



FCC

RF Test Report

Product Name: cdma2000 Digital Mobile Phone; Evolution III

Model Number: HUAWEI CM990, CM990

Report No: SYBH(Z-RF)015072013-2001

FCC ID: QISCM990

Reliability Laboratory of Huawei Technologies Co., Ltd.

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Notice

1. The laboratory has Passed the accreditation by China National Accreditation Service for Conformity Assessment (CNAS). The accreditation number is L0310.
2. The laboratory has Passed the accreditation by The American Association for Laboratory Accreditation (A2LA). The accreditation number is 2174.01.
3. The laboratory has been listed by the US Federal Communications Commission to perform electromagnetic emission measurements. The site recognition number is 97456.
4. The laboratory has been listed by Industry Canada to perform electromagnetic emission measurements. The recognition numbers of test site are 6369A-2.
5. The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.
6. The test report is invalid if there is any evidence of erasure and/or falsification.
7. The test report is only valid for the test samples.
8. Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.



Applicant: Huawei Technologies Co., Ltd.
Address: Administration Building, Headquarters of Huawei Technologies Co., Ltd.,
 Bantian, Longgang District, Shenzhen, 518129, P.R.C

Date of Receipt Sample: 2013-07-18
Start Date of Test: 2013-07-18
End Date of Test: 2013-07-24

Test Result: Pass

Approved by Senior Engineer:	2013-07-25	Dai Linjun	
	Date	Name	Signature

Prepared by:	2013-07-25	Zhu Mingjing	
	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

Test Method: FCC KDB 971168 D01 Power Meas License Digital Systems v02r01

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)
Effective (Isotropic) Radiated Power Output Data	§2.1046, §22.913	FCC: $ERP \leq 7 W$.	Appendix A	Pass
Modulation Characteristics	§2.1047	Digital modulation	Appendix B	Pass
Bandwidth	§2.1049	OBW: No limit. EBW: No limit.	Appendix C	Pass
Band Edges Compliance	§2.1051, §22.917	$\leq -13 \text{ dBm}/1\% \cdot \text{EBW}$, in 1 MHz bands immediately outside and adjacent to the frequency block.	Appendix D	Pass
Spurious Emission at Antenna Terminals	§2.1051, §22.917	FCC: $\leq -13 \text{ dBm}/100 \text{ kHz}$, from 9 kHz to 10 th harmonics but outside authorized operating frequency ranges.	Appendix E	Pass
Field Strength of Spurious Radiation	§2.1053, §22.917	FCC: $\leq -13 \text{ dBm}/100 \text{ kHz}$.	Appendix F	Pass
Frequency Stability	§2.1055, §22.355	$\leq \pm 2.5 \text{ ppm}$.	Appendix G	Pass
<p>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.</p> <p>NOTE 2: For the verdict, the "N/A" denotes "not applicable", the "N/T" denotes "not tested".</p>				



3 Description of the Equipment under Test (EUT)

3.1 General Description

cdma2000 Digital Mobile Phone- HUAWEI CM990, CM990 is subscriber equipment in the CDMA/EVDO system. The frequency band is BC0, US cellular test data included in this report. The Mobile Phone implements such functions as RF signal receiving/transmitting, CDMA2000 1x and 1XEV-DO protocol processing, voice, MMS service, GPS, AGPS and WIFI etc. Externally it provides micro SD card interface, earphone port (to provide voice service). It also provides Bluetooth module to synchronize data between a PC and the phone, or to use the built-in modem of the phone to access the Internet with a PC, or to exchange data with other Bluetooth devices.

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		
Software Version	Hardware Version	Description
V100R001C32B170	HC1CM990M	Main board of Mobile Phone



3.3 Technical Specification

Characteristics	Description	
Radio System Type	<input checked="" type="checkbox"/> CDMA	
Supported Frequency Range	BC 0	Transmission (TX): 824 to 849 MHz
		Receiving (RX): 869 to 894 MHz
TX and RX Antenna Ports	TX & RX port:	1
	TX-only port:	0
	RX-only port:	0
Target TX Output Power	CDMA BC0: 24dBm	
Supported Channel Bandwidth	CDMA system:	<input checked="" type="checkbox"/> 1.25 MHz
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.)	CDMA BC0:	1M30F9W



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
CDMA/TM1	CDMA system, CDMA2000 1x mode QPSK modulation
CDMA/TM3	CDMA system, CDMA2000 1x mode HPSK modulation
CDMA/EV-DO/Su btype 0	CDMA system, CDMA2000 1x EV-DO mode HPSK modulation
CDMA/EV-DO/Su btype 2	CDMA2000 1x EV-DO mode The R-Data packet size determines the modulation format, R-Data Packet Size:128, 256, 512, 768 or 1024 BPSK Modulation R-Data Packet Size:1536 , 2048,3072,4096,6144 or 8192 QPSK Modulation R-Data Packet Size:12288 8-PSK Modulation

4.2 Test Environment

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

NOTE: 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)
CDMA BC0	TX	Channel 1013	Channel 384	Channel 777
		824.7MHz	836.52MHz	848.31MHz
	RX	Channel 1013	Channel 384	Channel 777
		869.7MHz	881.52MHz	893.31MHz

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 $43 + 10\log_{10}(\text{Power}_{\text{[Watts]}})$.

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 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:

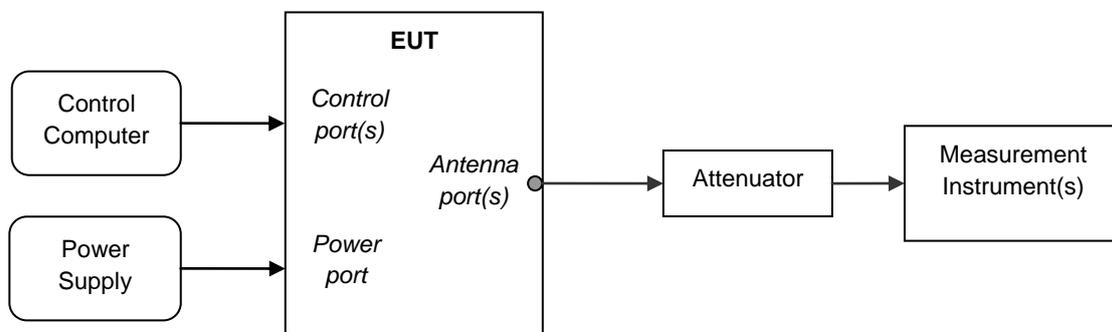
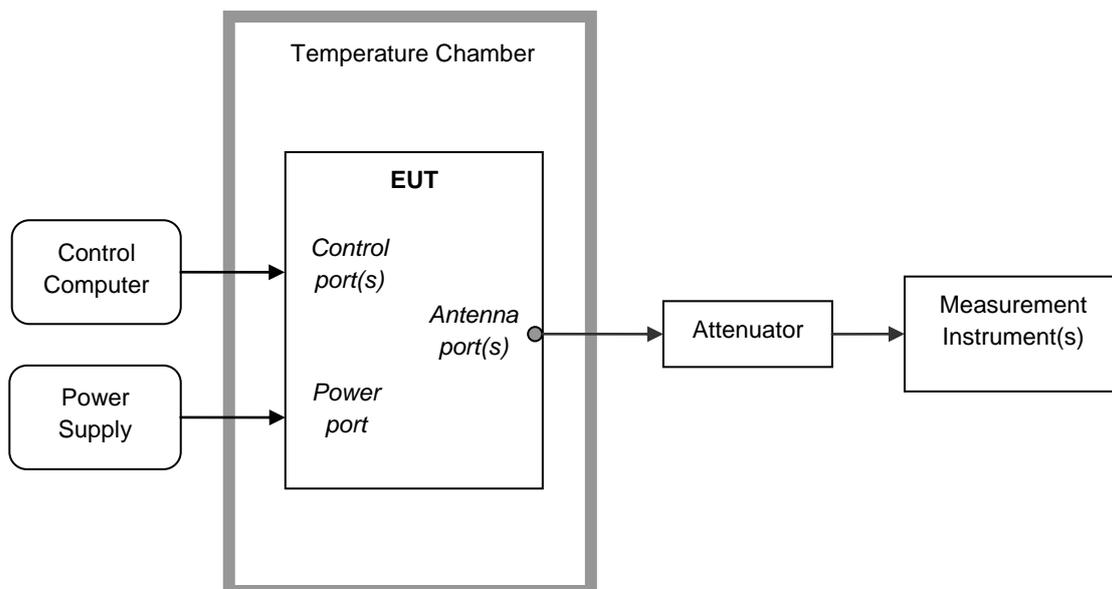
- a.) **Temperature:** The temperature is varied from -30°C to +50°C in 10°C increments using an environmental chamber.
- b.) **Primary Supply Voltage:** The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried,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

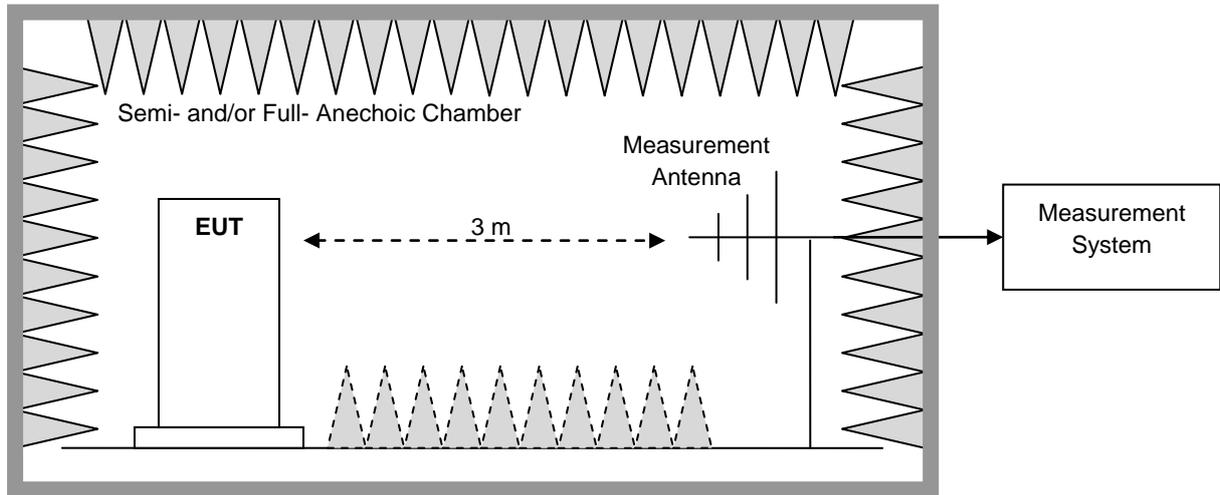
Note: Reference test setup 2.

4.5 Test Setups**4.5.1 Test Setup 1****4.5.2 Test Setup 2**

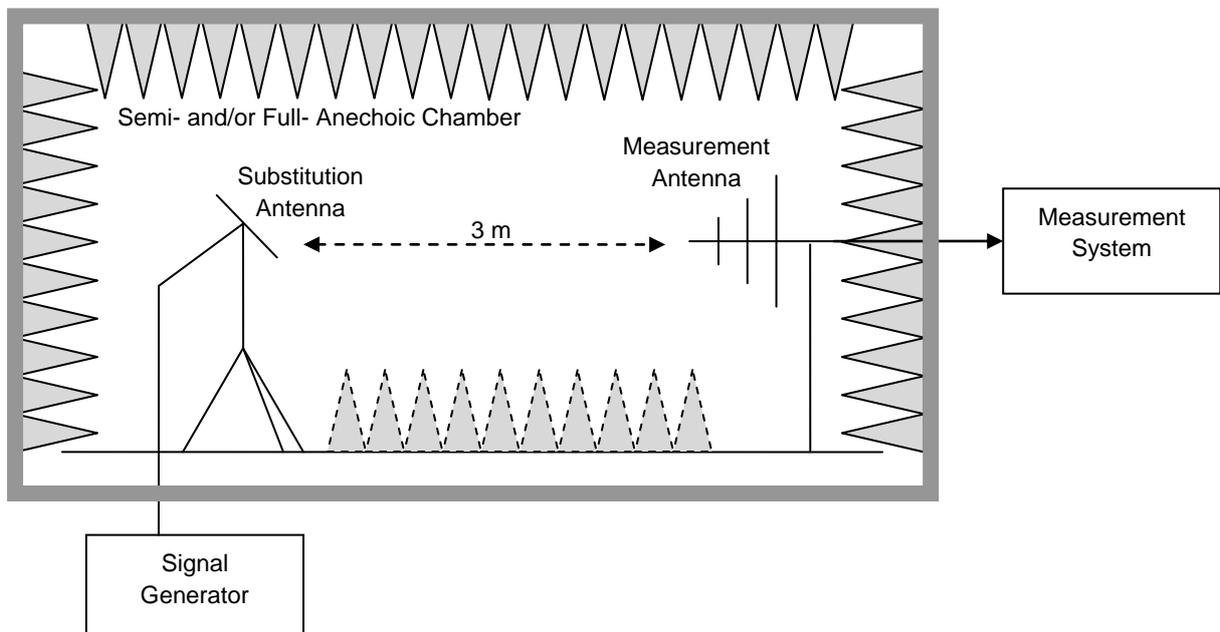
4.5.3 Test Setup 3

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	
Transmit Output Power Data	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	CDMA/1X,CDMA/EV-DO
	Average Power, Spectral Density (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	CDMA/1X,CDMA/EV-DO
Modulation Characteristics		Test Env.	Ambient Climate & Rated Voltage
		Test Setup	Test Seup 1
		RF Channels (TX)	M (L= low channel, M= middle channel, H= high channel)
		Test Mode	CDMA/1X,CDMA/EV-DO
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	CDMA/1X,CDMA/EV-DO
	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	CDMA/1X,CDMA/EV-DO
Band Edges Compliance		Test Env.	Ambient Climate & Rated Voltage
		Test Setup	Test Seup 1
		RF Channels (TX)	L, H (L= low channel, M= middle channel, H= high channel)
		Test Mode	CDMA/1X,CDMA/EV-DO
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	CDMA/1X,CDMA/EV-DO
Field Strength of Spurious Radiation		Test Env.	Ambient Climate & Rated Voltage
		Test Setup	Test Seup 3
		Test Mode	CDMA/1X,CDMA/EV-DO NOTE: If applicable, the EUT conf. that has maximum power



Test Case	Test Conditions	
		density (based on the equivalent power level) is selected.
	RF Channels (TX)	L, M, H (L= low channel, M= middle channel, H= high channel)
Frequency Stability	Test Env.	(1) -30 °C to +50 °C with step 10 °C at Rated Voltage; (2) VL, VN and VH 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	CDMA/1X,CDMA/EV-DO

**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
Spectrum Analyzer	Agilent	N9030A	MY49431698	2012-11-09	2013-11-08
Universal Radio Communication Tester	Agilent	E5515C	MY50260239	2012-11-09	2013-11-08
Temperature Chamber	WEISS	WKL64	5624600294001 0	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
Trilog Broadband Antenna (30M~3GHz)	SCHWARZBE CK	VULB 9163	9163-521	2011-12-09	2013-12-08
Pyramidal Horn Antenna(18GHz-26.5G Hz)	ETS-Lindgren	3160-09	00091989	2011-10-20	2013-10-19
LOOP Antennas(9kHz-30MH z)	R&S	HFH2-Z2	100262	2013-03-23	2015-03-22
150M-1G Biconical VHF-UHF Broadband Antenna	SCHWARZBE CK	VUBA 9117	9117-213	2013-02-02	2015-02-01
Double-Ridged Waveguide Horn Antenna (1G~18GHz)	R&S	HF907	100391	2011-10-12	2013-10-11



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
Transmit Output Power Data	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



1 Appendix_A: Effective (Isotropic) Radiated Power Output Data

Part I - Test Results

Test Band	Test Mode	Test Channel	Measured[dBm]	Limit [dBm]	Verdict
BC0	CDMA/1X/TM1	LCH	24.20	38.5	PASS
		MCH	24.14	38.5	PASS
		HCH	23.69	38.5	PASS
	CDMA/1X/TM3	LCH	24.13	38.5	PASS
		MCH	24.58	38.5	PASS
		HCH	23.74	38.5	PASS
BC0	CDMA/EV-DO/Su btype0	LCH	24.05	38.5	PASS
		MCH	23.89	38.5	PASS
		HCH	23.51	38.5	PASS
	CDMA/EV-DO/Su btype2	LCH	23.74	38.5	PASS
		MCH	23.88	38.5	PASS
		HCH	23.44	38.5	PASS

Note1:

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

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

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

b, SGP=Signal Generator Level

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

Detector: RMS

2Appendix_B: Modulation Characteristics

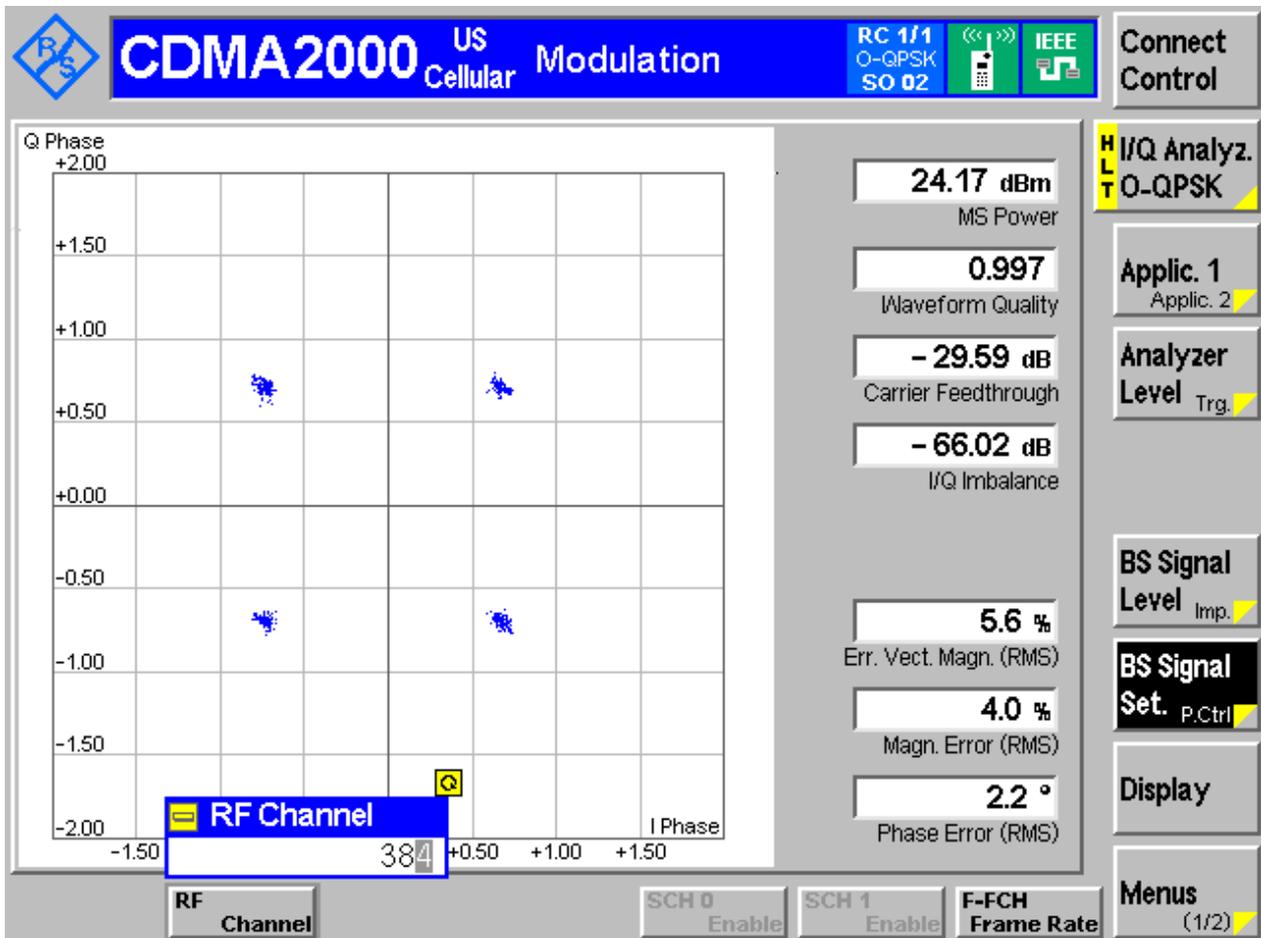
Part I - Test Plots

2.1 For CDMA/1X

2.1.1 Test Band = BC0

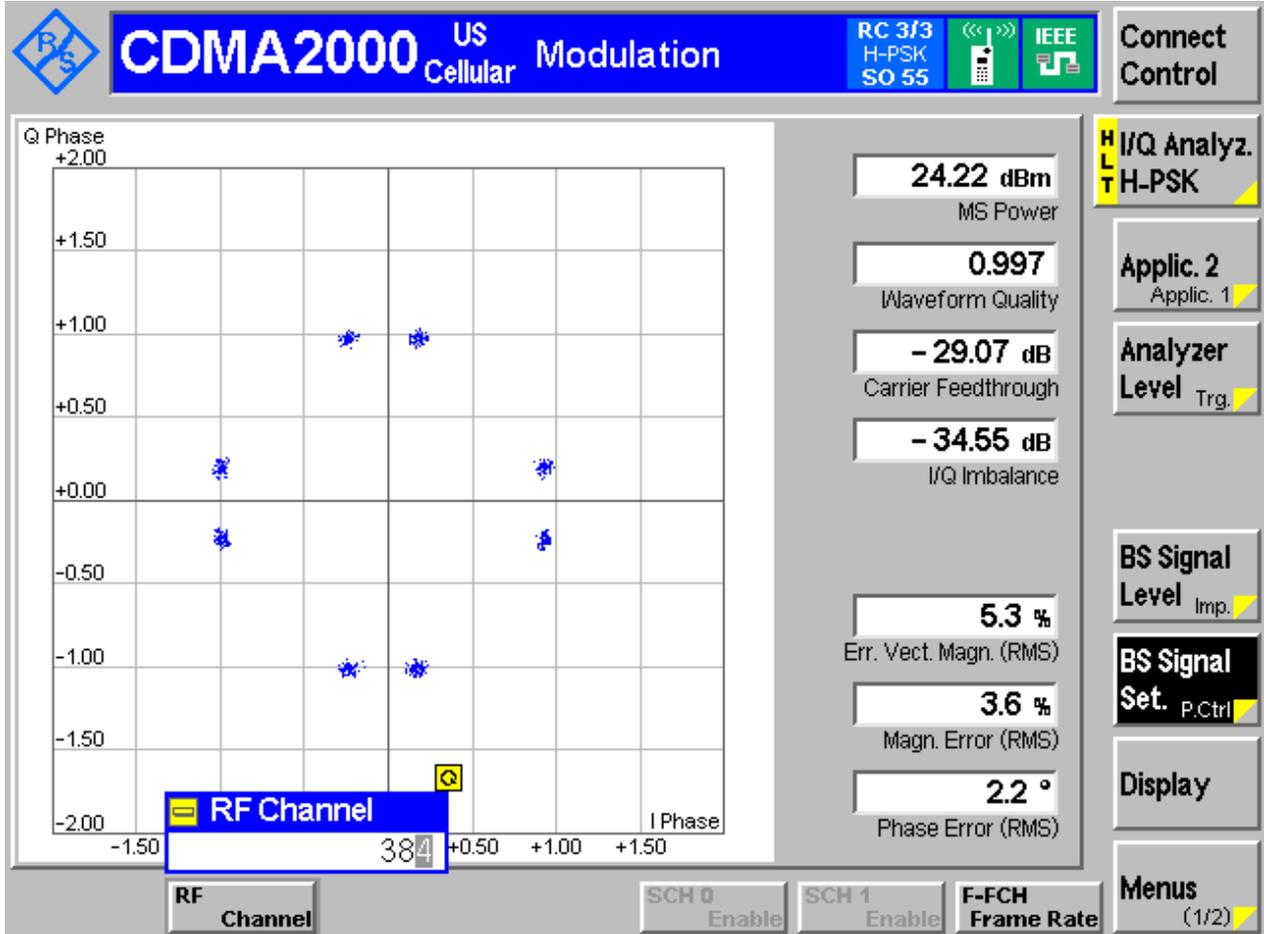
2.1.1.1 Test Mode = CDMA/1X/TM1

2.1.1.1.1 Test Channel = MCH



2.1.1.2 Test Mode = CDMA/1X/TM3

2.1.1.2.1 Test Channel = MCH

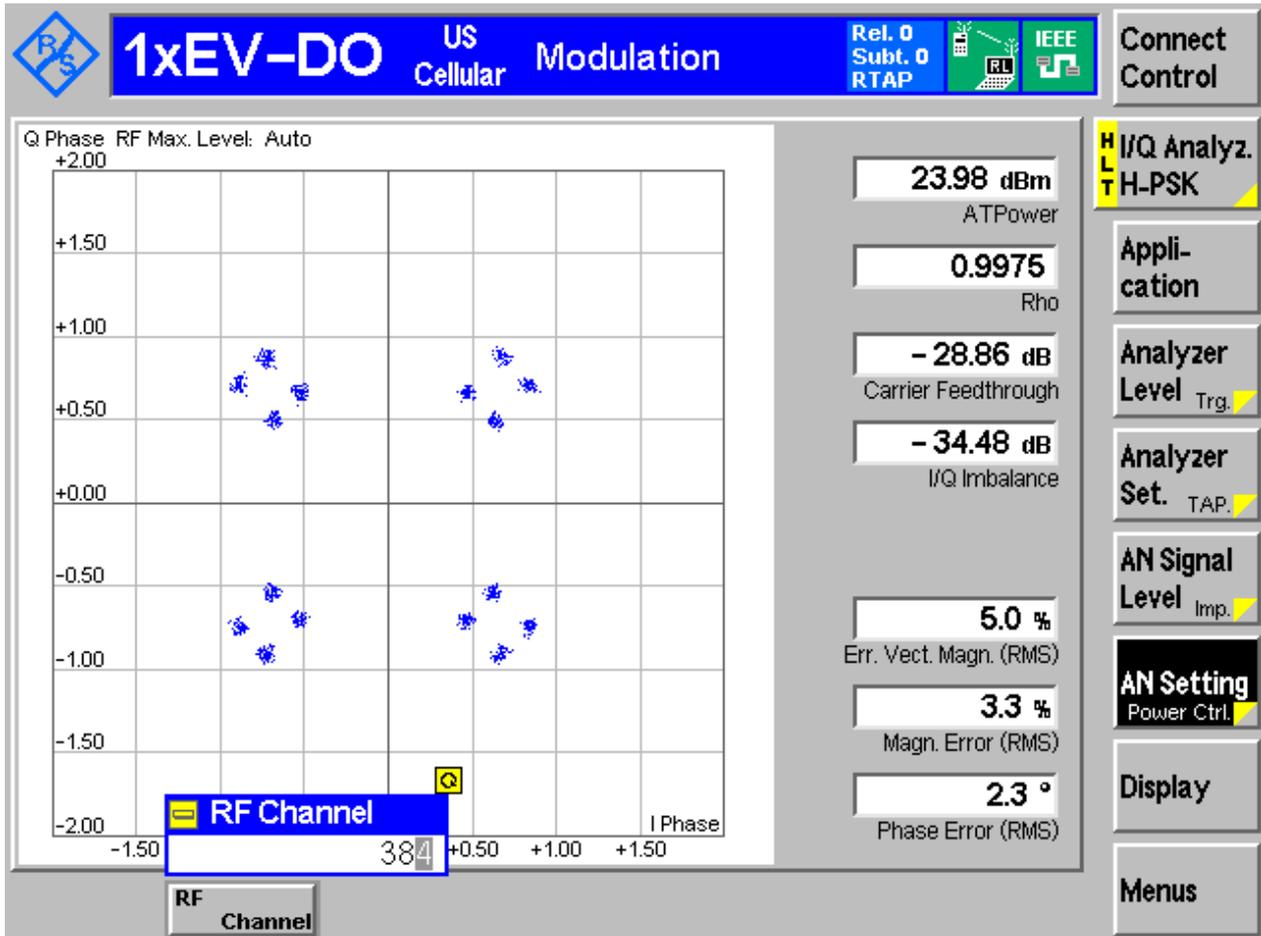


2.2 For CDMA/EVDO

2.2.1 Test Band = BC0

2.2.1.1 Test Mode = CDMA/EV-DO/Subtype0

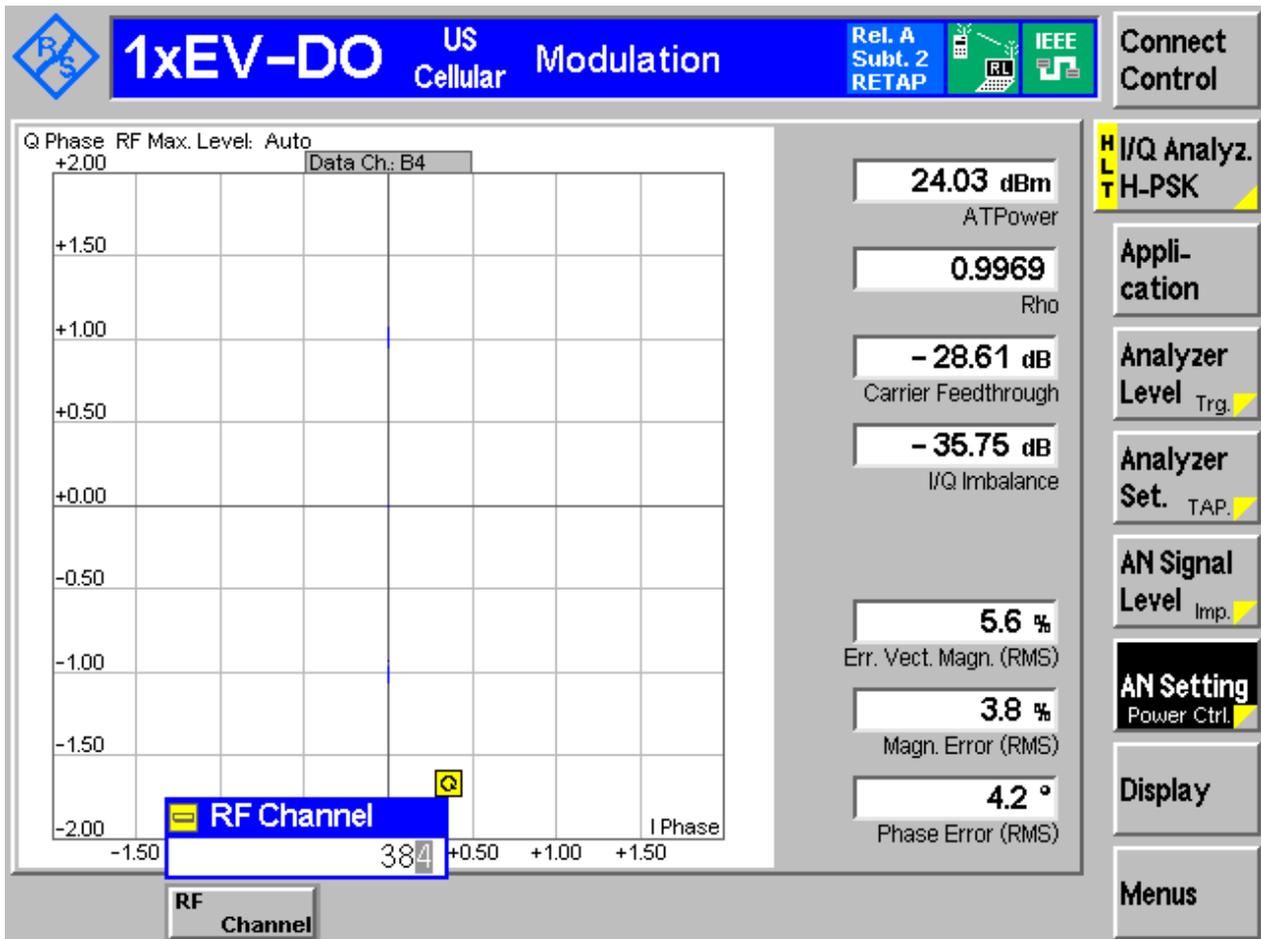
2.2.1.1.1 Test Channel = MCH



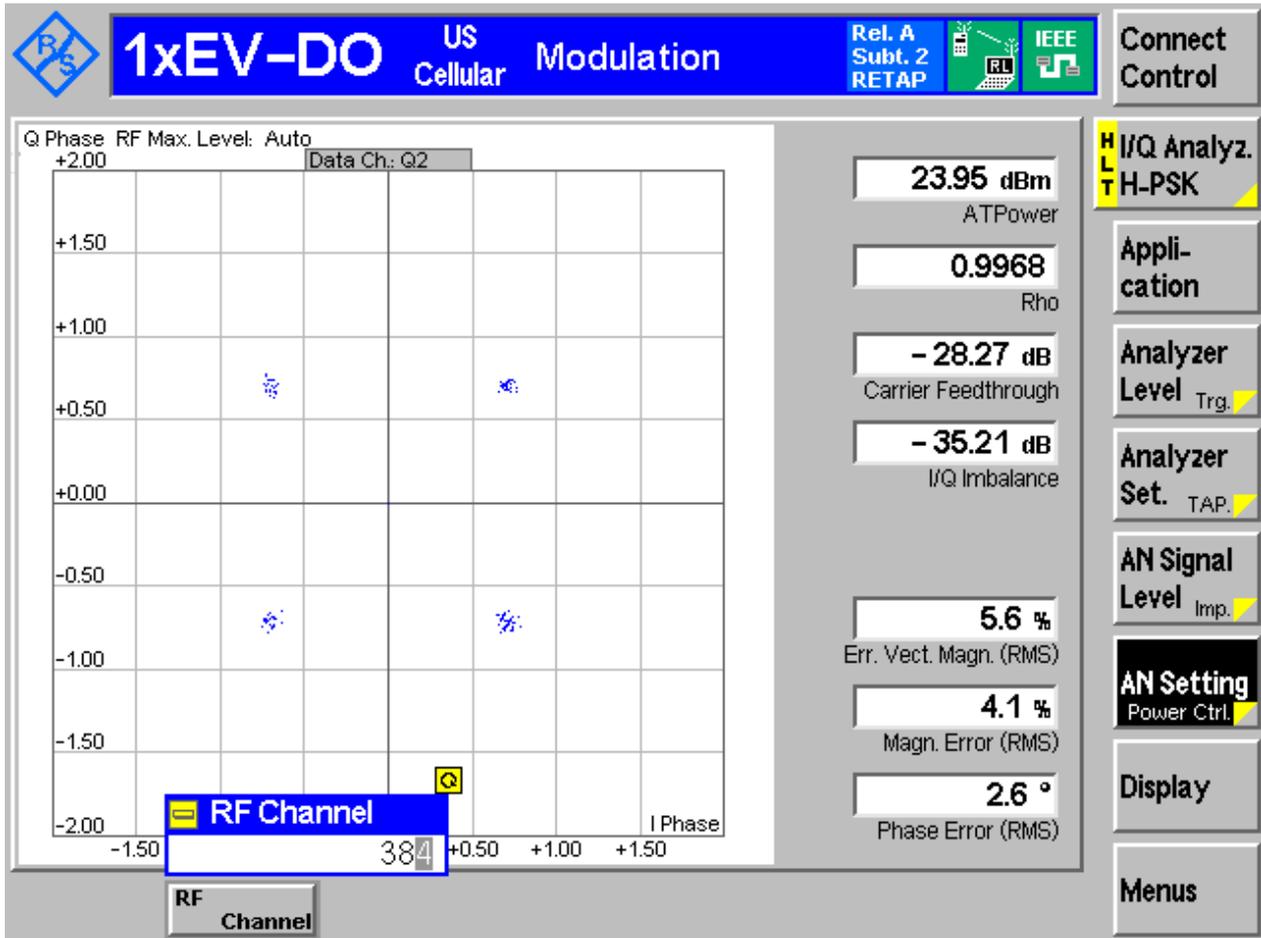
2.3.1.1 Test Mode = CDMA/EV-DO/Subtype2

2.3.1.1.1 Test Channel = MCH

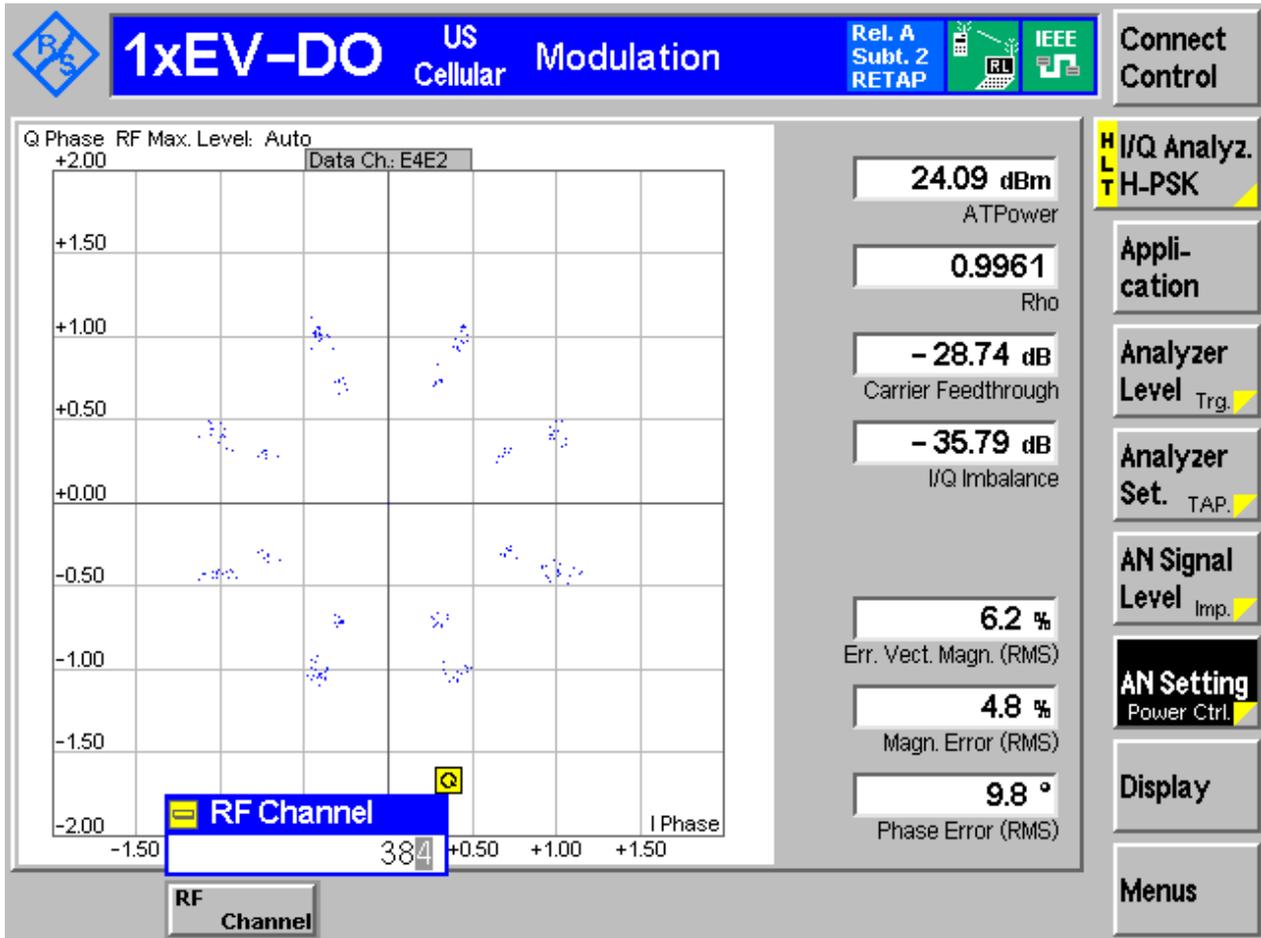
R-Data Pkt Size (256 bits) (BPSK)



R-Data Pkt Size (4096 bits) (QPSK)



R-Data Pkt Size (12288 bits) (8PSK)





3Appendix_C: Bandwidth

Part I - Test Results

Test Band	Test Mode	Test Channel	Occupied Bandwidth [MHz]	Emission Bandwidth [MHz]	Verdict
BC0	CDMA/1X/TM1	LCH	1.30	1.46	Pass
		MCH	1.30	1.47	Pass
		HCH	1.30	1.46	Pass
	CDMA/1X/TM3	LCH	1.29	1.46	Pass
		MCH	1.29	1.46	Pass
		HCH	1.29	1.46	Pass

Test Band	Test Mode	Test Modulation(R-Data)	Test Channel	Occupied Bandwidth [MHz]	Emission Bandwidth [MHz]	Verdict
BC0	CDMA/EV-DO/Subtype0	HPSK	LCH	1.29	1.46	Pass
			MCH	1.29	1.46	Pass
			HCH	1.29	1.46	Pass
	CDMA/EV-DO/Subtype2	BPSK(256 bits)	LCH	1.29	1.46	Pass
			MCH	1.29	1.45	Pass
			HCH	1.29	1.46	Pass
		QPSK(4096 bits)	LCH	1.29	1.46	Pass
			MCH	1.29	1.46	Pass
			HCH	1.29	1.46	Pass
		8-PSK(12288 bits)	LCH	1.29	1.46	Pass
			MCH	1.29	1.46	Pass
			HCH	1.29	1.46	Pass

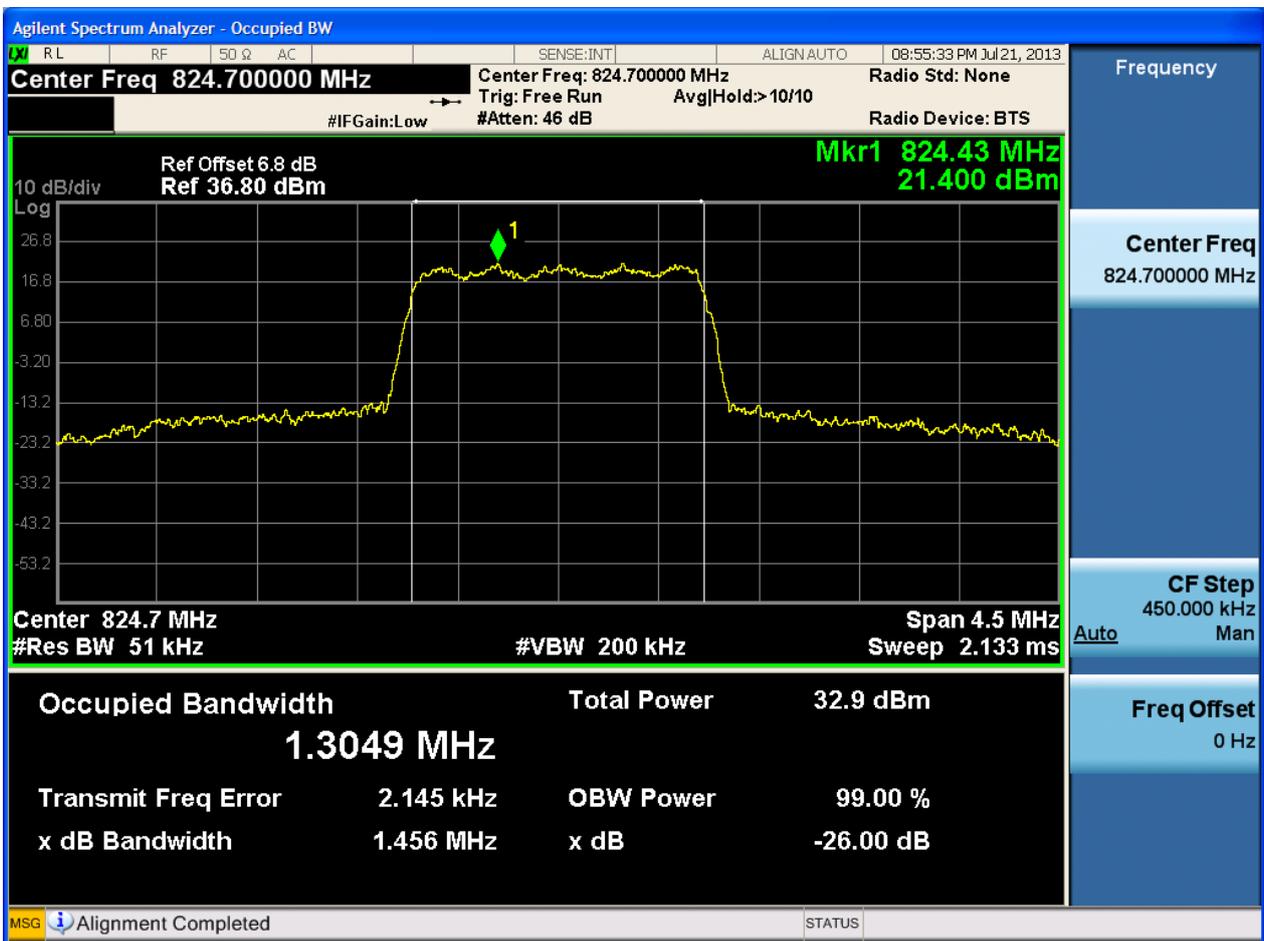
Part II - Test Plots

3.1 For CDMA/1X

3.1.1 Test Band = BC0

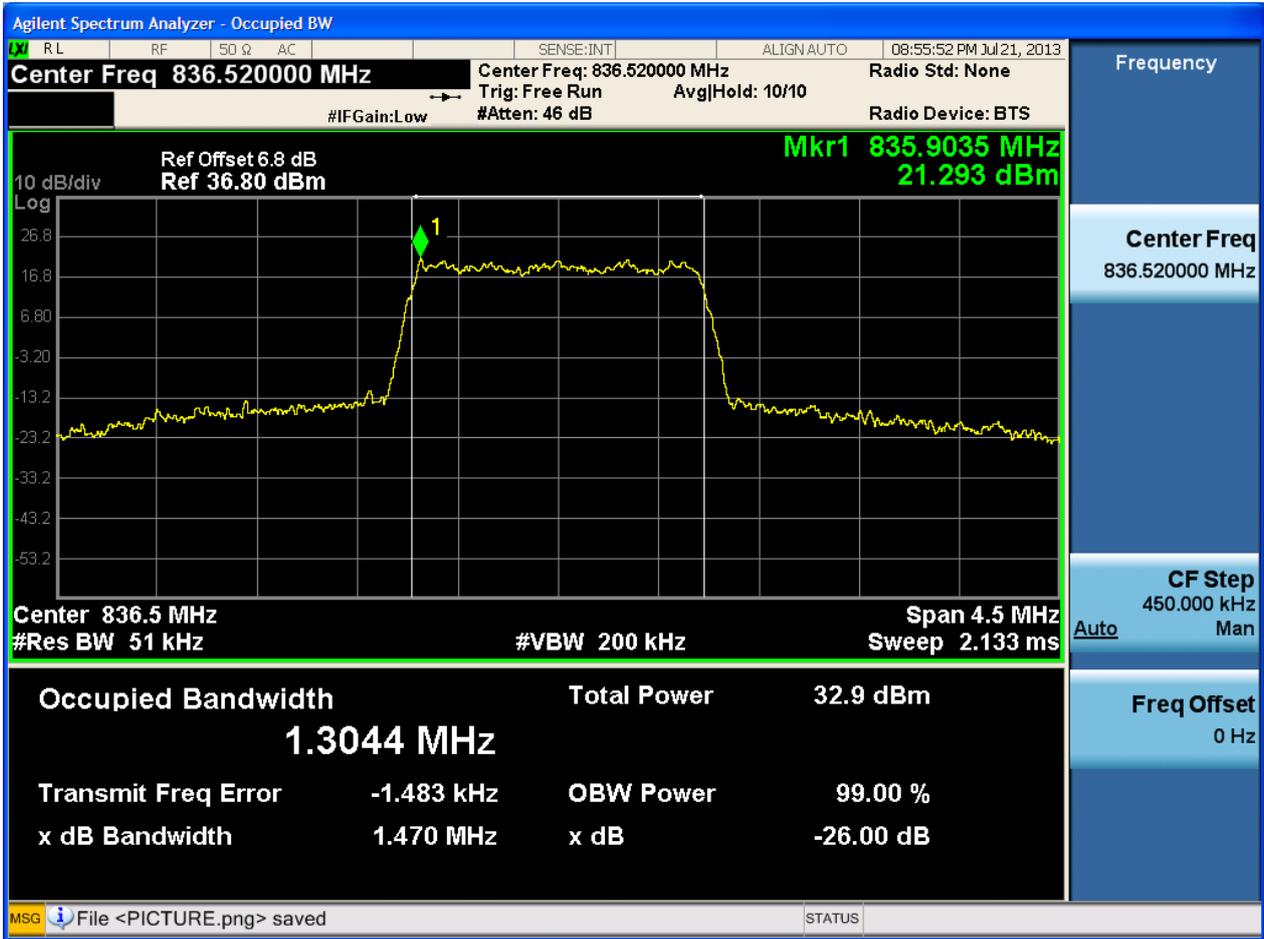
3.1.1.1 Test Mode = CDMA/1X/TM1

3.1.1.1.1 Test Channel = LCH



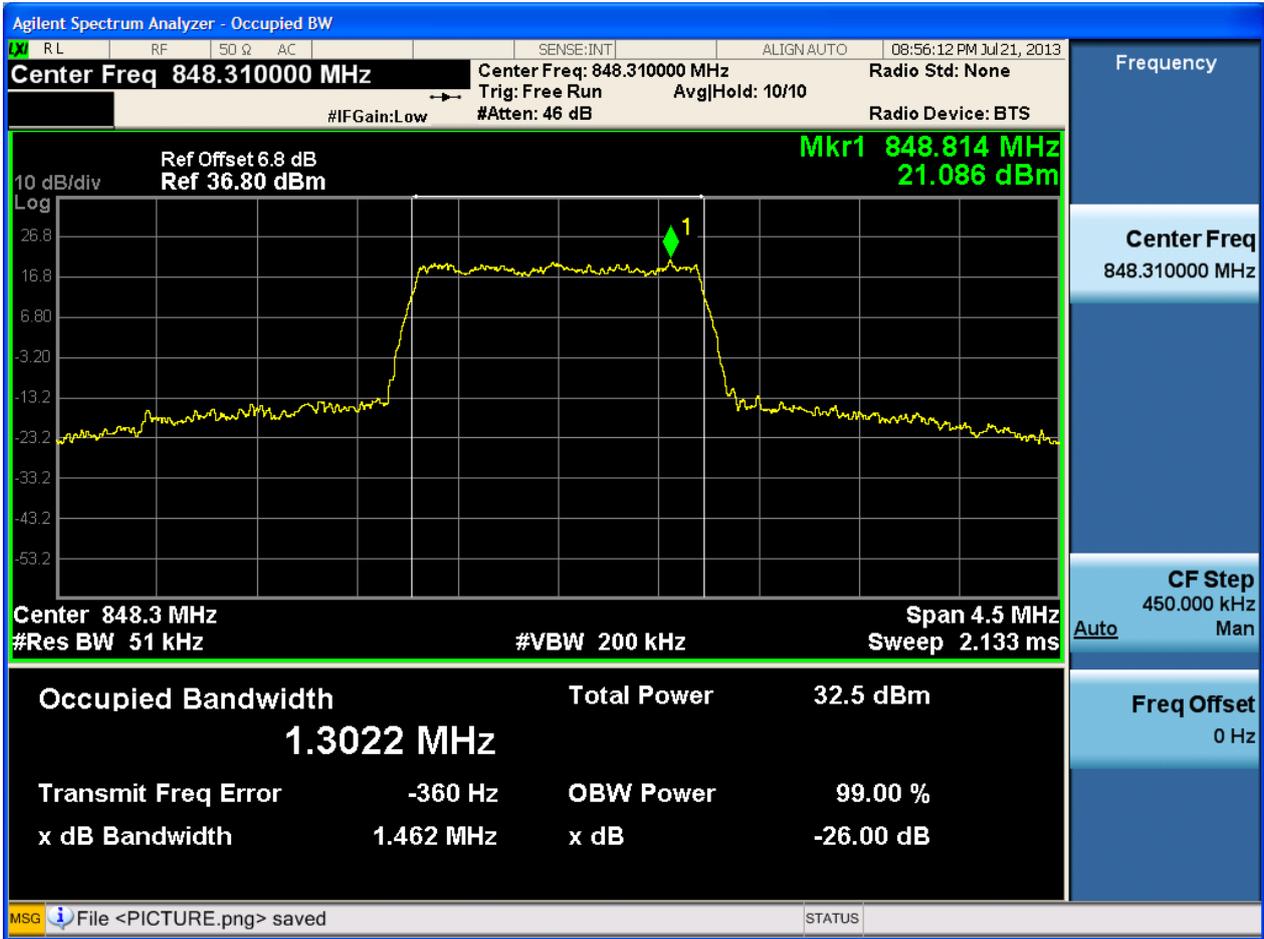


3.1.1.1.2 Test Channel = MCH





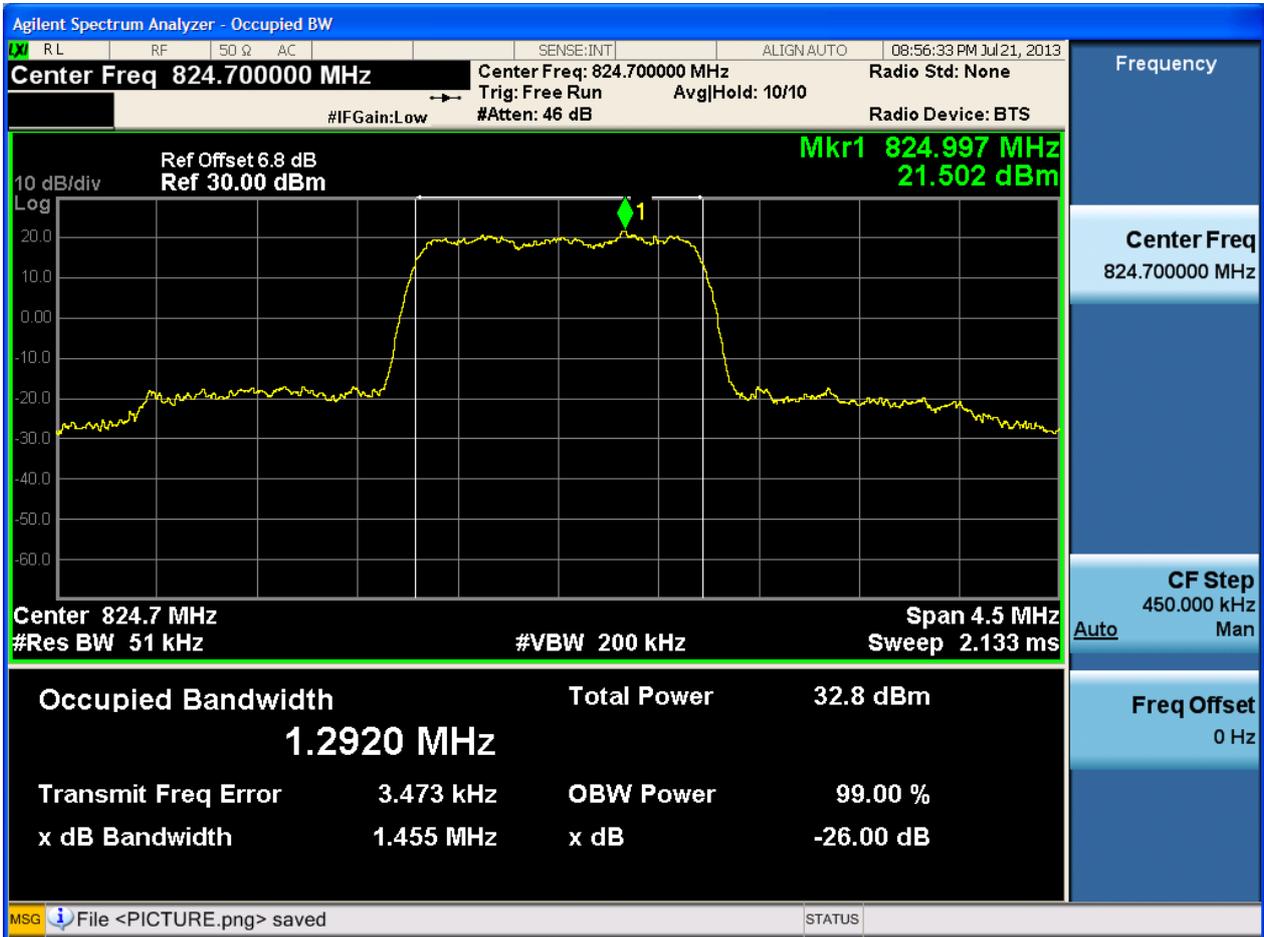
3.1.1.1.3 Test Channel = HCH





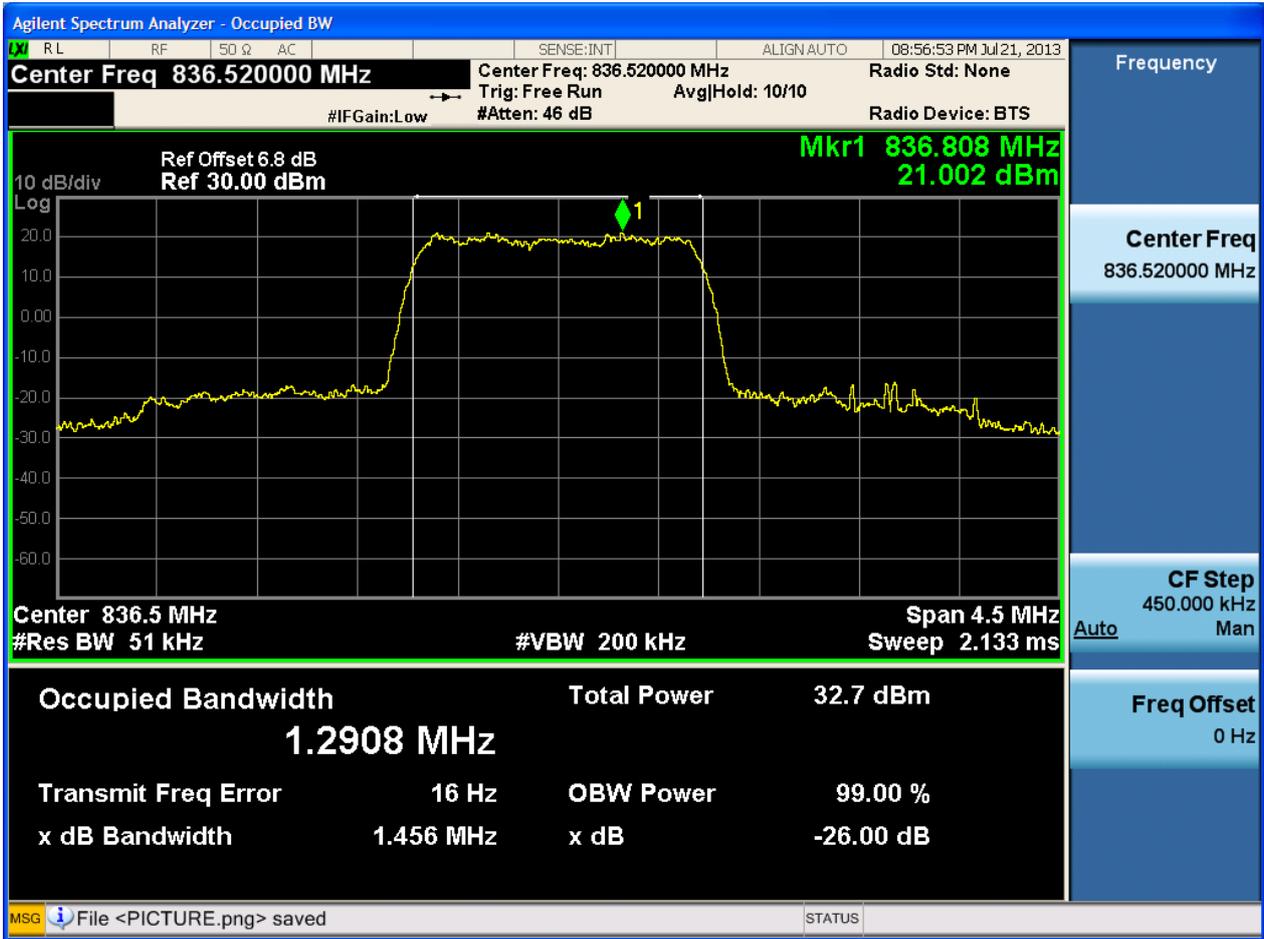
3.1.1.2 Test Mode = CDMA/1X/TM3

3.1.1.2.1 Test Channel = LCH



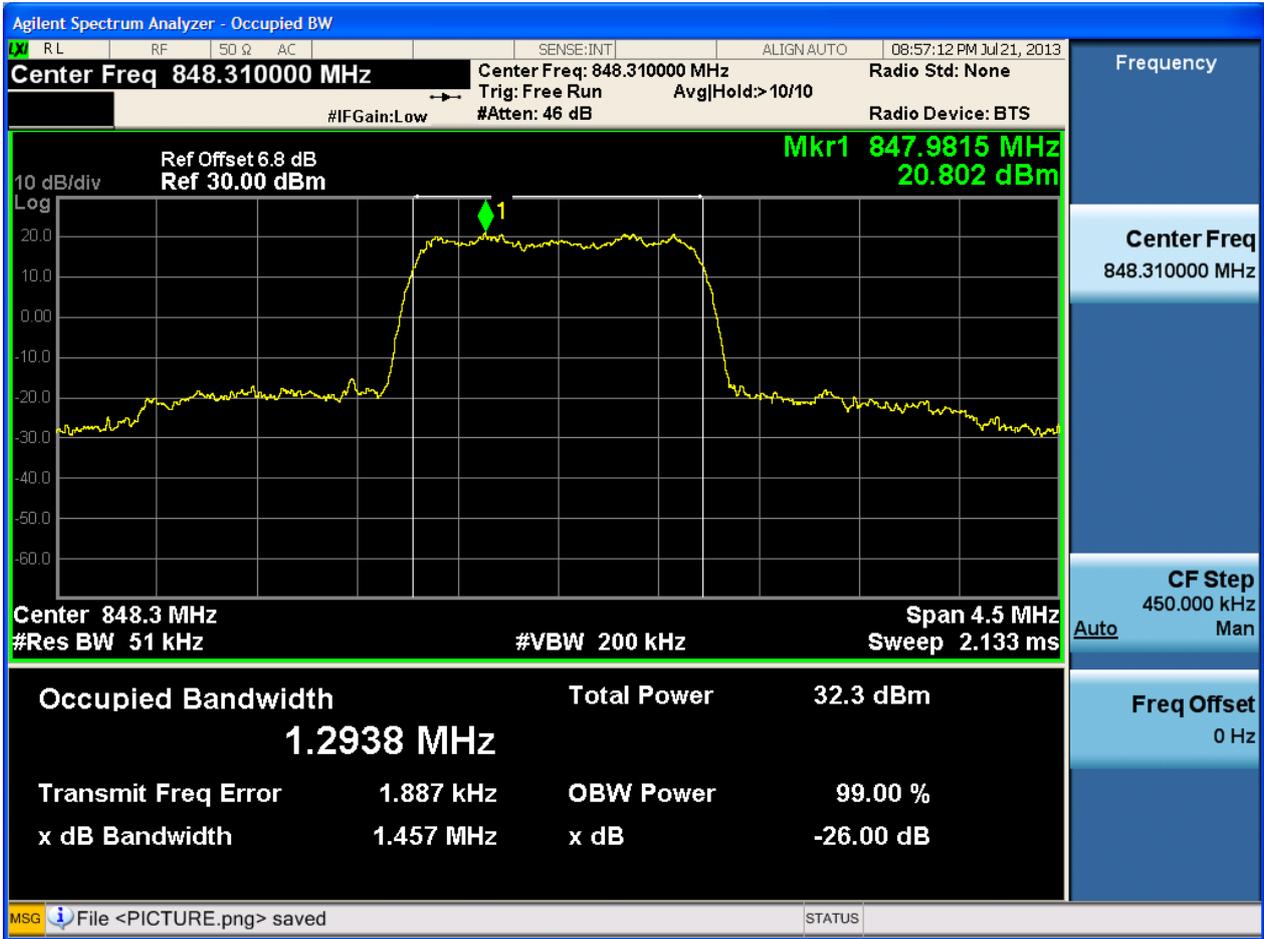


3.1.1.2.2 Test Channel = MCH





3.1.1.2.3 Test Channel = HCH





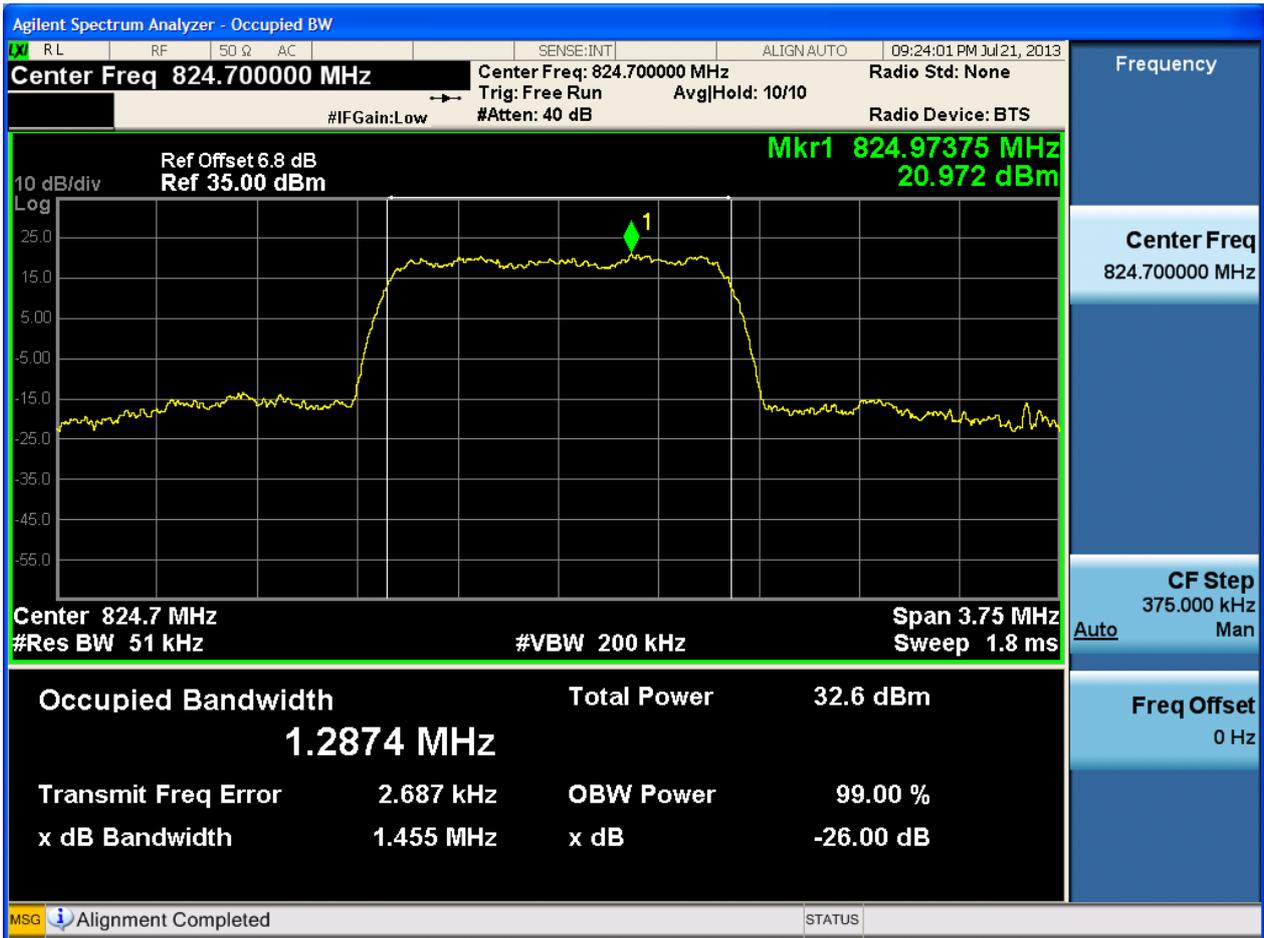
3.2 For CDMA/EV-DO

3.2.1 Test Band = BC0

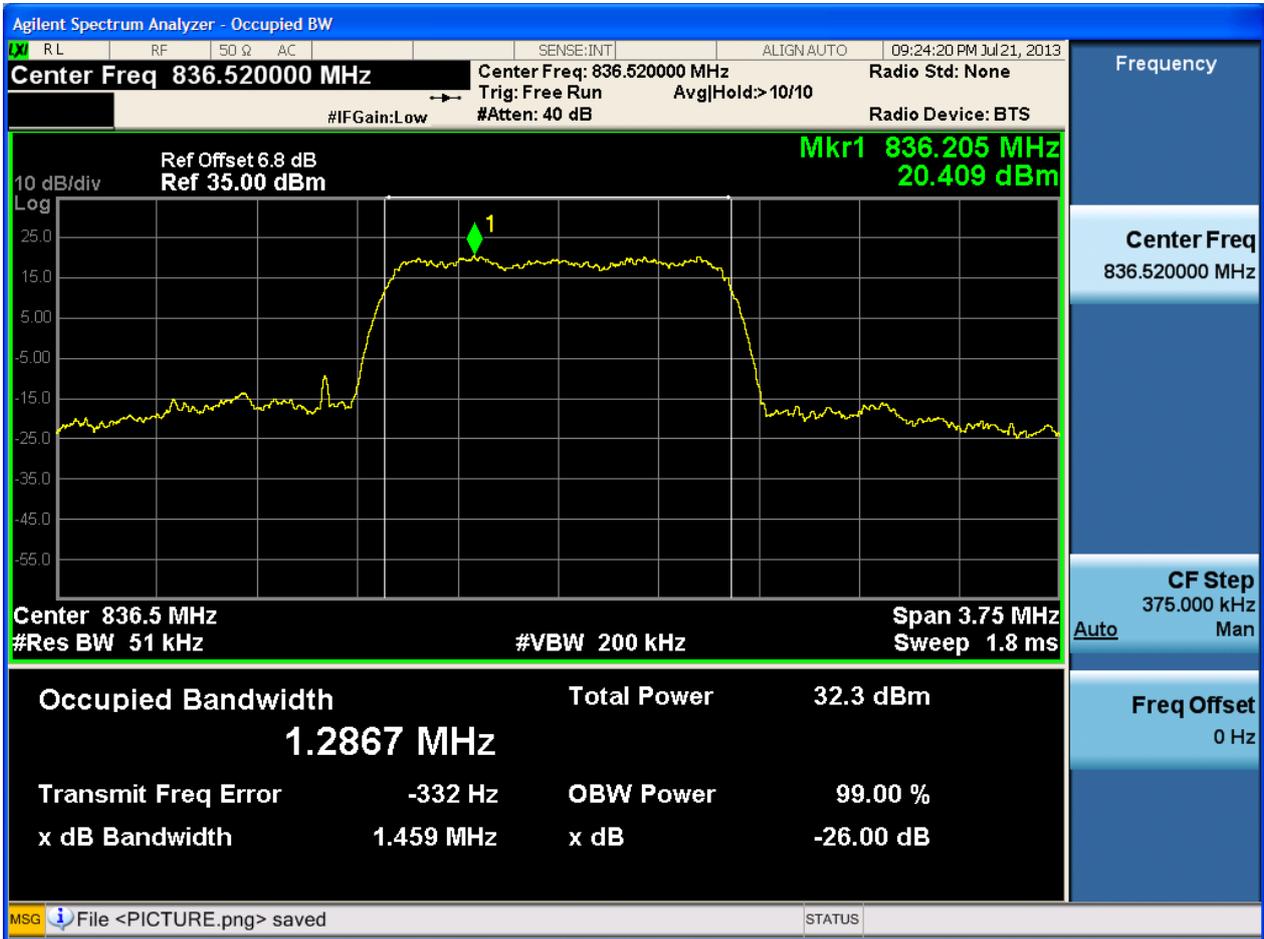
3.2.1.1 Test Mode = CDMA/EV-DO/Subtype0

3.2.1.1.1 Test Modulation = HPSK

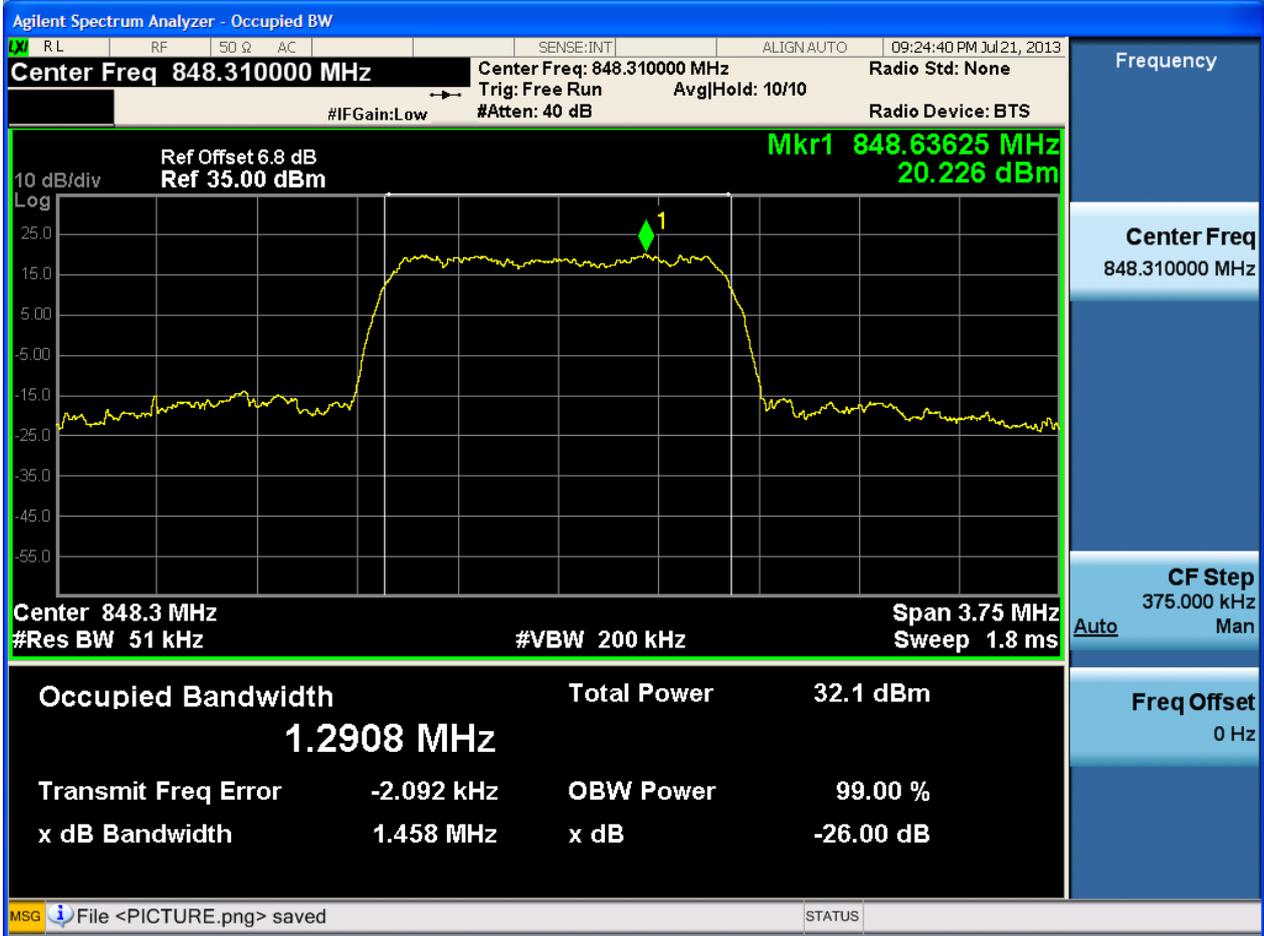
3.2.1.1.1.1 Test Channel = LCH



3.2.1.1.1.2 Test Channel = MCH



3.2.1.1.1.3 Test Channel = HCH



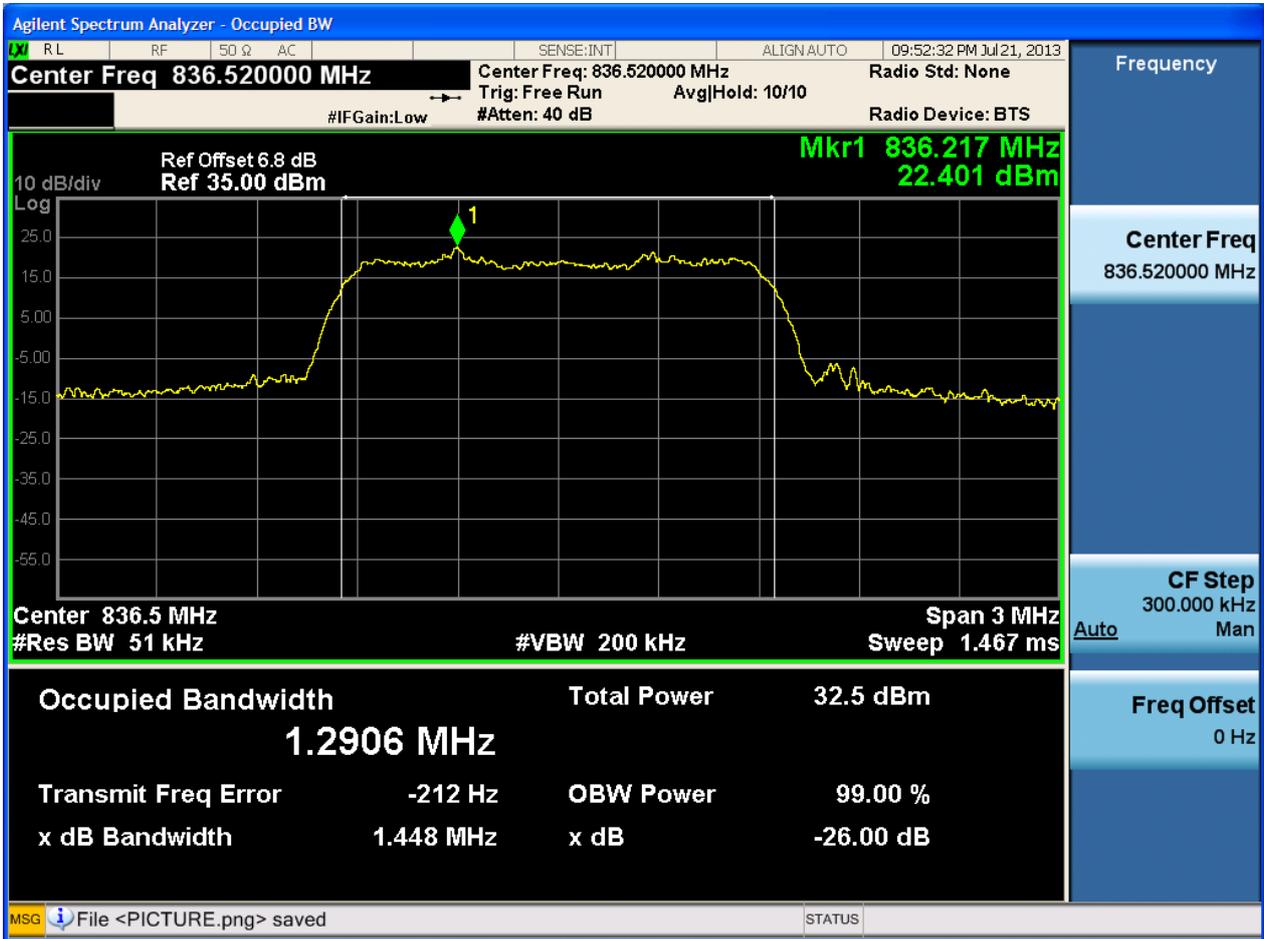
3.2.1.2 Test Mode = CDMA/EV-DO/Subtype2

3.2.1.2.1 Test Modulation = BPSK (256 bits)

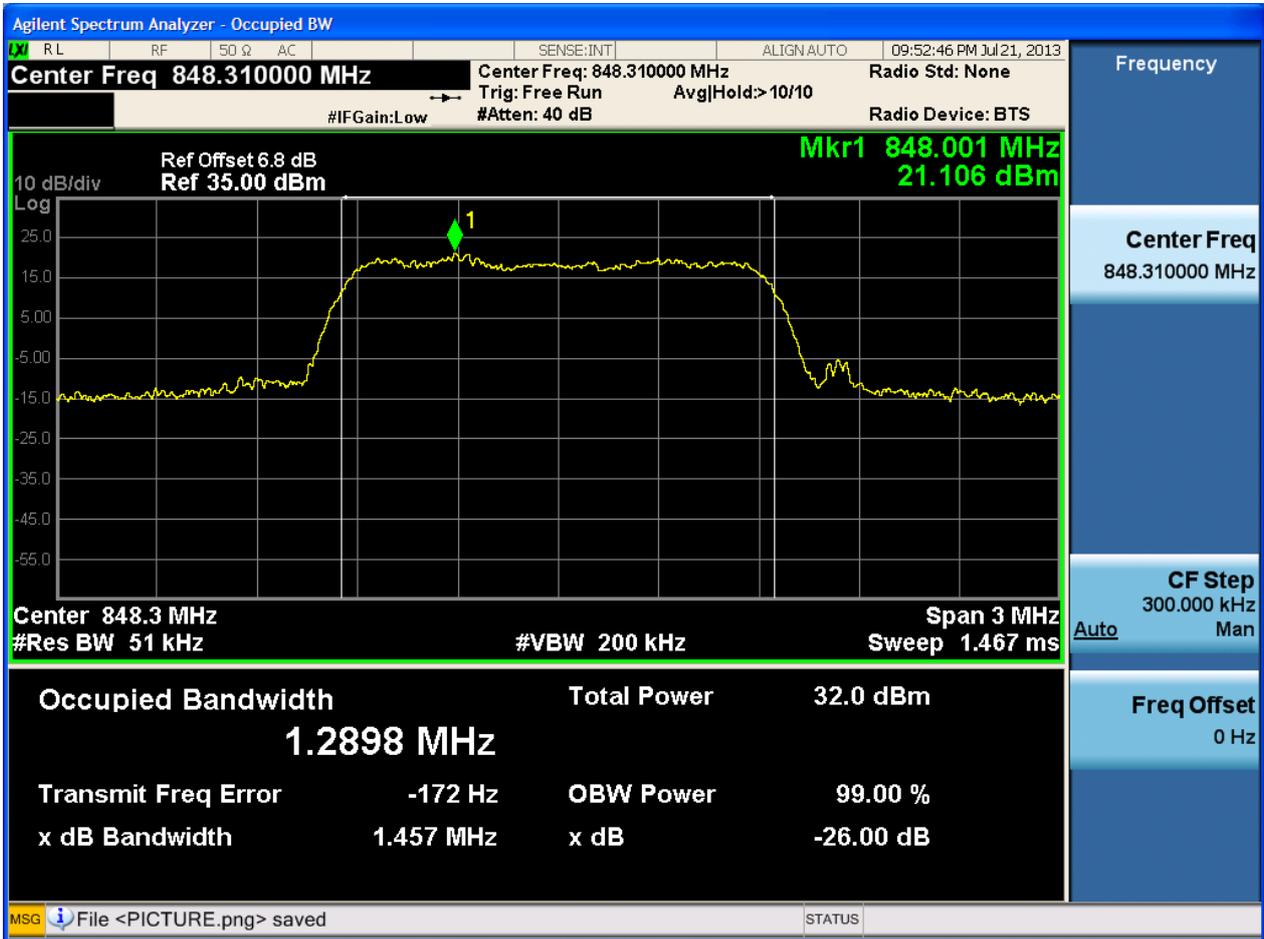
3.2.1.2.1.1 Test Channel = LCH



3.2.1.2.1.2 Test Channel = MCH



3.2.1.2.1.3 Test Channel = HCH

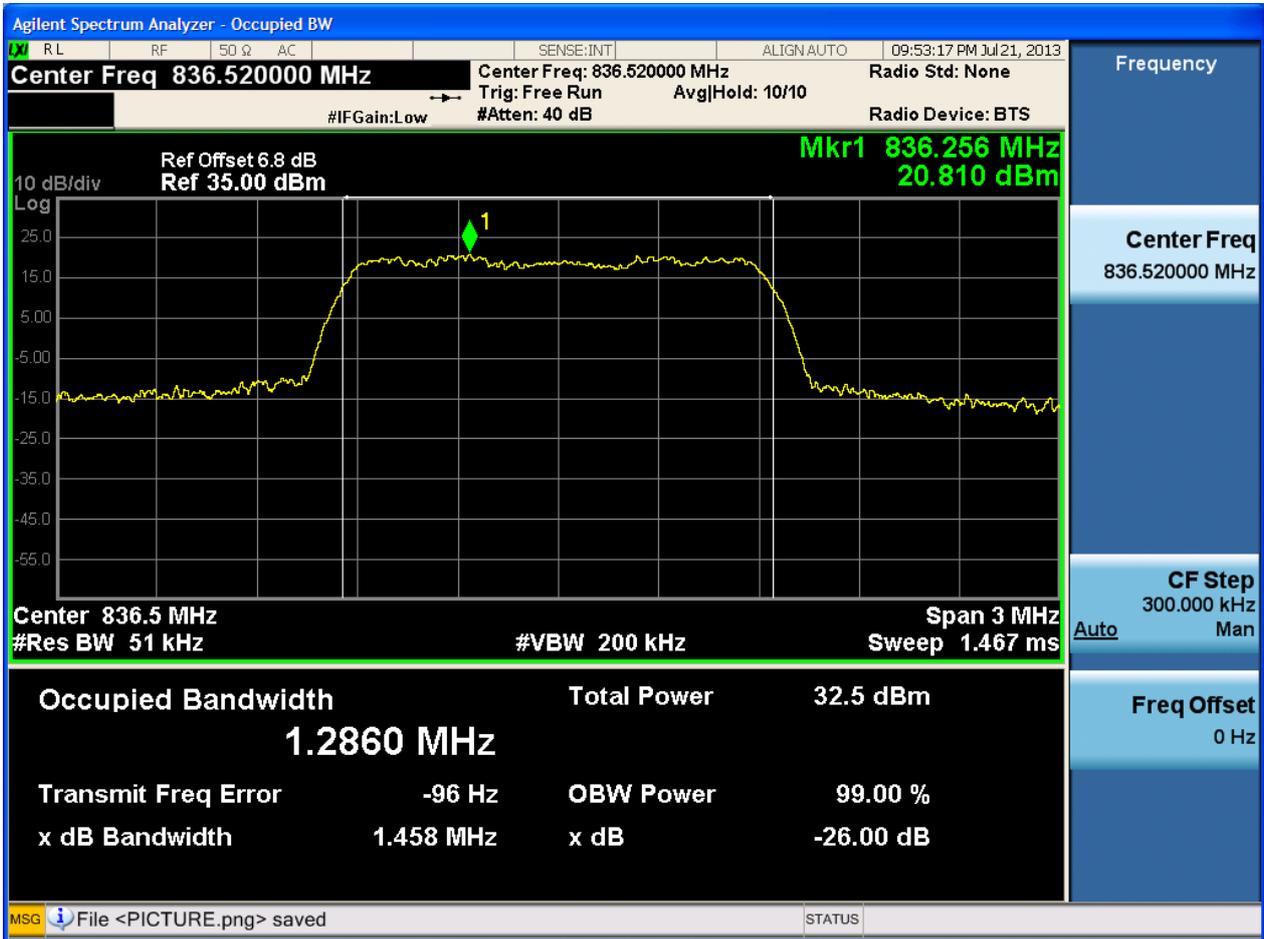


3.2.1.2.2 Test Modulation = QPSK (4096 bits)

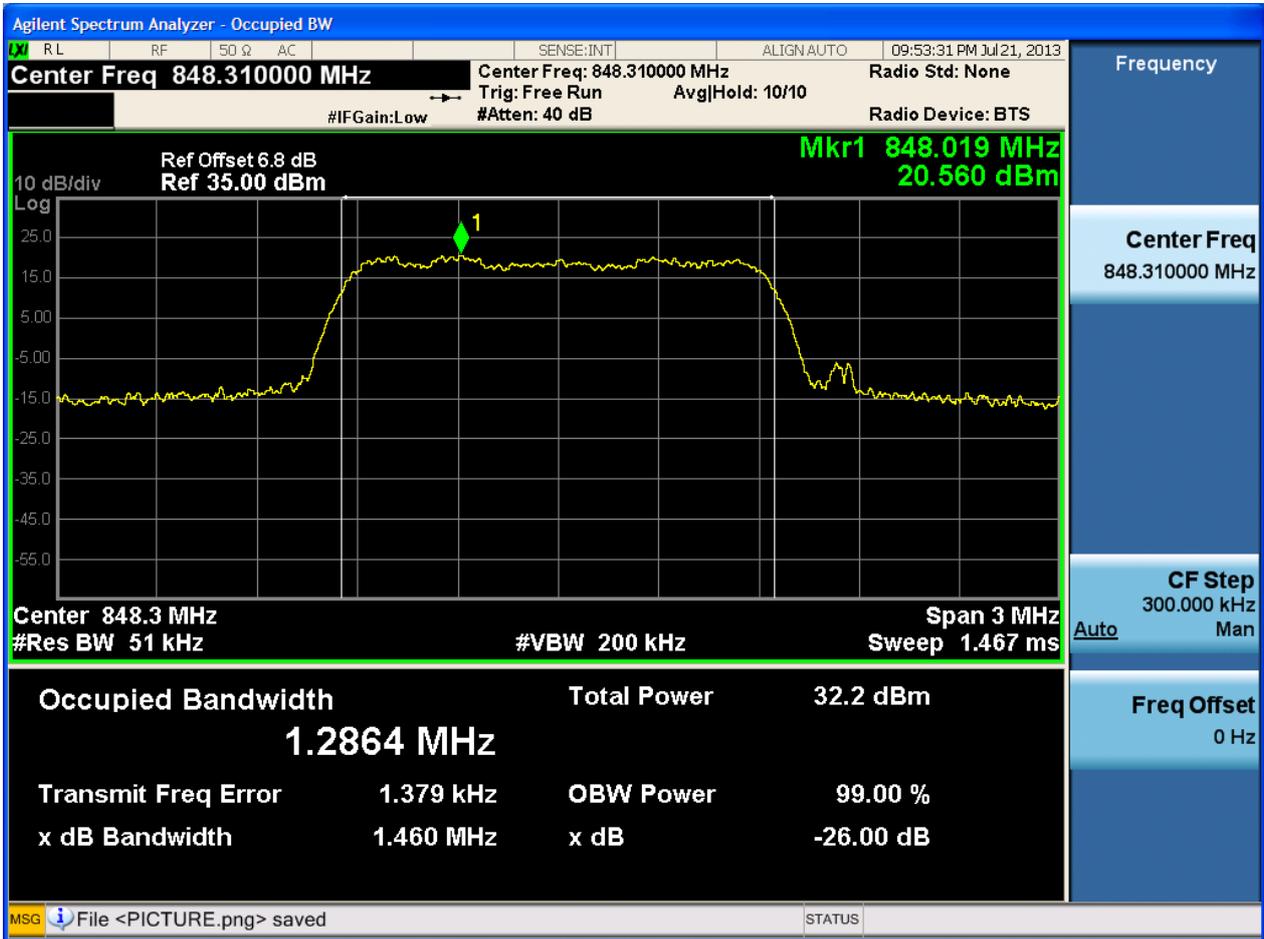
3.2.1.2.2.1 Test Channel = LCH



3.2.1.2.2.2 Test Channel = MCH

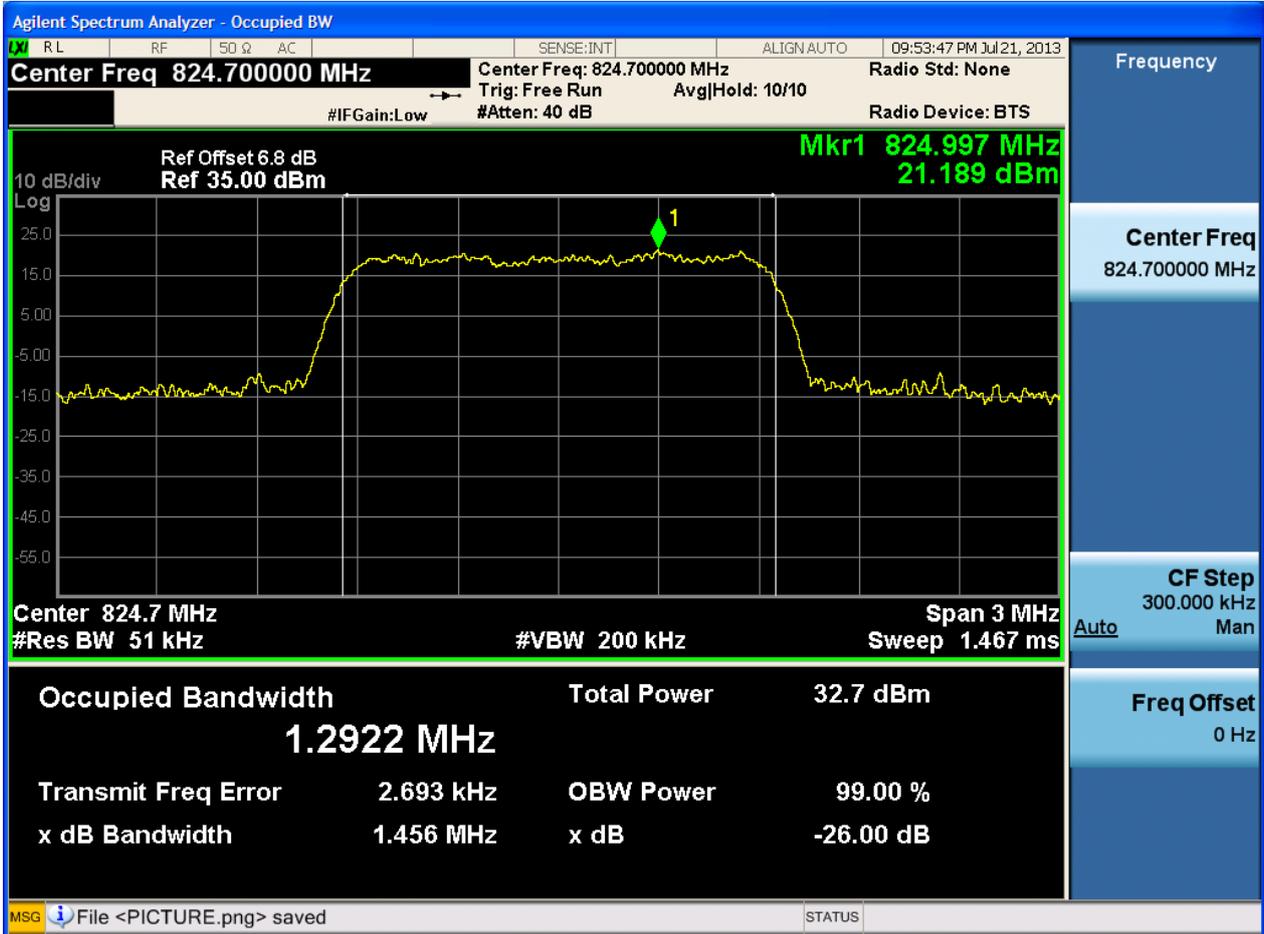


3.2.1.2.2.3 Test Channel = HCH

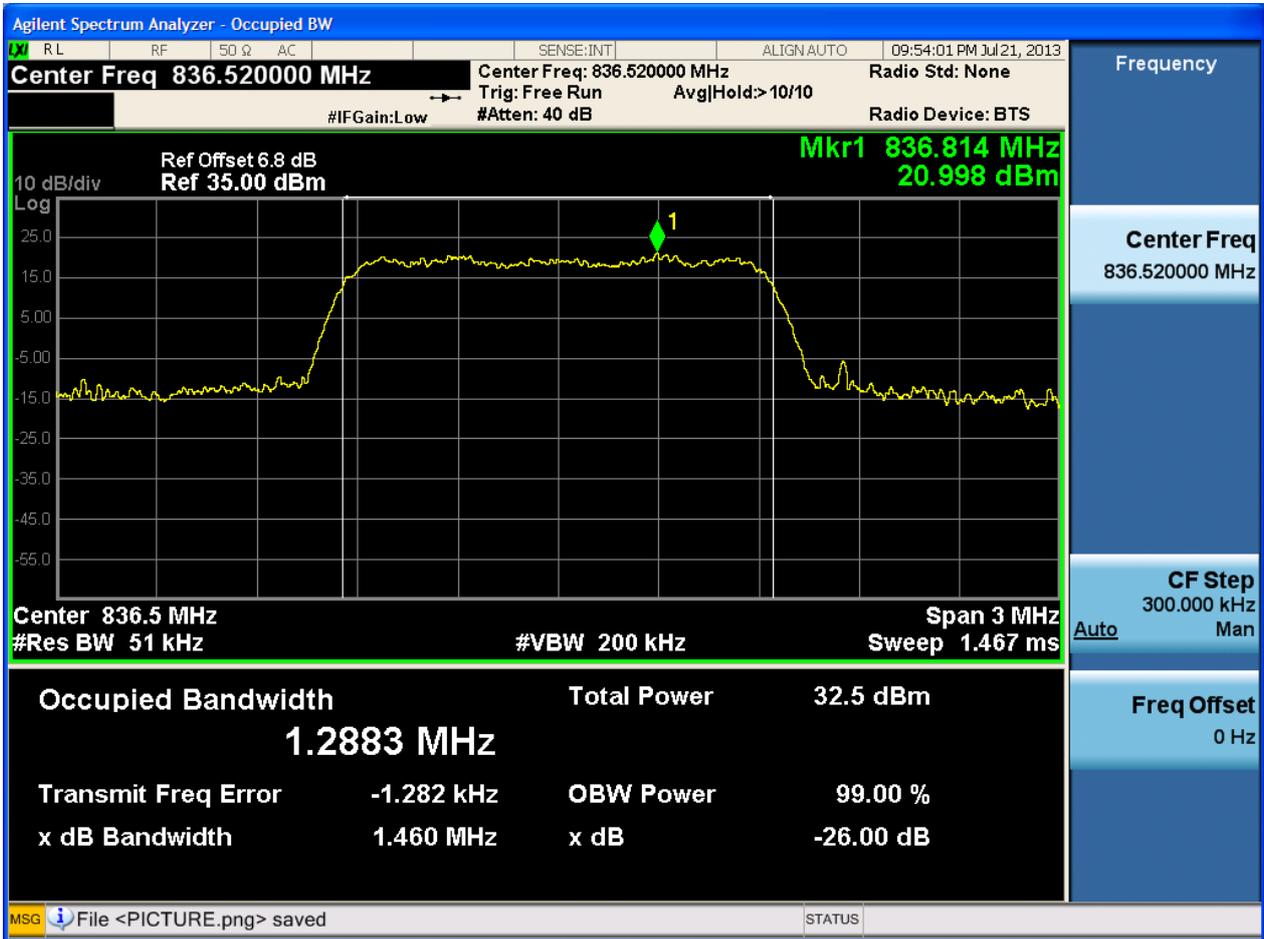


3.2.1.2.3 Test Modulation = 8-PSK (12288 bits)

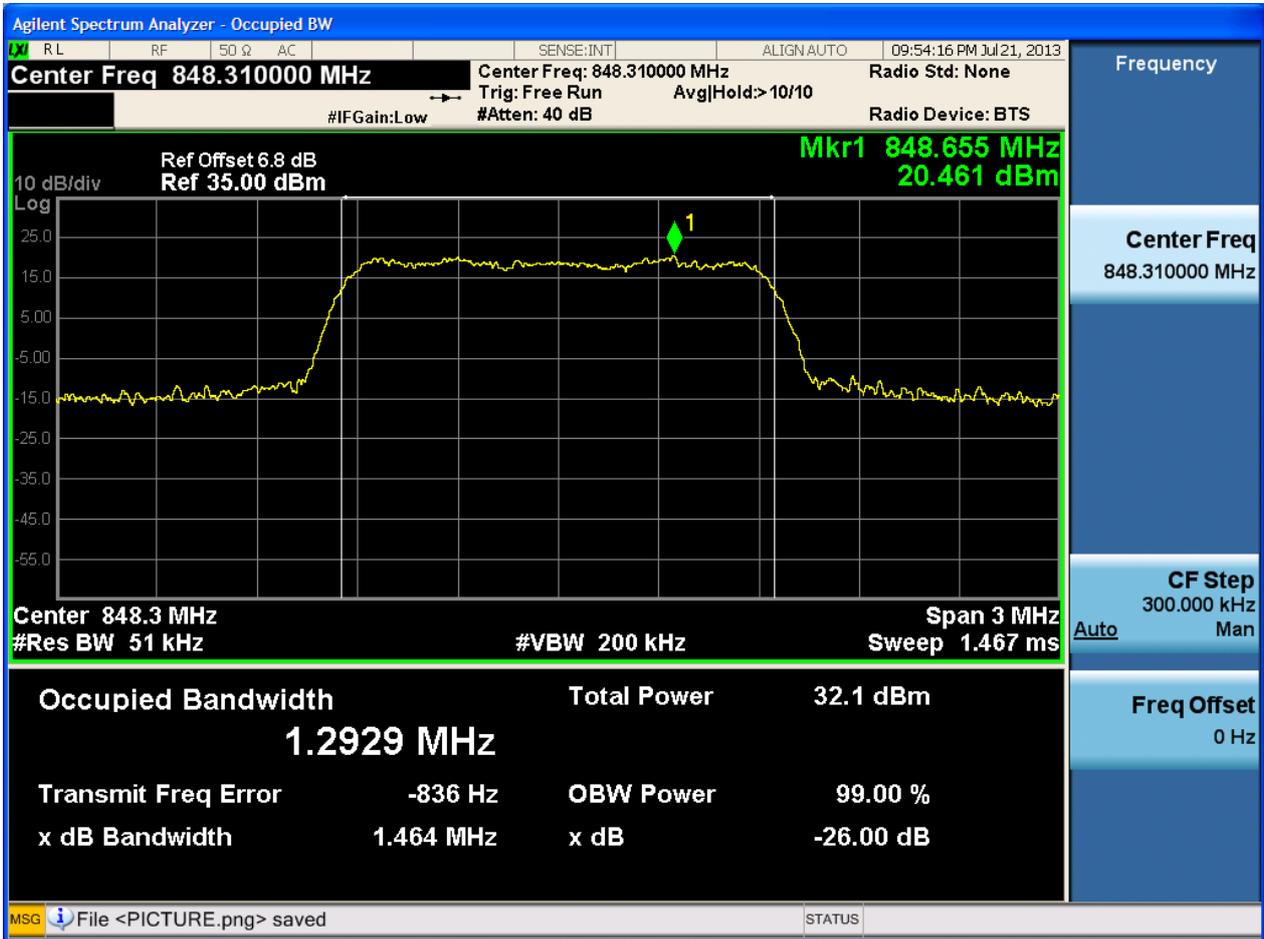
3.2.1.2.3.1 Test Channel = LCH



3.2.1.2.3.2 Test Channel = MCH



3.2.1.2.3.3 Test Channel = HCH



4Appendix_D: Band Edges Compliance

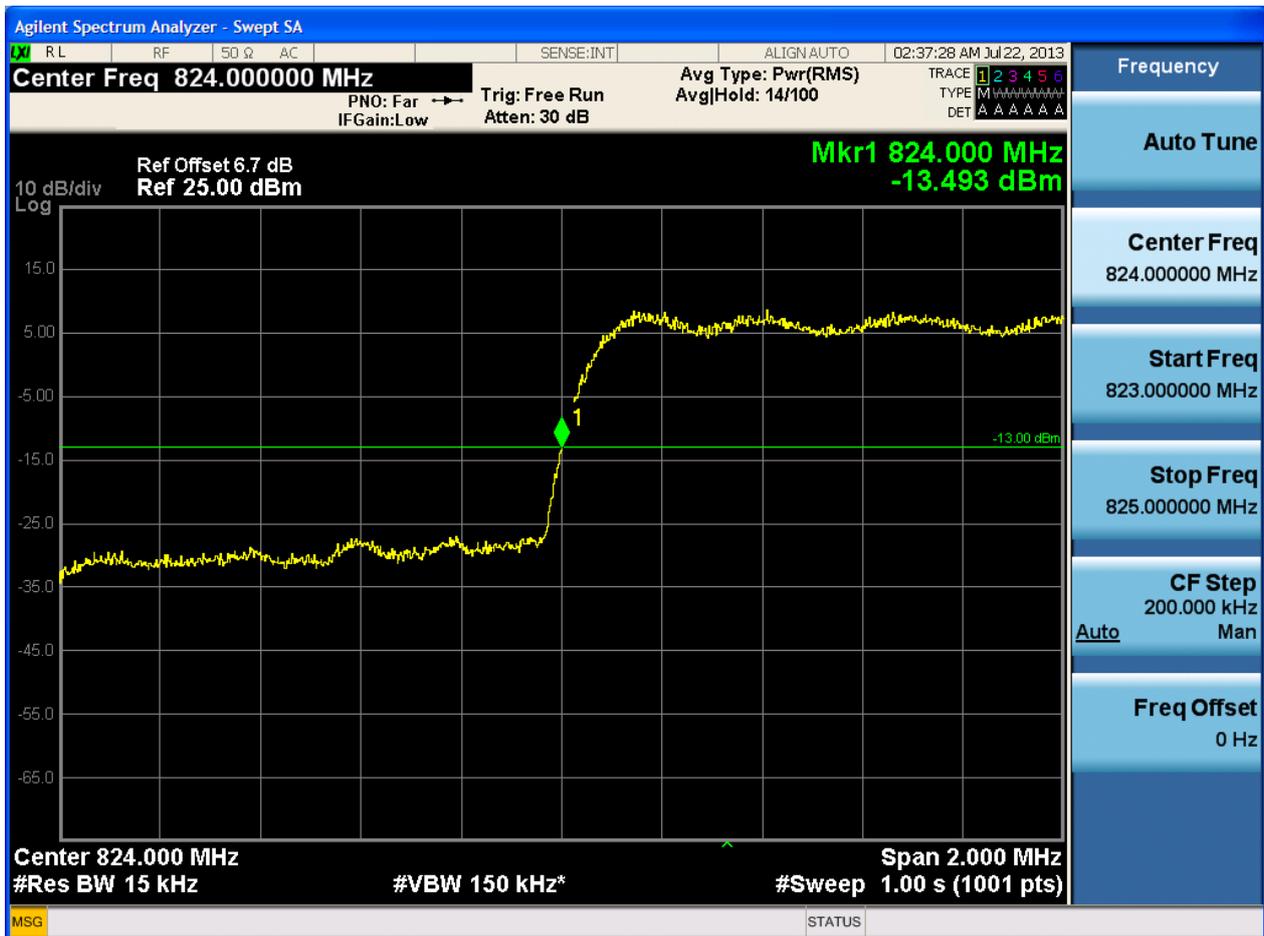
Part I - Test Plots

4.1 For CDMA/1X

4.1.1 Test Band = BC0

4.1.1.1 Test Mode = CDMA/1X/TM1

4.1.1.1.1 Test Channel = LCH

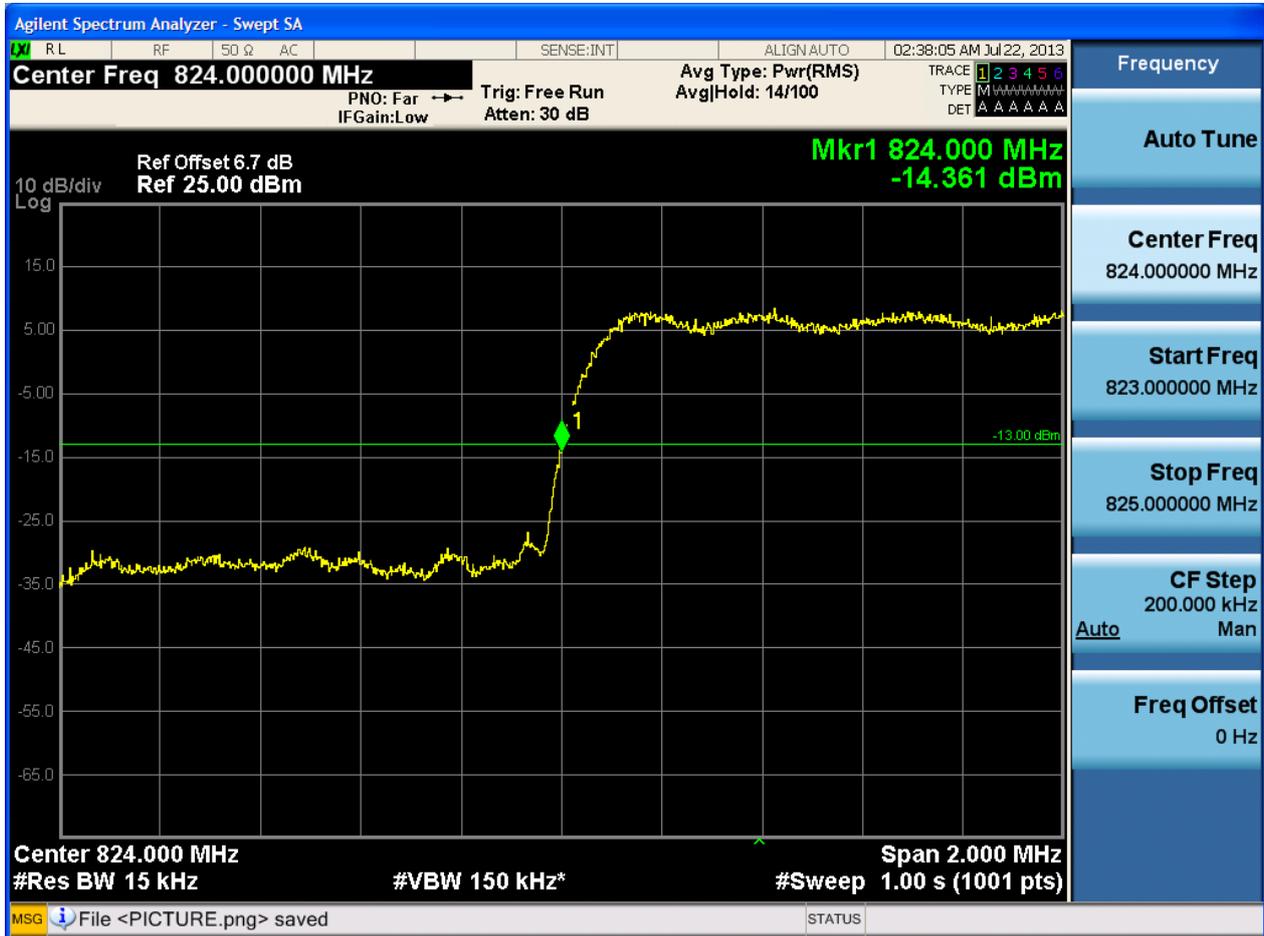


4.1.1.1.2 Test Channel = HCH



4.1.1.2 Test Mode = CDMA/1X/TM3

4.1.1.2.1 Test Channel = LCH



4.1.1.2.2 Test Channel = HCH



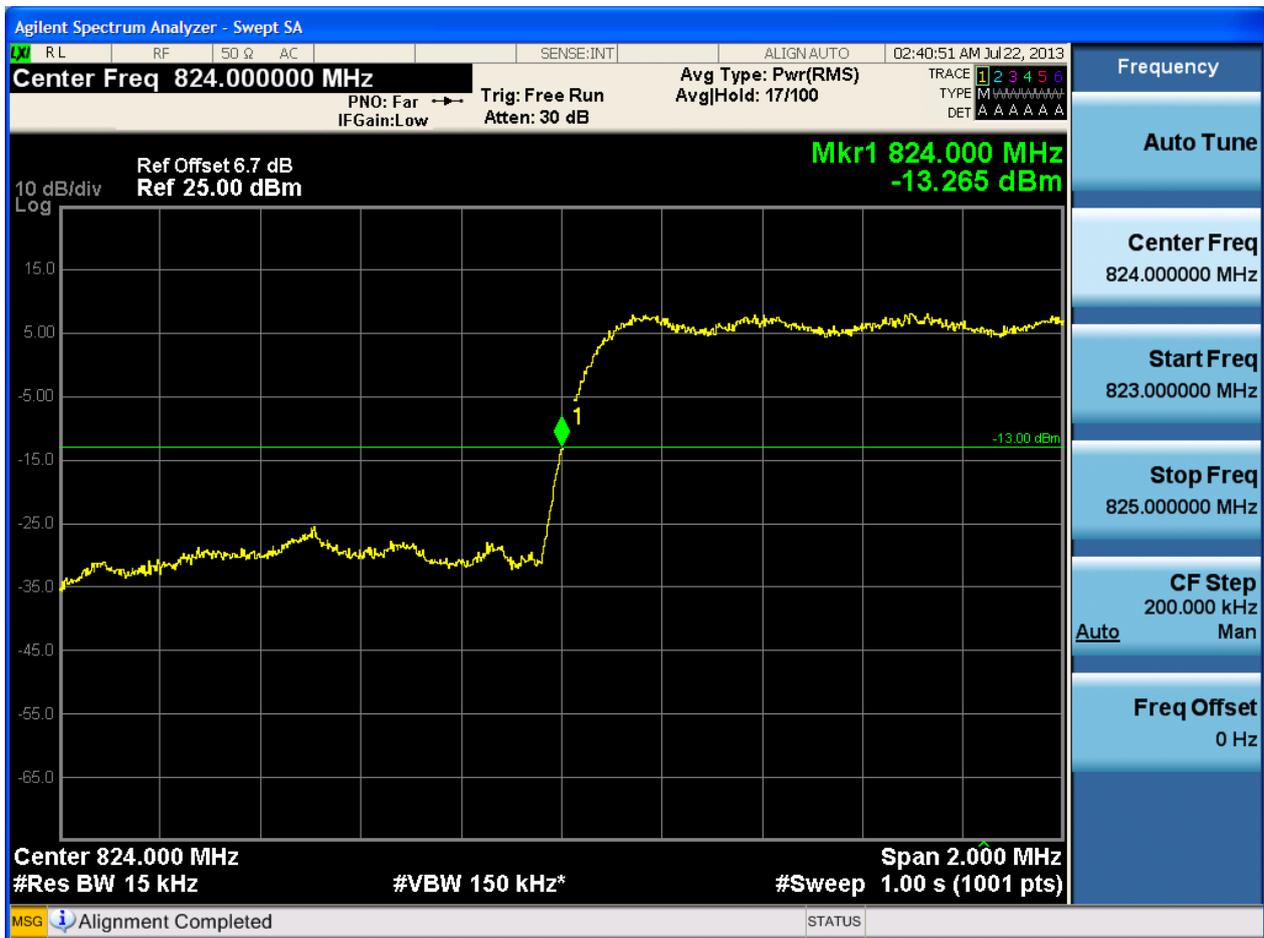
4.2 For CDMA/EV-DO

4.2.1 Test Band = BC0

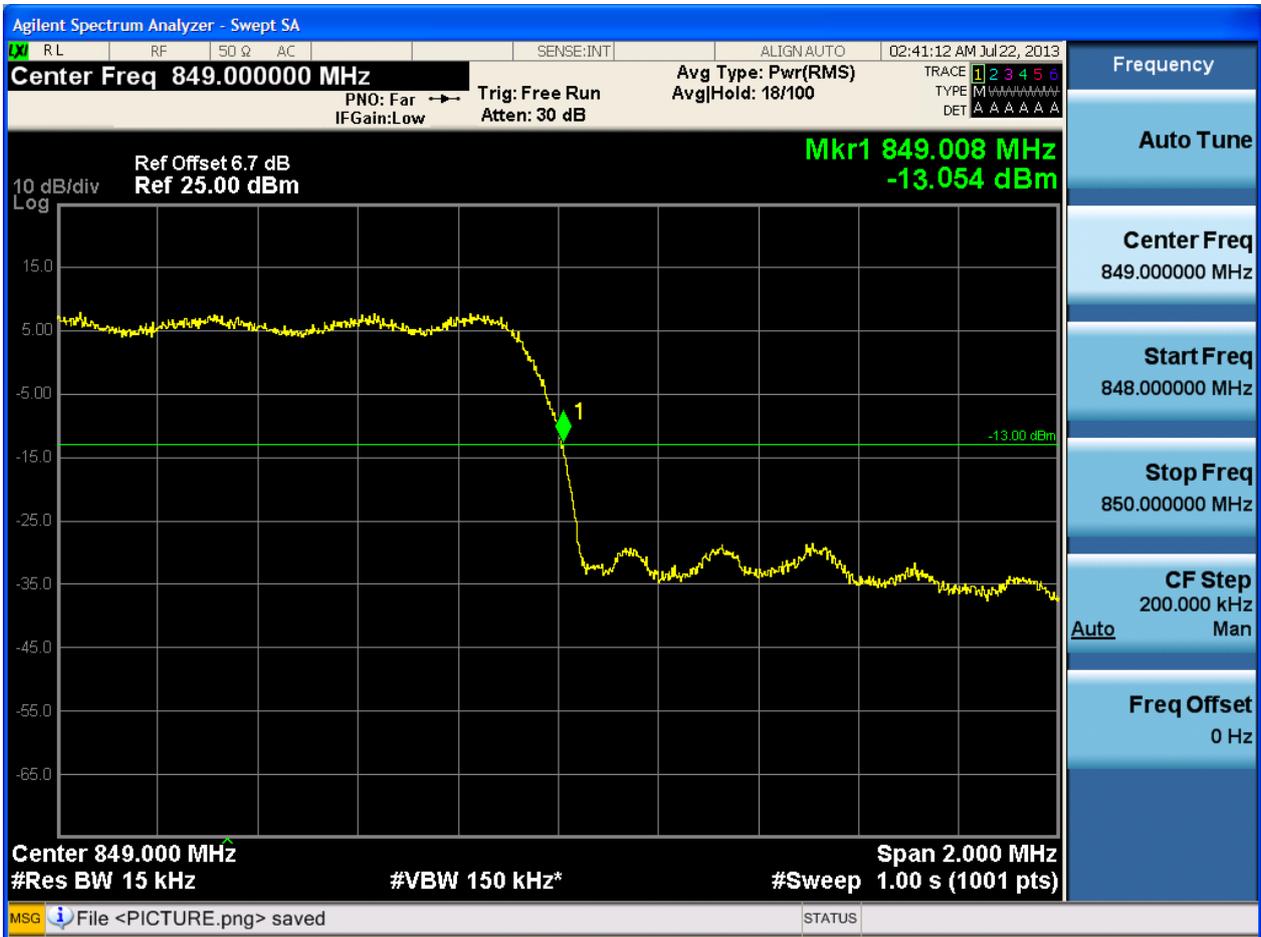
4.2.1.1 Test Mode = CDMA/EV-DO/Subtype0

4.2.1.1.1 Test Modulation = HPSK

4.2.1.1.1.1 Test Channel = LCH



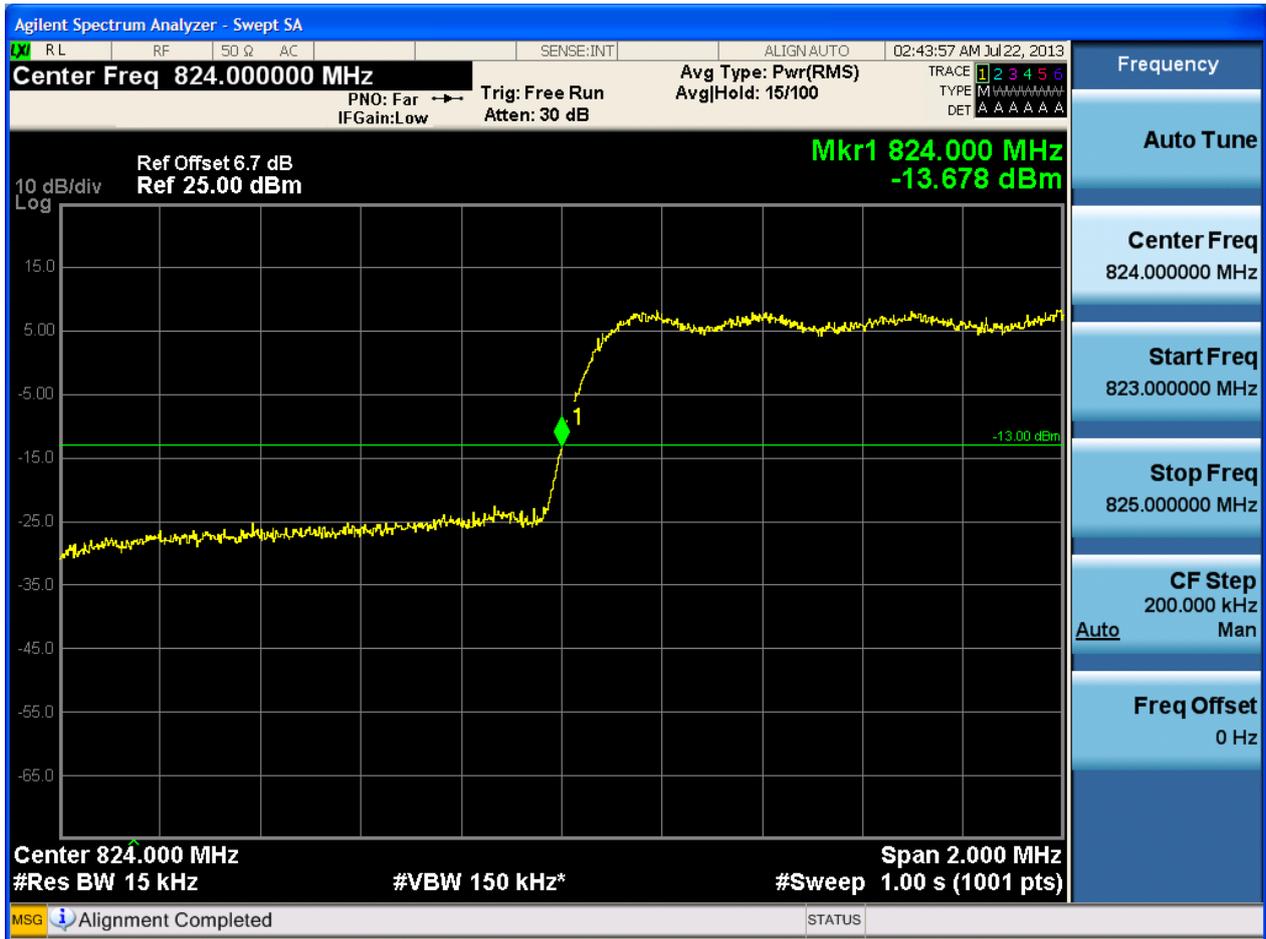
4.2.1.1.1.2 Test Channel = HCH



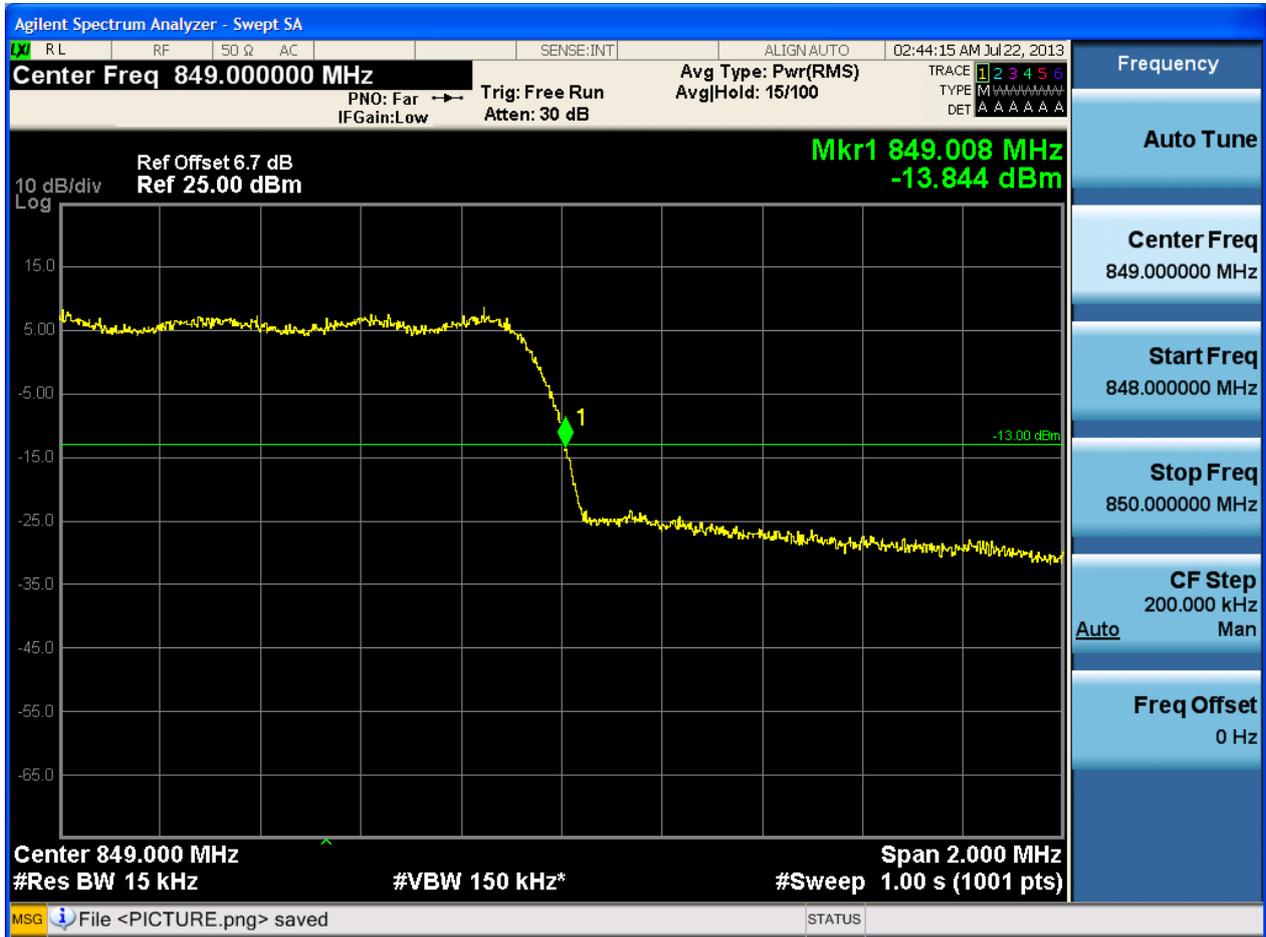
4.2.1.2 Test Mode = CDMA/EV-DO/Subtype2

4.2.1.2.1 Test Modulation = BPSK (256 bits)

4.2.1.2.1.1 Test Channel = LCH

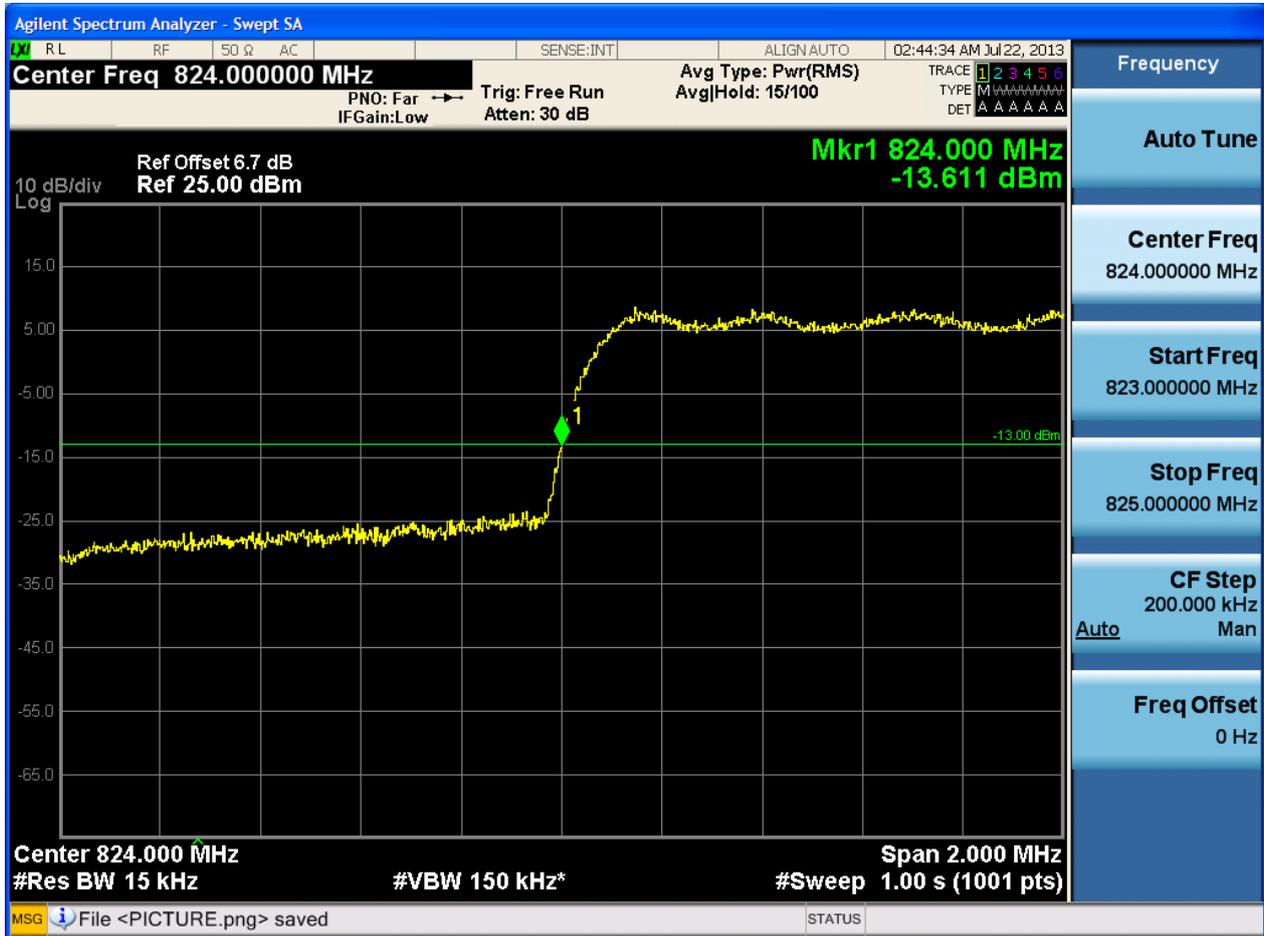


4.2.1.2.1.2 Test Channel = HCH

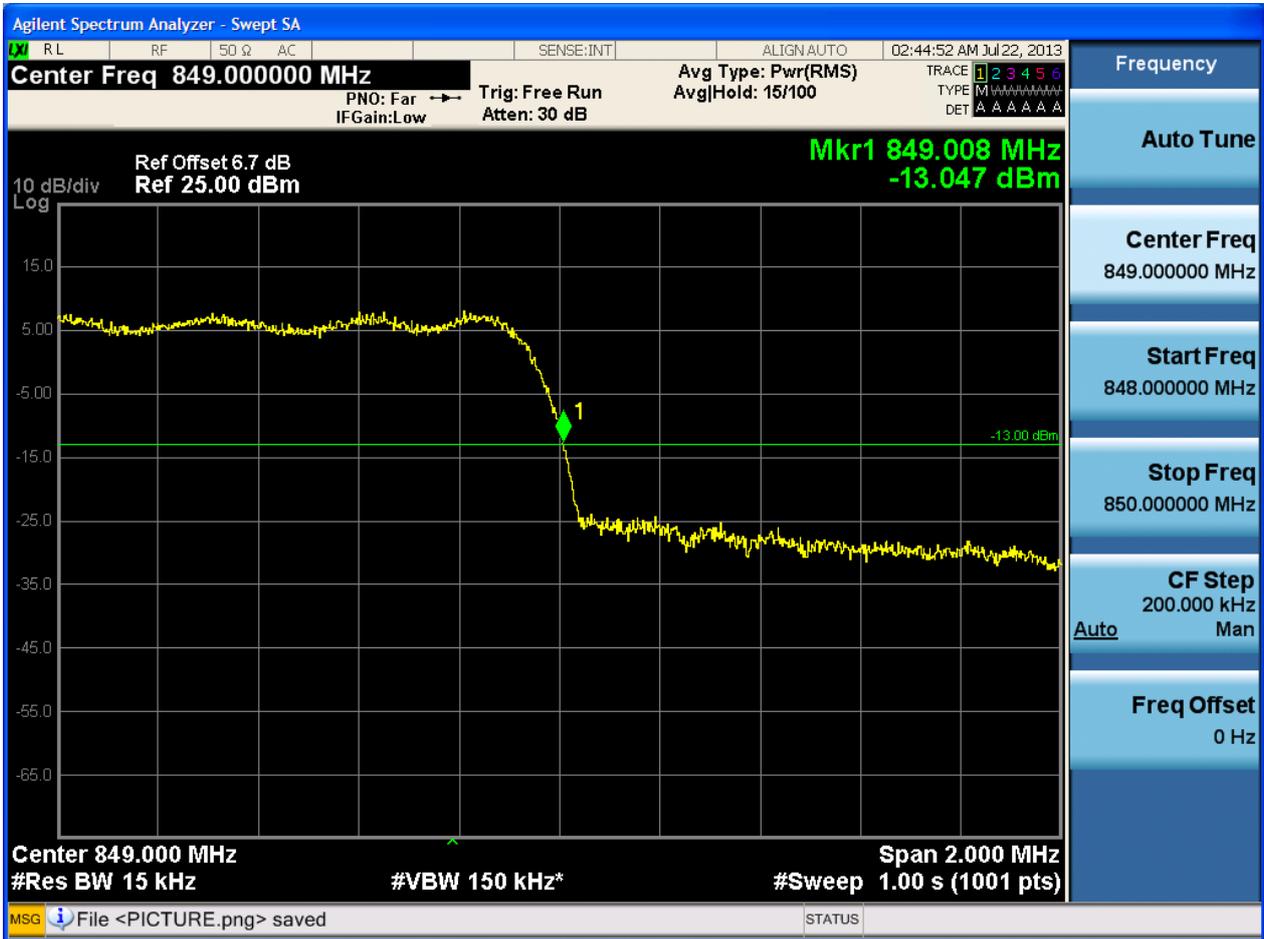


4.2.1.2.2 Test Modulation = QPSK (4096 bits)

4.2.1.2.2.1 Test Channel = LCH



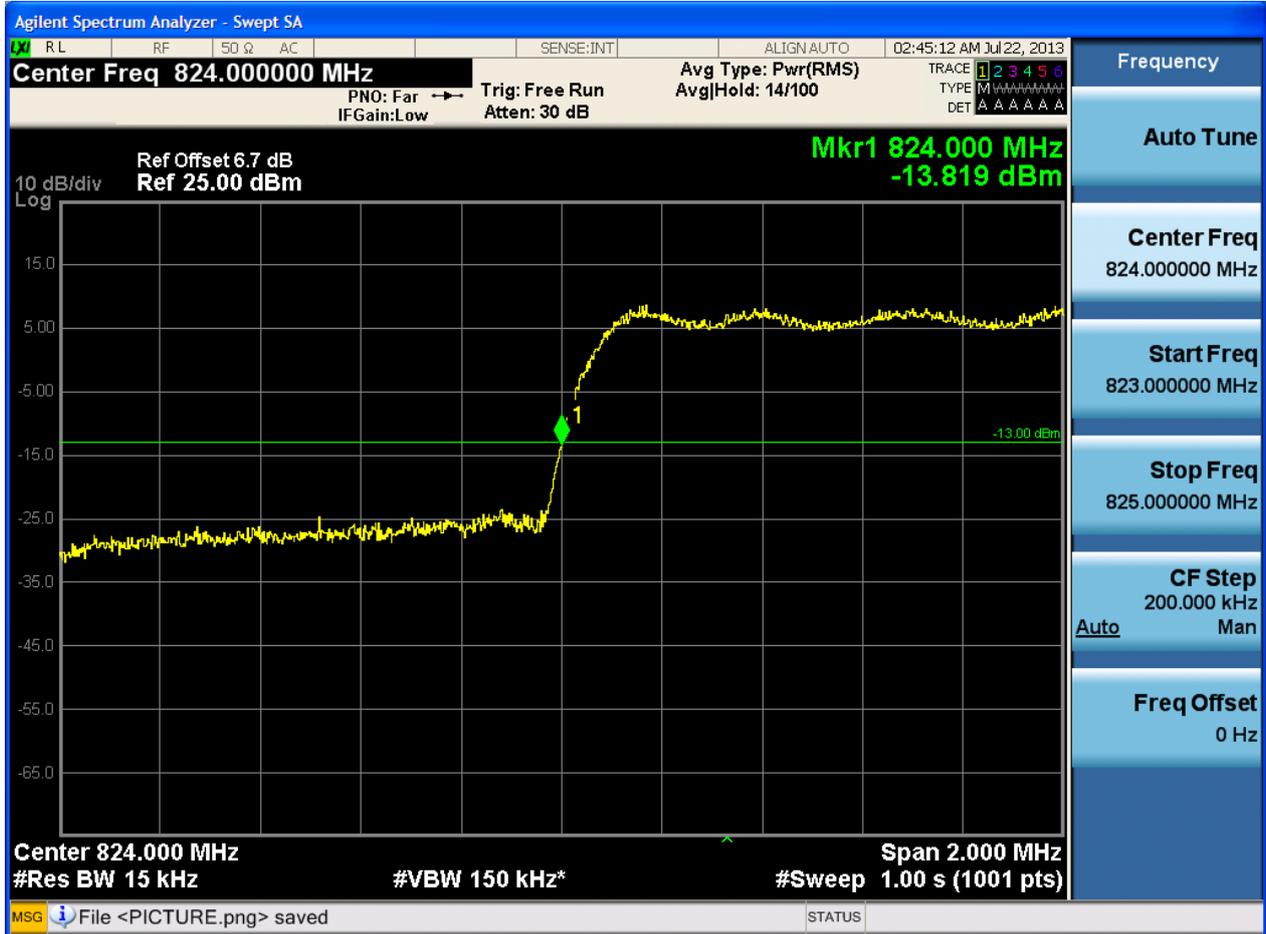
4.2.1.2.2.2 Test Channel = HCH



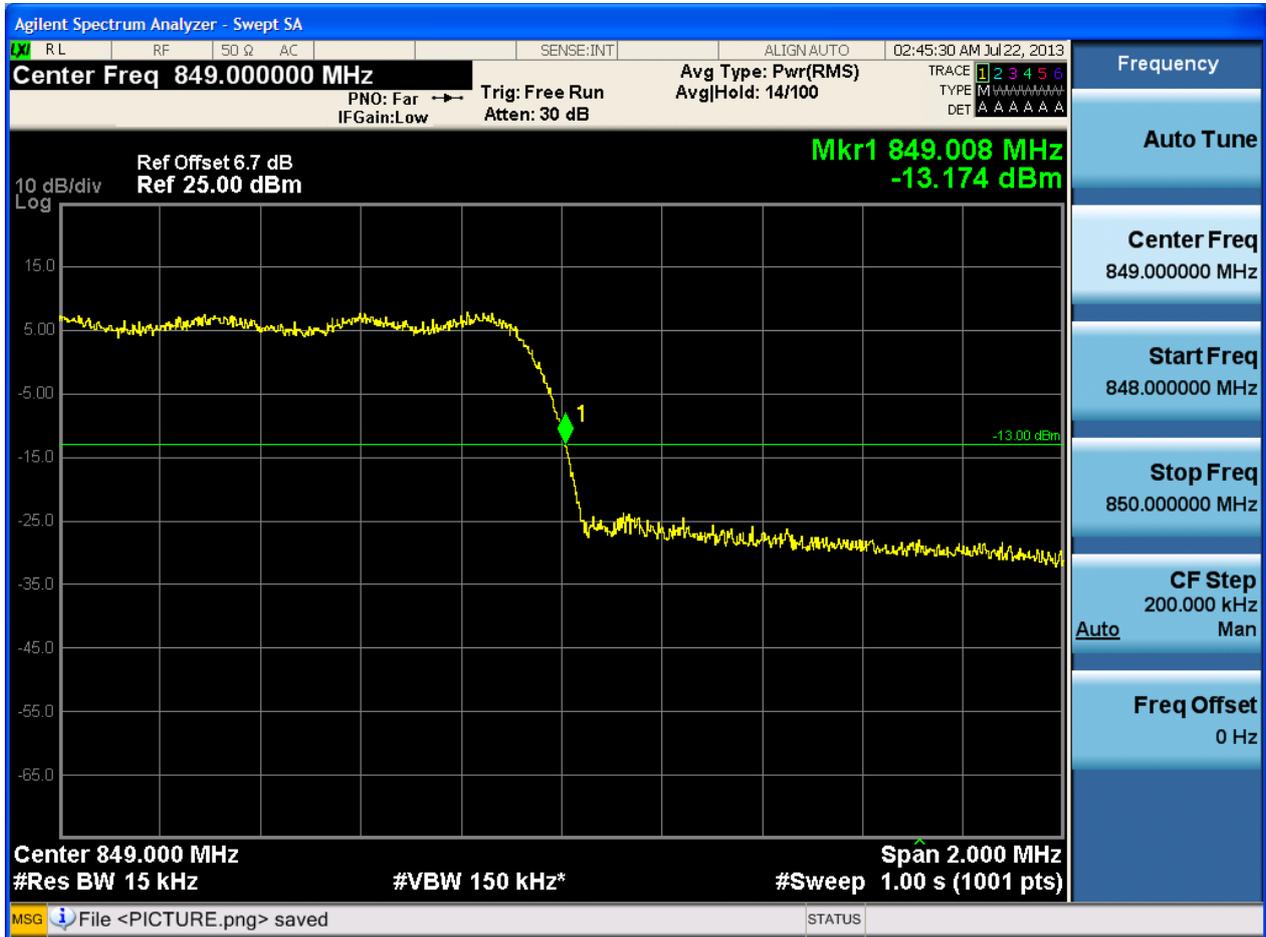


4.2.1.2.3 Test Modulation = 8-PSK (12288 bits)

4.2.1.2.3.1 Test Channel = LCH



4.2.1.2.3.2 Test Channel = HCH





5Appendix_E: 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.

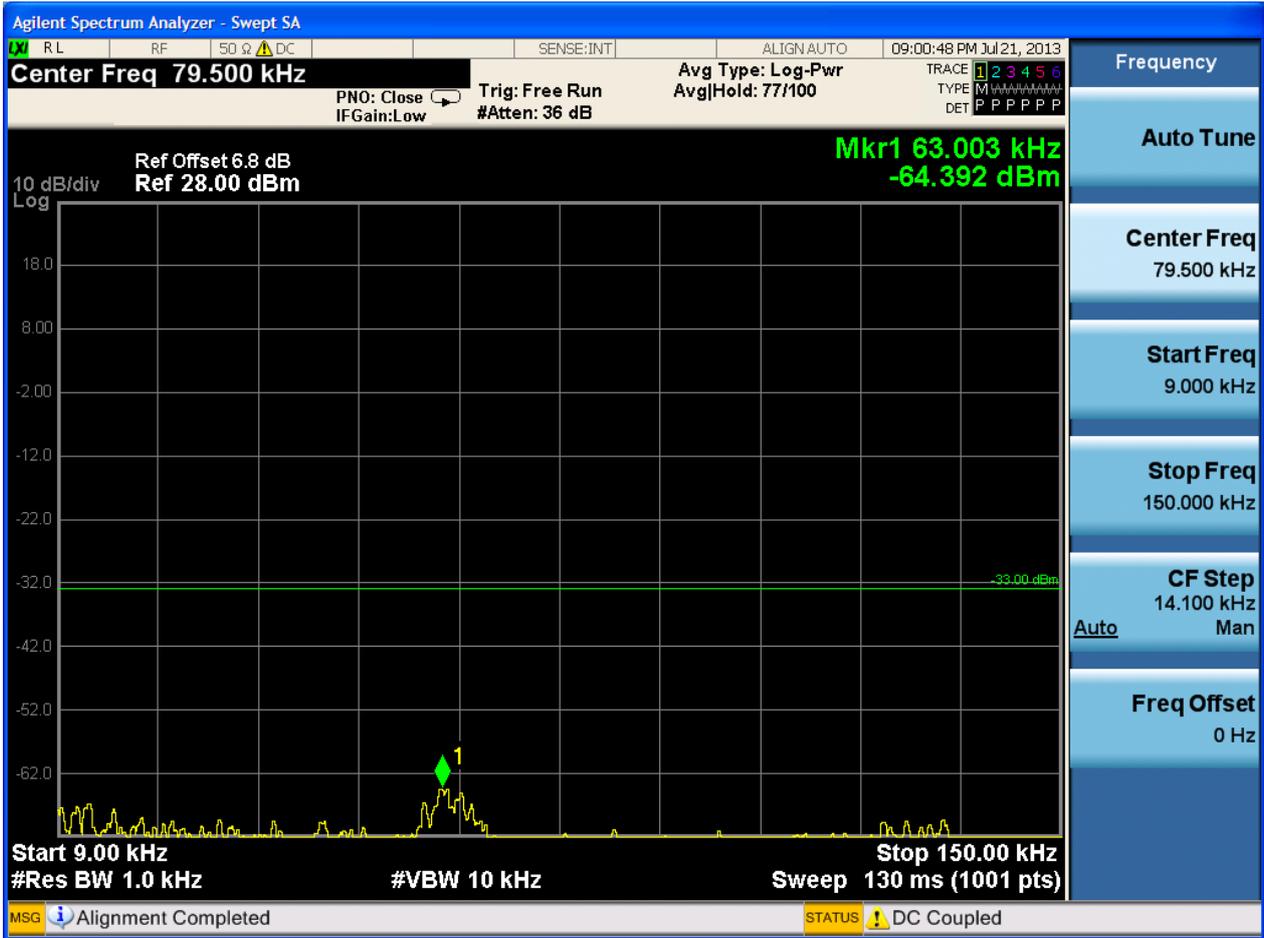
Part I - Test Plots

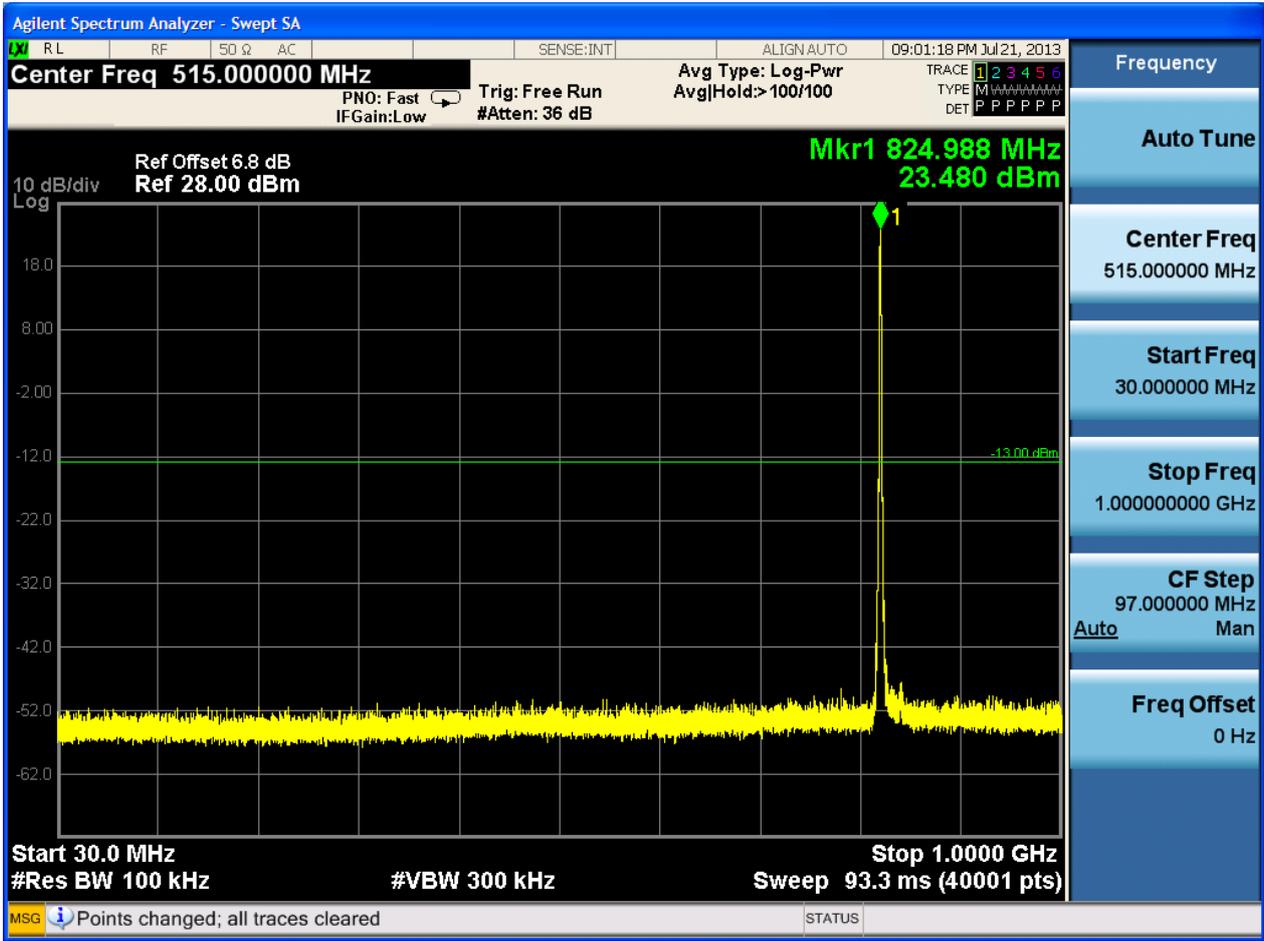
5.1 For CDMA/1X

5.1.1 Test Band = BC0

5.1.1.1 Test Mode = CDMA/1X/TM1

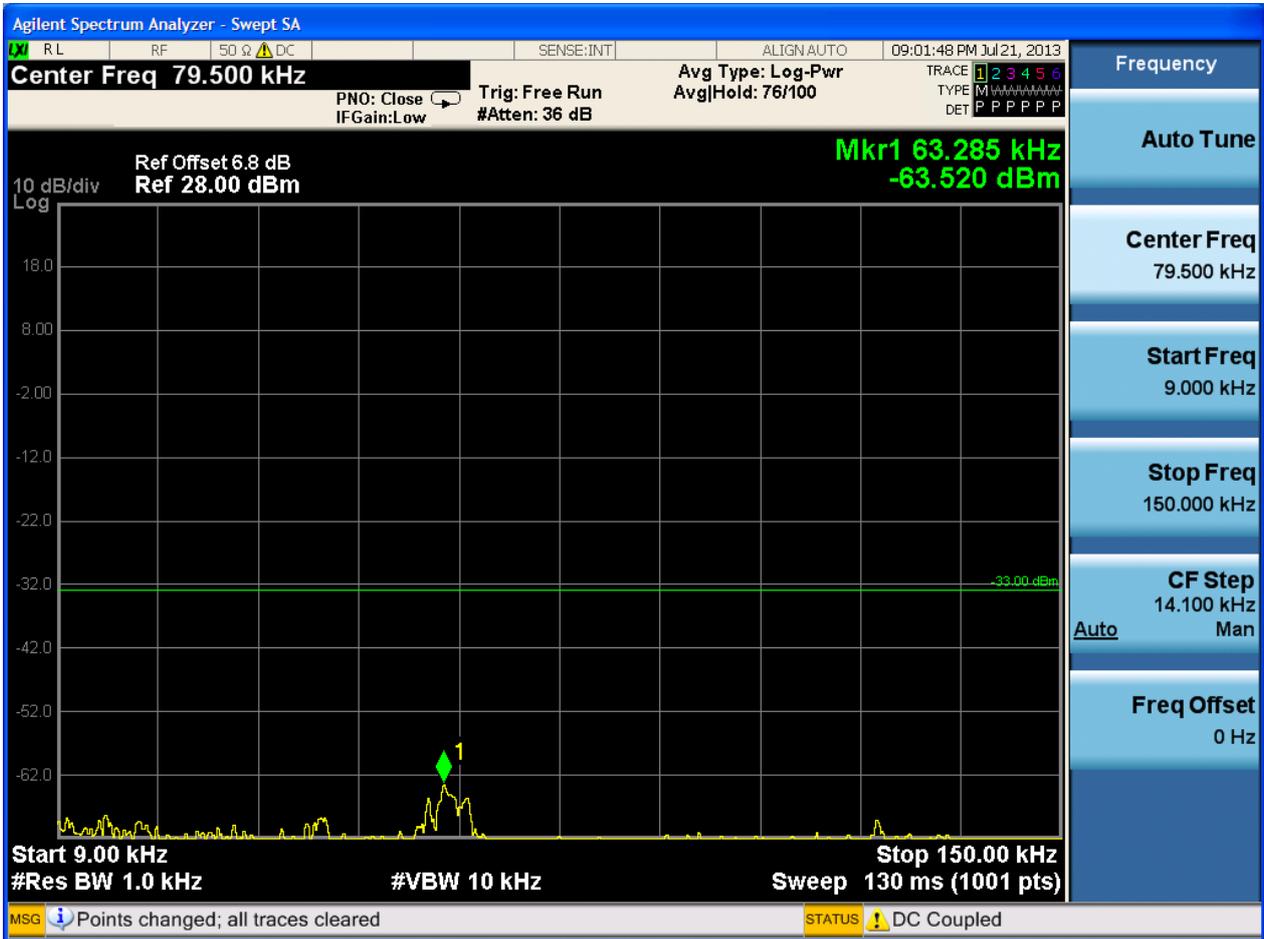
5.1.1.1.1 Test Channel = LCH

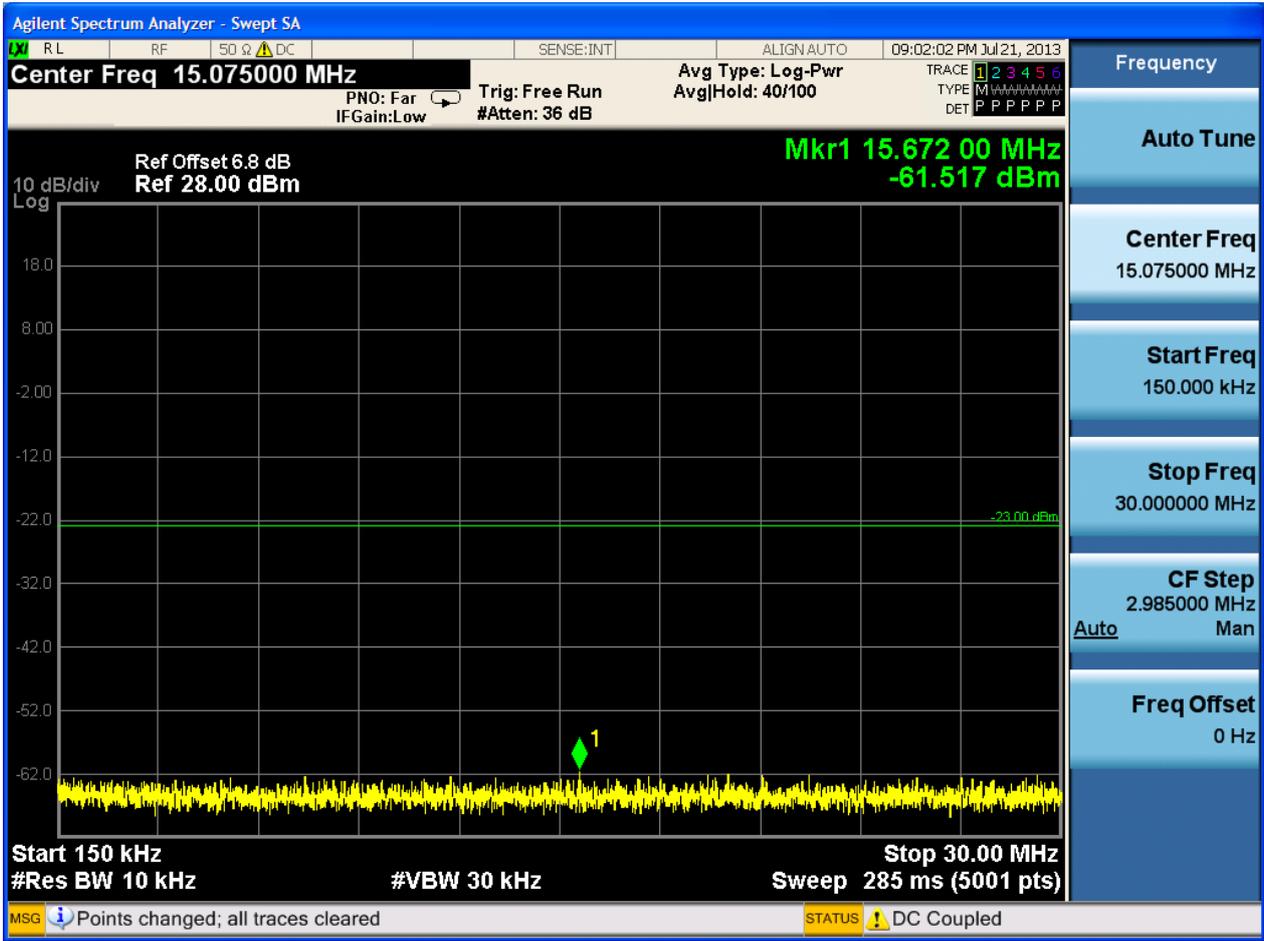


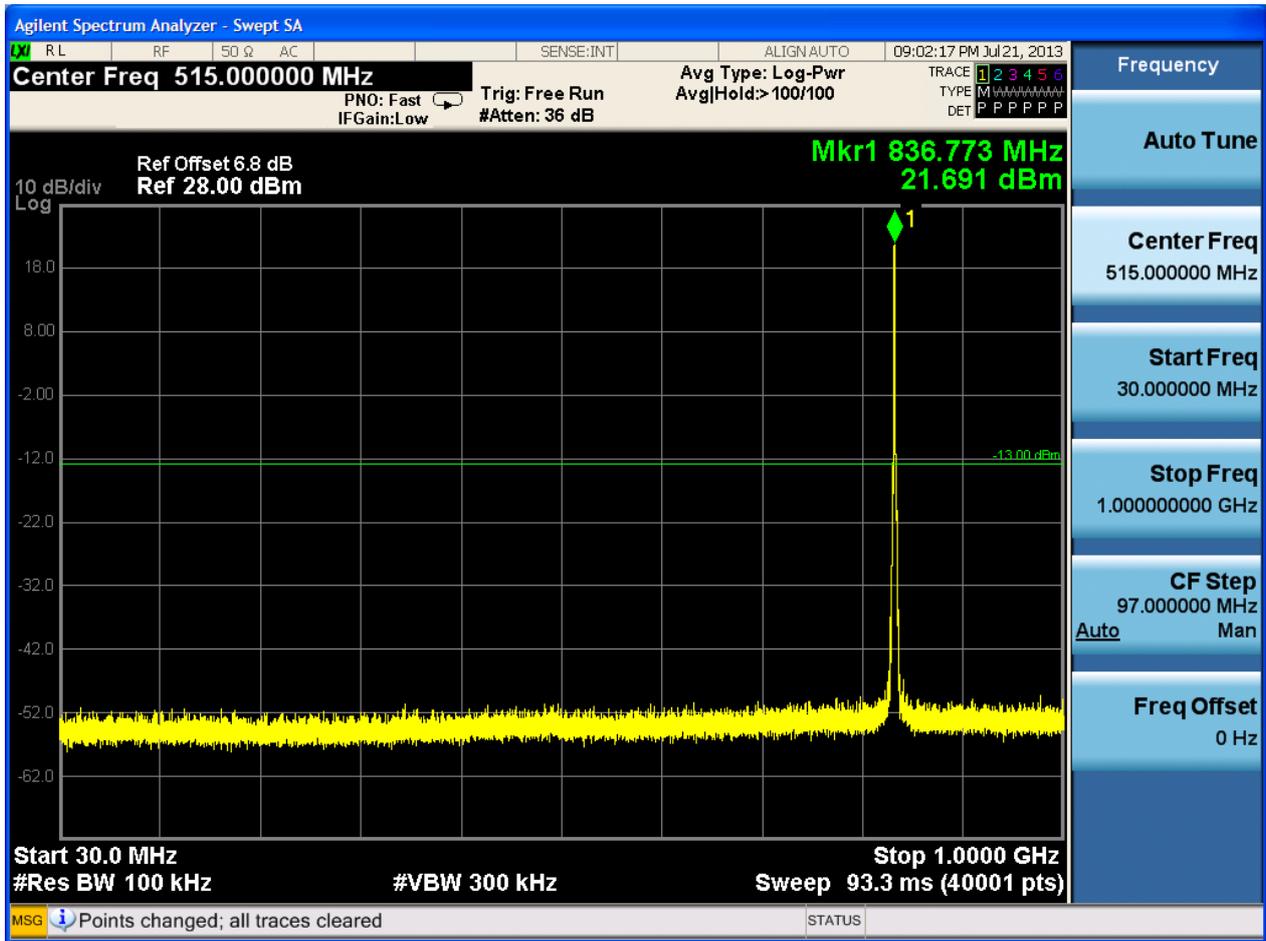


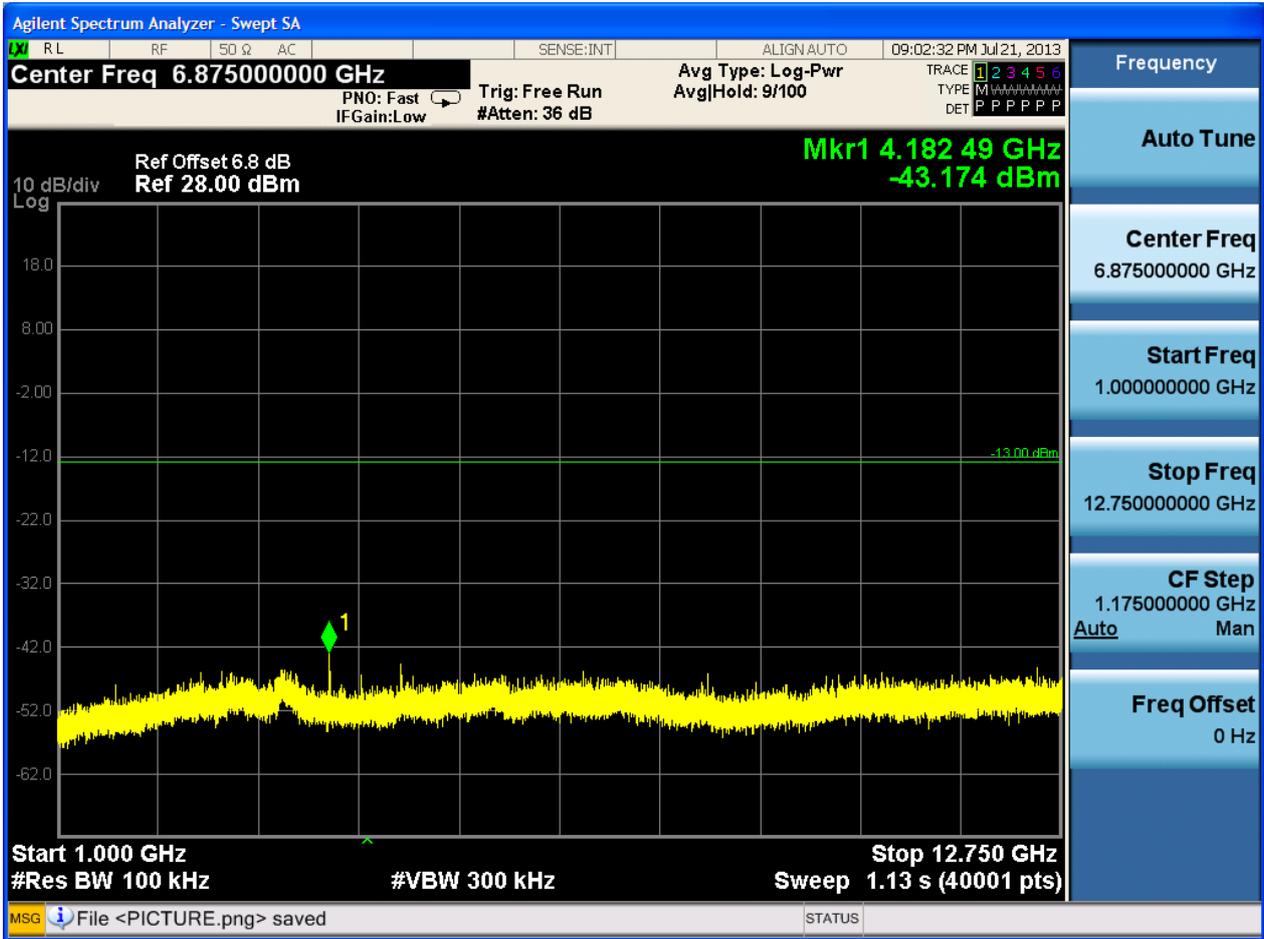


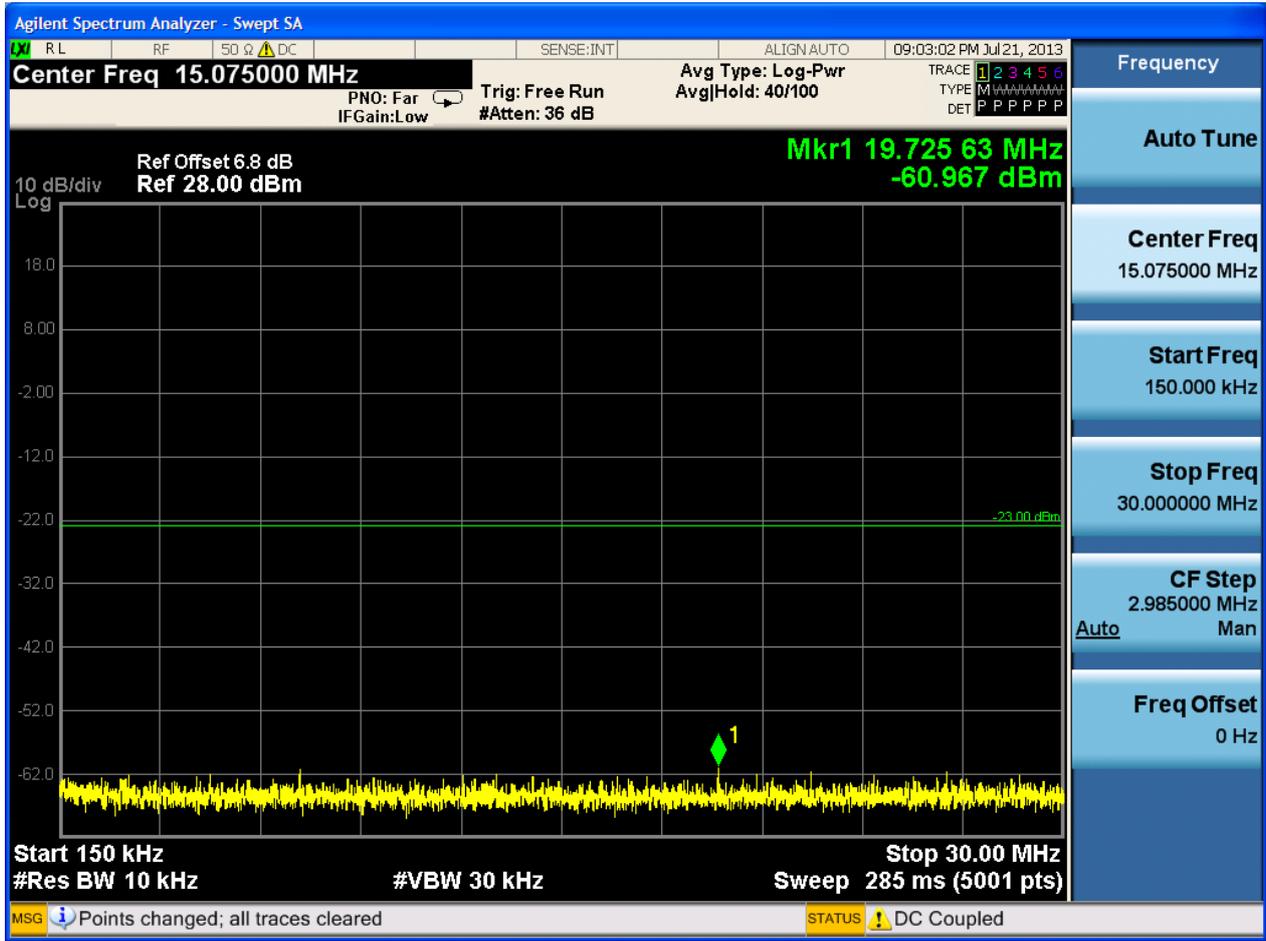
5.1.1.1.2 Test Channel = MCH

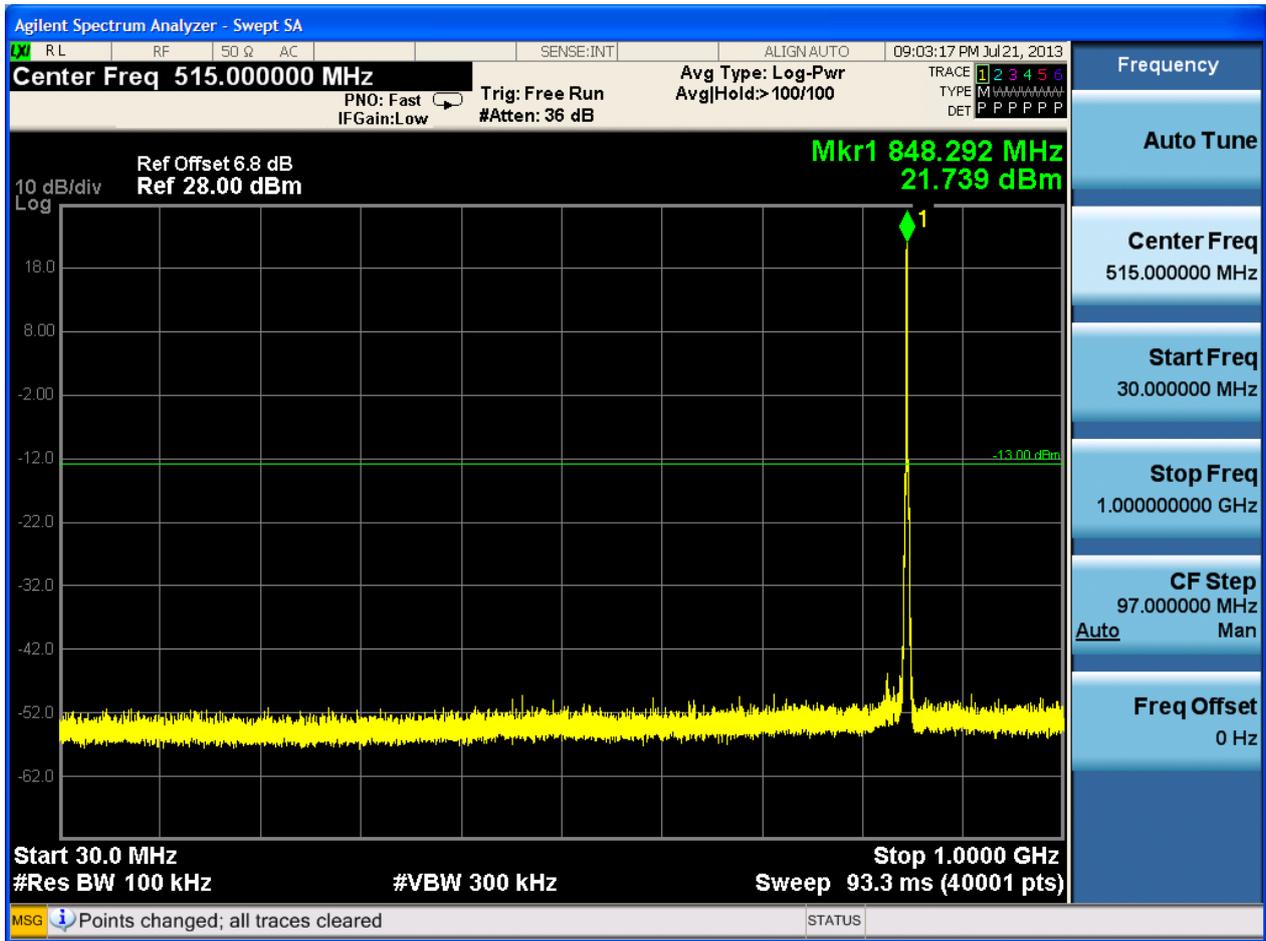


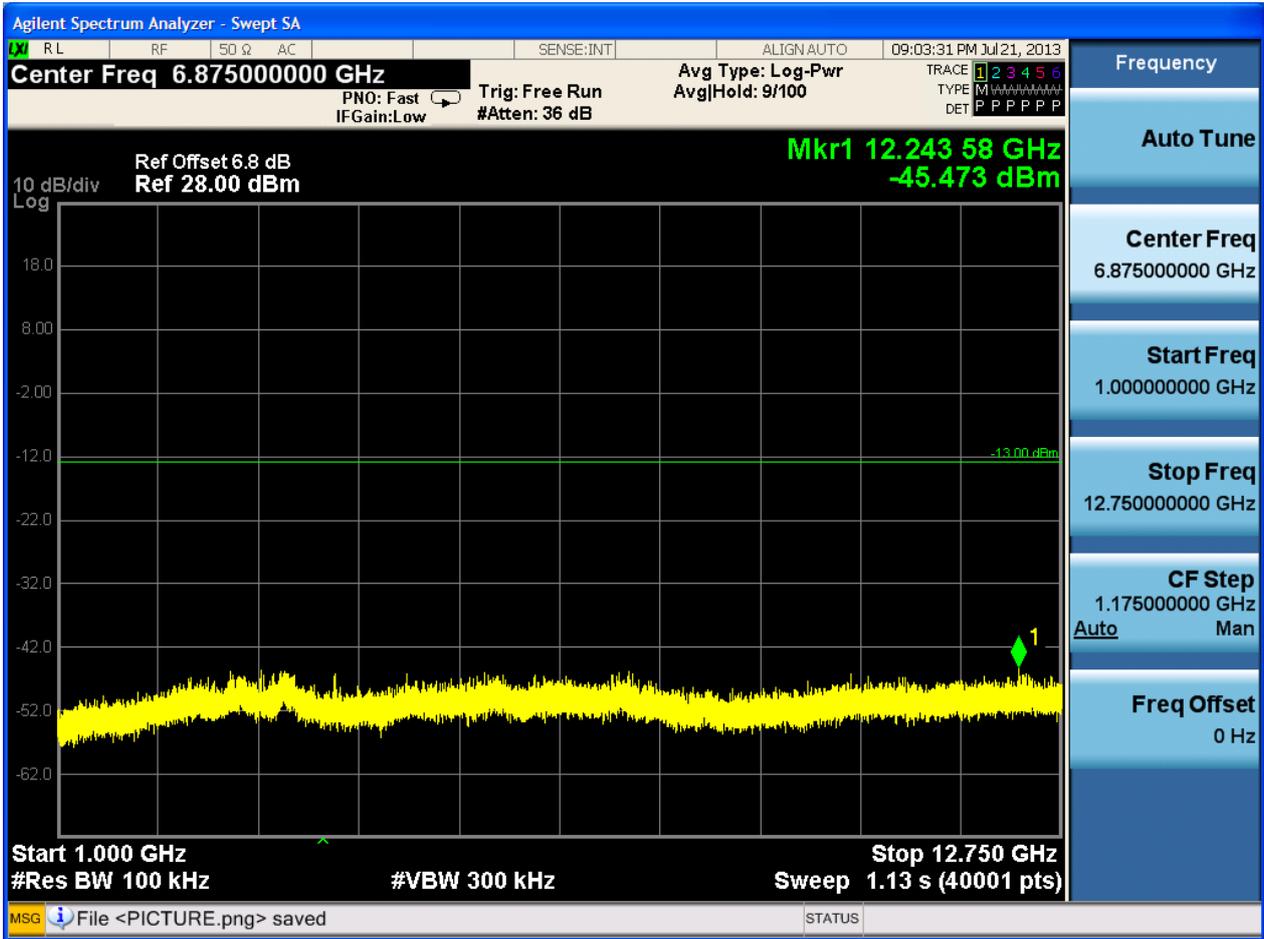










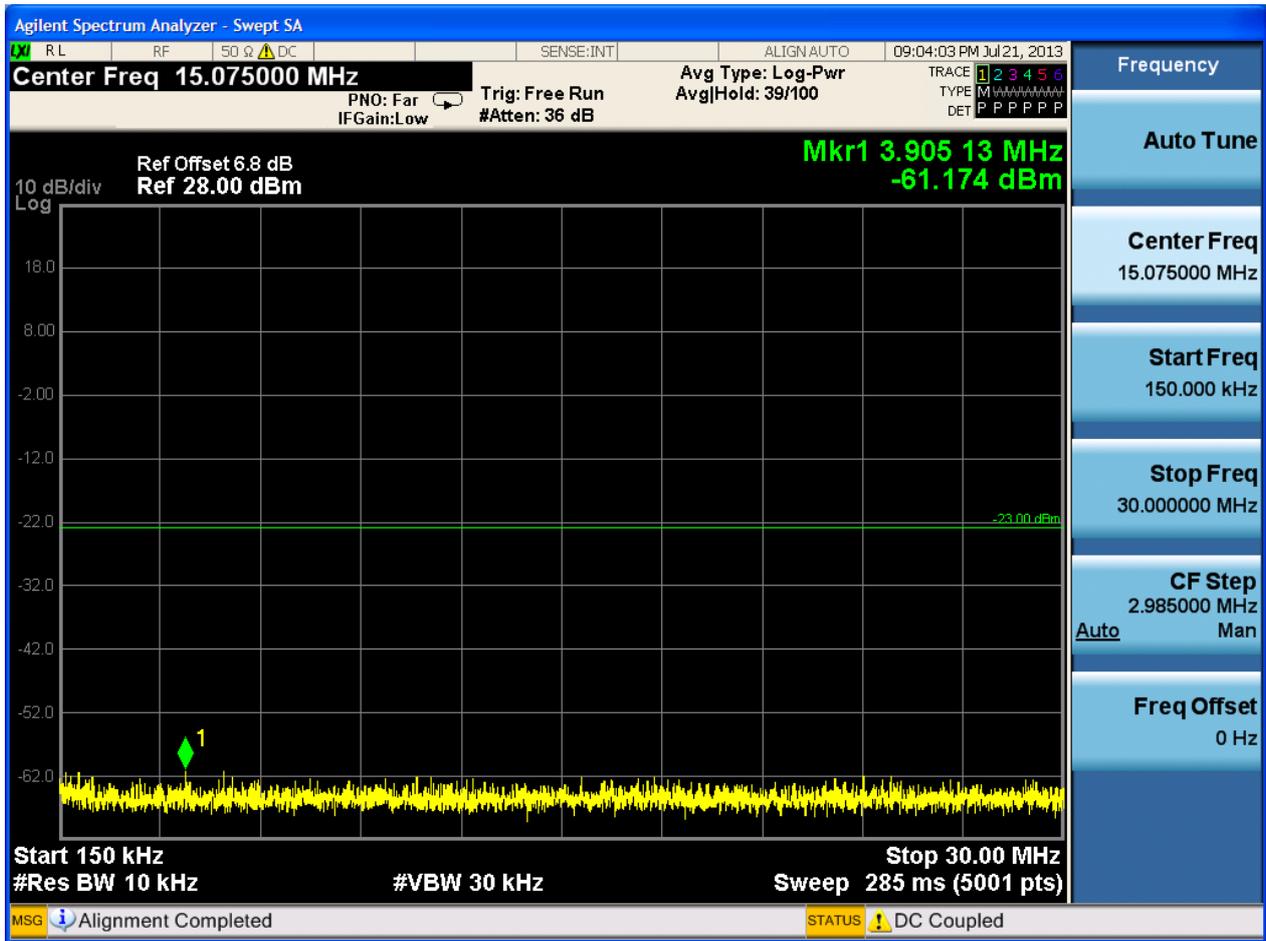


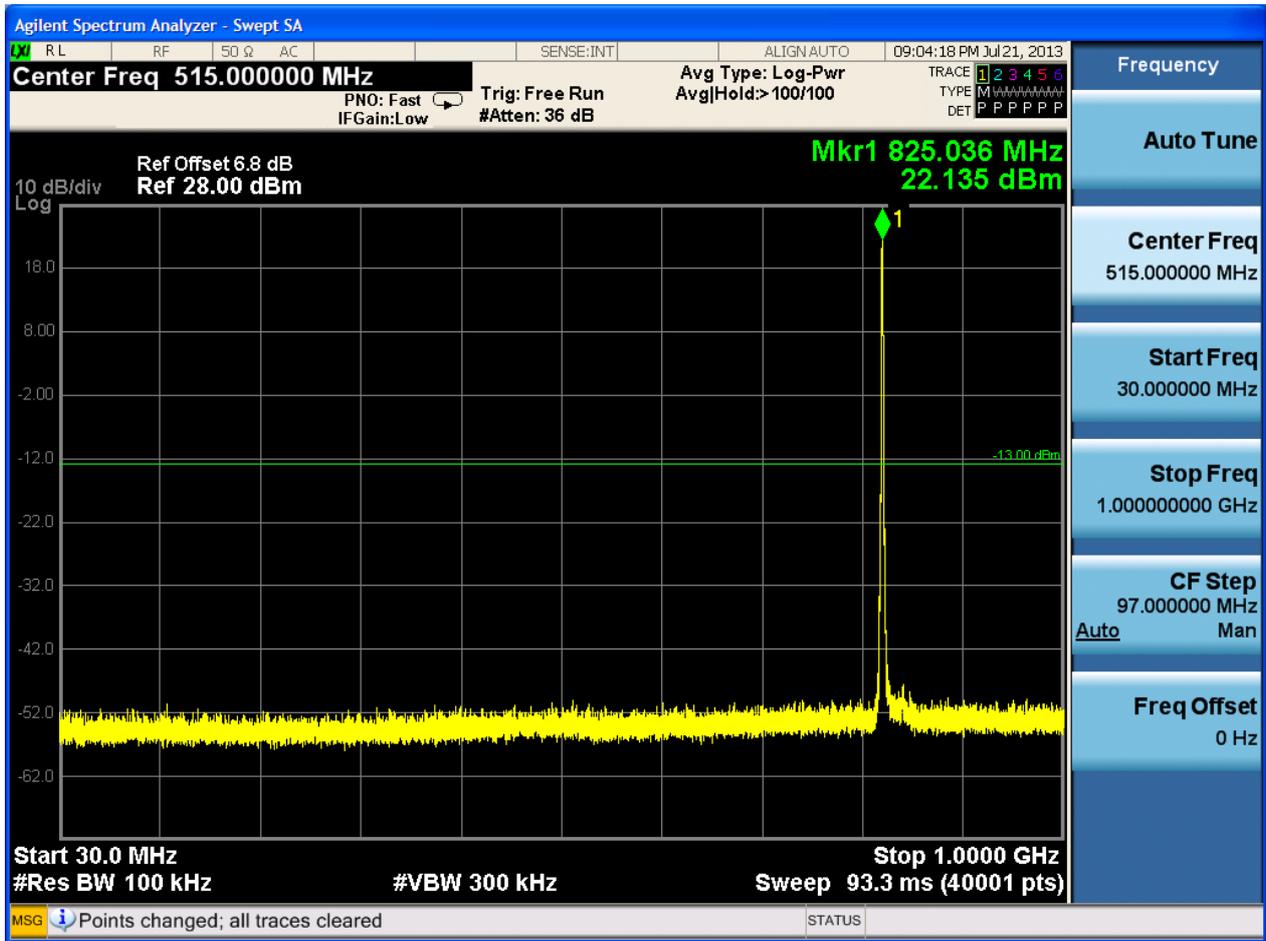


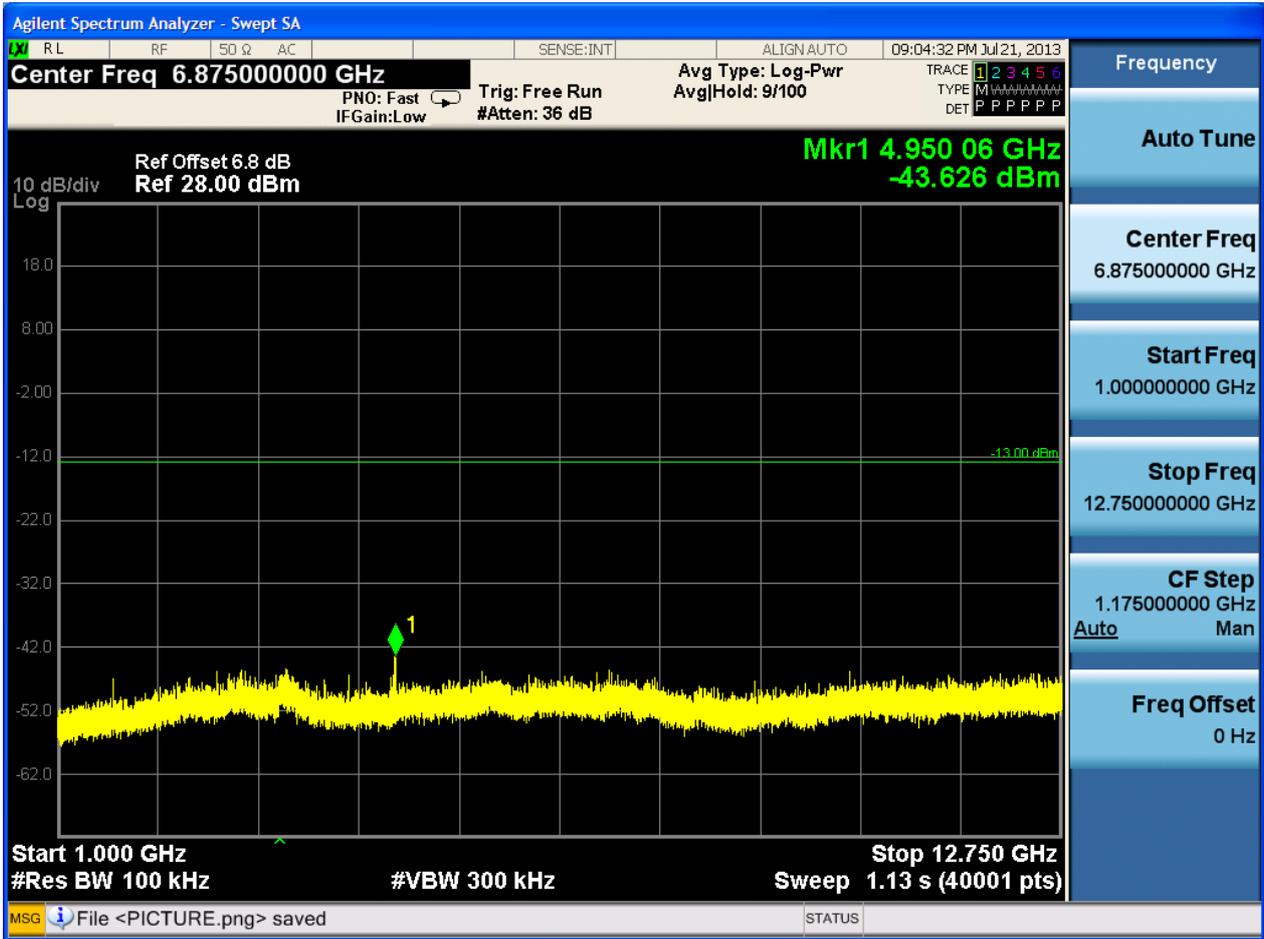
5.1.1.2 Test Mode = CDMA/1X/TM3

5.1.1.2.1 Test Channel = LCH





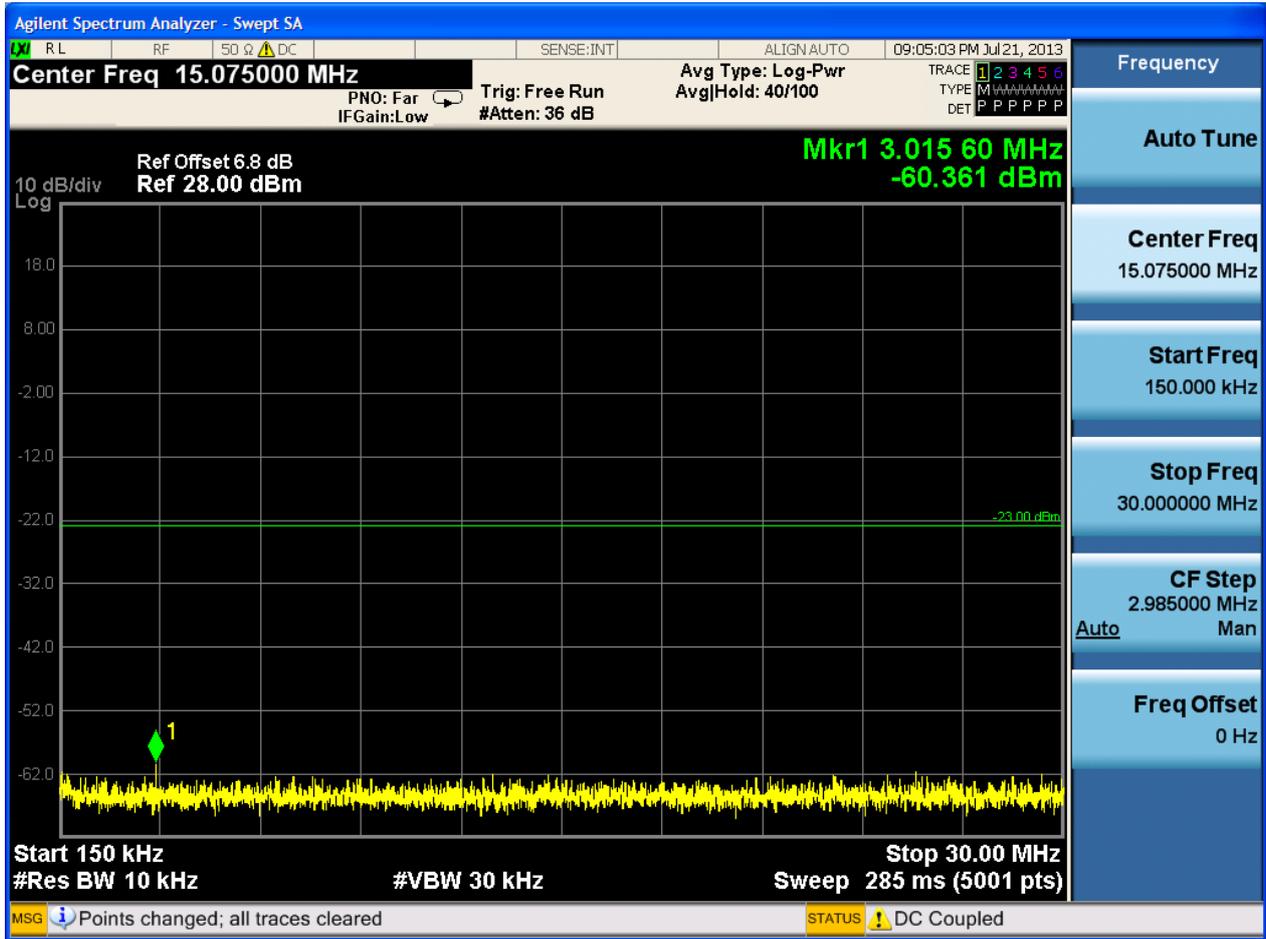


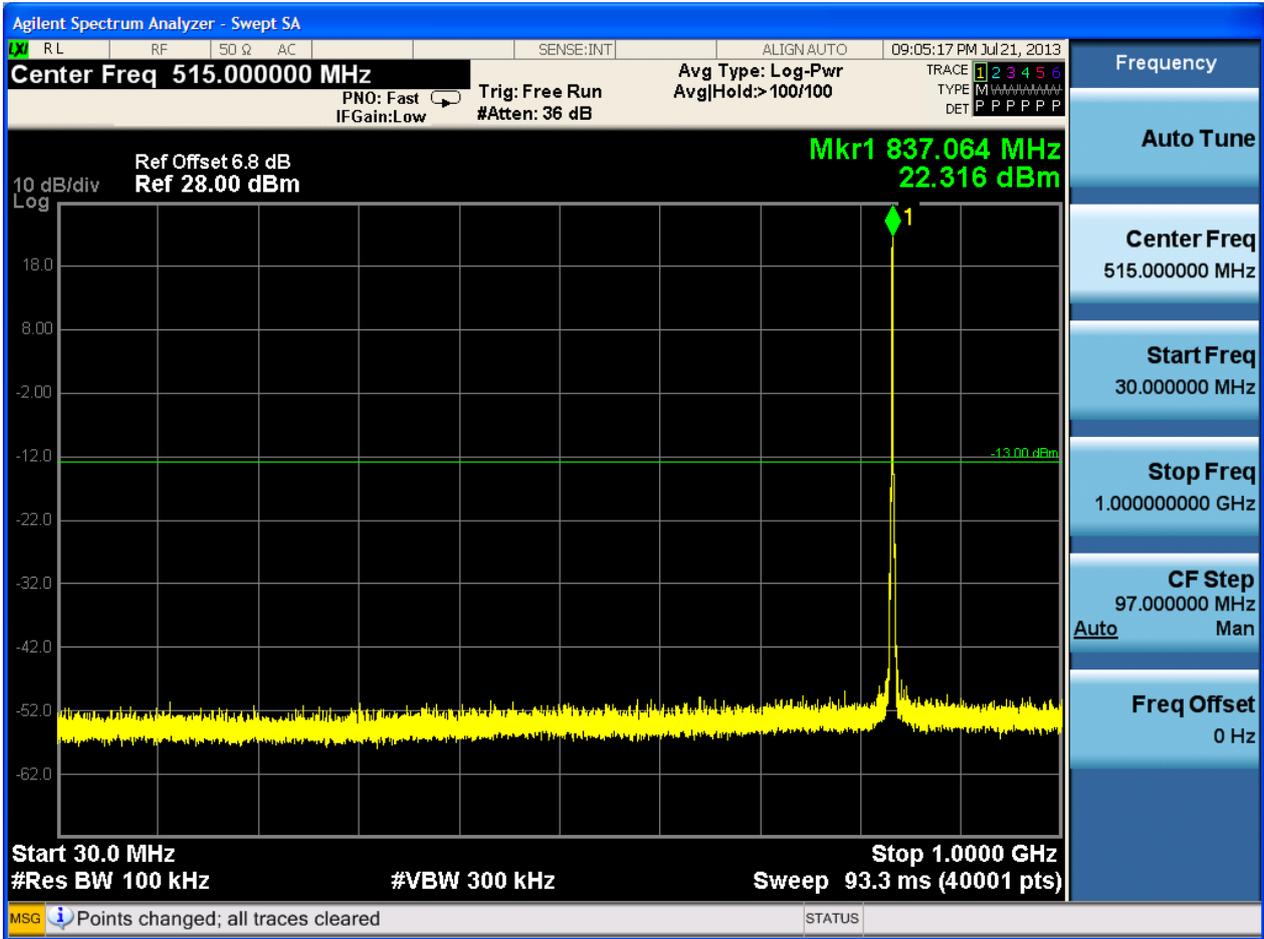


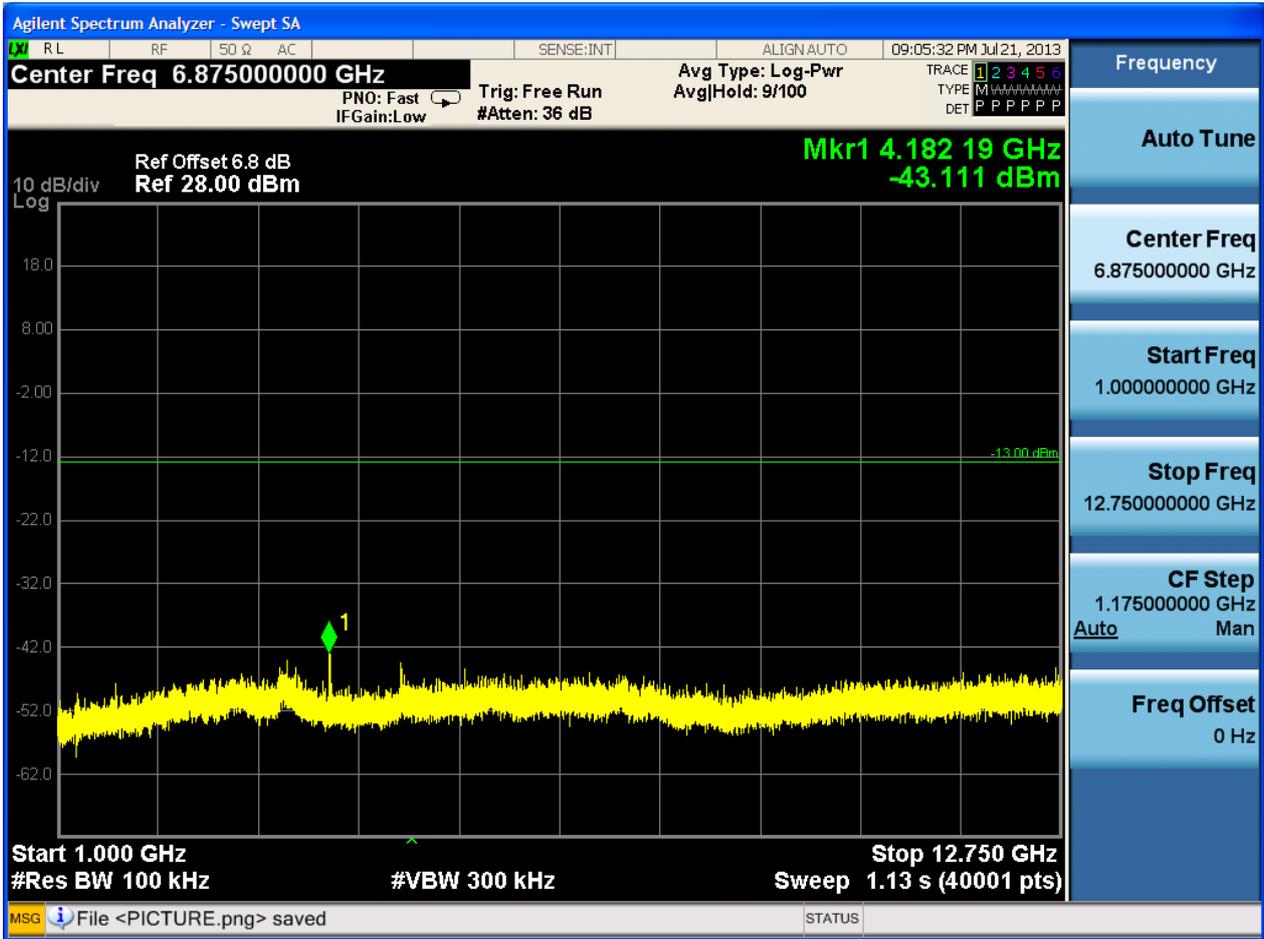


5.1.1.2.2 Test Channel = MCH





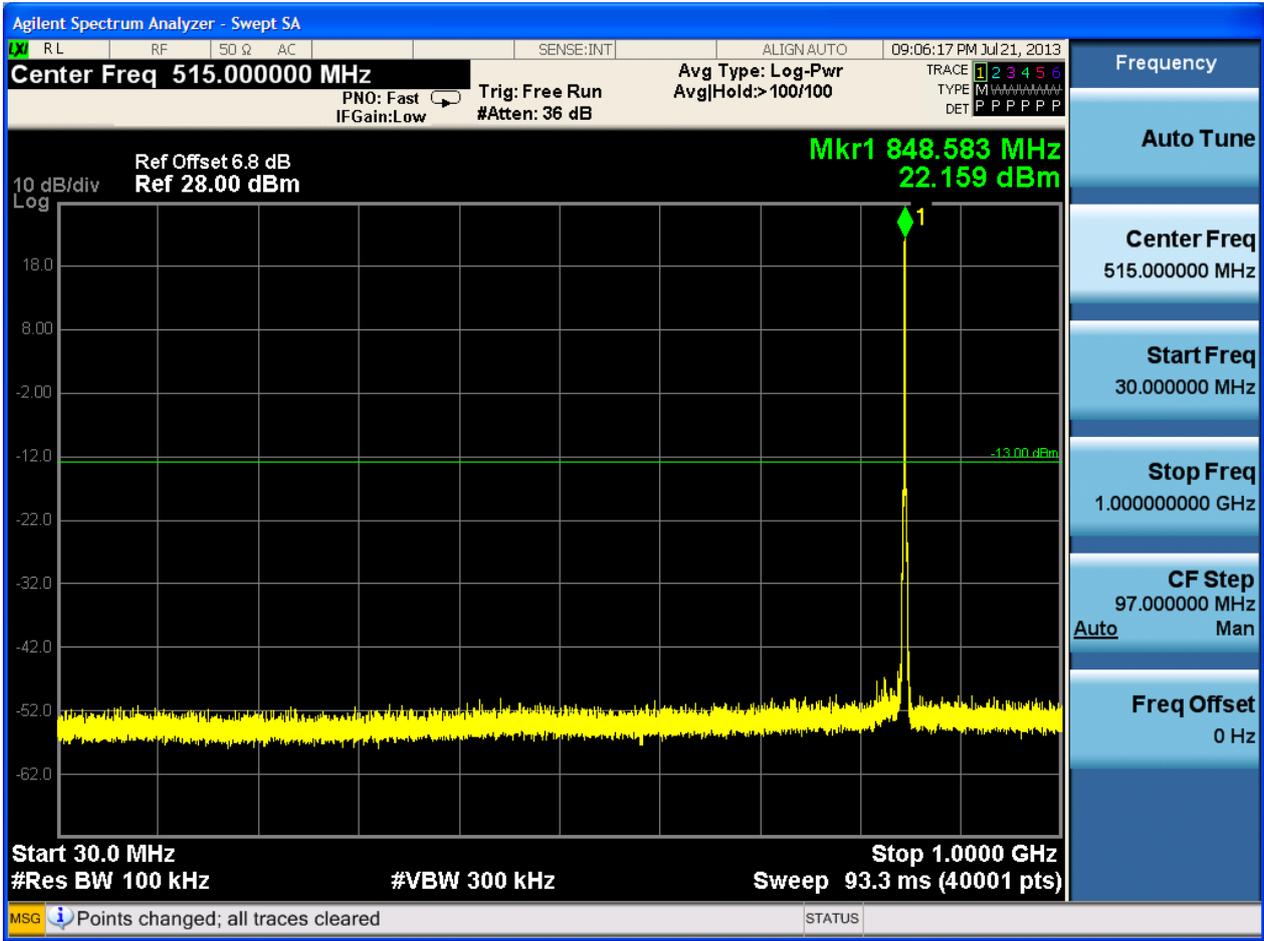






5.1.1.2.3 Test Channel = HCH







5.2 For CDMA/EV-DO

5.2.1 Test Band = BC0

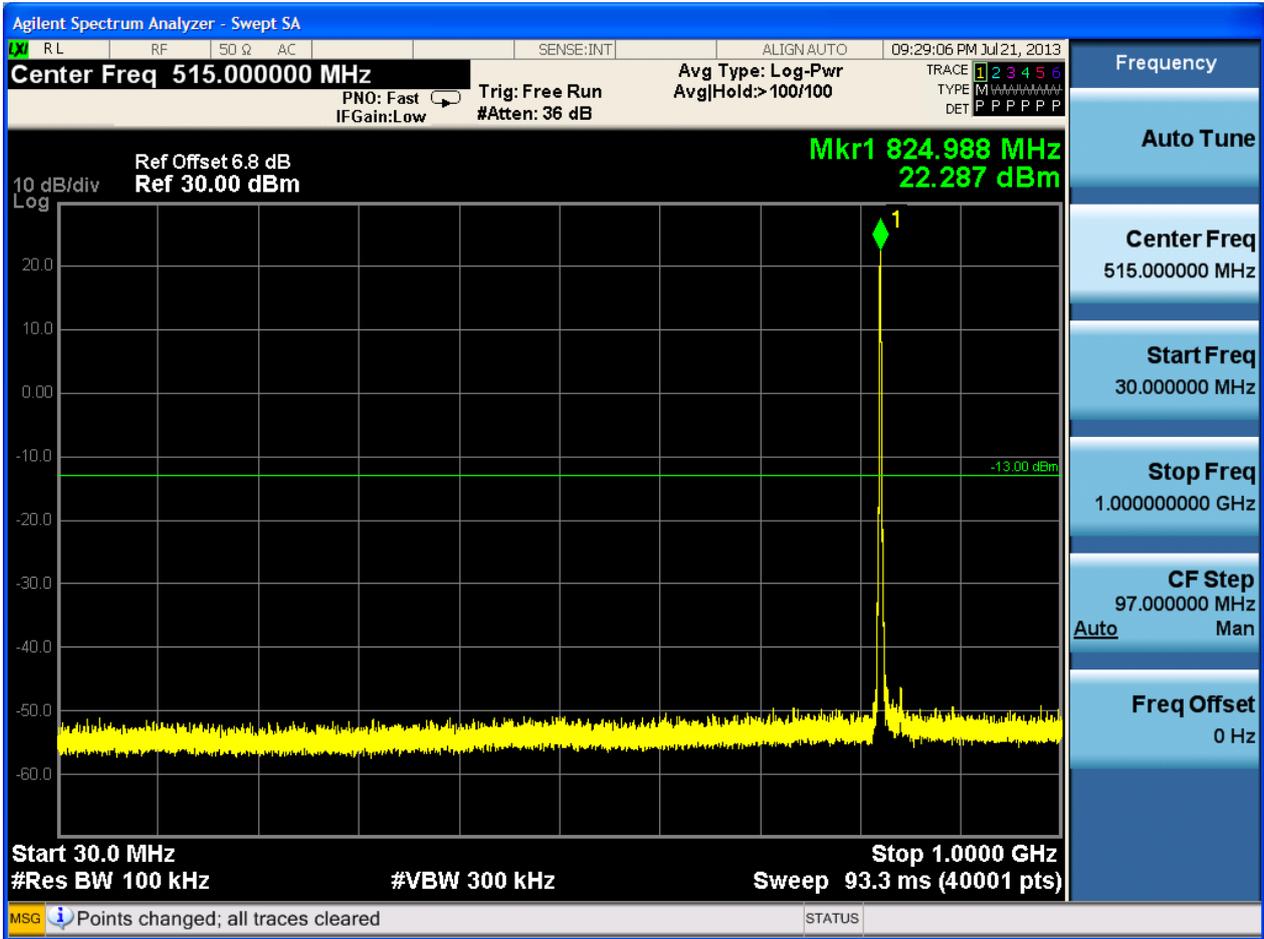
5.2.1.1 Test Mode = CDMA/EV-DO/Subtype0

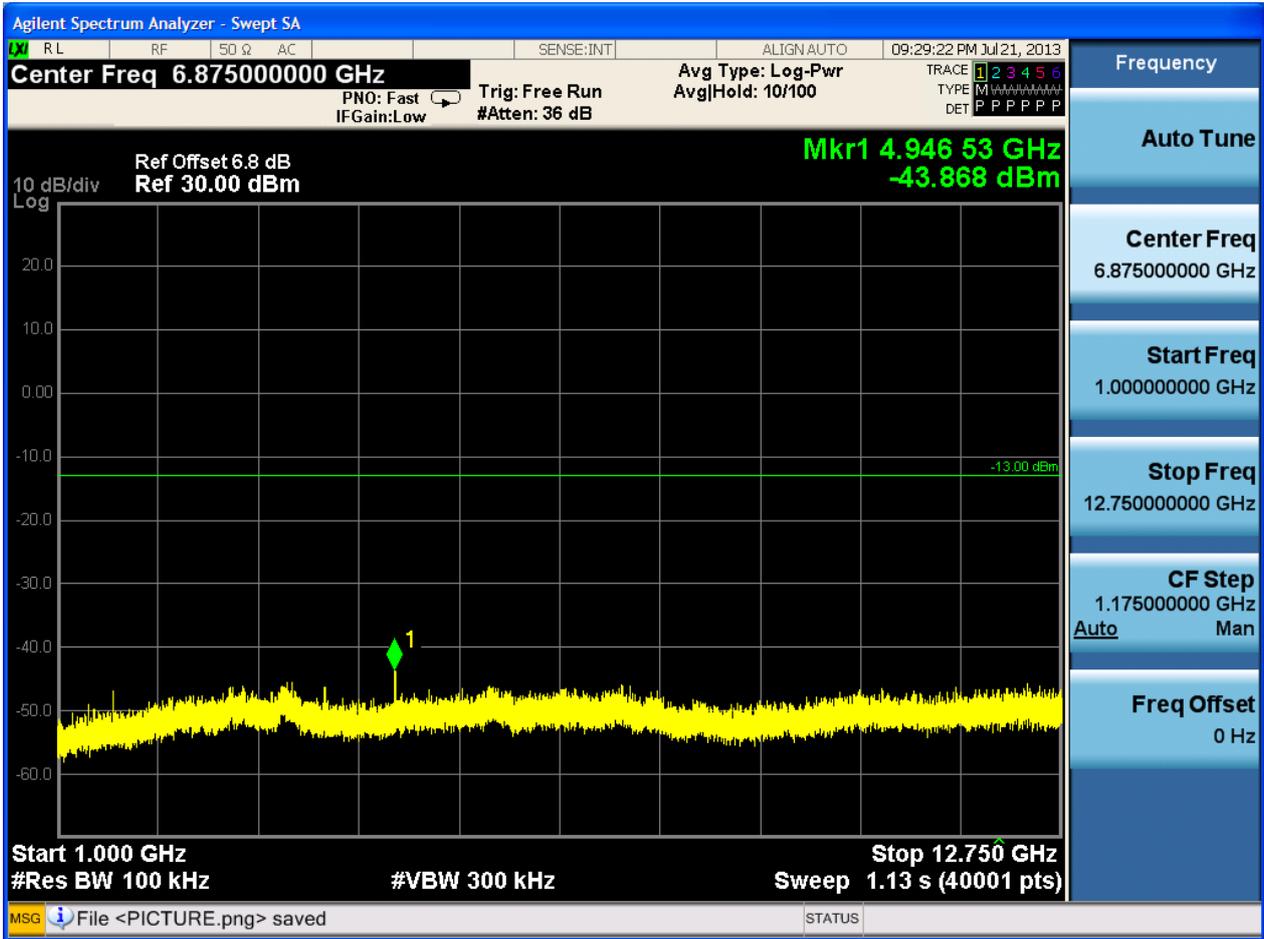
5.2.1.1.1 Test Modulation = HPSK

5.2.1.1.1.1 Test Channel = LCH





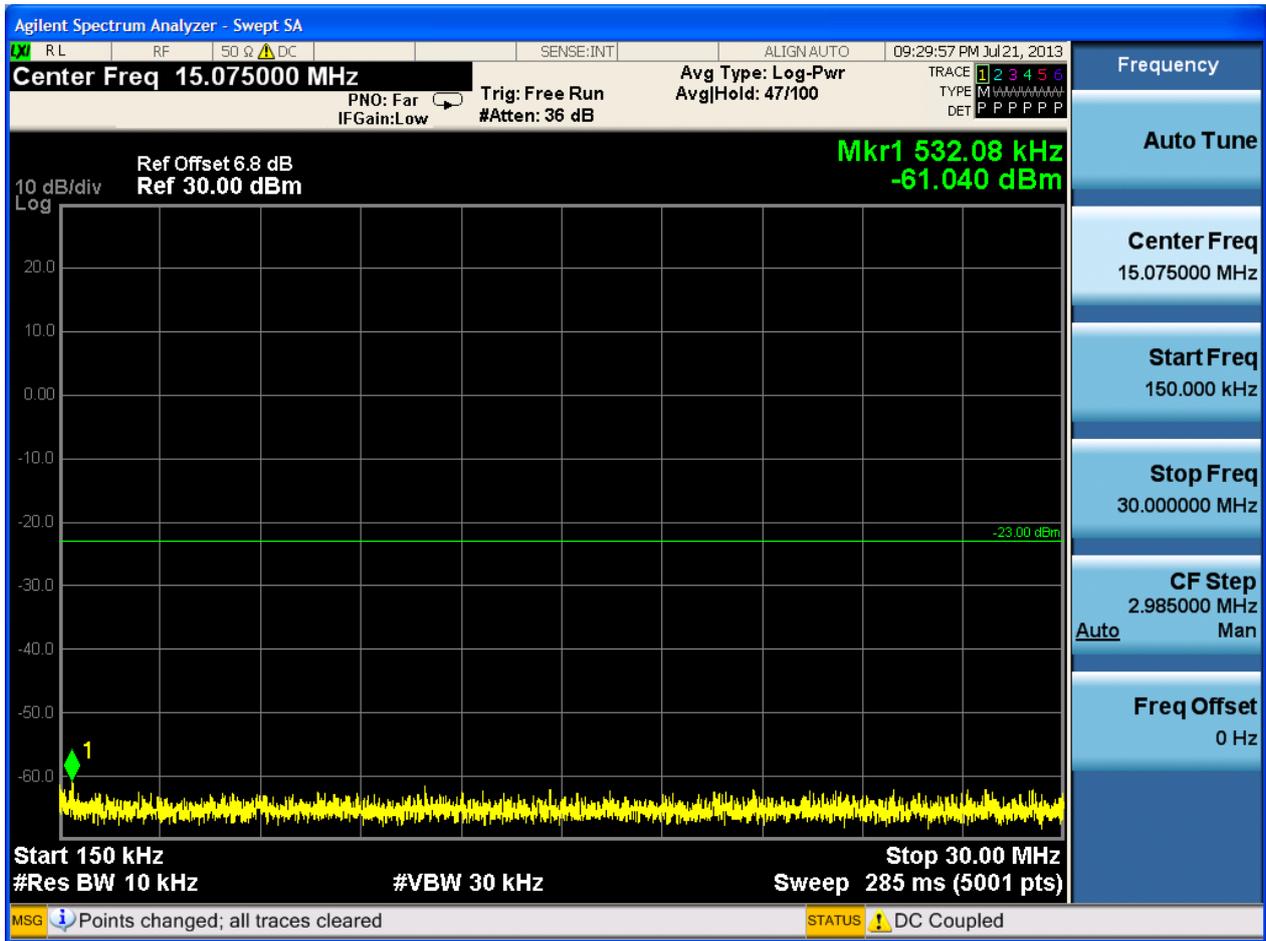


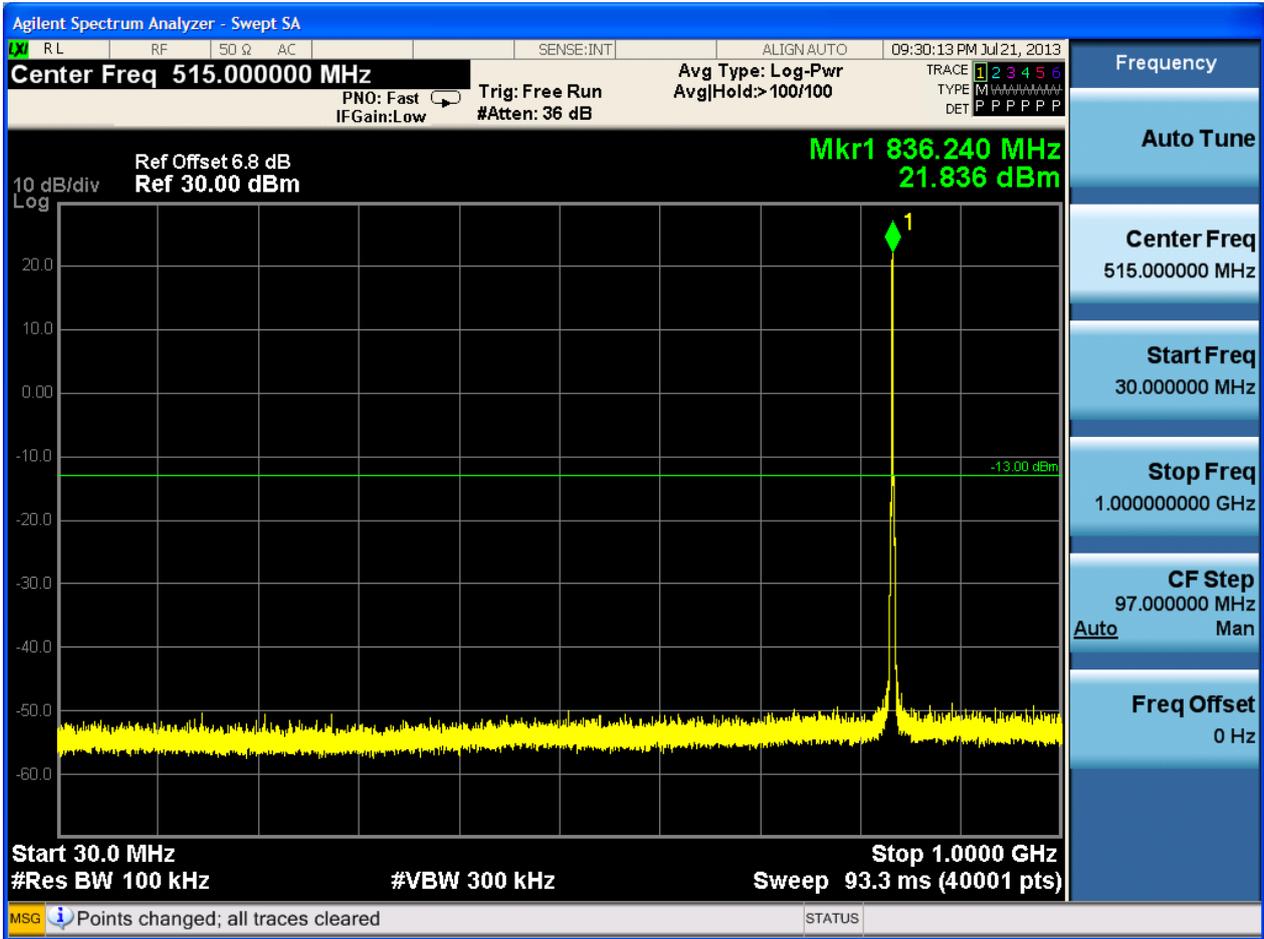




5.2.1.1.1.2 Test Channel = MCH



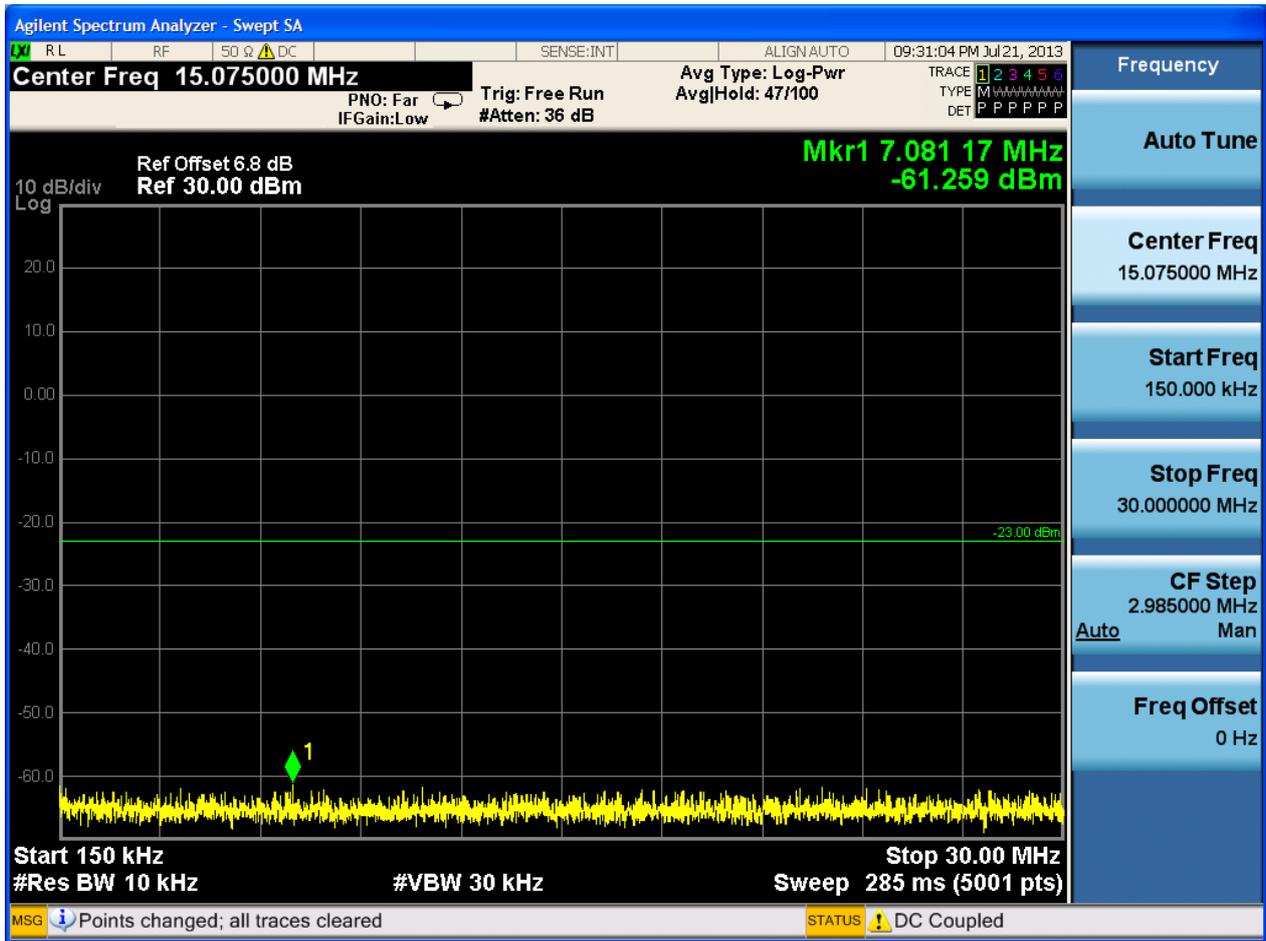


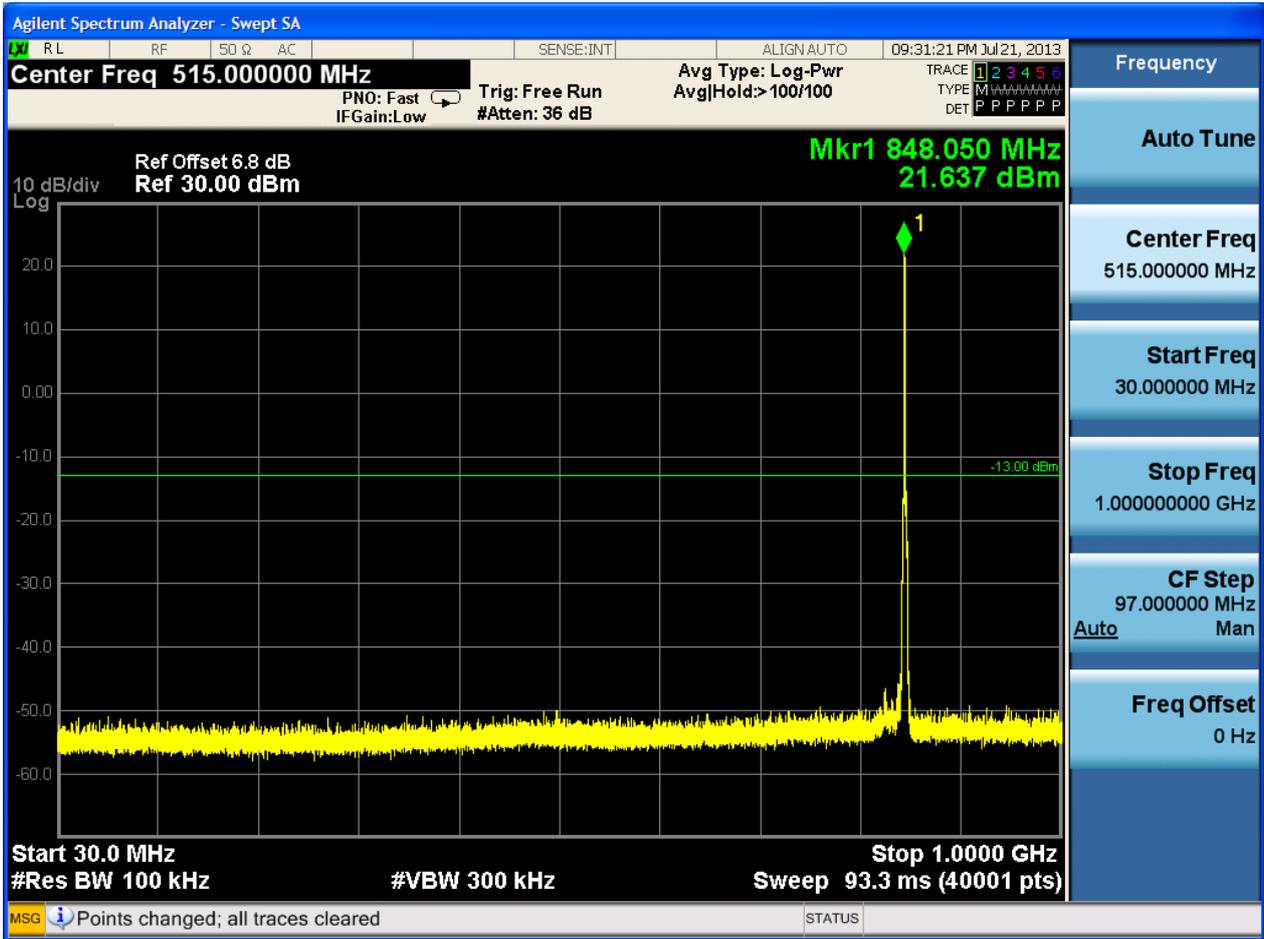


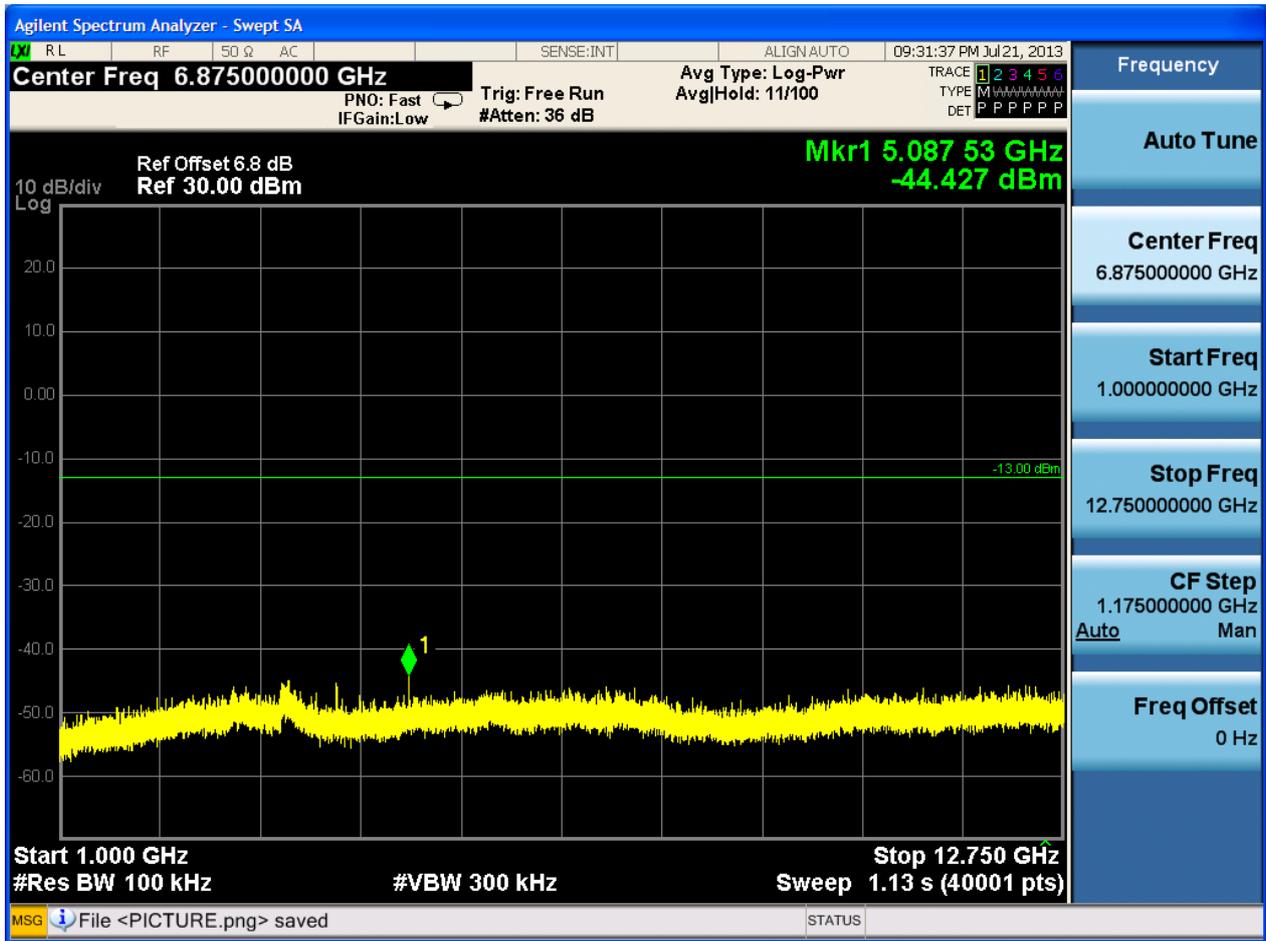


5.2.1.1.1.3 Test Channel = HCH







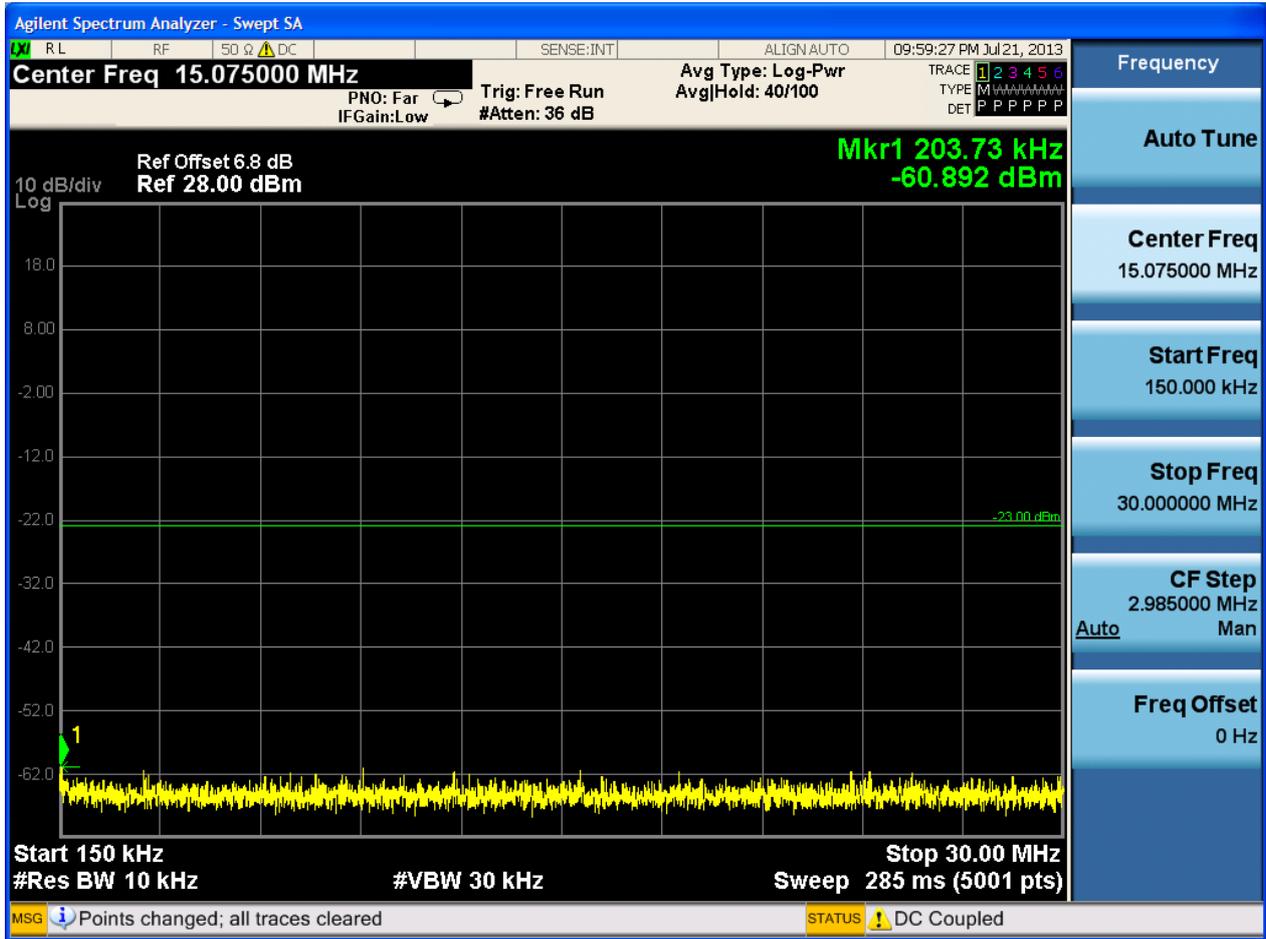


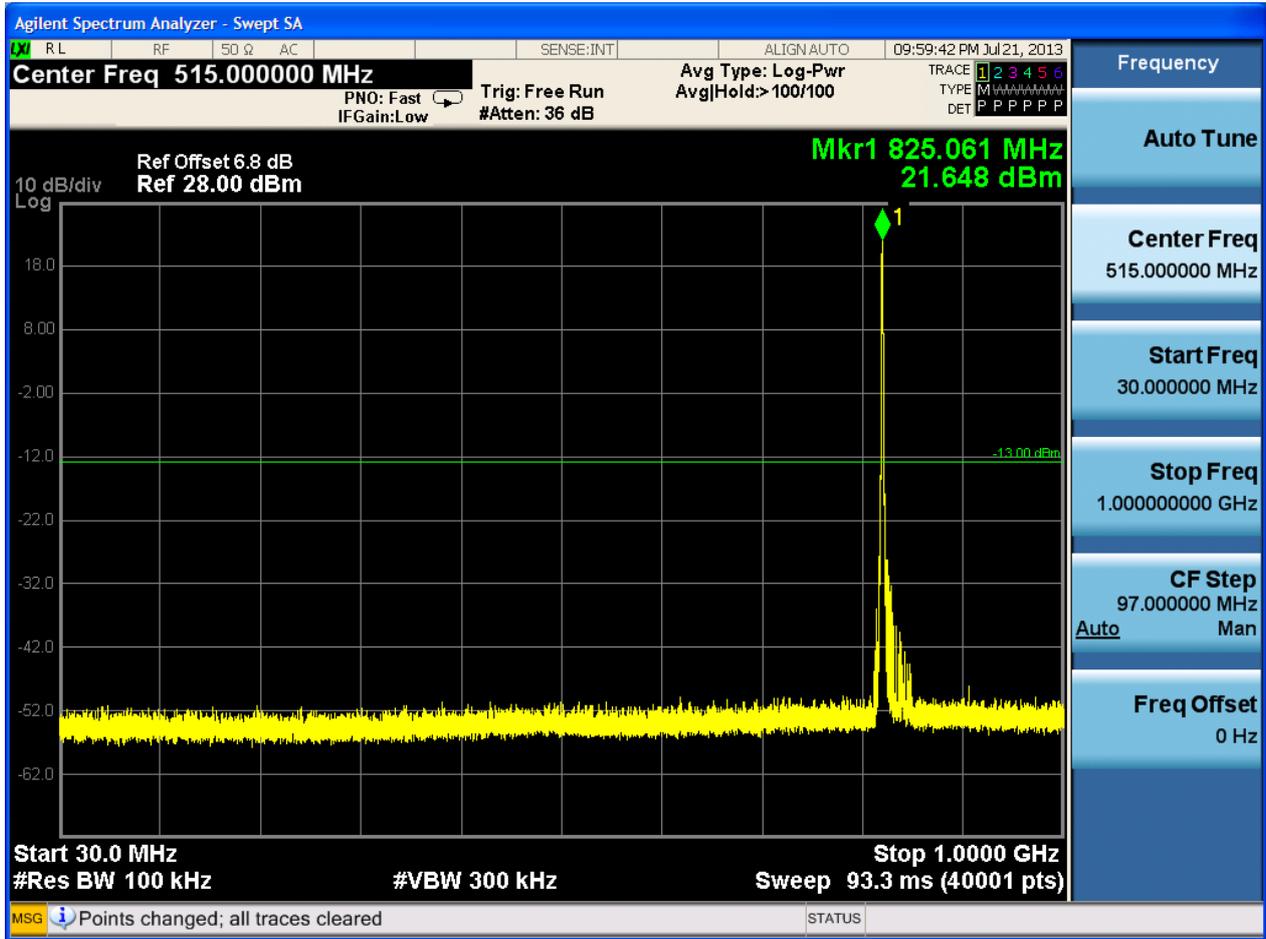
5.2.1.2 Test Mode = CDMA/EV-DO/Subtype2

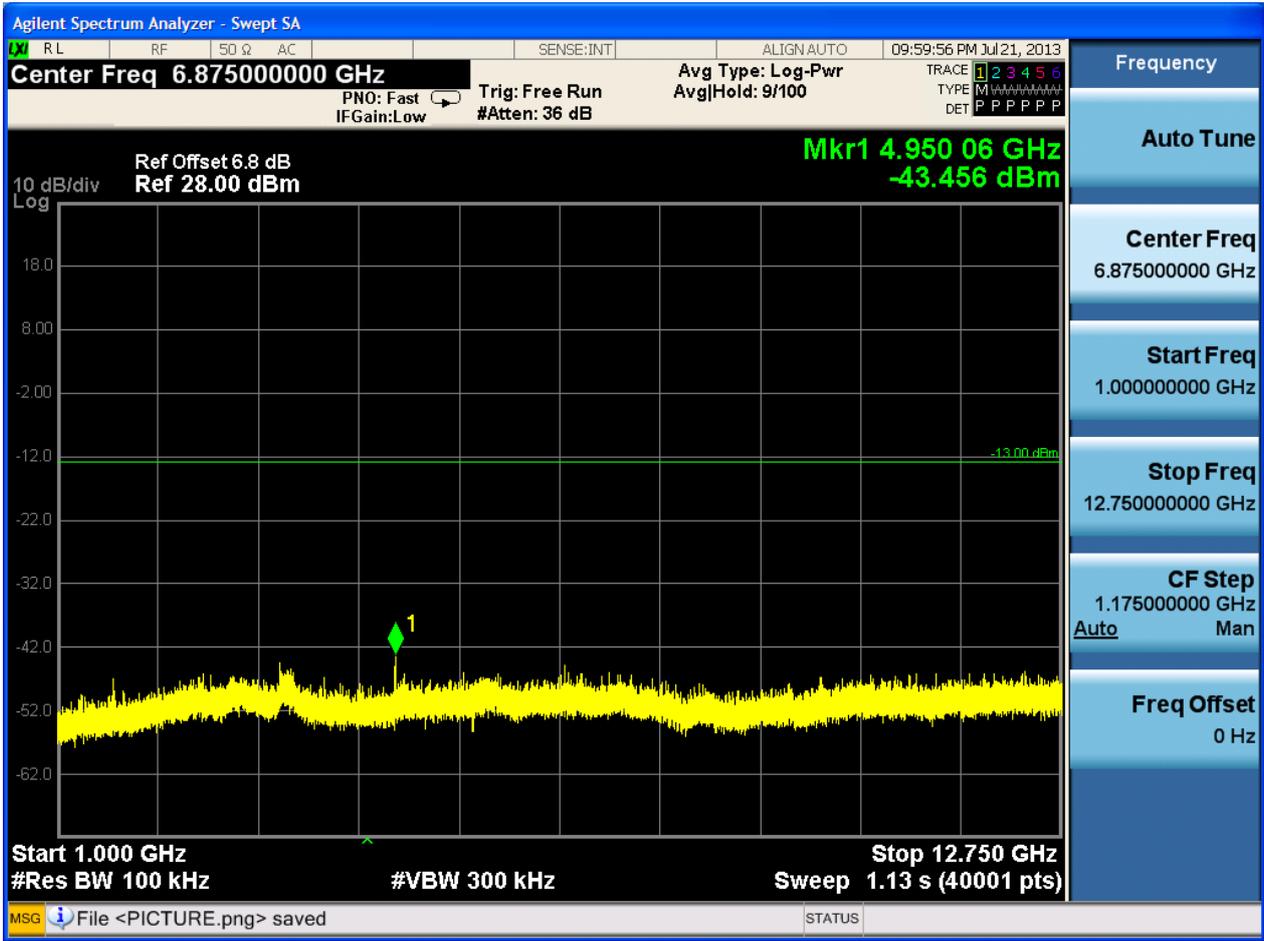
5.2.1.2.1 Test Modulation = BPSK (256 bits)

5.2.1.2.1.1 Test Channel = LCH



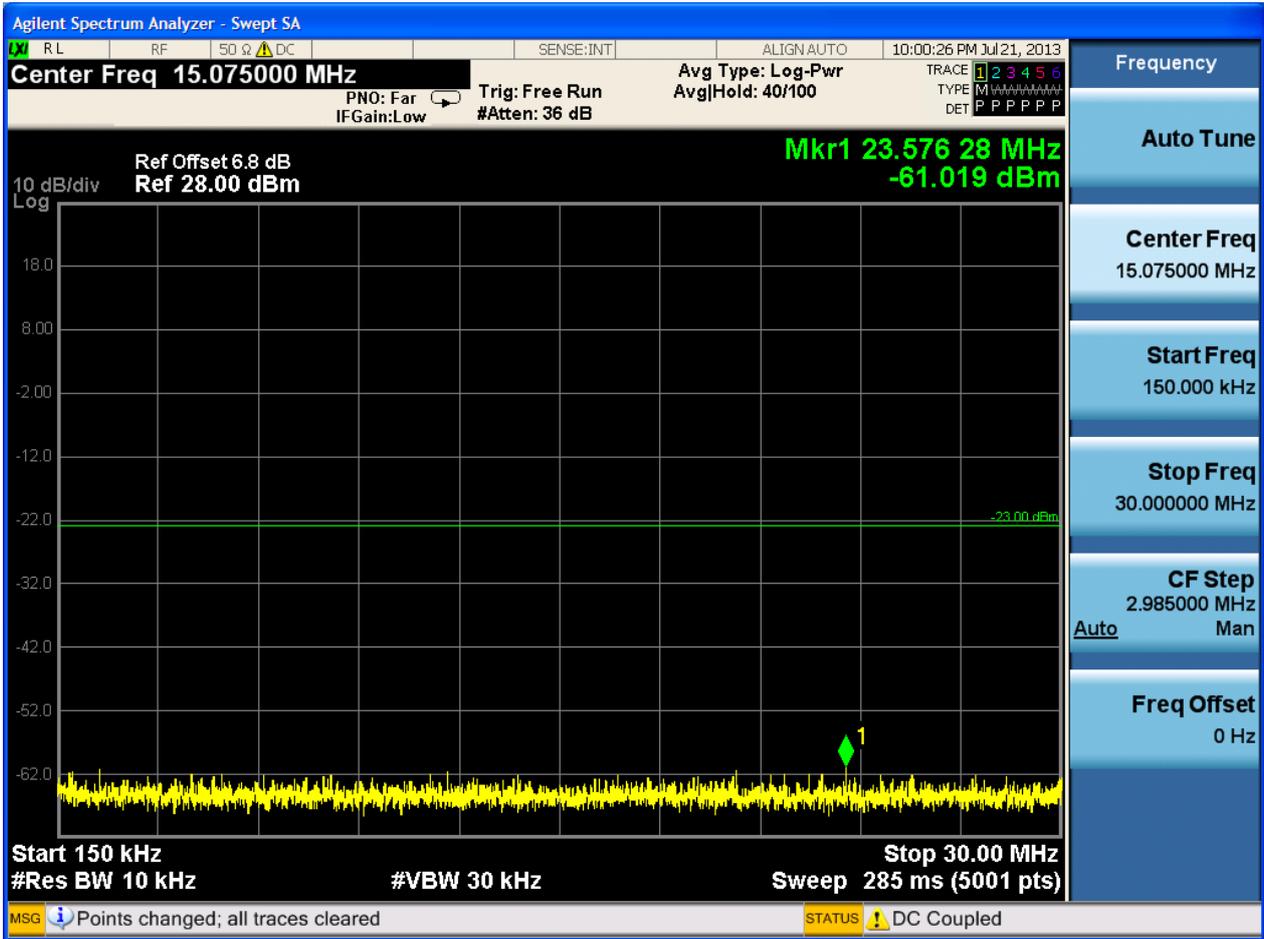


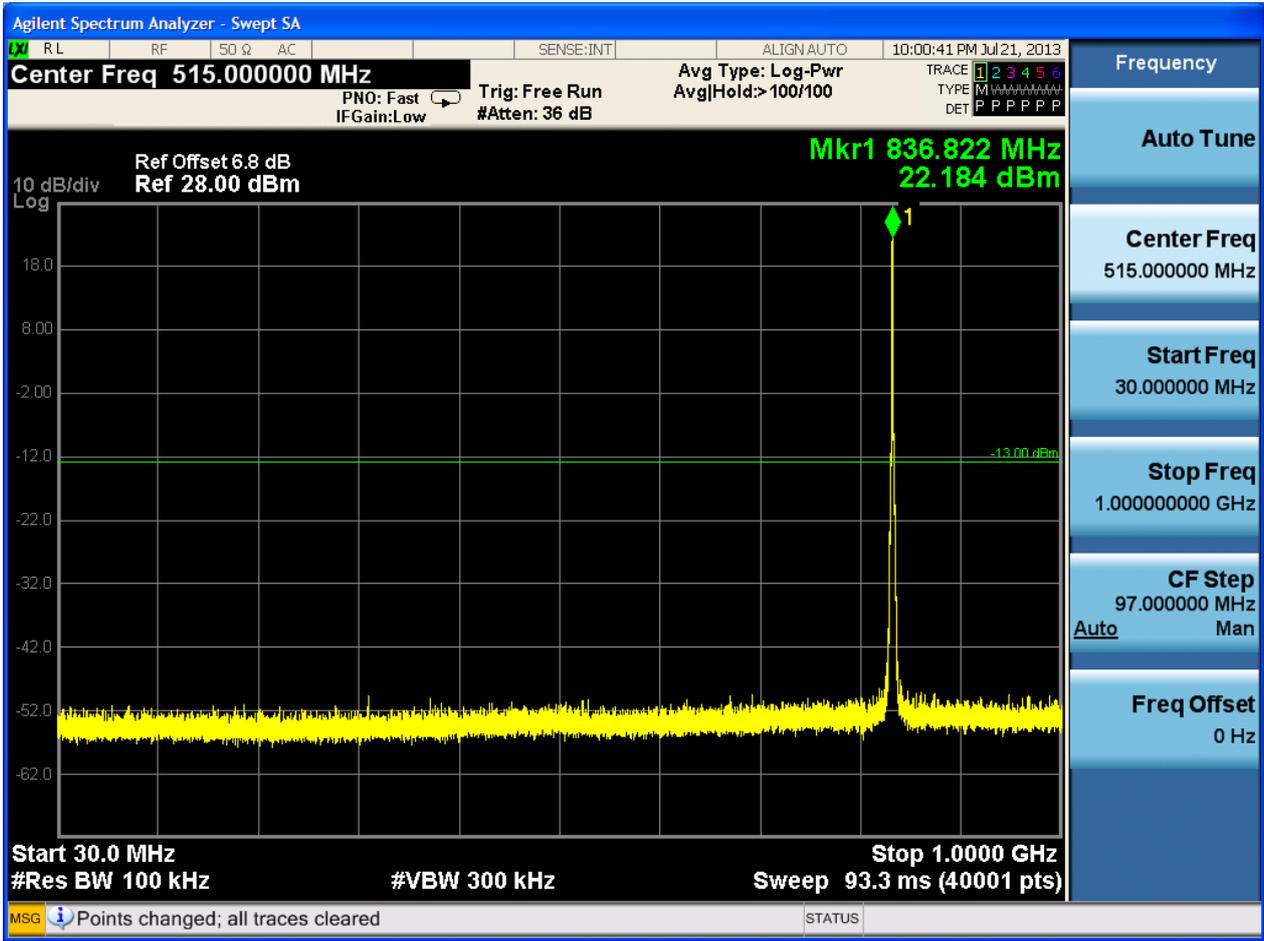


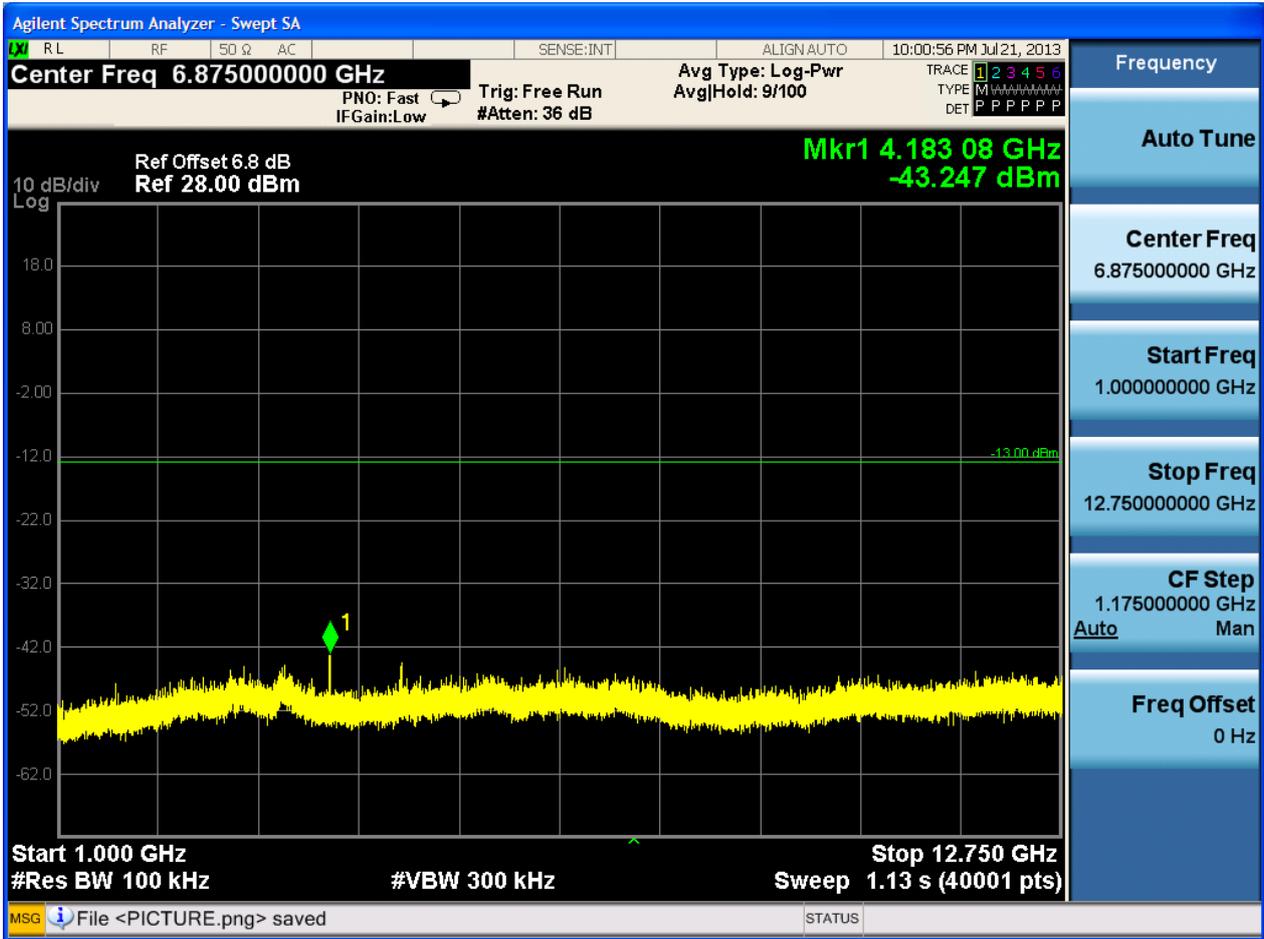


5.2.1.2.1.2 Test Channel = MCH

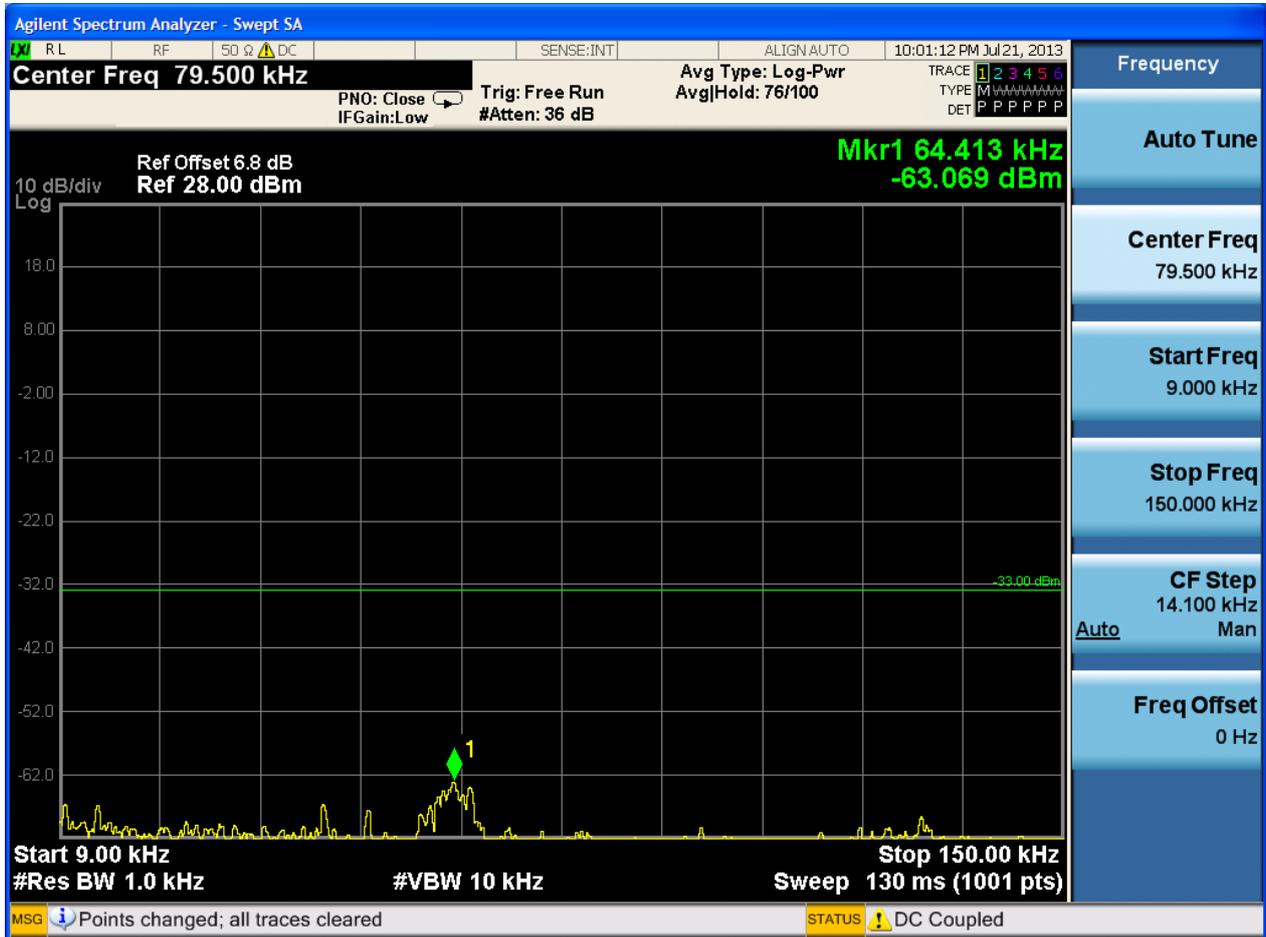


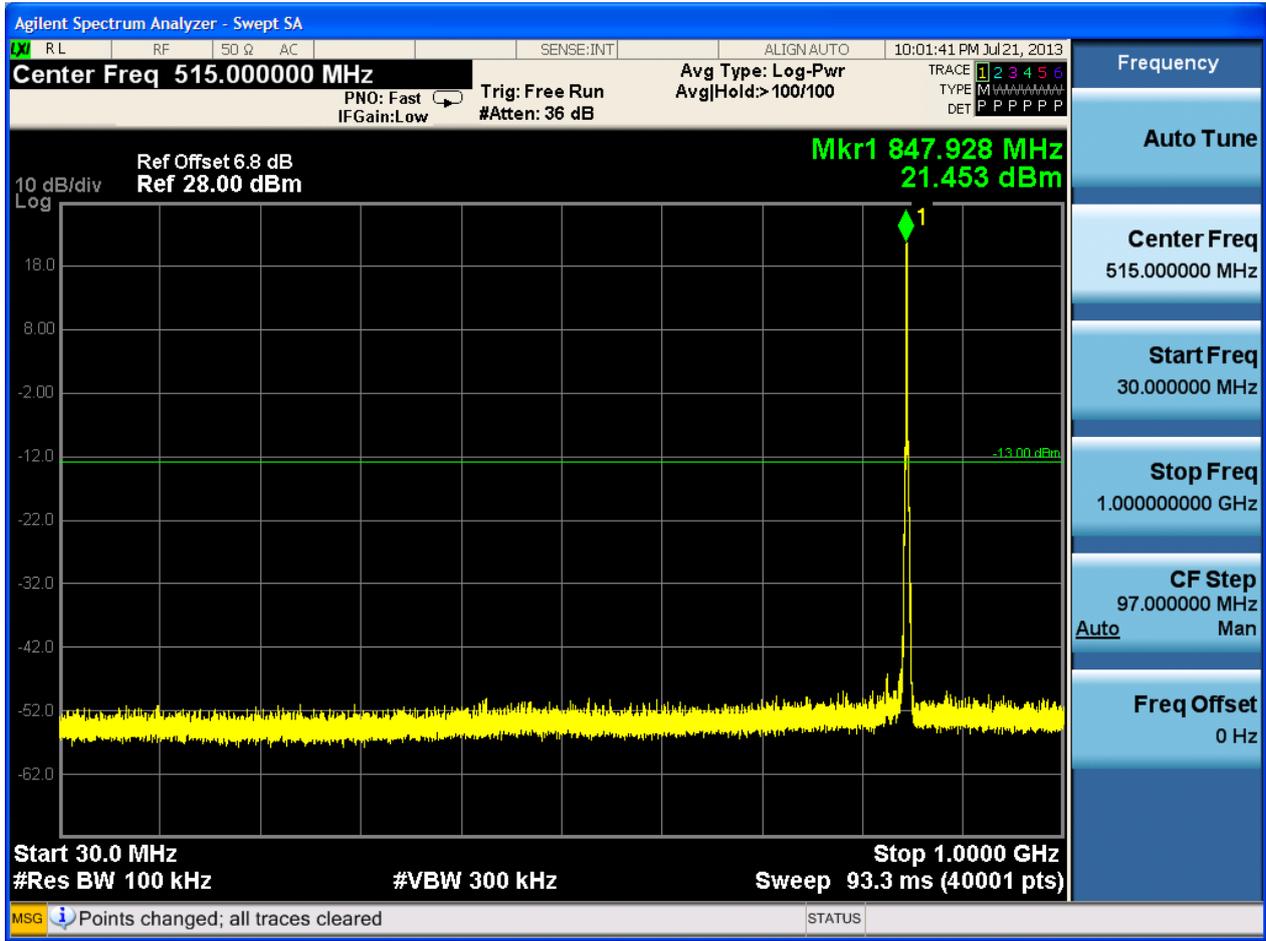


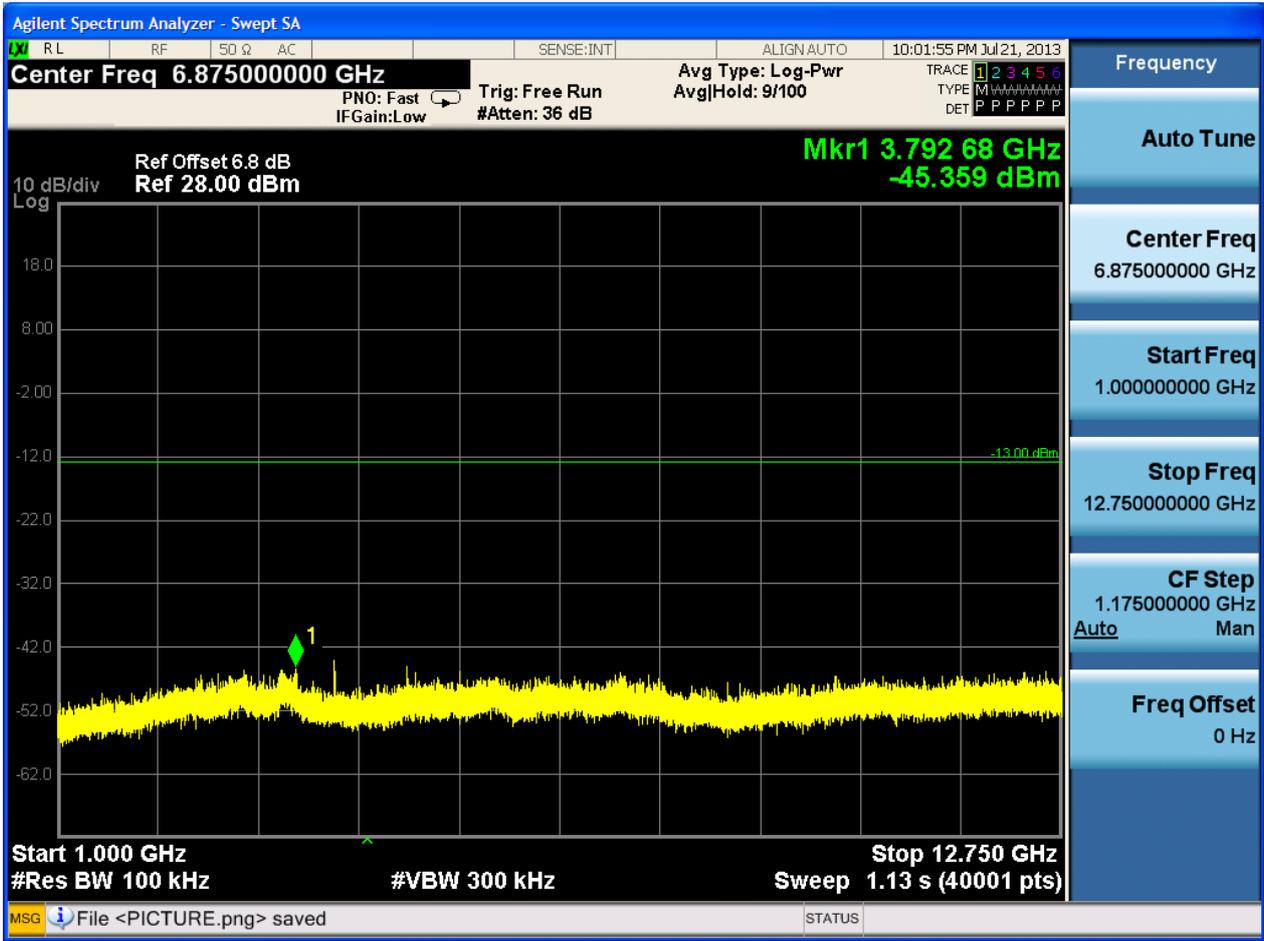




5.2.1.2.1.3 Test Channel = HCH



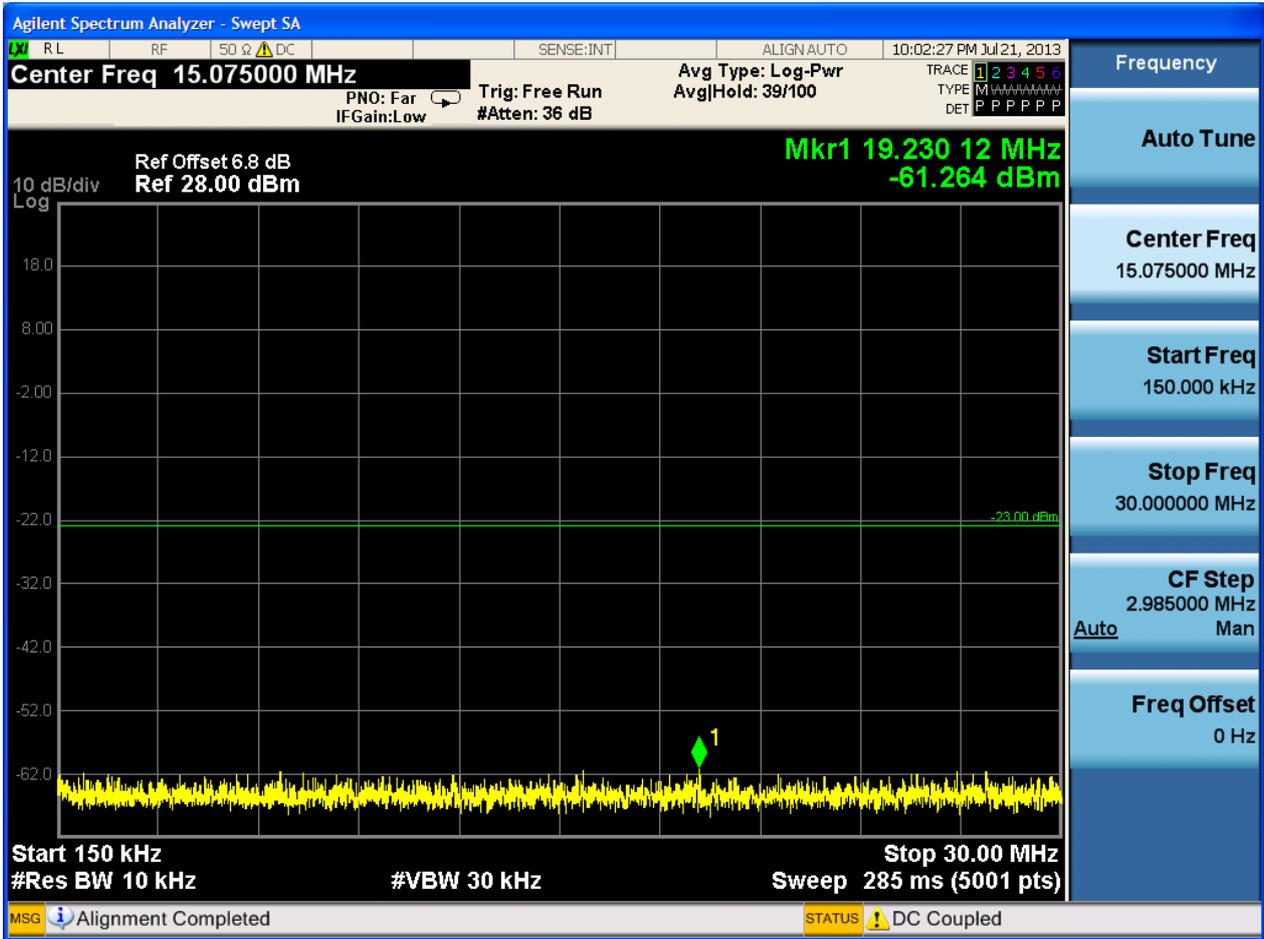


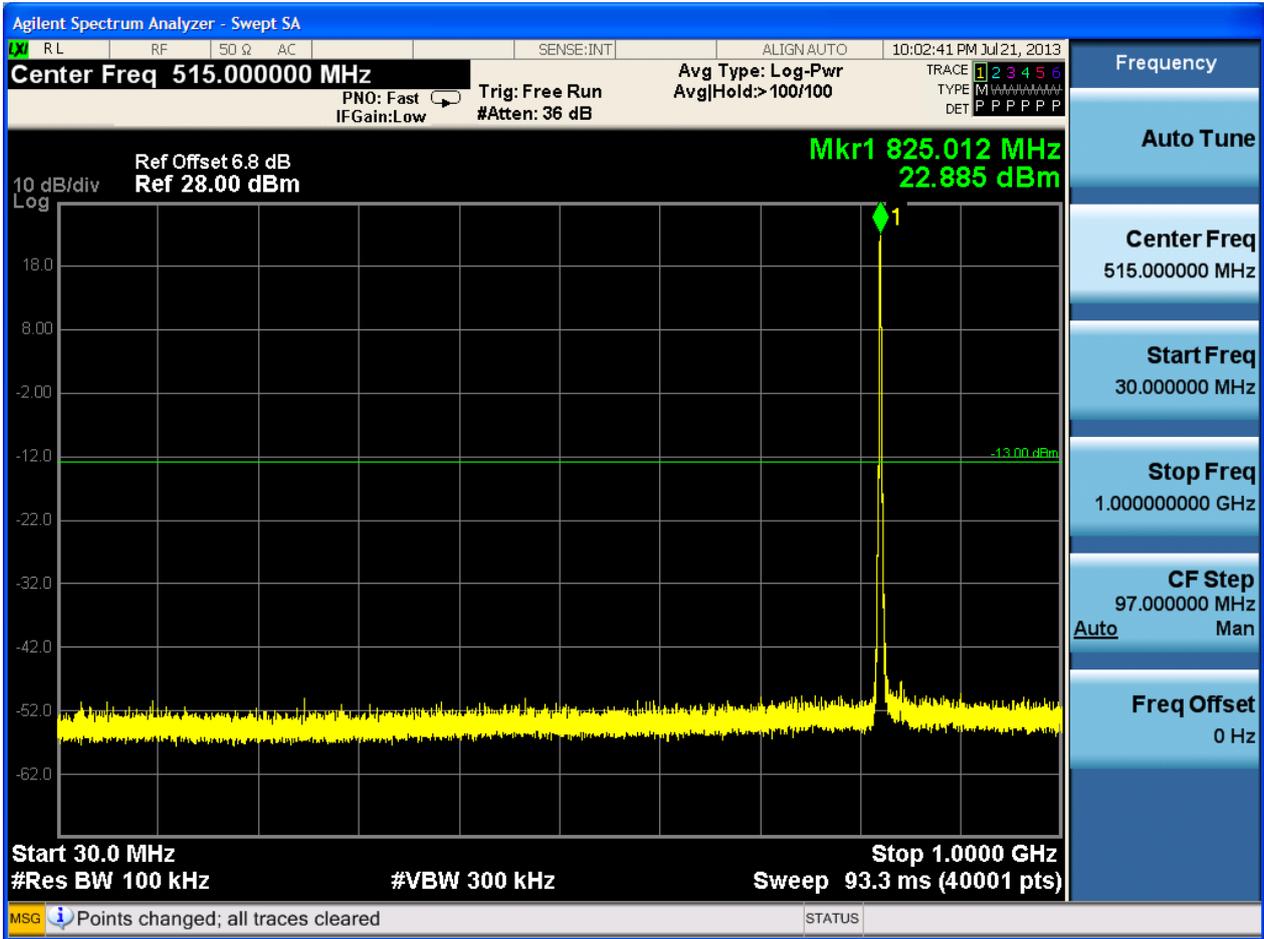


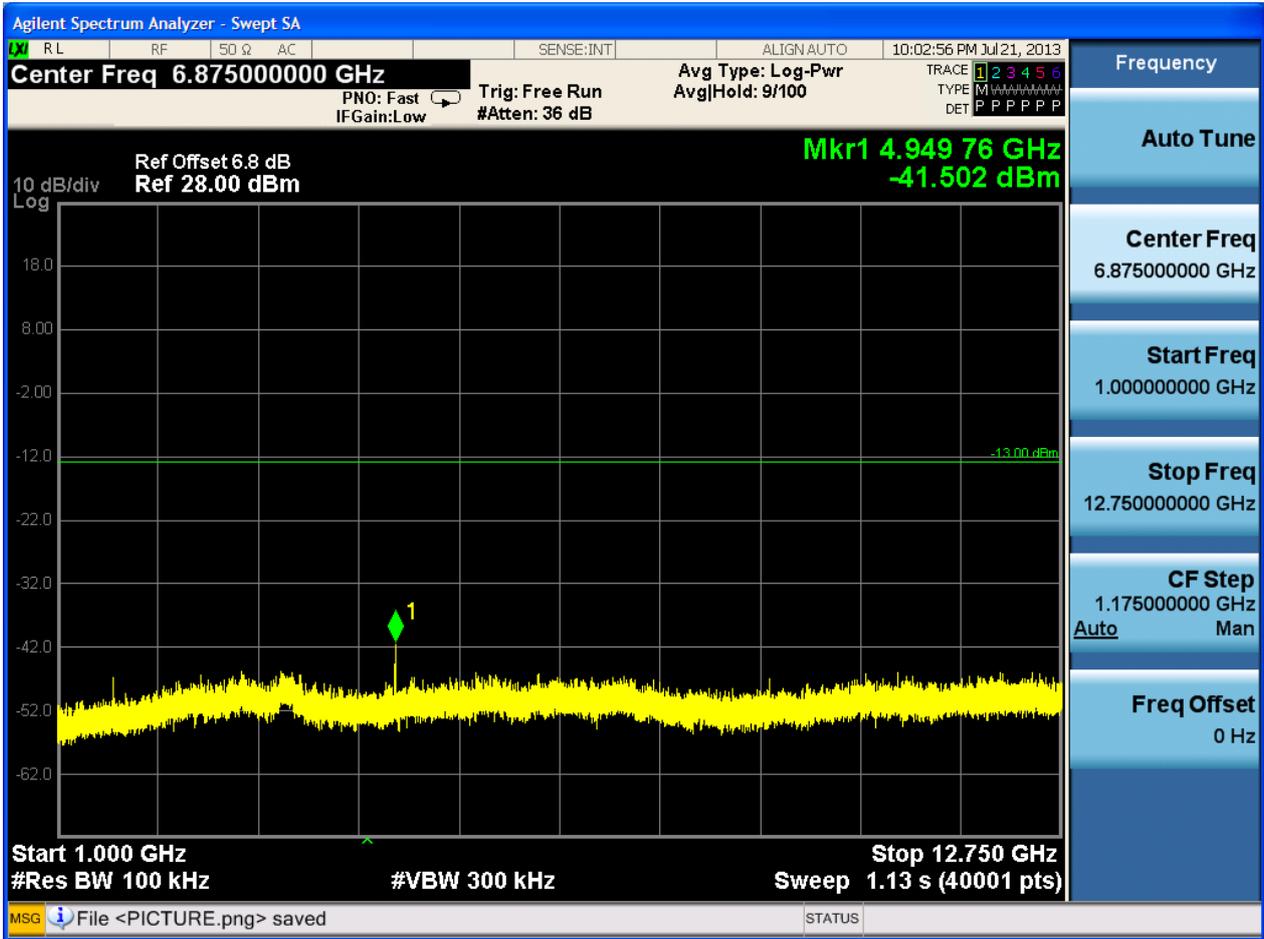
5.2.1.2.2 Test Modulation = QPSK (4096 bits)

5.2.1.2.2.1 Test Channel = LCH



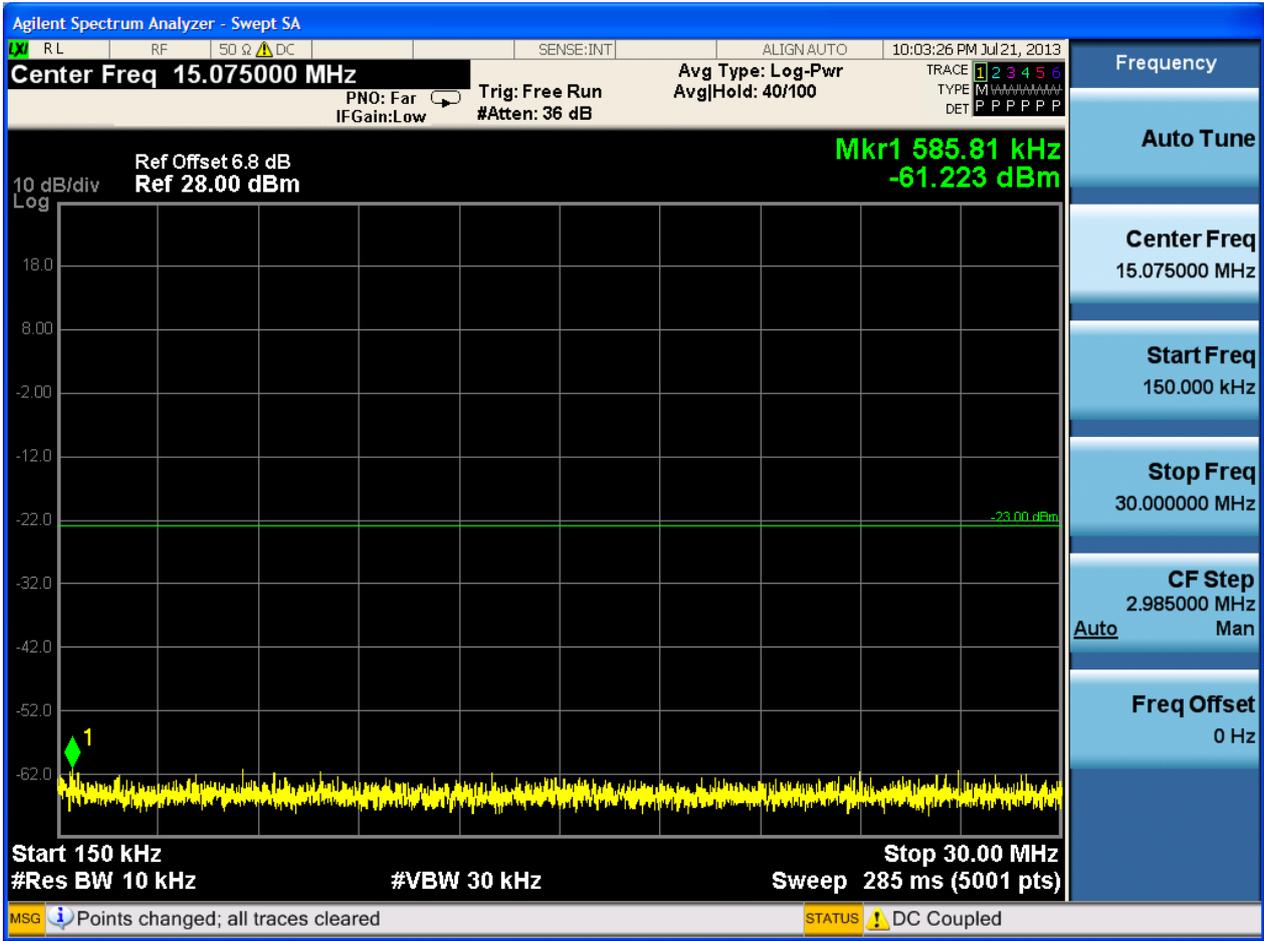


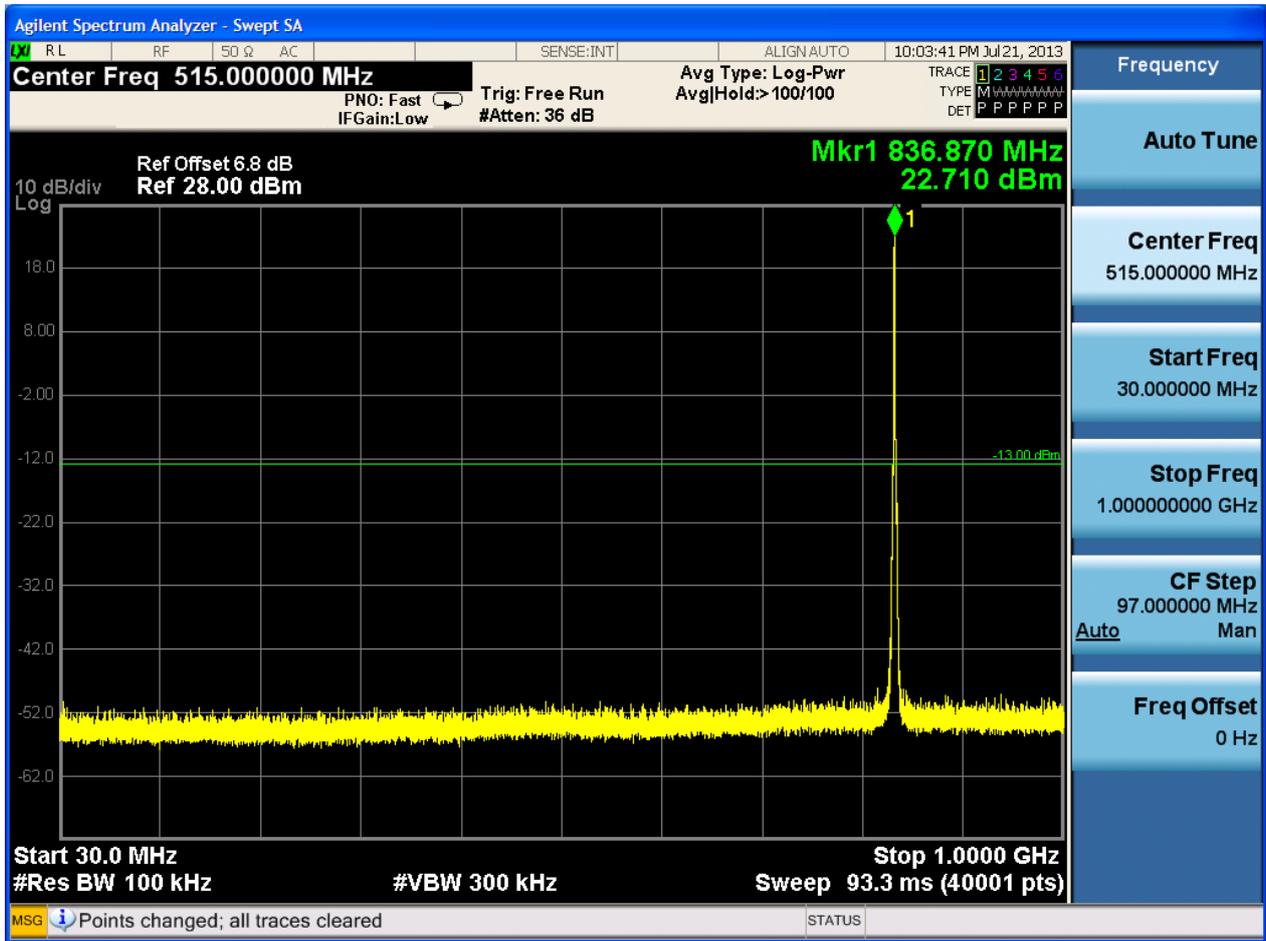




5.2.1.2.2.2 Test Channel = MCH

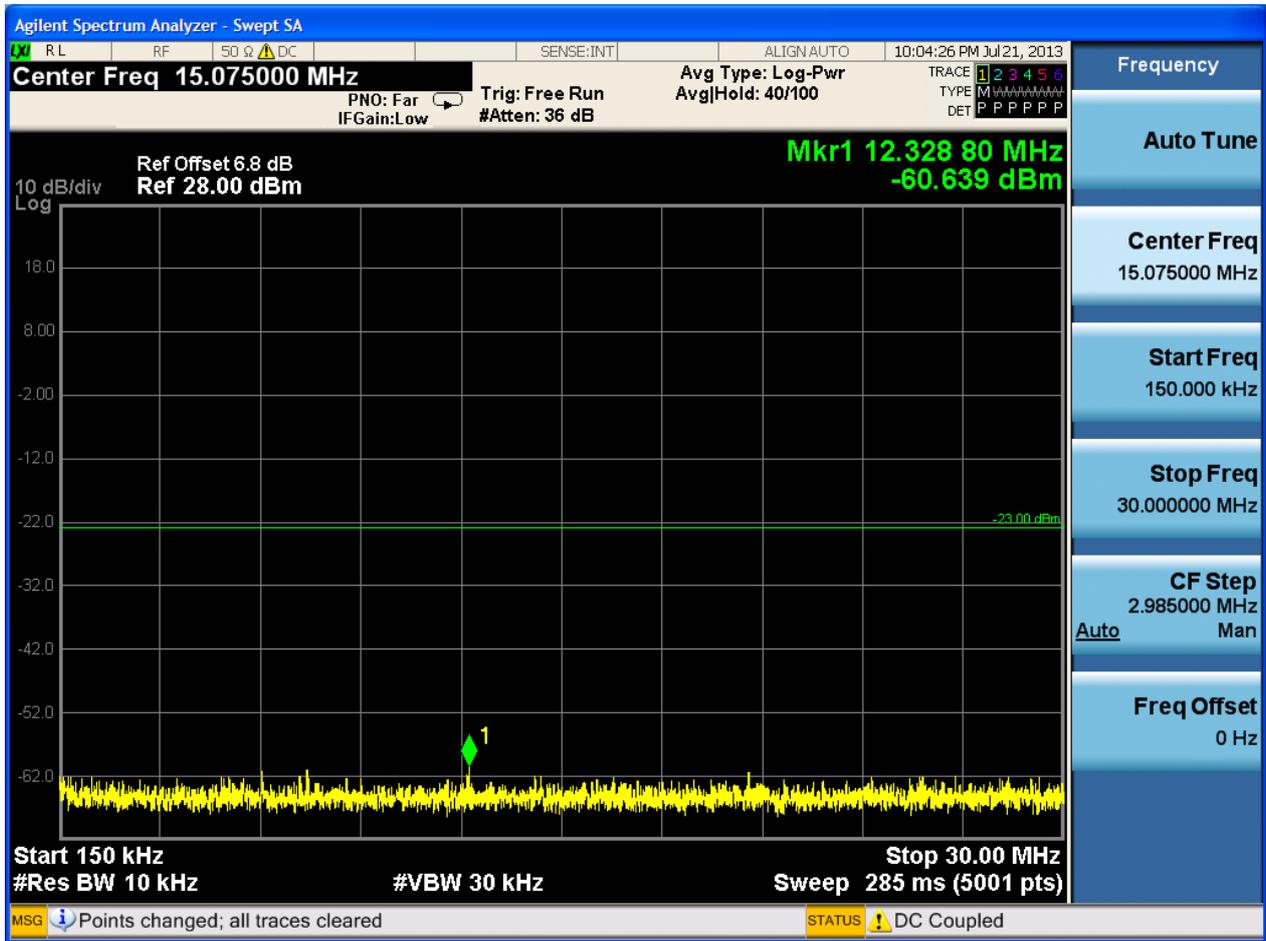


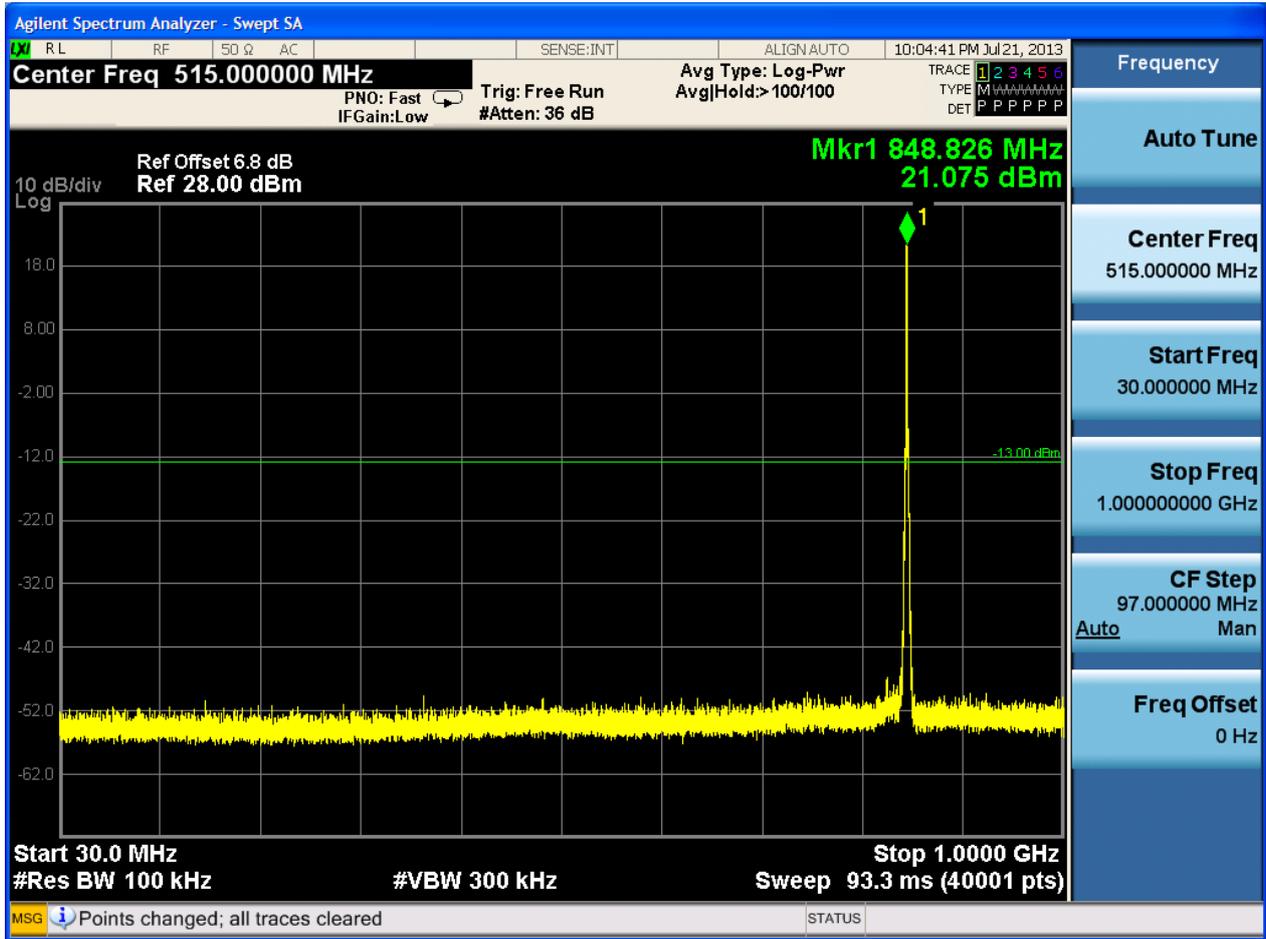


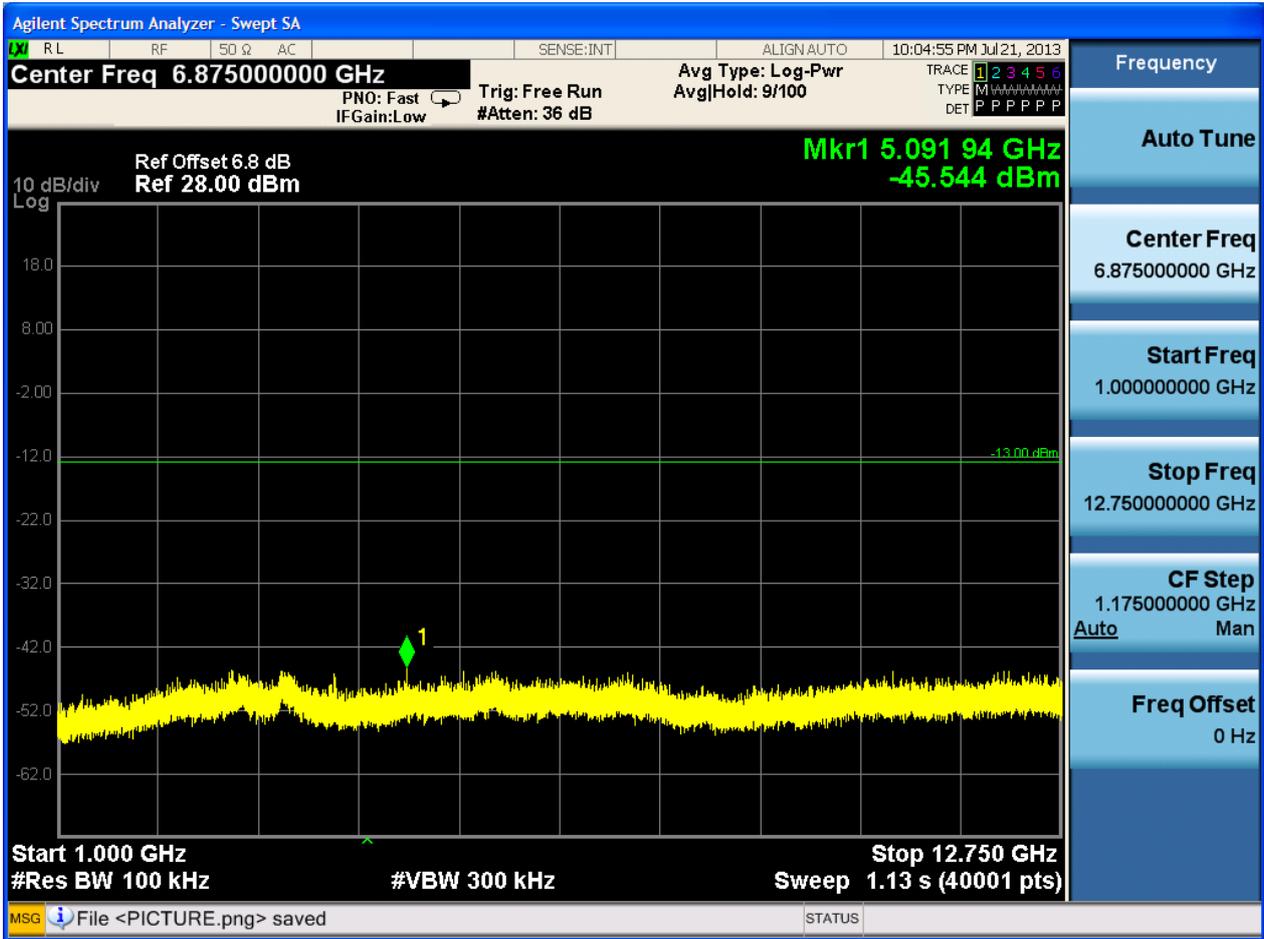


5.2.1.2.2.3 Test Channel = HCH







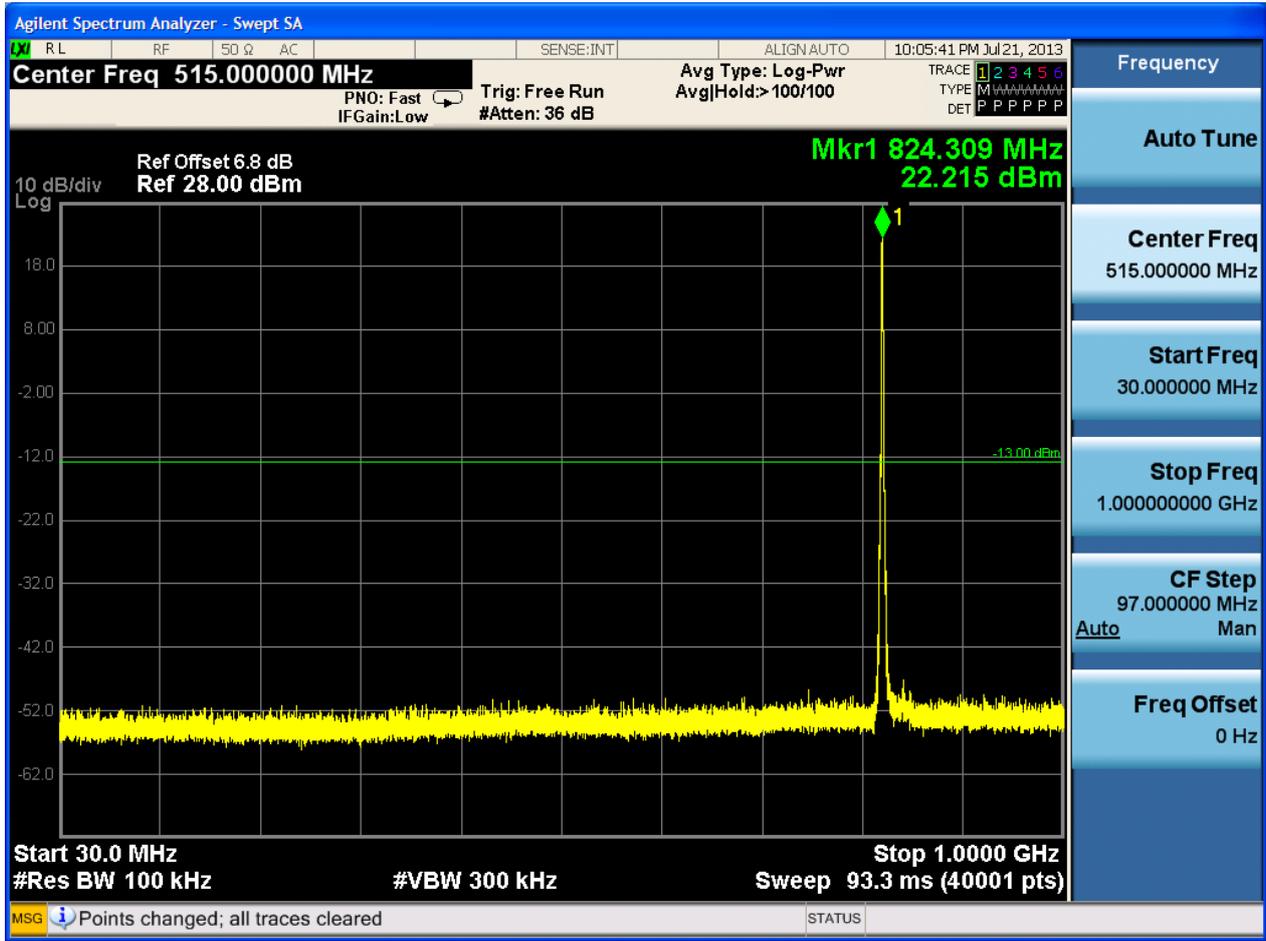


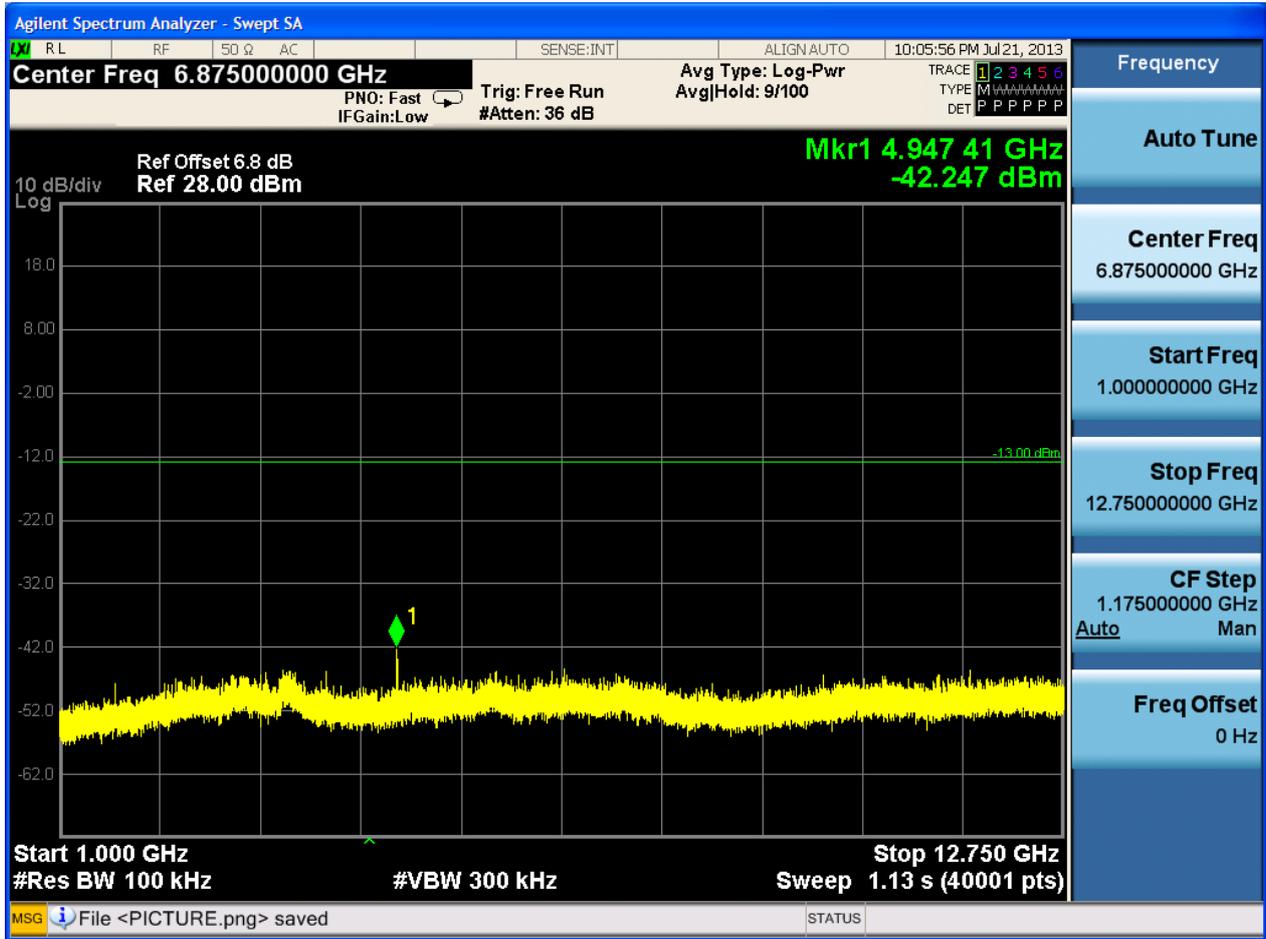


5.2.1.2.3 Test Modulation = 8-PSK (12288 bits)

5.2.1.2.3.1 Test Channel = LCH



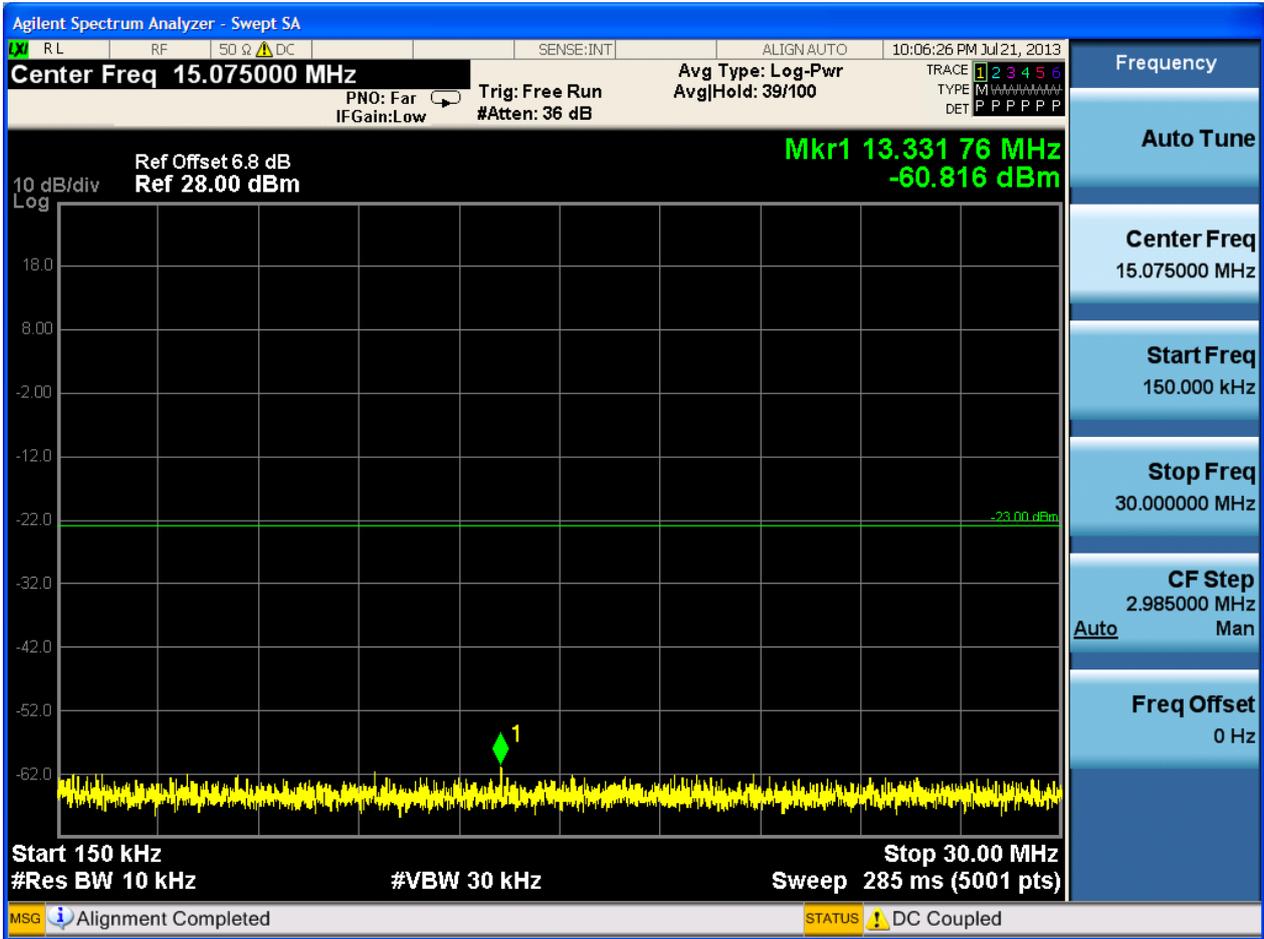


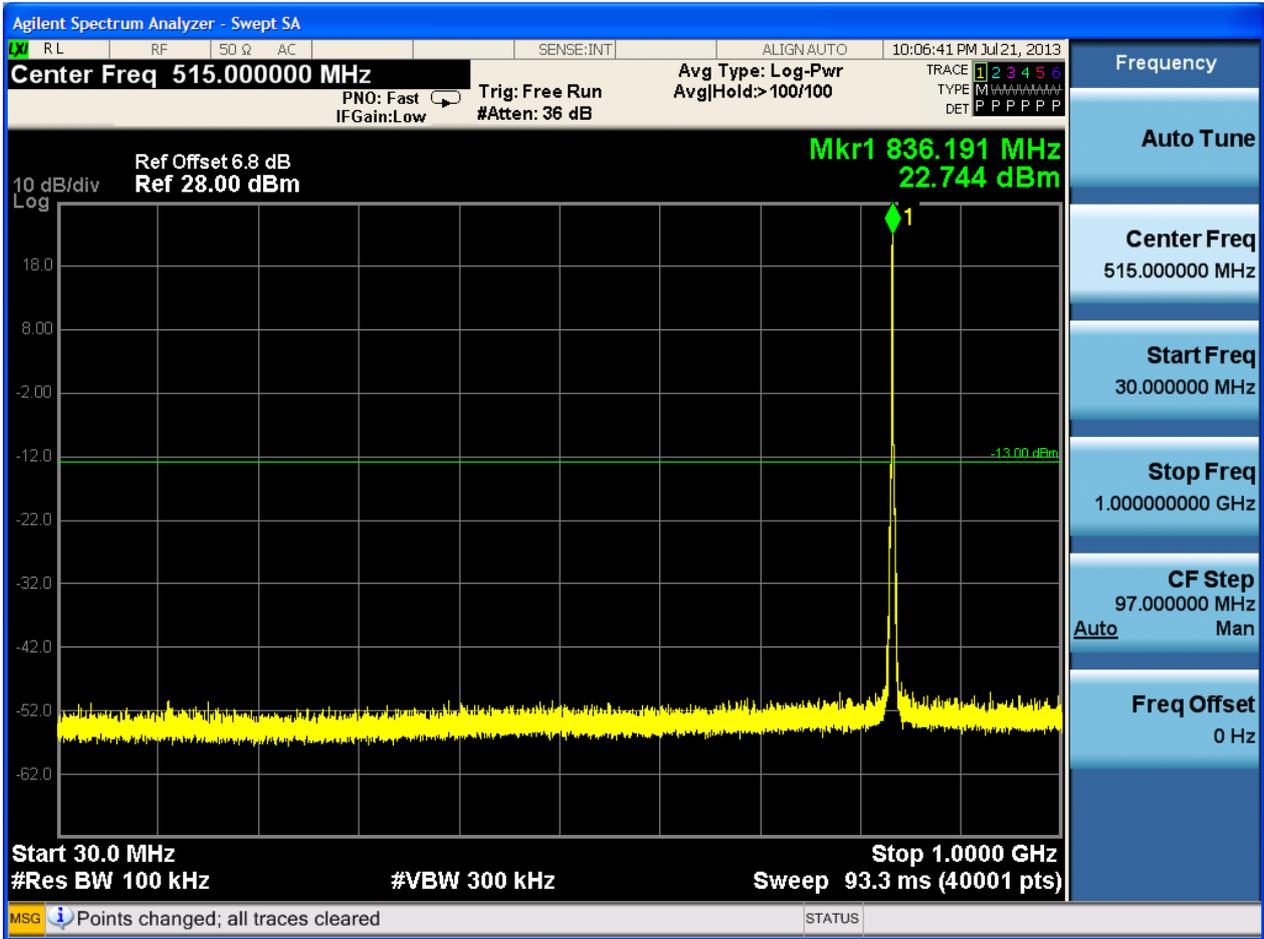


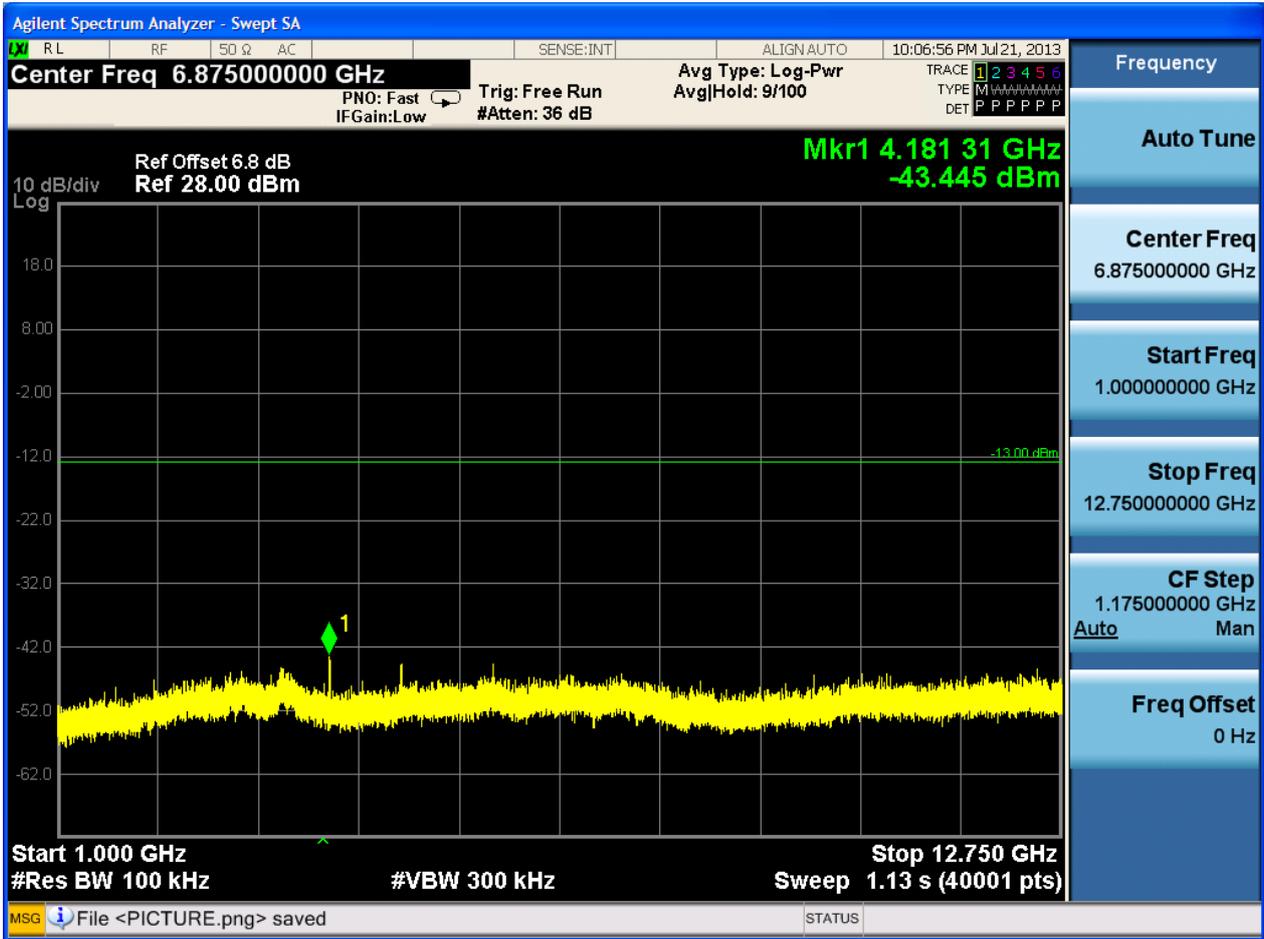


5.2.1.2.3.2 Test Channel = MCH



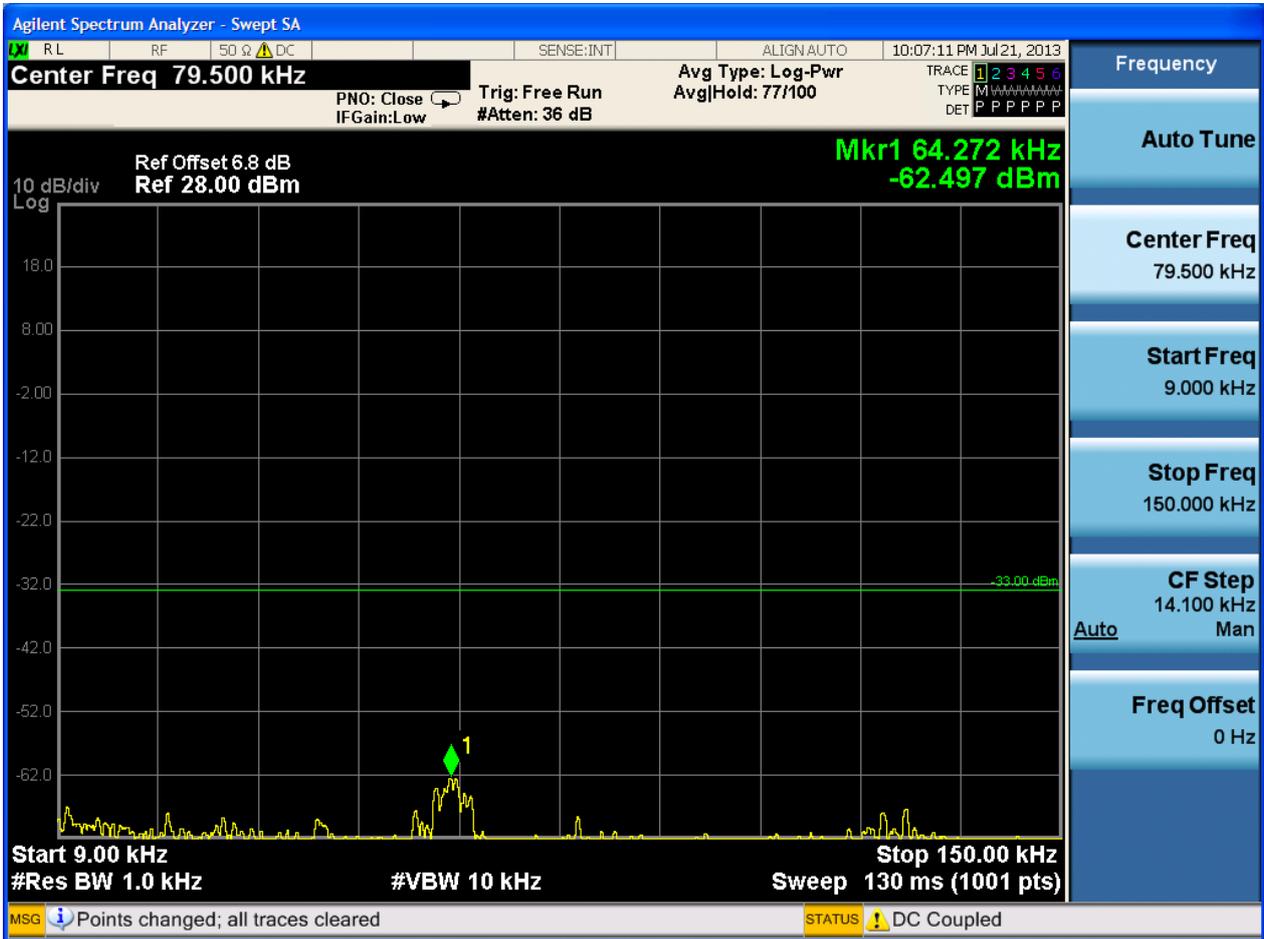


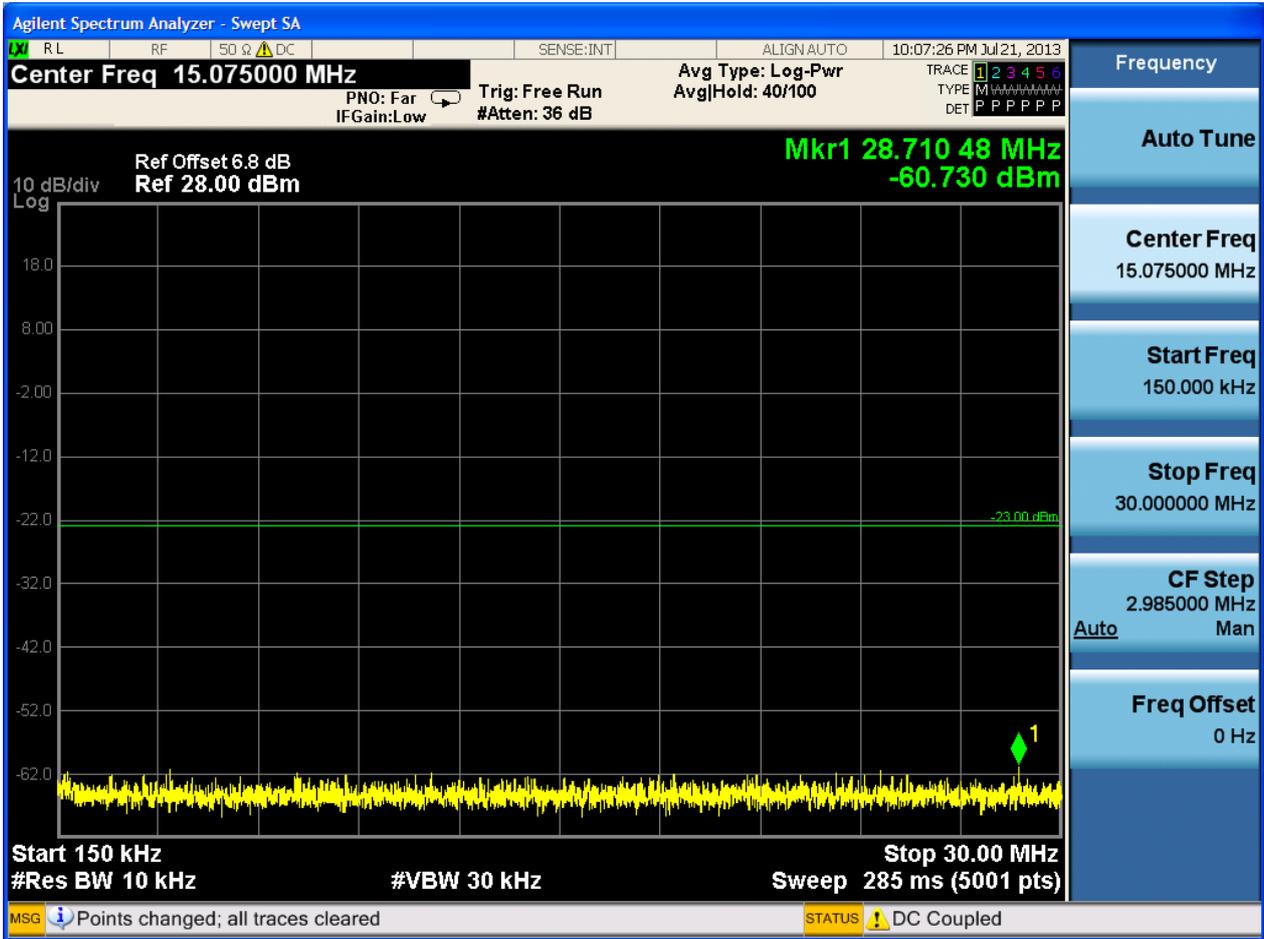


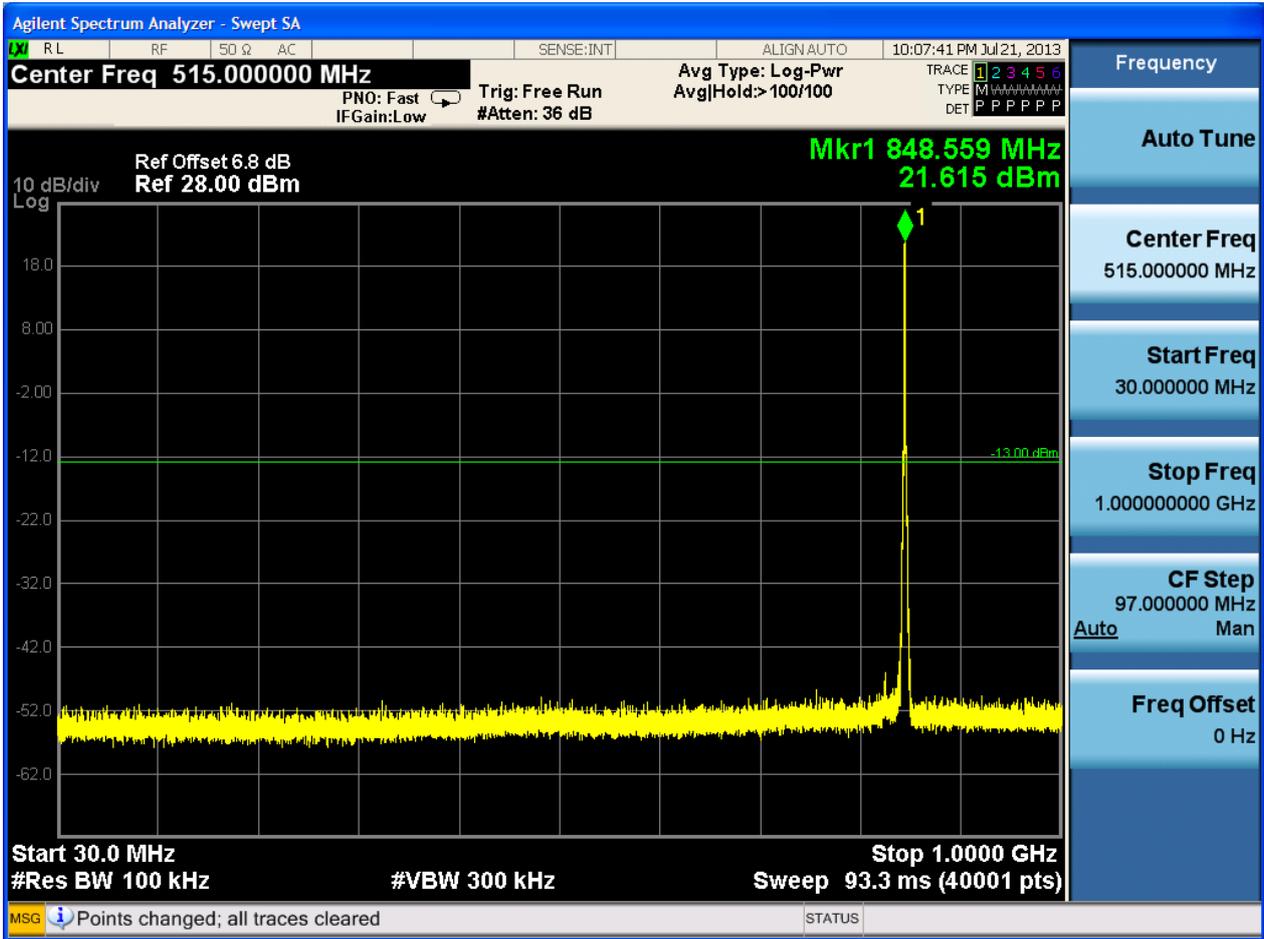


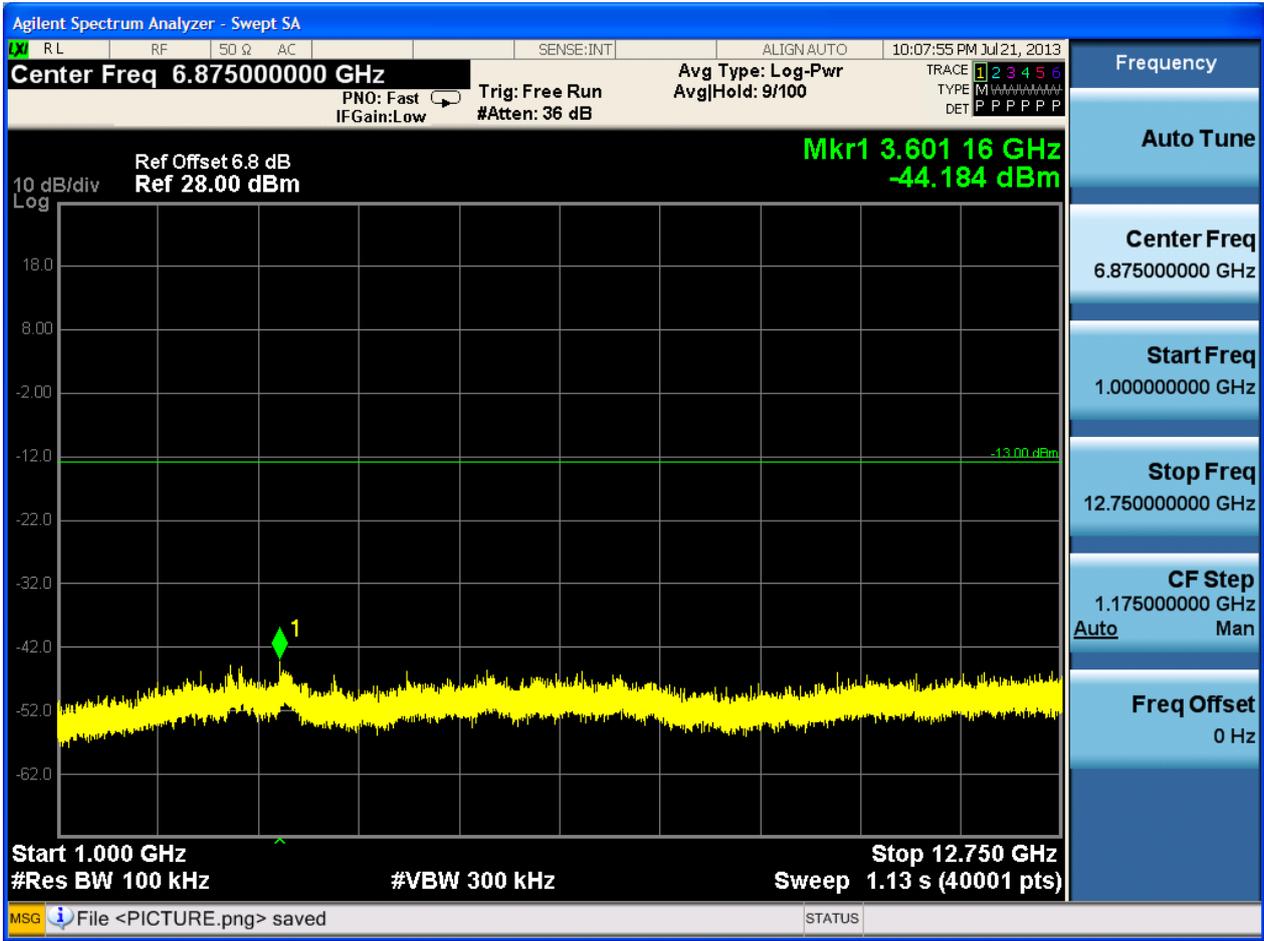


5.2.1.2.3.3 Test Channel = HCH









6Appendix_F: Field Strength of Spurious Radiation

Note:

9kHz~150kHz, VBW = 200Hz, VBW = 600 Hz, Detector: PK

150kHz~30MHz, VBW = 9kHz, VBW = 30k Hz, Detector: PK

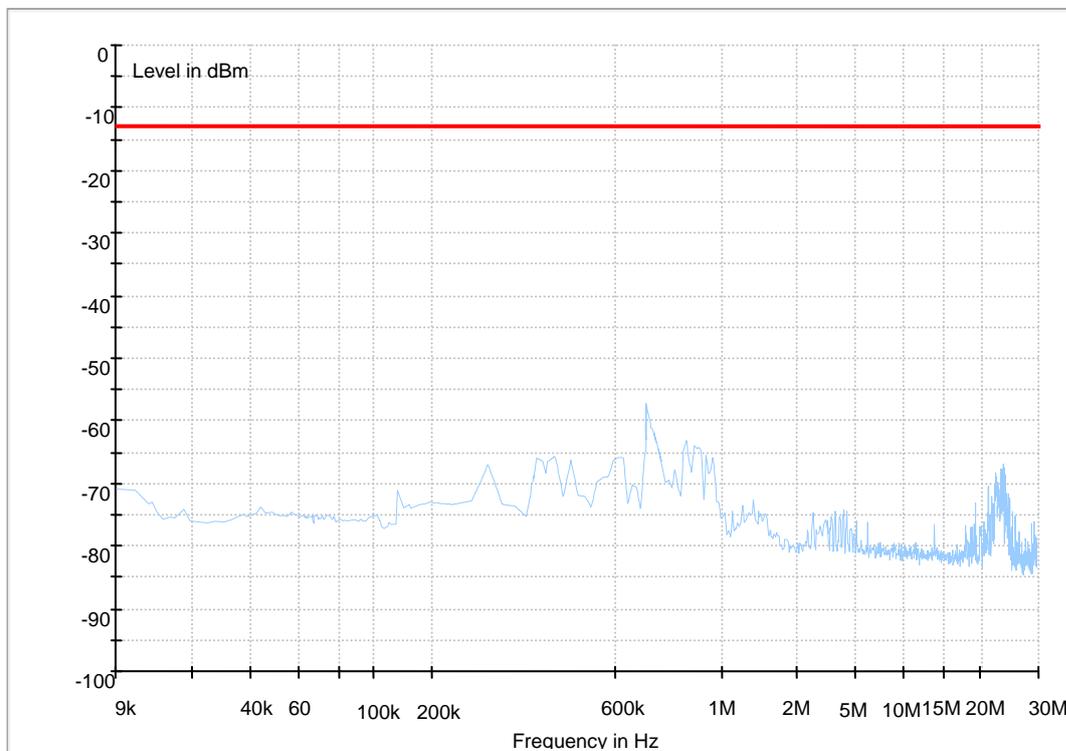
30MHz~1GHz, RBW = 100 kHz, VBW = 300 kHz. Detector: PK

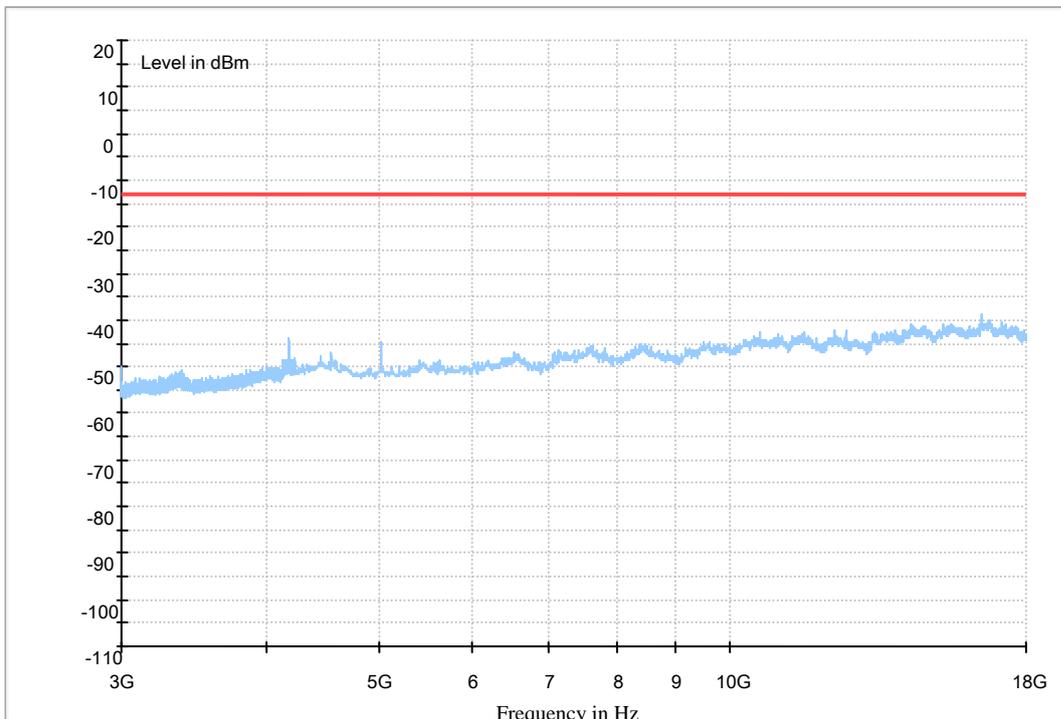
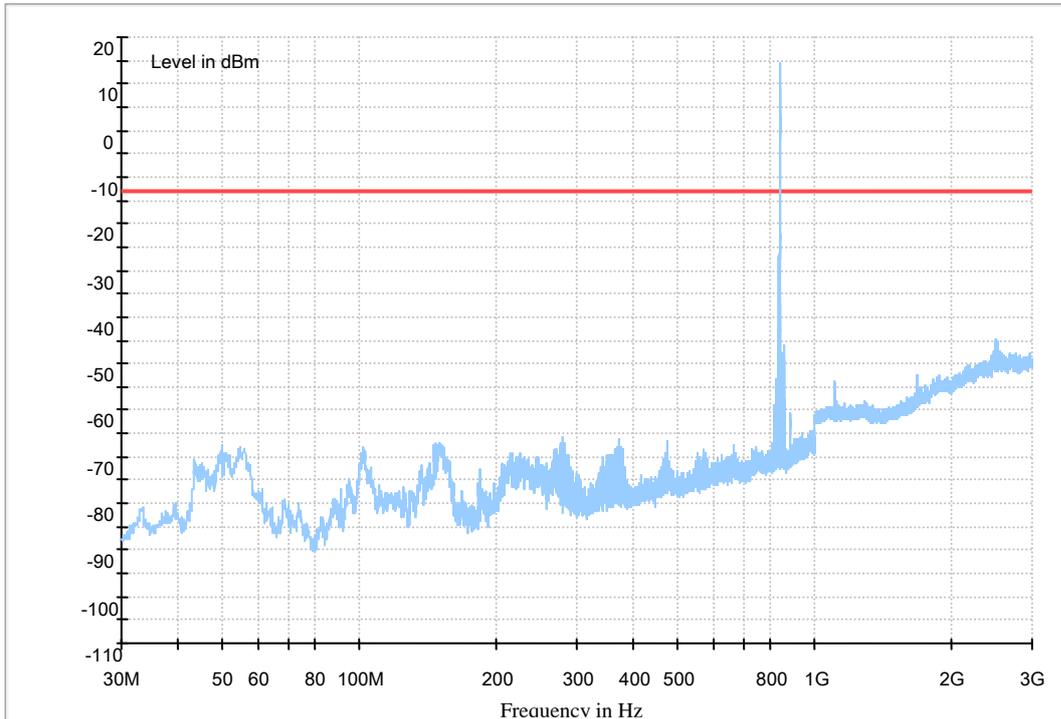
Above 1GHz, RBW = 1 MHz, VBW = 3 MHz. Detector: PK

Part I - Test Plots

6.1 For CDMA/1X

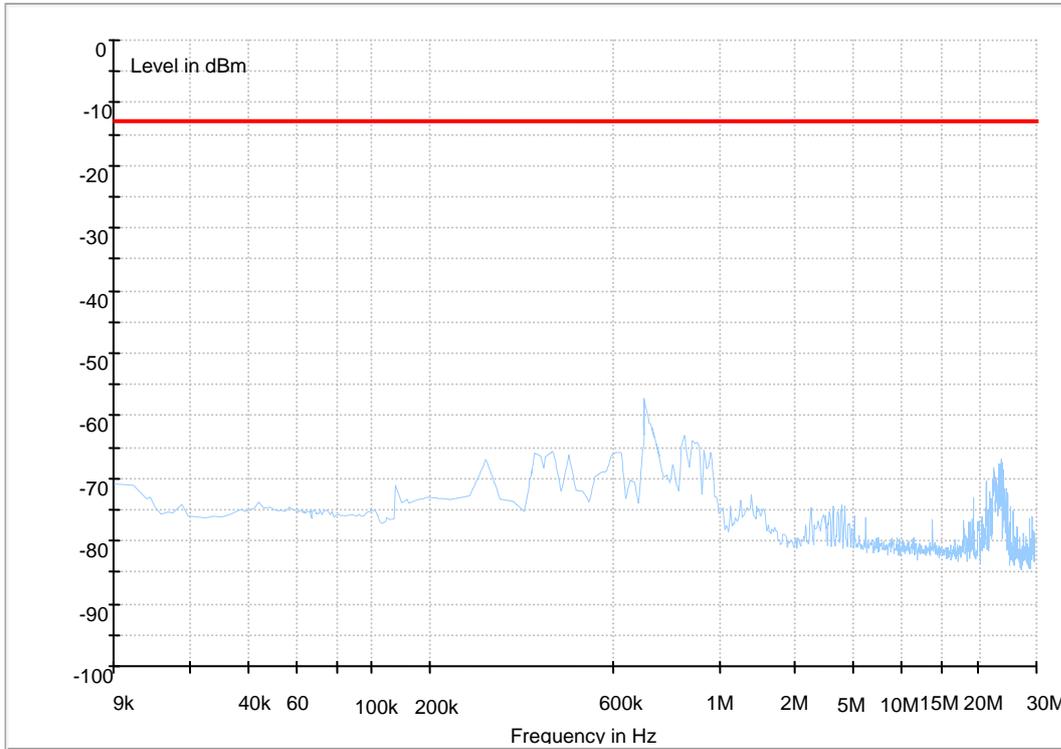
6.1.1 Test Band = BC0

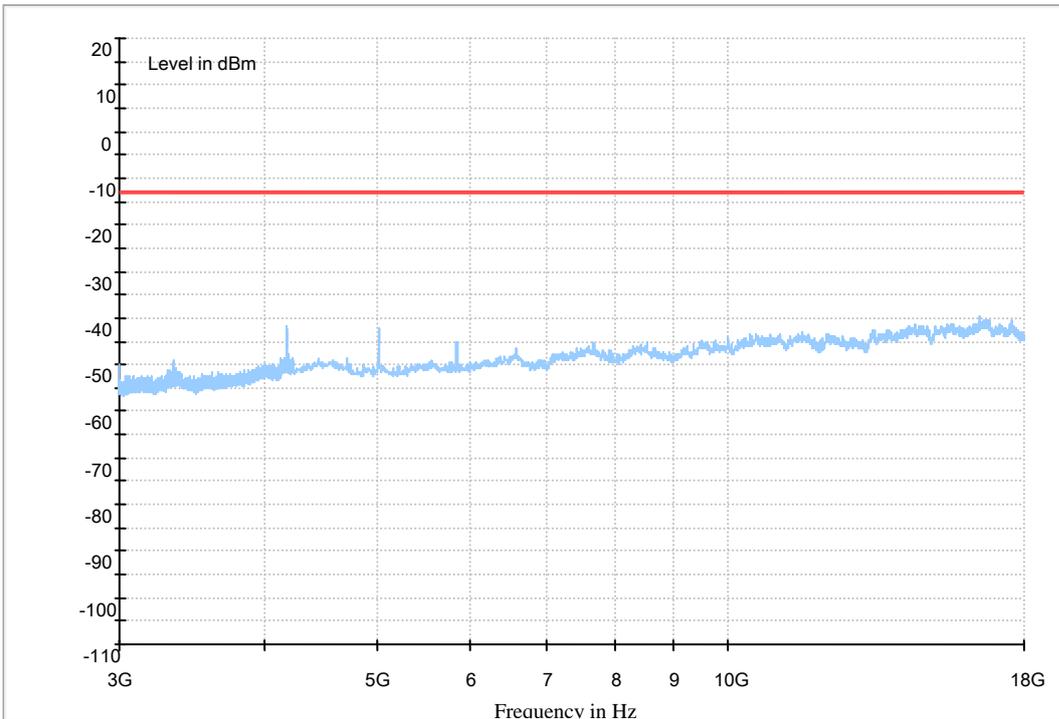
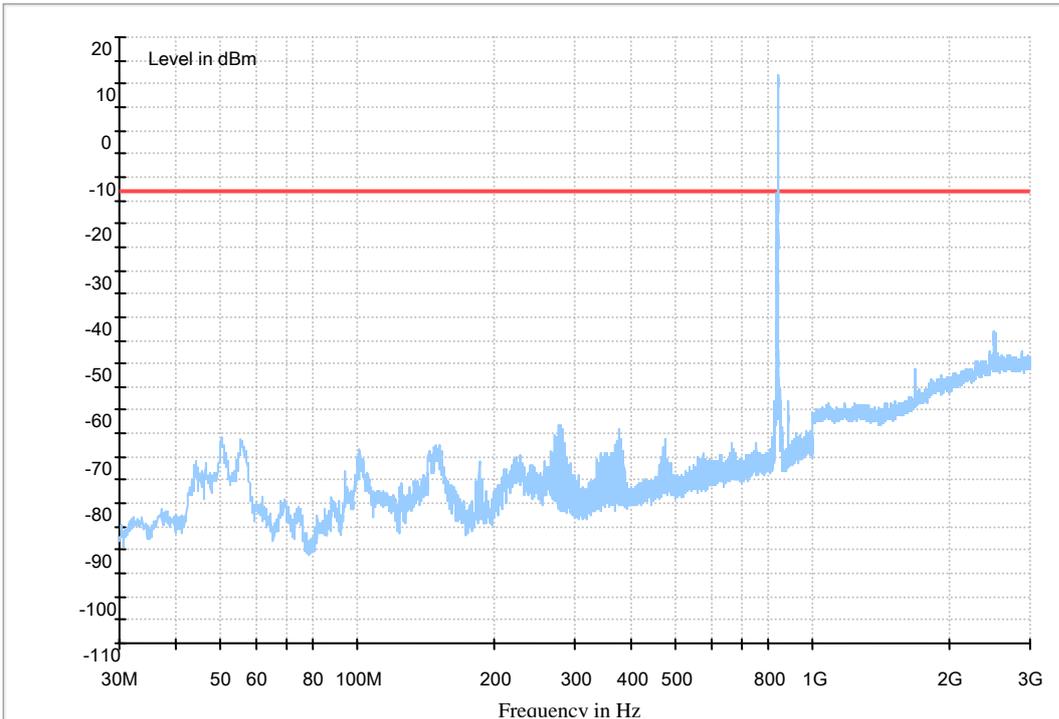




6.2 For CDMA/EV-DO/Subtype0

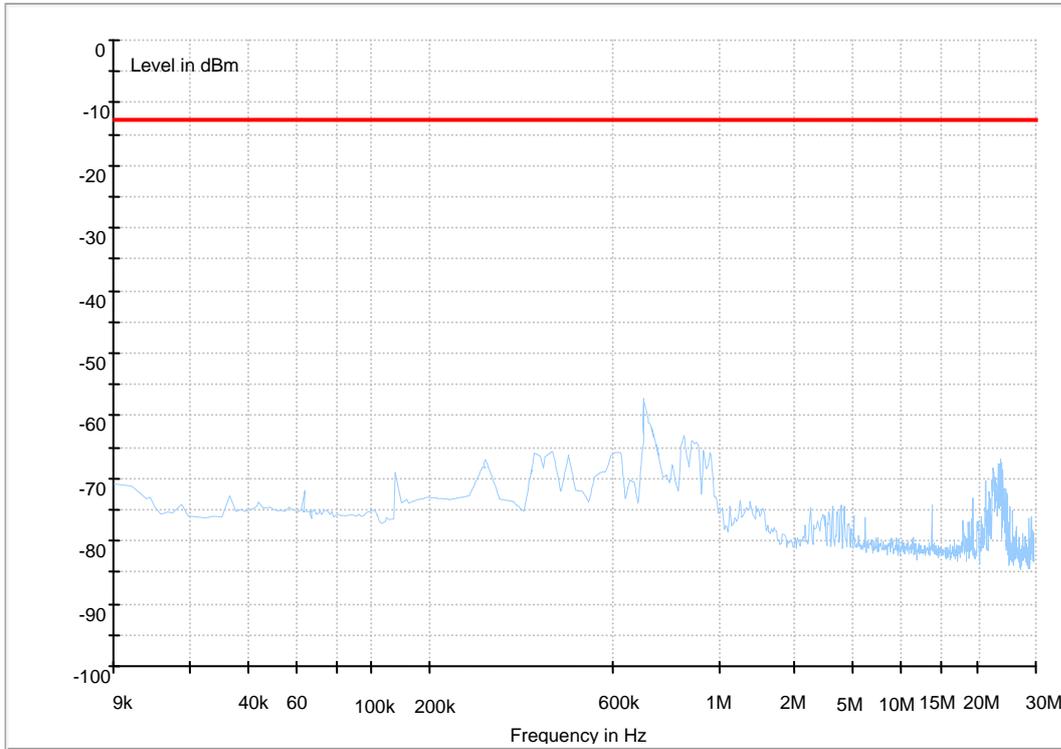
6.2.1 Test Band = BC0

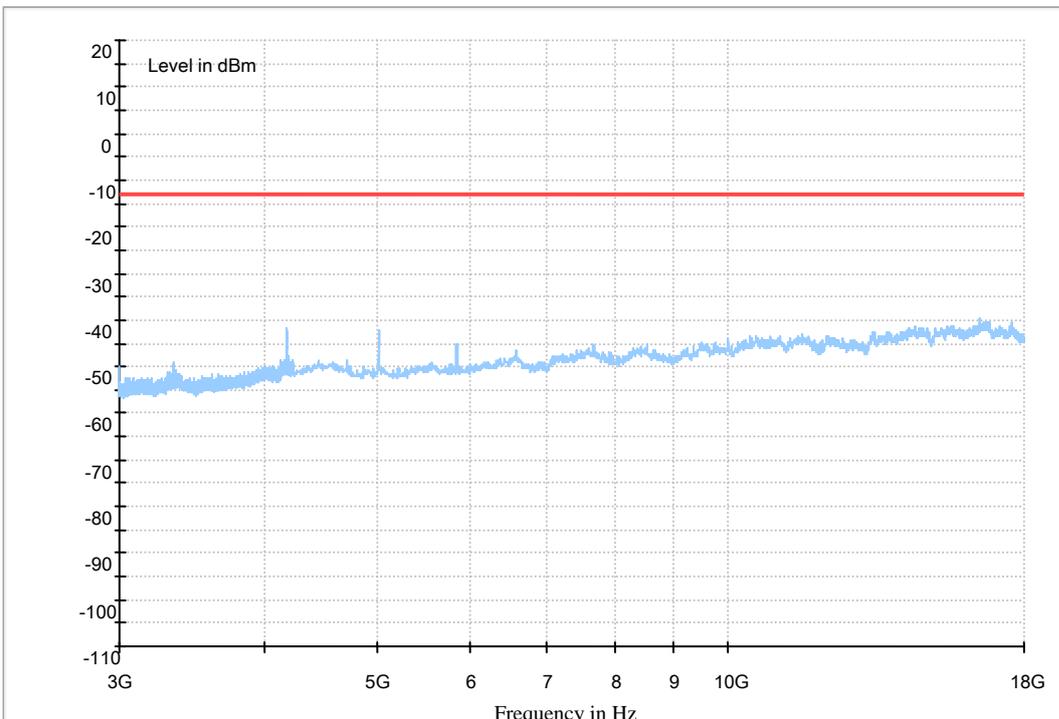
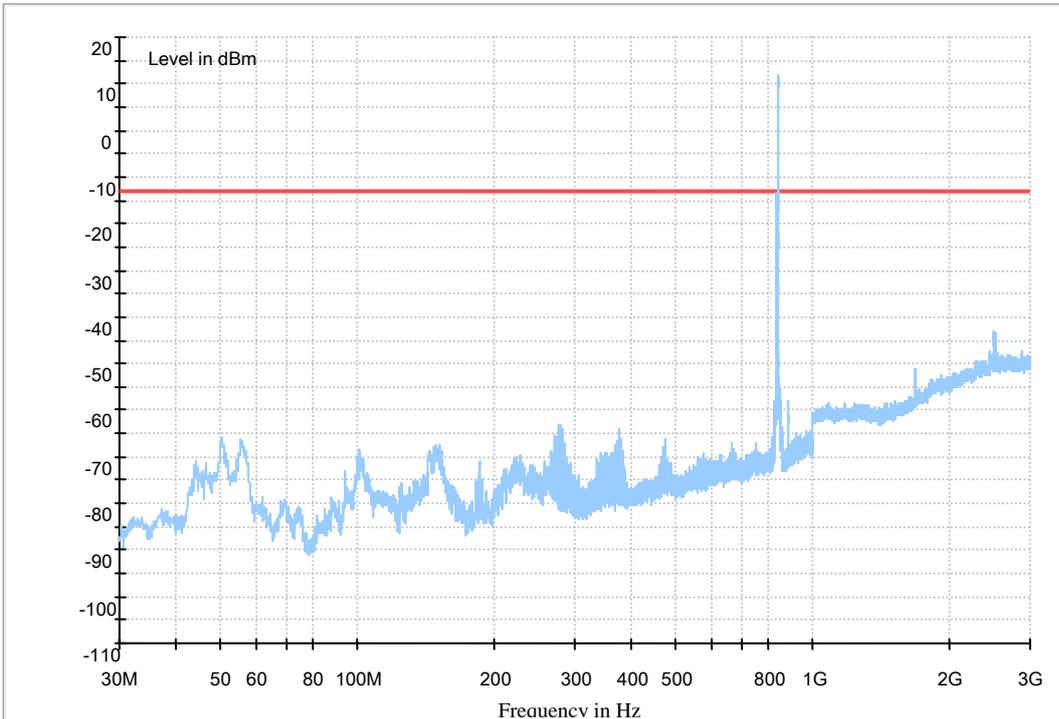




6.3 For CDMA/EV-DO/Subtype2

6.3.1 Test Band = BC0





7Appendix_G: Frequency Stability

7.1 For CDMA/1X

7.1.1 Frequency Error vs. Voltage:

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
BC0	CDMA/1X/TM1	LCH	TN	VL	-0.7324	-0.00089	PASS
				VN	8.2764	0.01004	PASS
				VH	8.7158	0.01057	PASS
		MCH	TN	VL	10.4736	0.01252	PASS
				VN	7.5439	0.00902	PASS
				VH	7.3975	0.00884	PASS
		HCH	TN	VL	8.8623	0.01045	PASS
				VN	8.7891	0.01036	PASS
				VH	8.6426	0.01019	PASS
	CDMA/1X/TM3	LCH	TN	VL	-7.0313	-0.00853	PASS
				VN	1.9043	0.00231	PASS
				VH	1.9775	0.0024	PASS
		MCH	TN	VL	2.4902	0.00298	PASS
				VN	-0.0732	-0.00009	PASS
				VH	0.2197	0.00026	PASS
		HCH	TN	VL	-1.3184	-0.00155	PASS
				VN	1.4648	0.00173	PASS
				VH	1.0986	0.0013	PASS

7.1.2 Frequency Error vs. Temperature:

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
BC0	CDMA/1X/TM1	LCH	VN	-30	-3.2227	-0.00391	PASS
				-20	7.6172	0.00924	PASS
				-10	8.7158	0.01057	PASS
				0	9.5215	0.01155	PASS
				10	8.7158	0.01057	PASS
				20	8.7158	0.01057	PASS
				30	8.8623	0.01075	PASS



Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				40	8.6426	0.01048	PASS
				50	8.7158	0.01057	PASS
		MCH	VN	-30	8.9355	0.01068	PASS
				-20	7.2510	0.00867	PASS
				-10	7.3242	0.00876	PASS
				0	7.3242	0.00876	PASS
				10	7.7637	0.00928	PASS
				20	7.4707	0.00893	PASS
				30	7.6904	0.00919	PASS
				40	7.9102	0.00946	PASS
				50	7.9102	0.00946	PASS
				HCH	VN	-30	8.9355
		-20	9.5215			0.01122	PASS
		-10	9.3018			0.01097	PASS
		0	9.3750			0.01105	PASS
		10	9.5215			0.01122	PASS
		20	8.9355			0.01053	PASS
		30	9.3750			0.01105	PASS
		40	8.8623			0.01045	PASS
		50	9.5947	0.01131	PASS		
	CDMA/1X/TM3	LCH	VN	-30	-11.7920	-0.0143	PASS
				-20	2.3438	0.00284	PASS
				-10	2.7100	0.00329	PASS
				0	1.6846	0.00204	PASS
				10	1.4648	0.00178	PASS
				20	1.0254	0.00124	PASS
				30	0.8789	0.00107	PASS
				40	1.0986	0.00133	PASS
				50	1.0986	0.00133	PASS
				MCH	VN	-30	1.4648
		-20	0.4395			0.00053	PASS
		-10	0.3662			0.00044	PASS
		0	0.0732			0.00009	PASS
		10	0.4395			0.00053	PASS
		20	0.9521			0.00114	PASS
		30	0.5127			0.00061	PASS
		40	-0.1465			-0.00018	PASS
		50	0.3662	0.00044	PASS		
		HCH	VN	-30	-0.5127	-0.0006	PASS
				-20	0.8789	0.00104	PASS



Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				-10	0.9521	0.00112	PASS
				0	0.6592	0.00078	PASS
				10	0.5859	0.00069	PASS
				20	0.7324	0.00086	PASS
				30	0.5127	0.0006	PASS
				40	0.4395	0.00052	PASS
				50	0.5127	0.0006	PASS

7.2 For CDMA/EV-DO

7.2.1 Frequency Error vs. Voltage:

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
BC0	CDMA/EV-DO/Subtype0	LCH	TN	VL	-0.07	-0.00008	PASS
				VN	0.81	0.00098	PASS
				VH	0.59	0.00072	PASS
		MCH	TN	VL	-2.34	-0.0028	PASS
				VN	-0.66	-0.00079	PASS
				VH	0.66	0.00079	PASS
		HCH	TN	VL	1.10	0.0013	PASS
				VN	1.46	0.00172	PASS
				VH	0.22	0.00026	PASS
	CDMA/EV-DO/Subtype2	LCH	TN	VL	-13.70	-0.01661	PASS
				VN	3.00	0.00364	PASS
				VH	2.42	0.00293	PASS
		MCH	TN	VL	-8.06	-0.00964	PASS
				VN	6.81	0.00814	PASS
				VH	10.33	0.01235	PASS
HCH	TN	VL	-20.95	-0.0247	PASS		
		VN	16.77	0.01977	PASS		
		VH	9.23	0.01088	PASS		

7.2.2 Frequency Error vs. Temperature:

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
BC0	CDMA/EV-DO/Subtype0	LCH	VN	-30	0.22	0.00027	PASS
				-20	-0.51	-0.00062	PASS
				-10	1.03	0.00125	PASS



Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict		
	CDMA/EV-DO/Subtype2			0	-0.44	-0.00053	PASS		
				10	-4.83	-0.00586	PASS		
				20	0.29	0.00035	PASS		
				30	-0.73	-0.00089	PASS		
				40	0.29	0.00035	PASS		
				50	1.17	0.00142	PASS		
		MCH	VN	-30	-0.07	-0.00008	PASS		
				-20	-1.76	-0.0021	PASS		
				-10	-3.74	-0.00447	PASS		
				0	1.10	0.00131	PASS		
				10	1.03	0.00123	PASS		
				20	-0.66	-0.00079	PASS		
				30	-0.37	-0.00044	PASS		
				40	0.37	0.00044	PASS		
		HCH	VN	50	-1.98	-0.00237	PASS		
				-30	0.88	0.00104	PASS		
				-20	-4.83	-0.00569	PASS		
				-10	-0.95	-0.00112	PASS		
				0	0.37	0.00044	PASS		
				10	-1.39	-0.00164	PASS		
				20	0.88	0.00104	PASS		
				30	-0.59	-0.0007	PASS		
		LCH	VN	40	-4.32	-0.00509	PASS		
				50	0.51	0.0006	PASS		
				-30	24.32	0.02949	PASS		
				-20	-0.66	-0.0008	PASS		
				-10	10.03	0.01216	PASS		
				0	20.14	0.02442	PASS		
				10	2.12	0.00257	PASS		
				20	1.32	0.0016	PASS		
				30	5.64	0.00684	PASS		
				40	-6.23	-0.00755	PASS		
		MCH	VN	50	5.42	0.00657	PASS		
				-30	10.84	0.01296	PASS		
				-20	19.34	0.02312	PASS		
				-10	7.40	0.00885	PASS		
				0	-11.50	-0.01375	PASS		
				10	-2.42	-0.00289	PASS		
						20	-1.83	-0.00219	PASS



Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				30	8.35	0.00998	PASS
				40	6.52	0.00779	PASS
				50	5.93	0.00709	PASS
		HCH	VN	-30	21.53	0.02538	PASS
				-20	-2.56	-0.00302	PASS
				-10	8.50	0.01002	PASS
				0	0.81	0.00095	PASS
				10	-0.51	-0.0006	PASS
				20	1.98	0.00233	PASS
				30	10.69	0.0126	PASS
				40	8.64	0.01018	PASS
				50	5.27	0.00621	PASS

END