EMF TEST REPORT

Test Report No.	**: OT-21O-RWD-001**
Reception No.	**: 2109004307**
Applicant	**: LG Electronics USA**
Address	**: 111 Sylvan Avenue North Building, Englewood Cliffs, New Jersey, United States**
Manufacturer	**: LG Electronics Inc.**
Address	**: 222, LG-ro, Jinwi-myeon, Pyeongtaek-si, Gyeonggi-do 17709, Rep of Korea**
Type of Equipment	**: Bluetooth Adapter Card**
FCC ID.	**: BEJ-MB8811QD**
Model Name	**: MB8811QD**
Serial number	**: N/A**
Total page of Report	**: 7 pages (including this page)**
Date of Incoming	**: September 27, 2021**
Date of issue	**: October 07, 2021**

SUMMARY

The equipment complies with the regulation; ***FCC PART 15 SUBPART C Section 15.247***

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.

Tested by	Reviewed by	Approved by
/ Ha-Ram Lee / Manager	Tae-Ho, Kim / Senior Manager	Ki-Hong, Nam / General Manager
ONETECH Corp.	ONETECH Corp.	ONETECH Corp.

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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)

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Revision History

Rev. No.	Issue Report No.	Issued Date	Revisions	Section Affected
0	OT-21O-RWD-001	October 07, 2021	Initial Release	All

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1. VERIFICATION OF COMPLIANCE

Applicant : LG Electronics USA

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

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

Telephone No. : 201-266-2215

FCC ID : BEJ-MB8811QD

Model Name : MB8811QD

Brand Name : LG

Serial Number : N/A

Date : October 07, 2021

EQUIPMENT CLASS	DSS – PART 15 SPREAD SPECTRUM TRANSMITTER
E.U.T. DESCRIPTION	Bluetooth Adapter Card
THIS REPORT CONCERNS	Original Grant
MEASUREMENT PROCEDURES	ANSI C63.10: 2020
TYPE OF EQUIPMENT TESTED	Pre-Production
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	Certification
EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S)	FCC PART 15 SUBPART C Section 15.247 KDB 558074 D01 15.247 Meas Guidance v05r02
Modifications on the Equipment to Achieve Compliance	None
Final Test was Conducted On	3 m, Semi Anechoic Chamber

-. 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, Model MB8811QD (referred to as the EUT in this report) is a Bluetooth Adapter Card. The product specification described herein was obtained from product data sheet or user's manual.

Device Type	Bluetooth Adapter Card	
Operating Frequency	2 402 MHz ~ 2 480 MHz	
RF Output Power	Bluetooth	7.46 dBm
	Bluetooth LE	7.49 dBm
Number of Channel	Bluetooth	79 Channels
	Bluetooth LE	40 Channels
Modulation Type	Bluetooth	GFSK for 1 Mbps, π/4-DQPSK for 2 Mbps, 8-DPSK for 3 Mbps
	Bluetooth LE	GFSK
Antenna Type	PCB Antenna	
Antenna Gain	1.19 dBi	
Rated Supply Voltage	DC 3.3 V	
List of each Osc. or crystal Freq.(Freq. >= 1 MHz)	26 MHz	

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

-. None

3. EUT MODIFICATIONS

-. None

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4. MAXIMUM PERMISSIBLE EXPOSURE

4.1 RF Exposure Calculation

According to the FCC rule 1.1310 table 1B, the limit for the maximum permissible RF exposure for an uncontrolled environment are f/1500 mW/cm² for the frequency range between 300 MHz and 1 500 MHz and 1.0 mW/cm² for the frequency range between 1 500 MHz and 100 000 MHz.

The electric field generated for a 1 mW/cm² exposure is calculated as follows:

$E = \sqrt{(30 * P * G)} / d$, and $S = E^2 / Z = E^2 / 377$, because 1 mW/cm² = 10 W/m²

Where

S = Power density in mW/cm², Z = Impedance of free space, 377 Ω

E = Electric filed strength in V/m, G = Numeric antenna gain, and d = distance in meter

Combing equations and rearranging the terms to express the distance as a function of the remaining variable

$d = \sqrt{(30 * P * G) / (377 * 10 S)}$

Changing to units of mW and cm, using P (mW) = P (W) / 1 000, d (cm) = 0.01 * d (m)

$d = 0.282 * \sqrt{(P * G) / S}$

Where

d = distance in cm, P = Power in mW, G = Numeric antenna gain, and S = Power density in mW/cm²

4.2 EUT Description

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

4.3 Calculated MPE Safe Distance

4.3.1 Bluetooth

According to above equation, the following result was obtained.

Operating Freq. Band (MHz)	Operating Mode	Target Power W/tolerance (dBm)	Max tune up power		Antenna Gain		Safe Distance (cm)	Power Density (mW/cm²) @ 20 cm Separation	Limit (mW/cm²)
			(dBm)	(mW)	Log	Linear			
2 402 ~ 2 480	1 Mbps	7.46 ± 1.0	8.46	7.01	1.19	1.315	0.86	0.001 8	1.00
	2 Mbps	6.27 ± 1.0	7.27	5.33			0.75	0.001 4	1.00
	3 Mbps	6.65 ± 1.0	7.65	5.82			0.78	0.001 5	1.00

According to above table, for 2 402 ~ 2480 MHz Band(1 Mbps), safe distance,

$D = 0.282 * \sqrt{(7.01 * 1.315)/1.00} = 0.86$ cm.

For getting power density at 20 cm separation in above table, following formula was used.

$S = P * G / (4\pi * R^2) = 7.01 * 1.315 / (4 * \pi * 20\text{^}2) = 0.001\ 8$

Where:

S = Power Density,

P = Power input to the external antenna (Output power from the EUT antenna port (dBm) – cable loss (dB)),

G = Gain of Transmit Antenna (linear gain), R = Distance from Transmitting Antenna

4.3.2 Bluetooth LE

According to above equation, the following result was obtained.

Operating Freq. Band (MHz)	Operating Mode	Target Power W/tolerance (dBm)	Max tune up power		Antenna Gain		Safe Distance (cm)	Power Density (mW/cm²) @ 20 cm Separation	Limit (mW/cm²)
			(dBm)	(mW)	Log	Linear			
2 402 ~ 2 480	1 Mbps	7.49 ± 1.0	8.49	7.06	1.19	1.315	0.86	0.001 8	1.00

According to above table, for 2 402 ~ 2480 MHz Band(1 Mbps), safe distance,

$D = 0.282 * \sqrt{(7.06 * 1.315)/1.00} = 0.86$ cm.

For getting power density at 20 cm separation in above table, following formula was used.

$S = P * G / (4\pi * R^2) = 7.06 * 1.315 / (4 * \pi * 20\text{^}2) = 0.001\ 8$

Where:

S = Power Density,

P = Power input to the external antenna (Output power from the EUT antenna port (dBm) – cable loss (dB)),

G = Gain of Transmit Antenna (linear gain), R = Distance from Transmitting Antenna

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