

# HCT CO., LTD.

## CERTIFICATE OF COMPLIANCE FCC Certification

<b>Applicant Name:</b> Pantech Co., Ltd.	<b>Date of Issue:</b> February 05, 2013
<b>Address:</b> Pantech Bldg, I-2, DMC, Sangam-dong, Mapo-gu, Seoul, 121-792, Korea	<b>Location:</b> HCT CO., LTD., 105-1, Jangam-ri, Majang-Myeon, Icheon-si, Kyunggi-Do, Korea
	<b>Test Report No.:</b> HCTR1302FR09
	<b>HCT FRN:</b> 0005866421

<b>FCC ID</b>	<b>: JYCORBIT</b>
<b>APPLICANT</b>	<b>: Pantech Co., Ltd.</b>

<b>FCC Model(s):</b>	MHS291LVW
<b>EUT Type:</b>	Cellular/PCS CDMA, GSM, WCDMA and LTE Portable Router with WLAN
<b>Tx Frequency:</b>	824.70 — 848.31 MHz (CDMA) 1 851.25 — 1 908.75 MHz (PCS CDMA)
<b>Rx Frequency:</b>	869.70 — 893.31 MHz (CDMA) 1 931.25 — 1 988.75 MHz (PCS CDMA)
<b>Max. RF Output Power:</b>	0.200 W ERP CDMA (23.00 dBm)/ 1.156 W EIRP PCS CDMA (30.63 dBm) 0.368 W ERP CDMA EVDO (25.66 dBm)/ 1.300 W EIRP PCS EVDO (31.14 dBm)
<b>Emission Designator(s):</b>	1M27F9W (CDMA), 1M27F9W (PCS CDMA), 1M27F9W (CDMA EVDO), 1M28F9W (PCS CDMA EVDO)
<b>FCC Classification:</b>	PCS Licensed Transmitter (PCB)
<b>FCC Rule Part(s):</b>	§22, §24, §2

The measurements shown in this report were made in accordance with the procedures specified in §2.947. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them.

HCT CO., LTD. Certifies that no party to this application has subject to a denial of Federal benefits that includes FCC benefits pursuant to section 5301 of the Anti-Drug Abuse Act of 1998, 21 U.S.C. 853(a)

  
 Report prepared by  
 : Jae Chul Shin  
 Test engineer of RF Team

  
 Approved by  
 : Chang Seok Choi  
 Manager of RF Team

This report only responds to the tested sample and may not be reproduced, except in full, without written approval of the HCT Co., Ltd.

FCC CERTIFICATION REPORT			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1302FR09	Date of Issue: February 05, 2013	EUT Type: Cellular/PCS CDMA, GSM, WCDMA and LTE Portable Router with WLAN	FCC ID: JYCORBIT

# Version

TEST REPORT NO.	DATE	DESCRIPTION
HCTR1302FR09	February 05, 2013	- First Approval Report

# Table of Contents

1. GENERAL INFORMATION .....	4
2. INTRODUCTION .....	5
2.1. EUT DESCRIPTION.....	5
2.2. MEASURING INSTRUMENT CALIBRATION.....	5
2.3. TEST FACILITY .....	5
3. DESCRIPTION OF TESTS .....	6
3.1 ERP/EIRP RADIATED POWER AND RADIATED SPURIOUS EMISSIONS.....	6
3.2 PEAK- TO- AVERAGE RATIO .....	6
3.3 OCCUPIED BANDWIDTH. ....	7
3.4 FREQUENCY RANGE.....	8
3.5 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL.....	9
3.6 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE .....	10
4. LIST OF TEST EQUIPMENT .....	11
5. SUMMARY OF TEST RESULTS .....	12
6. SAMPLE CALCULATION.....	13
7. TEST DATA .....	14
7.1 CONDUCTED OUTPUT POWER .....	14
7.2 PEAK-TO-AVERAGE RATIO .....	15
7.3 OCCUPIED BANDWIDTH .....	15
7.4 CONDUCTED SPURIOUS EMISSIONS .....	16
7.4.1 Band Edge .....	16
7.5 EFFECTIVE RADIATED POWER OUTPUT .....	17
7.6 EQUIVALENT ISOTROPIC RADIATED POWER .....	18
7.7 RADIATED SPURIOUS EMISSIONS.....	19
7.7.1 RADIATED SPURIOUS EMISSIONS (CDMA Mode).....	19
7.7.2 RADIATED SPURIOUS EMISSIONS (PCS Mode) .....	20
7.8 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE .....	21
7.8.1 FREQUENCY STABILITY (CDMA).....	21
7.8.2 FREQUENCY STABILITY (PCS CDMA) .....	22
8. TEST PLOTS.....	23

<b>FCC CERTIFICATION REPORT</b>			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1302FR09	Date of Issue: February 05, 2013	EUT Type: Cellular/PCS CDMA, GSM, WCDMA and LTE Portable Router with WLAN	FCC ID: JYCORBIT

# MEASUREMENT REPORT

## 1. GENERAL INFORMATION

**Applicant Name:** Pantech Co., Ltd.

**Address:** Pantech Bldg, I-2, DMC, Sangam-dong, Mapo-gu, Seoul, 121-792, Korea

**FCC ID:** JYCORBIT

**Application Type:** Certification

**FCC Classification:** PCS Licensed Transmitter (PCB)

**FCC Rule Part(s):** §22, §24, §2,

**EUT Type:** Cellular/PCS CDMA, GSM, WCDMA and LTE Portable Router with WLAN

**FCC Model(s):** MHS291LVW

**Tx Frequency:** 824.70 — 848.31 MHz (CDMA)  
1 851.25 — 1 908.75 MHz (PCS CDMA)

**Rx Frequency:** 869.70 — 893.31 MHz (CDMA)  
1 931.25 — 1 988.75 MHz (PCS CDMA)

**Max. RF Output Power:** 0.200 W ERP CDMA (23.00 dBm)/ 1.156 W EIRP PCS CDMA (30.63 dBm)  
0.368 W ERP CDMA EVDO (25.66 dBm)/ 1.300 W EIRP PCS EVDO (31.14 dBm)

**Emission Designator(s):** 1M27F9W (CDMA), 1M27F9W (PCS CDMA),  
1M27F9W (CDMA EVDO), 1M28F9W (PCS CDMA EVDO)

**Date(s) of Tests:** December 06, 2012 ~ February 01, 2013

**Antenna Specification** Manufacturer: KARAM SOLUTION  
Antenna type: Built-in Antenna  
Peak Gain: CDMA : 0.55 dBi  
PCS CDMA : 0.66 dBi

FCC CERTIFICATION REPORT			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
<b>Test Report No.</b> HCTR1302FR09	<b>Date of Issue:</b> February 05, 2013	<b>EUT Type:</b> Cellular/PCS CDMA, GSM, WCDMA and LTE Portable Router with WLAN	<b>FCC ID:</b> JYCORBIT

## 2. INTRODUCTION

### 2.1. EUT DESCRIPTION

The MHS291LVW Cellular/PCS CDMA, GSM, WCDMA and LTE Portable Router with WLAN consists of Cellular CDMA, PCS CDMA, 1xRTT and EVDO Rev.0,A.

### 2.2. MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

### 2.3. TEST FACILITY

The SAC(Semi-Anechoic Chamber) and conducted measurement facility used to collect the radiated data are located at the 105-1, Jangam-ri, Majang-Myeon, Icheon-si, Kyunggi-Do, 467-811, Korea. The site is constructed in conformance with the requirements of ANSI C63.4 and CISPR Publication 22. Detailed description of test facility was submitted to the Commission and accepted dated March 02, 2011 (Registration Number: 90661)

FCC CERTIFICATION REPORT			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1302FR09	Date of Issue: February 05, 2013	EUT Type: Cellular/PCS CDMA, GSM, WCDMA and LTE Portable Router with WLAN	FCC ID: JYCORBIT

### 3. DESCRIPTION OF TESTS

#### 3.1 ERP/EIRP RADIATED POWER AND RADIATED SPURIOUS EMISSIONS

Note: ERP(Effective Radiated Power), EIRP(Effective Isotropic Radiated Power)

Test Procedure

Radiated emission measurements are performed in the Fully-anechoic chamber. The equipment under test is placed on a non-conductive table 3-meters away from the receive antenna in accordance with ANSI/TIA-603-C-2004 Clause 2.2.17. The turntable is rotated through 360 degrees, and the receiving antenna scans in order to determine the level of the maximized emission. The level and position of the maximized emission is recorded with the spectrum analyzer using a positive peak detector.

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 and the previously recorded signal was duplicated.

The power is calculated by the following formula;

$$P_{d(dBm)} = P_{g(dBm)} - \text{cable loss}_{(dB)} + \text{antenna gain}_{(dB)}$$

Where:  $P_d$  is the dipole equivalent power and  $P_g$  is the generator output power into the substitution antenna.

The maximum EIRP is calculated by adding the forward power to the calibrated source plus its appropriate gain value. These steps are repeated with the receiving antenna in both vertical and horizontal polarization. the difference between the gain of the horn and an isotropic antenna are taken into consideration

Note : This device was tested under all R.C.s and S.O.s and worst case is reported with RC3/SO55(CDMA) and RC1/SO55(PCS) with 'All Up' power control bits.

#### 3.2 PEAK- TO- AVERAGE RATIO

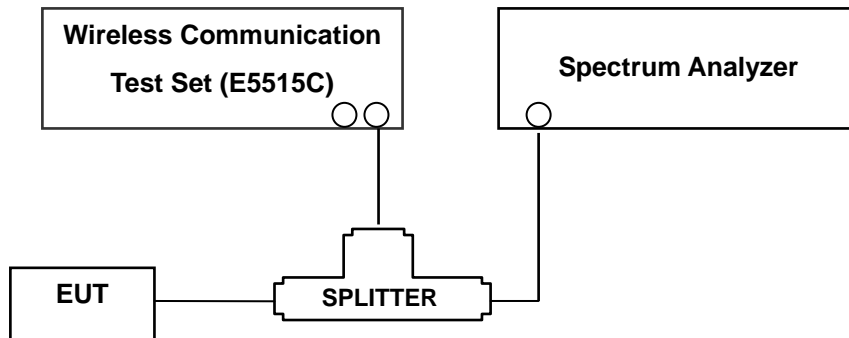
A peak to average ratio measurement is performed at the conducted port of the EUT. For CDMA and WCDMA signals, the spectrum analyzers Complementary Cumulative Distribution Function ( CCDF ) measurement profile is used to determine the largest deviation between the average and the peak power of the EUT 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. Plots of the EUT's Peak- to- Average Ratio are shown herein.

Note : This device was tested under all R.C.s and S.O.s and worst case is reported with RC3/SO55(CDMA) and RC1/SO55(PCS) with 'All Up' power control bits.

FCC CERTIFICATION REPORT			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1302FR09	Date of Issue: February 05, 2013	EUT Type: Cellular/PCS CDMA, GSM, WCDMA and LTE Portable Router with WLAN	FCC ID: JYCORBIT

### 3.3 OCCUPIED BANDWIDTH.

#### Test set-up



(Configuration of conducted Emission measurement)

The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 % of the total mean power of a given emission.

#### Test Procedure

The EUT makes a call to the communication simulator. The power was measured with R&S Spectrum Analyzer. All measurements were done at 3 channels(low, middle and high operational range.)

The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.

The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth

Note : This device was tested under all R.C.s and S.O.s and worst case is reported with RC3/SO55(CDMA) and RC1/SO55(PCS) with 'All Up' power control bits.

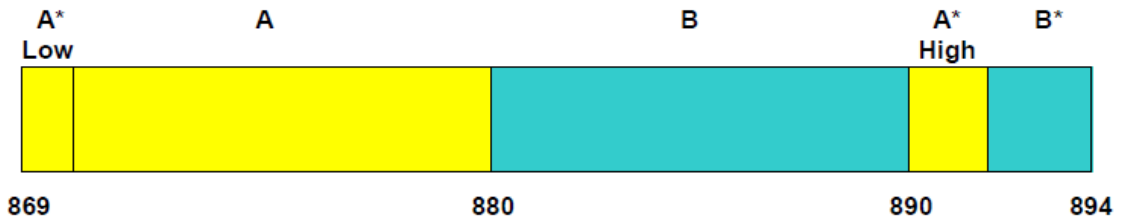
FCC CERTIFICATION REPORT			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1302FR09	Date of Issue: February 05, 2013	EUT Type: Cellular/PCS CDMA, GSM, WCDMA and LTE Portable Router with WLAN	FCC ID: JYCORBIT

### 3.4 FREQUENCY RANGE

§ 22.905

Subpart H—Cellular Radiotelephone Service

- **Cellular – Base Frequency Blocks**



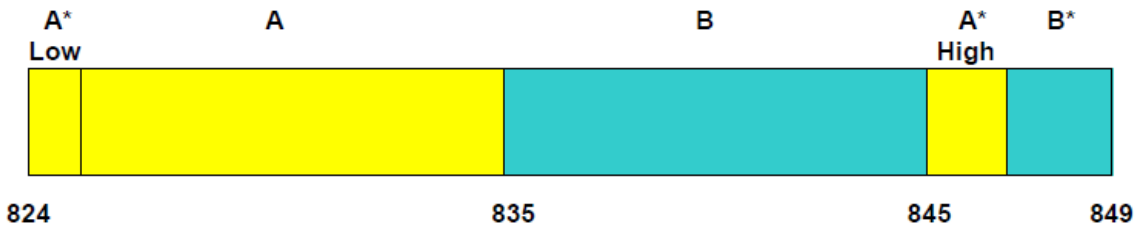
BLOCK 1: 869 – 880 MHz (A\* Low + A)

BLOCK 3: 890 – 891.5 MHz (A\* High)

BLOCK 2: 880 – 890 MHz (B)

BLOCK 4: 891.5 – 894 MHz (B\*)

- **Cellular – Mobile Frequency Blocks**



BLOCK 1: 824 – 835 MHz (A\* Low + A)

BLOCK 3: 845 – 846.5 MHz (A\* High)

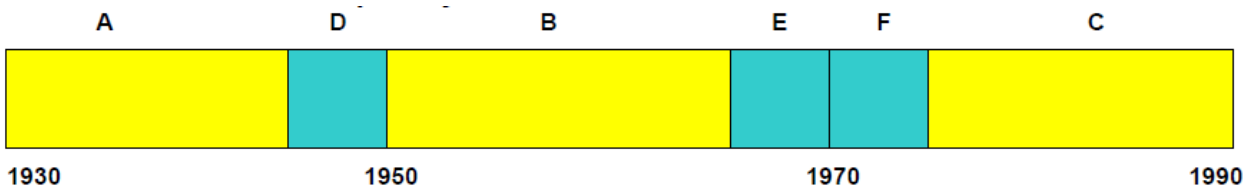
BLOCK 2: 835 – 845 MHz (B)

BLOCK 4: 846.5 – 849 MHz (B\*)

§ 24.229

Subpart E—Broadband PCS

- **PCS – Base Frequency Blocks**



BLOCK 1: 1930 – 1945 MHz (A)

BLOCK 4: 1965 – 1970 MHz (E)

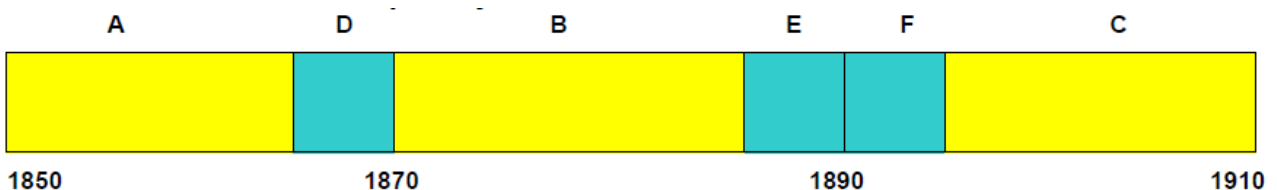
BLOCK 2: 1945 – 1950 MHz (D)

BLOCK 5: 1970 – 1975 MHz (F)

BLOCK 3: 1950 – 1965 MHz (B)

BLOCK 6: 1975 – 1990 MHz (C)

- **PCS – Mobile Frequency Blocks**



BLOCK 1: 1850 – 1865 MHz (A)

BLOCK 4: 1885 – 1890 MHz (E)

BLOCK 2: 1865 – 1870 MHz (D)

BLOCK 5: 1890 – 1895 MHz (F)

BLOCK 3: 1870 – 1885 MHz (B)

BLOCK 6: 1895 – 1910 MHz (C)

FCC CERTIFICATION REPORT			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1302FR09	Date of Issue: February 05, 2013	EUT Type: Cellular/PCS CDMA, GSM, WCDMA and LTE Portable Router with WLAN	FCC ID: JYCORBIT



### 3.5 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL.

#### Test Procedure

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer.

The EUT was setup to maximum output power at its lowest channel. The Resolution BW of the analyzer is set to < 1 % of the emission bandwidth to show compliance with the – 13 dBm limit, in the 1 MHz bands immediately outside and adjacent to the edge of the frequency block. The 1 MHz RBW was used to scan from 10 MHz to 10 GHz. (GSM1900 Mode: 10 MHz to 20 GHz). A display line was placed at – 13 dBm to show compliance. The high, lowest and a middle channel were tested for out of band measurements.

- Band Edge Requirement : In the 1MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 1 percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to measure the out of band Emissions. Limit, -13dBm.

Note : This device was tested under all R.C.s and S.O.s and worst case is reported with RC3/SO55(CDMA) and RC1/SO55(PCS) with 'All Up' power control bits.

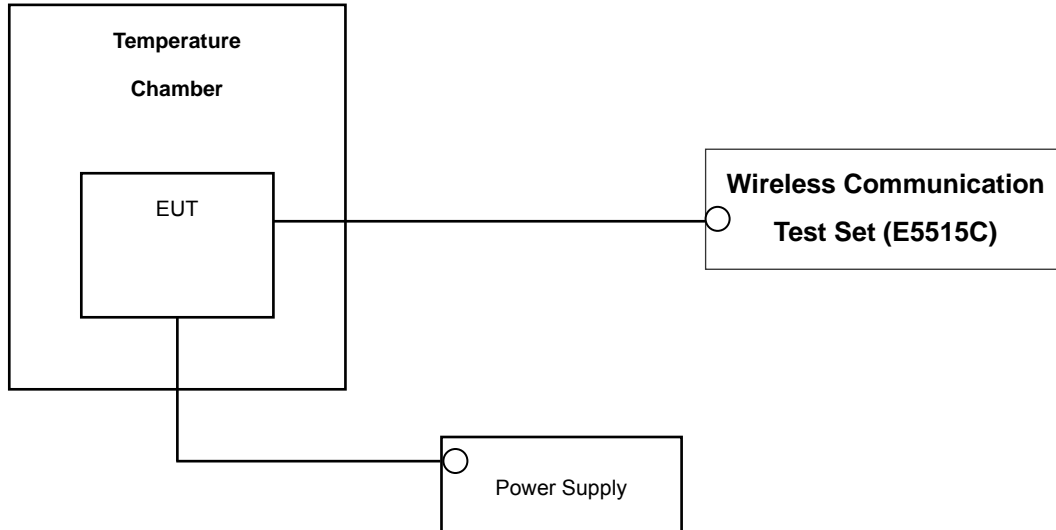
The analyzer plot offsets were determined by below conditions.

- For CDMA, total offset 27.1 dBm = 20 dBm attenuator + 6 dBm Divider + 1.1 dBm RF cables.
- For PCS, total offset 28.6 dBm = 20 dBm attenuator + 6 dBm Divider + 2.6 dBm RF cables.

FCC CERTIFICATION REPORT			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
<b>Test Report No.</b> HCTR1302FR09	<b>Date of Issue:</b> February 05, 2013	<b>EUT Type:</b> Cellular/PCS CDMA, GSM, WCDMA and LTE Portable Router with WLAN	<b>FCC ID:</b> JYCORBIT

### 3.6 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

#### Test Set-up



\* Nominal Operating Voltage

#### Test Procedure

The frequency stability of the transmitter is measured by:

- a.) **Temperature:** The temperature is varied from - 30 °C to + 50 °C using an environmental chamber.
- b.) **Primary Supply Voltage:** The primary supply voltage is varied from battery end point to 115 % of the voltage normally at the input to the device or at the power supply terminals if cables are not normally supplied.

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  $\pm 0.00025\%$  ( $\pm 2.5$  ppm) of the center frequency.

#### Time Period and Procedure:

The carrier frequency of the transmitter is measured at room temperature (20°C to provide a reference).

1. The equipment is turned on in a “standby” condition for one minute 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.
2. 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: The EUT is tested down to the battery endpoint.**

Note : This device was tested under all R.C.s and S.O.s and worst case is reported with RC3/SO55(CDMA) and RC1/SO55(PCS) with ‘All Up’ power control bits.

FCC CERTIFICATION REPORT			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1302FR09	Date of Issue: February 05, 2013	EUT Type: Cellular/PCS CDMA, GSM, WCDMA and LTE Portable Router with WLAN	FCC ID: JYCORBIT

## 4. LIST OF TEST EQUIPMENT

Manufacture	Model/ Equipment	Serial Number	Calibration Interval	Calibration Due
Agilent	E9327A/ Power Sensor	MY4442009	Annual	05/02/2013
MITEQ	AMF-6D-001180-35-20P/AMP	1081666	Annual	09/11/2013
Wainwright	WHK1.2/15G-10EF/H.P.F	2	Annual	05/02/2013
Wainwright	WHK3.3/18G-10EF/H.P.F	1	Annual	05/02/2013
Hewlett Packard	11667B / Power Splitter	10126	Annual	11/07/2013
Digital	EP-3010/ Power Supply	3110117	Annual	11/07/2013
Schwarzbeck	UHAP/ Dipole Antenna	557	Biennial	03/11/2013
Schwarzbeck	UHAP/ Dipole Antenna	558	Biennial	03/11/2013
Korea Engineering	KR-1005L / Chamber	KRAB05063-3CH	Annual	11/07/2013
Schwarzbeck	BBHA 9120D/ Horn Antenna	296	Biennial	02/20/2014
Agilent	E4440A/Spectrum Analyzer	US45303008	Annual	05/02/2013
WEINSCHTEL	ATTENUATOR	BR0592	Annual	11/07/2013
REOHDE&SCHWARZ	FSV40/Spectrum Analyzer	1307.9002K40-100931-NK	Annual	06/11/2013
Agilent	8960 (E5515C)/ Base Station	GB44400269	Annual	02/10/2013
Anritsu	MT8820C/ Radio Communication Analyer	6200951754	Annual	08/24/2013

## 5. SUMMARY OF TEST RESULTS

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result
2.1049, 22.917(a), 24.238(a)	Occupied Bandwidth	N/A	CONDUCTED	PASS
2.1051, 22.917(a), 24.238(a)	Band Edge / Spurious and Harmonic Emissions at Antenna Terminal.	< 43 + 10log <sub>10</sub> (P[Watts]) at Band Edge and for all out-of-band emissions		PASS
2.1046	Conducted Output Power	N/A		PASS
24.232(d)	Peak- to- Average Ratio	< 13 dB		PASS
2.1055, 22.355, 24.235	Frequency stability / variation of ambient temperature	< 2.5 ppm		PASS
22.913(a)(2) 24.232(c)	Effective Radiated Power	< 7 Watts max. ERP	RADIATED	PASS
	Equivalent Isotropic Radiated Power	< 2 Watts max. EIRP		PASS
2.1053, 22.917(a), 24.238(a)	Radiated Spurious and Harmonic Emissions	< 43 + 10log <sub>10</sub> (P[Watts]) for all out-of band emissions		PASS

FCC CERTIFICATION REPORT			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1302FR09	Date of Issue: February 05, 2013	EUT Type: Cellular/PCS CDMA, GSM, WCDMA and LTE Portable Router with WLAN	FCC ID: JYCORBIT

## 6. SAMPLE CALCULATION

### A. ERP Sample Calculation

Mode	Ch./ Freq.		Measured Level(dBm)	Substitute LEVEL(dBm)	Ant. Gain (dBd)	C.L	Pol.	ERP	
	channel	Freq.(MHz)						W	dBm
CDMA	384	836.52	-15.49	33.43	-10.50	1.67	V	0.134	21.26

**ERP = SubstituteLEVEL(dBm) + Ant. Gain – CL(Cable Loss)**

- 1) The EUT mounted on a non-conductive tunnable is 0.8 meter above test site ground level.
- 2) During the test , the turn table is rotated and the antenna height is also varied from 1 to 4 meters until the maximum signal is found.
- 3) Record the field strength meter's level.
- 4) Replace the EUT with dipole/Horn antenna that is connected to a calibrated signal generator.
- 5) Increase the signal generator output till the field strength meter's level is equal to the item (3).
- 6) The signal generator output level with Ant. Gain and cable loss are the rating of effective radiated power (**ERP**).

### B. Emission Designator

#### CDMA Emission Designator

**Emission Designator = 1M27F9W**

CDMA BW = 1.27 MHz (Measured at the 99% power bandwidth)

F = Frequency Modulation

9 = Composite Digital Info

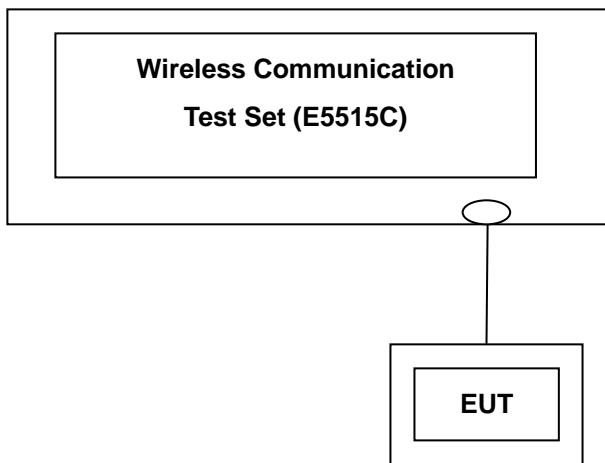
W = Combination (Audio/Data)

FCC CERTIFICATION REPORT			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1302FR09	Date of Issue: February 05, 2013	EUT Type: Cellular/PCS CDMA, GSM, WCDMA and LTE Portable Router with WLAN	FCC ID: JYCORBIT

## 7. TEST DATA

### 7.1 CONDUCTED OUTPUT POWER

A base station simulator was used to establish communication with The EUT. The base station simulator parameters were set to produce the maximum power from the EUT. This device was tested under all configurations and the highest power is reported. Conducted Output Powers of EUT are reported below.



Band	Channel	SO2	SO2	SO55	SO55	TDSO SO32	1xEvDO Rev.O	1xEvDO Rev.O	1xEvDO Rev.1	1xEvDO Rev.1
		RC1/1 (dBm)	RC3/3 (dBm)	RC1/1 (dBm)	RC3/3 (dBm)	RC3/3 (dBm)	(FTAP)	(RTAP)	(FETAP)	(RETAP)
CDMA	1013	24.36	24.34	24.25	24.23	24.32	24.34	24.26	24.25	24.20
	384	24.20	24.17	24.07	24.13	24.15	24.17	24.10	24.07	24.04
	777	24.10	23.97	24.04	23.95	23.97	24.11	24.02	24.04	23.94
PCS	25	24.83	24.80	24.79	24.83	24.77	24.74	24.76	24.75	24.78
	600	24.75	24.63	24.75	24.65	24.64	24.62	24.64	24.60	24.61
	1175	24.35	24.28	24.29	24.24	24.23	24.25	24.24	24.20	24.18

(Maximum Conducted Output Powers)

Note : Detecting mode is average.

FCC CERTIFICATION REPORT			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1302FR09	Date of Issue: February 05, 2013	EUT Type: Cellular/PCS CDMA, GSM, WCDMA and LTE Portable Router with WLAN	FCC ID: JYCORBIT

## 7.2 PEAK-TO-AVERAGE RATIO

- Plots of the EUT's Peak- to- Average Ratio are shown Page 28.

## 7.3 OCCUPIED BANDWIDTH

Band	Channel	Frequency(MHz)	Data (MHz)
CDMA	1013	824.70	1.2712
	384	836.52	1.2677
	777	848.31	1.2715
CDMA EVDO	777	848.31	1.2744
PCS	25	1851.25	1.2717
	600	1880.00	1.2737
	1175	1908.75	1.2718
PCS EVDO	600	1880.00	1.2753

- Plots of the EUT's Occupied Bandwidth are shown Page 24 ~ 27.

## 7.4 CONDUCTED SPURIOUS EMISSIONS

Band	Channel	Frequency of Maximum Harmonic (GHz)	Maximum Data (dBm)
CDMA	1013	7.500	-38.56
	384	1.673	-30.73
	777	1.697	-33.05
PCS	25	14.480	-35.20
	600	13.920	-36.13
	1175	13.680	-36.33

- Plots of the EUT's Conducted Spurious Emissions are shown Page 37 ~ 42.

### 7.4.1 Band Edge

- Plots of the EUT's Band Edge are shown Page 29 ~ 36.



## 7.5 EFFECTIVE RADIATED POWER OUTPUT

### (CDMA Mode)

Mode	Ch./ Freq.		Measured Level(dBm)	Substitute LEVEL (dBm)	Ant. Gain	C.L	Pol.	ERP	
	channel	Freq.(MHz)						W	dBm
CDMA	1013	824.70	-25.65	34.12	-10.61	0.95	H	0.180	22.56
	384	836.52	-25.68	34.50	-10.54	0.96	H	0.200	23.00
	777	848.31	-25.85	34.57	-10.47	1.10	H	0.200	23.00
EVDO	1013	824.70	-22.55	37.22	-10.61	0.95	H	0.368	25.66
	384	836.52	-25.24	34.94	-10.54	0.96	H	0.221	23.44
	777	848.31	-25.42	35.00	-10.47	1.10	H	0.220	23.43

Note: Standard batteries are the only options for this phone. And a peak detector is used.

#### NOTES:

#### Effective Radiated Power Output Measurements by Substitution Method

according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

The EUT was placed on a non-conductive styrofoam resin table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. For CDMA signals, a peak detector is used, with RBW = VBW = 3 MHz. For WCDMA signals, a peak detector is used, with RBW = VBW = 5MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW = VBW = 1 MHz. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. The conducted power at the terminals of the dipole is measured. The ERP is recorded.

This device was tested under all configurations and the highest power is reported. Also, we have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna. The worst case of the EUT is in x plane in CDMA (z plane ch 1013) mode. Also worst case of detecting Antenna is in horizontal polarization in CDMA mode.

The EVDO mode testing were performed using FETAP on Rev.A because FETAP on Rev.A is highest power in EVDO mode.

FCC CERTIFICATION REPORT			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1302FR09	Date of Issue: February 05, 2013	EUT Type: Cellular/PCS CDMA, GSM, WCDMA and LTE Portable Router with WLAN	FCC ID: JYCORBIT

## 7.6 EQUIVALENT ISOTROPIC RADIATED POWER

### (PCS CDMA Mode)

Mode	Ch./ Freq.		Measured Level(dBm)	Substitute LEVEL (dBm)	Ant. Gain	C.L	Pol.	EIRP	
	channel	Freq.(MHz)						W	dBm
PCS	25	1,851.25	-10.30	21.85	10.02	1.40	H	1.114	30.47
	600	1,880.00	-10.50	21.81	10.04	1.45	H	1.096	30.40
	1175	1,908.75	-10.40	22.04	10.05	1.46	H	1.156	30.63
EVDO	25	1,851.25	-9.68	22.47	10.02	1.40	H	1.285	31.09
	600	1,880.00	-10.10	22.21	10.04	1.45	H	1.202	30.80
	1175	1,908.75	-9.89	22.55	10.05	1.46	H	1.300	31.14

Note: Standard batteries are the only options for this phone. And a peak detector is used.

#### NOTES:

Equivalent Isotropic Radiated Power Measurements by Substitution Method according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

The EUT was placed on a non-conductive styrofoam resin table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. For CDMA signals, a peak detector is used, with RBW = VBW = 3 MHz. For WCDMA signals, a peak detector is used, with RBW = VBW = 5MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW = VBW = 1 MHz. A Horn antenna was substituted in place of the EUT. This Horn antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. The conducted power at the terminals of the Horn antenna is measured. The difference between the gain of the horn and an isotropic antenna is taken into consideration and the EIRP is recorded.

This device was tested under all configurations and the highest power is reported. Also, we have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna. And worst case of the EUT is in x plane in PCS mode. Also worst case of detecting Antenna is in horizontal in PCS mode.

The EVDO mode testing were performed using FETAP on Rev.A because FETAP on Rev.A is highest power in EVDO mode.

FCC CERTIFICATION REPORT			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1302FR09	Date of Issue: February 05, 2013	EUT Type: Cellular/PCS CDMA, GSM, WCDMA and LTE Portable Router with WLAN	FCC ID: JYCORBIT

## 7.7 RADIATED SPURIOUS EMISSIONS

### 7.7.1 RADIATED SPURIOUS EMISSIONS (CDMA Mode)

- MEASURED OUTPUT POWER: 25.66 dBm = 0.368 W
- MODULATION SIGNAL: CDMA EVDO
- DISTANCE: 3 meters
- LIMIT: - (43 + 10 log10 (W)) = -38.66 dBc

Ch.	Freq.(MHz)	Measured Level [dBm]	Ant. Gain	Substitute Level [dBm]	C.L	Pol.	ERP (dBm)	dBc
1013	1,649.40	-34.83	9.20	-43.82	1.18	V	-35.80	-61.46
	2,474.10	-43.57	10.55	-49.61	1.62	H	-40.68	-66.34
	3,298.80	-	-	-	-	-	-	-
384	1,673.04	-35.55	9.37	-44.70	1.20	H	-36.53	-62.19
	2,509.56	-40.65	10.66	-46.59	1.65	H	-37.58	-63.24
	3,346.08	-	-	-	-	-	-	-
777	1,696.62	-31.67	9.49	-40.84	1.20	H	-32.55	-58.21
	2,544.93	-41.99	10.76	-47.68	1.65	H	-38.57	-64.23
	3,393.24	-	-	-	-	-	-	-

- NOTES:**
1. Radiated Spurious Emission Measurements at 3 meters by Substitution Method according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:
  2. The magnitude of spurious emissions attenuated more than 20dB below the limit above 5<sup>th</sup> Harmonic for all channel.
  3. we have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

FCC CERTIFICATION REPORT			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1302FR09	Date of Issue: February 05, 2013	EUT Type: Cellular/PCS CDMA, GSM, WCDMA and LTE Portable Router with WLAN	FCC ID: JYCORBIT

### 7.7.2 RADIATED SPURIOUS EMISSIONS (PCS Mode)

- MEASURED OUTPUT POWER: 31.14 dBm = 1.300 W
- MODULATION SIGNAL: PCS CDMA EVDO
- DISTANCE: 3 meters
- LIMIT: - (43 + 10 log<sub>10</sub> (W)) = -44.14 dBc

Ch.	Freq.(MHz)	<u>Measured Level</u> [dBm]	Ant. Gain	<u>Substitute</u> <u>Level</u> [dBm]	C.L	Pol.	ERP (dBm)	dBc
25	3,702.50	-52.48	12.27	-57.22	2.19	V	-47.14	-78.28
	5,553.75	-55.47	13.40	-55.14	2.88	V	-44.62	-75.76
	7,405.00	-	-	-	-	-	-	-
600	3,760.00	-53.20	12.31	-57.75	2.11	H	-47.55	-78.69
	5,640.00	-	-	-	-	-	-	-
	7,520.00	-	-	-	-	-	-	-
1175	3,817.50	-55.98	12.37	-60.46	2.14	H	-50.23	-81.37
	5,726.25	-	-	-	-	-	-	-
	7,635.00	-	-	-	-	-	-	-

- NOTES:**
1. Radiated Spurious Emission Measurements at 3 meters by Substitution Method according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:
  2. The magnitude of spurious emissions attenuated more than 20dB below the limit above 5<sup>th</sup> Harmonic for all channel.
  3. we have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

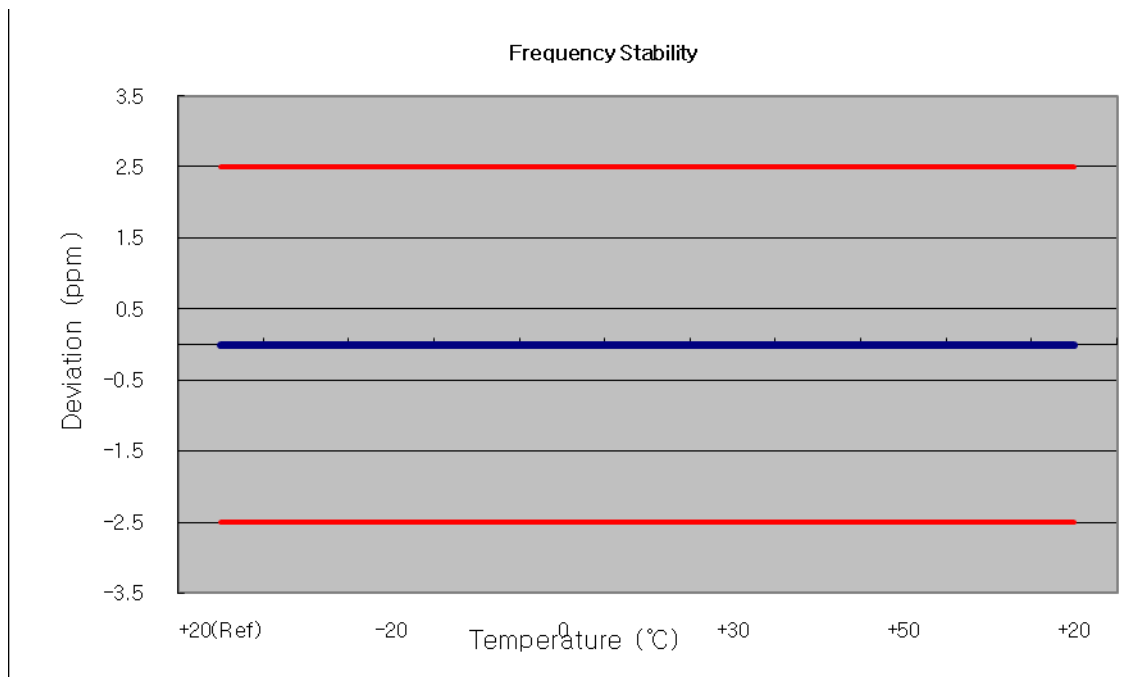
FCC CERTIFICATION REPORT			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1302FR09	Date of Issue: February 05, 2013	EUT Type: Cellular/PCS CDMA, GSM, WCDMA and LTE Portable Router with WLAN	FCC ID: JYCORBIT

## 7.8 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

### 7.8.1 FREQUENCY STABILITY (CDMA)

- ▣ OPERATING FREQUENCY: 836,520,000 Hz
- ▣ CHANNEL: 384
- ▣ REFERENCE VOLTAGE: 3.8 VDC
- ▣ DEVIATION LIM IT: ± 0.000 25 % or 2.5 ppm

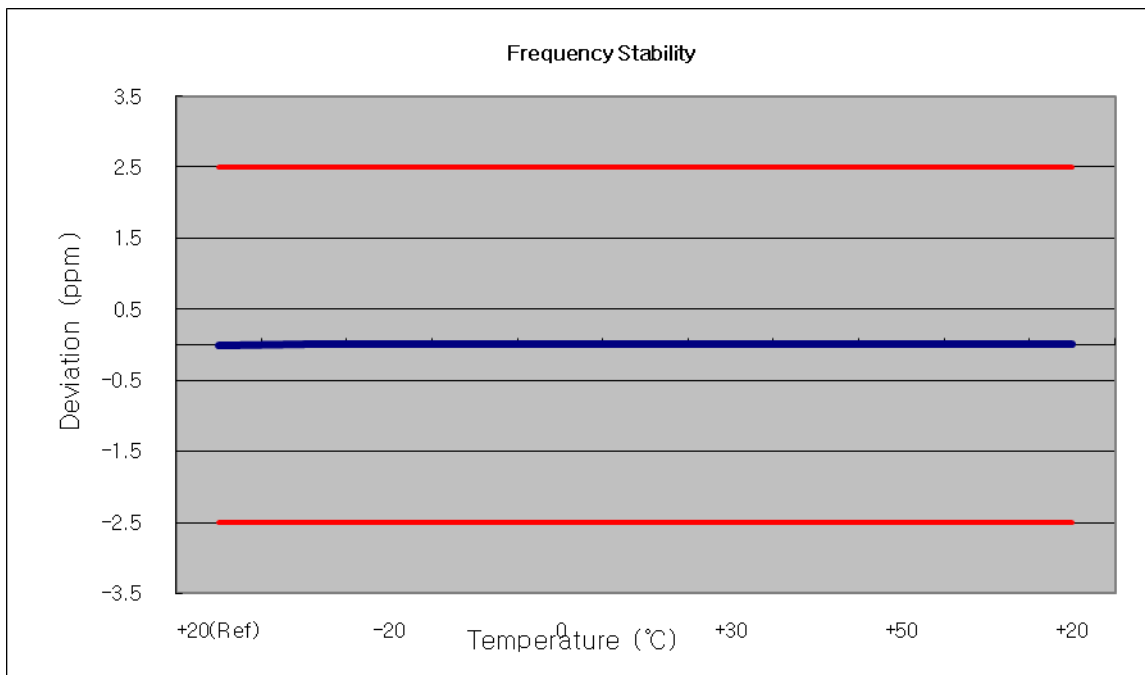
Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	3.800	+20(Ref)	836 520 011	0	0.000 000	0.000
100%		-30	836 520 000	-11.53	-0.000 001	-0.014
100%		-20	836 519 998	-13.22	-0.000 002	-0.016
100%		-10	836 520 000	-11.21	-0.000 001	-0.013
100%		0	836 519 998	-13.05	-0.000 002	-0.016
100%		+10	836 520 001	-10.12	-0.000 001	-0.012
100%		+30	836 520 001	-10.43	-0.000 001	-0.012
100%		+40	836 519 999	-12.23	-0.000 001	-0.015
100%		+50	836 519 997	-13.93	-0.000 002	-0.017
115%	4.370	+20	836 519 998	-12.95	-0.000 002	-0.015
Batt. Endpoint	3.500	+20	836 519 997	-14.56	-0.000 002	-0.017



### 7.8.2 FREQUENCY STABILITY (PCS CDMA)

- ▣ OPERATING FREQUENCY: 1880,000,000 Hz
- ▣ CHANNEL: 600
- ▣ REFERENCE VOLTAGE: 3.8 VDC
- ▣ DEVIATION LIM IT: ± 0.000 25 % or 2.5 ppm

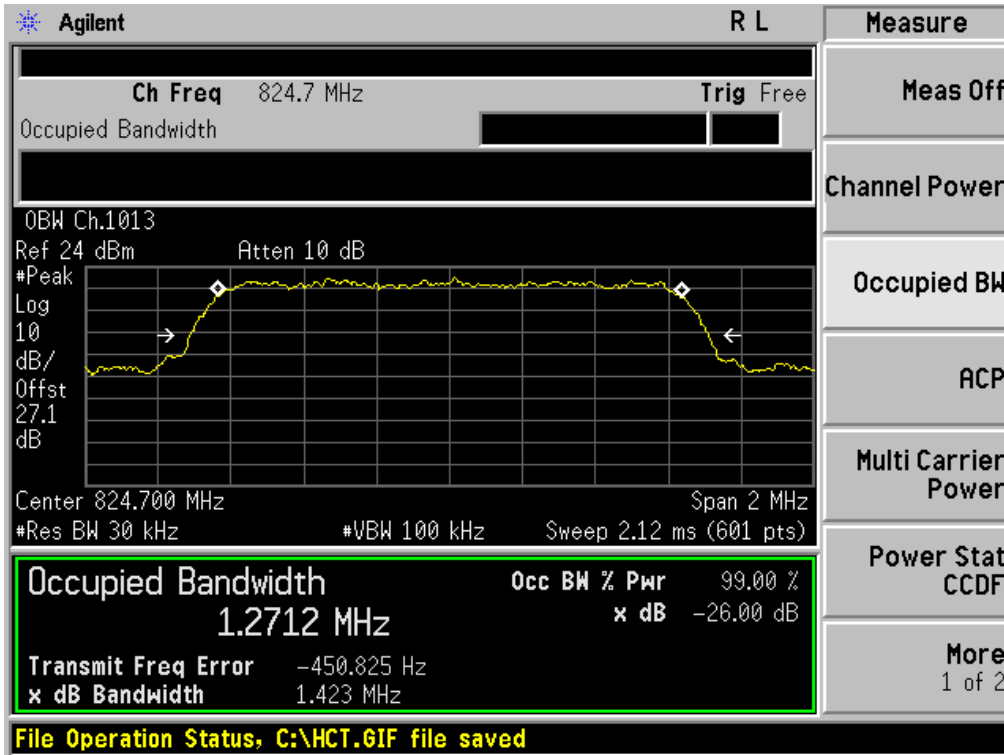
Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	3.800	+20(Ref)	1879 999 991	0	0.000 000	0.000
100%		-30	1880 000 009	9.02	0.000 000	0.005
100%		-20	1880 000 009	8.51	0.000 000	0.005
100%		-10	1880 000 009	8.95	0.000 000	0.005
100%		0	1880 000 007	6.74	0.000 000	0.004
100%		+10	1880 000 008	8.47	0.000 000	0.005
100%		+30	1880 000 008	8.36	0.000 000	0.004
100%		+40	1880 000 007	6.86	0.000 000	0.004
100%		+50	1880 000 008	7.50	0.000 000	0.004
115%		4.370	+20	1880 000 008	7.69	0.000 000
Batt. Endpoint	3.500	+20	1880 000 008	8.33	0.000 000	0.004



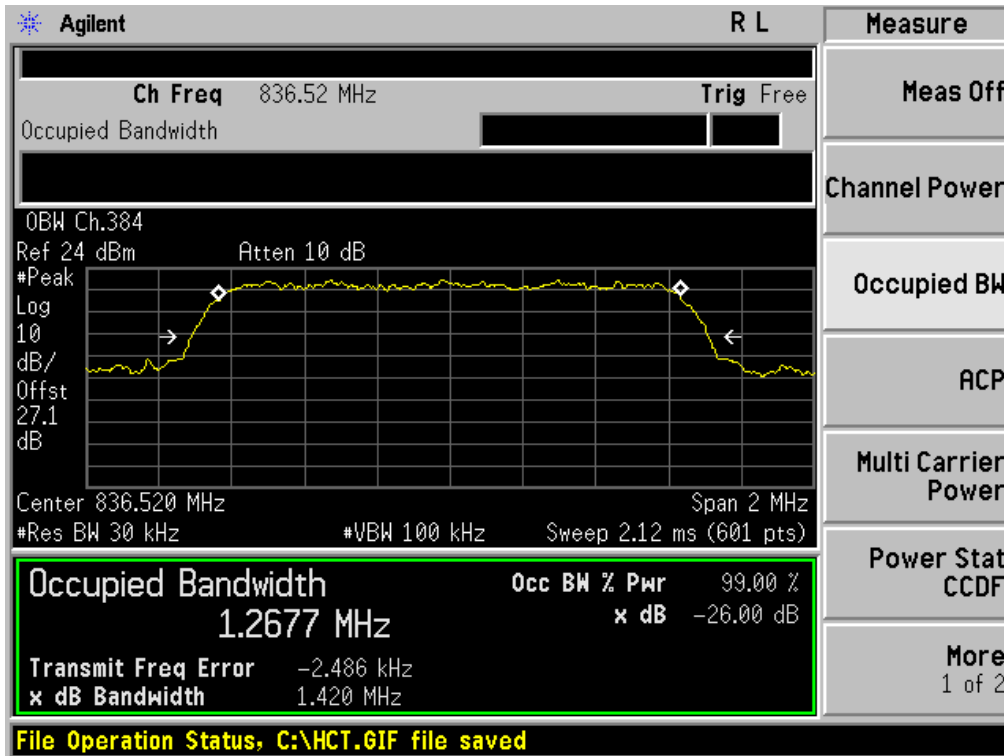
## 8. TEST PLOTS

FCC CERTIFICATION REPORT			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
<b>Test Report No.</b> HCTR1302FR09	<b>Date of Issue:</b> February 05, 2013	<b>EUT Type:</b> Cellular/PCS CDMA, GSM, WCDMA and LTE Portable Router with WLAN	<b>FCC ID:</b> JYCORBIT

■ CDMA MODE (1013 CH.) Occupied Bandwidth



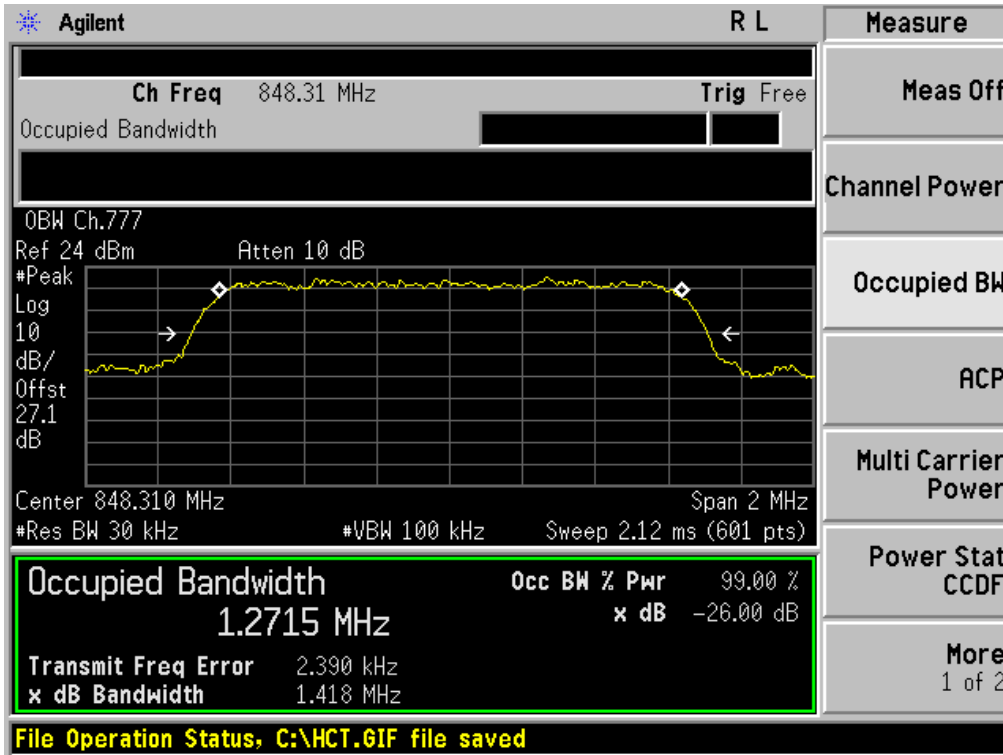
■ CDMA MODE (384 CH.) Occupied Bandwidth



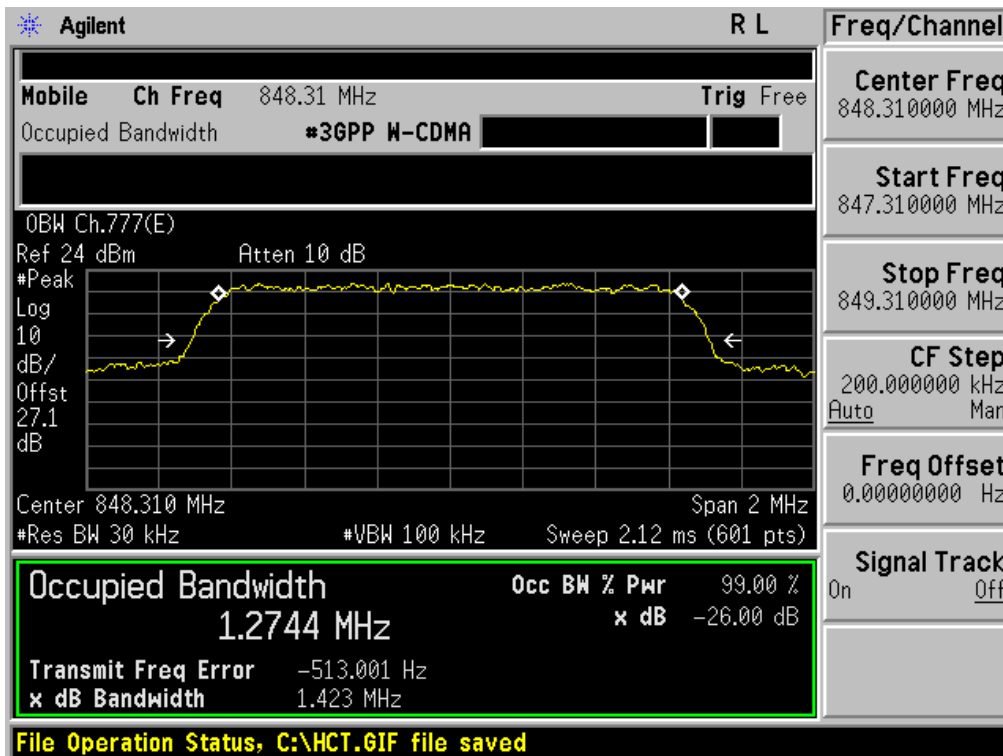
FCC CERTIFICATION REPORT			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1302FR09	Date of Issue: February 05, 2013	EUT Type: Cellular/PCS CDMA, GSM, WCDMA and LTE Portable Router with WLAN	FCC ID: JYCORBIT



■ CDMA MODE (777 CH.) Occupied Bandwidth

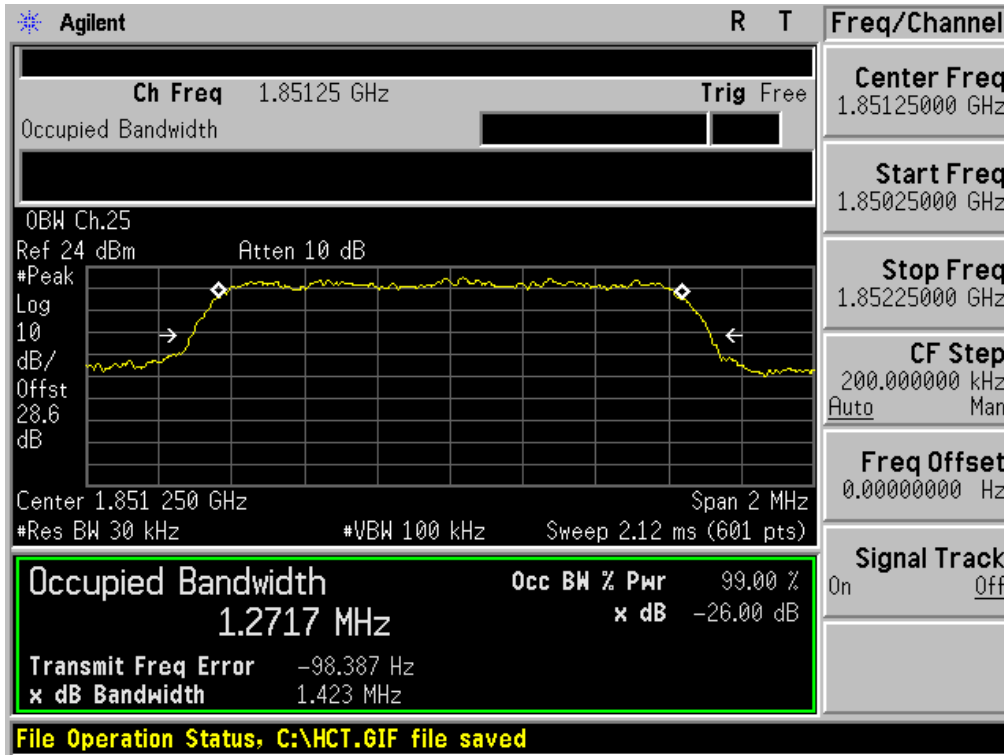


■ CDMA EVDO MODE (777 CH.) Occupied Bandwidth

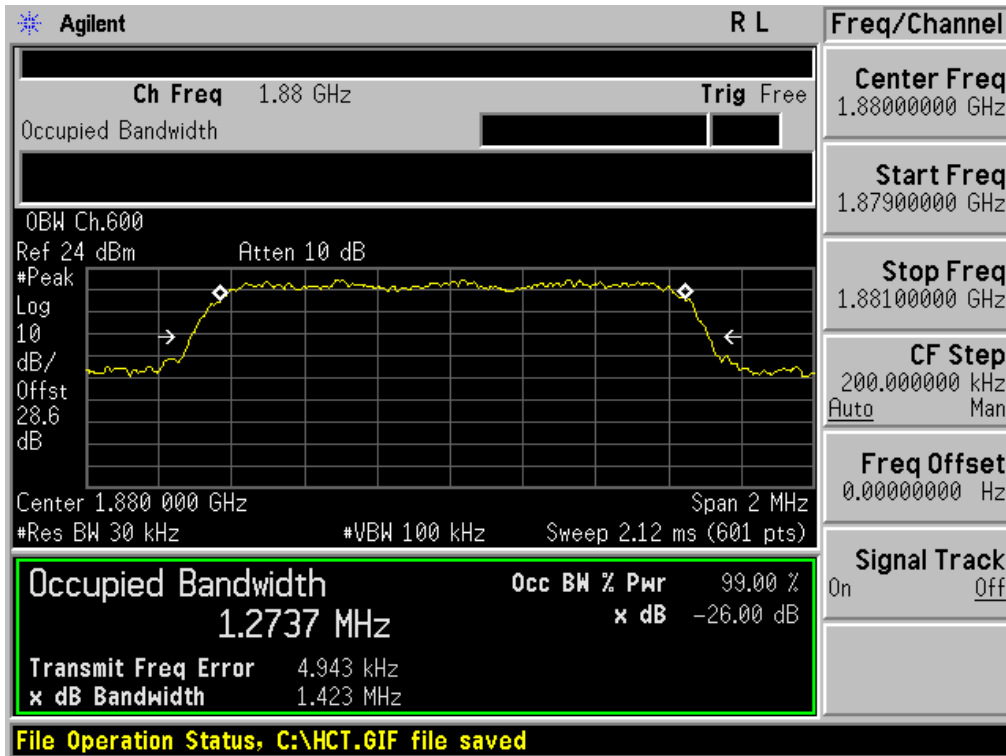


FCC CERTIFICATION REPORT			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1302FR09	Date of Issue: February 05, 2013	EUT Type: Cellular/PCS CDMA, GSM, WCDMA and LTE Portable Router with WLAN	FCC ID: JYCORBIT

■ PCS CDMA MODE (25 CH.) Occupied Bandwidth

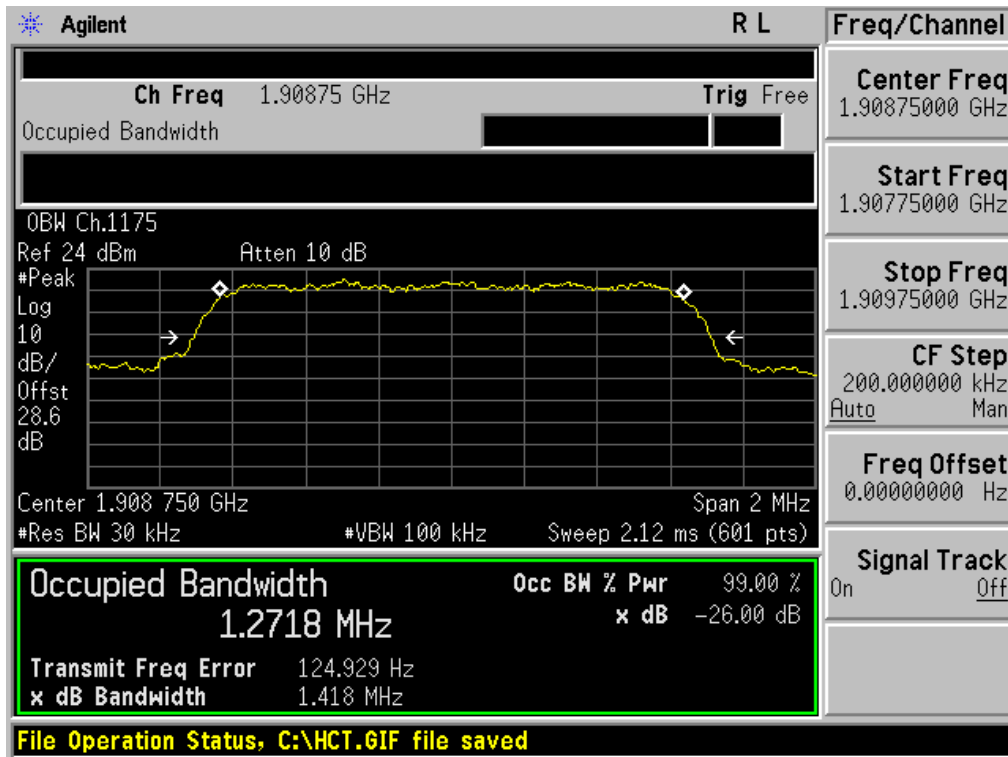


■ PCS CDMA MODE (600 CH.) Occupied Bandwidth

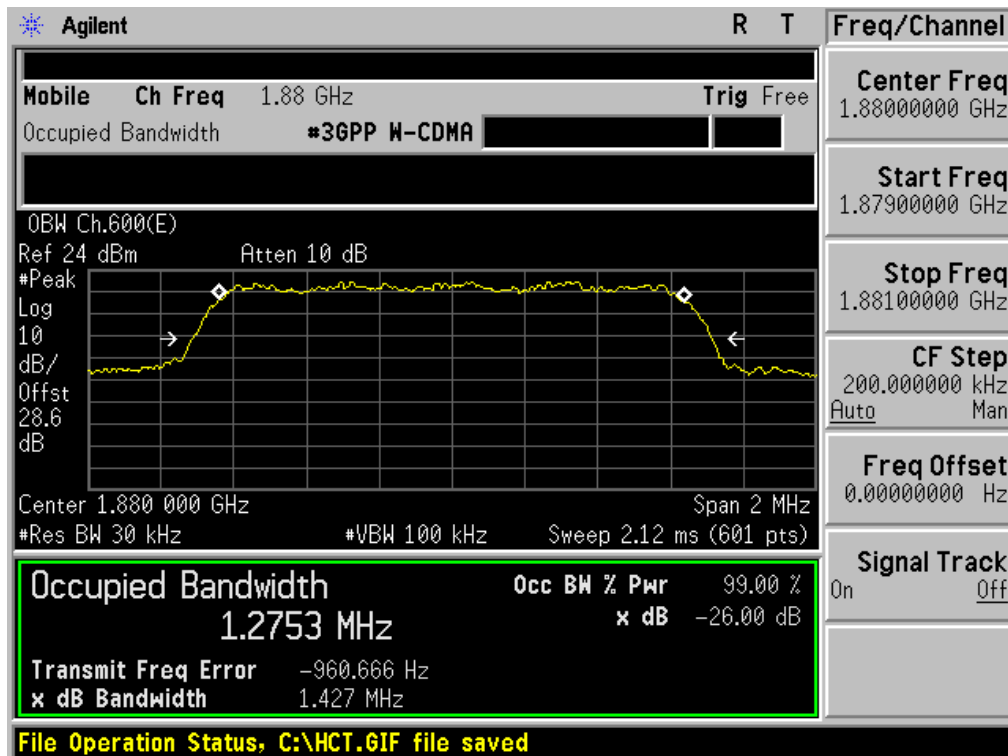


FCC CERTIFICATION REPORT			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1302FR09	Date of Issue: February 05, 2013	EUT Type: Cellular/PCS CDMA, GSM, WCDMA and LTE Portable Router with WLAN	FCC ID: JYCORBIT

■ PCS CDMA MODE (1175 CH.) Occupied Bandwidth

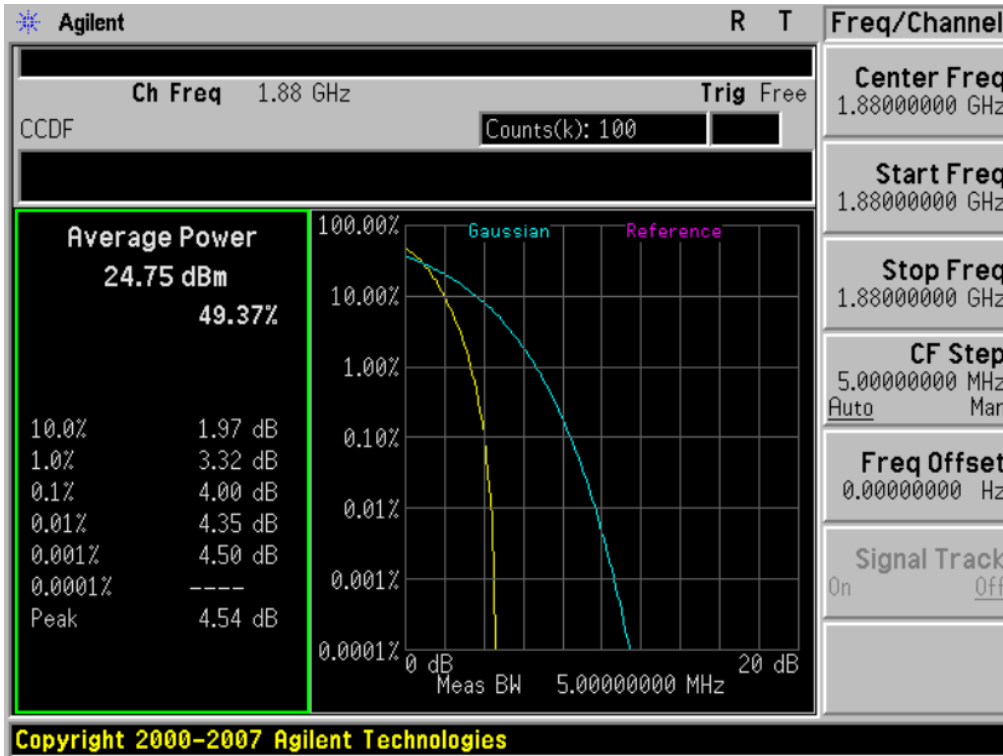


■ PCS CDMA EVDO MODE (600 CH.) Occupied Bandwidth

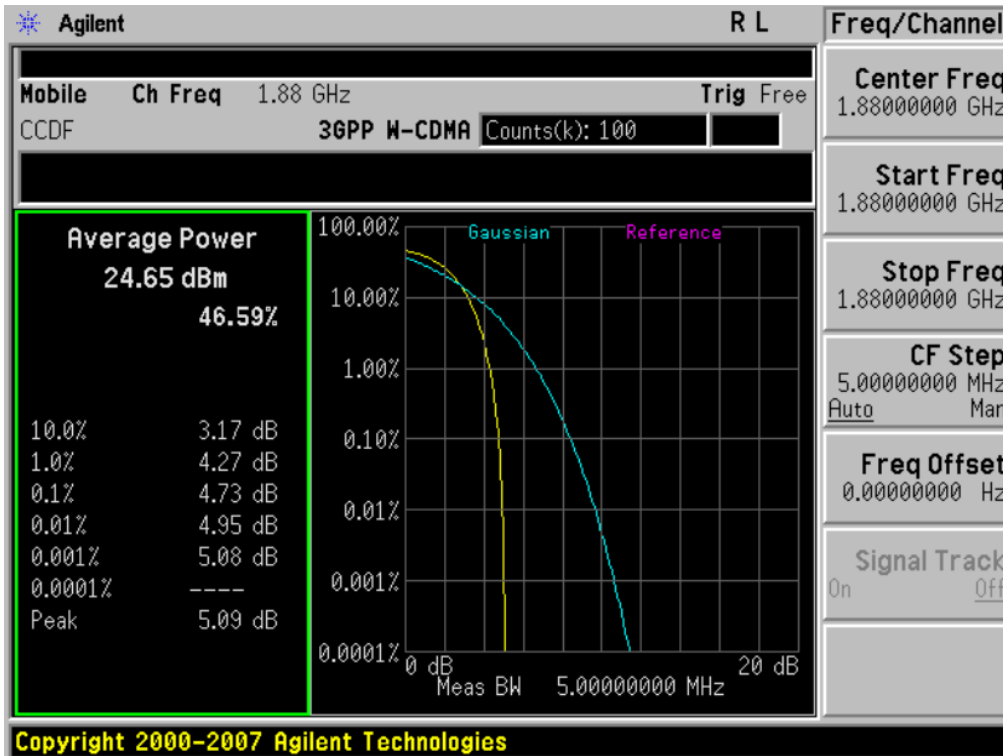


FCC CERTIFICATION REPORT			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1302FR09	Date of Issue: February 05, 2013	EUT Type: Cellular/PCS CDMA, GSM, WCDMA and LTE Portable Router with WLAN	FCC ID: JYCORBIT

■ PCS CDMA MODE (600 CH.) Peak-to-Average Ratio

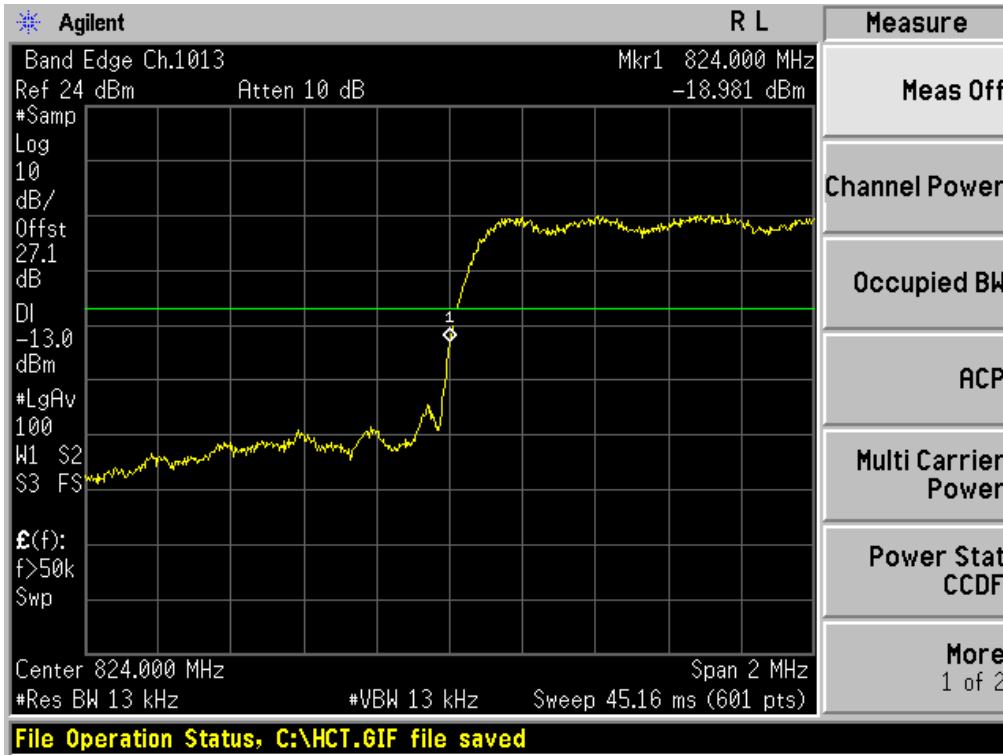


■ PCS CDMA EVDO MODE (600 CH.) Peak-to-Average Ratio

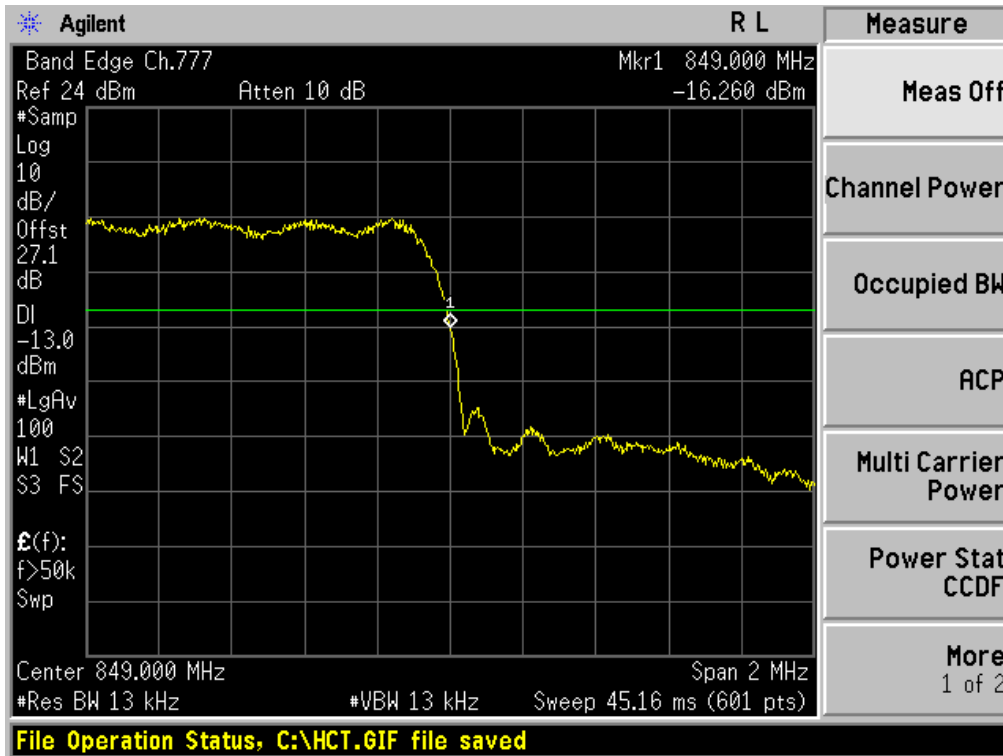


FCC CERTIFICATION REPORT			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1302FR09	Date of Issue: February 05, 2013	EUT Type: Cellular/PCS CDMA, GSM, WCDMA and LTE Portable Router with WLAN	FCC ID: JYCORBIT

■ CDMA MODE (1013 CH.) Block Edge

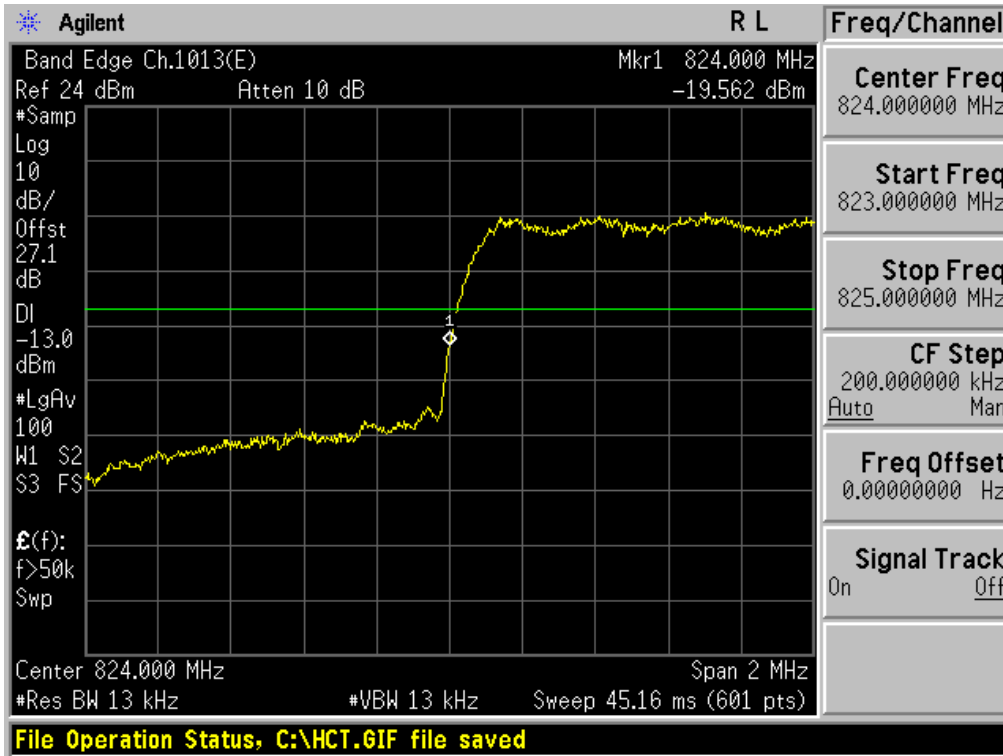


■ CDMA MODE (777 CH.) Block Edge

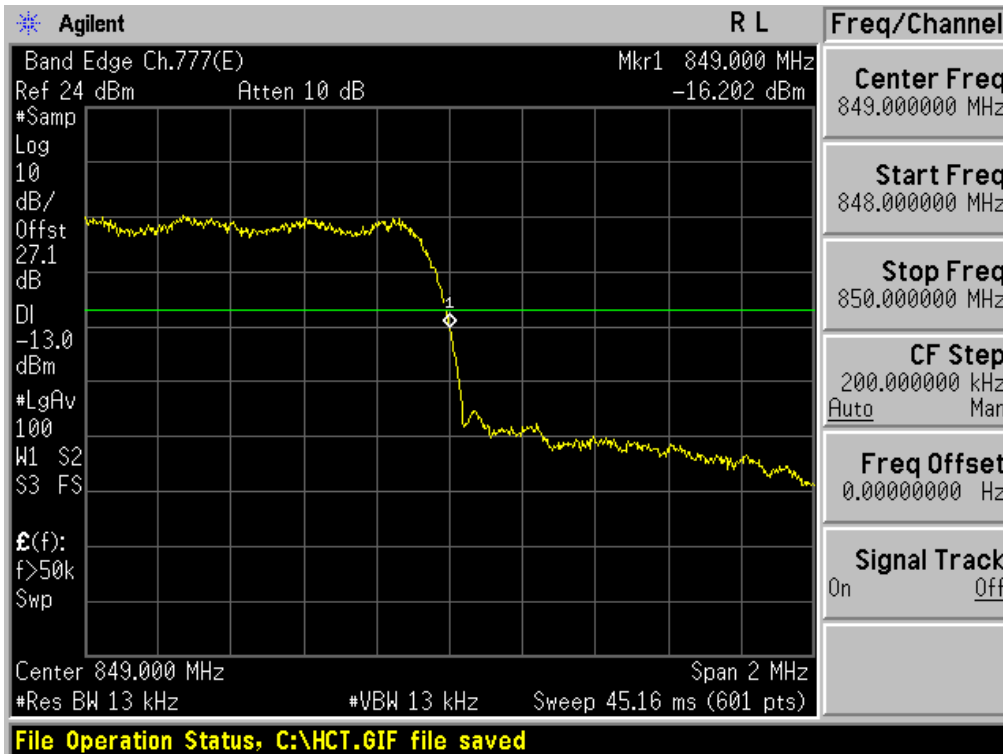


FCC CERTIFICATION REPORT			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1302FR09	Date of Issue: February 05, 2013	EUT Type: Cellular/PCS CDMA, GSM, WCDMA and LTE Portable Router with WLAN	FCC ID: JYCORBIT

■ CDMA EVDO MODE (1013 CH.) Block Edge

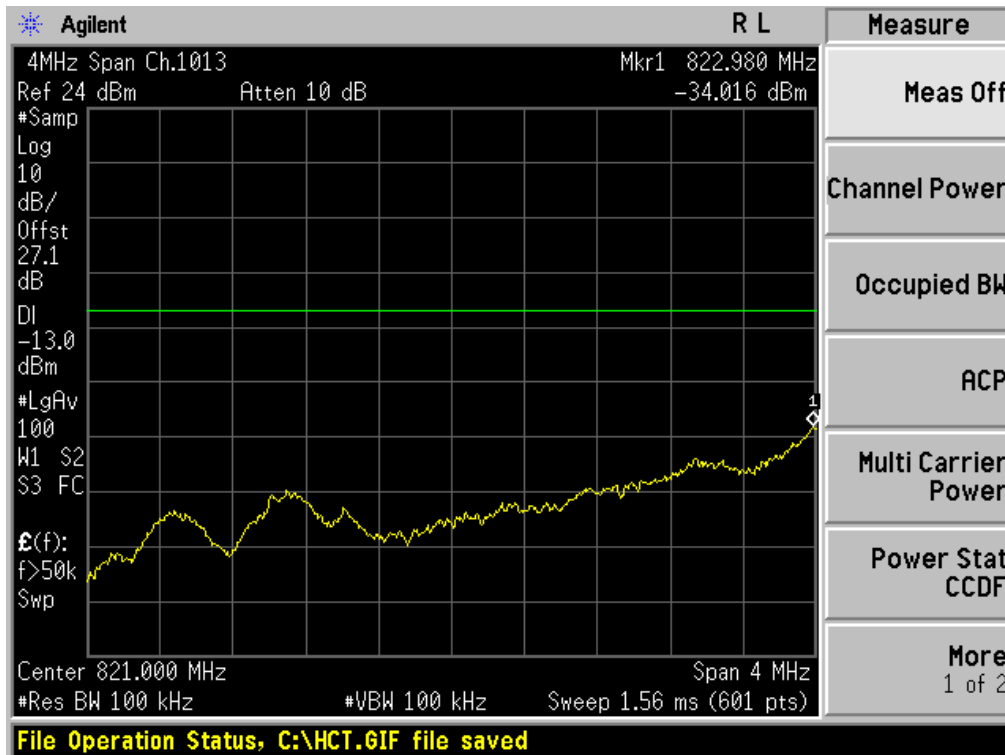


■ CDMA EVDO MODE (777 CH.) Block Edge

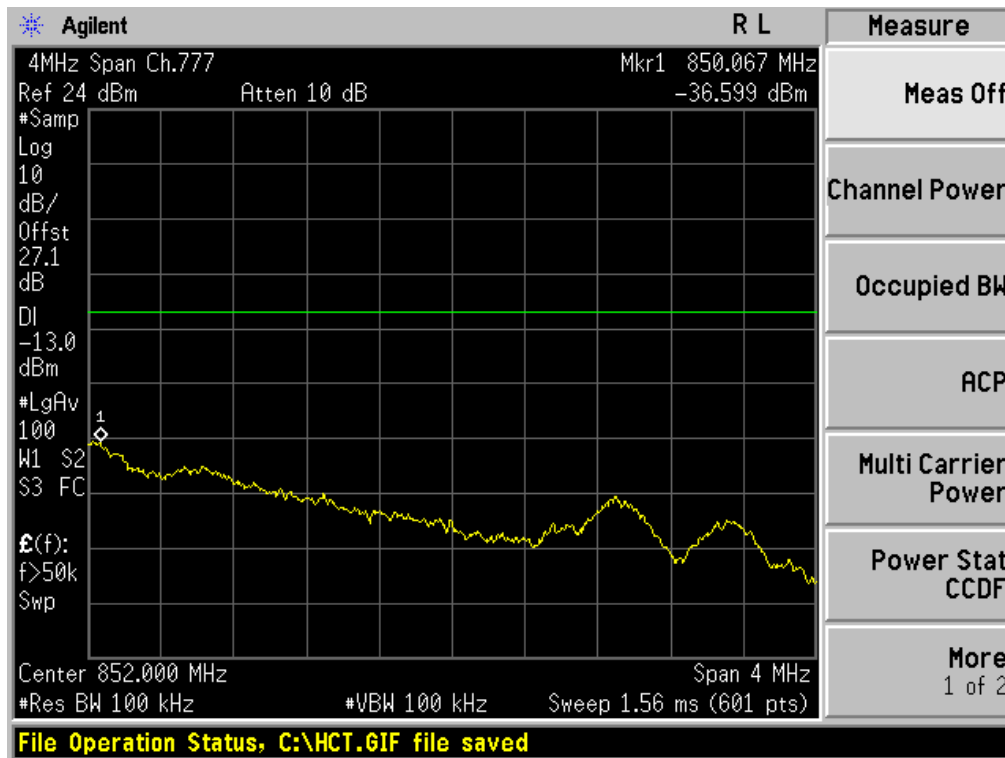


FCC CERTIFICATION REPORT			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1302FR09	Date of Issue: February 05, 2013	EUT Type: Cellular/PCS CDMA, GSM, WCDMA and LTE Portable Router with WLAN	FCC ID: JYCORBIT

■ CDMA MODE (1013 CH.) 4 MHz Span

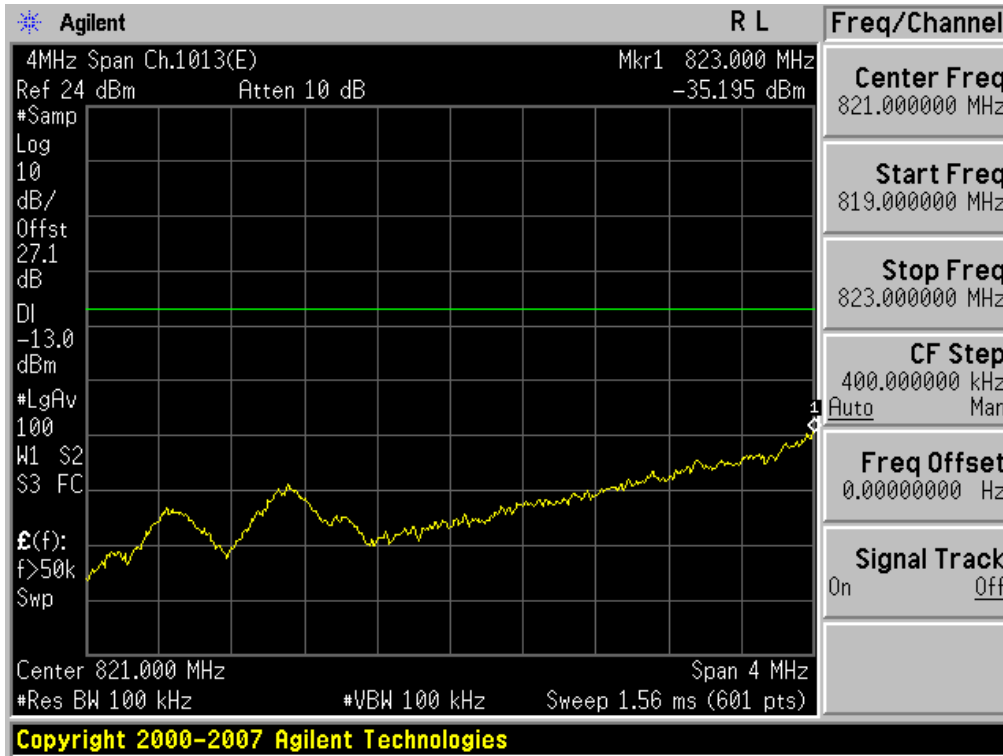


■ CDMA MODE (777 CH.) 4 MHz Span

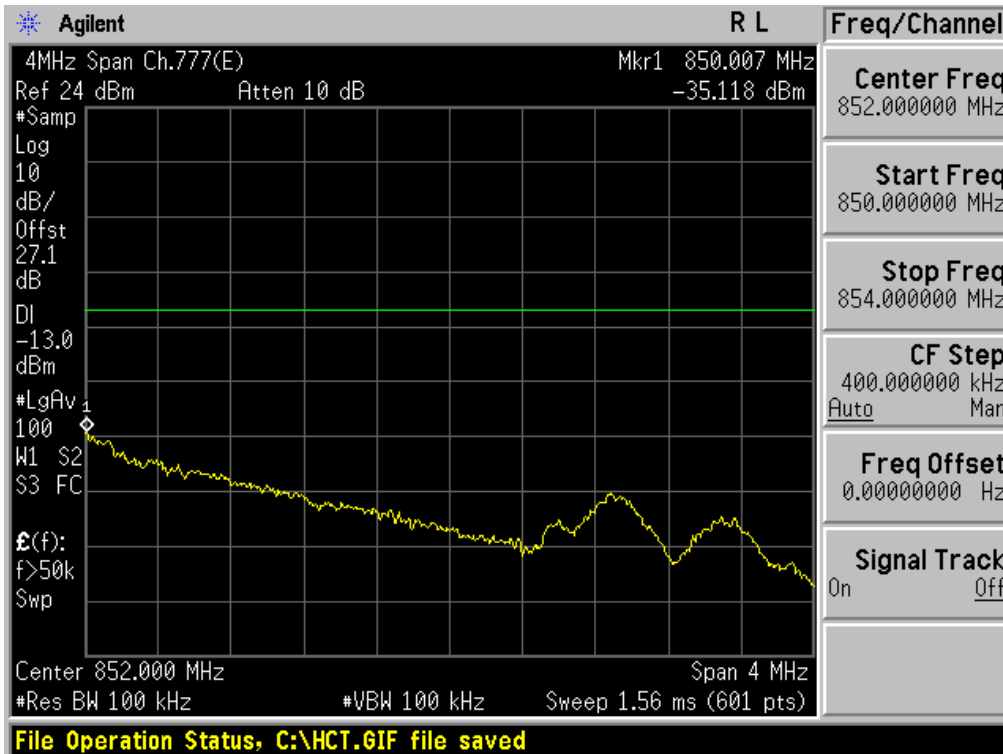


FCC CERTIFICATION REPORT			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1302FR09	Date of Issue: February 05, 2013	EUT Type: Cellular/PCS CDMA, GSM, WCDMA and LTE Portable Router with WLAN	FCC ID: JYCORBIT

■ CDMA EVDO MODE (1013 CH.) 4 MHz Span



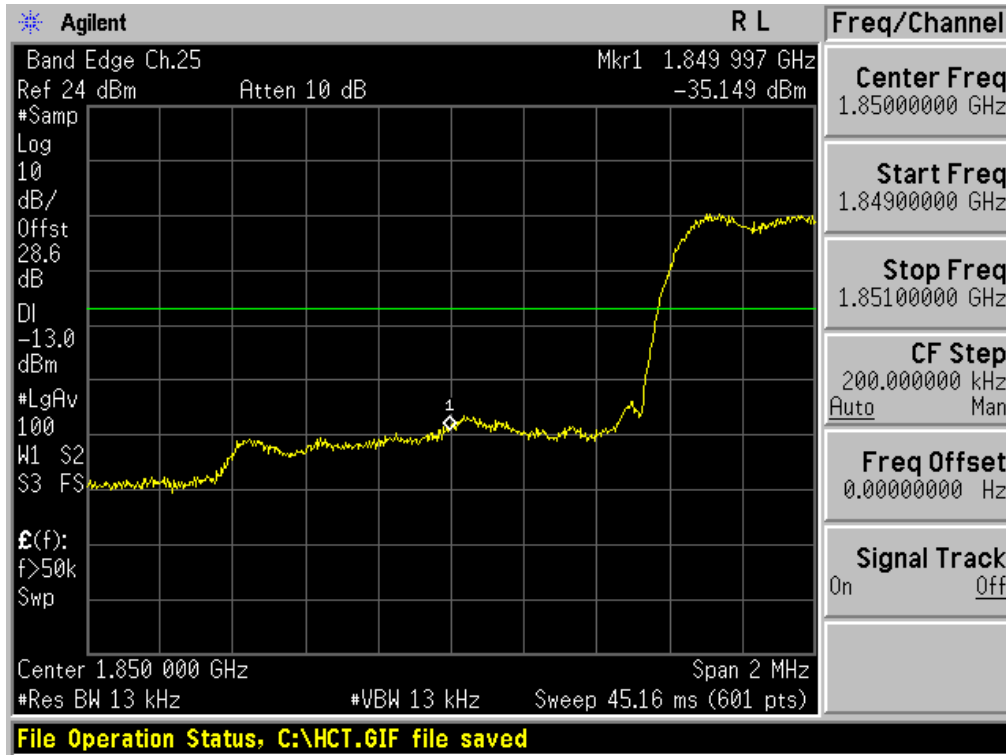
■ CDMA EVDO MODE (777 CH.) 4 MHz Span



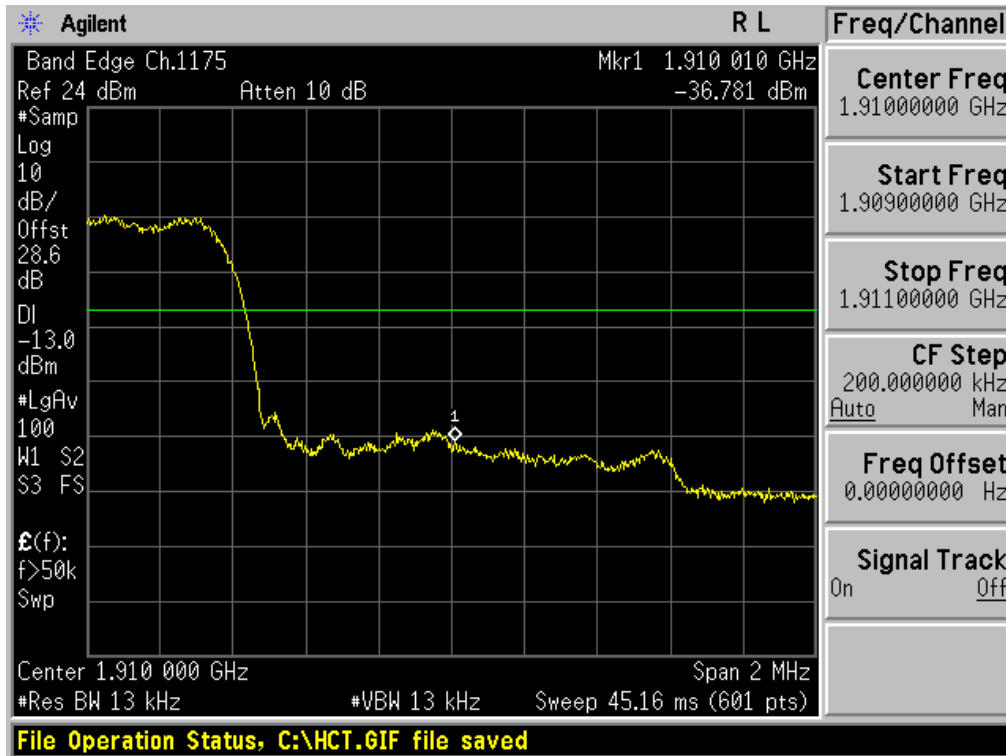
FCC CERTIFICATION REPORT			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1302FR09	Date of Issue: February 05, 2013	EUT Type: Cellular/PCS CDMA, GSM, WCDMA and LTE Portable Router with WLAN	FCC ID: JYCORBIT



■ PCS CDMA MODE (25 CH.) Block Edge

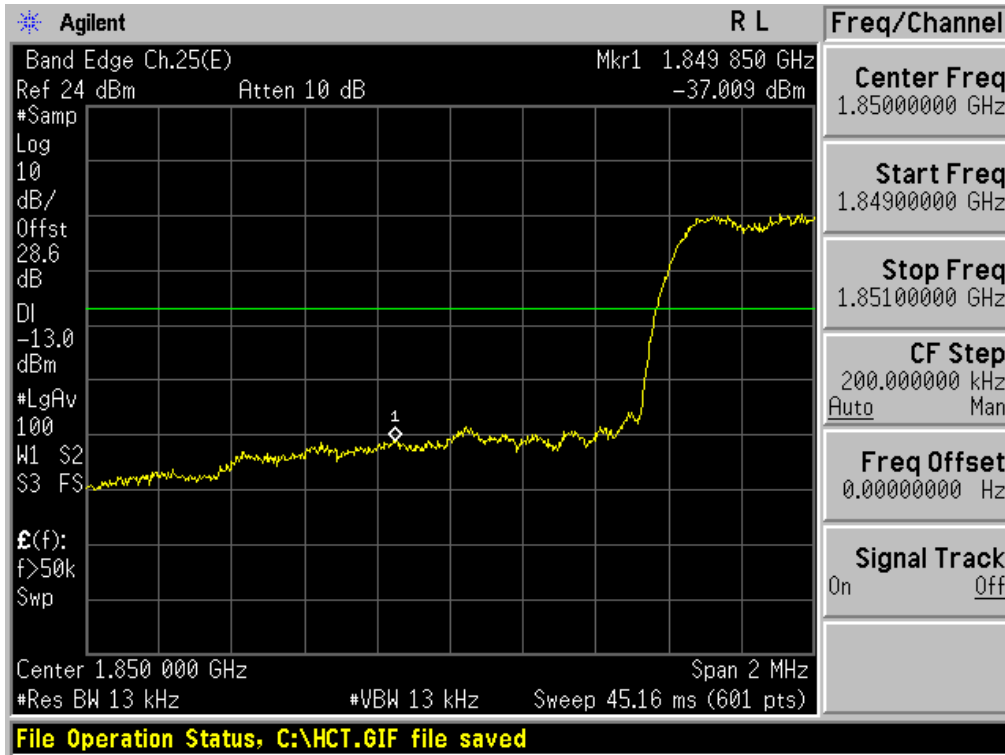


■ PCS CDMA MODE (1175 CH.) Block Edge

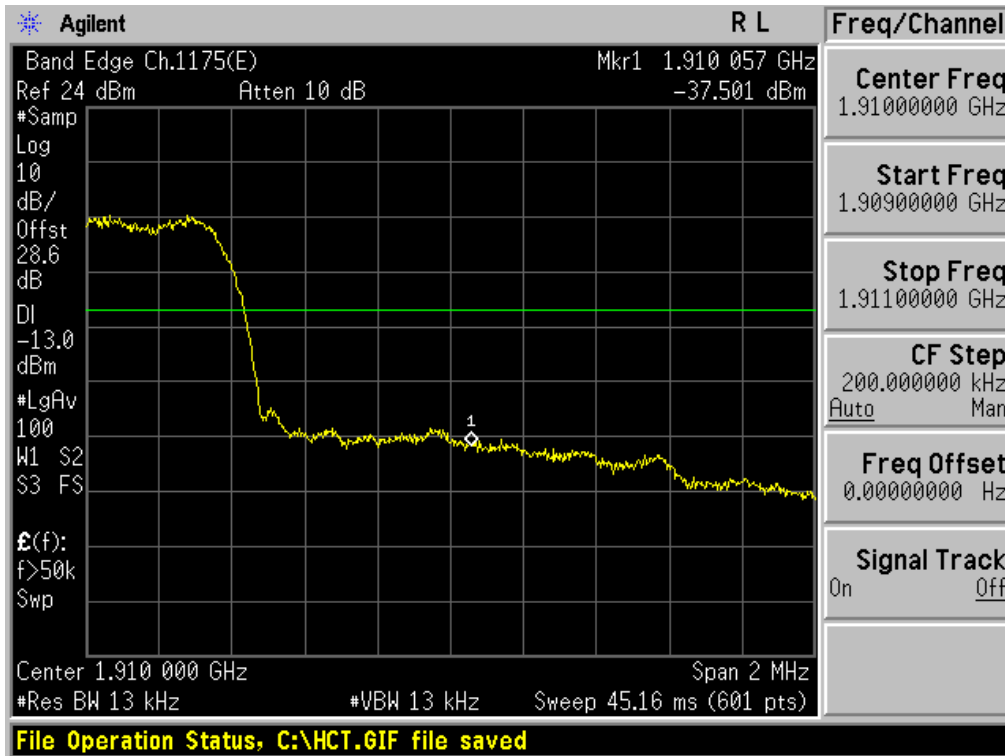


FCC CERTIFICATION REPORT			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1302FR09	Date of Issue: February 05, 2013	EUT Type: Cellular/PCS CDMA, GSM, WCDMA and LTE Portable Router with WLAN	FCC ID: JYCORBIT

■ PCS CDMA EVDO MODE (25 CH.) Block Edge

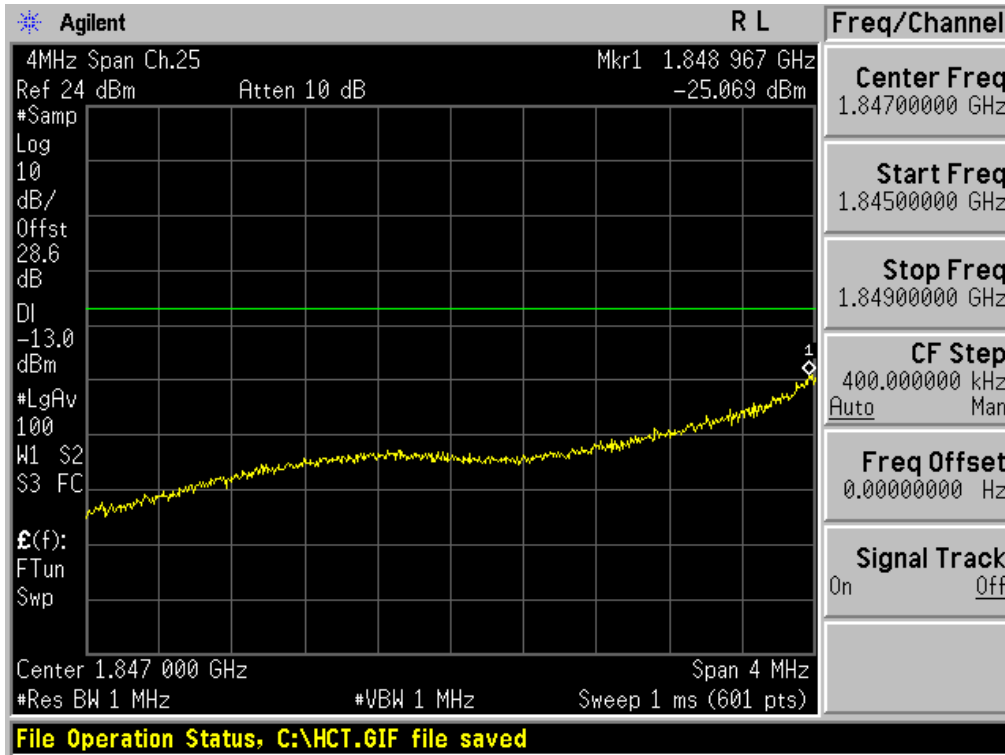


■ PCS CDMA EVDO MODE (1175 CH.) Block Edge

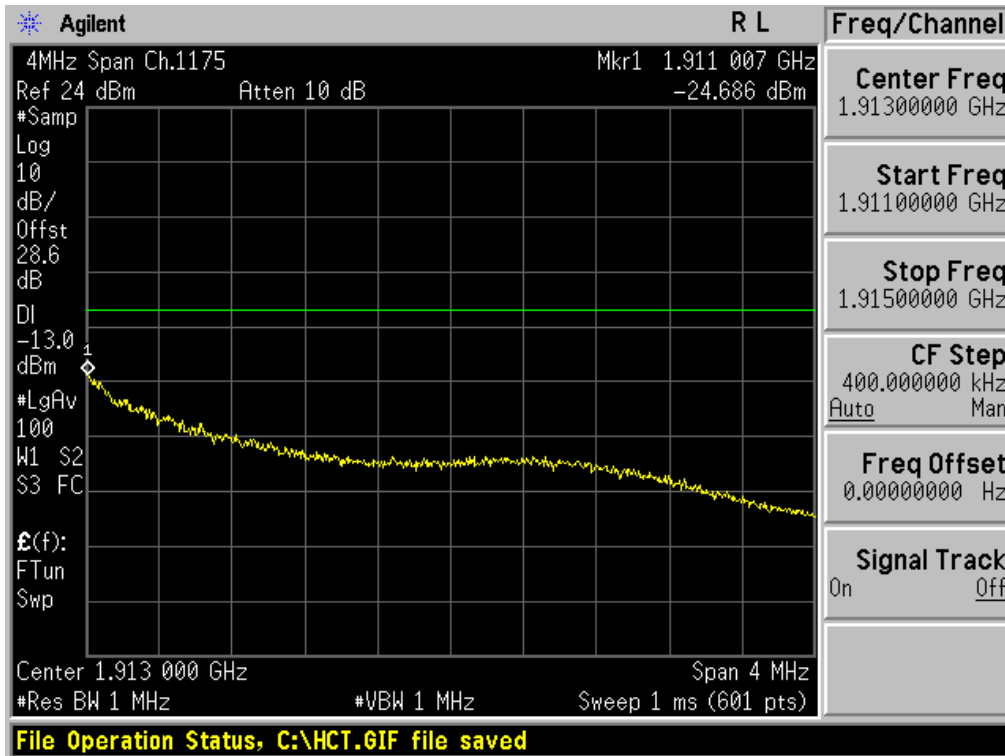


FCC CERTIFICATION REPORT			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1302FR09	Date of Issue: February 05, 2013	EUT Type: Cellular/PCS CDMA, GSM, WCDMA and LTE Portable Router with WLAN	FCC ID: JYCORBIT

■ PCS CDMA MODE (25 CH.) 4 MHz Span

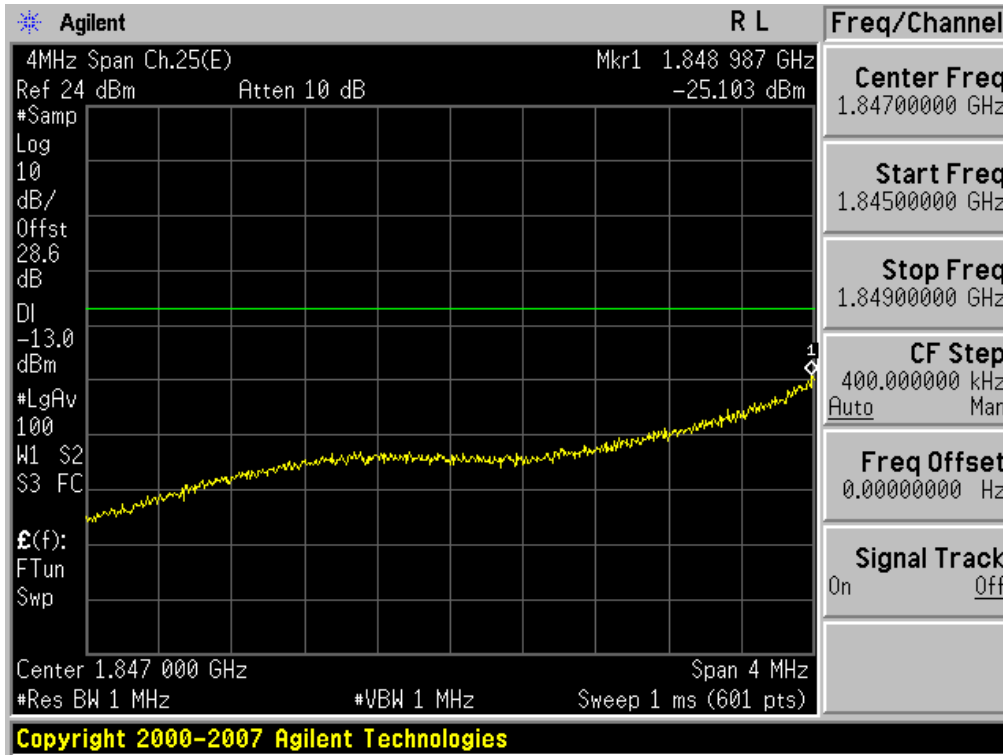


■ PCS CDMA MODE (1175 CH.) 4 MHz Span

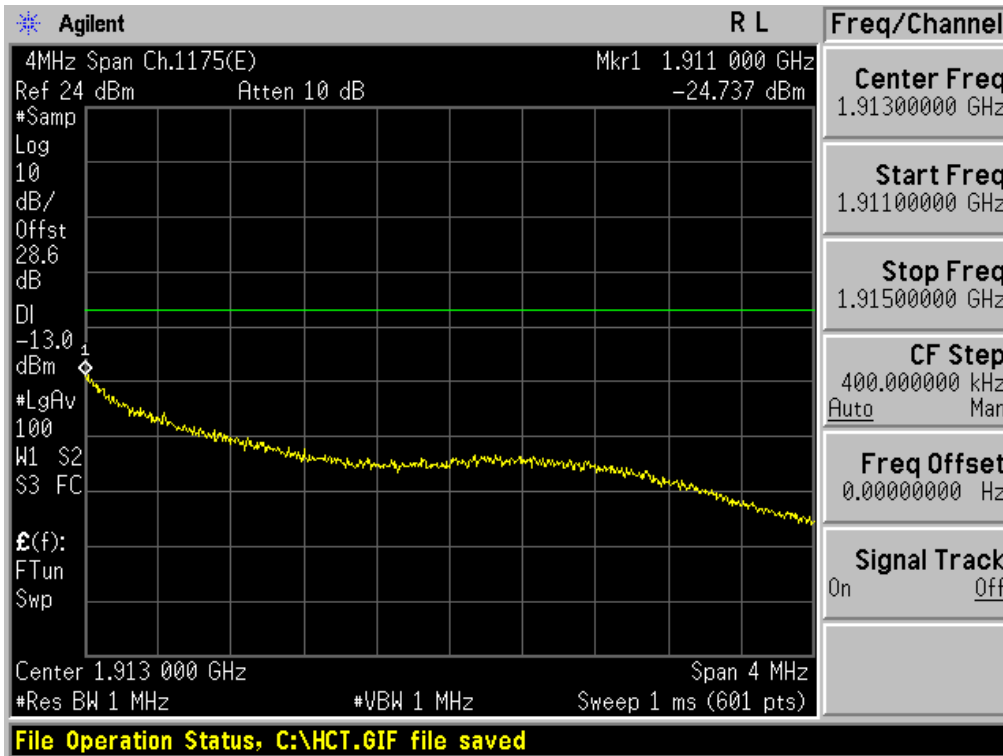


FCC CERTIFICATION REPORT			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1302FR09	Date of Issue: February 05, 2013	EUT Type: Cellular/PCS CDMA, GSM, WCDMA and LTE Portable Router with WLAN	FCC ID: JYCORBIT

■ PCS CDMA EVDO MODE (25 CH.) 4 MHz Span

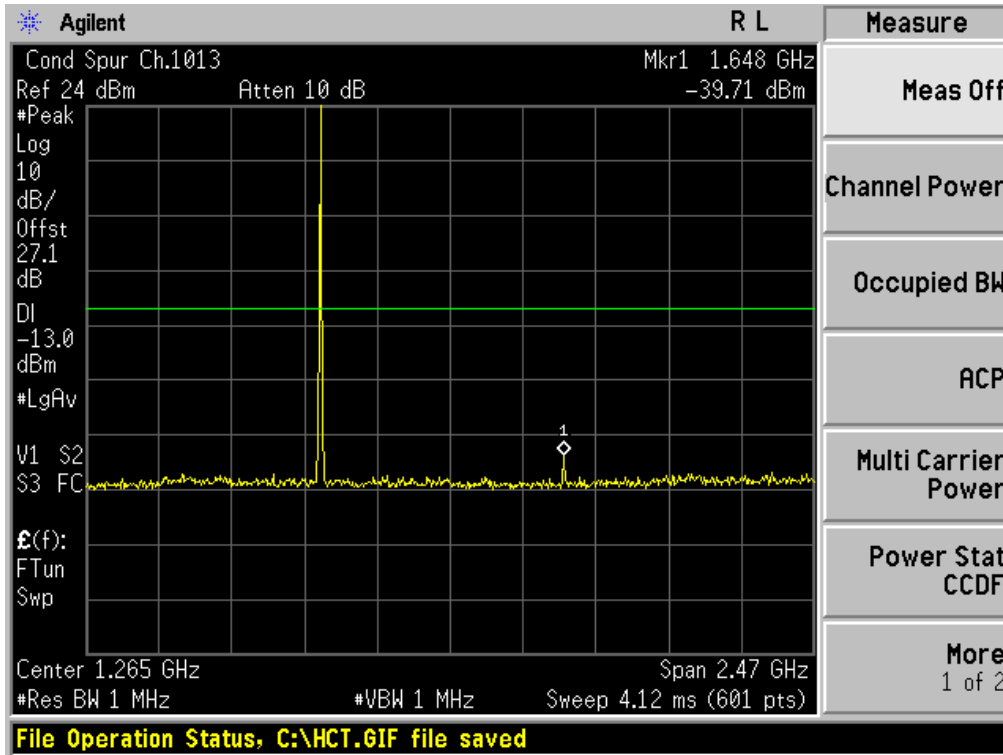


■ PCS CDMA EVDO MODE (1175 CH.) 4 MHz Span

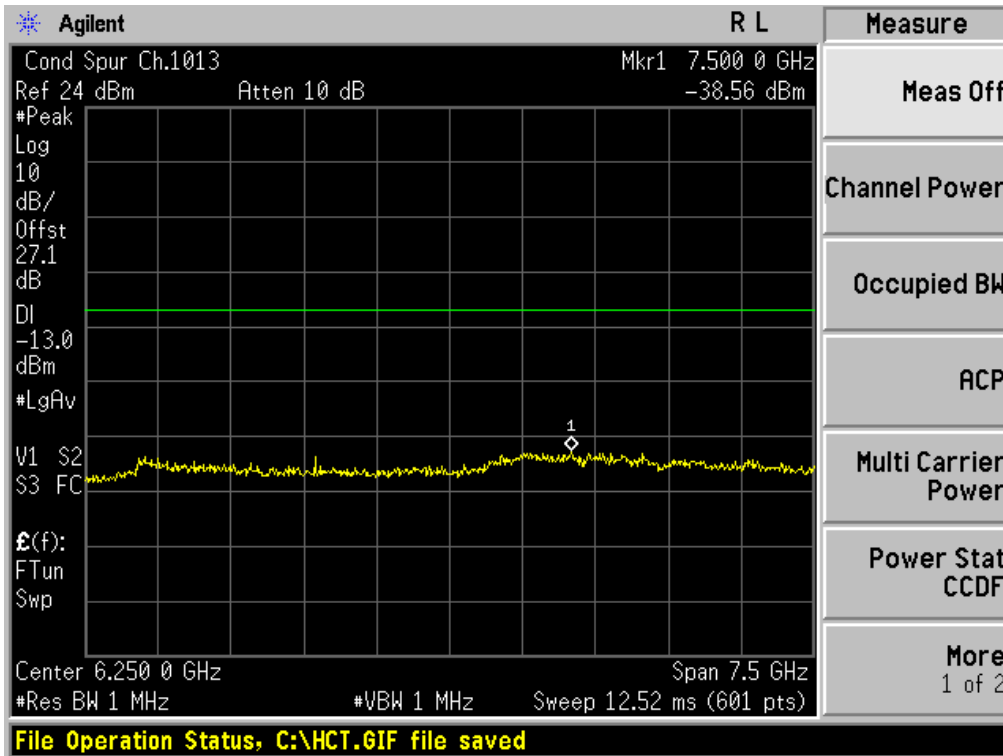


FCC CERTIFICATION REPORT			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1302FR09	Date of Issue: February 05, 2013	EUT Type: Cellular/PCS CDMA, GSM, WCDMA and LTE Portable Router with WLAN	FCC ID: JYCORBIT

■ CDMA MODE (1013 CH.) Conducted Spurious Emissions - 1

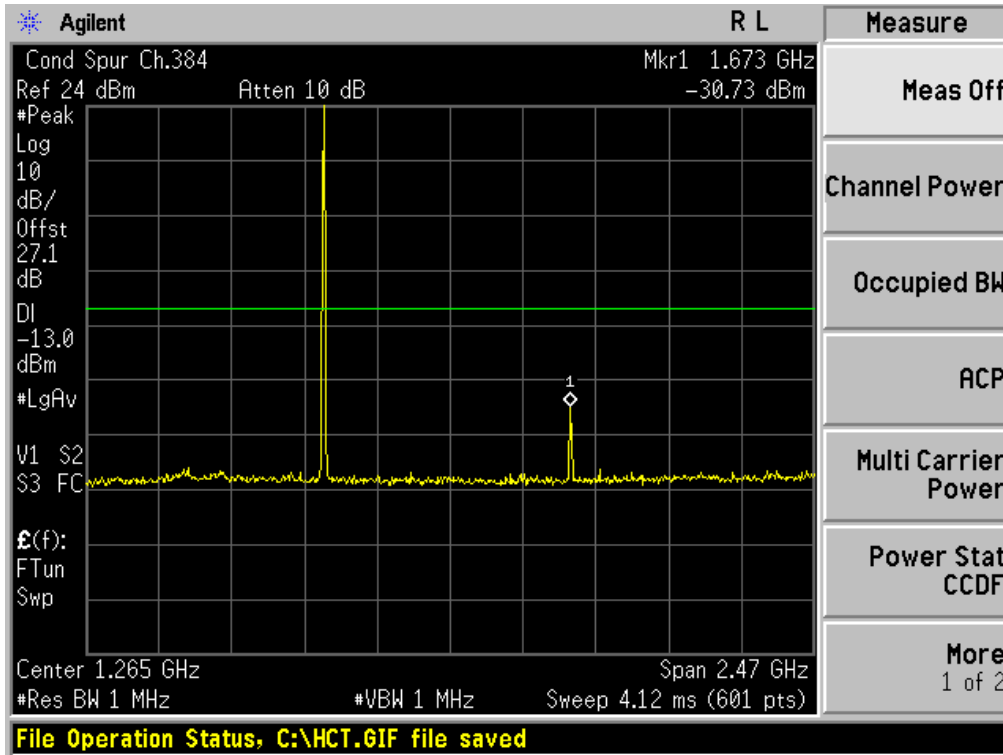


■ CDMA MODE (1013 CH.) Conducted Spurious Emissions - 2

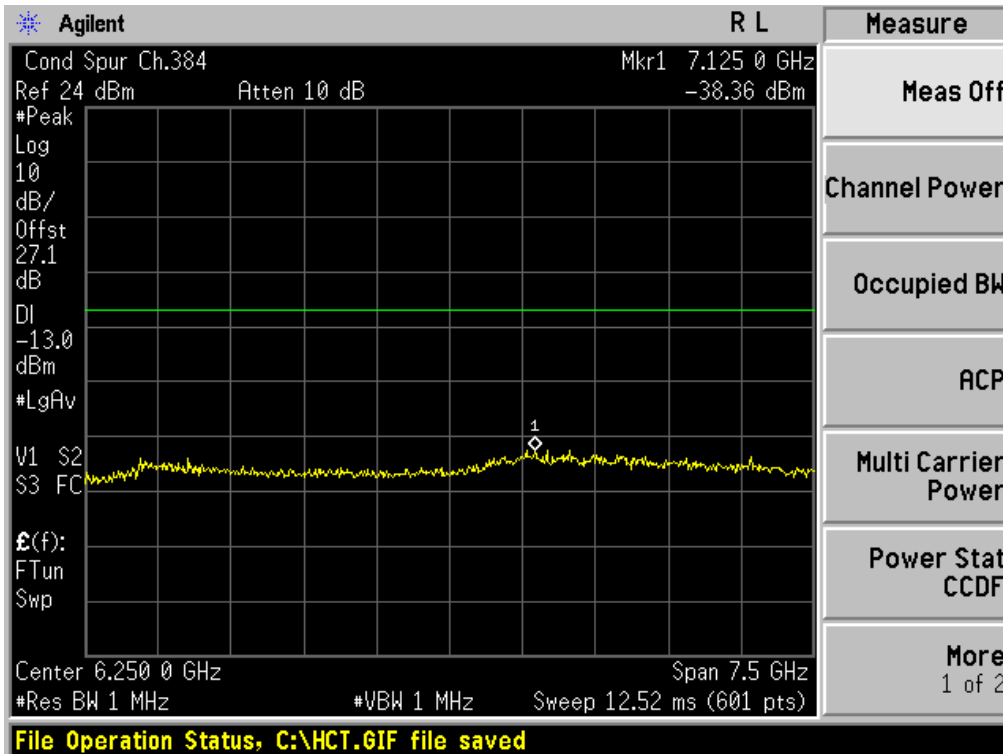


FCC CERTIFICATION REPORT			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1302FR09	Date of Issue: February 05, 2013	EUT Type: Cellular/PCS CDMA, GSM, WCDMA and LTE Portable Router with WLAN	FCC ID: JYCORBIT

■ CDMA MODE (384 CH.) Conducted Spurious Emissions - 1

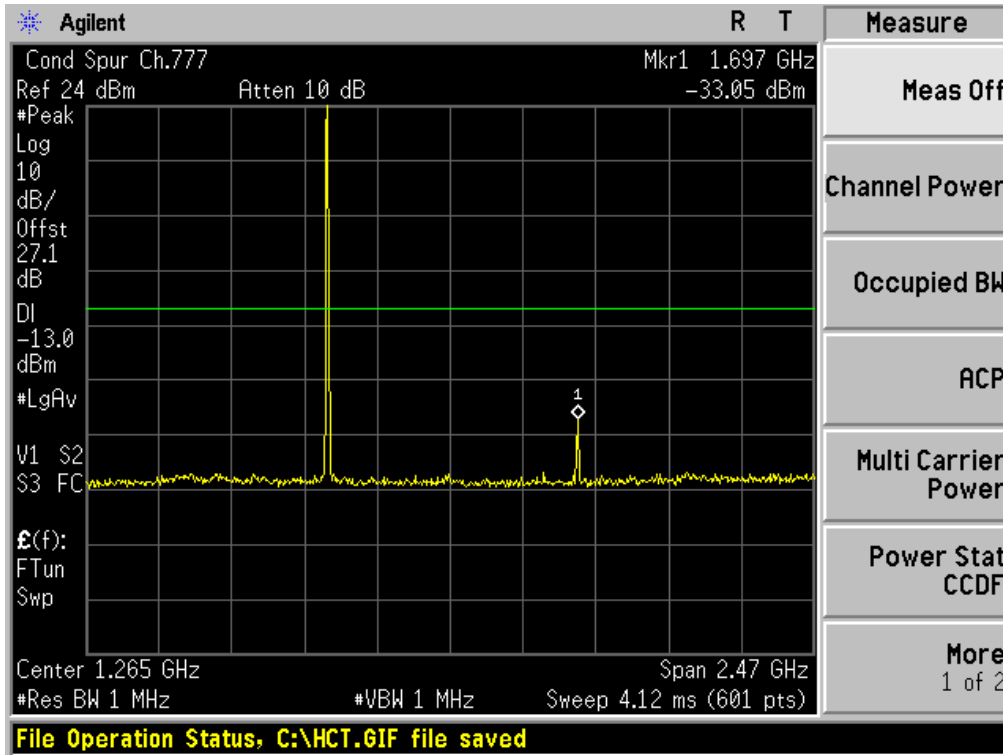


■ CDMA MODE (384 CH.) Conducted Spurious Emissions - 2

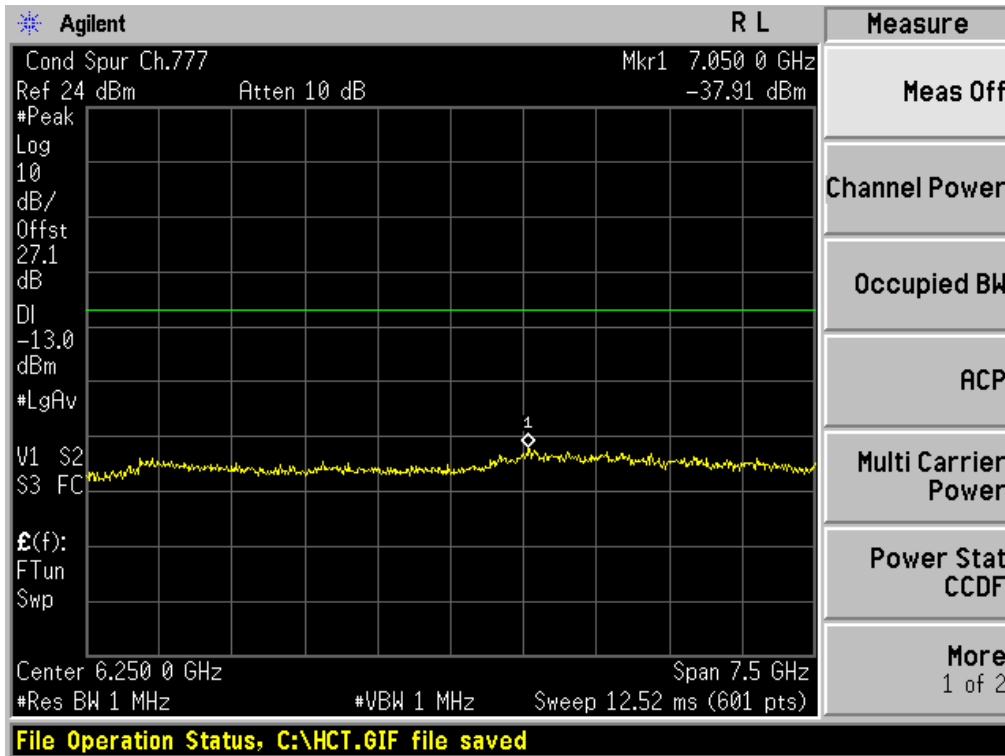


FCC CERTIFICATION REPORT			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1302FR09	Date of Issue: February 05, 2013	EUT Type: Cellular/PCS CDMA, GSM, WCDMA and LTE Portable Router with WLAN	FCC ID: JYCORBIT

■ CDMA MODE (777 CH.) Conducted Spurious Emissions - 1

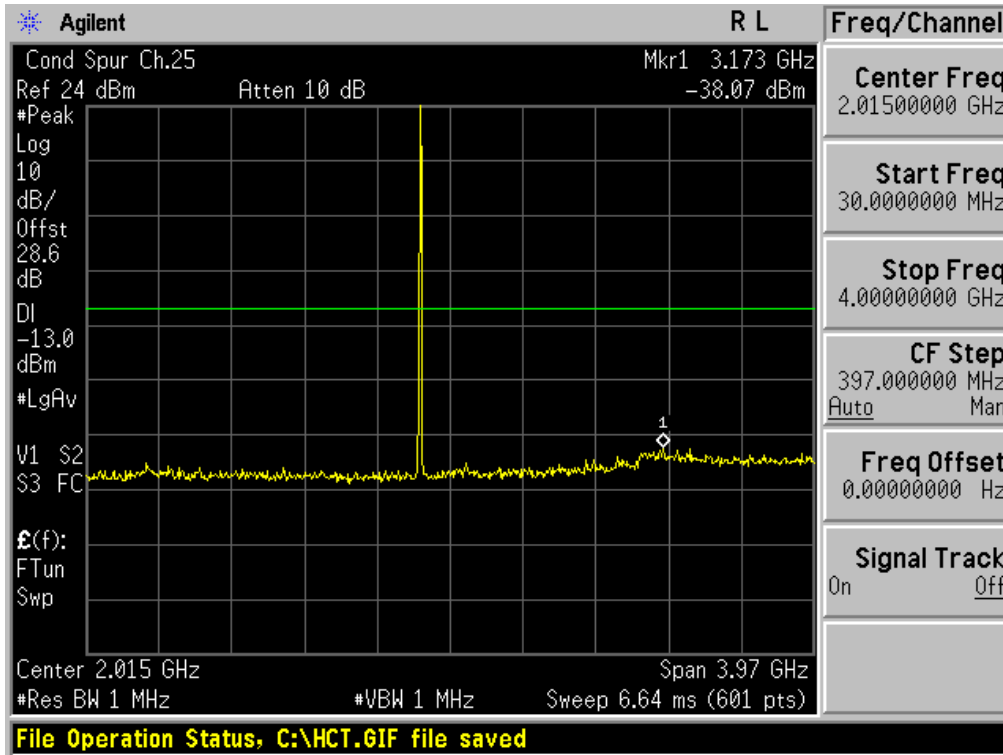


■ CDMA MODE (777 CH.) Conducted Spurious Emissions - 2

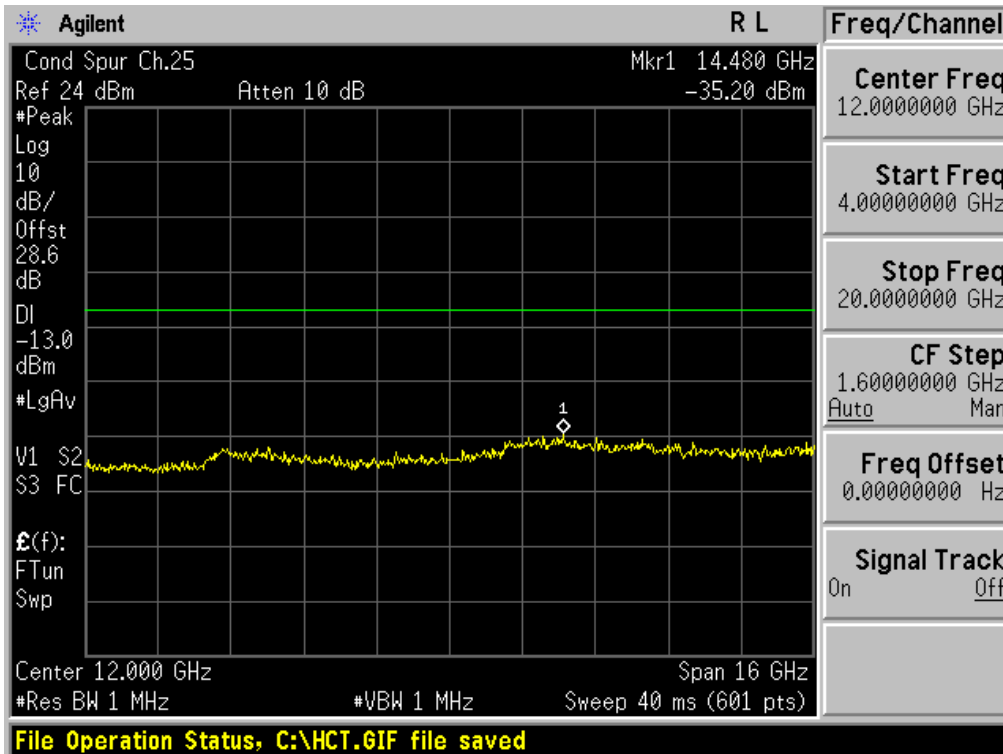


FCC CERTIFICATION REPORT			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1302FR09	Date of Issue: February 05, 2013	EUT Type: Cellular/PCS CDMA, GSM, WCDMA and LTE Portable Router with WLAN	FCC ID: JYCORBIT

■ PCS CDMA MODE (25 CH.) Conducted Spurious Emissions - 1



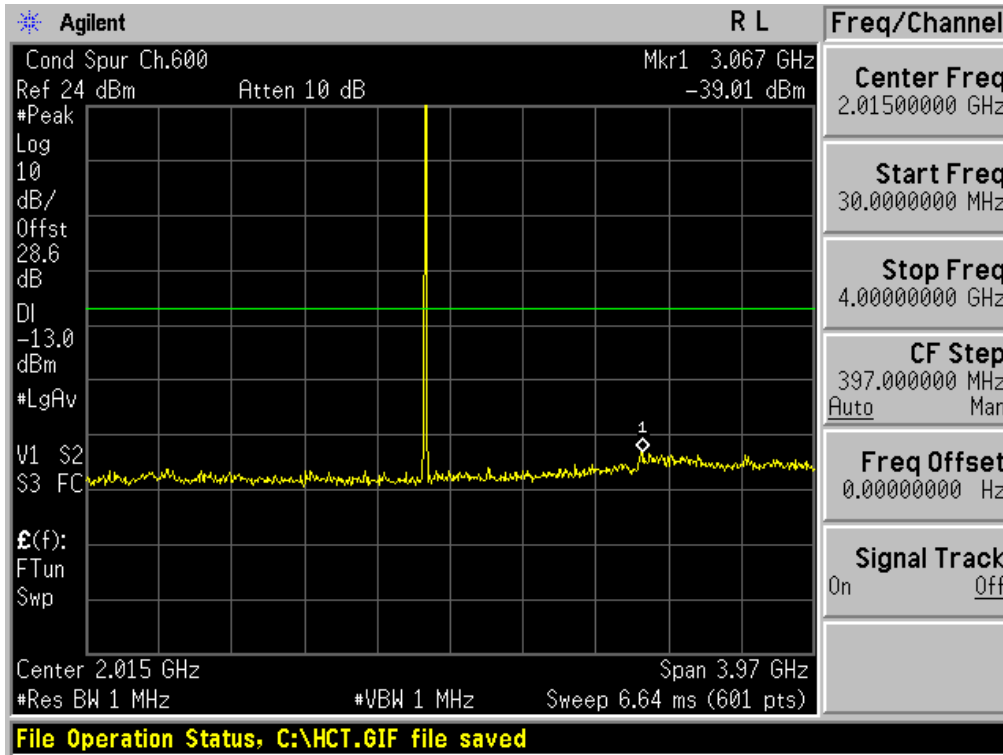
■ PCS CDMA MODE (25 CH.) Conducted Spurious Emissions - 2



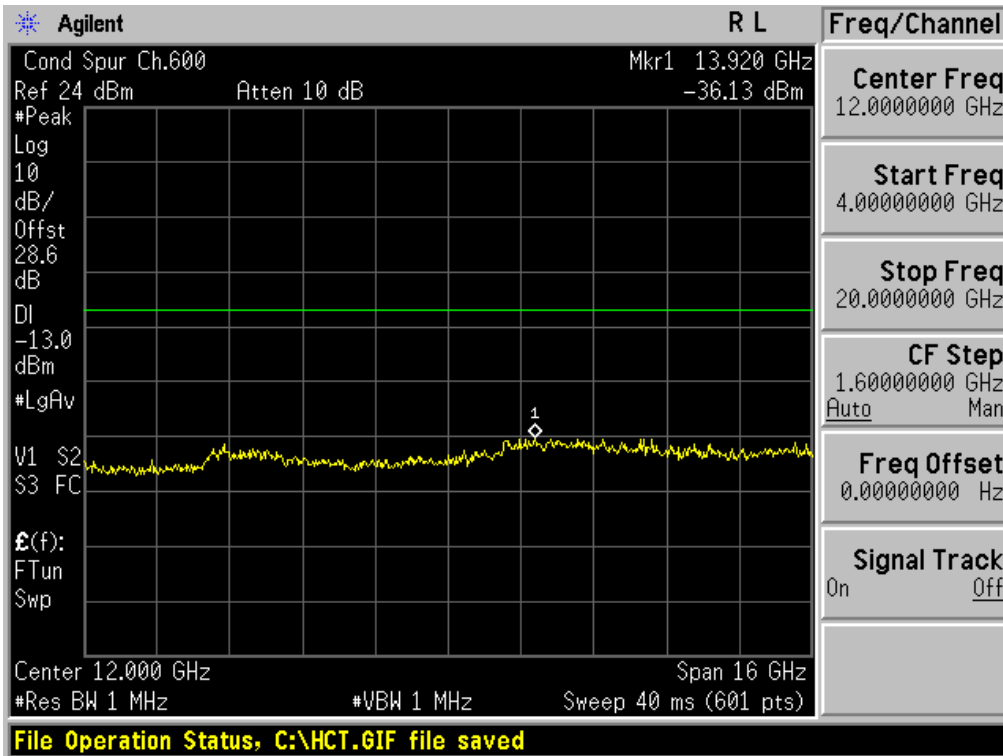
FCC CERTIFICATION REPORT			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1302FR09	Date of Issue: February 05, 2013	EUT Type: Cellular/PCS CDMA, GSM, WCDMA and LTE Portable Router with WLAN	FCC ID: JYCORBIT



■ PCS CDMA MODE (600 CH.) Conducted Spurious Emissions - 1

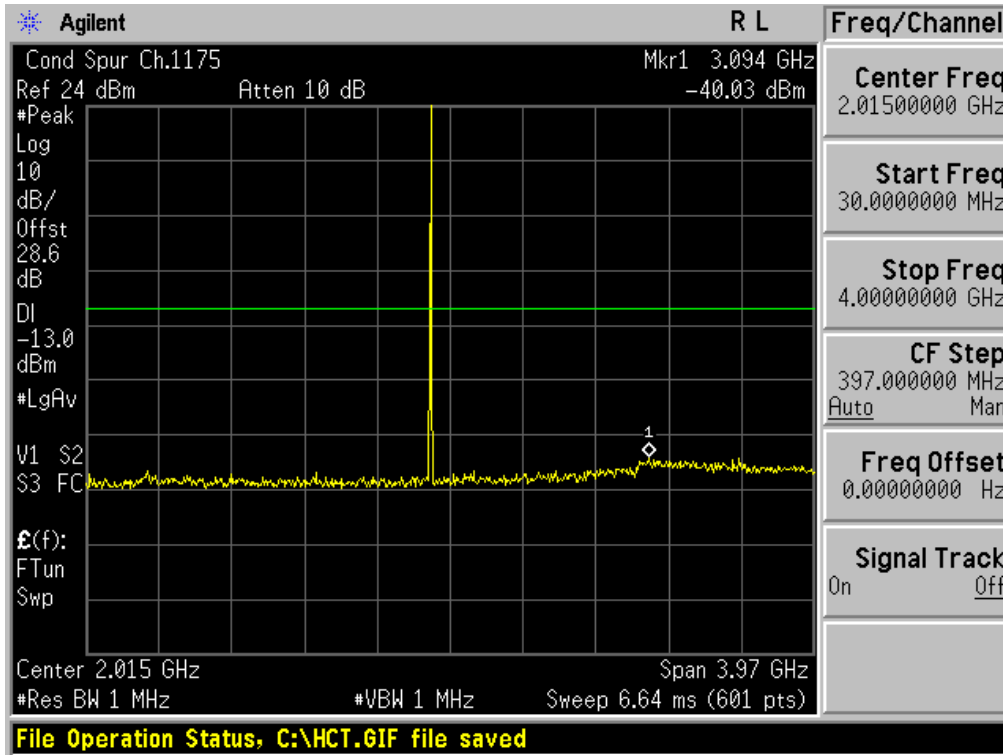


■ PCS CDMA MODE (600 CH.) Conducted Spurious Emissions - 2

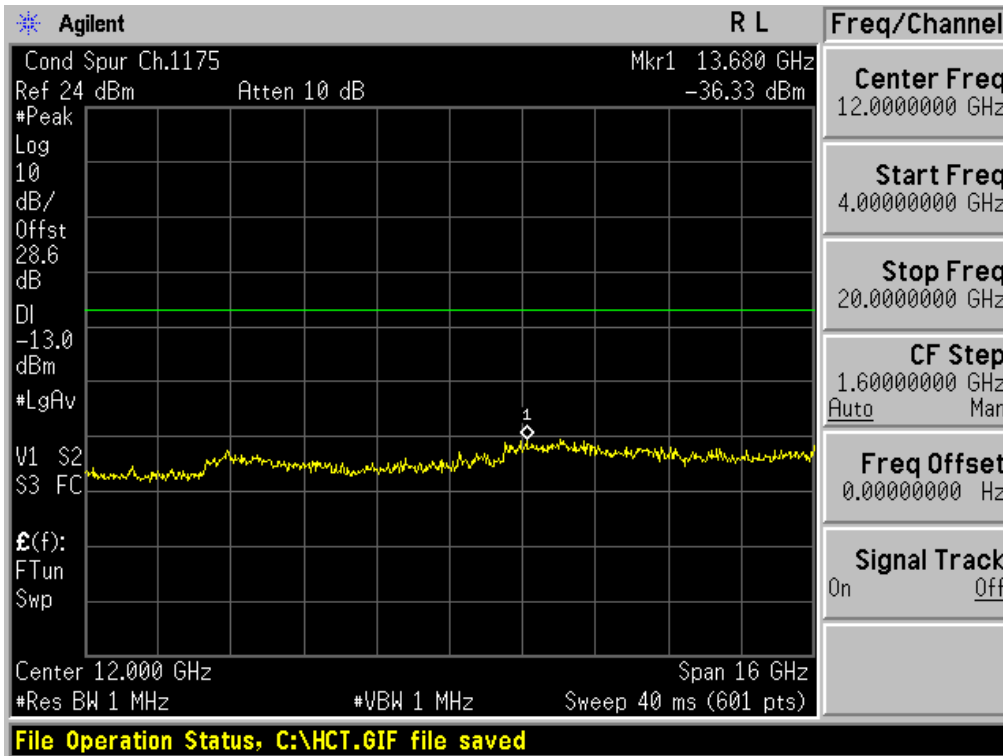


FCC CERTIFICATION REPORT			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1302FR09	Date of Issue: February 05, 2013	EUT Type: Cellular/PCS CDMA, GSM, WCDMA and LTE Portable Router with WLAN	FCC ID: JYCORBIT

■ PCS CDMA MODE (1175 CH.) Conducted Spurious Emissions - 1



■ PCS CDMA MODE (1175 CH.) Conducted Spurious Emissions - 2



FCC CERTIFICATION REPORT			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1302FR09	Date of Issue: February 05, 2013	EUT Type: Cellular/PCS CDMA, GSM, WCDMA and LTE Portable Router with WLAN	FCC ID: JYCORBIT