

HCT CO., LTD.**CERTIFICATE OF COMPLIANCE**
FCC Class I Permissive Change**Applicant Name:**
LG Electronics MobileComm U.S.A., Inc.**Date of Issue:**

February 15, 2012

Address:
10101 Old Grove Road, San Diego, CA 92131**Location:**
HCT CO., LTD., 105-1, Jangam-ri, Majang-Myeon, Icheon-si, Kyunggi-Do, Korea**Test Report No.:** HCTR1202FR09**HCT FRN:** 0005866421**FCC ID:** **ZNFVS840****APPLICANT:** **LG Electronics MobileComm U.S.A., Inc.****FCC Model(s):** VS840**Additional FCC Model(s):** LG-VS840, LGVS840**EUT Type:** Cellular/PCS CDMA and LTE Phone with Bluetooth & WLAN**FCC Classification:** Licensed Portable Transmitter Held to Ear (PCE)**FCC Rule Part(s):** §2, §27**Tx Frequency:** 782 MHz (LTE – Band 13)**Max. RF Output Power:**
Normal Battery Cover
0.137W (21.36 dBm) ERP (QPSK)
0.129W (21.10 dBm) ERP (16-QAM)
Wireless Charger Cover
0.137W (21.36 dBm) ERP (QPSK)
0.125W (20.97 dBm) ERP (16-QAM)**Emission Designator(s):** 8M94G7D (QPSK) / 8M94W7D (16-QAM)

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)

Hyo Sun Kwak
Report prepared by
: Hyo Sun Kwak
Test engineer of RF Team

Sang Jun Lee
Approved by
: Sang Jun Lee
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 Class I Permissive Change REPORT			
Test Report No. HCTR1202FR09	Date of Issue: February 15, 2012	EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth & WLAN	FCC ID: ZNFVS840



Version

TEST REPORT NO.	DATE	DESCRIPTION
HCTR1202FR09	February 15, 2012	First Approval Report

FCC Class I Permissive Change REPORT			www.hct.co.kr
Test Report No. HCTR1202FR09	Date of Issue: February 15, 2012	EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth & WLAN	FCC ID: ZNFVS840

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 EFFECTIVE RADIATED POWER/EQUIVALENT ISOTROPIC RADIATED POWER.....	6
3.2 OCCUPIED BANDWIDTH.....	7
3.3 BLOCK FREQUENCY RANGE	8
3.4 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL.....	9
3.5 RADIATED SPURIOUS AND HARMONIC EMISSIONS	10
3.6 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE.....	11
4. LIST OF TEST EQUIPMENT	12
5. SUMMARY OF TEST RESULTS	13
6. SAMPLE CALCULATION.....	14
7. TEST DATA	15
7.1 CONDUCTED OUTPUT POWER.....	15
7.2 OCCUPIED BANDWIDTH	16
7.3 CONDUCTED SPURIOUS EMISSIONS	17
7.3.1 BAND EDGE.....	17
7.4 EFFECTIVE RADIATED POWER OUTPUT	18
7.5 RADIATED SPURIOUS EMISSIONS	19
7.5.1 RADIATED SPURIOUS EMISSIONS.....	19
7.5.2 RADIATED SPURIOUS EMISSIONS (1559 ~ 1610 MHz Band)	20
7.6 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE	21
7.6.1 FREQUENCY STABILITY (LTE).....	21
7.7 PEAK-TO-AVERAGE RATIO	22
8. TEST PLOTS.....	23

FCC Class I Permissive Change REPORT				www.hct.co.kr
Test Report No. HCTR1202FR09	Date of Issue: February 15, 2012	EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth & WLAN		FCC ID: ZNFVS840



MEASUREMENT REPORT

1. GENERAL INFORMATION

Applicant Name: LG Electronics MobileComm U.S.A., Inc.

Address: 10101 Old Grove Road, San Diego, CA 92131

FCC ID: ZNFVS840

Application Type: FCC Class I Permissive Change

FCC Classification: Licensed Portable Transmitter Held to Ear (PCE)

FCC Rule Part(s): §2 , §27

EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth & WLAN

FCC Model(s): VS840

Additional FCC Model(s): LG-VS840, LGVS840

Tx Frequency: 782 MHz (LTE – Band 13)

Max. RF Output Power:
Normal Battery Cover
0.137W (21.36 dBm) ERP (QPSK)
0.129W (21.10 dBm) ERP (16-QAM)
Wireless Charger Cover
0.137W (21.36 dBm) ERP (QPSK)
0.125W (20.97 dBm) ERP (16-QAM)

Emission Designator(s): 8M94G7D (QPSK) / 8M94W7D (16-QAM)

Antenna Specification Manufacturer: LS Mtron Co. Ltd.

Antenna type: INENNA Antenna

Peak Gain: -3.30 dBi

Date(s) of Tests: January 25, 2012 ~ February 10, 2012

FCC Class I Permissive Change REPORT			www.hct.co.kr
Test Report No. HCTR1202FR09	Date of Issue: February 15, 2012	EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth & WLAN	FCC ID: ZNFVS840



2. INTRODUCTION

2.1. EUT DESCRIPTION

The VS840 Cellular/PCS CDMA and LTE Phone with Bluetooth & WLAN consists of Cellular CDMA, PCS CDMA, 1xRTT and EVDO Rev0, 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

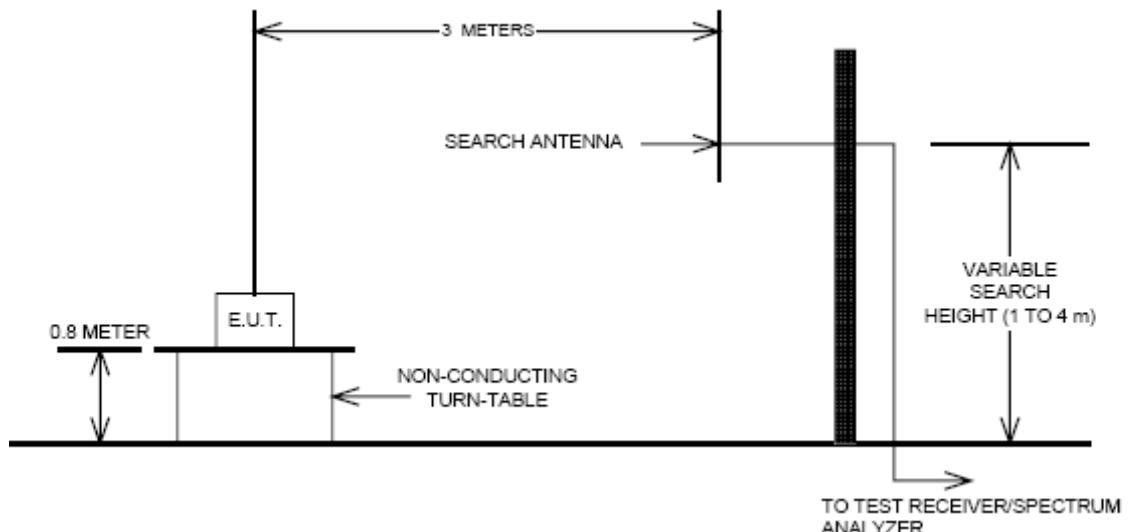
The SAC(Semi-Anechoic Chamber) and conducted measurement facility used to collect the radiated data are located at the 105-1, Jangam-ri, Majang-Myeon, Icheon-si, Kyunggi-Do, 467-811, Korea. The site is constructed in conformance with the requirements of ANSI C63.4 and CISPR Publication 22. Detailed description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

FCC Class I Permissive Change REPORT				www.hct.co.kr
Test Report No. HCTR1202FR09	Date of Issue: February 15, 2012	EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth & WLAN		FCC ID: ZNFVS840

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 SAC(Semi-Anechoic Chamber)

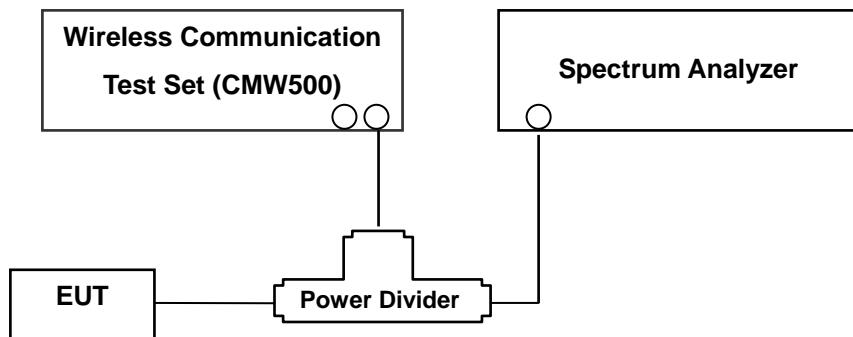
The equipment under test is placed on a non-conductive styrofoam resin table 3-meters from the receive antenna. A styrofoam turntable was rotated 360° and the receiving antenna scanned from 1-4m in order to capture the maximum emission. A half wave dipole was substituted in place of the EUT. This dipole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

FCC Class I Permissive Change REPORT				www.hct.co.kr
Test Report No. HCTR1202FR09	Date of Issue: February 15, 2012	EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth & WLAN		FCC ID: ZNFVS840

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.

FCC Class I Permissive Change REPORT				www.hct.co.kr
Test Report No. HCTR1202FR09	Date of Issue: February 15, 2012	EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth & WLAN		FCC ID: ZNFVS840



3.3 BLOCK FREQUENCY RANGE

Two paired channels of 11 megahertz each are available for assignment in Block C in the 746–757 MHz and 776 – 787 MHz bands. In the event that no licenses for two channels in this Block C are assigned based on the results of the first auction in which such licenses were offered because the auction results do not satisfy the applicable reserve price, the spectrum in the 746 – 757 MHz and 776 – 787 MHz bands will instead be made available for assignment at a subsequent auction as follows:

- (i) Two paired channels of 6 megahertz each available for assignment in Block C1 in the 746–752 MHz and 776–782 MHz bands.
- (ii) Two paired channels of 5 megahertz each available for assignment in Block C2 in the 752–757 MHz and 782–787 MHz bands

FCC Class I Permissive Change REPORT			www.hct.co.kr
Test Report No. HCTR1202FR09	Date of Issue: February 15, 2012	EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth & WLAN	FCC ID: ZNFVS840



3.4 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.

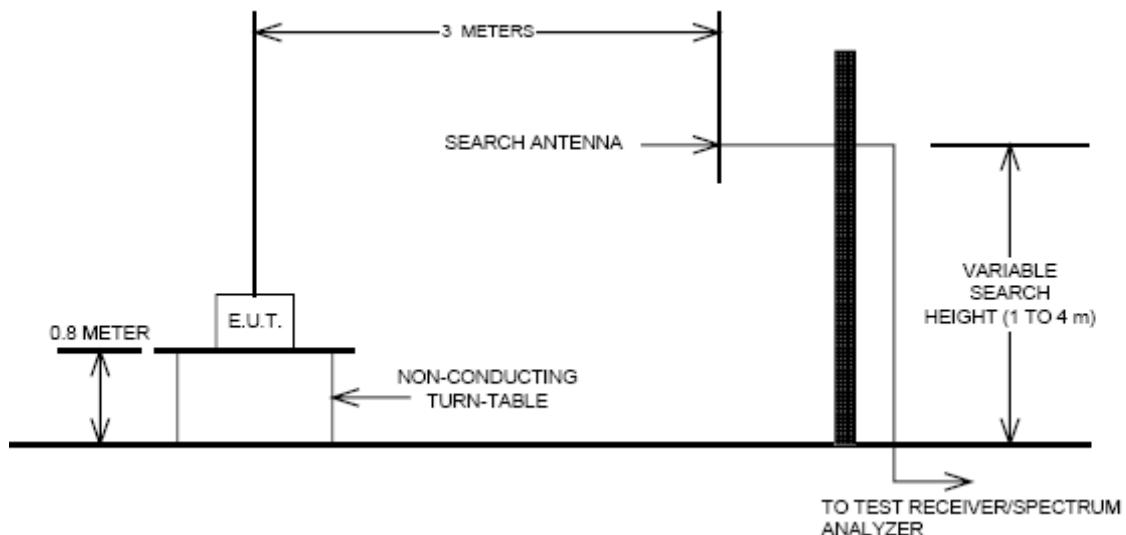
The EUT was setup to maximum output power at its lowest channel. The Resolution BW of the analyzer is set to 1 % of the emission bandwidth to show compliance with the – 13 dBm limit, in the 1 MHz bands immediately outside and adjacent to the edge of the frequency block. The 1 MHz RBW was used to scan 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.

FCC Class I Permissive Change REPORT			www.hct.co.kr
Test Report No. HCTR1202FR09	Date of Issue: February 15, 2012	EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth & WLAN	FCC ID: ZNFVS840

3.5 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 SAC(Semi-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 styrofoam platform mounted at three from the antenna mast.

- 1) The unit mounted on a styrofoam turntable $1.5 \text{ m} \times 1.0 \text{ m} \times 0.80 \text{ m}$ 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 10th harmonic of the fundamental frequency.

Test Procedure

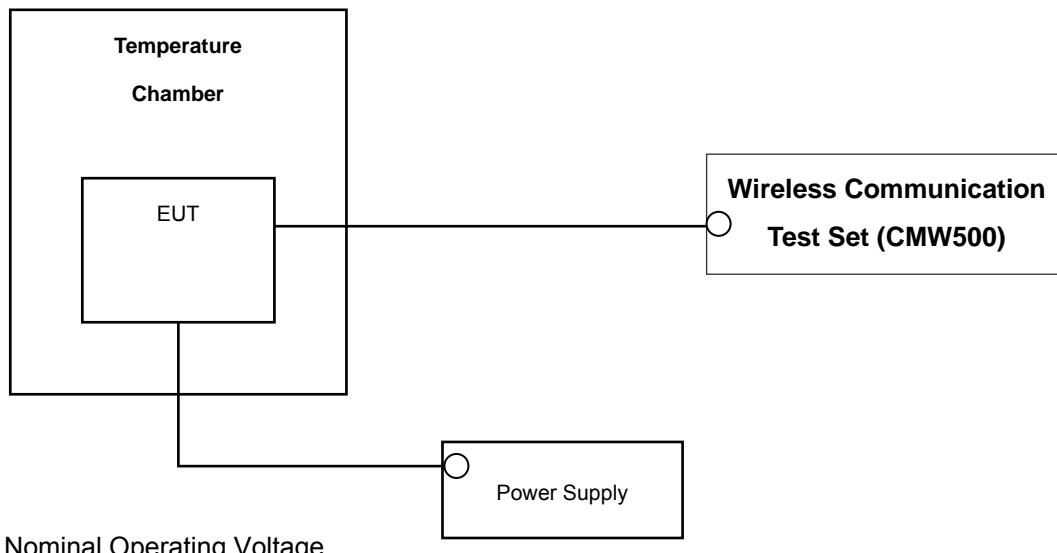
The equipment under test is placed on a non-conductive styrofoam resin table 3-meters from the receive antenna. A styrofoam turntable was rotated 360° and the receiving antenna scanned from 1-4m in order to capture the maximum emission. A half wave dipole was substituted in place of the EUT. This dipole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

FCC Class I Permissive Change REPORT				www.hct.co.kr
Test Report No. HCTR1202FR09	Date of Issue: February 15, 2012	EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth & WLAN		FCC ID: ZNFVS840

3.6 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

Test Set-up



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 $\pm 0.000\ 25\% (\pm 2.5\ ppm)$ 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.

FCC Class I Permissive Change REPORT			www.hct.co.kr
Test Report No. HCTR1202FR09	Date of Issue: February 15, 2012	EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth & WLAN	FCC ID: ZNFVS840

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	01/04/2012
Schwarzbeck	UHAP/ Dipole Antenna	949	Biennial	03/18/2012
Schwarzbeck	UHAP/ Dipole Antenna	950	Biennial	03/18/2012
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
WEINSCHEL	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

FCC Class I Permissive Change REPORT			www.hct.co.kr
Test Report No. HCTR1202FR09	Date of Issue: February 15, 2012	EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth & WLAN	FCC ID: ZNFVS840

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[Watts]) < 65 + 10 log ₁₀ (P[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 ppm		PASS
27.50(b)(10)	Effective Radiated Power	< 3 Watts max. ERP	RADIATED	PASS
2.1053, 27.53(c)(2) 27.53(c)(4)	Undesirable Out-of-Band Emissions	< 43 +10 log ₁₀ (P[Watts]) for all out-of-band emissions		PASS
2.1053, 27.53(f)	Undesirable Emissions in the 1559 – 1610 MHz band	< -40dBm/MHz EIRP (wideband) < -50dBm EIRP (narrowband)		PASS

FCC Class I Permissive Change REPORT			www.hct.co.kr
Test Report No. HCTR1202FR09	Date of Issue: February 15, 2012	EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth & WLAN	FCC ID: ZNFVS840

6. SAMPLE CALCULATION

A. ERP Sample Calculation

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

ERP = SubstituteLEVEL(dBm) + Ant. Gain – 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

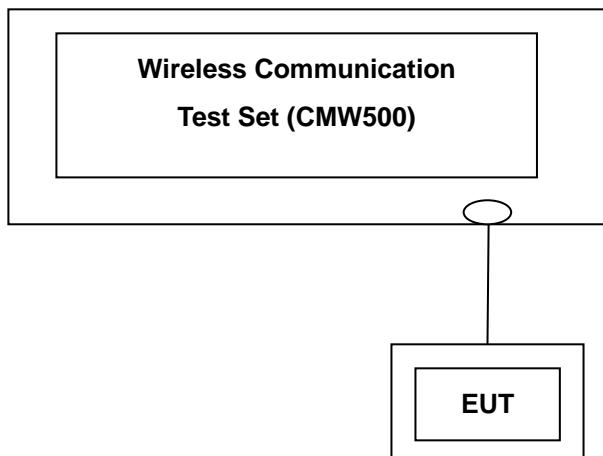
W = Combination (Audio/Data)

FCC Class I Permissive Change REPORT				www.hct.co.kr
Test Report No.	Date of Issue:	EUT Type:		
HCTR1202FR09	February 15, 2012	Cellular/PCS CDMA and LTE Phone with Bluetooth & WLAN		FCC ID: ZNFVS840

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	23.06	21.82
			1	49	22.99	21.89
			25	12	21.93	21.02
			50	0	21.89	21.00

(LTE Conducted Average Output Powers)

Note : Detecting mode is average.

7.2 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	-	8.9392
	782	16-QAM	1	0	-
	782		1	49	-
	782		25	12	-
	782		50	-	8.9367

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

FCC Class I Permissive Change REPORT				www.hct.co.kr
Test Report No. HCTR1202FR09	Date of Issue: February 15, 2012	EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth & WLAN		FCC ID: ZNFVS840

7.3 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	-31.422
	782		25	12	-	-
	782		50	-	-	-
	782	16-QAM	1	0	-	-
	782		1	49	2.3592	-33.773
	782		25	12	-	-
	782		50	-	-	-

- Plots of the EUT's Conducted Spurious Emissions are shown Page 30 ~ 31.

7.3.1 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 26 ~ 29.

FCC Class I Permissive Change REPORT				www.hct.co.kr
Test Report No. HCTR1202FR09	Date of Issue: February 15, 2012	EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth & WLAN		FCC ID: ZNFVS840



7.4 EFFECTIVE RADIATED POWER OUTPUT

(10 MHz)_Normal Battery Cover

Ch / Freq		Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBd)	C.L	Pol	ERP	
channel	Freq (MHz)							W	dBm
23230	782.00	QPSK	-14.77	33.41	-10.52	1.53	V	0.137	21.36
		16-QAM	-15.03	33.15	-10.52	1.53	V	0.129	21.10

(10 MHz)_Wireless Charger Cover

Ch / Freq		Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBd)	C.L	Pol	ERP	
channel	Freq (MHz)							W	dBm
23230	782.00	QPSK	-14.77	33.41	-10.52	1.53	V	0.137	21.36
		16-QAM	-15.16	33.02	-10.52	1.53	V	0.125	20.97

Note: Worst case is 1 resource block. This unit was tested with a notebook computer.

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.

FCC Class I Permissive Change REPORT					www.hct.co.kr
Test Report No.	Date of Issue:	EUT Type:			FCC ID:
HCTR1202FR09	February 15, 2012	Cellular/PCS CDMA and LTE Phone with Bluetooth & WLAN			ZNFVS840



7.5 RADIATED SPURIOUS EMISSIONS

7.5.1 RADIATED SPURIOUS EMISSIONS

Normal Battery Cover

OPERATING FREQUENCY : 782.00 MHz

MEASURED OUTPUT POWER: 21.36 dBm = 0.137W

MODULATION SIGNAL: QPSK

DISTANCE: 3 meters

LIMIT: - (43 + 10 \log_{10} (W)) = - 34.36 dBc

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBd)	Substitution Level (dBm)	C.L	Pol	ERP (dBm)	dBc
23230 (782.00)	2346.00	-59.46	10.72	-60.46	3.32	V	-53.06	-74.42
	3128.00	-	-	-	-	-	-	-
	3910.00	-	-	-	-	-	-	-

Wireless Charger Cover

OPERATING FREQUENCY : 782.00 MHz

MEASURED OUTPUT POWER: 21.36 dBm = 0.137W

MODULATION SIGNAL: QPSK

DISTANCE: 3 meters

LIMIT: - (43 + 10 \log_{10} (W)) = - 34.36 dBc

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBd)	Substitution Level (dBm)	C.L	Pol	ERP (dBm)	dBc
23230 (782.00)	2346.00	-58.46	10.72	-59.46	3.32	H	-52.06	-73.42
	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 5th 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 1 resource block.

FCC Class I Permissive Change REPORT				www.hct.co.kr
Test Report No.	Date of Issue:	EUT Type:		
HCTR1202FR09	February 15, 2012	Cellular/PCS CDMA and LTE Phone with Bluetooth & WLAN		FCC ID: ZNFVS840



7.5.2 RADIATED SPURIOUS EMISSIONS (1559 ~ 1610 MHz Band)

Normal Battery Cover

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)	Substitution Level (dBm)	C.L	Pol	ERP (dBm)	MARGIN (dB)
1563.9	WIDEBAND	-59.48	8.95	-63.06	2.57	H	-56.68	-16.68

Wireless Charger Cover

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)	Substitution Level (dBm)	C.L	Pol	ERP (dBm)	MARGIN (dB)
2566.3	WIDEBAND	-59.62	8.95	-63.20	2.57	H	-56.82	-16.82

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 5th 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 1 resource block.

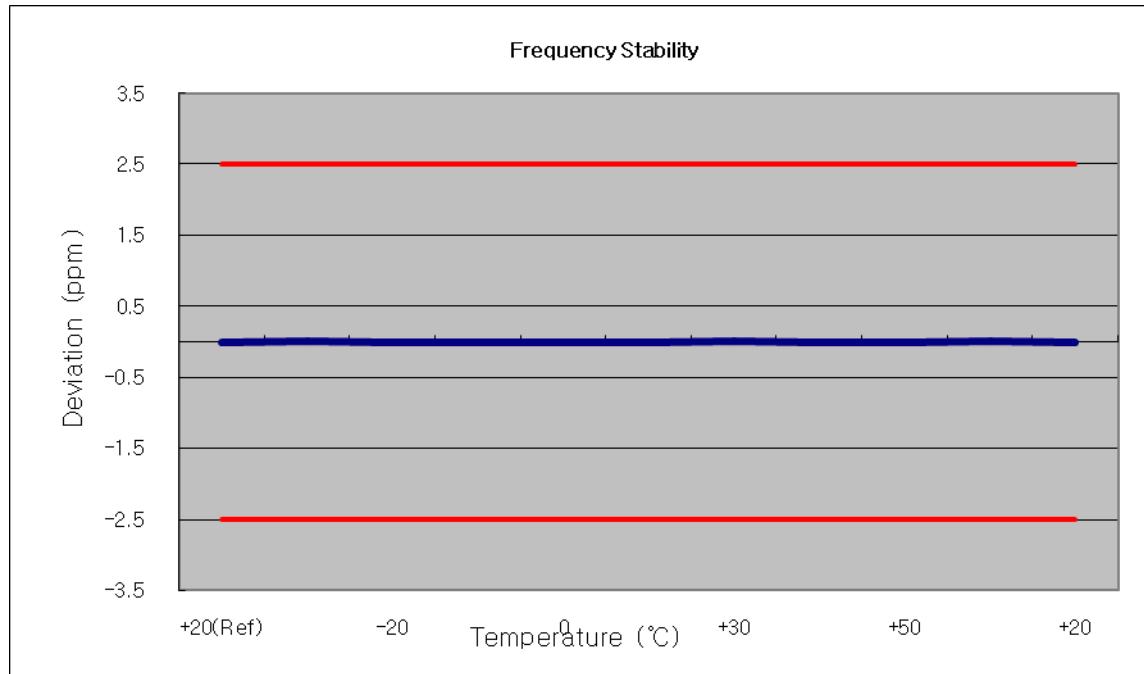
FCC Class I Permissive Change REPORT				www.hct.co.kr
Test Report No.	Date of Issue:	EUT Type:		
HCTR1202FR09	February 15, 2012	Cellular/PCS CDMA and LTE Phone with Bluetooth & WLAN		FCC ID: ZNFVS840

7.6 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

7.6.1 FREQUENCY STABILITY (LTE)

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

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	3.700	+20(Ref)	782 000 002	0	0.000 000	0.000
100%		-30	782 000 000	0.09	0.000 000	0.000
100%		-20	782 000 000	-0.49	0.000 000	-0.001
100%		-10	781 999 998	-1.54	0.000 000	-0.002
100%		0	781 999 998	-2.29	0.000 000	-0.003
100%		+10	781 999 999	-0.80	0.000 000	-0.001
100%		+30	782 000 001	0.62	0.000 000	0.001
100%		+40	781 999 998	-2.39	0.000 000	-0.003
100%		+50	781 999 996	-4.01	-0.000 001	-0.005
115%	4.255	+20	782 000 001	0.51	0.000 000	0.001
Batt. Endpoint	3.400	+20	781 999 998	-2.48	0.000 000	-0.003





7.7 PEAK-TO-AVERAGE RATIO

- Plots of the EUT's Peak- to- Average Ratio are shown Page 25.

Band	Channel	Frequency(MHz)	Bandwidth	Modulation	P A R
LTE BAND 13	23230	782	10 MHz	QPSK	4.74
				16-QAM	6.05

FCC Class I Permissive Change REPORT				www.hct.co.kr
Test Report No. HCTR1202FR09	Date of Issue: February 15, 2012	EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth & WLAN		FCC ID: ZNFVS840



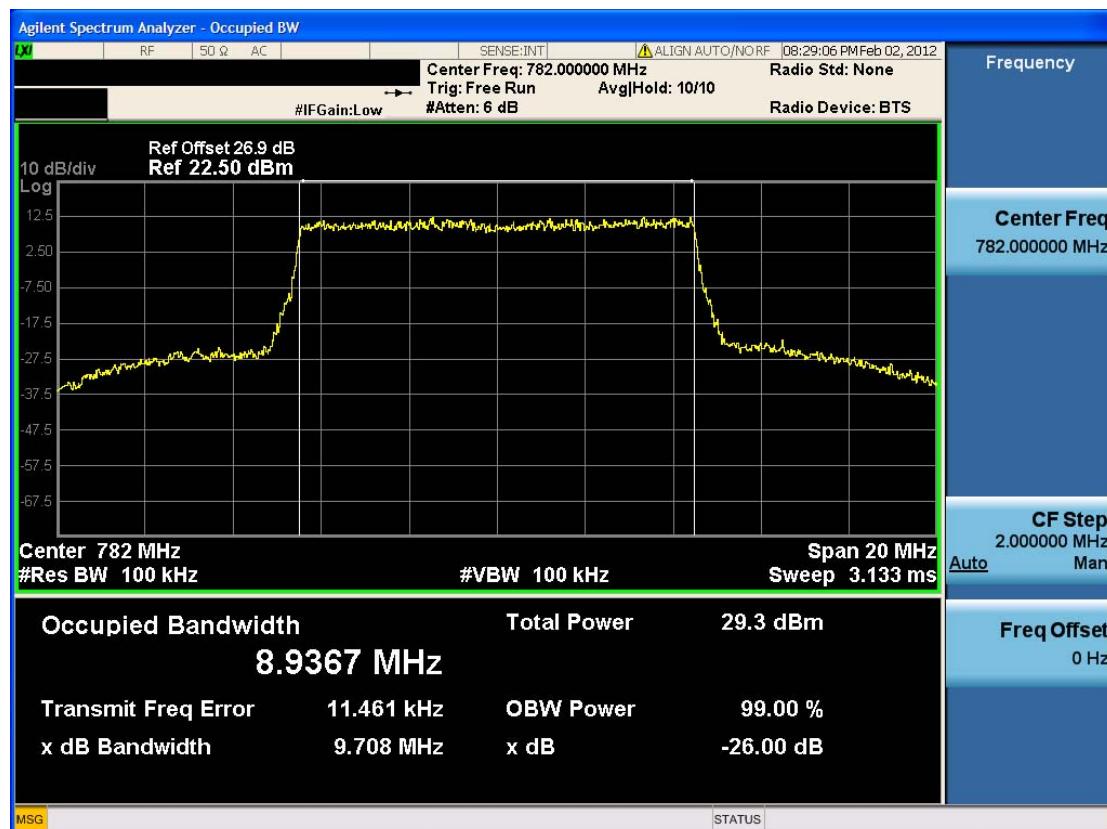
8. TEST PLOTS

FCC Class I Permissive Change REPORT				www.hct.co.kr
Test Report No. HCTR1202FR09	Date of Issue: February 15, 2012	EUT Type: Cellular/PCS CDMA and LTE Phone with Bluetooth & WLAN		FCC ID: ZNFVS840

■ Occupied Bandwidth (QPSK – RB Size 50)



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



■ Peak-Average Ratio Plot (QPSK)



■ Peak-Average Ratio Plot (16-QAM)



■ Low Band Edge (QPSK – RB Size 50)



■ Upper Band Edge (QPSK – RB Size 50)



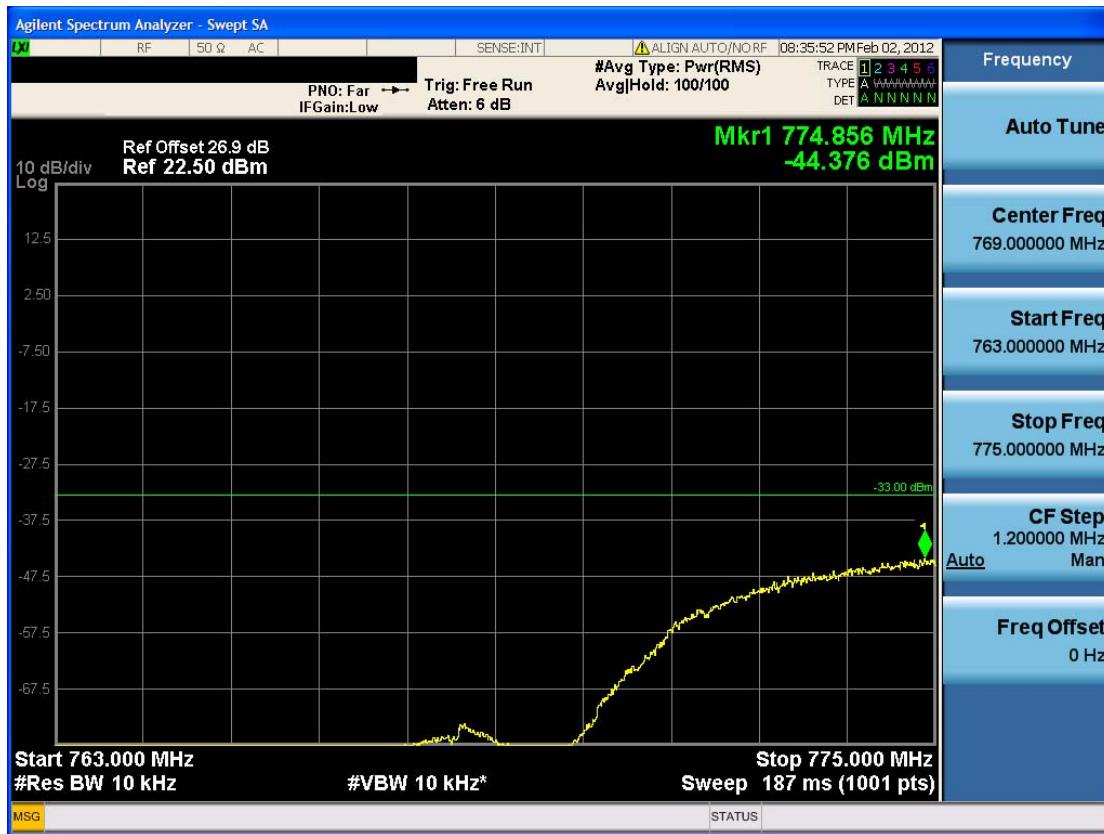
■ Low Band Edge (16-QAM – RB Size 50)



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



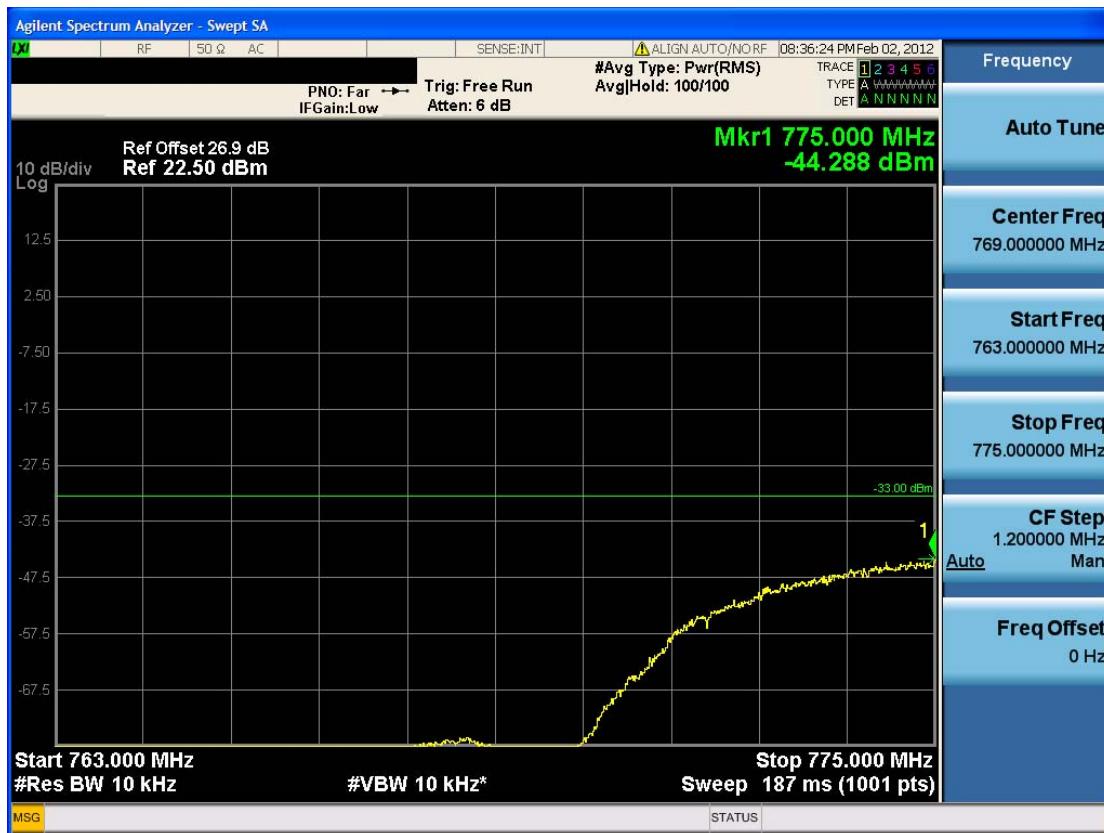
■ Low Emission Mask (763 MHz – 775 MHz) QPSK –RB Size 50



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



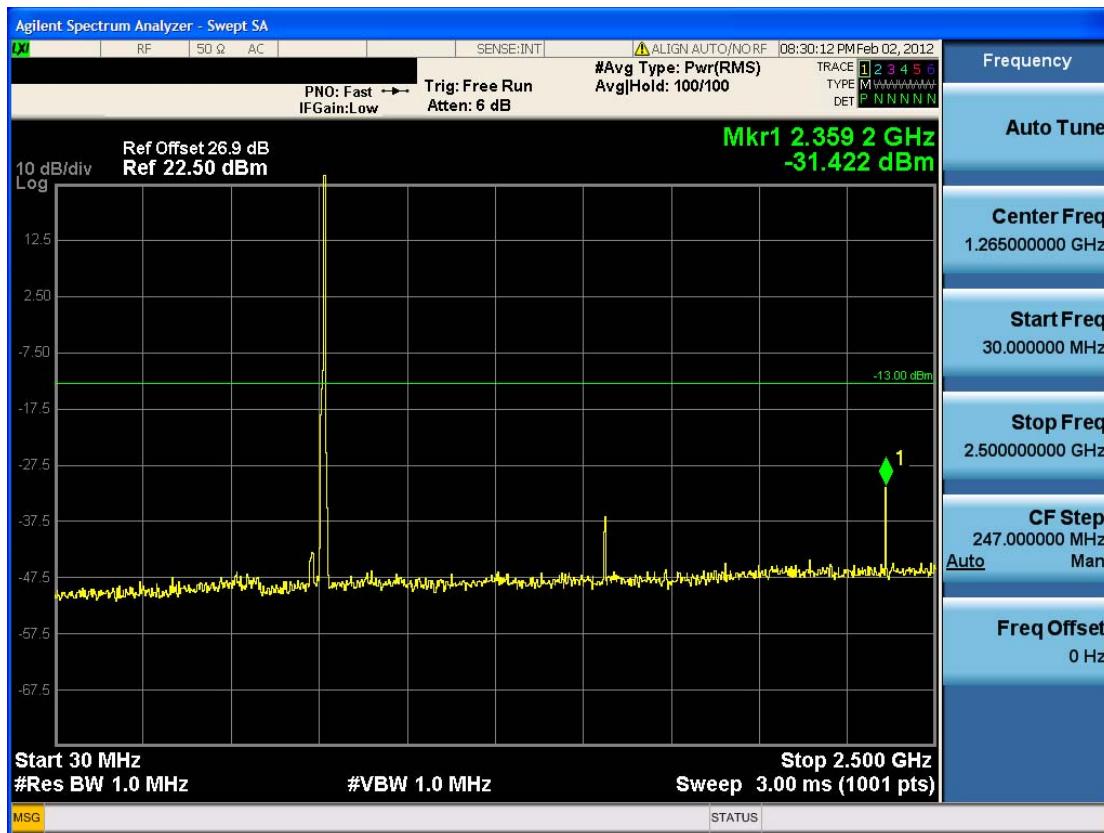
■ Low Emission Mask (763 MHz – 775 MHz) 16-QAM –RB Size 50



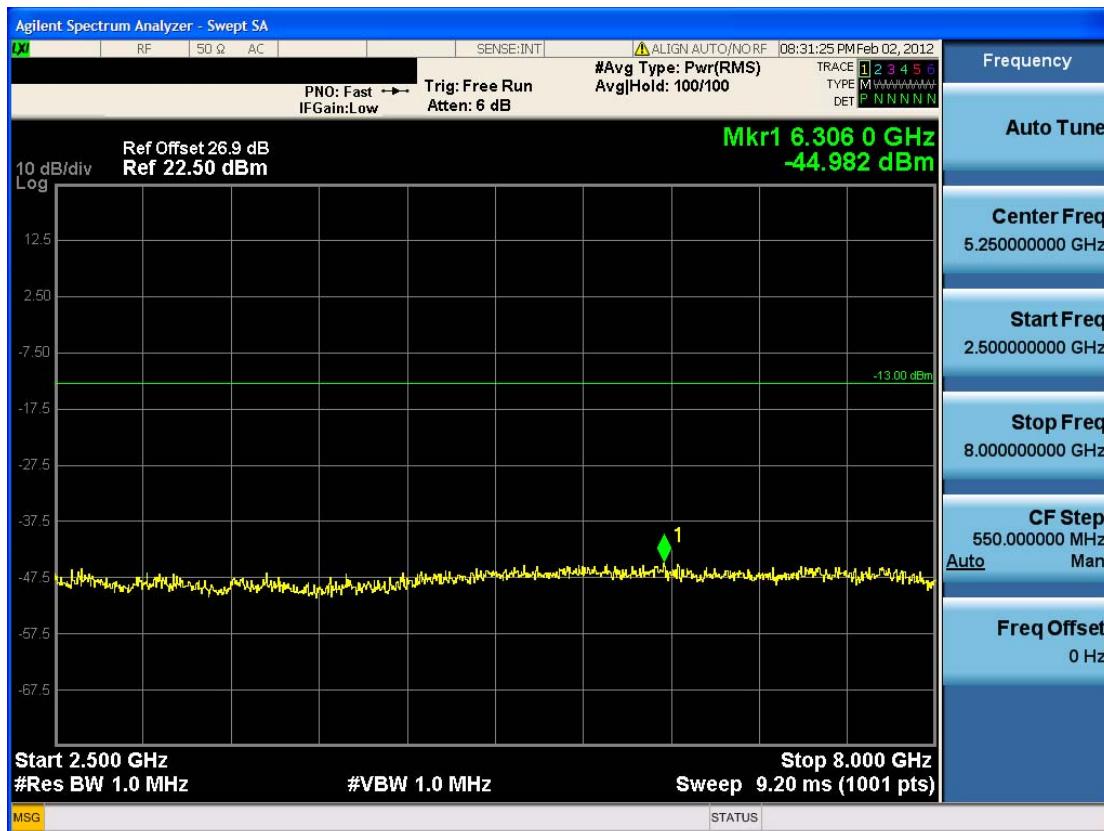
■ Upper Emission Mask (793 MHz – 805 MHz) 16-QAM –RB Size 50



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

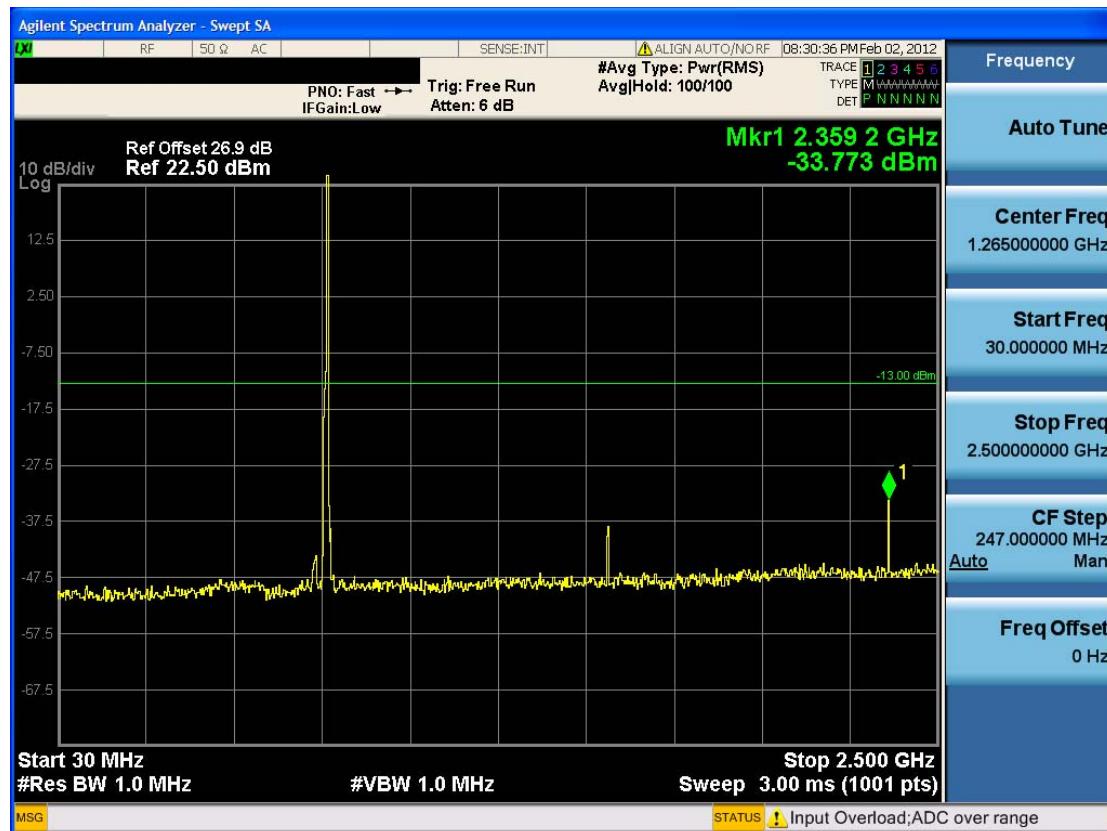


■ Conducted Spurious Emission (QPSK – RB Size 1, RB Offset 49)-2



FCC Class I Permissive Change REPORT				www.hct.co.kr
Test Report No.	Date of Issue:	EUT Type:		
HCTR1202FR09	February 15, 2012	Cellular/PCS CDMA and LTE Phone with Bluetooth & WLAN		FCC ID: ZNFFV840

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



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

