

TEST REPORT

of

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

FCC ID: BEJTLHOBDNN0B

Equipment Under Test : Car Telematics Device
Model Name : TLHOBDNN0B2
Variant Model Name(s) : Refer to the page 3
Applicant : LG Electronics USA
Manufacturer : LG Electronics Inc.
Date of Receipt : 2021.06.03
Date of Test(s) : 2021.06.04 ~ 2021.08.03
Date of Issue : 2021.08.04

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

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Tested by:



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Report Number: F690501-RF-RTL002424

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1. General Information

1.1. Testing 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

Kind of Product	Car Telematics Device
Model Name	TLHOBDDNN0B2
Variant Model Name	TLHOBDDNN0B1
Power Supply	DC 13.2 V
Frequency Range	WCDMA II : 1 850 MHz ~ 1 910 MHz WCDMA V : 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 12: 699 MHz ~ 716 MHz WLAN 2.4G (11b/g/n_HT20, HT40/ac_VHT20, VHT40): 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
Modulation Technique	DSSS, OFDM, QPSK, 16QAM
Antenna Type	Planar Inverted F Antenna
Antenna Gain*	2 400 MHz ~ 2 483.5 MHz: 2.52 dBi (WLAN 2.4 G) 5 150 MHz ~ 5 250 MHz: 2.49 dBi (WLAN 5 G) 5 725 MHz ~ 5 850 MHz: 2.74 dBi (WLAN 5 G) 699 MHz ~ 716 MHz: -2.85 dBi (LTE Band 12) 824 MHz ~ 849 MHz: 0.32 dBi (WCDMA 5, LTE Band 5) 1 710 MHz ~ 1 755 MHz: 2.86 dBi (LTE Band 4) 1 850 MHz ~ 1 910 MHz: 2.83 dBi (WCDMA 2, LTE Band 2)
H/W Version	Rev.C1
S/W Version	V3.6_20210526

1.5. Information of Variant Model

Model Name		Description
Basic Model	TLHOBDDNN0B2	D-Class AMP condition
Variant Model	TLHOBDDNN0B1	Same RF module and circuit to basic model, Except below - Buffer AMP condition - De-populated to BUB (Backup battery) part

1.6. Test Report Revision

Revision	Report Number	Date of Issue	Description
0	F690501-RF-RTL002424	2021.08.04	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 ²)	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
<u>300-1 500</u>	-	-	<u>f/1500</u>	<u>30</u>
<u>1 500-100 000</u>	-	-	<u>1.0</u>	<u>30</u>

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/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

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

P_d the limit of MPE, 1 mW/cm². 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. 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 ²)	Limits (mW/cm ²)
2 400 ~ 2 483.5	17.0	2.52	0.017 813	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 ²)	Limits (mW/cm ²)
5 150 ~ 5 250	12.0	2.49	0.005 594	1
5 725 ~ 5 850	12.0	2.74	0.005 926	1

WCDMA 2

- 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 ²)	Limits (mW/cm ²)
1 850 ~ 1 910	24.0	2.83	0.095 880	1

WCDMA 5

- 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 ²)	Limits (mW/cm ²)
824 ~ 849	24.0	0.32	0.053 794	0.55

LTE Band 2

- 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 ²)	Limits (mW/cm ²)
1 850 ~ 1 910	24.0	2.83	0.095 880	1

LTE Band 4

- 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 ²)	Limits (mW/cm ²)
1 710 ~ 1 755	24.0	2.86	0.096 545	1

LTE Band 5

- 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 ²)	Limits (mW/cm ²)
824 ~ 849	24.0	0.32	0.053 794	0.55

LTE Band 12

- 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 ²)	Limits (mW/cm ²)
699 ~ 716	24.0	-2.85	0.025 926	0.47

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/cm².
- 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 0.017 813 / 1

WWAN: the ratio is 0.053 794 / 0.55

Confirm the sum result of individual MPEs ratio is ≤ 1.0 ;

WLAN + WWAN: $(0.017\ 813 / 1) + (0.053\ 794 / 0.55) = 0.115\ 620 \leq 1.0$

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

- End of the Test Report -