TEST REPORT

of

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

FCC ID: BEJTA4HEBW

Equipment Under Test	:	Car Telematics
Model Name	:	TA4HEB-W
Variant Model Name	:	TA4LEN-W
Applicant	:	LG Electronics USA
Manufacturer	:	LG Electronics USA
Date of Receipt	:	2018.08.01
Date of Test(s)	:	2018.08.02 ~ 2018.11.15
Date of Issue	:	2019.02.28

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

Tested By: **Date:** **2019.02.28**

Nancy Park

Technical Manager: **Date:** **2019.02.28**

Harim Lee

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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
-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
FAX : +82 31 688 0921

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 Telematics
Model Name	TA4HEB-W
Variant Model Name	TA4LEN-W
Power Supply	DC 12 V
Frequency Range	GSM 850: 824 ㎒ ~ 849 ㎒ GSM 1 900: 1 850 ㎒ ~ 1 910 ㎒ WCDMA 5: 824 ㎒ ~ 849 ㎒ LTE Band 5: 824 ㎒ ~ 849 ㎒ LTE Band 7: 2 500 ㎒ ~ 2 570 ㎒ LTE Band 26: 814 ㎒ ~ 849 ㎒ WLAN 2.4G (11b/g/n_HT20, HT40): 2 412 ㎒ ~ 2 462 ㎒ WLAN 5G Band 1 (11a/n_HT20, 11ac_VHT20): 5 180 ㎒ ~ 5 240 ㎒ WLAN 5G Band 1 (11n_HT40, 11ac_VHT40): 5 190 ㎒ ~ 5 230 ㎒ WLAN 5G Band 1 (11ac_VHT80): 5 210 ㎒ WLAN 5G Band 3 (11a/n_HT20, 11ac_VHT20): 5 745 ㎒ ~ 5 825 ㎒ WLAN 5G Band 3 (11n_HT40, 11ac_VHT40): 5 755 ㎒ ~ 5 795 ㎒ WLAN 5G Band 3 (11ac_VHT80): 5 775 ㎒

1.5. Test report revision

Revision	Report number	Date of Issue	Description
0	F690501/RF-RTL013189	2018.11.29	Initial
1	F690501/RF-RTL013189-1	2019.02.19	Corrected the maximum tune up tolerance
2	F690501/RF-RTL013189-2	2019.02.28	Corrected the maximum tune up tolerance of WLAN (5G)

1.6. Information of Variant Model

Model Name	Description
TA4HEB-W	Basic Model
TA4LEN-W	Variant model is the same RF module and circuit, except the as below part and function. - De-populated to Audio amp, DSP part - De-populated to BUB(Backup battery) part

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 (㎒)	Electric Field Strength(V/m)	Magnetic Field Strength (A/m)	Power Density (㎽/㎠)	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^2	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^2	30
30-300	27.5	0.073	0.2	30
300-1 500	-	-	**f/1500**	**30**
1 500-100 000	-	-	**1.0**	**30**

2.1.1. Friis transmission formula: Pd = (Pout*G)/(4*pi*R^2)

Where Pd = power density in ㎽/㎠

Pout = output power to antenna in ㎽

G = gain of antenna in linear scale

Pi = 3.1416

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

Pd the limit of MPE, 1 ㎽/㎠. 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 (㎒)	Cable Loss (㏈)	Antenna Gain of EUT (㏈i)	Final Antenna Gain (㏈i)
GSM 850	824 ~ 849	-1.12	-0.69	-1.81
GSM 1900	1 850 ~ 1 910	-1.12	0.85	-0.27
WCDMA 5	824 ~ 849	-1.12	-0.69	-1.81
LTE 5	824 ~ 849	-1.12	-0.69	-1.81
LTE 7	2 500 ~ 2 570	-1.94	0.99	-0.95
LTE 26	814 ~ 824	-1.12	-1.79	-2.91
LTE 26	824 ~ 849	-1.12	-0.69	-1.81

Note;

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

2.1.4. Output Power into Antenna & RF Exposure Evaluation Distance

WLAN (2.4G)
- Maximum tune up tolerance

Frequency (㎒)	Output Average Power to Antenna (dB m)	Antenna Gain (dB i)	Power Density at 20 ㎝ (㎽/㎠)	Limits (㎽/㎠)
2 412 ~ 2 462	18.5	0.94	0.017 488	1

WLAN (5G)
- Maximum tune up tolerance

Frequency (㎒)	Output Average Power to Antenna (dB m)	Antenna Gain (dB i)	Power Density at 20 ㎝ (㎽/㎠)	Limits (㎽/㎠)
5 180 ~ 5 240	11	5.71	0.009 327	1
5 745 ~ 5 825	11	3.82	0.006 036	1

GSM 850
- Maximum tune up tolerance

Frequency Range (㎒)	Output Average Power to Antenna (dB m)	Final Antenna Gain (dB i)	Power Density at 20 ㎝ (㎽/㎠)	Limits (㎽/㎠)
824 ~ 849	32.7	-1.81	0.244 191	0.55

GSM 1 900
- Maximum tune up tolerance

Frequency Range (㎒)	Output Average Power to Antenna (dB m)	Final Antenna Gain (dB i)	Power Density at 20 ㎝ (㎽/㎠)	Limits (㎽/㎠)
1 850 ~ 1 910	32	-0.27	0.296 299	1

WCDMA Band 5
- Maximum tune up tolerance

Frequency Range (㎒)	Output Average Power to Antenna (dB m)	Final Antenna Gain (dB i)	Power Density at 20 ㎝ (㎽/㎠)	Limits (㎽/㎠)
824 ~ 849	25.5	-1.81	0.046 530	0.55

LTE - Band 5
- Maximum tune up tolerance

Frequency Range (㎒)	Output Average Power to Antenna (dB m)	Final Antenna Gain (dB i)	Power Density at 20 ㎝ (㎽/㎠)	Limits (㎽/㎠)
824 ~ 849	25.5	-1.81	0.046 530	0.55

LTE - Band 7

- Maximum tune up tolerance

Frequency Range (㎒)	Output Average Power to Antenna (dB m)	Final Antenna Gain (dB i)	Power Density at 20 ㎝ (㎽/㎠)	Limits (㎽/㎠)
2 500 ~ 2 570	25.5	-0.95	0.056 719	1

LTE - Band 26

- Maximum tune up tolerance

Frequency Range (㎒)	Output Average Power to Antenna (dB m)	Final Antenna Gain (dB i)	Power Density at 20 ㎝ (㎽/㎠)	Limits (㎽/㎠)
814 ~ 824	25.5	-2.91	0.036 119	0.54
824 ~ 849	25.5	-1.81	0.046 530	0.55

Note;

- The power density Pd (5th column) at a distance of 20 ㎝ calculated from the friis transmission formula is far below the limit of 1 ㎽/㎠.
- This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.
- This equipment should be installed and operated with minimum 20 ㎝ between the radiator and your body.
- The antenna gain of this transmitter is less than 6 dBi and must not be collocated 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.

WLAN: the ratio is 0.017 488 / 1
WWAN: the ratio is 0.244 191/ 0.55

Confirm the sum result of individual MPEs ratio is ≤ 1.0;
WLAN + WWAN: (0.017 488 / 1) + (0.244 191 / 0.55)
= 0.461 472 ≤ 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 -