



HCT CO., LTD.

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EMI CERTIFICATION REPORT

Applicant:

LG Electronics MobileComm U.S.A., Inc.
1000 Sylvan Avenue, Englewood Cliffs NJ 07632

Date of Issue: July 10, 2013

Test Report No.: HCTE1307FE12

Test Site: HCT CO., LTD.
HCT FRN: 0005-8664-21

FCC ID:


ZNFE410J


Rule Part(s) / Standard(s) : FCC PART 15 Subpart B Class B
Equipment Type : GSMWCDMA Phone with Bluetooth3.0, WIFI802.11 b/g/n
Model Name : LG-E410j
Additional Model Name : LGE410j, E410j
Port / Connector(s) : USB / Earphone Port
Date of Test : July 05, 2013 - July 09, 2013

The device bearing the trade name and model specified above, has been shown to comply with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.4-2003. (See Test Report if any modifications were made for compliance)

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

HCT certifies that no party to application has been subject to a denial of Federal benefits that includes FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C 862


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DOCUMENT HISTORY

The revision history for this document is shown in table.

| Version | Date | Description |
|--------------|---------------|-----------------|
| HCTE1307FE12 | July 10, 2013 | Initial Release |

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ATTACHMENT: TEST SETUP PHOTOGRAPHS

1. GENERAL INFORMATION

1.1 Product Description

Equipment Under Test is **EUT type: GSM/WCDMA Phone with Bluetooth3.0, WIFI802.11 b/g/n, Model: LG-E410j** manufactured by **LG Electronics MobileComm U.S.A., Inc.** Its basic purpose is used for communications.

| | |
|------------------------------|--|
| Model Name | LG-E410j |
| FCC ID | ZNFE410J |
| Additional Model Name | LGE410j, E410j |
| EUT Type | GSM/WCDMA Phone with Bluetooth3.0, WIFI802.11 b/g/n |
| TX Frequency | 824.20 MHz to 848.80 MHz (GSM 850) 1 850.20 MHz to 1 909.80 MHz (GSM 1 900) 1 852.4 MHz to 1 907.6 MHz (WCDMA 1 900) |
| RX Frequency | 869.20 MHz to 893.80 MHz (GSM 850) 1 930.20 MHz to 1 989.80 MHz (GSM 1 900) 1 932.4 MHz to 1 987.6 MHz (WCDMA 1 900) |

1.2 Related Submittal(s) / Grant(s)

Original submittal only.

1.3 Tested System Details

All equipment descriptions used in the tested system (including inserted cards) are:

| Device Type | Model Name | Manufacturer | FCC ID / DoC | Connected To |
|---------------------|--------------|---------------------------------|--------------|-------------------------------|
| EUT | LG-E410j | LG | ZNFE410J | Notebook PC Ear-phone |
| USB cable | IFS00015 | INTERFACESAMIL | - | E.U.T Notebook PC |
| Ear-phone | EAB62808211 | I-SOUND | - | E.U.T |
| Notebook PC | ProBook6560b | H.P | DoC | EUT Notebook PC adaptor |
| Notebook PC adaptor | PPP009D | DELTA Electronics (JIANGSU) LTD | - | Notebook PC |
| Mouse | Serial mouse | Radio shack | FSUGMZE3 | Notebook PC |
| Adaptor | DA-60M12 | Yang Ming Industrial | - | Gateway |
| Gateway | MV440R | Axesstel | - | Notebook PC, Adaptor |
| RJ45 cable | - | - | - | Notebook PC, Gateway |
| Micro SD card | 8 GB | SanDisk | - | E.U.T |

1.4 Cable Description

| Product Name | Port | Power Cord Shielded (Y/N) | I/O Cable Shielded (Y/N) | Length (m) |
|--------------|----------------|---------------------------|--------------------------|------------|
| EUT | Micro USB | Y | Y | (P,D)1.0 |
| | Ear-phone | N/A | Y | (D)1.2 |
| Notebook PC | RJ 45 | N/A | N | (D)1.5 |
| | Serial (Mouse) | N/A | Y | (D)1.8 |
| | DC in | N | N/A | (P)1.8 |
| Gateway | DC in | N | N/A | (P)1.8 |

* The marked "(D)" means the data cable and "(P)" means the power cable.

1.5 Noise Suppression Parts on Cable. (I/O cable)

| Product Name | Port | Ferrite Bead (Y/N) | Location | Metal Hood (Y/N) | Location |
|--------------|----------------|--------------------|----------|------------------|-----------------|
| EUT | Micro USB | N | N/A | Y | Both End |
| | Ear-phone | N | N/A | Y | EUT End |
| Notebook PC | RJ 45 | N | N/A | N | N/A |
| | Serial (Mouse) | N | N/A | Y | Notebook PC End |

1.6 Test Methodology

Both Conducted and Radiated testing was performed according to the procedures in ANSI C63.4/2003. Radiated testing was performed at an antenna to EUT distance of 3 m

1.7 Test Facility

Chamber used to collect the test data is located at the 74, SEOICHEON-RO, 578BEON-GIL, MAJANG-MYEON, ICHEON-SI, GYEONGGI-DO, KOREA. Those measurement facilities are constructed in conformance with the requirements of ANSI C63.4.

| Measurement Facilities | Reg. No. |
|--|-----------------------|
| Radiated Field strength measurement facility (3m) | 90661(Mar. 02, 2011) |
| Radiated Field strength measurement facility (10m) | 90661 (Sep. 03, 2010) |

1.8 Frequency Range of Radiated Measurements

An unintentional radiator, including a digital device, the spectrum shall be investigated from the lowest radio frequency signal generated or used in the device, without going below the lowest frequency for which a Radiated Emission limit is specified, up to the frequency shown in the following table

| Highest frequency generated or used in the device or on which the device operates or tunes (MHz) | Upper frequency of measurement range (MHz) |
|--|---|
| Below 1.705 | 30 |
| 1.705 to 108 | 1 000 |
| 108 to 500 | 2 000 |
| 500 to 1 000 | 5 000 |
| Above 1 000 | 5 th harmonic of the highest frequency or 40 GHz, whichever is lower |

2. SYSTEM TEST CONFIGURATION

2.1 Configuration of Test System

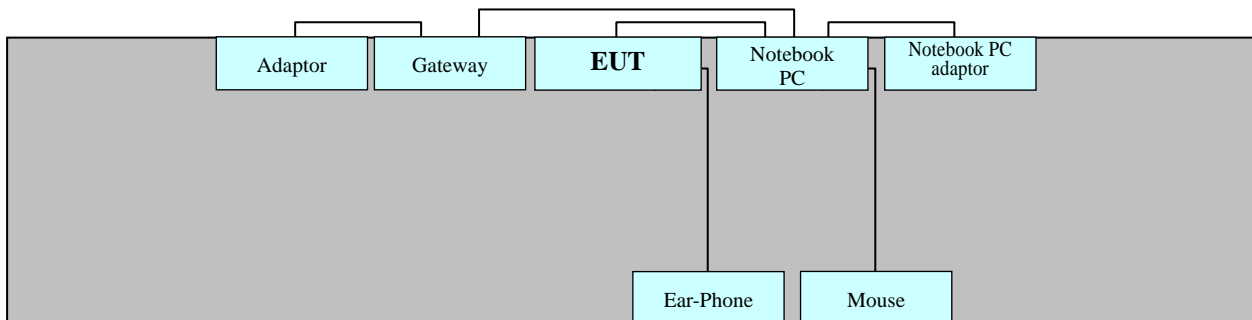
2.1.1 Conducted Emission Test

EUT was connected to LISN via Notebook PC adaptor and Base Station. Preliminary Power Line Conducted Emission tests were performed by using the procedure in ANSI C63.4/2003 7.2.3 to determine the worst operating conditions.

2.1.2 Radiated Emission Test

Preliminary Radiated Emission tests were performed by using the procedure in ANSI C63.4/2003 8.3.1.1 to determine the worst operating condition. Final Radiated Emission tests were performed at 3 m semi-anechoic chamber.

[Configuration of Tested System]



Non-Conductive Table
Power Line: 120 VAC

3. PRELIMINARY TEST

3.1 Conducted Emission Test

- It was tested Data Communication mode, after connecting all peripheral devices.

Operation Mode: Data Communication mode

3. 2 Radiated Emission Test

- It was tested Data Communication mode, after connecting all peripheral devices.

Operation Mode: Data Communication mode

4. CONDUCTED AND RADIATED EMISSION TEST SUMMARY

4.1 Conducted Emission Test

The following table shows the highest levels of conducted emissions on both polarization of hot and neutral line.

| | |
|----------------|---|
| Limit Apply to | : FCC PART 15 Subpart B Class B |
| Detector | : Quasi-Peak, Average (6 dB Bandwidth: 9 kHz) |
| Operation Mode | : Data Communication mode |
| Temperature | : 23.6 °C |
| Humidity Level | : 52.4 % |
| Test Date | : July 05, 2013 |

| Frequency (MHz) | Transd (dB) | Conductor | Quasi-Peak | | | Average | | |
|--------------------|----------------|-----------|-----------------|--------------------------------|---------------------------|-----------------|--------------------------------|---------------------------|
| | | | Limit (dBuV) | Measurement Level (dBuV) | Result Level (dBuV) | Limit (dBuV) | Measurement Level (dBuV) | Result Level (dBuV) |
| 0.154 | 9.8 | H | 66 | 44.3 | 54.1 | 56 | - | - |
| 0.154 | 10.0 | N | 66 | 44.8 | 54.8 | 56 | 21.4 | 31.4 |
| 0.174 | 10.0 | N | 65 | 39.8 | 49.8 | 55 | - | - |
| 0.186 | 9.8 | H | 64 | 38.4 | 48.2 | 54 | - | - |
| 0.190 | 10.0 | N | 64 | 38.1 | 48.1 | 54 | - | - |
| 0.210 | 9.8 | H | 63 | 37.1 | 46.9 | 53 | - | - |

※ **NOTE:** Refer to page 11 to page 14 for details.

1. Line H = Hot, Line N = Neutral
2. Transd = LISN factor + Cable Loss factor

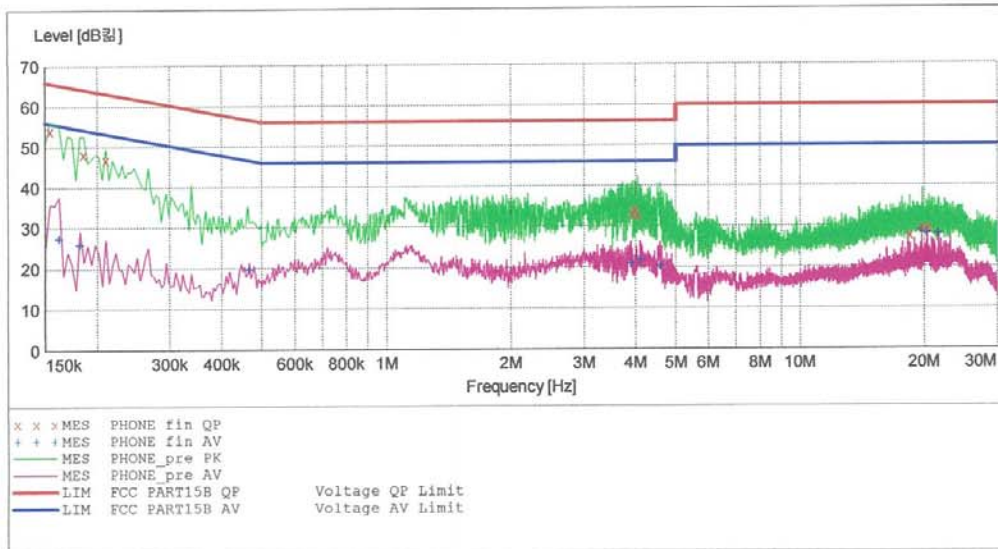
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EMC

EUT: LG-E410j
 Manufacturer: LG
 Operating Condition: DATA MODE
 Test Site: SHIELD ROOM
 Operator: GC YOON
 Test Specification: FCC PART15 B
 Comment: H

SCAN TABLE: "FCC CLASS B(H)"

| Start Frequency | Stop Frequency | Step Width | Detector | Meas. Time | IF Bandw. | Transducer |
|-----------------|----------------|------------|--------------|------------|-----------|------------|
| 150.0 kHz | 500.0 kHz | 4.0 kHz | KN22 CLASS B | 10.0 ms | 9 kHz | None |
| 500.0 kHz | 5.0 MHz | 4.0 kHz | MaxPeak | 10.0 ms | 9 kHz | None |
| 5.0 MHz | 30.0 MHz | 4.0 kHz | MaxPeak | 10.0 ms | 9 kHz | None |
| | | | Average | | | |



MEASUREMENT RESULT: "PHONE_fin QP"

2013-07-05 6:22 오후

| Frequency MHz | Level dBμV | Transd dB | Limit dBμV | Margin dB | Line | PE |
|---------------|------------|-----------|------------|-----------|------|-----|
| 0.154001 | 54.10 | 9.8 | 66 | 11.7 | --- | --- |
| 0.186001 | 48.20 | 9.8 | 64 | 16.0 | --- | --- |
| 0.210001 | 46.90 | 9.8 | 63 | 16.3 | --- | --- |
| 3.944000 | 33.00 | 10.1 | 56 | 23.0 | --- | --- |
| 3.980000 | 34.20 | 10.1 | 56 | 21.8 | --- | --- |
| 4.048000 | 32.80 | 10.1 | 56 | 23.2 | --- | --- |
| 18.468000 | 27.70 | 10.9 | 60 | 32.3 | --- | --- |
| 19.768000 | 29.60 | 10.9 | 60 | 30.4 | --- | --- |
| 20.524000 | 29.50 | 10.9 | 60 | 30.5 | --- | --- |

MEASUREMENT RESULT: "PHONE_fin AV"

2013-07-05 6:22 오후

| Frequency MHz | Level dB _{μV} | Transd dB | Limit dB _{μV} | Margin dB | Line | PE |
|------------------|---------------------------|--------------|---------------------------|--------------|------|-----|
| 0.162001 | 27.40 | 9.8 | 55 | 28.0 | --- | --- |
| 0.182001 | 25.80 | 9.8 | 54 | 28.6 | --- | --- |
| 0.466001 | 19.70 | 9.8 | 47 | 26.9 | --- | --- |
| 3.904000 | 20.80 | 10.1 | 46 | 25.2 | --- | --- |
| 4.112000 | 21.60 | 10.1 | 46 | 24.4 | --- | --- |
| 4.588000 | 20.10 | 10.2 | 46 | 25.9 | --- | --- |
| 19.708000 | 28.80 | 10.9 | 50 | 21.2 | --- | --- |
| 20.260000 | 28.10 | 10.9 | 50 | 21.9 | --- | --- |
| 21.664000 | 27.90 | 11.0 | 50 | 22.1 | --- | --- |

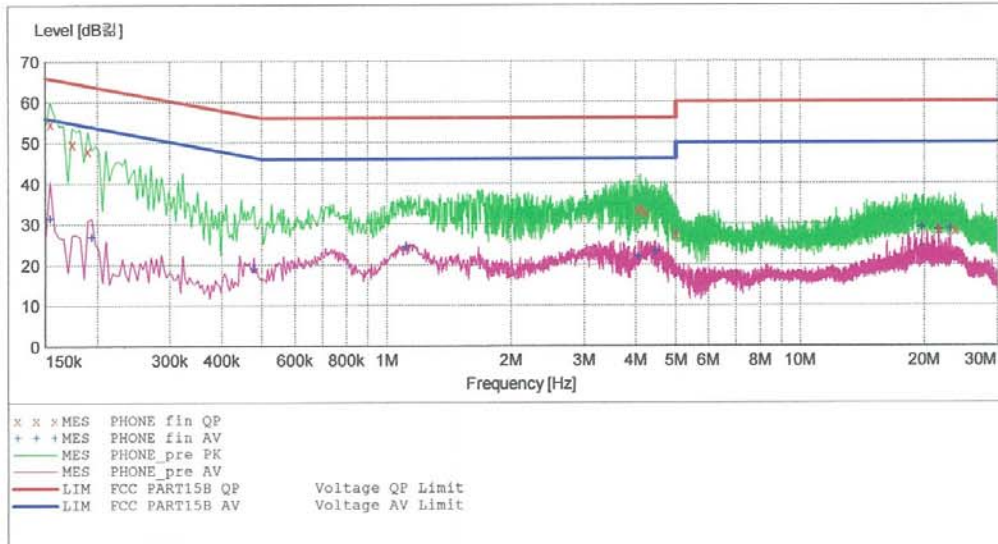
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EMC

EUT: LG-E410j
 Manufacturer: LG
 Operating Condition: DATA MODE
 Test Site: SHIELD ROOM
 Operator: GC YOON
 Test Specification: FCC PART15 B
 Comment: N

SCAN TABLE: "FCC CLASS B(N)"

| Short Description: | | | KN22 CLASS B | | | |
|--------------------|----------------|------------|--------------|------------|-----------|------------|
| Start Frequency | Stop Frequency | Step Width | Detector | Meas. Time | IF Bandw. | Transducer |
| 150.0 kHz | 500.0 kHz | 4.0 kHz | MaxPeak | 10.0 ms | 9 kHz | None |
| | | | Average | | | |
| 500.0 kHz | 5.0 MHz | 4.0 kHz | MaxPeak | 10.0 ms | 9 kHz | None |
| | | | Average | | | |
| 5.0 MHz | 30.0 MHz | 4.0 kHz | MaxPeak | 10.0 ms | 9 kHz | None |
| | | | Average | | | |



MEASUREMENT RESULT: "PHONE_fin QP"

2013-07-05 6:18오 후

| Frequency MHz | Level dBμV | Transd dB | Limit dBμV | Margin dB | Line | PE |
|---------------|------------|-----------|------------|-----------|------|-----|
| 0.154001 | 54.80 | 10.0 | 66 | 11.0 | --- | --- |
| 0.174001 | 49.80 | 10.0 | 65 | 15.0 | --- | --- |
| 0.190001 | 48.10 | 10.0 | 64 | 15.9 | --- | --- |
| 4.064000 | 33.40 | 10.3 | 56 | 22.6 | --- | --- |
| 4.116000 | 33.90 | 10.3 | 56 | 22.1 | --- | --- |
| 4.232000 | 32.80 | 10.3 | 56 | 23.2 | --- | --- |
| 5.000000 | 27.50 | 10.4 | 56 | 28.5 | --- | --- |
| 21.720000 | 28.70 | 11.3 | 60 | 31.3 | --- | --- |
| 23.700000 | 28.40 | 11.5 | 60 | 31.6 | --- | --- |

MEASUREMENT RESULT: "PHONE_fin AV"

2013-07-05 6:18 오후

| Frequency MHz | Level dB _{μV} | Transd dB | Limit dB _{μV} | Margin dB | Line | PE |
|------------------|---------------------------|--------------|---------------------------|--------------|------|-----|
| 0.154001 | 31.40 | 10.0 | 56 | 24.3 | --- | --- |
| 0.194001 | 26.80 | 10.0 | 54 | 27.1 | --- | --- |
| 0.478001 | 19.20 | 10.0 | 46 | 27.2 | --- | --- |
| 1.116000 | 24.50 | 10.1 | 46 | 21.5 | --- | --- |
| 4.064000 | 21.90 | 10.3 | 46 | 24.1 | --- | --- |
| 4.472000 | 23.20 | 10.3 | 46 | 22.8 | --- | --- |
| 19.708000 | 29.10 | 11.2 | 50 | 20.9 | --- | --- |
| 21.664000 | 28.60 | 11.3 | 50 | 21.4 | --- | --- |
| 23.128000 | 28.80 | 11.4 | 50 | 21.2 | --- | --- |

4.2 Radiated Emission Test

The following table shows the highest levels of Radiated Emissions on both polarization of horizontal and vertical.

-For measurement below 1 GHz

Limit Apply to : FCC PART 15 Subpart B Class B

Detector : Quasi-Peak (6 dB Bandwidth: 120 kHz)

Operation Mode : Data Communication mode

Temperature : 22.9 °C

Humidity Level : 57.2 %

Test Date : July 09, 2013

| Frequency (MHz) | Reading (dBuV) | Polarity (H/V) | Antenna Height (m) | Correction Factor | | Limit (dBuV/m) | Level (dBuV/m) | Margin (dB) |
|-----------------|----------------|----------------|--------------------|-------------------|------------|----------------|----------------|-------------|
| | | | | Antenna (dB/m) | Cable (dB) | | | |
| 44.400 | 11.00 | V | 1.0 | 12.37 | 3.53 | 40.0 | 26.9 | 13.1 |
| 58.100 | 12.46 | V | 1.0 | 11.91 | 3.62 | 40.0 | 28.0 | 12.0 |
| 93.200 | 18.25 | H | 1.3 | 8.03 | 3.82 | 43.5 | 30.1 | 13.4 |
| 125.000 | 14.07 | H | 1.0 | 12.01 | 4.02 | 43.5 | 30.1 | 13.4 |
| 250.200 | 12.92 | H | 1.0 | 11.78 | 4.50 | 46.0 | 29.2 | 16.8 |
| 624.000 | 6.53 | H | 1.0 | 19.96 | 5.51 | 46.0 | 32.0 | 14.0 |

-For measurement above 1 GHz

Limit Apply to : FCC PART 15 Subpart B Class B

Detector : Peak mode: Peak (RBW: 1 MHz, VBW: 1 MHz)
 : Average mode: Peak (RBW: 1 MHz, VBW: 10 Hz)

Operation Mode : Data Communication mode

Temperature : 22.9 °C

Humidity Level : 57.2 %

Test Date : July 09, 2013

| Frequency (GHz) | Peak | | | POL | Average | | |
|--------------------|-------------------------|-------------------------|----------------|-----|-------------------------|-------------------------|----------------|
| | Total (dB μ V/m) | Limit (dB μ V/m) | Margin (dB) | | Total (dB μ V/m) | Limit (dB μ V/m) | Margin (dB) |
| 1.9922 | 51.40 | 74 | 22.6 | V | 36.20 | 54 | 17.8 |

※ NOTE:

1. Measurement above 1 GHz was performed from 1 GHz to the 5th harmonic of highest fundamental frequency. Test was measured by 12 GHz.

5. FIELD STRENGTH CALCULATION

The field strength is calculated by adding the antenna factor and cable factor.
 The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF$$

Where FS = Field Strength

RA = Receiver Amplitude

AF = Antenna Factor

CF = Cable Attenuation Factor

Assume a receiver reading of 21.5 dB μ V is obtained. The antenna factor of 7.4 dB/m and a cable factor of 1.1 dB are added. The 30 dB μ V/m value is mathematically converted to its corresponding level in μ V/m.

$$FS = 21.5 + 7.4 + 1.1 = 30 \text{ dB}\mu\text{V/m}$$

[Radiated Emission Limits]

| Frequency of Emission (MHz) | Field Strength | |
|--------------------------------|----------------|--------------|
| | μ V/m | dB μ V/m |
| 30 to 88 | 100 | 40.0 |
| 88 to 216 | 150 | 43.5 |
| 216 to 960 | 200 | 46.0 |
| Above 960 | 500 | 54.0 |

6. TEST EQUIPMENT

| <u>Type</u> | <u>Manufacturer</u> | <u>Model Name</u> | <u>Serial Number</u> | <u>Calibration Cycle</u> | <u>Next CAL Date</u> |
|---|---------------------|-------------------|----------------------|--------------------------|----------------------|
| <u>Conducted Emission</u> | | | | | |
| <input checked="" type="checkbox"/> EMI Test Receiver | Rohde & Schwarz | ESCI | 100584 | 1 year | 2014.04.25 |
| <input checked="" type="checkbox"/> LISN | EMCO | 3816/2SH | 9706-1070 | 1 year | 2014.04.26 |
| <input checked="" type="checkbox"/> LISN | Rohde & Schwarz | ENV216 | 100073 | 1 year | 2014.02.06 |
| <input type="checkbox"/> Attenuator | Rohde & Schwarz | ESH3-Z2 | 357.8810.352 | 1 year | 2013.07.31 |

Radiated Emission

-For measurement below 1 GHz

| | | | | | |
|---|-----------------|----------|-----------|--------|------------|
| <input checked="" type="checkbox"/> EMI Test Receiver | Rohde & Schwarz | ESI40 | 831564103 | 1 year | 2014.04.16 |
| <input checked="" type="checkbox"/> Trilog Antenna | Schwarzbeck | VULB9160 | 3301 | 2 year | 2014.12.17 |
| <input checked="" type="checkbox"/> Antenna master | HD GmbH | MA240 | 240/520 | N/A | - |
| <input checked="" type="checkbox"/> Turn Table | HD GmbH | 2090 | 9702/1224 | N/A | - |

-For measurement above 1 GHz

| | | | | | |
|---|-----------------|------------|-----------|--------|------------|
| <input checked="" type="checkbox"/> EMI Test Receiver | Rohde & Schwarz | ESI40 | 831564103 | 1 year | 2014.04.16 |
| <input checked="" type="checkbox"/> Antenna master | HD GmbH | MA240 | 240/520 | N/A | - |
| <input checked="" type="checkbox"/> Turn Table | HD GmbH | 2090 | 9702/1224 | N/A | - |
| <input checked="" type="checkbox"/> Power Amplifier | Rohde & Schwarz | SCU-18 | 10094 | 1 year | 2013.09.11 |
| <input checked="" type="checkbox"/> Horn Antenna | Schwarzbeck | BBHA 9120D | 296 | 2 year | 2014.12.13 |

7. CONCLUSION

The data collected shows that the **EUT type: GSM/WCDMA Phone with Bluetooth3.0, WIFI802.11 b/g/n, FCC ID: ZNFE410J, Model: LG-E410j** complies with §15.107 and §15.109 of the FCC rules.