

# RF Test Report

**Product Name:** cdma2000 Digital Mobile Phone;

**Product Model:** Orinoquia Auyantepui Y210, Auyantepui Y210, Y210

**Report Number:** SYBH(Z-RF)007012013-2001

**FCC ID:** QISY210

**Reliability Laboratory of Huawei Technologies Co., Ltd.**

Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District,  
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## Notice

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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.
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 laboratory has been listed by the VCCI to perform EMC measurements. The accreditation numbers of test site No.1 are R-2364, G-415, C-2583, and T-256, and the accreditation numbers of test site No.2 are R-3760, G-485, C-4210 and T-1237.
6. The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.
7. The test report is invalid if there is any evidence of erasure and/or falsification.
8. The test report is only valid for the test samples.
9. 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:** 2013-1-14  
**Start Date of Test:** 2013-1-15  
**End Date of Test:** 2013-1-20

**Test Result:** Pass

<b>Approved by Senior Engineer:</b>	2013-1-24	Dai Linjun	
	Date	Name	Signature

<b>Prepared by:</b>	2013-1-24	Guo Xingxing	
	Date	Name	Signature



# Contents

<b>1</b>	<b><u>General Information</u></b> .....	<b>5</b>
1.1	APPLIED STANDARD.....	5
1.2	TEST LOCATION.....	5
1.3	TEST ENVIRONMENTAL CONDITION.....	5
<b>2</b>	<b><u>Summary</u></b> .....	<b>6</b>
<b>3</b>	<b><u>Product Description</u></b> .....	<b>7</b>
3.1	PRODUCT INFORMATION .....	7
<b>4</b>	<b><u>Test Description</u></b> .....	<b>9</b>
4.1	SUPPORTED FREQUENCY RANGE.....	9
4.2	TRANSMITTER / RECEIVER CHARACTERISTICS.....	9
4.3	ANTENNA GAIN.....	9
4.4	POWER SUPPLY .....	错误! 未定义书签。
<b>5</b>	<b><u>General Test Conditions / Configurations</u></b> .....	<b>10</b>
5.1	RF CHANNELS UNDER TEST.....	10
5.2	TEST MODES.....	10
5.3	TEST ENVIRONMENT .....	10
5.4	TEST SETUP.....	11
5.5	TEST CONDITIONS .....	15
<b>6</b>	<b><u>Main Test Instruments</u></b> .....	<b>16</b>
<b>7</b>	<b><u>Test Results</u></b> .....	<b>17</b>
<b>8</b>	<b><u>Measurement Uncertainty</u></b> .....	<b>17</b>



# 1 General Information

<b>1.1 Applied Standard</b>	
Applied Rules:	47 CFR FCC Part 2:2011, Subpart J 47 CFR FCC Part 22:2011, Subpart H ANSI/TIA 603C:2004
<b>1.2 Test Location</b>	
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
<b>1.3 Test Environmental Condition</b>	
Ambient Temperature:	20 – 25 °C
Ambient Relative Humidity:	45 – 55 %
Atmospheric Pressure:	101 kPa



## 2 Summary

Table 1 Summary of results

Test Case	FCC Part No.	Requirements	Result
Cellular Band			
Effective Radiated Power Output Data	2.1046 & 22.913	ERP not exceed 7 W	Pass
Bandwidth	2.1049	(Not specified)	Pass
Band Edges Compliance	2.1051 & 917	Below -13 dBm/1%*EBW, in 1 MHz range	Pass
Spurious Emission at Antenna Terminals	2.1051 & 2.917	Below -13 dBm/1 kHz, 9 kHz to 150 kHz Below -13 dBm/10 kHz, 150 kHz to 30 MHz Below -13 dBm/100 kHz, 30 MHz to 10 <sup>th</sup> harmonics	Pass
Radiated Spurious Emission	2.1053 & 22.917	Below -13 dBm/100 kHz	Pass
Frequency Stability	2.1055 & 22.355	Maintained within the tolerances of $\pm 2.5$ ppm	Pass



### 3 Product Description

#### 3.1 Product Information

##### 3.1.1 General Description

Cdma2000 Digital Mobile Phone- Orinoquia Auyantepui Y210, Auyantepui Y210, Y210 is subscriber equipment in the CDMA/EVDO system. The frequency band is US Cellular, The band 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.

##### 3.1.2 Board Information

Table 2 Board Information

Board		
Serial Number	Hardware Version	Description
S5E01A9311600142	HC3C8685M	Main board of Mobile Phone

##### 3.1.3 Adapter Technical Data

Sub-Assembly			
Sub-Assembly Name	Model	Manufacturer	Description
AC/DC Adapter	HW-050055U1W	Huawei Technologies Co., Ltd.	Input voltage: ~100-240V 50/60Hz 0.2A Output voltage: 5V  550mA Rate power: 2.75W



### 3.1.4 Battery Technical Data

Name	Qty.	Manufacture	Description
Rechargeable Li-ion	1	Huawei Technologies Co., Ltd.	Battery Model: HB4W1 Rated capacity: 1700mAh Nominal Voltage:  +3.7V Charging Voltage:  +4.2V



## 4 Test Description

### 4.1 Supported Frequency Range

Characteristics	Description
Downlink	869 to 894 MHz
Uplink	824 to 849 MHz

### 4.2 Transmitter / Receiver Characteristics

Characteristics	Description
System Type	CDMA
TX Output Power (per Antenna Port)	CDMA system: 23.5dBm
Channel Spacing(s) / Bandwidth(s)	CDMA system: 1.30 MHz (Cellular band)
Designation of Emissions	CDMA system: 1M46F9W (Cellular band)

### 4.3 Antenna Gain

Antenna Gain(dBi)	2.2
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## 5 General Test Conditions / Configurations

### 5.1 RF Channels under Test

Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
TM1/TM3/ Subtype 0/ Subtype 2	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

### 5.2 Test Modes

Test Mode	Test Modes Description
TM1	CDMA2000 1x mode QPSK modulation
TM3	CDMA2000 1x mode HPSK modulation
Subtype 0	CDMA2000 1x EV-DO mode HPSK modulation
Subtype 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

### 5.3 Test Environment

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

NOTE: VL= lower extreme test voltage

VN= nominal voltage

VH= upper extreme test voltage

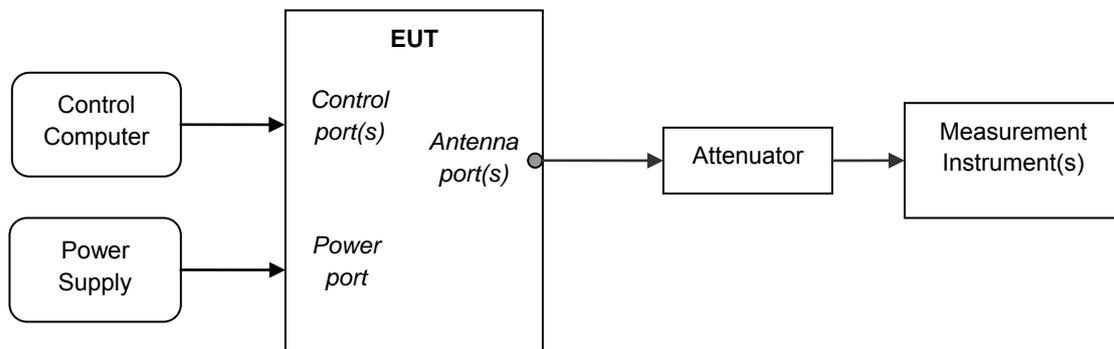
TN= normal temperature

## 5.4 Test Setup

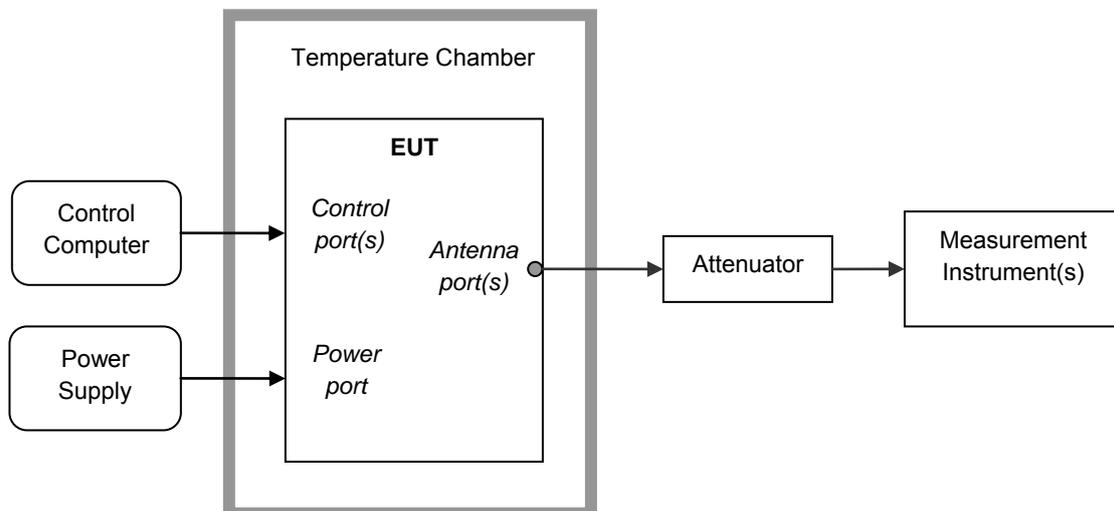
### 5.4.1 General Test Setup Configurations

Configuration	Description
Test Antenna Ports	Until otherwise declared, all TX tests are ONLY performed at the main Transmitter antenna port (e.g. TRXA, TXA and so on) of the EUT, and all RX tests are ONLY performed at the main Receiver antenna port (e.g. TRXA, RXA and so on) of the EUT.
Multiple RF Sources	Other than the tested RF source of the EUT, other RF source(s) are disabled or shutdown during measurements.

### 5.4.2 Test Setup 1



### 5.4.3 Test Setup 2



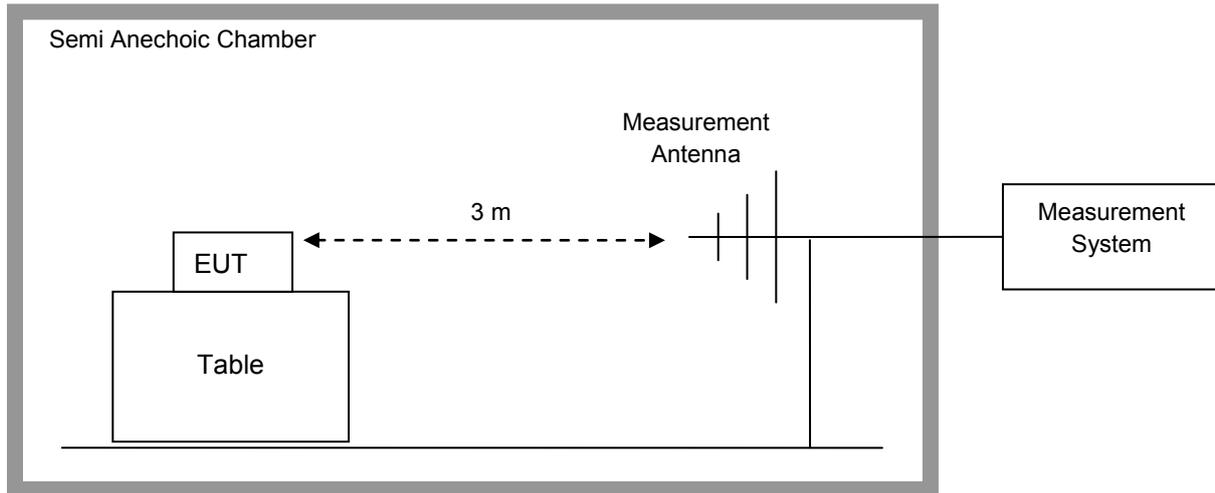
#### 5.4.4 Test Setup 3

NOTE1: Effective radiated power (ERP) or Effective Isotropic radiated power (EIRP) refers to the EUT radiation power output, assuming all emissions are radiated from half-wave dipole antennas or horn antennas.

NOTE2: The EUT was set on insulator 80cm above the Ground Plane. The setup and test methods were according to ANSI-TIA-603C 2004. The measurements were carried through with a Rohde and Schwarz Test Receiver and control software.

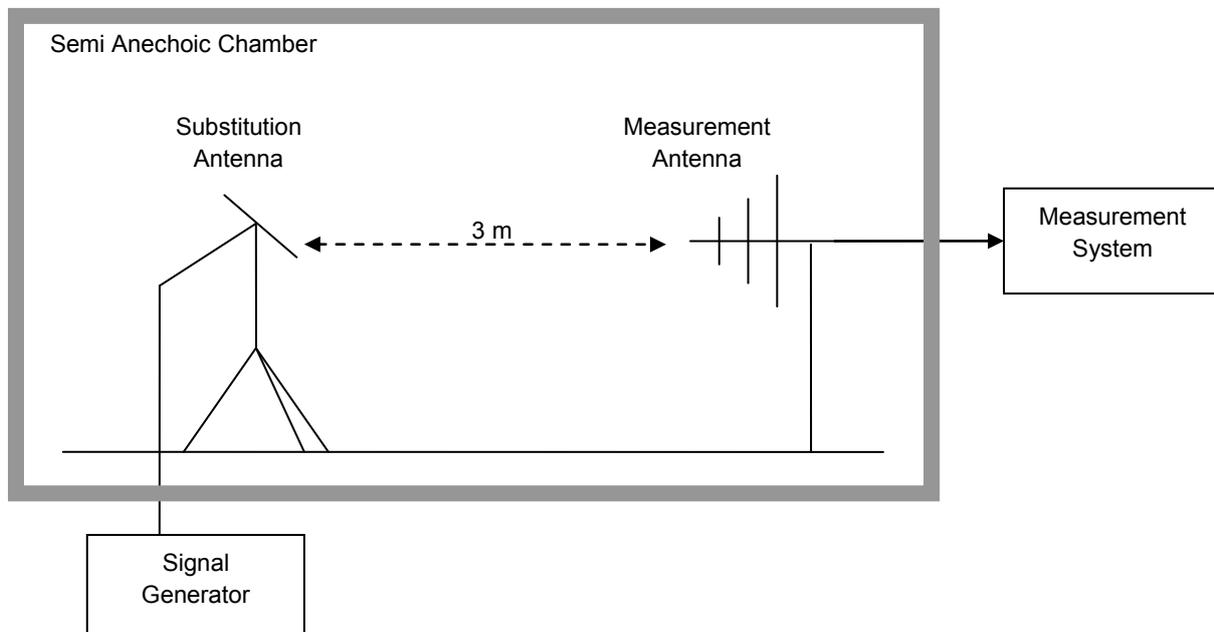
#### Step 1: Pre-test to find the Maximum ERP or EIRP

1. Connect the test system according to the following figure. EUT is running for 30 minutes before test, and measurement instruments are warming-up for 30 minutes.
2. Set up communication link between Universal radio communication tester and EUT, set EUT working frequency, and control EUT to transmit at maximum power.
3. Set the center frequency of the signal analyzer or receiver to the EUT's operating frequency, the RBW is equal to the emission bandwidth of the signal. Set RMS detector for the test, and the span is equal to 2 times of emission bandwidth, the other settings should remain automatic. Normally, the height range of antenna was 1m to 4m, the azimuth range of turntable was 0° to 360°. The receiver antenna has two polarizations V and H. 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.
4. Changing EUT working frequency and measuring the RF power at channel L, M, H respectively. Complete the test data.



## Step 2: Substitution method to verify the maximum ERP or EIRP

1. Measurement setup is according to the following figure. EUT was substituted by antenna, and the polarization is identical with the test antenna; the signal generator was connected to the substitution antenna.
2. The radiated output power, measured by signal analyzer set, is the same as recorded in above. Then this power level is matched by a signal from a calibrated signal generator which is substituted for EUT. The power supplied by the generator is then equal to the ERP or EIRP after corrected by the antenna gain and cable loss.





## 5.5 Test Conditions

Test Case	Test Conditions	
Effective Radiated Power Output Data	Test Configuration	Ambient Temperature & Rated Voltage
	Test Setup	Test Setup 1 & Test Setup 3
	Detector	RMS
	RF Channels (TX)	L, M, H
	Test Mode	TM1/TM3/ Subtype 0/ Subtype 2
Bandwidth	Test Configuration	Ambient Temperature & Rated Voltage
	Test Setup	Test Setup 1
	Detector	PK
	RF Channels (TX)	L, M, H
	Test Mode	TM1/TM3/ Subtype 0/ Subtype 2
Band Edges Compliance	Test Configuration	Ambient Temperature & Rated Voltage
	Test Setup	Test Setup 1
	Detector	RMS
	RF Channels (TX)	L, H
	Test Mode	TM1/TM3/ Subtype 0/ Subtype 2
Spurious Emission at Antenna Terminals	Test Configuration	Ambient Temperature & Rated Voltage
	Test Setup	Test Setup 1
	Detector	PK
	RF Channels (TX)	L, M,H
	Test Mode	TM1/TM3/ Subtype 0/ Subtype
Radiated Spurious Emission	Test Configuration	Ambient Temperature & Rated Voltage
	Test Setup	Test Setup 3
	Detector	PK
	RF Channels (TX)	M
	Test Mode	TM1/TM3/ Subtype 0/ Subtype 2
Frequency Stability	Test Configuration	(1) -30 °C to +50 °C with step 10 °C at Rated Voltage; (2) 85%, 100% and 115% of Rated Voltage at Ambient Temperature.
	Test Setup	Test Setup 2
	RF Channels (TX)	M
	Test Mode	TM1/TM3/ Subtype 0/ Subtype 2



## 6 Main Test Instruments

Table 3 Main Test Equipments

Equipment Name	Manufacturer	Model	Serial Number	Cal Date	Cal. Due
Power supply	KEITHLEY	2303	1288003	2012-11-09	2013-11-08
Universal Radio Communication Tester	R&S	CMU200	123299	2012-09-20	2013-09-19
Universal Radio Communication Tester	Agilent	E5515C	MY50260239	2012-11-09	2013-11-08
Spectrum Analyzer	Agilent	E4440A	MY49420179	2012-07-18	2013-07-17
Signal Analyzer	R&S	FSQ31	200021	2012-11-09	2013-11-08
Temperature Chamber	WEISS	WKL64	24600294	2012-02-14	2013-02-13
Signal generator	Agilent	E8257D	MY49281095	2012-07-10	2013-07-09
Spectrum analyzer	R&S	FSU3	200474	2012-03-06	2013-03-05
Spectrum analyzer	R&S	FSU43	100144	2012-03-06	2013-03-05
Double-Ridged Waveguide Horn Antenna (1G~18GHz)	R&S	HF907	100304	2012-04-06	2013-04-05
Double-Ridged Waveguide Horn Antenna (1G~18GHz)	R&S	HF907	100391	2012-04-06	2013-04-05
Trilog Broadband Antenna (30M~3GHz)	SCHWARZBECK	VULB 9163	9163-521	2012-07-18	2013-07-17
Pyramidal Horn Antenna(26GHz-40GHz)	ETS-Lindgren	3160-10	00123940	2012-02-28	2013-02-27
Pyramidal Horn Antenna(18GHz-26.5GHz)	ETS-Lindgren	3160-09	00125912	2012-02-28	2013-02-27



## 7 Test Results

No.	Test Item	Test Result
1	Effective Radiated Power Output Data	Appendix A
2	Bandwidth	Appendix B
3	Band Edges Compliance	Appendix C
4	Spurious Emission at Antenna Terminals	Appendix D
5	Radiated Spurious Emission	Appendix E
6	Frequency Stability	Appendix F

NOTE: There is no test data in Appendix H, only Photos of Test Setup for Field Strength of Spurious Radiation.

## 8 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
Effective Radiated Power Output Data	Power (dBm)	U =0.39 dB
Bandwidth	Magnitude (%)	U=0.2%
Band Edge Compliance	Disturbance Power (dBm)	U=2.0 dB
Conducted Spurious Emissions	Disturbance Power (dBm)	U=2.0 dB
Radiated Spurious Emission	ERP (dBm)	U=4.6 dB (30 MHz – 1GHz) U=3.0 dB (above 1 GHz)
Frequency Stability	Frequency Accuracy (ppm)	U=0.21 ppm

END



# Appendix for Test report



## 1Appendix\_A: Effective Radiated Power Output Data

### Part I - Test Results

Test Band	Test Mode	Test Channel	Measured[dBm]	Limit [dBm]	Verdict
BC0	CDMA/1X/TM1	LCH	23.44	38.5	PASS
		MCH	23.75	38.5	PASS
		HCH	23.82	38.5	PASS
	CDMA/1X/TM3	LCH	23.37	38.5	PASS
		MCH	23.75	38.5	PASS
		HCH	23.79	38.5	PASS
Test Band	Test Mode	Test Channel	Measured[dBm]	Limit [dBm]	Verdict
BC0	CDMA/EV-DO/Subt ype0	LCH	23.34	38.5	PASS
		MCH	23.50	38.5	PASS
		HCH	23.37	38.5	PASS
	CDMA/EV-DO/Subt ype2	LCH	23.45	38.5	PASS
		MCH	23.71	38.5	PASS
		HCH	23.54	38.5	PASS



## 2Appendix\_B: 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	1.45	Pass
		MCH	1.30	1.45	Pass
		HCH	1.30	1.46	Pass
	CDMA/1X/TM3	LCH	1.29	1.45	Pass
		MCH	1.29	1.45	Pass
		HCH	1.29	1.45	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	1.45	Pass
			MCH	1.29	1.45	Pass
			HCH	1.29	1.45	Pass
	CDMA/EV-DO/Subtype2	BPSK(256 bits)	LCH	1.29	1.45	Pass
			MCH	1.29	1.45	Pass
			HCH	1.29	1.45	Pass
		QPSK(4096 bits)	LCH	1.29	1.45	Pass
			MCH	1.29	1.46	Pass
			HCH	1.29	1.45	Pass
		8-PSK(12288 bits)	LCH	1.29	1.45	Pass
			MCH	1.29	1.45	Pass
			HCH	1.29	1.45	Pass



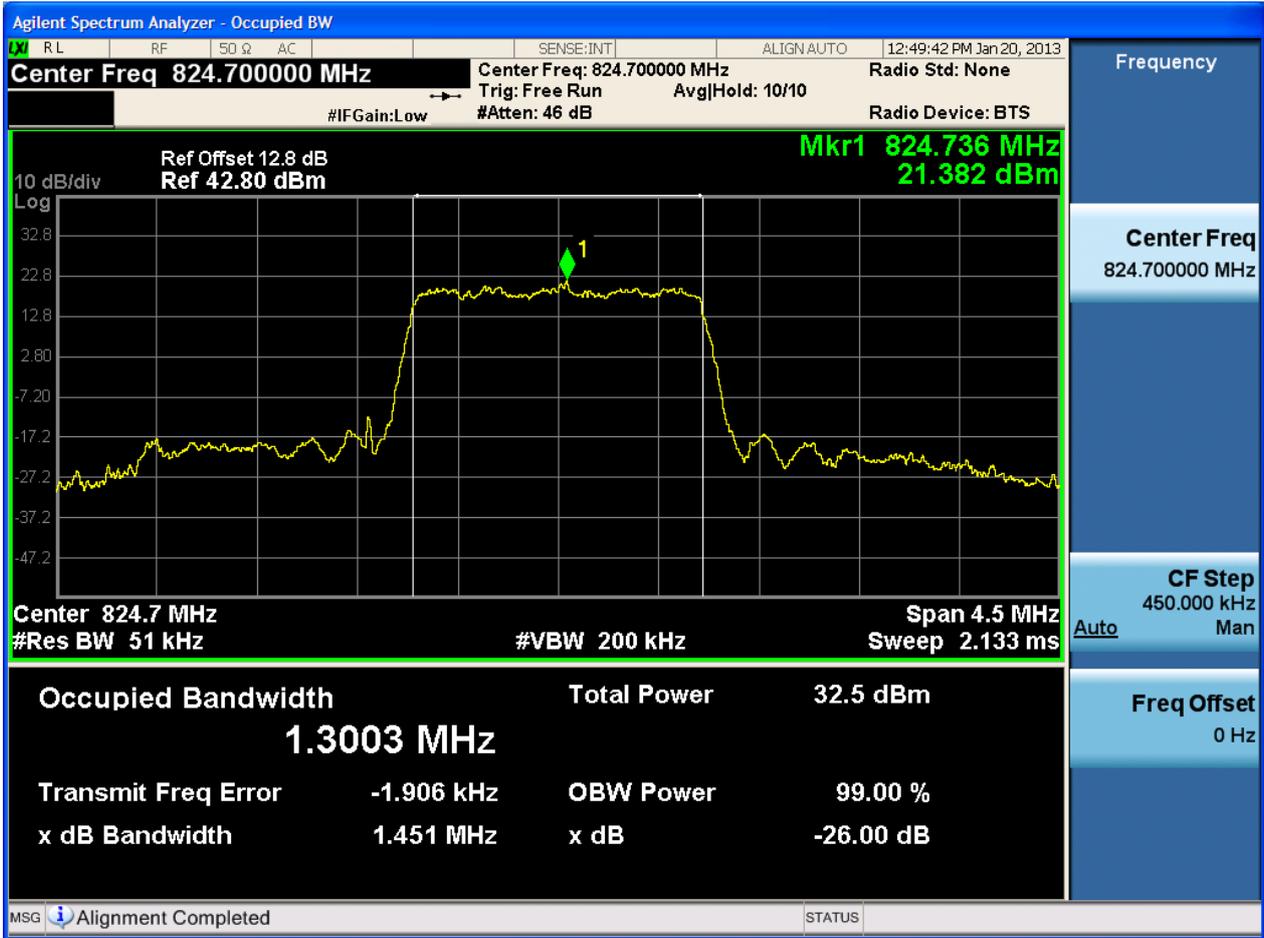
Part II - Test Plots

2.1 For CDMA/1X

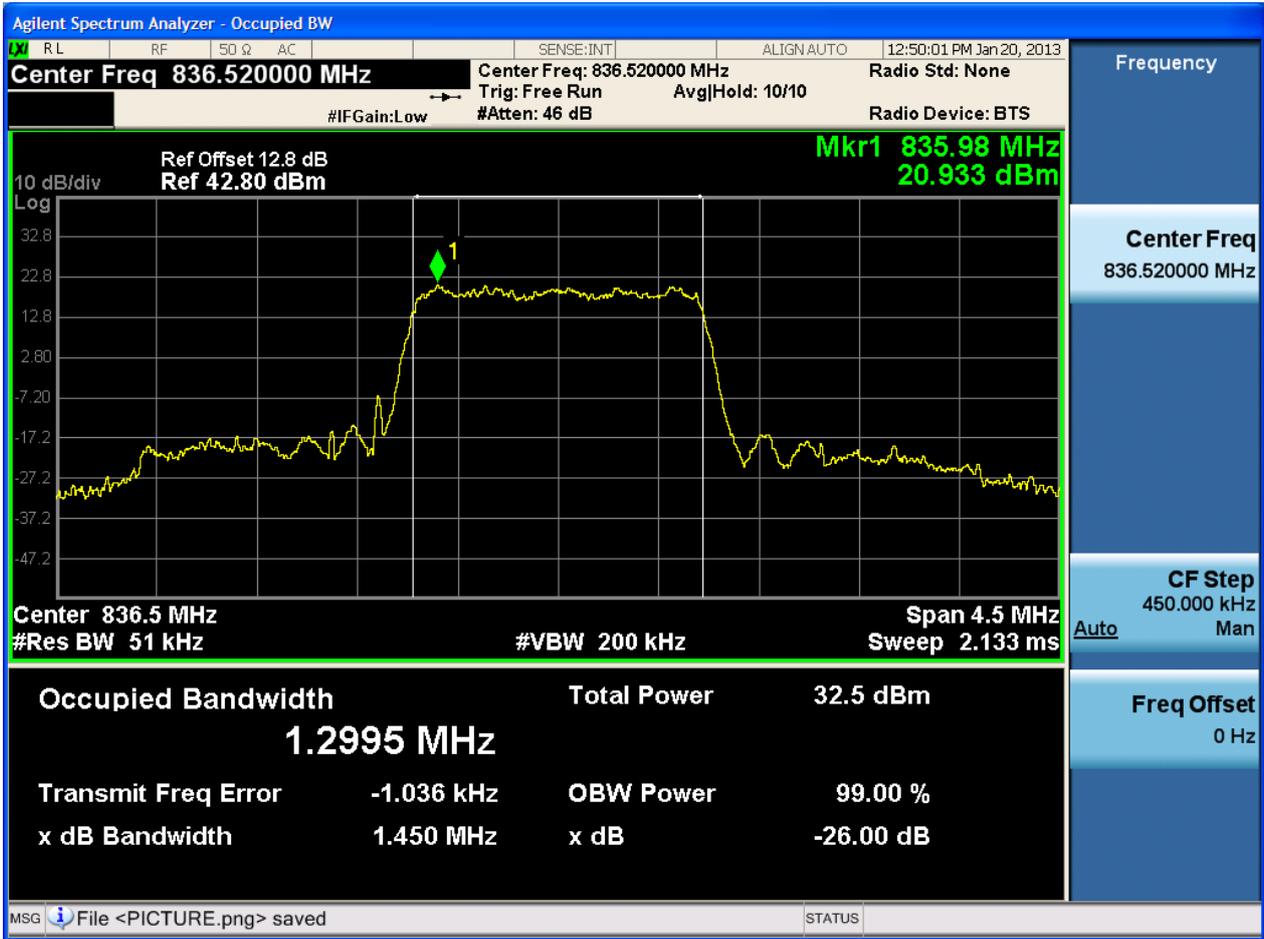
2.1.1 Test Band = BC0

2.1.1.1 Test Mode = CDMA/1X/TM1

2.1.1.1.1 Test Channel = LCH

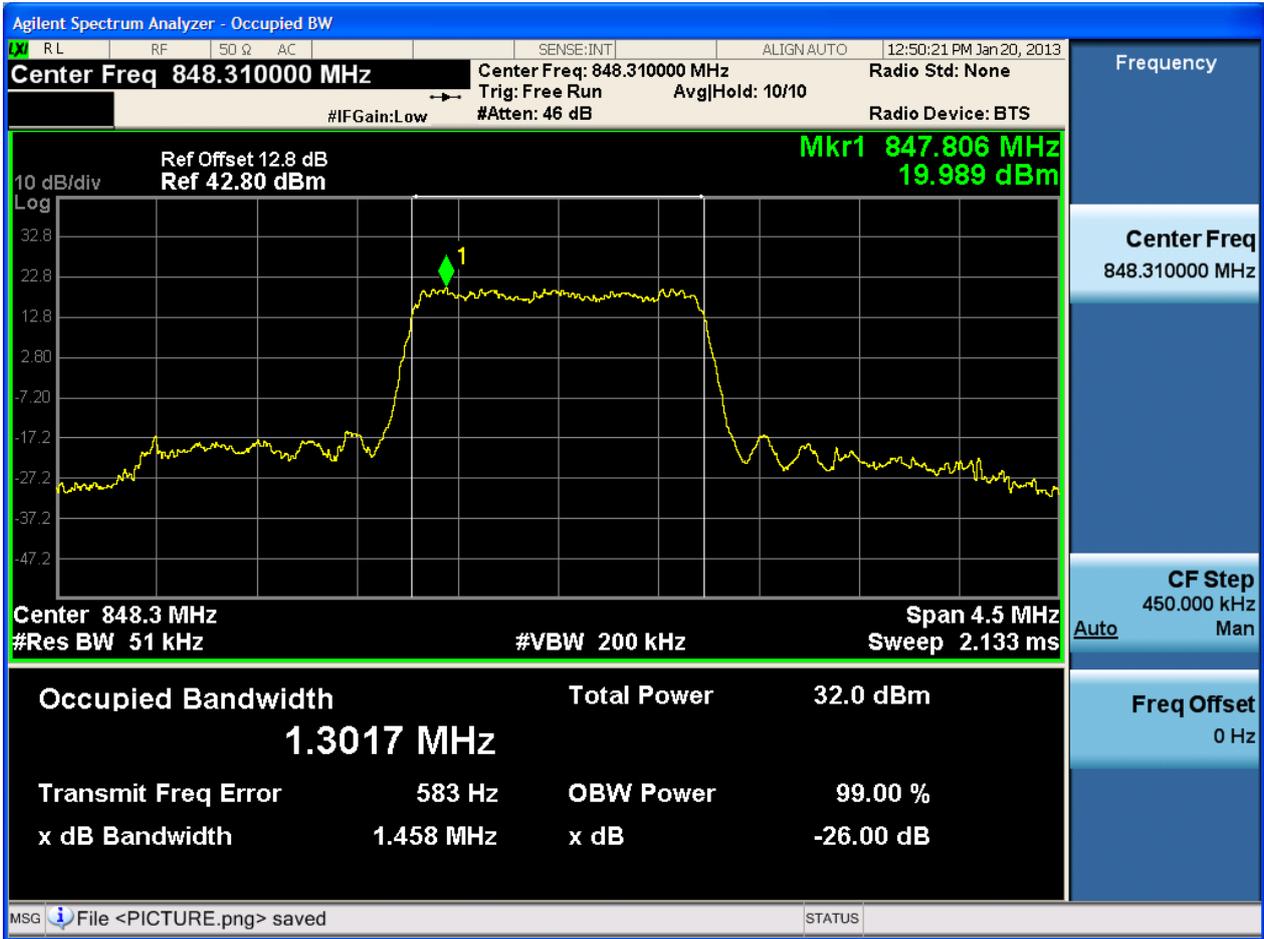


2.1.1.1.2 Test Channel = MCH





2.1.1.1.3 Test Channel = HCH





2.1.1.2 Test Mode = CDMA/1X/TM3

2.1.1.2.1 Test Channel = LCH





2.1.1.2.2 Test Channel = MCH





2.1.1.2.3 Test Channel = HCH





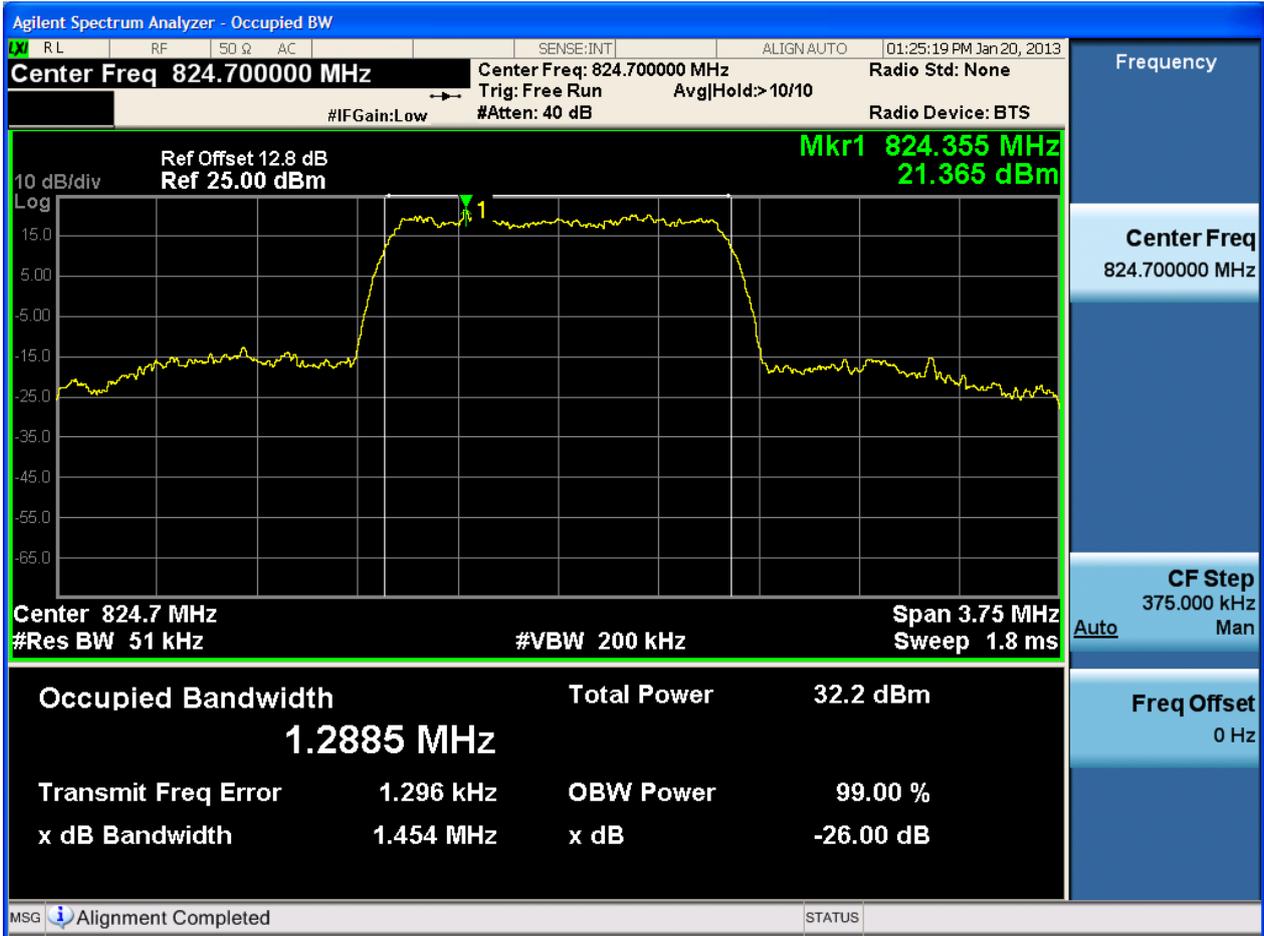
## 2.2 For CDMA/EV-DO

### 2.2.1 Test Band = BC0

#### 2.2.1.1 Test Mode = CDMA/EV-DO/Subtype0

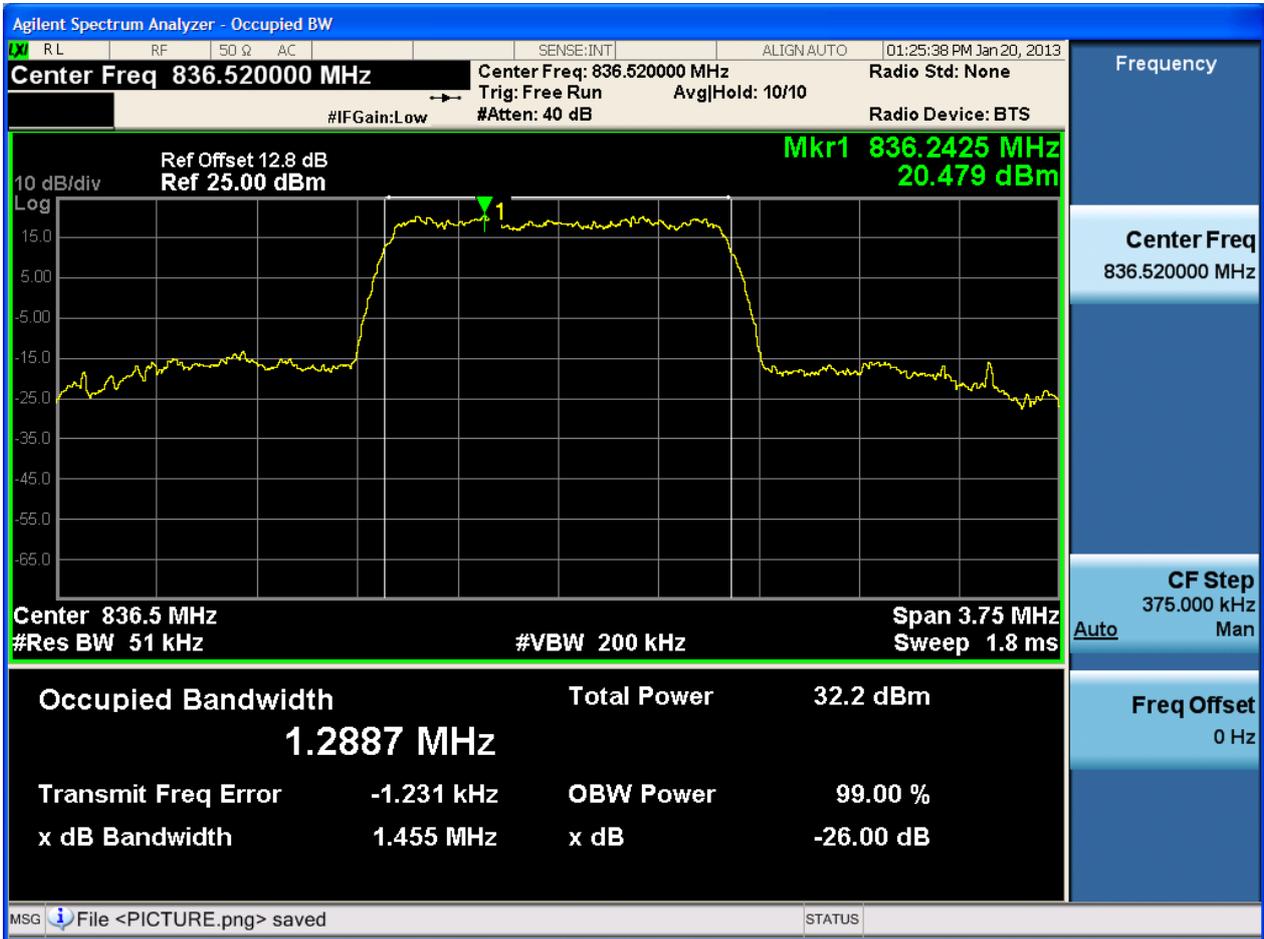
##### 2.2.1.1.1 Test Modulation = HPSK

##### 2.2.1.1.1.1 Test Channel = LCH





2.2.1.1.1.2 Test Channel = MCH



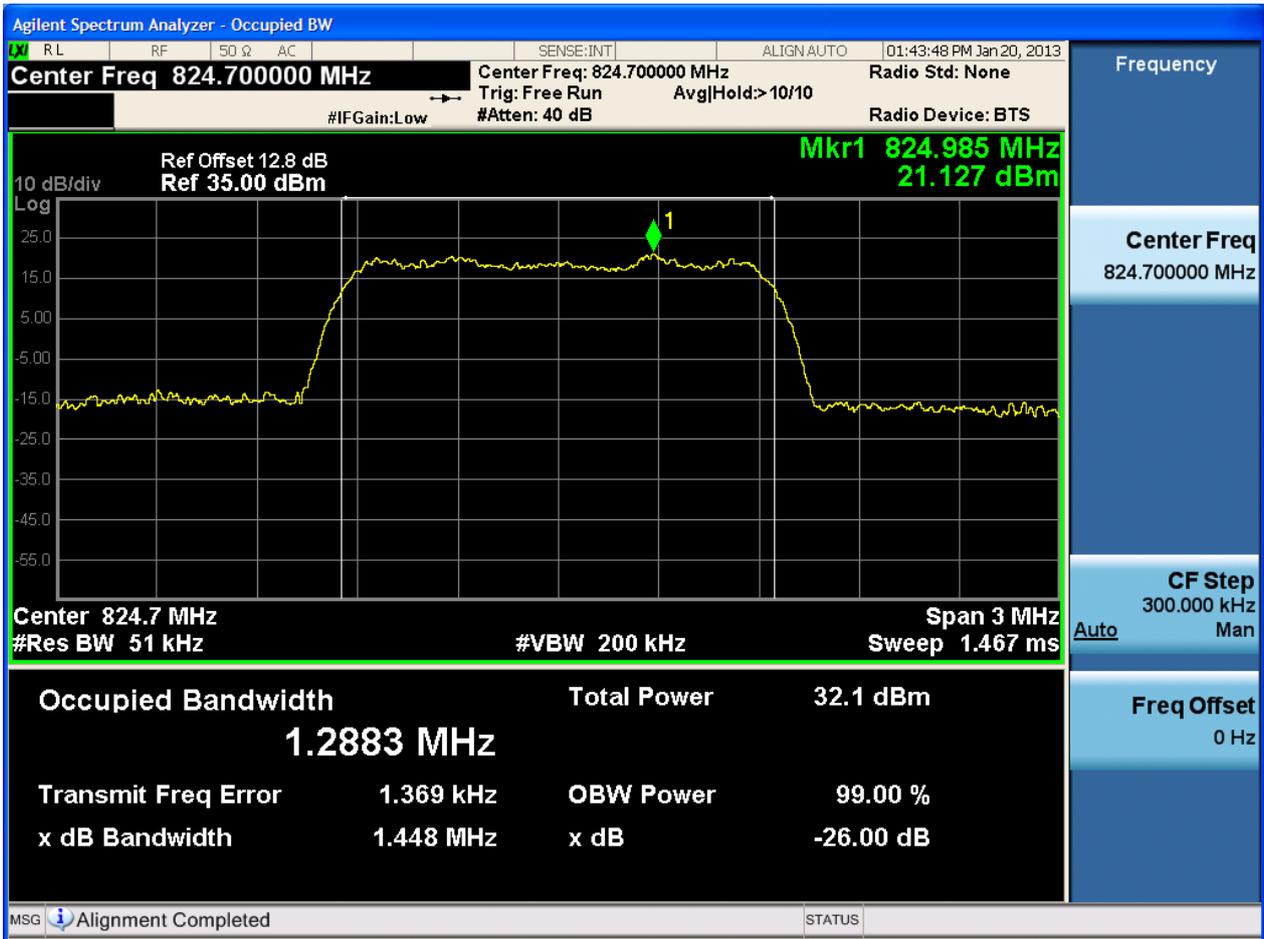
2.2.1.1.1.3 Test Channel = HCH



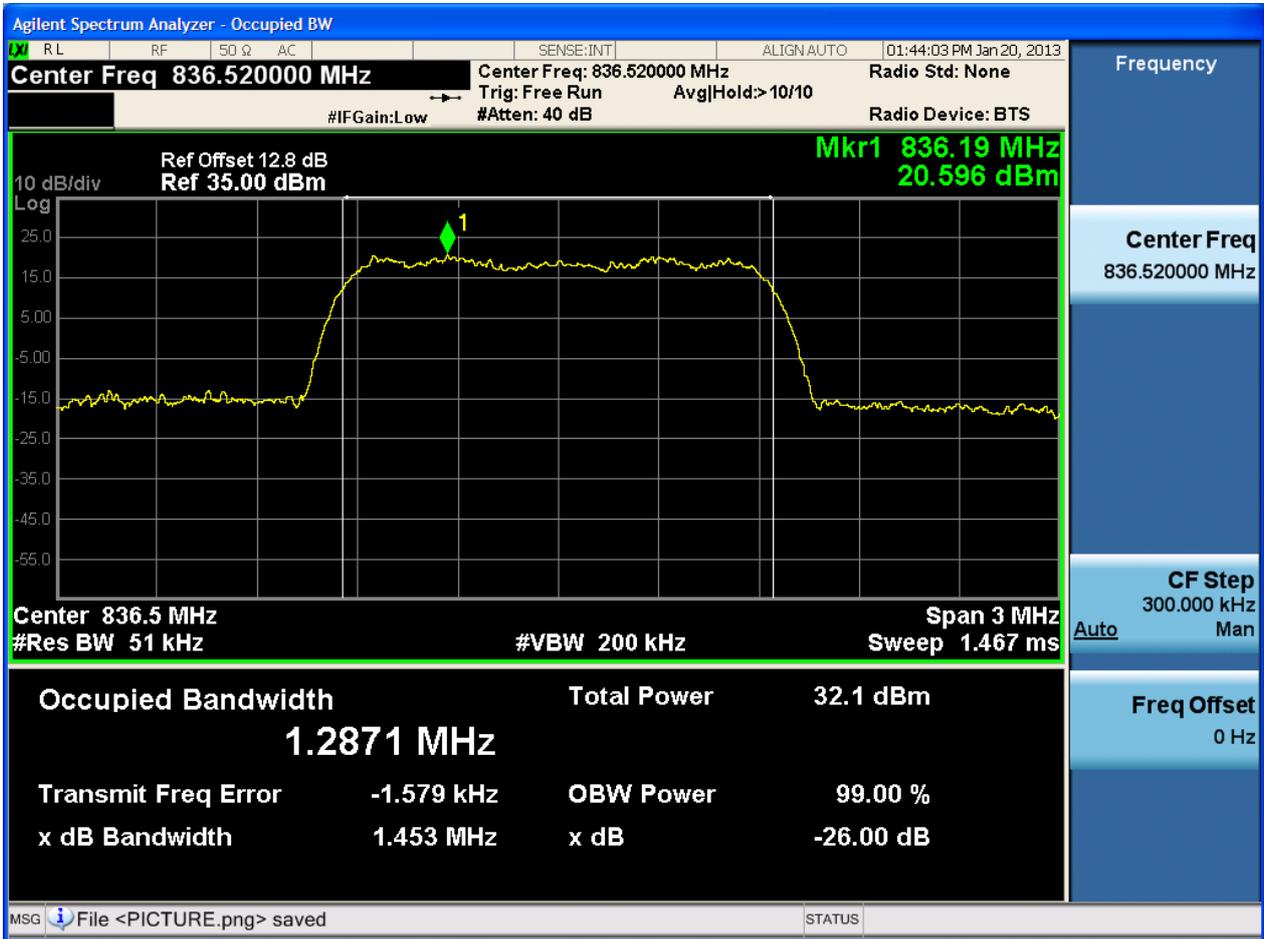
2.2.1.2 Test Mode = CDMA/EV-DO/Subtype2

2.2.1.2.1 Test Modulation = BPSK (256 bits)

2.2.1.2.1.1 Test Channel = LCH



2.2.1.2.1.2 Test Channel = MCH

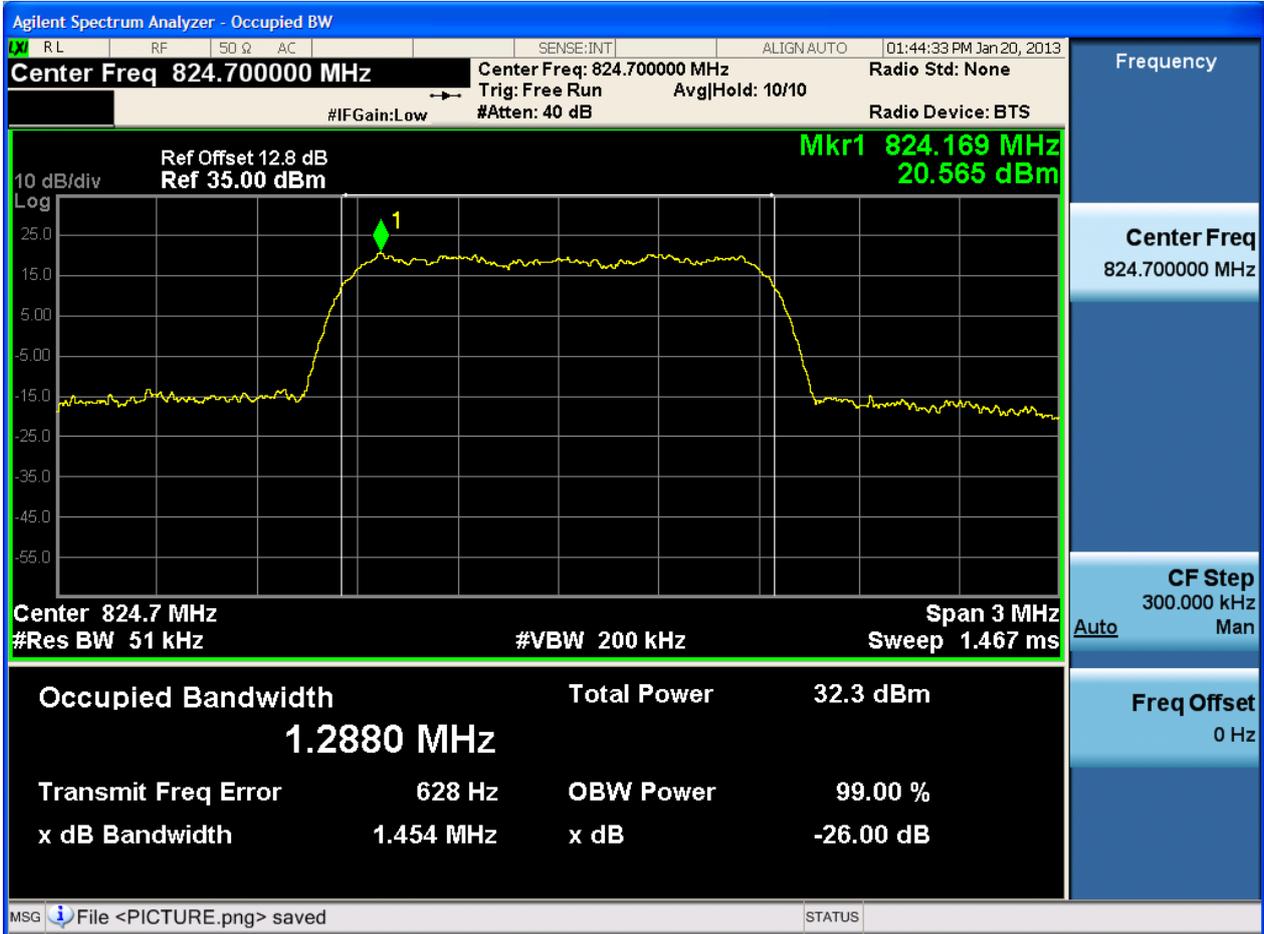


2.2.1.2.1.3 Test Channel = HCH

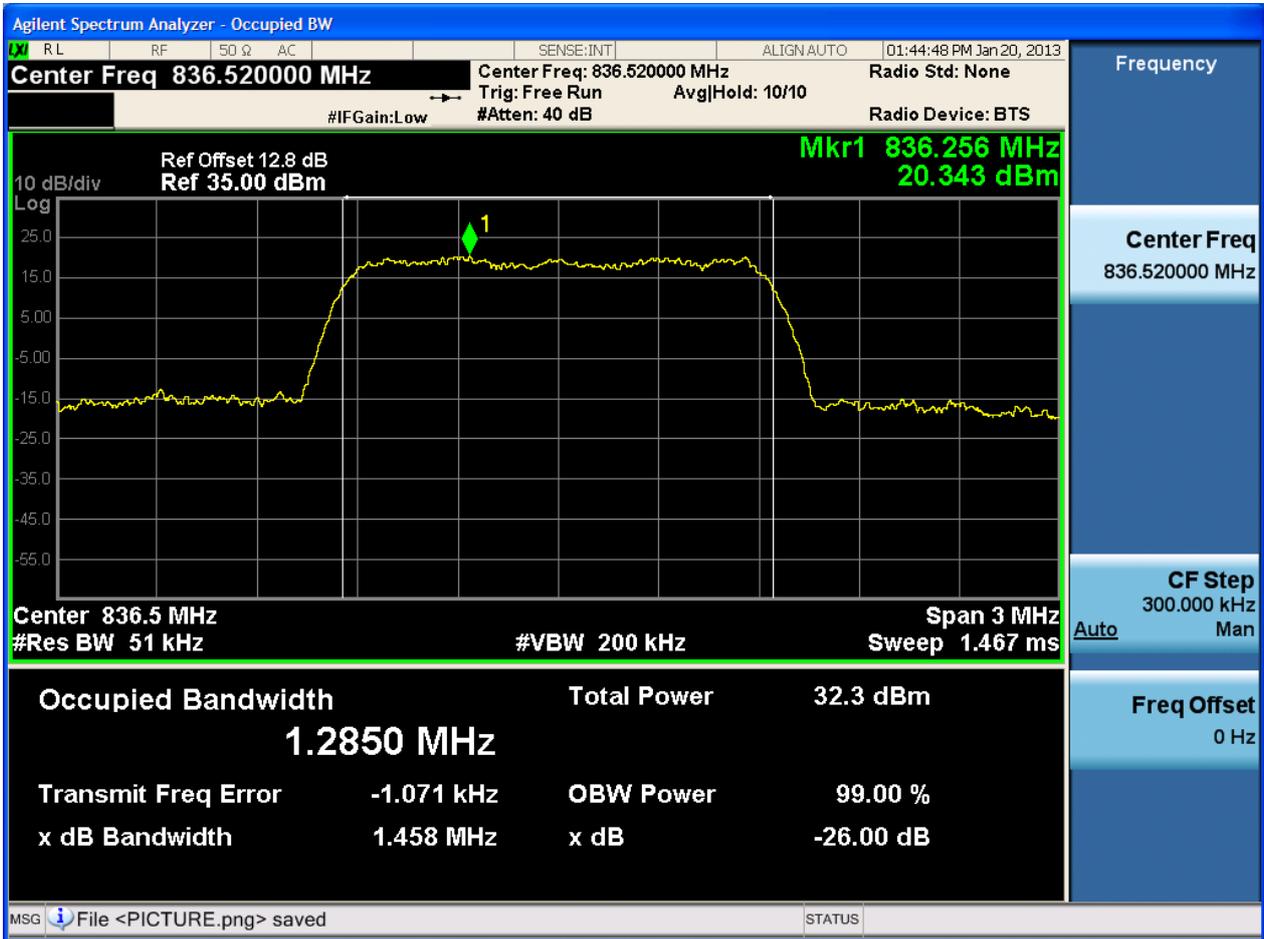


2.2.1.2.2 Test Modulation = QPSK (4096 bits)

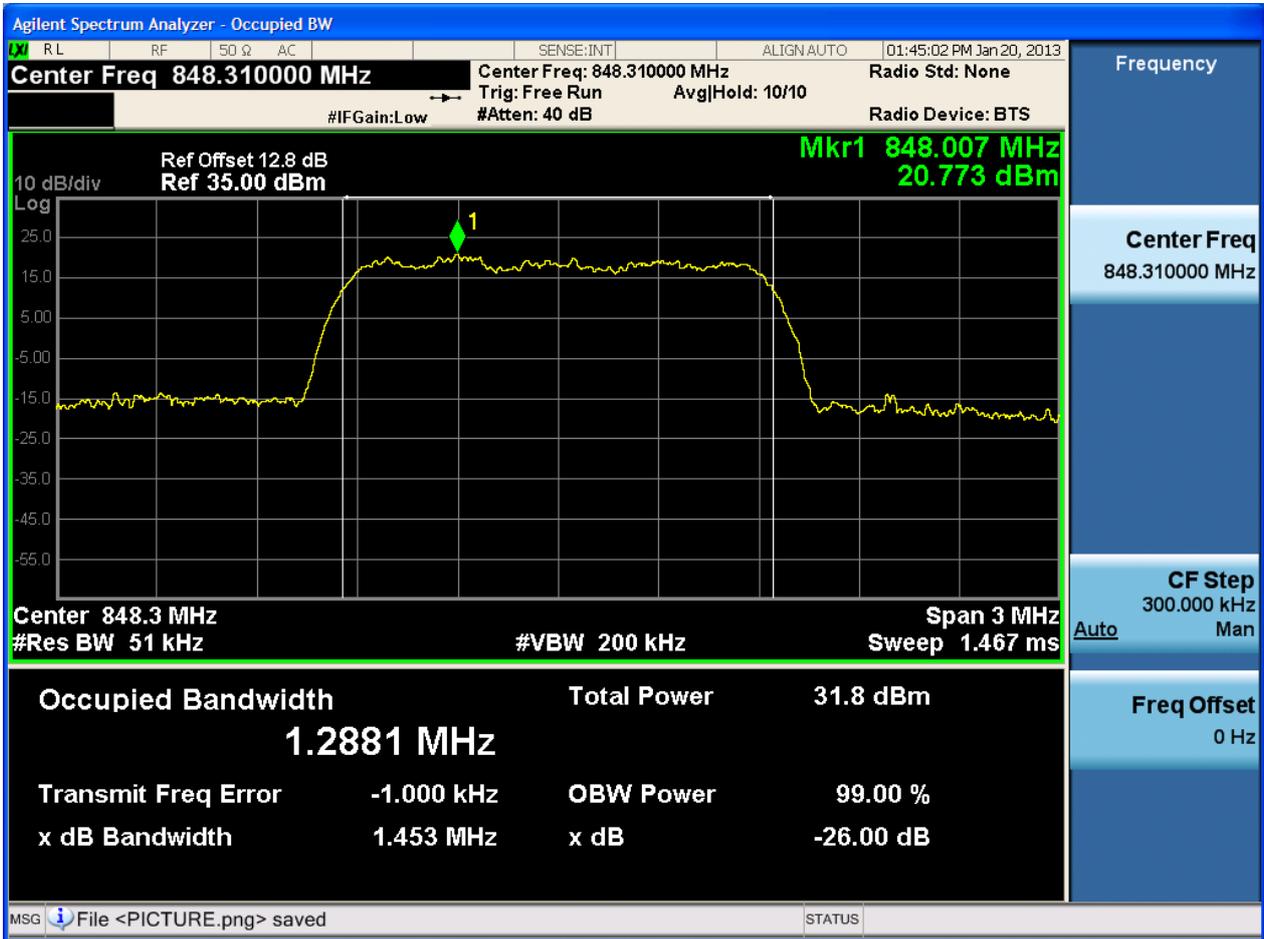
2.2.1.2.2.1 Test Channel = LCH



2.2.1.2.2.2 Test Channel = MCH

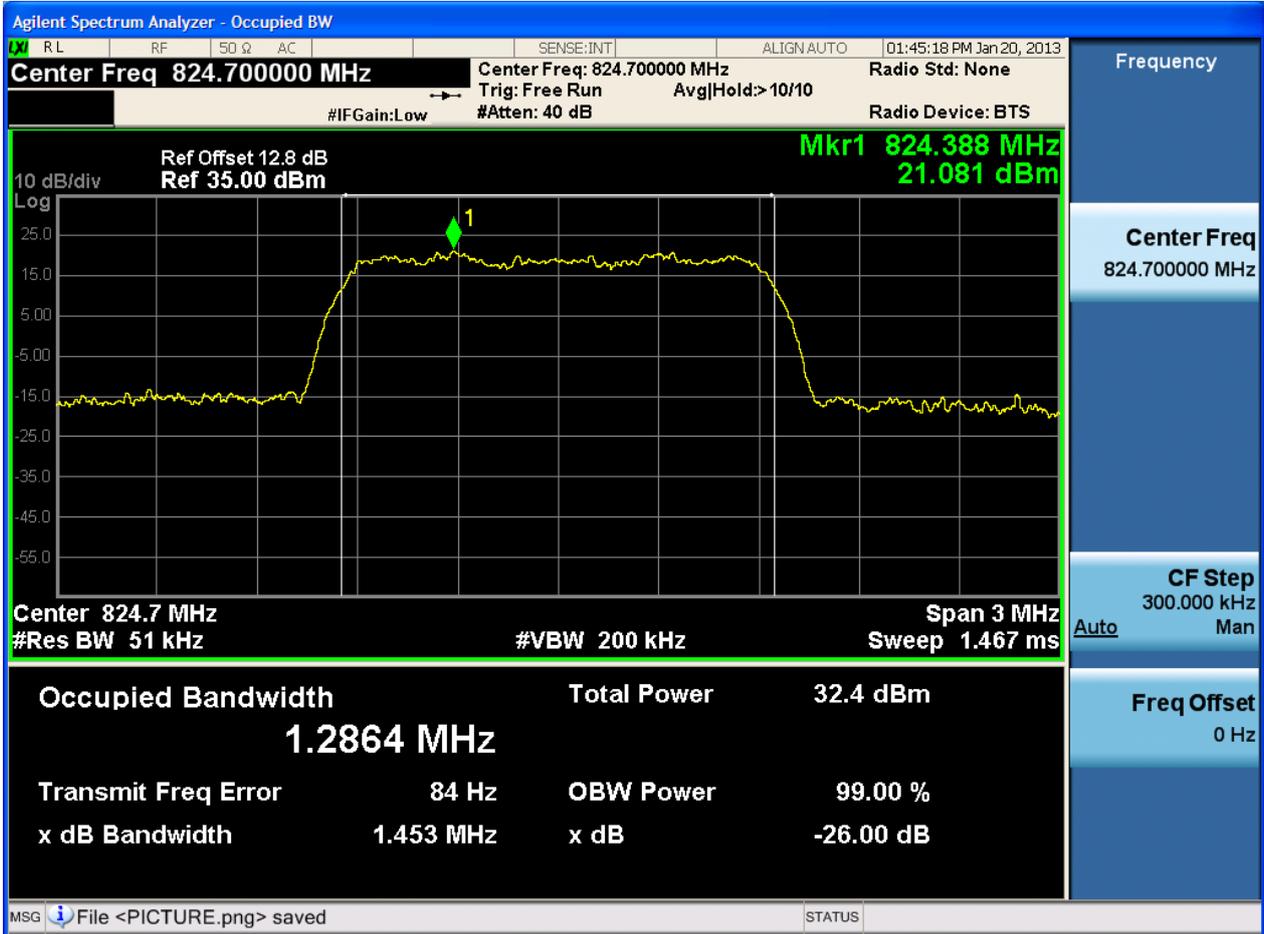


2.2.1.2.2.3 Test Channel = HCH

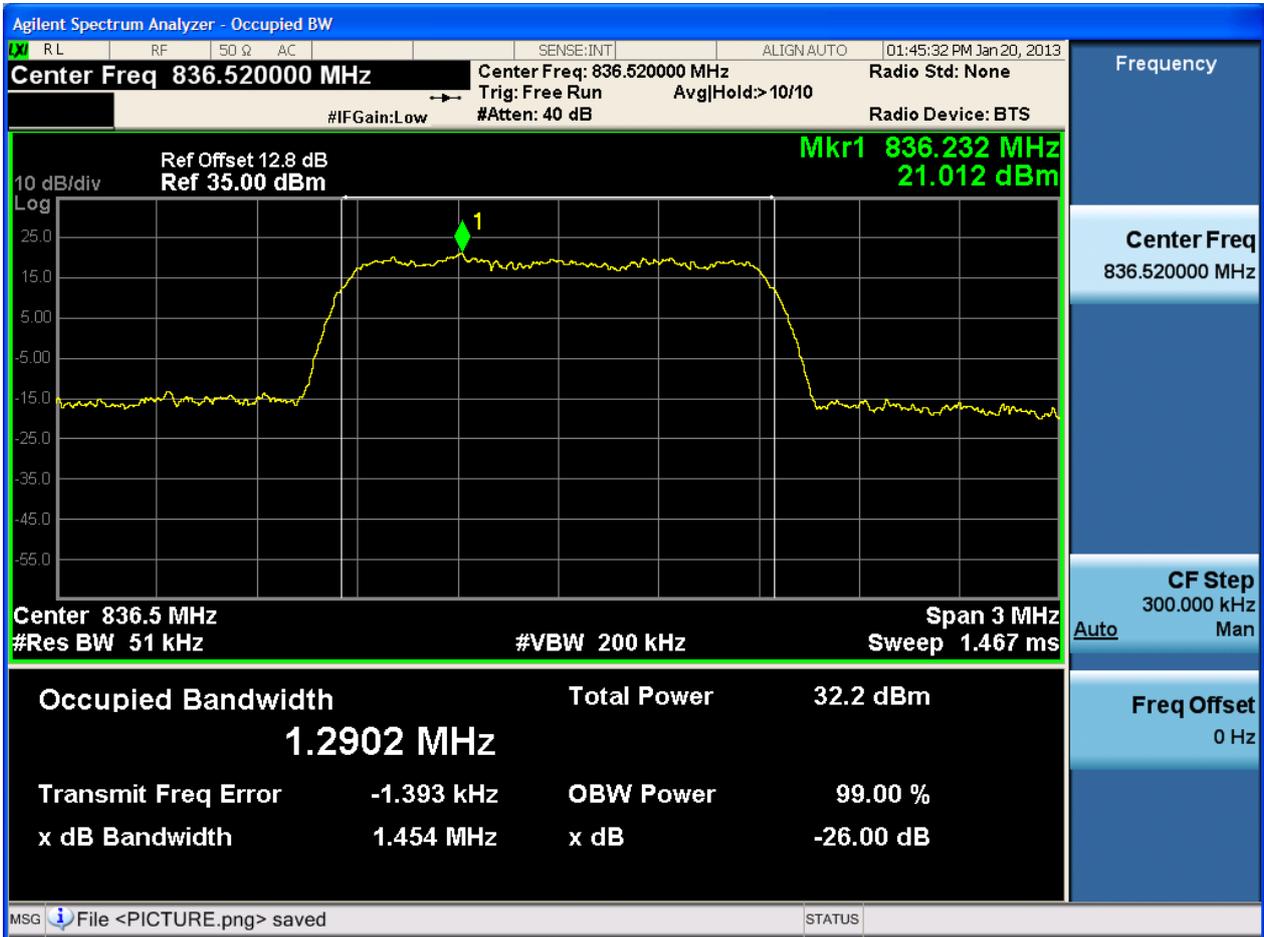


2.2.1.2.3 Test Modulation = 8-PSK (12288 bits)

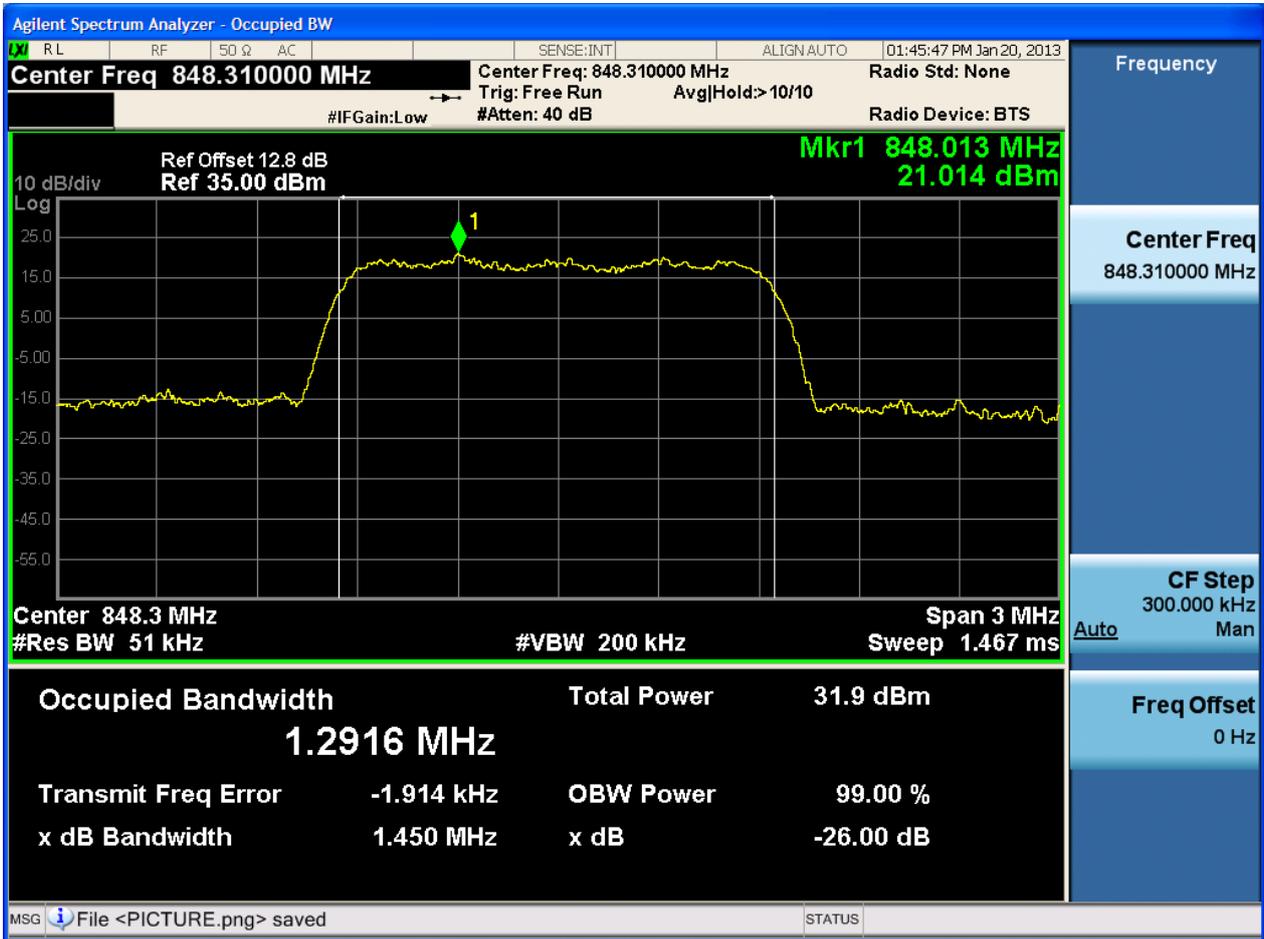
2.2.1.2.3.1 Test Channel = LCH



2.2.1.2.3.2 Test Channel = MCH



2.2.1.2.3.3 Test Channel = HCH





### 3Appendix\_C: Band Edges Compliance

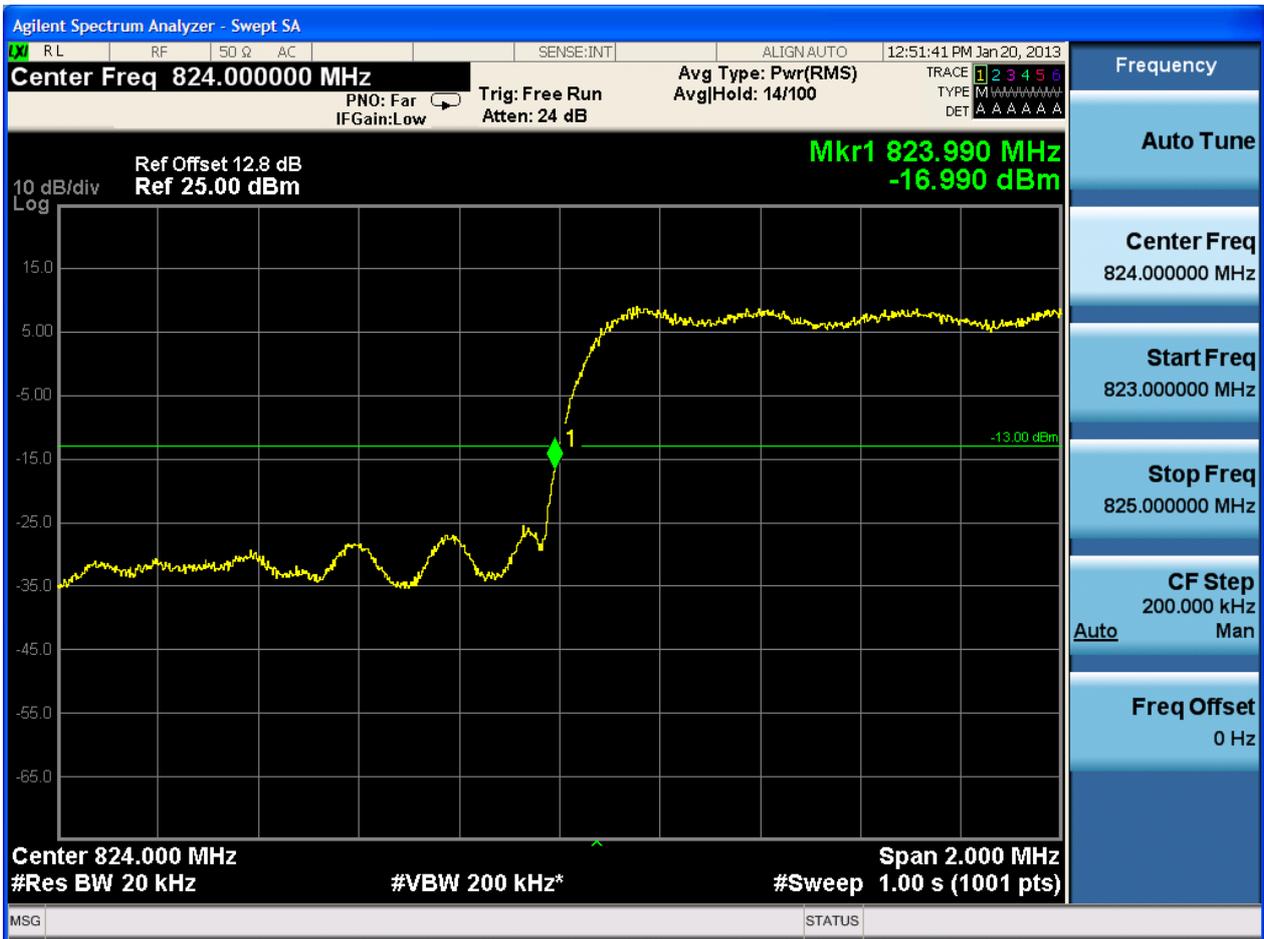
#### Part I - Test Plots

##### 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



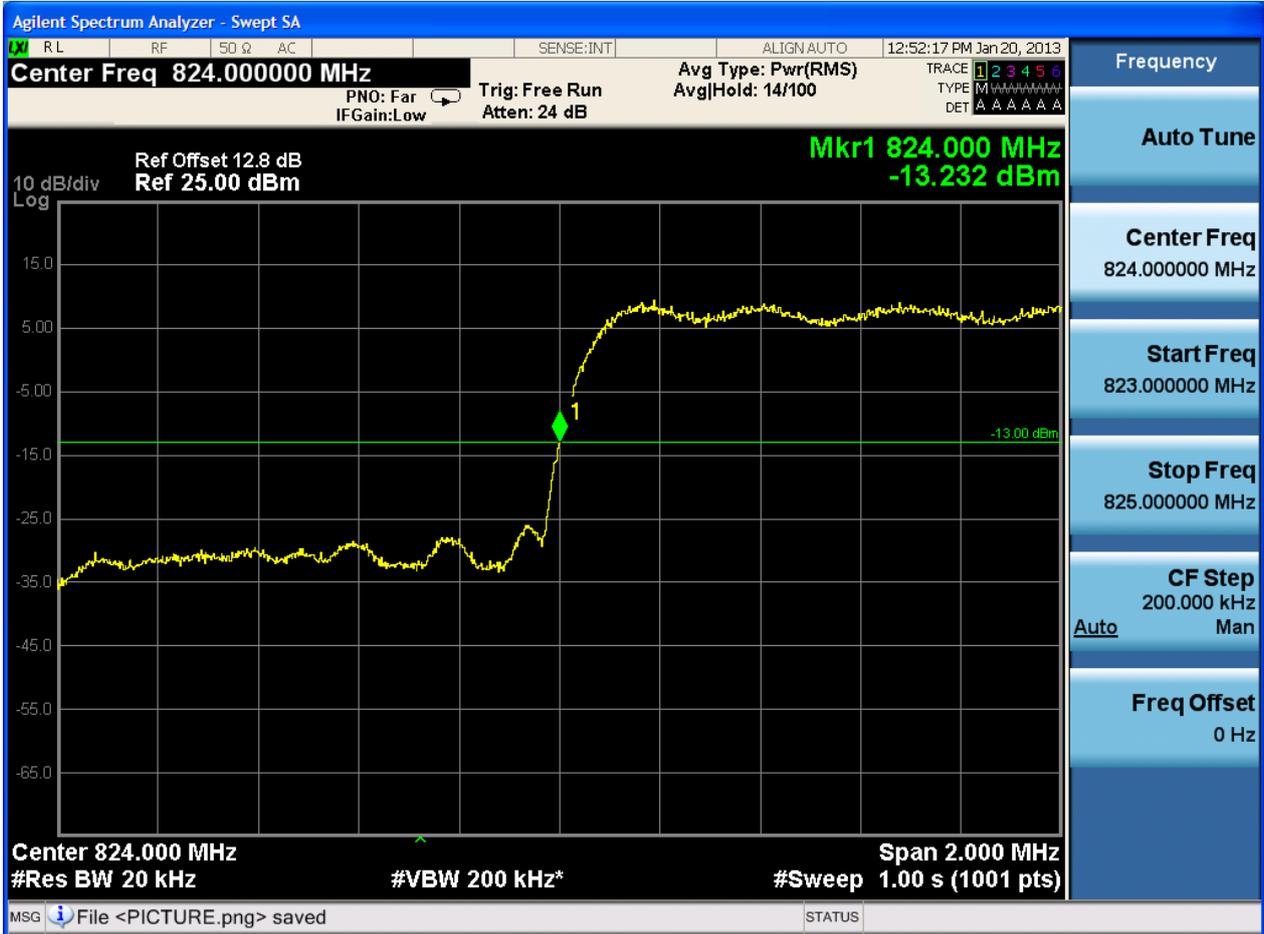


### 3.1.1.1.2 Test Channel = HCH



### 3.1.1.2 Test Mode = CDMA/1X/TM3

#### 3.1.1.2.1 Test Channel = LCH





### 3.1.1.2.2 Test Channel = 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 = HCH

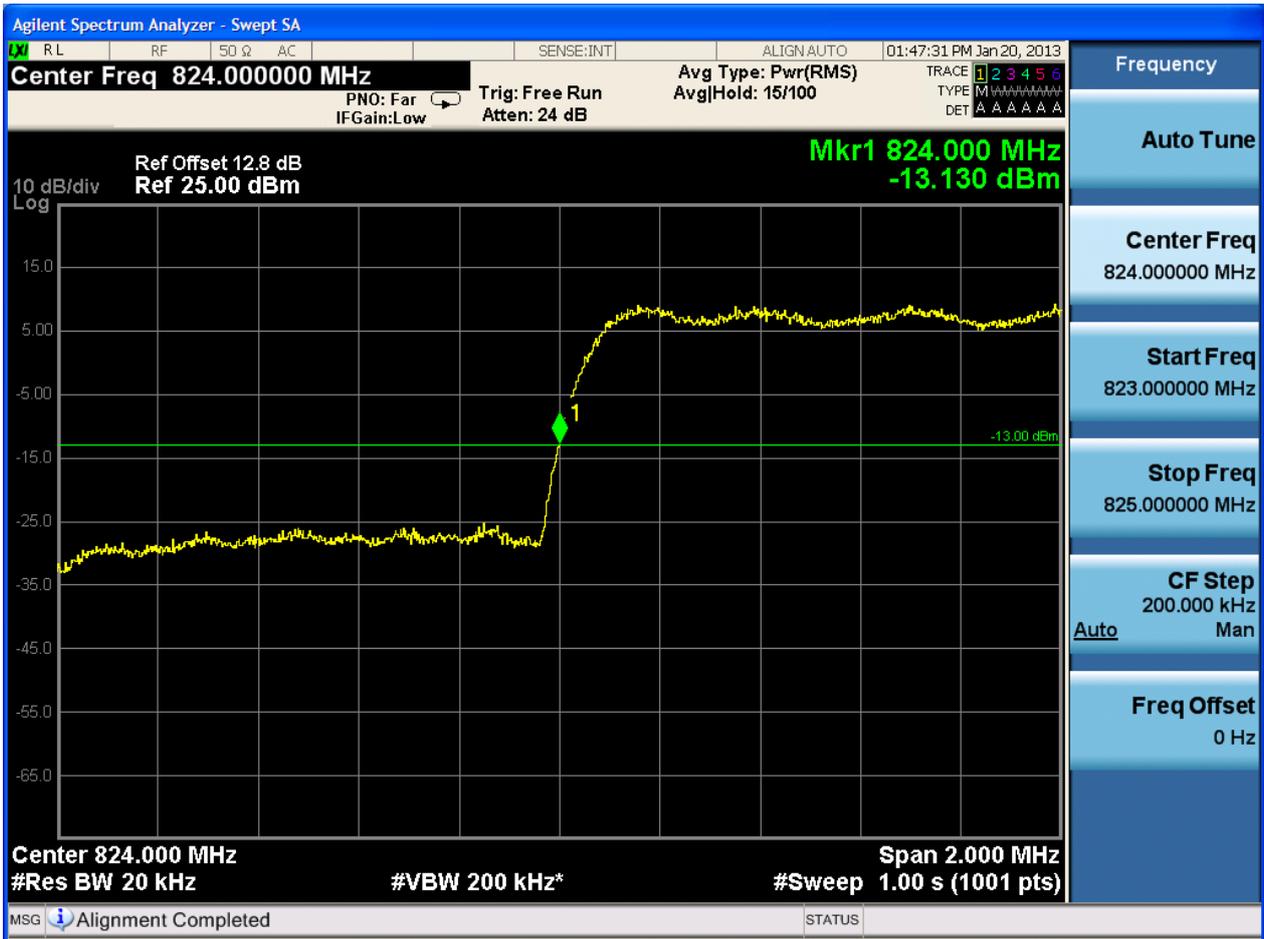




### 3.2.1.2 Test Mode = CDMA/EV-DO/Subtype2

#### 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 = HCH



### 3.2.1.2.2 Test Modulation = QPSK (4096 bits)

#### 3.2.1.2.2.1 Test Channel = LCH



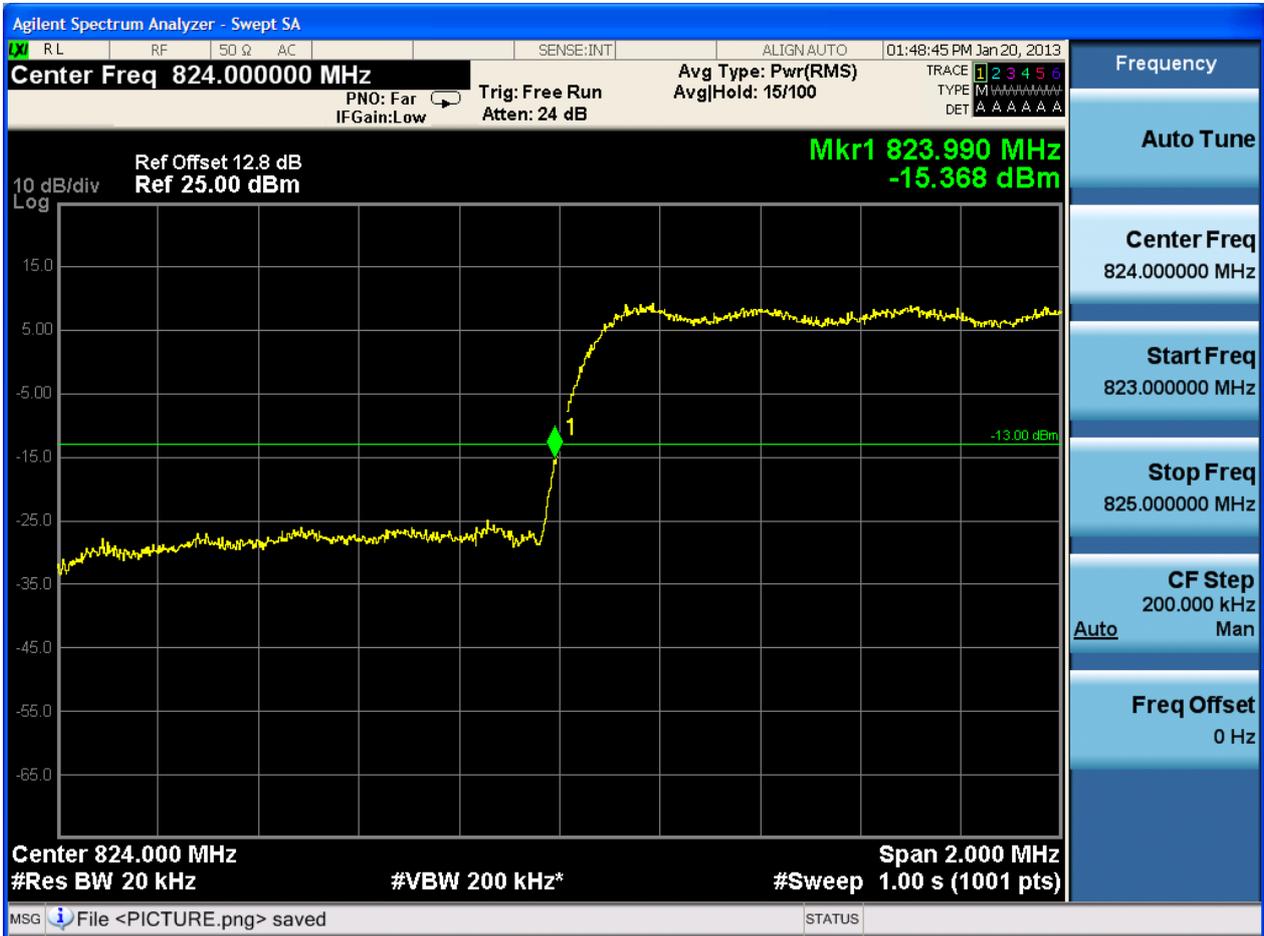
3.2.1.2.2.2 Test Channel = HCH





### 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 = HCH





## **4Appendix\_D: 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.

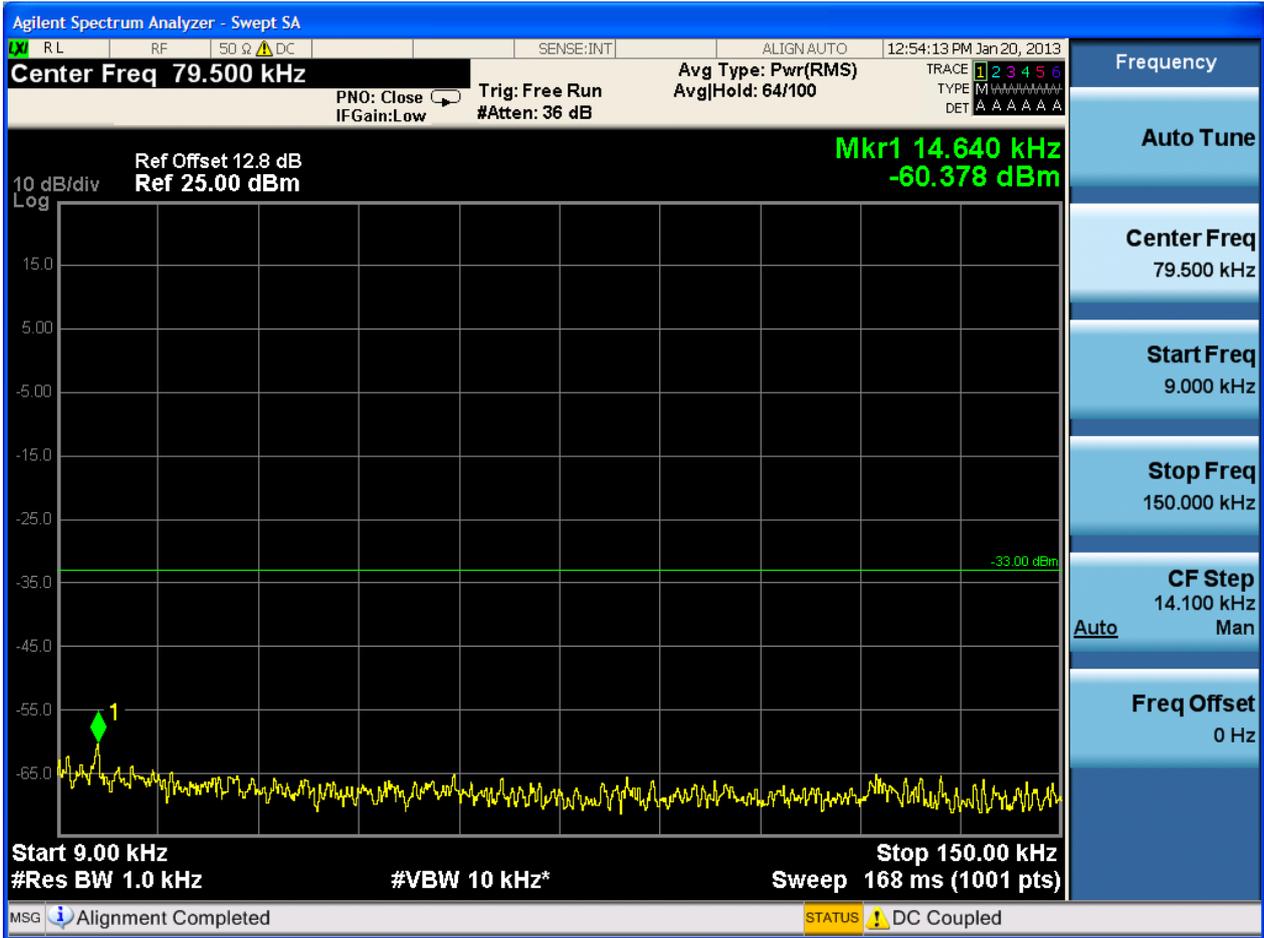
### **Part I - Test Plots**

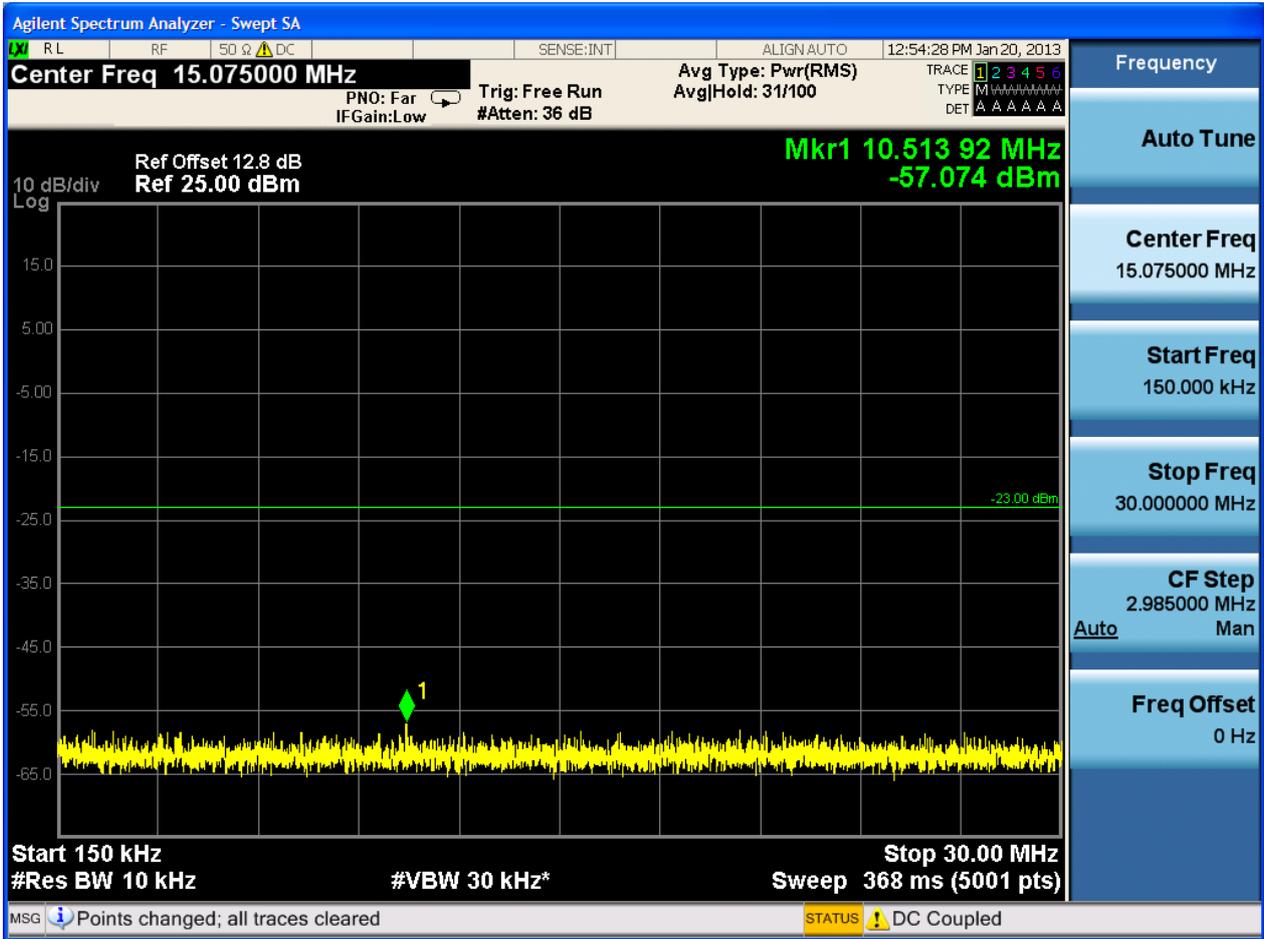
#### **4.1 For CDMA/1X**

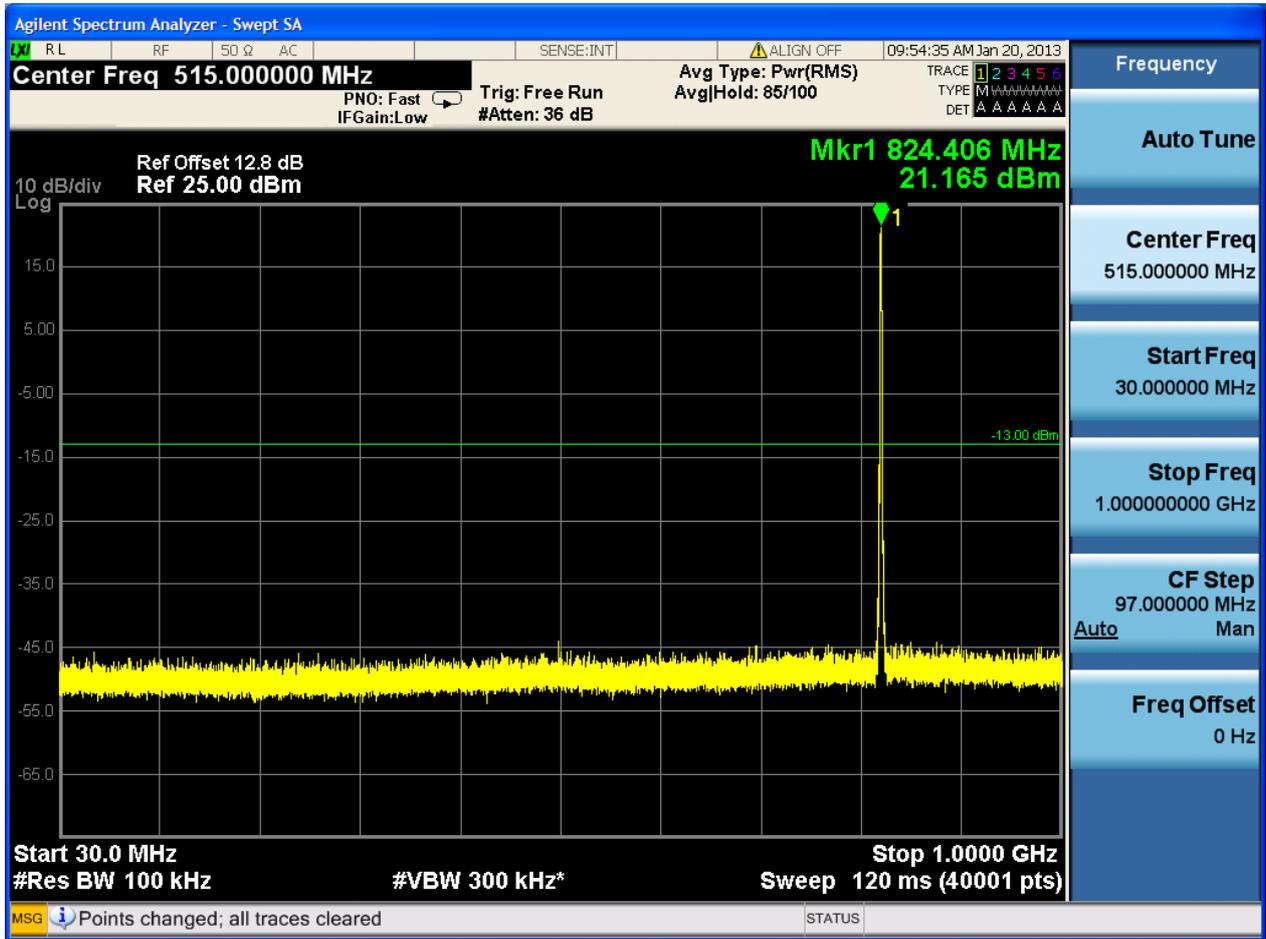
##### **4.1.1 Test Band = BC0**

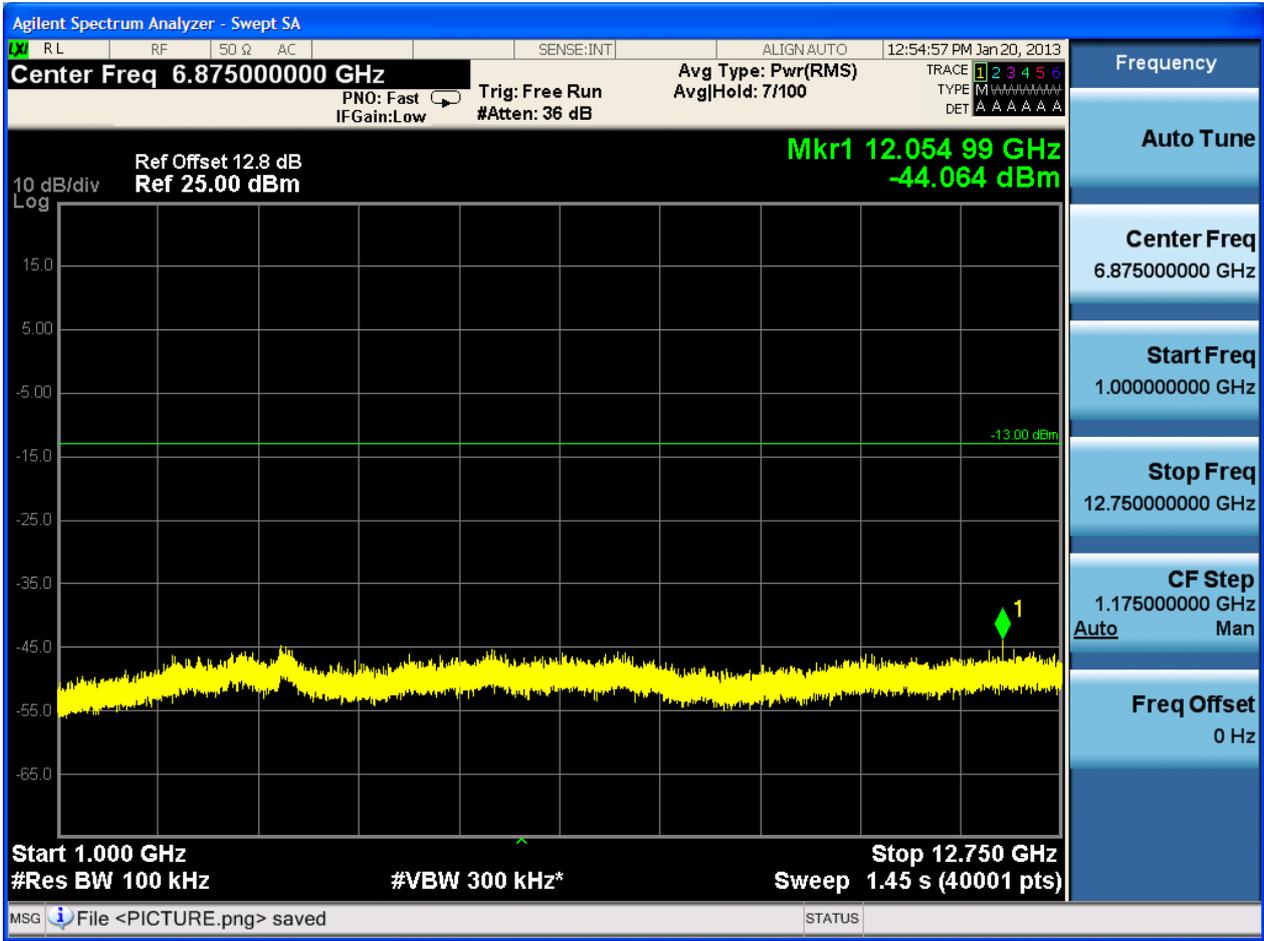
##### **4.1.1.1 Test Mode = CDMA/1X/TM1**

##### **4.1.1.1.1 Test Channel = LCH**



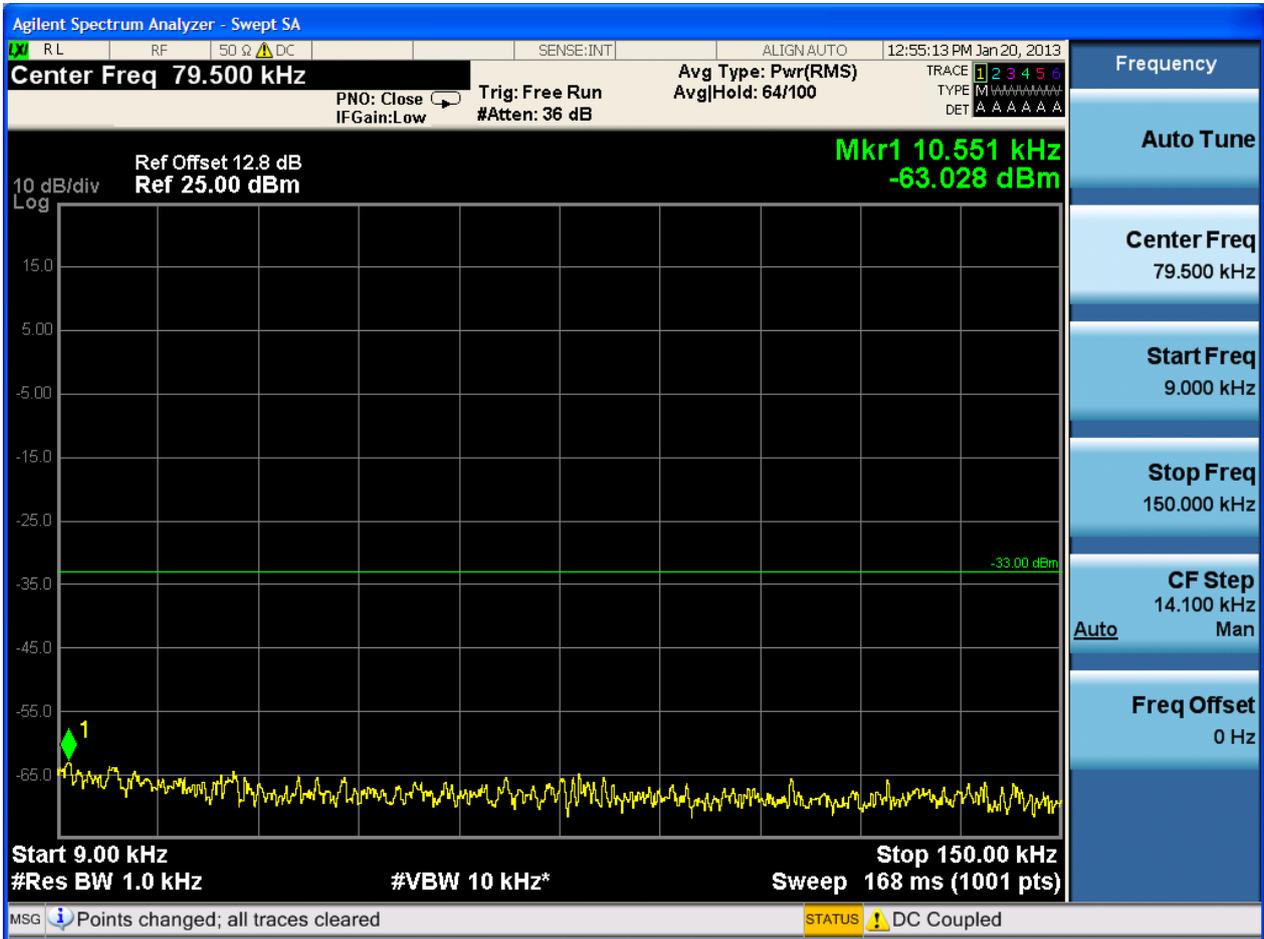


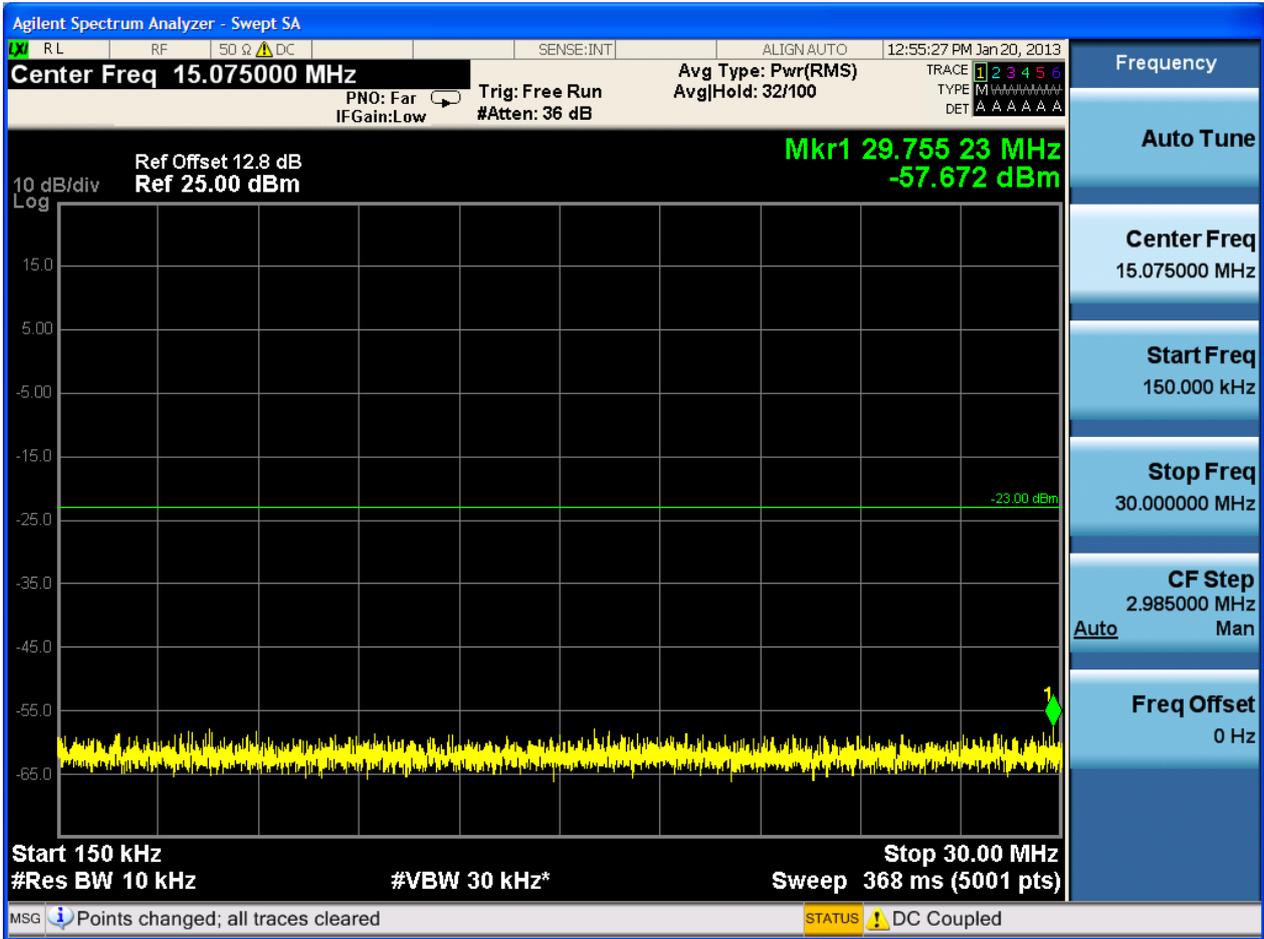


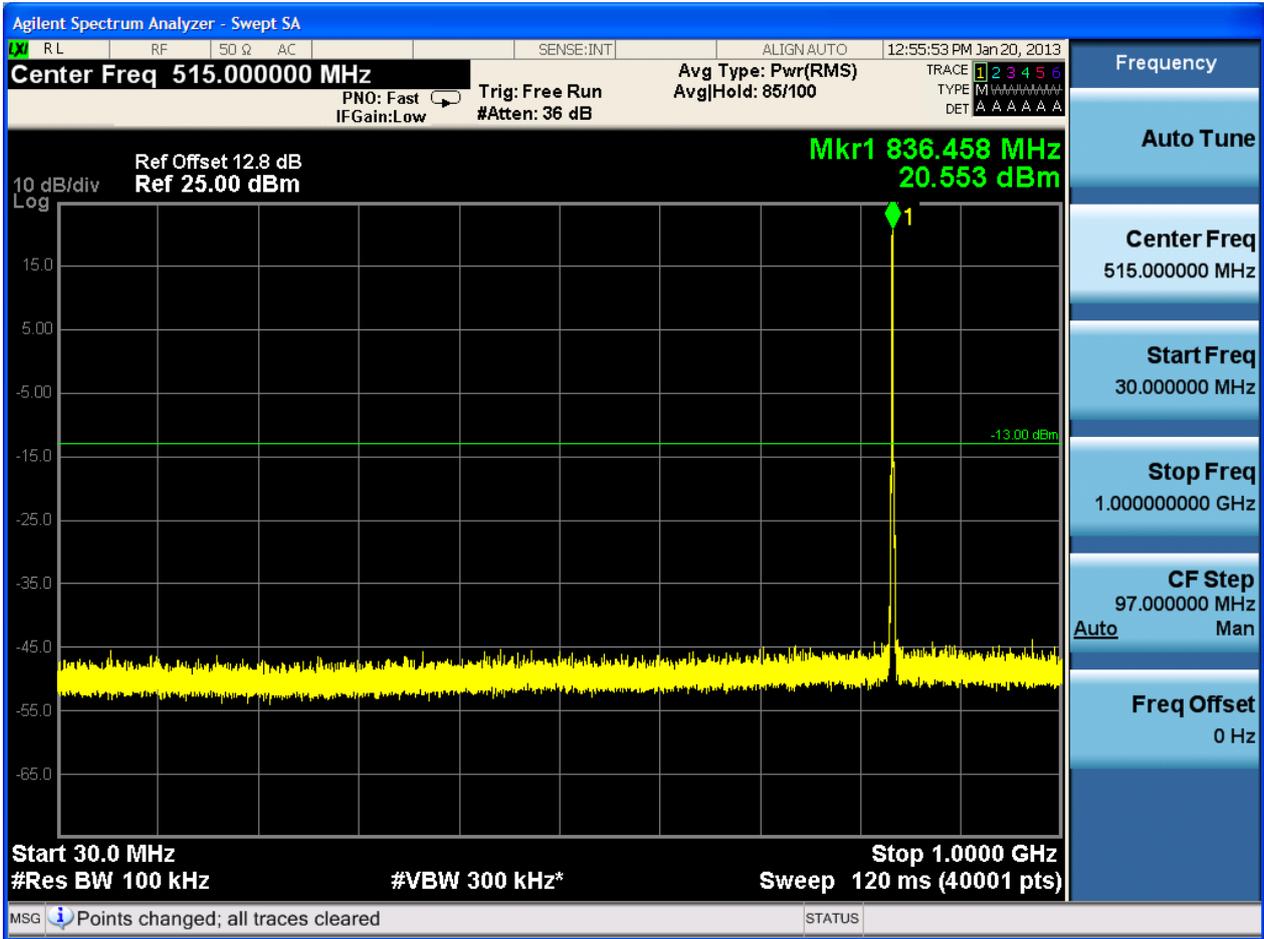


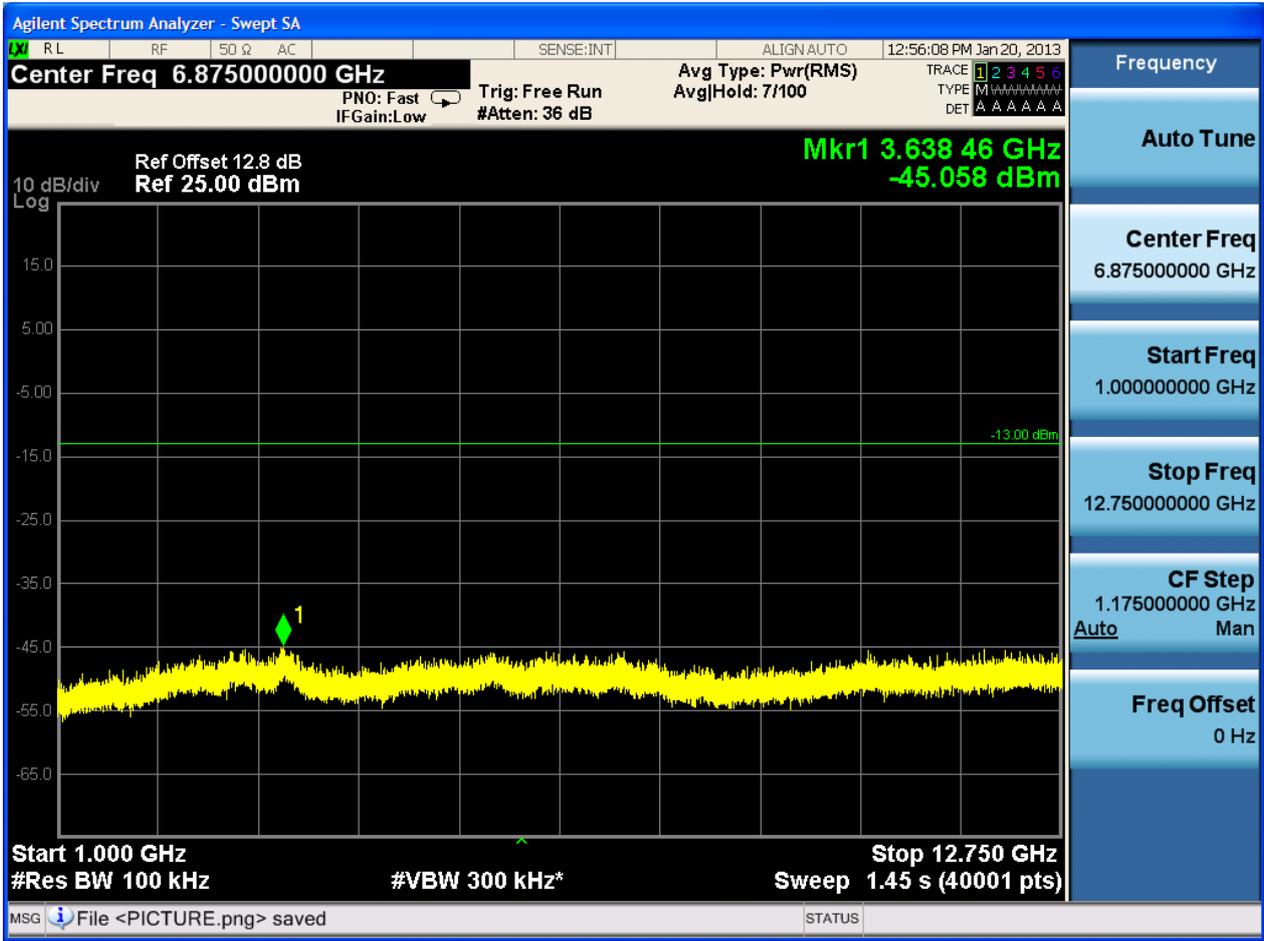


#### 4.1.1.1.2 Test Channel = MCH



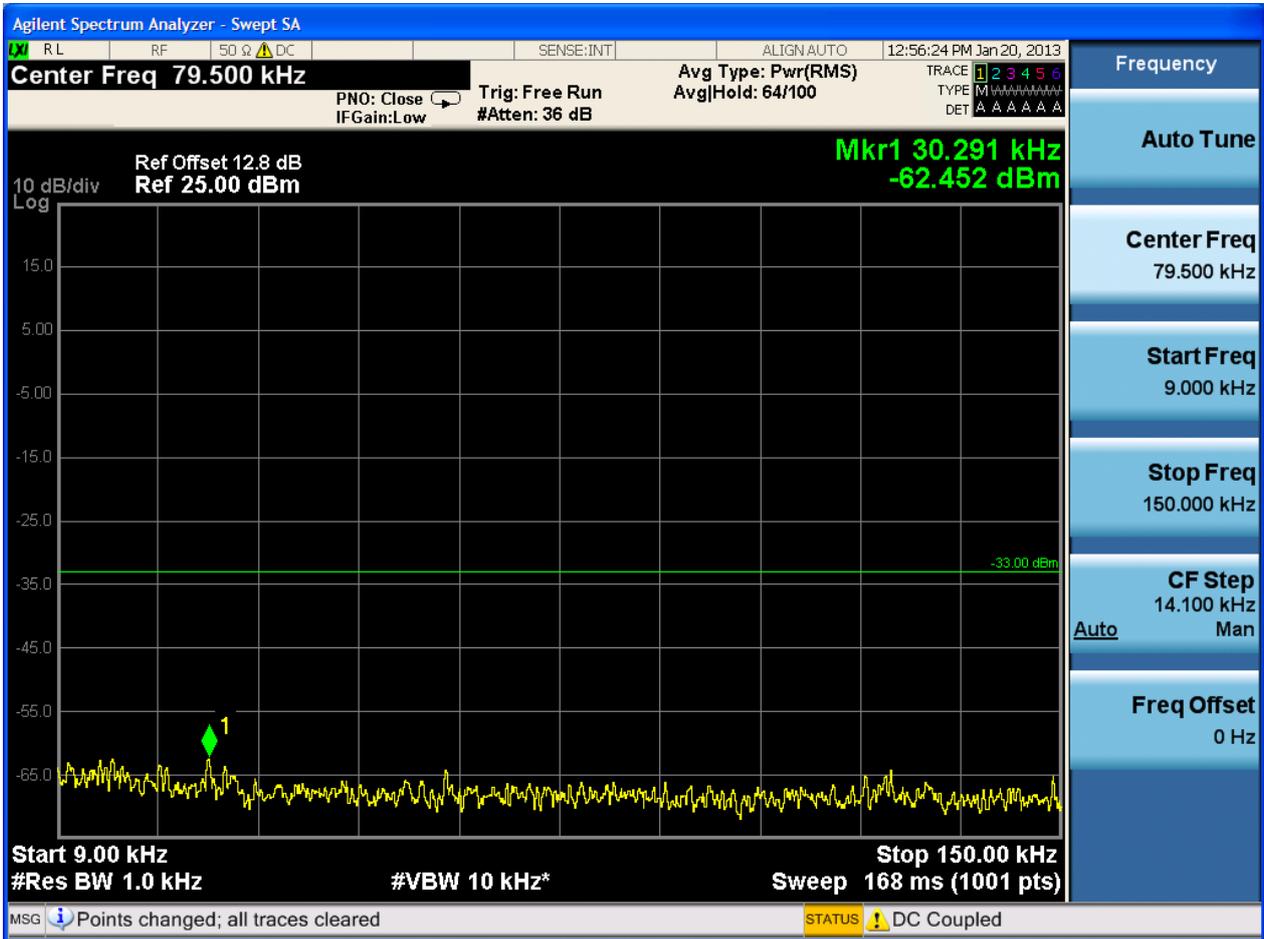


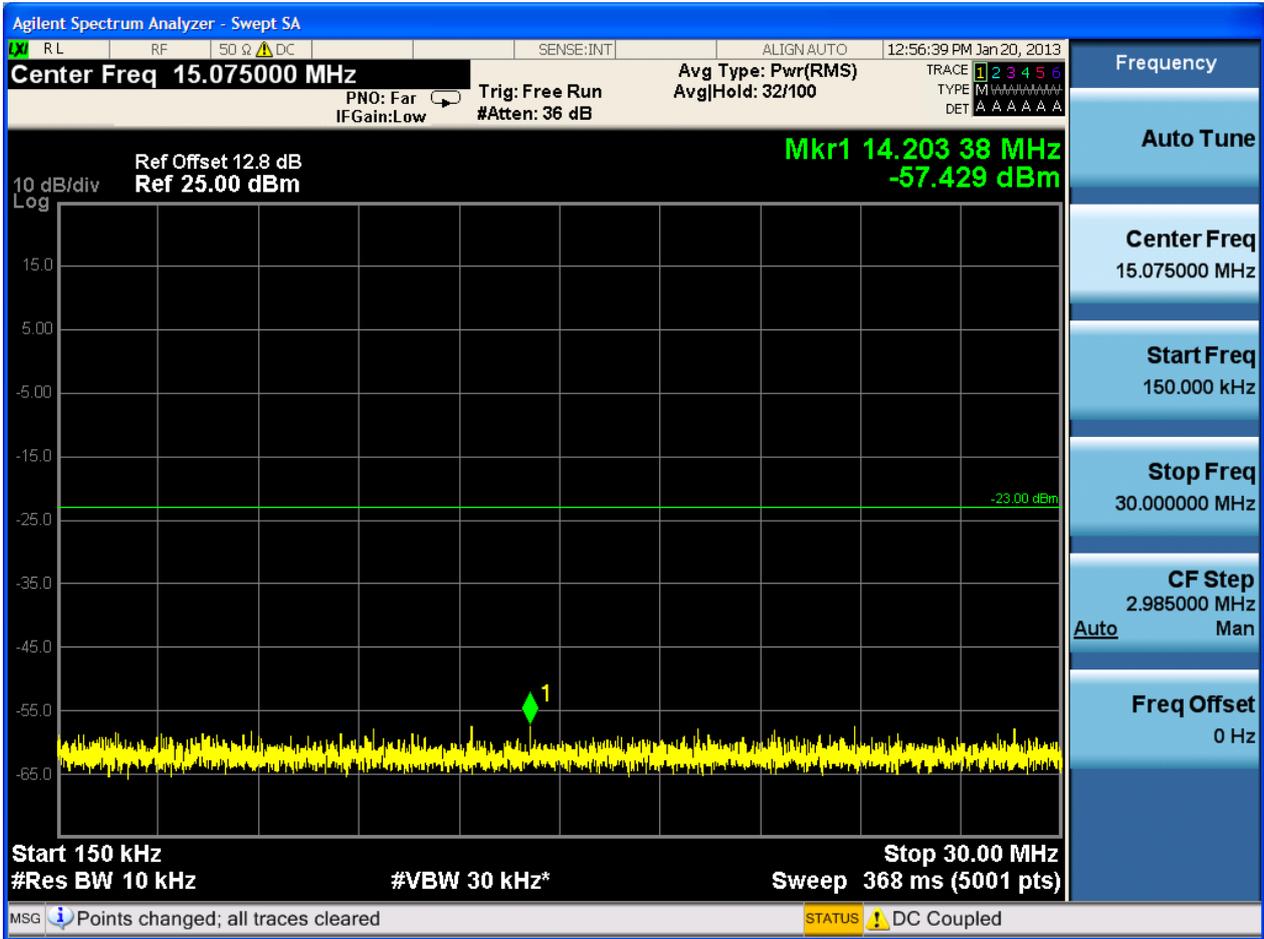


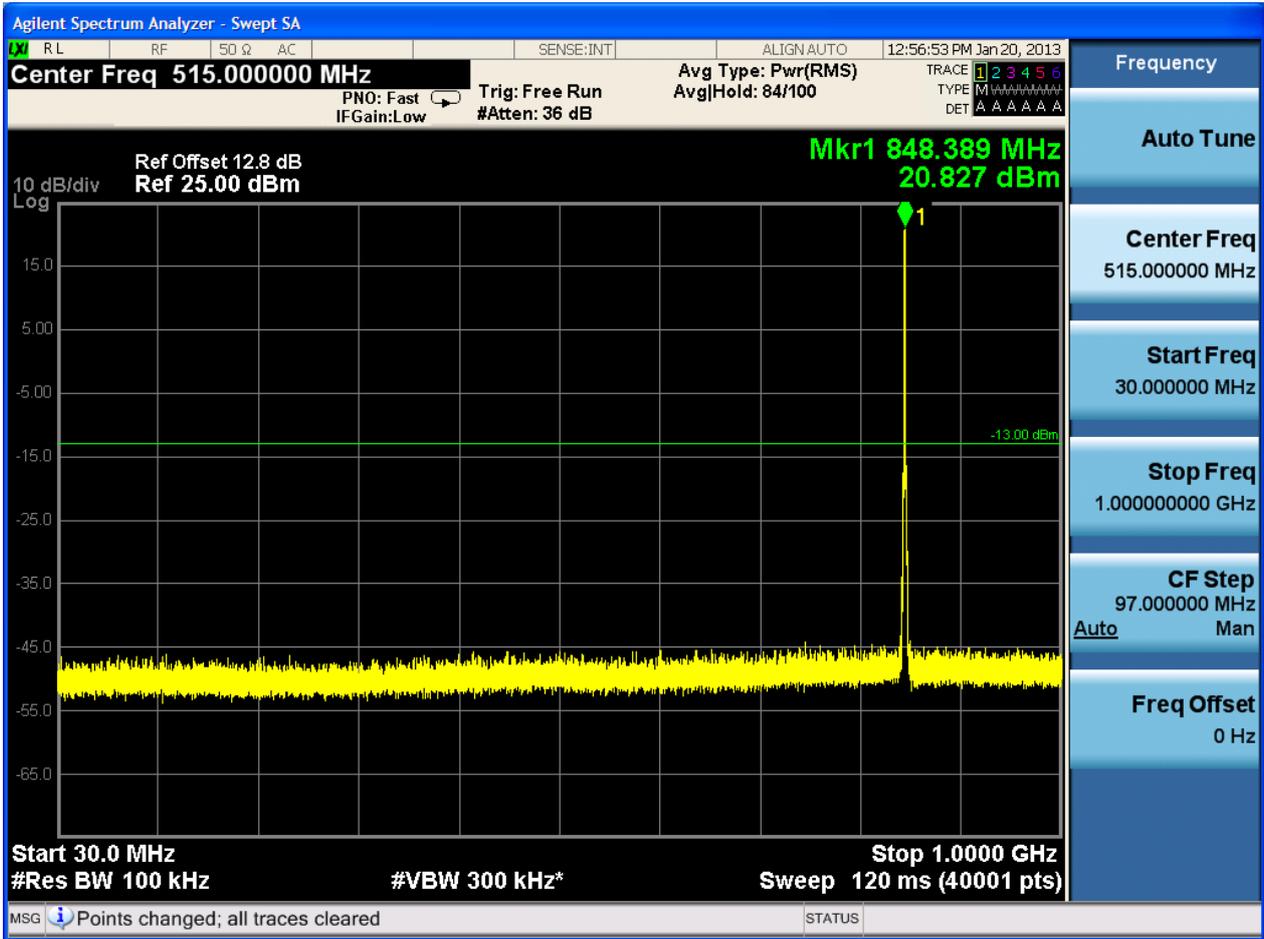


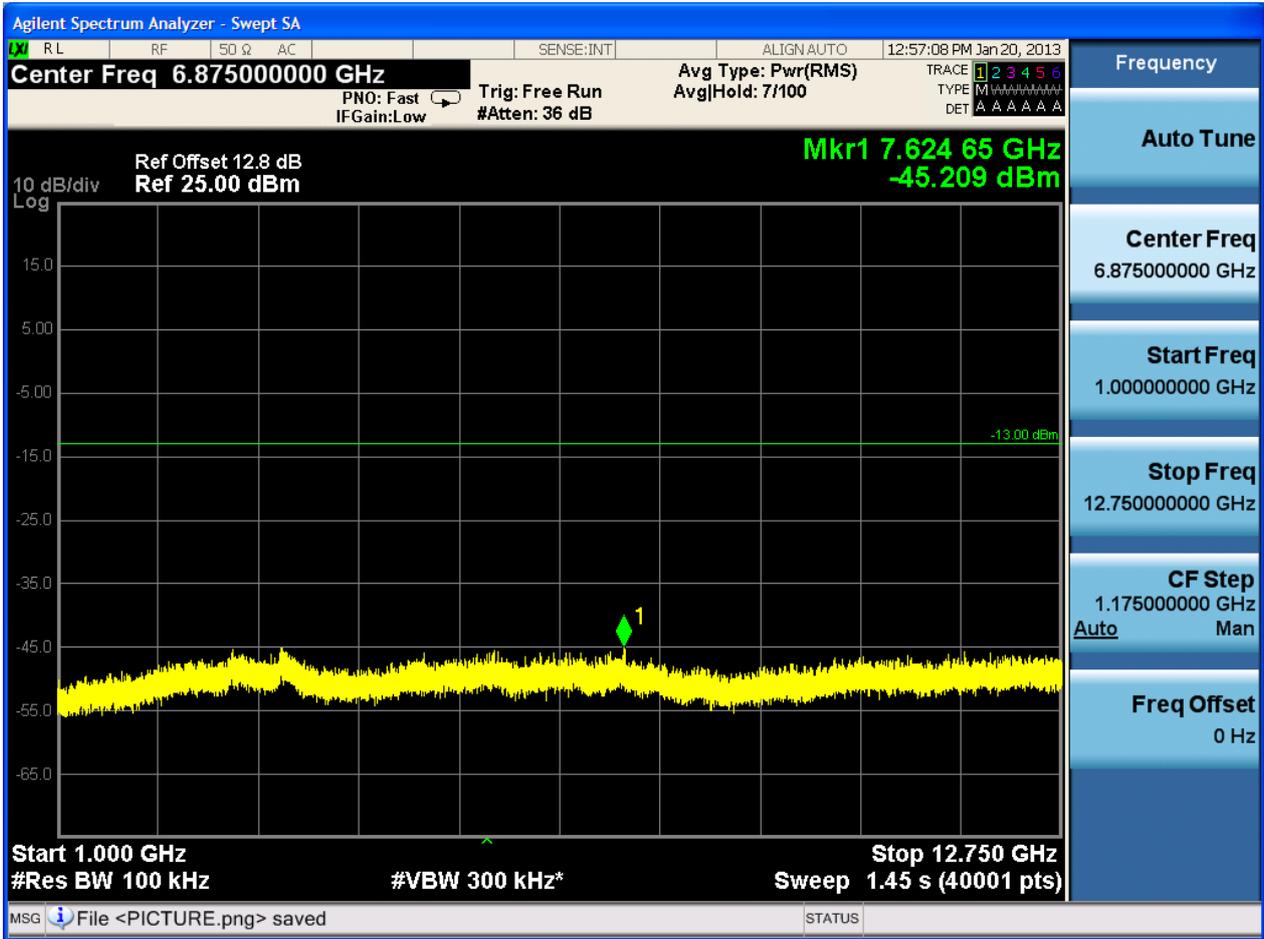


#### 4.1.1.1.3 Test Channel = HCH





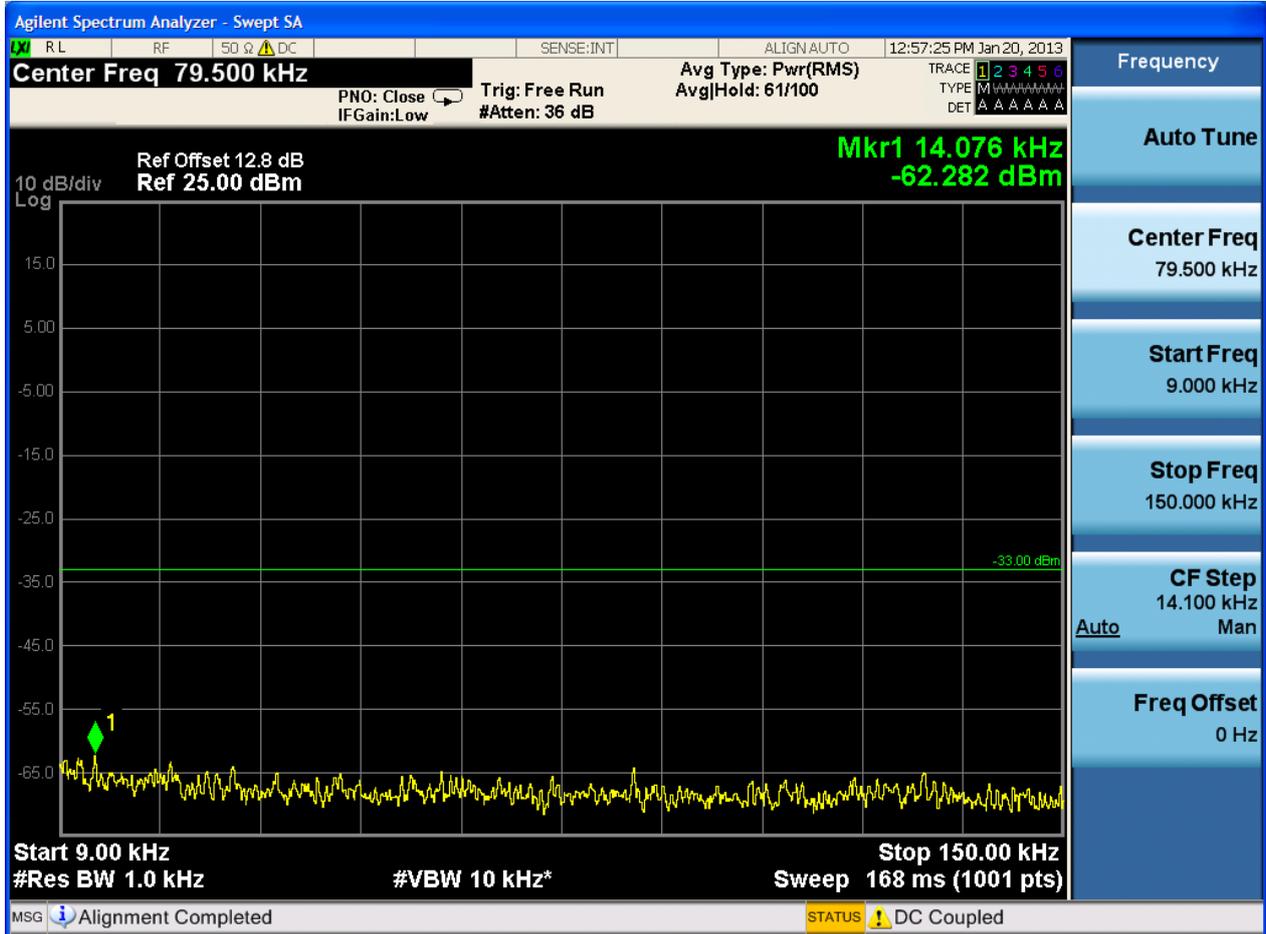


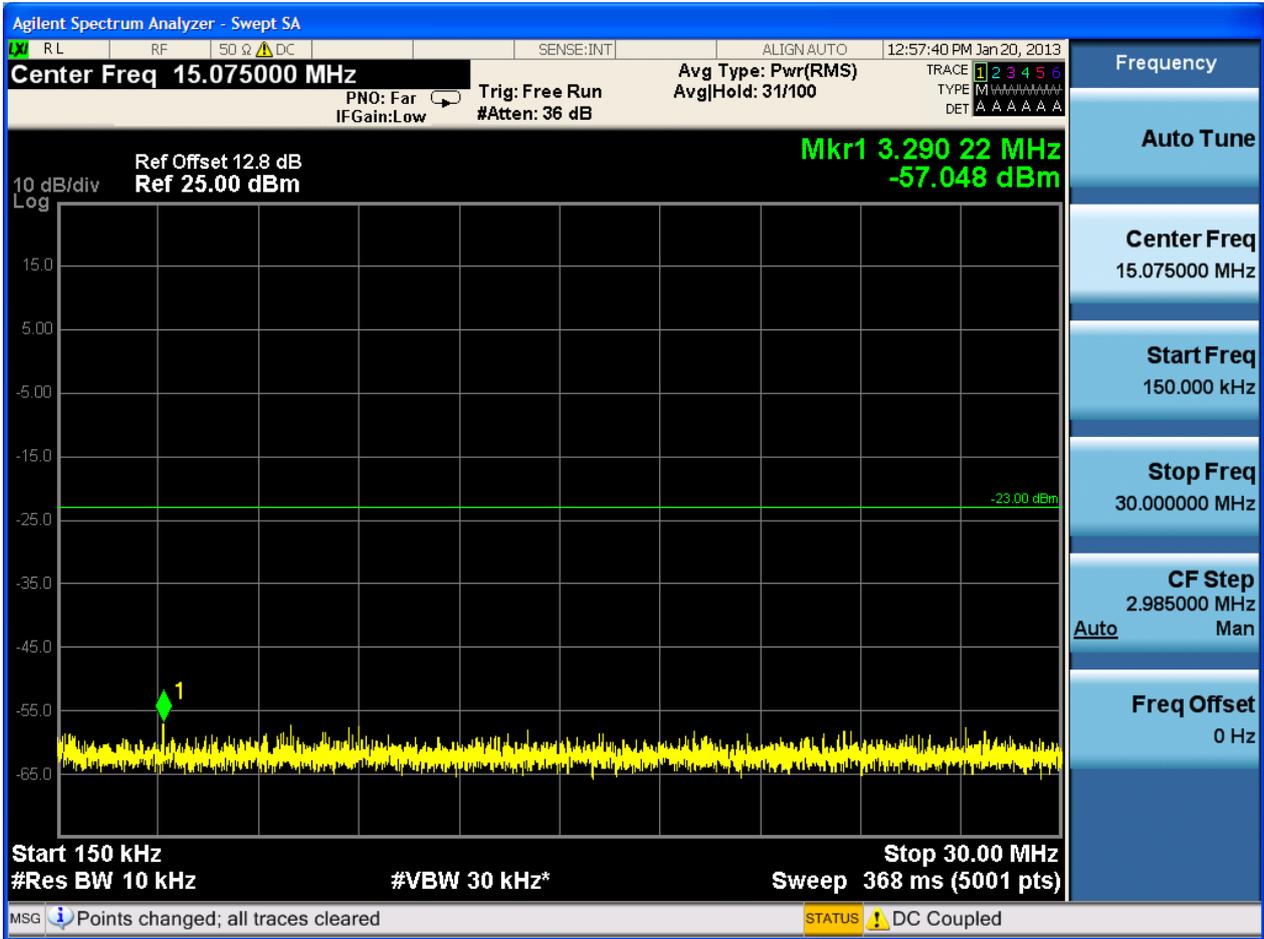


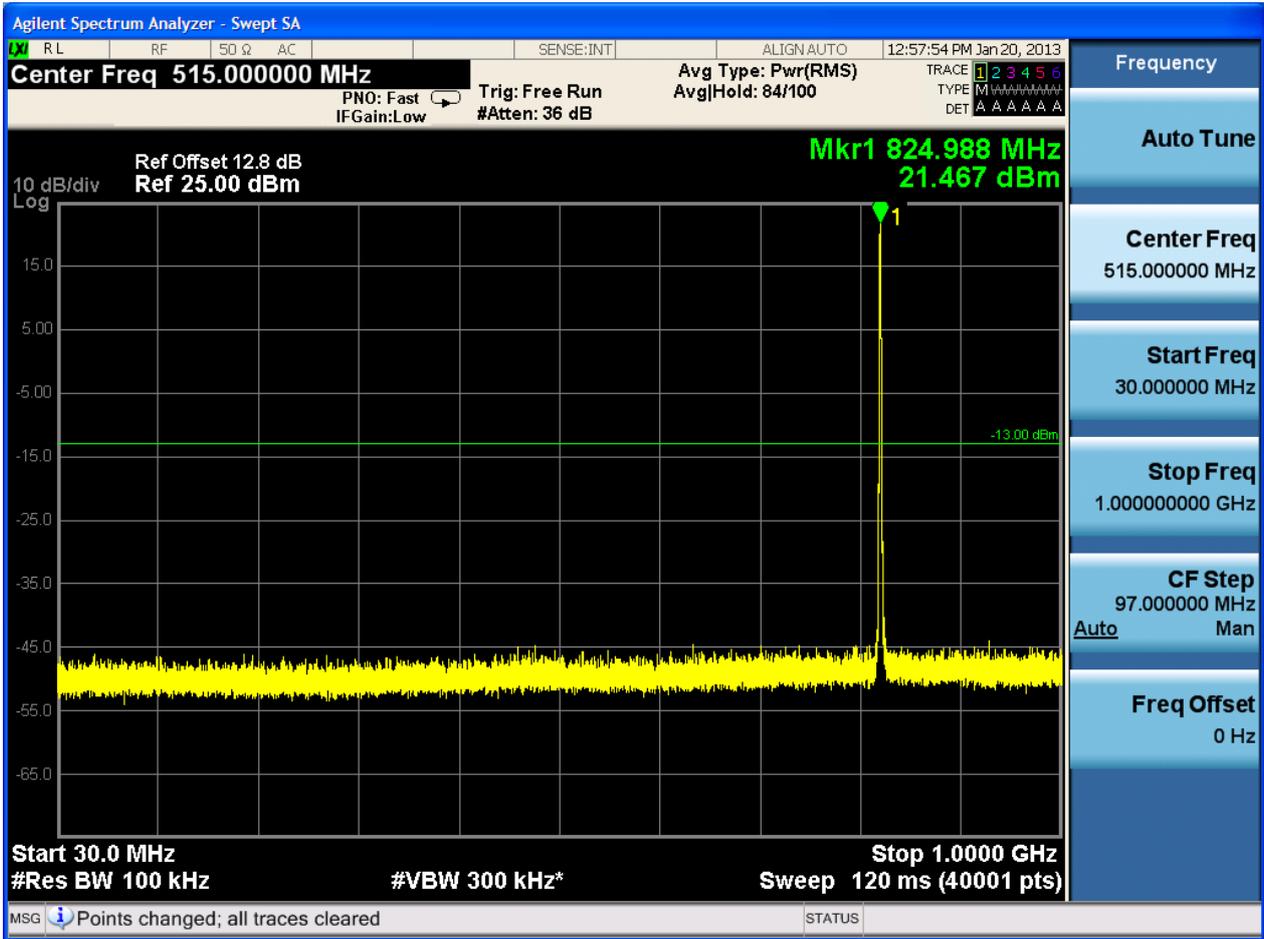


#### 4.1.1.2 Test Mode = CDMA/1X/TM3

##### 4.1.1.2.1 Test Channel = LCH











#### 4.1.1.2.2 Test Channel = MCH

