



FCC ID: VPYLB1ZM  
Report No.: T201215W01-MF

Ref. No.: T200915W04-MF

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**KDB 447498 D03**  
**47 C.F.R. Part 1, Subpart I, Section 1.1310**  
**47 C.F.R. Part 2, Subpart J, Section 2.1091**

## **RF EXPOSURE REPORT**

**For**

**Communication Module**

**Model: LBEE5QD1ZM**

**Trade Name: muRata**

Issued to

**Murata Manufacturing Co., Ltd.**  
**1-10-1, Higashikotari, Nagaokakyo-shi, Kyoto 617-8555 Japan**

Issued by

**Compliance Certification Services Inc.**  
**Wugu Laboratory**  
**No.11, Wugong 6th Rd., Wugu Dist.,**  
**New Taipei City, Taiwan. (R.O.C.)**  
**Issue Date: January 7, 2021**

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Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

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## Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	December 11, 2020	Initial Issue	ALL	Mita Wu
01	January 7, 2021	See the following Note Rev.(01)	ALL	Allison Chen

**Note:**
**Rev.(01)**

1. This test report is an addendum to the original test report T200915W04-MF, the EUTs represent the original and this test report are assessed as identical in hardware and software, measurement results in the original report are fully leveraged in this test report without further verification test.



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## 1. TEST RESULT CERTIFICATION

### We hereby certify that:

The above equipment was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10: 2013 and the energy emitted by the sample EUT tested as described in this report is in compliance with the requirements of FCC Rules Part 15.207, 15.209, 15.247.

The test results of this report relate only to the tested sample EUT identified in this report.

APPLICABLE STANDARDS	
STANDARD	TEST RESULT
KDB 447498 D03 47 C.F.R. Part 1, Subpart I, Section 1.1310 47 C.F.R. Part 2, Subpart J, Section 2.1091	No non-compliance noted
Statements of Conformity	
Determination of compliance is based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.	

Approved by:




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Kevin Tsai  
Deputy Manager  
Compliance Certification Services Inc.

## **2. LIMIT**

According to §15.247(i), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines. See § 1.1307(b)(1) of this chapter.

### 3. EUT SPECIFICATION

<b>EUT</b>	Communication Module
<b>Model</b>	LBEE5QD1ZM
<b>Model Discrepancy</b>	N/A
<b>Received Date</b>	September 15, 2020
<b>Frequency band (Operating)</b>	<input checked="" type="checkbox"/> Bluetooth: 2402MHz-2480MHz <input checked="" type="checkbox"/> 802.11b/g/n HT20 / ac20: 2412MHz ~ 2462 MHz <input type="checkbox"/> 802.11n HT40 / ac40: 2422MHz ~ 2452MHz <input checked="" type="checkbox"/> 802.11a/n HT20 / ac20: 5180MHz ~ 5240MHz / 5260 ~ 5320MHz 5500 ~ 5700MHz / 5745MHz ~ 5825MHz <input checked="" type="checkbox"/> 802.11n HT40 / ac40: 5190MHz ~ 5230MHz / 5270 ~ 5310MHZ 5510 ~ 5670MHz / 5755MHz ~ 5795MHz <input checked="" type="checkbox"/> 802.11ac VHT80: 5210MHz / 5290MHz / 5530 MHz~5610MHz / 5775MHz <input type="checkbox"/> Others
<b>Device category</b>	<input type="checkbox"/> Portable (<20cm separation) <input checked="" type="checkbox"/> Mobile (>20cm separation) <input type="checkbox"/> Others
<b>Exposure classification</b>	<input type="checkbox"/> Occupational/Controlled exposure ( $S = 5\text{mW/cm}^2$ ) <input checked="" type="checkbox"/> General Population/Uncontrolled exposure ( $S=1\text{mW/cm}^2$ )
<b>Antenna Specification</b>	BT & WIFI 2.4GHz: 3.6 dBi WIFI 5GHz: 4.75 dBi  <div style="display: flex;"> <div style="flex: 1;">BT:</div> <div style="flex: 2;">Directional Gain : 3.60 dBi   (Numeric gain: 2.29) Worst</div> </div> <div style="display: flex;"> <div style="flex: 1;">2.4GHz:</div> <div style="flex: 2;">Directional Gain : 3.60 dBi   (Numeric gain: 2.29) Worst</div> </div> <div style="display: flex;"> <div style="flex: 1;">5GHz:</div> <div style="flex: 2;">Directional Gain : 4.75 dBi   (Numeric gain: 2.99) Worst</div> </div>

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Maximum Measurement Average Power	BT	5.26 dBm	(3.357 mW)
	2.4GHz		
	IEEE 802.11b Mode:	18.56 dBm	(71.779 mW)
	IEEE 802.11g Mode:	18.76 dBm	(75.162 mW)
	IEEE 802.11n HT 20 Mode:	17.89 dBm	(61.518 mW)
	5GHz		
	IEEE 802.11a Mode:	21.71 dBm	(148.252 mW)
	IEEE 802.11n HT 20 Mode:	20.73 dBm	(118.304 mW)
	IEEE 802.11n HT 40 Mode:	20.74 dBm	(118.577 mW)
	IEEE 802.11ac VHT 80 Mode:	20.40 dBm	(109.648 mW)
Maximum tune up power	BT	5.26 dBm	(3.357 mW)
	2.4GHz		
	IEEE 802.11b Mode:	18.56 dBm	(71.779 mW)
	IEEE 802.11g Mode:	18.76 dBm	(75.162 mW)
	IEEE 802.11n HT 20 Mode:	17.89 dBm	(61.518 mW)
	5GHz		
	IEEE 802.11a Mode:	21.71 dBm	(148.252 mW)
	IEEE 802.11n HT 20 Mode:	20.73 dBm	(118.304 mW)
	IEEE 802.11n HT 40 Mode:	20.74 dBm	(118.577 mW)
	IEEE 802.11ac VHT 80 Mode:	20.40 dBm	(109.648 mW)
Evaluation applied	<input checked="" type="checkbox"/> MPE Evaluation* <input type="checkbox"/> SAR Evaluation <input type="checkbox"/> N/A		
Received Date	December 15, 2020		

**Remark:**

- For more details, refer to the User's manual of the EUT.
- Disclaimer: Antenna information is provided by the applicant, test results of this report are applicable to the sample EUT received.
- The tune up power referred the AVG power of the test report T201215W01-RP1, T201215W01-RP2, T201215W01-RP3, T201215W01-RP4 for RF Exposure assessment purpose.

## 4. TEST RESULTS

**No non-compliance noted.**

### Calculation

Given  $E = \frac{\sqrt{30 \times P \times G}}{d}$  &  $S = \frac{E^2}{377}$

Where E = Field strength in Volts / meter

P = Power in Watts

G = Numeric antenna gain

d = Distance in meters

S = Power density in milliwatts / square centimeter

Combining equations and re-arranging the terms to express the distance as a function of the remaining variables yields:

$$S = \frac{30 \times P \times G}{377 d^2}$$

Changing to units of mW and cm, using:

P (mW) = P (W) / 1000 and

d (cm) = d(m) / 100

Yields

$$S = \frac{30 \times (P/1000) \times G}{377 \times (d/100)^2} = 0.0796 \times \frac{P \times G}{d^2} \text{Equation 1}$$

Where d = Distance in cm

P = Power in mW

G = Numeric antenna gain

S = Power density in mW / cm<sup>2</sup>



## 5. MAXIMUM PERMISSIBLE EXPOSURE

Substituting the MPE safe distance using  $d = 20$  cm into Equation 1:

$$S = 0.000199 \times P \times G$$

Where  $P$  = Power in mW

$G$  = Numeric antenna gain

$S$  = Power density in mW / cm<sup>2</sup>

**BT:**

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm <sup>2</sup>	Limit (mW/cm2)
39	2480	3.357	2.29	20	0.0015	1

**IEEE 802.11b mode:**

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm <sup>2</sup>	Limit (mW/cm2)
11	2462	71.779	2.29	20	0.0327	1

**IEEE 802.11g mode:**

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm <sup>2</sup>	Limit (mW/cm2)
6	2437	75.162	2.29	20	0.0343	1

**IEEE 802.11n HT20 mode:**

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm <sup>2</sup>	Limit (mW/cm2)
6	2437	61.518	2.29	20	0.0280	1

**IEEE 802.11a mode:**

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm <sup>2</sup>	Limit (mW/cm2)
140	5700	148.252	2.99	20	0.0882	1

**IEEE 802.11n HT20 mode:**

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm <sup>2</sup>	Limit (mW/cm2)
116	5580	118.304	2.99	20	0.0704	1

**IEEE 802.11n HT40 mode:**

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm <sup>2</sup>	Limit (mW/cm2)
46	5230	118.577	2.99	20	0.0706	1

**IEEE 802.11ac VHT80 mode:**

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm <sup>2</sup>	Limit (mW/cm2)
138	5690	109.648	2.99	20	0.0652	1

## 6. SIMULTANEOUS TRANSMISSION SAR ANALYSIS

Both of the WiFi 5GHz and Bluetooth can transmit simultaneously, the formula of calculated the MPE is:

$$\text{CPD1} / \text{LPD1} + \text{CPD2} / \text{LPD2} + \dots \text{etc.} < 1$$

CPD = Calculation power density

LPD = Limit of power density

### WiFi 5GHz + Bluetooth

Therefore, the worst-case situation is  $0.0882 / 1 + 0.0015 / 1 = 0.0897$ , which is less than "1".

**--End of Report--**