EMF TEST REPORT

Test Report No. : **OT-235-RWD-014**

Reception No. : **2305001325**

Applicant : **LG Electronics USA, Inc.**

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

Manufacturer : **LG Electronics Inc.**

Address : **222 LG-ro, Jinwi-Myeon, Pyeongtaek -Si, Gyeonggi-Do, 451-713, Korea**

Type of Equipment : **Car Navigation**

FCC ID. : **BEJ-MIB3OIVR-E01**

Model Name : **MIB3 OI VR-E**

Multiple Model Name : **N/A**

Serial number : **N/A**

Total page of Report : **11 pages (including this page)**

Date of Incoming : **May 03, 2023**

Date of issue : **May 23, 2023**

SUMMARY

The equipment complies with the regulation; ***FCC CFR 47 §2.1093***

This test report only contains the result of a single test of the sample supplied for the examination.

It is not a generally valid assessment of the features of the respective products of the mass-production.

This report is not correlated with the "KS Q ISO/IEC 17025 and KOLAS accreditation" of Korean Laboratory Accreditation Scheme.

Tested by	Reviewed by	Approved by
Myeong-Hwa, Jang / Sr. Engineer	Tae-Ho, Kim / Chief Engineer	Jae-Ho, Lee / Chief Engineer
ONETECH Corp.	ONETECH Corp.	ONETECH Corp.

ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)

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ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)

Revision History

Rev. No.	Issue Report No.	Issued Date	Revisions	Section Affected
0	OT-22N-RWD-066	November 21, 2022	Initial Release	All
1	OT-235-RWD-014	May 23, 2023	Data has been changed.	All

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1. VERIFICATION OF COMPLIANCE

Applicant : LG Electronics USA, Inc.

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

Contact Person : Sung Soo, Kim / Director, Regulatory and Environmental Affairs

Telephone No. : +201-266-2215

FCC ID : BEJ-MIB3OIVR-E01

Model Name : MIB3 OI VR-E

Brand Name : LG, VOLKSWAGEN, SEAT, SKODA, FORD

Serial Number : N/A

Date : May 23, 2023

E.U.T. DESCRIPTION	Car Navigation
THIS REPORT CONCERNS	Original Grant
MEASUREMENT PROCEDURES	KDB 447498 D04 Interim General RF Exposure Guidance v01
TYPE OF EQUIPMENT TESTED	Pre-Production
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	Certification
Modifications on the Equipment to Achieve Compliance	None

-. The above equipment was tested by ONETECH Corp. for compliance with the requirement set forth in the FCC Rules and Regulations. This said equipment in the configuration described in this report, shows the maximum emission levels emanating from equipment are within the compliance requirements.

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2. GENERAL INFORMATION

2.1 Product Description

The LG Electronics USA, Inc., Model MIB3 OI VR-E (referred to as the EUT in this report) is a Car Navigation. The product specification described herein was obtained from product data sheet or user's manual.

DEVICE TYPE	Car Navigation	
OPERATING FREQUENCY	Bluetooth	2 402 MHz ~ 2 480 MHz
	WLAN 2.4 GHz	2 412 MHz ~ 2 462 MHz (802.11b/g/n(HT20))
	WLAN 5 150 MHz ~ 5 250 MHz Band	5 180 MHz ~ 5 240 MHz (802.11a/n(HT20))
		5 190 MHz ~ 5 230 MHz (802.11n(HT40))
		5 210 MHz (802.11ac(VHT80))
	WLAN 5 725 MHz ~ 5 850 MHz Band	5 745 MHz ~ 5 825 MHz (802.11a/n(HT20))
		5 755 MHz ~ 5 795 MHz (802.11n(HT40))
		5 775 MHz (802.11ac(VHT80))
MODULATION TYPE	Bluetooth	GFSK for 1Mbps, π/4-DQPSK for 2Mbps, 8-DPSK for 3Mbps
	WLAN 2.4 GHz	802.11b: DSSS Modulation (DBPSK/DQPSK/CCK) 802.11g/n(HT20): OFDM Modulation (BPSK/QPSK/16QAM/64QAM)
	WLAN 5 GHz	802.11a/n(HT20)/n(HT40)/ac(VHT80): OFDM Modulation(BPSK/QPSK/16QAM/64QAM)

RF OUTPUT POWER	Bluetooth	1 Mbps	2.46 dBm
		2 Mbps	1.66 dBm
		3 Mbps	1.89 dBm
	WLAN 2.4 GHz	9.13 dBm(802.11b) 9.30 dBm(802.11g) 9.52 dBm(802.11n_HT20)	
	WLAN 5 150 MHz ~ 5 250 MHz Band	Antenna 0	9.05 dBm(802.11a) 9.07 dBm(802.11n_HT20) 9.05 dBm(802.11n_HT40) 9.20 dBm(802.11ac_VHT80)
		Antenna 1	9.10 dBm(802.11a) 9.10 dBm(802.11n_HT20) 8.93 dBm(802.11n_HT40) 8.84 dBm(802.11ac_VHT80)
		Multiple Antenna	12.09 dBm(802.11a) 12.10 dBm(802.11n_HT20) 12.00 dBm(802.11n_HT40) 12.03 dBm(802.11ac_VHT80)
	WLAN 5 725 MHz ~ 5 850 MHz Band	Antenna 0	12.80 dBm(802.11a) 12.82 dBm(802.11n_HT20) 12.82 dBm(802.11n_HT40) 12.42 dBm(802.11ac_VHT80)
		Antenna 1	11.52 dBm(802.11a) 11.56 dBm(802.11n_HT20) 11.68 dBm(802.11n_HT40) 11.31 dBm(802.11ac_VHT80)
		Multiple Antenna	15.22 dBm(802.11a) 15.25 dBm(802.11n_HT20) 15.30 dBm(802.11n_HT40) 15.26 dBm(802.11ac_VHT80)

ANTENNA TYPE	Bluetooth	PCB Antenna	
	WLAN 2.4 GHz	Chip Antenna	
	WLAN 5 GHz	Antenna 0	Chip Antenna
		Antenna 1	PCB Antenna
ANTENNA GAIN	Bluetooth	1.39 dBi	
	WLAN 2.4 GHz	4.64 dBi	
	5 150 MHz ~ 5 250 MHz Band	Antenna 0	3.19 dBi
		Antenna 1	4.62 dBi
		Multiple Antenna	6.97 dBi
	5 725 MHz ~ 5 850 MHz Band	Antenna 0	2.29 dBi
		Antenna 1	7.30 dBi
		Multiple Antenna	8.49 dBi
List of each Osc. or crystal Freq.(Freq. >= 1 MHz)		19.2 MHz, 20 MHz, 25 MHz, 26 MHz, 40 MHz, 55.466 67 MHz	

2.2 Alternative type(s)/model(s); also covered by this test report.

-. None

3. EUT MODIFICATIONS

-. None

4. RF EXPOSURE EVALUATION

4.1 RF Exposure Calculation

CFR Title 47 §2.1093(b) (b) For purposes of this section, a portable device is defined as a transmitting device designed to be used so that the radiating structure(s) of the device is/are within 20 centimeters of the body of the user.

FCC KDB 447498 Derives: According with FCC KDB 447498 D04, Appendix B, The SAR-based exemption formula applies for single fixed, mobile, and portable RF sources with available maximum time-averaged power or effective radiated power (ERP), whichever is greater, of less than or equal to the threshold Pth (mW). This method shall only be used at separation distances from 0.5 cm to 40 cm and at frequencies from 0.3 GHz to 6 GHz (inclusive). The following table shows the power threshold from 5mm to 50mm.

Power Thresholds (mW)					
Frequency (MHz)	At separation distance of ≤5 mm	At separation distance of 10 mm	At separation distance of 15 mm	At separation distance of 20 mm	At separation distance of 25 mm
300	39 mW	65 mW	88 mW	110 mW	129 mW
450	22 mW	44 mW	67 mW	89 mW	112 mW
835	9 mW	25 mW	44 mW	66 mW	90 mW
1900	3 mW	12 mW	26 mW	44 mW	66 mW
2450	3 mW	10 mW	22 mW	38 mW	59 mW
3600	2 mW	8 mW	18 mW	32 mW	49 mW
5800	1 mW	6 mW	14 mW	25 mW	40 mW
Frequency (MHz)	At separation distance of 30 mm	At separation distance of 35 mm	At separation distance of 40 mm	At separation distance of 45 mm	At separation distance of 50 mm
300	148 mW	166 mW	184 mW	201 mW	217 mW
450	135 mW	158 mW	180 mW	203 mW	226 mW
835	116 mW	145 mW	175 mW	207 mW	240 mW
1900	92 mW	122 mW	157 mW	195 mW	236 mW
2450	83 mW	111 mW	143 mW	179 mW	219 mW
3600	71 mW	96 mW	125 mW	158 mW	195 mW
5800	58 mW	80 mW	106 mW	136 mW	169 mW

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Note:

1. Maximum power is the source-based time-average power and represents the maximum RF output power including tune-up tolerance among production units

2. Per KDB 447498 D04, for larger devices, the test separation distance of adjacent edge configuration is determined by the closest separation between the antenna and the user.

3. Per KDB 447498 D04, standalone SAR test exclusion threshold is applied

4. Per KDB 447498 D04, for separation distances from 0.5 cm to 40 cm and at frequencies from 0.3 GHz to 6 GHz (inclusive), the threshold Pth (mW) is given by Following:

$$P_{\text{th}}\ (\text{mW}) = \begin{cases} ERP_{20\ \text{cm}}(d/20\ \text{cm})^{x} & d \le 20\ \text{cm} \\ ERP_{20\ \text{cm}} & 20\ \text{cm} < d \le 40\ \text{cm} \end{cases}$$

Where

$$x = -\log_{10}\left(\frac{60}{ERP_{20\ \text{cm}}\sqrt{f}}\right)$$

a. f(GHz) is the RF channel transmit frequency in GHz

b. d is the separation distance (cm), The result is rounded to one decimal place for comparison

c. $ERP20cm$ are determined by:

$$P_{\text{th}}\ (\text{mW}) = ERP_{20\ \text{cm}}\ (\text{mW}) = \begin{cases} 2040f & 0.3\ \text{GHz} \le f < 1.5\ \text{GHz} \\ 3060 & 1.5\ \text{GHz} \le f \le 6\ \text{GHz} \end{cases}$$

FCC KDB 447498 Derives: According with FCC KDB 447498 D04, Appendix C,

SAR-based or MPE-based exemption may be considered for test exemption for fixed, mobile, or portable device exposure conditions; therefore, the contributions from each exemption in conjunction with the measured SAR (Evaluatedk term) shall be used to determine exemption for simultaneous transmission according to Formula

$$\sum_{i=1}^{a}\frac{P_i}{P_{\text{th},i}} + \sum_{j=1}^{b}\frac{ERP_j}{ERP_{\text{th},j}} + \sum_{k=1}^{c}\frac{Evaluated_k}{Exposure\ Limit_k} \le 1$$

4.2 EUT Description

Kind of EUT	Car Navigation
Device Category	■ Portable (< 20 cm separation) ☐ Mobile (> 20 cm separation) ☐ Others
Exposure Evaluation Applied	☐ MPE ■ SAR ☐ N/A

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4.3 Test Result

4.3.1 Test data for WLAN_Antenna 0

Frequency (MHz)	distance (mm)	Conducted Power (dBm)	Conducted Power (mW)	Antenna Gain (dBi)	ERP (dBm)	ERP (mW)	Threshold Value(mW)
2462	40	9.52	8.95	4.64	12.01	**15.89**	143.03
5210		9.2	8.32	3.19	10.24	**10.57**	110.07
5745		12.82	19.14	2.29	12.96	**19.77**	106.37

Note : According KDB 447498 D04, used the greater of maximum conducted power and ERP to compare with the threshold value

4.3.2 Test data for WLAN_Antenna 1

Frequency (MHz)	distance (mm)	Conducted Power (dBm)	Conducted Power (mW)	Antenna Gain (dBi)	ERP (dBm)	ERP (mW)	Threshold Value(mW)
5240	40	9.1	8.13	4.62	11.57	**14.35**	109.85
5755		11.68	14.72	7.30	16.83	**48.19**	106.31

Note : According KDB 447498 D04, used the greater of maximum conducted power and ERP to compare with the threshold value

4.3.3 Test data for Bluetooth_Antenna 1

Frequency (MHz)	distance (mm)	Conducted Power (dBm)	Conducted Power (mW)	Antenna Gain (dBi)	ERP (dBm)	ERP (mW)	Threshold Value(mW)
2441	40	2.46	**1.76**	1.39	1.7	1.48	143.46
2402		1.66	**1.47**	1.39	0.9	1.23	144.27
2402		1.89	**1.55**	1.39	1.13	1.30	144.27

Note : According KDB 447498 D04, used the greater of maximum conducted power and ERP to compare with the threshold value

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4.3.4 Test data for WLAN_Antenna 0+1

Simultaneous Transmission	Frequency (MHz)	Conducted Power or ERP (mW)	Calculated SAR	Limit
WLAN 5 G (Antenna 0) + WLAN 5 G (Antenna 1)	5 210	10.57	0.227	≤ 1
	5 240	14.35		
WLAN 5 G (Antenna 0) + WLAN 5 G (Antenna 1)	5 745	19.77	0.640	
	5 755	48.19		

Note : According KDB 447498 D04, used the greater of maximum conducted power and ERP to compare with the threshold value

4.3.5 Test data for Intermodulation Transmit

Simultaneous Transmission	Frequency (MHz)	Conducted Power or ERP (mW)	Calculated SAR	Limit
WLAN 2 G (Antenna 0) + Bluetooth (Antenna 1)	2 462	15.89	0.124	≤ 1
	2 441	1.76		
WLAN 5 G (Antenna 0) + Bluetooth (Antenna 1)	5 745	19.77	0.199	
	2 441	1.76		
WLAN 2 G (Antenna 0) + WLAN 5 G (Antenna 1)	2 462	15.89	0.565	
	5 755	48.19		

Note : According KDB 447498 D04, used the greater of maximum conducted power and ERP to compare with the threshold value