

# HCT CO., LTD.

## CERTIFICATE OF COMPLIANCE

### FCC Certification

**Applicant Name:**  
BIT & PULSE CO., LTD.

**Date of Issue:**

March 07, 2012

**Location:**

**Address:**  
2F Baegang B/D, 666-14 Sinsa-dong, Gangnam-gu, Seoul  
135-897, Korea

HCT CO., LTD., 105-1, Jangam-ri, Majang-Myeon,  
Icheon-si, Kyunggi-Do, Korea

**Test Report No.:** HCTR1203FR10

**HCT FRN:** 0005866421

**FCC ID:** CO3BPL-R100

**APPLICANT:** BIT & PULSE CO., LTD.

**FCC Model(s):** BPL-R100

**EUT Type:** Portable Router

**Tx Frequency:** 777 MHz ~ 787 MHz (LTE – Band 13)

**Rx Frequency:** 746 MHz ~ 756 MHz (LTE – Band 13)

**Max. RF Output Power:** 0.229W (23.59 dBm) ERP (QPSK)  
0.245W (23.89 dBm) ERP (16-QAM)

**Emission Designator(s):** 8M90G7D (QPSK) / 8M91W7D (16-QAM)

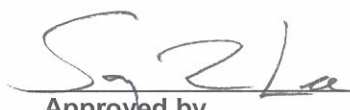
**FCC Classification:** PCB(PCS Licensed Transmitter)

**FCC Rule Part(s):** §2 , §27

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**  
: Hyo Sun Kwak  
**Test engineer of RF Team**

  
**Approved by**  
: Sang Jun Lee  
**Manager of RF Team**

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FCC CERTIFICATION REPORT			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1203FR10	Date of Issue: March 07, 2012	EUT Type: Portable Router	FCC ID: CO3BPL-R100

## Version

TEST REPORT NO.	DATE	DESCRIPTION
HCTR1203FR10	March 07, 2012	First Approval Report

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# MEASUREMENT REPORT

## 1. GENERAL INFORMATION

**Applicant Name:** BIT & PULSE CO., LTD.

**Address:** 2F Baegang B/D, 666-14 Sinsa-dong, Gangnam-gu, Seoul 135-897, Korea

**FCC ID:** CO3BPL-R100

**Application Type:** Certification

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

**FCC Rule Part(s):** §2 , §27

**EUT Type:** Portable Router

**FCC Model(s):** BPL-R100

**Tx Frequency:** 777 MHz ~ 787 MHz (LTE – Band 13)

**Rx Frequency:** 746 MHz ~ 756 MHz (LTE – Band 13)

**Max. RF Output Power:** 0.229W (23.59 dBm) ERP (QPSK)  
0.245W (23.89 dBm) ERP (16-QAM)

**Emission Designator(s):** 8M90G7D (QPSK) / 8M91W7D (16-QAM)

**Antenna Specification** Manufacturer: ARRO  
Antenna type: INTERNAL Antenna  
Peak Gain: 1.90 dBi

**Date(s) of Tests:** February 15, 2012 ~ February 24, 2012

## **2. INTRODUCTION**

### **2.1. EUT DESCRIPTION**

The BIT & PULSE CO., LTD. BPL-R100 Portable Router 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**

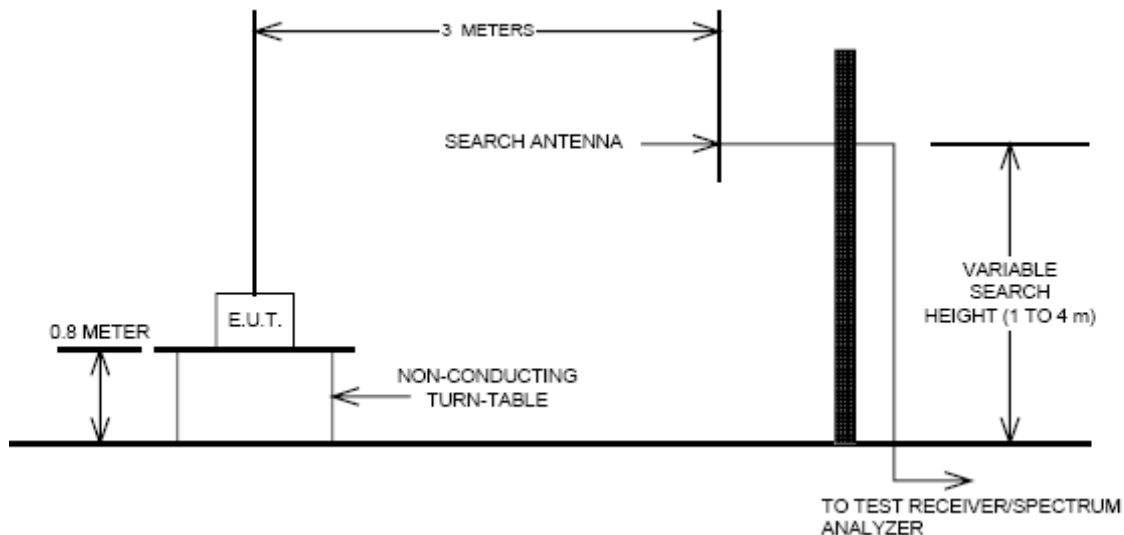
The SAC(Semi-Anechoic Chamber) and conducted measurement facility used to collect the radiated data are located at the 105-1, Jangam-ri, Majang-Myeon, Icheon-si, Kyunggi-Do, 467-811, Korea. The site is constructed in conformance with the requirements of ANSI C63.4 and CISPR Publication 22. Detailed description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

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### 3. DESCRIPTION OF TESTS

#### 3.1 EFFECTIVE RADIATED POWER/EQUIVALENT ISOTROPIC RADIATED POWER

##### Test Set-up



##### Test Procedure

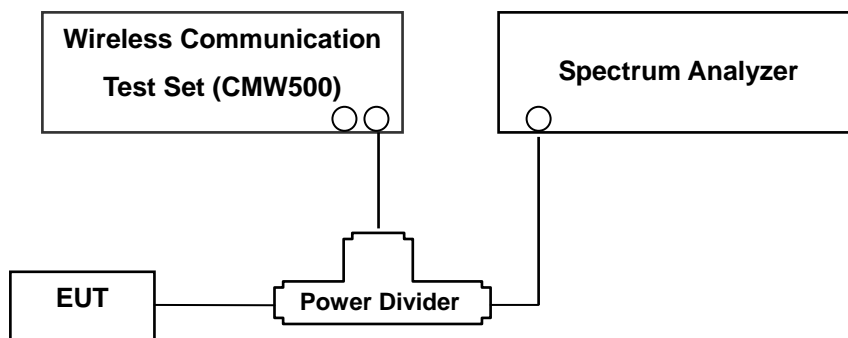
Radiated emission measurements were performed at an Fully-anechoic chamber.

The equipment under test is placed on a non-conductive table 3-meters from the receive antenna. A turntable was rotated 360° and the receiving antenna scanned from 1-4m in order to capture the maximum emission. A half wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the previously recorded signal was duplicated.

The maximum EIRP was calculated by adding the forward power to the calibrated source plus its appropriate gain value. These steps were carried out with the receiving antenna in both vertical and horizontal polarization. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic antenna are taken into consideration

### 3.2 OCCUPIED BANDWIDTH.

#### Test set-up



(Configuration of conducted Emission measurement)

#### Test Procedure

The EUT was setup to maximum output power at its lowest channel. The occupied bandwidth was measured using a spectrum analyzer. The measurements are repeated for the highest and a middle channel. The EUT's occupied bandwidth is measured as the width of the signal between two points, one below the carrier center frequency and one above the carrier frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power. Plots of the EUT's occupied bandwidth are shown herein.

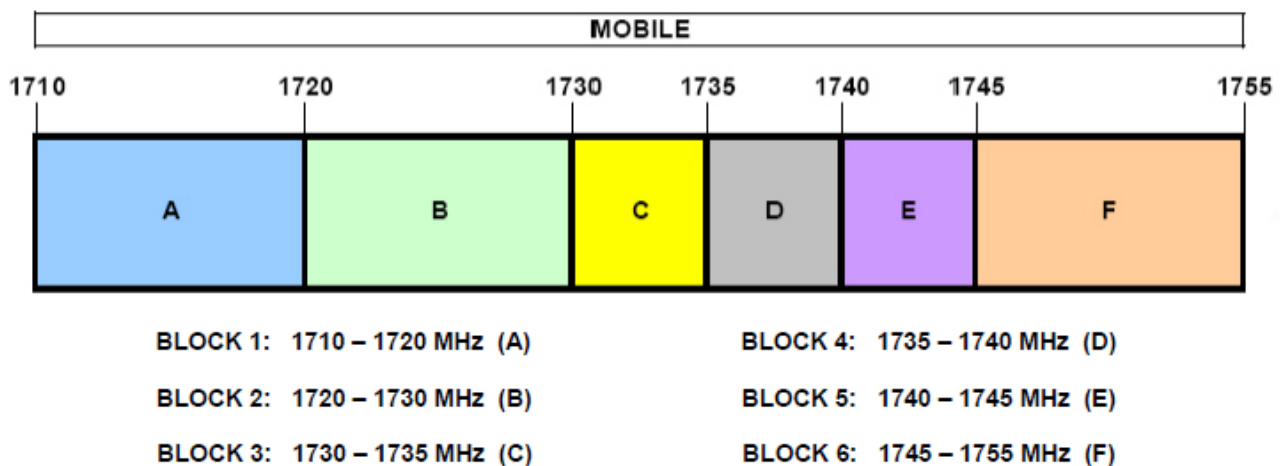
### 3.3 BLOCK B FREQUENCY RANGE (704 – 710 and 734 – 740 MHz)

§27.5(c)

Three paired channel blocks of 12 MHz each are available for assignment as follows : Block A: 698 – 704 MHz and 728 – 734 MHz ; Block B : 704 – 710 MHz and 734 – 740 MHz ; and Block C : 710 – 716 MHz and 740 – 746 MHz. Two unpaired channel blocks of 6 MHz each are available for assignment as follows : Block D : 716 – 722 MHz ; and Block E : 722- 728 MHz.

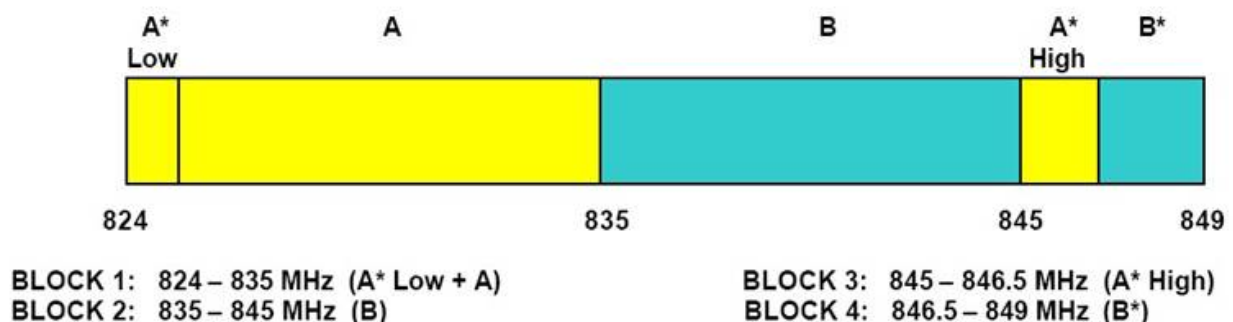
### 3.4 AWS – MOBILE FREQUENCY BLOCKS

§27.5(h)



### 3.5 CELLULAR – MOBILE FREQUENCY BLOCKS

§22.917(a)





### 3.6 PEAK-AVERAGE RATIO.

§27.50(d)(5)

A peak to average ratio measurement is performed at the conducted port of the EUT. 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.

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

#### Test Procedure

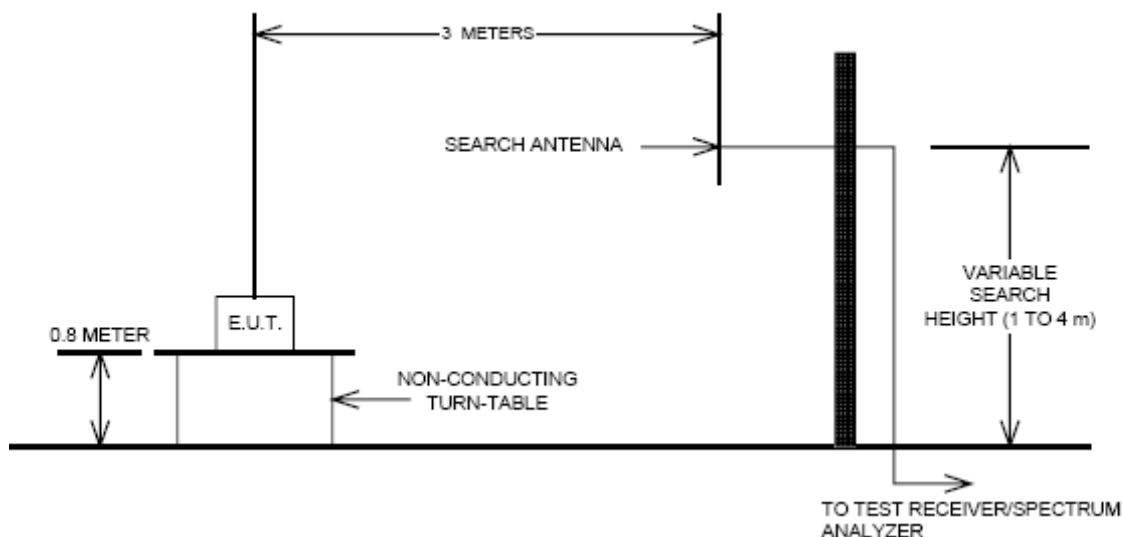
The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer.

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 30 MHz to 26.5 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.

### 3.8 RADIATED SPURIOUS AND HARMONIC EMISSIONS

#### Test Set-up



The measurement facilities used for this test have been documented in previous filings with the commission pursuant to section § 2.948. The Fully-anechoic chamber meets requirements in ANSI C63.4 –2003. A mast capable of lifting the receiving antenna from a height of one to four meters is used together with a rotatable platform mounted at three from the antenna mast.

- 1) The unit mounted on a turntable 1.5 m × 1.0 m × 0.80 m is 0.8 meter above test site ground level.
- 2) During the emission test, the turntable is rotated and the EUT is manipulated to find the configuration resulting in maximum emission under normal condition of installation and operation.
- 3) The antenna height and polarization are also varied from 1 to 4 meters until the maximum signal is found.
- 4) The spectrum shall be scanned up to the 10<sup>th</sup> harmonic of the fundamental frequency.

#### Test Procedure

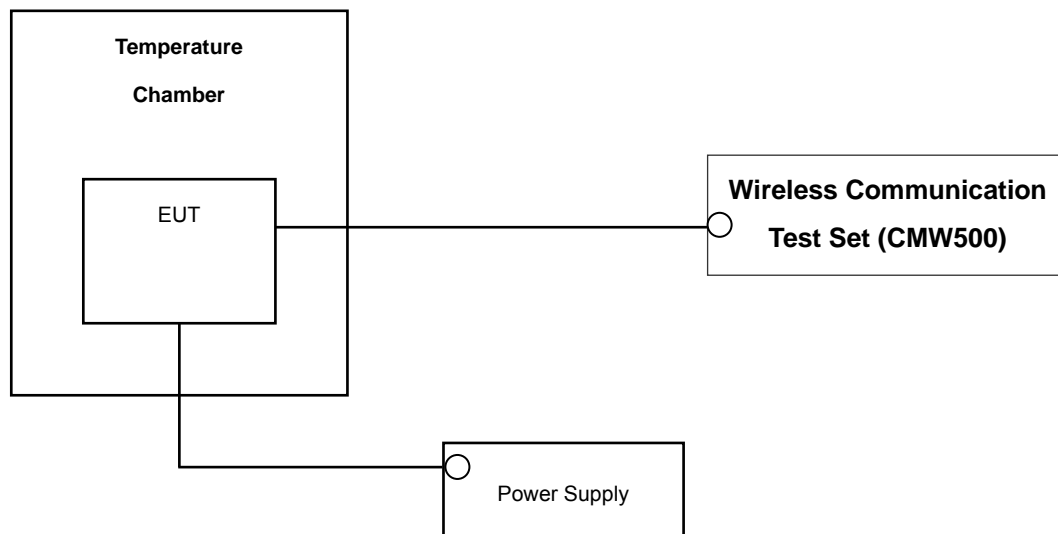
The equipment under test is placed on a non-conductive table 3-meters from the receive antenna. A turntable was rotated 360° and the receiving antenna scanned from 1-4m in order to capture the maximum emission. A half wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the previously recorded signal was duplicated.

The maximum EIRP was calculated by adding the forward power to the calibrated source plus its appropriate gain value. These steps were carried out with the receiving antenna in both vertical and horizontal polarization. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic antenna are taken into consideration.

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### 3.9 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.**

## 4. LIST OF TEST EQUIPMENT

Manufacture	Model/ Equipment	Serial Number	Calibration Interval	Calibration Due
R&S	N9020A	MY51110020	Annual	09/23/2012
Agilent	E9327A/ Power Sensor	MY4442009	Annual	05/02/2012
R&S	CMW500/ Base Station	1201.0002K50_10395	Annual	04/20/2012
MITEQ	AMF-6D-001180-35-20P/AMP	1081666	Annual	09/24/2012
Wainwright	WHK1.2/15G-10EF/H.P.F	2	Annual	05/02/2012
Wainwright	WHK3.3/18G-10EF/H.P.F	1	Annual	05/02/2012
Agilent	11636B/ Power Divider	11377	Annual	11/07/2012
Digital	EP-3010/ Power Supply	3110117	Annual	11/07/2012
Schwarzbeck	UHAP/ Dipole Antenna	557	Biennial	05/03/2012
Schwarzbeck	UHAP/ Dipole Antenna	558	Biennial	05/03/2012
Korea Engineering	KR-1005L / Chamber	KRAB05063-3CH	Annual	11/07/2012
Schwarzbeck	BBHA 9120D/ Horn Antenna	147	Biennial	04/13/2012
Agilent	E4440A/Spectrum Analyzer	US45303008	Annual	05/02/2012
WEINSCHL	ATTENUATOR	BR0592	Annual	11/07/2012
REOHDE&SCHWARZ	FSP30/Spectrum Analyzer	839117/011	Annual	03/23/2012
Agilent	8960 (E5515C)/ Base Station	GB44400269	Annual	02/10/2013

## 5. SUMMARY OF TEST RESULTS

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result
2.1049	Occupied Bandwidth	N/A	CONDUCTED	PASS
2.1051, 27.53(c)(2)	Band Edge / Spurious and Harmonic Emissions at Antenna Terminal.	$< 43 + 10 \log_{10} (P[\text{Watts}])$ $< 65 + 10 \log_{10} (P[\text{Watts}])$ in a 6.25 KHz bandwidth for emissions in the 763 – 775 MHz and 793 – 805 MHz bands		PASS
2.1046	Conducted Output Power	N/A		PASS
2.1055, 27.54	Frequency stability / variation of ambient temperature	$< 2.5 \text{ ppm}$		PASS
27.50(b)(10)	Effective Radiated Power	$< 3 \text{ Watts max. ERP}$	RADIATED	PASS
2.1053, 27.53(c)(2) 27.53©(4)	Undesirable Out-of-Band Emissions	$< 43 + 10 \log_{10} (P[\text{Watts}])$ for all out-of-band emissions		PASS
2.1053, 27.53(f)	Undesirable Emissions in the 1559 – 1610 MHz band	$< -40\text{dBm/MHz EIRP (wideband)}$ $< -50\text{dBm EIRP (narrowband)}$		PASS

## 6. SAMPLE CALCULATION

### A. ERP Sample Calculation

Mode	Ch./ Freq.		Measured	Substitute	Ant. Gain	C.L	Pol.	ERP	
	channel	Freq.(MHz)	Level(dBm)	LEVEL(dBm)				W	dBm
LTE	23230	782	-11.56	34.28	-8.32	1.17	H	0.30	24.79

$$\text{ERP} = \text{SubstituteLEVEL(dBm)} + \text{Ant. Gain} - \text{CL(Cable Loss)}$$

- 1) The EUT mounted on a wooden tripod 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

#### QPSK Modulation

**Emission Designator = 8M95G7D**

LTE BW = 8.95 MHz

G = Phase Modulation

7 = Quantized/Digital Info

D = Amplitude/Angle Modulated

#### 16QAM Modulation

**Emission Designator = 8M94W7D**

LTE BW = 8.94 MHz

D = Amplitude/Angle Modulated

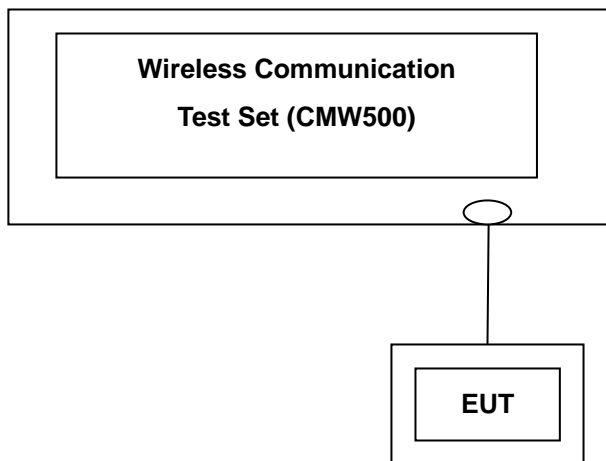
7 = Quantized/Digital Info

W = Combination (Audio/Data)

## 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.



Test Result

Band	Frequency(Mhz)	Channel	Resource Block Size	Resource Block Offset	Average Power [dBm]	
					QPSK	16-QAM
LTE	782	23230	1	0	23.08	22.70
			1	49	22.75	22.70
			25	12	23.14	23.18
			50	0	23.00	23.12

(LTE Conducted Average Output Powers)

Note : Detecting mode is average.

### 7.2 EMISSION MASK

- Plots of the EUT's Emission Mask are shown Page 30 ~ 31.

### 7.3 OCCUPIED BANDWIDTH

Band	Frequency(Mhz)	Modulation	Resource Block Size	Resource Block Offset	Data ( RB 1 : KHz / RB 25,50 : MHz )
LTE	782	QPSK	1	0	-
	782		1	49	-
	782		25	12	-
	782		50	-	8.9025
	782	16-QAM	1	0	-
	782		1	49	-
	782		25	12	-
	782		50	-	8.9087

- Plots of the EUT's Occupied Bandwidth are shown Page 26.



## 7.4 CONDUCTED SPURIOUS EMISSIONS

Band	Frequency (Mhz)	Modulation	Resource Block Size	Resource Block Offset	Frequency of Maximum Harmonic (GHz)	Maximum Data [dBm]
LTE	782	QPSK	1	0	-	-
	782		1	49	2.3592	-36.159
	782		25	12	-	-
	782		50	-	-	-
	782	16-QAM	1	0	-	-
	782		1	49	2.3592	-38.544
	782		25	12	-	-
	782		50	-	-	-

- Plots of the EUT's Conducted Spurious Emissions are shown Page 32 ~ 33.

### 7.4.1 BAND EDGE

Note : In the 763 – 775 MHz and 793 – 805 MHz band, the FCC limit is  $65 + 10\log_{10}(P_{\text{Watts}}) = -35$  dBm in a 6.25 KHz bandwidth.

By using a 10KHz bandwidth, the limit was adjusted by  $10\log_{10}(10\text{KHz}/6.25\text{KHz}) = 2.04$  dB.

LIMIT :  $-35$  dBm + 2.04 dB =  $-32.96$  dBm.

- Plots of the EUT's Band Edge are shown Page 28 ~ 29.

## 7.5 EFFECTIVE RADIATED POWER OUTPUT

Mode	RB/RB SIZE	Freq (MHz)	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBi)	C.L	Pol	ERP	
								W	dBm
10 MHz BAND QPSK	1/0	782.00	-13.51	34.67	-10.52	1.53	V	0.183	22.62
	1/49		-13.28	34.90	-10.52	1.53	V	0.193	22.85
	25/12		-12.54	35.64	-10.52	1.53	V	0.229	23.59
	50/0		-13.30	34.88	-10.52	1.53	H	0.192	22.83

Mode	RB/RB SIZE	Freq (MHz)	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBi)	C.L	Pol	ERP	
								W	dBm
10 MHz BAND 16-QAM	1/0	782.00	-13.62	34.56	-10.52	1.53	V	0.178	22.51
	1/49		-13.12	35.06	-10.52	1.53	V	0.200	23.01
	25/12		-12.24	35.94	-10.52	1.53	V	0.245	23.89
	50/0		-12.27	35.91	-10.52	1.53	V	0.243	23.86

### 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 1 MHz BW signals, a peak detector is used, with RBW = VBW = 1 MHz. For 10 MHz BW signals, a peak detector is used, with RBW = VBW = 10 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.

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 y plane in LTE mode. Also worst case of detecting Antenna is vertical polarization in LTE mode.

## 7.6 RADIATED SPURIOUS EMISSIONS

### 7.6.1 RADIATED SPURIOUS EMISSIONS

■ OPERATING FREQUENCY : 782.00 MHz  
 ■ MEASURED OUTPUT POWER: 23.59 dBm = 0.229 W  
 ■ MODULATION SIGNAL: QPSK  
 ■ DISTANCE: 3 meters  
 ■ LIMIT: - (43 + 10 log<sub>10</sub> (W)) = - 36.59 dBc

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBd)	Substitute Level (dBm)	C.L	Pol	ERP (dBm)	dBc
23230 (782.00)	2346.00	-58.94	10.72	-59.94	3.32	H	-52.54	-76.13
	3128.00	-	-	-	-	-	-	-
	3910.00	-	-	-	-	-	-	-

- 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.
  4. Worst case is 25 resource block.

## 7.6.2 RADIATED SPURIOUS EMISSIONS

- OPERATING FREQUENCY : 782.00 MHz
- MEASURED OUTPUT POWER: 23.89 dBm = 0.245 W
- MODULATION SIGNAL: 16-QAM
- DISTANCE: 3 meters
- LIMIT: - (43 + 10 log<sub>10</sub> (W)) = - 36.89 dBc

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBd)	Substitute Level (dBm)	C.L	Pol	ERP (dBm)	dBc
23230 (782.00)	2346.00	-58.96	10.72	-59.96	3.32	H	-52.56	-76.45
	3128.00	-	-	-	-	-	-	-
	3910.00	-	-	-	-	-	-	-

- 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.
  4. Worst case is 25 resource block.

### 7.6.3 RADIATED SPURIOUS EMISSIONS (1559 ~ 1610 MHz Band)

☐ OPERATING FREQUENCY : 782.00 MHz  
☐ MODULATION SIGNAL: QPSK  
☐ DISTANCE: 3 meters  
☐ NARROWBAND EMISSION LIMIT: - 50 dBm  
☐ WIDEBAND EMISSION LIMIT: - 40 dBm/MHz

FREQUENCY (MHz)	EMISSION TYPE	Measured Level (dBm)	Ant. Gain (dBd)	Substitute Level (dBm)	C.L	Pol	ERP (dBm)	MARGIN (dB)
1581.0	WIDEBAND	-59.49	10.72	-60.49	3.32	V	-53.09	-13.09

**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.
4. Worst case is 25 resource block.

#### 7.6.4 RADIATED SPURIOUS EMISSIONS (1559 ~ 1610 MHz Band)

- OPERATING FREQUENCY : 782.00 MHz
- MODULATION SIGNAL: 16-QAM
- DISTANCE: 3 meters
- NARROWBAND EMISSION LIMIT: - 50 dBm
- WIDEBAND EMISSION LIMIT: - 40 dBm/MHz

FREQUENCY (MHz)	EMISSION TYPE	Measured Level (dBm)	Ant. Gain (dBd)	Substitute Level (dBm)	C.L	Pol	ERP (dBm)	MARGIN (dB)
1598.1	WIDEBAND	-59.49	10.72	-60.49	3.32	H	-53.09	-13.09

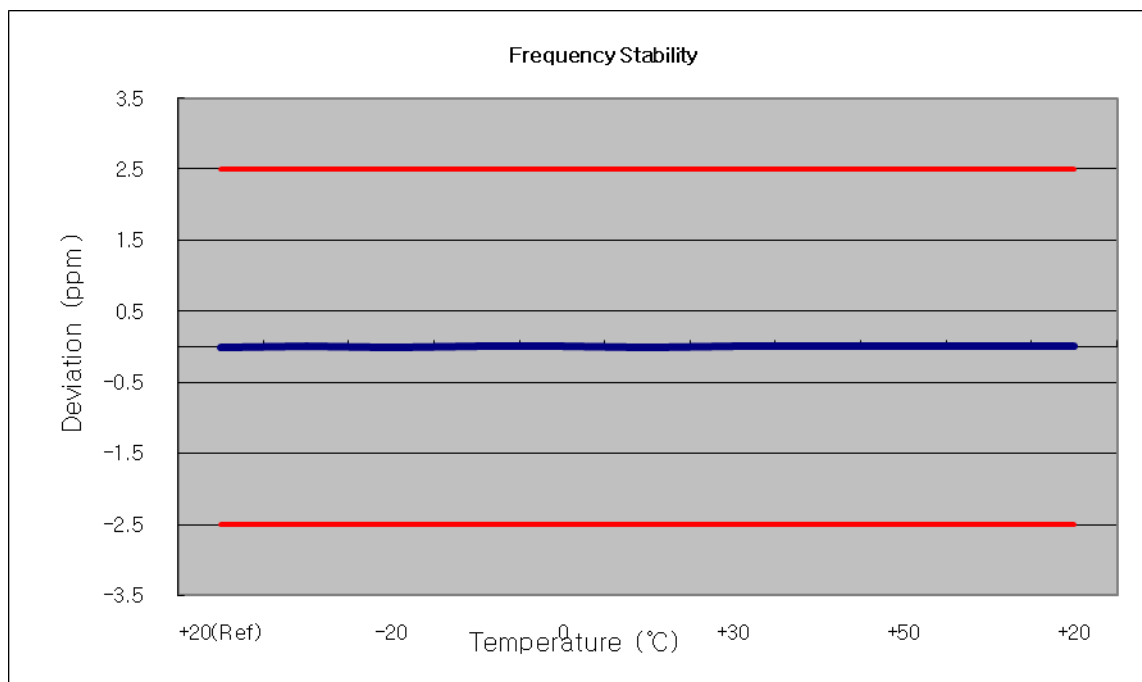
- NOTES:**
1. Radiated Spurious Emission Measurements at 3 meters by Substitution Method according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:
  2. The magnitude of spurious emissions attenuated more than 20dB below the limit above 5<sup>th</sup> Harmonic for all channel.
  3. we have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
  4. Worst case is 25 resource block.

## 7.7 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

### 7.7.1 FREQUENCY STABILITY (LTE)

OPERATING FREQUENCY: 782,000,000 Hz  
 CHANNEL: 23230  
 REFERENCE VOLTAGE: 5 VDC  
 DEVIATION LIM IT: ± 0.000 25 % or 2.5 ppm

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	3.700	+20(Ref)	781 999 994	0	0.000 000	0.000
100%		-30	782 000 001	1.42	0.000 000	0.002
100%		-20	781 999 994	-5.51	-0.000 001	-0.007
100%		-10	782 000 003	2.83	0.000 000	0.004
100%		0	782 000 006	6.11	0.000 001	0.008
100%		+10	781 999 999	-1.20	0.000 000	-0.002
100%		+30	782 000 001	1.21	0.000 000	0.002
100%		+40	782 000 002	2.12	0.000 000	0.003
100%		+50	782 000 005	4.96	0.000 001	0.006
115%	4.255	+20	782 000 006	6.29	0.000 001	0.008
Batt. Endpoint	3.400	+20	782 000 000	0.37	0.000 000	0.000



## 7.5 PEAK-TO-AVERAGE RATIO

- Plots of the EUT's Peak- to- Average Ratio are shown Page 27,

Band	Channel	Frequency(MHz)	Bandwidth	Modulation	P A R
LTE	23230	782	10 MHz	QPSK	5.72
				16-QAM	6.37



## 8. TEST PLOTS

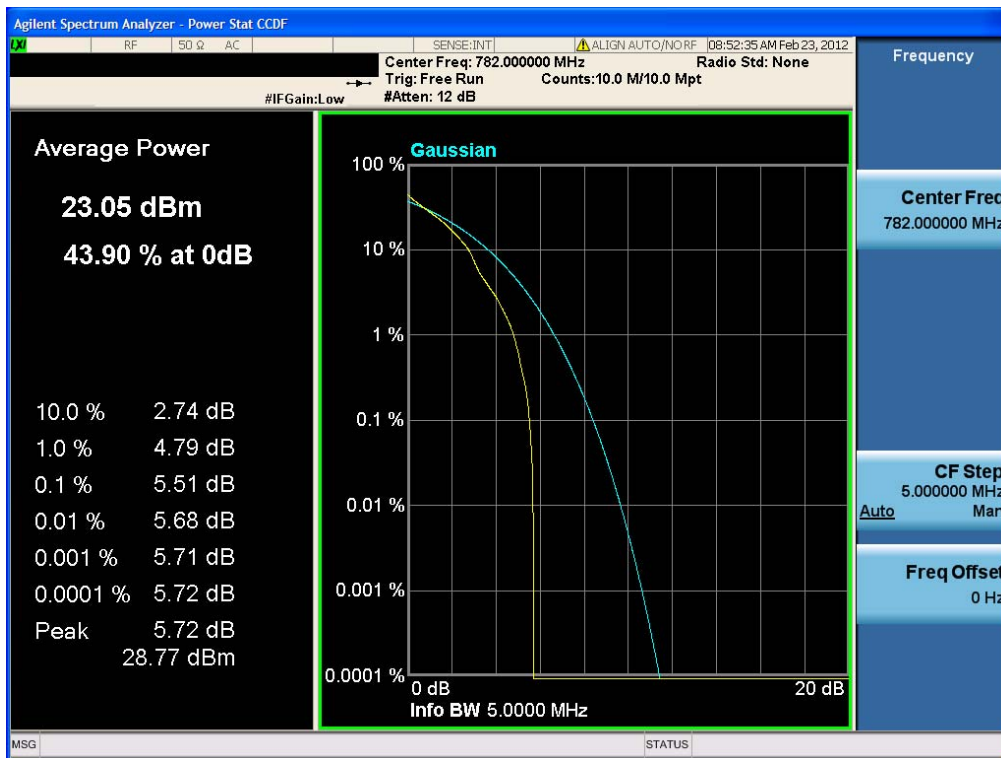
### ■ Occupied Bandwidth (QPSK – RB Size 50)



### ■ Occupied Bandwidth (16-QAM – RB Size 50)



■ Peak-Average Ratio Plot ( QPSK )



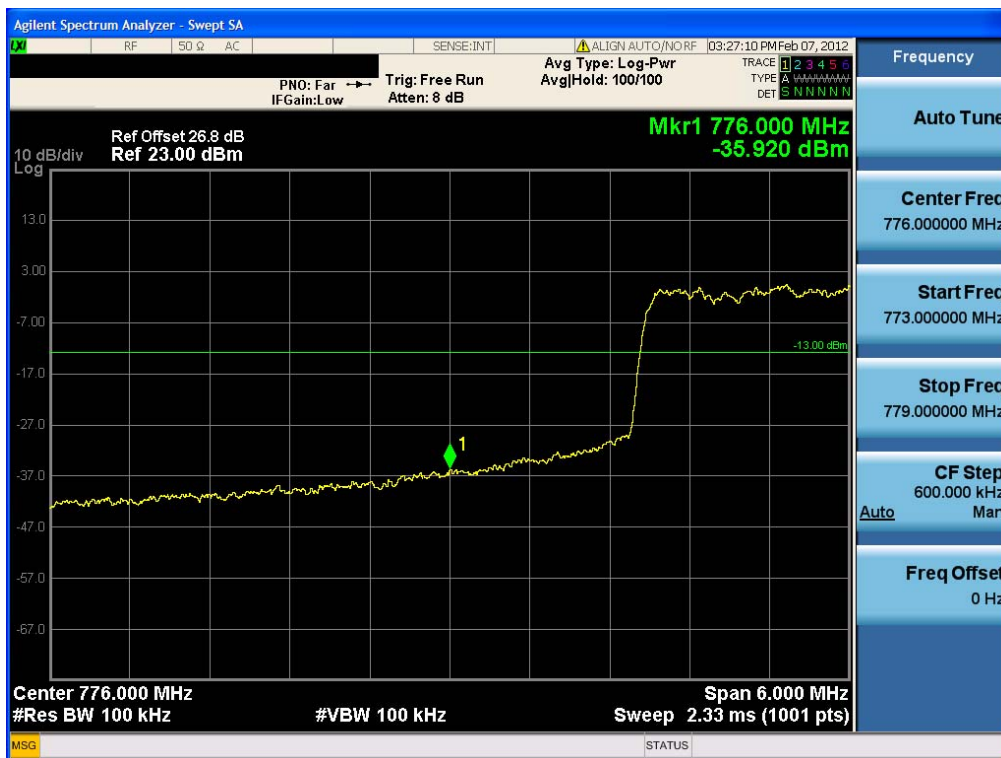
■ Peak-Average Ratio Plot ( 16-QAM )



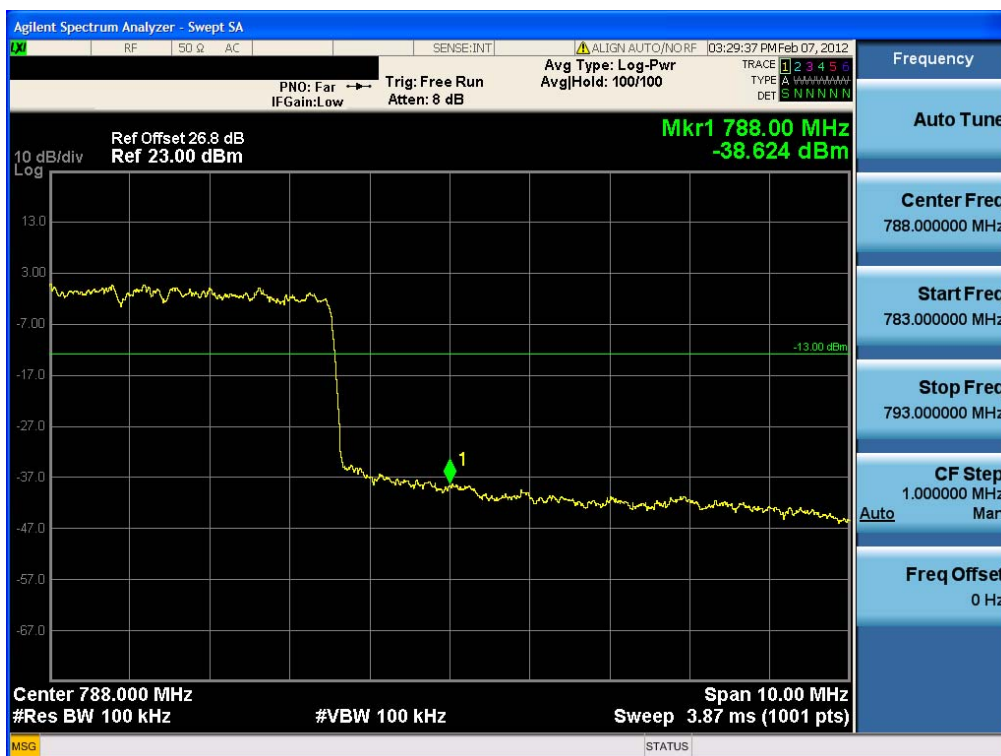
FCC CERTIFICATION REPORT

Test Report No. HCTR1203FR10	Date of Issue: March 07, 2012	EUT Type: Portable Router	<a href="http://www.hct.co.kr">www.hct.co.kr</a> FCC ID: CO3BPL-R100
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■ Low Band Edge (QPSK – RB Size 50)



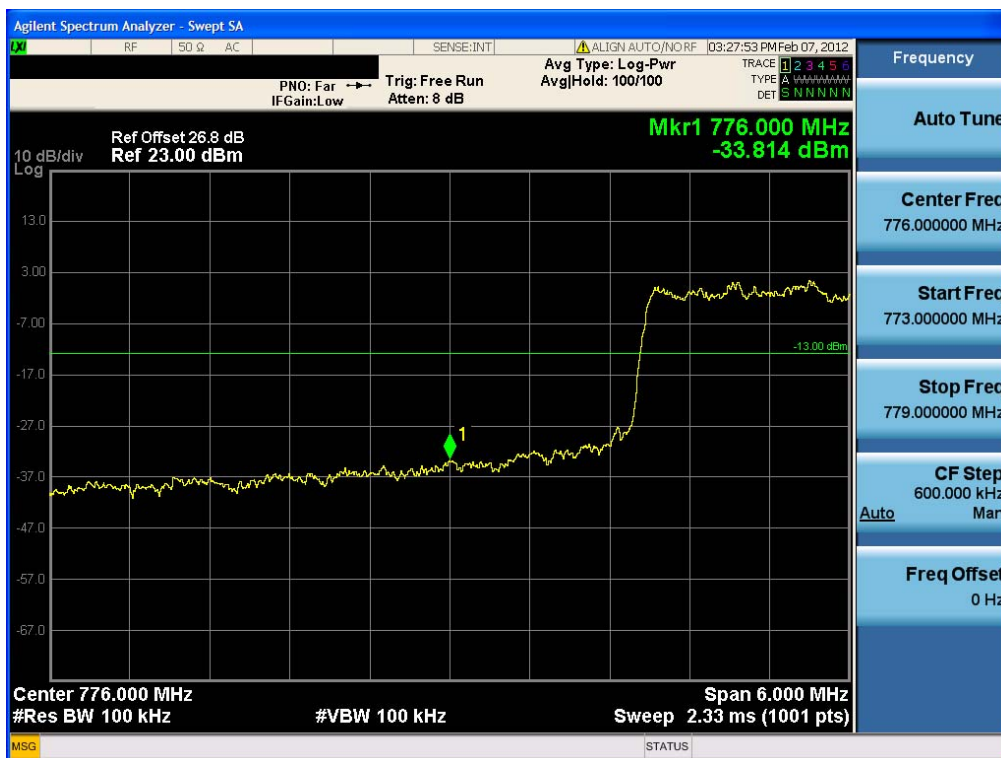
■ Upper Band Edge (QPSK – RB Size 50)



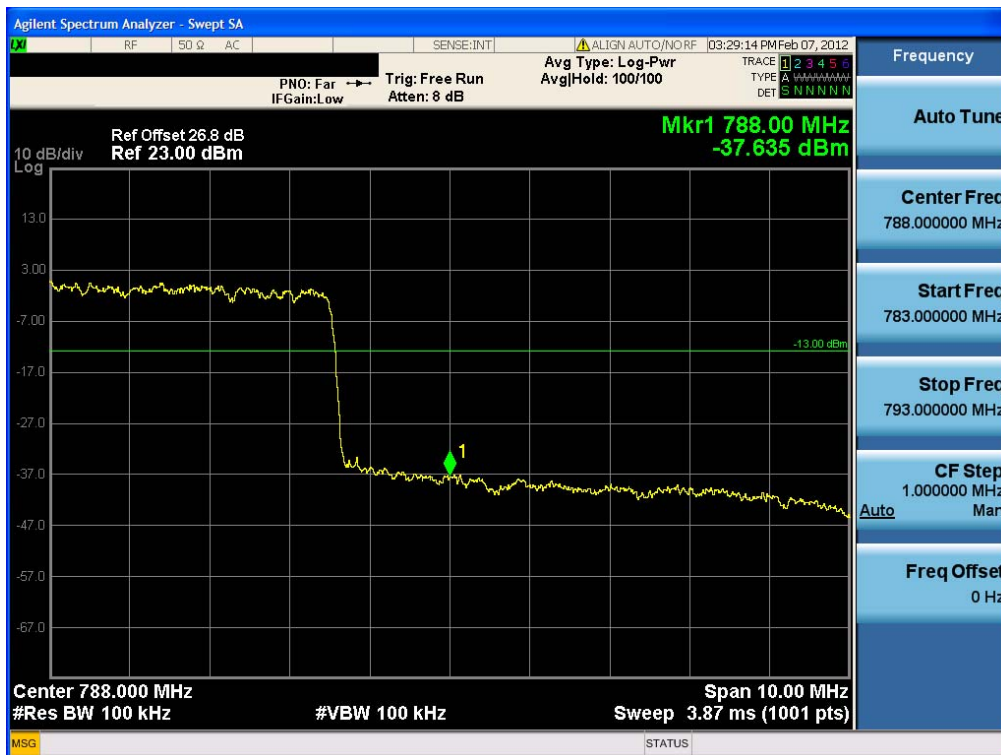
FCC CERTIFICATION REPORT

Test Report No. HCTR1203FR10	Date of Issue: March 07, 2012	EUT Type: Portable Router	<a href="http://www.hct.co.kr">www.hct.co.kr</a> FCC ID: CO3BPL-R100
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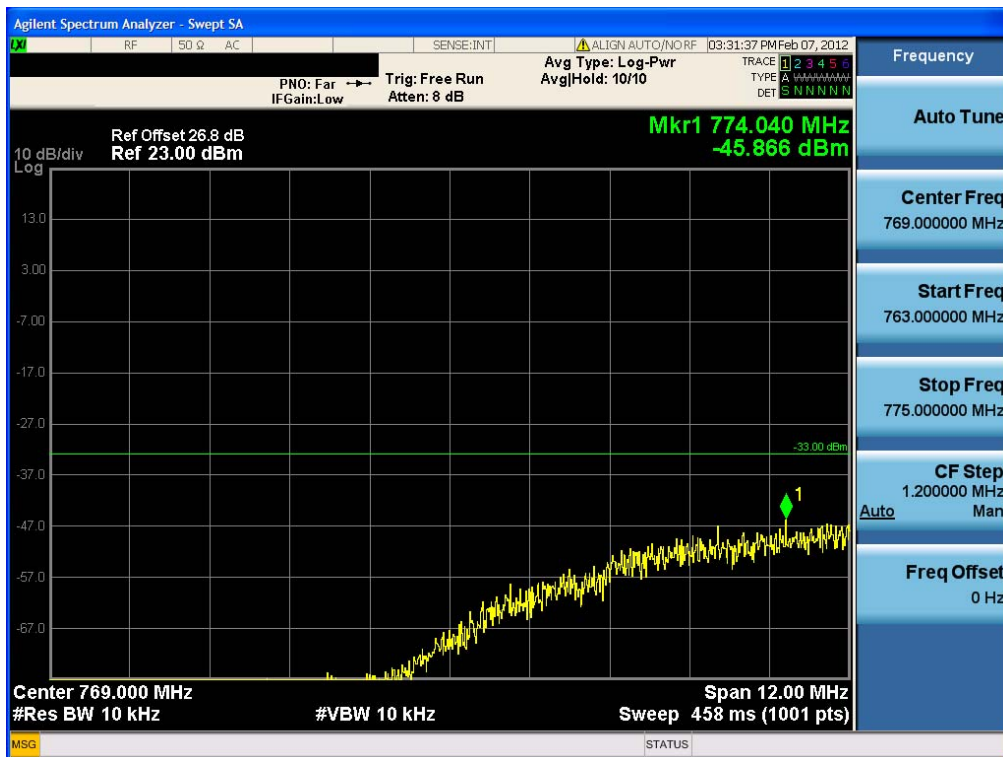
■ Low Band Edge (16-QAM – RB Size 50)



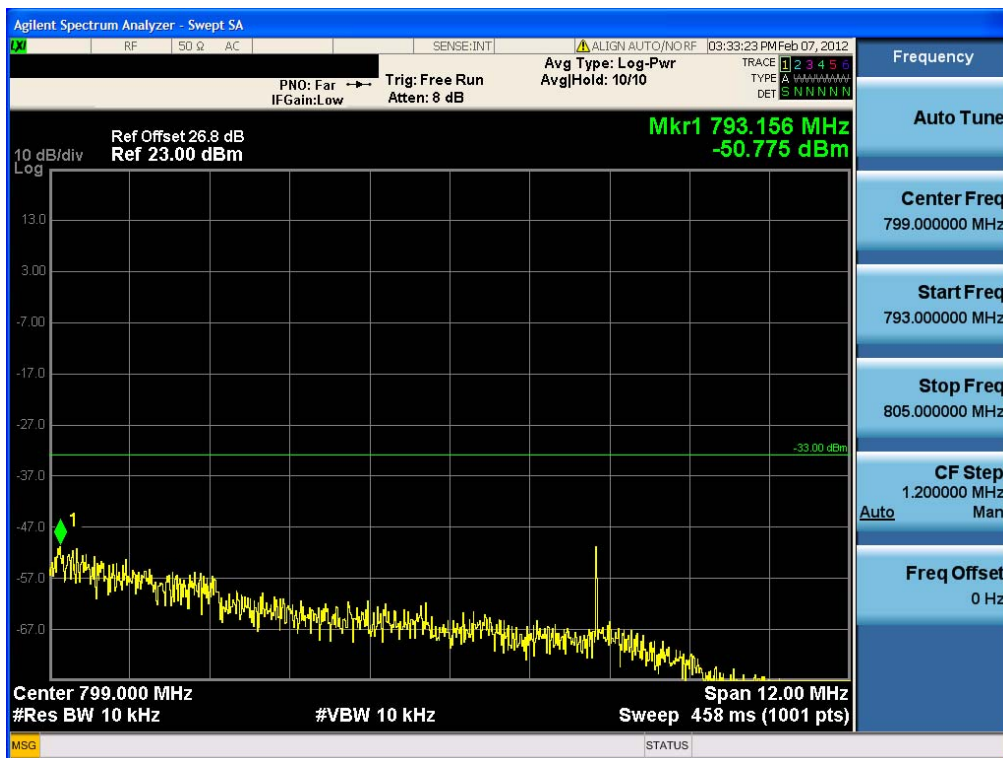
■ Upper Band Edge (16-QAM – RB Size 50)



■ Low Emission Mask (763 MHz – 775 MHz) QPSK –RB Size 50

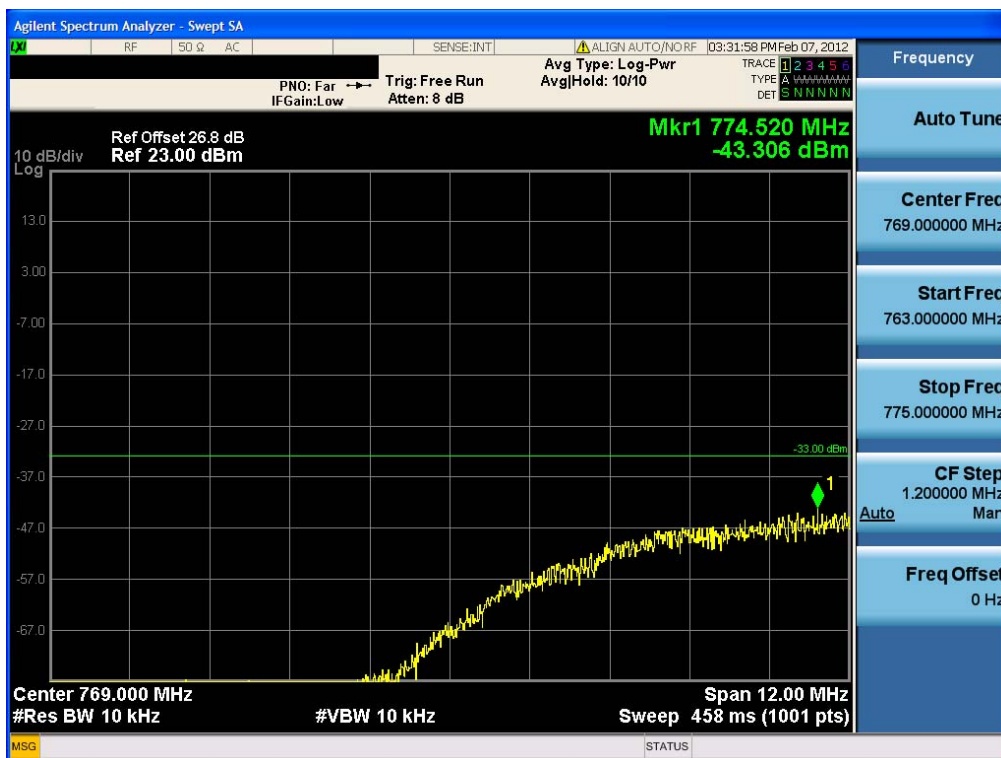


■ Upper Emission Mask (793 MHz – 805 MHz) QPSK –RB Size 50





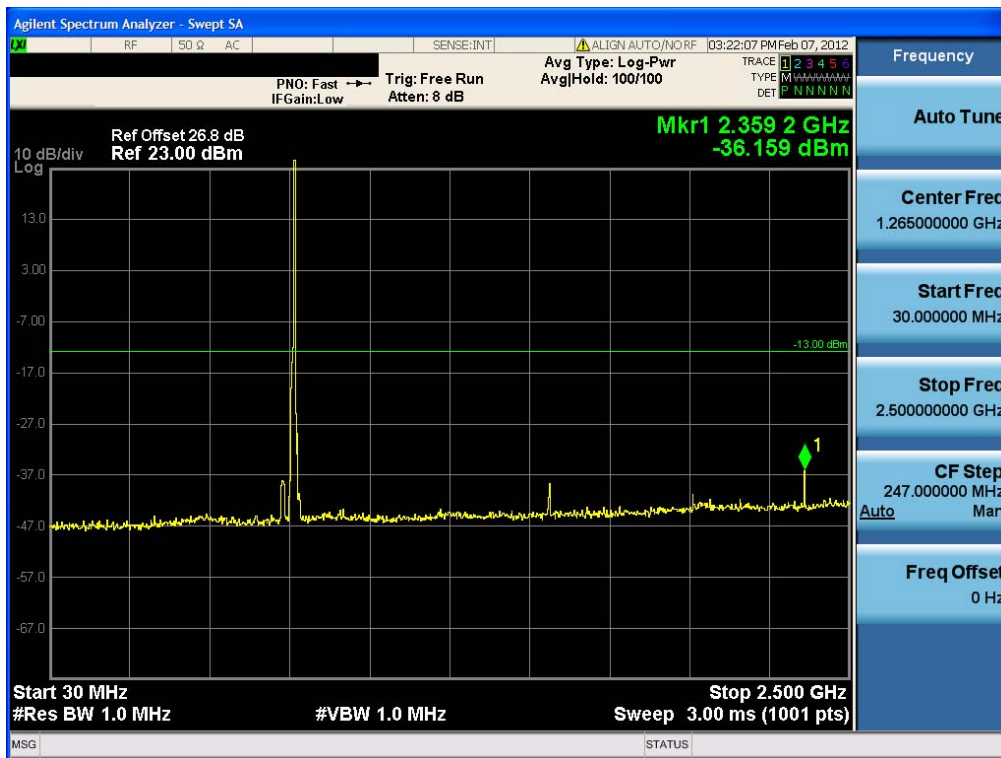
■ Low Emission Mask (763 MHz – 775 MHz) 16-QAM –RB Size 50



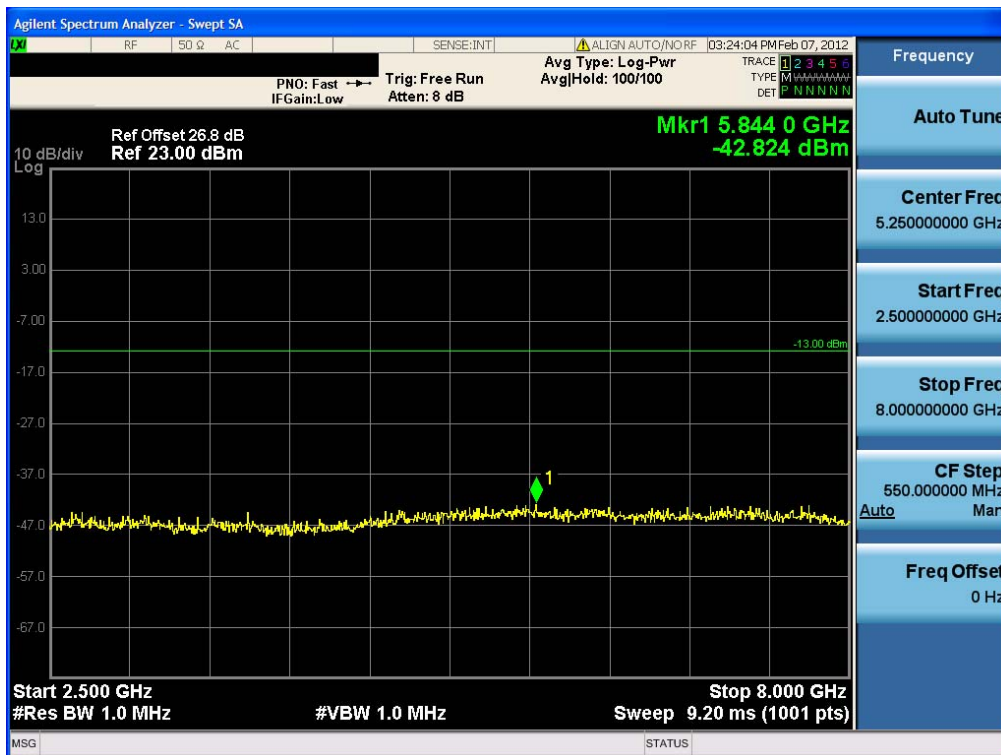
■ Upper Emission Mask (793 MHz – 805 MHz) 16-QAM –RB Size 50



■ Conducted Spurious Emission (QPSK – RB Size 1, RB Offset 49)-1

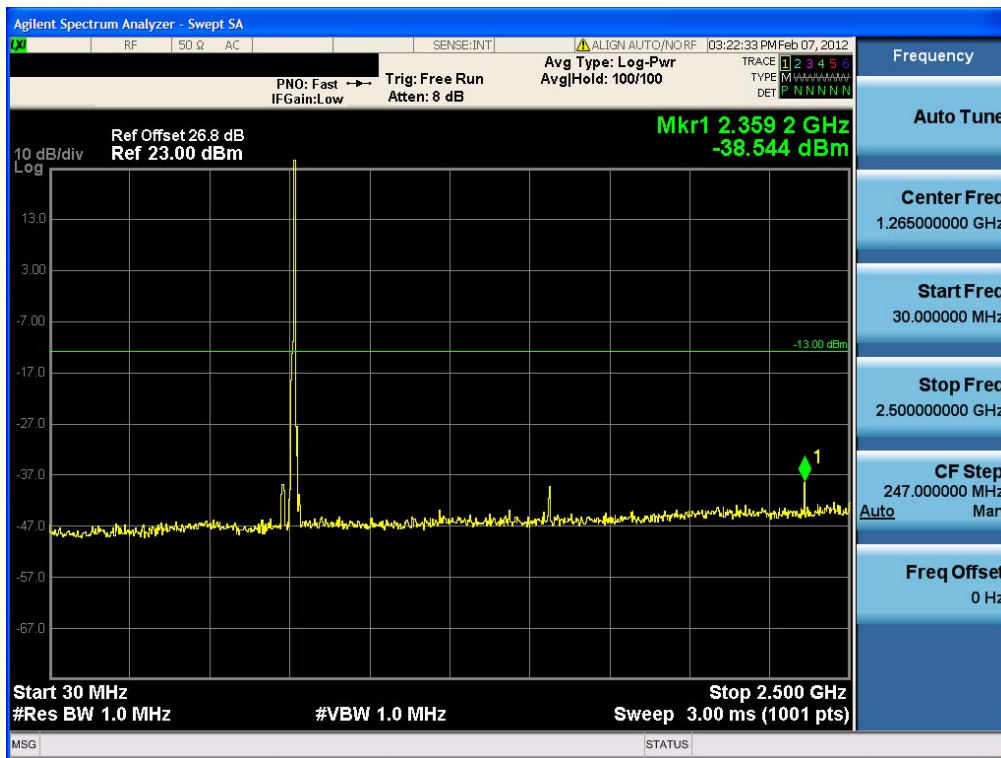


■ Conducted Spurious Emission (QPSK – RB Size 1, RB Offset 49)-2





■ Conducted Spurious Emission (16-QAM – RB Size 1, RB Offset 49)-1



■ Conducted Spurious Emission (16-QAM – RB Size 1, RB Offset 49)-2

