

# EMI CERTIFICATION REPORT

**Applicant:**

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

**Date of Receipt: March 03, 2015****Date of Issue: April 20, 2015****Test Report No. HCT-E-1503-F011-1****HCT FRN: 0005866421****FCC ID:****ZNFLS991**

**Rule Part(s) / Standard(s):** FCC CFR 47 PART 15 Subpart B Class B  
**FCC Classification:** JBP (Part 15 B – Class B Computing Device Peripheral)  
**EUT Type:** Cellular/PCS CDMA/EVDO and LTE Phone with Bluetooth, WLAN and NFC  
**Model Name:** LGLS991  
**Additional Model Name:** LS991, LG-LS991  
**Test Port:** USB / Earphone Port  
**Date of Test:** March 03, 2015 - March 10, 2015  
April 20, 2015

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 denied the FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C 862

**Tested By**

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**EMC Team**  
**Certification Division**

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## DOCUMENT HISTORY

The revision history for this document is shown in table.

| Version           | Date           | Description                       |
|-------------------|----------------|-----------------------------------|
| HCT-E-1503-F011   | March 11, 2015 | Initial Release                   |
| HCT-E-1503-F011-1 | April 20, 2015 | Additional testing of Quick Cover |



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### ATTACHMENT:     TEST SETUP PHOTOGRAPHS



## 1. GENERAL INFORMATION

### 1.1 Description of EUT

Equipment Under Test is manufactured by **LG Electronics MobileComm U.S.A., Inc.**  
Its basic purpose is used for communications.

|                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Model</b>            | LGLS991                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>FCC ID</b>           | ZNFLS991                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Additional Model</b> | LS991, LG-LS991                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>EUT Type</b>         | Cellular/PCS CDMA/EVDO and LTE Phone with Bluetooth, WLAN and NFC                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>TX Frequency</b>     | 824.70 MHz to 848.31 MHz (CDMA BC0)<br>1 851.25 MHz to 1 908.75 MHz (CDMA BC1)<br>817.90 MHz to 823.10 MHz (CDMA BC10)<br>824.20 MHz to 848.80 MHz (GSM 850)<br>1 850.20 MHz to 1 909.80 MHz (GSM 1 900)<br>826.40 MHz to 846.60 MHz (WCDMA 850)<br>1 852.4 MHz to 1 907.6 MHz (WCDMA 1 900)<br>1 850.7 MHz to 1 909.3 MHz (LTE B2)<br>1 710 MHz to 1 755 MHz (LTE B4)<br>824 MHz to 849 MHz (LTE B5)<br>699 MHz to 716 MHz (LTE B12)<br>1 850 MHz to 1 915 MHz (LTE B25)<br>814 MHz to 849 MHz (LTE B26)<br>2 496 MHz to 2 690 MHz (LTE B41)   |
| <b>RX Frequency</b>     | 869.70 MHz to 893.31 MHz (CDMA BC0)<br>1 931.25 MHz to 1 988.75 MHz (CDMA BC1)<br>862.00 MHz to 894.00 MHz (CDMA BC10)<br>869.20 MHz to 893.80 MHz (GSM 850)<br>1 930.20 MHz to 1 989.80 MHz (GSM 1 900)<br>871.40 MHz to 891.60 MHz (WCDMA 850)<br>1 932.4 MHz to 1 987.6 MHz (WCDMA 1 900)<br>1 930.00 MHz to 1 990.00 MHz (LTE B2)<br>2 110 MHz to 2 155 MHz (LTE B4)<br>869 MHz to 894 MHz (LTE B5)<br>729 MHz to 746 MHz (LTE B12)<br>1 925 MHz to 1 990 MHz (LTE B25)<br>859 MHz to 894 MHz (LTE B26)<br>2 496 MHz to 2 690 MHz (LTE B41) |



## 1.2 Related Submittal(s) / Grant(s)

Original submittal only.

## 1.3 Test Facility

Test site is located at 74, SEOICHEON-RO, 578BEON-GIL, MAJANG-MYEON, ICHEON-SI, GYEONGGI-DO, SOUTH KOREA. Those measurement facilities are constructed in conformance with the requirements of ANSI C63.4-2003.

| Measurement Facilities                              | Reg. No.                  |
|-----------------------------------------------------|---------------------------|
| Radiated Field strength measurement facility (3 m)  | 90661 (February 28, 2014) |
| Radiated Field strength measurement facility (10 m) | 90661 (February 28, 2014) |



## 1.4 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                 | LGLS991               | LG                              | ZNFLS991     | Notebook PC, Earphone    |
| USB cable           | LG0121                | Ningbo Broad                    | -            | EUT, Notebook PC         |
| USB cable           | DLC-LGE51DC MUW-1     | CRESYN                          | -            | EUT, Notebook PC         |
| USB cable           | KCA-ET-3-0255         | KSD                             | -            | EUT, Notebook PC         |
| Earphone            | EAB62910501           | I-SOUND                         | -            | EUT                      |
| Standard cover      | -                     | -                               | -            | EUT                      |
| Quick cover         | ACQ88174001           | DKUIL                           | -            | EUT                      |
| Notebook PC         | ProBook6560b          | HP                              | DoC          | EUT, Notebook PC adaptor |
| Notebook PC adaptor | PPP009D               | DELTA Electronics (Jiangsu) LTD | -            | Notebook PC              |
| Gateway             | MV440                 | Axesstel                        | PH7MV440     | Notebook PC, Adaptor     |
| Serial mouse        | Serial 2 button mouse | Radio shack                     | FSUGMZE3     | Notebook PC              |
| Adaptor             | DA-60M12              | Yang Ming Industrial            | -            | Gateway                  |
| RJ45 cable          | -                     | -                               | -            | Notebook PC, Gateway     |
| Micro SD card       | 16 GB                 | Samsung                         | -            | EUT                      |



## 1.5 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)1.2   |
|              | Earphone       | 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.

## 1.6 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        |
|              | Earphone       | 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 |



## 2. DESCRIPTION OF TEST

### 2.1 Measurement of Conducted Emission

The test procedure was in accordance with ANSI C63.4-2003, Clause 7

- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN).  
If the EUT is connected to the PC through USB, the AC power-line adapter of the PC is directly connected to a line impedance stabilization network (LISN).  
Other support units were connected to the power mains through another LISN. The two LISNs provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both conducted lines are measured in Quasi-Peak and Average mode, including the worst-case data points for each tested configuration.
- c. The frequency range from 150 kHz to 30 MHz was searched.

#### [ Conducted Emission Limits ]

| Frequency<br>(MHz) | Resolution Bandwidth<br>(kHz) | Quasi-Peak<br>(dB(μV)) | Average<br>(dB(μV)) |
|--------------------|-------------------------------|------------------------|---------------------|
| 0.15 to 0.5        | 9                             | 66 to 56*              | 56 to 46*           |
| 0.5 to 5           | 9                             | 56                     | 46                  |
| 5 to 30            | 9                             | 60                     | 50                  |

*\*Decreases with the logarithm of the frequency.*



## 2.2 Measurement of Radiated Emission

The test procedure was in accordance with ANSI C63.4-2003, Clause 8

- a. The EUT was placed on the top of a turn table 0.8 meters above the ground at a 3 m shield room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 m away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna height is varied from 1 m to 4 m above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 m to 4 m and the turn table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Quasi-Peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to Peak and Average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz.
- g. The antenna height scans apply for both horizontal and vertical polarizations, except that for vertical polarization, the minimum height of the center of the antenna shall be increased so that the lowest point of the bottom of the lowest antenna element clears the site reference ground plane by at least 25 cm. (below 1 GHz)

### [ Radiated Emission Limits ]

| Frequency (MHz) | Antenna Distance (m) | Field Strength (μV/m) | Quasi-Peak (dB(μV)/m) |
|-----------------|----------------------|-----------------------|-----------------------|
| 30 to 88        | 3                    | 100                   | 40.0                  |
| 88 to 216       | 3                    | 150                   | 43.5                  |
| 216 to 960      | 3                    | 200                   | 46.0                  |
| Above 960       | 3                    | 500                   | 54.0                  |
| Frequency (MHz) | Antenna Distance (m) | Peak (dB(μV)/m)       | Average (dB(μV)/m)    |
| Above 1 000     | 3                    | 74                    | 54                    |

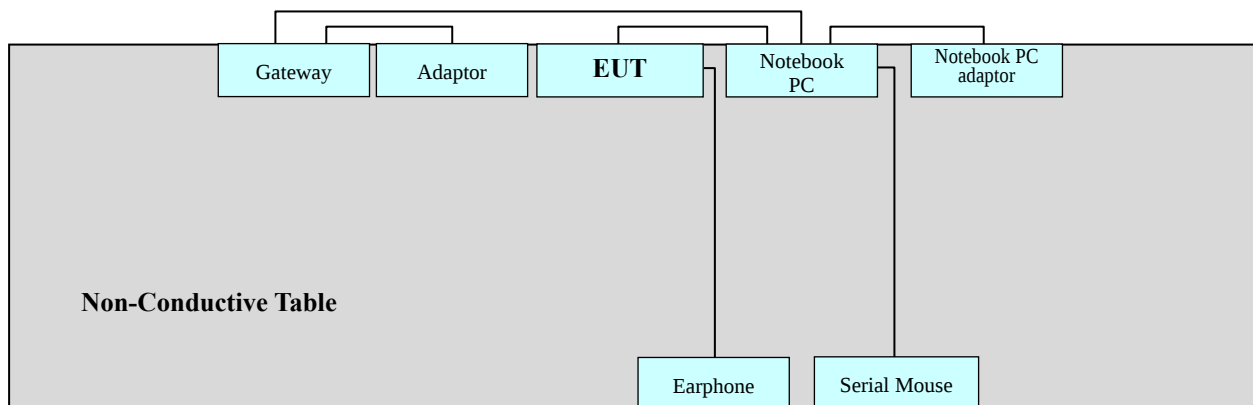


## 2.2.1 Frequency Range of Radiated Measurements

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 <sup>th</sup> harmonic of the highest frequency or 40 GHz, whichever is lower |

## 2.3 Configuration of Tested System



Power Line: 120 VAC, 60 Hz



### 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

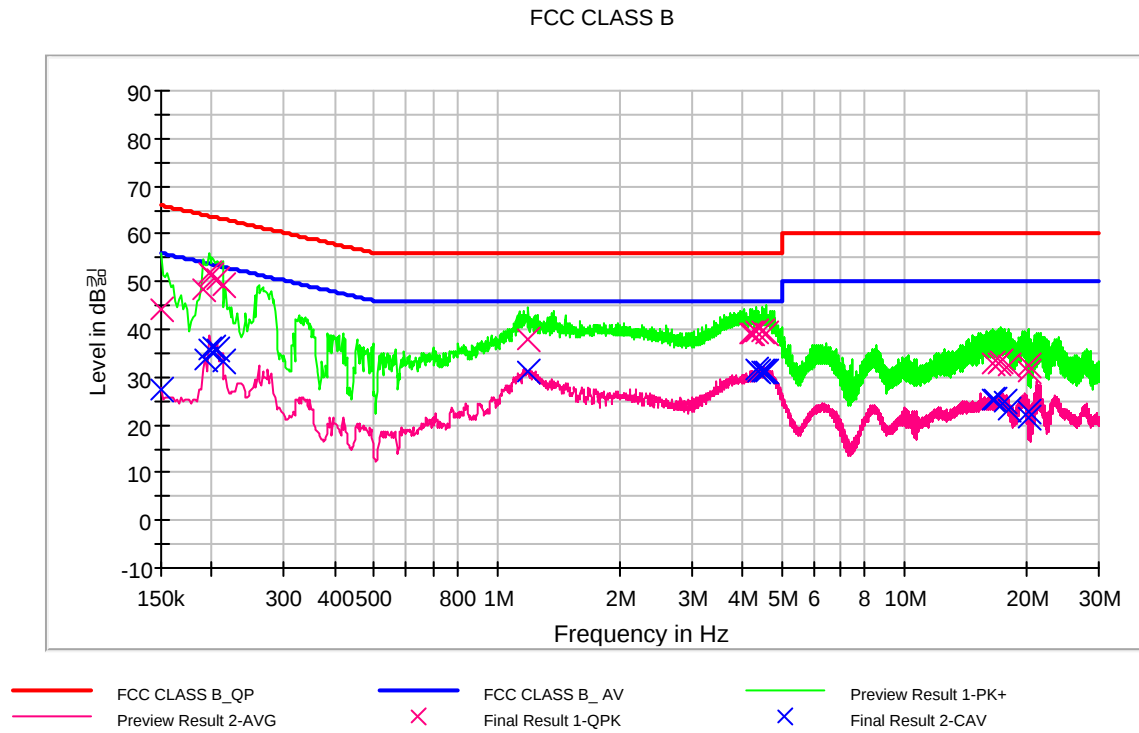
### 4.1 Conducted Emission Test

The test results of conducted emission at mains ports provide the following information:

|                      |                                                                           |
|----------------------|---------------------------------------------------------------------------|
| Rule Part / Standard | FCC PART 15 Subpart B Class B                                             |
| Detector             | Quasi-Peak, CISPR-Average                                                 |
| Bandwidth            | 9 kHz (6 dB)                                                              |
| Operation Mode       | Data Communication mode                                                   |
| EUT Cover Type       | Standard cover                                                            |
| USB Type             | CRESYN(DLC-LGE51DCMUW-1)<br>※NOTE: The worst-case emissions are reported. |
| Kind of Test Site    | Shielded Room                                                             |
| Temperature          | 21.6 °C                                                                   |
| Relative Humidity    | 24.8 %                                                                    |
| Test Date            | March 10, 2015                                                            |

#### - Calculation Formula:

1. Conductor L1 = Hot, Conductor N = Neutral
2. Corr. = LISN Factor + Cable Loss
3. QuasiPeak or CAverage= Receiver Reading + Corr.
4. Margin = Limit – QuasiPeak or CAverage

**Figure 1: Spectral Diagrams, Conducted Emission, AC Main Port, Line (L1)**



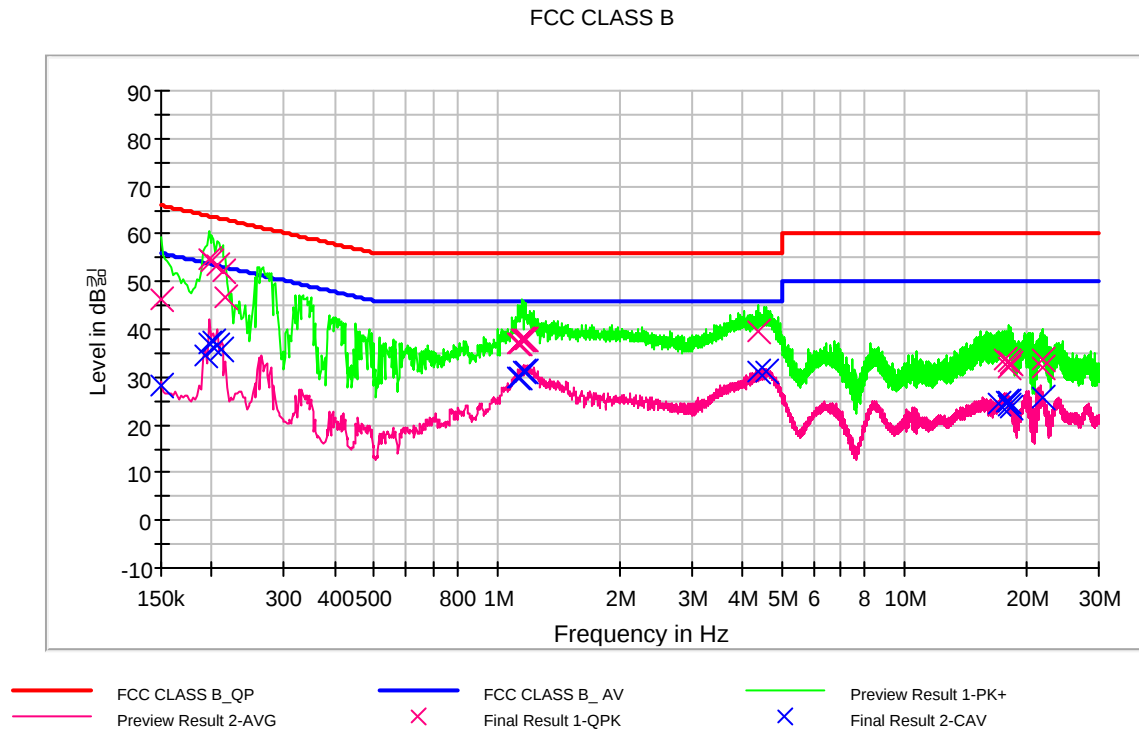
## QuasiPeak Final Result, Line (L1)

| Frequency (MHz) | QuasiPeak (dBuV) | Bandwidth (kHz) | Line | Corr. (dB) | Margin (dB) | Limit (dBuV) |
|-----------------|------------------|-----------------|------|------------|-------------|--------------|
| 0.150000        | 44.3             | 9.000           | L1   | 9.6        | 21.7        | 66.0         |
| 0.190000        | 48.5             | 9.000           | L1   | 9.6        | 15.5        | 64.0         |
| 0.196000        | 51.8             | 9.000           | L1   | 9.6        | 12.0        | 63.8         |
| 0.200000        | 51.4             | 9.000           | L1   | 9.7        | 12.2        | 63.6         |
| 0.206000        | 50.6             | 9.000           | L1   | 9.7        | 12.8        | 63.4         |
| 0.212000        | 49.4             | 9.000           | L1   | 9.7        | 13.7        | 63.1         |
| 1.196000        | 37.8             | 9.000           | L1   | 9.7        | 18.2        | 56.0         |
| 4.178000        | 39.3             | 9.000           | L1   | 9.9        | 16.7        | 56.0         |
| 4.248000        | 39.3             | 9.000           | L1   | 9.9        | 16.7        | 56.0         |
| 4.318000        | 39.5             | 9.000           | L1   | 9.9        | 16.5        | 56.0         |
| 4.460000        | 39.7             | 9.000           | L1   | 9.9        | 16.3        | 56.0         |
| 4.602000        | 39.2             | 9.000           | L1   | 9.9        | 16.8        | 56.0         |
| 16.494000       | 32.7             | 9.000           | L1   | 10.2       | 27.3        | 60.0         |
| 16.990000       | 32.7             | 9.000           | L1   | 10.2       | 27.3        | 60.0         |
| 17.198000       | 33.3             | 9.000           | L1   | 10.2       | 26.7        | 60.0         |
| 18.118000       | 32.6             | 9.000           | L1   | 10.3       | 27.4        | 60.0         |
| 20.170000       | 32.5             | 9.000           | L1   | 10.3       | 27.5        | 60.0         |
| 20.184000       | 31.3             | 9.000           | L1   | 10.3       | 28.7        | 60.0         |



## CAverage Final Result, Line (L1)

| Frequency (MHz) | CAverage (dBuV) | Bandwidth (kHz) | Line | Corr. (dB) | Margin (dB) | Limit (dBuV) |
|-----------------|-----------------|-----------------|------|------------|-------------|--------------|
| 0.150000        | 27.5            | 9.000           | L1   | 9.6        | 28.5        | 56.0         |
| 0.192000        | 33.6            | 9.000           | L1   | 9.6        | 20.3        | 53.9         |
| 0.196000        | 35.9            | 9.000           | L1   | 9.6        | 17.9        | 53.8         |
| 0.202000        | 36.2            | 9.000           | L1   | 9.7        | 17.3        | 53.5         |
| 0.206000        | 35.7            | 9.000           | L1   | 9.7        | 17.7        | 53.4         |
| 0.212000        | 33.4            | 9.000           | L1   | 9.7        | 19.7        | 53.1         |
| 1.196000        | 31.0            | 9.000           | L1   | 9.7        | 15.0        | 46.0         |
| 4.318000        | 31.4            | 9.000           | L1   | 9.9        | 14.6        | 46.0         |
| 4.388000        | 31.4            | 9.000           | L1   | 9.9        | 14.6        | 46.0         |
| 4.462000        | 31.2            | 9.000           | L1   | 9.9        | 14.8        | 46.0         |
| 4.532000        | 31.1            | 9.000           | L1   | 9.9        | 14.9        | 46.0         |
| 4.602000        | 31.3            | 9.000           | L1   | 9.9        | 14.7        | 46.0         |
| 16.494000       | 25.1            | 9.000           | L1   | 10.2       | 24.9        | 50.0         |
| 16.634000       | 25.2            | 9.000           | L1   | 10.2       | 24.8        | 50.0         |
| 17.696000       | 25.1            | 9.000           | L1   | 10.3       | 24.9        | 50.0         |
| 18.118000       | 23.2            | 9.000           | L1   | 10.3       | 26.8        | 50.0         |
| 20.170000       | 21.7            | 9.000           | L1   | 10.3       | 28.3        | 50.0         |
| 20.184000       | 22.7            | 9.000           | L1   | 10.3       | 27.3        | 50.0         |

**Figure 2: Spectral Diagrams, Conducted Emission, AC Main Port, Line (N)**



## QuasiPeak Final Result, Line (N)

| Frequency (MHz) | QuasiPeak (dBuV) | Bandwidth (kHz) | Line | Corr. (dB) | Margin (dB) | Limit (dBuV) |
|-----------------|------------------|-----------------|------|------------|-------------|--------------|
| 0.150000        | 46.5             | 9.000           | N    | 9.6        | 19.5        | 66.0         |
| 0.196000        | 54.7             | 9.000           | N    | 9.6        | 9.1         | 63.8         |
| 0.200000        | 54.4             | 9.000           | N    | 9.6        | 9.2         | 63.6         |
| 0.206000        | 53.5             | 9.000           | N    | 9.6        | 9.9         | 63.4         |
| 0.212000        | 52.1             | 9.000           | N    | 9.6        | 11.0        | 63.1         |
| 0.216000        | 46.6             | 9.000           | N    | 9.6        | 16.4        | 63.0         |
| 1.126000        | 37.2             | 9.000           | N    | 9.7        | 18.8        | 56.0         |
| 1.132000        | 37.2             | 9.000           | N    | 9.7        | 18.8        | 56.0         |
| 1.156000        | 37.9             | 9.000           | N    | 9.7        | 18.1        | 56.0         |
| 1.162000        | 37.8             | 9.000           | N    | 9.7        | 18.2        | 56.0         |
| 1.178000        | 37.7             | 9.000           | N    | 9.7        | 18.3        | 56.0         |
| 4.390000        | 39.5             | 9.000           | N    | 9.9        | 16.5        | 56.0         |
| 17.632000       | 33.7             | 9.000           | N    | 10.2       | 26.3        | 60.0         |
| 17.988000       | 33.3             | 9.000           | N    | 10.3       | 26.7        | 60.0         |
| 18.034000       | 32.1             | 9.000           | N    | 10.3       | 27.9        | 60.0         |
| 18.198000       | 32.9             | 9.000           | N    | 10.3       | 27.1        | 60.0         |
| 21.728000       | 33.7             | 9.000           | N    | 10.3       | 26.3        | 60.0         |
| 21.882000       | 32.2             | 9.000           | N    | 10.3       | 27.8        | 60.0         |



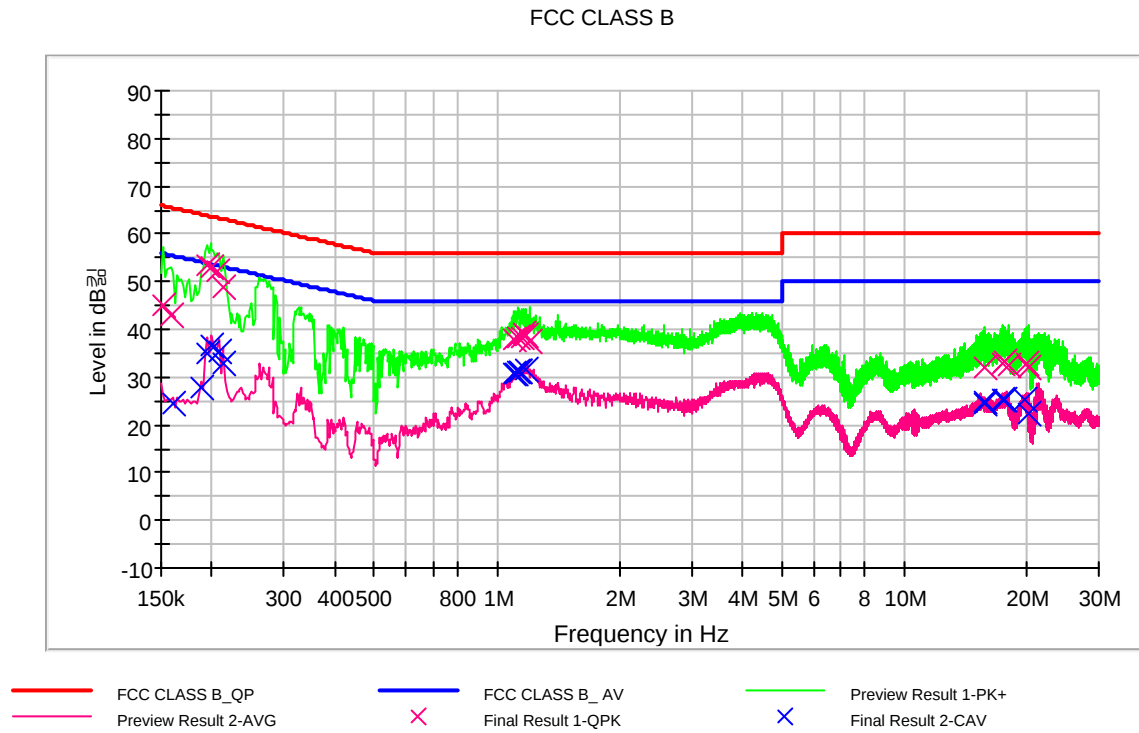
## CAverage Final Result, Line (N)

| Frequency (MHz) | CAverage (dBuV) | Bandwidth (kHz) | Line | Corr. (dB) | Margin (dB) | Limit (dBuV) |
|-----------------|-----------------|-----------------|------|------------|-------------|--------------|
| 0.150000        | 28.2            | 9.000           | N    | 9.6        | 27.8        | 56.0         |
| 0.192000        | 34.4            | 9.000           | N    | 9.6        | 19.5        | 53.9         |
| 0.196000        | 37.2            | 9.000           | N    | 9.6        | 16.6        | 53.8         |
| 0.202000        | 37.4            | 9.000           | N    | 9.6        | 16.1        | 53.5         |
| 0.206000        | 36.7            | 9.000           | N    | 9.6        | 16.7        | 53.4         |
| 0.210000        | 35.7            | 9.000           | N    | 9.6        | 17.6        | 53.2         |
| 1.126000        | 29.9            | 9.000           | N    | 9.7        | 16.1        | 46.0         |
| 1.142000        | 29.8            | 9.000           | N    | 9.7        | 16.2        | 46.0         |
| 1.162000        | 31.1            | 9.000           | N    | 9.7        | 14.9        | 46.0         |
| 1.178000        | 31.0            | 9.000           | N    | 9.7        | 15.0        | 46.0         |
| 4.390000        | 31.1            | 9.000           | N    | 9.9        | 14.9        | 46.0         |
| 4.604000        | 31.2            | 9.000           | N    | 9.9        | 14.8        | 46.0         |
| 17.064000       | 24.5            | 9.000           | N    | 10.2       | 25.5        | 50.0         |
| 17.730000       | 24.9            | 9.000           | N    | 10.3       | 25.1        | 50.0         |
| 17.988000       | 24.7            | 9.000           | N    | 10.3       | 25.3        | 50.0         |
| 18.034000       | 23.9            | 9.000           | N    | 10.3       | 26.1        | 50.0         |
| 18.198000       | 23.6            | 9.000           | N    | 10.3       | 26.4        | 50.0         |
| 21.728000       | 25.9            | 9.000           | N    | 10.3       | 24.1        | 50.0         |



The test results of conducted emission at mains ports provide the following information:

|                             |                                                                           |
|-----------------------------|---------------------------------------------------------------------------|
| <b>Rule Part / Standard</b> | FCC PART 15 Subpart B Class B                                             |
| <b>Detector</b>             | Quasi-Peak, CISPR-Average                                                 |
| <b>Bandwidth</b>            | 9 kHz (6 dB)                                                              |
| <b>Operation Mode</b>       | Data Communication mode                                                   |
| <b>EUT Cover Type</b>       | Quick cover                                                               |
| <b>USB Type</b>             | CRESYN(DLC-LGE51DCMUW-1)<br>※NOTE: The worst-case emissions are reported. |
| <b>Kind of Test Site</b>    | Shielded Room                                                             |
| <b>Temperature</b>          | 21.9 °C                                                                   |
| <b>Relative Humidity</b>    | 37.9 %                                                                    |
| <b>Test Date</b>            | April 20, 2015                                                            |

**Figure 3: Spectral Diagrams, Conducted Emission, AC Main Port, Line (L1)**



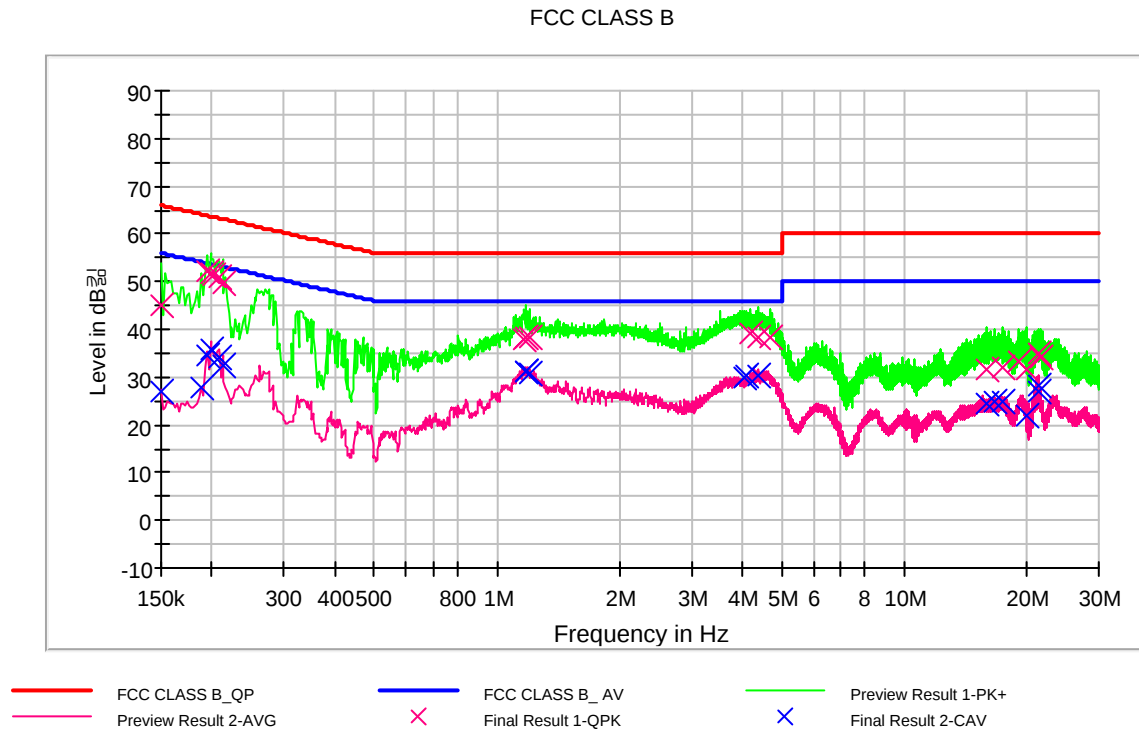
## QuasiPeak Final Result, Line (L1)

| Frequency (MHz) | QuasiPeak (dBuV) | Bandwidth (kHz) | Line | Corr. (dB) | Margin (dB) | Limit (dBuV) |
|-----------------|------------------|-----------------|------|------------|-------------|--------------|
| 0.152000        | 45.0             | 9.000           | L1   | 9.6        | 20.9        | 65.9         |
| 0.158000        | 43.0             | 9.000           | L1   | 9.6        | 22.6        | 65.6         |
| 0.194000        | 53.3             | 9.000           | L1   | 9.6        | 10.6        | 63.9         |
| 0.198000        | 53.0             | 9.000           | L1   | 9.6        | 10.7        | 63.7         |
| 0.206000        | 52.0             | 9.000           | L1   | 9.7        | 11.4        | 63.4         |
| 0.214000        | 49.0             | 9.000           | L1   | 9.7        | 14.0        | 63.0         |
| 1.106000        | 37.8             | 9.000           | L1   | 9.7        | 18.2        | 56.0         |
| 1.130000        | 38.5             | 9.000           | L1   | 9.7        | 17.5        | 56.0         |
| 1.148000        | 38.3             | 9.000           | L1   | 9.7        | 17.7        | 56.0         |
| 1.166000        | 39.1             | 9.000           | L1   | 9.7        | 16.9        | 56.0         |
| 1.176000        | 38.7             | 9.000           | L1   | 9.7        | 17.3        | 56.0         |
| 1.206000        | 37.3             | 9.000           | L1   | 9.7        | 18.7        | 56.0         |
| 15.650000       | 31.9             | 9.000           | L1   | 10.2       | 28.1        | 60.0         |
| 17.420000       | 32.9             | 9.000           | L1   | 10.3       | 27.1        | 60.0         |
| 17.706000       | 33.1             | 9.000           | L1   | 10.3       | 26.9        | 60.0         |
| 18.054000       | 32.6             | 9.000           | L1   | 10.3       | 27.4        | 60.0         |
| 19.964000       | 32.8             | 9.000           | L1   | 10.3       | 27.2        | 60.0         |
| 20.178000       | 32.1             | 9.000           | L1   | 10.3       | 27.9        | 60.0         |



## CAverage Final Result, Line (L1)

| Frequency (MHz) | CAverage (dBuV) | Bandwidth (kHz) | Line | Corr. (dB) | Margin (dB) | Limit (dBuV) |
|-----------------|-----------------|-----------------|------|------------|-------------|--------------|
| 0.160000        | 24.3            | 9.000           | L1   | 9.6        | 31.2        | 55.5         |
| 0.188000        | 27.6            | 9.000           | L1   | 9.6        | 26.5        | 54.1         |
| 0.194000        | 35.0            | 9.000           | L1   | 9.6        | 18.9        | 53.9         |
| 0.200000        | 36.8            | 9.000           | L1   | 9.7        | 16.8        | 53.6         |
| 0.208000        | 35.4            | 9.000           | L1   | 9.7        | 17.9        | 53.3         |
| 0.212000        | 32.7            | 9.000           | L1   | 9.7        | 20.4        | 53.1         |
| 1.106000        | 30.6            | 9.000           | L1   | 9.7        | 15.4        | 46.0         |
| 1.114000        | 30.8            | 9.000           | L1   | 9.7        | 15.2        | 46.0         |
| 1.128000        | 31.2            | 9.000           | L1   | 9.7        | 14.8        | 46.0         |
| 1.132000        | 31.1            | 9.000           | L1   | 9.7        | 14.9        | 46.0         |
| 1.142000        | 31.3            | 9.000           | L1   | 9.7        | 14.7        | 46.0         |
| 1.174000        | 31.8            | 9.000           | L1   | 9.7        | 14.2        | 46.0         |
| 15.650000       | 24.6            | 9.000           | L1   | 10.2       | 25.4        | 50.0         |
| 15.788000       | 24.8            | 9.000           | L1   | 10.2       | 25.2        | 50.0         |
| 17.420000       | 25.2            | 9.000           | L1   | 10.3       | 24.8        | 50.0         |
| 17.706000       | 25.4            | 9.000           | L1   | 10.3       | 24.6        | 50.0         |
| 19.780000       | 25.1            | 9.000           | L1   | 10.3       | 24.9        | 50.0         |
| 20.176000       | 22.6            | 9.000           | L1   | 10.3       | 27.4        | 50.0         |

**Figure 4: Spectral Diagrams, Conducted Emission, AC Main Port, Line (N)**



## QuasiPeak Final Result, Line (N)

| Frequency (MHz) | QuasiPeak (dBuV) | Bandwidth (kHz) | Line | Corr. (dB) | Margin (dB) | Limit (dBuV) |
|-----------------|------------------|-----------------|------|------------|-------------|--------------|
| 0.150000        | 45.1             | 9.000           | N    | 9.6        | 20.9        | 66.0         |
| 0.194000        | 52.2             | 9.000           | N    | 9.6        | 11.7        | 63.9         |
| 0.198000        | 51.9             | 9.000           | N    | 9.6        | 11.8        | 63.7         |
| 0.202000        | 51.5             | 9.000           | N    | 9.6        | 12.0        | 63.5         |
| 0.208000        | 50.8             | 9.000           | N    | 9.6        | 12.5        | 63.3         |
| 0.212000        | 49.8             | 9.000           | N    | 9.6        | 13.3        | 63.1         |
| 1.170000        | 37.9             | 9.000           | N    | 9.7        | 18.1        | 56.0         |
| 1.176000        | 38.2             | 9.000           | N    | 9.7        | 17.8        | 56.0         |
| 1.202000        | 38.4             | 9.000           | N    | 9.7        | 17.6        | 56.0         |
| 4.176000        | 39.0             | 9.000           | N    | 9.8        | 17.0        | 56.0         |
| 4.392000        | 38.2             | 9.000           | N    | 9.9        | 17.8        | 56.0         |
| 4.672000        | 38.2             | 9.000           | N    | 9.9        | 17.8        | 56.0         |
| 15.926000       | 31.4             | 9.000           | N    | 10.2       | 28.6        | 60.0         |
| 17.410000       | 32.1             | 9.000           | N    | 10.2       | 27.9        | 60.0         |
| 19.178000       | 33.4             | 9.000           | N    | 10.3       | 26.6        | 60.0         |
| 19.888000       | 31.6             | 9.000           | N    | 10.3       | 28.4        | 60.0         |
| 21.302000       | 35.0             | 9.000           | N    | 10.3       | 25.0        | 60.0         |
| 21.494000       | 34.0             | 9.000           | N    | 10.3       | 26.0        | 60.0         |



## CAverage Final Result, Line (N)

| Frequency (MHz) | CAverage (dBuV) | Bandwidth (kHz) | Line | Corr. (dB) | Margin (dB) | Limit (dBuV) |
|-----------------|-----------------|-----------------|------|------------|-------------|--------------|
| 0.150000        | 26.9            | 9.000           | N    | 9.6        | 29.1        | 56.0         |
| 0.188000        | 27.7            | 9.000           | N    | 9.6        | 26.4        | 54.1         |
| 0.194000        | 34.5            | 9.000           | N    | 9.6        | 19.4        | 53.9         |
| 0.198000        | 35.6            | 9.000           | N    | 9.6        | 18.1        | 53.7         |
| 0.208000        | 34.3            | 9.000           | N    | 9.6        | 19.0        | 53.3         |
| 0.212000        | 32.4            | 9.000           | N    | 9.6        | 20.7        | 53.1         |
| 1.176000        | 31.2            | 9.000           | N    | 9.7        | 14.8        | 46.0         |
| 1.180000        | 31.2            | 9.000           | N    | 9.7        | 14.8        | 46.0         |
| 1.202000        | 31.0            | 9.000           | N    | 9.7        | 15.0        | 46.0         |
| 4.044000        | 29.8            | 9.000           | N    | 9.8        | 16.2        | 46.0         |
| 4.104000        | 30.4            | 9.000           | N    | 9.8        | 15.6        | 46.0         |
| 4.392000        | 30.3            | 9.000           | N    | 9.9        | 15.7        | 46.0         |
| 15.926000       | 24.4            | 9.000           | N    | 10.2       | 25.6        | 50.0         |
| 16.736000       | 24.8            | 9.000           | N    | 10.2       | 25.2        | 50.0         |
| 17.410000       | 24.7            | 9.000           | N    | 10.2       | 25.3        | 50.0         |
| 19.888000       | 22.0            | 9.000           | N    | 10.3       | 28.0        | 50.0         |
| 21.302000       | 28.4            | 9.000           | N    | 10.3       | 21.6        | 50.0         |
| 21.376000       | 26.9            | 9.000           | N    | 10.3       | 23.1        | 50.0         |



## 4.2 Radiated Emission Test

The test results of radiated emission provide the following information:

### -For Measurement Below 1 GHz

|                      |                                                                           |
|----------------------|---------------------------------------------------------------------------|
| Rule Part / Standard | FCC PART 15 Subpart B Class B                                             |
| Detector             | Quasi-Peak                                                                |
| Bandwidth            | 120 kHz (6 dB)                                                            |
| Operation Mode       | Data Communication mode                                                   |
| EUT Cover Type       | Standard cover                                                            |
| USB Type             | CRESYN(DLC-LGE51DCMUW-1)<br>※NOTE: The worst-case emissions are reported. |
| Kind of Test Site    | 3 m semi anechoic chamber                                                 |
| Temperature          | 24.1 °C                                                                   |
| Relative Humidity    | 26.7 %                                                                    |
| Test Date            | March 03, 2015                                                            |

| Frequency (MHz) | Quasi Peak (dBuV/m) | Antenna Height (cm) | POL. (H/V) | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBuV/m) |
|-----------------|---------------------|---------------------|------------|---------------|------------|-------------|----------------|
| 34.687776       | 27.6                | 100.0               | V          | 1.0           | 15.0       | 12.4        | 40.0           |
| 81.181082       | 32.7                | 400.0               | H          | 251.0         | 11.8       | 7.3         | 40.0           |

### - Calculation Formula:

1. POL. H = Horizontal, POL. V = Vertical
2. QuasiPeak = Reading (Receiver Reading) + Corr.
3. Corr. (Correction Factor) = Antenna Factor + Cable Loss
4. Margin = Limit - QuasiPeak



|                             |                                                                           |
|-----------------------------|---------------------------------------------------------------------------|
| <b>Rule Part / Standard</b> | FCC PART 15 Subpart B Class B                                             |
| <b>Detector</b>             | Quasi-Peak                                                                |
| <b>Bandwidth</b>            | 120 kHz (6 dB)                                                            |
| <b>Operation Mode</b>       | Data Communication mode                                                   |
| <b>EUT Cover Type</b>       | Quick cover                                                               |
| <b>USB Type</b>             | CRESYN(DLC-LGE51DCMUW-1)<br>※NOTE: The worst-case emissions are reported. |
| <b>Kind of Test Site</b>    | 3 m semi anechoic chamber                                                 |
| <b>Temperature</b>          | 23.4 °C                                                                   |
| <b>Relative Humidity</b>    | 40.4 %                                                                    |
| <b>Test Date</b>            | April 20, 2015                                                            |

| Frequency<br>(MHz) | Quasi Peak<br>(dBuV/m) | Antenna<br>Height<br>(cm) | POL.<br>(H/V) | Azimuth<br>(deg) | Corr.<br>(dB) | Margin<br>(dB) | Limit<br>(dBuV/m) |
|--------------------|------------------------|---------------------------|---------------|------------------|---------------|----------------|-------------------|
| 33.207776          | 20.4                   | 100.0                     | V             | 218.0            | 14.9          | 19.6           | 40.0              |
| 78.877194          | 28.7                   | 350.0                     | H             | 253.0            | 12.1          | 11.3           | 40.0              |
| 133.306052         | 32.1                   | 100.0                     | V             | 136.0            | 16.4          | 11.4           | 43.5              |
| 266.554309         | 34.4                   | 116.0                     | H             | 305.0            | 16.9          | 11.6           | 46.0              |
| 750.222365         | 28.3                   | 193.0                     | V             | 164.0            | 27.5          | 17.7           | 46.0              |



## -For Measurement Above 1 GHz

|                             |                                                                                               |
|-----------------------------|-----------------------------------------------------------------------------------------------|
| Rule Part / Standard        | FCC PART 15 Subpart B Class B                                                                 |
| Detector                    | Peak mode: Peak (RBW: 1 MHz, VBW: 3 MHz)<br>CISPR-Average mode: Peak (RBW: 1 MHz, VBW: 10 Hz) |
| Highest Operating Frequency | 1.8 GHz                                                                                       |
| Testing Frequency Range     | 1 GHz to 9 GHz                                                                                |
| Operation Mode              | Data Communication mode                                                                       |
| EUT Cover Type              | Standard cover                                                                                |
| USB Type                    | Ningbo Broad (LG0121)<br>※NOTE: The worst-case emissions are reported.                        |
| Kind of Test Site           | 3 m semi anechoic chamber                                                                     |
| Temperature                 | 22.3 °C                                                                                       |
| Relative Humidity           | 26.5 %                                                                                        |
| Test Date                   | March 04, 2015                                                                                |

| Frequency (MHz) | Peak (dBμV/m) | Antenna Height (cm) | POL. (H/V) | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBμV/m) |
|-----------------|---------------|---------------------|------------|---------------|------------|-------------|----------------|
| 1249.649299     | 49.4          | 100.0               | V          | -1.0          | -9.4       | 24.6        | 74.0           |
| 1994.438878     | 56.1          | 100.0               | V          | 28.0          | -7.8       | 17.9        | 74.0           |
| 2658.767535     | 49.1          | 100.0               | V          | 37.0          | -4.8       | 24.9        | 74.0           |

| Frequency (MHz) | CAverage (dBμV/m) | Antenna Height (cm) | POL. (H/V) | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBμV/m) |
|-----------------|-------------------|---------------------|------------|---------------|------------|-------------|----------------|
| 1249.649299     | 42.0              | 100.0               | V          | -1.0          | -9.4       | 12.0        | 54.0           |
| 1994.438878     | 38.1              | 100.0               | V          | 28.0          | -7.8       | 15.9        | 54.0           |
| 2658.767535     | 33.3              | 100.0               | V          | 37.0          | -4.8       | 20.7        | 54.0           |

### - Calculation Formula:

1. POL. H = Horizontal, POL. V = Vertical
2. Peak or CAverage = Reading (Receiver Reading) + Corr.
3. Corr. (Correction Factor) = Antenna Factor+ Cable Loss –Amplifier Gain
4. Margin = Limit - Peak or CAverage



|                                    |                                                                                               |
|------------------------------------|-----------------------------------------------------------------------------------------------|
| <b>Rule Part / Standard</b>        | FCC PART 15 Subpart B Class B                                                                 |
| <b>Detector</b>                    | Peak mode: Peak (RBW: 1 MHz, VBW: 3 MHz)<br>CISPR-Average mode: Peak (RBW: 1 MHz, VBW: 10 Hz) |
| <b>Highest Operating Frequency</b> | 1.8 GHz                                                                                       |
| <b>Testing Frequency Range</b>     | 1 GHz to 9 GHz                                                                                |
| <b>Operation Mode</b>              | Data Communication mode                                                                       |
| <b>EUT Cover Type</b>              | Quick cover                                                                                   |
| <b>USB Type</b>                    | CRESYN(DLC-LGE51DCMUW-1)<br>※NOTE: The worst-case emissions are reported.                     |
| <b>Kind of Test Site</b>           | 3 m semi anechoic chamber                                                                     |
| <b>Temperature</b>                 | 23.4 °C                                                                                       |
| <b>Relative Humidity</b>           | 40.4 %                                                                                        |
| <b>Test Date</b>                   | April 20, 2015                                                                                |

| Frequency (MHz) | Peak (dBμV/m) | Antenna Height (cm) | POL. (H/V) | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBμV/m) |
|-----------------|---------------|---------------------|------------|---------------|------------|-------------|----------------|
| 1250.150301     | 50.0          | 100.0               | V          | 353.0         | -9.4       | 24.0        | 74.0           |
| 1329.509018     | 52.6          | 100.0               | V          | 29.0          | -9.3       | 21.4        | 74.0           |
| 1996.643287     | 54.2          | 100.0               | V          | 28.0          | -7.8       | 19.8        | 74.0           |
| 2055.561123     | 50.5          | 100.0               | V          | 30.0          | -7.5       | 23.5        | 74.0           |

| Frequency (MHz) | CAverage (dBμV/m) | Antenna Height (cm) | POL. (H/V) | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBμV/m) |
|-----------------|-------------------|---------------------|------------|---------------|------------|-------------|----------------|
| 1250.150301     | 46.2              | 100.0               | V          | 353.0         | -9.4       | 7.8         | 54.0           |
| 1329.509018     | 28.4              | 100.0               | V          | 29.0          | -9.3       | 25.6        | 54.0           |
| 1996.643287     | 31.0              | 100.0               | V          | 28.0          | -7.8       | 23.0        | 54.0           |
| 2055.561123     | 30.1              | 100.0               | V          | 30.0          | -7.5       | 23.9        | 54.0           |



## 5. LIST OF TEST EQUIPMENT

| <u>Type</u>                                                   | <u>Manufacturer</u> | <u>Model Name</u> | <u>Serial Number</u> | <u>Calibration Cycle</u> | <u>CAL Date</u> |
|---------------------------------------------------------------|---------------------|-------------------|----------------------|--------------------------|-----------------|
| <b><u>Conducted Emission</u></b>                              |                     |                   |                      |                          |                 |
| <input checked="" type="checkbox"/> EMI Test Receiver         | Rohde & Schwarz     | ESCI              | 100584               | 1 year                   | 01.13.2015      |
| <input checked="" type="checkbox"/> LISN                      | Rohde & Schwarz     | ESH3-Z5           | 100282               | 1 year                   | 06.10.2014      |
| <input checked="" type="checkbox"/> LISN                      | Rohde & Schwarz     | ENV216            | 100073               | 1 year                   | 01.13.2015      |
| <input checked="" type="checkbox"/> Software                  | Rohde & Schwarz     | EMC32             | -                    | -                        | -               |
| <b><u>Radiated Emission</u></b>                               |                     |                   |                      |                          |                 |
| <b>-For measurement below 1 GHz</b>                           |                     |                   |                      |                          |                 |
| <input checked="" type="checkbox"/> EMI Test Receiver         | Rohde & Schwarz     | ESI40             | 831564103            | 1 year                   | 04.01.2015      |
| <input checked="" type="checkbox"/> Trilog Antenna            | Schwarzbeck         | VULB9160          | 3301                 | 2 year                   | 11.17.2014      |
| <input checked="" type="checkbox"/> Antenna master            | HD GmbH             | MA240             | 240/520              | N/A                      | -               |
| <input checked="" type="checkbox"/> Antenna master controller | HD GmbH             | HD 100            | 100/637              | N/A                      | -               |
| <input checked="" type="checkbox"/> Turn Table                | EMCO                | 1060-2M           | -                    | N/A                      | -               |
| <input checked="" type="checkbox"/> Turn Table controller     | EMCO                | 2090              | 9702-1224            | N/A                      | -               |
| <input type="checkbox"/> EMI Test Receiver                    | Rohde & Schwarz     | ESU 26            | 100241               | 1 year                   | 06.18.2014      |
| <input type="checkbox"/> Antenna master                       | INNCO Systems       | MA4000-EP         | MA4000/283           | N/A                      | -               |
| <input type="checkbox"/> Turn Table                           | INNCO Systems       | DT3000-3T         | DT3000/69            | N/A                      | -               |
| <input checked="" type="checkbox"/> Software                  | Rohde & Schwarz     | EMC32             | -                    | -                        | -               |
| <b>-For measurement above 1 GHz</b>                           |                     |                   |                      |                          |                 |
| <input checked="" type="checkbox"/> EMI Test Receiver         | Rohde & Schwarz     | ESI40             | 831564103            | 1 year                   | 04.01.2015      |
| <input checked="" type="checkbox"/> Antenna master            | HD GmbH             | MA240             | 240/520              | N/A                      | -               |
| <input checked="" type="checkbox"/> Antenna master controller | HD GmbH             | HD 100            | 100/637              | N/A                      | -               |
| <input checked="" type="checkbox"/> Turn Table                | EMCO                | 1060-2M           | -                    | N/A                      | -               |
| <input checked="" type="checkbox"/> Turn Table controller     | EMCO                | 2090              | 9702-1224            | N/A                      | -               |
| <input type="checkbox"/> Power Amplifier                      | CERNEX              | CBLU1183540       | 21691                | 1 year                   | 07.11.2014      |
| <input checked="" type="checkbox"/> Power Amplifier           | CERNEX              | CBLU5183530       | 24348                | 1 year                   | 06.11.2014      |
| <input checked="" type="checkbox"/> Horn Antenna              | Schwarzbeck         | BBHA 9120D        | 296                  | 2 year                   | 10.07.2014      |
| <input type="checkbox"/> Horn Antenna                         | Schwarzbeck         | BBHA 9120D        | 1151                 | 2 year                   | 07.05.2013      |
| <input type="checkbox"/> EMI Test Receiver                    | Rohde & Schwarz     | ESU 26            | 100241               | 1 year                   | 06.18.2014      |
| <input type="checkbox"/> Turn Table                           | INNCO Systems       | DT3000-3T         | DT3000/69            | N/A                      | -               |
| <input type="checkbox"/> Horn Antenna                         | Schwarzbeck         | BBHA 9170         | BBHA9170124          | 2 year                   | 10.30.2013      |
| <input checked="" type="checkbox"/> Software                  | Rohde & Schwarz     | EMC32             | -                    | -                        | -               |



## 6. CONCLUSION

The data collected shows that the **EUT Type: Cellular/PCS CDMA/EVDO and LTE Phone with Bluetooth, WLAN and NFC, FCC ID: ZNFLS991, Model: LGLS991** complies with §15.107 and §15.109 of the FCC rules.