

HCT CO., LTD.

CERTIFICATE OF COMPLIANCE FCC Class II Permissive Change

Applicant Name: LG Electronics MobileComm U.S.A., Inc.	Date of Issue: March 06, 2013
Address: 1000 Sylvan Avenue, Englewood Cliffs NJ 07632	Test Site/Location: HCT CO., LTD., 105-1, Jangam-ri, Majang-Myeon, Icheon-si, Kyunggi-Do, Korea
	Report No.: HCTR1303FR11
	HCT FRN: 0005866421

FCC ID : ZNFUS780

APPLICANT : LG Electronics MobileComm U.S.A., Inc.

FCC Model(s): US780
Additional FCC Model(s): LG-US780, LGUS780, AS780, LGAS780, LG-AS780
EUT Type: AWS/Cellular/PCS CDMA Phone with AWS/Cellular/PCS LTE WLAN, Bluetooth and NFC
Frequency Range: 20 MHz BW
5180 MHz - 5240 MHz (UNII 1)/ 5260 MHz - 5320 MHz (UNII 2)/
5500 MHz - 5700 MHz (UNII 3)
40 MHz BW
5190 MHz - 5230 MHz (UNII 1)/ 5270 MHz - 5310 MHz (UNII 2)/
5510 MHz - 5670 MHz (UNII 3)

Modulation type OFDM

FCC Classification: Unlicensed National Information Infrastructure(UNII)

FCC Rule Part(s): Part 15.407

Engineering Statement:

The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. 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
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Approved by
: Chang Seok Choi
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Version

TEST REPORT NO.	DATE	DESCRIPTION
HCTR1303FR11	March 06, 2013	- First Approval Report

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1. GENERAL INFORMATION

Applicant: LG Electronics MobileComm U.S.A., Inc.
Address: 1000 Sylvan Avenue, Englewood Cliffs NJ 07632
FCC ID: ZNFUS780
EUT Type: AWS/Cellular/PCS CDMA Phone with AWS/Cellular/PCS LTE WLAN, Bluetooth and NFC
FCC Model(s): US780
Additional FCC Model(s): LG-US780, LGUS780, AS780, LGAS780, LG-AS780
Date(s) of Tests: January 13, 2013 ~ January 24, 2013
Place of Tests: HCT Co., Ltd.
 105-1, Jangam-ri , Majang-Myeon, Icheon-si, Kyunggi-Do, 467-811, KOREA.
 (IC Recognition No. : 5944A-3)

2. EUT DESCRIPTION

EUT Type	AWS/Cellular/PCS CDMA Phone with AWS/Cellular/PCS LTE WLAN, Bluetooth and NFC
FCC Model Name	US780
Additional FCC Model Name	LG-US780, LGUS780, AS780, LGAS780, LG-AS780
Power Supply	DC 3.8 V
Frequency Range	TX_20 MHz BW: 5180 MHz - 5240 MHz (UNII 1)/ 5260 MHz - 5320 MHz (UNII 2)/ 5500 MHz - 5700 MHz (UNII 3) where) Not supported 5600 MHz – 5640 MHz 40 MHz BW: 5190 MHz - 5230 MHz (UNII 1)/ 5270 MHz - 5310 MHz (UNII 2)/ 5510 MHz - 5670 MHz (UNII 3) where) Not supported 5600 MHz – 5640 MHz RX_20 MHz BW: 5180 MHz - 5240 MHz (UNII 1)/ 5260 MHz - 5320 MHz (UNII 2)/ 5500 MHz - 5700 MHz (UNII 3) where) Not supported 5600 MHz – 5640 MHz 40 MHz BW: 5190 MHz - 5230 MHz (UNII 1)/ 5270 MHz - 5310 MHz (UNII 2)/ 5510 MHz - 5670 MHz (UNII 3) where) Not supported 5600 MHz – 5640 MHz
Modulation Type	OFDM(802.11a, 802.11n_20 MHz, 802.11n_40 MHz)
Antenna Specification	Manufacturer: LS Mtron Co., Ltd. Antenna type: Internal Antenna Peak 3D Gain : 0.69 dBi

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3. TEST METHODOLOGY

The measurement procedure described in FCC KDB 789033 D01 General UNII Test Procedures v01r02 dated September 26, 2012 entitled “ Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E” were used in the measurement.

3.1 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

3.2 EUT EXERCISE

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. According to its specifications, the EUT must comply with the requirements of the Section 15.207, 15.209 and 15.407 under the FCC Rules Part 15 Subpart E.

3.3 GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 6.2 of ANSI C63.10. (Version :2009) Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3 m away from the receiving antenna, which varied from 1 m to 4 m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes according to the requirements in Section 6.3 of ANSI C63.10. (Version: 2009)

3.4 DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition. Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

Channel low, mid and high with highest data rate (worst case) is chosen for full testing.

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4. 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 equipments, which is traceable to recognized national standards.

5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

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. (Version :2003) and CISPR Publication 22. Detailed description of test facility was submitted to the Commission and accepted dated March 02, 2011 (Registration Number: 90661)

5.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of Linearly polarized antennas: tuned dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements. Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers. Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

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6. ANTENNA REQUIREMENTS

According to FCC 47 CFR §15.203:

“An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.”

* The antennas of this E.U.T are permanently attached.

*The E.U.T Complies with the requirement of §15.203

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7. SUMMARY OF TEST RESULTS

Test Description	FCC Part Section(s)	Test Limit	Test Condition	Test Result
TRANSMITTER MODE(TX)			CONDUCTED	
Undesirable Emissions	§15.407(b)(1), (2), (3)	<-27 dBm/ MHz EIRP (5150-5350 MHz, 5470-5725 MHz)	RADIATED	PASS
General Field Strength Limits(Restricted Bands and Radiated Emission Limits)	15.205, 5.407(b)(1), (5), (6)	Emissions in restricted bands must meet the radiated limits detailed in 15.209		PASS

8. TEST RESULT

8.1 RADIATED MEASUREMENT.

8.1.1 RADIATED SPURIOUS EMISSIONS.

Test Requirements and limit, §15.205, §15.209, §15.407

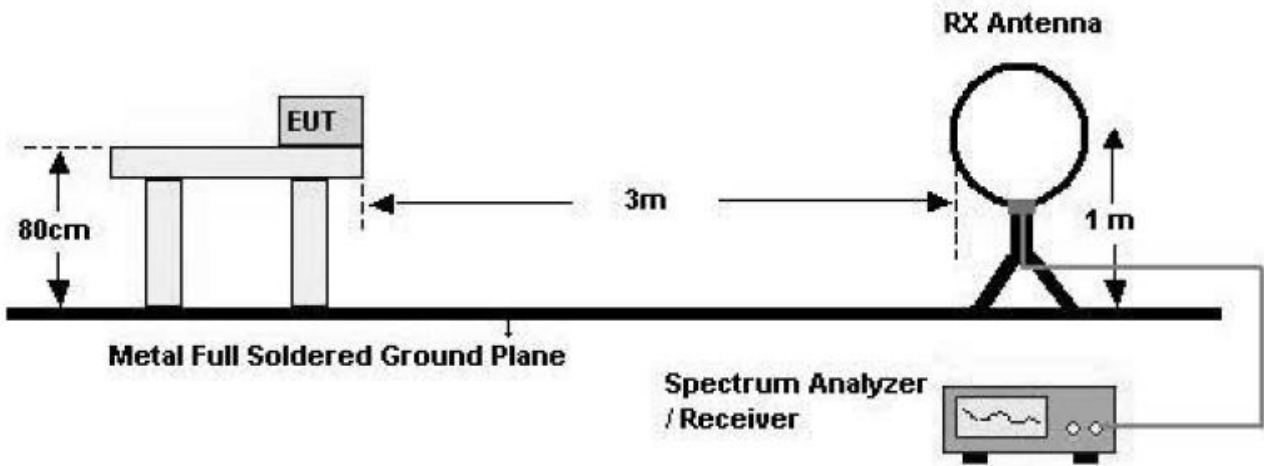
Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

§15.407, KDB 789033

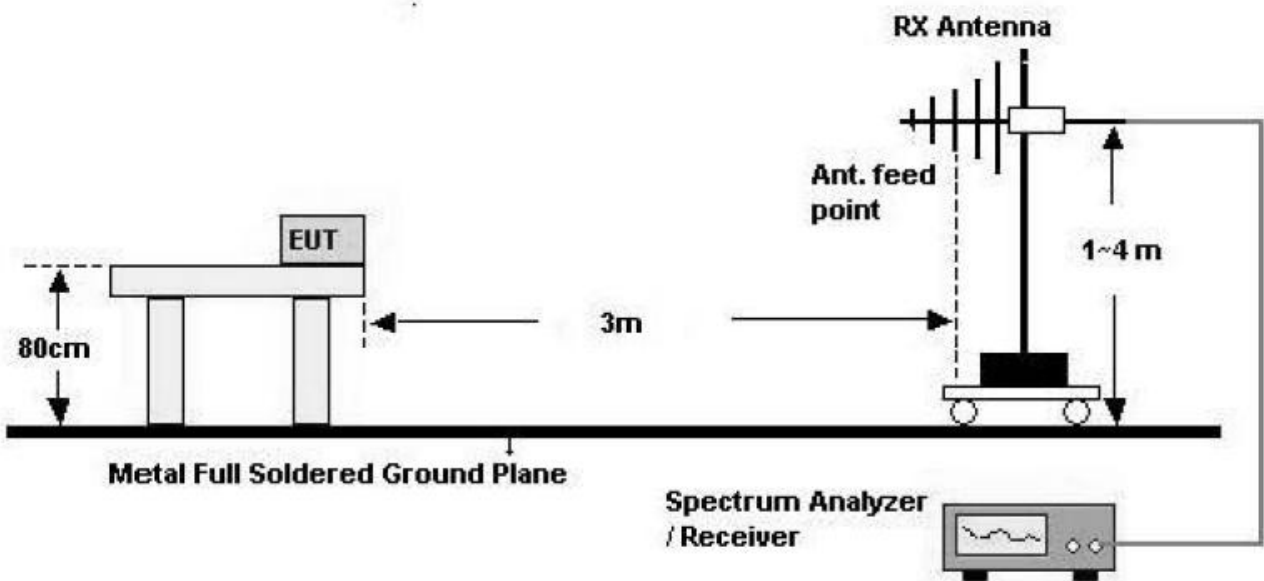
All harmonics that do not lie in a restricted band are subject to a peak limit of -27 dBm/MHz. At a distance of 3 meters the field strength limit in dBµV/m can be determined by adding a “conversion” factor of 95.2 dB to the EIRP limit of -27 dBm/MHz to obtain the limit for out of band spurious emissions of 68.2 dBµV/m.

Test Configuration

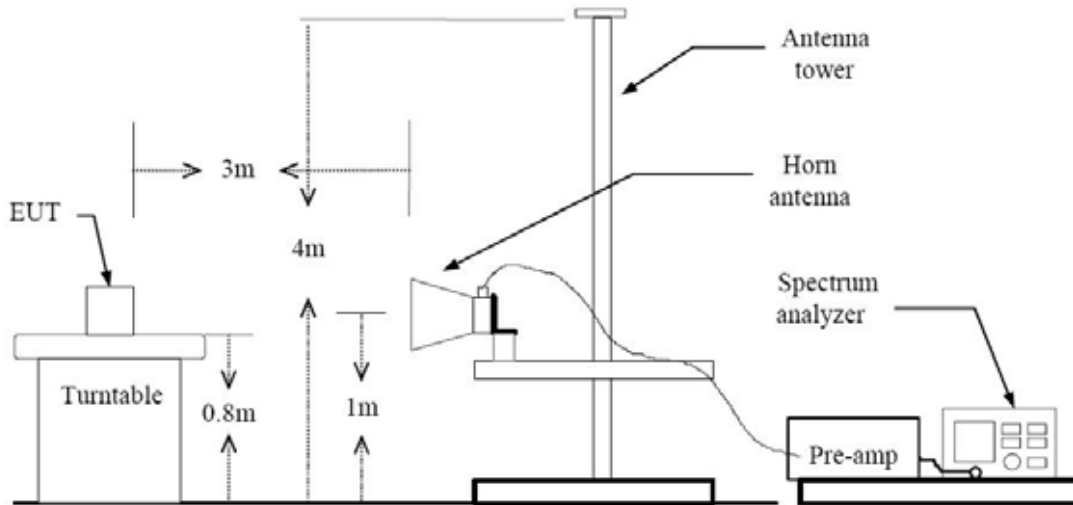
Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz



TEST PROCEDURE

1. The EUT is placed on a turntable, which is 0.8 m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.

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TEST RESULTS

9 kHz – 30MHz

Operation Mode: Normal Mode

Frequency	Reading	Ant. factor	Cable loss	Ant. POL	Total	Limit	Margin
MHz	dB μ V	dB /m	dB	(H/V)	dB μ V/m	dB μ V/m	dB
No Critical peaks found							

Notes:

1. Measuring frequencies from 9 kHz to the 30MHz.
2. The reading of emissions are attenuated more than 20 dB below the permissible limits or the field strength is too small to be measured.
3. Distance extrapolation factor = 40 log (specific distance / test distance) (dB)
4. Limit line = specific Limits (dBuV) + Distance extrapolation factor
5. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

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TEST RESULTS

Below 1 GHz

Operation Mode: Normal Mode

Frequency	Reading	Ant. factor	Cable loss	Ant. POL	Total	Limit	Margin
MHz	dB μ V	dB /m	dB	(H/V)	dB μ V/m	dB μ V/m	dB
No Critical peaks found							

Notes:

1. Measuring frequencies from 30 MHz to the 1 GHz.
2. Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Quasi peak detector mode.
3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

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Above 1 GHz

Band :	UNII 1
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5180 MHz
Channel No.	36 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
10360	41.04	9.33	V	50.37	68.2	17.83	PK
10360	27.74	9.33	V	37.07	54.0	16.93	AV
15540	45.49	14.61	V	60.10	74.0	13.90	PK
15540	31.59	14.61	V	46.20	54.0	7.80	AV
10360	43.13	9.33	H	52.46	68.2	15.74	PK
10360	28.78	9.33	H	38.11	54.0	15.89	AV
15540	45.33	14.61	H	59.94	74.0	14.06	PK
15540	31.54	14.61	H	46.15	54.0	7.85	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. Spectrum setting:
 - Peak (Page 12 in KDB 789033, issued 09/26/2012)
 - RBW = 1 MHz
 - VBW = 3 MHz
 - Detector = Peak
 - Sweep Time = auto
 - Trace mode = max hold
 - Average (Method VB in KDB 789033, issued 09/26/2012)
 - RBW = 1 MHz
 - VBW = 10 Hz.(Duty Cycle ≥ 98 percent)

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Detector = Peak

Sweep Time = auto

Trace Mode = max hold

Trace = 50 traces

6. We have done 802.11a, 802.11n test. Worst case is 6 Mbps in 802.11a.

7. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

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Band :	UNII 1
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5200 MHz
Channel No.	40 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
10400	39.94	10.13	V	50.07	68.2	18.13	PK
10400	26.99	10.13	V	37.12	54.0	16.88	AV
15600	44.51	14.60	V	59.11	74.0	14.89	PK
15600	31.79	14.60	V	46.39	54.0	7.61	AV
10400	41.90	10.13	H	52.03	68.2	16.17	PK
10400	28.21	10.13	H	38.34	54.0	15.66	AV
15600	44.37	14.60	H	58.97	74.0	15.03	PK
15600	31.74	14.60	H	46.34	54.0	7.66	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. Spectrum setting:
 - Peak (Page 12 in KDB 789033, issued 09/26/2012)
 - RBW = 1 MHz
 - VBW = 3 MHz
 - Detector = Peak
 - Sweep Time = auto
 - Trace mode = max hold
 - Average (Method VB in KDB 789033, issued 09/26/2012)
 - RBW = 1 MHz
 - VBW = 10 Hz.(Duty Cycle ≥ 98 percent)
 - Detector = Peak

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Sweep Time = auto

Trace Mode = max hold

Trace = 50 traces

6. We have done 802.11a, 802.11n test. Worst case is 6 Mbps in 802.11a.

7. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

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Band :	UNII 1
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5240 MHz
Channel No.	48 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
10480	42.27	10.20	V	52.47	68.2	15.73	PK
10480	27.86	10.20	V	38.06	54.0	15.94	AV
15720	46.29	13.47	V	59.76	74.0	14.24	PK
15720	32.80	13.47	V	46.27	54.0	7.73	AV
10480	44.05	10.20	H	54.25	68.2	13.95	PK
10480	29.25	10.20	H	39.45	54.0	14.55	AV
15720	46.31	13.47	H	59.78	74.0	14.22	PK
15720	32.79	13.47	H	46.26	54.0	7.74	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. Spectrum setting:
 - Peak (Page 12 in KDB 789033, issued 09/26/2012)
 - RBW = 1 MHz
 - VBW = 3 MHz
 - Detector = Peak
 - Sweep Time = auto
 - Trace mode = max hold
 - Average (Method VB in KDB 789033, issued 09/26/2012)
 - RBW = 1 MHz
 - VBW = 10 Hz.(Duty Cycle ≥ 98 percent)
 - Detector = Peak

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Sweep Time = auto

Trace Mode = max hold

Trace = 50 traces

6. We have done 802.11a, 802.11n test. Worst case is 6 Mbps in 802.11a.

7. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

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Band :	UNII 1
Operation Mode:	802.11n_40 MHz BW
Transfer Rate:	13.5 Mbps
Operating Frequency	5190 MHz
Channel No.	38 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
10380	42.00	9.33	V	51.33	68.2	16.87	PK
10380	27.40	9.33	V	36.73	54.0	17.27	AV
15570	45.75	14.61	V	60.36	74.0	13.64	PK
15570	31.71	14.61	V	46.32	54.0	7.68	AV
10380	41.86	9.33	H	51.19	68.2	17.01	PK
10380	27.46	9.33	H	36.79	54.0	17.21	AV
15570	45.39	14.61	H	60.00	74.0	14.00	PK
15570	31.58	14.61	H	46.19	54.0	7.81	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. Spectrum setting:
 - Peak (Page 12 in KDB 789033, issued 09/26/2012)
 - RBW = 1 MHz
 - VBW = 3 MHz
 - Detector = Peak
 - Sweep Time = auto
 - Trace mode = max hold
 - Average (Method VB in KDB 789033, issued 09/26/2012)
 - RBW = 1 MHz
 - VBW = 10 Hz.(Duty Cycle ≥ 98 percent)
 - Detector = Peak

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Sweep Time = auto

Trace Mode = max hold

Trace = 50 traces

6. We have done all data rate 802.11n_40 MHz BW test. Worst case is 13.5 Mbps in 802.11n_40 MHz BW.

7. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

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Band :	UNII 1
Operation Mode:	802.11n_40 MHz BW
Transfer Rate:	13.5 Mbps
Operating Frequency	5230 MHz
Channel No.	46 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
10460	41.72	10.13	V	51.85	68.2	16.35	PK
10460	28.05	10.13	V	38.18	54.0	15.82	AV
15690	46.11	14.60	V	60.71	74.0	13.29	PK
15690	32.80	14.60	V	47.40	54.0	6.60	AV
10460	41.85	10.13	H	51.98	68.2	16.22	PK
10460	27.95	10.13	H	38.08	54.0	15.92	AV
15690	46.23	14.60	H	60.83	74.0	13.17	PK
15690	32.84	14.60	H	47.44	54.0	6.56	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. Spectrum setting:
 - Peak (Page 12 in KDB 789033, issued 09/26/2012)
 - RBW = 1 MHz
 - VBW = 3 MHz
 - Detector = Peak
 - Sweep Time = auto
 - Trace mode = max hold
 - Average (Method VB in KDB 789033, issued 09/26/2012)
 - RBW = 1 MHz
 - VBW = 10 Hz.(Duty Cycle ≥ 98 percent)
 - Detector = Peak

FCC PT.15.247 TEST REPORT	FCC Class II Permissive Change REPORT		www.hct.co.kr
Test Report No. HCTR1303FR11	Date of Issue: March 06, 2013	EUT Type: AWS/Cellular/PCS CDMA Phone with AWS/Cellular/PCS LTE WLAN, Bluetooth and NFC	FCC ID: ZNFUS780



Sweep Time = auto

Trace Mode = max hold

Trace = 50 traces

6. We have done all data rate 802.11n_40 MHz BW test. Worst case is 13.5 Mbps in 802.11n_40 MHz BW.

7. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

FCC PT.15.247 TEST REPORT	FCC Class II Permissive Change REPORT		www.hct.co.kr
Test Report No. HCTR1303FR11	Date of Issue: March 06, 2013	EUT Type: AWS/Cellular/PCS CDMA Phone with AWS/Cellular/PCS LTE WLAN, Bluetooth and NFC	FCC ID: ZNFUS780



Band :	UNII 2
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5260 MHz
Channel No.	52 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
10520	41.88	10.38	V	52.26	68.2	15.94	PK
10520	28.77	10.38	V	39.15	54.0	14.85	AV
15780	46.11	14.38	V	60.49	74.0	13.51	PK
15780	32.65	14.38	V	47.03	54.0	6.97	AV
10520	42.56	10.38	H	52.94	68.2	15.26	PK
10520	29.22	10.38	H	39.60	54.0	14.40	AV
15780	46.21	14.38	H	60.59	74.0	13.41	PK
15780	32.71	14.38	H	47.09	54.0	6.91	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. Spectrum setting:
 - Peak (Page 12 in KDB 789033, issued 09/26/2012)
 - RBW = 1 MHz
 - VBW = 3 MHz
 - Detector = Peak
 - Sweep Time = auto
 - Trace mode = max hold
 - Average (Method VB in KDB 789033, issued 09/26/2012)
 - RBW = 1 MHz
 - VBW = 10 Hz.(Duty Cycle ≥ 98 percent)
 - Detector = Peak

FCC PT.15.247 TEST REPORT	FCC Class II Permissive Change REPORT		www.hct.co.kr
Test Report No. HCTR1303FR11	Date of Issue: March 06, 2013	EUT Type: AWS/Cellular/PCS CDMA Phone with AWS/Cellular/PCS LTE WLAN, Bluetooth and NFC	FCC ID: ZNFUS780



Sweep Time = auto

Trace Mode = max hold

Trace = 50 traces

6. We have done 802.11a, 802.11n test. Worst case is 6 Mbps in 802.11a.

7. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

FCC PT.15.247 TEST REPORT	FCC Class II Permissive Change REPORT		www.hct.co.kr
Test Report No. HCTR1303FR11	Date of Issue: March 06, 2013	EUT Type: AWS/Cellular/PCS CDMA Phone with AWS/Cellular/PCS LTE WLAN, Bluetooth and NFC	FCC ID: ZNFUS780



Band :	UNII 2
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5300 MHz
Channel No.	60 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
10600	42.20	10.39	V	52.59	68.2	15.61	PK
10600	28.31	10.39	V	38.70	54.0	15.30	AV
15900	44.68	14.00	V	58.68	74.0	15.32	PK
15900	31.13	14.00	V	45.13	54.0	8.87	AV
10600	42.89	10.39	H	53.28	68.2	14.92	PK
10600	28.73	10.39	H	39.12	54.0	14.88	AV
15900	45.19	14.00	H	59.19	74.0	14.81	PK
15900	31.23	14.00	H	45.23	54.0	8.77	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. Spectrum setting:
 - Peak (Page 12 in KDB 789033, issued 09/26/2012)
 - RBW = 1 MHz
 - VBW = 3 MHz
 - Detector = Peak
 - Sweep Time = auto
 - Trace mode = max hold
 - Average (Method VB in KDB 789033, issued 09/26/2012)
 - RBW = 1 MHz
 - VBW = 10 Hz.(Duty Cycle ≥ 98 percent)
 - Detector = Peak

FCC PT.15.247 TEST REPORT	FCC Class II Permissive Change REPORT		www.hct.co.kr
Test Report No. HCTR1303FR11	Date of Issue: March 06, 2013	EUT Type: AWS/Cellular/PCS CDMA Phone with AWS/Cellular/PCS LTE WLAN, Bluetooth and NFC	FCC ID: ZNFUS780



Sweep Time = auto

Trace Mode = max hold

Trace = 50 traces

6. We have done 802.11a, 802.11n test. Worst case is 6 Mbps in 802.11a.

7. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

FCC PT.15.247 TEST REPORT	FCC Class II Permissive Change REPORT		www.hct.co.kr
Test Report No. HCTR1303FR11	Date of Issue: March 06, 2013	EUT Type: AWS/Cellular/PCS CDMA Phone with AWS/Cellular/PCS LTE WLAN, Bluetooth and NFC	FCC ID: ZNFUS780



Band :	UNII 2
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5320 MHz
Channel No.	64 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
10640	44.14	10.50	V	54.64	74	19.36	PK
10640	29.09	10.50	V	39.59	54	14.41	AV
15960	44.37	14.27	V	58.64	74	15.36	PK
15960	30.92	14.27	V	45.19	54	8.81	AV
10640	42.43	10.50	H	52.93	74	21.07	PK
10640	28.82	10.50	H	39.32	54	14.68	AV
15960	45.02	14.27	H	59.29	74	14.71	PK
15960	30.95	14.27	H	45.22	54	8.78	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. Spectrum setting:
 - Peak (Page 12 in KDB 789033, issued 09/26/2012)
 - RBW = 1 MHz
 - VBW = 3 MHz
 - Detector = Peak
 - Sweep Time = auto
 - Trace mode = max hold
 - Average (Method VB in KDB 789033, issued 09/26/2012)
 - RBW = 1 MHz
 - VBW = 10 Hz.(Duty Cycle ≥ 98 percent)
 - Detector = Peak

FCC PT.15.247 TEST REPORT	FCC Class II Permissive Change REPORT		www.hct.co.kr
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Sweep Time = auto

Trace Mode = max hold

Trace = 50 traces

6. We have done 802.11a, 802.11n test. Worst case is 6 Mbps in 802.11a.

7. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

FCC PT.15.247 TEST REPORT	FCC Class II Permissive Change REPORT		www.hct.co.kr
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Band :	UNII 2
Operation Mode:	802.11n_40 MHz BW
Transfer Rate:	13.5 Mbps
Operating Frequency	5270 MHz
Channel No.	54 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
10540	42.67	10.55	V	53.22	68.2	14.98	PK
10540	28.19	10.55	V	38.74	54.0	15.26	AV
15810	45.77	14.26	V	60.03	74.0	13.97	PK
15810	32.27	14.26	V	46.53	54.0	7.47	AV
10540	41.33	10.55	H	51.88	68.2	16.32	PK
10540	28.23	10.55	H	38.78	54.0	15.22	AV
15810	45.73	14.26	H	59.99	74.0	14.01	PK
15810	32.26	14.26	H	46.52	54.0	7.48	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. Spectrum setting:
 - Peak (Page 12 in KDB 789033, issued 09/26/2012)
 - RBW = 1 MHz
 - VBW = 3 MHz
 - Detector = Peak
 - Sweep Time = auto
 - Trace mode = max hold
 - Average (Method VB in KDB 789033, issued 09/26/2012)
 - RBW = 1 MHz
 - VBW = 10 Hz.(Duty Cycle ≥ 98 percent)
 - Detector = Peak

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Sweep Time = auto

Trace Mode = max hold

Trace = 50 traces

6. We have done all data rate 802.11n_40 MHz BW test. Worst case is 13.5 Mbps in 802.11n_40 MHz BW.

7. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

FCC PT.15.247 TEST REPORT	FCC Class II Permissive Change REPORT		www.hct.co.kr
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Band :	UNII 2
Operation Mode:	802.11n_40 MHz BW
Transfer Rate:	13.5 Mbps
Operating Frequency	5310 MHz
Channel No.	62 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
10620	41.48	10.25	V	51.73	74	22.27	PK
10620	27.64	10.25	V	37.89	54	16.11	AV
15930	44.58	13.62	V	58.20	74	15.80	PK
15930	30.99	13.62	V	44.61	54	9.39	AV
10620	42.02	10.25	H	52.27	74	21.73	PK
10620	27.62	10.25	H	37.87	54	16.13	AV
15930	44.37	13.62	H	57.99	74	16.01	PK
15930	30.96	13.62	H	44.58	54	9.42	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. Spectrum setting:
 - Peak (Page 12 in KDB 789033, issued 09/26/2012)
 - RBW = 1 MHz
 - VBW = 3 MHz
 - Detector = Peak
 - Sweep Time = auto
 - Trace mode = max hold
 - Average (Method VB in KDB 789033, issued 09/26/2012)
 - RBW = 1 MHz
 - VBW = 10 Hz.(Duty Cycle ≥ 98 percent)
 - Detector = Peak

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Sweep Time = auto

Trace Mode = max hold

Trace = 50 traces

6. We have done all data rate 802.11n_40 MHz BW test. Worst case is 13.5 Mbps in 802.11n_40 MHz BW.

7. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

FCC PT.15.247 TEST REPORT	FCC Class II Permissive Change REPORT		www.hct.co.kr
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Band :	UNII 3
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5500 MHz
Channel No.	100 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
11000	42.01	11.28	V	53.29	74.0	20.71	PK
11000	27.99	11.28	V	39.27	54.0	14.73	AV
16500	45.54	14.19	V	59.73	68.2	8.47	PK
16500	32.22	14.19	V	46.41	54.0	7.59	AV
11000	41.41	11.28	H	52.69	74.0	21.31	PK
11000	28.04	11.28	H	39.32	54.0	14.68	AV
16500	45.25	14.19	H	59.44	68.2	8.76	PK
16500	32.17	14.19	H	46.36	54.0	7.64	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. Spectrum setting:
 - Peak (Page 12 in KDB 789033, issued 09/26/2012)
 - RBW = 1 MHz
 - VBW = 3 MHz
 - Detector = Peak
 - Sweep Time = auto
 - Trace mode = max hold
 - Average (Method VB in KDB 789033, issued 09/26/2012)
 - RBW = 1 MHz
 - VBW = 10 Hz.(Duty Cycle ≥ 98 percent)
 - Detector = Peak

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Sweep Time = auto

Trace Mode = max hold

Trace = 50 traces

6. We have done 802.11a, 802.11n test. Worst case is 6 Mbps in 802.11a.

7. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

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Band :	UNII 3
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5580 MHz
Channel No.	116 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
11160	42.09	11.10	V	53.19	74.0	20.81	PK
11160	28.40	11.10	V	39.50	54.0	14.50	AV
16740	45.77	15.70	V	61.47	68.2	6.73	PK
16740	32.27	15.70	V	47.97	54.0	6.03	AV
11160	43.49	11.10	H	54.59	74.0	19.41	PK
11160	29.40	11.10	H	40.50	54.0	13.50	AV
16740	45.34	15.70	H	61.04	68.2	7.16	PK
16740	32.22	15.70	H	47.92	54.0	6.08	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. Spectrum setting:
 - Peak (Page 12 in KDB 789033, issued 09/26/2012)
 - RBW = 1 MHz
 - VBW = 3 MHz
 - Detector = Peak
 - Sweep Time = auto
 - Trace mode = max hold
 - Average (Method VB in KDB 789033, issued 09/26/2012)
 - RBW = 1 MHz
 - VBW = 10 Hz.(Duty Cycle ≥ 98 percent)
 - Detector = Peak

FCC PT.15.247 TEST REPORT	FCC Class II Permissive Change REPORT		www.hct.co.kr
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Sweep Time = auto

Trace Mode = max hold

Trace = 50 traces

6. We have done 802.11a, 802.11n test. Worst case is 6 Mbps in 802.11a.

7. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

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Band :	UNII 3
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5700 MHz
Channel No.	140 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
11400	42.94	10.97	V	53.91	74.0	20.09	PK
11400	29.16	10.97	V	40.13	54.0	13.87	AV
17100	45.68	17.82	V	63.50	68.2	4.70	PK
17100	32.19	17.82	V	50.01	54.0	3.99	AV
11400	43.95	10.97	H	54.92	74.0	19.08	PK
11400	29.42	10.97	H	40.39	54.0	13.61	AV
17100	46.38	17.82	H	64.20	68.2	4.00	PK
17100	32.12	17.82	H	49.94	54.0	4.06	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. Spectrum setting:
 - Peak (Page 12 in KDB 789033, issued 09/26/2012)
 - RBW = 1 MHz
 - VBW = 3 MHz
 - Detector = Peak
 - Sweep Time = auto
 - Trace mode = max hold
 - Average (Method VB in KDB 789033, issued 09/26/2012)
 - RBW = 1 MHz
 - VBW = 10 Hz.(Duty Cycle ≥ 98 percent)
 - Detector = Peak

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Sweep Time = auto

Trace Mode = max hold

Trace = 50 traces

6. We have done 802.11a, 802.11n test. Worst case is 6 Mbps in 802.11a.

7. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

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Band :	UNII 3
Operation Mode:	802.11n_40 MHz BW
Transfer Rate:	13.5 Mbps
Operating Frequency	5510 MHz
Channel No.	102 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
11020	41.07	11.28	V	52.35	74.0	21.65	PK
11020	26.90	11.28	V	38.18	54.0	15.82	AV
16530	45.54	8.83	V	54.37	68.2	13.83	PK
16530	32.01	8.83	V	40.84	54.0	13.16	AV
11020	41.11	11.28	H	52.39	74.0	21.61	PK
11020	27.13	11.28	H	38.41	54.0	15.59	AV
16530	45.29	8.83	H	54.12	68.2	14.08	PK
16530	32.00	8.83	H	40.83	54.0	13.17	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. Spectrum setting:
 - Peak (Page 12 in KDB 789033, issued 09/26/2012)
 - RBW = 1 MHz
 - VBW = 3 MHz
 - Detector = Peak
 - Sweep Time = auto
 - Trace mode = max hold
 - Average (Method VB in KDB 789033, issued 09/26/2012)
 - RBW = 1 MHz
 - VBW = 10 Hz.(Duty Cycle ≥ 98 percent)
 - Detector = Peak

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Sweep Time = auto

Trace Mode = max hold

Trace = 50 traces

6. We have done all data rate 802.11n_40 MHz BW test. Worst case is 13.5 Mbps in 802.11n_40 MHz BW.

7. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

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Band :	UNII 3
Operation Mode:	802.11n_40 MHz BW
Transfer Rate:	13.5 Mbps
Operating Frequency	5550 MHz
Channel No.	110 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
11100	40.57	11.56	V	52.13	74	21.87	PK
11100	26.61	11.56	V	38.17	54	15.83	AV
16650	45.56	14.98	V	60.54	74	13.46	PK
16650	31.99	14.98	V	46.97	54	7.03	AV
11100	40.67	11.56	H	52.23	74	21.77	PK
11100	27.06	11.56	H	38.62	54	15.38	AV
16650	45.31	14.98	H	60.29	74	13.71	PK
16650	31.95	14.98	H	46.93	54	7.07	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. Spectrum setting:
 - Peak (Page 12 in KDB 789033, issued 09/26/2012)
 - RBW = 1 MHz
 - VBW = 3 MHz
 - Detector = Peak
 - Sweep Time = auto
 - Trace mode = max hold
 - Average (Method VB in KDB 789033, issued 09/26/2012)
 - RBW = 1 MHz
 - VBW = 10 Hz.(Duty Cycle ≥ 98 percent)
 - Detector = Peak

FCC PT.15.247 TEST REPORT	FCC Class II Permissive Change REPORT		www.hct.co.kr
Test Report No. HCTR1303FR11	Date of Issue: March 06, 2013	EUT Type: AWS/Cellular/PCS CDMA Phone with AWS/Cellular/PCS LTE WLAN, Bluetooth and NFC	FCC ID: ZNFUS780



Sweep Time = auto

Trace Mode = max hold

Trace = 50 traces

6. We have done all data rate 802.11n_40 MHz BW test. Worst case is 13.5 Mbps in 802.11n_40 MHz BW.

7. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

FCC PT.15.247 TEST REPORT	FCC Class II Permissive Change REPORT		www.hct.co.kr
Test Report No. HCTR1303FR11	Date of Issue: March 06, 2013	EUT Type: AWS/Cellular/PCS CDMA Phone with AWS/Cellular/PCS LTE WLAN, Bluetooth and NFC	FCC ID: ZNFUS780



Band :	UNII 3
Operation Mode:	802.11n_40 MHz BW
Transfer Rate:	13.5 Mbps
Operating Frequency	5670 MHz
Channel No.	134 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-Amp G. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
11340	41.45	10.86	V	52.31	74	21.69	PK
11340	27.56	10.86	V	38.42	54	15.58	AV
17010	45.02	18.15	V	63.17	74	10.83	PK
17010	31.71	18.15	V	49.86	54	4.14	AV
11340	42.43	10.86	H	53.29	74	20.71	PK
11340	28.08	10.86	H	38.94	54	15.06	AV
17010	45.13	18.15	H	63.28	74	10.72	PK
17010	31.69	18.15	H	49.84	54	4.16	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. Spectrum setting:
 - Peak (Page 12 in KDB 789033, issued 09/26/2012)
 - RBW = 1 MHz
 - VBW = 3 MHz
 - Detector = Peak
 - Sweep Time = auto
 - Trace mode = max hold
 - Average (Method VB in KDB 789033, issued 09/26/2012)
 - RBW = 1 MHz
 - VBW = 10 Hz.(Duty Cycle ≥ 98 percent)
 - Detector = Peak

FCC PT.15.247 TEST REPORT	FCC Class II Permissive Change REPORT		www.hct.co.kr
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Sweep Time = auto

Trace Mode = max hold

Trace = 50 traces

6. We have done all data rate 802.11n_40 MHz BW test. Worst case is 13.5 Mbps in 802.11n_40 MHz BW.

7. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

FCC PT.15.247 TEST REPORT	FCC Class II Permissive Change REPORT		www.hct.co.kr
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8.1.2 RADIATED RESTRICTED BAND EDGE MEASUREMENTS

Test Requirements and limit, §15.247(d) §15.205, §15.209

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in section 15.209(a) (See section 15.205(c)).

Band :	UNII 1
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5180 MHz
Channel No.	36 Ch

Frequency [MHz]	Reading dBuV	AN.+CL+AMP+ATT. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
5150	52.96	3.63	H	56.59	74	17.41	PK
5150	38.78	3.63	H	42.41	54	11.59	AV
5150	52.80	3.63	V	56.43	74	17.57	PK
5150	38.52	3.63	V	42.15	54	11.85	AV

FCC PT.15.247 TEST REPORT	FCC Class II Permissive Change REPORT		www.hct.co.kr
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Band : UNII 2
 Operation Mode: 802.11 a
 Transfer Rate: 6 Mbps
 Operating Frequency 5320 MHz
 Channel No. 64 Ch

Frequency [MHz]	Reading dBuV	AN.+CL+AMP+ATT. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
5350	51.12	4.45	H	55.57	74	18.43	PK
5350	36.96	4.45	H	41.41	54	12.59	AV
5350	51.19	4.45	V	55.64	74	18.36	PK
5350	36.78	4.45	V	41.23	54	12.77	AV

Band : UNII 3
 Operation Mode: 802.11 a
 Transfer Rate: 6 Mbps
 Operating Frequency 5500 MHz
 Channel No. 100 Ch

Frequency [MHz]	Reading DBuV	AN.+CL+AMP+ATT. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
5460	50.29	5.54	H	55.83	68.2	12.37	PK
5460	36.35	5.54	H	41.89	54.0	12.11	AV
5460	50.32	5.54	V	55.86	68.2	12.34	PK
5460	36.23	5.54	V	41.77	54.0	12.23	AV

Notes:

- Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + ATT
- Spectrum setting:
 - Peak (Page 12 in KDB 789033, issued 09/26/2012)
 - RBW = 1 MHz
 - VBW = 3 MHz
 - Detector = Peak
 - Sweep Time = auto
 - Trace mode = max hold
 - Average (Method VB in KDB 789033, issued 09/26/2012)

FCC PT.15.247 TEST REPORT	FCC Class II Permissive Change REPORT		www.hct.co.kr
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RBW = 1 MHz

VBW = 10 Hz.(Duty Cycle ≥ 98 percent)

Detector = Peak

Sweep Time = auto

Trace Mode = max hold

Trace = 50 traces

3. We have done 802.11a/n mode test. . Worst case of EUT is 6 Mbps in 802.11a.

4. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

FCC PT.15.247 TEST REPORT	FCC Class II Permissive Change REPORT		www.hct.co.kr
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Band : UNII 1
 Operation Mode: 802.11n_40 MHz BW
 Transfer Rate: 13.5 Mbps
 Operating Frequency 5190 MHz
 Channel No. 38 Ch

Frequency [MHz]	Reading dBuV	AN.+CL+AMP+ATT. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
5150	56.27	3.63	H	59.90	74	14.10	PK
5150	40.82	3.63	H	44.45	54	9.55	AV
5150	54.61	3.63	V	58.24	74	15.76	PK
5150	39.84	3.63	V	43.47	54	10.53	AV

Band : UNII 2
 Operation Mode: 802.11n_40 MHz BW
 Transfer Rate: 13.5 Mbps
 Operating Frequency 5310 MHz
 Channel No. 62 Ch

Frequency [MHz]	Reading dBuV	AN.+CL+AMP+ATT. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
5350	55.65	4.45	H	60.10	74	13.90	PK
5350	37.56	4.45	H	42.01	54	11.99	AV
5350	55.07	4.45	V	59.52	74	14.48	PK
5350	37.18	4.45	V	41.63	54	12.37	AV



Band :	UNII 3
Operation Mode:	802.11n_40 MHz BW
Transfer Rate:	13.5 Mbps
Operating Frequency	5510 MHz
Channel No.	102 Ch

Frequency [MHz]	Reading dBuV	AN.+CL+AMP+ATT. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
5460	50.90	5.54	H	56.44	68.2	11.76	PK
5460	36.85	5.54	H	42.39	54.0	11.61	AV
5460	50.33	5.54	V	55.87	68.2	12.33	PK
5460	36.39	5.54	V	41.93	54.0	12.07	AV

Notes:

- Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + ATT
- Spectrum setting:
 - Peak (Page 12 in KDB 789033, issued 09/26/2012)
 - RBW = 1 MHz
 - VBW = 3 MHz
 - Detector = Peak
 - Sweep Time = auto
 - Trace mode = max hold
 - Average (Method VB in KDB 789033, issued 09/26/2012)
 - RBW = 1 MHz
 - VBW = 10 Hz.(Duty Cycle ≥ 98 percent)
 - Detector = Peak
 - Sweep Time = auto
 - Trace Mode = max hold
 - Trace = 50 traces
- We have done all data rate 802.11n_40 MHz BW test. Worst case is 13.5 Mbps in 802.11n_40 MHz BW.
- We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

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9. LIST OF TEST EQUIPMENT

Manufacturer	Model / Equipment	Calibration Interval	Calibration Due	Serial No.
Rohde & Schwarz	ENV216/ LISN	Annual	02/06/2014	100073
Schwarzbeck	VULB 9168/ TRILOG Antenna	Biennial	06/17/2013	255
Rohde & Schwarz	ESI 40 / EMI TEST RECEIVER	Annual	05/03/2013	831564103
Agilent	E4440A/ Spectrum Analyzer	Annual	05/02/2013	US45303008
Agilent	N9020A/ SIGNAL ANALYZER	Annual	05/21/2013	MY51110063
HD	MA240/ Antenna Position Tower	N/A	N/A	556
EMCO	1050/ Turn Table	N/A	N/A	114
HD GmbH	HD 100/ Controller	N/A	N/A	13
HD GmbH	KMS 560/ SlideBar	N/A	N/A	12
Rohde & Schwarz	SCU-18/ Signal Conditioning Unit	Annual	09/11/2013	10094
MITEQ	AMF-6B-180265-35-10P / POWER AMP	Annual	04/16/2013	667624
CERNEX	CBL26405040 / POWER AMP	Annual	04/16/2013	19660
Schwarzbeck	BBHA 9120D/ Horn Antenna	Biennial	10/17/2013	937
Schwarzbeck	BBHA9170 / Horn Antenna(15 GHz ~ 40 GHz)	Biennial	10/30/2014	BBHA9170124
Rohde & Schwarz	FSP / Spectrum Analyzer	Annual	02/08/2014	839117/011
Agilent	E4416A /Power Meter	Annual	11/07/2013	GB41291412
Agilent	E9327A /POWER SENSOR	Annual	05/02/2013	MY4442009
Wainwright Instrument	WHF3.3/18G-10EF / High Pass Filter	Annual	05/02/2013	1
Wainwright Instrument	WHF3.0/18G-10EF / High Pass Filter	Annual	02/08/2014	F6
Wainwright Instrument	WHNX6.0/26.5G-6SS / High Pass Filter	Annual	05/02/2013	1
Wainwright Instrument	WHNX7.0/18G-8SS / High Pass Filter	Annual	05/02/2013	29
Wainwright Instrument	WRCJ2400/2483.5-2370/2520-60/14SS / Band Reject Filter	Annual	05/02/2013	1
Hewlett Packard	11636B/Power Divider	Annual	11/07/2013	11377
Hewlett Packard	11667B / Power Splitter	Annual	06/05/2013	05001
DIGITAL	EP-3010 /DC POWER SUPPLY	Annual	11/07/2013	3110117
ITECH	IT6720 / DC POWER SUPPLY	Annual	11/07/2013	010002156287001199
TESCOM	TC-3000C / BLUETOOTH TESTER	Annual	11/07/2013	3000C000276
Rohde & Schwarz	CBT / BLUETOOTH TESTER	Annual	05/02/2013	100422
EMCO	6502.LOOP ANTENNA	Biennial	01/11/2014	9009-2536
MITEQ	AMF-6D-001180-35-20P/ POWER AMP	Annual	07/30/2013	990893
Agilent	8493C / Attenuator(10 dB)	Annual	07/30/2013	76649
WEINSCHTEL	2-3 / Attenuator(3 dB)	Annual	11/07/2013	BR0617