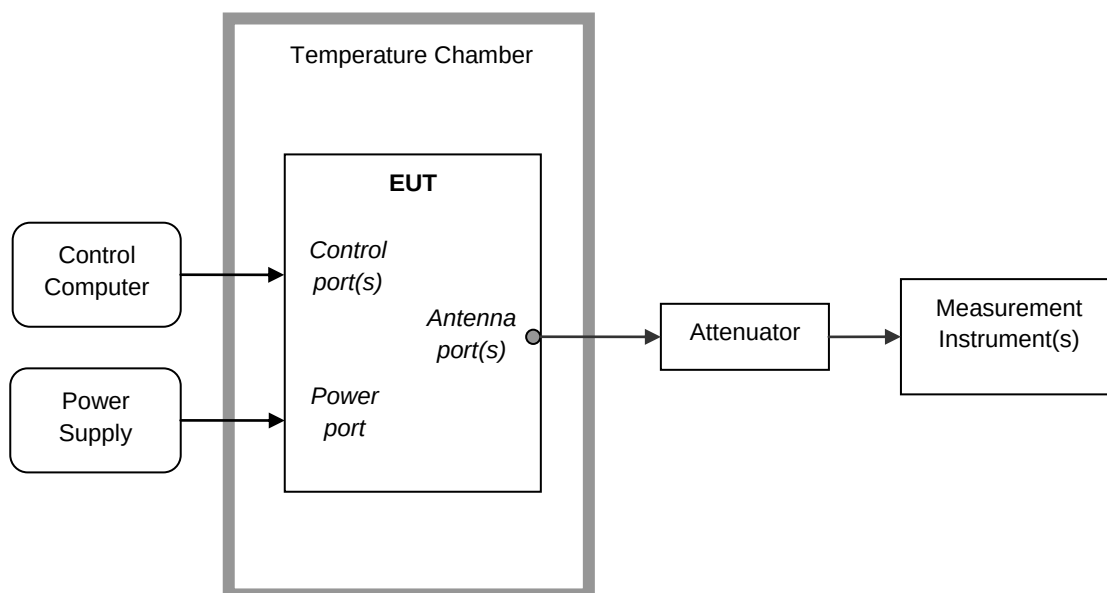
Note: Reference test setup 2.

4.5 Test Setups

4.5.1 Test Setup 1



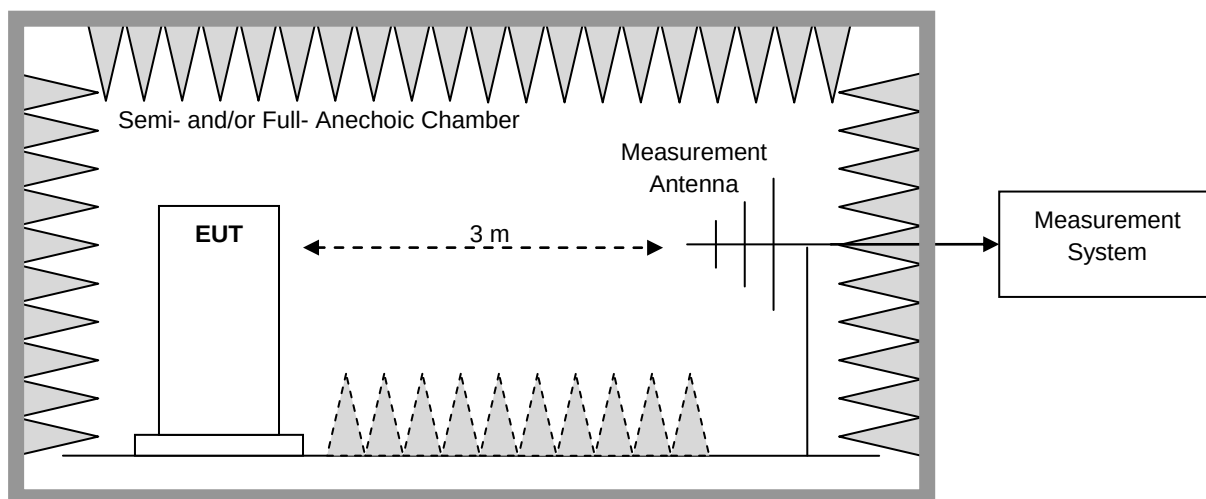
4.5.2 Test Setup 2



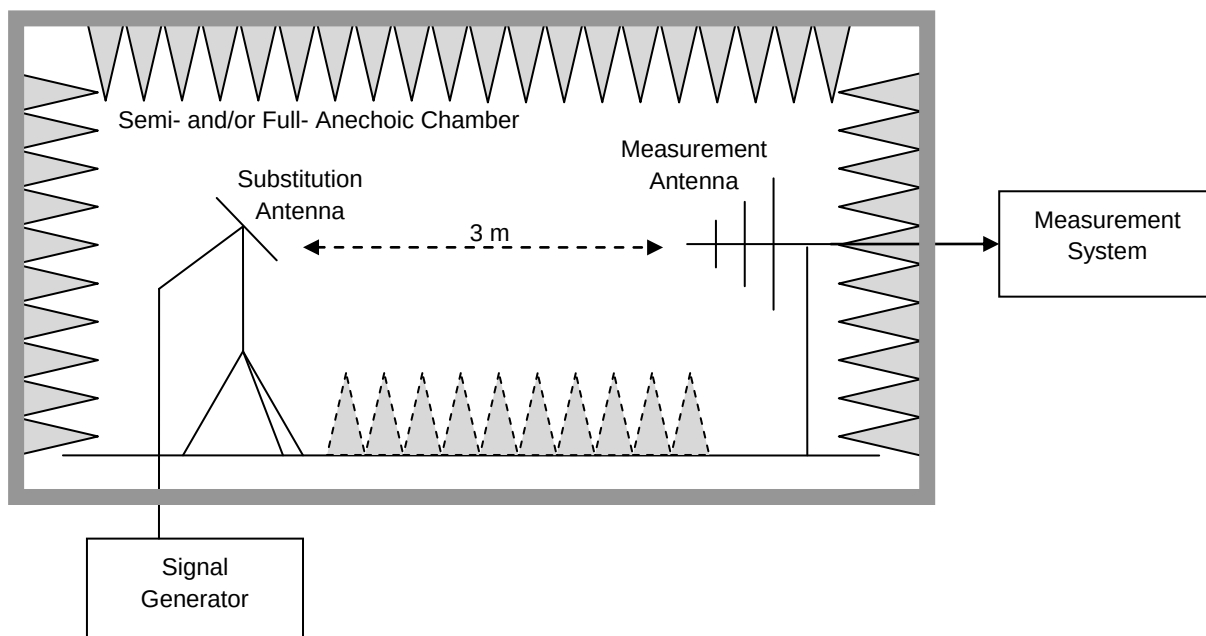
4.5.3 Test Setup 3

NOTE: Effective radiated power (ERP) refers to the radiation power output of the EUT, assuming all emissions are radiated from half-wave dipole antennas.

4.5.3.1 Step 1: Pre-test



4.5.3.2 Step 2: Substitution method to verify the maximum ERP



4.6 Test Conditions

Test Case		Test Conditions	
Transmitter Output Power	Average Power Total	Test Env.	Ambient Climate & Rated Voltage
		Test Setup	Test Seup 1
		RF Channels (TX)	L, M, H (L= low channel, M= middle channel, H= high channel)
		Test Mode	GSM/TM1& GSM/TM2
	Peak-to-Average Ratio (if required)	Test Env.	Ambient Climate & Rated Voltage
		Test Setup	Test Seup 1
		RF Channels (TX)	L, M, H (L= low channel, M= middle channel, H= high channel)
		Test Mode	GSM/TM1& GSM/TM2
Bandwidth	Occupied Bandwidth	Test Env.	Ambient Climate & Rated Voltage
		Test Setup	Test Seup 1
		RF Channels (TX)	L, M, H (L= low channel, M= middle channel, H= high channel)
		Test Mode	GSM/TM1& GSM/TM2
	Emission Bandwidth (if required)	Test Env.	Ambient Climate & Rated Voltage
		Test Setup	Test Seup 1
		RF Channels (TX)	L, M, H (L= low channel, M= middle channel, H= high channel)
		Test Mode	GSM/TM1& GSM/TM2
Band Edges Compliance		Test Env.	Ambient Climate & Rated Voltage
		Test Setup	Test Seup 1
		RF Channels (TX)	L, M, H (L= low channel, M= middle channel, H= high channel)
		Test Mode	GSM/TM1& GSM/TM2
Spurious Emission at Antenna Terminals		Test Env.	Ambient Climate & Rated Voltage
		Test Setup	Test Seup 1
		RF Channels (TX)	L, M, H (L= low channel, M= middle channel, H= high channel)
		Test Mode	GSM/TM1& GSM/TM2
Field Strength of Spurious Radiation		Test Env.	Ambient Climate & Rated Voltage
		Test Setup	Test Seup 3
		Test Mode	GSM/TM1& GSM/TM2 NOTE: If applicable, the EUT conf. that has maximum power density (based on the equivalent power level) is selected.
		RF Channels (TX)	L, M, H (L= low channel, M= middle channel, H= high channel)



Test Case	Test Conditions	
Frequency Stability	Test Env.	(1) -30 °C to +50 °C with step 10 °C at Rated Voltage; (2) 85%, 100% and 115% of Rated Voltage at Ambient Climate.
	Test Setup	Test Seup 2
	RF Channels (TX)	L, M, H (L= low channel, M= middle channel, H= high channel)
	Test Mode	GSM/TM1& GSM/TM2

5 Main Test Instruments

Equipment Name	Manufacturer	Model	Serial Number	Cal Date	Cal. Due
Power supply	KEITHLEY	2303	1288003	2012-11-19	2014-11-18
Universal Radio Communication Tester	R&S	CMU200	123299	2012-09-20	2013-09-19
Spectrum Analyzer	Agilent	E4440A	MY48250119	2012-08-20	2013-08-19
Signal Analyzer	R&S	FSQ31	200021	2012-11-09	2013-11-08
Universal Radio Communication Tester	Agilent	E5515C	MY50260239	2012-11-09	2013-11-08
Temperature Chamber	WEISS	WKL64	562460029400 10	2013-01-29	2014-01-28
Signal generator	Agilent	E8257D	MY49281095	2012-09-14	2013-09-13
Vector Signal Generator	R&S	SMU200A	104162	2012-10-16	2013-10-15
Spectrum analyzer	R&S	FSU3	200474	2013-01-29	2014-01-28
Spectrum analyzer	R&S	FSU43	100144	2013-01-29	2014-01-28
Double-Ridged Waveguide Horn Antenna (1G~18GHz)	R&S	HF907	100304	2013-02-02	2014-02-01
Double-Ridged Waveguide Horn Antenna (1G~18GHz)	R&S	HF907	100391	2011-10-12	2013-10-11
Trilog Broadband Antenna (30M~3GHz)	SCHWARZB ECK	VULB 9163	9163-521	2011-12-09	2013-12-08
Pyramidal Horn Antenna(18GHz-26.5GHz)	ETS-Lindgren	3160-09	00091989	2011-10-20	2013-10-19

6 Measurement Uncertainty

For a 95% confidence level ($k = 2$), the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 as following:

Test Item		Extended Uncertainty
RF Power Output	Power [dBm]	U = 0.39 dB
Bandwidth	Magnitude [%]	U = 0.2%
Band Edge Compliance	Disturbance Power [dBm]	U = 2.0 dB
Spurious Emissions, Conducted	Disturbance Power [dBm]	U = 2.0 dB
Field Strength of Spurious Radiation	ERP [dBm]	For 3 m Chamber: U = 4.6 dB (30 MHz to 1GHz) U = 3.0 dB (above 1 GHz) For 10 m Chamber: U = 4.6 dB (30 MHz to 1GHz) U = 3.0 dB (above 1 GHz)
Frequency Stability	Frequency Accuracy [ppm]	U = 0.21 ppm

END



Appendix for Test report

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1Appendix_A: 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	31.9	31.41	38.5	PASS
		MCH	31.99	31.22	38.5	PASS
		HCH	32.07	31.30	38.5	PASS
	GSM/TM2	LCH	24.99	24.22	38.5	PASS
		MCH	25.14	24.37	38.5	PASS
		HCH	24.98	24.21	38.5	PASS
Test Band	Test Mode	Test Channel	Conducted Power [dBm]	EIRP [dBm]	Limit [dBm]	Verdict
GSM1900	GSM/TM1	LCH	29.46	31.93	33	PASS
		MCH	29.22	31.36	33	PASS
		HCH	29.10	31.52	33	PASS
	GSM/TM2	LCH	24.31	26.45	33	PASS
		MCH	24.38	26.52	33	PASS
		HCH	23.99	26.13	33	PASS



Note1: a, For getting the ERP (Efficient Radiated Power) or EIRP (Efficient Isotropic Radiated Power) in substitution method, the following formula should be taken to calculate it,

$$\text{ERP [dBm]} = \text{SGP [dBm]} - \text{Cable Loss [dB]} + \text{Gain [dBd]}$$

$$\text{EIRP [dBm]} = \text{SGP [dBm]} - \text{Cable Loss [dB]} + \text{Gain [dBi]}$$

b, SGP=Signal Generator Level

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



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	0.15	13	PASS
		MCH	0.15	13	PASS
		HCH	0.14	13	PASS
	GSM/TM2	LCH	3.08	13	PASS
		MCH	3.15	13	PASS
		HCH	3.15	13	PASS

3Appendix_C: Modulation Characteristics

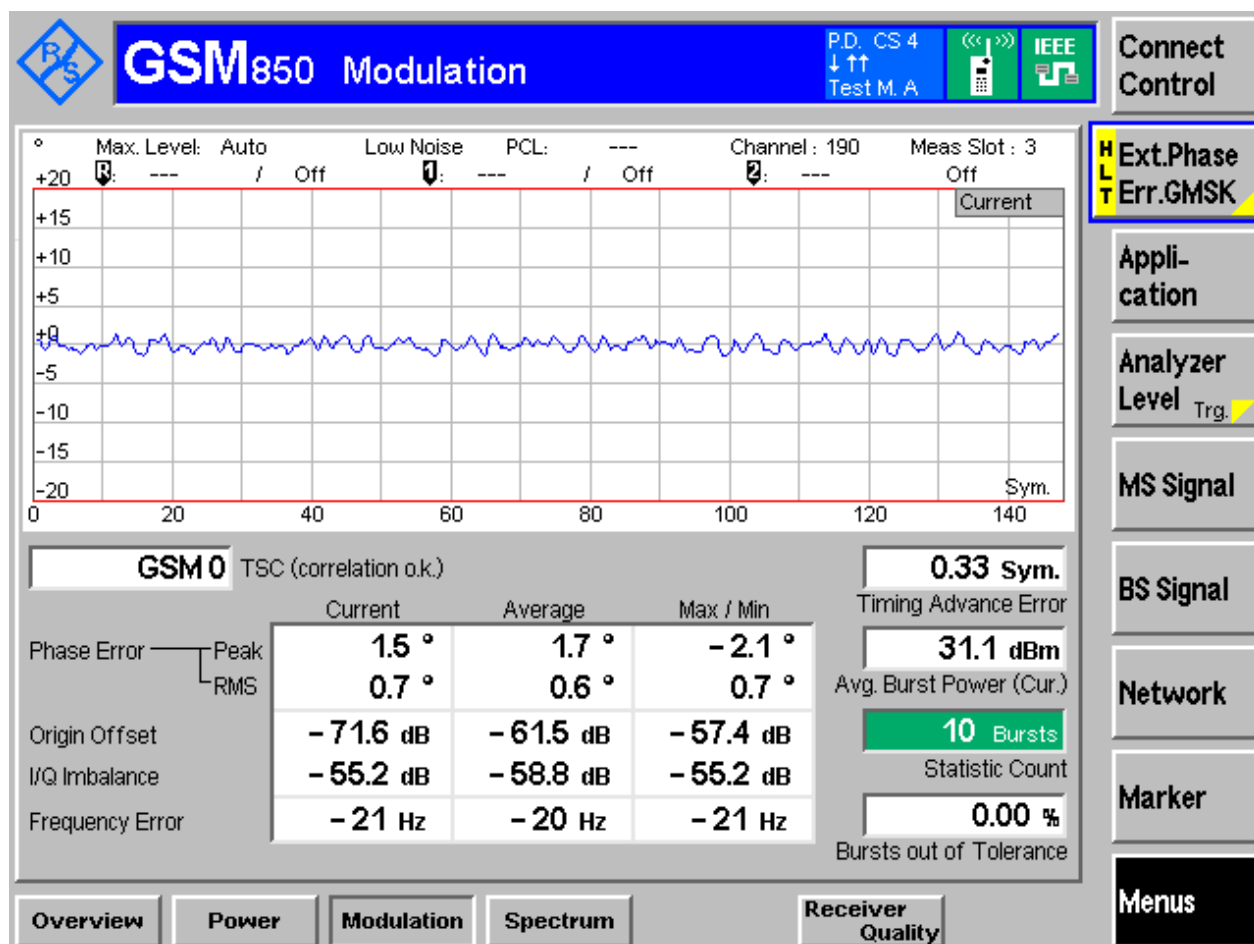
Part I - Test Plots

3.1 For GSM

3.1.1 Test Band = GSM850

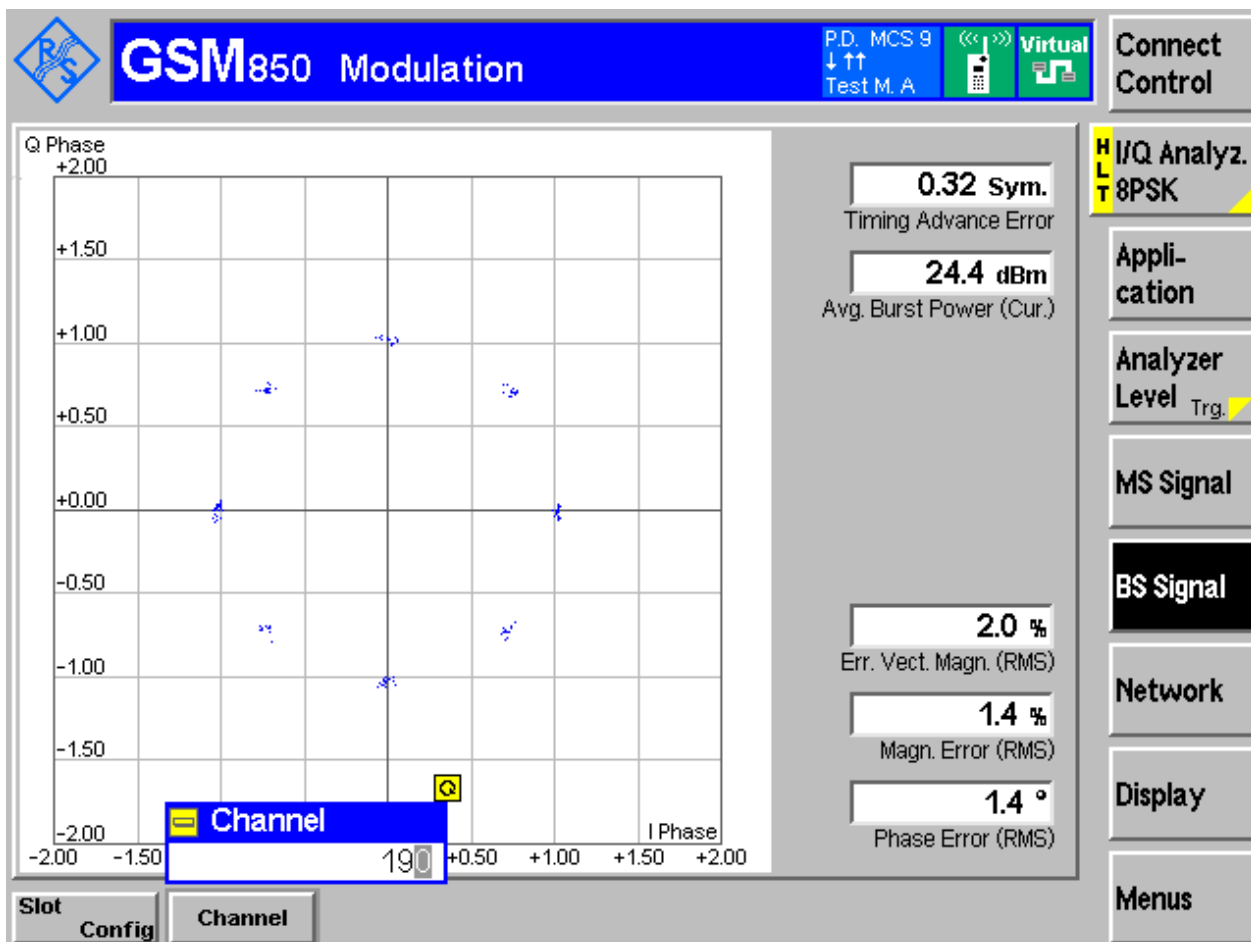
3.1.1.1 Test Mode = GSM/TM1

3.1.1.1.1 Test Channel = MCH



3.1.1.2 Test Mode = GSM/TM2

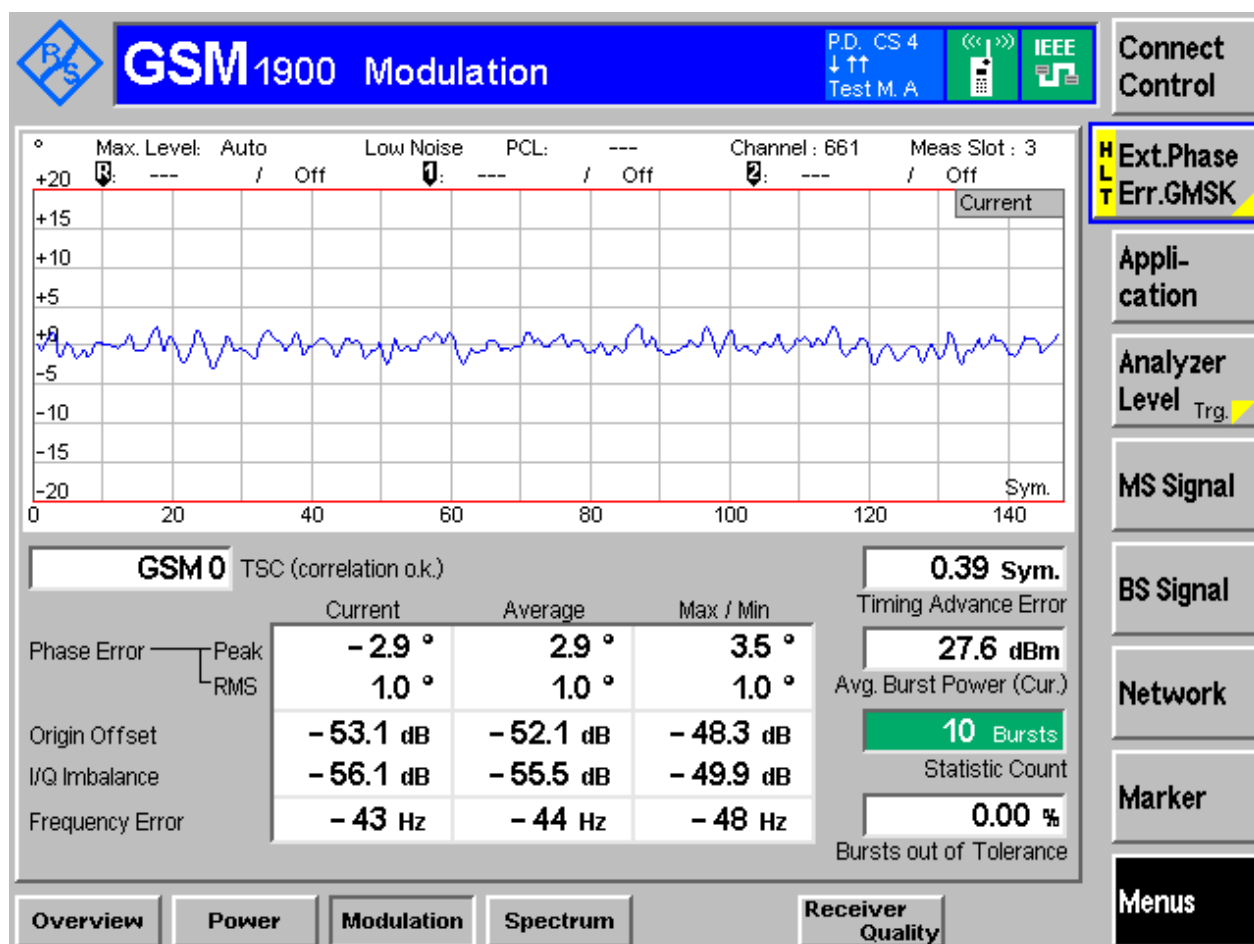
3.1.1.2.1 Test Channel = MCH



3.1.2 Test Band = GSM1900

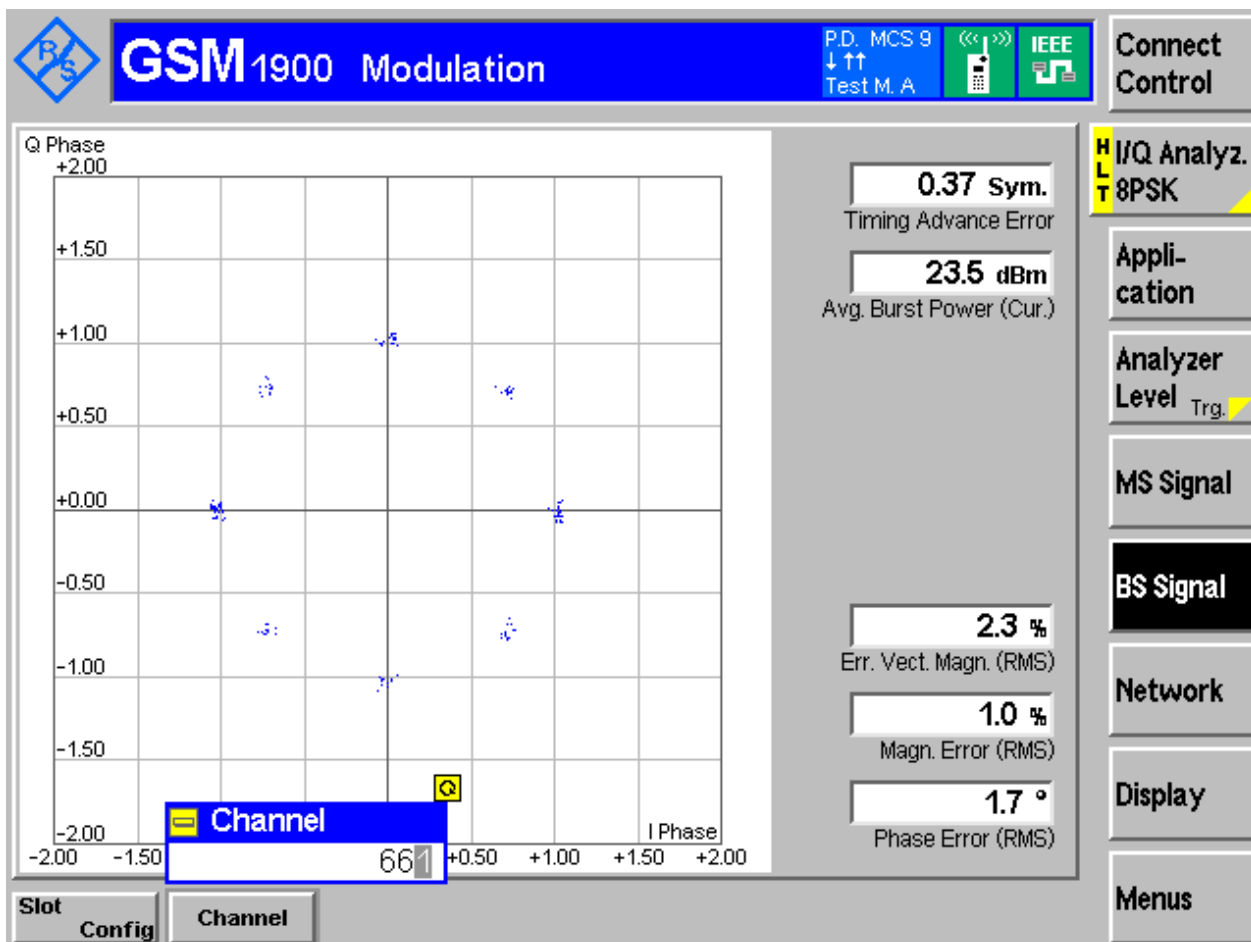
3.1.2.1 Test Mode = GSM/TM1

3.1.2.1.1 Test Channel = MCH



3.1.2.2 Test Mode = GSM/TM2

3.1.2.2.1 Test Channel = MCH



4Appendix_D: Bandwidth

Part I - Test Results

Test Band	Test Mode	Test Channel	Occupied Bandwidth [kHz]	Emission Bandwidth [kHz]	Verdict
GSM850	GSM/TM1	LCH	246.93	313.49	Pass
		MCH	249.64	325.38	Pass
		HCH	249.46	325.26	Pass
	GSM/TM2	LCH	249.04	310.16	Pass
		MCH	250.36	318.21	Pass
		HCH	246.79	311.27	Pass
GSM1900	GSM/TM1	LCH	246.48	317.86	Pass
		MCH	246.02	322.47	Pass
		HCH	245.77	309.78	Pass
	GSM/TM2	LCH	247.84	316.18	Pass
		MCH	249.71	302.51	Pass
		HCH	245.16	313.67	Pass

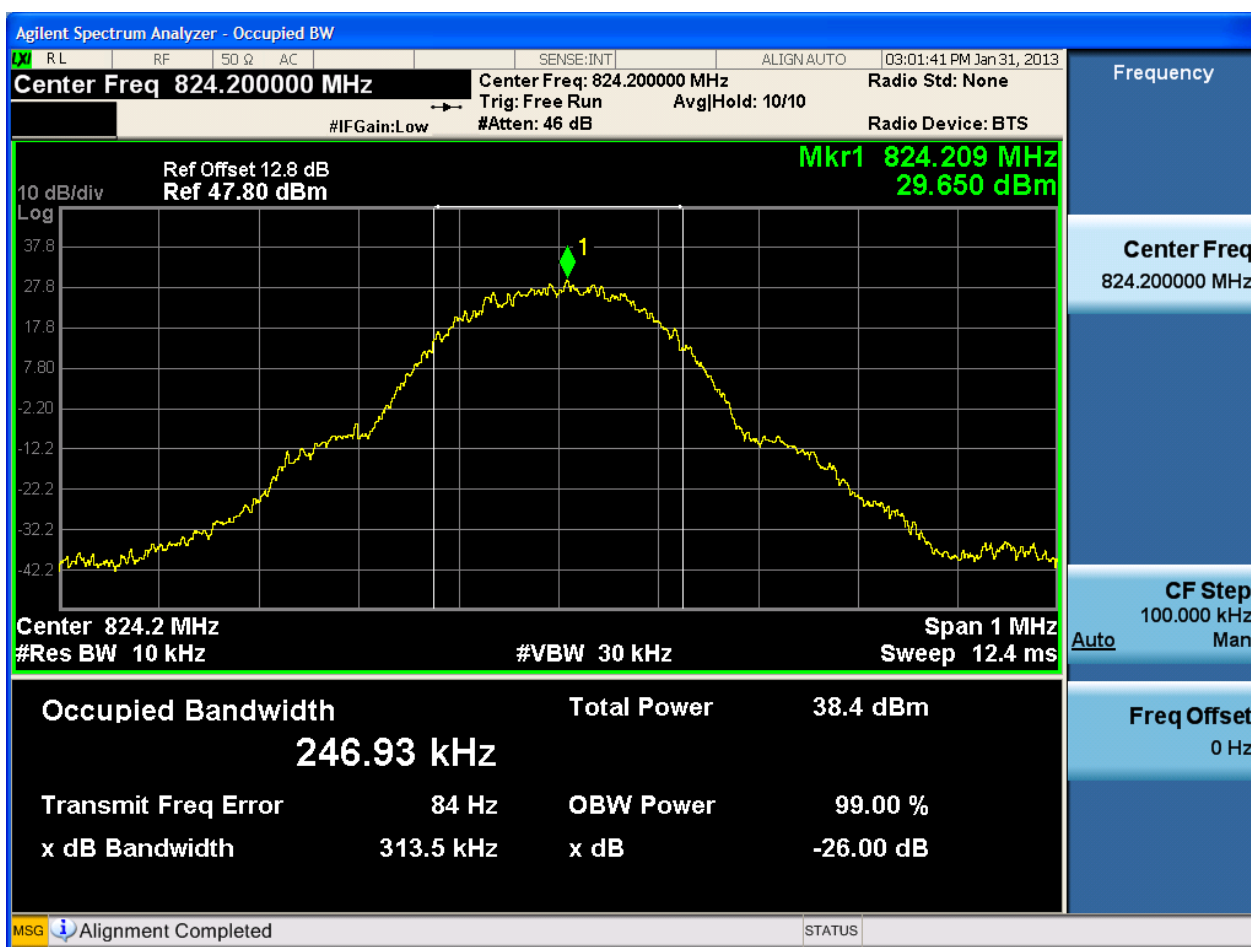
Part II - Test Plots

4.1 For GSM

4.1.1 Test Band = GSM850

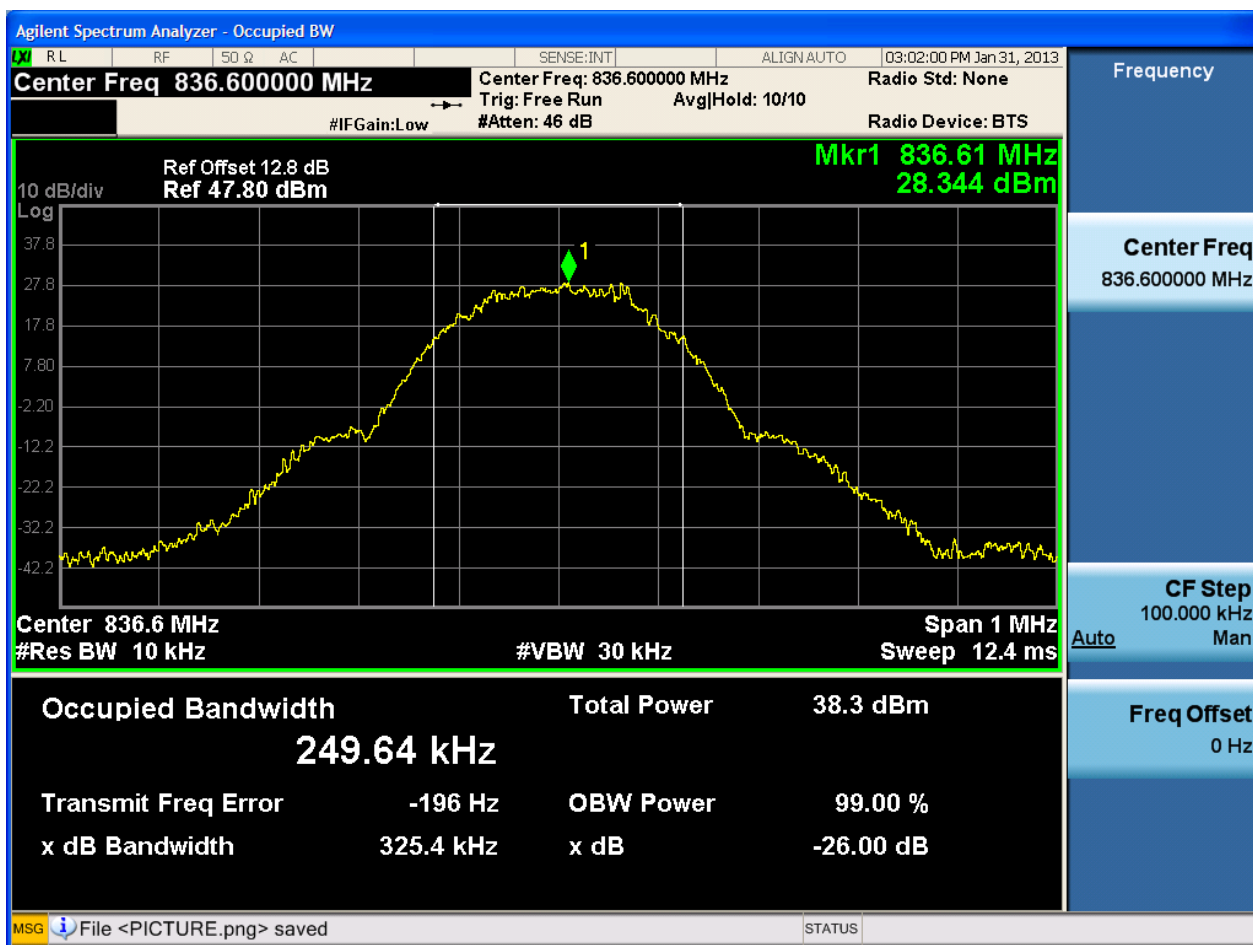
4.1.1.1 Test Mode = GSM/TM1

4.1.1.1.1 Test Channel = LCH



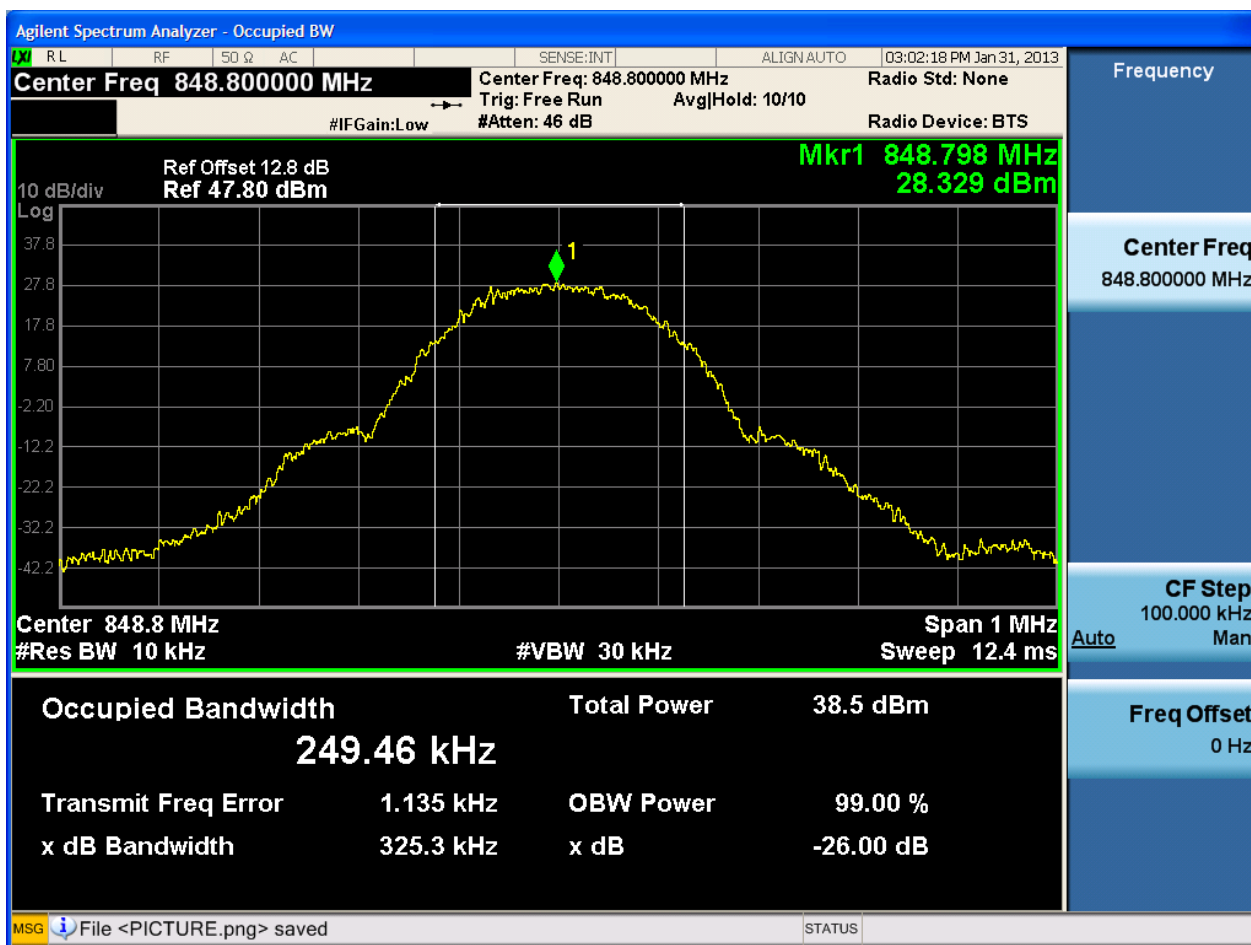


4.1.1.1.2 Test Channel = MCH



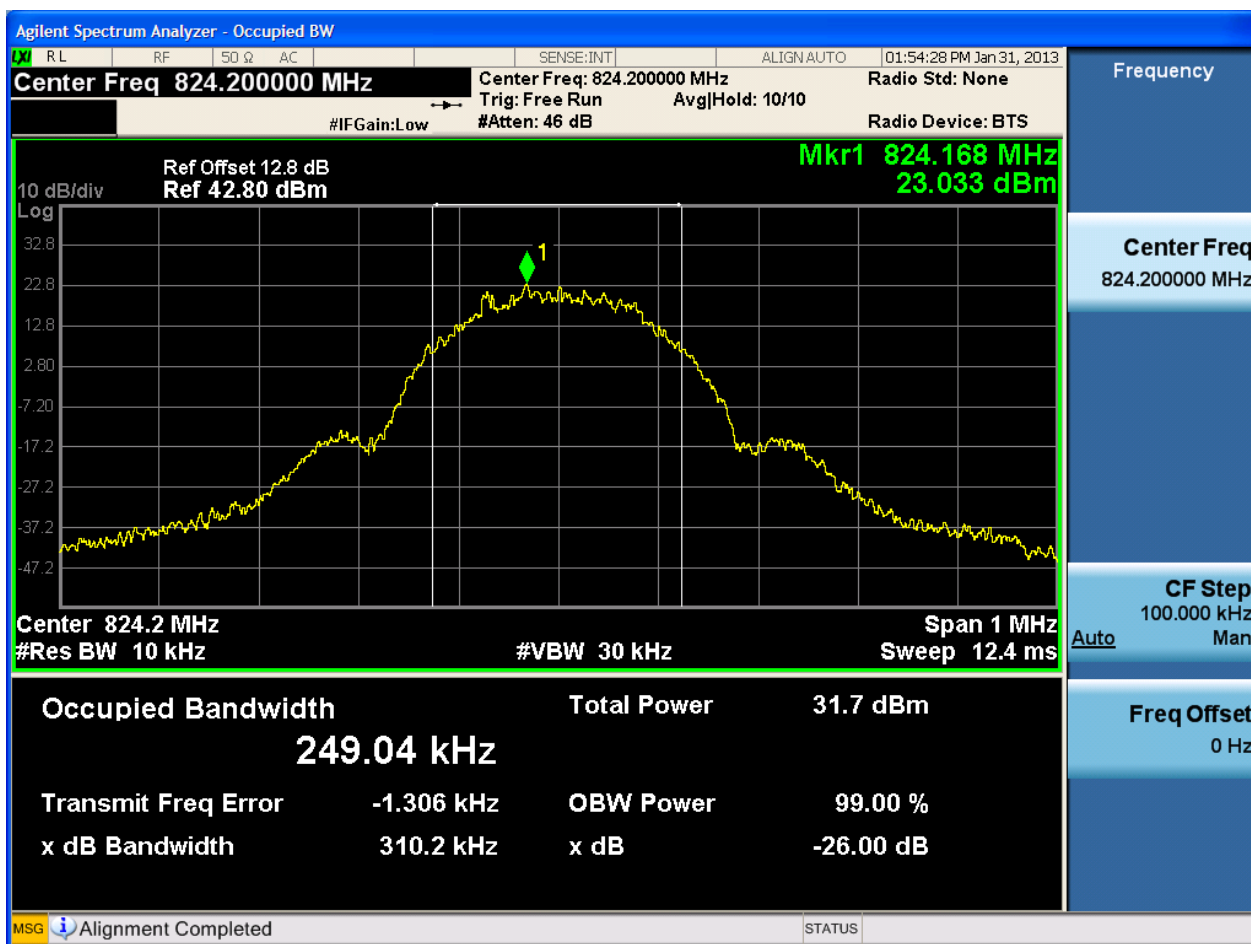


4.1.1.1.3 Test Channel = HCH



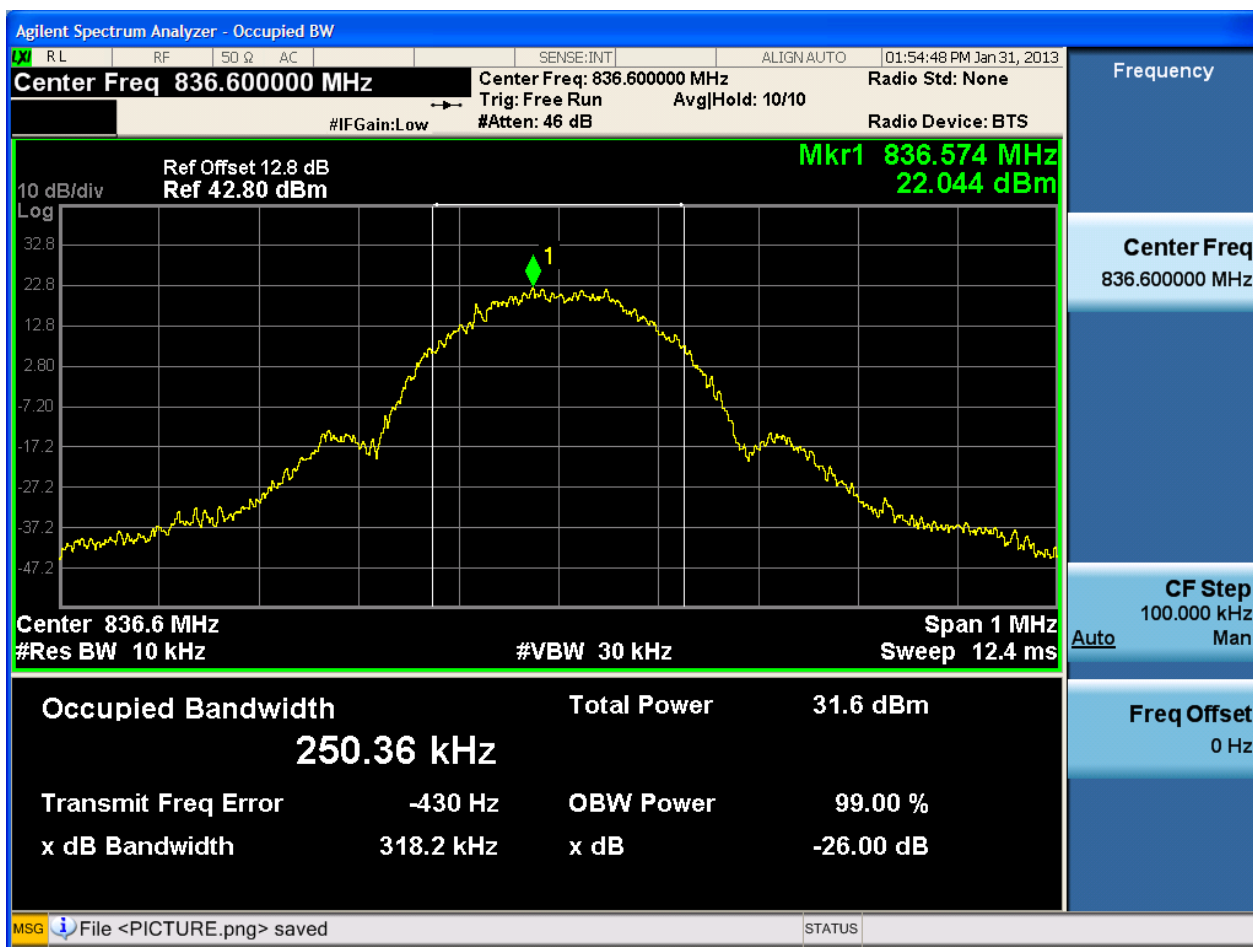
4.1.1.2 Test Mode = GSM/TM2

4.1.1.2.1 Test Channel = LCH



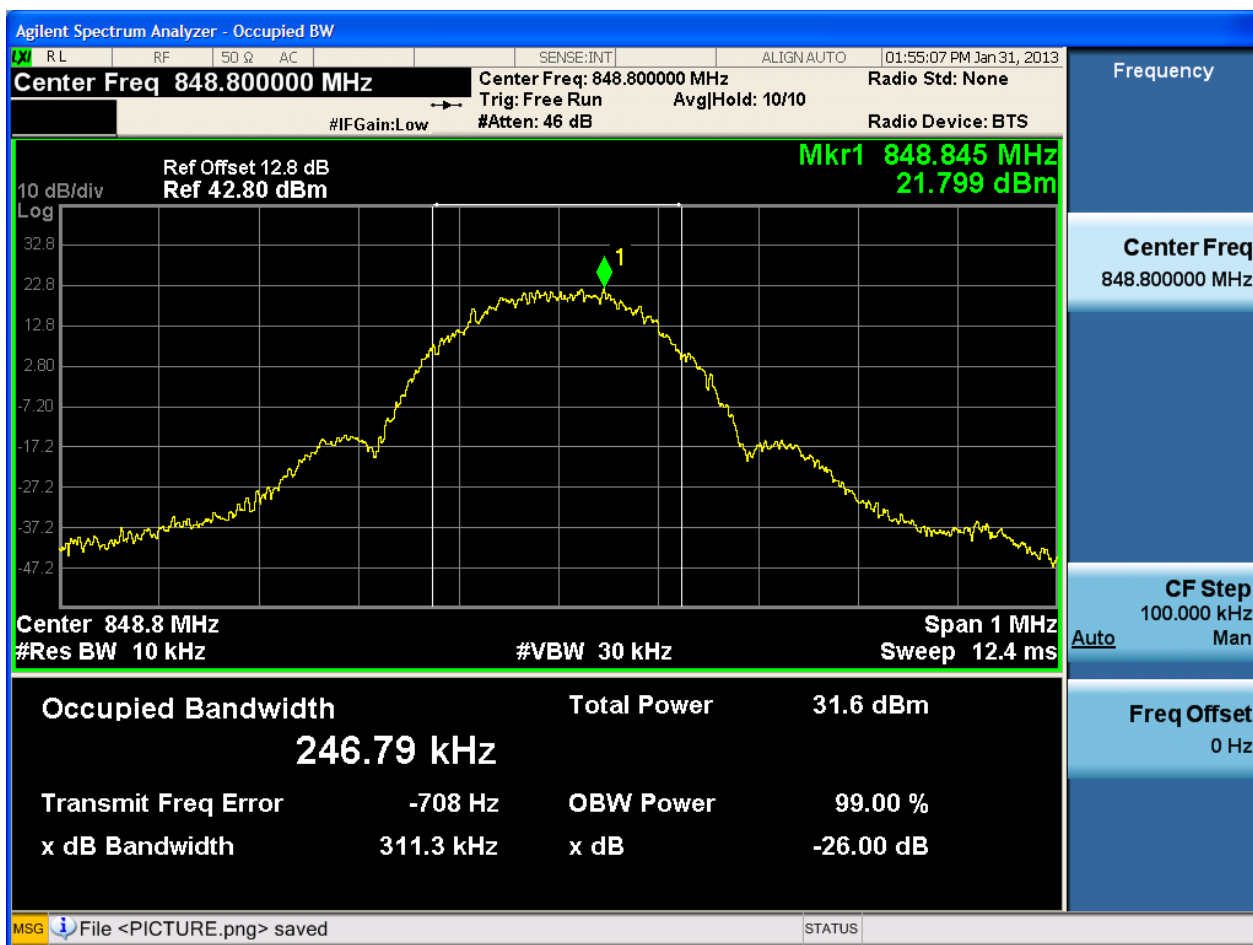


4.1.1.2.2 Test Channel = MCH





4.1.1.2.3 Test Channel = HCH

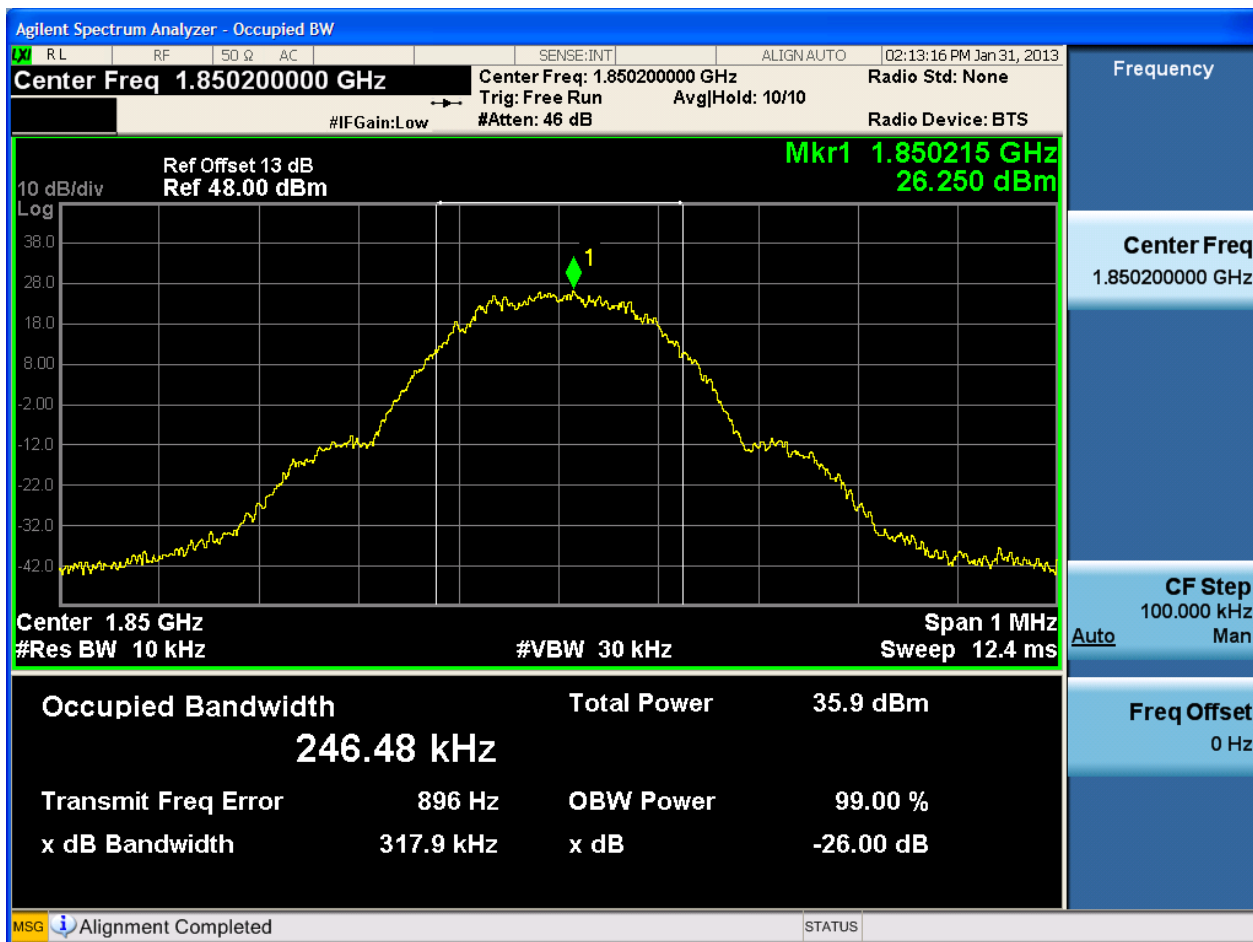




4.1.2 Test Band = GSM1900

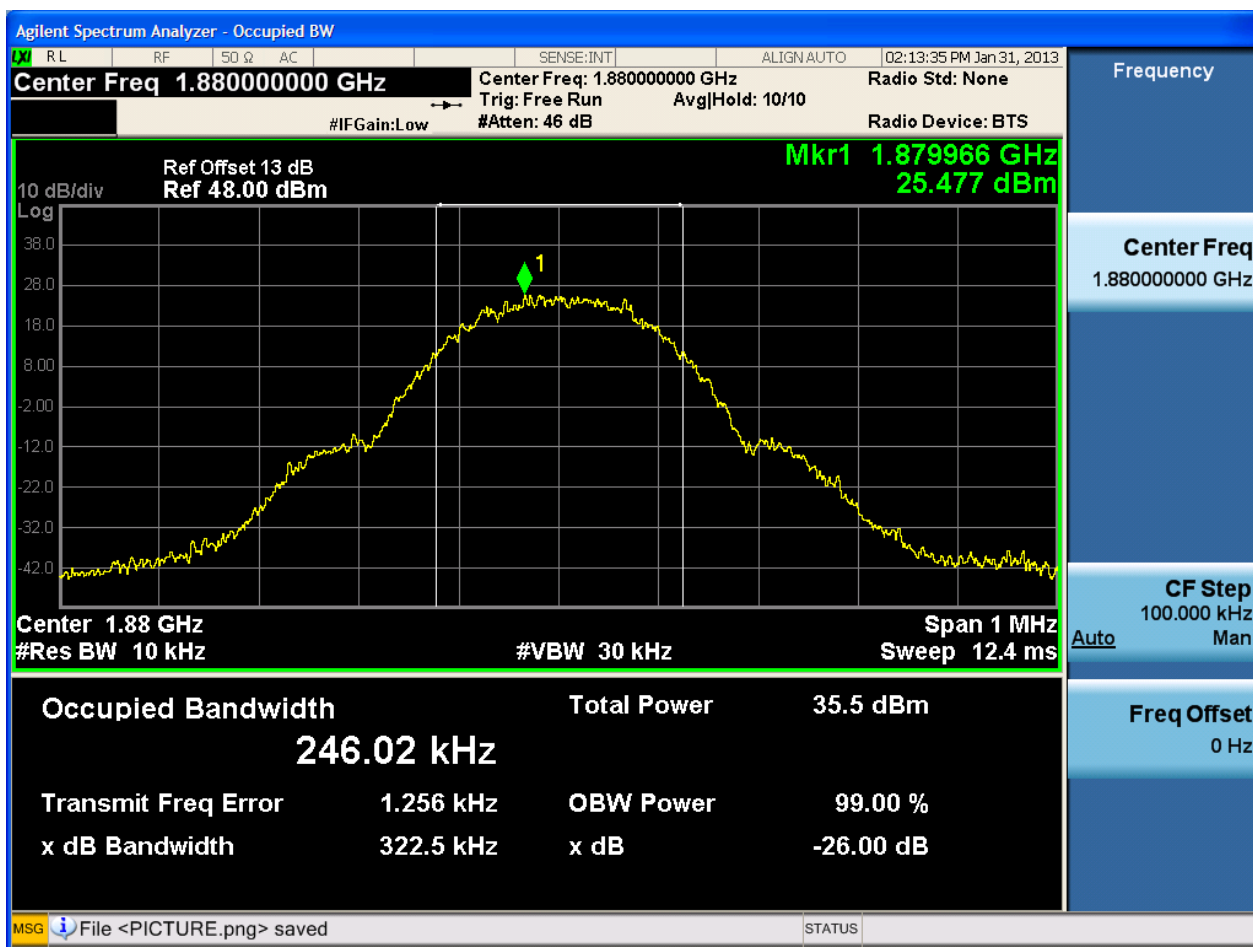
4.1.2.1 Test Mode = GSM/TM1

4.1.2.1.1 Test Channel = LCH



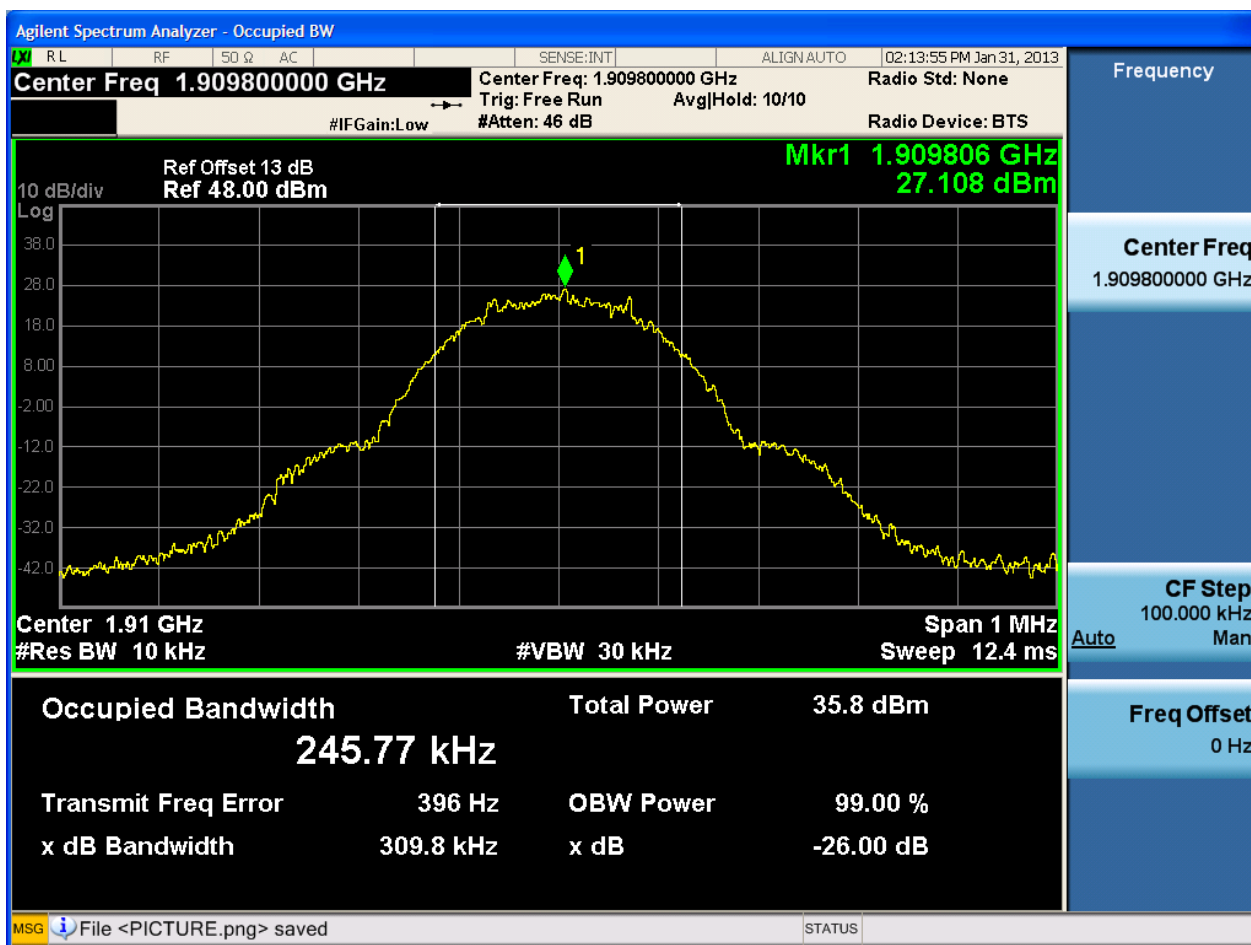


4.1.2.1.2 Test Channel = MCH





4.1.2.1.3 Test Channel = HCH





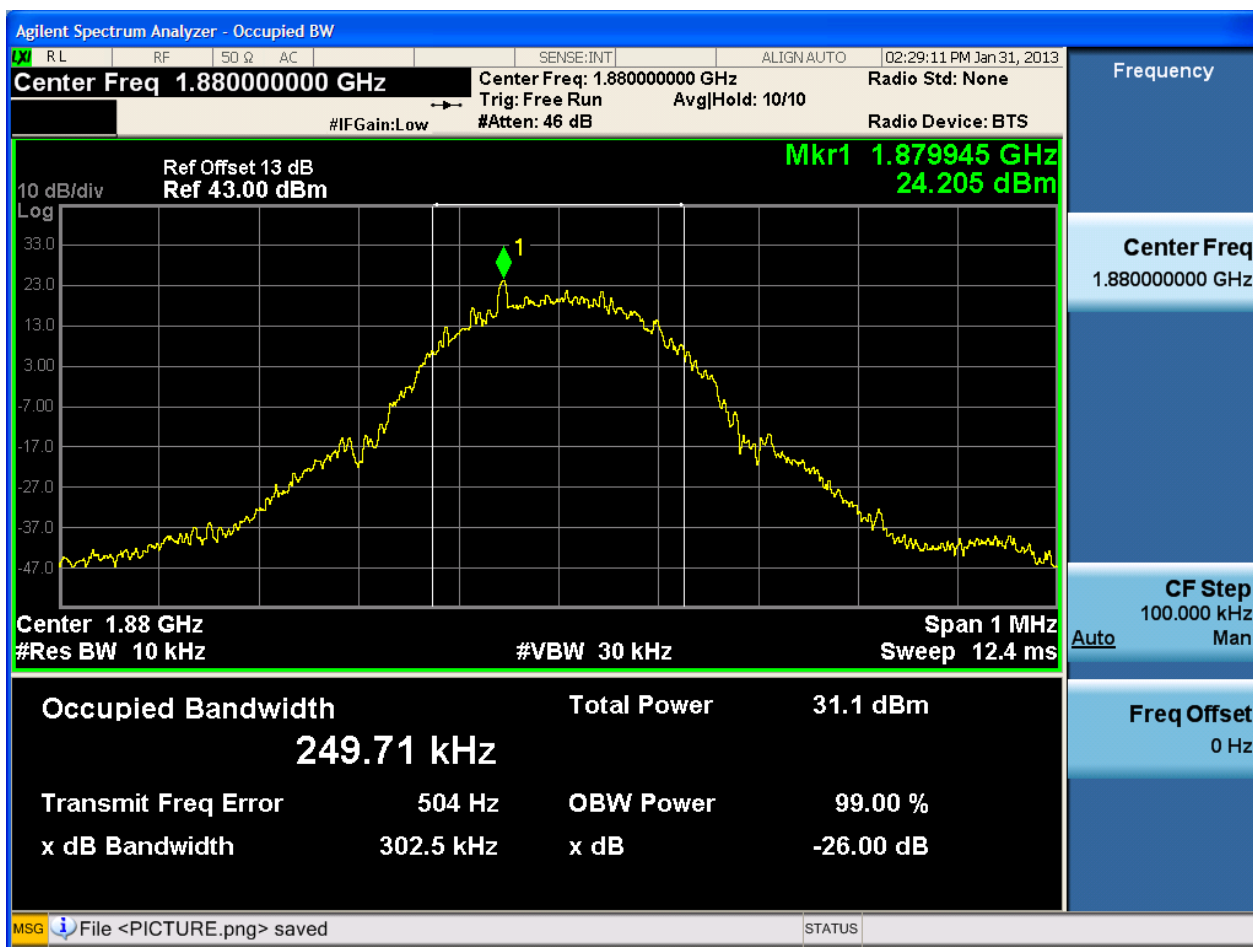
4.1.2.2 Test Mode = GSM/TM2

4.1.2.2.1 Test Channel = LCH



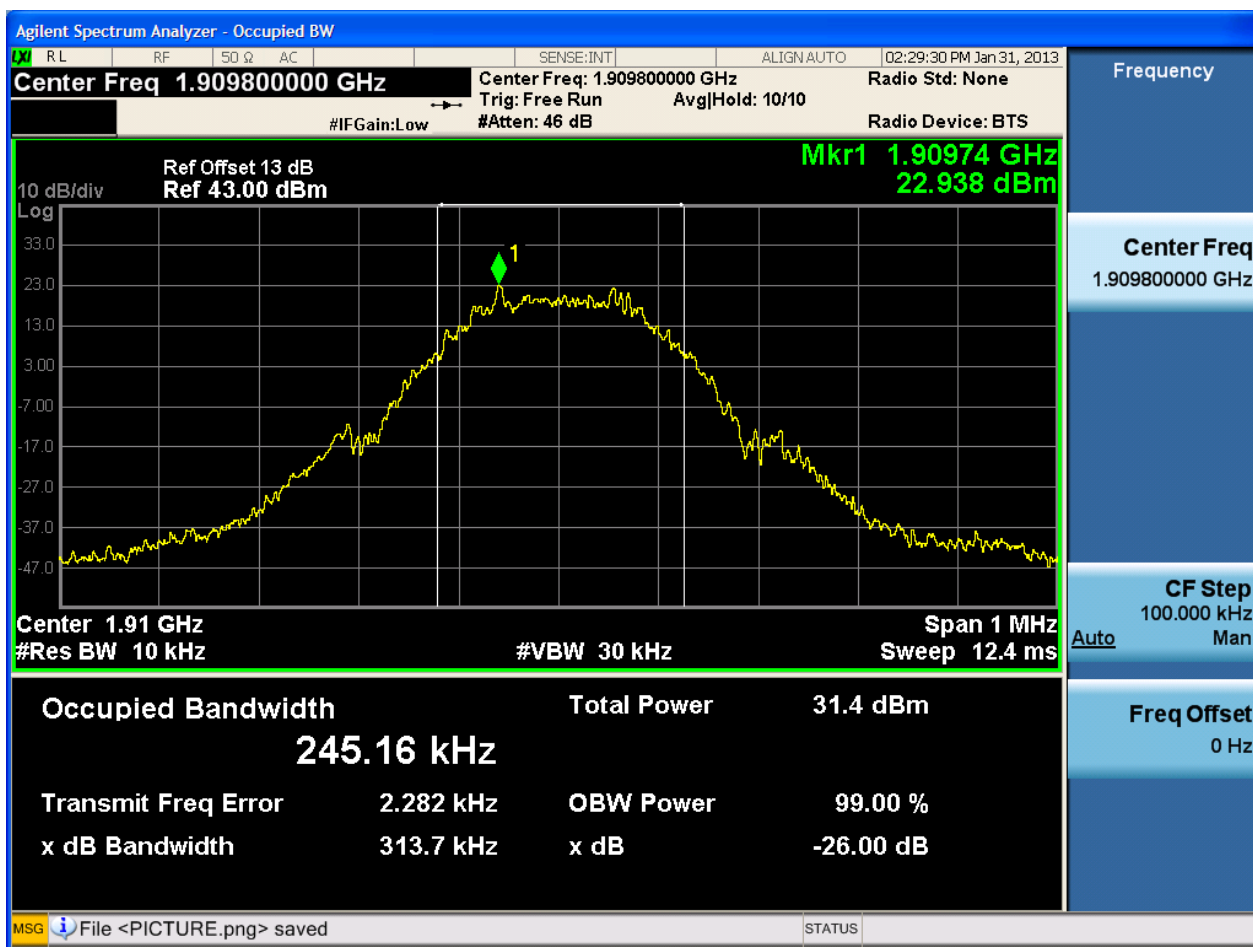


4.1.2.2.2 Test Channel = MCH





4.1.2.2.3 Test Channel = HCH



5Appendix_E: Band Edges Compliance

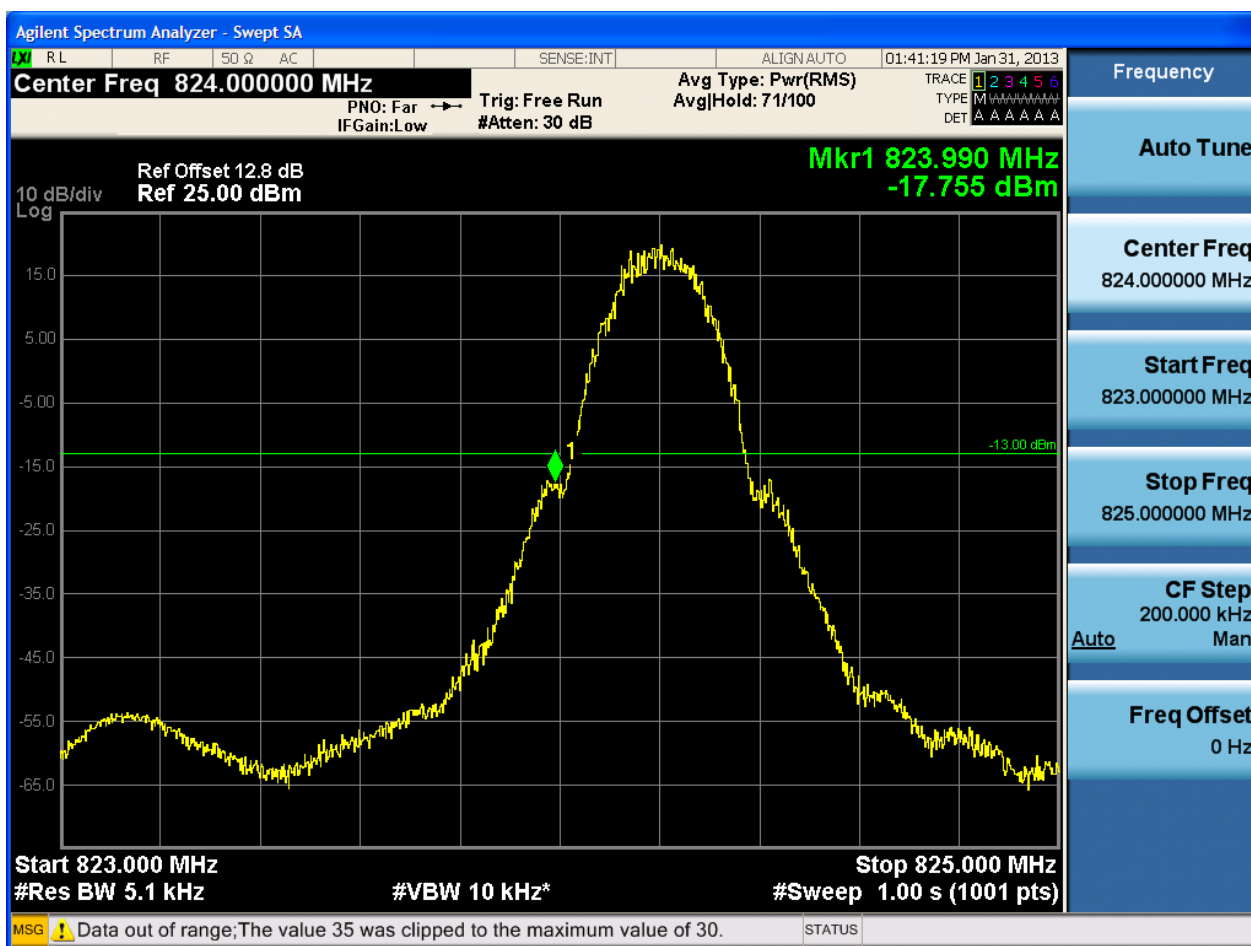
Part I - Test Plots

5.1 For GSM

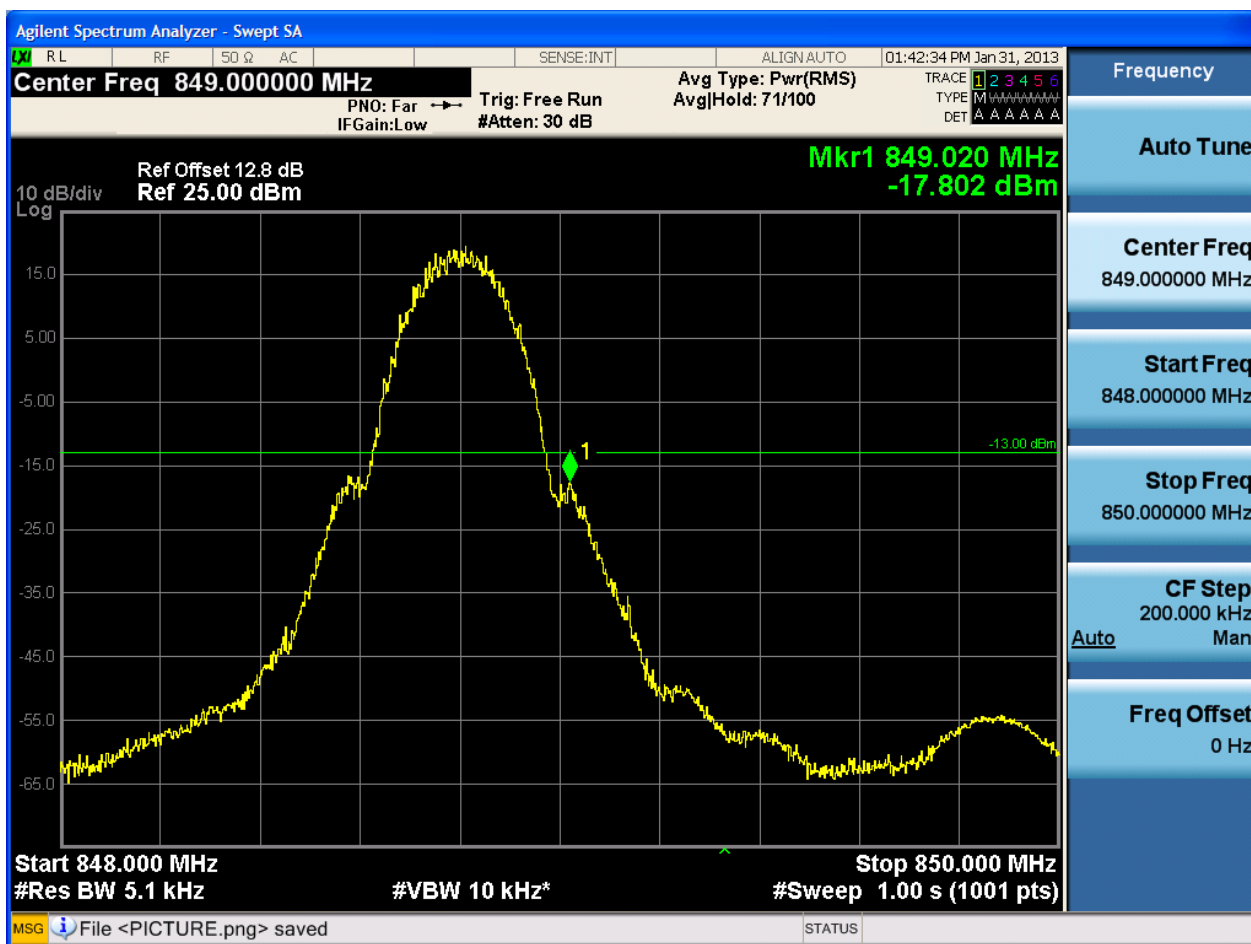
5.1.1 Test Band = GSM850

5.1.1.1 Test Mode = GSM/TM1

5.1.1.1.1 Test Channel = LCH

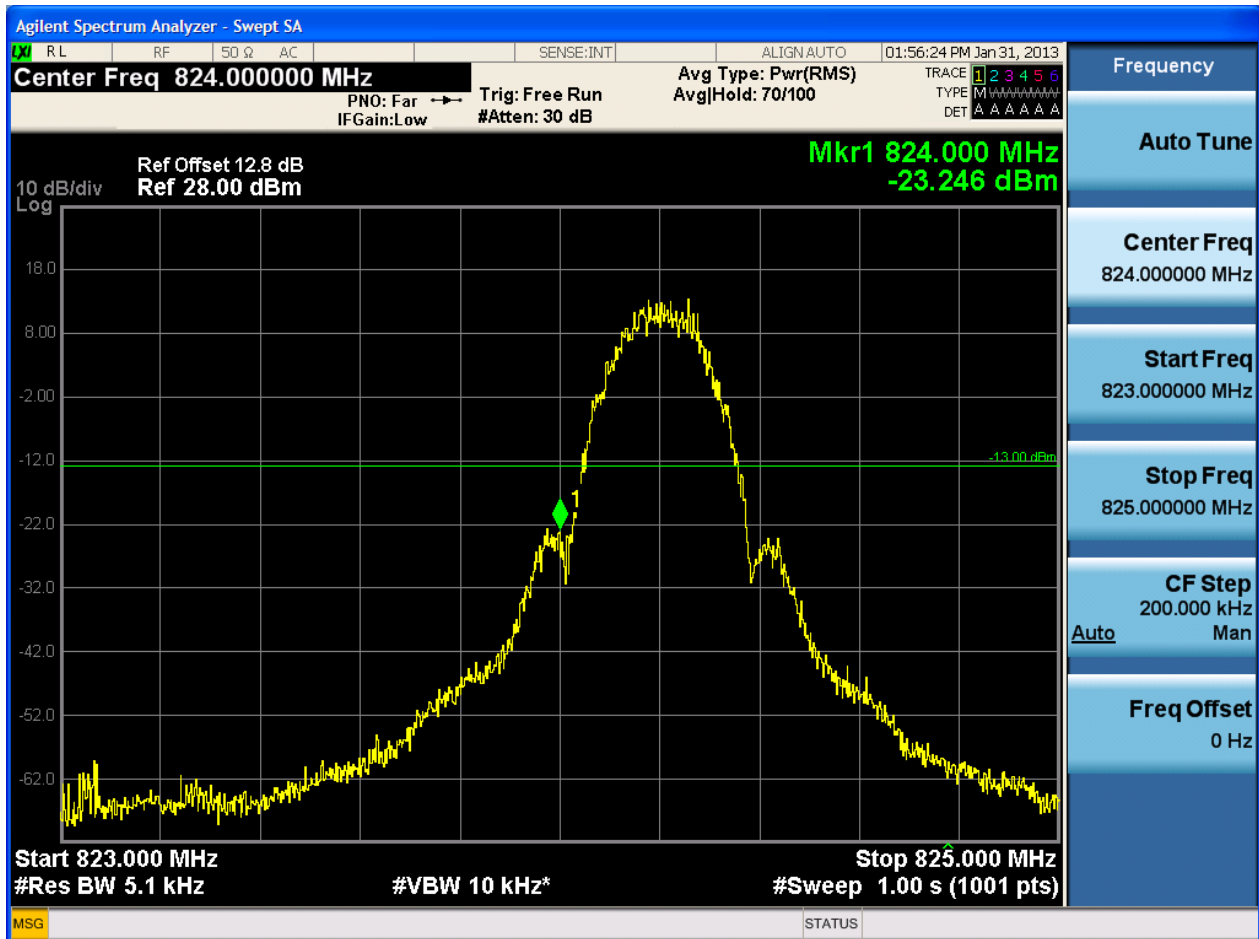


5.1.1.1.2 Test Channel = HCH

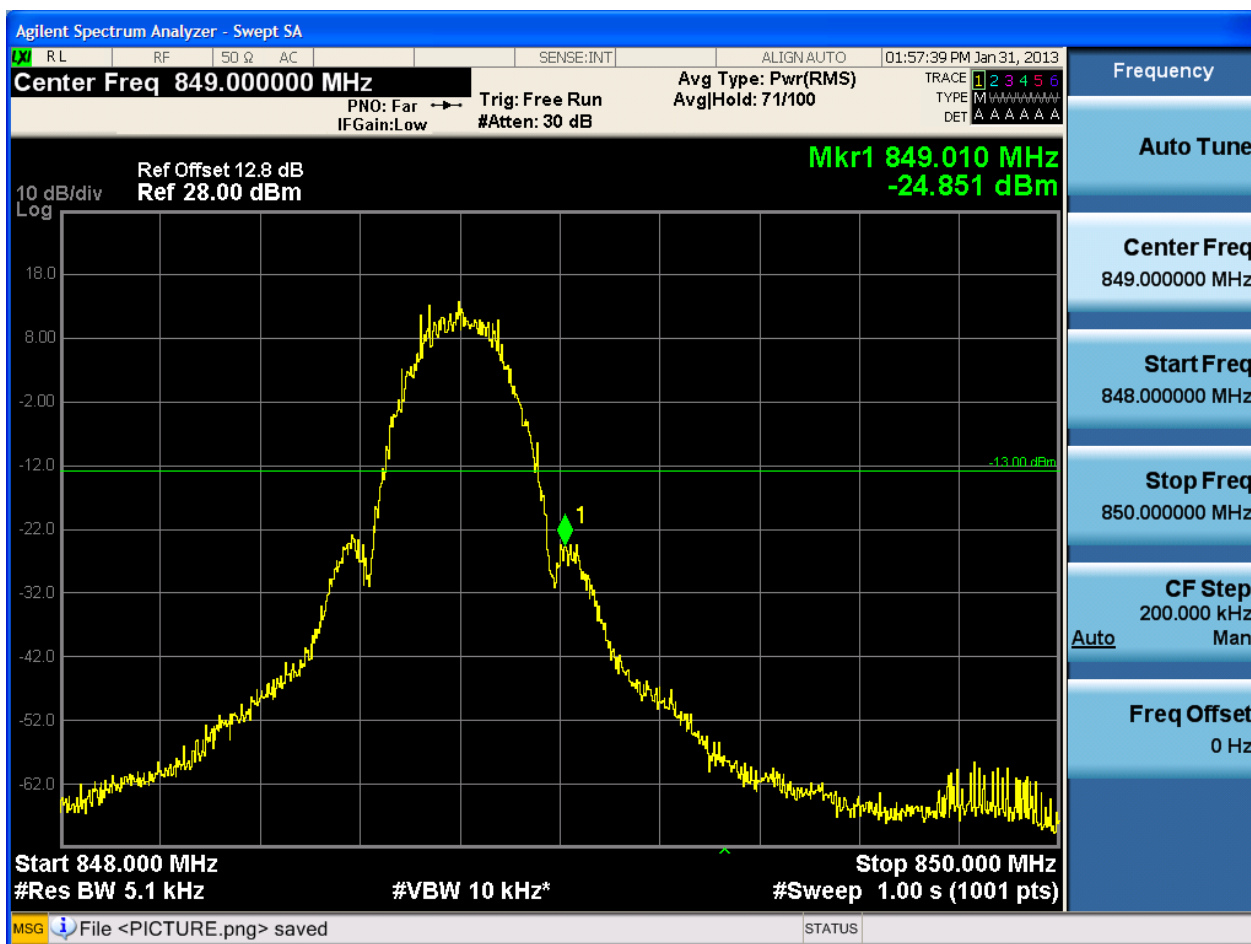


5.1.1.2 Test Mode = GSM/TM2

5.1.1.2.1 Test Channel = LCH



5.1.1.2.2 Test Channel = HCH

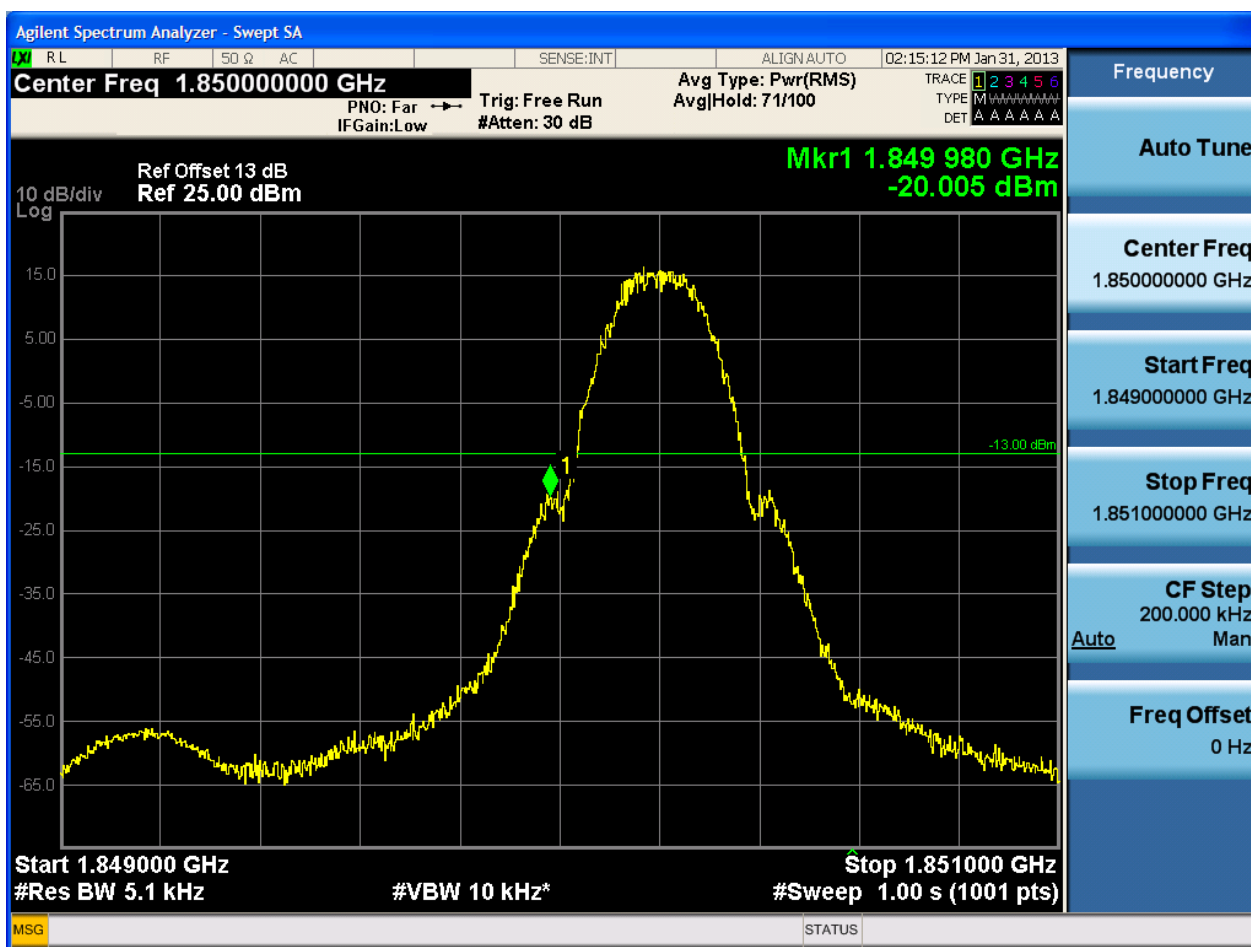




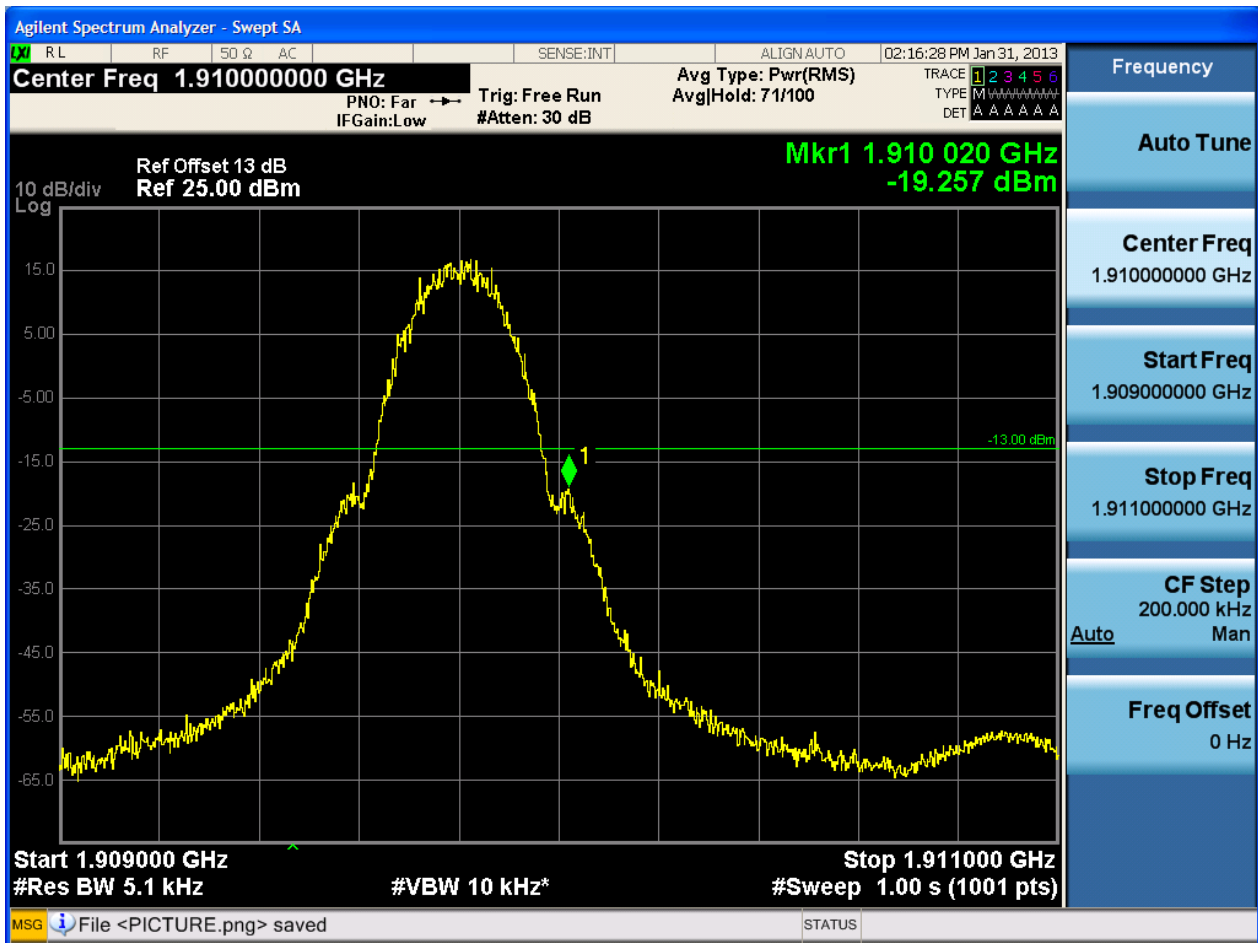
5.1.2 Test Band = GSM1900

5.1.2.1 Test Mode = GSM/TM1

5.1.2.1.1 Test Channel = LCH

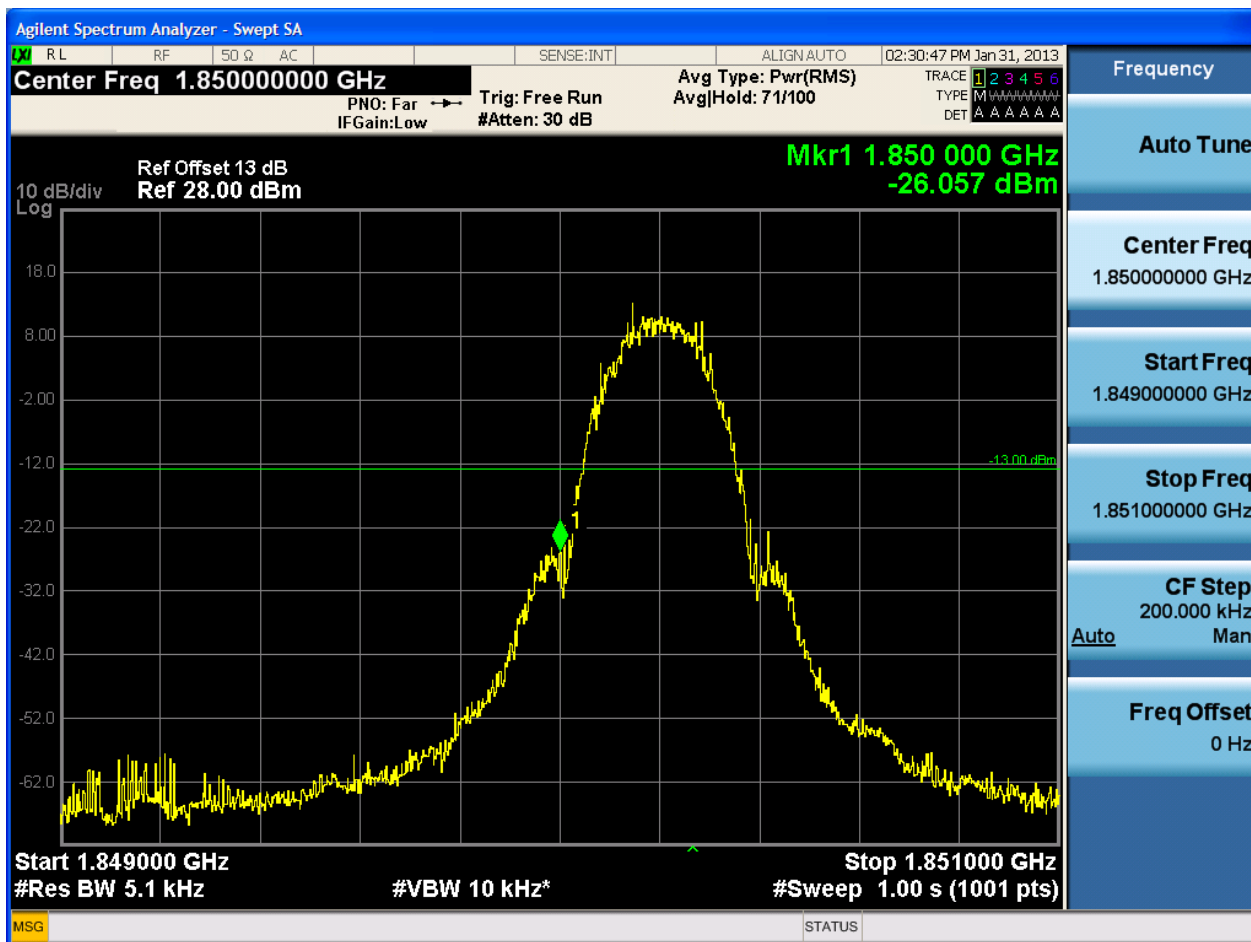


5.1.2.1.2 Test Channel = HCH

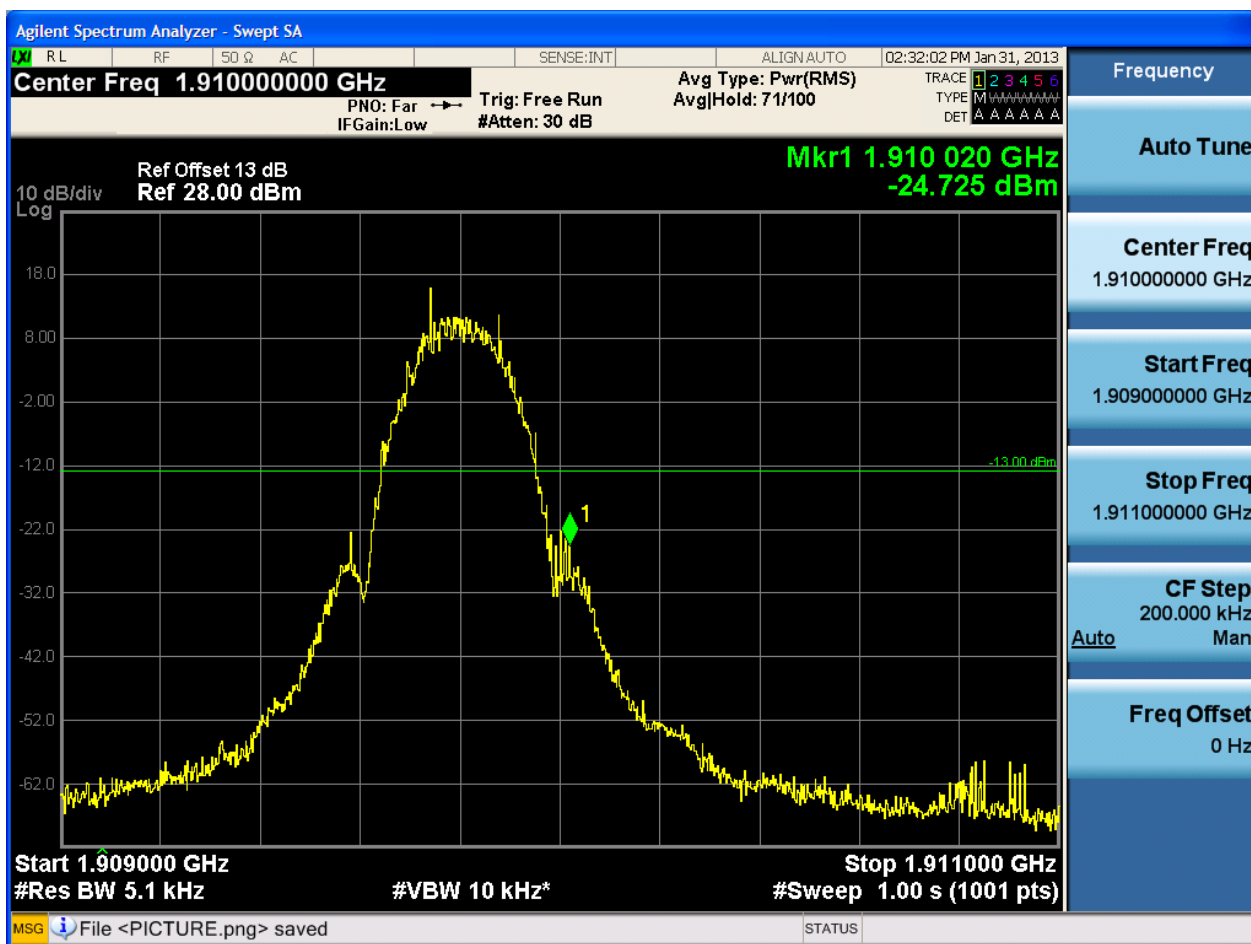


5.1.2.2 Test Mode = GSM/TM2

5.1.2.2.1 Test Channel = LCH



5.1.2.2.2 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.

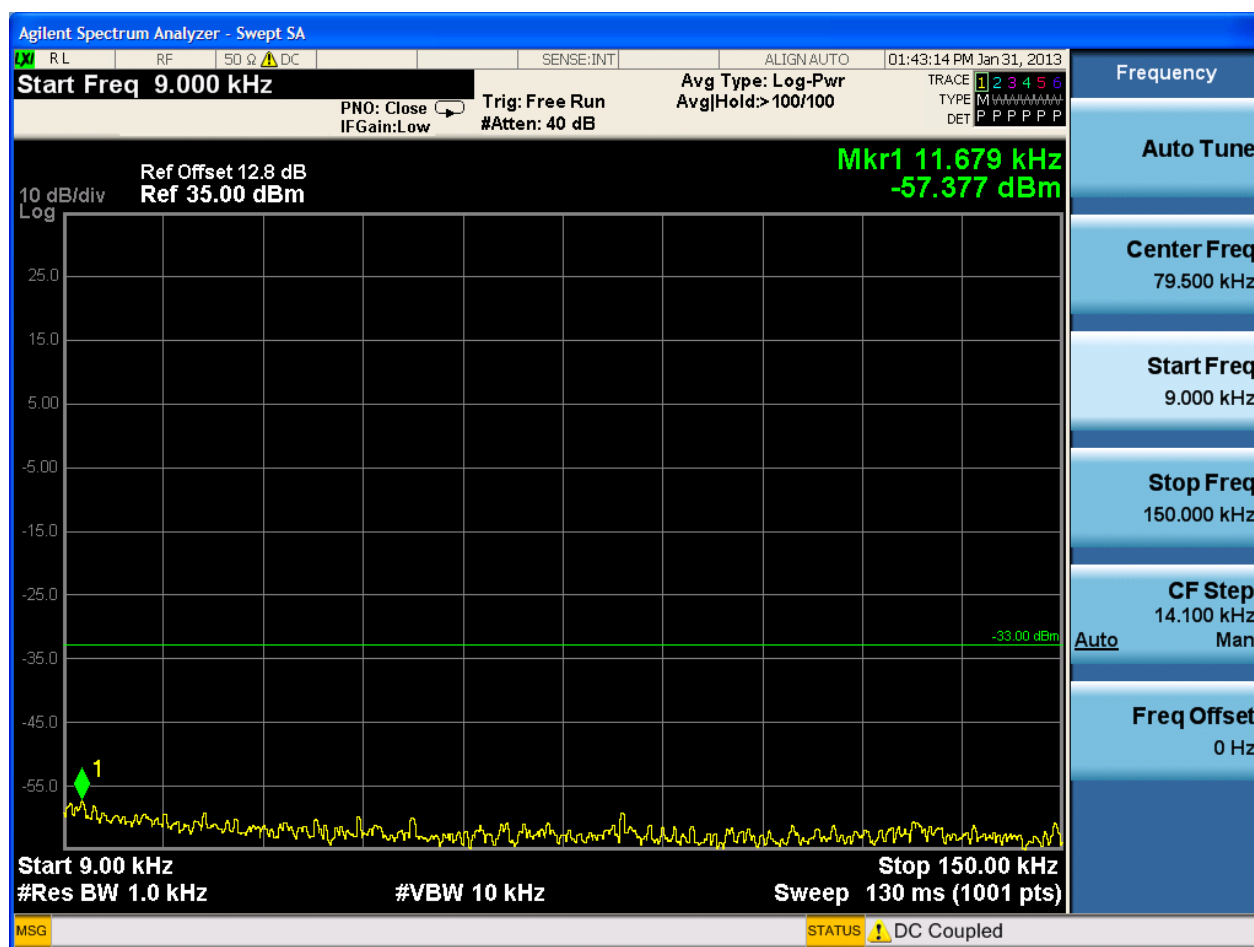
Part I - Test Plots

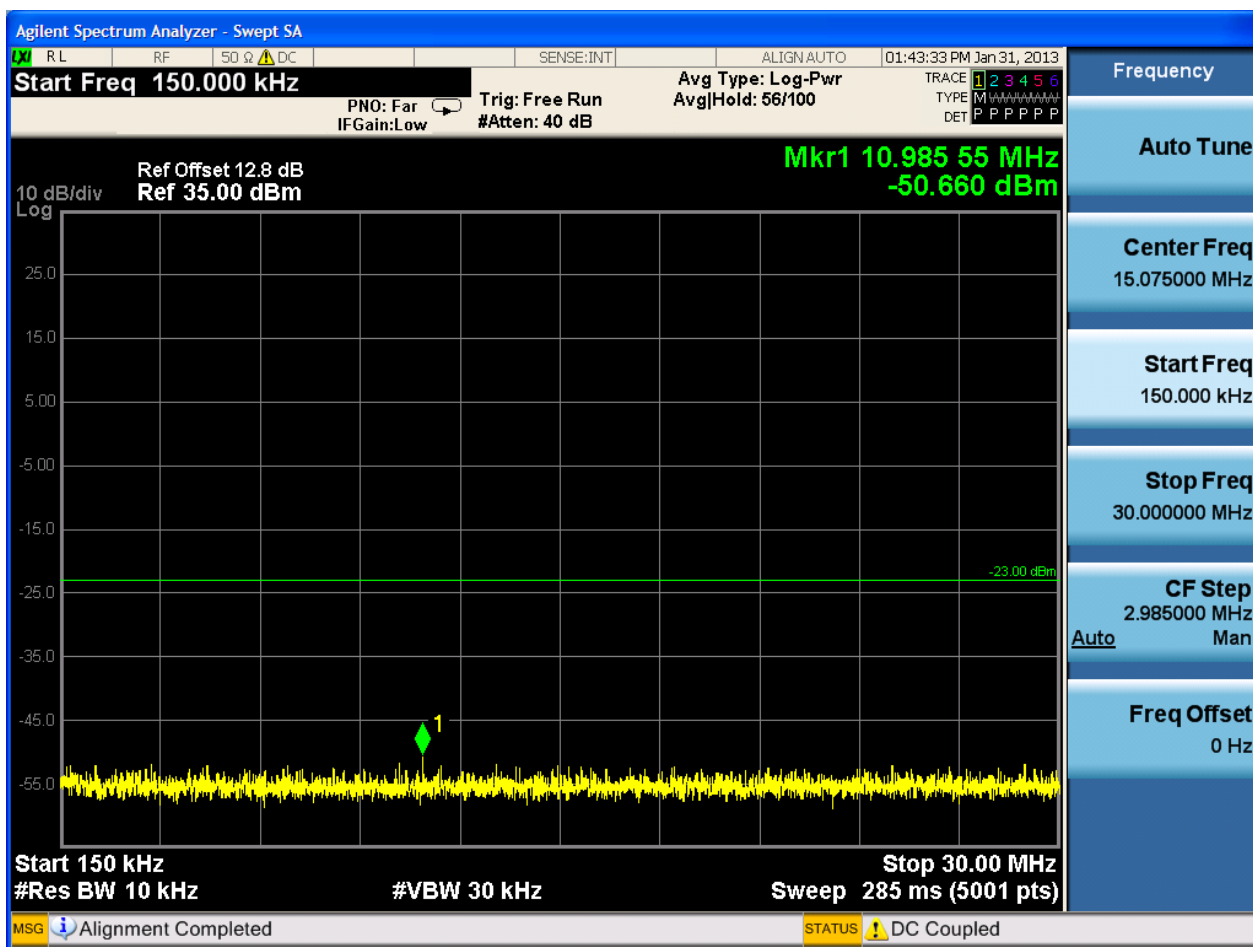
6.1 For GSM

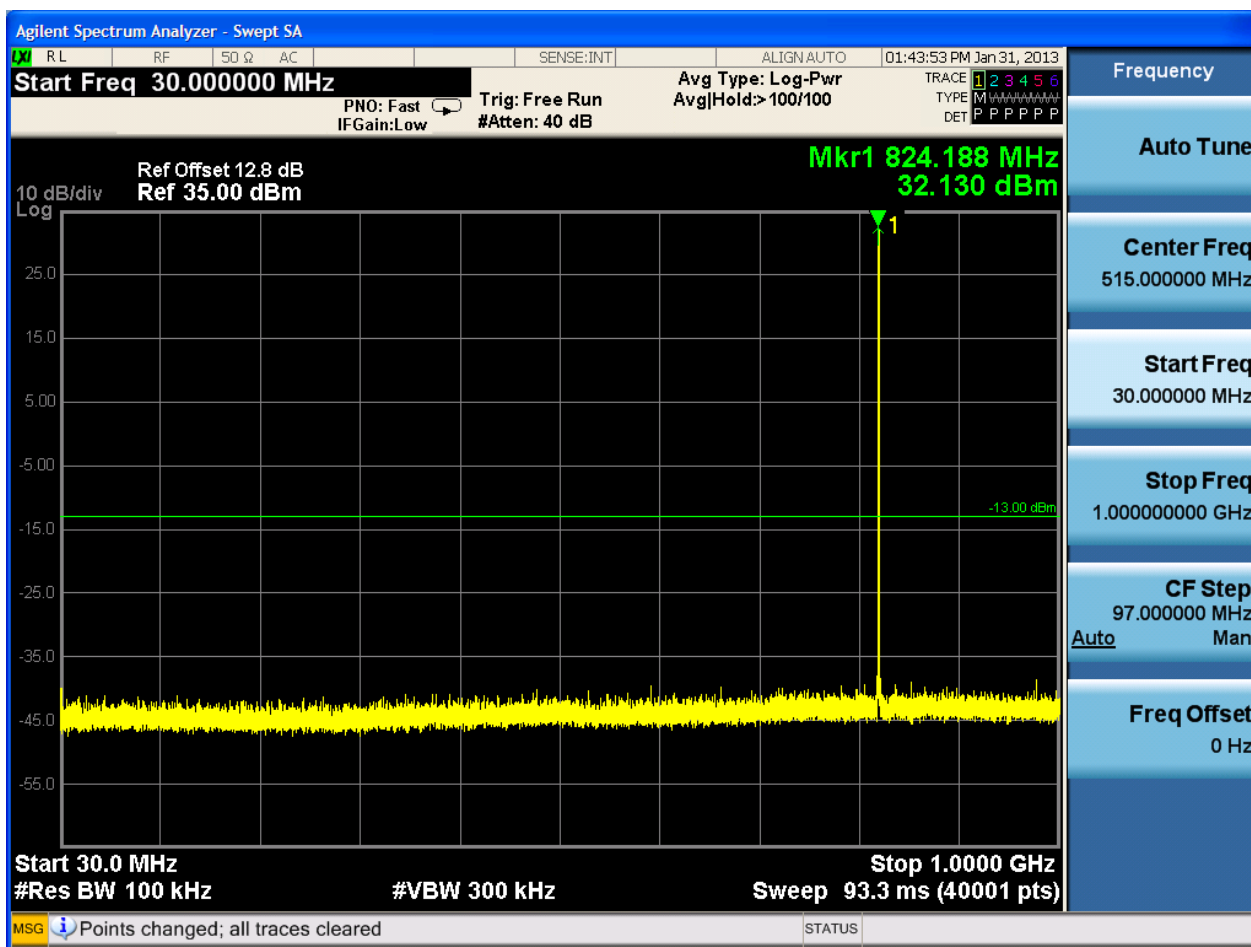
6.1.1 Test Band = GSM850

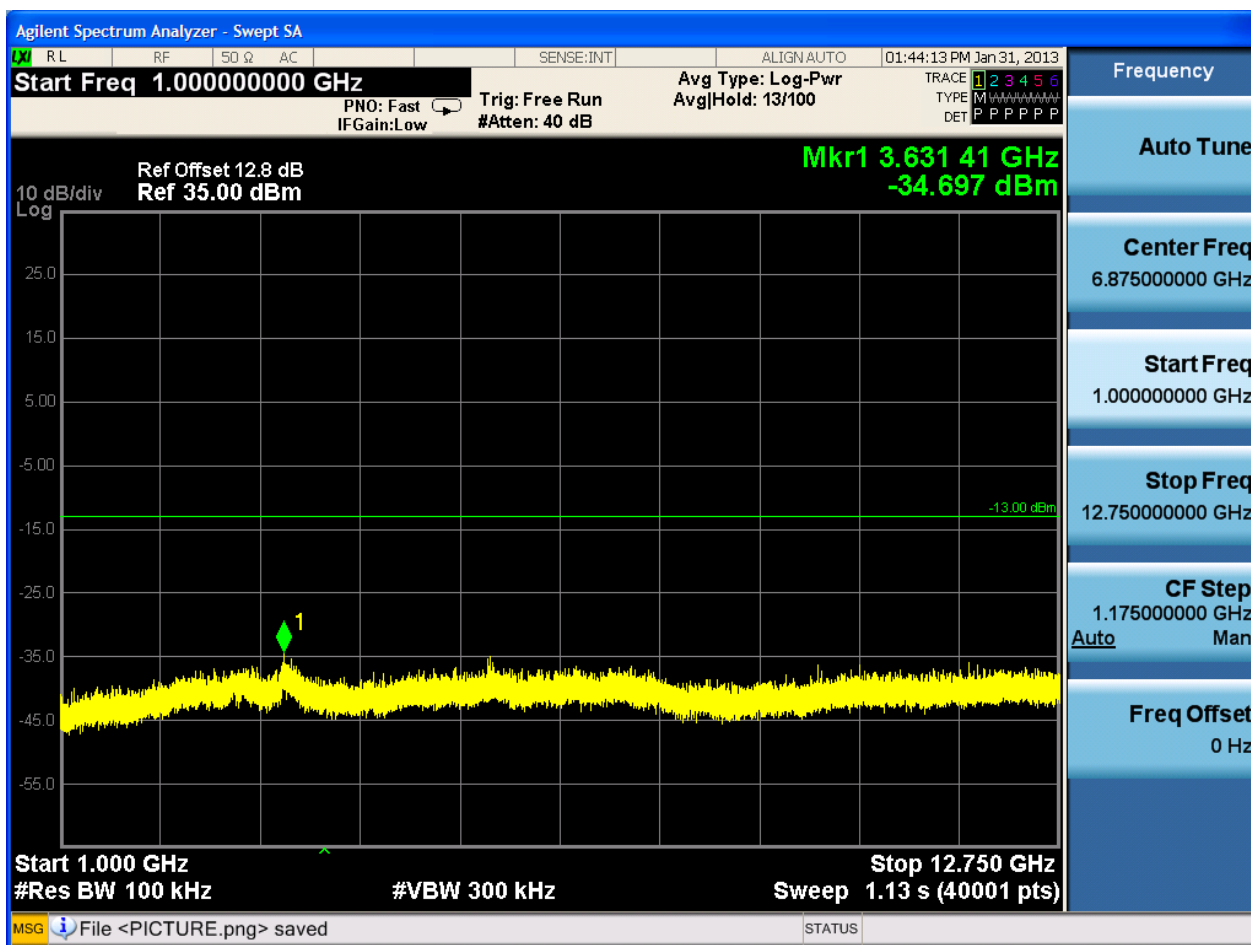
6.1.1.1 Test Mode = GSM/TM1

6.1.1.1.1 Test Channel = LCH

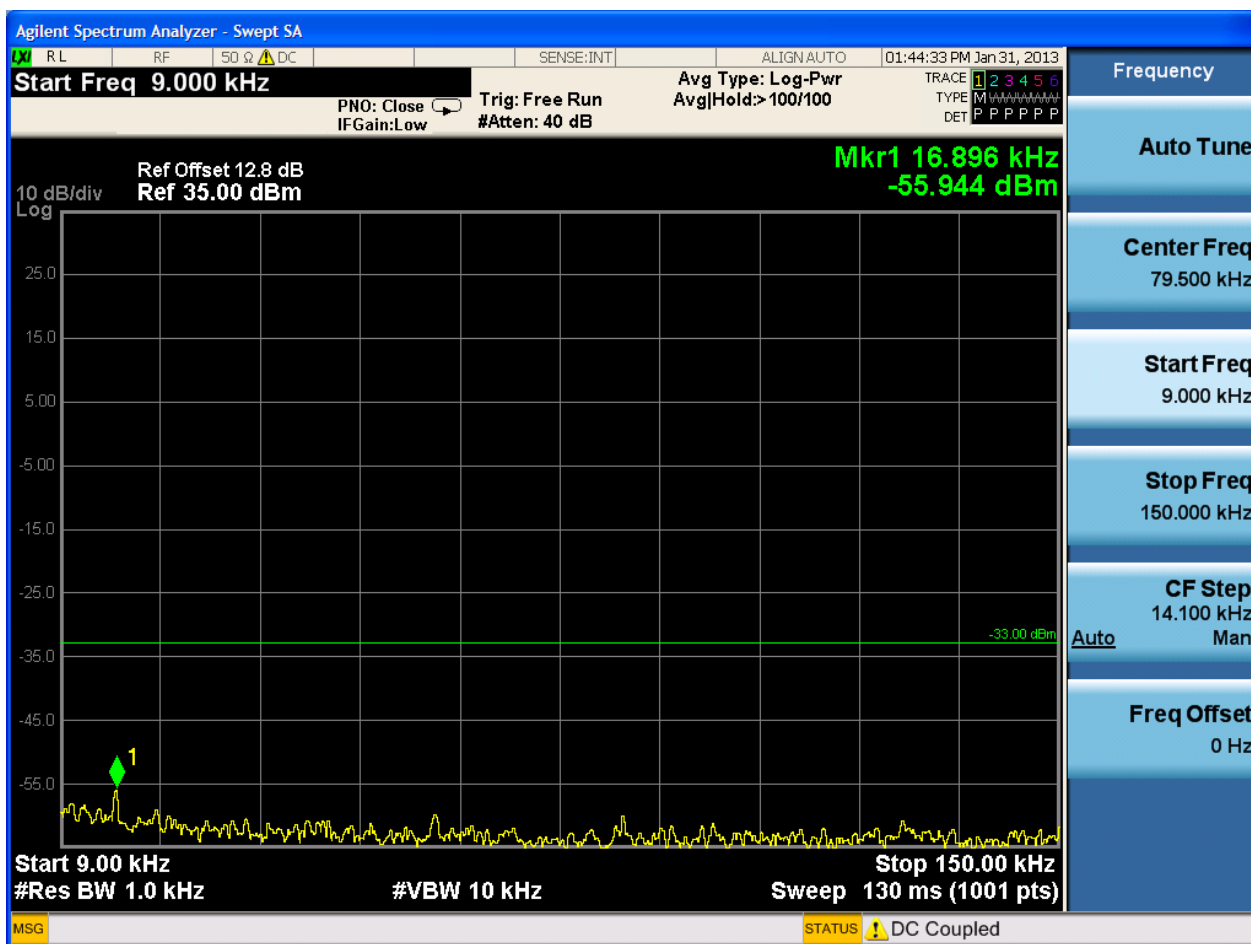


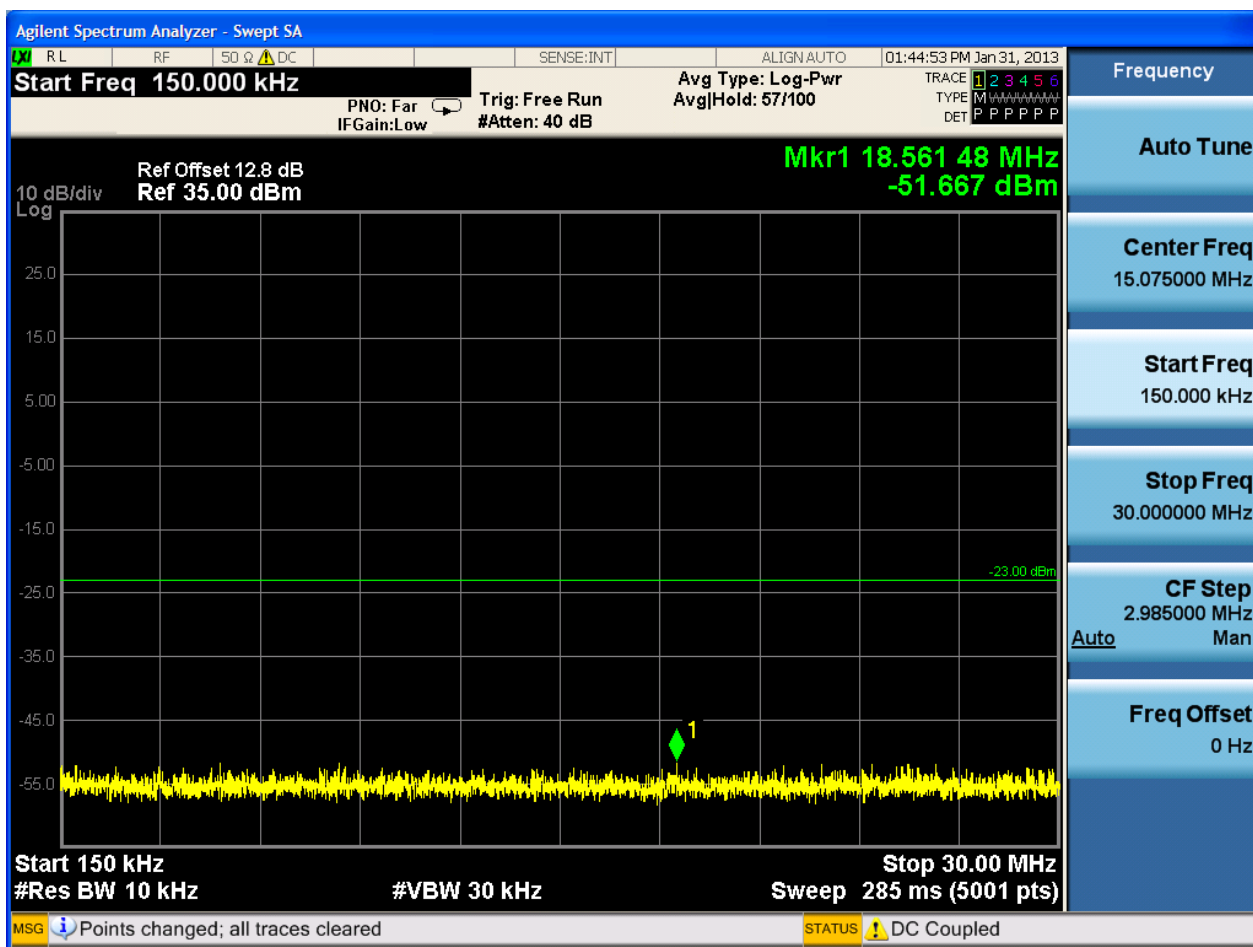


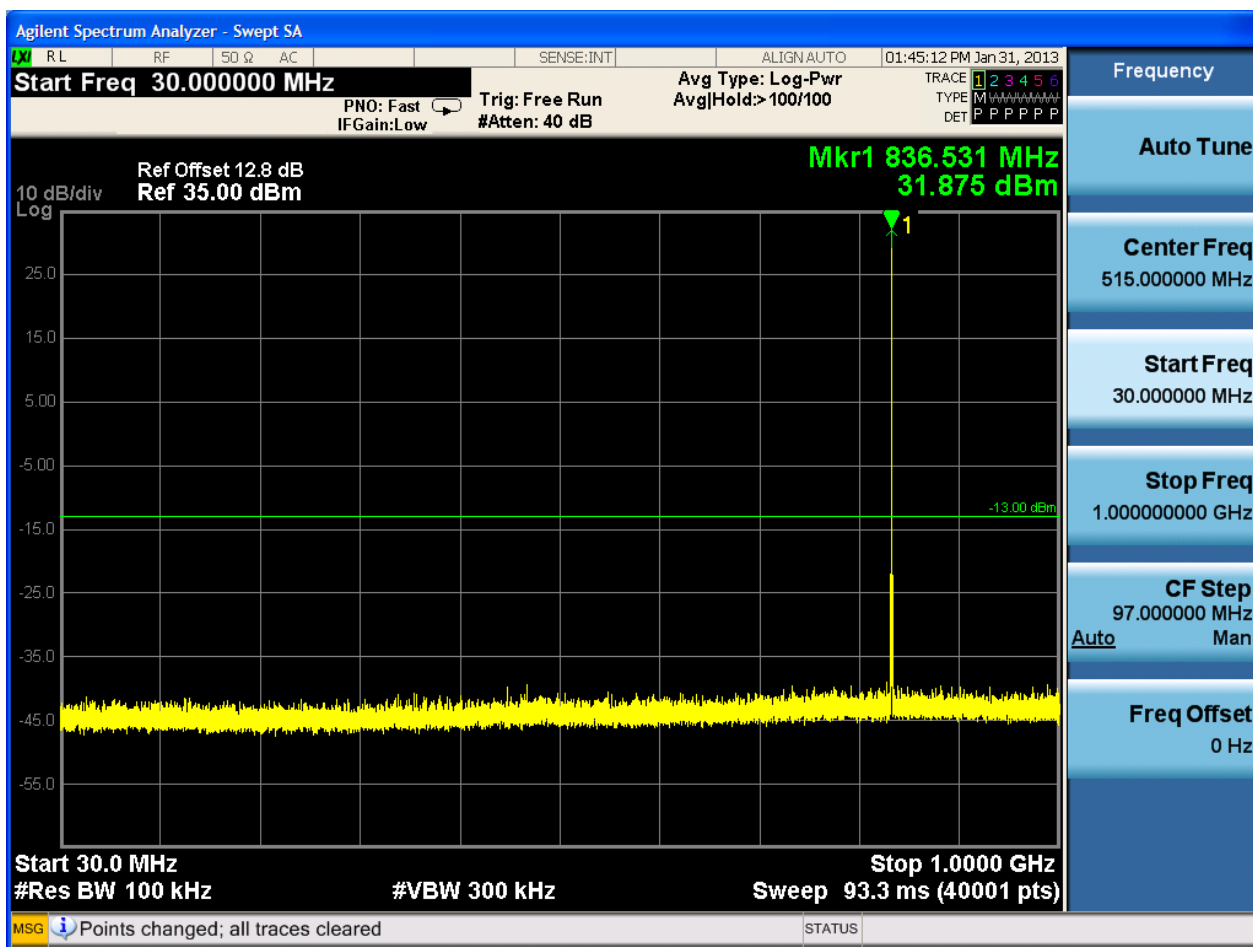


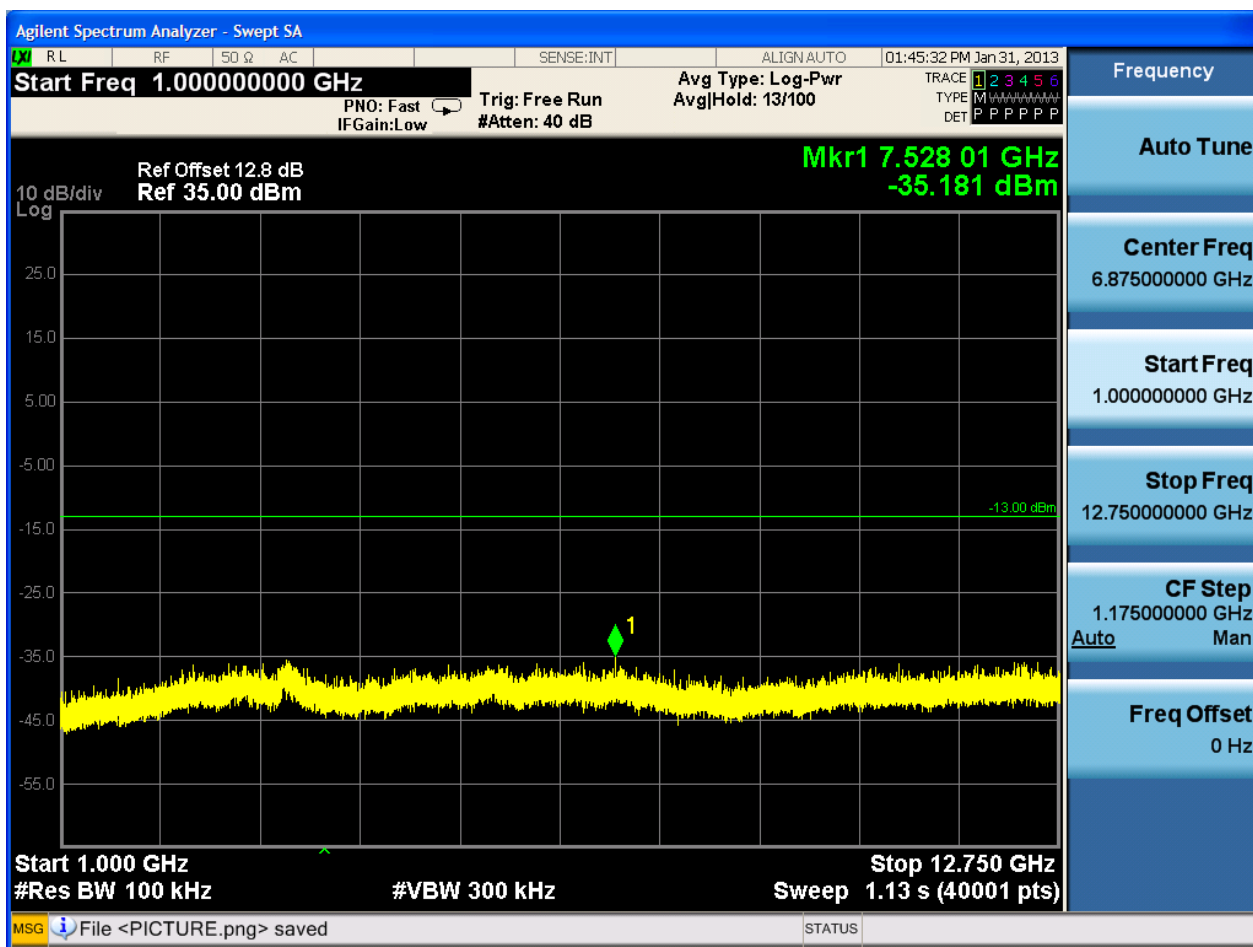


6.1.1.1.2 Test Channel = MCH

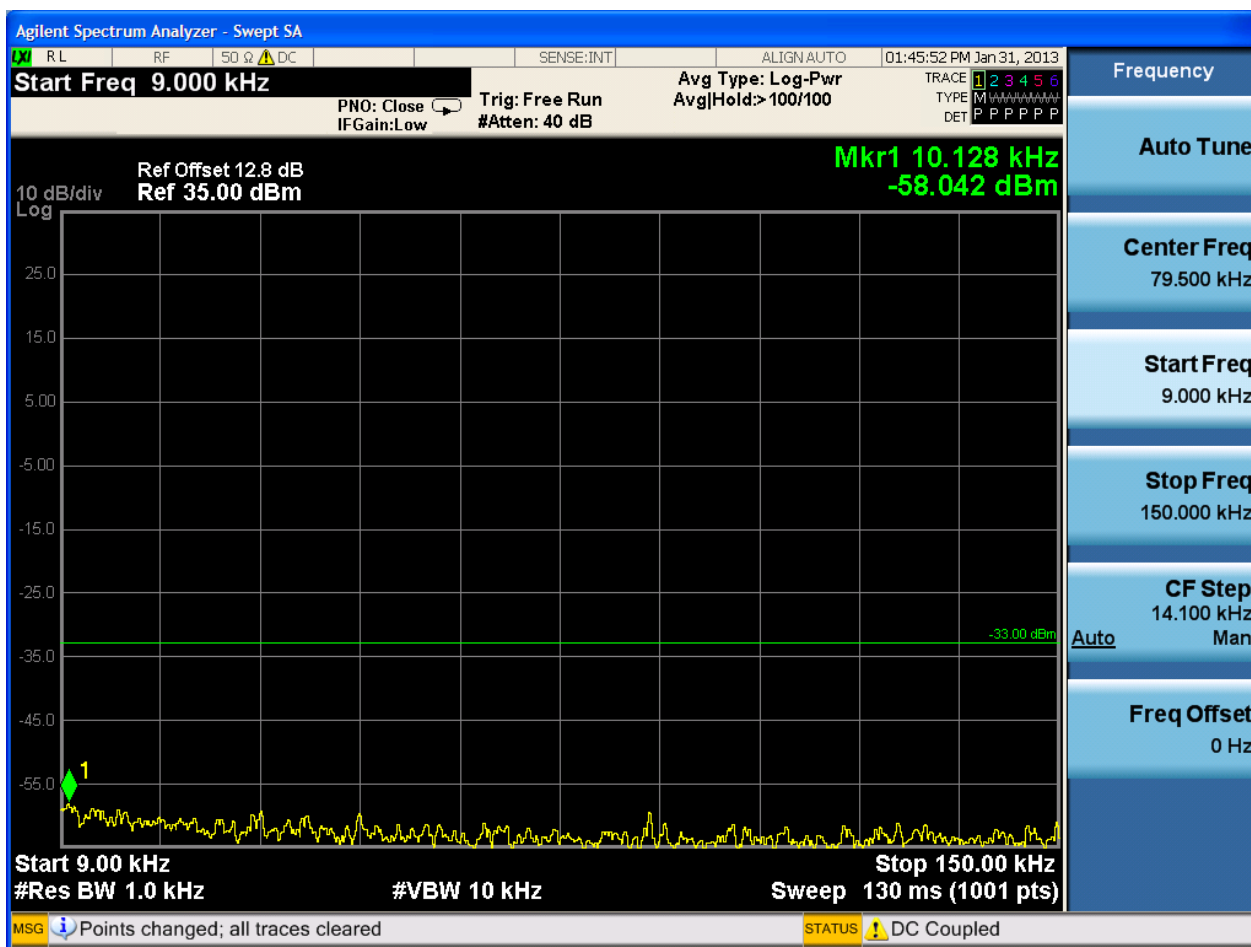


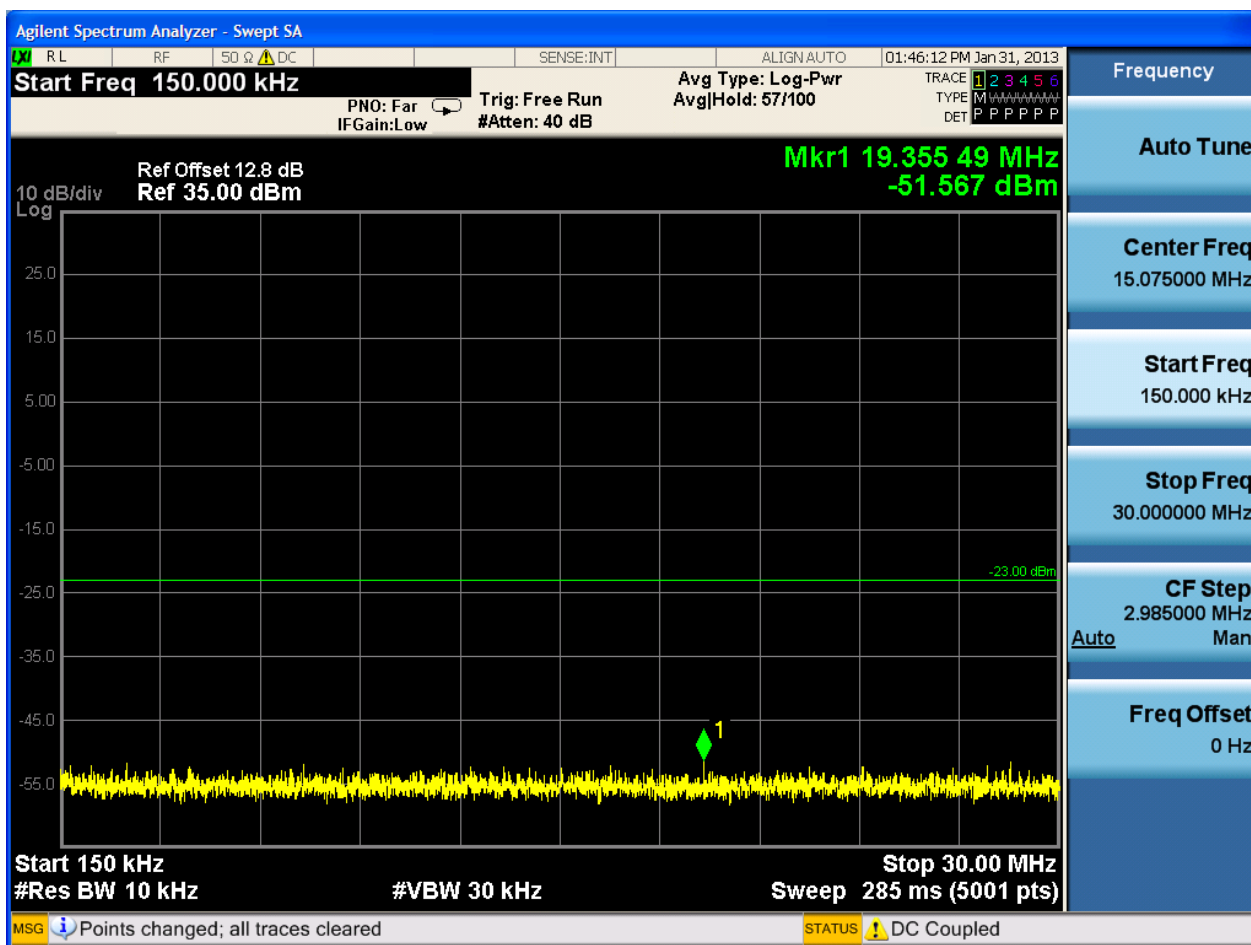


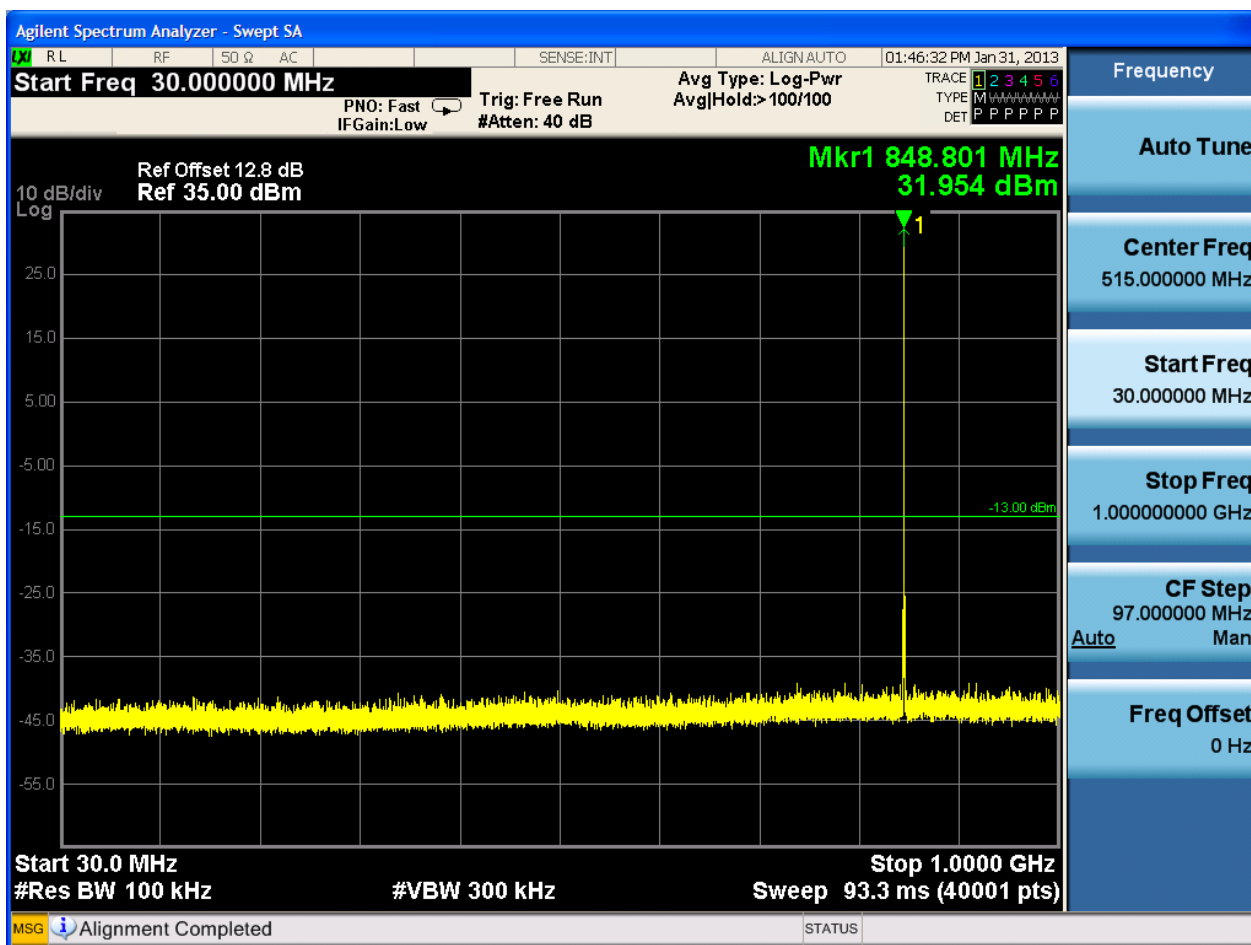


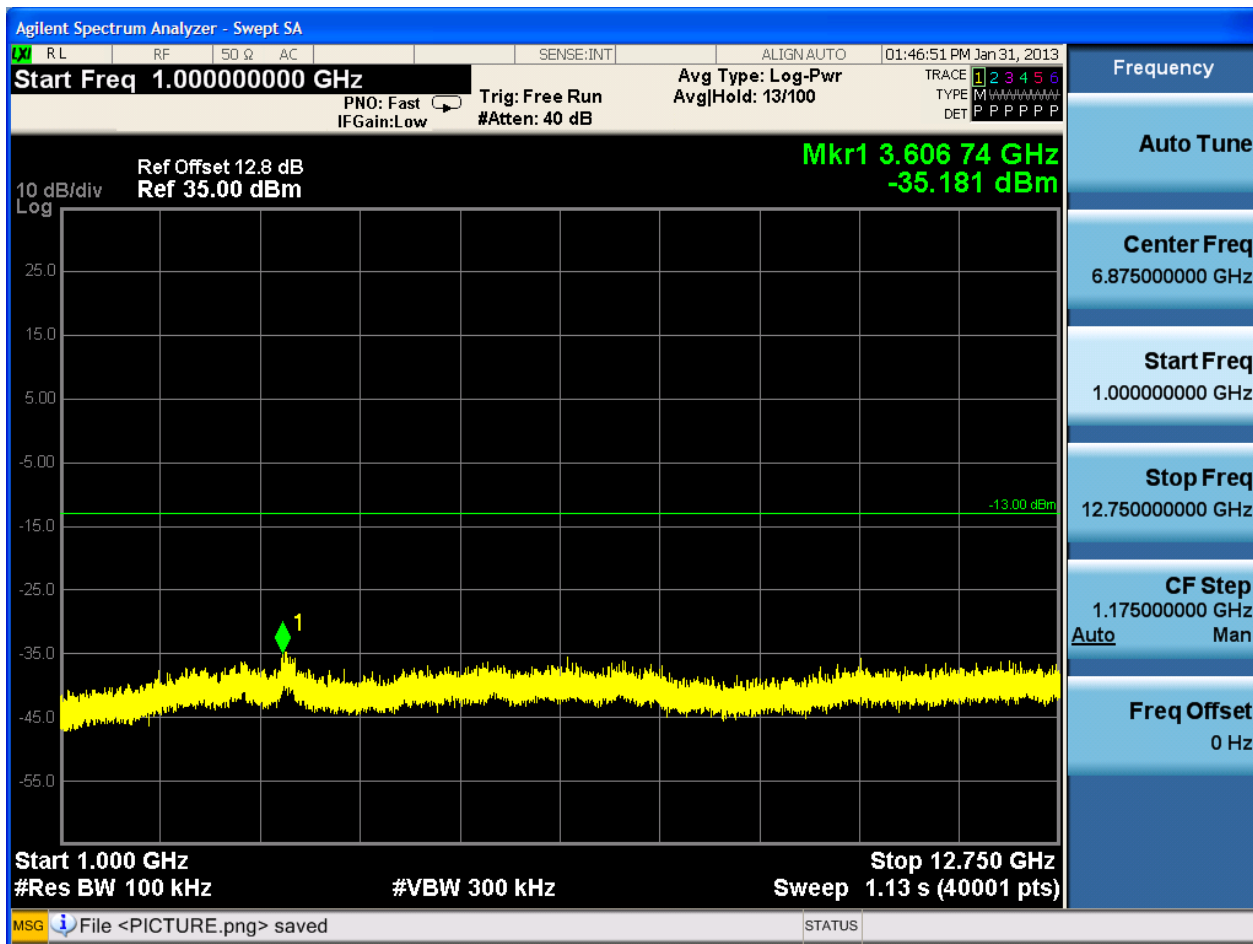


6.1.1.1.3 Test Channel = HCH



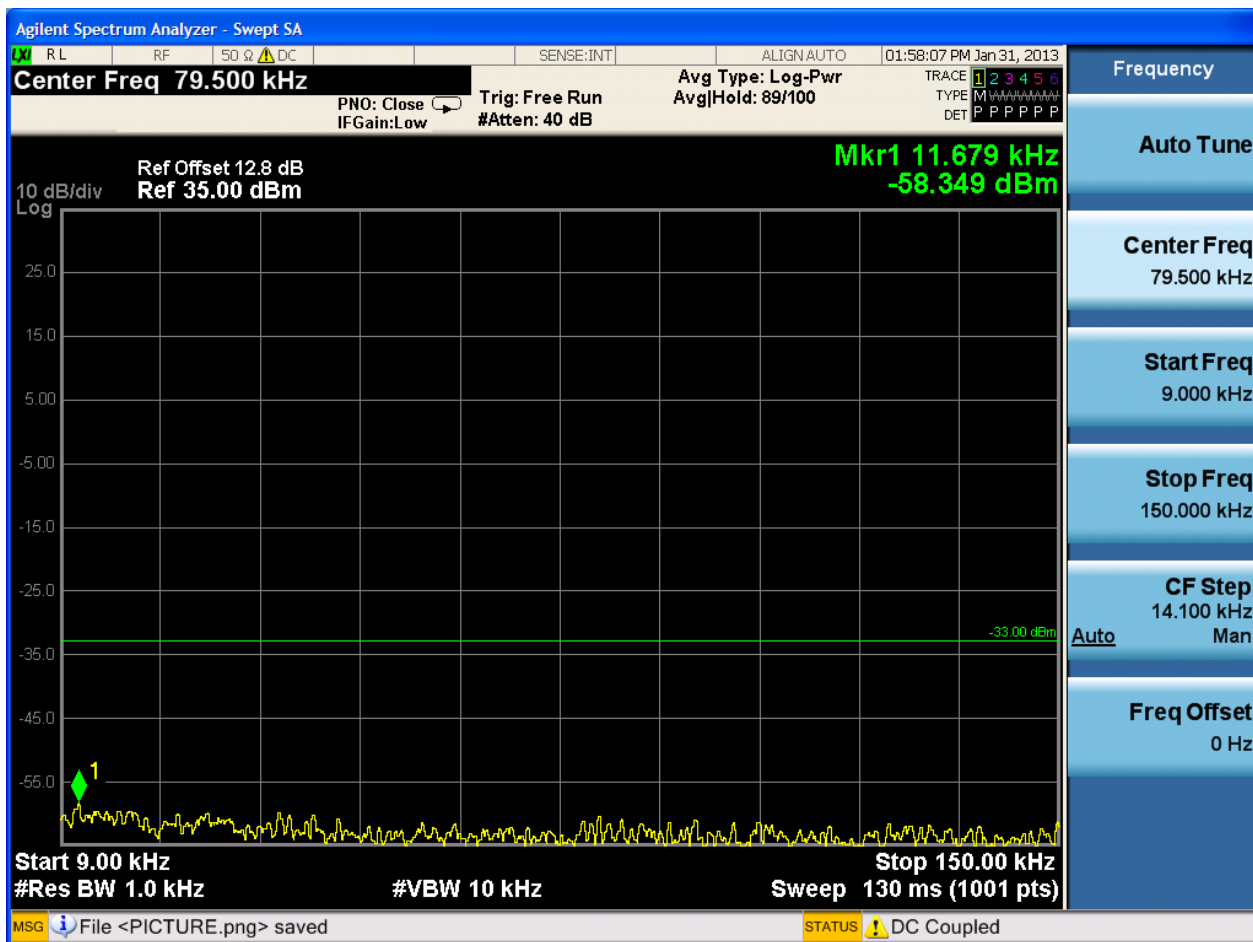


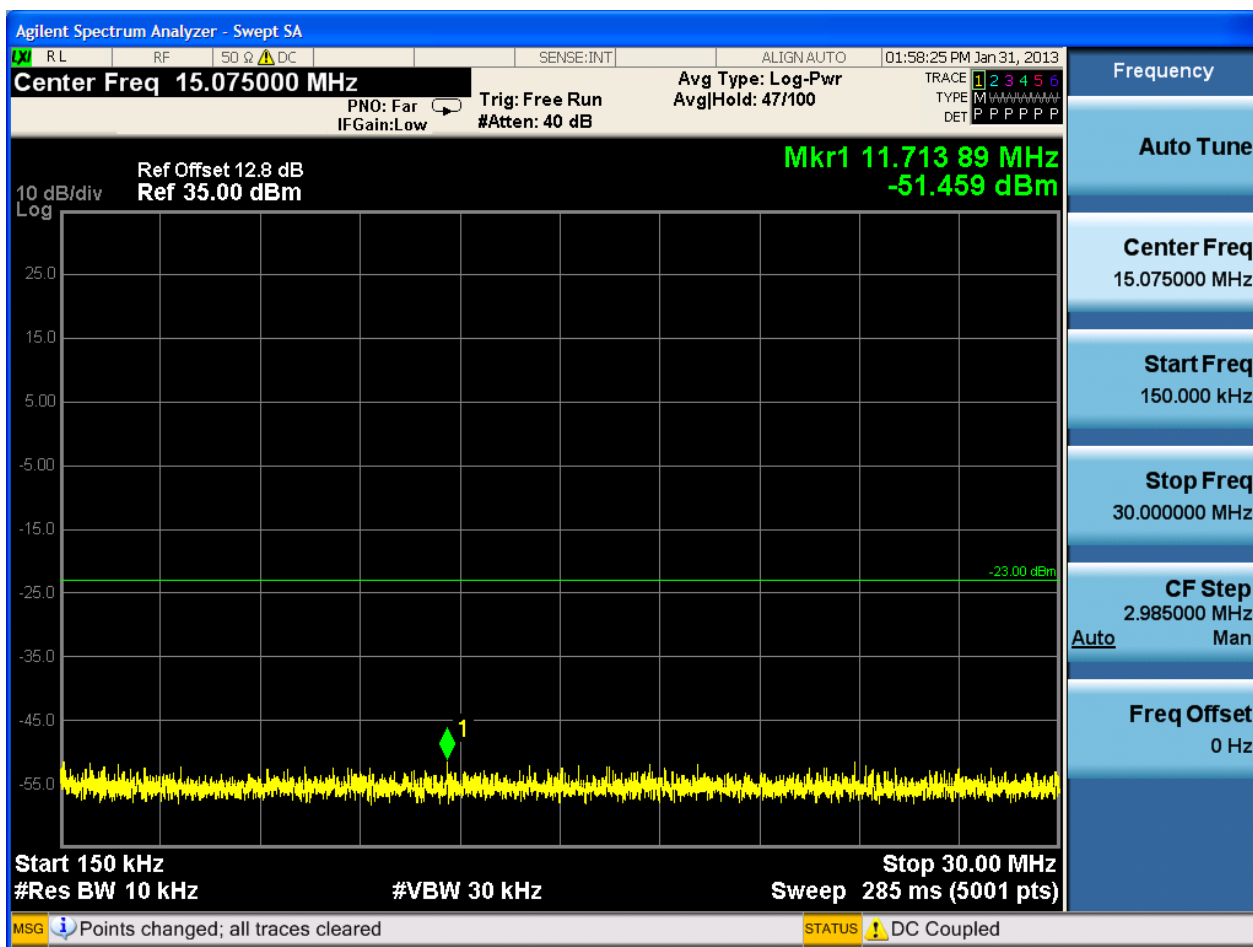


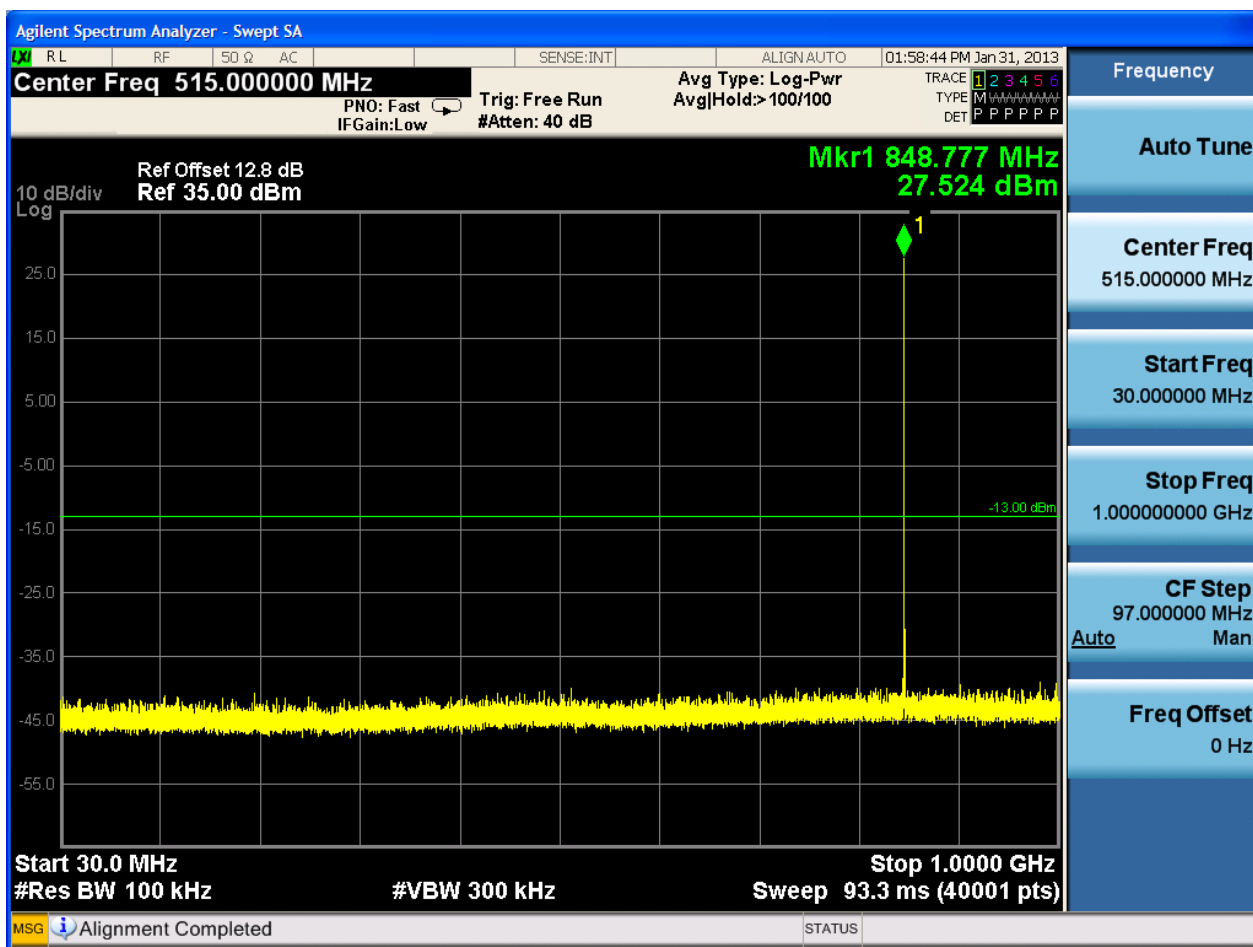


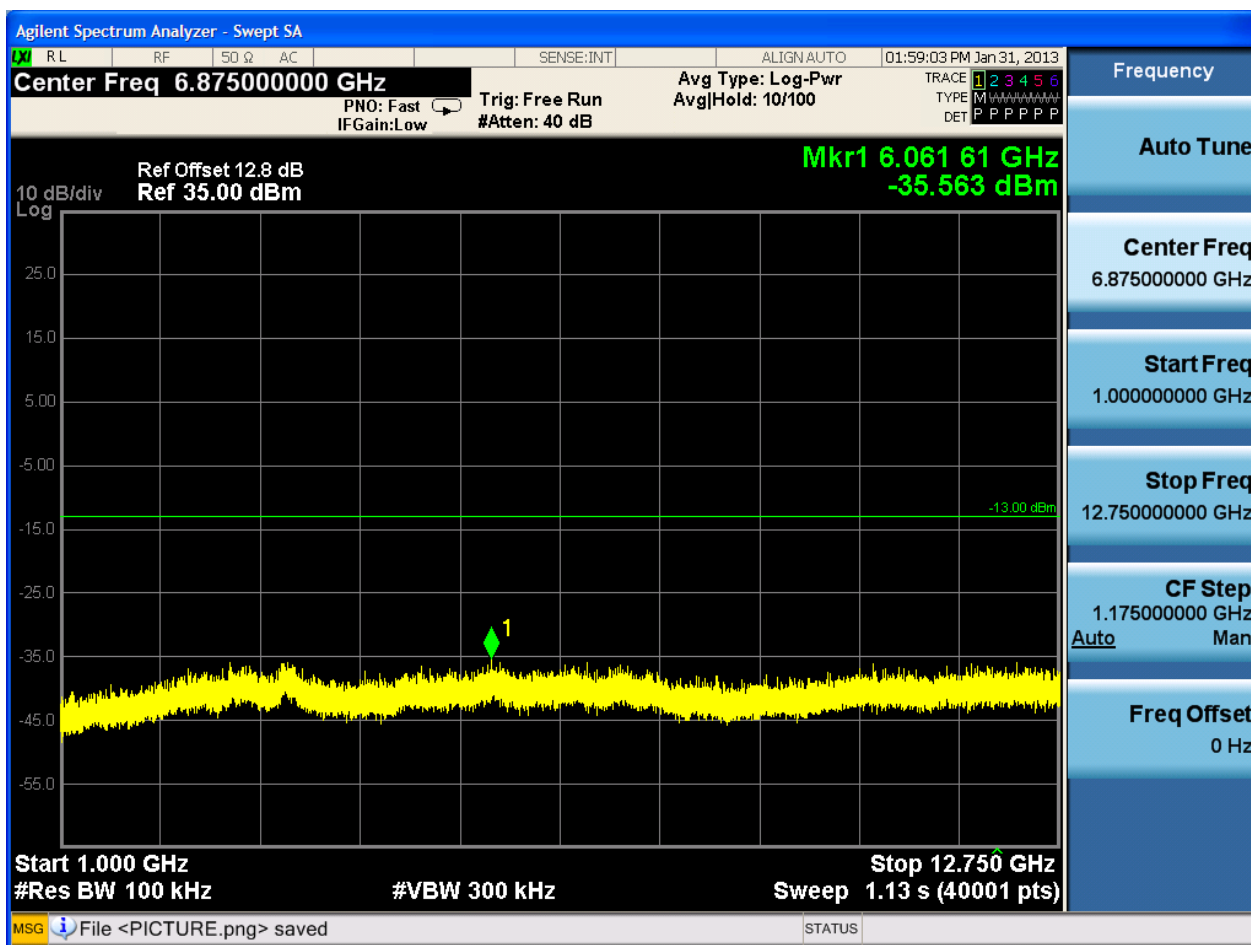
6.1.1.2 Test Mode = GSM/TM2

6.1.1.2.1 Test Channel = LCH

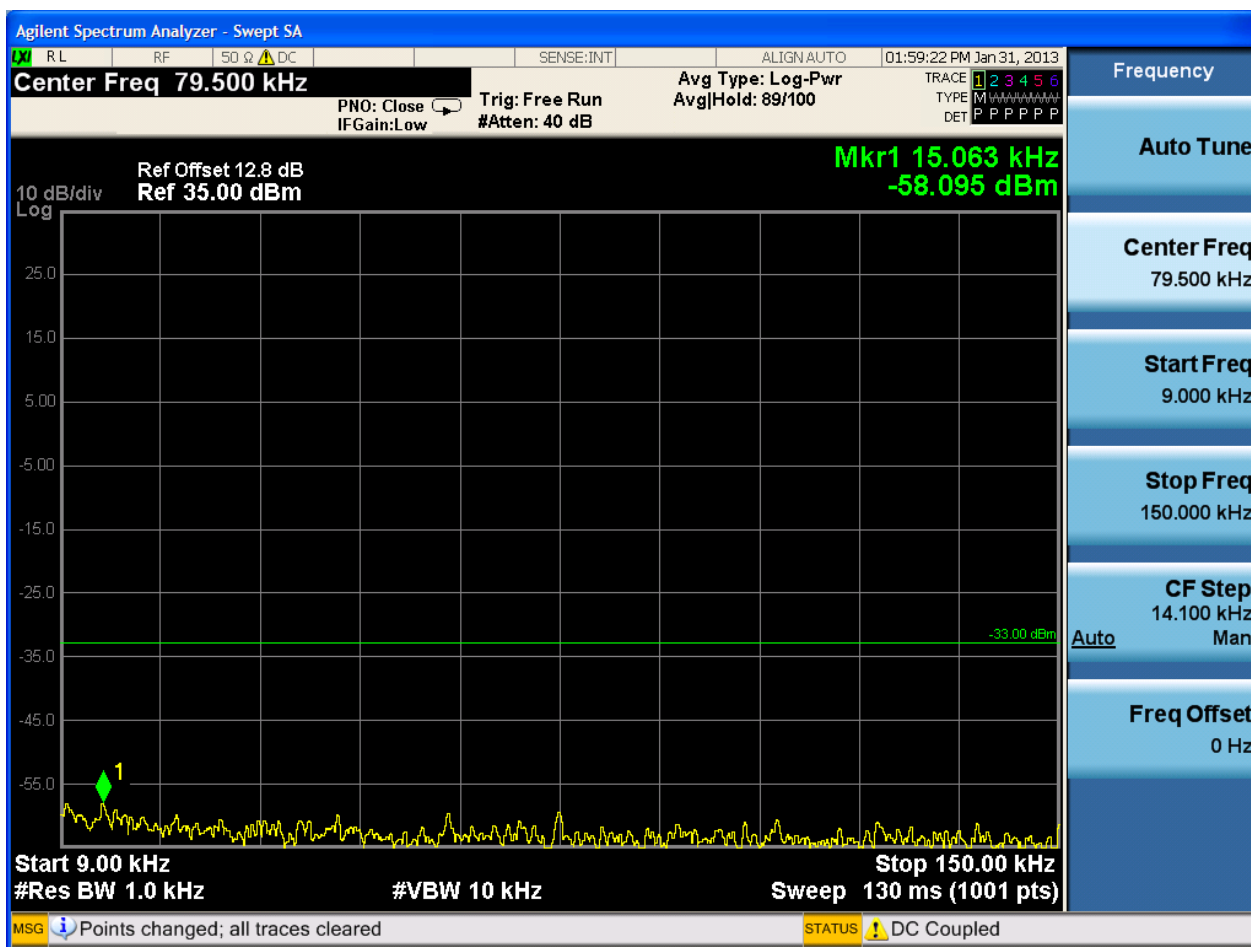


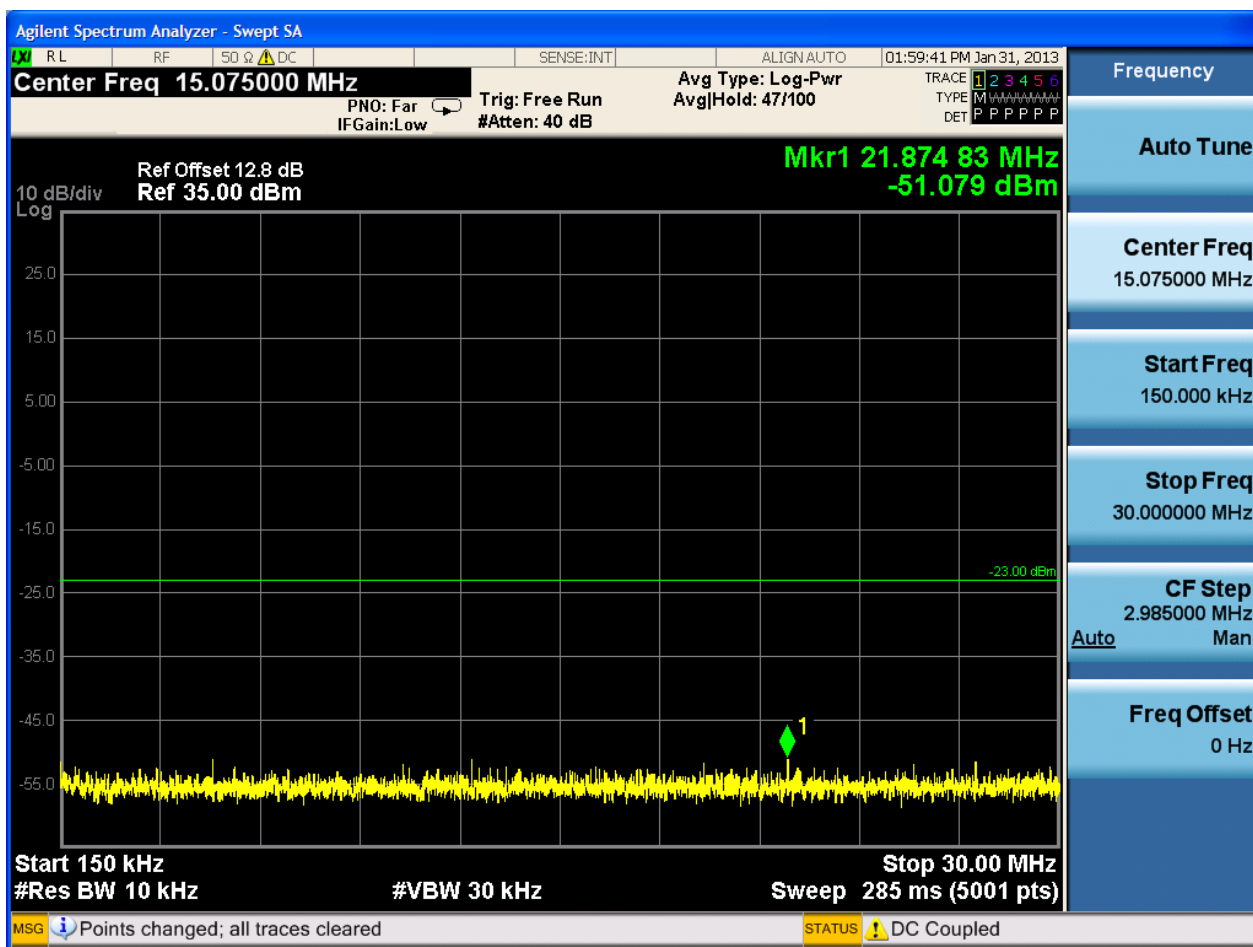


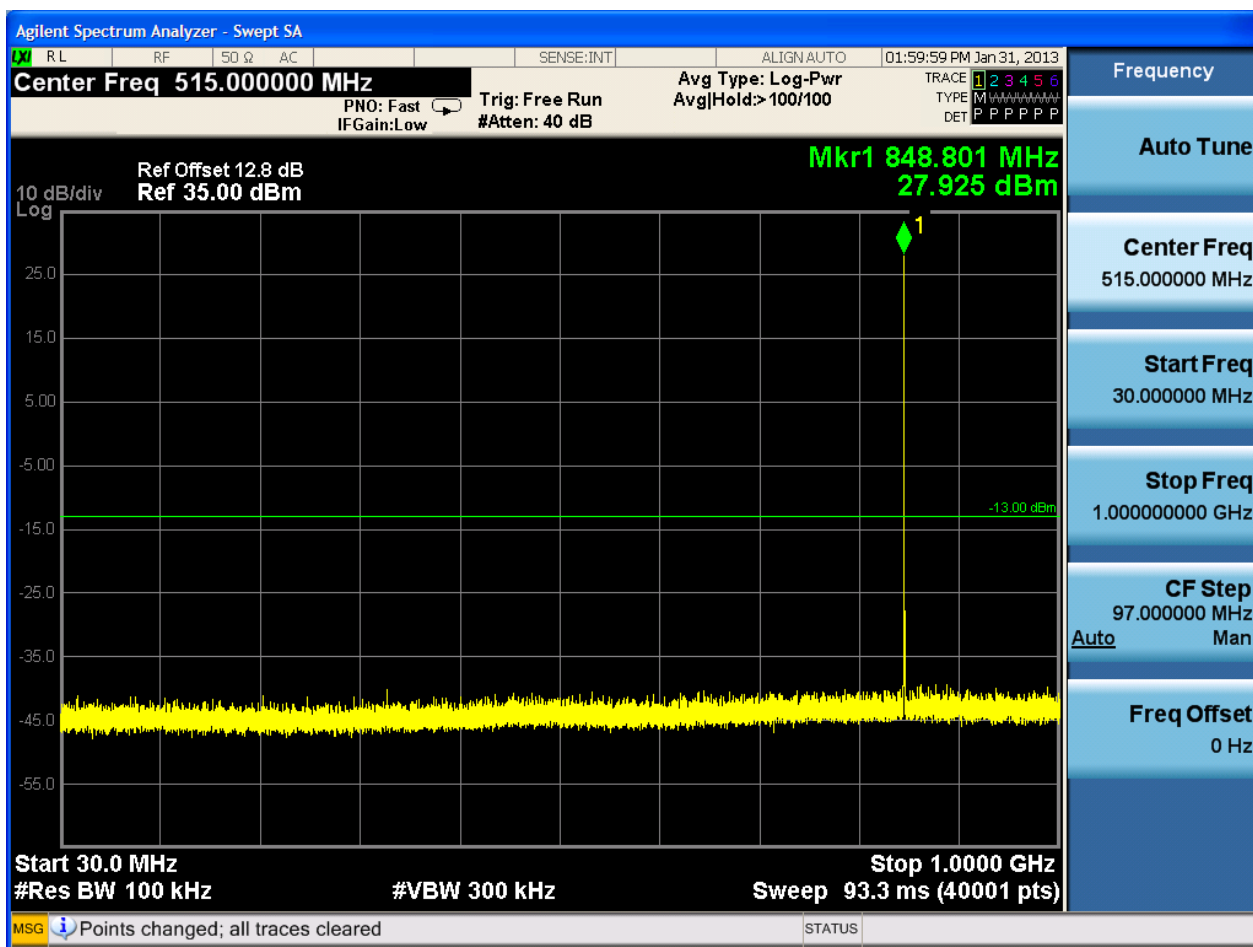


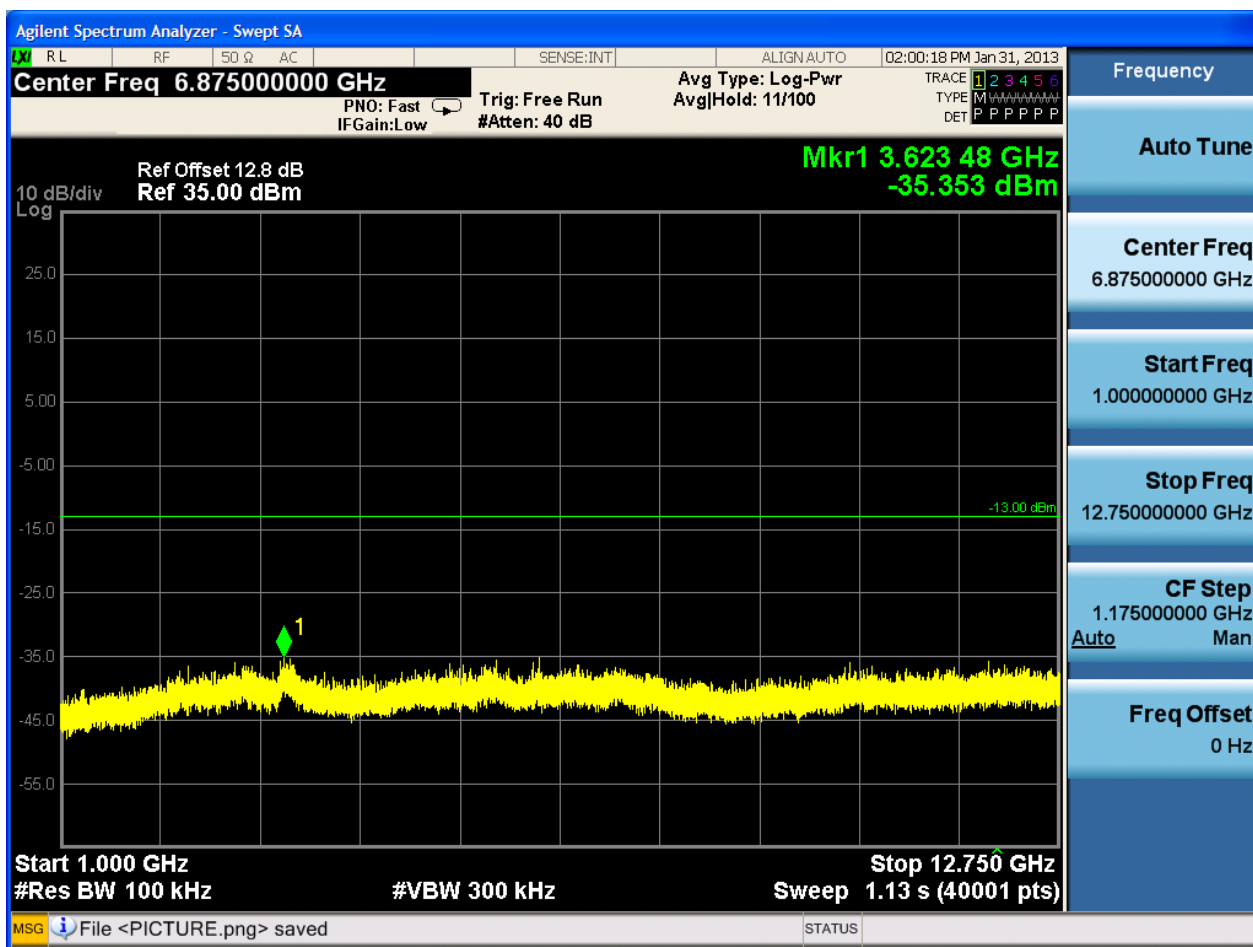


6.1.1.2.2 Test Channel = MCH

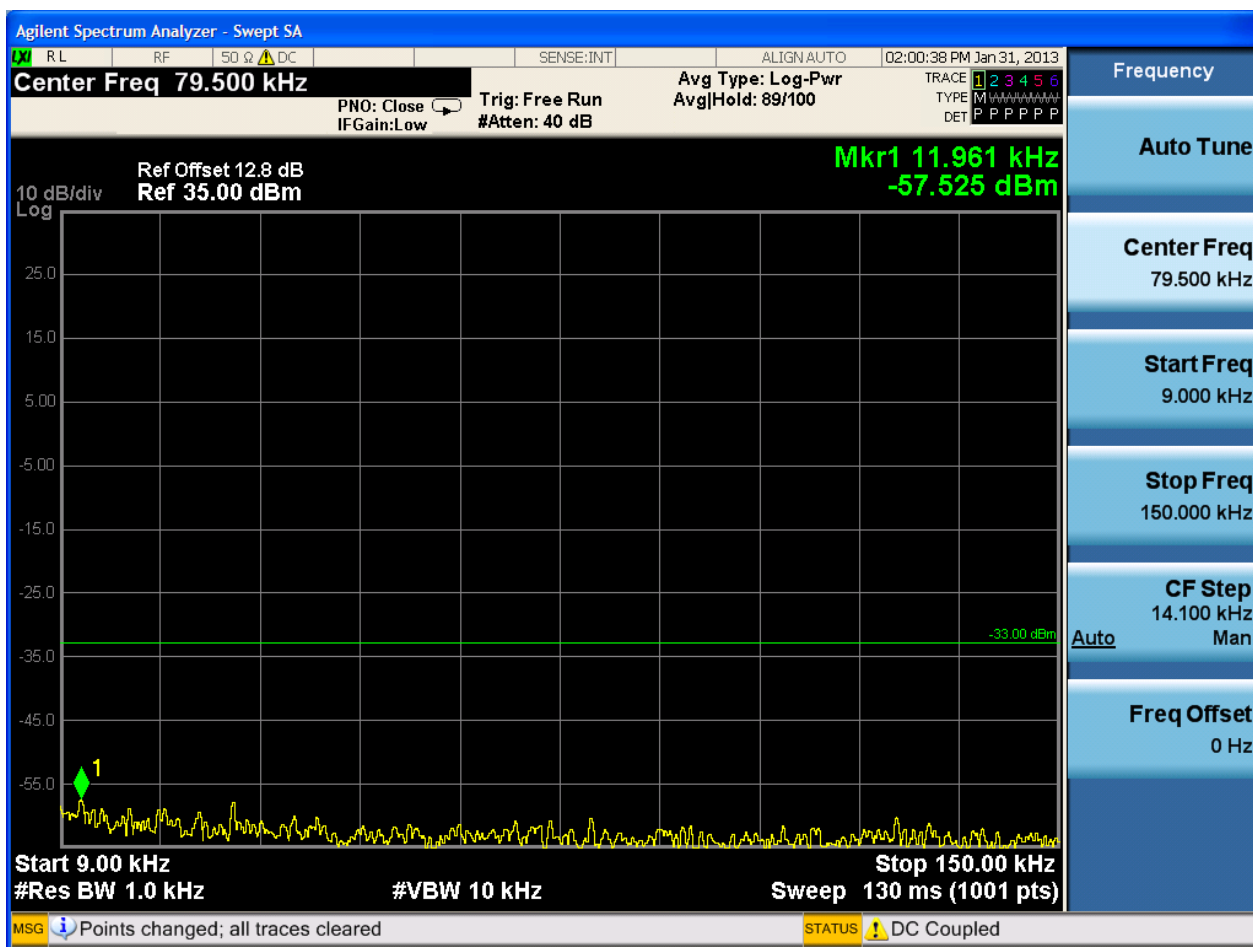


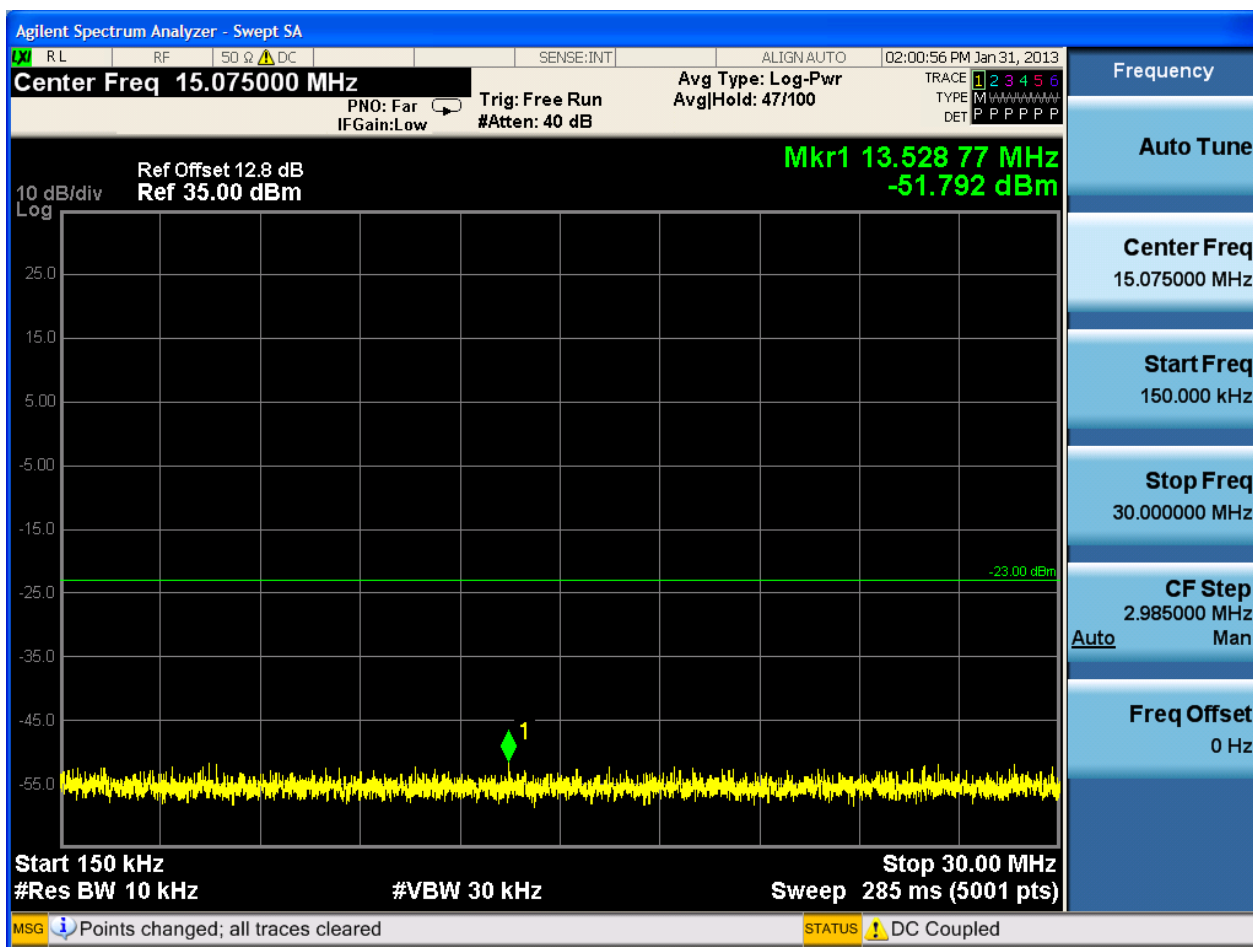


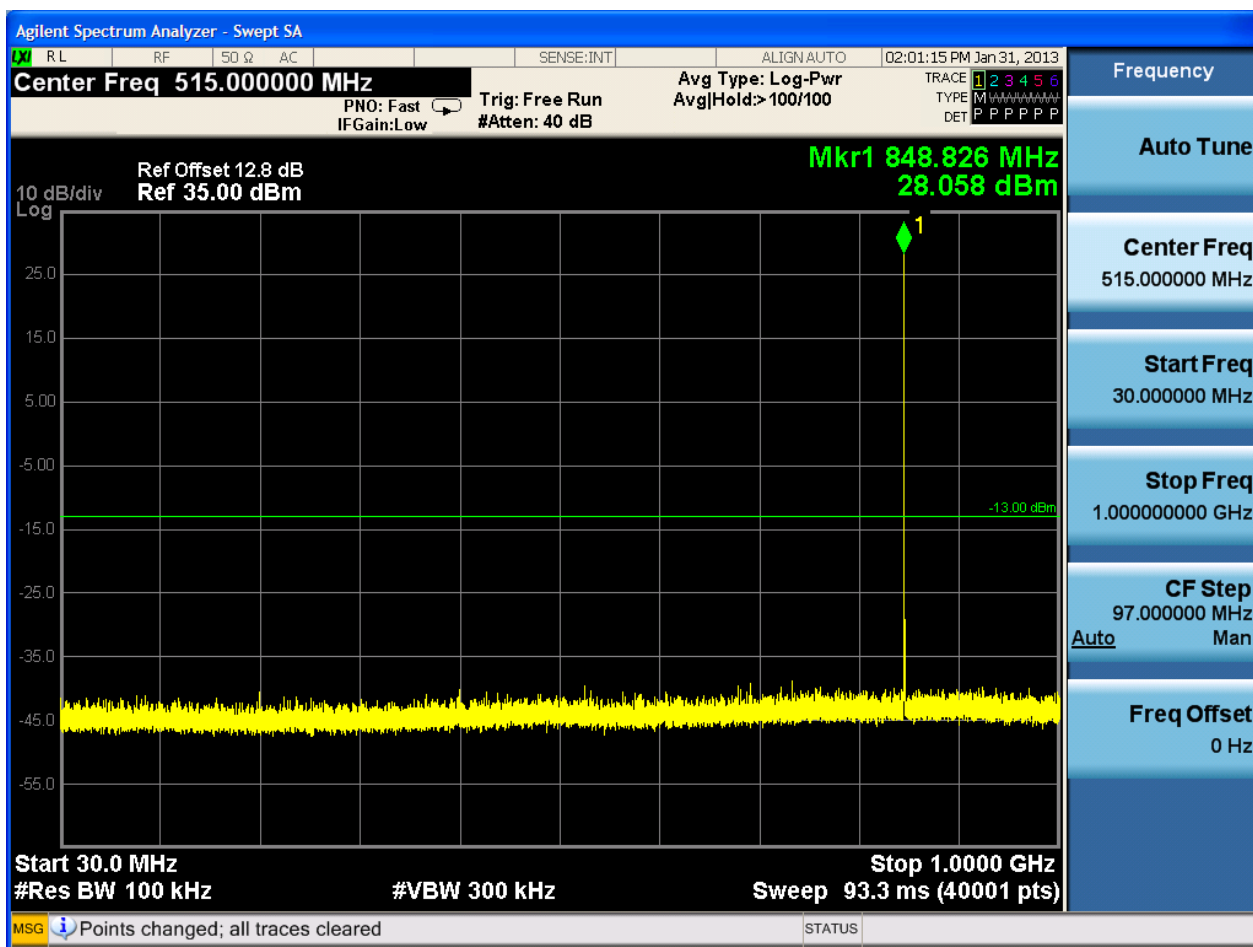


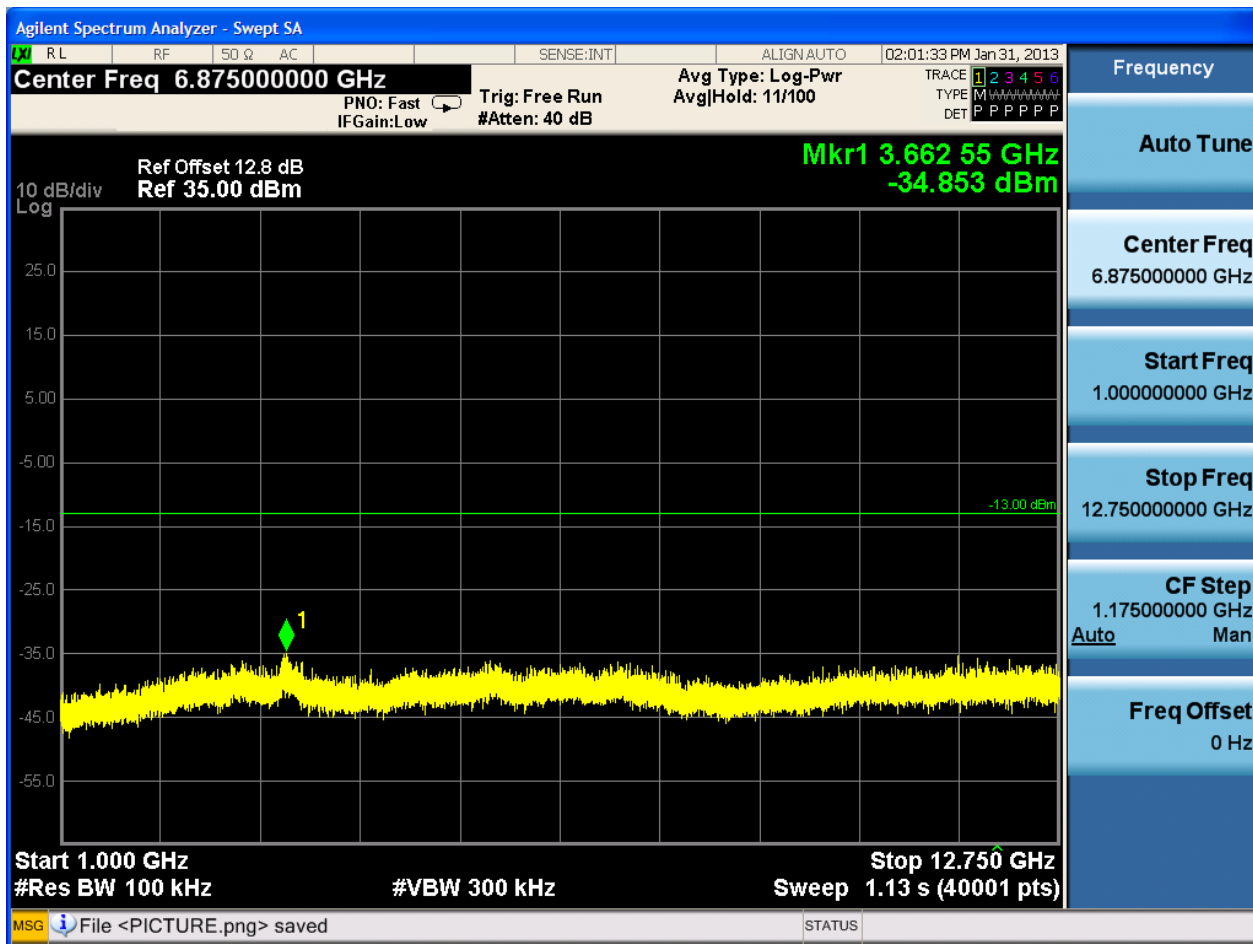


6.1.1.2.3 Test Channel = HCH





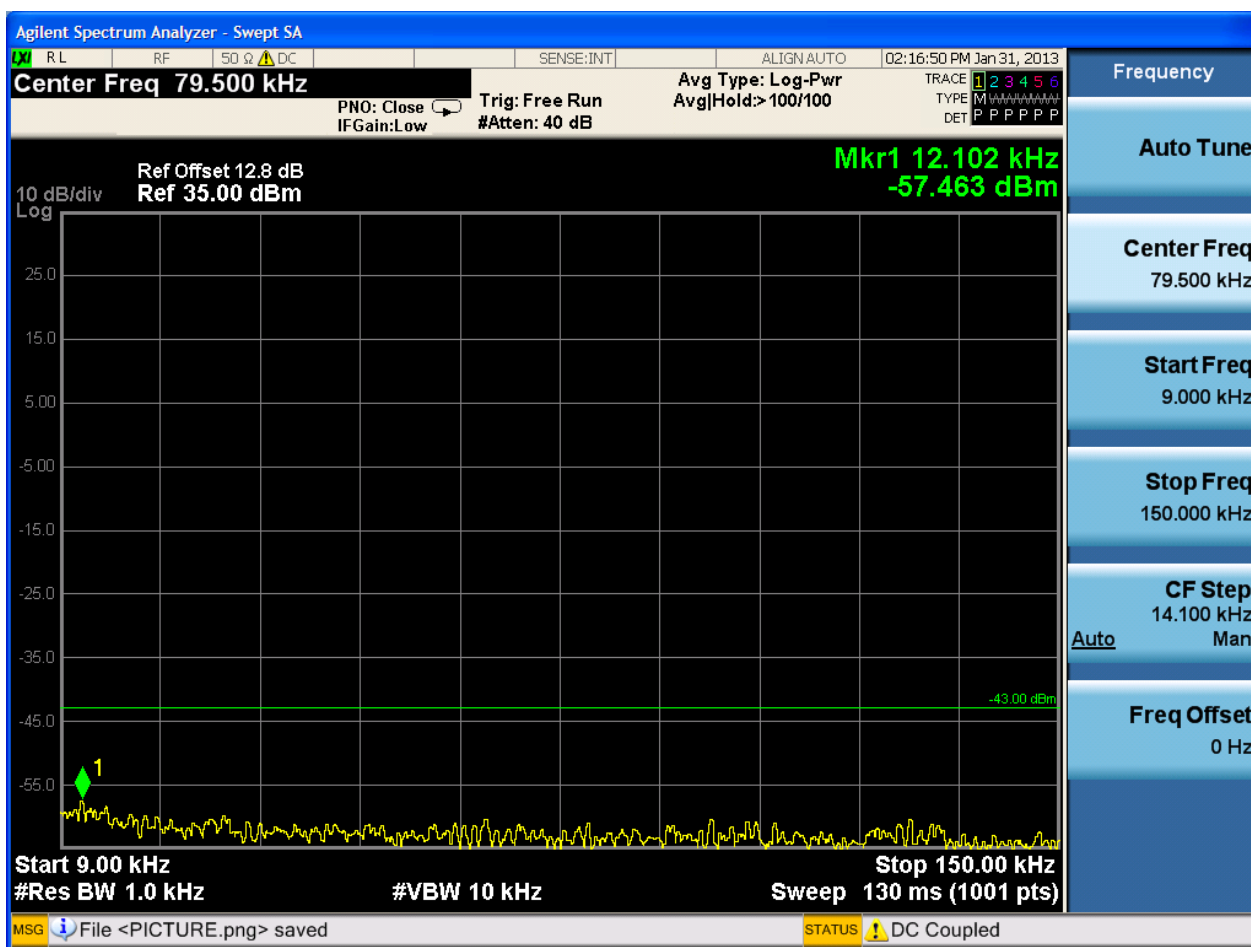


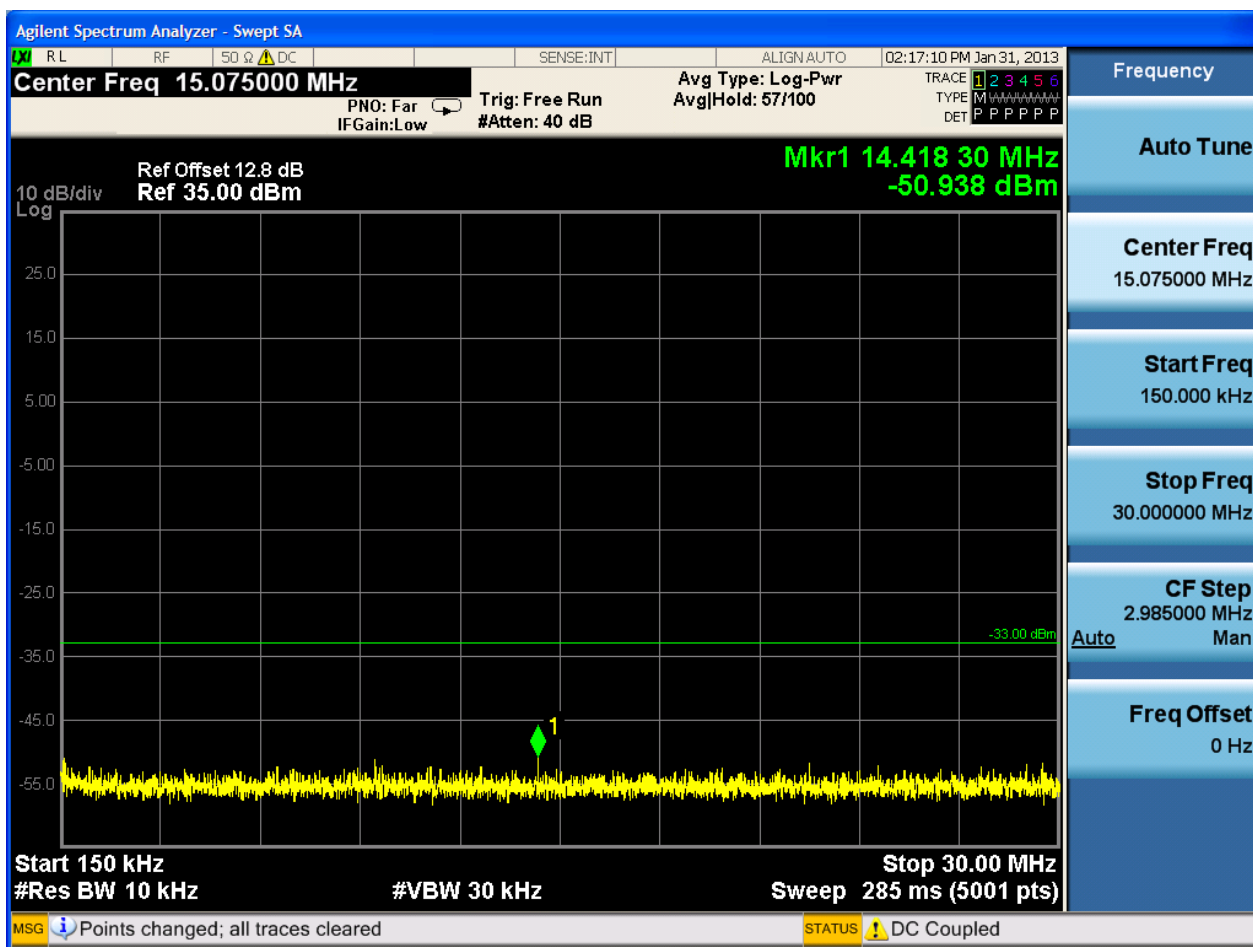


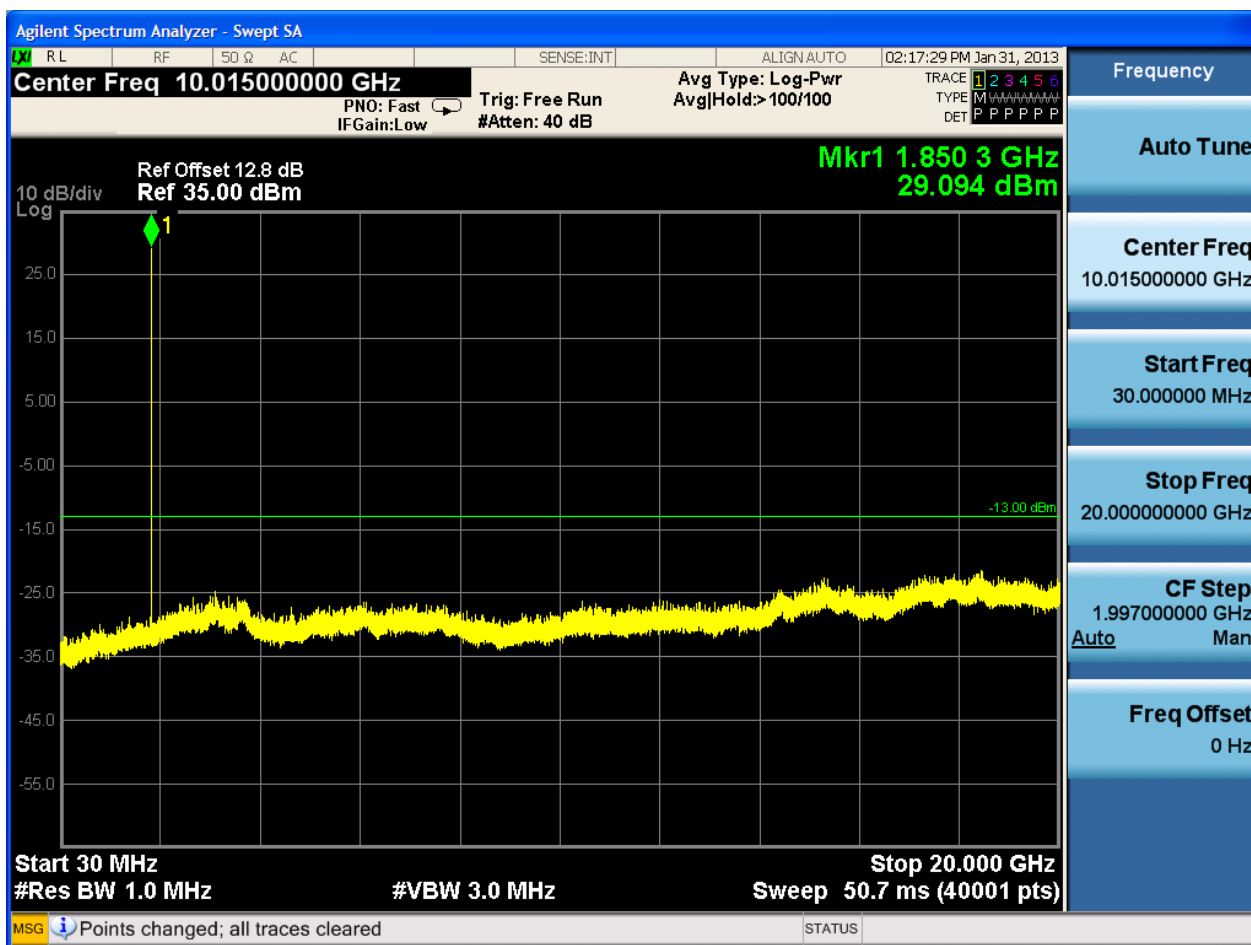
6.1.2 Test Band = GSM1900

6.1.2.1 Test Mode = GSM/TM1

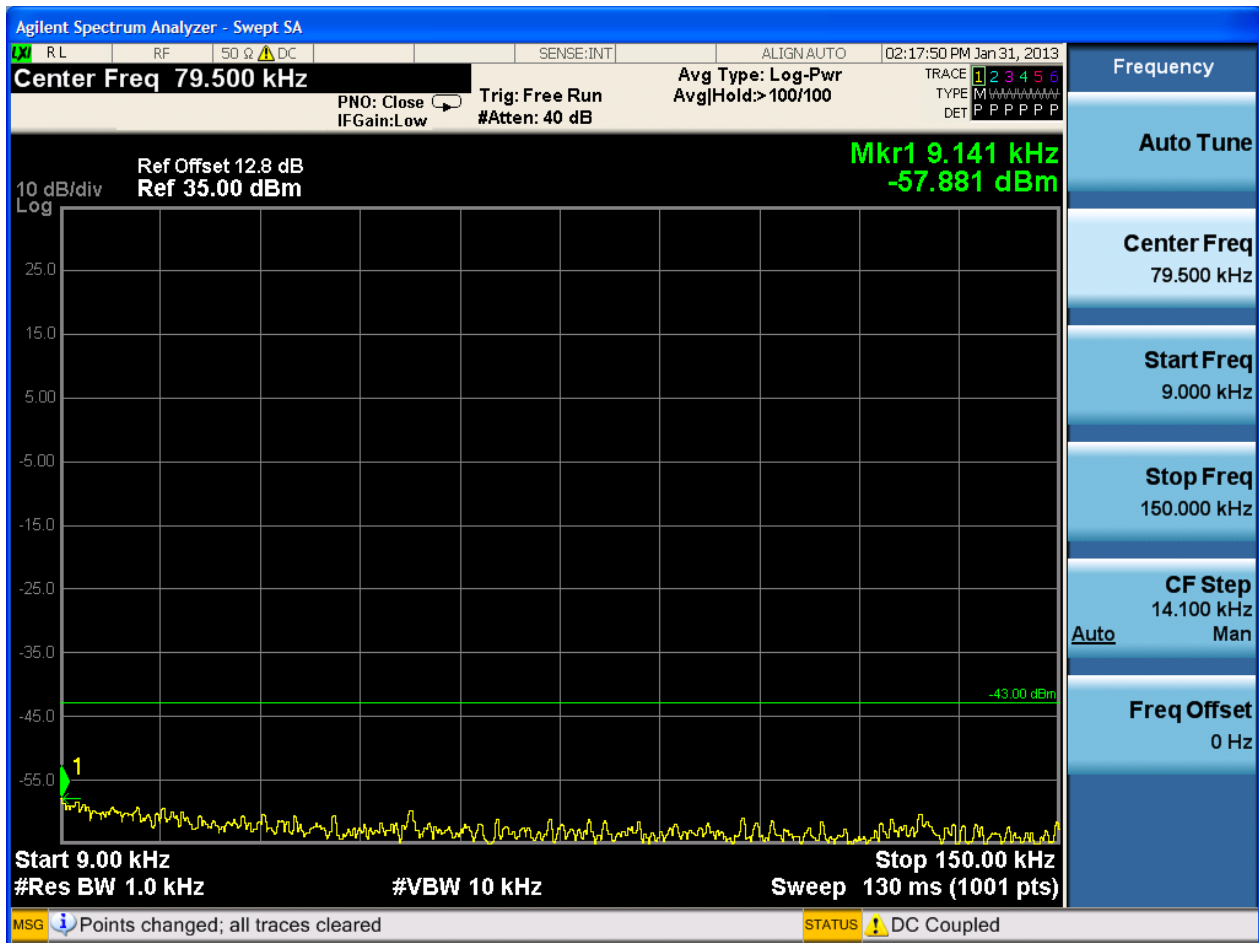
6.1.2.1.1 Test Channel = LCH

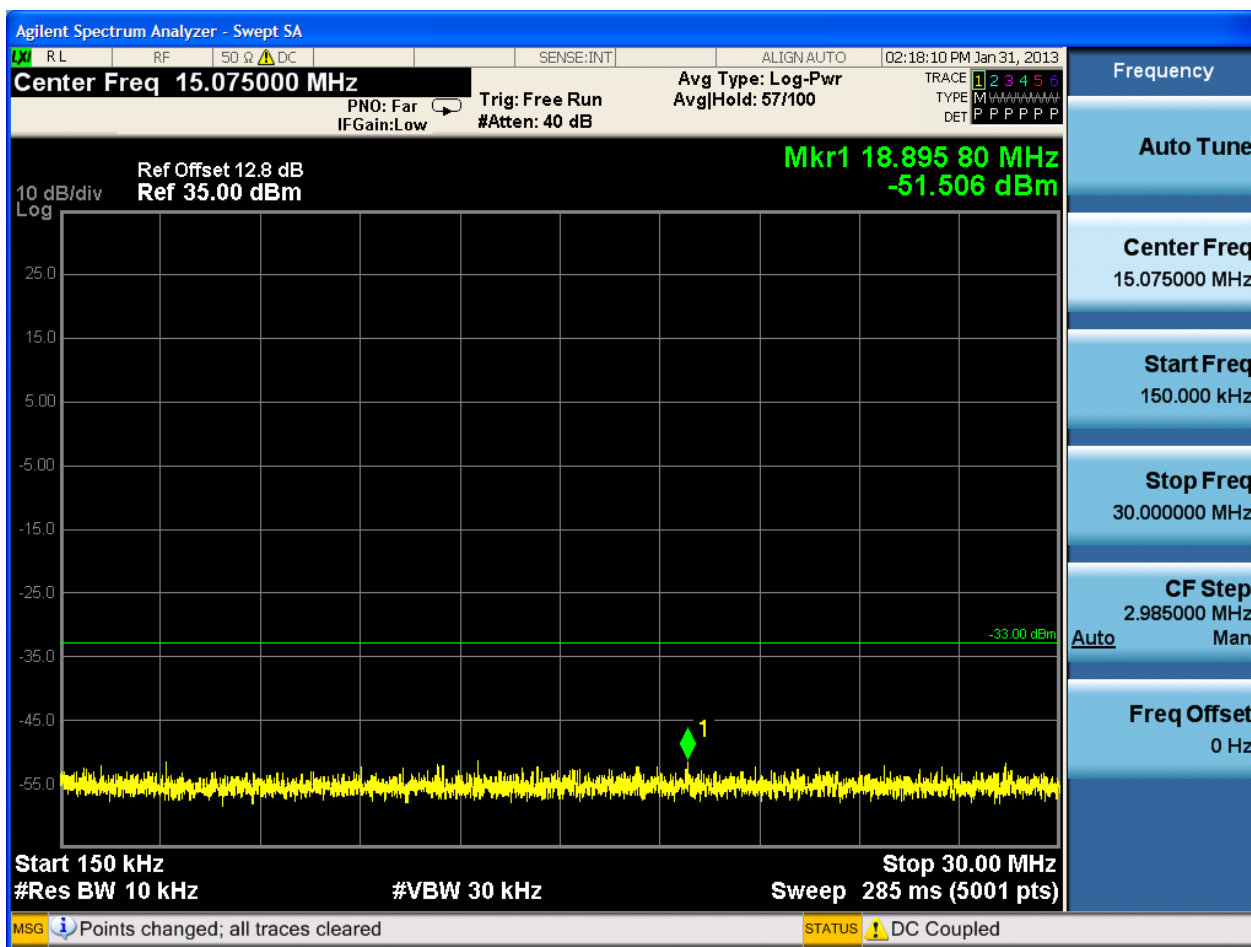


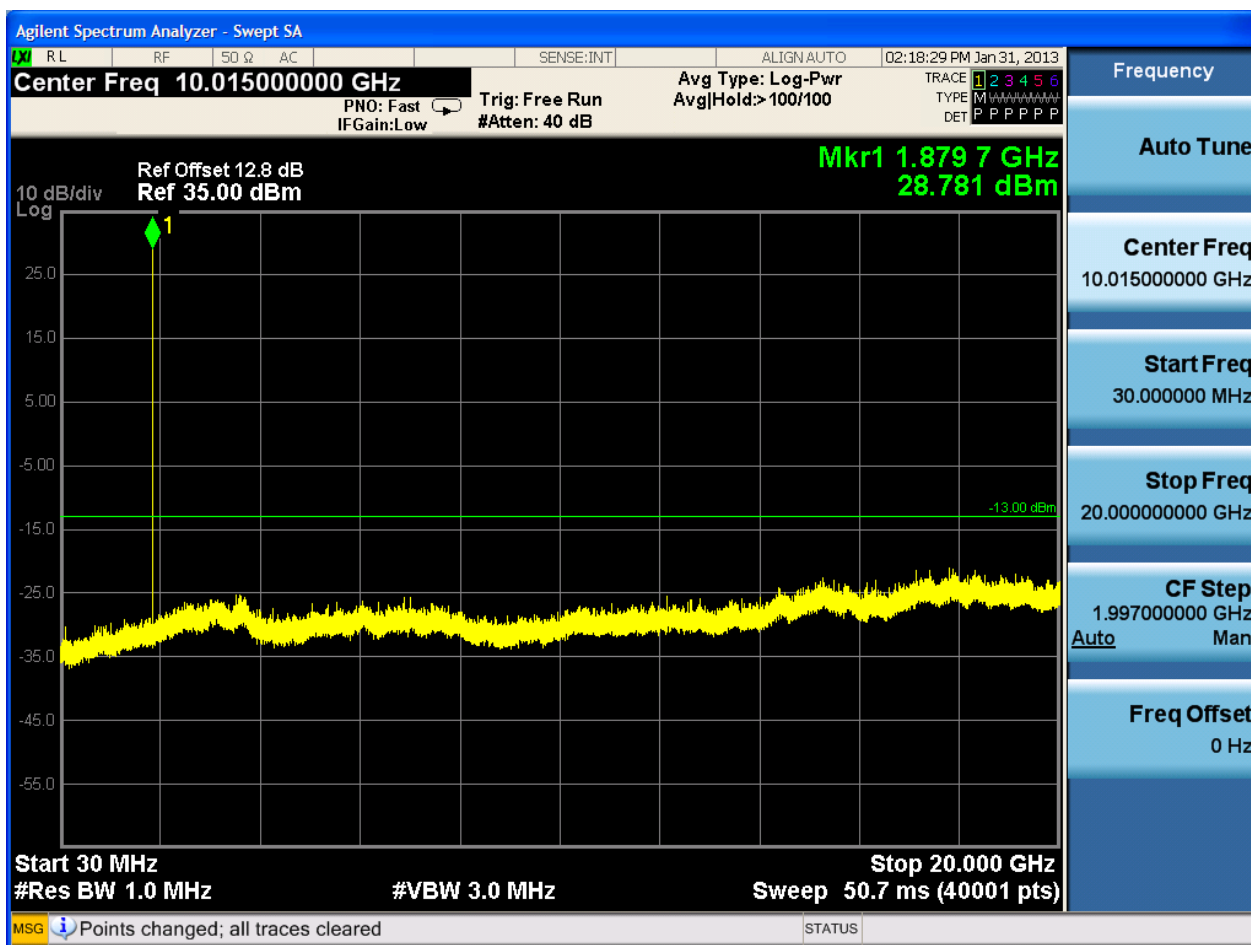




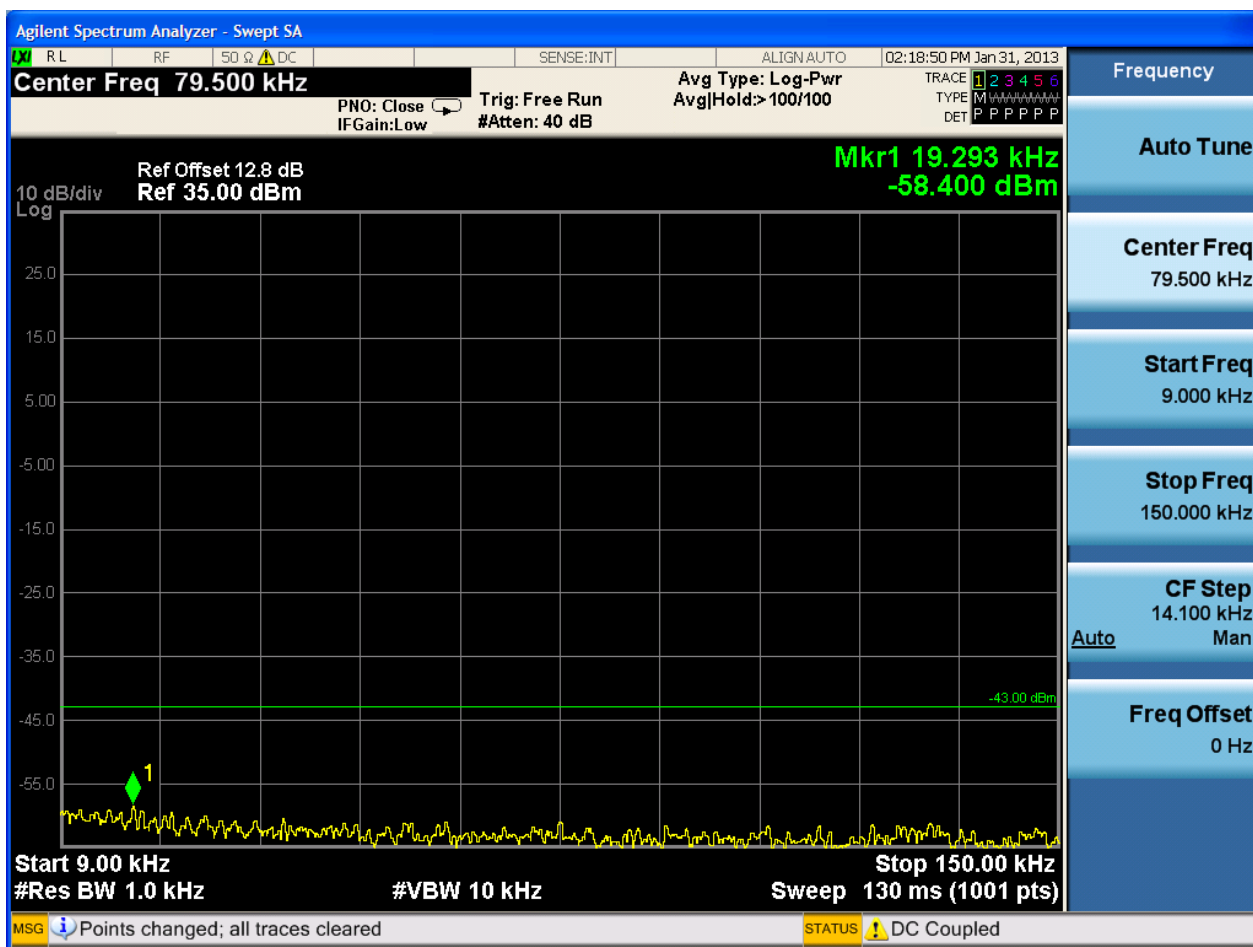
6.1.2.1.2 Test Channel = MCH

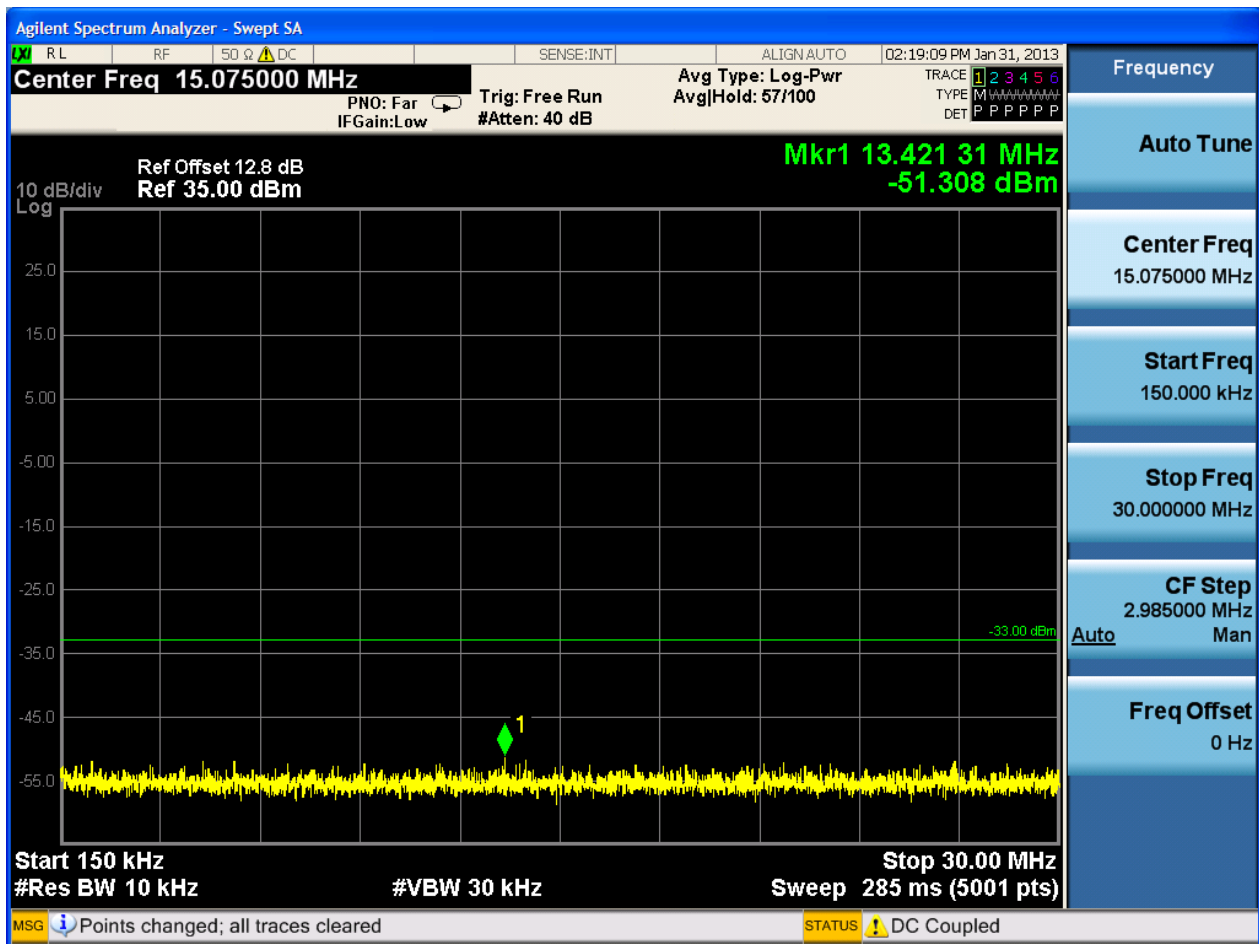


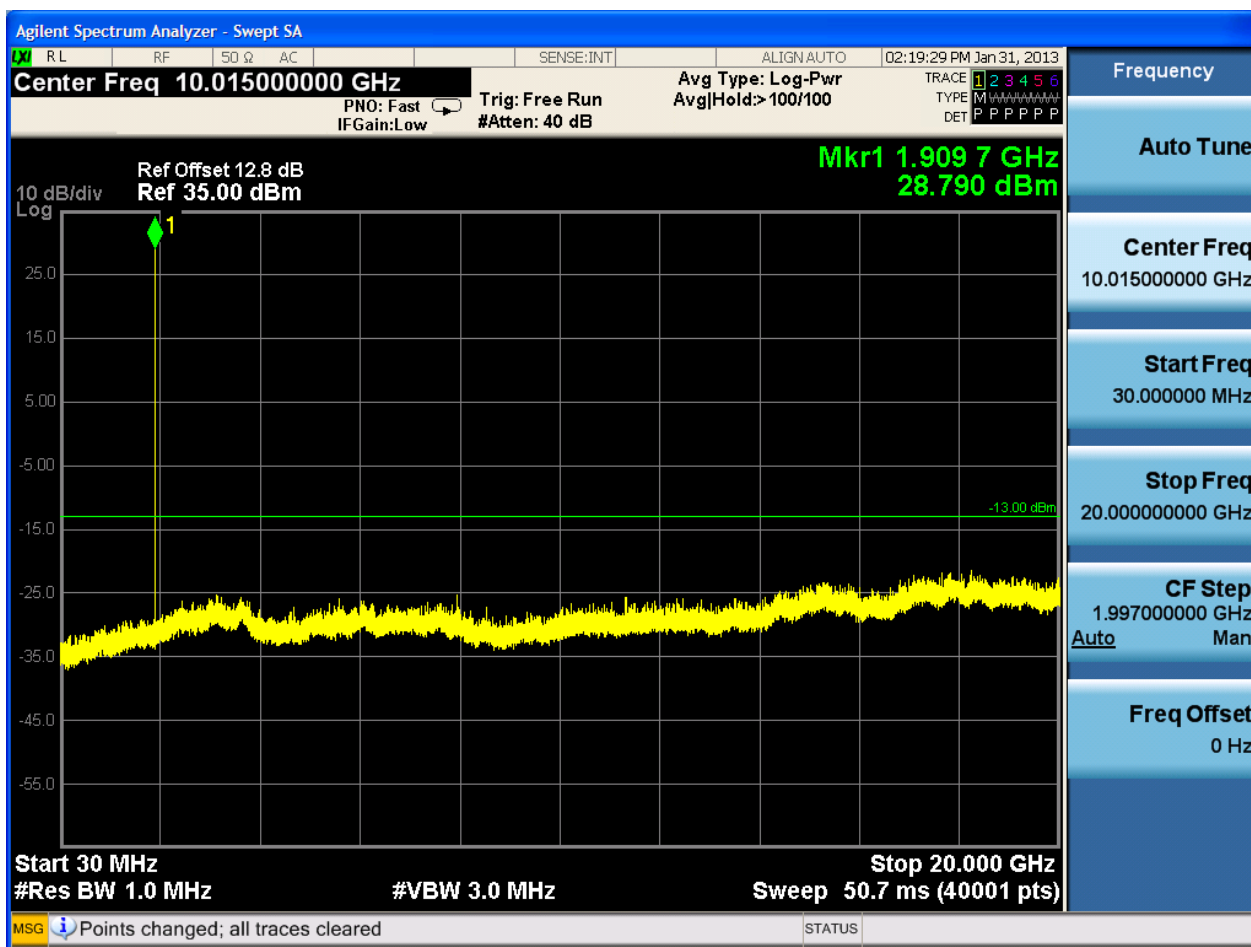




6.1.2.1.3 Test Channel = HCH



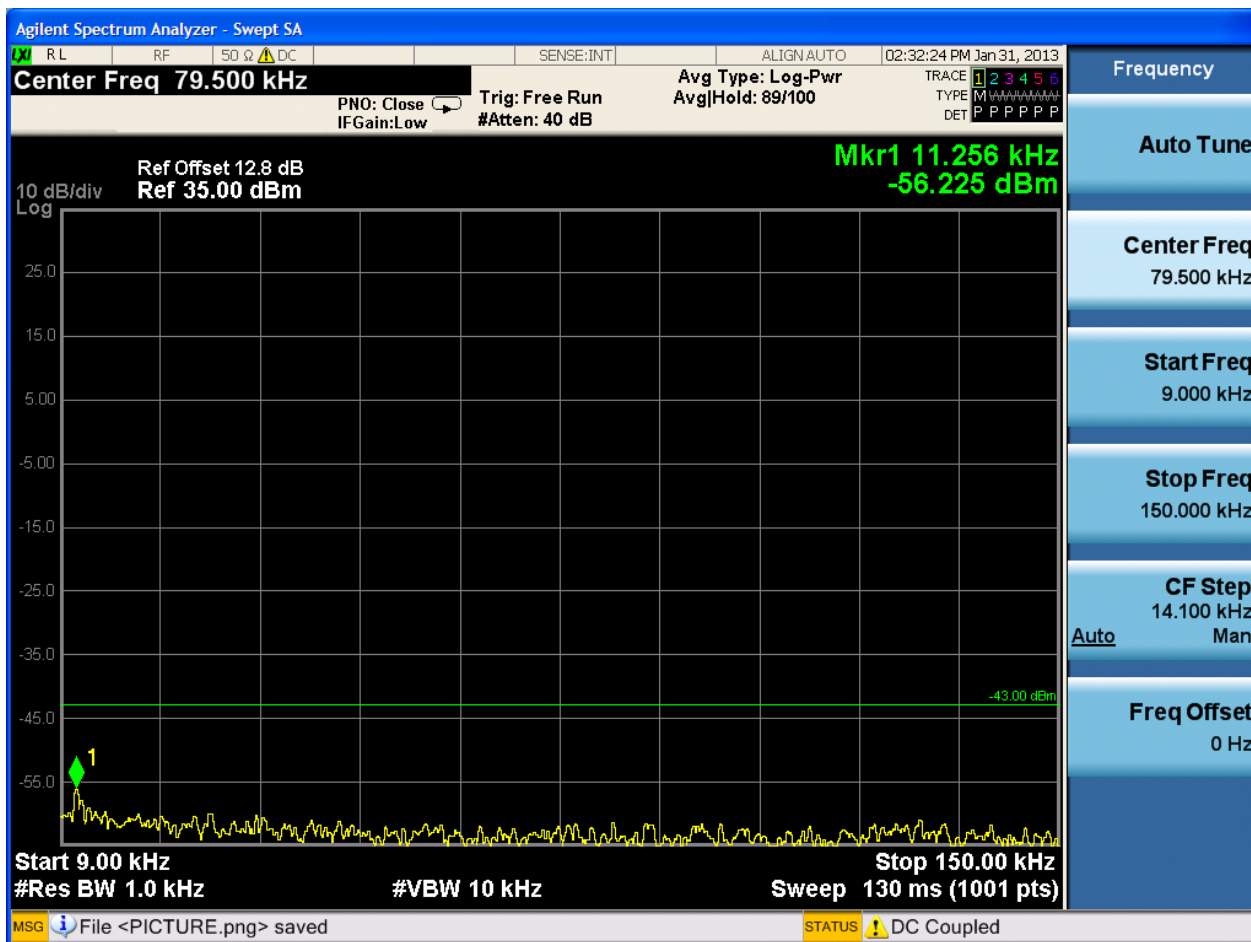


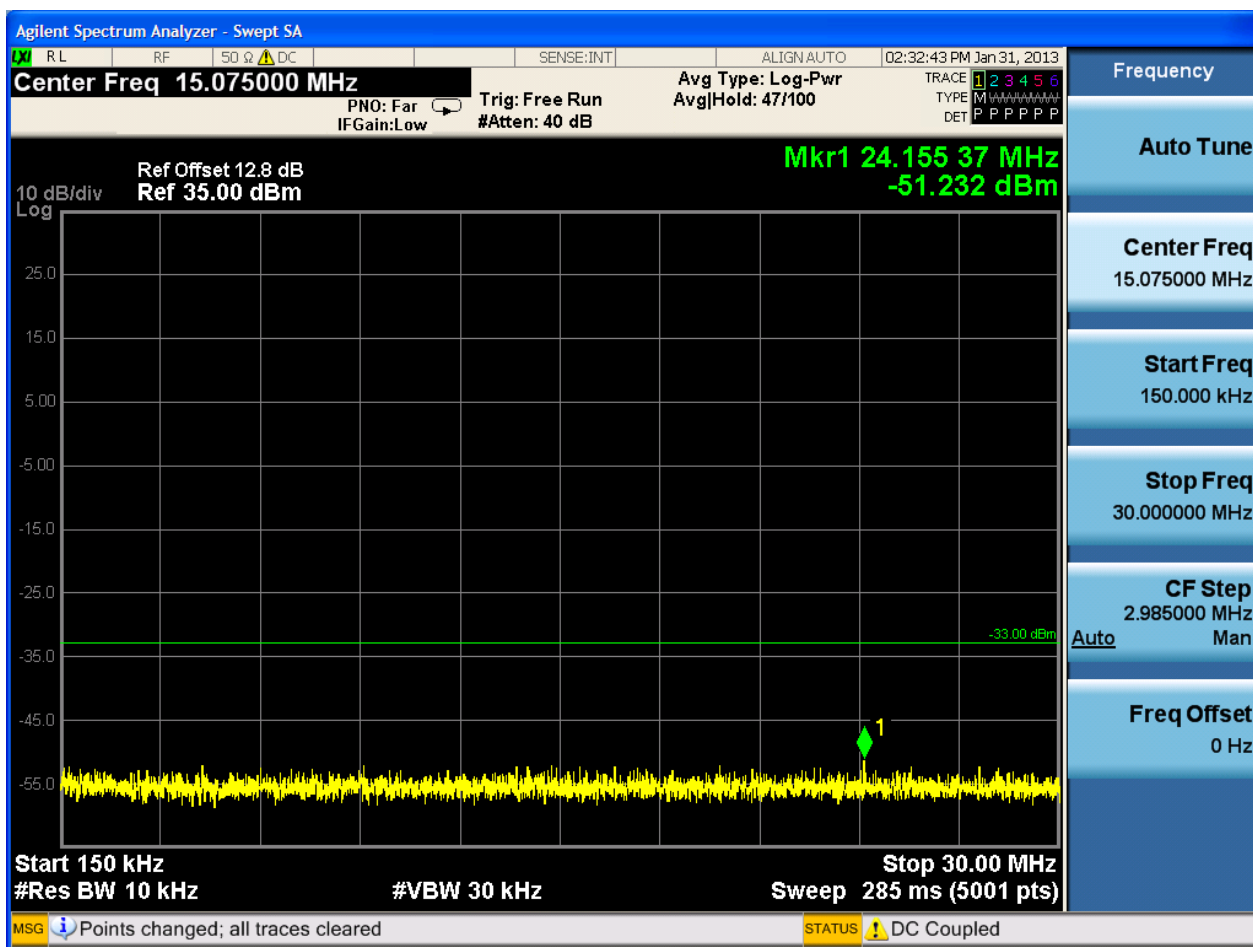


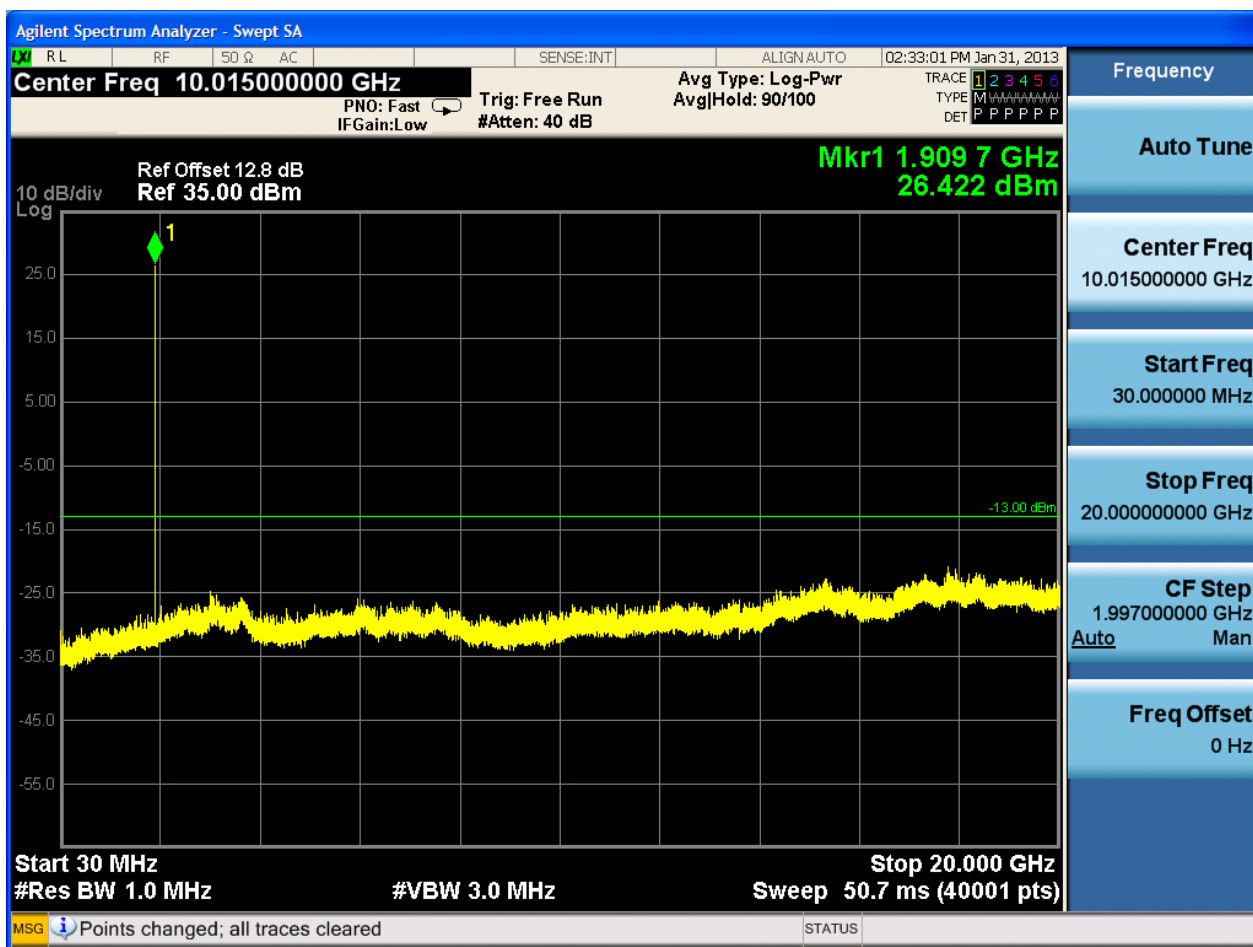


6.1.2.2 Test Mode = GSM/TM2

6.1.2.2.1 Test Channel = LCH

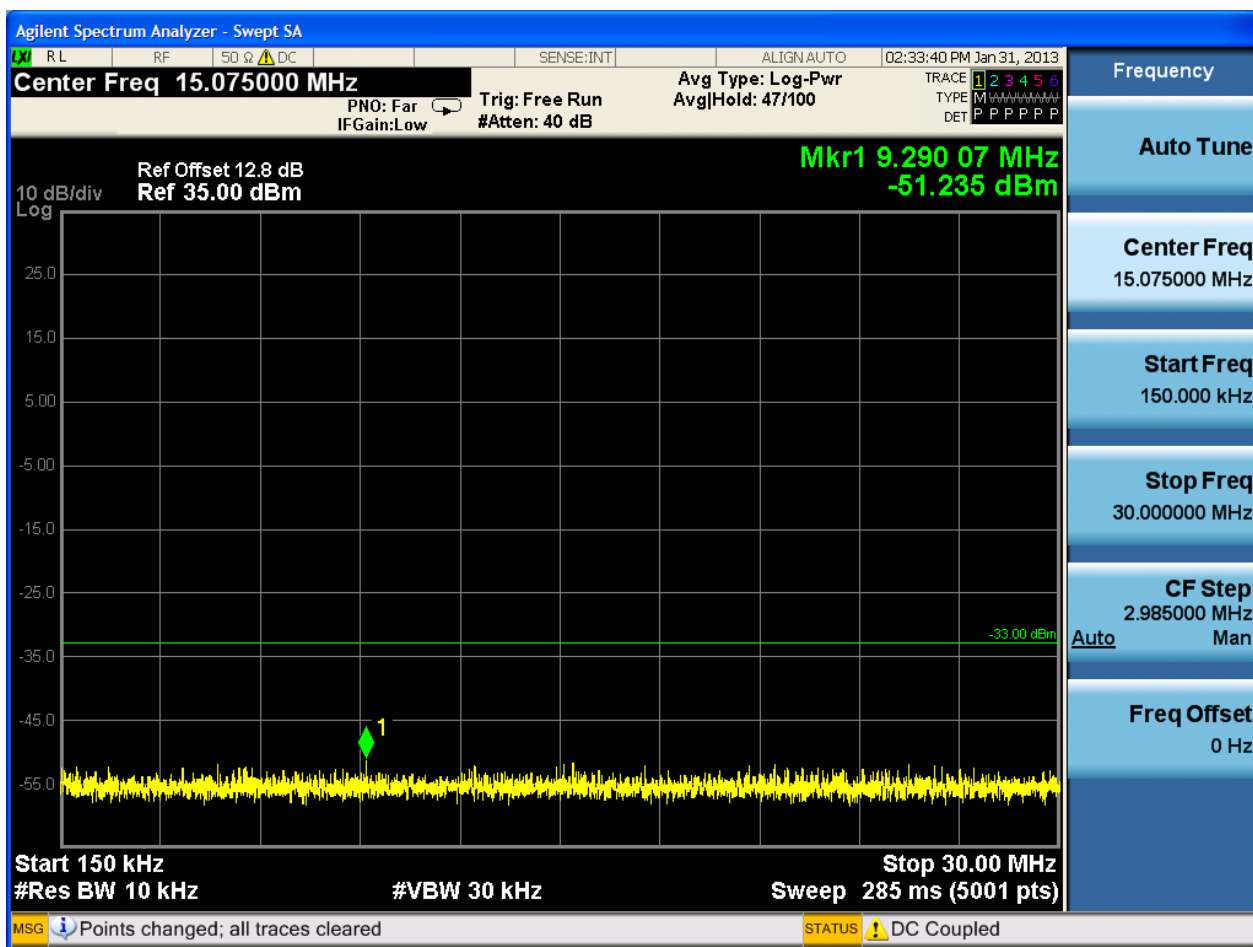


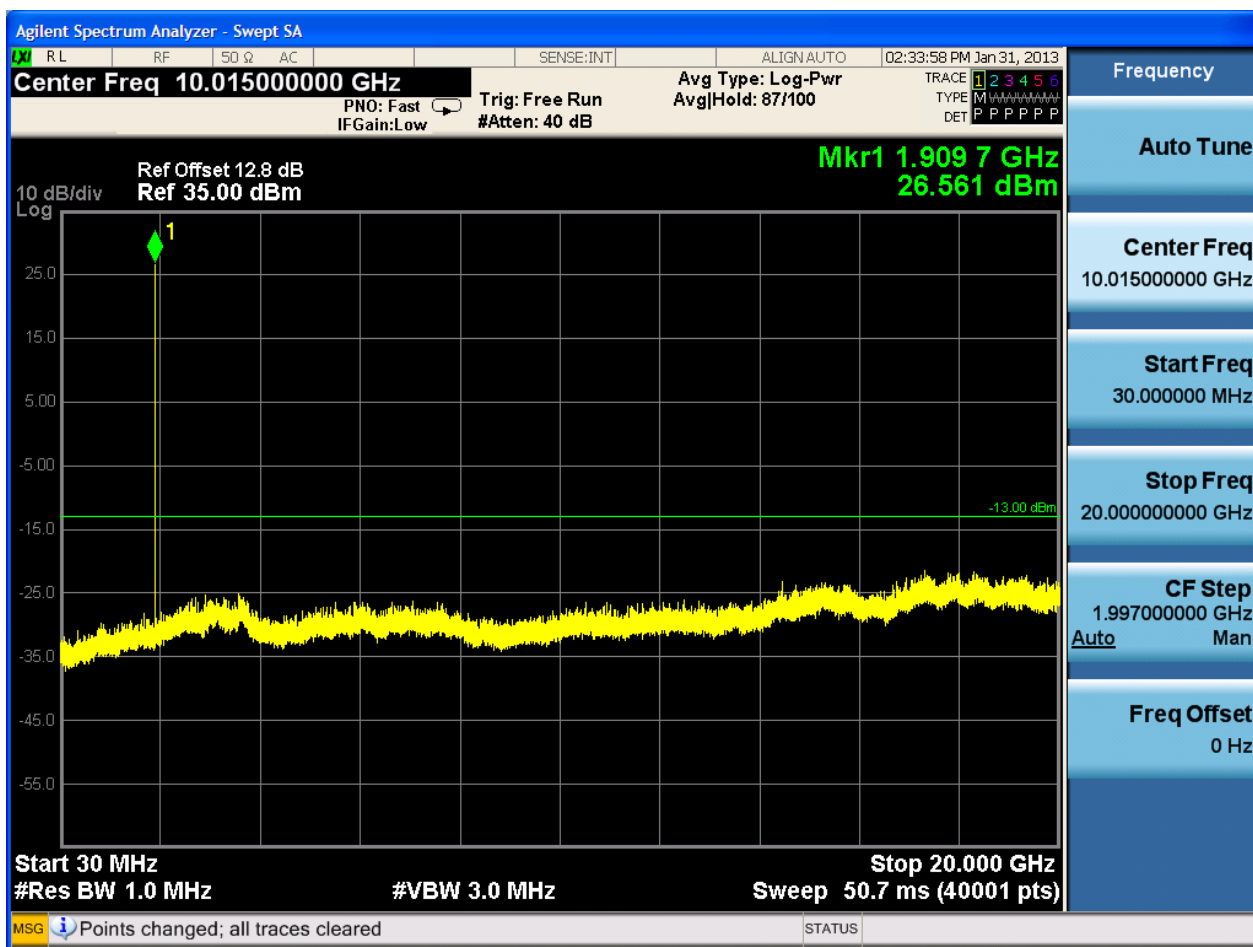




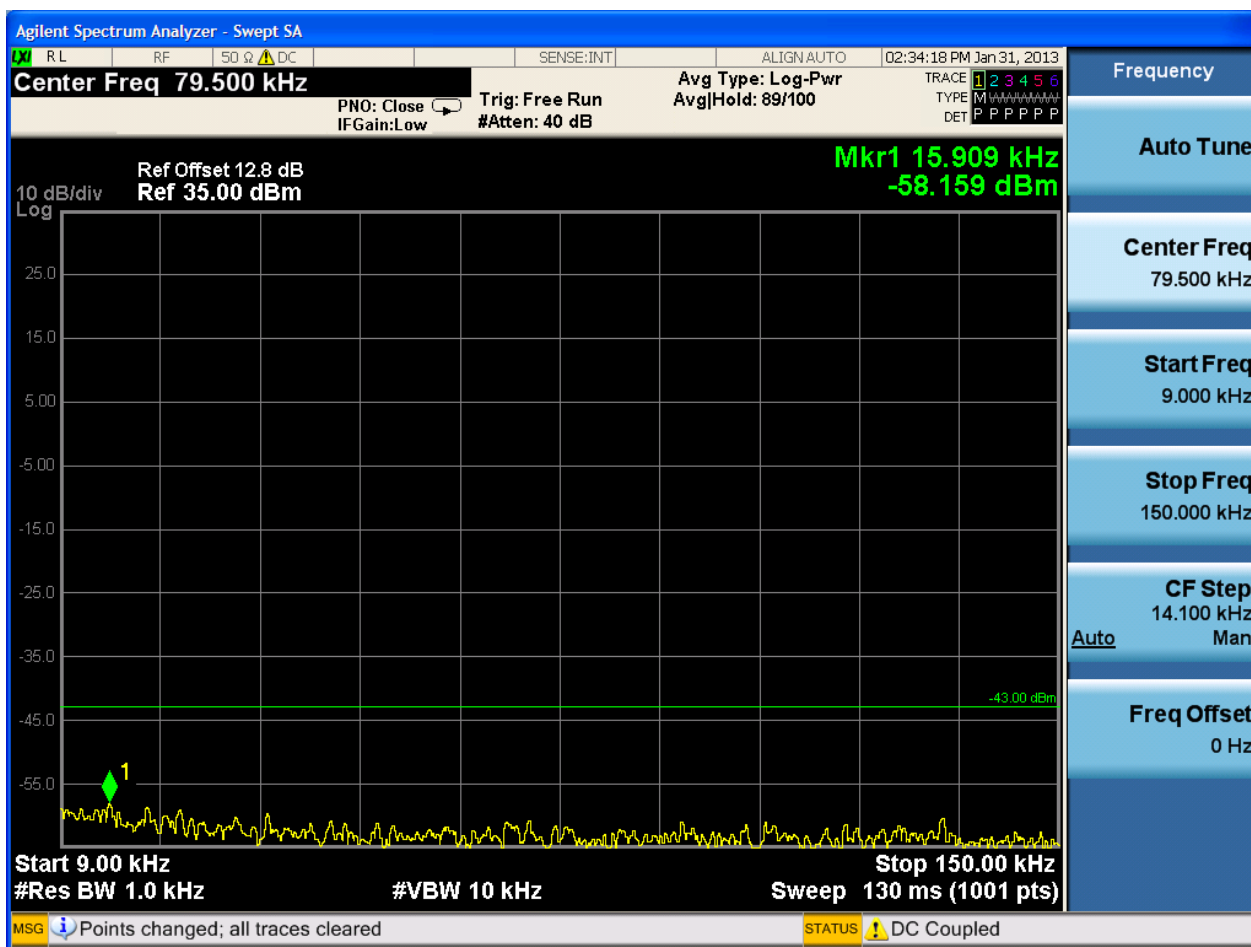
6.1.2.2.2 Test Channel = MCH

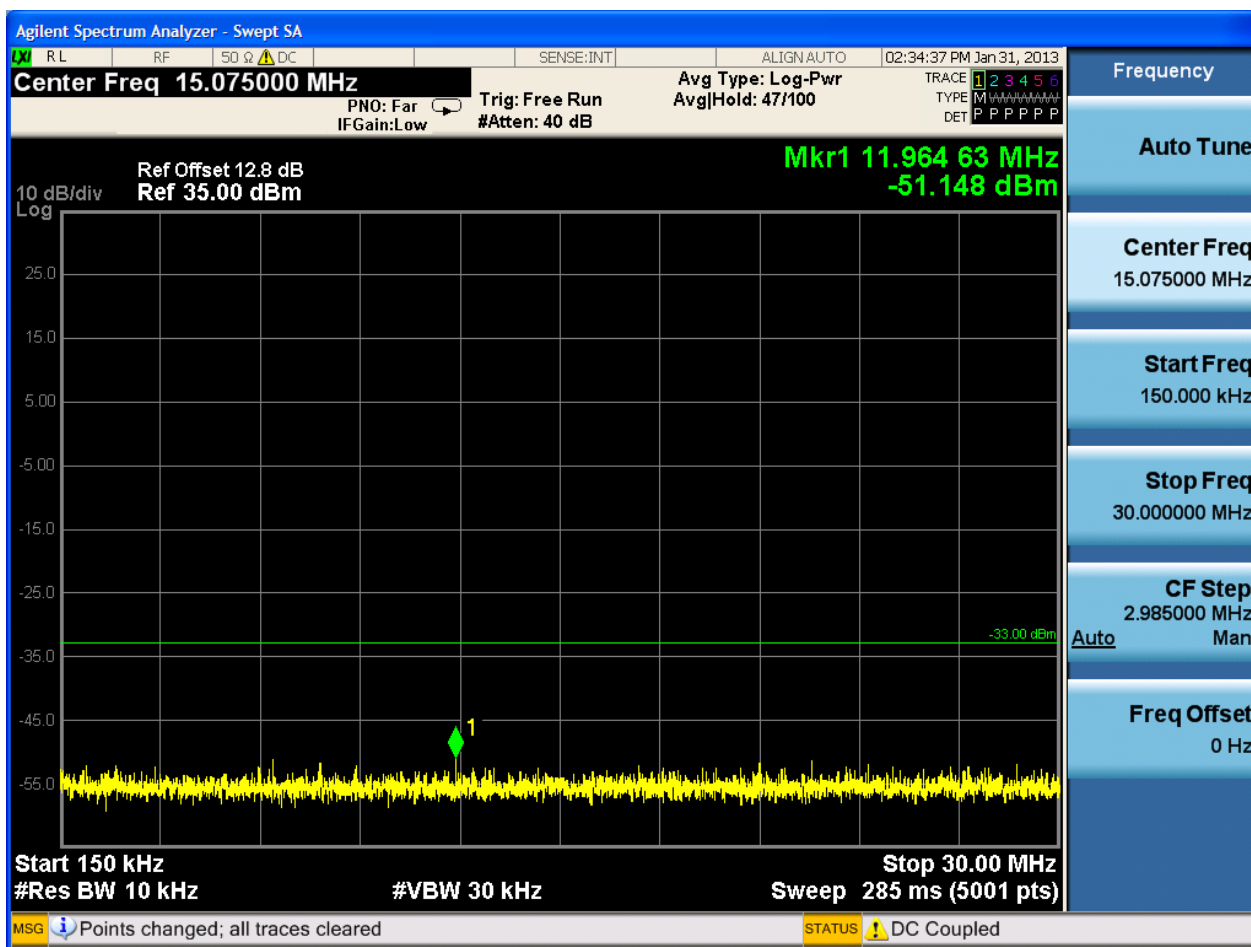


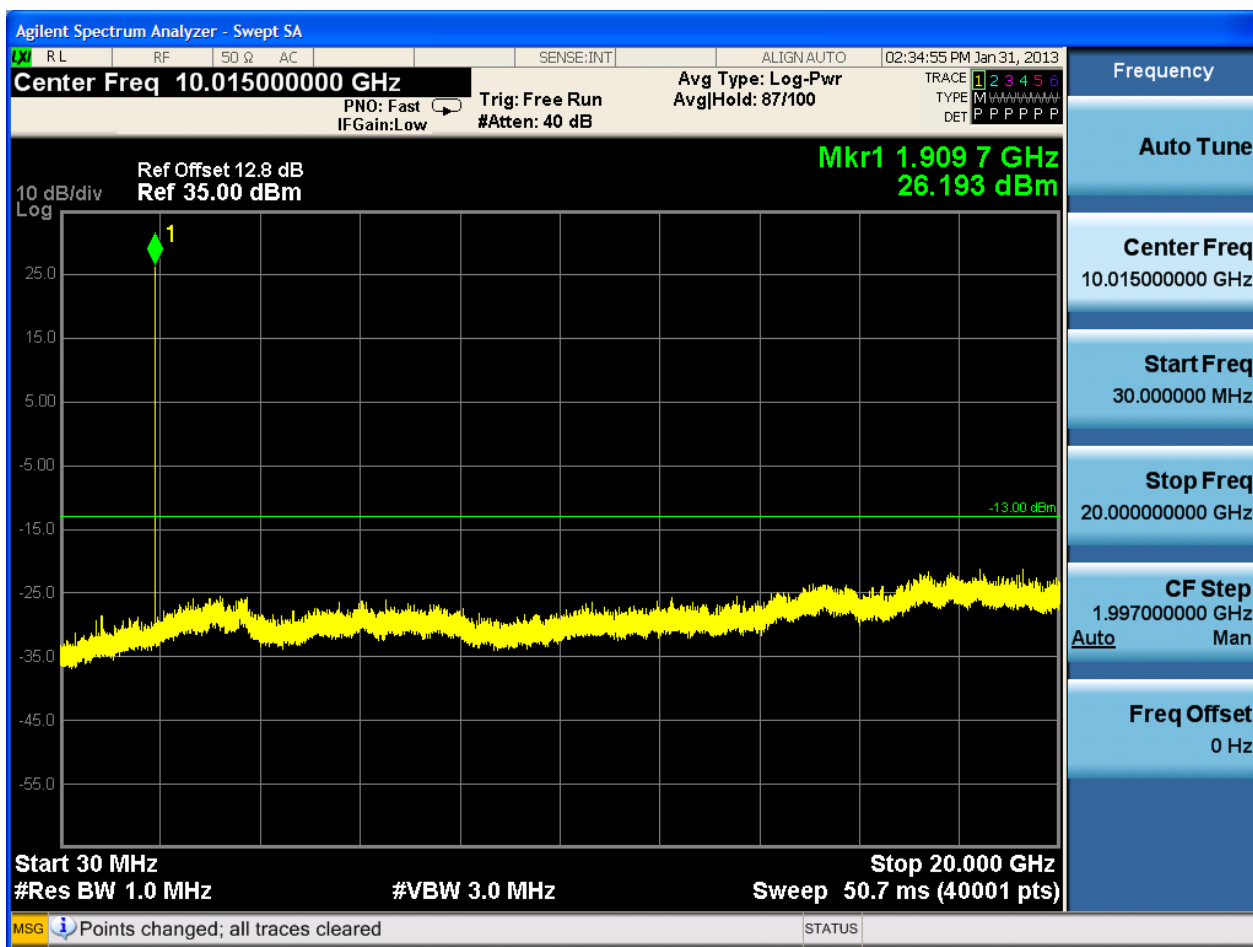




6.1.2.2.3 Test Channel = HCH







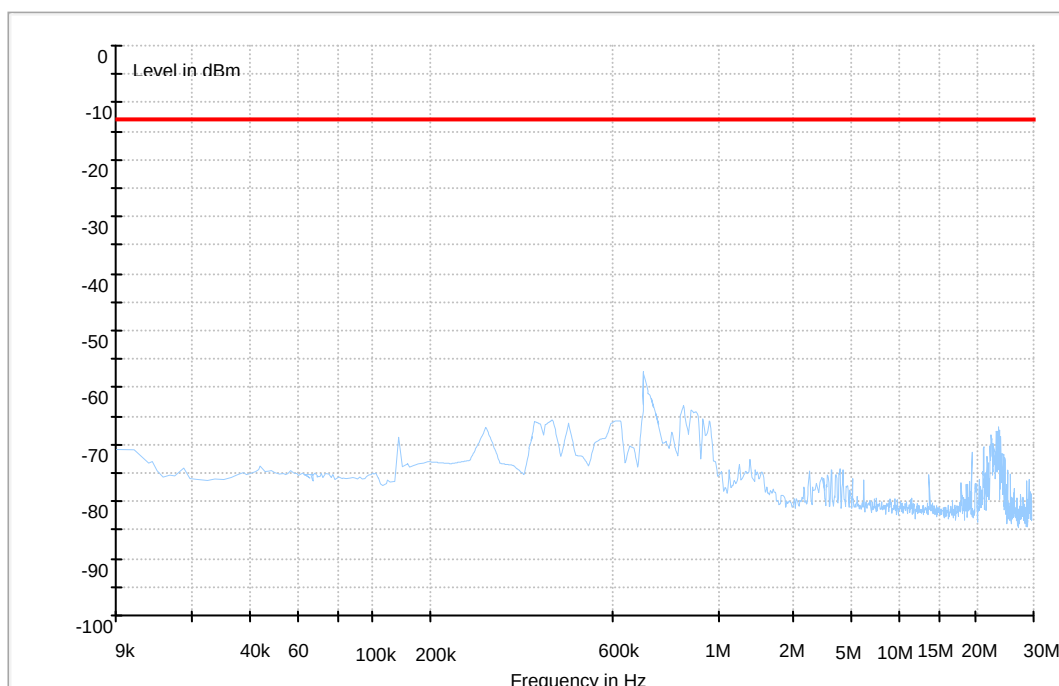
7Appendix_G: Radiated spurious emission

7.1For GSM

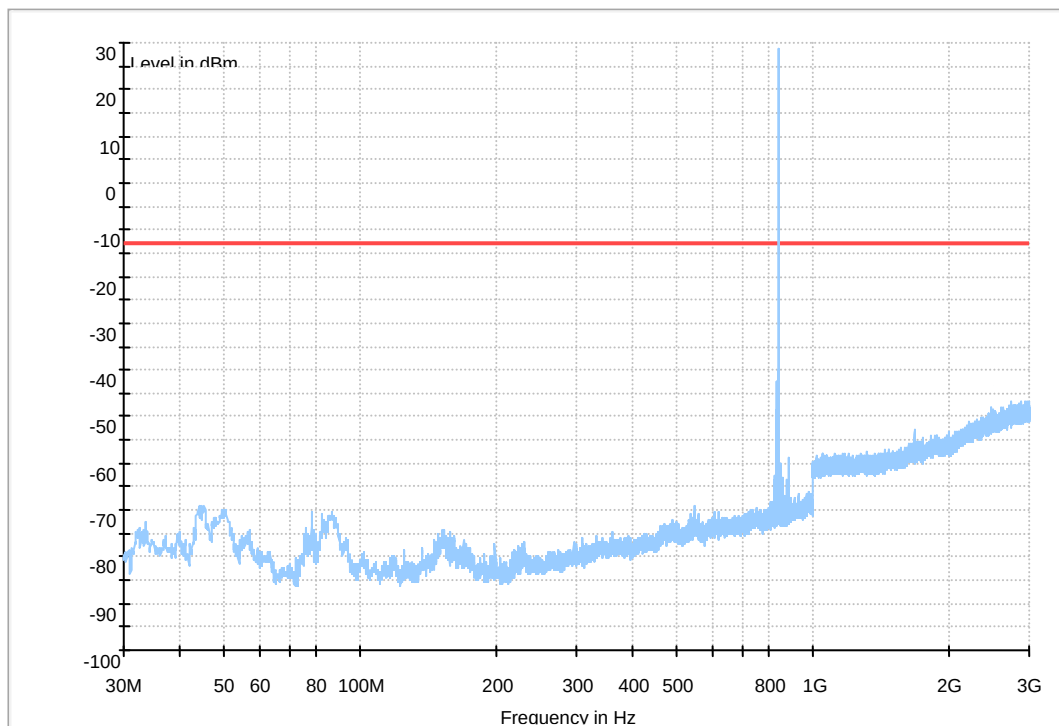
7.1.1Test Band=GSM850

7.1.1.1 Test Mode = GSM/TM1

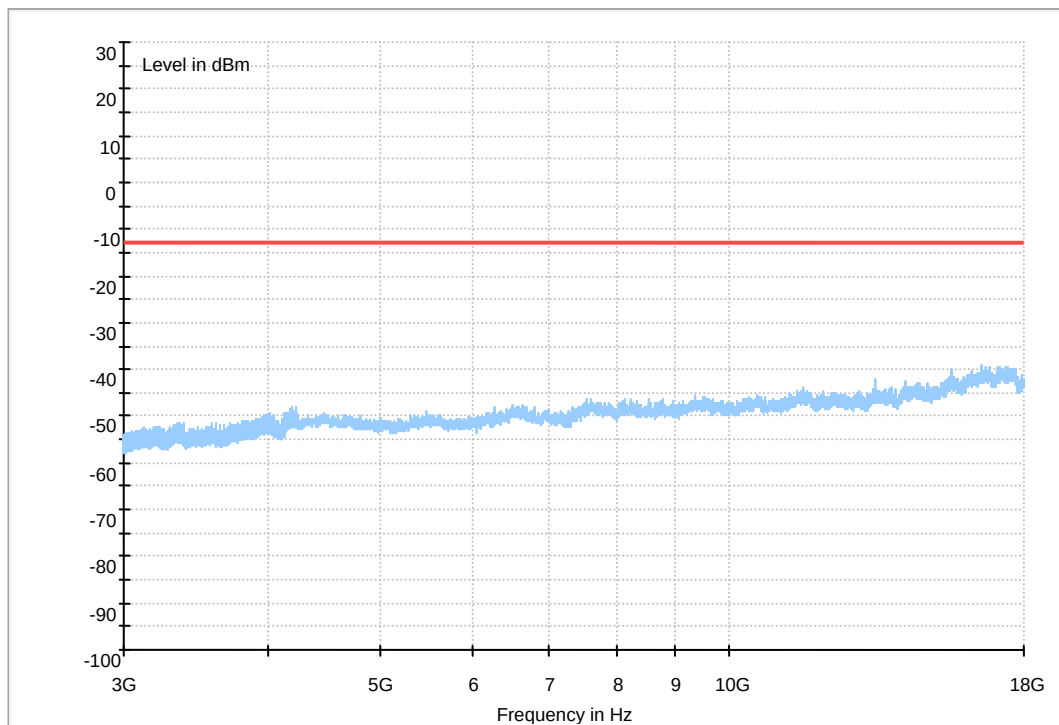
Traffic Mode (9kHz-30MHz)



Traffic Mode (30MHz-3GHz)

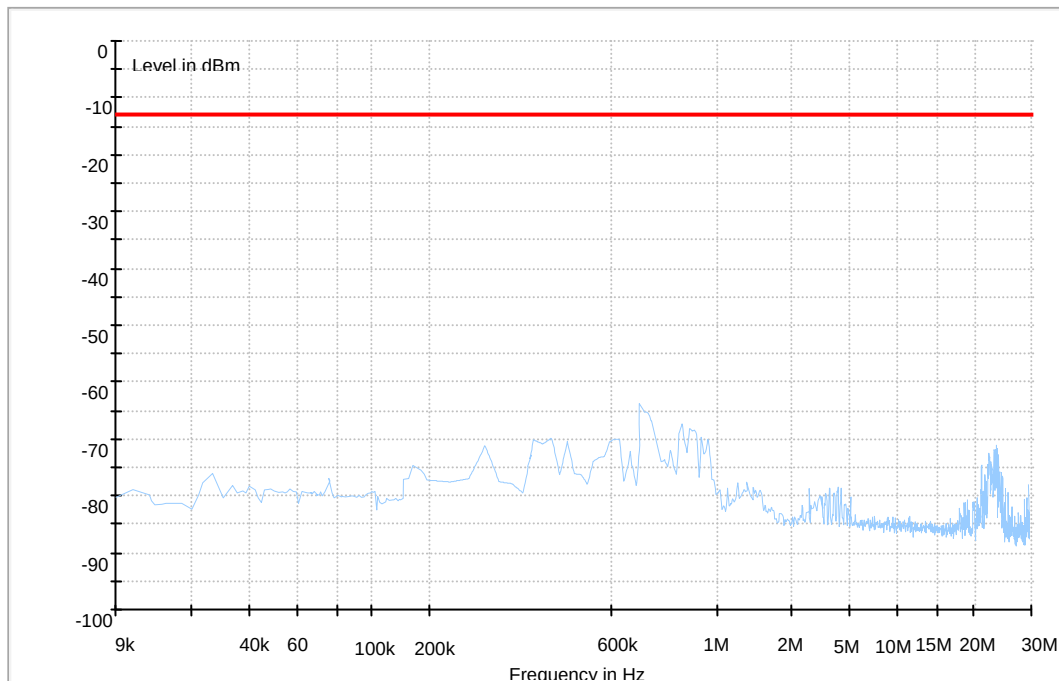


Traffic Mode (3GHz-18GHz)

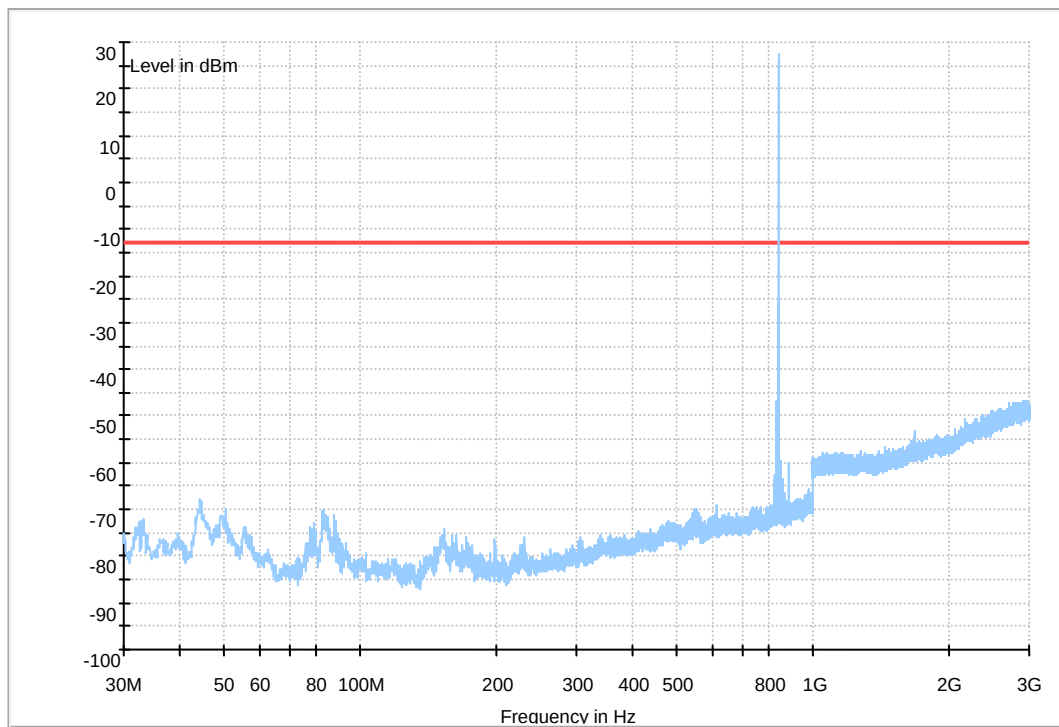


7.1.1.2 Test Mode = GSM/TM2

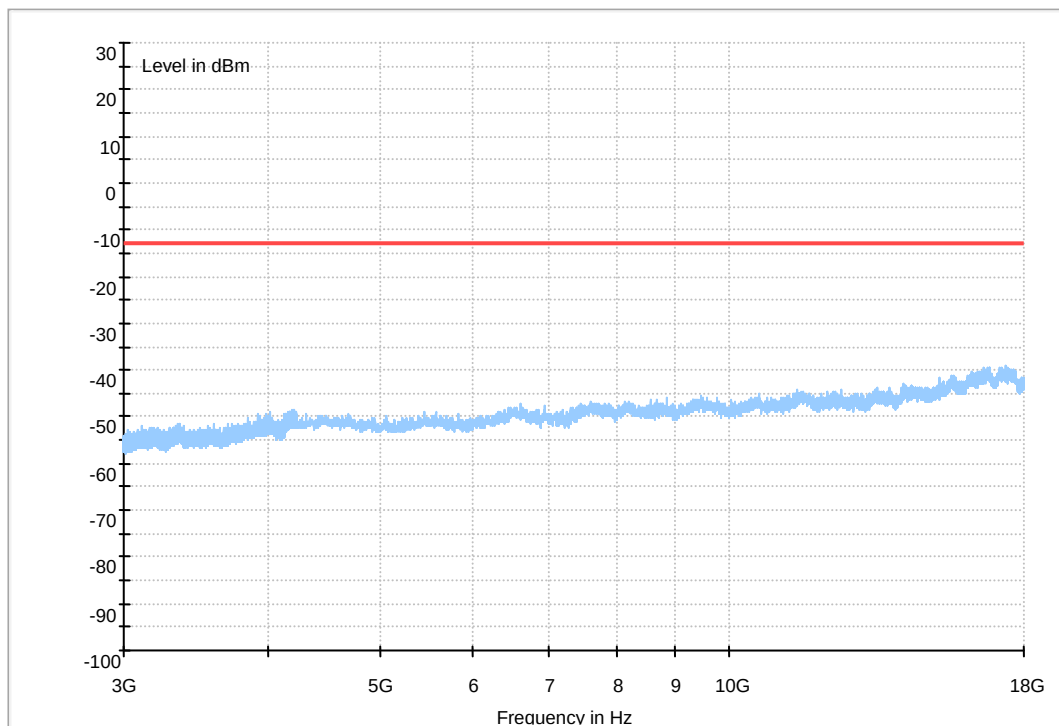
Traffic Mode (9kHz-30MHz)



Traffic Mode (30MHz-3GHz)



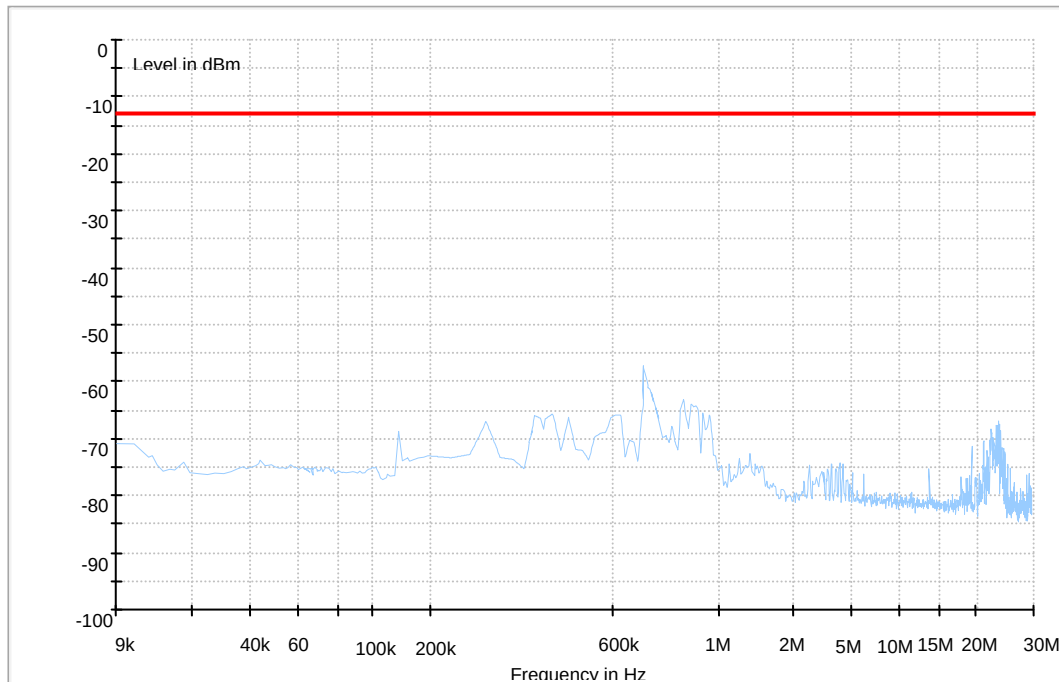
Traffic Mode (3GHz-18GHz)



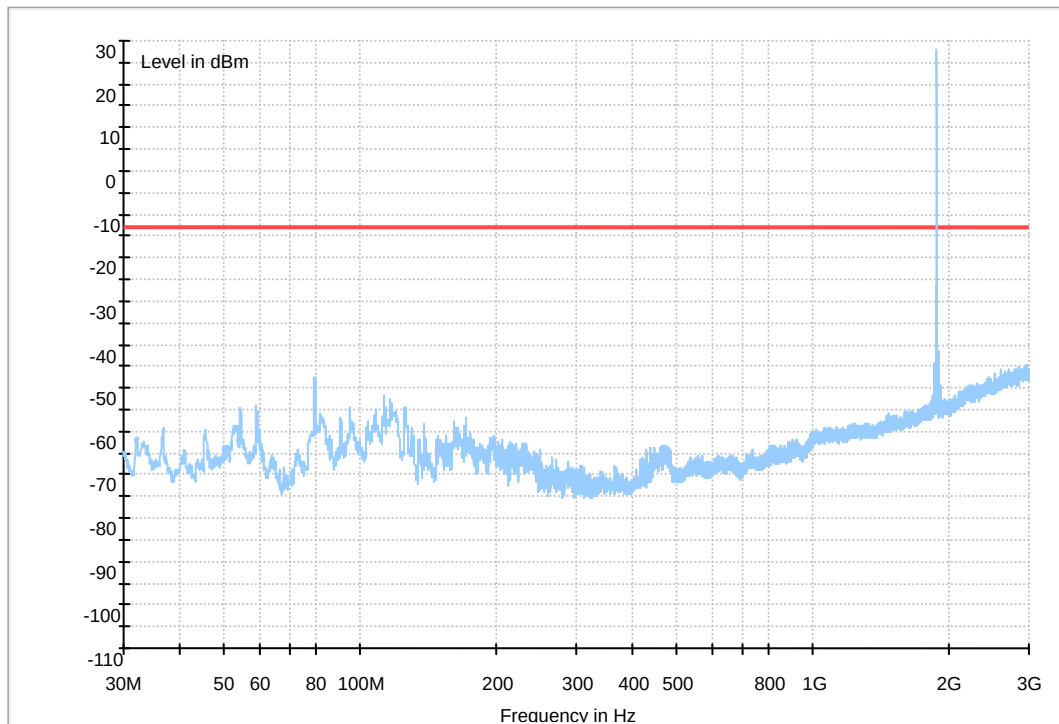
7.1.2 Test Band=GSM1900

7.1.2.1 Test Mode = GSM/TM1

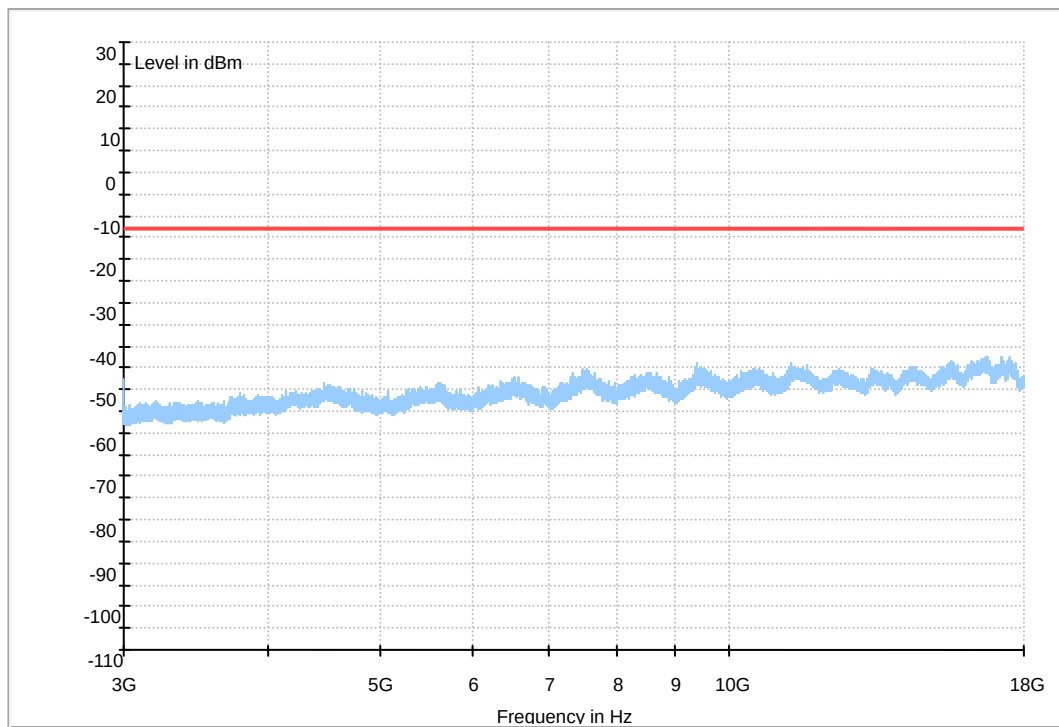
Traffic Mode (9kHz-30MHz)



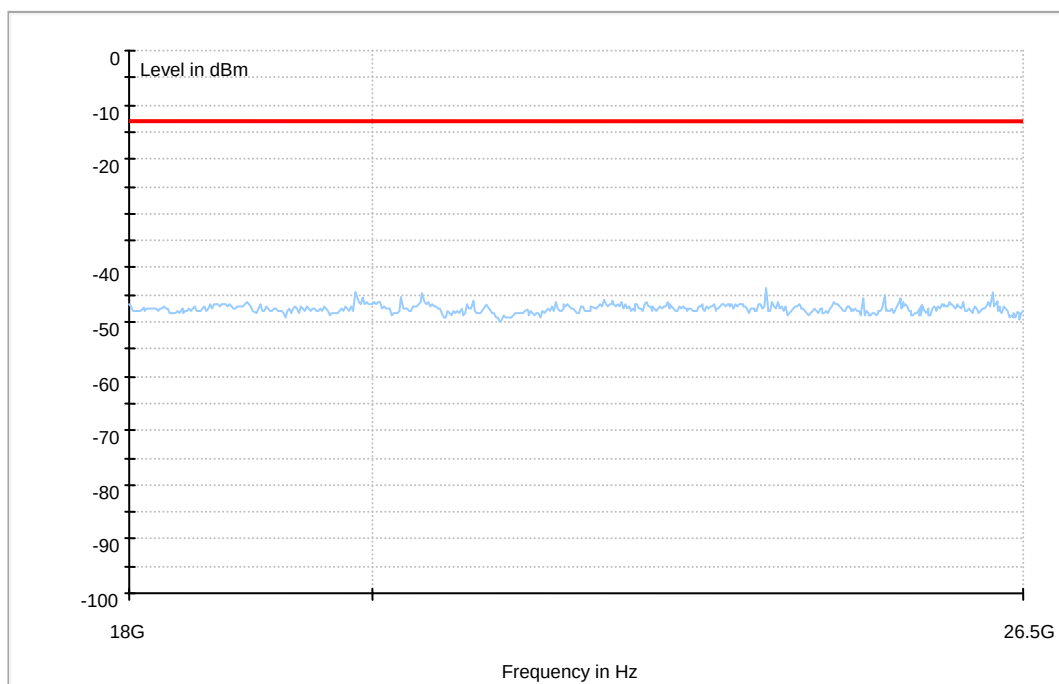
Traffic Mode (30MHz-3GHz)



Traffic Mode (3GHz-18GHz)

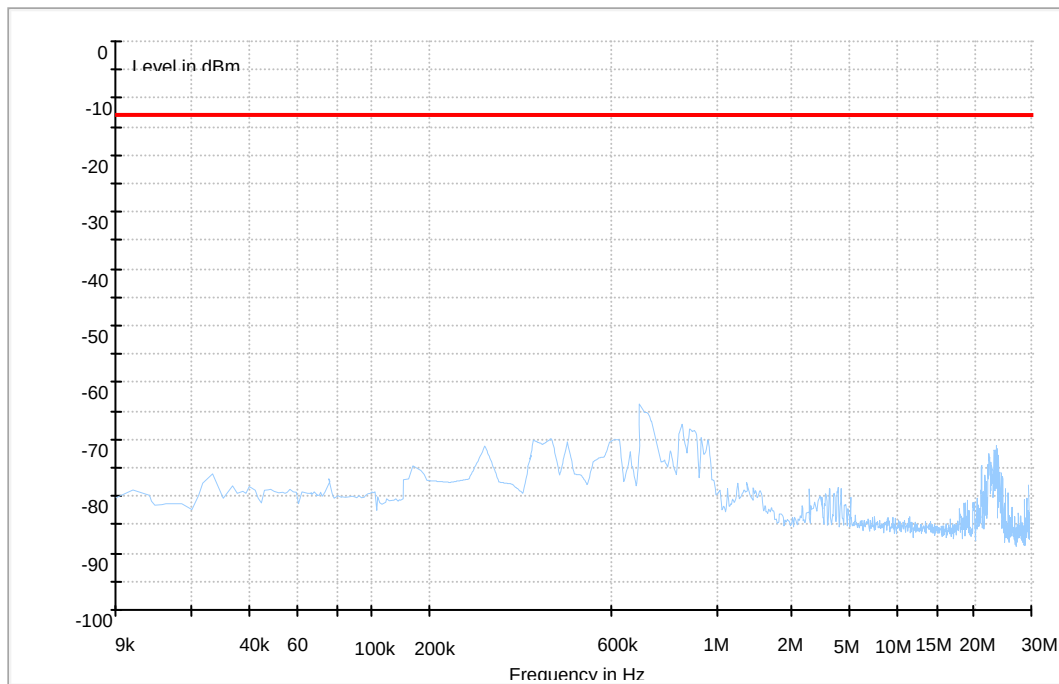


Traffic Mode (18GHz-26.5GHz)

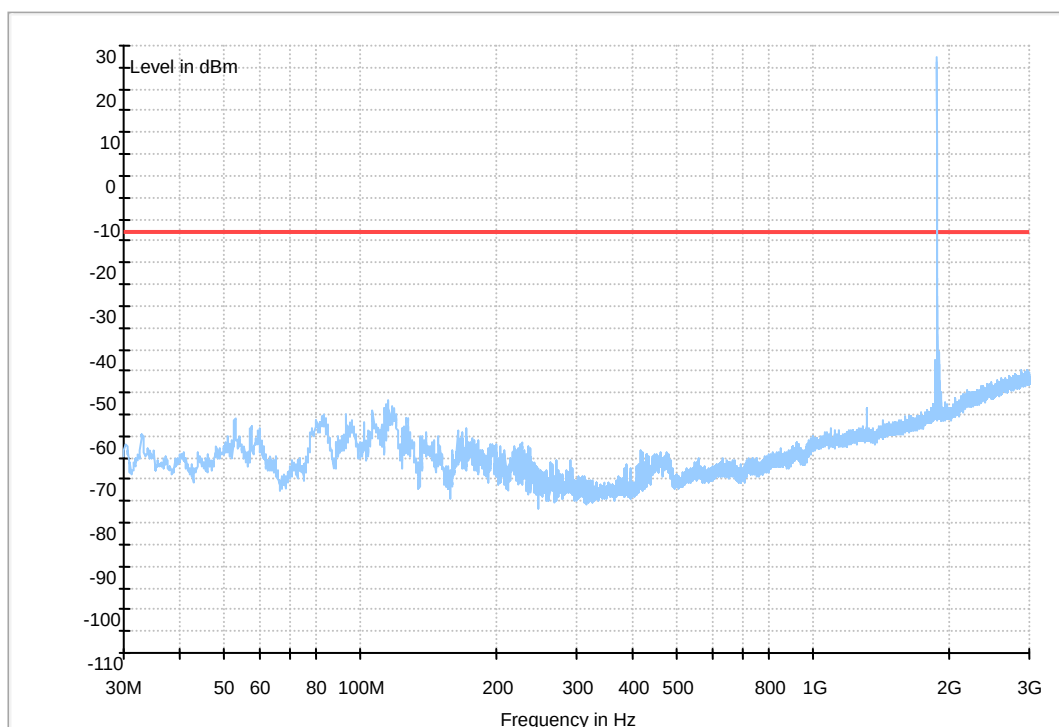


7.1.2.2 Test Mode = GSM/TM2

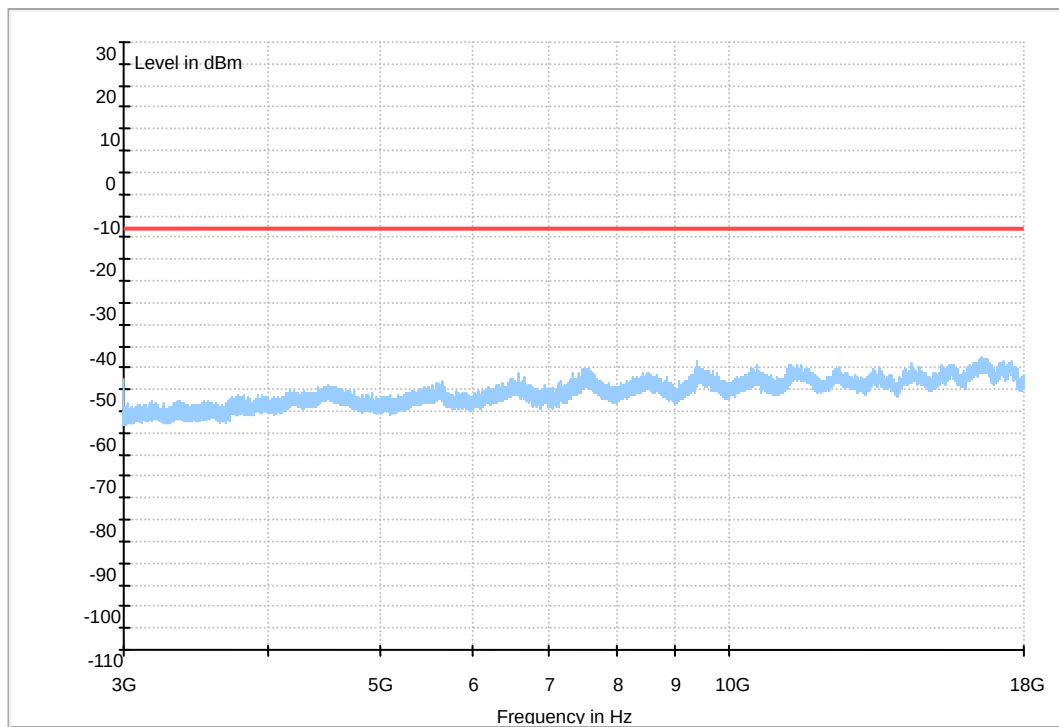
Traffic Mode (9kHz-30MHz)



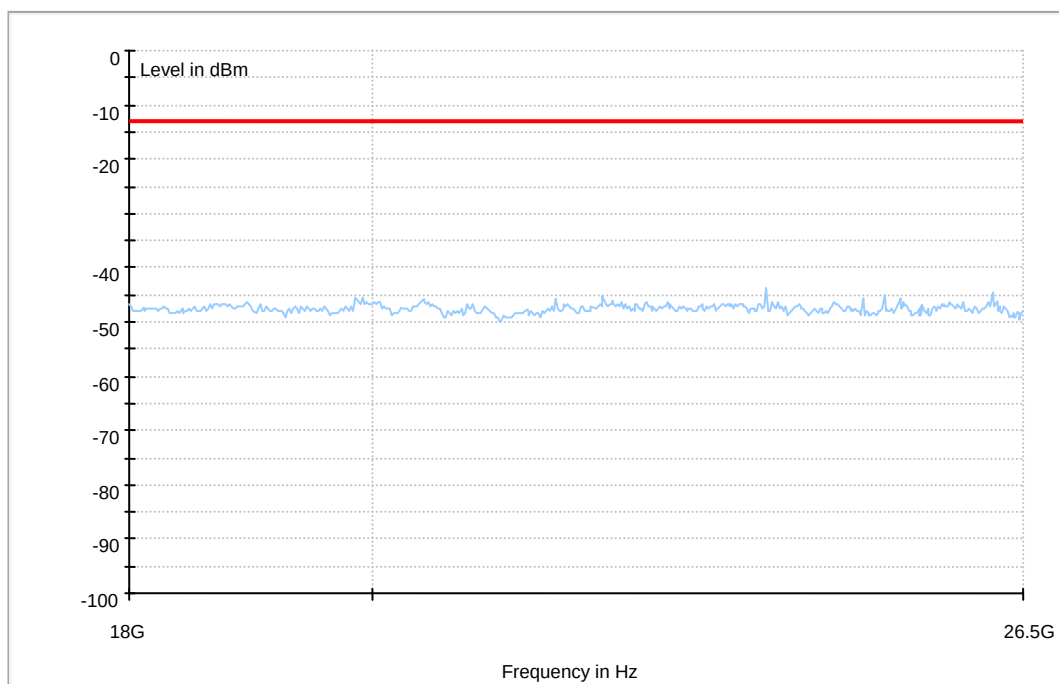
Traffic Mode (30MHz-3GHz)



Traffic Mode (3GHz-18GHz)



Traffic Mode (18GHz-26.5GHz)



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	-17.11	-0.02076	±2.5	PASS
				VN	-17.37	-0.02107	±2.5	PASS
				VH	-16.79	-0.02037	±2.5	PASS
		MCH	TN	VL	-18.79	-0.02246	±2.5	PASS
				VN	-19.82	-0.02369	±2.5	PASS
				VH	-19.24	-0.02300	±2.5	PASS
		HCH	TN	VL	-18.40	-0.02168	±2.5	PASS
				VN	-17.18	-0.02024	±2.5	PASS
				VH	-19.89	-0.02343	±2.5	PASS
	GSM/TM2	LCH	TN	VL	-23.41	-0.0284	±2.5	PASS
				VN	-17.24	-0.02092	±2.5	PASS
				VH	-21.60	-0.02621	±2.5	PASS
		MCH	TN	VL	-28.96	-0.03462	±2.5	PASS
				VN	-26.05	-0.03114	±2.5	PASS
				VH	-24.89	-0.02975	±2.5	PASS
		HCH	TN	VL	-25.99	-0.03062	±2.5	PASS
				VN	-27.22	-0.03207	±2.5	PASS
				VH	-26.73	-0.03149	±2.5	PASS
GSM1900	GSM/TM1	LCH	TN	VL	-26.54	-0.01434	±2.5	PASS
				VN	-25.63	-0.01385	±2.5	PASS
				VH	-26.80	-0.01448	±2.5	PASS
		MCH	TN	VL	-33.96	-0.01806	±2.5	PASS
				VN	-40.49	-0.02154	±2.5	PASS
				VH	-46.62	-0.02480	±2.5	PASS
		HCH	TN	VL	-43.13	-0.02258	±2.5	PASS
				VN	-37.45	-0.01961	±2.5	PASS
				VH	-37.26	-0.01951	±2.5	PASS
	GSM/TM2	LCH	TN	VL	-35.71	-0.0193	±2.5	PASS
				VN	-28.80	-0.01557	±2.5	PASS

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Limit [ppm]	Verdict
		MCH	TN	VH	-39.42	-0.02131	±2.5	PASS
				VL	-39.78	-0.02116	±2.5	PASS
				VN	-46.98	-0.02499	±2.5	PASS
				VH	-51.17	-0.02722	±2.5	PASS
		HCH	TN	VL	-41.29	-0.02162	±2.5	PASS
				VN	-48.11	-0.02519	±2.5	PASS
				VH	-46.72	-0.02446	±2.5	PASS

8.1.2 Frequency 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	-15.69	-0.01904	±2.5	PASS
				-20	-13.69	-0.01661	±2.5	PASS
				-10	-17.89	-0.02171	±2.5	PASS
				0	-17.11	-0.02076	±2.5	PASS
				10	-17.31	-0.0210	±2.5	PASS
				20	-19.18	-0.02327	±2.5	PASS
				30	-19.31	-0.02343	±2.5	PASS
				40	-15.11	-0.01833	±2.5	PASS
				50	-16.98	-0.0206	±2.5	PASS
		MCH	VN	-30	-20.60	-0.02462	±2.5	PASS
				-20	-19.76	-0.02362	±2.5	PASS
				-10	-20.53	-0.02454	±2.5	PASS
				0	-22.79	-0.02724	±2.5	PASS
				10	-21.70	-0.02594	±2.5	PASS
				20	-24.09	-0.0288	±2.5	PASS
				30	-23.18	-0.02771	±2.5	PASS
				40	-19.95	-0.02385	±2.5	PASS
				50	-25.38	-0.03034	±2.5	PASS
		HCH	VN	-30	-22.02	-0.02594	±2.5	PASS
				-20	-19.63	-0.02313	±2.5	PASS
				-10	-18.47	-0.02176	±2.5	PASS
				0	-18.60	-0.02191	±2.5	PASS
				10	-17.56	-0.02069	±2.5	PASS
				20	-17.05	-0.02009	±2.5	PASS
				30	-18.98	-0.02236	±2.5	PASS
				40	-18.40	-0.02168	±2.5	PASS
				50	-19.76	-0.02328	±2.5	PASS
	GSM/TM2	LCH	VN	-30	-19.63	-0.02382	±2.5	PASS

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Limit [ppm]	Verdict
				-20	-23.96	-0.02907	±2.5	PASS
				-10	-20.89	-0.02535	±2.5	PASS
				0	-18.18	-0.02206	±2.5	PASS
				10	-21.34	-0.02589	±2.5	PASS
				20	-19.40	-0.02354	±2.5	PASS
				30	-21.76	-0.0264	±2.5	PASS
				40	-21.02	-0.0255	±2.5	PASS
				50	-21.57	-0.02617	±2.5	PASS
		MCH	VN	-30	-22.83	-0.02729	±2.5	PASS
				-20	-27.28	-0.03261	±2.5	PASS
				-10	-29.86	-0.03569	±2.5	PASS
				0	-28.15	-0.03365	±2.5	PASS
				10	-28.09	-0.03358	±2.5	PASS
				20	-28.15	-0.03365	±2.5	PASS
				30	-24.41	-0.02918	±2.5	PASS
				40	-29.41	-0.03515	±2.5	PASS
				50	-25.99	-0.03107	±2.5	PASS
		HCH	VN	-30	-26.70	-0.03146	±2.5	PASS
				-20	-27.28	-0.03214	±2.5	PASS
				-10	-25.89	-0.0305	±2.5	PASS
				0	-25.96	-0.03058	±2.5	PASS
				10	-23.83	-0.02807	±2.5	PASS
				20	-23.25	-0.02739	±2.5	PASS
				30	-29.15	-0.03434	±2.5	PASS
				40	-25.57	-0.03012	±2.5	PASS
				50	-24.12	-0.02842	±2.5	PASS
GSM1900	GSM/TM1	LCH	VN	-30	-28.99	-0.01567	±2.5	PASS
				-20	-22.86	-0.01236	±2.5	PASS
				-10	-27.38	-0.0148	±2.5	PASS
				0	-30.61	-0.01654	±2.5	PASS
				10	-30.74	-0.01661	±2.5	PASS
				20	-26.67	-0.01441	±2.5	PASS
				30	-25.89	-0.01399	±2.5	PASS
				40	-30.48	-0.01647	±2.5	PASS
				50	-26.73	-0.01445	±2.5	PASS
		MCH	VN	-30	-45.85	-0.02439	±2.5	PASS
				-20	-41.13	-0.02188	±2.5	PASS
				-10	-43.46	-0.02312	±2.5	PASS
				0	-41.71	-0.02219	±2.5	PASS

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Limit [ppm]	Verdict
				10	-43.65	-0.02322	±2.5	PASS
				20	-41.65	-0.02215	±2.5	PASS
				30	-47.14	-0.02507	±2.5	PASS
				40	-47.91	-0.02548	±2.5	PASS
				50	-45.33	-0.02411	±2.5	PASS
		HCH	VN	-30	-43.52	-0.02279	±2.5	PASS
				-20	-40.81	-0.02137	±2.5	PASS
				-10	-38.68	-0.02025	±2.5	PASS
				0	-38.10	-0.01995	±2.5	PASS
				10	-34.16	-0.01789	±2.5	PASS
				20	-35.45	-0.01856	±2.5	PASS
				30	-38.68	-0.02025	±2.5	PASS
				40	-40.29	-0.0211	±2.5	PASS
				50	-38.03	-0.01991	±2.5	PASS
	GSM/TM2	LCH	VN	-30	-34.64	-0.01872	±2.5	PASS
				-20	-31.45	-0.017	±2.5	PASS
				-10	-26.99	-0.01459	±2.5	PASS
				0	-28.41	-0.01536	±2.5	PASS
				10	-37.23	-0.02012	±2.5	PASS
				20	-34.97	-0.0189	±2.5	PASS
				30	-36.26	-0.0196	±2.5	PASS
				40	-37.32	-0.02017	±2.5	PASS
				50	-41.81	-0.02260	±2.5	PASS
		MCH	VN	-30	-49.85	-0.02652	±2.5	PASS
				-20	-52.37	-0.02786	±2.5	PASS
				-10	-45.65	-0.02428	±2.5	PASS
				0	-49.56	-0.02636	±2.5	PASS
				10	-52.11	-0.02772	±2.5	PASS
				20	-39.42	-0.02097	±2.5	PASS
				30	-49.33	-0.02624	±2.5	PASS
				40	-50.37	-0.02679	±2.5	PASS
				50	-55.95	-0.02976	±2.5	PASS
		HCH	VN	-30	-47.69	-0.02497	±2.5	PASS
				-20	-47.23	-0.02473	±2.5	PASS
				-10	-54.01	-0.02828	±2.5	PASS
				0	-48.46	-0.02537	±2.5	PASS
				10	-46.14	-0.02416	±2.5	PASS
				20	-48.88	-0.02559	±2.5	PASS
				30	-47.17	-0.02470	±2.5	PASS



Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Limit [ppm]	Verdict
				40	-56.44	-0.02955	±2.5	PASS
				50	-49.95	-0.02615	±2.5	PASS

END