

# TEST REPORT

of

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

FCC ID: BEJTA4HEBN2

Equipment Under Test : Car Telematics Device  
Model Name : TA4HEB-N2  
Variant Model Name(s) : -  
Applicant : LG Electronics USA  
Manufacturer : LG Electronics Inc.  
Date of Receipt : 2020.11.16  
Date of Test(s) : 2021.01.13 ~ 2021. 02.24  
Date of Issue : 2021.02.25

In the configuration tested, the EUT complied with the standards specified above. This test report does not assure KOLAS accreditation.

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- 2) The SGS Korea is not responsible for the sampling, the results of this test report apply to the sample as received.
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Tested by:



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Technical  
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**SGS Korea Co., Ltd. Gunpo Laboratory**



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## 1. General Information

### 1.1. Testing Laboratory

SGS Korea Co., Ltd. (Gunpo Laboratory)

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- Designation number: KR0150

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### 1.2. Details of Applicant

Applicant : LG Electronics USA

Address : 111 Sylvan Avenue, North Building, Englewood Cliffs, New Jersey, United States,  
07632

Contact Person : Kim, Dae-woong

Phone No. : +1 201 266 2215

### 1.3. Details of Manufacturer

Company : LG Electronics Inc.

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

### 1.4. Description of EUT

<b>Kind of Product</b>	Car Telematics Device
<b>Model Name</b>	TA4HEB-N2
<b>Power Supply</b>	DC 12V
<b>Frequency Range</b>	GSM 850: 824 MHz ~ 849 MHz GSM 1 900: 1 850 MHz ~ 1 910 MHz WCDMA 2: 1 850 MHz ~ 1 910 MHz WCDMA 4: 1 710 MHz ~ 1 755 MHz WCDMA 5: 824 MHz ~ 849 MHz LTE Band 2: 1 850 MHz ~ 1 910 MHz LTE Band 4: 1 710 MHz ~ 1 755 MHz LTE Band 5: 824 MHz ~ 849 MHz LTE Band 7: 2 500 MHz ~ 2 570 MHz LTE Band 12: 699 MHz ~ 716 MHz LTE Band 26: 814 MHz ~ 849 MHz WLAN 2.4G (11b/g/n_HT20, HT40): 2 412 MHz ~ 2 462 MHz WLAN 5G Band 1 (11a/n_HT20, 11ac_VHT20): 5 180 MHz ~ 5 240 MHz WLAN 5G Band 1 (11n_HT40, 11ac_VHT40): 5 190 MHz ~ 5 230 MHz WLAN 5G Band 1 (11ac_VHT80): 5 210 MHz WLAN 5G Band 3 (11a/n_HT20, 11ac_VHT20): 5 745 MHz ~ 5 825 MHz WLAN 5G Band 3 (11n_HT40, 11ac_VHT40): 5 755 MHz ~ 5 795 MHz WLAN 5G Band 3 (11ac_VHT80): 5 775 MHz
<b>Modulation Technique</b>	DSSS, OFDM, QPSK, 16QAM, 64QAM, GMSK, 8PSK
<b>Antenna Type</b>	External antenna
<b>Antenna Gain</b>	2 400 MHz ~ 2 483.5 MHz: 2.55 dBi (WLAN 2.4 G) 5 150 MHz ~ 5 250 MHz: 3.96 dBi (WLAN 5 G) 5 725 MHz ~ 5 850 MHz: 6.31 dBi (WLAN 5 G) 699 MHz ~ 716 MHz: -1.85 dBi (LTE 12) 814 MHz ~ 824 MHz: -3.18 dBi (LTE 26) 824 MHz ~ 849 MHz: -2.45 dBi (GSM 850, WCDMA 5, LTE 26/5) 1 850 MHz ~ 1 910 MHz: 1.13 dBi (GSM 1 900, WCDMA 2, LTE 2) 1 710 MHz ~ 1 755 MHz: 1.45 dBi (WCDMA 4, LTE 4) 2 500 MHz ~ 2 570 MHz: -1.67 dBi (LTE 7)
<b>H/W Version</b>	Rev.D
<b>S/W Version</b>	V9.1.02

### 1.5. Test Report Revision

Revision	Report Number	Date of Issue	Description
0	F690501-RF-RTL001715	2021.02.25	Initial

## 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.

### 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 (MHz)	Cable Loss (dB)	Antenna Gain of EUT (dB i)	Final Antenna Gain (dB i)
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	-1.67	-3.61
LTE 12	699 ~ 716	-0.76	-1.85	-2.61
LTE 26	814 ~ 824	-1.12	-3.18	-4.30
LTE 26	824 ~ 849	-1.12	-2.45	-3.57

**Note;**

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

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

#### WLAN (2.4G )

##### - Maximum tune up tolerance

Frequency Range (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> )
2 400 ~ 2 483.5	17.5	2.55	0.020 125	1

#### WLAN (5G)

##### - Maximum tune up tolerance

Frequency Range (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> )
5 150 ~ 5 250	12.5	3.96	0.008 805	1
5 725 ~ 5 850	12.5	6.31	0.015 126	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	33.5	-3.57	0.195 763	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	0.01	0.063 057	0.55

#### WCDMA Band 4

##### - 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> )
1 710 ~ 1 755	25.0	0.33	0.067 878	0.55

**WCDMA Band 5**

**- 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	25.0	-3.57	0.027 652	0.55

**LTE - 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	25.5	0.01	0.070 751	1

**LTE - Band 4**

**- 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> )
1 710 ~ 1 755	25.5	0.33	0.076 161	1

**LTE - Band 5**

**- 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	25.5	-3.57	0.031 026	0.55

**LTE - Band 7**

**- 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> )
2 500 ~ 2 570	25.5	-3.61	0.030 742	1

**LTE - Band 12**

**- 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> )
699 ~ 716	25.5	-2.61	0.038 702	0.47



**LTE - Band 26**

**- 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> )
814 ~ 824	25.5	-4.30	0.026 226	0.54
824 ~ 849	25.5	-3.57	0.031 026	0.55

**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 collocated or operating in conjunction with any other antenna or transmitter unless authorized to do so by the FCC.
- According to KDB 447498 D01 RF Exposure Guidance 4.1.

**Simultaneous transmission of RF Exposure test exclusion for worst case configuration.**

WLAN: the ratio is 0.020 125 / 1  
 WWAN: the ratio is 0.195 763 / 0.55

Confirm the sum result of individual MPEs ratio is  $\leq 1.0$ ;  
 WLAN + WWAN:  $(0.020\ 125 / 1) + (0.195\ 763 / 0.55)$   
 $= 0.376\ 058 \leq 1.0$

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