

# TEST REPORT

of

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

FCC ID: YZP-BK1110

Equipment Under Test : Telematics Modem  
Model Name : LTD-BK1110  
Applicant : LG Innotek Co., Ltd.  
Manufacturer : LG Innotek Co., Ltd.  
Date of Receipt : 2018.12.18  
Date of Test(s) : 2018.12.20 ~ 2019.01.22  
Date of Issue : 2019.01.28

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

Tested By:

  
\_\_\_\_\_  
Murphy Kim

Date: 2019.01.28

Technical  
Manager:

  
\_\_\_\_\_  
Harim Lee

Date: 2019.01.28

*The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company. This test report does not assure KOLAS accreditation.*

SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

RTT5041-19(2017.07.10)(0)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

# INDEX

| <u>Table of Contents</u>        | Page |
|---------------------------------|------|
| 1. General information -----    | 3    |
| 2. RF Exposure Evaluation ----- | 5    |

*The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company. This test report does not assure KOLAS accreditation.*

## 1. General information

### 1.1. Testing Laboratory

SGS Korea Co., Ltd. (Gunpo Laboratory)

-Wireless Div. 2FL, 10-2, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807

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>.

Phone No. : +82 31 688 0901

Fax No. : +82 31 688 0921

### 1.2. Details of applicant

Applicant : LG Innotek Co., Ltd.

Address : 26, Hanamsandan 5beon-ro, Gwangsan-gu, Gwangju, 62229, Korea

Contact Person : Jeong, In-Chang

Phone No. : +82 62 950 0332

### 1.3. Details of manufacturer

Company : Same as applicant

Address : Same as applicant

### 1.4. Description of EUT

|                 |                                                                                                                                                                                                                                                                                         |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Kind of Product | Telematics Modem                                                                                                                                                                                                                                                                        |
| Model Name      | LTD-BK1110                                                                                                                                                                                                                                                                              |
| Power Supply    | DC 4.0 V                                                                                                                                                                                                                                                                                |
| Frequency Range | WCDMA 2: 1 850 MHz ~ 1 910 MHz,<br>WCDMA 5: 824 MHz ~ 849 MHz,<br>LTE Band 2: 1 850 MHz ~ 1 910 MHz,<br>LTE Band 4: 1 710 MHz ~ 1 755 MHz,<br>LTE Band 5: 824 MHz ~ 849 MHz,<br>LTE Band 7: 2 500 MHz ~ 2 570 MHz,<br>LTE Band 12: 699 MHz ~ 716 MHz,<br>LTE Band 17: 704 MHz ~ 716 MHz |
| Antenna Type    | Dipole Antenna                                                                                                                                                                                                                                                                          |
| Antenna Gain    | 699 MHz ~ 716 MHz: 4.5 dB i,<br>824 MHz ~ 849 MHz: 4.5 dB i,<br>1 850 MHz ~ 1 910 MHz: 2.0 dB i,<br>1 710 MHz ~ 1 755 MHz: 2.0 dB i,<br>2 500 MHz ~ 2 570 MHz: 2.0 dB i                                                                                                                 |

*The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company. This test report does not assure KOLAS accreditation.*

**SGS Korea Co., Ltd. (Gunpo Laboratory)** 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

RTT5041-19(2017.07.10)(0)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

## 1.5. Test report revision

| Revision | Report number        | Date of Issue | Description |
|----------|----------------------|---------------|-------------|
| 0        | F690501/RF-RTL013476 | 2019.01.28    | Initial     |

*The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company. This test report does not assure KOLAS accreditation.*

**SGS Korea Co., Ltd. (Gunpo Laboratory)** 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

RTT5041-19(2017.07.10)(0)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

## 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.

*The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company. This test report does not assure KOLAS accreditation.*

**SGS Korea Co., Ltd. (Gunpo Laboratory)** 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

RTT5041-19(2017.07.10)(0)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

## 2.1.2. Test Result of RF Exposure Evaluation

Test Item : RF Exposure Evaluation Data

Test Mode : Normal Operation

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

| Power Index table                                 |              |           |
|---------------------------------------------------|--------------|-----------|
| 1. Maximum output Power (Target Power, Tolerance) |              |           |
|                                                   | Target Power | Tolerance |
| LTE B2, B4, B5, B7, B12(17)                       | 23           | ±2.7      |
| WCDMA B2, B5                                      | 24           | +1.7/-3.7 |

Copyright©, 2017, All Rights Reserved.

 LG Innotek

### WCDMA Band 2

#### - Maximum tune up tolerance

| Channel | Frequency (MHz) | Output Average Power to Antenna (dB m) | Antenna Gain (dB i) | Power Density at 20 cm (mW/cm <sup>2</sup> ) | Limits (mW/cm <sup>2</sup> ) |
|---------|-----------------|----------------------------------------|---------------------|----------------------------------------------|------------------------------|
| 9262    | 1 852.4         | 25.7                                   | 2.0                 | 0.117 147                                    | 1                            |

### WCDMA Band 5

#### - Maximum tune up tolerance

| Channel | Frequency (MHz) | Output Average Power to Antenna (dB m) | Antenna Gain (dB i) | Power Density at 20 cm (mW/cm <sup>2</sup> ) | Limits (mW/cm <sup>2</sup> ) |
|---------|-----------------|----------------------------------------|---------------------|----------------------------------------------|------------------------------|
| 4132    | 826.4           | 25.7                                   | 4.5                 | 0.208 320                                    | 0.550 933                    |

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company. This test report does not assure KOLAS accreditation.

SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

RTT5041-19(2017.07.10)(0)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

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

| Channel | Frequency (MHz) | Output Average Power to Antenna (dB m) | Antenna Gain (dB i) | Power Density at 20 cm (mW/cm <sup>2</sup> ) | Limits (mW/cm <sup>2</sup> ) |
|---------|-----------------|----------------------------------------|---------------------|----------------------------------------------|------------------------------|
| 18607   | 1 850.7         | 25.7                                   | 2.0                 | 0.117 147                                    | 1                            |

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

| Channel | Frequency (MHz) | Output Average Power to Antenna (dB m) | Antenna Gain (dB i) | Power Density at 20 cm (mW/cm <sup>2</sup> ) | Limits (mW/cm <sup>2</sup> ) |
|---------|-----------------|----------------------------------------|---------------------|----------------------------------------------|------------------------------|
| 19957   | 1 710.7         | 25.7                                   | 2.0                 | 0.117 147                                    | 1                            |

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

| Channel | Frequency (MHz) | Output Average Power to Antenna (dB m) | Antenna Gain (dB i) | Power Density at 20 cm (mW/cm <sup>2</sup> ) | Limits (mW/cm <sup>2</sup> ) |
|---------|-----------------|----------------------------------------|---------------------|----------------------------------------------|------------------------------|
| 20407   | 824.7           | 25.7                                   | 4.5                 | 0.208 320                                    | 0.549 800                    |

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

| Channel | Frequency (MHz) | Output Average Power to Antenna (dB m) | Antenna Gain (dB i) | Power Density at 20 cm (mW/cm <sup>2</sup> ) | Limits (mW/cm <sup>2</sup> ) |
|---------|-----------------|----------------------------------------|---------------------|----------------------------------------------|------------------------------|
| 20775   | 2 502.5         | 25.7                                   | 2.0                 | 0.117 147                                    | 1                            |

**LTE Band 12**
**- Maximum tune up tolerance**

| Channel | Frequency (MHz) | Output Average Power to Antenna (dB m) | Antenna Gain (dB i) | Power Density at 20 cm (mW/cm <sup>2</sup> ) | Limits (mW/cm <sup>2</sup> ) |
|---------|-----------------|----------------------------------------|---------------------|----------------------------------------------|------------------------------|
| 23017   | 699.7           | 25.7                                   | 4.5                 | 0.208 320                                    | 0.466 467                    |

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company. This test report does not assure KOLAS accreditation.

# LTE Band 17

## - Maximum tune up tolerance

| Channel | Frequency (MHz) | Output Average Power to Antenna (dB m) | Antenna Gain (dB i) | Power Density at 20 cm (mW/cm <sup>2</sup> ) | Limits (mW/cm <sup>2</sup> ) |
|---------|-----------------|----------------------------------------|---------------------|----------------------------------------------|------------------------------|
| 23755   | 706.5           | 25.7                                   | 4.5                 | 0.208 320                                    | 0.471 000                    |

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>.

**- End of the Test Report -**

*The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company. This test report does not assure KOLAS accreditation.*

**SGS Korea Co., Ltd. (Gunpo Laboratory)** 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

RTT5041-19(2017.07.10)(0)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)