



## HCT CO., LTD.

Product Compliance Division

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### FCC PART 15.247 Class II Permissive Change

**Applicant Name:**

LG Electronics Inc.

60-39, Gasan-dong, Gumchon-gu,  
Seoul 153-023, Korea

**Date of Issue:**

May 13, 2010

**Test Site/Location:**

HCT.CO., LTD., San 136-1 Ami-ri, Bubal-eup, Icheon-si,  
Kyungki-do, Korea

**Test Report No.:** HCTR1005FR04-1

**HCT FRN:** 0005866421

**IC Recognition No.:** 5944A-1

**FCC ID:**

BEJGW300

**IC:**

2703C-GW300

**APPLICANT:**

LG Electronics Inc.

**FCC Model(s):**

GW300, GW300FD

**IC Model(s):**

GW300, GW300FD

**EUT Type:**

Cellular/ PCS GSM/ EDGE Phone with Bluetooth

**Frequency Range:**

2402 - 2480 MHz (Bluetooth)

**Modulation type**

GFSK, PSK

**FCC Classification:**

FCC Part 15 Frequency Hopping Spread Spectrum Transceiver

**FCC Rule Part(s):**

Part 15 subpart C 15.247

**IC Rule :**

RSS-210 , RSS-GEN

**IC Registration No. :**

5944A-1

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 been denied FCC benefits pursuant to section 5301 of the Anti-Drug Abuse Act of 1998, 21 U.S.C. 862

Report prepared by

: Jong Seouk Lee

Test engineer of RF Team

Approved by

: Sang Jun Lee

Manager of RF Team

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|                                   |                                       |                                                           |                     |                                                  |
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| HCT PT.15.247<br>TEST REPORT      | FCC Class II Permissive Change REPORT |                                                           |                     | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCTR1005FR04-1 | Date of Issue:<br>May 13, 2010        | EUT Type:<br>Cellular/ PCS GSM/ EDGE Phone with Bluetooth | FCC ID:<br>BEJGW300 | IC:<br>2703C-GW300                               |



## Version

| TEST REPORT NO.  | DATE         | DESCRIPTION           |
|------------------|--------------|-----------------------|
| HCTR1005FR04-1   | May 06, 2010 | First Approval Report |
| HCTR1005FR04-1-1 | May 13, 2010 | Radiated Test Report  |
|                  |              |                       |
|                  |              |                       |
|                  |              |                       |



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## 1. GENERAL INFORMATION

**Applicant:** LG Electronics Inc.  
**Address:** 60-39, Gasan-dong, Gumchon-gu,  
Seoul 153-023, Korea  
**FCC ID:** BEJGW300  
**IC:** 2703C-GW300  
**Application Type:** FCC Class II Permissive Change  
**EUT:** Cellular/ PCS GSM/ EDGE Phone with Bluetooth  
**Model Name** FCC: GW300, GW300FD  
IC: GW300, GW300FD  
**Date of Test:** April 19, 2010 ~ April 25, 2010  
**Contact person:** Name: Bong Hyo, Han  
Phone #: +82-2-2033-1160  
Fax #: +82-2-2033-1222  
**Place of Tests:** HCT Co., Ltd.  
Icheon, Kyounki-Do, Korea (IC Recognition No. : 5944A-1)

## 2. EUT DESCRIPTION

|                              |                                                                                                               |
|------------------------------|---------------------------------------------------------------------------------------------------------------|
| <b>Product</b>               | Cellular/ PCS GSM/ EDGE Phone with Bluetooth                                                                  |
| <b>Model Name</b>            | FCC: GW300, GW300FD<br>IC: GW300, GW300FD                                                                     |
| <b>Power Supply</b>          | DC 3.7 V                                                                                                      |
| <b>Battery type</b>          | Standard                                                                                                      |
| <b>Frequency Range</b>       | 2402 ~ 2480 MHz                                                                                               |
| <b>Modulation Type</b>       | GFSK(Normal), PSK(EDR)                                                                                        |
| <b>Modulation Technique</b>  | FHSS                                                                                                          |
| <b>Number of Channels</b>    | 79 Channels                                                                                                   |
| <b>Antenna Specification</b> | Manufacturer: E.M.W Antenna Co., Ltd.<br>Antenna type: Multi-Layer PCB Chip Antenna<br>Peak Gain : -4.248 dBi |

### ※ 15.247 Requirements for Bluetooth transmitter.

- This Bluetooth module has been tested by a Bluetooth Qualification Lab, and we confirm the following:
  - 1) This system is hopping pseudorandomly.
  - 2) Each frequency is used equally on the average by each transmitter.
  - 3) The receiver input bandwidths that match the hopping channel bandwidths of their corresponding transmitters
  - 4) The receiver shifts frequencies in synchronization with the transmitted signals.
- 15.247(g): The system, consisting of both the transmitter and the receiver, must be designed to comply with all of the regulations in this Section 15.247 should the transmitter be presented with a continuous data (or information) stream.
- 15.247(h): The coordination of frequency hopping systems in any other manner for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters is not permitted.

|                                          |                                              |                                                                  |                            |                                                  |
|------------------------------------------|----------------------------------------------|------------------------------------------------------------------|----------------------------|--------------------------------------------------|
| <b>HCT PT.15.247<br/>TEST REPORT</b>     | <b>FCC Class II Permissive Change REPORT</b> |                                                                  |                            | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| <b>Test Report No.</b><br>HCTR1005FR04-1 | <b>Date of Issue:</b><br>May 13, 2010        | <b>EUT Type:</b><br>Cellular/ PCS GSM/ EDGE Phone with Bluetooth | <b>FCC ID:</b><br>BEJGW300 | <b>IC:</b><br>2703C-GW300                        |



### 3. TEST METHODOLOGY

The measurement procedure described in the American National Standard for Methods of Measurement of Radio-Noise Emission from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40GHz(ANSI C63.4-2003) and FCC Public Notice DA 00-705 dated March 30, 2000 entitled "Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems" were used in the measurement of the **LG Electronics Inc.**

**Cellular/ PCS GSM/ EDGE Phone with Bluetooth FCC ID: BEJGW300**

#### 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 15.247 under the FCC Rules Part 15 Subpart C.

#### 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 13.1.4.1 of ANSI C63.4. (Version :2003) 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 13.1.4.1 of ANSI C63.4. (Version: 2003)

#### 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 open area test site and conducted measurement facility used to collect the radiated data are located at the 254-1, Maekok-Ri, Hobup-Myun, Ichon-Si, Kyoungki-Do, 467-701, 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 June 10, 2009 (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. FCC PART 15.247 REQUIREMENTS

### 7.1 SPURIOUS EMISSIONS

#### 7.1.1 Radiated Spurious Emissions

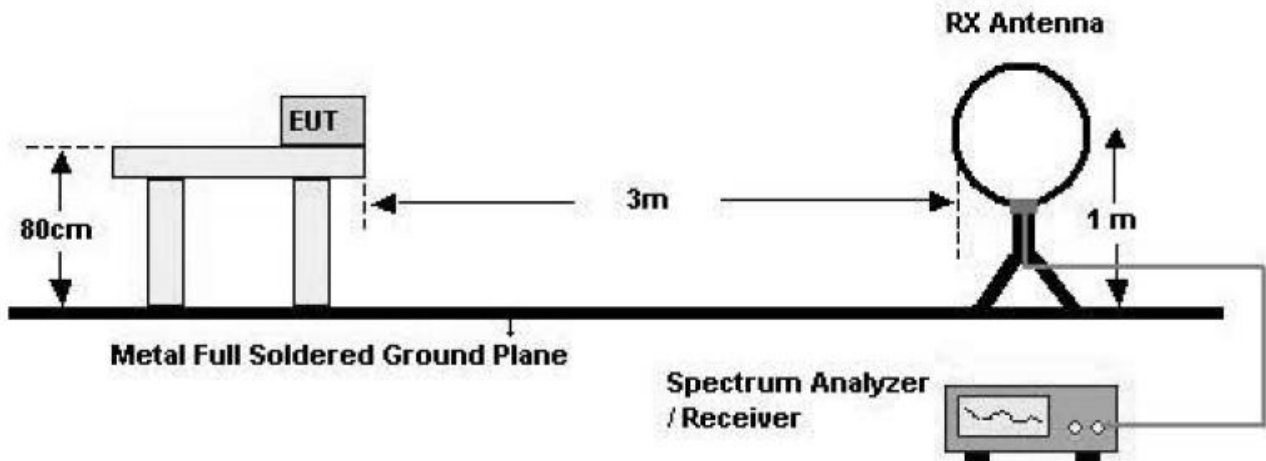
**LIMIT : §15.247(d), §15.205, §15.209**

1. 20dBc in any 100kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed

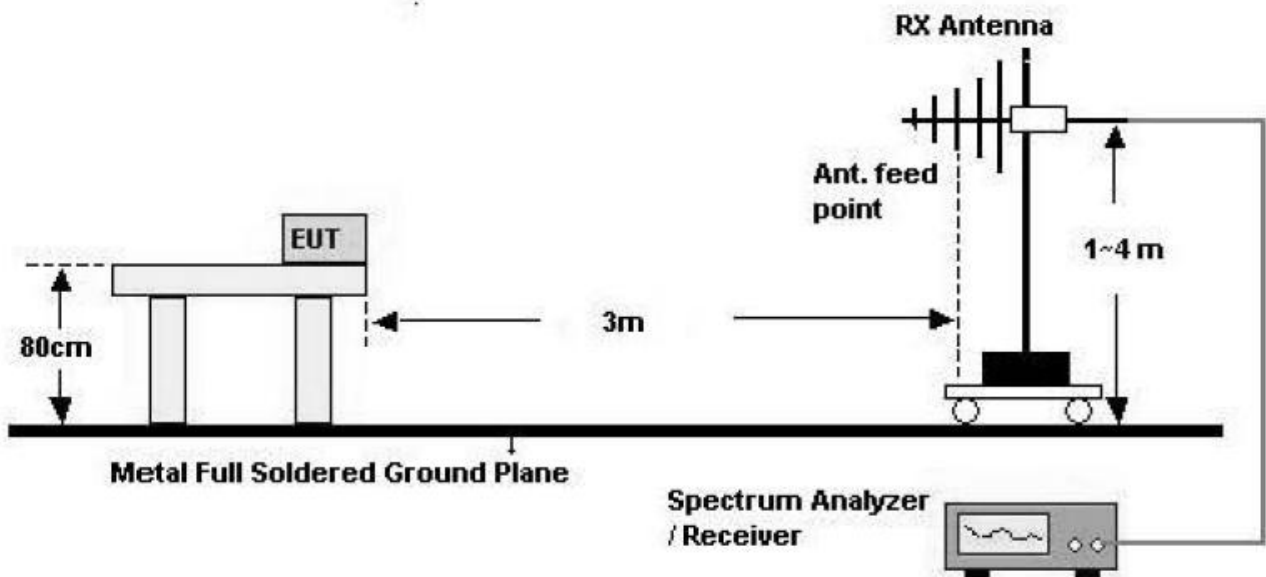
| Frequency (MHz) | Field Strength (uV/m) | Measurement Distance (m) |
|-----------------|-----------------------|--------------------------|
| 0.009 – 0.490   | 2400/F(kHz)           | 300                      |
| 0.490 – 1.705   | 24000/F(kHz)          | 30                       |
| 1.705 – 30    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

## Test Configuration

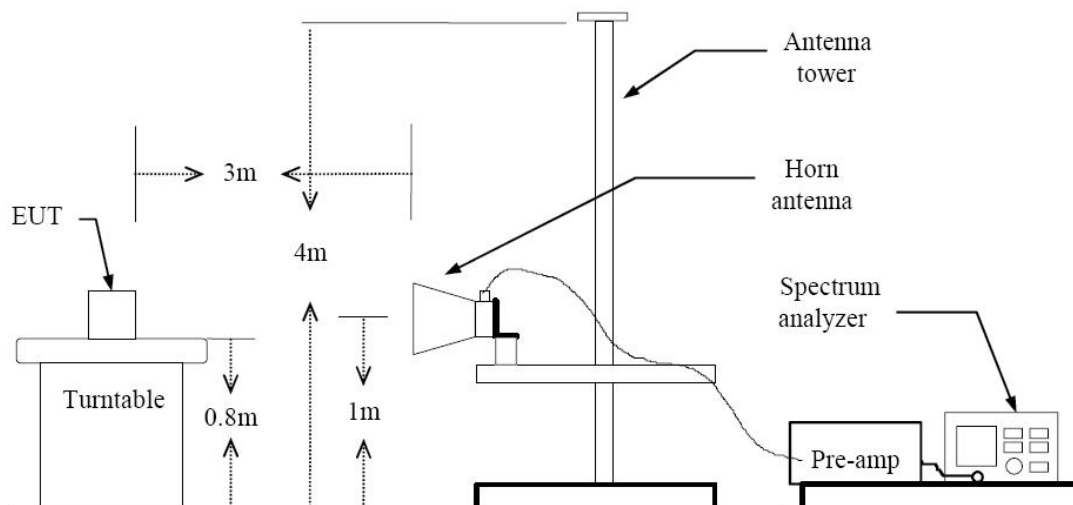
### Below 30 MHz



### 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 Link

| Frequency               | Reading    | Ant. factor | Cable loss | Ant. POL | Total        | Limit        | Margin |
|-------------------------|------------|-------------|------------|----------|--------------|--------------|--------|
| MHz                     | dB $\mu$ V | dB /m       | dB         | (H/V)    | dB $\mu$ V/m | dB $\mu$ 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 (dB $\mu$ V) + Distance extrapolation factor

|                                   |                                       |                                                           |                     |                                                  |
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## TEST RESULTS

Below 1 GHz

Operation Mode: EDR Mode (Channel : 2402)

| Frequency<br>MHz | Reading<br>dBuV | Ant.<br>Factor<br>dB/m | Cable<br>Loss<br>dB | ANT POL<br>(H/V) | Total<br>dBuV/m | Limit<br>dBuV/m | Margin<br>dB |
|------------------|-----------------|------------------------|---------------------|------------------|-----------------|-----------------|--------------|
| 762.35           | 11.5            | 22.1                   | 3.0                 | H                | 36.60           | 46.0            | 9.4          |
| 970.90           | 10.1            | 24.0                   | 3.8                 | H                | 37.91           | 54.0            | 16.1         |
| 467.47           | 11.9            | 16.8                   | 2.3                 | V                | 30.96           | 46.0            | 15.0         |
| 536.34           | 12.2            | 18.0                   | 2.5                 | V                | 32.66           | 46.0            | 13.3         |
| 750.71           | 12.4            | 22.0                   | 3.0                 | V                | 37.36           | 46.0            | 8.6          |
| 800.18           | 12.2            | 22.2                   | 3.1                 | V                | 37.50           | 46.0            | 8.5          |

### 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 Normal Mode and EDR Mode test. Worst case of EUT is EDR Mode.

|                                   |                                       |                                                           |                     |                                                  |
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## Above 1 GHz

### Operation Mode: CH Low (Normal)

| Frequency<br>[MHz] | Reading<br>dBuV | AN.+CL-AMP GAIN.<br>[dB] | ANT. POL<br>[H/V] | Total<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Detect |
|--------------------|-----------------|--------------------------|-------------------|-------------------|-------------------|----------------|--------|
| 4804               | 50.82           | -6.08                    | V                 | 44.74             | 74                | 29.26          | PK     |
| 4804               | 41.48           | -6.08                    | V                 | 35.40             | 54                | 18.60          | AV     |
| 7206               | 50.16           | 1.28                     | V                 | 51.44             | 74                | 22.56          | PK     |
| 7206               | 39.98           | 1.28                     | V                 | 41.26             | 54                | 12.74          | AV     |
| 4804               | 53.69           | -6.08                    | H                 | 47.61             | 74                | 26.39          | PK     |
| 4804               | 41.50           | -6.08                    | H                 | 35.42             | 54                | 18.58          | AV     |
| 7206               | 50.51           | 1.28                     | H                 | 51.79             | 74                | 22.21          | PK     |
| 7206               | 36.99           | 1.28                     | H                 | 38.27             | 54                | 15.73          | 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. Spectrum setting:
  - a. Peak Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 MHz.
  - b. AV Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 10 Hz.
5. We have done Normal Mode and EDR Mode test. Worst case of EUT is Normal Mode.

|                                   |                                       |                                                           |                     |                                                  |
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**Operation Mode: CH Mid (Normal)**

| Frequency<br>[MHz] | Reading<br>dBuV | AN.+CL-AMP GAIN.<br>[dB] | ANT. POL<br>[H/V] | Total<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Detect |
|--------------------|-----------------|--------------------------|-------------------|-------------------|-------------------|----------------|--------|
| 4882               | 49.48           | -5.81                    | V                 | 43.67             | 74                | 30.33          | PK     |
| 4882               | 38.22           | -5.81                    | V                 | 32.41             | 54                | 21.59          | AV     |
| 7323               | 50.68           | 1.65                     | V                 | 52.33             | 74                | 21.67          | PK     |
| 7323               | 37.06           | 1.65                     | V                 | 38.71             | 54                | 15.29          | AV     |
| 4882               | 49.17           | -5.81                    | H                 | 43.36             | 74                | 30.64          | PK     |
| 4882               | 37.34           | -5.81                    | H                 | 31.53             | 54                | 22.47          | AV     |
| 7323               | 50.05           | 1.65                     | H                 | 51.70             | 74                | 22.30          | PK     |
| 7323               | 37.06           | 1.65                     | H                 | 38.71             | 54                | 15.29          | 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 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Spectrum setting:
  - a. Peak Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 MHz.
  - b. AV Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 10 Hz.
5. We have done Normal Mode and EDR Mode test. Worst case of EUT is Normal Mode.

|                                   |                                       |                                                           |                     |                                                  |
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**Operation Mode: CH High (Normal)**

| Frequency<br>[MHz] | Reading<br>dBuV | AN.+CL-AMP GAIN.<br>[dB] | ANT. POL<br>[H/V] | Total<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Detect |
|--------------------|-----------------|--------------------------|-------------------|-------------------|-------------------|----------------|--------|
| 4960               | 50.18           | -5.53                    | V                 | 44.65             | 74                | 29.35          | PK     |
| 4960               | 38.67           | -5.53                    | V                 | 33.14             | 54                | 20.86          | AV     |
| 7440               | 50.54           | 2.03                     | V                 | 52.57             | 74                | 21.43          | PK     |
| 7440               | 37.71           | 2.03                     | V                 | 39.74             | 54                | 14.26          | AV     |
| 4960               | 49.53           | -5.53                    | H                 | 44.00             | 74                | 30.00          | PK     |
| 4960               | 37.16           | -5.53                    | H                 | 31.63             | 54                | 22.37          | AV     |
| 7440               | 50.72           | 2.03                     | H                 | 52.75             | 74                | 21.25          | PK     |
| 7440               | 37.70           | 2.03                     | H                 | 39.73             | 54                | 14.27          | 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 > 20dB 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. Spectrum setting:
  - a. Peak Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 MH.
  - b. AV Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 10 Hz.
5. We have done Normal Mode and EDR Mode test. Worst case of EUT is Normal Mode.

|                                   |                                       |                                                           |                     |                                                  |
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### 7.1.2 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)).

|                     |                |
|---------------------|----------------|
| Operation Mode:     | 8DPSK(EDR)     |
| Operating Frequency | 2402, 2480 MHz |
| Channel No.         | 0, 78 Ch       |

| Frequency<br>[MHz] | Reading<br>dBuV | AN.+CL-AMP G<br>[dB] | ANT. POL<br>[H/V] | Total<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Detect |
|--------------------|-----------------|----------------------|-------------------|-------------------|-------------------|----------------|--------|
| 2340.88            | 51.17           | -12.54               | H                 | 38.63             | 74                | 35.37          | PK     |
| 2340.88            | 37.58           | -12.54               | H                 | 25.04             | 54                | 28.96          | AV     |
| 2350.48            | 50.40           | -12.50               | V                 | 37.90             | 74                | 36.10          | PK     |
| 2320.08            | 37.79           | -12.63               | V                 | 25.16             | 54                | 28.84          | AV     |
| 2499.77            | 50.31           | -11.85               | H                 | 38.46             | 74                | 35.54          | PK     |
| 2499.77            | 37.62           | -11.85               | H                 | 25.77             | 54                | 28.23          | AV     |
| 2499.31            | 49.56           | -11.85               | V                 | 37.71             | 74                | 36.29          | PK     |
| 2499.31            | 37.51           | -11.85               | V                 | 25.66             | 54                | 28.34          | AV     |

#### Notes:

##### 1. Spectrum setting:

- Peak Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 MHz.
- AV Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 10 Hz.

Note: We have done Normal Mode and EDR Mode test. Worst case of EUT is EDR Mode.

|                                   |                                       |                                                           |                     |                                                  |
|-----------------------------------|---------------------------------------|-----------------------------------------------------------|---------------------|--------------------------------------------------|
| HCT PT.15.247<br>TEST REPORT      | FCC Class II Permissive Change REPORT |                                                           |                     | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCTR1005FR04-1 | Date of Issue:<br>May 13, 2010        | EUT Type:<br>Cellular/ PCS GSM/ EDGE Phone with Bluetooth | FCC ID:<br>BEJGW300 | IC:<br>2703C-GW300                               |

## 8. LIST OF TEST EQUIPMENT

| Manufacturer          | Model / Equipment                  | Calibration Interval | Calibration Due | Serial No.         |
|-----------------------|------------------------------------|----------------------|-----------------|--------------------|
| Rohde & Schwarz       | ESH2-Z5/ LISN                      | Annual               | 04/05/2011      | 861741/013         |
| Rohde & Schwarz       | ESH3-Z6/ LISN                      | Annual               | 06/13/2010      | 100329             |
| Schwarzbeck           | VULB 9160/ TRILOG Antenna          | Biennial             | 12/18/2010      | 9160-3150          |
| 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       | ESH3-Z2/ PULSE LIMITER             | Annual               | 10/30/2010      | 375.8810.352       |
| MITEQ                 | AMF-6D-001180-35-20P/AMP           | Annual               | 05/20/2010      | 990893             |
| Schwarzbeck           | BBHA 9120D/ Horn Antenna           | Biennial             | 09/23/2011      | 296                |
| Rohde & Schwarz       | FSP30 / Spectrum Analyzer          | Annual               | 07/31/2010      | 839117/011         |
| Agilent               | E4440A / Spectrum Analyzer         | Annual               | 12/23/2010      | US45303008         |
| Agilent               | E4416A /Power Meter                | Annual               | 01/14/2011      | GB41291412         |
| Agilent               | E9327A /POWER SENSOR               | Annual               | 07/28/2010      | MY4442009          |
| Wainwright Instrument | WHF3.3/18G-10EF / High Pass Filter | Annual               | 06/29/2010      | 1                  |
| Hewlett Packard       | 11636B/Power Divider               | Annual               | 12/24/2010      | 11377              |
| DIGITAL               | EP-3010 /DC POWER SUPPLY           | Annual               | 01/08/2011      | 3110117            |
| ITECH                 | IT6720 / DC POWER SUPPLY           | Annual               | 12/01/2010      | 010002156287001199 |
| TESCOM                | TC-3000A / BLUETOOTH TESTER        | Annual               | 01/11/2011      | 3000A490112        |
| Rohde & Schwarz       | CBT / BLUETOOTH TESTER             | Annual               | 06/22/2010      | 100422             |
| EMCO                  | 6502.LOOP ANTENNA                  | Biennial             | 01/13/2012      | 9009-2536          |