

# TEST REPORT

of

FCC CFR 47 part 1, 1.1307(b), 1.1310

FCC ID: BEJIGCJ1PHN

Equipment Under Test : Car AVN  
Model Name : IGCJ1PHN  
Applicant : LG Electronics USA  
Manufacturer : LG Electronics Inc.  
Date of Receipt : 2018.09.21  
Date of Test(s) : 2018.09.27 ~ 2019.05.23  
Date of Issue : 2019.06.25

In the configuration tested, the EUT complied with the standards specified above.

Tested By:



Nancy Park

Date:

2019.06.25

Technical  
Manager:



Jungmin Yang

Date:

2019.06.25

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RTT5041-19(2019.04.24)(1)

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A4(210 mm x 297 mm)

## 1. General Information

### 1.1. Testing Laboratory

SGS Korea Co., Ltd. (Gunpo Laboratory)

- 10-2, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807
- 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807
- Designation number: KR0150

All SGS services are rendered in accordance with the applicable SGS conditions of service available on request and accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx>.

Telephone : +82 31 688 0901

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### 1.2. Details of Applicant

Applicant : LG Electronics USA

Address : 1000 Sylvan Avenue, Englewood Cliffs, New Jersey, United States, 07632

Contact Person : Han, Kyung-su

Phone No. : +2 201 472 2623

### 1.3. Details of Manufacturer

Company : LG Electronics Inc.

Address : 10, Magokjungang 10-ro, Gangseo-gu, Seoul, Korea, 07796

### 1.4. Description of EUT

|                 |                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Kind of Product | Car AVN                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Model Name      | IGCJ1PHN                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Power Supply    | DC 12 V                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Frequency Range | Bluetooth: 2 402 MHz ~ 2 480 MHz<br>WLAN 2.4G (11b/g/n_HT20): 2 412 MHz ~ 2 462 MHz<br>WLAN 5G Band 1 (11a/n_HT20, 11ac_VHT20): 5 180 MHz ~ 5 240 MHz<br>WLAN 5G Band 1 (11n_HT40, 11ac_VHT40): 5 190 MHz ~ 5 230 MHz<br>WLAN 5G Band 1 (11ac_VHT80): 5 210 MHz<br>WLAN 5G Band 3 (11a/n_HT20, 11ac_VHT20): 5 745 MHz ~ 5 825 MHz<br>WLAN 5G Band 3 (11n_HT40, 11ac_VHT40): 5 755 MHz ~ 5 795 MHz<br>WLAN 5G Band 3 (11ac_VHT80): 5 775 MHz |

### 1.5. Test Report Revision

| Revision | Report Number        | Date of Issue | Description |
|----------|----------------------|---------------|-------------|
| 0        | F690501/RF-RTL014000 | 2019.06.25    | Initial     |

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## 2. RF Exposure Evaluation

### 2.1. Environmental evaluation and exposure limit according to FCC CFR 47 part 1, 1.1307(b), 1.1310

#### LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

| Frequency Range (MHz)                                   | Electric Field Strength(V/m) | Magnetic Field Strength (A/m) | Power Density (mW/cm <sup>2</sup> ) | Average Time     |
|---------------------------------------------------------|------------------------------|-------------------------------|-------------------------------------|------------------|
| (A) Limits for Occupational/Controlled Exposure         |                              |                               |                                     |                  |
| 0.3-3.0                                                 | 614                          | 1.63                          | *100                                | 6                |
| 3.0-30                                                  | 1842/f                       | 4.89/f                        | *900/f <sup>2</sup>                 | 6                |
| 30-300                                                  | 61.4                         | 0.163                         | 1.0                                 | 6                |
| 300-1 500                                               | -                            | -                             | f/300                               | 6                |
| 1 500-100 000                                           | -                            | -                             | 5                                   | 6                |
| (B) Limits for General Population/Uncontrolled Exposure |                              |                               |                                     |                  |
| 0.3-1.34                                                | 614                          | 1.63                          | *100                                | 30               |
| 1.34-30                                                 | 824/f                        | 2.19/f                        | *180/f <sup>2</sup>                 | 30               |
| 30-300                                                  | 27.5                         | 0.073                         | 0.2                                 | 30               |
| <b><u>300-1 500</u></b>                                 | -                            | -                             | <b><u>f/1500</u></b>                | <b><u>30</u></b> |
| <b><u>1 500-100 000</u></b>                             | -                            | -                             | <b><u>1.0</u></b>                   | <b><u>30</u></b> |

#### 2.1.1. Friis transmission formula: $P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot R^2)$

Where  $P_d$  = power density in mW/cm<sup>2</sup>

$P_{out}$  = output power to antenna in mW

G = gain of antenna in linear scale

$\pi$  = 3.1416

R = distance between observation point and center of the radiator in cm

$P_d$  the limit of MPE, 1 mW/cm<sup>2</sup>. If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance where the MPE limit is reached.

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### 2.1.2. Test Result of RF Exposure Evaluation

Test Item : RF Exposure Evaluation Data

Test Mode : Normal Operation

### 2.1.3. Test information of Cable Loss and Antenna Gain

| Test Item | Frequency Range<br>(MHz) | Cable Loss<br>(dB) | Antenna Gain of EUT<br>(dB i) | Final Antenna Gain<br>(dB i) |
|-----------|--------------------------|--------------------|-------------------------------|------------------------------|
| Bluetooth | 2 402 ~ 2 480            | -1.94              | 3.00                          | 1.06                         |
| WLAN 2.4G | 2 412 ~ 2 462            | -1.94              | 3.00                          | 1.06                         |
| WLAN 5G   | 5 180 ~ 5 240            | -2.08              | 8.01                          | 5.93                         |
| WLAN 5G   | 5 745 ~ 5 825            | -2.08              | 8.01                          | 5.93                         |
| GSM 850   | 824 ~ 849                | -1.12              | -2.45                         | -3.57                        |
| GSM 1900  | 1 850 ~ 1 910            | -1.12              | 1.13                          | 0.01                         |
| WCDMA 2   | 1 850 ~ 1 910            | -1.12              | 1.13                          | 0.01                         |
| WCDMA 4   | 1 710 ~ 1 755            | -1.12              | 1.45                          | 0.33                         |
| WCDMA 5   | 824 ~ 849                | -1.12              | -2.45                         | -3.57                        |
| LTE 2     | 1 850 ~ 1 910            | -1.12              | 1.13                          | 0.01                         |
| LTE 4     | 1 710 ~ 1 755            | -1.12              | 1.45                          | 0.33                         |
| LTE 5     | 824 ~ 849                | -1.12              | -2.45                         | -3.57                        |
| LTE 7     | 2 500 ~ 2 570            | -1.94              | -0.63                         | -2.57                        |
| LTE 12    | 699 ~ 716                | -0.76              | -0.98                         | -1.74                        |
| LTE 26    | 814 ~ 849                | -1.12              | -2.45                         | -3.57                        |

#### Note;

-Final Antenna Gain (dB i) = Cable Loss (dB) + Antenna Gain of EUT (dB i)

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## 2.1.4. Output Power into Antenna & RF Exposure Evaluation Distance

### Bluetooth

#### - Maximum tune up tolerance

| Frequency (MHz) | Output Average Power to Antenna (dB m) | Final Antenna Gain (dB i) | Power Density at 20 cm (mW/cm <sup>2</sup> ) | Limits (mW/cm <sup>2</sup> ) |
|-----------------|----------------------------------------|---------------------------|----------------------------------------------|------------------------------|
| 2 402 ~ 2 480   | 0.5                                    | 1.06                      | 0.000 285                                    | 1                            |

### WLAN 2.4G

#### - Maximum tune up tolerance

| Frequency (MHz) | Output Average Power to Antenna (dB m) | Final Antenna Gain (dB i) | Power Density at 20 cm (mW/cm <sup>2</sup> ) | Limits (mW/cm <sup>2</sup> ) |
|-----------------|----------------------------------------|---------------------------|----------------------------------------------|------------------------------|
| 2 412 ~ 2 462   | 13.5                                   | 1.06                      | 0.005 685                                    | 1                            |

### WLAN 5G

#### - Maximum tune up tolerance

| Frequency (MHz) | Output Average Power to Antenna (dB m) | Final Antenna Gain (dB i) | Power Density at 20 cm (mW/cm <sup>2</sup> ) | Limits (mW/cm <sup>2</sup> ) |
|-----------------|----------------------------------------|---------------------------|----------------------------------------------|------------------------------|
| 5 180 ~ 5 240   | 6                                      | 5.93                      | 0.003 103                                    | 1                            |
| 5 745 ~ 5 825   | 6                                      | 5.93                      | 0.003 103                                    | 1                            |

### GSM 850

#### - Maximum tune up tolerance

| Frequency Range (MHz) | Output Average Power to Antenna (dB m) | Final Antenna Gain (dB i) | Power Density at 20 cm (mW/cm <sup>2</sup> ) | Limits (mW/cm <sup>2</sup> ) |
|-----------------------|----------------------------------------|---------------------------|----------------------------------------------|------------------------------|
| 824 ~ 849             | 34                                     | -3.57                     | 0.219 649                                    | 0.55                         |

### GSM 1 900

#### - Maximum tune up tolerance

| Frequency Range (MHz) | Output Average Power to Antenna (dB m) | Final Antenna Gain (dB i) | Power Density at 20 cm (mW/cm <sup>2</sup> ) | Limits (mW/cm <sup>2</sup> ) |
|-----------------------|----------------------------------------|---------------------------|----------------------------------------------|------------------------------|
| 1 850 ~ 1 910         | 30.5                                   | 0.01                      | 0.223 733                                    | 1                            |

### WCDMA Band 2

#### - Maximum tune up tolerance

| Frequency Range (MHz) | Output Average Power to Antenna (dB m) | Final Antenna Gain (dB i) | Power Density at 20 cm (mW/cm <sup>2</sup> ) | Limits (mW/cm <sup>2</sup> ) |
|-----------------------|----------------------------------------|---------------------------|----------------------------------------------|------------------------------|
| 1 850 ~ 1 910         | 25                                     | 0.01                      | 0.063 057                                    | 1                            |

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**WCDMA Band 4**
**- Maximum tune up tolerance**

| Frequency Range<br>(MHz) | Output Average<br>Power to Antenna<br>(dB m) | Final Antenna<br>Gain<br>(dB i) | Power Density<br>at 20 cm<br>(mW/cm <sup>2</sup> ) | Limits<br>(mW/cm <sup>2</sup> ) |
|--------------------------|----------------------------------------------|---------------------------------|----------------------------------------------------|---------------------------------|
| 1 710 ~ 1 755            | 25                                           | 0.33                            | 0.067 878                                          | 1                               |

**WCDMA Band 5**
**- Maximum tune up tolerance**

| Frequency Range<br>(MHz) | Output Average<br>Power to Antenna<br>(dB m) | Final Antenna<br>Gain<br>(dB i) | Power Density<br>at 20 cm<br>(mW/cm <sup>2</sup> ) | Limits<br>(mW/cm <sup>2</sup> ) |
|--------------------------|----------------------------------------------|---------------------------------|----------------------------------------------------|---------------------------------|
| 824 ~ 849                | 25                                           | -3.57                           | 0.027 652                                          | 0.55                            |

**LTE Band 2**
**- Maximum tune up tolerance**

| Frequency Range<br>(MHz) | Output Average<br>Power to Antenna<br>(dB m) | Final Antenna<br>Gain<br>(dB i) | Power Density<br>at 20 cm<br>(mW/cm <sup>2</sup> ) | Limits<br>(mW/cm <sup>2</sup> ) |
|--------------------------|----------------------------------------------|---------------------------------|----------------------------------------------------|---------------------------------|
| 1 850 ~ 1 910            | 25                                           | 0.01                            | 0.063 057                                          | 1                               |

**LTE Band 4**
**- Maximum tune up tolerance**

| Frequency Range<br>(MHz) | Output Average<br>Power to Antenna<br>(dB m) | Final Antenna<br>Gain<br>(dB i) | Power Density<br>at 20 cm<br>(mW/cm <sup>2</sup> ) | Limits<br>(mW/cm <sup>2</sup> ) |
|--------------------------|----------------------------------------------|---------------------------------|----------------------------------------------------|---------------------------------|
| 1 710 ~ 1 755            | 25                                           | 0.33                            | 0.067 878                                          | 1                               |

**LTE Band 5**
**- Maximum tune up tolerance**

| Frequency Range<br>(MHz) | Output Average<br>Power to Antenna<br>(dB m) | Final Antenna<br>Gain<br>(dB i) | Power Density<br>at 20 cm<br>(mW/cm <sup>2</sup> ) | Limits<br>(mW/cm <sup>2</sup> ) |
|--------------------------|----------------------------------------------|---------------------------------|----------------------------------------------------|---------------------------------|
| 824 ~ 849                | 25                                           | -3.57                           | 0.027 652                                          | 0.55                            |

**LTE Band 7**
**- Maximum tune up tolerance**

| Frequency Range<br>(MHz) | Output Average<br>Power to Antenna<br>(dB m) | Final Antenna<br>Gain<br>(dB i) | Power Density<br>at 20 cm<br>(mW/cm <sup>2</sup> ) | Limits<br>(mW/cm <sup>2</sup> ) |
|--------------------------|----------------------------------------------|---------------------------------|----------------------------------------------------|---------------------------------|
| 2 500 ~ 2 570            | 25                                           | -2.57                           | 0.034 812                                          | 1                               |

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## LTE Band 12

### - Maximum tune up tolerance

| Frequency Range<br>(MHz) | Output Average<br>Power to Antenna<br>(dB m) | Final Antenna<br>Gain<br>(dB i) | Power Density<br>at 20 cm<br>(mW/cm <sup>2</sup> ) | Limits<br>(mW/cm <sup>2</sup> ) |
|--------------------------|----------------------------------------------|---------------------------------|----------------------------------------------------|---------------------------------|
| 699 ~ 716                | 25                                           | -1.74                           | 0.042 143                                          | 0.47                            |

## LTE Band 26

### - Maximum tune up tolerance

| Frequency Range<br>(MHz) | Output Average<br>Power to Antenna<br>(dB m) | Final Antenna<br>Gain<br>(dB i) | Power Density<br>at 20 cm<br>(mW/cm <sup>2</sup> ) | Limits<br>(mW/cm <sup>2</sup> ) |
|--------------------------|----------------------------------------------|---------------------------------|----------------------------------------------------|---------------------------------|
| 814 ~ 849                | 25                                           | -3.57                           | 0.027 652                                          | 0.54                            |

### Note;

- The power density Pd (5th column) at a distance of 20 cm calculated from the friis transmission formula is far below the limit of 1 mW/cm<sup>2</sup>.
- This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.
- This equipment should be installed and operated with minimum 20 cm between the radiator and your body.
- The antenna gain of this transmitter is less than 6 dB i and must not be colocated or operating in conjunction with any other antenna or transmitter unless authorized to do so by the FCC.

### Simultaneous transmission of MPE test exclusion for worst case configuration.

Bluetooth: the ratio is 0.000 285 / 1

WLAN: the ratio is 0.005 685 / 1

WWAN: the ratio is 0.219 649/ 0.55

Confirm the sum result of individual MPEs ratio is  $\leq 1.0$ ;

BT + WLAN + WWAN:  $(0.000\ 285 / 1) + (0.005\ 685 / 1) + (0.219\ 649 / 0.55)$

$= 0.405\ 332 \leq 1.0$

So this device meets the KDB447498 D01 v06 section 7.2 requirement of "Simultaneous transmission MPE test exclusion"

## - End of the Test Report -

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